



Jp2g Consultants Inc.

ENGINEERS • PLANNERS • PROJECT MANAGERS

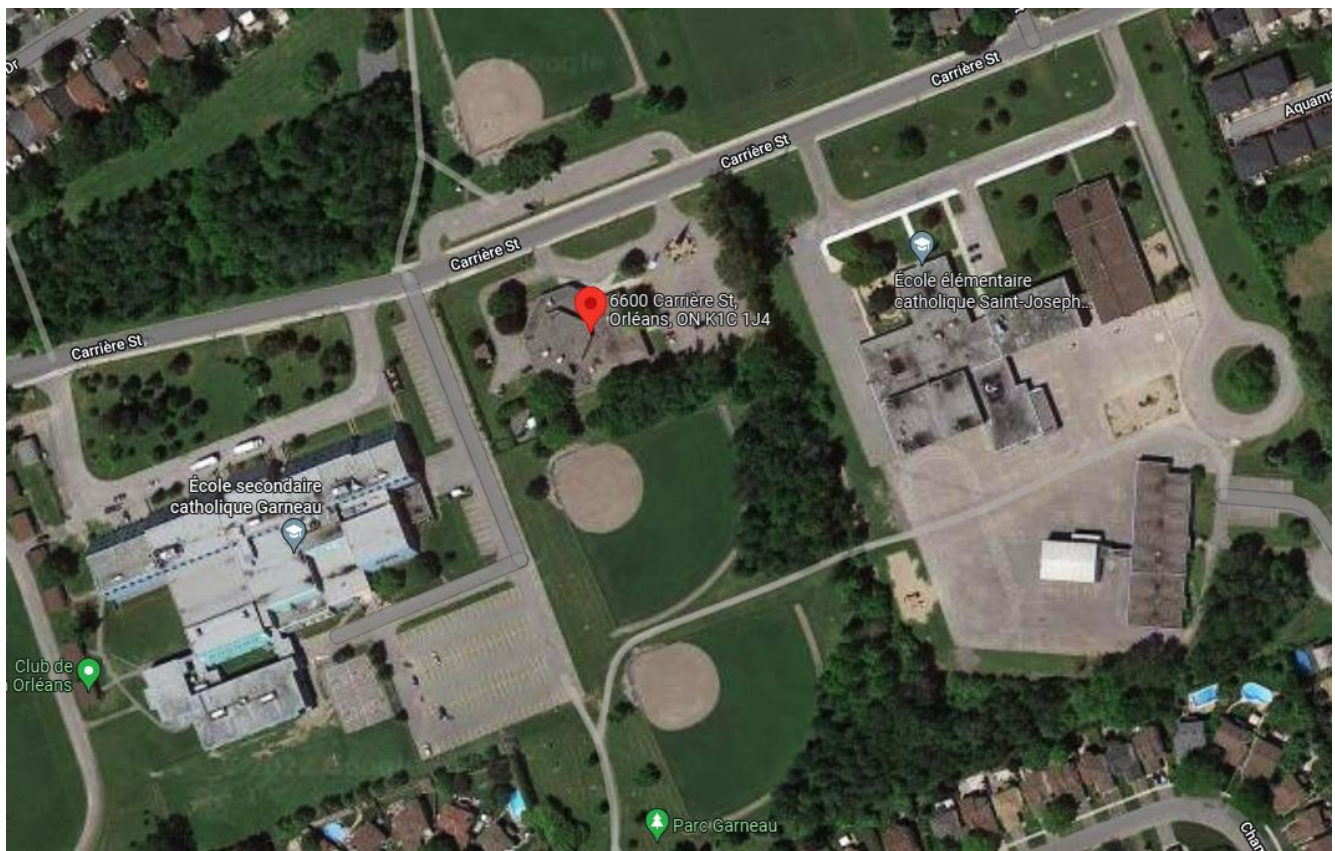
1150 Morrison Drive, Suite 410, Ottawa, ON K2H 8S9
T 613-828-7800, F 613-828-2600, www.jp2g.com

1150 Morrison Drive, Suite 410
Ottawa, ON, K2H 8S9
T.613.828.7800 F.613.828.2600
Project No. 21-5089A

Site Servicing and Stormwater Management Report

MIFO New Building

6600 Carrière Street, Ottawa, Ontario



Prepared for

Provencher Roy.
47 Clarence Street, Unit #440
Ottawa, Ontario, K1N 9K1

Revision 3 SUBMISSION May 16, 2025



Table of Contents

1	Introduction	1
1.1	Design Drawings	1
2	Objective	1
3	Stormwater Management	1
3.1	Pre-Development Conditions	1
3.2	Allowable Release Rate	1
3.3	Post-Development Conditions	2
3.4	Storm Sewer Pipe Design	2
3.5	Stormwater Quality Control	2
3.6	Stormwater Quantity Control	2
4	Sanitary Servicing	4
5	Water	4
5.1	Domestic Water Demand	4
5.2	Fire Flow Demand	5

❖	Appendix A	Drawings and Figures
❖	Appendix B	Stormwater Management Calculations
❖	Appendix C	Sanitary Servicing Calculations
❖	Appendix D	Fire Flow Demand Calculations
❖	Appendix E	Boundary Conditions and Pressure Check
❖	Appendix F	Pre-Consultation Notes
❖	Appendix G	Roof Drain and ICD Product Data Sheets
❖	Appendix H	OGS Data Sheet



1 Introduction

Jp2g Consultants Inc. was retained by Provencher Roy to complete a Site Servicing and Stormwater Management Report suitable for the City of Ottawa Site Plan Control Application, for a new Office Building development located on the south side of Carrière Street east of Orléans Boulevard in Orléans, ON.

The site is approximately **0.82 ha** in size and is bound by Carrière Street on the north property limit. The proposed development includes the construction of a new **2700 m²** Theatre Building, and associated parking and landscaped areas.

A Pre-Consultation meeting was held with City of Ottawa staff on May 9, 2022, to determine the project constraints and requirements. Preconsultation meeting minute notes are available in [Appendix F](#). The following report details the site servicing & stormwater management calculations used for capacity, water quantity and quality control in accordance with the City of Ottawa's requirements.

1.1 Design Drawings

The following reference civil design drawings are included.

- C1 – Site Servicing Plan
- C2 – Grading Plan
- C3 – General Notes and Details
- C4 – General Notes and Details II
- Figure 1 – Pre-Development Storm Drainage Areas
- Figure 2 – Post-Development Storm Drainage Areas
- Figure 3 – Fire Hydrant Coverage Area

2 Objective

This study will outline the servicing requirements for the development and identify the impact of the development on the existing municipal services, including water, storm and sanitary.

The stormwater management plan is to control post-development peak flows to pre-determined levels, and detain onsite, stormwater up to and including the 100-year storm event with a 20% increase of rainfall intensity (hereby referred to as 100-year* storm event) without affecting adjacent lands, and to provide clean runoff to minimize pollution of the downstream receiving watercourse

3 Stormwater Management

3.1 Pre-Development Conditions

The existing site consists of one commercial parcel that includes a parking lot. The parcels are bounded by two existing schools on each side.

3.2 Allowable Release Rate

Based on existing conditions the site appears to be about 60% hard surface, 40% of the site was assumed to be soft surface. Using this data, a pre-development runoff coefficient of 0.62 was calculated. From the Pre-Consultation meeting, if the calculated pre-development runoff coefficient is greater than 0.5, then a pre-development runoff coefficient of 0.5 is to be used. As a result, the pre-development runoff coefficient of 0.50 an allowable release rate of **$Q_{allowable} = 87.3 \text{ L/s}$** was calculated for the new site based on the pre-development 2-year flow, in accordance with the City of Ottawa requirements, see attached [Appendix B](#). Please refer to [Appendix B](#) Table B.1.2 for areas that are controlled/uncontrolled.



3.3 Post-Development Conditions

The proposed site development includes a new office building, asphalt parking, hard surface walkways, landscaped areas and a bioswale. Site storm drainage will be conveyed through the new on-site storm sewer, a bioswale retention system and connect to the existing **1800mm** storm sewer on Carrière Street in the right of way. An existing storm sewer trunk easement runs along the west side of the site which conveys flows from Jeanne d'Arc Boulevard through to Carrière Street. A new storm manhole will be installed on site and the new storm sewer servicing the building will be by gravity sewer. Flows will be managed to limit the 100-year post-development flow rate to the pre-allocated 2-year release rate identified in section 3.2.

Stormwater runoff from the roof, parking areas and partial green spaces will be collected into the on-site manhole's, catch basins and bio swale as applicable.

Storm water quantity storage is anticipated on the building roof, parking lot, and underground and will be managed using inlet control devices. The foundation drains will flow unobstructed through the on-site storm sewer system. Foundation drains and perimeter parking lot subdrains will connect to the proposed storm sewer between STMH01 and OGS01 and the interior parking lot sub drains will connect to the proposed storm sewer at CB-1.

The site development area is approximately **0.82 ha** with a post-development average weighted run-off coefficient of **C = 0.74** and **C = 0.83** for the 5-year and 100-year* storm events, respectively. Refer to calculations in **Appendix B**. Stormwater management techniques are required to reduce peak flows from the area, given that post-development peak flows will exceed the pre-development allowable release rate of **87.3L/s**.

3.4 Storm Sewer Pipe Design

Pipe diameter sizing was based on the **5-year** storm event, in accordance with City requirements. Under 5-year conditions, the storm sewers are not in surcharged conditions (i.e. flow/capacity <100%).

3.5 Stormwater Quality Control

Stormwater quality control will be managed by an oil grit separator unit to 80% TSS Removal. The proposed OGS unit is a Stormceptor Model EFO4. Details relating to the proposed OGS can be found in **Appendix H**.

3.6 Stormwater Quantity Control

Post-development peak flows will be detained on the building roof by installing parabolic weirs, (Watts Drainage Adjustable Flow Control for Roof Drains, or equivalent approved product), and ICD's.

Table 1: Allowable Release Rate Breakdown

ID	Description	Flows	
		5-Year Event	100-Year Event
	Allowable Release Rate (Section 3.2)	87.3 L/s	87.3 L/s
1.2.1	Uncontrolled overland surface flow	20.4 L/s	40.2 L/s
1.2.2	Net-allowable release rate	66.9 L/s	47.1 L/s*

* Note: Must be controlled to net-allowable 100-year.

To meet the net-allowable release rate for storm sewers, post-development flows will be controlled on the building's roof, in the new parking lot at the West side of the property, and in the South parking lot. The total resulting peak controlled flow is **47.1 L/s** for both the **5-year and 100-year**, which is equal to the net-allowable release rate.



Table 2: Controlled Flow Breakdown

ID	Description	Controlled Flows	Head (m)	Surface Storage (m ³)			Available Storage (m ³)
				5-Year Requirement	100-Year Requirement	100+20% Requirement	
	Net-allowable controlled release rate (Table 1)	47.3 L/s					
1.3.2	Building Roof	8.8 L/s	0.15	51	119	150	135
1.3.3	West Side Parking Lot	20.0 L/s	1.82	21	60	79	79
1.3.4	Rear Parking Lot	18.3 L/s	1.08	13	37	48	41

Refer to [Appendix B](#) for full calculation.

Note: 9.15 L/s is being used to determine storage requirements for the Rear Parking Lot area to compensate for less than maximum head over the ICD over the course of a storm event.

The building roof storage requirements were calculated to be 119m³ for the 100-year storm event and 51m³ for the 5-year storm event. Parabolic weirs (Watts Drainage Adjustable Accutrol Weir for Roof Drains, or equivalent approved product to be confirmed by building mechanical) will be installed at each roof drain, limiting the flow of each restrictor to 0.31 L/s. Scuppers will be supplied on the building roof at 150mm above the roof drain elevation. For 28 roof drains, the total release rate from the building roof will be a maximum of 8.8 L/s. Details relating to the roof drains can be found in [Appendix G](#).

Flow will be restricted at CB1 using an ICD size 84mm. This ICD was sized to provide the restricted 20 L/s of flow through the orifice, at the maximum design head for the surface storage for the 100 year +20% design storm. The maximum ponding depth in the parking lot is up to 340mm which is in accordance with the City of Ottawa requirements. In the event the capacity of this system is exceeded, emergency runoff will overflow onto Carrière Street from the northwest parking lot entrance.

Additional storage will be required for the rear parking lot. Flow is restricted through the rear parking lot storm sewer using an ICD of 90mm at STMH01. This ICD was sized using the upstream obvert of the oversized 1050mm pipe to ensure that sufficient storage within the pipe is provided for the restricted release rate of 18.3 L/s. The 1050mm storm sewer from CBMH01 to STMH-1 allows for the 41m³ of storage required for the rear parking lot. There will be no surface ponding in the rear parking lot for all storms up to and including the 100+20% design storm, and the oversized pipe was sized to ensure sufficient storage volume to capture the excess runoff from the 100+20% design storm. Refer to [Appendix B](#) for storage calculations.

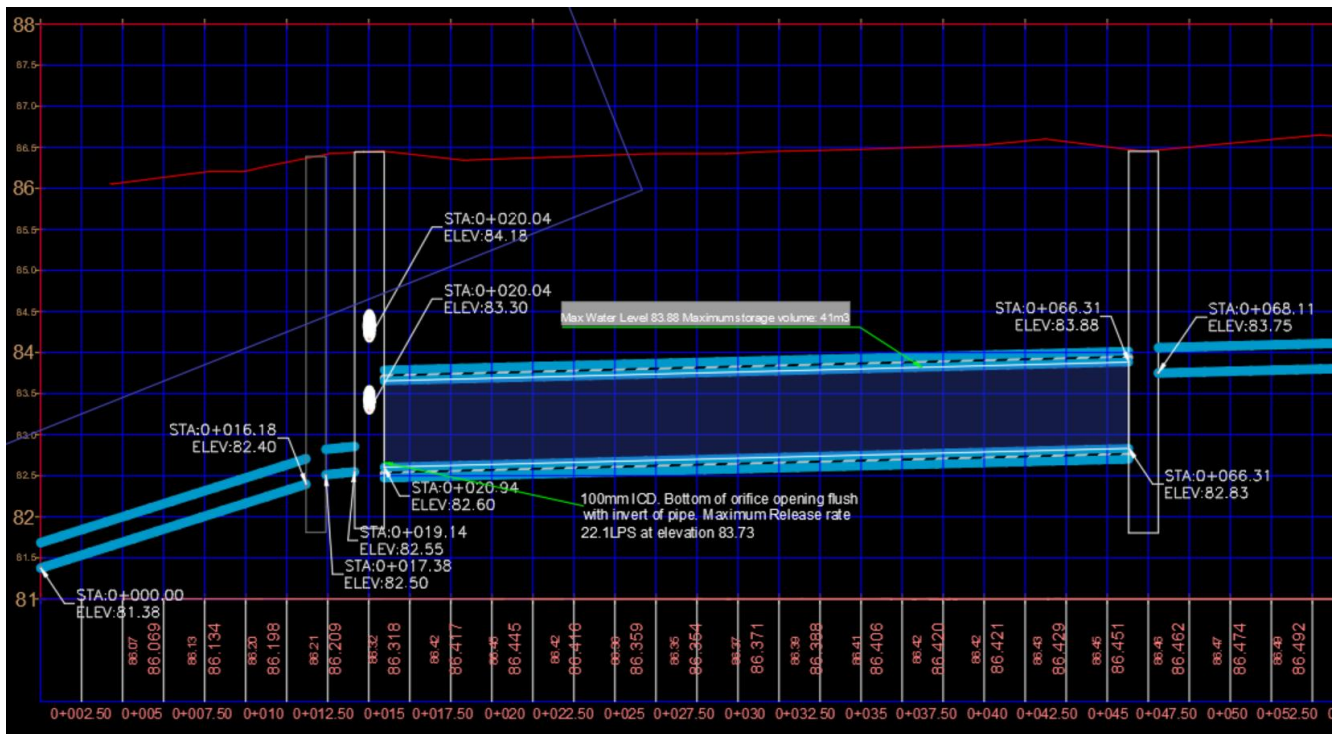


Figure 1: Oversized Storage Pipe Details

4 Sanitary Servicing

A new **200mm** sanitary sewer service will connect to the existing **250mm** sanitary sewer located on the north side of Carrière Street in the City right of way. A new sanitary manhole will be installed on site connecting the building sanitary service to the existing sanitary sewer in the right of way. The new sanitary sewer servicing the building will be installed at a **2.00%** slope conveying sanitary flow from the building to the proposed on site **SAMH-01**, and to the to the existing sanitary sewer on Carrière Street. Refer to drawing **C1 – Site Servicing Plan**.

Peak sanitary flow for the site is calculated to be **0.67 l/s**. The new **200mm** sanitary sewers at minimum **2.00%** slope will have a full flow capacity of **46.4 l/s**.

5 Water

A **150mm** ductile iron watermain exists along Carrière Street. A new **150mm** pvc watermain is proposed to be connected to the existing **150mm** watermain on Carrière Street to supply the building with the required demand.

5.1 Domestic Water Demand

The water demand for the new development is calculated based on Table 4.2 of the *City of Ottawa Design Guidelines for Water Distribution*.

Design Criteria:

- Average daily demand = 28,000 l/gross ha/day
- Gross Hectares = 0.82ha
- Maximum Day Factor = 1.5
- Maximum Hour Factor = 1.8



Average Daily Demand: $\frac{28,000 \text{ l/gross ha/day} \times 0.82\text{ha}}{24 \text{ hrs/day} \times 3600 \text{ s/hr}} = 0.27 \text{ l/s}$

Maximum Daily Demand: $0.27 \text{ l/s} \times 1.5 = 0.41 \text{ l/s}$

Maximum Hour Demand: $0.41 \text{ l/s} \times 1.8 = 0.74 \text{ l/s}$

A new water service will be located at a minimum of **2.4m** below grade for adequate frost protection. This new water service will be connected to the existing **150mm** municipal watermain located on the south side of Carrière Street in the City right of way. A new valve box will be installed at the property line.

5.2 Fire Flow Demand

There are (2) fire hydrants along the frontage of the property which will provide fire protection to the site. The new building will be equipped with an automatic sprinkler system. Based on the Fire Underwriters Survey Method, the fire flow demand for the new building is calculated to be:

Fire Flow Demand: **116.7 l/s** (Refer to Appendix B – Fire Flow Calculations).

The existing 2 fire hydrants on the frontage of the property are both Class AA fire hydrants, within 75m to the exposed building. The total contribution from these fire hydrants is a maximum of 190 l/s, meeting the site's 116.7 l/s requirement based on Table 1 of *Appendix I Ottawa Design Guidelines – Water Distribution*, to be confirmed by boundary conditions upon receipt.

End of Site Servicing and Stormwater Management Report.

Please contact the undersigned should you require any clarification.

