MTE Consultants
123 St. George St., London, ON N6A 3A1

December 3, 2019

MTE File No.: 45013-300

Mr. Guy Riopeele
10919 Longwoods Road Inc.
10919 Longwoods Road
Middlesex Centre, Ontario

Dear Mr. Riopeele:

RE: Results of Groundwater Sampling and Nitrate Loading Assessment, 10919 Longwoods Road, Proposed Industrial Subdivision

MTE Consultants Inc. (MTE) was retained by 10919 Longwoods Road Inc. to conduct a groundwater sampling program and nitrate loading assessment for a proposed industrial subdivision to be located at 10919 Longwoods Road, Municipality of Middlesex Centre, Ontario ("the Site"). The approximate location of the Site is shown on Figure 1 (attached).

It is our understanding that the proposed industrial subdivision will be developed on approximately 6.65 hectares (ha) of agricultural lands and will include a private roadway, up to eighteen industrial lots and an on-site stormwater management facility. Each proposed lot will be connected to a piped municipal water supply but will be serviced with individual wastewater treatment facilities (septic beds). These wastewater systems are intended for domestic waste disposal only and no commercial/industrial cooling or process wastewater will be directed to these systems. A preliminary site plan concept is shown on Figure 2 (attached).

The purpose of this groundwater sampling program and nitrate loading assessment is to support the site plan design and approval process.

Scope of Work

Our scope of work included the following:

- Collection of groundwater samples from the six on-site monitoring wells;
- Submission of six groundwater samples to an accredited laboratory for analysis of Nitrite-N, Nitrate-N, Ammonia-N, and Total Kjeldahl Nitrogen (TKN);
- Comparison of laboratory results to applicable criteria (Ontario Regulation 169/03 Ontario Drinking Water Quality Standards, Safe Drinking Water Act 2002);
- Completion of a Nitrate Loading Assessment; and
- Data assessment and reporting.

Field Sampling and Observations

On September 13, 2019, and October 4, 2019, MTE collected groundwater samples from the six monitoring wells installed on March 20, 2019 as part of a Geotechnical Investigation (MW101-19, MW102-19, MW103-19, MW104-19, MW105-19, and MW106-19). Refer to Figure 2 for

monitoring well locations. Prior to sample collection, the monitoring wells were purged a minimum of three standing well volumes or until 'dry'. Samples were collected using dedicated Waterra™ inertial pumps; placed into laboratory supplied jars and submitted under chain of custody procedures, in ice packed coolers, to AGAT Laboratories for analysis of Nitrite-N, Nitrate-N, Ammonia-N, and TKN.

The sampling program was conducted in general accordance with the Ministry of Environment, Conservation and Parks (MECP[1]) document *"Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario,"* dated December 1996. All chemical analyses were performed by an accredited analytical laboratory in accordance with the document "*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act,"* dated July 1, 2011, as amended.

Analytical Results

The analytical results are summarized in Table 1 (attached), which includes a comparison to the Ontario Regulation 169/03 Ontario Drinking Water Quality Standards (ODWQS). Copies of the Certificates of Analysis received from the analytical laboratory are also attached.

Based on the analytical results for the samples collected on September 13, 2019, there was an exceedance of the corresponding ODWQS for Nitrate-N at MW104-19. No other samples collected during this event exceeded the corresponding ODWQS for the parameters analyzed.

In response, MTE collected additional groundwater samples from all six wells on October 4, 2019 to confirm the initial results and assess temporal variability of the groundwater quality. The analytical results for these samples were similar, with a repeated exceedance of the corresponding ODWQS for Nitrate-N at MW104-19. Similar to the previous sample event results, no other samples collected during this event exceeded the corresponding ODWQS for the parameters analyzed.

These analytical results are typical for agricultural properties where chemical fertilizers and/or biosolids are routinely applied. As a result, the nitrate concentration observed in the groundwater sample collected from MW104-19 should decline following the proposed change in land use from agricultural to commercial/industrial.

Nitrate Loading Assessment

To support the site plan design, three scenarios were compared to assess the potential nitrate loading of the proposed industrial subdivision. Details of each scenario are described below.

Scenario 1

- A conventional, anaerobic septic system will be installed on each of the 18 lots;
- Total daily design sanitary sewage flow is 75 litres (L) per employee per 8 hour shift (in general accordance with Section 8.2.1.3 of the Ontario Building Code)[2];

[1] It is noted that the Ontario Ministry of the Environment, Conservation and Parks (MECP) was previously named the Ontario Ministry of the Environment (MOE) and the Ontario Ministry of the Environment and Climate Change (MOECC). For ease of discussion in this document, "MECP" is used to represent this provincial ministry and is inclusive of MOE and MOECC.

[2] https://www.buildingcode.online accessed November 2019.

- Each industrial lot will require wastewater servicing to support up to six employees with one 8 hour shift per day, or equivalent;
- The nitrate concentration in the sewage effluent following conventional treatment will be 40 milligrams per litre (mg/L);
- The development will have no more than 75% impervious surface, or achieve equivalent infiltration using appropriately designed low impact development strategies (LIDs);
- A groundwater recharge rate of 0.25 m/year (in accordance with Section 22.2.8 of the MECP[1] document *Design Guidelines for Sewage Works* (2008); and
- A background nitrate concentration of 1 mg/L was assumed for the infiltration.

