FUNCTIONAL SERVICING STUDY REPORT

For
2409 Carlsen Avenue, Ottawa

Prepared by:

W.Elias & Associates
204 Borealis Cres . Ottawa, ON KI1 4V1
Mobile | 613.762.7800
EMAIL: wissamelias@gmail.com

Revision 1
March 2025

1. Project Description:

1.1. Introduction:

Property at 2409 Carlsen Avenue is located close to intersection of Carlsen Avenue and Heron Road, Ottawa, Ontario. The property is about 0.11 Hectare severed from an existing lot which contain an existing two story building.
Property at 2409 Carlsen Avenue is currently under R3A Zoning. Due to market demand for residential, the idea initiated to use the lot to build 3 three-story dwelling that contains 8 units each.
This report will address the servicing (water, sanitary) requirements associated with the proposed development located at 2409 Carlsen Avenue within the City of Ottawa, Ontario. This report is prepared in response to the request from City of Ottawa Planning department.

1.2. Existing Conditions:

The existing site located at 2409 Carlsen Avenue. The property measure a total area of approximately 0.11 Hectare. The site is fronting 305mm diameter UCI water main on Heron Road, 152mm diameter CI water main on Carlsen Avenue and 152mm diameter CI water main on Chasseur Ave. Also the site is fronting 300mm diameter Concrete sanitary main on Heron Road, 225mm diameter Concrete sanitary main on Carlsen Avenue and 300mm diameter Concrete sanitary main on Chasseur Avenue. In this report the development water and sanitary connection will be to mains on Carlsen Avenue and Chasseur Avenue.

1.3. Guidelines, Previous Studies, And Reports

The following studies were utilized in the preparation of this report:

- Ottawa Sewer Design Guidelines,
  City of Ottawa, SDG002, October 2012.
  (City Standards)
  - Technical Bulletin ISTB-2018-01
    City of Ottawa, March 21, 2018.
    (ISTB-2018-01)
  - Technical Bulletin ISTB-2018-04
    City of Ottawa, June 27, 2018.
    (ISTB-2018-04)

- Ottawa Design Guidelines Water Distribution
  City of Ottawa, July 2010.
  (Water Supply Guidelines)
  - Technical Bulletin ISD-2010-2
    City of Ottawa, December 15, 2010.
    (ISD-2010-2)
  - Technical Bulletin ISDTB-2014-02
    City of Ottawa, May 27, 2014.
    (ISDTB-2014-02)
  - Technical Bulletin ISTB-2018-02
    City of Ottawa, March 21, 2018.
    (ISTB-2018-02)

- Design Guidelines for Sewage Works,
  Ministry of the Environment, 2008.
  (MOE Design Guidelines)

- Stormwater Planning and Design Manual,
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)

- Ontario Building Code Compendium
  Ministry of Municipal Affairs and Housing Building Development Branch,
  January 1, 2012 Update. (OBC)

- Geotechnical Investigation Report

2. Water Supply

Residential Water Demand:

The water demand is calculated based on the City of Ottawa Design Guidelines – Water Distribution as follows:

Design Parameter	Value
Residential 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Residential Average Daily Demand	280 L/d/P
Residential Maximum Daily Demand	2.5 x Average Daily *
Residential Maximum Hourly	2.2 x Average Daily *
Commercial Retail	2.5 $L/m^2/d$
Commercial Maximum Daily Demand	1.5 x avg. day
Commercial Maximum Hour Demand	1.8 x max. day
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350kPa and 480kPa
During normal operating conditions pressure must not drop below	275kPa
During normal operating conditions pressure must not exceed	552kPa
During fire flow operating pressure must not drop below	140kPa

■ Residential occupancy = 1.4 persons per one bedroom apartment and 2.1 persons per 2 bedroom apartment and 3.1 persons per 3 bedroom apartment

□ 7 x 2 bedroom units x 2.1 (average) pers./unit = 14.7 persons
□ 1 x 1 bedroom units x 1.4 (average) pers./unit = 1.4 persons

Total occupancy taken as = 16.1 persons taken as 17 persons

Residential Average Daily Demand = 280 L/c/d.
□ Average daily demand of 280 L/c/day x 17 persons =4760 Liters/day or 0.06 L/s
□ Maximum daily demand (factor of 2.5) is 0.06 L/s x 2.5 = 0.15 L/s
□ Peak hourly demand (factor of 2.2) = 0.15 L/s x 2.2 = 0.33 L/s

Fire Fighting Requirement
Based on Fire Underwriter Survey Method

Fire flow protection requirements were calculated as per the Fire Underwriter's Survey (FUS). The estimated fire flow for the proposed buildings was calculated in accordance with ISTB-2018-02. The following parameters were provided by the Architect:

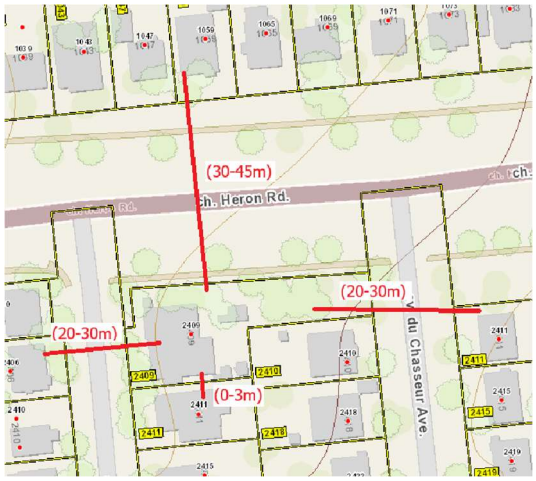
- Type of construction – Ordinary Construction
- Occupancy type – Limited Combustibility
- Sprinkler Protection – Standard Fully Supervised Sprinkler System

The fire flow demand was estimated to be 5,000 L/min,

Fire Flow Calculations as per Fire Underwriter's Survey Guidelines

F=220C√A Address:
where File No.:
F= Required fire flow in L/min
C= Coefficient related to the type of construction
A= Total floor area in m²

C	**Coefficient Related to Type of Construction**			C-Value
	• Wood Frame Construction		☐	1.5
	• Ordinary Construction		☑	1.0
	• Non-Combustible Construction		☐	0.8
	• Fire-Resistive Construction		☐	0.6
			C =	**1.0**
A	**Total Floor Area (m²)**			
	4845 ft² ◄►	**450.12** m²		
F	**Required Fire Flow (L/min)**			
	= 220·C·√A			
	= **4668** L/min			
Occupancy Reductions or Surcharges				
	• Non-Combustible		☐	-25%
	• Limited Combustible		☑	-15%
	• Combustible		☐	0%
	• Free Burning		☐	15%
	• Rapid Burning		☐	25%
				-15%
			3967	**L/min**
Sprinkler Reduction				
	• Adequately Designed System		☐	-30%
	• Water Supply is Standard		☐	-10%
	• Fully Supervised System		☑	-10%
				-10%
		3967 L/min		
	Reduction:	397 L/min		
	Fire Flow	**3571 L/min**		
Exposure Surcharge				
	Distance	**Charge**	**# of Sides**	
	• 0 to 3m	25%	1	25%
	• 3.1 to 10m	20%		
	• 10.1 to 20m	15%		
	• 20.1 to 30m	10%	2	20%
	• 30.1 to 45m	5%	1	5%
				50%
		3571 L/min		
	Surcharge:	1785 L/min		
	Fire Flow:	**5356 L/min**		
REQUIRED FIRE FLOW				
	Cannot exceed 45,000 L/min nor be less than 2,000 L/min			
				5000 L/min
			or	83 L/s
			or	1100 IGPM



Exposure Distance utilized in FUS calculation

There are three (3) existing fire hydrants in proximity to the proposed building that are available to provide the required fire flow demand of 5,000 L/min. Fire hydrant locations are demonstrated in below sketch. Table below summarizes the aggregate fire flow of the contributing hydrants in close proximity to the proposed development based on Table 18.5.4.3 of ISTB-2018-02.

