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- Streetscapes & Public Amenities
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- Community & Residential
- Commercial & Institutional
- Environmental Restoration

39 Years

444 CitiGate Drive & 560 Dealership Drive

Serviceability Report

444 CITIGATE DRIVE & 560 DEALERSHIP DRIVE
OTTAWA, ONTARIO

SERVICEABILITY REPORT

Prepared by:

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

December 2, 2022

Ref: R-2022-205
Novatech File: 122003

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Engineers, Planners & Landscape Architects

December 2, 2022

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

Attention: Jeff Shillington

Dear Mr. Shillington:

Re: 444 CitiGate Drive & 560 Dealership Drive
Serviceability Report
Our File No.: 122003

Please find enclosed the complete pdf copy of a Serviceability Report for the above noted site. This report is submitted in support of a Draft Plan of Subdivision application and is hereby submitted for review and approval.

If you have any questions, please contact the undersigned.

Yours truly,

NOVATECH

Cara Ruddle, P.Eng.
Senior Project Manager, Land Development Engineering

cc: Bonnie Martell, Colonnade Bridgeport

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List of Figures

List of Appendices

1.0. INTRODUCTION

Novatech has been retained by Colonnade BridgePort to review the servicing for proposed developments at 444 CitiGate Drive and 560 Dealership Drive. This report was prepared to support a Draft Plan of Subdivision Application for the subject properties. **Figure 1** is a Key Plan showing the site location. The purpose of this report is to demonstrate that the proposed developments can be serviced with the existing municipal infrastructure surrounding the property.

2.0. EXISTING DEVELOPMENT

Both parcels of land are located within the CitiGate Business Park located just east of the Fallowfield Road/Highway 416 interchange. Development of the business park has changed from the original concept. Refer to the original Concept Plan from the original design report for the CitiGate 416 Corporate Campus. The original concept includes smaller buildings with associated parking areas. The business park has actually been developed with larger buildings which means the original internal road network has been adjusted as development progresses. Therefore, Crosskey Place, which runs through both parcels, is no longer part of the development concept. Each of the property parcels is discussed subsequently.

444 CitiGate Drive

The total site area is approximately 20.29 hectares in size and is located in the northwest portion of the CitiGate Business Park, immediately south of the intersection of CitiGate Drive and Systemhouse Street. The property has a municipal address of 444 CitiGate Drive and is bounded by the existing Amazon building to the north, the O'Keefe Drain to the east, both developed and undeveloped parcels within the CitiGate Business Park and an existing stormwater management pond to the south, and Highway 416 to the west. The topography of the site slopes easterly towards the O'Keefe drain. **Figure 2** shows the existing site conditions.

560 Dealership Drive

The total site area is approximately 6.32 hectares and is located in the south portion of the CitiGate Business Park at the end of the existing Dealership Drive. The property has a municipal address of 560 Dealership Drive and is bounded by undeveloped lands to the north, developed lands to the east (automotive dealerships etc.), undeveloped lands to the south, and Highway 416 to the west. The site is currently undeveloped with the topography sloping easterly towards the O'Keefe Drain. **Figure 2** shows the existing site conditions.

3.0. PROPOSED DEVELOPMENT

444 CitiGate Drive

The proposed development consists of four (4) development blocks and one block for a municipal road. The current zoning for the development blocks is light industrial use. It is proposed to extend CitiGate Drive from the intersection of Systemhouse Street on the north side of the site through the subject site and connect to the existing CitiGate Drive extension to the south of the site, herein referred to as Street 1. **Figure 4** shows a proposed 26m right-of-way (ROW) cross-section. There is also a block adjacent to Highway 416 that is a compensation block and will remain in its natural state as noted in the Envinormental Impact Study prepared

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444 CITIGATE DRIVE
560 DEALERSHIP DRIVE

KEY PLAN

SCALE		
N.T.S		
DATE	JOB	FIGURE
NOV 2022	122003	1

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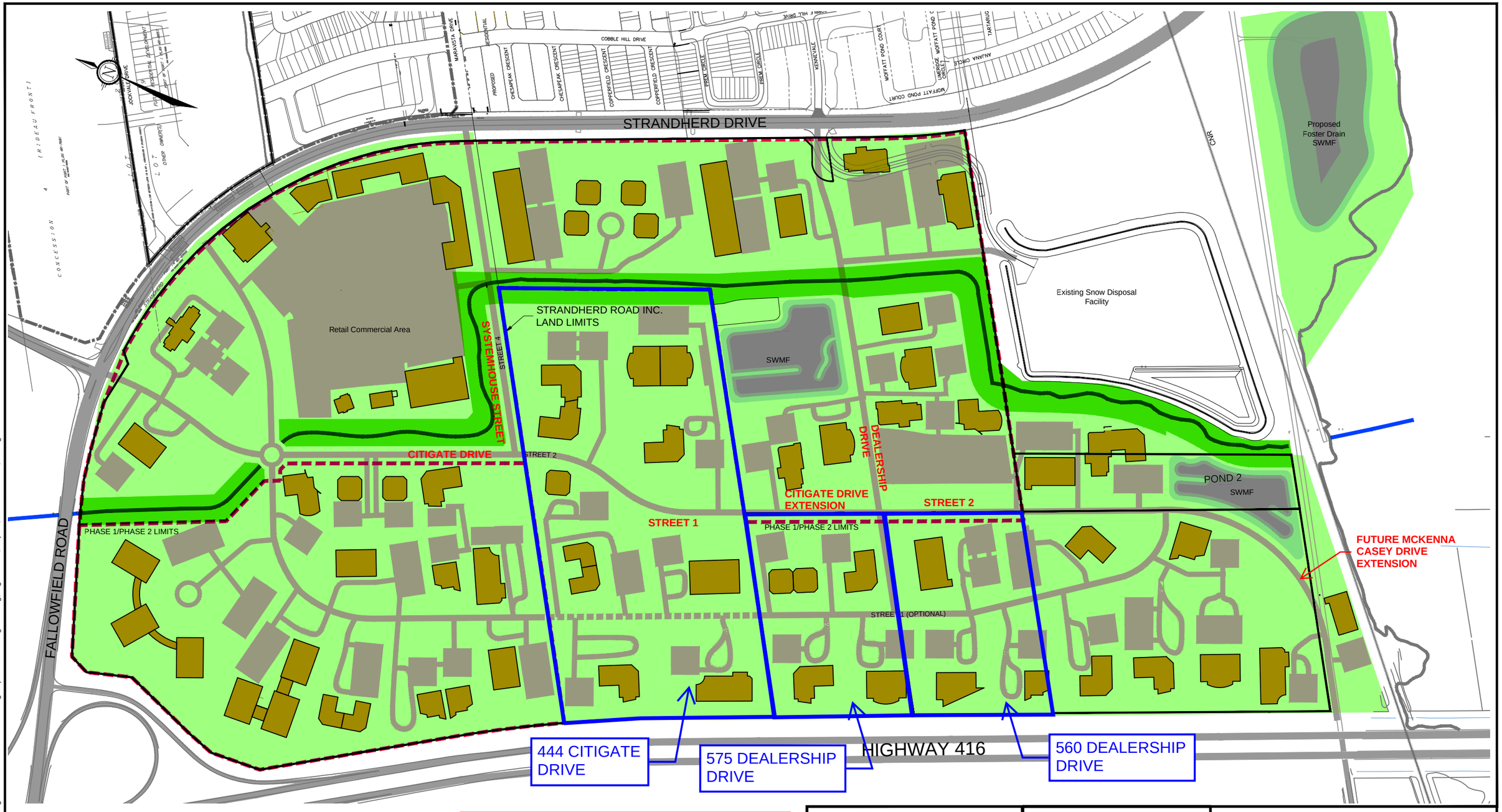

NOTE: ALL BLOCK LAYOUTS ARE CONCEPTUAL AND SUBJECT TO SITE PLAN APPROVAL.

MODIFIED FROM:
CITIGATE 416 CORPORATE CAMPUS, DETAILED SERVICING AND SWM REPORT (PHASE 1) BY NOVATECH DATED OCTOBER 1, 2014.

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Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

SCALE

N.T.S

CITI GATE
416 CORPORATE CAMPUS

CONCEPT PLAN

SEP 2014 | 109203 | FIGURE 2

M:\2009\109203\Citi Gate\CAD\Design\Figures\Design Brief\2014March31-Servicing Report\109203-Figure2.dwg, Figure 2 CP, Sep 05, 2014 - 11:36am, cstang

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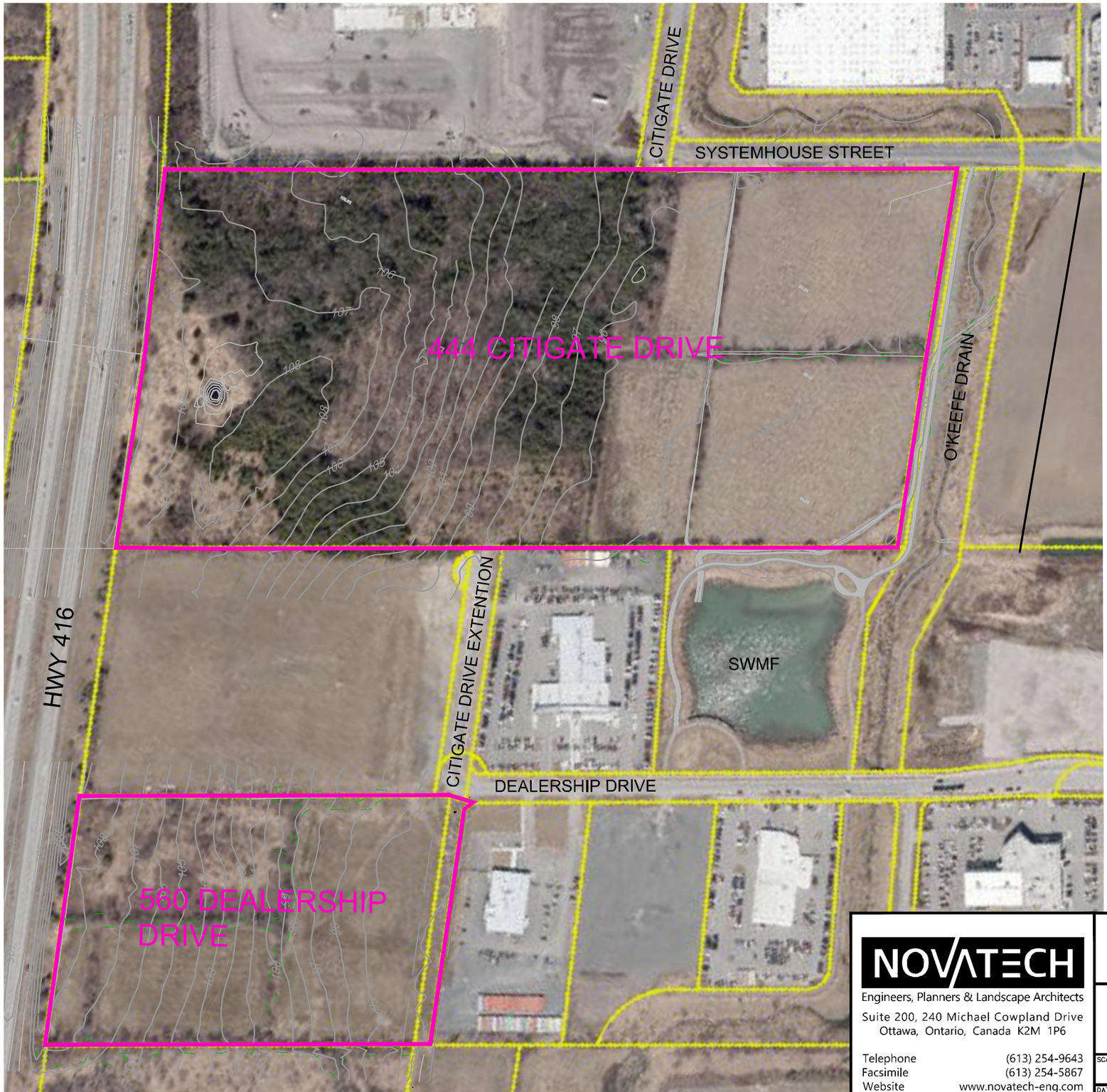

LEGEND

LIMITS OF PROPOSED DRAFT PLAN APPLICATION

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444 CITIGATE DRIVE
560 DEALERSHIP DRIVE

EXISTING CONDITIONS

SCALE 1 : 3000 (0 10 20 30 40 50)

DATE NOV 2022 | JOB 122003 | FIGURE 2

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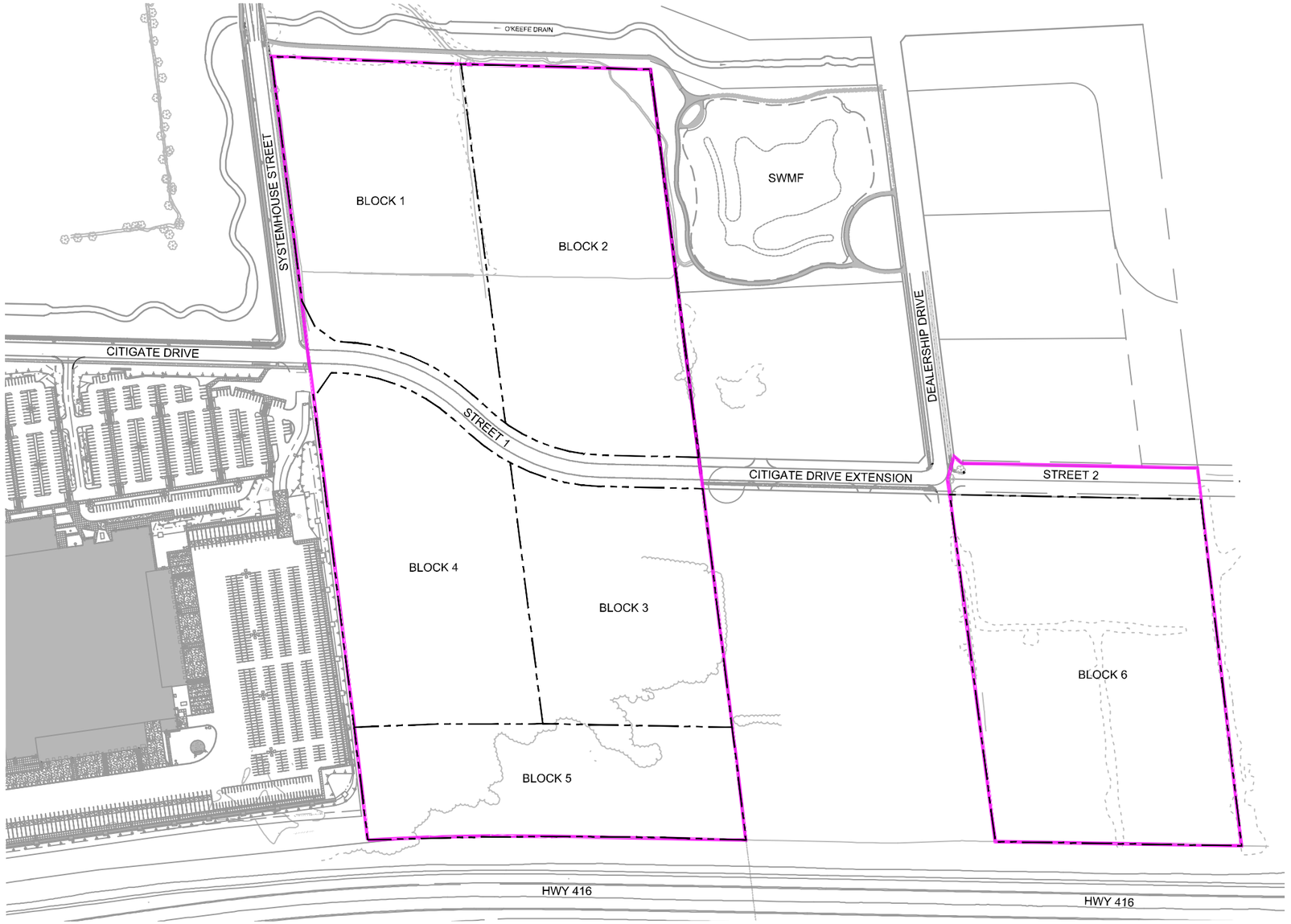

13m R.O.W DEDICATION

EXISTING PROPERTY BOUNDARY

PROPOSED PROPERTY BOUNDARY

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444 CITIGATE DRIVE
560 DEALERSHIP DRIVE

CONCEPT PLAN

SCALE 1 : 4000 (0, 20, 40, 60, 80)

DATE NOV 2022 | JOB 122003 | FIGURE 3

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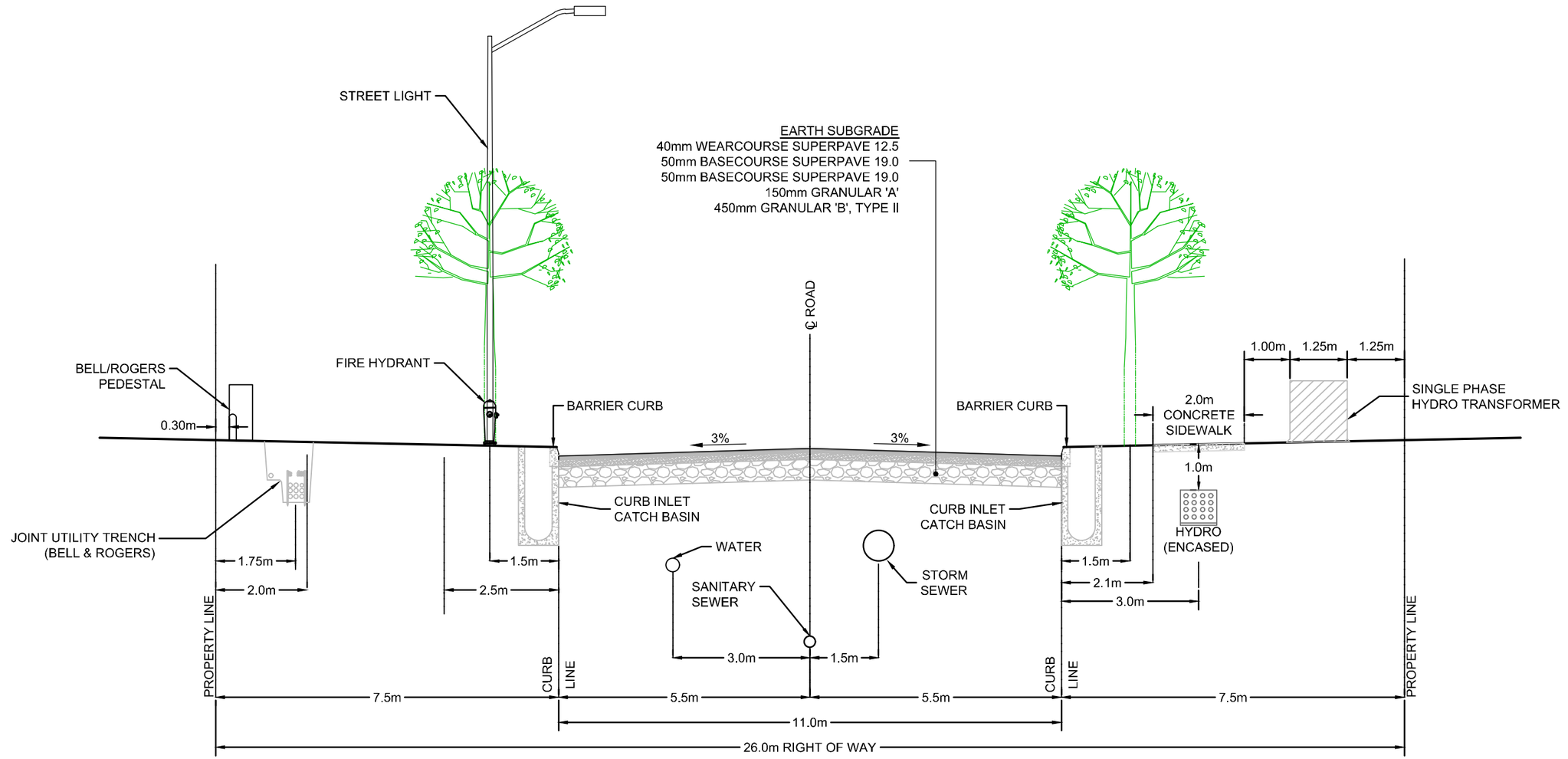

CITIGATE DRIVE CONNECTION & STREET 1
(LOOKING SOUTH)

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444 CITIGATE DRIVE
560 DEALERSHIP DRIVE

R.O.W CROSS-SECTION

SCALE 1 : 100

DATE NOV 2022 | JOB 122003 | FIGURE 4

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by GHD. **Figure 3** shows the site area and the above noted parcel blocks. A copy of the Draft Plan of Subdivision is included in **Appendix A** for reference.

560 Dealership Drive

The proposed development will consist of one development block and it is proposed to develop the site with a light industrial use. The road network and servicing infrastructure for the business park have not been completed south of the intersection of Dealership Drive and CitiGate Drive. Therefore, a 26m wide block along the east side of the site will be granted for use as part of a municipal right-of-way, herein referred to as Street 2. A similar 26m right-of-way cross section is proposed as shown in **Figure 4**. The municipal road will be constructed as part of the development with a temporary cul-de-sac at the south end. It is understood that ultimately this municipal road would be extended to connect to the future McKenna Casey Drive extension. It is understood that the intention is to connect the recently disconnected McKenna Casey Drive extension to Strandherd Road via Dealership Drive as per the McKenna Casey Realignment Study, dated November 2021 by Parsons.

This property is also subject to be serviced by a future stormwater management pond however, an interim storm servicing solution will be required until the future pond is constructed (to be discussed in subsequent sections of the report). **Figure 3** shows the property and the Draft Plan of Subdivision is included in **Appendix A** for reference.

4.0. REFERENCE AND SUPPORTING DOCUMENTS

The following documents will be referenced in conjunction with this report:

- CitiGate 416 Corporate Campus Detailed Servicing and Stormwater Management Report (Phase 1) R-2014-115, Prepared by Novatech revised October 1, 2014. (CitiGate Phase 1 Report).
- CitiGate Drive Extension Site Servicing Brief R-2017-090, Prepared by Novatech revised September 26, 2017. (CitiGate Dr. Extension Report)
- Environmental Impact Study, 444 CitiGate Drive, Report Ref: 12574213-01-RPT-1-22-06-16, Prepared by GHD, dated November 20, 2022 (EIS).
- Environmental Impact Study, Dealership Drive, Report Ref: 12574213-01-RPT-1-EIS-DealershipDrive, Prepared by GHD, dated November 2, 2022 (EIS).
- McKenna Casey Realignment Study, An Addendum to the 1991 Strandherd Drive Highway 416 to Jockvale Road Environmental Assessment Study, Prepared by Parsons, dated November 2021.

