# **APPENDIX**

# HYDROGEOLOGICAL ASSESSMENT



# **Hydrogeological Investigation**

Environmental Assessment Study of Arterial Roads within Highway 427 Industrial Secondary Plan Area 47 Brampton, Ontario Project No. TP115086



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Environmental Assessment Study of Arterial Roads within Highway 427 Industrial Secondary Plan Area 47 Brampton, Ontario
Project No. TP115086

#### **Prepared for:**

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#### 1.0 Introduction

Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood), was retained by the City of Brampton (City) to conduct Phases 3 and 4 of a Municipal Class Environmental Assessment (MCEA) for improvements to existing roads and construction of new roads in the Highway 427 Industrial Secondary Plan Area 47 (SPA47) (Site) in Brampton, Ontario. The improvements will include widening of existing roads Coleraine Drive, Clarkway Drive and Countryside Drive, and building of two new arterial roads named Arterial A2 and East-West Arterial. Figure 1 shows the location of the Site and the sections of roads to be improved and built. This report provides the results of a hydrogeological investigation conducted as part of this MCEA.

At the time of writing this report, access has not yet been provided to conduct the geotechnical and hydrogeological investigations along the middle portion of East-West Arterial and along the northwestern section of Arterial A2 southeast of Mayfield Road. Therefore, no assessment for these areas could be provided in this report. These areas will be assessed during the detailed design stage of the project.

#### 1.1 Purpose and Scope of Work

The purpose of this hydrogeological investigation was to characterize the soil, groundwater and surface water conditions at the Site, as well as to investigate the use of private water wells within 500 m of the road alignments.

The scope of work for the hydrogeological investigation included the following:

- Installation of monitoring wells along the road alignments.
- Monitoring of groundwater levels in monitoring wells.
- Identification of the presence of groundwater seeps near the proposed creek crossings.
- Completion of single well response tests and estimation of hydraulic conductivity.
- Characterization of local streams and monitoring of surface water levels and flows at stream crossings.
- Preparation of stratigraphical profiles along the road alignments.
- Review of private water wells within 500 m of the road alignments.
- Preliminary estimation of dewatering rates at culvert locations and recommendations on permitting requirements.
- Review of existing conditions and identification of potential groundwater impacts from the planned works.
- Preparation of a report to provide the results of the hydrogeological investigation.





#### 2.0 Coleraine Drive

The section of Coleraine Drive that will be reconstructed and widened is 2.3 km long between Mayfield Road in the northwest and Highway 50 in the southeast (Figure 1). The proposed widening of Coleraine Drive will increase the number of lanes from two to four. The reconstruction of Coleraine Drive includes replacing one box culvert to allow for water in Rainbow Creek to continue to cross underneath Coleraine Drive approximately 625 m southeast of Mayfield Road (Figure 2). There is also a small pipe culvert approximately 985 m southeast of Mayfield Road.

#### 2.1 Existing Conditions

Existing conditions were evaluated within a 500-m study area around the section of Coleraine Drive that will be reconstructed. The entire Coleraine Drive study area is in the Peel Plain physiographic region consisting of bevelled till plains (Figure 3). Surface geology along the majority of the Coleraine Drive study area consists of glaciolacustrine deposits of clay and silt. Along the northwestern portion, clay to silt till predominates (Figure 4). The underlying bedrock is composed of limestone, interbedded with shale at depth, in the Georgian Bay Formation from the Ordovician Period.

A Site plan showing the locations of the boreholes and monitoring wells is provided as Figure 5a and the borehole logs are provided in Appendix A. Twenty-four boreholes and one monitoring well were installed along Coleraine Drive, designated A1 to A31, S1 and S2. The monitoring well was designated A23/S1 but is referred to in this report only as S1 for simplicity. The A-series boreholes were drilled to depths ranging from 1.2 to 5 metres below ground surface (m BGS) and S1 and S2 were drilled to 9.4 m BGS. The S-series boreholes are structural boreholes and monitoring wells installed at stream crossings where culverts will be replaced or installed.

A geological profile around Culvert S1 is shown on Figure 5b. The stratigraphy beneath the road alignment consists of one to two metres of fill, underlain by stiff to hard silty clay to clayey silt with trace sand and gravel, occasionally some sand, to the maximum depth of investigation, up to 9.4 m BGS. Monitoring well S1 was screened from 6.1 to 9.2 m BGS in the native clay and silt. The static groundwater level in S1 was measured on 4 May 2020 to be 0.87 m BGS, equivalent to 221.93 metres above mean sea level (m AMSL) (Table 1).

Wood identified the presence of 78 water well records within 500 m of the proposed road reconstruction, shown on Figure 5c. Of the 78 water well records, 29 are listed as water supply wells. These wells are spread out throughout the study area.

Land use around Coleraine Drive is shown on Figure 5d. The majority of the land use around Coleraine Drive is agricultural, with a few rural residential areas, some wetlands and meadows, along with a large vacant lot and an industrial lot both situated northeast of Coleraine Drive at the southeastern end of the study area. The land use data are from the Toronto Region Conservation Authority (TRCA – 2017).

Most of the Coleraine Drive study area is within the Humber River Watershed, as shown on Figure 5f. The Humber River Watershed has an area of 911 km<sup>2</sup> and is the largest within the jurisdiction of the TRCA.



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Rainbow Creek is the main watercourse that provides drainage in the study area and is part of the headwaters for the Humber River. Rainbow Creek starts around Mayfield Road, approximately 400 m northeast of Coleraine Drive, and flows south-southeast across the Site, intersecting Coleraine Drive approximately 625 m southeast of Mayfield Road at monitoring well S1 (Figure 5e). From here, some water flows beneath Coleraine Drive through a box culvert, named Culvert S1, and continues along a channel along the southwestern side of the road and some water flows along the northeastern side of the road. Approximately 360 m farther downstream at a smaller pipe culvert, from which the stream continues to flow south-southeast of Coleraine Drive. These are the only two culverts along Coleraine Drive within the study area.

Streamflow monitoring was completed in Rainbow Creek upstream and downstream of Culvert S1 on 12 May 2020. The water depths at both stations were approximately 0.2 m but there was no measurable flow upstream, while the flow downstream of the box culvert was approximately 1.1 litres per second (I/s), equivalent to 99 m<sup>3</sup>/day (Table 2).

**Table 2: Streamflow along Coleraine Drive** 

Culvert	Upstream (m³/day)	Downstream (m³/day)
S1	0	99

The natural habitat within the study area includes a few disconnected meadows, wetlands and one wooded area, most along Rainbow Creek (Figure 5g). One larger strip of land is classified as a meadow that extends from Coleraine Drive southwest to Rainbow Creek in the southeastern portion of the study area.

#### 2.2 Water Taking

Culvert S1 along Coleraine Drive is underlain by silty clay to clayey silt fill overlying silty clay to clayey silt till. A rising head single well response test (SWRT) was completed in monitoring well S1 adjacent to Culvert S1 on 4 May 2020. Water was purged from the well and the water level then monitored using a pressure transducer installed in the well as it recovered back to the static condition. Water levels were also measured manually to verify the transducer readings. Recovery data were analyzed using the Bouwer-Rice solution in AQTESOLV version 4.5. The software incorporates the transducer water level data collected during the SWRT and monitoring well construction details to estimate the hydraulic conductivity of the soil formation at the well screen level. The estimated hydraulic conductivity in S1 was calculated to be  $1.2 \times 10^{-6}$  m/s (Table 1). The results of the hydraulic conductivity analysis are provided in Appendix B.

#### 2.2.1 Dewatering Rates

During the road reconstruction and culvert replacement, open trench excavations will be used for the installation of utilities and new structures. Dewatering rate estimates for both installation of a box culvert and installation of underground utilities were calculated. In addition to potential removal of groundwater, runoff water from precipitation events may also need to be removed.





#### 2.2.1.1 Assumptions

The following assumptions were used in calculating estimates of dewatering rates, which are based on information provided and Site conditions encountered during the investigation:

- culvert dimensions of 10 m long, 9 m wide and 4 m deep
- utility excavation dimensions of 15 m long, 3 m wide and 4 m deep
- only one excavation is open at any one time
- hydraulic conductivity of 1.2×10<sup>-6</sup> m/s from monitoring well S1
- groundwater depth of 0.87 m in monitoring well S1 on 4 May 2020 with seasonal variation up to 0.5 m higher
- maximum aguifer thickness of 5 m
- radial, steady-state flow is assumed for inflow to trench ends
- linear, steady-state flow is assumed for inflow to trench sides
- b the surficial aquifer is assumed to be unconfined and hydrogeologically homogeneous
- any surface water is beyond the dewatering radius of influence such that it does not provide potential recharge to groundwater
- an uncertainty factor of 3 has been incorporated into the dewatering rate estimations to account for:
  - o potential variability in the hydraulic conductivity
  - initial depletion of aquifer storage, a temporary response to dewatering; i.e. the initial dewatering rate should decrease to the expected rate once equilibrium conditions are reached
  - infiltration or runoff from precipitation events.

#### 2.2.1.2 Analytical Equation

The amount of groundwater flow into an excavation that is trench-shaped under unconfined hydrogeological conditions is estimated using the following analytical expression (corrected from Powers et al., 2007):

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln\left(\frac{2R_i + w}{w}\right)} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

where

 $Q = \text{groundwater flow rate (m}^3/\text{s})$ 

K =hydraulic conductivity (m/s)

 $H_0$  = static groundwater level head above the top of the aquitard (m) – measured during investigation

 $h_e$  = dewatered groundwater level head above the top of the aquitard at the excavation (m) – assumed to be 1.0 m below the proposed excavation depth and assumes there is no significant groundwater upflow from depths greater than 1.0 m below the excavation

w =trench width (m

 $\ell =$  trench length (m)

 $R_i$  = radius of influence (m), estimated using Sichardt equation:

$$R_i = 3000(H_0 - h_e)\sqrt{K}$$



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#### 2.2.1.3 Estimated Dewatering Rates

**Table 3: Dewatering Rates along Coleraine Drive** 

Structure	Dewatering Rate (no uncertainty factor) (m³/day)	Dewatering Rate (with uncertainty factor) (m³/day)
Culvert S1	6.9	20.7
Utilities	5.7	17.1

Details of the dewatering rate calculations for the replacement of Culvert S1 and the utility installations along Coleraine Drive using the assumptions and equations listed above are provided in Appendix C. The dewatering estimates are summarized in Table 3.

The dewatering rates for box Culvert S1 have been estimated for a trench excavation 10 m long, 9 m wide and 4 m deep. The estimated dewatering rate for this culvert indicates that the groundwater inflow rate of approximately 6.9 m³/day can be expected. A conservative dewatering rate has been determined by multiplying the maximum groundwater inflow by an uncertainty factor of three, which results in an estimated groundwater inflow of approximately 20.7 m³/day.

The dewatering rate for the utility installations has been estimated for a trench excavation 15 m long, 3 m wide and 4 m deep. The estimated dewatering rate for the utility installations indicates that the groundwater inflow rate of approximately 5.7 m<sup>3</sup>/day can be expected. A conservative dewatering rate has been determined by multiplying the maximum groundwater inflow by an uncertainty factor of three, which results in an estimated groundwater inflow of approximately 17.1 m<sup>3</sup>/day.

These dewatering estimates do not include the direct influx of surface water from streams or wetlands into the excavations; it includes only the groundwater that would be expected to infiltrate into the excavation from the soil. In addition to groundwater extraction, stream diversion is expected to be necessary to install the culverts. Any dewatering system should be designed by a dewatering contractor and should take the stream surface water flow into consideration.

Based on the dewatering calculations, no registration in the Environmental Activity and Sector Registry (EASR) nor a Permit To Take Water (PTTW) would be required for groundwater extraction because the dewatering rates are below both the threshold of 50 m<sup>3</sup>/day for EASR registration and below the threshold of 400 m<sup>3</sup>/day for a PTTW.

#### 2.2.2 Water Taking Impact Assessment

#### 2.2.2.1 Zone of Influence

The zone of influence from the excavations for both the box Culvert S1 and the utility installations was estimated to be approximately 12 m, with a conservative estimate of approximately 21 m using an uncertainty factor of three (Table 4).





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Structure	Zone of Influence (no uncertainty factor) (m)	Zone of Influence (with uncertainty factor) (m)		
Culvert S1	11.9	20.7		
Utilities	11.9	20.7		

Table 4: Zones of Influence along Coleraine Drive

The calculated radius of influence is 21 m from the point of groundwater dewatering; however, the actual radius of influence may be influenced by the presence of nearby streams and wetlands. Streams and wetlands may act as boundaries to the zone of influence if they are hydraulically connected to the groundwater being abstracted, thus reducing the zone of influence. While the zone of influence may be buffered somewhat by a stream or wetland, dewatering immediately adjacent to a stream or wetland may also significantly increase the amount of dewatering required. Water supply wells, creeks and wetlands adjacent to the construction Site could be affected by the dewatering.

#### 2.2.2.2 Water Well Impact Assessment

Twenty-nine water supply wells were identified in the MECP database of water well records that are within 500 m of Coleraine Drive. Well depths range from 9 to 45 m BGS, below the expected maximum depth of excavation of 4 m BGS. Most of the identified water supply wells are more than 10 m deep and outside the zone of influence of 21 m and are thus not expected to be affected by construction dewatering, especially if the pump intakes are below the excavation depth.

Two water supply wells between Countryside Drive and Highway 50 are less than 10 m deep and near Coleraine Drive. Well 4907185 is 9.4 m deep and within the zone of influence of 21 m. Well 4904154 is 9.1 m deep and approximately 50 m from Coleraine Drive. To be diligent, it is recommended that a private well survey be completed to confirm the location of, depth of and water level in these two wells.

As the maximum zone of influence around the excavations is 21 m, it is not expected that the construction dewatering will impact any of the private wells within the study area because most of them are outside the zone of influence. While some private wells near the road may be within the zone of influence, significant dewatering effects are not anticipated because the dewatering rates are relatively low, dewatering is expected to be of short duration and the excavations are expected to be relatively shallow.

#### 2.2.2.3 Surface Water Impact Assessment

Wood observed no visual evidence of groundwater seeps near the existing box Culvert S1 along Coleraine Drive or along Rainbow Creek within 50 m upstream and downstream of the culvert. Given that the groundwater level in monitoring well S1 was approximately 0.9 m BGS in May 2020 (Table 1), there may be a hydraulic connection to the creek, with some groundwater recharge possibly occurring along the creek.





The potential for dewatering to affect Rainbow Creek or a wetland will depend on the duration of the dewatering and the degree of hydraulic connection between groundwater and surface water. The dewatering effect on the creek or wetland may be mitigated if the abstracted groundwater is returned into the creek or wetland downstream. However, the water quality will need to meet upstream (i.e. background) water quality and/or regulatory requirements and treatment of the discharge water may be necessary.

During construction, Rainbow Creek may need temporary diversion using coffer dams with pumping (i.e. active diversion) or using an artificial stream channel without a pump (i.e. passive diversion). Such temporary surface water diversions for construction purposes are exempt from Section 34 of the *Ontario Water Resources Act* and do not require EASR registration or a PTTW. The key criteria for this exemption to be valid include:

- diversion does not affect the stream water levels and quality upstream and downstream
- water remains in or is directly returned to the same water body
- water does not contain visible contaminants
- erosion and sediment control measures are installed and maintained properly.

Widening of the road will add pavement and thus decrease groundwater recharge and increase runoff. Runoff will be diverted to roadside ditches and storm sewers and will thus be returned to the local watershed and allowed to infiltrate along roadside ditches or on the adjacent land.

Dewatering effects on surface water are expected to be localized and temporary. With the stream temporarily diverted around the culvert to be replaced, local dewatering may only be required on a temporary basis to maintain dry working conditions long enough for the culvert to be installed and no permanent impact is expected from the culvert.

#### 3.0 Countryside Drive

The section of Countryside Drive that will be reconstructed and widened is 2.9 km long between approximately 675 m northeast of The Gore Road in the southwest and Highway 50 in the northeast (Figure 1). The proposed widening of Countryside Drive will increase the number of lanes from two to four. The reconstruction of Countryside Drive includes replacing three box culverts to allow for water in Rainbow Creek, Clarkway Drive Tributary and Gore Road Tributary to continue to cross underneath Countryside Drive approximately 1.6, 1.4 and 1.0 km northeast of The Gore Road (Figure 2). There is also a pipe culvert approximately 675 m northeast of The Gore Road.

#### 3.1 Existing Conditions

Existing conditions were evaluated within a 500-m study area around the section of Countryside Drive that will be reconstructed. The entire Countryside Drive study area is in the Peel Plain physiographic region consisting of bevelled till plains (Figure 3). Surface geology along the Countryside Drive study area consists of glaciolacustrine deposits of clay and silt, with clay and silt till and modern alluvial deposits of clay, silt, sand, gravel and organics along the two tributaries that cross Countryside Drive (Figure 4). The underlying





bedrock is composed of limestone, interbedded with shale at depth, in the Georgian Bay Formation from the Ordovician Period.