Scenario 2

- A conventional, anaerobic septic system will be installed on each of the 13 lots (i.e., a five lot reduction);
- Total daily design sanitary sewage flow is 75 L per employee per 8 hour shift;
- Each industrial lot will require wastewater servicing to support up to six employees with one 8 hour shift per day, or equivalent;
- The nitrate concentration in the sewage effluent following conventional treatment will be 40 mg/L;
- The development will have no more than 50% impervious surface, or achieve equivalent infiltration using appropriately designed LIDs;
- A groundwater recharge rate of 0.25 m/year; and
- A background nitrate concentration of 1 mg/L was assumed for the infiltration.

Scenario 3

- A tertiary treatment system will be installed on each of the 18 lots;
- Total daily design sanitary sewage flow is 75 L per employee per 8 hour shift;
- Each industrial lot will require wastewater servicing to support up to six employees with one 8 hour shift per day, or equivalent;
- The nitrate concentration in the sewage effluent following tertiary treatment will be 20 mg/L;
- The development will have no more than 75% impervious surface, or achieve equivalent infiltration using appropriately designed LIDs;
- A groundwater recharge rate of 0.25 m/year; and
- A background nitrate concentration of 1 mg/L was assumed for the infiltration.

Using the above, the nitrate loading assessment was performed using the following formula:

$$C_B = \frac{SEF \times C_{SEF} + RWI \times C_{RWI}}{SEF + RWI}$$

Where:

C_B = Nitrate concentration at the down-gradient site boundary (mg/L as N)
SEF = Sewage Effluent Flow (L/yr)
C_{SEF} = Nitrate Concentration of sewage effluent (mg/L as N)
RWI = Recharge Water Infiltration (L/yr)
C_{RWI} = Nitrate concentration of infiltration water (mg/L as N)

The results for each of the three scenarios described above are provided in the following table:

Parameter	Units	Scenario 1	Scenario 2	Scenario 3
SEF	L/yr	2,956,500	2,135,250	2,956,500
C_{SEF}	mg/L as N	40	40	20
RWI	L/yr	4,156,250	8,312,500	4,156,250
C_{RWI}	mg/L as N	1	1	1
C_B	mg/L as N	17.2	9.0	8.9
ODWQS Compliance?		**No**	**Yes**	**Yes**

As shown in the table above, the nitrate concentration in groundwater at the down-gradient site boundary (C_B) for Scenario 1 is predicted to be 17.2 mg/L, which exceeds the corresponding ODWQS of 10 mg/L. However, Scenario 2 results in a predicted C_B of 9.0 mg/L by reducing the number of lots to thirteen and using the area of those five lots to increase the total pervious area available for infiltration to approximately 50%. Alternatively, Scenario 3 achieves a predicted C_B of 8.9 mg/L by replacing the conventional septic systems with tertiary treatment systems to reduce the nitrate concentration in the effluent by 50%.

Findings and Recommendations

Based on the above results, the preferred option to achieve a nitrate concentration at the down-gradient site boundary of less than 10 mg/L is to install a tertiary treatment system approved under the Ontario Building Code for each lot. To improve the overall system performance, we suggest implementing LID strategies to promote increased infiltration at the site.

This recommendation assumes that the final site plan design is similar to that shown on Figure 2 and that the design adheres to the assumptions described for Scenario 3. Should the site plan or design assumptions need to be altered in any way, MTE should be requested to review the changes and assess whether the findings and recommendations described herein remain valid.

Limitations

Services performed by MTE were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the Environmental Engineering and Consulting profession. No other warranty or representation expressed or implied as to the accuracy of the information, conclusions or recommendations is included or intended in this report.

This letter is not intended to be exhaustive in scope or to imply a risk-free site. The findings of this report are based on conditions as they existed during the time period of the investigation.

Any use which another party makes of this report, or any reliance on, or decisions to be made based upon it, are the responsibility of such parties.

Closure

We trust that this letter provides sufficient information for your current needs. Should you require additional information or have any questions regarding the information provided, please contact this office.

Yours Truly,

MTE Consultants Inc.

Andrew Bingeman, C.E.T.
Manager, Groundwater Resources
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John McNeil, M.Sc., P.Geo.
Senior Hydrogeologist
519-204-6510 ext. 2228
jmcneil@mte85.com

Attachments:

- Figures 1 and 2
- Table 1
- Borehole Logs
- Certificates of Analysis

JDM/ALB:lmb

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FIGURE 1 – LOCATION PLAN Project: 45013-300 CAD: P:\P\45013\300\BH FIGURES\45013-300 BH FIGURES.DWG

REFERENCES:

- AERIAL IMAGE FROM GOOGLE EARTH PRO.

MTE
Engineers | Scientists | Surveyors

LOCATION PLAN

Project Name
10919 LONGWOODS ROAD PROPOSED INDUSTRIAL SUBDIVISION

Site	Client
10919 LONGWOODS ROAD, MUNICIPALITY OF MIDDLESEX, ON	10919 LONGWOODS ROAD INC.

Scale. (8.5x11)	MTE Project No.	Date	Figure No.
N.T.S.	45013-300	MARCH 27, 2019	1

LEGEND

BH107–19
MTE BOREHOLE

MW101–19
MTE MONITORING WELL

REFERENCES:

- AERIAL IMAGE FROM GOOGLE EARTH PRO.
- BOREHOLE ELEVATIONS SURVEYED BY MTE.

MTE
Engineers | Scientists | Surveyors

SITE PLAN

Project Name
10919 LONGWOODS ROAD PROPOSED INDUSTRIAL SUBDIVISION

Site	Client
10919 LONGWOODS ROAD, MUNICIPALITY OF MIDDLESEX, ON	10919 LONGWOODS ROAD INC.