5.0. DEVELOPMENT CONSTRAINTS

444 CitiGate Drive

The following are constraints that affect the site development:

- Topography - The site's topography includes a steep slope running from the rear of the site by Highway 416 towards the front of the site. There is approximately a 14m drop across the site. The grading design to create flat areas for building, parking and stormwater storage areas will need to be considered.

- Proximity to Highway 416 (MTO) - The site is immediately adjacent to Highway 416. Therefore, a 14m set back from the Highway is typically required and approval from the Ministry of Transportation (MTO) will be required.

- Natural Heritage Feature Compensation Area – The EIS prepared for the site recommends that an area adjacent to Highway 416 be maintained as a compensation area. This area contains Natural Heritage Features and additional trees are to be planted within this compensation area to account for lost trees due to development.

560 Dealership Drive

The following are constraints that affect the site development:

- Topography - The site's topography includes a steep slope running from the rear of the site by Highway 416 towards the front of the site. There is approximately a 14m drop across the site. The grading design to create flat areas for building, parking and stormwater storage areas will need to be considered.

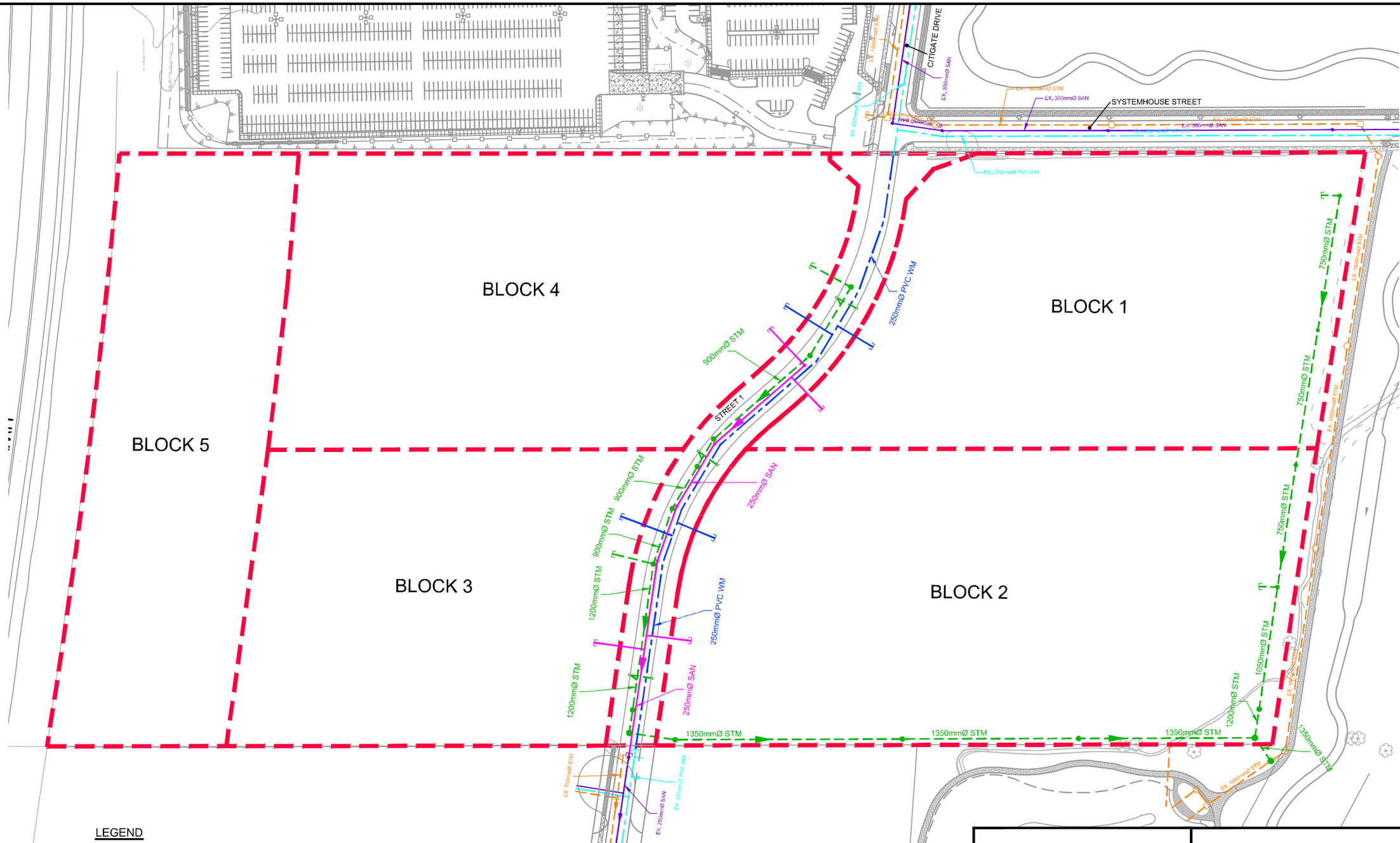
- Proximity to Highway 416 (MTO) - The site is immediately adjacent to Highway 416. Therefore, a 14m set back from the Highway is typically required and approval from the Ministry of Transportation (MTO) will be required.

6.0. WATER SERVICING

444 CitiGate Drive

There is an existing 250mm diameter watermain within the CitiGate Drive/Systemhouse Street right-of-way north of the subject property that was constructed as part of the Phase 1 CitiGate development. The watermain infrastructure currently terminates at the southern extent of the CitiGate and Systemhouse intersection. Similarly, there is an existing 250mm diameter watermain within the CitiGate Drive extension to the south of the property.

It is proposed to install a 250mm diameter watermain within the proposed Street 1 right-of-way and connect to each of the existing watermains north and south of the site to complete a looped system. Private water services can connect to this proposed watermain to service the development blocks. Hydrants are also proposed within the road allowance to provide fire



LEGEND

- PROPOSED PROPERTY BOUNDARY
- PROPOSED WATERMAIN
- PROPOSED SANITARY SEWER AND MANHOLE
- PROPOSED STORM SEWER AND MANHOLE
- EXISTING WATERMAIN
- EXISTING SANITARY SEWER AND MANHOLE
- EXISTING STORM SEWER AND MANHOLE

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444 CITIGATE DRIVE

PRELIMINARY SITE SERVICING PLAN

SCALE 1 : 2000 (0, 20, 40, 60, 80)

DATE	JOB	FIGURE
NOV 2022	122003	5

SHT11X17.DWG - 279mmX432mm

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protection. Private hydrants may also be required within the development blocks for fire protection. Refer to **Figure 5** which shows the preliminary site servicing plan for the subject site.

Preliminary water demand and fire flow calculations were calculated using criteria in Section 4 of the City of Ottawa Design Guidelines for Water Distribution Systems. Fire flows were calculated using the Fire Underwriters Survey method with assumptions on building construction and setback requirements. For the purposes of these calculations a light-industrial building was considered to be 50% of the total property area (excluding 26m ROW allowance). Preliminary water demands and fire flows are summarized in **Table 5.1A** below and supporting calculations are provided in **Appendix B1**.

Table 5.1A Water Demand Summary

Use	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
Light-Industrial	3.92	5.88	10.58	350

As per the City of Ottawa Technical Bulletin ISDTB-2014-02, the proposed development area will require two service connections as the average day demands were calculated to be greater than 50 cubic meters of water. The two services will be separated by an isolation valve within the municipal watermain system in the event maintenance on the system is required.

The above water demand information was submitted to the City of Ottawa for boundary conditions provided from the City's water model. The boundary conditions will determine whether the existing watermain infrastructure surrounding the development has capacity for the proposed development. The boundary conditions are provided in **Table 5.2A**.

Table 5.2A Water Boundary Conditions

Criteria	Head (m)
Connection #1 to Existing 254mm Watermain in CitiGate Drive	
Minimum HGL	146.9
Maximum HGL	153.9
Max Day + Fire Flow 1 (167 L/s)	147.3
Max Day + Fire Flow 2 (350 L/s)	131.3
Connection #2 to Existing 254mm Watermain in CitiGate Drive	
Minimum HGL	146.8
Maximum HGL	153.9
Max Day + Fire Flow 1 (167 L/s)	143.0
Max Day + Fire Flow 2 (350 L/s)	114.6

These boundary conditions were used to create a hydraulic model using EPANET for analyzing the proposed watermain for four theoretical conditions: 1) High Pressure check under Average Day conditions, 2) Peak Hour demand, 3) Maximum Day + Fire Flow 1 and 4) Max Day + Fire Flow 2. The following **Table 5.3A** summarizes the results from the hydraulic water analysis.

Table 5.3A Water Analysis Results Summary

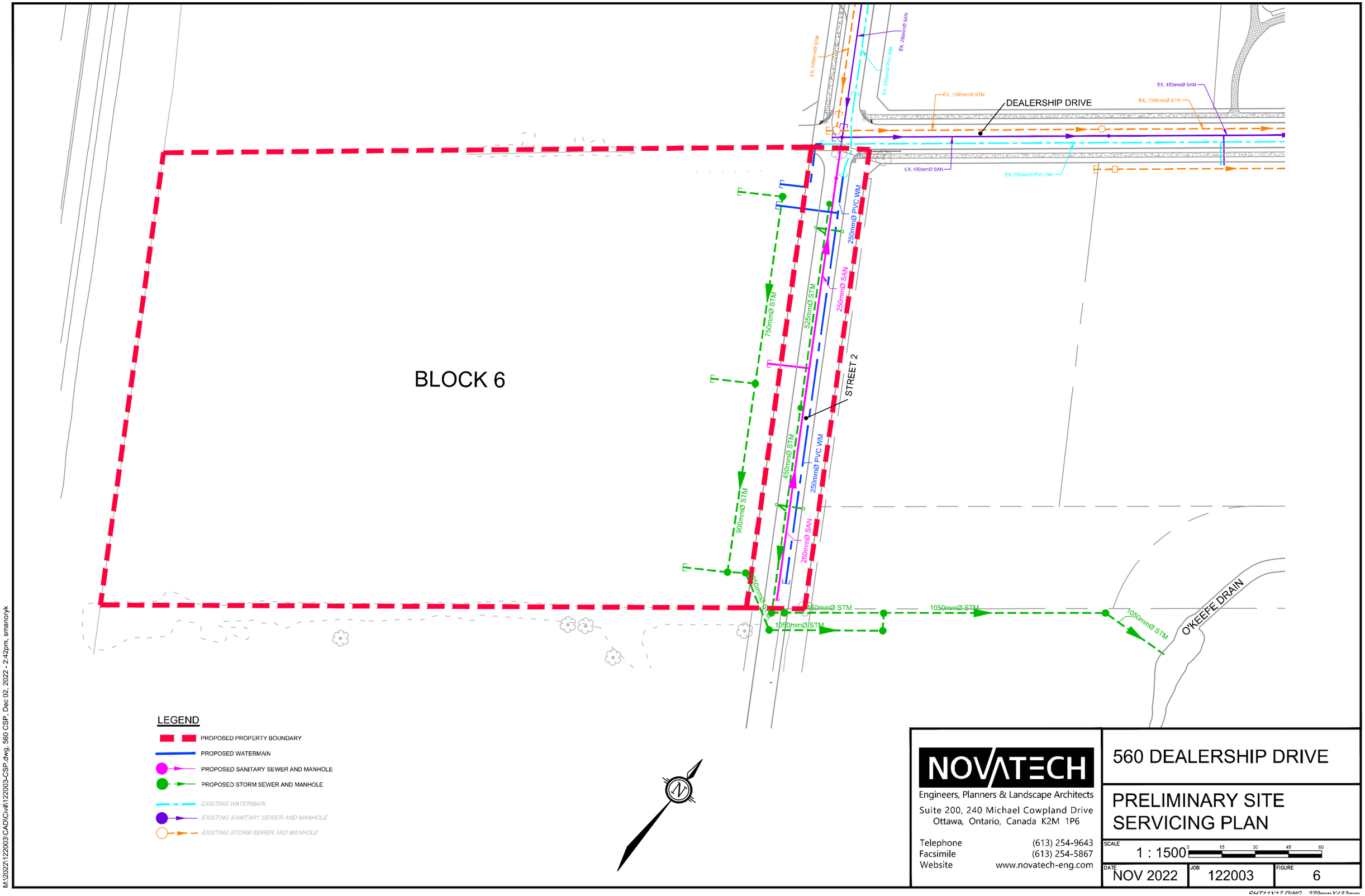
Condition	Demand (L/s)	Min/Max Allowable Operating Pressures (psi)	Limits of Design Operating Pressures (psi)
High Pressure	3.92	80psi (Max)	80.54
Peak Hour	10.58	40psi (Min)	70.39
Max Day + Fire Flow 1	172.88	20psi (Min)	63.18
Max Day + Fire Flow 2	355.88	20psi (Min)	22.57

Based on the proceeding analysis it can be concluded that the watermain will provide adequate flow and pressures for the fire flow + maximum day demand and peak hour demand. The existing and proposed fire hydrants surrounding the development will provide fire protection for the proposed development. It is recommended that pressure reductions valves are installed on the building service connections as the pressures exceed the 80-psi threshold during the high pressure test. The anticipated water demand for the buildings will be finalized during the site plan process. Calculations will be updated at that time to confirm capacity of the surrounding system. Refer to **Appendix B1** for hydraulic calculations and City of Ottawa boundary conditions.

560 Dealership Drive

There is an existing 250mm diameter watermain in each of Dealership Drive and CitiGate Drive with a stub from each watermain at the Dealership Drive/CitiGate Drive intersection by the northeast corner of the subject property. It is proposed to extend the watermain in the CitiGate Drive extension and construct a 250mm diameter watermain in the proposed Street 2 right-of-way. It is assumed that this proposed watermain would extended in the future (by others) to create a looped system. As an interim scenario it is proposed to construct a second watermain for the site and connect into the existing watermain in Dealership Drive to provide a looped system for the proposed development. Refer to **Figure 6** which shows the preliminary site servicing plan for the development.

Water demand and fire flow calculations were calculated using criteria in Section 4 of the City of Ottawa Design Guidelines for Water Distribution Systems. Fire flows were calculated using the Fire Underwriters Survey method with assumptions on building construction and setback requirements. For the purposes of these calculations a light-industrial building was considered to be 50% of the total property area (excluding 26m for the municipal ROW allowance). Preliminary water demand and fire flows are summarized in **Table 5.1B** below and supporting calculations are provided in **Appendix B2**.



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560 DEALERSHIP DRIVE

PRELIMINARY SITE SERVICING PLAN

SCALE 1 : 1500 (0, 15, 30, 45, 60)
DATE NOV 2022
JOB 122003
FIGURE 6

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Table 5.1B Water Demand Summary

Use	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
Light-Industrial	1.21	1.82	3.27	200

As per the City of Ottawa Technical Bulletin ISDTB-2014-02, the proposed development area will require two service connections as the average day demands were calculated to be greater than 50 cubic meters of water. The two services will be separated by an isolation valve within the municipal watermain system in the event maintenance on the system is required.

The above water demand information was submitted to the City of Ottawa for boundary conditions provided from the City's water model. The boundary conditions will determine whether the existing watermain infrastructure surrounding the development has capacity for the proposed development. The boundary conditions are provided in **Table 5.2B**.

Table 5.2B Water Boundary Conditions

Criteria	Head (m)
Connection #1 to Existing 254mm Watermain in Dealership Drive	
Minimum HGL	147.0
Maximum HGL	154.4
Max Day + Fire Flow 1 (167 L/s)	116.0
Max Day + Fire Flow 2 (167 L/s)	
Connection #2 to Existing 254mm Watermain in Dealership Drive	
Minimum HGL	147.0
Maximum HGL	154.4
Max Day + Fire Flow 1 (167 L/s)	117.1
Max Day + Fire Flow 2 (167 L/s)	

These boundary conditions were used to create a hydraulic model using EPANET for analyzing the proposed watermain for four theoretical conditions: 1) High Pressure check under Average Day conditions, 2) Peak Hour demand, 3) Maximum Day + Fire Flow 1 and 4) Max Day + Fire Flow 2. The following **Table 5.3B** summarizes the results from the hydraulic water analysis.

Table 5.3B Water Analysis Results Summary

Condition	Demand (L/s)	Min/Max Allowable Operating Pressures (psi)	Limits of Design Operating Pressures (psi)
High Pressure	1.21	80psi (Max)	84.61
Peak Hour	3.27	40psi (Min)	71.94
Max Day + Fire Flow 1	168.82	20psi (Min)	42.89
Max Day + Fire Flow 2	201.82	20psi (Min)	28.07

Based on the proceeding analysis it can be concluded that the watermain will provide adequate flow and pressures for the fire flow + maximum day demand and peak hour demand. The existing and proposed fire hydrants surrounding the development will provide fire protection for the proposed development. It is recommended that pressure reductions valves are installed on the building service connections as the pressures exceed the 80-psi threshold during the high pressure test. The anticipated water demand for the buildings will be finalized during the site plan process. Calculations will be updated at that time to confirm capacity of the surrounding system. Refer to **Appendix B2** for hydraulic calculations and City of Ottawa boundary conditions.

7.0. SANITARY SERVICING

444 CitiGate Drive

There is an existing 250mm diameter sanitary sewer in CitiGate Drive south of the development that was constructed as part of the CitiGate Drive extension. There is also a 300mm diameter sanitary sewer in Systemhouse Street north of the subject site. The subject property was included in the drainage area for the sanitary sewer network as part of the initial design for the CitiGate Business Park with a connection to the sanitary sewer by the intersection of CitiGate Drive/Dealership Drive. A copy of the drainage area plan from the initial design is included in **Appendix C1** for reference. The drainage areas were updated and revised when the CitiGate Drive extension was designed. A sanitary stub was capped at the end of the CitiGate Drive extension to service the subject property. There is also a portion of the subject property, adjacent to Highway 416 and adjacent to the proposed Crosskey Place, that was to continue to outlet to the CitiGate Drive/Dealership Drive intersection given the initial development concept. A copy of the sanitary drainage area plan for the CitiGate Drive extension design is included in **Appendix C1** for reference.

It is proposed to service the development with a 250mm diameter sanitary sewer within the proposed Street 1 right-of-way which will connect to the stub by the north end of the CitiGate Drive extension. Refer to **Figure 5** which shows the preliminary site servicing plan for the development.

Sanitary flows for the proposed development were calculated using criteria in Section 4 of the City of Ottawa Sewer Design Guidelines and were based on a light-industrial use with an average flow of 35,000 L/ha/day. The peak sanitary flow was calculated to be 8.58 L/s. Refer to **Appendix C1** for detailed sanitary flow calculations.

Since the existing sanitary sewer in the CitiGate Drive extension is the designated outlet for the subject site, the sanitary sewer design sheets from the CitiGate Drive extension were reviewed to confirm the existing sanitary sewers have capacity for the proposed development. An as-built design sheet for the sanitary sewer in the CitiGate Drive extension was updated to include the revised drainage areas and sanitary flows for the subject property. It should be noted that the original design was based on an average flow of 50,000 L/ha/day to calculate the peak sanitary flows. Given the intended light industrial use the proposed peak sanitary flow was calculated using 35,000 L//ha/day as per the current City of Ottawa design criteria. The updated sanitary sewer design sheet confirms that there is adequate capacity within the existing municipal sanitary sewer system to service the proposed development. Refer to **Appendix C1** for detailed calculations, drainage area plans, and sanitary sewer design sheets.

560 Dealership Drive

There is an existing 450mm diameter sanitary sewer in Dealership Drive currently servicing the business park. The subject site was allocated in the original CitiGate design to outlet to the existing sanitary sewer in Dealership Drive and was noted as future development by others.

It is proposed to service the development with a 250mm diameter sanitary sewer within the Street 2 right-of-way which will outlet to the existing sanitary sewer in Dealership Drive. A private sanitary sewer will service the development block. Refer to **Figure 6** which shows the preliminary site servicing plan for the subject property.

Sanitary flows for the proposed development were calculated using criteria in Section 4 of the City of Ottawa Sewer Design Guidelines and were based on a light-industrial use with an average flow of 35,000 L/ha/d. The peak sanitary flow was calculated to be 2.65 L/s. Detailed sanitary flow calculations are provided in **Appendix C2** for reference.

As indicated previously, the overall design of the CitiGate development included the site area within the drainage area for the sanitary sewer in Dealership Drive. An as-built design sheet for the sanitary sewer in Dealership Drive was updated to include the revised drainage areas and sanitary flows for the subject property. It should be noted that the original design was based on an average flow of 50,000 L/ha/day to calculate the peak sanitary flows. Given the intended light industrial use the proposed peak sanitary flow was calculated using 35,000 L/ha/day as per the current City of Ottawa design criteria. The updated sanitary sewer design sheet confirms that there is adequate capacity within the existing sanitary sewer system to service the proposed development. Refer to **Appendix C2** for detailed calculations, drainage area plans, and sanitary sewer design sheets.

8.0. STORM SERVICING & STORMWATER MANAGEMENT

444 CitiGate Drive

The topography of the site slopes from west to east and stormwater currently sheet drains across the site towards the O'Keefe Drain. There is a substantial grade drop across the site of approximately 14 m.

A municipal storm sewer system is proposed within the proposed Street 1 right-of-way which will outlet to the existing stormwater management pond by the southeast corner of the site. The development block parcels will be serviced with private storm sewers that will outlet to either the municipal storm sewer along Street 1 or to a storm sewer within an easement along the east property line which will also outlet to the existing stormwater management pond. Refer to **Figure 5** for the Preliminary Servicing Plan.

As noted previously, this parcel of land was included in the design of the CitiGate Campus. This parcel is to be serviced by a stormwater management pond constructed with Phase 1 of the CitiGate Campus. The CitiGate Phase 1 Report provides information on the detailed design of the servicing and stormwater management of the CitiGate Campus. This report provides the following stormwater management criteria for the subject site which is included in the area on the west side of the O'Keefe Drain:

- Allowable release rates and storage requirements for individual sites are to be calculated as follows, based on a runoff coefficient of C=0.80:
    - The 5-year peak flow can be released uncontrolled.
    - The maximum release rate is not to exceed 120% of the 5-year peak flow for all storms up to and including the 100-year event.
    - Ensure no overland flow for all storms up to and including the 100-year event.
- Based on these release rates, it is anticipated that 100 m^3/ha of on-site storage will be sufficient to prevent major system (overland) flows during the 100-year event.