A Site plan showing the locations of the boreholes and monitoring wells is provided as Figure 6a and the borehole logs are provided in Appendix A. Twenty-nine boreholes and three monitoring wells were installed along Countryside Drive, designated C1 to C37, S7, S8, S9, S10, S11 and S12. The three monitoring wells were designated C27/S7, S10 and S12 but C27/S7 is referred to in this report only as S7 for simplicity. The C-series boreholes were drilled to depths ranging from 1.2 to 5.2 m BGS and the S-series boreholes and monitoring wells were drilled to depths ranging from 5.8 to 9.8 m BGS. The S-series boreholes are structural boreholes and monitoring wells installed at stream crossings where culverts will be replaced or installed.

Geological profiles around Culverts S7, S10 and S12 are shown on Figures 6b-i, 6b-ii and 6b-iii. The stratigraphy beneath the road alignment consists of one to two metres of fill, underlain by stiff to hard silty clay to clayey silt with trace sand and gravel, occasionally some sand, to the maximum depth of investigation, up to 9.8 m BGS. Silty sand to sandy silt was encountered above the silty clay to clayey silt in S11 and S12, approximately 6 m thick, possibly reflecting the modern alluvial deposits along the Gore Road Tributary. Monitoring wells S7 and S10 were screened from 6.1 to 9.2 m BGS in the native clay and silt. Monitoring well S12 was screened from 2.7 to 5.8 m BGS in the silt and sand layer. The static groundwater levels in S7, S10 and S12 were measured on 4 May 2020 to range from 0.9 to 1.7 m BGS, equivalent to a range from 212.06 to 216.09 m AMSL (Table 1).

Wood identified the presence of 71 water well records within 500 m of the proposed road reconstruction, shown on Figure 6c. Of the 71 water well records, 49 are listed as water supply wells. These wells are spread out throughout the study area.

Land use around Countryside Drive is shown on Figure 6d. The majority of the land use around Countryside Drive is agricultural, with a few rural residential areas and some meadows and forests. The land use data are from the TRCA (2017).

Most of the Countryside Drive study area is within the Humber River Watershed, as shown on Figure 6f. The Humber River Watershed has an area of 911 km<sup>2</sup> and is the largest within the jurisdiction of the TRCA. All the streams that provide drainage in the study area are part of the headwaters for the Humber River. The streams generally flow from northwest to southeast across the Site (Figure 6e).

At the southwestern end of the Site, there is a small stream that collects water at the side of the farm fields and flows for approximately 500 m before crossing beneath Countryside Drive through a pipe culvert located approximately 675 m northeast of The Gore Road. This stream is at the edge of the reconstruction area.

The Gore Road Tributary starts northwest of Healey Road between The Gore Road and Humber Station Road and flows southeast towards Countryside Drive. Numerous branches connect along the way to form a larger stream, including branches starting on the northeast side of Humber Station Road, which flow south to connect to this tributary system. The Gore Road Tributary flows beneath Countryside Drive through a box culvert, named S12, approximately 1.0 km northeast of The Gore Road.





The Clarkway Drive Tributary has branches that start northwest of Healey Road, between Humber Station Road and Coleraine Drive, as well as northeast of Coleraine Drive. The branches flow underneath either Healey Road and Coleraine Drive, connecting and then flowing southeast towards Countryside Drive. The Clarkway Drive Tributary flows beneath Countryside Drive through a box culvert, named S10, just northeast of Clarkway Drive.

Rainbow Creek starts around Mayfield Road, approximately 400 m northeast of Coleraine Drive, and flows south-southeast across the Site, intersecting Countryside Drive through a box culvert, named S7, approximately 115 m southwest of Coleraine Drive.

Streamflow monitoring was completed in the streams upstream and downstream of Culverts S7, S10 and S12 on 11 and 12 May 2020. The water depths at the six stations ranged approximately from 0.2 to 0.3 m and the streamflows were measured to range from 0.4 to 10 l/s, equivalent to 38 to 875 m<sup>3</sup>/day (Table 5). The highest flows were measured at Culvert S10 in the Clarkway Drive Tributary and the lowest flows were measured at Culvert S12 in the Gore Road Tributary.

Table 5: Streamflow along Countryside Drive

Culvert	Upstream (m³/day)	Downstream (m³/day)
<b>S</b> 7	132	142
S10	567	875
S12	84	38

The natural habitat within the study area includes a few disconnected meadows, wetlands, successional habitat and forests, most along the streams (Figure 6g).

#### 3.2 Water Taking

Culverts S7 and S10 along Countryside Drive are underlain by silty clay to clayey silt fill overlying silty clay to clayey silt till. Culvert S12 is underlain by silty clay to clayey silt fill overlying silty sand to sandy silt. Rising head SWRTs were completed in monitoring wells S7, S10 and S12 adjacent to the three culverts on 4 to 14 May 2020. Water was purged from each well and the water level then monitored using a pressure transducer installed in the well as it recovered back to the static condition. Water levels were also measured manually to verify the transducer readings. Recovery data were analyzed using the Bouwer-Rice solution in AQTESOLV version 4.5. The software incorporates the transducer water level data collected during the SWRT and monitoring well construction details to estimate the hydraulic conductivity of the soil formation at the well screen level. The estimated hydraulic conductivity values in S7, S10 and S12 were calculated to be  $4.0 \times 10^{-7}$ ,  $4.7 \times 10^{-8}$  and  $2.9 \times 10^{-8}$  m/s, respectively (Table 1). The results of the hydraulic conductivity analyses are provided in Appendix B.



#### 3.2.1 Dewatering Rates

During the road reconstruction and culvert replacements, open trench excavations will be used for the installation of utilities and new structures. Dewatering rate estimates for installation of each box culvert and installation of underground utilities were calculated. In addition to potential removal of groundwater, runoff water from precipitation events may also need to be removed.

#### 3.2.1.1 Assumptions

The following assumptions were used in calculating estimates of dewatering rates, which are based on information provided and Site conditions encountered during the investigation:

- culvert dimensions of 10 m long, 9 m wide and 4 m deep
- utility excavation dimensions of 15 m long, 3 m wide and 4 m deep
- only one excavation is open at any one time
- hydraulic conductivities of 4.0×10<sup>-7</sup>, 4.7×10<sup>-8</sup> and 2.9×10<sup>-8</sup> m/s from monitoring wells S7, S10 and S12, respectively
- groundwater depths of 1.71, 0.9 and 1.44 m in monitoring wells S7, S10 and S12 on 4 May 2020, respectively, with seasonal variation up to 1.0 m higher
- maximum aquifer thickness of 5 m
- radial, steady-state flow is assumed for inflow to trench ends
- linear, steady-state flow is assumed for inflow to trench sides
- b the surficial aquifer is assumed to be unconfined and hydrogeologically homogeneous
- any surface water is beyond the dewatering radius of influence such that it does not provide potential recharge to groundwater
- an uncertainty factor of 3 has been incorporated into the dewatering rate estimations to account for:
  - o potential variability in the hydraulic conductivity
  - initial depletion of aquifer storage, a temporary response to dewatering; i.e. the initial dewatering rate should decrease to the expected rate once equilibrium conditions are reached
  - infiltration or runoff from precipitation events.

#### 3.2.1.2 Analytical Equation

The amount of groundwater flow into an excavation that is trench-shaped under unconfined hydrogeological conditions is estimated using the following analytical expression (corrected from Powers et al., 2007):

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln\left(\frac{2R_i + w}{w}\right)} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

where

Q = groundwater flow rate (m<sup>3</sup>/s)

K = hydraulic conductivity (m/s)





 $H_0$  = static groundwater level head above the top of the aguitard (m) – measured during investigation

 $h_e$  = dewatered groundwater level head above the top of the aquitard at the excavation (m) – assumed to be 1.0 m below the proposed excavation depth and assumes there is no significant groundwater upflow from depths greater than 1.0 m below the excavation

w = trench width (m  $\ell =$  trench length (m)

 $R_i$  = radius of influence (m), estimated using Sichardt equation:

$$R_i = 3000(H_0 - h_e)\sqrt{K}$$

#### 3.2.1.3 Estimated Dewatering Rates

Details of the dewatering rate calculations for the replacement of Culverts S7, S10 and S12 and the utility installations along Countryside Drive using the assumptions and equations listed above are provided in Appendix C. The estimates are summarized in Table 6.

**Table 6: Dewatering Rates along Countryside Drive** 

Structure	Dewatering Rate (no uncertainty factor) (m³/day)	Dewatering Rate (with uncertainty factor) (m³/day)
Culvert S7	3.1	9.4
Culvert S10	1.0	3.1
Culvert S12	0.7	2.2
Utilities	2.6	7.8

The dewatering rates for the box culverts have been estimated for a trench excavation 10 m long, 9 m wide and 4 m deep. The estimated dewatering rates for these culverts indicate that groundwater inflow rates ranging approximately from 0.7 to 3.1 m<sup>3</sup>/day can be expected. Conservative dewatering rates have been determined by multiplying the maximum groundwater inflow by an uncertainty factor of three, which results in estimated groundwater inflows ranging approximately from 2.2 to 9.4 m<sup>3</sup>/day.

The dewatering rate for the utility installations has been estimated for a trench excavation 15 m long, 3 m wide and 4 m deep. The estimated dewatering rate for the utility installations indicates that the groundwater inflow rate of approximately 2.6 m³/day can be expected. A conservative dewatering rate has been determined by multiplying the maximum groundwater inflow by an uncertainty factor of three, which results in an estimated groundwater inflow of approximately 7.8 m³/day.

These dewatering estimates do not include the direct influx of surface water from streams or wetlands into the excavations; it includes only the groundwater that would be expected to infiltrate into the excavation from the soil. In addition to groundwater extraction, stream diversion is expected to be necessary to install the culverts. Any dewatering system should be designed by a dewatering contractor and should take the stream surface water flow into consideration.

11.9



Based on the dewatering calculations, no registration in the EASR nor a PTTW would be required for groundwater extraction because the dewatering rates are below both the threshold of 50 m<sup>3</sup>/day for EASR registration and below the threshold of 400 m<sup>3</sup>/day for a PTTW.

#### 3.2.2 Water Taking Impact Assessment

#### 3.2.2.1 Zone of Influence

The zones of influence from the excavations for the box culverts and the utility installations were estimated to be up to approximately 6 m, with a conservative estimate of up to approximately 12 m using an uncertainty factor of three (Table 7).

Structure	Zone of Influence (no uncertainty factor) (m)	Zone of Influence (with uncertainty factor) (m)
Culvert S7	6.2	10.8
Culvert S10	2.6	4.5
Culvert S12	1.8	3.2

**Table 7: Zones of Influence along Countryside Drive** 

6.2

The calculated radius of influence is up to 12 m from the point of groundwater dewatering; however, the actual radius of influence may be influenced by the presence of nearby streams and wetlands. Streams and wetlands may act as boundaries to the zone of influence if they are hydraulically connected to the groundwater being abstracted, thus reducing the zone of influence. While the zone of influence may be buffered somewhat by a stream or wetland, dewatering immediately adjacent to a stream or wetland may also significantly increase the amount of dewatering required. Water supply wells, creeks and wetlands adjacent to the construction Site could be affected by the dewatering.

#### 3.2.2.2 Water Well Impact Assessment

Utilities

Forty-nine water supply wells were identified in the MECP database of water well records that are within 500 m of Countryside Drive. Well depths range from 14 to 30 m BGS, below the expected maximum depth of excavation of 4 m BGS. All the identified water supply wells are more than 10 m deep and most are outside the zone of influence of 12 m and are thus not expected to be affected by construction dewatering, especially if the pump intakes are below the excavation depth.

As the maximum zone of influence around the excavations is 12 m, it is not expected that the construction dewatering will impact any of the private wells within the study area because most of them are outside the zone of influence. While some private wells near the road may be within the zone of influence, significant dewatering effects are not anticipated because the dewatering rates are relatively low, dewatering is expected to be of short duration and the excavations are expected to be relatively shallow.



#### 3.2.2.3 Surface Water Impact Assessment

Wood observed no visual evidence of groundwater seeps near the existing box culverts along Countryside Drive or along Rainbow Creek, Clarkway Drive Tributary or Gore Road Tributary within 50 m upstream and downstream of the culverts. Given that the groundwater levels in monitoring wells S7, S10 and S12 ranged from 0.9 to 1.9 m BGS in May 2020 (Table 1), there may be a hydraulic connection to the creeks, with some groundwater recharge possibly occurring along the creeks.

The potential for dewatering to affect the creeks or a wetland will depend on the duration of the dewatering and the degree of hydraulic connection between groundwater and surface water. The dewatering effect on the creek or wetland may be mitigated if the abstracted groundwater is returned into the creek or wetland downstream. However, the water quality will need to meet upstream (i.e. background) water quality and/or regulatory requirements and treatment of the discharge water may be necessary.

During construction, the creeks may need temporary diversion using coffer dams with pumping (i.e. active diversion) or using an artificial stream channel without a pump (i.e. passive diversion). Such temporary surface water diversions for construction purposes are exempt from Section 34 of the *Ontario Water Resources Act* and do not require EASR registration or a PTTW. The key criteria for this exemption to be valid include:

- diversion does not affect the stream water levels and quality upstream and downstream
- water remains in or is directly returned to the same water body
- water does not contain visible contaminants
- erosion and sediment control measures are installed and maintained properly.

Widening of the road will add pavement and thus decrease groundwater recharge and increase runoff. Runoff will be diverted to roadside ditches and storm sewers and will thus be returned to the local watershed and allowed to infiltrate along roadside ditches or on the adjacent land.

Dewatering effects on surface water are expected to be localized and temporary. With the streams temporarily diverted around the culverts to be replaced, local dewatering may only be required on a temporary basis to maintain dry working conditions long enough for the culverts to be installed and no permanent impact is expected from the culverts.

#### 4.0 Clarkway Drive

The section of Clarkway Drive that will be reconstructed and widened is 4.3 km long between Mayfield Road in the northwest and Castlemore Road in the southeast (Figure 1). The proposed widening of Clarkway Drive will increase the number of lanes from two to four. The reconstruction of Clarkway Drive includes replacing two box culverts to allow for water in Clarkway Drive Tributary to continue to cross underneath Clarkway Drive approximately 130 and 765 m southeast of Countryside Drive (Figure 2). There is an additional pipe approximately two kilometres southeast of Countryside Drive.





#### 4.1 Existing Conditions

Existing conditions were evaluated within a 500-m study area around the section of Clarkway Drive that will be reconstructed. The entire Clarkway Drive study area is in the Peel Plain physiographic region consisting of bevelled till plains (Figure 3). Surface geology along the Clarkway Drive study area consists of glaciolacustrine deposits of clay and silt, with modern alluvial deposits of clay, silt, sand, gravel and organics along the Clarkway Drive Tributary that crosses Clarkway Drive (Figure 4). The underlying bedrock is composed of limestone, interbedded with shale at depth, in the Georgian Bay Formation from the Ordovician Period.

Site plans showing the locations of the boreholes and monitoring wells are provided as Figures 7a and 7e and the borehole logs are provided in Appendix A. Forty-four boreholes and two monitoring wells were installed along Clarkway Drive, designated D1 to D37, S13, S14, S15 and S16. The two monitoring wells were designated S13 and S16. The D-series boreholes were drilled to depths ranging from 0.9 to 5.2 m BGS and the S-series boreholes and monitoring wells were drilled to depths ranging from 9.3 to 9.8 m BGS. The S-series boreholes are structural boreholes and monitoring wells installed at stream crossings where culverts will be replaced or installed.

Geological profiles around Culverts S13 and S16 are shown on Figures 7b-i and 7b-ii. The stratigraphy beneath the road alignment consists of one to four metres of fill, underlain by stiff to hard silty clay to clayey silt with trace sand and gravel, occasionally some sand, to the maximum depth of investigation, up to 9.8 m BGS. Silty sand to sandy silt was encountered below the silty clay to clayey silt in S13 and S14, possibly reflecting the modern alluvial deposits along the Clarkway Drive Tributary. Monitoring well S13 was screened from 4.6 to 7.7 m BGS in the native clay and silt and underlying silt and sand. Monitoring well S16 was screened from 6.1 to 9.2 m BGS in the native clay and silt. The static groundwater levels in S13 and S16 were measured on 22 April 2020 to be 1.2 and 3.1 m BGS, respectively, equivalent to 209 to 210 m AMSL (Table 1).

Wood identified the presence of 90 water well records within 500 m of the proposed road reconstruction, shown on Figure 7c. Of the 90 water well records, 45 are listed as water supply wells. These wells are spread out throughout the study area.

Land use around Clarkway Drive is shown on Figure 7d. The majority of the land use around Clarkway Drive is agricultural, with a few rural residential areas and some meadows and forests. The land use data are from the TRCA (2017).

