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1795 Montreal Road

Development Servicing and Stormwater Management Report

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1795 MONTREAL ROAD

DEVELOPMENT SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared by:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Kanata, Ontario
K2M 1P6

March 9, 2018

Ref: R-2017-179
Novatech File No. 116151

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Engineers, Planners & Landscape Architects

March 9, 2018

City of Ottawa
Planning and Growth Management Department
Infrastructure Approvals Division
110 Laurier Avenue West, 4th Floor
Ottawa, Ontario
K1P 1J1

Attention: Mr. William Curry

Dear Sir:

Re: Development Servicing and Stormwater Management Report
1795 Montreal Road
Ottawa, Ontario
Our File No.: 116151

Enclosed herein is the 'Development Servicing and Stormwater Management Report' for the proposed development located at 1795 Montreal Road, in the City of Ottawa. This report addresses the approach to site servicing and stormwater management for the subject property and is submitted in support of the site plan approval application.

Should you have any questions or require additional information, please contact the undersigned.

Yours truly,

NOVATECH

M Savic

Miroslav Savic, P. Eng.
Project Manager

MS/sm

cc: Simon Frigon (cdrg+RedTeam)
Samantha Schneider (Christopher Simmonds Architect Inc.)

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

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1.0 INTRODUCTION

The proposed development consists of a two-storey office building and a one-storey multi-purpose accessory building with paved parking lot and a single access driveway to Montreal Road. Novatech has been retained to complete the site servicing, grading and stormwater management design for this project.

1.1 Purpose

This report outlines the servicing aspects of the proposed development with respect to water, sanitary and storm drainage and addresses the approach to stormwater management. This report is being submitted in support of the site plan application for the subject property.

1.2 Location and Site Description

The site is located at 1795 Montreal Road in the City of Ottawa. The subject site is bordered to the north and east by residential dwellings, to the west by Monfort Renaissance facility, and to the south by Montreal Road. The subject site, shown in **Figure 1.1**, is currently undeveloped.

Figure 1.1: **Aerial Plan** provides an aerial view of the site.

1.3 Consultation and Reference Material

A pre-consultation meeting was held with the City of Ottawa in August 2017 at which time the owner was advised of the general submission requirements. Further discussions were held with the City of Ottawa regarding the approach to stormwater management for the site. Rideau Valley Conservation Authority (RVCA) was also consulted regarding the proposed development of this site. Refer to **Appendix A** for a summary of the e-mail correspondence with the City of Ottawa, and RVCA.

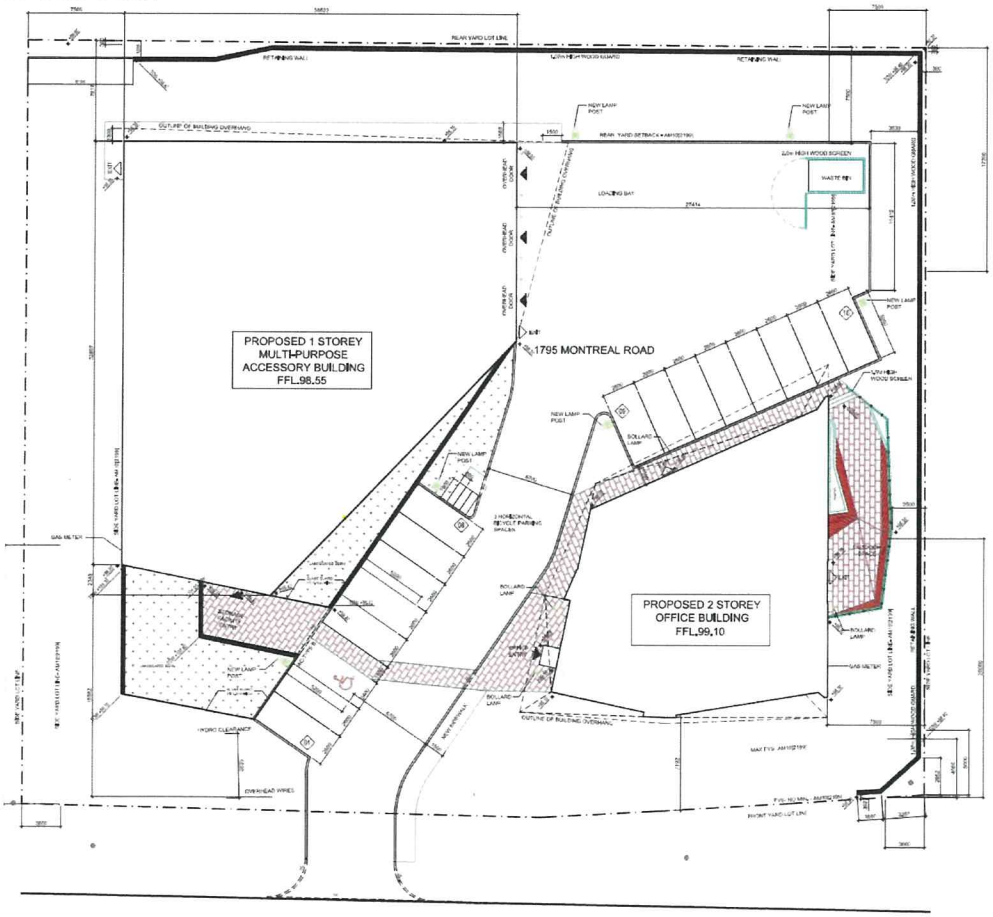
Reference Material:

- Geotechnical Investigation Proposed Commercial Building 1795 Montreal Road, prepared by Houle Chevrier Engineering, dated September 6, 2017.
- 1777 Montreal Road Ottawa Withdrawal Management Centre, Septic System Design Brief prepared by Novatech Engineering Consultants Ltd., dated January 2010.

2.0 PROPOSED DEVELOPMENT

The proposed development consists of a two-storey office building and a one-storey multi-purpose accessory building with a paved parking lot and associated landscaped areas. The site will have a single right-in right-out access to Montreal Road. Refer to **Figure 2.1** for the proposed site plan.

Figure 2.1: Site Plan



3.0 SITE SERVICING

The objective of the site servicing design is to conform to the requirements of the City of Ottawa servicing design guidelines by providing a suitable domestic water supply, proper sewage outlets and ensuring that appropriate fire protection is provided.

The servicing criteria, expected sewage flows and water demands for the site have been established using the City of Ottawa municipal design guidelines for sewer and water distribution. The City of Ottawa Servicing Study Guidelines for Development Applications require a Development Servicing Study Checklist to confirm that each applicable item is deemed complete and ready for review by City of Ottawa Infrastructure Approvals. A completed checklist is enclosed in **Appendix B** at the back of this report.

3.1 Water

The proposed development will be serviced by a 250mm dia. watermain connecting to the existing 300mm dia. watermain in Montreal Road. Each building will have a 150mm diameter water service.

The proposed buildings will be sprinklered. The fire protection will be provided from a private hydrant located within 45m along an unobstructed path from the fire department siamese connections.

The theoretical water demand for the proposed development, calculated as per the Ottawa Design Guidelines – Water Distribution, is summarized in **Table 3.1**. Detailed calculations are shown in **Appendix C**.

Table 3.1: Water Demand

Average Day Demand	Maximum Day Demand	Peak Hour Demand
0.01 L/s	0.02 L/s	0.04 L/s

The Fire Underwriter's Survey (FUS) was used to estimate fire flow demands for the proposed buildings. The calculated fire flow demands for the proposed office and storage buildings are 83 L/s (5,000 L/min) and 100 L/s (6,000 L/min) respectively. Refer to **Appendix C** for detailed calculations.

The hydraulic model EPANET was used for the purpose of analyzing the performance of the proposed watermain for two theoretical conditions: 1) Maximum Day + Fire Flow Demand and 2) Peak Hour Demand. The model is based on hydraulic boundary conditions provided by the City of Ottawa. Refer to **Appendix C** for email correspondence with the City of Ottawa.

The model indicates that the minimum watermain pressure under the Maximum Day + Fire Flow Demand will be 141.0 kPa (20.4 psi). The minimum watermain pressure under the Peak Hour Demand will be 466.0 kPa (66.8 psi). Refer to **Appendix C** for detailed calculations.

Based on the preceding analysis it can be concluded that the existing 300mm watermain in Montreal Road can provide adequate water supply to the proposed development.

3.2 Sanitary Sewer

There is no municipal sanitary sewer in Montreal Road in front of the property. There is an existing 250mm diameter municipal sanitary sewer in Rothwell Avenue located northeast from the site. In order to service the proposed development, it is proposed to extend the 250mm diameter Rothwell Avenue sewer approximately 48m to the west and construct approximately 92m of private 200mm diameter sanitary sewer from the site and connect to the Rothwell Drive sewer. Since the development property does not front Rothwell Avenue, a portion of the new 200mm diameter sanitary sewer will have to be constructed in side and rear yards of the adjacent residential properties (41 Cedar Road and 45 Cedar Road). A 6m wide sewer easement is being proposed where the sanitary sewer crosses the adjacent private properties. In addition, the proposed 200mm diameter sanitary sewer will be extended to the west along the north property line to provide service to the Monfort Renaissance facility located at 1777 Montreal Road.

The calculated peak sanitary flow from the site, calculated as per the City of Ottawa Sewer Design Guidelines, including infiltration, is 0.14 L/s. Refer to **Appendix C** for detailed calculations.

The peak sanitary flow from the Monfort Renaissance facility, including infiltration, is calculated to be 0.26 L/s. The flow is based on previously approved *"1777 Montreal Road Ottawa Withdrawal Management Centre, Septic System Design Brief prepared by Novatech Engineering Consultants Ltd."* Detailed calculations and an excerpt from *Septic System Design Brief* are enclosed in **Appendix C**.

The proposed 200 mm dia. private sanitary sewer will be a gravity pipe at a minimum slope of 4.0% with a full flow conveyance capacity of at least 68.4 L/s. The proposed 250mm diameter sanitary sewer extension in Rothwell Avenue at a minimum slope of 1.0% slope has a full flow capacity of approximately 62.0 L/s. Therefore, the proposed sanitary sewer system has sufficient capacity to convey anticipated sanitary flows (0.40 L/s) generated from the proposed development and the existing Montfort Renaissance facility.

The existing 250mm sanitary sewer in Rothwell Avenue at a minimum slope of 0.24% has a full flow capacity of 30.4 L/s. The additional flow of 0.40 L/s to the Rothwell Avenue sewer can be considered negligible and will not negatively affect the level of service provided by the existing sewer.

3.3 Stormwater Management

The 0.415 ha site is currently wooded and overlain with grasses. The majority of the existing overland stormwater runoff is conveyed from the site to the adjacent residential properties to the north and east. A portion of the stormwater runoff for the adjacent Monfort Renaissance site (1777 Montreal Road) currently drains towards the subject site.

The stormwater management design for the proposed development will include on-site water quantity control prior to releasing flows from the site. The proposed development will be serviced by connecting a new private storm sewer to the existing 250mm diameter storm sewer in Montreal Road.

Stormwater management will be provided by rooftop storage, surface storage within the paved parking and landscaped areas as well as by underground storage pipes. Further details on the drainage sub catchment areas captured within the on-site storm sewer systems are explained in subsequent sections of the report. See the Stormwater Management Plan (116151-SWM) included in **Appendix G**, for catchment locations, areas, and runoff coefficients.

3.3.1 Stormwater Management Objectives

The proposed stormwater management design is based on the latest City of Ottawa Sewer Design Guidelines and is as follows:

- Provide a dual drainage system (i.e. minor and major system flows).
- Maximize the use of surface storage available on site.
- Control 1:100 year post-development flow from the site to the maximum 1:5 year allowable release rate as specified by the City of Ottawa. Post-development runoff in excess of the allowable release rate will be stored and controlled on site prior to being released into the municipal storm sewer system in Montreal Road.
- Ensure that no surface ponding will occur on the paved surfaces (i.e. drive aisle and parking lot) during the 2-year storm event.
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

3.3.2 Storm Drainage Areas

The proposed site has been subdivided into three distinct storm drainage areas for the post-development condition. The size and location of the sub-catchment areas is based on the proposed grading design for the site. The runoff coefficients for each sub-catchment area were calculated for the proposed conditions and the catchment areas are shown on the Stormwater Management Plan (116151-SWM). A brief description of the sub-catchment areas are as follows:

- Runoff from the small landscaped areas along the northern and eastern property lines (Area A-1) will continue to drain uncontrolled towards the adjacent properties.
- Runoff from the proposed paved driveway, parking lot, loading area, the storage building roof, and landscaped areas (Area A-2) will be controlled and stored on the surface of the parking lot and landscaped areas, and in an underground storage pipe.
- The office rooftop area (Area R-1) will be controlled through the use of three (3) control flow roof drains. The controlled rooftop flows will be conveyed internally to the building storm service. The building service will be connected to the on-site storm sewer system downstream of the controlled flow site areas.

Runoff from the upstream Monfort Renaissance site (1777 Montreal Road) which currently sheet drains over the subject site (Area A-3) will be collected by the proposed on-site storm system and conveyed to the Montreal Road storm sewer. This runoff will be controlled and stored on the surface of the parking lot and landscaped area, and in an underground storage pipe.

3.3.3 Allowable Release Rate

The allowable release rate for the 0.415 ha site was calculated using the Rational Method to be 16.2 L/s. This release rate was based on an existing runoff coefficient of C=0.2 and a 1:5 year rainfall intensity of 70.25 mm/hr, based on City of Ottawa IDF Curves using a time of concentration (t_c) of 20 minutes.

Similarly, the allowable release rate for the upstream Monfort Renaissance site area, that currently sheet drains over the subject site, was calculated using the Rational Method to be 8.1 L/s. This release rate was based on an existing runoff coefficient of C=0.32 and a 1:5 year rainfall intensity of 70.25 mm/hr, based on City of Ottawa IDF Curves using a time of concentration (tc) of 20 minutes.

Refer to **Appendix A** for correspondence from the City of Ottawa and to **Appendix D** for Rational Method calculations.

3.3.4 Post-Development Conditions

Under post-development conditions, the imperviousness of the site will increase. In order to mitigate the stormwater related impacts due to the proposed development, post-development flows will have to be controlled and stored on site prior to the runoff entering the existing municipal storm sewer in Montreal Road. Refer to **Appendix D** for uncontrolled runoff calculations for the sub catchments areas for the site.

Area A-1 – Direct Runoff

The post-development runoff from sub-catchment Area A-1 was calculated using the Rational Method to be 0.3 L/s and 0.7 L/s for the 1:5 year and 1:100 year design events respectively. Refer to **Appendix D** for Rational Method tables and calculations.

Areas A-2 and A-3 – Paved Parking Lot, Storage Building Rooftop, Landscaped Areas and Adjacent Upstream Site Area

The post-development flows from sub-catchment Areas A-2 and A-3 will be attenuated by the use of an orifice plug type ICD installed within the outlet pipe of proposed STM MH 2. Stormwater runoff from this drainage area will be temporarily stored on the surface of the parking lot and landscaped areas, and in an underground storage pipe prior to being discharged into the municipal storm sewer system.

The Modified Rational Method was used to determine the storage volume required for this catchment area. Refer to **Appendix D** for detailed tables and calculations.

Table 3.3.1 summarizes the post-development design flows, the type of ICD, and storage volumes required and storage volume provided for both the 1:5 year and the 1:100 year design events.

Table 3.3.1: Areas A-2 and A-3 Design Flow and ICD Information

Design Event	Post-Development Flow			
	ICD Type	Design Flow (L/s)	Storage Volume Required (m^3)	Volume Provided (m^3)
1:5 Year	83mm Orifice Plug	17.8 L/s	40.2 m^3	104.7 m^3
1:100 Year	83mm Orifice Plug	21.0 L/s	100.1 m^3	104.7 m^3

Area R-1 – Office Building Rooftop Area

The post-development flow from Area R-1 will be attenuated by the use of controlled flow roof drains. A total of three (3) adjustable flow control roof drains will control the flow from the proposed building to 2.2 L/s/ for the 1:5 year design event and 2.6 L/s for the 1:100 year design event.

The controlled release rate, ponding depth, required and maximum storage volumes for both the 1:5 year and 1:100 year design events are summarized in the following table.

Table 3.3.2: Area R-1 Controlled Flow Building Roof Drains

Roof Drain ID &	Controlled Flow (L/s)		Ponding Depth (m)		Storage Vol. Required (m^3)		Max. Storage Available (m^3)
	1:5 Year	1:100 Year	1:5 Year	1:100 Year	1:5 Year	1:100 Year	
RD 1	0.79	0.87	0.10	0.13	2.4	5.8	6.8
RD 2	0.71	0.87	0.08	0.13	1.7	4.1	7.0
RD 3	0.71	0.87	0.08	0.13	2.0	4.7	7.0
Total Roof	**2.2**	**2.6**	**-**	**-**	**6.1**	**14.6**	**20.8**

Refer to **Appendix D** for Modified Rational Method calculations and **Appendix E** for Watts adjustable flow control roof drain information.

Summary of Post-Development Flows

Table 3.3.3: Post-Development Stormwater Flow Table

Area	Post-Development Flow (L/s)		Storage Required (m^3)		Provided (m^3)
	5 year	100 year	5 year	100 year	
A-1	0.3	0.7	N/A	N/A	N/A
A-2 and A-3	17.8	21.0	40.2	100.1	104.7
R-1	2.2	2.6	4.9	14.6	27.1
Total Flow	**20.2**	**24.3**			

As shown in **Table 3.3.3** the total post-development flow from the sub-catchment areas will be released from the proposed development at a combined maximum rate of 24.3 L/s during the 1:100 year design event and 20.2 L/s during the 1:5 year design event; both of which are less than or equal to the allowable flow for the site.

3.3.5 Stormwater Quality Control

The subject site is located within the jurisdiction of the Rideau Valley Conservation Authority (RVCA) and is in the Greens Creek tributary area. An 'Enhanced' Level of Protection, equivalent

to a long-term average removal of 80% of total suspended solids (TSS), with at least 90% of the total rainfall being captured and treated, is required.

In order to achieve this level of quality control protection, a new oil-grit separator unit (CDS Model PMSU 20_15_5m) will be installed downstream of STM MH 2 on the proposed 250mm diameter storm sewer outlet pipe from the site. Stormwater runoff collected by the on-site storm sewer system (0.54 ha tributary area from the entire site) will be directed through the proposed treatment unit. The contributing area includes the proposed paved parking areas, loading area, the building roofs as well as the upstream Monfort Renaissance site area.

As stated above, the proposed oil-grit separator has been sized to provide an Enhanced Level of water quality treatment prior to discharging the stormwater towards the municipal storm sewer in Montreal Road. Echelon Environmental and Contech Stormwater Solutions Inc. have modeled and analyzed the tributary area to provide a CDS unit capable of meeting the TSS removal requirements. The model parameters for the TSS removal were based on historical rainfall data for Ottawa from the Ontario Climate Centre. It was determined that a CDS Model PMSU 20_15_5m will exceed the target removal rate, providing a net annual 84.9% TSS removal. The CDS unit has a a sediment storage capacity of 1.668m^3; an oil storage capacity of 313 L and will treat a net annual volume of approximately 98.7% for the tributary area.

Maintenance and Monitoring of Storm Sewer and SWM Systems

It is recommended that the client implements a maintenance and monitoring program for both the on-site storm sewer and the stormwater management systems: The storm drainage system should be inspected routinely (at least annually); the plug type ICD unit should be inspected to ensure they are fitted securely and free of debris; and the oil-grit separator should be inspected at regular intervals and maintained when necessary to ensure optimum performance. Refer to **Appendix F** for the CDS unit operation, design, performance and maintenance summary parameters as well as the annual TSS removal efficiency data.

4.0 SITE GRADING

The intent of the grading design was to propose the building finished floor elevations to best tie into the elevations along the existing adjacent roadway and surrounding property line, and to provide mayor overland flow route towards Montreal Road R.O.W. The proposed grading design provides positive drainage away from the building and towards the on-site stormwater drainage structures. Due to substantial grade difference between front and back of the property, a large retaining wall is required along the northern and eastern property lines in order to direct major overland flow towards the Montreal Road R.O.W. Refer to the enclosed Grading and Erosion & Sediment Control Plan (116151-GR) for details.

4.1 Major System Overland Flow Route

In the case of a major rainfall event exceeding the design storms provided for, the stormwater located within the paved parking and landscaped areas will pond to a maximum depth of 0.25 m before overflowing to a lower sub-catchment drainage area and will ultimately overflow towards Montreal Road. The minimum building elevations have been set at least 0.30 m above the maximum on-site ponding elevations for protection from flooding.

