THE TOWNSHIP OF EDWARDSBUGH/CARDINAL
DEVELOPMENT AGREEMENT

THIS AGREEMENT, made in triplicate, the ___ day of_____2024.

BETWEEN:

HOWARD PETER HUTTON
(the “Owner”)

-and-

THE CORPORATION OF THE TOWNSHIP OF EDWARDSBUGH/CARDINAL
(the “Township”)

FOR LANDS DESCRIBED AS
The severed parcel of severance application B-89-24
of the United Counties of Leeds and Grenville

Part 2 of 15R12485; EDWARDSBURGH/CARDINAL

RECITALS:

1. The Owner is the owner of the lands described in Schedule "A” to this Agreement and proposes to subdivide it for the purpose of selling, conveying, or leasing it in lots.

2. The said lands are the subject matter of consent application B-89-24 which has received conditional approval from the United Counties of Leeds and Grenville Consent Granting Authority, a copy of which is annexed hereto as Schedule "B";

3. The Township, pursuant to Section 53 of the Planning Act, R.S.O. 1990, as amended, has the authority to enter into an agreement imposed as a condition of the approval of consent.

4. This agreement shall be registered at the cost of the Owner against the land to which it applies subject to the Registry Act and the Land Titles Act;

NOW THEREFORE THIS AGREEMENT WITNESSETH that in consideration of the other good and valuable consideration and the sum of One ($1.00) Dollar of lawful money of Canada, now paid by each of the other parties hereto (the receipt whereof is hereby acknowledged) the Parties hereby covenant, promise and agree with each other as follows:

1. This Agreement affects the Lands described in Schedule "A" to this Agreement and shall ensure to the benefit of and be binding upon parties hereto, and their respective successors and assigns, The Owner hereby agrees to the registration of this Agreement against the title to the severed lands, at the sole cost of the Owner.

2. The Owner hereby agrees to obtain all required municipal approvals and comply with all applicable Zoning By-Laws of the Township, the Building Code Act, 1992, S.O. 1992, c.23 requirements and approvals required by applicable government authorities which may be required prior to the development of the lands.

3. The Owner hereby acknowledges that the lands described in Schedule "A" to this Agreement are the subject of the Scoped Hydrogeological and Terrain Study, as shown in Schedule “C” to this Agreement, which was completed in order to assess the water quality and quantity for the site and groundwater impacts for a single dwelling on private servicing.

4. The owner hereby acknowledges and agrees that the professional recommendations and matters provided by Schedules “C” shall be provided and maintained by the Owner at the Owner’s sole risk and expense.

5. In the event the Owner defaults in the performance of an obligation under this agreement or for reasons of public safety as determined by the Chief Building Official under the Building Code Act of Ontario or the Fire Marshall under the Fire Protection & Prevention Act of Ontario, the Township may, at the expense of the Owner, enter upon the lands and do all such matters and things as may be required to comply with any Order of the Chief Building Official or Assistant to the Fire Marshall (local Fire Chief). Such actual costs incurred by the Township plus an overhead charge of 15%, shall be deemed to be recoverable from the Owner by invoice and may be recovered in like manner as municipal taxes pursuant to the Municipal Act.

6. That the owner be advised that the severed land is located in the rural area and may be adjacent to existing or future agricultural and agricultural diverse uses. Any new residential development on the severed land shall be outside of the required calculated Minimum Distance Separation (MDS) setback from any neighbouring livestock facility or manure storage and all other applicable requirements at the time of building permit issuance.

7. In the event that deeply buried or previously undiscovered archaeological deposits are discovered in the course of development or site alteration, all work must immediately cease and the site must be secured. The Cultural Program Branch of the Ministry of Tourism, Culture and Sport (416-314-7132) and the Township’s Building Department (613-658-3055) must be immediately contacted.

8. In the event that human remains are encountered, all work must immediately cease,

and the site must be secured. The Grenville County Ontario Provincial Police (613-925-4221), the Registrar of Cemeteries Regulation Section of the Ontario Ministry of Consumer Business Services (416-326-8404), the Cultural Program Branch of the Ministry of Tourism, Culture and Sport (416-314-7132), and the Township's Building Department (613-658-3055) must be immediately contacted.

9. Any notice to be given hereunto shall be in writing to all other parties and either delivered personally or sent by prepaid registered mail, and in the latter case shall be deemed to have been given three (3) business days following the date upon which it was mailed. The address of the parties for the purpose hereof shall be:

to the Owner at:	to the Township at:
Peter Hutton 6008 Hurley Road Spencerville ON K0E 1X0	Township of Edwardsburgh/Cardinal PO Box 129 Spencerville ON KOE 1XO

10. The following schedules will form part of this agreement:
    SCHEDULE "A" – Description of the Property
    SCHEDULE "B" – Decision of the United Counties of Leeds and Grenville Consent Granting Authority
    SCHEDULE "C" – Scoped Hydrogeological and Terrain Analysis Prepared by Morey Associates Ltd, September 3, 2024
    SCHEDULE "D" – Site Survey 15R12485

IN WITNESS WHEREOF the parties hereto have executed this agreement.

OWNER, HOWARD PETER HUTTON

_____
Owner

_____
Owner

I/We are the registered owners of the property.

THE CORPORATION OF THE TOWNSHIP OF EDWARDSBURGH/CARDINAL

_____
Mayor

_____
Clerk

I/We have authority to bind the Corporation.

DATED AT Spencerville, ON this _____ day of _____, 2024

SCHEDULE “A”

DESCRIPTION OF THE PROPERTY

The severed parcel of severance application B-89-24
of the United Counties of Leeds and Grenville

Shown as Part 2 on Registered Survey 15R12485

SCHEDULE "B"

DECISION OF THE UNITED COUNTIES OF LEEDS AND GRENVILLE CONSENT GRANTING AUTHORITY

Phone 613-342-3840 – Ext. 2414
Fax 613-342-2101
E-Mail: krista.weidenaar@uclg.on.ca

25 Central Avenue West
Suite 100,
Brockville, ON, K6V 4N6

UNITED COUNTIES OF LEEDS AND GRENVILLE
CONSENT GRANTING AUTHORITY

DECISION

APPLICATION B-89-24

We the undersigned members of the Consent Granting Authority of the United Counties of Leeds and Grenville; do hereby certify that the following is a decision reached by the Committee on **September 25, 2024.** The said decision was reached on the application of **Howard Hutton** to sever a parcel of land being; part of Lot 36, Concession 6; **Township of Edwardsburgh Cardinal** having dimensions of approximately 50 metres by 148.3 metres with an area of 0.737 hectares.

DECISION: **GRANTED** providing the conditions as stated below are met.

REASONS:
Division of land is compatible with the intent and purpose of the Official Plan and meets the criteria in Section 51 (24) of the Planning Act providing conditions are met.

EFFECT OF WRITTEN SUBMISSIONS ON THE DECISION:
No written comments were submitted on this consent application to the approval authority.

CONDITIONS:

(1) That all conditions imposed in the granting of this decision be met and one (1) original paper copy and one (1) digital copy of the deposited reference plan of the subject lands, which conforms substantially with the application as submitted, and the instrument relating to the transaction (deed/transfer, Service Ontario parcel register, grant of right-of-way, etc.) be presented to the Secretary-Treasurer of the Consent Granting Authority for the Certificate of Consent no later than **September 26, 2026.**

(2) That a copy of the deposited survey be submitted to the Township.

(3) That a Hydrogeological Assessment and Terrain Analysis be completed by a qualified professional to demonstrate that the site conditions are suitable for the long-term provision of private services with no negative impacts (or cumulative negative impacts) to the environment or public health resulting from the use of on-site private water and sewage services to the satisfaction of the Township.

(4) That the owner enters into a development agreement with the Township, as required by the Township, to implement the recommendations of the Hydrogeological Assessment and Terrain Analysis.

(5) That written release of conditions 2, 3 and 4 from the Township be submitted to the Consent Granting Authority prior to endorsement of consent on the deed for the severed land.

NOTES:

(1) The Township had no objection providing conditions 2, 3 and 4 are complied with.

(2) South Nation Conservation had no objection.
- According to SNC mapping, the severed and retained lots do not contain any features regulated by SNC.

(3) South Nation Conservation (Septic Review) had no objection providing the required setbacks in the Ontario Building Code, Part 8, Sewage Systems, are maintained.

ADDITIONAL INFORMATION:
- You will be entitled to receive notice of any changes to the conditions of the provisional consent, if you have made a written request to be notified of changes to the conditions of the provisional consent.
- Only the applicant, the Minister, a specified person (under the Planning Act) or any public body (i.e. Municipality) may appeal a consent application to the Ontario Land Tribunal.

- Any appeal to the Ontario Land Tribunal must be received by the Secretary-Treasurer of the Consent Granting Authority at the United Counties of Leeds & Grenville no later than the appeal date of this notice and it must:
  - Set out the reasons for the appeal; and,
  - Be accompanied by the fee charged under the Ontario Land Tribunal Act.

I hereby certify this to be a true and exact copy

Cherie Mills

Chair

K Weidenaar

Secretary-Treasurer

This Decision was mailed on September 26, 2024

The last date for appealing this decision is October 16, 2024

SCHEDULE “C”

SCOPED HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS PREPARED BY MOREY ASSOCIATES LTD SEPTEMBER 3, 2024

MOREY ASSOCIATES LTD.
CONSULTING ENGINEERS

2672 Highway 43, PO Box 184
Kemptville, Ontario, K0G 1J0
info@moreyassociates.com
613.215.0605

REPORT ON

SCOPED HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS
6008 HURLEY ROAD
TOWNSHIP OF EDWARDSBURGH/CARDINAL
UNITED COUNTIES OF LEEDS AND GRENVILLE, ONTARIO

Submitted to:

Lockwood Brothers Construction
2010 Totem Ranch Road
Oxford Station, Ontario
K0G 1T0

DISTRIBUTION
1 PDF copy – Lockwood Brothers Construction

September 2024

File No. 024241

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1.0 INTRODUCTION

Morey Associates Ltd. was retained by Lockwood Brothers Construction (hereinafter referred to as the client) to carry out a scoped hydrogeological assessment and terrain analysis in support of three proposed lot severances located at 6008 Hurley Road within Lot 36, Concession 6, in the Township of Edwardsburgh/Cardinal, United Counties of Leeds and Grenville, Ontario (see Key Plan, Figure 1).

For the purposes of this report Hurley Road is considered to exist at the east side of the subject site. The subject site of this report consists of the existing property known as 6008 Hurley Road plus the property adjacent to the north, south and west boundaries of 6008 Hurley Road which consists of the existing property with Roll No. 070170104018103. The above mentioned two properties are hereinafter collectively referred to as the "subject site" or "site".

It is understood that the above mentioned severances will create three proposed dwelling lots with frontage on the west side of Hurley Road, and that the existing property at 6008 Hurley Road will be increased in plan area by a lot addition (see attached Severance Sketch, Appendix A). A single family dwelling serviced by an on-site private drilled well and on-site private sewage system currently exists at 6008 Hurley Road. The three proposed dwelling lots consist of, in general, irregular rectangular shaped parcels of land some 1.95, 0.74 and 1.14 hectares in plan area and the existing property at 6008 Hurley Road, following the above mentioned lot addition, is to consist of a rectangular shaped parcel of land some 0.89 hectares in plan area. It is further understood that the future dwellings at the three proposed dwelling lots are to be serviced by proposed on-site private wells and on-site private sewage systems (Class 4 septic systems) as municipal servicing (watermain and sanitary sewer) is not available for the subject site.

1.1 ASSESSMENT OBJECTIVES

This scoped assessment report summarizes the results of a review of readily available geological, physiographical, and hydrogeological information for the site and site area, and the results of field work carried out at the subject site that is considered to provide a reasonable expectation of the actual hydrogeological conditions at the subject site.

This scoped assessment addresses our interpretation of the relevant requirements outlined in the Ontario Ministry of the Environment, Conservation and Parks (MECP) technical guideline documents titled “MOEE Hydrogeological Technical Information Requirements For Land Development Applications” (April 1995), “D-5-5 Private Wells: Water Supply Assessment” (August 1996), and “D-5-4 Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment” (August 1996) in view of the site setting and proposed site development.

The following were the primary objectives of this present scoped hydrogeological assessment and terrain analysis:

- To investigate the potential quantity and quality of groundwater that would be expected from water supply wells drilled at the subject site to service the proposed dwelling lots based on, in general, the results of a well pumping test and water sample laboratory testing of a test well at the site.

- To provide limited recommendations for design of private services, from a scoped hydrogeological assessment point of view, in view of the expected hydrogeological conditions at the site.

1.3 METHODOLOGY

This scoped hydrogeological assessment and terrain analysis involved the review of readily available literature and maps regarding the geology and physiography of the site and the general site region. Aerial and “street level” photographs available from online sources such as, but not necessarily limited to, Google Maps, Google Earth, and County, Provincial, and Conservation Authority Geographic Information System (GIS) mapping websites, were also utilized.

MECP Water Well Records (well records) obtained from the Province of Ontario (MECP) map based well records search website were reviewed to obtain information regarding well construction for wells and to obtain information regarding aquifers utilized for domestic water supply for the general area surrounding the site. A summary of information provided on 6 well records indicated to be for wells located within about a 500 metre radius of the subject site is provided in the attached Table I: MECP Well Records Summary. That summary includes the well record for the selected

test well (Well ID 2406623 – servicing the existing dwelling located at 6008 Hurley Road) which was used for the above mentioned pumping test and well water sampling and testing. The well records summarized in Table I are provided in the attached Appendix B. The approximate locations of the wells associated with the above mentioned well records are provided on the attached Figure 4. The approximate well locations indicated on Figure 4 are based on the information provided on the well records by the well drillers. Other well records/wells are indicated to be within a 500 metre radius of the subject site on the MECP online map based well records search website. However, based on a review of the location information provided by the well drillers on those well records it was either apparent or could not be concluded with confidence that those well records represented wells that are actually located within the 500 metre radius of the subject site. For the purposes of this assessment and to avoid potential misrepresentation of actual hydrogeological conditions, only the well records that could be determined, with a relatively high degree of confidence, to represent wells within about a 500 metre radius of the subject site were summarized in the above mentioned Table I.

A site reconnaissance visit, which also included putting down test pits at the site, was carried out by the undersigned on May 9, 2024. The results of the above mentioned test pits are provided in the attached Table V.

A well pumping test, in-situ well water quality testing, and well water sampling was carried out at the previously mentioned test well on June 19, 2024 (hereinafter referred to as “TW1” or the “test well”). As previously mentioned, the test well is located at 6008 Hurley Road (at the subject site) and provides domestic water supply to the existing dwelling at 6008 Hurley Road. The water samples obtained during the pumping test were delivered to Eurofins Environment Testing laboratories in Ottawa, Ontario for subsequent laboratory testing of the MECP “subdivision package” list of parameters and trace metals (Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Lead, Molybdenum, Nickel, Selenium, Silver, Strontium, Thallium, Uranium, Vanadium and Zinc). The factual results of the pumping test and in-situ water quality testing are provided in Appendix C and Table III, respectively. The laboratory testing results of the test well water samples are provided in Appendix D. Discussion of the results of the well pumping test, in-situ well water quality testing, and laboratory testing results of the well water samples are provided in following sections of this report.

2.0 PHYSICAL SETTING

The subject site is located on the west side of Hurley Road and north side of County Road 21 within Lot 36, Concession 6, in the Township of Edwardsburgh/Cardinal, United Counties of Leeds and Grenville, Ontario (see Key Plan, Figure 1 and Appendix A). The site is located within, in general, a sparsely developed, agricultural land setting. The proposed dwelling lots are currently, in general, vacant grassed fields.

As indicated on the Severance Sketch, see Appendix A, prepared by Zanderplan (understood to be the planning consultant for the proposed severances) and on the Aerial Photograph And Well Locations, Figure 4, a drainage swale indicated to be draining south/southwest away from the site, exists within the south portion of the subject site. The South Nation Conservation Authority (SNC) GIS mapping website also indicates a watercourse (Keelers Creek) exists about 300 metres east of the subject site and is aligned in about the north-south direction (see attached Figure 4). The above mentioned swale and creek are indicated to ultimately drain to the South Nation River which exists some 600 metres south/southeast of the subject site.

The attached Aerial Photograph And Well Locations, Figure 4 provides a relatively recent (Google Earth Imagery Date 3/30/2024) aerial photograph of the area within about a 500 metre radius of the subject site. The following provides a general description of the physical setting for the lands within about a 500 metre radius of the subject site.

The site is bordered, in general, on the north by scattered existing dwellings and agricultural fields, on the east by Hurley Road, with agricultural fields, an existing dwelling, Keelers Creek and woodland beyond, on the south by County Road 21 with existing dwellings, agricultural fields, the above mentioned drainage swale and some woodland beyond, and on the west by an existing dwelling and agricultural fields. A sawmill (Malwood Sawmills) is indicated to exist some 200 metres southeast of the site at the property known as 3609 County Road 21.

2.1 LAND USE

Based on zoning by-law mapping obtained from the Township of Edwardsburgh/Cardinal website the site and surrounding area is indicated to be zoned rural and agricultural. The local land use is, in general, rural residential and agricultural.

Some 8 existing dwellings, including the existing dwelling at 6008 Hurley Road, are indicated to be located within about a 500 metre radius of the subject site (based on review of relatively recent available aerial photographs). The town of Spencerville, considered to be the closest rural settlement to the site, is located some 4 kilometres northeast of the site.

No waste disposal sites are indicated to exist within 2 kilometres of the site.

Based on a search of the MECP Access Environment database search website, no MECP issued Permits To Take Water are indicated within 2 kilometres of the site.

The above mentioned Severance Sketch (see Appendix A) indicates two building setback lines at the subject site (within about the north portion of the site and within about the southwest corner of the site) related to the “Minimum Distance Separation” (MDS) required for the proposed dwelling development at the site to livestock facilities that exist beyond the site. Based on a discussion with a representative of Lockwood Brothers Construction it is understood that the livestock facility north of the subject site consists of a relatively low number of cattle (possibly 2 cows) and that there is a potential for livestock southwest of the site (i.e.: it is understood there is no current livestock related to the MDS southwest of the site).

2.2 SITE PHYSIOGRAPHY AND DRAINAGE

Based on the SNC website the site is located within the Upper South Nation subwatershed. As previously mentioned, a drainage swale exists at the site within about the south portion of the site and drains to the south through a cross road culvert beneath County Road 21 and ultimately to the South Nation River which exists some 600 metres south/southeast of the subject site. Roadside ditching exists along Hurley Road and County Road 21 adjacent to the site.

The site is located within a mapped area of Till Plain and Sand Plain (as indicated by Chapman and Putnam, 1973). The Sand Plain is indicated to be glacio-fluvial in origin and the Till Plain in this area is indicated to be drumlinized.

As indicated by available topographical information for the site, the ground surface at the site is relatively flat with a gentle slope from about the northwest portion of the site downwards to south/southeast portions of the site. Based on observations made at the time of the above mentioned site reconnaissance visit the site is, in general, relatively flat. The site, in general, appears to be moderately drained by the existing roadside ditching system and previously mentioned existing drainage swale. No surface water was observed at the site at the time of the above mentioned site reconnaissance. However, the ground surface was observed to be wet within the above mentioned existing drainage swale at the site. No exposed bedrock was observed at the ground surface at the site. Based on the site drainage conditions observed at the time of the site visit and the direction of surface drainage flow, any shallow groundwater flow at the site is inferred to be towards the south in a direction towards the South Nation River.

3.0 SITE GEOLOGY

3.1 SURFICIAL GEOLOGY

A review of the surficial geology map for the site area (Chapman and Putnam 2007) indicates that the site is underlain by till plains, see attached Surficial Geology Map, Figure 2.

Karst mapping completed by Brunton and Dodge (2008) indicates that the closest mapped potential karst/inferred karst areas are located some 28 kilometres east of the subject site. No karst features for the general site area are indicated to exist on available karst mapping.

Drift thickness mapping published by the Ontario Geological Survey provides no data points for the subject site and limited datapoints for the area within about a 500 metre radius of the subject site. However, where provided the drift thickness mapping indicates overburden thicknesses of between 7.9 to 12.6 metres.

A review of the well records provided in the attached Table I, which includes the test well located at the site and wells indicated to be located within about a 500 metre radius of the site, indicate overburden thicknesses at the wells of between 3.7 to 13.4 metres.

Thin soils as defined in Ontario Regulation 153/04 consists of soil equal to or less than 2 metres in depth (exclusive of any surficial asphaltic concrete, concrete or aggregate). Based on the above surficial geology information, thin soil conditions are not indicated to exist at the subject site.

3.2 BEDROCK GEOLOGY

The bedrock geology map for the site area indicates that the bedrock underlying the site and general site area consists of dolostone, minor shale and sandstone of the Oxford Formation (Ontario Geological Survey 2007), see attached Bedrock Geology Map, Figure 3.

A review of the summarized well records information provided in the attached Table I indicates the bedrock surface at the wells was encountered by the well drillers at depths ranging from between about 7.9 to 12.6 metres below the ground surface.