Preliminary stormwater management calculations were completed for the proposed development. The overall release rate for the site is 3359 L/s as taken from the model within the CitiGate Phase 1 Report. This release rate was then divided between the development blocks and the ROW based on percent area.

Quantity control of stormwater will be required for each of the development blocks and in the proposed right-of-way. It is assumed that stormwater within each development block can be stored on building roofs, on the surface or within underground storage tanks. Flow control roof drains and inlet control devices will be implemented into the design to control the release of stormwater to the allowable release rate. The allowable release rates and storage requirements for the development blocks is provided in **Table 7.1A**.

Table 7.1A Development Block Allowable Release Rates and Required Storage

Block No.	Area (ha)	100 Year Storm Event	
		Allowable Release Rate (L/s)	Required Storage (m^3)
R.O.W	0.961	129.0	112.22
Block 1	3.938	657.8	657.49
Block 2	5.037	841.4	840.98
Block 3	4.638	774.8	483.90
Block 4	5.725	956.3	654.30
Total	20.30	3359.30	2748.89

Note: Storage calculated assumes a post development runoff coefficient of 0.80 as per CitiGate Phase 1 Report for each development block. Reserved Area (Block 5A and 5B) were included in the Total Area for Block 3 & 4 respectively. The runoff coefficient for Block 3 & 4 were calculated based on the post development runoff coefficient and a 0.20 runoff coefficient assumed for the Reserved Area (Block 5A & 5B).

Quantity control of stormwater will also be required within the public right-of-way. Inlet control devices will be installed in the roadside catchbasins to control the release of stormwater to the allowable release rate and stormwater will pond within the road allowance.

During storms in excess of the 100-year storm event, site grading will provide an overland flow route to either the Street 1 right-of-way or to the swale along the east property limit which will outlet to the existing stormwater management pond. ***Figure 7*** shows the preliminary conceptual grading design.

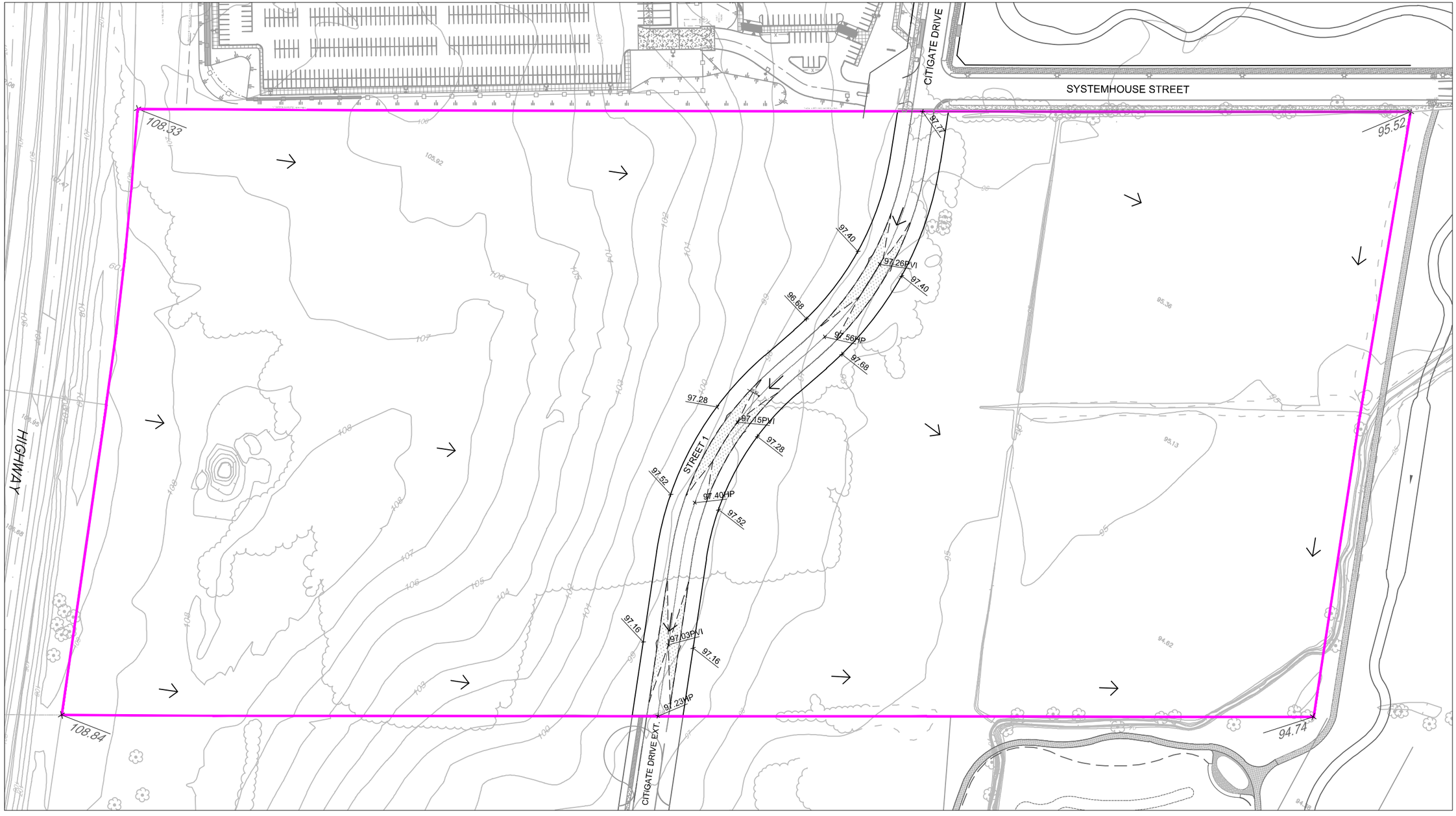
Quality control of stormwater is required to an enhanced level or 80% total suspended solids removal. Quality control of stormwater is provided by the existing stormwater management pond as noted in the CitiGate Phase 1 Report

In summary, the existing stormwater management pond has been designed to service the subject property. Quantity control of stormwater will be required within each development block and appropriate stormwater management methods can be used to meet the allowable release rate. Refer to **Appendix D1** for preliminary stormwater management calculations and pre and post development drainage area figures.

560 Dealership Drive

The topography of the site slopes from west to east and stormwater currently sheet drains across the site towards the O'Keefe Drain. There is a substantial grade drop across the site of approximately 14 m.

A municipal storm sewer system is proposed within the proposed Street 2 right-of-way which will outlet to a proposed ditch and drain to the existing O'Keefe Drain in an interim condition. Ultimately Street 2 (and municipal services) will be extended, and a stormwater management pond will be constructed which will service this property. The property will be serviced with



LEGEND

- EXISTING GRADE (89.57)
- PROPOSED GRADE (89.57)
- PROPOSED VERTICAL POINT OF INTERSECTION ELEVATION (9.7PVI)
- PROPOSED GRADE HIGH POINT (89.57HP)
- DIRECTION OF FLOW
- ROAD STORAGE
- EXISTING PROPERTY BOUNDARY

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Website www.novatech-eng.com

444 CITIGATE DRIVE

CONCEPTUAL R.O.W GRADING PLAN

SCALE 1 : 2000 (0 20 40 60 80)

DATE NOV 2022 | JOB 122003 | FIGURE 7

SHT11X17.DWG - 279mmX432mm

M:\2022\122003\CAD\Civil\Figures\122003-CON GR.dwg, FIGURE 7, Nov 24, 2022 - 4:02pm, mateoti

private storm sewers that will outlet to the municipal storm sewer in Street 2. Refer to **Figure 6** for the Preliminary Servicing Plan.

This property is within the CitiGate Lands which are tributary to the O'Keefe Drain and fall under the Jurisdiction of the Rideau Valley Conservation Authority (RVCA). The proposed SWM criteria has been established in the CitiGate Phase 1 Report and is summarized as follows:

Quantity Control

- Control post-development peak flows to pre-development levels for all storms up to and including the 100-year storm event at all stages of development.
- Provide an Enhanced level of water quality control corresponding to 80% long-term removal of total suspended solids (TSS) as per Ministry of the Environment (MOE) guidelines.
- Where possible, implement lot-level and conveyance best management practices to maximize the potential for water quality treatment.

Fluvial Geomorphology / Erosion

- Ensure that the proposed development does not result in adverse changes to the geomorphology of the O'Keefe Drain downstream of McKenna Casey Drive.

Fish Habitat / Temperature Mitigation

- The reaches of the O'Keefe Drain within the limits of the CitiGate Lands are considered to provide direct fish habitat for common warm to cool water forage fish species. As such, temperature mitigation measures are recommended to promote the cooling of storm runoff prior to discharging to the O'Keefe Drain.
- The proposed SWM strategy should investigate opportunities to increase baseflows in the O'Keefe Drain. Options include:
  - Extended detention / baseflow outlets from SWM facilities
  - Promote infiltration of storm runoff in areas with suitable soils
- To ensure that the O'Keefe Drain remains a hospitable fish environment, any increase in the temperature of the stormwater entering the drain should be kept to a minimum. Temperature mitigation techniques are to be incorporated into the design and layout of the proposed SWM facilities and the proposed O'Keefe Drain corridor.

Preliminary stormwater management calculations were completed for the proposed development. The overall release rate for the site is 224 L/s, 303 L/s and 648 L/s in the 2-, 5-, and 100-year storm events respectively. These release rates were allocated to the ROW and development block based on percent area.

Quantity control of stormwater will be required for the development block and in the proposed right-of-way. It is assumed that stormwater within the development block can be stored on building roofs, on the surface or within underground storage tanks with orifices controlling the release of stormwater to the allowable release rate. The allowable release rates and storage required for the development block is provided in **Table 7.1B**.

Table 7.1B Development Block Allowable Release Rates and Required Storage

Block No.	Area (ha)	100 Year Storm Event	
		Allowable Release Rate (L/s)	Required Storage (m^3)
R.O.W	0.54	86.0	55.70
Block 6	5.98	561.9	1455.41
Total	6.52	647.9	1511.11

Quantity control of stormwater will also be required within the public right-of-way. Inlet control devices will be installed in the roadside catch basins to control the release of stormwater to the allowable release rate and stormwater will pond within the road allowance.

During storms in excess of the 100-year storm event, site grading will provide an overland flow route to the Street 2 right-of-way and to the proposed ditch which drains to the O'Keefe Drain. ***Figure 8*** Conceptual Grading Plan shows the preliminary conceptual grading design.

Quality control of stormwater is required to an enhanced level or 80% total suspended solids removal. Quality control of stormwater will be provided by the installation of oil grit separator units within the development block and in the Street 1 right-of-way for road drainage.

Temperature mitigation is also required due to fish habitat within the O'Keefe Drain. Measures such a white building roofs and storing stormwater underground will be implemented in order to provide temperature mitigation. Further details will be provided during the detailed design stage.

In summary, the site will continue to drain stormwater to the existing O'Keefe Drain per existing conditions. Quantity and quality control of stormwater will be required within the development block and appropriate stormwater management methods can be used to meet the allowable release rate. Refer to **Appendix D2** for preliminary stormwater management calculations and pre and post development drainage area figures.

LEGEND

- EXISTING GRADE (89.57)
- PROPOSED GRADE (89.57)
- PROPOSED VERTICAL POINT OF INTERSECTION ELEVATION (9.7PVI)
- PROPOSED GRADE HIGH POINT (89.57HP)
- DIRECTION OF FLOW
- ROAD STORAGE
- EXISTING PROPERTY BOUNDARY

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560 DEALERSHIP DRIVE

CONCEPTUAL R.O.W GRADING PLAN

SCALE 1 : 2000 (0, 20, 40, 60, 80)

DATE NOV 2022 | JOB 122003 | FIGURE 8

SHT11X17.DWG - 279mmX432mm

M:\2022\122003\CAD\Civil\Figures\122003-CON GR.dwg, FIGURE 8, Nov 24, 2022 - 4:02pm, madeoti

9.0. EROSION AND SEDIMENT CONTROL MEASURES

Temporary erosion and sediment control measures will be required on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter socks will be placed in existing catchbasins and manholes, and will remain in place until vegetation has been established and construction is completed;
- Silt fencing will be placed along the surrounding construction limits;
- Mud mats will be installed at the site entrances;
- The contractor will be required to perform regular street sweeping and cleaning as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site;

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

10.0. CONCLUSIONS AND RECOMMENDATIONS

The conclusions of this report are as follows:

444 CitiGate Drive

- Water servicing, including both domestic and fire protection, can be provided by connection to the existing watermain infrastructure surrounding the site. It is proposed to install a watermain within the proposed Street 1 right-of-way to service the proposed development blocks.
- Sanitary servicing can be provided from the existing sanitary sewer infrastructure surrounding the site. It is proposed to install sanitary sewers within the proposed right-of-way and connect to the municipal sanitary sewer within the CitiGate Drive extension which was already sized to accommodate flows from the proposed development blocks.
- Storm servicing can be provided for the proposed development. Quantity control of stormwater can be provided within the proposed right-of-way using inlet control devices at the roadside catchbasins and ponding stormwater within the road right-of-way. The development blocks are expected to adhere to the same stormwater criteria as outlined in this report. Quantity control of stormwater will be provided by each individual development block through roof storage, on the surface and/or underground storage tanks.
- Quality control of stormwater will be provided for the public road right-of-way through the installation of oil grit separator units. Quality control of stormwater not required on the development blocks if the drainage is limited to roof and landscape drainage. In the event surface parking is proposed then quality control will be required and would be handled by each individual development block.
- An overland flow route will be provided to either the Street 1 right-of-way or to a swale along the east property limit which will outlet to the existing stormwater management pond (SWMF-A).
- Erosion and sediment control measures will be required during construction.

560 Dealership Drive

- Water servicing, including both domestic and fire protection, can be provided by connection to the existing watermain infrastructure surrounding the site. It is proposed to install watermain within the proposed Street 1 right-of-way to service the proposed development block. A second connection to the existing municipal system will be provided in the interim until Street 2 is extended and the municipal system can be looped.
- Sanitary servicing can be provided from the existing sanitary sewer infrastructure surrounding the site. It is proposed to install sanitary sewers within the proposed Street 2 right-of-way and connect to the municipal sanitary sewer within Dealership Drive which was already sized to accommodate flows from the proposed development block.
- Storm servicing can be provided for the proposed development. Quantity control of stormwater can be provided within the proposed right-of-way using inlet control devices at the roadside catchbasins and ponding stormwater within the road right-of-way. The development block is expected to adhere to the same stormwater criteria as outlined in this report. Quantity control of stormwater will be provided by the development block through underground storage tanks. Temperature mitigation measures such as white roofs and underground stormwater storage are also required.
- Quality control of stormwater will be provided for the public road right-of-way through the installation of oil grit separator units. Quality control of stormwater is not required on the development blocks if the drainage is limited to roof and landscape drainage. In the event surface parking is proposed then quality control will be required and would be handled by each individual development block.
- An overland flow route will be provided to the Street 2 right-of-way and to the proposed ditch which drains to the O'Keefe Drain per existing conditions.
- Erosion and sediment control measures will be required during construction.

The preceding report is respectfully submitted for review and approval. Please contact the undersigned should you have any questions or require additional information.

NOVATECH

Prepared by:

Spencer Manoryk
Project Engineer
Land Development Engineering

Micheal Adeoti, EIT
Project Engineer
Land Development Engineering

Reviewed by:

Cara Ruddle, P.Eng.
Senior Project Manager
Land Development Engineering

FOR REVIEW ONLY

APPENDIX A
Draft Plan of Subdivision

EXISTING BUSINESS PARK

EXISTING MIXED USE

EXISTING OPEN SPACE

Citigate Drive

Systemhouse Street

N 59°37'30" E 94.66 — 117.04 — N 59°18'40" E 280.82 — 211.60 — N 59°13'10" E 71.22

N59°23'50"E 76.61 — 104.23 — N 59°09'50" E 205.54 — 153.58

26.00 — 24.00

20.32 — 21.15 — 23.72

N 24°44'00" W — R=2050.15 — C=153.51

72.05 — 84.88 — 219.32 — 301.06

N 22°35'10" W — 161.73

N 22°03'00" W — 158.33 — 155.51 — 158.05 — 156.83

BLOCK 4
Industrial & Logistics
Area= 4.22 Ha
(10.43 Acres)

BLOCK 1
Industrial & Logistics
Area= 3.93 Ha
(9.72 Acres)

BLOCK 5
Parkland Dedication
Area= 2.95 Ha
(7.29 Acres)

BLOCK 3
Industrial & Logistics
Area= 3.18 Ha
(7.86 Acres)

BLOCK 2
Industrial & Logistics
Area= 5.03 Ha
(12.44 Acres)

Street One

110.22 — 129.49 — 8.56 — 49.23 — 23.04 — 8.86 — 73.27 — 80.87 — 26.00 — 90.45 — 86.01

EXISTING OPEN SPACE

94.57 — 200.23 — 325.67

N 59°31'50" E 77.99 — N 59°13'10" E 85.48 — N 59°18'00" E 144.47 — N 59°12'40" E 139.04 — N 59°23'00" E 136.27 — N 59°16'10" E 63.60

FUTURE INDUSTRIAL

EXISTING BUSINESS PARK

EXISTING SWM

FUTURE INDUSTRIAL

N 59°21'30" E 152.52 — N 59°14'40" E 154.24

24.00

Dealership Drive

152.52 — 141.14 — 13.10

208.55

N 22°34'40" W — 78.29 — N 22°28'50" W — 78.29

BLOCK 6
Industrial & Logistics
Area= 6.05 Ha
(14.95 Acres)

Street Two

81.79 — 130.03 — N 22°37'00" W — 50.07 — 26.00

EXISTING BUSINESS PARK

EXISTING OPEN SPACE

Philsar Street

EXISTING BUSINESS PARK

N 59°13'10" E — N 59°15'20" E 152.30

PIN 04467-0028

PIN 04467-0022

KEY MAP
NOT TO SCALE

METRIC : MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

DRAFT PLAN OF SUBDIVISION OF
PART LOT 17 & 18
CONCESSION 4 (RIDEAU FRONT)
Geographic Township of Nepean
CITY OF OTTAWA
SCALE
1 : 1500
DATE: OCTOBER, 2022

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJOINING LANDS ARE CORRECTLY SHOWN.

DATED _____ _____
?surveyor name?
ONTARIO LAND SURVEYOR

?name of surveying company?
ONTARIO LAND SURVEYORS ?surveyor job number?

OWNER'S CERTIFICATE

I/WE, ,BEING THE REGISTERED OWNER(S), HEREBY AUTHORIZE NOVATECH TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CITY OF OTTAWA FOR REVIEW AND APPROVAL.

DATED _____ _____
owner name

OWNER'S CERTIFICATE

I/WE, CITY OF OTTAWA, BEING THE REGISTERED OWNER(S), HEREBY AUTHORIZE NOVATECH TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CITY OF OTTAWA FOR REVIEW AND APPROVAL.

DATED _____ _____
owner name

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51 (17) OF THE PLANNING ACT.

A) The boundaries of the land proposed to be subdivided, certified by an Ontario land Surveyor;
As shown on Draft Plan

B) The locations, widths & names of the proposed highways within the proposed subdivision & of existing highways on which the proposed subdivision abuts;
As shown on Draft Plan

C) On a small keyplan, on a scale of not less than 1cm to 100m, all of the land adjacent to the proposed subdivision that is owned by the applicant or in which the applicant has an interest, every subdivision adjacent to the proposed subdivision & the relationship of the boundaries of the land to be subdivided to the boundaries of the township lot of other original grant of which the land forms the whole part;
As Shown on Draft Plan

D) The purpose for which the proposed lots are to be used;
Industrial, and Open Space shown on Draft Plan

E) The existing uses of all adjoining lands;
Business Park, Open Space, and Stormwater Management shown on Draft Plan

F) The approximate dimensions & layout of the proposed lots;
As shown on Draft Plan

G) Natural & artificial features such as buildings or other structures or installations, railways, highways, watercourses, drainage ditches, wetlands & wooded areas within or adjacent to the land proposed to be subdivided;
As shown on Draft Plan

H) The availability and nature of domestic water supplies;
Development will be supplied with full municipal piped water service

I) The nature & porosity of the soil;
See Soils Report

J) Existing contours or elevations as may be required to determine the grade of the highways and the drainage of the land proposed to be subdivided;
Contours shown at 0.25 metre intervals on Draft Plan

K) The municipal services available or to be available to the land proposed to be subdivided;
Development will be supplied with full sanitary and storm water sewer services.

L) The nature & extent of any restrictions affecting the land proposed to be subdivided, including restrictive covenants or easements. 1994, c. 23, s. 30; 1996, c.4, s. 28 (3);
As shown on Draft Plan.