Fire Protection Summary Table

Building	Fire Flow Demand (L/min)	Fire Hydrant within 75m	Fire Hydrant within 150m	Fire Hydrant within 300m	Available Combine Fire Flow (L/min)
Proposed 2409 Carlsen Avenue	5,400	2	0	0	(2 x 5678) + (0 x 3785) = 11,356

The total available fire flow from contributing hydrants is equal to 11,356L/min which will provide adequate fire flow for the proposed development. A certified fire protection system specialist will need to be employed to design the building's fire suppression system and confirm the actual fire flow demand.

The city of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand. The followings are boundary conditions, HGL, for hydraulic analysis at 2409 Carlsen Avenue assumed to be three separate buildings connected via three connections to 152mm watermain at Carlsen and 152mm watermain at Chasseur. Note that 2409 Carlsen Avenue is located in zone 2W2C water pressure.

All three connections:

Minimum HGL: 123.9 m
Maximum HGL: 132.0 m
Max Day + Fire Flow (90 L/s): 116.0 m (Connection 1), 116.0 m (Connection 2), 115.7 m (Connection 3)

Average ground elevation of 78.50 m

Analyzing results:

Demand Senario	Head (m)	Pressure (KPa)
Max. HGL	132.0 – 78.50 = 53.50	524
Min HGL	123.9 – 78.50 = 45.40	445
Max Day + Fire Flow	116.0 – 78.50 = 37.50	368

❖ Ground Elevation = 78.50 m

Floor Elevation	Max Day + Fire Flow (m) = 116.0	Pressure (KPa) at Each Floor
Ground Floor EL. = 80.00 m	36.0	353

Based on City of Ottawa Design Guidelines – Water Distribution existing water service size of 25mm is adequate where the residential water pressure is over 310 kPa. As such, since the calculated pressure is approximately above the minimum requirement, the service diameter for the proposed development recommended to be 25mm.
Note that pressure test will be required at the time of construction to confirm minimum pressure is supplied for proposed development.

The proposed water supply design conforms to all relevant City Guidelines and Policies.

3. Sanitary Sewage

The sanitary flow is calculated based on the Ministry of Environment Guidelines as follow:

Design Parameter	Value
Residential 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Average Daily Demand	280 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0 Harmon Correction Factor 0.8
Commercial Floor/Amenity Space	2.5 L/m^2/d
Commercial Peaking Factor*	1.0
Infiltration and Inflow Allowance	0.05 L/s/ha (Dry) 0.28 L/s/ha (Wet) 0.33 L/s/ha (Total)
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s

3.1. Sanitary Sewage Calculation

Design Flows

Residential

- 7 x 2 bedroom units x 2.1 (average) pers./unit = 14.7 persons
- 1 x 1 bedroom units x 1.4 (average) pers./unit = 1.4 persons

Total occupancy taken as = 16.1 persons taken as 17 persons

Residential Average Daily Demand = 280 L/c/d.
- Average daily of 280 L/c/day x 17 persons =4760 Liters/day or 0.06 L/s

Peaking Factor = 1 + 14/(4 + (13/ 1000)^0.5) = 4.40 *use 4 maximum

Q Peak Domestic = 0.06 L/sec x 4.0 = 0.24 L/sec

Infiltration

Q Infiltration = 0.11 L/S/Gross hectare x 0.10 ha = 0.01 L/sec

Total Peak Sanitary Flow = 0.24 + 0.01 = 0.25 L/sec

The Ontario Building Code specifies minimum pipe size and maximum hydraulic loading for sanitary sewer pipe. OBC 7.4.10.8 (2) states "Horizontal sanitary drainage pipe shall be designed to carry no more than 65% of its full capacity." A 150 mm diameter sanitary service with a minimum slope of 5.0% has a capacity of 73 Litres per second.

The maximum peak sanitary flows for the site is 0.43 L/s. Since 0.43 L/s is much less than 0.65 x 73 = 47 L/s, which means existing 150mm sanitary line has enough capacity.

The flow depth under peak flow is less than 0.3 of the pipe diameter, therefore, the actual velocity is calculated and pipe slope increased to 5% achieve minimum self-cleansing velocity of 0.6m/s as per the recommendation of section 6.1.2 of the City of Ottawa Sewer Design Guidelines. Please refer to the appendix for sanitary design calculation sheet.

Sewage discharges will be domestic in type and in compliance with the Ministry of Environment guidelines. The peak sanitary flow from the proposed development is less than 10 percent of the capacity of the existing sanitary. As such the proposed increase in sanitary flow as a result of the construction of the proposed development is negligible and there is sufficient available capacity for the proposed development.

Should you have any questions or comments, please feel free to contact undersigned.

Yours truly,
Wissam Elias, P. Eng
Senior Project Manager

APPENDIX A:

GeoOttawa Snapshot


ch. Heron Rd.
av. du Chasseur Ave.
300mmØ CONC
152mmØ - DI
305mmØ - UCI
750mmØ CONC
225mmØ CONC
MHST32650
MHSA32819
MHSA32827
MHSA12828
MHST32653
76.75
75.11

APPENDIX B:

Correspondent
&
Architectural/Engineering Drawings

Gmail W. Elias & Associates Team <myottawa2@gmail.com>

Fwd: Request for boundary conditions 2409 Carlsen

1 message

Sam Elias <wissamelias@gmail.com> Fri, Jul 19, 2024 at 7:43 AM

204 BOREALIS Cresc, Ottawa, ON K1K 4V1
wissamelias@gmail.com | T 613 762-7800
www.eliasengineering.ca

---------- Forwarded message ---------
From: **Whelan, Amy** <amy.whelan@ottawa.ca>
Date: Fri, Jul 19, 2024 at 7:42 AM
Subject: RE: Request for boundary conditions 2409 Carlsen
To: Sam Elias <wissamelias@gmail.com>

Good morning Sam,

Please find the boundary condition results below:

The following are boundary conditions, HGL, for hydraulic analysis at 2409 Carlsen Avenue (zone 2W2C) assumed to be three separate Buildings connected via three connections to 152mm watermain at Carlsen and 152mm watermain at Chasseur (see attached PDF for location).

-

All three connections:

Minimum HGL: 123.9 m

Maximum HGL: 132.0 m

May Day + Fire Flow (90 L/s): 116.0 m (Connection 1), 116.0 m (Connection 2), 115.7 m (Connection 3)

These are for current conditions and are based on computer model simulation.

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.

