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PROPOSED COURTYARD BY MARRIOTT 40 FRANK NIGHBOR PLACE

DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT

Engineering excellence.

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**PROPOSED COURTYARD BY MARRIOTT
40 FRANK NIGHBOR PLACE**

**DEVELOPMENT SERVICING STUDY AND
STORMWATER MANAGEMENT REPORT**

Prepared by:

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May 11, 2023

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Ref: R-2023-014

Novatech File No. 123002

September 29, 2023

401 Real Estate Trust Inc.
2225 Eagle Street N.
Cambridge, Ontario
N3H 4R7

Attention: Mr. Ted Lancaster

**Re: Development Servicing Study and Stormwater Management Report
Proposed Courtyard by Marriott
40 Frank Nighbor Place, Ottawa, ON
Novatech File No.: 123002**

Enclosed is a copy of the revised 'Development Servicing Study and Stormwater Management Report' for the proposed development of the 40 Frank Nighbor Place property in the City of Ottawa. This report addresses the approach to site servicing and stormwater management, and it is being submitted in support of a Site Plan Control application.

Please contact the undersigned, should you have any questions or require additional information.

NOVATECH



François Thauvette, P. Eng.
Senior Project Manager

cc: Shika Rathnasooriya (City of Ottawa)
David Barnard (API Development Consultants Inc.)
James Sam (J+B Engineering)

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1.0 INTRODUCTION

Novatech has been retained by 401 Real Estate Trust Inc. to complete the site servicing, grading, and stormwater management design for the proposed development. This report is being submitted in support of a Site Plan Control application.

1.1 Location and Site Description

The vacant site is located at 40 Frank Nighbor Place within the Terry Fox Business Park in the west end of the City of Ottawa. The site is south of Highway 417, west of Frank Nighbor Place and east of the Carp River. The Subject Site is identified as Part of Block 2 Plan 4M1012, Part 1 Plan 4R30745 Together with an easement over Part of Block 2 Plan 4M1012, Parts 2, 3, 5, 8, 11 and 13 Plan 4R30745 as in OC1955094 City of Ottawa and is located within the City of Ottawa.

Figure 1: Aerial view of the site



1.2 Pre-Consultation Information

A pre-consultation meeting was held with the City of Ottawa on November 3, 2022, at which time the client was advised of the general submission requirements. The Mississippi Valley Conservation Authority (MVCA) was also consulted regarding the proposed development. Based on a review of **O. Reg. 525/98: Approval Exemptions**, a Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) will not be required for the proposed development. Refer to **Appendix A** for a summary of the correspondence related to the proposed development.

1.3 Proposed Development

The proposed development will consist of a 6-storey hotel with an attached restaurant and associated surface parking lots as well as loading and drop off areas. The building will also have a partial basement. Landscaped areas around the building and perimeter of the site are also included in the proposed development. The site will be serviced by the municipal sanitary sewer, storm sewer and watermain located within an existing easement immediately north of the site.

1.4 Reference Material

- ¹ The 'Terry Fox Business Park – Stormwater Design Plan' (Ref. No. 91005-3), prepared by Novatech Engineering Consultants Ltd., on August 9, 1994.
- ² The Proposed U-Haul Development - 30 Frank Nighbor Place – Development Servicing Study & Stormwater Management Report (Ref. R-2022-014) dated Dec. 5, 2022.
- ³ Preliminary Geotechnical Investigation Report (Ref. No. 02211293.000), prepared by Englobe Corp. dated May 10, 2023.
- ⁴ Ottawa Sewer Design Guidelines (October 2012) and subsequent Technical Bulletins.
- ⁵ Ottawa Design Guidelines – Water Distribution (2010) and subsequent Technical Bulletins.
- ⁶ MOE Stormwater Management Planning and Design Manual Guidelines (March 2003).
- ⁷ Ontario Provincial Standards.

2.0 SITE SERVICING

The objective of the site servicing design is to provide proper sewage outlets, a suitable domestic water supply and to ensure that appropriate fire protection is provided for the proposed development. The servicing criteria, the expected sewage flows, and the water demands are to conform to the requirements of the City of Ottawa municipal design guidelines for sewer and water distribution systems. Refer to the subsequent sections of the report for further details.

The City of Ottawa Servicing Study Guidelines for Development Applications requires that a Development Servicing Study Checklist is to be included to confirm that each applicable item is deemed complete and ready for review by City of Ottawa Infrastructure Approvals. Enclosed in **Appendix B** of the report is a completed checklist.

2.1 Sanitary Sewage

The subject site is currently undeveloped. Under post-development conditions, the proposed site will be serviced by a new 200mm dia. sanitary sewer connected to the municipal 450mm dia. sanitary sewer in the existing easement to the north. Design Criteria from the City of Ottawa Sewer Design Guidelines Appendix 4-A were used to calculate the theoretical sewage flows for the proposed development. The sanitary sewage calculations for the proposed development are based on the following criteria:

Hotel and Restaurant Use

- Average Daily Hotel (with full housekeeping) Sewage Flow: 225 L/person/day
- Average Daily Hotel Room Occupancy: 1.8 people/room
- Average Hotel/Restaurant Staff Sewage Flow: 40 L/staff/day
- Hotel Peaking Factor = 3.73 (Harmon Equation)
- Average Restaurant Sewage Flow: 125 L/seat/day
- Commercial Peaking Factor = 1.5
- Infiltration Allowance: 0.33 L/s/ha x 0.813 ha site = 0.27 L/s

Table 1 identifies the theoretical sanitary flows for the proposed development based on the above design criteria. Detailed calculations are provided in **Appendix C**.

Table 1: Theoretical Post-Development Sanitary Flows

Type of Use	Suite/Seat/Staff Count	Design Population	Average Flow (L/s)	Peaking Factor	Peak Flow (L/s)
Hotel Suites	115 suites	207	0.54	3.73	2.01
Hotel/Restaurant Staff	50 staff	50	0.02	1.5	0.03
Restaurant Seats	285 seats	285	0.41	1.5	0.62
Infiltration Allowance	0.813 ha	-	-	-	0.27
Total	-	542	0.97*	-	2.93*

*Represents rounded values.

A 200mm dia. sanitary sewer at a minimum slope of 1.0% has a full flow conveyance capacity of 34.2 L/s and will have enough capacity to convey the theoretical sanitary flows for the proposed development. Refer to the enclosed **General Plan of Services** (123002-GP) and to **Appendix C** for detailed sanitary sewage calculations.

2.2 Water for Domestic Use and Fire Protection

The subject site is located within the City of Ottawa 3W watermain pressure zone. The proposed development will be serviced by a new 150mm dia. private watermain looped off the existing 300mm dia. watermain in the easement to the north and in Frank Nighbor Place. The hotel will be fully-sprinklered and equipped with fire department (siamese) connection located within 45m of the new on-site fire hydrant. The proposed on-site watermain will be 150mm dia. in size with two (2) 150mm dia. service laterals, due to the sprinkler flow requirements and the anticipated average daily water demand being greater than 50m³/day (0.58 L/s). The private watermain and building services have been sized to provide both the required domestic water demand and fire flow. Shut-off valves will be provided on the proposed watermain at the property lines as well as on the building services. The water meter will be within the mechanical room, while the remote meter will be located on the exterior face of the larger building.

To determine if the existing 300mm dia. municipal watermain has adequate capacity to accommodate the proposed development a hydraulic analysis was completed based on boundary conditions provided by the City of Ottawa.

2.2.1 Water Demands and Watermain Analysis

The theoretical water demands for the proposed development were based on the design criteria from the City of Ottawa Water Distribution Guidelines. The Fire Underwriters Survey (FUS) method was used to calculate the fire flows based on general assumptions and information provided by the architect. The water demands are calculated based on the following criteria:

- Average Daily Hotel Room (with full housekeeping) Water Demand: 225 L/person/day
- Average Daily Hotel Room Occupancy: 1.8 people/room
- Maximum Day Demand Peaking Factor = 2.5 x Avg. Day Demand (City Water Table 4.2)
- Peak Hour Demand Peaking Factor = 2.2 x Max. Day Demand (City Water Table 4.2)
- Average Hotel/Restaurant Staff Water Demand: 40 L/staff/day
- Average Restaurant Water Demand: 125 L/seat/day
- Maximum Day Demand Peaking Factor = 1.5 x Avg. Day Demand (City Water Table 4.2)
- Peak Hour Demand Peaking Factor = 1.8 x Max. Day Demand (City Water Table 4.2)

Table 2 identifies the theoretical domestic water demands and fire flow requirements for the development based on the above design criteria.

Table 2: Theoretical Water Demand for Proposed Development

Type of Use	Room/Seat/Staff Count	Design Population	Average Day Demand (L/s)*	Max. Day Demand (L/s)	Peak Hour Demand (L/s)
Hotel Suites	115 suites	207	0.54	1.35	2.97
Hotel/Restaurant Staff	50 staff	50	0.02	0.03	0.06
Restaurant Seats	285 seats	285	0.41	0.62	1.11
Total	-	542	0.97**	2.00**	4.14**

*Based on design criteria and demands similar to values in Table 1.

**Represents rounded values.

The fire flow requirements were calculated using the Fire Underwriters Survey (FUS). Based on information provided by the architect, the fire flow requirements for the buildings are expected to be in the order of 133 L/s, including both sprinkler system and hose allowances in accordance with the OBC and NFPA 13. The sprinkler system will be designed by the fire protection (sprinkler) contractor as this process involves detailed hydraulic calculations based on building layout, pipe runs, head losses, fire pump requirements, etc. Pressure reducing valves will be required as system pressures will exceed 80 psi. Consequently, booster pumps are not anticipated to be required. Refer to **Appendix D** for detailed calculations and correspondence from the City of Ottawa.

As discussed with the City of Ottawa, a multi-hydrant approach to firefighting is anticipated to be required to achieve the maximum fire flow requirements on-site. In addition to the nearby existing hydrants, a new private fire hydrant is being proposed on-site. Based on the City of Ottawa Technical Bulletin ISTB-2018-02, Class AA (blue bonnet) hydrants within 75m have a maximum capacity 95 L/s while hydrants between 75m and 150m have a maximum capacity 63 L/s (at a pressure of 20 PSI). The combined maximum flow from the various nearby fire hydrants should exceed the Max Day + Fire Flow requirement of the proposed development. This multi-hydrant approach to firefighting is in accordance with the City of Ottawa Technical Bulletin ISTB-2018-02. **Table 2.1** summarizes the total theoretical combined fire flow available from the nearby fire hydrants and compares it to the fire flow demands based on FUS calculations.

Table 2.1: Fire Protection Summary Table

Building Type	Fire Flow Demand (L/s)	Fire Hydrant(s) within 75m (~ 95 L/s each)	Fire Hydrant(s) within 150m (~ 63 L/s each)	Theoretical Combined Available Fire Flow (L/s)
Hotel + Restaurant	133	1	3	>133

Preliminary domestic water demands, and fire flow requirements were provided to the City of Ottawa. **Table 2.2** summarizes preliminary hydraulic analysis results based on municipal watermain boundary conditions provided by the City of Ottawa.

Table 2.2: Hydraulic Boundary Conditions Provided by the City

Municipal Watermain Boundary Condition	Boundary Condition	Normal Operating Pressure Range (psi)	Anticipated WM Pressure (psi)
Connection #1 to existing 300mm dia. WM in private access road North of Site*			
Minimum HGL (Peak Hour Demand)	156.5 m	40 psi (min.)	~ 87.6 psi
Maximum HGL (Max Day Demand)	161.3 m	50 - 70 psi	~ 94.4 psi
HGL (Max Day + Fire Flow) (2 L/s + 133 L/s)	154.4 m	20 psi (min.)	~ 84.6 psi
Connection #2 to existing 300mm dia. WM in Frank Nighbor Place East of Site**			
Minimum HGL (Peak Hour Demand)	156.5 m	40 psi (min.)	~ 87.9 psi
Maximum HGL (Max Day Demand)	161.3 m	50 - 70 psi	~ 94.7 psi
HGL (Max Day + Fire Flow) (2 L/s + 133 L/s)	153.9 m	20 psi (min.)	~ 84.2 psi

*Based on an approximate ground elevation of 94.9m on-site.

**Based on an approximate ground elevation of 94.7m on-site.

Design pressure = (HGL – ground elevation) x 1.42197 PSI/m.

The following design criteria were taken from Section 4.2.2 – ‘Watermain Pressure and Demand Objectives’ of the City of Ottawa Design Guidelines for Water Distribution:

- Normal operating pressures are to range between 345 kPa (50 psi) and 483 kPa (70 psi) under Max Day demands.
- Minimum system pressures are to be 276 kPa (40 psi) under Peak Hour demands.
- Minimum system pressures are to be 140 kPa (20 psi) under Max Day + Fire Flow demands.

The hydraulic model EPANET was used to analyzing the performance of the proposed watermain configuration for four (4) theoretical conditions:

- Average Daily Demand
- Peak Hour Demand

- Maximum HGL
- Maximum Day + Fire Flow Demand

A schematic representation of the hydraulic network depicts the node and pipe numbers used in the model. The model is based on hydraulic boundary conditions provided by the City of Ottawa. **Tables 2.3, 2.4, 2.5** and **2.6** summarize the hydraulic model results. The values demonstrate that fire flow conditions for the building can be met. Refer to **Appendix D** for City of Ottawa boundary conditions, the hydraulic modeling schematic and modeling results.

Table 2.3: Average Daily Demand

Operating Condition	Minimum System Pressure	Maximum System Pressure
Average daily demand of 0.97 L/s at J6 (Bldg)	Minimum system pressure of 645.50 kPa (93.62 psi) is available at Node J6 (Bldg)	Maximum system pressure 676.89 kPa (98.17 psi) is available at Node J2 (on-site watermain near connection to municipal WM)

Table 2.4: Peak Hour Demand

Operating Condition	Minimum System Pressure	Maximum System Pressure
Peak Hour demand of 4.1 L/s at J6 (Bldg)	Minimum system pressure of 598.12 kPa (86.75 psi) is available at Node J6 (Bldg)	Maximum system pressure 629.80 kPa (91.35 psi) is available at Node J2 (on-site watermain near connection to municipal WM)

Table 2.5: Maximum HGL

Operating Condition	Minimum System Pressure	Maximum System Pressure
Max Day demand of 2 L/s at J6 (Bldg)	Minimum system pressure of 645.40 kPa (93.61 psi) is available at Node J6 (Bldg)	Maximum system pressure 676.89 kPa (98.17 psi) is available at Nodes J1 and J2 (on-site watermain)

Table 2.6: Maximum Day + Fire Flow Demand

Operating Condition	Minimum System Pressure	Maximum System Pressure
Max Day demand of 2 L/s at J6 (Bldg) and a demand of 133 L/s at J4 (on-site Hydrant)	Minimum system pressure of 508.26 kPa (73.72 psi) is available at Node J4 (on-site Hydrant)	Maximum system pressure 602.14 kPa (87.33 psi) is available at Node J2 (on-site watermain near connection to municipal WM)

The model indicates that the municipal watermain and private on-site watermain will provide adequate fire flow during 'Max Day + Fire Flow' conditions, however, pressure reducing valves will be required as system pressures will exceed 80 psi during 'Average Day', 'Peak Hour' and 'Max Day' conditions.

2.3 Storm Drainage and Stormwater Management

The proposed development will be serviced by connecting the new on-site storm sewer system to the existing 1050mm diameter storm sewer in the easement within the private access road to

the north. The approach for the stormwater management design for the site is discussed in the subsequent sections of the report.

On-site stormwater management will include both stormwater quantity and quality control measures. Post-development storm flows will be controlled to a maximum release rate of 50 L/s/ha as defined in the 'Terry Fox Business Park – Stormwater Design Plan'¹ by means of an inlet control device (ICD) located within the on-site storm sewer system. Stormwater quality control measures (i.e., an Enhanced Level of Treatment equivalent to 80% Total Suspended Solids removal) will be achieved using an oil/grit separator prior to releasing flows towards the Carp River. As such, the stormwater management design will meet the requirements of the City of Ottawa and the Mississippi Valley Conservation Authority (MVCA).

2.3.1 Stormwater Management Criteria and Objectives

The stormwater management (SWM) criteria have been provided during pre-consultation meetings with the City of Ottawa and the MVCA. The SWM criteria and objectives are as follows:

- Maintain existing drainage patterns.
- Provide a dual drainage system (i.e., minor system and emergency overland flow route, for events exceeding the 100-year design storm).
- Control the post-development flows from the site to the maximum allowable release rate of 50 L/s/ha for both the 5-year and 100-year design storms, as defined in the 'Terry Fox Business Park – Stormwater Design Plan'¹.
- Ensure that no surface ponding will occur on the paved surfaces (i.e., private drive aisles or parking lots) during the 2-year storm event.
- Ensure that a maximum of 0.35m of surface ponding will occur on the paved surfaces (i.e., private drive aisles or parking lots) during the 100-year storm event.
- Ensure that the surface ponding limits do not touch any part of the building envelope and remain below the lowest building opening during the stress test event (100-year + 20%).
- Provide on-site water quality control equivalent to an 'Enhanced' Level of Protection (i.e., minimum 80% TSS removal) as required by the MVCA prior to releasing flows from the site towards the Carp River.
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

2.3.2 Pre-Development Conditions and Allowable Release Rate

The uncontrolled pre-development flows from the 0.813 ha site were calculated using the Rational Method and are summarized below in **Table 3**. The allowable minor system release rate for the proposed site, as specified in the 'Terry Fox Business Park – Stormwater Design Plan'¹, was calculated to be 40.7 L/s (50 L/s/ha x 0.813 ha). The proposed site is located within 'Drainage Basin 1' as defined on Figure 2. Refer to **Appendix E** for detailed calculations and excerpts from the 'Terry Fox Business Park–Stormwater Design Plan'¹.

The 'Terry Fox Business Park-Stormwater Design Plan' indicates that major system flows can be allowed to outlet uncontrolled to the Carp River, following defined overland drainage routes. However, the City generally requires sites to provide sufficient on-site storage to contain all runoff up to and including the 100-year design event. Furthermore, there have been additional studies and models of the Carp River since the publication of the 'Terry Fox Business Park Stormwater Design Plan' which could potentially impact the recommendations from this report. As such, the

site has been designed to control the total post-development flow (controlled and uncontrolled areas) to a maximum release rate corresponding to 50 L/s/ha for all storms events up to and including the 100-year design event.

Table 3: Summary of Pre-Development Storm Flows

Return Period	Pre-Development Flow (L/s)	Allowable Flow (L/s)
2-Year	34.7	40.7
5-Year	47.1	
100-Year	100.9	

2.3.3 Post-Development Conditions

Post-Development stormwater runoff will be collected by the proposed storm sewer system. Stormwater runoff from the proposed building roof will be directed to the surface, via roof drains and internal plumbing to gooseneck outlets. As a result, the building will be hydraulically disconnected from the storm sewer system. Due to the existing grades, runoff from the perimeter of property will sheet drain uncontrolled offsite and ultimately drain to the Carp River.

Flow from the proposed on-site storm sewers will outlet to the existing 1050mm diameter storm sewer, which discharges directly to the Carp River, approximately 80m to the west of the proposed connection point. To mitigate the stormwater related impacts due to the increase in imperviousness of the site, the minor system flows will be attenuated using an inlet control device (ICD) installed within the outlet pipe of CBMH116.

Storm Sewer Design

The proposed storm sewers have been sized to convey the uncontrolled 5-year storm event using the Rational Method. The design criteria used in sizing the storm sewers are summarized in **Table 3.1**. It should be noted that the pipes were oversized to provide additional underground storage to ensure no ponding in the 2-year event. Refer to **Appendix E** for the storm sewer design sheet. The corresponding Post-Development Storm Drainage Area Plan (123002-STM2) is provided in **Appendix G**.

Table 3.1: Storm Sewer Design Parameters

Parameter	Design Criteria
Local Roads	5 Year Return Period
Storm Sewer Design	Rational Method
IDF Rainfall Data	City of Ottawa Sewer Design Guidelines
Initial Time of Concentration (Tc)	10 min
Minimum Velocity	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

2.3.4 Stormwater Management Modeling

The City of Ottawa Sewer Design Guidelines (October 2012) requires hydrologic / hydraulic modeling for all dual drainage systems. The performance of the proposed storm drainage system for the site was evaluated using the PCSWMM hydrologic / hydraulic model. The results of the analysis were used to:

- Determine the total runoff from the site.
- Size the required ICD and restrictor pipe.
- Determine the required storage volumes.
- Calculate the storm sewer hydraulic grade line and ponding elevations for the 5-year and 100-year design events.

The PCSWMM model schematics and model output files are provided in **Appendix E**.

2.3.4.1 Design Storms

The hydrologic analysis was completed using the following synthetic design storms:

- 3-hour Chicago storm distribution
- 12-hour SCS Type II storm distribution

The return periods analyzed include the 2-year, 5-year and 100-year storm events. The IDF parameters used to generate the design storms were taken from the *City of Ottawa Sewer Design Guidelines* (October 2012). It was determined after analyzing the results that the 3-hour Chicago distribution generated the highest peak flows for both the minor and major systems and was determined to be the critical storm distribution for the design of the storm drainage system.

Stress Test Event

The proposed drainage system was also 'stress tested' using a 100-year (+20%) 3-hour Chicago design storm. This design storm has a 20% higher intensity and total volume compared to the 100-year event.

2.3.4.2 Model Development

Storm Drainage Areas

For modeling purposes, the site has been divided into sub-catchments based on the drainage areas tributary to each inlet of the proposed storm sewer system. The sub-catchment areas are shown on the Post-Development Storm Drainage Area Plan (123002-STM2).

The hydrologic modeling parameters for each sub-catchment were developed based on the Site Plan and the Post-Development Storm Drainage Area Plan specified above. Sub-catchment parameters are provided below in **Table 3.2**.

Table 3.2: Sub-catchment Parameters

Area ID	Catchment Area (ha)	Runoff Coefficient (C)	Percent Impervious (%)	Zero-Imperv. (%)	Equiv. Width / Flow Length (m)		Average Slope (%)
Uncontrolled Areas							
A-0a	0.019	0.20	0.0	0	5	38	7.5
A-0b	0.001	0.33	18.6	0	2	7	2.0
A-0c	0.015	0.20	0.0	0	4	38	14.5
A-0d	0.036	0.57	52.9	0	6	60	4.0
TOTAL (Uncontrolled)	0.071	0.39	27.1	-	-	-	-
Controlled Areas							
A-1a	0.028	0.87	95.7	0	8	35	1.5
A-1b	0.058	0.89	98.6	0	12	48	2.0
A-1c	0.068	0.85	92.9	0	17	40	2.0
A-1d	0.057	0.85	92.9	0	15	38	2.0
A-1e	0.100	0.85	92.9	0	16	63	2.0
A-1f	0.106	0.85	92.9	0	16	66	2.0
A-1g	0.079	0.79	84.3	0	16	49	2.0
A-1h	0.074	0.84	91.4	0	15	49	2.0
R-1	0.107	0.90	100.0	100	38	28	0.5
R-2	0.065	0.90	100.0	100	24	27	0.5
TOTAL (Controlled)	0.742	0.86	94.0	-	-	-	-
TOTAL	0.813	0.82	88.0	-	-	-	-

Infiltration

Infiltration losses for all sub-catchments were modelled using Horton's infiltration equation, which defines the infiltration capacity of soil over the duration of a precipitation event using a decay function that ranges from an initial maximum infiltration rate to a minimum rate as the storm progresses. The default values for the City of Ottawa were used for all catchments.

Horton's Equation:	Initial infiltration rate: $f_0 = 76.2$ mm/hr
$f(t) = f_c + (f_0 - f_c)e^{-k(t)}$	Final infiltration rate: $f_c = 13.2$ mm/hr
	Decay Coefficient: $k = 4.14$ /hr

Depression Storage

The default values for depression storage in the City of Ottawa were used for all catchments. Rooftops were assumed to provide no depression storage (zero-impervious parameter).

- Depression Storage (pervious areas): 4.67 mm
- Depression Storage (impervious areas): 1.57 mm

Equivalent Width

'Equivalent Width' refers to the width of the sub-catchment flow path. This parameter (Table 5.1) is calculated as described in Section 5.4.5.6 of the City of Ottawa Sewer Design Guidelines. The flow paths used to generate an average flow length for each subcatchments are shown on the model schematics (Refer to **Appendix E**).

Impervious Values

Runoff coefficients for each sub-catchment area were determined based on the proposed site plan. Refer to the Post-Development Storm Drainage Area Plan (123002-STM2) for details. Percent impervious values were calculated using:

$$\%imp = (C - 0.20) / 0.70$$

Storage Nodes

The PCSWMM model for development utilizes storage nodes for each catchbasin and catchbasin manhole inlet to represent the underground and surface storage for each drainage area. Additionally, storage nodes are used instead of junctions in the model to improve stability and reduce the routing errors when running the model.

Downstream Boundary Conditions

Due to the proximity of the 1050mm diameter sewer outlet, the HGL elevation in the connecting pipe is directly correlated to the Carp River water elevations. The model was run using the Carp River water elevations as outfall boundary conditions for the different storm events. The water elevations in the Carp River were taken derived from the PCSWMM 2021 Carp River model run. The elevations are provided below in **Table 3.3**.

Table 3.3: Boundary Conditions

Return Period	Carp River Water Elevation (m)	
	PCSWMM 2021	MVCA
25mm	92.85	N/A
2-Year	93.22	N/A
5-Year	93.43	N/A
100-Year	94.02	94.10

It should be noted that there is a discrepancy in the 100-year floodplain elevation between the elevation provided by the Conservation Authority (94.10m) and the elevation from the Carp River model run (94.02m). The floodplain limit shown on the engineering drawings is based on the 100-year elevation provided by the Conservation Authority.

As previously noted, the PCSWMM model was run for the 2-year, 5-year, and 100-year storm events to determine the total runoff from the site and calculate the required storage volumes. For each storm event, the corresponding boundary condition shown in **Table 3.3** was applied at the outfall. The 100-year boundary condition was used when running the stress test event. An analysis of the impacts of the proposed development to the Carp River model has been performed (refer to **Section 2.3.6**) which will allow the site to be run in a model using the Carp River model boundary condition.

Initial Conditions (Hotstart File)

In addition to the outfall boundary condition, the PCSWMM model uses a 'hotstart' file which is updated each time the outlet boundary condition is adjusted. The 'hotstart' file improves model stability by applying an initial water depth corresponding to the downstream boundary condition to all conduits, junctions, and storage nodes.

The 'hotstart' file creates an initial condition where any potential underground storage below the boundary condition elevation is full at the start of the simulated design storm event. Consequently, the storage required to control post-development peak flows to the allowable release rate is limited to the storage available above the boundary condition elevation.

2.3.4.3 Model Results

The on-site storage and conveyance system requirements were refined using the PCSWMM model. The model was used to ensure that peak flows are controlled to the allowable release rates, confirm that the 100-year hydraulic grade line is contained on-site, and that there will be no surface ponding during the 2-year storm event.

Post-development Controlled Site Flow (Drainage Area: A-1a to A-1h, R-1, and R-2)

The post-development flow from the controlled areas of the site (including building roofs, paved areas, and landscaped areas) will be attenuated using an ICD on the outlet pipe from CBMH 116. Stormwater runoff from the upstream drainage areas will be temporarily stored within the underground storm sewer system and on the surface of the paved parking lot prior to being discharged into the 1050mm diameter storm sewer.

Table 3.4 summarizes the post-development design flow as well as the size of the ICD, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year, and the 100-year design events.

Table 3.4: Design Flow and ICD Table

Design Event	ICD Located at CBMH 116			
	ICD Size (mm)	Max. Ponding Elevation (m)	Design Head ⁽¹⁾ (m)	Release Rate (L/s)
2-Year	109mm dia. orifice plate	94.79	1.57	31.6
5-Year		94.97	1.54	31.3
100-Year		95.10	1.08	25.2

⁽¹⁾ Note: Design head is the difference between the max. ponding elevation and the Carp River boundary condition water levels from Table 3.3.

Note that the release rates are larger in the smaller storm events due to the backwater effects from the Carp River, which reduces the design head on the ICD and results in a lower flow rate through the ICD during the larger storm events. Refer to **Appendix E** for SWM calculations.

Table 3.5 summarizes the post-development required and provided storage volumes for the 2-year, 5-year, and the 100-year design events.

Table 3.5: Required and Provided Storage Volumes

Design Event	Controlled Areas (Subcatchments A-1a to A-1h, R-1, and R-2)					Total Available Storage Volume (m ³)
	Required Storage Volume (m ³)				Total Storage (Including Dead Storage)	
	Dead Storage ⁽¹⁾	Active Storage		Total Active Storage		
Available Underground Storage ⁽²⁾		Surface Ponding				
2-Year	32	46	0	46	78	380 m ³
5-Year	53	26	53	79	132	
100-Year	69	10	258	268	337	

⁽¹⁾ Note: Dead storage refers to the underground storage that is assumed to be filled at the start of the storm event due to the backwater effects from the boundary conditions listed in Table 3.3.

⁽²⁾ Note: Active underground storage refers to the underground storage above the dead storage that is utilized during the storm event.

The model results demonstrate that there is sufficient storage for the 2-year, 5-year, and 100-year design events, and that there will be no ponding during the 2-year storm event. Furthermore, the site grading design will ensure that surface ponding depths will not touch the building envelope or lowest building openings during the 100-year+20% stress test.

Summary of Post-Development Flows

Table 3.6 compares the post-development site flows from the proposed development to the uncontrolled pre-development flows and to the maximum allowable release rate specified by the City of Ottawa, for the 2-year, 5-year, and the 100-year design events.

Table 3.6: Stormwater Peak Flow Comparison Table

Return Period	Pre-Development Peak Flow (L/s)	Allowable Release Rate (L/s)	Post-Development Peak Flow (L/s)			
			Direct Runoff	Controlled Areas	Total	Change from Pre to Post (L/s or %)*
			A-0a & A-0d	A-1a to A-1h, R-1 & R-2		
2-year	34.7	40.7	5.3	31.6	36.9	2.2 or 6%
5-year	47.1		7.2	31.3	38.5	-8.6 or -18%
100-year	100.9		14.4	25.2	39.6	-61.3 or -61%

* Compared to pre-development conditions (negative values represent decrease between pre-development flows and post-development flows).

As indicated in the table above, the 2-year, 5-year, and 100-year post-development flows will be less than the maximum allowable release rate for the site. Furthermore, except for the 2-year storm event, this represents significant reductions in total site flow rates when compared to the respective pre-development conditions. The 2-year peak flow only slightly exceeds pre-development levels, and this is mostly due to the sizing of the ICD for the 100-year boundary condition at the Carp River where the higher boundary condition reduces the head (and flow) at the ICD.

Hydraulic Grade Line (HGL)

The PCSWMM model was used to estimate the hydraulic grade line (HGL) elevation of the of the storm sewer system during the 100-year storm event. **Table 3.7** provides a summary of the 100-year HGL elevation at each storm manhole and CBMH within the proposed development.

Table 3.7: Hydraulic Grade Line (HGL) Elevations

MH ID	Invert Elevation (m)	T/G Elevation (m)	100-yr HGL Elevation (m)	Surcharge (m)	Clearance from T/G (m)	HGL in Stress Test (m)
CBMH100	93.19	95.05	95.10	1.38	-0.05	95.12
CBMH102	93.13	94.95	95.10	1.44	-0.15	95.12
CBMH104	93.04	94.90	95.10	1.53	-0.20	95.11
CBMH106	92.97	94.90	95.10	1.60	-0.20	95.11
CBMH110	92.77	94.80	95.10	1.72	-0.30	95.11
CBMH112	92.95	94.85	95.10	1.54	-0.25	95.11
CBMH114	92.87	94.80	95.10	1.62	-0.30	95.11
CBMH116	92.74	94.80	95.10	2.05	-0.30	95.11
LD01	93.74	95.26	95.19	1.25	0.07	95.27
MH108	92.83	95.14	95.10	1.66	0.04	95.11
OGS	92.69	94.94	94.11	1.11	0.83	94.12

Notes: Based on PCSWMM Model Results for a 3-hour Chicago Storm.
Negative clearance from T/G values indicate surface ponding.

Stress Test

Table 3.7 also provides the estimated HGL elevations for the ‘stress test’ event. The stress test event represents a 20% increase (rainfall intensity and total precipitation) in the 100-year design event. The ‘stress test’ event will not be confined within the storm sewer system. Ponding will occur within the parking lot sags and will cascade off-site. The major system overland flow will be diverted through overland pathways and spill off-site towards the Carp River.

Foundation Drains

Due to the proximity of the Carp River and the HGL within the municipal storm sewer system, flow from the building weeping tile (partial basement) will be pumped to the surface, hydraulically disconnected from the on-site storm sewer system. Back-up power will be provided for the pumps. Consequently, there are no concerns with the surcharged HGL elevations. As indicated on the Grading and Erosion Sediment Control Plan (123002-GR) the site grading will allow stormwater to pond within the parking lot and overflow downstream before impacting the building.

2.3.5 Stormwater Quality Control

The subject site is located within the jurisdiction of the Mississippi Valley Conservation Authority (MVCA) and is tributary to the Carp River. Based on preliminary feedback from the MVCA, surface parking lots and drive aisles will require an ‘Enhanced’ Level of Protection (i.e., 80% TSS removal). Landscaped areas and roof tops are considered clean for the purposes of water quality and aquatic habitat protection.

To achieve this level of quality control protection, a new oil-grit separator unit (CDS Model PMSU 2020-5) will be installed downstream of CBMH 116 on the storm sewer outlet pipe from the site. Stormwater runoff collected by the on-site storm sewer system (0.742 ha tributary area) will be directed through the proposed treatment unit. The contributing area includes the proposed building roof, paved parking lots and some landscaped areas.

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 into the 1050mm diameter storm sewer. Echelon Environmental and Contech Stormwater Solutions Inc. have modelled 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 2020-5 will exceed the target removal rate, providing a net annual 82.5% TSS removal. The CDS unit has a treatment capacity of approximately 31 L/s, a sediment storage capacity of 1.1 m³; an oil storage capacity of 376 L, will treat a net annual volume of approximately 89.2% for the tributary area. The OGS unit was sized to account for the tailwater conditions in Carp River. A custom weir height of 686mm in the unit will provide effective treatment of stormwater up to the 2-year water elevation in the Carp River. Refer to correspondence with Echelon Environmental and notes on the CDS unit detail provided in **Appendix F**. The unit has also been designed to ensure all floatable materials will remain captured during the larger storm events. The on-site catchbasins and storm manhole structures will be equipped with sumps to promote additional settling of sediment.

Maintenance and Monitoring

It is recommended that the client implement a maintenance and monitoring program for both the on-site storm sewers and the stormwater management systems: The storm drainage system should be inspected routinely (at least annually); the ICD should be inspected to ensure it is 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 design parameters, sizing analysis, operation, design, performance, and maintenance summary parameters as well as the annual TSS removal efficiency data.

2.3.6 Carp River Watershed PCSWMM Model

The City of Ottawa has developed a PCSWMM model of the Carp River subwatershed and indicated that all new development within the watershed is to be represented in this model to confirm that the cumulative impacts of development are accounted for and that the proposed stormwater management strategies will have no adverse impact on water levels in the Carp River.

To evaluate the impact of the proposed development on the downstream Carp River, the 40 Frank Nighbor PCSWMM model was integrated into the Carp River Watershed PCSWMM model provided by the City, following the protocol outlined in the *City of Ottawa Carp River PCSWMM Model Documentation*.

Boundary Conditions & Release Rates

The stormwater management design for the site was evaluated using fixed boundary condition water levels, assuming that any underground storage below the boundary condition elevation is full at the start of the simulation. This is a conservative approach that ensures that the proposed design will provide sufficient quantity control storage above the boundary condition elevation for all storm events.

The Carp River PCSWMM model simulates the change in water levels in the Carp River over the course of the modelled storm event. Consequently, the maximum flow rate through the proposed ICD is higher in this model, as the SWM design (storage requirements and ICD sizing) were based on a fixed boundary condition water level. In the Carp River model, the peak flow from the site

occurs in advance of the maximum water levels in the Carp River, resulting in a greater head on the orifice and higher flows.

Design Storms

The Carp River PCSWMM model uses the 12hr SCS distribution as the critical design event, as this distribution results in the highest peak flows and water levels in the Carp River. The SWM design for the proposed development is based on the 3hr Chicago storm, as this storm distribution results in the highest peak flows and storage requirements for the site.

Model Results

The results of the analysis indicate that the proposed development will not have an adverse effect on the downstream watercourses, as the outflows from the development are to be controlled to an allowable release rate of 50 L/s/ha as defined in the 'Terry Fox Business Park – Stormwater Design Plan'¹ which is less than the existing flows into the Carp River West Tributary.

Table 3.8 provides a comparison of the 100-year water levels and flows along the main Branch of the Carp River between the updated Carp River Models and the original 2021 models provided by the City of Ottawa.

Table 3.8: 100-year Flows and Water Levels in Carp River

Location on Carp River	PCSWMM Node	Original 2021		With 40 Frank Nighbor	
		Flow (m ³ /s)	Water Level (m)	Flow (m ³ /s)	Water Level (m)
Palladium Drive	CJ152	32.56	94.07	32.69	94.07
Frank Nighbor Place	CJ142	32.55	94.02	32.62	94.02
Highway 417	CJ120	32.47	93.97	32.51	93.97

The model results indicate a minimal increase in peak flow within the Carp River at all locations noted in **Table 3.8**. The slight increase is due to the peak site flow occurring earlier than the peak water level within the Carp River. The model results also indicate that there will be no change in the 100-year water levels in the Carp River.

3.0 SITE GRADING

The vacant site is generally flat but slopes slightly from east to west towards the Carp River, which is located approximately 46m southwest of the furthest development limit for the subject site.

The finished floor elevation (FFE) of the proposed building will be set at an elevation of 95.50m, which corresponds to the FFE of the proposed U-Haul, Camp Mart and Home Depot buildings to the north and northeast. The building and general site elevations will work well with the grades along the property lines, Frank Nighbor Place to the east and the private access road for the adjacent 40 Frank Nighbor Place property to the north. Refer to the enclosed Grading and ESC Plan (123002-GR) for details.

3.1 Emergency Overland Flow Route

In the case of a major rainfall event exceeding the design storms provided for, the stormwater located within the subject site will overflow towards the downstream drainage areas and ultimately flow towards the Carp River. The finished floor elevation of the building has been set at 95.50m, which represents a minimum of 0.3m above the major system overflow points. The emergency overland flow route is shown on the enclosed Grading and ESC Plan.

4.0 GEOTECHNICAL INVESTIGATIONS

Englobe Corp. prepared a Geotechnical Investigation Report for the proposed development. Refer to the Geotechnical Report³ for subsurface conditions, grade raise restrictions, construction recommendations and geotechnical inspection requirements.

5.0 EROSION AND SEDIMENT CONTROL

To mitigate erosion and to prevent sediment from entering the storm sewer system and downstream water course, temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter bags will be placed under the grates of nearby catchbasins, manholes and will remain in place until vegetation has been established and construction is completed.
- Silt fencing will be placed per OPSS 577 and OPSD 219.110 where appropriate, along the surrounding construction limits.
- Mud mats will be installed at the site entrances.
- Street sweeping and cleaning will be performed, as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site.
- On-site dewatering is to be directed to a sediment trap and/or gravel splash pad and discharged safely to an approved outlet as directed by the engineer.
- Any stockpiled material will be properly managed to prevent those materials from entering the sewer system and/or the downstream watercourse.

The temporary erosion and sediment control measures will be implemented prior to construction and will remain in place during all phases of construction. Regular inspection and maintenance of the erosion control measures will be undertaken.

In addition, the following measures will provide permanent erosion and sediment control on the proposed site:

- A CDS type Oil/Grit Separator will be installed to provide water quality control prior to releasing stormwater from the site.

6.0 CONCLUSION

This report has been prepared in support of a Site Plan Control application for the proposed development at 40 Frank Nighbor Place. The conclusions are as follows:

- The proposed development will be serviced by the municipal watermain, sanitary and storm sewers located within an easement along the private access road north of the subject site.
- The building will be sprinklered and supplied with a fire department (siamese) connection. The siamese connection will be located within 45m of the on-site fire hydrant.
- The proposed design will include on-site stormwater management measures (both quantity and quality controls) prior to releasing flows from the site.
 - Post-development flow from sub-catchment area A-1a to A-h, R-1, and R-2 will be controlled by an ICD installed within the on-site storm sewer system, while flows from areas A0-a to A0-d will flow uncontrolled.
 - The total post-development flow to the municipal storm sewer (Carp River) will be approximately 36.6 L/s during the 2-year design event, 31.3 L/s during the 5-year event and 39.6 L/s during the 100-year event, all less than the maximum allowable release rate of 40.7 L/s. The post-development flows are also being significantly reduced when compared to current 5-year and 100-year design conditions.
 - Erosion and sediment controls are to be provided both during construction and on a permanent basis. In addition, an oil / grit separator unit (CDS Model PMSU 2020-5) will provide an 'Enhanced' Level of water quality control for the controlled flows from the site discharging into the municipal storm sewer.
- Regular inspection and maintenance of the storm sewer system, including the inlet control devices and the water quality treatment unit is recommended to ensure that the storm drainage system is clean and operational.

It is recommended that the proposed site servicing and stormwater management design be approved for implementation.

