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Site Servicing Report

Mixed-Use Site Plan (Block 15)

2983, 3053 and 3079 Navan Road & 2690 Pagé Road

Site Servicing Report

2983, 3053 and 3079 Navan Road & 2690 Pagé Road

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1.0 INTRODUCTION

1.1 General

In 2023, J.L. Richards & Associates Limited (JLR) was retained by 12714001 Canada Inc. (the Owner) to prepare the detailed design of municipal infrastructure for Site Plan Approval (SPA) of the Mixed-Use Site Plan (Block 15). This Site Servicing Report (SSR) presents the servicing constraints and strategies for water, wastewater, stormwater servicing, and stormwater management in accordance with the City of Ottawa Design Guidelines, the associated technical bulletins and relevant design excerpts.

1.2 Site Description

The Mixed-Use Site Plan (Block 15) is located within the City of Ottawa's Official Plan boundary and consists of a 0.54 ha parcel bounded by Brian Coburn to the northwest and the proposed East Ridge Orleans Subdivision in the remaining directions (refer to the East Ridge Orleans Subdivision Site Servicing Report prepared by J.L. Richards and Associates, dated September 22, 2023). The legal description of the subject property can be found in the Draft Plan of Subdivision attached to Appendix A.

A topographical survey was completed by Stantec Inc. in August 2023 (Appendix A). The survey indicates that a portion of Block 15 adjacent to Brian Coburn conveys overland flow to existing ditch inlet catch basins along Brian Coburn. The remaining existing ground surface generally slopes in a southeasterly direction towards the future subdivision lands.

1.3 Proposed Development

The proposed development will consist of two (2) mid-rise residential condominiums with underground parking and one (1) storey of commercial space. One (1) of the condominium buildings consists of 47 units, and the second (2) consists of 36 units. Mixed-Use Site Plan (Block 15) has a total of 83 units. The Concept Plan for the Mixed-Use Site Plan (Block 15) is attached to Appendix A.

1.4 Proposed Connections to Existing Infrastructure

Block 15 is proposed to be serviced by the infrastructure that is part of the East Ridge Orleans Subdivision. One sanitary, storm and water service will extend to the parking garage footprint from the subdivision as shown in the servicing drawings.

1.5 Consultation and Permits

A pre-consultation meeting was held on September 13, 2023, to discuss the planning process, design criteria, and servicing constraints. A copy of the pre-consultation meeting notes and the site servicing checklist has been provided in Appendix B.

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2.0 WATER SERVICING

2.1 Water Supply Design Criteria

A Hydraulic Network Analysis (HNA) was completed as part of the detailed design for the East Ridge Orleans subdivision to confirm that the proposed watermains could provide adequate supply while complying with both the Ottawa Design Guidelines for Water Distribution (July 2010) and Technical Bulletins ISDTB-2014-02, ISTB-2018-02 and ISTB-2021-03. These documents are herein referred to as the Design Guidelines and TB-2014-02, TB-2018-02, and TB-2021-03, respectively.

The HNA completed as part of the East Ridge Orleans Subdivision design included water demands for the Mixed Used Site Plan (Block 15). The HNA has since been updated to reflect the proposed water service lateral for Block 15 but is based on the same demands and the boundary conditions used in the original East Ridge Orleans Subdivision HNA (refer to Appendix C for a copy of City correspondence for boundary conditions).

Section 4.2.2 of the Design Guidelines states the following criteria for development additions to the public water distribution system:

- Under maximum hourly demand conditions (peak hour), the residual pressures shall not be less than 276 kPa (40 psi);
- During periods of maximum day and fire flow demand, the residual pressure at any point in the distribution system shall not be less than 140 kPa (20 psi);
- In accordance with the Ontario Building Code (OBC) in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi);
- The maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi); and
- Feeder mains, which have been provided primarily for the purpose of redundancy, shall meet, at a minimum, the basic day plus fire flow demand.

2.2 Domestic Water Demands

The water demands presented in this section are based on the site layout and unit count shown in the Site Plan (Appendix A) and commercial flows. Domestic water demands were calculated for 83 apartment units with an average density of 1.8 persons per unit, giving a total population of 149 people. Commercial flows were calculated for a commercial area of 0.09 ha.

The residential and commercial consumption rates for average day, maximum day, and peak hour demand were set in accordance with Table 4-2 of the Design Guidelines. Table 1 summarizes the water consumption rates and peaking factors used in the HNA.

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Table 1: Water Demands

Demand Scenario	Residential Water Consumption or Peaking Factor	Commercial Water Consumption of Peaking Factor	Total Demands (L/s)
Average Day Demand	280 L/c/d	28,000 L/ha/d	0.52
Maximum Day Demand	2.5 x Avg Day	1.5 x Avg Day	1.26
Peak Hour Demand	2.2 x Max Day	1.8 x Max Day	2.74

2.3 Fire Flow Requirements

The City has specified that the Fire Underwriters Survey (FUS) method shall be used for any public or private site where new fire hydrants are being designed. Specifically, the required fire flow (RFF) for each structure was calculated in accordance with TB-2018-02.

The required fire flow for the Mixed-Use Site Plan (Block 15) was calculated as 200 L/s for Building C and 217 L/s for Building D. Refer to Appendix C for the detailed RFF calculations for the critical fire area.

Both buildings within Block 15 will be equipped with a fully supervised automatic sprinkler designed and installed in accordance with NFPA 13. In the analysis, a sprinkler flow of 1500 L/min (25 L/s) was applied to each building as recommended by the Owner's Mechanical Engineer (refer to Appendix C).

2.4 Proposed Water Servicing, Boundary Conditions and Water Model

2.4.1 Proposed Water Servicing

Water will be supplied to the Mixed-Use Site Plan (Block 15) by a 150 mm diameter water service that will connect to the 200 mm diameter watermain loop within the East Ridge Orleans subdivision. Fire protection will be provided by each building's sprinkler system and the proposed hydrants within the East Ridge Orleans Subdivision. The Siamese connection for each building is shown on the Servicing Drawings and is located no more than 45 m away from a hydrant as required by the OBC (refer to hydrant coverage markup in Appendix C).

2.4.2 Boundary Conditions

Hydraulic boundary conditions were provided by the City at the two proposed connection locations for the East Ridge Orleans subdivision (Connection 1 and Connection 2). Table 2 summarizes the hydraulic boundary conditions received (refer to Appendix C for a copy of the City correspondence).

The boundary condition for 233 L/s was used in this analysis since this is above the maximum required fire flow for the site (refer to Section 2.3).

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Table 2: Hydraulic Boundary Conditions

Demand Scenarios	Connection 1 Head (m)	Connection 2 Head (m)
Maximum HGL	130.7	130.7
Peak Hour	127.0	126.8
Max Day plus Fire Flow #3 13,980 L/min (233.00 L/s)	124.9	122.7

2.4.3 Water Model

A hydraulic water model within the WaterCAD® software platform was used to carry out the HNA (refer to the overall schematics presented in Appendix C). The water demands from Table 1 and the boundary conditions from Table 2 were input into the model for each demand scenario. Table 3 summarizes the watermain diameters and roughness coefficients used in the model, based on Sections 4.2.12 and 4.3.5 of the Design Guidelines.

Table 3: Watermain Internal Diameters and C-Factors

Nominal Diameter	Inside Diameter	C-Factor
150 mm	155 mm	100
200 mm	204 mm	110
300 mm	297 mm	120

2.5 Simulation Results

The HNA was carried out under steady-state peak hour, maximum day plus fire flow, and maximum pressure conditions to confirm that the proposed water servicing can meet the design criteria outlined in Section 2.1.

2.5.1 Peak Hour

The simulation results found the minimum pressure at the site (node J-23 in the model) during the peak hour condition to be 406 kPa (58.9 psi) (refer to Appendix C), which exceeds the minimum pressure criterion of 276 kPa (40 psi) per the Design Guidelines.

2.5.2 Maximum Day Plus Fire Flow

Fire water supply will be provided by the fully automatic sprinkler system and the hydrants within the East Ridge Orleans subdivision. To ensure adequate fire protection, the maximum day demand shown in Table 1 was analyzed simultaneously with the fire flow requirements. As mentioned in Section 2.3, a sprinkler system flow of 1500 L/min (25 L/s)

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was assumed for Block 15 and it was assumed that only one (1) building would require fire flow at once.

Once the maximum day demands, the sprinkler system demands, and the 14,000 L/min (233 L/s) boundary condition provided by the City (refer to Table 2) were input in the model, the fire flow simulation was carried out by allowing WaterCAD® to calculate the available fire flow that can be drawn from a hydrant without allowing any part of the system to experience pressures less than 140 kPa (20 psi).

From the simulation results, the system is expected to deliver a minimum of 14,000 L/min (233 L/s) to the site through the contribution of the sprinkler system and the nearby hydrants. Attached to Appendix C is a map of the hydrant coverage for Block 15 which confirms that both buildings within the block meet the RFF of 233 L/s through the aggregate sum of hydrant flows. Based on Appendix I of TB-2018-02 hydrants within 75 m of a building can provide 95 L/s of fire flow and hydrants within 75 to 150 m of a building can provide 63 L/s of fire flow.

2.5.3 Maximum Pressure

Based on a zero (0 L/s) demand condition, the simulation results found the maximum pressure at the site to be 444 kPa (64.40 psi). This value is below the maximum pressure constraint of 552 kPa (80 psi), therefore pressure reducing valves (PRVs) are not anticipated to be required.

2.6 Summary and Conclusions

Based on the water simulation results, the proposed development can be serviced by the proposed 150 mm water service lateral connected to the 200 mm watermain loop within the East Ridge Orleans Subdivision. Furthermore, adequate fire water supply can be achieved with the proposed hydrants within the East Ridge Orleans Subdivision.

3.0 WASTEWATER SERVICING

3.1 Design Criteria

The sanitary sewer system within the Mixed-Use Site Plan (Block 15) is designed in accordance with the Ottawa Sewer Design Guidelines and subsequent technical bulletins. The design parameters are applied under two scenarios as per ISTB Technical Bulletin 2018-01. The key design parameters have been summarized in the table below.

Table 4: Wastewater Key Design Parameters

Design Parameter	Design Value
Commercial Average Flow	28,000 L/gross ha/Day
Residential Average Flow	280 L/Cap/Day
Residential Peaking Factor	Harmon's Formula
Commercial Peaking Factor	1.5
Harmon's Correction Factor (K)	0.8
Infiltration Allowance	0.33 L/s/ha

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Design Parameter	Design Value
Manning's Roughness Coefficient (n)	0.013
Allowable Slopes	Varies (Refer to Section 6.1.2.2 of ODSG)
Allowable Velocities	0.6 m/s – 3.0 m/s
Allowable Freeboard	-

3.2 Proposed Sanitary Servicing and Design Flows

Wastewater generated from Block 15 will be conveyed via a proposed 200 mm diameter sanitary service lateral, which will then discharge into the East Ridge Orleans Subdivision. Based on the design criteria above and the site constraints, a total design peak flow of 1.95 L/s is calculated for the development. The table below summarizes the peak sanitary flow for the site plan. A detailed design sheet can be found in Appendix E.

Table 5: Sanitary Design Flow Summary

Area	Site Area	Unit Count	Unit Density	Pop.	Harmon's Peaking Factor	Res. Peak Flow	Comm. Peak Flow	Infilt. Flow	Total Flow
Block 15	0.54 ha	83	1.8 ppu	149 persons	3.55	1.72 L/s	0.05 L/s	0.18 L/s	1.95 L/s

A 200 mm diameter sanitary service lateral is expected to have sufficient capacity to convey the wastewater flows for the site. The flows from this block were already incorporated in the design of the sanitary sewer for the subdivision (refer to the East Ridge Orleans Subdivision Site Servicing Report prepared by J.L. Richards and Associates, dated February 16, 2024). As shown in this report, the subdivision will consist of 200 mm diameter pipes which will have, at minimum, 20.24 L/s of capacity. Furthermore, the overall subdivision inclusive of the Site Plan Blocks 14, 15 and 17 is expected to generate 12.98 L/s of wastewater flows which is less than the minimum expected capacity of the pipes by 35%. Therefore, it is anticipated that the sanitary sewer system downstream will have sufficient capacity for the 1.95 L/s of wastewater flows generated by Block 15.

Furthermore, it has been confirmed by the Mechanical Engineer on file that a 200mm diameter service will be sufficient to convey the flows generated by the mechanical fixtures (refer to Appendix E).

3.3 Summary and Conclusions

Wastewater servicing for Block 15 will be designed in accordance with the City of Ottawa Sewer Design Guidelines, the associated technical bulletins, and various background documents as highlighted throughout this section. Wastewater will be conveyed via a proposed 200 mm diameter sanitary service lateral which will then discharge into the East Ridge Orleans Subdivision.

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4.0 STORM SERVICING AND STORMWATER MANAGEMENT

4.1 Design Criteria

Storm and stormwater management servicing for the Mixed-Use Site Plan (Block 15) was developed in accordance with the City of Ottawa 2012 Sewer Design Guidelines (OSDG) and the more recent Technical Bulletin PIEDTB-2016-01 (September 6, 2016). These two documents are herein referred to as the Design Guidelines in this section. A summary of the key storm and stormwater management criteria follows:

- Control minor system flows to the allowable release rates of 44 L/s as identified in Table 5-4 Site Servicing Report 2983, 3053 and 3079 Navan Road & 2690 Pagé Road, Ottawa, Ontario (JLR 2024);
- The runoff coefficients (C-factors) to be calculated based on the ratio of pervious and impervious surfaces depicted on proposed site plans;
- Minimum roadway slope of 0.1% from crest-to-crest for overland flow route;
- Minimum rear yard slope in the absence of perforated pipe system of 1.5% along with swale side slopes of 3 horizontal to 1 vertical;
- Maximum parking ponding depth of 350 mm (static and dynamic) as per the Design Guidelines and maximum depth of surface flow to be 300 mm;
- Minimum vertical clearance of 0.15 m between the spill elevation on the street and the finished grade (garage elevation);
- Minimum vertical clearance of 0.30 m between the surface spill elevation and the ground elevation at the building in the rear yards;
- Major system flows, up to and including the 1:100-year design storm event, are contained within the site using the parking lot area and surface drainage.
- Quality control will be accommodated by Pond #3 to meet an MECP Enhanced Level of Protection (80% TSS removal) as identified in Site Servicing Report 2983, 3053 and 3079 Navan Road & 2690 Pagé Road, Ottawa, Ontario (JLR 2024).
- Provide measures to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

4.2 Proposed Stormwater Management Approach

In order to achieve the allowable release rates, the stormwater management of the site will include:

- Rooftop control with rooftop storage and released at a cumulative controlled release rate of 2 L/s for each building; per WATTS RD-200 detail for Small Area Roof Drain (Appendix D) and as recommended by the landowner's mechanical engineer.
- Surface storage within the parking lots in greater than a 1:2-year event with captured flows conveyed to the building plumbing system and internal cistern;
- Ramp runoff captured and conveyed to the building plumbing system and internal cistern;
- Storage in the building cistern with flows pumped at a controlled rate to the minor system with a backwater valve at the connection; and,
- Controlled release of the flows captured in the ditch drainage system for the surrounding landscaped areas.

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Foundation drains will be connected to the internal building plumbing system therefore no HGL analysis is required.

4.3 Proposed Minor System Servicing

4.3.1 Runoff Coefficient

A minor system connection will be provided from the building envelope to the minor system within the subdivision. The connection will be sized based on the 1:2-year release from the site. The runoff coefficient is based on the ratio of impervious surfaces and grassed or landscaped areas. The breakdown between pervious and impervious surfaces is shown on the figure entitled Overall Site Imperviousness in Appendix D.

4.4 Stormwater Management Modelling Approach

4.4.1 Dual Drainage Model

The analysis of both major and minor drainage systems was carried out to demonstrate their compliance with respect to the design criteria described in Section 4.1. The performance of the major overland system and minor storm sewer system was analyzed with PCSWMM. This software is a dynamic model which allows both hydrologic and hydraulic components to be simulated in the same platform and also allows the simulation of the interaction between the major and minor systems. The PCSWMM software platform was used to:

- Generate the surface runoff hydrograph for each sub-area under various recurrences.
- Subdivide each inflow hydrograph into its minor and major system components based on the proposed inlet capture rates and roadway sag storage.
- Assess cascading, if any, and carry out dynamic routing of storm flows to determine flow depths along the roadways. As previously stated, the maximum major overland flow depths within the parking lot areas are to be limited to 350 mm or less, as per Technical Bulletin PIEDTB-2016-01.

PCSWMM was set-up to evaluate the proposed servicing as detailed on Drawing C01 and C02. Subcatchments were delineated for the structure roof areas, parking lot low points and landscaped low points. Model schematics are prepared in Appendix D.

4.4.2 Boundary Conditions

Boundary conditions are taken from the downstream subdivision model issued as part of the Site Servicing Report 2983, 3053 and 3079 Navan Road & 2690 Pagé Road, Ottawa, Ontario (JLR 2024).

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The downstream 1:100-year HGL at the connection to the Subdivision at MH514 is identified as 81.07 m which is lower than any minor system within the site and therefore there is no backflow from the boundary condition and no impacts on HGL.

The rear-yard outlet connection into the subdivision connects directly into the pipe from STM STUB 16 to EXST MH514. The downstream 1:100-year HGL at STM STUB 16 is 81.28 m which is below the catch basin invert of 83.28 m at CB112.

4.4.3 Hydrological Modelling Parameters

The following parameters were used in the hydrologic component of PCSWMM:

- **Areas and Imperviousness:** Catchment ID and drainage areas used by PCSWMM match those shown on either Drawing DST or Figure 1 (Appendix D).
- **Catchment Width:** The catchment width is estimated at the width of overland sheet flow based on the grading of the catchment and slope direction.
- **Manning's Roughness Coefficient:** Manning's Roughness Coefficients of 0.013 and 0.25 were used for the impervious and pervious surfaces, respectively.
- **Horton Infiltration parameters:** City of Ottawa OSDG Horton Infiltration Parameters have been used in the modelling.
- **Initial Abstraction:** Initial abstraction of 4.67 mm and 1.57 mm was used for the pervious and impervious surfaces respectively, consistent with the OSDG.

4.4.4 Simulation of Storm Distributions

To assess peak flow rates and peak volume storage requirements the 3-hour Chicago storm has been simulated for the site for the 1:2-year event and 1:100-year event and the 24-hour SCS storms for the 1:100-year event.

4.5 Simulation Results

4.5.1 Low Point Ponding Analysis

Ponding depths in the low points in the parking area and landscaped areas are shown in Table 6.

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Table 6: Catchbasin Ponding Depths

Low Point ID	Top of Grate (m)	Maximum Static Depth (mm)	3-hour Chicago 1:2 year Depth (mm)	3-hour Chicago 1:100 year Depth (mm)	24-hour SCS 1:100 year Depth (mm)
1	85.30	200	10*	30	30
2	85.25	200	20*	50	40
3	85.20	150	20*	30	30
4	85.15	150	20*	40	30
5	85.22	180	0*	10	10
6	85.30	300	0	0	0
7	85.20	180	0	0	0
8	85.15	100	0	0	0

Those values marked with * are greater than 0 mm in the 2-year event due to the model setup. In order to represent the Zurn inlet control device, the orifice has been set at the top of grate elevation as the control is at the surface. Therefore, the model requires a head buildup over the structure for simulation of flows.

The simulation results compiled in Table 6 shows that:

- No ponding nor dynamic flow will occur in the 1:2-year event;
- Maximum ponding depth of 50 mm during the 1:100-year event; and,
- There is no spill from the site in the 1:100-year event.

4.5.2 Roof Drainage

The roof drainage system is to be designed by the Mechanical Engineer to achieve a flow rate of 2 L/s from each roof structure. The maximum depth of ponding required, assuming storage across 66% of the rooftop area, is 80 mm.

4.5.3 Parking Lot Drainage

The parking lot drainage system connects to the building cistern and is controlled by the ZURN_Z150F-6NH (detail provided in Appendix D) to allow the 1:2-year event to drain and for the surface to provide storage during greater events up to the 1:100 year. Capture rates are shown in **Error! Reference source not found..**

Table 7: Parking Area ICD Capture Analysis

Low Point	ICD Type	1:2 year Rational Flow (l/s)	1:100 year 3-hour Chicago Flow (l/s)	1:100 year 3-hour Chicago Head (m)
1	ZURN_Z150F-6NH	3	20	30
2		11	36	50

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Low Point	ICD Type	1:2 year Rational Flow (l/s)	1:100 year 3-hour Chicago Flow (l/s)	1:100 year 3-hour Chicago Head (m)
3		7	20	30
4		10	27	40
5		1	6	10

The table shows that the parking lot ICDs capture the 1:2-year design flow.

4.5.4 Landscaped Drainage

The landscaped drainage consists of typical rear yard system of swales and perforated pipes. At the downstream end the Vortex ICD 95 provides flow control to 10 L/s in the 1:100-year event with a head of 1.63m. The release is greater than the rational method 1:2-year design flow of 4 L/s for the combined upstream catchments. The Vortex ICD sizing ensures that there is no spill from Low Point 8 in the 1:100 year event.

4.5.5 Building Release Rates

To maintain overall release rate from the site at the allowable flow rate of 44 L/s, the building drainage system must be controlled to 29 L/s. Based on a pumped rate of 29 L/s a cistern size of 49 m³ is required in the building basement.

4.6 Summary and Conclusions

The stormwater servicing achieves a release rate from the site to the minor system limited to the allowable release rate and contains up to the 1:100 year on site.

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5.0 Erosion and Sedimentation Control

Erosion and sediment control measures, as outlined in the Ontario Ministry of Natural Resources (MNR) Guidelines on Erosion and Sediment Control for Urban Construction Sites, will be implemented to trap sediment on site. The following erosion and sediment control measures can be implemented during construction as shown on the Erosion and Sediment Control Plan (Drawing ESC):

- Supply and installation of a silt fence barrier, as per OPSD 219.110.
- Supply and installation of siltsack or sentinel CB inserts between the frame and cover of catch basins and maintenance holes adjacent to the project area during construction, to prevent sediment from entering the sewer system.
- Stockpiling of material during construction is to be located along flat areas away from drainage paths. For material placed on sloped areas, stockpiles are to be enclosed with a silt fence to protect watercourses.
- All catch basins are to be equipped with sumps, inspected frequently, and cleaned as required.
- Temporary ICD to be placed blocking part of the sanitary sewer pipe in the connecting maintenance holes to eliminate construction debris from entering the existing sanitary sewer system. The ICDs are to be removed after the proposed sanitary sewers have been fully cleaned.

The proposed removal and reinstatement measures as well as the erosion control measures shall conform to the following documents:

- “Guidelines on Erosion and Sediment Control for Urban Construction Sites” published by Ontario Ministries of Natural Resources, Environment, Municipal Affairs, and Transportation & Communication, Association of Construction Authorities of Ontario and Urban Development Institute, Ontario, May 1987.
- “MTO Drainage Manual”, Chapter F: “Erosion of Materials and Sediment Control”, Ministry of Transportation & Communications, 1985.
- “Erosion and Sediment Control” Training Manual by Ministry of Environment, Spring 1998.
- Applicable Regulations and Guidelines of the Ministry of Natural Resources.

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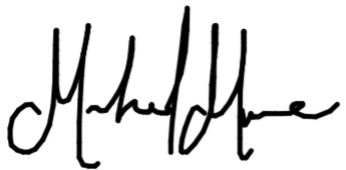
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Appendix A

Concept Plan, Draft Plan of
Subdivision and Topographical
Survey



LOTS AREAS		LOTS AREAS	
LOT NUMBER	AREAS (M2)	LOT NUMBER	AREAS (M2)
B01-1	394	B06-4	154
B01-2	184	B06-5	163
B01-3	184	B06-6	154
B01-4	189	B06-7	369
B01-5	189	B07	2,002
B01-6	184	B08-1	525
B01-7	184	B08-2	174
B01-8	299	B08-3	184
B02-1	281	B08-4	174
B02-2	176	B08-5	184
B02-3	184	B08-6	174
B02-4	184	B08-7	234
B02-5	174	B09-1	234
B02-6	233	B09-2	174
B03-1	250	B09-3	184
B03-2	182	B09-4	184
B03-3	182	B09-5	174
B03-4	182	B09-6	234
B03-5	182	B10-1	234
B03-6	182	B10-2	174
B03-7	250	B10-3	184
B04-1	233	B10-4	184
B04-2	174	B10-5	174
B04-3	184	B10-6	487
B04-4	174	B11-1	748
B04-5	184	B11-2	286
B04-6	174	B11-3	265
B04-7	278	B11-4	246
B05-1	368	B11-5	242
B05-2	154	B11-6	242
B05-3	163	B11-7	321
B05-4	163	B12	240
B05-5	154	B13	1,232
B05-6	206	B14	5,728
B06-1	206	B16	7,811
B06-2	154	B17	5,312
B06-3	163		

SITE PLAN LEGEND		
[Symbol]	EXISTING BUILDING	[Symbol] LOT LINE
[Symbol]	NEW BUILDING	[Symbol] SETBACKS
[Symbol]	NEW BUILDING WITH COMMERCIAL SPACE AT-GRADE	[Symbol] NEW TREE
[Symbol]	GRASS	[Symbol] FIREWALL
[Symbol]	ASPHALT	[Symbol] SIDEWALK

SITE INFORMATION & DEVELOPMENT STATISTICS		
LOTS		PIN
		04756-0303
		04756-0315
		04756-0316
		04756-1337
ZONING		GM(2546) H(14.5)
SITE AREA		
TOTAL SITE AREA:	~53,441.14 m ²	(5.34ha)
TOTAL DEVELOPABLE AREA:	~45,956.28 m ²	(4.59ha)
NET SITE AREA:	~38,956.28 m ²	(3.89ha)

UNITS	REQUIRED	PROVIDED
TOWNHOUSES:		67 UNITS
BLOCK 01:		
1 X RESIDENTIAL APARTMENT BUILDING		48 UNITS
1 X MIXED USE BUILDING		36 UNITS
RESIDENTIAL:		~899 m ²
COMMERCIAL SPACES:		
BLOCK 02:		
1 X RESIDENTIAL APARTMENT BUILDING		47 UNITS
1 X MIXED USE BUILDING		36 UNITS
RESIDENTIAL:		~899 m ²
COMMERCIAL SPACES:		
BLOCK 03:		
2 X RESIDENTIAL APARTMENT BUILDING		96 UNITS
TOTAL NUMBER OF UNITS:		330 UNITS
TOTAL COMMERCIAL SPACES:		~1,798 m ²

	REQUIRED	PROVIDED
MAXIMUM DENSITY	NO MAX.	84.8 units/net ha
MINIMUM LOT WIDTH	NO MIN.	5.8 m
MINIMUM LOT AREA	NO MIN.	174 m ²
MAXIMUM BUILDING HEIGHT	14.5 m	14.5 m
SETBACKS		
MINIMUM FRONT YARD:	3 m	3 m
MINIMUM CORNER SIDE YARD:	3 m	3 m
MINIMUM INTERIOR SIDE YARD:		
NON-RESIDENTIAL OR MIXED-USE:	5 m	5 m
LOW-RISE RESIDENTIAL:	1.2 m	1.2 m
MID-RISE RESIDENTIAL:	3 m	3 m
MINIMUM REAR YARD:		
ABUTTING A STREET:	3 m	3 m
FROM A RESIDENTIAL ZONE:	7.5 m	7.5 m
FOR A RESIDENTIAL BUILDING:	7.5 m	7.5 m

PARKING RATES		
R9 - TOWNHOUSES:	1 p/unit = 67	67 (GARAGES)
VISITOR:	0	67 DRIVE AISLES
BLOCK 14:		
R12 - APARTEMENTS	1.0 p/unit = 84	84 (UNDERGROUND)
VISITOR:	0.2 p/unit = 17	18 (UNDERGROUND)
N79 - RETAIL STORE:	3.4 p/100 m ² GFA = 30.6	32 (EXTERIOR)
		TOTAL: 134
BLOCK 15:		
R12 - APARTEMENTS	1.0 p/unit = 83	83 (UNDERGROUND)
VISITOR:	0.2 p/unit = 16.6	16 (UNDERGROUND)
N79 - RETAIL STORE:	3.4 p/100 m ² GFA = 30.6	32 (EXTERIOR)
		TOTAL: 131
BLOCK 17:		
R12 - APARTEMENTS	1.0 p/unit = 96	96 (UNDERGROUND)
VISITOR:	0.2 p/unit = 19.2	19 (15 EXT. + 4 UND.)
		TOTAL: 115

GROSS FLOOR AREA	
TOWNHOUSE A:	267 m ²
TOWNHOUSE B:	239 m ²
TOWNHOUSE C:	232 m ²
TOWNHOUSE C (CORNER UNIT):	236 m ²
TOWNHOUSE D:	225 m ²
TOTAL MODEL 01 (ABBBBBBA)	1,968 m ²
TOTAL MODEL 02 (ABBBBBBA)	1,729 m ²
TOTAL MODEL 03 (ABBBBBBA)	1,490 m ²
TOTAL MODEL 04 (CDDCCDC)	1,611 m ²
TOTAL MODEL 05 (CDDCCDC)	1,386 m ²

MIXED USE BUILDING (TOTAL OF 2 BUILDINGS):		TOTAL: 3,926 m ²
RESIDENTIAL:		3,027 m ²
COMMERCIAL:		899 m ²
RESIDENTIAL APARTMENT BUILDING (TOTAL OF 4 BUILDINGS):		TOTAL: 3,927 m ²
RESIDENTIAL:		3,927 m ²

- NOTE
1. ASSUMES TYPICAL RESIDENTIAL FLOOR HEIGHT OF 3m.
 2. THE BASE PLAN (LOT LINES, EXISTING ROADS AND SURROUNDING AREAS) IS BASED ON THE TOPOGRAPHICAL PLAN OF SURVEY, SURVEYED STANTEC GEOMATICS LTD.
 3. DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

PROJECT
NAVAN ROAD DEVELOPMENT
2983, Navan Road, Orleans, ON K1C 7G4

OWNER
Group of Heafey Group
788, BOUL. SAINT-JOSEPH, SUITE 100 GATINEAU, QC J8Y 4B8

ARCHITECTURAL
PJA PMA ARCHITECTES
(418) 851-8954
INFO@PJAARCHITECTES.COM
3070, CHEMIN DES QUATRE-BORDEAUX QUÉBEC, QC G1M 2M4
PJAARCHITECTES.COM

ENGINEERS / PLANNER
L'Atelier architectes
53, BOUL. SAINT-RAYMOND, GATINEAU, QC J8Y 1B8

SURVEYOR
J.L. Richards
ENGINEERS - ARCHITECTS - PLANNERS
1565 CARLING AVENUE, SUITE 700, OTTAWA, ON K2K 6R1

KEY PLAN
Stantec
1331 CLYDE AVENUE, SUITE 400, OTTAWA, ON K2C 3G4

NO	REVISIONS	DATE
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

NOTE
IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON THE SITE AND TO REPORT ALL ERRORS AND/OR OMISSIONS TO THE ARCHITECT. ALL CONTRACTORS MUST COMPLY WITH ALL PERTINENT CODES AND BY-LAWS. DO NOT SCALE DRAWINGS.