Kind regards,

Amy Whelan, E.I.T

Project Manager, Infrastructure Approvals

Development Review, Central | Examen des projets d'aménagement, Central

Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1

613.580.2424 ext./poste 26642, amy.whelan@ottawa.ca

From: Whelan, Amy
Sent: July 09, 2024 8:28 AM
To: Sam Elias <wissamelias@gmail.com>
Subject: RE: Request for boundary conditions 2409 Carlsen

Hey Sam,

Apologies I sent this to the modeling group to get the boundary conditions May 24th and have not heard back. The City staff who checks the model is away until the 12th, but I have asked them to prioritize this request upon their return.

Kind regards,

Amy Whelan, E.I.T

Project Manager, Infrastructure Approvals

Development Review, Central | Examen des projets d'aménagement, Central

Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1

613.580.2424 ext./poste 26642, amy.whelan@ottawa.ca

From: Sam Elias <wissamelias@gmail.com>
Sent: July 08, 2024 7:48 PM
To: Whelan, Amy <amy.whelan@ottawa.ca>
Subject: Re: Request for boundary conditions 2409 Carlsen

Hi Amy

Any update on the boundary conditions for 2409 Carlsen we requested

204 BOREALIS Cresc, Ottawa, ON K1K 4V1
wissamelias@gmail.com | T 613 762-7800
www.eliasengineering.ca

On Fri, May 24, 2024 at 9:20 AM Whelan, Amy <amy.whelan@ottawa.ca> wrote:

> Good morning Sam and Jeremy,
>
> I wanted to make you both aware that the storm sewer on Carlsen surcharges often, I believe during the 2-year storm event. Due to this the back water valve would be engaged on a regular basis increasing the risk of failure over time. A sump pump to hydraulicly disconnect the foundation drain is highly recommended to avoid basement flooding.
>
> Kind regards,
>
> **Amy Whelan, E.I.T**
>
> Project Manager, Infrastructure Approvals
>
> Development Review, Central | Examen des projets d'aménagement, Central
>
> Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
>
> City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1

613.580.2424 ext./poste 26642, amy.whelan@ottawa.ca

From: Whelan, Amy
Sent: May 24, 2024 9:11 AM
To: Sam Elias <wissamelias@gmail.com>
Cc: Jeremy Silburt <jeremy@thebergehomes.com>
Subject: RE: Request for boundary conditions 2409 Carlsen

Thank you Sam,

I have sent your request to water resources, please note that it may take up to 10 business days for the results.

Kind regards,

Amy

From: Sam Elias <wissamelias@gmail.com>
Sent: May 16, 2024 1:30 PM
To: Whelan, Amy <amy.whelan@ottawa.ca>
Cc: Jeremy Silburt <jeremy@thebergehomes.com>
Subject: Re: Request for boundary conditions 2409 Carlsen

Hi Amy

Please see attachment for the info requested

Sam Elias, P. Eng

204 BOREALIS Cresc, Ottawa, ON K1K 4V1

wissamelias@gmail.com | T 613 762-7800

www.eliasengineering.ca

On Wed, May 8, 2024 at 8:31 AM Whelan, Amy <amy.whelan@ottawa.ca> wrote:

> Good morning Sam,
>
> Missing a few items to process the boundary condition request please see below:
>
> 1. Fire flow calculations
> 2. Exposure distances plan
> 3. Domestic demand calculations
>
> Kind regards,
>
> Amy
>
> ---
>
> **From:** Smith, Jack <jack.smith@ottawa.ca>
> **Sent:** May 06, 2024 8:47 AM
> **To:** Sam Elias <wissamelias@gmail.com>
> **Cc:** Jeremy Silburt <jeremy@thebergehomes.com>; Whelan, Amy <amy.whelan@ottawa.ca>; Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>; Renaud, Jean-Charles <Jean-Charles.Renaud@ottawa.ca>
> **Subject:** RE: Request for boundary conditions 2409 Carlsen
>
> Hi Sam,
>
> Thanks for reaching out. I have copied Amy Whelan and Abdul Mottalib, the Infrastructure Project Managers for this file to make them aware of and assist in your request for boundary conditions.
>
> Best,
>
> Jack Smith
>
> ---
>
> **From:** Sam Elias <wissamelias@gmail.com>
> **Sent:** May 06, 2024 8:00 AM
> **To:** Smith, Jack <jack.smith@ottawa.ca>
> **Cc:** Jeremy Silburt <jeremy@thebergehomes.com>
> **Subject:** Fwd: Request for boundary conditions 2409 Carlsen
>
>
>
> Dear Jack Smith,
>
> We have been retained by Theberge Homes to prepare the services adequacy report for the development at 2409 Carlsen (PC2024-0017). To proceed effectively, we require detailed boundary conditions for each building within the development.
>
> Could you please provide the necessary boundary condition information or forward this request to the appropriate staff member who can assist us? Your cooperation would be greatly appreciated
>
> Thank you for your attention to this matter.
>
> Address: 2409 Carlsen Avenue
>
> proposed Development: 3- three-storey buildings

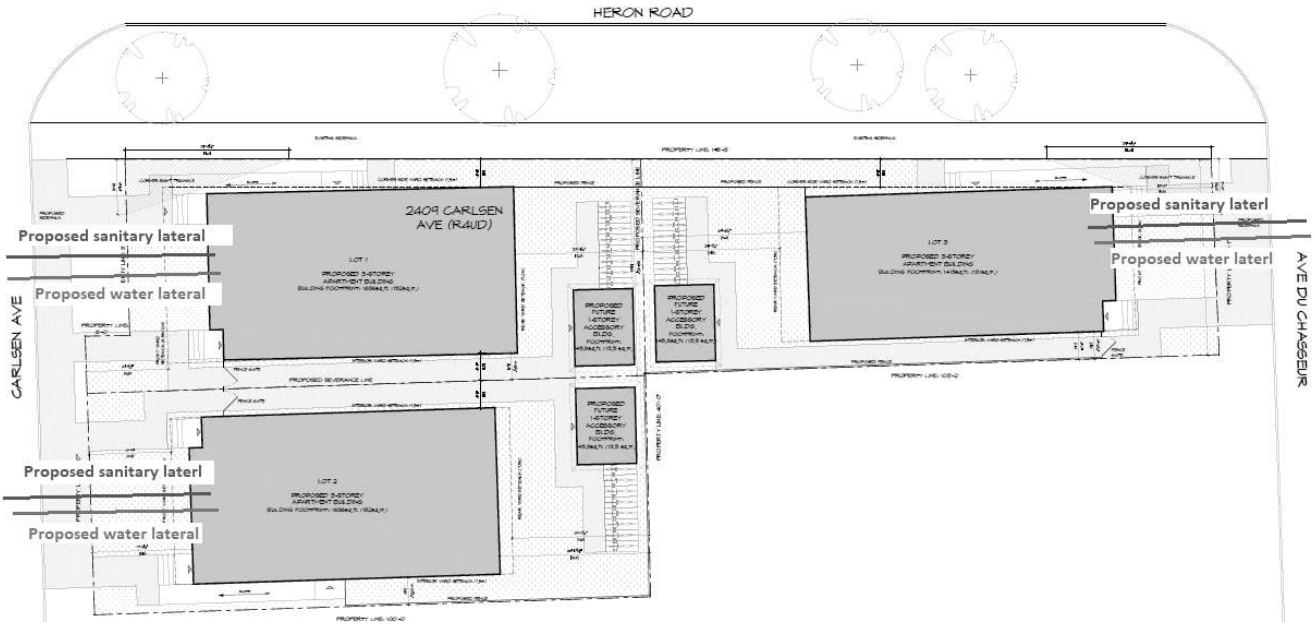
Average daily Demand for each building :0.06 L/ S

May Daily Demand for each building :0.15 L/ s

Peak hour demand for each building : 0.33 L/s

Fire flow requirement as per FUS: 5,400 L/ min for each building

Closest Hydrant approximately 25m away from each building.