NOVATECH

Prepared by:



Melanie Schroeder, P. Eng.
Project Engineer - Water Resources

Prepared by:



François Thauvette, P. Eng.
Senior Project Manager

APPENDIX A
Correspondence

MEMO

Date: November 3, 2022

To /
Destinataire Sarah Ezzio, Planner

From /
Expéditeur Shika Rathnasooriya, Project Manager,
Infrastructure Approvals

Subject /
Objet **Pre-Application Consultation**
46 Frank Nighbor Place

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

1. The Servicing Study Guidelines for Development Applications are available at the following address: <https://ottawa.ca/en/planning-development-and-construction/developing-property/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-study-guidelines-development-applications>
2. Servicing and site works shall be in accordance with the following documents:
 - ⇒ Ottawa Sewer Design Guidelines (October 2012)
 - ⇒ Ottawa Design Guidelines – Water Distribution (2010)
 - ⇒ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
 - ⇒ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
 - ⇒ City of Ottawa Environmental Noise Control Guidelines (January 2016)
 - ⇒ City of Ottawa Park and Pathway Development Manual (2012)
 - ⇒ City of Ottawa Accessibility Design Standards (2012)
 - ⇒ Ottawa Standard Tender Documents (latest version)
 - ⇒ Ontario Provincial Standards for Roads & Public Works (2013)
3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

4. Watermain Infrastructure:

- a) There is an available 305mm diameter PVC watermain located within the proposed extension of Frank Nighbor Place. A water boundary condition request is needed for the proposed water connection to the City main.
- b) As per Section 4.4.7.2 of the Ottawa Design Guidelines – Water Distribution, a DMA (District Metering Area) chamber will be required for private developments serviced by a connection 150mm or larger.
- c) Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide an email to Shika Rathnasooriya (Thakshika.Rathnasooriya@ottawa.ca) with the following information:
 - i. Location of service
 - ii. Type of development and the amount of fire flow required (as per FUS, 1999 – See technical bulletin ISTB 2021-03).
 - iii. Average daily demand: ___ l/s.
 - iv. Maximum daily demand: ___ l/s.
 - v. Maximum hourly daily demand: ___ l/s.

5. Sanitary / Storm Infrastructure:

- a) There is an available 450mm diameter concrete sanitary sewer located within a private access road west of Frank Nighbor Place.
- b) There is an available 1050mm diameter concrete storm sewer within a private access road west of Frank Nighbor Place.
- c) A monitoring maintenance hole will be required for a private sanitary sewer outletting to a public sanitary sewer. The maintenance hole should be located in an accessible location on private property near the property line (ie. Not in a parking area).
- d) All services (STM, SAN, WTR) should be grouped in a common trench to minimize the number of road cuts.
- e) Sewer connections to be made above the springline of the sewermain as per:
 - i. Std Dwg S11.1 for flexible main sewers.
 - ii. Std Dwg S11 (For rigid main sewers).
 - iii. Std Dwg S11.2 (for rigid main sewers using bell end insert method).
 - iv. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

6. The Stormwater Management Criteria, for the subject site, is to be based on the following:
 - a) The 5-yr and 100-yr post development peak flows for the development area are to be controlled to a release rate of 50 L/s/ha based on the 'Terry Fox Business Park- Stormwater Design Plan' dated 1994. Onsite storage is to be provided for storm events up to and including the 100-yr storm.
 - b) There should be no stormwater ponding in parking areas or drive aisles during the 2-year storm event.
 - c) Quality control to be provided as specified by the MVCA.
 - d) The design of the storm sewers in the area are based on a 5-yr storm. If discharging to a storm sewer, the SWM criteria is to be based on the following for the development area:
 - i. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
 - ii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less.
 - iii. A calculated time of concentration (Cannot be less than 10 minutes).
 - iv. Flows to the storm sewer in excess of the 5-yr storm release rate, up to and including the 100-year storm event, must be detained on site.
7. MECP ECA Requirements:

An MECP Environmental Compliance Approval (Private Sewage Works) will not be anticipated for the proposed development.
8. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

Should you have any questions or require additional information, please contact me directly at Thakshika.Rathnasooriya@ottawa.ca.

RE: Pre-Application Consultation Follow-up - 46 Frank Nighbor

Ezzio, Sarah <sarah.ezzio@ottawa.ca>

Wed 11/16/2022 11:59 AM

To: Natalia Garavito <ngaravito@apiconsultants.net>

Cc: Ted Lancaster <ted.lancaster@401auto.ca>; David Barnard <dbarnard@apiconsultants.net>; Rathnasooriya, Shika <Thakshika.Rathnasooriya@ottawa.ca>; O'Connor, Ann <Ann.OConnor@ottawa.ca>; Giampa, Mike <Mike.Giampa@ottawa.ca>; Planning Circulations / Diffusions Planification <planningcirculations@ottawa.ca>; Vito Picicci <vito@saplysarchitects.ca>

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Hi Natalia,

[Here's](#) the current site plan application form, which includes the fees. They are \$46,964.88 for the cost of a new Complex Site Plan, a variable fee for Design Review and Inspection (I would advise you to pay the smallest amount, we can collect more later if the value is greater), and \$1,065.00 for the initial conservation authority review fee. Please don't submit any hard copies, PDS of all plans and studies should be provided.

You will have to reach out to the Committee adjustment planner directly to discuss the variances and submission requirements. I included contacts in the follow up email and general information can be found on their [website](#).

Best,
Sarah

From: Natalia Garavito <ngaravito@apiconsultants.net>

Sent: November 16, 2022 11:47 AM

To: Ezzio, Sarah <sarah.ezzio@ottawa.ca>

Cc: Ted Lancaster <ted.lancaster@401auto.ca>; David Barnard <dbarnard@apiconsultants.net>; Rathnasooriya, Shika <Thakshika.Rathnasooriya@ottawa.ca>; O'Connor, Ann <Ann.OConnor@ottawa.ca>; Giampa, Mike <Mike.Giampa@ottawa.ca>; Planning Circulations / Diffusions Planification <planningcirculations@ottawa.ca>; Vito Picicci <vito@saplysarchitects.ca>

Subject: Re: Pre-Application Consultation Follow-up - 46 Frank Nighbor

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ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Good Morning Sarah,

Thank you very much for providing the comments, we will give the comments a read over and get back to you if we have any questions.

In the meantime, would you be able to share with us the most current version of the Site Plan and MV applications and the submission requirements; such as, application fees and confirmation if any hardcopies will be required and

the amount.

Thank you once again!

Kindest Regards!

Natalia Garavito



Site Plan & Development Coordinator.

Email: ngaravito@apiconsultants.net

Office: [905-337 7249](tel:905-337-7249) Ext:206

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<https://www.youtube.com/@apigroupofcompaniesinc>

From: Ezzio, Sarah <sarah.ezzio@ottawa.ca>

Sent: Wednesday, November 16, 2022 11:35 AM

To: Natalia Garavito <ngaravito@apiconsultants.net>

Cc: Ted Lancaster <ted.lancaster@401auto.ca>; David Barnard <dbarnard@apiconsultants.net>; Rathnasooriya, Shika <Thakshika.Rathnasooriya@ottawa.ca>; O'Connor, Ann <Ann.OConnor@ottawa.ca>; Giampa, Mike <Mike.Giampa@ottawa.ca>; Planning Circulations / Diffusions Planification <planningcirculations@ottawa.ca>

Subject: Pre-Application Consultation Follow-up - 46 Frank Nighbor

CAUTION: This email originated from outside of the organization. Please be cautious with links and attachments.

Hello Natalia,

Please refer to the below notes regarding the Pre-Application Consultation Meeting held on November 3, 2022 for the site at 46 Frank Nighbor Place.

Project:

During the meeting, a proposal to develop the site with a 6-storey hotel with 115 suites and 170 Surface parking spaces was discussed.

Below are staff's preliminary comments:

Policies/Designations of the site

- Official Plan – Suburban West Transect, designated as Mixed Industrial
- Zoning – Light Industrial Subzone 6, Exception 1414 with a maximum height of 30 metres and a holding symbol (IL6[1414] H(30)-h)
 - Within Area C for Minimum Parking Requirements (Schedule 1A)

Engineering

- Please find attached the pre-consult follow up comments from Engineering.

- Should you have any questions or require additional information, please contact [mailto:Rathnasooriya,%20Shika%20%3cThakshika.Rathnasooriya@ottawa.ca%3e]Shika Rathnasooriya.

Planning

- We appreciate the design considerations that have been made for tree planting and pedestrian movement, and also appreciate seeing a restaurant use and patio to serve as amenities for hotel guests.
- The site has a large amount of pavement, we would love to this reduced and replaced with soft landscaping where possible.
- There is a holding symbol in the zoning, but it does not have to be lifted, since this is not a Retail Store or Shopping Centre
- Please provide a sidewalk across the site's frontage on Frank Nighbor.
- Please ensure section 69 - Setback from Watercourses is met, and show setbacks on site plan (even if off-site).
- The parking rates are as follows: 1 per guest unit for hotel, and 10 per 100 square metre restaurant area. If the kitchen is to be used for hotel rooms as well and you would like it to not be included in the restaurant area, please specify this in your submission and show the GFA of each use clearly on the site plan.
- We have a 40% tree canopy cover target, please include as many tree plantings as possible, and ensure there are sufficient soil volumes.
- Please show the following elements on the site plan when submitted:
 - Loading space and bicycle parking dimensions and details
 - Depressed Curb for continuous walkways, and access to each accessible parking space
- The new OP has now been adopted, and should be referred to in your Planning Cover Letter.
- Please reach out to Committee Adjustment Planners ([mailto:Kelly,%20Siobhan%20%3csiobhan.kelly@ottawa.ca%3e]Siobhan and [mailto:Sclauzero,%20Cass%20%3ccass.sclauzero@ottawa.ca%3e]Cass) for more information on the CoA applications, the variances will need to be obtained prior to site plan approval.
- Please discuss details of the proposal with the ward Councillor, Allan Hubley, prior to submitting an application.
- Please note that the City is currently developing an implementation strategy to respond to the province's Bill 109, and there may be some changes to the process. We are happy to discuss this further as more details become available. The same applies to Bill 23, which has been tabled but has not been passed as legislation at time of this email. Please stay tuned to the changing context.
- Feel free to contact me should you have any comments or questions on the planning comments.

Urban Design

- An Urban Design Brief that follows the provided Terms of Reference is required upon submission of the application.
- Consider an alternate site design whereby there is only one vehicular egress with consolidated parking.
- Connectivity and Pedestrian Movement
 - Staff support providing a public sidewalk along the entire eastern property line, along Frank Nighbor Place.
 - Design staff support the proposed 2.6m walkway through the parking lot running to the proposed hotel from the northern property line; however, the Owner's legal access to this abutting private road (owned by the abutting property owner) requires explanation and clarification. Ensure pedestrian pathways lead to pathways/roads that can be legally used.
 - Any additional considerations for how people will move around the site on foot should be considered.
- Landscaping and outdoor amenity areas

- Support the proposed trees along the north, east, and south property lines. Ensure adequate soil volumes are provided in this landscape buffer to support these trees so they can grow and thrive as mature trees over time.
- Consider providing a landscape buffer and trees also on the western lot line.
- Consider providing a grassed area / soft landscaping amenity area at-grade for guests of the hotel and/or for staff to enjoy.
- Eastern façade and engagement with the public realm along Frank Nighbor.
 - Design staff support the proposed location of the restaurant along the frontage facing the public street Frank Nighbor. Also support having the entrance to the restaurant be at the corner and visible from the public realm.
 - Consider prioritizing this façade in terms of design and how it can engage with the public realm at-grade.
- Ensure adequate fencing and privacy is considered for adjacent uses.
- Refer to the active application for the property at 30 Frank Nighbor drive, which abuts the property to the north and west. Understanding the use and design of this space and how it relates to this property is important in terms of on-site design.
- Design staff would be happy to provide additional input on Elevations and the Landscape Plan when they are drafted.
- Please contact [mailto:O'Connor,%20Ann%20%3cAnn.OConnor@ottawa.ca%3e]Ann O'Connor should there be any further comments on the Urban Design comments.

Transportation

- A TIA will not be required.
- A Road Noise Impact Study is required
- On site plan:
 - The proposed sidewalk should extend along the entire property frontage and be continuous and depressed through the accesses.
 - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
 - Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
 - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
 - Show lane/aisle widths.
- Please contact [mailto:Giampa,%20Mike%20%3cMike.Giampa@ottawa.ca%3e]Mike Giampa if you have any questions on these transportation comments.

Mississippi Valley Conservation Authority

- The Mississippi Valley Conservation Authority (MVCA) confirms that a portion of the subject property is regulated under Ontario Regulation 153/06, *Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*. Under Ontario Regulation 153/06, written permission is required from the MVCA prior to the initiation of development (which includes construction, site grading and the placement or removal of fill) within an area regulated by the Conservation Authority.
- The stormwater water quality requirement for the Carp River is:
 - 80% TSS removal, or enhanced level of protection is recommended, but 70%, or normal level of protection is required as per the Carp River Watershed Subwatershed Study.
- The property is within the Carp River Watershed Subwatershed Study area, and has an annual infiltration target outlined below. Existing infiltration rates on site should be assessed and maintained post development.
 - Low Groundwater Recharge Area which has an annual infiltration target of 73mm/year.
- Please contact [mailto:Mercedes%20Liedtke%20%3cmliedtke@mvc.on.ca%3e]Mercedes Liedtke if you have any further questions on these comments.

Parks & Facilities Planning

- As per the [Parkland Dedication \(By-law No. 2022-280\) | City of Ottawa](#), as amended, parkland dedication will be required as a condition of development. In this circumstance given the parcel size and proposed use, Cash in Lieu of parkland would be considered appropriate.
- Based in the details provided, the proposal would be best considered a commercial development for the purposes of the parkland dedication by-law. The applicant is encouraged to review the parkland dedication by-law should they feel that an alternative land use category be more appropriate. The parkland requirement for a commercial use is calculated as 2% of the gross land area of the site being developed.
- The proponent will need to confirm that the hotel suites will not have kitchen (or internal dining facilities) ranging from a small kitchenette (e.g. with a stove or cook top) to full kitchens.
- Has there been any past Parkland Dedication credited to the subject property parcel(s)? If so, please provide the associated documentation for Parks and Facilities Planning (PFP) review/consideration. The conveyance of land for purposes or the payment of money in-lieu of accepting the conveyance is not required for development, redevelopment, subdivisions or consents, where it is known, or can be demonstrated that the required parkland conveyance or money in-lieu thereof has been previously satisfied. Please provide/ identify this in the Planning Rationale or by other means when the initial development application is submitted.
- Please identify in the Planning Rationale (when the initial development application is submitted) how the requirements in the Parkland Dedication (By-law No. 2022-280) will be achieved.
- Given the above comments and should Cash in Lieu of Parkland be collected, the value of the land shall be determined by the City's Realty Services Branch or submitted otherwise according to By-law No. 2022-280. The owner is responsible for any appraisal costs incurred by the City.
- Please note that the park comments are preliminary and will be finalized (and subject to change) upon receipt of the requested supporting documentation. Additionally, if the proposed land use changes, then the parkland dedication requirement will be re-evaluated accordingly.
- PFP encourages the applicant/ proponent to reach out to the north site property owner to confirm pedestrian access onto and through their site leading West towards the Multi-Use Pathway located adjacent to the watercourse.
- Please contact [mailto:Goettling,%20Jeff%20%3cjeff.goettling@ottawa.ca%3e]Jeff Goettling should there be any questions relating to these Parks & Facilities Planning comments.

Environmental Planning

- According to the OP, the subject property is within 30m of an Urban Natural Feature (UNF), which is the Carp River corridor, so any development application triggers a requirement for an Environmental Impact Study (EIS).
- Given the distance of the subject property from the UNF, the other property between the two and the nature of the proposal, I am willing to accept a scoped EIS.
- The scoped EIS will need to address the following:
 - looking to ecologically improve and soften the interface of the proposal with the Carp River Corridor
 - identifying the appropriate watercourse setbacks (OP section 4.9.3)
 - review and include recommendations from the Carp River Subwatershed Study
 - review and draw design elements from the City's Bird Safe Design guidelines into the proposal
 - looking to see more locally appropriate native trees to contribute the tree canopy target; this will certainly require more soil volumes to increase the trees' viability
 - potential impacts from snow storage
- The TCR can be combined with the EIS to avoid duplications.
- Please contact [mailto:Rehman,%20Sami%20%3cSami.Rehman@ottawa.ca%3e]Sami Rehman with any follow up questions on the environmental planning comments.

Forestry & Trees

TCR requirements:

1. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
 - a. an approved TCR is a requirement of Site Plan approval.
 - b. The TCR may be combined with the LP provided all information is supplied
2. Any removal of privately-owned trees 10cm or larger in diameter, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
 - a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
 - b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
4. The TCR must contain 2 separate plans:
 - a. Plan/Map 1 - show existing conditions with tree cover information
 - b. Plan/Map 2 - show proposed development with tree cover information
 - c. Please ensure retained trees are shown on the landscape plan
5. the TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition
6. please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
7. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
8. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available at [Tree Protection Specification](#) or by searching Ottawa.ca
 - a. the location of tree protection fencing must be shown on the plan
 - b. show the critical root zone of the retained trees
9. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
10. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on [City of Ottawa](#)

LP tree planting requirements:

For additional information on the following please contact tracy.smith@Ottawa.ca

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible

- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please document on the LP that adequate soil volumes can be met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.

Sensitive Marine Clay

- Please follow the City’s 2017 Tree Planting in Sensitive Marine Clay guidelines

Tree Canopy Cover

- The landscape plan shall show how the proposed tree planting will replace and increase canopy cover on the site over time, to support the City’s 40% urban forest canopy cover target.
- At a site level, efforts shall be made to provide as much canopy cover as possible, through tree planting and tree retention, with an aim of 40% canopy cover at 40 years, as appropriate.
- Indicate on the plan the projected future canopy cover at 40 years for the site.

This proposal as presented is subject to a **Site Plan Control** (Complex) application, plus **Minor Variance** applications to the Committee of Adjustment as needed. The list of required plans and studies are attached.

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

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

We are happy to discuss further or answer any follow-up questions.

All the best,

Sarah Ezzio, MCIP RPP
 Planner II, Development Review (West Services)

Urbaniste II, Examen des projets d'aménagement (services ouest)

City of Ottawa | Ville d'Ottawa

☎ 613.580.2424 ext. | poste 23493

ottawa.ca/planning_ / ottawa.ca/urbanisme

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APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.

A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer [here](#):

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

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
■	15	17. Draft Plan of Subdivision	18. Plan Showing Layout of Parking Garage	■	2
■	5	19. Draft Plan of Condominium	20. Planning Cover Letter	S	3
S	15	21. Site Plan	22. Minimum Distance Separation (MDS)	■	3
■	15	23. Concept Plan Showing Proposed Land Uses and Landscaping	24. Agrology and Soil Capability Study	■	3
■	3	25. Concept Plan Showing Ultimate Use of Land	26. Cultural Heritage Impact Statement	■	3
S	15	27. Landscape Plan	28. Archaeological Resource Assessment Requirements: S (site plan) A (subdivision, condo)	■	3
S	2	29. Survey Plan	30. Shadow Analysis	■	3
S	3	31. Architectural Building Elevation Drawings (dimensioned)	32. Design Brief (includes the Design Review Panel Submission Requirements)	S	Available online
■	3	33. Wind Analysis		■	

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S	3	34. Phase 1 Environmental Site Assessment	35. Impact Assessment of Adjacent Waste Disposal/Former Landfill Site	■	3
A	3	36. Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37. Assessment of Landform Features	■	3
A	3	38. Record of Site Condition	39. Mineral Resource Impact Assessment	■	3
S	3	40. Tree Conservation Report	41. Environmental Impact Statement / Impact Assessment of Endangered Species	S	3
■	3	42. Mine Hazard Study / Abandoned Pit or Quarry Study	43. Integrated Environmental Review (Draft, as part of Planning Rationale)	■	3

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
S	1	44. Applicant's Public Consultation Strategy (may be provided as part of the Planning Rationale)	45. Site Lighting Plan and Certification Letter	S	PDF

Meeting Date: November 3, 2022

Application Type: Site Plan Control

File Lead (Assigned Planner): Sarah Ezzio

Infrastructure Approvals Project Manager: Shika Rathnasooriya

Site Address (Municipal Address): 46 Frank Nighbor

*Preliminary Assessment: 1 2 3 4 5

*One (1) indicates that considerable major revisions are required before a planning application is submitted, while five (5) suggests that proposal appears to meet the City's key land use policies and guidelines. **This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.**

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

APPENDIX B

Development Servicing Study Checklist

Servicing study guidelines for development applications

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- Executive Summary (for larger reports only).
- Date and revision number of the report.
- Location map and plan showing municipal address, boundary, and layout of proposed development.
- Plan showing the site and location of all existing services.
- 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.
- Summary of Pre-consultation Meetings with City and other approval agencies.
- 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 defensible design criteria.
- Statement of objectives and servicing criteria.
- Identification of existing and proposed infrastructure available in the immediate area.
- 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).
- Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- 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.
- Proposed phasing of the development, if applicable.

- Reference to geotechnical studies and recommendations concerning servicing.

- All preliminary and formal site plan submissions should have the following information:
 - Metric scale

 - North arrow (including construction North)

 - Key plan

 - Name and contact information of applicant and property owner

 - Property limits including bearings and dimensions

 - Existing and proposed structures and parking areas

 - Easements, road widening and rights-of-way

 - Adjacent street names

4.2 Development Servicing Report: Water

- Confirm consistency with Master Servicing Study, if available
- Availability of public infrastructure to service proposed development
- Identification of system constraints
- Identify boundary conditions
- Confirmation of adequate domestic supply and pressure
- 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.
- 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.
- Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
- Address reliability requirements such as appropriate location of shut-off valves
- Check on the necessity of a pressure zone boundary modification.
- 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

- 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.
- Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- Confirm consistency with Master Servicing Study and/or justifications for deviations.
- 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.
- Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- 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)
- Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.
- Description of proposed sewer network including sewers, pumping stations, and forcemains.
- 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).
- Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- Analysis of available capacity in existing public infrastructure.
- A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- 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.
- Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- Set-back from private sewage disposal systems.
- Watercourse and hazard lands setbacks.
- Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- 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.
- Any proposed diversion of drainage catchment areas from one outlet to another.
- Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- 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.
- Identification of potential impacts to receiving watercourses
- Identification of municipal drains and related approval requirements.
- Descriptions of how the conveyance and storage capacity will be achieved for the development.
- 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- Inclusion of hydraulic analysis including hydraulic grade line elevations.
- Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- 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.
- Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

- 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.
- Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- Changes to Municipal Drains.
- Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

- Clearly stated conclusions and recommendations
- 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.
- All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

APPENDIX C
Sanitary Sewage Calculations

**40 Frank Nighbor Place - Proposed Hotel Building and Restaurant
 SANITARY SEWAGE ANALYSIS**

Hotel	Post-Development	
Number of Hotel Suites	115	
Average Daily Hotel Room Occupancy	1.8	
Design Population	207	
Average Daily Hotel (with full housekeeping) Sewage Flow	225	L/person/day
Peak Factor (Harmon Formula)	3.73	
Peak Residential Flow	2.01	L/s
Restaurant		
Number of Restaurant/Hotel Staff	50	
Average Restaurant Sewage Flow	40	L/staff/day
Number of Restaurant Seats	285	
Average Restaurant Sewage Flow	125	L/seat/day
Peaking Factor	1.5	
Design Population	335	
Peak Commercial Flows	0.65	L/s
Extraneous Flow		
Site Area	0.813	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	0.27	L/s
Total Peak Sanitary Flow	2.93	L/s

Post-Development Sanitary Flows

Location			Hotel		Restaurant/Hotel		Peak Factor		Residential Flows		Commercial Flows		Infiltration			Peak Design Flow (l/s)	PIPE					
Street / Area	From	To	# of Units	Population	# of Staff	# of Seats	Res Peak Factor	Comm Peak Factor	Peak Flow (l/s)	Accu. Peak Flow	Peak Flow (l/s)	Accu. Peak Flow	Area (ha)	Infil. Flow (l/s)	Accu Infil. Flow		Size (mm)	Slope (%)	Length (m)	Capacity (l/s)	Full Flow Vel. (m/s)	Q/Q ₁₀ (%)
Building	Cap	SANMH 101	115	207.0	50.00	285.00	3.73	1.5	2.01	2.01	0.65	0.65	0.813	0.27	0.27	2.93	200	1.00	8.0	32.8	1.04	8.9%
Site	SANMH 101	SANMH 103							0.00	2.01	0.00	0.65		0.00	0.27	2.93	200	0.35	21.8	19.4	0.62	15.1%
Site	SANMH 103	SANMH 105							0.00	2.01	0.00	0.65		0.00	0.27	2.93	200	0.35	17.7	19.4	0.62	15.1%
Site	SANMH 105	Ex. 450mm Dia.							0.00	2.01	0.00	0.65		0.00	0.27	2.93	200	0.35	6.5	19.4	0.62	15.1%

Design Parameters

-Average Apt.	1.8	persons/unit
Appendix 4-A Ottawa Sewer Design Guidelines		
- Average Daily Hotel (w/ Full Housekeeping) Sewage Flow	225	L/person/day
- Average Restaurant/Hotel Sewage Flow (Staff)	40	L/staff/day
- Average Restaurant Sewage Flow (Seats)	125	L/seat/day
- Extraneous Flows	0.33	L/s/ha
Residential Peaking Factor	Harmon Equation, Correction Factor = 0.8	
Institutional / Commercial Peaking Factor	1.5	

APPENDIX D

Water Demands, Boundary Conditions, Schematic of the Hydraulic Model, Hydraulic Modeling Results and FUS Calculations

40 Frank Nighbor - Proposed Hotel and Restaurant WATER ANALYSIS

DOMESTIC WATER DEMANDS

Hotel	Post-Development	
Number of Hotel Suites	115	
Average Daily Hotel Room Occupancy	1.8	
Design Population	207	
Average Daily Hotel (with full housekeeping)	225	
Water Demand		L/person/day
Average Day Demand	0.54	L/s
Maximum Day Demand (2.5 x avg. day)	1.35	L/s
Peak Hour Demand (2.2 x max. day)	2.96	L/s
Restaurant		
Number of Restaurant/Hotel Staff	50	
Average Staff Water Demand	40	L/staff/day
Number of Restaurant Seats	285	
Average Restaurant Water Demand	125	L/seat/day
Average Day Demand	0.44	L/s
Maximum Day Demand (1.5 x avg. day)	0.65	L/s
Peak Hour Demand (1.8 x max. day)	1.18	L/s
TOTAL		
Average Day Demand	0.97	L/s
Maximum Day Demand	2.00	L/s
Peak Hour Demand	4.14	L/s

Francois Thauvette

From: Rathnasooriya, Shika <Thakshika.Rathnasooriya@ottawa.ca>
Sent: Monday, February 13, 2023 10:54 AM
To: Francois Thauvette
Cc: Zarak Ali
Subject: RE: 46 Frank Nighbor - Municipal WM Boundary Conditions Request
Attachments: 46 Frank Nighbor Place_Boundary Condition(10Feb2023).docx

Hi Francois,

Please find boundary conditions attached.

Thank you,
Shika

From: Francois Thauvette <f.thauvette@novatech-eng.com>
Sent: February 08, 2023 4:26 PM
To: Rathnasooriya, Shika <Thakshika.Rathnasooriya@ottawa.ca>
Cc: Zarak Ali <z.ali@novatech-eng.com>
Subject: FW: 46 Frank Nighbor - Municipal WM Boundary Conditions Request

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

We are sending this e-mail to request municipal watermain boundary conditions for a proposed hotel/restaurant development. Please see e-mail below and attached files for details.

Regards,

François Thauvette, P. Eng., Sr. Project Manager | Land Development & Public-Sector Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | T: 613.254.9643 Ext: 219 | C: 613.276.0310

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Zarak Ali <z.ali@novatech-eng.com>
Sent: Wednesday, February 8, 2023 3:25 PM
To: Francois Thauvette <f.thauvette@novatech-eng.com>
Subject: DRAFT-Boundary Conditions Request

We are looking for boundary conditions for the existing watermain infrastructure to complete a water servicing analysis for the 46 Frank Nighbor Place development. Please refer to the attached hydrant sketch for the following:

- Existing water infrastructure and our proposed connection locations,
- Exposure separation distances to support the Fire Flow calculations (Fire flow calculations attached separately), and
- Hydrants that were identified as being considered to meet the required Fire Flow

Water Demands for the proposed development are provided below:

- Average Day Demand = 0.97 L/s
- Maximum Day Demand = 2.00 L/s
- Peak Hour Demand = 4.14 L/s
- Fire Flow Demand = 133 L/s
- Maximum Day + Fire Flow = 135.00 L/s

Please let us know if you require any additional information.

Regards,

Zarak Ali, E.I.T. | Land Development Engineering

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext: 330

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Boundary Conditions 46 Frank Nighbor Place

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	58	0.97
Maximum Daily Demand	120	2.00
Peak Hour	248	4.14
Fire Flow Demand #1	7,998	133.30

Location



Results

Connection 1 - North of 46 Frank Nighbor Place

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	161.3	94.3
Peak Hour	156.5	87.5
Max Day plus Fire Flow	154.4	84.5

¹ Ground Elevation = 94.9 m

Connection 2 - East of 46 Frank Nighbor Place

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	161.3	94.6
Peak Hour	156.5	87.8
Max Day plus Fire Flow	153.9	84.2

¹ Ground Elevation = 94.7 m

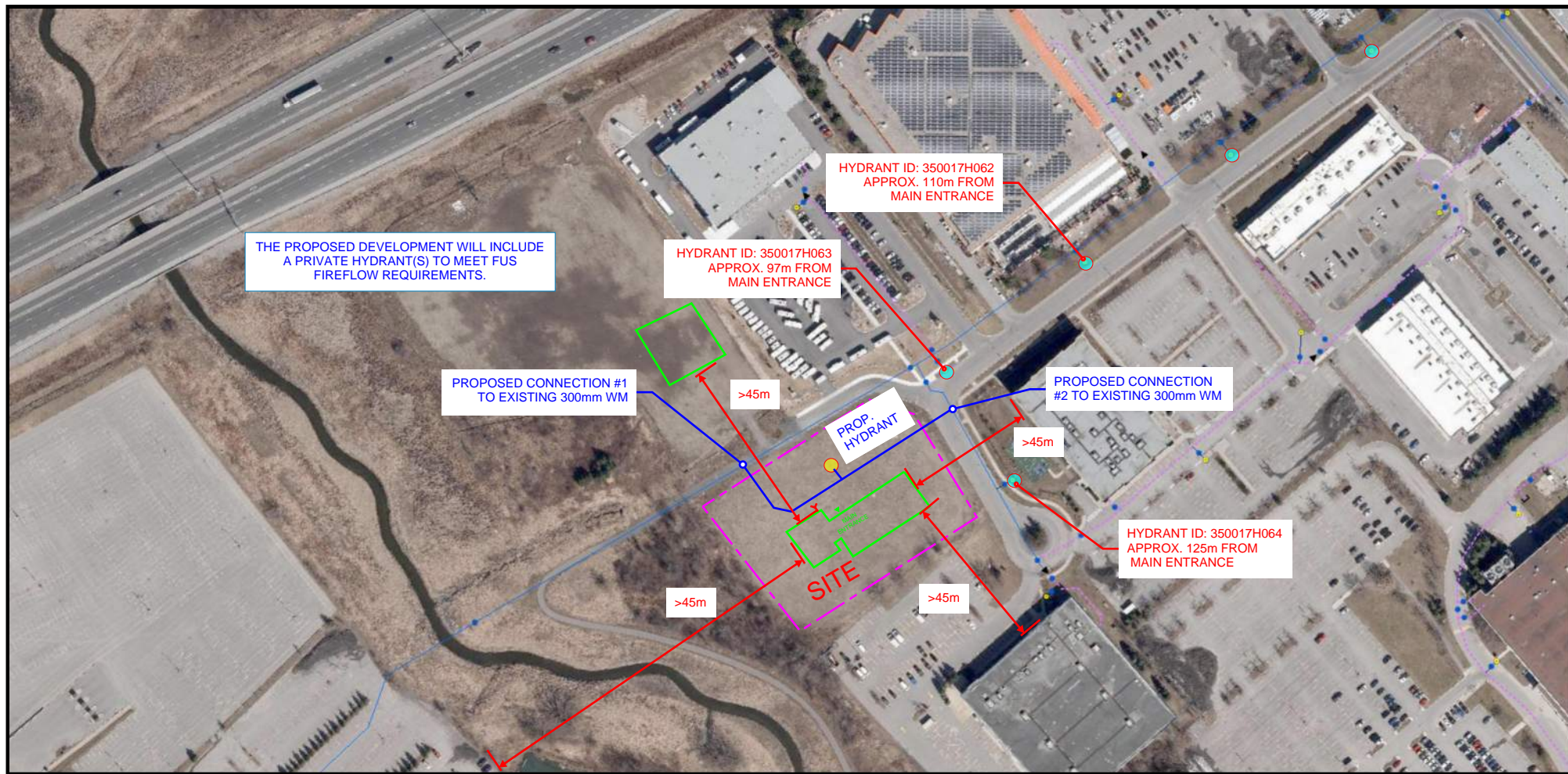
Notes

1. As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
 - a. If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
 - b. Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

Disclaimer

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

FIRE HYDRANT SKETCH 40 FRANK NIGHBOR PLACE



Source: GeoOttawa

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines



Engineers, Planners & Landscape Architects

Novatech Project #: 123002
 Project Name: 40 Frank Nighbor Place
 Date: 2/8/2023
 Input By: ZA
 Reviewed By: F. Thauvette

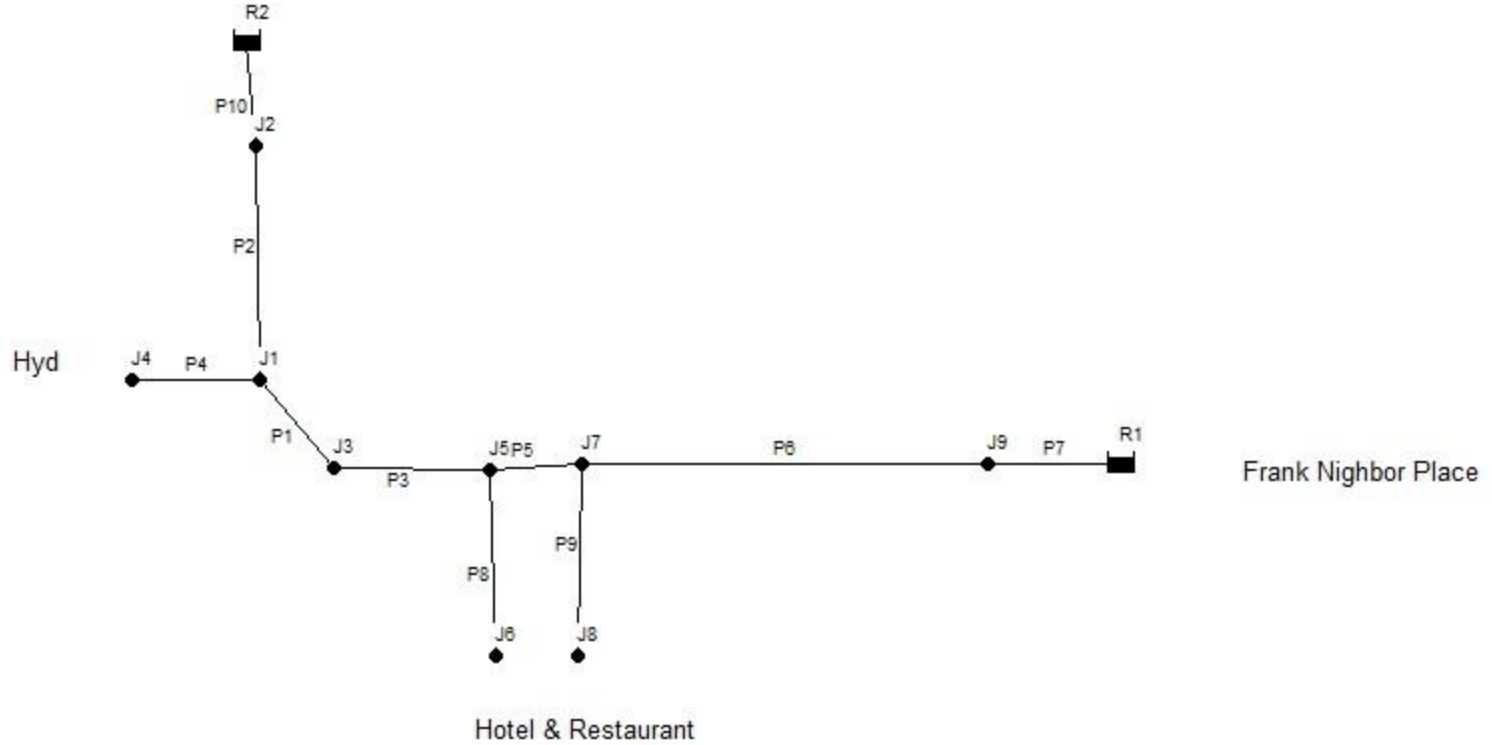
Legend

Input by User
 No Information or Input Required

Building Description: 6 Storey Hotel with Podium
 Type II - Non-combustible construction

Step		Choose		Value Used	Total Fire Flow (L/min)	
Base Fire Flow						
1	Construction Material		Multiplier			
	Coefficient related to type of construction C	Type V - Wood frame		1.5		0.8
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
Type I - Fire resistive construction (2 hrs)			0.6			
2	Floor Area					
	A	Podium Level Footprint (m ²)	1720.4			
		Total Floors/Storeys (Podium)	2			
		Tower Footprint (m ²)	1084.6			
		Total Floors/Storeys (Tower)	4			
		Protected Openings (1 hr)				
		Area of structure considered (m ²)		7,779		
F	Base fire flow without reductions			16,000		
	$F = 220 C (A)^{0.5}$					
Reductions or Surcharges						
3	Occupancy hazard reduction or surcharge		Reduction/Surcharge		13,600	
	(1)	Non-combustible		-25%		-15%
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
Rapid burning			25%			
4	Sprinkler Reduction (100% sprinkler coverage of building used)		Reduction		-5,440	
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%		
		Standard Water Supply	Yes	-10%		
		Fully Supervised System		-10%		
			Cumulative Total	-40%		
5	Exposure Surcharge (cumulative %, Maximum Exposure Adjustment Charge Used)		Surcharge		0	
	(3)	North Side	> 45.1m	0%		
		East Side	> 45.1m	0%		
		South Side	> 45.1m	0%		
		West Side	> 45.1m	0%		
			Cumulative Total	0%		
Results						
6	(1) + (2) + (3)	Total Required Fire Flow, rounded to nearest 1000L/min		L/min	8,000	
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	133
				or	USGPM	2,114
7	Storage Volume	Required Duration of Fire Flow (hours)		Hours	2	
		Required Volume of Fire Flow (m ³)		m³	960	

40 Frank Nighbor Place - Proposed Hotel Building and Restaurant Proposed Watermain Schematic



40 Frank Nighbor Place - Proposed Hotel Building and Restaurant Water Model Results

Average Daily Demand

Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	92.3	0	161.3	69	676.89	98.17
Junc J2	92.3	0	161.3	69	676.89	98.17
Junc J4	95.45	0	161.3	65.85	645.99	93.69
Junc J3	92.4	0	161.3	68.9	675.91	98.03
Junc J5	92.4	0	161.3	68.9	675.91	98.03
Junc J6	95.5	0.97	161.3	65.8	645.50	93.62
Junc J7	92.4	0	161.3	68.9	675.91	98.03
Junc J8	95.5	0	161.3	65.8	645.50	93.62
Junc J9	92.4	0	161.30	68.90	675.91	98.03
Resvr R1	161.3	-0.41	161.3	0.00	0.00	0.00
Resvr R2	161.3	-0.56	161.30	0.00	0.00	0.00

Average Daily Demand

Min= 93.62

Network Table - Links

Max= 98.17

Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P2	14.3	150	100	-0.56	0.03	0.02
Pipe P4	5	150	100	0	0	0
Pipe P1	7.1	150	100	0.56	0.03	0.02
Pipe P3	6.3	150	100	0.56	0.03	0.02
Pipe P5	2	150	100	-0.41	0.02	0.02
Pipe P6	34.6	150	100	-0.41	0.02	0.01
Pipe P7	17.5	150	100	-0.41	0.02	0.01
Pipe P8	22	150	100	0.97	0.05	0.06
Pipe P9	22	150	100	0	0	0
Pipe P10	2.7	150	100	0.56	0.03	0.02

40 Frank Nighbor Place - Proposed Hotel Building and Restaurant Water Model Results

Peak Hour Demand
 Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	92.3	0	156.49	64.19	629.70	91.33
Junc J2	92.3	0.0	156.5	64.2	629.80	91.35
Junc J4	95.45	0	156.49	61.04	598.80	86.85
Junc J3	92.4	0	156.49	64.09	628.72	91.19
Junc J5	92.4	0	156.49	64.09	628.72	91.19
Junc J6	95.5	4.1	156.47	60.97	598.12	86.75
Junc J7	92.4	0	156.49	64.09	628.72	91.19
Junc J8	95.5	0	156.49	60.99	598.31	86.78
Junc J9	92.4	0	156.5	64.1	628.82	91.20
Resvr R1	156.5	-1.73	156.5	0	0.00	0.00
Resvr R2	156.5	-2.37	156.5	0	0.00	0.00

Peak Hour Demand
 Network Table - Links

Min= 86.75
 Max= 91.35

Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P2	14.3	150	100	-2.37	0.13	0.3
Pipe P4	5	150	100	0	0	0
Pipe P1	7.1	150	100	2.37	0.13	0.3
Pipe P3	6.3	150	100	2.37	0.13	0.3
Pipe P5	2	150	100	-1.73	0.1	0.17
Pipe P6	34.6	150	100	-1.73	0.1	0.17
Pipe P7	17.5	150	100	-1.73	0.1	0.17
Pipe P8	22	150	100	4.1	0.23	0.82
Pipe P9	22	150	100	0	0	0
Pipe P10	2.7	150	100	2.37	0.13	0.3