Limestone is reported by the well drillers on the above mentioned well records. Sandstone overlying limestone is reported by the well driller for the subject site test well.

4.0 REGIONAL HYDROGEOLOGY

4.1 SITE SETTING

The site and surrounding area are within a region where drinking water source protection is regulated by the SNC. Based on the SNC GIS mapping website the site and surrounding area are not within a wellhead/drinking water source protection area.

4.2 MECP Well Records

As previously mentioned, a summary of information provided on 6 well records indicated to be for wells located within about a 500 metre radius of the subject site is provided in the attached Table I: MECP Well Records Summary. Information relevant to this scoped assessment provided on those well records is summarized below.

- Well depths range between some 21.3 to 32.0 metres. The wells are indicated to be completed, in general, into a limestone bedrock aquifer.

- The well drillers indicated on the well records that water was found at the wells at depths ranging between about 7.9 to 29.9 metres, with an average depth that water was found of about 22.9 metres.

- Reported well yields (recommended pump rates by the well drillers on the well records) are indicated to range between some 19 L/min to 113 L/min with an average well yield of about 46 L/min.

Based on a review of the information provided on the well records summarized in the attached Table I and on the indicated location of those associated wells, it is considered that wells completed into a limestone bedrock aquifer likely represent the expected hydrogeological conditions at the site.

Based on the above information, it is considered that the test well (Well ID 2406623) located at the site offers a reasonable expectation that the hydrogeological conditions at the test well location will be similar to the conditions at the three proposed dwelling lots. The results of the above mentioned pumping test and discussion regarding well water quantity are provided in the below report Section 5.0.

4.3 Regional Water Quality Impacts

Based on the previously mentioned land uses identified for the general site area, it is expected that groundwater impacts would most likely be evident in the form of elevated levels of nitrate, nitrite,

sodium and chloride due to effluent loading from sewage systems, nitrogen rich nutrient spreading on ground surface for agriculture, and the application of road salt.

The results of the laboratory testing of the well water samples obtained from the test well (which are discussed in further detail in the below report Section 6.0) indicate nitrate and nitrite levels of 0.17 to 0.19 mg/L and less than the laboratory reporting limit (<0.1 mg/L), respectively, and relatively low levels of sodium and chloride (7 and 12.6 to 11.9 mg/L, respectively). Based on the above laboratory testing results and current site setting, it is considered that no significant undue surface impact is identified for the subject site.

5.0 WELL WATER QUANTITY

5.1 PUMPING TEST TW1

As previously mentioned, a pumping test was conducted at TW1 on June 19, 2024, by a member of our technical field staff at the existing well servicing the dwelling located at 6008 Hurley Road and consisted of a six hour duration constant discharge rate pumping test. During the pumping test, water level measurements were made on a regular basis to monitor the drawdown of the water level in the well in response to pumping. After the pumping period, the pump was shut off and the recovery of the water level in the well was monitored for a period of time. During the pump test, the pump discharge outlet was located an adequate distance and downgradient from the well to ensure the discharge did not interfere with the natural recharge to the well.

The drawdown and recovery data for the well pumping test is shown in Appendix C. The drawdown and recovery data provided were measured with reference to the top of the test well casing.

The pumping test data for the test well was analyzed using the method of Cooper and Jacob (1946). Although the assumptions on which these equations are based are not strictly met, this method provides a reasonable estimate of the aquifer transmissivity. The analysis of the data obtained during the pumping test is summarized in the attached Table II.

The six hour duration pumping test was carried out at a discharge rate of about 27 litres per minute (6 Igpm). The static water level prior to testing was about 6.16 metres below the top of the test well

casing and the water level after six hours of pumping was about 23.02 metres below the top of the test well casing for a total drawdown at the end of pumping of 16.86 metres. The available drawdown in the test well is approximated at about 21.4 metres. The specific capacity of the test well at the pumping test rate is approximately 2.3 cubic metres per day per metre of drawdown. At the end of pumping, about 130 minutes was required for 100 percent recovery of the total drawdown in the static water level created during pumping.

Based on the pumping test drawdown data the transmissivity of the aquifer is estimated to be 8.0 m^2/day. Based on the pumping test recovery data the aquifer transmissivity is estimated to be 1.4 m^2/day. The average transmissivity of the aquifer in the area of the test well is estimated to be 4.7 m^2/day.

Based on the data obtained during the pumping test, it can be concluded that the test well is capable of sustaining a short term yield of at least 27 litres per minute (6 Igpm) and that during the course of the six hour pumping period about 79 percent of the available drawdown in the test well was utilized.

5.2 SUMMARY OF TRANSMISSIVITY ANALYSIS

The above mentioned estimated transmissivity values based on the pumping test drawdown and recovery data are summarized in Table 5.1 and classified regarding magnitude, designation and groundwater supply potential based on Krasny (1993).

Table 5.1: Classification of Transmissivity Values

[1]Magnitude (m^2/day)	[1]Class	[1]Designation	[1]Groundwater Supply Potential	Transmissivity Values Based on Existing On-Site Well Pumping Test		
				Pump.	Rec.	Avg.
>1000	I	Very High	Regional Importance			
100 - 1000	II	High	Lesser Regional Importance			
10 - 100	III	Intermediate	Local Water Supply			
1 - 10	IV	Low	Private Consumption	8.0	1.4	4.7
0.1 - 1	V	Very Low	Limited Consumption			
<0.1	VI	Imperceptible	Very difficult to Utilize for Water Supply			

[1]Kransy (1993) 'Classification of Transmissivity Magnitude and Variation", Vol.31, No.2 - Ground Water

Based on the above, the test well is indicated to be capable of providing an adequate quantity related to a supply potential of private consumption. It is pointed out that a groundwater supply potential of "Private Consumption" is associated with a water supply well typically adequate for rural residential development serviced by individual on-site private wells.

5.3 SUMMARY OF WELL YIELDS

The MECP Guideline D-5-5 Section 4.3.2 states, with regard to water quantity requirements, *"The per-person requirement shall be 450 litres per day. Peak demand occurs for a period of 120 minutes each day. This is equivalent to a peak demand rate of 3.75 litres/minute for each person. The basic minimum pumping test rate is this rate multiplied by the 'likely number of persons per well' which, for a single family residence, shall be the number of bedrooms plus one. Unless it is otherwise established to MOEE's satisfaction, a minimum of four bedrooms shall be used in the calculation. However, regardless of the results of this calculation, this rate shall not be less than 13.7 litres/minute".*

Based on the above, the MECP recommended peak demand rate for a four bedroom dwelling is about 18.8 litres per minute. And for five persons occupying a four bedroom dwelling, a 2,250 litre daily water requirement is indicated.

During the pumping test some 9,720 litres of water was pumped from TW1 at a rate of 27 litres per minute for 6 consecutive hours and resulted in the use of 79 percent of the available test well drawdown depth. Within 130 minutes after the pumping test the water level fully recovered to above the static water level measured before the pumping test started. The results of the well pumping test carried out on TW1 for this present scoped assessment indicates that the test well is capable of meeting the MECP minimum demand rate of 13.7 litres per minute and is capable of meeting the MECP peak demand rate for a four bedroom dwelling (about 18.8 litres per minute). The results also indicate that 2,250 litres of water can be removed from the test well aquifer with an expected full well recovery within about 130 minutes.

As mentioned above, the lowest and average well yields for the previously mentioned well records indicated to be completed into a limestone bedrock aquifer located within about 500 metres of the subject site, which are considered likely representative of the expected hydrogeological conditions at the site, are about 19 and 46 litres per minute, respectively. These well yields indicate that the

wells are capable of meeting the MECP minimum demand rate of 13.7 litres per minute and are capable of meeting the MECP peak demand rate for a four bedroom dwelling (about 18.8 litres per minute).

It is considered that, based on the three proposed dwelling lots sizes (0.74 to 1.95 hectares), the existing relatively low density of residential development in the general site area, the results of the above mentioned pumping test, and the reported well yields on the reviewed well records, sufficient well water quantity is indicated to exist in the limestone bedrock aquifer for the proposed development at the three proposed dwelling lots.

6.0 WELL WATER QUALITY

Groundwater samples were collected from TW1 at about hours 3 and 6 of the above mentioned pumping test on June 19, 2024, and prepared/preserved in the field using appropriate techniques and submitted to Eurofins Environment Testing Laboratory (Eurofins) in Ottawa, Ontario for laboratory testing of the MECP “subdivision package” list of parameters and trace metals. The water samples were collected in the Eurofins provided sample bottles with appropriate preservatives where required. No field filtering was carried out for the samples as the samples were analyzed for total metals. The sample bottles were placed in a cooler with ice packs for temporary storage prior to and during delivery to Eurofins. The water samples were deemed compliant upon receipt by Eurofins. Prior to sampling, the well water was tested several times for free and total chlorine using a Hanna Instruments HI93414 Turbidity and Free/Total Chlorine Meter. That meter was calibrated by a member of our technical field staff prior to carrying out the pumping test/well water sampling field work and the results of the calibrating indicated that the meter met the HI93414 calibration literature requirements. Sampling of the well water was not carried out until a reading of 0 for free and total chlorine was obtained.

The in-situ temperature, electrical conductivity (EC), pH, total dissolved solids (TDS), turbidity, free and total chlorine levels and apparent colour of the well water were measured just prior to sampling and at other periodic intervals during the above mentioned pumping test. The in-situ temperature, pH, EC and TDS was measured using a Hanna Instruments HI98129 pH/EC/Temp./TDS Meter. That meter was calibrated by a member of our technical field staff prior to carrying out the pumping test/well water sampling field work and the results of the calibrating indicated that the meter met the

HI98129 calibration literature requirements. The in-situ apparent colour was measured using a Hanna Instruments HI727 Handheld Color of Water Colorimeter. That colorimeter was calibrated by a member of our technical field staff prior to carrying out the pumping test/well water sampling field work and the results of the calibrating indicated that the colorimeter met the HI727 calibration literature requirements.

The results of the above mentioned in-situ field testing are provided in the attached Table III. Those results indicate that once the well pumping test was well underway, at hours 4, 5 and 6, the pH, TDS, turbidity and apparent colour levels measured all met the Ontario Drinking Water Standards, Objectives and Guidelines (ODWSOG). Some elevated levels of turbidity and apparent colour were measured during about the first half of the pumping test, which is not uncommon in our technical field staffs' experience having carried out well pumping tests over the past some 30 years. It is considered that the in-situ measurements obtained during about the second half of the well pumping test are representative of the raw water from the test well bedrock aquifer.

The results of the above mentioned laboratory testing are provided in the attached Appendix D and are summarized with comparison to the ODWSOG in the attached Table IV.

The laboratory testing results of the well water samples indicate that the water samples meet all the Ontario Drinking Water Standards chemical, physical and bacteriological parameters tested for except for hardness and organic nitrogen.

Hardness

The water samples obtained from the test well are considered to be hard by water treatment standards with a hardness level above the ODWS operational guideline of 80 to 100 mg/L. The hardness for the samples tested was measured at 271 mg/L. The Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines, Revised June 2006, states *"Water supplies with a hardness greater than 200 mg/L are considered poor but tolerable. Hardness in excess of 500 mg/L in drinking water is unacceptable for most domestic purposes".*

The hardness levels of the water samples are less than what is considered unacceptable (greater than 500 mg/L) for most domestic purposes and are considered treatable. The levels of hardness

measured for the water samples obtained from the test well are well within the acceptable range that is considered reasonably treatable. Water softeners and/or manganese greensand filters are indicated to be adequate to lower hardness to acceptable levels. Water with hardness above 80 to 100 mg/L as $CaC0_3$ is often softened for domestic use. Water softening by conventional sodium ion exchange may introduce relatively high concentrations of sodium into the drinking water, which may contribute a significant percentage to the daily sodium intake for a consumer on a sodium restricted diet. Where ion exchange water softeners are used, a separate unsoftened water supply could be used for drinking and culinary purposes. As an alternative, water softening using potassium chloride could also be considered. A recommendation for water treatment specific to hardness is provided in the following report Section 10.2.

Organic Nitrogen

Organic nitrogen concentration is calculated as the difference between total Kjeldahl nitrogen (TKN) and ammonia. The concentrations of organic nitrogen for the 3 hour and 6 hour water samples obtained from the test well are calculated as 0.16 and 0.23 mg/L, respectively. The ODWS operational guideline for organic nitrogen is 0.15 mg/L and relates to the potential severe reduction for chlorine as a disinfectant. Organic nitrogen may also result in taste and odour problems with levels greater than 0.15 mg/L. Based on olfactory detection carried out by a member of our technical field staff during the above mentioned pump test on June 19, 2024, no odour problems were detected from the well water. Based on the results of bacteriological testing of the above mentioned water samples it is considered that a continuous/permanent disinfectant treatment system using chlorine for well water treatment at the three proposed dwelling lots is not likely. As such, it is considered that the presence of organic nitrogen slightly above the ODWS operational guideline in the 3 hour and 6 hour water samples is not expected to be a concern for the subject site from an operational guideline point of view.

7.0 SCOPED TERRAIN ANALYSIS

7.1 SOIL AND GROUNDWATER CONDITIONS ENCOUNTERED

Three test pits, labelled TP24-1, TP24-2 and TP24-3, were put down at the site using a rubber tire mounted excavator, supplied and operated by the client, at the time of the above mentioned site

reconnaissance visit on May 9, 2024. The logs of the test pits are provided in the attached Table V, Record of Test Pits. The approximate locations of the test pits is shown on the attached Figure 4. From the ground surface at all of the test pits about a 0.2 to 0.3 metre thickness of topsoil was encountered underlain by, in general, red brown to grey brown silty sand. Beneath the silty sand layer at TP24-1 a deposit of grey brown glacial till material was encountered. Test pit TP24-1 was terminated within the glacial till material at a depth of some 2.0 metres below the existing ground surface. Test pits TP24-2 and TP24-3 were terminated within a grey brown silty sand to sandy silt material at depths of some 2.1 and 2.2 metres below the existing ground surface, respectively.

A sample of the glacial till material encountered at test pit TP24-1 and a sample of the silty sand to sandy silt material encountered at test pit TP24-2 were delivered to a soil laboratory for grain size distribution testing, the results of which are provided in Appendix E.

The grain size distribution analysis indicates that the glacial till sample consists of about 38 percent gravel, about 28 percent sand and about 34 silt and clay. It is pointed out that cobbles and boulders were also observed within the glacial till material at the time of the field work. Based on the grain size distribution analysis and information published by the MECP relating grain size, percolation rate and permeability, it is estimated that the permeability coefficient for the glacial till sample ranges from some $1x10^{-4}$ to $3x10^{-6}$ cm/s, which relates approximately to percolation times of about 12 to 35 min/cm.

The grain size distribution analysis indicates that the silty sand to sandy silt sample consists of 0 percent gravel, about 35 percent sand, about 54 percent silt and about 11 percent clay. Based on the grain size distribution analysis and information published by the MECP relating grain size, percolation rate and permeability, it is estimated that the permeability coefficient for the silty sand to sandy silt sample ranges from some $3x10^{-4}$ to $4x10^{-5}$ cm/s, which relates approximately to percolation times of about 10 to 15 min/cm.

Relatively minor groundwater seepage was observed in test pit TP24-1 at about 0.3 metres below the existing ground surface. Below the above mentioned minor groundwater seepage test pit TP24-1 was relatively dry. Groundwater seepage was observed in test pits TP24-2 and TP24-3 at about 0.8 metres below the existing ground surface.

7.2 PROPOSED SEPTIC SYSTEMS

Based on the results of the scoped terrain analysis field work it is expected that the septic systems for the three proposed dwelling lots will consist of Class 4 partially to fully raised septic system leaching beds.

Based on the results of the above mentioned test pits it is considered that the future septic system leaching beds (septic envelopes) at the site may be constructed within areas of silty sand/sandy silt and glacial till. The loading rate for septic envelopes is to be in accordance with the 2012 Ontario Building Code (OBC), Table 8.7.4.1. Prior to establishing the actual/exact septic envelope size and location at the proposed dwelling lot, a site specific investigation should be carried out, meeting the 2012 OBC and South Nation Conservation Authority (sewage system approval authority for the site) requirements.

It is considered that based on the size of the three proposed dwelling lots all 2012 OBC septic system clearance distances should be readily achievable for proposed partially to fully raised septic system leaching beds at the site.

It is pointed out that septic system disposal treatment systems that have been approved for use by the OBC for Level IV treatment of effluent (known as tertiary treatment) could be considered for use at the three proposed dwelling lots rather than the above mentioned conventional Class IV leaching beds. The Level IV treatment systems are, in general, associated with smaller area dispersal leaching beds than conventional Class IV leaching beds, reduced separation distance between the underside of dispersal leaching bed and low permeability soils, bedrock, and seasonally high groundwater table. It is pointed out that some Level IV treatment systems have been indicated to reduce contaminants from effluent, such as nitrates.

Prior to construction of any sewage systems at the three proposed dwelling lots a Part 8 – Sewage Permit must be obtained from the local sewage system approval authority.

8.0 GROUNDWATER IMPACT ASSESSMENT

8.1 GENERAL

The previously mentioned MECP D-5-4 guideline provides three general considerations regarding groundwater impact assessment for proposed developments. The first consideration ("Step 1") is in regard to the proposed lot sizes of a residential development. In brief, the proposed severed lot size of 0.74 does not meet the plan area requirement of the above mentioned "Step 1" consideration. The "Step 2" consideration is a consideration regarding sewage effluent being hydrogeologically isolated from an existing or potential supply aquifer(s). A Step 2 assessment is outside the scope of work of this present scoped assessment. A Step 2 assessment can involve relatively extensive subsurface/hydrogeological investigation and analysis at the site and possibly for up to 500 metres beyond the site. It is considered prudent that the feasibility of carrying out an investigation and analysis for a Step 2 consideration be discussed with the consultant prior to carrying out that work. The "Step 3" consideration is a consideration regarding contaminant attenuation. Accordingly, based on the above a Step 3 approach was addressed for the subject site.

Prior to carrying out one of the groundwater impact assessment MECP "Steps", the MECP D-5-4 guideline indicates that it should be demonstrated that the subject site is not obviously hydrogeologically sensitive (i.e.: karstic areas, areas of fractured bedrock exposed at surface, areas of thin soil cover, or areas of highly permeable soils).

8.2 HYDROGEOLOGICAL SENSITIVITY

Based on the results of the review of available site physiographical and geological information and on the results of the field work carried out for this scoped assessment, no karstic areas, areas of fractured bedrock exposed at the ground surface, areas of thin soil cover, or areas of highly permeable soils were encountered or are expected for the subject site.

Based on the above, the subject site is not considered obviously hydrogeologically sensitive.

8.3 STEP 3 – PREDICTIVE ASSESSMENT

To obtain a general indication as to the potential impact of septic effluent on the properties adjoining the proposed severed and retained lots a nitrate dilution model was utilized. The annual water surplus for the site was estimated using meteorological data from the Environment Canada station at Kemptville and the potential evapotranspiration for the site calculated using the Thornthwaite Method. The estimate of water surplus using the Thornthwaite Method is shown in Appendix F. It is pointed out that the Town of Kemptville is located some 22 kilometres northeast of the subject site and based on the limited available meteorological stations available from Environment Canada is considered adequately representative of the weather at the subject site.

With regard to nitrate dilution calculations, the MECP D-5-4 guideline document states *"For the purposes of predicting the potential for groundwater impacts, a nitrate loading of at least 40 grams/lot/day per residential dwelling unit shall normally be used".* That guideline document also states in relation to the 40 grams/lot/day, *"This is based on expected actual flows of 1000 L/day and a minimum value of 40 mg/L nitrate-nitrogen in the discharge from a Class 4 or Class 6 system treating domestic/household sewage".* As such, a daily effluent loading of 1000 L/day was assumed per dwelling unit at the site in accordance with the MECP D-5-4 guideline document.

With regard to treatment and dispersal of effluent from a leaching bed, the expected impact on the groundwater of a septic system at the proposed severed and retained lots was determined by considering the attenuation of nitrate in the effluent from an assumed 40 mg/L (as N) at the septic tank to 10 mg/L (as N) at the site boundaries by dilution as a result of the infiltration of meteoric water only. The results of the calculation indicate that the expected concentration of nitrate at the down gradient boundary for the site is 4.0 mg/L, which meets the MECP nitrate impact limit of 10 mg/L (see Appendix F). The results of additional calculations indicate that a total of 8 dwelling units for the proposed severed and retained lots at the site would meet the MECP nitrate impact limit (with an expected concentration of nitrate at the down gradient boundary for the site calculated as 9.0 mg/L, see Appendix F). This additional calculation is provided as it may relate to possible future secondary dwelling units constructed at the subject site.

9.0 PROPOSED WELL CONSTRUCTION

Future wells at the site must be constructed, as a minimum, in accordance with Ontario Regulation 903 (O.Reg 903), as amended, and constructed in accordance with the recommendations outlined in this present assessment report (see report Section 10.0) and any municipal requirements.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 SUMMARY AND CONCLUSIONS

A scoped hydrogeological assessment and terrain analysis was carried out in support of three proposed lot severances that will create three proposed dwelling lots located on the west side of Hurley Road within Lot 36, Concession 6, in the Township of Edwardsburgh/Cardinal, United Counties of Leeds and Grenville, Ontario. The scoped assessment consisted of a review of readily available information from a hydrogeological point of view and on-site observations, field work and in-situ and laboratory testing.