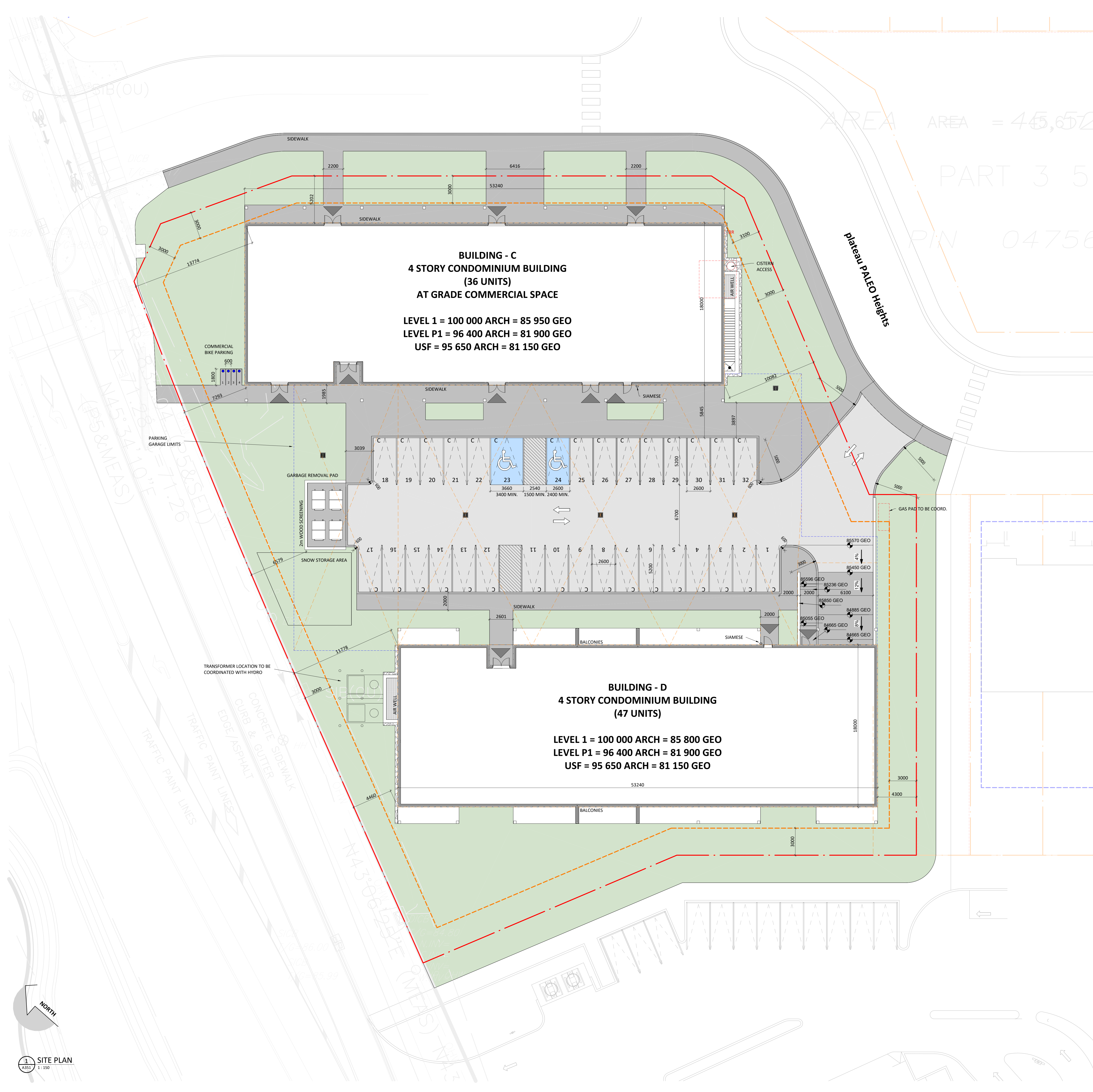
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DO NOT USE FOR CONSTRUCTION

DATE	DESIGNED
2024-07-17	P.POMERLEAU
DATE	DRAWN
	P.POMERLEAU
PROJECT NO.	CHECKED
2054	P.MARTIN
SHEET TITLE	
GLOBAL SITE PLAN	

SHEET NO.
A100

Autodesk Docs://NAVAN ROAD/2054_DEV/NAVAN SITE PLAN_LR24.rvt



LEGEND - SITE PLAN

- LOT LINE
- SETBACKS
- ELECTRICAL LINE
- EASEMENTS
- 0000 GEO - ÉLEVATION GÉODÉSIQUE
- EXISTING BUILDING
- DEMOLISHED BUILDING
- EXISTING TREE
- DEMOLISHED TREE
- NEW TREE
- NEW PLANT
- GRASS
- PEA GRAVEL
- SIDEWALK
- ASPHALT
- RADIANT ZONE
- LANDSCAPED AREA

AREA = 45,652
 PART 3 5F
 PIN 04756

BUILDING - C
4 STORY CONDOMINIUM BUILDING
(36 UNITS)
AT GRADE COMMERCIAL SPACE
 LEVEL 1 = 100 000 ARCH = 85 950 GEO
 LEVEL P1 = 96 400 ARCH = 81 900 GEO
 USF = 95 650 ARCH = 81 150 GEO

BUILDING - D
4 STORY CONDOMINIUM BUILDING
(47 UNITS)
 LEVEL 1 = 100 000 ARCH = 85 800 GEO
 LEVEL P1 = 96 400 ARCH = 81 900 GEO
 USF = 95 650 ARCH = 81 150 GEO

PROJECT
NAVAN ROAD DEVELOPMENT
 2983, Navan Road, Orleans, ON K1C 7G4
 OWNER
Heafey GROUP
 788, BOUL. SAINT-JOSEPH, SUITE 100
 GATINEAU, QC J8Y 4B8
 ARCHITECTURAL
PMA ARCHITECTES
 (418) 851-9954
 INFO@PMAARCHITECTES.COM
 3070, CHEMIN DES QUATRE-BORGEONS
 QUÉBEC (QC) G1W 2W4
 PMAARCHITECTES.COM
L'Atelier architectes
 53, BOUL. SAINT-RAYMOND,
 GATINEAU, QC J8Y 1R8
 CIVIL ENGINEERS / PLANNER
J.L. Richards
 ENGINEERS - ARCHITECTS - PLANNERS
 1565 CARLING AVENUE, SUITE 700,
 OTTAWA, ON K1Z 8R1
 MECHANICAL & ELECTRICAL ENGINEERS
M&E ENGINEERING
 9 GURDWARA ROAD, UNIT 200,
 OTTAWA, ON K2E 7X6
 SURVEYOR
Stantec
 1331 CLYDE AVENUE, SUITE 400,
 OTTAWA, ON K2C 3G4
 ARCHITECT SEAL

REVISIONS

NO	DESCRIPTION	DATE
1	FOR CITY REVIEW	2024-07-17
2	FOR CITY REVIEW	2024-08-31
3	FOR CITY REVIEW	2024-09-17

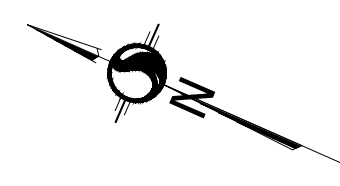
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DATE 2024-07-17	DESIGNED P.POMERLEAU
PROJECT No 20554	DRAWN P.POMERLEAU
	CHECKED P.MARTIN
	SHEET TITLE SITE PLAN - BLOCK 15

Autodesk Docs://NAVAN ROAD/20551_DEV/NAVAN_CONDO_15_R04.rvt

44-20-2033



PAGE ROAD
ROAD ALLOWANCE BETWEEN LOTS 5 & 6 (AS WIDENED)
PIN 04404-0409

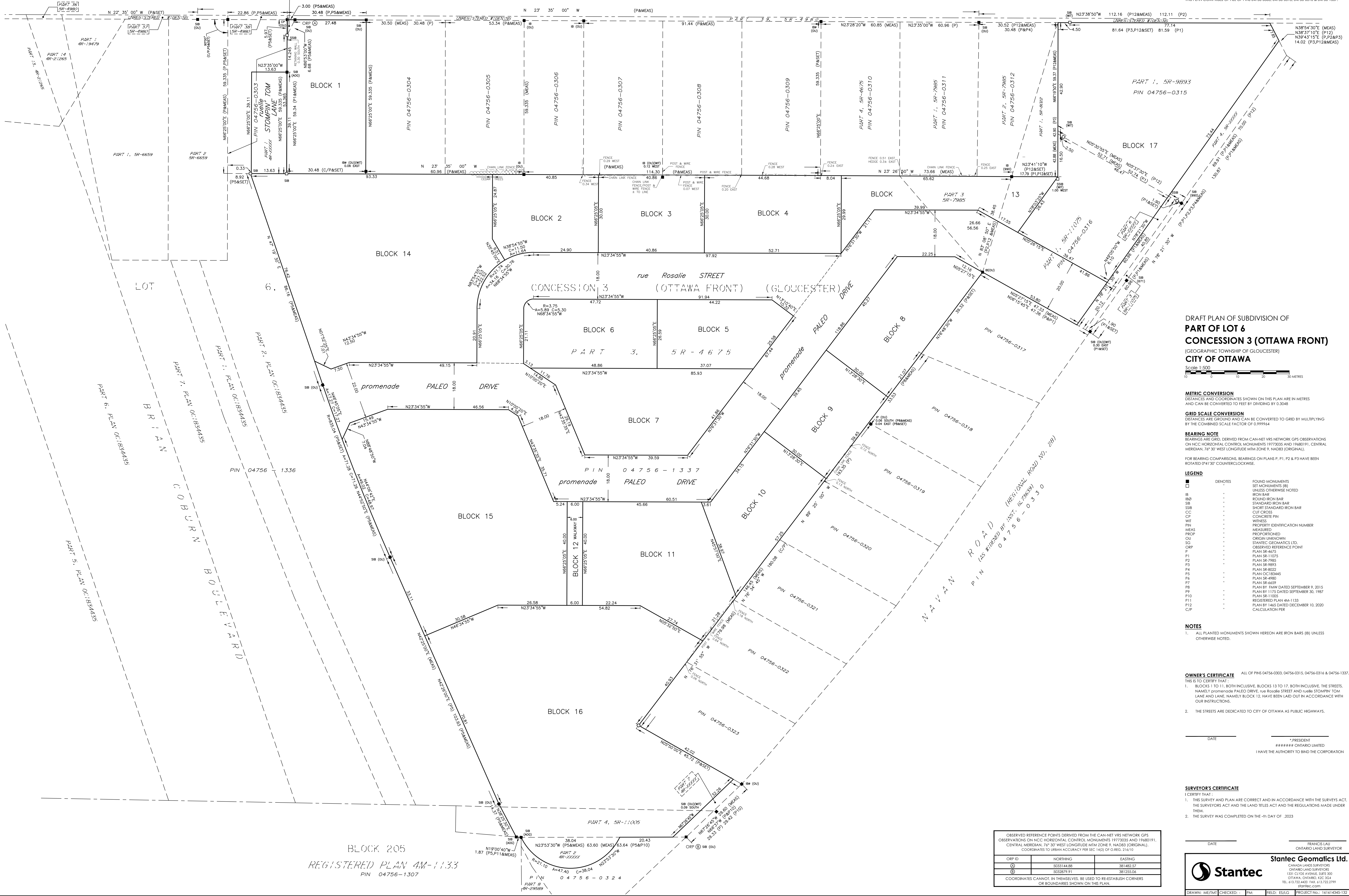
APPROVED UNDER SECTION 51 OF THE PLANNING ACT BY THE
CITY OF OTTAWA THIS ____ DAY OF _____ 20__

DON HERWEYER, M.C.P., R.P.P., ACTING GENERAL
MANAGER PLANNING, REAL ESTATE AND
ECONOMIC DEVELOPMENT DEPARTMENT,
CITY OF OTTAWA

PLAN 4M-

I HEREBY CERTIFY THAT THIS PLAN 4M-_____ IS REGISTERED IN THE
LAND REGISTRY OFFICE FOR THE LAND TITLES DIVISION OF
OTTAWA-CARLETON (No. 4) AT _____ O'CLOCK ON THE _____ DAY OF
_____ 2023 AND ENTERED IN THE REGISTER FOR P.L.N.'s
04756-0303, 04756-0315, 04756-0316 & 04756-1337, AND THE REQUIRED
CONSENTS ARE REGISTERED AS PLAN DOCUMENT NUMBER
OC-_____
REPRESENTATIVE FOR LAND REGISTRAR

THIS PLAN COMPRISES OF ALL OF PINS 04756-0303, 04756-0315, 04756-0316 & 04756-1337.



DRAFT PLAN OF SUBDIVISION OF
**PART OF LOT 6
CONCESSION 3 (OTTAWA FRONT)**
(GEOGRAPHIC TOWNSHIP OF GLOUCESTER)
CITY OF OTTAWA

Scale 1:500

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

GRID SCALE CONVERSION
DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING
BY THE COMBINED SCALE FACTOR OF 0.999964

BEARING NOTE
BEARINGS ARE GRID, DERIVED FROM CAN-NET VRS NETWORK GPS OBSERVATIONS
ON NCC HORIZONTAL CONTROL MONUMENTS 1977035 AND 1980191, CENTRAL
MERIDIAN, 76° 30' WEST LONGITUDE MAM ZONE 9, NAD83 (ORIGINAL).

FOR BEARING COMPARISONS, BEARINGS ON PLANS P. 1, P. 2 & P. 3 HAVE BEEN
ROTATED 0°41'30" COUNTERCLOCKWISE.

LEGEND

SYMBOL	DENOTES	FOUND MONUMENTS
□	SET MONUMENTS (B)	SET MONUMENTS (B)
○	UNLESS OTHERWISE NOTED	UNLESS OTHERWISE NOTED
IB	IRON BAR	IRON BAR
IBD	ROUND IRON BAR	ROUND IRON BAR
SB	STANDARD IRON BAR	STANDARD IRON BAR
SIB	SHORT STANDARD IRON BAR	SHORT STANDARD IRON BAR
CC	CUT CROSS	CUT CROSS
CF	CONCRETE PIN	CONCRETE PIN
WIT	WITNESS	WITNESS
FIN	PROPERTY IDENTIFICATION NUMBER	PROPERTY IDENTIFICATION NUMBER
MEAS	MEASURED	MEASURED
PROP	PROPORTIONED	PROPORTIONED
CU	CORNER UNDERNOWN	CORNER UNDERNOWN
SG	STANTEC GEOMATICS LTD.	STANTEC GEOMATICS LTD.
CRP	OBSERVED REFERENCE POINT	OBSERVED REFERENCE POINT
P1	PLAN SR-4675	PLAN SR-4675
P2	PLAN SR-7995	PLAN SR-7995
P3	PLAN SR-8893	PLAN SR-8893
P4	PLAN SR-8822	PLAN SR-8822
P5	PLAN OC18345	PLAN OC18345
P6	PLAN SR-4993	PLAN SR-4993
P7	PLAN SR-6659	PLAN SR-6659
P8	PLAN BY FIRM DATED SEPTEMBER 9, 2015	PLAN BY FIRM DATED SEPTEMBER 9, 2015
P9	PLAN BY 1175 DATED SEPTEMBER 30, 1987	PLAN BY 1175 DATED SEPTEMBER 30, 1987
P10	PLAN SR-11025	PLAN SR-11025
P11	REGISTERED PLAN 4M-1133	REGISTERED PLAN 4M-1133
P12	PLAN BY 1465 DATED DECEMBER 10, 2020	PLAN BY 1465 DATED DECEMBER 10, 2020
C/P	CALCULATION PIN	CALCULATION PIN

NOTES

1. ALL PLANTED MONUMENTS SHOWN HEREON ARE IRON BARS (B) UNLESS OTHERWISE NOTED.

OWNER'S CERTIFICATE

ALL OF PINS 04756-0303, 04756-0315, 04756-0316 & 04756-1337.

1. BLOCKS 1 TO 11, BOTH INCLUSIVE, BLOCKS 13 TO 17, BOTH INCLUSIVE, THE STREETS, NAMELY PROMENADE PALEO DRIVE, rue Rosalie STREET and rue STONPIN TOM LANE and LANE, NAMELY BLOCK 12, HAVE BEEN Laid OUT IN ACCORDANCE WITH OUR INSTRUCTIONS.

2. THE STREETS ARE DEDICATED TO CITY OF OTTAWA AS PUBLIC HIGHWAYS.

DATE _____ PRESIDENT
ONTARIO LIMITED
I HAVE THE AUTHORITY TO BIND THE CORPORATION

SURVEYOR'S CERTIFICATE

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

2. THE SURVEY WAS COMPLETED ON THE ____ DAY OF _____ 2023.

DATE _____ FRANCIS LAU
ONTARIO LAND SURVEYOR

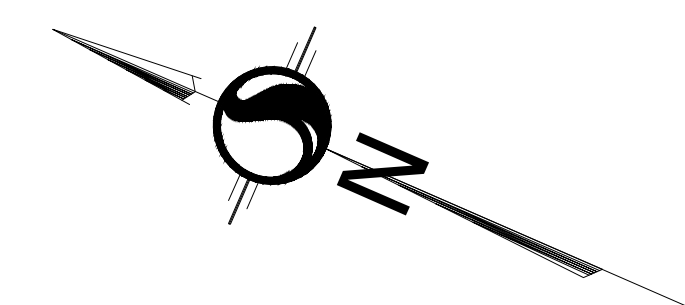
Stantec CANADA LAND SURVEYORS
ONTARIO LAND SURVEYORS
1331 CYCLE AVENUE, SUITE 300
OTTAWA, ONTARIO, CANADA K1C 3Z4
TEL: 416-752-4400 FAX: 416-752-2799
dgn@stn.com

OBSERVED REFERENCE POINTS DERIVED FROM THE CAN-NET VRS NETWORK GPS OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 1977035 AND 1980191, CENTRAL MERIDIAN, 76° 30' WEST LONGITUDE MAM ZONE 9, NAD83 (ORIGINAL). COORDINATES TO UTM ACCURACY PER SEC 1463.05 REG. 314115

CRP ID	NORTHING	EASTING
①	9333144.68	381482.57
②	9332879.91	381255.06

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

BLOCK 205
REGISTERED PLAN 4M-1133
PIN 04756-1307



PAGE ROAD

PIN 04756-0409



TOPOGRAPHIC SKETCH OF
**PART OF LOT 6
CONCESSION 3 (OTTAWA FRONT)**
(GEOGRAPHIC TOWNSHIP OF GLOUCESTER)
CITY OF OTTAWA

Scale 1:500

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

GRID SCALE CONVERSION
DISTANCES ARE GIVEN AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE
CORRECTIONAL FACTOR OF 0.99994

BEARING NOTE
BEARINGS ARE AZIMUTHIC AND ARE REFERRED TO THE WESTERLY LIMIT OF PAGE ROAD,
AS SHOWN ON PLAN SR-11075, HAVING A BEARING OF 272°23'30" W.

ELEVATION NOTE
ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928/1978) AND ARE DERIVED FROM THE
CANADIAN VEG NETWORK

LEGEND (IF APPLICABLE)

- DEVIOTES
- FOUND MONUMENTS
- IRON BAR
- ROUND IRON BAR
- STANDARD IRON BAR
- SHORT STANDARD IRON BAR
- CUT CROSS
- CONCRETE PIN
- WITNESS
- PROPERTY IDENTIFICATION NUMBER
- MEASURED
- PROPORTIONED
- ORIGIN UNKNOWN
- STANTIC GEOMETRICAL ID.
- OBSERVED REFERENCE POINT
- PLAN SR-11075
- PLAN SR-11075
- PLAN SR-8993
- PLAN SR-9092
- PLAN OC-18345
- PLAN OC-4916
- PLAN SR-8659
- PLAN BY 1175 DATED SEPTEMBER 9, 2015
- PLAN BY 1175 DATED SEPTEMBER 30, 1987
- REGISTERED PLAN 446-1133
- CALCULATION
- AIR CONDITIONING UNIT
- ANCHOR
- AIR FLUPE
- ANTENNA
- BORERHOLE
- BRUSH
- BRIK RACK
- BROAD
- BOLLARD
- BENCH
- CATCH BASIN
- CEILING
- CHIMNEY
- CHIMNEY
- CONCRETE
- CORNER
- CORNER
- CORNER
- CURB STOP
- DRAIN
- ELECTRICAL OUTLET
- FLAG POLE
- FLOOD LIGHT
- GAS VALVE
- FUEL TANK FILLER CAP
- GAS TIE TRUMP
- PIPE FLANGE (GAS)
- POST
- POST
- POST
- POLE GLYVRE
- GAS SERVICE REGULATOR
- GAS VALVE
- HEADBOTTOM
- HEADSTONE
- LIGHT STAKE/HAND HYDRO
- HYDRO METER
- HYDRO TRANSFORMER
- HAND WELL
- PILE HYDRO
- JUNCTION BOX
- MANHOLE
- MOUNDING PIN
- MAINTENANCE HOLE UNIDENTIFIED
- MAINTENANCE HOLE BELL
- MAINTENANCE HOLE FIBRE OPTIC
- MAINTENANCE HOLE HYDRO
- MAINTENANCE HOLE INVERT
- MAINTENANCE HOLE SANITARY
- MAINTENANCE HOLE SIGN
- MAINTENANCE HOLE TRAFFIC
- MONITORING WEL
- NEWS PAPER BOX
- LIGHT STAND/ORNAMENTAL
- OBSERVATION WELL
- PARALLEL METER
- FULL BOX
- FILLER
- FILLER
- FILLER
- FREEZEMETER
- RED LIGHT CAMERA
- RAILWAY SIGNAL LIGHT
- RAILWAY SWITCH STAND
- SATELLITE DOME
- SOLIFLUE
- SNOW/ICE LIGHT
- SPRINKLER CONTROL VALVE
- SPRINKLER HEAD
- SIAMENSE CONNECTION
- SOLAR PANEL
- SOLAR PANEL
- SOLAR PANEL
- TERMINAL BOX BELL
- TERMINAL BOX - CABLE
- TERMINAL BOX
- TRAFFIC SIGNAL LIGHT
- MARKER BELL UNDERGROUND
- MARKER CABLE UNDERGROUND
- NATURAL GAS LOCATE
- UTILITY POLE
- VALVE BOX
- VALVE CHAMBER
- WATER VALVE
- TREE CONIFEROUS @ centimetres
- TREE DECIDUOUS @ centimetres

UPDATE NOTE:
1. TOPOGRAPHIC INFORMATION SHOWN HEREON UPDATED PER FIELD
SURVEY DATED AUGUST 1, 2023.

DATE FRANCIS LAU
ONARIO LAND SURVEYOR

UPDATE NOTE:
1. TOPOGRAPHIC INFORMATION SHOWN HEREON UPDATED PER FIELD
SURVEY DATED MARCH 29, 2022.

DATE FRANCIS LAU
ONARIO LAND SURVEYOR

SURVEYOR'S CERTIFICATE
I CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS
ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM;
2. THE SURVEY WAS COMPLETED ON THE 14TH DAY OF DECEMBER, 2020.

DATE FRANCIS LAU
ONARIO LAND SURVEYOR

DATE FRANCIS LAU
ONARIO LAND SURVEYOR

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SRO C00003: 21.381.388 v1 | 502979

Appendix B

Pre Consultation Meeting Notes
and Site Servicing Report
Checklist

Carmine Zayoun
12714001 Canada Inc (Zayoun Group)
Via email: carmine@zayoungroup.com

**Subject: Pre-Consultation: Meeting Feedback
Proposed Site Plan Application – 2983 Navan Road
Four residential and two mixed-use buildings – PC2023-0226**

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on September 13, 2023.

Pre-Consultation Preliminary Assessment

1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input checked="" type="checkbox"/>	5 <input type="checkbox"/>
----------------------------	----------------------------	----------------------------	---------------------------------------	----------------------------

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

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. Please proceed to complete a Phase 2 / Phase 3 Pre-consultation Application Form and submit it together with the necessary studies and/or plans to planningcirculations@ottawa.ca.
2. In your subsequent pre-consultation submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.
3. Please note, if your development proposal changes significantly in scope, design, or density before the Phase 3 pre-consultation, you may be required to complete or repeat the Phase 2 pre-consultation process.

Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.
 - a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline

the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

1. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Planning

Comments:

1. In the Official Plan the subject site is designated as Neighbourhood is modified with the Evolving Neighbourhood overlay. Brian Coburn Boulevard is also designated as a Minor Corridor. The property is further identified as Low-density residential in the EUC – Phases 1 Community Design Plans (CDP). The subject lands are currently zoned GM[2546]H(14.5) General Mixed-Use, Exception and DR Development Reserve.

2. Committee of Adjustment

No variances have been identified at this point. I would be supportive of reducing the parking requirement for the residential units if it will result in addition landscaping and tree cover. Staff will set up a meeting with a Committee of Adjustment Plan if any required.

3. Design guidelines

The following guidelines are meant as a starting place to help guide the design. I realize that they are specifically related to your project. [Urban Design Guidelines for Low-rise Infill Housing](#)

4. Landscape requirements

All required yards are to be landscaped with parking located between the buildings. Green spaces and tree canopy needs to be maximized.

5. Parking requirements

Parking should comply with Sections 100, 101, 106, 109 and 111

Vehicle and bicycle parking should be situated with easily access while minimizing pavement.

6. Easements

Will there be any easements required?

7. Commercial units should be orientated to the streets as much as possible.
8. Provide locations of signage and ensure that space is made available for tree planting

Urban Design

9. This proposal does not run along or does not meet the threshold in one of the City's Design Priority Areas and need not attend the City's UDRP. Staff will be responsible for evaluating the Urban Design Brief and providing design direction.
10. An Urban Design Brief is a required submittal Re-zoning applications. The Urban Design Brief should be structured by generally following the headings highlighted under Section 3 – Contents of these Terms of Reference. Please see the Urban Design Brief Terms of Reference provided.
11. We recommend further detail be provided about the low-rise apartments to better understand their relationship to the surrounding buildings and properties.
12. If this site is located outside the greenbelt, a shadow analysis will be required.
13. We recommend the low-rise buildings fronting City streets consider grade related units accessed from the street to further 'fit-in' with the surrounding low-rise residential community where feasible.
14. We recommend additional landscaping detail be provided around the low-rise apartments to better understand how the buildings relate to their context.
15. We recommend additional detail be provided of the front yards of the townhouse units facing City streets to better understand how they will integrate with the public realm.
16. We recommend tree planting in front yards facing public right-of-way.
17. When a wind and/or shadow studies are required please refer to the Terms of Reference for the wind analysis and shadow analysis to conduct the studies and evaluate the impacts.
18. Note. The Urban Design Brief submittal should have a section which addresses these pre-consultation comments.

This is an exciting project in an area full of potential. We look forward to helping you achieve its goals with the highest level of design resolution. We are happy to assist and answer any questions regarding the above. Feel free to contact the Urban Design Planner, Christopher Moise, at Christopher.Moise@ottawa.ca, for follow-up questions

Engineering

Comments:

19. The Stormwater Management Criteria, for the subject site, is to be based on the following:
 - a. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
 - b. For separated sewer system built pre-1970 the design of the storm sewers are based on a 2 year storm.
 - c. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
 - d. A calculated time of concentration (Cannot be less than 10 minutes).
 - e. Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.
 - f. For a combined sewer system the maximum $C = 0.4$ or the pre-development C value, whichever is less. In the absence of other information the allowable release rate shall be based on a 2 year storm event.
20. Deep Services (Storm, Sanitary & Water Supply)
 - a. Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.
 - b. Connections to trunk sewers and easement sewers are typically not permitted.
 - c. Provide information on the monitoring manhole requirements – should be located in an accessible location on private property near the property line (ie. Not in a parking area).
 - d. Review provision of a high-level sewer.

- e. Sewer connections to be made above the springline of the sewermain as per:
 - i. Std Dwg S11.1 for flexible main sewers – connections made using approved tee or wye fittings.
 - ii. Std Dwg S11 (For rigid main sewers) – lateral must be less than 50% the diameter of the sewermain,
 - iii. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – for larger diameter laterals where manufactured inserts are not available; lateral must be less than 50% the diameter of the sewermain,
 - iv. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.
 - v. No submerged outlet connections.

21. Water Boundary condition requests must include the location of the service (map or plan with connection location(s) indicated) and the expected loads required by the proposed development, including calculations. Please provide the following information:

no BCR will be requested for res site plans, no watermains built, navaan connection already provided as part of subdivision

- a. Location of service
- b. Type of development and the amount of fire flow required (as per FUS).
- c. Average daily demand: ___ l/s.
- d. Maximum daily demand: ___ l/s.
- e. Maximum hourly daily demand: ___ l/s.

22. An MECP Environmental Compliance Approval **[Industrial Sewage Works or Municipal/Private Sewage Works]** will be required for the proposed development. Please contact the Ministry of the Environment, Conservation and Parks, Ottawa District Office to arrange a pre-submission consultation:

a. Charlie Primeau at (613) 521-3450, ext. 251 or Charlie.Primeau@ontario.ca

b. Emily Diamond at (613) 521-3450, ext. 238 or Emily.Diamond@ontario.ca

General Comments:

23. Review of the Phase 3 submission for this application will not occur until the detailed design of the subdivision that it is within (D07-16-21-0027) is approved.
24. At the stage of site plan approval, a condition will be imposed detailing that a commence work notification will not be issued until the subdivision's infrastructure is in-service.
25. Engineering Studies:
26. All engineering studies (detailed in the Study and Plan Identification List form) are to follow the to be approved draft plan of subdivision D07-16-21-0027

Feel free to contact **Derek Unrau, Infrastructure Project Manager**, for follow-up questions.

Noise

Comments:

27. Noise report is required to identify and mitigate traffic noise from **Brian Coburn Boulevard and Navan Road**

Feel free to contact the Senior Transportation Engineer, Mike Giampa, at Mike.Giampa@ottawa.ca , for follow-up questions.

