

October 17, 2022



**PATERSON
GROUP**

PH4593-LET.01

12213559 Canada Inc.
996 St-Augustin Road, Unit B
Embrum, Ontario
K0A 1W0

Attention: Matthew Rocheleau

Subject: **Hydrogeological Risk Brief
Proposed Multi-Story Building
5497 Manotick Main Street, Ottawa, Ontario**

Consulting Engineers

9 Auriga Drive
Ottawa, Ontario
K2E 7T9
Tel: (613) 226-7381

Geotechnical Engineering
Environmental Engineering
Hydrogeology
Materials Testing
Building Science
Rural Development Design
Retaining Wall Design
Noise and Vibration Studies

patersongroup.ca

Dear Matthew Rocheleau,

Further to your request and authorization, Paterson group (Paterson) was commissioned to complete a Hydrogeological Risk Brief for the proposed multi-story building to be constructed at 5497 Manotick Main Street in Ottawa (Manotick). This letter summarizes the results of the baseline water quality sampling program at the adjacent residences.

Background

A Geotechnical field investigation was previously completed on site on September 3, 2021 in support of Paterson Group (Paterson) Report PG5957 - 1 - Geotechnical Investigation (dated September 29, 2021). At the time of the field investigation, the subject site was occupied by a commercial building and accompanying parking lot. The site is bounded by a residential property to the northwest, the Rideau River to the northeast, a commercial area to the southeast, and Manotick Main Street to the southwest. The ground surface across the site slopes down toward the north-east side of the property towards the Rideau River.

Generally, the subsurface profile encountered at the test hole locations consisted of a thin layer of topsoil or asphaltic concrete overlying fill material which is underlain by a hard to very stiff brown silty clay or compact silty sand and further underlain by glacial till deposits. Practical refusal to augering was encountered in BH 1-21 at a depth of approximately 5.7 m below ground surface (bgs). A DCPT was performed at BH 2-21, commencing at a depth of 6.1 m bgs, with practical DCPT refusal occurring at a depth of 7.57 m bgs.





Based on available geological mapping (OGS, MRD219), bedrock consists of dolostone with minor shale and sandstone from the Oxford formation with an overburden drift thickness of approximately 5 to 10 m depth.

At the time of the geotechnical investigation completed at the subject site, groundwater levels at the test hole locations were observed to range from 5.33 to greater than 6.1 m bgs, (as one borehole was dry). It should be noted that groundwater levels can fluctuate both seasonally and in conjunction with precipitation events. Therefore, groundwater levels may vary at the time of construction.

Based on groundwater levels measured at the subject site and surrounding area, a local flow direction is anticipated to have a northeasterly direction. Shallow groundwater flow in the vicinity of the subject site is expected to reflect local topography. Regional groundwater flow is considered to be in a northeasterly direction, towards the Rideau River.

A search of the Ontario Water Well Records online mapping database indicates that there are approximately 100 Water Well Records (WWR) in a 250 m radius of the proposed multi-story building. Many of the WWR's are either erroneously located or have been decommissioned with decommissioning records not being available. As per discussions with the City of Ottawa Hydrogeologists, three properties were chosen to partake in a baseline water quality sampling program prior to site construction.

The participating lots were chosen in consultation with City of Ottawa staff based on the nature of the subsurface material present in the area, the theoretical radius of influence related to construction activities at the subject site, the water service locations provided by the City of Ottawa and our understanding of the developed nature of subject area.

The baseline water quality sampling program has been completed to ensure that all parties considered in the project are protected (the developer, the City of Ottawa and the homeowners) should a concern arise during or after construction.

City of Ottawa Pre-consultation

A pre-consultation was completed with a City of Ottawa Hydrogeologist on June 27, 2022 regarding the Baseline Sampling Program. As a result of the pre-consultation, three (3) addresses to the west and south of the subject site were selected to participate in the baseline sampling program.

As per the discussions with the City of Ottawa, the Baseline Sampling Program was to consist of attempting two visits in person, once during the day and once during the evening after normal work hours and by sending a registered letter if in-person contact has not been made. This way, there was documented confirmation of homeowner receipt of the Baseline Sampling Program Letter.