Based on the results of the scoped assessment, the following conclusions are provided by Morey Associates Ltd. and are based on our interpretation of the relevant sections of the previously mentioned MECP guideline documents.

1) The results of this scoped assessment, discussed in the preceding report sections, indicates that there is a sufficient quantity of groundwater of acceptable drinking water quality in the bedrock aquifer system to satisfy the water requirements of the proposed future dwellings at the site.

2) The proposed severed and retained lots are indicated to be of sufficient size that the impact, if any, to the downgradient off property groundwater quality due to proposed septic system loading at the subject site, is not expected to exceed the acceptable impact as outlined in the MECP D-5-4 guideline.

3) Based on the results of this scoped assessment, the proposed severed and retained lots are considered suitable for development using private services, from a scoped hydrogeological and terrain analysis point of view.

10.2 RECOMMENDATIONS

Morey Associates Ltd. provides the following recommendations regarding proposed groundwater supply wells and sewage systems at the site. The reader(s) of this report should read/reference the entire report.

1) The future wells at the proposed severed and retained lots must be constructed, as a minimum, in accordance with Ontario Regulation 903 (O.Reg 903), as amended, and constructed in accordance with the recommendations outlined in this present assessment report and any municipal requirements.

2) Future wells drilled at the site should be constructed with a minimum 6 metre length of casing extending through overburden materials and set at least 1.5 metres into sound, competent bedrock. The entire annular space between the steel casing and the overburden/bedrock should be filled with a suitable cement and/or bentonite grout.

3) Once the steel well casing has been suitably sealed, the well should be advanced uncased in the bedrock. The proposed wells may have to be drilled to depths of up to some 32 metres below the ground surface (based on the well depths indicated on the attached Table I). However, due to possible changes in topography and because it is impossible to predict with certainty the depth(s) at which water-producing factures will be encountered during drilling, the above mentioned depth of 32 metres below the ground surface should be considered an approximate target depth only.

4) Any new wells drilled significantly deeper than 32 metres depth may require additional water quality testing and review to ensure the well water quality is in keeping with the findings of this present scoped assessment.

5) The final landscaping at the site should be graded such that surface water (including any eavestrough downspout discharge and sumpline discharge) is not directed to or ponds around the well head. New constructed wells should have casing heights extending not less than 0.4 metres above the ground surface. Future drilled wells at the site should be located up gradient of septic leaching beds and meet the clearance distances to septic system leaching beds and septic tanks indicated in the most recent version of the Ontario Building Code as amended.

6) In order to encourage domestic supply well education and best management practices future residents at the site should be made aware of and refer to the province of Ontario web-doc-publication: ontario.ca/document/water-supply-wells-requirements-and-best-practices

7) Future residents at the site should be made aware that it is considered prudent to adhere to the regulatory well maintenance requirements, general maintenance for well owners (Table 11-1: Well Maintenance Checklist Items), and well water quality laboratory testing outlined in the above mentioned province of Ontario web-doc publication.

8) Future residents at the site should be made aware of and refer to the Province of Ontario publications titled “Septic Smart! Understanding Your Home’s Septic System (available for download at time of preparation of this report on the Province of Ontario website, www.ontario.ca/files/2022-10/omafra-septic-smart-understanding-home-wastewater-system-en-2022-10-14.pdf).

9) Based on the testing results of water samples obtained from the test well, well water may exceed the prescribed operational guidelines for hardness and organic nitrogen. Organic nitrogen levels encountered at the test well are not indicative of requiring specific water treatment. Water treatment specific to hardness may be desired to mitigate hard water concerns. Commercially available water softeners are indicated to be adequate to treat hardness concentrations encountered at the test well.

10) Future residents at the site should be made aware that the use of conventional sodium ion exchange water softeners may introduce relatively high concentrations of sodium into the

drinking water, which may contribute a significant percentage to the daily sodium intake for a consumer on a sodium restricted diet. Where sodium ion exchange water softeners are used, a separate unsoftened water supply could be used for drinking and culinary purposes. Alternatively, commercially available potassium chloride ion exchange water softeners could be considered.

11) In addition to the above mentioned recommendation (recommendation No. 10) and as per the MECP D-5-5 Guideline Document, if water softening is utilized, a warning should be registered on title with a recommendation that a separate tap, which by-passes the softener, be installed to supply unsoftened drinking water.

12) Future residents at the site should be made aware that water wells should be adequately disinfected prior to use, and that wells must be accessible in perpetuity for maintenance, repair and replacement, as per O.Reg 903.

11.0 LIMITATIONS AND USE OF REPORT

This report was prepared for the exclusive use of Lockwood Brothers Construction. This report may not be relied upon by any other person or entity without the express written consent of Lockwood Brothers Construction and Morey Associates Ltd.

This scoped hydrogeological assessment and terrain analysis does not address the design/construction of earth/groundwater energy systems at the site. Should earth/groundwater energy systems be considered for construction at the site hydrogeological studies and subsurface investigations may be required for obtaining approvals of such systems.

This report documents work that was carried out with generally accepted professional standards at the time and location in which the services were provided and in a manner consistent with a level of care and skill normally exercised by other professional engineering and geoscientist firms practicing under similar conditions and subject to the time limits and financial and physical constraints applicable to the services.

Any third party use of this report, including reliance of this report and/or decisions made based on this report, is the sole responsibility of the third party. Morey Associates Ltd. accepts no responsibility for damages, whether direct or indirect, suffered by any third party as a result of any third party use of this report.

The conclusions provided herein represent an opinion of Morey Associates Ltd. as of the time of preparation of this report. It is recognized that the passage of time affects the information provided in this report. This report should not be construed as legal advice, nothing in this report is intended to provide a legal opinion. If new information is discovered during future work, including excavations, borings or other studies, Morey Associates Ltd. should be requested to re-evaluate the conclusions presented in this report and provide amendments as required.

12.0 SIGNATURE

We trust that this report is sufficient for your present requirements. If you have any questions concerning this report, please do not hesitate to contact our office.

Yours truly,
Morey Associates Ltd.

D. G. Morey, P.Eng.
Principal | Consulting Engineer

13.0 REFERENCES

Chapman, L.J. and Putnam, D.F. 2007. Physiography of Southern Ontario; Ontario Geological Survey, Miscellaneous Release-Data 228.

Armstrong, D.K. and Dodge, J.E.P. 2007. Paleozoic Geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release-Data 219.

Armstrong, D.K. and Dodge, J.E.P. 2008. Karst of South Ontario and Manitoulin Island; Ontario Geological S4urvey, Groundwater Resources Study 5.

Ontario Ministry of the Environment, Conservation and Parks: MOEE Hydrogeological Technical Information Requirements for Land Development Applications, 1995.

Ontario Ministry of the Environment, Conservation and Parks: Procedure D-5-5: Technical Guideline for Private Wells: Water Supply Assessment, August 1996.

Ontario Ministry of the Environment, Conservation and Parks: Procedure D-5-4: Technical Guideline for Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment, August 1996.

Ontario Ministry of the Environment, Conservation and Parks: On line map-based water well records search website.

Ontario Ministry of the Environment, Conservation and Parks: Source Protection Information Atlas, mapping website

Kransy: Classification of Transmissivity Magnitude and Variation, Vol.31, No.2 - Ground Water, dated 1993.

Province of Ontario: Web-doc publication – Water Supply Wells: Requirements and Best Practices, revised April 2015.

Province of Ontario: Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines, revised June 2006.

South Nation Conservation Authority: GeoPortal Website.

Google Earth: Google Earth Pro Application Imagery.

TABLE I
MECP WELL RECORDS SUMMARY

Well ID	*Stratum Description*	*Geology Stratum Top Depth (m)*	*Geology Stratum Bottom Depth (m)*	*Well Completion Date (mm/yyyy)*	*Drill Method*	*Casing Depth Below Ground Surface (m)*	*Depth at which Water was Found (m)*	*[1] Well Yield (L/min)*
2406623 6008 Hurley Rd (Test Well)	Topsoil	0.0	0.6	01/1988	Cable Tool	7.6	19.8, 25.9	113
	Sand, clay, stones	0.6	7.3					
	Sandstone	7.3	21.9					
	Limestone	21.9	27.4					
A006980 Possibly 6031 Hurley Rd	Sand, stones, clay	0.0	3.7	05/2004	Rotary (Air) & Air Percussion	6.6	7.9, 28.3	46
	Limestone	3.7	29.9					
2402629 Possibly 3532 CR-21	Topsoil, sand	0.0	0.6	08/1973	Air Percussion	13.1	23.8	19
	Clay, boulders	0.6	12.5					
	Limestone	12.5	25.9					
2402000 Possibly 3609 CR-21	Sand, gravel, boulders	0.0	13.4	01/1970	Rotary (Air)	14.3	17.7	38
	Limestone	13.4	21.3					
2403200 Possibly 3704 CR-21	Topsoil	0.0	0.6	02/1976	Rotary (Air)	11.6	29.6	38
	Clay, sand, gravel, boulders	0.6	11.6					
	Limestone	11.6	32.0					
2404543 Possibly 3717 CR-21	Hardpan, boulders	0.0	12.8	06/1981	Air Percussion	13.4	29.9	19
	Limestone	12.8	32.0					

[1] Recommended pumping rate indicated by well driller on well records & assuming US gpm on well records

TABLE II
SUMMARY OF PUMPING TEST RESULTS AND WELL PARAMETERS
FOR TEST WELL

Well	Tp (m^2/day)	Tr (m^2/day)	Tav (m^2/day)	Q (m^3/day)	SC (m^3/day/m)	ho m	hf m	Td m	TD m	CS m	AD m
Test Well (6008 Hurley Rd)	8.0	1.4	4.7	39.3	2.3	6.16	23.02	16.86	27.4	0.20	21.4

Well	% Available Drawdown Used
	79%

Note:

Tp:	Transmissivity as calculated from pumping data (m^2/day)
Tr:	Transmissivity as calculated from recovery data (m^2/day)
Tav:	Average transmissivity (average of pumping and recovery) (m^2/day)
Q:	Test pumping rate (m^3/day)
SC:	Specific Capacity (m^3/day/m)
ho:	Static water level (below top of casing) at beginning of pumping test (metres)
hf:	Water level (below top of casing) at end of 6 hour pumping test (metres)
Td:	Total drawdown (metres)
TD:	Total depth of well (below ground surface) (metres)
CS:	Casing stickup above ground surface, as measured at time of pumping test (metres)
AD:	Approximate available drawdown (metres)

TABLE III
RESULTS OF IN-SITU WATER QUALITY MEASUREMENTS
FOR TEST WELL

Test Well	Hours Since Pumping Started	Temp. (°C)	Conductivity (uS/cm)	pH (pH units)	TDS (ppm)	Turbidity (NTU)	Colour [Apparent] (TCU)	Free Chlorine (mg/L)	Total Chlorine (mg/L)	Odour[1,2]	Sample
Test Well (6008 Hurley Rd)	1	16.7	536	8.0	258	13.7	20	-	-	none	-
	2	16.7	499	7.8	247	8.2	15	-	-	none	-
	3	18.6	489	7.8	256	2.3	10	0.00	0.00	none	3hr sample
	4	16.6	484	7.7	229	2.6	5	0.00	0.00	none	-
	5	16.6	480	7.7	227	2.4	5	0.00	0.00	none	-
	6	16.7	482	7.6	223	2.1	0	0.00	0.00	none	6hr sample

[2]Olfactory detection used for odour.

[1]Chlorination of the test well was carried out prior to commencement of pumping test.

In-Situ Water Quality Testing Equipment:

Hanna Instruments HI93414 Turbidity and Free/Total Chlorine Meter - Calibrated and battery check prior to field work.

Hanna Instruments HI98129 pH/EC/Temp./TDS Meter - Calibrated and battery check prior to field work.

Hanna Instruments HI727 Handheld Color of Water Colorimeter - Calibrated and battery check prior to field work.

TABLE IV - SUMMARY OF TEST WELL LABORATORY WATER QUALITY TESTING

Parameter	RL	Units	[1]Guideline	3hr sample	6hr sample
Anions					
Chloride	0.5	mg/L	AO 250	12.6	11.9
Nitrate (as Nitrogen)	0.1	mg/L	MAC 1	0.17	0.19
Nitrite (as Nitrogen)	0.1	mg/L	MAC 10	<0.1	<0.1
Sulphate	1	mg/L	AO 500	28	28
Calculations					
Ion Balance	0.1	-	-	1.00	1.00
General Chemistry					
Alkalinity (as CaCO3)	5	mg/L	OG 30-500	245	244
Colour (true)	2	TCU	AO 5, T[2] 7	2	<2
Conductivity (at 25 degree C)	5	uS/cm	-	512	516
Dissolved Organic Carbon	0.5	mg/L	AO 5, T[2] 10	1.2	1.1
Fluoride	0.1	mg/L	MAC 1.5	0.67	0.67
Hardness (as CaCO3)	1	mg/L	OG 80-100, 500[4]	***271***	***271***
pH (at 25 degree C)	1	-	OG 6.5-8.5	8.06	8.01
Phenols-4AAP	0.001	mg/L	-	<0.001	<0.001
Sulphide (S2-)	0.01	mg/L	AO 0.05	<0.01	<0.01
Tannin and Lignin	0.1	mg/L	-	0.1	0.1
Total Dissolved Solids	5	mg/L	AO 500	333	335
Turbidity	0.1	NTU	AO 5.0	0.39	1.00
Metals					
Aluminum	0.01	mg/L	OG 0.1	0.09	<0.01
Antimony	0.0005	mg/L	IMAC 0.006	<0.0005	<0.0005
Arsenic	0.001	mg/L	IMAC 0.025	<0.001	<0.001
Barium	0.001	mg/L	MAC 1	0.086	0.091
Beryllium	0.0005	mg/L	-	<0.0005	<0.0005
Boron	0.01	mg/L	IMAC 5	0.32	0.31
Cadmium	0.0001	mg/L	MAC 0.005	<0.0001	<0.0001
Calcium	1	mg/L	-	52	52
Chromium	0.001	mg/L	MAC 0.05	<0.001	<0.001
Cobalt	0.0002	mg/L	-	0.0004	0.0005
Copper	0.001	mg/L	AO 1	<0.001	<0.001
Iron	0.03	mg/L	AO 0.3, [2]T 5.0	0.12	0.05
Lead	0.001	mg/L	MAC 0.01	<0.001	<0.001
Magnesium	1	mg/L	-	34	34
Manganese	0.01	mg/L	AO 0.05	0.02	0.02
Molybdenum	0.005	mg/L	-	<0.005	<0.005
Nickel	0.005	mg/L	-	<0.005	<0.005
Potassium	1	mg/L	-	6	6
Selenium	0.001	mg/L	MAC 0.05	<0.001	<0.001
Silver	0.0001	mg/L	-	<0.0001	<0.0001
Sodium	1	mg/L	AO 200, A 20	7	7
Strontium	0.001	mg/L	7 [Health Canada Proposed]	1.81	1.85
Thallium	0.0001	mg/L	-	<0.0001	<0.0001
Uranium	0.001	mg/L	MAC 0.02	<0.001	<0.001
Vanadium	0.001	mg/L	-	<0.001	<0.001
Zinc	0.01	mg/L	AO 5	<0.01	<0.01
Microbiology					
E. Coli	0	CFU/100mL	MAC Not detectable	0	0
Total Coliforms	0	CFU/100mL	MAC Not detectable	0	0
Fecal Coliforms	0	CFU/100mL	-	0	0
Heterotrophic Plate Count	0	CFU/1mL	-	33	151
Nutrients					
Ammonia (Total, as Nitrogen)	0.02	mg/L	-	0.119	0.121
Total Kjeldahl Nitrogen	0.1	mg/L	-	0.276	0.352
[5]Organic Nitrogen	-	mg/L	OG 0.15	***0.16***	***0.23***

[1] Guideline = Ontario Drinking Water Standards Objectives and Guidelines

[2] MOE Maximum Concentration Considered Reasonably Treatable (See MOE Guideline `D-5-5 Private Wells: Water Supply Assessment`)

[3] Table 2, Appendix, MOE Guideline `D-5-5 Private Wells: Water Supply Assessment` document

[4] "Hardness in excess of 500mg/L in drinking water is unacceptable for most domestic purposes" - Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines, Revised June 2006, Province of Ontario.

[5] Organic Nitrogen=Total Kjeldahl Nitrogen - N-NH3, and should not exceed 0.15 mg/L

RL = Reporting Limit
AO = Aesthetic Objective
OG = Operational Guideline
MAC = Maximum Acceptable Concentration
IMAC = Interim Maximum Acceptable Concentration
T = Treatability Limit (See Note 2)
A = Advisory Limit (See Note 3)
Bold Italic = AO, OG, A, T, or MAC Guideline Exceedence

TABLE V
RECORD OF TEST PITS

6008 HURLEY ROAD
TOWNSHIP OF EDWARDSBURGH/CARDINAL
UNITED COUNTIES OF LEEDS AND GRENVILLE, ONTARIO

TEST PIT NUMBER	DEPTH (METRES)	DESCRIPTION
TP24-1	0.00 – 0.20	TOPSOIL
	0.20 – 0.50	Red brown SILTY SAND, trace to some clay
	0.50 – 0.90	Grey brown SILTY SAND, trace to some clay
	0.90 – 2.00	Grey brown silty sand, some clay, gravel, cobbles and boulders (GLACIAL TILL)
	2.00	End of test pit

Minor groundwater seepage into test pits observed at about 0.3 metres below existing ground surface, May 9, 2024.
No groundwater seepage observed in test pit below about 0.3 metres below existing ground surface and soil material within test pit relatively dry below 0.3 metres depth.

TP24-2	0.00 – 0.30	TOPSOIL
	0.30 – 0.80	Red brown SILTY SAND, trace to some clay
	0.80 – 1.10	Grey brown SILTY SAND, trace boulders, some shells
	1.10 – 2.10	Grey brown SILTY SAND to SANDY SILT, trace to some clay
	2.10	End of test pit

Groundwater seepage into test pit observed at about 0.8 metres below existing ground surface, May 9, 2024.

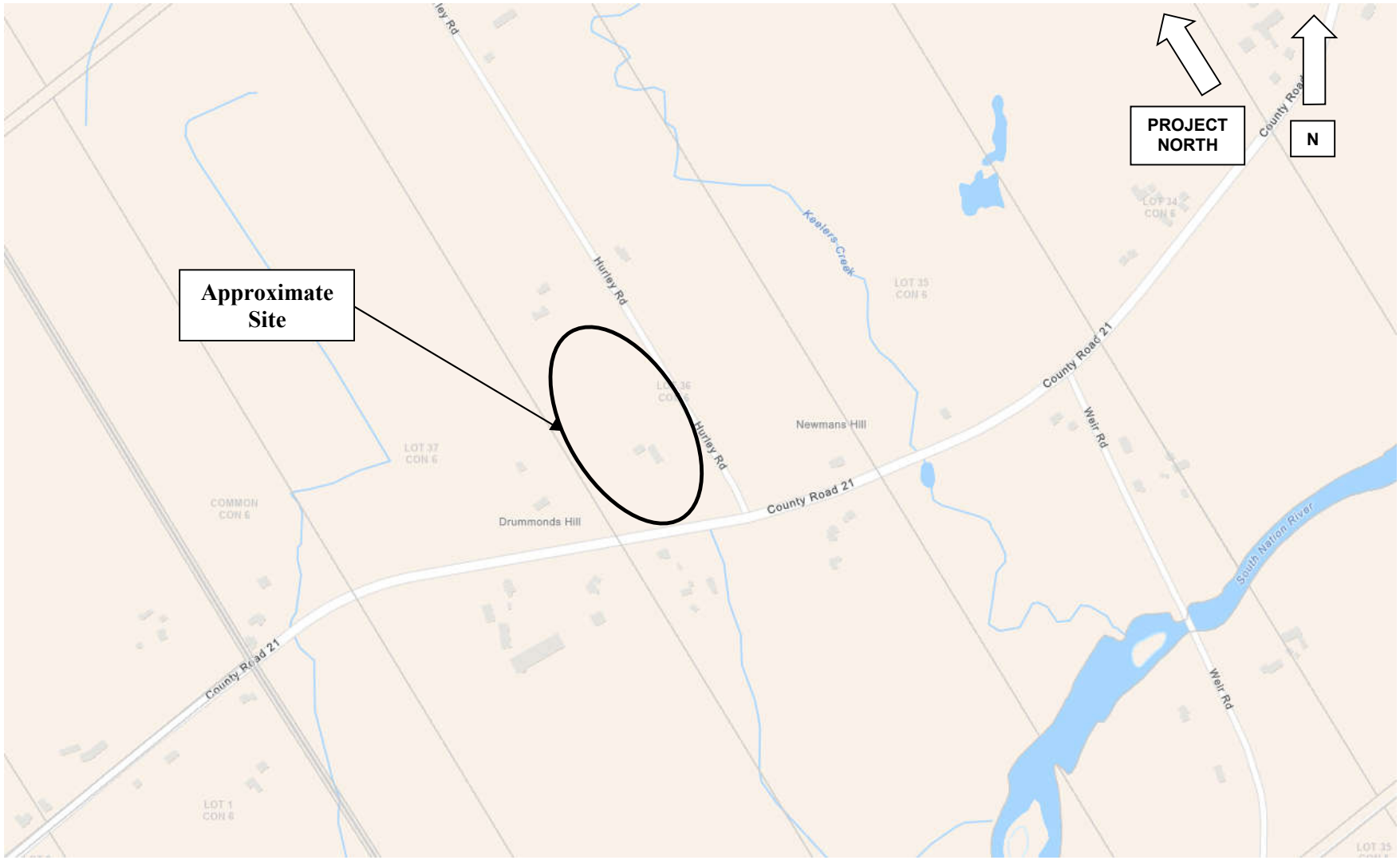
TABLE V CONTINUED

TEST PIT NUMBER	DEPTH (METRES)	DESCRIPTION
TP24-3	0.00 – 0.30	TOPSOIL
	0.30 – 1.20	Red brown SILTY SAND, trace to some clay
	1.20 – 2.20	Grey brown SILTY SAND to SANDY SILT, trace to some clay
	2.20	End of test pit

Groundwater seepage observed at about 0.8 metres below existing ground surface, May 9, 2024.