Transportation

Comments:

- a. A full TIA is not required as this site is covered under the recent subdivision TIA.
- b. **A memo including the pertinent subdivision trips is sufficient.**
- c. The right of way protection on Brian Coburn and Navan Roads is 40m and 37.5m, respectively

Feel free to contact the Senior Transportation Engineer, Mike Giampa, at Mike.Giampa@ottawa.ca , for follow-up questions.

Planning Forestry

Comments:

28. A Tree Conservation Report and Landscape Plan must be submitted with both SPC applications
29. A permit is required prior to any tree removal on site. The tree permit will be released upon site plan approval. Please contact the File Lead or the Planning Forester, Hayley Murray (hayley.murray@ottawa.ca) for information on obtaining the tree permit.
30. If marine clay soils are present, setbacks on City properties must adhere to the 2017 SMC guidelines (attached). The Geotechnical report must address the implications of these soils, if present, on tree planting in relation to private land.
31. If underground parking is planned, a design must be provided for the site to support tree planting
32. We expect a very strong landscape plan to re-establish canopy cover across the properties. Tree planting and protecting existing urban forest canopy is imperative to reach the City's target of 40% canopy cover.

Feel free to contact Hayley Murray, Planning Forester, for follow-up questions.

Parkland

Comments:

33. Parkland contributions were made through the Subdivision process.

Feel free to contact Jessica Button, Parks Planner, for follow-up questions

Conservation Authority

Comments:

34. The Rideau Valley Conservation authority will be commenting on this application

Feel free to contact RVCA, for follow-up questions.

Other

35. The High Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building projects to achieve sustainable and resilient design. The HPDS was passed by Council on April 13, 2022.



- a. At this time, the HPDS is not in effect and Council has referred the 2023 HPDS Update Report back to staff with direction to bring forward an updated report to Committee with recommendations for revised phasing timelines, resource requirements and associated amendments to the Site Plan Control By-law by no later than Q1 2024.
- b. Please refer to the HPDS information attached and ottawa.ca/HPDS for more information.

Submission Requirements and Fees

1. Outlines the application type/subtype required and the associated fees
 - a. Additional information regarding fees related to planning applications can be found [here](#).
2. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.
 - a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
3. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,
Steve Belan

cc.

Tim Chadder
Raad Akrawi
Madelen Fellows
Karla Ferrey
Tatyana Roumie
Christopher Moise
Derek Unrau
Mike Giampa
Haley Murray
Jessica Button

12714001 Canada Inc – Mixed Use Site Plan (Block 15)
2983, 3053 and 3079 Navan Road & 2690 Pagé Road
SITE SERVICING REPORT CHECKLIST

REFERENCED STUDIES AND REPORTS	REFERENCE
Site Servicing Report for 12714001 Canada Inc, Mixed Used Site Plan (Block 15) 2983, 3053 and 3079 Navan Road & 2690 Pagé Road (J.L. Richards & Associates Limited, December 8, 2023)	Site Servicing Report

4.1	GENERAL CONTENT	REFERENCE
<input type="checkbox"/>	Executive Summary (for larger reports only).	N/A
<input checked="" type="checkbox"/>	Date and revision number of the report.	Site Servicing Report
<input checked="" type="checkbox"/>	Location map and plan showing municipal address, boundary, and layout of proposed development.	Site Servicing Report (Appendix A) All Drawings
<input checked="" type="checkbox"/>	Plan showing the site and location of all existing services.	Servicing Plan
<input checked="" type="checkbox"/>	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Site Servicing Report
<input checked="" type="checkbox"/>	Summary of Pre-consultation Meetings with City and other approval agencies.	Site Servicing Report (Appendix 'A')
<input checked="" type="checkbox"/>	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria.	Reference made to Stantec 2005 EUC ISSU
<input checked="" type="checkbox"/>	Statement of objectives and servicing criteria.	Site Servicing Report
<input checked="" type="checkbox"/>	Identification of existing and proposed infrastructure available in the immediate area.	Site Servicing Report Servicing Plan
<input type="checkbox"/>	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A

<input checked="" type="checkbox"/>	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Grading Plan
<input type="checkbox"/>	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
<input type="checkbox"/>	Proposed phasing of the development, if applicable.	N/A
<input checked="" type="checkbox"/>	Reference to geotechnical studies and recommendations concerning servicing.	Site Servicing Report and Drawings
<input checked="" type="checkbox"/>	All preliminary and formal site plan submissions should have the following information: <ul style="list-style-type: none"> ▪ Metric scale ▪ North arrow (including construction North) ▪ Key plan ▪ Name and contact information of applicant and property owner ▪ Property limits, including bearings and dimensions ▪ Existing and proposed structures and parking areas ▪ Easements, road widening and rights-of-way ▪ Adjacent street names 	All Drawings

4.2	SITE SERVICING REPORT: WATER	REFERENCE
<input type="checkbox"/>	Confirm consistency with Master Servicing Study, if available.	N/A
<input checked="" type="checkbox"/>	Availability of public infrastructure to service proposed development.	Site Servicing Report (Section 2.0) Servicing Plan
<input checked="" type="checkbox"/>	Identification of system constraints.	Site Servicing Report (Section 2.0) Servicing Plan
<input checked="" type="checkbox"/>	Identify boundary conditions.	Site Servicing Report (Section 2.0)
<input checked="" type="checkbox"/>	Confirmation of adequate domestic supply and pressure.	Site Servicing Report (Section 2.0)
<input checked="" type="checkbox"/>	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Site Servicing Report (Section 2.0)
<input checked="" type="checkbox"/>	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Site Servicing Report (Section 2.0)

<input type="checkbox"/>	Definition of phasing constraints. Hydraulic modelling is required to confirm servicing for all defined phases of the project, including the ultimate design.	N/A
<input checked="" type="checkbox"/>	Address reliability requirements, such as appropriate location of shutoff valves.	Site Servicing Report (Section 2.0)
<input type="checkbox"/>	Check on the necessity of a pressure zone boundary modification.	N/A
<input checked="" type="checkbox"/>	Reference to water supply analysis to show that major infrastructure can deliver sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Site Servicing Report (Section 2.0)
<input checked="" type="checkbox"/>	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants), including special metering provisions.	Site Servicing Report (Section 2.0) Servicing Plan
<input type="checkbox"/>	Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
<input checked="" type="checkbox"/>	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Site Servicing Report (Section 2.0)
<input checked="" type="checkbox"/>	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Site Servicing Report (Section 2.0)

4.3	SITE SERVICING REPORT: WASTEWATER	REFERENCE
<input checked="" type="checkbox"/>	Summary of proposed design criteria (Note: Wet weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Site Servicing Report (Section 3.0,
<input type="checkbox"/>	Confirm consistency with Master Servicing Study and/or justifications for deviations.	Stantec 2005 EUC ISSU
<input type="checkbox"/>	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the Guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
<input checked="" type="checkbox"/>	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Site Servicing Report (Section 3.0) Servicing Plan

<input checked="" type="checkbox"/>	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable.)	Site Servicing Report (Section 3.0)
<input checked="" type="checkbox"/>	Calculations related to dry weather and wet weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Site Servicing Report (Section 3.0)
<input checked="" type="checkbox"/>	Description of proposed sewer network, including sewers, pumping stations and forcemains.	Site Servicing Report (Section 3.0) Servicing Plan
<input type="checkbox"/>	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A
<input type="checkbox"/>	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
<input type="checkbox"/>	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
<input type="checkbox"/>	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
<input type="checkbox"/>	Special considerations, such as contamination, corrosive environment, etc.	N/A

4.4	SITE SERVICING REPORT: STORMWATER	REFERENCE
<input checked="" type="checkbox"/>	Description of drainage outlets and downstream constraints, including legality of outlets (i.e., municipal drain, right-of-way, watercourse, or private property).	Site Servicing Report (Section 4.0)
<input checked="" type="checkbox"/>	Analysis of available capacity in existing public infrastructure.	Site Servicing Report (Section 4.0)
<input checked="" type="checkbox"/>	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Servicing, Grading and Drainage Plans
<input checked="" type="checkbox"/>	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Site Servicing Report (Section 4.0)

<input checked="" type="checkbox"/>	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Site Servicing Report (Section 4.0)
<input checked="" type="checkbox"/>	Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Site Servicing Report (Section 4.0) Servicing, Grading and Drainage Plans
<input type="checkbox"/>	Setback from private sewage disposal systems.	N/A
<input type="checkbox"/>	Watercourse and hazard lands setbacks.	N/A
<input checked="" type="checkbox"/>	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Site Servicing Report (Appendix 'A')
<input type="checkbox"/>	Confirm consistency with subwatershed and Master Servicing Study, if applicable study exists.	Stantec 2005 EUC ISSU
<input checked="" type="checkbox"/>	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:2 year return period) and major events (1:100 year return period).	Site Servicing Report (Section 4.0)
<input type="checkbox"/>	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
<input checked="" type="checkbox"/>	Calculate pre- and post-development peak flow rates, including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Site Servicing Report (Section 4.0)
<input checked="" type="checkbox"/>	Any proposed diversion of drainage catchment areas from one outlet to another.	Site Servicing Report (Section 4.0)
<input checked="" type="checkbox"/>	Proposed minor and major systems, including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Servicing, Grading and Drainage Plans
<input type="checkbox"/>	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	Quantity control proposed per Site Servicing Report (Section 4.0)
<input type="checkbox"/>	Identification of potential impacts to receiving watercourses.	N/A
<input type="checkbox"/>	Identification of municipal drains and related approval requirements.	N/A
<input checked="" type="checkbox"/>	Description of how the conveyance and storage capacity will be achieved for the development.	Site Servicing Report (Section 4.0)

<input checked="" type="checkbox"/>	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Site Servicing Report (Section 4.0) Servicing, Grading and Drainage Plans
<input checked="" type="checkbox"/>	Inclusion of hydraulic analysis, including hydraulic grade line elevations.	Site Servicing Report (Section 4.0)
<input checked="" type="checkbox"/>	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Site Servicing Report (Section 5.0) Servicing Plan
<input type="checkbox"/>	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
<input type="checkbox"/>	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5	APPROVAL AND PERMIT REQUIREMENTS	REFERENCE
The Site Servicing Report shall provide a list of applicable permits and regulatory approvals necessary for the proposed development, as well as the relevant issues affecting such approval. The approval and permitting shall include but not be limited to the following:		
<input type="checkbox"/>	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams, as defined in the Act.	N/A
<input type="checkbox"/>	Application for Environmental Compliance Approval (ECA) under the Ontario Water Resources Act.	As part of future submission
<input type="checkbox"/>	Changes to Municipal Drains.	N/A
<input type="checkbox"/>	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation, etc.).	N/A

4.6	CONCLUSION CHECKLIST	REFERENCE
<input checked="" type="checkbox"/>	Clearly stated conclusions and recommendations.	Site Servicing Report
<input checked="" type="checkbox"/>	Comments received from review agencies, including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	Not yet applicable

<input checked="" type="checkbox"/>	All draft and final reports shall be signed and stamped by a Professional Engineer registered in Ontario.	Site Servicing Report All Drawings

Appendix C

Water Servicing

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : NAVAN ROAD DEVELOPMENT PROJECT
LOCATION : CITY OF OTTAWA
DEVELOPER : 12714001 Canada Inc.

NODE	RESIDENTIAL			NON-RESIDENTIAL	AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			PEAK HOUR DEMAND (l/s)		
	UNITS		POP'N	COMM	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total
	Townhouses (TH)	Condo Units (CU)		(ha.)									
J-23	0	83	149	0.09	0.48	0.03	0.52	1.21	0.05	1.26	2.66	0.08	2.74
TOTALS	0	83	149	0.09	0.48	0.03	0.52	1.21	0.05	1.26	2.66	0.08	2.74

ASSUMPTIONS			
RESIDENTIAL DENSITIES			
- Townhouse (TH)	2.7	p / p / u	AVG. DAILY DEMAND
			- Residential
			- Institutional
- Condo Units (CU)	1.8	p / p / u	- Commercial
			MAX. DAILY DEMAND
			- Residential
			- Institutional
			- Commercial
			MAX. HOURLY DEMAND
			- Residential
			- Institutional
			- Commercial

FUS Fire Flow Calculations

NAVAN ROAD DEVELOPMENT PROJECT - Commercial Building
(JLR 29899-002)

Step	Parameter	Value	Note
A	Type of Construction	Wood Frame	Building C (4 Story Mixed Use Condominium Building)
	Coefficient (C)	1.5	
B	Ground Floor Area	929 m ²	
C	Height in storeys	4 storeys	Basements are excluded.
	Total Floor Area	3716 m ²	
D	Fire Flow Formula	F=220C ^{1/4} A	
	Fire Flow	20116	L/min
	Rounded Fire Flow	20000	L/min
E	Occupancy Class	Limited Combustible	Residential buildings have a limited combustible occupancy.
	Occupancy Charge	-15%	
	Occupancy Increase or Decrease	-3000	
	Fire Flow	17000	
F	Sprinkler Protection	Automatic Fully Supervised	
	Sprinkler Credit	-50%	
	Decrease for Sprinkler	-8500	L/min
G	<i>North Side Exposure</i>		
	Exposing Wall:	Wood Frame	
	Exposed Wall:	Wood Frame	
	Length of Exposed Wall:	35.7	m
	Height of Exposed Wall:	4	storeys
	Length-Height Factor	142.9	m-storeys
	Separation Distance	26	m
	North Side Exposure Charge	10%	
	<i>East Side Exposure</i>		
	Exposing Wall:	Wood Frame	
	Exposed Wall:	Wood Frame	
	Length of Exposed Wall:	0.0	m
	Height of Exposed Wall:	0	storeys
	Length-Height Factor	0.0	m-storeys
	Separation Distance	50	m
	East Side Exposure Charge	0%	
	<i>South Side Exposure</i>		
	Exposing Wall:	Wood Frame	
	Exposed Wall:	Wood Frame	
	Length of Exposed Wall:	35.9	m
	Height of Exposed Wall:	4	storeys
	Length-Height Factor	143.5	m-storeys
	Separation Distance	26.89	m
	South Side Exposure Charge	10%	
	<i>West Side Exposure</i>		
	Exposing Wall:	Wood Frame	
	Exposed Wall:	Wood Frame	
	Length of Exposed Wall:	0.0	m
	Height of Exposed Wall:	0	storeys
	Length-Height Factor	0.0	m-storeys
Separation Distance	50	m	
West Side Exposure Charge	0%		
Total Exposure Charge	20%		The total exposure charge is below the maximum value of 75%.
Increase for Exposures	3400	L/min	
H	Fire Flow	11900	L/min
	Rounded Fire Flow	12000	L/min
City Cap	Required Fire Flow (RFF)	12000	L/min
		200	L/s

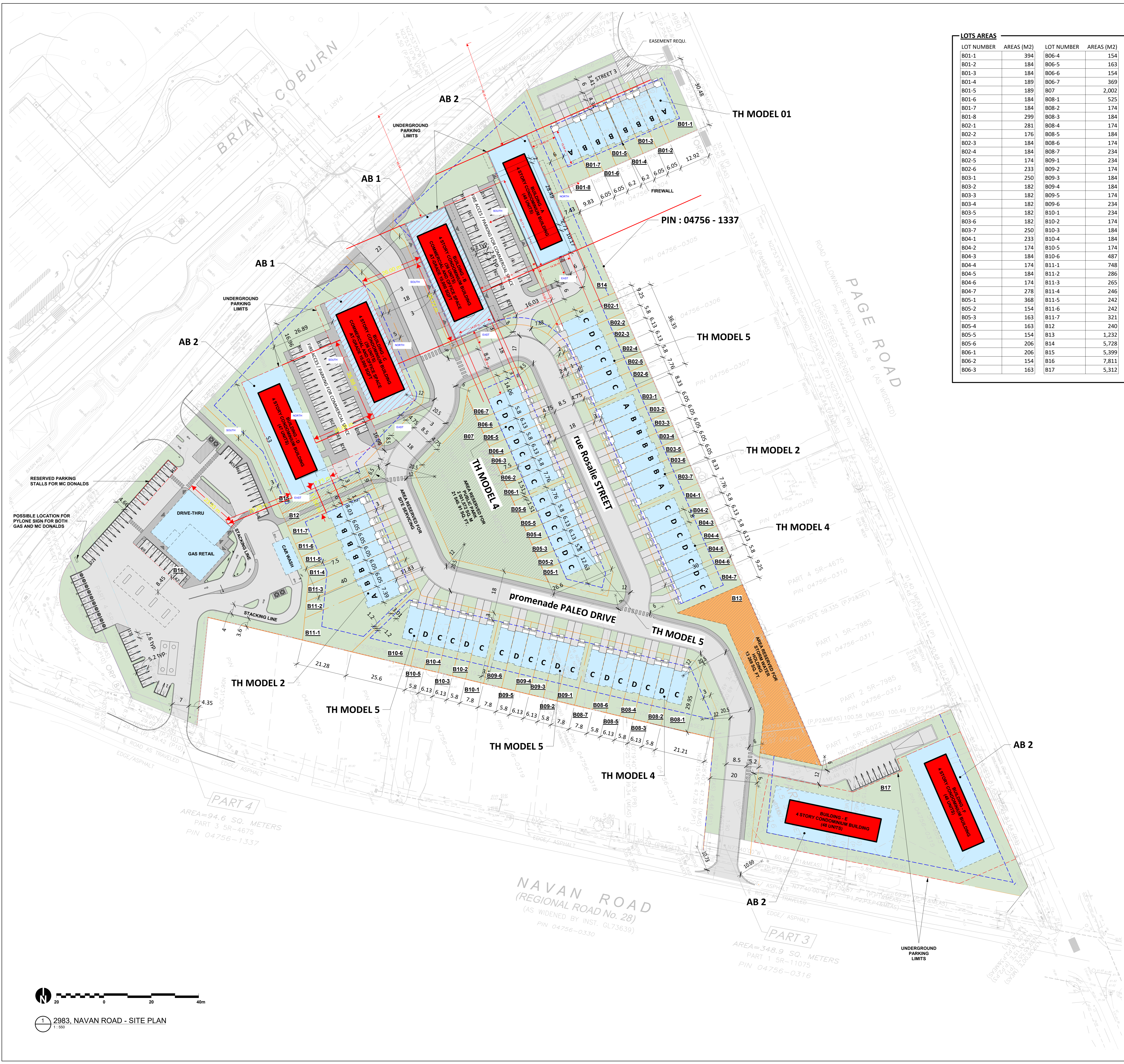
Fire Underwriters Survey (FUS) Fire Flow Calculations
In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

FUS Fire Flow Calculations

NAVAN ROAD DEVELOPMENT PROJECT - Commercial Building
(JLR 29899-002)

Step	Parameter	Value	Note
A	Type of Construction	Wood Frame	Building D (4 Story Mixed Use Condominium Building)
	Coefficient (C)	1.5	
B	Ground Floor Area	929 m ²	
C	Height in storeys	4 storeys	Basements are excluded.
	Total Floor Area	3716 m ²	
D	Fire Flow Formula	F=220C ^{1/4} A	
	Fire Flow	20116	L/min
	Rounded Fire Flow	20000	L/min
E	Occupancy Class	Limited Combustible	Residential buildings have a limited combustible occupancy.
	Occupancy Charge	-15%	
	Occupancy Increase or Decrease	-3000	
	Fire Flow	17000	
F	Sprinkler Protection	Automatic Fully Supervised	
	Sprinkler Credit	-50%	
	Decrease for Sprinkler	-8500	L/min
G	<i>North Side Exposure</i>		
	Exposing Wall:	Wood Frame	
	Exposed Wall:	Wood Frame	
	Length of Exposed Wall:	35.9	m
	Height of Exposed Wall:	4	storeys
	Length-Height Factor	143.5	m-storeys
	Separation Distance	26.89	m
	North Side Exposure Charge	10%	
	<i>East Side Exposure</i>		
	Exposing Wall:	Wood Frame	
	Exposed Wall:	Wood Frame	
	Length of Exposed Wall:	7.8	m
	Height of Exposed Wall:	2	storeys
	Length-Height Factor	15.5	m-storeys
	Separation Distance	11.5	m
	East Side Exposure Charge	12%	
	<i>South Side Exposure</i>		
	Exposing Wall:	Wood Frame	
	Exposed Wall:	Non-combustible	
	Length of Exposed Wall:	23.9	m
	Height of Exposed Wall:	1	storeys
	Length-Height Factor	23.9	m-storeys
	Separation Distance	32.28	m
	South Side Exposure Charge	5%	
	<i>West Side Exposure</i>		
	Exposing Wall:	Wood Frame	
	Exposed Wall:	Wood Frame	
Length of Exposed Wall:	0.0	m	
Height of Exposed Wall:	0	storeys	
Length-Height Factor	0.0	m-storeys	
Separation Distance	50	m	
West Side Exposure Charge	0%		
Total Exposure Charge	27%		The total exposure charge is below the maximum value of 75%.
Increase for Exposures	4590	L/min	
H	Fire Flow	13090	L/min
	Rounded Fire Flow	13000	L/min
City Cap	Required Fire Flow (RFF)	13000	L/min
		217	L/s

Fire Underwriters Survey (FUS) Fire Flow Calculations
In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018



LOTS AREAS			
LOT NUMBER	AREAS (M2)	LOT NUMBER	AREAS (M2)
B01-1	394	B06-4	154
B01-2	184	B06-5	163
B01-3	184	B06-6	154
B01-4	189	B06-7	369
B01-5	189	B07	2,002
B01-6	184	B08-1	525
B01-7	184	B08-2	174
B01-8	299	B08-3	184
B02-1	281	B08-4	174
B02-2	176	B08-5	184
B02-3	184	B08-6	174
B02-4	184	B08-7	234
B02-5	174	B09-1	234
B02-6	233	B09-2	174
B03-1	250	B09-3	184
B03-2	182	B09-4	184
B03-3	182	B09-5	174
B03-4	182	B09-6	234
B03-5	182	B10-1	234
B03-6	182	B10-2	174
B03-7	250	B10-3	184
B04-1	233	B10-4	184
B04-2	174	B10-5	174
B04-3	184	B10-6	487
B04-4	174	B11-1	748
B04-5	184	B11-2	286
B04-6	174	B11-3	265
B04-7	278	B11-4	246
B05-1	368	B11-5	242
B05-2	154	B11-6	242
B05-3	163	B11-7	321
B05-4	163	B12	240
B05-5	154	B13	1,232
B05-6	206	B14	5,728
B06-1	206	B15	5,399
B06-2	154	B16	7,811
B06-3	163	B17	5,312

SITE PLAN LEGEND			
	EXISTING BUILDING		LOT LINE
	NEW BUILDING		SETBACKS
	NEW BUILDING WITH COMMERCIAL SPACE AT-GRADE		NEW TREE
	GRASS		FIREWALL
	ASPHALT		SIDEWALK

SITE INFORMATION & DEVELOPMENT STATISTICS		
LOTS		PIN
		04756-0303
		04756-0315
		04756-0316
		04756-1337
ZONING		GM(2546) H(14.5)

SITE AREA	
TOTAL SITE AREA:	~53,441.14 m ² (5.34ha)
TOTAL DEVELOPABLE AREA:	~45,956.28 m ² (4.59ha)
NET SITE AREA:	~38,956.28 m ² (3.89ha)
UNITS	
TOWNHOUSES:	67 UNITS
BLOCK 01:	
1 X RESIDENTIAL APARTMENT BUILDING	48 UNITS
1 X MIXED USE BUILDING	
RESIDENTIAL:	36 UNITS
COMMERCIAL SPACES:	~929 m ²
BLOCK 02:	
1 X RESIDENTIAL APARTMENT BUILDING	47 UNITS
1 X MIXED USE BUILDING	
RESIDENTIAL:	36 UNITS
COMMERCIAL SPACES:	~929 m ²
BLOCK 03:	
2 X RESIDENTIAL APARTMENT BUILDING	96 UNITS
TOTAL NUMBER OF UNITS:	330 UNITS
TOTAL COMMERCIAL SPACES:	~1,858 m ²

	REQUIRED	PROVIDED
MAXIMUM DENSITY	NO MAX.	84.8 units/net ha
MINIMUM LOT WIDTH	NO MIN.	5.8 m
MINIMUM LOT AREA	NO MIN.	174 m ²
MAXIMUM BUILDING HEIGHT	14.5 m	14.5 m
SETBACKS		
MINIMUM FRONT YARD:	3 m	3 m
MINIMUM CORNER SIDE YARD:	3 m	3 m
MINIMUM INTERIOR SIDE YARD:		
NON-RESIDENTIAL OR MIXED-USE:	5 m	5 m
LOW-RISE RESIDENTIAL :	1.2 m	1.2 m
MID-RISE RESIDENTIAL :	3 m	3 m
MINIMUM REAR YARD:		
ABUTTING A STREET:	3 m	3 m
FROM A RESIDENTIAL ZONE:	7.5 m	7.5 m
FOR A RESIDENTIAL BUILDING:	7.5 m	7.5 m

PARKING RATES			
R9 - TOWNHOUSES:	1 p/unit = 67		67 (GARAGES)
VISITOR:	0		67 DRIVE AISLES
BLOCK 14:			
R12 - APARTEMENTS	1.2 p/unit = 101		101 (UNDERGROUND)
VISITOR:	0.2 p/unit = 17		17 (UNDERGROUND)
N79 - RETAIL STORE:	3.4 p/100 m ² GFA = 32		32 (EXTERIOR)
			TOTAL: 150
BLOCK 15:			
R12 - APARTEMENTS	1.2 p/unit = 100		100 (UNDERGROUND)
VISITOR:	0.2 p/unit = 17		17 (UNDERGROUND)
N79 - RETAIL STORE:	3.4 p/100 m ² GFA = 32		32 (EXTERIOR)
			TOTAL: 150
BLOCK 18:			
R12 - APARTEMENTS	1.2 p/unit = 116		145 (UNDERGROUND)
VISITOR:	0.2 p/unit = 17		17 (8 EXT. + 12 UND.)
			TOTAL: 162

GROSS FLOOR AREA	
TOWNHOUSE A:	267 m ²
TOWNHOUSE B:	239 m ²
TOWNHOUSE C:	232 m ²
TOWNHOUSE C (CORNER UNIT):	236 m ²
TOWNHOUSE D:	225 m ²
TOTAL MODEL 01 (ABBBBBBA)	1,968 m ²
TOTAL MODEL 02 (ABBBBBBA)	1,729 m ²
TOTAL MODEL 03 (ABBBBB)	1,490 m ²
TOTAL MODEL 04 (CDCDCDC)	1,611 m ²
TOTAL MODEL 05 (CDCDCDC)	1,386 m ²
MIXED USE BUILDING (TOTAL OF 2 BUILDINGS):	
RESIDENTIAL:	TOTAL: 4,130 m ²
COMMERCIAL:	3,201 m ²
COMMERCIAL:	929 m ²
RESIDENTIAL APARTMENT BUILDING (TOTAL OF 4 BUILDINGS):	
RESIDENTIAL:	TOTAL: 4,130 m ²
RESIDENTIAL:	4,130 m ²

NOTE

- ASSUMES TYPICAL RESIDENTIAL FLOOR HEIGHT OF 3m.
- THE BASE PLAN (LOT LINES, EXISTING ROADS AND SURROUNDING AREAS) IS BASED ON THE TOPOGRAPHICAL PLAN OF SURVEY, SURVEYED STANTEC GEOMATICS LTD.
- DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

PROJECT

NAVAN ROAD DEVELOPMENT

2983, Navan Road, Orleans, ON K1C 7G4

OWNER

Heafey GROUP

788, BOUL. SAINT-JOSEPH, SUITE 100 GATINEAU, QC J8Y 4B8

ARCHITECTURAL

PMA ARCHITECTES

(418) 851-8954
INFO@PMAARCHITECTES.COM
3070, CHEMIN DES QUATRE-BOURGEOIS QUÉBEC (QC) G1W 2W4
PMAARCHITECTES.COM

ARCHITECTES ASSOCIÉS

LAPALME RHEAULT

53, BOUL. SAINT-RAYMOND, GATINEAU, QC J8Y 1R8

ENGINEERS / PLANNER

J.L. Richards

ENGINEERS - ARCHITECTS - PLANNERS

1985 CARLING AVENUE, SUITE 700, OTTAWA, ON K1Z 6R1

SURVEYOR

Stantec

1331 GLYDE AVENUE, SUITE 400, OTTAWA, ON K2C 3G4

KEY PLAN

ARCHITECT SEAL

REVISIONS

NO	DESCRIPTION	DATE
1	FOR CITY REVIEW	2023-11-28
2	FOR COORDINATION	2023-11-08
3	FOR COORDINATION	2023-11-01
4	FOR COORDINATION	2023-10-14
5	FOR COORDINATION	2023-10-03
6	FOR COORDINATION	2023-09-19
7	FOR COORDINATION	2023-08-18
8	FOR COORDINATION	2023-08-18
9	FOR COORDINATION	2023-08-18
10	DESCRIPTION	DATE

NOTE

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON THE SITE AND TO REPORT ALL ERRORS AND/OR OMISSIONS TO THE ARCHITECT. ALL CONTRACTORS MUST COMPLY WITH ALL PERTINENT CODES AND BY-LAWS. DO NOT SCALE DRAWINGS.