Prepared By:

Zach Bauman, EIT
Civil Engineering Intern
Zach.Bauman@Jp2g.com

Revision By:

Will Voteary, EIT
Civil Engineering Intern
William.Voteary@Jp2g.com

Reviewed By:



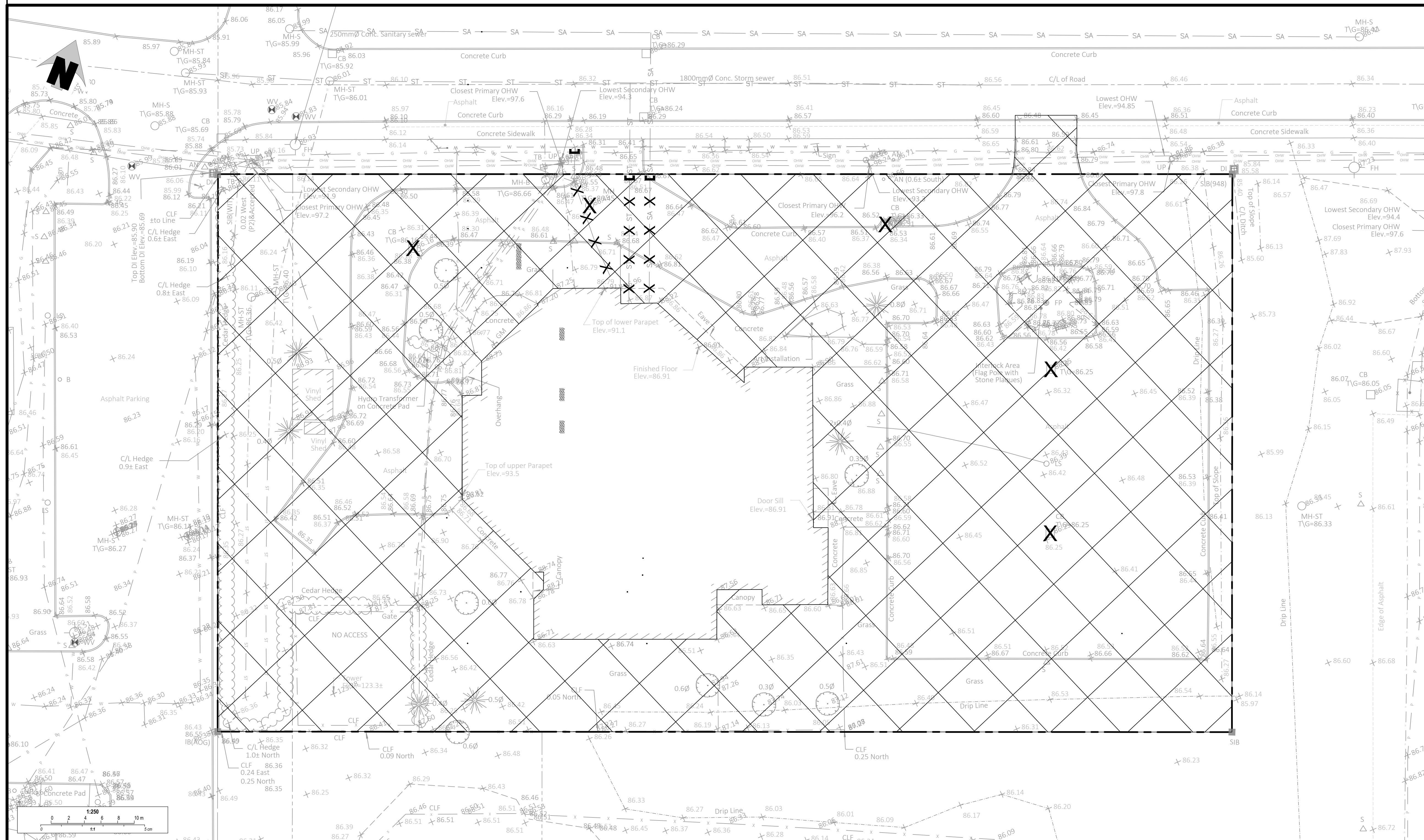
David Nguyen, P.Eng., ing.
Senior Civil Engineer
David.Nguyen@Jp2g.com

Appendix A - Drawings and Figures

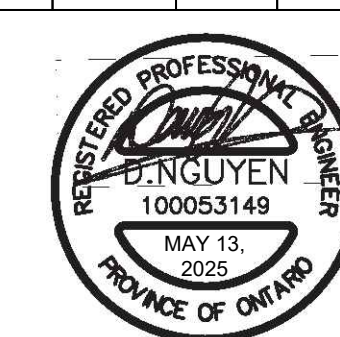
1. DEMOLISH AND REMOVE EXISTING ASPHALT, GRANULAR BASE, GRANULAR SUB-BASE, CONCRETE CURBS, WALKWAYS. REFER TO ARCHITECTURAL FOR ADDITIONAL DEMOLITION NOTES.
2. DEMOLISH AND REMOVE EXISTING CATCHBASIN/MANHOLES.
3. DEMOLISH AND REMOVE EXISTING STORM AND SANITARY SEWER LINES FROM BUILDING TO PROPERTY LINE AND CAP AT PROPERTY LINE. EXISTING LOCATION OF STORM AND SANITARY SHOWN IS APPROXIMATE AND TO BE FIELD CONFIRMED BEFORE DEMOLITION.
4. DEMOLISH AND REMOVE EXISTING WATERMAIN FROM BUILDING TO PROPERTY LINE. WATER SERVICE TO BE 'BLANKET' AT MUNICIPAL WATERMAIN IN ACCORDANCE WITH CITY OF OTTAWA REQUIREMENTS. REFER TO C1 DRAWING.
5. REFER TO ARCHITECTURAL, MECHANICAL, ELECTRICAL FOR OTHER SITE SERVICES NOT INCLUDED IN CIVIL DEMOLITION DRAWING.
6. REMOVE EXISTING EASTERN ENTRANCE INCLUDING DEPRESSED CURB, CONCRETE SIDEWALK, AND ASPHALT (BOULEVARD AND ENTRANCE).

	PROPERTY LINE
	EXISTING BUILDING
	REMOVALS INCLUDE ASPHALT, CONCRETE, CONCRETE CURB
	EXISTING SANITARY SEWER REMOVAL
	EXISTING STORM SEWER REMOVAL
	EXISTING WATERMAIN REMOVAL
	EXISTING CATCHBASIN / MANHOLE REMOVAL

DESIGN PROFESSIONAL'S SEAL OR SIGNATURE IS EFFECTIVE ONLY AS TO THAT VERSION OF THIS DOCUMENT AS ORIGINALLY PUBLISHED BY DESIGN PROFESSIONAL.
DESIGN PROFESSIONAL IS NOT RESPONSIBLE FOR ANY SUBSEQUENT MODIFICATION, CORRUPTION, OR UNAUTHORIZED USE OF SUCH DOCUMENT. TO VERIFY THE VALIDITY OR APPLICABILITY OF THE SEAL OR SIGNATURE, CONTACT DESIGN PROFESSIONAL.



2	2025-05-13	DN / WV	SOUMISSION POUR CONTROL DU SITE R3
2	2025-04-10	DN / LA	ISSUED FOR CONSTRUCTION - SI #001
1	2025-02-12	DN / RW	ISSUED FOR ADDENDUM 1



MIFO
6600 CARRIÈRE STREET,
OTTAWA, ONTARIO
~
DEMOLITION PLAN



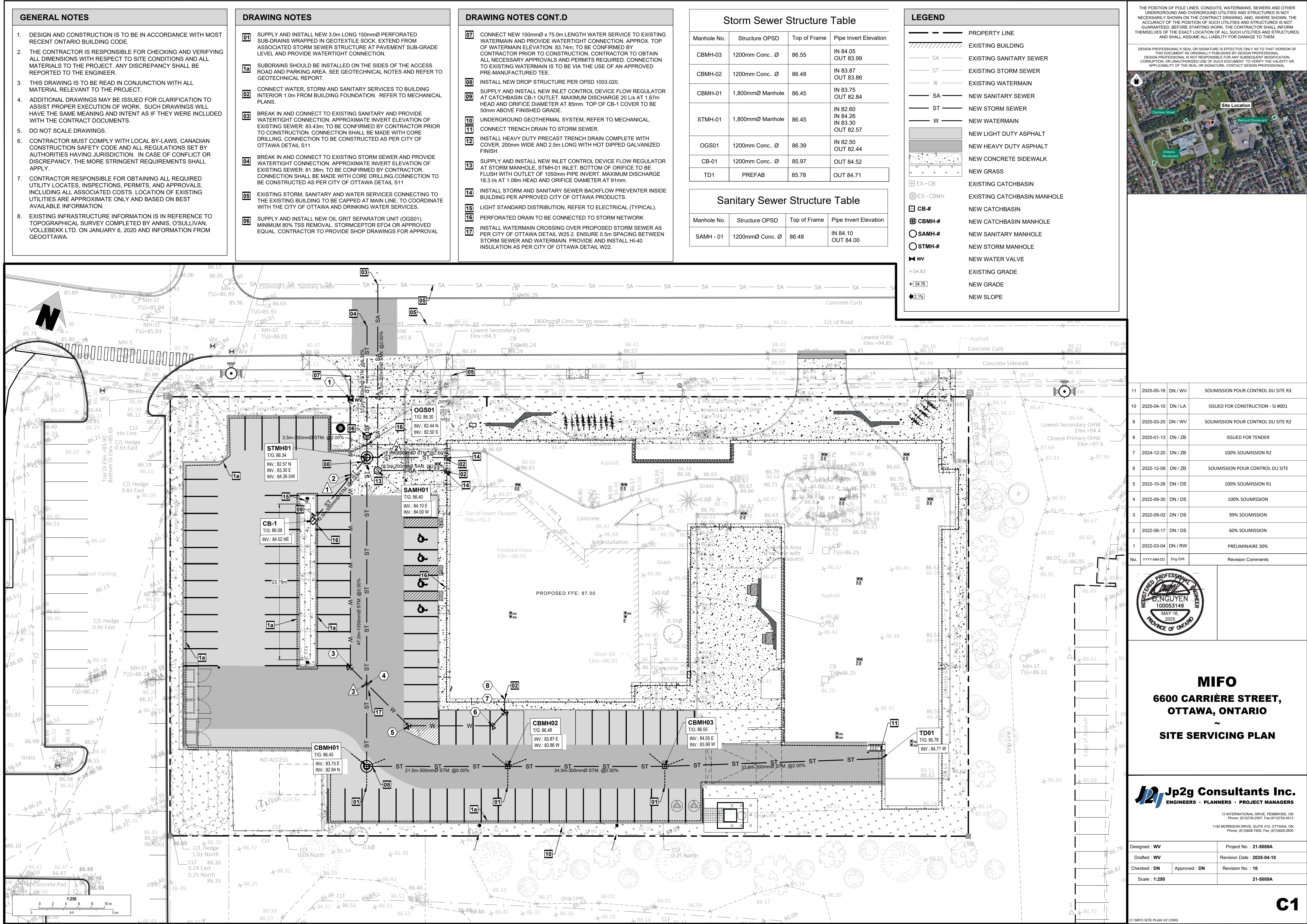
12 INTERNATIONAL DRIVE, PEMBROKE, ON
Phone: (613)735-2507, Fax:(613)735-4513

1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON
Phone: (613)828-7800, Fax: (613)828-2600

Designed : ZB		Project No. : 21-5089A
Drafted : ZB		Revision Date : 2025-04-10
Checked : DN	Approved : DN	Revision No. : 02
Scale : 1:250		21-5089A

CO

C1 MIFO SITE PLAN V21.DWG



GENERAL NOTES

- DESIGN AND CONSTRUCTION IS TO BE IN ACCORDANCE WITH MOST RECENT ONTARIO BUILDING CODE.
- THE CONTRACTOR IS RESPONSIBLE FOR CHECKING AND VERIFYING ALL DIMENSIONS WITH RESPECT TO SITE CONDITIONS AND ALL MATERIALS TO THE PROJECT. ANY DISCREPANCY SHALL BE REPORTED TO THE ENGINEER.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL MATERIAL RELEVANT TO THE PROJECT.
- ADDITIONAL DRAWINGS MAY BE ISSUED FOR CLARIFICATION TO ASSIST PROPER EXECUTION OF WORK. SUCH DRAWINGS WILL HAVE THE SAME MEANING AND INTENT AS IF THEY WERE INCLUDED WITH THE CONTRACT DOCUMENTS.
- DO NOT SCALE DRAWINGS.
- CONTRACTOR MUST COMPLY WITH LOCAL BY-LAWS, CANADIAN CONSTRUCTION SAFETY CODE AND ALL REGULATIONS SET BY AUTHORITIES HAVING JURISDICTION. IN CASE OF CONFLICT OR DISCREPANCY, THE MORE STRINGENT REQUIREMENTS SHALL APPLY.
- CONTRACTOR RESPONSIBLE FOR OBTAINING ALL REQUIRED UTILITY LOCATES, INSPECTIONS, PERMITS, AND APPROVALS, INCLUDING ALL ASSOCIATED COSTS. LOCATION OF EXISTING UTILITIES ARE APPROXIMATE ONLY AND BASED ON BEST AVAILABLE INFORMATION.
- EXISTING INFRASTRUCTURE INFORMATION IS IN REFERENCE TO TOPOGRAPHICAL SURVEY COMPLETED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. ON JANUARY 6, 2020 AND INFORMATION FROM GEOOTTAWA.

DRAWING NOTES

- INSTALL SILT FENCE IN ACCORDANCE WITH OPSD 219.130 AND PROVIDE SNOW FENCE AROUND EXISTING TREES (REFER TO LANDSCAPE PLAN).
- MATCH EXISTING GRADES AT PROPERTY LINE AND LIMITS OF WORK.
- PROTECT EXISTING ASPHALT AND CONCRETE WALKWAYS DURING CONSTRUCTION.
- CONTRACTOR TO PROTECT EXISTING STRUCTURES DURING CONSTRUCTION.
- TOP OF CB1 TO BE 50mm ABOVE FINISHED GRADE.
- NEW BIOSWALE DETAIL PER LANDSCAPE.
- REMOVE PORTION OF EXISTING SIDEWALK. CONSTRUCT DEPRESSED ENTRANCE AS PER CITY OF OTTAWA STANDARD DETAIL SC7.1 AND SC2. MATCH EXISTING SIDEWALK AT LIMITS OF WORK.
- REINSTATE TRENCH ROAD CUT PER CITY OF OTTAWA STANDARD DETAIL R10. REINSTATEMENT TO BE TO THE SATISFACTION OF THE CITY OF OTTAWA. KEY INTO EXISTING ASPHALT PER DETAIL 5/C3.
- REINSTATE EXISTING CONCRETE BARRIER CURB AS PER CITY OF OTTAWA STANDARD DETAIL SC1.1. MATCH EXISTING ELEVATION
- REINSTATE DISTURBED GRASSED AREA. MATCH SURROUNDING GRADE.
- NEW CURB CUT

GEOTECHNICAL NOTES

- GEOTECHNICAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO SHALL INSPECT ALL SUBGRADE SURFACES FOR FOOTING AND PAVEMENT STRUCTURES PRIOR TO CONSTRUCTION.
- GEOTECHNICAL INVESTIGATION PROPOSED BUILDING EXPANSION, 6600 CARRIÈRE STREET PREPARED BY PATERSON GROUP INC., REPORT: PG3694-1 REV.2, DATED APRIL 29, 2025.

DRAWING NOTES CONT.

- NEW LIGHT DUTY ASPHALT AS PER DETAIL 1 ON SHEET C3
- NEW HEAVY DUTY ASPHALT AS PER DETAIL 2 ON SHEET C3
- REMOVE PORTION OF EXISTING SIDEWALK, CURB, AND ASPHALT BOULEVARD. REPLACE WITH NEW FULL HEIGHT CONCRETE CURB, ASPHALT GUTTER, AND CONCRETE SIDEWALK AS PER CITY OF OTTAWA DETAILS SC1, SC4, AND SC20.

EROSION AND SEDIMENT CONTROL NOTES

- THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATER COURSE, DURING CONSTRUCTION ACTIVITIES; THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, INSTALLING SILT FENCES AND OTHER EFFECTIVE SEDIMENT TRAPS, AND INSTALLING AND MAINTAINING MUD MATS FOR OUTGOING CONSTRUCTION TRAFFIC DURING CONSTRUCTION ACTIVITIES.
- PREVENT SOIL LOSS DURING CONSTRUCTION (BY STORM WATER RUNOFF OR WIND EROSION).
- PREVENT SEDIMENTATION OF STORM SEWERS AND RECEIVING STREAMS.
- PREVENT AIR POLLUTION FROM DUST AND PARTICULATE MATTER.
- INSTALL FILTER BAG INSERT IN ALL STORM MANHOLES AND CATCH BASINS IMPACTED DURING CONSTRUCTION, INCLUDING CATCH BASINS IN THE RIGHT OF WAY.
- SEDIMENT AND EROSION CONTROL MEASURES MAY BE MODIFIED IN THE FIELD AT THE DISCRETION OF THE TOWNSHIP OF NORTH DUNDAS INSPECTOR OR CONSERVATION AUTHORITY.
- STORM WATER PUMPED INTO CITY SERVICE SHALL FLOW THROUGH A FILTER SOCK.
- THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENTATION CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
- CONTRACTOR TO PROVIDE SNOW FENCE PROTECTION FOR EXISTING TREES AS PER THE LANDSCAPE DRAWINGS.

LEGEND

- PROPERTY LINE
- EXISTING BUILDING
- SA EXISTING SANITARY SEWER
- ST EXISTING STORM SEWER
- W EXISTING WATERMAIN
- SA NEW SANITARY SEWER
- ST NEW STORM SEWER
- W NEW WATERMAIN
- NEW LIGHT DUTY ASPHALT (DET1/C3)
- NEW HEAVY DUTY ASPHALT (DET2/C3)
- NEW CONCRETE SIDEWALK
- NEW GRASS
- EX-CB EXISTING CATCHBASIN
- EX-CBMH EXISTING CATCHBASIN MANHOLE
- CB-# NEW CATCHBASIN
- CBMH-# NEW CATCHBASIN MANHOLE
- SAMH-# NEW SANITARY MANHOLE
- STMH-# NEW STORM MANHOLE
- WV NEW WATER VALVE
- +54.83 EXISTING GRADE
- +54.76 NEW GRADE
- 2.1% NEW SLOPE
- OVERLAND FLOW ROUTE

THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

DESIGN PROFESSIONAL'S SEAL OR SIGNATURE IS EFFECTIVE ONLY AS TO THAT VERSION OF THIS DOCUMENT AS ORIGINALLY PUBLISHED BY DESIGN PROFESSIONAL. DESIGN PROFESSIONAL IS NOT RESPONSIBLE FOR ANY SUBSEQUENT MODIFICATION, CORRUPTION, OR UNAUTHORIZED USE OF SUCH DOCUMENT. TO VERIFY THE VALIDITY OR APPLICABILITY OF THE SEAL OR SIGNATURE, CONTACT DESIGN PROFESSIONAL.



11	2025-05-16	DN / WV	SOUMISSION POUR CONTROL DU SITE R3
10	2025-04-10	DN / LA	ISSUED FOR CONSTRUCTION - SI #001
9	2025-03-25	DN / WV	SOUMISSION POUR CONTROL DU SITE R2
8	2025-01-13	DN / ZB	ISSUED FOR TENDER
7	2024-12-20	DN / ZB	100% SOUMISSION R2
6	2022-12-09	DN / ZB	SOUMISSION POUR CONTROL DU SITE
5	2022-10-28	DN / DS	100% SOUMISSION R1
4	2022-09-30	DN / DS	100% SOUMISSION
3	2022-09-02	DN / DS	99% SOUMISSION
2	2022-06-17	DN / DS	60% SOUMISSION
1	2022-03-04	DN / RW	PRÉLIMINAIRE 30%
No.	YYYY-MM-DD	Eng./Drt.	Revision Comments



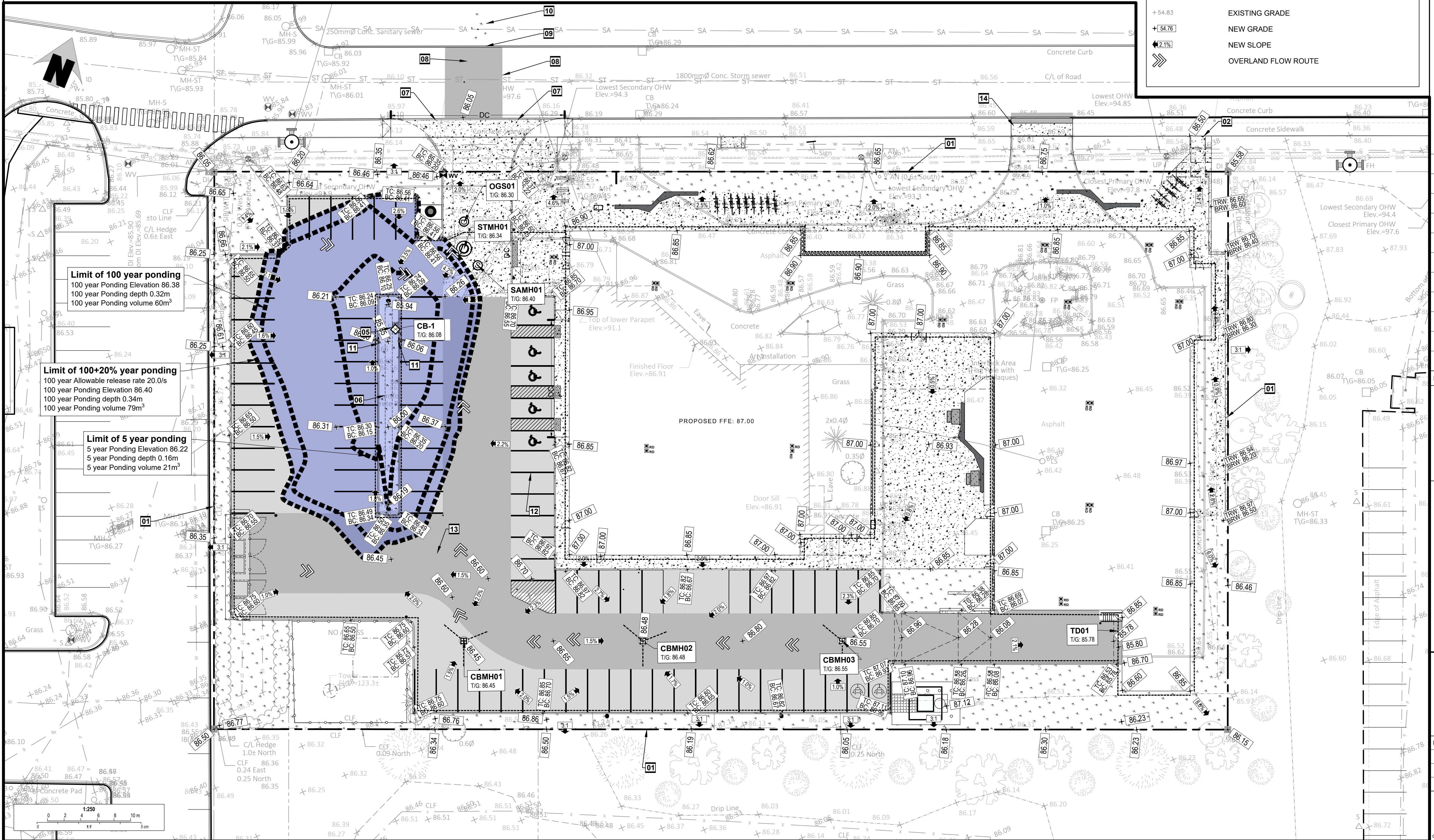
MIFO
6600 CARRIÈRE STREET,
OTTAWA, ONTARIO
SITE GRADING AND DRAINAGE,
EROSION AND SEDIMENT
CONTROL PLAN