Sam Elias, P. Eng

204 BOREALIS Cresc, Ottawa, ON K1K 4V1

wissamelias@gmail.com | T 613 762-7800

www.eliasengineering.ca

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2409 Carlsen Avenue July 2024.pdf
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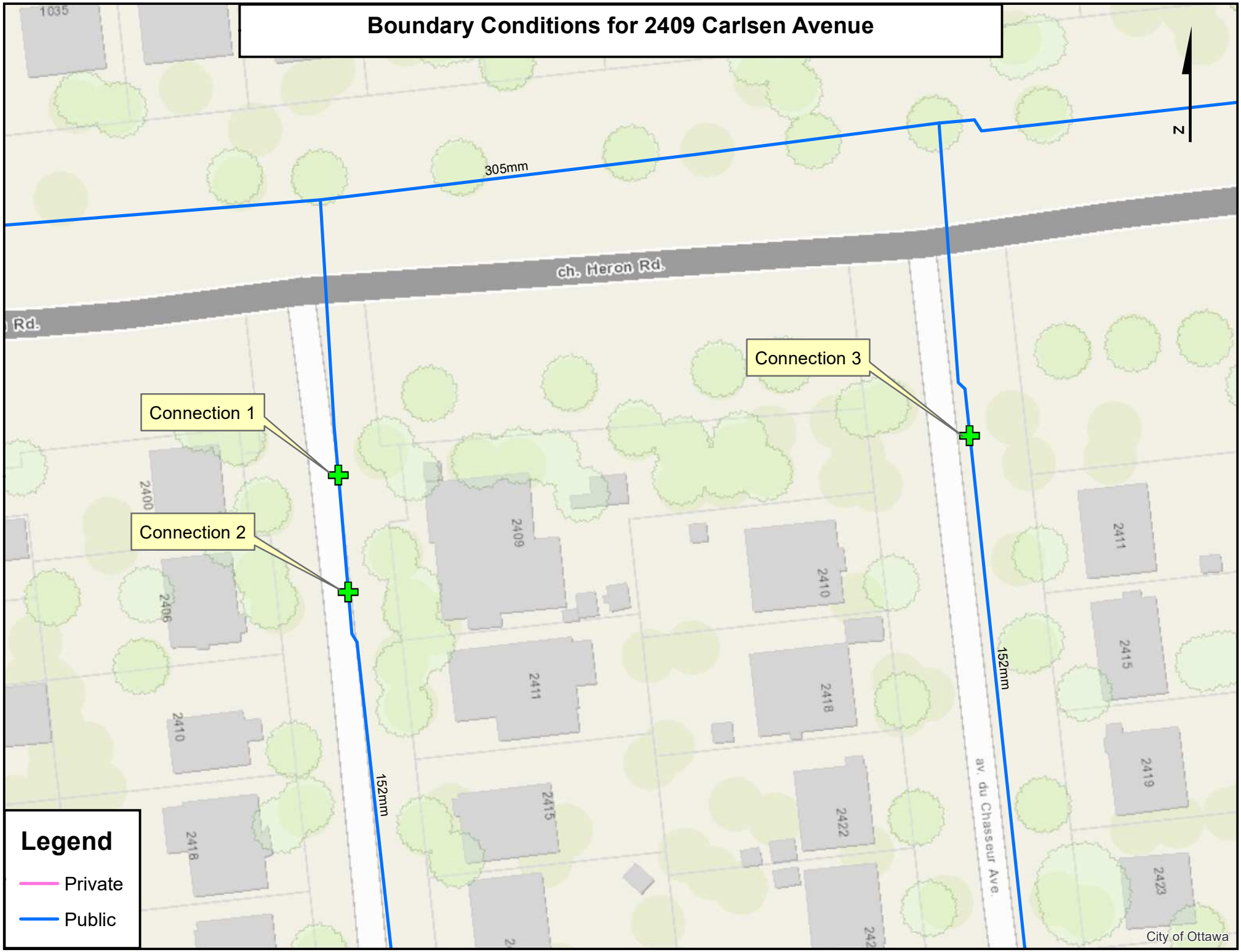
Boundary Conditions for 2409 Carlsen Avenue
N
305mm
ch. Heron Rd.
Rd.
Connection 1
Connection 2
Connection 3
152mm
152mm
av. du Chasseur Ave.
2400
2406
2409
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2411
2418
2415
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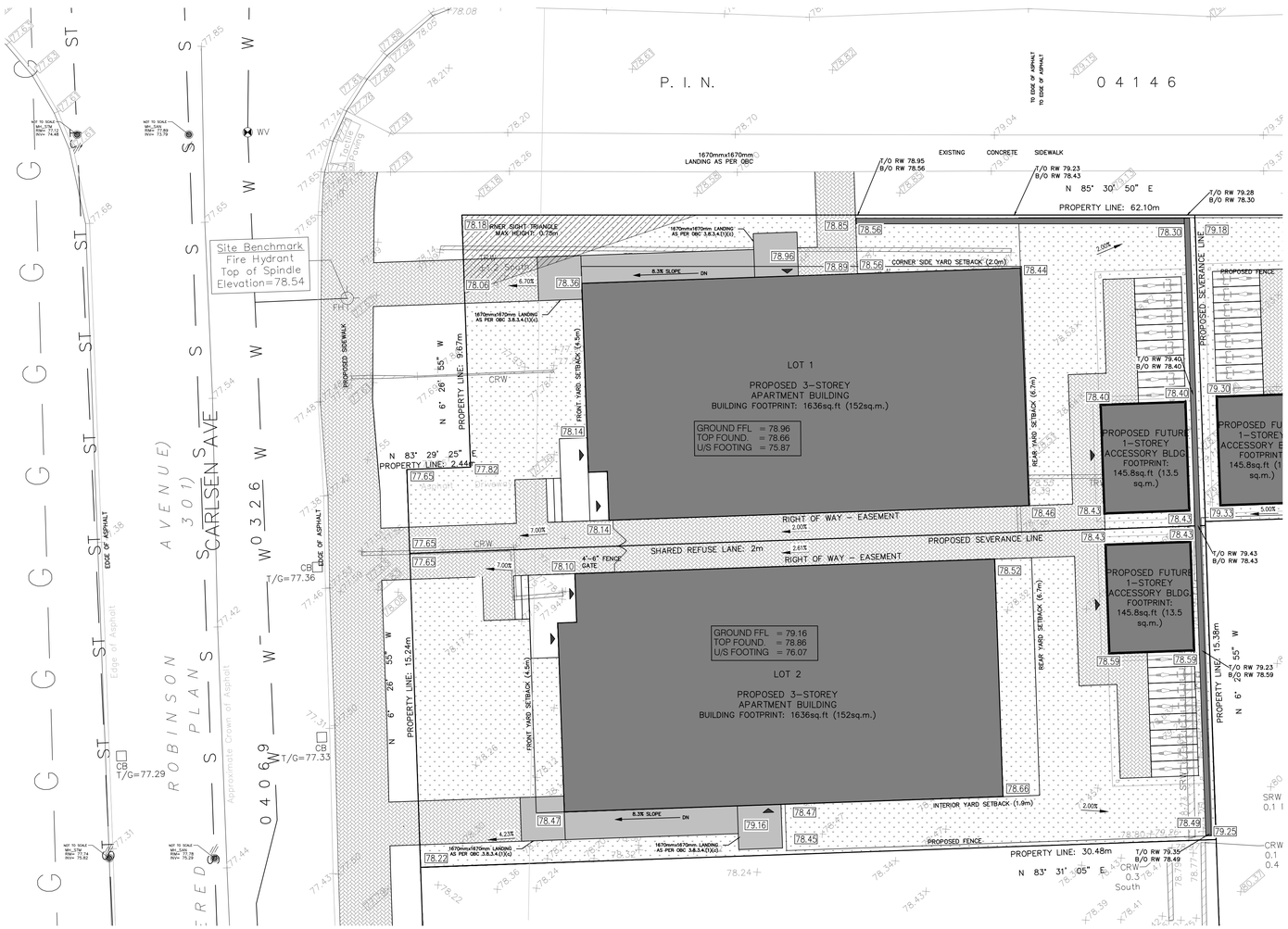
2423
Legend
Private
Public
City of Ottawa