Most of the Clarkway Drive study area is within the Humber River Watershed, as shown on Figure 7f. The Humber River Watershed has an area of 911 km² and is the largest within the jurisdiction of the TRCA. The Clarkway Drive Tributary is the main watercourse that provides drainage in the study area and is part of the headwaters for the Humber River. The Clarkway Drive Tributary has branches that start northwest of Healey Road, between Humber Station Road and Coleraine Drive, as well as northeast of Coleraine Drive. The branches flow underneath either Healey Road and Coleraine Drive, connecting and then flowing southeast towards Countryside Drive and Clarkway Drive. The Clarkway Drive Tributary flows beneath Clarkway Drive through a box culvert, named S16, 130 m southeast of Countryside Drive.





Two small tributaries start in the farm fields northeast of Clarkway Drive and cross Clarkway Drive through a culvert, named S13, 765 m southeast of Countryside Drive, and through a culvert 2 km southeast of Countryside Drive, and then both joining the Clarkway Drive Tributary.

Streamflow monitoring was completed in the streams upstream and downstream of Culverts S13 and S16 on 11 May 2020. The water depths at the four stations ranged approximately from 0.03 to 0.4 m. The depth of water in the small tributary upstream of Culvert S13 was only 3 cm and flow could thus not be measured. And while the depth of water downstream of Culvert S13 was up to 0.3 m, the water was measured not to be flowing. In the Clarkway Drive Tributary at Culvert S16, the flow upstream was measured to be 7 l/s, equivalent to 600 m³/day, and the flow downstream was measured to be 2 l/s, equivalent to 170 m³/day (Table 8).

Table 8: Streamliow along Clarkway Drive			
Culvert	Upstream (m³/day)	Downstream (m³/day)	
S13	could not measure	0	

600

170

**Table 8: Streamflow along Clarkway Drive** 

**S16** 

The natural habitat within the study area includes a series of disconnected meadows, wetlands, successional habitat and forests along the streams (Figure 7g).

#### 4.2 Water Taking

Culvert S13 along Clarkway Drive is underlain by silty clay to clayey silt fill overlying silty clay to clayey silt till and silty sand to sandy silt. Culvert S16 is underlain by silty clay to clayey silt fill overlying silty clay to clayey silt till. Rising head SWRTs were completed in monitoring wells S13 and S16 adjacent to the two culverts on 4 May and 17 June 2020, respectively. Water was purged from each well and the water level then monitored using a pressure transducer installed in the well as it recovered back to the static condition. Water levels were also measured manually to verify the transducer readings. Recovery data were analyzed using the Bouwer-Rice solution in AQTESOLV version 4.5. The software incorporates the transducer water level data collected during the SWRT and monitoring well construction details to estimate the hydraulic conductivity of the soil formation at the well screen level. The estimated hydraulic conductivity values in S13 and S16 were calculated to be  $8.1 \times 10^{-7}$  and  $3.7 \times 10^{-9}$  m/s, respectively (Table 1). The results of the hydraulic conductivity analyses are provided in Appendix B.

#### 4.2.1 Dewatering Rates

During the road reconstruction and culvert replacements, open trench excavations will be used for the installation of utilities and new structures. Dewatering rate estimates for installation of each box culvert and installation of underground utilities were calculated. In addition to potential removal of groundwater, runoff water from precipitation events may also need to be removed.





#### 4.2.1.1 Assumptions

The following assumptions were used in calculating estimates of dewatering rates, which are based on information provided and Site conditions encountered during the investigation:

- culvert dimensions of 10 m long, 9 m wide and 4 m deep
- utility excavation dimensions of 15 m long, 3 m wide and 4 m deep
- only one excavation is open at any one time
- hydraulic conductivities of 8.1×10<sup>-7</sup> and 3.7×10<sup>-9</sup> m/s from monitoring wells S13 and S16, respectively
- groundwater depths of 1.4 and 3.2 m in monitoring wells S13 and S16 on 4 May 2020, respectively, with seasonal variation up to 1.0 m higher
- maximum aguifer thickness of 5 m
- radial, steady-state flow is assumed for inflow to trench ends
- linear, steady-state flow is assumed for inflow to trench sides
- the surficial aquifer is assumed to be unconfined and hydrogeologically homogeneous
- any surface water is beyond the dewatering radius of influence such that it does not provide potential recharge to groundwater
- an uncertainty factor of 3 has been incorporated into the dewatering rate estimations to account for:
  - o potential variability in the hydraulic conductivity
  - initial depletion of aquifer storage, a temporary response to dewatering; i.e. the initial dewatering rate should decrease to the expected rate once equilibrium conditions are reached
  - o infiltration or runoff from precipitation events.

#### 4.2.1.2 Analytical Equation

The amount of groundwater flow into an excavation that is trench-shaped under unconfined hydrogeological conditions is estimated using the following analytical expression (corrected from Powers et al., 2007):

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln\left(\frac{2R_i + w}{w}\right)} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

where

Q = groundwater flow rate (m<sup>3</sup>/s)

K =hydraulic conductivity (m/s)

 $H_0 =$  static groundwater level head above the top of the aguitard (m) – measured during investigation

 $h_e$  = dewatered groundwater level head above the top of the aquitard at the excavation (m) – assumed to be 1.0 m below the proposed excavation depth and assumes there is no significant groundwater upflow from depths greater than 1.0 m below the excavation

w = trench width (m

 $\ell =$  trench length (m)

 $R_i$  = radius of influence (m), estimated using Sichardt equation:





$$R_i = 3000(H_0 - h_e)\sqrt{K}$$

#### 4.2.1.3 Estimated Dewatering Rates

Details of the dewatering rate calculations for the replacement of Culverts S13 and S16 and the utility installations along Clarkway Drive using the assumptions and equations listed above are provided in Appendix C. The estimates are summarized in Table 9.

**Table 9: Dewatering Rates along Clarkway Drive** 

Structure	Dewatering Rate (no uncertainty factor) (m³/day)	Dewatering Rate (with uncertainty factor) (m³/day)
Culvert S13	5.3	16
Culvert S16	0.2	0.5
Utilities	4.4	13

The dewatering rates for the box culverts have been estimated for a trench excavation 10 m long, 9 m wide and 4 m deep. The estimated dewatering rates for Culverts S13 and S16 indicate that groundwater inflow rates of approximately 5.3 and 0.2 m³/day can be expected, respectively. Conservative dewatering rates have been determined by multiplying the maximum groundwater inflow by an uncertainty factor of three, which results in estimated groundwater inflows of 16 and 0.5 m³/day.

The dewatering rate for the utility installations has been estimated for a trench excavation 15 m long, 3 m wide and 4 m deep. The estimated dewatering rate for the utility installations indicates that the groundwater inflow rate of approximately 4.4 m³/day can be expected. A conservative dewatering rate has been determined by multiplying the maximum groundwater inflow by an uncertainty factor of three, which results in an estimated groundwater inflow of approximately 13 m³/day.

These dewatering estimates do not include the direct influx of surface water from streams or wetlands into the excavations; it includes only the groundwater that would be expected to infiltrate into the excavation from the soil. In addition to groundwater extraction, stream diversion is expected to be necessary to install the culverts. Any dewatering system should be designed by a dewatering contractor and should take the stream surface water flow into consideration.

Based on the dewatering calculations, no registration in the EASR nor a PTTW would be required for groundwater extraction because the dewatering rates are below both the threshold of 50 m<sup>3</sup>/day for EASR registration and below the threshold of 400 m<sup>3</sup>/day for a PTTW.



#### 4.2.2 Water Taking Impact Assessment

#### 4.2.2.1 Zone of Influence

The zones of influence from the excavations for the box culverts and the utility installations were estimated to be up to approximately 10 m, with a conservative estimate of up to approximately 17 m using an uncertainty factor of three (Table 10).

Table 10: Zones of Influence along Clarkway Drive			
Structure	Zone of Influence (no uncertainty factor) (m)	Zone of Influence (with uncertainty factor) (m)	
Culvert S13	10	17	
Culvert S16	0.3	0.6	
Utilities	5	13	

Table 10: Zones of Influence along Clarkway Drive

The calculated radius of influence is up to 17 m from the point of groundwater dewatering; however, the actual radius of influence may be influenced by the presence of nearby streams and wetlands. Streams and wetlands may act as boundaries to the zone of influence if they are hydraulically connected to the groundwater being abstracted, thus reducing the zone of influence. While the zone of influence may be buffered somewhat by a stream or wetland, dewatering immediately adjacent to a stream or wetland may also significantly increase the amount of dewatering required. Water supply wells, creeks and wetlands adjacent to the construction Site could be affected by the dewatering.

#### 4.2.2.2 Water Well Impact Assessment

Forty-five water supply wells were identified in the MECP database of water well records that are within 500 m of Clarkway Drive. Well depths range from 5 to 39 m BGS, below the expected maximum depth of excavation of 4 m BGS. Within 50 m of Clarkway Drive, all the identified water supply wells are more than 9 m deep and most are outside the zone of influence of 17 m and are thus not expected to be affected by construction dewatering, especially if the pump intakes are below the excavation depth.

Three water supply wells within 50 m of Clarkway Drive are the shallowest. Well 4902856 near Mayfield Road is 10.1 m deep and potentially within the zone of influence of 17 m. Well 4902866, approximately halfway between Countryside Drive and Castlemore Road, is 11.3 m deep and potentially within the zone of influence. Well 4905894 is 9.1 m deep, adjacent to Clarkway Drive Tributary and approximately 50 m southwest of Culvert S13. To be diligent, it is recommended that a private well survey be completed to confirm the location of, depth of and water level in these three wells.

As the maximum zone of influence around the excavations is 17 m, it is not expected that the construction dewatering will impact any of the private wells within the study area because most of them are outside the zone of influence. While some private wells near the road may be within the zone of influence, significant dewatering effects are not anticipated because the dewatering rates are relatively low, dewatering is expected to be of short duration and the excavations are expected to be relatively shallow.





#### 4.2.2.3 Surface Water Impact Assessment

Wood observed no visual evidence of groundwater seeps near the existing box culverts along Clarkway Drive or along Clarkway Drive Tributary within 50 m upstream and downstream of the culverts. Given that the groundwater levels in monitoring wells S13 and S16 were 1.4 and 3.2 m BGS in May 2020, respectively (Table 1), there may be a hydraulic connection to the creek at S13, with some groundwater recharge possibly occurring along the creek.

The potential for dewatering to affect Clarkway Drive Tributary or a wetland will depend on the duration of the dewatering and the degree of hydraulic connection between groundwater and surface water. The dewatering effect on the creek or wetland may be mitigated if the abstracted groundwater is returned into the creek or wetland downstream. However, the water quality will need to meet upstream (i.e. background) water quality and/or regulatory requirements and treatment of the discharge water may be necessary.

During construction, Clarkway Drive Tributary may need temporary diversion using coffer dams with pumping (i.e. active diversion) or using an artificial stream channel without a pump (i.e. passive diversion). Such temporary surface water diversions for construction purposes are exempt from Section 34 of the *Ontario Water Resources Act* and do not require EASR registration or a PTTW. The key criteria for this exemption to be valid include:

- diversion does not affect the stream water levels and quality upstream and downstream
- water remains in or is directly returned to the same water body
- water does not contain visible contaminants
- erosion and sediment control measures are installed and maintained properly.

Widening of the road will add pavement and thus decrease groundwater recharge and increase runoff. Runoff will be diverted to roadside ditches and storm sewers and will thus be returned to the local watershed and allowed to infiltrate along roadside ditches or on the adjacent land.

Dewatering effects on surface water are expected to be localized and temporary. With the stream temporarily diverted around the culverts to be replaced, local dewatering may only be required on a temporary basis to maintain dry working conditions long enough for the culverts to be installed and no permanent impact is expected from the culverts.

#### 5.0 Arterial A2

The section of Arterial A2 that will be built is 3.4 km long between Mayfield Road in the northwest and Highway 50 in the east. However, this report includes an assessment for only the 2.9-km long section between approximately 500 m southeast of Mayfield Road and Highway 50 (Figure 1) because access to the remaining section has not been provided yet to be able to conduct the geotechnical and hydrogeological investigations. The remaining section of Arterial A2 will be assessed during the detailed design stage of the project.





The construction of the investigated section of Arterial A2 includes installing one new box culvert to allow for water in Rainbow Creek to cross beneath the new road approximately 635 m west of Highway 50 and replacing one box culvert to allow water in a tributary to Rainbow Creek to continue to cross underneath Highway 50 at the new Arterial A2 intersection.

#### 5.1 Existing Conditions

Existing conditions were evaluated within a 500-m study area around the proposed Arterial A2 section that will be constructed. The entire Arterial A2 study area is in the Peel Plain physiographic region consisting of bevelled till plains (Figure 3). Surface geology along the Arterial A2 study area consists of glaciolacustrine deposits of clay and silt (Figure 4). The underlying bedrock is composed of limestone, interbedded with shale at depth, in the Georgian Bay Formation from the Ordovician Period.

A Site plan showing the locations of the boreholes and monitoring wells is provided as Figure 8a and the borehole logs are provided in Appendix A. Twenty-nine boreholes and two monitoring wells were installed along Arterial A2, designated B1 to B28, S3, S4, S5 and S6. The two monitoring wells were designated S4 and B7/S5 but B7/S5 is referred to in this report only as S5 for simplicity. The B-series boreholes were drilled to depths ranging from 1.5 to 5.2 m BGS and the S-series boreholes and monitoring wells were drilled to depths ranging from 9.4 to 9.8 m BGS. The S-series boreholes are structural boreholes and monitoring wells installed at stream crossings where culverts will be replaced or installed.

A geological profile around Culvert S5 is shown on Figure 8b. The stratigraphy beneath the proposed road alignment consists of 0.2 m of topsoil and 0.5 m of reworked soil (i.e. fill), underlain by stiff to hard silty clay to clayey silt with trace sand and gravel, occasionally some sand, to the maximum depth of investigation, up to 9.8 m BGS. Between 2 and 4 m of fill was encountered at Countryside Drive and Highway 50. Silty sand to sandy silt was encountered below the silty clay to clayey silt in S3 and S4 at Highway 50, but below 7 m deep. Monitoring wells S4 and S5 were screened from 6.1 to 9.2 m BGS in the native clay and silt. The static groundwater level in S5 was measured on 4 and 12 May 2020 to be -0.7 and -0.5 m BGS, equivalent to 210 and 209.8 m AMSL, indicating artesian conditions (Table 1). On 4 May 2020, water was observed to be flowing out of the above-ground protective casing and on 12 May 2020, the water level was below the top of the protective casing but 0.5 m above the ground surface.

Wood identified the presence of 96 water well records within 500 m of the proposed road construction, shown on Figure 8c. Of the 96 water well records, 31 are listed as water supply wells. These wells are spread out throughout the study area.

Land use around Arterial A2 is shown on Figure 8d. The majority of the land use around Arterial A2 is agricultural, with two meadows and wetlands, one at Countryside Drive and one at Rainbow Creek. One rural residential lot and industrial areas are located near Highway 50. Rural residential lots are also near Mayfield Road. The land use data are from the TRCA (2017).

Most of the Arterial A2 study area is within the Humber River Watershed, as shown on Figure 8f. The Humber River Watershed has an area of 911 km<sup>2</sup> and is the largest within the jurisdiction of the TRCA. Rainbow Creek is the main watercourse that provides drainage in the study area and is part of the





headwaters for the Humber River. Rainbow Creek starts around Mayfield Road, approximately 400 m northeast of Coleraine Drive, and flows south-southeast across the Site, and will intersect the proposed Arterial A2 through a new box culvert, named S5, approximately 630 m west of Highway 50 (Figure 8e). A tributary to Rainbow Creek also starts near Highway 50 and flows east beneath Highway 50 through a box culvert, named S4. A channel directing surface runoff to Clarkway Drive Tributary crosses the proposed Arterial A2 alignment between Mayfield Road and Countryside Drive. No culvert is planned at this crossing as it is not a permanent surface water feature and any runoff is assumed to be directed to ditches along the new road alignment.

Streamflow monitoring was completed in Rainbow Creek downstream of the proposed Culvert S5 on 12 May 2020. The water depth was approximately 0.1 m and the water flow was approximately 0.2 l/s, equivalent to  $16 \text{ m}^3$ /day (Table 11).

Table 11: Streamflow along Arterial A2

Culvert	Downstream (m³/day)
S5	16

The natural habitat within the study area includes meadows and wetlands near Mayfield Road, Countryside Drive and Rainbow Creek (Figure 8g). The meadow at Rainbow Creek extends from the stream to Coleraine Drive in the northeast.