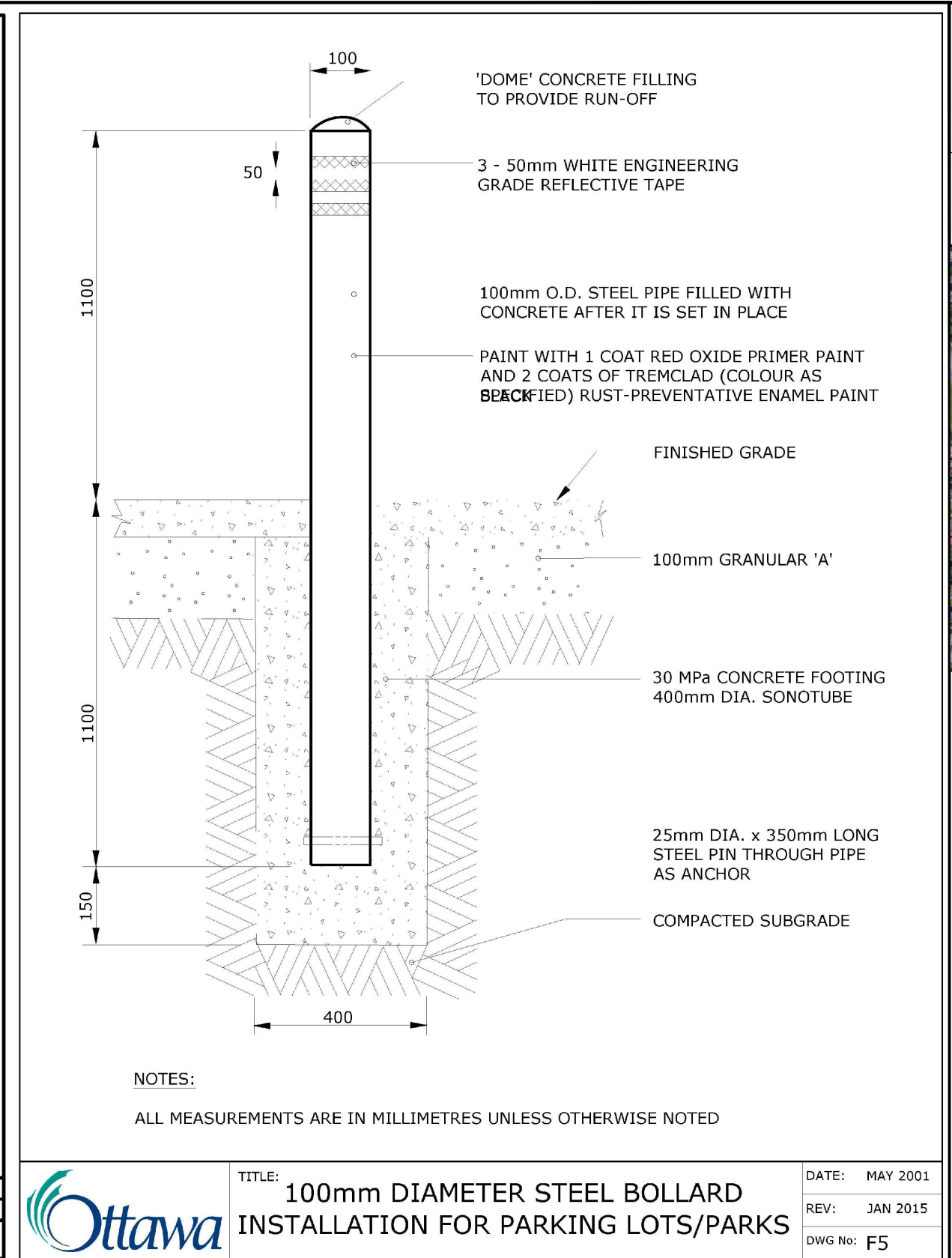
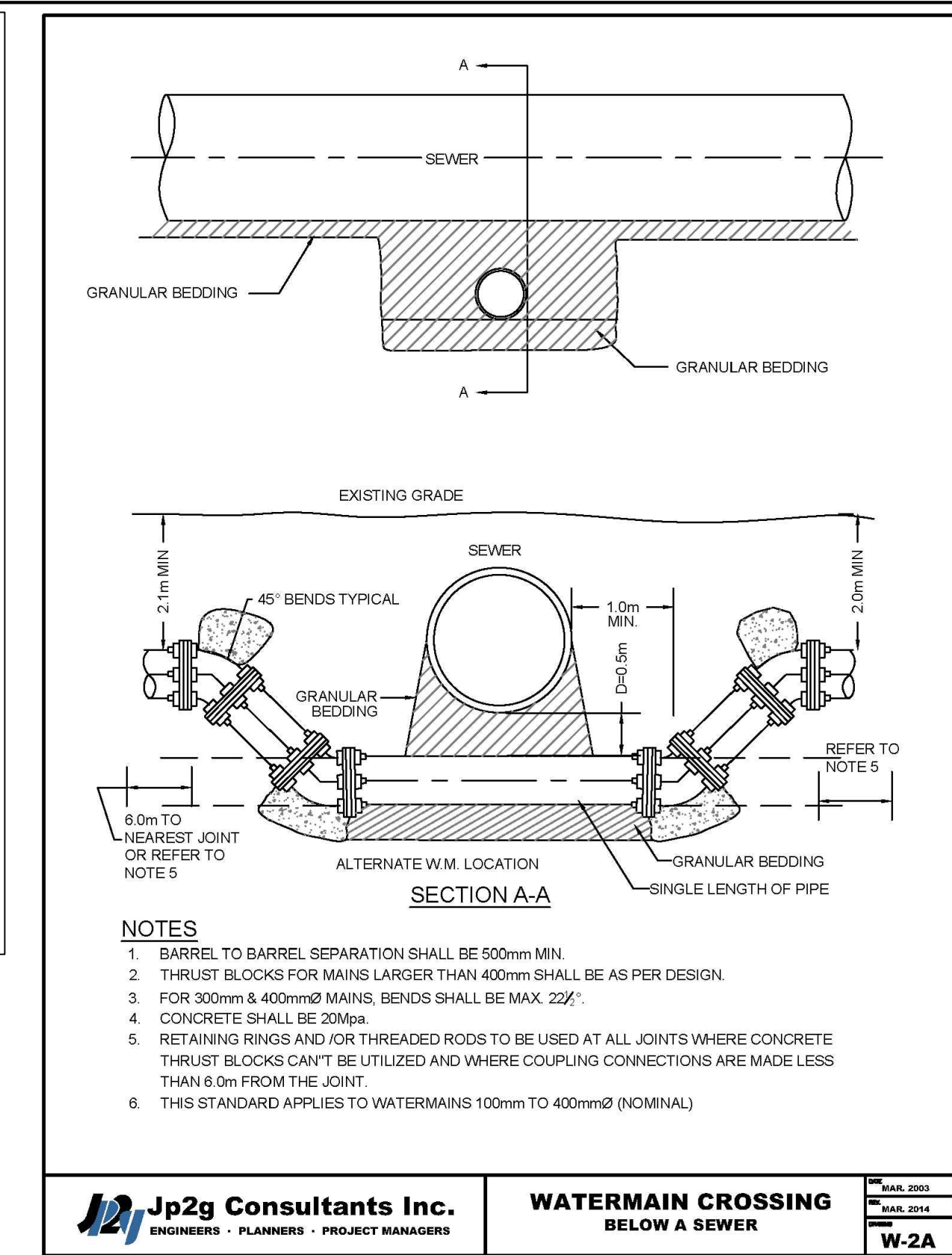
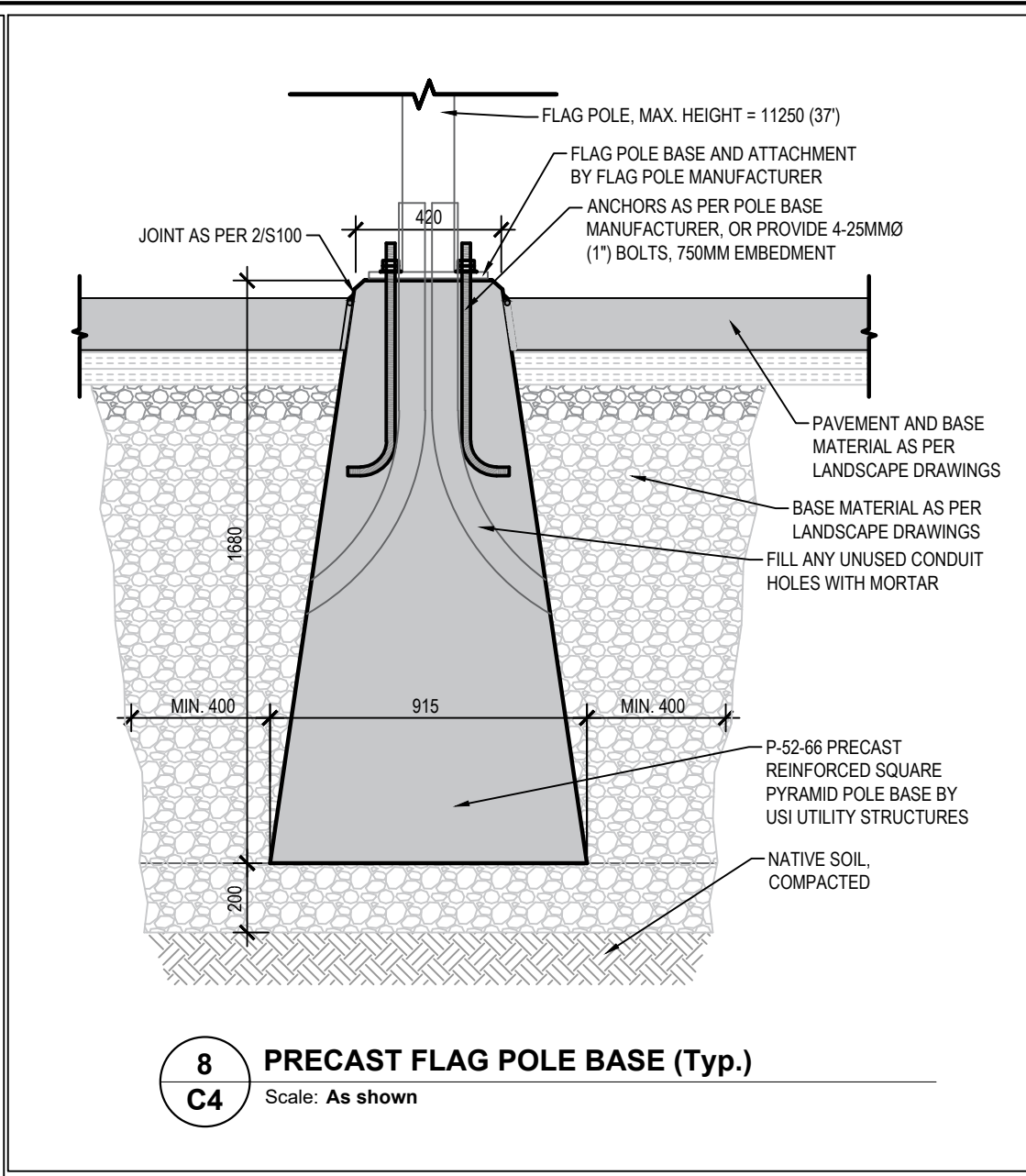
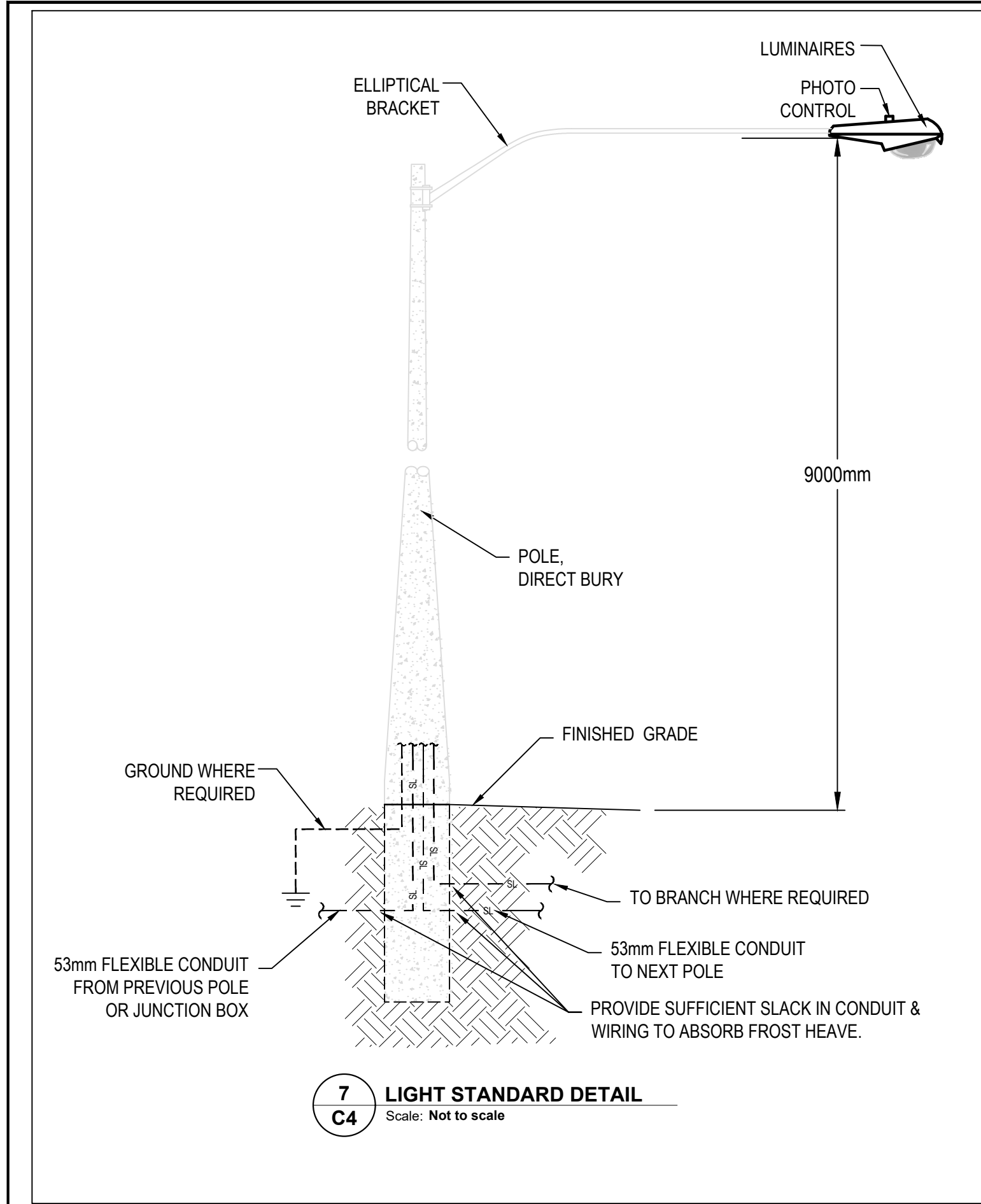
Jp2g Consultants Inc.
ENGINEERS • PLANNERS • PROJECT MANAGERS

12 INTERNATIONAL DRIVE, PEMBROKE, ON
Phone: (613)735-2507, Fax: (613)735-4513
1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON
Phone: (613)628-7800, Fax: (613)628-2600

Designed : WV	Project No. : 21-5089A
Drafted : WV	Revision Date : 2025-04-10
Checked : DN	Approved : DN
Scale : 1:250	21-5089A

C2





THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

DESIGN PROFESSIONAL'S SEAL OR SIGNATURE IS EFFECTIVE ONLY AS TO THAT VERSION OF THIS DOCUMENT AS ORIGINALLY PUBLISHED BY DESIGN PROFESSIONAL. DESIGN PROFESSIONAL IS NOT RESPONSIBLE FOR ANY SUBSEQUENT MODIFICATION, CORRUPTION, OR UNAUTHORIZED USE OF SUCH DOCUMENT. TO VERIFY THE VALIDITY OR APPLICABILITY OF THE SEAL OR SIGNATURE, CONTACT DESIGN PROFESSIONAL.

Site Location

Revision Table:

No.	DATE	BY	REVISION
11	2025-05-16	DN / WV	SOUMISSION POUR CONTROL DU SITE R3
10	2025-04-10	DN / LA	ISSUED FOR CONSTRUCTION - SI #001
9	2025-03-25	DN / WV	SOUMISSION POUR CONTROL DU SITE R2
8	2025-01-13	DN / ZB	ISSUED FOR TENDER
7	2024-12-20	DN / ZB	100% SOUMISSION R2
6	2022-12-09	DN / ZB	SOUMISSION POUR CONTROL DU SITE
5	2022-10-28	DN / DS	100% SOUMISSION R1
4	2022-09-30	DN / DS	100% SOUMISSION
3	2022-09-02	DN / DS	99% SOUMISSION
2	2022-06-17	DN / DS	60% SOUMISSION
1	2022-03-04	DN / RW	PRÉLIMINAIRE 30%