Baseline Sampling Program Participants

The municipal addresses selected, as shown in Figure 1 - Sampling Location Plan, are as follows:

- 5491 Manotick Main Street
- 5495 Manotick Main Street
- 5500 Manotick Main Street



Figure 1 – Sample Location Plan

Well Inspection and Testing Program

The homeowners of the aforementioned properties were approached to have their raw well water sampled between August 10 and August 26, 2022 for the purpose of obtaining baseline water quality information prior to the commencement of construction activities at the subject site. Paterson and the City of Ottawa contact information was provided to allow the homeowner to set up a sampling time if they wished or discuss the sampling program in more detail. Appended to the report is a copy of the letter provided to the homeowners for the baseline water quality sampling program.



All three (3) homeowners of the properties invited to participate in the baseline Sampling Program contacted Paterson to organize the sampling of their wells. The following are the municipal addresses that were successfully sampled:

- 5491 Manotick Main Street
- 5495 Manotick Main Street
- 5500 Manotick Main Street

The following program was carried out at the sampled addresses:

- A survey was conducted to determine the construction specifications of the well (well type and age, pump type, treatment system, water quality and quantity).
- Water samples were recovered from the homeowners well prior to water treatment.
- The samples were submitted for analytical testing (subdivision package and E.Coli/Total Coliforms) at an accredited laboratory (Eurofins Environment Testing Canada Inc.).

Sampling Results

Each of the results provided exceedances of the Ontario Drinking Water Standards (ODWS) outlined in the City of Ottawa's Hydrogeological and Terrain Analysis Guidelines (HTAG) for various aesthetic and operational parameters. The aesthetic parameters would relate to the taste of the water and is a personal preference as to what treatment is used. Operational guidelines, if not controlled, may negatively affect the efficient and effective treatment, disinfection and distribution of the water.

Due to the high Hardness levels recorded (420- 626 mg CaCO₃/L) the use of a water softener is recommended. Dwellings with sodium sensitive residents should be informed of high sodium content, as one of the results indicated elevated sodium levels of 229 mg Na⁺/L (AO 200 mg Na⁺/L). Iron (Fe) was found to exceed the aesthetic objective at all three (3) dwellings which may result in staining of fixtures after prolonged use and an iron filter is recommended. Turbidity was found to exceed the aesthetic objective in two (2) of the dwellings. Dissolved Organic Carbon (DOC) was found to exceed the aesthetic objective at two (2) of the dwellings. Total Coliforms were detected in one (1) sample and the residents have been notified. E.Coli was not detected in any of the samples.

One (1) of the dwellings has groundwater results which indicate that the water supply well is near the mineralized water threshold. The homeowners were provided the recommended notice as per the City of Ottawa and MECP. Total dissolved solids (TDS) concentrations exceeded the aesthetic objective at each dwelling.



Survey Results

In general, the occupants were uncertain about the specific details of their wells and related systems, however, they supplied what information they could. All information taken from the surveys should be taken as anecdotal and are only expressed as a matter of general survey information.

5491 Manotick Main Street

Based on the survey completed for 5491 Manotick Main Street, it is understood that a drilled well with a 4" diameter casing was installed approximately 60 years ago and is equipped with a jet pump and pressure tank. Generally, the water quality was noted by the occupant to be good with high hardness, iron staining on fixtures, and an odour from a time before the current occupant. Hardness concentrations are treated using a conventional water softener. It was noted that the well has never run dry. The occupant indicated that they do not drink from the well.

5495 Manotick Main Street

Based on the survey completed for 5495 Manotick Main Street, the details about the well, casing, and location are unknown, and that their water system consists of a pressure tank and a jet pump. Generally, the quality of the water was considered poor. It was noted by the occupant that the water would often smell of rotten eggs or copper and it left an orange tinge on clothes and fixtures. To treat the elevated hardness, the resident uses a conventional water softener. An iron filter is used but only for water intended for the swimming pool. It was noted that the well has never run dry, even with filling the pool with a foot of water each day. The occupant indicated that they do not drink the water.