#### 5.2 Water Taking

Proposed Culvert S5 along Arterial A2 is underlain by silty clay to clayey silt fill overlying silty clay to clayey silt till. A rising head SWRT was completed in monitoring well S5 adjacent to proposed Culvert S5 on 13 May 2020. Water was purged from the well and the water level then monitored using a pressure transducer installed in the well as it recovered back to the static condition. Water levels were also measured manually to verify the transducer readings. Recovery data were analyzed using the Bouwer-Rice solution in AQTESOLV version 4.5. The software incorporates the transducer water level data collected during the SWRT and monitoring well construction details to estimate the hydraulic conductivity of the soil formation at the well screen level. The estimated hydraulic conductivity in S5 was calculated to be 7.8×10<sup>-9</sup> m/s (Table 1). The results of the hydraulic conductivity analysis are provided in Appendix B.

#### 5.2.1 Dewatering Rates

During the road construction and culvert installations, open trench excavations will be used for the installation of utilities and new structures. Dewatering rate estimates for both installation of a box culvert and installation of underground utilities were calculated. In addition to potential removal of groundwater, runoff water from precipitation events may also need to be removed.

#### 5.2.1.1 Assumptions

The following assumptions were used in calculating estimates of dewatering rates, which are based on information provided and Site conditions encountered during the investigation:





- culvert dimensions of 10 m long, 9 m wide and 4 m deep
- utility excavation dimensions of 15 m long, 3 m wide and 4 m deep
- only one excavation is open at any one time
- hydraulic conductivity of 7.8×10<sup>-9</sup> m/s from monitoring well S5
- groundwater depth at ground surface (i.e. 0 m BGS) in monitoring well S5 on 4 May 2020
- maximum aguifer thickness of 5 m
- radial, steady-state flow is assumed for inflow to trench ends
- ▶ linear, steady-state flow is assumed for inflow to trench sides
- the surficial aguifer is assumed to be unconfined and hydrogeologically homogeneous
- any surface water is beyond the dewatering radius of influence such that it does not provide potential recharge to groundwater
- ▶ an uncertainty factor of 3 has been incorporated into the dewatering rate estimations to account for:
  - potential variability in the hydraulic conductivity
  - initial depletion of aquifer storage, a temporary response to dewatering; i.e. the initial dewatering rate should decrease to the expected rate once equilibrium conditions are reached
  - o infiltration or runoff from precipitation events.

#### **5.2.1.2 Analytical Equation**

The amount of groundwater flow into an excavation that is trench-shaped under unconfined hydrogeological conditions is estimated using the following analytical expression (corrected from Powers et al., 2007):

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln\left(\frac{2R_i + w}{w}\right)} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

where

 $Q = \text{groundwater flow rate (m}^3/\text{s})$ 

K =hydraulic conductivity (m/s)

 $H_0$  = static groundwater level head above the top of the aquitard (m) – measured during investigation

 $h_e$  = dewatered groundwater level head above the top of the aquitard at the excavation (m) – assumed to be 1.0 m below the proposed excavation depth and assumes there is no significant groundwater upflow from depths greater than 1.0 m below the excavation

w =trench width (m

 $\ell =$  trench length (m)

 $R_i$  = radius of influence (m), estimated using Sichardt equation:

$$R_i = 3000(H_0 - h_e)\sqrt{K}$$



Brampton, Ontario



#### **5.2.1.3 Estimated Dewatering Rates**

Details of the dewatering rate calculations for the installation of proposed Culvert S5 and the utility installations along Arterial A2 using the assumptions and equations listed above are provided in Appendix C. The estimates are summarized in Table 12.

**Table 12: Dewatering Rates along Arterial A2** 

Structure	Dewatering Rate (no uncertainty factor) (m³/day)	Dewatering Rate (with uncertainty factor) (m³/day)
Culvert S5	0.4	1.2
Utilities	0.3	1

The dewatering rates for box Culvert S5 have been estimated for a trench excavation 10 m long, 9 m wide and 4 m deep. The estimated dewatering rate for this culvert indicates that the groundwater inflow rate of approximately 0.4 m³/day can be expected. A conservative dewatering rate has been determined by multiplying the maximum groundwater inflow by an uncertainty factor of three, which results in an estimated groundwater inflow of approximately 1.2 m³/day. It is important to remember that artesian conditions have been observed at this location.

The dewatering rate for the utility installations has been estimated for a trench excavation 15 m long, 3 m wide and 4 m deep. The estimated dewatering rate for the utility installations indicates that the groundwater inflow rate of approximately 0.3 m³/day can be expected. A conservative dewatering rate has been determined by multiplying the maximum groundwater inflow by an uncertainty factor of three, which results in an estimated groundwater inflow of approximately 1 m³/day.

These dewatering estimates do not include the direct influx of surface water from streams or wetlands into the excavations; it includes only the groundwater that would be expected to infiltrate into the excavation from the soil. In addition to groundwater extraction, stream diversion is expected to be necessary to install the culverts. Any dewatering system should be designed by a dewatering contractor and should take the stream surface water flow into consideration.

Based on the dewatering calculations, no registration in the EASR nor a PTTW would be required for groundwater extraction because the dewatering rates are below both the threshold of 50 m<sup>3</sup>/day for EASR registration and below the threshold of 400 m<sup>3</sup>/day for a PTTW.

#### **5.2.2 Water Taking Impact Assessment**

#### 5.2.2.1 Zone of Influence

The zone of influence from the excavations for both the proposed box Culvert S5 and the utility installations was estimated to be approximately 1 m, with a conservative estimate of approximately 2 m using an uncertainty factor of three (Table 13).





Table 13. Zones of Influence along Arterial AZ			
Structure	Zone of Influence (no uncertainty factor) (m)	Zone of Influence (with uncertainty factor) (m)	
Culvert S5	1.1	1.8	
Utilities	1.1	1.8	

Table 13: Zones of Influence along Arterial A2

The calculated radius of influence is 2 m from the point of groundwater dewatering; however, the actual radius of influence may be influenced by the presence of nearby streams and wetlands. Streams and wetlands may act as boundaries to the zone of influence if they are hydraulically connected to the groundwater being abstracted, thus reducing the zone of influence. While the zone of influence may be buffered somewhat by a stream or wetland, dewatering immediately adjacent to a stream or wetland may also significantly increase the amount of dewatering required. Water supply wells, creeks and wetlands adjacent to the construction Site could be affected by the dewatering.

#### **5.2.2.2 Water Well Impact Assessment**

Thirty-one water supply wells were identified in the MECP database of water well records that are within 500 m of Arterial A2. Well depths range from 9 to 38 m BGS, below the expected maximum depth of excavation of 4 m BGS. All the identified water supply wells are more than 9 m deep and all are outside the zone of influence of 2 m and are thus not expected to be affected by construction dewatering, especially if the pump intakes are below the excavation depth.

As the maximum zone of influence around the excavations is 2 m, it is not expected that the construction dewatering will impact any of the private wells within the study area because they are outside the zone of influence. Significant dewatering effects are not anticipated because the dewatering rates are relatively low, dewatering is expected to be of short duration and the excavations are expected to be relatively shallow.

#### **5.2.2.3 Surface Water Impact Assessment**

Wood observed no visual evidence of groundwater seeps near the proposed box Culvert S5 along Arterial A2 or along Rainbow Creek within 50 m upstream and downstream of the proposed culvert. Given that the groundwater level in monitoring well S5 was approximately 0.5 m above the ground surface in May 2020 (Table 1), there may be a hydraulic connection to the creek at S5, with groundwater discharge possibly occurring into the creek.

The potential for dewatering to affect Rainbow Creek or a wetland will depend on the duration of the dewatering and the degree of hydraulic connection between groundwater and surface water. The dewatering effect on the creek or wetland may be mitigated if the abstracted groundwater is returned into the creek or wetland downstream. However, the water quality will need to meet upstream (i.e. background) water quality and/or regulatory requirements and treatment of the discharge water may be necessary.





During construction, Rainbow Creek may need temporary diversion using coffer dams with pumping (i.e. active diversion) or using an artificial stream channel without a pump (i.e. passive diversion). Such temporary surface water diversions for construction purposes are exempt from Section 34 of the *Ontario Water Resources Act* and do not require EASR registration or a PTTW. The key criteria for this exemption to be valid include:

- diversion does not affect the stream water levels and quality upstream and downstream
- water remains in or is directly returned to the same water body
- water does not contain visible contaminants
- erosion and sediment control measures are installed and maintained properly.

Construction of the new road will add pavement and thus decrease groundwater recharge and increase runoff. Runoff will be diverted to roadside ditches and storm sewers and will thus be returned to the local watershed and allowed to infiltrate along roadside ditches or on the adjacent land.

Dewatering effects on surface water are expected to be localized and temporary. With the stream temporarily diverted around the culvert to be installed, local dewatering may only be required on a temporary basis to maintain dry working conditions long enough for the culvert to be installed and no permanent impact is expected from the culvert.

#### 6.0 East-West Arterial

The section of East-West Arterial that will be built is 3.1 km long between The Gore Road in the southwest and Coleraine Drive in the northeast (Figure 1). However, this report includes an assessment for only the end portions of the East-West Arterial where access has been granted and boreholes were advanced (Figure 9a). The remaining 1.4-km long section in the middle has not yet been investigated because access to the remaining section has not been provided to be able to conduct the geotechnical and hydrogeological investigations. The remaining section of East-West Arterial will be assessed during the detailed design stage of the project.

The construction of the investigated sections of East-West Arterial includes installing two new box culverts to allow for water in Gore Road Tributary and Rainbow Creek to cross beneath the new road (Figure 2). The box culvert at Rainbow Creek is at the proposed intersection between Arterial A2 and East-West Arterial and was discussed in Section 5.0 above as well. A box culvert will also be constructed at the Clarkway Drive Tributary where it will cross the proposed East-West Arterial; however, the investigation of this area will need to be conducted during the detailed design stage of the project.

#### **6.1** Existing Conditions

Existing conditions were evaluated within a 500-m study area around the proposed East-West Arterial section that will be constructed. The entire East-West Arterial study area is in the Peel Plain physiographic region consisting of bevelled till plains (Figure 3). Surface geology along the East-West Arterial study area consists of glaciolacustrine deposits of clay and silt, with modern alluvial deposits of clay, silt, sand, gravel and organics along the Gore Road and Clarkway Drive Tributaries that cross the proposed East-West Arterial





(Figure 4). The underlying bedrock is composed of limestone, interbedded with shale at depth, in the Georgian Bay Formation from the Ordovician Period.

A Site plan showing the locations of the boreholes and monitoring wells is provided as Figures 9a and 9e and the borehole logs are provided in Appendix A. Nineteen boreholes, two instrumented as monitoring wells, were installed along East-West Arterial, designated E1 to E7, E23 to E32, S5, S17 and S18. The two monitoring wells were designated S5 (installed as part of Arterial A2 investigation) and S17. The E-series boreholes were drilled to depths ranging from 2.1 to 5.2 m BGS and the S-series boreholes and monitoring wells were drilled to depths ranging from 7 to 9.8 m BGS. The S-series boreholes are structural boreholes and monitoring wells installed at stream crossings where culverts will be replaced or installed.

A geological profile around Culvert S17 is shown on Figure 9b. The stratigraphy beneath the proposed road alignment consists of 0.1 m of topsoil and 0.6 m of reworked soil (i.e. fill), underlain by stiff to hard silty clay to clayey silt with trace sand and gravel, occasionally some sand. The silty clay is approximately 1.5 to 4.5 m thick and underlain by dense sandy silt to silty sand. At S17 at Gore Road Tributary, the silty clay is absent and the sandy silt is underlain by weathered shale at 5.5 to 8.5 m BGS. Monitoring well S5 was screened from 6.1 to 9.2 m BGS in the native silty clay and S17 was screened from 3.8 to 6.9 m BGS across the native sandy silt and weathered shale. The static groundwater level in S5 was measured on 4 and 12 May 2020 to be -0.7 and -0.5 m BGS, equivalent to 210 and 209.8 m AMSL, indicating artesian conditions (Table 1). On 4 May 2020, water was observed to be flowing out of the above-ground protective casing and on 12 May 2020, the water level was below the top of the protective casing but 0.5 m above the ground surface. The static groundwater level in S17 was measured on 26 January 2022 to be 3.3 m BGS, equivalent to 199 m AMSL.

Wood identified the presence of 52 water well records within 500 m of the proposed road construction, shown on Figure 9c, many of which were listed as water supply wells. These wells are spread out throughout the study area.

Land use around East-West Arterial is shown on Figure 9d. The majority of the land use around East-West Arterial is agricultural, with natural areas around the streams and rural residential lots at The Gore Road and Clarkway Drive. There is a meadow and wetland north of Rainbow Creek, a meadow at Clarkway Drive Tributary and a forest around Gore Road Tributary. The land use data are from the TRCA (2017).

Most of the East-West Arterial study area is within the Humber River Watershed, as shown on Figure 9f. The Humber River Watershed has an area of 911 km² and is the largest within the jurisdiction of the TRCA. Gore Road Tributary, Clarkway Drive Tributary and Rainbow Creek are the main watercourses that provide drainage in the study area and are part of the headwaters for the Humber River. The streams flow south-southeast across the Site and will intersect the proposed East-West Arterial through new box culverts S5 at Rainbow Creek, approximately 630 m west of Highway 50, a box culvert at Clarkway Drive Tributary, approximately 250 m southwest of Clarkway Drive, and S17 at Gore Road Tributary, approximately 500 m northeast of Gore Road (Figure 9e). The area for the box culvert around Clarkway Drive Tributary has not yet been investigated.





Streamflow monitoring was completed in Rainbow Creek downstream of the proposed Culvert S5 on 12 May 2020. The water depth was approximately 0.1 m and the water flow was approximately 0.2 l/s, equivalent to  $16 \text{ m}^3/\text{day}$  (Table 14).

**Table 14: Streamflow along East-West Arterial** 

Culvert	Downstream (m³/day)
S5	16

Streamflow monitoring was not completed in Gore Road Tributary or Clarkway Drive Tributary at the proposed East-West Arterial. However, streamflow in these streams was measured farther upstream at Countryside Drive and Clarkway Drive on 12 May 2020 as reported in Sections 3.1 and 4.1. Streamflow in Gore Road Tributary at Countryside Drive (S12) was 84 m³/day upstream and 38 m³/day downstream (Table 5). Streamflow in Clarkway Drive Tributary at Clarkway Drive (S16) was 600 m³/day upstream and 170 m³/day downstream (Table 8).

The natural habitat within the study area includes meadows, wetlands and forests along the three streams crossing the proposed East-West Arterial alignment (Figure 9g). The meadow at Rainbow Creek extends from the stream to Coleraine Drive in the northeast.

#### 6.2 Water Taking

Proposed Culvert S5 along East-West Arterial, at intersection with proposed Arterial A2, is underlain by silty clay to clayey silt fill overlying silty clay to clayey silt till. Proposed culvert S17 is underlain by sandy silt fill overlying silty sand to sandy silt till and weathered shale at depth. Rising head SWRTs were completed in monitoring wells S5 and S17 adjacent to the two proposed culverts on 13 May 2020 and 26 January 2022, respectively. Water was purged from the well and the water level then monitored using a pressure transducer installed in the well as it recovered back to the static condition. Water levels were also measured manually to verify the transducer readings. Recovery data were analyzed using the Bouwer-Rice solution in AQTESOLV version 4.5. The software incorporates the transducer water level data collected during the SWRT and monitoring well construction details to estimate the hydraulic conductivity of the soil formation at the well screen level. The estimated hydraulic conductivity values in S5 and S17 were calculated to be 7.8×10<sup>-9</sup> and 1.1×10<sup>-7</sup> m/s, respectively (Table 1). The results of the hydraulic conductivity analyses are provided in Appendix B.

#### 6.2.1 Dewatering Rates

During the road construction and culvert installations, open trench excavations will be used for the installation of utilities and new structures. Dewatering rate estimates for installation of each box culvert and installation of underground utilities were calculated. In addition to potential removal of groundwater, runoff water from precipitation events may also need to be removed.



#### 6.2.1.1 Assumptions

The following assumptions were used in calculating estimates of dewatering rates, which are based on information provided and Site conditions encountered during the investigation:

- culvert dimensions of 10 m long, 9 m wide and 4 m deep
- utility excavation dimensions of 15 m long, 3 m wide and 4 m deep
- only one excavation is open at any one time
- hydraulic conductivities of 7.8×10<sup>-9</sup> and 1.1×10<sup>-7</sup> m/s from monitoring wells S5 and S17, respectively
- proundwater depth at ground surface (i.e. 0 m BGS) in monitoring well S5 on 4 May 2020 and 3.3 m in monitoring well S17 on 26 January 2022 with seasonal variation up to 1.0 m higher
- maximum aguifer thickness of 5 m
- radial, steady-state flow is assumed for inflow to trench ends
- linear, steady-state flow is assumed for inflow to trench sides
- the surficial aquifer is assumed to be unconfined and hydrogeologically homogeneous
- any surface water is beyond the dewatering radius of influence such that it does not provide potential recharge to groundwater
- an uncertainty factor of 3 has been incorporated into the dewatering rate estimations to account for:
  - o potential variability in the hydraulic conductivity
  - initial depletion of aquifer storage, a temporary response to dewatering; i.e. the initial dewatering rate should decrease to the expected rate once equilibrium conditions are reached
  - o infiltration or runoff from precipitation events.