No. YYYY-MM-DD Eng./Drt. Revision Comments

REGISTERED PROFESSIONAL ENGINEER
D. NGUYEN
100053149
MAY 16, 2025
PROVINCE OF ONTARIO

MIFO
6600 CARRIÈRE STREET,
OTTAWA, ONTARIO

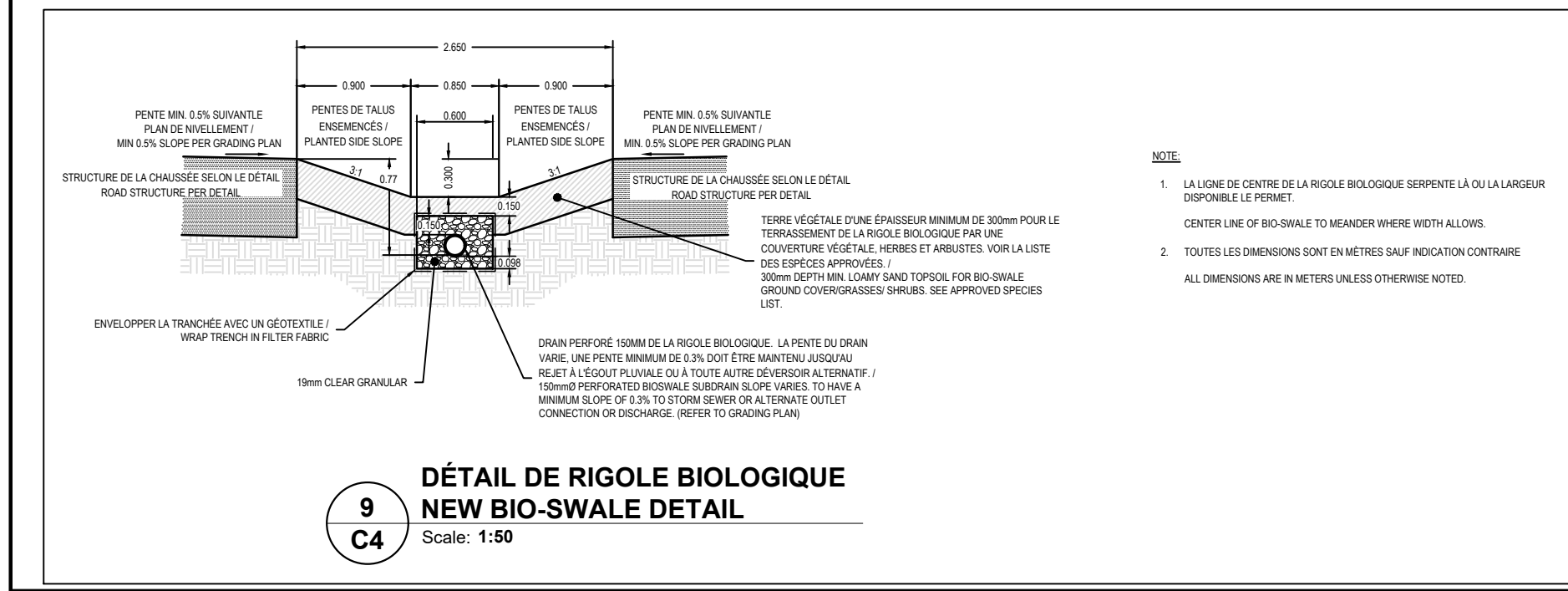
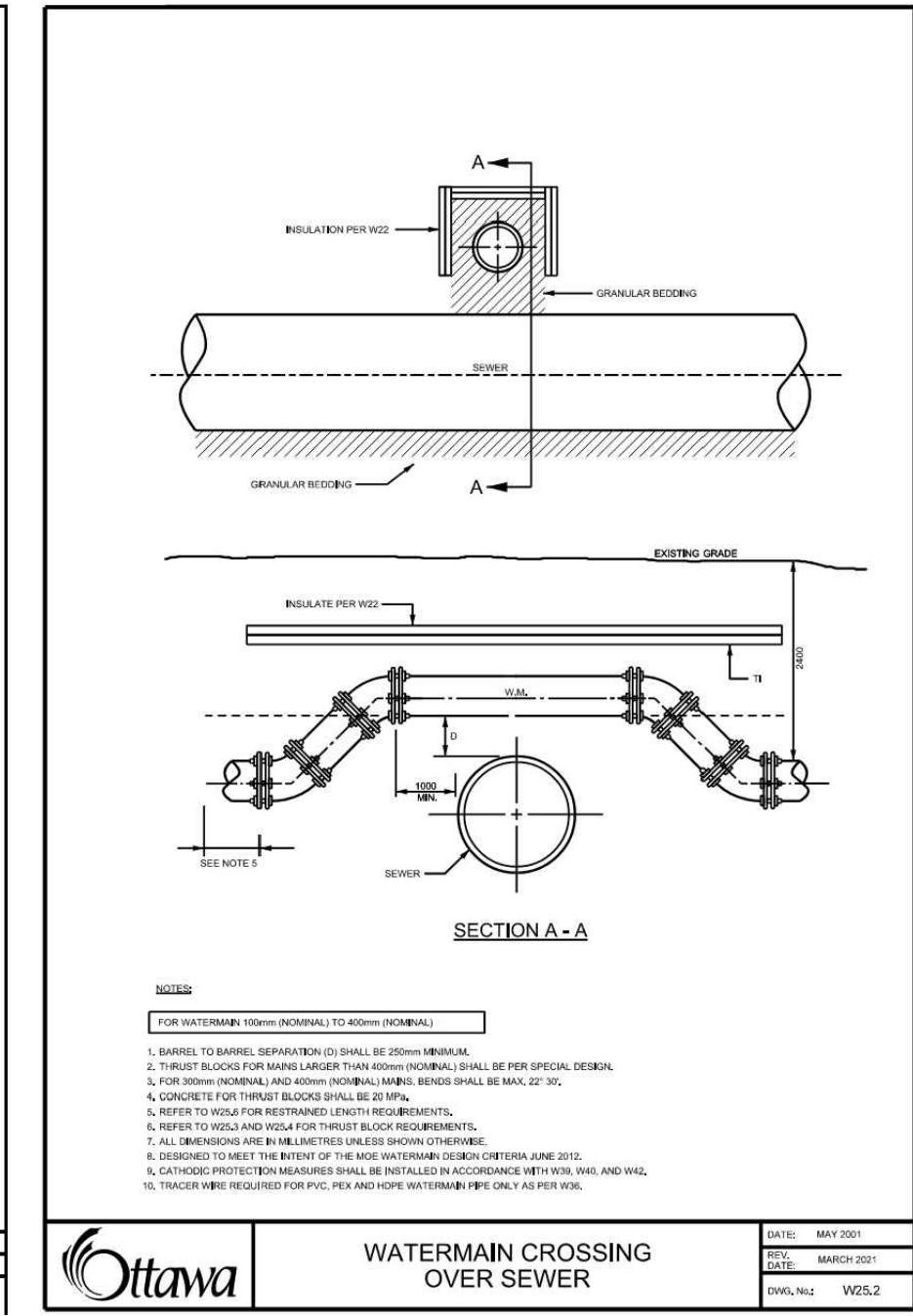
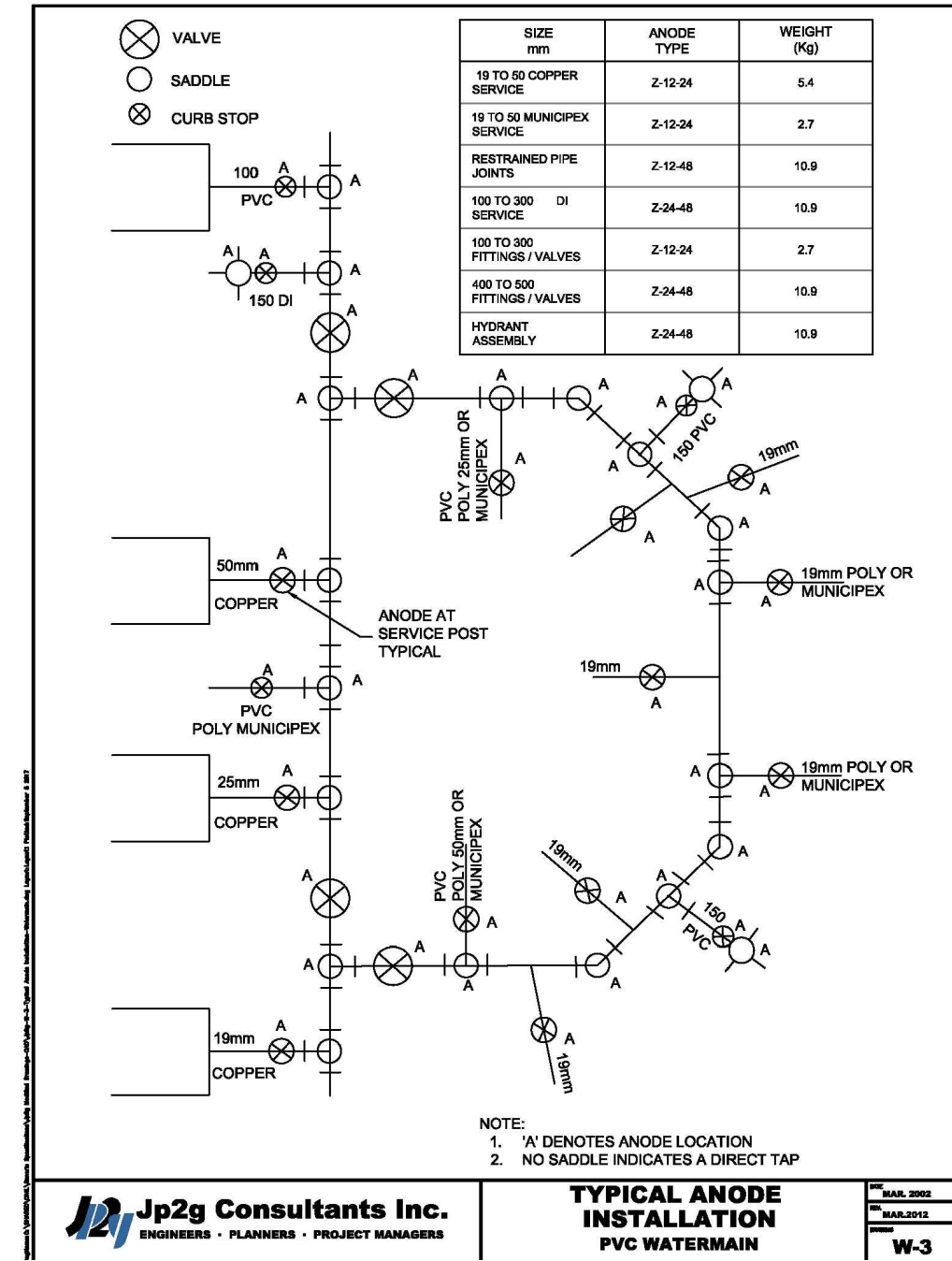
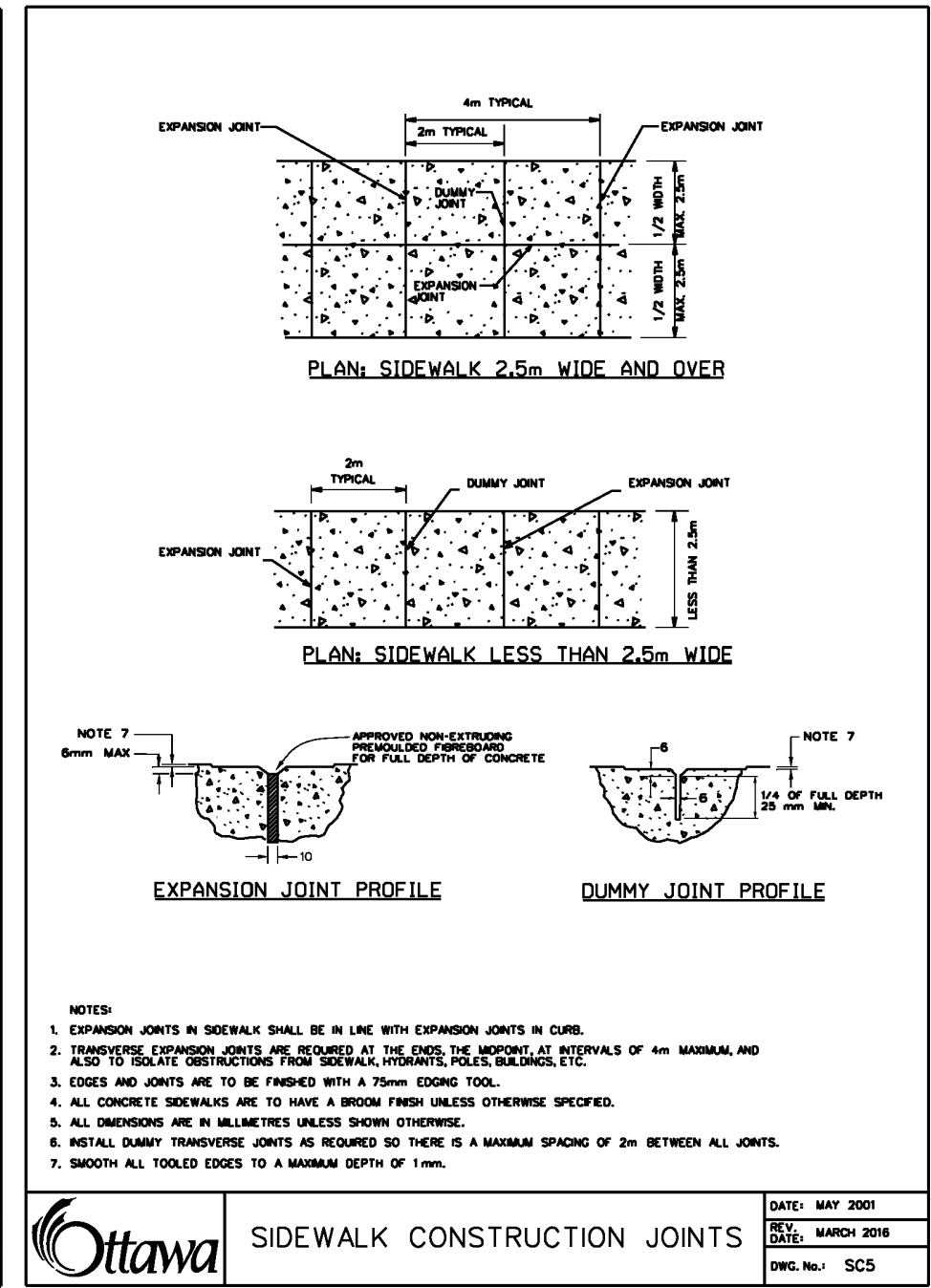
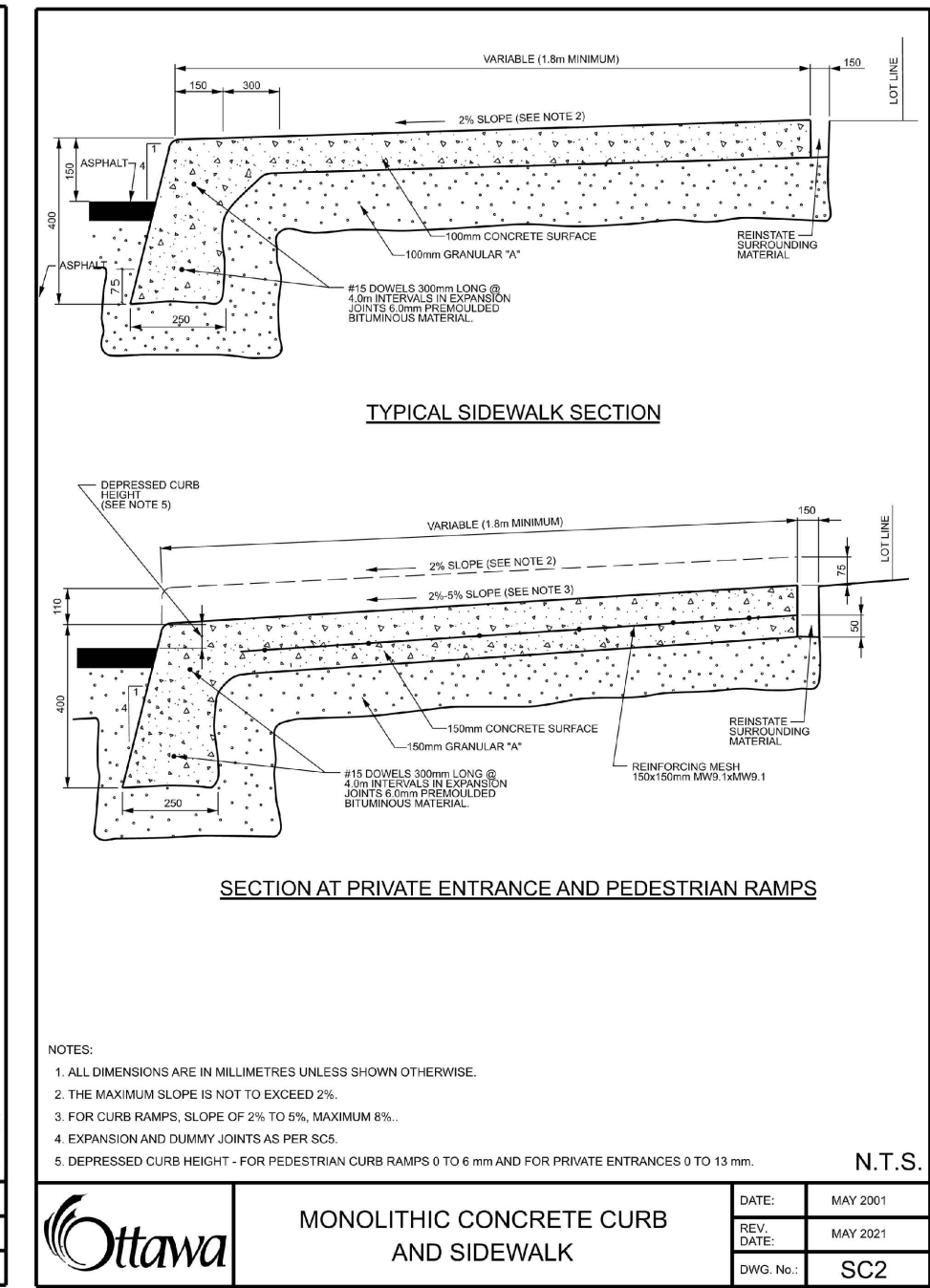
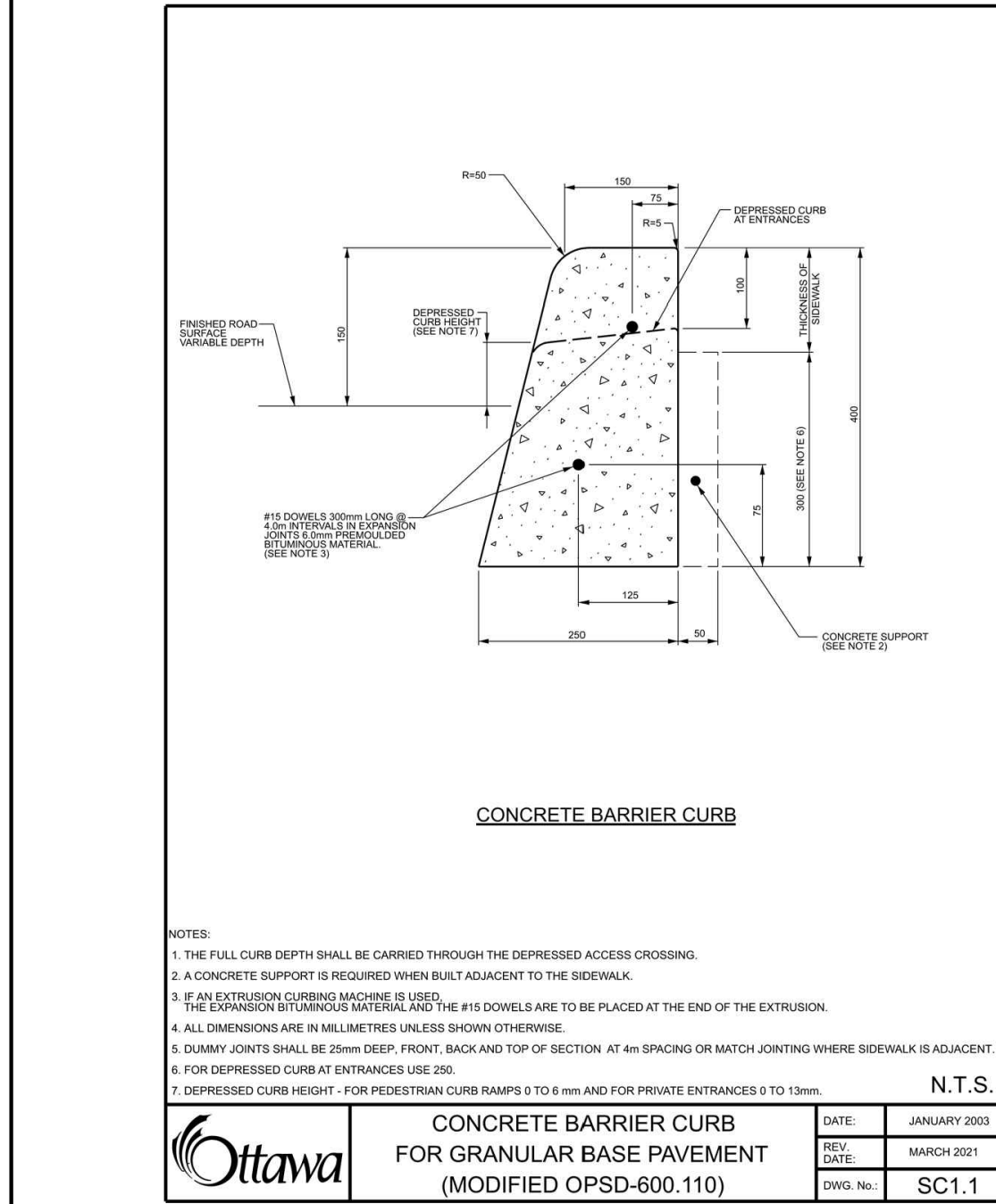
GENERAL NOTES AND DETAILS II

Jp2g Consultants Inc.
ENGINEERS • PLANNERS • PROJECT MANAGERS

12 INTERNATIONAL DRIVE, PEMBROKE, ON
Phone: (613)735-2507, Fax: (613)735-4513
1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON
Phone: (613)828-7800, Fax: (613)828-2600

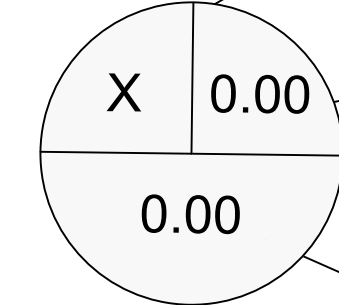
Designed by: **WV** Project No.: **21-5089A**
Drafted by: **WV** Revision Date: **2025-04-10**
Checked by: **DN** Approved by: **DN** Revision No.: **10**
Scale: **1:250** **21-5089A**

C4



CROSSING TABLE					
LOCATION	OVER / UNDER	T/G	INVERT	OBVERT	CLEARANCE (m)
	NEW STORM - NEW WATERMAIN	86.26	84.36 (STORM)	83.86 (WM)	0.50
	NEW SANITARY - NEW STORM SEWER	86.38	83.96 (SAN)	83.54 (STORM)	0.42
	NEW WATERMAIN - NEW STORM SEWER	86.50	84.33 (WM)	83.83 (STORM)	0.50

LEGEND



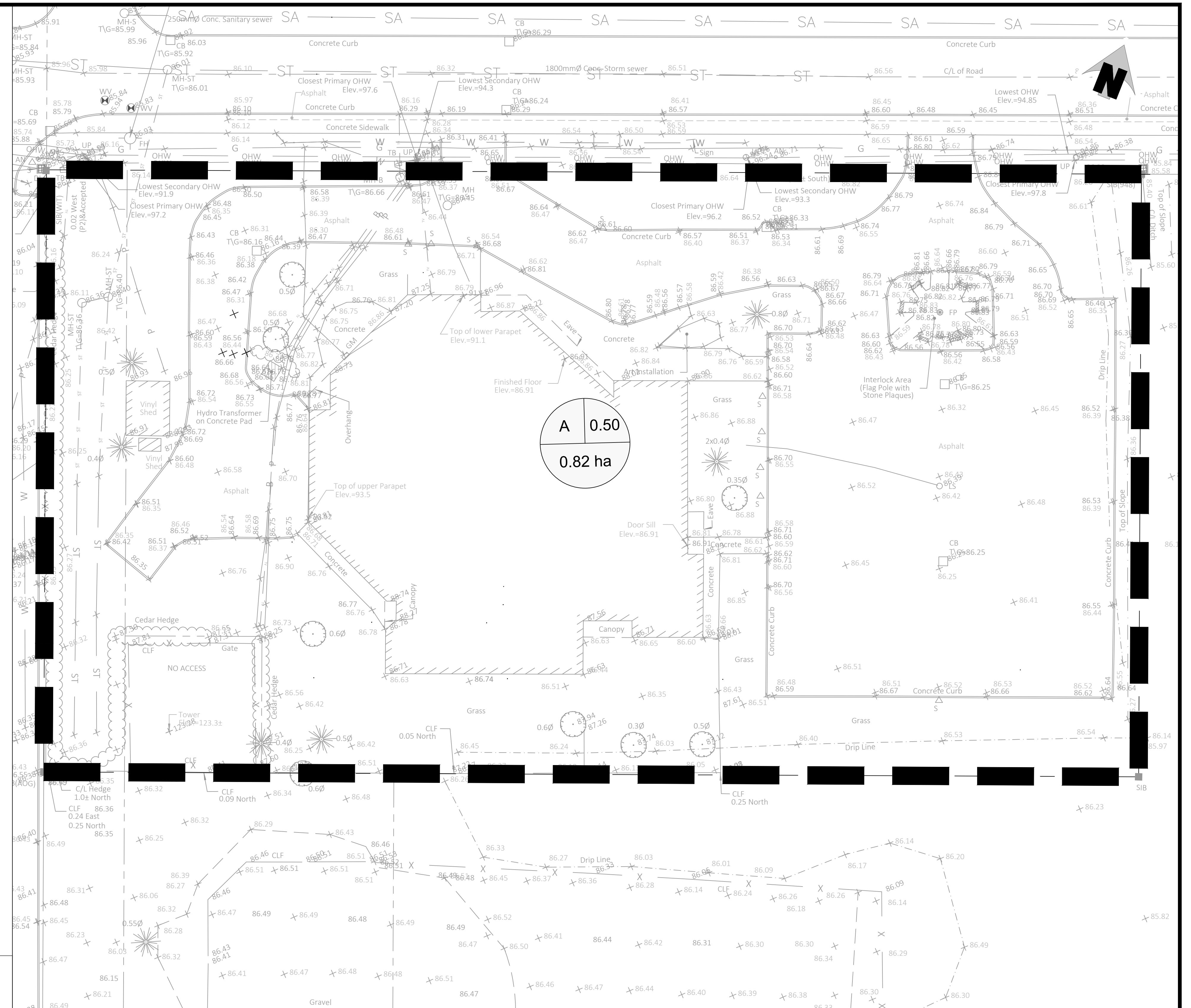
DRAINAGE AREA ID

WEIGHTED RUNOFF
COEFFICIENTDRAINAGE AREA
HECTARES

DRAINAGE AREA LIMIT

* ALLOWABLE RELEASE RATE = 108.8 l/s .

