

Mattamy Northwoods Block 454 (Phase 6)

Site Servicing and Stormwater Management Report



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1 Introduction

Mattamy Homes Ltd. has commissioned Stantec Consulting Ltd. to prepare the following Site Servicing and Stormwater Management Report for the Kanata Northwoods Subdivision Block 454 (Phase 6) site plan development. The subject property is located at the northwest parcel of the Kanata Northwoods subdivision, east of March Road in the Kanata North neighbourhood within the City of Ottawa.

The block is currently zoned as General Mixed-Use GM15 [3021] and measures approximately 1.09 ha in area. The site is bordered by Linseed Road to the south, March Road to the west, existing residential development to the north, and residential development which is part of Phase 1 of the Northwoods Subdivision to the east.

The proposed development is comprised of three (3) back-to-back stacked townhouse blocks and a mixed-used apartment block with commercial space on the ground floor, for a total of 48 townhouse units, 24 apartment units, 705 m² of commercial retail space, and associated private streets. The objective of this report is to provide a servicing scenario for the site that is free of conflicts, provides on-site servicing in accordance with City of Ottawa design guidelines, utilizes the existing local infrastructure in accordance with the various background studies including the Mattamy Northwoods Subdivision Servicing and Stormwater Management Report, as outlined in Section 2.



Figure 1.1: Location of Northwoods Block 454

2 Background

The following documents were referenced in the preparation of this report:

- *Mattamy Northwoods Subdivision Servicing and Stormwater Management Report*, Stantec Consulting Ltd., Rev. 05, February 25, 2025
- *Geotechnical Investigation, Proposed Residential Development 1020 and 1070 March Road, Ottawa*, Paterson Group Inc., Rev. 03, August 20, 2022
- *Kanata North Master Servicing Study*, Novatech, June 28, 2016
- *Stormwater Management Planning and Design Manual*, Ministry of the Environment (Ontario), March 2003
- *Ottawa Design Guidelines – Water Distribution*, City of Ottawa, July 2010, and all subsequent Technical Bulletins
- *City of Ottawa Sewer Design Guidelines, 2nd Ed.*, City of Ottawa, October 2012, and all subsequent Technical Bulletins



3 Water Servicing

3.1 Background

The Mattamy Northwoods development is within Pressure Zone 2W2C of the City of Ottawa's water distribution system. As part of the detailed design of the Mattamy Northwoods subdivision, a water hydraulic analysis was completed to demonstrate that the water distribution network for the subdivision would adequately meet the domestic and fire supply requirements for the future development blocks. Results are documented in the Mattamy Northwoods Subdivision Servicing and SWM Report (Stantec, February 2025). Block 454 will be serviced by the 300 mm diameter municipal watermain in Linseed Road that was constructed as part of the Kanata Northwoods subdivision development.

3.2 Design Criteria

3.2.1 Water Demand and Allowable Pressure

The domestic water demand and allowable water pressure are assessed using the City of Ottawa Water Distribution Guidelines (2010) as amended, and the ISTB 2021-03 Technical Bulletin.

Residential Population Rate

Townhouse	2.7 persons / unit
Apartment	1.8 persons / unit

Residential Demand

Average Daily (AVDY)	280 L/cap/day
Maximum Daily (MXDY)	$2.5 \times \text{AVDY}$
Peak Hour (PKHR)	$2.2 \times \text{MXDY}$

Commercial Demand

Average Daily (AVDY)	28,000 L/ha/day
Maximum Daily (MXDY)	$1.5 \times \text{AVDY}$
Peak Hour (PKHR)	$1.8 \times \text{MXDY}$

Allowable Water Pressure

MXDY Flow	345 kPa (50 psi) to 552 kPa (80 psi)
PKHR Flow Minimum	276 kPa (40 psi)
MXDY + Fire Flow	140 kPa (20 psi)
Maximum Allowable for Occupied Area	552 kPa (80 psi)



3.2.2 Fire Flow and Hydrant Capacity

Detailed fire flow requirements are assessed using the Fire Underwriters Survey (FUS) methodology (2020). Site specific criteria considered are noted in **Section 3.3.2**.

The minimum number of fire hydrants required to meet the fire flow is assessed using Section 18.5 of the National Fire Protection Agency (NFPA) Fire Code document.

- The aggregate fire flow capacity of all fire hydrants within 305 m of the building cannot be less than the required fire flow (RFF)
- Table 18.5.4.3 provides the maximum fire flow capacity for which an individual fire hydrant can be credited based on the unobstructed distance from the hydrant to the building.

Table 3.1: Table 18.5.4.3 of the NFPA - Maximum Fire Hydrant Fire Flow Capacity

Distance to Building (m)	Maximum Capacity (L/min)
≤76	5,678
>76 and ≤152	3,785
>152 and ≤305	2,839

Furthermore, per Section 3.2.5.15 of the Ontario Building Code, the unobstructed distance between the hydrant and the building's fire department connection (FDC) cannot exceed 45 m.

3.3 Water Demands

3.3.1 Domestic Water Demands

Based on the unit type breakdown for the overall site, the development is estimated to have a total population of 173. The estimated demands for the site are summarized in **Table 3.1** and detailed in **Appendix A.1**.

Table 3.2: Estimated Water Demands

No. of Units	Population	Commercial Area (ha)	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
72	173	0.071	0.6	1.4	3.1

3.3.2 Fire Flow Demands

Wood frame construction was considered in the assessment for fire flow requirements according to the Fire Underwriter's Survey (FUS) Guidelines. The FUS Guidelines indicate that low hazard occupancies include dwellings, apartments, dormitories, hotels, and schools. As such, except for Building C, a limited combustible building contents credit was applied for the townhomes. Based on the FUS 2020 methodology



in assuming the townhomes to be wood frame, limited combustible, and not sprinklered, the worst-case required fire flows at the site is 16,000 L/min (267 L/s) for Buildings A and B.

Through correspondence with the architect, it is confirmed that the mixed-use building (Building C) will be fully sprinklered, while a combustible occupancy charge is applied. The floor immediately above the retail area will have two-hour fire resistive rating.

On site fire protection will be provided by private hydrants and existing public hydrants located with a maximum of 90 m spacing and within 90 m of all building entrances. The internal private streets have been designed with a fire route providing access to all hydrants and residential units.

The FUS calculation sheets and correspondence on the Building C construction are all attached in **Appendix A.2**.

3.3.3 Boundary Conditions

For the worst-case fire flow of 267 L/s (16,000 L/min), the Mattamy Northwoods Subdivision model was run under the scenario using boundary conditions provided by the City of Ottawa to establish the pressure and flow in the main on Linseed Road in the ultimate condition. The boundary conditions used for the Block 6 site plan analysis were taken from Nodes 95 and 96 of the Northwoods Subdivision hydraulic model (Stantec, 2025), depicted in **Figure 3.1** and **Table 3.2**. Excerpts from the subdivision model are included in **Appendix A.3**.

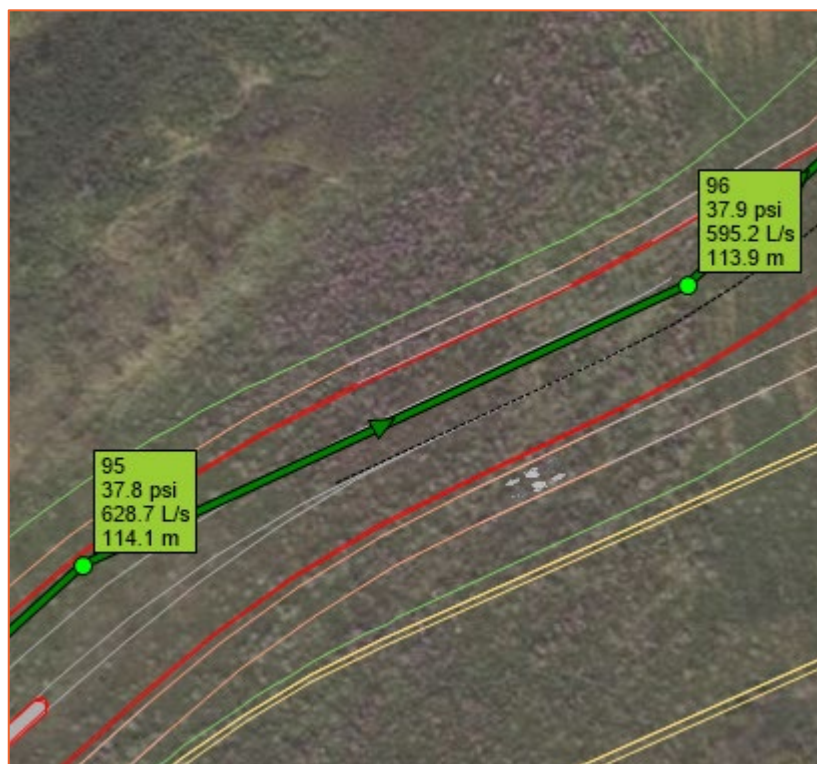


Figure 3.1: Northwoods Subdivision Nodes 95 and 96 Boundary Conditions (MXDY+267 L/s FF)

Table 3.3: Boundary Conditions at Linseed Road

Connection	Connection 1	Connection 2
Min. HGL (m)	125.0	124.9
Max. HGL (m)	130.9	130.9
MXDY+FF (267 L/s)	114.1	113.9

3.4 Proposed Watermain Servicing and Layout

The proposed watermain alignment and sizing for Block 454 has been designed to tie into the adjacent watermain within the Mattamy Northwoods subdivision development and to provide required domestic and fire flows.

Private watermain with a diameter of 200 mm are proposed within Block 454 and will be fed by the existing 300 mm diameter municipal watermain on Linseed Road. Two connections are proposed to provide redundancy should there be a need to isolate portions of the watermain on Linseed Road. **Drawing SSP-1** details the proposed private watermain design and connections.

Building D is greater than 600 m² in area and will require a fire wall in accordance with the Ontario Building Code (OBC). The assumed fire wall location is identified on **Drawing GP-1**. The final location will be coordinated with the Architect.

3.5 Hydraulic Assessment

3.5.1 Level of Service

The City of Ottawa Water Distribution Design Guidelines state that the desired range of system pressures under normal demand conditions (i.e. basic day, maximum day and peak hour) should be in the range of 350 to 552 kPa (50 to 80 psi) and no less than 275 kPa (40 psi) at the ground elevation in the streets (i.e. at hydrant level). The maximum pressure at any point in the distribution system in occupied areas outside of the public right-of-way is 552 kPa (80 psi).

As per the OBC & Guide for Plumbing, if pressures greater than 552 kPa (80 psi) are anticipated, pressure relief measures are required. The maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi). Under emergency fire flow conditions, the minimum pressure objective in the distribution system is 138 kPa (20 psi).

3.5.2 Model Development

New watermain were imported to the hydraulic model to simulate the proposed distribution system. Hazen-Williams coefficients ("C-Factors") were applied to the new watermain in accordance with the City of Ottawa's Water Distribution Design Guidelines and as shown in **Table 3.3** below.



Table 3.4: Proposed Watermain C-Factors

Pipe Diameter (mm)	C-Factor
150	100
200 to 250	110
300 to 600	120
> 600	130

3.6 Hydraulic Model Results

PCSWMM by Computational Hydraulics Inc. (CHI) was used to conduct the watermain hydraulic analysis. The model was tested for AVDY, PKHR, and MXDY+FF demands under the boundary conditions established from the subdivision model.

3.6.1 Average Day & Peak Hour

The results from the existing zone analysis show that the maximum pressure modeled for Block 454 is approximately 489 kPa (71.0 psi) and the minimum pressure during the peak hour scenario was approximately 422 kPa (61.2 psi) within the block, as shown in **Figure 3.2** and **Figure 3.3** respectively. These pressures are well above the minimum allowable pressure of 276 kPa (40 psi) and within the normal serviceable limit of 345 kPa to 552 kPa (50 psi to 80 psi).





Figure 3.2: AVDY Pressure Results

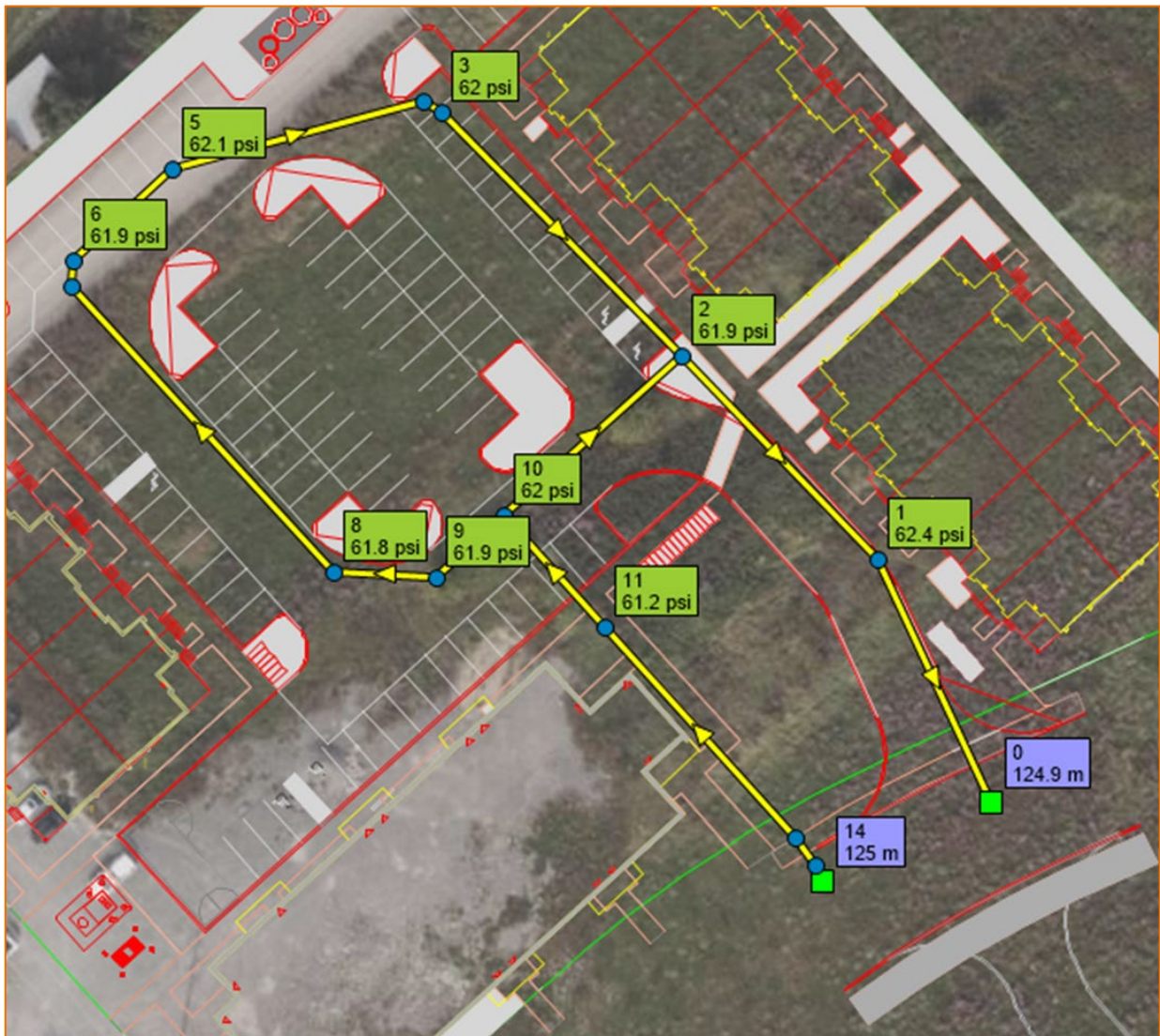


Figure 3.3: PKHR Pressure Results

3.6.2 Maximum Day Plus Fire Flow

The hydraulic model was used to assess the fire flow conditions of the proposed site. The model was run to verify if the worst-case fire flow requirement can be provided while maintaining minimum residual pressure.

Results demonstrate that flows in excess of 267 L/s can be delivered while maintaining a residual pressure of 138 kPa (20 psi) as shown in **Figure 3.4**. Results of the hydraulic modeling are included for reference in **Appendix A.4**.

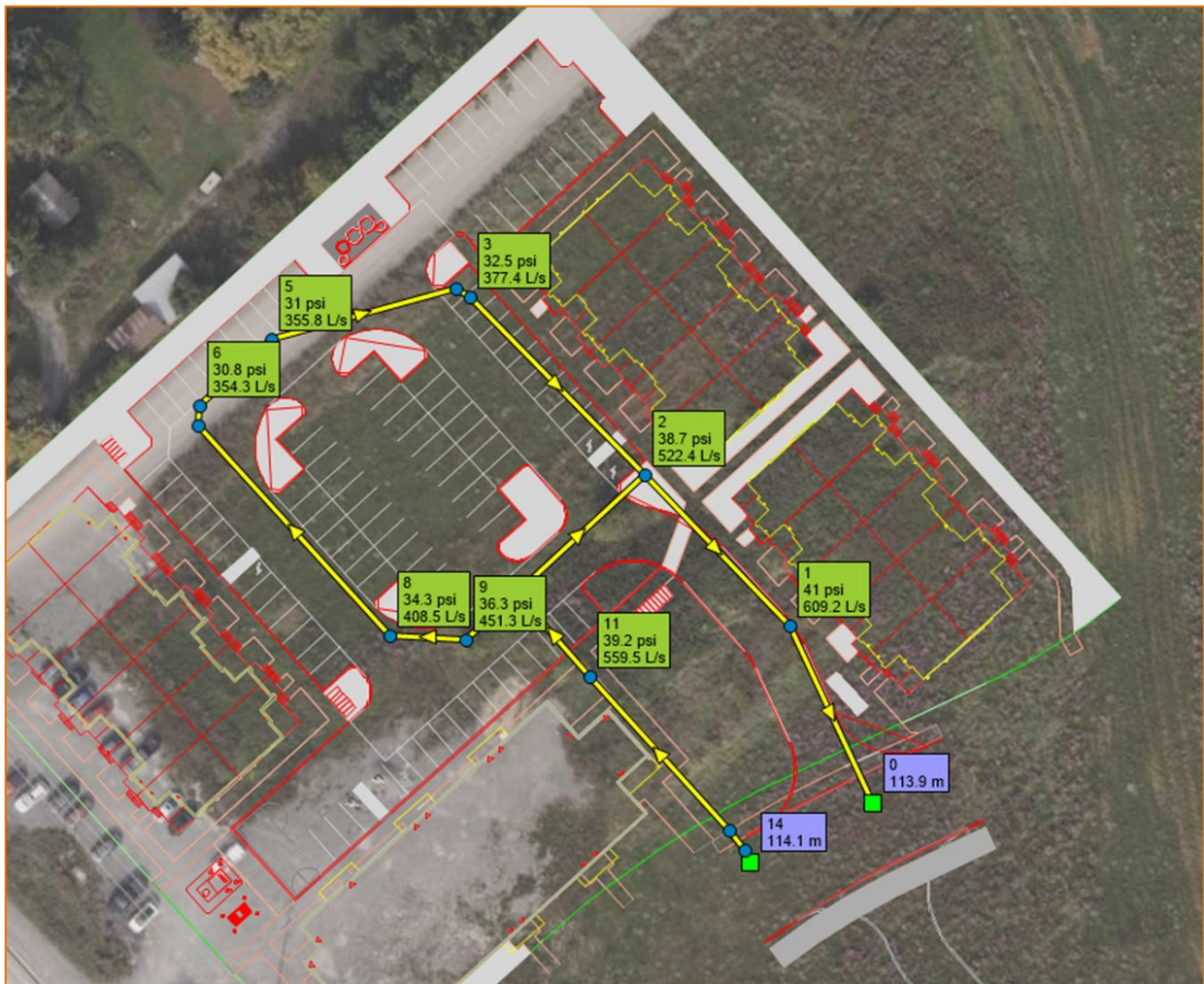


Figure 3.4: MXDY+FF Residual Pressure Results

3.6.3 Fire Hydrant Coverage

There are two fire hydrants proposed on site to deliver fire flow in the site and supplement the two existing fire hydrants on Linseed Road adjacent to the site. The full site falls under the coverage of all four hydrants, existing and proposed. According to the NFPA 1 Table 18.5.4.3 in Appendix I of the City of Ottawa Technical Bulletin ISTB-2018-02, a hydrant situated less than 76 m away from a building can supply a maximum capacity of 5,678 L/min.

The proposed watermain and hydrant layout will provide all buildings with hydrant coverage exceeding their respective fire flow demands. See **Appendix A.5** for fire hydrant coverage table calculations, NFPA Table 18.5.4.3, and the fire hydrant coverage figure.

3.7 Summary of Findings

Based on the findings of the hydraulic analysis, the proposed network is capable of servicing the development area and will meet all servicing requirements per the City of Ottawa standards under typical demand conditions (average day and peak hour conditions) as well as under emergency fire demand conditions (maximum day + fire flow).

Adequate fire hydrant coverage has been provided throughout the subdivision and within the site. Fire walls will be required for Building D which is over 600 m² in area to meet OBC requirements.



4 Wastewater Servicing

4.1 Background

The proposed development within Block 454 of the Kanata Northwoods subdivision will be serviced by the 300 mm diameter sanitary sewer in Linseed Road which directs flow from the western portion of the subdivision to March Road.

4.2 Design Criteria

As outlined in the City of Ottawa Sewer Design Guidelines and the MECP Design Guidelines for Sewage Works, the following criteria are used to calculate the estimated wastewater flow rates and to determine the size and location of the sanitary service laterals:

- Minimum velocity = 0.6 m/s (0.8 m/s for upstream sections)
- Maximum velocity = 3.0 m/s
- Manning roughness coefficient for all smooth wall pipes = 0.013
- Minimum size of sanitary sewer service = 135 mm
- Minimum grade of sanitary sewer service = 1.0 % (2.0 % preferred)
- Average residential wastewater generation = 280 L/person/day (per City Design Guidelines)
- Average commercial wastewater generation = 28,000 L/ha/day (per City Design Guidelines)
- Peak Factor = based on Harmon Equation; maximum of 4.0 (residential)
- Peak Factor = 1.5 (commercial)
- Harmon correction factor = 0.8
- Infiltration allowance = 0.33 L/s/ha (per City Design Guidelines)
- Minimum cover for sewer service connections = 2.0 m
- Population density for townhome units = 2.7 persons/unit
- Population density for apartment units = 1.8 persons/unit

4.3 Proposed Servicing

Block 454 will be serviced by a network of 200 mm diameter gravity sanitary sewers, which will direct wastewater peak flows (approximately 2.4 L/s with allowance for infiltration) to the existing 300 mm diameter PVC sanitary sewer in Linseed Road. The receiving sewers within Linseed Road and downstream have been sized to accommodate wastewater from Block 454. The sanitary sewer design sheet for the proposed sanitary sewers within the Block 454 site plan development and the sanitary design sheet and sanitary drainage area plan for the Northwoods subdivision are included in **Appendix B**.

Block 454 is represented by Area ID Number C102A on the subdivision sanitary design sheet. As part of the subdivision design, it was assumed that Block 454 would be developed with commercial uses. Given that the development is proceeding with a mixture of residential and commercial development, design flows for the development block are higher than the flows assumed at the time of subdivision design. The Kanata North Master Servicing Study (KNMSS) (Novatech, June 2016), assumed 28.7 L/s would be directed to



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March Road from the Northwoods subdivision whereas the subdivision design assumed a flow of 16.5 L/s to March Road. As such, the increase in sanitary flow from both Block 453 and 454 can easily be accommodated in the downstream system sized in accordance with the KNMSS.

Full port backwater valves are to be installed on all sanitary services within the site to prevent any surcharge from the downstream sewer mains from impacting the proposed site.



5 Stormwater Management

The following section describes the stormwater management (SWM) design for Block 454 in accordance with the background documents and governing criteria for the Northwoods subdivision established in the Mattamy Northwoods Servicing and Stormwater Management Report (Stantec, February 2025).

5.1 Proposed Conditions

The proposed 1.09 ha development is located within the northwest corner of the Northwoods subdivision and comprises a total of 72 residential units with commercial space. The storm sewer collection system for Block 454 will discharge to the existing 900 mm diameter storm sewer on Linseed Road (see **Drawing SD-1**).

Stormwater collected from the Northwoods subdivision is ultimately discharged to the Kanata North Urban Expansion Area (KNU EA) SWM Pond 3, which was constructed as part of the Minto Brookline Subdivision to the south of the Northwoods subdivision and will provide quantity and quality control (80 % TSS Removal) of runoff before discharging to Shirley's Brook.

5.2 Criteria and Constraints

The overall approach for storm servicing and stormwater management for the proposed development is outlined in the Mattamy Northwoods Servicing and SWM Report by Stantec (February 2025), excerpts can be found in **Appendix C.3**. The following summarizes the SWM criteria and constraints that will govern the detailed design of the proposed site as per the latest revision of the City of Ottawa Sewer Design Guidelines as well as the conclusions made in the Northwoods Site Servicing and SWM Report.

- Design using the dual drainage principle. (City of Ottawa SDG)
- Minor system capture rate from Block 454 up to the 100-year storm is to be restricted to **304 L/s**. (Mattamy Northwoods Servicing and SWM Report)
- The hydraulic grade line in the storm sewer must remain at least 0.3m below the underside of adjacent building footings during the 100-year storm event or a minimum clearance of 0.3m from the pipe invert. Whatever governs. (City)
- Where there is footing drainage connected to the storm collection system, maximum 'climate change' HGL to be lower than proposed basement elevations. (City)
- Total maximum depth of flow under static and dynamic conditions shall be less than 0.35 m. (City)
- Design storm sewers along local roadways to convey the 5-year peak flow respectively under free-flow conditions using 2004 City of Ottawa I-D-F parameters and an inlet time of 10 minutes. (City)
- Assess impact of 5-year storm, and the worst case 100-year storm events, on the major & minor drainage system. (City)
- Building openings to be above the 100-year water level. (City)
- There must be at least 30 cm of vertical clearance between the spill elevation on the private street and the lowest building opening that is in the proximity of the flow route or ponding area. (City)
- Minimum roadway profile grades at 0.5 %. (City)



- Minimum roadway slope of 0.1 % from crest-to-crest for overland flow route. (City)
- Provide adequate emergency overflow conveyance off-site. (City)

5.3 Design Methodology

The design methodology for the SWM component of the development is as follows:

- Create a PCSWMM model that generates major and minor system hydrographs and assesses the minor system hydraulic grade line and the major system flow depths.
- Size inlet control devices for the proposed catch basins to avoid surface ponding during the 2-year storm while meeting the required 0.3 m 100-year HGL to USF clearance and the 304 L/s minor system allowable release rate in the 100-year storm.
- Ensure that total dynamic and static surface ponding depths do not exceed 0.35 m during the 100-year storm scenario.
- Confirm that climate change storm simulation does not result in flooding of properties.

The site is designed using the “dual drainage” principle, whereby the minor (pipe) system is designed to convey the peak rate of runoff from the 5-year design storm and runoff from larger events is conveyed by both minor (pipe) and major (overland) channels, such as roadways and walkways, safely to the appropriate outlet without impacting proposed or existing downstream properties.

In keeping with the minor system target peak outflow, Inlet Control Devices (ICDs) or orifice plates have been specified for all catch basins to limit the inflow to the minor system, which outlets to the 900 mm diameter storm sewer on Linseed Road. Restricted inlet rates to the sewer are necessary to meet the target peak outflows.

Drawing SD-1 outlines the proposed storm sewer alignment, ICD locations, drainage divides, and labels. The storm sewer design sheet is included in **Appendix C.1**.

5.4 Modeling Rationale

A comprehensive hydrologic modeling exercise was completed with PCSWMM, accounting for the estimated major and minor systems to evaluate the storm sewer infrastructure and major system segments. The use of PCSWMM for modeling of the site hydrology and hydraulics allowed for an analysis of the systems' response during various storm events. The following assumptions were applied to the detailed model:

- Hydrologic parameters as per Ottawa Sewer Design Guidelines, including Horton infiltration, Manning's 'n', and depression storage values.
- 3-hour Chicago Storm distribution for the 2-year, 5-year and 100-year analysis.
- To 'stress test' the system a 'climate change' scenario was created by adding 20% of the individual intensity values of the 100-year storm at their specified time step.
- Percent imperviousness calculated based on actual soft and hard surfaces for the proposed catchments and converted to equivalent Runoff Coefficient using the relationship $C = (\text{Imp.} \times 0.7) + 0.2$.

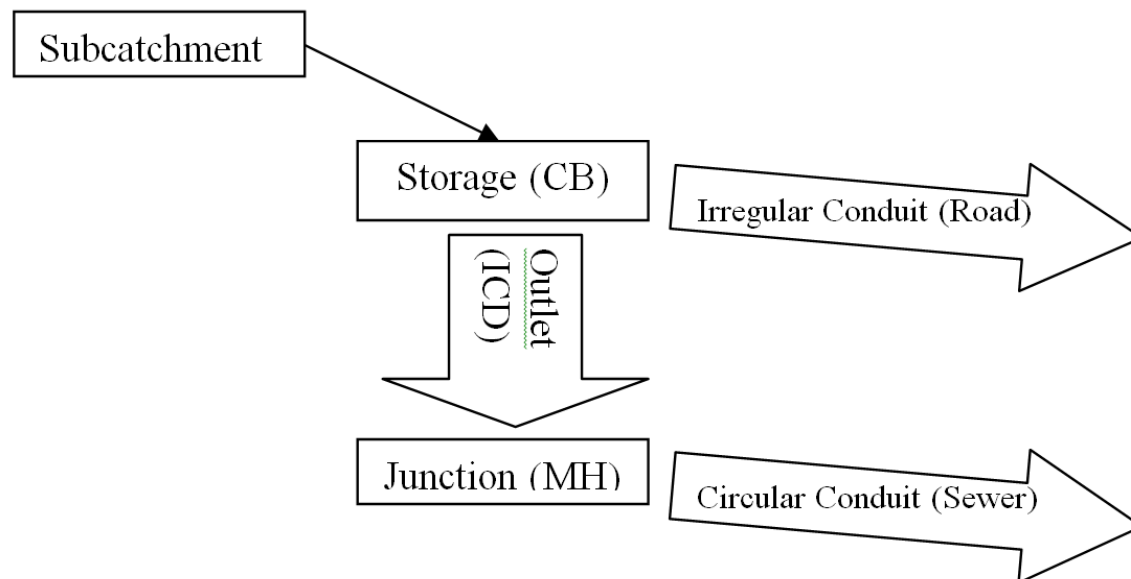


- Subcatchment areas are defined from high-point to high-point where sags occur.
- Width parameter was taken as twice the length of the street/swale segment for two-sided catchments and as the length of the street/swale segment for one-sided catchments. Irregular shaped catchments were calculated by measuring the flow length on the drawing and the width parameter was calculated respectively, or alternatively set at 225 x subcatchment area per recommendations of the OSDG.
- Catch basin inflow restricted with inlet-control devices (ICDs) as necessary to maintain the minor system target peak outflow.
- Surface storage in road sags calculated based on grading plans (**Drawing SD-1**).

5.4.1 SWMM Dual Drainage Methodology

The proposed development is modeled in one modeling program as a dual conduit system (see **Figure 5.1**), with: 1) circular conduits representing the sewers & storage nodes representing manholes; 2) irregular conduits using street-shaped cross-sections to represent the approximate overland road network and storage nodes representing catchbasins. The dual drainage systems are connected via outlet/orifice link objects from storage node (i.e. CB) to storage node (i.e. MH) and represent inlet control devices (ICDs). Subcatchments are linked to the storage node on the surface so that generated hydrographs are directed there firstly.

Figure 5.1: Schematic Representing Model Object Roles



Storage nodes are used in the model to represent catch basins as well as major system junctions. For storage nodes representing catch basins (CBs), the invert of the storage node represents the invert of the CB and the rim of the storage node represents the top of the CB plus an allowable flow depth on the segment. For the purpose of this SWM plan, CB inverts have been set 1.38 m below the top of the CB. An additional depth of 0.40 m has been added to rim elevations to allow routing from one surface storage to the next.

Storage nodes that represent catch basins at sags, are connected by weirs that discharge at the spill elevation for each subcatchment area. The widths of each weir were calculated based on the respective elevation across the length of the spill location.

The storage value assigned to the storage node represents the available ponding volume above the catch basin. The maximum ponding volumes are calculated using the cone equation in the drawing and equivalent surface areas are inputted into the storage curves within PCSWMM using the trapezoidal equation. If the available storage volume in a storage node is exceeded, flows spill to the downstream storage node and continue routing through the system until ultimately flows either re-enter the minor system or reach the outfall of the major system.

Inlet control devices, as represented by orifice links, have been used to represent the proposed vertical circular orifices sized to restrict minor system capture rates to the 2-year for local streets.

5.4.2 Design Storms

The 3-hour Chicago distribution was selected to estimate the 2-year capture rates for the proposed subcatchments, and to assess the 100-year HGL across the proposed development.

To 'stress test' the system a 'climate change' scenario was created by adding 20% of the individual intensity values of the 100-year storm at their specified time step.

5.4.3 Boundary Conditions

The detailed PCSWMM hydrology and the proposed storm sewers were used to assess the peak inflows and hydraulic grade line (HGL) in the proposed site. Dynamic boundary conditions in the form of backwater elevations were obtained from Stantec's Northwoods subdivision PCSWMM model (February 2025) from the outlet for Block 454 (Node 215) and attached in **Appendix C.3**.

5.4.4 Modeling Parameters

Table 5.1 presents the general subcatchment parameters used:

Table 5.1: General Subcatchment Parameters

Subcatchment Parameter	Value
Infiltration Method	Horton
Max. Infil. Rate (mm/hr)	76.2
Min. Infil. Rate (mm/hr)	13.2
Decay Constant (1/hr)	4.14
N Imperv	0.013
N Perv	0.25
Dstore Imperv (mm)	1.57
Dstore Perv (mm)	4.67



Table 5.2 presents the individual parameters that vary for each of the subcatchments tributary to the storm outlet.

Table 5.2: Subcatchment Parameters

Area ID	Area (ha)	Width (m)	Slope (%)	% Impervious	Runoff Coefficient
L102A	0.103	25.5	0.6	84.3	0.79
L102B	0.066	28.3	3.0	34.3	0.44
L103A	0.051	26.0	1.7	81.4	0.77
L103B	0.069	18.2	1.7	78.6	0.75
L103C	0.018	4.1	0.7	57.1	0.60
L104	0.407	35.9	2.5	91.4	0.84
L105A	0.054	15.8	1.0	91.4	0.84
L105B	0.057	5.0	33.0	17.1	0.32
L106	0.152	14.5	2.0	65.7	0.66
UNC-1	0.059	55.7	3.0	75.7	0.73
UNC-2	0.041	42.8	2.7	50.0	0.55
UNC-3	0.013	15.8	0.7	12.9	0.29

Table 5.3 summarizes the storage node parameters used in the model. All catch basins have been modeled as having an outlet invert as depicted on **Drawings SSP-1**. Static ponding depths, areas, and volumes within the proposed development area are as per **Drawings SD-1**.

Table 5.3: Storage Node Parameters

Storage Node	Invert Elevation (m)	Rim Elevation (m)	Total Depth (m)	Storage Curve	Curve Name
L102A-S	79.60	81.16	1.56	TABULAR	L102A-V
L102B-S	79.72	81.35	1.63	TABULAR	L102B-V
L104C-S	78.80	81.38	2.58	TABULAR	L104C-V
L105A-S	79.48	81.20	1.72	TABULAR	L105A-V
L105B-S	80.58	81.08	0.50	TABULAR	L105B-V
L106A-S	78.27	80.25	1.98	TABULAR	L106A-V

*The rim of the storage node represents the maximum allowable flow depth elevation above the storage node (equal to the top of the catch basin plus an additional 0.40 m).

5.4.5 Hydraulic Parameters

As per the City of Ottawa Sewer Design Guidelines, 2025, Manning's roughness values of 0.013 were used for sewer modeling and overland flow corridors representing roadways.



Storm sewers were modeled to confirm flow capacities, assess hydraulic grade lines (HGLs) and to determine minor system peak outflows to the outlet. The detailed storm sewer design sheet is included in **Appendix C.1**. Exit losses at manholes were set for all pipe segments based on the flow angle through the structure. Exit losses were assigned as per City guidelines (Appendix 6b), see **Table 5.4**.

Table 5.4: Exit Loss Coefficients for Bends at Manholes

Degrees	Coefficient
11	0.060
22	0.140
30	0.210
45	0.390
60	0.640
90	1.320
180	0.020

Table 5.5 and **Table 5.6** present the parameters for the outlet and orifice link objects in the model, which represent ICDs. All IPEX tempest orifices were assigned a discharge coefficient of 0.572. It should be noted that the proposed ICDs will consist of slide type vertical circular orifices. A coefficient of 0.572 was applied when using orifices to conform to head/discharge curves as supplied by the manufacturer for IPEX Tempest HF model ICDs.

Table 5.5: Orifice Parameters for Proposed Catchments

Orifice Name	Catchbasin ID	Tributary Area ID	Minor System Node	ICD Type
C102A-IC	CB 102A	L102A	102	152 mm Orifice
C103A-IC	CB 103B	L103A L103B L103C	103A	127 mm Orifice
C104C-IC	CBMH 104C	L104	105	140 mm Orifice
C105A-IC	CB 105A	L105A	105	83 mm Orifice
C106A-IC	CB 106A	L106	106	152 mm Orifice

Table 5.6: Outlet Parameters

Name	Inlet	Outlet	Inlet Elev.	Curve Name	ICD Type
C102B-IC	CB 102B	MH 102	79.72	-	LMF 80
OR4	CB 105B	MH 105	80.58	Single	-

A detailed schematic of the model is attached in **Appendix C.2**.



5.5 Modeling Results and Discussion

The following sections summarize the key hydrologic and hydraulic model results. For detailed model results or inputs please refer to the electronic model files.

5.5.1 Proposed Inlet Control Devices

Table 5.7 summarizes the orifice link maximum flow rates and heads across the proposed development. **Table 5.8** compares the 2-year orifice link flows with the 2-year uncontrolled flows calculated through rational method to verify no ponding during the 2-year storm event.

Table 5.7: Proposed Phase Orifice Link Results

Orifice Name	Catchbasin ID	Tributary Area ID	ICD Type	2yr Head (m)	100yr Head (m)	2yr Flow (L/s)	100yr Flow (L/s)
C102A-IC	CB 102A	L102A	152 mm Orifice	0.23	1.45	18.3	53.88
C102B-IC	CB 102B	L102B	LMF 80	0.61	1.55	4.50	7.11
C103A-IC	CB 103B	L103A L103B L103C	127 mm Orifice	0.60	1.55	22.5	38.61
C104C-IC	CBMH 104C	L104	140 mm Orifice	2.02	2.45	54.5	60.17
C105A-IC	CB 105A	L105A	83 mm Orifice	0.61	1.53	10.4	16.74
C106A-IC	CB 106A	L106	152 mm Orifice	0.88	1.77	21.0	48.06

The rational method calculations for the 2-year flows without controls utilize the City of Ottawa IDF curve for the 2-year storm event with a time of concentration (t_c) of 10 minutes. Note that for the drainage areas where the runoff without controls exceeds the orifice runoff (Areas L102B, L106), the difference is negligible.

Table 5.8: Comparison with Rational Method 2-year Flows

Area ID	Area (ha)	C	Uncontrolled Runoff (L/s)	Orifice Runoff (L/s)
L102A	0.103	0.79	17.3	18.3
L102B	0.066	0.44	6.2	4.5
L103A, L103B, L103C	0.138	0.74	21.6	22.5
L104	0.407	0.84	73.0 *	54.5
L105A	0.054	0.84	9.8	10.4
L106	0.152	0.66	21.4	21.0



*A 2-year storage pipe is provided at CBMH 104C (Area L104) to eliminate ponding during the 2-year storm event.

5.5.2 Proposed Development Hydraulic Grade Line Analysis

The 100-year hydraulic grade line (HGL) elevation across the proposed development was estimated using the PCSWMM model for the worst-case HGL using the 3-hour Chicago storm for the 100-year runoff with the 100-year water level in MH 215 as a boundary condition. The boundary conditions used are based on the Mattamy Northwoods subdivision model.

The climate change scenario was assessed using the 100-year runoff intensities (worst-case HGL) increased by 20% with the 100-year water level in MH 215 as a boundary condition. The HGL values for manhole 215 were obtained from Stantec's Northwoods PCSWMM model (February 2025), excerpts of the stormwater management section can be found in **Appendix C.3**. **Table 5.9** presents the clearance between the proposed storm sewers worst case HGL and the nearest proposed under side of footing (USF). The storm sewer design sheet is included in **Appendix C.1**.

Table 5.9: Worst-Case 100-Year HGL Results

STM MH	USF (m)	100-Year, 3hr Chicago Storm		100-year+20%, 3hr Chicago Storm	
		HGL (m)	Clearance (m)	HGL (m)	Clearance (m)
101	78.97	77.61	1.36	77.61	1.36
102	78.97	77.65	1.32	77.66	1.31
103	79.17	77.70	1.47	77.71	1.46
103A	80.04	79.43	0.61	79.43	0.61
104	-	81.25	-	81.3	-
105	-	78.31	-	78.32	-
106	78.97	77.97	1.00	77.99	0.98
100	-	77.56	-	77.56	-

The model results indicate that there is sufficient clearance between the worst-case HGL and the proposed USFs within Block 454. Detailed grading of the site has been completed to ensure that the maximum hydraulic grade line is kept at least 0.30 m below the underside-of-footing (USF) of the adjacent units connected to the storm sewer during the worst case 100-year storm event and below proposed basement elevations during the 'climate change' event.

5.5.3 Overland Flow

Table 5.10 presents the maximum total surface water depths (static ponding depth + dynamic flow) above the top-of-grate of the proposed catch basins for the 100-year, 3-hr Chicago storm and the 'climate change' storm. Based on the model results, the total ponding depth (static + dynamic) does not exceed the required 0.35 m maximum during the 100-year event.



Table 5.10: Proposed Phase – Maximum Static and Dynamic Surface Water Depths

Storage node ID	Structure ID	Top of Grate Elevation (m)	2-year, 3-hour Chicago		100-year, 3-hour Chicago		100-year, 3-hour Chicago+20%	
			Max HGL (m)	Total Surface Water Depth (m)	Max HGL (m)	Total Surface Water Depth (m)	Max HGL (m)	Total Surface Water Depth (m)
L102A-S	CB 102A	80.98	79.83	-	81.05	0.07	81.08	0.10
L102B-S	CB 102B	81.10	80.33	-	81.27	0.17	81.27	0.17
L103A-S	CB 103B	81.45	80.67	-	81.62	0.17	81.63	0.18
L104C-S	CBMH 104C	80.99	80.82	-	81.25	0.26	81.30	0.31
L105A-S	CB 105A	80.70	80.09	-	81.01	0.31	81.01	0.31
L105B-S	DICB 105B	80.58	80.60	0.02	80.65	0.07	80.66	0.08
L106A-S	CB 106A	80.25	79.15	-	80.04	-	80.25	-

A 900 mm diameter storage pipe has been included as part of the stormwater management design. The pipe is not required to provide storage in the 100-year event but to eliminate ponding from the parking area L104C in the 2-year event.

The model results indicate that there will be ponding at DICB 105B during the 2-year 3-hour Chicago storm event. The DICB is located in a grassed area, the depth of ponding is 2 cm, lasting no more than 10 minutes and is considered negligible.

5.5.4 Results

The following section summarizes the key hydrologic and hydraulic model results for the proposed site and demonstrates the proposed stormwater management plan meets target peak rates established in the Northwoods subdivision servicing and stormwater management report. For detailed model results or inputs please refer to the example input file in **Appendix C.2** and the electronic model files.

Table 5.11: Target and Resultant Major and Minor System Release Rates

Storm event	Minor System Release Rate per Subdivision Design (L/s)	Target Major System Release Rate per Subdivision Design (L/s)	Minor System to Linseed Road Storm Sewer (L/s)	Major System to March Road ROW (L/s)	Major System to Linseed Road ROW (L/s)	Total (L/s)
2-year, 3-hour Chicago	304	0	128.5	0.4	14.3	143.2
5-year, 3-hour Chicago	304	0	170.5	1.3	24.2	196.0
100-year, 3-hour Chicago	304	0	250.5	4.4	46.8	301.7



100-year, 3-hour Chicago+20%	N/A	N/A	268.1	5.9	85.7	359.8
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While the subdivision model assumed that the full Block 454 area is to discharge to the minor system during the 100-year event, it was to conservatively assess the HGLs in the downstream manholes at peak flow during the 100-year and climate change storm events. Given the surface storage volume provided in the downstream catch basins along the major system overland flow route during the 100-year storm event, the impact of uncontrolled discharge from Block 454 to Linseed Road is negligible (see **Section 5.5.5** below).

Furthermore, the uncontrolled discharge from UNC-3 to March Road is minimal and is expected to be factored into the detailed design for the urbanization of March Road in the future.

5.5.5 Impacts to Downstream Systems

To assess impacts of uncontrolled and anticipated major system runoff on Linseed Road and the downstream Northwoods subdivision, subdivision PCSWMM modelling was updated to include uncontrolled runoff from Block 454 contributing to the major system on Linseed Road. When compared to the original subdivision model, there is no change in ponding depth and duration at the immediate downstream catch basin (CB 214A) during the 5-year storm event. In the 100-year storm event, ponding depths in the immediate downstream sag in Linseed from catch basins CB 214A-1 and -2 increase from 0.18m to 0.20m. This additional depth results in additional major system spillage further east of Mortar Terrace to the next downstream CB213A-1 and -2 (from 6.6L/s to 23L/s), where sufficient ponding areas are modeled to exist to ensure 100-year flows do not result in further major system flows downstream. The increase in runoff volume does not result in changes to ponding depths (<1cm) downstream of Mortar Terrace, and so no changes to ICDs within the subdivision are warranted. Updated PCSWMM model outputs for the 100-year storm are included in **Appendix C.4**.

The maximum conveyance along Linseed Road before flow spread exceeds half the drive aisle width. Drive aisle width was conservatively set at 4.5m based on cross-sections on Drawing DS-1 for the subdivision, and does not consider the segments of widened parking row that would otherwise provide additional conveyance capacity without impacts to the drive aisle. Runoff from the 5-year uncontrolled areas was summed along with gutter contribution to the downstream catch basin at the north side of Linseed (roughly a 90m length of flow over half the 24m ROW) for the 5-year storm event. Anticipated runoff to the north side of Linseed lies well below that which would cause an exceedance in flow spread criteria (45.4L/s vs. maximum of 73.2L/s). Please see attached calculation sheet outlining the maximum conveyance along Linseed Road in **Appendix C.4**.

With regards to anticipated major system flows to March Road, the design engineer(s) for March Road are anticipated to have the responsibility to ensure that the existing and planned future drainage conditions are accommodated as part of the future roadway design.