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DO NOT USE FOR CONSTRUCTION

DATE	DESIGNED
2023-11-29	PP
DATE	DRAWN
2023-11-29	PP
PROJECT No	CHECKED
2054	PM
SHEET TITLE	
SITE PLAN	

SHEET No
A100

Table 1. Maximum flow to be considered from a given hydrant

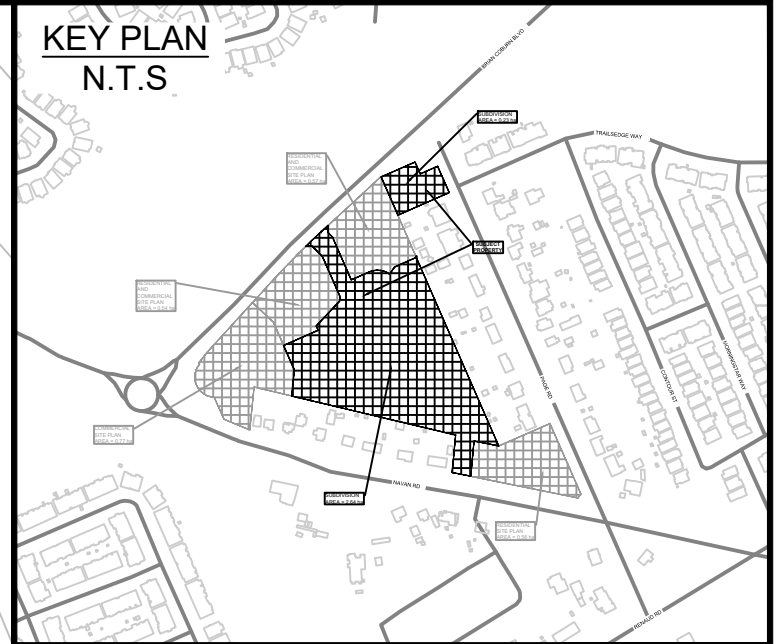
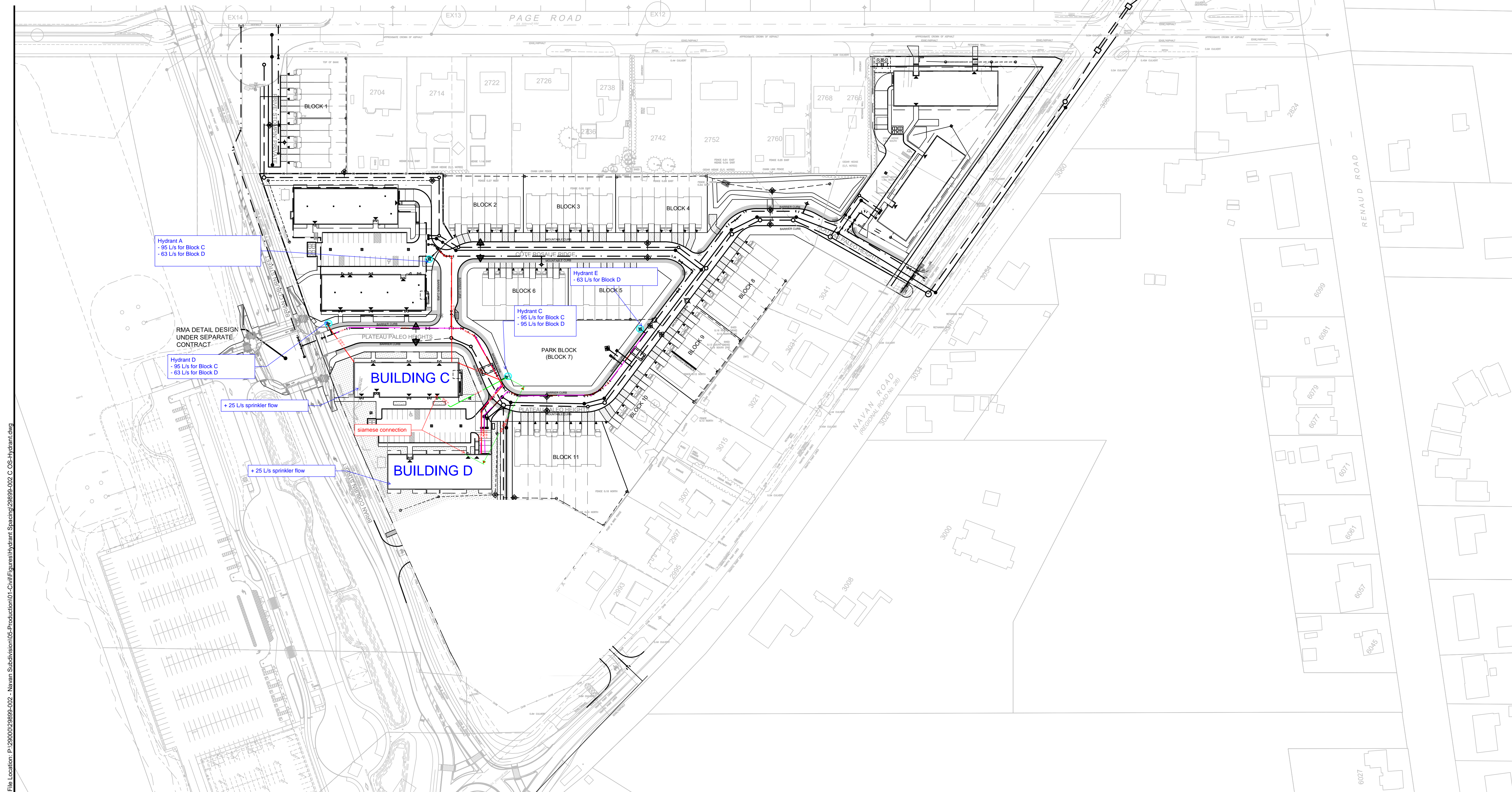
Block 15

Required Fire Flow Building C = 200 L/s (
Required Fire Flow Building D = 233 L/s

Hydrant Class	Distance to asset/structure/building (m) ^a	Contribution to required fire flow (L/min) ^b
AA	≤ 75	5,700
	> 75 and ≤ 150	3,800
A	≤ 75	3,800
	> 75 and ≤ 150	2,850
B	≤ 75	1,900
	> 75 and ≤ 150	1,500
C	≤ 75	800
	> 75 and ≤ 150	800

^a Distance of contributing hydrant from the structure, measured in accordance with NFPA 1 (Appendix A).

^b Maximum flow contribution to be considered for a given asset/structure/building, at a residual pressure of 20 psi, measured at the location of the main, at ground level.



LEGEND

- PROPOSED WATERMAIN, VALVE & HYDRANT
- EXISTING WATERMAIN, VALVE & HYDRANT
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- PROPOSED SANITARY SEWER & MANHOLE
- PROPOSED STORM SEWER & MANHOLE
- STEPPED FOOTING
- FIREWALL
- PROPOSED CULVERT
- DRAWING NUMBER
- RIP-RAP TO OPSD 810.010 (TYPE B)
- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN w/ CO
- PROPOSED CATCH BASIN & LEAD
- PROPOSED TEE CATCHBASIN
- PROPOSED 3-WAY CATCHBASIN
- CONC. SIDEWALK
- ASPHALT
- INFILTRATION TRENCH
- TACTILE WALKING SURFACE INDICATOR (TWSI)
- SPEED HUMP PER CITY DETAIL R19

Draft Print

2024-07-24 8:19:38 AM

04	RE-ISSUED TO CITY FOR ENGINEERING REVIEW (SECOND SUBMISSION)	16/02/24
03	ISSUED FOR MUNICIPAL CONSENT	09/02/24
02	ISSUED TO CITY FOR ENGINEERING REVIEW	22/09/23
01	ISSUE / REVISION	DDMMYY

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VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING.

SCALE: 1:1000

CLIENT:

CONSULTANT:

J.L. Richards
ENGINEERS - ARCHITECTS - PLANNERS

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH

PROJECT:

NAVAN SUBDIVISION

2983, 3053, & 3079 NAVAN ROAD & 2690 PAGE ROAD
OTTAWA, ONTARIO

DRAWING:

OVERALL SERVICING

DESIGN: TR	DRAWING #:
DRAWN: KT	OS
CHECKED: KF	
JLR #: 29899-002	

William Rugamba

From: William Rugamba
Sent: July 22, 2024 8:18 AM
To: William Rugamba
Subject: FW: Re-confirmation of Mechanical Items for Servicing Report

William Rugamba, M.Eng., B.A.Sc., EIT
Civil Engineering Graduate
Ottawa, ON
Work: [343-804-4374](tel:343-804-4374)

From: Sarith Lopez <slopez@qmeengineering.com>
Sent: Wednesday, July 17, 2024 8:07 PM
To: Mahad Musse <mmusse@jlrichards.ca>; Chuck Clark <CWC@qmeengineering.com>
Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>
Subject: RE: Re-confirmation of Mechanical Items for Servicing Report

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Hi Mahad,

All items below confirmed

Regards

Sarith López
Project Manager

9 Gurdwara Road, Unit 200
Ottawa, ON K2E 7X6
T: 613-366-4763 ext. 129
slopez@qmeengineering.com



From: Mahad Musse <mmusse@jlrichards.ca>

Sent: Tuesday, July 16, 2024 3:08 PM

To: Sarith Lopez <slopez@qmeengineering.com>; Chuck Clark <CWC@qmeengineering.com>

Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>

Subject: Re-confirmation of Mechanical Items for Servicing Report

Hi Sarith/Chuck,

Thank you for the information below and in our meetings. I understand all these items have been discussed before but we need to submit something as part of our report. Can you just re-confirm the following questions below and then we will attach your confirmation to the Report.

1. Please confirm that the sanitary service size of 200mm diameter for the Site Plan Blocks (Block 14, 15 and 17) is preferred by the mechanical engineer on file;
2. Please confirm that a sprinkler flow of 25 L/s can be assumed for the Site Plan Blocks (Block 14, 15 and 17) at this stage.

Thanks
Mahad



Mahad Musse, B.Eng., EIT
Civil Engineering Graduate

1000-343 Preston Street
Ottawa, ON, K1S 1N4



Work: [343-633-1501](tel:343-633-1501)
mmusse@jlrichards.ca



William Rugamba

From: William Rugamba
Sent: July 15, 2024 4:00 PM
To: William Rugamba
Subject: FW: Navan Subdivision - Boundary Condition Request
Attachments: NavanSubdivision_Boundary Condition(4july2024).docx

William Rugamba, M.Eng., B.A.Sc., EIT
Civil Engineering Graduate
Ottawa, ON
Work: [343-804-4374](tel:343-804-4374)

From: Polyak, Alex <alex.polyak@ottawa.ca>
Sent: Monday, July 15, 2024 10:12 AM
To: Mahad Musse <mmusse@jlrichards.ca>
Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>; Armstrong, Justin <justin.armstrong@ottawa.ca>; Tatyana Roumie <troumie@jlrichards.ca>
Subject: RE: Navan Subdivision - Boundary Condition Request

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Good morning Mahad,

Please find the boundary conditions attached.

Regards,

Oleksandr (Alex) Polyak, B.Eng., C.E.T., P.Eng. 

Project Manager, Infrastructure Approvals, Development Review East Branch | Gestionnaire de projet, Direction de l'examen des projets d'aménagement – Est.
Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)

City of Ottawa | Ville d'Ottawa
110 Laurier Ave., 4th Fl East, Ottawa ON K1P 1J1
Email: alex.polyak@ottawa.ca
Cell : 613-857-4380
www.Ottawa.ca



From: Mahad Musse <mmusse@jlrichards.ca>

Sent: July 12, 2024 1:31 PM

To: Polyak, Alex <alex.polyak@ottawa.ca>

Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>; Armstrong, Justin <justin.armstrong@ottawa.ca>; Tatyana Roumie <troumie@jlrichards.ca>

Subject: RE: Navan Subdivision - Boundary Condition Request

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Hi Alex,

Just wondering if you have a status update for the boundary conditions for Navan.

Thanks
Mahad



Mahad Musse, B.Eng., EIT
Civil Engineering Graduate

1000-343 Preston Street
Ottawa, ON, K1S 1N4

Work: [343-633-1501](tel:343-633-1501)
mmusse@jlrichards.ca

From: Mahad Musse <mmusse@jlrichards.ca>

Sent: Wednesday, July 3, 2024 11:02 AM

To: Polyak, Alex <alex.polyak@ottawa.ca>

Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>; Armstrong, Justin <justin.armstrong@ottawa.ca>; Tatyana Roumie <troumie@jlrichards.ca>

Subject: RE: Navan Subdivision - Boundary Condition Request

Good morning Alex,

As we discussed last week our Client is looking into the option of converting the row townhouse units into duplex units (townhouse units with apartments in the basement). As a result, this will increase the total demand on the site and we will therefore require new water boundary conditions. We'd like to note that the footprint of the blocks will not change and neither will their layout or any of the offsets.

As a summary:

- Domestic demands were calculated based on a daily consumption rate of 280 L/cap/day with peaking factors consistent with City of Ottawa Guidelines
- Required Fire Flow (RFF) was calculated in accordance to the Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection and the City of Ottawa FUS protocol (Bulletin ISDTB-2014-02 & Bulletin ISDTB-2018-02), which considers material, expose distance & height. We have attached the calculation spreadsheet and the figure.

We request boundary conditions under high pressure, peak hour, and maximum day + fire flow conditions (for each of the below fire flows). Domestic demand and fire flow calculations are attached. Please provide the boundary conditions at the proposed connection locations as shown in the attached figure.

Average Day Demand: 6.74 L/s

Maximum Day Demand: 10.53 L/s

Peak Hour Demand: 18.17 L/s

Required Fire Flow (per FUS): 6,000 L/min (100 L/s)

Required Fire Flow (per FUS): 10,000 L/min (167 L/s)

Required Fire Flow (per FUS): 14,000 L/min (233 L/s)

Required Fire Flow (per FUS): 15,000 L/min (250 L/s)

For your reference, the previous boundary condition received from the City is attached and below is the email chain.

If you have any questions or comments please let us know.

Thanks
Mahad



Mahad Musse, B.Eng., EIT
Civil Engineering Graduate

1000-343 Preston Street
Ottawa, ON, K1S 1N4

Work: [343-633-1501](tel:343-633-1501)
mmusse@jlrichards.ca

From: Polyak, Alex <alex.polyak@ottawa.ca>

Sent: Thursday, August 17, 2023 3:01 PM

To: William Rugamba <wrugamba@jlrichards.ca>

Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>; Shahira Jalal <sjalal@jlrichards.ca>

Subject: RE: Navan Subdivision - Boundary Condition Request

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Hello William,

Sorry that I missed your call, I was in a meeting. The boundary conditions are attached.

Regards,

Oleksandr (Alex) Polyak, B.Eng., P.Eng

Project Manager, Infrastructure Approvals, Development Review East Branch | Gestionnaire de projet, Direction de l'examen des projets d'aménagement – Est.
Planning, Real Estate and Economic Development Department | Direction générale de la planification, des biens immobiliers et du développement économique

City of Ottawa | Ville d'Ottawa
110 Laurier Ave., 4th Fl East, Ottawa ON K1P 1J1
Email: alex.polyak@ottawa.ca
Cell : 613-857-4380
www.Ottawa.ca



From: William Rugamba <wrugamba@jlrichards.ca>
Sent: August 15, 2023 9:26 AM
To: Polyak, Alex <alex.polyak@ottawa.ca>
Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>; Shahira Jalal <sjalal@jlrichards.ca>
Subject: RE: Navan Subdivision - Boundary Condition Request

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Good morning Alex,

Just wanted to follow up on the status of this boundary request. Please let me know if you need anything else from us.

Thanks,
William

William Rugamba, M.Eng.
Civil Engineering Intern

J.L. Richards & Associates Limited
1000-343 Preston Street, Ottawa, ON K1S 1N4
Direct: 343-804-4374



From: Tatyana Roumie
Sent: Tuesday, July 25, 2023 3:53 PM
To: 'alex.polyak@ottawa.ca' <alex.polyak@ottawa.ca>
Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; carmine@zayoungroup.com; Shahira Jalal <sjalal@jlrichards.ca>
Subject: Navan Subdivision - Boundary Condition Request

Hello Alex.

To support our upcoming detailed design for the site, we are requesting updated boundary conditions for the 3079 Navan Road Development.

As a brief history, we received boundary conditions from the City in July 2021 (attached, but with incorrect connection locations) and again in April 2022 (also attached) in support of the functional servicing design. We understand from the April 2022 boundary conditions that the maximum available fire flow for the site is 250 L/s.

We are currently requesting updated boundary conditions for this site as we are commencing the detailed servicing design and this request will accommodate the recent site plan changes and proposed connection points. This request is also applicable to the upcoming site plan designs which will be submitted as separate applications.

We request boundary conditions under high pressure, peak hour, and maximum day + fire flow conditions (for each of the below fire flows). Domestic demand and fire flow calculations are attached. Please provide the boundary conditions at the proposed connection locations as shown in the attached figure.

Average Day Demand: 6.44 L/s
Maximum Day Demand: 9.77 L/s
Peak Hour Demand: 16.50 L/s
Required Fire Flow (per FUS): 6,000 L/min (100 L/s)
Required Fire Flow (per FUS): 10,000 L/min (167 L/s)
Required Fire Flow (per FUS): 14,000 L/min (233 L/s)
Required Fire Flow (per FUS): 15,000 L/min (250 L/s)

Thanks,
Tatyana

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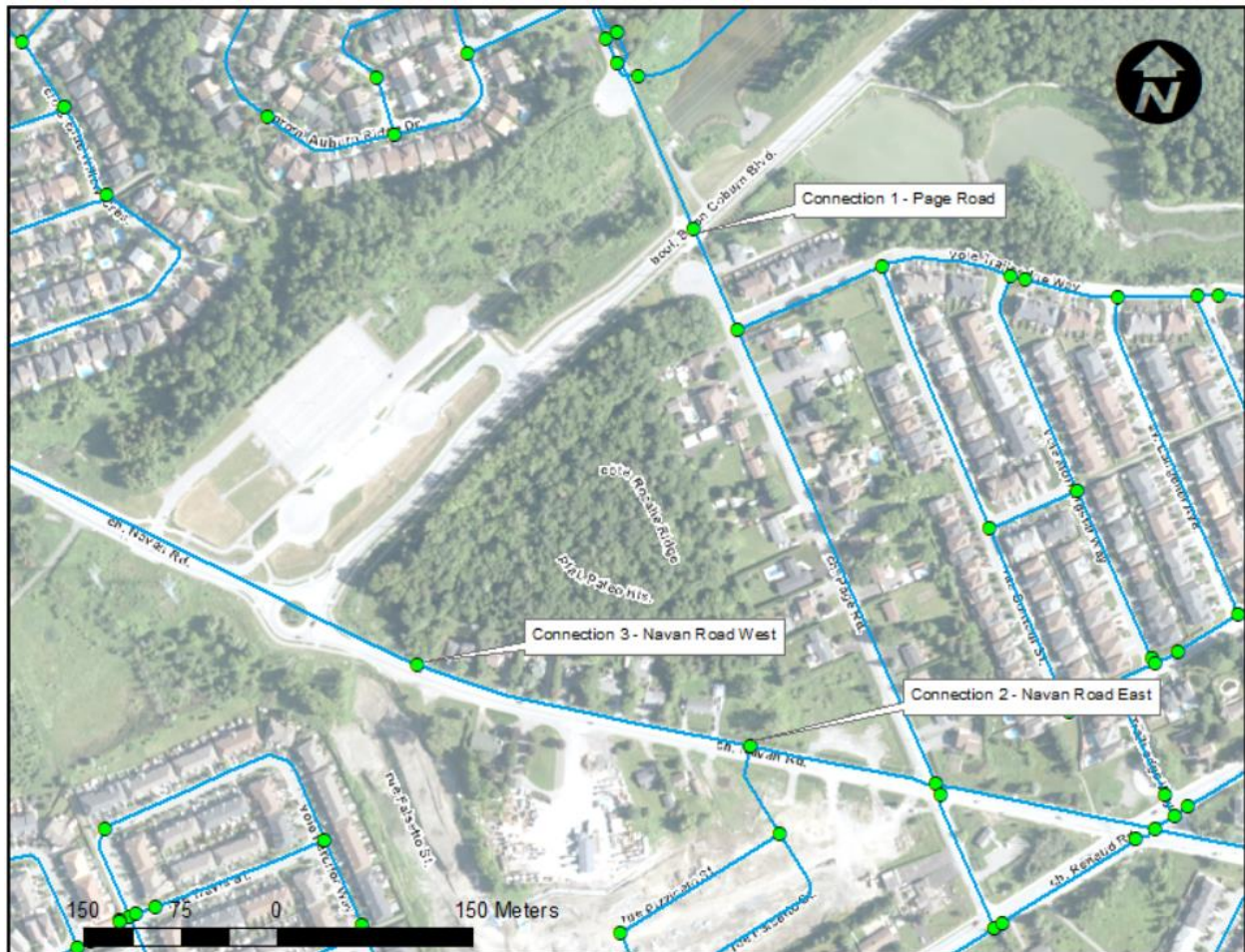
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Boundary Conditions Navan Subdivision

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	404	6.74
Maximum Daily Demand	632	10.53
Peak Hour	1,090	18.17
Fire Flow Demand #1	6,000	100.00
Fire Flow Demand #2	10,000	166.67
Fire Flow Demand #3	14,000	233.33
Fire Flow Demand #4	15,000	250.00

Location



Results

Connection 1 - Page Road

Demand Scenario	Head (m)	Pressure¹ (psi)
Maximum HGL	130.7	64.0
Peak Hour	127.0	58.6
Max Day plus Fire Flow #1	128.2	60.4
Max Day plus Fire Flow #2	126.8	58.3
Max Day plus Fire Flow #3	124.9	55.7
Max Day plus Fire Flow #4	124.4	55.0

¹ Ground Elevation = 85.7 m

Connection 2 - Navan Road East

Demand Scenario	Head (m)	Pressure¹ (psi)
Maximum HGL	130.7	71.4
Peak Hour	126.8	65.9
Max Day plus Fire Flow #1	127.7	67.1
Max Day plus Fire Flow #2	125.5	64.1
Max Day plus Fire Flow #3	122.7	60.1
Max Day plus Fire Flow #4	121.9	58.9

¹ Ground Elevation = 80.5 m

Connection 3 - Navan Road West

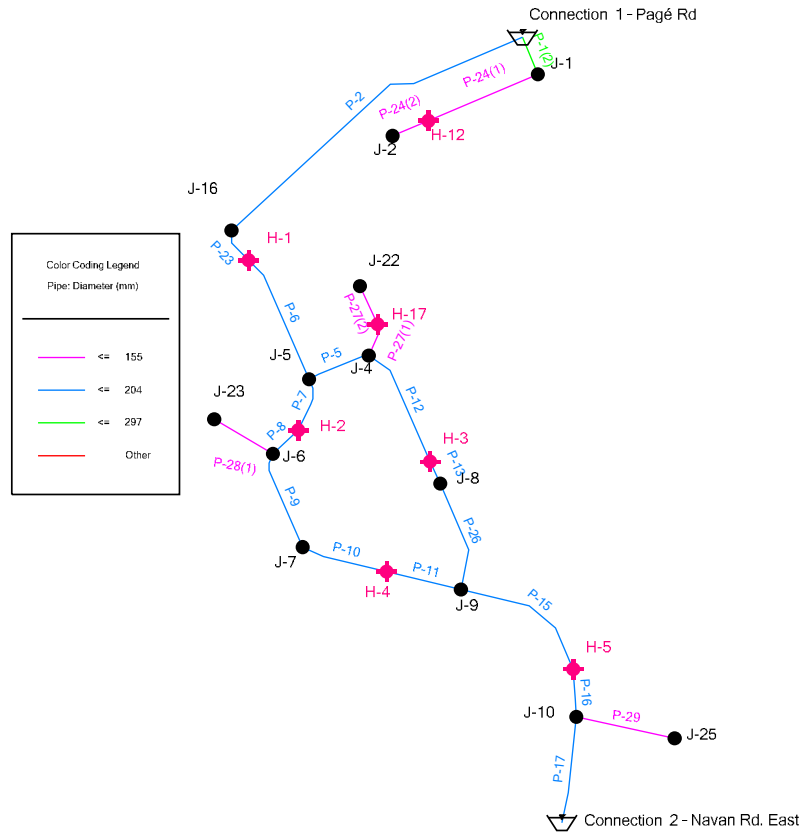
Demand Scenario	Head (m)	Pressure¹ (psi)
Maximum HGL	130.7	69.3
Peak Hour	126.8	63.8
Max Day plus Fire Flow #1	127.3	64.5
Max Day plus Fire Flow #2	124.6	60.6
Max Day plus Fire Flow #3	120.9	55.3
Max Day plus Fire Flow #4	119.8	53.8

¹ Ground Elevation = 81.9 m

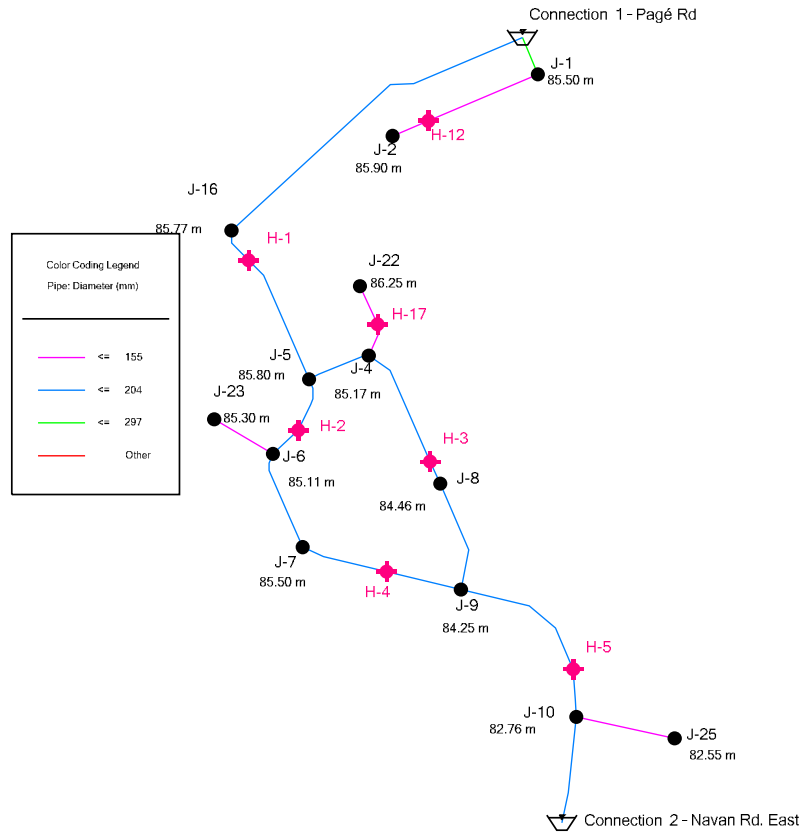
Disclaimer

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

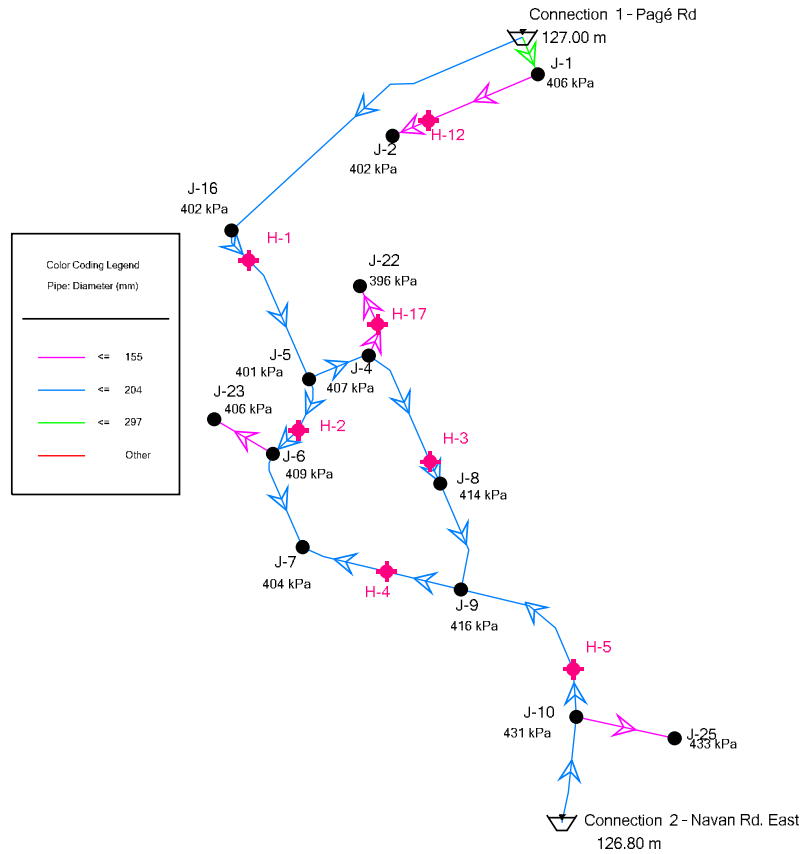
Mixed-Use Site Plan (Block 15) Model Schematic



Mixed-Use Site Plan (Block 15) Model Schematic Elevation Model



Mixed-Use Site Plan (Block 15) Peak Hour Demand



Mixed-Use Site Plan (Block 15)
 Peak Hour Demand
 Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-22	86.25	2.78	126.76	396
J-5	85.80	0.00	126.78	401
J-16	85.77	0.00	126.85	402
J-2	85.90	0.58	127.00	402
J-7	85.50	4.95	126.77	404
J-23	85.30	2.74	126.76	406
J-1	85.50	0.00	127.00	406
J-4	85.17	0.00	126.78	407
J-6	85.03	0.00	126.77	409
J-8	84.46	1.90	126.77	414
J-9	84.25	1.46	126.77	416
J-10	82.76	0.00	126.78	431
J-25	82.55	3.08	126.76	433

Mixed-Use Site Plan (Block 15)

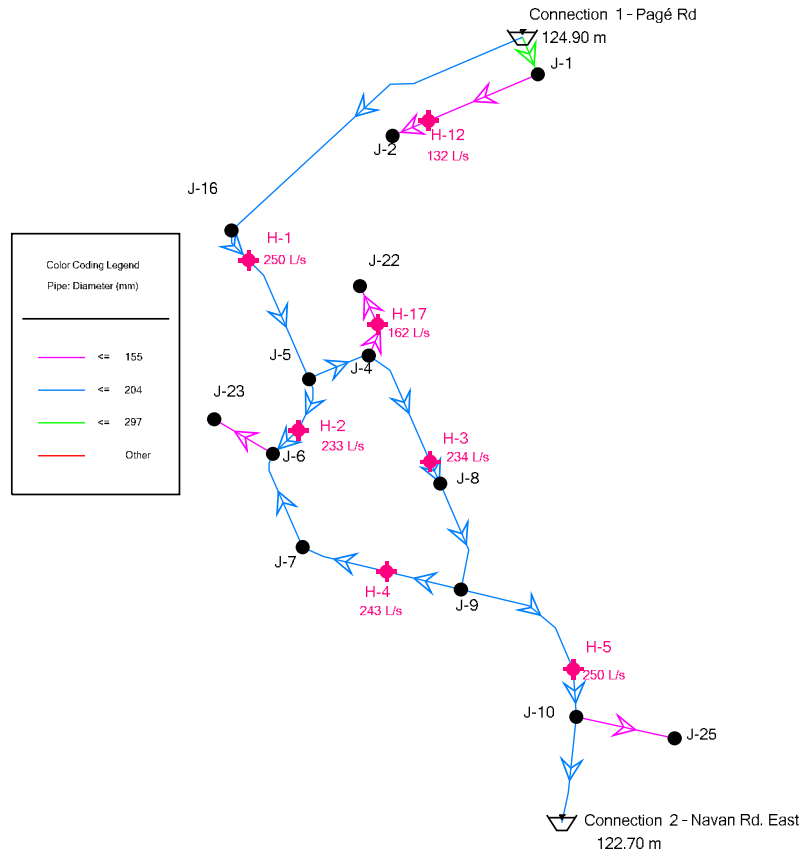
Peak Hour Demand

Pipe Table

ID	Label	Length (Scaled) (m)	Diameter (mm)	Material	Hazen-Williams C	Flow (L/s)	Velocity (m/s)
49	P-2	168	204	PVC	110.0	10	0.32
52	P-5	31	204	PVC	110.0	-5	0.15
82	P-6	64	204	PVC	110.0	-10	0.32
85	P-7	26	204	PVC	110.0	5	0.17
86	P-8	16	204	PVC	110.0	5	0.17
54	P-9	48	204	PVC	110.0	3	0.08
91	P-10	41	204	PVC	110.0	-2	0.07
92	P-11	36	204	PVC	110.0	-2	0.07
104	P-12	59	204	PVC	110.0	2	0.07
105	P-13	11	204	PVC	110.0	2	0.07
108	P-15	70	204	PVC	110.0	-3	0.10
109	P-16	23	204	PVC	110.0	-3	0.10
97	P-17	50	204	PVC	110.0	-6	0.20
110	P-23	17	204	PVC	110.0	10	0.32
129	P-24(1)	56	155	PVC	100.0	1	0.03
130	P-24(2)	18	155	PVC	100.0	1	0.03
123	P-26	53	204	PVC	110.0	0	0.01
154	P-27(1)	16	155	PVC	100.0	3	0.15
155	P-27(2)	20	155	PVC	100.0	3	0.15
171	P-28(1)	32	155	PVC	100.0	3	0.15
183	P-29	47	155	PVC	100.0	3	0.16