Scale (11x17)	MTE Project No.	Date	Figure No.
1:2000	45013-300	MARCH 27, 2019	2

Project: 45013-300 CAD: P:\P\45013\300\BH FIGURES\45013-300 BH FIGURES.DWG
March 27, 2019 — 11:39 a.m. — Plotted By: awilliams
FIGURE 2 – SITE PLAN

TABLE 1: GROUNDWATER ANALYTICAL RESULTS - O. Reg 169/03: ONTARIO DRINKING WATER QUALITY STANDARDS

Parameter	Unit	RDL	Sample Name	MW101-19		MW102-19		MW103-19		MW104-19		MW105-19		MW106-19	
			Lab Job #	19L517579	19L526675	19L517579	19L526675	19L517579	19L526675	19L517579	19L526675	19L517579	19L526675	19L517579	19L526675
			Laboratory ID	523781	587532	523793	587576	523794	587591	523795	587600	523796	587605	523797	587607
			Sampling Date	2019-09-13	2019-10-04	2019-09-13	2019-10-04	2019-09-13	2019-10-04	2019-09-13	2019-10-04	2019-09-13	2019-10-04	2019-09-13	2019-10-04
			O. Reg. 169/03												
Nitrate as N	mg/L	0.05 or 0.25 or 0.50	10.0	<0.5	<0.5	<0.05	<0.25	<0.05	<0.05	**18.7**	**19.7**	<0.05	<0.05	<0.05	<0.05
Nitrite as N	mg/L	0.05 or 0.25 or 0.50	1.0	<0.5	<0.5	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrate + Nitrite) as N (Calculated)	mg/L	0.07	NR	NA	<0.07	NA	<0.07	NA	<0.07	**18.7**	**19.7**	NA	<0.07	NA	<0.07
Ammonia as N	mg/L	0.02	NR	0.75	0.90	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.12	<0.02	<0.02
Total Kjeldahl Nitrogen	mg/L	0.10	NR	1.78	2.49	0.56	6.10	0.45	0.53	<0.10	<0.10	0.86	0.55	0.56	0.33

NOTES:

Bold - Exceeds O.Reg 169/03 Criteria

"<" - Less than the Reporting Detection Limit

RDL - Reported detection limit (varies for N in each Certificate of Analysis for this project)

NR - Not Relevant

NA - Not Applicable (not tested or calculated)

ID Number: MW101-19

Project: 10919 Longwoods Road Proposed Industrial Subdivision

Project No: 45013-300

Client: 10919 Longwoods Road Inc.