LEGEND

SAN	EXISTING SANITARY SEWER
STM	EXISTING STORM SEWER
WM	EXISTING WATERMAIN
EX.SANMH	EXISTING SANITARY MANHOLE
EX.STMMH	EXISTING STORM MANHOLE
EX.CB	EXISTING CATCHBASIN
V&VC	EXISTING VALVE AND VALVE CHAMBER
V&VB	EXISTING VALVE AND VALVE BOX
EX.FH	EXISTING FIRE HYDRANT
	EXISTING OVERHEAD BELL
	EXISTING OVERHEAD HYDRO
	EXISTING UNDERGROUND HYDRO
	EXISTING GAS MAIN
135mmø SAN	PROPOSED SANITARY SEWER
100mmø STM	PROPOSED STORM SEWER
25mmø WM	PROPOSED WATERMAIN
SANMH	PROPOSED SANITARY MANHOLE
CBMH	PROPOSED CATCHBASIN MANHOLE
LMH	LANDSCAPE MANHOLE
CB1	PROPOSED CATCHBASIN
V&VB	PROPOSED VALVE AND VALVE BOX
FH	PROPOSED FIRE HYDRANT
WRM	PROPOSED WATER REMOTE METER
M	PROPOSED WATER METER
	PROPOSED CURB STOP
FFL	FINISHED FLOOR LEVEL ELEVATION
BFL	BASEMENT FLOOR LEVEL ELEVATION
U.S.F	UNDERSIDE OF THE FOOTING
F.D	FLOOR DRAIN
	BUILDING ENTRY
	DOWNSPOUTS LOCATION W/ SPLASH PAD
	WATERPOST
	GRASS AREA
	GREEN PAVERS
	INTERLOCK
58.20	PROPOSED ELEVATION
× 58.14	EXISTING ELEVATION
2.00%	PROPOSED GRADING SLOPE BETWEEN2–7%, GRADING OVER 7% MUST BE TERRACED TO A MAXIMUM SLOPE OF 3H:1V
	STREET ASPHALT OVERLAY
	CONCRETE WALK
	BOARD FENCE
	PROPERTY LINE
	PROPOSED SILT FENCE
	ROOF DRAIN RESTRICTOR TO L/S
	5 YEAR FLOOD
	10 YEAR FLOOR
	LEVEL AREA
	SCUPPER
	WATER SAMPLING CHAMBER
SP	SUMP PUMP FOR FOUNDATION DRAINAGE
WP	WATER POST
	EXISTING CEDAR FENCE TO REMAIN
	NEW PRESSURE TREATED WOOD FENCE
	NEW GLASS RAILING

1. ALL SERVICES, MATERIALS, CONSTRUCTION METHODS AND INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND REGULATIONS OF THE CITY OF OTTAWA STANDARD SPECIFICATIONS AND DRAWINGS, ONTARIO PROVINCIAL SPECIFICATION STANDARD SPECIFICATION (OPSS) AND ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD), UNLESS OTHERWISE SPECIFIED, TO THE SATISFACTION OF THE CITY AND THE CONSULTANT.
2. THE POSITION OF EXISTING POLE LINES, CONDUITS, WATERMAINS SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES, STRUCTURES AND APPURTENANCES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SATISFY HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM DURING THE COURSE OF CONSTRUCTION. ANY RELOCATION OF EXISTING UTILITIES REQUIRED BY THE DEVELOPMENT OF SUBJECT LANDS IS TO BE UNDERTAKEN AT CONTRACTOR'S EXPENSE.
3. THE CONTRACTOR MUST NOTIFY ALL EXISTING UTILITY COMPANY OFFICIALS FIVE (5) BUSINESS DAYS PRIOR TO START OF CONSTRUCTION AND HAVE ALL EXISTING UTILITIES AND SERVICES LOCATED IN THE FIELD OR EXPOSED PRIOR TO THE START OF CONSTRUCTION, INCLUDING BUT NOT LIMITED TO HYDRO, BELL, CABLE TV, AND CONSUMERS GAS LINES.
4. ALL TRENCHING AND EXCAVATIONS TO BE IN ACCORDANCE WITH THE LATEST REVISIONS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
5. REFER TO ARCHITECTS PLANS FOR BUILDING DIMENSIONS LAYOUT AND REMOVALS. REFER TO LANDSCAPE PLAN FOR LANDSCAPED DETAILS AND OTHER RELEVANT INFORMATION. AU. INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. TOPOGRAPHIC SURVEY COMPLETED ON 13TH DAY OF MARCH 2024 AND PROVIDED B YFARLEY, SMITH & DENNIS SURVEYING LTD. CONTRACTOR TO VERIFY IN THE FIELD PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
7. THE LOCATION OF UNDERGROUND SERVICES ARE BASED ON THE SURVEY PROVIDED WITH THE INFORMATION FROM THE CITY OF OTTAWA ON GEODTTAWA. HOWEVER, CONTRACTOR MUST ENSURE THAT THIS INFORMATION IS VERIFIED PRIOR TO CONSTRUCTION AND NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.
8. ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS.
9. JOB BENCH MARK AS INDICATED ON THE DRAWINGS
10. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCH BASIN OUTLETS ARE PROVIDED.
11. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT. PAVEMENT REINSTATEMENT SHALL BE WITH STEP JOINTS OF 500mm WIDTH MINIMUM
12. ALL DISTURBED AREAS OUTSIDE PROPOSED GRADING LIMITS TO BE RESTORED TO ORIGINAL ELEVATIONS AND CONDITIONS UNLESS OTHERWISE SPECIFIED. ALL RESTORATION SHALL BE COMPLETED WITH THE GEOTECHNICAL REQUIREMENTS FOR BACKFILL AND COMPACTION.
13. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO OPSS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED. CONSTRUCTION TO OPSS 206, 310 & 314. MATERIALS TO OPSS 1001, 1003 & 1010.
14. ABUTTING PROPERTY GRADES TO BE MATCHED.
15. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE MUNICIPAL AUTHORITIES PRIOR TO COMMENCING CONSTRUCTION.
16. MINIMIZE DISTURBANCE TO EXISTING VEGETATION DURING THE EXECUTION OF ALL WORKS.
17. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL UNLESS OTHERWISE DIRECTED FROM THE ENGINEER. EXCAVATE AND REMOVE ALL ORGANIC MATERIAL AND DEBRIS LOCATED WITHIN THE PROPOSED BUILDING, PARKING AND ROADWAY LOCATIONS.
18. AT PROPOSED UTILITIES CONNECTION POINTS AND CROSSINGS (I.E. STORM SEWER, SANITARY SEWER WATER, ETC.) THE CONTRACTOR SHALL DETERMINE THE PRECISE LOCATION AND DEPTH OF EXISTING UTILITIES AND REPORT ANY DISCREPANCIES OR CONFLICTS TO THE ENGINEER BEFORE COMMENCING WORK.
19. SERVICE TRENCHES ON MUNICIPAL RIGHT OF WAY TO BE REINSTATED AS PER CITY OF OTIAWA DETAIL R10.
20. PRIOR TO CONSTRUCTION, A GEOTECHNICAL ENGINEER REGISTERED IN THE PROVINCE OF ONTARIO IS TO INSPECT ALL SUB-SURFACES FOR FOOTINGS, SERVICES AND PAVEMENT STRUCTURES.