#### 6.2.1.2 Analytical Equation

The amount of groundwater flow into an excavation that is trench-shaped under unconfined hydrogeological conditions is estimated using the following analytical expression (corrected from Powers et al., 2007):

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln\left(\frac{2R_i + w}{w}\right)} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

where

Q = groundwater flow rate (m<sup>3</sup>/s)

K =hydraulic conductivity (m/s)

 $H_0 =$  static groundwater level head above the top of the aquitard (m) – measured during investigation

 $h_e$  = dewatered groundwater level head above the top of the aquitard at the excavation (m) – assumed to be 1.0 m below the proposed excavation depth and assumes there is no significant groundwater upflow from depths greater than 1.0 m below the excavation

w = trench width (m

 $\ell =$  trench length (m)

 $R_i$  = radius of influence (m), estimated using Sichardt equation:





$$R_i = 3000(H_0 - h_e)\sqrt{K}$$

#### **6.2.1.3 Estimated Dewatering Rates**

Details of the dewatering rate calculations for the installation of proposed Culverts S5 and S17 and the utility installations along East-West Arterial using the assumptions and equations listed above are provided in Appendix C. The estimates are summarized in Table 15.

Table 15: De	watering l	Rates alone	East-West	<b>Arterial</b>
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Structure	Dewatering Rate (no uncertainty factor) (m³/day)	Dewatering Rate (with uncertainty factor) (m³/day)
Culvert S5	0.4	1.2
Culvert S17	0.9	2.8
Utilities	0.8	2.3

The dewatering rates for the box culverts have been estimated for a trench excavation 10 m long, 9 m wide and 4 m deep. The estimated dewatering rates for Culverts S5 and S17 indicate that the groundwater inflow rates of approximately 0.4 and 0.9 m³/day can be expected, respectively. Conservative dewatering rates have been determined by multiplying the maximum groundwater inflow by an uncertainty factor of three, which results in estimated groundwater inflows of 1.2 and 2.8 m³/day. However, it is important to remember that artesian conditions have been observed at S5.

The dewatering rate for the utility installations has been estimated for a trench excavation 15 m long, 3 m wide and 4 m deep. The estimated dewatering rate for the utility installations indicates that the groundwater inflow rate of approximately 0.8 m³/day can be expected. A conservative dewatering rate has been determined by multiplying the maximum groundwater inflow by an uncertainty factor of three, which results in an estimated groundwater inflow of approximately 2.3 m³/day.

These dewatering estimates do not include the direct influx of surface water from streams or wetlands into the excavations; it includes only the groundwater that would be expected to infiltrate into the excavation from the soil. In addition to groundwater extraction, stream diversion is expected to be necessary to install the culverts. Any dewatering system should be designed by a dewatering contractor and should take the stream surface water flow into consideration.

Based on the dewatering calculations, no registration in the EASR nor a PTTW would be required for groundwater extraction because the dewatering rates are below both the threshold of 50 m<sup>3</sup>/day for EASR registration and below the threshold of 400 m<sup>3</sup>/day for a PTTW.



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#### 6.2.2 **Water Taking Impact Assessment**

#### 6.2.2.1 Zone of Influence

The zones of influence from the excavations for the box culverts and the utility installations were estimated to be up to approximately 2 m, with a conservative estimate of approximately 4 m using an uncertainty factor of three (Table 16).

Table 16: Zones of Influence along East-West Arterial

Structure	Zone of Influence (no uncertainty factor) (m)	Zone of Influence (with uncertainty factor) (m)
Culvert S5	1.1	1.8
Culvert S17	1.7	2.9
Utilities	2.1	3.6

The calculated radius of influence is 4 m from the point of groundwater dewatering; however, the actual radius of influence may be influenced by the presence of nearby streams and wetlands. Streams and wetlands may act as boundaries to the zone of influence if they are hydraulically connected to the groundwater being abstracted, thus reducing the zone of influence. While the zone of influence may be buffered somewhat by a stream or wetland, dewatering immediately adjacent to a stream or wetland may also significantly increase the amount of dewatering required. Water supply wells, creeks and wetlands adjacent to the construction Site could be affected by the dewatering.

#### **6.2.2.2 Water Well Impact Assessment**

Up to 52 water supply wells were identified in the MECP database of water well records that are within 500 m of Arterial A2. Well depths range from 9 to 38 m BGS, below the expected maximum depth of excavation of 4 m BGS. All the identified water supply wells are more than 9 m deep and all are outside the zone of influence of 4 m and are thus not expected to be affected by construction dewatering, especially if the pump intakes are below the excavation depth.

As the maximum zone of influence around the excavations is 4 m, it is not expected that the construction dewatering will impact any of the private wells within the study area because they are outside the zone of influence. Significant dewatering effects are not anticipated because the dewatering rates are relatively low, dewatering is expected to be of short duration and the excavations are expected to be relatively shallow.

#### **6.2.2.3 Surface Water Impact Assessment**

Wood observed no visual evidence of groundwater seeps near the proposed box Culvert S5 along East-West Arterial or along Rainbow Creek within 50 m upstream and downstream of the proposed culvert. Given that the groundwater level in monitoring well S5 was approximately 0.5 m above the ground surface in May 2020 (Table 1), there may be a hydraulic connection to the creek at S5, with groundwater discharge possibly occurring into the creek.





The potential for dewatering to affect Gore Road Tributary, Clarkway Drive Tributary, Rainbow Creek or a wetland will depend on the duration of the dewatering and the degree of hydraulic connection between groundwater and surface water. The dewatering effect on the creek or wetland may be mitigated if the abstracted groundwater is returned into the creek or wetland downstream. However, the water quality will need to meet upstream (i.e. background) water quality and/or regulatory requirements and treatment of the discharge water may be necessary.

During construction, the streams may need temporary diversion using coffer dams with pumping (i.e. active diversion) or using an artificial stream channel without a pump (i.e. passive diversion). Such temporary surface water diversions for construction purposes are exempt from Section 34 of the *Ontario Water Resources Act* and do not require EASR registration or a PTTW. The key criteria for this exemption to be valid include:

- diversion does not affect the stream water levels and quality upstream and downstream
- water remains in or is directly returned to the same water body
- water does not contain visible contaminants
- erosion and sediment control measures are installed and maintained properly.

Construction of the new road will add pavement and thus decrease groundwater recharge and increase runoff. Runoff will be diverted to roadside ditches and storm sewers and will thus be returned to the local watershed and allowed to infiltrate along roadside ditches or on the adjacent land.

Dewatering effects on surface water are expected to be localized and temporary. With the streams temporarily diverted around the culverts to be installed, local dewatering may only be required on a temporary basis to maintain dry working conditions long enough for the culverts to be installed and no permanent impact is expected from the culverts.

## 7.0 Summary and Conclusions

The results of the hydrogeological assessment are summarized as follows:

- The Site is in the Peel Plain physiographic region consisting of bevelled till plains and the surface geology consists of glaciolacustrine deposits of clay and silt, with modern alluvial deposits of clay, silt, sand, gravel and organics along some of the streams. The underlying bedrock is composed of limestone, interbedded with shale at depth, in the Georgian Bay Formation from the Ordovician Period.
- 2. The stratigraphy beneath the road alignments consists of one to four metres of fill, underlain by stiff to hard silty clay to clayey silt with trace sand and gravel, occasionally some sand. The silty clay is underlain by silty sand to sandy silt in eight of the deep structural boreholes S3, S4, S11, S12, S13, S14, S17 and S18, possibly reflecting the modern alluvial deposits along some of the streams. The silty clay is absent some boreholes near the streams, it extends up to 9.8 m BGS, the maximum





depth of investigation. Shale bedrock was encountered at 5.5 to 8.5 m BGS at S17 and S18 near Gore Road Tributary and the proposed East-West Arterial.

- 3. Primary land use across the Site is agricultural with a few rural residences and scattered wetlands, meadows and forests along the streams. Numerous private wells were identified across the Site.
- 4. The main watercourses are Rainbow Creek, Clarkway Drive Tributary and Gore Road Tributary flowing southeast across the Site. Streamflows measured in these three watercourses in May 2020 ranged from 0.2 l/s (16 m³/day) to 10 l/s (875 m³/day). The greatest flows were measured in Clarkway Drive Tributary and the lowest flows were measured in Gore Road Tributary. Significant reductions in flow were observed at the stations downstream of proposed Culvert S5 along Rainbow Creek and existing Culvert S16 along Clarkway Drive Tributary because of relatively large wetland meadows at these locations which probably serve to retain and retard flow and also provide multiple channels for water to flow through, all of which may not have been captured during the flow measurements.
- 5. The results of the single well response tests in seven of the eight monitoring wells across the Site indicated hydraulic conductivity values of the clay, silt and sand to range from  $3.7 \times 10^{-9}$  to  $1.2 \times 10^{-6}$  m/s.
- 6. Dewatering rates were based on the design dimensions of the excavations, with only one excavation open at any one time, which were assumed to be 10 m long, 9 m wide and 4 m deep for box culverts and 15 m long, 3 m wide and 4 m deep for underground utilities. The conservatively estimated dewatering rates calculated using an uncertainty factor of three ranged from 1 to 21 m³/day for the proposed excavations to install culverts and underground utilities. These rates include only groundwater influx and not surface water influx from streams, storms or wetlands. No EASR registration nor a PTTW would be required for groundwater extraction based on the assumptions used in preparing these calculations.
- 7. The conservatively estimated zones of influence calculated using an uncertainty factor of three ranged from 2 to 21 m.
- 8. Most of the identified water supply wells are more than 10 m deep, below the expected maximum depth of excavation of 4 m BGS and outside the zones of influence and are thus not expected to be affected by construction dewatering because the dewatering rates are relatively low, dewatering is expected to be of short duration and the excavations are expected to be relatively shallow. Five water supply wells may need to be investigated further (see recommendation in Section 7.0).
- 9. Wood observed no visual evidence of groundwater seeps near the existing or proposed box culverts or along the creeks within 50 m upstream and downstream of the culverts. Given that the groundwater levels in the monitoring wells at the existing culverts ranged from 0.9 to 3.2 m BGS in May 2020 and January 2022, there may be a hydraulic connection to sections of the creeks, with some groundwater recharge occurring, although this was not measured. The groundwater level in





S5 at proposed Culvert S5 was above the ground surface, indicating possible groundwater discharge into Rainbow Creek.

- 10. Dewatering effects on surface water are expected to be localized and temporary. With the streams temporarily diverted around the culverts to be installed, local dewatering may only be required on a temporary basis to maintain dry working conditions long enough for the culverts to be installed and no permanent impact is expected from the culverts.
- 11. Should the infrastructure design change, the estimated dewatering rates and zones of influence, as well as the conclusions and recommendations provided in this report will need to be reviewed and updated.

## 8.0 Recommendations

Based on the results of the hydrogeological assessment as summarized above, the following recommendations are provided:

- 1. While a permit to take water for groundwater extraction from excavations is not anticipated to be needed, permitting may be required if dewatering rates exceed the thresholds for EASR registration and a PTTW because of surface water, storm water and wetland water influx into excavations.
- 2. Record the amount of water taking during each day of dewatering to ensure the maximum water taking does not exceed the thresholds for EASR registration or a PTTW.
- 3. To be diligent, it is recommended that a private well survey be completed during detailed design to confirm the location of, depth of and water level in water supply wells 4907185 and 4904154 near Coleraine Drive and water supply wells 4902856, 4902866 and 4905894 near Clarkway Drive.
- 4. In addition to groundwater extraction, stream diversion may be necessary to install the culverts. Any dewatering system should be designed by a dewatering contractor and should take the stream surface water flow into consideration.
- 5. Use standard erosion and sediment control measures that meet or exceed Ontario Provincial Standards and Specifications to discharge the abstracted water into the adjacent wetlands, streams or other natural surface water body. The measures should be implemented prior to work and be maintained during construction until disturbed areas have been effectively stabilized and restored. Removing sediment from the abstracted water could be achieved by filter bags or for higher amounts by collecting the abstracted water in a weir tank to allow sediment to settle out of the water first.
- The quality of the water discharged into the adjacent wetlands, streams or other natural surface water body should meet upstream (i.e. background) water quality and/or the Ontario Provincial Water Quality Objectives (PWQOs).





## 9.0 Limitations

The assessment presented in this report is based on data obtained by means of a limited number of boreholes and in-situ and laboratory tests. Borehole characterization may not effectively determine all the factors that may affect construction methods and costs. Subsurface and groundwater conditions between and beyond the boreholes may differ from those encountered at the boreholes, and conditions may become apparent during construction, which could not be detected or anticipated at the time of Site investigation.

The anticipated construction conditions were discussed only to the extent of the permitting process. Construction methods discussed express Wood's opinion only and are not intended to direct the contractors on how to carry out the construction. Contractors should also be aware that the data and interpretation presented in this assessment may not be sufficient to assess all the factors that may have an effect upon the construction.

The assessment was prepared with the condition that the design will be in accordance with all applicable standards and codes, regulations of authorities having jurisdiction and good engineering practice. Further, the findings in this assessment are applicable only to the project as described above. On-going liaison with Wood during the final design and construction phase of the project is recommended to confirm that the findings in this assessment are applicable and/or correctly interpreted and implemented. Also, any queries concerning the hydrogeological aspects of the project should be directed to Wood for further elaboration and/or clarification. This report is further subject to the limitations contained in Appendix D.

## 10.0 Closure

We trust the information presented in this report meets your current requirements. Should you have any questions or concerns, please contact the undersigned.

Yours truly,

Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited

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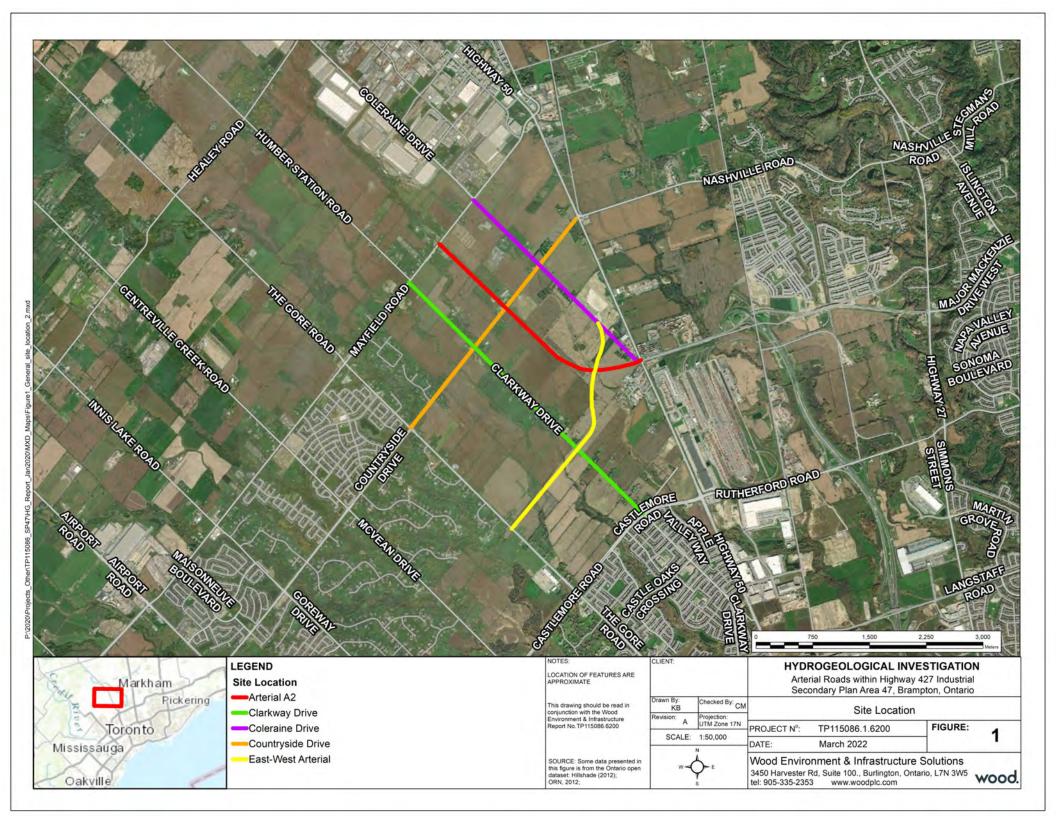
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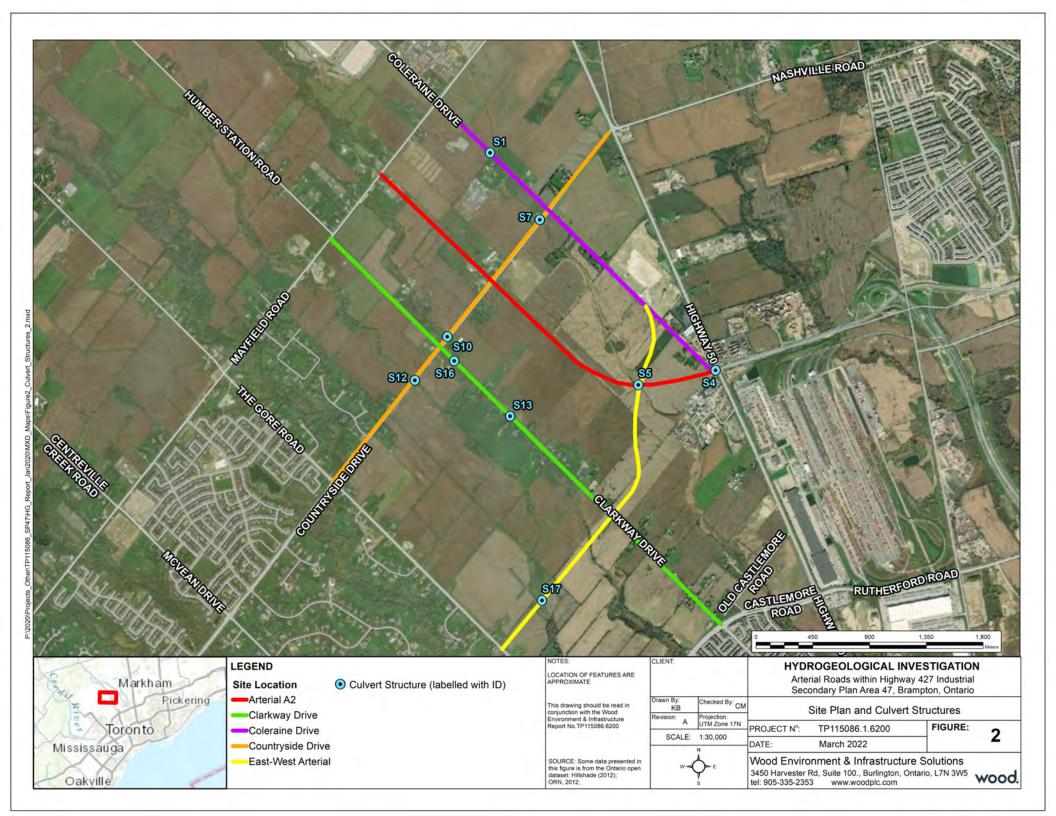
Nick Schmidt, BSc, PGeo Senior Hydrogeologist