5500 Manotick Main Street

Based on the survey completed for 5500 Manotick Main Street, it is understood that a drilled well with a 6" diameter casing was installed approximately 70 years ago and is equipped with a jet pump and pressure tank. Generally, the water quality was noted by the occupant to be good with no issues, however, they noted that they did not drink the water. It was noted by the occupant that the well has never run dry.



Potential Adverse Effects

The subsurface profile encountered at the subject site generally consists of a thin layer of topsoil overlaying fill material, silty clay or silty sand and is underlain by glacial till. Based on the well records, existing wells located in proximity to the subject site and included in this baseline water sampling program were noted to be accessing an aquifer within the bedrock between 6 and 18 m depth. Due to the horizontal and vertical separation between the existing wells and the subject site, construction activities at the site are not expected to cause interference to the water supplies of surrounding well users or other negative impacts. As hoe ramming related to excavation is not expected, it is anticipated that the construction techniques used will consist of low energy methods.

We trust that the current submission satisfies your immediate requirements.

Best Regards,

Paterson Group Inc.

Alexander Schopf, PhD, EIT

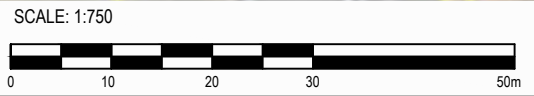


Erik Ardley, P. Geo

Attachments:

- Drawing PH4593 - 1 – Site Plan
- Drawing PH4593 - 4 - MECP Water Well Location Plan
- City of Ottawa – Water Service Plan
- Homeowner Letter
- Eurofins Analytical Results