KEY PLAN

FIGURE 1



NOT TO SCALE

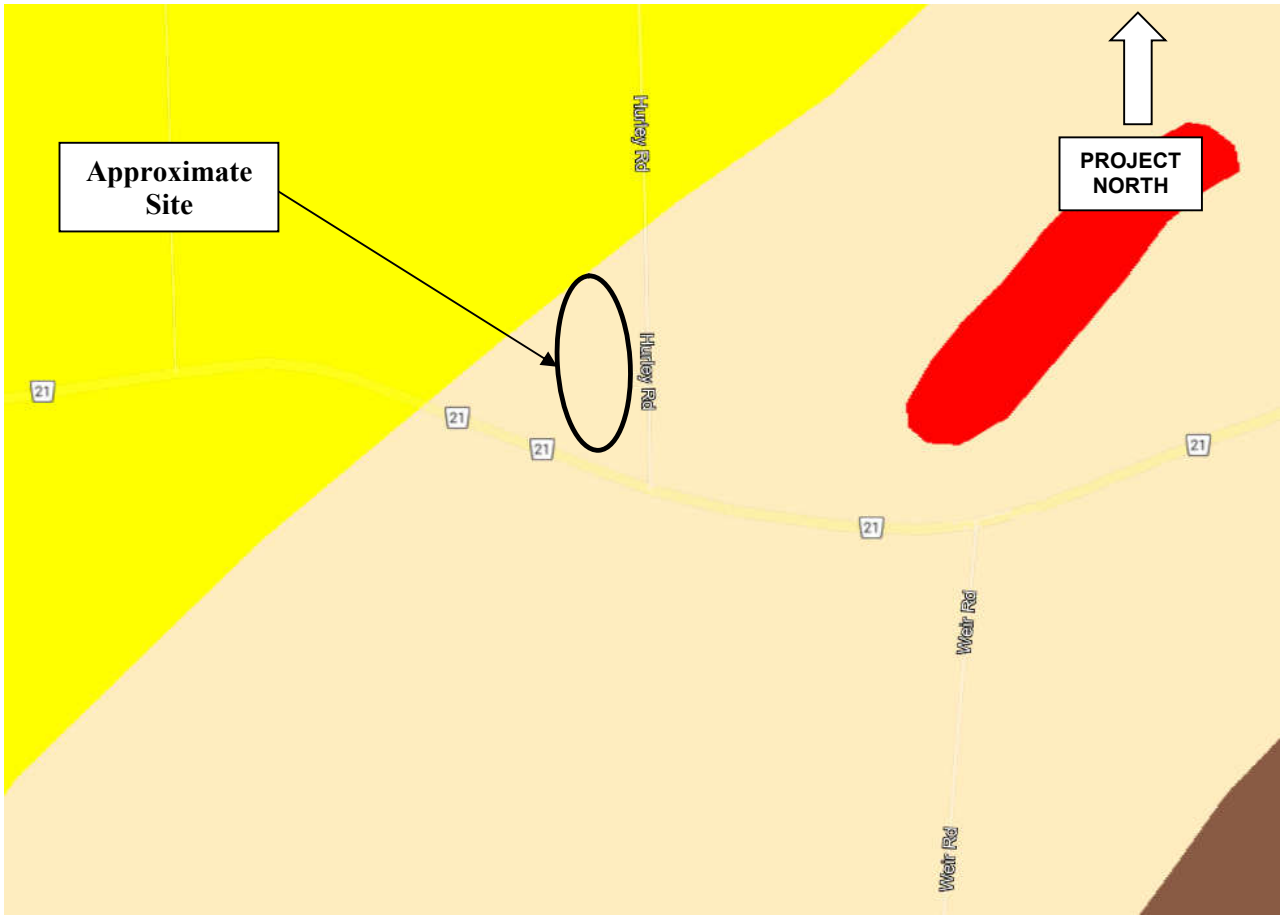
MOREY ASSOCIATES LTD.
CONSULTING ENGINEERS

Project No. 024241

Date September 2024

SURFICIAL GEOLOGY MAP

FIGURE 2



NOT TO SCALE

6 Till Plains (Drumlinized)

Reference: Chapman and Putnam, Ontario Geological Survey, 2007

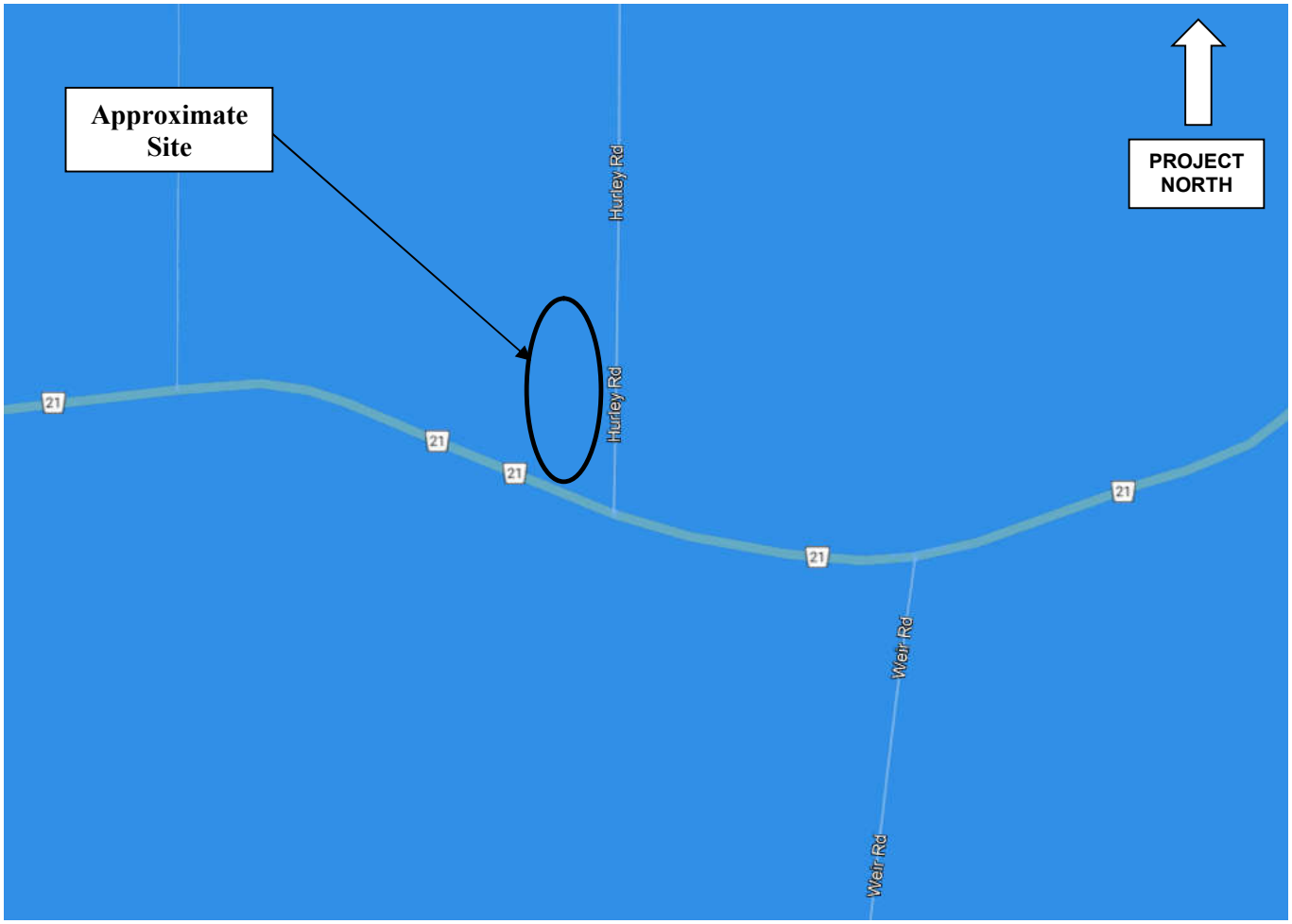
MOREY ASSOCIATES LTD.
CONSULTING ENGINEERS

Project No. 024241

Date September 2024

BEDROCK GEOLOGY MAP

FIGURE 3



NOT TO SCALE

5 **Oxford Formation**: dolostone, minor shale and sandstone

Reference: Ontario Geological Survey, 2007

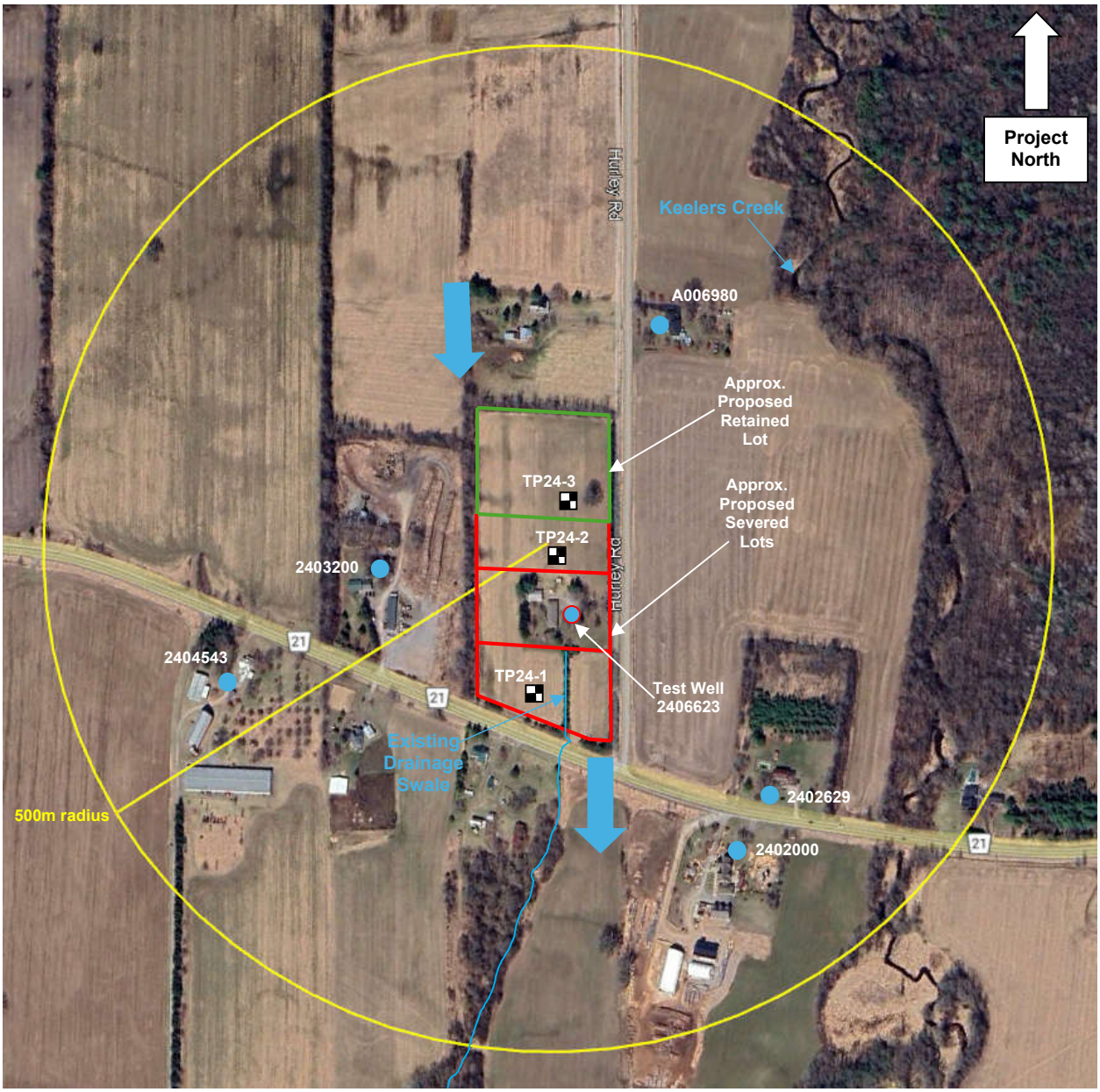
MOREY ASSOCIATES LTD.
CONSULTING ENGINEERS

Project No. 024241

Date September 2024

AERIAL PHOTOGRAPH AND WELL LOCATIONS

FIGURE 4



NOT TO SCALE

- Indicates Possible Well Location (based on available information) and Well ID
- Indicates Test Well
- Inferred Regional Groundwater Flow Direction

MOREY ASSOCIATES LTD.
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Project No. 024241

Date September 2024

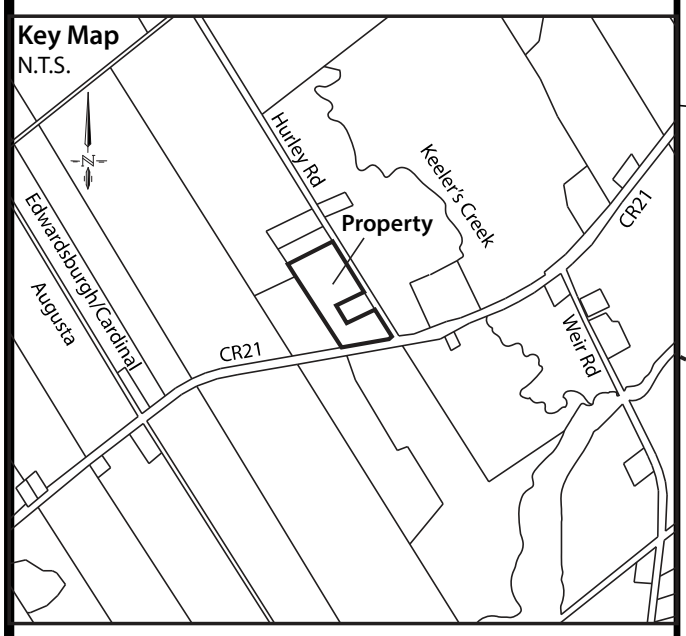
APPENDIX A

SEVERANCE SKETCH

Hutton Severance Sketch

Hurley Road Property
Part 1, Plan 15R-8000
Part Lot 36, Concession 6
Geographic Edwardsburgh
Township of Edwardsburgh/Cardinal
LEEDS AND GRENVILLE

Key Map
N.T.S.



Legend

- Lands to be Severed
- Lands to be Retained
- Lands Receiving the Lot Addition
- Buildable Areas on Vacant Lots
- MDS Setbacks
- Watercourse
- Overhead Wires
- UP — Utility Poles

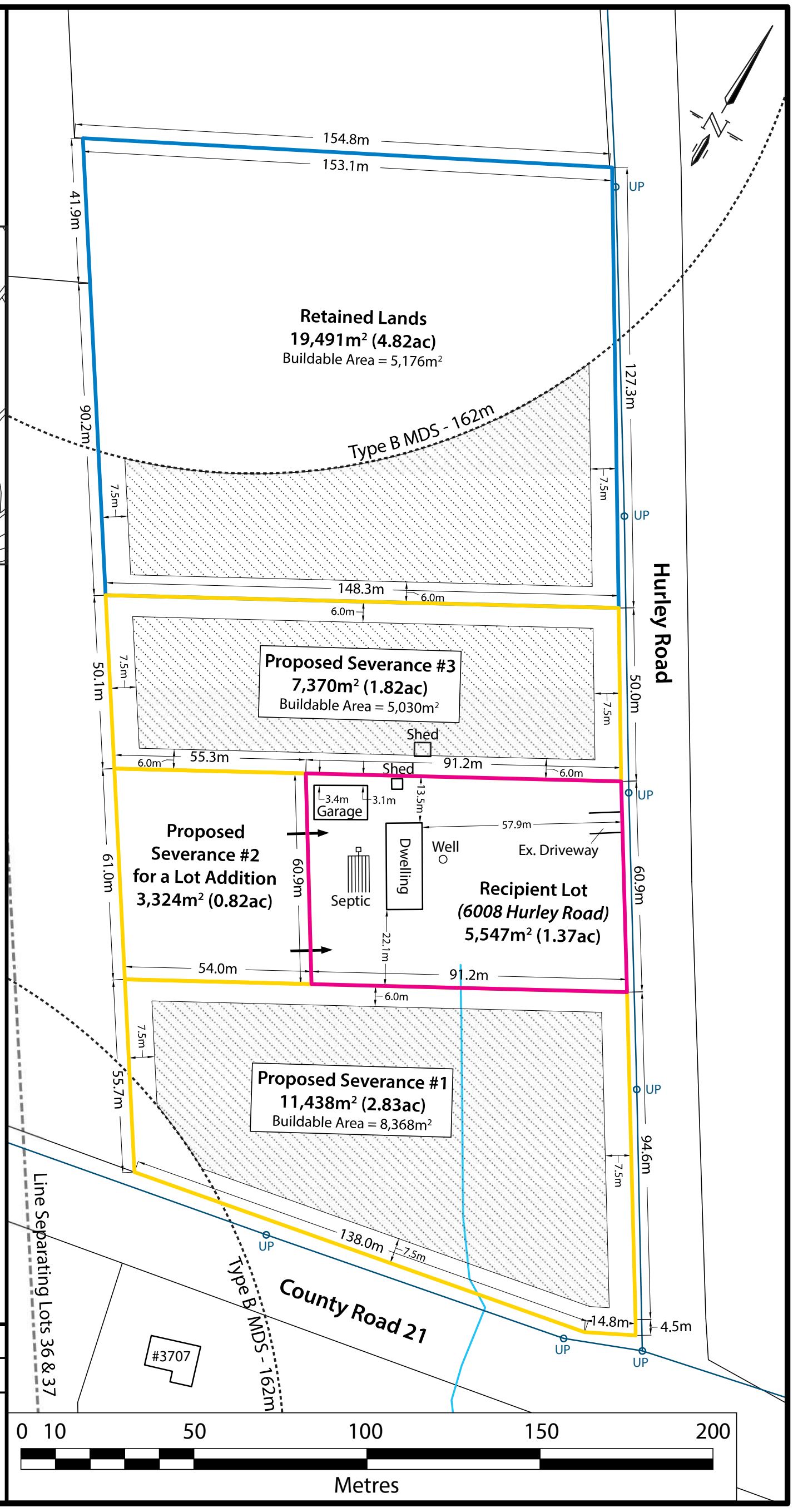
Notes:

1. Given the proposed severances for new lots and an addition to #6008 Hurley Road results in a cluster of four or more lots in close proximity, MDS calculations for nearby barns have been completed as Type B.
2. Location of the watercourse, hydro servicing, and existing buildings are approximate and derived from available mapping. One shed on the property at #6008 Hurley Road falls within 3 metres of the interior side lot line and may require relocation to comply with setbacks.
3. Boundary and dimensions of the subject property derived from Plan 15R-8000 completed by Collett, Jordan and Wiseman Ltd. in August of 1990. The recipient lot at #6008 Hurley Road is described as Part 1 on Plan 15R-5340 completed by Hazan Meldrum Ltd. in July of 1977.

Version Date: April 25, 2024

File No. 23-230 | Drawn By: CC

zanderPLAN
Your rural land planning experts
40 Sunset Boulevard, Perth, ON K7H 2Y4 613-264-9600



APPENDIX B

MECP WELL RECORDS

SUBJECT SITE WELL - TEST WELL

Ministry of the Environment
Ontario

2406623

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

~~2403000~~ AR.