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Website www.novatech-eng.com

PROJECT No. 122003

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DXX-XX-XXXX

#xxxxx

APPENDIX B1
444 CitiGate Drive – Water Servicing Information

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 122003
Project Name: 444 CitiGate Drive
Date: 11/21/2022
Input By: Spencer Manoryk
Reviewed By: Cara Ruddle

Legend: Input by User; No Information or Input Required

Building Description: Light Industrial
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame		1.5	0.6	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)	Yes	0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	96700			
		Number of Floors/Storeys	1			
		Protected Openings (1 hr)	Yes			
		Area of structure considered (m^2)			**96,700**	
	F	**Base fire flow without reductions**				**41,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	0%	**41,000**
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-20,500**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	> 45.1m		0%	**0**
		East Side	> 45.1m		0%	
		South Side	> 45.1m		0%	
		West Side	> 45.1m		0%	
				Cumulative Total	**0%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**21,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**350**
				or	USGPM	5,548
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	4.5
		Required Volume of Fire Flow (m^3)			m^3	5670

Project No. 122003
Project Name: 444 CitiGate Drive
Project Location: Ottawa, ON

Date: November, 2022

444 Citigate Drive - Preliminary Development Water Demands

Site	Commercial Demand (L/s)				
	Area (ha)	Commercial Area* (ha)	Avg. Day	Max. Daily	Peak Hour
444 CitiGate Drive	20.29	9.67	3.917	5.88	10.58

* Commercial Area was considered to be 50% of the total property area (excluding 26m ROW allowance)

Consumption Rates:

Establishment	Daily Demand Volume	Source
Industrial - Light	35000 L/ha/day	City of Ottawa Water Design Guidelines

Commercial Peaking Factors City of Ottawa Water Distrubution Guidelines:

Conditions	Peaking Factor		Units
Maximum Day	1.5	x avg day	L/c/day
Peak Hour	1.8	x max day	L/c/day

Boundary Conditions
444 Citigate Drive

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	235	3.92
Maximum Daily Demand	353	5.88
Peak Hour	635	10.58
Fire Flow Demand #1	10,000	166.67
Fire Flow Demand #2	21,000	350.00

Location

Results – Existing Conditions

Connection 1 – Citigate Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	153.9	82.2
Peak Hour	146.9	72.1
Max Day plus Fire 1	147.3	72.8
Max Day plus Fire 2	131.3	50.0

Ground Elevation = 96.2 m

Connection 2 – Dealership Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	153.9	80.0
Peak Hour	146.8	69.8
Max Day plus Fire 1	143.0	64.3
Max Day plus Fire 2	114.6	24.0

Ground Elevation = 97.7 m

Notes

1. A 250mm watermain was added for modelling purposes between Connection 1 and Connection 2, as internal looping of the site is required to meet minimum fire flow requirements.
2. As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
    a. If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
    b. Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

Disclaimer

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

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

Input File: 122003-HP.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RES1	1	96	250
2	1	2	5.5	250
3	2	3	130.75	250
4	3	4	7.5	250
5	4	RES2	114.5	250

Node Results:

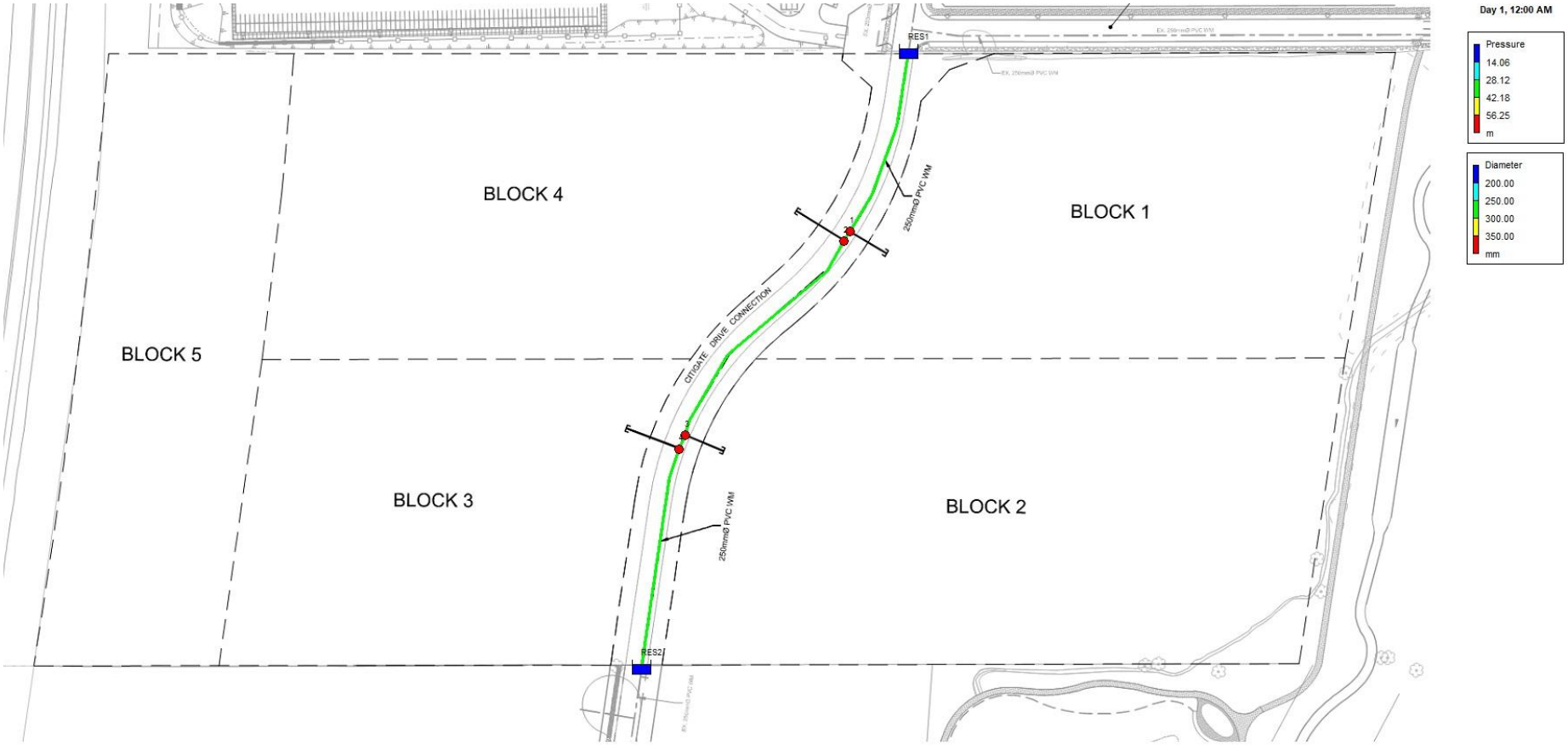
Node ID	Demand LPS	Head m	Pressure m	Quality hours	
1	0.98	153.90	56.64	0.00	
2	0.98	153.90	56.60	0.00	
3	0.98	153.90	56.64	0.00	
4	0.98	153.90	56.59	0.00	
RES1	-2.05	153.90	0.00	0.00	Reservoir
RES2	-1.87	153.90	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	2.05	0.04	0.02	Open
2	1.07	0.02	0.01	Open
3	0.09	0.00	0.00	Open
4	-0.89	0.02	0.00	Open
5	-1.87	0.04	0.01	Open

HIGH PRESSURE (AVG. DAY) MAP

Connection 1
boundary conditions
153.9 head (m)
82.2 psi



Connection 2
boundary conditions
153.9 head (m)
80.0 psi

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

Input File: 122003-PH.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RES1	1	96	250
2	1	2	5.5	250
3	2	3	130.75	250
4	3	4	7.5	250
5	4	RES2	114.5	250

Node Results:

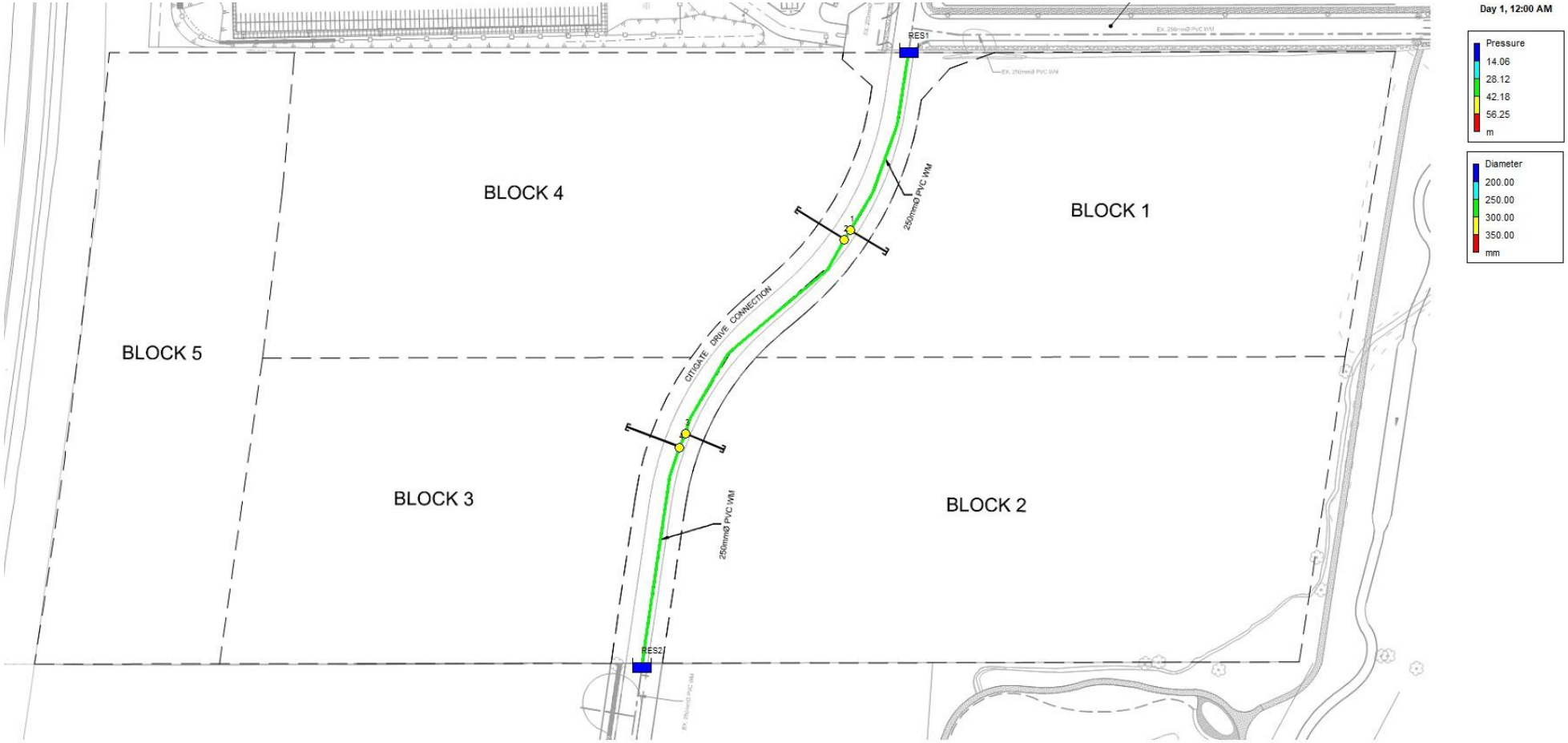
Node ID	Demand LPS	Head m	Pressure m	Quality hours	
1	2.65	146.84	49.58	0.00	
2	2.65	146.84	49.54	0.00	
3	2.65	146.81	49.55	0.00	
4	2.65	146.81	49.50	0.00	
RES1	-14.32	146.90	0.00	0.00	Reservoir
RES2	3.72	146.80	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	14.32	0.29	0.60	Open
2	11.67	0.24	0.40	Open
3	9.02	0.18	0.26	Open
4	6.37	0.13	0.13	Open
5	3.72	0.08	0.05	Open

PEAK HOUR MAP

Connection 1
boundary conditions
146.9 head (m)
72.1 psi



Connection 2
boundary conditions
146.8 head (m)
69.8 psi

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

Input File: 122003-MD+FF1.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RES1	1	96	250
2	1	2	5.5	250
3	2	3	130.75	250
4	3	4	7.5	250
5	4	RES2	114.5	250

Node Results:

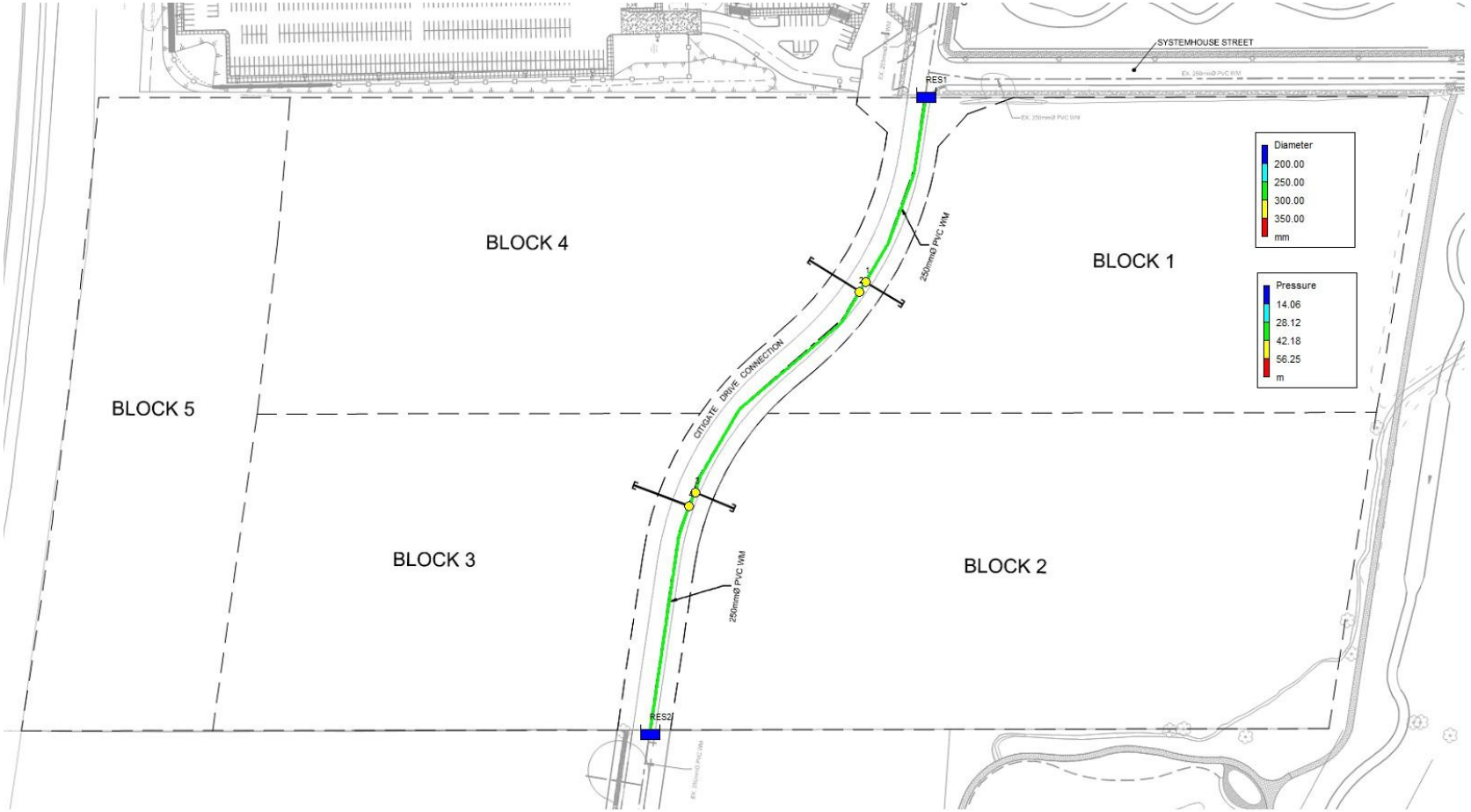
Node ID	Demand LPS	Head m	Pressure m	Quality hours	
1	1.50	145.02	47.76	0.00	
2	1.50	144.90	47.60	0.00	
3	1.50	141.90	44.64	0.00	
4	168.20	141.74	44.43	0.00	
RES1	-103.85	147.30	0.00	0.00	Reservoir
RES2	-68.85	143.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	103.85	2.12	23.77	Open
2	102.35	2.09	22.22	Open
3	100.85	2.05	22.93	Open
4	99.35	2.02	21.03	Open
5	-68.85	1.40	11.01	Open

MAX DAY + FIRE FLOW 1 MAP

Connection 1
boundary conditions
147.3 head (m)
72.8 psi



Connection 2
boundary conditions
143.0 head (m)
64.8 psi

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

Input File: 122003-MD+FF2.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RES1	1	96	250
2	1	2	5.5	250
3	2	3	130.75	250
4	3	4	7.5	250
5	4	RES2	114.5	250

Node Results:

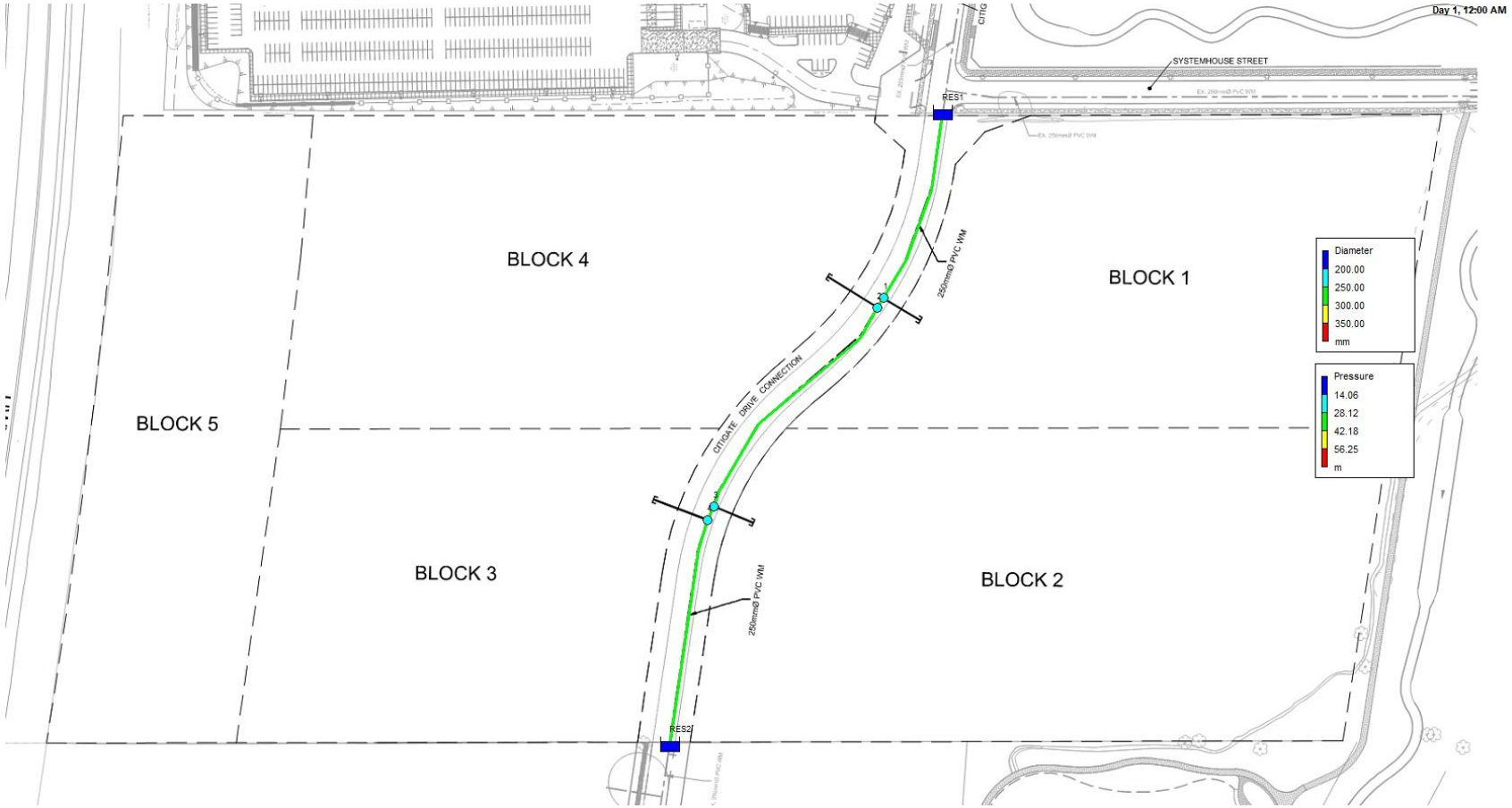
Node ID	Demand LPS	Head m	Pressure m	Quality hours	
1	176.50	116.53	19.27	0.00	
2	1.50	116.40	19.10	0.00	
3	176.50	113.13	15.87	0.00	
4	1.50	113.22	15.91	0.00	
RES1	-283.63	131.30	0.00	0.00	Reservoir
RES2	-72.37	114.60	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	283.63	5.78	153.81	Open
2	107.13	2.18	24.18	Open
3	105.63	2.15	25.00	Open
4	-70.87	1.44	11.25	Open
5	-72.37	1.47	12.08	Open

MAX DAY + FIRE FLOW 1 MAP

Connection 1
boundary conditions
131.3 head (m)
50.0 psi



Connection 2
boundary conditions
114.6 head (m)
24.0 psi

APPENDIX B2
560 Dealership Drive – Water Servicing Information

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 121028
Project Name: 560 Dealership Drive
Date: 11/21/2022
Input By: Spencer Manoryk
Reviewed By: Cara Ruddle

Legend: Input by User; No Information or Input Required

Building Description: Light Industrial
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Wood frame		1.5	0.6	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)	Yes	0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	29900			
		Number of Floors/Storeys	1			
		Protected Openings (1 hr)	Yes			
		Area of structure considered (m^2)			**29,900**	
	F	**Base fire flow without reductions**				**23,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	0%	**23,000**
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-11,500**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	> 45.1m		0%	**0**
		East Side	> 45.1m		0%	
		South Side	> 45.1m		0%	
		West Side	> 45.1m		0%	
				Cumulative Total	**0%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**12,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**200**
				or	USGPM	3,170
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2.5
		Required Volume of Fire Flow (m^3)			m^3	1800

Project No. 121028
Project Name: 560 Dealership Drive
Project Location: Ottawa, ON

Date: November, 2022

560 Dealership Drive - Preliminary Development Water Demands

Site	Commercial Demand (L/s)				
	Area (ha)	Commercial Area* (ha)	Avg. Day	Max. Daily	Peak Hour
560 Dealership Drive	6.32	2.99	1.211	1.82	3.27

* Commercial Area was considered to be 50% of the total property area (excluding 13m for ROW allowance)

Consumption Rates:

Establishment	Daily Demand Volume	Source
Industrial - Light	35000 L/ha/day	City of Ottawa Water Design Guidelines

Commercial Peaking Factors City of Ottawa Water Distrubution Guidelines:

Conditions	Peaking Factor	Units
Maximum Day	1.5 x avg day	L/c/day
Peak Hour	1.8 x max day	L/c/day

Boundary Conditions
560 Dealership Drive

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	73	1.21
Maximum Daily Demand	109	1.82
Peak Hour	196	3.27
Fire Flow Demand #1	10,000	166.67
Fire Flow Demand #2	12,000	200.00

Location

Results – Existing Conditions

Connection 1 – Dealership Drive

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	154.4	82.5
Peak Hour	147.0	72.0
Max Day plus Fire 1	126.5	42.9
Max Day plus Fire 2	116.0	28.0

Ground Elevation = 96.3 m

Connection 2 – Dealership Drive

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	154.4	82.7
Peak Hour	147.0	72.2
Max Day plus Fire 1	127.2	44.1
Max Day plus Fire 2	117.1	29.7

Ground Elevation = 96.2 m

Notes

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

Disclaimer

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

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

Input File: 121028-HP.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RES2	1	22	250
2	RES1	2	17	250
3	2	3	33.5	250
4	1	3	18	250