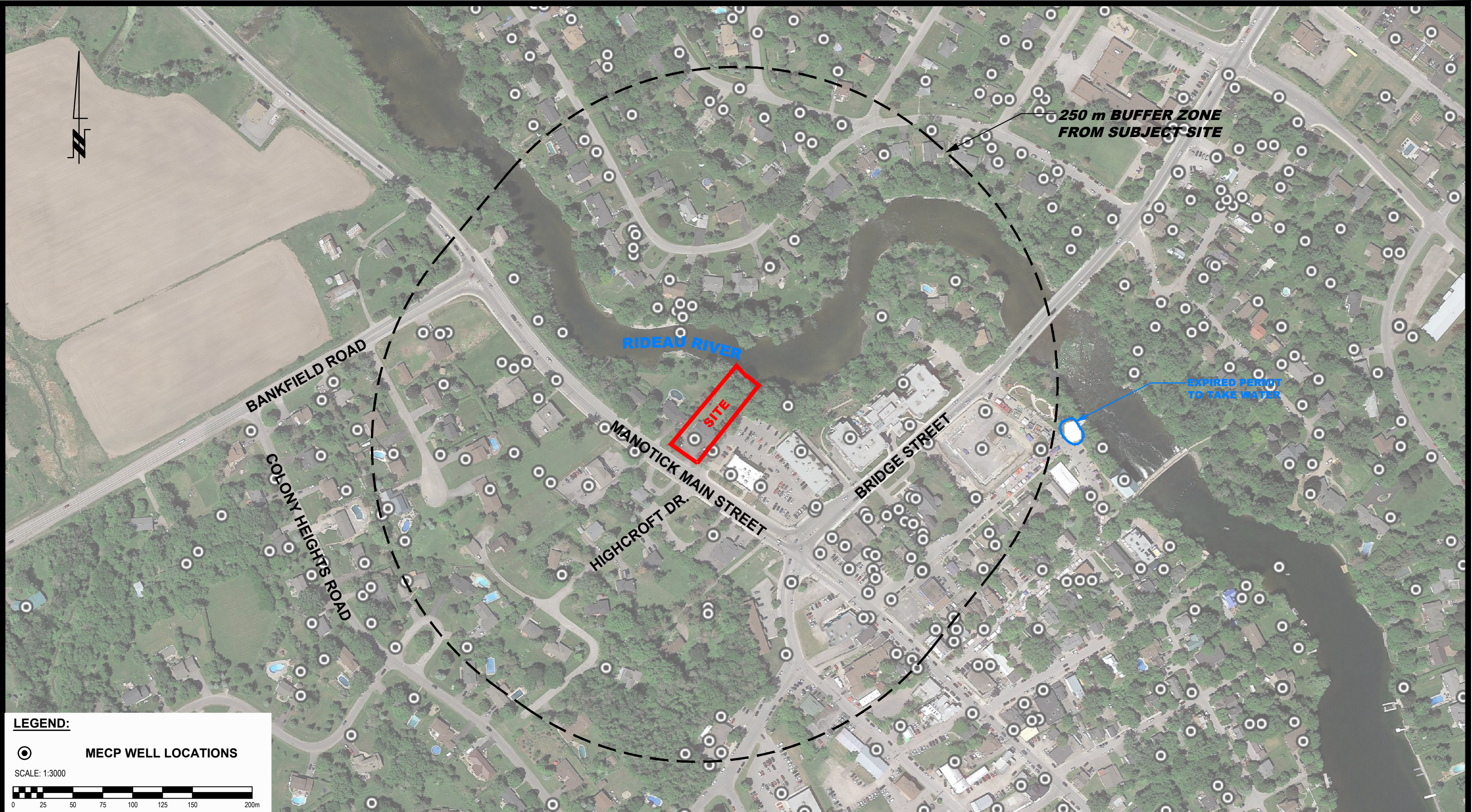




NO.	REVISIONS	DATE	INITIAL

12213559 CANADA INC.
**GROUNDWATER IMPACT ASSESSMENT
 PROPOSED MULTI-STOREY BUILDING
 5497 MANOTICK MAIN STREET**
 OTTAWA, ONTARIO
 Title: **SITE PLAN**

Scale:	1:750	Date:	07/2022
Drawn by:	JM	Report No.:	PH4593-REP.01
Checked by:	AS	Dwg. No.:	PH4593-1
Approved by:	EA	Revision No.:	



LEGEND:

⊙ MECP WELL LOCATIONS

SCALE: 1:3000

NO.	REVISIONS	DATE	INITIAL

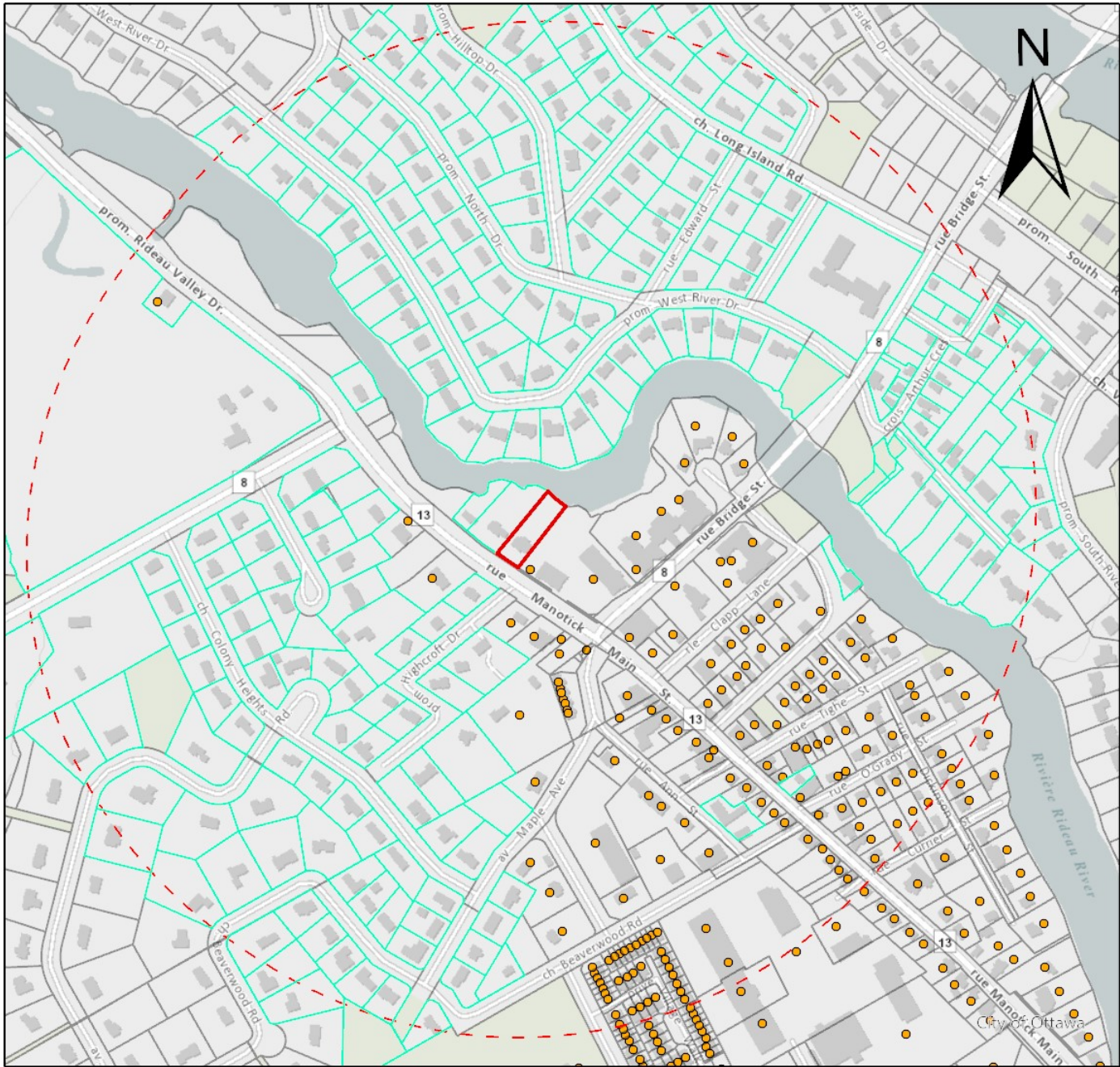
12213559 CANADA INC.