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24. a) PAVEMENT STRUCTURE SHALL CONSIST OF FOR CAR ONLY PARKING AREAS:
65 mm ASPHALTIC CONCRETE (PG 58–34), 92% to 97 % MRD
150 mm GRANULAR A BASE (OPSS 1010) (CRUSHED LIMESTONE), 100% SPMDD
300 mm GRANULAR B TYPE II SUB–BASE (OPSS 1010), 100% SPMDD
SUBGRADE– APPROVED EXISTING FILL, SUBGRADE AND IMPORTED GRANULAR FILL (COMPACTED TO 95% SPMDD)

25. CONTRACTOR TO REINSTATE PAVER STONES IN CITY ROW.

NOTES WATERMAIN

24. ALL WATERMAIN AND WATERMAIN APPURTENANCES, MATERIALS, CONSTRUCTION AND TESTING METHODS SHALL CONFORM TO THE CURRENT CITY OF OTTAWA AND MINISTRY OF ENVIRONMEN STANDARDS AND SPECIFICATIONS.

25. ALL WATERMAIN 300mm DIAMETER AND SMALLER TO BE POLY VINYL CHLORIDE (PVC) CLASS 150 DR 18 MEETING AWWA SPECIFICATION C900. STANDARD LATERAL MATERIAL SERVICES UP TO 50MM IS COPPER TYPE 'K'.

26. ALL WATER MAIN TO BE INSTALLED AT MINIMUM COVER OF 2.4m BELOW FINISHED GRADE WHERE WATERMAINS CROSS OVER OTHER UTILITIES, A MINIMUM 0.30m CLEARANCE FROM UTILITIES OBVERT SHALL BE MAINTAINED; WHERE WATERMAINS CROSS UNDER OTHER UTILITIES, A MINIMUM 0.50m CLEARANCE SHALL BE MAINTAINED. WHERE THE MINIMUM SEPARATION CANNOT BE ACHIEVED. THE WATERMAN SHALL BE INSTALLED AS PER CITY OF OTTAWA STANDARDS W25 AND W25.2. WHERE 2.4m MINIMUM DEPTH CANNOT BE ACHIEVED, THERMAL INSULATION SHALL BE PROVIDED AS PER CITY OF OTIAWA STANDARD W22.

27. WATER MAIN BEDDING TO BE AS PER CITY OF OTTAWA STANDARD W17.

28. VALVE BOX TO BE AS PER CITY OF OTIAWA STANDARD W24.

29. CONCRETE THRUST BLOCKS AND MECHANICAL RESTRAINTS ARE TO BE INSTALLED AT ALL TEES, BENDS, HYDRANTS, REDUCERS, ENDS OF MAINS AND CONNECTIONS 100mm AND LARGER, IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS W25.3 &: W25.4.

30. CATHODIC PROTECTION REQUIRED FOR ALL IRON FITTINGS AS PER CITY OF OTTAWA STANDARD W40 &: W42.

31. FIRE HYDRANTS TO BE AS PER CITY OF OTTAWA STANDARD W19. (NOT REQUIRED)

32. IF WATER MAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS LESS THAN HALF THAT RECOMMENDED BY THE MANUFACTURER.

"TYPICAL WATER SERVICE LINE AS PER W26(FOR 19MM & 25MM DIA. WATER SERVICES). AND TO BE INSTALLED AT 1 M FROM THE FOUNDATION WALLS

NOTES: SANITARY SEWER AND MANHOLES

34. ALL SANITARY SEWER, SANITARY SEWER APPURTENANCE AND CONSTRUCTION METHODS SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.

36. SEWER BEDDING AS PER CITY OF OTTAWA DETAIL S6.

37. ALL WORK SHALL BE PERFORMED, AS APPLICABLE IN ACCORDANCE WITH OPSS 407, AND 410.

38. ALL SANITARY MANHOLES 1200mm IN DIAMETER TO BE AS PER OPSD 701.01. FRAME AND COVER TO BE AS PER CITY OF OTIAWA STANDARD S25 AND 524. (NOT APPLICABLE)

39. SANITARY BACKWATER VALVES TO BE PROVIDED FOR EACH BUILDING CLOSE TO THE FOUNDATION WALL NEAR SERVICES ENTRY AS PER CITY OF OTTAWA STD S14.1 OR S14.2

40. STORM BACKWATER VALVES TO BE PROVIDED FOR EACH BUILDING CLOSE TO THE FOUNDATION WALL NEAR SERVICES ENTRY AS PER CITY OF OTTAWA STD S14

NOTES: STORM SEWERS AND STRUCTURES

41. ALL STORM SEWER MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.

NOTES: EROSION AND SEDIMENT CONTROL

42. CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

PROVIDE FROST PROTECTION FOR FOOTING ABOVE 1.5m BELOW THE SURROUNDING GRADE

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GENERAL NOTES

1– ALL TREES SHALL BE PROTECTED AS PER 'MUNICIPAL TREES AND NATURAL AREAS PROTECTION BY–LAWS AND THE 'URBAN TREES CONSERVATION BY–LAW' AS AMENDED ON PROPERTIES.

2– ALL TREES ON RIGHT – OF – WAY TO BE MAINTAINED BEFORE AND DURING CONSTRUCTION.

3– EAVESTHROUGHS / DOWNSPOUT TO BE INSTALLED AND DIRECTED TO THE FRONT OF THE PROPERTY AND A MINIMUM OF 1.5M FROM PROPERTY LINES.

4–MINIMUM OF 1.5M SOIL COVERAGE BETWEEN USF AND SURROUNDING GRADES OR PROVIDE RIGID FOAM INSULATION UNDER FOOTING FOR FROST PROTECTION IF REQUIRED.

5–PROVIDE PERIMETER SUB–DRAIN ALONG FOOTINGS

6–CONFIRMATION OF EXISTING AND AS–BUILT INVERTS TO BE DETERMINED PRIOR TO EXCAVATING ON PROPOSED UNDER SIDE OF FOOTINGS.