Site Location: 10919 Longwoods Road, Middlesex Centre, ON

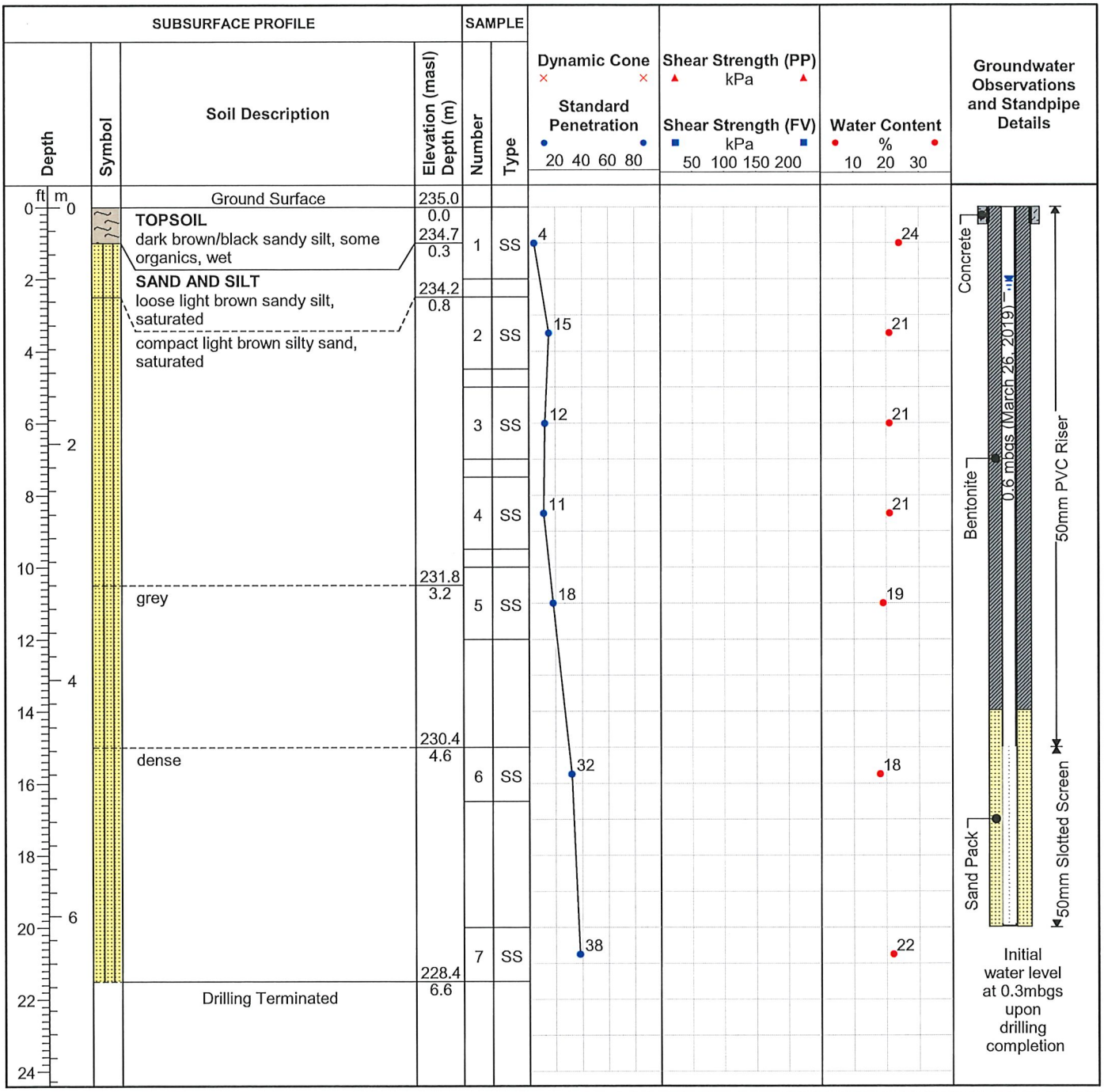
Drill Date: 3/20/2019

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track

Drill Method: Hollow Stem Auger

Protective Cover: Monument Casing



Field Technician: M. Dalgliesh

Drafted by: B. Heinbuch

Reviewed by: D. Gonser

MTE

Sheet: 1 of 1

ID Number: MW102-19

Project: 10919 Longwoods Road Proposed Industrial Subdivision

Project No: 45013-300

Client: 10919 Longwoods Road Inc.

Site Location: 10919 Longwoods Road, Middlesex Centre, ON

Drill Date: 3/20/2019

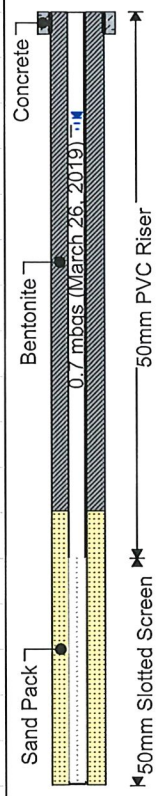
Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track

Drill Method: Hollow Stem Auger

Protective Cover: Monument Casing

SUBSURFACE PROFILE				SAMPLE		Dynamic Cone / Standard Penetration	Shear Strength (PP) / Shear Strength (FV)	Water Content	Groundwater Observations and Standpipe Details
Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	20 40 60 80	kPa: 50 100 150 200	%: 10 20 30	
0 / 0		Ground Surface	235.6						
		TOPSOIL dark brown/black sandy silt, some organics, wet	0.0 / 235.3 / 0.3	1	SS	4		24	
2		**SAND AND SILT** loose dark brown sandy silt, wet	234.8 / 0.8						
		light brown, trace clay, saturated		2	SS	8		23	
4			234.1						
		compact	1.5	3	SS	10		22	
6 / 2			233.3						
		grey	2.3	4	SS	10		25	
8									
10				5	SS	10		23	
12									
14 / 4			231.0						
		compact grey silt, some sand, trace clay, saturated	4.6	6	SS	10		21	
16									
18									
20 / 6			229.5						
		compact grey sandy silt, saturated	6.1	7	SS	11		21	
22			228.9						
		Drilling Terminated	6.7						
24									



Initial water level at 0.8mbgs upon drilling completion

Field Technician: M. Dalgliesh

Drafted by: B. Heinbuch

Reviewed by: D. Gonser

MTE

ID Number: MW103-19

Project: 10919 Longwoods Road Proposed Industrial Subdivision

Project No: 45013-300

Client: 10919 Longwoods Road Inc.