Mixed-Use Site Plan (Block 15)

Max Day + Fire Flow Requirement

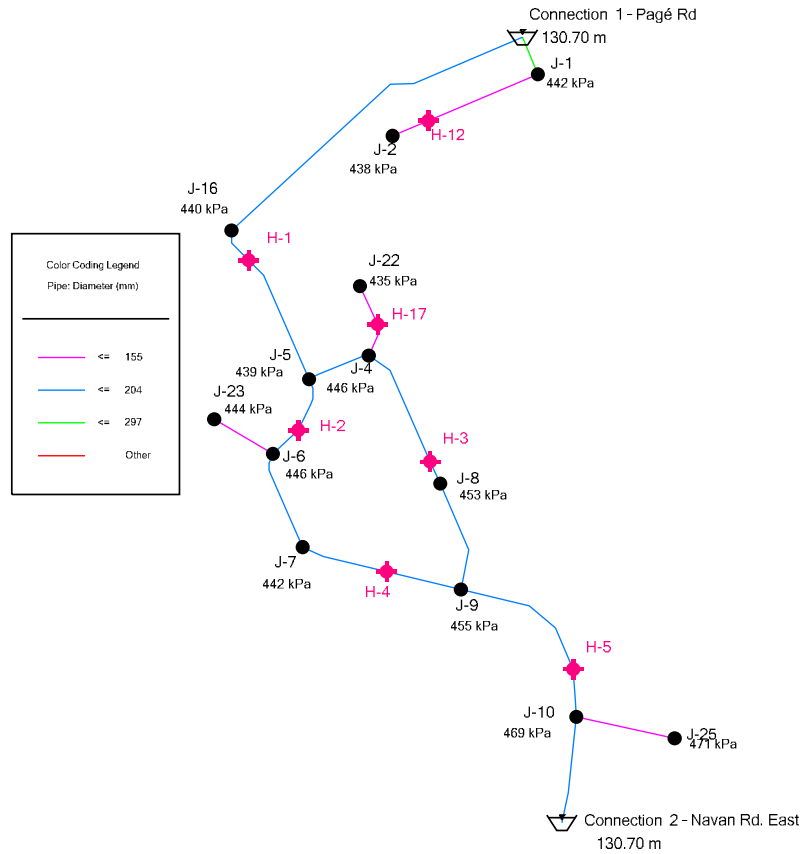


Mixed-Use Site Plan (Block 15)
Max Day + Fire Flow Requirement
Hydrant Table

Label	Satisfies Fire Flow Constraints?	Fire Flow (Available) (L/s)	Flow (Total Available) (L/s)	Pressure (Residual Lower Limit) (kPa)	Pressure (Calculated Residual) (kPa)	Pressure (Calculated System Lower Limit) (kPa)	Junction w/ Minimum Pressure (System)
H-1	True	250	250	140	152	178	J-16
H-2	True	233	233	140	140	142	J-23
H-4	True	243	243	140	140	142	J-7
H-3	True	234	234	140	140	158	J-8
H-5	True	250	250	140	256	247	J-23
H-12	True	132	132	140	142	140	J-2
H-17	True	162	162	140	143	140	J-22

Mixed-Use Site Plan (Block 15)

Maximum Pressure Analysis



Mixed-Use Site Plan (Block 15)

Maximum Pressure Analysis

Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-22	86.25	0	130.70	435
J-2	85.90	0	130.70	438
J-5	85.80	0	130.70	439
J-16	85.77	0	130.70	440
J-7	85.50	0	130.70	442
J-1	85.50	0	130.70	442
J-23	85.30	0	130.70	444
J-4	85.17	0	130.70	446
J-6	85.11	0	130.70	446
J-8	84.46	0	130.70	453
J-9	84.25	0	130.70	455
J-10	82.76	0	130.70	469
J-25	82.55	0	130.70	471

Mixed-Use Site Plan (Block 15)

Maximum Pressure Analysis

Pipe Table

ID	Label	Length (Scaled) (m)	Diameter (mm)	Material	Hazen-Williams C	Flow (L/s)	Velocity (m/s)
114	P-1(2)	19	297	PVC	120.0	0	0.00
49	P-2	168	204	PVC	110.0	0	0.00
52	P-5	31	204	PVC	110.0	0	0.00
82	P-6	64	204	PVC	110.0	0	0.00
85	P-7	26	204	PVC	110.0	0	0.00
86	P-8	16	204	PVC	110.0	0	0.00
54	P-9	48	204	PVC	110.0	0	0.00
91	P-10	41	204	PVC	110.0	0	0.00
92	P-11	36	204	PVC	110.0	0	0.00
104	P-12	59	204	PVC	110.0	0	0.00
105	P-13	11	204	PVC	110.0	0	0.00
108	P-15	70	204	PVC	110.0	0	0.00
109	P-16	23	204	PVC	110.0	0	0.00
97	P-17	50	204	PVC	110.0	0	0.00
110	P-23	17	204	PVC	110.0	0	0.00
129	P-24(1)	56	155	PVC	100.0	0	0.00
130	P-24(2)	18	155	PVC	100.0	0	0.00
123	P-26	53	204	PVC	110.0	0	0.00
154	P-27(1)	16	155	PVC	100.0	0	0.00
155	P-27(2)	20	155	PVC	100.0	0	0.00
171	P-28(1)	32	155	PVC	100.0	0	0.00
183	P-29	47	155	PVC	100.0	0	0.00

Appendix D

Stormwater Management

PIPE REACH		Peak Flow Estimation															Sewer Data					Upstream Geometry			Downstream Geometry			Self-Cleaning Velocities														
LOCATION	From MH	To MH	C-Factor 1/2		Total Area (ha)	Add. Area from Substation (ha)	Cum. Total Area (ha)	Inlet Time (min)	In Pipe Flow Time (min)	Total Time	12 Year Storm (RATIONAL METHOD)					FLOW COEFF.					Total Peak Flow ⁽⁶⁾ (L/s)	Type	Nominal Dia. (mm)	Actual Dia. (mm)	Slope	Length (m)	Q Full (L/s)	V Full (m/s)	Residual Capacity ⁽⁷⁾ (%)	% Full	TD From	Obvert	Invert	Cover	TD To	Obvert	Invert	Cover	G/Q ⁽⁸⁾ Ratio	Flow Depth (mm)	Actual Velocity (m/s)	Flow Depth to Dia. Ratio (D/D)
			2 YEAR	Add. 2 YEAR From Upstream							2 YEAR	1.5 Year Peak Flow (L/s)	1.5 Year Peak Flow (L/s)	ICD Flow ⁽⁴⁾ EX STM 15/18 16 (L/s)	85 L/s/ha Controlled Flow ⁽⁵⁾ (L/s)	ICD Flow ⁽⁴⁾ CG 1/2 (L/s)	Roof Drain Flow ⁽⁴⁾ (L/s)	Cistern Flow ⁽⁴⁾ (L/s)																								
EAST ORLEANS RIDGE SUBDIVISION / GAS BAR SITE PLAN (BLOCK 15)	UPSTREAM GAS STATION ⁽¹⁾	EXIST MH014	0.062	0.007	0.00	0.04	3.11	16.00	0.83	16.83	0.00	2.20	2.34	76.61	180.11	88.00	47.00	50.00	126.00	CONCRETE	600	533.40	0.25%	60.00	224.33	1.00	44.22	80%	85.50	81.45	80.95	3.61	84.03	81.35	80.82	3.80	0.20	254.30	0.83	0.83		
SEWER 15	EXIST MH015	EXIST MH014	0.088	0.341	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	CONCRETE	300	257.30	0.25%	6.00	143.07	1.00	17.45	40%	85.50	81.45	80.95	3.61	84.03	81.35	80.82	3.80	0.20	128.30	0.83	0.83		
EAST ORLEANS RIDGE SUBDIVISION	UPSTREAM SUBDIVISION ⁽²⁾	EXIST MH014	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	12.00	PIPE	300	257.30	0.25%	6.00	143.07	1.00	17.45	40%	85.50	81.45	80.95	3.61	84.03	81.35	80.82	3.80	0.20	128.30	0.83	0.83		
EAST ORLEANS RIDGE SUBDIVISION	EXIST MH014	EXIST MH012	0.27	1.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	204.00	CONCRETE	600	620.00	0.25%	60.00	370.66	1.30	76.47	80%														

Design Parameters (Per OSDG)
 Manning Coefficient: 0.013
 12 Year Storm: 77.5 (SI) / 1.6 (4. 100% 2.0)
 Note: Tc is the time of concentration in minutes

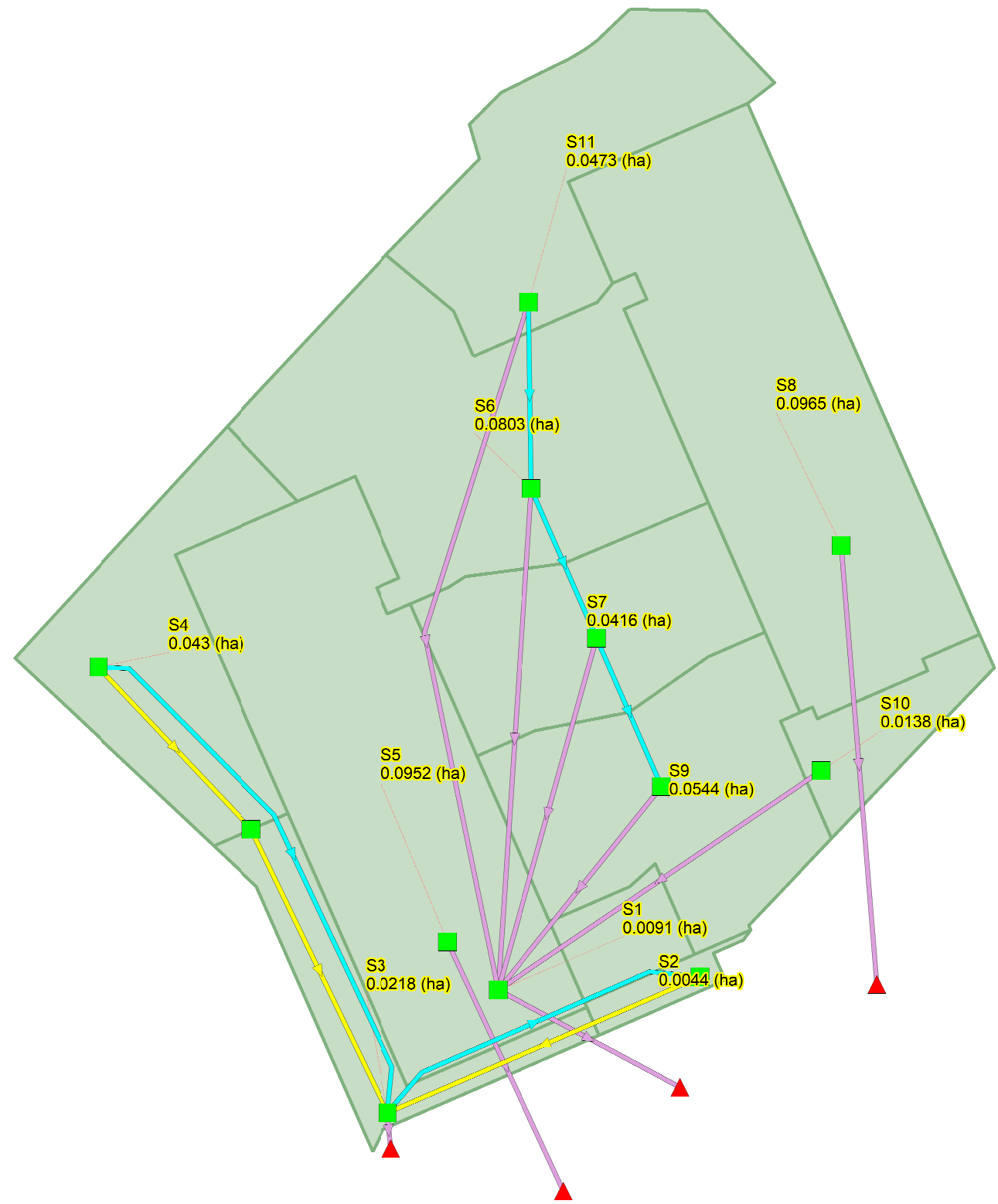
Drainage Areas Breakdown
 Total Site Area: 0.04 ha
 Central Area Within Site Property Line: 0.007 ha
 Existing Areas Captured Within Site: 0.000 ha
 Total Captured Areas: 0.007 ha --
 Uncaptured Areas - Outlet to Subdivision: 0.04 ha --
 Additional Areas from Upstream Roma: 1.46 ha --
 Total Area from MH014 to MH012 on Subdivision Design Sheet: 1.46 ha --
 This area is part of the total site area (0.04 ha)
 This area is gas station (0.02) + near yard subdivision (0.10) + roadway subdivision (0.27) + roadway subdivision (0.15) + equipment subdivision (0.04)
 This area is the sum of the Block 15 captured areas (0.00 ha) and the upstream areas (1.46 ha)

Notes on Plug Flows
 (1) Flow rate controlled distribution of EXIST MH015 as part of the Gas Bar (Block 16)
 (2) Flow rate controlled by Subdivision at 85 L/s/ha
 (3) ICD Flow Rate at CB112
 (4) Total flow rate of roof drains for Buildings C and D
 (5) Cistern Outflow Rate

Notes on Peak Flow and Pipe Sizing
 (6) Peak flows are equal to the diurnal retention rate for Block 15 (40 L/s), gas station controlled flow (88.00 L/s), roadway controlled flow (23 L/s and 26 L/s), near yard controlled flow (12 L/s)
 (7) Pipes are conservatively sized for 1.2 Year Peak Flow Rate
 (8) Actual Velocities based on actual peak flows from Note 5
 (9) Details from Existing Sewers Upstream of EXIST MH012 can be found within East Orleans Ridge Subdivision Design Sheet. This line is only used to carry over the upstream values for time of concentration and 1.2 year peak flow

REAR YARD CATCH BASIN TABLE

Street Name	CB ID Number	T/G	Inlet				Outlet			COVER (m)	1:100 Yr Restricted Capture Rate (L/s)	CATCH BASIN TYPE	ICD TYPE
			Pipe Dia. (mm)	Pipe Length (m)	Slope	Invert	Pipe Dia. (mm)	Pipe Length (m)	Invert				
BLOCK 15	CB113	85.15	-	-	-	-	150	31.32	83.55	1.45	-	-	NO ICD
	CB110	85.30	-	-	-	-	150	20.47	83.75	1.40	-	-	NO ICD
	CB111	85.60	150	20.47	0.8%	83.59	150	28.91	83.59	1.86	-	-	NO ICD
	CB112 (NE)	85.20	150	31.32	0.6%	83.36	150	4.21	83.28	1.69	10.00	600 mm x 600 mm CATCH BASIN PER OPSD 705.010	Vortex_ICD_95
	CB112 (NW)	85.20	150	28.91	0.8%	83.34							



Legend

- ▲ Outfalls
- Storages
- Conduits
- Weirs
- Outlets
- Subcatchments



150 m

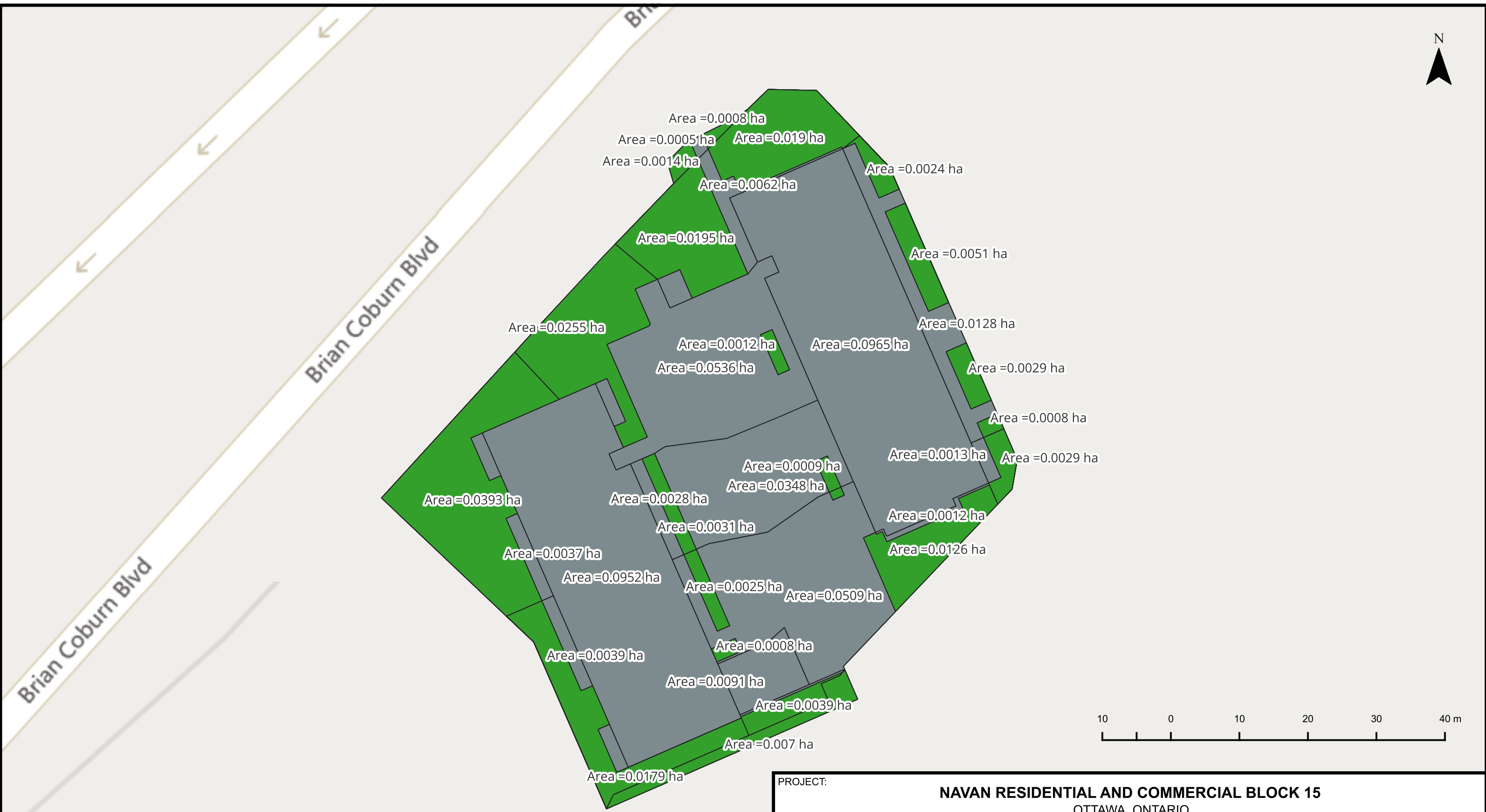
PROJECT: **NAVAN RESIDENTIAL AND COMMERCIAL SITE PLAN - BLOCK 15**
Ottawa, ON

DRAWING: **Overall System Model Schematic**



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DESIGN:	ML	JLR NO.:	29899-002
DRAWN:	ML	DRAWING NO.:	Figure 1
CHECKED:	BP		



Legend

IMPERVIOUSNESS

	Landscaped Areas (C-Factor - 0.2)
	Pavement Areas (C-Factor - 0.9)

PROJECT:		NAVAN RESIDENTIAL AND COMMERCIAL BLOCK 15	
		OTTAWA, ONTARIO	
DRAWING:		OVERALL SITE IMPERVIOUSNESS	
 J.L. Richards <small>ENGINEERS · ARCHITECTS · PLANNERS</small>	<small>This drawing is copyright protected and may not be reproduced or used for purposes other than execution of the described work without express written consent of J.L. Richards & Associates Limited.</small>	DESIGN: ML	JLR NO: 29899-002
		DRAWN: ML	DRAWING NO:
		CHECKED: BP	Figure

Post-Development 3-hour Chicago 1:2 year Event

Post-Development 3-hour Chicago 1:2 year Event

```

[TITLE]
;;Project Title/Notes
0

[OPTIONS]
;;Option Value
FLOW_UNITS CMS
INFILTRATION HORTON
FLOW_ROUTING DYNWAVE
LINK_OFFSETS ELEVATION
MIN_SLOPE 0
ALLOW_PONDING NO
SKIP_STEADY_STATE NO

START_DATE 01/01/2000
START_TIME 00:00:00
REPORT_START_DATE 01/01/2000
REPORT_START_TIME 00:00:00
END_DATE 01/01/2000
END_TIME 06:00:00
SWEEP_START 01/01
SWEEP_END 12/31
DRY_DAYS 0
REPORT_STEP 00:01:00
WET_STEP 00:01:00
DRY_STEP 00:01:00
ROUTING_STEP 5
RULE_STEP 00:00:00

INERTIAL_DAMPING PARTIAL
NORMAL_FLOW_LIMITED BOTH
FORCE_MAIN_EQUATION H-W
VARIABLE_STEP 0.75
LENGTHENING_STEP 0
MIN_SURFAREA 0
MAX_TRIALS 8
HEAD_TOLERANCE 0.0015
SYS_FLOW_TOL 5
LAT_FLOW_TOL 5
MINIMUM_STEP 0.5
THREADS 12

[EVAPORATION]
;;Data Source Parameters
CONSTANT 0.0
DRY_ONLY NO

[RAINGAGES]
;;Name Format Interval SCF Source
Rainfall INTENSITY 0:10 1.0 TIMESERIES 3CHI002

[SUBCATCHMENTS]
;;Name Rain Gage Outlet Area %Imperv Width %Slope
CurbLen SnowPack
S1 Rainfall St_UnGrd 0.0091 100 6.1 15 0
S10 Rainfall CB118 0.0138 8.79 28.998 1 0
S11 Rainfall CB114 0.0473 18.805 70.001 2 8
S2 Rainfall CB113 0.0044 0.002 4.3 1.9 0
S3 Rainfall CB112 0.0218 17.802 75 1 0
S4 Rainfall CB110 0.043 8.51 52.001 3.5 0
S5 Rainfall Roof_1 0.0952 99.998 104.996 1 0
S6 Rainfall CB115 0.0803 66.775 45.001 2.5 0
S7 Rainfall CB116 0.0416 90.416 28.601 2.7 0
S8 Rainfall Roof_2 0.0965 100 105.005 1 0
S9 Rainfall CB117 0.0544 93.568 50 2.4 0

[SUBAREAS]
;;Subcatchment N-Imperv N-Perv S-Imperv S-Perv PctZero RouteTo
PctRouted
S1 0.013 0.25 1.57 4.67 0 OUTLET
S10 0.013 0.25 1.57 4.67 0 PERVIOUS 100
S11 0.013 0.25 1.57 4.67 0 PERVIOUS 100
S2 0.013 0.25 1.57 4.67 0 OUTLET
S3 0.013 0.25 1.57 4.67 0 PERVIOUS 100
S4 0.013 0.25 1.57 4.67 0 PERVIOUS 100
S5 0.013 0.25 1.57 4.67 0 OUTLET
S6 0.013 0.25 1.57 4.67 0 OUTLET
S7 0.013 0.25 1.57 4.67 0 OUTLET
S8 0.013 0.25 1.57 4.67 0 OUTLET
S9 0.013 0.25 1.57 4.67 0 OUTLET

[INFILTRATION]
;;Subcatchment Param1 Param2 Param3 Param4 Param5
S1 76.2 13.2 4.14 7 0
S10 76.2 13.2 4.14 7 0
S11 76.2 13.2 4.14 7 0
S2 76.2 13.2 4.14 7 0
S3 76.2 13.2 4.14 7 0
S4 76.2 13.2 4.14 7 0
S5 76.2 13.2 4.14 7 0
S6 76.2 13.2 4.14 7 0
S7 76.2 13.2 4.14 7 0
S8 76.2 13.2 4.14 7 0
S9 76.2 13.2 4.14 7 0

[OUTFALLS]
;;Name Elevation Type Stage Data Gated Route To
OF4 80.628 FIXED 81.11 NO
OF7 80.628 FIXED 81.11 NO
STUB15 80.628 FIXED 81.11 NO
STUB16 80.646 FIXED 81.28 NO

[STORAGE]
;;Name Elev. Ps1 MaxDepth InitDepth Shape Curve Name/Params
SurDepth Fevap IMD
CB110 83.75 1.9 0 TABULAR CB110 0
CB111 83.59 2.01 0 TABULAR CB111 0
CB112 83.28 2.12 0 TABULAR CB112 0
CB113 83.55 1.7 0 TABULAR CB113 0
CB114 85.3 0.25 0 TABULAR CB114 0
CB115 85.25 0.31 0 TABULAR CB115 0
CB116 85.2 0.4 0 TABULAR CB116 0
CB117 85.15 0.15 0 TABULAR CB117 0
CB118 85.22 0.18 0 TABULAR CB118 0
Roof_1 96.35 0.15 0 FUNCTIONAL 0 0 635 0
Roof_2 96.35 0.15 0 FUNCTIONAL 0 0 643 0
St_UnGrd 81.8 1 0 FUNCTIONAL 0 0 49 0

[CONDUITS]
;;Name From Node To Node Length Roughness InOffset
OutOffset InitFlow MaxFlow
CB110 0 0.08 CB111 CB112 28.913 0.013 83.59 83.34
CB111 0 0.04 CB113 CB112 31.317 0.013 83.55 83.36
CB112 0 0.04 CB110 CB111 20.475 0.013 83.75 83.59

[WEIRS]
;;Name From Node To Node Type CrestHt Qcoeff Gated
EndCon EndCoeff SurchARGE RoadWidth RoadSurf Coeff. Curve
W1 0 CB115 CB116 TRANSVERSE 85.45 1.84 NO
W2 0 CB115 CB117 TRANSVERSE 85.35 1.84 NO
W3 0 CB112 CB113 TRANSVERSE 85.38 1.84 NO
W4 0 CB114 CB115 TRANSVERSE 85.5 1.84 NO
W5 0 CB110 CB112 TRANSVERSE 85.6 1.84 NO

[OUTLETS]
;;Name From Node To Node Offset Type
QTable/Qcoeff Qexpon Gated
C2 CB112 STUB16 83.28 TABULAR/HEAD
Vortex_ICD_95 CB115 NO 85.25 TABULAR/HEAD ZURN_2150F-
6NH NO St_UnGrd 85.2 TABULAR/HEAD ZURN_2150F-
OL2 CB116 St_UnGrd 85.15 TABULAR/HEAD ZURN_2150F-
6NH NO St_UnGrd 85.15 TABULAR/HEAD ZURN_2150F-
OL3 CB117 St_UnGrd 96.35 TABULAR/HEAD O_Roof1
6NH NO St_UnGrd 96.35 TABULAR/HEAD O_Roof1
OL4 Roof_1 STUB15 96.35 TABULAR/HEAD O_Roof1
NO Roof_2 OF4 96.35 TABULAR/HEAD O_Roof1
OL5 St_UnGrd OF4 96.35 TABULAR/HEAD ZURN_2150F-
6NH NO St_UnGrd 81.8 TABULAR/HEAD O_St_UnGrd
OL7 St_UnGrd OF7 81.8 TABULAR/HEAD O_St_UnGrd
NO St_UnGrd 85.22 TABULAR/HEAD ZURN_2150F-
OL8 CB118 St_UnGrd 85.22 TABULAR/HEAD ZURN_2150F-
6NH NO

[XSECTIONS]
;;Link Shape Geom1 Geom2 Geom3 Geom4 Barrels
Culvert
C1 CIRCULAR 0.15 0 0 0 1
C3 CIRCULAR 0.15 0 0 0 1
C5 CIRCULAR 0.15 0 0 0 1
W1 RECT_OPEN 0.11 17.1 0 0
W2 RECT_OPEN 0.25 17.1 0 0
W3 RECT_OPEN 0.02 4.58 0 0
W4 RECT_OPEN 0.05 7 0 0
W5 RECT_OPEN 0.05 3.487 0 0

[LOSSES]
;;Link Kentry Kexit Kavg Flap Gate Seepage
Kentry Kexit Kavg Flap Gate Seepage

[INFLOWS]
;;Node Constituent Time Series Type Mfactor Sfactor Baseline
Pattern
St_UnGrd FLOW InfiltratedInflow FLOW 1.0 1 0

[CURVES]
;;Name Type X-Value Y-Value
Tempest Rating Curve for MHF IPEX TYPE A, No grate allowance
MHF_IPEX_TYPE_A Rating 0 0
MHF_IPEX_TYPE_A 0.1 0.0057
MHF_IPEX_TYPE_A 0.2 0.0081
MHF_IPEX_TYPE_A 0.3 0.0099
MHF_IPEX_TYPE_A 0.4 0.0114
MHF_IPEX_TYPE_A 0.5 0.0128
MHF_IPEX_TYPE_A 0.6 0.014
MHF_IPEX_TYPE_A 0.7 0.0151
MHF_IPEX_TYPE_A 0.8 0.0162
MHF_IPEX_TYPE_A 0.9 0.0172
MHF_IPEX_TYPE_A 1 0.0181
MHF_IPEX_TYPE_A 1.2 0.0198
MHF_IPEX_TYPE_A 1.4 0.0214
MHF_IPEX_TYPE_A 1.6 0.0229
MHF_IPEX_TYPE_A 1.8 0.0243
MHF_IPEX_TYPE_A 2 0.0256
MHF_IPEX_TYPE_A 2.5 0.0286
MHF_IPEX_TYPE_A 3 0.0313
Tempest Rating Curve for MHF IPEX TYPE B, No grate allowance
MHF_IPEX_TYPE_B Rating 0 0
MHF_IPEX_TYPE_B 0.1 0.0081
MHF_IPEX_TYPE_B 0.2 0.0115
MHF_IPEX_TYPE_B 0.3 0.0141
MHF_IPEX_TYPE_B 0.4 0.0162
MHF_IPEX_TYPE_B 0.5 0.0182
MHF_IPEX_TYPE_B 0.6 0.0199
MHF_IPEX_TYPE_B 0.7 0.0215
MHF_IPEX_TYPE_B 0.8 0.023
MHF_IPEX_TYPE_B 0.9 0.0244
MHF_IPEX_TYPE_B 1 0.0257
MHF_IPEX_TYPE_B 1.2 0.0281
MHF_IPEX_TYPE_B 1.4 0.0304
MHF_IPEX_TYPE_B 1.6 0.0325
MHF_IPEX_TYPE_B 1.8 0.0344
MHF_IPEX_TYPE_B 2 0.0363
MHF_IPEX_TYPE_B 2.5 0.0406
MHF_IPEX_TYPE_B 3 0.0445
Tempest Rating Curve for MHF IPEX TYPE C, No grate allowance
MHF_IPEX_TYPE_C Rating 0 0
MHF_IPEX_TYPE_C 0.1 0.0106
MHF_IPEX_TYPE_C 0.2 0.015
MHF_IPEX_TYPE_C 0.3 0.0183
MHF_IPEX_TYPE_C 0.4 0.0212
MHF_IPEX_TYPE_C 0.5 0.0237
MHF_IPEX_TYPE_C 0.6 0.0259
MHF_IPEX_TYPE_C 0.7 0.028
MHF_IPEX_TYPE_C 0.8 0.0299
MHF_IPEX_TYPE_C 0.9 0.0317
MHF_IPEX_TYPE_C 1 0.0335
MHF_IPEX_TYPE_C 1.2 0.0366
MHF_IPEX_TYPE_C 1.4 0.0396
MHF_IPEX_TYPE_C 1.6 0.0423
MHF_IPEX_TYPE_C 1.8 0.0449
MHF_IPEX_TYPE_C 2 0.0473
MHF_IPEX_TYPE_C 2.5 0.0529
MHF_IPEX_TYPE_C 3 0.0579
Tempest Rating Curve for MHF IPEX TYPE D, No grate allowance
MHF_IPEX_TYPE_D Rating 0 0
MHF_IPEX_TYPE_D 0.1 0.0154
MHF_IPEX_TYPE_D 0.2 0.0217
MHF_IPEX_TYPE_D 0.3 0.0266
MHF_IPEX_TYPE_D 0.4 0.0307
MHF_IPEX_TYPE_D 0.5 0.0343
MHF_IPEX_TYPE_D 0.6 0.0376
MHF_IPEX_TYPE_D 0.7 0.0406
MHF_IPEX_TYPE_D 0.8 0.0434