5.5.6 Quality Control

Kanata North Pond 3 is a stormwater management pond located to the east of the Northwoods subdivision development. The pond has been designed to provide quality control treatment for the entirety of the Northwoods subdivision including the Phase 6 site plan block (Block 454). As outlined in the Mattamy Northwoods Subdivision Servicing and Stormwater Management Report, Stantec Consulting Ltd., February 25, 2025, the Block 454 was assumed to have a runoff coefficient of $C=0.85$ and area of 1.2 ha. The detailed design of the Phase 6 site has a runoff coefficient of $C=0.61$ and area of 1.1 ha. As such, no additional on-site quality control measures are required.



6 Grading

The proposed Block 454 development site measure approximately 1.09 ha in area. The topography across the site under existing conditions slopes towards the southeast. The objective of the grading design strategy is to satisfy the stormwater management requirements, adhere to permissible grade raise restrictions, and provide for minimum cover requirements for sewers.

The grading design also follows the recommendations outlined in the Mattamy Northwoods Servicing and Stormwater Management Report (Stantec, February 2025) and directs majority of the overland drainage towards Linseed Road and ultimately into the outlet of the KNUEA SWM Pond 3.

The grading plan (**Drawing GP-1**) was prepared considering the grade raise restrictions identified in the geotechnical investigation.

7 Utilities

As the subject site lies within an existing residential community under development, electrical, gas, and telecommunications servicing for the proposed site will be readily available within the neighbouring rights-of-way. Exact size, location and routing of utilities will be established with the utility providers.

8 Approvals

Reporting on the Environmental Activity and Sector Registry (EASR) may be required for the site as some of the proposed works may be below the groundwater elevation shown in the geotechnical report. The geotechnical consultant shall determine whether EASR reporting is required prior to construction.

Per O.Reg. 525/98, the proposed stormwater management works service a single parcel of land, discharge into a separated storm sewer in Linseed Road, and the site is not industrial nor does it service industrial land. As such, the proposed works for the Block 454 development are exempt from Environmental Compliance Approval requirements.



9 Erosion Control

To protect downstream water quality and prevent sediment build-up in catch basins and storm sewers, erosion and sediment control measures must be implemented during construction. The following recommendations will be included in the contract documents and communicated to the Contractor.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit the extent of the exposed soils at any given time.
3. Re-vegetate exposed areas as soon as possible.
4. Minimize the area to be cleared and grubbed.
5. Protect exposed slopes with geotextiles, geogrid, or synthetic mulches.
6. Install silt barriers/fencing around the perimeter of the site to prevent the migration of sediment offsite.
7. Install track out control mats (mud mats) at the entrance/egress as shown in **Drawing ECDS-1** to prevent migration of sediment into the public ROW.
8. Provide sediment traps and basins during dewatering works.
9. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
10. Schedule the construction works at times which avoid flooding due to seasonal rains.

The Contractor will also be required to complete inspections and guarantee the proper performance of their erosion and sediment control measures at least after every rainfall. The inspections are to include:

- Verification that water is not flowing under silt barriers.
- Cleaning and changing the sediment traps placed on catch basins.

Refer to **Drawing ECDS-1** for the proposed location of silt fences, sediment traps, and other erosion control measures.



10 Geotechnical Investigation

A geotechnical investigation for the development was completed by Paterson Group Inc. in August 2022. The report summarizes the existing soil conditions within the Block 454 site and construction recommendations. For details which are not summarized below, please see the Paterson report included in the submission package.

Subsurface soil conditions within Block 454 were determined through field investigations conducted for the overall subdivision on December 6, 2019, in addition to the previous investigations, completed by Paterson in 2011. A single test pit was drilled within the site in the 2011 investigation along with a probehole.

In general, soil stratigraphy consisted of topsoil overlying silty clay or silty sand within the west and east portion of the site, respectively. A glacial till layer was noted at all test pit locations of the subdivision. Practical refusal to excavation was encountered between 0.9 and 3.7 m depth at all test pit locations complete by Paterson. Bedrock was estimated to occur between depths of 0 to 5 m. Based on moisture levels and colour of the recovered soil samples, the long-term groundwater table is expected to be at 4 m to 5 m below ground surface, though as groundwater levels fluctuate seasonally, they could vary at the time of construction.

Based on the results of the geotechnical investigation, the subject site is suitable for the proposed development, and it is recommended that the proposed dwellings be founded on conventional spread footings placed on an undisturbed, very stiff silty clay, compact silty sand, compact glacial till, engineered fill, and/or surface-sounded bedrock bearing surface. Due to the presence of a silty clay deposit, the site is subject to a permissible grade raise restriction of 2.0 m above existing grade at the southwest corner of the site.

The recommended rigid pavement structure is further presented in **Table 10.1** below.

Table 10.1: Recommended Pavement Structure

Material	Driveways and Car-only Parking Areas	Local Residential Roadways
Wear Course – HL-3 or Superpave 12.5 Asphaltic Concrete	50 mm	40 mm
Binder Course – HL-8 or Superpave 19.0 Asphaltic Concrete	-	50 mm
BASE – OPSS Granular A Crushed Stone	150 mm	
SUBBASE – OPSS Granular B Type II	300 mm	400 mm



11 Conclusions and Recommendations

Based on the preceding information, the following conclusions are summarized below:

11.1 Potable Water Analysis

The water distribution system is designed in accordance with City of Ottawa design criteria to meet the domestic and fire flow needs of the development. The site is designed with two watermain feeds to ensure reliability for domestic supply and adequate fire hydrant coverage has been provided. Fire walls will be required for Building D to meet OBC requirements.

11.2 Wastewater Servicing

Block 454 will be serviced by a network of gravity sewers which will direct wastewater flows to Linseed Road. The receiving sewer system has sufficient available capacity to receive the design flows. Design guidelines for slope and velocity have been met within the proposed sewers.

11.3 Stormwater Management

- The proposed stormwater management plan complies with the goals specified in the background reports and the 2025 City of Ottawa Sewer Design Guidelines.
- Inlet control devices are proposed to limit inflow from the site area into the minor system to the 2-year storm event based on City of Ottawa IDF curves.
- All dynamic surface water depths are less than 0.35 m during all storm events up to the 100-year storm event.
- The storm sewer hydraulic grade line will be maintained at least 0.30 m below the underside of footing in the subdivision during design storm events.
- Minor system peak flows from the proposed site will be directed to the receiving sewer in Linseed Road.
- The minor system outflow rates are within the Mattamy Northwoods subdivision targets.

11.4 Grading

A grading plan has been prepared to account for the required overland flow conveyance, cover over sewers, hydraulic grade line requirements, and grade raise restrictions as identified in the geotechnical investigation.



11.5 Utilities

Electrical, gas, and telecommunications infrastructure exist within the Mattamy Northwoods subdivision development designed by the respective utility providers. Private utility servicing for Block 454 will be designed by the respective utilities.



Appendix A Water Servicing

A.1 Domestic Water Demands



Kanata Northwoods Phase 6, Ottawa, ON - Domestic Water Demand Estimates

Site Plan provided by Urbantypology (2026-02-19)

Project No. 160402120

Designed by: MW

Date: 2026-03-12

Checked by:

Revision: 02

City File No. D07-12-25-0148

Population densities per Table 4.1 City of Ottawa Water Design Guidelines:

Apartment	1.8	ppu
Townhouse	2.7	ppu

Demand conversion factors per Table 4.2 of the City of Ottawa Water Design Guidelines and Technical Bulletin ISTB-2021-03:

Residential	280	L/cap/day
Commercial	28000	L/ha/day



Building ID	Commercial Floor Area (m ²)	No. of Units	Population	Avg Day Demand		Max Day Demand ^{1 2}		Peak Hour Demand ^{1 2}	
				(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Building A									
Stacked Townhouse		15	41	7.9	0.1	19.7	0.3	43.3	0.7
Building B									
Stacked Townhouse		15	41	7.9	0.1	19.7	0.3	43.3	0.7
Building C									
Apartment		24	43	8.4	0.1	21.0	0.4	46.2	0.8
Commercial	705			1.4	0.0	2.1	0.0	3.7	0.1
<i>Building C Subtotal</i>	<i>705</i>	<i>24</i>	<i>43</i>	<i>9.8</i>	<i>0.2</i>	<i>23.1</i>	<i>0.4</i>	<i>49.9</i>	<i>0.8</i>
Building D									
Stacked Townhouse		18	49	9.5	0.2	23.6	0.4	52.0	0.9
<i>Residential Subtotal</i>		<i>72</i>	<i>173</i>	<i>33.6</i>	<i>0.6</i>	<i>84.0</i>	<i>1.4</i>	<i>184.8</i>	<i>3.1</i>
<i>Commerical Subtotal</i>	<i>705</i>			<i>1.4</i>	<i>0.0</i>	<i>2.1</i>	<i>0.0</i>	<i>3.7</i>	<i>0.1</i>
Total Site :	705	72	173	35.0	0.6	86.1	1.4	188.5	3.1

1 The City of Ottawa water demand criteria used to estimate peak demand rates for residential areas are as follows:

maximum day demand rate = 2.5 x average day demand rate

peak hour demand rate = 2.2 x maximum day demand rate (as per Technical Bulletin ISD-2010-02)

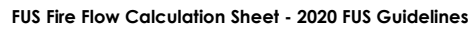
2 Water demand criteria used to estimate peak demand rates for commercial areas are as follows:

maximum daily demand rate = 1.5 x average day demand rate

peak hour demand rate = 1.8 x maximum day demand rate (as per Technical Bulletin ISD-2010-02)

A.2 FUS Calculation Sheets





Stantec Project #: 160402120
Project Name: Kanata Northwoods Phase 6
Date: 2026-03-12
Flow Calculation #: 1
Description: Building A

Notes: 15-unit back-to-back stacked townhouses. Building footprint of 585 m².

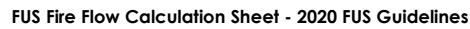
Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction										1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas										NO	-
		585	585	585							1755	-	
3	Determine Required Fire Flow	(F = 220 x C x A ^{1/2}). Round to nearest 1000 L/min										-	14000
4	Determine Occupancy Charge	Limited Combustible										-15%	11900
5	Determine Sprinkler Reduction	None										0%	0
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length:Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?			-	-	
		North	> 30	0	0	0-20	Type V	NO			0%	3927	
		East	10.1 to 20	34	3	> 100	Type V	NO			15%		
		South	3.1 to 10	21	3	61-80	Type V	NO			18%		
		West	> 30	0	0	0-20	Type V	NO			0%		
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min										16000	
		Total Required Fire Flow in L/s										266.7	
		Required Duration of Fire Flow (hrs)										3.50	
		Required Volume of Fire Flow (m³)										3360	



Stantec Project #: 160402120
Project Name: Kanata Northwoods Phase 6
Date: 2026-03-12
Flow Calculation #: 2
Description: Building B

Notes: 15-unit back-to-back stacked townhouses. Building footprint of 585 m².

Step	Task	Notes									Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction									1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas									YES	-
		585	585	585							1755	-
3	Determine Required Fire Flow	(F = 220 x C x A ^{1/2}). Round to nearest 1000 L/min									-	14000
4	Determine Occupancy Charge	Limited Combustible									-15%	11900
5	Determine Sprinkler Reduction	None									0%	0
		Non-Standard Water Supply or N/A									0%	
		Not Fully Supervised or N/A									0%	
		% Coverage of Sprinkler System									0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?		-	-	
		North	3.1 to 10	21	3	61-80	Type V	NO		18%	4403	
		East	10.1 to 20	34	3	> 100	Type V	NO		15%		
		South	> 30	0	0	0-20	Type V	NO		0%		
		West	20.1 to 30	19	3	41-60	Type V	NO		4%		
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min									16000	
		Total Required Fire Flow in L/s									266.7	
		Required Duration of Fire Flow (hrs)									3.50	
		Required Volume of Fire Flow (m³)									3360	



Fire Flow Calculation #: 3

Description: Building C

Notes: Mixed-use building with commercial space on ground floor and residential apartments above. Building footprint area of 796 m². Correspondence with architect via client confirmed the building will be sprinklered.

Step	Task	Notes								Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction								1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas								-	-
		796	796	796						2387	-
3	Determine Required Fire Flow	(F = 220 x C x A ^{1/2}). Round to nearest 1000 L/min								-	16000
4	Determine Occupancy Charge	Combustible								0%	16000
5	Determine Sprinkler Reduction	Conforms to NFPA 13								-30%	-8000
		Standard Water Supply								-10%	
		Fully Supervised								-10%	
		% Coverage of Sprinkler System								100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length:Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?		-	-
		North	10.1 to 20	21	3	61-80	Type V	NO		13%	2720
		East	20.1 to 30	19	3	41-60	Type V	NO		4%	
		South	> 30	0	0	0-20	Type V	NO		0%	
		West	> 30	0	0	0-20	Type V	NO		0%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min								11000	
		Total Required Fire Flow in L/s								183.3	
		Required Duration of Fire Flow (hrs)								2.00	
		Required Volume of Fire Flow (m ³)								1320	



Stantec Project #: 160402120
Project Name: Kanata Northwoods Phase 6
Date: 2026-03-12
Flow Calculation #: 8
Description: Building D

Notes: Back-to-back stacked townhouses. Building footprint of 700 m². Broken down into a 12-unit and a 6-unit cluster to reduce floor area to 464 m².

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type V - Wood Frame / Type IV-D - Mass Timber Construction										1.5	-
2	Determine Effective Floor Area	Sum of All Floor Areas										YES	-
		464	464	464							1393	-	
3	Determine Required Fire Flow	(F = 220 x C x A ^{1/2}). Round to nearest 1000 L/min										-	12000
4	Determine Occupancy Charge	Limited Combustible										-15%	10200
5	Determine Sprinkler Reduction	None										0%	0
		Non-Standard Water Supply or N/A										0%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										0%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?		-	-		
		North	> 30	0	0	0-20	Type V	NO		0%	0		
		East	> 30	19	3	41-60	Type V	NO		0%			
		South	0 to 3	21	3	61-80	Type V	YES		0%			
		West	> 30	0	0	0-20	Type V	NO		0%			
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min										10000	
		Total Required Fire Flow in L/s										166.7	
		Required Duration of Fire Flow (hrs)										2.00	
		Required Volume of Fire Flow (m³)										1200	

Wu, Michael

From: Arden Hamilton <arden.hamilton@mattamycorp.com>
Sent: October 21, 2025 09:50
To: Wu, Michael
Cc: Smadella, Karin; Olivia Hughes
Subject: RE: [EXTERNAL] Northwoods Phase 6 Block 454 Building C Construction Type Confirmation

Hi Michael,

Please see comments from our architect,

1. It is combustible
2. There are sprinklers throughout the building
 - a. All floors are to be 0.75hr FRR except for the floor above the retail which is to be 2hr FRR

Thanks,



Arden Hamilton, MRED
Land Development Coordinator
C (613) 223-3866(cell).
Arden.hamilton@mattamycorp.com
Ottawa Office: 50 Hines Road, Suite 100, Ottawa, ON Canada K2K 2M5

From: Wu, Michael <Michael.Wu@stantec.com>
Sent: October 16, 2025 12:26 PM
To: Arden Hamilton <arden.hamilton@mattamycorp.com>
Cc: Smadella, Karin <Karin.Smadella@stantec.com>; Olivia Hughes <olivia.hughes@mattamycorp.com>
Subject: [EXTERNAL] Northwoods Phase 6 Block 454 Building C Construction Type Confirmation
Importance: High

Good afternoon, Arden:

Could you reach out to the architect to confirm the following information for the proposed mixed-use Building C in Block 454 of Northwoods? We would require the information to confirm the fire flow requirements for water boundary conditions from the City.

1. Construction type.
2. Confirmation that the vertical openings (between floors) are going to be **protected** per the fire code requirements outlined in the Ontario and National Building Codes and whether the building will be sprinklered.

Thanks,

Michael Wu, EIT
Civil Engineering Intern
He, him

Direct: (613) 738 6033

michael.wu@stantec.com



With every community, we redefine what's possible.

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Attention: Ce courriel provient de l'extérieur de Stantec. Veuillez prendre des précautions supplémentaires.

Atención: Este correo electrónico proviene de fuera de Stantec. Por favor, tome precauciones adicionales.

A.3 Boundary Conditions



Junction Results - Basic Day

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (m)	Pressure (psi)2	Pressure (kPa)
95	0.96	81.00	130.89	49.89	70.95	489.16
39	0.00	81.00	130.89	49.89	70.95	489.17
38	0.00	81.00	130.90	49.90	70.95	489.18
91	0.00	80.32	130.89	50.57	71.91	495.79
57	0.17	80.00	130.89	50.89	72.36	498.92
58	0.07	80.00	130.89	50.89	72.36	498.92
59	0.00	80.00	130.89	50.89	72.36	498.92
60	0.00	80.00	130.89	50.89	72.36	498.92
61	0.21	80.00	130.89	50.89	72.36	498.92
62	0.11	80.00	130.89	50.89	72.36	498.92
63	0.07	80.00	130.89	50.89	72.36	498.92
87	0.18	80.00	130.89	50.89	72.36	498.92
88	0.14	80.00	130.89	50.89	72.36	498.92
89	0.18	80.00	130.89	50.89	72.36	498.92
92	0.16	80.00	130.89	50.89	72.36	498.92
94	0.24	80.00	130.89	50.89	72.36	498.92
114	0.03	80.00	130.89	50.89	72.36	498.92
151	0.21	80.00	130.89	50.89	72.36	498.92
152	0.09	80.00	130.89	50.89	72.36	498.92
85	0.04	80.00	130.89	50.89	72.36	498.93
99	0.13	80.00	130.89	50.89	72.36	498.93
100	0.10	80.00	130.89	50.89	72.36	498.93
109	0.00	80.00	130.89	50.89	72.36	498.93
110	0.15	80.00	130.89	50.89	72.36	498.93
111	0.14	80.00	130.89	50.89	72.36	498.93
112	0.00	80.00	130.89	50.89	72.36	498.93
93	0.09	80.00	130.89	50.89	72.37	498.94
97	0.00	80.00	130.89	50.89	72.37	498.94
98	0.00	80.00	130.89	50.89	72.37	498.94
96	0.00	80.00	130.89	50.89	72.37	498.95
80	0.11	79.00	130.89	51.89	73.78	508.73
86	0.16	79.00	130.89	51.89	73.78	508.73
113	0.13	79.00	130.89	51.89	73.78	508.73
115	0.22	79.00	130.89	51.89	73.78	508.73
101	0.92	79.00	130.89	51.89	73.79	508.74
79	0.16	78.50	130.89	52.39	74.50	513.63
64	0.00	78.00	130.89	52.89	75.21	518.53
65	0.00	78.00	130.89	52.89	75.21	518.53
81	0.05	78.00	130.89	52.89	75.21	518.53
82	0.04	78.00	130.89	52.89	75.21	518.53
153	0.22	77.24	130.89	53.65	76.29	525.98
83	0.11	77.00	130.89	53.89	76.63	528.34
66	0.00	76.00	130.89	54.89	78.05	538.14
102	0.00	75.00	130.89	55.89	79.47	547.94
24	0.00	74.49	130.90	56.41	80.21	553.02
103	0.00	74.00	130.89	56.89	80.89	557.75
116	0.21	74.00	130.89	56.89	80.89	557.75
117	0.04	74.00	130.89	56.89	80.89	557.75
136	0.18	74.00	130.89	56.89	80.89	557.75
137	0.09	74.00	130.89	56.89	80.89	557.75
138	0.04	74.00	130.89	56.89	80.89	557.75
154	0.14	73.45	130.89	57.44	81.68	563.14
104	0.00	73.00	130.89	57.89	82.32	567.55
105	0.00	73.00	130.89	57.89	82.32	567.55
118	0.00	73.00	130.89	57.89	82.32	567.55
120	0.03	73.00	130.89	57.89	82.32	567.55
121	0.18	73.00	130.89	57.89	82.32	567.55
67	0.58	73.00	130.89	57.89	82.32	567.56
73	0.13	72.66	130.89	58.23	82.80	570.90
140	0.23	72.44	130.89	58.45	83.12	573.06
3	0.00	72.31	130.89	58.58	83.30	574.35

Junction Results - Peak Hour

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (m)	Pressure (psi)2	Pressure (kPa)
95	2.59	81.00	124.96	43.96	62.51	431.01
39	0.00	81.00	124.99	43.99	62.55	431.24
38	0.00	81.00	125.01	44.01	62.57	431.43
91	0.00	80.32	124.86	44.54	63.34	436.69
60	0.00	80.00	124.86	44.86	63.79	439.78
61	1.15	80.00	124.86	44.86	63.79	439.78
62	0.61	80.00	124.86	44.86	63.79	439.78
63	0.36	80.00	124.86	44.86	63.79	439.78
58	0.41	80.00	124.86	44.86	63.79	439.79
59	0.00	80.00	124.86	44.86	63.79	439.79
57	0.91	80.00	124.86	44.86	63.79	439.81
88	0.77	80.00	124.86	44.86	63.79	439.81
92	0.87	80.00	124.86	44.86	63.79	439.81
94	1.30	80.00	124.86	44.86	63.79	439.81
87	1.01	80.00	124.86	44.86	63.79	439.84
89	1.01	80.00	124.86	44.86	63.79	439.84
152	0.48	80.00	124.86	44.86	63.80	439.85
114	0.18	80.00	124.87	44.87	63.80	439.86
151	1.16	80.00	124.87	44.87	63.80	439.89
85	0.24	80.00	124.88	44.88	63.81	439.96
100	0.55	80.00	124.88	44.88	63.81	439.98
112	0.00	80.00	124.88	44.88	63.82	439.99
111	0.79	80.00	124.88	44.88	63.82	440.00
110	0.81	80.00	124.89	44.89	63.83	440.10
109	0.00	80.00	124.89	44.89	63.83	440.11
99	0.69	80.00	124.90	44.90	63.84	440.17
93	0.48	80.00	124.90	44.90	63.84	440.19
98	0.00	80.00	124.90	44.90	63.85	440.25
97	0.00	80.00	124.91	44.91	63.86	440.32
96	0.00	80.00	124.93	44.93	63.89	440.48
80	0.58	79.00	124.86	45.86	65.21	449.60
86	0.60	79.00	124.86	45.86	65.21	449.60
115	1.21	79.00	124.87	45.87	65.22	449.67
113	0.73	79.00	124.87	45.87	65.22	449.71
101	2.48	79.00	124.87	45.87	65.23	449.75
79	0.91	78.50	124.86	46.36	65.92	454.50
64	0.00	78.00	124.86	46.86	66.63	459.40
65	0.00	78.00	124.86	46.86	66.63	459.40
81	0.28	78.00	124.86	46.86	66.63	459.40
82	0.24	78.00	124.86	46.86	66.63	459.40
153	1.21	77.24	124.86	47.62	67.71	466.86
83	0.60	77.00	124.86	47.86	68.05	469.21
66	0.00	76.00	124.86	48.86	69.48	479.07
102	0.00	75.00	124.87	49.87	70.91	488.88
24	0.00	74.49	125.02	50.53	71.85	495.35
116	1.15	74.00	124.86	50.86	72.33	498.67
117	0.24	74.00	124.86	50.86	72.33	498.67
103	0.00	74.00	124.86	50.86	72.33	498.68
136	0.97	74.00	124.86	50.86	72.33	498.68
137	0.48	74.00	124.87	50.87	72.33	498.69
138	0.24	74.00	124.87	50.87	72.33	498.69
154	0.79	73.45	124.86	51.41	73.11	504.06
120	0.18	73.00	124.86	51.86	73.74	508.39
121	0.97	73.00	124.86	51.86	73.74	508.39
105	0.00	73.00	124.86	51.86	73.74	508.45
104	0.00	73.00	124.86	51.86	73.75	508.47
118	0.00	73.00	124.86	51.86	73.75	508.47
67	1.56	73.00	124.87	51.87	73.76	508.57
73	0.70	72.66	124.89	52.23	74.27	512.06
140	1.29	72.44	124.88	52.44	74.57	514.15
3	0.00	72.31	124.91	52.60	74.80	515.73

Northwoods Subdivision Fire Flow Results - Max Day + 267 L/s

ID	Static Demand (L/s)	Static Pressure (m)	Static Pressure (psi)	Static Pressure (kPa)	Static Head (m)	Fire Flow Demand (L/s)	Residual Pressure (m)	Residual Pressure (psi)	Available Flow (L/s)	Available Pressure (psi)
95	1.44	33.12	47.09	324.66	114.12	266.67	26.57	37.79	628.67	20
96	0.00	33.86	48.15	331.96	113.86	266.67	26.62	37.86	595.25	20

A.4 Hydraulic Modeling Results



Junction Results - Basic Day

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (m)	Pressure (psi)2	Pressure (kPa)
1	0.10	81.00	130.90	49.90	70.96	489.23
2	0.00	81.40	130.90	49.50	70.39	485.33
3	0.10	81.31	130.90	49.59	70.52	486.22
4	0.00	81.29	130.90	49.61	70.54	486.34
5	0.00	81.25	130.90	49.65	70.61	486.81
6	0.00	81.42	130.90	49.48	70.36	485.10
7	0.00	81.43	130.90	49.47	70.35	485.04
8	0.20	81.46	130.90	49.44	70.30	484.73
9	0.00	81.44	130.90	49.46	70.32	484.87
10	0.00	81.35	130.90	49.55	70.46	485.80
11	0.20	81.89	130.90	49.01	69.69	480.50
12	0.00	81.32	130.90	49.58	70.50	486.10
13	0.00	81.21	130.90	49.69	70.66	487.16

Link Results - Basic Day

ID	FROM	TO	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)
1000	1	0	25.24	204	110	-0.289	0.009
1001	2	1	26.39	204	110	-0.189	0.006
1002	3	2	32.08	204	110	-0.128	0.004
1003	4	3	1.83	204	110	-0.028	0.001
1004	5	4	24.35	204	110	-0.028	0.001
1005	6	5	12.47	204	110	-0.028	0.001
1006	7	6	2.32	204	110	-0.028	0.001
1007	8	7	36.36	204	110	-0.028	0.001
1008	9	8	9.64	204	110	0.172	0.005
1009	10	9	8.74	204	110	0.172	0.005
1010	11	10	14.05	204	110	0.111	0.003
1011	12	11	26.61	204	110	0.311	0.010
1012	13	12	3.00	204	110	0.311	0.010
1013	14	13	1.78	204	110	0.311	0.010
1014	2	10	22.22	204	110	0.060	0.002

Junction Results - Peak Hour

ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (m)	Pressure (psi)2	Pressure (kPa)
1	0.70	81.00	124.92	43.92	62.45	430.57
2	0.00	81.40	124.94	43.54	61.91	426.88
3	0.70	81.31	124.94	43.63	62.04	427.78
4	0.00	81.29	124.94	43.65	62.06	427.91
5	0.00	81.25	124.94	43.70	62.13	428.40
6	0.00	81.42	124.94	43.52	61.89	426.70
7	0.00	81.43	124.94	43.52	61.88	426.64
8	0.90	81.46	124.95	43.49	61.84	426.35
9	0.00	81.44	124.95	43.50	61.86	426.51
10	0.00	81.35	124.95	43.60	62.00	427.46
11	0.80	81.89	124.96	43.07	61.25	422.29
12	0.00	81.32	124.99	43.68	62.10	428.20
13	0.00	81.21	125.00	43.79	62.26	429.29

Link Results - Peak Hour

ID	FROM	TO	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)
1000	1	0	25.24	204	110	9.148	0.280
1001	2	1	26.39	204	110	9.848	0.301
1002	3	2	32.08	204	110	2.262	0.069
1003	4	3	1.83	204	110	2.962	0.091
1004	5	4	24.35	204	110	2.962	0.091
1005	6	5	12.47	204	110	2.962	0.091
1006	7	6	2.32	204	110	2.962	0.091
1007	8	7	36.36	204	110	2.962	0.091
1008	9	8	9.64	204	110	3.862	0.118
1009	10	9	8.74	204	110	3.862	0.118
1010	11	10	14.05	204	110	11.448	0.350
1011	12	11	26.61	204	110	12.248	0.375
1012	13	12	3.00	204	110	12.248	0.375
1013	14	13	1.78	204	110	12.248	0.375
1014	2	10	22.22	204	110	-7.586	0.232

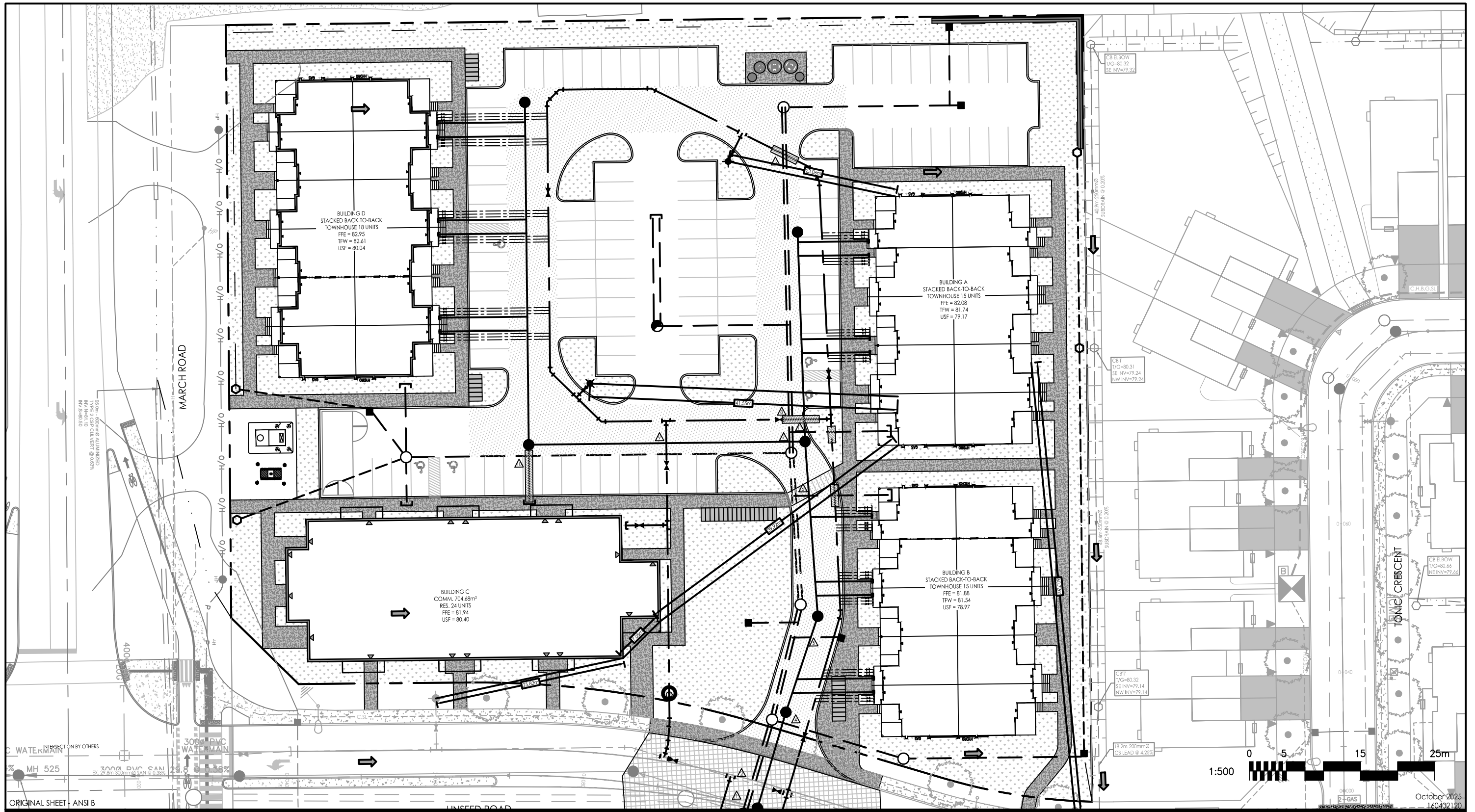
Fire Flow Results - Max Day + 267 L/s

ID	Static Demand (L/s)	Static Pressure (m)	Static Pressure (psi)	Static Pressure (kPa)	Static Head (m)	Fire Flow Demand (L/s)	Residual Pressure (m)	Residual Pressure (psi)	Available Flow (L/s)	Available Pressure (psi)
6	0.00	32.58	46.33	319.41	114.00	266.67	21.63	30.75	354.28	20
7	0.00	32.57	46.32	319.36	114.00	266.67	21.67	30.81	354.99	20
5	0.00	32.75	46.57	321.11	114.00	266.67	21.78	30.98	355.76	20
4	0.00	32.70	46.50	320.60	113.99	266.67	22.76	32.37	374.69	20
3	0.30	32.69	46.48	320.47	113.99	266.67	22.89	32.55	377.40	20
8	0.40	32.55	46.28	319.11	114.01	266.67	24.14	34.33	408.50	20
9	0.00	32.57	46.31	319.27	114.01	266.67	25.56	36.35	451.29	20
2	0.00	32.59	46.34	319.54	113.99	266.67	27.25	38.74	522.42	20
10	0.00	32.66	46.44	320.22	114.01	266.67	27.41	38.97	528.87	20
11	0.40	32.15	45.71	315.17	114.04	266.67	27.54	39.16	559.47	20
1	0.30	32.94	46.84	322.98	113.94	266.67	28.86	41.04	609.21	20
12	0.00	32.77	46.60	321.29	114.09	266.67	31.52	44.82	1161.48	20
13	0.00	32.89	46.76	322.41	114.10	266.67	32.35	46.00	1852.46	20

A.5 Hydrant Coverage Table and Figure



V:\01-604\active\160402120\design\drawing\160402120-FA.dwg
2026/03/12 6:14 PM By: Wu, Michael



Stantec
 Stantec Consulting Ltd.
 300 - 1331 Clyde Avenue
 Ottawa ON
 Tel. 613.722.4420
www.stantec.com

Legend

Notes

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Client/Project
MATTAMY HOMES LTD.
KANATA NORTHWOODS
PHASE 6 BLOCK 454

Figure No.

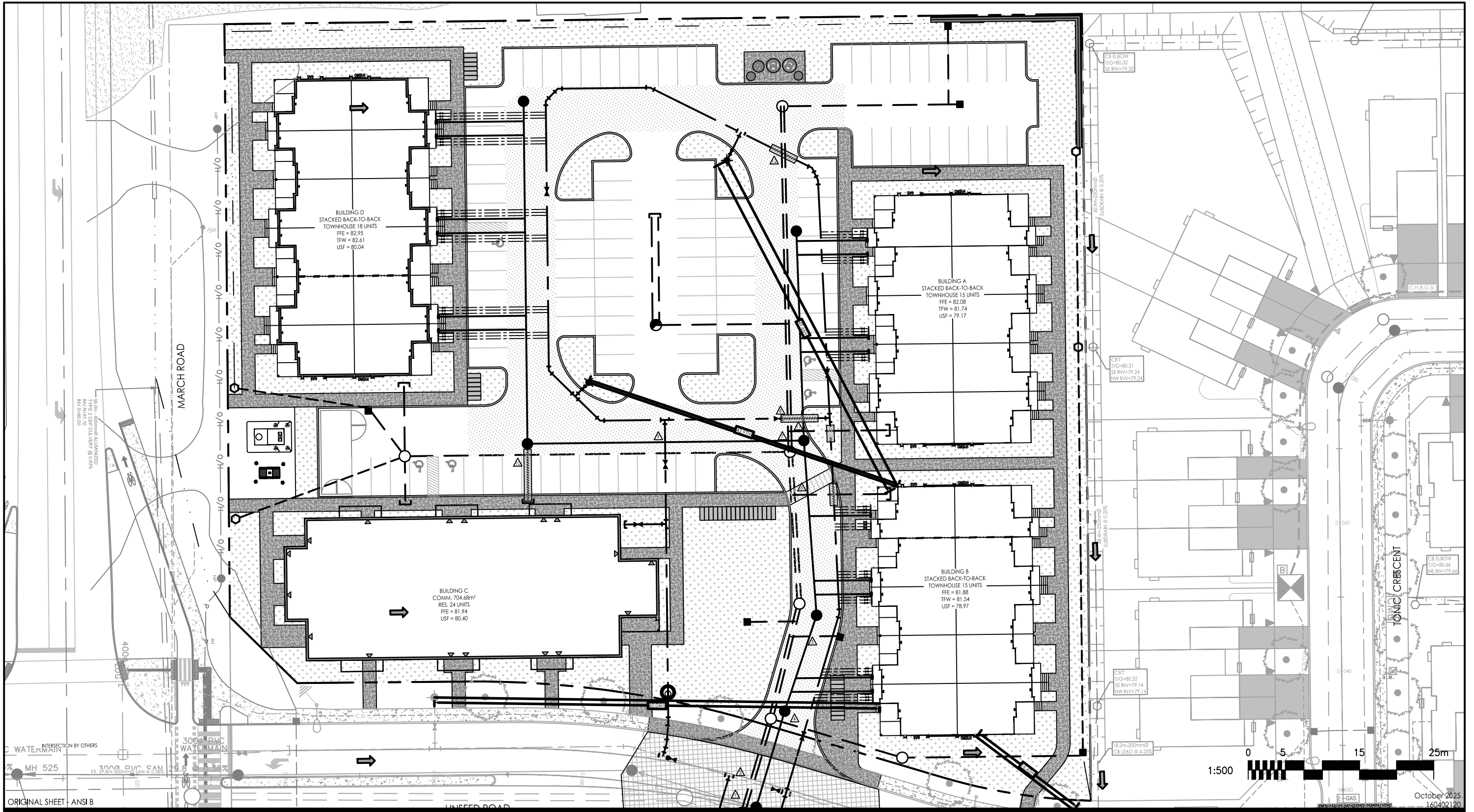
1.0

Title

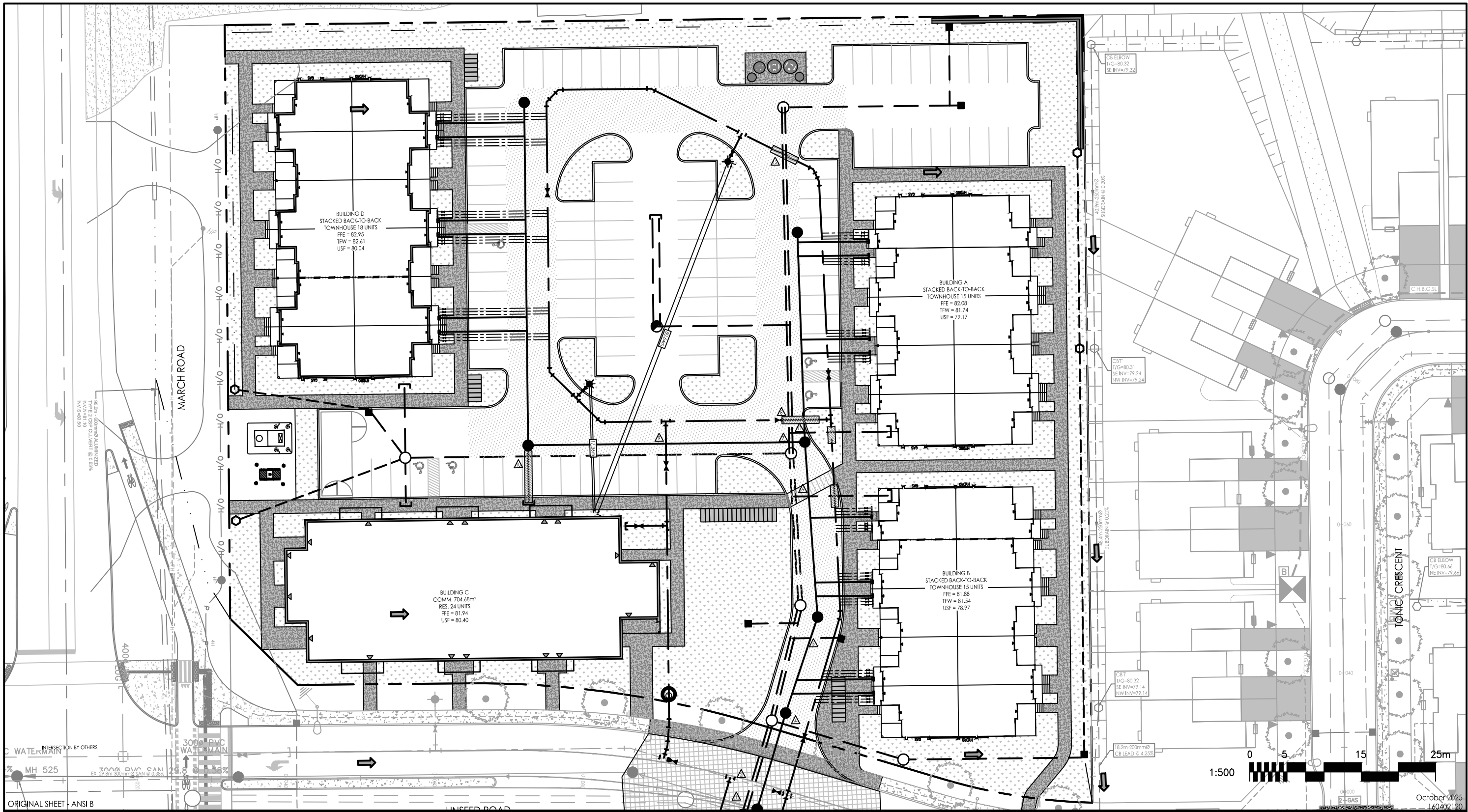
Hydrant Coverage Sketch
Building A

October 2025
160402120

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2026/03/12 6:15 PM By: Wu, Michael



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2026/03/12 6:16 PM By: Wu, Michael



Stantec
 Stantec Consulting Ltd.
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Notes

PRELIMINARY
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Client/Project

MATTAMY HOMES LTD.
KANATA NORTHWOODS
PHASE 6 BLOCK 454

Figure No.

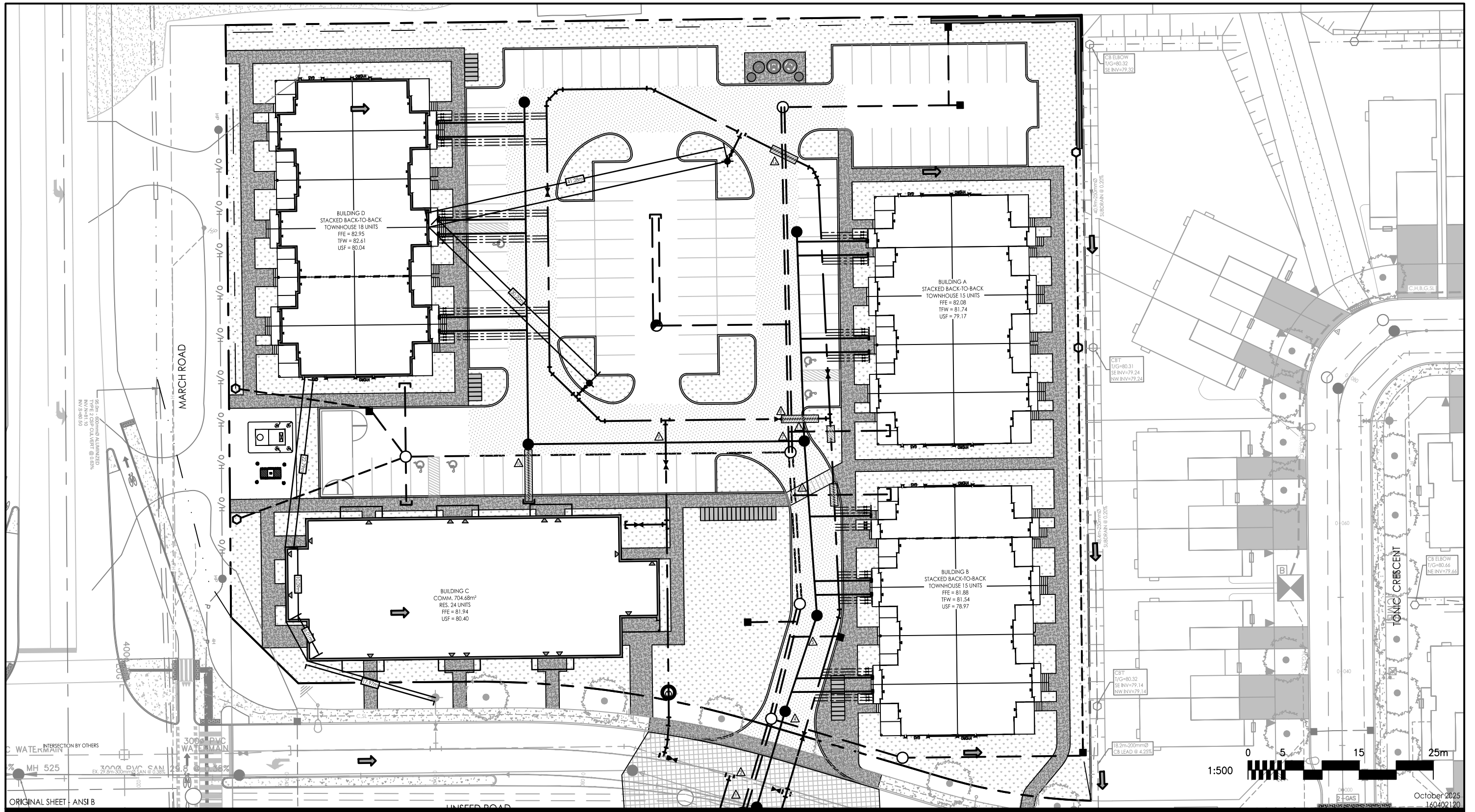
1.0

Title

Hydrant Coverage Sketch
Building C

October 2025
160402120

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2026/03/12 6:17 PM By: Wu, Michael



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PHASE 6 BLOCK 454

Figure No.

1.0

Title

Hydrant Coverage Sketch
Building D

October 2025
160402120



Project: **Northwoods Block 454** 160402120

**TABLE 1:
FIRE HYDRANT COVERAGE TABLE**

Revision: 01 Prepared By: MW
Revision Date: 2026-03-12 Checked By:

Description	Hydrants ¹			Total Available Fire Flow (L/min)	Total Required Fire Flow ² (L/min)
	HYD-01	HYD-02	HYD-03		
Building A					
Distance from building (m)	23.1	41.6	60.7	-	-
Maximum fire flow capacity ³ (L/min)	5,678	5,678	5,678	17,034	16,000

NFPA 1 Table 18.5.4.3	
Distance to Building (m)	Maximum Capacity (L/min)
≤ 76	5,678
> 76 and ≤ 152	3,785
> 152 and ≤ 305	2,839

Notes:

1. Hydrant locations as per Drawing SSP-1. Refer to fire hydrant coverage sketch (Appendix A.5).
2. See FUS Calculations, Appendix A.2 for fire flow requirements.
3. See NFPA 1 Table 18.5.4.3 for maximum fire flow capacity of hydrants by distance to building.