Site Location: 10919 Longwoods Road, Middlesex Centre, ON

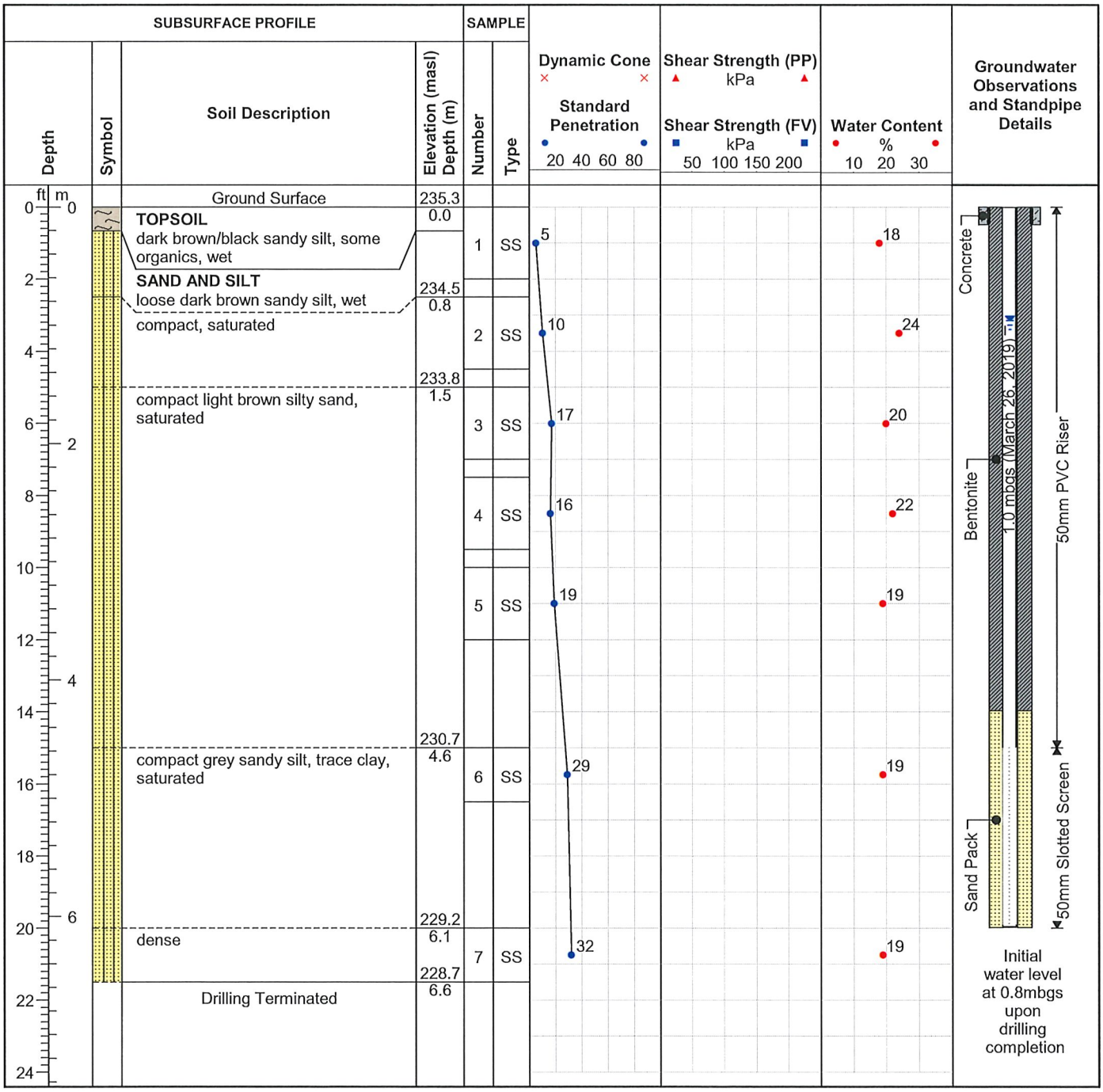
Drill Date: 3/20/2019

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track

Drill Method: Hollow Stem Auger

Protective Cover: Monument Casing



Field Technician: M. Dalgliesh

Drafted by: B. Heinbuch

Reviewed by: D. Gonser

MTE

Sheet: 1 of 1

ID Number: MW104-19

Project: 10919 Longwoods Road Proposed Industrial Subdivision

Project No: 45013-300

Client: 10919 Longwoods Road Inc.

Site Location: 10919 Longwoods Road, Middlesex Centre, ON

Drill Date: 3/20/2019

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track

Drill Method: Hollow Stem Auger

Protective Cover: Monument Casing

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
0 ft / 0 m		Ground Surface	236.4						
		TOPSOIL dark brown/black sandy silt, some organics, saturated/frozen	0.0	1	SS	3		16	
2		**SAND AND SILT** very loose dark brown silty sand, wet	235.6 / 0.8	2	SS	4		24	
4		loose dark brown sand, some silt, trace clay, wet	235.2 / 1.2						
		saturated	234.9 / 1.5						
6 / 2		compact light brown	234.6 / 1.8	3	SS	14		25	
8				4	SS	17		21	
10				5	SS	15		22	
12 / 4									
14			231.8						
		dense, brown	4.6 / 231.4	6	SS	35		21	
16		grey	5.0						
18									
20 / 6			230.3						
		dense grey sandy silt, saturated	6.1 / 229.8	7	SS	31		22	
22		Drilling Terminated	6.6						
24									

Groundwater Observations and Standpipe Details: Concrete; Bentonite; 1.3 mbgs (March 26, 2019); Sand Pack; 50mm PVC Riser; 50mm Slotted Screen

Initial water level at 0.8mbgs upon drilling completion

Field Technician: M. Dalgliesh

Drafted by: B. Heinbuch

Reviewed by: D. Gonser

MTE

ID Number: MW105-19

Project: 10919 Longwoods Road Proposed Industrial Subdivision

Project No: 45013-300

Client: 10919 Longwoods Road Inc.

Site Location: 10919 Longwoods Road, Middlesex Centre, ON

Drill Date: 3/20/2019

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track

Drill Method: Hollow Stem Auger

Protective Cover: Monument Casing

SUBSURFACE PROFILE				SAMPLE		Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type				
0 / 0		Ground Surface	234.2						
		TOPSOIL dark brown/black sandy silt, some organics, saturated	0.0 / 233.8 / 0.4	1	SS	4		22	
2		**SAND AND SILT** loose dark brown sandy silt, wet	233.4 / 0.8						
		compact, saturated light brown		2	SS	14		23	
4			232.7						
		grey	1.5	3	SS	18		21	
6 / 2									
				4	SS	12		22	
8									
10				5	SS	11		20	
12									
4									
14			229.6						
		compact grey silt, some sand, trace clay, saturated	4.6	6	SS	21		17	
16									
18									
6			228.1						
20		dense grey silty sand, saturated	6.1	7	SS	36		18	
			227.6						
22		Drilling Terminated	6.6						
24									

Groundwater Observations and Standpipe Details: Concrete; Bentonite; Sand Pack; 0.6 mbgs (March 26, 2019); 50mm PVC Riser; 50mm Slotted Screen; Initial water level at 0.8mbgs upon drilling completion

Field Technician: M. Dalgliesh

Drafted by: B. Heinbuch

Reviewed by: D. Gonser

MTE

ID Number: MW106-19

Project: 10919 Longwoods Road Proposed Industrial Subdivision

Project No: 45013-300

Client: 10919 Longwoods Road Inc.