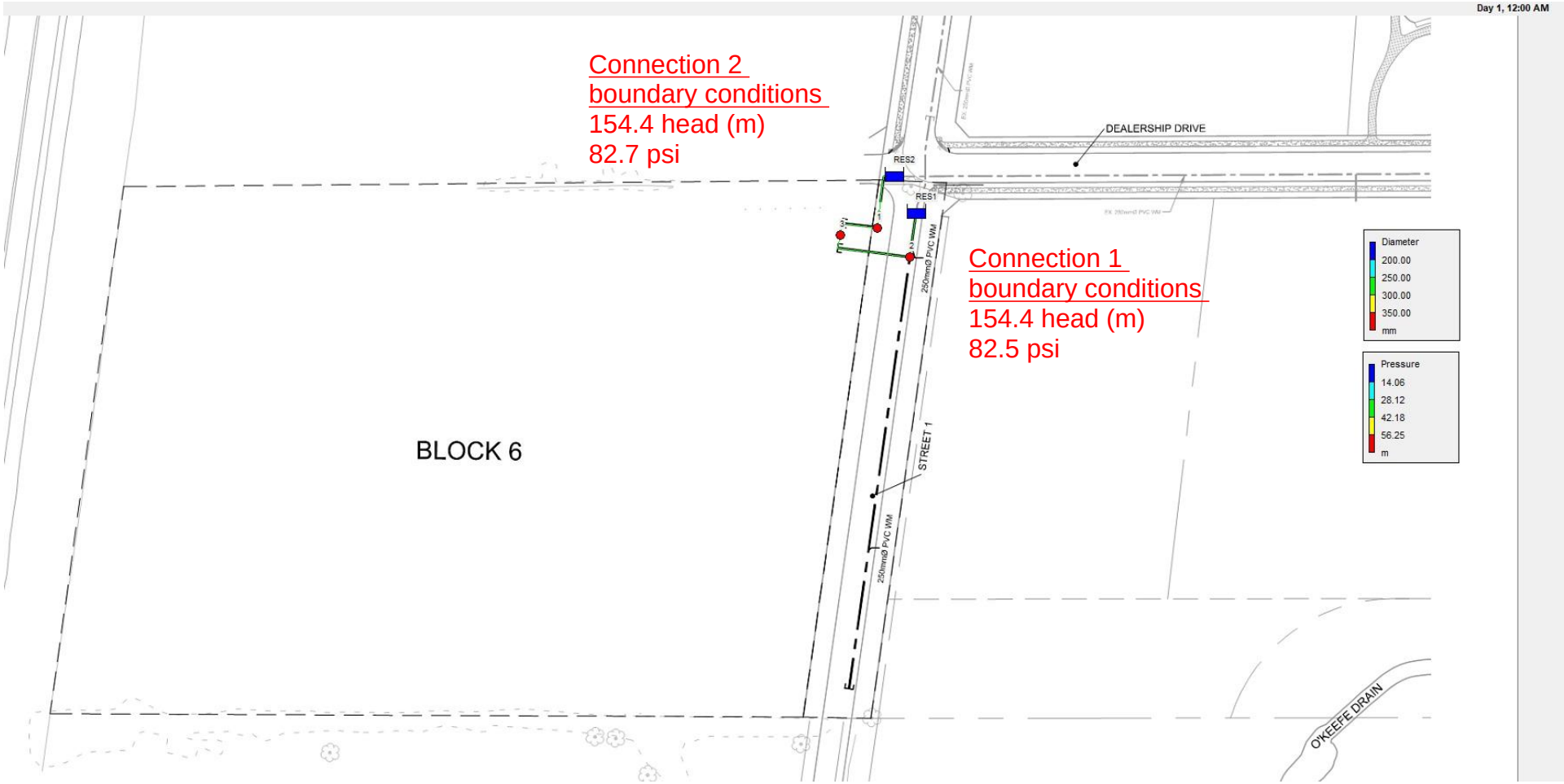
Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality hours	
1	0.00	154.40	57.99	0.00	
2	0.00	154.40	58.33	0.00	
3	1.21	154.40	59.50	0.00	
RES2	-0.63	154.40	0.00	0.00	Reservoir
RES1	-0.58	154.40	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	0.63	0.01	0.00	Open
2	0.58	0.01	0.00	Open
3	0.58	0.01	0.00	Open
4	0.63	0.01	0.00	Open

HIGH PRESSURE (AVG. DAY) MAP



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

Input File: 121028-PH.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RES2	1	22	250
2	RES1	2	17	250
3	2	3	33.5	250
4	1	3	18	250

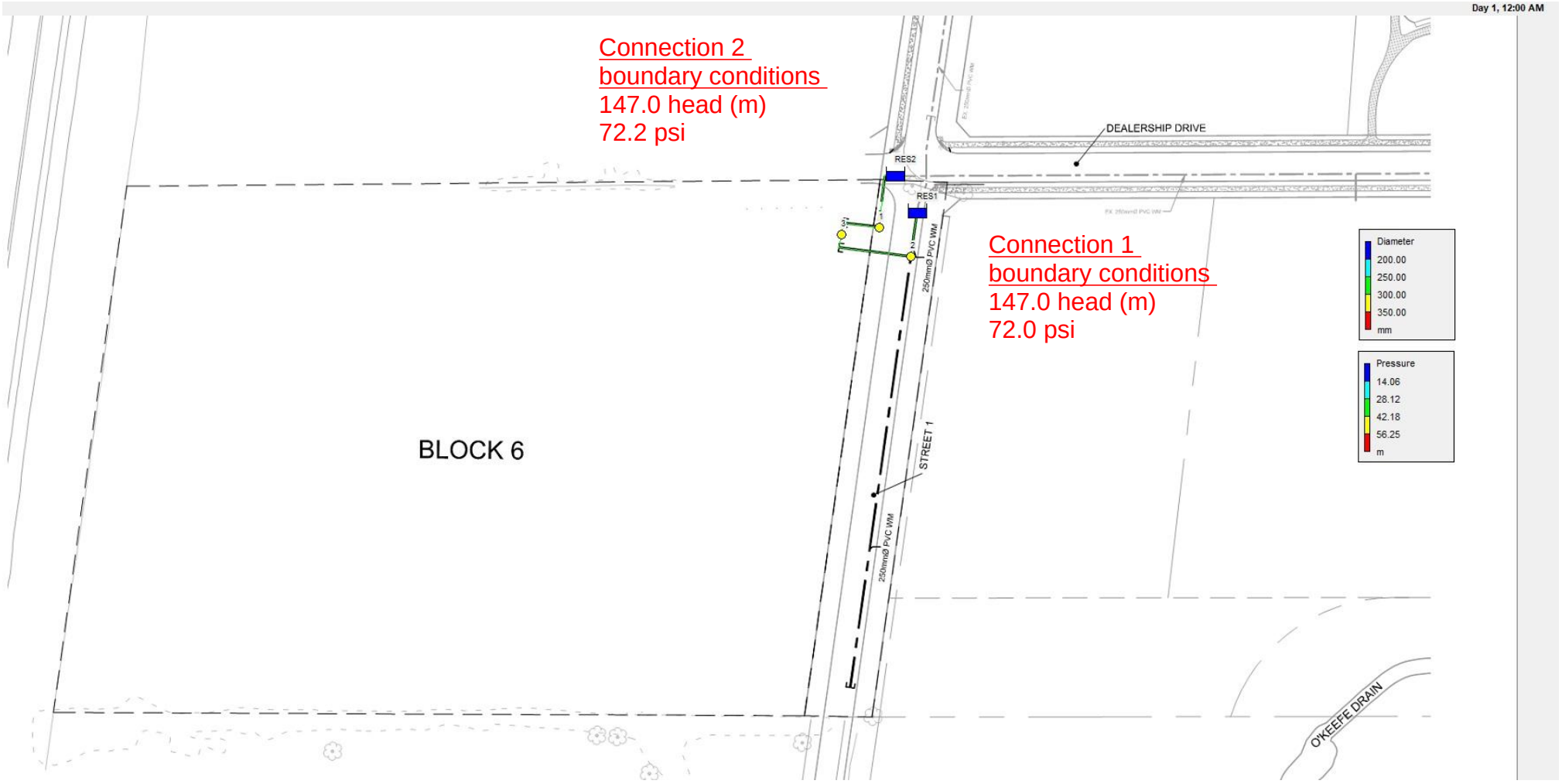
Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality hours	
1	0.00	147.00	50.59	0.00	
2	0.00	147.00	50.93	0.00	
3	3.27	147.00	52.10	0.00	
RES2	-1.71	147.00	0.00	0.00	Reservoir
RES1	-1.56	147.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	1.71	0.03	0.01	Open
2	1.56	0.03	0.01	Open
3	1.56	0.03	0.01	Open
4	1.71	0.03	0.01	Open

PEAK HOUR MAP



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

Input File: 121028-Max+FF1.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RES2	1	22	250
2	RES1	2	17	250
3	2	3	33.5	250
4	1	3	18	250

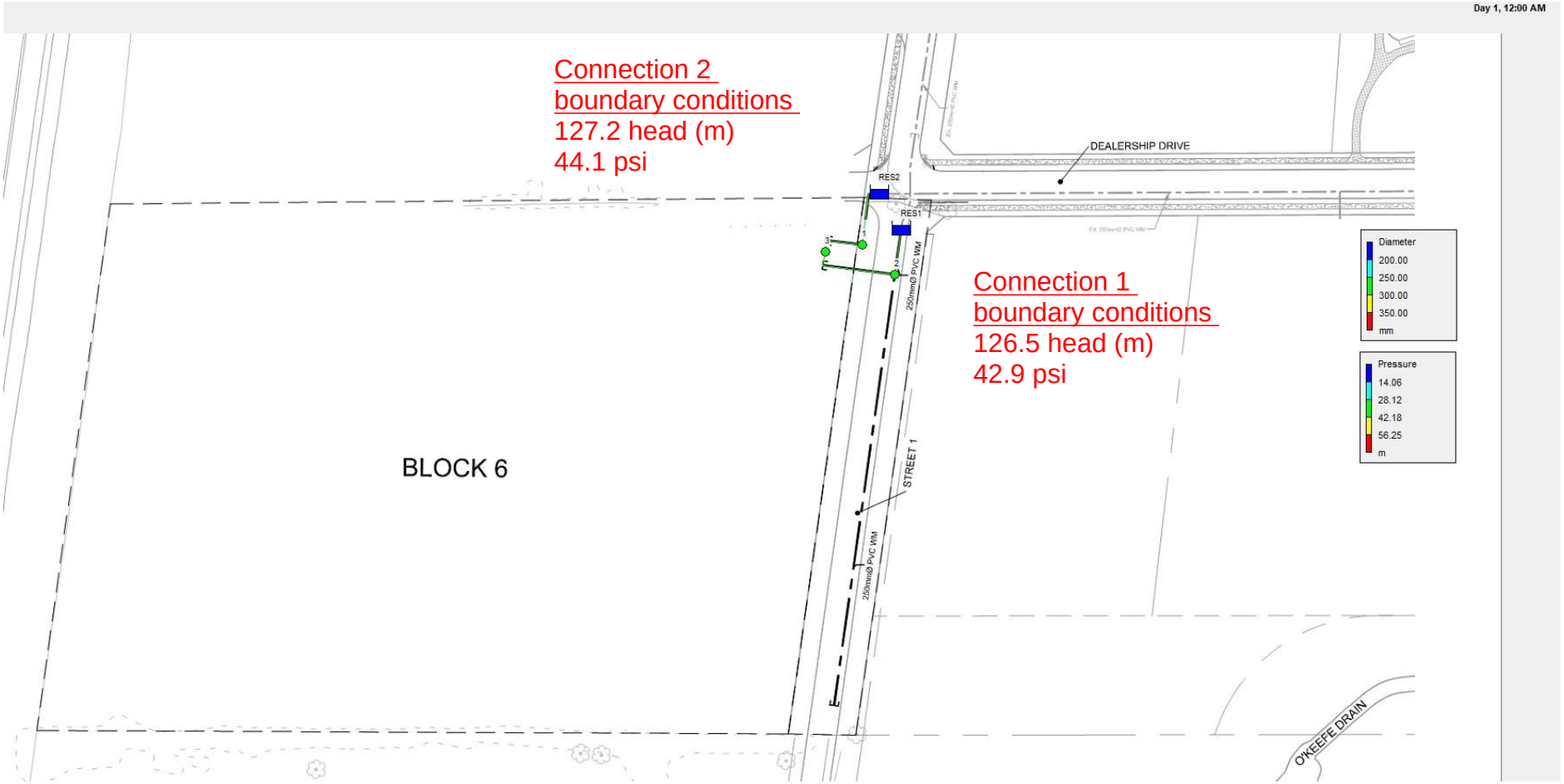
Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality hours	
1	0.00	126.57	30.16	0.00	
2	0.00	126.35	30.28	0.00	
3	168.50	126.04	31.14	0.00	
RES2	-107.30	127.20	0.00	0.00	Reservoir
RES1	-61.20	126.50	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	107.30	2.19	28.67	Open
2	61.20	1.25	8.57	Open
3	61.20	1.25	9.52	Open
4	107.30	2.19	29.66	Open

MAX DAY + FIRE FLOW 1 MAP



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

Input File: 121028-Max+FF2.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	RES2	1	22	250
2	RES1	2	17	250
3	2	3	33.5	250
4	1	3	18	250

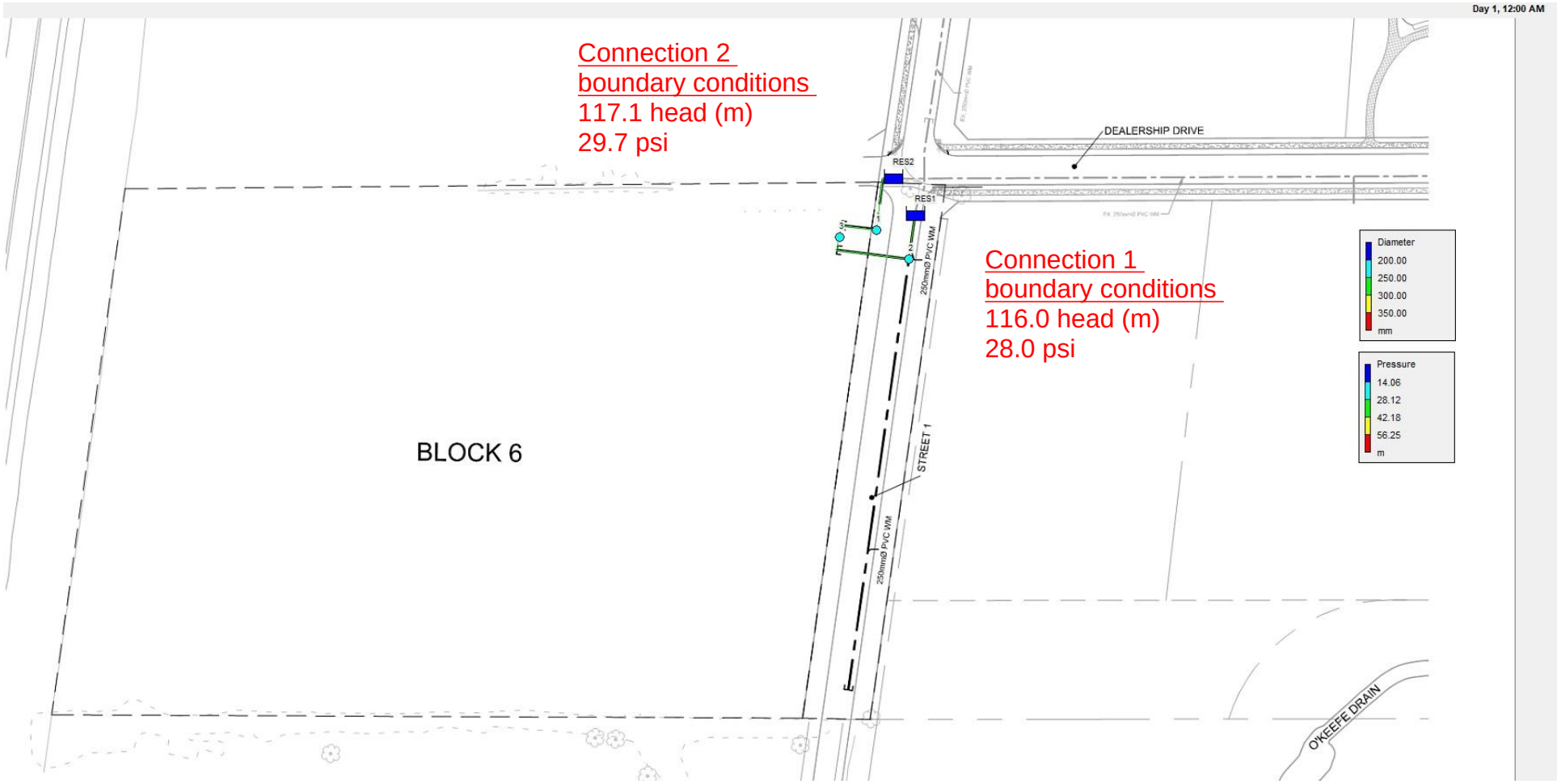
Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality hours	
1	0.00	116.18	19.77	0.00	
2	0.00	115.81	19.74	0.00	
3	201.80	115.40	20.50	0.00	
RES2	-131.38	117.10	0.00	0.00	Reservoir
RES1	-70.42	116.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	131.38	2.68	41.92	Open
2	70.42	1.43	11.11	Open
3	70.42	1.43	12.37	Open
4	131.38	2.68	43.39	Open

MAX DAY + FIRE FLOW 2 MAP



APPENDIX C1
444 CitiGate Drive - Sanitary Servicing Information

PROJECT #: 122003
PROJECT NAME: 444 Citigate Drive
LOCATION: Ottawa, ON

Engineers, Planners & Landscape Architects

DATE PREPARED: November, 2022

Property	Total Area	Commercial Area*	Flow Rate	Wastewater Flow	Infiltration Flow	Total Flow
	(ha)	(ha)	(L/ha/d)	(L/s)	(L/s)	(L/s)
444 CitiGate Drive	20.3	9.67	35000	5.88	2.71	8.58

* Commercial Area was considered to be 50% of the total property area (excluding 26m ROW allowance)

Design Parameters:

1. Q(d) = Q(w) + Q(i) , where
2. Q(i) = 0.28 L/s/ha
3. Commercial/Institutional Peaking Factor = 1.5

Q(d) = Design Flow (L/s)
Q(w) = Peak Wastewater Flow (L/s)
Q(i) = Extraneous Flow (L/s)

City of Ottawa Sewer Design Guidelines (Apendix 4-A)
- Light Industial Flow Rate 35,000 L/ha/day

LEGEND

- 0.38 / 4-A / 305-307 — DRAINAGE AREA (hectares) / AREA ID / MANHOLE TO MANHOLE
- SANITARY DRAINAGE AREA BOUNDARY
- SANITARY SERVICE LOCATION
- 5003 — PROPOSED SANITARY MANHOLE AND PIPE (WITH FLOW DIRECTION)

REFER TO DRAWING 109203-CG-NTB FOR NOTES AND TABLES

SEE DRAWING No. 109203-CG-SAN1

ACTUAL DRAINAGE AREA 444 CITIGATE DRIVE EXT.

AREA=20.30ha

FUTURE DEVELOPMENT (BY OTHERS)

BLOCK 3

O'KEEFE DRAIN BLOCK 19

BLOCK 4

3.39 / B-16 / 509-511

BLOCK 11

2.72 / B-2 / 501-503

STORMWATER MANAGEMENT FACILITY

BLOCK 12

3.20 / B-7 / 505-507

2.51 / B-10 / 507-509

NORTEL DRIVE

CROSSKEY PLACE

27.06 / E-1 / 501-503

SANITARY OUTLET B

REFER TO 109203-CG-PS FOR SANITARY LIFT STATION DETAILS

STRANDHERD DRIVE

0.04 / B-19 / 513-515

0.24 / B-17 / 509-511

0.20 / B-18 / 511-513

19.2m-525mmØ SAN @ 0.40%

32.4m-450mmØ SAN @ 0.60%

6.0m-250mmØ SAN @ 0.24%

4.5m-300mmØ SAN @ 0.20%

4.0m-300mmØ SAN @ 0.20%

DEALERSHIP STREET

56.4m-450mmØ SAN @ 0.14%

120.0m-450mmØ SAN @ 0.14%

120.0m-450mmØ SAN @ 0.14%

84.9m-450mmØ SAN @ 0.14%

98.7m-450mmØ SAN @ 0.20%

76.3m-450mmØ SAN @ 0.24%

17.3m-200mmØ SAN @ 1.00%

KENNEVALE DRIVE

0.28 / B-4 / 501-503

0.29 / B-6 / 503-505

0.20 / B-5 / 505-507

0.13 / B-11 / 507-509

0.19 / B-15 / 601-509

BLOCK 5

2.14 / B-14 / 511-513

PHILSAR STREET

105.9m-250mmØ SAN @ 0.24%

41.3m-250mmØ SAN @ 0.24%

14.9m-200mmØ SAN @ 1.00%

FUTURE DEVELOPMENT (BY OTHERS)

22.68 / C-1 / FUT-501

BLOCK 10

2.14 / B-3 / 501-503

BLOCK 9

1.84 / B-5 / 503-505

BLOCK 8

1.64 / B-8 / 505-507

O'KEEFE DRAIN BLOCK 7

0.23 / B-13 / 603-601

BLOCK 6

1.62 / B-12 / 603-601

NORTEL DRIVE

STRANDHERD DRIVE

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

CITI GATE 416 CORPORATE CAMPUS

REGIONAL THE REGIONAL GROUP

MODIFIED FROM:
CITIGATE 416 CORPORATE CAMPUS, DETAILED SERVICING AND SWM REPORT (PHASE 1) BY NOVATECH DATED OCTOBER 1, 2014.