The major system overland flow route is shown on the enclosed Grading and Erosion& Sediment Control Plan (116151-GR) and the Stormwater Management Plan (116151-SWM).

4.2 Erosion and Sediment Control

Erosion and sediment control measures will be implemented during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987). Details are provided on the Grading and Erosion & Sediment Control Plan (116151-GR).

- All erosion and sediment control measures are to be installed to the satisfaction of the engineer, the municipality and the conservation authority prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and remain present during all phases of site preparation and construction.
- A qualified inspector should conduct daily visits during construction to ensure that the contractor is working in accord with the design drawings and that mitigation measures are being implemented as specified.
    - A light duty silt fence is to be installed as per OPSS 577 and OPSD 219.110 along the surrounding construction limits.
    - Filter cloth is to be placed under the grates of all proposed and existing catchbasins and catchbasin manhole drainage structures.
    - Street sweeping and cleaning will be performed, as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site.
    - After complete build-out, all sewers are to be inspected and cleaned and all sediment and construction fencing is to be removed.
- The contractor shall immediately report to the engineer or inspector any accidental discharges of sediment material into any ditch or sewer system. Appropriate response measures shall be carried out by the contractor without delay.

The proposed temporary erosion and sediment control measures will be implemented prior to construction and will remain in place during all phases of construction.

5.0 GEOTECHNICAL INVESTIGATIONS

A Geotechnical Investigation Report has been prepared for the proposed site. Refer to the Houle Chevrier Geotechnical Investigation (64504.01) dated September 6, 2017 for the existing subsurface conditions, construction recommendations and geotechnical inspection requirements for the proposed development.

6.0 SUMMARY AND CONCLUSIONS

This report has been prepared in support of the site plan application for the proposed development located at 1795 Montreal Road, in the City of Ottawa.

The conclusions are as follows:

- The proposed development will be serviced by connecting to the existing municipal storm sewer system and the existing municipal watermain in Montreal Road and to the existing municipal sanitary sewer system in Rothwell Avenue.

- The proposed buildings will be sprinklered. Fire protection will be provided from a private fire hydrant located within a 45m unobstructed path from the proposed siamese connections.
- Stormwater runoff will consist of a combination of uncontrolled direct runoff and controlled stormwater flow from the site. On-site stormwater quantity control will be achieved by the use of an inlet control devices located within the on-site storm sewer system.
- The total post-development flow from the site will be controlled to a maximum of 24.3 L/s during the 1:100 year design event and over controlled to 20.2 L/s during the 1:5 year design event. Neither flows exceed the maximum allowable release rate of 24.3 L/s as calculated to meet the municipal stormwater quantity requirements.
- No surface ponding will occur on the paved surfaces (i.e. private drive aisles or parking lots) during the 2-year storm event.
- On-site stormwater quality treatment will be provided by the installation of an oil-grit separator (CDS Model PMSU 20_15_5m). The treatment unit will provide 84.9% TSS removal and will treat 98.7% of the total annual runoff, thus exceeding the MVCA requirements.
- Regular inspection and maintenance of the storm sewer system, including the inlet control device (ICD) and the CDS treatment unit, is recommended to ensure that the storm drainage system is kept clean and operational.
- Temporary erosion and sediment controls are to be provided during construction.

Servicing assessments discussed in the preceding sections show that there are no major obstacles to servicing the proposed development. It is recommended that the proposed site servicing and stormwater management design be approved for implementation.

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Prepared by:

Miroslav Savic, P. Eng.
Senior Project Manager | Land Development

Reviewed by:

Lee Sheets, C.E.T.
Director | Land Development & Public Sector Infrastructure

APPENDIX A

Correspondence

Miro Savic

From: Boughton, Michael <Michael.Boughton@ottawa.ca>
Sent: Wednesday, August 09, 2017 8:09 AM
To: Murray Chown; Ryan Poulton
Cc: Yousfani, Asad; Young, Mark; Richardson, Mark; Lebrun, Julie (Planning); Curry, William
Subject: RE: Pre-application Consultation Meeting - 1730 Montreal Road
Attachments: Submission Requirments, ZBA, 1795 Montreal Road, 08 Aug 17 .pdf; Submission Requirements, SPA, 1795 Montreal Road, 08 Aug 17 .pdf

Good morning Murray, Ryan,

In follow up to last Thursday's meeting, I have summarized for you below City staff's understanding of the proposed site development along with a few comments and a list of the submission requirements for your client's site plan control and zoning amendment applications should he choose to proceed.

PROPOSAL SUMMARY:

To briefly summarize the proposed development, it is to construct a two-storey office building for a property restoration business, and a separate one-storey warehouse building on the 0.4183-ha. site. The office building would be positioned as close to Montreal Road as possible, while respecting the required separation distance from the existing above-ground hydro power line. The warehouse building would be sited toward the rear of the property. A single vehicular access is proposed from Montreal Road providing access to a surface parking area and a loading area for the warehouse use behind the office building. The servicing solution contemplates a connection over the abutting northern residential property to the existing services in Cedar Road. The proponent has already engaged in discussions with the affected residential property owner(s).

The proposed zoning amendment would respect the planned AM10 zone for this stretch of Montreal Road, but would also propose a set of site-specific zone provisions to better suit the proposed built form. The specific zone provisions would be identified later as the preliminary site plan design evolves; the planning rationale would describe the proposed zoning provisions.

STAFF COMMENTS:

In response to the proposal, City staff expressed general support for the development. It was noted that the subject site occupies a high point of land along Montreal Road and that the grades drop considerably toward the neighbouring residences along Cedar Road. Careful attention to the building placement along the rear of the property is required. Strong and convincing arguments would be needed to support the merits of a warehouse use within an Arterial Mainstreet land use designation; the design of the site, the extent of the warehouse use, and the building's architecture will no doubt factor considerably in City staff's recommendation.

Given that the Montreal Road Arterial Mainstreet is a designated design priority area in the City's Official Plan, the proposed development through site plan control approval would need to be presented to the City's Design Review Panel if the total development is greater than 1,858 square metres (20,000 square feet) of gross floor area. There was some discussion that the proposed development may be reduced slightly in GFA in order to be exempt from the Design Review Panel.

As for the servicing of the site, City staff are aware of the proposal to extend sanitary services over the abutting residential property to connect into the Cedar Road sewer. Staff do not have a specific concern with this proposed servicing solution provided the servicing report demonstrates that there is sufficient capacity in the existing receiving

piped system, and that the abutting affected residents are in agreement with the plan and the need to enter into joint use and maintenance agreement for the resulting private service. A servicing easement(s) also would be required.

Finally, it was identified that the protected road right-of-way width for Montreal Road as an arterial roadway is 37.5 metres. The road width currently measures around 30 metres. Therefore, a road widening of approximately 3.5 metres taken across the frontage of the property normally would be a requirement. However, due to the presence of the hydro power lines, the extent of the actual required road widening to be taken can be discussed and decided upon prior to the formal submission the site plan control application. In any event, it is expected that the entire front yard of the development site and the public road boulevard adjacent to Montreal Road, from building face to curb face, is to be of a high landscape design standard. This will be determined during site plan review.

The following list of reports and submission materials focus on the above and other matters necessary for staff and circulated agencies to provide informed review and comment on the proposed site plan control approval and zoning by-law amendment applications.

REQUIRED PLANS AND REPORTS – SITE PLAN CONTROL:

Attached is a list of the submission requirements for your action. It lists the reports and plans that are required in order to deem the site plan control application complete. In addition to the list, I have included a few points of clarification below:

- Planning Rationale – Include well reasoned arguments in support of the proposed zoning amendment to specifically address the requested warehouse use and the site-specific performance standards.
- Transportation Impact Study – The TIS should focus on the type of intersection (full vs. right in/right out) and the type of control (signals vs. stop controlled). Also, any auxiliary lane(s) that may be required, regardless of whether the intersection under consideration is signals vs. stop-controlled.
- Site Servicing Study and the Stormwater Management Report – May be combined in one report. Also, note that prior to submitting the servicing report, the consultant should contact Will Curry and request boundary conditions for the water main design. The consultant will need to provide the type of development, fire flow required, average day demand, maximum day demand and maximum hour demand as well as a location plan showing the proposed connections to the public system through the abutting residential properties.
- Noise Study – The study should document the analysis of the traffic noise generated from the adjacent arterial road on the proposed office use and the stationary noise generated from any proposed HVAC systems on the existing (residential) and proposed sensitive land uses.
- Tree Conservation Report – A TCR must be supplied for review; an approved TCR is a requirement of Site Plan Approval. The following comments are provided:

1. Any removal of privately-owned trees 10cm or larger in diameter require a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR.
2. In this case, the TCR may be combined with the Landscape Plan.
3. The TCR must list all trees on or off site (residential properties) by species, diameter and health condition; if only a small portion of a property is being impacted, the TCR only needs to cover the area that may be impacted by the development. Note that the TCR must address all trees with a critical root zone that extends into the developable area.
4. If trees are to be removed, the TCR must clearly show where they are and document the reason they can not be retained.
5. All retained trees must also be shown and all retained trees within the area impacted by the development process must be protected as per the City guidelines listed on Ottawa.ca.
6. Trees with a trunk that crosses/touches a property line are considered co-owned by both property owners; permission from the adjoining property owner must be obtained prior to the removal of co-owned trees.

7. the City does encourage the retention of healthy trees wherever possible; there are large trees at the rear of this lot that should be protected.
8. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca
9. The removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR.

- Coloured Building Elevations – In addition to the three sets of building elevations, I would like one set of coloured elevations or a set of coloured building perspectives.
- Site Cross-section – The cross-section should be to 1:1 ratio (vertical and horizontal) and be taken north-south from Montreal Road through the proposed warehouse building and rear yard (retaining wall?) through the Cedar Road rear yard and dwelling. Ensure the cross-section shows the proposed building height in section.
- Site and Landscape Plans – As you are aware, recent changes to regulations governing natural gas lines now require Enbridge Gas as the local natural gas service provider to install above-ground blow-off valve assemblies on site in very conspicuous places. These installations are eye sores on the urban environment and their placement often undermines planning staff's urban design objectives for the public road frontage or on-site open spaces. Therefore, please ensure that you engage Enbridge Gas early in the design process and factor into your site and landscape designs where the blow-off valve assembly is to be installed. Preferably, it should be screened in a discrete fashion.
- Phase 1 Environmental Site Assessment – Prepared in accordance with Ontario Regulation 153/04.
- CD in .pdf format of all plans and reports – 1 copy

The following link directs you to a guide for the preparation of the various required reports and plans identified above and in the attachment. All reports and plans are expected to follow these guidelines.

Guide for Preparation of Reports and Plans: http://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2-3

ZONING AMENDMENT SUBMISSION REQUIREMENTS:

I have provided another list of additional submission requirements specific to the proposed zoning amendment application. In this case, it is assumed that you would file both the zoning amendment application and site plan control applications concurrently.

APPLICATION FEES:

Site Plan Control Approval – New, Manager Approval with Public Consultation:
Planning/Legal Fee - $21,086.77 (incl. on-site sign)
Initial Engineering Design Review & Inspection Fee - $5,000 (est. value of hard and soft servicing between $50,000 and $300,000)
Conservation Authority Fee - $955
Total - $27,041.77 (incl. HST)

Zoning By-law Amendment:
Major Zoning Amendment - $16,221 (Planning Fee, incl. on-site sign)
Conservation Authority Fee - $350
Total - $16,571.00 (incl. HST)

Note: A 10% reduction in the planning/legal fee component of each application type will be applied if both applications are filed concurrently. Therefore, the total reduced Site Plan Control Application fee payment would be $24,933.09; the total reduced Zoning Amendment Application fee payment would be $14,948.90.

Link to Site Plan Control Application: http://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2-1#site-plan-control
Link to Zoning Amendment Application: http://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2-1#zoning-law-amendment

LINKS TO DESIGN GUIDELINES AND RELEVANT POLICY:

As part of Planning staff's review, we will evaluate your proposal against the relevant Official Plan policies and applicable Council-approved design guidelines. I have provided links to some of the more critical ones for your information.

Section 4 of OP: http://ottawa.ca/en/node/1009704
Section 4 of OP (OPA 150):
http://documents.ottawa.ca/sites/documents.ottawa.ca/files/documents/annotatedOP_en.pdf
Arterial Mainstreet Development Urban Design Guidelines: http://ottawa.ca/en/city-hall/planning-and-development/community-plans-and-design-guidelines/design-and-planning/completed-guidelines/urban-design-guidelines-development-along-arterial-mainstreets

OTHER MATTERS:

1. Cash-in-lieu of Parkland – The City will seek a cash-in-lieu of parkland contribution at the time of site plan control approval. The following link directs you to the City's Parkland Dedication By-law: http://ottawa.ca/en/parkland-dedication-law-no-2009-95
2. It is recommended that you contact the Ward Councillor, Tim Tierney, in advance of submitting your application to introduce yourself and your client and to briefly describe your proposal. His telephone no. is 613-580-2481.

If you have any questions with the above information don't hesitate to contact me.

Sincerely,

Michael J. Boughton, MCIP, RPP
Senior Planner | *Urbaniste principal*
Development Review | *Examen des projets d'aménagement*
Planning, Infrastructure and Economic Development Department | *Services de la planification, de l'infrastructure et du développement économique*
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 27588, fax/téléc: 613-560-6006
Michael.Boughton@ottawa.ca

Absence Alert: I will be away from the office Monday, 21 August, to Friday, 25 August 2017.

Miro Savic

From: Curry, William <William.Curry@ottawa.ca>
Sent: Tuesday, November 21, 2017 11:30 AM
To: Miro Savic
Cc: Lee Sheets
Subject: RE: 1795 Montreal Road - Major Overland Flow Route

Miro,

Pre-development should be tc = 20 minutes and post-development tc=10

Thanks

Will

From: Miro Savic [mailto:m.savic@novatech-eng.com]
Sent: Tuesday, November 21, 2017 9:13 AM
To: Curry, William <William.Curry@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1795 Montreal Road - Major Overland Flow Route

Will,

Should we to use 10 or 20 minutes Tc to calculate the allowable 5 year flow?

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265 | Fax: 613.254.5867

From: Curry, William [mailto:William.Curry@ottawa.ca]
Sent: Wednesday, November 08, 2017 3:38 PM
To: Miro Savic <m.savic@novatech-eng.com>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1795 Montreal Road - Major Overland Flow Route

Miro,

As the storm sewer was a former RMOC 1986 sewer then it is a 5 year.

Thanks

Will

From: Miro Savic [mailto:m.savic@novatech-eng.com]
Sent: Wednesday, November 08, 2017 3:21 PM
To: Curry, William <William.Curry@ottawa.ca>

Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1795 Montreal Road - Major Overland Flow Route

Will,

According to section 8.3.7.3 of the SDG, all runoff from commercial sites must be controlled to the 2-year or 5-year pre-development level depending on the design return period of the receiving sewer. Could you please confirm which design return period we should be using for connection to the existing storm sewer in Montreal Road. Please note that the pre-development flow would be calculated using the pre-development C=0.2 and Tc=10min.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265 | Fax: 613.254.5867

From: Curry, William [mailto:William.Curry@ottawa.ca]
Sent: Thursday, August 24, 2017 2:55 PM
To: Miro Savic <m.savic@novatech-eng.com>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1795 Montreal Road - Major Overland Flow Route

As per the SDG

From: Miro Savic [mailto:m.savic@novatech-eng.com]
Sent: Thursday, August 24, 2017 2:04 PM
To: Curry, William <William.Curry@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1795 Montreal Road - Major Overland Flow Route

Thank you Will.
Could you please provide stormwater management criteria for quantity control?

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265 | Fax: 613.254.5867

From: Curry, William [mailto:William.Curry@ottawa.ca]
Sent: Thursday, August 24, 2017 2:00 PM
To: Miro Savic <m.savic@novatech-eng.com>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1795 Montreal Road - Major Overland Flow Route

Miro,
As you know it is supposed to spill to the ROW. If you put Major Storm in the sanitary sewer easement and at the end it spills to the ROW that is fine.

However, it changes the JUMA and notices on Title and the easement would have to cover both the sanitary sewer and the major storm drainage in the same easement. Furthermore, via a cross section maybe of a swale to demonstrate the major flow is contained with the easement (swale) and only spills to the ROW and not adjacent properties.

Hope that helps.

Will

From: Miro Savic [mailto:m.savic@novatech-eng.com]
Sent: Thursday, August 24, 2017 1:36 PM
To: Curry, William <William.Curry@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: 1795 Montreal Road - Major Overland Flow Route

Will,

Please find attached concept grading and drainage sketch for the 1795 Montreal Road. Due to significant grade drop from the front to the back of the property, we are looking to direct major overland flow from the site towards the proposed sanitary sewer easement at the back of the property. The storm drainage from the landscaped area along the back property line will also need to be directed towards the sanitary easement. The storm drainage from the proposed building and the parking lot would be collected in the on-site storm system and connected to the existing 300mm diameter storm sewer in Montreal Road.

Could you please confirm if this is acceptable to the City and provide stormwater management criteria for the site?

Thank you,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265 | Fax: 613.254.5867

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Miro Savic

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Wednesday, December 13, 2017 10:42 AM
To: Miro Savic
Cc: Lee Sheets
Subject: RE: 1795 Montreal Road - RVCA Pre-consultation

Good Morning Miro,

We note that this site outlets to an existing municipal stormsewer, approximately 1900 metres upstream of a direct outlet to Greens Creek. No municipal facility provides quality treatment for the stromwater entering the watercourse, which under current standards requires 80% TSS Removal. Therefore we would advise the proponent that the appropriate water quality target for on-site quality treatment is 80% TSS.

From: Miro Savic [mailto:m.savic@novatech-eng.com]
Sent: Tuesday, December 05, 2017 10:47 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: 1795 Montreal Road - RVCA Pre-consultation

Hello Jamie,

We are working on a commercial development located at 1795 Montreal Road. The cdrg+RedTeam is proposing to construct a new office building and a storage facility. Refer to the attached Site Plan for details.

The storm sewer system from the site will be connected to the municipal storm sewer in Montreal Road. Stormwater management design for the site will include the stormwater quantity control as specified by the City of Ottawa. The 1:100 year post development flow will be controlled to the 1:5 pre development level. Can you please provide the stormwater quality control objectives for the site.

Regards,
Miro

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265 | Fax: 613.254.5867

APPENDIX B

Development Servicing Study Checklist

1795 MONTREAL ROAD ROAD, OTTAWA
DEVELOPMENT SERVICING STUDY CHECKLIST

4.1 General Content	Addressed (Y/N/NA)	Comments
Executive Summary (for larger reports only).	N/A	
Date and revision number of the report.	Y	
Location map and plan showing municipal address, boundary, and layout of proposed development.	Y	
Plan showing the site and location of all existing services.	Y	
Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	N	Refer to Site Plan
Summary of Pre-consultation Meetings with City and other approval agencies.	Y	
Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	N/A	
Statement of objectives and servicing criteria.	Y	
Identification of existing and proposed infrastructure available in the immediate area.	Y	
Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A	
Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighboring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	N/A	

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

4.2 Water	Addressed (Y/N/NA)	Comments
Confirm consistency with Master Servicing Study, if available.	N/A	
Availability of public infrastructure to service proposed development.	Y	
Identification of system constraints.	N/A	
Identify boundary conditions.	Y	Provided by City of Ottawa
Confirmation of adequate domestic supply and pressure.	Y	
Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Y	
Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A	
Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design.	N/A	
Address reliability requirements such as appropriate location of shut-off valves.	Y	
Check on the necessity of a pressure zone boundary modification.	N/A	
Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Y	
Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Y	
Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A	
Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Y	
Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Y	

4.3 Wastewater	Addressed (Y/N/NA)	Comments
Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed	Y	
Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A	
Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A	
Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Y	
Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	N/A	
Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	N/A	
Description of proposed sewer network including sewers, pumping stations, and forcemains.	Y	
Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A	
Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A	
Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A	
Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A	
Special considerations such as contamination, corrosive environment etc.	N/A	

4.4 Stormwater	Addressed (Y/N/NA)	Comments
Description of drainage outlets and downstream constraints including legality of outlet (i.e. municipal drain, right-of-way, watercourse, or private property).	Y	
Analysis of the available capacity in existing public infrastructure.	N/A	The allowable flow was provided by the City of Ottawa.
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns and proposed drainage patterns.	Y	
Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Y	
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Y	
Description of stormwater management concept with facility locations and descriptions with references and supporting information.	Y	
Set-back from private sewage disposal systems.	N/A	
Watercourse and hazard lands setbacks.	N/A	
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N	
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A	
Storage requirements (complete with calcs) and conveyance capacity for 5 yr and 100 yr events.	Y	
Identification of watercourse within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A	
Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Y	
Any proposed diversion of drainage catchment areas from one outlet to another.	N/A	
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and SWM	Y	
If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A	

4.4 Stormwater	Addressed (Y/N/NA)	Comments
Identification of municipal drains and related approval requirements.	N/A	
Description of how the conveyance and storage capacity will be achieved for the development.	Y	
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Y	
Inclusion of hydraulic analysis including HGL elevations.	N/A	
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Y	
Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A	
Identification of fill constrains related to floodplain and geotechnical investigation.	N/A	

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

4.6 Conclusion	Addressed (Y/N/NA)	Comments
Clearly stated conclusions and recommendations.	Y	
Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	Y	T.B.D.
All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario.	Y	

APPENDIX C

Sanitary Sewer, Watermain and Fire Flow Calculations

Miro Savic

From: Curry, William <William.Curry@ottawa.ca>
Sent: Thursday, November 23, 2017 11:59 AM
To: Miro Savic
Subject: Boundary conditions-1795 Montreal Road
Attachments: 1795 Montreal November 2017.pdf

The following are boundary conditions, HGL, for hydraulic analysis at 1795 Montreal (zone MONT) assumed to be connected to the 305 mm on Montreal (see attached PDF for location).