Project: **Northwoods Block 454** 160402120

**TABLE 1:
FIRE HYDRANT COVERAGE TABLE**

Revision: 01 Prepared By: MW
Revision Date: 2026-03-12 Checked By:

Description	Hydrants ¹			Total Available Fire Flow (L/min)	Total Required Fire Flow ² (L/min)
	HYD-01	HYD-02	HYD-03		
Building B					
Distance from building (m)	49.7	44.0	16.4	-	-
Maximum fire flow capacity ³ (L/min)	5,678	5,678	5,678	17,034	16,000

NFPA 1 Table 18.5.4.3	
Distance to Building (m)	Maximum Capacity (L/min)
≤ 76	5,678
> 76 and ≤ 152	3,785
> 152 and ≤ 305	2,839

Notes:

1. Hydrant locations as per Drawing SSP-1. Refer to fire hydrant coverage sketch (Appendix A.5).
2. See FUS Calculations, Appendix A.2 for fire flow requirements.
3. See NFPA 1 Table 18.5.4.3 for maximum fire flow capacity of hydrants by distance to building.



Project:	Northwoods Block 454	160402120
TABLE 1: FIRE HYDRANT COVERAGE TABLE		
Revision: 01	Prepared By: MW	
Revision Date: 2026-03-12	Checked By:	

Description	Hydrants ¹			Total Available Fire Flow (L/min)	Total Required Fire Flow ² (L/min)
	HYD-01	HYD-02	HYD-03		
Building C					
Distance from building (m)	17.4	51.5	-	-	-
Maximum fire flow capacity ³ (L/min)	5,678	5,678	-	11,356	11,000

NFPA 1 Table 18.5.4.3	
Distance to Building (m)	Maximum Capacity (L/min)
≤ 76	5,678
> 76 and ≤ 152	3,785
> 152 and ≤ 305	2,839

Notes:

1. Hydrant locations as per Drawing SSP-1. Refer to fire hydrant coverage sketch (Appendix A.5).
2. See FUS Calculations, Appendix A.2 for fire flow requirements.
3. See NFPA 1 Table 18.5.4.3 for maximum fire flow capacity of hydrants by distance to building.



Project: **Northwoods Block 454** 160402120

**TABLE 1:
FIRE HYDRANT COVERAGE TABLE**

Revision: 01 Prepared By: MW
Revision Date: 2026-03-12 Checked By:

Description	Hydrants ¹			Total Available Fire Flow (L/min)	Total Required Fire Flow ² (L/min)
	HYD-01	HYD-02	HYD-03		
Building D					
Distance from building (m)	41.3	30.2	-	-	-
Maximum fire flow capacity ³ (L/min)	5,678	5,678	-	11,356	10,000

NFPA 1 Table 18.5.4.3	
Distance to Building (m)	Maximum Capacity (L/min)
≤ 76	5,678
> 76 and ≤ 152	3,785
> 152 and ≤ 305	2,839

Notes:

1. Hydrant locations as per Drawing SSP-1. Refer to fire hydrant coverage sketch (Appendix A.5).
2. See FUS Calculations, Appendix A.2 for fire flow requirements.
3. See NFPA 1 Table 18.5.4.3 for maximum fire flow capacity of hydrants by distance to building.

Appendix B Wastewater Servicing

B.1 Sanitary Sewer Design Sheet



Stantec			SUBDIVISION: Northwoods Block 454		SANITARY SEWER DESIGN SHEET (City of Ottawa)								DESIGN PARAMETERS																				
			DATE: 2026-03-12 REVISION: 1 DESIGNED BY: MJS CHECKED BY: MW										FILE NUMBER: 160402120			MAX PEAK FACTOR (RES.)= 4.0 MIN PEAK FACTOR (RES.)= 2.0 PEAKING FACTOR (INDUSTRIAL): 2.4 PEAKING FACTOR (ICI >20%): 1.5 PERSONS / SINGLE 3.4 PERSONS / TOWNHOME 2.7 PERSONS / APARTMENT 1.8			AVG. DAILY FLOW / PERSON 280 l/p/day COMMERCIAL 28,000 l/ha/day INDUSTRIAL (HEAVY) 55,000 l/ha/day INDUSTRIAL (LIGHT) 35,000 l/ha/day INSTITUTIONAL 28,000 l/ha/day INFILTRATION 0.33 l/s/Ha			MINIMUM VELOCITY 0.60 m/s MAXIMUM VELOCITY 3.00 m/s MANNINGS n 0.013 BEDDING CLASS B MINIMUM COVER 2.50 m HARMON CORRECTION FACTOR 0.8											
LOCATION			RESIDENTIAL AREA AND POPULATION								COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE							
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (ha)	SINGLE	UNITS TOWN	APT	POP.	CUMULATIVE AREA (ha)	POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	FLOW (l/s)	LENGTH (m)	DIA (mm)	MATERIAL	CLASS	SLOPE (%)	CAP. (FULL) (l/s)	CAP. V PEAK FLOW (%)	VEL. (FULL) (m/s)	
R6A	6	5	0.29	0	18	0	49	0.29	49	3.65	0.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.29	0.29	0.1	0.7	46.2	200	PVC	SDR 35	0.50	23.6	2.84%	0.74	
R5A	5A	5	0.09	0	0	24	43	0.09	43	3.66	0.5	0.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.09	0.09	0.0	0.6	8.0	150	PVC	DR 28	1.00	15.3	3.76%	0.86	
	5	4	0.00	0	0	0	0	0.38	92	3.60	1.1	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	0.38	0.1	1.2	37.3	250	PVC	SDR 35	0.40	38.3	3.18%	0.77	
R7A	7	4	0.43	0	15	0	41	0.43	41	3.67	0.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.43	0.43	0.1	0.6	28.3	200	PVC	SDR 35	0.50	23.7	2.63%	0.75	
R4A	4	3	0.16	0	9	0	24	0.97	157	3.55	1.8	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.16	0.97	0.3	2.1	23.6	250	PVC	SDR 35	0.40	38.3	5.59%	0.77	
R3A	3	2	0.12	0	6	0	16	1.09	173	3.54	2.0	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.12	1.09	0.4	2.4	13.6	250	PVC	SDR 35	0.40	38.3	6.16%	0.77	
	2	1	0.00	0	0	0	0	1.09	173	3.54	2.0	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	1.09	0.4	2.4	13.5	250	PVC	SDR 35	2.00	85.7	2.76%	1.73	
																											250						
R9A	9	8	1.87	0	102	24	319	1.87	319	3.45	3.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	1.87	1.87	0.6	4.2	4.5	250	PVC	SDR 35	0.40	38.3	10.91%	0.77	
	8	1	0.00	0	0	0	0	1.87	319	3.45	3.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	1.87	0.6	4.2	14.9	250	PVC	SDR 35	0.40	38.3	10.91%	0.77	
																											250						

B.2 Sanitary Design Background Report Excerpts



Mattamy Northwoods Subdivision

Servicing and Stormwater Management Report



Prepared for:
Mattamy Homes Ltd.

February 25, 2025

Prepared by:
Stantec Consulting Ltd.

Project/File:
160401977

MATTAMY NORTHWOODS SUBDIVISION - SERVICING AND STORMWATER MANAGEMENT REPORT

Wastewater Servicing
February 25, 2025

4 Wastewater Servicing

4.1 Background

Two existing sanitary collection systems service the KNUFA and the Mattamy Northwoods Subdivision as outlined in the KNMSS (see report excerpts in **Appendix B.2**).

The eastern portion of the development will be serviced by the sanitary sewer network that conveys wastewater to the Briar Ridge Pump Station (BRPS), located south of Klondike Road and east of the former CN railway corridor. The BRPS discharges into the East March Trunk sanitary sewer. Upgrades are underway at the pump station as part of a City of Ottawa capital project. Commissioning of the upgraded pump station was scheduled for completion in April 2024 but has been delayed. The City of Ottawa has established a temporary solution to allow the upstream developments to proceed in advance of commissioning of the BRPS upgrades. The KNMSS assumed sewage from 19.80 ha within the proposed site would be directed to the BRPS outlet with a total peak flow of 26.4 L/s (see KNMSS excerpts in **Appendix B.2**).

The western portion of the development at the top of the ridge will outlet to the recently installed 600mm sanitary trunk sewer in March Road. The KNMSS assumed sewage from 19.99 ha within the proposed site would be directed to the March Road outlet with a total peak flow of 28.7 L/s (see KNMSS excerpts in **Appendix B.2**).

As part of the KNMSS, a hydraulic grade line (HGL) analysis was completed on the BRPS to ensure that, when the future lands within the KNUFA are added to the system, there were no negative impacts to the existing developments. The existing BRPS has two existing overflow outlets to provide relief to the system in the event of failure. The analysis concluded that an additional overflow outlet discharging into the KNUFA SWM Pond 3 (Overflow invert of 67.50 m) would be required to minimize any negative impacts on the existing subdivision. The sanitary overflow to Pond 3 has been incorporated into the DSEL design for the Minto Brookline Subdivision.

4.2 Design Criteria

The sanitary sewer design sheet is included in **Appendix B.1**. The sewers have been designed in conformance with all relevant City of Ottawa and MECP Guidelines and Policies. Per ISTB-2018-01, the City's current design parameters represent a flow reduction from the outdated standards used within the KNMSS. As a result, the revised sanitary sewer design criteria differ from the criteria previously used in the KNMSS as shown in the **Table 4.1** below.



MATTAMY NORTHWOODS SUBDIVISION - SERVICING AND STORMWATER MANAGEMENT REPORT

Wastewater Servicing
February 25, 2025

Table 4.1: Sanitary Sewer Design Criteria Comparison

Design Parameters	Revised Design Criteria (City Guidelines - 2018)	2016 KNMSS Criteria
Minimum Velocity (m/s)	0.6	
Maximum Velocity (m/s)	3.0	
Manning roughness coefficient for all smooth wall pipes	0.013	
Minimum size	200mm dia. for residential areas, 250mm for commercial areas	
Single Family Persons per unit	3.4	3.4
Townhouse Persons per unit	2.7	2.7
Average Apartment Persons per unit	1.8	1.8
Extraneous Flow Allowance (L/s/ha)	0.33	0.28
Manhole Spacing (m)	120 m	
Minimum Cover (m)	2.5 m	
Average Daily Discharge / Person (L/cap/day)	280	350
Harmon Correction Factor	0.8	1.0
Institutional Daily Flow (L/ha/day)	28,000	28,000
Commercial Daily Flow (L/ha/day)	28,000	50,000

4.3 Sanitary Servicing

The wastewater servicing for the proposed development was considered within the KNMSS and the functional design. Sanitary sewage from the eastern portion of the development will drain the south, with a connection to the sanitary sewer system within the Minto Brookline Subdivision. The western portion of the development at the top of the ridge will drain to the west, with a connection to the 600 mm diameter trunk sanitary sewer in March Road (see **Appendix B.2**). **Drawings SA-1 and SA-2** detail the wastewater servicing and sanitary drainage areas for the development.

The proposed development will be serviced by a network of gravity sewers, designed in accordance with the wastewater design parameters from ISTB-2018-01 and the Sewer Design Guidelines, summarized above.

The sanitary sewer design sheet can be found in **Appendix B.1**. A breakdown of the estimated sewage peak flows that will be directed to each outlet is shown in **Table 4.2**.

Table 4.2: Estimated Wastewater Peak Flows



MATTAMY NORTHWOODS SUBDIVISION - SERVICING AND STORMWATER MANAGEMENT REPORT

Wastewater Servicing
February 25, 2025

Sanitary Outlet	Residential Population (persons)	Residential Peak Flow (L/s)	Institutional Area (ha)	Commercial Area (ha)	Commercial /Institutional Peak Flow (L/s)	Total Area (ha)	Extraneous Flow (L/s)	Total Peak Flow (L/s)
BRPS (via Minto Brookline)	1,681	17.0	N/A	N/A	N/A	22.85	7.5	24.5
March Road	800	8.5	2.84	2.96	2.8	15.66	5.2	16.5

As can be seen in the above table, the total design peak flows to the March Road outlet and BRPS outlet are less than the peak flows assumed in the KNMSS of 28.7 L/s and 26.4 L/s respectively.

4.4 Sanitary HGL Analysis

The BRPS sanitary sewer overflow outlet at MH1470A will provide emergency relief to the sanitary sewer network under emergency conditions via a 375 mm diameter sewer with an invert of 67.50 m that will outlet into the Minto Brookline storm sewer and SWM Pond 3. The proposed minimum unit underside of footing elevations exceeds the 0.3m freeboard requirement between the sanitary sewer HGL and USF. Results of the analyses are demonstrated in **Table 4.3** below, as well as within **Appendix B**.

Table 4.3: Emergency Overflow HGL

Manhole	Rim Elev. (m)	Adjacent USF (m)	HGL (m)	Freeboard
1	72.39	70.59	67.66	2.93
2	72.41	70.55	67.89	2.66
3	72.14	70.45	68.08	2.37
4	72.18	70.41	68.11	2.30
5	72.31	70.41	68.18	2.23
6	72.29	70.27	69	1.27
7	72.16	70.06	69.09	0.97
8	72.08	69.74	69.14	0.60
9	72.21	70.01	69.27	0.74
10	72.50	70.41	69.43	0.98
11	72.60	70.41	69.57	0.84
11A	72.51	70.57	69.84	0.73
12	72.99	70.77	70.14	0.63
13	73.23	71.36	70.39	0.97
14	72.61	70.61	69.8	0.81



Appendix B Wastewater Servicing

B.1 Sanitary Sewer Design Sheet



Stantec			SUBDIVISION:		SANITARY SEWER DESIGN SHEET (City of Ottawa) FILE NUMBER:160401977								DESIGN PARAMETERS																																																																						
			1020 & 1070 March Road																																																																																
			DATE:2024-06-18 REVISION:3 DESIGNED BY:WAJ CHECKED BY:DCT																																																																																
MAX PEAK FACTOR (RES.):=4.0 MIN PEAK FACTOR (RES.):=2.0 PEAKING FACTOR (INDUSTRIAL):2.4 PEAKING FACTOR (ICI >20%):1.5 PERSONS / SINGLE3.4 PERSONS / TOWNHOME2.7 PERSONS / APARTMENT1.8																												AVG. DAILY FLOW / PERSON280 l/p/day COMMERCIAL28,000 l/ha/day INDUSTRIAL (HEAVY)55,000 l/ha/day INDUSTRIAL (LIGHT)35,000 l/ha/day INSTITUTIONAL28,000 l/ha/day INFILTRATION0.33 l/s/Ha																												MINIMUM VELOCITY0.60 m/s MAXIMUM VELOCITY3.00 m/s MANNINGS n0.013 BEDDING CLASSB MINIMUM COVER2.50 m HARMON CORRECTION FACTOR0.8																											
LOCATION			RESIDENTIAL AREA AND POPULATION										COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+H	INFILTRATION			TOTAL	PIPE																																																							
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (ha)	SINGLE	UNITS TOWN	APT	POP.	CUMULATIVE AREA (ha)	POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	FLOW (l/s)	LENGTH (m)	DIA (mm)	MATERIAL	CLASS	SLOPE (%)	CAP. (FULL) (l/s)	CAP. V PEAK FLOW (%)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)																																																		
R110B	110	108	0.47	10	0	0	34	0.47	34	3.68	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.47	0.47	0.2	0.6	58.4	200	PVC	SDR 35	0.65	27.0	2.08%	0.85	0.29																																																		
R108A	108	107	0.52	11	0	0	37	0.99	71	3.62	0.8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.52	0.99	0.3	1.2	61.2	200	PVC	SDR 35	0.45	22.4	5.19%	0.71	0.31																																																		
R107A	107	106	0.17	2	0	0	7	1.16	78	3.62	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.17	1.16	0.4	1.3	10.9	200	PVC	SDR 35	0.45	22.4	5.79%	0.71	0.32																																																		
R106A	106	105	0.27	5	0	0	17	1.43	95	3.60	1.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.27	1.43	0.5	1.6	66.3	200	PVC	SDR 35	0.45	22.4	7.06%	0.71	0.34																																																		
R133A	133	130	0.25	5	0	0	17	0.25	17	3.71	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.25	0.25	0.1	0.3	28.8	200	PVC	SDR 35	0.65	27.0	1.06%	0.85	0.23																																																		
R130A	130	129	0.40	7	0	0	24	0.65	41	3.67	0.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.40	0.65	0.2	0.7	62.1	200	PVC	SDR 35	0.32	18.9	3.69%	0.60	0.24																																																		
R129A	129	128	0.59	0	20	0	54	1.24	95	3.60	1.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.59	1.24	0.4	1.5	93.8	300	PVC	SDR 35	0.19	42.0	3.61%	0.60	0.24																																																		
R128A, I128B	128	127	0.25	0	10	0	27	1.49	122	3.58	1.4	0.00	0.00	0.00	0.00	2.84	2.84	0.00	0.00	1.4	3.09	4.33	1.4	4.2	65.9	300	PVC	SDR 35	0.19	42.0	10.06%	0.60	0.32																																																		
R127A	127	126	0.18	0	7	0	19	1.67	141	3.56	1.6	0.00	0.00	0.00	0.00	2.84	2.84	0.00	0.00	1.4	0.18	4.51	1.5	4.5	59.7	300	PVC	SDR 35	0.19	42.0	10.70%	0.60	0.33																																																		
R126A	126	105	0.12	0	0	0	0	1.79	141	3.56	1.6	0.00	0.00	0.00	0.00	2.84	2.84	0.00	0.00	1.4	0.12	4.63	1.5	4.5	74.0	300	PVC	SDR 35	0.19	42.0	10.80%	0.60	0.33																																																		
R105A	105	104	0.49	9	2	0	36	3.71	272	3.48	3.1	0.00	0.00	0.00	0.00	2.84	2.84	0.00	0.00	1.4	0.49	6.55	2.2	6.6	70.3	300	PVC	SDR 35	0.19	42.0	15.74%	0.60	0.36																																																		
R104A	104	103	0.45	9	1	0	33	4.16	305	3.46	3.4	0.00	0.00	0.00	0.00	2.84	2.84	0.00	0.00	1.4	0.45	7.00	2.3	7.1	64.7	300	PVC	SDR 35	0.19	42.0	16.95%	0.60	0.37																																																		
R110A	110	109	0.16	0	2	0	5	0.16	5	3.75	0.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.16	0.16	0.1	0.1	10.8	200	PVC	SDR 35	0.70	28.0	0.42%	0.88	0.19																																																		
R109A	109	103	0.27	0	7	0	19	0.43	24	3.69	0.3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.27	0.43	0.1	0.4	66.3	200	PVC	SDR 35	0.70	28.0	1.55%	0.88	0.27																																																		
R133B	133	132	0.63	14	0	0	48	0.63	48	3.66	0.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.63	0.63	0.2	0.8	75.9	200	PVC	SDR 35	0.32	18.9	4.08%	0.60	0.24																																																		
R132A	132	131	0.41	8	0	0	27	1.04	75	3.62	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.41	1.04	0.3	1.2	59.4	200	PVC	SDR 35	0.32	18.9	6.45%	0.60	0.28																																																		
R131A	131	124	0.11	1	0	0	3	1.14	78	3.62	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.11	1.14	0.4	1.3	11.5	200	PVC	SDR 35	0.32	18.9	6.84%	0.60	0.28																																																		
R124A	124	123	0.28	5	0	0	17	1.42	95	3.60	1.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.28	1.42	0.5	1.6	59.8	200	PVC	SDR 35	0.32	18.9	8.35%	0.60	0.30																																																		
R123A	123	122	0.08	0	1	0	3	1.51	98	3.60	1.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.08	1.51	0.5	1.6	11.5	200	PVC	SDR 35	0.32	18.9	8.66%	0.60	0.30																																																		
R122A	122	113	0.55	0	20	0	54	2.05	152	3.55	1.7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.55	2.05	0.7	2.4	90.0	250	PVC	SDR 35	0.25	30.3	8.00%	0.61	0.30																																																		
R121A	121	120	0.09	0	1	0	3	0.09	3	3.76	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.09	0.09	0.0	0.1	8.1	200	PVC	SDR 35	0.65	27.0	0.23%	0.85	0.13																																																		
R120B	120	119	0.19	0	6	0	16	0.28	19	3.71	0.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.19	0.28	0.1	0.3	45.0	200	PVC	SDR 35	0.32	18.9	1.68%	0.60	0.18																																																		
R119B	119	113	0.20	0	6	0	16	0.47	35	3.67	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.20	0.47	0.2	0.6	45.0	200	PVC	SDR 35	0.32	18.9	3.04%	0.60	0.23																																																		
R113A	113	112	0.30	0	13	0	35	2.83	222	3.50	2.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.30	2.83	0.9	3.5	70.4	300	PVC	SDR 35	0.19	42.0	8.23%	0.60	0.30																																																		
R112A	112	111	0.30	0	13	0	35	3.13	257	3.48	2.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.30	3.13	1.0	3.9	56.2	300	PVC	SDR 35	0.19	42.0	9.38%	0.60	0.31																																																		
R119A	119	117	0.26	0	14	0	38	0.26	38	3.67	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.26	0.26	0.1	0.5	64.5	200	PVC	SDR 35	0.32	18.9	2.84%	0.60	0.22																																																		
R117A	117	114	0.25	0	14	0	38	0.51	76	3.62	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.25	0.51	0.2	1.1	61.8	200	PVC	SDR 35	0.32	18.9	5.59%	0.60	0.27																																																		
R120A	120	118	0.26	0	14	0	38	0.26	38	3.67	0.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.26	0.26	0.1	0.5	65.9	200	PVC	SDR 35	0.32	18.9	2.84%	0.60	0.22																																																		
R118A	118	115	0.25	0	14	0	38	0.51	76	3.62	0.9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.25	0.51	0.2	1.1	60.0	200	PVC	SDR 35	0.32	18.9	5.58%	0.60	0.27																																																		
R116A	116	115	0.15	0	4	0	11	0.15	11	3.73	0.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.15	0.15	0.1	0.2	28.1	200	PVC	SDR 35	0.65	27.0	0.67%	0.85	0.21																																																		
R115A	115	114	0.18	0	6	0	16	0.84	103	3.59	1.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.18	0.84	0.3																																																												

Appendix C Stormwater Management and Servicing

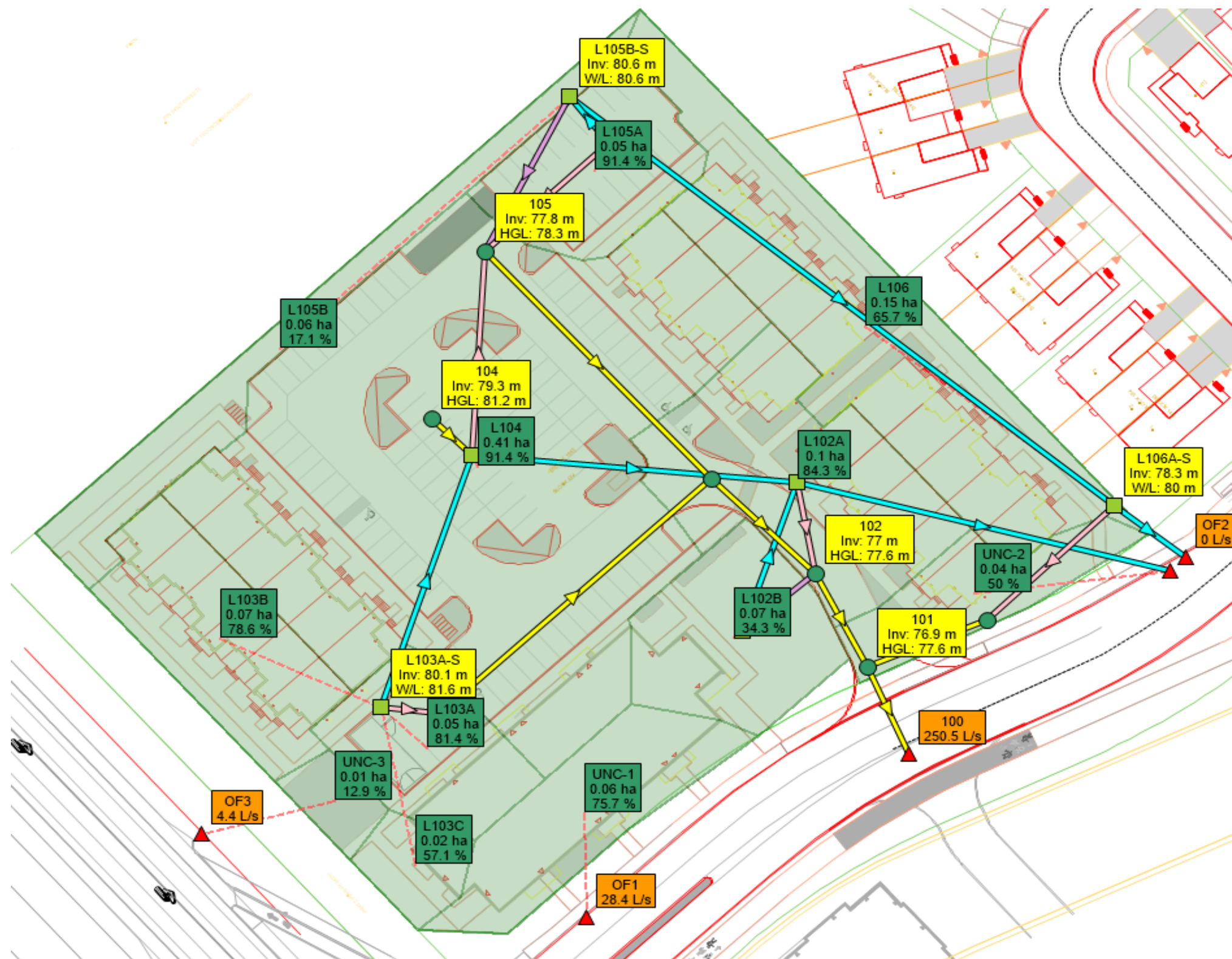
C.1 Storm Sewer Design Sheet



 Stantec	Northwoods Block 454			STORM SEWER DESIGN SHEET (City of Ottawa)										DESIGN PARAMETERS																							
	DATE: 2026-03-12													I = a / (t+b) ² (As per City of Ottawa Guidelines, 2012)																							
	REVISION: 1			FILE NUMBER: 160402120															a =	732.951	998.071	1174.184	1735.688	MANNING'S n =	0.013	BEDDING CLASS = B											
	DESIGNED BY: MJS																		b =	6.199	6.053	6.014	6.014	MINIMUM COVER:	2.00				m								
	CHECKED BY: MW																		c =	0.810	0.814	0.816	0.820	TIME OF ENTRY	10				min								
LOCATION			DRAINAGE AREA																		PIPE SELECTION																
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (2-YEAR) (ha)	AREA (5-YEAR) (ha)	AREA (10-YEAR) (ha)	AREA (100-YEAR) (ha)	AREA (ROOF) (ha)	C (2-YEAR) (-)	C (5-YEAR) (-)	C (10-YEAR) (-)	C (100-YEAR) (-)	A x C (2-YEAR) (ha)	ACCUM AxC (2YR) (ha)	A x C (5-YEAR) (ha)	ACCUM AxC (5YR) (ha)	A x C (10-YEAR) (ha)	ACCUM AxC (10YR) (ha)	A x C (100-YEAR) (ha)	ACCUM AxC (100YR) (ha)	T of C (min)	I ₂ -YEAR (mm/h)	I ₅ -YEAR (mm/h)	I ₁₀ -YEAR (mm/h)	I ₁₀₀ -YEAR (mm/h)	Q _{CONTROL} (L/s)	ACCUM Q _{CONTROL} (L/s)	Q _{ACT} (CIA/360) (L/s)	LENGTH (m)	PIPE WIDTH OR DIAMETE (mm)	PIPE HEIGHT (mm)	PIPE SHAPE (-)	MATERIAL	CLASS (-)	SLOPE (%)	Q _{Cap} (FULL) (L/s)	% FULL (-)	VEL. (FULL) (m/s)
L106	106	101	0.15	0.00	0.00	0.00	0.00	0.66	0.00	0.00	0.00	0.100	0.100	0.000	0.000	0.000	0.000	0.000	0.000	10.43	76.81	104.19	122.14	178.56	0.0	0.0	21.4	18.5	300	300	CIRCULAR	PVC	-	0.50	68.0	31.48%	0.97
L103A,L103B,L103C,	103A	103	0.14	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.00	0.101	0.101	0.000	0.000	0.000	0.000	0.000	0.000	11.33	76.81	104.19	122.14	178.56	0.0	0.0	21.6	51.9	375	375	CIRCULAR	CONCRETE	-	0.40	104.3	20.75%	0.99
L104,L105B,L105A	105	103	0.52	0.00	0.00	0.00	0.00	0.78	0.00	0.00	0.00	0.406	0.406	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	86.6	46.6	450	450	CIRCULAR	CONCRETE	-	0.40	188.1	46.04%	1.15
L102A,L102B	103	102	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.507	0.000	0.000	0.000	0.000	0.000	0.000	11.33	72.06	97.67	114.46	167.27	0.0	0.0	101.6	20.5	525	525	CIRCULAR	CONCRETE	-	0.40	283.8	35.79%	1.27
	102	101	0.17	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.00	0.110	0.617	0.000	0.000	0.000	0.000	0.000	0.000	11.68	70.91	96.09	112.60	164.55	0.0	0.0	121.6	16.0	525	525	CIRCULAR	CONCRETE	-	0.40	283.8	42.86%	1.27
	101	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.718	0.000	0.000	0.000	0.000	0.000	0.000	11.94	70.09	94.97	111.28	162.61	0.0	0.0	139.7	13.6	525	525	CIRCULAR	CONCRETE	-	0.40	283.8	49.24%	1.27
L107A	107A	107	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	0.0	3.5	600	600	CIRCULAR	CONCRETE	-	0.40	405.1	0.00%	1.39
	107	100	1.87	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	1.306	1.306	0.000	0.000	0.000	0.000	0.000	0.000	10.19	76.81	104.19	122.14	178.56	0.0	0.0	278.7	15.3	600	600	CIRCULAR	CONCRETE	-	0.40	405.1	68.80%	1.39

C.2 Schematic and Sample PCSWMM Input and Output Files





EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)

WARNING 03: negative offset ignored for Link C105A-IC

Element Count

Number of rain gages 4
 Number of subcatchments ... 12
 Number of nodes 19
 Number of links 21
 Number of pollutants 0
 Number of land uses 0

Raingage Summary

Name	Data Source	Data Type	Recording Interval
002	002_CHI	INTENSITY	10 min.
005	005_CHI	INTENSITY	10 min.
100	100_CHI	INTENSITY	10 min.
120	120_CHI	INTENSITY	10 min.

Subcatchment Summary

Name Outlet	Area	Width	%Imperv	%Slope	Rain Gage
----------------	------	-------	---------	--------	-----------

L102A	0.10	25.46	84.29	0.6000	100
L102A-S					
L102B	0.07	28.30	34.29	3.0000	100
L102B-S					
L103A	0.05	25.99	81.43	1.7000	100
L103A-S					
L103B	0.07	18.20	78.57	1.7000	100
L103A-S					
L103C	0.02	4.10	57.14	0.7000	100
L103A-S					
L104	0.41	35.87	91.43	2.5000	100
L104C-S					
L105A	0.05	15.78	91.43	1.0000	100

L105A-S					
L105B	0.06	5.03	17.14	33.0000	100
L105B-S					
L106	0.15	14.46	65.71	2.0000	100
L106A-S					
UNC-1	0.06	55.74	75.71	3.0000	100
OF1					
UNC-2	0.04	42.80	50.00	2.7000	100
OF4					
UNC-3	0.01	15.84	12.86	0.7000	100
OF3					

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
-----	-----	-----	-----	-----	-----
100	OUTFALL	76.77	0.90	0.0	
OF1	OUTFALL	80.09	0.00	0.0	
OF2	OUTFALL	80.31	0.00	0.0	
OF3	OUTFALL	81.16	0.00	0.0	
OF4	OUTFALL	80.83	0.00	0.0	
101	STORAGE	76.90	4.28	0.0	
102	STORAGE	76.99	4.12	0.0	
103	STORAGE	77.10	4.16	0.0	
103A	STORAGE	78.97	2.74	0.0	
104	STORAGE	79.32	2.07	0.0	
105	STORAGE	77.77	3.62	0.0	
106	STORAGE	77.44	3.55	0.0	
L102A-S	STORAGE	79.60	1.56	0.0	
L102B-S	STORAGE	79.72	1.63	0.0	
L103A-S	STORAGE	80.07	1.63	0.0	
L104C-S	STORAGE	78.80	2.58	0.0	
L105A-S	STORAGE	79.48	1.72	0.0	
L105B-S	STORAGE	80.58	0.50	0.0	
L106A-S	STORAGE	78.27	1.98	0.0	

Link Summary

Name	From Node	To Node	Type	Length
-----	-----	-----	-----	-----
C1	104	L104C-S	CONDUIT	15.0
0.1333 0.0130				

Pipe_10	103A	103	CONDUIT	51.9
0.4006 0.0130				
Pipe_13	105	103	CONDUIT	46.6
0.3992 0.0130				
Pipe_22	106	101	CONDUIT	18.5
0.4978 0.0130				
Pipe_41	102	101	CONDUIT	16.0
0.4005 0.0130				
Pipe_8	101	100	CONDUIT	13.6
0.3969 0.0130				
Pipe_9	103	102	CONDUIT	20.5
0.3998 0.0130				
C102A-IC	L102A-S	102	ORIFICE	
C103A-IC	L103A-S	103A	ORIFICE	
C104C-IC	L104C-S	105	ORIFICE	
C105A-IC	L105A-S	105	ORIFICE	
C106A-IC	L106A-S	106	ORIFICE	
W2	L102B-S	L102A-S	WEIR	
W3	L102A-S	OF4	WEIR	
W4	L106A-S	OF2	WEIR	
W5	L105B-S	L106A-S	WEIR	
W6	L104C-S	L102A-S	WEIR	
W7	L105A-S	L105B-S	WEIR	
W8	L103A-S	L104C-S	WEIR	
C102B-IC	L102B-S	102	OUTLET	
OR4	L105B-S	105	OUTLET	

Cross Section Summary

Full Conduit Flow	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels

C1	CIRCULAR	0.90	0.64	0.23	0.90	1
661.07						
Pipe_10	CIRCULAR	0.38	0.11	0.09	0.38	1
110.97						
Pipe_13	CIRCULAR	0.45	0.16	0.11	0.45	1
180.15						
Pipe_22	CIRCULAR	0.30	0.07	0.07	0.30	1
68.23						
Pipe_41	CIRCULAR	0.53	0.22	0.13	0.53	1
272.19						
Pipe_8	CIRCULAR	0.53	0.22	0.13	0.53	1
270.95						