```


Post-Development 3-hour Chicago 1:2 year Event

```

InfiltratedInflow 01/01/2000 03:04:00 5.458821E-07
InfiltratedInflow 01/01/2000 03:05:00 3.720303E-07
InfiltratedInflow 01/01/2000 03:06:00 2.668294E-07
InfiltratedInflow 01/01/2000 03:07:00 1.989971E-07
InfiltratedInflow 01/01/2000 03:08:00 1.530554E-07
InfiltratedInflow 01/01/2000 03:09:00 1.206954E-07
InfiltratedInflow 01/01/2000 03:10:00 9.71604E-08
InfiltratedInflow 01/01/2000 03:11:00 7.958157E-08
InfiltratedInflow 01/01/2000 03:12:00 6.415256E-08
InfiltratedInflow 01/01/2000 03:13:00 5.5694E-08
InfiltratedInflow 01/01/2000 03:14:00 4.741166E-08
InfiltratedInflow 01/01/2000 03:15:00 4.075622E-08
InfiltratedInflow 01/01/2000 03:16:00 3.53387E-08
InfiltratedInflow 01/01/2000 03:17:00 3.087828E-08
InfiltratedInflow 01/01/2000 03:18:00 2.716789E-08
InfiltratedInflow 01/01/2000 03:19:00 2.405291E-08
InfiltratedInflow 01/01/2000 03:20:00 2.14159E-08
InfiltratedInflow 01/01/2000 03:21:00 1.916655E-08
InfiltratedInflow 01/01/2000 03:22:00 1.723456E-08
InfiltratedInflow 01/01/2000 03:23:00 1.556459E-08
InfiltratedInflow 01/01/2000 03:24:00 1.411267E-08
InfiltratedInflow 01/01/2000 03:25:00 1.284352E-08
InfiltratedInflow 01/01/2000 03:26:00 1.172859E-08
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InfiltratedInflow 01/01/2000 03:28:00 9.872395E-09
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InfiltratedInflow 01/01/2000 03:30:00 8.402821E-09
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InfiltratedInflow 01/01/2000 03:38:00 4.812527E-09
InfiltratedInflow 01/01/2000 03:39:00 4.524653E-09
InfiltratedInflow 01/01/2000 03:40:00 4.255984E-09
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InfiltratedInflow 01/01/2000 03:42:00 3.79291E-09
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InfiltratedInflow 01/01/2000 03:53:00 2.172E-09
InfiltratedInflow 01/01/2000 03:54:00 2.076386E-09
InfiltratedInflow 01/01/2000 03:55:00 1.986563E-09
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InfiltratedInflow 01/01/2000 03:58:00 1.747602E-09
InfiltratedInflow 01/01/2000 03:59:00 1.676895E-09
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InfiltratedInflow 01/01/2000 04:01:00 0
InfiltratedInflow 01/01/2000 04:02:00 0
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InfiltratedInflow 01/01/2000 04:09:00 0
InfiltratedInflow 01/01/2000 04:10:00 0
InfiltratedInflow 01/01/2000 04:11:00 0
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InfiltratedInflow 01/01/2000 05:58:00 0
InfiltratedInflow 01/01/2000 05:59:00 0
InfiltratedInflow 01/01/2000 06:00:00 0

```

```

[REPORT]
;;Reporting Options
INPUT YES
CONTROLS
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]
Subcatch S1 Ramp
Subcatch S5 Building
Subcatch S6 ParkingLot
Subcatch S7 ParkingLot
Subcatch S8 Building
Subcatch S9 ParkingLot
Node St_UnGrd Underground_Storage

[MAP]
DIMENSIONS 381280,91645 5032948,93205 381379,86255 5033068,41295
UNITS Meters

[COORDINATES]
;;Node X-Coord Y-Coord
-----
OF4 381364.593 5032973.357
OF7 381346.502 5032963.916
STUB15 381335.776 5032954.363
STUB16 381319.979 5032958.277
CB110 381293.102 5033002.513
CB111 381307.131 5032987.6
CB112 381319.643 5032961.536
CB113 381348.344 5032974.064
CB114 381332.566 5033036.058
CB115 381332.827 5033018.906
CB116 381338.815 5033005.189
CB117 381344.774 5032991.539
CB118 381359.473 5032992.996
Roof_1 381325.164 5032977.273
Roof_2 381361.335 5033013.684
St_UnGrd 381329.806 5032972.84

[VERTICES]
;;Link X-Coord Y-Coord
-----
W3 381322.829 5032965.271
W3 NO 381343.656 5032974.514
W5 381295.919 5033002.386
W5 381309.233 5032988.935
W5 381320.071 5033006.527
OL6 381323.041 5033005.693

[POLYGONS]
;;Subcatchment X-Coord Y-Coord
-----
S1 381344.215 5032984.464
S1 381347.856 5032976.123
S1 381337.733 5032971.705
S1 381334.493 5032979.128
S1 381341.864 5032982.351
S1 381344.215 5032984.464
S10 381360.442 5032996.777
S10 381355.738 5032997.554
S10 381357.523 5032998.333
S10 381358.678 5032998.837
S10 381359.142 5032997.774
S10 381369.264 5033002.193
S10 381368.8 5033003.256
S10 381374.019 5033005.534
S10 381375.365 5033006.452
S10 381360.442 5032986.777
S11 381341.862 5033062.982
S11 381348.903 5033062.839
S11 381355.186 5033056.237
S11 381352.72 5033054.328
S11 381336.223 5033047.127
S11 381340.298 5033037.792
S11 381338.894 5033036.045
S11 381327.521 5033018.08
S11 381325.697 5033035.259
S11 381319.536 5033040.417
S11 381328.068 5033049.243
S11 381327.155 5033052.4
S11 381330.052 5033055.329
S11 381335.192 5033057.864
S11 381336.099 5033058.311
S11 381336.581 5033058.572
S11 381337.055 5033058.848
S11 381337.521 5033059.137
S11 381337.977 5033059.441
S11 381338.424 5033059.758
S11 381338.861 5033060.089
S11 381341.862 5033062.982
S2 381339.051 5032968.685
S2 381337.931 5032976.251
S2 381337.733 5032971.705
S2 381347.856 5032976.123
S2 381352.652 5032978.217
S2 381352.769 5032978.256
S2 381352.887 5032978.313
S2 381353.006 5032978.356
S2 381352.331 5032977.428
S2 381349.581 5032976.228
S2 381350.662 5032973.753
S2 381339.051 5032968.685
S3 381318.259 5032957.972
S3 381307.625 5032952.321
S3 381303.659 5032986.085
S3 381310.51 5032989.076
S3 381321.435 5032964.05
S3 381337.931 5032976.251
S3 381339.051 5032968.685
S3 381319.267 5032960.048
S3 381318.259 5032957.972
S4 381303.659 5032986.085
S4 381285.414 5033003.349
S4 381304.879 5033024.646
S4 381311.368 5033017.747
S4 381300.135 5033012.843
S4 381310.51 5032989.076
S4 381303.659 5032986.085

```

Post-Development 3-hour Chicago 1:2 year Event

S5 381316.631 5033020.045
 S5 381320.706 5033010.711
 S5 381318.612 5033009.797
 S5 381319.652 5033007.414
 S5 381321.746 5033008.328
 S5 381327.851 5032994.342
 S5 381334.493 5032979.128
 S5 381337.733 5032971.705
 S5 381337.931 5032971.251
 S5 381321.435 5032964.05
 S5 381310.51 5032989.076
 S5 381300.135 5033012.843
 S5 381311.368 5033017.747
 S5 381316.631 5033020.045
 S6 381327.521 5033031.08
 S6 381338.894 5033036.045
 S6 381340.298 5033037.792
 S6 381342.392 5033038.706
 S6 381343.432 5033036.323
 S6 381341.338 5033035.409
 S6 381349.093 5033017.644
 S6 381343.736 5033015.306
 S6 381335.821 5033012.047
 S6 381326.803 5033010.853
 S6 381325.27 5033009.866
 S6 381321.746 5033008.328
 S6 381319.652 5033007.414
 S6 381318.612 5033009.797
 S6 381320.706 5033010.711
 S6 381316.631 5033020.045
 S6 381311.368 5033017.747
 S6 381304.879 5033024.646
 S6 381307.751 5033027.787
 S6 381319.536 5033040.417
 S6 381325.697 5033035.259
 S6 381327.521 5033031.08
 S7 381354.292 5033005.735
 S7 381349.118 5033003.477
 S7 381341.795 5032998.364
 S7 381333.208 5032996.68
 S7 381327.851 5032994.342
 S7 381321.746 5033008.328
 S7 381325.27 5033009.866
 S7 381326.803 5033010.853
 S7 381335.821 5033012.047
 S7 381349.093 5033017.644
 S7 381354.292 5033005.735
 S7 381336.223 5033047.127
 S8 381352.72 5033054.328
 S8 381374.019 5033005.534
 S8 381368.8 5033003.256
 S8 381369.264 5033002.193
 S8 381359.142 5032997.774
 S8 381358.678 5032998.837
 S8 381357.523 5032998.333
 S8 381355.797 5033002.286
 S8 381341.338 5033035.409
 S8 381343.432 5033036.323
 S8 381342.392 5033038.706
 S8 381340.298 5033037.792
 S8 381336.223 5033047.127
 S9 381360.442 5032986.777
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 S9 381353.006 5032978.356
 S9 381352.846 5032978.297
 S9 381352.688 5032978.233
 S9 381347.856 5032976.123
 S9 381344.215 5032984.464
 S9 381341.866 5032982.347
 S9 381334.493 5032979.128
 S9 381327.851 5032994.342
 S9 381333.208 5032996.68
 S9 381341.795 5032998.364
 S9 381349.118 5033003.477
 S9 381354.292 5033005.735
 S9 381357.523 5032998.333
 S9 381355.738 5032997.554
 S9 381360.442 5032986.777

```
;;Storage Node X-Coord Y-Coord
;;
[SYMBOLS]
;;Gage X-Coord Y-Coord
;;
```

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

***** Element Count *****

```
Number of rain gages ..... 1
Number of subcatchments ... 11
Number of nodes ..... 16
Number of links ..... 17
Number of pollutants ..... 0
Number of land uses ..... 0
```

***** Raingage Summary *****

Name	Data Source	Data Type	Recording Interval
Rainfall	3CHI002	INTENSITY	10 min.

***** Subcatchment Summary *****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.01	6.10	100.00	15.0000	Rainfall	
St_UnGrd						
S10	0.01	29.00	8.79	1.0000	Rainfall	CB118
S11	0.05	70.00	18.80	2.0000	Rainfall	CB114
S2	0.00	4.30	0.00	1.9000	Rainfall	CB113
S3	0.02	75.00	17.80	1.0000	Rainfall	CB112
S4	0.04	52.00	8.51	3.5000	Rainfall	CB110
S5	0.10	105.00	100.00	1.0000	Rainfall	Roof_1
S6	0.08	45.00	66.78	2.5000	Rainfall	CB115
S7	0.04	28.60	90.42	2.7000	Rainfall	CB116
S8	0.10	105.00	100.00	1.0000	Rainfall	Roof_2
S9	0.05	50.00	93.57	2.4000	Rainfall	CB117

***** Node Summary *****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OF4	OUTFALL	80.63	0.00	0.0	
OF7	OUTFALL	80.63	0.00	0.0	
STUB15	OUTFALL	80.63	0.00	0.0	
STUB16	OUTFALL	80.65	0.00	0.0	
CB110	STORAGE	83.75	1.90	0.0	
CB111	STORAGE	83.59	2.01	0.0	
CB112	STORAGE	83.28	2.12	0.0	
CB113	STORAGE	83.55	1.70	0.0	
CB114	STORAGE	85.30	0.25	0.0	
CB115	STORAGE	85.25	0.31	0.0	
CB116	STORAGE	85.20	0.40	0.0	
CB117	STORAGE	85.15	0.15	0.0	
CB118	STORAGE	85.22	0.18	0.0	
Roof_1	STORAGE	96.35	0.15	0.0	
Roof_2	STORAGE	96.35	0.15	0.0	
St_UnGrd	STORAGE	81.80	1.00	0.0	Yes

***** Link Summary *****

Name	Roughness	From Node	To Node	Type	Length	%Slope
C1	0.0130	CB111	CB112	CONDUIT	28.9	0.8647
C3	0.0130	CB113	CB112	CONDUIT	31.3	0.6067
C5	0.0130	CB110	CB111	CONDUIT	20.5	0.7815
W1		CB115	CB116	WEIR		
W2		CB116	CB117	WEIR		
W3		CB112	CB113	WEIR		
W4		CB114	CB115	WEIR		
W5		CB110	CB112	WEIR		
C2		CB112	STUB16	OUTLET		
OL1		CB115	St_UnGrd	OUTLET		
OL2		CB116	St_UnGrd	OUTLET		
OL3		CB117	St_UnGrd	OUTLET		
OL4		Roof_1	STUB15	OUTLET		
OL5		Roof_2	OF4	OUTLET		
OL6		CB114	St_UnGrd	OUTLET		
OL7		St_UnGrd	OF7	OUTLET		
OL8		CB118	St_UnGrd	OUTLET		

***** Cross Section Summary *****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.15	0.02	0.04	0.15	1	0.01
C3	CIRCULAR	0.15	0.02	0.04	0.15	1	0.01
C5	CIRCULAR	0.15	0.02	0.04	0.15	1	0.01

***** Analysis Options *****

```
Flow Units ..... CMS
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 ..... 01/01/2000 00:00:00
Ending Date ..... 01/01/2000 06:00:00
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 ..... YES
Maximum Trials ..... 8
Number of Threads ..... 1
Head Tolerance ..... 0.001500 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.016	31.879
Evaporation Loss	0.000	0.000
Infiltration Loss	0.005	9.717
Surface Runoff	0.011	21.078
Final Storage	0.001	1.117
Continuity Error (%)	-0.103	

Post-Development 3-hour Chicago 1:2 year Event

	Volume hectare-m	Volume 10 ⁶ ltr
Flow Routing Continuity	0.000	0.000
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.011	0.107
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.002
External Outflow	0.011	0.109
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 (%)	0.000	

 Highest Continuity Errors

 Node CB113 (18.32%)

 Time-Step Critical Elements

 None

 Highest Flow Instability Indexes

 Link OL7 (7)

 Most Frequent Nonconverging Nodes

 Convergence obtained at all time steps.

 Routing Time Step Summary

Minimum Time Step	: 4.50 sec
Average Time Step	: 5.00 sec
Maximum Time Step	: 5.00 sec
% of Time in Steady State	: 0.00
Average Iterations per Step	: 2.00
% of Steps Not Converging	: 0.00
Time Step Frequencies	:
5.000 - 3.155 sec	: 100.00 %
3.155 - 1.991 sec	: 0.00 %
1.991 - 1.256 sec	: 0.00 %
1.256 - 0.792 sec	: 0.00 %
0.792 - 0.500 sec	: 0.00 %

 Subcatchment Runoff Summary

Total Runoff Subcatchment mm	Total Runoff 10 ⁶ ltr	Peak Runoff CMS	Total Runoff Precip mm	Total Runoff mm	Total Evap mm	Total Infil mm	Total Imperv Runoff mm	Total Perv Runoff mm
S1			31.88	0.00	0.00	0.00	30.36	0.00
30.36	0.00	0.00	0.952					
S10			31.88	0.00	0.00	30.55	2.67	1.20
1.20	0.00	0.00	0.038			28.60	5.71	3.00
S11			31.88	0.00	0.00	0.04		
3.00	0.00	0.00	31.88	0.00	0.00	31.75	0.00	0.13
S2			31.88	0.00	0.00	0.004		
0.13	0.00	0.00	31.88	0.00	0.00	28.56	5.40	3.07
S3			31.88	0.00	0.00	0.096		
3.07	0.00	0.00	31.88	0.00	0.00	30.56	2.58	1.20
S4			31.88	0.00	0.00	0.038		
1.20	0.00	0.00	31.88	0.00	0.00	0.00	30.35	0.00
S5			31.88	0.00	0.00	0.952		
30.36	0.03	0.02	31.88	0.00	0.00	10.52	20.27	0.07
S6			31.88	0.00	0.00	0.638		
20.34	0.02	0.01	31.88	0.00	0.00	3.01	27.44	0.05
S7			31.88	0.00	0.00	0.862		
27.49	0.01	0.01	31.88	0.00	0.00	0.00	30.35	0.00
S8			31.88	0.00	0.00	0.952		
30.36	0.03	0.02	31.88	0.00	0.00	2.01	28.40	0.04
S9			31.88	0.00	0.00			
28.44	0.02	0.01	0.892					

 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
OF4	OUTFALL	0.48	0.48	81.11	0 00:00	0.48
OF7	OUTFALL	0.48	0.48	81.11	0 00:00	0.48
STUB15	OUTFALL	0.48	0.48	81.11	0 00:00	0.48
STUB16	OUTFALL	0.63	0.63	81.28	0 00:00	0.63
CB110	STORAGE	0.00	0.03	83.78	0 01:10	0.03
CB111	STORAGE	0.00	0.03	83.62	0 01:11	0.03
CB112	STORAGE	0.00	0.09	83.37	0 01:11	0.09
CB113	STORAGE	0.00	0.00	83.55	0 01:14	0.00
CB114	STORAGE	0.00	0.01	85.31	0 01:10	0.01
CB115	STORAGE	0.00	0.02	85.27	0 01:10	0.02
CB116	STORAGE	0.00	0.02	85.22	0 01:10	0.02
CB117	STORAGE	0.00	0.02	85.17	0 01:10	0.02
CB118	STORAGE	0.00	0.00	85.22	0 01:10	0.00
Roof_1	STORAGE	0.01	0.03	96.38	0 01:40	0.03
Roof_2	STORAGE	0.01	0.03	96.38	0 01:40	0.03
St_UnGrd	STORAGE	0.00	0.06	81.86	0 01:10	0.06

 Node Inflow Summary

Flow	Maximum Lateral	Maximum Total	Maximum Time of Max Occurrence	Lateral Inflow	Total Inflow
Balance					
Error Node Percent	Type	CMS	days hr:min	10 ⁶ ltr	10 ⁶ ltr
OF4	OUTFALL	0.000	0 00:51	0	0.0293
0.000					
OF7	OUTFALL	0.000	0 01:02	0	0.0495
0.000					
STUB15	OUTFALL	0.000	0 00:51	0	0.0289
0.000					
STUB16	OUTFALL	0.000	0 01:11	0	0.00119
0.000					
CB110	STORAGE	0.001	0 01:10	0.000515	0.000515
-0.097					

CB111	STORAGE	0.000	0.001	0 01:10	0	0.000515
0.658						
CB112	STORAGE	0.002	0.002	0 01:10	0.000669	0.00119
0.004						
CB113	STORAGE	0.000	0.000	0 01:10	5.84e-06	5.84e-06
1.070 ltr						
CB114	STORAGE	0.003	0.003	0 01:10	0.00142	0.00142
-0.001						
CB115	STORAGE	0.012	0.012	0 01:10	0.0163	0.0163
-0.013						
CB116	STORAGE	0.008	0.008	0 01:10	0.0114	0.0114
-0.017						
CB117	STORAGE	0.011	0.011	0 01:10	0.0155	0.0155
-0.013						
CB118	STORAGE	0.000	0.000	0 01:10	0.000166	0.000166
0.006						
Roof_1	STORAGE	0.020	0.020	0 01:10	0.0289	0.0289
-0.002						
Roof_2	STORAGE	0.021	0.021	0 01:10	0.0293	0.0293
-0.002						
St_UnGrd	STORAGE	0.003	0.037	0 01:10	0.00465	0.0495
0.005						

 Node Surcharge Summary

No nodes were surcharged.

 Node Flooding Summary

No nodes were flooded.

 Storage Volume Summary

Maximum Outflow Storage Unit CMS	Average Volume 1000 m ³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m ³	Max Pcnt Full	Time of Max Occurrence days hr:min
CB110	0.000	0.0	0.0	0.0	0.000	0.0	0 01:10
0.001							
CB111	0.000	0.1	0.0	0.0	0.000	1.4	0 01:11
0.001							
CB112	0.000	0.0	0.0	0.0	0.000	1.1	0 01:11
0.002							
CB113	0.000	0.0	0.0	0.0	0.000	0.1	0 01:14
0.000							
CB114	0.000	0.0	0.0	0.0	0.000	0.2	0 01:10
0.003							
CB115	0.000	0.0	0.0	0.0	0.000	0.7	0 01:10
0.012							
CB116	0.000	0.0	0.0	0.0	0.000	0.3	0 01:10
0.008							
CB117	0.000	0.1	0.0	0.0	0.000	2.3	0 01:10
0.011							
CB118	0.000	0.0	0.0	0.0	0.000	0.0	0 01:10
0.000							
Roof_1	0.007	6.9	0.0	0.0	0.017	17.6	0 01:40
0.002							
Roof_2	0.007	7.1	0.0	0.0	0.017	17.7	0 01:40
0.002							
St_UnGrd	0.000	0.1	0.0	0.0	0.003	5.6	0 01:10
0.029							

 Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10 ⁶ ltr
OF4	74.27	0.002	0.002	0.029
OF7	58.74	0.004	0.029	0.049
STUB15	73.34	0.002	0.002	0.029
STUB16	6.60	0.001	0.002	0.001
System	53.23	0.008	0.035	0.109

 Link Flow Summary

Link	Type	Maximum [Flow] CMS	Time of Max Occurrence days hr:min	Maximum [Veloc] m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.001	0 01:11	0.47	0.08	0.19
C3	CONDUIT	0.000	0 01:12	0.07	0.00	0.03
C5	CONDUIT	0.001	0 01:10	0.61	0.10	0.19
W1	WEIR	0.000	0 00:00			0.00
W2	WEIR	0.000	0 00:00			0.00
W3	WEIR	0.000	0 00:00			0.00
W4	WEIR	0.000	0 00:00			0.00
W5	WEIR	0.000	0 00:00			0.00
C2	DUMMY	0.002	0 01:11			
OL1	DUMMY	0.012	0 01:10			
OL2	DUMMY	0.008	0 01:10			
OL3	DUMMY	0.011	0 01:10			
OL4	DUMMY	0.002	0 00:51			
OL5	DUMMY	0.002	0 00:51			
OL6	DUMMY	0.003	0 01:10			
OL7	DUMMY	0.029	0 01:02			
OL8	DUMMY	0.000	0 01:10			

 Flow Classification Summary

Conduit	Adjusted /Actual Length	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.19	0.00	0.00	0.00	0.00	0.81	0.00	0.00
C3	1.00	0.19	0.00	0.00	0.01	0.00	0.80	0.00	0.00
C5	1.00	0.19	0.00	0.00	0.80	0.01	0.00	0.00	0.00

 Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Thu Oct 10 10:09:49 2024
 Analysis ended on: Thu Oct 10 10:09:49 2024
 Total elapsed time: < 1 sec

Post-Development 3-hour Chicago 1:100 year Event

Post-Development 3-hour Chicago 1:100-year Event

```

[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option Value
FLOW_UNITS CMS
INFILTRATION HORTON
FLOW_ROUTING DYNWAVE
LINK_OFFSETS ELEVATION
MIN_SLOPE 0
ALLOW_PONDING NO
SKIP_STEADY_STATE NO

START_DATE 01/01/2000
START_TIME 00:00:00
REPORT_START_DATE 01/01/2000
REPORT_START_TIME 00:00:00
END_DATE 01/01/2000
END_TIME 06:00:00
SWEEP_START 01/01
SWEEP_END 12/31
DRY_DAYS 0
REPORT_STEP 00:01:00
WET_STEP 00:01:00
DRY_STEP 00:01:00
ROUTING_STEP 5
RULE_STEP 00:00:00

INERTIAL_DAMPING PARTIAL
NORMAL_FLOW_LIMITED BOTH
FORCE_MAIN_EQUATION H-W
VARIABLE_STEP 0.75
LENGTHENING_STEP 0
MIN_SURFAREA 0
MAX_TRIALS 8
HEAD_TOLERANCE 0.0015
SYS_FLOW_TOL 5
LAT_FLOW_TOL 5
MINIMUM_STEP 0.5
THREADS 12

[EVAPORATION]
;;Data Source Parameters
CONSTANT 0.0
DRY_ONLY NO

[RAINGAGES]
;;Name Format Interval SCF Source
Rainfall INTENSITY 0:10 1.0 TIMESERIES 3CHI100

[SUBCATCHMENTS]
;;Name Rain Gage Outlet Area %Imperv Width %Slope
CurbLen SnowPack
S1 Rainfall St_UnGrd 0.0091 100 6.1 15 0
S10 Rainfall CB118 0.0138 8.79 28.998 1 0
S11 Rainfall CB114 0.0473 18.805 70.001 2 0
S2 Rainfall CB113 0.0044 0.002 4.3 1.9 0
S3 Rainfall CB112 0.0218 17.802 75 1 0
S4 Rainfall CB110 0.043 8.51 52.001 3.5 0
S5 Rainfall Roof_1 0.0952 99.998 104.996 1 0
S6 Rainfall CB115 0.0803 66.775 45.001 2.5 0
S7 Rainfall CB116 0.0416 90.416 28.601 2.7 0
S8 Rainfall Roof_2 0.0965 100 105.005 1 0
S9 Rainfall CB117 0.0544 93.568 50 2.4 0

[SUBAREAS]
;;Subcatchment N-Imperv N-Perv S-Imperv S-Perv PctZero RouteTo
PctRouted
S1 0.013 0.25 1.57 4.67 0 OUTLET
S10 0.013 0.25 1.57 4.67 0 PERVIOUS 100
S11 0.013 0.25 1.57 4.67 0 PERVIOUS 100
S2 0.013 0.25 1.57 4.67 0 OUTLET
S3 0.013 0.25 1.57 4.67 0 PERVIOUS 100
S4 0.013 0.25 1.57 4.67 0 PERVIOUS 100
S5 0.013 0.25 1.57 4.67 0 OUTLET
S6 0.013 0.25 1.57 4.67 0 OUTLET
S7 0.013 0.25 1.57 4.67 0 OUTLET
S8 0.013 0.25 1.57 4.67 0 OUTLET
S9 0.013 0.25 1.57 4.67 0 OUTLET

[INFILTRATION]
;;Subcatchment Param1 Param2 Param3 Param4 Param5
S1 76.2 13.2 4.14 7 0
S10 76.2 13.2 4.14 7 0
S11 76.2 13.2 4.14 7 0
S2 76.2 13.2 4.14 7 0
S3 76.2 13.2 4.14 7 0
S4 76.2 13.2 4.14 7 0
S5 76.2 13.2 4.14 7 0
S6 76.2 13.2 4.14 7 0
S7 76.2 13.2 4.14 7 0
S8 76.2 13.2 4.14 7 0
S9 76.2 13.2 4.14 7 0

[OUTFALLS]
;;Name Elevation Type Stage Data Gated Route To
OF4 80.628 FIXED 81.11 NO
OF7 80.628 FIXED 81.11 NO
STUB15 80.628 FIXED 81.11 NO
STUB16 80.646 FIXED 81.28 NO