Minimum HGL = 146.0 m

Maximum HGL = 146.8 m

Max Day + Fire Flow = 113.6 m

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

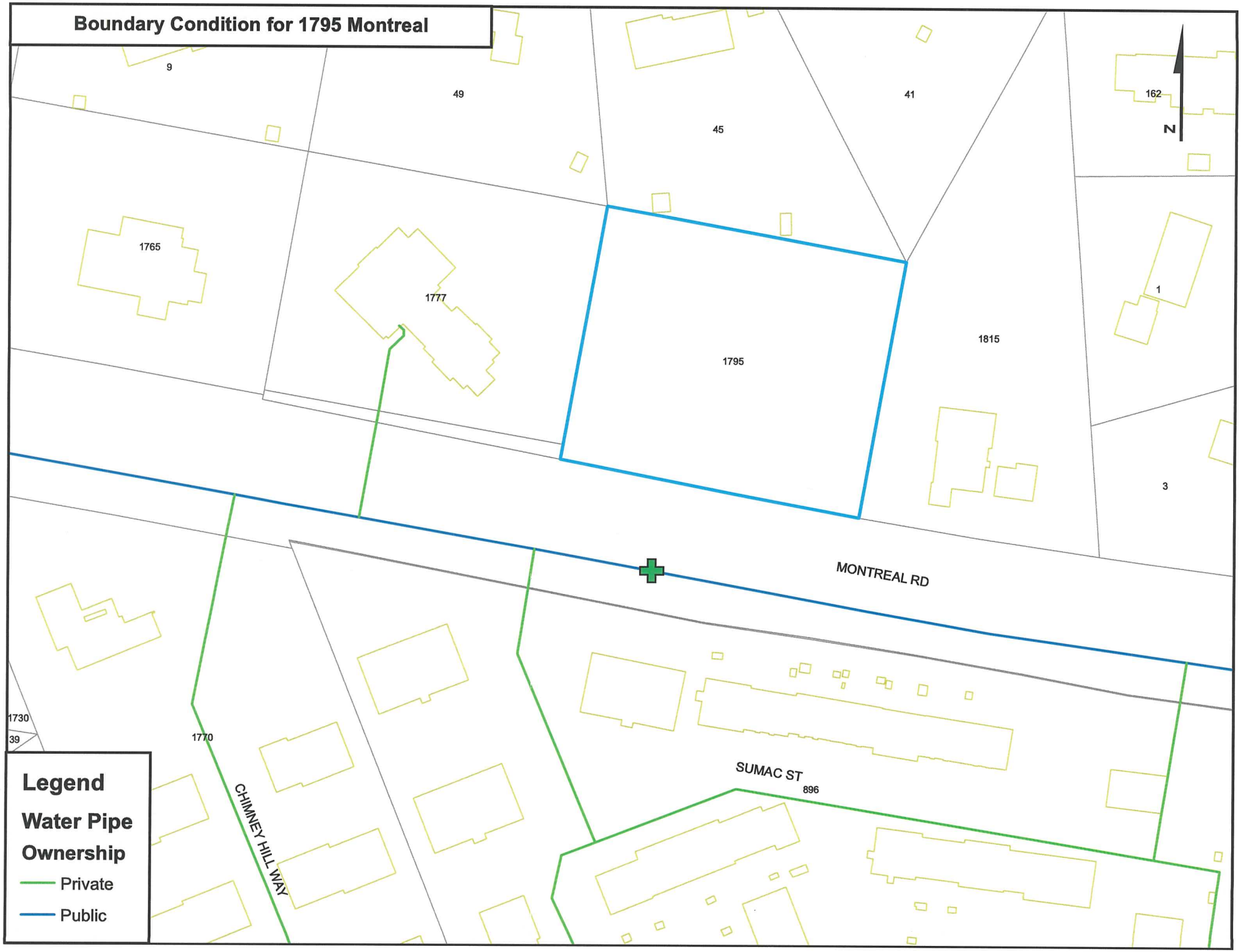
Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation 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.

Will Curry, C.E.T.

William.Curry@Ottawa.ca

Planning, Infrastructure and Economic Development Department
Project Manager - Infrastructure Approvals
Development Review - East Branch
110 Laurier Ave., 4th Floor East;
Ottawa ON K1P 1J1
Mail Code 01-14

City of Ottawa
613.580.2424 ext.16214
William.Curry@Ottawa.ca


Boundary Condition for 1795 Montreal
9
49
45
41
162
N
1765
1777
1795
1815
1
3
MONTREAL RD
1730
39
1770
CHIMNEY HILL WAY
SUMAC ST
896
Legend
Water Pipe
Ownership
Private
Public

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 116151
Project Name: 1795 Montreal Road
Date: 7-Nov-17
Input By: Miroslav Savic
Reviewed By: -

Legend: Input by User; No Information or Input Required

Building Description: Office Building
Ordinary construction

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame		1.5	1	
		Ordinary construction	Yes	1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)				
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**695**	
	F	**Base fire flow without reductions**				**6,000**
		$F = 220\ C\ (A)^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	0%	**6,000**
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	***-2,400***
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	No	-10%		
				Cumulative Total	**-40%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	> 45.1m		0%	**1,500**
		East Side	20.1 - 30 m		10%	
		South Side	> 45.1m		0%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**25%**	
	(1) + (2) + (3)	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	***5,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**83**
				or	USGPM	1,321
		Required Duration of Fire Flow (hours)			Hours	1.75
		Required Volume of Fire Flow (m^3)			m^3	525

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech #: 116151
Project Name: 1795 Montreal Road
Date: 7-Nov-17
Input By: Miroslav Savic
Reviewed By: -

Legend: Input by User; No Information or Input Required

Building Description: Storage Facility
Ordinary construction

Step			Choose	Multiplier Options	Value Used	Total Fire Flow (L/min)
	Required Fire Flow					
1	**Construction Material**					
	Coefficient related to type of construction C	Wood frame		1.5	1	
		Ordinary construction	Yes	1		
		Non-combustible construction		0.8		
		Fire resistive construction (< 3 hrs)		0.7		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)				
		Number of Floors/Storeys	1			
		Area of structure considered (m^2)			**901**	
	F	**Base fire flow without reductions**				**7,000**
		F = 220 C (A)$^{0.5}$				
	Reductions or Surcharges					
3	**Occupancy hazard reduction or surcharge**					
	(1)	Non-combustible		-25%	0%	**7,000**
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**					
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	***-2,800***
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	No	-10%		
				Cumulative Total	**-40%**	
5	***Exposure surcharge (cumulative (%))***					
	(3)	North Side	> 45.1m		0%	**1,750**
		East Side	10.1 - 20 m		15%	
		South Side	> 45.1m		0%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**25%**	
	(1) + (2) + (3)	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	***6,000***
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**100**
				or	USGPM	1,585
		Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	720

1795 MONTREAL RAOD
SANITARY FLOW

Number of Employees	16	
Daily Volume	75	L/perosns/day
Average Sanitary Flow	0.01	L/s
Peak Factor	1.5	
Peak Sanitary Flow	**0.02**	**L/s**
Site Area	0.415	ha
Infiltration Allowance	0.28	L/s/ha
Peak Extraneous Flows	**0.12**	**L/s**
Total Peak Sanitary Flow	**0.14**	**L/s**

Notes:
1. Number of Emloyees provided by the owner
2. Daily Voume as per Appedix 4-A of City of Ottawa Sewer Design Guidelins

1777 MONTREAL RAOD
SANITARY FLOW

Average Daily Flow	8,300	L/day
Average Sanitary Flow	0.10	L/s
Peak Factor	1.5	
Peak Sanitary Flow	**0.14**	**L/s**
Site Area	0.409	ha
Infiltration Allowance	0.28	L/s/ha
Peak Extraneous Flows	**0.11**	**L/s**
Total Peak Sanitary Flow	**0.26**	**L/s**

Notes:
1. Average Daily Flow as per *Septic System Design Brief*, prepared by Novatech Engineering Consultants Ltd., dated January 2010

1795 MONTREAL ROAD
WATER DEMAND

Number of Employees	16	
Average Water Demand	75	L/persons/day
Average Water Demand	0.01	L/s
Maximum Day Demand (1.5 x avg. day)	0.02	L/s
Peak Hour Demand (1.8 x max. day)	0.04	L/s

1795 MONTREAL ROAD

Maximum Day + Fire Flow Demand

Network Table - Nodes

Node ID	Elevation m	Demand LPS	Head m	Pressure m	kPa	psi
Junc J1	97.4	0	113.42	16.02	157.2	22.8
Junc J2	97.4	100	112.04	14.64	143.6	20.8
Junc J3	97.1	0	113.42	16.32	160.1	23.2
Junc J4	99.05	0.02	113.42	14.37	141.0	20.4
Junc J5	98.5	0.02	113.42	14.92	146.4	21.2
Resvr R1	113.6	-100.04	113.6	0	0.0	0.0

Network Table - Links

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Unit Headloss m/km
Pipe P1	24.8	300	120	100.04	1.42	7.46
Pipe P2	4.5	150	100	100	5.66	305.7
Pipe P3	2.5	150	100	0.04	0	0
Pipe P4	55.5	150	100	0.02	0	0
Pipe P5	33.5	150	100	0.02	0	0

Peak Hour Demand

Network Table - Nodes

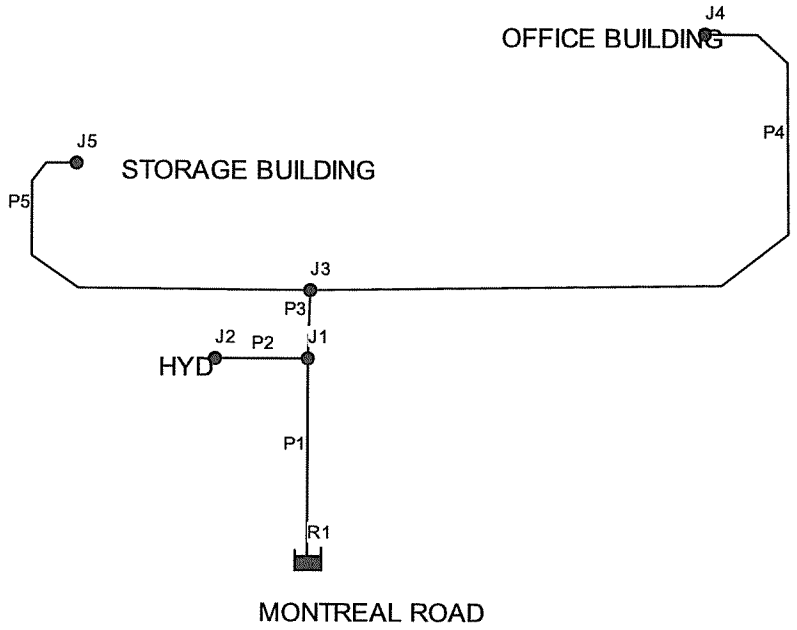
Node ID	Elevation m	Demand LPS	Head m	Pressure m	kPa	psi
Junc J1	97.4	0	146	48.6	476.8	69.1
Junc J2	97.4	0	146	48.6	476.8	69.1
Junc J3	97.1	0	146	48.9	479.7	69.6
Junc J4	99.05	0.04	146	46.95	460.6	66.8
Junc J5	98.5	0.04	146	47.5	466.0	67.6
Resvr R1	146	-0.08	146	0	0.0	0.0

Network Table - Links

Network Table - Links

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Unit Headloss m/km
Pipe P1	24.8	300	120	0.08	0	0
Pipe P2	4.5	150	100	0	0	0
Pipe P3	2.5	150	100	0.08	0	0
Pipe P4	55.5	150	100	0.04	0	0
Pipe P5	33.5	150	100	0.04	0	0

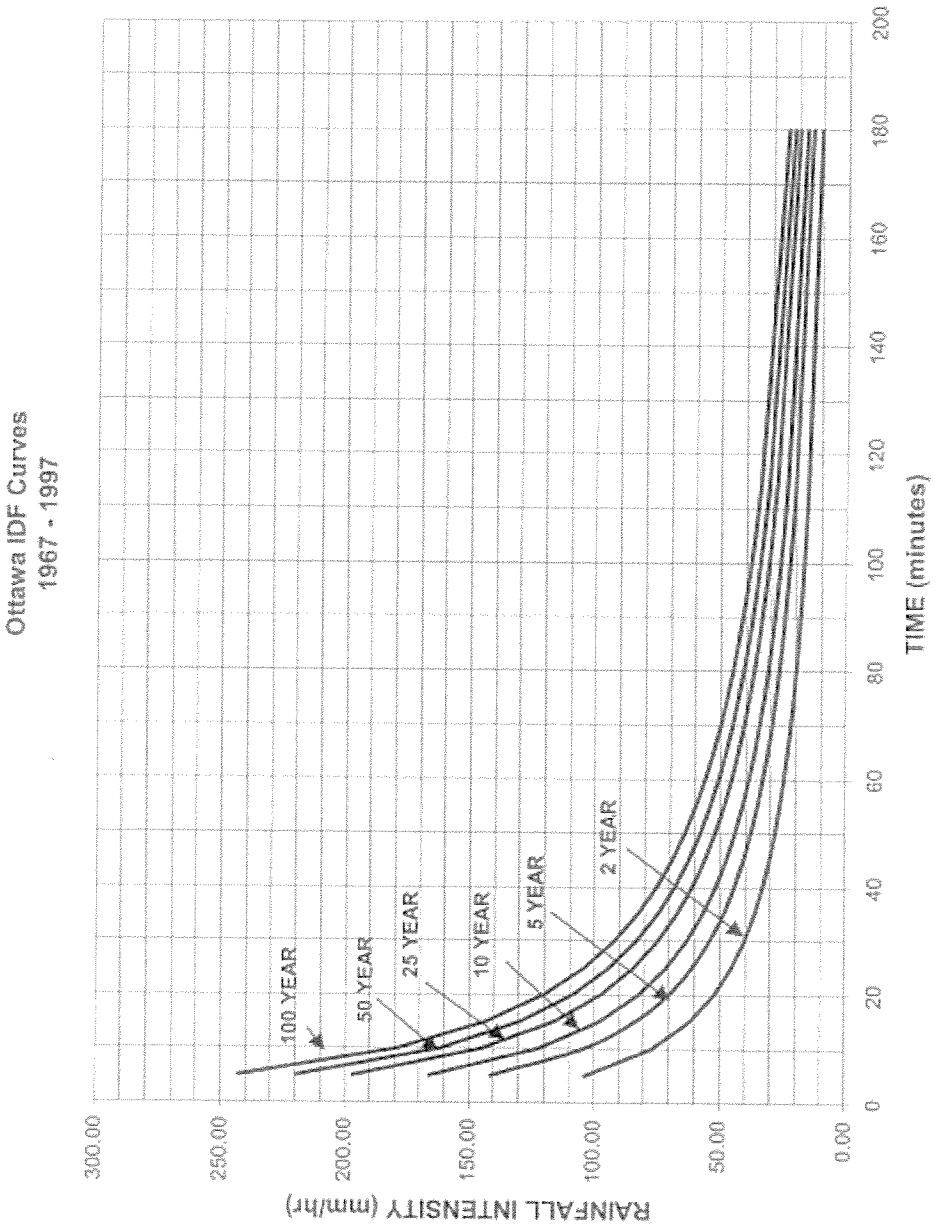
1795 MONTREAL ROAD



APPENDIX D

Stormwater Calculations, IDF Curves, Storage Tables and Stage Storage Curves

APPENDIX 5-A OTTAWA INTENSITY DURATION FREQUENCY (IDF) CURVE



RATIONAL METHOD

The Rational Method was used to determine both the allowable runoff as well as the post-development runoff for the proposed site. The equation is as follows:

Q=2.78 CIA

Where:
Q is the runoff in L/s
C is the weighted runoff coefficient*
I is the rainfall intensity in mm/hr**
A is the area in hectares

*The weighted runoff coefficient is determined for each of the catchment areas as follows:

$$C = \frac{(A_p \times C_p) + (A_{imp} \times C_{imp}) + (A_{grav} \times C_{grav})}{A_{tot}}$$

Where:
A_p is the pervious area in hectares
C_p is the pervious area runoff coefficient (C_{perv}=0.20)
A_{imp} is the impervious area in hectares
C_{imp} is the impervious area runoff coefficient (C_{imp}=0.90)
A_{grav} is the impervious area in hectares
C_{grav} is the impervious area runoff coefficient (C_{grav}=0.60)
A_{tot} is the catchment area ($A_{perv} + A_{imp} + A_{grav}$) in hectares

** The rainfall intensity is taken from the City of Ottawa IDF Curves using a time of concentration (tc) of 10 minutes resulting in a rainfall intensity of 104.2mm/hr and 178.6mm/hr for the 1:5 year and 1:100 year design events respectively.

Note: The post-development C values are to be increased by 25% for the 1:100 year event (max. C_{imp}=1.0).