Pipe_9	CIRCULAR	0.53	0.22	0.13	0.53	1
271.96						

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 ..... 11/02/2025 00:00:00
Ending Date ..... 11/03/2025 00:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:01:00
Wet Time Step ..... 00:01:00
Dry Time Step ..... 00:01:00
Routing Time Step ..... 5.00 sec
Variable Time Step ..... NO
Maximum Trials ..... 8
Number of Threads ..... 1
Head Tolerance ..... 0.001500 m

```

	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation	0.078	71.667
Evaporation Loss	0.000	0.000
Infiltration Loss	0.012	11.469
Surface Runoff	0.064	59.084
Final Storage	0.001	1.173
Continuity Error (%)	-0.083	

	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
*****	-----	-----
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.064	0.643
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000

External Inflow	0.000	0.000
External Outflow	0.064	0.641
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.002
Continuity Error (%)	0.024	

Highest Flow Instability Indexes

All links are stable.

Most Frequent Nonconverging Nodes

Convergence obtained at all time steps.

Routing Time Step Summary

Minimum Time Step	:	5.00 sec
Average Time Step	:	5.00 sec
Maximum Time Step	:	5.00 sec
% of Time in Steady State	:	0.00
Average Iterations per Step	:	2.01
% of Steps Not Converging	:	0.02

Subcatchment Runoff Summary

Perv		Total	Total	Total	Total	Total	Imperv
Runoff	Runoff	Runoff	Peak	Runoff	Evap	Infil	Runoff
Subcatchment	Runoff	Runoff	Precip	Runoff			
mm	mm	10^6 ltr	mm	Coeff	mm	mm	mm
			LPS				
L102A		71.67		0.00	0.00	7.04	59.13

4.23	63.36	0.07	48.11	0.884			
L102B			71.67	0.00	0.00	29.50	24.07
17.62	41.69	0.03	24.89	0.582			
L103A			71.67	0.00	0.00	8.19	57.16
5.14	62.30	0.03	24.27	0.869			
L103B			71.67	0.00	0.00	9.55	55.14
5.82	60.96	0.04	32.07	0.851			
L103C			71.67	0.00	0.00	19.96	40.09
10.76	50.86	0.01	6.64	0.710			
L104			71.67	0.00	0.00	3.82	64.13
2.33	66.46	0.27	195.93	0.927			
L105A			71.67	0.00	0.00	3.78	64.15
2.37	66.52	0.04	26.59	0.928			
L105B			71.67	0.00	0.00	37.99	12.04
21.42	33.45	0.02	15.89	0.467			
L106			71.67	0.00	0.00	16.07	46.10
8.51	54.61	0.08	58.50	0.762			
UNC-1			71.67	0.00	0.00	10.66	53.16
6.78	59.94	0.04	28.40	0.836			
UNC-2			71.67	0.00	0.00	22.05	35.10
13.83	48.93	0.02	18.38	0.683			
UNC-3			71.67	0.00	0.00	39.07	9.02
23.42	32.44	0.00	4.40	0.453			

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
100	OUTFALL	0.19	0.79	77.56	0 01:10	0.79
OF1	OUTFALL	0.00	0.00	80.09	0 00:00	0.00
OF2	OUTFALL	0.00	0.00	80.31	0 00:00	0.00
OF3	OUTFALL	0.00	0.00	81.16	0 00:00	0.00
OF4	OUTFALL	0.00	0.00	80.83	0 00:00	0.00
101	STORAGE	0.31	0.71	77.61	0 01:10	0.70
102	STORAGE	0.31	0.66	77.65	0 01:10	0.65
103	STORAGE	0.31	0.59	77.70	0 01:10	0.59
103A	STORAGE	0.30	0.47	79.43	0 01:10	0.47
104	STORAGE	0.07	1.93	81.25	0 01:20	1.93
105	STORAGE	0.31	0.54	78.31	0 01:10	0.54
106	STORAGE	0.30	0.53	77.97	0 01:11	0.53
L102A-S	STORAGE	0.02	1.45	81.05	0 01:10	1.45
L102B-S	STORAGE	0.04	1.55	81.27	0 01:10	1.55
L103A-S	STORAGE	0.06	1.55	81.62	0 01:10	1.55
L104C-S	STORAGE	0.11	2.45	81.25	0 01:20	2.45

L105A-S	STORAGE	0.02	1.53	81.01	0	01:07	1.53
L105B-S	STORAGE	0.00	0.07	80.65	0	01:10	0.07
L106A-S	STORAGE	0.60	1.77	80.04	0	01:10	1.77

Node Inflow Summary

Total Flow		Type	Maximum	Maximum	Lateral	
Inflow	Balance		Lateral	Total	Time of Max	Inflow
Volume	Error		Inflow	Inflow	Occurrence	Volume
Node	Percent		LPS	LPS	days hr:min	10^6 ltr
ltr						10^6
100		OUTFALL	0.00	250.54	0 01:10	0
0.582	0.000					
OF1		OUTFALL	28.40	28.40	0 01:10	0.0356
0.0356	0.000					
OF2		OUTFALL	0.00	0.00	0 00:00	0
0	0.000 ltr					
OF3		OUTFALL	4.40	4.40	0 01:10	0.00412
0.00412	0.000					
OF4		OUTFALL	18.38	18.38	0 01:10	0.0198
0.0198	0.000					
101		STORAGE	0.00	249.18	0 01:10	0
0.582	-0.058					
102		STORAGE	0.00	200.41	0 01:10	0
0.5	0.024					
103		STORAGE	0.00	140.07	0 01:10	0
0.408	-0.055					
103A		STORAGE	0.00	38.61	0 01:10	0
0.0758	0.007					
104		STORAGE	0.00	41.73	0 01:03	0
0.00743	-2.038					
105		STORAGE	0.00	103.43	0 01:09	0
0.333	-0.002					
106		STORAGE	0.00	48.06	0 01:10	0
0.0822	0.011					
L102A-S		STORAGE	48.11	65.20	0 01:10	0.065
0.0697	0.161					
L102B-S		STORAGE	24.89	24.89	0 01:10	0.0274

0.0274	0.176						
L103A-S		STORAGE	62.98	62.98	0	01:10	0.0827
0.0827	0.223						
L104C-S		STORAGE	195.93	220.05	0	01:10	0.271
0.285	-0.054						
L105A-S		STORAGE	26.59	26.59	0	01:10	0.0362
0.0362	0.026						
L105B-S		STORAGE	15.89	26.44	0	01:10	0.0191
0.0228	0.005						
L106A-S		STORAGE	58.50	58.50	0	01:10	0.083
0.083	0.666						

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Max		Average	Avg	Evap	Exfil	Maximum	Max	Time of
Occurrence	Maximum Outflow	Volume	Pcnt	Pcnt	Pcnt	Volume	Pcnt	
Storage Unit	1000 m	Full	Loss	Loss	Loss	1000 m	Full	days
hr:min	LPS							
101		0.000	7.3	0.0	0.0	0.001	16.5	0
01:10	250.54							
102		0.000	7.6	0.0	0.0	0.001	16.0	0
01:10	201.29							
103		0.000	7.5	0.0	0.0	0.001	14.3	0
01:10	139.51							
103A		0.000	11.0	0.0	0.0	0.001	17.1	0

01:10	38.61							
104		0.000	3.6	0.0	0.0	0.000	93.2	0
01:20	30.91							
105		0.000	8.6	0.0	0.0	0.001	14.9	0
01:10	101.46							
106		0.000	8.5	0.0	0.0	0.001	15.0	0
01:11	47.99							
L102A-S		0.000	0.2	0.0	0.0	0.001	31.4	0
01:10	53.88							
L102B-S		0.000	0.9	0.0	0.0	0.004	55.7	0
01:10	24.30							
L103A-S		0.000	0.6	0.0	0.0	0.004	57.8	0
01:10	62.73							
L104C-S		0.002	1.1	0.0	0.0	0.076	48.1	0
01:20	96.83							
L105A-S		0.000	0.2	0.0	0.0	0.001	11.8	0
01:07	30.88							
L105B-S		0.000	0.3	0.0	0.0	0.000	14.9	0
01:10	27.14							
L106A-S		0.000	3.5	0.0	0.0	0.004	64.0	0
01:10	48.06							

 Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
100	22.95	29.32	250.54	0.582
OF1	12.19	3.38	28.40	0.036
OF2	0.00	0.00	0.00	0.000
OF3	9.31	0.51	4.40	0.004
OF4	11.81	1.94	18.38	0.020
System	11.25	35.15	291.81	0.641

 Link Flow Summary

Link	Type	Maximum Flow LPS	Time of Max Occurrence days hr:min	Maximum Veloc m/sec	Max/ Full Flow	Max/ Full Depth

C1	CONDUIT	41.73	0	01:03	0.39	0.06	1.00
Pipe_10	CONDUIT	38.61	0	01:10	0.90	0.35	0.41
Pipe_13	CONDUIT	101.46	0	01:10	1.24	0.56	0.51
Pipe_22	CONDUIT	47.99	0	01:11	0.96	0.70	0.67
Pipe_41	CONDUIT	201.29	0	01:10	1.38	0.74	0.70
Pipe_8	CONDUIT	250.54	0	01:10	1.59	0.92	0.78
Pipe_9	CONDUIT	139.51	0	01:10	1.16	0.51	0.60
C102A-IC	ORIFICE	53.88	0	01:10			1.00
C103A-IC	ORIFICE	38.61	0	01:10			1.00
C104C-IC	ORIFICE	60.17	0	01:20			1.00
C105A-IC	ORIFICE	16.74	0	01:06			1.00
C106A-IC	ORIFICE	48.06	0	01:10			1.00
W2	WEIR	17.20	0	01:10			0.16
W3	WEIR	0.00	0	00:00			0.00
W4	WEIR	0.00	0	00:00			0.00
W5	WEIR	0.00	0	00:00			0.00
W6	WEIR	0.00	0	00:00			0.00
W7	WEIR	14.14	0	01:07			0.11
W8	WEIR	24.11	0	01:10			0.20
C102B-IC	DUMMY	7.11	0	01:10			
OR4	DUMMY	27.14	0	01:09			

Flow Classification Summary

		Adjusted	----- Fraction of Time in Flow Class							
		/Actual	Up		Down	Sub	Sup	Up	Down	Norm
Inlet	Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd
Ctrl										

--										
C1		1.00	0.04	0.00	0.00	0.05	0.00	0.00	0.91	0.00
0.00										
Pipe_10		1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00
0.00										
Pipe_13		1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00
0.00										
Pipe_22		1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00
0.00										
Pipe_41		1.00	0.02	0.00	0.00	0.01	0.00	0.00	0.96	0.00
0.00										
Pipe_8		1.00	0.02	0.00	0.00	0.02	0.00	0.00	0.95	0.00

0.00
Pipe_9 1.00 0.02 0.00 0.00 0.02 0.00 0.00 0.96 0.00
0.00

Conduit Surcharge Summary

Conduit	----- Hours Full -----			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited

C1	0.93	0.93	0.93	0.01	0.01

Analysis begun on: Tue May 19 10:14:43 2026
Analysis ended on: Tue May 19 10:14:44 2026
Total elapsed time: 00:00:01

C.3 Storm Design Background Report Excerpts



Mattamy Northwoods Subdivision

Servicing and Stormwater Management Report



Prepared for:
Mattamy Homes Ltd.

February 25, 2025

Prepared by:
Stantec Consulting Ltd.

Project/File:
160401977

MATTAMY NORTHWOODS SUBDIVISION - SERVICING AND STORMWATER MANAGEMENT REPORT

Storm Drainage
February 25, 2025

Refer to **Table 5.12** for depth of flow in culvert C-1.

5.5.3 Development Blocks

Peak discharge rates and required storage volumes for development blocks (including the proposed school and park blocks) within the subdivision are noted in **Table 5.16** below. The proposed park block has been split into three catchments to represent treed areas to be retained that are anticipated to sheet flow to adjacent right-of-ways uncontrolled and managed within the ROW catchbasins.

Table 5.16: Storm Event Peak Discharge Rates to Pond 3

Catchment	2-Year Storm (L/s)	5-Year Storm (L/s)	100-Year Storm (L/s)	100-Year Storage Volume (m3)
C264A (Park)	27	84	294	0
C247B (Park)	2	14	68	0
C261B (Park)	3	25	120	0
C211B (School)	382	582	582	245
C216B (Block 454)	216	304	304	107
C216C (Block 453)	370	522	522	184

Stormwater management criteria for the future development blocks within the subdivision are noted in **Table 5.17** below.

Table 5.17: Future Development Block SWM Criteria

Catchment	Block Number	Allowable Minor System Release Rate up to the 100-Year Storm (L/s)	Allowable Major System Release Rate up to the 100-Year Storm (L/s)	Storage (up to 100-Year Storm)
C264A (Park)	456	294	0	Storage required for flows exceeding allowable release rate
C211B (School)	455	582	0	
C216B	454	304	0	
C216C	453	522	0	

The park block is divided into 3 drainage areas, two of the areas encompass the stand of white cedars which are to be retained as part of the park development. The City has asked that release rates be established for the portion of the forested portion of the park in the event that the trees are lost in the future and the area is considered for development. **Table 5.18** below provides the allowable release rates for the park block under that condition. Note that with development of the forested area of the park, adjustments to the ICDs in the downstream catchments within Leone Farrell Street will be required.



MATTAMY NORTHWOODS SUBDIVISION - SERVICING AND STORMWATER MANAGEMENT REPORT

Storm Drainage
February 25, 2025

Table 5.18: Park Block SWM Criteria (under condition of loss of cedar forest)

Catchment	Block Number	Allowable Minor System Release Rate up to the 100-Year Storm (L/s)	Allowable Major System Release Rate up to the 100-Year Storm (L/s)	Storage (up to 100-Year Storm)
C264A (Park)	456	294	0	Storage required for flows exceeding allowable release rate
C247B		58*	10*	
C261B		32**	88**	

* ICD control to be reduced to 90 L/s in C247A

** ICD control to be reduced to 55 L/s in C261A.

5.6 Results

Table 5.19 demonstrates the modeled peak outflow from each modeled connection point to the downstream KNUEA SWM Pond 3 during the design storm events assessed.

Table 5.19: Storm Event Peak Discharge Rates to Pond 3

Storm Event	Minor System Discharge (201-200) (m3/s)	Major System Discharge (C1) (m3/s)	Total Discharge (HWL-200) m3/s)	Per Approved Pond 3 PCSWMM Model
2-Year, 3 Hour Chicago	4.898	0.041	4.937	5.065
5-Year, 3 Hour Chicago	6.793	0.067	6.853	7.428
10-Year, 3 Hour Chicago	7.417	0.115	7.413	8.508
100-Year, 3 Hour Chicago	8.275	0.612	8.553	11.380
100-Year, 3 Hour Chicago + 20%	8.554	1.152	9.319	13.708
100-Year, 24 Hour SCS	8.191	0.359	8.280	10.602
July 1979	7.758	0.179	7.951	9.657
August 1988	7.858	0.219	7.922	9.347
August 1996	7.487	0.112	7.501	8.497

5.7 Quality Control

Per the Pond Design Brief for Kanata North Pond 3, the pond has been sized to provide 80% long term TSS removal to meet conservation authority requirements for the receiving watercourse. The accompanying PCSWMM model and drainage area plan prepared by JFSA for the design of Pond 3 includes a lumped drainage area from the proposed subdivision totaling 38.4ha at 73.4% imperviousness to discharge for treatment to Pond 3. Based on subcatchment parameters detailed in sections above discharging directly to Pond 3, the subdivision is proposed to direct runoff from approximately 35.73 ha at approximately 67.7% imperviousness. As Pond 3 provides approximately 15,000 m³ more permanent pool



Appendix C Stormwater Management and Servicing

C.1 Storm Sewer Design Sheet



Northwoods Phase 6 (Block 454) Boundary Conditions at STM MH 215

Backwater elevations					
Date/Time	Head	Date/Time	Head	Date/Time	Head
M/d/yyyy	m	M/d/yyyy	m	M/d/yyyy	m
6/11/2024 12:01:00 AM	76.82	6/11/2024 1:08:00 AM	77.56	6/11/2024 2:15:00 AM	76.98
6/11/2024 12:02:00 AM	76.82	6/11/2024 1:09:00 AM	77.56	6/11/2024 2:16:00 AM	76.98
6/11/2024 12:03:00 AM	76.82	6/11/2024 1:10:00 AM	77.56	6/11/2024 2:17:00 AM	76.98
6/11/2024 12:04:00 AM	76.82	6/11/2024 1:11:00 AM	77.56	6/11/2024 2:18:00 AM	76.98
6/11/2024 12:05:00 AM	76.82	6/11/2024 1:12:00 AM	77.56	6/11/2024 2:19:00 AM	76.98
6/11/2024 12:06:00 AM	76.82	6/11/2024 1:13:00 AM	77.56	6/11/2024 2:20:00 AM	76.98
6/11/2024 12:07:00 AM	76.82	6/11/2024 1:14:00 AM	77.53	6/11/2024 2:21:00 AM	76.98
6/11/2024 12:08:00 AM	76.82	6/11/2024 1:15:00 AM	77.48	6/11/2024 2:22:00 AM	76.97
6/11/2024 12:09:00 AM	76.82	6/11/2024 1:16:00 AM	77.48	6/11/2024 2:23:00 AM	76.97
6/11/2024 12:10:00 AM	76.82	6/11/2024 1:17:00 AM	77.47	6/11/2024 2:24:00 AM	76.9
6/11/2024 12:11:00 AM	76.82	6/11/2024 1:18:00 AM	77.47	6/11/2024 2:25:00 AM	76.97
6/11/2024 12:12:00 AM	76.82	6/11/2024 1:19:00 AM	77.47	6/11/2024 2:26:00 AM	76.97
6/11/2024 12:13:00 AM	76.82	6/11/2024 1:20:00 AM	77.47	6/11/2024 2:27:00 AM	76.97
6/11/2024 12:14:00 AM	76.82	6/11/2024 1:21:00 AM	77.46	6/11/2024 2:28:00 AM	76.97
6/11/2024 12:15:00 AM	76.82	6/11/2024 1:22:00 AM	77.45	6/11/2024 2:29:00 AM	76.97
6/11/2024 12:16:00 AM	76.82	6/11/2024 1:23:00 AM	77.44	6/11/2024 2:30:00 AM	76.97
6/11/2024 12:17:00 AM	76.82	6/11/2024 1:24:00 AM	77.44	6/11/2024 2:31:00 AM	76.97
6/11/2024 12:18:00 AM	76.82	6/11/2024 1:25:00 AM	77.22	6/11/2024 2:32:00 AM	76.96
6/11/2024 12:19:00 AM	76.82	6/11/2024 1:26:00 AM	77.15	6/11/2024 2:33:00 AM	76.96
6/11/2024 12:20:00 AM	76.82	6/11/2024 1:27:00 AM	77.14	6/11/2024 2:34:00 AM	76.96
6/11/2024 12:21:00 AM	76.82	6/11/2024 1:28:00 AM	77.14	6/11/2024 2:35:00 AM	76.96
6/11/2024 12:22:00 AM	76.82	6/11/2024 1:29:00 AM	77.13	6/11/2024 2:36:00 AM	76.96
6/11/2024 12:23:00 AM	76.82	6/11/2024 1:30:00 AM	77.13	6/11/2024 2:37:00 AM	76.96
6/11/2024 12:24:00 AM	76.82	6/11/2024 1:31:00 AM	77.12	6/11/2024 2:38:00 AM	76.96
6/11/2024 12:25:00 AM	76.82	6/11/2024 1:32:00 AM	77.10	6/11/2024 2:39:00 AM	76.96
6/11/2024 12:26:00 AM	76.83	6/11/2024 1:33:00 AM	77.09	6/11/2024 2:40:00 AM	76.96
6/11/2024 12:27:00 AM	76.84	6/11/2024 1:34:00 AM	77.08	6/11/2024 2:41:00 AM	76.96
6/11/2024 12:28:00 AM	76.86	6/11/2024 1:35:00 AM	77.08	6/11/2024 2:42:00 AM	76.96
6/11/2024 12:29:00 AM	76.88	6/11/2024 1:36:00 AM	77.07	6/11/2024 2:43:00 AM	76.96
6/11/2024 12:30:00 AM	76.90	6/11/2024 1:37:00 AM	77.07	6/11/2024 2:44:00 AM	76.96
6/11/2024 12:31:00 AM	76.92	6/11/2024 1:38:00 AM	77.07	6/11/2024 2:45:00 AM	76.95
6/11/2024 12:32:00 AM	76.93	6/11/2024 1:39:00 AM	77.07	6/11/2024 2:46:00 AM	76.95
6/11/2024 12:33:00 AM	76.95	6/11/2024 1:40:00 AM	77.06	6/11/2024 2:47:00 AM	76.95
6/11/2024 12:34:00 AM	76.96	6/11/2024 1:41:00 AM	77.06	6/11/2024 2:48:00 AM	76.95
6/11/2024 12:35:00 AM	76.97	6/11/2024 1:42:00 AM	77.05	6/11/2024 2:49:00 AM	76.95
6/11/2024 12:36:00 AM	76.97	6/11/2024 1:43:00 AM	77.05	6/11/2024 2:50:00 AM	76.95
6/11/2024 12:37:00 AM	76.98	6/11/2024 1:44:00 AM	77.04	6/11/2024 2:51:00 AM	76.95
6/11/2024 12:38:00 AM	76.98	6/11/2024 1:45:00 AM	77.04	6/11/2024 2:52:00 AM	76.95
6/11/2024 12:39:00 AM	76.98	6/11/2024 1:46:00 AM	77.03	6/11/2024 2:53:00 AM	76.95
6/11/2024 12:40:00 AM	76.99	6/11/2024 1:47:00 AM	77.03	6/11/2024 2:54:00 AM	76.95
6/11/2024 12:41:00 AM	76.99	6/11/2024 1:48:00 AM	77.03	6/11/2024 2:55:00 AM	76.95
6/11/2024 12:42:00 AM	77.00	6/11/2024 1:49:00 AM	77.03	6/11/2024 2:56:00 AM	76.95
6/11/2024 12:43:00 AM	77.01	6/11/2024 1:50:00 AM	77.03	6/11/2024 2:57:00 AM	76.95
6/11/2024 12:44:00 AM	77.02	6/11/2024 1:51:00 AM	77.03	6/11/2024 2:58:00 AM	76.95
6/11/2024 12:45:00 AM	77.02	6/11/2024 1:52:00 AM	77.02	6/11/2024 2:59:00 AM	76.95
6/11/2024 12:46:00 AM	77.03	6/11/2024 1:53:00 AM	77.02	6/11/2024 3:00:00 AM	76.95
6/11/2024 12:47:00 AM	77.03	6/11/2024 1:54:00 AM	77.01	6/11/2024 3:01:00 AM	76.95
6/11/2024 12:48:00 AM	77.03	6/11/2024 1:55:00 AM	77.01	6/11/2024 3:02:00 AM	76.95
6/11/2024 12:49:00 AM	77.03	6/11/2024 1:56:00 AM	77.01	6/11/2024 3:03:00 AM	76.95
6/11/2024 12:50:00 AM	77.04	6/11/2024 1:57:00 AM	77.01	6/11/2024 3:04:00 AM	76.94
6/11/2024 12:51:00 AM	77.05	6/11/2024 1:58:00 AM	77.01	6/11/2024 3:05:00 AM	76.94
6/11/2024 12:52:00 AM	77.09	6/11/2024 1:59:00 AM	77.01	6/11/2024 3:06:00 AM	76.94
6/11/2024 12:53:00 AM	77.12	6/11/2024 2:00:00 AM	77.00	6/11/2024 3:07:00 AM	76.94
6/11/2024 12:54:00 AM	77.14	6/11/2024 2:01:00 AM	77.00	6/11/2024 3:08:00 AM	76.94
6/11/2024 12:55:00 AM	77.16	6/11/2024 2:02:00 AM	77.00	6/11/2024 3:09:00 AM	76.94
6/11/2024 12:56:00 AM	77.16	6/11/2024 2:03:00 AM	77.00	6/11/2024 3:10:00 AM	76.94
6/11/2024 12:57:00 AM	77.17	6/11/2024 2:04:00 AM	76.99	6/11/2024 3:11:00 AM	76.94
6/11/2024 12:58:00 AM	77.17	6/11/2024 2:05:00 AM	76.99	6/11/2024 3:12:00 AM	76.93
6/11/2024 12:59:00 AM	77.17	6/11/2024 2:06:00 AM	76.99	6/11/2024 3:13:00 AM	76.93
6/11/2024 1:00:00 AM	77.18	6/11/2024 2:07:00 AM	76.99	6/11/2024 3:14:00 AM	76.92
6/11/2024 1:01:00 AM	77.25	6/11/2024 2:08:00 AM	76.99	6/11/2024 3:15:00 AM	76.91
6/11/2024 1:02:00 AM	77.51	6/11/2024 2:09:00 AM	76.99	6/11/2024 3:16:00 AM	76.91
6/11/2024 1:03:00 AM	77.55	6/11/2024 2:10:00 AM	76.99	6/11/2024 3:17:00 AM	76.90
6/11/2024 1:04:00 AM	77.55	6/11/2024 2:11:00 AM	76.99	6/11/2024 3:18:00 AM	76.89
6/11/2024 1:05:00 AM	77.55	6/11/2024 2:12:00 AM	76.99	6/11/2024 3:19:00 AM	76.89
6/11/2024 1:06:00 AM	77.55	6/11/2024 2:13:00 AM	76.98	6/11/2024 3:20:00 AM	76.89
6/11/2024 1:07:00 AM	77.56	6/11/2024 2:14:00 AM	76.98	6/11/2024 3:21:00 AM	76.88

Northwoods Phase 6 (Block 454) Boundary Conditions at STM MH 215

Date/Time	Head	Date/Time	Head	Date/Time	Head
M/d/yyyy	m	M/d/yyyy	m	M/d/yyyy	m
6/11/2024 3:22:00 AM	76.88	6/11/2024 4:30:00 AM	76.83	6/11/2024 5:38:00 AM	76.83
6/11/2024 3:23:00 AM	76.88	6/11/2024 4:31:00 AM	76.83	6/11/2024 5:39:00 AM	76.83
6/11/2024 3:24:00 AM	76.88	6/11/2024 4:32:00 AM	76.83	6/11/2024 5:40:00 AM	76.83
6/11/2024 3:25:00 AM	76.87	6/11/2024 4:33:00 AM	76.83	6/11/2024 5:41:00 AM	76.83
6/11/2024 3:26:00 AM	76.87	6/11/2024 4:34:00 AM	76.83	6/11/2024 5:42:00 AM	76.83
6/11/2024 3:27:00 AM	76.87	6/11/2024 4:35:00 AM	76.83	6/11/2024 5:43:00 AM	76.83
6/11/2024 3:28:00 AM	76.87	6/11/2024 4:36:00 AM	76.83	6/11/2024 5:44:00 AM	76.83
6/11/2024 3:29:00 AM	76.86	6/11/2024 4:37:00 AM	76.83	6/11/2024 5:45:00 AM	76.83
6/11/2024 3:30:00 AM	76.86	6/11/2024 4:38:00 AM	76.83	6/11/2024 5:46:00 AM	76.83
6/11/2024 3:31:00 AM	76.86	6/11/2024 4:39:00 AM	76.83	6/11/2024 5:47:00 AM	76.83
6/11/2024 3:32:00 AM	76.86	6/11/2024 4:40:00 AM	76.83	6/11/2024 5:48:00 AM	76.83
6/11/2024 3:33:00 AM	76.86	6/11/2024 4:41:00 AM	76.83	6/11/2024 5:49:00 AM	76.83
6/11/2024 3:34:00 AM	76.86	6/11/2024 4:42:00 AM	76.83	6/11/2024 5:50:00 AM	76.83
6/11/2024 3:35:00 AM	76.86	6/11/2024 4:43:00 AM	76.83	6/11/2024 5:51:00 AM	76.83
6/11/2024 3:36:00 AM	76.86	6/11/2024 4:44:00 AM	76.83	6/11/2024 5:52:00 AM	76.83
6/11/2024 3:37:00 AM	76.85	6/11/2024 4:45:00 AM	76.83	6/11/2024 5:53:00 AM	76.83
6/11/2024 3:38:00 AM	76.85	6/11/2024 4:46:00 AM	76.83	6/11/2024 5:54:00 AM	76.83
6/11/2024 3:39:00 AM	76.85	6/11/2024 4:47:00 AM	76.83	6/11/2024 5:55:00 AM	76.83
6/11/2024 3:40:00 AM	76.85	6/11/2024 4:48:00 AM	76.83	6/11/2024 5:56:00 AM	76.83
6/11/2024 3:41:00 AM	76.85	6/11/2024 4:49:00 AM	76.83	6/11/2024 5:57:00 AM	76.83
6/11/2024 3:42:00 AM	76.85	6/11/2024 4:50:00 AM	76.83	6/11/2024 5:58:00 AM	76.83
6/11/2024 3:43:00 AM	76.85	6/11/2024 4:51:00 AM	76.83	6/11/2024 5:59:00 AM	76.83
6/11/2024 3:44:00 AM	76.85	6/11/2024 4:52:00 AM	76.83	6/11/2024 6:00:00 AM	76.83
6/11/2024 3:45:00 AM	76.85	6/11/2024 4:53:00 AM	76.83	6/11/2024 6:01:00 AM	76.83
6/11/2024 3:46:00 AM	76.85	6/11/2024 4:54:00 AM	76.83	6/11/2024 6:02:00 AM	76.83
6/11/2024 3:47:00 AM	76.85	6/11/2024 4:55:00 AM	76.83	6/11/2024 6:03:00 AM	76.83
6/11/2024 3:48:00 AM	76.85	6/11/2024 4:56:00 AM	76.83	6/11/2024 6:04:00 AM	76.83
6/11/2024 3:49:00 AM	76.85	6/11/2024 4:57:00 AM	76.83	6/11/2024 6:05:00 AM	76.83
6/11/2024 3:50:00 AM	76.85	6/11/2024 4:58:00 AM	76.83	6/11/2024 6:06:00 AM	76.83
6/11/2024 3:51:00 AM	76.85	6/11/2024 4:59:00 AM	76.83	6/11/2024 6:07:00 AM	76.83
6/11/2024 3:52:00 AM	76.84	6/11/2024 5:00:00 AM	76.83	6/11/2024 6:08:00 AM	76.83
6/11/2024 3:53:00 AM	76.84	6/11/2024 5:01:00 AM	76.83	6/11/2024 6:09:00 AM	76.83
6/11/2024 3:54:00 AM	76.84	6/11/2024 5:02:00 AM	76.83	6/11/2024 6:10:00 AM	76.83
6/11/2024 3:55:00 AM	76.84	6/11/2024 5:03:00 AM	76.83	6/11/2024 6:11:00 AM	76.83
6/11/2024 3:56:00 AM	76.84	6/11/2024 5:04:00 AM	76.83	6/11/2024 6:12:00 AM	76.83
6/11/2024 3:57:00 AM	76.84	6/11/2024 5:05:00 AM	76.83	6/11/2024 6:13:00 AM	76.83
6/11/2024 3:58:00 AM	76.84	6/11/2024 5:06:00 AM	76.83	6/11/2024 6:14:00 AM	76.83
6/11/2024 3:59:00 AM	76.84	6/11/2024 5:07:00 AM	76.83	6/11/2024 6:15:00 AM	76.83
6/11/2024 4:00:00 AM	76.84	6/11/2024 5:08:00 AM	76.83	6/11/2024 6:16:00 AM	76.83
6/11/2024 4:01:00 AM	76.84	6/11/2024 5:09:00 AM	76.83	6/11/2024 6:17:00 AM	76.83
6/11/2024 4:02:00 AM	76.84	6/11/2024 5:10:00 AM	76.83	6/11/2024 6:18:00 AM	76.83
6/11/2024 4:03:00 AM	76.84	6/11/2024 5:11:00 AM	76.83	6/11/2024 6:19:00 AM	76.83
6/11/2024 4:04:00 AM	76.84	6/11/2024 5:12:00 AM	76.83	6/11/2024 6:20:00 AM	76.83
6/11/2024 4:05:00 AM	76.84	6/11/2024 5:13:00 AM	76.83	6/11/2024 6:21:00 AM	76.83
6/11/2024 4:06:00 AM	76.84	6/11/2024 5:14:00 AM	76.83	6/11/2024 6:22:00 AM	76.83
6/11/2024 4:07:00 AM	76.84	6/11/2024 5:15:00 AM	76.83	6/11/2024 6:23:00 AM	76.83
6/11/2024 4:08:00 AM	76.84	6/11/2024 5:16:00 AM	76.83	6/11/2024 6:24:00 AM	76.83
6/11/2024 4:09:00 AM	76.84	6/11/2024 5:17:00 AM	76.83	6/11/2024 6:25:00 AM	76.83
6/11/2024 4:10:00 AM	76.84	6/11/2024 5:18:00 AM	76.83	6/11/2024 6:26:00 AM	76.83
6/11/2024 4:11:00 AM	76.84	6/11/2024 5:19:00 AM	76.83	6/11/2024 6:27:00 AM	76.83
6/11/2024 4:12:00 AM	76.84	6/11/2024 5:20:00 AM	76.83	6/11/2024 6:28:00 AM	76.83
6/11/2024 4:13:00 AM	76.84	6/11/2024 5:21:00 AM	76.83	6/11/2024 6:29:00 AM	76.83
6/11/2024 4:14:00 AM	76.84	6/11/2024 5:22:00 AM	76.83	6/11/2024 6:30:00 AM	76.83
6/11/2024 4:15:00 AM	76.84	6/11/2024 5:23:00 AM	76.83	6/11/2024 6:31:00 AM	76.83
6/11/2024 4:16:00 AM	76.84	6/11/2024 5:24:00 AM	76.83	6/11/2024 6:32:00 AM	76.83
6/11/2024 4:17:00 AM	76.84	6/11/2024 5:25:00 AM	76.83	6/11/2024 6:33:00 AM	76.83
6/11/2024 4:18:00 AM	76.84	6/11/2024 5:26:00 AM	76.83	6/11/2024 6:34:00 AM	76.83
6/11/2024 4:19:00 AM	76.84	6/11/2024 5:27:00 AM	76.83	6/11/2024 6:35:00 AM	76.83
6/11/2024 4:20:00 AM	76.84	6/11/2024 5:28:00 AM	76.83	6/11/2024 6:36:00 AM	76.83
6/11/2024 4:21:00 AM	76.84	6/11/2024 5:29:00 AM	76.83	6/11/2024 6:37:00 AM	76.83
6/11/2024 4:22:00 AM	76.84	6/11/2024 5:30:00 AM	76.83	6/11/2024 6:38:00 AM	76.83
6/11/2024 4:23:00 AM	76.84	6/11/2024 5:31:00 AM	76.83	6/11/2024 6:39:00 AM	76.82
6/11/2024 4:24:00 AM	76.83	6/11/2024 5:32:00 AM	76.83	6/11/2024 6:40:00 AM	76.82
6/11/2024 4:25:00 AM	76.83	6/11/2024 5:33:00 AM	76.83	6/11/2024 6:41:00 AM	76.82
6/11/2024 4:26:00 AM	76.83	6/11/2024 5:34:00 AM	76.83	6/11/2024 6:42:00 AM	76.82
6/11/2024 4:27:00 AM	76.83	6/11/2024 5:35:00 AM	76.83	6/11/2024 6:43:00 AM	76.82
6/11/2024 4:28:00 AM	76.83	6/11/2024 5:36:00 AM	76.83	6/11/2024 6:44:00 AM	76.82
6/11/2024 4:29:00 AM	76.83	6/11/2024 5:37:00 AM	76.83	6/11/2024 6:45:00 AM	76.83

C.4 Subdivision PCSWMM Model Updates and Flow Spread Calculations



EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)

WARNING 04: minimum elevation drop used for Conduit C2
 WARNING 03: negative offset ignored for Link C214A-IC2
 WARNING 03: negative offset ignored for Link C216A-IC1
 WARNING 03: negative offset ignored for Link C248A-IC2
 WARNING 03: negative offset ignored for Link C262A-IC2
 WARNING 10: crest elevation raised to downstream invert for regulator Link L249A-IC1
 WARNING 10: crest elevation raised to downstream invert for regulator Link L249A-IC2
 WARNING 10: crest elevation raised to downstream invert for regulator Link L249B-IC
 WARNING 03: negative offset ignored for Link C235A-IC

 Element Count

Number of rain gages 1
 Number of subcatchments ... 112
 Number of nodes 258
 Number of links 445
 Number of pollutants 0
 Number of land uses 0

Raingage Summary

Name	Data Source	Data Type	Recording Interval
RG1	Chicago_100yr_3h	INTENSITY	10 min.

Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
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A216A	0.70	182.00	71.43	1.0000	RG1	A217A-S
A216B	0.44	115.00	71.43	1.0000	RG1	A217B-S
C205AA	0.53	234.00	80.00	2.0000	RG1	C205AA-S
C206A	0.20	94.00	80.00	2.0000	RG1	C206A-S
C207A	0.16	51.00	58.57	2.0000	RG1	C207A-S
C209A	0.25	70.00	77.14	2.0000	RG1	C209A-S
C210A	0.18	58.00	77.14	2.0000	RG1	C210A-S
C211A	0.15	53.00	58.57	2.0000	RG1	C211A-S
C211B	2.77	623.00	64.29	3.0000	RG1	C211B-S
C212A	0.29	112.00	77.14	2.0000	RG1	C212A-S
C213A	0.27	109.00	77.14	2.0000	RG1	C213A-S
C214A	0.29	116.00	68.57	2.0000	RG1	C214A-S
C216A	0.08	30.00	68.57	2.0000	RG1	C216A-S
C216C	1.87	420.00	92.86	2.0000	RG1	C216C-S
C235A	0.56	199.00	75.71	2.0000	RG1	C235A-S
C246A	0.25	102.00	78.57	2.0000	RG1	C246A-S
C247A	0.42	167.00	77.14	2.0000	RG1	C247A-S
C247B	0.28	62.00	7.00	6.0000	RG1	C247A-S
C248A	0.19	80.00	58.57	2.0000	RG1	C248A-S
C252A	0.26	99.00	78.57	2.0000	RG1	C252A-S
C261A	0.25	103.00	80.00	2.0000	RG1	C261A-S
C261B	0.49	110.00	7.00	5.7500	RG1	C261A-S
C262A	0.12	33.00	80.00	2.0000	RG1	C262A-S
C264A	1.01	227.00	28.57	2.7000	RG1	264
EXT-1	0.41	217.00	50.00	2.0000	RG1	SU55
EXT-10	0.44	170.00	50.00	5.0000	RG1	MJ-OF2
EXT-12	0.19	123.00	50.00	2.0000	RG1	SU56
EXT-2	9.51	1060.00	14.29	5.0000	RG1	SU54
EXT-3	0.59	390.00	50.00	2.0000	RG1	MINTO
EXT-4	0.17	90.00	42.86	2.0000	RG1	MINTO
EXT-5	0.07	45.00	42.86	2.0000	RG1	MINTO
EXT-6	0.24	157.00	42.86	2.0000	RG1	MINTO
EXT-7	0.12	65.00	42.86	2.0000	RG1	MINTO
EXT-8	0.26	160.00	42.86	2.0000	RG1	MINTO
EXT-9	0.11	80.00	55.71	5.0000	RG1	MINTO
F268B	0.20	158.00	52.86	2.0000	RG1	F268B-S
F282C	0.32	229.00	52.86	2.0000	RG1	F282C-S
L204A	0.22	67.00	74.29	2.0000	RG1	L204A-S

L204B	0.46	318.00	52.86	2.0000	RG1	L204B-S
L205A	0.16	45.00	74.29	2.0000	RG1	L205A-S
L206B	0.06	23.00	58.57	2.0000	RG1	L206B-S
L207B	0.80	445.00	50.00	2.0000	RG1	L207B-S
L211B	0.71	322.00	50.00	2.0000	RG1	L211B-S
L214B	0.13	77.00	52.86	2.0000	RG1	L214B-S
L214C	0.20	147.00	52.86	2.0000	RG1	L214C-S
L218A	0.25	70.00	74.29	2.0000	RG1	L218A-S
L220A	0.37	166.00	78.57	2.0000	RG1	L220A-S
L220B	0.64	412.00	52.86	2.0000	RG1	L220B-S
L221A	0.24	105.00	78.57	2.0000	RG1	L221A-S
L222A	0.29	133.00	78.57	2.0000	RG1	L222A-S
L225A	0.35	163.00	78.57	2.0000	RG1	L225A-S
L226A	0.43	179.00	78.57	2.0000	RG1	L226A-S
L229A	0.20	65.00	74.29	2.0000	RG1	L229A-S
L230A	0.21	60.00	74.29	2.0000	RG1	L230A-S
L230B	0.46	296.00	51.43	2.0000	RG1	L230B-S
L232A	0.37	172.00	75.71	2.0000	RG1	L232A-S
L233A	0.41	196.00	75.71	2.0000	RG1	L233A-S
L233B	0.20	105.00	50.00	2.0000	RG1	L233B-S
L234A	0.15	50.00	74.29	2.0000	RG1	L234A-S
L235B	0.62	412.00	50.00	2.0000	RG1	L235B-S
L237A	0.43	195.00	75.71	2.0000	RG1	L237A-S
L238A	0.47	182.00	75.71	2.0000	RG1	L238A-S
L239A	0.21	69.00	75.71	2.0000	RG1	L239A-S
L240A	0.23	71.00	74.29	2.0000	RG1	L240A-S
L240B	0.32	232.00	50.00	2.0000	RG1	L240B-S
L242A	0.60	263.00	75.71	2.0000	RG1	L242A-S
L244A	0.07	24.00	75.71	2.0000	RG1	L244A-S
L245A	0.48	196.00	78.57	2.0000	RG1	L245A-S
L246B	0.47	276.00	51.43	2.0000	RG1	L246B-S
L247B	0.21	114.00	50.00	2.0000	RG1	L247B-S
L249A	0.48	190.00	75.71	2.0000	RG1	L249A-S
L249B	0.22	149.00	50.00	2.0000	RG1	L249B-S
L250A	0.28	116.00	74.29	2.0000	RG1	L250A-S
L250B	0.15	87.00	50.00	2.0000	RG1	L250B-S
L252B	0.19	139.00	51.43	2.0000	RG1	L252B-S
L253A	0.27	134.00	75.71	2.0000	RG1	L253A-S
L254A	0.26	115.00	75.71	2.0000	RG1	L254A-S

L255A	0.30	108.00	74.29	2.0000	RG1	L255A-S
L256A	0.44	299.00	51.43	2.0000	RG1	L256A-S
L257A	0.38	164.00	74.29	2.0000	RG1	L257A-S
L258A	0.31	88.00	74.29	2.0000	RG1	L258A-S
L260A	0.30	143.00	74.29	2.0000	RG1	L260A-S
L263A	0.27	92.00	74.29	2.0000	RG1	L263A-S
L265A	0.22	76.00	74.29	2.0000	RG1	L265A-S
L265B	0.43	244.00	50.00	2.0000	RG1	L265B-S
L266A	0.55	210.00	75.71	2.0000	RG1	L266A-S
L268A	0.24	79.00	74.29	2.0000	RG1	L268A-S
L269A	0.44	188.00	75.71	2.0000	RG1	L269A-S
L272A	0.21	66.00	75.71	2.0000	RG1	L272A-S
L273A	0.24	104.00	78.57	2.0000	RG1	L273A-S
L274A	0.23	89.00	78.57	2.0000	RG1	L274A-S
L274B	0.12	92.00	52.86	2.0000	RG1	L274B-S
L275A	0.37	150.00	75.71	2.0000	RG1	L275A-S
L279A	0.14	67.00	58.57	2.0000	RG1	L279A-S
L279B	0.30	231.00	51.43	2.0000	RG1	L279B-S
L280A	0.13	47.00	80.00	2.0000	RG1	L280A-S
L281A	0.26	76.00	80.00	2.0000	RG1	L281A-S
L282A	0.31	147.00	75.71	2.0000	RG1	L282A-S
L282B	0.18	50.00	74.29	2.0000	RG1	L282B-S
L283A	0.34	120.00	74.29	2.0000	RG1	L283A-S
L283B	0.72	442.00	51.43	2.0000	RG1	L283B-S
L285A	0.33	108.00	74.29	2.0000	RG1	L285A-S
L286A	0.46	196.00	74.29	2.0000	RG1	L286A-S
L287A	0.13	41.00	75.71	2.0000	RG1	L287A-S
L288A	0.13	40.00	75.71	2.0000	RG1	L288A-S
L289A	0.12	35.00	75.71	2.0000	RG1	L289A-S
L290A	0.24	100.00	80.00	2.0000	RG1	L290A-S
L291A	0.25	110.00	80.00	2.0000	RG1	L291A-S
L292B	0.30	120.00	80.00	2.0000	RG1	L292B-S
L293A	0.22	88.00	75.71	2.0000	RG1	L293A-S
L293B	0.25	106.00	80.00	2.0000	RG1	L293B-S
L294A	0.10	41.00	58.57	2.0000	RG1	L294A-S

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
200	OUTFALL	66.00	3.50	0.0	
D-EAST	OUTFALL	69.37	1.20	0.0	
MARCH	OUTFALL	82.12	0.41	0.0	
MINTO	OUTFALL	70.00	0.00	0.0	
201	STORAGE	66.13	4.47	0.0	
201A	STORAGE	66.00	3.90	0.0	
202	STORAGE	66.24	5.69	0.0	
203	STORAGE	66.47	5.65	0.0	
204	STORAGE	66.92	5.49	0.0	
205	STORAGE	67.26	5.23	0.0	
205A	STORAGE	67.63	4.79	0.0	
206	STORAGE	68.29	4.63	0.0	
207	STORAGE	68.63	4.80	0.0	
208	STORAGE	69.64	5.39	0.0	
209	STORAGE	70.68	6.61	0.0	
210	STORAGE	72.68	7.31	0.0	
211	STORAGE	74.56	5.54	0.0	
212	STORAGE	74.82	5.49	0.0	
213	STORAGE	75.21	5.31	0.0	
214	STORAGE	76.58	4.01	0.0	
215	STORAGE	76.82	4.49	0.0	Yes
216	STORAGE	77.16	4.62	0.0	
218	STORAGE	66.90	5.10	0.0	
219	STORAGE	66.96	5.11	0.0	
220	STORAGE	67.44	4.84	0.0	
221	STORAGE	67.62	4.81	0.0	
222	STORAGE	69.89	2.57	0.0	
225	STORAGE	68.96	3.65	0.0	
226	STORAGE	69.30	3.45	0.0	
227	STORAGE	69.42	3.43	0.0	
229	STORAGE	69.98	3.20	0.0	
230	STORAGE	69.07	3.47	0.0	
231	STORAGE	69.19	3.31	0.0	
232	STORAGE	69.56	3.27	0.0	
233	STORAGE	69.92	3.20	0.0	

234	STORAGE	77.30	2.73	0.0	
235	STORAGE	71.50	2.70	0.0	
236	STORAGE	71.75	2.57	0.0	
237	STORAGE	73.77	2.41	0.0	
238	STORAGE	77.28	2.59	0.0	
239	STORAGE	78.25	2.50	0.0	
240	STORAGE	77.52	2.97	0.0	
241	STORAGE	77.65	2.86	0.0	
242	STORAGE	77.96	2.39	0.0	
243	STORAGE	78.31	2.45	0.0	
244	STORAGE	69.97	2.49	0.0	
245	STORAGE	70.04	2.47	0.0	
246	STORAGE	67.99	4.56	0.0	
247	STORAGE	70.04	2.78	0.0	
248	STORAGE	70.72	2.65	0.0	
249	STORAGE	71.72	2.56	0.0	
250	STORAGE	72.02	2.59	0.0	
251	STORAGE	68.26	4.29	0.0	
252	STORAGE	68.92	3.47	0.0	
253	STORAGE	69.38	2.93	0.0	
254	STORAGE	69.56	2.56	0.0	
255	STORAGE	69.65	2.43	0.0	
256	STORAGE	69.87	2.49	0.0	
257	STORAGE	69.91	2.44	0.0	
258	STORAGE	69.35	2.91	0.0	
259	STORAGE	69.44	2.94	0.0	
260	STORAGE	69.63	2.85	0.0	
261	STORAGE	69.83	2.77	0.0	
262	STORAGE	70.20	2.44	0.0	
263	STORAGE	70.96	3.02	0.0	
264	STORAGE	71.50	3.79	0.0	
265	STORAGE	73.82	3.41	0.0	
266	STORAGE	75.02	2.94	0.0	
267	STORAGE	75.32	2.78	0.0	
268	STORAGE	75.53	3.04	0.0	
269	STORAGE	76.28	2.74	0.0	
270	STORAGE	76.41	2.49	0.0	
271	STORAGE	76.34	2.47	0.0	
272	STORAGE	75.72	4.87	0.0	

273	STORAGE	76.01	4.58	0.0	
274	STORAGE	76.19	4.38	0.0	
275	STORAGE	76.70	3.87	0.0	
276	STORAGE	76.78	3.84	0.0	
277	STORAGE	77.06	3.29	0.0	
279	STORAGE	75.97	4.22	0.0	
280	STORAGE	76.17	4.02	0.0	
281	STORAGE	76.37	3.78	0.0	
282	STORAGE	76.73	3.23	0.0	
283	STORAGE	76.98	3.10	0.0	
284	STORAGE	77.14	3.15	0.0	
285	STORAGE	77.34	2.92	0.0	
286	STORAGE	77.32	2.96	0.0	
287	STORAGE	76.17	4.21	0.0	
288	STORAGE	76.47	3.77	0.0	
289	STORAGE	76.83	3.22	0.0	
290	STORAGE	76.69	3.78	0.0	
291	STORAGE	76.93	3.42	0.0	
292	STORAGE	76.52	3.84	0.0	
293	STORAGE	76.78	3.47	0.0	
294	STORAGE	76.92	3.07	0.0	
A217A-S	STORAGE	81.66	1.78	0.0	
A217B-S	STORAGE	81.32	1.78	0.0	Yes
C205AA-S	STORAGE	70.78	1.88	0.0	
C206A-S	STORAGE	71.21	1.78	0.0	
C207A-S	STORAGE	71.59	1.78	0.0	
C209A-S	STORAGE	74.50	1.78	0.0	
C210A-S	STORAGE	77.00	1.78	0.0	
C211A-S	STORAGE	78.40	1.78	0.0	
C211B-S	STORAGE	78.87	1.83	0.0	
C212A-S	STORAGE	77.51	2.78	0.0	
C213A-S	STORAGE	78.71	1.78	0.0	
C214A-S	STORAGE	78.92	1.78	0.0	Yes
C216A-S	STORAGE	80.12	1.78	0.0	
C216C-S	STORAGE	80.82	1.83	0.0	
C235A-S	STORAGE	72.10	1.78	0.0	
C246A-S	STORAGE	70.77	1.80	0.0	
C247A-S	STORAGE	70.92	1.78	0.0	
C248A-S	STORAGE	71.96	1.78	0.0	

C252A-S	STORAGE	70.72	1.78	0.0	
C261A-S	STORAGE	70.92	1.78	0.0	
C262A-S	STORAGE	71.06	1.78	0.0	
F268B-S	STORAGE	75.80	2.41	0.0	
f282C-S	STORAGE	77.21	2.34	0.0	
J1	STORAGE	69.85	1.30	0.0	
J2	STORAGE	80.27	0.40	0.0	
J3	STORAGE	74.89	0.40	0.0	
J4	STORAGE	72.77	0.40	0.0	
J5	STORAGE	72.47	0.40	0.0	