Site Location: 10919 Longwoods Road, Middlesex Centre, ON

Drill Date: 3/20/2019

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track

Drill Method: Hollow Stem Auger

Protective Cover: Monument Casing

SUBSURFACE PROFILE				SAMPLE		Dynamic Cone / Standard Penetration	Shear Strength (PP) / Shear Strength (FV)	Water Content	Groundwater Observations and Standpipe Details
Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	20 40 60 80	kPa: 50 100 150 200	%: 10 20 30	
0 / 0		Ground Surface	235.5						
		TOPSOIL dark brown/black sandy silt, some organics, wet	0.0 / 235.2 / 0.3	1	SS	4		18	
2		**SAND AND SILT** loose dark brown sandy silt, wet	234.7 / 0.8						
		saturated		2	SS	9		24	
4			234.0						
		compact, light brown	1.5	3	SS	10		21	
6 / 2									
8				4	SS	24		21	
10			232.5						
		grey	3.0	5	SS	13		20	
12									
14 / 4									
16				6	SS	17		22	
18									
20 / 6				7	SS	24		21	
22		Drilling Terminated	228.9 / 6.6						
24									

Groundwater Observations and Standpipe Details: Concrete; Bentonite; 1.2 mbgs (March 26, 2019); 50mm PVC Riser; Sand Pack; 50mm Slotted Screen; Initial water level at 0.8mbgs upon drilling completion

Field Technician: M. Dalgliesh

Drafted by: B. Heinbuch

Reviewed by: D. Gonser

MTE

ID Number: BH107-19

Project: 10919 Longwoods Road Proposed Industrial Subdivision

Project No: 45013-300

Client: 10919 Longwoods Road Inc.

Site Location: 10919 Longwoods Road, Middlesex Centre, ON

Drill Date: 3/21/2019

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track

Drill Method: Hollow Stem Auger

Protective Cover: Monument Casing

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
0 ft / 0 m		Ground Surface	234.5						
		TOPSOIL dark brown/black sandy silt, some organics and plastic/glass fragments, saturated	0.0 / 234.2 / 0.3	1	SS	3		25	Cuttings
		SAND AND SILT very loose dark brown/red sandy silt, wet	233.7 / 0.8	2	SS	12		22	
4		compact, saturated	233.0 / 1.5	3	SS	22		21	Bentonite
6 / 2		compact dark brown/red silty sand, saturated	232.2 / 2.3	4	SS	20		21	Wet cave
		grey		5	SS	23		22	
12 / 4			229.9 / 4.6	6	SS	30		22	Water level at 1.5mbgs upon drilling completion
16		dense grey sandy silt, saturated							
20 / 6				7	SS	40		25	
22		Drilling Terminated	227.9 / 6.6						
24									

Field Technician: M. Dalgliesh

Drafted by: B. Heinbuch

Reviewed by: D. Gonser

MTE

Sheet: 1 of 1

Notes:
Bentonite forced into wet cave at 2.4mbgs

ID Number: BH108-19

Project: 10919 Longwoods Road Proposed Industrial Subdivision

Project No: 45013-300

Client: 10919 Longwoods Road Inc.

Site Location: 10919 Longwoods Road, Middlesex Centre, ON

Drill Date: 3/21/2019

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track

Drill Method: Hollow Stem Auger

Protective Cover: Monument Casing

SUBSURFACE PROFILE				SAMPLE		Dynamic Cone / Standard Penetration	Shear Strength (PP) / Shear Strength (FV)	Water Content	Groundwater Observations and Standpipe Details
Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	20 40 60 80	kPa: 50 100 150 200	%: 10 20 30	
0 / 0		Ground Surface	235.1						
		TOPSOIL dark brown/black sandy silt, some organics, saturated	0.0 / 234.7 / 0.4	1	SS	4		23	
2		**SAND AND SILT** loose dark brown sandy silt, wet	234.3 / 0.8						
		trace clay, saturated		2	SS	5		20	
4			233.6						
6 / 2		compact, light brown	1.5	3	SS	12		20	
			232.8						
8		compact grey silty sand, saturated	2.3	4	SS	16		19	
10				5	SS	19		18	
12 / 4									
14			230.5						
16		compact grey sandy silt, saturated	4.6	6	SS	19		20	
18									
20 / 6			229.0						
		dense	6.1 / 228.5	7	SS	35		19	
22		Drilling Terminated	6.6						
24									

Groundwater Observations and Standpipe Details: ← Cuttings; ← Bentonite; ← Wet cave

Water level at 1.5mbgs upon drilling completion

Field Technician: M. Dalgliesh

Drafted by: B. Heinbuch

Reviewed by: D. Gonser

MTE

Sheet: 1 of 1

Notes:
Bentonite forced into wet cave at 3.1mbgs

ID Number: BH109-19

Project: 10919 Longwoods Road Proposed Industrial Subdivision

Project No: 45013-300

Client: 10919 Longwoods Road Inc.