40 Frank Nighbor Place - Proposed Hotel Building and Restaurant Water Model Results

Max HGL check
 Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	92.3	0	161.3	69	676.89	98.17
Junc J2	92.3	0	161.3	69	676.89	98.17
Junc J4	95.45	0	161.3	65.85	645.99	93.69
Junc J3	92.4	0	161.3	68.9	675.91	98.03
Junc J5	92.4	0	161.3	68.9	675.91	98.03
Junc J6	95.5	2	161.29	65.79	645.40	93.61
Junc J7	92.4	0	161.3	68.9	675.91	98.03
Junc J8	95.5	0	161.3	65.8	645.50	93.62
Junc J9	92.4	0	161.3	68.9	675.91	98.03
Resvr R1	161.3	-0.85	161.3	0	0.00	0.00
Resvr R2	161.3	-1.15	161.3	0	0.00	0.00

Min= 93.61

Max HGL check
 Network Table - Links

Max= 98.17

Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P2	14.3	150	100	-1.15	0.07	0.08
Pipe P4	5	150	100	0	0	0
Pipe P1	7.1	150	100	1.15	0.07	0.08
Pipe P3	6.3	150	100	1.15	0.07	0.08
Pipe P5	2	150	100	-0.85	0.05	0.05
Pipe P6	34.6	150	100	-0.85	0.05	0.04
Pipe P7	17.5	150	100	-0.85	0.05	0.04
Pipe P8	22	150	100	2	0.11	0.22
Pipe P9	22	150	100	0	0	0
Pipe P10	2.7	150	100	1.15	0.07	0.08

40 Frank Nighbor Place - Proposed Hotel Building and Restaurant Water Model Results

Max Day + Fire Flow Demand
 Network Table - Nodes

Node ID	Elevation m	Demand L/s	Head m	Pressure m	Pressure kPa	Pressure psi
Junc J1	92.3	0	149.85	57.55	564.57	81.88
Junc J2	92.3	0	153.68	61.38	602.14	87.33
Junc J4	95.45	133	147.26	51.81	508.26	73.72
Junc J3	92.4	0	150.24	57.84	567.41	82.30
Junc J5	92.4	0	150.6	58.2	570.94	82.81
Junc J6	95.5	2	150.59	55.09	540.43	78.38
Junc J7	92.4	0	150.72	58.32	572.12	82.98
Junc J8	95.5	0	150.72	55.22	541.71	78.57
Junc J9	92.4	0	152.83	60.43	592.82	85.98
Resvr R1	153.9	-41.91	153.9	0	0.00	0.00
Resvr R2	154.4	-93.09	154.4	0	0.00	0.00

Min= 73.72
 Max= 87.33

Max Day + Fire Flow Demand
 Network Table - Links

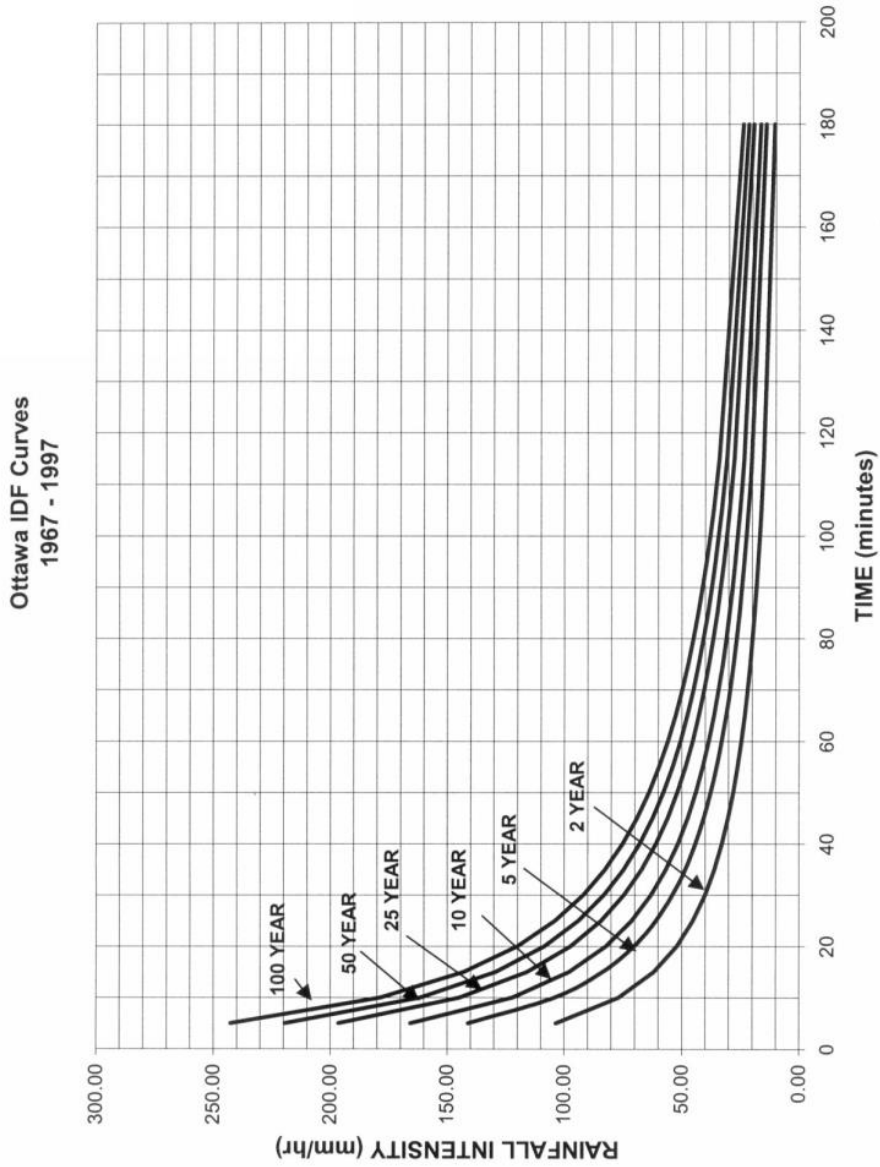
Link ID	Length m	Diameter mm	Roughness	Flow L/s	Velocity m/s	Unit Headloss m/km
Pipe P2	14.3	150	100	-93.09	5.27	267.73
Pipe P4	5	150	100	133	7.53	518.4
Pipe P1	7.1	150	100	-39.91	2.26	55.78
Pipe P3	6.3	150	100	-39.91	2.26	55.78
Pipe P5	2	150	100	-41.91	2.37	61.07
Pipe P6	34.6	150	100	-41.91	2.37	61.07
Pipe P7	17.5	150	100	-41.91	2.37	61.07
Pipe P8	22	150	100	2	0.11	0.22
Pipe P9	22	150	100	0	0	0
Pipe P10	2.7	150	100	93.09	5.27	267.73

APPENDIX E

**IDF Curves, Storm Design Sheet, Synthetic Design storms, SWM Modelling Files,
Excerpts from Terry Fox Business Park – Stormwater Design Plan**

APPENDIX 5-A

OTTAWA INTENSITY DURATION FREQUENCY (IDF) CURVE



STORM SEWER DESIGN SHEET

Novatech Project #: 123002
 Project Name: 40 Frank Neighbor Place - Proposed Hotel and Restaurant
 Date Prepared: 8/10/2023
 Date Revised:
 Input By: Zarak Ali
 Reviewed By: François Thauvette
 Drawing Reference: 123002-STM2

Legend:
 PROJECT SPECIFIC INFO
 USER DESIGN INPUT
 CUMULATIVE CELL
 CALCULATED DESIGN CELL OUTPUT
 USER AS-BUILT INPUT

LOCATION		DEMAND											CAPACITY											
From MH	To MH	AREA							FLOW				TOTAL PEAK FLOW (QDesign) (L/s)	PROPOSED SEWER PIPE SIZING / DESIGN					CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min.)	OPEAK DESIGN / QFULL (%)		
		Area ID	Building	Pavement	Gravel	Landscaped area	Total Area (ha)	Weighted Runoff Coefficient	Indivi 2.78 AR	Accum 2.78 AR	Time of Concentration (min.)	Rain Intensity (mm/hr)			Peak Flow (L/s)	PIPE PROPERTIES								
		0.80	0.80	0.70	0.20							2yr	5yr	100yr		LENGTH (m)	SIZE / MATERIAL (mm / type)	ID ACTUAL (m)	ROUGHNESS	DESIGN GRADE (%)				
CDS OGS Unit to Ex. Storm																								
LD 01	CBMH 100	R-2	0.065	0.000		0.000	0.065	0.90	0.00	0.00	10.00				104.19			0.2032	0.013	2.00	48.4	1.49	0.13	35.0%
CBMH 100	CBMH 102	A-1a	0.000	0.027		0.001	0.028	0.87	0.07	0.23	18.13				103.50			0.5334	0.013	0.20	200.6	0.90	0.49	11.9%
CBMH 102	CBMH 104	A-1b	0.000	0.057		0.001	0.058	0.89	0.14	0.37	19.62				101.03			0.5334	0.013	0.20	200.6	0.90	0.58	18.8%
CBMH 104	CBMH 106	A-1c	0.000	0.064		0.004	0.068	0.85	0.05	0.00	10.00				98.27			0.5334	0.013	0.20	200.6	0.90	0.39	26.2%
CBMH 106	STMMH 108	R-1	0.107	0.000		0.000	0.107	0.90	0.27	0.27	10.00				104.19									
		A-1d	0.000	0.053		0.004	0.057	0.85	0.13	0.34	11.58				98.51			0.5334	0.013	0.20	200.6	0.90	0.59	45.0%
STMMH 108	CBMH 110		0.000	0.000					0.00	0.04	12.17				93.97			0.6096	0.013	0.15	248.1	0.85	0.34	35.5%
CBMH 110	CBMH 116	A-1e	0.000	0.094		0.007	0.100	0.85	0.24	1.17	12.51				92.58			0.6096	0.013	0.15	248.1	0.85	0.32	43.8%
CBMH 112	CBMH 114	A-1f	0.000	0.099		0.007	0.106	0.85	0.25	0.25	10.00				104.19			0.6096	0.013	0.15	248.1	0.85	0.32	10.6%
CBMH 114	CBMH 116	A-1g	0.000	0.066		0.013	0.079	0.78	0.17	0.42	18.32				102.55			0.6096	0.013	0.15	248.1	0.85	0.98	17.5%
CBMH 116	CDS OGS Unit	A-1h	0.000	0.068		0.006	0.074	0.84	ICD Downstream of CBMH 116: 5-Yr Flow Controlled to 31.3						31.3	4.8	300 PVC	0.3048	0.013	0.80	90.2	1.24	0.06	34.7%
CDS OGS Unit	Ex. Storm		0.000															0.3048	0.013	0.80	90.2	1.24	0.15	34.7%

DEMAND EQUATION
 $Q = 2.78 AR$

Where : Q = Peak flow in litres per second (L/s)
 A = Area in hectares (ha)
 R = Weighted runoff coefficient (increased by 25% for 100-year)
 I = Rainfall intensity in millimeters per hour (mm/hr)
 Rainfall intensity (I) is based on City of Ottawa IDF data presented in the City of Ottawa Sewer Design Guidelines (Oct. 2012)

CAPACITY EQUATION

$$Q_{full} = (1/n) A R^{2/3} S_o^{1/2}$$

Where : Q full = Capacity (L/s)
 n = Manning coefficient of roughness (0.013)
 A = Flow area (m²)
 R = Wetted perimeter (m)
 S_o = Pipe Slope/gradient

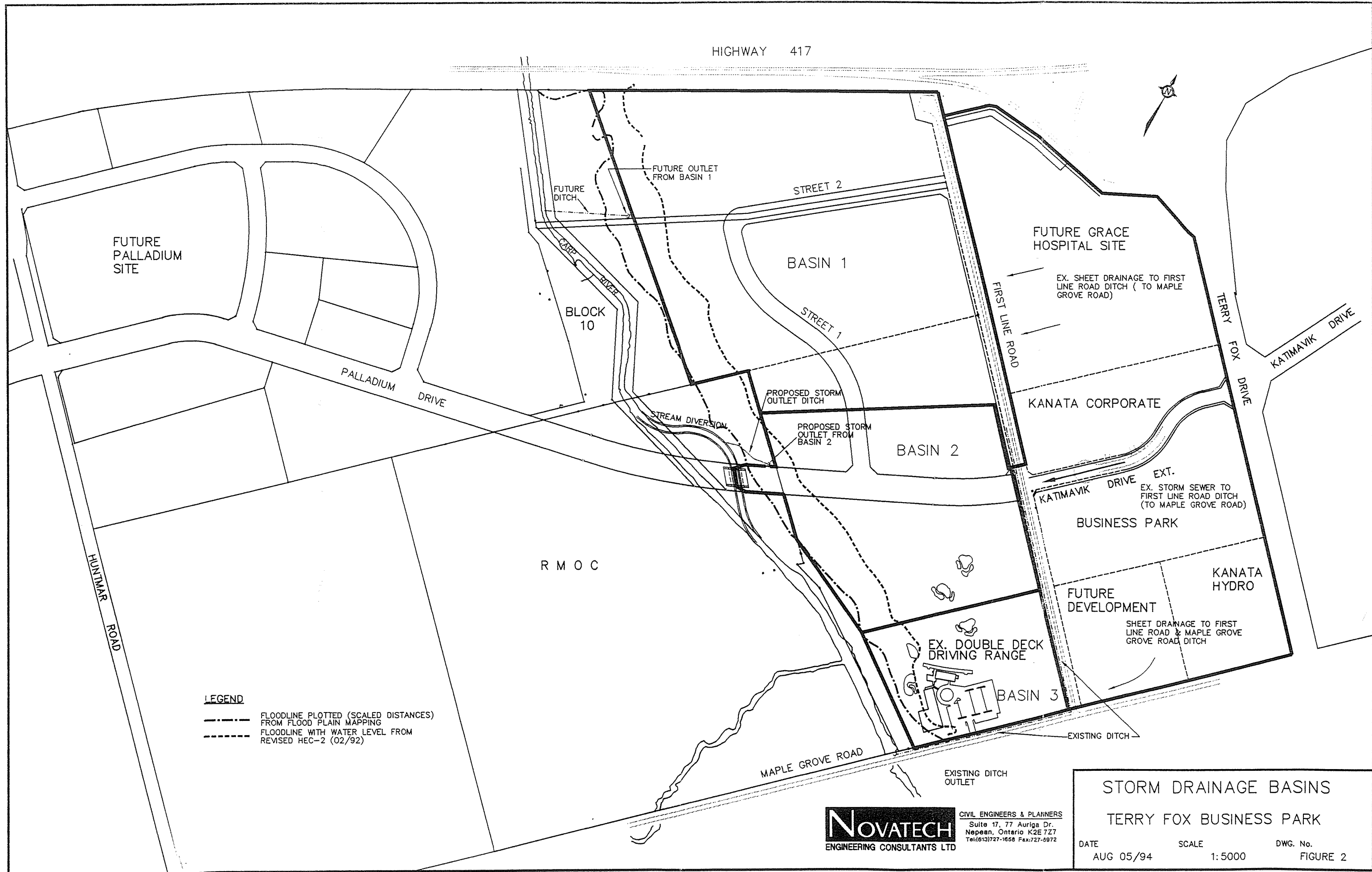
**TERRY FOX BUSINESS PARK
STORMWATER DESIGN PLAN**

**RMOC FILE NO.: 15-90-18.07
MMA FILE NO.: 06T-90019**

Prepared by:

NOVATECH ENGINEERING CONSULTANTS LTD.

August 4, 1994



HIGHWAY 417

FUTURE PALLADIUM SITE

BLOCK 10

PALLADIUM DRIVE

HUNTER ROAD

R M O C

STREET 2

STREET 1

BASIN 1

BASIN 2

FUTURE GRACE HOSPITAL SITE

EX. SHEET DRAINAGE TO FIRST LINE ROAD DITCH (TO MAPLE GROVE ROAD)

KANATA CORPORATE

EXT. EX. STORM SEWER TO FIRST LINE ROAD DITCH (TO MAPLE GROVE ROAD)

BUSINESS PARK

FUTURE DEVELOPMENT

SHEET DRAINAGE TO FIRST LINE ROAD & MAPLE GROVE GROVE ROAD DITCH

KANATA HYDRO

EX. DOUBLE DECK DRIVING RANGE

BASIN 3

EXISTING DITCH

MAPLE GROVE ROAD

EXISTING DITCH OUTLET

FUTURE OUTLET FROM BASIN 1

FUTURE DITCH

STREAM DIVERSION

PROPOSED STORM OUTLET DITCH

PROPOSED STORM OUTLET FROM BASIN 2

LEGEND

- FLOODLINE PLOTTED (SCALED DISTANCES) FROM FLOOD PLAIN MAPPING
- - - FLOODLINE WITH WATER LEVEL FROM REVISED HEC-2 (02/92)

NOVATECH
ENGINEERING CONSULTANTS LTD
CIVIL ENGINEERS & PLANNERS
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Nepean, Ontario K2E 7Z7
Tel: (613) 727-1658 Fax: 727-6972

STORM DRAINAGE BASINS
TERRY FOX BUSINESS PARK
DATE: AUG 05/94 SCALE: 1:5000 DWG. No.: FIGURE 2

6.0 PROPOSED STORMWATER DESIGN CRITERIA

The storm drainage of the site will be consistent with a dual drainage concept whereby the minor drainage system relies on roadway gutters, catchbasins and storm sewers to convey 1:5 year return period flows to the Carp River outlet. On-site controls will restrict release rates to 50 L/s/ha for each developable lot which is slightly in excess of the pre-development rate. The other half of the dual drainage system is the major system drainage which will convey flows in excess of the 1:5 year flows overland via roadways and drainage swales to the Carp River or control it on-site and release it at the 5 year pre-development rate. The hydrologic analysis has indicated that neither option will increase Carp River peak flows.

The principal elements or guidelines for the stormwater design plan are as follows:

- On-site flow restricted to 50 L/s/ha maximum by a combination of roof top storage, inlet control or other devices. Individual lot developers will be required to provide on-lot grading and drainage control to attenuate site drainage to the stipulated maximum for the 5 year design event.
- Roadway catchbasins with inlet capacity for the 1:5 year design event.
- Storm sewer pipe designed to convey post-development right-of-way (R.O.W.) flows for the 1:5 year design event and the on-site flows restricted to 50 L/s/ha maximum.
- The developer will have the option of controlling the 5 year - 100 year event and releasing it through the storm sewer (at 50 L/s/ha max.) or, alternatively, releasing it uncontrolled via the major system drainage network. This shall be a site specific consideration.
- Catchbasins/manholes shall contain sumps and will require regular maintenance. Sumps may have to be cleaned out more often than a conventional parking lot drainage network.
- Future lot developers shall submit stormwater management calculations which should either be based on the modified rational method or an appropriate stormwater management model such as OTTSWMM. Calculations which should be submitted in support of the design should include:
 - i) Allowable run-off;
 - ii) Post-development run-off;
 - iii) Storage calculations (5 year);
 - iv) Method of providing storage, including volume calculations, and
 - v) Orifice and outlet weir calculations.

-
- Site grading should ensure that OSD's retain ponding without flooding buildings and maximum ponding depths in parking lots should be limited to between 0.25m and 0.30m.
 - Site developments should incorporate feasible BMP's for improved water quality such as:
 - infiltration trenches or basins
 - sumps in catchbasins and catchbasin manholes
 - grassed swales
 - If overland flow routes (major system) are incorporated in the design, then the overland major system slope should be 0.1% minimum as measured from summit to summit.
 - Existing Katimavik Road storm drainage outlet culvert will be relocated to the existing First Line Road ditch south of future Palladium Drive. Some minor re-ditching along First Line Road may be required.

Proposed Hotel/Restaurant 40 Frank Nighbor Place

Pre - Development Stormwater Flows											
Area	Description	Area (ha)	A _{imperv} (ha) C=0.9	A _{gravel} (ha) C=0.7	A _{pervious} (ha) C=0.2	Weighted C _{w5}	Weighted C _{w100}	2-Year Flow (L/s)	5-Year Flow (L/s)	100-Year Flow (L/s)	Allowable Flows
											50 L/s/ha
PRE-1	Runoff to West / Carp Creek	0.663	0.000	0.000	0.663	0.20	0.25	28.3	38.4	82.3	40.7
PRE-2	Runoff to Northeast (Frank Nighbor Place)	0.150	0.000	0.000	0.150	0.20	0.25	6.4	8.7	18.6	
TOTAL		0.813	0.000	0.000	0.813	0.20	0.25	34.7	47.1	100.9	

Note: Flows Calculated using a Tc of 10 minutes.

Post - Development Stormwater Flows									
Area	Description	Area (ha)	A _{imp} (ha) C=0.9	A _{perv} (ha) C=0.2	C ₅	C ₁₀₀	Uncontrolled Flow (L/s)		
							2-year	5-year	100-year
A-0a	Uncontrolled Direct Runoff	0.019	0.000	0.019	0.20	0.25	0.8	1.1	2.4
A-0b		0.001	0.000	0.001	0.33	0.39	0.1	0.1	0.2
A-0c		0.015	0.000	0.015	0.20	0.25	0.6	0.9	1.9
A-0d		0.036	0.015	0.021	0.49	0.56	3.8	5.1	10.0
<i>Total Uncontrolled Runoff</i>		<i>0.071</i>	<i>0.015</i>	<i>0.056</i>	<i>0.35</i>	<i>0.41</i>	<i>5.3</i>	<i>7.2</i>	<i>14.4</i>
A-1a	Parking Lot Area Controlled by ICD in CBMH 116	0.028	0.027	0.001	0.87	0.97	31.6	31.3	25.2
A-1b		0.058	0.057	0.001	0.89	0.99			
A-1c		0.068	0.063	0.005	0.85	0.95			
A-1d		0.057	0.053	0.004	0.85	0.95			
A-1e		0.100	0.093	0.007	0.85	0.95			
A-1f		0.106	0.098	0.008	0.85	0.95			
A-1g		0.079	0.065	0.014	0.78	0.87			
A-1h		0.074	0.068	0.006	0.84	0.94			
R-1	Roof Areas that Drain Uncontrolled to Ground Surface and are Controlled by ICD in CBMH 116	0.107	0.107	0.000	0.90	1.00	31.6	31.3	25.2
R-2		0.065	0.065	0.000	0.90	1.00			
<i>Total Controlled Runoff</i>		<i>0.742</i>	<i>0.696</i>	<i>0.046</i>	<i>0.86</i>	<i>0.95</i>	<i>31.6</i>	<i>31.3</i>	<i>25.2</i>
TOTAL FLOWS		0.813	0.712	0.101	0.81	0.91	36.9	38.5	39.6

Note: Uncontrolled Flows Calculated using a Tc of 10 minutes. Controlled Flows from PCSWMM model.

40 Frank Nighbor Place
Design Storm Time Series Data
Chicago Design Storms



C25mm-4.stm		C2-3.stm		C5-3.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr
0:00	0	0:00	0	0:00	0
0:10	1.51	0:10	2.81	0:10	3.68
0:20	1.75	0:20	3.5	0:20	4.58
0:30	2.07	0:30	4.69	0:30	6.15
0:40	2.58	0:40	7.3	0:40	9.61
0:50	3.46	0:50	18.21	0:50	24.17
1:00	5.39	1:00	76.81	1:00	104.19
1:10	13.44	1:10	24.08	1:10	32.04
1:20	56.67	1:20	12.36	1:20	16.34
1:30	17.77	1:30	8.32	1:30	10.96
1:40	9.12	1:40	6.3	1:40	8.29
1:50	6.14	1:50	5.09	1:50	6.69
2:00	4.65	2:00	4.29	2:00	5.63
2:10	3.76	2:10	3.72	2:10	4.87
2:20	3.17	2:20	3.29	2:20	4.3
2:30	2.74	2:30	2.95	2:30	3.86
2:40	2.43	2:40	2.68	2:40	3.51
2:50	2.18	2:50	2.46	2:50	3.22
3:00	1.98	3:00	2.28	3:00	2.98
3:10	1.81				
3:20	1.68				
3:30	1.56				
3:40	1.47				
3:50	1.38				
4:00	1.31				

40 Frank Nighbor Place
Design Storm Time Series Data
Chicago Design Storms



C100-3.stm		C100-3+20%.stm	
Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr
0:00	0	0:00	0
0:10	6.05	0:10	6.14
0:20	7.54	0:20	9.05
0:30	10.16	0:30	12.19
0:40	15.97	0:40	19.16
0:50	40.65	0:50	48.78
1:00	178.56	1:00	214.27
1:10	54.05	1:10	64.86
1:20	27.32	1:20	32.78
1:30	18.24	1:30	21.89
1:40	13.74	1:40	16.49
1:50	11.06	1:50	13.27
2:00	9.29	2:00	11.15
2:10	8.02	2:10	9.62
2:20	7.08	2:20	8.5
2:30	6.35	2:30	7.62
2:40	5.76	2:40	6.91
2:50	5.28	2:50	6.34
3:00	4.88	3:00	5.86

40 Frank Nighbor Place
Design Storm Time Series Data
SCS Design Storms



S2-12.stm		S5-12.stm		S100-12.stm	
Duration	Intensity	Duration	Intensity	Duration	Intensity
min	mm/hr	min	mm/hr	min	mm/hr
0:00	0.00	0:00	0	0:00	0
0:30	1.27	0:30	1.69	0:30	2.82
1:00	0.59	1:00	0.79	1:00	1.31
1:30	1.10	1:30	1.46	1:30	2.44
2:00	1.10	2:00	1.46	2:00	2.44
2:30	1.44	2:30	1.91	2:30	3.19
3:00	1.27	3:00	1.69	3:00	2.82
3:30	1.69	3:30	2.25	3:30	3.76
4:00	1.69	4:00	2.25	4:00	3.76
4:30	2.29	4:30	3.03	4:30	5.07
5:00	2.88	5:00	3.82	5:00	6.39
5:30	4.57	5:30	6.07	5:30	10.14
6:00	36.24	6:00	48.08	6:00	80.38
6:30	9.23	6:30	12.25	6:30	20.47
7:00	4.06	7:00	5.39	7:00	9.01
7:30	2.71	7:30	3.59	7:30	6.01
8:00	2.37	8:00	3.15	8:00	5.26
8:30	1.86	8:30	2.47	8:30	4.13
9:00	1.95	9:00	2.58	9:00	4.32
9:30	1.27	9:30	1.69	9:30	2.82
10:00	1.02	10:00	1.35	10:00	2.25
10:30	1.44	10:30	1.91	10:30	3.19
11:00	0.93	11:00	1.24	11:00	2.07
11:30	0.85	11:30	1.12	11:30	1.88
12:00	0.85	12:00	1.12	12:00	1.88

40 Frank Nighbor Place

Ponding Storage Curves



Storage Curves for Surface Ponding

CB ID	STM Area ID	Storage Curve				
CBMH100	A-1a	Elevation	Depth	Area	Incremental Volume	Cumulative Volume
Notes		(m)	(m)	(m ²)	(m ³)	(m ³)
Invert		93.19	0.000	1.13	0.0	0.0
CBMH T/G		95.05	1.860	1.13	2.1	2.1
5cm ponding		95.10	1.910	35.59	0.9	3.0
Max Static Ponding ⁽¹⁾		95.14	1.950	112.65	3.0	6.0
Top of Storage Node ⁽²⁾		95.40	2.210	112.65	29.3	35.3

⁽¹⁾ Based on high point between CBs

⁽²⁾ Top of storage node is 0.35m above T/G - modelled major system with 0.35m depth

CB ID	STM Area ID	Storage Curve				
CBMH102	A-1b	Elevation	Depth	Area	Incremental Volume	Cumulative Volume
Notes		(m)	(m)	(m ²)	(m ³)	(m ³)
Invert		93.13	0.000	1.13	0.0	0.0
CBMH T/G		94.95	1.820	1.13	2.1	2.1
5cm ponding		95.00	1.870	22.22	0.6	2.6
10cm ponding		95.05	1.920	87.22	2.7	5.4
15cm ponding		95.10	1.970	178.73	6.6	12.0
Max Static Ponding ⁽¹⁾		95.12	1.990	215.72	3.9	16.0
Top of Storage Node ⁽²⁾		95.30	2.170	215.72	38.8	54.8

⁽¹⁾ Based on high point between CBs

⁽²⁾ Top of storage node is 0.35m above T/G - modelled major system with 0.35m depth

CB ID	STM Area ID	Storage Curve				
CBMH104	A-1c	Elevation	Depth	Area	Incremental Volume	Cumulative Volume
Notes		(m)	(m)	(m ²)	(m ³)	(m ³)
Invert		93.04	0.000	1.13	0.0	0.0
CBMH T/G		94.90	1.860	1.13	2.1	2.1
5cm ponding		94.95	1.910	21.08	0.6	2.7
10cm ponding		95.00	1.960	83.02	2.6	5.3
15cm ponding		95.05	2.010	185.92	6.7	12.0
Max Static Ponding ⁽¹⁾		95.10	2.060	315.61	12.5	24.5
Top of Storage Node ⁽²⁾		95.25	2.210	315.61	47.3	71.9

⁽¹⁾ Based on high point between CBs

⁽²⁾ Top of storage node is 0.35m above T/G - modelled major system with 0.35m depth

40 Frank Nighbor Place

Ponding Storage Curves

CB ID	STM Area ID	Storage Curve				
CBMH106	A-1d	Elevation	Depth	Area	Incremental Volume	Cummulative Volume
Notes		(m)	(m)	(m ²)	(m ³)	(m ³)
Invert		92.97	0.000	1.13	0.0	0.0
CBMH T/G		94.90	1.930	1.13	2.2	2.2
5cm ponding		94.95	1.980	17.65	0.5	2.7
10cm ponding		95.00	2.030	69.28	2.2	4.8
15cm ponding		95.05	2.080	155.91	5.6	10.5
Max Static Ponding ⁽¹⁾		95.10	2.130	287.58	11.1	21.5
Top of Storage Node ⁽²⁾		95.25	2.280	287.58	43.1	64.7

⁽¹⁾ Based on high point between CBs

⁽²⁾ Top of storage node is 0.35m above T/G - modelled major system with 0.35m depth

CB ID	STM Area ID	Storage Curve				
CBMH110	A-1e	Elevation	Depth	Area	Incremental Volume	Cummulative Volume
Notes		(m)	(m)	(m ²)	(m ³)	(m ³)
Invert		92.77	0.000	1.77	0.0	0.0
CBMH T/G		94.80	2.030	1.77	3.6	3.6
5cm ponding		94.85	2.080	16.32	0.5	4.0
10cm ponding		94.90	2.130	63.84	2.0	6.0
Max Static Ponding ⁽¹⁾		94.95	2.180	142.48	5.2	11.2
Top of Storage Node ⁽²⁾		95.15	2.380	483.88	62.6	73.8

⁽¹⁾ Based on high point between CBs

⁽²⁾ Top of storage node is 0.35m above T/G - modelled major system with 0.35m depth

CB ID	STM Area ID	Storage Curve				
CBMH112	A-1f	Elevation	Depth	Area	Incremental Volume	Cummulative Volume
Notes		(m)	(m)	(m ²)	(m ³)	(m ³)
Invert		92.95	0.000	1.13	0.0	0.0
CBMH T/G		94.85	1.900	1.13	2.1	2.1
5cm ponding		94.90	1.950	26.01	0.7	2.8
Max Static Ponding ⁽¹⁾		94.95	2.000	102.92	3.2	6.0
Top of Storage Node ⁽²⁾		95.20	2.250	491.84	74.3	80.4

⁽¹⁾ Based on high point between CBs

⁽²⁾ Top of storage node is 0.35m above T/G - modelled major system with 0.35m depth

40 Frank Nighbor Place

Ponding Storage Curves

CB ID	STM Area ID	Storage Curve				
CBMH114	A-1g	Elevation (m)	Depth (m)	Area (m ²)	Incremental Volume (m ³)	Cummulative Volume (m ³)
Notes						
Invert		92.87	0.000	1.77	0.0	0.0
CBMH T/G		94.80	1.930	1.77	3.4	3.4
5cm ponding		94.85	1.980	24.19	0.6	4.1
10cm ponding		94.90	2.030	94.70	3.0	7.0
Max Static Ponding ⁽¹⁾		94.95	2.080	211.61	7.7	14.7
Top of Storage Node ⁽²⁾		95.15	2.280	608.90	82.1	96.7

⁽¹⁾ Based on high point between CBs

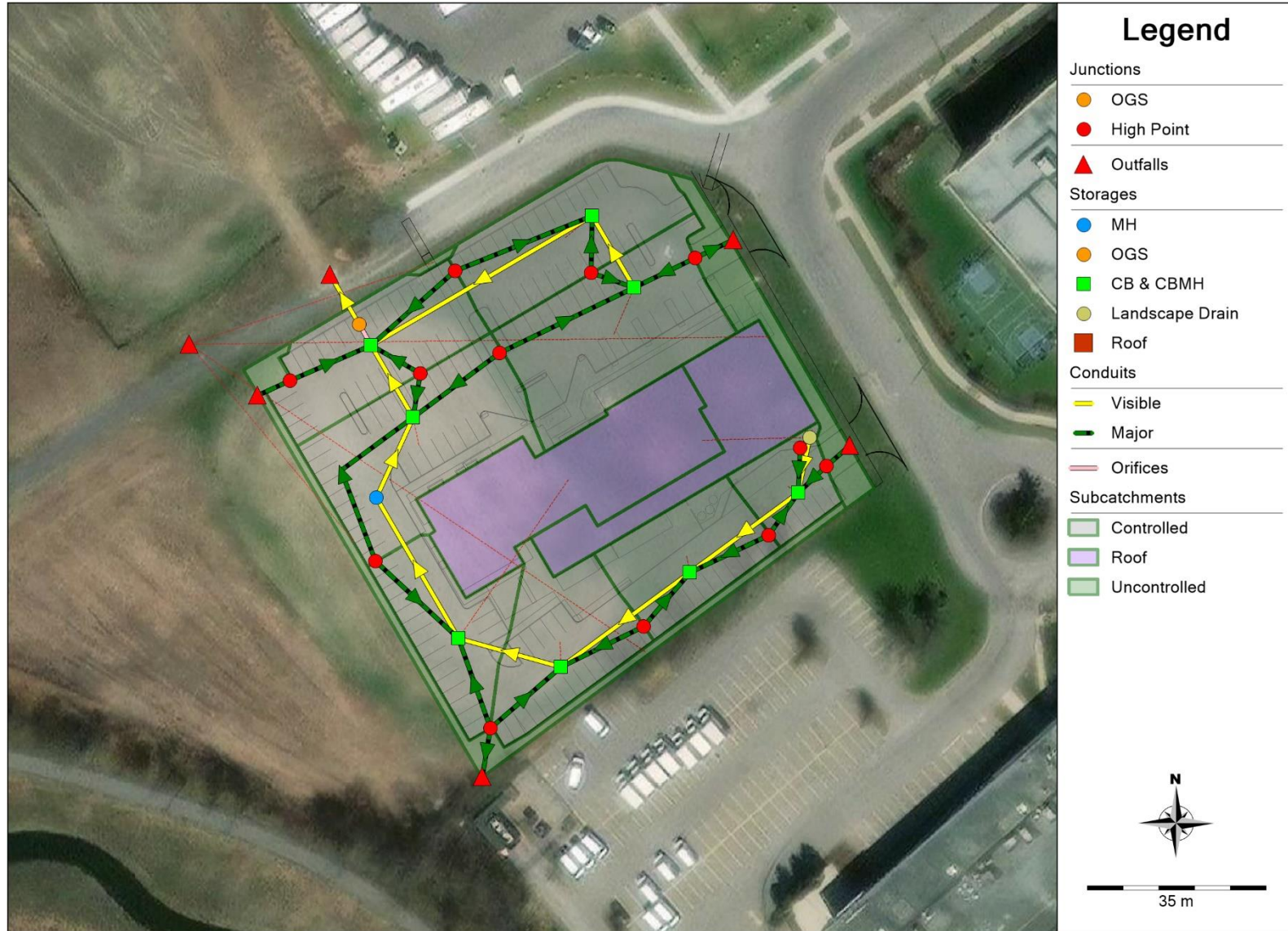
⁽²⁾ Top of storage node is 0.35m above T/G - modelled major system with 0.35m depth

CB ID	STM Area ID	Storage Curve				
CBMH116	A-1h	Elevation (m)	Depth (m)	Area (m ²)	Incremental Volume (m ³)	Cummulative Volume (m ³)
Notes						
Invert		92.74	0.000	1.77	0.0	0.0
CBMH T/G		94.80	2.060	1.77	3.6	3.6
5cm ponding		94.85	2.110	21.31	0.6	4.2
10cm ponding		94.90	2.160	84.96	2.7	6.9
Max Static Ponding ⁽¹⁾		94.95	2.210	190.89	6.9	13.8
Top of Storage Node ⁽²⁾		95.15	2.410	589.37	78.0	91.8

⁽¹⁾ Based on high point between CBs

⁽²⁾ Top of storage node is 0.35m above T/G - modelled major system with 0.35m depth

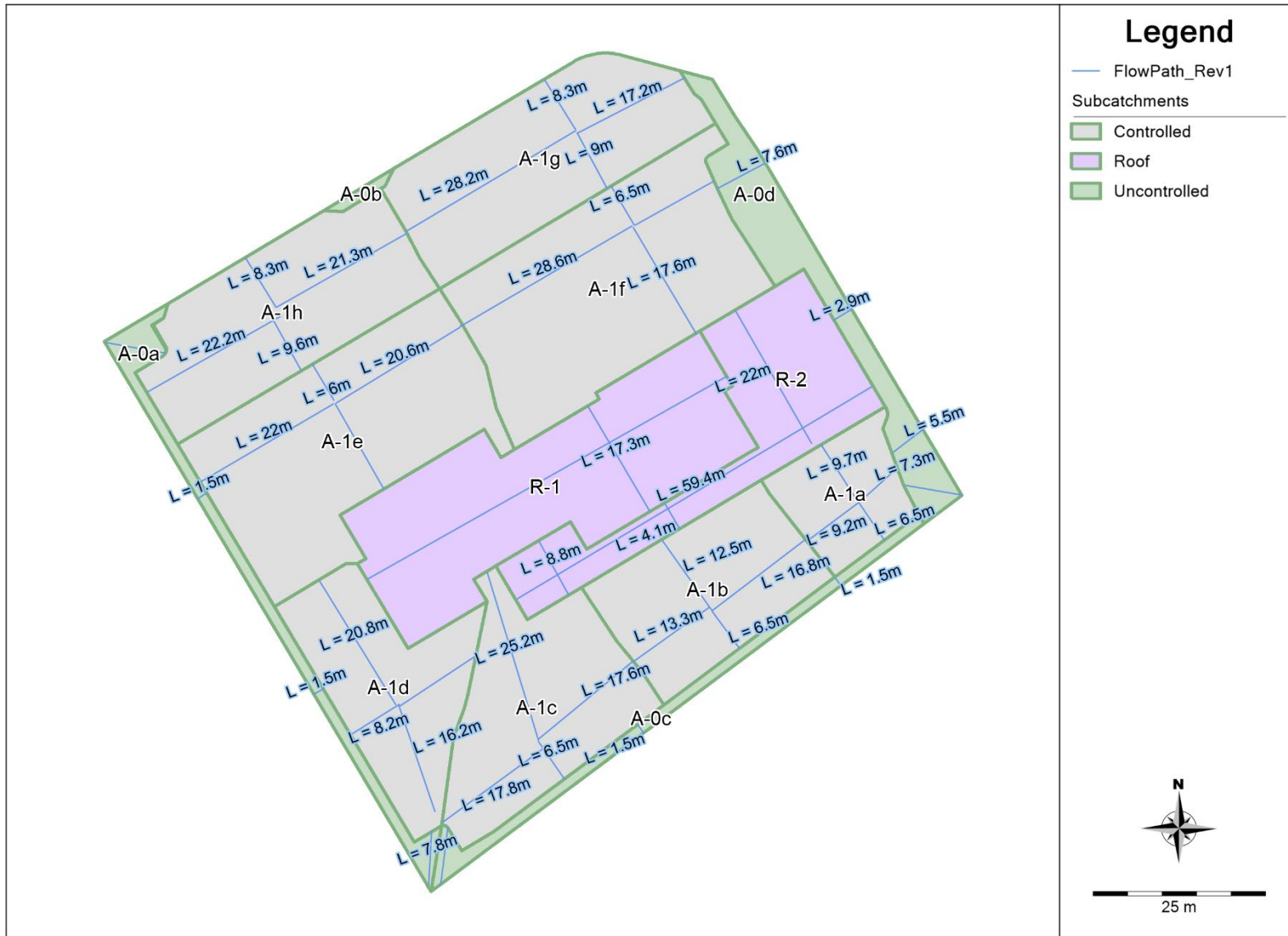
Overall Model Schematic



Date: 2023-09-14

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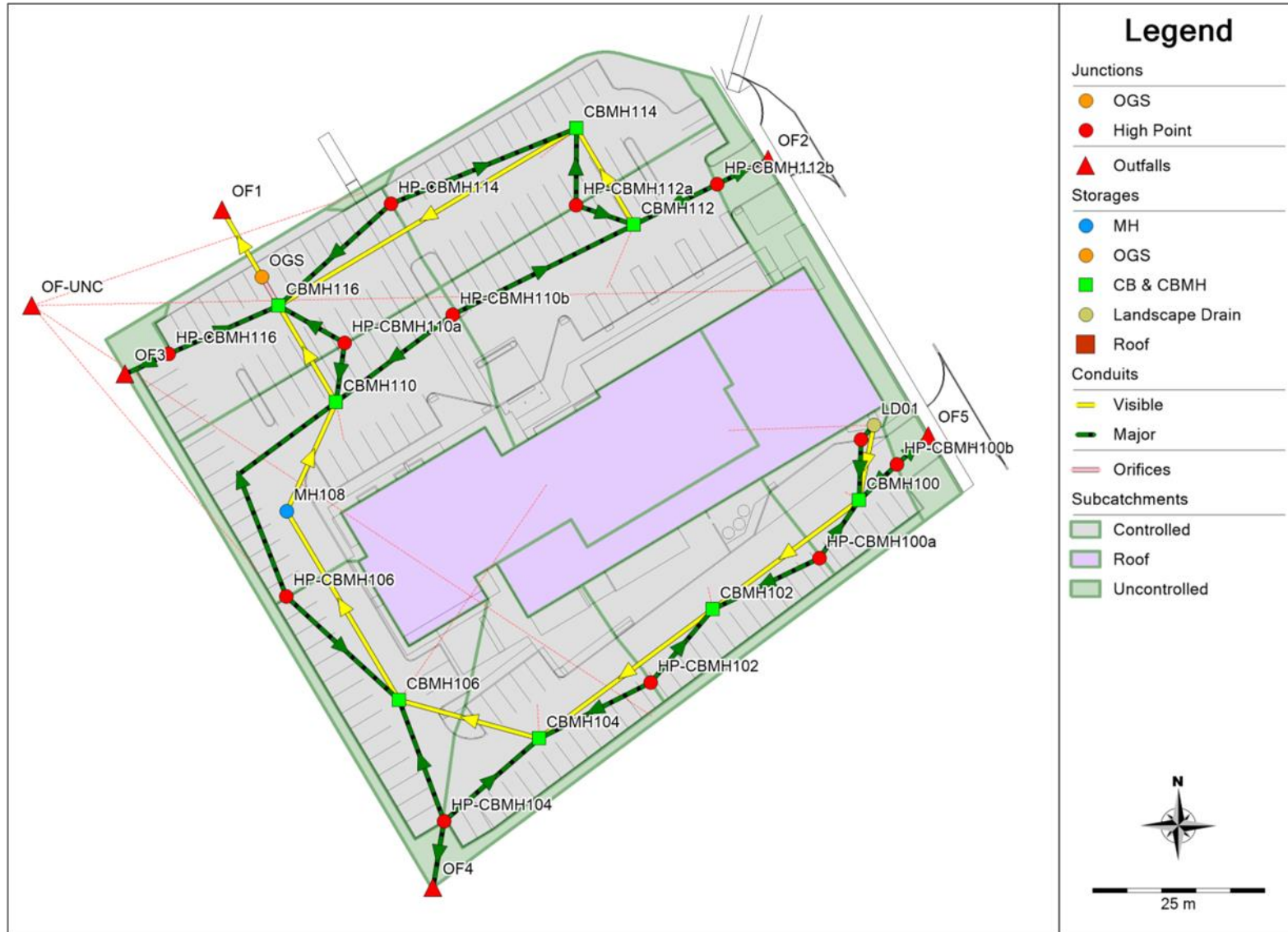
Subcatchments and Flow Paths



Date: 2023-09-14

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CBs, CBMHs, MHs, Highpoints, and Outfalls



Date: 2023-09-14

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40 Frank Nighbor Place (123002)

PCSWMM Model Output (3-hour 2-year Chicago Storm)

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

Boundary Condition
 25mm = 92.85
 2-Year = 93.22

 Element Count

 Number of rain gages 1
 Number of subcatchments ... 14
 Number of nodes 29
 Number of links 36
 Number of pollutants 0
 Number of land uses 0

 Raingage Summary

Name	Data Source	Data Type	Recording Interval
Raingage	01-C2yr-3hr	INTENSITY	10 min.

 Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-0a	0.02	38.00	0.00	7.5000	Raingage	OF-UNC
A-0b	0.00	6.67	18.60	2.0000	Raingage	OF-UNC
A-0c	0.01	37.50	0.00	14.5000	Raingage	OF-UNC
A-0d	0.04	60.00	41.40	3.5000	Raingage	OF-UNC
A-1a	0.03	35.00	95.70	1.5000	Raingage	CBMH100
A-1b	0.06	48.33	98.60	2.0000	Raingage	CBMH102
A-1c	0.07	40.00	92.90	2.0000	Raingage	CBMH104

A-1d	0.06	38.00	92.90	2.0000	Raingage	CBMH106
A-1e	0.10	62.50	92.90	2.0000	Raingage	CBMH110
A-1f	0.11	66.25	92.90	2.0000	Raingage	CBMH112
A-1g	0.08	49.38	82.90	2.0000	Raingage	CBMH114
A-1h	0.07	49.33	91.40	2.0000	Raingage	CBMH116
R-1	0.11	28.16	100.00	0.5000	Raingage	CBMH106
R-2	0.07	27.08	100.00	0.5000	Raingage	LD01

 Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
HP-CBMH100a	JUNCTION	95.14	0.35	0.0	
HP-CBMH100b	JUNCTION	95.15	0.35	0.0	
HP-CBMH102	JUNCTION	95.12	0.35	0.0	
HP-CBMH104	JUNCTION	95.10	0.35	0.0	
HP-CBMH106	JUNCTION	95.27	0.35	0.0	
HP-CBMH110a	JUNCTION	94.95	0.35	0.0	
HP-CBMH110b	JUNCTION	95.12	0.35	0.0	
HP-CBMH112a	JUNCTION	94.95	0.35	0.0	
HP-CBMH112b	JUNCTION	95.12	0.35	0.0	
HP-CBMH114	JUNCTION	95.11	0.35	0.0	
HP-CBMH116	JUNCTION	95.10	0.35	0.0	
HP-LD01	JUNCTION	95.29	0.35	0.0	
OF1	OUTFALL	92.22	0.69	0.0	
OF2	OUTFALL	94.53	0.35	0.0	
OF3	OUTFALL	94.57	0.35	0.0	
OF4	OUTFALL	94.90	0.35	0.0	
OF5	OUTFALL	94.66	0.35	0.0	
OF-UNC	OUTFALL	0.00	0.00	0.0	
CBMH100	STORAGE	93.19	2.21	0.0	
CBMH102	STORAGE	93.13	2.17	0.0	
CBMH104	STORAGE	93.04	2.21	0.0	
CBMH106	STORAGE	92.97	2.28	0.0	
CBMH110	STORAGE	92.77	2.38	0.0	
CBMH112	STORAGE	92.95	2.25	0.0	
CBMH114	STORAGE	92.87	2.28	0.0	
CBMH116	STORAGE	92.74	2.41	0.0	

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 2-year Chicago Storm)

LD01	STORAGE	93.74	1.87	0.0
MH108	STORAGE	92.83	2.31	0.0
OGS	STORAGE	92.69	2.25	0.0

Link Summary

Name	From Node	To Node	Type	Length	%Slope	Roughness
100-102	CBMH100	CBMH102	CONDUIT	26.2	0.1908	0.0130
102-104	CBMH102	CBMH104	CONDUIT	31.1	0.1929	0.0130
104-106	CBMH104	CBMH106	CONDUIT	20.9	0.1914	0.0130
106-108	CBMH106	MH108	CONDUIT	31.6	0.1899	0.0130
108-110	MH108	CBMH110	CONDUIT	17.2	0.1744	0.0130
1-100	LD01	CBMH100	CONDUIT	11.0	2.0004	0.0130
110-116	CBMH110	CBMH116	CONDUIT	16.1	0.1242	0.0130
112-114	CBMH112	CBMH114	CONDUIT	16.1	0.1242	0.0130
114-116	CBMH114	CBMH116	CONDUIT	49.9	0.1403	0.0130
MS01	HP-CBMH100b	OF5	CONDUIT	3.0	16.5557	0.0150
MS02	HP-CBMH100b	CBMH100	CONDUIT	3.0	3.3352	0.0150
MS03	HP-CBMH100a	CBMH100	CONDUIT	3.0	3.0014	0.0150
MS04	HP-CBMH100a	CBMH102	CONDUIT	3.0	6.3461	0.0150
MS05	HP-CBMH102	CBMH102	CONDUIT	3.0	5.6758	0.0150
MS06	HP-CBMH102	CBMH104	CONDUIT	3.0	7.3531	0.0150
MS07	HP-CBMH104	CBMH104	CONDUIT	3.0	6.6815	0.0150
MS08	HP-CBMH104	OF4	CONDUIT	3.0	6.6815	0.0150
MS09	HP-CBMH104	CBMH106	CONDUIT	3.0	6.6815	0.0150
MS10	HP-CBMH106	CBMH106	CONDUIT	3.0	12.4282	0.0150
MS11	HP-CBMH106	CBMH110	CONDUIT	3.0	15.8625	0.0150
MS12	HP-CBMH110a	CBMH110	CONDUIT	3.0	5.0063	0.0150
MS13	HP-CBMH110a	CBMH116	CONDUIT	3.0	5.0063	0.0150
MS14	HP-CBMH116	CBMH116	CONDUIT	3.0	10.0504	0.0150
MS15	HP-CBMH116	OF3	CONDUIT	3.0	17.9490	0.0150
MS16	HP-CBMH114	CBMH116	CONDUIT	3.0	10.3889	0.0150
MS17	HP-CBMH114	CBMH114	CONDUIT	3.0	10.3889	0.0150
MS18	HP-CBMH112a	CBMH114	CONDUIT	3.0	5.0063	0.0150
MS19	HP-CBMH112a	CBMH112	CONDUIT	3.0	3.3352	0.0150
MS20	HP-CBMH110b	CBMH110	CONDUIT	3.0	10.7279	0.0150
MS21	HP-CBMH110b	CBMH112	CONDUIT	3.0	9.0367	0.0150
MS22	HP-CBMH112b	CBMH112	CONDUIT	3.0	9.0367	0.0150

MS23	HP-CBMH112b	OF2	CONDUIT	3.0	20.0584	0.0150
MS25_1	HP-LD01	LD01	CONDUIT	3.0	1.0001	0.0150
MS25_2	HP-LD01	CBMH100	CONDUIT	3.0	8.0257	0.0150
OGS-OF1	OGS	OF1	CONDUIT	11.2	0.8036	0.0130
O-CBMH116	CBMH116	OGS	ORIFICE			

Cross Section Summary

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
100-102	CIRCULAR	0.53	0.22	0.13	0.53	1	195.62
102-104	CIRCULAR	0.53	0.22	0.13	0.53	1	196.68
104-106	CIRCULAR	0.53	0.22	0.13	0.53	1	195.90
106-108	CIRCULAR	0.53	0.22	0.13	0.53	1	195.12
108-110	CIRCULAR	0.61	0.29	0.15	0.61	1	268.00
1-100	CIRCULAR	0.20	0.03	0.05	0.20	1	46.39
110-116	CIRCULAR	0.61	0.29	0.15	0.61	1	226.18
112-114	CIRCULAR	0.61	0.29	0.15	0.61	1	226.18
114-116	CIRCULAR	0.61	0.29	0.15	0.61	1	240.35
MS01	RECT_OPEN	0.35	1.05	0.28	3.00	1	12300.49
MS02	RECT_OPEN	0.35	1.05	0.28	3.00	1	5520.89
MS03	RECT_OPEN	0.35	1.05	0.28	3.00	1	5237.30
MS04	RECT_OPEN	0.35	1.05	0.28	3.00	1	7615.56
MS05	RECT_OPEN	0.35	1.05	0.28	3.00	1	7202.15
MS06	RECT_OPEN	0.35	1.05	0.28	3.00	1	8197.58
MS07	RECT_OPEN	0.35	1.05	0.28	3.00	1	7814.25
MS08	RECT_OPEN	0.35	0.35	0.21	1.00	1	2103.07
MS09	RECT_OPEN	0.35	1.05	0.28	3.00	1	7814.25
MS10	RECT_OPEN	0.35	1.05	0.28	3.00	1	10657.46
MS11	RECT_OPEN	0.35	1.05	0.28	3.00	1	12040.25
MS12	RECT_OPEN	0.35	1.05	0.28	3.00	1	6764.04
MS13	RECT_OPEN	0.35	1.05	0.28	3.00	1	6764.04
MS14	RECT_OPEN	0.35	1.05	0.28	3.00	1	9583.86
MS15	RECT_OPEN	0.35	0.35	0.21	1.00	1	3446.96
MS16	RECT_OPEN	0.35	1.05	0.28	3.00	1	9743.95
MS17	RECT_OPEN	0.35	1.05	0.28	3.00	1	9743.95
MS18	RECT_OPEN	0.35	1.05	0.28	3.00	1	6764.04
MS19	RECT_OPEN	0.35	1.05	0.28	3.00	1	5520.89

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 2-year Chicago Storm)

ID	Structure	Inflow	Outflow	Storage	Volume	Count	Value
MS20	RECT_OPEN	0.35	1.05	0.28	3.00	1	9901.61
MS21	RECT_OPEN	0.35	1.05	0.28	3.00	1	9087.69
MS22	RECT_OPEN	0.35	1.05	0.28	3.00	1	9087.69
MS23	RECT_OPEN	0.35	1.05	0.28	3.00	1	13539.34
MS25_1	RECT_OPEN	0.35	1.05	0.28	3.00	1	3023.15
MS25_2	RECT_OPEN	0.35	1.05	0.28	3.00	1	8564.29
OGS-OF1	CIRCULAR	0.30	0.07	0.08	0.30	1	90.60

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

Analysis Options

Flow Units LPS
Process Models:
 Rainfall/Runoff YES
 RDII NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed NO
 Water Quality NO
Infiltration Method HORTON
Flow Routing Method DYNWAVE
Surcharge Method EXTRAN
Starting Date 02/06/2023 00:00:00
Ending Date 02/08/2023 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step 2.00 sec
Variable Time Step YES
Maximum Trials 8
Number of Threads 8

Head Tolerance 0.001500 m

	Volume hectare-m	Depth mm
*****	-----	-----
Runoff Quantity Continuity		

Initial LID Storage	0.001	1.042
Total Precipitation	0.026	31.857
Evaporation Loss	0.000	0.000
Infiltration Loss	0.003	3.931
Surface Runoff	0.023	28.122
Final Storage	0.001	1.042
Continuity Error (%)	-0.598	

	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Flow Routing Continuity		

Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.023	0.229
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.001
External Outflow	0.023	0.230
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.003	0.031
Final Stored Volume	0.003	0.031
Continuity Error (%)	-0.016	

Time-Step Critical Elements

None

Highest Flow Instability Indexes

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 2-year Chicago Storm)

Link O-CBMH116 (41)

Routing Time Step Summary

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Minimum Time Step      :    1.50 sec
Average Time Step      :    2.00 sec
Maximum Time Step      :    2.00 sec
Percent in Steady State :    0.00
Average Iterations per Step :    2.00
Percent Not Converging  :    0.00
Time Step Frequencies  :
  2.000 - 1.516 sec    :   100.00 %
  1.516 - 1.149 sec    :    0.00 %
  1.149 - 0.871 sec    :    0.00 %
  0.871 - 0.660 sec    :    0.00 %
  0.660 - 0.500 sec    :    0.00 %
  
```

Subcatchment Runoff Summary

Peak Runoff	Runoff Coeff	Total Precip	Total Runon	Total Evap	Total Infil	Imperv Runoff	Perv Runoff	Total Runoff	Total Runoff
Subcatchment	LPS	mm	mm	mm	mm	mm	mm	mm	10^6 ltr
A-0a	0.33	31.86	0.00	0.00	31.61	0.00	0.53	0.53	0.00
A-0b	0.07	31.86	0.00	0.00	25.62	5.93	0.79	6.72	0.00
A-0c	0.41	31.86	0.00	0.00	31.51	0.00	0.83	0.83	0.00
A-0d	3.53	31.86	0.00	0.00	18.52	13.20	0.30	13.50	0.00

A-1a	5.80	31.86	0.00	0.00	1.34	30.57	0.09	30.65	0.01
A-1b	12.28	31.86	0.00	0.00	0.44	31.52	0.04	31.56	0.02
A-1c	13.63	31.86	0.00	0.00	2.23	29.74	0.07	29.81	0.02
A-1d	11.44	31.86	0.00	0.00	2.23	29.72	0.08	29.80	0.02
A-1e	20.06	31.86	0.00	0.00	2.23	29.73	0.07	29.80	0.03
A-1f	21.27	31.86	0.00	0.00	2.23	29.73	0.07	29.80	0.03
A-1g	14.19	31.86	0.00	0.00	5.41	26.52	0.09	26.60	0.02
A-1h	14.63	31.86	0.00	0.00	2.71	29.24	0.08	29.32	0.02
R-1	22.14	31.86	0.00	0.00	0.00	32.11	0.00	32.11	0.03
R-2	13.74	31.86	0.00	0.00	0.00	32.12	0.00	32.12	0.02

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
HP-CBMH100a	JUNCTION	0.00	0.00	95.14	0 00:00	0.00
HP-CBMH100b	JUNCTION	0.00	0.00	95.15	0 00:00	0.00
HP-CBMH102	JUNCTION	0.00	0.00	95.12	0 00:00	0.00
HP-CBMH104	JUNCTION	0.00	0.00	95.10	0 00:00	0.00
HP-CBMH106	JUNCTION	0.00	0.00	95.27	0 00:00	0.00
HP-CBMH110a	JUNCTION	0.00	0.00	94.95	0 00:00	0.00
HP-CBMH110b	JUNCTION	0.00	0.00	95.12	0 00:00	0.00
HP-CBMH112a	JUNCTION	0.00	0.00	94.95	0 00:00	0.00
HP-CBMH112b	JUNCTION	0.00	0.00	95.12	0 00:00	0.00
HP-CBMH114	JUNCTION	0.00	0.00	95.11	0 00:00	0.00
HP-CBMH116	JUNCTION	0.00	0.00	95.10	0 00:00	0.00

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 2-year Chicago Storm)

HP-LD01	JUNCTION	0.00	0.00	95.29	0	00:00	0.00
OF1	OUTFALL	1.00	1.00	93.22	0	00:00	1.00
OF2	OUTFALL	0.00	0.00	94.53	0	00:00	0.00
OF3	OUTFALL	0.00	0.00	94.57	0	00:00	0.00
OF4	OUTFALL	0.00	0.00	94.90	0	00:00	0.00
OF5	OUTFALL	0.00	0.00	94.66	0	00:00	0.00
OF-UNC	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
CBMH100	STORAGE	0.07	1.60	94.79	0	01:24	1.60
CBMH102	STORAGE	0.13	1.66	94.79	0	01:24	1.66
CBMH104	STORAGE	0.22	1.75	94.79	0	01:24	1.75
CBMH106	STORAGE	0.29	1.82	94.79	0	01:23	1.82
CBMH110	STORAGE	0.49	2.02	94.79	0	01:23	2.02
CBMH112	STORAGE	0.31	1.84	94.79	0	01:23	1.84
CBMH114	STORAGE	0.39	1.92	94.79	0	01:23	1.92
CBMH116	STORAGE	0.52	2.05	94.79	0	01:23	2.05
LD01	STORAGE	0.02	1.05	94.79	0	01:24	1.05
MH108	STORAGE	0.43	1.96	94.79	0	01:23	1.96
OGS	STORAGE	0.53	0.55	93.24	0	01:23	0.55

Node Inflow Summary

Node	Type	Maximum	Maximum	Time of Max Occurrence	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
		Lateral Inflow LPS	Total Inflow LPS				
HP-CBMH100a	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH100b	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH102	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH104	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH106	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH110a	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH110b	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH112a	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH112b	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH114	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH116	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr

HP-LD01	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
OF1	OUTFALL	0.00	31.55	0 01:23	0	0.225	0.000
OF2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OF3	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OF4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OF5	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OF-UNC	OUTFALL	4.34	4.34	0 01:10	0.00515	0.00515	0.000
CBMH100	STORAGE	5.80	18.40	0 01:05	0.00858	0.0303	-0.171
CBMH102	STORAGE	12.28	22.57	0 01:07	0.0183	0.0501	0.007
CBMH104	STORAGE	13.63	23.02	0 01:08	0.0203	0.0716	-0.001
CBMH106	STORAGE	33.58	42.16	0 01:10	0.0513	0.123	-0.001
CBMH110	STORAGE	20.06	36.23	0 01:08	0.0298	0.154	-0.000
CBMH112	STORAGE	21.27	21.27	0 01:10	0.0316	0.0336	-0.002
CBMH114	STORAGE	14.19	29.93	0 01:09	0.021	0.0568	-0.000
CBMH116	STORAGE	14.63	46.37	0 01:10	0.0217	0.229	-0.017
LD01	STORAGE	13.74	13.74	0 01:10	0.0209	0.0209	0.143
MH108	STORAGE	0.00	30.77	0 01:08	0	0.124	-0.000
OGS	STORAGE	0.00	31.55	0 01:23	0	0.226	0.018

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow
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40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 2-year Chicago Storm)

Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	LPS
CBMH100	0.000	0	0	0	0.002	5	0 01:24	10.34
CBMH102	0.000	0	0	0	0.002	3	0 01:24	9.52
CBMH104	0.000	0	0	0	0.002	3	0 01:24	10.55
CBMH106	0.000	1	0	0	0.002	3	0 01:23	30.77
CBMH110	0.001	1	0	0	0.004	5	0 01:23	24.85
CBMH112	0.000	0	0	0	0.002	3	0 01:23	15.78
CBMH114	0.001	1	0	0	0.003	4	0 01:23	12.45
CBMH116	0.001	1	0	0	0.004	4	0 01:23	31.55
LD01	0.000	1	0	0	0.000	56	0 01:24	12.67
MH108	0.001	19	0	0	0.003	85	0 01:23	19.09
OGS	0.001	24	0	0	0.001	25	0 01:23	31.55

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	11.64	11.11	31.55	0.225
OF2	0.00	0.00	0.00	0.000
OF3	0.00	0.00	0.00	0.000
OF4	0.00	0.00	0.00	0.000
OF5	0.00	0.00	0.00	0.000
OF-UNC	6.34	0.47	4.34	0.005
System	3.00	11.58	32.28	0.230

Link Flow Summary

Maximum Flow	Time of Max Occurrence	Maximum Veloc	Max/ Full	Max/ Full
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Link	Type	LPS	days hr:min	m/sec	Flow	Depth
100-102	CONDUIT	10.34	0 01:07	0.05	0.05	1.00
102-104	CONDUIT	9.52	0 01:05	0.04	0.05	1.00
104-106	CONDUIT	10.55	0 01:13	0.05	0.05	1.00
106-108	CONDUIT	30.77	0 01:08	0.14	0.16	1.00
108-110	CONDUIT	19.09	0 01:15	0.07	0.07	1.00
1-100	CONDUIT	12.67	0 01:05	1.15	0.27	1.00
110-116	CONDUIT	24.85	0 01:10	0.09	0.11	1.00
112-114	CONDUIT	15.78	0 01:09	0.05	0.07	1.00
114-116	CONDUIT	12.45	0 01:07	0.04	0.05	1.00
MS01	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS02	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS03	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS04	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS05	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS06	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS07	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS08	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS09	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS11	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS12	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS13	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS14	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS15	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS16	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS17	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS18	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS19	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS20	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS21	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS22	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS23	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS25_1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS25_2	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OGS-OF1	CONDUIT	31.55	0 01:23	0.43	0.35	1.00
O-CBMH116	ORIFICE	31.55	0 01:23			1.00

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 2-year Chicago Storm)

Flow Classification Summary

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl	
100-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
102-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
104-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
106-108	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
1-100	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.01	0.00
110-116	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
112-114	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
114-116	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
MS01	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS02	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS03	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS04	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS05	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS06	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS07	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS08	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS09	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS20	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS21	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS22	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS23	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS25_1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MS25_2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OGS-OF1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

Conduit Surcharge Summary

Conduit	Hours Full			Hours Above Full	Hours Capacity Limited
	Both Ends	Upstream	Dnstream	Normal Flow	Limited
100-102	1.61	1.61	1.68	0.01	0.01
102-104	1.70	1.70	1.81	0.01	0.01
104-106	1.87	1.87	1.96	0.01	0.01
106-108	2.04	2.04	2.21	0.01	0.01
108-110	2.22	2.22	2.31	0.01	0.01
1-100	1.30	1.30	1.61	0.01	0.01
110-116	2.43	2.43	2.52	0.01	0.01
112-114	1.90	1.90	1.94	0.01	0.01
114-116	2.10	2.10	2.31	0.01	0.01
OGS-OF1	48.00	48.00	48.00	0.01	0.01

Analysis begun on: Thu Sep 14 12:03:56 2023
 Analysis ended on: Thu Sep 14 12:03:58 2023
 Total elapsed time: 00:00:02

40 Frank Nighbor Place (123002)

PCSWMM Model Output (3-hour 5-year Chicago Storm)

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

Boundary Condition
 25mm = 92.85
 2-Year = 93.22

 Element Count

 Number of rain gages 1
 Number of subcatchments ... 14
 Number of nodes 29
 Number of links 36
 Number of pollutants 0
 Number of land uses 0

 Raingage Summary

Name	Data Source	Data Type	Recording Interval
Raingage	01-C2yr-3hr	INTENSITY	10 min.

 Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-0a	0.02	38.00	0.00	7.5000	Raingage	OF-UNC
A-0b	0.00	6.67	18.60	2.0000	Raingage	OF-UNC
A-0c	0.01	37.50	0.00	14.5000	Raingage	OF-UNC
A-0d	0.04	60.00	41.40	3.5000	Raingage	OF-UNC
A-1a	0.03	35.00	95.70	1.5000	Raingage	CBMH100
A-1b	0.06	48.33	98.60	2.0000	Raingage	CBMH102
A-1c	0.07	40.00	92.90	2.0000	Raingage	CBMH104

A-1d	0.06	38.00	92.90	2.0000	Raingage	CBMH106
A-1e	0.10	62.50	92.90	2.0000	Raingage	CBMH110
A-1f	0.11	66.25	92.90	2.0000	Raingage	CBMH112
A-1g	0.08	49.38	82.90	2.0000	Raingage	CBMH114
A-1h	0.07	49.33	91.40	2.0000	Raingage	CBMH116
R-1	0.11	28.16	100.00	0.5000	Raingage	CBMH106
R-2	0.07	27.08	100.00	0.5000	Raingage	LD01

 Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
HP-CBMH100a	JUNCTION	95.14	0.35	0.0	
HP-CBMH100b	JUNCTION	95.15	0.35	0.0	
HP-CBMH102	JUNCTION	95.12	0.35	0.0	
HP-CBMH104	JUNCTION	95.10	0.35	0.0	
HP-CBMH106	JUNCTION	95.27	0.35	0.0	
HP-CBMH110a	JUNCTION	94.95	0.35	0.0	
HP-CBMH110b	JUNCTION	95.12	0.35	0.0	
HP-CBMH112a	JUNCTION	94.95	0.35	0.0	
HP-CBMH112b	JUNCTION	95.12	0.35	0.0	
HP-CBMH114	JUNCTION	95.11	0.35	0.0	
HP-CBMH116	JUNCTION	95.10	0.35	0.0	
HP-LD01	JUNCTION	95.29	0.35	0.0	
OF1	OUTFALL	92.22	0.69	0.0	
OF2	OUTFALL	94.53	0.35	0.0	
OF3	OUTFALL	94.57	0.35	0.0	
OF4	OUTFALL	94.90	0.35	0.0	
OF5	OUTFALL	94.66	0.35	0.0	
OF-UNC	OUTFALL	0.00	0.00	0.0	
CBMH100	STORAGE	93.19	2.21	0.0	
CBMH102	STORAGE	93.13	2.17	0.0	
CBMH104	STORAGE	93.04	2.21	0.0	
CBMH106	STORAGE	92.97	2.28	0.0	
CBMH110	STORAGE	92.77	2.38	0.0	
CBMH112	STORAGE	92.95	2.25	0.0	
CBMH114	STORAGE	92.87	2.28	0.0	
CBMH116	STORAGE	92.74	2.41	0.0	

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 5-year Chicago Storm)

LD01	STORAGE	93.74	1.87	0.0
MH108	STORAGE	92.83	2.31	0.0
OGS	STORAGE	92.69	2.25	0.0

Link Summary

Name	From Node	To Node	Type	Length	%Slope	Roughness
100-102	CBMH100	CBMH102	CONDUIT	26.2	0.1908	0.0130
102-104	CBMH102	CBMH104	CONDUIT	31.1	0.1929	0.0130
104-106	CBMH104	CBMH106	CONDUIT	20.9	0.1914	0.0130
106-108	CBMH106	MH108	CONDUIT	31.6	0.1899	0.0130
108-110	MH108	CBMH110	CONDUIT	17.2	0.1744	0.0130
1-100	LD01	CBMH100	CONDUIT	11.0	2.0004	0.0130
110-116	CBMH110	CBMH116	CONDUIT	16.1	0.1242	0.0130
112-114	CBMH112	CBMH114	CONDUIT	16.1	0.1242	0.0130
114-116	CBMH114	CBMH116	CONDUIT	49.9	0.1403	0.0130
MS01	HP-CBMH100b	OF5	CONDUIT	3.0	16.5557	0.0150
MS02	HP-CBMH100b	CBMH100	CONDUIT	3.0	3.3352	0.0150
MS03	HP-CBMH100a	CBMH100	CONDUIT	3.0	3.0014	0.0150
MS04	HP-CBMH100a	CBMH102	CONDUIT	3.0	6.3461	0.0150
MS05	HP-CBMH102	CBMH102	CONDUIT	3.0	5.6758	0.0150
MS06	HP-CBMH102	CBMH104	CONDUIT	3.0	7.3531	0.0150
MS07	HP-CBMH104	CBMH104	CONDUIT	3.0	6.6815	0.0150
MS08	HP-CBMH104	OF4	CONDUIT	3.0	6.6815	0.0150
MS09	HP-CBMH104	CBMH106	CONDUIT	3.0	6.6815	0.0150
MS10	HP-CBMH106	CBMH106	CONDUIT	3.0	12.4282	0.0150
MS11	HP-CBMH106	CBMH110	CONDUIT	3.0	15.8625	0.0150
MS12	HP-CBMH110a	CBMH110	CONDUIT	3.0	5.0063	0.0150
MS13	HP-CBMH110a	CBMH116	CONDUIT	3.0	5.0063	0.0150
MS14	HP-CBMH116	CBMH116	CONDUIT	3.0	10.0504	0.0150
MS15	HP-CBMH116	OF3	CONDUIT	3.0	17.9490	0.0150
MS16	HP-CBMH114	CBMH116	CONDUIT	3.0	10.3889	0.0150
MS17	HP-CBMH114	CBMH114	CONDUIT	3.0	10.3889	0.0150
MS18	HP-CBMH112a	CBMH114	CONDUIT	3.0	5.0063	0.0150
MS19	HP-CBMH112a	CBMH112	CONDUIT	3.0	3.3352	0.0150
MS20	HP-CBMH110b	CBMH110	CONDUIT	3.0	10.7279	0.0150
MS21	HP-CBMH110b	CBMH112	CONDUIT	3.0	9.0367	0.0150
MS22	HP-CBMH112b	CBMH112	CONDUIT	3.0	9.0367	0.0150

MS23	HP-CBMH112b	OF2	CONDUIT	3.0	20.0584	0.0150
MS25_1	HP-LD01	LD01	CONDUIT	3.0	1.0001	0.0150
MS25_2	HP-LD01	CBMH100	CONDUIT	3.0	8.0257	0.0150
OGS-OF1	OGS	OF1	CONDUIT	11.2	0.8036	0.0130
O-CBMH116	CBMH116	OGS	ORIFICE			

Cross Section Summary

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
100-102	CIRCULAR	0.53	0.22	0.13	0.53	1	195.62
102-104	CIRCULAR	0.53	0.22	0.13	0.53	1	196.68
104-106	CIRCULAR	0.53	0.22	0.13	0.53	1	195.90
106-108	CIRCULAR	0.53	0.22	0.13	0.53	1	195.12
108-110	CIRCULAR	0.61	0.29	0.15	0.61	1	268.00
1-100	CIRCULAR	0.20	0.03	0.05	0.20	1	46.39
110-116	CIRCULAR	0.61	0.29	0.15	0.61	1	226.18
112-114	CIRCULAR	0.61	0.29	0.15	0.61	1	226.18
114-116	CIRCULAR	0.61	0.29	0.15	0.61	1	240.35
MS01	RECT_OPEN	0.35	1.05	0.28	3.00	1	12300.49
MS02	RECT_OPEN	0.35	1.05	0.28	3.00	1	5520.89
MS03	RECT_OPEN	0.35	1.05	0.28	3.00	1	5237.30
MS04	RECT_OPEN	0.35	1.05	0.28	3.00	1	7615.56
MS05	RECT_OPEN	0.35	1.05	0.28	3.00	1	7202.15
MS06	RECT_OPEN	0.35	1.05	0.28	3.00	1	8197.58
MS07	RECT_OPEN	0.35	1.05	0.28	3.00	1	7814.25
MS08	RECT_OPEN	0.35	0.35	0.21	1.00	1	2103.07
MS09	RECT_OPEN	0.35	1.05	0.28	3.00	1	7814.25
MS10	RECT_OPEN	0.35	1.05	0.28	3.00	1	10657.46
MS11	RECT_OPEN	0.35	1.05	0.28	3.00	1	12040.25
MS12	RECT_OPEN	0.35	1.05	0.28	3.00	1	6764.04
MS13	RECT_OPEN	0.35	1.05	0.28	3.00	1	6764.04
MS14	RECT_OPEN	0.35	1.05	0.28	3.00	1	9583.86
MS15	RECT_OPEN	0.35	0.35	0.21	1.00	1	3446.96
MS16	RECT_OPEN	0.35	1.05	0.28	3.00	1	9743.95
MS17	RECT_OPEN	0.35	1.05	0.28	3.00	1	9743.95
MS18	RECT_OPEN	0.35	1.05	0.28	3.00	1	6764.04
MS19	RECT_OPEN	0.35	1.05	0.28	3.00	1	5520.89

40 Frank Nighbor Place (123002)

PCSWMM Model Output (3-hour 5-year Chicago Storm)

ID	Structure Type	Flow	Depth	Velocity	Time	Volume
MS20	RECT_OPEN	0.35	1.05	0.28	3.00	1 9901.61
MS21	RECT_OPEN	0.35	1.05	0.28	3.00	1 9087.69
MS22	RECT_OPEN	0.35	1.05	0.28	3.00	1 9087.69
MS23	RECT_OPEN	0.35	1.05	0.28	3.00	1 13539.34
MS25_1	RECT_OPEN	0.35	1.05	0.28	3.00	1 3023.15
MS25_2	RECT_OPEN	0.35	1.05	0.28	3.00	1 8564.29
OGS-OF1	CIRCULAR	0.30	0.07	0.08	0.30	1 90.60

 NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

 Analysis Options

 Flow Units LPS
 Process Models:
 Rainfall/Runoff YES
 RDII NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed NO
 Water Quality NO
 Infiltration Method HORTON
 Flow Routing Method DYNWAVE
 Surcharge Method EXTRAN
 Starting Date 02/06/2023 00:00:00
 Ending Date 02/08/2023 00:00:00
 Antecedent Dry Days 0.0
 Report Time Step 00:01:00
 Wet Time Step 00:05:00
 Dry Time Step 00:05:00
 Routing Time Step 2.00 sec
 Variable Time Step YES
 Maximum Trials 8
 Number of Threads 8

Head Tolerance 0.001500 m

	Volume hectare-m	Depth mm
*****	-----	-----
Runoff Quantity Continuity		

Initial LID Storage	0.001	1.042
Total Precipitation	0.026	31.857
Evaporation Loss	0.000	0.000
Infiltration Loss	0.003	3.931
Surface Runoff	0.023	28.122
Final Storage	0.001	1.042
Continuity Error (%)	-0.598	

	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Flow Routing Continuity		

Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.023	0.229
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.001
External Outflow	0.023	0.230
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.003	0.031
Final Stored Volume	0.003	0.031
Continuity Error (%)	-0.016	

 Time-Step Critical Elements

 None

 Highest Flow Instability Indexes

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 5-year Chicago Storm)

Link O-CBMH116 (41)

Routing Time Step Summary

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Minimum Time Step      :    1.50 sec
Average Time Step     :    2.00 sec
Maximum Time Step     :    2.00 sec
Percent in Steady State :    0.00
Average Iterations per Step :    2.00
Percent Not Converging :    0.00
Time Step Frequencies :
  2.000 - 1.516 sec : 100.00 %
  1.516 - 1.149 sec :    0.00 %
  1.149 - 0.871 sec :    0.00 %
  0.871 - 0.660 sec :    0.00 %
  0.660 - 0.500 sec :    0.00 %
  
```

Subcatchment Runoff Summary

Peak Runoff	Runoff Coeff	Total Precip	Total Runon	Total Evap	Total Infil	Imperv Runoff	Perv Runoff	Total Runoff	Total Runoff
Subcatchment		mm	mm	mm	mm	mm	mm	mm	10 ⁶ ltr
LPS									
A-0a	0.33	31.86	0.00	0.00	31.61	0.00	0.53	0.53	0.00
A-0b	0.07	31.86	0.00	0.00	25.62	5.93	0.79	6.72	0.00
A-0c	0.41	31.86	0.00	0.00	31.51	0.00	0.83	0.83	0.00
A-0d	3.53	31.86	0.00	0.00	18.52	13.20	0.30	13.50	0.00

A-1a	5.80	31.86	0.00	0.00	1.34	30.57	0.09	30.65	0.01
A-1b	12.28	31.86	0.00	0.00	0.44	31.52	0.04	31.56	0.02
A-1c	13.63	31.86	0.00	0.00	2.23	29.74	0.07	29.81	0.02
A-1d	11.44	31.86	0.00	0.00	2.23	29.72	0.08	29.80	0.02
A-1e	20.06	31.86	0.00	0.00	2.23	29.73	0.07	29.80	0.03
A-1f	21.27	31.86	0.00	0.00	2.23	29.73	0.07	29.80	0.03
A-1g	14.19	31.86	0.00	0.00	5.41	26.52	0.09	26.60	0.02
A-1h	14.63	31.86	0.00	0.00	2.71	29.24	0.08	29.32	0.02
R-1	22.14	31.86	0.00	0.00	0.00	32.11	0.00	32.11	0.03
R-2	13.74	31.86	0.00	0.00	0.00	32.12	0.00	32.12	0.02

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
HP-CBMH100a	JUNCTION	0.00	0.00	95.14	0 00:00	0.00
HP-CBMH100b	JUNCTION	0.00	0.00	95.15	0 00:00	0.00
HP-CBMH102	JUNCTION	0.00	0.00	95.12	0 00:00	0.00
HP-CBMH104	JUNCTION	0.00	0.00	95.10	0 00:00	0.00
HP-CBMH106	JUNCTION	0.00	0.00	95.27	0 00:00	0.00
HP-CBMH110a	JUNCTION	0.00	0.00	94.95	0 00:00	0.00
HP-CBMH110b	JUNCTION	0.00	0.00	95.12	0 00:00	0.00
HP-CBMH112a	JUNCTION	0.00	0.00	94.95	0 00:00	0.00
HP-CBMH112b	JUNCTION	0.00	0.00	95.12	0 00:00	0.00
HP-CBMH114	JUNCTION	0.00	0.00	95.11	0 00:00	0.00
HP-CBMH116	JUNCTION	0.00	0.00	95.10	0 00:00	0.00

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 5-year Chicago Storm)

HP-LD01	JUNCTION	0.00	0.00	95.29	0	00:00	0.00
OF1	OUTFALL	1.00	1.00	93.22	0	00:00	1.00
OF2	OUTFALL	0.00	0.00	94.53	0	00:00	0.00
OF3	OUTFALL	0.00	0.00	94.57	0	00:00	0.00
OF4	OUTFALL	0.00	0.00	94.90	0	00:00	0.00
OF5	OUTFALL	0.00	0.00	94.66	0	00:00	0.00
OF-UNC	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
CBMH100	STORAGE	0.07	1.60	94.79	0	01:24	1.60
CBMH102	STORAGE	0.13	1.66	94.79	0	01:24	1.66
CBMH104	STORAGE	0.22	1.75	94.79	0	01:24	1.75
CBMH106	STORAGE	0.29	1.82	94.79	0	01:23	1.82
CBMH110	STORAGE	0.49	2.02	94.79	0	01:23	2.02
CBMH112	STORAGE	0.31	1.84	94.79	0	01:23	1.84
CBMH114	STORAGE	0.39	1.92	94.79	0	01:23	1.92
CBMH116	STORAGE	0.52	2.05	94.79	0	01:23	2.05
LD01	STORAGE	0.02	1.05	94.79	0	01:24	1.05
MH108	STORAGE	0.43	1.96	94.79	0	01:23	1.96
OGS	STORAGE	0.53	0.55	93.24	0	01:23	0.55

Node Inflow Summary

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
HP-CBMH100a	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH100b	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH102	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH104	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH106	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH110a	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH110b	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH112a	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH112b	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH114	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH116	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr

HP-LD01	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
OF1	OUTFALL	0.00	31.55	0 01:23	0	0.225	0.000
OF2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OF3	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OF4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OF5	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OF-UNC	OUTFALL	4.34	4.34	0 01:10	0.00515	0.00515	0.000
CBMH100	STORAGE	5.80	18.40	0 01:05	0.00858	0.0303	-0.171
CBMH102	STORAGE	12.28	22.57	0 01:07	0.0183	0.0501	0.007
CBMH104	STORAGE	13.63	23.02	0 01:08	0.0203	0.0716	-0.001
CBMH106	STORAGE	33.58	42.16	0 01:10	0.0513	0.123	-0.001
CBMH110	STORAGE	20.06	36.23	0 01:08	0.0298	0.154	-0.000
CBMH112	STORAGE	21.27	21.27	0 01:10	0.0316	0.0336	-0.002
CBMH114	STORAGE	14.19	29.93	0 01:09	0.021	0.0568	-0.000
CBMH116	STORAGE	14.63	46.37	0 01:10	0.0217	0.229	-0.017
LD01	STORAGE	13.74	13.74	0 01:10	0.0209	0.0209	0.143
MH108	STORAGE	0.00	30.77	0 01:08	0	0.124	-0.000
OGS	STORAGE	0.00	31.55	0 01:23	0	0.226	0.018

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow
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40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 5-year Chicago Storm)

Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	LPS
CBMH100	0.000	0	0	0	0.002	5	0 01:24	10.34
CBMH102	0.000	0	0	0	0.002	3	0 01:24	9.52
CBMH104	0.000	0	0	0	0.002	3	0 01:24	10.55
CBMH106	0.000	1	0	0	0.002	3	0 01:23	30.77
CBMH110	0.001	1	0	0	0.004	5	0 01:23	24.85
CBMH112	0.000	0	0	0	0.002	3	0 01:23	15.78
CBMH114	0.001	1	0	0	0.003	4	0 01:23	12.45
CBMH116	0.001	1	0	0	0.004	4	0 01:23	31.55
LD01	0.000	1	0	0	0.000	56	0 01:24	12.67
MH108	0.001	19	0	0	0.003	85	0 01:23	19.09
OGS	0.001	24	0	0	0.001	25	0 01:23	31.55

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	11.64	11.11	31.55	0.225
OF2	0.00	0.00	0.00	0.000
OF3	0.00	0.00	0.00	0.000
OF4	0.00	0.00	0.00	0.000
OF5	0.00	0.00	0.00	0.000
OF-UNC	6.34	0.47	4.34	0.005
System	3.00	11.58	32.28	0.230

Link Flow Summary

Link	Maximum Flow	Time of Max Occurrence	Maximum Veloc	Max/ Full	Max/ Full
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Link	Type	LPS	days hr:min	m/sec	Flow	Depth
100-102	CONDUIT	10.34	0 01:07	0.05	0.05	1.00
102-104	CONDUIT	9.52	0 01:05	0.04	0.05	1.00
104-106	CONDUIT	10.55	0 01:13	0.05	0.05	1.00
106-108	CONDUIT	30.77	0 01:08	0.14	0.16	1.00
108-110	CONDUIT	19.09	0 01:15	0.07	0.07	1.00
1-100	CONDUIT	12.67	0 01:05	1.15	0.27	1.00
110-116	CONDUIT	24.85	0 01:10	0.09	0.11	1.00
112-114	CONDUIT	15.78	0 01:09	0.05	0.07	1.00
114-116	CONDUIT	12.45	0 01:07	0.04	0.05	1.00
MS01	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS02	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS03	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS04	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS05	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS06	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS07	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS08	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS09	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS11	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS12	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS13	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS14	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS15	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS16	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS17	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS18	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS19	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS20	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS21	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS22	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS23	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS25_1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS25_2	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OGS-OF1	CONDUIT	31.55	0 01:23	0.43	0.35	1.00
O-CBMH116	ORIFICE	31.55	0 01:23			1.00

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 5-year Chicago Storm)

Flow Classification Summary

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl	
100-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
102-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
104-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
106-108	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
1-100	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.01	0.00
110-116	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
112-114	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
114-116	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
MS01	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS02	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS03	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS04	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS05	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS06	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS07	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS08	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS09	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS20	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS21	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS22	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS23	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS25_1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MS25_2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OGS-OF1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

Conduit Surcharge Summary

Conduit	Hours Full			Hours Above Full	Hours Capacity Limited
	Both Ends	Upstream	Dnstream	Normal Flow	Limited
100-102	1.61	1.61	1.68	0.01	0.01
102-104	1.70	1.70	1.81	0.01	0.01
104-106	1.87	1.87	1.96	0.01	0.01
106-108	2.04	2.04	2.21	0.01	0.01
108-110	2.22	2.22	2.31	0.01	0.01
1-100	1.30	1.30	1.61	0.01	0.01
110-116	2.43	2.43	2.52	0.01	0.01
112-114	1.90	1.90	1.94	0.01	0.01
114-116	2.10	2.10	2.31	0.01	0.01
OGS-OF1	48.00	48.00	48.00	0.01	0.01

Analysis begun on: Thu Sep 14 12:03:56 2023
 Analysis ended on: Thu Sep 14 12:03:58 2023
 Total elapsed time: 00:00:02

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 100-year Chicago Storm)

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

Boundary Condition
25mm = 92.85
2-Year = 93.22

Element Count

Number of rain gages 1
Number of subcatchments ... 14
Number of nodes 29
Number of links 36
Number of pollutants 0
Number of land uses 0

Raingage Summary

Name	Data Source	Data Type	Recording Interval
Raingage	01-C2yr-3hr	INTENSITY	10 min.

Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
A-0a	0.02	38.00	0.00	7.5000	Raingage	OF-UNC
A-0b	0.00	6.67	18.60	2.0000	Raingage	OF-UNC
A-0c	0.01	37.50	0.00	14.5000	Raingage	OF-UNC
A-0d	0.04	60.00	41.40	3.5000	Raingage	OF-UNC
A-1a	0.03	35.00	95.70	1.5000	Raingage	CBMH100
A-1b	0.06	48.33	98.60	2.0000	Raingage	CBMH102
A-1c	0.07	40.00	92.90	2.0000	Raingage	CBMH104

A-1d	0.06	38.00	92.90	2.0000	Raingage	CBMH106
A-1e	0.10	62.50	92.90	2.0000	Raingage	CBMH110
A-1f	0.11	66.25	92.90	2.0000	Raingage	CBMH112
A-1g	0.08	49.38	82.90	2.0000	Raingage	CBMH114
A-1h	0.07	49.33	91.40	2.0000	Raingage	CBMH116
R-1	0.11	28.16	100.00	0.5000	Raingage	CBMH106
R-2	0.07	27.08	100.00	0.5000	Raingage	LD01

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
HP-CBMH100a	JUNCTION	95.14	0.35	0.0	
HP-CBMH100b	JUNCTION	95.15	0.35	0.0	
HP-CBMH102	JUNCTION	95.12	0.35	0.0	
HP-CBMH104	JUNCTION	95.10	0.35	0.0	
HP-CBMH106	JUNCTION	95.27	0.35	0.0	
HP-CBMH110a	JUNCTION	94.95	0.35	0.0	
HP-CBMH110b	JUNCTION	95.12	0.35	0.0	
HP-CBMH112a	JUNCTION	94.95	0.35	0.0	
HP-CBMH112b	JUNCTION	95.12	0.35	0.0	
HP-CBMH114	JUNCTION	95.11	0.35	0.0	
HP-CBMH116	JUNCTION	95.10	0.35	0.0	
HP-LD01	JUNCTION	95.29	0.35	0.0	
OF1	OUTFALL	92.22	0.69	0.0	
OF2	OUTFALL	94.53	0.35	0.0	
OF3	OUTFALL	94.57	0.35	0.0	
OF4	OUTFALL	94.90	0.35	0.0	
OF5	OUTFALL	94.66	0.35	0.0	
OF-UNC	OUTFALL	0.00	0.00	0.0	
CBMH100	STORAGE	93.19	2.21	0.0	
CBMH102	STORAGE	93.13	2.17	0.0	
CBMH104	STORAGE	93.04	2.21	0.0	
CBMH106	STORAGE	92.97	2.28	0.0	
CBMH110	STORAGE	92.77	2.38	0.0	
CBMH112	STORAGE	92.95	2.25	0.0	
CBMH114	STORAGE	92.87	2.28	0.0	
CBMH116	STORAGE	92.74	2.41	0.0	

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 100-year Chicago Storm)

LD01	STORAGE	93.74	1.87	0.0
MH108	STORAGE	92.83	2.31	0.0
OGS	STORAGE	92.69	2.25	0.0

Link Summary

Name	From Node	To Node	Type	Length	%Slope	Roughness
100-102	CBMH100	CBMH102	CONDUIT	26.2	0.1908	0.0130
102-104	CBMH102	CBMH104	CONDUIT	31.1	0.1929	0.0130
104-106	CBMH104	CBMH106	CONDUIT	20.9	0.1914	0.0130
106-108	CBMH106	MH108	CONDUIT	31.6	0.1899	0.0130
108-110	MH108	CBMH110	CONDUIT	17.2	0.1744	0.0130
1-100	LD01	CBMH100	CONDUIT	11.0	2.0004	0.0130
110-116	CBMH110	CBMH116	CONDUIT	16.1	0.1242	0.0130
112-114	CBMH112	CBMH114	CONDUIT	16.1	0.1242	0.0130
114-116	CBMH114	CBMH116	CONDUIT	49.9	0.1403	0.0130
MS01	HP-CBMH100b	OF5	CONDUIT	3.0	16.5557	0.0150
MS02	HP-CBMH100b	CBMH100	CONDUIT	3.0	3.3352	0.0150
MS03	HP-CBMH100a	CBMH100	CONDUIT	3.0	3.0014	0.0150
MS04	HP-CBMH100a	CBMH102	CONDUIT	3.0	6.3461	0.0150
MS05	HP-CBMH102	CBMH102	CONDUIT	3.0	5.6758	0.0150
MS06	HP-CBMH102	CBMH104	CONDUIT	3.0	7.3531	0.0150
MS07	HP-CBMH104	CBMH104	CONDUIT	3.0	6.6815	0.0150
MS08	HP-CBMH104	OF4	CONDUIT	3.0	6.6815	0.0150
MS09	HP-CBMH104	CBMH106	CONDUIT	3.0	6.6815	0.0150
MS10	HP-CBMH106	CBMH106	CONDUIT	3.0	12.4282	0.0150
MS11	HP-CBMH106	CBMH110	CONDUIT	3.0	15.8625	0.0150
MS12	HP-CBMH110a	CBMH110	CONDUIT	3.0	5.0063	0.0150
MS13	HP-CBMH110a	CBMH116	CONDUIT	3.0	5.0063	0.0150
MS14	HP-CBMH116	CBMH116	CONDUIT	3.0	10.0504	0.0150
MS15	HP-CBMH116	OF3	CONDUIT	3.0	17.9490	0.0150
MS16	HP-CBMH114	CBMH116	CONDUIT	3.0	10.3889	0.0150
MS17	HP-CBMH114	CBMH114	CONDUIT	3.0	10.3889	0.0150
MS18	HP-CBMH112a	CBMH114	CONDUIT	3.0	5.0063	0.0150
MS19	HP-CBMH112a	CBMH112	CONDUIT	3.0	3.3352	0.0150
MS20	HP-CBMH110b	CBMH110	CONDUIT	3.0	10.7279	0.0150
MS21	HP-CBMH110b	CBMH112	CONDUIT	3.0	9.0367	0.0150
MS22	HP-CBMH112b	CBMH112	CONDUIT	3.0	9.0367	0.0150

MS23	HP-CBMH112b	OF2	CONDUIT	3.0	20.0584	0.0150
MS25_1	HP-LD01	LD01	CONDUIT	3.0	1.0001	0.0150
MS25_2	HP-LD01	CBMH100	CONDUIT	3.0	8.0257	0.0150
OGS-OF1	OGS	OF1	CONDUIT	11.2	0.8036	0.0130
O-CBMH116	CBMH116	OGS	ORIFICE			

Cross Section Summary

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
100-102	CIRCULAR	0.53	0.22	0.13	0.53	1	195.62
102-104	CIRCULAR	0.53	0.22	0.13	0.53	1	196.68
104-106	CIRCULAR	0.53	0.22	0.13	0.53	1	195.90
106-108	CIRCULAR	0.53	0.22	0.13	0.53	1	195.12
108-110	CIRCULAR	0.61	0.29	0.15	0.61	1	268.00
1-100	CIRCULAR	0.20	0.03	0.05	0.20	1	46.39
110-116	CIRCULAR	0.61	0.29	0.15	0.61	1	226.18
112-114	CIRCULAR	0.61	0.29	0.15	0.61	1	226.18
114-116	CIRCULAR	0.61	0.29	0.15	0.61	1	240.35
MS01	RECT_OPEN	0.35	1.05	0.28	3.00	1	12300.49
MS02	RECT_OPEN	0.35	1.05	0.28	3.00	1	5520.89
MS03	RECT_OPEN	0.35	1.05	0.28	3.00	1	5237.30
MS04	RECT_OPEN	0.35	1.05	0.28	3.00	1	7615.56
MS05	RECT_OPEN	0.35	1.05	0.28	3.00	1	7202.15
MS06	RECT_OPEN	0.35	1.05	0.28	3.00	1	8197.58
MS07	RECT_OPEN	0.35	1.05	0.28	3.00	1	7814.25
MS08	RECT_OPEN	0.35	0.35	0.21	1.00	1	2103.07
MS09	RECT_OPEN	0.35	1.05	0.28	3.00	1	7814.25
MS10	RECT_OPEN	0.35	1.05	0.28	3.00	1	10657.46
MS11	RECT_OPEN	0.35	1.05	0.28	3.00	1	12040.25
MS12	RECT_OPEN	0.35	1.05	0.28	3.00	1	6764.04
MS13	RECT_OPEN	0.35	1.05	0.28	3.00	1	6764.04
MS14	RECT_OPEN	0.35	1.05	0.28	3.00	1	9583.86
MS15	RECT_OPEN	0.35	0.35	0.21	1.00	1	3446.96
MS16	RECT_OPEN	0.35	1.05	0.28	3.00	1	9743.95
MS17	RECT_OPEN	0.35	1.05	0.28	3.00	1	9743.95
MS18	RECT_OPEN	0.35	1.05	0.28	3.00	1	6764.04
MS19	RECT_OPEN	0.35	1.05	0.28	3.00	1	5520.89

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 100-year Chicago Storm)

ID	Structure Type	Flow	Depth	Velocity	Area	Volume
MS20	RECT_OPEN	0.35	1.05	0.28	3.00	1 9901.61
MS21	RECT_OPEN	0.35	1.05	0.28	3.00	1 9087.69
MS22	RECT_OPEN	0.35	1.05	0.28	3.00	1 9087.69
MS23	RECT_OPEN	0.35	1.05	0.28	3.00	1 13539.34
MS25_1	RECT_OPEN	0.35	1.05	0.28	3.00	1 3023.15
MS25_2	RECT_OPEN	0.35	1.05	0.28	3.00	1 8564.29
OGS-OF1	CIRCULAR	0.30	0.07	0.08	0.30	1 90.60

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

Analysis Options

Flow Units LPS
Process Models:
 Rainfall/Runoff YES
 RDII NO
 Snowmelt NO
 Groundwater NO
 Flow Routing YES
 Ponding Allowed NO
 Water Quality NO
Infiltration Method HORTON
Flow Routing Method DYNWAVE
Surcharge Method EXTRAN
Starting Date 02/06/2023 00:00:00
Ending Date 02/08/2023 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step 2.00 sec
Variable Time Step YES
Maximum Trials 8
Number of Threads 8

Head Tolerance 0.001500 m

	Volume hectare-m	Depth mm
*****	-----	-----
Runoff Quantity Continuity		

Initial LID Storage	0.001	1.042
Total Precipitation	0.026	31.857
Evaporation Loss	0.000	0.000
Infiltration Loss	0.003	3.931
Surface Runoff	0.023	28.122
Final Storage	0.001	1.042
Continuity Error (%)	-0.598	

	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Flow Routing Continuity		

Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.023	0.229
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.001
External Outflow	0.023	0.230
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.003	0.031
Final Stored Volume	0.003	0.031
Continuity Error (%)	-0.016	

Time-Step Critical Elements

None

Highest Flow Instability Indexes

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 100-year Chicago Storm)

Link O-CBMH116 (41)

Routing Time Step Summary

```

Minimum Time Step      :    1.50 sec
Average Time Step     :    2.00 sec
Maximum Time Step     :    2.00 sec
Percent in Steady State :    0.00
Average Iterations per Step :    2.00
Percent Not Converging :    0.00
Time Step Frequencies :
  2.000 - 1.516 sec   :   100.00 %
  1.516 - 1.149 sec   :    0.00 %
  1.149 - 0.871 sec   :    0.00 %
  0.871 - 0.660 sec   :    0.00 %
  0.660 - 0.500 sec   :    0.00 %
  
```

Subcatchment Runoff Summary

Peak Runoff	Runoff Coeff	Total Precip	Total Runon	Total Evap	Total Infil	Imperv Runoff	Perv Runoff	Total Runoff	Total Runoff
Subcatchment		mm	mm	mm	mm	mm	mm	mm	10^6 ltr
LPS									
A-0a	0.33	31.86	0.00	0.00	31.61	0.00	0.53	0.53	0.00
A-0b	0.07	31.86	0.00	0.00	25.62	5.93	0.79	6.72	0.00
A-0c	0.41	31.86	0.00	0.00	31.51	0.00	0.83	0.83	0.00
A-0d	3.53	31.86	0.00	0.00	18.52	13.20	0.30	13.50	0.00

A-1a	5.80	31.86	0.00	0.00	1.34	30.57	0.09	30.65	0.01
A-1b	12.28	31.86	0.00	0.00	0.44	31.52	0.04	31.56	0.02
A-1c	13.63	31.86	0.00	0.00	2.23	29.74	0.07	29.81	0.02
A-1d	11.44	31.86	0.00	0.00	2.23	29.72	0.08	29.80	0.02
A-1e	20.06	31.86	0.00	0.00	2.23	29.73	0.07	29.80	0.03
A-1f	21.27	31.86	0.00	0.00	2.23	29.73	0.07	29.80	0.03
A-1g	14.19	31.86	0.00	0.00	5.41	26.52	0.09	26.60	0.02
A-1h	14.63	31.86	0.00	0.00	2.71	29.24	0.08	29.32	0.02
R-1	22.14	31.86	0.00	0.00	0.00	32.11	0.00	32.11	0.03
R-2	13.74	31.86	0.00	0.00	0.00	32.12	0.00	32.12	0.02

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
HP-CBMH100a	JUNCTION	0.00	0.00	95.14	0 00:00	0.00
HP-CBMH100b	JUNCTION	0.00	0.00	95.15	0 00:00	0.00
HP-CBMH102	JUNCTION	0.00	0.00	95.12	0 00:00	0.00
HP-CBMH104	JUNCTION	0.00	0.00	95.10	0 00:00	0.00
HP-CBMH106	JUNCTION	0.00	0.00	95.27	0 00:00	0.00
HP-CBMH110a	JUNCTION	0.00	0.00	94.95	0 00:00	0.00
HP-CBMH110b	JUNCTION	0.00	0.00	95.12	0 00:00	0.00
HP-CBMH112a	JUNCTION	0.00	0.00	94.95	0 00:00	0.00
HP-CBMH112b	JUNCTION	0.00	0.00	95.12	0 00:00	0.00
HP-CBMH114	JUNCTION	0.00	0.00	95.11	0 00:00	0.00
HP-CBMH116	JUNCTION	0.00	0.00	95.10	0 00:00	0.00

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 100-year Chicago Storm)

HP-LD01	JUNCTION	0.00	0.00	95.29	0	00:00	0.00
OF1	OUTFALL	1.00	1.00	93.22	0	00:00	1.00
OF2	OUTFALL	0.00	0.00	94.53	0	00:00	0.00
OF3	OUTFALL	0.00	0.00	94.57	0	00:00	0.00
OF4	OUTFALL	0.00	0.00	94.90	0	00:00	0.00
OF5	OUTFALL	0.00	0.00	94.66	0	00:00	0.00
OF-UNC	OUTFALL	0.00	0.00	0.00	0	00:00	0.00
CBMH100	STORAGE	0.07	1.60	94.79	0	01:24	1.60
CBMH102	STORAGE	0.13	1.66	94.79	0	01:24	1.66
CBMH104	STORAGE	0.22	1.75	94.79	0	01:24	1.75
CBMH106	STORAGE	0.29	1.82	94.79	0	01:23	1.82
CBMH110	STORAGE	0.49	2.02	94.79	0	01:23	2.02
CBMH112	STORAGE	0.31	1.84	94.79	0	01:23	1.84
CBMH114	STORAGE	0.39	1.92	94.79	0	01:23	1.92
CBMH116	STORAGE	0.52	2.05	94.79	0	01:23	2.05
LD01	STORAGE	0.02	1.05	94.79	0	01:24	1.05
MH108	STORAGE	0.43	1.96	94.79	0	01:23	1.96
OGS	STORAGE	0.53	0.55	93.24	0	01:23	0.55

Node Inflow Summary

Node	Type	Maximum	Maximum	Time of Max Occurrence	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
		Lateral Inflow LPS	Total Inflow LPS				
HP-CBMH100a	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH100b	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH102	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH104	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH106	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH110a	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH110b	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH112a	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH112b	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH114	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
HP-CBMH116	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr

HP-LD01	JUNCTION	0.00	0.00	0 00:00	0	0	0.000 ltr
OF1	OUTFALL	0.00	31.55	0 01:23	0	0.225	0.000
OF2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OF3	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OF4	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OF5	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
OF-UNC	OUTFALL	4.34	4.34	0 01:10	0.00515	0.00515	0.000
CBMH100	STORAGE	5.80	18.40	0 01:05	0.00858	0.0303	-0.171
CBMH102	STORAGE	12.28	22.57	0 01:07	0.0183	0.0501	0.007
CBMH104	STORAGE	13.63	23.02	0 01:08	0.0203	0.0716	-0.001
CBMH106	STORAGE	33.58	42.16	0 01:10	0.0513	0.123	-0.001
CBMH110	STORAGE	20.06	36.23	0 01:08	0.0298	0.154	-0.000
CBMH112	STORAGE	21.27	21.27	0 01:10	0.0316	0.0336	-0.002
CBMH114	STORAGE	14.19	29.93	0 01:09	0.021	0.0568	-0.000
CBMH116	STORAGE	14.63	46.37	0 01:10	0.0217	0.229	-0.017
LD01	STORAGE	13.74	13.74	0 01:10	0.0209	0.0209	0.143
MH108	STORAGE	0.00	30.77	0 01:08	0	0.124	-0.000
OGS	STORAGE	0.00	31.55	0 01:23	0	0.226	0.018

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Average Volume	Avg Pcnt	Evap Pcnt	Exfil Pcnt	Maximum Volume	Max Pcnt	Time of Max Occurrence	Maximum Outflow
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40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 100-year Chicago Storm)

Storage Unit	1000 m3	Full	Loss	Loss	1000 m3	Full	days hr:min	LPS
CBMH100	0.000	0	0	0	0.002	5	0 01:24	10.34
CBMH102	0.000	0	0	0	0.002	3	0 01:24	9.52
CBMH104	0.000	0	0	0	0.002	3	0 01:24	10.55
CBMH106	0.000	1	0	0	0.002	3	0 01:23	30.77
CBMH110	0.001	1	0	0	0.004	5	0 01:23	24.85
CBMH112	0.000	0	0	0	0.002	3	0 01:23	15.78
CBMH114	0.001	1	0	0	0.003	4	0 01:23	12.45
CBMH116	0.001	1	0	0	0.004	4	0 01:23	31.55
LD01	0.000	1	0	0	0.000	56	0 01:24	12.67
MH108	0.001	19	0	0	0.003	85	0 01:23	19.09
OGS	0.001	24	0	0	0.001	25	0 01:23	31.55

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
OF1	11.64	11.11	31.55	0.225
OF2	0.00	0.00	0.00	0.000
OF3	0.00	0.00	0.00	0.000
OF4	0.00	0.00	0.00	0.000
OF5	0.00	0.00	0.00	0.000
OF-UNC	6.34	0.47	4.34	0.005
System	3.00	11.58	32.28	0.230

Link Flow Summary

Link	Maximum Flow	Time of Max Occurrence	Maximum Veloc	Max/ Full	Max/ Full
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Link	Type	LPS	days hr:min	m/sec	Flow	Depth
100-102	CONDUIT	10.34	0 01:07	0.05	0.05	1.00
102-104	CONDUIT	9.52	0 01:05	0.04	0.05	1.00
104-106	CONDUIT	10.55	0 01:13	0.05	0.05	1.00
106-108	CONDUIT	30.77	0 01:08	0.14	0.16	1.00
108-110	CONDUIT	19.09	0 01:15	0.07	0.07	1.00
1-100	CONDUIT	12.67	0 01:05	1.15	0.27	1.00
110-116	CONDUIT	24.85	0 01:10	0.09	0.11	1.00
112-114	CONDUIT	15.78	0 01:09	0.05	0.07	1.00
114-116	CONDUIT	12.45	0 01:07	0.04	0.05	1.00
MS01	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS02	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS03	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS04	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS05	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS06	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS07	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS08	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS09	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS10	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS11	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS12	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS13	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS14	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS15	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS16	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS17	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS18	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS19	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS20	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS21	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS22	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS23	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS25_1	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
MS25_2	CONDUIT	0.00	0 00:00	0.00	0.00	0.00
OGS-OF1	CONDUIT	31.55	0 01:23	0.43	0.35	1.00
O-CBMH116	ORIFICE	31.55	0 01:23			1.00

40 Frank Nighbor Place (123002) PCSWMM Model Output (3-hour 100-year Chicago Storm)

Flow Classification Summary

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl	
100-102	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
102-104	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
104-106	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
106-108	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
108-110	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
1-100	1.00	0.00	0.00	0.00	0.04	0.00	0.00	0.96	0.01	0.00
110-116	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
112-114	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
114-116	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
MS01	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS02	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS03	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS04	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS05	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS06	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS07	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS08	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS09	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS10	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS12	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS14	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS15	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS17	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS18	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS19	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS20	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS21	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS22	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS23	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MS25_1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MS25_2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OGS-OF1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

Conduit Surcharge Summary

Conduit	Hours Full			Hours Above Full	Hours Capacity Limited
	Both Ends	Upstream	Dnstream	Normal Flow	Limited
100-102	1.61	1.61	1.68	0.01	0.01
102-104	1.70	1.70	1.81	0.01	0.01
104-106	1.87	1.87	1.96	0.01	0.01
106-108	2.04	2.04	2.21	0.01	0.01
108-110	2.22	2.22	2.31	0.01	0.01
1-100	1.30	1.30	1.61	0.01	0.01
110-116	2.43	2.43	2.52	0.01	0.01
112-114	1.90	1.90	1.94	0.01	0.01
114-116	2.10	2.10	2.31	0.01	0.01
OGS-OF1	48.00	48.00	48.00	0.01	0.01

Analysis begun on: Thu Sep 14 12:03:56 2023
 Analysis ended on: Thu Sep 14 12:03:58 2023
 Total elapsed time: 00:00:02

APPENDIX F

Water Quality Treatment Unit Information



INFORMATION REQUEST FORM



Tel: (905) 948-0000

Fax: (905) 948-0577

E-mail: info@echelonenvironmental.ca

GENERAL PROJECT DATA

PROJECT NAME: _____
CITY: _____
ENGINEER: _____
DATE: _____

BASIN DATA

A_{TOTAL}: _____ ha.

A_{IMP}: _____ ha.

C_{RATIONAL}: _____

T_c: _____ MIN.

**PEAK FLOW
AT CDS UNIT**

**PEAK SITE
DISCHARGE**

Q: _____ L/S
RETURN FREQUENCY: _____ yr.
_____ L/S
_____ yr.
To 1050mm STM

FOR ORIFICE CONTROLLED SITES

ORIFICE SIZE: _____ mm

HEAD ON ORIFICE: _____ mm

MULTIPLE CONTROL POINTS: YES NO

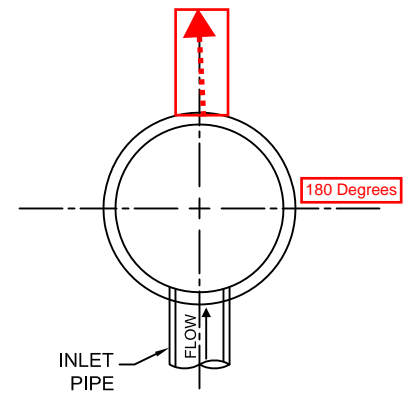
STORAGE-DISCHARGE PARAMETERS

DESIGN STORM	Q (L/s)	STORAGE (M ³)
25 mm	_____	_____
2 YEAR	_____	_____
5 YEAR	_____	_____
10 YEAR	_____	_____
25 YEAR	_____	_____
50 YEAR	_____	_____
100 YEAR	_____	_____

STORAGE TYPE: _____
Over sized storm sewers and parking lot ponding

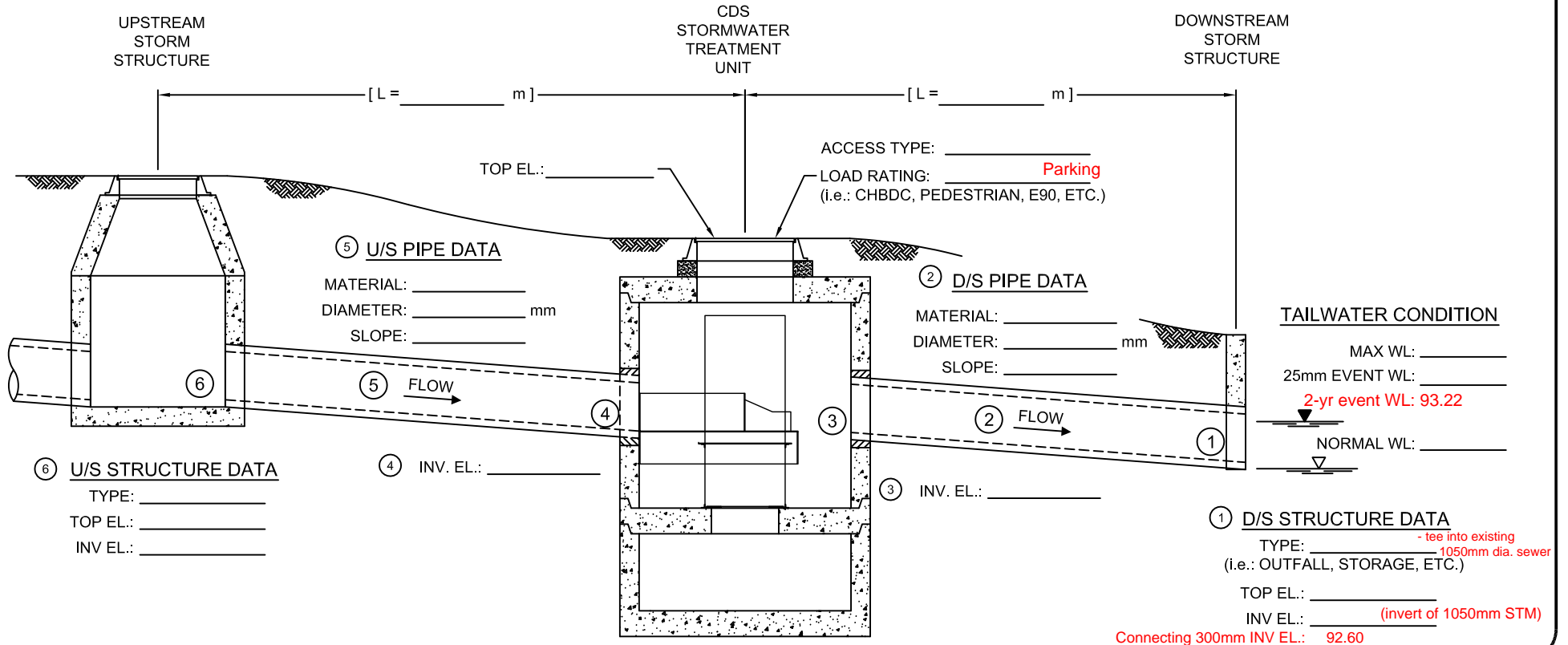
Storage is BEFORE or AFTER CDS unit (circle)

INLET/OUTLET PIPE ORIENTATION



SKETCH OUTLET PIPE AND PROVIDE ANGLE

COMPLETE SECTION BELOW IF HYDRAULIC CALCULATIONS ARE REQUIRED:





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



Project Name: 40 Frank Nighbor Place
Location: Ottawa, ON
OGS #: OGS

Engineer: NOVATECH
Contact: Melanie Schoeder
Report Date: 24-Apr-23

Area 0.742 ha
Weighted C 0.86
CDS Model 2020

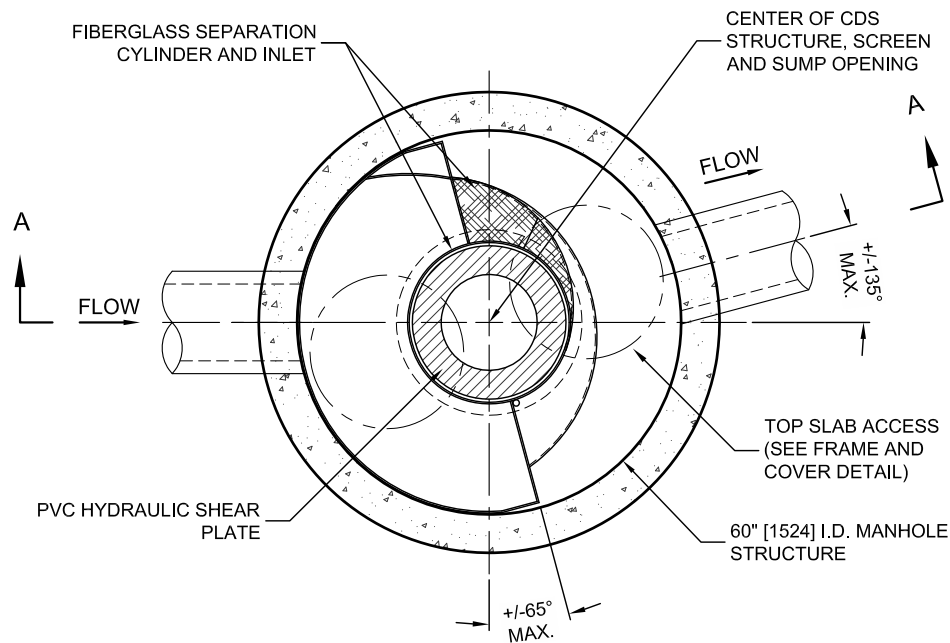
Rainfall Station # 215
Particle Size Distribution FINE
CDS Treatment Capacity 31 l/s

<u>Rainfall Intensity¹</u> <u>(mm/hr)</u>	<u>Percent Rainfall Volume¹</u>	<u>Cumulative Rainfall Volume</u>	<u>Total Flowrate (l/s)</u>	<u>Treated Flowrate (l/s)</u>	<u>Operating Rate (%)</u>	<u>Removal Efficiency (%)</u>	<u>Incremental Removal (%)</u>
0.5	9.2%	9.2%	0.9	0.9	2.8	98.0	9.0
1.0	10.6%	19.8%	1.8	1.8	5.7	97.2	10.3
1.5	9.9%	29.7%	2.7	2.7	8.5	96.4	9.5
2.0	8.4%	38.1%	3.5	3.5	11.4	95.6	8.0
2.5	7.7%	45.8%	4.4	4.4	14.2	94.8	7.3
3.0	5.9%	51.7%	5.3	5.3	17.1	94.0	5.6
3.5	4.4%	56.1%	6.2	6.2	19.9	93.1	4.1
4.0	4.7%	60.7%	7.1	7.1	22.8	92.3	4.3
4.5	3.3%	64.0%	8.0	8.0	25.6	91.5	3.0
5.0	3.0%	67.1%	8.9	8.9	28.5	90.7	2.7
6.0	5.4%	72.4%	10.6	10.6	34.2	89.1	4.8
7.0	4.4%	76.8%	12.4	12.4	39.9	87.4	3.8
8.0	3.5%	80.3%	14.2	14.2	45.6	85.8	3.0
9.0	2.8%	83.2%	16.0	16.0	51.3	84.2	2.4
10.0	2.2%	85.3%	17.7	17.7	56.9	82.5	1.8
15.0	7.0%	92.3%	26.6	26.6	85.4	74.4	5.2
20.0	4.5%	96.9%	35.5	31.2	100.0	61.6	2.8
25.0	1.4%	98.3%	44.3	31.2	100.0	49.3	0.7
30.0	0.7%	99.0%	53.2	31.2	100.0	41.1	0.3
35.0	0.5%	99.5%	62.1	31.2	100.0	35.2	0.2
40.0	0.5%	100.0%	71.0	31.2	100.0	30.8	0.2
45.0	0.0%	100.0%	79.8	31.2	100.0	27.4	0.0
50.0	0.0%	100.0%	88.7	31.2	100.0	24.7	0.0
							89.0

Removal Efficiency Adjustment² = 6.5%
Predicted Net Annual Load Removal Efficiency = 82.5%
Predicted Annual Rainfall Treated = 98.2%

- 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.
 3 - CDS efficiency based on testing conducted at the University of Central Florida.
 4 - CDS design and scaling based on original manufacturer model and product specifications.

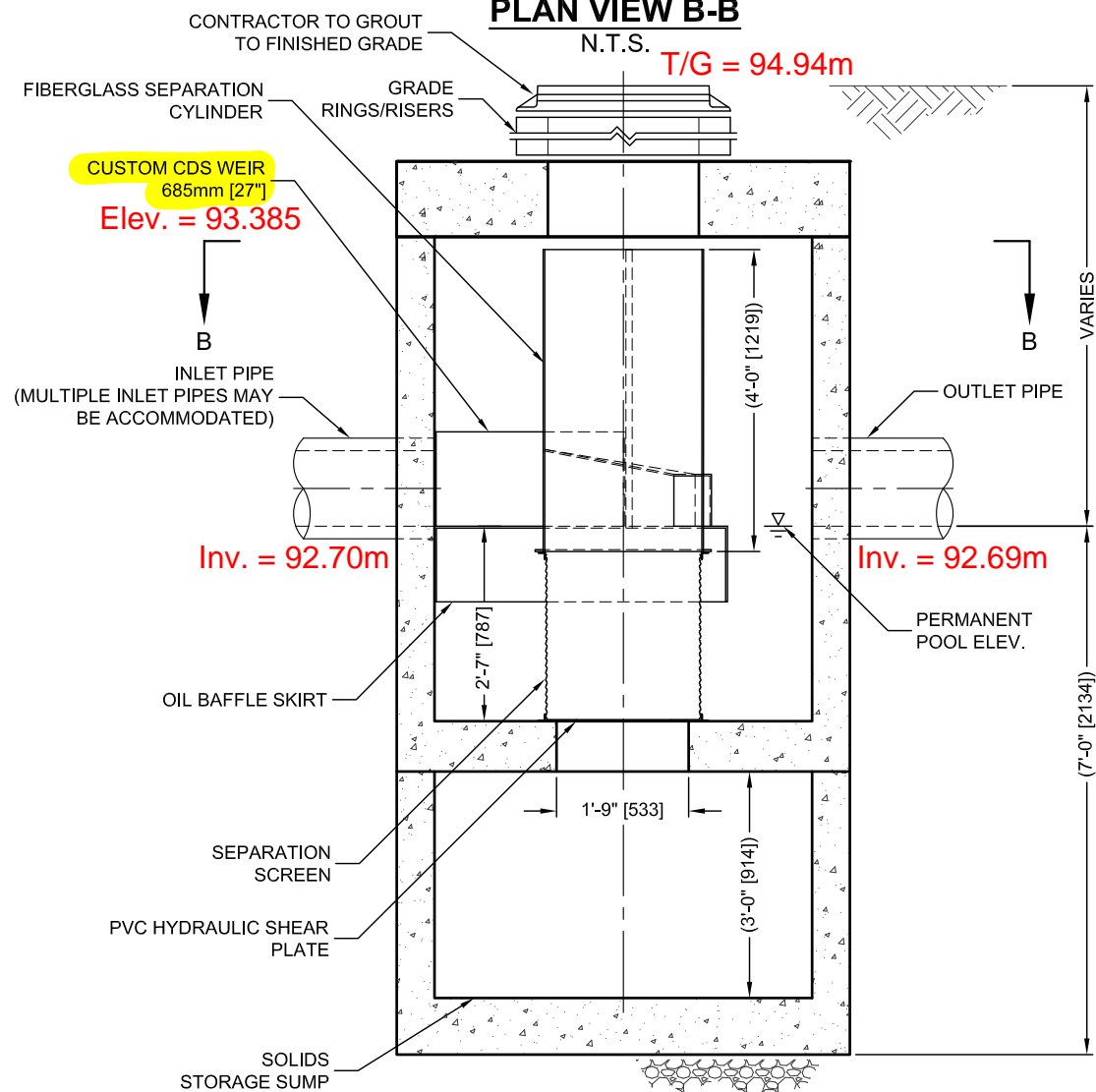
\\FILESERVER-ND\PUBLIC\SHARE\2.0 ALL PROJECTS\2023 PROJECTS\FRANK NIGHBOR PLACE - 40, OTTAWA\SAMPLE DRAWING\CDS2020-5-C-DTL.DWG 9/8/2023 4:32 PM



PLAN VIEW B-B

N.T.S.

T/G = 94.94m



ELEVATION A-A

N.T.S.



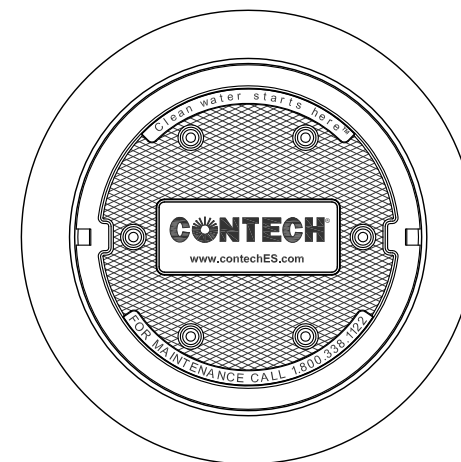
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 6,768,848; 6,841,722; 6,911,502; 6,981,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS FROM TIME TO TIME.