**GROUNDWATER IMPACT ASSESSMENT
PROPOSED MULTI-STORY BUILDING
5497 MANOTICK MAIN STREET**

OTTAWA, ONTARIO

Title: **MECP WATER WELL LOCATION PLAN**

Scale:	1:3000	Date:	07/2022
Drawn by:	JM	Report No.:	PH4593-REP.01
Checked by:	AS	Dwg. No.:	PH4593-4
Approved by:	EA	Revision No.:	



5497 Manotick Main Street

Water Service Locations
within 500 meters

Legend

-  Property parcels
-  Serviced Locations
-  5497 Manotick Main St.
-  500m Buffer
-  Possibly Unserved Locations



Feb-15-22



PATERSON GROUP

Consulting Engineers

9 Auriga Drive
Ottawa, Ontario
K2E 7T9

Tel: (613) 226-7381

Geotechnical Engineering
Environmental Engineering
Hydrogeology
Materials Testing
Building Science
Rural Development Design
Retaining Wall Design
Noise and Vibration Studies

August 23, 2022

File No.: PH4593

Attention: **Owner/Occupant**

Subject: **Baseline Water Well Testing**

patersongroup.ca

Dear Owner/Occupant,

Paterson Group Inc. (Paterson), an Ottawa based Geotechnical, Environmental, and Hydrogeological Engineering Consulting Firm, is carrying out a baseline well water sampling program in your area, along with a short interview. This baseline well sampling program is being completed as a requirement by the City of Ottawa prior to starting construction works for the proposed development to be located at 5497 Manotick Main Street in Ottawa (Manotick). The sample results will be used as a baseline to provide a reference water quantity and quality in the unlikely event that construction works impact your well.

We are anticipating carrying out the well sampling program over a three-week period (**August 10 through August 26, 2022**). We would like to take this opportunity to schedule an appointment to sample your well when convenient.

As part of the baseline well sampling program, we are requesting access to your property to collect a raw water sample from an untreated tap/spigot. It is preferred to sample an untreated outdoor location to reduce potential for close contact and maintain social distance. Participants will be asked if they can provide a copy of the Well Record from when the well was installed, but water samples will be taken even if the record is not available. The program will consist of a brief interview with our field staff regarding the well history, determining the location of the well on the property and taking a water sample from an exterior tap/spigot should the water not be subject to any filtration or treatment measures. The entire process will take **15 to 20 minutes**. The interview can be done either in person at the time of sampling, or over the phone in order to limit social interaction.