SAMPLE CALCULATIONS:
PRE-DEVELOPMENT FLOW CALCULATIONS (0.415 ha Site)

Drainage Area (A) = 0.415 ha
Impervious Area = 0.0 ha
Pervious Area = 0.0.415 ha
Weighted Runoff Coefficient (C_w= 0.20)
Intensity (I_5) = 70.25 mm/hr

Q_{allow}= 2.78 CIA
Q_{allow}= 2.78 x 0.20 x 70.25 x 0.415
Q_{allow}= 16.2 L/s

SAMPLE POST-DEVELOPMENT UNCONTROLLED FLOW CALCULATIONS (AREA A-2)

Drainage Area (A) = 0.368 ha
Impervious Area = 0.211 ha
Pervious Area = 0.158 ha
Runoff Coefficient (C_{5yr}) = 0.60
Runoff Coefficient (C_{w100yr}) = 0.68
Intensity (I_5) = 104.2 mm/hr
Intensity (I_{100}) = 178.6 mm/hr

$$C_{5\,yr} = \frac{(0.211 \times 0.90) + (0.158 \times 0.2)}{0.368} = 0.60$$

Q_5= 2.78 CIA
Q_5= 2.78 x 0.60 x 104.2 x 0.368
Q_5= 64.0 L/s

$$C_{100\,yr} = \frac{(0.211 \times 1.0) + (0.158 \times 0.25)}{0.368} = 0.68$$

Q_{100}= 2.78 CIA
Q_{100}= 2.78 x 0.68 x 178.6 x 0.368
Q_{100}= 124.2 L/s

Proposed Development
1795 Montreal Road
Project No: 116151

Pre - Development: Overall Flows								
Description	A (ha)	A imp (ha) C=0.9	A grav (ha) C=0.6	A perv (ha) C= 0.20	C_5	C_{100} (25% increase)	Q-pre (L/s)	
							5 year	100 year
Site Area	0.415	0.000	0	0.415	0.20	0.250	16.2	34.6
Upstream area (from 1777 Montreal Road)	0.130	0.022	0	0.108	0.32	0.379	8.1	16.4
Total =	0.545	0.022	0	0.523			**24.3**	**51.0**
							Allowable Site Flow	
							t_c=20mins	t_c=20mins

Post - Development: Overall Flows for Uncontrolled Site								
Description	A (ha)	A imp (ha) C=0.9	A grav (ha) C=0.6	A perv (ha) C=0.20	C_5	C_{100} (25% increase)	Q-post uncontrolled (L/s)	
							5 year	100 year
Site Area	0.415	0.252	0	0.163	0.63	0.706	75.1	145.3
Upstream area (from 1777 Montreal Road)	0.130	0.022	0	0.108	0.32	0.379	12.1	24.4
Total =	0.545	0.274	0	0.271			**87.2**	**169.7**
							t_c=10mins	t_c=10mins

Post - Development: Total Flows for Uncontrolled Sub Catchments									
Area	Description	A (ha)	A imp (ha) C=0.9	A pavers (ha) C=0.6	A perv (ha) C=0.2	C_5	C_{100} (25% increase)	Q-post uncontrolled (L/s)	
								5 year	100 year
A-1	Direct Runoff	0.005	0.000	0	0.005	0.20	0.25	0.3	0.70
A-2	*Controlled Area*	*0.368*	*0.211*	*0*	*0.158*	*0.60*	*0.68*	*64.0*	*124.10*
A-3	*Upstream area (from 1777 Montreal Road)*	*0.130*	*0.022*	*0*	*0.108*	*0.32*	*0.38*	*12.1*	*24.50*
A-2 & A-3	Controlled area (incl. upstream area)	0.498	0.233	0	0.266	0.53	0.60	76.1	148.60
R-1	*Office Building Roof*	*0.042*	*0.042*	*0*	*0*	*0.90*	*1.00*	*10.8*	*20.70*
	Controlled Building Roof Drain 1 (RD 1)	0.016	0.016	0	0	0.90	1.00	4.1	7.80
	Controlled Building Roof Drain 2 (RD 2)	0.012	0.012	0	0	0.90	1.00	3.2	6.20
	Controlled Building Roof Drain 3 (RD 3)	0.014	0.014	0	0	0.90	1.00	3.5	6.80
	Summed Area Check:	0.5448	0.2743	0.0000	0.2705				

Post - Development : Total Flows for Controlled Site						
Area	Description	Q-post controlled (L/s)		Storage Required (m^3)		Provided (m^3)
		5 year	100 year	5 year	100 year	
A-1	Direct Runoff	0.3	0.7	0.0	0.0	0.0
A-2 & A-3	Controlled Area (incl. upstream area)	17.8	21.0	40.2	100.1	104.7
R-1	*Office Building Roof*					
	Controlled Building Roof Drain 1 (RD 1)	0.79	0.87	2.4	5.8	9.0
	Controlled Building Roof Drain 2 (RD 2)	0.71	0.87	1.7	4.1	9.1
	Controlled Building Roof Drain 3 (RD 3)	0.71	0.87	0.7	4.7	9.0
	Sub-totals	*2.2*	*2.6*	*4.9*	*14.6*	*27.1*
Total =		**20.2**	**24.3**	**45.0**	**114.7**	**131.7**
		Meet Allowable Site Flow				

1795 Montreal Road
Project No: 116151
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-2 AND A-3 Controlled Flow-Parking Lot Storage

OTTAWA IDF CURVE

Area = 0.498 ha Qallow = 17.8 L/s
C = 0.53 Vol(max) = 40.2 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	103.07	85.27	25.58
10	104.19	76.07	58.27	34.96
15	83.56	61.01	43.21	38.88
20	70.25	51.29	33.49	40.19
25	60.90	44.46	26.66	39.99
30	53.93	39.37	21.57	38.83
35	48.52	35.42	17.62	37.01
40	44.18	32.26	14.46	34.70
45	40.63	29.66	11.86	32.03
50	37.65	27.49	9.69	29.07
55	35.12	25.64	7.84	25.88
60	32.94	24.05	6.25	22.51
65	31.04	22.66	4.86	18.97
70	29.37	21.44	3.64	15.31
75	27.89	20.36	2.56	11.53
90	24.29	17.73	-0.07	-0.36
105	21.58	15.76	-2.04	-12.87
120	19.47	14.21	-3.59	-25.82
135	17.76	12.97	-4.83	-39.12
150	16.36	11.95	-5.85	-52.69

1795 Montreal Road
Project No: 116151
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-2 AND A-3 Controlled Flow-Parking Lot Storage

OTTAWA IDF CURVE

Area = 0.498 ha Qallow = 21.0 L/s
C = 0.60 Vol(max) = 100.1 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	201.86	180.84	54.25
10	178.56	148.51	127.49	76.49
15	142.89	118.85	97.83	88.04
20	119.95	99.77	78.74	94.49
25	103.85	86.37	65.35	98.02
30	91.87	76.41	55.39	99.70
35	82.58	68.68	47.66	100.09
40	75.15	62.50	41.48	99.55
45	69.05	57.43	36.41	98.30
50	63.95	53.19	32.17	96.51
55	59.62	49.59	28.57	94.27
60	55.89	46.49	25.47	91.68
65	52.65	43.79	22.76	88.78
70	49.79	41.41	20.39	85.63
75	47.26	39.30	18.28	82.26
90	41.11	34.19	13.17	71.12
105	36.50	30.36	9.33	58.80
120	32.89	27.36	6.34	45.62
135	30.00	24.95	3.93	31.80
150	27.61	22.96	1.94	17.48

Structures	Size (mm)	Area (m^2)	T/G	Inv IN	Inv OUT
STM MH2	1800	2.54	98.20	96.26	96.22
STM MH1	1800	2.54	98.06	-	96.31
CBMH 2	1200	1.13	98.00	96.66	96.58
CB 2	600 x 600	0.36	97.95	-	96.71
CB 3	600 x 600	0.36	98.05	-	96.80
CB 4	600 x 600	0.36	98.05	-	96.75

PI = 3.14159265
pipe I.D.= 914.4 (900 nominal)
U/G Pipe Volume
End Area 0.657 (m^2)
Total Length 45.0 (m)
Pipe Volume 29.6 (m^3)

U/G Pipe Size	900mm
Pipe Segment	STM MH1 - STM MH2
Centre-Centre Length	46.8
Inside Structure	1.8
U/G Storage Length	45.0

Area A-2 and A-3: Storage Table

		Underground Storage								Surface Storage									Total Storage
Elevation (m)	System Head (m)	STM MH2 Volume (m^3)	STM MH1 Volume (m^3)	CBMH 2 Volume (m^3)	CB 2 Volume (m^3)	CB 3 Volume (m^3)	CB 4 Volume (m^3)	900mm dia. Pipe Storage (m^3)	**Total U/G Volume (m^3)**	Ponding @ CBMH2 Area (m^2)	Ponding @ CBMH2 Volume (m^3)	Ponding @ CB 2 Area (m^2)	Ponding @ CB 2 Volume (m^3)	Ponding @ CB3 Area (m^2)	Ponding @ CB3 Volume (m^3)	Ponding @ CB4 Area (m^2)	Ponding @ CB4 Volume (m^3)	**Total Surface Volume (m^3)**	**Volume (m^3)**
96.22	0.00	0.00							0.00										**0.0**
96.26	0.04	0.10	0.00					0.00	0.10										**0.1**
96.58	0.36	0.92	0.69	0.00				12.15	13.57										**13.6**
96.71	0.49	1.25	1.02	0.15	0.00			20.70	23.07										**23.1**
96.75	0.53	1.35	1.12	0.19	0.01		0.00	23.40	26.06										**26.1**
96.80	0.58	1.48	1.25	0.25	0.03	0.00	0.02	27.00	30.02										**30.0**
97.23	1.01	2.57	2.34	0.74	0.19	0.15	0.17	29.55	35.71										**35.7**
97.95	1.73	4.40	4.17	1.55	0.45	0.41	0.43	29.55	40.97			0	0.00						**41.0**
98.00	1.78	4.53	4.30	1.61	0.45	0.43	0.45	29.55	41.32	0	0.00	5	0.12					0.12	**41.4**
98.05	1.83	4.66	4.43	1.61	0.45	0.45	0.47	29.55	41.61	14	0.35	33	1.07	0	0.00	0	0.00	1.42	**43.0**
98.10	1.88	4.78	4.45	1.61	0.45	0.45	0.47	29.55	41.76	57	2.12	76	3.80	3	0.07	5	0.12	6.12	**47.9**
98.15	1.93	4.91	4.45	1.61	0.45	0.45	0.47	29.55	41.89	121	6.57	130	8.95	8	0.35	17	0.67	16.55	**58.4**
98.20	1.98	5.04	4.45	1.61	0.45	0.45	0.47	29.55	42.01	196	14.50	207	17.37	23	1.12	29	1.82	34.82	**76.8**
98.25	2.03	5.04	4.45	1.61	0.45	0.45	0.47	29.55	42.01	278	26.35	283	29.62	50	2.95	47	3.72	62.65	**104.7**

Inlet Control Device - Circular Plug

1:100 Yr
Flow (L/s) = 21.0
Head (m) = 2.02
Elevation (m) = **98.24**
Outlet Pipe Dia.(mm) = 250
Volume (m3) = 100.1

1:5 Yr
Flow (L/s) = 17.8
Head (m) = 1.43
Elevation (m) = **97.65**
Outlet Pipe Dia.(mm) = 250
Volume (m3) = 40.2

Maximum Ponding Depth	(cm)
1:100 Yr	**29**
1:5 Yr	**0**

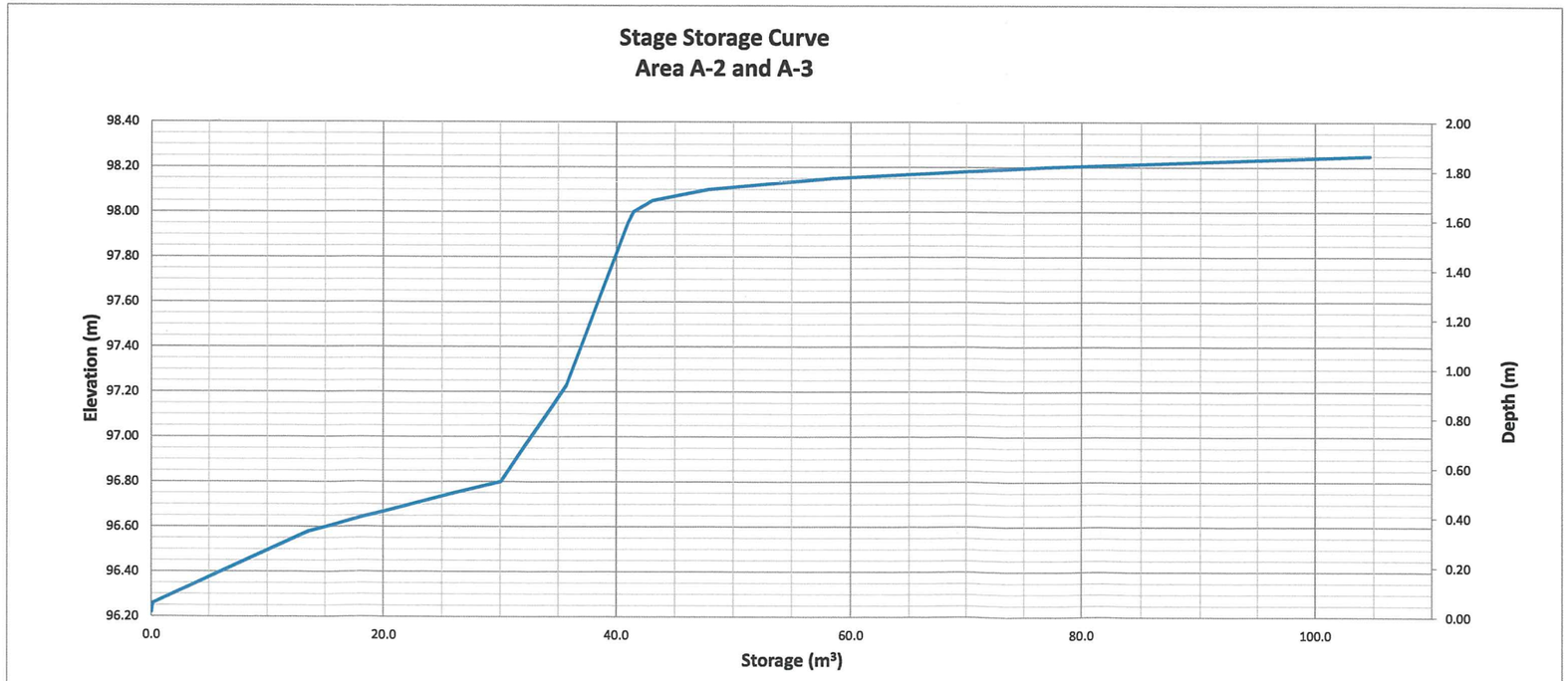
Orifice Size - 1:100 yr Flow Check

Q=0.62xAx(2gh)^0.5

	1:100 yr	Flow Check
Q (m^3/s) =	0.0210	**0.0211**
g (m/s^2) =	9.81	9.81
h (m) =	**2.02**	2.02
A (m^2) =	**0.005386087**	**0.00541**
D (m) =	**0.082811708**	**0.08300**
D (mm) =	**83**	83.0

1:5 yr Flow Check

	1:5 yr
Q (m^3/s) =	0.0178
g (m/s^2) =	9.81
h (m) =	**1.43**
A (m^2) =	**0.00541**
D (m) =	**0.083**
D (mm) =	**83**



1795 Montreal Road
Project No: 116151
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain #1**

OTTAWA IDF CURVE

Area =	0.016	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	2.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	5.55	4.76	1.43
10	104.19	4.09	3.30	1.98
15	83.56	3.28	2.49	2.24
20	70.25	2.76	1.97	2.36
25	60.90	2.39	1.60	2.40
30	53.93	2.12	1.33	2.39
35	48.52	1.91	1.12	2.34
40	44.18	1.74	0.95	2.27
45	40.63	1.60	0.81	2.18
50	37.65	1.48	0.69	2.07
55	35.12	1.38	0.59	1.95
60	32.94	1.29	0.50	1.81
65	31.04	1.22	0.43	1.67
70	29.37	1.15	0.36	1.53
75	27.89	1.10	0.31	1.37
90	24.29	0.95	0.16	0.89
105	21.58	0.85	0.06	0.36
120	19.47	0.76	-0.03	-0.18

1795 Montreal Road
Project No: 116151
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain #1**

OTTAWA IDF CURVE

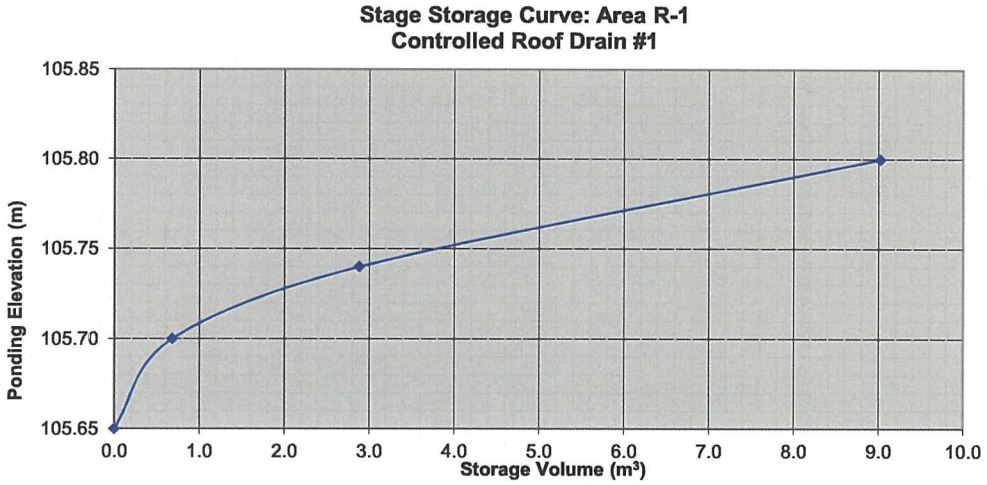
Area =	0.016	ha	Qallow =	0.87	L/s
C =	1.00		Vol(max) =	5.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	10.59	9.72	2.92
10	178.56	7.79	6.92	4.15
15	142.89	6.24	5.37	4.83
20	119.95	5.24	4.37	5.24
25	103.85	4.53	3.66	5.49
30	91.87	4.01	3.14	5.65
35	82.58	3.60	2.73	5.74
40	75.15	3.28	2.41	5.78
45	69.05	3.01	2.14	5.79
50	63.95	2.79	1.92	5.76
55	59.62	2.60	1.73	5.72
60	55.89	2.44	1.57	5.65
65	52.65	2.30	1.43	5.57
70	49.79	2.17	1.30	5.47
75	47.26	2.06	1.19	5.37
90	41.11	1.79	0.92	4.99
105	36.50	1.59	0.72	4.55
120	32.89	1.44	0.57	4.07

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to 1/4 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.79	0.79	10	2.4	3.8
1:100 Year	0.87	0.87	13	5.8	6.8

Roof Drain Storage Table for RD 1

Elevation	Area RD 1	Total Volume
m	m^2	m^3
105.65	0	0
105.70	27.3	0.7
105.74	82.7	2.9
105.80	122	9.0



1795 Montreal Road
Project No: 116151
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain #2**

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	1.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	4.34	3.63	1.09
10	104.19	3.21	2.50	1.50
15	83.56	2.57	1.86	1.68
20	70.25	2.16	1.45	1.74
25	60.90	1.87	1.16	1.75
30	53.93	1.66	0.95	1.71
35	48.52	1.49	0.78	1.64
40	44.18	1.36	0.65	1.56
45	40.63	1.25	0.54	1.46
50	37.65	1.16	0.45	1.35
55	35.12	1.08	0.37	1.22
60	32.94	1.01	0.30	1.09
65	31.04	0.96	0.25	0.96
70	29.37	0.90	0.19	0.81
75	27.89	0.86	0.15	0.67
90	24.29	0.75	0.04	0.20
105	21.58	0.66	-0.05	-0.29
120	19.47	0.60	-0.11	-0.80

1795 Montreal Road
Project No: 116151
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain #2**

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.87	L/s
C =	1.00		Vol(max) =	4.1	m3

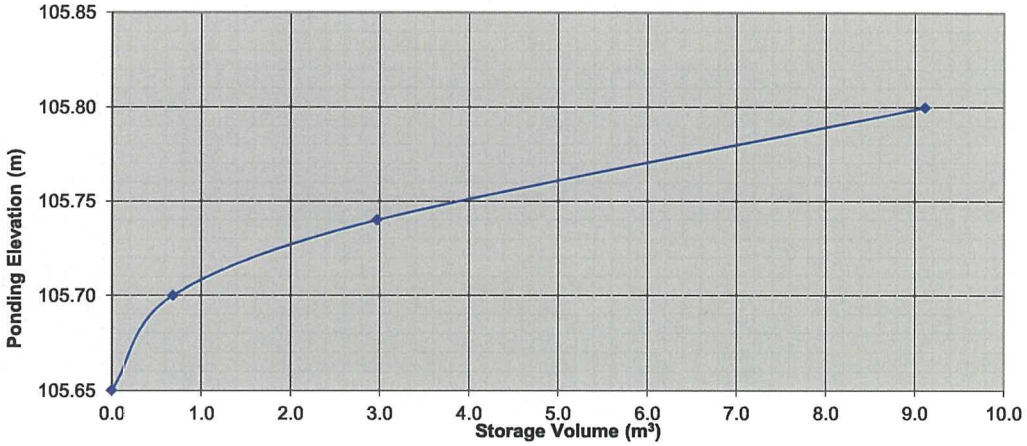
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	8.30	7.43	2.23
10	178.56	6.11	5.24	3.14
15	142.89	4.89	4.02	3.61
20	119.95	4.10	3.23	3.88
25	103.85	3.55	2.68	4.02
30	91.87	3.14	2.27	4.09
35	82.58	2.82	1.95	4.10
40	75.15	2.57	1.70	4.08
45	69.05	2.36	1.49	4.03
50	63.95	2.19	1.32	3.95
55	59.62	2.04	1.17	3.86
60	55.89	1.91	1.04	3.75
65	52.65	1.80	0.93	3.63
70	49.79	1.70	0.83	3.50
75	47.26	1.62	0.75	3.36
90	41.11	1.41	0.54	2.89
105	36.50	1.25	0.38	2.38
120	32.89	1.12	0.25	1.83

Watts Accutrol Flow Control Roof Drains:		RD-100-A-ADJ set to1/4 Exposed			
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3)**	
				Required	**Provided**
1:5 Year	0.71	0.71	8	1.7	2.2
1:100 Year	0.87	0.87	13	4.1	7.0

Roof Drain Storage Table for RD 2

Elevation	Area RD 2	Total Volume
m	m^2	m^3
105.65	0	0
105.70	27.4	0.7
105.74	86.8	3.0
105.80	118	9.1