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC	LOT
Grenville	Edwardsburg	Con #6	136

[redacted] R.R. #3 Spencerville

DATE COMPLETED: DAY 2 MO 1 YR 88

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Top Soil		Loose	0	2
Brown	Sand		Loose	2	14
Grey	Clay	Stone's	Packed	14	20
Brown	Sand	Stone's	Loose	20	24
Brown	Sand Stone		Layered	24	72
Grey	Limestone		Soft	72	90

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
65	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
85	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	25
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
24	18	Cement Grout

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER

PUMPING RATE: 14 GPM

DURATION OF PUMPING: 1 HOURS 30 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
18 FEET	50 FEET	25 FEET	38 FEET	50 FEET	50 FEET

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: 80 FEET

WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY

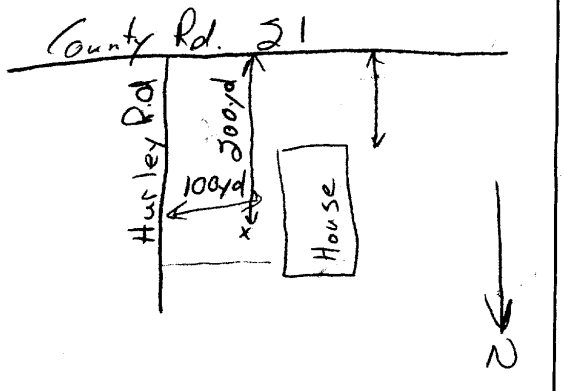
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING: 80 FEET

RECOMMENDED PUMPING RATE: 30 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 19408

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED 9 ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

4877

CONTRACTOR

NAME OF WELL CONTRACTOR: Splash Well Drilling

WELL CONTRACTOR'S LICENCE NUMBER: 1877

ADDRESS: Box 1083 Prescott

NAME OF WELL TECHNICIAN: Todd Ferguson

WELL TECHNICIAN'S LICENCE NUMBER: T-0478

SIGNATURE OF TECHNICIAN/CONTRACTOR: Todd Ferguson

SUBMISSION DATE: DAY ____ MO ____ YR. ____

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED: FEB 02 1988

DATE OF INSPECTION | INSPECTOR

REMARKS: CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

POSSIBLY 6031 HURLEY ROAD

Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below) A006980

A006980

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

[redacted]

Address of Well Location (County/District/Municipality): **Leeds * Grenville**

Township: **Edwardsburgh**

Lot: **27**

Concession: **6**

RR#/Street Number/Name: **Lot 36, Hurley Road**

City/Town/Village: **Spencerville**

Site/Compartment/Block/Tract etc.

GPS Reading: NAD **8 3** Zone **18** Easting **45 37 62** Northing **49 62 980**

Unit Make/Model: **Garmin**

Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Metres To
Brown	Sandy Soil	Stones		0	3.04
Gray	Clay			3.04	3.65
Gray	Limestone			3.65	29.87

Hole Diameter

Depth From	Metres To	Diameter Centimetres
0	6.55	22.53
6.55	29.87	15.23

Water Record

Water found at ___ Metres	Kind of Water
7.92 m	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
28.34 m	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: **not tested**
m	☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

After test of well yield, water was ☒ Clear and sediment free ☐ Other, specify

Chlorinated ☒ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Metres To
Casing				
15.86	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.48	+ 0.91	6.55
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
15.23	☒ Open hole		6.55	29.87

Test of Well Yield

Pumping test method: **submersible**

	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres) 15.24	Static Level	3.77		
Pumping rate - (litres/min) 54.6	1	3.55	1	4.06
Duration of pumping 2 hrs + ___ min	2	3.59	2	4.06
Final water level end of pumping 4.45 metres	3	4.18	3	4.06
Recommended pump type. ☐ Shallow ☒ Deep	4	4.19	4	4.06
Recommended pump depth 15.24 metres	5	4.30	5	4.05
Recommended pump rate. 45.5 (litres/min)	10	4.23	10	4.02
If flowing give rate - (litres/min)	15	4.26	15	4.00
If pumping discontinued, give reason.	20	4.28	20	3.99
	25	4.30	25	3.97
	30	4.31	30	3.96
	40	4.34	40	3.94
	50	4.37	50	3.93
	60	4.38	60	3.91

Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
6.55	0	Grouted - Bentonite & Cement	0.254m3

Method of Construction

☐ Cable Tool ☒ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☒ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

☒ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☒ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: **Capital Water Supply Ltd.**

Well Contractor's Licence No.: **1558**

Business Address (street name, number, city etc.): **P.O. Box 490 Stittsville, Ontario K2S 1A6**

Name of Well Technician (last name, first name): **Miller; Stephen**

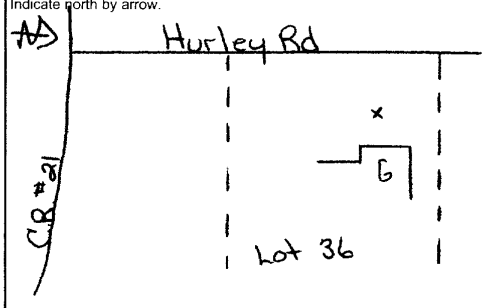
Well Technician's Licence No.: **T0097**

Signature of Technician/Contractor: X [signature]

Date Submitted YYYY MM DD: **2004 5 19**

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 07008

Date Well Completed YYYY MM DD: **2004 5 17**

Was the well owner's information package delivered? ☒ Yes ☐ No

Date Delivered YYYY MM DD: **2004 5 18**

Ministry Use Only

Data Source

Contractor: **1558**

Date Received YYYY MM DD: JUN 24 2004

Date of Inspection YYYY MM DD

Remarks: CSSPSS

Well Record Number: **2409979**

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☐ Well Owner's Copy ☐ *Cette formule est disponible en français*

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

Possible 3532 County Rd 21

WATER WELL RECORD

31B/13E 47

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 2402629 MUNICIP. 24002 CON. CON 06

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
GRENVILLE	EDWARDSBURG.	6	035

[redacted] R. #4, Spencerville, Ontario.

DATE COMPLETED: DAY 31 MO. 08 YR. 73

RC. ELEVATION RC. BASIN CODE

2402629 18 454131 4962525 4 315 5 26 MAR 24, 1977 245

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Topsoil	Sand	Loose.	0	2
Grey	Clay	Boulders	Cemented	2	41
Grey	Limestone	Rock	Hard	41	85

OWRC P-5

31 0002 6128 | 0041 205/3 | 0085 215

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0078	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	043
06	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE			0085
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	0005 GPM	01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
025 FEET	050 FEET	1 ☒ PUMPING 2 ☐ RECOVERY	050 FEET	050 FEET	050 FEET	050 FEET

IF FLOWING GIVE RATE: GPM

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

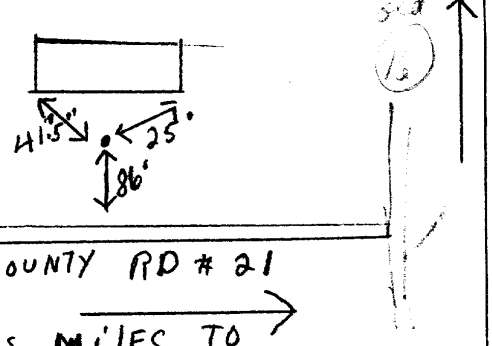
RECOMMENDED PUMP SETTING: 040 FEET

RECOMMENDED PUMPING RATE: 0005 ~~500 G.P.H~~

000.2 with 35' of tailpipe.

LOCATION OF WELL 5462

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL: 1

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE: 02

1 ☐ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING ☐ OTHER 9 ☐ NOT USED

METHOD OF DRILLING: 5

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Ramon H. Casselman — LICENCE NUMBER: 1505

ADDRESS: Williamsburg, Ontario

NAME OF DRILLER OR BORER: Dalton Gow — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Ramon H. Casselman — SUBMISSION DATE: DAY 31 MO. Aug YR. 73

OFFICE USE ONLY

DATA SOURCE: 1 — CONTRACTOR: 1505 — DATE RECEIVED: 18 02 74

DATE OF INSPECTION: — INSPECTOR:

REMARKS:

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 07-091

Possible 3609 County Rd 21

The Ontario Water Resources Commission Act

WATER WELL RECORD

31B13E

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 2402000 MUNICIP. 24002 CON. CON 06

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Grenville	Edwardsburg	VI	~~36~~ 036

[redacted] R. No. 2 - Spencerville, Ont.

DATE COMPLETED DAY 06 MO. ~~Jan.~~ 01 YR. 70

UTM NG 16237/0 RC 4 ELEVATION 0325 RC 5 BASIN CODE 2

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
	boulders - gravel - pan			0	36
black	sand - gravel			36	44
grey	limestone			44	70

31 0036 1/3 1/4 1/5 0044 809 1/1 0070 2 1/5

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0058	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
06	1 ☒ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE	3/16	0	~~69~~ 0047
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE			0070
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

PUMPING TEST

71 PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 0025 GPM. DURATION OF PUMPING: 01 HOURS 00 MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: ☐ PUMPING ☒ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
040 FEET	060 FEET		040 FEET	040 FEET	040 FEET	040 FEET

IF FLOWING, GIVE RATE: GPM. PUMP INTAKE SET AT: FEET. WATER AT END OF TEST: ☒ CLEAR 2 ☐ CLOUDY

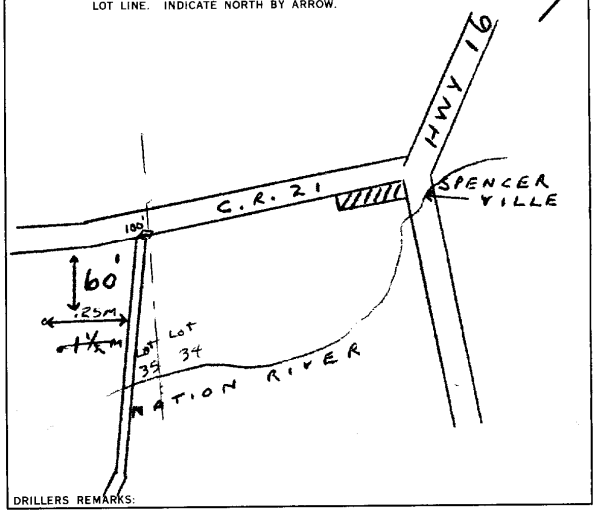
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP. RECOMMENDED PUMP SETTING: 065 FEET. RECOMMENDED PUMPING RATE: 0010 GPM.

50-53 001.2 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

N

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL

54: 1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE 01

55-56: 1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING

57: 1 ☐ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☒ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: J.B. DUPRESNE & CO. LIMITED — LICENCE NUMBER: 1802

ADDRESS: 1014 Maitland Ave., Ottawa 5, Ont.

NAME OF DRILLER OR BORER: R. Lindal — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: [signature] — SUBMISSION DATE: DAY 6 MO. Jan. YR. 70

OFFICE USE ONLY

DATA SOURCE: 1 — 58 — CONTRACTOR: 1802 — 59-62 — DATE RECEIVED: 020870 — 63-68

DATE OF INSPECTION: — INSPECTOR: R/L

REMARKS:

OWRC COPY

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

Possible 3704 County Rd 21

WATER WELL RECORD

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 2403200 | MUNICIP 24002 | CON. CON | 3/B/13E | 06

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC	LOT
Grenville	Edwardsburg	6	037

[redacted] 3 Dibble Street, Prescott, Ontario

DATE COMPLETED: DAY 25 MO. 02 YR. 76

UTM 6240 0 | RC 5 | ELEVATION 0325 | RC 5 | BASIN CODE 25

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Topsoil		Loose	0	2
Grey	Clay	Boulders	Hard packed	2	27
Grey	Sand	Gravel, Clay	Coarse, packed	27	38
Grey	Limestone Rock		Hard	38	105

31 | 0002602771 | 0027205137 | 0038228105 | 0105215 73

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0097	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0038
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: ~~600 G.P.M.~~ 00 GPM | DURATION OF PUMPING: 01 HOURS 00 MINS

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
019 FEET	060 FEET	060 FEET	060 FEET	060 FEET	060 FEET

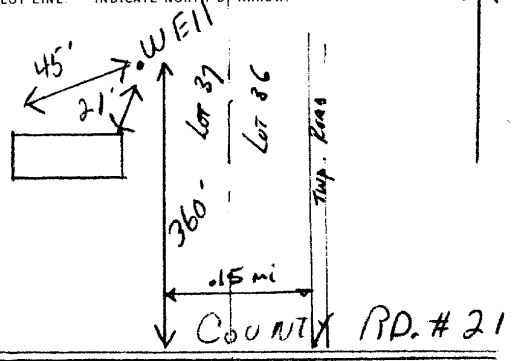
IF FLOWING, GIVE RATE: GPM | PUMP INTAKE SET AT: FEET | WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING: 055 FEET | RECOMMENDED PUMPING RATE: ~~600 G.P.M.~~ 000

with 35 ft. of tailpipe

LOCATION OF WELL 5362

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



2 7/10 MILES TO SPENCERVILLE →

DRILLERS REMARKS:

FINAL STATUS OF WELL: 1

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE: 01

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING: 4

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☒ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Ramon H. CAsselman | LICENCE NUMBER: 1505

ADDRESS: Williamsburg, Ontario

NAME OF DRILLER OR BORER: Dalton Gow | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Ramon H Casselman | SUBMISSION DATE: DAY 25 MO. Feb. YR. 76

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 1505 | DATE RECEIVED: 130476

DATE OF INSPECTION: | INSPECTOR:

REMARKS: CSSS

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Ministry of the Environment
Ontario

Possibly 3717 County Rd 21

The Ontario Water Resources Act

31 B/3E

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 2404543 | MUNICIP 24002 | CON. CON | 106

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON. BLOCK, TRACT, SURVEY, ETC.	LOT	DATE COMPLETED
Leeds & Grenville	Edwardsburg	Conc. 6	37	DAY 19 MO 06 YR 81

[redacted] Rideau Heights Dr., Nepean, Ontario

ING | RC | ELEVATION | RC | BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Hardpan	Boulders		0	42
Gray	Limestone			42	105

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
98'	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	44
5 13/16	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		44	105
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 50 GPM | DURATION OF PUMPING: 1 HOURS ___ MINS

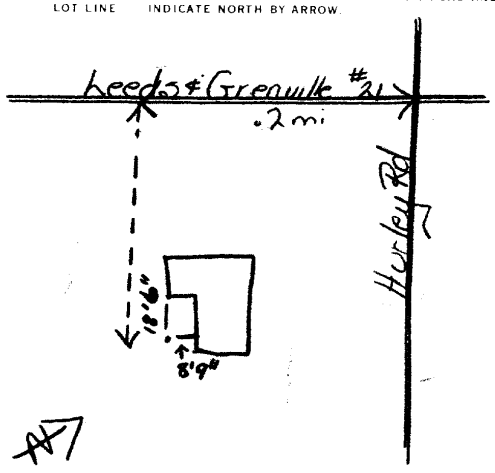
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☒ PUMPING 2 ☐ RECOVERY)			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
30 FEET	60 FEET	60 FEET	60 FEET	60 FEET	60 FEET

IF FLOWING GIVE RATE ___ GPM | PUMP INTAKE SET AT ___ FEET | WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING: 75 FEET | RECOMMENDED PUMPING RATE: 5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL	1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED
WATER USE	1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED
METHOD OF DRILLING	1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply Ltd. | LICENCE NUMBER: 1558

ADDRESS: Box 490, Stittsville, Ontario K0A 3G0

NAME OF DRILLER OR BORER: J. Miller | LICENCE NUMBER

SIGNATURE OF CONTRACTOR: W. Kavanagh | SUBMISSION DATE: DAY 30 MO 06 YR 81

MINISTRY OF THE ENVIRONMENT COPY

OFFICE USE ONLY

DATA SOURCE 58 | CONTRACTOR 59-62: 1558 | DATE RECEIVED 63-68: 150981

DATE OF INSPECTION | INSPECTOR

REMARKS

WDE

CSS.ES

FORM NO. 0506—4—77 FORM 7

APPENDIX C

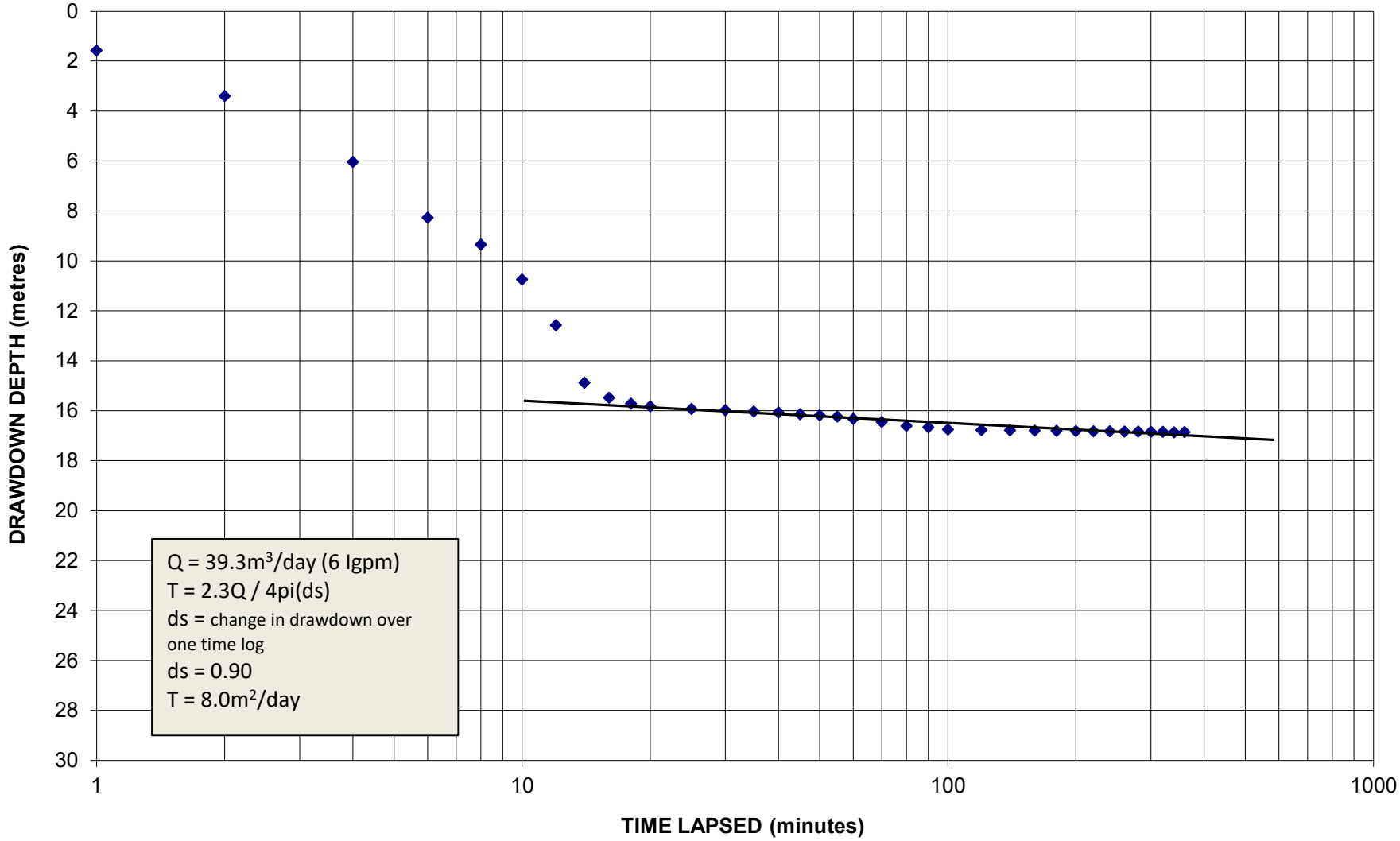
PUMPING TEST DATA FOR TEST WELL

DRAWDOWN DATA TEST WELL

File: 024241
Pump Test Date: June 19/24
Pump Rate: 6 Igpm

Time of Day	Time Lapsed (minutes)	Depth (metres)	h-ho (metres)
8:40	0	6.16	0.00
8:41	1	7.74	1.58
8:42	2	9.56	3.40
8:44	4	12.20	6.04
8:46	6	14.43	8.27
8:48	8	15.51	9.35
8:50	10	16.90	10.74
8:52	12	18.74	12.58
8:54	14	21.04	14.88
8:56	16	21.64	15.48
8:58	18	21.87	15.71
9:00	20	21.99	15.83
9:05	25	22.09	15.93
9:10	30	22.14	15.98
9:15	35	22.19	16.03
9:20	40	22.23	16.07
9:25	45	22.30	16.14
9:30	50	22.34	16.18
9:35	55	22.39	16.23
9:40	60	22.49	16.33
9:50	70	22.61	16.45
10:00	80	22.77	16.61
10:10	90	22.82	16.66
10:20	100	22.91	16.75
10:40	120	22.93	16.77
11:00	140	22.94	16.78
11:20	160	22.95	16.79
11:40	180	22.96	16.80
12:00	200	22.97	16.81
12:20	220	22.99	16.83
12:40	240	22.99	16.83
13:00	260	23.00	16.84
13:20	280	23.00	16.84
13:40	300	23.01	16.85
14:00	320	23.01	16.85
14:20	340	23.03	16.87
14:40	360	23.02	16.86