J6	STORAGE	72.47	0.40	0.0	
L204A-S	STORAGE	70.56	1.78	0.0	
L204B-S	STORAGE	70.05	2.45	0.0	
L205A-S	STORAGE	70.80	1.78	0.0	
L206B-S	STORAGE	71.46	1.78	0.0	
L207B-S	STORAGE	71.11	2.59	0.0	
L211B-S	STORAGE	77.37	2.97	0.0	
L214B-S	STORAGE	78.31	2.40	0.0	
L214C-S	STORAGE	78.35	2.41	0.0	
L218A-S	STORAGE	70.49	1.78	0.0	
L220A-S	STORAGE	70.55	1.78	0.0	
L220B-S	STORAGE	70.15	2.41	0.0	
L221A-S	STORAGE	70.71	1.78	0.0	
L222A-S	STORAGE	70.51	1.78	0.0	
L225A-S	STORAGE	70.77	1.78	0.0	
L226A-S	STORAGE	70.96	1.78	0.0	
L229A-S	STORAGE	71.25	1.78	0.0	
L230A-S	STORAGE	70.91	1.78	0.0	
L230B-S	STORAGE	70.29	2.44	0.0	
L232A-S	STORAGE	70.94	1.78	0.0	
L233A-S	STORAGE	71.30	1.78	0.0	
L233B-S	STORAGE	70.39	2.69	0.0	
L234A-S	STORAGE	78.51	1.78	0.0	
L235B-S	STORAGE	71.76	2.46	0.0	
L237A-S	STORAGE	73.23	1.78	0.0	
L238A-S	STORAGE	75.65	1.78	0.0	
L239A-S	STORAGE	78.86	1.78	0.0	
L240A-S	STORAGE	78.49	1.78	0.0	
L240B-S	STORAGE	78.11	2.40	0.0	

L242A-S	STORAGE	78.82	1.78	0.0
L244A-S	STORAGE	70.89	1.78	0.0
L245A-S	STORAGE	70.75	1.78	0.0
L246B-S	STORAGE	70.18	2.60	0.0
L247B-S	STORAGE	70.32	2.43	0.0
L249A-S	STORAGE	71.23	1.78	0.0
L249B-S	STORAGE	71.15	2.43	0.0
L250A-S	STORAGE	73.23	1.78	0.0
L250B-S	STORAGE	72.56	2.57	0.0
L252B-S	STORAGE	70.11	2.59	0.0
L253A-S	STORAGE	70.70	1.78	0.0
L254A-S	STORAGE	70.66	1.78	0.0
L255A-S	STORAGE	70.64	1.78	0.0
L256A-S	STORAGE	70.16	2.44	0.0
L257A-S	STORAGE	70.79	1.78	0.0
L258A-S	STORAGE	70.63	1.83	0.0
L260A-S	STORAGE	70.60	2.04	0.0
L263A-S	STORAGE	71.02	1.78	0.0
L265A-S	STORAGE	73.55	1.78	0.0
L265B-S	STORAGE	74.01	2.38	0.0
L266A-S	STORAGE	75.60	1.78	0.0
L268A-S	STORAGE	76.10	1.78	0.0
L269A-S	STORAGE	76.48	2.14	0.0
L272A-S	STORAGE	78.81	1.78	0.0
L273A-S	STORAGE	78.91	1.78	0.0
L274A-S	STORAGE	78.91	1.78	0.0
L274B-S	STORAGE	78.26	2.50	0.0
L275A-S	STORAGE	78.89	1.78	0.0
L279A-S	STORAGE	78.40	1.83	0.0
L279B-S	STORAGE	77.86	2.40	0.0
L280A-S	STORAGE	78.61	1.78	0.0
L281A-S	STORAGE	78.47	1.78	0.0
L282A-S	STORAGE	78.28	1.78	0.0
L282B-S	STORAGE	77.64	1.78	0.0
L283A-S	STORAGE	78.41	1.78	0.0
L283B-S	STORAGE	77.80	2.46	0.0
L285A-S	STORAGE	78.79	1.78	0.0
L286A-S	STORAGE	78.57	1.78	0.0
L287A-S	STORAGE	78.83	1.78	0.0

L288A-S	STORAGE	78.67	1.78	0.0
L289A-S	STORAGE	78.58	1.78	0.0
L290A-S	STORAGE	78.67	1.78	0.0
L291A-S	STORAGE	78.52	1.78	0.0
L292B-S	STORAGE	78.68	1.78	0.0
L293A-S	STORAGE	78.67	1.78	0.0
L293B-S	STORAGE	78.60	1.78	0.0
L294A-S	STORAGE	78.51	1.79	0.0
MJ-OF2	STORAGE	70.00	1.30	0.0
SU1	STORAGE	79.98	0.40	0.0
SU10	STORAGE	80.76	0.40	0.0
SU11	STORAGE	80.48	0.40	0.0
SU12	STORAGE	80.05	0.40	0.0
SU13	STORAGE	80.12	0.40	0.0
SU14	STORAGE	72.57	0.40	0.0
SU15	STORAGE	82.12	0.40	0.0
SU16	STORAGE	80.17	0.40	0.0
SU17	STORAGE	80.07	0.40	0.0
SU18	STORAGE	80.31	0.40	0.0
SU19	STORAGE	80.52	0.40	0.0
SU2	STORAGE	81.66	0.40	0.0
SU20	STORAGE	80.49	0.40	0.0
SU21	STORAGE	80.17	0.40	0.0
SU22	STORAGE	73.43	0.40	0.0
SU23	STORAGE	80.07	0.40	0.0
SU24	STORAGE	80.21	0.40	0.0
SU25	STORAGE	80.41	0.40	0.0
SU26	STORAGE	73.39	0.40	0.0
SU27	STORAGE	74.90	0.40	0.0
SU28	STORAGE	72.97	0.40	0.0
SU29	STORAGE	80.59	0.40	0.0
SU3	STORAGE	80.46	0.40	0.0
SU30	STORAGE	78.98	0.40	0.0
SU31	STORAGE	77.19	0.40	0.0
SU32	STORAGE	78.45	0.40	0.0
SU33	STORAGE	72.53	0.40	0.0
SU34	STORAGE	72.69	0.40	0.0
SU35	STORAGE	72.55	0.40	0.0
SU36	STORAGE	72.37	0.40	0.0

SU37	STORAGE	72.46	0.40	0.0
SU38	STORAGE	72.52	0.40	0.0
SU39	STORAGE	72.84	0.40	0.0
SU4	STORAGE	80.57	0.40	0.0
SU40	STORAGE	73.13	0.40	0.0
SU41	STORAGE	72.08	0.40	0.0
SU42	STORAGE	72.80	0.40	0.0
SU43	STORAGE	72.38	0.40	0.0
SU44	STORAGE	72.37	0.40	0.0
SU45	STORAGE	72.31	0.40	0.0
SU46	STORAGE	72.27	0.40	0.0
SU47	STORAGE	72.22	0.40	0.0
SU48	STORAGE	72.33	0.40	0.0
SU49	STORAGE	72.44	0.40	0.0
SU5	STORAGE	79.90	0.40	0.0
SU50	STORAGE	72.49	0.40	0.0
SU51	STORAGE	72.47	0.40	0.0
SU52	STORAGE	72.27	0.40	0.0
SU53	STORAGE	72.16	0.40	0.0
SU54	STORAGE	79.32	1.60	0.0
SU55	STORAGE	70.16	0.60	0.0
SU56	STORAGE	69.41	2.71	0.0
SU57	STORAGE	70.00	0.60	0.0
SU58	STORAGE	68.90	1.90	0.0
SU6	STORAGE	80.22	0.40	0.0
SU7	STORAGE	80.37	0.40	0.0
SU8	STORAGE	80.27	0.40	0.0
SU9	STORAGE	80.26	0.40	0.0

Link Summary

Name	From Node	To Node	Type	Length	%Slope	Roughness
201-200	201	201A	CONDUIT	37.7	0.3447	0.0130
202-201	202	201	CONDUIT	30.9	0.3239	0.0130
203-202	203	202	CONDUIT	22.2	0.3605	0.0130
204-203	204	203	CONDUIT	67.0	0.4030	0.0130

205-204	205	204	CONDUIT	48.0	0.3958	0.0130
205A-205	205A	205	CONDUIT	76.5	0.4054	0.0130
206-205A	206	205A	CONDUIT	98.6	0.4463	0.0130
206-227	206	227	CONDUIT	39.9	0.4010	0.0130
207-206	207	206	CONDUIT	68.0	0.3971	0.0130
208-207	208	207	CONDUIT	80.0	0.7000	0.0130
209-208	209	208	CONDUIT	66.2	0.6946	0.0130
210-209	210	209	CONDUIT	84.8	0.7079	0.0130
211-210	211	210	CONDUIT	68.5	0.4964	0.0130
212-211	212	211	CONDUIT	69.8	0.3583	0.0130
213-212	213	212	CONDUIT	69.2	0.3467	0.0130
214-213	214	213	CONDUIT	44.8	0.4906	0.0130
215-214	215	214	CONDUIT	44.0	0.4996	0.0130
216-215	216	215	CONDUIT	66.4	0.4972	0.0130
218-202	218	202	CONDUIT	17.6	0.3417	0.0130
219-218	219	218	CONDUIT	12.3	0.2439	0.0130
220-219	220	219	CONDUIT	109.9	0.3002	0.0130
221-220	221	220	CONDUIT	57.3	0.2966	0.0130
222-203	222	203	CONDUIT	84.8	0.2593	0.0130
225-204	225	204	CONDUIT	100.8	0.3967	0.0130
226-225	226	225	CONDUIT	65.7	0.4111	0.0130
227-226	227	226	CONDUIT	11.5	0.4355	0.0130
229-206	229	206	CONDUIT	69.9	0.4007	0.0130
230-205	230	205	CONDUIT	70.0	0.3998	0.0130
231-230	231	230	CONDUIT	11.4	0.4398	0.0130
232-231	232	231	CONDUIT	86.1	0.3948	0.0130
233-229	233	229	CONDUIT	11.5	0.3484	0.0130
233-232	233	232	CONDUIT	70.9	0.3948	0.0130
234-210	234	210	CONDUIT	70.2	0.9978	0.0130
235-207	235	207	CONDUIT	69.9	0.8582	0.0130
236-235	236	235	CONDUIT	11.4	0.8742	0.0130
237-236	237	236	CONDUIT	99.7	1.9964	0.0130
238-234	238	234	CONDUIT	10.4	1.0578	0.0130
238-237	238	237	CONDUIT	115.2	2.9885	0.0130
239-213	239	213	CONDUIT	69.8	0.7015	0.0130
240-211	240	211	CONDUIT	69.8	0.4444	0.0130
241-240	241	240	CONDUIT	10.9	0.4570	0.0130
242-241	242	241	CONDUIT	61.6	0.4548	0.0130
243-239	243	239	CONDUIT	10.8	0.6476	0.0130

243-242	243	242	CONDUIT	61.0	0.4587	0.0130
244-221	244	221	CONDUIT	40.4	0.3715	0.0130
245-222	245	222	CONDUIT	82.5	0.2062	0.0130
245-244	245	244	CONDUIT	11.5	0.3484	0.0130
246-221	246	221	CONDUIT	70.5	0.2979	0.0130
247-246	247	246	CONDUIT	64.3	0.4978	0.0130
248-247	248	247	CONDUIT	87.4	0.6065	0.0130
249-247	249	247	CONDUIT	68.9	2.0042	0.0130
250-208	250	208	CONDUIT	90.8	0.3964	0.0130
250-249	250	249	CONDUIT	11.5	2.0021	0.0130
251-246	251	246	CONDUIT	68.0	0.3088	0.0130
252-251	252	251	CONDUIT	70.5	0.4114	0.0130
253-252	253	252	CONDUIT	83.0	0.1928	0.0130
254-253	254	253	CONDUIT	84.8	0.2004	0.0130
255-254	255	254	CONDUIT	11.4	0.1759	0.0130
256-255	256	255	CONDUIT	56.8	0.2466	0.0130
256-257	256	257	CONDUIT	12.5	0.4000	0.0130
257-260	257	260	CONDUIT	80.7	0.2603	0.0130
258-252	258	252	CONDUIT	64.9	0.2004	0.0130
259-258	259	258	CONDUIT	11.5	0.1742	0.0130
260-259	260	259	CONDUIT	78.3	0.2043	0.0130
261-251	261	251	CONDUIT	73.5	0.6938	0.0130
262-261	262	261	CONDUIT	33.5	0.2090	0.0130
263-261	263	261	CONDUIT	67.0	1.5522	0.0130
264-263	264	263	CONDUIT	13.9	1.0087	0.0130
265-263	265	263	CONDUIT	94.0	2.7043	0.0130
266-265	266	265	CONDUIT	93.4	0.3962	0.0130
267-266	267	266	CONDUIT	11.5	2.0091	0.0130
268-265	268	265	CONDUIT	71.0	1.2959	0.0130
269-268	269	268	CONDUIT	93.5	0.5027	0.0130
270-267	270	267	CONDUIT	54.8	2.0088	0.0130
270-269	270	269	CONDUIT	11.5	0.5208	0.0130
271-268	271	268	CONDUIT	11.9	3.0164	0.0130
272-213	272	213	CONDUIT	70.5	0.2979	0.0130
273-272	273	272	CONDUIT	56.1	0.2496	0.0130
274-273	274	273	CONDUIT	70.6	0.2408	0.0130
275-274	275	274	CONDUIT	90.0	0.4000	0.0130
276-275	276	275	CONDUIT	11.5	0.4355	0.0130
277-276	277	276	CONDUIT	62.8	0.3983	0.0130

279-211	279	211	CONDUIT	70.5	0.2979	0.0130
280-279	280	279	CONDUIT	62.2	0.3053	0.0130
281-280	281	280	CONDUIT	63.3	0.3001	0.0130
282-271	282	271	CONDUIT	54.5	1.9993	0.0130
282-281	282	281	CONDUIT	97.2	0.2984	0.0130
283-282	283	282	CONDUIT	62.2	0.3054	0.0130
284-277	284	277	CONDUIT	11.5	0.4355	0.0130
285-284	285	284	CONDUIT	63.5	0.2994	0.0130
286-283	286	283	CONDUIT	31.7	0.3467	0.0130
286-285	286	285	CONDUIT	71.8	0.3066	0.0130
287-272	287	272	CONDUIT	45.0	0.5111	0.0130
288-287	288	287	CONDUIT	45.0	0.5111	0.0130
289-288	289	288	CONDUIT	32.1	0.6540	0.0130
290-287	290	287	CONDUIT	61.9	0.5977	0.0130
291-288	291	288	CONDUIT	63.5	0.6138	0.0130
292-274	292	274	CONDUIT	45.0	0.4000	0.0130
292-290	292	290	CONDUIT	64.4	0.4968	0.0130
293-291	293	291	CONDUIT	62.4	0.4006	0.0130
293-292	293	292	CONDUIT	45.0	0.4000	0.0130
294-293	294	293	CONDUIT	31.5	0.4122	0.0130
C1	SU58	201A	CONDUIT	27.5	2.9103	0.0130
C10	L240A-S	SU12	CONDUIT	15.4	-1.1712	0.0130
C100	SU28	L226A-S	CONDUIT	63.4	0.9937	0.0130
C101	L226A-S	SU35	CONDUIT	36.6	-0.5738	0.0130
C102	SU26	C207A-S	CONDUIT	56.3	0.7458	0.0130
C103	SU40	L229A-S	CONDUIT	50.0	1.0001	0.0130
C104	L229A-S	SU42	CONDUIT	17.0	-1.0001	0.0130
C105	C207A-S	SU42	CONDUIT	15.7	1.0842	0.0130
C106	SU42	C206A-S	CONDUIT	51.3	0.4092	0.0130
C107	SU28	L206B-S	CONDUIT	100.0	0.1300	0.0130
C108	L206B-S	SU42	CONDUIT	100.0	0.0400	0.0130
C109	SU36	L204A-S	CONDUIT	48.3	0.8903	0.0130
C11	C212A-S	SU12	CONDUIT	32.5	-0.4919	0.0130
C110	L204A-S	SU41	CONDUIT	21.7	-0.6449	0.0130
C111	L222A-S	SU41	CONDUIT	13.5	-1.4107	0.0130
C112	SU43	L222A-S	CONDUIT	62.8	0.7803	0.0130
C113	L245A-S	SU43	CONDUIT	51.0	-0.4902	0.0130
C114	SU51	L245A-S	CONDUIT	33.0	1.0304	0.0130
C115	SU51	L244A-S	CONDUIT	43.3	0.4615	0.0130

C116	L244A-S	SU44	CONDUIT	7.7	-1.3056	0.0130
C117	SU44	L221A-S	CONDUIT	37.7	0.7433	0.0130
C118	C246A-S	SU44	CONDUIT	37.1	-0.5925	0.0130
C119	J5	C246A-S	CONDUIT	36.9	0.8679	0.0130
C12	SU9	C212A-S	CONDUIT	36.7	1.0074	0.0130
C120	L221A-S	SU52	CONDUIT	24.0	-0.7500	0.0130
C121	SU52	L220A-S	CONDUIT	43.1	0.7889	0.0130
C122	L220A-S	SU53	CONDUIT	41.9	-0.5489	0.0130
C123	SU53	L218A-S	CONDUIT	44.3	0.6548	0.0130
C124	SU41	L218A-S	CONDUIT	20.7	1.0145	0.0130
C125	J6	C252A-S	CONDUIT	39.0	0.9488	0.0130
C126	C252A-S	SU45	CONDUIT	35.0	-0.6000	0.0130
C127	SU45	L253A-S	CONDUIT	39.1	0.5882	0.0130
C128	L253A-S	SU46	CONDUIT	33.5	-0.5666	0.0130
C129	SU46	L254A-S	CONDUIT	29.4	0.7823	0.0130
C13	C213A-S	SU9	CONDUIT	32.6	-0.5210	0.0130
C130	SU50	L258A-S	CONDUIT	40.0	1.2001	0.0130
C131	L258A-S	SU45	CONDUIT	46.0	-0.6528	0.0130
C132	L254A-S	SU47	CONDUIT	35.6	-0.5056	0.0130
C133	SU47	L255A-S	CONDUIT	33.5	0.5970	0.0130
C134	SU50	L260A-S	CONDUIT	34.5	0.7247	0.0130
C135	L260A-S	SU49	CONDUIT	40.5	-0.4938	0.0130
C136	SU49	L257A-S	CONDUIT	54.5	0.4954	0.0130
C137	L257A-S	SU48	CONDUIT	20.5	-0.7805	0.0130
C138	SU48	L255A-S	CONDUIT	61.5	0.5041	0.0130
C139	L255A-S	MJ-OF2	CONDUIT	31.2	5.7699	0.0130
C14	L279A-S	SU12	CONDUIT	29.0	-0.9311	0.0130
C140	SU55	SU56	CONDUIT	151.0	0.2914	0.0250
C141	L218A-S	SU57	CONDUIT	30.4	4.9134	0.0130
C15	SU13	L279A-S	CONDUIT	45.0	0.7561	0.0130
C16	L289A-S	SU13	CONDUIT	15.3	-1.0424	0.0130
C17	SU16	L289A-S	CONDUIT	29.6	0.7083	0.0130
C18	L288A-S	SU16	CONDUIT	16.7	-0.7186	0.0130
C180	C211B-S	L279A-S	CONDUIT	20.0	4.1035	0.0130
C181	264	L263A-S	CONDUIT	20.0	14.3454	0.0130
C183	C216C-S	C216A-S	CONDUIT	20.0	5.4079	0.0130
C19	SU18	L288A-S	CONDUIT	28.3	0.9188	0.0130
C2	201A	200	CONDUIT	5.0	0.0061	0.0130
C20	L287A-S	SU18	CONDUIT	18.8	-0.5319	0.0130

C21	SU19	L272A-S	CONDUIT	41.6	0.7937	0.0130
C22	L272A-S	SU3	CONDUIT	32.4	-0.8334	0.0130
C23	C214A-S	SU3	CONDUIT	30.3	-0.5284	0.0130
C24	SU19	L287A-S	CONDUIT	26.2	1.1833	0.0130
C25	SU3	C213A-S	CONDUIT	33.1	1.1172	0.0130
C26	L273A-S	SU19	CONDUIT	27.0	-0.8513	0.0130
C27	SU4	L273A-S	CONDUIT	38.0	0.7369	0.0130
C28	SU4	L274A-S	CONDUIT	41.0	0.6829	0.0130
C29	L274A-S	SU20	CONDUIT	21.8	-0.9170	0.0130
C3	C216A-S	SU2	CONDUIT	23.4	-0.6851	0.0130
C30	L290A-S	SU18	CONDUIT	26.7	-0.9724	0.0130
C31	SU7	L290A-S	CONDUIT	34.2	0.9357	0.0130
C32	SU8	L291A-S	CONDUIT	39.3	0.9415	0.0130
C33	L291A-S	SU16	CONDUIT	26.6	-1.0136	0.0130
C34	SU8	L293B-S	CONDUIT	39.6	0.7323	0.0130
C35	L293B-S	SU21	CONDUIT	20.5	-0.9264	0.0130
C36	SU7	L292B-S	CONDUIT	44.9	0.6904	0.0130
C37	L292B-S	J2	CONDUIT	21.6	-0.9723	0.0130
C37_1	SU20	J2	CONDUIT	45.0	0.4889	0.0130
C37_2	J2	L293A-S	CONDUIT	24.0	0.9167	0.0130
C38	L293A-S	SU21	CONDUIT	21.0	-0.5714	0.0130
C39	L280A-S	SU13	CONDUIT	26.7	-0.4864	0.0130
C4	SU2	C214A-S	CONDUIT	90.2	1.5079	0.0130
C40	SU24	L280A-S	CONDUIT	22.9	0.9607	0.0130
C41	SU24	L281A-S	CONDUIT	42.9	0.8392	0.0130
C42	L281A-S	SU23	CONDUIT	34.1	-0.6448	0.0130
C43	SU21	L294A-S	CONDUIT	27.2	0.9925	0.0130
C44	L294A-S	SU23	CONDUIT	16.1	-1.0546	0.0130
C45	SU29	L275A-S	CONDUIT	65.1	0.4916	0.0130
C46	L275A-S	SU20	CONDUIT	40.9	-0.5379	0.0130
C47	SU29	L285A-S	CONDUIT	69.9	0.6009	0.0130
C48	L285A-S	SU25	CONDUIT	34.6	-0.6937	0.0130
C49	SU25	L286A-S	CONDUIT	46.1	0.9979	0.0130
C5	SU10	L239A-S	CONDUIT	52.0	1.0001	0.0130
C50	L286A-S	SU6	CONDUIT	54.4	-0.4963	0.0130
C51	SU6	L283A-S	CONDUIT	50.0	0.8600	0.0130
C52	SU23	L282A-S	CONDUIT	68.4	0.5996	0.0130
C53	L282A-S	SU5	CONDUIT	25.4	-0.9442	0.0130
C54	L283A-S	SU5	CONDUIT	29.2	-0.3772	0.0130

C55	SU17	L238A-S	CONDUIT	107.1	2.8396	0.0130
C56	L238A-S	L237A-S	CONDUIT	100.9	2.3993	0.0130
C57	L237A-S	C235A-S	CONDUIT	87.2	1.2955	0.0130
C58	SU14	C262A-S	CONDUIT	17.6	0.7406	0.0130
C58_1	C209A-S	J3	CONDUIT	28.2	3.5153	0.0130
C58_2	J3	SU26	CONDUIT	75.0	2.0004	0.0130
C59	C248A-S	SU26	CONDUIT	17.0	-0.2948	0.0130
C6	L239A-S	SU3	CONDUIT	16.5	-1.3335	0.0130
C60	SU22	C248A-S	CONDUIT	12.1	0.7457	0.0130
C61	C210A-S	C209A-S	CONDUIT	75.0	3.3352	0.0130
C62	SU1	C210A-S	CONDUIT	60.4	2.6508	0.0130
C63	L234A-S	SU1	CONDUIT	15.0	-0.5984	0.0130
C64	SU17	L234A-S	CONDUIT	39.4	0.4572	0.0130
C65	SU12	C211A-S	CONDUIT	19.0	1.4242	0.0130
C66	C211A-S	SU1	CONDUIT	37.5	-0.5339	0.0130
C67	C235A-S	SU26	CONDUIT	15.3	0.5882	0.0130
C68	SU27	L250A-S	CONDUIT	32.8	0.8847	0.0130
C69	SU27	L249A-S	CONDUIT	84.5	2.7098	0.0130
C7	SU10	L242A-S	CONDUIT	74.2	0.7547	0.0130
C70	SU15	C216A-S	CONDUIT	24.0	2.5842	0.0130
C70_1	SU22	J4	CONDUIT	71.2	0.9267	0.0130
C70_2	J4	C247A-S	CONDUIT	31.6	1.4884	0.0130
C71	SU30	L269A-S	CONDUIT	64.2	1.1839	0.0130
C72	SU30	L266A-S	CONDUIT	134.0	1.4927	0.0130
C73	SU5	L282B-S	CONDUIT	43.3	2.0318	0.0130
C74	L282B-S	SU32	CONDUIT	26.1	2.1861	0.0130
C75	L269A-S	SU32	CONDUIT	28.3	-0.8127	0.0130
C76	SU32	L268A-S	CONDUIT	52.9	1.8357	0.0130
C77	L266A-S	SU31	CONDUIT	29.3	-0.7160	0.0130
C78	L268A-S	SU31	CONDUIT	15.2	1.9145	0.0130
C79	SU31	L265A-S	CONDUIT	65.3	3.4604	0.0130
C8	L242A-S	SU11	CONDUIT	56.8	-0.4930	0.0130
C80	L265A-S	L263A-S	CONDUIT	80.4	3.1495	0.0130
C81	L263A-S	SU33	CONDUIT	15.1	-0.8610	0.0130
C82	C262A-S	SU33	CONDUIT	14.8	-0.6085	0.0130
C83	SU33	C261A-S	CONDUIT	40.6	0.5664	0.0130
C84	A217A-S	MARCH	CONDUIT	184.0	0.5000	0.0130
C84_1	SU34	J6	CONDUIT	36.0	0.6111	0.0130
C84_2	J6	C261A-S	CONDUIT	29.4	0.5782	0.0130

C85	A217B-S	SU15	CONDUIT	116.0	0.5000	0.0130
C85_1	SU34	J5	CONDUIT	36.0	0.6111	0.0130
C85_2	J5	C247A-S	CONDUIT	32.2	0.5280	0.0130
C86	L250A-S	J3	CONDUIT	36.8	-0.7609	0.0130
C87	L249A-S	J4	CONDUIT	14.9	-1.0703	0.0130
C88	SU40	L233A-S	CONDUIT	68.4	0.6579	0.0130
C89	L233A-S	SU39	CONDUIT	26.6	-0.6015	0.0130
C9	SU11	L240A-S	CONDUIT	55.4	1.1011	0.0130
C90	SU39	L232A-S	CONDUIT	45.0	1.1556	0.0130
C91	L232A-S	SU38	CONDUIT	40.0	-0.5000	0.0130
C92	SU38	L230A-S	CONDUIT	23.4	0.9830	0.0130
C93	L230A-S	SU37	CONDUIT	37.6	-0.4521	0.0130
C94	C205AA-S	SU37	CONDUIT	29.3	-1.0250	0.0130
C95	C206A-S	C205AA-S	CONDUIT	85.2	0.5047	0.0130
C96	SU37	L205A-S	CONDUIT	28.1	0.9965	0.0130
C97	L205A-S	SU36	CONDUIT	20.9	-0.9091	0.0130
C98	SU35	L225A-S	CONDUIT	80.6	0.4963	0.0130
C99	L225A-S	SU36	CONDUIT	9.9	-2.2318	0.0130
CULV-1	SU56	D-EAST	CONDUIT	12.7	0.3150	0.0250
EX-D2	SU54	SU55	CONDUIT	720.0	1.2723	0.0250
W2_1	SU57	SU58	CONDUIT	58.5	1.3665	0.0100
W2_3	MJ-OF2	J1	CONDUIT	105.4	0.1461	0.0100
W2_4	J1	SU58	CONDUIT	236.0	0.2737	0.0100
C205AA-IC1	C205AA-S	205A	ORIFICE			
C205AA-IC2	C205AA-S	205A	ORIFICE			
C211A-IC1	C211A-S	211	ORIFICE			
C211A-IC2	C211A-S	211	ORIFICE			
C212A-IC1	C212A-S	212	ORIFICE			
C212A-IC2	C212A-S	212	ORIFICE			
C213A-IC1	C213A-S	213	ORIFICE			
C213A-IC2	C213A-S	213	ORIFICE			
C214A-IC1	C214A-S	214	ORIFICE			
C214A-IC2	C214A-S	214	ORIFICE			
C216A-IC1	C216A-S	216	ORIFICE			
C216A-IC2	C216A-S	216	ORIFICE			
C246A-IC1	C246A-S	246	ORIFICE			
C246A-IC2	C246A-S	246	ORIFICE			
C247A-IC1	C247A-S	247	ORIFICE			
C247A-IC2	C247A-S	247	ORIFICE			

C248A-IC1	C248A-S	248	ORIFICE
C248A-IC2	C248A-S	248	ORIFICE
C252A-IC1	C252A-S	252	ORIFICE
C252A-IC2	C252A-S	252	ORIFICE
C253A-IC1	L253A-S	253	ORIFICE
C253A-IC2	L253A-S	253	ORIFICE
C261A-IC1	C261A-S	261	ORIFICE
C261A-IC2	C261A-S	261	ORIFICE
C262A-IC1	C262A-S	262	ORIFICE
C262A-IC2	C262A-S	262	ORIFICE
F268B-IC	F268B-S	268	ORIFICE
F282C-IC	F282C-S	282	ORIFICE
L204A-IC1	L204A-S	204	ORIFICE
L204A-IC2	L204A-S	204	ORIFICE
L204B-IC	L204B-S	204	ORIFICE
L205A-IC1	L205A-S	205	ORIFICE
L205A-IC2	L205A-S	205	ORIFICE
L206B-IC1	L206B-S	206	ORIFICE
L206B-IC2	L206B-S	206	ORIFICE
L207B-IC	L207B-S	207	ORIFICE
L211B-IC	L211B-S	211	ORIFICE
L214B-IC	L214B-S	214	ORIFICE
L214C-IC	L214C-S	214	ORIFICE
L218A-IC1	L218A-S	218	ORIFICE
L218A-IC2	L218A-S	218	ORIFICE
L220A-IC1	L220A-S	220	ORIFICE
L220A-IC2	L220A-S	220	ORIFICE
L220B-IC	L220B-S	220	ORIFICE
L221A-IC1	L221A-S	221	ORIFICE
L221A-IC2	L221A-S	221	ORIFICE
L222A-IC1	L222A-S	222	ORIFICE
L222A-IC2	L222A-S	222	ORIFICE
L225A-IC1	L225A-S	225	ORIFICE
L225A-IC2	L225A-S	225	ORIFICE
L226A-IC1	L226A-S	226	ORIFICE
L226A-IC2	L226A-S	226	ORIFICE
L229A-IC1	L229A-S	229	ORIFICE
L229A-IC2	L229A-S	229	ORIFICE
L230A-IC1	L230A-S	230	ORIFICE

L230A-IC2	L230A-S	230	ORIFICE
L230B-IC	L230B-S	230	ORIFICE
L232A-IC1	L232A-S	232	ORIFICE
L232A-IC2	L232A-S	232	ORIFICE
L233A-IC1	L233A-S	233	ORIFICE
L233A-IC2	L233A-S	233	ORIFICE
L233B-IC	L233B-S	233	ORIFICE
L234A-IC1	L234A-S	234	ORIFICE
L234A-IC2	L234A-S	234	ORIFICE
L235B-IC	L235B-S	235	ORIFICE
L239A-IC1	L239A-S	239	ORIFICE
L239A-IC2	L239A-S	239	ORIFICE
L240A-IC1	L240A-S	240	ORIFICE
L240A-IC2	L240A-S	240	ORIFICE
L240B-IC	L240B-S	240	ORIFICE
L242A-IC1	L242A-S	242	ORIFICE
L242A-IC2	L242A-S	242	ORIFICE
L244A-IC1	L244A-S	244	ORIFICE
L244A-IC2	L244A-S	244	ORIFICE
L245A-IC1	L245A-S	245	ORIFICE
L245A-IC2	L245A-S	245	ORIFICE
L246B-IC	L246B-S	246	ORIFICE
L247B-IC	L247B-S	247	ORIFICE
L249A-IC1	L249A-S	249	ORIFICE
L249A-IC2	L249A-S	249	ORIFICE
L249B-IC	L249B-S	249	ORIFICE
L250A-IC1	L250A-S	250	ORIFICE
L250A-IC2	L250A-S	250	ORIFICE
L250B-IC	L250B-S	250	ORIFICE
L252B-IC	L252B-S	252	ORIFICE
L254A-IC1	L254A-S	254	ORIFICE
L254A-IC2	L254A-S	254	ORIFICE
L255A-IC1	L255A-S	255	ORIFICE
L255A-IC2	L255A-S	255	ORIFICE
L256A-IC	L256A-S	256	ORIFICE
L257A-IC1	L257A-S	257	ORIFICE
L257A-IC2	L257A-S	257	ORIFICE
L258A-IC1	L258A-S	258	ORIFICE
L258A-IC2	L258A-S	258	ORIFICE

L260A-IC1	L260A-S	260	ORIFICE
L260A-IC2	L260A-S	260	ORIFICE
L265B-IC	L265B-S	265	ORIFICE
L266A-IC1	L266A-S	266	ORIFICE
L266A-IC2	L266A-S	266	ORIFICE
L268A-IC1	L268A-S	268	ORIFICE
L268A-IC2	L268A-S	268	ORIFICE
L269A-IC1	L269A-S	269	ORIFICE
L269A-IC2	L269A-S	269	ORIFICE
L272A-IC1	L272A-S	272	ORIFICE
L272A-IC2	L272A-S	272	ORIFICE
L273A-IC1	L273A-S	273	ORIFICE
L273A-IC2	L273A-S	273	ORIFICE
L274A-IC1	L274A-S	274	ORIFICE
L274A-IC2	L274A-S	274	ORIFICE
L274B-IC	L274B-S	274	ORIFICE
L275A-IC1	L275A-S	275	ORIFICE
L275A-IC2	L275A-S	275	ORIFICE
L279A-IC1	L279A-S	279	ORIFICE
L279A-IC2	L279A-S	279	ORIFICE
L279B-IC	L279B-S	279	ORIFICE
L280A-IC1	L280A-S	280	ORIFICE
L280A-IC2	L280A-S	280	ORIFICE
L281A-IC1	L281A-S	281	ORIFICE
L281A-IC2	L281A-S	281	ORIFICE
L282A-IC1	L282A-S	282	ORIFICE
L282A-IC2	L282A-S	282	ORIFICE
L282B-IC1	L282B-S	282	ORIFICE
L282B-IC2	L282B-S	282	ORIFICE
L283A-IC1	L283A-S	283	ORIFICE
L283A-IC2	L283A-S	283	ORIFICE
L283B-IC	L283B-S	283	ORIFICE
L285A-IC1	L285A-S	285	ORIFICE
L285A-IC2	L285A-S	285	ORIFICE
L286A-IC1	L286A-S	286	ORIFICE
L286A-IC2	L286A-S	286	ORIFICE
L287A-IC1	L287A-S	287	ORIFICE
L287A-IC2	L287A-S	287	ORIFICE
L288A-IC1	L288A-S	288	ORIFICE

L288A-IC2	L288A-S	288	ORIFICE
L289A-IC1	L289A-S	289	ORIFICE
L289A-IC2	L289A-S	289	ORIFICE
L290A-IC1	L290A-S	290	ORIFICE
L290A-IC2	L290A-S	290	ORIFICE
L291A-IC1	L291A-S	291	ORIFICE
L291A-IC2	L291A-S	291	ORIFICE
L292B-IC1	L292B-S	292	ORIFICE
L292B-IC2	L292B-S	292	ORIFICE
L293A-IC1	L293A-S	293	ORIFICE
L293A-IC2	L293A-S	293	ORIFICE
L293B-IC1	L293B-S	293	ORIFICE
L293B-IC2	L293B-S	293	ORIFICE
L294A-IC1	L294A-S	294	ORIFICE
L294A-IC2	L294A-S	294	ORIFICE
C142	L233B-S	L233A-S	WEIR
C159	L240B-S	L240A-S	WEIR
C160	L214B-S	C214A-S	WEIR
C161	L214C-S	C214A-S	WEIR
C162	L279B-S	L279A-S	WEIR
C163	L274B-S	L274A-S	WEIR
C164	L283B-S	L283A-S	WEIR
C165	L211B-S	C211A-S	WEIR
C166	F282C-S	L282B-S	WEIR
C167	F268B-S	L268A-S	WEIR
C168	L265B-S	L265A-S	WEIR
C169	L252B-S	C252A-S	WEIR
C170	L220B-S	L220A-S	WEIR
C171	L256A-S	L257A-S	WEIR
C172	L204B-S	L204A-S	WEIR
C173	L230B-S	L230A-S	WEIR
C174	L207B-S	C207A-S	WEIR
C175	L246B-S	C246A-S	WEIR
C176	L249B-S	L249A-S	WEIR
C177	L235B-S	C235A-S	WEIR
C178	L250B-S	L247B-S	WEIR
C179	L247B-S	C247A-S	WEIR
W1	SU57	MINTO	WEIR
C207A-IC	C207A-S	207	OUTLET

C210A-IC	C210A-S	210	OUTLET
C211B-O	C211B-S	211	OUTLET
C216C-O	C216C-S	216	OUTLET
C235A-IC	C235A-S	235	OUTLET
L238A-IC	L238A-S	237	OUTLET
L263A-IC	L263A-S	263	OUTLET
L265A-IC	L265A-S	265	OUTLET
OL1	L237A-S	237	OUTLET
OL2	A217B-S	216	OUTLET
OL3	A217A-S	216	OUTLET
OL4	C209A-S	209	OUTLET
OL5	C206A-S	206	OUTLET

Cross Section Summary

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
201-200	CIRCULAR	2.10	3.46	0.53	2.10	1	10181.12
202-201	CIRCULAR	2.10	3.46	0.53	2.10	1	9869.24
203-202	CIRCULAR	1.95	2.99	0.49	1.95	1	8544.62
204-203	CIRCULAR	1.80	2.54	0.45	1.80	1	7297.47
205-204	CIRCULAR	1.80	2.54	0.45	1.80	1	7232.42
205A-205	CIRCULAR	1.80	2.54	0.45	1.80	1	7319.67
206-205A	CIRCULAR	1.65	2.14	0.41	1.65	1	6089.01
206-227	CIRCULAR	0.30	0.07	0.07	0.30	1	61.24
207-206	CIRCULAR	1.65	2.14	0.41	1.65	1	5743.62
208-207	CIRCULAR	1.20	1.13	0.30	1.20	1	3262.15
209-208	CIRCULAR	1.20	1.13	0.30	1.20	1	3249.42
210-209	CIRCULAR	1.20	1.13	0.30	1.20	1	3280.46
211-210	CIRCULAR	1.20	1.13	0.30	1.20	1	2746.92
212-211	CIRCULAR	1.20	1.13	0.30	1.20	1	2333.92
213-212	CIRCULAR	1.05	0.87	0.26	1.05	1	1607.92
214-213	CIRCULAR	0.90	0.64	0.23	0.90	1	1268.12
215-214	CIRCULAR	0.90	0.64	0.23	0.90	1	1279.59
216-215	CIRCULAR	0.90	0.64	0.23	0.90	1	1276.59
218-202	CIRCULAR	1.50	1.77	0.38	1.50	1	4132.29

219-218	CIRCULAR	1.50	1.77	0.38	1.50	1	3491.28
220-219	CIRCULAR	1.35	1.43	0.34	1.35	1	2924.79
221-220	CIRCULAR	1.35	1.43	0.34	1.35	1	2906.89
222-203	CIRCULAR	0.45	0.16	0.11	0.45	1	145.19
225-204	CIRCULAR	0.45	0.16	0.11	0.45	1	179.59
226-225	CIRCULAR	0.38	0.11	0.09	0.38	1	112.42
227-226	CIRCULAR	0.30	0.07	0.07	0.30	1	63.82
229-206	CIRCULAR	0.30	0.07	0.07	0.30	1	61.22
230-205	CIRCULAR	0.53	0.22	0.13	0.53	1	271.95
231-230	CIRCULAR	0.45	0.16	0.11	0.45	1	189.08
232-231	CIRCULAR	0.45	0.16	0.11	0.45	1	179.16
233-229	CIRCULAR	0.30	0.07	0.07	0.30	1	57.08
233-232	CIRCULAR	0.38	0.11	0.09	0.38	1	110.17
234-210	CIRCULAR	0.30	0.07	0.07	0.30	1	96.60
235-207	CIRCULAR	0.53	0.22	0.13	0.53	1	398.42
236-235	CIRCULAR	0.38	0.11	0.09	0.38	1	163.94
237-236	CIRCULAR	0.38	0.11	0.09	0.38	1	247.75
238-234	CIRCULAR	0.30	0.07	0.07	0.30	1	99.46
238-237	CIRCULAR	0.30	0.07	0.07	0.30	1	167.18
239-213	CIRCULAR	0.30	0.07	0.07	0.30	1	81.00
240-211	CIRCULAR	0.45	0.16	0.11	0.45	1	190.07
241-240	CIRCULAR	0.38	0.11	0.09	0.38	1	118.54
242-241	CIRCULAR	0.38	0.11	0.09	0.38	1	118.24
243-239	CIRCULAR	0.30	0.07	0.07	0.30	1	77.82
243-242	CIRCULAR	0.30	0.07	0.07	0.30	1	65.50
244-221	CIRCULAR	0.30	0.07	0.07	0.30	1	58.94
245-222	CIRCULAR	0.45	0.16	0.11	0.45	1	129.47
245-244	CIRCULAR	0.30	0.07	0.07	0.30	1	57.08
246-221	CIRCULAR	1.20	1.13	0.30	1.20	1	2127.97
247-246	CIRCULAR	0.68	0.36	0.17	0.68	1	593.08
248-247	CIRCULAR	0.53	0.22	0.13	0.53	1	334.94
249-247	CIRCULAR	0.38	0.11	0.09	0.38	1	248.23
250-208	CIRCULAR	0.30	0.07	0.07	0.30	1	60.89
250-249	CIRCULAR	0.30	0.07	0.07	0.30	1	136.84
251-246	CIRCULAR	1.20	1.13	0.30	1.20	1	2166.73
252-251	CIRCULAR	0.82	0.53	0.21	0.82	1	920.70
253-252	CIRCULAR	0.53	0.22	0.13	0.53	1	188.87
254-253	CIRCULAR	0.53	0.22	0.13	0.53	1	192.55
255-254	CIRCULAR	0.45	0.16	0.11	0.45	1	119.58

256-255	CIRCULAR	0.38	0.11	0.09	0.38	1	87.07
256-257	CIRCULAR	0.30	0.07	0.07	0.30	1	61.16
257-260	CIRCULAR	0.38	0.11	0.09	0.38	1	89.45
258-252	CIRCULAR	0.53	0.22	0.13	0.53	1	192.52
259-258	CIRCULAR	0.45	0.16	0.11	0.45	1	119.01
260-259	CIRCULAR	0.45	0.16	0.11	0.45	1	128.86
261-251	CIRCULAR	0.75	0.44	0.19	0.75	1	927.36
262-261	CIRCULAR	0.45	0.16	0.11	0.45	1	130.33
263-261	CIRCULAR	0.68	0.36	0.17	0.68	1	1047.33
264-263	CIRCULAR	0.38	0.11	0.09	0.38	1	176.10
265-263	CIRCULAR	0.45	0.16	0.11	0.45	1	468.88
266-265	CIRCULAR	0.38	0.11	0.09	0.38	1	110.37
267-266	CIRCULAR	0.30	0.07	0.07	0.30	1	137.08
268-265	CIRCULAR	0.45	0.16	0.11	0.45	1	324.58
269-268	CIRCULAR	0.38	0.11	0.09	0.38	1	124.32
270-267	CIRCULAR	0.30	0.07	0.07	0.30	1	137.06
270-269	CIRCULAR	0.30	0.07	0.07	0.30	1	69.79
271-268	CIRCULAR	0.30	0.07	0.07	0.30	1	167.96
272-213	CIRCULAR	0.75	0.44	0.19	0.75	1	607.64
273-272	CIRCULAR	0.60	0.28	0.15	0.60	1	306.78
274-273	CIRCULAR	0.60	0.28	0.15	0.60	1	301.34
275-274	CIRCULAR	0.45	0.16	0.11	0.45	1	180.33
276-275	CIRCULAR	0.45	0.16	0.11	0.45	1	188.17
277-276	CIRCULAR	0.45	0.16	0.11	0.45	1	179.94
279-211	CIRCULAR	0.60	0.28	0.15	0.60	1	335.13
280-279	CIRCULAR	0.60	0.28	0.15	0.60	1	339.30
281-280	CIRCULAR	0.60	0.28	0.15	0.60	1	336.36
282-271	CIRCULAR	0.30	0.07	0.07	0.30	1	136.74
282-281	CIRCULAR	0.53	0.22	0.13	0.53	1	234.92
283-282	CIRCULAR	0.53	0.22	0.13	0.53	1	237.67
284-277	CIRCULAR	0.45	0.16	0.11	0.45	1	188.17
285-284	CIRCULAR	0.45	0.16	0.11	0.45	1	156.00
286-283	CIRCULAR	0.30	0.07	0.07	0.30	1	56.94
286-285	CIRCULAR	0.38	0.11	0.09	0.38	1	97.09
287-272	CIRCULAR	0.53	0.22	0.13	0.53	1	307.48
288-287	CIRCULAR	0.45	0.16	0.11	0.45	1	203.84
289-288	CIRCULAR	0.30	0.07	0.07	0.30	1	78.21
290-287	CIRCULAR	0.38	0.11	0.09	0.38	1	135.56
291-288	CIRCULAR	0.38	0.11	0.09	0.38	1	137.37

292-274	CIRCULAR	0.45	0.16	0.11	0.45	1	180.33
292-290	CIRCULAR	0.38	0.11	0.09	0.38	1	123.59
293-291	CIRCULAR	0.38	0.11	0.09	0.38	1	110.98
293-292	CIRCULAR	0.38	0.11	0.09	0.38	1	110.90
294-293	CIRCULAR	0.38	0.11	0.09	0.38	1	112.57
C1	CIRCULAR	0.90	0.64	0.23	0.90	1	3088.52
C10	18mROW	0.30	2.71	0.16	18.00	1	6716.48
C100	18mROW	0.30	2.71	0.16	18.00	1	6186.77
C101	18mROW	0.30	2.71	0.16	18.00	1	4701.11
C102	24mROW	0.41	5.25	0.20	24.00	1	11923.83
C103	18mROW	0.30	2.71	0.16	18.00	1	6206.38
C104	18mROW	0.30	2.71	0.16	18.00	1	6206.38
C105	24mROW	0.41	5.25	0.20	24.00	1	14377.41
C106	24mROW	0.41	5.25	0.20	24.00	1	8832.52
C107	18mROW	0.30	2.71	0.16	18.00	1	2237.69
C108	18mROW	0.30	2.71	0.16	18.00	1	1241.24
C109	18mROW	0.30	2.71	0.16	18.00	1	5855.94
C11	24mROW	0.41	5.25	0.20	24.00	1	9683.60
C110	18mROW	0.30	2.71	0.16	18.00	1	4983.86
C111	18mROW	0.30	2.71	0.16	18.00	1	7371.27
C112	18mROW	0.30	2.71	0.16	18.00	1	5482.17
C113	18mROW	0.30	2.71	0.16	18.00	1	4345.25
C114	18mROW	0.30	2.71	0.16	18.00	1	6299.72
C115	18mROW	0.30	2.71	0.16	18.00	1	4216.00
C116	18mROW	0.30	2.71	0.16	18.00	1	7091.39
C117	18mROW	0.30	2.71	0.16	18.00	1	5350.75
C118	18mROW	0.30	2.71	0.16	18.00	1	4777.27
C119	18mROW	0.30	2.71	0.16	18.00	1	5781.95
C12	24mROW	0.41	5.25	0.20	24.00	1	13858.55
C120	18mROW	0.30	2.71	0.16	18.00	1	5374.82
C121	18mROW	0.30	2.71	0.16	18.00	1	5512.33
C122	18mROW	0.30	2.71	0.16	18.00	1	4598.20
C123	18mROW	0.30	2.71	0.16	18.00	1	5022.02
C124	18mROW	0.30	2.71	0.16	18.00	1	6251.20
C125	18mROW	0.30	2.71	0.16	18.00	1	6045.13
C126	18mROW	0.30	2.71	0.16	18.00	1	4807.36
C127	18mROW	0.30	2.71	0.16	18.00	1	4760.00
C128	18mROW	0.30	2.71	0.16	18.00	1	4671.52
C129	18mROW	0.30	2.71	0.16	18.00	1	5489.39

C13	24mROW	0.41	5.25	0.20	24.00	1	9966.33
C130	18mROW	0.30	2.71	0.16	18.00	1	6798.82
C131	18mROW	0.30	2.71	0.16	18.00	1	5014.21
C132	18mROW	0.30	2.71	0.16	18.00	1	4413.08
C133	18mROW	0.30	2.71	0.16	18.00	1	4795.39
C134	18mROW	0.30	2.71	0.16	18.00	1	5283.16
C135	18mROW	0.30	2.71	0.16	18.00	1	4361.32
C136	18mROW	0.30	2.71	0.16	18.00	1	4368.31
C137	18mROW	0.30	2.71	0.16	18.00	1	5482.99
C138	18mROW	0.30	2.71	0.16	18.00	1	4406.29
C139	TRAPEZOIDAL	0.20	0.91	0.15	6.08	1	4709.56
C14	18mROW	0.30	2.71	0.16	18.00	1	5988.52
C140	TRIANGULAR	0.50	1.87	0.25	7.50	1	1597.36
C141	TRAPEZOIDAL	0.20	1.22	0.13	9.20	1	5404.71
C15	18mROW	0.30	2.71	0.16	18.00	1	5396.49
C16	18mROW	0.30	2.71	0.16	18.00	1	6336.44
C17	18mROW	0.30	2.71	0.16	18.00	1	5223.12
C18	18mROW	0.30	2.71	0.16	18.00	1	5260.97
C180	RECT_OPEN	0.10	0.60	0.10	6.00	1	1970.83
C181	RECT_OPEN	0.05	0.30	0.05	6.00	1	1173.33
C183	RECT_OPEN	0.05	0.30	0.05	6.00	1	720.41
C19	18mROW	0.30	2.71	0.16	18.00	1	5948.81
C2	CIRCULAR	3.50	9.62	0.87	3.50	1	5286.52
C20	18mROW	0.30	2.71	0.16	18.00	1	4526.39
C21	18mROW	0.30	2.71	0.16	18.00	1	5529.03
C22	18mROW	0.30	2.71	0.16	18.00	1	5665.58
C23	24mROW	0.41	5.25	0.20	24.00	1	10036.94
C24	18mROW	0.30	2.71	0.16	18.00	1	6751.07
C25	24mROW	0.41	5.25	0.20	24.00	1	14594.38
C26	18mROW	0.30	2.71	0.16	18.00	1	5726.07
C27	18mROW	0.30	2.71	0.16	18.00	1	5327.46
C28	18mROW	0.30	2.71	0.16	18.00	1	5128.85
C29	18mROW	0.30	2.71	0.16	18.00	1	5943.25
C3	24mROW	0.41	5.25	0.20	24.00	1	11428.56
C30	18mROW	0.30	2.71	0.16	18.00	1	6119.89
C31	18mROW	0.30	2.71	0.16	18.00	1	6003.42
C32	18mROW	0.30	2.71	0.16	18.00	1	6022.01
C33	18mROW	0.30	2.71	0.16	18.00	1	6248.18
C34	18mROW	0.30	2.71	0.16	18.00	1	5311.10

C35	18mROW	0.30	2.71	0.16	18.00	1	5973.53
C36	18mROW	0.30	2.71	0.16	18.00	1	5156.92
C37	18mROW	0.30	2.71	0.16	18.00	1	6119.56
C37_1	18mROW	0.30	2.71	0.16	18.00	1	4339.45
C37_2	18mROW	0.30	2.71	0.16	18.00	1	5942.13
C38	18mROW	0.30	2.71	0.16	18.00	1	4691.50
C39	18mROW	0.30	2.71	0.16	18.00	1	4328.15
C4	24mROW	0.41	5.25	0.20	24.00	1	16955.37
C40	18mROW	0.30	2.71	0.16	18.00	1	6083.19
C41	18mROW	0.30	2.71	0.16	18.00	1	5685.36
C42	18mROW	0.30	2.71	0.16	18.00	1	4983.55
C43	18mROW	0.30	2.71	0.16	18.00	1	6183.06
C44	18mROW	0.30	2.71	0.16	18.00	1	6373.55
C45	18mROW	0.30	2.71	0.16	18.00	1	4351.26
C46	18mROW	0.30	2.71	0.16	18.00	1	4551.77
C47	18mROW	0.30	2.71	0.16	18.00	1	4810.80
C48	18mROW	0.30	2.71	0.16	18.00	1	5168.93
C49	18mROW	0.30	2.71	0.16	18.00	1	6199.64
C5	18mROW	0.30	2.71	0.16	18.00	1	6206.38
C50	18mROW	0.30	2.71	0.16	18.00	1	4372.33
C51	18mROW	0.30	2.71	0.16	18.00	1	5755.52
C52	18mROW	0.30	2.71	0.16	18.00	1	4805.72
C53	18mROW	0.30	2.71	0.16	18.00	1	6030.52
C54	18mROW	0.30	2.71	0.16	18.00	1	3811.81
C55	18mROW	0.30	2.71	0.16	18.00	1	10458.20
C56	18mROW	0.30	2.71	0.16	18.00	1	9613.32
C57	18mROW	0.30	2.71	0.16	18.00	1	7064.02
C58	24mROW	0.41	5.25	0.20	24.00	1	11882.45
C58_1	24mROW	0.41	5.25	0.20	24.00	1	25887.94
C58_2	24mROW	0.41	5.25	0.20	24.00	1	19528.76
C59	24mROW	0.41	5.25	0.20	24.00	1	7497.03
C6	18mROW	0.30	2.71	0.16	18.00	1	7166.65
C60	24mROW	0.41	5.25	0.20	24.00	1	11923.12
C61	24mROW	0.41	5.25	0.20	24.00	1	25216.01
C62	24mROW	0.41	5.25	0.20	24.00	1	22480.50
C63	18mROW	0.30	2.71	0.16	18.00	1	4800.97
C64	18mROW	0.30	2.71	0.16	18.00	1	4196.46
C65	24mROW	0.41	5.25	0.20	24.00	1	16477.87
C66	24mROW	0.41	5.25	0.20	24.00	1	10089.06

C67	18mROW	0.30	2.71	0.16	18.00	1	4760.00
C68	18mROW	0.30	2.71	0.16	18.00	1	5837.55
C69	18mROW	0.30	2.71	0.16	18.00	1	10216.30
C7	18mROW	0.30	2.71	0.16	18.00	1	5391.70
C70	24mROW	0.41	5.25	0.20	24.00	1	22196.22
C70_1	24mROW	0.41	5.25	0.20	24.00	1	13292.19
C70_2	24mROW	0.41	5.25	0.20	24.00	1	16845.47
C71	18mROW	0.30	2.71	0.16	18.00	1	6752.77
C72	18mROW	0.30	2.71	0.16	18.00	1	7582.53
C73	18mROW	0.30	2.71	0.16	18.00	1	8846.46
C74	18mROW	0.30	2.71	0.16	18.00	1	9176.20
C75	18mROW	0.30	2.71	0.16	18.00	1	5595.07
C76	18mROW	0.30	2.71	0.16	18.00	1	8408.67
C77	18mROW	0.30	2.71	0.16	18.00	1	5251.54
C78	18mROW	0.30	2.71	0.16	18.00	1	8587.37
C79	18mROW	0.30	2.71	0.16	18.00	1	11544.86
C8	18mROW	0.30	2.71	0.16	18.00	1	4357.48
C80	18mROW	0.30	2.71	0.16	18.00	1	11014.08
C81	18mROW	0.30	2.71	0.16	18.00	1	5758.62
C82	24mROW	0.41	5.25	0.20	24.00	1	10771.04
C83	24mROW	0.41	5.25	0.20	24.00	1	10391.24
C84	24mROW	0.41	5.25	0.20	24.00	1	9763.47
C84_1	24mROW	0.41	5.25	0.20	24.00	1	10793.95
C84_2	24mROW	0.41	5.25	0.20	24.00	1	10499.55
C85	24mROW	0.41	5.25	0.20	24.00	1	9763.47
C85_1	24mROW	0.41	5.25	0.20	24.00	1	10793.95
C85_2	24mROW	0.41	5.25	0.20	24.00	1	10032.65
C86	18mROW	0.30	2.71	0.16	18.00	1	5413.63
C87	18mROW	0.30	2.71	0.16	18.00	1	6420.65
C88	18mROW	0.30	2.71	0.16	18.00	1	5033.97
C89	18mROW	0.30	2.71	0.16	18.00	1	4813.38
C9	18mROW	0.30	2.71	0.16	18.00	1	6512.54
C90	18mROW	0.30	2.71	0.16	18.00	1	6671.71
C91	18mROW	0.30	2.71	0.16	18.00	1	4388.49
C92	18mROW	0.30	2.71	0.16	18.00	1	6153.10
C93	18mROW	0.30	2.71	0.16	18.00	1	4173.11
C94	24mROW	0.41	5.25	0.20	24.00	1	13979.03
C95	24mROW	0.41	5.25	0.20	24.00	1	9809.20
C96	18mROW	0.30	2.71	0.16	18.00	1	6195.33

C97	18mROW	0.30	2.71	0.16	18.00	1	5917.52
C98	18mROW	0.30	2.71	0.16	18.00	1	4372.13
C99	18mROW	0.30	2.71	0.16	18.00	1	9271.59
CULV-1	CIRCULAR	1.20	1.13	0.30	1.20	1	1137.84
EX-D2	TRIANGULAR	0.40	1.00	0.20	5.00	1	1530.19
W2_1	TRIANGULAR	0.60	1.05	0.28	3.50	1	5300.81
W2_3	TRIANGULAR	0.50	0.75	0.24	3.00	1	1098.40
W2_4	TRIANGULAR	1.00	3.00	0.47	6.00	1	9546.47

Transect Summary

Transect 18mROW
Area:

0.0004	0.0017	0.0039	0.0069	0.0109
0.0156	0.0213	0.0278	0.0352	0.0434
0.0525	0.0625	0.0734	0.0851	0.0977
0.1112	0.1255	0.1407	0.1568	0.1737
0.1915	0.2101	0.2290	0.2478	0.2666
0.2858	0.3059	0.3268	0.3486	0.3712
0.3947	0.4190	0.4441	0.4701	0.4969
0.5245	0.5530	0.5823	0.6125	0.6435