Stage Storage Curve: Area R-1
Controlled Roof Drain #2



1795 Montreal Road
Project No: 116151
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 **Controlled Roof Drain #3**

OTTAWA IDF CURVE

Area =	0.014	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	2.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	4.77	4.06	1.22
10	104.19	3.52	2.81	1.69
15	83.56	2.82	2.11	1.90
20	70.25	2.37	1.66	2.00
25	60.90	2.06	1.35	2.02
30	53.93	1.82	1.11	2.00
35	48.52	1.64	0.93	1.95
40	44.18	1.49	0.78	1.88
45	40.63	1.37	0.66	1.79
50	37.65	1.27	0.56	1.69
55	35.12	1.19	0.48	1.57
60	32.94	1.11	0.40	1.45
65	31.04	1.05	0.34	1.32
70	29.37	0.99	0.28	1.18
75	27.89	0.94	0.23	1.04
90	24.29	0.82	0.11	0.60
105	21.58	0.73	0.02	0.12
120	19.47	0.66	-0.05	-0.38

1795 Montreal Road
Project No: 116151
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 **Controlled Roof Drain #3**

OTTAWA IDF CURVE

Area =	0.014	ha	Qallow =	0.87	L/s
C =	1.00		Vol(max) =	4.7	m3

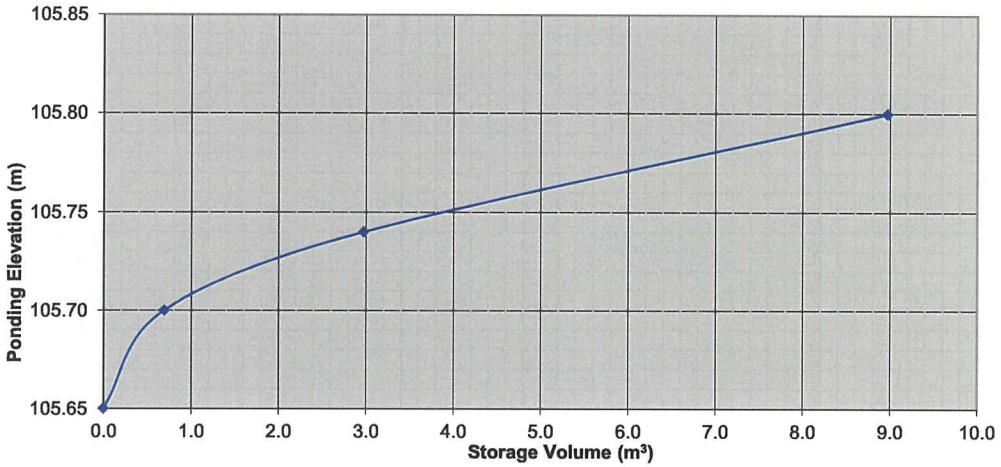
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	9.11	8.24	2.47
10	178.56	6.70	5.83	3.50
15	142.89	5.36	4.49	4.04
20	119.95	4.50	3.63	4.36
25	103.85	3.90	3.03	4.54
30	91.87	3.45	2.58	4.64
35	82.58	3.10	2.23	4.68
40	75.15	2.82	1.95	4.68
45	69.05	2.59	1.72	4.65
50	63.95	2.40	1.53	4.59
55	59.62	2.24	1.37	4.51
60	55.89	2.10	1.23	4.42
65	52.65	1.98	1.11	4.31
70	49.79	1.87	1.00	4.19
75	47.26	1.77	0.90	4.07
90	41.11	1.54	0.67	3.63
105	36.50	1.37	0.50	3.15
120	32.89	1.23	0.36	2.62

Watts Accutrol Flow Control Roof Drains:			RD-100-A-ADJ set to1/4 Exposed		
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.71	0.71	8	2.0	2.2
1:100 Year	0.87	0.87	13	4.7	7.0

Roof Drain Storage Table for RD 3

Elevation	Area RD 2	Total Volume
m	m^2	m^3
105.65	0	0
105.70	27.8	0.7
105.74	86.2	3.0
105.80	113.6	9.0

Stage Storage Curve: Area R-1
Controlled Roof Drain #3



APPENDIX E

Watts Control Flow Roof Drain Information

WATTS®	Adjustable Accutrol Weir Tag: _____	Adjustable Flow Control for Roof Drains

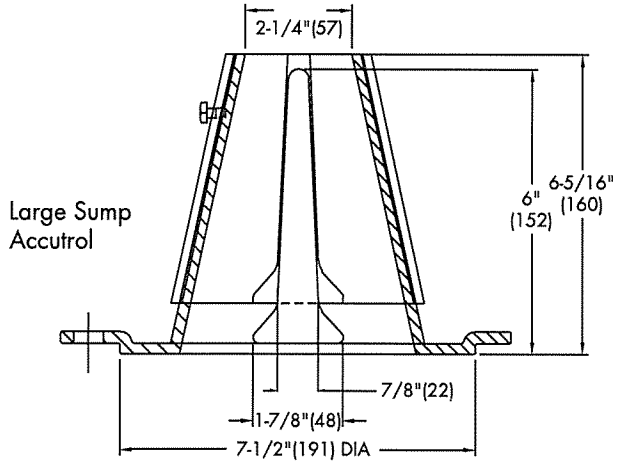
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

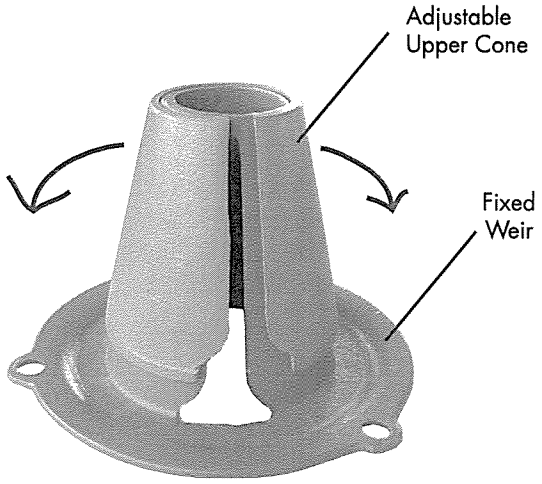
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the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

EXAMPLE:

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

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





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

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

Job Name _____ Contractor _____

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

Engineer _____ Representative _____

USA: Tel: (800) 338-2581 • Fax: (828) 248-3929 • Watts.com
Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com

WATTS®
A Watts Water Technologies Company

APPENDIX F

Oil / Grit Separation Unit Information

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
BASED ON A FINE PARTICLE SIZE DISTRIBUTION

Project Name:	1795 Montreal Road	**Engineer:**	Novatech Engineers
Location:	Ottawa, ON	**Contact:**	Miroslav Savic, P.Eng
OGS #:	OGS	**Report Date:**	12-Jan-18

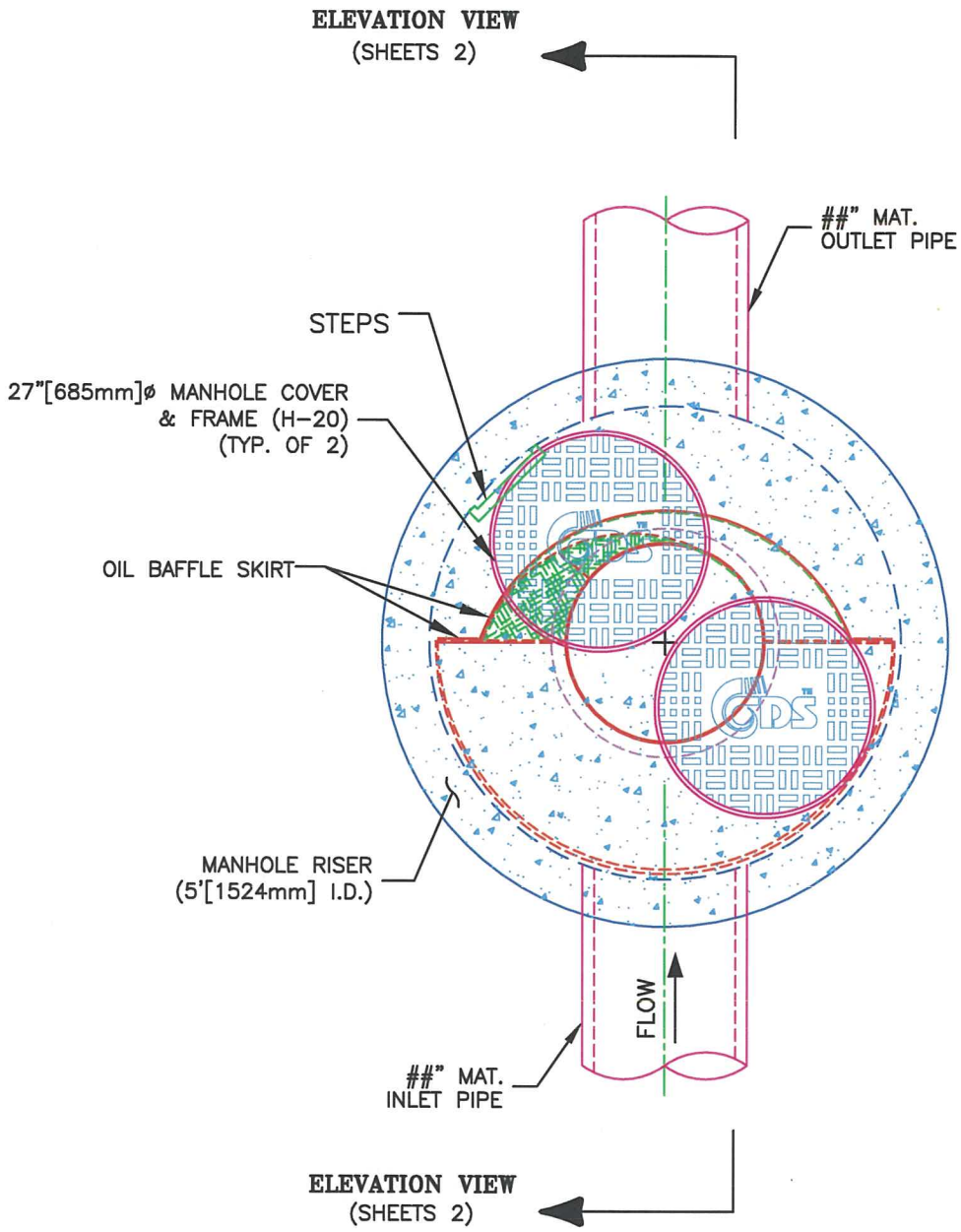
Area	0.54	ha	**Rainfall Station #**	215	
Weighted C	0.58		**Particle Size Distribution**	FINE	
CDS Model	2015		**CDS Treatment Capacity**	20	l/s

Rainfall Intensity[1] (mm/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (l/s)	Treated Flowrate (l/s)	Operating Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
1.0	10.6%	19.8%	0.9	0.9	4.4	97.6	10.4
1.5	9.9%	29.7%	1.3	1.3	6.6	97.0	9.6
2.0	8.4%	38.1%	1.7	1.7	8.8	96.3	8.1
2.5	7.7%	45.8%	2.2	2.2	11.0	95.7	7.4
3.0	5.9%	51.7%	2.6	2.6	13.2	95.1	5.6
3.5	4.4%	56.1%	3.0	3.0	15.4	94.5	4.1
4.0	4.7%	60.7%	3.5	3.5	17.6	93.8	4.4
4.5	3.3%	64.0%	3.9	3.9	19.8	93.2	3.1
5.0	3.0%	67.1%	4.4	4.4	22.0	92.6	2.8
6.0	5.4%	72.4%	5.2	5.2	26.4	91.3	4.9
7.0	4.4%	76.8%	6.1	6.1	30.7	90.0	3.9
8.0	3.5%	80.3%	7.0	7.0	35.1	88.8	3.1
9.0	2.8%	83.2%	7.8	7.8	39.5	87.5	2.5
10.0	2.2%	85.3%	8.7	8.7	43.9	86.3	1.9
15.0	7.0%	92.3%	13.1	13.1	65.9	80.0	5.6
20.0	4.5%	96.9%	17.4	17.4	87.8	73.7	3.3
25.0	1.4%	98.3%	21.8	19.8	100.0	63.9	0.9
30.0	0.7%	99.0%	26.1	19.8	100.0	53.3	0.4
35.0	0.5%	99.5%	30.5	19.8	100.0	45.7	0.2
40.0	0.5%	100.0%	34.8	19.8	100.0	40.0	0.2
45.0	0.0%	100.0%	39.2	19.8	100.0	35.5	0.0
50.0	0.0%	100.0%	43.5	19.8	100.0	32.0	0.0
							91.4
						Removal Efficiency Adjustment[2] =	6.5%
						Predicted Net Annual Load Removal Efficiency =	**84.9%**
						Predicted Annual Rainfall Treated =	**98.7%**

1 - Based on 42 years of hourly rainfall data from Canadian Station 6105976, Ottawa ON

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

PLAN VIEW

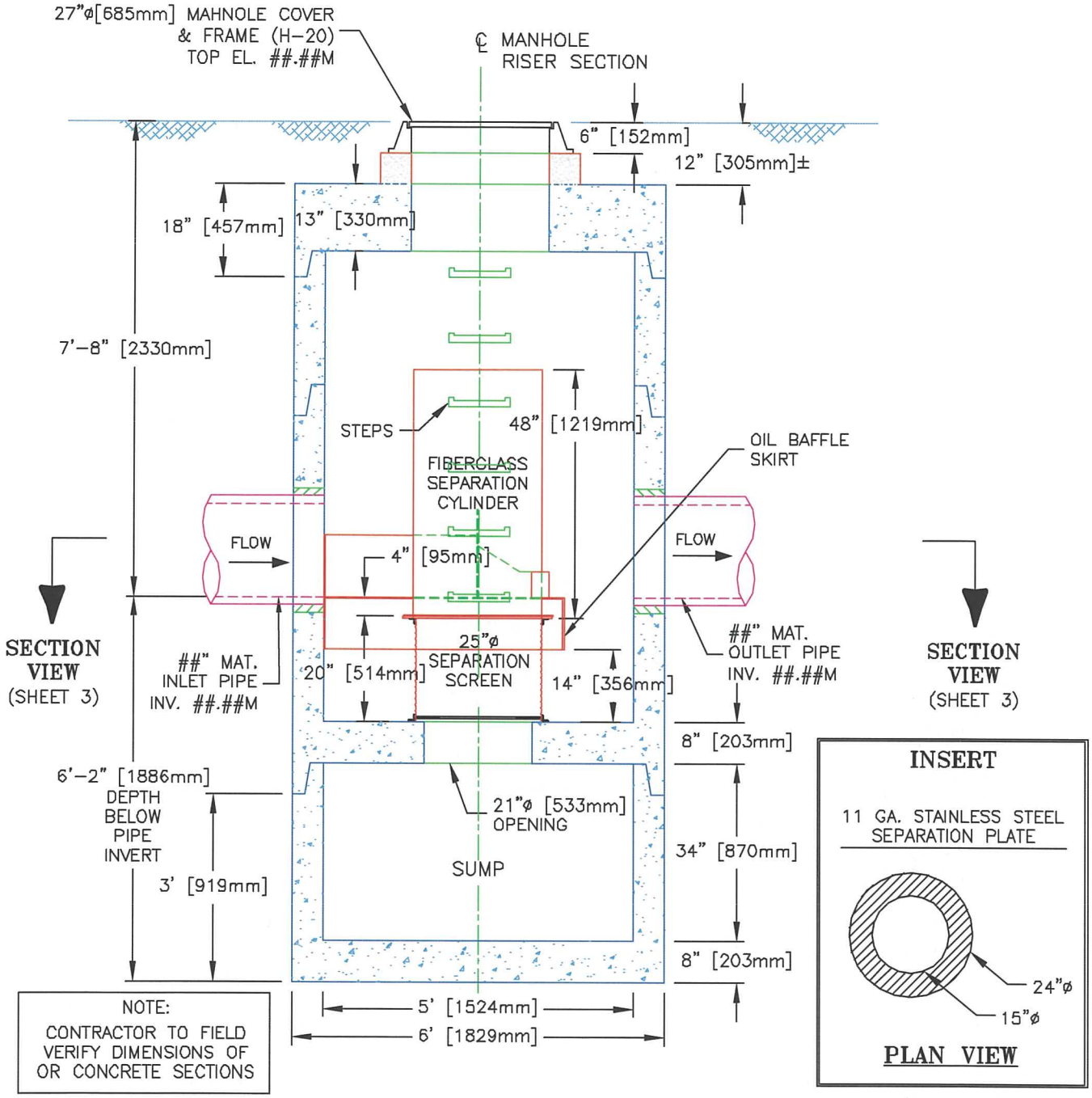


CDS MODEL PMSU20_15m, 0.7 CFS TREATMENT CAPACITY STORM WATER TREATMENT UNIT

CONTECH STORMWATER SOLUTIONS	PROJECT NAME CITY, STATE	JOB# XX-##-###	SCALE 1" = 2'
		DATE ##/##/##	SHEET 1
		DRAWN INITIALS	
		APPROV.	

Echelon Environmental 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577
CONTECH Stormwater Solutions Inc. 200 Enterprise Drive, Scarborough, Maine 04074 Tel: (877) 907-8676 Fax: (207) 885-9825

ELEVATION VIEW



CDS MODEL PMSU20_15m, 0.7 CFS TREATMENT CAPACITY STORM WATER TREATMENT UNIT

CONTECH STORMWATER SOLUTIONS	PROJECT NAME CITY, STATE	JOB# XX-##-###	SCALE 1" = 2.5'
		DATE ##/##/##	SHEET 2
		DRAWN INITIALS	
		APPROV.	

Echelon Environmental 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577
CONTECH Stormwater Solutions Inc. 200 Enterprise Drive, Scarborough, Maine 04074 Tel: (877) 907-8676 Fax: (207) 885-9825

CONTECH®
ENGINEERED SOLUTIONS

CDS® Inspection and Maintenance Guide

CDS TECHNOLOGIES

Maintenance

The CDS system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit. For example, unstable soils or heavy winter sanding will cause the grit chamber to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided.

Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point would allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.

CDS Model	Diameter		Distance from Water Surface to Top of Sediment Pile		Sediment Storage Capacity	
	ft	m	ft	m	yd3	m3
CDS2015-4	4	1.2	3.0	0.9	0.9	0.7
CDS2015	5	1.5	3.0	0.9	1.3	1.0
CDS2020	5	1.5	3.5	1.1	1.3	1.0
CDS2025	5	1.5	4.0	1.2	1.3	1.0
CDS3020	6	1.8	4.0	1.2	2.1	1.6
CDS3030	6	1.8	4.6	1.4	2.1	1.6
CDS3035	6	1.8	5.0	1.5	2.1	1.6
CDS4030	8	2.4	4.6	1.4	5.6	4.3
CDS4040	8	2.4	5.7	1.7	5.6	4.3
CDS4045	8	2.4	6.2	1.9	5.6	4.3
CDS5640	10	3.0	6.3	1.9	8.7	6.7
CDS5653	10	3.0	7.7	2.3	8.7	6.7
CDS5668	10	3.0	9.3	2.8	8.7	6.7
CDS5678	10	3.0	10.3	3.1	8.7	6.7

Table 1: CDS Maintenance Indicators and Sediment Storage Capacities

Support

- Drawings and specifications are available at www.contechstormwater.com.
- Site-specific design support is available from our engineers.

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, earth stabilization and wastewater treament products. For information, visit www.ContechES.com or call 800.338.1122

The product(s) described may be protected by one or more of the following US patents: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 5,788,848; 5,985,157; 6,027,639; 6,350,374; 6,406,218; 6,641,720; 6,511,595; 6,649,048; 6,991,114; 6,998,038; 7,186,058; 7,296,692; 7,297,266; 7,517,450 related foreign patents or other patents pending.