No.	REVISION	DATE	BY
4.	ISSUED FOR SWM APPROVAL	AUG 10/14	MER
3.	ISSUED FOR APPROVAL	JUL 23/14	MER
2.	REV. PER CITY COMMENTS / ISS. FOR MOE APPROVAL	JUNE 27/14	MER
1.	ISSUED FOR CITY REVIEW	MAR 31/14	MER

SCALE 1:1000 (1:1000, 0 10 20 30 40)

DESIGN LAB
CHECKED MER
DRAWN MTM/BET
CHECKED MER
APPROVED JGR

LICENSED PROFESSIONAL ENGINEER M.E. RIDDELL 100040125 PROVINCE OF ONTARIO — Aug 10/14

REGISTERED PROFESSIONAL ENGINEER J.G. RIDDELL PROVINCE OF ONTARIO

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

LOCATION
CITY OF OTTAWA
CITI GATE 416 CORPORATE CAMPUS

DRAWING NAME
SANITARY DRAINAGE AREA PLAN (OUTLET B)

PROJECT No. 109203-00
REV REV # 4
DRAWING No. 109203-CG-SAN2

M:\2009\109203\CAD\Design\109203-CG-SAN.dwg, SAN2, Aug 11, 2014 - 5:40pm, tthurber

PROJECT : 109203
DESIGNED BY: LAB
CHECKED BY: MER
DATE (Issued with report): March 31, 2014
REVISED : August 10, 2014

SANITARY SEWER DESIGN SHEET
Citi Gate 416 Corporate Campus

NOVATECH ENGINEERING CONSULTANTS LTD.

Location						Wastewater Flow Q(w)		Extraneous Flow Q(i)		Design Flow Q(d)	Proposed Sanitary Sewer						
Area I.D.	Street	Block Number	From MH	To MH	Area (ha)	Individual Peak Flow Rate 50,000 L/ha/d (L/s)	Cumulative Peak Flow Rate (L/s)	Individual Infiltration Rate 0.28 L/s/ha (L/s)	Cumulative Infiltration Rate (L/s)	Peak Design Flow (L/s)	Length (m)	Pipe Size (mm)	Type of Pipe	Grade %	Capacity (L/s)	Full Flow Velocity (m/s)	Percentage of Capacity
Sanitary Outlet B to Strandherd Drive at Kennevale Drive **Plan Reference: Sanitary Drainage Area Plan (109203-CG-SAN2)**																	
C-1	Nortel Drive	Lands Owned by Others	Fut	501	22.68	19.69	19.69	6.35	6.35	26.04	4.5	300	PVC	0.20	45.12	0.62	58%
B-1	Dealership Street	Lands Owned by Others	Fut	501	27.06	23.49	23.49	7.58	7.58	31.07	4.5	300	PVC	0.20	45.12	0.62	69%
B-2	Dealership Street	Block 11	501	503	2.72	2.36	45.54	0.76	14.69	60.23							
B-3	Dealership Street	Block 10	501	503	2.14	1.86	47.40	0.60	15.29	62.68							
B-4	Dealership Street		501	503	0.28	0.24	47.64	0.08	15.37	63.01	120.0	450	PVC	0.14	111.29	0.68	57%
B-5	Dealership Street	Block 9	503	505	1.84	1.60	49.24	0.52	15.88	65.12							
B-6	Dealership Street		503	505	0.29	0.25	49.49	0.08	15.96	65.45	120.0	450	PVC	0.14	111.29	0.68	59%
B-7	Dealership Street	Block 12 (SWM)	505	507	3.20	2.78	52.27	0.90	16.86	69.12							
B-8	Dealership Street	Block 8	505	507	1.64	1.42	53.69	0.46	17.32	71.01							
B-9	Dealership Street		505	507	0.20	0.17	53.86	0.06	17.37	71.24	84.9	450	PVC	0.14	111.29	0.68	64%
B-10	Dealership Street	Block 19	507	509	2.51	2.18	56.04	0.70	18.08	74.12							
B-11	Dealership Street		507	509	0.13	0.11	56.15	0.04	18.11	74.27	56.4	450	PVC	0.14	111.29	0.68	67%
B-12	Philsar Street	Block 6	603	601	1.62	1.41	1.41	0.45	0.45	1.86							
B-13	Philsar Street		603	601	0.23	0.20	1.61	0.06	0.52	2.12	41.3	250	PVC	0.24	30.39	0.60	7%
B-15	Philsar Street		601	509	0.19	0.16	1.77	0.05	0.57	2.34	101.9	250	PVC	0.24	30.39	0.60	8%
B-16	Dealership Street	Block 4	509	511	3.39	2.94	60.87	0.95	19.63	80.50							
B-17	Dealership Street		509	511	0.24	0.21	61.08	0.07	19.70	80.78	98.7	450	PVC	0.20	133.02	0.81	61%
B-14	Dealership Street	Block 5	511	513	2.14	1.86	62.93	0.60	20.30	83.23							
B-18	Dealership Street		511	513	0.20	0.17	63.11	0.06	20.36	83.46	76.3	450	PVC	0.24	145.71	0.89	57%
B-19	Outlet to Lift Station		513	515	0.04	0.03	63.14	0.01	20.37	**83.51**	32.4	450	PVC	0.60	230.39	1.40	36%
					72.74												

Notes:
1. Q(d) = Q(w) + Q(i) , where
2. Q(i) = 0.28 L/s/ha
3. Peaking Factor = 1.5

Q(d) = Design Flow (L/s)
Q(w) = Peak Wastewater Flow (L/s)
Q(i) = Extraneous Flow (L/s)

444 CITIGATE DRIVE IS INCLUDED IN THE AREA I.D. B-1 AS SHOWN ON THE MODIFIED SANITARY DRAINAGE AREA PLAN

MODIFIED FROM:
CITIGATE 416 CORPORATE CAMPUS, DETAILED SERVICING AND SWM REPORT (PHASE 1) BY NOVATECH DATED OCTOBER 1, 2014.

NOVATECH FILE NO.: 109203-0
CITY FILE NO.: D07-16-12-0023
DESIGNED BY: CAH
CHECKED BY: DBB
DATE : July 20, 2017

SANITARY SEWER DESIGN SHEET

CitiGate 416 Corporate Campus
CitiGate Drive Extension

Location						Wastewater Flow Q(w)		Extraneous Flow Q(i)		Design Flow Q(d)	Proposed Sanitary Sewer						
Area I.D.	Street	Block Number	From MH	To MH	Area (ha)	Individual Peak Flow Rate 50,000 L/ha/d (L/s)	Cumulative Peak Flow Rate (L/s)	Individual Infiltration Rate 0.28 L/s/ha (L/s)	Cumulative Infiltration Rate (L/s)	Peak Design Flow (L/s)	Length (m)	Pipe Size (mm)	Type of Pipe	Grade %	Capacity (L/s)	Full Flow Velocity (m/s)	Percentage of Capacity
Plan Reference: Sanitary Drainage Area Plan (109203-CGD-SAN)																	
FUT-1	CitiGate Drive	Future lands	FUTURE	227	15.18	13.18	13.18	4.25	4.25	17.43							
B-1A & B-2A	CitiGate Drive		227	229	2.58	2.24	15.42	0.72	4.97	20.39							
B-1B	CitiGate Drive		227	229	0.26	0.23	15.64	0.07	5.05	20.69	94.6	250	PVC	0.24	30.39	0.60	68%
B-1C & B-2B	CitiGate Drive		229	501	2.40	2.08	17.73	0.67	5.72	23.44							
B-1D	CitiGate Drive		229	501	0.24	0.21	17.93	0.07	5.78	23.72	94.0	250	PVC	0.24	30.39	0.60	78%
FUT-2	Dealership Street	Future lands	FUTURE	501	9.12	7.92	25.85	2.55	8.34	34.19							
					29.78												

Notes:
1. Q(d) = Q(w) + Q(i) , where
2. Q(i) = 0.28 L/s/ha
3. Peaking Factor = 1.5

Q(d) = Design Flow (L/s)
Q(w) = Peak Wastewater Flow (L/s)
Q(i) = Extraneous Flow (L/s)

* Future Areas (Fut-1 and Fut-2) plus CitiGate Drive Areas plus Block 11 Areas = 29.78 Ha
* Sanitary Area B-1 (27.06 Ha) plus Block 11 (2.72 Ha) = 29.78 Ha

444 CITIGATE DRIVE CONSISTS OF FUT-1 AND A PORTION OF FUT-2

MODIFIED FROM:
CITIGATE DRIVE EXTENSION SITE SERVICING BRIEF BY NOVATECH DATED SEPTEMBER 26, 2017.

SEE DRAWING No. 109203-CG-GR2

SITE OUTLET

SITE OUTLET

SITE OUTLET

SITE OUTLET

BLOCK 11

1.46 B-2A 227-229

1.26 B-2B 229-501

0.26 B-1B 227-229

0.24 B-1D 229-501

27.4m-250mmØ SAN @ 1.00%

16.0m-250mmØ SAN @ 1.00%

94.6m-250mmØ SAN @ 0.24%

94.0m-250mmØ SAN @ 0.24%

3.0m-250mmØ SAN @ 0.24%

15.9m-250mmØ SAN @ 1.00%

16.0m-250mmØ SAN @ 1.00%

CITIGATE DRIVE

DEALERSHIP STREET

120.0m - 450mmØ SAN @ 0.14%

4.0m - 300mmØ SAN @ 0.20%

4.5m - 300mmØ SAN @ 0.20%

6.0m - 250mmØ SAN @ 0.24%

FUTURE CITIGATE DRIVE

FUTURE CITIGATE DRIVE

FUTURE DEALERSHIP STREET

SITE OUTLET

MODIFIED

15.18 FUT-1 FUT-227

FUTURE BLOCK

1.12 B-1A 227-229

MODIFIED

FUTURE BLOCK

1.14 B-1C 229-501

MODIFIED

AREA I.D. = 444 DEALERSHIP DRIVE
(Parks Property)
AREA (ha) = 20.30ha
FROM EXT TO MH229

AREA I.D. = 575 DEALERSHIP DRIVE
AREA (ha) = 6.02ha
FROM MH229 TO MH510

9.12 FUT-2 FUT-501

MODIFIED DRAINAGE AREA BOUNDARY

MODIFIED DRAINAGE AREA BOUNDARY

MODIFIED FROM:
CITIGATE DRIVE EXTENSION
SITE SERVICING BRIEF BY
NOVATECH DATED
SEPTEMBER 26, 2017.

KEY PLAN
N.T.S.

HWY 416

SITE

LEGEND (SANITARY)

- 0.38 / 4-A / 305-307 — DRAINAGE AREA (hectares) / AREA ID / MANHOLE TO MANHOLE
- PROPOSED SANITARY DRAINAGE AREA BOUNDARY
- ADJACENT SANITARY DRAINAGE AREA BOUNDARY
- 305 — PROPOSED SANITARY MANHOLE AND PIPE (WITH FLOW DIRECTION)

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

CITI GATE
416 CORPORATE CAMPUS

No.	REVISION	DATE	BY
2.	REVISED PER CITY COMMENTS	SEPT 26/17	DDB
1.	ISSUED FOR CITY REVIEW	JULY 27/17	DDB

SCALE 1:500

1:500
0 5 10 15 20

DESIGN CAH
CHECKED DDB
DRAWN CAH
CHECKED DDB
APPROVED JGR

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
D.D. BLAIR
100122737
Sept 26/ 2017
PROVINCE OF ONTARIO

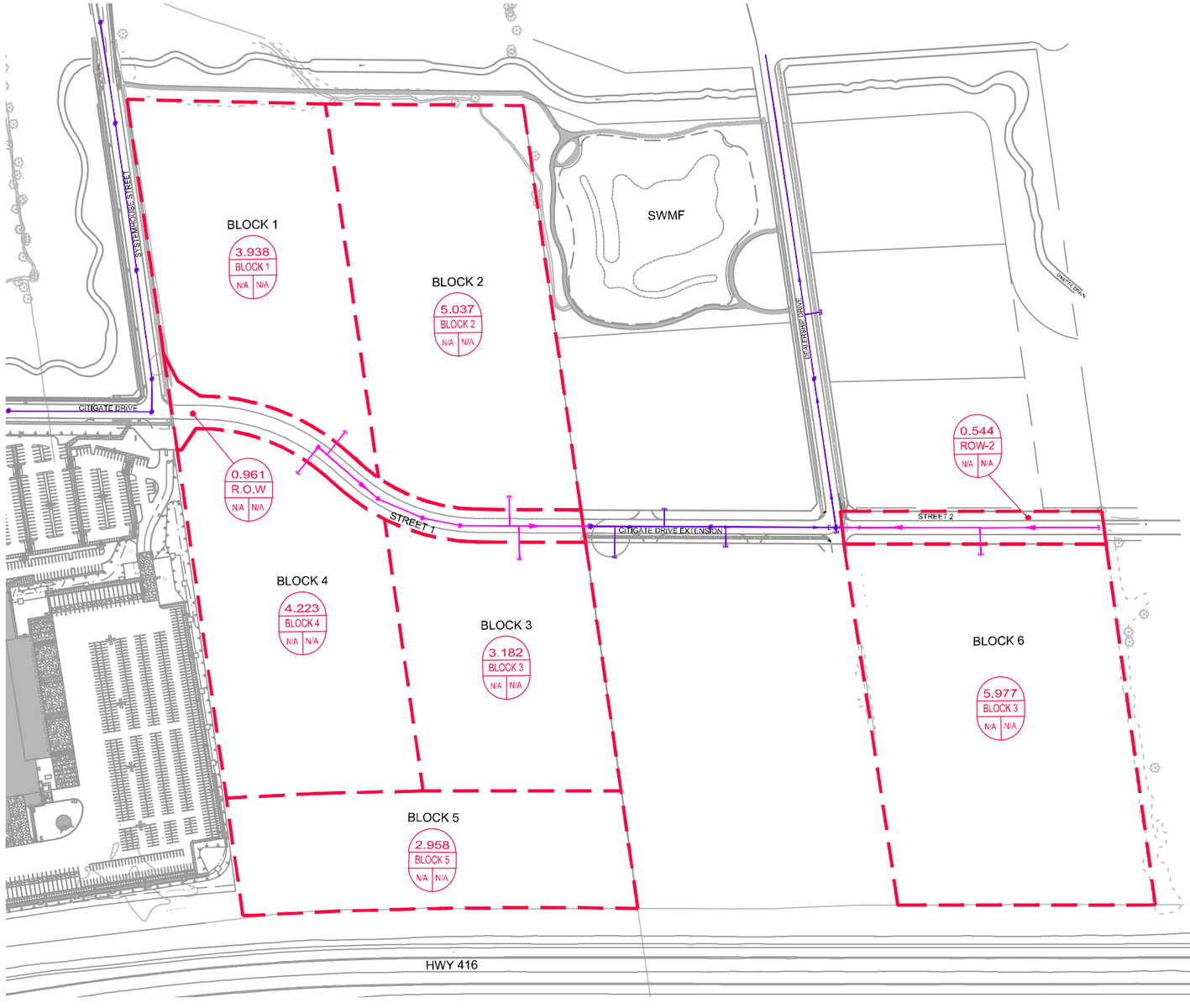
NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
CITI GATE 416 CORPORATE CAMPUS

DRAWING NAME
CITIGATE DRIVE
SANITARY DRAINAGE AREA PLAN

PROJECT No. 109203-00
REV REV #2
DRAWING No. 109203-CGD-SAN

M:\2009\109203\Civil Gate\CAD\Design\Citigate Dr\109203-CGD-GP.dwg, CGD-SAN, Sep 26, 2017, mfang



LEGEND

PROPOSED STM DRAINAGE AREA BOUNDARY

0.234 | Block 4 | 243 | 437
DRAINAGE AREA
AREA ID
NO. OF UNITS / POPULATION

PROPOSED SANITARY SEWER AND MANHOLE

EXISTING SANITARY SEWER AND MANHOLE

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

444 CITIGATE DRIVE & 560 DEALERSHIP DRIVE

SANITARY DRAINAGE AREAS

SCALE 1 : 4000 (0 50 100 150 200)
DATE NOV 2022
JOB 122003
FIGURE SAN

M:\2022\122003\CAD\Civil\122003-SAN.dwg, SAN, Nov 22, 2022 - 11:13am, madeoli

SHT11X17.DWG - 279mmX432mm

NOVATECH FILE NO.: 122003
CITY FILE NO.:
DESIGNED BY: MA
CHECKED BY: CJR
DATE : November 30, 2022

UPDATED - SANITARY SEWER DESIGN SHEET

CitiGate 416 Corporate Campus
CitiGate Drive Extension

NOVATECH
Engineers, Planners & Landscape Architects

Location						Wastewater Flow Q(w)			Extraneous Flow Q(i)		Design Flow Q(d)	Proposed Sanitary Sewer						
Area I.D.	Street	Block Number	From MH	To MH	Area (ha)	Flow Rate (L/ha/d)	Individual Peak Flow Rate (L/s)	Cumulative Peak Flow Rate (L/s)	Individual Infiltration Rate 0.28 L/s/ha (L/s)	Cumulative Infiltration Rate (L/s)	Peak Design Flow (L/s)	Length (m)	Pipe Size (mm)	Type of Pipe	Grade %	Capacity (L/s)	Full Flow Velocity (m/s)	Percentage of Capacity
Plan Reference: Sanitary Drainage Area Plan (109203-CGD-SAN)																		
444	CitiGate Drive		FUTURE	227	9.67	35,000	5.88	5.88	2.71	2.71	8.58							
B-2A	Dealership Drive	11	227	229	1.46	50,000	1.27	7.14	0.41	3.12	10.26							
B-1B	CitiGate Drive		227	229	0.26	50,000	0.23	7.37	0.07	3.19	10.56	***94.6***	250	PVC	***0.27***	32.24	0.64	33%
B-2B	Dealership Drive	11	229	501	1.26	50,000	1.09	8.46	0.35	3.54	12.00							
575	Dealership Drive		229	501	2.99	35,000	1.82	10.28	0.84	4.38	14.66							
B-1D	CitiGate Drive		229	501	0.24	50,000	0.21	10.49	0.07	4.45	14.93	***100.0***	250	PVC	***0.24***	30.39	0.60	49%

Notes:
1. Q(d) = Q(w) + Q(i) , where
2. Q(i) = 0.28 L/s/ha
3. Commercial/Institutional Peaking Factor = 1.5
City of Ottawa Sewer Design Guidelines (Apendix 4-A)
- Light Industial Flow Rate 35,000 L/ha/day
- Commercial / Institutional Flow Rate 50,000 L/ha/day

Q(d) = Design Flow (L/s)
Q(w) = Peak Wastewater Flow (L/s)
Q(i) = Extraneous Flow (L/s)

*Area for 444 CitiGate Drive was considered to be 50% of the total property area (excluding 26m ROW allowance)
*Area for 575 Dealership Drive was considered to be 50% of the total property area (excluding 13m for ROW allowance)

MODIFIED FROM:
CITIGATE DRIVE EXTENSION SITE SERVICING BRIEF BY NOVATECH DATED SEPTEMBER 26, 2017.

PROPOSED SANITARY SEWER INFORMATION IS UPDATED WITH AS-BUILT SEWER INFORMATION.

APPENDIX C2
560 Dealership Drive - Sanitary Servicing Information

PROJECT #: 121028
PROJECT NAME: 560 DEALERSHIP DRIVE
LOCATION: OTTAWA

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: November, 2022

Property	Total Area	Commercial Area*	Flow Rate	Wastewater Flow	Infiltration Flow	Total Flow
	(ha)	(ha)	(L/ha/d)	(L/s)	(L/s)	(L/s)
560 Dealership Drive	6.32	2.99	35000	1.82	0.84	2.65

* Commercial Area was considered to be 50% of the total property area (excluding 13m for ROW allowance)

Design Parameters:

1. Q(d) = Q(w) + Q(i) , where
2. Q(i) = 0.28 L/s/ha
3. Commercial/Institutional Peaking Factor = 1.5

Q(d) = Design Flow (L/s)
Q(w) = Peak Wastewater Flow (L/
Q(i) = Extraneous Flow (L/s)

City of Ottawa Sewer Design Guidelines (Apendix 4-A)
- Light Industial Flow Rate 35,000 L/ha/day

PROJECT : 109203
DESIGNED BY: LAB
CHECKED BY: MER
DATE (Issued with report): March 31, 2014
REVISED : August 10, 2014

SANITARY SEWER DESIGN SHEET
Citi Gate 416 Corporate Campus

NOVATECH ENGINEERING CONSULTANTS LTD.

Location						Wastewater Flow Q(w)		Extraneous Flow Q(i)		Design Flow Q(d)	Proposed Sanitary Sewer						
Area I.D.	Street	Block Number	From MH	To MH	Area (ha)	Individual Peak Flow Rate 50,000 L/ha/d (L/s)	Cumulative Peak Flow Rate (L/s)	Individual Infiltration Rate 0.28 L/s/ha (L/s)	Cumulative Infiltration Rate (L/s)	Peak Design Flow (L/s)	Length (m)	Pipe Size (mm)	Type of Pipe	Grade %	Capacity (L/s)	Full Flow Velocity (m/s)	Percentage of Capacity
Sanitary Outlet B to Strandherd Drive at Kennevale Drive **Plan Reference: Sanitary Drainage Area Plan (109203-CG-SAN2)**																	
C-1	Nortel Drive	Lands Owned by Others	Fut	501	22.68	19.69	19.69	6.35	6.35	26.04	4.5	300	PVC	0.20	45.12	0.62	58%
B-1	Dealership Street	Lands Owned by Others	Fut	501	27.06	23.49	23.49	7.58	7.58	31.07	4.5	300	PVC	0.20	45.12	0.62	69%
B-2	Dealership Street	Block 11	501	503	2.72	2.36	45.54	0.76	14.69	60.23							
B-3	Dealership Street	Block 10	501	503	2.14	1.86	47.40	0.60	15.29	62.68							
B-4	Dealership Street		501	503	0.28	0.24	47.64	0.08	15.37	63.01	120.0	450	PVC	0.14	111.29	0.68	57%
B-5	Dealership Street	Block 9	503	505	1.84	1.60	49.24	0.52	15.88	65.12							
B-6	Dealership Street		503	505	0.29	0.25	49.49	0.08	15.96	65.45	120.0	450	PVC	0.14	111.29	0.68	59%
B-7	Dealership Street	Block 12 (SWM)	505	507	3.20	2.78	52.27	0.90	16.86	69.12							
B-8	Dealership Street	Block 8	505	507	1.64	1.42	53.69	0.46	17.32	71.01							
B-9	Dealership Street		505	507	0.20	0.17	53.86	0.06	17.37	71.24	84.9	450	PVC	0.14	111.29	0.68	64%
B-10	Dealership Street	Block 19	507	509	2.51	2.18	56.04	0.70	18.08	74.12							
B-11	Dealership Street		507	509	0.13	0.11	56.15	0.04	18.11	74.27	56.4	450	PVC	0.14	111.29	0.68	67%
B-12	Philsar Street	Block 6	603	601	1.62	1.41	1.41	0.45	0.45	1.86							
B-13	Philsar Street		603	601	0.23	0.20	1.61	0.06	0.52	2.12	41.3	250	PVC	0.24	30.39	0.60	7%
B-15	Philsar Street		601	509	0.19	0.16	1.77	0.05	0.57	2.34	101.9	250	PVC	0.24	30.39	0.60	8%
B-16	Dealership Street	Block 4	509	511	3.39	2.94	60.87	0.95	19.63	80.50							
B-17	Dealership Street		509	511	0.24	0.21	61.08	0.07	19.70	80.78	98.7	450	PVC	0.20	133.02	0.81	61%
B-14	Dealership Street	Block 5	511	513	2.14	1.86	62.93	0.60	20.30	83.23							
B-18	Dealership Street		511	513	0.20	0.17	63.11	0.06	20.36	83.46	76.3	450	PVC	0.24	145.71	0.89	57%
B-19	Outlet to Lift Station		513	515	0.04	0.03	63.14	0.01	20.37	**83.51**	32.4	450	PVC	0.60	230.39	1.40	36%
					72.74												

Notes:
1. Q(d) = Q(w) + Q(i) , where
2. Q(i) = 0.28 L/s/ha
3. Peaking Factor = 1.5

Q(d) = Design Flow (L/s)
Q(w) = Peak Wastewater Flow (L/s)
Q(i) = Extraneous Flow (L/s)

560 DEALERSHIP DRIVE IS INCLUDED IN THE AREA I.D C-1 AS SHOWN ON THE MODIFIED SANITARY DRAINAGE AREA PLAN

MODIFIED FROM:
CITIGATE 416 CORPORATE CAMPUS, DETAILED SERVICING AND SWM REPORT (PHASE 1) BY NOVATECH DATED OCTOBER 1, 2014.