The purpose of the sampling program is to protect homeowners against possible effects of construction on the adjacent properties, for which contingency plans will be in place. Well water testing includes several chemical parameters (not only bacteria) and the results will be provided to you **free of charge** (value of approximately \$350).

Homeowner names, addresses with related analytical results, and contact information **will not** be released publicly by Paterson or the client. The information will be provided to the City where they have noted they will not share the report and that all personal information will remain private. If there are any questions as to how the parties will handle your information, please reach out to the appropriate person noted below.

Please contact Alexander Schopf at Paterson Group (613-807-4147) or via email at (aschopf@patersongroup.ca) to schedule an appointment to sample your well. Please contact Tessa Di Iorio at the City of Ottawa (613-406-6465) or via email at (tessa.diiorio@ottawa.ca) should you require further information or if you have questions about the City's requirement for the well water sampling program.

We will continue to follow Public Health Ontario and Ottawa Public Health recommendations related to COVID-19 throughout these times. Please let us know if there are any health-related concerns you may have regarding the sampling.

Best Regards,

Paterson Group Inc.

Alexander Schopf, PhD., EIT



Client: Paterson Group
 9 Auriga Dr
 Nepean, ON
 K2E 7T9
 Attention: Mr. Alex Schopf
 PO#: 55613
 Invoice to: Paterson Group

Report Number: 1984504
 Date Submitted: 2022-08-23
 Date Reported: 2022-09-02
 Project: PH4593
 COC #: 898882

Group	Analyte	MRL	Units	Guideline	1646385 GW 2022-08-23 5491 M	1648015 GW 2022-08-29 5491M
Anions	Cl	1	mg/L	AO 250	279*	
	F	0.10	mg/L	MAC 1.5	0.40	
	SO4	1	mg/L	AO 500	94	
General Chemistry	Alkalinity as CaCO3	5	mg/L	OG 30-500	289	
	Colour (Apparent)	2	TCU	AO 5	20*	
	Conductivity	5	uS/cm		1480	
	DOC	1	mg/L	AO 5	47*	
	pH	1.00		6.5-8.5	7.90	
	Phenols	0.001	mg/L		<0.001	
	S2-	0.01	mg/L	AO 0.05	<0.01	
	TDS (COND - CALC)	1	mg/L	AO 500	962*	
	Turbidity	0.1	NTU	AO 5	5.7*	
Hardness	Hardness as CaCO3	1	mg/L	OG 80-100	420*	
Indices/Calc	Ion Balance	0.01			0.97	
Metals	Ca	1	mg/L		89	
	Fe	0.03	mg/L	AO 0.3	0.71*	
	K	1	mg/L		9	
	Mg	1	mg/L		48	
	Mn	0.01	mg/L	AO 0.05	0.04	
	Na	1	mg/L	AO 200	149	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	NDLA	0
	Total Coliforms	0	ct/100mL	MAC 0	NDLA	0
Nutrients	N-NH3	0.020	mg/L		0.170	
	Total Kjeldahl Nitrogen	0.100	mg/L		0.297	
Others	N-NO2	0.10	mg/L	MAC 1.0	<0.10	

Guideline = ODWSOG

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.
 Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

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Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1646385 GW 2022-08-23 5491 M	1648015 GW 2022-08-29 5491M
Others	N-NO3	0.10	mg/L	MAC 10.0		<0.10	
Subcontract	Tannin & Lignin	0.1	mg/L			1.0	

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 9 Auriga Dr
 Nepean, ON
 K2E 7T9
 Attention: Mr. Alex Schopf
 PO#: 55662
 Invoice to: Paterson Group

Report Number: 1984975
 Date Submitted: 2022-08-30
 Date Reported: 2022-09-14
 Project: PH4593
 COC #: 899379

Lab I.D. 1647992
 Sample Matrix GW
 Sample Type
 Sampling Date 2022-08-30
 Sample I.D. 5495M