CONTECH ENGINEERED SOLUTIONS
800.925.5240
www.ContechES.com

CDS Inspection & Maintenance Log

CDS Model: _____ Location: _____

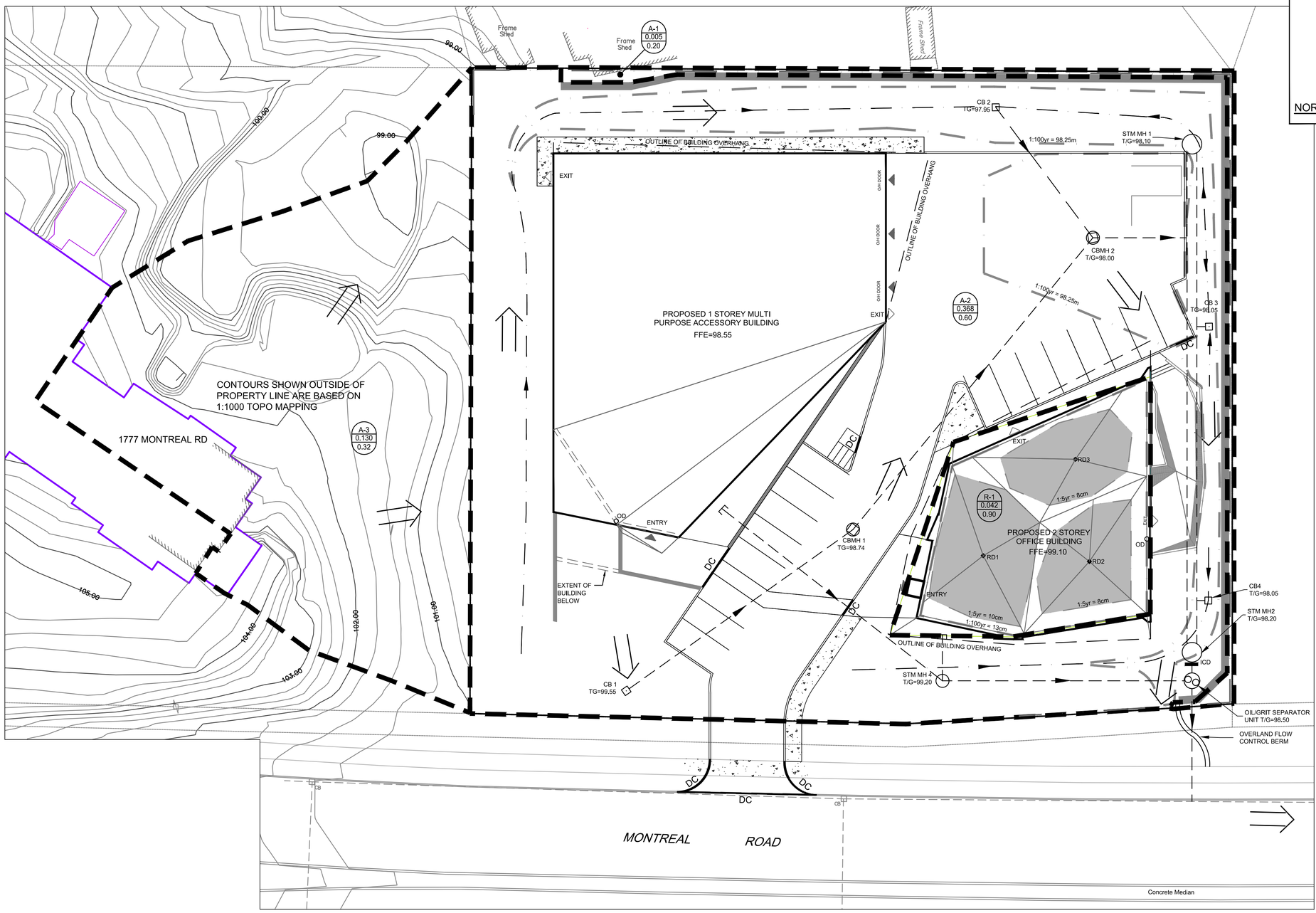
Date	Water depth to sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The water depth to sediment is determined by taking two measurements with a stadia rod: one measurement from the manhole opening to the top of the sediment pile and the other from the manhole opening to the water surface. If the difference between these measurements is less than the values listed in table 1 the system should be cleaned out. **Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.**

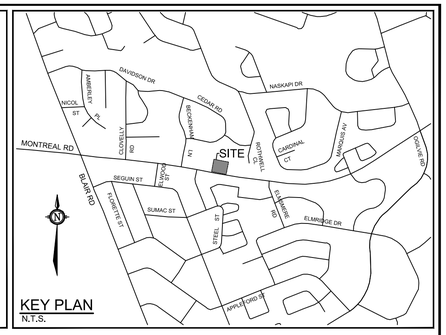
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.

APPENDIX G

Engineering Drawings



NORTH



KEY PLAN
N.T.S.

LEGEND

- PROPOSED BARRIER CURB
- DC — PROPOSED DEPRESSED CURB
- PROPOSED DRAINAGE AREA LIMITS
- 1:5 YR / 1:100 YR — APPROXIMATE PONDING LIMITS
- A-2 / 0.145 / 0.89 — POST-DEVELOPMENT AREA ID; POST-DEVELOPMENT DRAINAGE AREA (ha); 1:5 YEAR WEIGHTED RUNOFF COEFICIENT
- STM MH — PROPOSED STORM MANHOLE
- CBMH — PROPOSED CATCHBASIN MANHOLE
- CB — PROPOSED CATCHBASIN
- RD — CONTROLLED FLOW ROOF DRAIN
- OD — UNCONTROLLED OVERFLOW ROOF DRAIN
- PROPOSED STORM SEWER AND FLOW DIRECTION
- ICD — PROPOSED INLET CONTROL DEVICE
- DIRECTION OF MAJOR OVERLAND FLOW
- PROPOSED BUILDING ENTRANCE / EXIT
- PROPOSED RETAINING WALL
- PROPOSED SWALE
- *STM MH — EXISTING STORM MH & SEWER*
- *CB — EXISTING CATCHBASIN C/W CATCHBASIN LEAD*
- MAXIMUM 3:1 SIDESLOPE

INLET CONTROL DEVICE DATA - STM MH 2

DESIGN EVENT	CIRCULAR ORIFICE ICD	DIAMETER OF OUTLET PIPE	DESIGN FLOW	DESIGN HEAD	WATER ELEVATION
1:5 YR	83mm PLUG	250mm Ø	17.8 L/s	1.43m	97.65m
1:100 YR	83mm PLUG	250mm Ø	21.0 L/s	2.02m	98.24m

ROOF DRAIN TABLE - AREA R-1 (ROOF DRAINS 1 to 3)

AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING SETTING	1:5 YEAR RELEASE RATE	APPROX. 5 YR PONDING DEPTH	1:100 YEAR RELEASE RATE	APPROX. 100 YR PONDING DEPTH
R-1	RD 1 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	10 cm	0.87 L/s	13 cm
R-1	RD 2 (RD-100-A-ADJ)	1/4 EXPOSED	0.71 L/s	8 cm	0.87 L/s	13 cm
R-1	RD 3 (RD-100-A-ADJ)	1/4 EXPOSED	0.71 L/s	8 cm	0.87 L/s	13 cm

* REFER TO THE 'DEVELOPMENT SERVICING AND STORMWATER MANAGEMENT REPORT' (R-2017-179) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

**ALL CONTROLLED FLOW ROOF DRAINS FOR THE PROPOSED BUILDING TO BE WATTS ADJUSTABLE ACCUTROL ROOF DRAINS.

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

OWNER INFORMATION
CDRG+REDTEAM
1084 KENASTON ST UNIT #5
OTTAWA, ONTARIO, K1B 3P5

SIMON FRIGON
PHONE: (613) 736-9222
E-MAIL: storm@redteam.ca

No.	REVISION	DATE	BY
1.	ISSUED FOR SITE PLAN APPROVAL	MAR 9/18	MS

SCALE: 1:200 (1:200 0 2 4 6 8)

DESIGN: LGB
CHECKED: MS
DRAWN: LGB
CHECKED: MS
APPROVED: MS

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
M. SAVIC
100102651
MAR 9/18
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
1795 MONTREAL ROAD
OTTAWA, ONTARIO

DRAWING NAME
STORMWATER MANAGEMENT PLAN

PROJECT No. 116151-00
REV REV # 1
DRAWING No. 116151-SWM

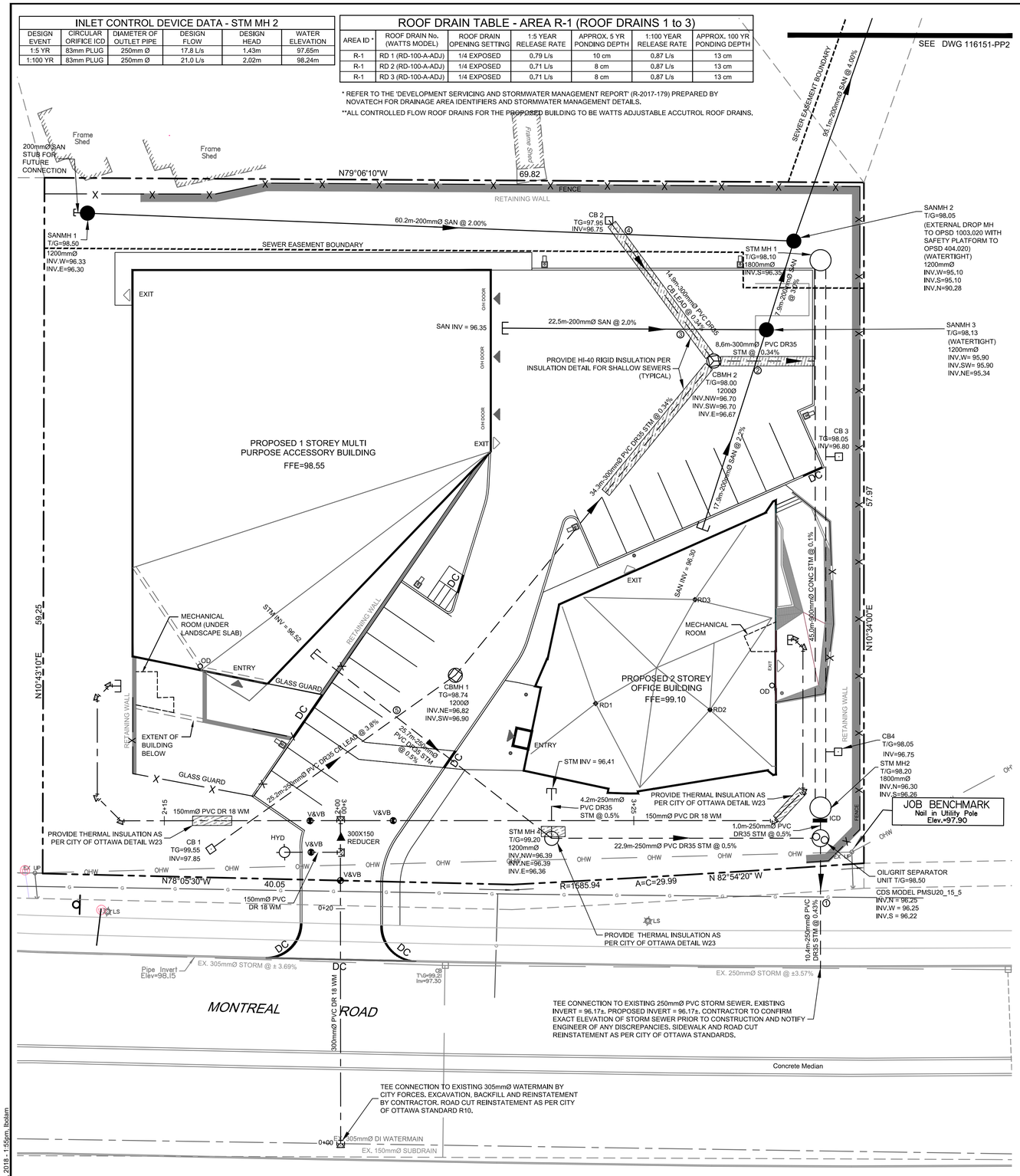
M:\2016\116151\CAD\Design\116151-SWM.dwg SWM, Apr 02, 2018 - 2:14pm, lbodam

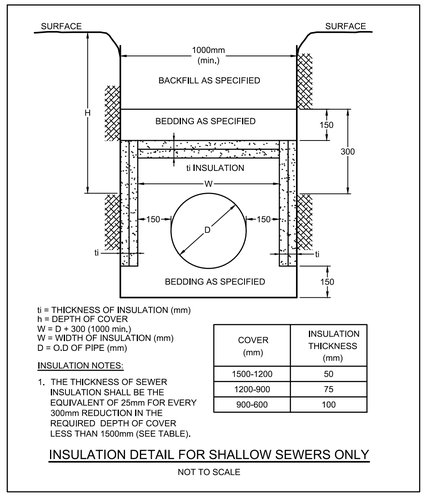
INLET CONTROL DEVICE DATA - STM MH 2					
DESIGN EVENT	CIRCULAR ORIFICE ICD	DIAMETER OF OUTLET PIPE	DESIGN FLOW	DESIGN HEAD	WATER ELEVATION
1:5 YR	83mm PLUG	250mm Ø	17,8 L/s	1,43m	97,65m
1:100 YR	83mm PLUG	250mm Ø	21,0 L/s	2,02m	98,24m

ROOF DRAIN TABLE - AREA R-1 (ROOF DRAINS 1 to 3)						
AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING SETTING	1:5 YEAR RELEASE RATE	APPROX. 5 YR PONDING DEPTH	1:100 YEAR RELEASE RATE	APPROX. 100 YR PONDING DEPTH
R-1	RD 1 (RD-100-A-ADJ)	1/4 EXPOSED	0,79 L/s	10 cm	0,87 L/s	13 cm
R-1	RD 2 (RD-100-A-ADJ)	1/4 EXPOSED	0,71 L/s	8 cm	0,87 L/s	13 cm
R-1	RD 3 (RD-100-A-ADJ)	1/4 EXPOSED	0,71 L/s	8 cm	0,87 L/s	13 cm

* REFER TO THE 'DEVELOPMENT SERVICING AND STORMWATER MANAGEMENT REPORT' (R-2017-179) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

**ALL CONTROLLED FLOW ROOF DRAINS FOR THE PROPOSED BUILDING TO BE WATTS ADJUSTABLE ACCUTROL ROOF DRAINS.





ti = THICKNESS OF INSULATION (mm)
h = DEPTH OF COVER
W = D + 300 (1000 min.)
W = WIDTH OF INSULATION (mm)
D = O.D OF PIPE (mm)

COVER (mm)	INSULATION THICKNESS (mm)
1500-1200	50
1200-900	75
900-600	100

INSULATION NOTES:

1. THE THICKNESS OF SEWER INSULATION SHALL BE THE EQUIVALENT OF 25mm FOR EVERY 300mm REDUCTION IN THE REQUIRED DEPTH OF COVER LESS THAN 1500mm (SEE TABLE).

INSULATION DETAIL FOR SHALLOW SEWERS ONLY

NOT TO SCALE

WATERMAIN NOTES:

1. SUPPLY AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.
2. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
WATERMAIN TRENCHING	W17	CITY OF OTTAWA
THERMAL INSULATION IN SHALLOW TRENCHES	W22	CITY OF OTTAWA
THERMAL INSULATION BY OPEN STRUCTURES	W23	CITY OF OTTAWA
WATERMAIN CROSSING BELOW SEWER	W25	CITY OF OTTAWA
WATER SERVICE	PVC DR 18	

3. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACTOR, CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY CITY OFFICIALS.
4. WATERMAIN SHALL BE MINIMUM 2,4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.
5. PROVIDE MINIMUM 0,5m CLEARANCE BETWEEN OUTSIDE OF PIPES AT ALL CROSSINGS.
6. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED, UNLESS OTHERWISE INDICATED.

PROPOSED 300Ø/150Ø WATER SERVICE CONNECTION TABLE			
STATION	SURFACE ELEVATION	T/WM ELEVATION	COMMENTS
0+00	99,75	97,35± ✱	T.V.S. CONNECTION TO EX. 305mmØ WM
0+15,5	99,56	97,16	CROSS BELOW EX.305Ø STM (±0,53m CLEARANCE)
0+21,5	99,64	97,24	CROSS BELOW EX. GAS
0+22,4	99,75	97,35	50mmØ STANDPOST @ PROPERTY LINE
0+24,8	99,55	97,15	300 X 300 X 300 TEE
0+25,8	99,53	97,13	300 X 150 REDUCER
0+27,5	99,45	97,05	150 X 150 X 150 TEE

PROPOSED 150Ø WATER SERVICE TO STORAGE FACILITY TABLE			
STATION	SURFACE ELEVATION	T/WM ELEVATION	COMMENTS
2+02,6	99,58	97,18	150MMØ VALVE AND VALVE BOX
2+07,6	99,65	97,25✱✱✱	CROSS BELOW 250Ø STM (±0,47m CLEARANCE)
2+18,7	99,70	97,30	45° HORIZONTAL BEND
2+21,5	99,25	96,85	45° HORIZONTAL BEND
2+30,0	99,06	96,66	45° HORIZONTAL BEND
2+31,4	99,08	96,66	45° HORIZONTAL BEND
2+32,4	99,10	96,66	CAP 1,0M FROM BUILDING FACE

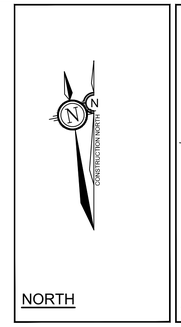
PROPOSED 150Ø WATER SERVICE TO OFFICE BUILDING TABLE			
STATION	SURFACE ELEVATION	T/WM ELEVATION	COMMENTS
3+04,5	99,25	96,85	150MMØ VALVE AND VALVE BOX
3+16,1	98,60	95,87 ✱✱	CROSS BELOW 250Ø STM (±0,5m CLEARANCE)
3+18,0	98,15	95,75 ✱✱	CROSS BELOW 250Ø STM (±0,5m CLEARANCE)
3+36,9	98,14	95,74✱✱✱	45° HORIZONTAL BEND
3+40,4	98,23	95,83✱✱✱	45° HORIZONTAL BEND
3+52,6	99,08	95,83	45° HORIZONTAL BEND
3+53,6	99,09	95,83	45° HORIZONTAL BEND
3+54,2	99,09	95,83	CAP 1,0M FROM BUILDING FACE

✱ 250mmØ CONNECTION TO EXISTING 305mmØ WATERMAIN, EXACT ELEVATION TO BE FIELD DETERMINED.

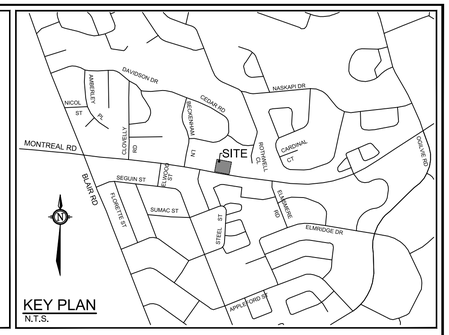
✱✱ PROVIDE WATERMAIN CROSSING BELOW BOTH STORM SEWERS AS PER CITY OF OTTAWA DETAIL W25.

✱✱✱ PROVIDE THERMAL INSULATION AS PER CITY OF OTTAWA DETAIL W22 AND DETAIL W23 WHERE COVER IS LESS THAN 2,4m AND/OR ADJACENT TO OPEN STRUCTURES.

CRITICAL SEWER PIPE CROSSING TABLE			
CROSSING	LOWER PIPE	HIGHER PIPE	CLEARANCE
①	250mmØ STM OBV=96.45±	GAS = APPROX. 1M DEEP	±0,3m
②	200mmØ SAN OBV=96.16	300mmØ STM INV = 96,66	±0,50m
③	200mmØ SAN OBV=96,23	300mmØ STM INV= 96,71	±0,48m
④	200mmØ SAN OBV=95,60	300mmØ STM INV= 96,75	±1,15m
⑤	250mmØ STM OBV=96,73	250mmØ STM INV=97,13	±0.40m



NORTH



KEY PLAN
N.T.S.

LEGEND

- SAN MH 1 — PROPOSED SANITARY MH & SEWER
- CBMH 3 — PROPOSED CATCHBASIN MANHOLE & SEWER
- STM MH 1 — PROPOSED STORM MANHOLE & SEWER
- CB 2 — PROPOSED CATCHBASIN AND LEAD
- HYD — PROPOSED HYDRANT AND VALVE
- VB — PROPOSED BARRIER CURB
- DC — PROPOSED DEPRESSED CURB
- 200mmØ — PROPOSED WATERMAIN AND DIAMETER
- V&VB — PROPOSED VALVE AND VALVE BOX
- BEND — PROPOSED BEND AND THRUSTBLOCK 11.25°, 22.5°, 45° or TEE
- PROPOSED CAP
- ICD — PROPOSED INLET CONTROL DEVICE
- RD — CONTROLLED FLOW ROOF DRAIN
- OD — UNCONTROLLED OVERFLOW ROOF DRAIN
- PROPOSED THERMAL INSULATION
- PROPOSED BUILDING ENTRANCE
- PROPOSED RETAINING WALL
- PROPOSED LAMP POST

- SANMH — EXISTING CONCRETE CURB
- SANMH — EXISTING SANITARY MANHOLE AND SEWER
- CBMH — EXISTING CATCHBASIN MANHOLE
- STMMH — EXISTING STORM MANHOLE AND SEWER
- CB — EXISTING CATCHBASIN C/W CATCHBASIN LEAD
- EX UP — EXISTING UTILITY POLE C/W GUY WIRES
- 300mmØ WM — EXISTING WATERMAIN
- LS — EXISTING LIGHT STANDARD
- OHW — EXISTING OVERHEAD UTILITY WIRES
- G — EXISTING GAS

GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $2,000,000.00, INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF MUNICIPAL AUTHORITIES.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL INVESTIGATION REPORT NO. 64504.01 (DATED SEPTEMBER 6, 2017) PREPARED BY HOULE CHEVRIER ENGINEERING LTD. FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS BEFORE EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARD SURFACE AREAS AND DIMENSIONS.
10. REFER TO THE 'DEVELOPMENT SERVICING AND STORMWATER MANAGEMENT REPORT' (R-2017-179) PREPARED BY NOVATECH.
11. SAW CUT AND KEYGRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10 AND R25).