LEGEND

- 0.38 / 4-A / 305-307 — DRAINAGE AREA (hectares) / AREA ID / MANHOLE TO MANHOLE
- SANITARY DRAINAGE AREA BOUNDARY
- SANITARY SERVICE LOCATION
- PROPOSED SANITARY MANHOLE AND PIPE (WITH FLOW DIRECTION)

REFER TO DRAWING 109203-CG-NTB FOR NOTES AND TABLES

SEE DRAWING No. 109203-CG-SAN1

CITIGATE DRIVE EXTENSION

ACTUAL DRAINAGE AREA 560 DEALERSHIP DRIVE

AREA=6.32ha

FUTURE DEVELOPMENT (BY OTHERS)

FUTURE DEVELOPMENT (BY OTHERS)

22.68 / C-1 / FUT-501

27.06 / B-1 / 501-503

NORTEL DRIVE

CROSSKEY PLACE

BLOCK 11 — 2.72 / B-2 / 501-503

STORMWATER MANAGEMENT FACILITY

BLOCK 12 — 3.20 / B-7 / 505-507

BLOCK 3

BLOCK 4 — 3.39 / B-16 / 509-511

BLOCK 5 — 2.14 / B-14 / 511-513

BLOCK 6 — 1.62 / B-12 / 603-601

BLOCK 10 — 2.14 / B-3 / 501-503

BLOCK 9 — 1.84 / B-5 / 503-505

BLOCK 8 — 1.64 / B-8 / 505-507

2.51 / B-10 / 507-509

0.28 / B-4 / 501-503

0.29 / B-6 / 503-505

0.20 / B-9 / 505-507

0.13 / B-11 / 507-509

0.24 / B-17 / 509-511

0.20 / B-18 / 511-513

0.04 / B-19 / 513-515

0.19 / B-15 / 601-509

0.23 / B-13 / 603-601

OKEEFE DRAIN BLOCK 19

O'KEEFE DRAIN BLOCK 7

DEALERSHIP STREET

PHILSAR STREET

STRANDHERD DRIVE

KENNEVALE DRIVE

SANITARY OUTLET B

REFER TO 109203-CG-PS FOR SANITARY LIFT STATION DETAILS

6.0m-250mmØ SAN @ 0.24%
4.5m-300mmØ SAN @ 0.20%
4.0m-300mmØ SAN @ 0.20%
120.0m-450mmØ SAN @ 0.14%
120.0m-450mmØ SAN @ 0.14%
84.9m-450mmØ SAN @ 0.14%
56.4m-450mmØ SAN @ 0.14%
98.7m-450mmØ SAN @ 0.20%
76.3m-450mmØ SAN @ 0.24%
32.4m-450mmØ SAN @ 0.60%
19.2m-525mmØ SAN @ 0.60%
17.3m-200mmØ SAN @ 1.00%
101.9m-250mmØ SAN @ 0.24%
41.3m-250mmØ SAN @ 0.24%
14.9m-200mmØ SAN @ 1.00%

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

CITI GATE 416 CORPORATE CAMPUS

REGIONAL — THE REGIONAL GROUP

MODIFIED FROM:
CITIGATE 416 CORPORATE CAMPUS, DETAILED SERVICING AND SWM REPORT (PHASE 1) BY NOVATECH DATED OCTOBER 1, 2014.

No.	REVISION	DATE	BY
4.	ISSUED FOR SWM APPROVAL	AUG 10/14	MER
3.	ISSUED FOR APPROVAL	JUL 23/14	MER
2.	REV. PER CITY COMMENTS / ISS. FOR MOE APPROVAL	JUNE 27/14	MER
1.	ISSUED FOR CITY REVIEW	MAR 31/14	MER

SCALE 1:1000 (1:1000, 0 10 20 30 40)

DESIGN LAB
CHECKED MER
DRAWN MTM/BET
CHECKED MER
APPROVED JGR

LICENSED PROFESSIONAL ENGINEER — M.E. RIDDELL — 100040125 — PROVINCE OF ONTARIO — Aug 5/14

REGISTERED PROFESSIONAL ENGINEER — J.G. RIDDELL — PROVINCE OF ONTARIO

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

LOCATION
CITY OF OTTAWA
CITI GATE 416 CORPORATE CAMPUS

DRAWING NAME
SANITARY DRAINAGE AREA PLAN (OUTLET B)

PROJECT No. 109203-00
REV REV # 4
DRAWING No. 109203-CG-SAN2

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NOVATECH FILE NO.: 121028
CITY FILE NO.:
DESIGNED BY: SM
CHECKED BY: CJR
REVISED : November 30, 2022

UPDATED - SANITARY SEWER DESIGN SHEET

Citi Gate 416 Corporate Campus
Phase 1 - As-Built

CITI GATE 416 CORPORATE CAMPUS

NOVATECH Engineers, Planners & Landscape Architects

Location							Wastewater Flow Q(w)		Extraneous Flow Q(i)		Design Flow Q(d)	Proposed Sanitary Sewer						
Area I.D.	Street	Block Number	From MH	To MH	Area (ha)	Flow Rate (L/ha/d)	Individual Peak Flow Rate (L/s)	Cumulative Peak Flow Rate (L/s)	Individual Infiltration Rate 0.28 L/s/ha (L/s)	Cumulative Infiltration Rate (L/s)	Peak Design Flow (L/s)	Length (m)	Pipe Size (mm)	Type of Pipe	Grade %	Capacity (L/s)	Full Flow Velocity (m/s)	Percentage of Capacity
Sanitary Outlet B to Strandherd Drive at Kennevale Drive **Plan Reference: Sanitary Drainage Area Plan (109203-CG-SAN2)**																		
560 Dealership Drive	Dealership Drive	Lands Owned	Fut	501	2.99	35,000	1.82	1.82	0.84	0.84	2.65							
C-1	Nortel Drive	Lands Owned by Others	Fut	501	16.36	50,000	14.20	16.02	4.58	5.42	21.44	*4.0*	300	PVC	*0.20*	45.12	0.62	48%
B-1	Dealership Drive	Lands Owned by Others	Fut	501	27.06		23.49	23.49	7.58	7.58	31.07	*12.5*	300	PVC	*0.20*	45.12	0.62	69%
B-2	Dealership Drive	Block 11	501	503	2.72	50,000	2.36	41.87	0.76	13.76	55.63							
B-3	Dealership Drive	Block 10	501	503	2.14	50,000	1.86	43.73	0.60	14.36	58.08							
B-4	Dealership Drive		501	503	0.28	50,000	0.24	43.97	0.08	14.43	58.40	*119.5*	450	PVC	*0.14*	111.29	0.68	52%
B-5	Dealership Drive	Block 9	503	505	1.84	50,000	1.60	45.57	0.52	14.95	60.52							
B-6	Dealership Drive		503	505	0.29	50,000	0.25	45.82	0.08	15.03	60.85	*119.2*	450	PVC	*0.16*	118.97	0.72	51%
B-7	Dealership Drive	Block 12 (SWM)	505	507	3.20	50,000	2.78	48.60	0.90	15.93	64.52							
B-8	Dealership Drive	Block 8	505	507	1.64	50,000	1.42	50.02	0.46	16.39	66.41							
B-9	Dealership Drive		505	507	0.20	50,000	0.17	50.19	0.06	16.44	66.64	*85.7*	450	PVC	*0.12*	103.03	0.63	65%
B-10	Dealership Drive	Block 19	507	509	2.51	50,000	2.18	52.37	0.70	17.14	69.52							
B-11	Dealership Drive		507	509	0.13	50,000	0.11	52.49	0.04	17.18	69.67	*55.9*	450	PVC	*0.16*	118.97	0.72	59%
B-12	Philsar Street	Block 6	603	601	1.62	50,000	1.41	1.41	0.45	0.45	1.86							
B-13	Philsar Street		603	601	0.23	50,000	0.20	1.61	0.06	0.52	2.12	*41.2*	250	PVC	*0.19*	27.04	0.53	8%
B-15	Philsar Street		601	509	0.19	50,000	0.16	1.77	0.05	0.57	2.34	*101.2*	250	PVC	*0.25*	31.02	0.61	8%
B-16	Dealership Drive	Block 4	509	511	3.39	50,000	2.94	57.20	0.95	18.70	75.90							
B-17	Dealership Drive		509	511	0.24	50,000	0.21	57.41	0.07	18.77	76.18	*99.5*	450	PVC	*0.17*	122.63	0.75	62%
B-14	Dealership Drive	Block 5	511	513	2.14	50,000	1.86	59.26	0.60	19.37	78.63							
B-18	Dealership Drive		511	513	0.20	50,000	0.17	59.44	0.06	19.42	78.86	*75.9*	450	PVC	*0.20*	133.02	0.81	59%
B-19	Outlet to Lift Station		513	515	0.04	50,000	0.03	59.47	0.01	19.43	**78.91**	*35.5*	450	PVC	*0.42*	192.76	1.17	41%
					66.42													

Notes:
1. Q(d) = Q(w) + Q(i) , where
2. Q(i) = 0.28 L/s/ha
3. Peaking Factor = 1.5

Q(d) = Design Flow (L/s)
Q(w) = Peak Wastewater Flow (L/s)
Q(i) = Extraneous Flow (L/s)

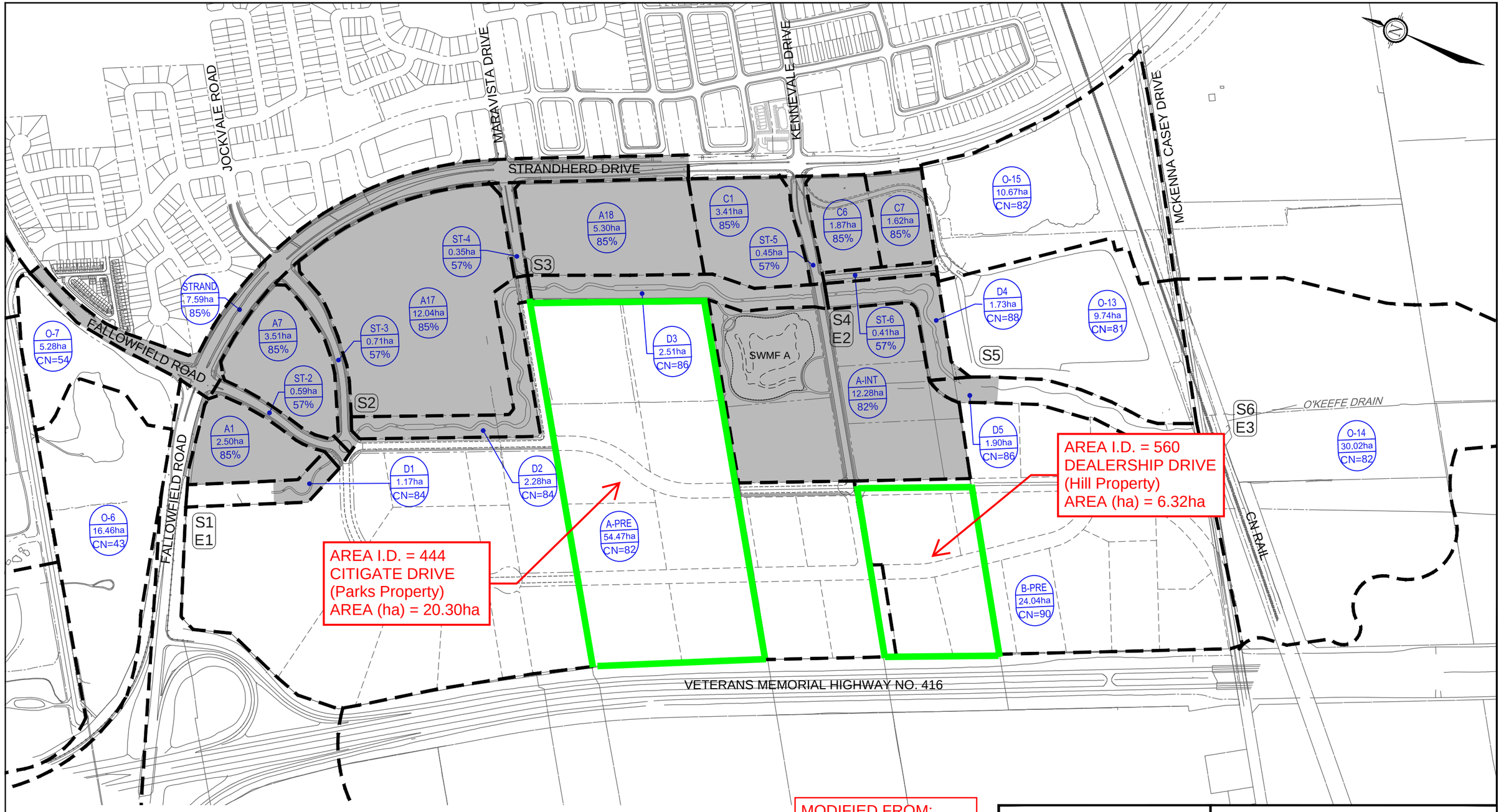
Legend:
0.20 As-built pipe grade (%) or length (m)

* Area for 575 Dealership Drive was considered to be 50% of the total property area (excluding 13m for ROW allowance)
* Area for C-1 reduced by 6.32ha (site area for 575 Dealership Drive)

MODIFIED FROM:
CITIGATE 416 CORPORATE CAMPUS, DETAILED SERVICING AND SWM REPORT (PHASE 1) BY NOVATECH DATED OCTOBER 1, 2014.

PROPOSED SANITARY SEWER INFORMATION IS UPDATED WITH AS-BUILT SEWER INFORMATION

APPENDIX D1
444 CitiGate Drive – Storm Sewer and Stormwater Management Information



LEGEND

- DRAINAGE BOUNDARIES
- ID / HA / %/CN — AREA ID, CATCHMENT AREA, TOTAL IMPERVIOUSNESS / SCS CURVE NUMBER
- S1 / E1 — HYDROLOGIC MODELING (SWMHYMO) ANALYSIS POINT; ENVIRONMENTAL MANAGEMENT PLAN (EMP) ANALYSIS POINT
- PHASE 1 DEVELOPMENT AREA

NOTE: STRANDHERD DRIVE SIMULATED USING AUTODESK SSA.

MODIFIED FROM:
CITIGATE 416 CORPORATE CAMPUS, DETAILED SERVICING AND SWM REPORT (PHASE 1) BY NOVATECH DATED OCTOBER 1, 2014.

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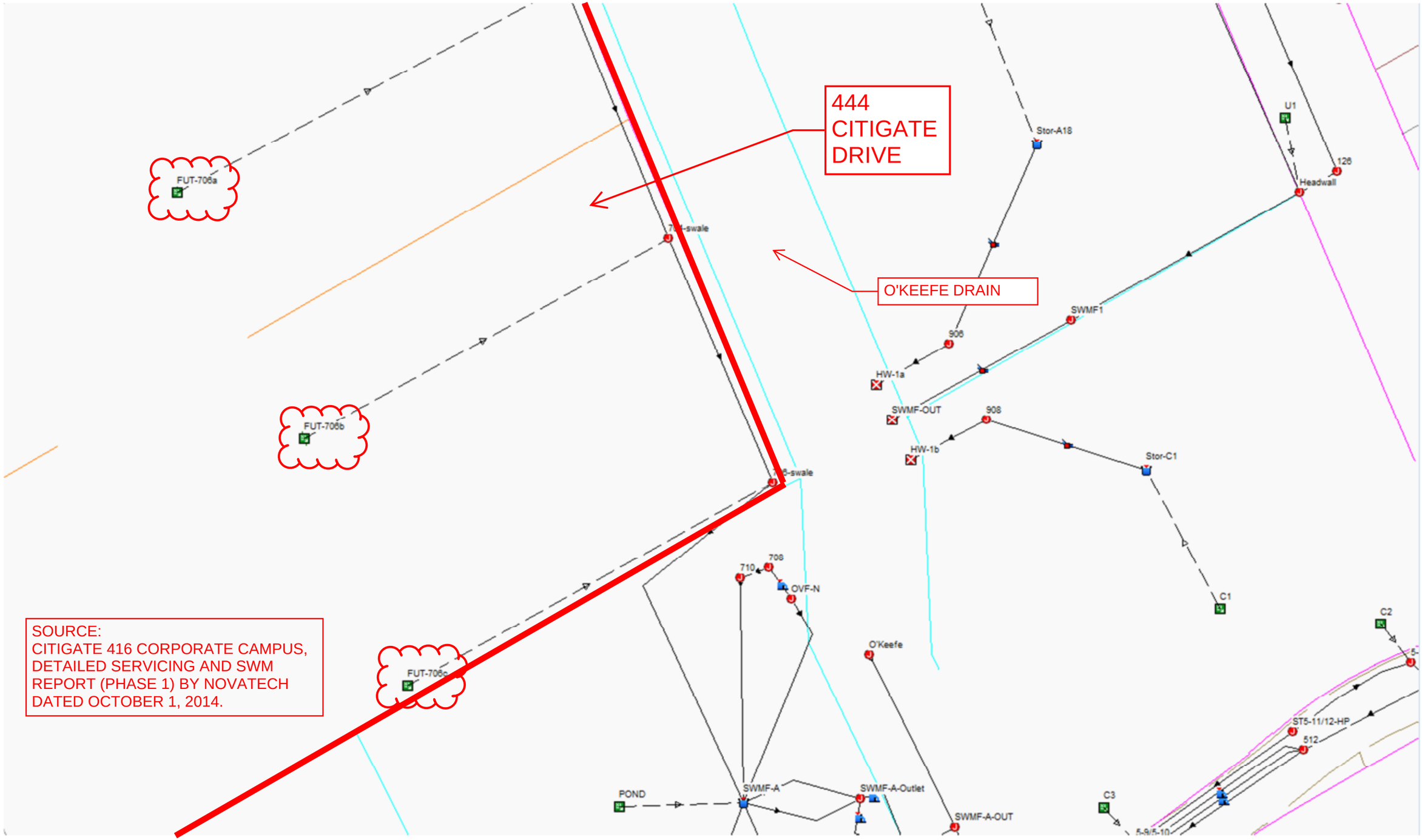
CITI GATE 416 EMPLOYMENT LANDS

Interim Development Drainage Area Plan

SCALE: N.T.S
DATE: SEP 2014 | JOB: 109203 | FIGURE: FIGURE 5

SHT11X17.DWG - 279mmX432mm


444
CITIGATE
DRIVE
O'KEEFE DRAIN
FUT-706a
FUT-706b
FUT-706c
706-swale
708-swale
Stor-A18
U1
126
Headwall
SWMF1
906
HW-1a
SWMF-OUT
908
HW-1b
Stor-C1
C1
C2
C3
710
708
OVF-N
O'Keefe
POND
SWMF-A
SWMF-A-Outlet
SWMF-A-OUT
ST5-11/12-HP
512
SOURCE:
CITIGATE 416 CORPORATE CAMPUS, DETAILED SERVICING AND SWM REPORT (PHASE 1) BY NOVATECH DATED OCTOBER 1, 2014.