CDS PMSU2020-5-C DESIGN NOTES

THE STANDARD CDS PMSU2020-5-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION

- GRATED INLET ONLY (NO INLET PIPE)
- GRATED INLET WITH INLET PIPE OR PIPES
- CURB INLET ONLY (NO INLET PIPE)
- CURB INLET WITH INLET PIPE OR PIPES
- CUSTOMIZABLE SUMP DEPTH AVAILABLE
- ANTI-FLOTATION DESIGN AVAILABLE UPON REQUEST



FRAME AND COVER

(DIAMETER VARIES)

N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID				
WATER QUALITY FLOW RATE (CFS OR L/s)				*
PEAK FLOW RATE (CFS OR L/s)				*
RETURN PERIOD OF PEAK FLOW (YRS)				*
SCREEN APERTURE (2400 OR 4700)				*
PIPE DATA:	I.E.	MATERIAL	DIAMETER	
INLET PIPE 1	*	*	*	
INLET PIPE 2	*	*	*	
OUTLET PIPE	*	*	*	
RIM ELEVATION				*
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT		
	*	*		
NOTES/SPECIAL REQUIREMENTS:				
* PER ENGINEER OF RECORD				

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH () ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES

- A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
- C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
- D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
- E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.



www.contechES.com

9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069

800-338-1122 513-645-7000 513-645-7993 FAX

**CDS PMSU2020-5-C
INLINE CDS
STANDARD DETAIL**

From: Melanie Schroeder
Sent: Tuesday, April 25, 2023 5:00 PM
To: Zarak Ali
Cc: Francois Thauvette
Subject: FW: Proposed Hotel Development (40 Frank Nighbor Place) - OGS Sizing Request
Attachments: [CDS TSSR- 40 Frank Nighbor Place, Ottawa \(24-Apr-2023\).pdf](#); RE: Proposed Hotel Development (40 Frank Nighbor Place) - OGS Sizing Request

Hi Zarak,

The OGS unit was confirmed to be a CDS PMSU2020-5. See the attached for calcs / details.
I will add the info for the OGS appendix.

Thanks,

Melanie Schroeder, B.A.Sc., E.I.T. | Water Resources (She/Her)

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 296

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Shane <shane@echelonenvironmental.ca>
Sent: Tuesday, April 25, 2023 4:38 PM
To: Melanie Schroeder <m.schroeder@novatech-eng.com>
Subject: RE: Proposed Hotel Development (40 Frank Nighbor Place) - OGS Sizing Request

Hello Melanie,

Please see attached revised sizing the CDS model remains unchanged. **To account for the 2yr water level I will need to use a custom weir height of 686mm,** I will make a note in my files for this for when it comes to tender.

Thank you,

Shane Jensen
Project Manager
Cell: 416-460-6328

From: Melanie Schroeder <m.schroeder@novatech-eng.com>
Sent: Friday, April 21, 2023 9:41 AM
To: Shane <shane@echelonenvironmental.ca>
Subject: RE: Proposed Hotel Development (40 Frank Nighbor Place) - OGS Sizing Request

Hi Shane,

I have attached the form as requested.

There were some minor changes to the site, but all info is noted in the attachment.

Can you design the internal weir for the 2-year water level. During the design of previous project we did in the area, the City requested the 2-year tailwater be used.

Thanks,

Melanie Schroeder, B.A.Sc., E.I.T. | Water Resources (She/Her)

NOVATECH

Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 296

The information contained in this email message is confidential and is for exclusive use of the addressee.

From: Shane <shane@echelonenvironmental.ca>

Sent: Thursday, April 6, 2023 4:44 PM

To: Melanie Schroeder <m.schroeder@novatech-eng.com>

Subject: RE: Proposed Hotel Development (40 Frank Nighbor Place) - OGS Sizing Request

Hello Melanie,

Thank you for sizing request.

Please see attached CDS sizing report, the selected model is a PMSU2020_5. Budget price, assuming a typical 2m depth to invert is \$27,000.

Would you be able to fill out the attached information form I can check the hydraulics for the tailwater conditions. If you could please confirm the normal water level and 15mm water level I can size the internal weir accordingly.

Thank you,

Shane Jensen
Project Manager
Cell: 416-460-6328

From: Melanie Schroeder <m.schroeder@novatech-eng.com>

Sent: Thursday, April 06, 2023 12:03 PM

To: Shane <shane@echelonenvironmental.ca>

Subject: Proposed Hotel Development (40 Frank Nighbor Place) - OGS Sizing Request

Hi Shane,

Can you please provide OGS sizing for a CDS unit for a proposed hotel development in Ottawa, Ontario. The OGS unit will be providing treatment for the site that is controlled by an ICD that is located

From: Shane <shane@echelonenvironmental.ca>
Sent: Thursday, April 6, 2023 4:44 PM
To: Melanie Schroeder
Subject: RE: Proposed Hotel Development (40 Frank Nighbor Place) - OGS Sizing Request
Attachments: [CDS TSSR- 40 Frank Nighbor Place, Ottawa.pdf](#); [Information Request Form - Echelon - Fillable.pdf](#)

Hello Melanie,

Thank you for sizing request.

Please see attached CDS sizing report, the selected model is a PMSU2020_5. Budget price, assuming a typical 2m depth to invert is \$27,000.

Would you be able to fill out the attached information form I can check the hydraulics for the tailwater conditions. If you could please confirm the normal water level and 15mm water level I can size the internal weir accordingly.

Thank you,

Shane Jensen
Project Manager
Cell: 416-460-6328

From: Melanie Schroeder <m.schroeder@novatech-eng.com>
Sent: Thursday, April 06, 2023 12:03 PM
To: Shane <shane@echelonenvironmental.ca>
Subject: Proposed Hotel Development (40 Frank Nighbor Place) - OGS Sizing Request

Hi Shane,

Can you please provide OGS sizing for a CDS unit for a proposed hotel development in Ottawa, Ontario. The OGS unit will be providing treatment for the site that is controlled by an ICD that is located upstream of the unit. There will be back water effects from the downstream pipe that discharges into a nearby river.

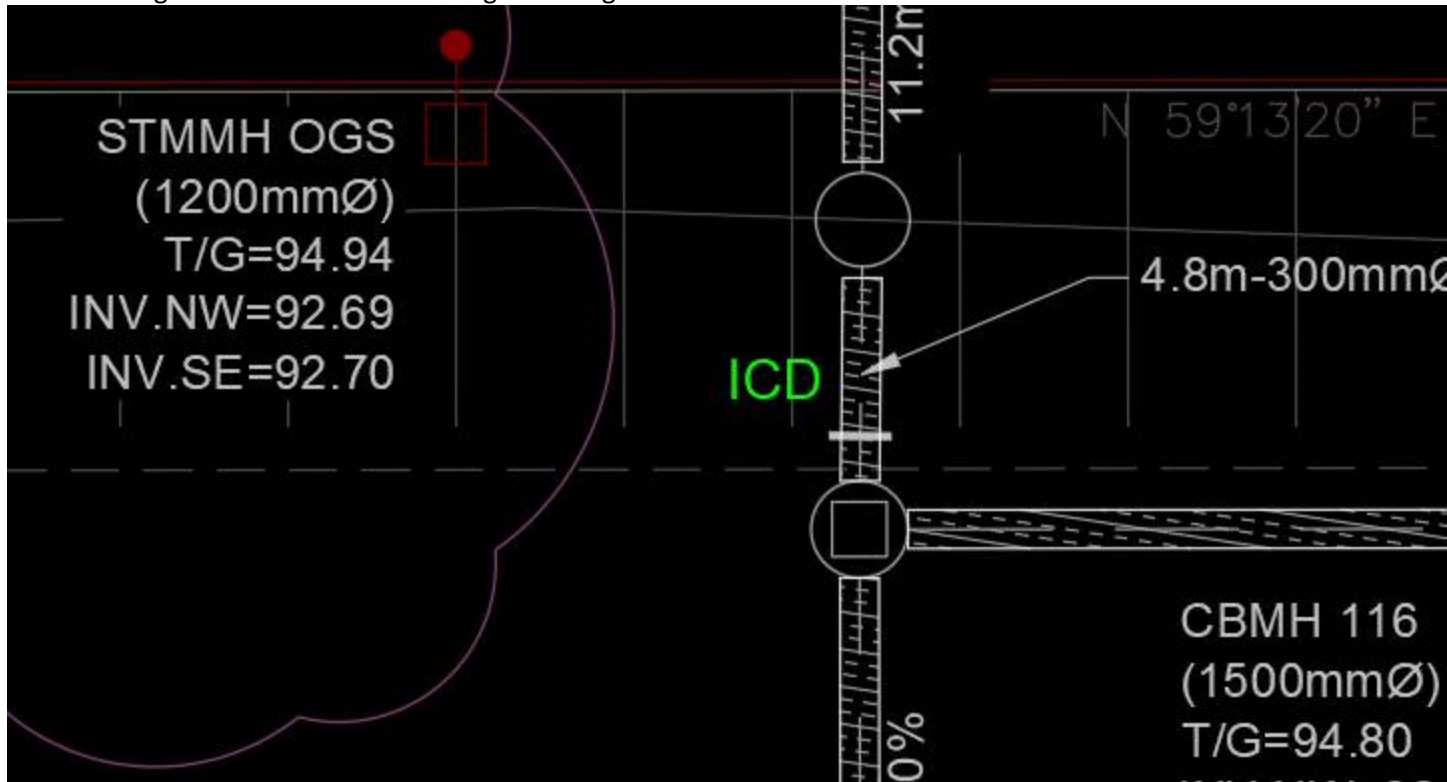
Proposed Hotel Development (40 Frank Nighbor Place, Ottawa)

Area tributary to unit: 0.741 ha
Overall % Impervious: 93.3%
Overall C value: 0.86
TSS removal = 80%
100-year flow through ICD = 25.3 L/s
Inlet pipe size = 300 mm
Inlet pipe invert = 92.70 m
Outlet pipe size = 300 mm
Outlet pipe invert = 92.69 m

T/G at the unit = 94.94 m

The downstream boundary condition from receiving watercourse is:
100-year = 94.02

The following is a screenshot of the design drawing for the location of the unit.



Let me know if there is any additional information you require.

Thank you,

Melanie Schroeder, B.A.Sc., E.I.T. | Water Resources (She/Her)

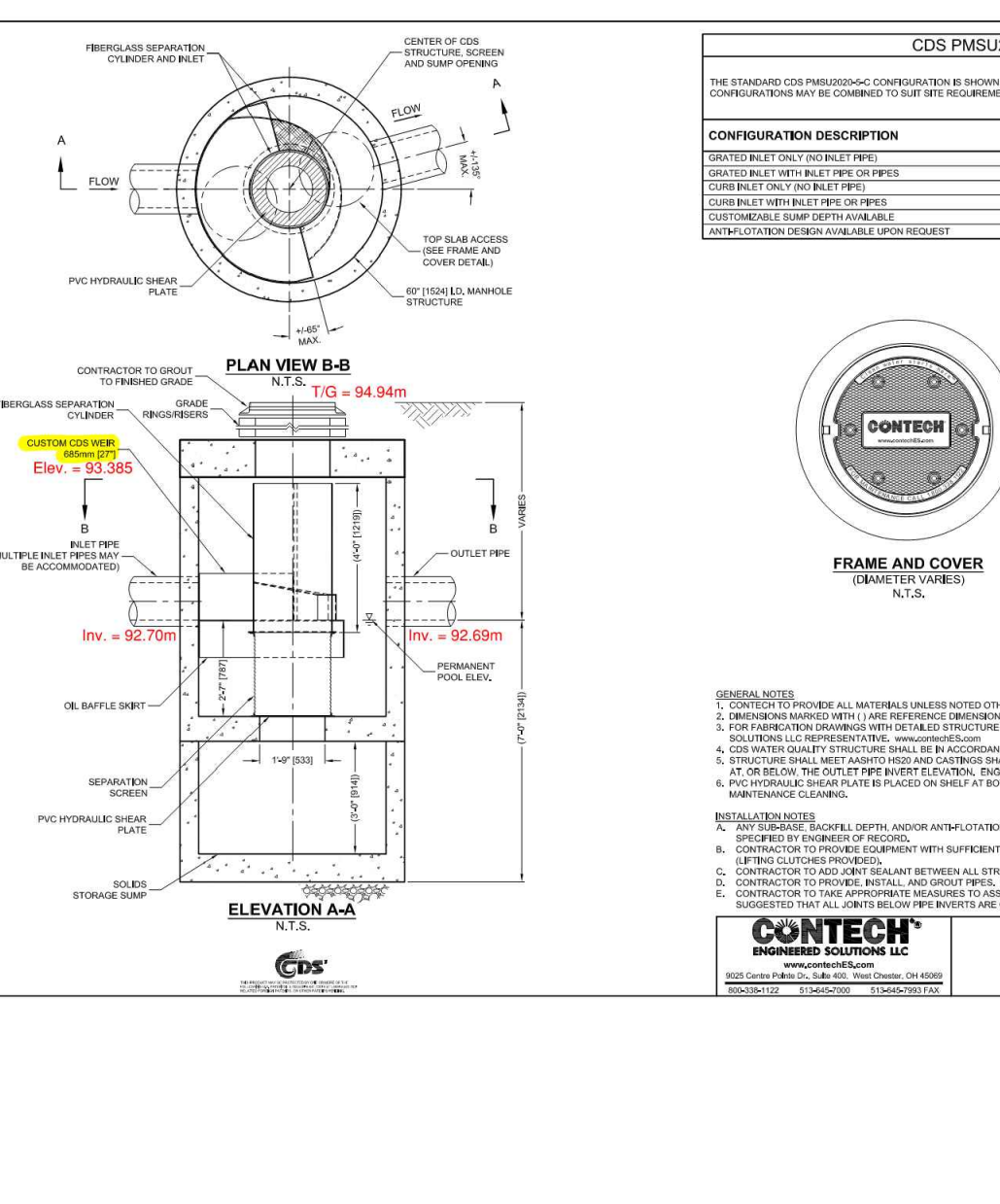
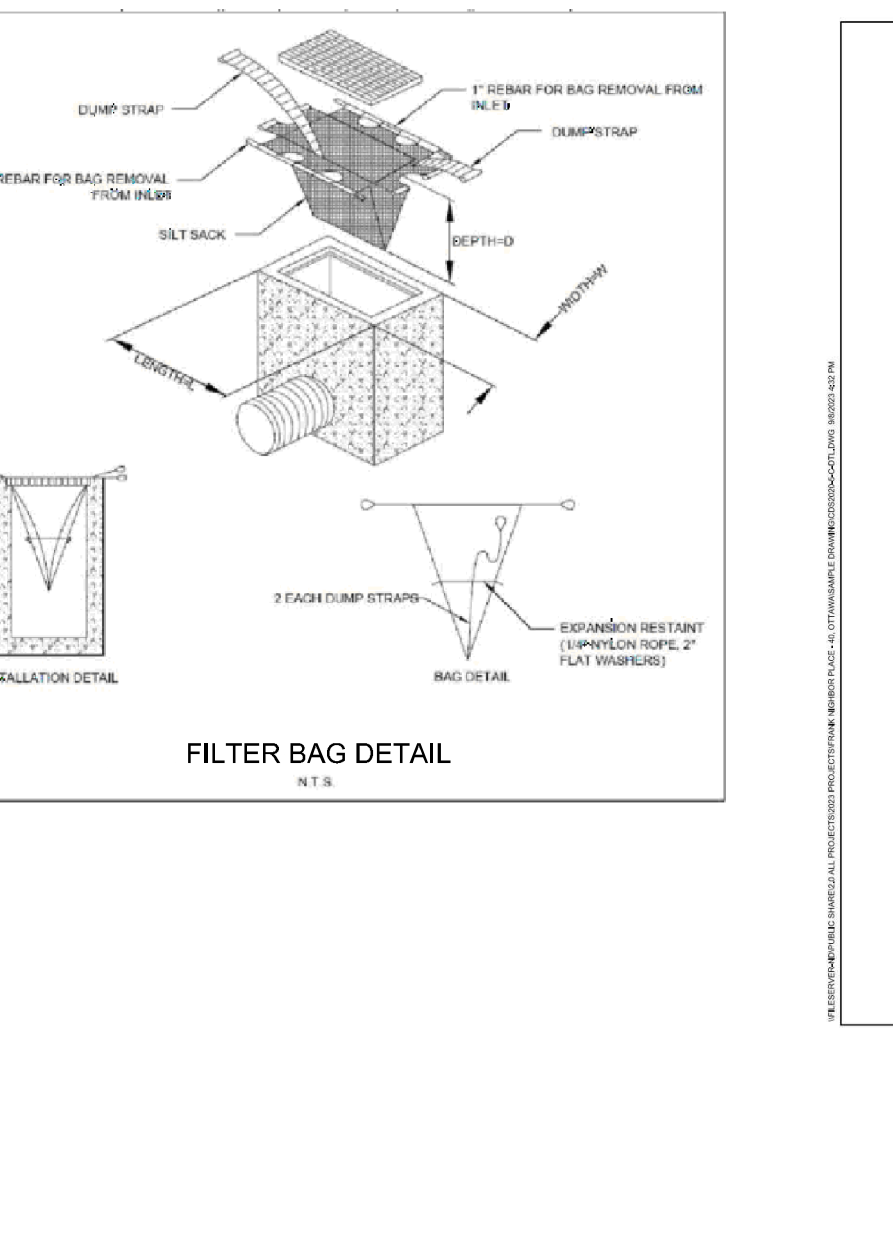
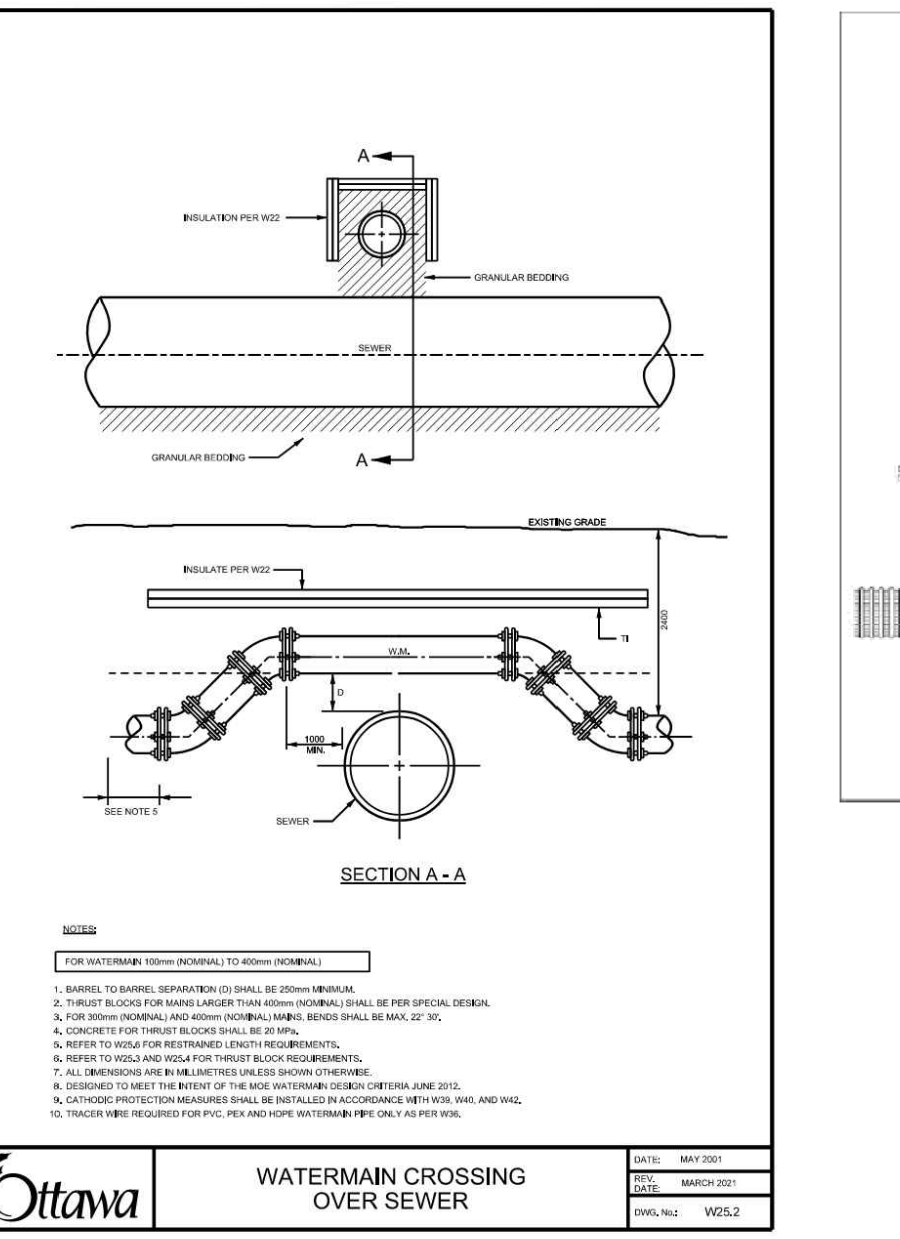
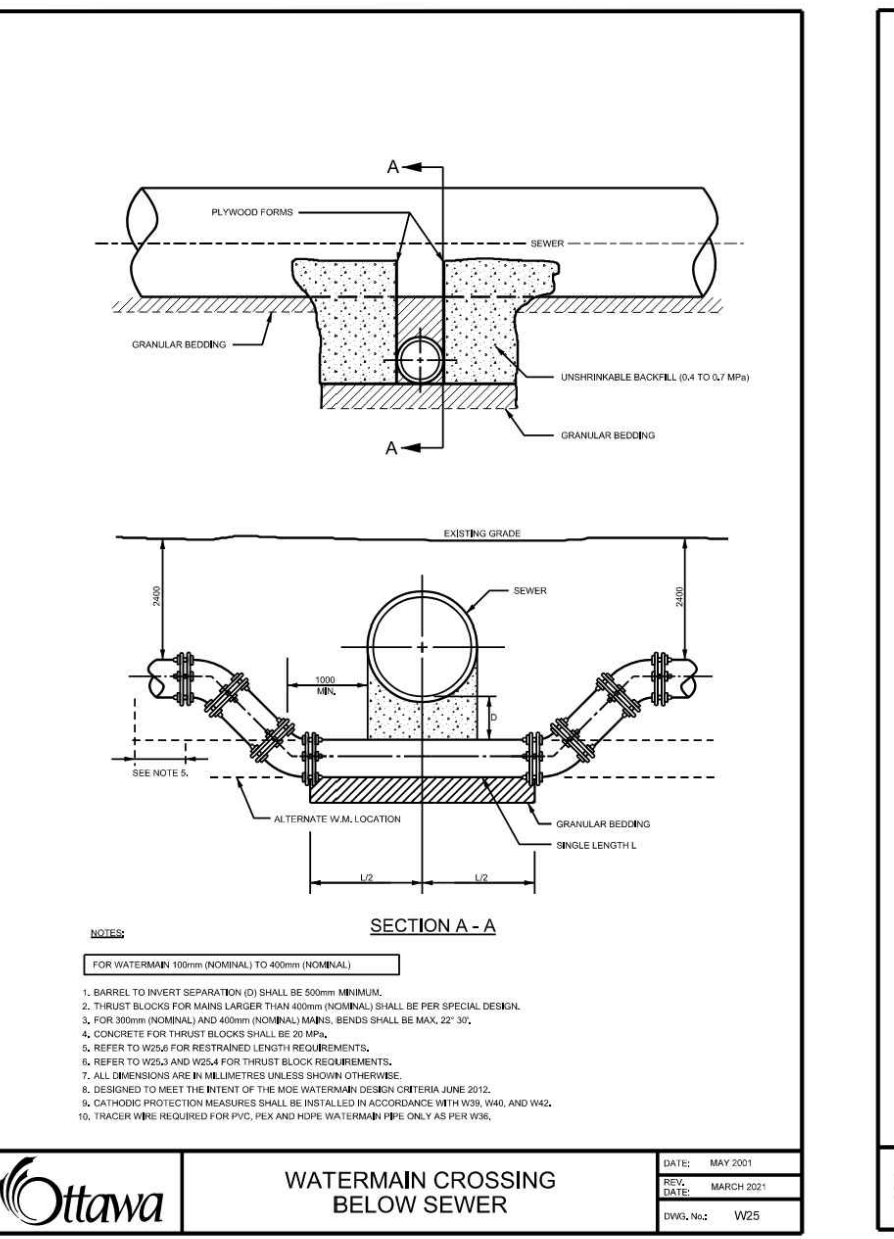
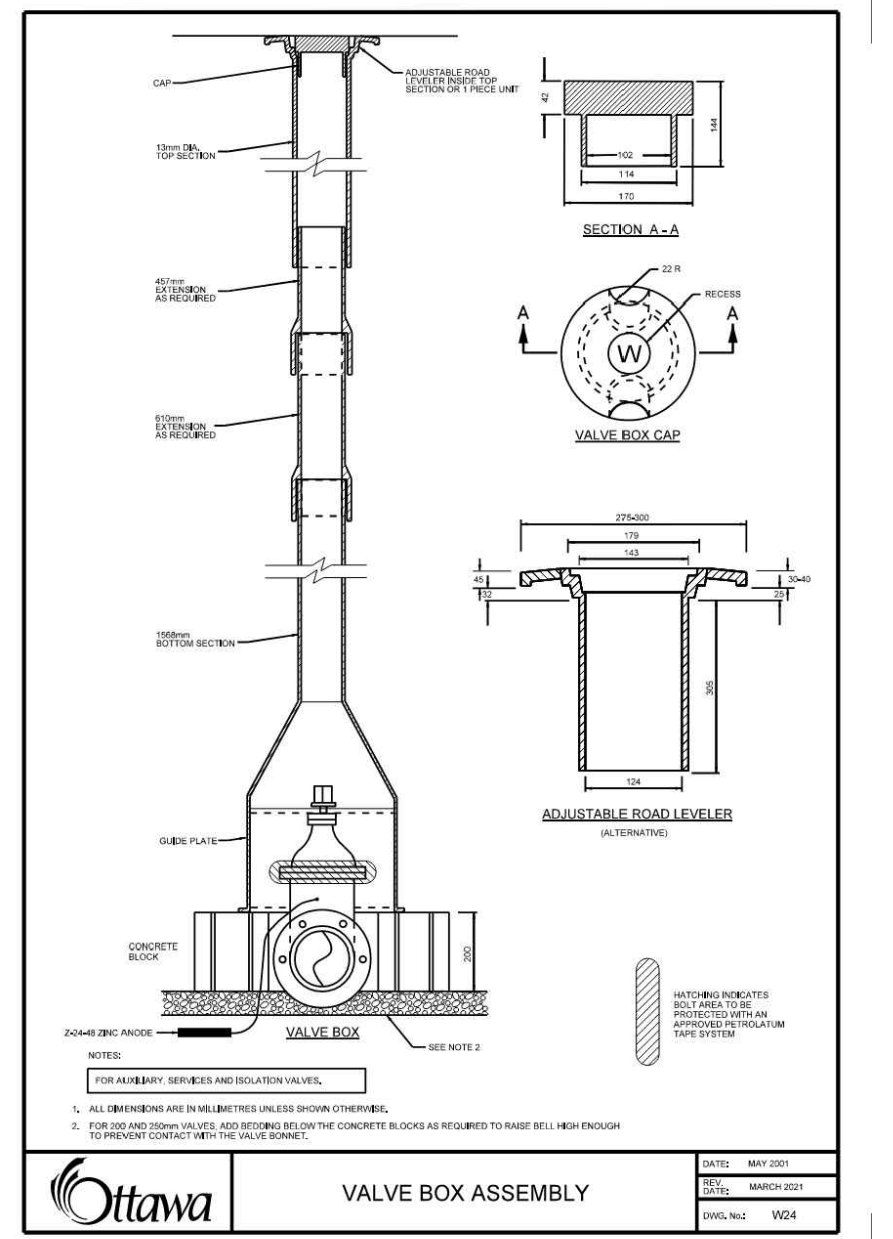
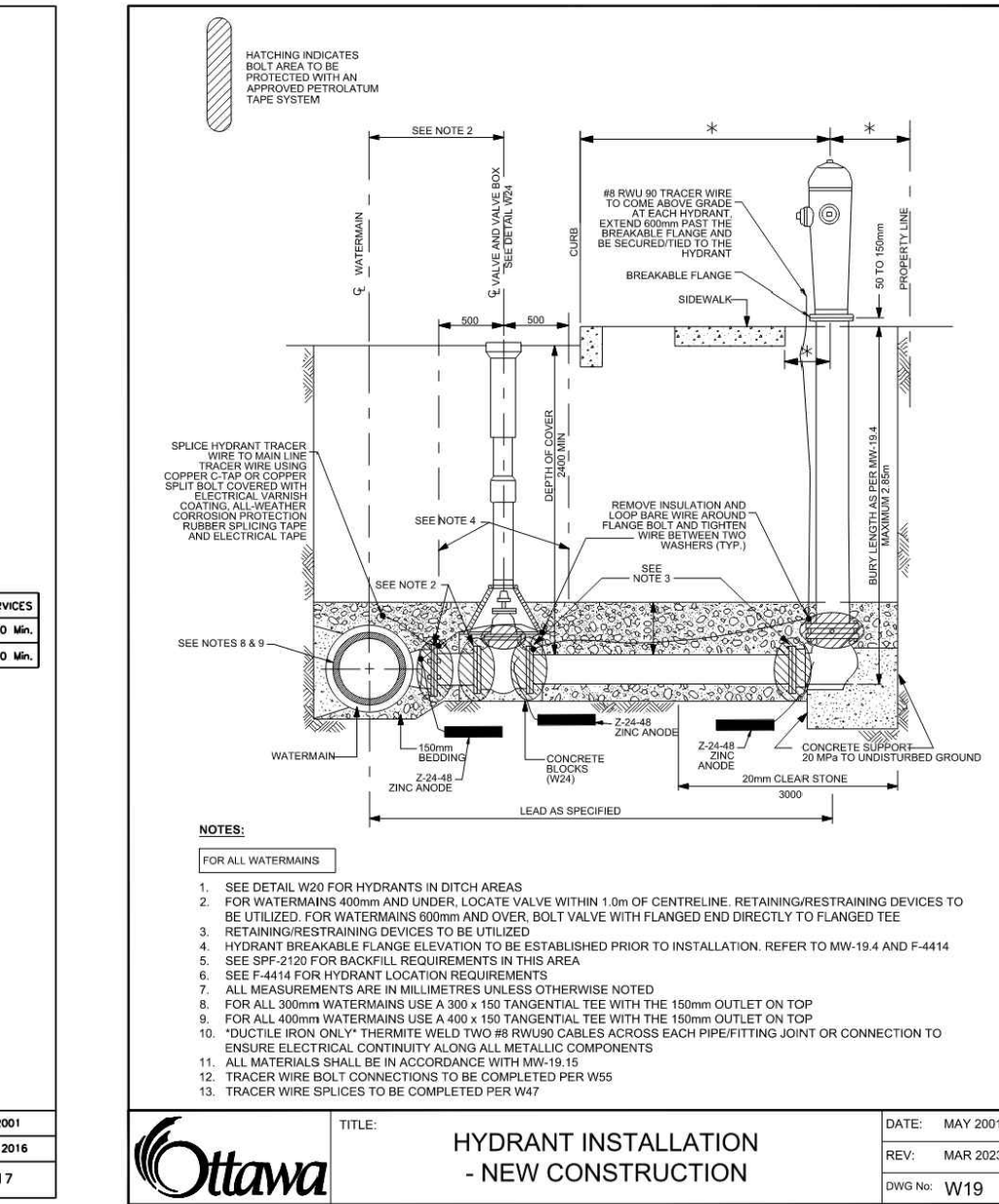
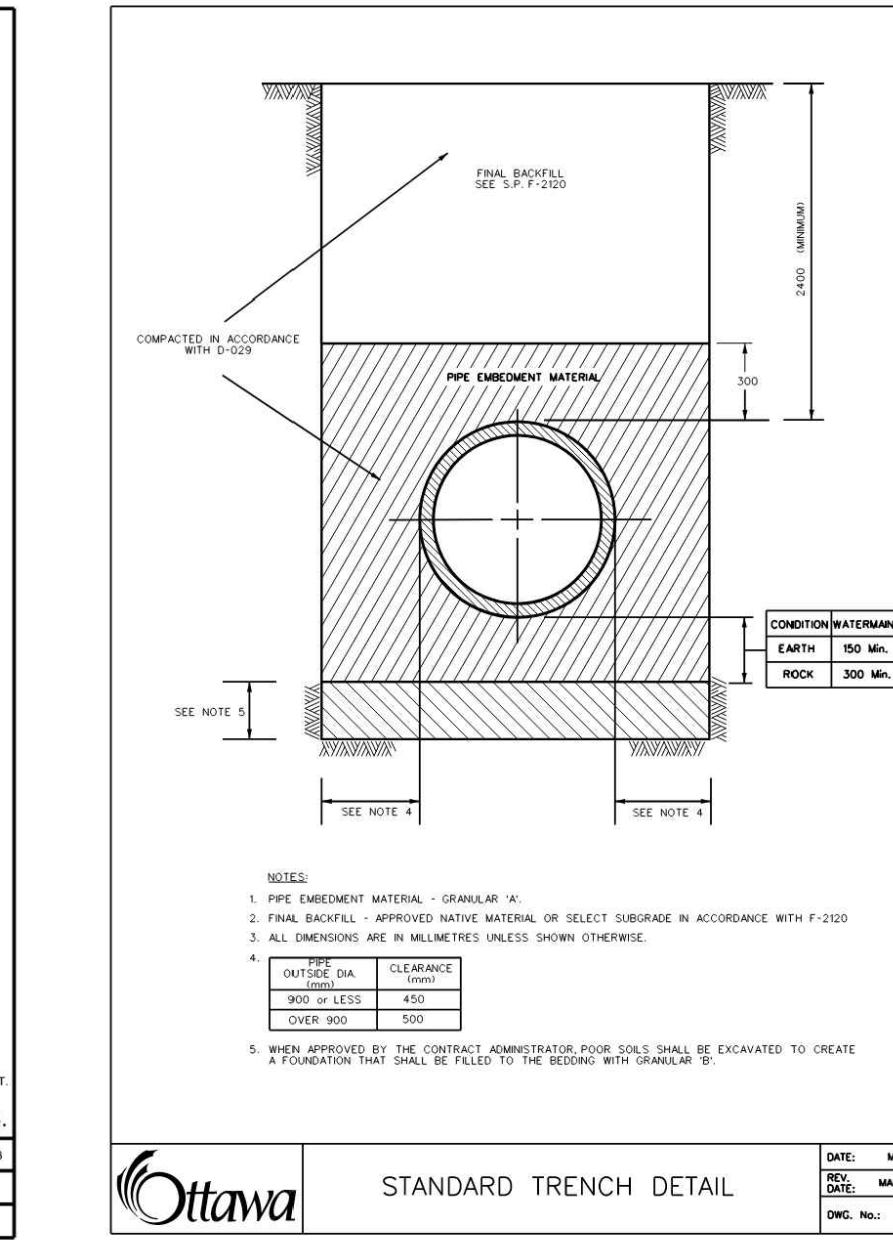
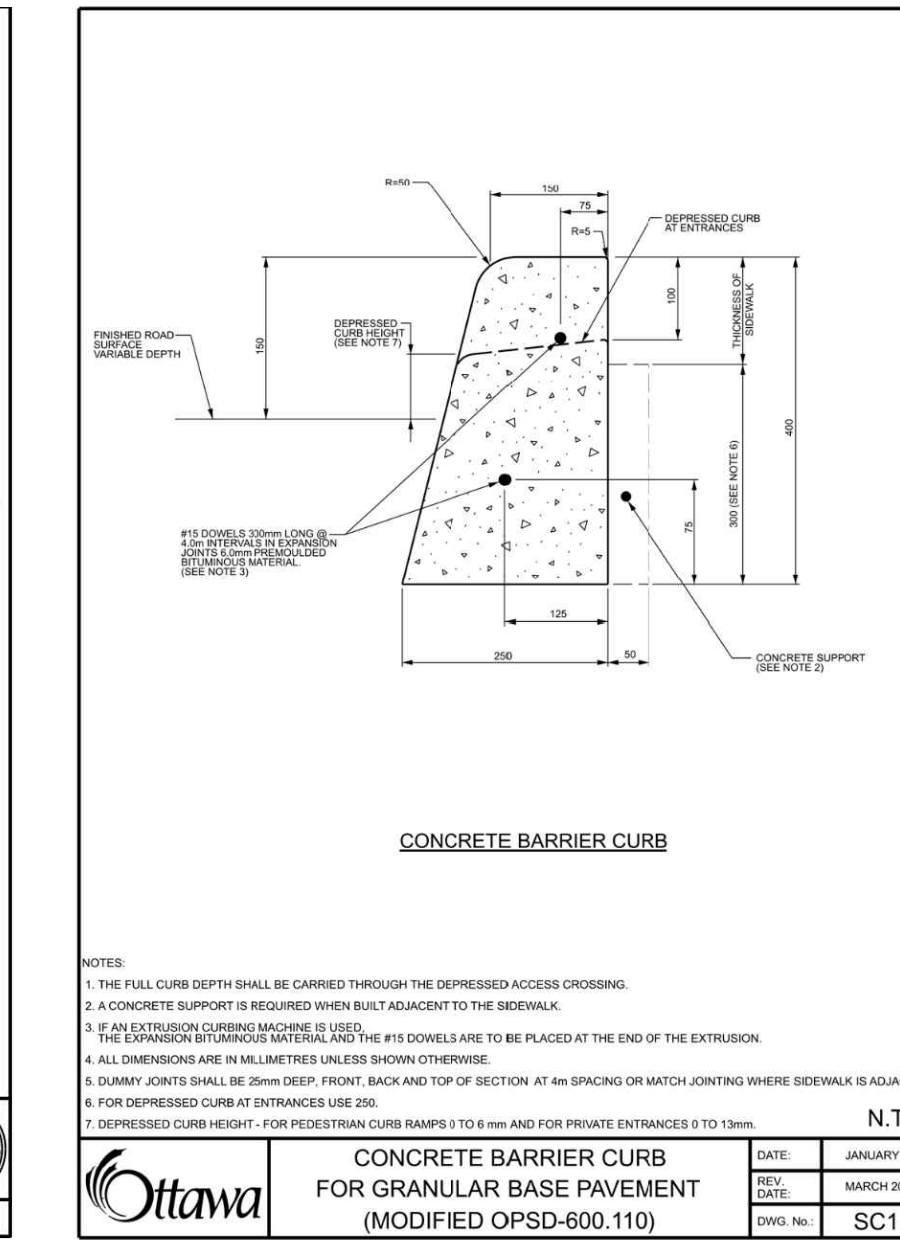
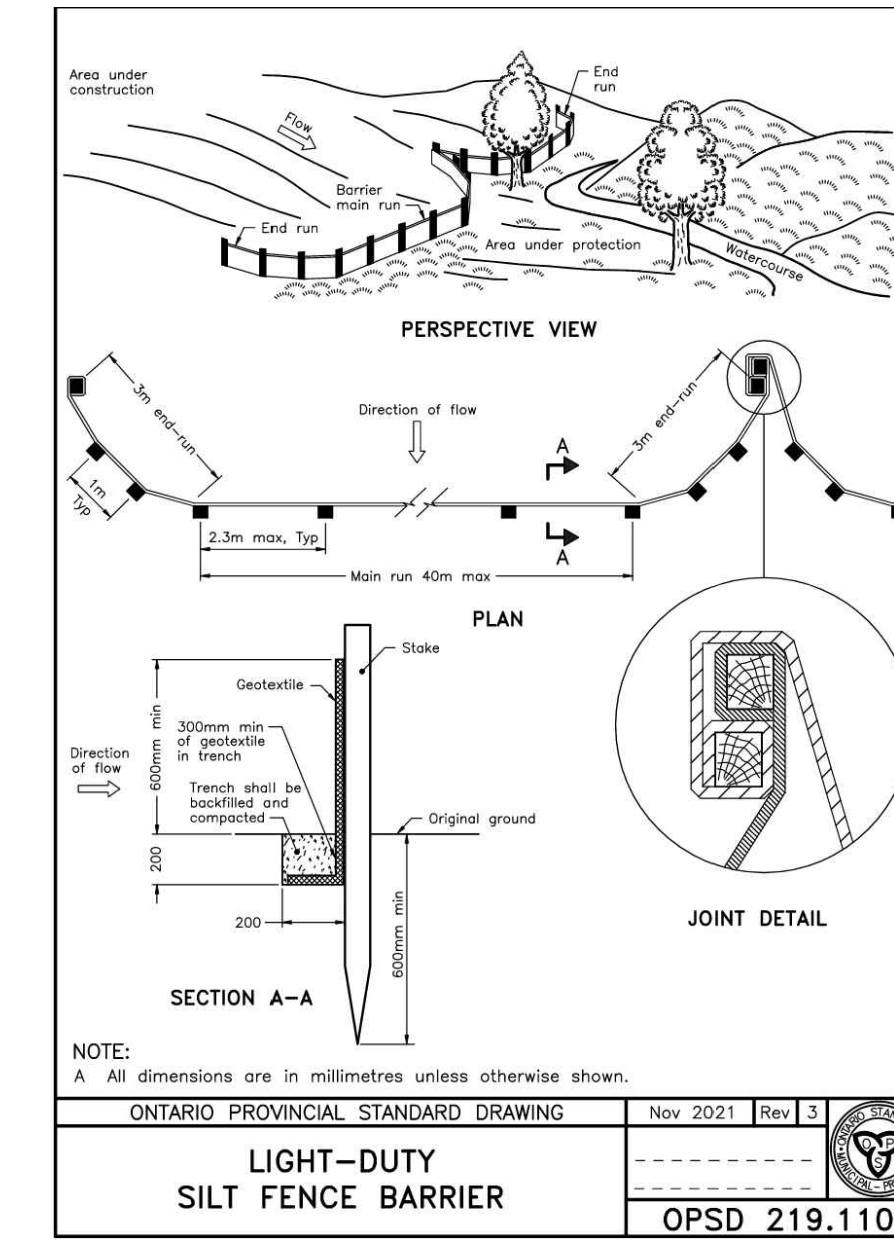
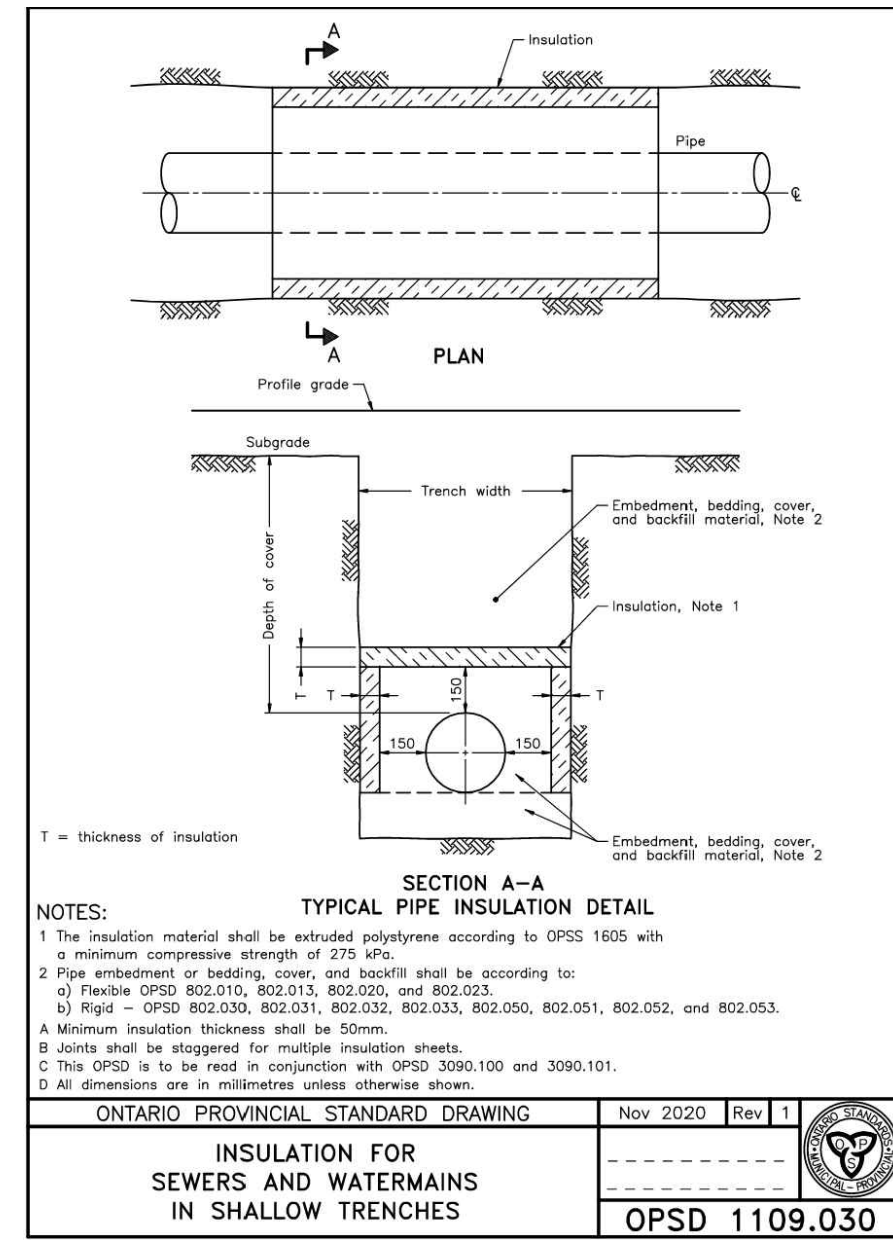
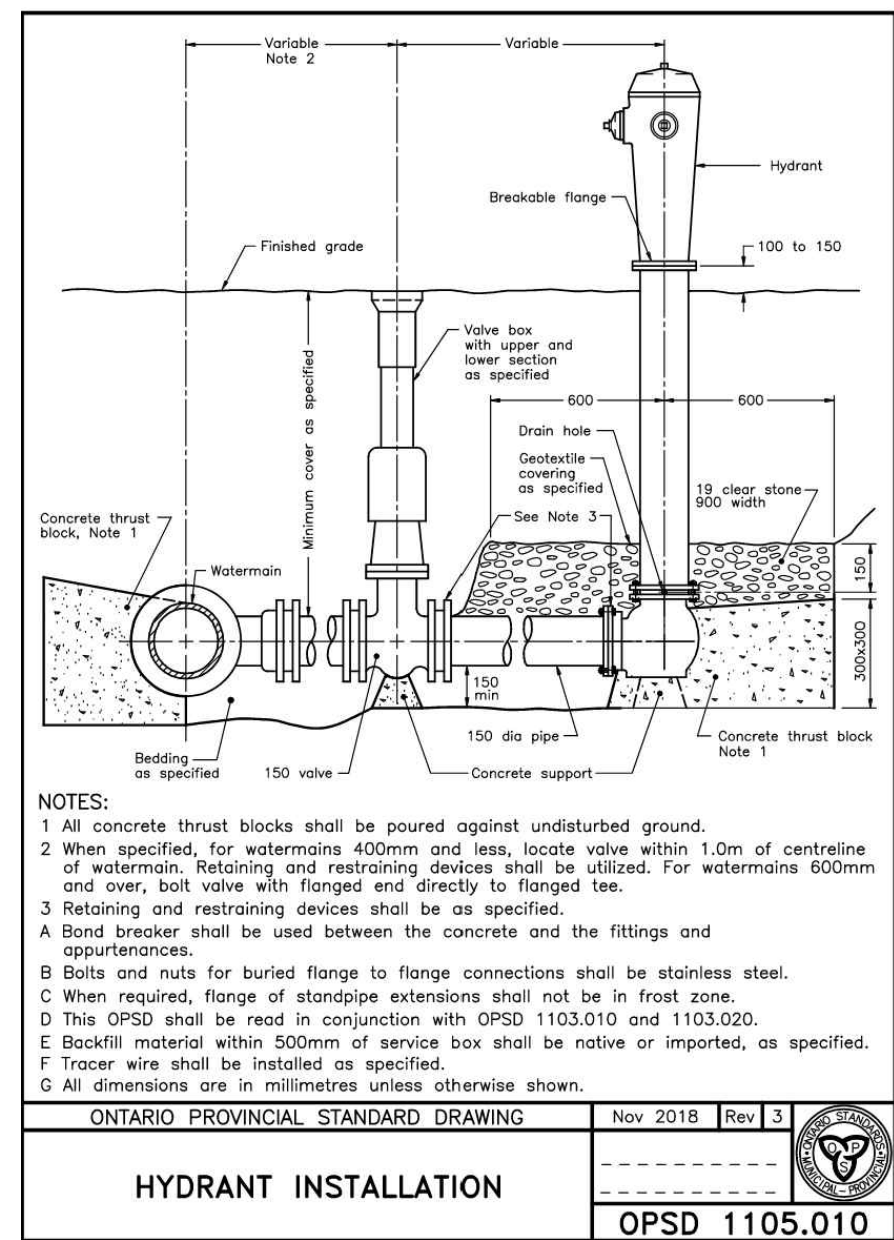
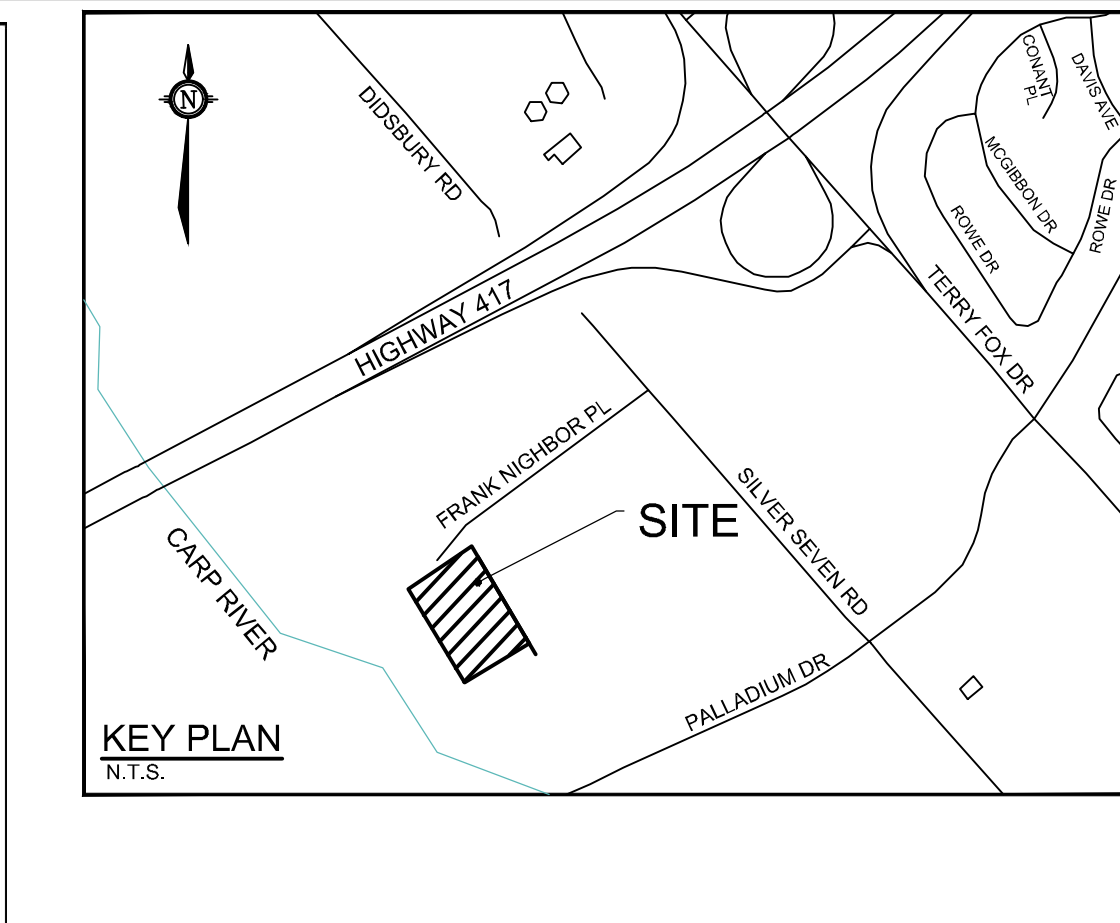
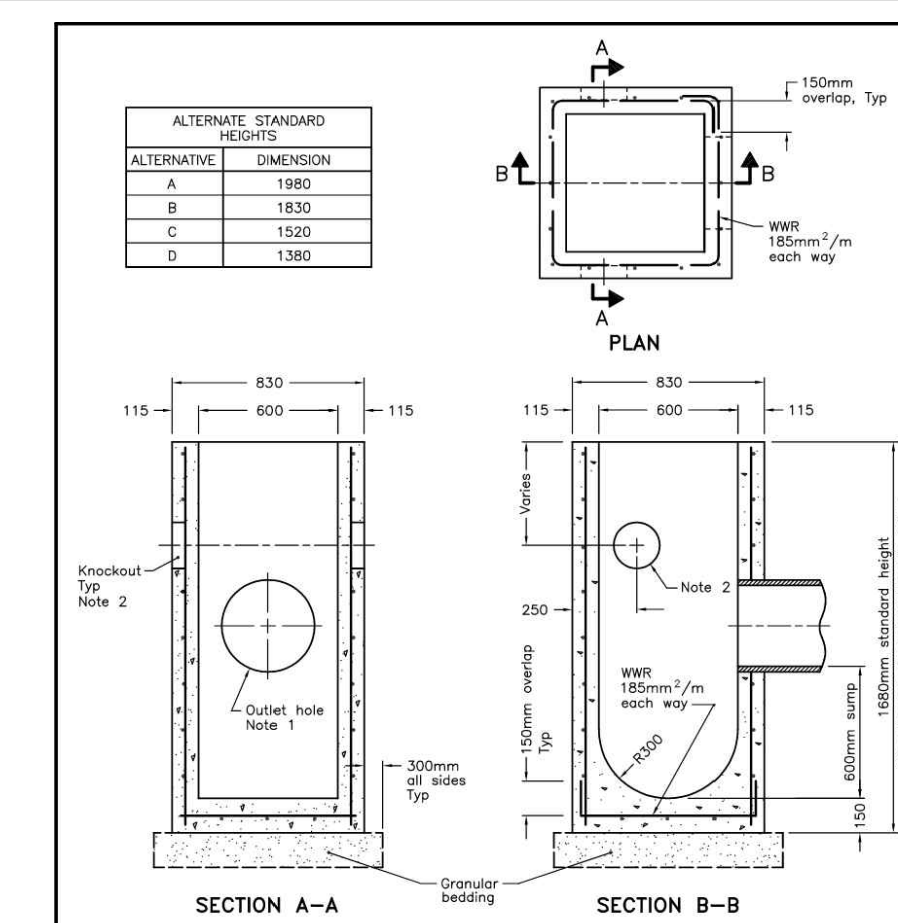
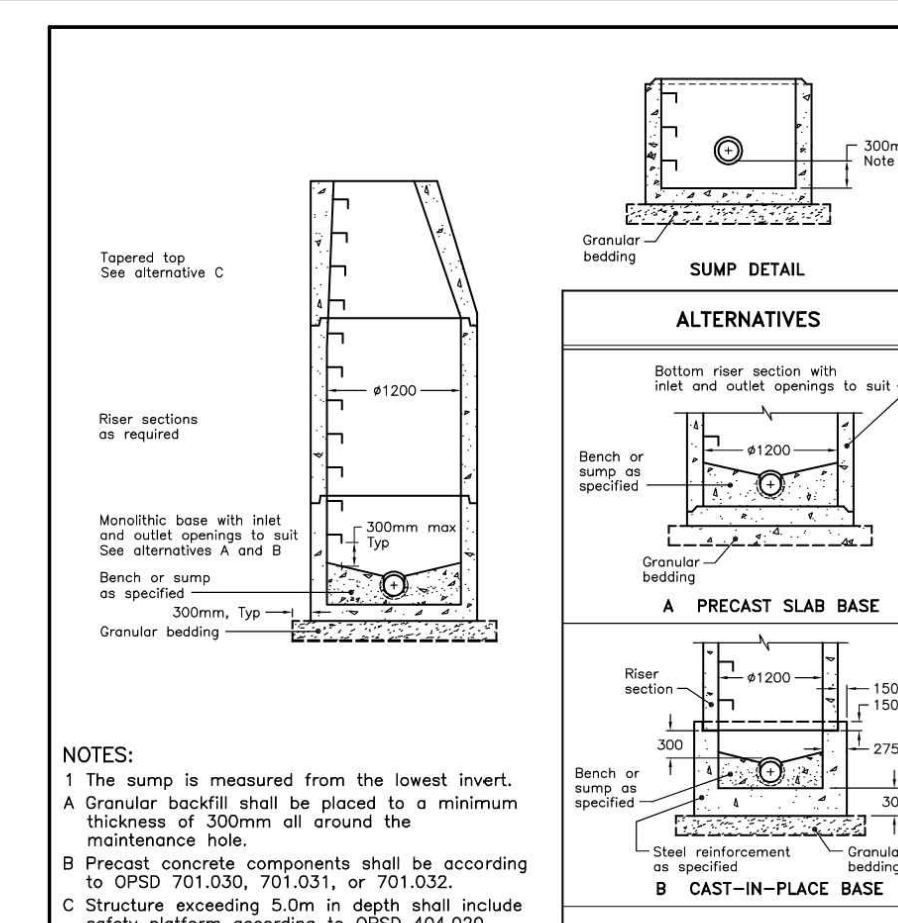
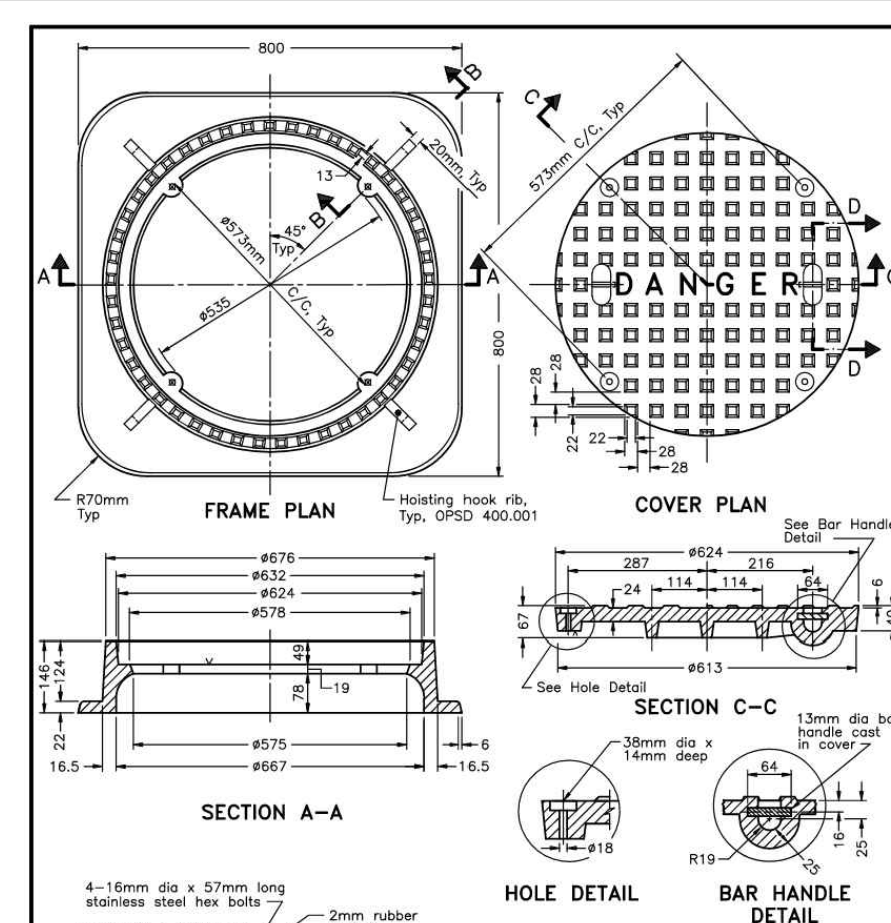
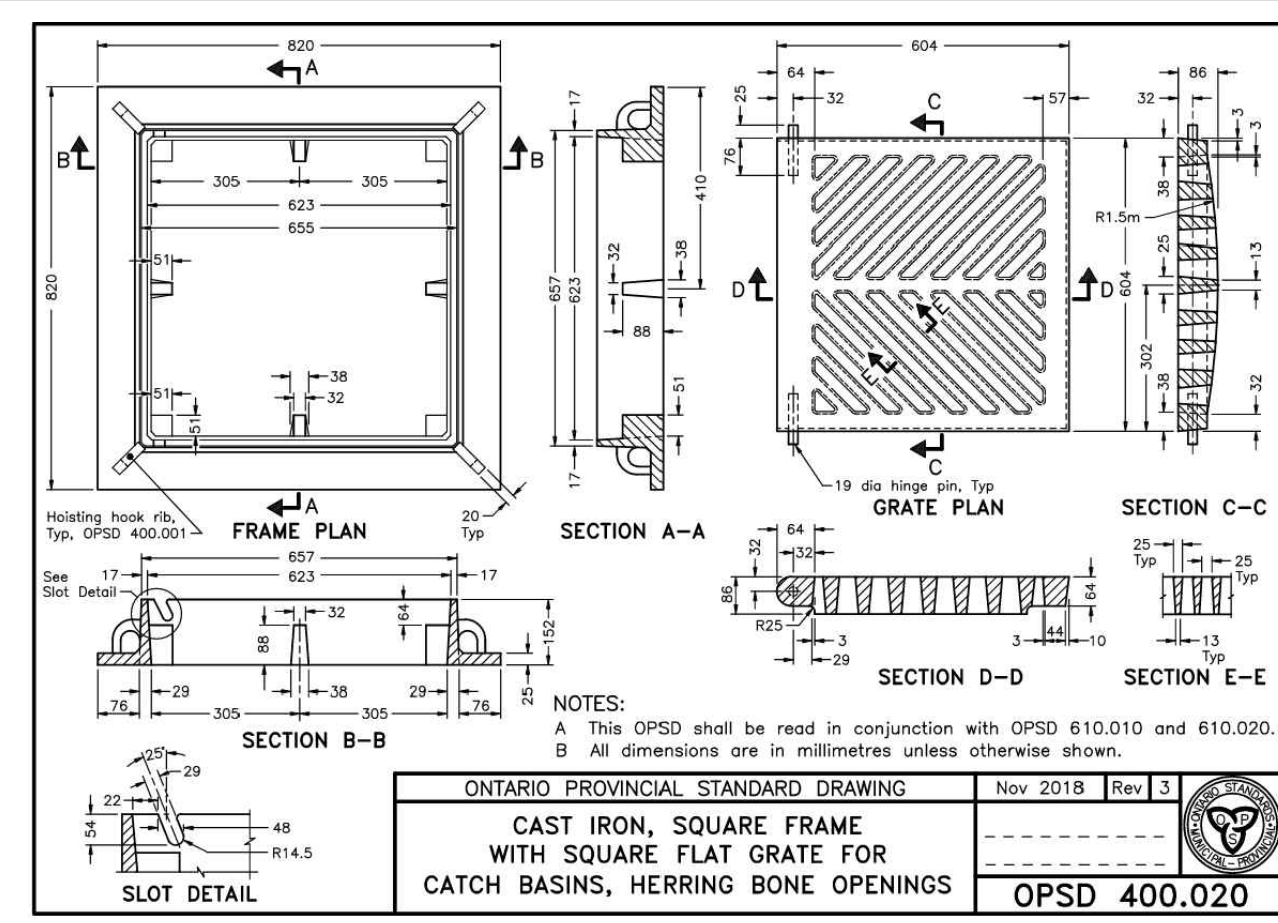
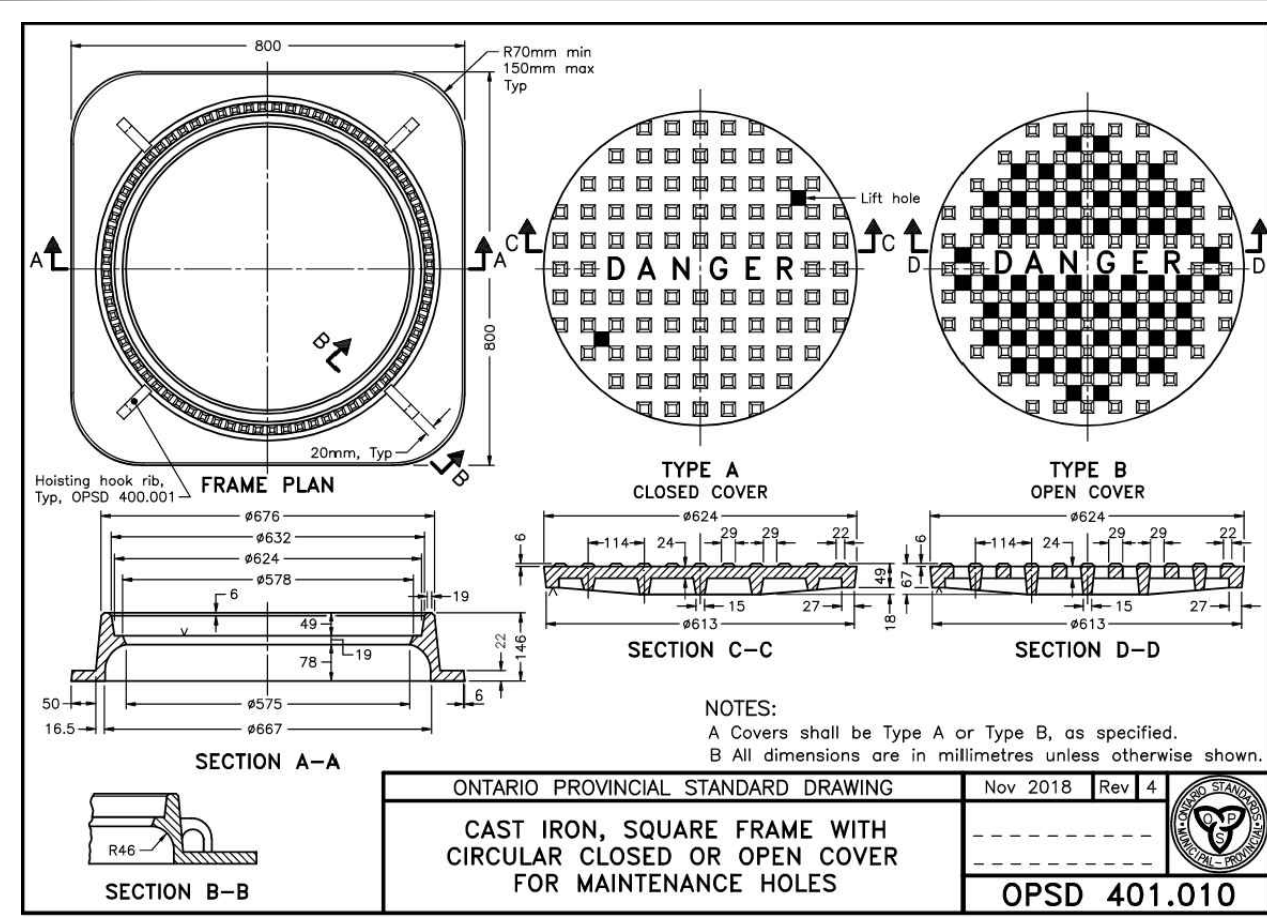
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Engineers, Planners & Landscape Architects