* C=0.5 IF CALCULATED PRE-DEVELOPMENT IS GREATER THAN 0.5
REFER TO PRE-CONSULTING MEETING NOTES : MAY 9th, 2022 .



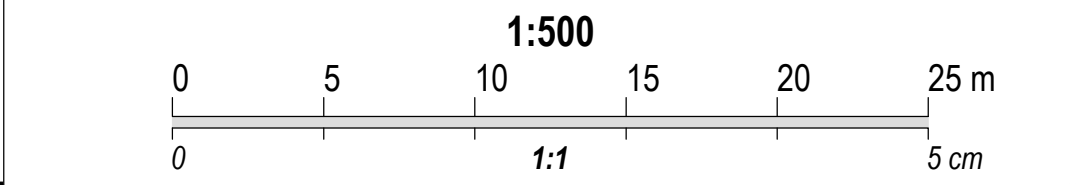
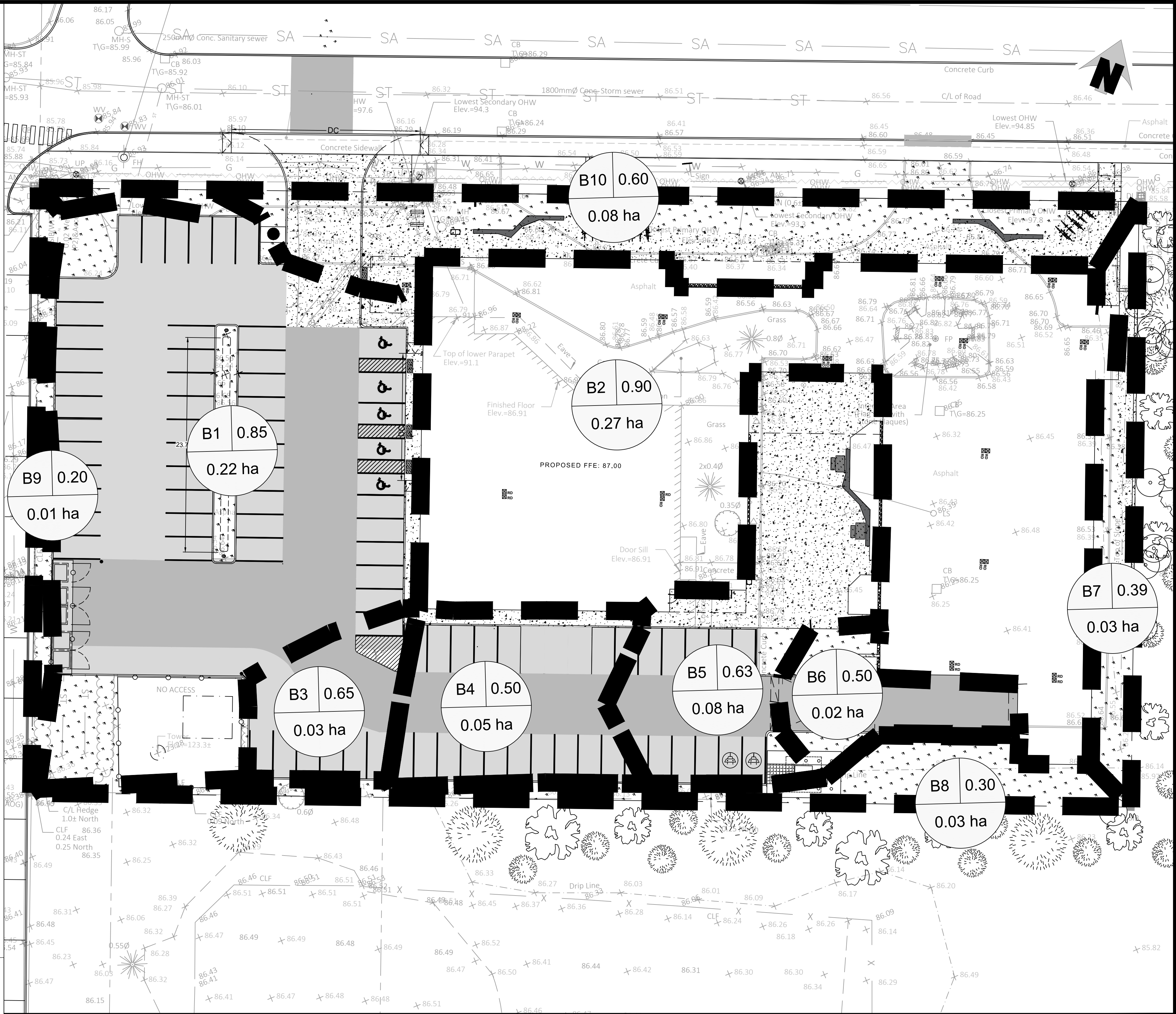
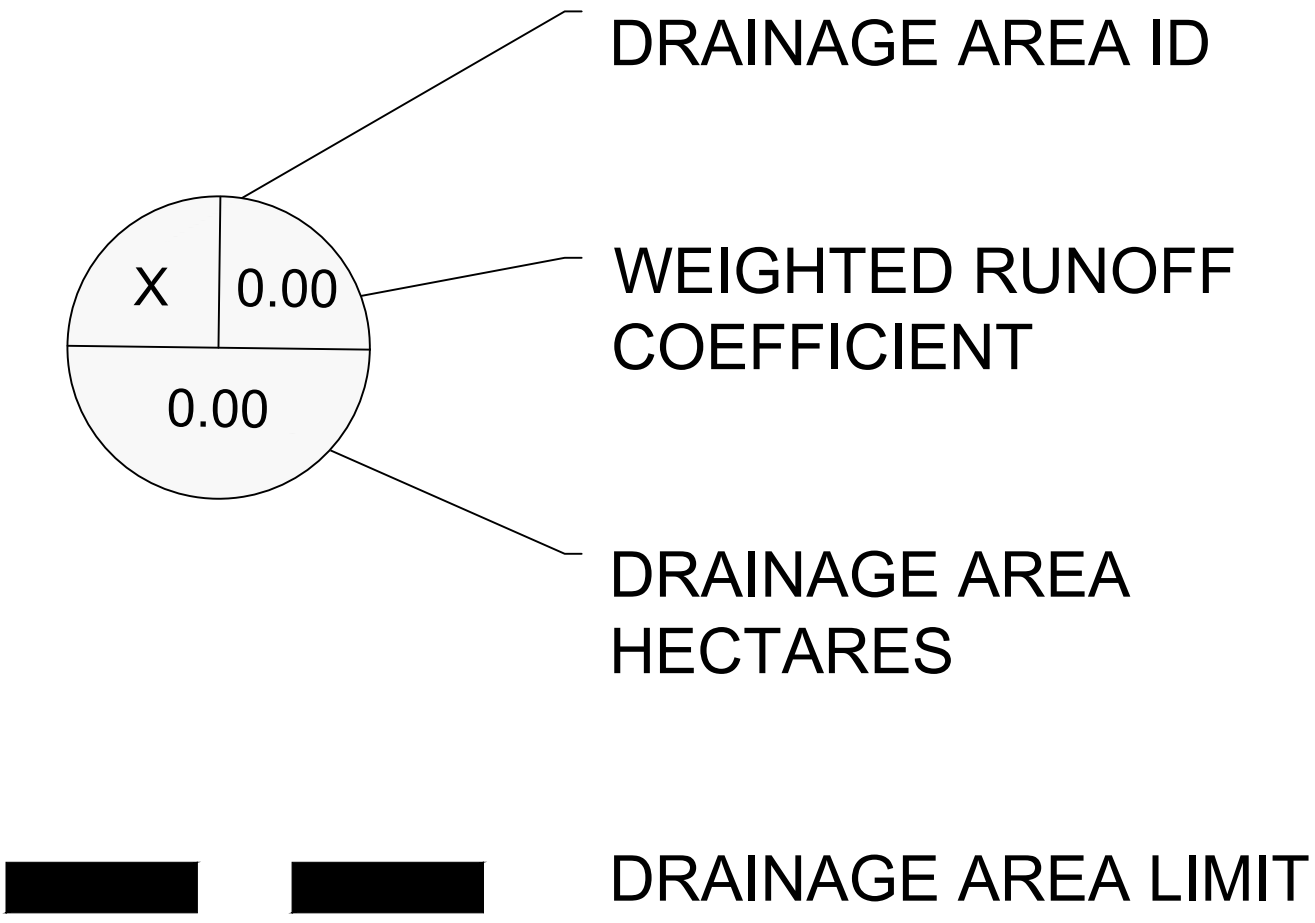
12 INTERNATIONAL DRIVE, PEMBROKE, ON 1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON
Phone: (613)735-2507, Fax:(613)735-4513 Phone: (613)828-7800, Fax: (613)828-2600

MIFO New Building
6600 Carriere Street, Ottawa ONTARIO

FIGURE 1 PRE-DEVELOPMENT DRAINAGE AREAS

DESIGNED: WV		PROJECT No.: 21-5089
DRAFTED: WV		REVISION DATE: 2025-05-16
CHECKED: AS	APPROVED: AS	REVISION No.: 3
SCALE: 1:500		

LEGEND



Jp2g Consultants Inc.
ENGINEERS • PLANNERS • PROJECT MANAGERS

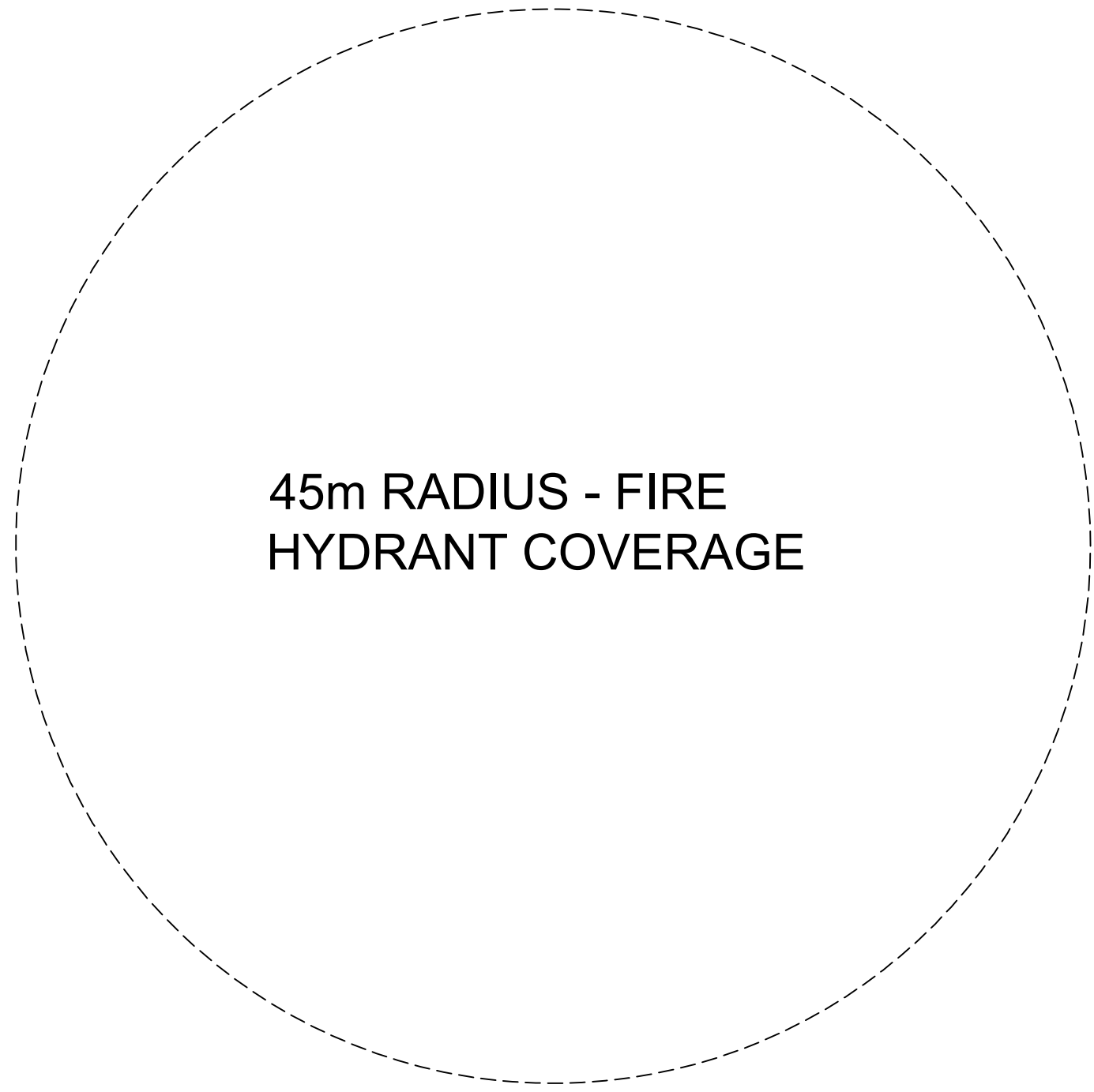
12 INTERNATIONAL DRIVE, PEMBROKE, ON
Phone: (613)735-2507, Fax: (613)735-4513

1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON
Phone: (613)828-7800, Fax: (613)828-2600

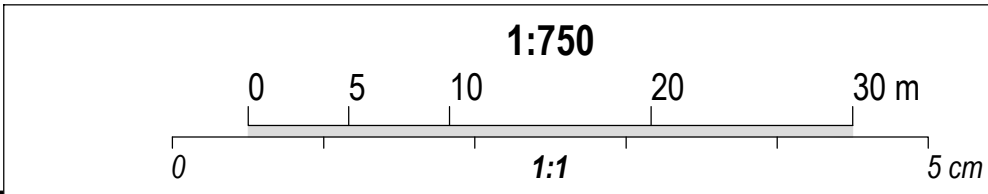
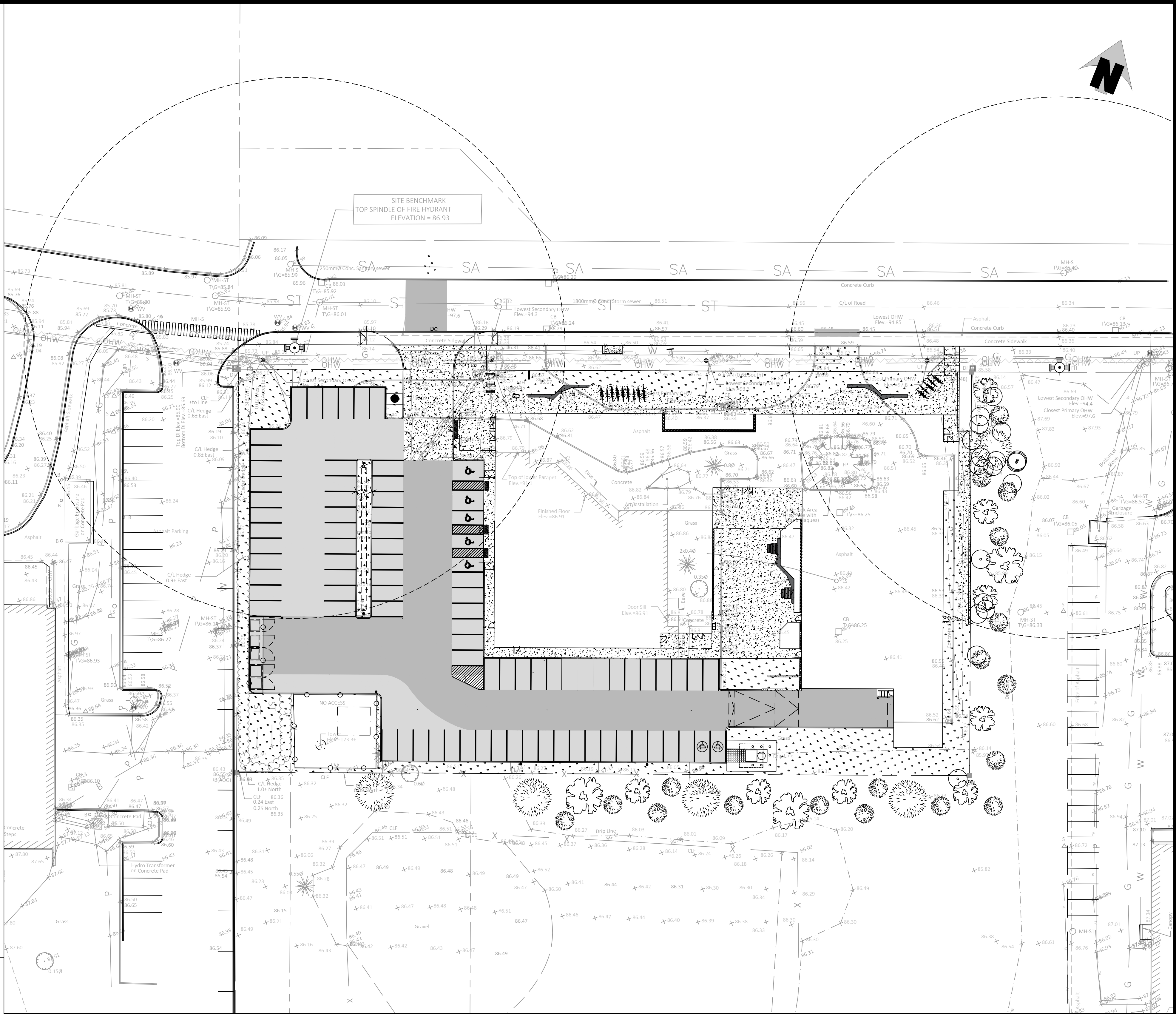
MIFO New Building
6600 Carriere Street, Ottawa ONTARIO

FIGURE 2 POST-DEVELOPMENT DRAINAGE AREAS

DESIGNED: WV		PROJECT No.: 21-5089
DRAFTED: WV		REVISION DATE: 2025-05-16
CHECKED: AS	APPROVED: AS	REVISION No.: 3
SCALE: 1:500		



45m RADIUS - FIRE
HYDRANT COVERAGE



Jp2g Consultants Inc.
ENGINEERS • PLANNERS • PROJECT MANAGERS

12 INTERNATIONAL DRIVE, PEMBROKE, ON
Phone: (613)735-2507, Fax: (613)735-4513
1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON
Phone: (613)828-7800, Fax: (613)828-2600

MIFO New Building
6600 Carriere Street, Ottawa ONTARIO

FIGURE 3 FIRE HYDRANT COVERAGE AREA

DESIGNED: WV	PROJECT No.: 21-5089A
DRAFTED: WV	REVISION DATE: 2025-05-16
CHECKED: AS	APPROVED: AS
SCALE: 1:500	REVISION No.: 3



Appendix B - Stormwater Management Calculations

Appendix B - Storm Sewer Design Sheet

B.1.1 - Allowable release rate

ID	Description	Type	Areas (m ²)		Total (m ²)	C _{pre-5-yr}	C _{pre-100-yr} *
			C _{0.90}	C _{0.20}			
A	Property Grounds	uncontrolled	4943	3236	8179	0.62	0.70
			4943	3236	8179	0.50	0.63

*including 25% increase as per City of Ottawa Sewer Design Guidelines

Estimated time of concentration, t_c = 10.0 minutes

As per Pre-Consultation Meeting, a C = 0.50 is to be used if the pre-development C is greater than 0.5

Based on Ottawa IDF curve, $i_{2\text{-years}}$ = $732.951 / (t_c + 6.199)^{0.810}$
 76.8 mm/hr

Total Area, A = 0.82 ha
 $Q_{\text{allowable (2-year)}}$ = 87.3 l/s ①

B.1.2 - Post-development release rate

ID	Description	Type	Areas (m ²)		Total (m ²)	C _{post-5-yr}	C _{post-100-yr} *
			C _{0.90}	C _{0.20}			
B1	Main Parking Lot (bioswale/CB1)	controlled	2041	164	2205	0.85	0.94
B2	Building Roof	controlled	2700	0	2700	0.90	1.00
B3	Rear Parking Lot (CBMH01)	controlled	172	95	267	0.65	0.73
B4	Rear Parking Lot (CBMH02)	controlled	204	276	480	0.50	0.57
B5	Rear Parking Lot (CBMH03)	controlled	486	298	784	0.63	0.71
B6	Trench Drain	controlled	102	136	238	0.50	0.57
B7	East Frontage	uncontrolled	70	185	254	0.39	0.46
B8	South Frontage	uncontrolled	48	292	340	0.30	0.36
B9	West Frontage	uncontrolled	0	107	105	0.20	0.25
B10	North Frontage	uncontrolled	459	347	806	0.60	0.68
		uncontrolled	577	931	1505	0.47	0.54
		Total	6282	1900	8179	0.74	0.83