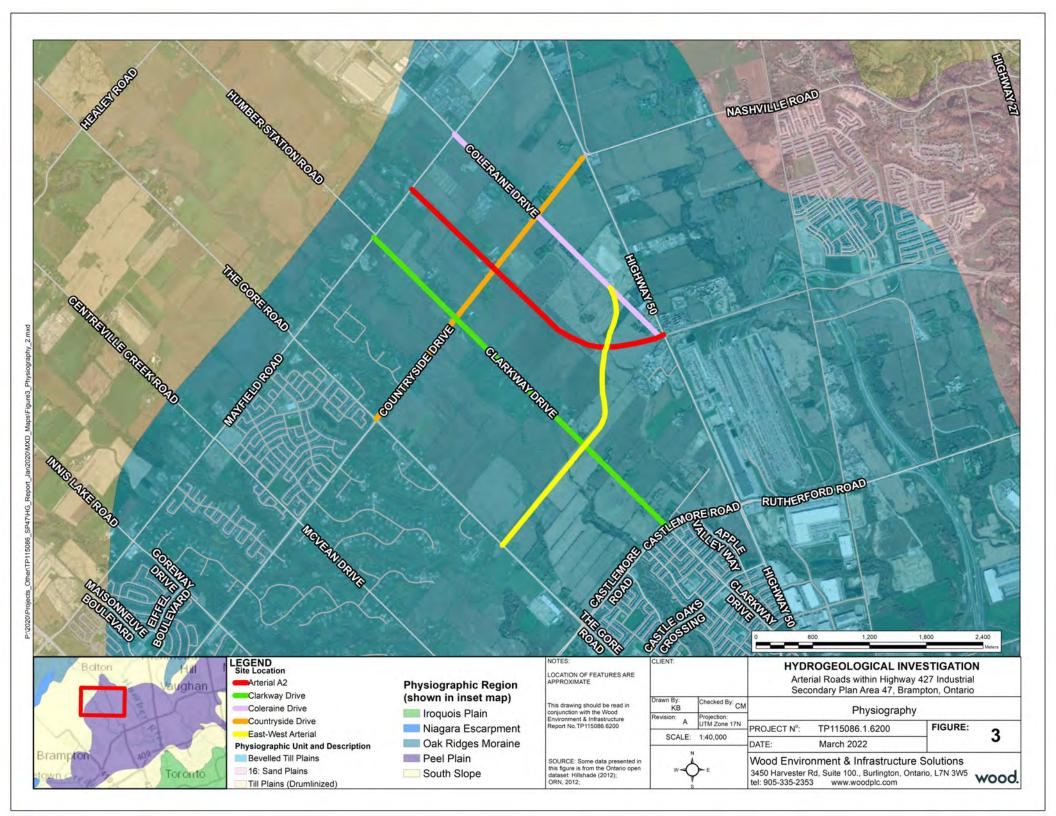
Niel Solwith

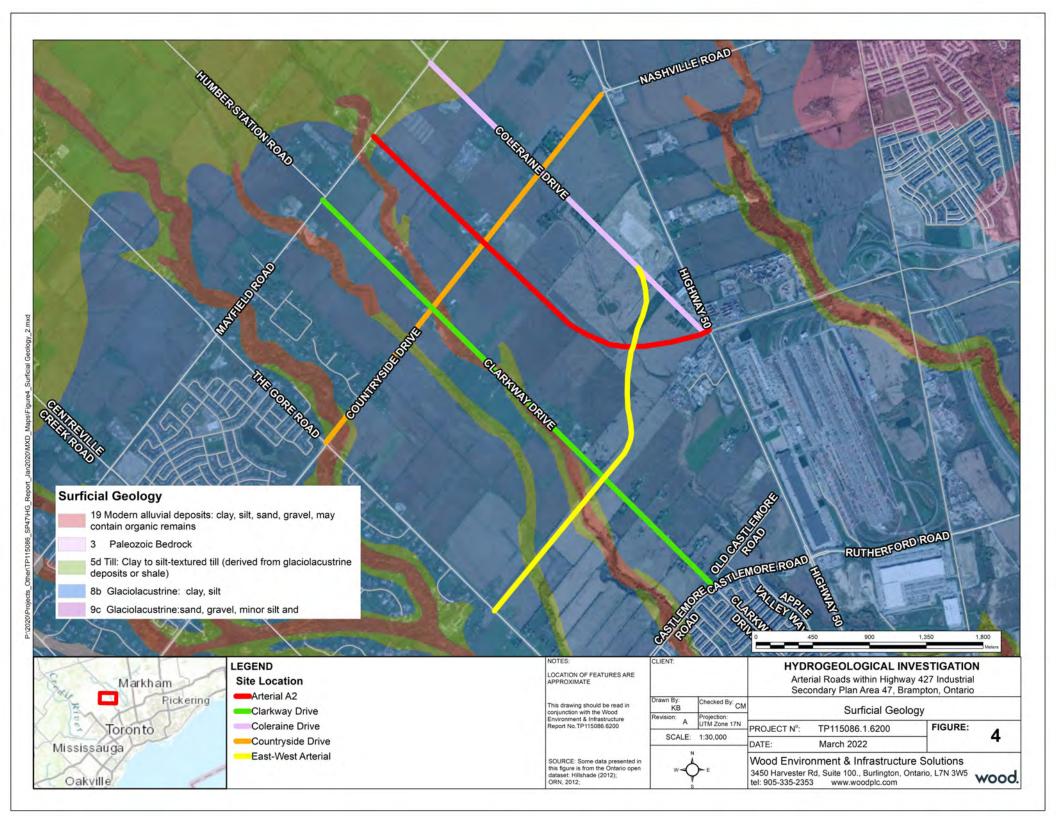
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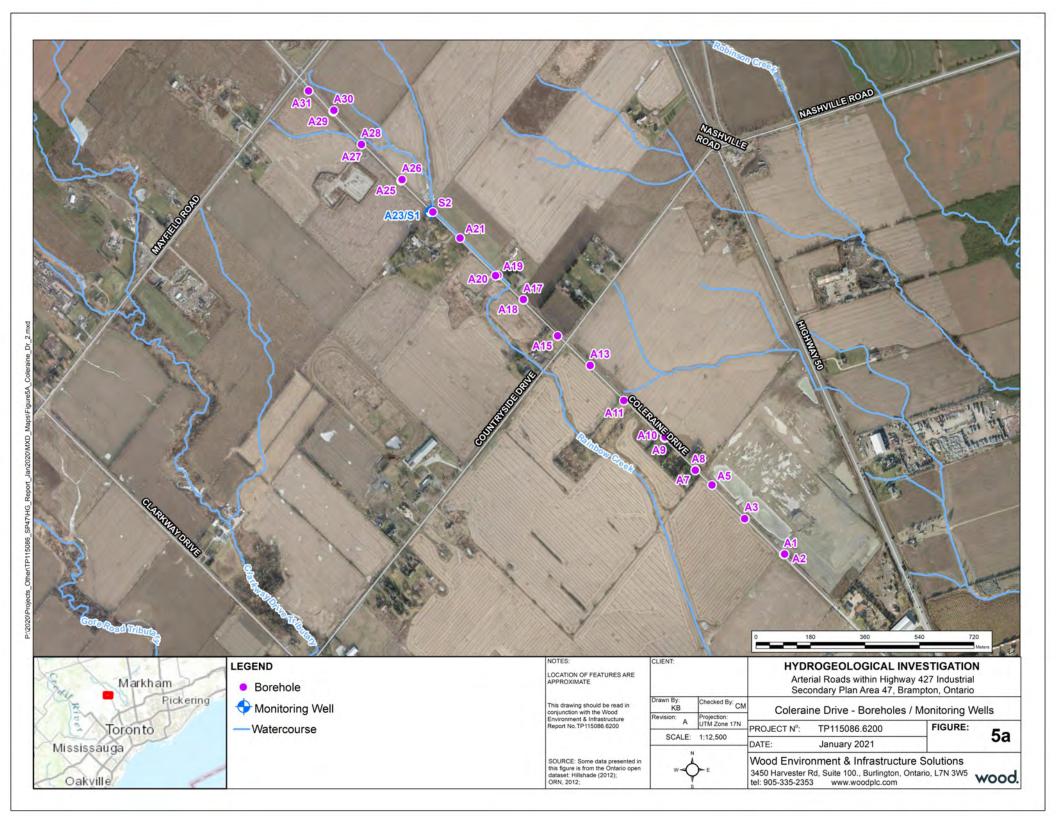
**Figures** 