0.6754	0.7081	0.7416	0.7760	0.8113
0.8473	0.8842	0.9220	0.9606	1.0000

Hrad:

0.0178	0.0357	0.0535	0.0714	0.0892
0.1070	0.1249	0.1427	0.1606	0.1784
0.1963	0.2141	0.2319	0.2498	0.2676
0.2855	0.3033	0.3211	0.3390	0.3568
0.3747	0.3983	0.4333	0.4683	0.5032
0.5376	0.5699	0.6003	0.6290	0.6560
0.6815	0.7057	0.7287	0.7505	0.7712
0.7910	0.8099	0.8280	0.8453	0.8619
0.8779	0.8933	0.9082	0.9225	0.9364
0.9499	0.9629	0.9756	0.9880	1.0000

Width:

0.0218	0.0436	0.0654	0.0872	0.1090
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0.1308	0.1526	0.1744	0.1962	0.2179
0.2397	0.2615	0.2833	0.3051	0.3269
0.3487	0.3705	0.3923	0.4141	0.4359
0.4577	0.4722	0.4722	0.4722	0.4722
0.4933	0.5144	0.5356	0.5567	0.5778
0.5989	0.6200	0.6411	0.6622	0.6833
0.7044	0.7256	0.7467	0.7678	0.7889
0.8100	0.8311	0.8522	0.8733	0.8944
0.9156	0.9367	0.9578	0.9789	1.0000

Transect 24mROW

Area:

0.0004	0.0018	0.0040	0.0071	0.0111
0.0160	0.0217	0.0284	0.0359	0.0443
0.0536	0.0638	0.0749	0.0869	0.0998
0.1135	0.1275	0.1416	0.1559	0.1709
0.1868	0.2036	0.2211	0.2395	0.2588
0.2789	0.2998	0.3215	0.3441	0.3675
0.3918	0.4168	0.4428	0.4695	0.4971
0.5255	0.5548	0.5849	0.6158	0.6476
0.6802	0.7136	0.7479	0.7826	0.8178
0.8534	0.8894	0.9259	0.9627	1.0000

Hrad:

0.0198	0.0397	0.0595	0.0794	0.0992
0.1191	0.1389	0.1588	0.1786	0.1985
0.2183	0.2382	0.2580	0.2778	0.2977
0.3204	0.3594	0.3983	0.4368	0.4725
0.5055	0.5360	0.5644	0.5908	0.6154
0.6385	0.6602	0.6806	0.6999	0.7183
0.7357	0.7523	0.7682	0.7834	0.7981
0.8122	0.8258	0.8390	0.8518	0.8642
0.8763	0.8880	0.9002	0.9140	0.9280
0.9422	0.9565	0.9709	0.9854	1.0000

Width:

0.0237	0.0473	0.0710	0.0946	0.1183
0.1419	0.1656	0.1892	0.2129	0.2365
0.2602	0.2838	0.3075	0.3312	0.3548
0.3750	0.3750	0.3750	0.3908	0.4130
0.4353	0.4576	0.4799	0.5021	0.5244

0.5467	0.5689	0.5912	0.6135	0.6358
0.6580	0.6803	0.7026	0.7249	0.7471
0.7694	0.7917	0.8140	0.8362	0.8585
0.8808	0.9031	0.9218	0.9330	0.9442
0.9553	0.9665	0.9777	0.9888	1.0000

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 06/11/2024 00:00:00

Ending Date 06/12/2024 00:00:00

Antecedent Dry Days 0.0

Report Time Step 00:01:00

Wet Time Step 00:01:00

Dry Time Step 00:05:00

Routing Time Step 2.00 sec

Variable Time Step NO

Maximum Trials 8

Number of Threads 16

Head Tolerance 0.001500 m

Volume

Depth

Runoff Quantity Continuity

hectare-m

mm

Total Precipitation

3.433

71.667

Evaporation Loss	0.000	0.000
Infiltration Loss	1.016	21.203
Surface Runoff	2.379	49.672
Final Storage	0.042	0.872
Continuity Error (%)	-0.111	

	Volume hectare-m	Volume 10^6 ltr
Flow Routing Continuity		
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	2.379	23.793
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.061	0.612
External Outflow	2.441	24.410
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	-0.021	

Highest Continuity Errors

Node J2 (12.00%)
Node L206B-S (-10.82%)
Node SU15 (7.55%)
Node SU42 (5.14%)
Node C206A-S (-2.88%)

Highest Flow Instability Indexes

Link L249B-IC (5)
Link L249A-IC2 (4)

Link L249A-IC1 (4)
Link 201-200 (2)

Most Frequent Nonconverging Nodes

Convergence obtained at all time steps.

Routing Time Step Summary

Minimum Time Step : 2.00 sec
Average Time Step : 2.00 sec
Maximum Time Step : 2.00 sec
% of Time in Steady State : 0.00
Average Iterations per Step : 2.02
% of Steps Not Converging : 0.12

Subcatchment Runoff Summary

			Total	Total	Total	Total	Imperv	Perv	Total
Total	Peak	Runoff	Precip	Runon	Evap	Infil	Runoff	Runoff	Runoff
Runoff	Runoff	Coeff							
Subcatchment	Subcatchment		mm	mm	mm	mm	mm	mm	mm
ltr	LPS								10^6
A216A			71.67	0.00	0.00	12.91	50.12	7.58	57.70
0.40	305.77	0.805							

A216B			71.67	0.00	0.00	12.91	50.12	7.58	57.70
0.26	193.82	0.805							
C205AA			71.67	0.00	0.00	8.83	56.16	5.52	61.68
0.33	255.27	0.861							
C206A			71.67	0.00	0.00	8.82	56.16	5.53	61.69
0.12	94.35	0.861							
C207A			71.67	0.00	0.00	18.63	41.11	11.08	52.19
0.09	68.57	0.728							
C209A			71.67	0.00	0.00	10.17	54.14	6.22	60.36
0.15	117.33	0.842							
C210A			71.67	0.00	0.00	10.14	54.14	6.25	60.39
0.11	83.93	0.843							
C211A			71.67	0.00	0.00	18.57	41.12	11.14	52.25
0.08	63.84	0.729							
C211B			71.67	0.00	0.00	16.05	45.12	9.56	54.68
1.51	1191.55	0.763							
C212A			71.67	0.00	0.00	10.12	54.15	6.28	60.43
0.18	137.77	0.843							
C213A			71.67	0.00	0.00	10.11	54.15	6.29	60.44
0.16	125.94	0.843							
C214A			71.67	0.00	0.00	13.97	48.14	8.57	56.71
0.16	131.42	0.791							
C216A			71.67	0.00	0.00	14.00	48.13	8.54	56.68
0.05	37.59	0.791							
C216C			71.67	0.00	0.00	3.14	65.15	1.98	67.14
1.25	915.85	0.937							
C235A			71.67	0.00	0.00	10.77	53.14	6.65	59.79
0.33	261.44	0.834							
C246A			71.67	0.00	0.00	9.47	55.15	5.90	61.05
0.15	119.75	0.852							
C247A			71.67	0.00	0.00	10.12	54.15	6.28	60.43
0.25	199.09	0.843							
C247B			71.67	0.00	0.00	43.57	4.91	28.03	28.03
0.08	68.29	0.391							
C248A			71.67	0.00	0.00	18.50	41.12	11.22	52.34
0.10	82.06	0.730							
C252A			71.67	0.00	0.00	9.48	55.15	5.89	61.04
0.16	123.65	0.852							
C261A			71.67	0.00	0.00	8.83	56.16	5.52	61.67

0.15	119.33	0.861							
C261B			71.67	0.00	0.00	43.61	4.91	27.99	27.99
0.14	119.68	0.390							
C262A			71.67	0.00	0.00	8.89	56.14	5.46	61.60
0.08	58.12	0.860							
C264A			71.67	0.00	0.00	35.90	20.06	35.38	35.38
0.36	293.82	0.494							
EXT-1			71.67	0.00	0.00	22.31	35.11	13.55	48.66
0.20	173.68	0.679							
EXT-10			71.67	0.00	0.00	22.25	35.11	13.61	48.72
0.21	189.79	0.680							
EXT-12			71.67	0.00	0.00	22.22	35.11	13.64	48.75
0.09	82.11	0.680							
EXT-2			71.67	0.00	0.00	40.94	10.03	20.50	30.53
2.90	1809.51	0.426							
EXT-3			71.67	0.00	0.00	22.22	35.11	13.65	48.76
0.29	256.35	0.680							
EXT-4			71.67	0.00	0.00	25.56	30.09	15.42	45.52
0.08	67.73	0.635							
EXT-5			71.67	0.00	0.00	25.46	30.09	15.53	45.62
0.03	28.90	0.637							
EXT-6			71.67	0.00	0.00	25.46	30.09	15.53	45.62
0.11	100.28	0.637							
EXT-7			71.67	0.00	0.00	25.56	30.09	15.42	45.52
0.05	48.86	0.635							
EXT-8			71.67	0.00	0.00	25.49	30.09	15.50	45.59
0.12	108.07	0.636							
EXT-9			71.67	0.00	0.00	19.52	39.12	12.26	51.38
0.06	50.28	0.717							
F268B			71.67	0.00	0.00	25.12	37.11	45.85	45.85
0.09	93.31	0.640							
F282C			71.67	0.00	0.00	25.14	37.11	45.82	45.82
0.15	149.75	0.639							
L204A			71.67	0.00	0.00	11.44	52.14	7.00	59.14
0.13	99.63	0.825							
L204B			71.67	0.00	0.00	25.15	37.11	45.81	45.81
0.21	214.64	0.639							
L205A			71.67	0.00	0.00	11.47	52.13	6.97	59.11
0.10	74.99	0.825							

L206B			71.67	0.00	0.00	18.51	41.12	11.20	52.32
0.03	24.53	0.730							
L207B			71.67	0.00	0.00	26.46	35.11	44.54	44.54
0.36	362.92	0.622							
L211B			71.67	0.00	0.00	26.53	35.11	44.46	44.46
0.32	317.80	0.620							
L214B			71.67	0.00	0.00	25.18	37.11	45.78	45.78
0.06	57.91	0.639							
L214C			71.67	0.00	0.00	25.14	37.11	45.83	45.83
0.09	93.49	0.639							
L218A			71.67	0.00	0.00	11.46	52.14	6.98	59.11
0.15	114.20	0.825							
L220A			71.67	0.00	0.00	9.46	55.16	5.91	61.07
0.22	174.93	0.852							
L220B			71.67	0.00	0.00	25.17	37.11	45.79	45.79
0.29	295.21	0.639							
L221A			71.67	0.00	0.00	9.47	55.15	5.91	61.06
0.15	115.17	0.852							
L222A			71.67	0.00	0.00	9.46	55.16	5.92	61.07
0.17	136.28	0.852							
L225A			71.67	0.00	0.00	9.46	55.16	5.91	61.07
0.22	168.32	0.852							
L226A			71.67	0.00	0.00	9.47	55.15	5.90	61.06
0.26	203.59	0.852							
L229A			71.67	0.00	0.00	11.44	52.14	7.00	59.14
0.12	94.77	0.825							
L230A			71.67	0.00	0.00	11.46	52.14	6.98	59.12
0.12	96.94	0.825							
L230B			71.67	0.00	0.00	25.79	36.11	45.19	45.19
0.21	213.20	0.631							
L232A			71.67	0.00	0.00	10.74	53.15	6.69	59.84
0.22	176.49	0.835							
L233A			71.67	0.00	0.00	10.73	53.15	6.69	59.84
0.25	194.47	0.835							
L233B			71.67	0.00	0.00	26.48	35.11	44.52	44.52
0.09	90.70	0.621							
L234A			71.67	0.00	0.00	11.43	52.14	7.02	59.16
0.09	68.69	0.825							
L235B			71.67	0.00	0.00	26.40	35.11	44.60	44.60

0.28	286.65	0.622							
L237A			71.67	0.00	0.00	10.74	53.15	6.68	59.83
0.26	203.81	0.835							
L238A			71.67	0.00	0.00	10.76	53.15	6.66	59.81
0.28	221.30	0.835							
L239A			71.67	0.00	0.00	10.79	53.14	6.63	59.78
0.12	96.94	0.834							
L240A			71.67	0.00	0.00	11.44	52.14	7.00	59.14
0.13	104.97	0.825							
L240B			71.67	0.00	0.00	26.38	35.11	44.63	44.63
0.14	146.82	0.623							
L242A			71.67	0.00	0.00	10.74	53.15	6.68	59.83
0.36	280.85	0.835							
L244A			71.67	0.00	0.00	10.77	53.14	6.65	59.80
0.04	30.59	0.834							
L245A			71.67	0.00	0.00	9.47	55.15	5.90	61.05
0.29	228.49	0.852							
L246B			71.67	0.00	0.00	25.82	36.11	45.16	45.16
0.21	215.96	0.630							
L247B			71.67	0.00	0.00	26.46	35.11	44.53	44.53
0.09	95.23	0.621							
L249A			71.67	0.00	0.00	10.76	53.15	6.66	59.81
0.29	227.43	0.835							
L249B			71.67	0.00	0.00	26.40	35.11	44.60	44.60
0.10	101.42	0.622							
L250A			71.67	0.00	0.00	11.39	52.15	7.05	59.20
0.17	131.28	0.826							
L250B			71.67	0.00	0.00	26.43	35.11	44.57	44.57
0.06	66.48	0.622							
L252B			71.67	0.00	0.00	25.76	36.11	45.22	45.22
0.09	89.28	0.631							
L253A			71.67	0.00	0.00	10.73	53.15	6.70	59.85
0.16	128.53	0.835							
L254A			71.67	0.00	0.00	10.74	53.15	6.68	59.83
0.16	123.51	0.835							
L255A			71.67	0.00	0.00	11.42	52.14	7.03	59.17
0.18	139.65	0.826							
L256A			71.67	0.00	0.00	25.78	36.11	45.20	45.20
0.20	203.66	0.631							

L257A			71.67	0.00	0.00	11.39	52.15	7.06	59.21
0.23	180.11	0.826							
L258A			71.67	0.00	0.00	11.46	52.14	6.98	59.11
0.18	143.47	0.825							
L260A			71.67	0.00	0.00	11.37	52.15	7.08	59.23
0.18	139.49	0.826							
L263A			71.67	0.00	0.00	11.43	52.14	7.02	59.16
0.16	125.86	0.825							
L265A			71.67	0.00	0.00	11.43	52.14	7.02	59.16
0.13	103.41	0.825							
L265B			71.67	0.00	0.00	26.45	35.11	44.54	44.54
0.19	197.48	0.622							
L266A			71.67	0.00	0.00	10.76	53.15	6.66	59.81
0.33	257.43	0.834							
L268A			71.67	0.00	0.00	11.43	52.14	7.01	59.15
0.14	111.91	0.825							
L269A			71.67	0.00	0.00	10.75	53.15	6.68	59.82
0.26	207.89	0.835							
L272A			71.67	0.00	0.00	10.80	53.14	6.62	59.76
0.13	97.80	0.834							
L273A			71.67	0.00	0.00	9.47	55.15	5.91	61.06
0.15	115.39	0.852							
L274A			71.67	0.00	0.00	9.48	55.15	5.89	61.04
0.14	109.44	0.852							
L274B			71.67	0.00	0.00	25.13	37.11	45.83	45.83
0.06	58.08	0.639							
L275A			71.67	0.00	0.00	10.75	53.15	6.67	59.82
0.22	171.93	0.835							
L279A			71.67	0.00	0.00	18.46	41.12	11.25	52.37
0.08	63.44	0.731							
L279B			71.67	0.00	0.00	25.75	36.11	45.24	45.24
0.14	139.66	0.631							
L280A			71.67	0.00	0.00	8.85	56.15	5.50	61.65
0.08	61.62	0.860							
L281A			71.67	0.00	0.00	8.87	56.14	5.47	61.62
0.16	121.98	0.860							
L282A			71.67	0.00	0.00	10.73	53.15	6.69	59.84
0.19	147.72	0.835							
L282B			71.67	0.00	0.00	11.47	52.13	6.97	59.11

0.11	83.18	0.825							
L283A			71.67	0.00	0.00	11.42	52.14	7.02	59.16
0.20	160.28	0.826							
L283B			71.67	0.00	0.00	25.81	36.11	45.17	45.17
0.33	332.16	0.630							
L285A			71.67	0.00	0.00	11.44	52.14	7.01	59.15
0.20	155.01	0.825							
L286A			71.67	0.00	0.00	11.39	52.15	7.06	59.21
0.27	214.78	0.826							
L287A			71.67	0.00	0.00	10.79	53.14	6.63	59.77
0.08	59.26	0.834							
L288A			71.67	0.00	0.00	10.79	53.14	6.62	59.77
0.08	59.20	0.834							
L289A			71.67	0.00	0.00	10.81	53.14	6.61	59.75
0.07	54.59	0.834							
L290A			71.67	0.00	0.00	8.83	56.16	5.52	61.67
0.15	114.18	0.861							
L291A			71.67	0.00	0.00	8.83	56.16	5.52	61.68
0.15	117.37	0.861							
L292B			71.67	0.00	0.00	8.84	56.15	5.51	61.67
0.18	141.27	0.860							
L293A			71.67	0.00	0.00	10.76	53.15	6.67	59.81
0.13	102.89	0.835							
L293B			71.67	0.00	0.00	8.83	56.16	5.52	61.67
0.15	119.39	0.861							
L294A			71.67	0.00	0.00	18.53	41.12	11.19	52.30
0.05	44.86	0.730							

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
200	OUTFALL	0.07	1.19	67.19	0 01:13	1.19

D-EAST	OUTFALL	0.03	0.58	69.95	0	01:24	0.58
MARCH	OUTFALL	0.00	0.06	82.18	0	01:10	0.06
MINTO	OUTFALL	0.00	0.00	70.00	0	00:00	0.00
201	STORAGE	0.07	1.38	67.51	0	01:15	1.38
201A	STORAGE	0.07	1.21	67.21	0	01:13	1.20
202	STORAGE	0.07	1.45	67.69	0	01:14	1.45
203	STORAGE	0.08	1.73	68.20	0	01:14	1.73
204	STORAGE	0.06	1.39	68.31	0	01:14	1.39
205	STORAGE	0.06	1.20	68.46	0	01:16	1.20
205A	STORAGE	0.05	1.09	68.72	0	01:16	1.09
206	STORAGE	0.05	1.04	69.33	0	01:13	1.04
207	STORAGE	0.07	1.47	70.10	0	01:13	1.47
208	STORAGE	0.05	1.24	70.88	0	01:15	1.24
209	STORAGE	0.05	1.17	71.85	0	01:15	1.17
210	STORAGE	0.05	1.16	73.84	0	01:14	1.16
211	STORAGE	0.06	1.32	75.88	0	01:14	1.32
212	STORAGE	0.05	1.28	76.10	0	01:14	1.27
213	STORAGE	0.05	1.28	76.49	0	01:13	1.28
214	STORAGE	0.03	0.72	77.30	0	01:10	0.72
215	STORAGE	0.03	0.70	77.52	0	01:10	0.70
216	STORAGE	0.03	0.59	77.75	0	01:10	0.59
218	STORAGE	0.06	1.26	68.16	0	01:15	1.26
219	STORAGE	0.06	1.28	68.24	0	01:15	1.28
220	STORAGE	0.05	1.19	68.63	0	01:14	1.19
221	STORAGE	0.05	1.11	68.73	0	01:14	1.11
222	STORAGE	0.02	0.37	70.26	0	01:17	0.37
225	STORAGE	0.02	0.39	69.35	0	01:16	0.39
226	STORAGE	0.01	0.23	69.53	0	01:11	0.23
227	STORAGE	0.00	0.11	69.53	0	01:12	0.11
229	STORAGE	0.02	0.42	70.40	0	01:15	0.42
230	STORAGE	0.02	0.49	69.56	0	01:14	0.49
231	STORAGE	0.02	0.45	69.64	0	01:15	0.45
232	STORAGE	0.02	0.51	70.07	0	01:15	0.51
233	STORAGE	0.02	0.48	70.40	0	01:15	0.48
234	STORAGE	0.01	0.13	77.43	0	01:13	0.13
235	STORAGE	0.02	0.37	71.87	0	01:10	0.37
236	STORAGE	0.01	0.24	71.99	0	01:10	0.24
237	STORAGE	0.01	0.17	73.94	0	01:10	0.17
238	STORAGE	0.00	0.00	77.28	0	00:00	0.00

239	STORAGE	0.01	0.16	78.41	0	01:15	0.16
240	STORAGE	0.02	0.54	78.06	0	01:13	0.54
241	STORAGE	0.02	0.49	78.14	0	01:13	0.49
242	STORAGE	0.02	0.45	78.41	0	01:15	0.45
243	STORAGE	0.00	0.10	78.41	0	01:14	0.10
244	STORAGE	0.02	0.33	70.30	0	01:15	0.33
245	STORAGE	0.01	0.28	70.32	0	01:16	0.28
246	STORAGE	0.04	1.02	69.01	0	01:14	1.02
247	STORAGE	0.03	0.76	70.80	0	01:12	0.76
248	STORAGE	0.01	0.25	70.97	0	01:10	0.25
249	STORAGE	0.02	0.52	72.24	0	01:12	0.52
250	STORAGE	0.01	0.36	72.38	0	01:13	0.36
251	STORAGE	0.04	0.85	69.11	0	01:13	0.85
252	STORAGE	0.03	0.56	69.48	0	01:16	0.56
253	STORAGE	0.02	0.49	69.87	0	01:14	0.49
254	STORAGE	0.02	0.45	70.01	0	01:13	0.45
255	STORAGE	0.02	0.41	70.06	0	01:12	0.41
256	STORAGE	0.01	0.30	70.17	0	01:11	0.30
257	STORAGE	0.01	0.26	70.17	0	01:11	0.26
258	STORAGE	0.03	0.47	69.82	0	01:14	0.47
259	STORAGE	0.02	0.42	69.86	0	01:14	0.42
260	STORAGE	0.02	0.40	70.03	0	01:13	0.40
261	STORAGE	0.03	0.71	70.54	0	01:12	0.71
262	STORAGE	0.01	0.34	70.54	0	01:12	0.34
263	STORAGE	0.02	0.66	71.62	0	01:11	0.66
264	STORAGE	0.01	1.06	72.56	0	01:10	1.03
265	STORAGE	0.02	1.09	74.91	0	01:12	1.09
266	STORAGE	0.02	0.37	75.39	0	01:18	0.37
267	STORAGE	0.00	0.07	75.39	0	01:18	0.07
268	STORAGE	0.01	0.37	75.90	0	01:10	0.37
269	STORAGE	0.01	0.24	76.52	0	01:14	0.24
270	STORAGE	0.00	0.09	76.50	0	01:14	0.09
271	STORAGE	0.00	0.17	76.51	0	01:11	0.17
272	STORAGE	0.04	1.02	76.74	0	01:14	1.01
273	STORAGE	0.04	0.93	76.94	0	01:14	0.93
274	STORAGE	0.04	0.96	77.15	0	01:15	0.96
275	STORAGE	0.03	0.87	77.57	0	01:19	0.87
276	STORAGE	0.02	0.82	77.60	0	01:19	0.82
277	STORAGE	0.02	0.62	77.68	0	01:19	0.62

279	STORAGE	0.03	0.70	76.67	0	01:12	0.70
280	STORAGE	0.03	0.76	76.93	0	01:12	0.76
281	STORAGE	0.03	0.79	77.16	0	01:12	0.79
282	STORAGE	0.03	0.95	77.68	0	01:11	0.95
283	STORAGE	0.03	0.85	77.83	0	01:10	0.85
284	STORAGE	0.02	0.57	77.71	0	01:18	0.57
285	STORAGE	0.02	0.45	77.79	0	01:18	0.45
286	STORAGE	0.02	0.52	77.84	0	01:11	0.52
287	STORAGE	0.02	0.73	76.90	0	01:15	0.73
288	STORAGE	0.02	0.57	77.04	0	01:16	0.57
289	STORAGE	0.01	0.24	77.07	0	01:16	0.24
290	STORAGE	0.01	0.38	77.07	0	01:17	0.38
291	STORAGE	0.01	0.33	77.26	0	01:18	0.33
292	STORAGE	0.02	0.68	77.20	0	01:15	0.68
293	STORAGE	0.02	0.58	77.36	0	01:16	0.58
294	STORAGE	0.01	0.46	77.38	0	01:16	0.46
A217A-S	STORAGE	0.03	1.45	83.11	0	01:10	1.44
A217B-S	STORAGE	0.03	1.44	82.76	0	01:10	1.44
C205AA-S	STORAGE	0.04	1.72	72.50	0	01:17	1.72
C206A-S	STORAGE	1.35	1.51	72.72	0	01:12	1.51
C207A-S	STORAGE	1.35	1.51	73.10	0	01:10	1.51
C209A-S	STORAGE	1.35	1.44	75.94	0	01:10	1.44
C210A-S	STORAGE	1.35	1.43	78.43	0	01:11	1.43
C211A-S	STORAGE	0.03	1.64	80.04	0	01:11	1.64
C211B-S	STORAGE	0.05	1.73	80.60	0	01:12	1.73
C212A-S	STORAGE	0.04	2.51	80.02	0	01:11	2.51
C213A-S	STORAGE	0.03	1.54	80.25	0	01:11	1.54
C214A-S	STORAGE	0.04	1.58	80.50	0	01:11	1.58
C216A-S	STORAGE	0.03	1.49	81.61	0	01:13	1.49
C216C-S	STORAGE	0.04	1.73	82.55	0	01:11	1.73
C235A-S	STORAGE	0.04	1.52	73.62	0	01:10	1.52
C246A-S	STORAGE	0.04	1.68	72.45	0	01:13	1.68
C247A-S	STORAGE	0.04	1.66	72.58	0	01:11	1.66
C248A-S	STORAGE	0.02	1.55	73.51	0	01:10	1.55
C252A-S	STORAGE	0.04	1.64	72.36	0	01:18	1.64
C261A-S	STORAGE	0.04	1.64	72.56	0	01:14	1.64
C262A-S	STORAGE	0.03	1.56	72.62	0	01:11	1.56
F268B-S	STORAGE	0.01	1.46	77.26	0	01:10	1.46
f282C-S	STORAGE	0.03	2.06	79.27	0	01:10	2.06

J1	STORAGE	0.01	0.28	70.13	0	01:12	0.28
J2	STORAGE	0.00	0.02	80.29	0	01:13	0.02
J3	STORAGE	0.00	0.05	74.94	0	01:10	0.05
J4	STORAGE	0.00	0.08	72.85	0	01:11	0.08
J5	STORAGE	0.00	0.09	72.56	0	01:12	0.09
J6	STORAGE	0.00	0.08	72.55	0	01:14	0.08
L204A-S	STORAGE	0.05	1.61	72.17	0	01:10	1.61
L204B-S	STORAGE	0.04	2.37	72.42	0	01:10	2.37
L205A-S	STORAGE	0.05	1.60	72.40	0	01:14	1.60
L206B-S	STORAGE	0.02	1.46	72.92	0	01:15	1.46
L207B-S	STORAGE	0.04	2.46	73.57	0	01:10	2.46
L211B-S	STORAGE	0.06	2.93	80.30	0	01:10	2.93
L214B-S	STORAGE	0.04	2.25	80.56	0	01:10	2.25
L214C-S	STORAGE	0.05	2.38	80.73	0	01:10	2.38
L218A-S	STORAGE	0.04	1.50	71.99	0	01:11	1.50
L220A-S	STORAGE	0.06	1.70	72.25	0	01:11	1.70
L220B-S	STORAGE	0.04	2.31	72.46	0	01:10	2.31
L221A-S	STORAGE	0.05	1.62	72.33	0	01:17	1.62
L222A-S	STORAGE	0.05	1.64	72.15	0	01:11	1.64
L225A-S	STORAGE	0.04	1.58	72.35	0	01:12	1.58
L226A-S	STORAGE	0.05	1.60	72.56	0	01:10	1.60
L229A-S	STORAGE	0.05	1.71	72.96	0	01:11	1.71
L230A-S	STORAGE	0.05	1.63	72.54	0	01:10	1.63
L230B-S	STORAGE	0.04	2.36	72.65	0	01:10	2.36
L232A-S	STORAGE	0.05	1.62	72.56	0	01:14	1.62
L233A-S	STORAGE	0.04	1.60	72.90	0	01:10	1.60
L233B-S	STORAGE	0.04	2.65	73.04	0	01:10	2.65
L234A-S	STORAGE	0.03	1.52	80.03	0	01:12	1.52
L235B-S	STORAGE	0.04	2.41	74.17	0	01:10	2.41
L237A-S	STORAGE	1.36	1.47	74.70	0	01:10	1.47
L238A-S	STORAGE	1.35	1.45	77.10	0	01:10	1.45
L239A-S	STORAGE	0.05	1.57	80.43	0	01:16	1.57
L240A-S	STORAGE	0.05	1.62	80.11	0	01:10	1.62
L240B-S	STORAGE	0.04	2.34	80.45	0	01:10	2.34
L242A-S	STORAGE	0.05	1.61	80.43	0	01:12	1.61
L244A-S	STORAGE	0.03	1.55	72.44	0	01:15	1.55
L245A-S	STORAGE	0.04	1.62	72.37	0	01:11	1.62
L246B-S	STORAGE	0.04	2.35	72.53	0	01:10	2.35
L247B-S	STORAGE	0.05	2.34	72.66	0	01:10	2.34

L249A-S	STORAGE	0.51	1.62	72.85	0	01:10	1.62
L249B-S	STORAGE	0.59	2.35	73.50	0	01:10	2.35
L250A-S	STORAGE	0.05	1.62	74.85	0	01:14	1.62
L250B-S	STORAGE	0.05	2.48	75.04	0	01:10	2.48
L252B-S	STORAGE	0.04	2.31	72.42	0	01:10	2.31
L253A-S	STORAGE	0.05	1.59	72.29	0	01:20	1.59
L254A-S	STORAGE	0.05	1.58	72.24	0	01:12	1.58
L255A-S	STORAGE	0.03	1.49	72.13	0	01:10	1.49
L256A-S	STORAGE	0.04	2.36	72.52	0	01:10	2.36
L257A-S	STORAGE	0.04	1.64	72.43	0	01:10	1.64
L258A-S	STORAGE	0.06	1.60	72.23	0	01:21	1.60
L260A-S	STORAGE	0.05	1.85	72.45	0	01:10	1.85
L263A-S	STORAGE	1.36	1.62	72.64	0	01:11	1.62
L265A-S	STORAGE	1.35	1.46	75.01	0	01:10	1.46
L265B-S	STORAGE	0.04	2.30	76.31	0	01:10	2.30
L266A-S	STORAGE	0.05	1.60	77.20	0	01:13	1.60
L268A-S	STORAGE	0.03	1.46	77.56	0	01:10	1.46
L269A-S	STORAGE	0.06	2.03	78.51	0	01:13	2.03
L272A-S	STORAGE	0.05	1.56	80.37	0	01:15	1.56
L273A-S	STORAGE	0.05	1.60	80.51	0	01:12	1.60
L274A-S	STORAGE	0.05	1.61	80.52	0	01:11	1.61
L274B-S	STORAGE	0.04	2.40	80.66	0	01:10	2.40
L275A-S	STORAGE	0.04	1.57	80.46	0	01:12	1.57
L279A-S	STORAGE	0.07	1.62	80.02	0	01:15	1.62
L279B-S	STORAGE	0.04	2.34	80.20	0	01:10	2.34
L280A-S	STORAGE	0.03	1.52	80.13	0	01:10	1.52
L281A-S	STORAGE	0.05	1.58	80.05	0	01:12	1.58
L282A-S	STORAGE	0.06	1.66	79.94	0	01:16	1.66
L282B-S	STORAGE	0.03	1.46	79.10	0	01:10	1.46
L283A-S	STORAGE	0.04	1.61	80.02	0	01:10	1.61
L283B-S	STORAGE	0.04	2.42	80.22	0	01:10	2.42
L285A-S	STORAGE	0.05	1.58	80.37	0	01:13	1.58
L286A-S	STORAGE	0.05	1.62	80.19	0	01:12	1.62
L287A-S	STORAGE	0.03	1.50	80.33	0	01:10	1.50
L288A-S	STORAGE	0.03	1.51	80.18	0	01:10	1.51
L289A-S	STORAGE	0.03	1.50	80.08	0	01:11	1.50
L290A-S	STORAGE	0.05	1.61	80.28	0	01:12	1.61
L291A-S	STORAGE	0.04	1.59	80.11	0	01:11	1.59
L292B-S	STORAGE	0.05	1.61	80.29	0	01:12	1.61

L293A-S	STORAGE	0.03	1.54	80.21	0	01:10	1.54
L293B-S	STORAGE	0.04	1.61	80.21	0	01:11	1.60
L294A-S	STORAGE	0.02	1.49	80.00	0	01:12	1.49
MJ-OF2	STORAGE	0.01	0.33	70.33	0	01:10	0.33
SU1	STORAGE	0.00	0.05	80.03	0	01:13	0.05
SU10	STORAGE	0.00	0.00	80.76	0	00:00	0.00
SU11	STORAGE	0.00	0.00	80.48	0	00:00	0.00
SU12	STORAGE	0.00	0.04	80.09	0	01:11	0.04
SU13	STORAGE	0.00	0.01	80.13	0	01:11	0.01
SU14	STORAGE	0.00	0.06	72.63	0	01:11	0.05
SU15	STORAGE	0.00	0.04	82.16	0	01:10	0.04
SU16	STORAGE	0.00	0.01	80.18	0	01:11	0.01
SU17	STORAGE	0.00	0.00	80.07	0	00:00	0.00
SU18	STORAGE	0.00	0.02	80.33	0	01:11	0.02
SU19	STORAGE	0.00	0.00	80.52	0	00:00	0.00
SU2	STORAGE	0.00	0.00	81.66	0	00:00	0.00
SU20	STORAGE	0.00	0.03	80.52	0	01:11	0.03
SU21	STORAGE	0.00	0.03	80.20	0	01:12	0.03
SU22	STORAGE	0.00	0.07	73.50	0	01:10	0.07
SU23	STORAGE	0.00	0.00	80.07	0	00:00	0.00
SU24	STORAGE	0.00	0.00	80.21	0	00:00	0.00
SU25	STORAGE	0.00	0.00	80.41	0	00:00	0.00
SU26	STORAGE	0.00	0.13	73.52	0	01:10	0.13
SU27	STORAGE	0.00	0.00	74.90	0	00:00	0.00
SU28	STORAGE	0.00	0.00	72.97	0	00:00	0.00
SU29	STORAGE	0.00	0.00	80.59	0	00:00	0.00
SU3	STORAGE	0.00	0.04	80.50	0	01:12	0.03
SU30	STORAGE	0.00	0.00	78.98	0	00:00	0.00
SU31	STORAGE	0.00	0.06	77.25	0	01:10	0.06
SU32	STORAGE	0.00	0.07	78.52	0	01:10	0.07
SU33	STORAGE	0.00	0.09	72.62	0	01:12	0.09
SU34	STORAGE	0.00	0.00	72.69	0	00:00	0.00
SU35	STORAGE	0.00	0.02	72.57	0	01:12	0.02
SU36	STORAGE	0.00	0.03	72.40	0	01:14	0.03
SU37	STORAGE	0.00	0.06	72.52	0	01:11	0.06
SU38	STORAGE	0.00	0.04	72.56	0	01:14	0.04
SU39	STORAGE	0.00	0.06	72.90	0	01:11	0.06
SU4	STORAGE	0.00	0.00	80.57	0	00:00	0.00
SU40	STORAGE	0.00	0.00	73.13	0	00:00	0.00

SU41	STORAGE	0.00	0.07	72.15	0	01:11	0.07
SU42	STORAGE	0.00	0.15	72.95	0	01:11	0.15
SU43	STORAGE	0.00	0.00	72.38	0	00:00	0.00
SU44	STORAGE	0.00	0.07	72.44	0	01:16	0.07
SU45	STORAGE	0.00	0.05	72.36	0	01:18	0.05
SU46	STORAGE	0.00	0.02	72.29	0	01:21	0.02
SU47	STORAGE	0.00	0.03	72.25	0	01:11	0.03
SU48	STORAGE	0.00	0.09	72.42	0	01:10	0.09
SU49	STORAGE	0.00	0.01	72.45	0	01:12	0.01
SU5	STORAGE	0.00	0.07	79.97	0	01:10	0.07
SU50	STORAGE	0.00	0.00	72.49	0	00:00	0.00
SU51	STORAGE	0.00	0.00	72.47	0	00:00	0.00
SU52	STORAGE	0.00	0.05	72.32	0	01:17	0.05
SU53	STORAGE	0.00	0.08	72.24	0	01:11	0.08
SU54	STORAGE	0.03	0.39	79.71	0	01:10	0.39
SU55	STORAGE	0.05	0.46	70.62	0	01:21	0.46
SU56	STORAGE	0.06	0.93	70.34	0	01:24	0.93
SU57	STORAGE	0.00	0.20	70.20	0	01:12	0.20
SU58	STORAGE	0.01	0.27	69.17	0	01:12	0.27
SU6	STORAGE	0.00	0.00	80.22	0	00:00	0.00
SU7	STORAGE	0.00	0.00	80.37	0	00:00	0.00
SU8	STORAGE	0.00	0.00	80.27	0	00:00	0.00
SU9	STORAGE	0.00	0.00	80.26	0	00:00	0.00

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
200	OUTFALL	0.00	8490.33	0 01:13	0	20.4	0.000
D-EAST	OUTFALL	0.00	1150.84	0 01:24	0	3.23	0.000
MARCH	OUTFALL	0.00	78.95	0 01:10	0	0.0246	0.000
MINTO	OUTFALL	660.46	660.46	0 01:10	0.735	0.735	0.000

201	STORAGE	0.00	7973.14	0 01:15	0	19.9	-0.009
201A	STORAGE	0.00	8663.70	0 01:14	0	20.4	-0.002
202	STORAGE	0.00	7971.50	0 01:15	0	20	0.010
203	STORAGE	0.00	5333.86	0 01:17	0	13.7	0.010
204	STORAGE	0.00	5212.13	0 01:14	0	13.3	-0.016
205	STORAGE	0.00	4946.77	0 01:14	0	12.6	0.003
205A	STORAGE	0.00	4598.24	0 01:13	0	11.6	0.065
206	STORAGE	0.00	4284.91	0 01:13	0	10.9	-0.003
207	STORAGE	0.00	4096.60	0 01:12	0	10.6	-0.000
208	STORAGE	0.00	3681.16	0 01:15	0	9.48	0.003
209	STORAGE	0.00	3674.69	0 01:14	0	9.47	0.002
210	STORAGE	0.00	3652.00	0 01:14	0	9.41	0.003
211	STORAGE	0.00	3593.23	0 01:14	0	9.29	0.002
212	STORAGE	0.00	2112.64	0 01:14	0	5.33	-0.029
213	STORAGE	0.00	2013.54	0 01:13	0	5.15	0.227
214	STORAGE	0.00	1275.19	0 01:10	0	2.84	-0.131
215	STORAGE	240.69	1134.39	0 01:10	0.549	2.49	-0.052
216	STORAGE	0.00	894.40	0 01:10	0	1.94	0.089
218	STORAGE	0.00	2640.62	0 01:15	0	6.28	0.000
219	STORAGE	0.00	2597.66	0 01:14	0	6.14	-0.180
220	STORAGE	0.00	2600.86	0 01:14	0	6.14	0.066
221	STORAGE	0.00	2431.58	0 01:13	0	5.68	0.034
222	STORAGE	0.00	123.60	0 01:15	0	0.337	0.030
225	STORAGE	0.00	158.81	0 01:13	0	0.486	-0.093
226	STORAGE	0.00	79.75	0 01:11	0	0.259	0.109
227	STORAGE	0.00	6.98	0 01:01	0	0.000655	2.253
229	STORAGE	0.00	82.34	0 01:11	0	0.22	-0.085
230	STORAGE	0.00	309.75	0 01:14	0	0.84	-0.018
231	STORAGE	0.00	198.73	0 01:16	0	0.567	-0.010
232	STORAGE	0.00	198.95	0 01:13	0	0.567	0.153
233	STORAGE	0.00	120.65	0 01:08	0	0.326	0.431
234	STORAGE	0.00	33.39	0 01:12	0	0.0839	-0.006
235	STORAGE	0.00	275.87	0 01:10	0	0.737	-0.002
236	STORAGE	0.00	102.58	0 01:10	0	0.213	0.093
237	STORAGE	0.00	102.90	0 01:10	0	0.213	0.048
238	STORAGE	0.00	0.00	0 00:00	0	0	0.000 ltr
239	STORAGE	0.00	45.36	0 01:12	0	0.134	-0.008
240	STORAGE	0.00	203.03	0 01:11	0	0.593	-0.043
241	STORAGE	0.00	118.61	0 01:31	0	0.357	-0.256

242	STORAGE	0.00	116.09	0	01:26	0	0.36	0.329
243	STORAGE	0.00	5.30	0	01:09	0	0.00497	1.390
244	STORAGE	0.00	75.42	0	01:15	0	0.205	-0.054
245	STORAGE	0.00	114.13	0	01:11	0	0.293	0.003
246	STORAGE	0.00	2318.46	0	01:13	0	5.32	0.147
247	STORAGE	0.00	581.51	0	01:11	0	1.28	-0.016
248	STORAGE	0.00	152.66	0	01:10	0	0.221	0.041
249	STORAGE	0.00	236.49	0	01:04	0	0.622	-0.104
250	STORAGE	0.00	101.37	0	01:13	0	0.276	-0.033
251	STORAGE	0.00	1565.95	0	01:12	0	3.65	-0.015
252	STORAGE	0.00	545.71	0	01:15	0	1.53	-0.021
253	STORAGE	0.00	236.77	0	01:12	0	0.638	-0.252
254	STORAGE	0.00	185.77	0	01:11	0	0.463	0.037
255	STORAGE	0.00	134.82	0	01:10	0	0.307	0.366
256	STORAGE	0.00	79.64	0	01:02	0	0.151	-0.491
257	STORAGE	0.00	80.55	0	01:10	0	0.225	0.138
258	STORAGE	0.00	185.71	0	01:13	0	0.585	-0.065
259	STORAGE	0.00	129.14	0	01:13	0	0.381	-0.577
260	STORAGE	0.00	129.68	0	01:10	0	0.381	-0.053
261	STORAGE	0.00	1029.17	0	01:11	0	2.12	0.014
262	STORAGE	0.00	38.59	0	01:11	0	0.0911	0.642
263	STORAGE	0.00	880.03	0	01:10	0	1.72	0.011
264	STORAGE	293.82	293.82	0	01:10	0.357	0.357	0.004
265	STORAGE	0.00	548.20	0	01:10	0	1.13	0.003
266	STORAGE	0.00	125.96	0	01:18	0	0.376	-0.016
267	STORAGE	0.00	9.46	0	01:15	0	0.0208	0.081
268	STORAGE	0.00	321.80	0	01:10	0	0.574	-0.003
269	STORAGE	0.00	89.95	0	01:13	0	0.293	-0.010
270	STORAGE	0.00	9.47	0	01:14	0	0.0212	0.045
271	STORAGE	0.00	96.07	0	01:11	0	0.081	-0.001
272	STORAGE	0.00	766.39	0	01:23	0	2.01	-0.398
273	STORAGE	0.00	439.22	0	01:26	0	1.27	-0.627
274	STORAGE	0.00	385.41	0	01:27	0	1.12	-0.064
275	STORAGE	0.00	182.57	0	01:26	0	0.487	-0.036
276	STORAGE	0.00	109.71	0	01:08	0	0.263	0.026
277	STORAGE	0.00	112.49	0	01:09	0	0.263	0.059
279	STORAGE	0.00	478.11	0	01:12	0	1.46	-0.244
280	STORAGE	0.00	410.42	0	01:04	0	1.23	-0.174
281	STORAGE	0.00	401.30	0	01:03	0	1.15	0.096

282	STORAGE	0.00	409.66	0	01:10	0	1.07	-0.033
283	STORAGE	0.00	260.42	0	01:03	0	0.62	0.121
284	STORAGE	0.00	117.18	0	01:11	0	0.263	-0.139
285	STORAGE	0.00	116.62	0	01:11	0	0.263	0.204
286	STORAGE	0.00	80.09	0	01:12	0	0.271	-0.059
287	STORAGE	0.00	300.43	0	01:21	0	0.6	0.205
288	STORAGE	0.00	167.07	0	01:21	0	0.341	0.239
289	STORAGE	0.00	33.15	0	01:11	0	0.0711	0.416
290	STORAGE	0.00	95.98	0	01:15	0	0.186	-0.228
291	STORAGE	0.00	100.14	0	01:16	0	0.194	-0.205
292	STORAGE	0.00	185.17	0	01:05	0	0.482	0.048
293	STORAGE	0.00	139.84	0	01:12	0	0.342	0.560
294	STORAGE	0.00	33.00	0	01:12	0	0.0605	-0.008
A217A-S	STORAGE	305.77	305.77	0	01:10	0.404	0.404	-0.037
A217B-S	STORAGE	198.19	198.19	0	01:10	0.261	0.261	-0.524
C205AA-S	STORAGE	255.27	731.37	0	01:10	0.329	0.705	1.121
C206A-S	STORAGE	94.35	669.26	0	01:12	0.122	0.442	-2.799
C207A-S	STORAGE	68.57	867.17	0	01:10	0.0855	0.568	-0.066
C209A-S	STORAGE	117.33	186.31	0	01:10	0.152	0.246	1.053
C210A-S	STORAGE	83.93	124.36	0	01:11	0.108	0.135	1.473
C211A-S	STORAGE	63.84	316.09	0	01:10	0.0784	0.2	-0.211
C211B-S	STORAGE	1191.55	1191.55	0	01:10	1.51	1.51	0.092
C212A-S	STORAGE	137.77	161.59	0	01:10	0.176	0.187	-0.073
C213A-S	STORAGE	125.94	131.51	0	01:10	0.161	0.169	-0.208
C214A-S	STORAGE	178.17	282.31	0	01:10	0.22	0.272	-0.188
C216A-S	STORAGE	37.59	89.52	0	01:10	0.047	0.0656	-0.345
C216C-S	STORAGE	915.85	915.85	0	01:10	1.25	1.25	0.079
C235A-S	STORAGE	261.44	766.45	0	01:10	0.334	0.756	0.077
C246A-S	STORAGE	119.75	388.02	0	01:11	0.154	0.323	-0.273
C247A-S	STORAGE	267.37	561.51	0	01:10	0.332	0.478	-0.221
C248A-S	STORAGE	82.06	286.88	0	01:05	0.0989	0.27	-0.323
C252A-S	STORAGE	123.65	231.53	0	01:14	0.159	0.288	-0.295
C261A-S	STORAGE	239.01	400.14	0	01:10	0.291	0.404	0.385
C262A-S	STORAGE	58.12	119.07	0	01:08	0.0759	0.0937	-0.040
F268B-S	STORAGE	93.31	93.31	0	01:10	0.0918	0.0918	0.014
f282C-S	STORAGE	149.75	149.75	0	01:10	0.148	0.148	0.013
J1	STORAGE	0.00	387.19	0	01:10	0	0.311	0.269
J2	STORAGE	0.00	32.95	0	01:10	0	0.00599	13.632
J3	STORAGE	0.00	150.27	0	01:10	0	0.18	-0.568

J4	STORAGE	0.00	236.27	0	01:10	0	0.0876	2.265
J5	STORAGE	0.00	269.97	0	01:11	0	0.098	1.154
J6	STORAGE	0.00	190.53	0	01:13	0	0.0978	1.005
L204A-S	STORAGE	99.63	244.55	0	01:10	0.127	0.207	-0.516
L204B-S	STORAGE	214.64	214.64	0	01:10	0.212	0.212	0.016
L205A-S	STORAGE	74.99	141.63	0	01:10	0.0966	0.134	0.429
L206B-S	STORAGE	24.53	79.61	0	01:12	0.0297	0.0523	-9.763
L207B-S	STORAGE	362.92	362.92	0	01:10	0.356	0.356	0.014
L211B-S	STORAGE	317.80	317.80	0	01:10	0.318	0.318	0.016
L214B-S	STORAGE	57.91	57.91	0	01:10	0.0574	0.0574	0.015
L214C-S	STORAGE	93.49	93.49	0	01:10	0.0921	0.0921	0.015
L218A-S	STORAGE	114.20	356.83	0	01:11	0.147	0.293	-0.211
L220A-S	STORAGE	174.93	380.02	0	01:10	0.224	0.36	-0.430
L220B-S	STORAGE	295.21	295.21	0	01:10	0.292	0.292	0.015
L221A-S	STORAGE	115.17	142.79	0	01:16	0.148	0.19	-0.138
L222A-S	STORAGE	136.28	231.77	0	01:10	0.175	0.194	0.256
L225A-S	STORAGE	168.32	168.33	0	01:10	0.216	0.227	-0.392
L226A-S	STORAGE	203.59	203.59	0	01:10	0.261	0.263	-0.081
L229A-S	STORAGE	94.77	488.67	0	01:10	0.121	0.26	0.367
L230A-S	STORAGE	96.94	240.58	0	01:10	0.125	0.21	-0.514
L230B-S	STORAGE	213.20	213.20	0	01:10	0.209	0.209	0.015
L232A-S	STORAGE	176.49	238.53	0	01:10	0.224	0.256	0.037
L233A-S	STORAGE	194.47	247.72	0	01:10	0.246	0.269	-0.283
L233B-S	STORAGE	90.70	90.70	0	01:10	0.0894	0.0894	0.012
L234A-S	STORAGE	68.69	73.24	0	01:11	0.0876	0.0911	-0.115
L235B-S	STORAGE	286.65	286.65	0	01:10	0.279	0.279	0.015
L237A-S	STORAGE	203.81	381.71	0	01:10	0.258	0.458	-0.789
L238A-S	STORAGE	221.30	221.30	0	01:10	0.282	0.282	0.522
L239A-S	STORAGE	96.94	102.58	0	01:10	0.124	0.133	-0.005
L240A-S	STORAGE	104.97	203.29	0	01:10	0.134	0.183	0.018
L240B-S	STORAGE	146.82	146.82	0	01:10	0.142	0.142	0.016
L242A-S	STORAGE	280.85	280.85	0	01:10	0.356	0.356	0.089
L244A-S	STORAGE	30.59	119.72	0	01:14	0.039	0.0697	-0.027
L245A-S	STORAGE	228.49	228.49	0	01:10	0.294	0.294	0.058
L246B-S	STORAGE	215.96	215.96	0	01:10	0.213	0.213	0.016
L247B-S	STORAGE	95.23	140.30	0	01:10	0.0936	0.114	0.010
L249A-S	STORAGE	227.43	292.60	0	01:10	0.289	0.321	0.191
L249B-S	STORAGE	101.42	101.42	0	01:10	0.0985	0.0993	0.696
L250A-S	STORAGE	131.28	184.50	0	01:10	0.166	0.232	0.485

L250B-S	STORAGE	66.48	66.48	0	01:10	0.0649	0.0649	0.014
L252B-S	STORAGE	89.28	89.28	0	01:10	0.0872	0.0873	0.017
L253A-S	STORAGE	128.53	128.53	0	01:10	0.163	0.179	-0.505
L254A-S	STORAGE	123.51	123.55	0	01:10	0.157	0.16	-0.355
L255A-S	STORAGE	139.65	293.84	0	01:10	0.177	0.248	-0.524
L256A-S	STORAGE	203.66	203.66	0	01:10	0.199	0.199	0.016
L257A-S	STORAGE	180.11	314.24	0	01:10	0.227	0.295	-0.358
L258A-S	STORAGE	143.47	143.47	0	01:10	0.185	0.201	-0.135
L260A-S	STORAGE	139.49	139.49	0	01:10	0.175	0.176	-0.232
L263A-S	STORAGE	125.86	440.45	0	01:10	0.16	0.361	1.166
L265A-S	STORAGE	103.41	374.84	0	01:10	0.132	0.261	0.795
L265B-S	STORAGE	197.48	197.48	0	01:10	0.194	0.194	0.014
L266A-S	STORAGE	257.43	317.30	0	01:10	0.328	0.356	0.161
L268A-S	STORAGE	111.91	256.05	0	01:10	0.143	0.219	0.457
L269A-S	STORAGE	207.89	303.81	0	01:10	0.264	0.298	0.505
L272A-S	STORAGE	97.80	102.25	0	01:10	0.126	0.132	0.013
L273A-S	STORAGE	115.39	115.39	0	01:10	0.148	0.148	0.144
L274A-S	STORAGE	109.44	146.45	0	01:10	0.141	0.158	-0.012
L274B-S	STORAGE	58.08	58.08	0	01:10	0.0572	0.0572	0.016
L275A-S	STORAGE	171.93	177.99	0	01:10	0.218	0.224	-0.130
L279A-S	STORAGE	63.44	185.55	0	01:10	0.0758	0.134	0.435
L279B-S	STORAGE	139.66	139.66	0	01:10	0.136	0.136	0.016
L280A-S	STORAGE	61.62	61.62	0	01:10	0.0798	0.08	-0.119
L281A-S	STORAGE	121.98	121.98	0	01:10	0.159	0.159	0.088
L282A-S	STORAGE	147.72	257.10	0	01:10	0.187	0.233	0.460
L282B-S	STORAGE	83.18	292.87	0	01:10	0.107	0.202	0.245
L283A-S	STORAGE	160.28	371.22	0	01:10	0.204	0.307	-0.148
L283B-S	STORAGE	332.16	332.16	0	01:10	0.327	0.327	0.015
L285A-S	STORAGE	155.01	155.01	0	01:10	0.198	0.198	-0.092
L286A-S	STORAGE	214.78	214.78	0	01:10	0.271	0.271	0.091
L287A-S	STORAGE	59.26	59.26	0	01:10	0.076	0.0764	-0.065
L288A-S	STORAGE	59.20	61.22	0	01:10	0.076	0.0774	-0.253
L289A-S	STORAGE	54.59	54.67	0	01:10	0.0703	0.071	-0.270
L290A-S	STORAGE	114.18	116.26	0	01:10	0.147	0.149	0.057
L291A-S	STORAGE	117.37	117.46	0	01:10	0.151	0.152	0.026
L292B-S	STORAGE	141.27	141.27	0	01:10	0.183	0.185	-0.019
L293A-S	STORAGE	102.89	103.06	0	01:10	0.131	0.136	-0.333
L293B-S	STORAGE	119.39	133.34	0	01:10	0.154	0.157	0.157