240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext. 296

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APPENDIX G
Engineering Drawings



CDS PMSU020-6-C DESIGN NOTES	
<p>1. SEE DETAIL FOR HYDRANTS IN DITCH AREAS</p> <p>2. FOR WATERMANS WITH HOLE LOCATED WITHIN 1.0m OF CENTRAL LINE, RETAINING/STRAINING DEVICES TO BE UTILIZED FOR WATERMANS 600mm AND OVER. BOLT VALVE WITH FLANGED END DIRECTLY TO FLANGED TEE</p> <p>3. HYDRANT BREAKAWAY FLANGE ELEVATION TO BE ESTABLISHED PRIOR TO INSTALLATION. REFER TO MW-16 AND 44H4</p> <p>4. SEE OPSD 701.030 FOR ALL MEASUREMENTS IN THIS AREA</p> <p>5. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED</p> <p>6. ALL 600mm WATERMANS USE A 100mm TANGENTIAL TEE WITH THE 100mm OUTLET ON TOP</p> <p>7. ALL 600mm WATERMANS USE A 100mm TANGENTIAL TEE WITH THE 100mm OUTLET ON TOP</p> <p>8. ALL 600mm WATERMANS USE A 100mm TANGENTIAL TEE WITH THE 100mm OUTLET ON TOP</p> <p>9. ALL 600mm WATERMANS USE A 100mm TANGENTIAL TEE WITH THE 100mm OUTLET ON TOP</p> <p>10. ALL 600mm WATERMANS USE A 100mm TANGENTIAL TEE WITH THE 100mm OUTLET ON TOP</p> <p>11. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE CDS</p> <p>12. TRACER WIRE SHALL BE COMPLETED TO BE COMPLETED FOR 600</p> <p>13. TRACER WIRE SPACES TO BE COMPLETED FOR 600</p>	
<p>DATE: MAY 2001 REV: MARCH 2003 DWG NO: W19</p>	

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, 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
401 REAL ESTATE TRUST INC.
2225 EAGLE STREET N.
CAMBRIDGE, ONTARIO, N3H 4R7
TED LANCASTER
PHONE: (705) 816-6355
ted.lancaster@401auto.ca

No.	REVISION	DATE	BY
1	REVISED PER CITY COMMENTS	SEPT 29/23	FST

SCALE	DESIGN	FOR REVIEW ONLY
1:300	ZA	
	FST	
	ZA	
	FST	
	FST	

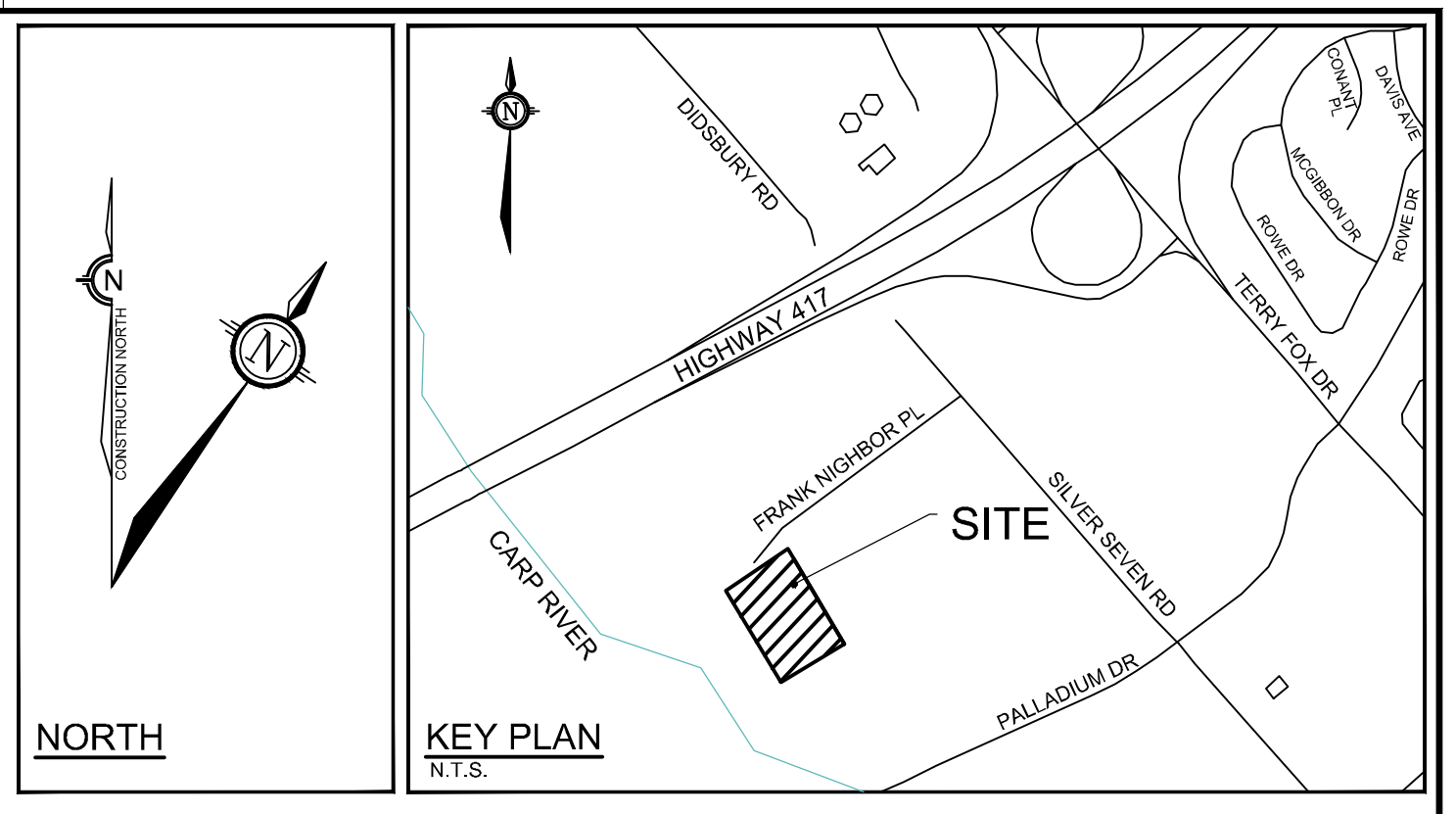
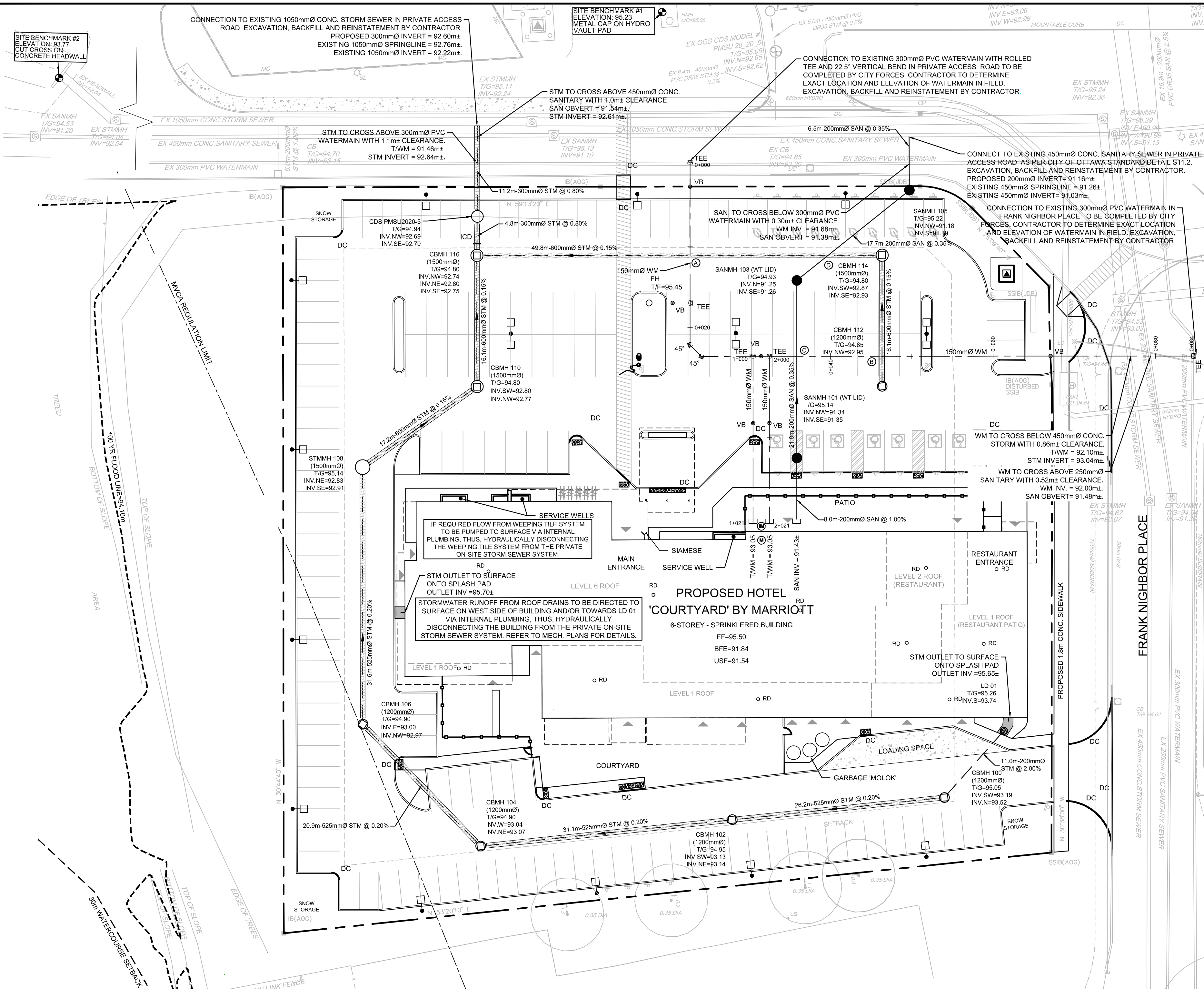
NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone: (613) 254-9643
Facsimile: (613) 254-5867
Website: www.novatech-eng.com

LOCATION
CITY OF OTTAWA
40 FRANK NIGHBOR PLACE

DRAWING NAME
CIVIL DETAILS PLAN

PROJECT NO.	123002
REV	REV #1
DRAWING NO.	123002-D

D07-12-23-0061



PROPOSED 150mmØ WATERMAIN TABLE

STATION	SURFACE ELEVATION	TWM ELEVATION	COMMENTS
0+000	95.05	91.70*	CONNECTION TO EXISTING 300mmØ WM
0+001.5	95.03	92.33	22.5' VERTICAL BEND
0+002.7	95.34	92.33	VALVE BOX AT PROPERTY LINE
0+011.1	95.06	92.23	CROSS BELOW 600mmØ STM (±0.5m CLEARANCE)
0+017.0	95.12	92.29	HYDRANT TEE
0+022.1	95.12	92.34	45' HORIZONTAL BEND
0+024.1	95.10	92.35	45' HORIZONTAL BEND
0+030.5	95.04	92.35	BUILDING SERVICE TEE
0+031.5	95.03	92.35	VALVE BOX
0+032.5	95.02	92.35	BUILDING SERVICE TEE
0+035.9	95.00	92.35	CROSS ABOVE 200mmØ SAN (±0.7m CLEARANCE)
0+046.4	95.02	92.35	CROSS BELOW 600mmØ STM (±0.5m CLEARANCE)
0+067.0	94.86	92.16	VALVE BOX AT PROPERTY LINE
0+076.5	94.50	92.10	CROSS EX. 450mmØ STM
0+079.4	94.55	92.15	CROSS EX. 250mmØ SAN
0+084.4	94.60	92.20*	CONNECTION TO EXISTING 300mmØ WM

PROPOSED 150mmØ WATERMAIN TABLE

STATION	SURFACE ELEVATION	TWM ELEVATION	COMMENTS
1+000	95.04	92.35	CONNECTION TO PROPOSED 150mmØ WM
1+008.2	95.05	92.65	VALVE BOX
1+020.6	95.45	93.05	CAP AT 1.0m FROM BUILDING FACE

PROPOSED 150mmØ WATERMAIN TABLE

STATION	SURFACE ELEVATION	TWM ELEVATION	COMMENTS
2+000	95.02	92.35	CONNECTION TO PROPOSED 150mmØ WM
2+008.2	95.05	92.65	VALVE BOX
2+020.6	95.45	93.05	CAP AT 1.0m FROM BUILDING FACE

CRITICAL SEWER PIPE CROSSING TABLE

CROSSING*	LOWER PIPE	HIGHER PIPE	CLEARANCE	SURFACE ELEVATION
1	150mmØ TWM-92.23	600mmØ STM INV-92.84	± 0.5m	95.06 m
2	150mmØ TWM-92.35	600mmØ STM INV-92.95	± 0.5m	94.91 m
3	200mmØ SAN OBV-91.50	150mmØ WM INV-92.20	± 0.7m	95.00 m
4	200mmØ SAN OBV-91.43	600mmØ STM INV-92.86	± 1.33m	94.87 m

ICD TABLE - CBMH116 (AREAS A-1a to A-1h, R-1 & R-2)

DESIGN EVENT	TYPE OF ICD	DIAMETER OF OUTLET PIPE (mm)	DESIGN FLOW (L/s)	DESIGN HEAD (m)	PONDING ELEV. (m)	VOLUME** (m³)
1.2 YR	109mm DIA. ORIFICE PLATE	300	31.6	1.57	94.79	78
1.5 YR			5.3	1.54	94.97	132
1:100 YR			25.2	1.09	95.10	337

* NOTE: DESIGN HEAD IS MEASURED FROM THE MAX. PONDING ELEVATION TO THE ELEVATION OF THE BOUNDARY CONDITION IN TABLE 3.3 OF THE DSS&SW REPORT (ACCOUNTS FOR BACKWATER EFFECT / DEAD STORAGE).
** REFER TO TABLE 3.5 IN THE DSS&SW REPORT (R-2023-014) FOR A BREAKDOWN OF VOLUME INTO DEAD AND ACTIVE STORAGE.

SITE FLOWS & STORMWATER MANAGEMENT TABLE

DESIGN EVENT	PRE-DEVELOPMENT CONDITIONS		POST-DEVELOPMENT CONDITIONS			
	UNCONTROLLED FLOW (L/s)	ALLOWABLE RELEASE RATE (L/s)	A-8a to A-8d DIRECT RUNOFF (L/s)	A-1a to A-1h, R-1 & R-2 FLOW (L/s)	TOTAL FLOW (L/s)	CHANGE FROM PRE TO POST (L/s or %)
1.2 YR	34.7	40.7	5.3	31.6	36.9	2.2 or 6%
1.5 YR	47.1		7.2	31.3	38.5	-8.6 or -18%
1:100 YR	100.9		14.4	25.2	39.6	-61.3 or -61%

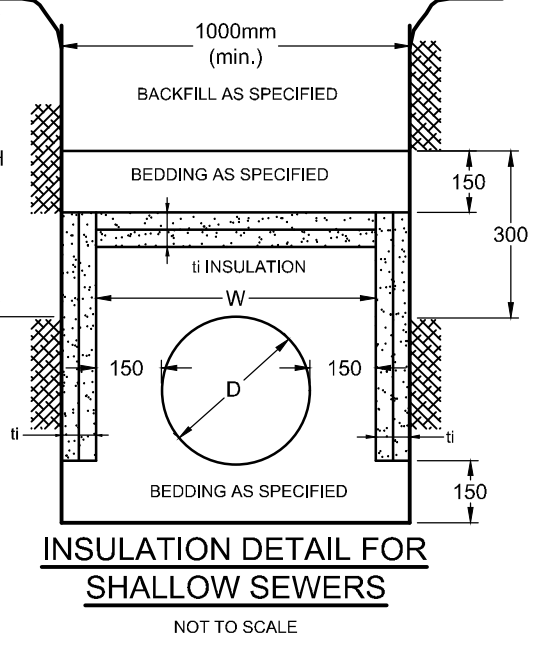
* COMPARED TO PRE-DEVELOPMENT CONDITIONS (NEGATIVE VALUES REPRESENT DECREASE BETWEEN PRE-DEVELOPMENT FLOWS AND POST-DEVELOPMENT FLOWS).

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 1800mm (SEE TABLE).

2. THICKNESS OF INSULATION (mm)
n = DEPTH OF COVER
W = 300 (1000 mm)
W = WIDTH OF INSULATION (mm)
D = O.D. OF PIPE (mm)

COVER (mm)	INSULATION THICKNESS (mm)
1900-1500	50
1500-1200	75
1200-900	100
900-600	125



- ### GENERAL NOTES:
- COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
 - 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.
 - OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
 - BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR \$5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
 - COMPLETE ALL WORKS IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS USING THE CURRENT GUIDELINES, BYLAWS AND STANDARDS INCLUDING MATERIALS OF CONSTRUCTION, DISINFECTION AND ALL RELEVANT REFERENCES TO OPS&S, OPS&D & AWWA GUIDELINES - ALL CURRENT VERSIONS AND 'AS AMENDED'.
 - 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 THE CITY OF OTTAWA AND ENGINEER.
 - 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.
 - ALL ELEVATIONS ARE GEODETIC.
 - REFER TO GEOTECHNICAL REPORT (NO. 02211293.000, DATED MAY 10, 2023), PREPARED BY ENGLOBE CORP., FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER CONSTRUCTION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
 - REFER TO ARCHITECTS AND LANDSCAPE ARCHITECTS DRAWINGS FOR BUILDING AND HARD SURFACE AREAS AND DIMENSIONS.
 - REFER TO THE DEVELOPMENT SERVICING STUDY & STORMWATER MANAGEMENT REPORT (R-2023-014) PREPARED BY NOVATECH.
 - SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
 - PROVIDE LINE / PARKING PAINTING AS REQUIRED PER THE ARCHITECTURAL SITE PLAN.