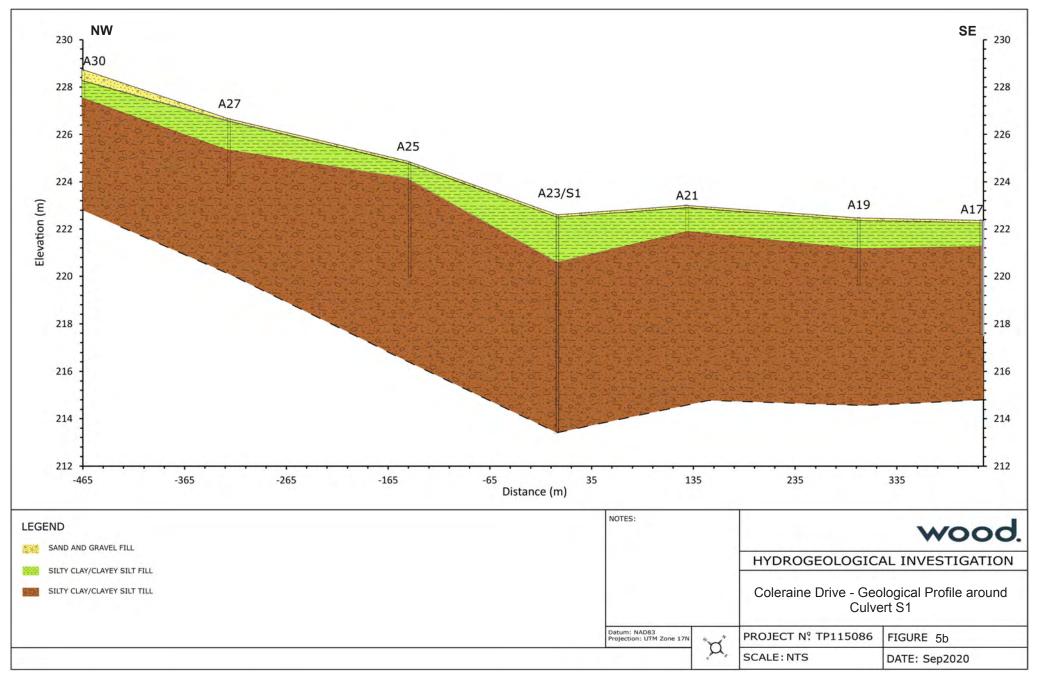


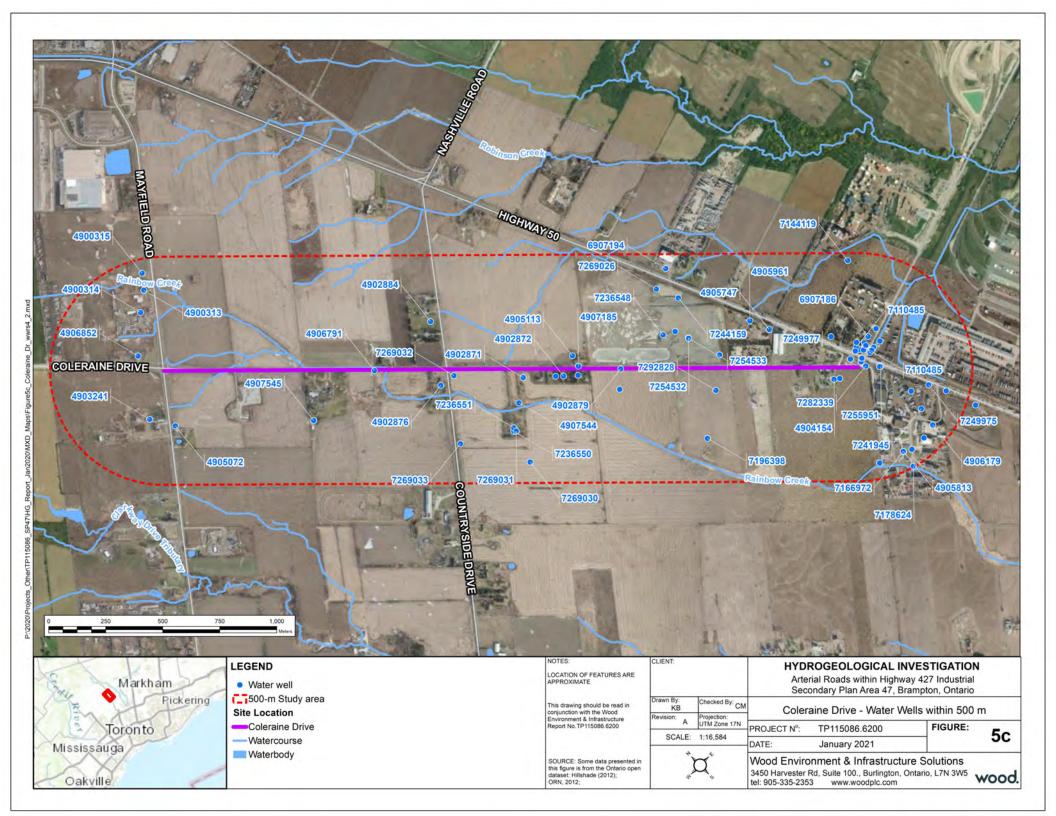


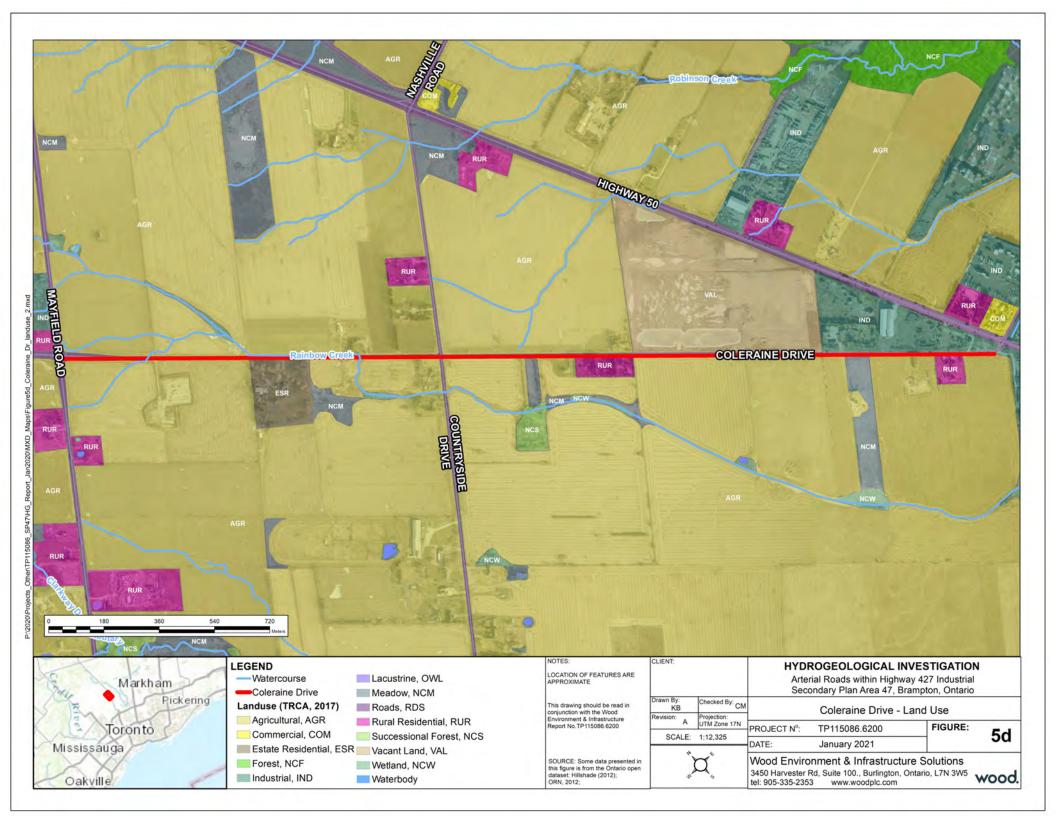


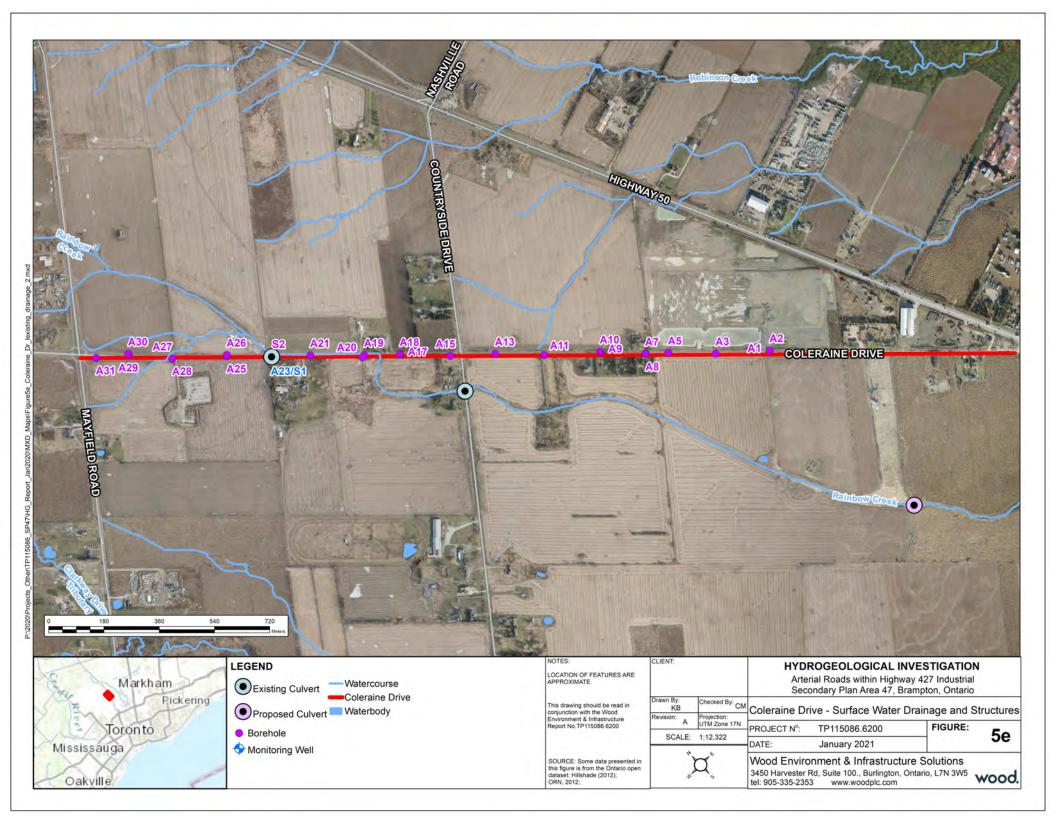


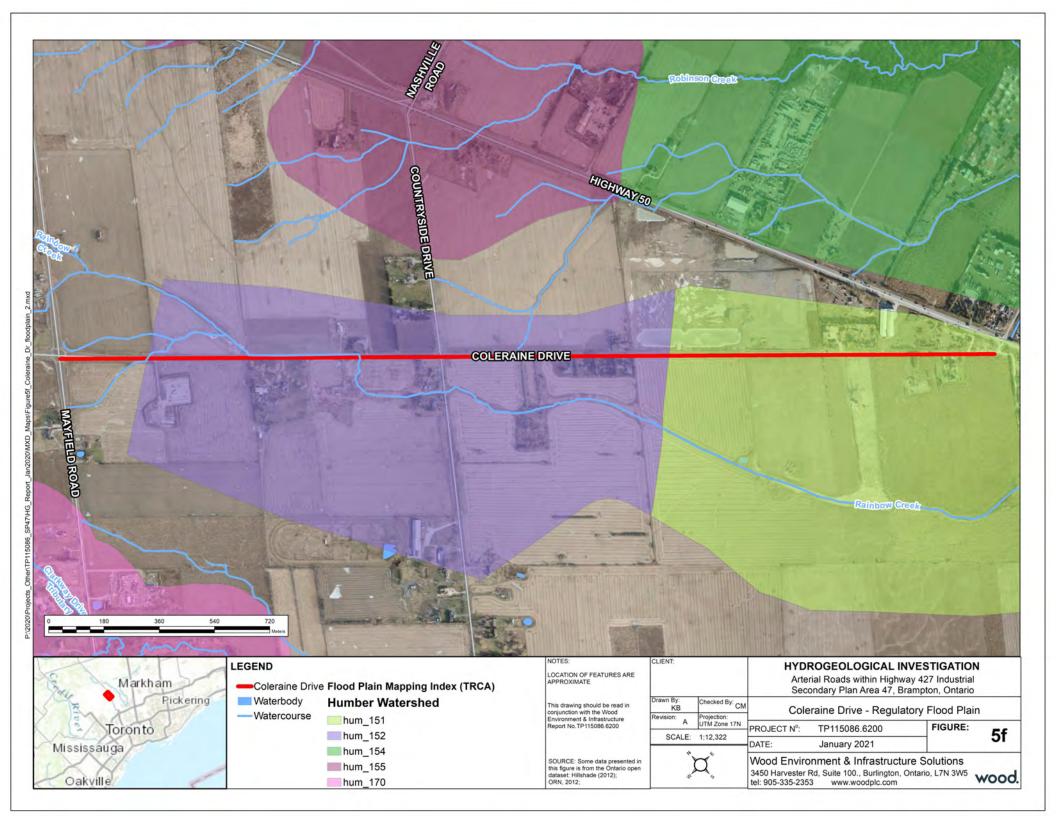


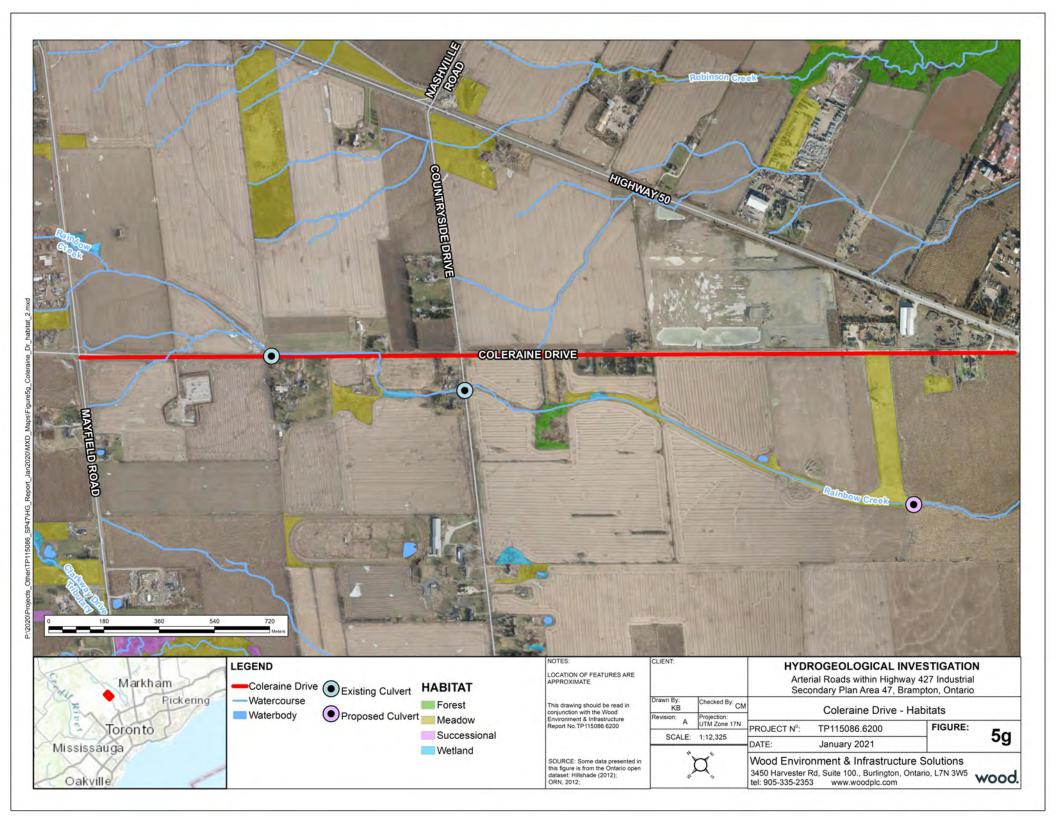


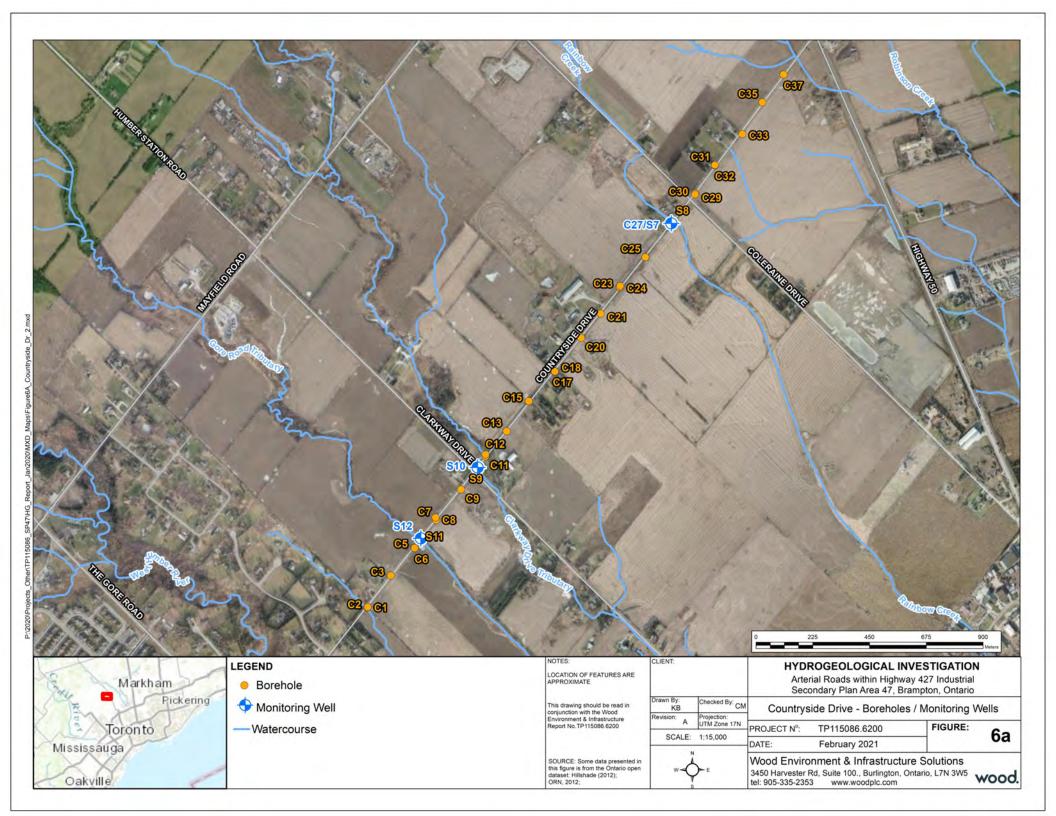