*including 25% increase as per City of Ottawa Sewer Design Guidelines

Calculations for post-development runoff coefficient $C_{\text{post-5-yr (col. D)}}$ = (column A * 0.9 + column B * 0.2) / column C

$C_{\text{post-100-yr (col. E)}}$ = (column A * 1.0 + column B * 0.2*1.25) / column C

Note: 0.90 x 1.25 = 1.125, use max. 1.0

Calculations for average weighted runoff coefficient

$C_{\text{post-5-yr}}$ = 0.74

$C_{\text{post-100-yr}}$ = 0.83

Estimated time of concentration, t_c = 10.0 minutes

***As per City of Ottawa Sewer Design Guidelines (Section 5.4.5.2)

Based on Ottawa IDF curve, $i_{5\text{-years}}$ = $998.071 / (t_c + 6.053)^{0.814}$
 104.2 mm/hr

Based on Ottawa IDF curve, $i_{100\text{-years}}$ = $1735.688 / (t_c + 6.014)^{0.820}$
 178.6 mm/hr

B.1.2.1 - Uncontrolled overland surface flow

Total uncontrolled area, B7 - B10 0.151 ha
 5-year Runoff coefficient, $C_{\text{5-yr-uncontrolled}}$ 0.47
 100-year Runoff coefficient, $C_{\text{100-yr-uncontrolled}}$ 0.54

Uncontrolled overland surface Release Rate 5-year 20.4 l/s ②

Uncontrolled overland surface Release Rate 100-year 40.2 l/s ④

B.1.2.2 - Net-allowable release rate for storm sewers

$Q_{\text{net-allowable 5-year}}$ = 66.9 l/s ③ = ① - ②

* $Q_{\text{net-allowable 100-year}}$ = 47.1 l/s ⑤ = ① - ④ * Must be controlled to net-allowable 100-year

B.1.3 - Post-development Roof Drainage (B2)

B.1.3.1 - Estimated detention Roof

Area **0.270** ha
 5-year Runoff coefficient **0.90**
 100-year Runoff coefficient **1.00**
 Roof Drains **8.8** l/s

Table 1.3.1a - 5-year estimated detention on roof

	Time (minutes)	i _{5-years} (mm/hr)	Q _{actual} (l/s)	Q _{allowable} (l/s)	Q _{stored} (l/s)	V _{stored} (m ³)
peak V _{stored} →	10	104.2	70.4	8.8	61.6	37.0
	15	83.6	56.4	8.8	47.6	42.9
	20	70.3	47.5	8.8	38.7	46.4
	25	60.9	41.1	8.8	32.3	48.5
	30	53.9	36.4	8.8	27.6	49.7
	35	48.5	32.8	8.8	24.0	50.3
	40	44.2	29.8	8.8	21.0	50.5
	45	40.6	27.4	8.8	18.6	50.3
	50	37.7	25.4	8.8	16.6	49.9
	55	35.1	23.7	8.8	14.9	49.3
	60	32.9	22.3	8.8	13.5	48.4

Therefore **51** m³ estimated vard detention

Table 1.3.1b - 100-year estimated detention on roof

	Time (min)	i _{100-years} (mm/hr)	Q _{actual} (l/s)	Q _{allowable} (l/s)	Q _{stored} (l/s)	V _{stored} (m ³)
peak V _{stored} →	10	178.6	134.0	8.8	125.2	75.1
	15	142.9	107.3	8.8	98.5	88.6
	20	120.0	90.0	8.8	81.2	97.5
	25	103.8	77.9	8.8	69.1	103.7
	30	91.9	69.0	8.8	60.2	108.3
	35	82.6	62.0	8.8	53.2	111.7
	40	75.1	56.4	8.8	47.6	114.2
	45	69.1	51.8	8.8	43.0	116.2
	50	64.0	48.0	8.8	39.2	117.6
	55	59.6	44.8	8.8	36.0	118.6
	60	55.9	42.0	8.8	33.2	119.4

Therefore **119** m³ estimated vard detention

Table 1.3.1c - 100-year +20% estimated detention on roof

	Time (min)	i _{100-years} (mm/hr)	Q _{actual} (l/s)	Q _{allowable} (l/s)	Q _{stored} (l/s)	V _{stored} (m ³)
peak V _{stored} →	10	214.3	160.8	8.8	152.0	91.2
	15	171.5	128.7	8.8	119.9	107.9
	20	143.9	108.0	8.8	99.2	119.1
	25	124.6	93.5	8.8	84.7	127.1
	30	110.2	82.7	8.8	73.9	133.1
	35	99.1	74.4	8.8	65.6	137.7
	40	90.2	67.7	8.8	58.9	141.3
	45	82.9	62.2	8.8	53.4	144.2
	50	76.7	57.6	8.8	48.8	146.4
	55	71.5	53.7	8.8	44.9	148.2
	60	67.1	50.3	8.8	41.5	149.6

Therefore **150** m³ estimated vard detention

B.1.4 - Post-development onsite storage in Main Parking Lot (B1)

B.1.3.1 - Estimated detention

Area **0.221** ha
 5-year Runoff coefficient **0.85**
 100-year Runoff coefficient **0.94**
 Release Rate **20.0** l/s **calculated in Visual Otthymo

Table 1.4.1a - 5-year estimated detention in parking area

	Time (minutes)	i _{5-years} (mm/hr)	Q _{actual} (l/s)	Q _{allowable} (l/s)	Q _{stored} (l/s)	V _{stored} (m ³)
peak V _{stored} →	10	104.2	54.2	20.0	34.2	20.5
	15	83.6	43.4	20.0	23.4	21.1
	20	70.3	36.5	20.0	16.5	19.8

25	60.9	31.7	20.0	11.7	17.5
30	53.9	28.0	20.0	8.0	14.5
35	48.5	25.2	20.0	5.2	11.0
40	44.2	23.0	20.0	3.0	7.1
45	40.6	21.1	20.0	1.1	3.0
50	37.7	19.6	20.0	-0.4	-1.3
55	35.1	18.3	20.0	-1.7	-5.8
60	32.9	17.1	20.0	-2.9	-10.4

Therefore **21** m³ estimated vard detention

Table 1.4.1b - 100-year estimated detention in parking area

Time (min)	i _{100-years} (mm/hr)	Q _{actual} (l/s)	Q _{allowable} (l/s)	Q _{stored} (l/s)	V _{stored} (m ³)
10	178.6	103.3	20.0	83.3	50.0
15	142.9	82.7	20.0	62.7	56.4
20	120.0	69.4	20.0	49.4	59.3
peak V _{stored} → 25	103.8	60.1	20.0	40.1	60.2
30	91.9	53.2	20.0	33.2	59.7
35	82.6	47.8	20.0	27.8	58.4
40	75.1	43.5	20.0	23.5	56.4
45	69.1	40.0	20.0	20.0	53.9
50	64.0	37.0	20.0	17.0	51.0
55	59.6	34.5	20.0	14.5	47.9
60	55.9	32.4	20.0	12.4	44.5

Therefore **60** m³ estimated vard detention

Table 1.4.1c - 100-year + 20% estimated detention in parking area

Time (min)	i _{100-years} (mm/hr)	Q _{actual} (l/s)	Q _{allowable} (l/s)	Q _{stored} (l/s)	V _{stored} (m ³)
10	214.3	124.0	20.0	104.0	62.4
15	171.5	99.2	20.0	79.2	71.3
20	143.9	83.3	20.0	63.3	76.0
25	124.6	72.1	20.0	52.1	78.2
peak V _{stored} → 30	110.2	63.8	20.0	43.8	78.9
35	99.1	57.4	20.0	37.4	78.4
40	90.2	52.2	20.0	32.2	77.3
45	82.9	48.0	20.0	28.0	75.5
50	76.7	44.4	20.0	24.4	73.3
55	71.5	41.4	20.0	21.4	70.7
60	67.1	38.8	20.0	18.8	67.8

Therefore **79** m³ estimated vard detention

B.1.5 - Post-development onsite storage in Rear Parking Lot (B3 - B6)

B.1.5.1 - Estimated detention

Area	0.177	ha
5-year Runoff coefficient	0.58	
100-year Runoff coefficient	0.66	
Release Rate	18.3	l/s

Table 1.5.1a - 5-year estimated detention in parking area

Time (minutes)	i _{5-years} (mm/hr)	Q _{actual} (l/s)	Q _{allowable} (l/s)	Q _{stored} (l/s)	V _{stored} (m ³)
10	104.2	29.8	18.3	11.5	6.9
15	83.6	23.9	18.3	5.6	5.0
20	70.3	20.1	18.3	1.8	2.2
25	60.9	17.4	18.3	-0.9	-1.3
30	53.9	15.4	18.3	-2.9	-5.2
35	48.5	13.9	18.3	-4.4	-9.3
40	44.2	12.6	18.3	-5.7	-13.6
45	40.6	11.6	18.3	-6.7	-18.0
50	37.7	10.8	18.3	-7.5	-22.6
55	35.1	10.0	18.3	-8.3	-27.2
60	32.9	9.4	18.3	-8.9	-32.0

Therefore **7** m³ estimated vard detention

Table 1.5.1b - 100-year estimated detention in parking area

	Time (min)	$i_{100\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{\text{allowable}}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m ³)
peak $V_{\text{stored}} \rightarrow$	10	178.6	57.9	18.3	39.6	23.7
	15	142.9	46.3	18.3	28.0	25.2
	20	120.0	38.9	18.3	20.6	24.7
	25	103.8	33.6	18.3	15.3	23.0
	30	91.9	29.8	18.3	11.5	20.6
	35	82.6	26.8	18.3	8.5	17.8
	40	75.1	24.3	18.3	6.0	14.5
	45	69.1	22.4	18.3	4.1	11.0
	50	64.0	20.7	18.3	2.4	7.3
	55	59.6	19.3	18.3	1.0	3.4
	60	55.9	18.1	18.3	-0.2	-0.7

Therefore **25** m³ estimated vard detention

Table 1.3.1c - 100-year + 20% estimated detention in parking area

	Time (min)	$i_{100\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{\text{allowable}}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m ³)
peak $V_{\text{stored}} \rightarrow$	10	214.3	69.4	18.3	51.1	30.7
	15	171.5	55.6	18.3	37.3	33.5
	20	143.9	46.6	18.3	28.3	34.0
	25	124.6	40.4	18.3	22.1	33.1
	30	110.2	35.7	18.3	17.4	31.4
	35	99.1	32.1	18.3	13.8	29.0
	40	90.2	29.2	18.3	10.9	26.2
	45	82.9	26.8	18.3	8.5	23.1
	50	76.7	24.9	18.3	6.6	19.7
	55	71.5	23.2	18.3	4.9	16.1
	60	67.1	21.7	18.3	3.4	12.4

Therefore **34** m³ estimated vard detention

B.1.6 - Post-development onsite storage in Rear Parking Lot (B3 - B6)

B.1.5.1 - Estimated detention

Area **0.177** ha
 5-year Runoff coefficient **0.58**
 100-year Runoff coefficient **0.66**
 *Release Rate **9.15** l/s

*Release rate being reduced to half to compensate for less than max head over the course of a storm event. Storage calculations shown below

Table 1.5.1a - 5-year estimated detention in parking area

	Time (minutes)	$i_{5\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{\text{allowable}}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m ³)
peak $V_{\text{stored}} \rightarrow$	10	104.2	29.8	9.2	20.7	12.4
	15	83.6	23.9	9.2	14.7	13.3
	20	70.3	20.1	9.2	10.9	13.1
	25	60.9	17.4	9.2	8.3	12.4
	30	53.9	15.4	9.2	6.3	11.3
	35	48.5	13.9	9.2	4.7	9.9
	40	44.2	12.6	9.2	3.5	8.4
	45	40.6	11.6	9.2	2.5	6.7
	50	37.7	10.8	9.2	1.6	4.9
	55	35.1	10.0	9.2	0.9	3.0
	60	32.9	9.4	9.2	0.3	1.0

Therefore **13** m³ estimated vard detention

Table 1.5.1b - 100-year estimated detention in parking area

	Time (min)	$i_{100\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{\text{allowable}}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m ³)
peak $V_{\text{stored}} \rightarrow$	10	178.6	57.9	9.2	48.7	29.2
	15	142.9	46.3	9.2	37.1	33.4
	20	120.0	38.9	9.2	29.7	35.7
	25	103.8	33.6	9.2	24.5	36.7
	30	91.9	29.8	9.2	20.6	37.1
	35	82.6	26.8	9.2	17.6	37.0
	40	75.1	24.3	9.2	15.2	36.5
	45	69.1	22.4	9.2	13.2	35.7

50	64.0	20.7	9.2	11.6	34.7
55	59.6	19.3	9.2	10.2	33.6
60	55.9	18.1	9.2	9.0	32.3

Therefore **37** m³ estimated yard detention

Table 1.3.1c - 100-year + 20% estimated detention in parking area

Time (min)	i _{100-years} (mm/hr)	Q _{actual} (l/s)	Q _{allowable} (l/s)	Q _{stored} (l/s)	V _{stored} (m ³)
10	214.3	69.4	9.2	60.3	36.2
15	171.5	55.6	9.2	46.4	41.8
20	143.9	46.6	9.2	37.5	45.0
25	124.6	40.4	9.2	31.2	46.8
30	110.2	35.7	9.2	26.6	47.8
35	99.1	32.1	9.2	23.0	48.2
40	90.2	29.2	9.2	20.1	48.2
45	82.9	26.8	9.2	17.7	47.8
50	76.7	24.9	9.2	15.7	47.1
55	71.5	23.2	9.2	14.0	46.3
60	67.1	21.7	9.2	12.6	45.3

peak V_{stored} →

Therefore **48** m³ estimated yard detention

B.1.6 - Site storage

	5-year required (m3)	100-year required (m3)	100-year +20% required (m3)	Ponding depth (m)	Ponding area (m2)	Max available (m3)
Roof	51	119	150	0.15	2700	135
Main Parking Lot	21	60	79	0.34	860	79
Rear Parking Lot	13	37	48	NA	NA	41*

*refer to Underground storage calculations

Oversized Pipe Storage for Rear Parking Lot

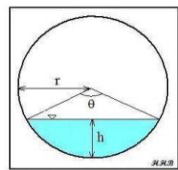


Figure 2. Partially Full Pipe Flow Parameters (Less than Half Full)

$$r = \frac{D}{2} \quad h = y$$

$$\theta = 2 \arccos \left(\frac{r-h}{r} \right)$$

$$A = \frac{r^2 (\theta - \sin \theta)}{2}$$

$$P = r \theta$$

$$R_h = A/P$$

Diameter (mm)	Pipe Length (m)	Actual Flow (LPS)	Full Flow (LPS)	Q/Qf
1050	47	18	1931	0.01

h (mm)	Theta	Pipe Area	Area of Flow (m2)	Area of Storage (m2)	Volume Storage (m3)
18	1	1	0.003	0.863	41

*Therefore 30m3 of storage is provided in the 900mm oversized pipe between CBMH03 and STMH01

B.1.7 - Release rate for site

Release rate

Allowable release rate (5-yr)	87.3	l/s	Section B.1.1
Allowable release rate (100-yr)	87.3	l/s	Section B.1.1
Uncontrolled flow (100-yr)	40.2	l/s	Section B.1.2.1
Controlled release rate at roof drain (100yr)	8.8	l/s	Section B.1.2.3
Controlled release rate main parking area (100-yr)	20.0	l/s	Section B.1.2.4
Controlled release rate rear parking area (100-yr)	18.3	l/s	Section B.1.2.5

Total release rate (100-yr)	87.3	l/s
Total release rate (100-yr) < Allowable release rate (5-yr)	OK	

STORM SEWER DESIGN SHEET

LOCATION				CONTRIBUTING AREA									FLOW				STORM SEWER DESIGN									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	15	16	18	21	22	23	24	25	26	27	28	29
Note	FROM	TO	AREA ID	SEWER TYPE (Lateral or Trunk)	HARD AREA (A1) (ha)	HARD RUNOFF COEFF. (C1) (--)	SOFT AREA (A2) (ha)	SOFT RUNOFF COEFF. (C2) (--)	TOTAL AREA (A3) (ha)	WEIGHTED RUNOFF COEFF. (C3) (--)	SECTION (A3*C3) (ha)	ACC. SECTION (ha)	TIME OF CONCEN. (Tc) (min)	RAINFALL INTENSITY 5-YR (I) (mm/hr)	RAINFALL INTENSITY 100-YR (I) (mm/hr)	FLOW 5-YR (L/s)	LENGTH (m)	SLOPE (%)	DIA. (mm)	FULL FLOW CAPACITY (L/s)	FULL FLOW vs. ACTUAL FLOW (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW IN PIPE (min)	TIME OF CONCEN AFT. PIPE (min)	FALL IN PIPE SECTION (m)	COMMENTS
Depressed Entrance	Trench Drain	CBMH03	B6	Lateral	0.01	0.90	0.01	0.20	0.02	0.50	0.012	0.012	10.00	104.193	178.559	3.45	33.0	2.00%	300	136.76	3%	1.93	0.28	10.28	0.66	
Parking Lot	CBMH03	CBMH02	B5	Trunk	0.05	0.90	0.03	0.20	0.08	0.63	0.050	0.062	10.00	104.193	178.559	17.84	24.0	0.50%	300	68.38	26%	0.97	0.41	10.41	0.12	
Parking Lot	CBMH02	CBMH01	B4	Trunk	0.02	0.90	0.03	0.20	0.05	0.50	0.024	0.086	10.00	104.193	178.559	24.77	21.5	0.50%	300	68.38	36%	0.97	0.37	10.37	0.11	
Parking Lot	CBMH-1	STMH01	B3	Trunk	0.02	0.90	0.01	0.20	0.03	0.65	0.017	0.103	10.00	104.193	178.559	18.30	47.0	0.50%	1050	1930.91	1%	2.23	0.35	10.35	0.24	
Parking Lot	CB01	STMH01	B1	Lateral	0.20	0.90	0.02	0.20	0.22	0.85	0.187	0.290	10.35	102.373	175.410	20.00	12.5	2.00%	300	136.76	15%	1.93	0.11	10.46	0.25	
Roof Drains	Building	STMH01	B2	Lateral	0.27	0.90	0.00	0.20	0.27	0.90	0.243	0.243	10.00	104.193	178.559	8.80	16.5	2.00%	250	84.10	10%	1.71	0.16	10.16	0.33	
	STMH01	OGS01		Trunk								0.636	10.46	101.829	174.469	47.10	3.5	2.00%	300	136.76	34%	1.93	0.03	10.49	0.07	
	OGS01	Mun Conn.		Trunk								0.636	10.49	101.678	174.208	47.100	17.0	6.32%	300	243.10	19%	3.44	0.08	10.57	1.07	

ICD CONTROL

Notes:
Rainfall Data Source: Ottawa CDA RCS 5 Year
Mannings, n = 0.013

Designed By: W.V
Checked By: A.S

Date: 25/03/25
Revision:

Orifice Diameter Calculation

Design Parameters*

Pipe Area Formula: $A = Q/(C(2gh)^{0.5})$

Pipe Diameter Formula: $A = (\pi d^2)/4$
 $d = \sqrt{4A/\pi}$

d = Orifice diameter (m)

A = Pipe area (m²)

C = 0.61

g = 9.81 (m/s²)

h = head of ponding from the centroid of the pipe invert (m)

Q = Max. flow through pipe (l/s)

CB-1

Elevation at Top of Ponding	Elevation at Pipe Invert	Size of Outlet Pipe	Head from Centroid (h)
(m)	(m)	(mm)	(m)
86.40	84.43	300.0	1.819

Max Flow (Q)	Coefficient (C)	g	Head from Centroid (h)	Pipe Area (A)	Orifice Diameter (d)	Orifice Diameter (d)
(l/s)	-	(m/s ²)	(m)	(m ²)	m	mm
20.0	0.61	9.8	1.82	0.005	0.084	84

STMH01

**to be placed before inlet side of STMH-01*

Elevation at Obvert of Oversized Pipe	Elevation of Orifice Invert	Orifice Size	Head from Centroid (h)
(m)	(m)	(mm)	(m)
83.79	82.60	90.0	1.145

Max Flow (Q)	Coefficient (C)	g	Head from Centroid (h)	Pipe Area (A)	Orifice Diameter (d)	Orifice Diameter (d)
(l/s)	-	(m/s ²)	(m)	(m ²)	m	mm
18.3	0.61	9.8	1.15	0.006	0.090	90

** SIMULATION:120% of 100 year storm **

|Bioretention(0034)| OUTFLOW: OFF UNDERDRAIN: ON
|IN= 2--> OUT= 3
DT= 5.0 min

SURFACE PONDING LAYER:

Max. Ponding Storage(cu.m.)= 127.61

STAGE (m)	AREA (m2)	STAGE (m)	AREA (m2)
0.000	22.551	0.500	564.000
0.150	70.304	0.550	794.000
0.250	104.000	0.560	860.000
0.400	282.000	0.000	0.000
0.450	393.000	0.000	0.000

MULCH LAYER:

Depth (m)= 0.15 Porosity = 0.20
Maximum Mulch layer Volume (cu.m.)= 0.61

ENGINEERED SOIL LAYER:

Soil moisture = 0.30 Depth (m)= 0.15
width (m)= 0.85 Length (m)= 23.78
Porosity = 0.40 Infiltration (m/hr)= 0.0150
Maximum Engineered Soil layer Volume(cu.m.)= 1.21

STORAGE LAYER:

Depth (m)= 0.15 Porosity = 0.40
Seepage (m/hr)= 0.0130
Maximum Storage layer Volume(cu.m.)= 1.21