- ### WATERMAIN NOTES:
- SUPPLY AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS - ALL CURRENT VERSIONS AND 'AS AMENDED'. 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 THE CONTRACTOR IN THE PRESENCE OF CITY OF OTTAWA FORCES.
 - SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
WATERMAIN TRENCHING	W17	CITY OF OTTAWA
HYDRANT INSTALLATION	W19	CITY OF OTTAWA
THERMAL INSULATION IN SHALLOW TRENCHES	W22	CITY OF OTTAWA
THERMAL INSULATION AT OPEN STRUCTURES	W23	CITY OF OTTAWA
VALVE BOX ASSEMBLY	W24	CITY OF OTTAWA
WATERMAIN CROSSING BELOW SEWER	W25	CITY OF OTTAWA
WATERMAIN CROSSING OVER SEWER	W25.2	CITY OF OTTAWA
WATERMAIN	PVC DR 18	
 - WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE, UNLESS OTHERWISE INDICATED.
 - PROVIDE MINIMUM 0.5m CLEARANCE BETWEEN OUTSIDE OF PIPES AT ALL CROSSINGS, UNLESS OTHERWISE INDICATED.
 - BENCH MARK IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED.

- ### BENCHMARK NOTES:
- ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM (CGVD28-78) AND ARE DERIVED FROM PUBLISHED CONTROL MONUMENT 0011983975 HAVING A PUBLISHED ELEVATION OF 90.612 METRES.
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 - BENCHMARK WAS PROVIDED ON PLAN OF SURVEY SHOWING TOPOGRAPHIC DETAIL OF PART OF BLOCK 2, REGISTERED PLAN 4M-1012, CITY OF OTTAWA, SURVEYED BY J.D. BARNES LIMITED.

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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No.	REVISION	DATE	BY
2	REVISED PER CITY COMMENTS	SEPT 29/23	FST
1	ISSUED FOR SITE PLAN CONTROL APPROVAL	MAY 11/23	FST

DESIGN	SCALE	FOR REVIEW ONLY
DESIGN: ZA	1:300	
CHECKED: FST		
DRAWN: ZA		
CHECKED: CV		
APPROVED: FST		

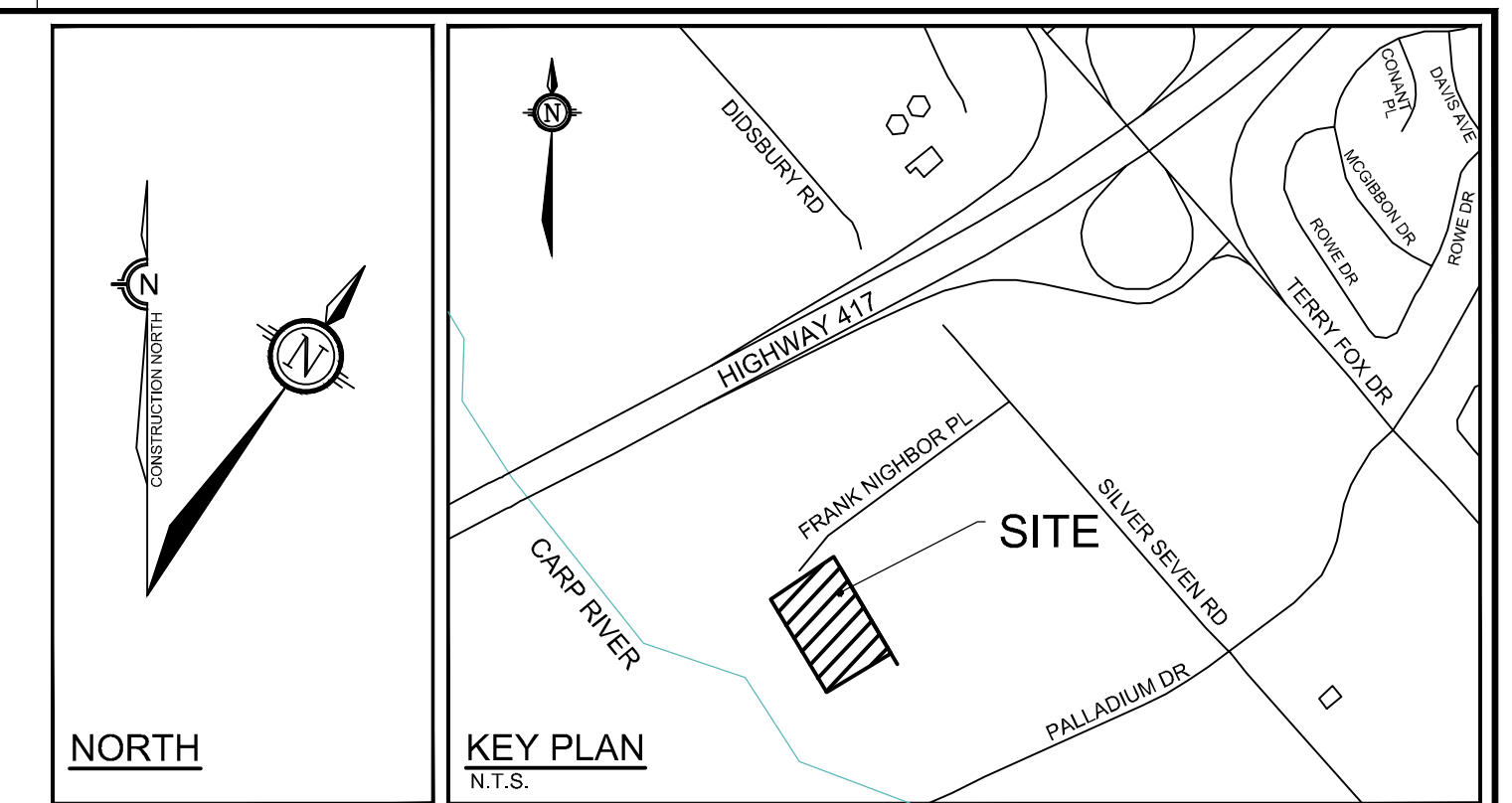
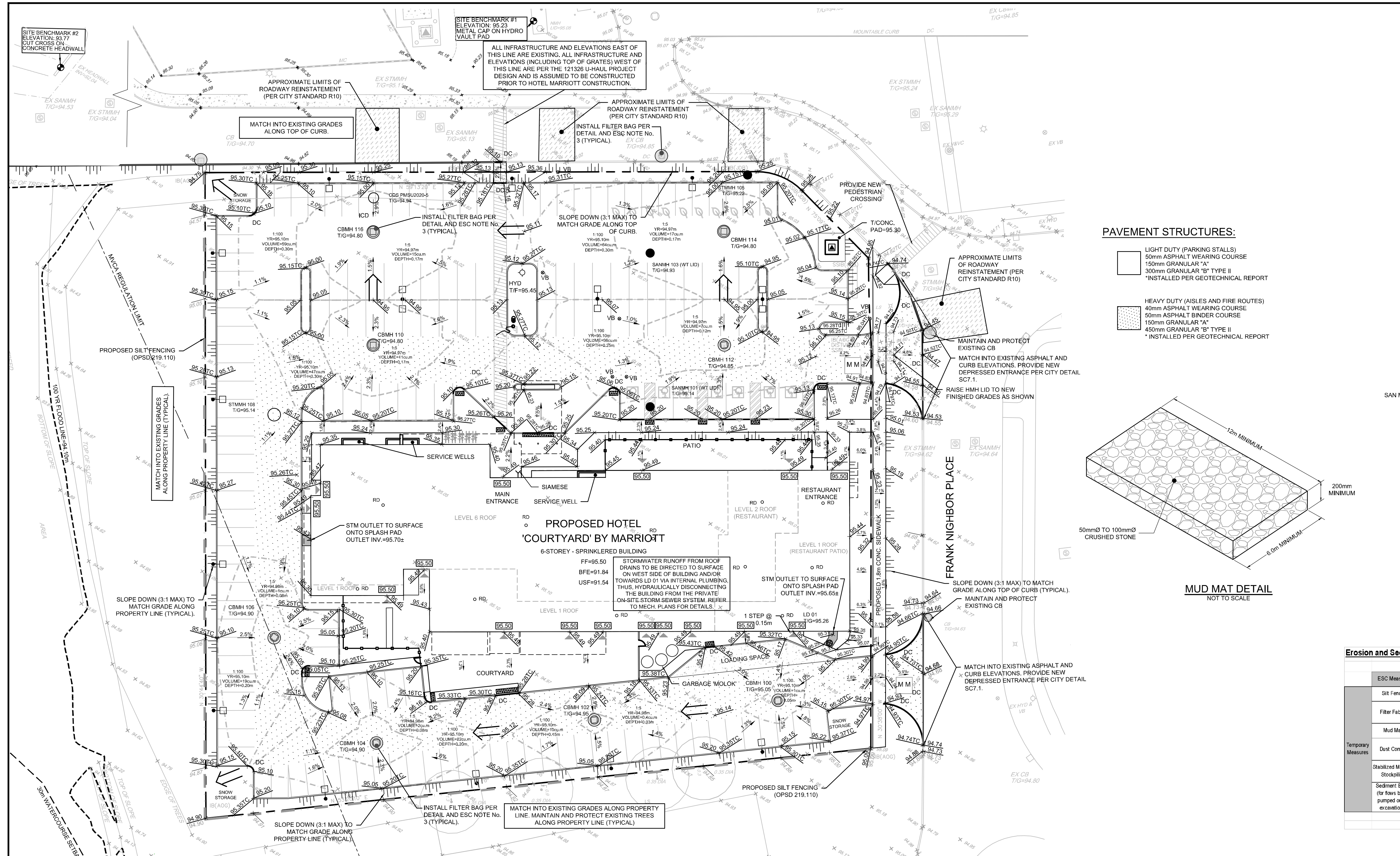
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LOCATION
CITY OF OTTAWA
40 FRANK NIGHBOR PLACE

DRAWING NAME
GENERAL PLAN OF SERVICES

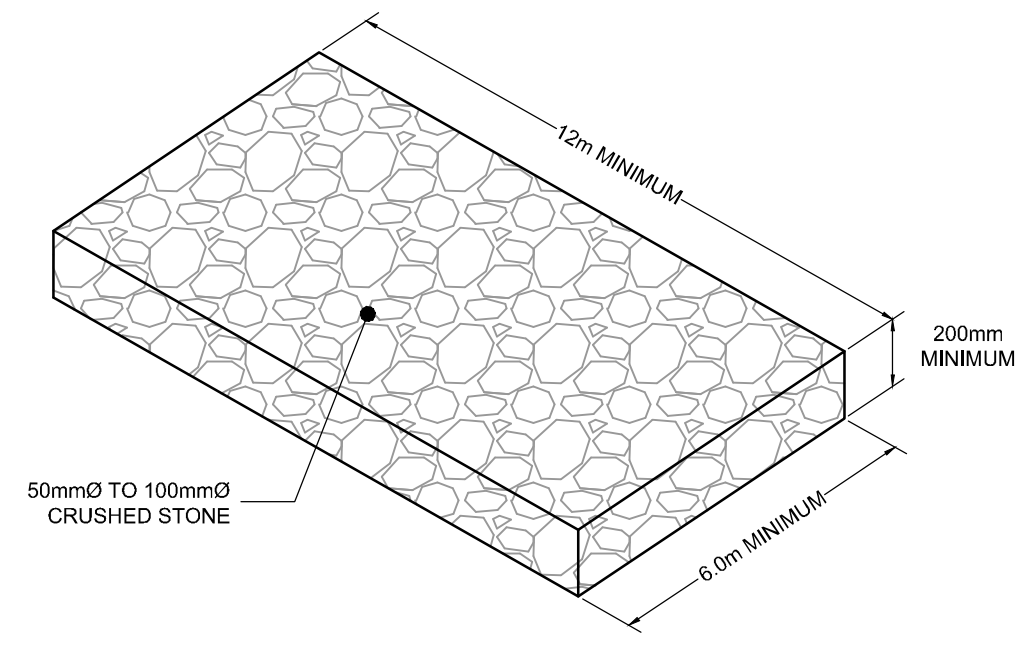
PROJECT No. 123002
REV #2
DRAWING No. 123002-GP
Date: SEPT 28, 2023

D07-12-23-0061



PAVEMENT STRUCTURES:

- LIGHT DUTY (PARKING STALLS)
 - 50mm ASPHALT WEARING COURSE
 - 150mm GRANULAR "A"
 - 300mm GRANULAR "B" TYPE II
 - * INSTALLED PER GEOTECHNICAL REPORT
- HEAVY DUTY (AISLES AND FIRE ROUTES)
 - 40mm ASPHALT WEARING COURSE
 - 50mm ASPHALT BINDER COURSE
 - 150mm GRANULAR "A"
 - 450mm GRANULAR "B" TYPE II
 - * INSTALLED PER GEOTECHNICAL REPORT



LEGEND

- PROPERTY LINE
- PROPOSED ELEVATION
- EXISTING ELEVATION
- PROPOSED ELEVATION (U-HAUL DESIGN)
- EXISTING TOP OF CURB ELEVATION
- PROPOSED TOP OF CURB ELEVATION
- PROPOSED FINISHED FLOOR ELEVATION
- GRADE AND DIRECTION
- MAXIMUM 3:1 SLOPE
- EMERGENCY OVERLAND FLOW ROUTE
- PROPOSED SANITARY MANHOLE (6" WATER TIGHT LID)
- PROPOSED BUILDING ENTRANCE
- PROPOSED SILT FENCING (OPSD 219.110)
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED MUD MAT / CONSTRUCTION ENTRANCE
- PROPOSED STORM MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED HYDRANT AND VALVE BOX
- PROPOSED BARRIER CURB
- PROPOSED PRIVACY FENCE
- DC DEPRESSED BARRIER CURB
- FFE PROPOSED FINISHED FLOOR ELEVATION
- USF PROPOSED UNDERSIDE OF FOOTING ELEVATION
- PROPOSED SITE LIGHTING (REFER TO ELEC)
- PROPOSED TWSI
- PROPOSED SIGN
- EXISTING CONCRETE CURB
- EXISTING SANITARY MANHOLE
- EXISTING CATCHBASIN MANHOLE
- EXISTING STORM MANHOLE
- EXISTING CATCHBASIN
- EXISTING TREES AND DIA
- EXISTING FENCE
- EXISTING LIGHT STANDARD
- RD PROPOSED ROOF DRAIN

GENERAL NOTES:

- COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
- 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.
- OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
- BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR \$5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
- COMPLETE ALL WORKS IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS USING THE CURRENT GUIDELINES, BYLAWS AND STANDARDS INCLUDING MATERIALS OF CONSTRUCTION, DISINFECTION AND ALL RELEVANT REFERENCES TO OPSS, OPSD & ANWA GUIDELINES - ALL CURRENT VERSIONS AND 'AS AMENDED'.
- 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 THE CITY OF OTTAWA AND ENGINEER.
- 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.
- ALL ELEVATIONS ARE GEODETIC.
- REFER TO GEOTECHNICAL REPORT (NO. 02211293.000, DATED MAY 10, 2023), PREPARED BY ENGLUBE CORP., 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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- PROVIDE LINE / PARKING PAINTING AS REQUIRED PER THE ARCHITECTURAL SITE PLAN.

GRADING NOTES:

- ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED BUILDING PAVED AREAS AS DIRECTED BY THE SITE ENGINEER OR GEOTECHNICAL ENGINEER.
- 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.
- 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.
- 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 98% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE.
- MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
- MAXIMUM TERRACING GRADE TO BE 3:1 UNLESS OTHERWISE NOTED.
- ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.
- CONCRETE BARRIER CURBS ARE TO BE CONSTRUCTED PER CITY OF OTTAWA STANDARDS (SC1.1) AT A HEIGHT OF 150mm AND ALL DEPRESSIONS ARE TO BE CONSTRUCTED FLUSH.
- REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
- CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THIS PLAN.

BENCHMARK NOTES:

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EROSION AND SEDIMENT CONTROL NOTES:

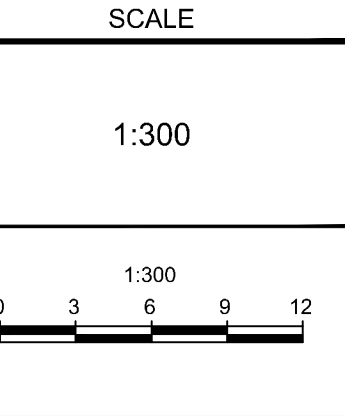
- THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
- ALL EROSION AND SEDIMENT CONTROL MEASURES 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.
 - 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.
 - TO PREVENT SURFACE EROSION FROM ENTERING ANY STORM SEWER SYSTEM DURING CONSTRUCTION, CATCHBASIN INSERTS (FILTER BAGS) WILL BE PLACED WITHIN SURFACE 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.
 - TO LIMIT EROSION, MINIMIZE THE AMOUNT OF EXPOSED SOILS AT ANY GIVEN TIME, RE-VEGETATE EXPOSED AREAS AND SLOPES AS POSSIBLE AND PROTECT EXPOSED SLOPES WITH NATURAL OR SYNTHETIC MULCHES.
 - 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.
 - 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.
 - 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.
 - THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
 - ROADWAYS ARE TO BE SWEEPED AS REQUIRED OR AS DIRECTED BY THE ENGINEER AND/OR THE MUNICIPALITY.
 - 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.

REFER TO PLAN 123002-D FOR CIVIL DETAILS

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, 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
401 REAL ESTATE TRUST INC.
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No.	REVISION	DATE	BY
2	REVISED PER CITY COMMENTS	SEPT 29/23	FST
1	ISSUED FOR SITE PLAN CONTROL APPROVAL	MAY 11/23	FST



DESIGN	FOR REVIEW ONLY
ZA	
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FST	

NOVATECH
Engineers, Planners & Landscape Architects
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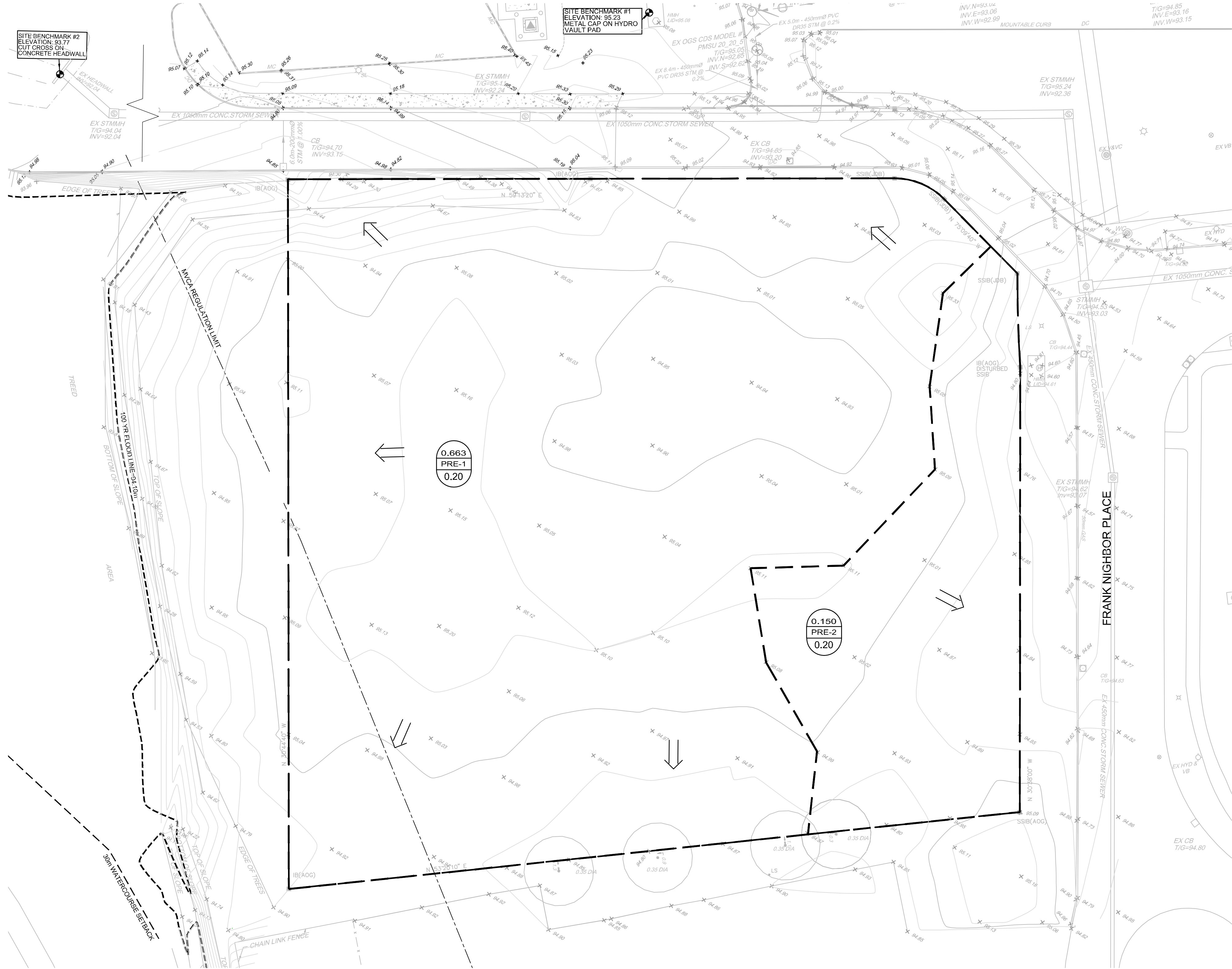
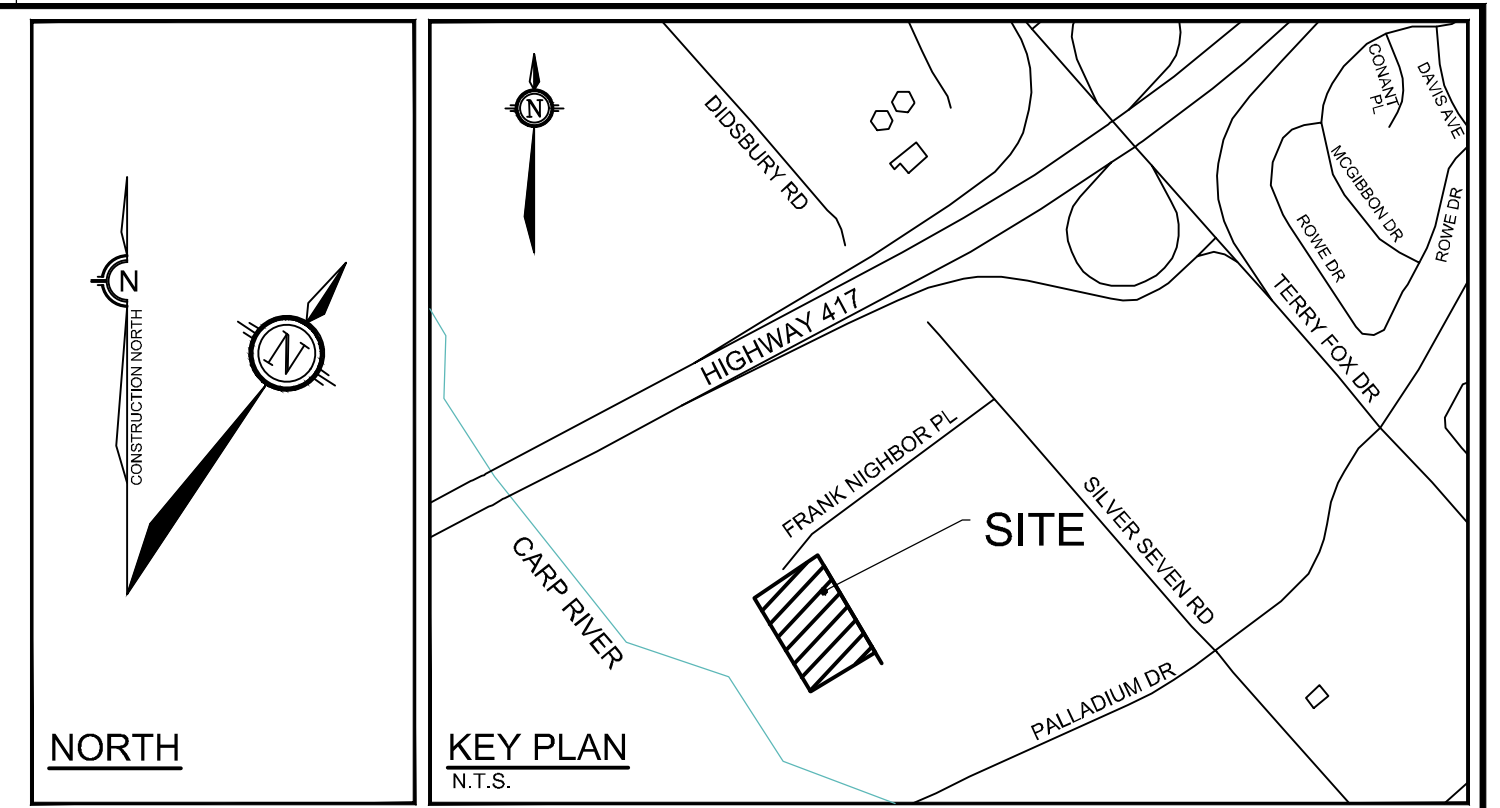
LOCATION
CITY OF OTTAWA
40 FRANK NIGHBOR PLACE

DRAWING NAME
GRADING AND EROSION & SEDIMENT CONTROL PLAN

PROJECT NO. 123002
REV #2
DRAWING NO. 123002-GR
PLAN #19002

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LEGEND

- PROPERTY LINE
- 0.813 PRE 0.20 PRE-DEVELOPMENT DRAINAGE AREA (ha)
- PRE-DEVELOPMENT AREA ID
- 1.5 YEAR WEIGHTED RUNOFF COEFFICIENT
- DRAINAGE AREA LIMITS
- ← DIRECTION OF MAJOR OVERLAND FLOW
- x 95.04 PROPOSED ELEVATION (PER U-HAUL DESIGN)
- x 95.19 EXISTING ELEVATION
- EXISTING CONCRETE CURB
- CBMH ○ EXISTING CATCHBASIN MANHOLE
- STMMH ○ EXISTING STORM MANHOLE
- CB □ EXISTING CATCHBASIN
- HYD ⊗ EXISTING HYDRANT & VALVE
- 0.35 DIA EXISTING TREES / VEGETATION
- EXISTING FENCE
- LS ☆ EXISTING LIGHT STANDARD

GENERAL NOTES:

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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.
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BENCHMARK NOTES:

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REFER TO PLAN 123002-D FOR CIVIL DETAILS

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SCALE

1:300



DESIGN	ZA
CHECKED	ZA
DRAWN	FST
CHECKED	ZA
APPROVED	CV
	FST

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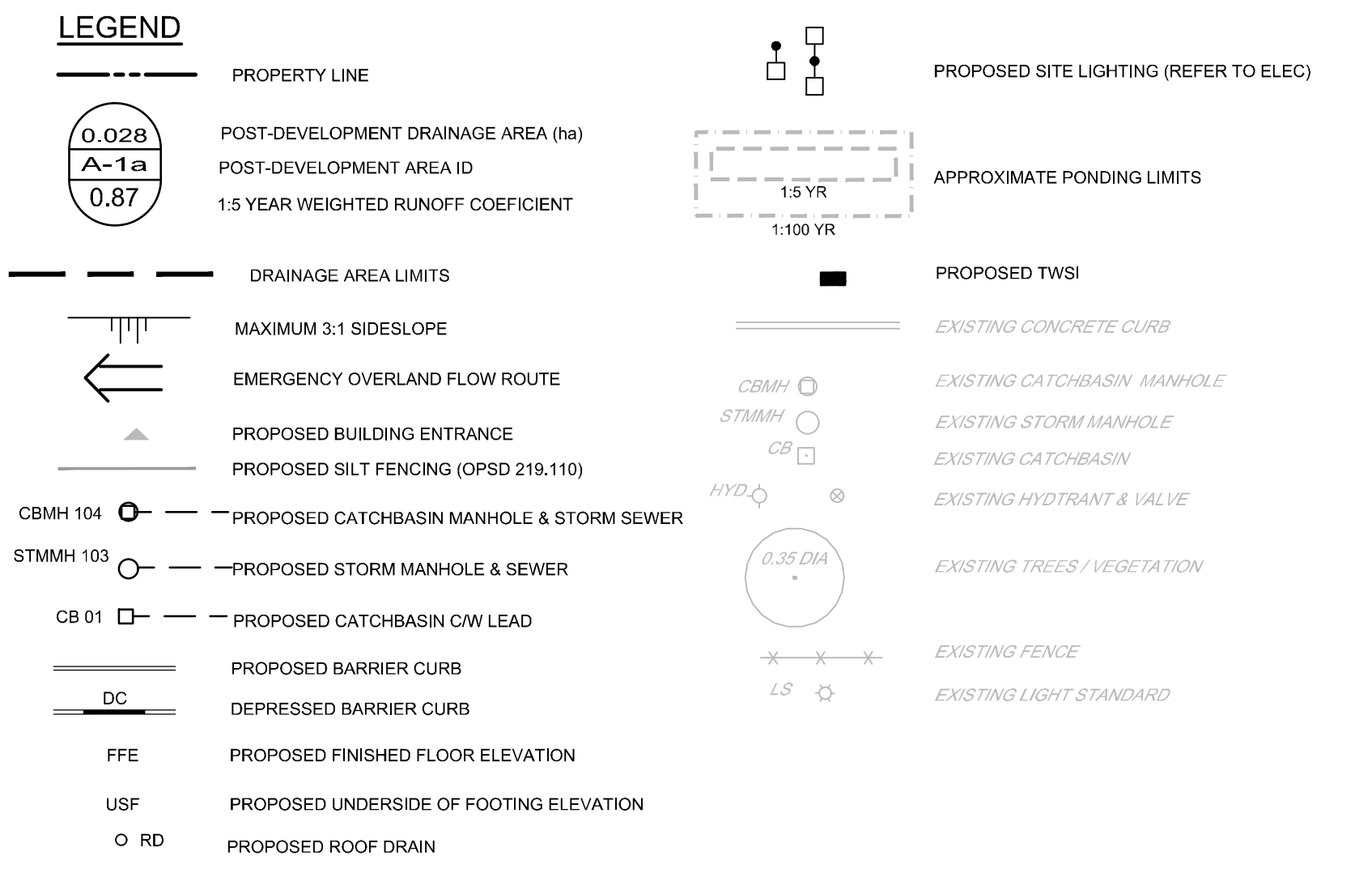
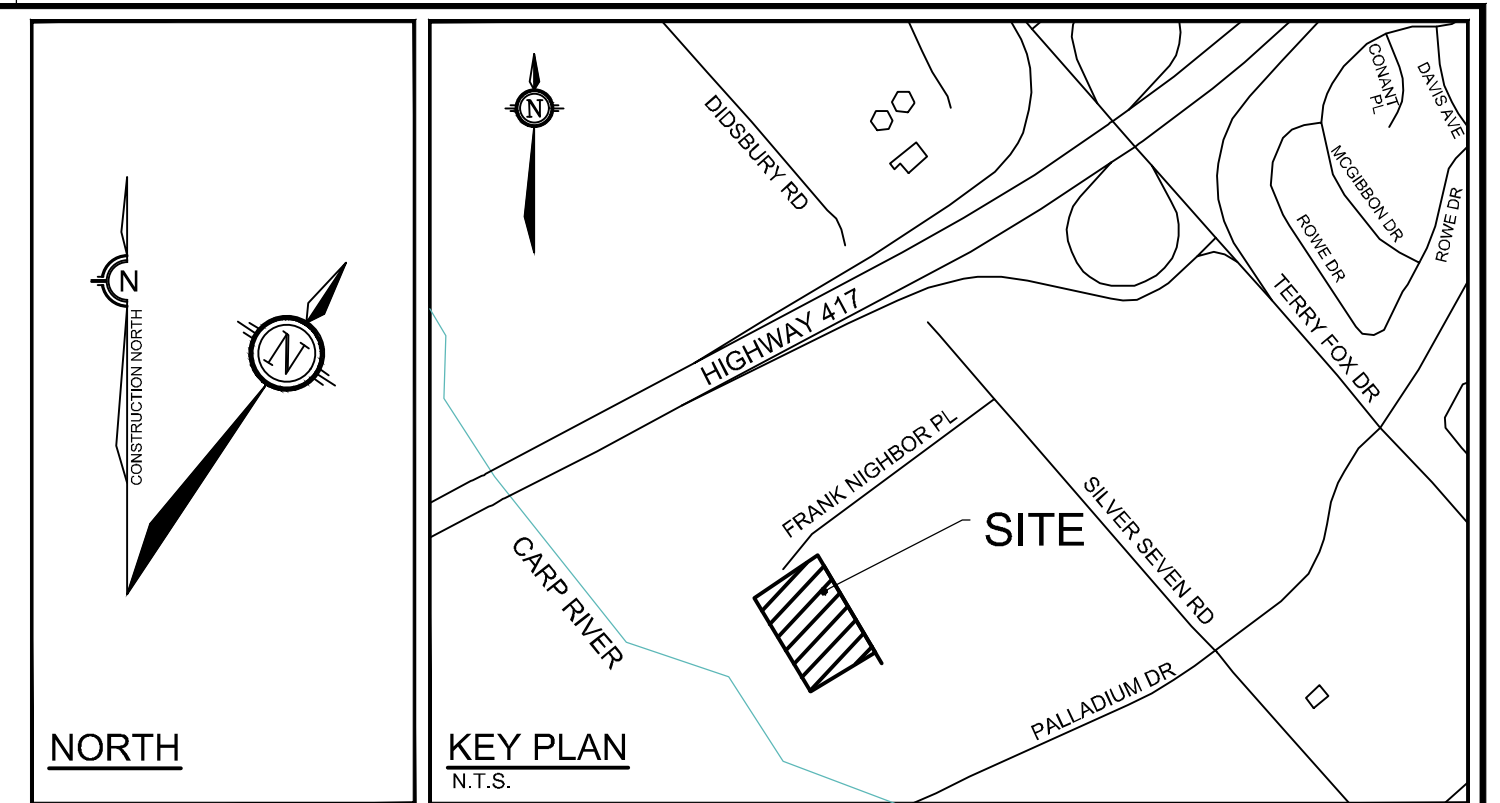


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LOCATION CITY OF OTTAWA 40 FRANK NIGHBOR PLACE		PROJECT No. 123002
DRAWING NAME PRE-DEVELOPMENT STORM DRAINAGE AREA PLAN		REV #2
DRAWING No. 123002-STM1		Plan #19002

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- GENERAL NOTES:**
- COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
 - 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.
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ICD TABLE - CBMH116 (AREAS A-1a TO A-1h, R-1 & R-2)

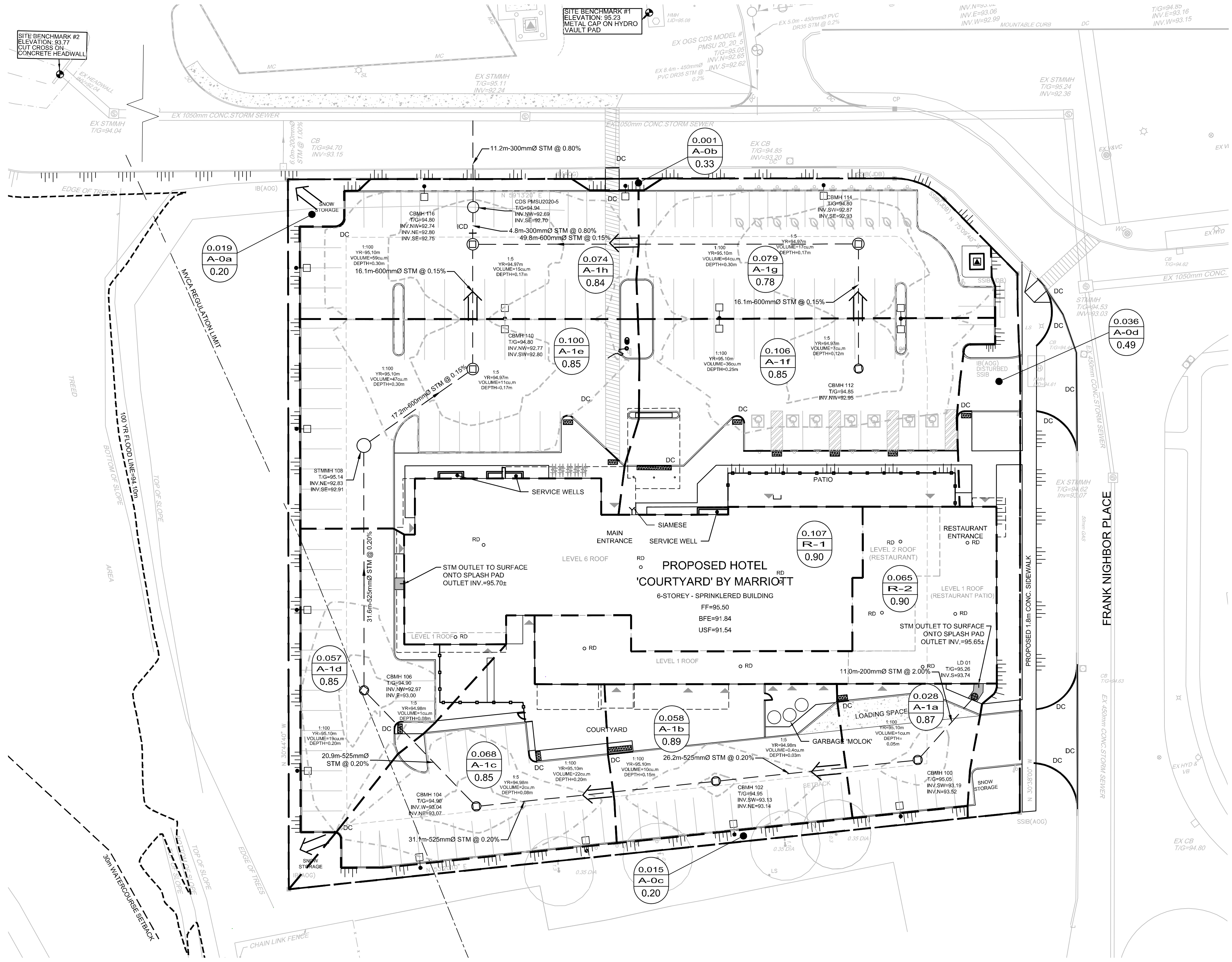
DESIGN EVENT	TYPE OF ICD	DIAMETER OF OUTLET PIPE (mm)	DESIGN FLOW (L/s)	DESIGN HEAD (m)	PONDING ELEV. (m)	VOLUME** (m³)
1:2 YR	109mm DIA. ORIFICE PLATE	300	31.6	1.57	94.79	78
1:5 YR			31.3	1.54	94.97	132
1:100 YR			25.2	1.08	95.10	337

* NOTE: DESIGN HEAD IS MEASURED FROM THE MAX. PONDING ELEVATION TO THE ELEVATION OF THE BOUNDARY CONDITION IN TABLE 3.3 OF THE DSS&SWM REPORT (ACCOUNTS FOR BACKWATER EFFECT / DEAD STORAGE).
 ** REFER TO TABLE 3.5 IN THE DSS&SWM REPORT (R-2023-014) FOR A BREAKDOWN OF VOLUME INTO DEAD AND ACTIVE STORAGE.

SITE FLOWS & STORMWATER MANAGEMENT TABLE

DESIGN EVENT	PRE-DEVELOPMENT CONDITIONS		POST-DEVELOPMENT CONDITIONS			
	UNCONTROLLED FLOW (L/s)	ALLOWABLE RELEASE RATE (L/s)	A-0a TO A-0d DIRECT RUNOFF (L/s)	A-1a TO A-1h, R-1 & R-2 FLOW (L/s)	TOTAL FLOW (L/s)	CHANGE FROM PRE TO POST (L/s or %)
1:2 YR	34.7	40.7	5.3	31.6	36.9	2.2 or 6%
1:5 YR	47.1		7.2	31.3	38.5	-8.6 or -18%
1:100 YR	100.9		14.4	25.2	39.6	-61.3 or -61%

* COMPARED TO PRE-DEVELOPMENT CONDITIONS (NEGATIVE VALUES REPRESENT DECREASE BETWEEN PRE-DEVELOPMENT FLOWS AND POST-DEVELOPMENT FLOWS).



NOTE:
 THE POSITION OF ALL POLE LINES, CONDUITS, WATERMANS, 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
 401 REAL ESTATE TRUST INC.
 2225 EAGLE STREET N.
 CAMBRIDGE, ONTARIO, N3H 4R7
 TED LANCASTER
 PHONE: (705) 816-6355
 ted.lancaster@401auto.ca

No.	REVISION	DATE	BY
2	REVISED PER CITY COMMENTS	SEPT 29/23	FST
1	ISSUED FOR SITE PLAN CONTROL APPROVAL	MAY 11/23	FST

SCALE
 1:300

DESIGN	ZA
CHECKED	FST
DRAWN	ZA
CHECKED	CV
APPROVED	FST

FOR REVIEW ONLY



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
 CITY OF OTTAWA
 40 FRANK NIGHBOR PLACE

DRAWING NAME
 POST-DEVELOPMENT STORM DRAINAGE AREA PLAN

PROJECT No. 123002
REV REV #2
DRAWING No. 123002-STM2
Plan #19002

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