Group	Analyte	MRL	Units	Guideline	
Anions	Cl	1	mg/L	AO 250	263*
	F	0.10	mg/L	MAC 1.5	0.38
	N-NO2	0.10	mg/L	MAC 1.0	<0.10
	N-NO3	0.10	mg/L	MAC 10.0	<0.10
	SO4	1	mg/L	AO 500	91
General Chemistry	Alkalinity as CaCO3	5	mg/L	OG 30-500	299
	Colour (Apparent)	2	TCU	AO 5	135*
	Conductivity	5	uS/cm		1470
	pH	1.00		6.5-8.5	7.79
	Phenols	0.001	mg/L		<0.001
	S2-	0.01	mg/L	AO 0.05	<0.01
	TDS (COND - CALC)	1	mg/L	AO 500	956*
	Turbidity	0.1	NTU	AO 5	10.2*
Hardness	Hardness as CaCO3	1	mg/L	OG 80-100	424*
Indices/Calc	Ion Balance	0.01			0.98
Metals	Ca	1	mg/L		89
	Fe	0.03	mg/L	AO 0.3	0.81*
	K	1	mg/L		10
	Mg	1	mg/L		49
	Mn	0.01	mg/L	AO 0.05	0.03
	Na	1	mg/L	AO 200	145
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0
	Total Coliforms	0	ct/100mL	MAC 0	0
Nutrients	N-NH3	0.020	mg/L		0.166
	Total Kjeldahl Nitrogen	0.100	mg/L		0.282

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Lab I.D. 1647992
 Sample Matrix GW
 Sample Type
 Sampling Date 2022-08-30
 Sample I.D. 5495M

Group	Analyte	MRL	Units	Guideline	
Subcontract	Tannin & Lignin	0.1	mg/L		1.0
Subcontract-Inorg	DOC	0.5	mg/L	AO 5	<0.5

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Client: Paterson Group
 9 Auriga Dr
 Nepean, ON
 K2E 7T9
 Attention: Mr. Alex Schopf
 PO#: 55613
 Invoice to: Paterson Group

Report Number: 1984503
 Date Submitted: 2022-08-23
 Date Reported: 2022-09-02
 Project: PH4593
 COC #: 898881

Group	Analyte	MRL	Units	Guideline	1646384 GW 2022-08-23 5500 M	1648016 GW 2022-08-30 5500M
Anions	Cl	1	mg/L	AO 250	487*	
	F	0.10	mg/L	MAC 1.5	0.12	
	SO4	1	mg/L	AO 500	116	
General Chemistry	Alkalinity as CaCO3	5	mg/L	OG 30-500	345	
	Colour (Apparent)	2	TCU	AO 5	<2	
	Conductivity	5	uS/cm		2140	
	DOC	1	mg/L	AO 5	57*	
	pH	1.00		6.5-8.5	7.56	
	Phenols	0.001	mg/L		<0.001	
	S2-	0.01	mg/L	AO 0.05	<0.01	
	TDS (COND - CALC)	1	mg/L	AO 500	1390*	
	Turbidity	0.1	NTU	AO 5	4.1	
Hardness	Hardness as CaCO3	1	mg/L	OG 80-100	626*	
Indices/Calc	Ion Balance	0.01			0.97	
Metals	Ca	1	mg/L		132	
	Fe	0.03	mg/L	AO 0.3	0.42*	
	K	1	mg/L		4	
	Mg	1	mg/L		72	
	Mn	0.01	mg/L	AO 0.05	0.01	
	Na	1	mg/L	AO 200	229*	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	NDLA	0
	Total Coliforms	0	ct/100mL	MAC 0	NDLA	18*
Nutrients	N-NH3	0.020	mg/L		<0.020	
	Total Kjeldahl Nitrogen	0.100	mg/L		0.395	
Others	N-NO2	0.10	mg/L	MAC 1.0	<0.10	

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Report Number: 1984503
 Date Submitted: 2022-08-23
 Date Reported: 2022-09-02
 Project: PH4593
 COC #: 898881

Group	Analyte	MRL	Units	Guideline	Lab I.D.	Sample Matrix	Sample Type	Sampling Date	Sample I.D.
Others	N-NO3	0.10	mg/L	MAC 10.0	1646384	GW		2022-08-23	5500 M
Subcontract	Tannin & Lignin	0.1	mg/L		1648016	GW		2022-08-30	5500M

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