[STORAGE]
;;Name Elev. Ps1 MaxDepth Ksat InidDepth IMD Shape Curve Name/Params
SurDepth Fevap
CB110 83.75 1.9 0 TABULAR CB110 0
CB111 83.59 2.01 0 TABULAR CB111 0
CB112 83.28 2.12 0 TABULAR CB112 0
CB113 83.55 1.7 0 TABULAR CB113 0
CB114 85.3 0.25 0 TABULAR CB114 0
CB115 85.25 0.31 0 TABULAR CB115 0
CB116 85.2 0.4 0 TABULAR CB116 0
CB117 85.15 0.15 0 TABULAR CB117 0
CB118 85.22 0.18 0 TABULAR CB118 0
Roof_1 96.35 0.15 0 FUNCTIONAL 0 0 635 0
Roof_2 96.35 0.15 0 FUNCTIONAL 0 0 643 0
St_UnGrd 81.8 1 0 FUNCTIONAL 0 0 49 0

[CONDUITS]
;;Name From Node To Node Length Roughness InOffset
OutOffset InitFlow MaxFlow

```

```

C1 0 CB111 CB112 28.913 0.013 83.59 83.34
C3 0 0.08 CB113 CB112 31.317 0.013 83.55 83.36
C5 0 0.04 CB110 CB111 20.475 0.013 83.75 83.59

[WEIRS]
;;Name From Node To Node RoadWidth RoadSurf Type CrestHt Qcoeff Gated
EndCon EndCoeff Surcharge
W1 0 NO CB115 CB116 TRANSVERSE 85.45 1.84 NO
W2 0 NO CB116 CB117 TRANSVERSE 85.35 1.84 NO
W3 0 NO CB112 CB113 TRANSVERSE 85.38 1.84 NO
W4 0 NO CB114 CB115 TRANSVERSE 85.5 1.84 NO
W5 0 NO CB110 CB112 TRANSVERSE 85.6 1.84 NO

[OUTLETS]
;;Name From Node To Node Offset Type
QTable/Qcoeff Qexpon Gated
C2 Vortex_ICD_95 CB112 NO STUB16 83.28 TABULAR/HEAD
OL1 CB115 St_UnGrd 85.25 TABULAR/HEAD ZURN_Z150F-
OL2 NO St_UnGrd 85.2 TABULAR/HEAD ZURN_Z150F-
OL3 CB117 St_UnGrd 85.15 TABULAR/HEAD ZURN_Z150F-
OL4 NO Roof_1 STUB15 96.35 TABULAR/HEAD O_Roof1
OL5 NO Roof_2 OF4 96.35 TABULAR/HEAD O_Roof1
OL6 CB114 St_UnGrd 85.3 TABULAR/HEAD ZURN_Z150F-
OL7 NO St_UnGrd OF7 81.8 TABULAR/HEAD O_St_UnGrd
OL8 NO CB118 St_UnGrd 85.22 TABULAR/HEAD ZURN_Z150F-
OL9 NO

[XSECTIONS]
;;Link Culvert Shape Geom1 Geom2 Geom3 Geom4 Barrels
C1 CIRCULAR 0.15 0 0 0 1
C3 CIRCULAR 0.15 0 0 0 1
C5 CIRCULAR 0.15 0 0 0 1
W1 RECT_OPEN 0.11 17.1 0 0 0
W2 RECT_OPEN 0.25 17.1 0 0 0
W3 RECT_OPEN 0.02 4.58 0 0 0
W4 RECT_OPEN 0.05 7 0 0 0
W5 RECT_OPEN 0.05 3.487 0 0 0

[LOSSES]
;;Link Kentry Kexit Kavg Flap Gate Seepage
St_UnGrd FLOW InfiltratedInflow FLOW 1.0 1 0

[CURVES]
;;Name Type X-Value Y-Value
;Tempest Rating Curve for MHF IPEX TYPE A, No grate allowance
MHF_IPEX_TYPE_A Rating 0 0.0057
MHF_IPEX_TYPE_A 0.2 0.0081
MHF_IPEX_TYPE_A 0.3 0.0099
MHF_IPEX_TYPE_A 0.4 0.0114
MHF_IPEX_TYPE_A 0.5 0.0128
MHF_IPEX_TYPE_A 0.6 0.014
MHF_IPEX_TYPE_A 0.7 0.0151
MHF_IPEX_TYPE_A 0.8 0.0162
MHF_IPEX_TYPE_A 0.9 0.0172
MHF_IPEX_TYPE_A 1 0.0181
MHF_IPEX_TYPE_A 1.2 0.0198
MHF_IPEX_TYPE_A 1.4 0.0214
MHF_IPEX_TYPE_A 1.6 0.0229
MHF_IPEX_TYPE_A 1.8 0.0243
MHF_IPEX_TYPE_A 2 0.0256
MHF_IPEX_TYPE_A 2.5 0.0286
MHF_IPEX_TYPE_A 3 0.0313
;Tempest Rating Curve for MHF IPEX TYPE B, No grate allowance
MHF_IPEX_TYPE_B Rating 0 0.0081
MHF_IPEX_TYPE_B 0.1 0.0115
MHF_IPEX_TYPE_B 0.2 0.0141
MHF_IPEX_TYPE_B 0.3 0.0162
MHF_IPEX_TYPE_B 0.4 0.0181
MHF_IPEX_TYPE_B 0.5 0.0199
MHF_IPEX_TYPE_B 0.6 0.0215
MHF_IPEX_TYPE_B 0.7 0.0229
MHF_IPEX_TYPE_B 0.8 0.0243
MHF_IPEX_TYPE_B 0.9 0.0257
MHF_IPEX_TYPE_B 1 0.0271
MHF_IPEX_TYPE_B 1.2 0.0281
MHF_IPEX_TYPE_B 1.4 0.0304
MHF_IPEX_TYPE_B 1.6 0.0325
MHF_IPEX_TYPE_B 1.8 0.0344
MHF_IPEX_TYPE_B 2 0.0363
MHF_IPEX_TYPE_B 2.5 0.0406
MHF_IPEX_TYPE_B 3 0.0445
;Tempest Rating Curve for MHF IPEX TYPE C, No grate allowance
MHF_IPEX_TYPE_C Rating 0 0.0106
MHF_IPEX_TYPE_C 0.1 0.015
MHF_IPEX_TYPE_C 0.2 0.0183
MHF_IPEX_TYPE_C 0.3 0.0212
MHF_IPEX_TYPE_C 0.4 0.0237
MHF_IPEX_TYPE_C 0.5 0.0259
MHF_IPEX_TYPE_C 0.6 0.028
MHF_IPEX_TYPE_C 0.7 0.0299
MHF_IPEX_TYPE_C 0.8 0.0317
MHF_IPEX_TYPE_C 0.9 0.0335
MHF_IPEX_TYPE_C 1 0.0356
MHF_IPEX_TYPE_C 1.2 0.0366
MHF_IPEX_TYPE_C 1.4 0.0396
MHF_IPEX_TYPE_C 1.6 0.0423
MHF_IPEX_TYPE_C 1.8 0.0449
MHF_IPEX_TYPE_C 2 0.0473
MHF_IPEX_TYPE_C 2.5 0.0529
MHF_IPEX_TYPE_C 3 0.0579
;Tempest Rating Curve for MHF IPEX TYPE D, No grate allowance
MHF_IPEX_TYPE_D Rating 0 0.0154
MHF_IPEX_TYPE_D 0.1 0.0217
MHF_IPEX_TYPE_D 0.2 0.0266
MHF_IPEX_TYPE_D 0.3 0.0307
MHF_IPEX_TYPE_D 0.4 0.0343
MHF_IPEX_TYPE_D 0.5 0.0376
MHF_IPEX_TYPE_D 0.6 0.0406
MHF_IPEX_TYPE_D 0.7 0.0434
MHF_IPEX_TYPE_D 0.8 0.0461
MHF_IPEX_TYPE_D 0.9 0.0485
MHF_IPEX_TYPE_D 1 0.0512
MHF_IPEX_TYPE_D 1.2 0.0532
MHF_IPEX_TYPE_D 1.4 0.0574

```


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```

InfiltratedInflow 01/01/2000 03:29:00 9.500691E-09
InfiltratedInflow 01/01/2000 03:30:00 8.764469E-09
InfiltratedInflow 01/01/2000 03:31:00 8.105708E-09
InfiltratedInflow 01/01/2000 03:32:00 7.514236E-09
InfiltratedInflow 01/01/2000 03:33:00 6.981469E-09
InfiltratedInflow 01/01/2000 03:34:00 6.500121E-09
InfiltratedInflow 01/01/2000 03:35:00 6.063984E-09
InfiltratedInflow 01/01/2000 03:36:00 5.667742E-09
InfiltratedInflow 01/01/2000 03:37:00 5.308823E-09
InfiltratedInflow 01/01/2000 03:38:00 4.972778E-09
InfiltratedInflow 01/01/2000 03:39:00 4.675687E-09
InfiltratedInflow 01/01/2000 03:40:00 4.399072E-09
InfiltratedInflow 01/01/2000 03:41:00 4.144837E-09
InfiltratedInflow 01/01/2000 03:42:00 3.910706E-09
InfiltratedInflow 01/01/2000 03:43:00 3.69468E-09
InfiltratedInflow 01/01/2000 03:44:00 3.494999E-09
InfiltratedInflow 01/01/2000 03:45:00 3.310106E-09
InfiltratedInflow 01/01/2000 03:46:00 3.138622E-09
InfiltratedInflow 01/01/2000 03:47:00 2.979323E-09
InfiltratedInflow 01/01/2000 03:48:00 2.831117E-09
InfiltratedInflow 01/01/2000 03:49:00 2.69303E-09
InfiltratedInflow 01/01/2000 03:50:00 2.564192E-09
InfiltratedInflow 01/01/2000 03:51:00 2.443821E-09
InfiltratedInflow 01/01/2000 03:52:00 2.331215E-09
InfiltratedInflow 01/01/2000 03:53:00 2.22574E-09
InfiltratedInflow 01/01/2000 03:54:00 2.126828E-09
InfiltratedInflow 01/01/2000 03:55:00 2.033962E-09
InfiltratedInflow 01/01/2000 03:56:00 1.946675E-09
InfiltratedInflow 01/01/2000 03:57:00 1.86454E-09
InfiltratedInflow 01/01/2000 03:58:00 1.787184E-09
InfiltratedInflow 01/01/2000 03:59:00 1.714243E-09
InfiltratedInflow 01/01/2000 04:00:00 1.645403E-09
InfiltratedInflow 01/01/2000 04:01:00 1.58057E-09
InfiltratedInflow 01/01/2000 04:02:00 3.099256E-09
InfiltratedInflow 01/01/2000 04:03:00 0
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InfiltratedInflow 01/01/2000 04:05:00 2.657084E-09
InfiltratedInflow 01/01/2000 04:06:00 0
InfiltratedInflow 01/01/2000 04:07:00 2.468666E-09
InfiltratedInflow 01/01/2000 04:08:00 0
InfiltratedInflow 01/01/2000 04:09:00 2.298437E-09
InfiltratedInflow 01/01/2000 04:10:00 0
InfiltratedInflow 01/01/2000 04:11:00 2.144199E-09
InfiltratedInflow 01/01/2000 04:12:00 0
InfiltratedInflow 01/01/2000 04:13:00 2.004073E-09
InfiltratedInflow 01/01/2000 04:14:00 0
InfiltratedInflow 01/01/2000 04:15:00 1.876439E-09
InfiltratedInflow 01/01/2000 04:16:00 0
InfiltratedInflow 01/01/2000 04:17:00 1.759903E-09
InfiltratedInflow 01/01/2000 04:18:00 0
InfiltratedInflow 01/01/2000 04:19:00 1.653253E-09
InfiltratedInflow 01/01/2000 04:20:00 0
InfiltratedInflow 01/01/2000 04:21:00 2.298981E-09
InfiltratedInflow 01/01/2000 04:22:00 0
InfiltratedInflow 01/01/2000 04:23:00 0
InfiltratedInflow 01/01/2000 04:24:00 0
InfiltratedInflow 01/01/2000 04:25:00 0
InfiltratedInflow 01/01/2000 04:26:00 1.104736E-09
InfiltratedInflow 01/01/2000 04:27:00 0
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InfiltratedInflow 01/01/2000 04:29:00 1.932717E-09
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InfiltratedInflow 01/01/2000 04:31:00 0
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InfiltratedInflow 01/01/2000 04:34:00 0
InfiltratedInflow 01/01/2000 04:35:00 1.643222E-09
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InfiltratedInflow 01/01/2000 04:39:00 2.002893E-09
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InfiltratedInflow 01/01/2000 04:42:00 0
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InfiltratedInflow 01/01/2000 05:05:00 0
InfiltratedInflow 01/01/2000 05:06:00 0
InfiltratedInflow 01/01/2000 05:07:00 0
InfiltratedInflow 01/01/2000 05:08:00 0
InfiltratedInflow 01/01/2000 05:09:00 0
InfiltratedInflow 01/01/2000 05:10:00 1.826997E-09
InfiltratedInflow 01/01/2000 05:11:00 0
InfiltratedInflow 01/01/2000 05:12:00 0
InfiltratedInflow 01/01/2000 05:13:00 0
InfiltratedInflow 01/01/2000 05:14:00 0
InfiltratedInflow 01/01/2000 05:15:00 0
InfiltratedInflow 01/01/2000 05:16:00 0
InfiltratedInflow 01/01/2000 05:17:00 0
InfiltratedInflow 01/01/2000 05:18:00 1.812251E-09
InfiltratedInflow 01/01/2000 05:19:00 0
InfiltratedInflow 01/01/2000 05:20:00 0
InfiltratedInflow 01/01/2000 05:21:00 0
InfiltratedInflow 01/01/2000 05:22:00 0
InfiltratedInflow 01/01/2000 05:23:00 0
InfiltratedInflow 01/01/2000 05:24:00 0
InfiltratedInflow 01/01/2000 05:25:00 0
InfiltratedInflow 01/01/2000 05:26:00 0
InfiltratedInflow 01/01/2000 05:27:00 1.752325E-09
InfiltratedInflow 01/01/2000 05:28:00 0
InfiltratedInflow 01/01/2000 05:29:00 0
InfiltratedInflow 01/01/2000 05:30:00 0
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InfiltratedInflow 01/01/2000 05:38:00 0
InfiltratedInflow 01/01/2000 05:39:00 0
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InfiltratedInflow 01/01/2000 05:42:00 0
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InfiltratedInflow 01/01/2000 05:45:00 0
InfiltratedInflow 01/01/2000 05:46:00 0
InfiltratedInflow 01/01/2000 05:47:00 0
InfiltratedInflow 01/01/2000 05:48:00 0
InfiltratedInflow 01/01/2000 05:49:00 1.677784E-09
InfiltratedInflow 01/01/2000 05:50:00 0
InfiltratedInflow 01/01/2000 05:51:00 0
InfiltratedInflow 01/01/2000 05:52:00 0
InfiltratedInflow 01/01/2000 05:53:00 0
InfiltratedInflow 01/01/2000 05:54:00 0
InfiltratedInflow 01/01/2000 05:55:00 0
InfiltratedInflow 01/01/2000 05:56:00 0
InfiltratedInflow 01/01/2000 05:57:00 0
InfiltratedInflow 01/01/2000 05:58:00 0
InfiltratedInflow 01/01/2000 05:59:00 0
InfiltratedInflow 01/01/2000 06:00:00 0

[REPORT]
;;Reporting Options
INPUT YES
CONTROLS NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]
Subcatch S1 Ramp
Subcatch S5 Building
Subcatch S6 ParkingLot
Subcatch S7 ParkingLot
Subcatch S8 Building
Subcatch S9 ParkingLot
Node St_UnGrd Underground_Storage

[MAP]
DIMENSIONS 381280.91645 5032948.93205 381379.86255 5033068.41295
UNITS Meters

[COORDINATES]
;;Node X-Coord Y-Coord
OP4 381364.593 5032973.357
OP7 381346.502 5032963.916
STUB15 381335.776 5032954.363
STUB16 381319.979 5032958.277
CB110 381293.102 5033002.513
CB111 381307.131 5032987.6
CB112 381319.643 5032961.536
CB113 381348.344 5032974.064
CB114 381332.566 5033036.058
CB115 381332.827 5033018.906
CB116 381338.815 5033005.189
CB117 381344.774 5032991.539
CB118 381359.473 5032992.996
Roof_1 381325.164 5032977.273
Roof_2 381361.335 5033013.684
St_UnGrd 381329.806 5032972.84

[VERTICES]
;;Link X-Coord Y-Coord
W1 381322.829 5032965.271
W3 381343.656 5032974.514
W5 381295.919 5033002.386
W5 381309.233 5032988.935
W5 381320.071 5033002.193
OL6 381323.041 5033005.693

[POLYGONS]
;;Subcatchment X-Coord Y-Coord
S1 381344.215 5032984.464
S1 381347.856 5032976.123
S1 381337.733 5032971.705
S1 381334.493 5032979.128
S1 381341.864 5032982.351
S1 381344.215 5032984.464
S10 381360.442 5032986.777
S10 381355.738 5032997.554
S10 381357.523 5032998.333
S10 381358.678 5032998.837
S10 381359.142 5032997.774
S10 381369.264 5033002.193
S10 381368.8 5033003.256
S10 381374.019 5033005.534
S10 381375.365 5033002.452
S10 381360.442 5032986.777
S11 381341.862 5033062.982
S11 381348.903 5033062.839
S11 381355.186 5033056.237
S11 381352.72 5033054.328
S11 381336.223 5033047.127
S11 381340.298 5033037.792
S11 381338.894 5033036.045
S11 381327.521 5033031.81
S11 381325.697 5033035.259
S11 381319.536 5033040.417
S11 381328.068 5033049.243
S11 381327.155 5033049.256
S11 381330.052 5033055.329
S11 381335.192 5033057.864
S11 381336.099 5033058.311
S11 381336.581 5033058.572
S11 381337.055 5033058.848
S11 381337.521 5033059.137
S11 381337.977 5033059.441
S11 381338.424 5033059.758
S11 381338.861 5033060.089
S11 381341.862 5033062.982
S2 381339.051 5032968.685
S2 381337.931 5032971.251
S2 381337.733 5032971.705
S2 381347.856 5032976.123
S2 381352.652 5032978.217
S2 381352.769 5032978.266
S2 381352.887 5032978.313
S2 381353.006 5032978.356
S2 381352.331 5032977.428
S2 381349.581 5032976.228
S2 381350.662 5032973.753
S2 381339.051 5032968.685
S3 381318.259 5032957.972
S3 381307.625 5032982.332
S3 381303.659 5032986.058
S3 381310.51 5032989.076
S3 381321.435 5032964.05
S3 381337.931 5032971.251
S3 381339.551 5032968.685
S3 381319.267 5032960.048
S3 381318.259 5032957.972
S4 381303.659 5032986.085
S4 381285.414 5033003.349
S4 381304.879 5033024.646
S4 381311.368 5033017.747
S4 381300.135 5033012.843
S4 381310.51 5032979.128
S4 381303.659 5032986.085
S5 381316.631 5033020.045
S5 381320.706 5033010.711
S5 381318.612 5032999.797
S5 381319.652 5033007.414
S5 381321.746 5033008.328
S5 381327.851 5032994.342
S5 381334.493 5032979.128
S5 381337.733 5032971.705
S5 381337.931 5032971.251
S5 381321.435 5032964.05
S5 381310.51 5032989.076
S5 381300.135 5033012.843
S5 381311.368 5033017.747
S5 381316.631 5033020.045
S6 381327.521 5033031.08
S6 381338.894 5033036.045
S6 381340.298 5033037.792
S6 381342.392 5033038.706
S6 381343.432 5033036.323
S6 381341.338 5033035.409
S6 381349.093 5033017.644
S6 381343.736 5033015.306
S6 381335.821 5033012.047
S6 381326.803 5033010.853
S6 381325.27 5033009.866

```

Post-Development 3-hour Chicago 1:100 year Event

```

S6      381321.746      5033008.328
S6      381319.652      5033007.414
S6      381318.612      5033009.797
S6      381320.706      5033010.711
S6      381316.631      5033020.045
S6      381311.368      5033017.747
S6      381304.879      5033024.646
S6      381307.751      5033027.787
S6      381319.536      5033040.417
S6      381325.697      5033035.259
S6      381327.521      5033031.08
S7      381354.292      5033005.735
S7      381349.118      5033003.477
S7      381341.795      5032998.364
S7      381333.208      5032996.68
S7      381327.851      5032994.342
S7      381321.746      5033008.328
S7      381325.27      5033009.866
S7      381326.803      5033010.853
S7      381335.821      5033012.047
S7      381349.093      5033017.644
S7      381354.292      5033005.735
S8      381336.223      5033047.127
S8      381352.72      5033054.328
S8      381374.019      5033005.534
S8      381368.8      5033003.256
S8      381369.264      5033002.193
S8      381359.142      5032997.774
S8      381358.678      5032998.837
S8      381357.523      5032998.333
S8      381355.797      5033002.286
S8      381341.338      5033035.409
S8      381343.432      5033036.323
S8      381342.392      5033038.706
S8      381340.298      5033037.792
S8      381336.223      5033047.127
S9      381360.442      5032986.777
S9      381352.823      5032978.774
S9      381353.006      5032978.356
S9      381352.846      5032978.297
S9      381352.688      5032978.233
S9      381347.856      5032976.123
S9      381344.215      5032984.464
S9      381341.866      5032982.347
S9      381334.493      5032979.128
S9      381327.851      5032994.342
S9      381333.208      5032996.68
S9      381341.795      5032998.364
S9      381349.118      5033003.477
S9      381354.292      5033005.735
S9      381357.523      5032998.333
S9      381355.738      5032997.554
S9      381360.442      5032986.777

```

```

;;Storage Node X-Coord Y-Coord
;;-----
[SYMBOLS]
;;Gage X-Coord Y-Coord
;;-----

```

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

***** Element Count *****

```

Number of rain gages ..... 1
Number of subcatchments ... 11
Number of nodes ..... 16
Number of links ..... 17
Number of pollutants ..... 0
Number of land uses ..... 0

```

***** Raiingage Summary *****

Name	Data Source	Data Type	Recording Interval
Rainfall	3CHI100	INTENSITY	10 min.

***** Subcatchment Summary *****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.01	6.10	100.00	15.0000	Rainfall	
St_UnGrd						
S10	0.01	29.00	8.79	1.0000	Rainfall	CB118
S11	0.05	70.00	18.80	2.0000	Rainfall	CB114
S2	0.00	4.30	0.00	1.9000	Rainfall	CB113
S3	0.02	75.00	17.80	1.0000	Rainfall	CB112
S4	0.04	52.00	8.51	3.5000	Rainfall	CB110
S5	0.10	105.00	100.00	1.0000	Rainfall	Roof_1
S6	0.08	45.00	66.78	2.5000	Rainfall	CB115
S7	0.04	28.60	90.42	2.7000	Rainfall	CB116
S8	0.10	105.00	100.00	1.0000	Rainfall	Roof_2
S9	0.05	50.00	93.57	2.4000	Rainfall	CB117

***** Node Summary *****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OF4	OUTFALL	80.63	0.00	0.0	
OF7	OUTFALL	80.63	0.00	0.0	
STUB15	OUTFALL	80.63	0.00	0.0	
STUB16	OUTFALL	80.65	0.00	0.0	
CB110	STORAGE	83.75	1.90	0.0	
CB111	STORAGE	83.59	2.01	0.0	
CB112	STORAGE	83.28	2.12	0.0	
CB113	STORAGE	83.55	1.70	0.0	
CB114	STORAGE	85.30	0.25	0.0	
CB115	STORAGE	85.25	0.31	0.0	
CB116	STORAGE	85.20	0.40	0.0	
CB117	STORAGE	85.15	0.15	0.0	
CB118	STORAGE	85.22	0.18	0.0	
Roof_1	STORAGE	96.35	0.15	0.0	
Roof_2	STORAGE	96.35	0.15	0.0	
St_UnGrd	STORAGE	81.80	1.00	0.0	Yes

***** Link Summary *****

Name	From Node	To Node	Type	Length	%Slope
C1	CB111	CB112	CONDUIT	28.9	0.8647
0.0130	CB113	CB112	CONDUIT	31.3	0.6067
C3	CB110	CB111	CONDUIT	20.5	0.7815
0.0130	CB115	CB116	WEIR		
W1	CB116	CB117	WEIR		
W2	CB112	CB113	WEIR		
W3	CB114	CB115	WEIR		
W4	CB110	CB112	WEIR		
W5	CB112	STUB16	OUTLET		
C2	CB115	St_UnGrd	OUTLET		
OL1	CB116	St_UnGrd	OUTLET		
OL2	CB117	St_UnGrd	OUTLET		
OL3	Roof_1	STUB15	OUTLET		
OL4	Roof_2	OF4	OUTLET		
OL5	CB114	St_UnGrd	OUTLET		
OL6	St_UnGrd	OF7	OUTLET		
OL7	CB118	St_UnGrd	OUTLET		
OL8					

***** Cross Section Summary *****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.15	0.02	0.04	0.15	1	0.01
C3	CIRCULAR	0.15	0.02	0.04	0.15	1	0.01
C5	CIRCULAR	0.15	0.02	0.04	0.15	1	0.01

***** Analysis Options *****

```

Flow Units ..... CMS
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 ..... 01/01/2000 00:00:00
Ending Date ..... 01/01/2000 06:00:00
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 ..... YES
Maximum Trials ..... 8
Number of Threads ..... 1
Head Tolerance ..... 0.001500 m

```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.036	71.708
Evaporation Loss	0.000	0.000
Infiltration Loss	0.007	13.013
Surface Runoff	0.029	57.684
Final Storage	0.001	1.117
Continuity Error (%)	-0.149	

Post-Development 24-hour SCS 1:100-year Event

```

[OPTIONS]
;;Option Value
FLOW_UNITS CMS
INFILTRATION HORTON
FLOW_ROUTING DYNWAVE
LINK_OFFSETS ELEVATION
MIN_SLOPE 0
ALLOW_PONDING NO
SKIP_STEADY_STATE NO

START_DATE 01/01/2000
START_TIME 00:00:00
REPORT_START_DATE 01/01/2000
REPORT_START_TIME 00:00:00
END_DATE 01/02/2000
END_TIME 00:00:00
SWEEP_START 01/01
SWEEP_END 12/31
DRY_DAYS 0
REPORT_STEP 00:01:00
WET_STEP 00:01:00
DRY_STEP 00:01:00
ROUTING_STEP 5
RULE_STEP 00:00:00

INERTIAL_DAMPING PARTIAL
NORMAL_FLOW_LIMITED BOTH
FORCE_MAIN_EQUATION H-W
VARIABLE_STEP 0.75
LENGTHENING_STEP 0
MIN_SURFAREA 0
MAX_TRIALS 8
HEAD_TOLERANCE 0.0015
SYS_FLOW_TOL 5
LAT_FLOW_TOL 5
MINIMUM_STEP 0.5
THREADS 12

[EVAPORATION]
;;Data Source Parameters
CONSTANT 0.0
DRY_ONLY NO

[RAINGAGES]
;;Name Format Interval SCF Source
Rainfall INTENSITY 0:15 1.0 TIMESERIES 24SCS100

[SUBCATCHMENTS]
;;Name Rain Gage Outlet Area %Imperv Width %Slope CurbLen
SnowPack
S1 Rainfall St_UnGrd 0.0091 100 6.1 15 0
S10 Rainfall CB118 0.0138 8.79 28.998 1 0
S11 Rainfall CB114 0.0473 18.805 70.001 2 0
S2 Rainfall CB113 0.0044 0.002 4.3 1.9 0
S3 Rainfall CB112 0.0218 17.802 75 1 0
S4 Rainfall CB110 0.043 8.51 52.001 3.5 0
S5 Rainfall Roof_1 0.0952 99.998 104.996 1 0
S6 Rainfall CB115 0.0803 66.775 45.001 2.5 0
S7 Rainfall CB116 0.0416 90.416 28.601 2.7 0
S8 Rainfall Roof_2 0.0965 100 105.005 1 0
S9 Rainfall CB117 0.0544 93.568 50 2.4 0

[SUBAREAS]
;;Subcatchment N-Imperv N-Perv S-Imperv S-Perv PctZero RouteTo PctRouted
S1 0.013 0.25 1.57 4.67 0 OUTLET 0
S10 0.013 0.25 1.57 4.67 0 PERVIOUS 100
S11 0.013 0.25 1.57 4.67 0 PERVIOUS 100
S2 0.013 0.25 1.57 4.67 0 OUTLET 0
S3 0.013 0.25 1.57 4.67 0 PERVIOUS 100
S4 0.013 0.25 1.57 4.67 0 PERVIOUS 100
S5 0.013 0.25 1.57 4.67 0 OUTLET 0
S6 0.013 0.25 1.57 4.67 0 OUTLET 0
S7 0.013 0.25 1.57 4.67 0 OUTLET 0
S8 0.013 0.25 1.57 4.67 0 OUTLET 0
S9 0.013 0.25 1.57 4.67 0 OUTLET 0

[INFILTRATION]
;;Subcatchment Param1 Param2 Param3 Param4 Param5
S1 76.2 13.2 4.14 7 0
S10 76.2 13.2 4.14 7 0
S11 76.2 13.2 4.14 7 0
S2 76.2 13.2 4.14 7 0
S3 76.2 13.2 4.14 7 0
S4 76.2 13.2 4.14 7 0
S5 76.2 13.2 4.14 7 0
S6 76.2 13.2 4.14 7 0
S7 76.2 13.2 4.14 7 0
S8 76.2 13.2 4.14 7 0
S9 76.2 13.2 4.14 7 0

[OUTFALLS]
;;Name Elevation Type Stage Data Gated Route To
OF4 80.628 FIXED 81.11 NO
OF7 80.628 FIXED 81.11 NO
STUB15 80.628 FIXED 81.11 NO
STUB16 80.646 FIXED 81.28 NO

[STORAGE]
;;Name Elev. MaxDepth InitDepth Shape Curve Name/Params
SurDepth Evap Psi Ksat IMD
CB110 83.75 1.9 0 TABULAR CB110 0
CB111 83.59 2.01 0 TABULAR CB111 0
CB112 83.28 2.12 0 TABULAR CB112 0
CB113 83.55 1.7 0 TABULAR CB113 0
CB114 85.3 0.25 0 TABULAR CB114 0
CB115 85.25 0.31 0 TABULAR CB115 0
CB116 85.2 0.4 0 TABULAR CB116 0
CB117 85.15 0.15 0 TABULAR CB117 0
CB118 85.22 0.18 0 TABULAR CB118 0
Roof_1 96.35 0.15 0 FUNCTIONAL 0 0 635 0
Roof_2 96.35 0.15 0 FUNCTIONAL 0 0 643 0
St_UnGrd 81.8 1 0 FUNCTIONAL 0 0 49 0

[CONDUITS]
;;Name From Node To Node Length Roughness InOffset OutOffset
InitFlow MaxFlow