Citi Gate: 416 Corporate Campus - Phase 1
Storage Nodes

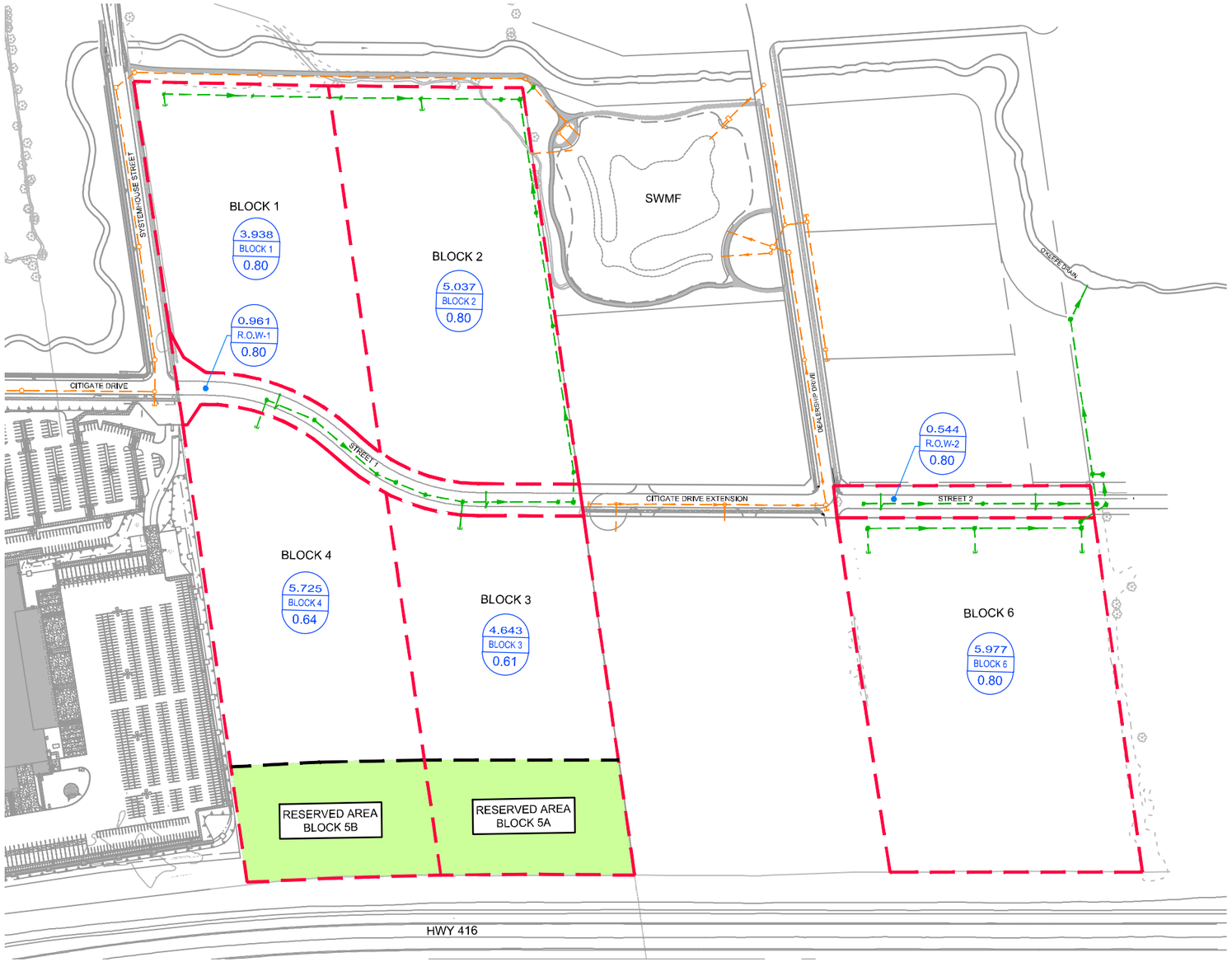
AutoDesk Storm and Sanitary Analysis
Chicago 100-year 3-hour Storm Model Output Results

NOVATECH
Engineers, Planners & Landscape Architects

SN	Element ID	Description	Invert Elevation (m)	Max (Rim) Elevation (m)	Max (Rim) Offset (m)	Initial Water Elevation (m)	Initial Water Depth (m)	Ponded Area (m^2)	Evaporation Loss	Peak Inflow (lps)	Peak Lateral Inflow (lps)	Peak Outflow (lps)	Peak Exfiltration Flow Rate (cmm)	Maximum HGL Elevation Attained (m)	Maximum HGL Depth Attained (m)	Average HGL Elevation Attained (m)	Average HGL Depth Attained (m)	Time of Maximum HGL Occurrence (days hh:mm)	Total Exfiltration Volume (1000-m^3)	Total Flooded Volume (ha-mm)	Total Time Flooded (minutes)	Total Retention Time (seconds)
1	DICB3	178mm	96.80	98.80	2.00	96.80	0.00	0.00	0.00	102.24	102.24	89.64	0.00	98.59	1.79	97.14	0.34	0 01:37	0.00	0.00	0.00	0.00
2	Stor-706a		95.10	97.50	2.40	95.10	0.00	0.00	0.00	1433.80	1433.80	1119.77	0.00	97.24	2.14	95.20	0.10	0 01:24	0.00	0.00	0.00	0.00
3	Stor-706b		95.10	97.50	2.40	95.10	0.00	0.00	0.00	1433.80	1433.80	1119.77	0.00	97.24	2.14	95.20	0.10	0 01:24	0.00	0.00	0.00	0.00
4	Stor-706c		95.10	97.50	2.40	95.10	0.00	0.00	0.00	1433.80	1433.80	1119.77	0.00	97.24	2.14	95.20	0.10	0 01:24	0.00	0.00	0.00	0.00
5	Stor-A1		97.15	98.65	1.50	97.15	0.00	0.00	0.00	701.76	701.76	185.00	0.00	98.52	1.37	97.64	0.49	0 01:58	0.00	0.00	0.00	0.00
6	Stor-A12		95.60	98.00	2.40	95.60	0.00	0.00	0.00	1706.18	1706.18	1699.74	0.00	97.79	2.19	95.71	0.11	0 01:40	0.00	0.00	0.00	0.00
7	Stor-A17a		95.96	97.31	1.35	95.96	0.00	0.00	0.00	1242.08	1242.08	408.70	0.00	97.26	1.30	96.26	0.30	0 02:07	0.00	0.00	0.00	0.00
8	Stor-A17b		95.96	97.31	1.35	95.96	0.00	0.00	0.00	1242.08	1242.08	408.70	0.00	97.26	1.30	96.26	0.30	0 02:07	0.00	0.00	0.00	0.00
9	Stor-A18		94.00	95.50	1.50	94.00	0.00	0.00	0.00	1253.42	1253.42	382.32	0.00	95.33	1.33	94.30	0.30	0 02:01	0.00	0.00	0.00	0.00
10	Stor-A7		97.00	98.50	1.50	97.00	0.00	0.00	0.00	1369.10	1369.10	297.50	0.00	98.44	1.44	97.31	0.31	0 01:42	0.00	0.00	0.00	0.00
11	Stor-A8		98.60	101.00	2.40	98.60	0.00	0.00	0.00	6846.92	6846.92	3355.29	0.00	100.92	2.32	98.77	0.17	0 01:28	0.00	0.00	0.00	0.00
12	Stor-B10		93.10	95.50	2.40	93.10	0.00	0.00	0.00	889.22	889.22	580.19	0.00	95.37	2.27	93.84	0.74	0 01:23	0.00	0.00	0.00	0.00
13	Stor-B11		93.10	95.50	2.40	93.10	0.00	0.00				395.52	0.00	95.21	2.11	93.83	0.73	0 01:28	0.00	0.00	0.00	0.00
14	Stor-B12		93.10	95.50	2.40	93.10	0.00	0.00				428.95	0.00	95.35	2.25	93.83	0.73	0 01:23	0.00	0.00	0.00	0.00
15	Stor-B3		95.10	97.50	2.40	95.10	0.00	0.00				865.52	0.00	97.29	2.19	95.18	0.08	0 01:21	0.00	0.00	0.00	0.00
16	Stor-B4		95.50	97.80	2.30	95.50	0.00	0.00				3383.50	0.00	97.65	2.15	95.60	0.10	0 01:20	0.00	0.00	0.00	0.00
17	Stor-B7		94.00	96.40	2.40	94.00	0.00	0.00				737.49	0.00	96.20	2.20	94.82	0.82	0 01:23	0.00	0.00	0.00	0.00
18	Stor-C1		94.00	95.50	1.50	94.00	0.00	0.00	0.00	1128.81	1128.81	273.09	0.00	95.40	1.40	94.29	0.29	0 01:52	0.00	0.00	0.00	0.00
19	Stor-C6		94.30	95.80	1.50	94.30	0.00	0.00	0.00	723.67	723.67	157.38	0.00	95.74	1.44	94.61	0.31	0 01:42	0.00	0.00	0.00	0.00
20	Stor-C7		94.30	95.80	1.50	94.30	0.00	0.00	0.00	629.76	629.76	142.68	0.00	95.74	1.44	94.61	0.31	0 01:41	0.00	0.00	0.00	0.00
21	SWMF-A		91.00	94.75	3.75	92.57	1.57	0.00	0.00	11729.18	781.40	1581.64	0.00	94.29	3.29	93.74	2.74	0 02:40	0.00	0.00	0.00	0.00

TOTAL ALLOWABLE RELEASE RATE FOR 444 CITIGATE DRIVE EXTENSION

SOURCE:
CITIGATE 416 CORPORATE CAMPUS, DETAILED SERVICING AND SWM REPORT (PHASE 1) BY NOVATECH DATED OCTOBER 1, 2014.



LEGEND

- PROPOSED STM DRAINAGE AREA BOUNDARY
- 0.120 / R-3 / 0.61 — DRAINAGE AREA, AREA ID, PROPOSED RUNOFF COEFFICIENT 'C'
- PROPOSED STORM SEWER AND MANHOLE
- *EXISTING STORM SEWER AND MANHOLE*

NOTE:

- RESERVED AREA (BLOCK 5A & 5B) ARE INCLUDED IN THE TOTAL AREA FOR BLOCK 3 & 4 RESPECTIVELY
- THE RUNOFF COEFFICIENT CALCULATED FOR BLOCK 3 & 4 IS BASED ON THE RUN-OFF COEFFICIENT C=0.8 (AS PER CITIGATE DETAILED SERVICING AND STORMWATER MANAGEMENT REPORT PHASE 1 DATED OCTOBER 1, 2014) ALLOCATED FOR EACH INDIVIDUAL SITE AND THE RUN-OFF COEFFICIENT C=0.2 FOR THE PROPOSED RESERVED AREA

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444 CITIGATE DRIVE & 560 DEALERSHIP DRIVE

POST-DEVELOPMENT DRAINAGE AREA PLAN

SCALE 1 : 4000 (0 50 100 150 200)
DATE NOV 2022 | JOB 122003 | FIGURE POST-STM

SHT11X17.DWG - 279mmX432mm

M:\2022\122003\CAD\Civil\122003-STM.dwg, STM, Dec 02, 2022 - 3:26pm, madeoli

TABLE 1A: Allowable release rate from CitiGate Report

Area ID	Area (ha)	Allowable Flow		
444 CitiGate Drive	20.307	3359.31		(Allowable flow from CitiGate 416 Corporate Campus, Detailed Servicing and SWM Report (Phase 1) By NOVATECH dated October 1, 2014. #R-2014-115)
Total	**20.307**	**3359.31**	**L/s**	

TABLE 1B: Calculated Allowable Release Rate Per Block

Zone	Area (ha)	% Area	Release Rate (L/s)	Comments
ROW	0.961	N/A	129.0	* ROW release rate based on an 82mm ICD at each catchbasin
Sub Total	**0.961**		**129.00**	
Block 1	3.938	20.36%	657.8	* Release Rate allocated by % area for remaining flow
Block 2	5.037	26.05%	841.4	
Block 3	4.638	23.98%	774.8	
Block 4	5.725	29.60%	956.3	
Sub Total	19.338	100.0%	3230.31	
Total	**20.299**		**3359.31**	

PROJECT #: 122003
PROJECT NAME: 444 CITIGATE DRIVE
LOCATION: OTTAWA, ON

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: NOV 2022

TABLE 2A: Post-Development Runoff Coefficient "C" - R.O.W

			5 Year Event		100 Year Event	
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.529	0.90	0.59	1.00	0.66
0.961	Roof	0.000	0.90		1.00	
	Soft	0.432	0.20		0.25	

TABLE 2B: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R.O.W

0.961 =Area (ha)
0.66 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	0	398.62	705.52	129.0	576.52	0.00
	5	242.70	429.57	129.0	300.57	90.17
	10	**178.56**	**316.04**	**129.0**	**187.04**	**112.22**
	15	142.89	252.91	129.0	123.91	111.52
	20	119.95	212.30	129.0	83.30	99.96

Equations:
Flow Equation
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation
$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$
$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Surface Storage in R.O.W

Assumptions:

Road Slope	0.5 - 0.75	%	The number of road sags was calculated based on a maximum catchbasin spacing of 90m for a road grade of 0.5-0.75%. The available storage volume per road sag was calculated based on a ponding depth of 0.25m to be 60cum. The flow rates were determined based on a 82mm diameter orifice at each catchbasin with a maximum head 2.21m.
Road Length	352.3	m	
Road Width	11	m	
Max Ponding Depth	0.25	m	
Number of Sags	3	ea	
Total Storage available	180	Cu.M	

PROJECT #: 122003
PROJECT NAME: 444 CITIGATE DRIVE
LOCATION: OTTAWA, ON

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: NOV 2022

TABLE 3A: Post-Development Runoff Coefficient "C" - Block 1

			5 Year Event		100 Year Event	
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	3.347	0.90	0.80	1.00	0.89
3.938	Roof	0.000	0.90		1.00	
	Soft	0.591	0.20		0.25	

TABLE 3B: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - Block 1

3.938 =Area (ha)
0.89 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	5	242.70	2358.12	657.8	1700.30	510.09
	10	178.56	1734.88	657.8	1077.06	646.24
	15	**142.89**	**1388.36**	**657.8**	**730.54**	**657.49**
	20	119.95	1165.44	657.8	507.62	609.14
	25	103.85	1008.98	657.8	351.16	526.74

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

PROJECT #: 122003
PROJECT NAME: 444 CITIGATE DRIVE
LOCATION: OTTAWA, ON

NOVATECH
Engineers, Planners & Landscape Architects

DATE PREPARED: NOV 2022

TABLE 4A: Post-Development Runoff Coefficient "C" - Block 2

			5 Year Event		100 Year Event	
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	4.281	0.90	0.80	1.00	0.89
5.037	Roof	0.000	0.90		1.00	
	Soft	0.756	0.20		0.25	

TABLE 4B: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - Block 2

5.037 =Area (ha)
0.89 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	5	242.70	3016.21	841.4	2174.81	652.44
	10	178.56	2219.05	841.4	1377.65	826.59
	15	**142.89**	**1775.82**	**841.4**	**934.42**	**840.98**
	20	119.95	1490.69	841.4	649.28	779.14
	25	103.85	1290.56	841.4	449.16	673.74

Equations:

Flow Equation

$Q = 2.78 \times C \times I \times A$

Where:

C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation

$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$

$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

TABLE 5A: Post-Development Runoff Coefficient "C" - Block 3

			5 Year Event		100 Year Event	
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	2.701	0.90		1.00	
4.638	Roof	0.000	0.90	0.61	1.00	0.69
	Soft	1.937	0.20		0.25	

TABLE 5B: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - Block 3

4.638 =Area (ha)
0.69 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	0	398.62	3530.02	774.8	2755.26	0.00
	5	242.70	2149.29	774.8	1374.54	412.36
	10	**178.56**	**1581.25**	**774.8**	**806.50**	**483.90**
	15	142.89	1265.42	774.8	490.66	441.60
	20	119.95	1062.24	774.8	287.48	344.98

Equations:
Flow Equation
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation
$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$
$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Note:

1. Reserved Area Block 5A (1.456 ha) is included in the Total area for Block 3
2. The Runoff Coefficient calculated is based on the run-off coefficient C = 0.8 (as per the CitiGate detailed servicing and stormwater management report (Phase 1) dated October 1, 2014) allocated for each individual site and the run-off coefficient C = 0.2 for the proposed reserved area.

TABLE 6A: Post-Development Runoff Coefficient "C" - Block 4

			5 Year Event		100 Year Event	
Area	0.4	Ha	"C"	C_{avg}	"C" + 25%	*C_{avg}
Total	Hard	3.590	0.90		1.00	
5.725	Roof	0.000	0.90	0.64	1.00	0.72
	Soft	2.135	0.20		0.25	

TABLE 6B: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - Block 4

5.725 =Area (ha)
0.72 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	0	398.62	4569.40	956.3	3613.07	0.00
	5	242.70	2782.14	956.3	1825.80	547.74
	10	**178.56**	**2046.84**	**956.3**	**1090.51**	**654.30**
	15	142.89	1638.01	956.3	681.68	613.51
	20	119.95	1375.00	956.3	418.67	502.41

Equations:
Flow Equation
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation
$C_s = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$
$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Note:

1. Reserved Area Block 5B (1.502 ha) is included in the Total area for Block 4
2. The Runoff Coefficient calculated is based on the run-off coefficient C = 0.8 (as per the CitiGate detailed servicing and stormwater management report (Phase 1) dated October 1, 2014) allocated for each individual site and the run-off coefficient C = 0.2 for the proposed reserved area.

Table 7: Post-Development Stormwater Mangement Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	Oulet Location	100 Year Storm Event	
				Release (L/s)	Req'd Vol (cu.m)
R.O.W	0.961	0.59	MH 706	129.0	112.22
Sub Total				129.0	
Block 1	3.938	0.80	MH 706	657.8	657.49
Block 2	5.037	0.80	MH 706	841.4	840.98
Block 3	4.638	0.61	MH 706	774.8	483.90
Block 4	5.725	0.64	MH 706	956.3	654.30
Sub Total				3230.3	
Total				**3359.3**	
Allowable				**3359.3**	

APPENDIX D2
560 Dealership Drive – Storm Sewer and Stormwater Management Information

Time to Peak Calculations - Existing Conditions

TABLE 1A: Time of Concentration (Uplands Overland Flow Method)

Area ID	Overland Flow						Channel Flow			Overall	
	Length (m)	Elevation U/S (m)	Elevation D/S (m)	Slope (%)	Velocity (Uplands) (m/s)	Travel Time (min)	Length (m)	Velocity * (m/s)	Travel Time (min)	Time of Concentration (min)	Time to Peak (min)
PRE	290	107.5	95	4.3%	0.35	14	N/A	N/A	N/A	14	9

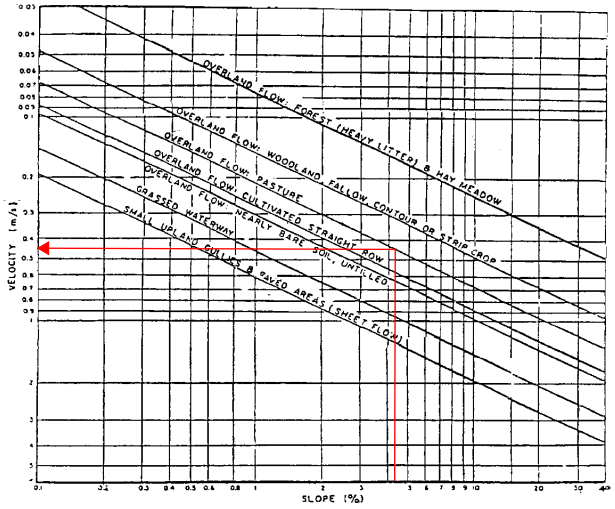

Figure A.5.2: Upland Method for Estimating Time of Concentration
(SCS National Engineering Handbook, 1971)

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TABLE 2A: Pre-Development Runoff Coefficient "C" - PRE

Area	Surface	Ha	"C"	C_{avg}	$*C_{100}$
Total	Hard	0.000	0.90	0.20	0.25
6.524	Soft	6.524	0.20		

Runoff Coefficient Equation
$C = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$
* Runoff

TABLE 2B: Pre-Development Flows

Outlet Options	Area (ha)	C_{avg}	Tc (min)	$Q_{2\ Year}$ (L/s)	$Q_{5\ Year}$ (L/s)	$Q_{100\ Year}$ (L/s)
O'Keefe Drain	6.524	0.20	15	**224.1**	**303.1**	**647.9**

Time of Concentration	Tc=	15	min
Intensity (2 Year Event)	I_2=	61.77	mm/hr
Intensity (5 Year Event)	I_5=	83.56	mm/hr
Intensity (100 Year Event)	I_{100}=	142.89	mm/hr

100 year Intensity = 1735.688 / (Time in min + 6.014)$^{0.820}$
5 year Intensity = 998.071 / (Time in min + 6.053)$^{0.814}$
2 year Intensity = 732.951 / (Time in min + 6.199)$^{0.810}$

Equations:
Flow Equation
Q = 2.78 x C x I x A
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

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TABLE 3A: Post-Development Runoff Coefficient "C" - R.O.W

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	0.299	0.90	0.59	1.00	0.66
0.544	Roof	0.000	0.90		1.00	
	Soft	0.245	0.20		0.25	

TABLE 3B: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - R.O.W

0.544 =Area (ha)
0.66 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	0	398.62	399.23	86.0	313.23	0.00
	5	242.70	243.08	86.0	157.08	47.12
	10	**178.56**	**178.83**	**86.0**	**92.83**	**55.70**
	15	142.89	143.11	86.0	57.11	51.40
	20	119.95	120.14	86.0	34.14	40.96

Equations:
Flow Equation
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation
$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$
$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Surface Storage in R.O.W

Assumptions:

Road Slope	0.5 - 0.75	%
Road Length	208.1	m
Road Width	11	m
Max Ponding Depth	0.25	m
Number of Sags	2	ea
Total Storage available	120	Cu.M

The number of road sags was calculated based on a maximum catchbasin spacing of 90m for a road grade of 0.5-0.75%. The available storage volume per road sag was calculated based on a ponding depth of 0.25m to be 60cum. The flow rates were determined based on a 82mm diameter orifice at each catchbasin with a maximum head 2.21m.

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TABLE 4A: Post-Development Runoff Coefficient "C" - Block 6

			5 Year Event		100 Year Event	
Area	Surface	Ha	"C"	C_{avg}	"C" + 25%	$*C_{avg}$
Total	Hard	5.083	0.90	0.80	1.00	0.89
5.980	Roof	0.000	0.90		1.00	
	Soft	0.897	0.20		0.25	

TABLE 4B: 100 YEAR EVENT QUANTITY STORAGE REQUIREMENT - Block 6

5.98 =Area (ha)
0.89 = C

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Allowable Runoff (L/s)	Net Flow to be Stored (L/s)	Storage Req'd (m^3)
100 YEAR	15	142.89	2108.28	561.9	1546.38	1391.74
	20	119.95	1769.77	561.9	1207.87	1449.44
	25	**103.85**	**1532.18**	**561.9**	**970.28**	**1455.41**
	30	91.87	1355.44	561.9	793.54	1428.37
	35	82.58	1218.38	561.9	656.48	1378.60

Equations:
Flow Equation
$Q = 2.78 \times C \times I \times A$
Where:
C is the runoff coefficient
I is the rainfall intensity, City of Ottawa IDF
A is the total drainage area

Runoff Coefficient Equation
$C_5 = (A_{hard} \times 0.9 + A_{soft} \times 0.2)/A_{Tot}$
$C_{100} = (A_{hard} \times 1.0 + A_{soft} \times 0.25)/A_{Tot}$

Table 5: Post-Development Stormwater Mangement Summary

Area ID	Area (ha)	1:5 Year Weighted Cw	Oulet Location	100 Year Storm Event	
				Release (L/s)	Req'd Vol (cu.m)
ROW	0.544	0.59	O'Keefe Drain	86.0	55.70
Block 6	5.980	0.80	O'Keefe Drain	561.9	1455.41
Total				**647.9**	
Allowable				**647.9**	