Site Location: 10919 Longwoods Road, Middlesex Centre, ON

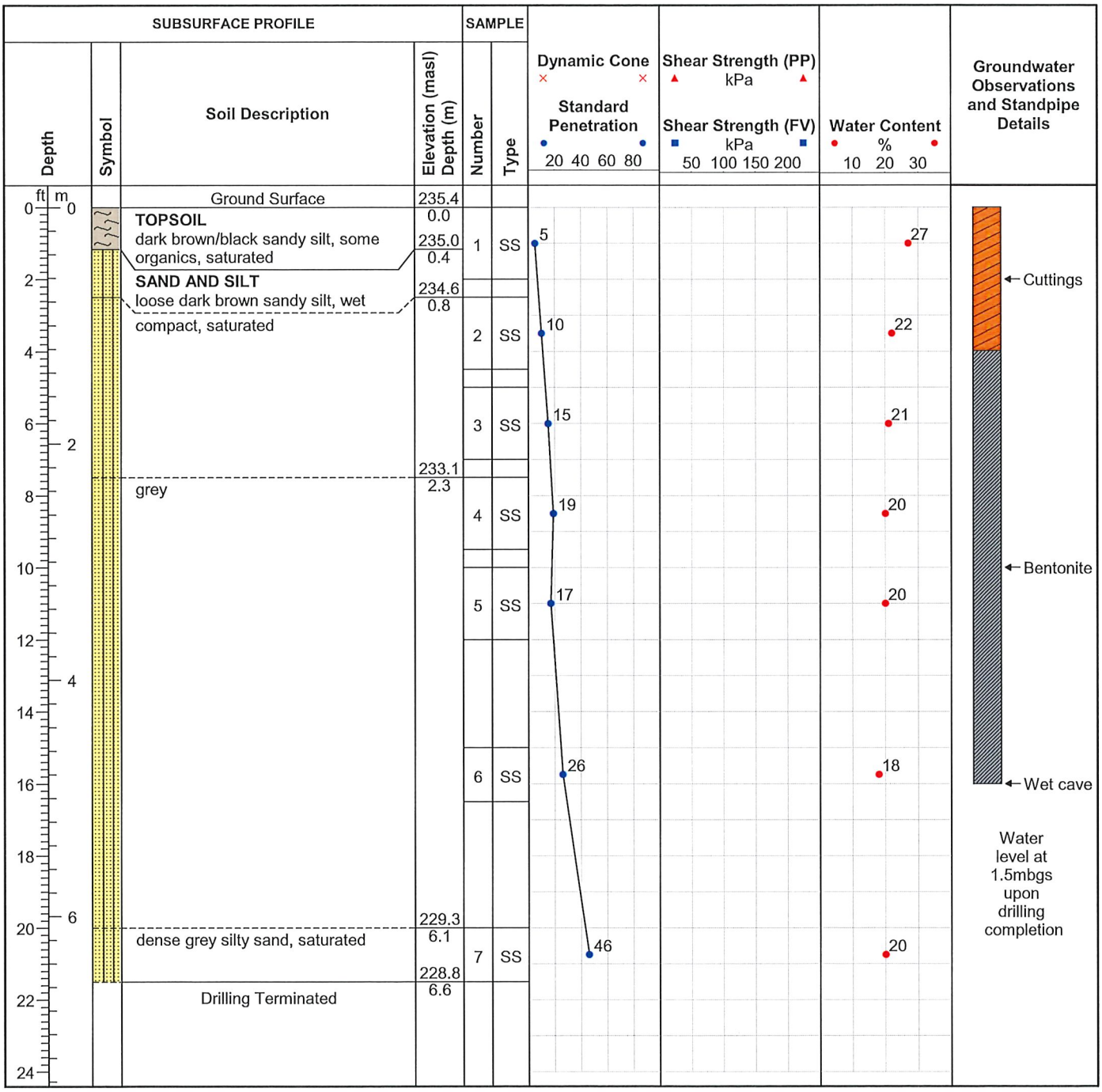
Drill Date: 3/21/2019

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track

Drill Method: Hollow Stem Auger

Protective Cover: Monument Casing



Field Technician: M. Dalgliesh

Drafted by: B. Heinbuch

Reviewed by: D. Gonser

MTE

Sheet: 1 of 1

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: MTE CONSULTANTS Inc.
123ST GEORGE STREET
LONDON, ON N6A 3A1
519-204-6510

ATTENTION TO: John McNeil

PROJECT: 45013-300

AGAT WORK ORDER: 19L517579

WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

DATE REPORTED: Sep 18, 2019

PAGES (INCLUDING COVER): 4

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 19L517579

PROJECT: 45013-300

CLIENT NAME: MTE CONSULTANTS Inc.

ATTENTION TO: John McNeil

SAMPLING SITE:Longwoods

SAMPLED BY:Mackenzie Costello

Various Inorganics (water)

DATE RECEIVED: 2019-09-13

DATE REPORTED: 2019-09-18

		SAMPLE DESCRIPTION:		MW101-19		MW102-19	MW103-19	MW104-19	MW105-19	MW106-19
		SAMPLE TYPE:		Water		Water	Water	Water	Water	Water
		DATE SAMPLED:		2019-09-13		2019-09-13	2019-09-13	2019-09-13	2019-09-13	2019-09-13
Parameter	Unit	G / S	RDL	523781	RDL	523793	523794	523795	523796	523797
Nitrate as N	mg/L		0.5	<0.5	0.05	<0.05	<0.05	18.7	<0.05	<0.05
Nitrite as N	mg/L		0.5	<0.5	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ammonia as N	mg/L		0.02	0.75	0.02	<0.02	<0.02	<0.02	0.02	<0.02
Total Kjeldahl Nitrogen	mg/L		0.10	1.78	0.10	0.56	0.45	<0.10	0.86	0.56

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

523781 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Divine Basily

AGAT Laboratories

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Quality Assurance

CLIENT NAME: MTE CONSULTANTS Inc.

PROJECT: 45013-300

SAMPLING SITE:Longwoods

AGAT WORK ORDER: 19L517579

ATTENTION TO: John McNeil

SAMPLED BY:Mackenzie Costello

Water Analysis

RPT Date: Sep 18, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Various Inorganics (water)															
Nitrate as N	533152		0.83	0.87	4.7%	< 0.05	93%	90%	110%	107%	90%	110%	103%	85%	115%
Nitrite as N	533152		<0.25	<0.25	NA	< 0.05	NA	90%	110%	106%	90%	110%	107%	85%	115%
Ammonia as N	520229		0.18	0.17	5.7%	< 0.02	99%	90%	110%	97%	90%	110%	99%	70%	130%
Total Kjeldahl Nitrogen	530411		36.4	36.6	0.5%	< 0.10	98%	80%	120%	97%	80%	120%	94%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By: Nivine Basily

AGAT Laboratories

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Method Summary

CLIENT NAME: MTE CONSULTANTS Inc.