TEST WELL DRAWDOWN VS. TIME



File: 024241

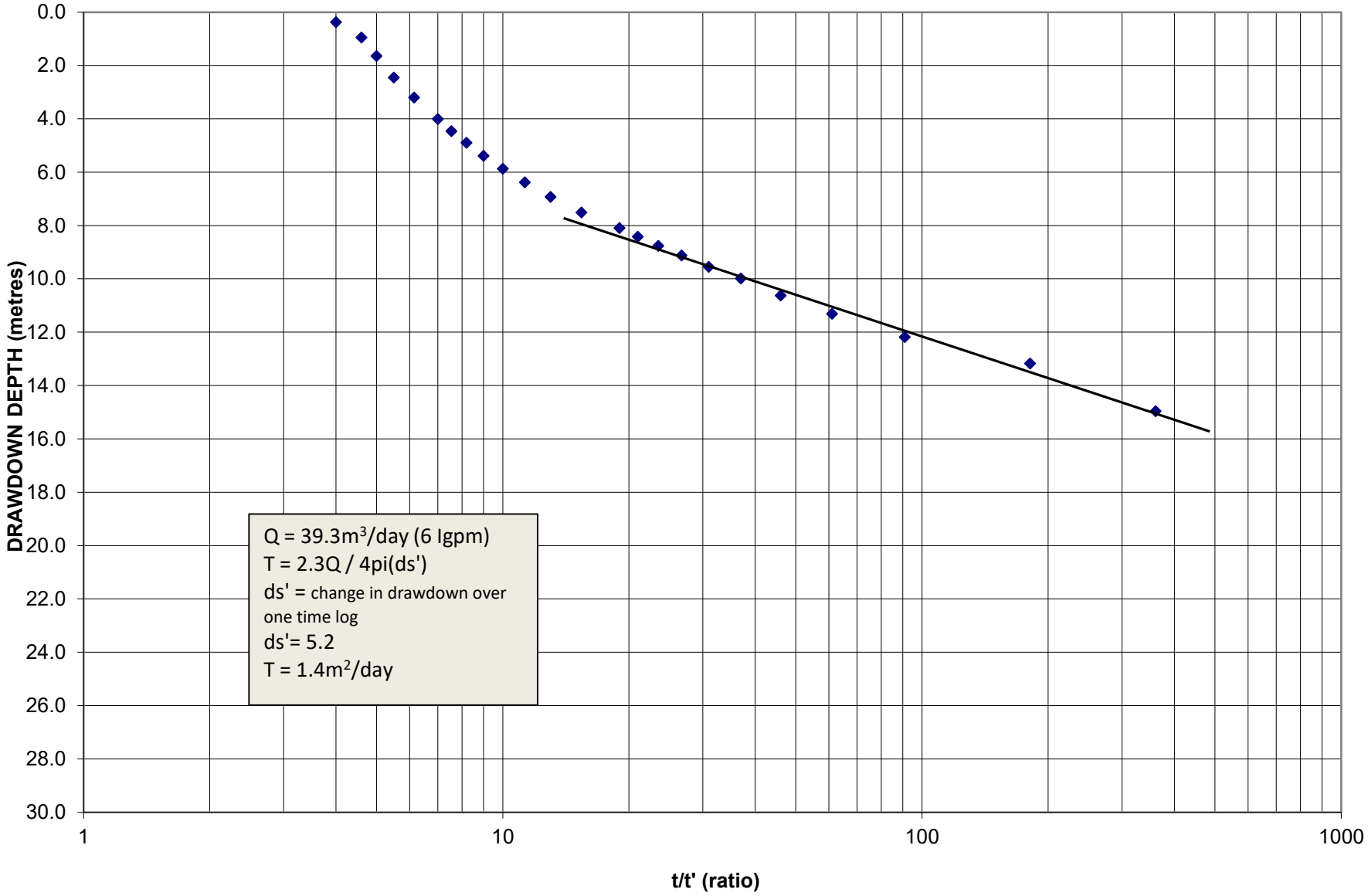
RECOVERY DATA TEST WELL

Pump Test Date: June 19/24

Recovery Time t' (minutes)	t / t' (ratio)	Depth (metres)	h-ho (metres)
0		23.02	16.86
1	361	21.12	14.96
2	181	19.33	13.17
4	91	18.34	12.18
6	61	17.47	11.31
8	46	16.79	10.63
10	37	16.15	9.99
12	31	15.71	9.55
14	27	15.28	9.12
16	24	14.92	8.76
18	21	14.58	8.42
20	19	14.26	8.10
25	15	13.67	7.51
30	13	13.09	6.93
35	11	12.54	6.38
40	10	12.03	5.87
45	9	11.55	5.39
50	8	11.06	4.90
55	8	10.62	4.46
60	7	10.17	4.01
70	6	9.36	3.20
80	6	8.61	2.45
90	5	7.81	1.65
100	5	7.11	0.95
120	4	6.54	0.38
130	4	6.14	-0.02

>100% **RECOVERY AFTER** **130** **MINUTES**

TEST WELL RECOVERY DATA



APPENDIX D

RESULTS OF LABORATORY TESTING OF TEST WELL WATER SAMPLES

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS : 3961292

WORK REQUEST : 100291252

Report Date : 2024-06-27

Morey Associates
2672 Highway 43
Kemptville, ON
K0G 1J0
Attention : Dan Morey

Reception Date : 2024-06-20
Project : 024241
Sampler : NA
PO Number : Not Applicable
Temperature : 14 °C

Analysis	Quantity	External Method
Alkalinity (Water, Automated)	1	Modified from SM 2320 B
Ammonia, Total (Water, Colorimetry)	1	Modified from EPA 350.1
Chloride (Water, IC)	1	Modified from SM 4110 B and C
Colour, True (Water, Spectrophotometry)	1	Modified from SM 2120 C
Conductivity (Water, Automated)	1	Modified from SM 2510 B
DOC (Water, IR)	1	Modified from SM 5310 B
E.Coli and Total Coliforms (DC Plate)	1	Modified from MECP E3407
Fecal Coliforms (mFC)	1	Modified from SM 9222 D
Fluoride (Water, Auto/ISE)	1	Modified from SM 4500-F A and 4500-F C
Hardness (Water, Calculation Only)	1	SM 2340 B
Heterotrophic Plate Count (mHPC)	1	Modified from SM 9215 D
Ion Balance (Water, Calculation)	1	Modified from SM1030 E
Metals Scan (Water, ICP/MS)	1	Modified from EPA 200.8
Metals Scan (Water, ICP/OES)	1	Modified from SM 3120 B
Nitrate (Water, IC)	1	Modified from SM 4110 B and C
Nitrite (Water, IC)	1	Modified from SM 4110 B and C
pH (25°C) (Water, Automated)	1	Modified from SM 4500-H+ B
Phenols (Water, Colorimetry)	1	Modified from EPA 420.2
Sulphate (Water, IC)	1	Modified from SM 4110 B and C
Sulphide (Water, Colorimetry)	1	Modified from SM 4500-S2 D
Tannin and Lignin (Water, Spec)	1	Modified from SM 5550 B
TDS (Estimated)	1	Modified from SM 2510 A
Total Kjeldahl Nitrogen (Water, Colorimetry)	1	Modified from EPA 351.2
Turbidity (Water, Turbidimeter)	1	Modified from SM 2130 B

Criteria :
A : Ontario Regulation 169/03 (Non-Regulated Drinking Water)

Sample status upon receipt :

7792332
Compliant

Certificate Comments :

7792332
Fe spike unavailable due to matrix interferences in the mother sample.

Notes :

- All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise stated.
- Eurofins Environment Testing Canada Inc. is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at https://directory.cala.ca/
- Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline or regulatory limits listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official guideline or regulation as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Legend :

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

RL : Reporting limit
QC : Reference material (QC)
N/A : Not applicable
1 : Results in annex
* : Analysis conducted by external subcontracting
^ : Analysis not accredited

OFFICIAL CERTIFICATE OF ANALYSIS - EXCEEDENCE SUMMARY

Client : Morey Associates
Project : 024241

Reception Date : 2024-06-20

Eurofins Sample No	Client Sample Identification	Analyte	Result	Units	Exceeded Criteria		
					A	B	C
Hardness (Water, Calculation Only)							
7792332	TW1 6008 Hurley 3hr	Hardness as CaCO3 (Calculation)	271	mg/L	80-100		

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Morey Associates
Project : 024241

Reception Date: 2024-06-20

					Eurofins Sample No :	7792332				
					Matrix :	Drinking water				
					Sampling Date :	2024-06-19				
					Client Sample Identification :	TW1 6008 Hurley 3hr				
Anions	**RL**	**Unit**	**Criteria A**	**Criteria B**	**Criteria C**					
Chloride	0.5	mg/L	250			12.6				
Nitrate (as Nitrogen)	0.1	mg/L	10.0			0.17				
Nitrite (as Nitrogen)	0.1	mg/L	1.0			<0.1				
Sulphate	1	mg/L	500			28				

			Eurofins Sample No :	7792332						
			Matrix :	Drinking water						
			Sampling Date :	2024-06-19						
			Client Sample Identification :	TW1 6008 Hurley 3hr						
Calculations	**RL**	**Unit**								
Ion Balance (Calculation)^	0.1		1.00							

					Eurofins Sample No :	7792332				
					Matrix :	Drinking water				
					Sampling Date :	2024-06-19				
					Client Sample Identification :	TW1 6008 Hurley 3hr				
General Chemistry	**RL**	**Unit**	**Criteria A**	**Criteria B**	**Criteria C**					
Alkalinity (as CaCO3)	5	mg/L	500			245				
Colour (True)	2	TCU				2				
Conductivity @ 25°C	5	µS/cm				512				
Dissolved Organic Carbon	0.5	mg/L	5			1.2				
Fluoride	0.1	mg/L	1.5			0.67				
Hardness as CaCO3 (Calculation)	1	mg/L	80-100			271				
pH @ 25°C	1		6.5-8.5			8.06				
Phenols-4AAP	0.001	mg/L				<0.001				
Sulphide (S2-)	0.01	mg/L	0.05			<0.01				
Tannin and Lignin	0.1	mg/L				0.1				
TDS (Estimated)^	5	mg/L	500			333				
Turbidity	0.1	NTU	5			0.394				

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Morey Associates
Project : 024241

Reception Date: 2024-06-20

Metals	RL	Unit	Criteria A	Criteria B	Criteria C	Eurofins Sample No : 7792332 Matrix : Drinking water Sampling Date : 2024-06-19 Client Sample Identification : TW1 6008 Hurley 3hr
Metals Scan (Water, ICP/MS)						
Aluminum	0.01	mg/L	0.1			0.09
Antimony	0.0005	mg/L	0.006			<0.0005
Arsenic	0.001	mg/L	0.01			<0.001
Barium	0.001	mg/L	1			0.086
Beryllium	0.0005	mg/L				<0.0005
Boron	0.01	mg/L	5			0.32
Cadmium	0.0001	mg/L	0.005			<0.0001
Chromium	0.001	mg/L	0.05			<0.001
Cobalt	0.0002	mg/L				0.0004
Copper	0.001	mg/L	1			<0.001
Iron	0.03	mg/L	0.3			0.12
Lead	0.001	mg/L	0.01			<0.001
Manganese	0.01	mg/L	0.05			0.02
Molybdenum	0.005	mg/L				<0.005
Nickel	0.005	mg/L				<0.005
Selenium	0.001	mg/L	0.05			<0.001
Silver	0.0001	mg/L				<0.0001
Strontium	0.001	mg/L				1.81
Thallium	0.0001	mg/L				<0.0001
Uranium	0.001	mg/L	0.02			<0.001
Vanadium	0.001	mg/L				<0.001
Zinc	0.01	mg/L	5			<0.01
Metals Scan (Water, ICP/OES)						
Calcium	1	mg/L				52
Magnesium	1	mg/L				34
Potassium	1	mg/L				6
Sodium	1	mg/L	200			7

Microbiology	RL	Unit	Criteria A	Criteria B	Criteria C	Eurofins Sample No : 7792332 Matrix : Drinking water Sampling Date : 2024-06-19 Client Sample Identification : TW1 6008 Hurley 3hr
E.Coli and Total Coliforms (DC Plate)						
Escherichia coli (DC)	0	CFU/100mL	0			0
Total Coliforms (DC)	0	CFU/100mL	0			0
Fecal Coliforms (mFC)	0	CFU/100mL	0			0
Heterotrophic Plate Count (mHPC)	0	CFU/1 mL				33

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OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Morey Associates
Project : 024241

Reception Date: 2024-06-20

Eurofins Sample No :			**7792332**						
Matrix :			Drinking water						
Sampling Date :			2024-06-19						
Client Sample Identification :			TW1 6008 Hurley 3hr						
Nutrients	**RL**	**Unit**							
Ammonia (Total, as Nitrogen)	0.02	mg/L	0.119						
Total Kjeldahl Nitrogen	0.1	mg/L	0.276						

Approved by : _____
Emma-Dawn Ferguson, M.Sc.
Environmental Chemist

Approved by : _____
Jason Kennedy,
Project Manager

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OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Morey Associates
Project : 024241

Reception Date: 2024-06-20

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Alkalinity (Water, Automated)									
Method : Alkalinity (water, titration to pH 4.5, automated). Internal method: OTT-I-AT-WI45398.									
Alkalinity (as CaCO3)	mg/L	5	<5	99	95-105			0	0-20
Associated Samples : 7792332								Prep Date: 2024-06-25 Analysis Date: 2024-06-26	
Ammonia, Total (Water, Colorimetry)									
Method : Ammonia (Water, Colorimetry). Internal method: OTT-I-NUT-WI46201.									
Ammonia (Total, as Nitrogen)	mg/L	0.02	<0.020	90	80-120	100	80-120	-	0-20
Associated Samples : 7792332								Prep Date: 2024-06-23 Analysis Date: 2024-06-24	
Chloride (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Chloride	mg/L	0.5	<0.5	94	80-120	97	80-120	-	0-20
Associated Samples : 7792332								Prep Date: 2024-06-24 Analysis Date: 2024-06-25	
Colour, True (Water, Spectrophotometry)									
Method : Colour (Water, Spectrophotometric). Internal method: OTT-I-SPEC-WI45980.									
Colour (True)	TCU	2	<2	97	39-159			-	0-40
Associated Samples : 7792332								Prep Date: 2024-06-25 Analysis Date: 2024-06-25	
Conductivity (Water, Automated)									
Method : Conductivity (Water, Autotitrator). Internal Method: OTT-I-AT-WI45398.									
Conductivity @ 25°C	uS/cm	5	<5	98	98-102			0	0-20
Associated Samples : 7792332								Prep Date: 2024-06-25 Analysis Date: 2024-06-26	
DOC (Water, IR)									
Method : Organic carbon (water, IR, combustion). Internal method: OTT-I-DEM-WI46148.									
Dissolved Organic Carbon	mg/L	0.5	<0.5	104	84-116	110	80-120	-	0-15
Associated Samples : 7792332								Prep Date: 2024-06-24 Analysis Date: 2024-06-25	
E.Coli and Total Coliforms (DC Plate)									
Method : Total Coliforms and E.Coli by MF (Water, DC plate). Internal method: OTT-M-BAC-WI45296.									
Escherichia coli (DC)	CFU/100mL	0	0					-	0-30
Total Coliforms (DC)	CFU/100mL	0	0					-	0-30
Associated Samples : 7792332								Prep Date: 2024-06-20 Analysis Date: 2024-06-21	
Fluoride (Water, Auto/ISE)									
Method : Fluoride by autotitrator, ion selective electrode. Internal method: OTT-I-AT-WI45398.									
Fluoride	mg/L	0.1	<0.10	100	90-110			-	0-20
Associated Samples : 7792332								Prep Date: 2024-06-25 Analysis Date: 2024-06-26	

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OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Morey Associates
Project : 024241

Reception Date: 2024-06-20

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Metals Scan (Water, ICP/MS)									
Method : Metals (Water, ICP/MS). Internal method: AMMTFQE1.									
Aluminum	mg/L	0.01	<0.01	100	80-120	100	70-130	7	0-20
Antimony	mg/L	0.0005	<0.0005	119	80-120	-	70-130	-	0-20
Arsenic	mg/L	0.001	<0.001	96	80-120	92	70-130	-	0-20
Barium	mg/L	0.001	<0.001	100	80-120	83	70-130	0	0-20
Beryllium	mg/L	0.0005	<0.0005	112	80-120	-	70-130	-	0-20
Boron	mg/L	0.01	<0.01	120	80-120	78	70-130	0	0-20
Cadmium	mg/L	0.0001	<0.0001	109	80-120	-	70-130	-	0-20
Chromium	mg/L	0.001	<0.001	110	80-120	97	70-130	-	0-20
Cobalt	mg/L	0.0002	<0.0002	110	80-120	95	70-130	-	0-20
Copper	mg/L	0.001	<0.001	110	80-120	88	70-130	-	0-20
Iron	mg/L	0.03	<0.03	100	80-120			1	0-20
Lead	mg/L	0.001	<0.001	110	80-120	88	70-130	-	0-20
Manganese	mg/L	0.01	<0.01	100	80-120	92	70-130	1	0-20
Molybdenum	mg/L	0.005	<0.005	100	80-120	99	70-130	-	0-20
Nickel	mg/L	0.005	<0.005	110	80-120	92	70-130	-	0-20
Selenium	mg/L	0.001	<0.001	105	80-120	90	70-130	-	0-20
Silver	mg/L	0.0001	<0.0001	112	80-120	94	70-130	-	0-20
Strontium	mg/L	0.001	<0.001	110	80-120	75	70-130	0	0-20
Thallium	mg/L	0.0001	<0.0001	115	80-120	-	70-130	-	0-20
Uranium	mg/L	0.001	<0.001	100	80-120	91	70-130	-	0-20
Vanadium	mg/L	0.001	<0.001	100	80-120	99	70-130	-	0-20
Zinc	mg/L	0.01	<0.01	120	80-120	86	70-130	-	0-20
Associated Samples : 7792332								Prep Date: 2024-06-24 Analysis Date: 2024-06-25	
Metals Scan (Water, ICP/OES)									
Method : Metals (Water, ICP/OES). Internal method: OTT-I-MET-WI48491.									
Calcium	mg/L	1	<1	103	86-115	101	70-130	-	0-20
Magnesium	mg/L	1	<1	102	91-109	99	70-130	-	0-20
Potassium	mg/L	1	<1	103	87-113	100	70-130	-	0-20
Sodium	mg/L	1	<1	101	85-115	100	70-130	-	0-20
Associated Samples : 7792332								Prep Date: 2024-06-27 Analysis Date: 2024-06-20	
Nitrate (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Nitrate (as Nitrogen)	mg/L	0.1	<0.1	96	80-120	100	80-120	-	0-20
Associated Samples : 7792332								Prep Date: 2024-06-24 Analysis Date: 2024-06-25	
Nitrite (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Nitrite (as Nitrogen)	mg/L	0.1	<0.1	93	80-120				
Associated Samples : 7792332								Prep Date: 2024-06-24 Analysis Date: 2024-06-25	
pH (25°C) (Water, Automated)									
Method : pH (Water, Automated Meter). Internal method: OTT-I-AT-WI45398.									
pH @ 25°C		1	5.84	100	97-103			0	0-20
Associated Samples : 7792332								Prep Date: 2024-06-25 Analysis Date: 2024-06-26	

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OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Morey Associates
Project : 024241

Reception Date: 2024-06-20

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Phenols (Water, Colorimetry)									
Method : Phenols (Water, Colorimetry). Internal method: OTT-I-4AAP-WI46150.									
Phenols-4AAP	mg/L	0.001	<0.001	106	75-125	104	70-130	-	0-20
Associated Samples : 7792332								Prep Date: 2024-06-25 Analysis Date: 2024-06-25	
Sulphate (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Sulphate	mg/L	1	<1	90	90-110	92	80-120	0	0-20
Associated Samples : 7792332								Prep Date: 2024-06-24 Analysis Date: 2024-06-25	
Sulphide (Water, Colorimetry)									
Method : Sulphide, S2- (Water, Colorimetry). Internal method: OTT-I-SPEC-WI45931.									
Sulphide (S2-)	mg/L	0.01	<0.01	96	80-120			-	0-20
Associated Samples : 7792332								Prep Date: 2024-06-26 Analysis Date: 2024-06-26	
Tannin and Lignin (Water, Spec)									
Method : Tannin and Lignin (Water, Spec), Internal method: OTT-I-SPEC-WI57693.									
Tannin and Lignin	mg/L	0.1	<0.1	94	80-120			-	0-20
Associated Samples : 7792332								Prep Date: 2024-06-21 Analysis Date: 2024-06-21	
Total Kjeldahl Nitrogen (Water, Colorimetry)									
Method : TKN (Water, colorimetry). Internal method: OTT-I-NUT-WI46201.									
Total Kjeldahl Nitrogen	mg/L	0.1	<0.100	97	70-130	129	70-130	5	0-20
Associated Samples : 7792332								Prep Date: 2024-06-25 Analysis Date: 2024-06-26	
Turbidity (Water, Turbidimeter)									
Method : Turbidity (Water, Turbidimeter). Internal method: OTT-I-TUR-WI46288.									
Turbidity	NTU	0.1	<0.1	102	80-120			-	0-30
Associated Samples : 7792332								Prep Date: 2024-06-21 Analysis Date: 2024-06-21	
Method : Fecal Coliforms by MF (mFC Media). Internal method: OTT-M-BAC-WI45296.									
Fecal Coliforms (mFC)	CFU/100mL	0	0					-	0-30
Method : Heterotrophic Plate Count by MF (mHPC Media). Internal method: OTT-M-BAC-WI45296.									
Heterotrophic Plate Count (mHPC)	CFU/1 mL	0	0					0	0-30
Associated Samples : 7792332								Prep Date: 2024-06-20 Analysis Date: 2024-06-22	

Where RPD % is reported as "-" the calculation is not available because one or both of the duplicates is within 5 times the RL.