7–NO EXCESS DRAINAGE DURING AND AFTER CONSTRUCTION SHALL BE DIRECTED TO ADJACENT PROPERTIES.

8–NO ALTERATIONS TO EXISTING GRADES ARE PERMITTED ON OR BEYOND THE PROPERTY LINE.

9–EXISTING GAS SERVICES LOCATED AT THE PROPERTIES WILL REQUIRE TO BE RELOCATED BY ENBRIDGE CONSUMERS GAS.

10–NEW GAS SERVICE WILL BE REQUIRED.

W. Elias & Associates
CONSULTING ENGINEERS
204 BOREALIS CR.
OTTAWA, ON K1K 4V1
TEL 613-762-7800
WISSAMELIAS@GMAIL.COM
Civil
Structure
electrical
mechanical

CONSULTANT:

SEAL:

LICENSED PROFESSIONAL ENGINEER
W. ELIAS
100556501
AUGUST 13, 2024
PROVINCE OF ONTARIO

CLIENT:

OTTAWA ONTARIO

PROJECT:

PROPOSED DEVELOPMENT
2409 CARLSEN AVENUE
OTTAWA, ON K1V 8E9

KEY PLAN:

ISSUED FOR – REVISION:

IS	RE	DATE	DESCRIPTION
1		2024–08–13	ISSUED FOR REVIEW

PROJECT NO: 2024–120
DATE: 2024–08–13
ORIGINAL SCALE: 1:100
IF THIS BAR IS NOT 1" LONG, ADJUST YOUR PLOTTING SCALE.
DESIGNED BY: R.E
DRAWN BY: R.E
CHECKED BY: W.E
1"

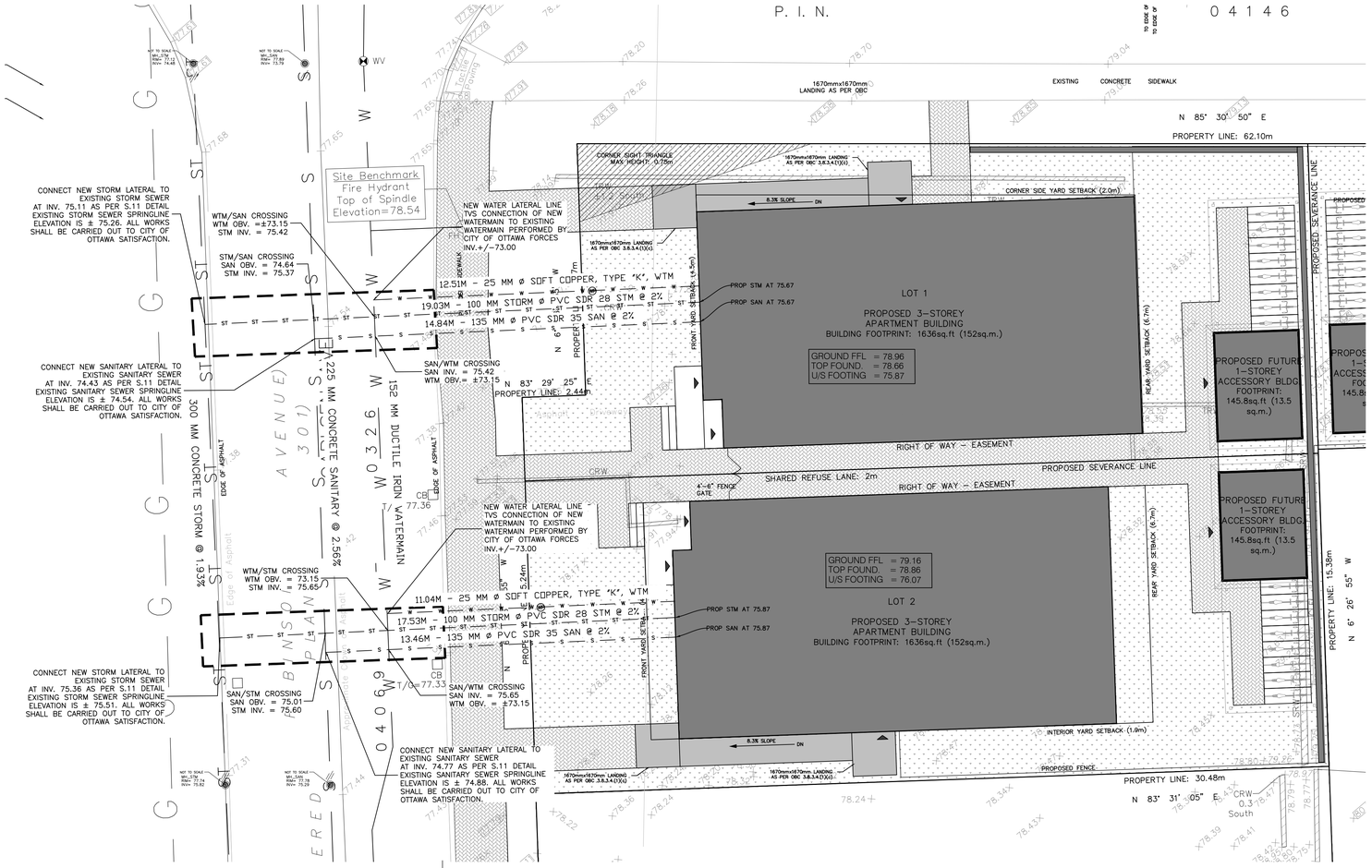
DISCIPLINE:

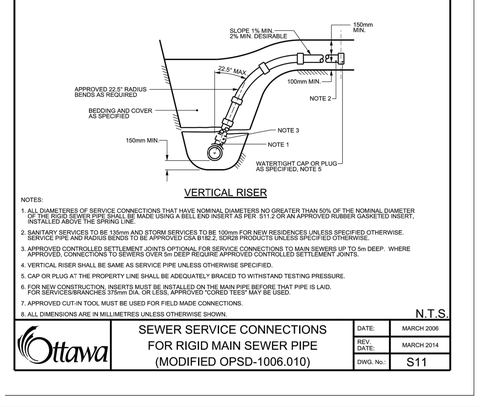
TITLE:

GRADING PLAN

SHEET NUMBER: G1
SHEET #: OF

ISSUE: ISSUED FOR REVIEW
REV #: –
DATE OF: 2024–08–13





CONNECTION WITHOUT VERTICAL RISER

VERTICAL RISER

NOTES:

1. ALL DIAMETERS OF SERVICE CONNECTIONS THAT HAVE NOMINAL DIAMETERS NO GREATER THAN 50% OF THE NOMINAL DIAMETER OF THE ROCD SEWER PIPE SHALL BE MADE USING A BELL END INSERT AS PER S11.2 OR AN APPROVED RUBBER GASKETED INSERT, INSTALLED ABOVE THE SPRING LINE.
2. SANITARY SERVICES TO BE 135mm AND STORM SERVICES TO BE 100mm FOR NEW RESIDENCES UNLESS SPECIFIED OTHERWISE. SERVICE PIPE AND RADIUS BENDS TO BE APPROVED CSA B182.2, SDR28 PRODUCTS UNLESS SPECIFIED OTHERWISE.
3. APPROVED CONTROLLED SETTLEMENT JOINTS OPTIONAL FOR SERVICE CONNECTIONS TO MAIN SEWERS UP TO 5m DEEP. WHERE APPROVED, CONNECTIONS TO SEWERS OVER 5m DEEP REQUIRE APPROVED CONTROLLED SETTLEMENT JOINTS.
4. VERTICAL RISER SHALL BE SAME AS SERVICE PIPE UNLESS OTHERWISE SPECIFIED.
5. CAP OR PLUG AT THE PROPERTY LINE SHALL BE ADEQUATELY BRACED TO WITHSTAND TESTING PRESSURE.
6. FOR NEW CONSTRUCTION, INSERTS MUST BE INSTALLED ON THE MAIN PIPE BEFORE THAT PIPE IS LAID. FOR SERVICES/BRANCHES 375mm DIA. OR LESS, APPROVED "CORED TEES" MAY BE USED.
7. APPROVED CUT-IN TOOL MUST BE USED FOR FIELD MADE CONNECTIONS.
8. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

N.T.S.