AGAT WORK ORDER: 19L517579

PROJECT: 45013-300

ATTENTION TO: John McNeil

SAMPLING SITE:Longwoods

SAMPLED BY:Mackenzie Costello

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	SM 4500-NH3 H	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA

AGAT Laboratories

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http://www.agatlabs.com

CLIENT NAME: MTE CONSULTANTS Inc.
123ST GEORGE STREET
LONDON, ON N6A 3A1
519-204-6510

ATTENTION TO: John Mcneil

PROJECT: 45013-300

AGAT WORK ORDER: 19L526675

WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

DATE REPORTED: Oct 10, 2019

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19L526675

PROJECT: 45013-300

CLIENT NAME: MTE CONSULTANTS Inc.

ATTENTION TO: John Mcneil

SAMPLING SITE:

SAMPLED BY:

Inorganic Chemistry (Water)

DATE RECEIVED: 2019-10-04

DATE REPORTED: 2019-10-10

		SAMPLE DESCRIPTION:		MW101-19		MW102-19		MW103-19	MW104-19	MW105-19	MW106-19
		SAMPLE TYPE:		Water		Water		Water	Water	Water	Water
		DATE SAMPLED:		2019-10-04 09:05		2019-10-04 12:22		2019-10-04 09:55	2019-10-04 10:35	2019-10-04 11:30	2019-10-04 11:55
Parameter	Unit	G / S	RDL	587532	RDL	587576	RDL	587591	587600	587605	587607
Nitrate as N	mg/L		0.5	<0.5	0.25	<0.25	0.05	<0.05	19.7	<0.05	<0.05
Nitrite as N	mg/L		0.5	<0.5	0.25	<0.25	0.05	<0.05	<0.05	<0.05	<0.05
(Nitrate + Nitrite) as N (Calculated)	mg/L		0.07	<0.07	0.07	<0.07	0.07	<0.07	19.7	<0.07	<0.07
Ammonia as N	mg/L		0.02	0.90	0.02	<0.02	0.02	<0.02	<0.02	0.12	<0.02
Total Kjeldahl Nitrogen	mg/L		0.10	2.49	0.50	6.10	0.10	0.53	<0.10	0.55	0.33

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

587576 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

Certified By: Divine Basily

AGAT Laboratories

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Quality Assurance

CLIENT NAME: MTE CONSULTANTS Inc.

PROJECT: 45013-300

SAMPLING SITE:

AGAT WORK ORDER: 19L526675

ATTENTION TO: John Mcneil

SAMPLED BY:

Water Analysis

RPT Date: Oct 10, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Inorganic Chemistry (Water)															
Nitrate as N	602152		<0.25	<0.25	NA	< 0.05	92%	90%	110%	104%	90%	110%	99%	85%	115%
Nitrite as N	602152		<0.25	<0.25	NA	< 0.05	NA	90%	110%	104%	90%	110%	109%	85%	115%
Ammonia as N	583935		0.90	0.89	1.1%	< 0.02	104%	90%	110%	103%	90%	110%	94%	70%	130%
Total Kjeldahl Nitrogen	587532	587532	2.49	2.48	0.4%	< 0.10	102%	80%	120%	101%	80%	120%	111%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By: Divine Basily

AGAT Laboratories

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Method Summary

CLIENT NAME: MTE CONSULTANTS Inc.

AGAT WORK ORDER: 19L526675

PROJECT: 45013-300

ATTENTION TO: John Mcneil

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
(Nitrate + Nitrite) as N (Calculated)	INOR-93-6004	SM 4110 B	CALCULATION
Ammonia as N	INOR-93-6059	SM 4500-NH3 H	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	QuikChem 10-107-06-2-I & SM 4500-Norg D	LACHAT FIA

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only
Work Order #: 19L526675
Cooler Quantity:
Arrival Temperatures: 2.6 | 3.0 | 16.0 / 36 | 4 | 4.2
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes: ice

Report Information:
Company: MTE Consultants
Contact: 123 St. George St, London, ON
Address:
Phone: Fax:
Reports to be sent to:
1. Email: jmcneil@mte85.com
2. Email: mcostello@mte85.com

Regulatory Requirements: ☒ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One): ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One): ☐ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region (Indicate One): ☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☒ No

Report Guideline on Certificate of Analysis ☐ Yes ☒ No

Turnaround Time (TAT) Required:
Regular TAT ☒ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Project Information:
Project: 45013-300
Site Location: Longwoods Rd.
Sampled By: Mackenzie Costello
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information: Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend
B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N
MW101-19	Oct 4/19	9:05	2	GW		
MW102-19		12:27	2			
MW103-19		9:55	2			
MW104-19		10:35	2			
MW105-19		11:30	2			
MW106-19		11:55	2			

Field Filtered - Metals, Hg, CrVI

O. Reg 153
- Metals and Inorganics
- ☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides)
- ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR
- Full Metals Scan
- Regulation/Custom Metals
- Nutrients: ☐ TP ☒ NH_3 ☒ TKN ☒ NO_3 ☒ NO_2 ☒ NO_3+NO_2
- Volatiles: ☐ VOC ☐ BTEX ☐ THM
- PHCs F1 - F4
- ABNs
- PAHs
- PCBs: ☐ Total ☐ Aroclors
- Organochlorine Pesticides
- TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs
- Sewer Use

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Mackenzie Costello	19/10/04	13:27	Ashlee-Ann Cobbs	2019/10/04	1:30 PM
Ashlee-Ann Cobbs	19/10/07	4:00 PM		9/10/8	

Page 1 of 1
N°: T 086790

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT
Date Issued: April 16, 2018