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OFFICIAL CERTIFICATE OF ANALYSIS : 3961289

WORK REQUEST : 100291255

Report Date : 2024-06-27

Morey Associates
2672 Highway 43
Kemptville, ON
K0G 1J0
Attention : Dan Morey

Reception Date : 2024-06-20
Project : 024241
Sampler : NA
PO Number : Not Applicable
Temperature : 14 °C

Analysis	Quantity	External Method
Alkalinity (Water, Automated)	1	Modified from SM 2320 B
Ammonia, Total (Water, Colorimetry)	1	Modified from EPA 350.1
Chloride (Water, IC)	1	Modified from SM 4110 B and C
Colour, True (Water, Spectrophotometry)	1	Modified from SM 2120 C
Conductivity (Water, Automated)	1	Modified from SM 2510 B
DOC (Water, IR)	1	Modified from SM 5310 B
E.Coli and Total Coliforms (DC Plate)	1	Modified from MECP E3407
Fecal Coliforms (mFC)	1	Modified from SM 9222 D
Fluoride (Water, Auto/ISE)	1	Modified from SM 4500-F A and 4500-F C
Hardness (Water, Calculation Only)	1	SM 2340 B
Heterotrophic Plate Count (mHPC)	1	Modified from SM 9215 D
Ion Balance (Water, Calculation)	1	Modified from SM1030 E
Metals Scan (Water, ICP/MS)	1	Modified from EPA 200.8
Metals Scan (Water, ICP/OES)	1	Modified from SM 3120 B
Nitrate (Water, IC)	1	Modified from SM 4110 B and C
Nitrite (Water, IC)	1	Modified from SM 4110 B and C
pH (25°C) (Water, Automated)	1	Modified from SM 4500-H+ B
Phenols (Water, Colorimetry)	1	Modified from EPA 420.2
Sulphate (Water, IC)	1	Modified from SM 4110 B and C
Sulphide (Water, Colorimetry)	1	Modified from SM 4500-S2 D
Tannin and Lignin (Water, Spec)	1	Modified from SM 5550 B
TDS (Estimated)	1	Modified from SM 2510 A
Total Kjeldahl Nitrogen (Water, Colorimetry)	1	Modified from EPA 351.2
Turbidity (Water, Turbidimeter)	1	Modified from SM 2130 B

Criteria :
A : Ontario Regulation 169/03 (Non-Regulated Drinking Water)

Sample status upon receipt :

7792341
Compliant

Certificate Comments :

7792341
Fe spike unavailable due to matrix interferences in the mother sample.

Notes :

- All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise stated.
- Eurofins Environment Testing Canada Inc. is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at https://directory.cala.ca/
- Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline or regulatory limits listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official guideline or regulation as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Legend :

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RL : Reporting limit
QC : Reference material (QC)
N/A : Not applicable
1 : Results in annex
* : Analysis conducted by external subcontracting
^ : Analysis not accredited

OFFICIAL CERTIFICATE OF ANALYSIS - EXCEEDENCE SUMMARY

Client : Morey Associates
Project : 024241

Reception Date : 2024-06-20

Eurofins Sample No	Client Sample Identification	Analyte	Result	Units	Exceeded Criteria		
					A	B	C
Hardness (Water, Calculation Only)							
7792341	TW1 6008 Hurley 6hr	Hardness as CaCO3 (Calculation)	271	mg/L	80-100		

eurofins | Environment Testing
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OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Morey Associates
Project : 024241

Reception Date: 2024-06-20

					Eurofins Sample No :	7792341				
					Matrix :	Drinking water				
					Sampling Date :	2024-06-19				
					Client Sample Identification :	TW1 6008 Hurley 6hr				
Anions	**RL**	**Unit**	**Criteria A**	**Criteria B**	**Criteria C**					
Chloride	0.5	mg/L	250			11.9				
Nitrate (as Nitrogen)	0.1	mg/L	10.0			0.19				
Nitrite (as Nitrogen)	0.1	mg/L	1.0			<0.1				
Sulphate	1	mg/L	500			28				

			Eurofins Sample No :	7792341						
			Matrix :	Drinking water						
			Sampling Date :	2024-06-19						
			Client Sample Identification :	TW1 6008 Hurley 6hr						
Calculations	**RL**	**Unit**								
Ion Balance (Calculation)^	0.1		1.00							

					Eurofins Sample No :	7792341				
					Matrix :	Drinking water				
					Sampling Date :	2024-06-19				
					Client Sample Identification :	TW1 6008 Hurley 6hr				
General Chemistry	**RL**	**Unit**	**Criteria A**	**Criteria B**	**Criteria C**					
Alkalinity (as CaCO3)	5	mg/L	500			244				
Colour (True)	2	TCU				<2				
Conductivity @ 25°C	5	µS/cm				516				
Dissolved Organic Carbon	0.5	mg/L	5			1.1				
Fluoride	0.1	mg/L	1.5			0.67				
Hardness as CaCO3 (Calculation)	1	mg/L	80-100			271				
pH @ 25°C	1		6.5-8.5			8.01				
Phenols-4AAP	0.001	mg/L				<0.001				
Sulphide (S2-)	0.01	mg/L	0.05			<0.01				
Tannin and Lignin	0.1	mg/L				0.1				
TDS (Estimated)^	5	mg/L	500			335				
Turbidity	0.1	NTU	5			1.00				

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OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Morey Associates
Project : 024241

Reception Date: 2024-06-20

						Eurofins Sample No :	**7792341**			
						Matrix :	Drinking water			
						Sampling Date :	2024-06-19			
						Client Sample Identification :	TW1 6008 Hurley 6hr			
Metals	**RL**	**Unit**	**Criteria**							
			A	**B**	**C**					
Metals Scan (Water, ICP/MS)										
Aluminum	0.01	mg/L	0.1			<0.01				
Antimony	0.0005	mg/L	0.006			<0.0005				
Arsenic	0.001	mg/L	0.01			<0.001				
Barium	0.001	mg/L	1			0.091				
Beryllium	0.0005	mg/L				<0.0005				
Boron	0.01	mg/L	5			0.31				
Cadmium	0.0001	mg/L	0.005			<0.0001				
Chromium	0.001	mg/L	0.05			<0.001				
Cobalt	0.0002	mg/L				0.0005				
Copper	0.001	mg/L	1			<0.001				
Iron	0.03	mg/L	0.3			0.05				
Lead	0.001	mg/L	0.01			<0.001				
Manganese	0.01	mg/L	0.05			0.02				
Molybdenum	0.005	mg/L				<0.005				
Nickel	0.005	mg/L				<0.005				
Selenium	0.001	mg/L	0.05			<0.001				
Silver	0.0001	mg/L				<0.0001				
Strontium	0.001	mg/L				1.85				
Thallium	0.0001	mg/L				<0.0001				
Uranium	0.001	mg/L	0.02			<0.001				
Vanadium	0.001	mg/L				<0.001				
Zinc	0.01	mg/L	5			<0.01				
Metals Scan (Water, ICP/OES)										
Calcium	1	mg/L				52				
Magnesium	1	mg/L				34				
Potassium	1	mg/L				6				
Sodium	1	mg/L	200			7				

						Eurofins Sample No :	**7792341**			
						Matrix :	Drinking water			
						Sampling Date :	2024-06-19			
						Client Sample Identification :	TW1 6008 Hurley 6hr			
Microbiology	**RL**	**Unit**	**Criteria**							
			A	**B**	**C**					
E.Coli and Total Coliforms (DC Plate)										
Escherichia coli (DC)	0	CFU/100mL	0			0				
Total Coliforms (DC)	0	CFU/100mL	0			0				
Fecal Coliforms (mFC)	0	CFU/100mL	0			0				
Heterotrophic Plate Count (mHPC)	0	CFU/1 mL				151				

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OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Morey Associates
Project : 024241

Reception Date: 2024-06-20

Eurofins Sample No :			**7792341**						
Matrix :			Drinking water						
Sampling Date :			2024-06-19						
Client Sample Identification :			TW1 6008 Hurley 6hr						
Nutrients	**RL**	**Unit**							
Ammonia (Total, as Nitrogen)	0.02	mg/L	0.121						
Total Kjeldahl Nitrogen	0.1	mg/L	0.352						

Approved by : _____
Emma-Dawn Ferguson, M.Sc.
Environmental Chemist

Approved by : _____
Jason Kennedy,
Project Manager

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OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Morey Associates
Project : 024241

Reception Date: 2024-06-20

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Alkalinity (Water, Automated)									
Method : Alkalinity (water, titration to pH 4.5, automated). Internal method: OTT-I-AT-WI45398.									
Alkalinity (as CaCO3)	mg/L	5	<5	99	95-105			0	0-20
Associated Samples : 7792341								Prep Date: 2024-06-25 Analysis Date: 2024-06-26	
Ammonia, Total (Water, Colorimetry)									
Method : Ammonia (Water, Colorimetry). Internal method: OTT-I-NUT-WI46201.									
Ammonia (Total, as Nitrogen)	mg/L	0.02	<0.020	90	80-120	100	80-120	-	0-20
Associated Samples : 7792341								Prep Date: 2024-06-23 Analysis Date: 2024-06-24	
Chloride (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Chloride	mg/L	0.5	<0.5	94	80-120	97	80-120	-	0-20
Associated Samples : 7792341								Prep Date: 2024-06-24 Analysis Date: 2024-06-25	
Colour, True (Water, Spectrophotometry)									
Method : Colour (Water, Spectrophotometric). Internal method: OTT-I-SPEC-WI45980.									
Colour (True)	TCU	2	<2	97	39-159			-	0-40
Associated Samples : 7792341								Prep Date: 2024-06-25 Analysis Date: 2024-06-25	
Conductivity (Water, Automated)									
Method : Conductivity (Water, Autotitrator). Internal Method: OTT-I-AT-WI45398.									
Conductivity @ 25°C	uS/cm	5	<5	98	98-102			0	0-20
Associated Samples : 7792341								Prep Date: 2024-06-25 Analysis Date: 2024-06-26	
DOC (Water, IR)									
Method : Organic carbon (water, IR, combustion). Internal method: OTT-I-DEM-WI46148.									
Dissolved Organic Carbon	mg/L	0.5	<0.5	104	84-116	110	80-120	-	0-15
Associated Samples : 7792341								Prep Date: 2024-06-24 Analysis Date: 2024-06-25	
E.Coli and Total Coliforms (DC Plate)									
Method : Total Coliforms and E.Coli by MF (Water, DC plate). Internal method: OTT-M-BAC-WI45296.									
Escherichia coli (DC)	CFU/100mL	0	0					-	0-30
Total Coliforms (DC)	CFU/100mL	0	0					-	0-30
Associated Samples : 7792341								Prep Date: 2024-06-20 Analysis Date: 2024-06-21	
Fluoride (Water, Auto/ISE)									
Method : Fluoride by autotitrator, ion selective electrode. Internal method: OTT-I-AT-WI45398.									
Fluoride	mg/L	0.1	<0.10	100	90-110			-	0-20
Associated Samples : 7792341								Prep Date: 2024-06-25 Analysis Date: 2024-06-26	

eurofins | Environment Testing
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OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Morey Associates
Project : 024241

Reception Date: 2024-06-20

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Metals Scan (Water, ICP/MS)									
Method : Metals (Water, ICP/MS). Internal method: AMMTFQE1.									
Aluminum	mg/L	0.01	<0.01	100	80-120	100	70-130	7	0-20
Antimony	mg/L	0.0005	<0.0005	119	80-120	-	70-130	-	0-20
Arsenic	mg/L	0.001	<0.001	96	80-120	92	70-130	-	0-20
Barium	mg/L	0.001	<0.001	100	80-120	83	70-130	0	0-20
Beryllium	mg/L	0.0005	<0.0005	112	80-120	-	70-130	-	0-20
Boron	mg/L	0.01	<0.01	120	80-120	78	70-130	0	0-20
Cadmium	mg/L	0.0001	<0.0001	109	80-120	-	70-130	-	0-20
Chromium	mg/L	0.001	<0.001	110	80-120	97	70-130	-	0-20
Cobalt	mg/L	0.0002	<0.0002	110	80-120	95	70-130	-	0-20
Copper	mg/L	0.001	<0.001	110	80-120	88	70-130	-	0-20
Iron	mg/L	0.03	<0.03	100	80-120			1	0-20
Lead	mg/L	0.001	<0.001	110	80-120	88	70-130	-	0-20
Manganese	mg/L	0.01	<0.01	100	80-120	92	70-130	1	0-20
Molybdenum	mg/L	0.005	<0.005	100	80-120	99	70-130	-	0-20
Nickel	mg/L	0.005	<0.005	110	80-120	92	70-130	-	0-20
Selenium	mg/L	0.001	<0.001	105	80-120	90	70-130	-	0-20
Silver	mg/L	0.0001	<0.0001	112	80-120	94	70-130	-	0-20
Strontium	mg/L	0.001	<0.001	110	80-120	75	70-130	0	0-20
Thallium	mg/L	0.0001	<0.0001	115	80-120	-	70-130	-	0-20
Uranium	mg/L	0.001	<0.001	100	80-120	91	70-130	-	0-20
Vanadium	mg/L	0.001	<0.001	100	80-120	99	70-130	-	0-20
Zinc	mg/L	0.01	<0.01	120	80-120	86	70-130	-	0-20
Associated Samples : 7792341								Prep Date: 2024-06-24 Analysis Date: 2024-06-25	
Metals Scan (Water, ICP/OES)									
Method : Metals (Water, ICP/OES). Internal method: OTT-I-MET-WI48491.									
Calcium	mg/L	1	<1	103	86-115	101	70-130	-	0-20
Magnesium	mg/L	1	<1	102	91-109	99	70-130	-	0-20
Potassium	mg/L	1	<1	103	87-113	100	70-130	-	0-20
Sodium	mg/L	1	<1	101	85-115	100	70-130	-	0-20
Associated Samples : 7792341								Prep Date: 2024-06-27 Analysis Date: 2024-06-20	
Nitrate (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Nitrate (as Nitrogen)	mg/L	0.1	<0.1	96	80-120	100	80-120	-	0-20
Associated Samples : 7792341								Prep Date: 2024-06-24 Analysis Date: 2024-06-25	
Nitrite (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Nitrite (as Nitrogen)	mg/L	0.1	<0.1	93	80-120				
Associated Samples : 7792341								Prep Date: 2024-06-24 Analysis Date: 2024-06-25	
pH (25°C) (Water, Automated)									
Method : pH (Water, Automated Meter). Internal method: OTT-I-AT-WI45398.									
pH @ 25°C		1	5.84	100	97-103			0	0-20
Associated Samples : 7792341								Prep Date: 2024-06-25 Analysis Date: 2024-06-26	

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OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Morey Associates
Project : 024241

Reception Date: 2024-06-20

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Phenols (Water, Colorimetry)									
Method : Phenols (Water, Colorimetry). Internal method: OTT-I-4AAP-WI46150.									
Phenols-4AAP	mg/L	0.001	<0.001	106	75-125	104	70-130	-	0-20
Associated Samples : 7792341								Prep Date: 2024-06-25 Analysis Date: 2024-06-25	
Sulphate (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Sulphate	mg/L	1	<1	90	90-110	92	80-120	0	0-20
Associated Samples : 7792341								Prep Date: 2024-06-24 Analysis Date: 2024-06-25	
Sulphide (Water, Colorimetry)									
Method : Sulphide, S2- (Water, Colorimetry). Internal method: OTT-I-SPEC-WI45931.									
Sulphide (S2-)	mg/L	0.01	<0.01	96	80-120			-	0-20
Associated Samples : 7792341								Prep Date: 2024-06-26 Analysis Date: 2024-06-26	
Tannin and Lignin (Water, Spec)									
Method : Tannin and Lignin (Water, Spec), Internal method: OTT-I-SPEC-WI57693.									
Tannin and Lignin	mg/L	0.1	<0.1	94	80-120			-	0-20
Associated Samples : 7792341								Prep Date: 2024-06-21 Analysis Date: 2024-06-21	
Total Kjeldahl Nitrogen (Water, Colorimetry)									
Method : TKN (Water, colorimetry). Internal method: OTT-I-NUT-WI46201.									
Total Kjeldahl Nitrogen	mg/L	0.1	<0.100	97	70-130	129	70-130	5	0-20
Associated Samples : 7792341								Prep Date: 2024-06-25 Analysis Date: 2024-06-26	
Turbidity (Water, Turbidimeter)									
Method : Turbidity (Water, Turbidimeter). Internal method: OTT-I-TUR-WI46288.									
Turbidity	NTU	0.1	<0.1	102	80-120			-	0-30
Associated Samples : 7792341								Prep Date: 2024-06-21 Analysis Date: 2024-06-21	
Method : Fecal Coliforms by MF (mFC Media). Internal method: OTT-M-BAC-WI45296.									
Fecal Coliforms (mFC)	CFU/100mL	0	0					-	0-30
Method : Heterotrophic Plate Count by MF (mHPC Media). Internal method: OTT-M-BAC-WI45296.									
Heterotrophic Plate Count (mHPC)	CFU/1 mL	0	0					0	0-30
Associated Samples : 7792341								Prep Date: 2024-06-20 Analysis Date: 2024-06-22	

Where RPD % is reported as "-" the calculation is not available because one or both of the duplicates is within 5 times the RL.