SEWER NOTES:

1. SUPPLY AND CONSTRUCT ALL SEWERS AND APPURTENANCES IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.
2. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
SANITARY/STORM/CATCHBASIN MANHOLE (1200Ø)	701.010	OPSD
STORM/CATCHBASIN MANHOLE (1800Ø)	701.012	OPSD
WATERTIGHT SAN / STM MH FRAME AND COVER	401.030	OPSD
STORM/CATCHBASIN MH FRAME AND COVER	401.010 - TYPE 'B' OPEN	OPSD
CATCHBASIN (600x600)	705.010	OPSD
CATCHBASIN FRAME AND COVER	400.020	OPSD
STORM SEWER	PVC DR 35 / HDPE	
SANITARY SEWER	PVC DR 35	
SEWER TRENCH - BEDDING (GRANULAR 'A') COVER (GRANULAR 'A' OR GRANULAR 'B' TYPE I WITH MAXIMUM PARTICLE SIZE=25mm)		

3. ALL STORM AND SANITARY SERVICE LATERALS SHALL BE EQUIPPED WITH BACKFLOW PREVENTERS AS PER THE CITY OF OTTAWA STANDARD DETAILS S14 AND S14.1 OR S14.2.
4. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.
5. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL), THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.
6. ALL STORM MANHOLES, CATCHBASIN MANHOLES ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED. ALL CATCHBASINS ARE TO HAVE 600mm SUMPS UNLESS OTHERWISE INDICATED.
7. ALL CATCHBASINS, MANHOLES AND/OR CATCHBASIN MANHOLES THAT ARE TO HAVE ICD's INSTALLED WITHIN THEM ARE TO HAVE 600mm SUMPS.
8. CONTRACTOR TO TELEVISE ALL PROPOSED SEWERS 200mm OR GREATER IN DIAMETER TO ENSURE THAT THEY ARE CLEAN AND OPERATIONAL. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES. OBTAIN APPROVAL FROM THE CITY'S SEWER OPERATIONS. PROVIDE THE CCTV INSPECTION AND REPORT TO THE ENGINEER FOR REVIEW AND APPROVAL.
9. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL APPLICABLE SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS AND ANY ALIGNMENT CHANGES, ETC.
10. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS, LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16, 410.07.16.04 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.

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

OWNER INFORMATION
CDRG+REDTEAM
1084 KENASTON ST UNIT #5
OTTAWA, ONTARIO, K1B 3P5

SIMON FRIGON
PHONE: (613) 736-9222
E-MAIL: storm@redteam.ca

No.	REVISION	DATE	BY
2.	ISSUED FOR SITE PLAN APPLICATION	MAR 9/18	MS
1.	ISSUED FOR COORDINATION	NOV 29/17	LGB

SCALE
1:200
1:200
0 2 4 6 8

DESIGN LGB
CHECKED MS
DRAWN LGB
CHECKED MS
APPROVED MS

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
M. SAVIC
100102651
MAR 9/18
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
1795 MONTREAL ROAD
OTTAWA, ONTARIO

DRAWING NAME
GENERAL PLAN OF SERVICES

PROJECT No. 116151-00
REV REV # 2
DRAWING No. 116151-GP

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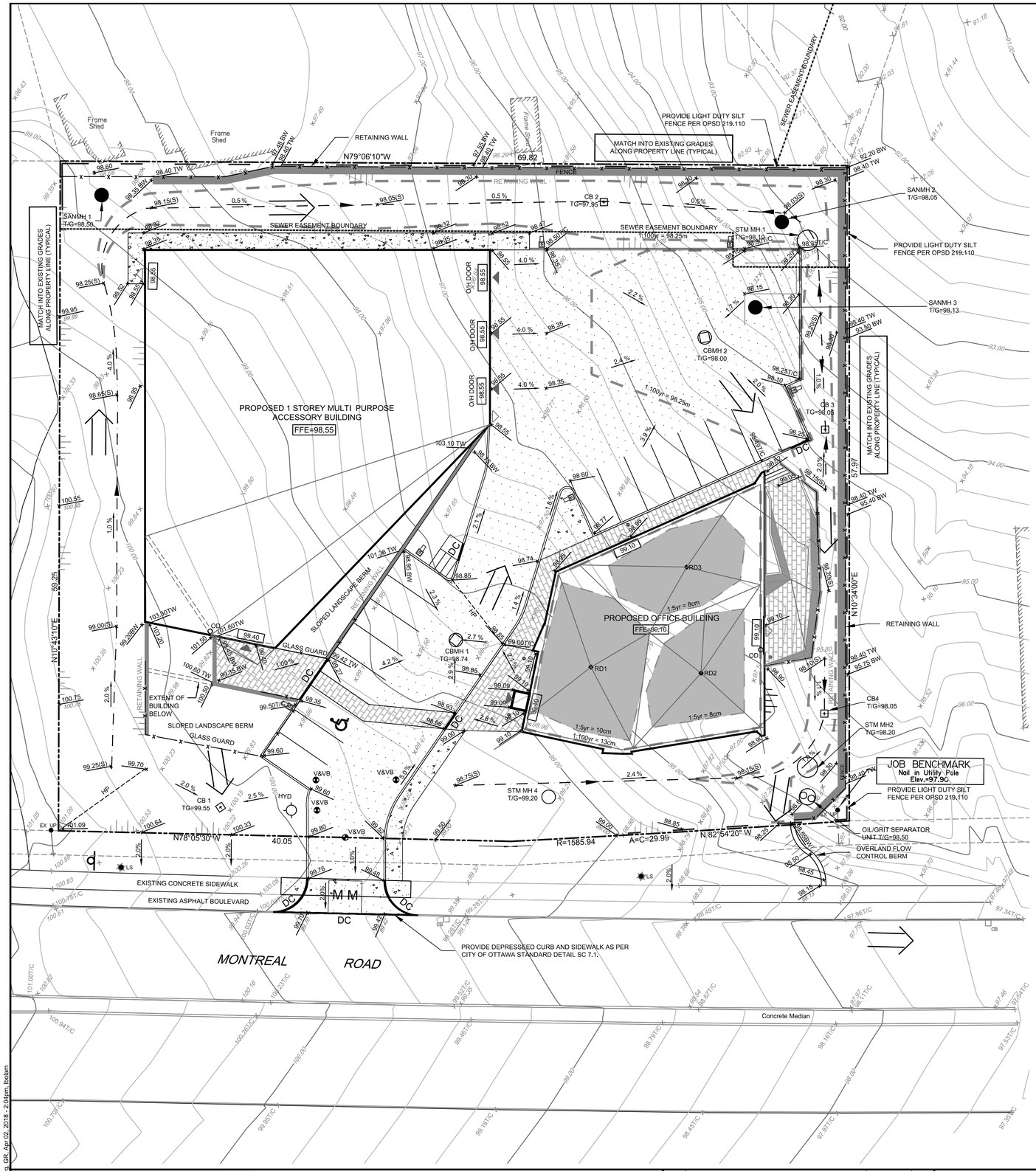

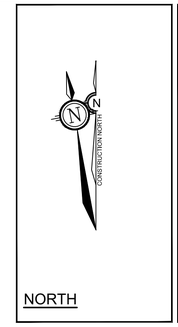

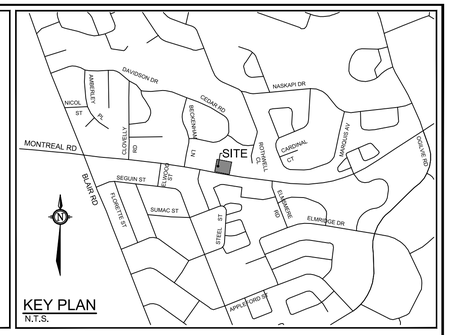

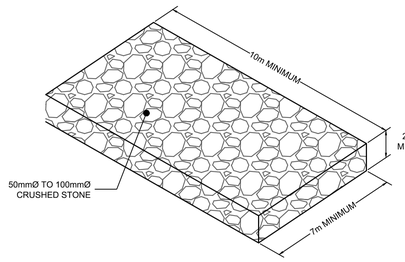

MUD MAT DETAIL
NOT TO SCALE

LEGEND

- 94.00 / 92.55 — PROPOSED ELEVATION / *EXISTING ELEVATION*
- × 97.44 — EXISTING ELEVATION
- 98.05(S) — PROPOSED SWALE ELEVATION
- 98.50T/C — PROPOSED TOP OF CURB ELEVATION
- 88.40 TW — PROPOSED TOP OF WALL ELEVATION
- 86.40 BW — PROPOSED BOTTOM OF WALL ELEVATION
- 88.50 — PROPOSED TERRACE ELEVATION
- 2.0% — GRADE AND DIRECTION
- MAXIMUM 3:1 SIDESLOPE
- DIRECTION OF MAJOR OVERLAND FLOW
- SAN MH 1 — PROPOSED SANITARY MANHOLE
- CBMH 3 — PROPOSED CATCHBASIN MANHOLE
- STM MH 1 — PROPOSED STORM MANHOLE
- CB — PROPOSED CATCHBASIN
- HYD / VVB — PROPOSED HYDRANT AND VALVE
- PROPOSED BARRIER CURB
- DC — PROPOSED DEPRESSED CURB
- ICD — PROPOSED INLET CONTROL DEVICE
- RD — PROPOSED ROOF DRAIN
- FFE=88.80 — PROPOSED FINISHED FLOOR ELEVATION
- PROPOSED BUILDING ENTRANCE
- PROPOSED SILT FENCING (OPSD 219.110)
- PROPOSED SWALE WITH UNDERDRAIN
- PROPOSED RETAINING WALL
- M M — PROPOSED MUD MAT LOCATION
- 1:5 YR / 1:100 YR — APPROXIMATE PONDING LIMITS
- *EXISTING CONCRETE CURB*
- CB — *EXISTING CATCHBASIN*
- EX UP — *EXISTING UTILITY POLE C/W GUY WIRES*
- *EXISTING FENCE*
- *EXISTING LIGHT STANDARD*

PAVEMENT STRUCTURES:

LIGHT DUTY (NEW PAVEMENT)
50mm SUPERPAVE 12.5
150mm GRAN "A"
375mm GRAN "B" TYPE II
ASPHALT GRADE PG 58-34

HEAVY DUTY (NEW PAVEMENT)
40mm SUPERPAVE 12.5
50mm SUPERPAVE 12.5
150mm GRAN "A"
450mm GRAN "B" TYPE II
ASPHALT GRADE PG 58-34

EROSION AND SEDIMENT CONTROL NOTES :

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.

1. ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF OTTAWA, THEY ARE TO BE APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION. THESE PRACTICES ARE TO BE IMPLEMENTED IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL AND SHOULD INCLUDE AS A MINIMUM THOSE MEASURES INDICATED ON THE PLAN.
2. EROSION AND SEDIMENT CONTROL MEASURES WILL BE IMPLEMENTED DURING CONSTRUCTION IN ACCORDANCE WITH THE "GUIDELINES ON EROSION AND SEDIMENT CONTROL FOR URBAN CONSTRUCTION SITES" (GOVERNMENT OF ONTARIO, MAY 1987). THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MEETING ALL REGULATORY AGENCY REQUIREMENTS.
3. TO PREVENT SURFACE EROSION FROM ENTERING ANY STORM SEWER SYSTEM DURING CONSTRUCTION, FILTER CLOTH WILL BE PLACED UNDER GRATES OF NEARBY CATCHBASINS AND STRUCTURES. A LIGHT DUTY SILT FENCE BARRIER WILL ALSO BE INSTALLED AROUND THE CONSTRUCTION AREA (WHERE APPLICABLE). THESE CONTROL MEASURES WILL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
4. TO LIMIT EROSION: MINIMIZE THE AMOUNT OF EXPOSED SOILS AT ANY GIVEN TIME, RE-VEGETATE EXPOSED AREAS AND SLOPES AS SOON AS POSSIBLE AND PROTECT EXPOSED SLOPES WITH NATURAL OR SYNTHETIC MULCHES.
5. FOR MATERIAL STOCKPILING: MINIMIZE THE AMOUNT OF EXPOSED MATERIALS AT ANY GIVEN TIME; APPLY TEMPORARY SEEDING, TARPS, COMPACTION AND/OR SURFACE ROUGHENING AS REQUIRED TO STABILIZE STOCKPILED MATERIALS THAT WILL NOT BE USED WITHIN 14 DAYS.
6. THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE ENGINEER, THE MEASURES ARE NO LONGER REQUIRED. NO CONTROL MEASURES MAY BE PERMANENTLY REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE ENGINEER.
7. THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE ENGINEER ANY ACCIDENTAL DISCHARGES OF SEDIMENT MATERIAL INTO ANY STORM SEWER SYSTEM. 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.
8. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
9. ROADWAYS ARE TO BE SWEPT AS REQUIRED OR AS DIRECTED BY THE ENGINEER AND/OR THE REPRESENTATIVE OF THE MUNICIPALITY.
10. THE CONTRACTOR SHALL ENSURE PROPER DUST CONTROL IS PROVIDED WITH THE APPLICATION OF WATER (AND IF REQUIRED, CALCIUM CHLORIDE) DURING DRY PERIODS. MONITOR DUST LEVELS DURING SITE PREPARATION/EXCAVATION, AND CONSTRUCTION ACTIVITIES, AND WHEN DUST LEVELS BECOME VISUALLY APPARENT SPRAY WATER TO MINIMIZE THE RELEASE OF DUST FROM GRAVEL, PAVED AREAS AND EXPOSED SOILS. USE CHEMICAL DUST SUPPRESSANTS ONLY WHERE NECESSARY ON PROBLEM AREAS

GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $2,000,000.00, INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF MUNICIPAL AUTHORITIES.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL INVESTIGATION REPORT (DATED SEPTEMBER 6, 2017, PROJECT NUMBER 64504.01) PREPARED BY HOULE CHEVRIER ENGINEERING FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARD SURFACE AREAS AND DIMENSIONS.
10. REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2017-179) PREPARED BY NOVATECH.
11. SAW CUT AND KEYGRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10 AND R25).

GRADING NOTES:

1. ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED PAVED AREAS AS DIRECTED BY THE SITE ENGINEER OR GEOTECHNICAL ENGINEER.
2. EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF GRANULARS.
3. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUB-EXCAVATED AND REPLACED WITH SUITABLE MATERIAL THAT IS FROST COMPATIBLE WITH THE EXISTING SOILS AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
4. THE GRANULAR BASE SHOULD BE COMPACTED TO AT LEAST 98% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE. ANY ADDITIONAL GRANULAR FILL USED BELOW THE PROPOSED PAVEMENT SHOULD BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE.
5. MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
6. MAXIMUM TERRACING GRADE TO BE 3:1 UNLESS OTHERWISE NOTED.
7. ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.
8. ALL CURBS SHALL BE BARRIER CURB (150mm) UNLESS OTHERWISE NOTED AND CONSTRUCTED AS PER CITY OF OTTAWA STANDARDS (SC1.1).
9. REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
10. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THIS PLAN.

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

OWNER INFORMATION
CDRG+REDTEAM
1084 KENASTON ST UNIT #5
OTTAWA, ONTARIO, K1B 3P5

SIMON FRIGON
PHONE: (613) 736-9222
E-MAIL: storm@redteam.ca

No.	REVISION	DATE	BY
2.	ISSUED FOR SITE PLAN APPLICATION	MAR 9/18	MS
1.	ISSUED FOR COORDINATION	NOV 29/17	LGB

SCALE
1:200
1:200
0 2 4 6 8

DESIGN LGB
CHECKED MS
DRAWN LGB
CHECKED MS
APPROVED MS

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
M. SAVIC
100102651
MAR 9/18
PROVINCE OF ONTARIO

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
1795 MONTREAL ROAD
OTTAWA, ONTARIO

DRAWING NAME
GRADING PLAN

PROJECT No. 116151-00
REV REV # 2
DRAWING No. 116151-GR

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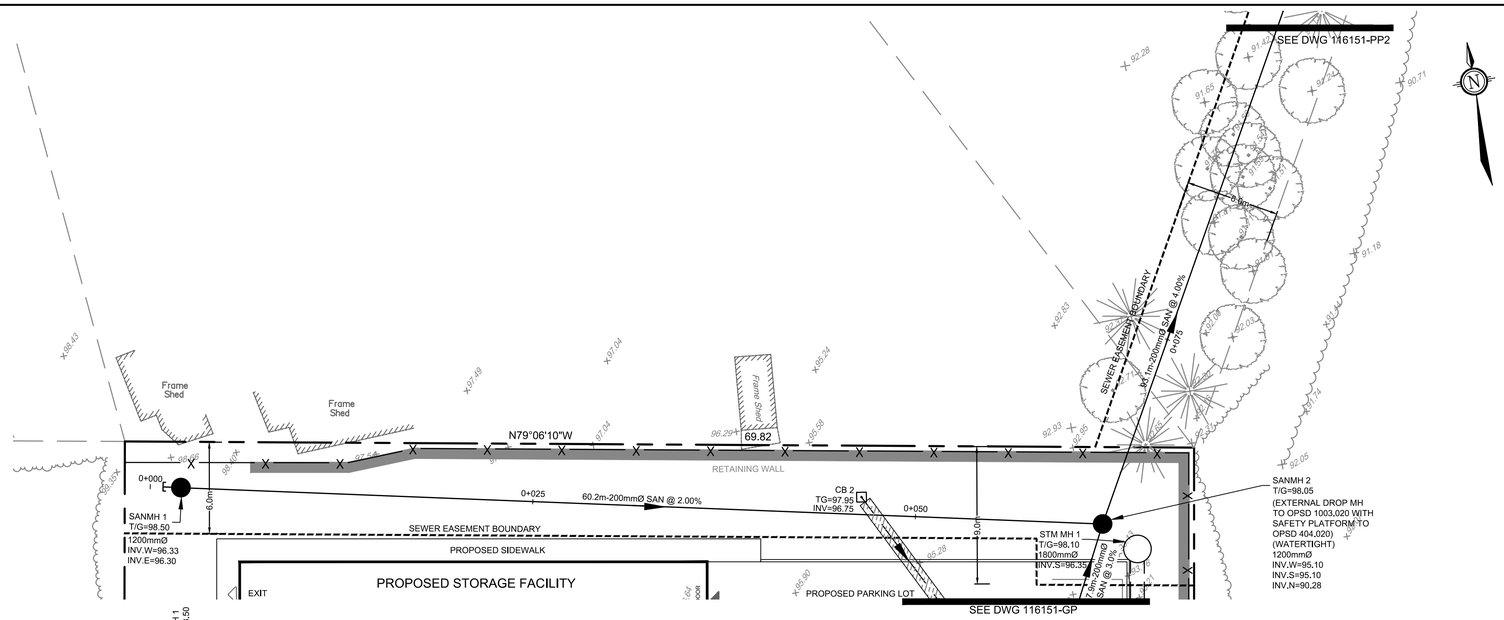