```

```

;;
C1 0 0.08 CB111 CB112 28.913 0.013 83.59 83.34
C3 0 0.04 CB113 CB112 31.317 0.013 83.55 83.36
C5 0 0.04 CB110 CB111 20.475 0.013 83.75 83.59

[WEIRS]
;;Name EndCon EndCoeff From Node Surcharge To Node RoadWidth RoadSurf Type Coeff. Curve CrestHt Qcoeff Gated
W1 0 CB115 CB116 TRANSVERSE 85.45 1.84 NO
W2 0 CB116 CB117 TRANSVERSE 85.35 1.84 NO
W3 0 CB112 CB113 TRANSVERSE 85.38 1.84 NO
W4 0 CB114 CB115 TRANSVERSE 85.5 1.84 NO
W5 0 CB110 CB112 TRANSVERSE 85.6 1.84 NO

[OUTLETS]
;;Name Qexpon Gated From Node To Node Offset Type QTable/Qcoeff
C2 CB112 STUB16 83.28 TABULAR/HEAD Vortex_ICD_95
CL1 CB115 St_UnGrd 85.25 TABULAR/HEAD ZURN_Z150F-6NH
OL2 CB116 St_UnGrd 85.2 TABULAR/HEAD ZURN_Z150F-6NH
OL3 CB117 St_UnGrd 85.15 TABULAR/HEAD ZURN_Z150F-6NH
OL4 Roof_1 STUB15 96.35 TABULAR/HEAD O_Roof1
OL5 Roof_2 OF4 96.35 TABULAR/HEAD O_Roof1
OL6 CB114 St_UnGrd 85.3 TABULAR/HEAD ZURN_Z150F-6NH
OL7 St_UnGrd OF7 81.8 TABULAR/HEAD O_St_UnGrd
OL8 CB118 St_UnGrd 85.22 TABULAR/HEAD ZURN_Z150F-6NH

[XSECTIONS]
;;Link Culvert Shape Geom1 Geom2 Geom3 Geom4 Barrels
C1 CIRCULAR 0.15 0 0 0 0 1
C3 CIRCULAR 0.15 0 0 0 0 1
C5 CIRCULAR 0.15 0 0 0 0 1
W1 RECT_OPEN 0.11 17.1 0 0 0
W2 RECT_OPEN 0.25 17.1 0 0 0
W3 RECT_OPEN 0.02 4.58 0 0 0
W4 RECT_OPEN 0.05 7 0 0 0
W5 RECT_OPEN 0.05 3.487 0 0 0

[LOSSES]
;;Link Kentry Kexit Kavg Flap Gate Seepage
[INFLOWS]
;;Node Constituent Time Series Type Mfactor Sfactor Baseline Pattern
St_UnGrd FLOW InfiltratedInflow FLOW 1.0 1 0

[CURVES]
;;Name Type X-Value Y-Value
;Tempest Rating Curve for MHF IPEX TYPE A, No grate allowance
MHF_IPEX_TYPE_A 0
MHF_IPEX_TYPE_A 0.1 0.0057
MHF_IPEX_TYPE_A 0.2 0.0081
MHF_IPEX_TYPE_A 0.3 0.0099
MHF_IPEX_TYPE_A 0.4 0.0114
MHF_IPEX_TYPE_A 0.5 0.0128
MHF_IPEX_TYPE_A 0.6 0.014
MHF_IPEX_TYPE_A 0.7 0.0151
MHF_IPEX_TYPE_A 0.8 0.0162
MHF_IPEX_TYPE_A 0.9 0.0172
MHF_IPEX_TYPE_A 1 0.0181
MHF_IPEX_TYPE_A 1.2 0.0198
MHF_IPEX_TYPE_A 1.4 0.0214
MHF_IPEX_TYPE_A 1.6 0.0229
MHF_IPEX_TYPE_A 1.8 0.0243
MHF_IPEX_TYPE_A 2 0.0256
MHF_IPEX_TYPE_A 2.5 0.0286
MHF_IPEX_TYPE_A 3 0.0313
;Tempest Rating Curve for MHF IPEX TYPE B, No grate allowance
MHF_IPEX_TYPE_B 0
MHF_IPEX_TYPE_B 0.1 0.0081
MHF_IPEX_TYPE_B 0.2 0.0115
MHF_IPEX_TYPE_B 0.3 0.0141
MHF_IPEX_TYPE_B 0.4 0.0162
MHF_IPEX_TYPE_B 0.5 0.0182
MHF_IPEX_TYPE_B 0.6 0.0199
MHF_IPEX_TYPE_B 0.7 0.0215
MHF_IPEX_TYPE_B 0.8 0.023
MHF_IPEX_TYPE_B 0.9 0.0244
MHF_IPEX_TYPE_B 1 0.0257
MHF_IPEX_TYPE_B 1.2 0.0281
MHF_IPEX_TYPE_B 1.4 0.0304
MHF_IPEX_TYPE_B 1.6 0.0325
MHF_IPEX_TYPE_B 1.8 0.0344
MHF_IPEX_TYPE_B 2 0.0363
MHF_IPEX_TYPE_B 2.5 0.0406
MHF_IPEX_TYPE_B 3 0.0445
;Tempest Rating Curve for MHF IPEX TYPE C, No grate allowance
MHF_IPEX_TYPE_C 0
MHF_IPEX_TYPE_C 0.1 0.0106
MHF_IPEX_TYPE_C 0.2 0.015
MHF_IPEX_TYPE_C 0.3 0.0183
MHF_IPEX_TYPE_C 0.4 0.0212
MHF_IPEX_TYPE_C 0.5 0.0237
MHF_IPEX_TYPE_C 0.6 0.0259
MHF_IPEX_TYPE_C 0.7 0.028
MHF_IPEX_TYPE_C 0.8 0.0299
MHF_IPEX_TYPE_C 0.9 0.0317
MHF_IPEX_TYPE_C 1 0.0335
MHF_IPEX_TYPE_C 1.2 0.0366
MHF_IPEX_TYPE_C 1.4 0.0396
MHF_IPEX_TYPE_C 1.6 0.0423
MHF_IPEX_TYPE_C 1.8 0.0449
MHF_IPEX_TYPE_C 2 0.0473
MHF_IPEX_TYPE_C 2.5 0.0529
MHF_IPEX_TYPE_C 3 0.0579
;Tempest Rating Curve for MHF IPEX TYPE D, No grate allowance
MHF_IPEX_TYPE_D 0
MHF_IPEX_TYPE_D 0.1 0.0154
MHF_IPEX_TYPE_D 0.2 0.0217
MHF_IPEX_TYPE_D 0.3 0.0266
MHF_IPEX_TYPE_D 0.4 0.0307
MHF_IPEX_TYPE_D 0.5 0.0343
MHF_IPEX_TYPE_D 0.6 0.0376
MHF_IPEX_TYPE_D 0.7 0.0406
MHF_IPEX_TYPE_D 0.8 0.0434
MHF_IPEX_TYPE_D 0.9 0.0461
MHF_IPEX_TYPE_D 1 0.0485
MHF_IPEX_TYPE_D 1.2 0.0532

```


S2	381337.931	5032971.705
S2	381347.856	5032976.123
S2	381352.652	5032978.217
S2	381352.769	5032978.266
S2	381352.887	5032978.313
S2	381353.006	5032978.356
S2	381352.331	5032977.428
S2	381349.581	5032976.228
S2	381350.662	5032973.753
S2	381339.051	5032968.685
S3	381318.259	5032957.972
S3	381307.625	5032982.332
S3	381303.659	5032986.085
S3	381310.51	5032989.076
S3	381321.435	5032964.05
S3	381337.931	5032971.251
S3	381339.051	5032968.685
S3	381319.267	5032960.048
S3	381318.259	5032957.972
S4	381303.659	5032986.085
S4	381285.414	5033003.349
S4	381304.879	5033024.646
S4	381311.368	5033017.747
S4	381300.135	5033012.843
S4	381310.51	5032989.076
S4	381303.659	5032986.085
S5	381316.631	5033020.045
S5	381320.706	5033010.711
S5	381318.612	5033009.797
S5	381319.652	5033007.414
S5	381321.746	5033008.328
S5	381327.851	5032994.342
S5	381334.493	5033009.128
S5	381337.733	5032971.705
S5	381337.931	5032971.251
S5	381321.435	5032964.05
S5	381310.51	5032989.076
S5	381300.135	5033012.843
S5	381311.368	5033017.747
S5	381316.631	5033020.045
S6	381327.521	5033031.08
S6	381338.894	5033036.045
S6	381340.298	5033037.792
S6	381342.392	5033038.706
S6	381343.432	5033036.323
S6	381341.338	5033035.409
S6	381349.093	5033017.644
S6	381343.736	5033015.306
S6	381335.821	5033012.047
S6	381326.803	5033010.853
S6	381325.27	5033009.866
S6	381321.746	5033008.328
S6	381319.652	5033007.414
S6	381318.612	5033009.797
S6	381320.706	5033010.711
S6	381316.631	5033020.045
S6	381311.368	5033017.747
S6	381304.879	5033024.646
S6	381307.751	5033027.787
S6	381319.536	5033040.417
S6	381325.697	5033035.256
S6	381327.521	5033031.08
S7	381354.292	5033005.735
S7	381349.118	5033003.477
S7	381341.795	5032998.364
S7	381333.208	5032996.68
S7	381327.851	5032994.342
S7	381321.746	5033008.328
S7	381325.27	5033009.866
S7	381326.803	5033010.853
S7	381335.821	5033012.047
S7	381349.093	5033017.644
S7	381354.292	5033005.735
S8	381336.223	5033047.127
S8	381352.72	5033054.328
S8	381374.019	5033005.534
S8	381368.8	5033003.256
S8	381369.264	5033002.193
S8	381359.142	5032997.774
S8	381358.678	5032998.837
S8	381357.523	5032998.333
S8	381355.797	5033002.286
S8	381341.338	5033035.409
S8	381343.432	5033036.323
S8	381342.392	5033038.706
S8	381340.298	5033037.792
S8	381336.223	5033047.127
S8	381360.442	5032986.777
S9	381352.823	5032978.774
S9	381353.006	5032978.356
S9	381352.846	5032978.297
S9	381352.688	5032978.233
S9	381347.856	5032976.123
S9	381344.215	5032984.464
S9	381341.866	5032982.347
S9	381334.493	5032979.128
S9	381327.851	5032994.342
S9	381333.208	5032996.68
S9	381341.795	5032998.364
S9	381349.118	5033003.477
S9	381354.292	5033005.735
S9	381357.523	5032998.333
S9	381355.738	5032997.554
S9	381360.442	5032986.777

```
;;Storage Node X-Coord Y-Coord
;;
[SYMBOLS]
;;Gage X-Coord Y-Coord
;;
```

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

```
*****
Element Count
*****
Number of rain gages ..... 1
Number of subcatchments ... 11
Number of nodes ..... 16
Number of links ..... 17
Number of pollutants ..... 0
Number of land uses ..... 0

*****
Raingage Summary
*****
Name Data Source Data Type Recording Interval
-----
Rainfall 24SCS100 INTENSITY 15 min.

*****
Subcatchment Summary
*****
Name Area Width %Imperv %Slope Rain Gage Outlet
-----
S1 0.01 6.10 100.00 15.0000 Rainfall St_UnGrd
S10 0.01 29.00 8.79 1.0000 Rainfall CB118
S11 0.05 70.00 18.80 2.0000 Rainfall CB114
S2 0.00 4.30 0.00 1.9000 Rainfall CB113
S3 0.02 75.00 17.80 1.0000 Rainfall CB112
S4 0.04 8.51 3.5000 Rainfall CB110
S5 0.10 105.00 100.00 1.0000 Rainfall Roof_1
S6 0.08 45.00 66.78 2.5000 Rainfall CB115
S7 0.04 28.60 90.42 2.7000 Rainfall CB116
S8 0.10 105.00 100.00 1.0000 Rainfall Roof_2
S9 0.05 50.00 93.57 2.4000 Rainfall CB117
```

```
*****
Node Summary
*****
Name Type Invert Elev. Max. Depth Ponded Area External Inflow
-----
OF4 OUTFALL 80.63 0.00 0.0
OF7 OUTFALL 80.63 0.00 0.0
STUB15 OUTFALL 80.63 0.00 0.0
STUB16 OUTFALL 80.65 0.00 0.0
CB110 STORAGE 83.75 1.90 0.0
CB111 STORAGE 83.59 2.01 0.0
CB112 STORAGE 83.28 2.12 0.0
CB113 STORAGE 83.55 1.70 0.0
CB114 STORAGE 85.30 0.25 0.0
CB115 STORAGE 85.25 0.31 0.0
CB116 STORAGE 85.20 0.40 0.0
CB117 STORAGE 85.15 0.15 0.0
CB118 STORAGE 85.22 0.18 0.0
Roof_1 STORAGE 96.35 0.15 0.0
Roof_2 STORAGE 96.35 0.15 0.0
St_UnGrd STORAGE 81.80 1.00 0.0 Yes
```

```
*****
Link Summary
*****
Name From Node To Node Type Length %Slope
-----
C1 CB111 CB112 CONDUIT 28.9 0.8647
0.0130 CB113 CB112 CONDUIT 31.3 0.6067
0.0130 CB110 CB111 CONDUIT 20.5 0.7815
0.0130 CB115 CB116 WEIR
W2 CB116 CB117 WEIR
W3 CB112 CB113 WEIR
W4 CB114 CB115 WEIR
W5 CB110 CB112 WEIR
C2 CB112 STUB16 OUTLET
OL1 CB115 St_UnGrd OUTLET
OL2 CB116 St_UnGrd OUTLET
OL3 CB117 St_UnGrd OUTLET
OL4 Roof_1 STUB15 OUTLET
OL5 Roof_2 OF4 OUTLET
OL6 CB114 St_UnGrd OUTLET
OL7 St_UnGrd OF7 OUTLET
OL8 CB118 St_UnGrd OUTLET
```

```
*****
Cross Section Summary
*****
Conduit Shape Full Depth Full Area Hyd. Rad. Max. Width No. of Barrels Full Flow
-----
C1 CIRCULAR 0.15 0.02 0.04 0.15 1 0.01
C3 CIRCULAR 0.15 0.02 0.04 0.15 1 0.01
C5 CIRCULAR 0.15 0.02 0.04 0.15 1 0.01
```

```
*****
Analysis Options
*****
Flow Units ..... CMS
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 ..... 01/01/2000 00:00:00
Ending Date ..... 01/02/2000 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 ..... YES
Maximum Trials ..... 8
Number of Threads ..... 1
Head Tolerance ..... 0.001500 m
```

```
*****
Volume Depth
Runoff Quantity Continuity hectare-m mm
-----
Total Precipitation ..... 0.052 103.200
Evaporation Loss ..... 0.000 0.000
Infiltration Loss ..... 0.012 23.698
Surface Runoff ..... 0.040 78.367
Final Storage ..... 0.001 1.200
Continuity Error (%) ..... -0.062
```

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


Engineering Specification

Job Name _____
 Job Location _____
 Engineer _____
 Approval _____
 Tag _____

Contractor _____
 Approval _____
 Contractor's P.O. No. _____
 Representative _____

RD-200 Small Area Roof Drain Specification

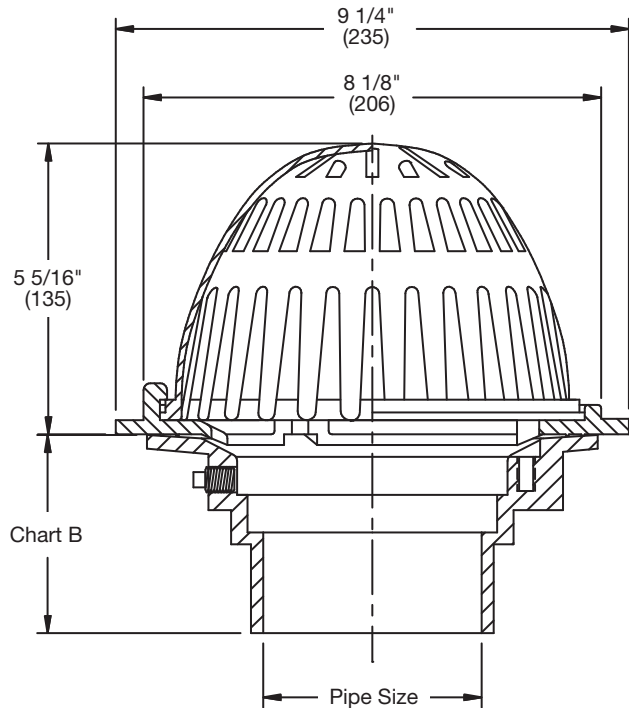
Watts RD-200 epoxy coated cast iron roof drain with flashing clamp with integral gravel stop, self-locking polyethylene dome (standard), and no hub (standard) outlet.

Pipe Sizing	
Suffix	Description
2	2"(51) Pipe Size <input type="checkbox"/>
3	3"(76) Pipe Size <input type="checkbox"/>
4	4"(102) Pipe Size (NH Only) <input type="checkbox"/>

Outlet Type	
Suffix	Description
NH	No Hub (MJ) <input type="checkbox"/>
P	Push On <input type="checkbox"/>
T	Threaded <input type="checkbox"/>
X	Inside Caulk <input type="checkbox"/>

Options	
Suffix	Description
-13	Galvanized Body & Flashing Clamp <input type="checkbox"/>
-B	Sump Receiver <input type="checkbox"/>
-D	Underdeck Clamp <input type="checkbox"/>
-F	Deck Flange/Adj. Extension <input type="checkbox"/>
-GSS	Stainless Steel Ballast Guard <input type="checkbox"/>
-K	Ductile Iron Dome <input type="checkbox"/>
-K13	Galvanized Dome <input type="checkbox"/>
-K80	Aluminum Dome <input type="checkbox"/>
-K81	Rough Bronze Dome <input type="checkbox"/>
-K83	SS Mesh Covered Dome <input type="checkbox"/>
-L	Vandal Proof Dome <input type="checkbox"/>
-R	2" External Water Dam <input type="checkbox"/>
-SO	Side Outlet <input type="checkbox"/>
-W	Adjustable Internal Water Dam <input type="checkbox"/>

Optional Body Material	
Suffix	Description
-60	PVC Body w/Socket Outlet <input type="checkbox"/>
-61	ABS Body w/Socket Outlet <input type="checkbox"/>



**Deck Opening 6 1/2"(165)
with Sump Receiver 8"(203)**

**Free Area
Sq. In.
35**

	Std.	P	T	X	60/61
Pipe Size	No Hub	Push On	Female Thread	Inside Caulk	PVC/ABS
2"(51)	3 5/8"(92)	4 1/4"(108)	4 1/4"(108)	4 1/2"(108)	4"(102)
3"(76)	3 5/8"(92)	4 1/4"(108)	4 1/4"(108)	4 1/2"(108)	4"(102)
4"(102)	3 5/8"(92)	4 1/4"(108)	4 1/4"(108)	4 1/2"(108)	4"(102)

NOTICE
 The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.



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Adjustable Accutrol Weir

Tag: _____

Adjustable Flow Control for Roof Drains

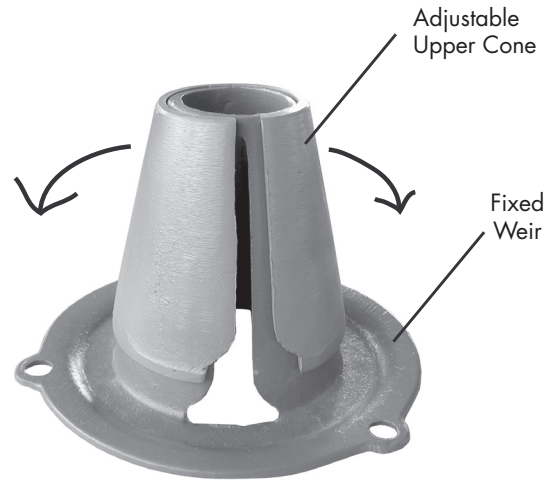
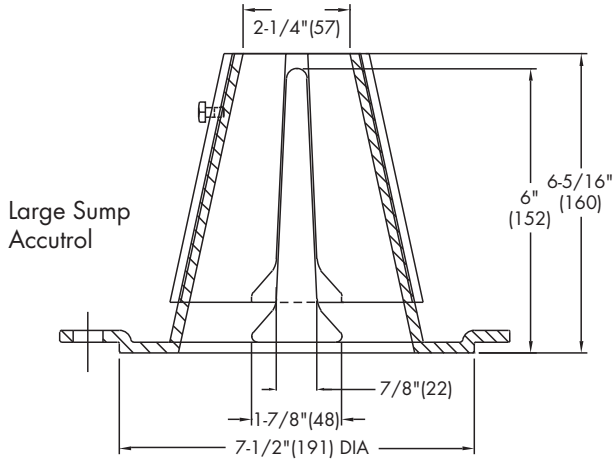
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

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

EXAMPLE:

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

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



1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

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

Job Name _____
 Job Location _____
 Engineer _____

Contractor _____
 Contractor's P.O. No. _____
 Representative _____

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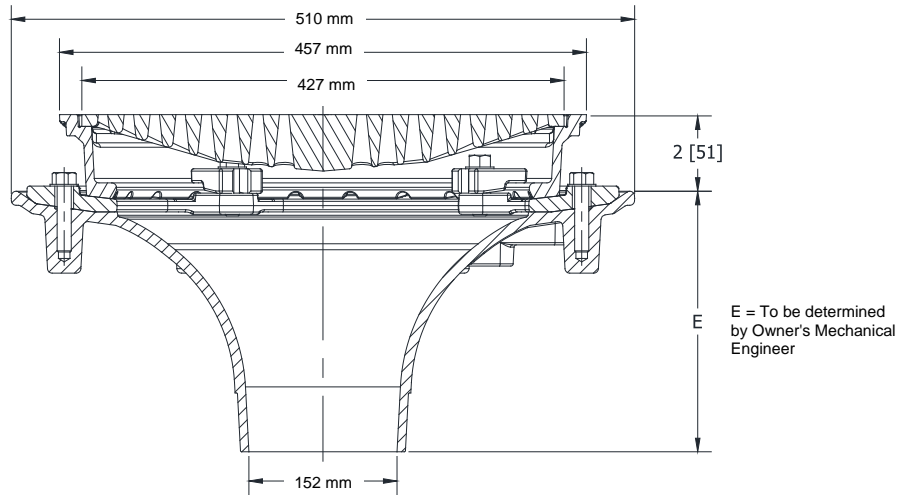
Z150F

FLOFORCE™ HIGH PERFORMANCE PROMENADE DECK DRAIN WITH ROTATABLE FRAME AND HEEL-PROOF GRATE

SPECIFICATION SHEET

TAG _____

Design and Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice



E = To be determined by Owner's Mechanical Engineer

4 [102] No-Hub Illustrated

A Outlet Size In. [mm]	B Body Diameter In [mm]	C Frame Size In [mm]	D Grate Size In [mm]	Weight lbs [kg]	Grate Open Area Sq. In. [cm ²]
2,3,4 [51,76,102]	16-9/16 [421]	14 [356]	12-13/16 [325]	66 [30]	44 [284]
6,8 [152, 203]	20-3/32 [510]	18 [457]	16-13/16 [427]	94 [43]	70 [452]

ENGINEERING SPECIFICATION: ZURN Z150F

FLOFORCE™ High efficient flow performing roof drain for promenade deck roof drain applications. Drain incorporates a smooth funnel-shaped interior surface, providing a seamless transition to outlet connection and eliminating internal obstructions within the body. Complete with Dura-Coated cast iron body with membrane flashing clamp, rotatable square promenade frame, seepage openings, securing clamps, and heavy-duty ductile iron heel-proof grate.

OPTIONS (Check/specify appropriate options)

PIPE SIZE

(Specify size/type) **OUTLET**

E BODY HT. DIM.

2, 3, 4 [51, 76, 102]	NH	No-Hub	6-15/16 [176]
6, 8 [152, 203]	NH	No-Hub	7-7/16 [189]
2, 3, 4 [51, 76, 102]	NL	Neo-Loc	7-3/8 [187]
6 [152]	NL	Neo-Loc	8-1/32 [204]
2, 3, 4 [51, 76, 102]	IP	Threaded	5-15/16, 6-3/16, 6-5/16 [151, 157, 160]
6, 8 [152, 203]	IP	Threaded	6-11/16, 6-3/4 [170, 171]
3, 4 [76, 102]	IC	Inside Caulk	5-13/16 [148]
6 [152]	IC	Inside Caulk	6-1/16 [154]

PREFIXES

___ Z	D.C.C.I. Body and Frame with Ductile Iron Grate*
___ ZN	D.C.C.I. Body and Frame with Ductile Iron Grate and Polished Nickel Bronze Veneer Finish

SUFFIXES

___ -AR	Acid Resistant Epoxy Coated	___ -R	Roof Sump Receiver
___ -C	Underdeck Clamp	___ -SC	Secondary Clamp Collar
___ -DP	Top-Set® Deck Plate (Replaces both the -C and -R)	___ -TC	Neo-Loc Test Cap Gasket (2, 3, 4 [51, 76, 102] NL Bottom Outlet Only)
___ -DR	Top-Set® Drain Riser	___ -VP	Vandal-Proof Secured Top
___ -E	Static Extension 1 [25] thru 4 [102] (Specify Ht.)	___ -Y	Type 304 [CF8] SS Sediment Bucket
___ -EA	Adjustable Extension Assembly 2-1/8 [54] thru 3-1/2 [89]	___ -85	Type 304 [CF8] Stainless Steel Perforated Extension
___ -G	Galvanized Cast Iron	___ -89	2 [51] High Overflow Dam and Low-Profile Pedestal Paver Dome
___ -PD	Low-Profile Pedestal Paver Dome		

* Regularly furnished unless otherwise specified

⚠ WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

⚠ ADVERTENCIA: Cáncer y daño reproductivo - www.P65Warnings.ca.gov

⚠ AVERTISSEMENT: Cancer et effets néfastes sur la reproduction - www.P65Warnings.ca.gov

Zurn Industries, LLC | Specification Drainage Operation
1801 Pittsburgh Avenue, Erie, PA 16502, Ph. 855.663.9876

In Canada | Zurn Industries Limited
7900 Goreway Drive, Unit 10, Brampton, Ontario L6T 5W6, Ph. 877.892.5216

www.zurn.com

Rev. -

Date: 08/08/2022

C.N. No. 144780

Prod. | Dwg. No. Z150F FLOFORCE™ Page 1 of 1

Site Servicing Report

2983, 3053 and 3079 Navan Road & 2690 Pagé Road, Ottawa, Ontario

Appendix E

Sanitary Servicing

Street Name	Pipe Reach		Commercial/Institutional				Infiltration			Peak Design Flow L/s	Pipe Data										Upstream Geometry					Downstream Geometry					Self Cleansing Velocities						
	From	To	Apartments	Pop.	Cum. Pop.	Peaking Factor	Residential Flow (L/s)	Area (ha)	Cum. Area (ha)		Peaking Factor	Inst. Flow (L/s)	Area (ha)	Cum. Area (ha)	Peak Extr. Flow L/s	Dia	Type	Actual Diameter	Slope	Q Full (L/s)	V Full	Length	Residual Capacity	% Full	TG From	Obvert	Invert	Cover	TG TO	Drop	Obvert	Invert	Cover	Q/Qf Ratio	Flow Depth (mm)	Actual Velocity (m/s)	Flow Depth to Dia. Ratio (d/D)
BLOCK 15	BLOCK 15	14	83	149	149	3.55	1.72	0.09	0.09	1.50	0.05	0.57	0.57	0.19	1.95	200	Circular	203.20	1.50%	41.91	1.29	6.10	39.95	5%	85.850	82.467	82.264	3.383	85.840	0.060	82.376	82.173	3.464	0.05	29.67	0.66	0.15
EAST ORLEANS RIDGE SUBDIVISION	14	13			149	3.55	1.72	0.09	0.09	1.50	0.05	0.57	0.57	0.19	1.95	200	Circular	203.20	1.50%	41.91	1.29	13.50	39.95	5%	85.840	82.316	82.113	3.524	84.940		82.113	81.910	2.827	0.05	29.67	0.66	0.15

Design Parameters		
Apartments Population	1.8	Cap/Unit
Residential Flows	280	L/Cap/Day
Infiltration Flows	0.33	L/s/ha
Harmon's Correction Factor	0.8	unitless
Commercial Peak Factor	1.5	unitless
Institutional/Commercial A	28000	L/gross ha/d
Manning Coefficient	0.013	unitless

William Rugamba

From: William Rugamba
Sent: July 22, 2024 8:18 AM
To: William Rugamba
Subject: FW: Re-confirmation of Mechanical Items for Servicing Report

William Rugamba, M.Eng., B.A.Sc., EIT
Civil Engineering Graduate
Ottawa, ON
Work: [343-804-4374](tel:343-804-4374)

From: Sarith Lopez <slopez@qmeengineering.com>
Sent: Wednesday, July 17, 2024 8:07 PM
To: Mahad Musse <mmusse@jlrichards.ca>; Chuck Clark <CWC@qmeengineering.com>
Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>
Subject: RE: Re-confirmation of Mechanical Items for Servicing Report

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Hi Mahad,

All items below confirmed

Regards

Sarith López
Project Manager

9 Gurdwara Road, Unit 200
Ottawa, ON K2E 7X6
T: 613-366-4763 ext. 129
slopez@qmeengineering.com



From: Mahad Musse <mmusse@jlrichards.ca>

Sent: Tuesday, July 16, 2024 3:08 PM

To: Sarith Lopez <slopez@qmeengineering.com>; Chuck Clark <CWC@qmeengineering.com>

Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>

Subject: Re-confirmation of Mechanical Items for Servicing Report

Hi Sarith/Chuck,

Thank you for the information below and in our meetings. I understand all these items have been discussed before but we need to submit something as part of our report. Can you just re-confirm the following questions below and then we will attach your confirmation to the Report.

1. Please confirm that the sanitary service size of 200mm diameter for the Site Plan Blocks (Block 14, 15 and 17) is preferred by the mechanical engineer on file;
2. Please confirm that a sprinkler flow of 25 L/s can be assumed for the Site Plan Blocks (Block 14, 15 and 17) at this stage.

Thanks
Mahad



Mahad Musse, B.Eng., EIT
Civil Engineering Graduate

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