APPENDIX E

RESULTS OF LABORATORY TESTING OF SOIL SAMPLES

Stantec
2781 Lancaster Road
Ottawa ON, K1B 1A7

Sieve Analysis
LS 602
ASTM C136

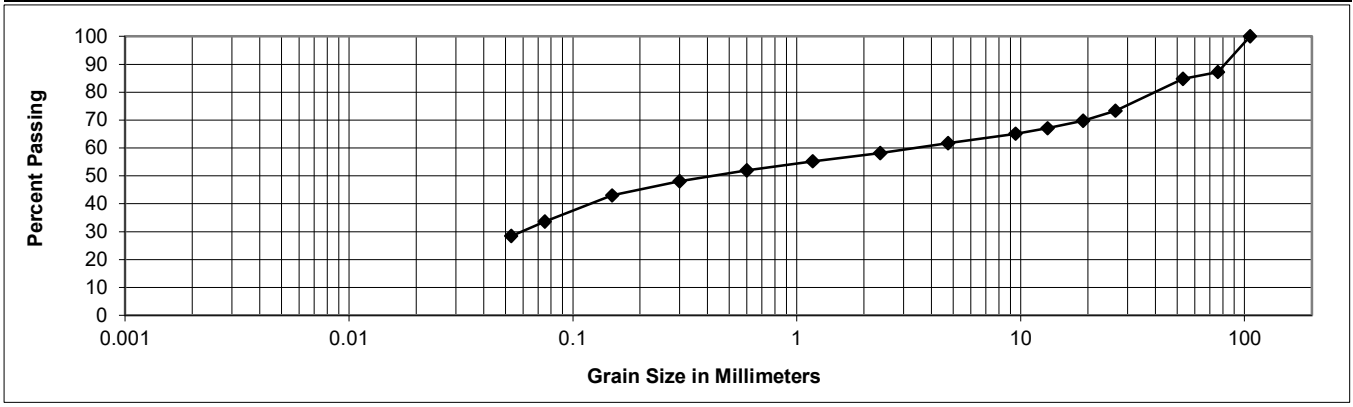
Client:	**Morey Associates, File #024241**	Project Number:	**121625580**
Project:	**Materials Testing**		
Material Type:	**Soils / Aggregates:**		
Proposed Use:	**Fill/Granulars**		
Source:	**TP24-1**		
Sample Number:	**SA-1**		
Sampled Depth:	**±1.5m**		
Sampled By:	**Morey Associates**	Tested By:	**Brian Prevost**
Date Sampled:	**May 9, 2024**	Date Tested:	**May 13, 2024**

Sieve Test Data		Wash Test Data		
Sample Weight Before Sieve, (g):	**8132.7**	Sample Weight Before Wash, (g):	**301.2**	**Corrected**
Sample Weight After Sieve, (g):	**8103.4**	Sample Weight After Wash, (g):	**169.7**	
Percent Loss In Sieve, (%):	**0.36**	Percent Passing No. 270, (%):	**43.7**	**26.9**

Sieve Analysis

Sieve No.	Size of Opening		Weight Retained	Cumulative Weight Retained	Percent Passing	No Envelope	
	Inches	mm	g	g	%	Minimum	Maximum
	6	**150**					
	4	**106**	**0**	**0.0**	**100.0**		
	3	**76.2**	**1033.7**	**1033.7**	**87.3**		
	2	**53.0**	**206.4**	**1240.1**	**84.8**		
	1	**26.5**	**924.1**	**2164.2**	**73.4**		
	3/4	**19.0**	**295.3**	**2459.5**	**69.8**		
	5/8	**16.0**					
	1/2	**13.2**	**216.3**	**2675.8**	**67.1**		
	3/8	**9.5**	**159.4**	**2835.2**	**65.1**		
+4	**0.187**	**4.75**	**280.2**	**3115.4**	**61.7**		
		- 4.75	**4988.0**	**8103.4**			
8	**0.0937**	**2.36**		**17.2**	**58.2**		
16	**0.0469**	**1.18**		**31.4**	**55.3**		
30	**0.234**	**0.600**		**47.2**	**52.0**		
50	**0.0117**	**0.300**		**66.7**	**48.0**		
100	**0.0059**	**0.150**		**91.5**	**43.0**		
200	**0.0029**	**0.075**		**136.9**	**33.7**		
270	**0.0021**	**0.053**		**162.6**	**28.4**		
		Pan		**168.5**			

Classification of Sample: % Gravel: **38.3** % Sand: **28.0** % Silt & Clay: **33.7**

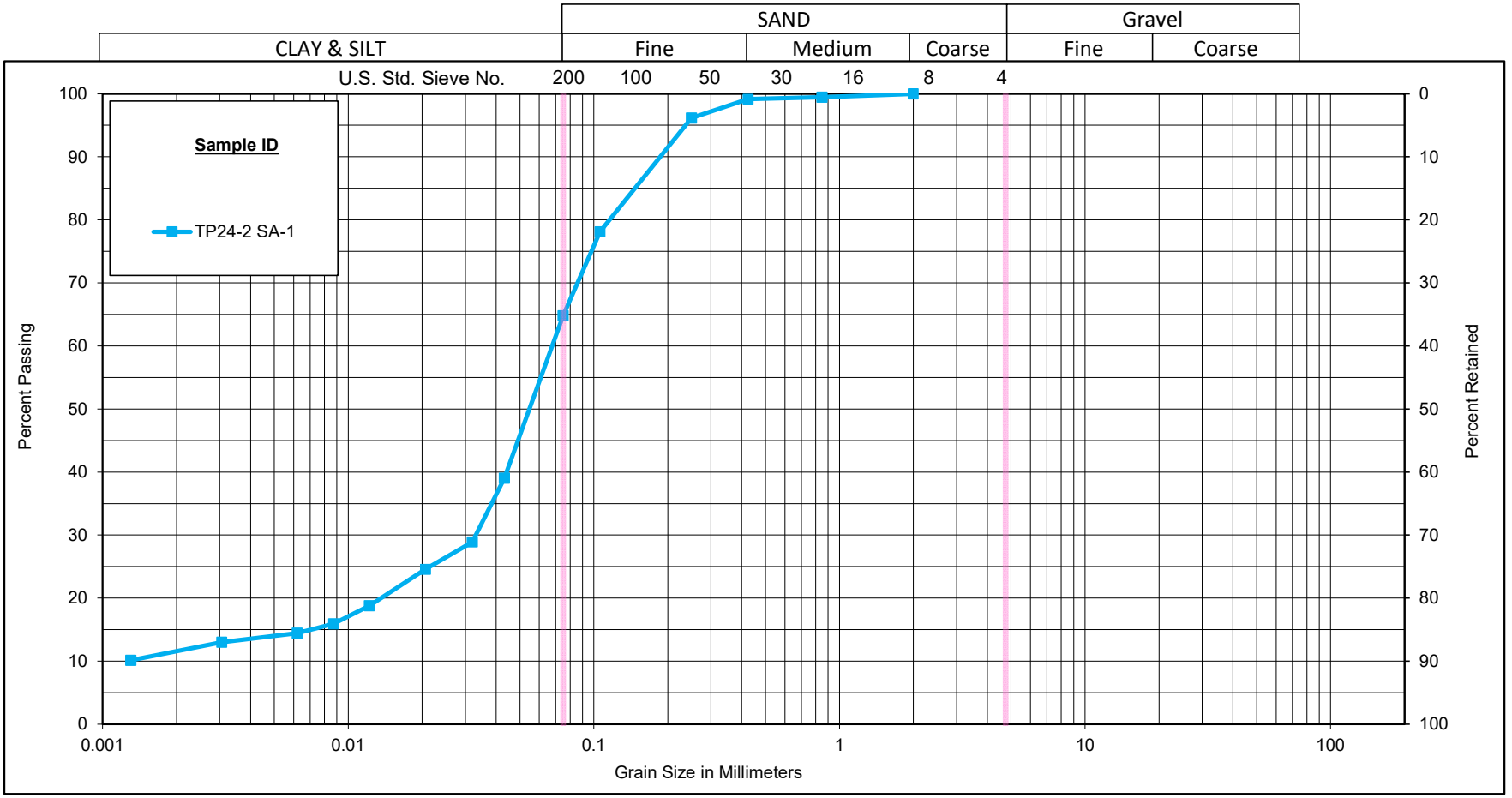


Remarks:

Reviewed By: Brian Prevost **Date:** May 14, 2024

V:\01216\active\laboratory_standing_offers\2024 Laboratory Standing Offers\121625580 Morey Associates\May 9, Hyd_Sieve_0.053mm, Morey #024241\Sieve Analysis Split, 0.053mm.xlsx

Unified Soil Classification System



Sample ID	Depth	% Gravel	% Sand	% Silt	% Clay
TP24-2 SA-1	±1.8m	0.0	35.2	53.8	11.0

Stantec

GRAIN SIZE DISTRIBUTION

Morey Associates, File #024241

Materials Testing

Figure No.

Project No. 121625580

Stantec

Particle-Size Analysis of Soils

LS702

AASHTO T88

PROJECT DETAILS			
Client:	**Morey Associates, File #024241**	Project No.:	**121625580**
Project:	**Materials Testing**	Test Method:	**LS702**
Material Type:	**Soil**	Sampled By:	**Morey Associates**
Source:	**TP24-2**	Date Sampled:	**May 9, 2024**
Sample No.:	**SA-1**	Tested By:	**Brian Prevost**
Sample Depth	**±1.8m**	Date Tested:	**May 13, 2024**

WASH TEST DATA	
Oven Dry Mass In Hydrometer Analysis (g)	67.68
Sample Weight after Hydrometer and Wash (g)	25.24
Percent Passing No. 200 Sieve (%)	**62.7**
Percent Passing Corrected (%)	**62.71**

PERCENT LOSS IN SIEVE	
Sample Weight Before Sieve (g)	**301.20**
Sample Weight After Sieve (g)	**300.60**
Percent Loss in Sieve (%)	**0.20**

SOIL INFORMATION		
Liquid Limit (LL)		
Plasticity Index (PI)		
Soil Classification		
Specific Gravity (G_s)	2.750	
Sg. Correction Factor (α)	0.978	
Mass of Dispersing Agent/Litre	24	g

CALCULATION OF DRY SOIL MASS	
Oven Dried Mass (W_o), (g)	45.62
Air Dried Mass (W_a), (g)	46.17
Hygroscopic Corr. Factor ($F=W_o/W_a$)	0.9881
Air Dried Mass in Analysis (M_a), (g)	68.50
Oven Dried Mass in Analysis (M_o), (g)	67.68
Percent Passing 2.0 mm Sieve (P_{10}), (%)	100.00
Sample Represented (W), (g)	67.68

HYDROMETER DETAILS	
Volume of Bulb (V_B), (cm^3)	63.0
Length of Bulb (L_2), (cm)	14.47
Length from '0' Reading to Top of Bulb (L_1), (cm)	10.29
Scale Dimension (h_s), (cm/Div)	0.155
Cross-Sectional Area of Cylinder (A), (cm^2)	27.25
Meniscus Correction (H_m), (g/L)	1.0

SIEVE ANALYSIS		
Sieve Size mm	**Cum. Wt. Retained**	**Percent Passing**
75.0		100.0
63.0		100.0
53.0		100.0
37.5		100.0
26.5		100.0
19.0		100.0
13.2		100.0
9.5		100.0
4.75		100.0
2.00	0.0	100.0
Total (C + F)[1]	300.60	
0.850	0.36	99.47
0.425	0.59	99.13
0.250	2.60	96.16
0.106	14.80	78.13
0.075	23.83	64.79
PAN	24.72	

Note 1: (C + F) = Coarse + Fine

START TIME 11:00 AM

HYDROMETER ANALYSIS

Date	Time	Elapsed Time T Mins	H_s Divisions g/L	H_c Divisions g/L	Temperature T_c °C	Corrected Reading $R = H_s - H_c$ g/L	Percent Passing P %	L cm	η Poise	K	Diameter D mm
13-May-24	11:01 AM	1	31.0	4.0	23.0	27.0	39.03	11.40904	9.39251	0.012818	0.04330
13-May-24	11:02 AM	2	24.0	4.0	23.0	20.0	28.91	12.49404	9.39251	0.012818	0.03204
13-May-24	11:05 AM	5	21.0	4.0	23.0	17.0	24.57	12.95904	9.39251	0.012818	0.02064
13-May-24	11:15 AM	15	17.0	4.0	23.0	13.0	18.79	13.57904	9.39251	0.012818	0.01220
13-May-24	11:30 AM	30	15.0	4.0	23.0	11.0	15.90	13.88904	9.39251	0.012818	0.00872
13-May-24	12:00 PM	60	14.0	4.0	23.0	10.0	14.45	14.04404	9.39251	0.012818	0.00620
13-May-24	3:10 PM	250	13.0	4.0	23.0	9.0	13.0095	14.19904	9.39251	0.012818	0.00305
14-May-24	11:00 AM	1440	11.0	4.0	22.0	7.0	10.1185	14.50904	9.61570	0.012970	0.00130

Remarks:

Reviewed By: D. Boateng

Date: May 14, 2024

V:\01216\active\laboratory_standing_offers\2024 Laboratory Standing Offers\121625580 Morey Associates\May 9, Hyd_Sieve_0.053mm, Morey #024241\Morey Associates, File# 024241_Hydrometer_revised.xlsx

APPENDIX F

THORNTHWAITE CALCULATIONS AND SEPTIC EFFLUENT DILUTION CALCULATIONS

Thornthwaite Method Calculation

Month	Precipitation (cm)	Mean Temp. °C (monthly)	I (Heat Index)	a	c (Daylight Factor)	E (cm)	PET (cm)	Net Water Surplus (cm)
January	6.38	-10.3	0.00	1.054	0.80	0.00	0.00	6.38
February	6.11	-8.8	0.00		0.81	0.00	0.00	6.11
March	7.00	-2.5	0.00		1.02	0.00	0.00	7.00
April	8.05	5.6	1.19		1.13	2.66	3.00	5.05
May	8.38	12.7	4.10		1.28	6.29	8.05	0.33
June	7.79	17.8	6.84		1.29	8.98	11.58	-3.79
July	9.75	20.4	8.41		1.31	10.37	13.58	-3.83
August	8.41	19.1	7.61		1.21	9.67	11.70	-3.29
September	9.28	14.1	4.80		1.04	7.02	7.31	1.97
October	8.18	7.8	1.96		0.94	3.76	3.54	4.64
November	8.37	1.3	0.13		0.79	0.57	0.45	7.92
December	8.47	-6.6	0.00		0.75	0.00	0.00	8.47
TOTALS	96.17		35.03			49.32	59.21	***36.96***

Notes:

Tm = Mean Monthly Temperative (from Environment Canada information)

I = (Tm/5)^1.514

a = 67.5(10^-8)(I^3) - 77.1(10^-6)(I^2) + 0.0179(I) + 0.492

c = based on latitude of 45 degrees

E = 1.62(10Tm/∑I)^a

PET = Ec

Net Water Surplus = Precipitation - PET

Nitrate Dilution Calculation - 4 Dwelling Units

Number of Lots	4		(Severed and retained lots as per Severance Sketch)
Number of Dwelling Units	***4***		(Number of dwelling units, including existing dwelling at 6008 Hurley Rd)
Gross Site Area	47170	m^2	(As per Severance Sketch)
Net Potential Infiltration (NPI)	369.6	mm/year	(As per Thornthwaite Method Calculation)

Infiltration Reduction Factors (IRF):

Topography	0.25	(Relatively flat with gentle slope across site)
Soil	0.40	(Sandy subgrade)
Cover	0.10	(Cultivated lands)
Total	0.75	

$$\frac{[1](\text{Number of Dwelling Units}) \times 365\ m^3 \text{ Effluent Per Year} \times 40\ mg/L\ NO_3}{[2](\text{Number of Lots}) \times 365\ m^3 \text{ Effluent Per Year} + (\text{Net Infiltration Area} \times \text{NPI} \times \text{IRF})} = \textbf{\textit{4.02}}\ mg/L\ NO_3 \text{ as N}$$

[1]Number of Dwelling Units is used as per MOE D-5-4 guidelines document, section 5.6.2.(a) which states *"For the purposes of predicting the potential for groundwater impacts, a nitrate loading of at least 40 grams/lot/day* ***per residential dwelling unit*** *shall normally be used."*

[2]Number of Lots is used as per MOE D-5-4 guidelines document, section 5.6.2.(b)(v) which states *"The volume of sewage effluent, if used as dilution water in mass balance calculations, should not exceed 1000 L/day/lot"*

Nitrate Dilution Calculation - 9 Dwelling Units

Number of Lots	4		(Severed and retained lots as per Severance Sketch)
Number of Dwelling Units	***9***		(Number of dwelling units, including existing dwelling at 6008 Hurley Rd)
Gross Site Area	47170	m^2	(As per Severance Sketch)
Net Potential Infiltration (NPI)	369.6	mm/year	(As per Thornthwaite Method Calculation)

Infiltration Reduction Factors (IRF):

Topography	0.25	(Relatively flat with gentle slope across site)
Soil	0.40	(Sandy subgrade)
Cover	0.10	(Cultivated lands)
Total	0.75	

$$\frac{[1]\text{(Number of Dwelling Units) x 365 } m^3 \text{ Effluent Per Year x 40 mg/L } NO_3}{[2]\text{(Number of Lots) x 365 } m^3 \text{ Effluent Per Year + (Net Infiltration Area x NPI x IRF)}} = \textbf{\textit{9.04}} \text{ mg/L } NO_3 \text{ as N}$$

[1]Number of Dwelling Units is used as per MOE D-5-4 guidelines document, section 5.6.2.(a) which states *"For the purposes of predicting the potential for groundwater impacts, a nitrate loading of at least 40 grams/lot/day* ***per residential dwelling unit*** *shall normally be used."*

[2]Number of Lots is used as per MOE D-5-4 guidelines document, section 5.6.2.(b)(v) which states *"The volume of sewage effluent, if used as dilution water in mass balance calculations, should not exceed 1000 L/day/lot"*

SCHEDULE “D”

SITE SURVEY 15R12485

Notes & Legend

—□—	Denotes	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
IBØ	"	Iron Bar
RPL	"	Rock Plug
(WIT)	"	Witness
Meas.	"	Measured
(P1)	"	Plan 15R-8000
(P2)	"	Plan 15R-5051
(P3)	"	Plan 15R-338
(P4)	"	Plan 15R-62
PWF	"	Post and Wire Fence
UP	"	Utility Pole
OHW	"	Overhead Wires

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.999949.

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations on reference points (ORP A and ORP B), shown hereon, having a bearing between them of N55°52'00"W and are referenced to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (CSRS)(2010).

For comparison purposes, a rotation of 0°36'40" counter clockwise was applied to the bearings on P1 and P2.

Coordinates are derived from Can-Net 2016 Real Time Network GPS observations and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (CSRS)(2010).

Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

. ORP A	Northing	4964536.27	Easting	377068.58
. ORP B	Northing	4964320.92	Easting	377386.27

Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundaries shown on this plan.

Scale 1 : 1000

40 30 20 10 0 20 40 Metres

The intended plot size of the plan is 610 mm in width by 457 mm in height when plotted at a scale of 1:1000.

Metric

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

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the 18th day of October, 2024.

November 8, 2024
Date

Emmett Ketchum
Ontario Land Surveyor

This Plan of Survey relates to AOLS Plan Submission Form number 2220168.

PLAN OF SURVEY OF
PART OF LOT 36
CONCESSION 6
GEOGRAPHIC TOWNSHIP OF
EDWARDSBURGH
NOW IN THE TOWNSHIP OF
EDWARDSBURGH/CARDINAL
COUNTY OF GRENVILLE

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

SCHEDULE

PART	PART OF LOT	CONCESSION	ALL OF PIN
1	36	6	68141 - 0135
2			
3			
4			

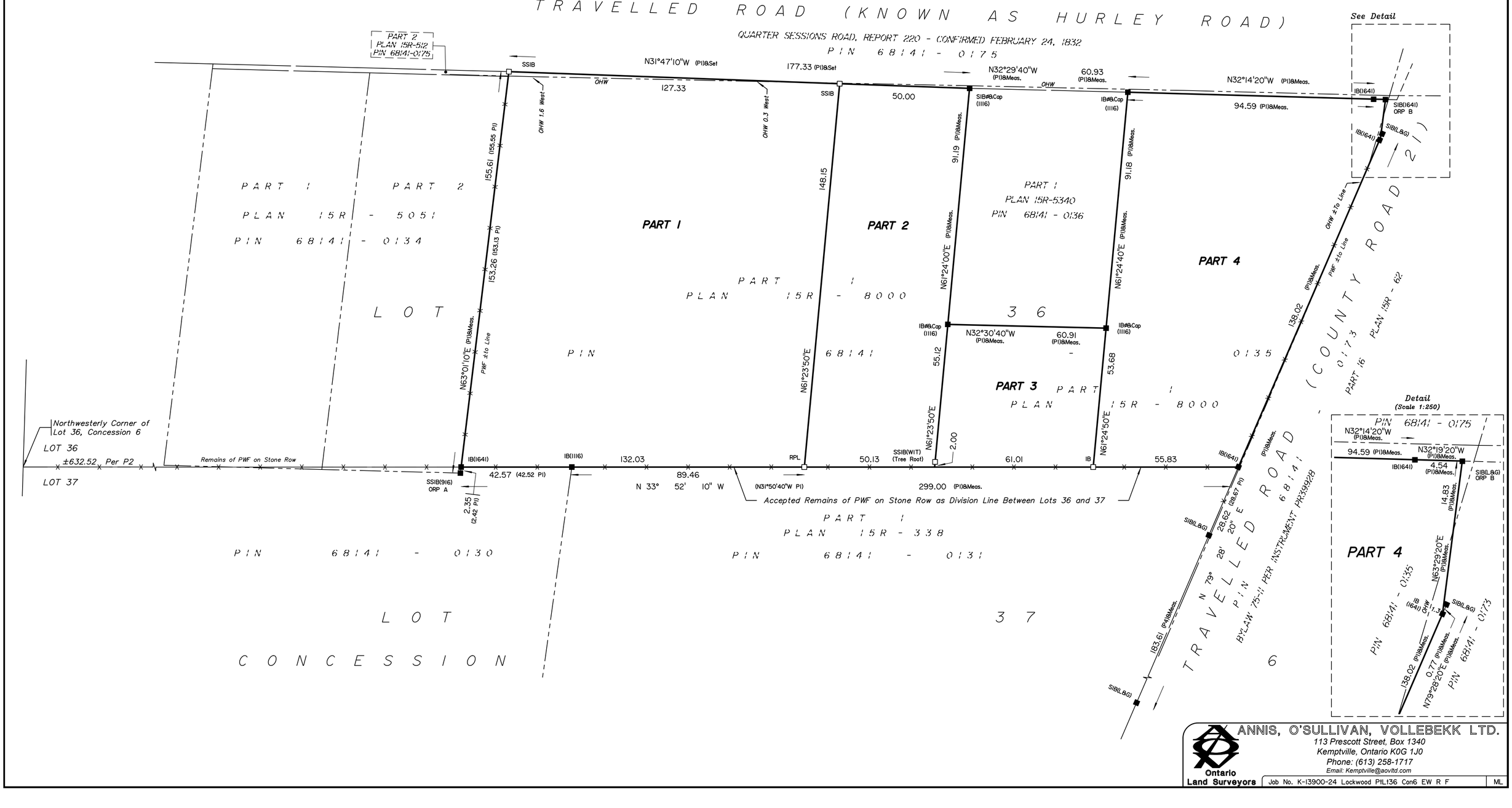
PLAN 15R-12485

Received and deposited

November 12th, 2024

Carolette Liburd

Representative for the Land Registrar for the Land Titles Division of Grenville (No.15)



ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
113 Prescott Street, Box 1340
Kemptville, Ontario K0G 1J0
Phone: (613) 258-1717
Email: Kemptville@aovltd.com
Ontario Land Surveyors

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