Ottawa	SEWER SERVICE CONNECTIONS FOR RIGID MAIN SEWER PIPE (MODIFIED OPSD-1006.010)	DATE:	MARCH 2006
		REV. DATE:	MARCH 2014
		DWG. No.:	S11

LEGEND

- SAN — EXISTING SANITARY SEWER
- STM — EXISTING STORM SEWER
- WM — EXISTING WATERMAIN
- EX.SANMH — EXISTING SANITARY MANHOLE
- EX.STMMH — EXISTING STORM MANHOLE
- EX.CB — EXISTING CATCHBASIN
- V&VC — EXISTING VALVE AND VALVE CHAMBER
- V&VB — EXISTING VALVE AND VALVE BOX
- EX.FH — EXISTING FIRE HYDRANT
- EXISTING OVERHEAD BELL
- EXISTING OVERHEAD HYDRO
- EXISTING UNDERGROUND HYDRO
- EXISTING GAS MAIN
- 135mmø SAN — PROPOSED SANITARY SEWER
- 100mmø STM — PROPOSED STORM SEWER
- 25mmø WM — PROPOSED WATERMAIN
- SANMH — PROPOSED SANITARY MANHOLE
- CBMH — PROPOSED CATCHBASIN MANHOLE
- LMH — LANDSCAPE MANHOLE
- CB1 — PROPOSED CATCHBASIN
- V&VB — PROPOSED VALVE AND VALVE BOX
- FH — PROPOSED FIRE HYDRANT
- WRM — PROPOSED WATER REMOTE METER
- PROPOSED WATER METER
- PROPOSED CURB STOP
- FFL — FINISHED FLOOR LEVEL ELEVATION
- BFL — BASEMENT FLOOR LEVEL ELEVATION
- U.S.F — UNDERSIDE OF THE FOOTING
- F.D — FLOOR DRAIN
- BUILDING ENTRY
- DOWNSPOUTS LOCATION W/ SPLASH PAD
- WATERPOST
- GRASS AREA
- GREEN PAVERS
- INTERLOCK
- 58.20 — PROPOSED ELEVATION
- × 58.14 — EXISTING ELEVATION
- 2.00% — PROPOSED GRADING SLOPE BETWEEN2-7%, GRADING OVER 7% MUST BE TERRACED TO A MAXIMUM SLOPE OF 3H:1V
- STREET ASPHALT OVERLAY
- CONCRETE WALK
- BOARD FENCE
- PROPERTY LINE
- PROPOSED SILT FENCE
- ROOF DRAIN RESTRICTOR TO L/S
- 5 YEAR FLOOD
- 10 YEAR FLOOR
- LEVEL AREA
- SCUPPER
- WATER SAMPLING CHAMBER
- SP — SUMP PUMP FOR FOUNDATION DRAINAGE
- WP — WATER POST
- EXISTING CEDAR FENCE TO REMAIN
- NEW PRESSURE TREATED WOOD FENCE
- NEW GLASS RAILING

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1. ALL SERVICES, MATERIALS, CONSTRUCTION METHODS AND INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND REGULATIONS OF THE CITY OF OTTAWA STANDARD SPECIFICATIONS AND DRAWINGS, ONTARIO PROVINCIAL SPECIFICATION STANDARD SPECIFICATION (OPSS) AND ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD), UNLESS OTHERWISE SPECIFIED, TO THE SATISFACTION OF THE CITY AND THE CONSULTANT.
2. THE POSITION OF EXISTING POLE LINES, CONDUITS, WATERMAINS SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES, STRUCTURES AND APPURTENANCES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SATISFY HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM DURING THE COURSE OF CONSTRUCTION. ANY RELOCATION OF EXISTING UTILITIES REQUIRED BY THE DEVELOPMENT OF SUBJECT LANDS IS TO BE UNDERTAKEN AT CONTRACTOR'S EXPENSE.
3. THE CONTRACTOR MUST NOTIFY ALL EXISTING UTILITY COMPANY OFFICIALS FIVE (5) BUSINESS DAYS PRIOR TO START OF CONSTRUCTION AND HAVE ALL EXISTING UTILITIES AND SERVICES LOCATED IN THE FIELD OR EXPOSED PRIOR TO THE START OF CONSTRUCTION, INCLUDING BUT NOT LIMITED TO HYDRO, BELL, CABLE TV, AND CONSUMERS GAS LINES.
4. ALL TRENCHING AND EXCAVATIONS TO BE IN ACCORDANCE WITH THE LATEST REVISIONS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
5. REFER TO ARCHITECTS PLANS FOR BUILDING DIMENSIONS LAYOUT AND REMOVALS. REFER TO LANDSCAPE PLAN FOR LANDSCAPED DETAILS AND OTHER RELEVANT INFORMATION. ALL INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. TOPOGRAPHIC SURVEY COMPLETED ON 13TH DAY OF MARCH 2024 AND PROVIDED B YFARLEY, SMITH & DENNIS SURVEYING LTD. CONTRACTOR TO VERIFY IN THE FIELD PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
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100556501
AUGUST 13, 2024
PROVINCE OF ONTARIO

CLIENT:

OTTAWA ONTARIO

PROJECT:

PROPOSED DEVELOPMENT
2409 CARLSEN AVENUE
OTTAWA, ON K1V 8E9

KEY PLAN:

DISCLAIMER: COPYRIGHT:

THIS DRAWING AND DESIGN IS COPYRIGHT PROTECTED WHICH SHALL NOT BE USED, REPRODUCED OR REVISED WITHOUT WRITTEN PERMISSION BY W.ELIAS ENGINEERING. THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND UTILITY LOCATIONS AND REPORT ALL ERRORS AND OMISSIONS PRIOR TO COMMENCING WORK.
THIS DRAWING IS NOT TO BE SCALED.

ISSUED FOR – REVISION:

1	2024-08-13	ISSUED FOR REVIEW	
IS	RE	DATE	DESCRIPTION

PROJECT NO: 2024-120
DATE: 2024-08-13
ORIGINAL SCALE: 1:100
DESIGNED BY: R.E
DRAWN BY: R.E
CHECKED BY: W.E
IF THIS BAR IS NOT 1" LONG, ADJUST YOUR PLOTTING SCALE.
1"

DISCIPLINE:

TITLE:

SERVICING PLAN

SHEET NUMBER: S1
SHEET #: OF

ISSUE: ISSUED FOR REVIEW
DATE OF: 2024-08-13
REV #: –