UNDERDRAIN LAYER:

DEPTH (m)	DISCHARGE (cms)	DEPTH (m)	DISCHARGE (cms)
0.000	0.000	0.600	0.010
0.100	0.002	0.700	0.010
0.200	0.005	0.800	0.011
0.300	0.006	0.900	0.012
0.400	0.007	1.000	0.013
0.500	0.009	0.000	0.000

TOTAL AVAILABLE STORAGE:

TOTAL STORAGE=Surface Ponding + Mulch Layer + Engineered soil +Storage Layer(cu.m.)=

NATIVE SOIL LAYER:

Infiltration (m/hr)= 0.0015

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW:ID= 2	0.22	0.115	2.33	85.45
UNDERDRAIN:ID= 4	0.15	0.000	4.42	78.46
OVERFLOW:ID= 3	0.08	0.019	2.58	78.46

Volume Reduction Rate[(RVin-RVout)/RVin] (%)= 8.18
Time to reach Max Ponding storage (Hr)= 4.33
Volume of water for drawdown in LID (cu.m.)= 129.53
Volume of Max. Water Storage (cu.m.)= 0.80
Maximum Surface Ponding And Mulch vol(cu.m.)= 128.21
Maximum Engineered Soil Volume (cu.m.)= 1.21
Surface Ponding And Mulch Drawdown Time(Hr)= 485.17
Engineered Soil Drawdown time (Hr)= 489.75
Calculated Drawdown Time (Hr)= 516.00

** SIMULATION:25mm **

|Bioretention(0034)| OUTFLOW: OFF UNDERDRAIN: ON
|IN= 2--> OUT= 3
DT= 5.0 min

SURFACE PONDING LAYER:

Max. Ponding Storage(cu.m.)= 127.61

STAGE (m)	AREA (m2)	STAGE (m)	AREA (m2)
0.000	22.551	0.500	564.000
0.150	70.304	0.550	794.000
0.250	104.000	0.560	860.000
0.400	282.000	0.000	0.000

0.450 393.000 | 0.000 0.000

MULCH LAYER:

Depth (m)= 0.15 Porosity = 0.20
Maximum Mulch layer Volume (cu.m.)= 0.61

ENGINEERED SOIL LAYER:

Soil moisture = 0.30 Depth (m)= 0.15
width (m)= 0.85 Length (m)= 23.78
Porosity = 0.40 Infiltration (m/hr) = 0.0150
Maximum Engineered Soil layer Volume(cu.m.)= 1.21

STORAGE LAYER:

Depth (m)= 0.15 Porosity = 0.40
Seepage (m/hr) = 0.0130
Maximum Storage layer volume(cu.m.)= 1.21

UNDERDRAIN LAYER:

DEPTH (m)	DISCHARGE (cms)	DEPTH (m)	DISCHARGE (cms)
0.000	0.000	0.600	0.010
0.100	0.002	0.700	0.010
0.200	0.005	0.800	0.011
0.300	0.006	0.900	0.012
0.400	0.007	1.000	0.013
0.500	0.009	0.000	0.000

TOTAL AVAILABLE STORAGE:

TOTAL STORAGE=Surface Ponding + Mulch Layer + Engineered soil +Storage Layer(cu.m.)=

NATIVE SOIL LAYER:

Infiltration (m/hr) = 0.0015

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW:ID= 2	0.22	0.011	3.50	18.74
UNDERDRAIN:ID= 4	0.22	0.000	4.42	16.36
OVERFLOW:ID= 3	0.00	0.000	0.00	0.00

Volume Reduction Rate[(RVin-RVout)/RVin] (%)= 12.70
Time to reach Max Ponding storage (Hr)= 4.33
Volume of water for drawdown in LID (cu.m.)= 41.03
Volume of Max. Water Storage (cu.m.)= 0.80
Maximum Surface Ponding And Mulch Vol(cu.m.)= 40.02
Maximum Engineered Soil Volume (cu.m.)= 1.21
Surface Ponding And Mulch Drawdown Time(Hr)= 148.42
Engineered Soil Drawdown time (Hr)= 153.00
Calculated Drawdown Time (Hr)= 179.25

** SIMULATION:C100-6 **

| Bioretention(0034) | OUTFLOW: OFF UNDERDRAIN: ON
| IN= 2--> OUT= 3 |
DT= 5.0 min

SURFACE PONDING LAYER:

Max. Ponding Storage(cu.m.)= 127.61

STAGE (m)	AREA (m2)	STAGE (m)	AREA (m2)
0.000	22.551	0.500	564.000
0.150	70.304	0.550	794.000
0.250	104.000	0.560	860.000
0.400	282.000	0.000	0.000
0.450	393.000	0.000	0.000

MULCH LAYER:

Depth (m)= 0.15 Porosity = 0.20
Maximum Mulch layer Volume (cu.m.)= 0.61

ENGINEERED SOIL LAYER:

Soil moisture = 0.30 Depth (m)= 0.15
width (m)= 0.85 Length (m)= 23.78
Porosity = 0.40 Infiltration (m/hr) = 0.0150
Maximum Engineered Soil layer Volume(cu.m.)= 1.21

STORAGE LAYER:

Depth (m)= 0.15 Porosity = 0.40
Seepage (m/hr) = 0.0130
Maximum Storage layer volume(cu.m.)= 1.21

UNDERDRAIN LAYER:

DEPTH (m)	DISCHARGE (cms)	DEPTH (m)	DISCHARGE (cms)
0.000	0.000	0.600	0.010
0.100	0.002	0.700	0.010
0.200	0.005	0.800	0.011
0.300	0.006	0.900	0.012
0.400	0.007	1.000	0.013
0.500	0.009	0.000	0.000

TOTAL AVAILABLE STORAGE:

TOTAL STORAGE=Surface Ponding + Mulch Layer + Engineered soil +Storage Layer(cu.m.)=

NATIVE SOIL LAYER:

Infiltration (m/hr) = 0.0015

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW:ID= 2	0.22	0.094	2.33	70.01
UNDERDRAIN:ID= 4	0.18	0.000	4.42	63.03
OVERFLOW:ID= 3	0.04	0.005	3.25	63.03

Volume Reduction Rate[(RVin-RVout)/RVin] (%)= 9.96
Time to reach Max Ponding storage (Hr)= 4.33
Volume of water for drawdown in LID (cu.m.)= 129.52
Volume of Max. Water Storage (cu.m.)= 0.80
Maximum Surface Ponding And Mulch Vol(cu.m.)= 128.21
Maximum Engineered Soil Volume (cu.m.)= 1.21
Surface Ponding And Mulch Drawdown Time(Hr)= 485.17
Engineered Soil Drawdown time (Hr)= 489.75
Calculated Drawdown Time (Hr)= 516.00

** SIMULATION:C5-6 **

| Bioretention(0034) | OUTFLOW: OFF UNDERDRAIN: ON
| IN= 2--> OUT= 3 |
DT= 5.0 min

SURFACE PONDING LAYER:

Max. Ponding Storage(cu.m.)= 127.61

STAGE (m)	AREA (m2)	STAGE (m)	AREA (m2)
0.000	22.551	0.500	564.000
0.150	70.304	0.550	794.000
0.250	104.000	0.560	860.000
0.400	282.000	0.000	0.000
0.450	393.000	0.000	0.000

MULCH LAYER:

Depth (m)= 0.15 Porosity = 0.20
Maximum Mulch layer volume (cu.m.)= 0.61

ENGINEERED SOIL LAYER:

Soil moisture = 0.30 Depth (m)= 0.15
width (m)= 0.85 Length (m)= 23.78
Porosity = 0.40 Infiltration (m/hr) = 0.0150
Maximum Engineered Soil layer Volume(cu.m.)= 1.21

STORAGE LAYER:

Depth (m)= 0.15 Porosity = 0.40
Seepage (m/hr) = 0.0130
Maximum Storage layer volume(cu.m.)= 1.21

UNDERDRAIN LAYER:

DEPTH (m)	DISCHARGE (cms)	DEPTH (m)	DISCHARGE (cms)
0.000	0.000	0.600	0.010
0.100	0.002	0.700	0.010
0.200	0.005	0.800	0.011
0.300	0.006	0.900	0.012
0.400	0.007	1.000	0.013
0.500	0.009	0.000	0.000

TOTAL AVAILABLE STORAGE:

TOTAL STORAGE=Surface Ponding + Mulch Layer + Engineered soil +Storage Layer(cu.m.)=

NATIVE SOIL LAYER:

Infiltration (m/hr) = 0.0015

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW:ID= 2	0.22	0.033	2.17	39.58
UNDERDRAIN:ID= 4	0.22	0.000	4.42	34.79
OVERFLOW:ID= 3	0.00	0.000	0.00	0.00

Volume Reduction Rate[(RVin-RVout)/RVin] (%)=	12.10
Time to reach Max Ponding storage (Hr)=	4.33
Volume of water for drawdown in LID (cu.m.)=	87.39
Volume of Max. Water Storage (cu.m.)=	0.80
Maximum Surface Ponding And Mulch Vol(cu.m.)=	86.15
Maximum Engineered Soil Volume (cu.m.)=	1.21
Surface Ponding And Mulch Drawdown Time(Hr)=	324.83
Engineered Soil Drawdown time (Hr)=	329.42
Calculated Drawdown Time (Hr)=	355.67



Appendix C - Sanitary Servicing Calculations

C.1.1 - Peak Flow Design Based on Site Area

Designed ZB

Checked DN

[illegible]



Appendix D - Fire Flow Demand Calculations

Appendix D- Fire Flow Demand Requirements

D.1.1 - Fire Flow Demand Requirements (Fire Underwriters Survey (FUS Guidelines))

Fire Flow Formula

Estimated Fire Flow Formula: $F=220 \times C \times A^{1/2}$ (L/min)

F = Required fire flow (L/min)
C = Coefficient related to the type of construction
C_{1.5} = 1.5 for Type V (Mass Timber) or Type IV-A (Mass Timber)
C_{1.0} = 1.0 for Type III (Ordinary) or Type IV-C (Mass Timber)
C_{0.9} = 0.9 for Type IV-B (Mass Timber)
C_{0.8} = 0.8 for Type IV-A (Mass Timber) or Type II (Noncombustible)
C_{0.6} = 0.6 for Type I (Fire Resistive)
A = Total floor area in square metres

Designed ZB
Checked AS
Dwg. Reference C1
Jp2g project No 21-5089A

New School Building

Design Parameters*
Type of Building Construction = I (Noncombustible)
Floor Area*** = 2700.0 m²
Occupancy and Contents Class Limited combustible

Sprinkler System = Automatic sprinkler system conforming to NFPA standards

Sprinkler Building Coverage = Complete building coverage
Factor of Building Coverage X = 1
Number of Storeys = 3

Exposure Parameters*	West	North	East	South
Separation Distance =	over 30m	NA	over 30m	NA
Length of Exposed Wall =	NA	NA	NA	NA
Length-Height Factor =	NA	NA	NA	NA

			Adjustments (increases or decreases)												
Building Construction	Floor Area***	Coefficient	A	B = A +/- %		C = B x %		D = B x %					Final Adjusted Fire Flow	Final Adjusted Fire Flow	
			Fire Flow (F)	Occupancy	Sprinkler	Exposure***									
Type II (Noncombustible)	(m ²)		(L/min)	%	Adjusted Fire Flow(s) (L/min)	%	Fire Adjustment Flow(s) (L/min)	West	North	East	South	Total Exposure	Fire Adjustment Flow(s) (L/min)	E = B - C + D (L/min)*	(L/s)
	8,100.0	0.8	16,000.0	-0.15	13,600.0	50%	6,800.0	0%	0%	0%	0%	0%	0.0	7,000.0	116.7

*Water Supply for Public Protection (Fire Underwriters Survey, 2020).
***Including all stories



Appendix E - Boundary Conditions and Pressure Check

Boundary Conditions 6600 Carrière Street

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	16	0.27
Maximum Daily Demand	25	0.41
Peak Hour	44	0.74
Fire Flow Demand #1	7,000	116.67

Location



Results

Connection 1 – Carrière St.

Demand Scenario	Head (m)	Pressure ¹ (psi)
Maximum HGL	130.3	62.8
Peak Hour	127.3	58.6
Max Day plus Fire 1	115.7	42.0

Ground Elevation = 86.1 m

Disclaimer

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

D.1.2 - Existing Water Boundary Conditions

Water Demands

Average Daily Demand:	0.27 l/s
Maximum Daily Demand:	0.41 l/s
Maximum Hour Demand:	0.74 l/s
Fire Flow Demand:	116.67 l/s
Maximum Daily + Fire Flow Demand:	117.08 l/s

Design Parameters

Pipe Diameter:	150 mm
Pipe Material:	PVC
Pipe Length (total network):	74.6 m
Finished Floor Elevation:	87.00
Pavement (R.O.W.) Elevation:	86.10

Boundary Conditions

Max. HGL:	130.3 m
Min HGL:	127.3 m
Max. Day + Fire:	115.7 m

Boundary Condition Check

Check water pressure at municipal connection:

Min. HGL - Pavement elevation =	41.20 m
=	58.59 psi*
=	403.93 kPa*

*Normal operating pressure ranges between 345 kPa (50 psi) and 552 kPa (80 psi) under a condition of maximum daily flow as per City of Ottawa Design Guidelines - Water Distribution (Section 4.2.2)

Pressure at municipal connection

OK

Check water pressure at building connection (at max. hour demand):

Min. HGL - Finished floor elevation - Friction Loss** =	40.30 m
=	57.3 psi***
=	395.09 kPa***

**Friction loss calculated using the Hazen-Williams Equation

***Under maximum hourly demand conditions the pressures shall not be less than 276 kPa (40 psi) as per City of Ottawa Design Guidelines - Water Distribution (Section 4.2.2)

Pressure at building connection (at max. hour demand)

OK

Hazen-Williams Equation for Pressure Loss in Pipes

SI Units

Specified Data

l = length of pipe (m)	74.62	
c = Hazen-Williams roughness constant	150	
q = volume flow (liter/sec)	0.74	0.00074 m ³ /s
d_h = inside or hydraulic diameter (mm)	150	

Calculated Pressure Loss

f = friction head loss in mm of water per 100 m of pipe (mm H₂O per 100 m pipe) 1.66

f = friction head loss in kPa per 100 m of pipe (kPa per 100 m pipe) 0.02

Head loss (mm H₂O) 1.24

Head loss (kPa) 0.01

0.001239 METERS

Calculated Flow Velocity

v = flow velocity (m/s) 0.04

Material	Hazen-Williams Coefficient - c -
ABS - Acrylonite Butadiene Styrene	130
Aluminum	130 - 150
Asbestos Cement	140
Asphalt Lining	130 - 140
Brass	130 - 140
Brick sewer	90 - 100
Cast-Iron - new unlined (CIP)	130
Cast-Iron 10 years old	107 - 113
Cast-Iron 20 years old	89 - 100
Cast-Iron 30 years old	75 - 90
Cast-Iron 40 years old	64-83
Cast-Iron, asphalt coated	100
Cast-Iron, cement lined	140
Cast-Iron, bituminous lined	140

Cast-Iron, sea-coated	120
Cast-Iron, wrought plain	100
Cement lining	130 - 140
Concrete	100 - 140
Concrete lined, steel forms	140
Concrete lined, wooden forms	120
Concrete, old	100 - 110
Copper	130 - 140
Corrugated Metal	60
Ductile Iron Pipe (DIP)	140
Ductile Iron, cement lined	120
Fiber	140
Fiber Glass Pipe - FRP	150
Galvanized iron	120
Glass	130
Lead	130 - 140
Metal Pipes - Very to extremely smooth	130 - 140
Plastic	130 - 150
Polyethylene, PE, PEH	140
Polyvinyl chloride, PVC, CPVC	150
Smooth Pipes	140
Steel new unlined	140 - 150
Steel, corrugated	60
Steel, welded and seamless	100
Steel, interior riveted, no projecting rivets	110
Steel, projecting girth and horizontal rivets	100
Steel, vitrified, spiral-riveted	90 - 110
Steel, welded and seamless	100
Tin	130
Vitrified Clay	110
Wrought iron, plain	100
Wooden or Masonry Pipe - Smooth	120
Wood Stave	110 - 120



Appendix F - Pre-Consultation & Development Servicing Study Checklist

Summary of the pre-application consultation meeting held on 9 May 2022.

PLANNING

Evode Rwagasore – Evode.Rwagasore@ottawa.ca

Please refer to related email for submission requirements

TRANSPORTATION

Josiane Gervais – Josiane.Gervais@ottawa.ca

Jenny

- Follow Transportation Impact Assessment Guidelines:
 - o Submit a Screening Form at your earliest convenience to josiane.gervais@ottawa.ca. A full Transportation Impact Assessment is required if any of the triggers on the screening form are satisfied.
 - o Start this process asap. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
 - o An update to the *TRANS Trip Generation Manual* has been completed (October 2020). This manual is to be utilized for this TIA. A copy of this document can be provided upon request.
- Clear throat length required is 15m off a collector roadway. Ensure this length is provided. The clear throat length is measured from the ends of the driveway curb return radii at the roadway and the point of first conflict on-site.
- TMP includes Transit Priority Measures (Isolated Measures) along Orleans Blvd (Affordable Network).
- As the proposed site is institutional and for general public use, AODA legislation applies.
 - o Ensure all crosswalks located internally on the site provide a TWSI at the depressed curb, per requirements of the Integrated Accessibility Standards Regulation under the AODA.
 - o Clearly define accessible parking stalls and ensure they meet AODA standards (include a 1.5m wide access aisle next to the parking stall and a pedestrian curb ramp at the end of the access aisle, as required).
 - o Please consider using the City's Accessibility Design Standards, which provide a summary of AODA requirements. <https://ottawa.ca/en/city-hall/creating-equal-inclusive-and-diverse-city/accessibility-services/accessibility-design-standards-features#accessibility-design-standards>
- As a reduction in parking is being sought, consider providing TDM measures to support this reduction. Measures may include providing Presto passes to staff, increasing bicycle parking, etc.
- On site plan:
 - o Ensure site access meets the City's Private Approach Bylaw.
 - o Show dimensions for site elements (i.e. lane/aisle widths, access width and throat length, parking stalls, sidewalks, pedestrian pathways, etc.)
 - o Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
 - o Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.

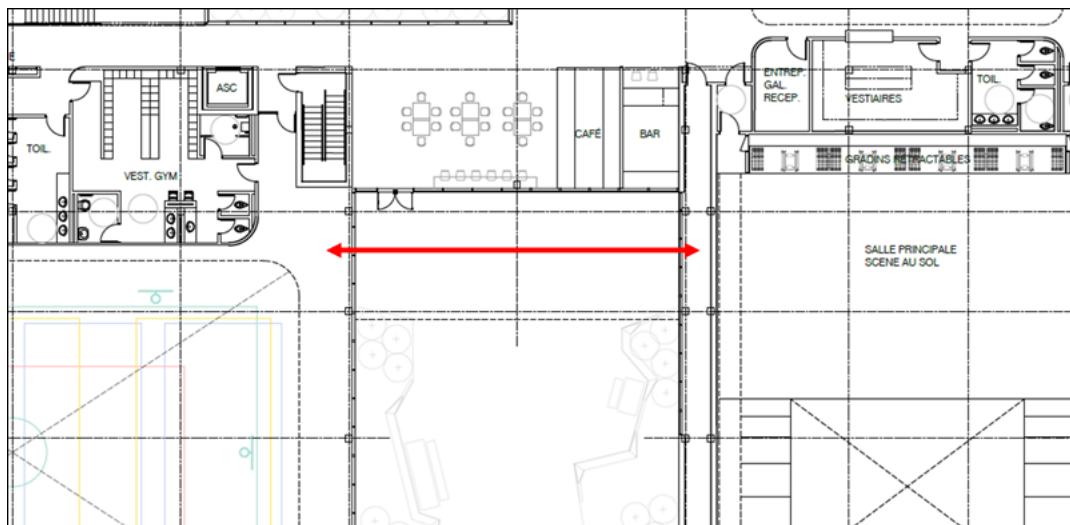
- Turning movement diagrams required for internal movements (loading areas, garbage).
- Show all curb radii measurements; ensure that all curb radii are reduced as much as possible and fall within TAC guidelines (Figure 8.5.1).
- Sidewalk is to be continuous across access as per City Specification 7.1.
- Parking stalls at the end of dead-end parking aisles require adequate turning around space.
- Noise Impact Studies required for the following:
 - Road, as site is on a collector roadway.