L294A-S	STORAGE	44.86	59.30	0	01:10	0.0545	0.0607	0.278

MJ-OF2	STORAGE	189.79	400.62	0	01:10	0.215	0.31	-0.405
SU1	STORAGE	0.00	123.36	0	01:11	0	0.0328	1.809
SU10	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU11	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU12	STORAGE	0.00	122.42	0	01:10	0	0.042	-0.526
SU13	STORAGE	0.00	13.32	0	01:10	0	0.00125	47.490
SU14	STORAGE	0.00	25.78	0	01:08	0	0.00233	6.020
SU15	STORAGE	0.00	61.56	0	01:10	0	0.0201	8.165
SU16	STORAGE	0.00	13.71	0	01:10	0	0.00148	37.121
SU17	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU18	STORAGE	0.00	15.65	0	01:10	0	0.00301	13.025
SU19	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU2	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU20	STORAGE	0.00	43.10	0	01:09	0	0.0107	4.063
SU21	STORAGE	0.00	36.82	0	01:10	0	0.011	0.171
SU22	STORAGE	0.00	125.60	0	01:10	0	0.05	-2.932
SU23	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU24	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU25	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU26	STORAGE	0.00	774.69	0	01:10	0	0.531	-0.886
SU27	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU28	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU29	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU3	STORAGE	0.00	75.19	0	01:11	0	0.0253	3.519
SU30	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU31	STORAGE	0.00	200.14	0	01:10	0	0.0892	-0.723
SU32	STORAGE	0.00	250.18	0	01:10	0	0.108	-2.352
SU33	STORAGE	0.00	261.40	0	01:11	0	0.125	-1.578
SU34	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU35	STORAGE	0.00	43.47	0	01:10	0	0.00437	55.139
SU36	STORAGE	0.00	49.52	0	01:11	0	0.0173	7.594
SU37	STORAGE	0.00	161.70	0	01:10	0	0.0735	-2.348
SU38	STORAGE	0.00	51.82	0	01:11	0	0.0153	7.021
SU39	STORAGE	0.00	97.37	0	01:10	0	0.0329	0.527
SU4	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU40	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU41	STORAGE	0.00	184.14	0	01:10	0	0.0862	0.165
SU42	STORAGE	0.00	1024.30	0	01:09	0	0.508	5.414
SU43	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr

SU44	STORAGE	0.00	196.27	0	01:13	0	0.0739	1.352
SU45	STORAGE	0.00	77.30	0	01:17	0	0.0357	5.304
SU46	STORAGE	0.00	29.80	0	01:10	0	0.0048	19.565
SU47	STORAGE	0.00	30.40	0	01:10	0	0.00388	18.442
SU48	STORAGE	0.00	185.39	0	01:10	0	0.0707	1.635
SU49	STORAGE	0.00	29.65	0	01:11	0	0.00275	95.227
SU5	STORAGE	0.00	280.78	0	01:10	0	0.125	-1.441
SU50	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU51	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU52	STORAGE	0.00	69.48	0	01:16	0	0.0343	3.900
SU53	STORAGE	0.00	172.81	0	01:10	0	0.0829	1.821
SU54	STORAGE	1809.51	1809.51	0	01:10	2.9	2.9	-1.657
SU55	STORAGE	173.68	1511.14	0	01:11	0.2	3.15	1.595
SU56	STORAGE	82.11	1246.80	0	01:17	0.0923	3.2	-0.925
SU57	STORAGE	0.00	296.69	0	01:11	0	0.162	-0.040
SU58	STORAGE	0.00	611.37	0	01:12	0	0.472	-0.001
SU6	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU7	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU8	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr
SU9	STORAGE	0.00	0.00	0	00:00	0	0	0.000 ltr

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Storage Unit	Average Volume 1000 m	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
201	0.000	1.5	0.0	0.0	0.002	30.8	0 01:15	8167.37
201A	0.000	0.0	0.0	0.0	0.000	0.0	0 00:00	8490.33
202	0.000	1.3	0.0	0.0	0.002	25.5	0 01:14	7973.14
203	0.000	1.4	0.0	0.0	0.002	30.6	0 01:14	5333.93
204	0.000	1.1	0.0	0.0	0.002	25.3	0 01:14	5210.59
205	0.000	1.1	0.0	0.0	0.001	23.0	0 01:16	4942.67
205A	0.000	0.0	0.0	0.0	0.000	0.0	0 00:00	4598.09
206	0.000	1.1	0.0	0.0	0.001	22.4	0 01:13	4287.29
207	0.000	1.4	0.0	0.0	0.002	30.7	0 01:13	4095.66
208	0.000	1.0	0.0	0.0	0.001	22.9	0 01:15	3685.87
209	0.000	0.8	0.0	0.0	0.001	17.8	0 01:15	3673.20
210	0.000	0.7	0.0	0.0	0.001	15.9	0 01:14	3647.44
211	0.000	1.0	0.0	0.0	0.001	23.8	0 01:14	3593.20
212	0.000	0.9	0.0	0.0	0.001	23.2	0 01:14	2112.43
213	0.000	0.9	0.0	0.0	0.001	24.1	0 01:13	2012.45
214	0.000	0.8	0.0	0.0	0.001	17.9	0 01:10	1275.24
215	0.000	0.7	0.0	0.0	0.001	15.6	0 01:10	1132.04
216	0.000	0.6	0.0	0.0	0.001	12.8	0 01:10	894.51
218	0.000	1.1	0.0	0.0	0.001	24.7	0 01:15	2640.60
219	0.000	1.1	0.0	0.0	0.001	25.0	0 01:15	2596.23
220	0.000	1.0	0.0	0.0	0.001	24.5	0 01:14	2597.66
221	0.000	1.0	0.0	0.0	0.001	23.1	0 01:14	2427.21
222	0.000	0.7	0.0	0.0	0.000	14.6	0 01:17	123.28
225	0.000	0.6	0.0	0.0	0.000	10.7	0 01:16	158.63
226	0.000	0.4	0.0	0.0	0.000	6.8	0 01:11	79.72
227	0.000	0.1	0.0	0.0	0.000	3.3	0 01:12	7.37
229	0.000	0.5	0.0	0.0	0.000	13.1	0 01:15	84.92
230	0.000	0.7	0.0	0.0	0.001	14.0	0 01:14	309.69
231	0.000	0.6	0.0	0.0	0.001	13.7	0 01:15	198.75
232	0.000	0.7	0.0	0.0	0.001	15.6	0 01:15	198.73
233	0.000	0.6	0.0	0.0	0.001	14.9	0 01:15	118.85
234	0.000	0.3	0.0	0.0	0.000	4.7	0 01:13	33.36
235	0.000	0.7	0.0	0.0	0.000	13.8	0 01:10	275.64

236	0.000	0.4	0.0	0.0	0.000	9.3	0 01:10	102.52
237	0.000	0.4	0.0	0.0	0.000	7.0	0 01:10	102.58
238	0.000	0.0	0.0	0.0	0.000	0.0	0 00:00	0.00
239	0.000	0.4	0.0	0.0	0.000	6.4	0 01:15	44.72
240	0.000	0.8	0.0	0.0	0.001	18.2	0 01:13	202.26
241	0.000	0.7	0.0	0.0	0.001	17.1	0 01:13	118.93
242	0.000	0.8	0.0	0.0	0.001	18.8	0 01:15	118.61
243	0.000	0.1	0.0	0.0	0.000	4.1	0 01:14	4.34
244	0.000	0.6	0.0	0.0	0.000	13.2	0 01:15	75.35
245	0.000	0.6	0.0	0.0	0.000	11.5	0 01:16	113.45
246	0.000	1.0	0.0	0.0	0.001	22.4	0 01:14	2312.74
247	0.000	1.0	0.0	0.0	0.001	27.3	0 01:12	580.83
248	0.000	0.3	0.0	0.0	0.000	9.4	0 01:10	152.64
249	0.000	0.7	0.0	0.0	0.001	20.2	0 01:12	236.17
250	0.000	0.5	0.0	0.0	0.000	13.8	0 01:13	107.05
251	0.000	0.9	0.0	0.0	0.001	19.9	0 01:13	1560.14
252	0.000	0.8	0.0	0.0	0.001	16.2	0 01:16	546.26
253	0.000	0.8	0.0	0.0	0.001	16.6	0 01:14	236.54
254	0.000	0.8	0.0	0.0	0.001	17.5	0 01:13	185.47
255	0.000	0.7	0.0	0.0	0.000	17.0	0 01:12	134.51
256	0.000	0.4	0.0	0.0	0.000	12.0	0 01:11	75.66
257	0.000	0.6	0.0	0.0	0.000	10.7	0 01:11	80.36
258	0.000	0.9	0.0	0.0	0.001	16.1	0 01:14	185.65
259	0.000	0.7	0.0	0.0	0.000	14.2	0 01:14	129.10
260	0.000	0.8	0.0	0.0	0.000	14.0	0 01:13	129.14
261	0.000	0.9	0.0	0.0	0.001	25.5	0 01:12	1022.55
262	0.000	0.4	0.0	0.0	0.000	14.1	0 01:12	45.03
263	0.000	0.7	0.0	0.0	0.001	21.8	0 01:11	876.58
264	0.000	0.4	0.0	0.0	0.001	28.0	0 01:10	289.88
265	0.000	0.6	0.0	0.0	0.001	32.0	0 01:12	521.91
266	0.000	0.6	0.0	0.0	0.000	12.5	0 01:18	122.77
267	0.000	0.1	0.0	0.0	0.000	2.6	0 01:18	12.77
268	0.000	0.4	0.0	0.0	0.000	12.1	0 01:10	321.18
269	0.000	0.5	0.0	0.0	0.000	8.8	0 01:14	89.90
270	0.000	0.1	0.0	0.0	0.000	3.8	0 01:14	9.46
271	0.000	0.1	0.0	0.0	0.000	6.7	0 01:11	96.08
272	0.000	0.8	0.0	0.0	0.001	20.9	0 01:14	783.96
273	0.000	0.8	0.0	0.0	0.001	20.4	0 01:14	450.50
274	0.000	0.8	0.0	0.0	0.001	21.9	0 01:15	396.02

275	0.000	0.7	0.0	0.0	0.001	22.4	0	01:19	188.41
276	0.000	0.6	0.0	0.0	0.001	21.2	0	01:19	105.57
277	0.000	0.5	0.0	0.0	0.001	18.8	0	01:19	109.71
279	0.000	0.8	0.0	0.0	0.001	16.5	0	01:12	478.02
280	0.000	0.8	0.0	0.0	0.001	19.0	0	01:12	395.82
281	0.000	0.9	0.0	0.0	0.001	20.9	0	01:12	377.98
282	0.000	1.1	0.0	0.0	0.001	29.3	0	01:11	408.99
283	0.000	0.9	0.0	0.0	0.001	27.3	0	01:10	227.96
284	0.000	0.5	0.0	0.0	0.001	18.0	0	01:18	112.49
285	0.000	0.5	0.0	0.0	0.001	15.5	0	01:18	117.18
286	0.000	0.7	0.0	0.0	0.001	17.6	0	01:11	87.62
287	0.000	0.5	0.0	0.0	0.001	17.4	0	01:15	306.15
288	0.000	0.4	0.0	0.0	0.001	15.2	0	01:16	174.67
289	0.000	0.2	0.0	0.0	0.000	7.5	0	01:16	34.09
290	0.000	0.3	0.0	0.0	0.000	10.0	0	01:17	96.78
291	0.000	0.3	0.0	0.0	0.000	9.7	0	01:18	100.55
292	0.000	0.6	0.0	0.0	0.001	17.7	0	01:15	176.36
293	0.000	0.6	0.0	0.0	0.001	16.8	0	01:16	139.96
294	0.000	0.4	0.0	0.0	0.001	14.8	0	01:16	32.87
A217A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	288.01
A217B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	192.39
C205AA-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	326.78
C206A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	624.78
C207A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	865.02
C209A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	184.90
C210A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	120.50
C211A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	238.30
C211B-S	0.003	1.1	0.0	0.0	0.247	97.8	0	01:12	583.42
C212A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	100.50
C213A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	77.98
C214A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	171.22
C216A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	32.96
C216C-S	0.002	0.8	0.0	0.0	0.185	95.5	0	01:11	521.90
C235A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	760.61
C246A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	305.30
C247A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	448.16
C248A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	278.26
C252A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	175.05
C261A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	306.70

C262A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	63.99
F268B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	92.93
f282C-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	149.74
J1	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	314.23
J2	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	10.01
J3	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	146.58
J4	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	217.65
J5	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	245.12
J6	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	182.34
L204A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	227.11
L204B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	214.63
L205A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	88.43
L206B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	50.28
L207B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	362.91
L211B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	317.78
L214B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	57.90
L214C-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	93.49
L218A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	341.22
L220A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	254.84
L220B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	295.21
L221A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	113.54
L222A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	81.39
L225A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	79.12
L226A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	123.18
L229A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	376.18
L230A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	209.28
L230B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	213.18
L232A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	131.76
L233A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	177.06
L233B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	90.68
L234A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	57.05
L235B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	286.64
L237A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	376.06
L238A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	218.96
L239A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	42.54
L240A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	165.53
L240B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	146.81
L242A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	114.00
L244A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	82.13

L245A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	114.13
L246B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	215.94
L247B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	140.22
L249A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	212.00
L249B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	101.41
L250A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	80.14
L250B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	66.47
L252B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	89.27
L253A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	81.08
L254A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	81.59
L255A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	280.61
L256A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	203.63
L257A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	265.94
L258A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	56.88
L260A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	85.21
L263A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	339.40
L265A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	367.05
L265B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	197.43
L266A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	113.39
L268A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	254.34
L269A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	115.82
L272A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	42.39
L273A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	43.80
L274A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	86.91
L274B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	58.07
L275A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	78.83
L279A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	34.44
L279B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	139.65
L280A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	46.66
L281A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	50.41
L282A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	88.42
L282B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	291.09
L283A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	349.69
L283B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	332.15
L285A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	57.34
L286A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	80.09
L287A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	48.79
L288A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	46.96
L289A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	33.15

L290A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	43.91
L291A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	51.31
L292B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	85.53
L293A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	92.59
L293B-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	67.98
L294A-S	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	33.00
MJ-OF2	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	387.19
SU1	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	118.65
SU10	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU11	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU12	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	116.10
SU13	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	1.40
SU14	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	9.21
SU15	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	56.07
SU16	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	3.56
SU17	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU18	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	8.34
SU19	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU2	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU20	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	25.05
SU21	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	32.87
SU22	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	123.50
SU23	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU24	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU25	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU26	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	765.12
SU27	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU28	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU29	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU3	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	65.25
SU30	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU31	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	195.85
SU32	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	245.05
SU33	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	239.90
SU34	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU35	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	5.47
SU36	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	34.75
SU37	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	155.78
SU38	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	27.69

SU39	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	84.19
SU4	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU40	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU41	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	180.71
SU42	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	973.70
SU43	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU44	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	191.67
SU45	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	68.16
SU46	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	6.60
SU47	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	8.50
SU48	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	171.43
SU49	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	2.33
SU5	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	277.65
SU50	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU51	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU52	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	58.00
SU53	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	152.47
SU54	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	1412.52
SU55	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	1220.53
SU56	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	1150.84
SU57	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	297.76
SU58	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	612.53
SU6	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU7	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU8	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
SU9	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
200	40.89	578.19	8490.33	20.425
D-EAST	50.25	74.28	1150.84	3.226

MARCH	0.75	37.84	78.95	0.025
MINTO	14.34	59.35	660.46	0.735
System	26.56	749.66	9622.27	24.411

Link Flow Summary

Link	Type	Maximum Flow LPS	Time of Max Occurrence days hr:min	Maximum Veloc m/sec	Max/ Full Flow	Max/ Full Depth
201-200	CONDUIT	8167.37	0 01:15	3.69	0.80	0.61
202-201	CONDUIT	7973.14	0 01:15	3.23	0.81	0.67
203-202	CONDUIT	5333.93	0 01:17	2.15	0.62	0.78
204-203	CONDUIT	5210.59	0 01:17	2.35	0.71	0.81
205-204	CONDUIT	4942.67	0 01:14	2.83	0.68	0.68
205A-205	CONDUIT	4598.09	0 01:14	2.85	0.63	0.62
206-205A	CONDUIT	4287.29	0 01:13	3.06	0.70	0.62
206-227	CONDUIT	0.00	0 00:00	0.00	0.00	0.14
207-206	CONDUIT	4095.66	0 01:13	2.36	0.71	0.76
208-207	CONDUIT	3685.87	0 01:15	3.38	1.13	0.93
209-208	CONDUIT	3673.20	0 01:15	3.39	1.13	0.92
210-209	CONDUIT	3647.44	0 01:15	3.38	1.11	0.92
211-210	CONDUIT	3593.20	0 01:14	3.28	1.31	0.93
212-211	CONDUIT	2112.43	0 01:14	1.87	0.91	1.00
213-212	CONDUIT	2012.45	0 01:14	2.41	1.25	1.00
214-213	CONDUIT	1275.24	0 01:10	2.43	1.01	0.77
215-214	CONDUIT	1132.04	0 01:10	2.14	0.88	0.78
216-215	CONDUIT	894.51	0 01:11	1.98	0.70	0.71
218-202	CONDUIT	2640.60	0 01:15	1.99	0.64	0.70
219-218	CONDUIT	2596.23	0 01:15	1.65	0.74	0.84
220-219	CONDUIT	2597.66	0 01:14	1.99	0.89	0.86
221-220	CONDUIT	2427.21	0 01:14	1.91	0.83	0.85
222-203	CONDUIT	123.28	0 01:17	1.06	0.85	0.69
225-204	CONDUIT	158.63	0 01:16	1.25	0.88	0.74

226-225	CONDUIT	79.69	0	01:11	1.17	0.71	0.74
227-226	CONDUIT	7.37	0	01:38	0.45	0.12	0.46
229-206	CONDUIT	78.84	0	01:15	1.21	1.29	0.86
230-205	CONDUIT	309.69	0	01:15	1.62	1.14	0.82
231-230	CONDUIT	198.75	0	01:16	1.38	1.05	0.96
232-231	CONDUIT	198.73	0	01:16	1.27	1.11	0.97
233-229	CONDUIT	23.30	0	01:34	0.59	0.41	1.00
233-232	CONDUIT	118.85	0	01:13	1.15	1.08	1.00
234-210	CONDUIT	33.36	0	01:13	1.20	0.35	0.42
235-207	CONDUIT	275.64	0	01:10	1.82	0.69	0.66
236-235	CONDUIT	102.52	0	01:10	1.44	0.63	0.62
237-236	CONDUIT	102.58	0	01:10	1.86	0.41	0.50
238-234	CONDUIT	0.00	0	00:00	0.00	0.00	0.16
238-237	CONDUIT	0.00	0	00:00	0.00	0.00	0.16
239-213	CONDUIT	44.72	0	01:15	1.17	0.55	0.53
240-211	CONDUIT	202.26	0	01:13	1.40	1.06	0.85
241-240	CONDUIT	118.93	0	01:31	1.13	1.00	1.00
242-241	CONDUIT	118.61	0	01:31	1.20	1.00	1.00
243-239	CONDUIT	2.91	0	01:12	0.19	0.04	0.31
243-242	CONDUIT	4.34	0	01:26	0.25	0.07	0.67
244-221	CONDUIT	75.35	0	01:16	1.17	1.28	0.86
245-222	CONDUIT	71.62	0	01:16	0.68	0.55	0.71
245-244	CONDUIT	47.90	0	01:01	0.97	0.84	0.97
246-221	CONDUIT	2312.74	0	01:13	2.42	1.09	0.82
247-246	CONDUIT	580.83	0	01:12	1.78	0.98	0.86
248-247	CONDUIT	152.64	0	01:10	0.92	0.46	0.74
249-247	CONDUIT	236.17	0	01:20	2.35	0.95	1.00
250-208	CONDUIT	8.25	0	01:13	0.63	0.14	0.24
250-249	CONDUIT	103.48	0	01:20	1.92	0.76	1.00
251-246	CONDUIT	1560.14	0	01:13	1.81	0.72	0.76
252-251	CONDUIT	546.26	0	01:17	1.60	0.59	0.63
253-252	CONDUIT	236.54	0	01:14	1.31	1.25	0.78
254-253	CONDUIT	185.47	0	01:12	1.00	0.96	0.88
255-254	CONDUIT	134.51	0	01:10	1.00	1.12	0.88
256-255	CONDUIT	75.66	0	01:06	0.85	0.87	0.84
256-257	CONDUIT	12.68	0	01:23	0.44	0.21	0.55
257-260	CONDUIT	74.12	0	01:10	0.86	0.83	0.79
258-252	CONDUIT	185.65	0	01:14	1.11	0.96	0.72
259-258	CONDUIT	129.10	0	01:13	0.86	1.08	0.91

260-259	CONDUIT	129.14	0	01:13	0.90	1.00	0.87
261-251	CONDUIT	1022.55	0	01:12	2.48	1.10	0.89
262-261	CONDUIT	45.03	0	01:19	0.81	0.35	0.83
263-261	CONDUIT	876.58	0	01:11	2.60	0.84	0.94
264-263	CONDUIT	289.88	0	01:10	2.64	1.65	0.98
265-263	CONDUIT	521.91	0	01:12	3.44	1.11	1.00
266-265	CONDUIT	122.77	0	01:18	1.28	1.11	0.83
267-266	CONDUIT	12.77	0	01:19	0.67	0.09	0.61
268-265	CONDUIT	321.18	0	01:10	2.32	0.99	0.81
269-268	CONDUIT	80.43	0	01:14	1.17	0.65	0.60
270-267	CONDUIT	9.46	0	01:15	1.10	0.07	0.18
270-269	CONDUIT	9.47	0	01:14	0.44	0.14	0.44
271-268	CONDUIT	96.08	0	01:11	2.43	0.57	0.55
272-213	CONDUIT	783.96	0	01:22	1.97	1.29	1.00
273-272	CONDUIT	450.50	0	01:25	1.71	1.47	1.00
274-273	CONDUIT	396.02	0	01:26	1.40	1.31	1.00
275-274	CONDUIT	188.41	0	01:26	1.18	1.04	1.00
276-275	CONDUIT	105.57	0	01:26	0.95	0.56	1.00
277-276	CONDUIT	109.71	0	01:08	1.05	0.61	1.00
279-211	CONDUIT	478.02	0	01:13	1.82	1.43	0.88
280-279	CONDUIT	395.82	0	01:12	1.40	1.17	1.00
281-280	CONDUIT	377.98	0	01:04	1.36	1.12	1.00
282-271	CONDUIT	96.07	0	01:11	2.08	0.70	0.62
282-281	CONDUIT	352.75	0	01:03	1.64	1.50	1.00
283-282	CONDUIT	227.96	0	01:02	1.22	0.96	1.00
284-277	CONDUIT	112.49	0	01:09	1.19	0.60	1.00
285-284	CONDUIT	117.18	0	01:11	1.06	0.75	1.00
286-283	CONDUIT	82.22	0	01:29	1.26	1.44	1.00
286-285	CONDUIT	59.34	0	01:11	0.88	0.61	0.76
287-272	CONDUIT	306.15	0	01:21	1.41	1.00	1.00
288-287	CONDUIT	174.67	0	01:23	1.36	0.86	1.00
289-288	CONDUIT	34.09	0	01:21	1.06	0.44	0.90
290-287	CONDUIT	96.78	0	01:20	1.20	0.71	1.00
291-288	CONDUIT	100.55	0	01:21	1.19	0.73	0.94
292-274	CONDUIT	176.36	0	01:05	1.32	0.98	1.00
292-290	CONDUIT	52.10	0	01:15	0.79	0.42	0.70
293-291	CONDUIT	48.99	0	01:16	0.77	0.44	0.66
293-292	CONDUIT	128.90	0	01:05	1.21	1.16	1.00
294-293	CONDUIT	32.87	0	01:16	0.30	0.29	1.00

C1	CONDUIT	612.53	0	01:12	3.78	0.20	0.30
C10	CHANNEL	122.42	0	01:10	0.19	0.02	0.47
C100	CHANNEL	0.00	0	00:00	0.00	0.00	0.37
C101	CHANNEL	43.47	0	01:10	0.12	0.01	0.40
C102	CHANNEL	562.68	0	01:10	0.98	0.05	0.31
C103	CHANNEL	0.00	0	00:00	0.00	0.00	0.50
C104	CHANNEL	414.36	0	01:10	0.57	0.07	0.74
C105	CHANNEL	787.02	0	01:10	1.52	0.05	0.33
C106	CHANNEL	632.00	0	01:12	0.89	0.07	0.35
C107	CHANNEL	0.00	0	00:00	0.00	0.00	0.13
C108	CHANNEL	68.19	0	01:12	0.19	0.05	0.35
C109	CHANNEL	13.45	0	01:14	0.13	0.00	0.40
C11	CHANNEL	29.06	0	01:11	0.25	0.00	0.22
C110	CHANNEL	184.14	0	01:10	0.28	0.04	0.49
C111	CHANNEL	97.75	0	01:10	0.14	0.01	0.56
C112	CHANNEL	0.00	0	00:00	0.00	0.00	0.44
C113	CHANNEL	0.00	0	00:00	0.00	0.00	0.39
C114	CHANNEL	0.00	0	00:00	0.00	0.00	0.39
C115	CHANNEL	0.00	0	00:00	0.00	0.00	0.29
C116	CHANNEL	109.24	0	01:14	0.71	0.02	0.39
C117	CHANNEL	107.59	0	01:16	0.15	0.02	0.51
C118	CHANNEL	196.27	0	01:13	0.20	0.04	0.60
C119	CHANNEL	245.12	0	01:12	0.22	0.04	0.64
C12	CHANNEL	0.00	0	00:00	0.00	0.00	0.16
C120	CHANNEL	69.48	0	01:16	0.13	0.01	0.48
C121	CHANNEL	58.00	0	01:17	0.13	0.01	0.58
C122	CHANNEL	172.81	0	01:10	0.16	0.04	0.63
C123	CHANNEL	152.47	0	01:11	0.45	0.03	0.34
C124	CHANNEL	144.48	0	01:11	0.46	0.02	0.33
C125	CHANNEL	182.34	0	01:14	0.22	0.03	0.56
C126	CHANNEL	77.30	0	01:17	0.17	0.02	0.51
C127	CHANNEL	33.19	0	01:18	0.12	0.01	0.43
C128	CHANNEL	29.80	0	01:10	0.10	0.01	0.39
C129	CHANNEL	5.06	0	01:21	0.15	0.00	0.37
C13	CHANNEL	0.00	0	00:00	0.00	0.00	0.19
C130	CHANNEL	0.00	0	00:00	0.00	0.00	0.36
C131	CHANNEL	34.97	0	01:18	0.12	0.01	0.44
C132	CHANNEL	30.40	0	01:10	0.10	0.01	0.38
C133	CHANNEL	7.35	0	01:11	0.15	0.00	0.22

C134	CHANNEL	0.00	0	00:00	0.00	0.00	0.35
C135	CHANNEL	29.65	0	01:11	0.10	0.01	0.37
C136	CHANNEL	1.17	0	01:12	0.12	0.00	0.44
C137	CHANNEL	185.39	0	01:10	0.20	0.03	0.58
C138	CHANNEL	171.43	0	01:11	0.56	0.04	0.32
C139	CONDUIT	221.23	0	01:10	1.88	0.05	0.19
C14	CHANNEL	37.58	0	01:11	0.07	0.01	0.45
C140	CONDUIT	1220.53	0	01:17	0.78	0.76	0.96
C141	CONDUIT	296.69	0	01:11	1.87	0.05	0.22
C15	CHANNEL	0.48	0	01:12	0.04	0.00	0.41
C16	CHANNEL	0.56	0	01:12	0.16	0.00	0.22
C17	CHANNEL	1.20	0	01:11	0.13	0.00	0.23
C18	CHANNEL	13.71	0	01:10	0.12	0.00	0.24
C180	CONDUIT	1.22	0	01:12	0.00	0.00	0.51
C181	CONDUIT	0.00	0	00:00	0.00	0.00	0.50
C183	CONDUIT	0.00	0	00:00	0.00	0.00	0.50
C19	CHANNEL	4.10	0	01:11	0.15	0.00	0.25
C2	CONDUIT	8490.33	0	01:13	2.91	1.61	0.34
C20	CHANNEL	15.65	0	01:10	0.12	0.00	0.23
C21	CHANNEL	0.00	0	00:00	0.00	0.00	0.31
C22	CHANNEL	18.64	0	01:12	0.12	0.00	0.36
C23	CHANNEL	75.19	0	01:11	0.16	0.01	0.29
C24	CHANNEL	0.00	0	00:00	0.00	0.00	0.20
C25	CHANNEL	23.03	0	01:12	0.22	0.00	0.24
C26	CHANNEL	0.00	0	00:00	0.00	0.00	0.36
C27	CHANNEL	0.00	0	00:00	0.00	0.00	0.36
C28	CHANNEL	0.00	0	00:00	0.00	0.00	0.39
C29	CHANNEL	43.10	0	01:09	0.10	0.01	0.45
C3	CHANNEL	0.00	0	00:00	0.00	0.00	0.13
C30	CHANNEL	4.22	0	01:11	0.05	0.00	0.41
C31	CHANNEL	0.00	0	00:00	0.00	0.00	0.38
C32	CHANNEL	0.00	0	00:00	0.00	0.00	0.34
C33	CHANNEL	1.44	0	01:11	0.02	0.00	0.36
C34	CHANNEL	0.00	0	00:00	0.00	0.00	0.38
C35	CHANNEL	16.42	0	01:12	0.03	0.00	0.43
C36	CHANNEL	0.00	0	00:00	0.00	0.00	0.38
C37	CHANNEL	27.76	0	01:10	0.14	0.00	0.42
C37_1	CHANNEL	11.02	0	01:11	0.47	0.00	0.09
C37_2	CHANNEL	4.93	0	01:13	0.22	0.00	0.29

C38	CHANNEL	36.82	0	01:10	0.12	0.01	0.32
C39	CHANNEL	13.32	0	01:10	0.10	0.00	0.24
C4	CHANNEL	0.00	0	00:00	0.00	0.00	0.25
C40	CHANNEL	0.00	0	00:00	0.00	0.00	0.23
C41	CHANNEL	0.00	0	00:00	0.00	0.00	0.33
C42	CHANNEL	0.00	0	00:00	0.00	0.00	0.33
C43	CHANNEL	18.33	0	01:12	0.21	0.00	0.22
C44	CHANNEL	0.00	0	00:00	0.00	0.00	0.17
C45	CHANNEL	0.00	0	00:00	0.00	0.00	0.32
C46	CHANNEL	14.03	0	01:11	0.11	0.00	0.37
C47	CHANNEL	0.00	0	00:00	0.00	0.00	0.33
C48	CHANNEL	0.00	0	00:00	0.00	0.00	0.33
C49	CHANNEL	0.00	0	00:00	0.00	0.00	0.40
C5	CHANNEL	0.00	0	00:00	0.00	0.00	0.32
C50	CHANNEL	0.00	0	00:00	0.00	0.00	0.40
C51	CHANNEL	0.00	0	00:00	0.00	0.00	0.39
C52	CHANNEL	0.00	0	00:00	0.00	0.00	0.47
C53	CHANNEL	112.55	0	01:10	0.17	0.02	0.55
C54	CHANNEL	280.78	0	01:10	0.39	0.07	0.50
C55	CHANNEL	0.00	0	00:00	0.00	0.00	0.11
C56	CHANNEL	177.96	0	01:10	0.85	0.02	0.27
C57	CHANNEL	314.16	0	01:10	0.71	0.04	0.39
C58	CHANNEL	25.78	0	01:08	0.14	0.00	0.29
C58_1	CHANNEL	150.27	0	01:10	1.40	0.01	0.14
C58_2	CHANNEL	92.81	0	01:10	0.65	0.00	0.22
C59	CHANNEL	217.69	0	01:05	0.55	0.03	0.37
C6	CHANNEL	23.58	0	01:12	0.08	0.00	0.37
C60	CHANNEL	125.60	0	01:10	0.25	0.01	0.30
C61	CHANNEL	92.58	0	01:11	1.08	0.00	0.12
C62	CHANNEL	88.37	0	01:13	1.04	0.00	0.12
C63	CHANNEL	36.62	0	01:11	0.14	0.01	0.32
C64	CHANNEL	0.00	0	00:00	0.00	0.00	0.24
C65	CHANNEL	49.46	0	01:11	0.24	0.00	0.37
C66	CHANNEL	123.36	0	01:11	0.16	0.01	0.37
C67	CHANNEL	682.61	0	01:10	1.19	0.14	0.45
C68	CHANNEL	0.00	0	00:00	0.00	0.00	0.40
C69	CHANNEL	0.00	0	00:00	0.00	0.00	0.40
C7	CHANNEL	0.00	0	00:00	0.00	0.00	0.39
C70	CHANNEL	56.07	0	01:10	0.83	0.00	0.17

C70_1	CHANNEL	123.50	0	01:10	1.09	0.01	0.18
C70_2	CHANNEL	217.65	0	01:11	0.26	0.01	0.43
C71	CHANNEL	0.00	0	00:00	0.00	0.00	0.48
C72	CHANNEL	0.00	0	00:00	0.00	0.00	0.36
C73	CHANNEL	165.10	0	01:10	1.02	0.02	0.24
C74	CHANNEL	250.18	0	01:10	1.45	0.03	0.24
C75	CHANNEL	97.91	0	01:10	0.13	0.02	0.56
C76	CHANNEL	147.14	0	01:10	0.95	0.02	0.24
C77	CHANNEL	61.23	0	01:10	0.12	0.01	0.44
C78	CHANNEL	200.14	0	01:10	1.40	0.02	0.22
C79	CHANNEL	134.62	0	01:10	0.91	0.01	0.23
C8	CHANNEL	0.00	0	00:00	0.00	0.00	0.39
C80	CHANNEL	316.61	0	01:10	0.45	0.03	0.53
C81	CHANNEL	261.40	0	01:11	0.30	0.05	0.56
C82	CHANNEL	61.83	0	01:08	0.20	0.01	0.34
C83	CHANNEL	229.92	0	01:12	0.24	0.02	0.43
C84	CHANNEL	78.95	0	01:10	0.55	0.01	0.16
C84_1	CHANNEL	0.00	0	00:00	0.00	0.00	0.10
C84_2	CHANNEL	190.53	0	01:13	0.21	0.02	0.42
C85	CHANNEL	61.56	0	01:10	0.65	0.01	0.13
C85_1	CHANNEL	0.00	0	00:00	0.00	0.00	0.11
C85_2	CHANNEL	269.97	0	01:11	0.26	0.03	0.45
C86	CHANNEL	53.77	0	01:10	0.41	0.01	0.48
C87	CHANNEL	112.77	0	01:10	0.16	0.02	0.53
C88	CHANNEL	0.00	0	00:00	0.00	0.00	0.37
C89	CHANNEL	97.37	0	01:10	0.15	0.02	0.47
C9	CHANNEL	0.00	0	00:00	0.00	0.00	0.39
C90	CHANNEL	84.19	0	01:11	0.16	0.01	0.49
C91	CHANNEL	51.82	0	01:11	0.10	0.01	0.47
C92	CHANNEL	27.80	0	01:08	0.15	0.00	0.46
C93	CHANNEL	161.70	0	01:10	0.22	0.04	0.51
C94	CHANNEL	80.62	0	01:11	0.19	0.01	0.46
C95	CHANNEL	546.78	0	01:12	0.62	0.06	0.54
C96	CHANNEL	75.16	0	01:11	0.15	0.01	0.46
C97	CHANNEL	49.52	0	01:11	0.12	0.01	0.42
C98	CHANNEL	2.67	0	01:12	0.13	0.00	0.37
C99	CHANNEL	21.30	0	01:14	0.22	0.00	0.39
CULV-1	CONDUIT	1150.84	0	01:24	1.53	1.01	0.63
EX-D2	CONDUIT	1412.52	0	01:11	1.51	0.92	0.98

W2_1	CONDUIT	297.76	0	01:12	2.46	0.06	0.34
W2_3	CONDUIT	387.19	0	01:10	1.44	0.35	0.60
W2_4	CONDUIT	314.23	0	01:12	1.36	0.03	0.28
C205AA-IC1	ORIFICE	157.06	0	01:17			1.00
C205AA-IC2	ORIFICE	157.06	0	01:17			1.00
C211A-IC1	ORIFICE	57.47	0	01:11			1.00
C211A-IC2	ORIFICE	57.47	0	01:11			1.00
C212A-IC1	ORIFICE	50.25	0	01:11			1.00
C212A-IC2	ORIFICE	50.25	0	01:11			1.00
C213A-IC1	ORIFICE	38.99	0	01:11			1.00
C213A-IC2	ORIFICE	38.99	0	01:11			1.00
C214A-IC1	ORIFICE	39.59	0	01:11			1.00
C214A-IC2	ORIFICE	56.47	0	01:11			1.00
C216A-IC1	ORIFICE	16.48	0	01:13			1.00
C216A-IC2	ORIFICE	16.48	0	01:13			1.00
C246A-IC1	ORIFICE	29.57	0	01:13			1.00
C246A-IC2	ORIFICE	79.46	0	01:13			1.00
C247A-IC1	ORIFICE	99.32	0	01:11			1.00
C247A-IC2	ORIFICE	78.95	0	01:11			1.00
C248A-IC1	ORIFICE	76.33	0	01:10			1.00
C248A-IC2	ORIFICE	76.33	0	01:10			1.00
C252A-IC1	ORIFICE	57.50	0	01:18			1.00
C252A-IC2	ORIFICE	40.30	0	01:18			1.00
C253A-IC1	ORIFICE	25.70	0	01:20			1.00
C253A-IC2	ORIFICE	25.70	0	01:20			1.00
C261A-IC1	ORIFICE	98.85	0	01:14			1.00
C261A-IC2	ORIFICE	17.34	0	01:14			1.00
C262A-IC1	ORIFICE	16.92	0	01:11			1.00
C262A-IC2	ORIFICE	21.66	0	01:11			1.00
F268B-IC	ORIFICE	92.93	0	01:10			1.00
F282C-IC	ORIFICE	102.86	0	01:04			1.00
L204A-IC1	ORIFICE	17.15	0	01:10			1.00
L204A-IC2	ORIFICE	25.82	0	01:10			1.00
L204B-IC	ORIFICE	69.70	0	01:10			1.00
L205A-IC1	ORIFICE	17.13	0	01:14			1.00
L205A-IC2	ORIFICE	21.93	0	01:14			1.00
L206B-IC1	ORIFICE	16.30	0	01:15			1.00
L206B-IC2	ORIFICE	16.30	0	01:15			1.00
L207B-IC	ORIFICE	122.37	0	01:10			1.00

L211B-IC	ORIFICE	106.08	0	01:10			1.00
L214B-IC	ORIFICE	20.38	0	01:10			1.00
L214C-IC	ORIFICE	26.88	0	01:10			1.00
L218A-IC1	ORIFICE	16.58	0	01:11			1.00
L218A-IC2	ORIFICE	27.95	0	01:11			1.00
L220A-IC1	ORIFICE	41.02	0	01:11			1.00
L220A-IC2	ORIFICE	41.02	0	01:11			1.00
L220B-IC	ORIFICE	94.05	0	01:10			1.00
L221A-IC1	ORIFICE	22.03	0	01:18			1.00
L221A-IC2	ORIFICE	22.03	0	01:18			1.00
L222A-IC1	ORIFICE	26.12	0	01:11			1.00
L222A-IC2	ORIFICE	26.12	0	01:11			1.00
L225A-IC1	ORIFICE	39.56	0	01:12			1.00
L225A-IC2	ORIFICE	39.56	0	01:12			1.00
L226A-IC1	ORIFICE	39.86	0	01:10			1.00
L226A-IC2	ORIFICE	39.86	0	01:10			1.00
L229A-IC1	ORIFICE	41.17	0	01:11			1.00
L229A-IC2	ORIFICE	41.17	0	01:11			1.00
L230A-IC1	ORIFICE	17.26	0	01:10			1.00
L230A-IC2	ORIFICE	25.99	0	01:10			1.00
L230B-IC	ORIFICE	69.54	0	01:10			1.00
L232A-IC1	ORIFICE	40.06	0	01:14			1.00
L232A-IC2	ORIFICE	40.06	0	01:14			1.00
L233A-IC1	ORIFICE	39.85	0	01:10			1.00
L233A-IC2	ORIFICE	39.85	0	01:10			1.00
L233B-IC	ORIFICE	37.43	0	01:10			1.00
L234A-IC1	ORIFICE	16.70	0	01:12			1.00
L234A-IC2	ORIFICE	16.70	0	01:12			1.00
L235B-IC	ORIFICE	95.55	0	01:10			1.00
L239A-IC1	ORIFICE	25.56	0	01:16			1.00
L239A-IC2	ORIFICE	16.98	0	01:16			1.00
L240A-IC1	ORIFICE	17.21	0	01:10			1.00
L240A-IC2	ORIFICE	25.91	0	01:10			1.00
L240B-IC	ORIFICE	48.49	0	01:10			1.00
L242A-IC1	ORIFICE	57.00	0	01:12			1.00
L242A-IC2	ORIFICE	57.00	0	01:12			1.00
L244A-IC1	ORIFICE	16.86	0	01:15			1.00
L244A-IC2	ORIFICE	16.86	0	01:15			1.00
L245A-IC1	ORIFICE	57.07	0	01:11			1.00

L245A-IC2	ORIFICE	57.07	0 01:11	1.00
L246B-IC	ORIFICE	69.41	0 01:10	1.00
L247B-IC	ORIFICE	24.85	0 01:03	1.00
L249A-IC1	ORIFICE	52.06	0 01:01	1.00
L249A-IC2	ORIFICE	52.06	0 01:01	1.00
L249B-IC	ORIFICE	38.20	0 01:03	1.00
L250A-IC1	ORIFICE	40.07	0 01:14	1.00
L250A-IC2	ORIFICE	40.07	0 01:14	1.00
L250B-IC	ORIFICE	21.40	0 01:10	1.00