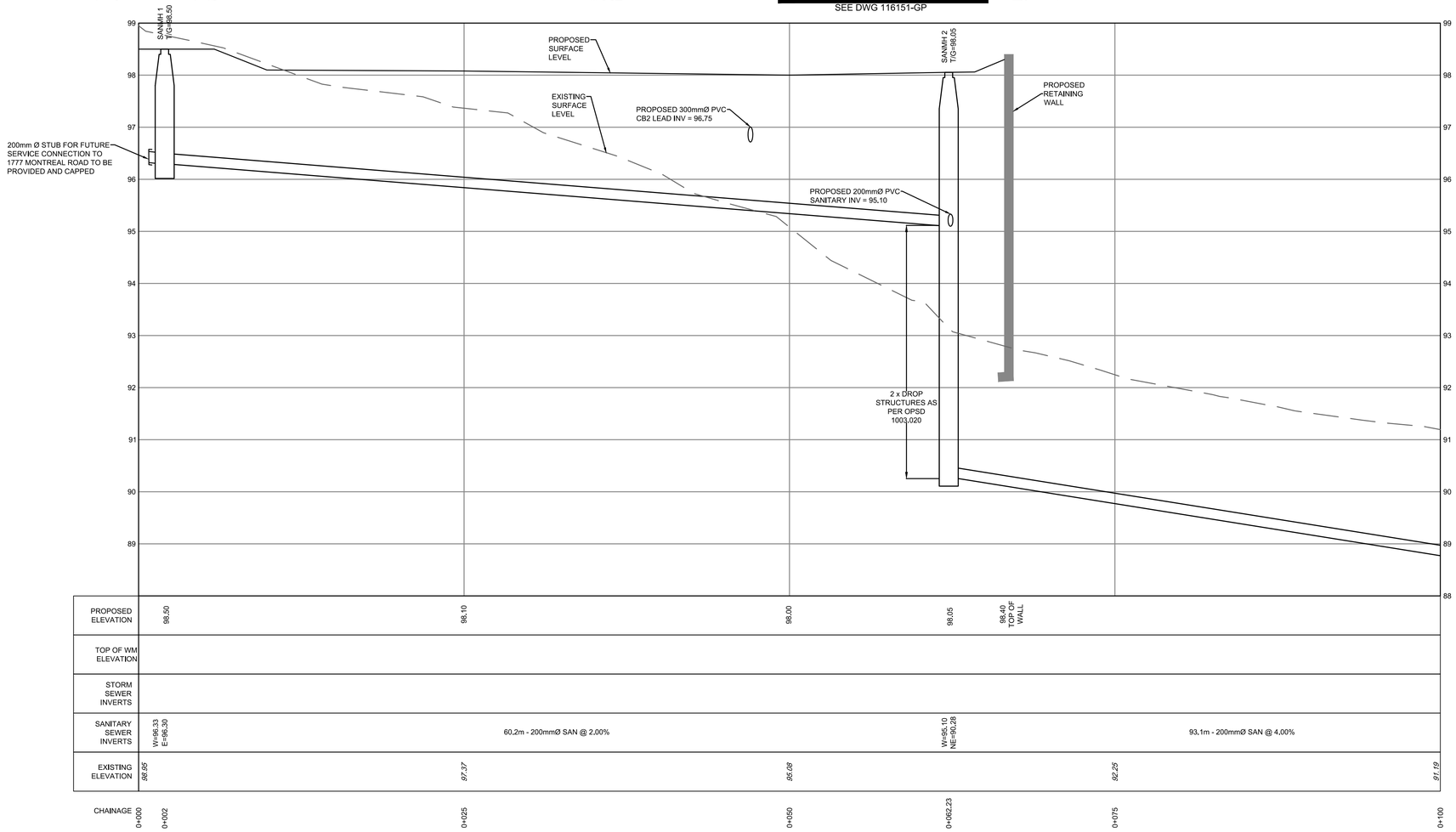

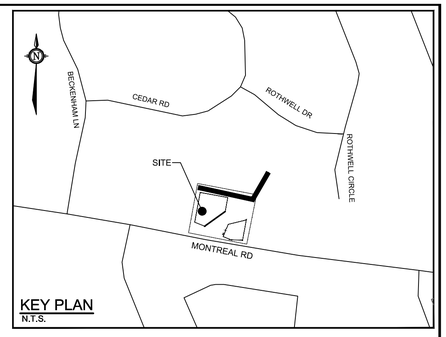

LEGEND

- SANMH 1 — PROPOSED SANITARY MH & SEWER
- STM MH 1 — PROPOSED STORM MH & SEWER
- CB 2 — PROPOSED CATCHBASIN AND LEAD
- PROPOSED BARRIER CURB
- PROPOSED RETAINING WALL
- PROPOSED FENCE
- THERMAL INSULATION
- EXISTING CONCRETE CURB
- SANMH — EXISTING SANITARY MANHOLE AND SEWER
- STMMH — EXISTING STORM MANHOLE AND SEWER
- CB — EXISTING CATCHBASIN C/W CATCHBASIN LEAD
- 300mmØ WM — EXISTING WATERMAIN
- × 97.44 — EXISTING ELEVATION

GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $2,000,000.00, INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF MUNICIPAL AUTHORITIES.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL INVESTIGATION REPORT NO. 64504.01 (DATED SEPTEMBER 6, 2017) PREPARED BY HOULE CHEVRIER ENGINEERING LTD. FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
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10. SAW CUT AND KEYGRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10 AND R25).

SANITARY SEWER NOTES:

1. SUPPLY AND CONSTRUCT ALL SEWERS AND APPURTENANCES IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.
2. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
WATERTIGHT SAN MH FRAME AND COVER	401.030	OPSD
SANITARY MANHOLE (1200Ø)	701.010	OPSD
SANITARY SEWER	PVC DR 35	
SEWER TRENCH -	BEDDING (GRANULAR 'A')	
	COVER (GRANULAR 'A' OR GRANULAR 'B' TYPE I WITH MAXIMUM PARTICLE SIZE=25mm)	

3. ALL SANITARY SERVICE LATERALS SHALL BE EQUIPPED WITH BACKFLOW PREVENTERS AS PER THE CITY OF OTTAWA STANDARD DETAILS S14 AND S14.1 OR S14.2.
4. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.
5. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL), THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.
6. CONTRACTOR TO TELEVISE ALL PROPOSED SEWERS 200mm OR GREATER IN DIAMETER TO ENSURE THAT THEY ARE CLEAN AND OPERATIONAL. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES. OBTAIN APPROVAL FROM THE CITY'S SEWER OPERATIONS. PROVIDE THE CCTV INSPECTION AND REPORT TO THE ENGINEER FOR REVIEW AND APPROVAL.
7. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL APPLICABLE SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS AND ANY ALIGNMENT CHANGES, ETC.
8. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDANCE WITH OPSS 410.07.16, 410.07.16.04 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.

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

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OTTAWA, ONTARIO, K1B 3P5

SIMON FRIGON
PHONE: (613) 736-9222
E-MAIL: storm@redteam.ca

No.	REVISION	DATE	BY
1.	ISSUED FOR SITE PLAN APPLICATION	MAR 9/18	MS

SCALE
1:200
0 2 4 6 8
HORIZONTAL
1:50
0 0.5 1.0 1.5 2.0
VERTICAL

DESIGN LGB
CHECKED MS
DRAWN LGB
CHECKED MS
APPROVED MS

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
M. SAVIC
100102651
MAR 9/18
PROVINCE OF ONTARIO

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LOCATION
1795 MONTREAL ROAD
OTTAWA, ONTARIO

DRAWING NAME
PLAN AND PROFILE
SANITARY SEWER

PROJECT No. 116151-00
REV REV # 1
DRAWING No. 116151-PP1

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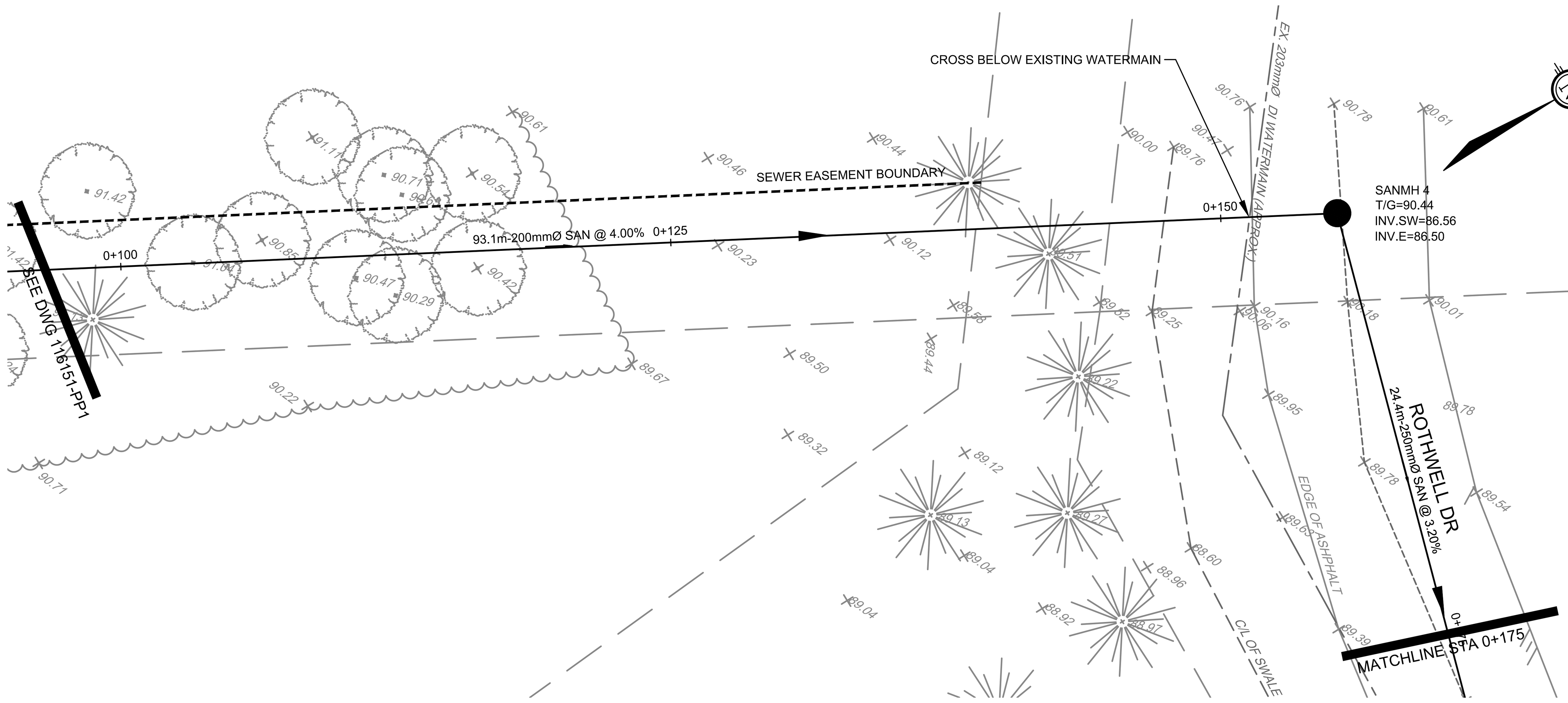

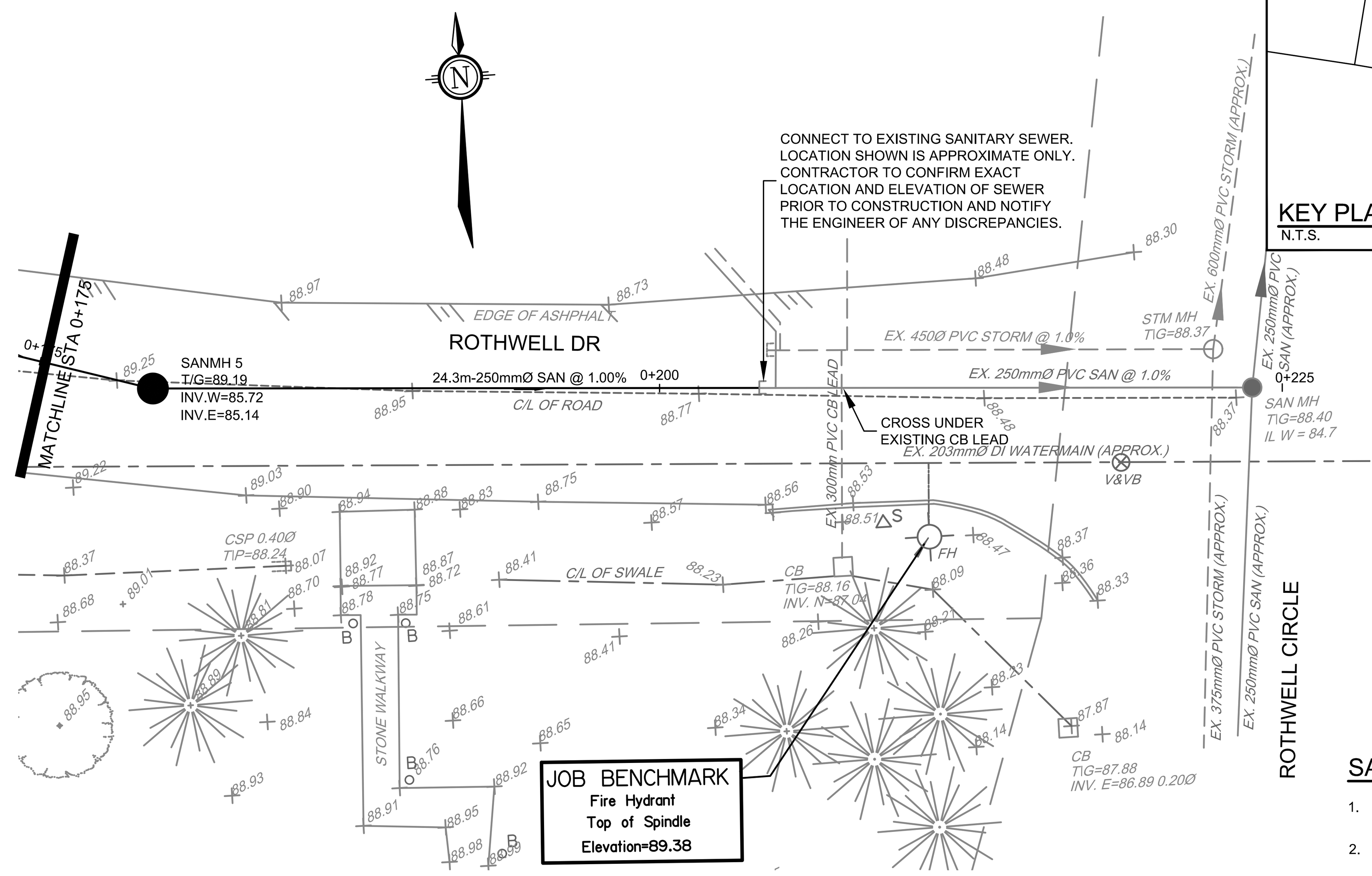

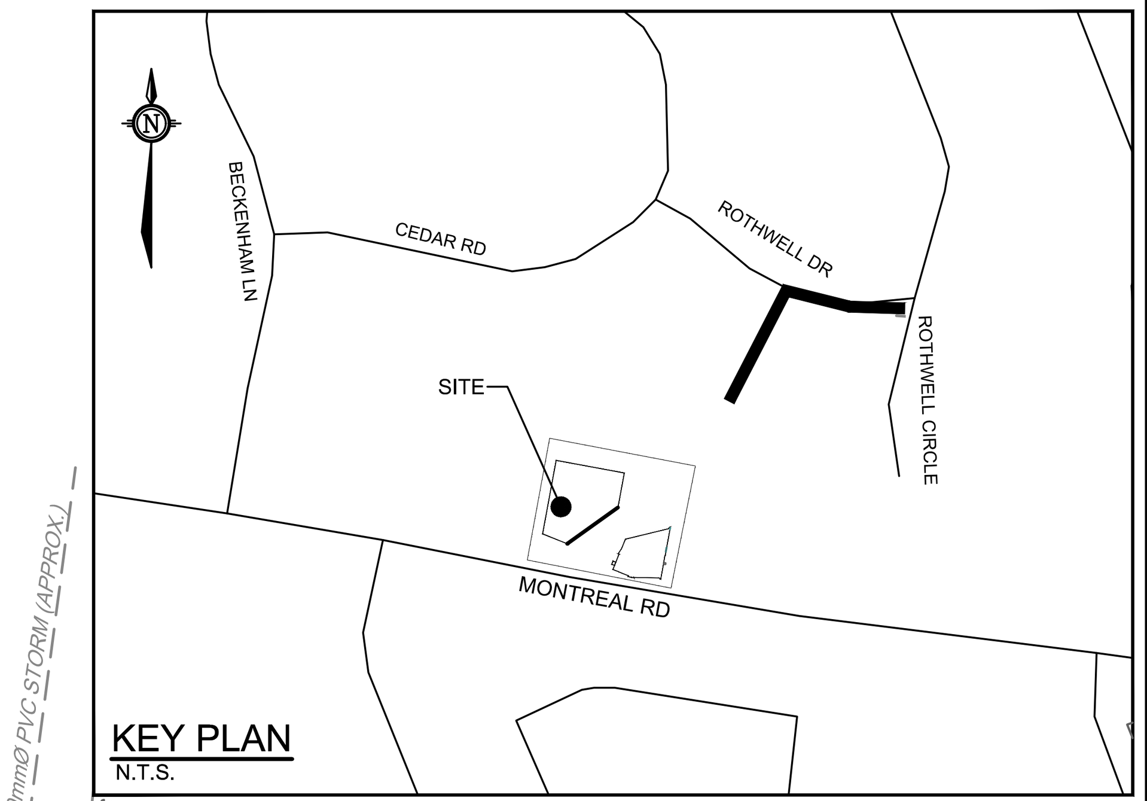

KEY PLAN
N.T.S.

LEGEND

SANMH 1	PROPOSED SANITARY MH & SEWER
	EXISTING CONCRETE CURB
SANMH	EXISTING SANITARY MANHOLE AND SEWER
STMMH	EXISTING STORM MANHOLE AND SEWER
CB	EXISTING CATCHBASIN C/W CATCHBASIN LEAD
300mmØ WM	EXISTING WATERMAIN
× 97.44	EXISTING ELEVATION

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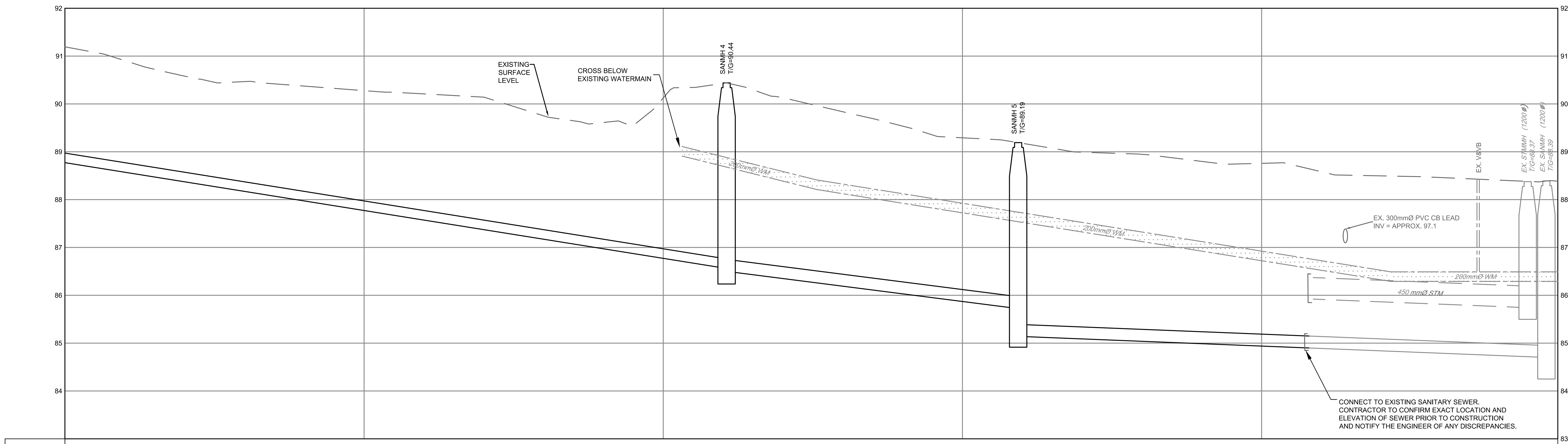

PROPOSED ELEVATION									
TOP OF WM ELEVATION			89.11	88.41	87.92		86.92	86.49	
STORM SEWER INVERTS							APPROX. 85.92	APPROX. 17.92m - 450mmØ STM @ 1.00%	W=85.74 APPROX.
SANITARY SEWER INVERTS		93.1m - 200mmØ SAN @ 4.00%	SW=86.56 E=86.50	24.4m - 250mmØ SAN @ 3.20%	W=85.72 E=85.14	24.3m - 250mmØ SAN @ 1.00%	APPROX. 84.90	APPROX. 19.8m - 250mmØ SAN @ 1.00%	W=84.70
EXISTING ELEVATION	91.19	90.28	90.13		89.29		88.76		88.38
CHAINAGE	0+100	0+125	0+150 / 0+155.29		0+175 / 0+179.66		0+200		0+222.23 / 0+223.80 / 0+224.75

GENERAL NOTES:

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