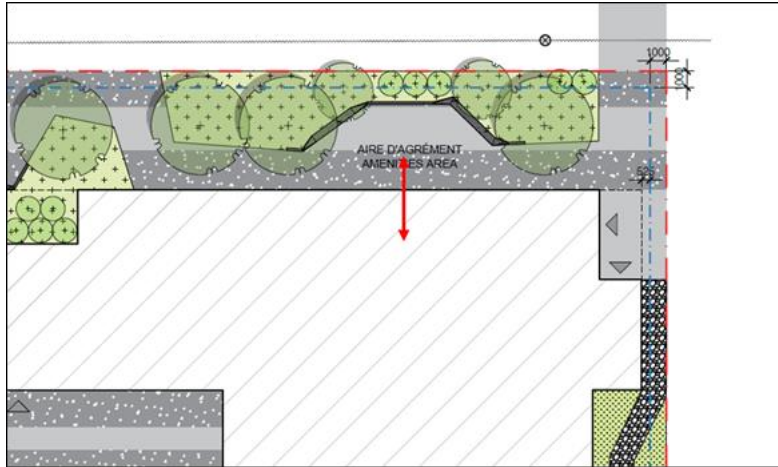
URBAN DESIGN

Jenny

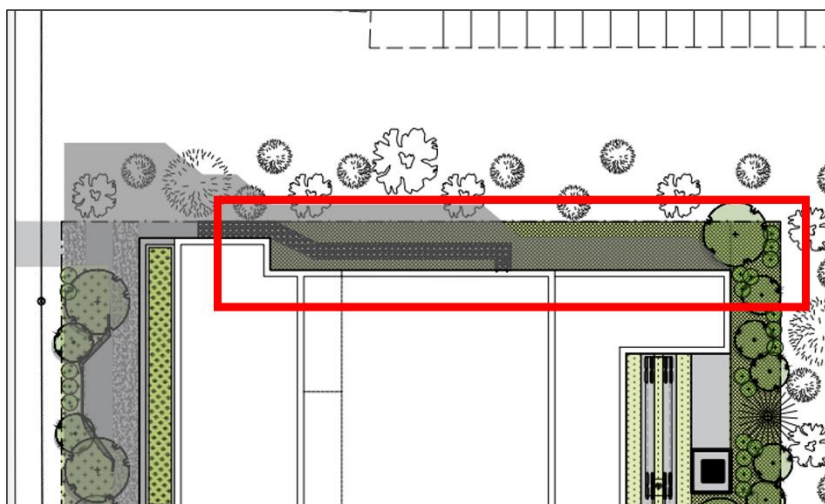
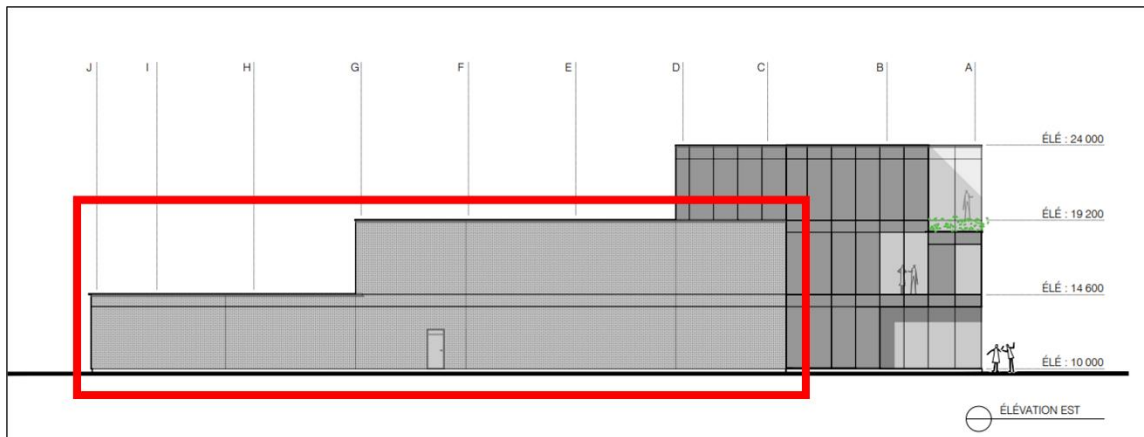
Adrian van Wyk – adrian.vanwyk@ottawa.ca

1. PRUD appreciates the detailed design package submitted and the analysis that has informed the evolution of this design.
2. An Urban Design Brief will be required as part of a complete application. Please see the Terms of Reference attached.
3. The requested reduction in the number of parking spaces required should be accompanied by an increase in the number of bicycle spaces provided.
4. The applicant is encouraged to limit the amount of impervious concrete and asphalt as far as possible.
5. The applicant is encouraged to maximize the number of sustainable design features in this proposal where possible (e.g., light coloured reflective materials, tree planting, green roofs, swales, etc.).
6. Additional entrances are recommended on the ground floor facing the internal courtyard and the foyer facing the front amenity area and to ensure these spaces are well activated and an extension of indoor and outdoor space is created.





7. Care should be taken to ensure that the east side yard is safe and well lit, and a blank wall condition is avoided on the east façade by breaking it up through variation in colour/material/fenestration.



FORESTRY

Mark Richardson – Mark.Richardson@ottawa.ca

- 1) please submit a TCR with their application and a tree permit is needed prior to any removal
- 2) please note that all trees on the property line as well as trees on adjacent properties that are close to the property line must be included in the TCR
- 3) City TCR requirements are sent to you, and include tree planting specifications for the Landscape Plan
- 3a) please note the minimum ad

not Selma

David to ask Marietta, project. for Forrester

TCR requirements: ▲

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

Selma, 100%

LP tree planting requirements:

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

Minimum Setbacks

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

from foundations as well

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

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

Soil Volume

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

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

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

Sensitive Marine Clay

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

Tree Canopy Cover

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

ENGINEERING

Will Curry – William.Curry@ottawa.ca

Submission required:

- ✓ Site Plan
- ✓ Topographical Plan of Survey Plan with a published Benchmark
- ✓ Demolition Plan (include service blanking's at main)
- ✓ Grading & Drainage Plan
- ✓ General Plan of Services
- ✓ Erosion & Sediment Control Plan
- ✓ Catchment Plan (post)
- ✓ Design Brief and Stormwater Management Report
- ✓ Geotechnical Report
- ✓ TCR & Landscape Plan
- ✓ Stationary noise Study

Sometimes combined with
Site Servicing Plan

have

by others

- * Storm Easement to be protected as shown on 5R 08061, Part 2. No planting of Trees in the Easement.
- * Title Search required based upon Instrument #. It determines what is permitted.

Consider Earthbin, Ecoloxia or Molok. Waste subsurface containers.

1. Minimum Drawing and File Requirements- All Plans

Plans are to be submitted on standard **A1 size (594mm x 841mm)** sheets, utilizing an appropriate Metric scale (1:200, 1:250, 1:300, 1:400, or 1:500).

Provide individual PDF of the DWGs and for reports please provide one PDF file of the reports.

All PDF documents are to be unlocked and flattened. No reports submitted to be older than 5 years.

SWM Criteria:

- ? Obtain existing Plans/reports geoinformation@ottawa.ca

Design Criteria - Civil Engineer to contact me directly if need be. william.curry@ottawa.ca

Storm Post to pre, C of .5, post tc 10

Onsite, 2-year pipe minimum and store up to 100-year on site. No surface 2-year ponding on site.

Consider LID on site.

Permissible ponding of 350mm for 100-year. No spilling to adjacent sites (prevent uncontrolled to adjacent sites). At 100-year ponding elevation you must spill to City ROW. 100-year Spill elevation must be 300mm lower than any building opening.

*The City reserves the right to make changes to any decisions made herein should new information or data present other information.

ENVIRONMENT

Sami Rehman, Environmental Planner – Sami.Rehman@ottawa.ca

- no environmental concerns with this proposal, so I don't think I need to participate.
 - you are encourage them to review the City's Bird-safe Design Guidelines and incorporate bird-safe design elements into their proposal.
-



Appendix G Roof Drain and ICD Product Data Sheets



Adjustable Accutrol Weir

Tag: _____

Adjustable Flow Control for Roof Drains

ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

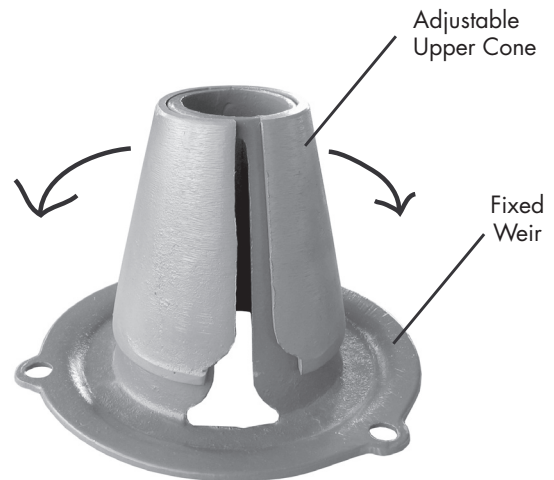
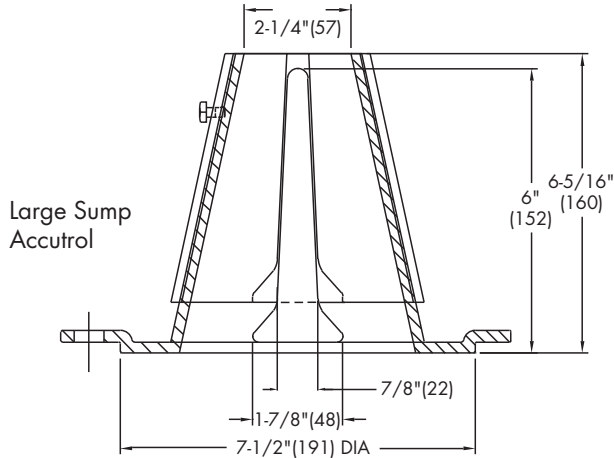
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the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

Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

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

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



1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

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

5 GPM * 28 Roof
Drains = 140 GPM @
6" Head (8.8L/s)

Job Name _____

Contractor _____

Job Location _____

Contractor's P.O. No. _____

Engineer _____

Representative _____

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

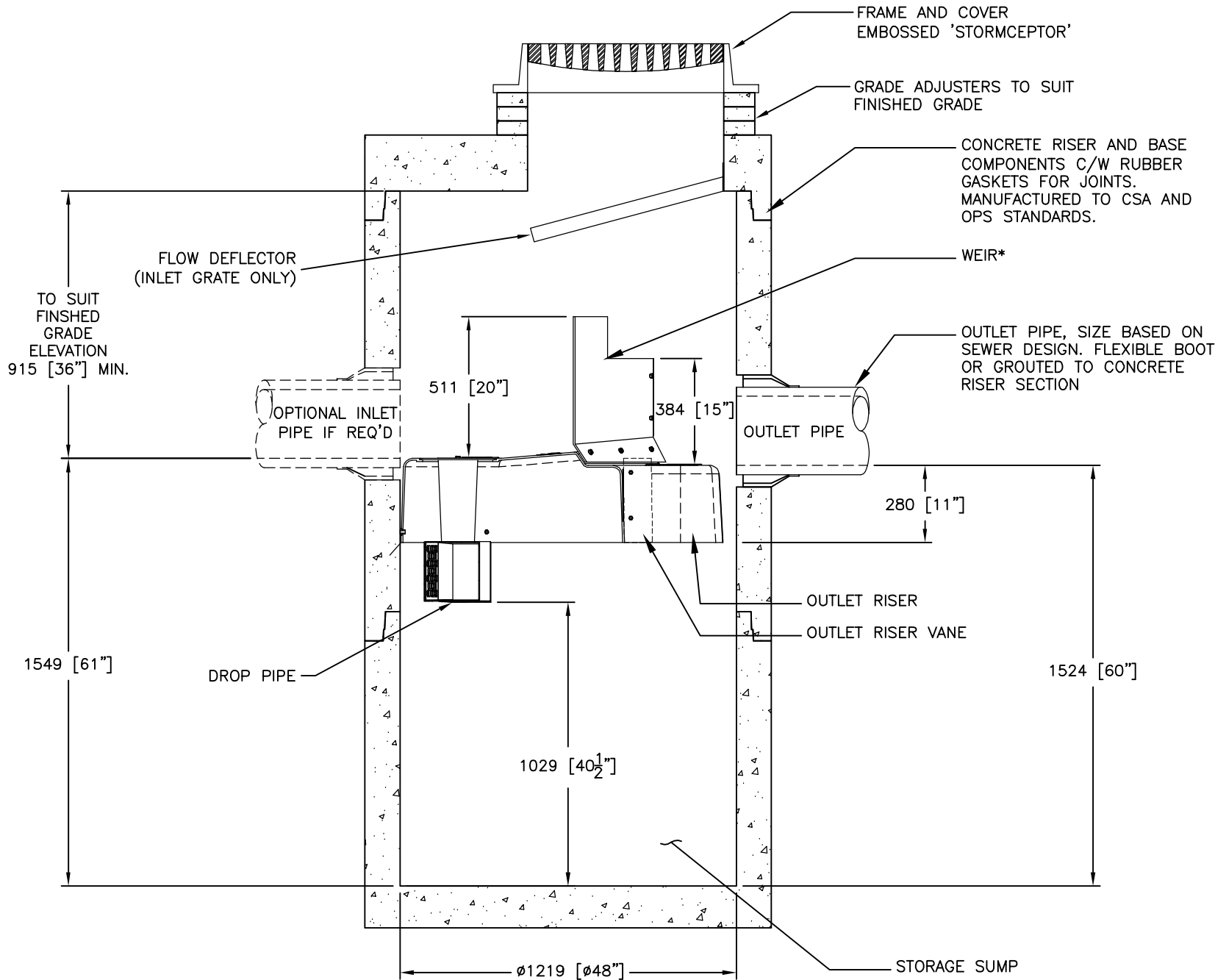
USA: Tel: (800) 338-2581 • Fax: (828) 248-3929 • Watts.com
Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com



A Watts Water Technologies Company



Appendix H OGS Data Sheets



SECTION VIEW

GENERAL NOTES:

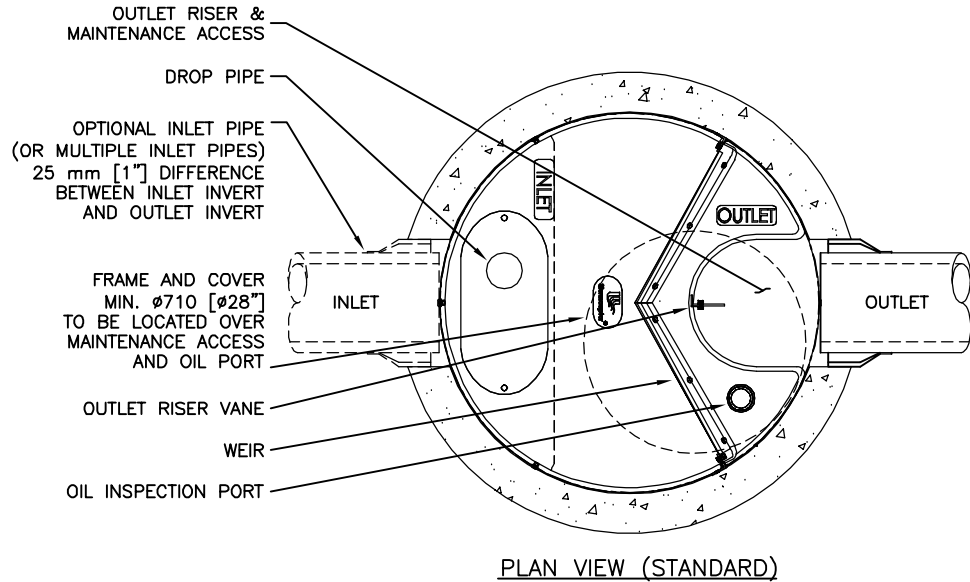
- * MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m² (27.9 gpm/ft²) FOR STORMCEPTOR EF4 AND 535 L/min/m² (13.1 gpm/ft²) FOR STORMCEPTOR EFO4 (OIL CAPTURE CONFIGURATION). WEIR HEIGHT IS 150 mm (6 INCH) FOR EF04.
1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
 2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
 3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
 4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
 5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

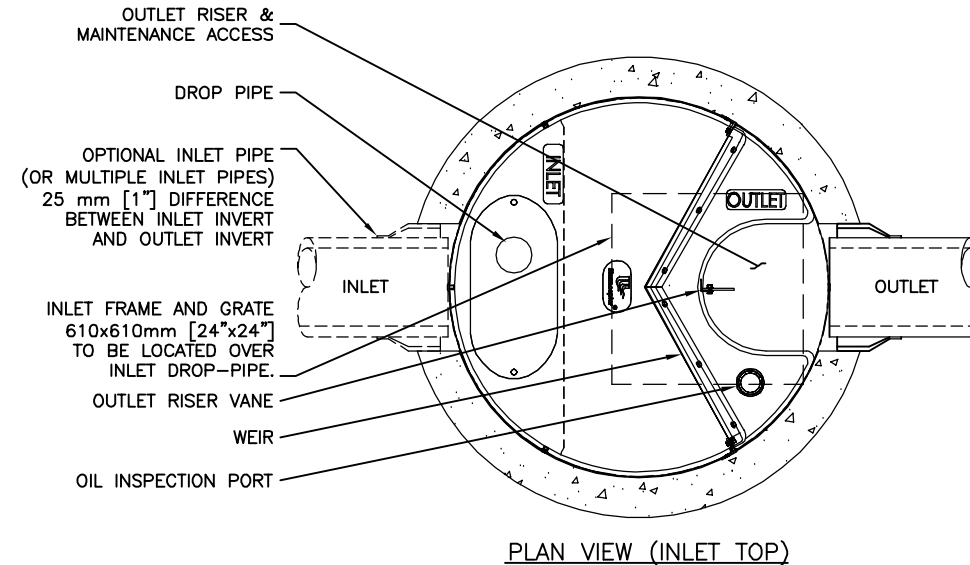
- A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
- C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
- D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
- E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL

NOT FOR CONSTRUCTION



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL					
EF4					
STRUCTURE ID					
*					
WATER QUALITY FLOW RATE (L/s)					
*					
PEAK FLOW RATE (L/s)					
*					
RETURN PERIOD OF PEAK FLOW (yrs)					
*					
DRAINAGE AREA (HA)					
*					
DRAINAGE AREA IMPERVIOUSNESS (%)					
*					
PIPE DATA:					
I.E.	MAT'L	DIA	SLOPE %	HGL	
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*
* PER ENGINEER OF RECORD					

The design and information shown on this drawing is provided as a service to the project owner, engineer and contractor by Imbrium Systems ("Imbrium"). Neither this drawing, nor any part thereof, may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or by any information storage and retrieval system, without the prior written consent of Imbrium. Imbrium expressly disclaims any liability or responsibility for such use. If discrepancies between the supplied information upon which this drawing is based and actual field conditions are encountered in site work progress, these are to be resolved by the engineer of record. Imbrium accepts no liability for designs based on missing, incomplete or inaccurate information supplied by others.

REVISION DESCRIPTION	DATE	BY
INITIAL RELEASE	5/26/17	JSK
UPDATES	6/8/18	JSK
MARK	1	0

Stormceptor® EF



7037 RIDGE ROAD, SUITE 350, HANOVER, MD 21075
USA 888-278-8828 CA 800-585-4801 INTL +1-410-560-5600
The Stormceptor system is designed for use on sites of the following types:
- Industrial Facilities, including refineries, chemical plants, and petrochemicals
- Municipal Wastewater Treatment Plants
- Commercial and Residential Development
- Stormwater Management Systems
- Agricultural and Forestry Operations
- Mining and Mineral Processing
- Power Generation Facilities
- Manufacturing Plants
- Food Processing Facilities
- Pharmaceutical Manufacturing
- Biotechnology Facilities
- Research and Development Laboratories
- Universities and Academic Institutions
- Government and Military Installations
- Airports and Transportation Hubs
- Ports and Harbors
- Cruise Ship Docks
- Yacht Clubs
- Golf Courses
- Amusement Parks
- Casinos
- Hotels and Resorts
- Shopping Centers
- Office Buildings
- Schools
- Hospitals
- Prisons
- Correctional Facilities
- Detention Centers
- Immigration Detention Centers
- Border Crossings
- Customs and Border Protection
- National Security
- Intelligence Gathering
- Counterterrorism
- Homeland Security
- Disaster Preparedness
- Emergency Response
- Environmental Protection
- Public Health
- Safety
- Security
- Defense
- Military
- Government
- Industry
- Commerce
- Agriculture
- Forestry
- Mining
- Manufacturing
- Transportation
- Infrastructure
- Energy
- Water
- Waste Management
- Environmental
- Social
- Governance
- Sustainability
- Corporate Social Responsibility
- Human Resources
- Information Technology
- Legal
- Finance
- Marketing
- Sales
- Customer Service
- Operations
- Logistics
- Supply Chain Management
- Procurement
- Project Management
- Risk Management
- Compliance
- Quality Management
- Environmental Management
- Safety Management
- Health Management
- Security Management
- Information Management
- Data Management
- Analytics
- Artificial Intelligence
- Machine Learning
- Robotics
- Automation
- Cloud Computing
- Big Data
- Internet of Things
- Blockchain
- Cryptocurrency
- Digital Marketing
- E-commerce
- Mobile Applications
- Social Media
- Content Management
- Search Engine Optimization
- Pay Per Click
- Display Advertising
- Video Advertising
- Native Advertising
- Influencer Marketing
- Affiliate Marketing
- Referral Marketing
- Direct Marketing
- Email Marketing
- Direct Mail
- Telemarketing
- Sales Representative
- Field Sales
- Account Executive
- Business Development
- Sales Manager
- Sales Director
- Sales Vice President
- Sales President
- Chief Sales Officer
- Chief Revenue Officer
- Chief Marketing Officer
- Chief Operating Officer
- Chief Executive Officer
- Board of Directors
- Shareholders
- Investors
- Lenders
- Creditors
- Suppliers
- Vendors
- Contractors
- Consultants
- Advisors
- Experts
- Witnesses
- Jurors
- Judges
- Lawyers
- Attorneys
- Solicitors
- Barristers
- Counselors
- Arbitrators
- Mediators
- Conciliators
- Reconcilers
- Peacemakers
- Diplomats
- Negotiators
- Mediators
- Conciliators
- Reconcilers
- Peacemakers
- Diplomats
- Negotiators

DATE: 5/26/2017	
DESIGNED: JSK	DRAWN: JSK
CHECKED: BSF	APPROVED: SP
PROJECT No.: EF4	SEQUENCE No.: *
SHEET: 1 OF 1	