L252B-IC	ORIFICE	26.46	0 01:10	1.00
L254A-IC1	ORIFICE	25.64	0 01:12	1.00
L254A-IC2	ORIFICE	25.64	0 01:12	1.00
L255A-IC1	ORIFICE	21.09	0 01:10	1.00
L255A-IC2	ORIFICE	38.28	0 01:10	1.00
L256A-IC	ORIFICE	69.50	0 01:10	1.00
L257A-IC1	ORIFICE	40.28	0 01:10	1.00
L257A-IC2	ORIFICE	40.28	0 01:10	1.00
L258A-IC1	ORIFICE	39.77	0 01:21	1.00
L258A-IC2	ORIFICE	17.11	0 01:21	1.00
L260A-IC1	ORIFICE	27.78	0 01:10	1.00
L260A-IC2	ORIFICE	27.78	0 01:10	1.00
L265B-IC	ORIFICE	67.07	0 01:03	1.00
L266A-IC1	ORIFICE	56.69	0 01:13	1.00
L266A-IC2	ORIFICE	56.69	0 01:13	1.00
L268A-IC1	ORIFICE	16.31	0 01:10	1.00
L268A-IC2	ORIFICE	37.88	0 01:10	1.00
L269A-IC1	ORIFICE	44.98	0 01:13	1.00
L269A-IC2	ORIFICE	44.98	0 01:13	1.00
L272A-IC1	ORIFICE	25.47	0 01:15	1.00
L272A-IC2	ORIFICE	16.92	0 01:15	1.00
L273A-IC1	ORIFICE	21.90	0 01:12	1.00
L273A-IC2	ORIFICE	21.90	0 01:12	1.00
L274A-IC1	ORIFICE	22.02	0 01:11	1.00
L274A-IC2	ORIFICE	22.02	0 01:11	1.00
L274B-IC	ORIFICE	21.06	0 01:10	1.00
L275A-IC1	ORIFICE	39.42	0 01:12	1.00
L275A-IC2	ORIFICE	39.42	0 01:12	1.00
L279A-IC1	ORIFICE	17.22	0 01:15	1.00
L279A-IC2	ORIFICE	17.22	0 01:15	1.00

L279B-IC	ORIFICE	48.44	0 01:10	1.00
L280A-IC1	ORIFICE	16.67	0 01:10	1.00
L280A-IC2	ORIFICE	16.67	0 01:10	1.00
L281A-IC1	ORIFICE	28.65	0 01:12	1.00
L281A-IC2	ORIFICE	21.75	0 01:12	1.00
L282A-IC1	ORIFICE	29.45	0 01:16	1.00
L282A-IC2	ORIFICE	29.45	0 01:16	1.00
L282B-IC1	ORIFICE	16.33	0 01:10	1.00
L282B-IC2	ORIFICE	24.58	0 01:10	1.00
L283A-IC1	ORIFICE	28.97	0 01:10	1.00
L283A-IC2	ORIFICE	39.94	0 01:10	1.00
L283B-IC	ORIFICE	121.21	0 01:10	1.00
L285A-IC1	ORIFICE	28.67	0 01:13	1.00
L285A-IC2	ORIFICE	28.67	0 01:13	1.00
L286A-IC1	ORIFICE	40.05	0 01:12	1.00
L286A-IC2	ORIFICE	40.05	0 01:12	1.00
L287A-IC1	ORIFICE	16.57	0 01:10	1.00
L287A-IC2	ORIFICE	16.57	0 01:10	1.00
L288A-IC1	ORIFICE	16.63	0 01:10	1.00
L288A-IC2	ORIFICE	16.63	0 01:10	1.00
L289A-IC1	ORIFICE	16.58	0 01:11	1.00
L289A-IC2	ORIFICE	16.58	0 01:11	1.00
L290A-IC1	ORIFICE	21.96	0 01:12	1.00
L290A-IC2	ORIFICE	21.96	0 01:12	1.00
L291A-IC1	ORIFICE	25.65	0 01:11	1.00
L291A-IC2	ORIFICE	25.65	0 01:11	1.00
L292B-IC1	ORIFICE	28.95	0 01:12	1.00
L292B-IC2	ORIFICE	28.95	0 01:12	1.00
L293A-IC1	ORIFICE	16.78	0 01:10	1.00
L293A-IC2	ORIFICE	38.99	0 01:10	1.00
L293B-IC1	ORIFICE	25.82	0 01:11	1.00
L293B-IC2	ORIFICE	25.82	0 01:11	1.00
L294A-IC1	ORIFICE	16.50	0 01:12	1.00
L294A-IC2	ORIFICE	16.50	0 01:12	1.00
C142	WEIR	53.26	0 01:10	0.63
C159	WEIR	98.32	0 01:10	0.63
C160	WEIR	37.53	0 01:10	0.25
C161	WEIR	66.61	0 01:10	0.73
C162	WEIR	91.21	0 01:10	0.60

C163	WEIR	37.02	0	01:10	0.33
C164	WEIR	210.93	0	01:10	0.79
C165	WEIR	211.70	0	01:10	0.79
C166	WEIR	49.24	0	01:10	0.17
C167	WEIR	0.00	0	00:00	0.00
C168	WEIR	139.81	0	01:10	0.60
C169	WEIR	62.81	0	01:10	0.20
C170	WEIR	201.16	0	01:10	0.61
C171	WEIR	134.13	0	01:10	0.60
C172	WEIR	144.93	0	01:10	0.62
C173	WEIR	143.64	0	01:10	0.61
C174	WEIR	240.54	0	01:10	0.58
C175	WEIR	146.54	0	01:10	0.77
C176	WEIR	65.18	0	01:10	0.48
C177	WEIR	191.09	0	01:10	0.74
C178	WEIR	45.08	0	01:10	0.38
C179	WEIR	116.22	0	01:10	0.54
W1	WEIR	0.00	0	00:00	0.00
C207A-IC	DUMMY	78.00	0	01:06	
C210A-IC	DUMMY	27.92	0	01:11	
C211B-O	DUMMY	582.20	0	01:01	
C216C-O	DUMMY	521.90	0	01:01	
C235A-IC	DUMMY	78.00	0	00:54	
L238A-IC	DUMMY	41.00	0	01:10	
L263A-IC	DUMMY	78.00	0	01:04	
L265A-IC	DUMMY	50.45	0	01:10	
OL1	DUMMY	61.90	0	01:10	
OL2	DUMMY	130.83	0	01:10	
OL3	DUMMY	209.06	0	01:10	
OL4	DUMMY	34.64	0	01:10	
OL5	DUMMY	78.00	0	01:10	

Flow Classification Summary

Adjusted ----- Fraction of Time in Flow Class -----

Conduit	/Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
201-200	1.00	0.02	0.00	0.00	0.88	0.10	0.00	0.00	0.96	0.00
202-201	1.00	0.02	0.00	0.00	0.10	0.00	0.00	0.89	0.00	0.00
203-202	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.95	0.00	0.00
204-203	1.00	0.02	0.00	0.00	0.03	0.01	0.00	0.95	0.00	0.00
205-204	1.00	0.02	0.00	0.00	0.02	0.00	0.00	0.96	0.00	0.00
205A-205	1.00	0.02	0.00	0.00	0.01	0.01	0.00	0.96	0.00	0.00
206-205A	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
206-227	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
207-206	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
208-207	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
209-208	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
210-209	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
211-210	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
212-211	1.00	0.02	0.00	0.00	0.20	0.00	0.00	0.78	0.08	0.00
213-212	1.00	0.01	0.00	0.00	0.02	0.00	0.00	0.97	0.00	0.00
214-213	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
215-214	1.00	0.02	0.00	0.00	0.02	0.01	0.00	0.96	0.00	0.00
216-215	1.00	0.01	0.00	0.00	0.05	0.08	0.00	0.85	0.07	0.00
218-202	1.00	0.02	0.00	0.00	0.01	0.00	0.00	0.98	0.00	0.00
219-218	1.00	0.02	0.00	0.00	0.11	0.00	0.00	0.87	0.00	0.00
220-219	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.95	0.00	0.00
221-220	1.00	0.02	0.00	0.00	0.23	0.00	0.00	0.76	0.02	0.00
222-203	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
225-204	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
226-225	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.96	0.02	0.00
227-226	1.00	0.02	0.01	0.00	0.06	0.00	0.00	0.91	0.93	0.00
229-206	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
230-205	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
231-230	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.96	0.00	0.00
232-231	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.96	0.00	0.00
233-229	1.00	0.88	0.06	0.00	0.02	0.00	0.03	0.00	0.00	0.00
233-232	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.96	0.00	0.00
234-210	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
235-207	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
236-235	1.00	0.02	0.00	0.00	0.00	0.01	0.00	0.96	0.00	0.00
237-236	1.00	0.02	0.00	0.00	0.00	0.02	0.00	0.96	0.01	0.00

238-234	1.00	0.91	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
238-237	1.00	0.96	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
239-213	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
240-211	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
241-240	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.95	0.00	0.00
242-241	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.96	0.00	0.00
243-239	1.00	0.89	0.09	0.00	0.01	0.00	0.02	0.00	0.00	0.00
243-242	1.00	0.02	0.02	0.00	0.06	0.00	0.00	0.89	0.05	0.00
244-221	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
245-222	1.00	0.02	0.86	0.00	0.12	0.00	0.00	0.00	0.96	0.00
245-244	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.96	0.00	0.00
246-221	1.00	0.02	0.00	0.00	0.01	0.00	0.00	0.97	0.00	0.00
247-246	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
248-247	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.95	0.03	0.00
249-247	1.00	0.02	0.00	0.00	0.01	0.00	0.00	0.97	0.00	0.00
250-208	1.00	0.99	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
250-249	1.00	0.02	0.00	0.00	0.02	0.00	0.00	0.96	0.00	0.00
251-246	1.00	0.02	0.00	0.00	0.04	0.00	0.00	0.94	0.00	0.00
252-251	1.00	0.02	0.00	0.00	0.01	0.00	0.00	0.98	0.00	0.00
253-252	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
254-253	1.00	0.02	0.00	0.00	0.19	0.00	0.00	0.80	0.14	0.00
255-254	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.96	0.00	0.00
256-255	1.00	0.03	0.01	0.00	0.03	0.00	0.00	0.93	0.01	0.00
256-257	1.00	0.92	0.05	0.00	0.01	0.00	0.02	0.00	0.00	0.00
257-260	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.95	0.02	0.00
258-252	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
259-258	1.00	0.02	0.00	0.00	0.04	0.00	0.00	0.94	0.00	0.00
260-259	1.00	0.02	0.00	0.00	0.04	0.00	0.00	0.94	0.01	0.00
261-251	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
262-261	1.00	0.02	0.00	0.00	0.02	0.00	0.00	0.96	0.01	0.00
263-261	1.00	0.02	0.00	0.00	0.00	0.02	0.00	0.96	0.00	0.00
264-263	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
265-263	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
266-265	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
267-266	1.00	0.92	0.03	0.00	0.05	0.00	0.00	0.00	0.95	0.00
268-265	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
269-268	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
270-267	1.00	0.97	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
270-269	1.00	0.03	0.01	0.00	0.05	0.00	0.00	0.91	0.02	0.00

271-268	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
272-213	1.00	0.02	0.00	0.00	0.02	0.00	0.00	0.97	0.00	0.00
273-272	1.00	0.02	0.00	0.00	0.02	0.00	0.00	0.97	0.00	0.00
274-273	1.00	0.02	0.00	0.00	0.20	0.00	0.00	0.79	0.04	0.00
275-274	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.96	0.00	0.00
276-275	1.00	0.02	0.00	0.00	0.08	0.00	0.00	0.90	0.00	0.00
277-276	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.95	0.00	0.00
279-211	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
280-279	1.00	0.02	0.00	0.00	0.16	0.00	0.00	0.82	0.04	0.00
281-280	1.00	0.02	0.00	0.00	0.15	0.00	0.00	0.83	0.01	0.00
282-271	1.00	0.98	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
282-281	1.00	0.02	0.00	0.00	0.02	0.00	0.00	0.96	0.00	0.00
283-282	1.00	0.02	0.00	0.00	0.04	0.00	0.00	0.94	0.01	0.00
284-277	1.00	0.02	0.00	0.00	0.02	0.00	0.00	0.97	0.00	0.00
285-284	1.00	0.02	0.00	0.00	0.04	0.00	0.00	0.95	0.00	0.00
286-283	1.00	0.02	0.00	0.00	0.02	0.00	0.00	0.96	0.00	0.00
286-285	1.00	0.94	0.03	0.00	0.03	0.00	0.00	0.00	0.95	0.00
287-272	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.96	0.01	0.00
288-287	1.00	0.02	0.00	0.00	0.01	0.00	0.00	0.97	0.00	0.00
289-288	1.00	0.02	0.00	0.00	0.01	0.00	0.00	0.97	0.00	0.00
290-287	1.00	0.02	0.00	0.00	0.01	0.00	0.00	0.97	0.01	0.00
291-288	1.00	0.02	0.00	0.00	0.02	0.00	0.00	0.97	0.00	0.00
292-274	1.00	0.02	0.00	0.00	0.03	0.00	0.00	0.95	0.00	0.00
292-290	1.00	0.88	0.10	0.00	0.01	0.00	0.00	0.00	0.95	0.00
293-291	1.00	0.87	0.11	0.00	0.02	0.00	0.00	0.00	0.96	0.00
293-292	1.00	0.02	0.00	0.00	0.02	0.00	0.00	0.96	0.00	0.00
294-293	1.00	0.02	0.00	0.00	0.14	0.00	0.00	0.84	0.11	0.00
C1	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
C10	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.93	0.01	0.00
C100	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C101	1.00	0.04	0.01	0.00	0.02	0.00	0.00	0.93	0.02	0.00
C102	1.00	0.03	0.00	0.00	0.08	0.01	0.00	0.89	0.04	0.00
C103	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C104	1.00	0.03	0.00	0.00	0.02	0.00	0.00	0.95	0.01	0.00
C105	1.00	0.03	0.49	0.00	0.38	0.10	0.00	0.00	0.88	0.00
C106	1.00	0.02	0.00	0.00	0.12	0.00	0.00	0.85	0.10	0.00
C107	1.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C108	1.00	0.03	0.96	0.00	0.01	0.00	0.01	0.00	0.00	0.00
C109	1.00	0.04	0.01	0.00	0.02	0.00	0.00	0.93	0.02	0.00

C49	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C50	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C51	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C52	1.00	0.96	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C53	1.00	0.04	0.00	0.00	0.03	0.00	0.00	0.92	0.03	0.00
C54	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.94	0.01	0.00
C55	1.00	0.65	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C56	1.00	0.60	0.05	0.00	0.14	0.12	0.00	0.09	0.13	0.00
C57	1.00	0.68	0.00	0.00	0.01	0.01	0.00	0.30	0.02	0.00
C58	1.00	0.04	0.00	0.00	0.01	0.00	0.00	0.94	0.01	0.00
C58_1	1.00	0.02	0.65	0.00	0.21	0.12	0.00	0.00	0.87	0.00
C58_2	1.00	0.02	0.00	0.00	0.50	0.48	0.00	0.00	0.96	0.00
C59	1.00	0.03	0.00	0.00	0.01	0.00	0.00	0.96	0.00	0.00
C6	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.93	0.02	0.00
C60	1.00	0.04	0.00	0.00	0.01	0.00	0.00	0.95	0.00	0.00
C61	1.00	0.63	0.07	0.00	0.12	0.12	0.00	0.06	0.96	0.00
C62	1.00	0.03	0.02	0.00	0.13	0.01	0.00	0.81	0.11	0.00
C63	1.00	0.04	0.00	0.00	0.01	0.00	0.00	0.94	0.01	0.00
C64	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C65	1.00	0.04	0.00	0.00	0.01	0.00	0.00	0.94	0.01	0.00
C66	1.00	0.04	0.00	0.00	0.01	0.00	0.00	0.94	0.01	0.00
C67	1.00	0.03	0.95	0.00	0.00	0.01	0.00	0.00	0.95	0.00
C68	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C69	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C70	1.00	0.04	0.00	0.00	0.01	0.00	0.00	0.95	0.01	0.00
C70_1	1.00	0.04	0.00	0.00	0.70	0.26	0.00	0.00	0.95	0.00
C70_2	1.00	0.04	0.00	0.00	0.01	0.00	0.00	0.94	0.01	0.00
C71	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C72	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C73	1.00	0.04	0.00	0.00	0.00	0.01	0.00	0.95	0.01	0.00
C74	1.00	0.04	0.94	0.00	0.00	0.01	0.00	0.00	0.95	0.00
C75	1.00	0.04	0.00	0.00	0.03	0.00	0.00	0.93	0.02	0.00
C76	1.00	0.04	0.00	0.00	0.00	0.01	0.00	0.95	0.01	0.00
C77	1.00	0.04	0.00	0.00	0.03	0.00	0.00	0.93	0.03	0.00
C78	1.00	0.04	0.94	0.00	0.00	0.01	0.00	0.00	0.94	0.00
C79	1.00	0.02	0.02	0.00	0.17	0.02	0.00	0.77	0.11	0.00
C8	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00

C80	1.00	0.64	0.07	0.00	0.24	0.00	0.00	0.04	0.98	0.00
C81	1.00	0.02	0.02	0.00	0.23	0.01	0.00	0.71	0.11	0.00
C82	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.94	0.01	0.00
C83	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.93	0.02	0.00
C84	1.00	0.99	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
C84_1	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C84_2	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.93	0.01	0.00
C85	1.00	0.04	0.95	0.00	0.00	0.01	0.00	0.00	0.95	0.00
C85_1	1.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C85_2	1.00	0.04	0.00	0.00	0.01	0.00	0.00	0.94	0.00	0.00
C86	1.00	0.02	0.00	0.00	0.02	0.00	0.00	0.95	0.02	0.00
C87	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.94	0.01	0.00
C88	1.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C89	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.93	0.01	0.00
C9	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C90	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.93	0.02	0.00
C91	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.93	0.01	0.00
C92	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.93	0.02	0.00
C93	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.93	0.01	0.00
C94	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.94	0.02	0.00
C95	1.00	0.64	0.00	0.00	0.02	0.00	0.00	0.34	0.02	0.00
C96	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.93	0.02	0.00
C97	1.00	0.04	0.01	0.00	0.02	0.00	0.00	0.93	0.01	0.00
C98	1.00	0.04	0.01	0.00	0.02	0.00	0.00	0.93	0.02	0.00
C99	1.00	0.04	0.01	0.00	0.02	0.00	0.00	0.93	0.02	0.00
CULV-1	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
EX-D2	1.00	0.02	0.00	0.00	0.96	0.03	0.00	0.00	0.95	0.00
W2_1	1.00	0.04	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
W2_3	1.00	0.02	0.00	0.00	0.97	0.02	0.00	0.00	0.88	0.00
W2_4	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00

Conduit Surcharge Summary

----- Hours Full ----- Hours
Above Full Hours
Capacity

Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
208-207	0.01	0.05	0.01	0.34	0.01
209-208	0.01	0.01	0.01	0.35	0.01
210-209	0.01	0.01	0.01	0.33	0.01
211-210	0.01	0.30	0.01	0.39	0.01
212-211	0.16	0.16	0.28	0.01	0.01
213-212	0.16	0.25	0.16	0.37	0.16
214-213	0.01	0.01	0.01	0.03	0.01
229-206	0.01	0.34	0.01	0.47	0.01
230-205	0.01	0.01	0.01	0.37	0.01
231-230	0.01	0.13	0.01	0.40	0.01
232-231	0.01	0.35	0.01	0.51	0.01
233-229	0.23	0.23	0.30	0.01	0.01
233-232	0.30	0.32	0.30	0.42	0.30
240-211	0.01	0.42	0.01	0.33	0.01
241-240	0.40	0.49	0.40	0.04	0.40
242-241	0.36	0.38	0.41	0.01	0.12
243-242	0.01	0.01	0.39	0.01	0.01
244-221	0.01	0.36	0.01	0.46	0.01
246-221	0.01	0.01	0.01	0.20	0.01
247-246	0.01	0.25	0.01	0.01	0.01
248-247	0.01	0.01	0.25	0.01	0.01
249-247	0.25	0.37	0.25	0.01	0.25
250-249	0.27	0.27	0.37	0.01	0.01
253-252	0.01	0.01	0.01	0.40	0.01
255-254	0.01	0.01	0.01	0.34	0.01
259-258	0.01	0.01	0.01	0.42	0.01
260-259	0.01	0.01	0.01	0.08	0.01
261-251	0.01	0.01	0.01	0.13	0.01
264-263	0.01	0.28	0.01	0.18	0.01
265-263	0.17	0.17	0.20	0.20	0.17
266-265	0.01	0.01	0.01	0.57	0.01
272-213	0.24	0.29	0.25	0.28	0.17
273-272	0.29	0.40	0.29	0.57	0.29
274-273	0.38	0.47	0.38	0.54	0.38
275-274	0.43	0.43	0.47	0.16	0.34
276-275	0.41	0.41	0.42	0.01	0.01
277-276	0.28	0.28	0.40	0.01	0.01

279-211	0.01	0.38	0.01	0.54	0.01
280-279	0.37	0.40	0.37	0.48	0.37
281-280	0.39	0.40	0.39	0.46	0.39
282-281	0.41	0.48	0.41	0.52	0.41
283-282	0.44	0.44	0.46	0.01	0.01
284-277	0.24	0.24	0.26	0.01	0.01
285-284	0.04	0.04	0.23	0.01	0.01
286-283	0.44	0.66	0.44	0.32	0.08
286-285	0.01	0.01	0.06	0.01	0.01
287-272	0.24	0.24	0.29	0.01	0.01
288-287	0.19	0.19	0.24	0.01	0.01
289-288	0.01	0.01	0.19	0.01	0.01
290-287	0.02	0.02	0.24	0.01	0.01
291-288	0.01	0.01	0.19	0.01	0.01
292-274	0.42	0.42	0.47	0.01	0.01
293-292	0.38	0.43	0.41	0.09	0.11
294-293	0.28	0.28	0.43	0.01	0.01
C104	0.01	0.01	0.07	0.01	0.01
C121	0.01	0.01	0.09	0.01	0.01
C122	0.01	0.01	0.09	0.01	0.01
C140	0.01	0.01	0.39	0.01	0.01
C180	0.01	0.01	22.81	0.01	0.01
C2	0.01	0.01	0.01	0.45	0.01
CULV-1	0.01	0.01	0.01	0.10	0.01
EX-D2	0.01	0.01	0.38	0.01	0.01

Analysis begun on: Mon Jun 22 15:58:35 2026
Analysis ended on: Mon Jun 22 15:58:50 2026
Total elapsed time: 00:00:15

Flow Spread

So	Longitudinal slope
n	Manning's n
Sb	Boulevard slope
Sx	Cross slope
Sw	Depression (shoulder) slope
W	Depression (shoulder) width
T	Flow Spread
P	Wetted Perimeter
R	Hydraulic Radius



$$Q = AR^{2/3} S^{1/2} / n$$

Curb Height	0.150
Paved Width	9.00
Boulevard Width	0.00
n (paved)	0.013
n (boulevard)	0.013
So	0.015
Sx	0.030
Sb	0.030
Max Flow Depth	0.068
Max Spread T	2.250

Area 1	
(Half Roadway to CL)	
Height	0.068
Width	2.250
Area	0.076
P	2.319
R	0.033
Q	0.073
A	0.076
Q (m3/s)	0.073
Q (L/s)	73.2
V (m/s)	0.964
V x d	0.065

5yr Flows Per Rational Method:

A	998.071
B	6.053
C	0.814
Tc	10.0
I	104.2

Subcatchment:

A	0.108
C	0.68

Runoff:	21.3 L/s
Uncontroll	24.1 L/s
Total	45.4 L/s

Appendix D Geotechnical Report Excerpts



Geotechnical Investigation

Proposed Residential Development

Northridge Subdivision

1020 and 1070 March Road
Ottawa, Ontario

Prepared for 1384341 Ontario Ltd.

Report PG6009-1 Revision 3 dated August 24, 2022

3.0 Method of Investigation

3.1 Field Investigation

Field Program

A geotechnical investigation was carried out on December 6, 2019. A total of 14 test pits were excavated to a maximum depth of 3.9 m below existing grade using a rubber-tired backhoe. It should be noted that previous investigations were conducted by this firm within the subject property in 2011, consisting of a total of 13 test pits excavated to a maximum depth of 4.6 m below existing grade. A follow-up Investigation was conducted by others and consisted of excavating 21 test pits to a maximum depth of 4.4 m below existing grade. The test holes were distributed in a manner to provide general coverage of the subject site.

All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer. The test pit procedure consisted of excavating to the required depths at the selected locations and sampling the overburden. The approximate locations of the test holes are shown on Drawing PG6009-1 - Test Hole Location Plan included in Appendix 2.

A supplemental geotechnical investigation was carried out between September 30 and October 4, 2021. During that time, a total of 82 probeholes were advanced into the bedrock using an Air Track pneumatic crawler drill. The probeholes were completed for the purpose of bedrock delineation and the generation of bedrock elevation contours. Refer to Drawing PG6009-4 - Bedrock Contour Plan included in Appendix 2.

Sampling and In Situ Testing

Soil samples from the test pits from the current investigation were recovered from the side walls of the open excavation and all soil samples were initially classified on site. All samples were transported to our laboratory for further examination and classification. The depths at which the grab samples were recovered from the test holes are shown as G on the Soil Profile and Test Data sheets in Appendix 1.

Undrained shear strength testing, using a hand held vane apparatus, was carried out at regular intervals of depth in cohesive soils.

The subsurface conditions observed at the test pits were recorded in detail in the field. The soil profiles are presented on the Soil Profile and Test Data sheets and Test Pit Logs by Others in Appendix 1.

4.0 Observations

4.1 Surface Conditions

The subject site is currently occupied by agricultural lands, with the exception of the east portion of 1020 March Road being occupied by trees and dense brush. The ground surface across the west portion of the subject site is relatively flat with a slight upward slope from the March Road to the central portion of the site, followed by a downward slope and grade lowering across the east portion of the subject site. An existing agricultural homestead building was noted within the central portion of 1070 March Road. A ditch was noted running north-south along March Road and the west portion of the site extending from the south neighbouring site. The site is bordered to the north by residential dwellings, to the east by an existing rail corridor running north-south, to the south by vacant agricultural lands, and to the west by March Road.

4.2 Subsurface Profile

Overburden

1020 March Road

Generally, the subsoil profile encountered at the test hole locations consists of topsoil overlying silty clay or silty sand within the west and east portion of the site, respectively. A glacial till layer was noted at all test pit locations east of TP 3-19 and TP 9-19 of the current investigation. Practical refusal to excavation was encountered between 0.3 and 2.4 m depth at test pits TP 4-19, TP 5-19, TP 11-19, TP 11B-19 and TP 12-19. Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for the details of the soil profiles encountered at each test hole location.

1070 March Road

Generally, the subsoil profile encountered at the test hole locations consists of topsoil overlying silty clay or silty sand within the west and east portion of the site, respectively. A glacial till layer was noted at all test pit locations. Practical refusal to excavation was encountered between 0.9 and 3.7 m depth at all test pit locations completed by Paterson, with the exception of TP 6 from Paterson's 2010 investigation, which was extended to a depth of 4.6 m below existing ground surface.

Based on the bedrock delineation program, bedrock was generally encountered between 3.5 and 5 m below existing ground surface in the southwest side of the site, with local undulations from approximately 2 to 7 m below existing ground surface. In the northeast side of the site, bedrock was encountered from ground surface to 3.5 m below existing ground surface.

Bedrock outcrops were observed at the ground surface in the northeast portion of the site. The estimated bedrock depths are presented on Drawing PG6009-4 – Bedrock Contour Plan in Appendix 2.

Reference should be made to the Soil Profile and Test Data Sheets in Appendix 1 for the details of the soil profiles encountered at each test hole location.

Bedrock

Based on available geological mapping, the subject site is underlain by interbedded sandstone and dolomite of the March Formation extending from the west to center of the property, followed by dolomite of the Oxford formation extending from the center of the property to the east with an overburden drift thickness varying between 0 to 5 m.

Laboratory Testing

Atterberg limits testing, as well as associated moisture content testing, were completed on the recovered silty clay samples at selected locations throughout the subject site. The results of the Atterberg limits tests are presented in Table 1 and on the Atterberg Limits' Results sheet in Appendix 1.

The results of the shrinkage limit test indicate a shrinkage limit of 17% and a shrinkage ratio of 1.85.

All test holes were generally observed to be dry upon completion of the sampling program, with the exception of minor infiltration noted along the test pit sidewalls at the above-noted depths. Based on the moisture levels and colouring of the recovered soil samples, and our experience with the local area, the long-term groundwater table is expected at depths between 4 to 5 m below ground surface. The recorded groundwater levels are noted on the applicable Soil Profile and Test Data sheet presented in Appendix 1.

It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater levels could vary at the time of construction.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is suitable for the proposed development. It is recommended that the proposed residential dwellings be founded on conventional spread footings placed on an undisturbed, very stiff silty clay, compact silty sand, compact glacial till, engineered fill and/or surface-sounded bedrock bearing surface.

Due to the presence of a silty clay deposit, a permissible grade raise restriction is required for the subject site.

The above and other considerations are discussed in the following paragraphs.

5.2 Site Grading and Preparation

Stripping Depth

Topsoil, and any deleterious fill, such as those containing organic materials, should be stripped from under any buildings and other settlement sensitive structures. Care should be taken not to disturb adequate bearing soils below the founding level during site preparation activities. Disturbance of the subgrade may result in having to sub-excavate the disturbed material and the placement of additional suitable fill material.

Existing foundation walls and other construction debris should be entirely removed from within the building perimeter. Under paved areas, existing construction remnants such as foundation walls should be excavated to a minimum of 1 m below final grade

Bedrock Removal

It is expected that line-drilling in conjunction with hoe-ramming or controlled blasting may be required to remove the bedrock. In areas of weathered bedrock and where only a small quantity of bedrock is to be removed, bedrock removal may be possible by hoe-ramming.

Prior to considering blasting operations, the blasting effects on the existing services, buildings and other structures should be addressed.

A pre-blast or pre-construction survey of the existing structures located in proximity of the blasting operations should be carried out prior to commencing site activities.

5.5 Basement Slab / Slab on Grade Construction

With the removal of all topsoil and deleterious materials within the footprint of the proposed building, the bedrock surface, approved by Paterson personnel at the time of construction, is considered to be an acceptable subgrade surface on which to commence backfilling for the floor slab construction.

Any soft areas should be removed and backfilled with appropriate backfill material prior to placing any fill. OPSS Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab.

For structures with slab-on-grade construction, the upper 200 mm of sub-slab fill is recommended to consist of OPSS Granular A crushed stone. All backfill material within the footprint of the proposed buildings should be placed in maximum 300 mm thick loose layers and compacted to a minimum of 98% of the SPMDD.

For structures with basement slabs, it is recommended that the upper 200 mm of sub-floor fill consists of 19 mm clear crushed stone.

5.8 Pavement Design

For design purposes, the pavement structures presented in the following tables could be used for the design of car only parking areas and local roadways.

Table 5 - Recommended Pavement Structure – Driveways/Car Only Parking Areas	
Thickness (mm)	Material Description
50	Wear Course - HL-3 or Superpave 12.5 Asphaltic Concrete
150	BASE - OPSS Granular A Crushed Stone
300	SUBBASE - OPSS Granular B Type II
SUBGRADE - Either approved fill, in situ soil or OPSS Granular B Type I and II material placed over in situ soil or approved fill.	
Note: Minimum Performance Grade (PG) 58-34 asphalt cement should be used for driveways.	

Table 6 - Recommended Pavement Structure – Local Residential Roadways

Thickness (mm)	Material Description
40	Wear Course - Superpave 12.5 Asphaltic Concrete
50	Binder Course - Superpave 19.0 Asphaltic Concrete
150	BASE - OPSS Granular A Crushed Stone
400	SUBBASE - OPSS Granular B Type II
SUBGRADE - Either approved fill, in situ soil or OPSS Granular B Type I or II material placed over in situ soil or approved fill.	
Note: Minimum Performance Grade (PG) 58-34 asphalt cement should be used for local roadways.	

Table 7 - Recommended Pavement Structure – Roadways with Bus Traffic

Thickness (mm)	Material Description
40	Wear Course - Superpave 12.5 Asphaltic Concrete
50	Upper Binder Course - Superpave 19.0 Asphaltic Concrete
50	Lower Binder Course - Superpave 19.0 Asphaltic Concrete
150	BASE - OPSS Granular A Crushed Stone
550	SUBBASE - OPSS Granular B Type II
SUBGRADE - Either in situ soil or OPSS Granular B Type II material placed over in situ soil.	
Note: Minimum Performance Grade (PG) 64-34 asphalt cement should be used for roadways with bus traffic.	

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type I or II material. Weak subgrade conditions may be experienced over service trench fill materials. This may require the use of a geotextile, thicker subbase, or other measures that can be recommended at the time of construction as part of the field observation program.

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for driveways and local roadways and (PG) 64-34 asphalt cement should be used for roadways with bus traffic. The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of the material's SPMDD using suitable vibratory equipment.

Pavement Structure Drainage

Satisfactory performance of the pavement structure is largely dependent on keeping the contact zone between the subgrade material and the base stone in a dry condition. Failure to provide adequate drainage under conditions of heavy wheel loading can result in the fine subgrade soil being pumped into the voids in the stone subbase, thereby reducing its load carrying capacity.

7.0 Recommendations

It is a requirement for the foundation design data provided herein to be applicable that a material testing and observation program be performed by the geotechnical consultant.

- Grading plan review from a geotechnical perspective, once the final grading plan is available.
- Observation of all bearing surfaces prior to the placement of concrete.
- Sampling and testing of the concrete and fill materials.
- Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- Observation of all subgrades prior to backfilling.
- Field density tests to determine the level of compaction achieved.
- Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued upon the completion of a satisfactory inspection program by the geotechnical consultant.

8.0 Statement of Limitations

The recommendations made in this report are in accordance with Paterson's present understanding of the project. Paterson requests permission to review the grading plan once available. Paterson's recommendations should also be reviewed when the drawings and specifications are complete.

The client should be aware that any information pertaining to soils and the test hole logs are furnished as a matter of general information only. Test hole descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those of the test holes.

A soils investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test locations, Paterson requests to be notified immediately in order to permit reassessment of the recommendations.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than 1384341 Ontario Ltd. or their agent(s) is not authorized without review by this firm for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.



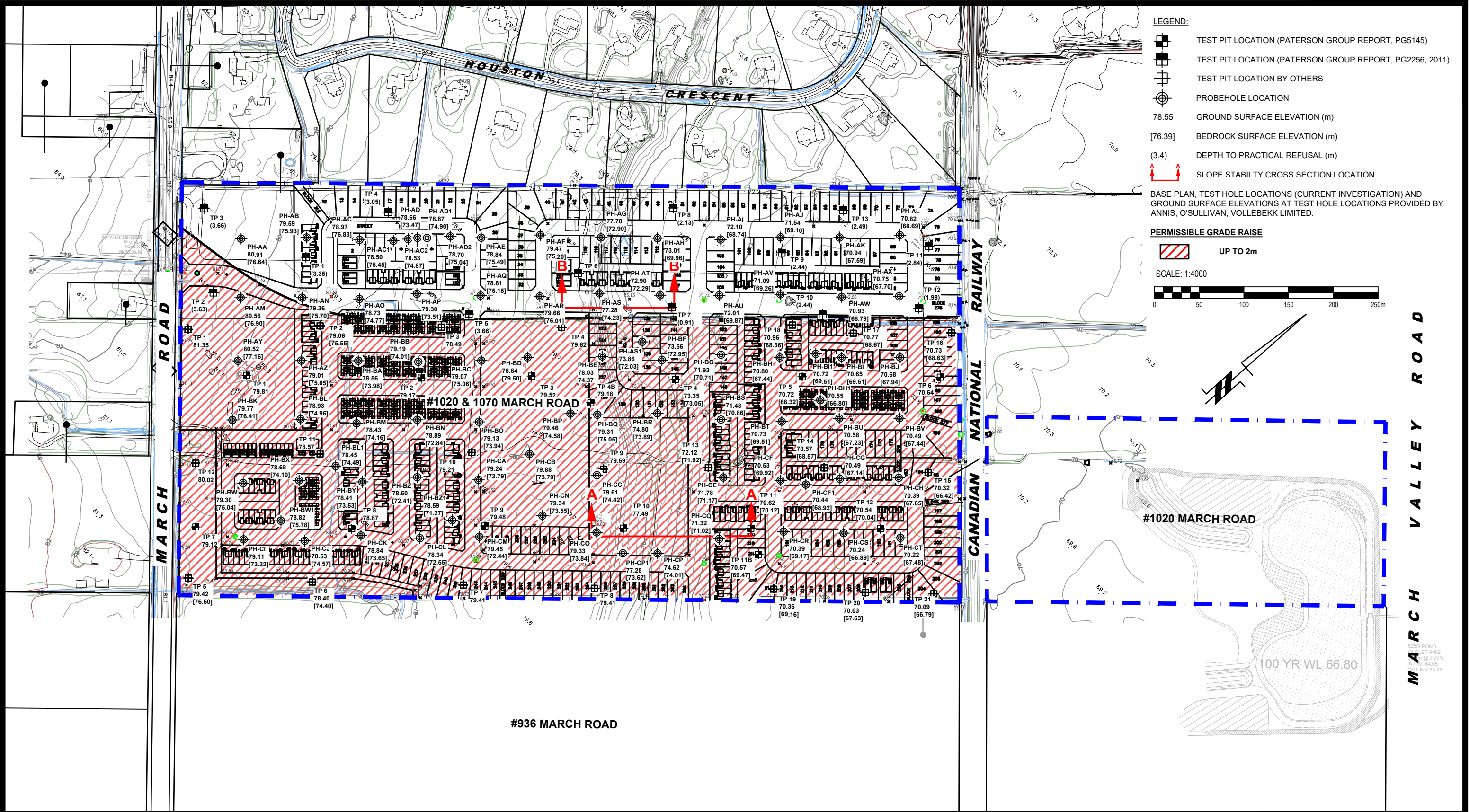
Fernanda Carozzi, PhD Geoph.



Faisal I. Abou-Seido, P.Eng.

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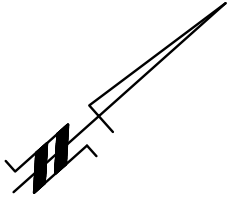
- LEGEND:
- TEST PIT LOCATION (PATERSON GROUP REPORT, PG5145)
 - TEST PIT LOCATION (PATERSON GROUP REPORT, PG2256, 2011)
 - TEST PIT LOCATION BY OTHERS
 - PROBEHOLE LOCATION
 - 78.55 GROUND SURFACE ELEVATION (m)
 - [76.39] BEDROCK SURFACE ELEVATION (m)
 - (3.4) DEPTH TO PRACTICAL REFUSAL (m)
 - SLOPE STABILITY CROSS SECTION LOCATION

BASE PLAN, TEST HOLE LOCATIONS (CURRENT INVESTIGATION) AND GROUND SURFACE ELEVATIONS AT TEST HOLE LOCATIONS PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LIMITED.

PERMISSIBLE GRADE RAISE

UP TO 2m

SCALE: 1:4000



MARCH VALLEY ROAD

#1020 MARCH ROAD

100 YR WL 66.80

#936 MARCH ROAD



PATERSON GROUP
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ENGINEERING

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NO.	REVISIONS	DATE	INITIAL

CAVANAGH CONSTRUCTION
GEOTECHNICAL INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
PART OF LOT 13 CONCESSION 4

OTTAWA,
Title:

ONTARIO

PERMISSIBLE GRADE RAISE PLAN

Scale:	1:4000	Date:	10/2021
Drawn by:	RG	Report No.:	P6009-1
Checked by:	OC	Dwg. No.:	PG6009-2
Approved by:	DJG	Revision No.:	

With every community, we redefine what's possible.



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