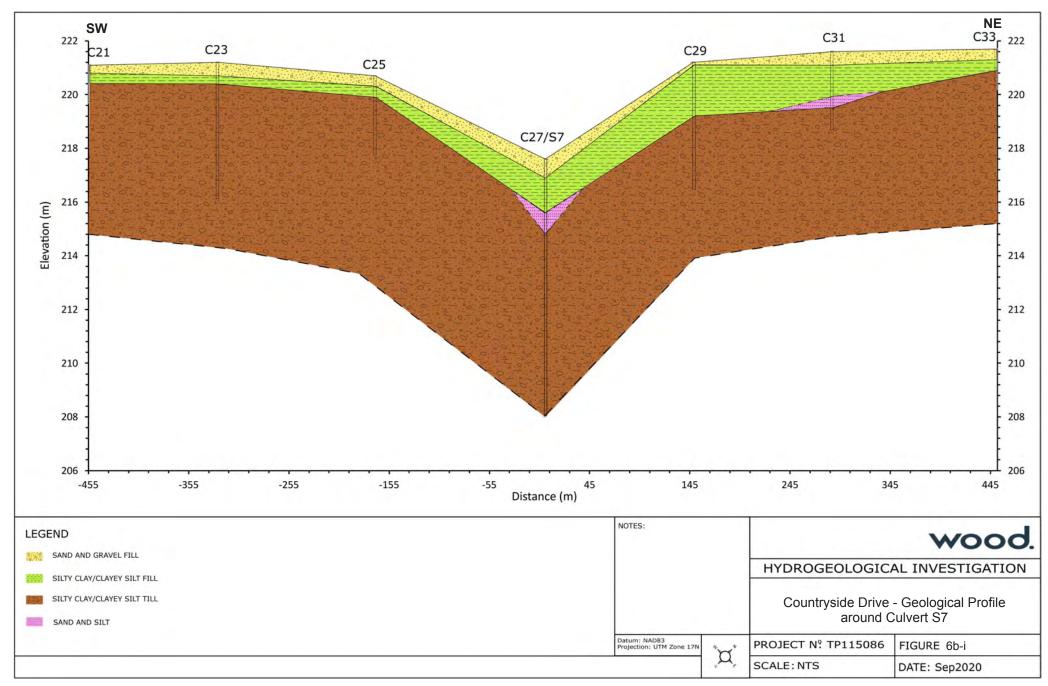


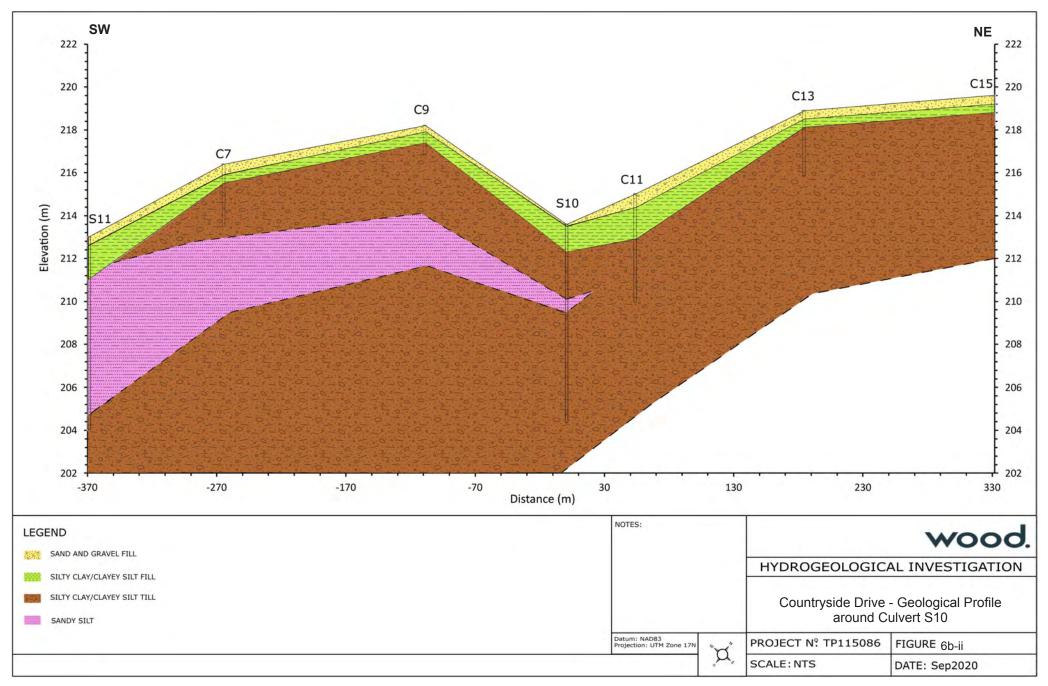


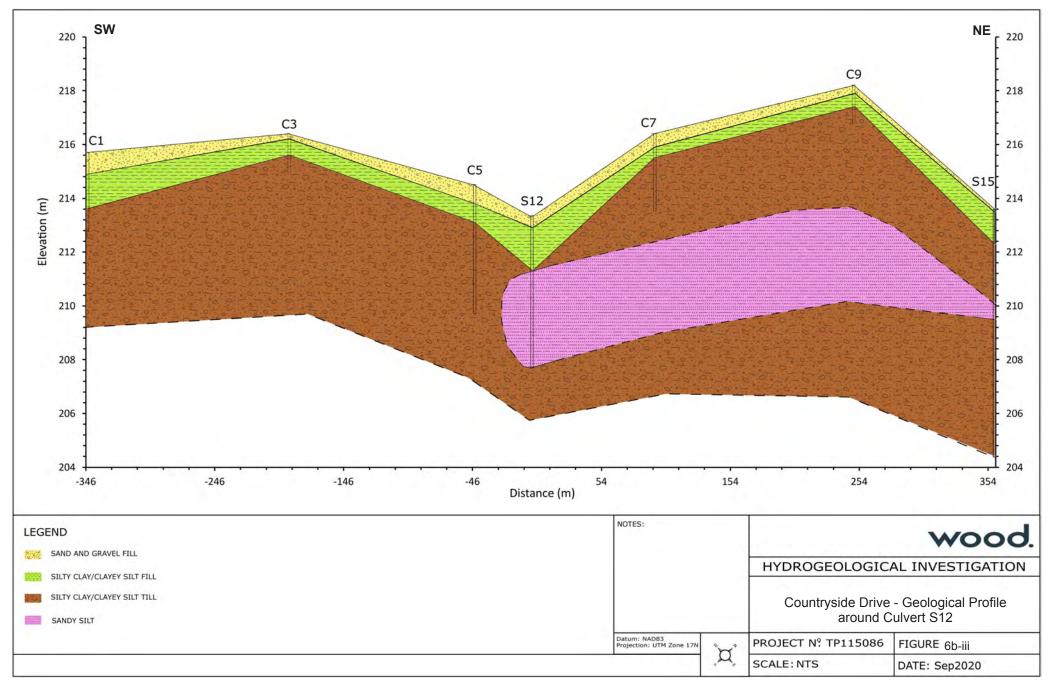


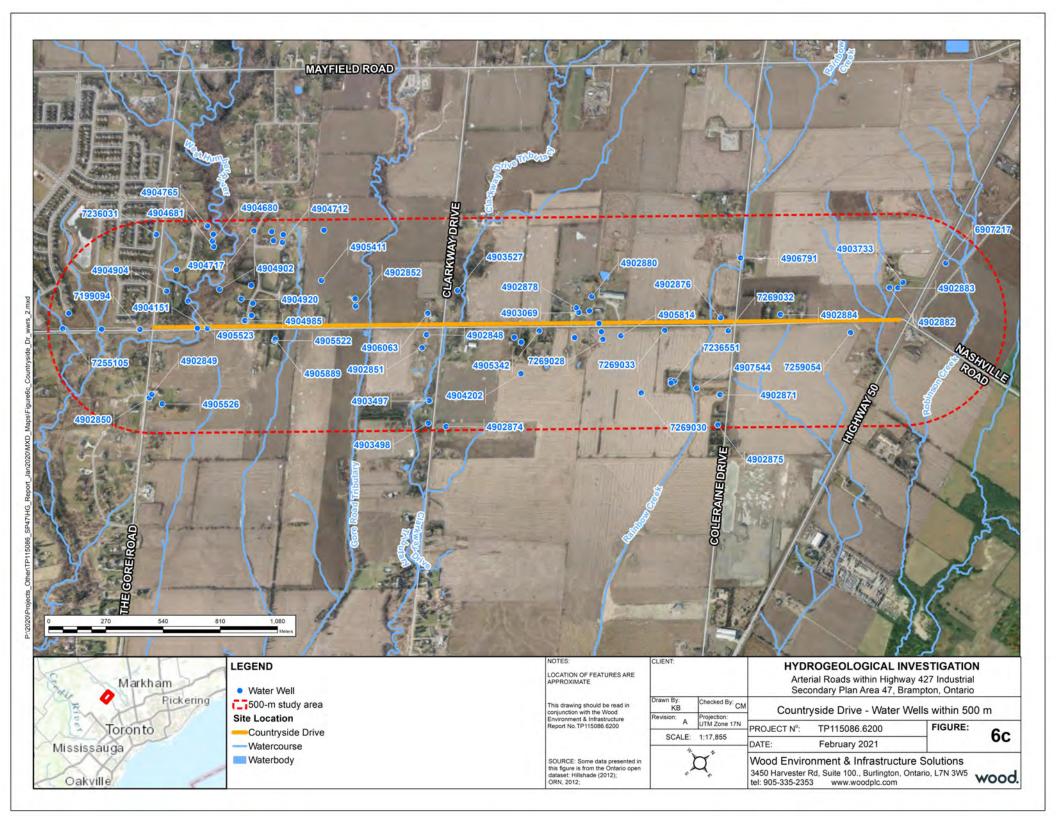


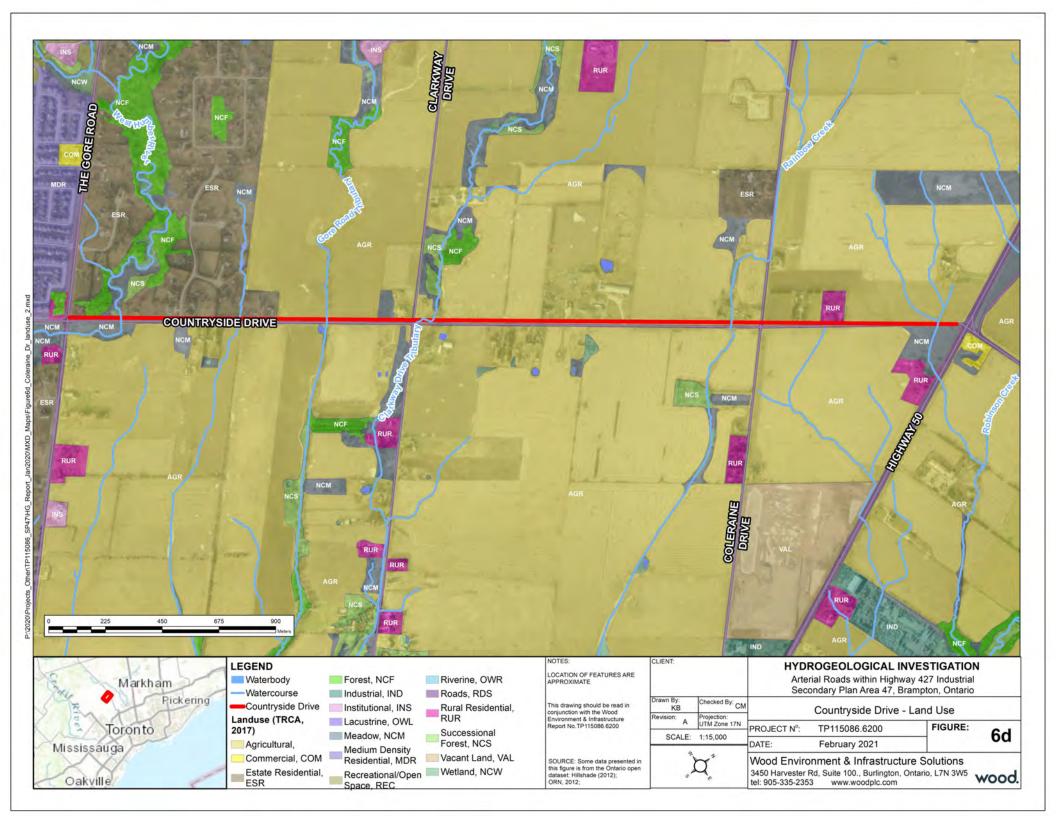


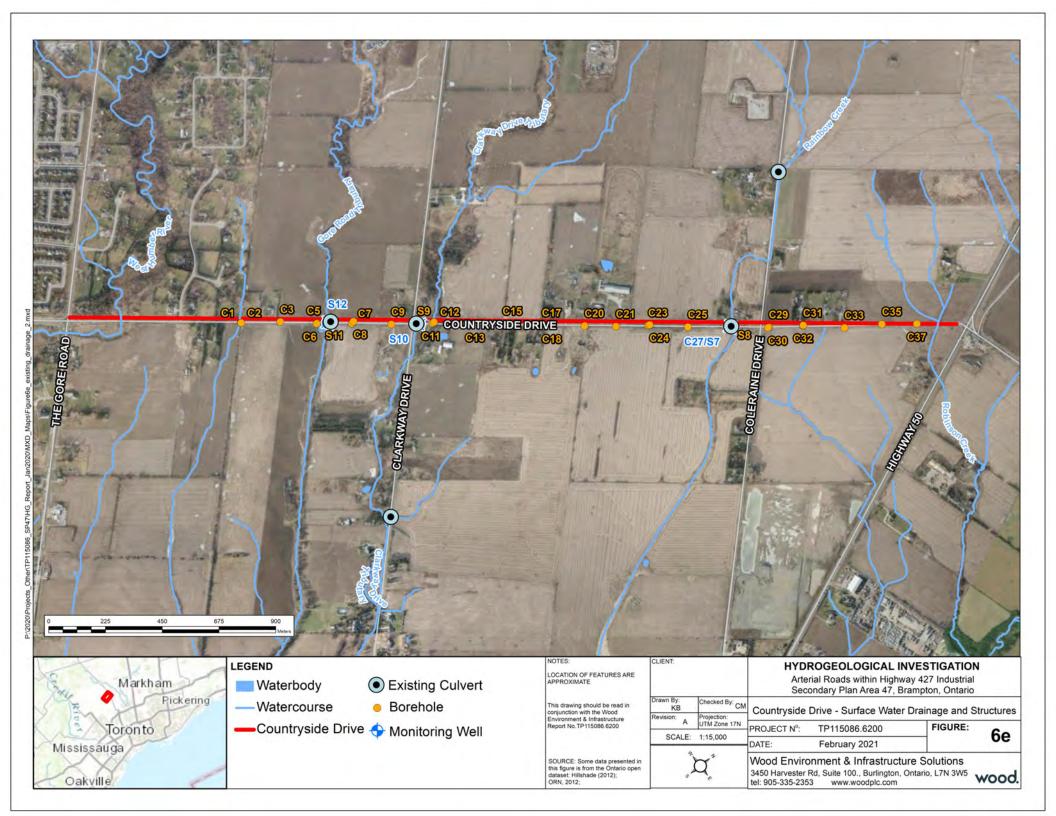


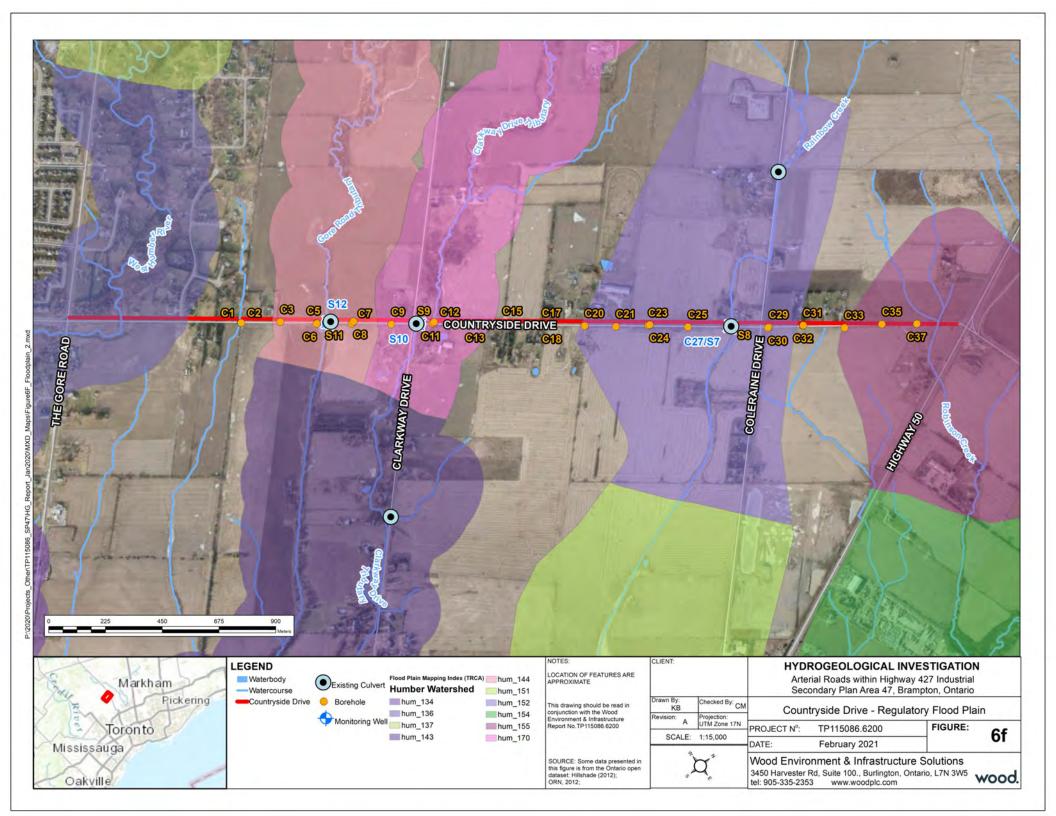


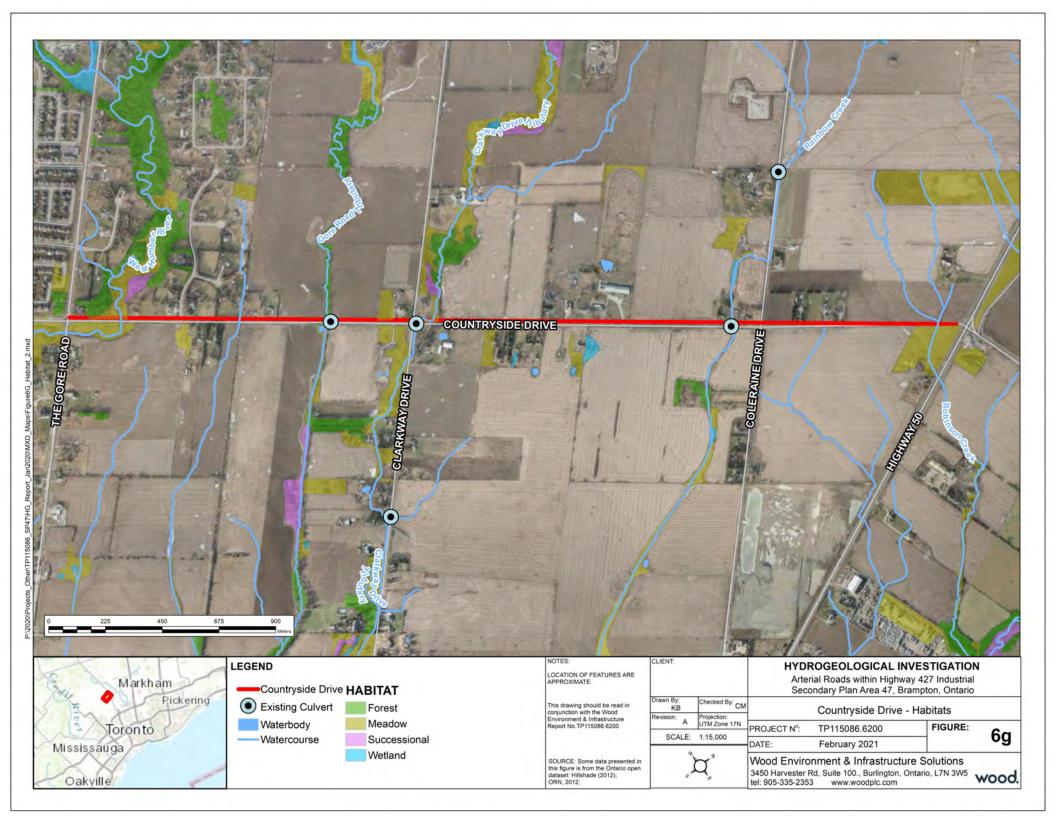


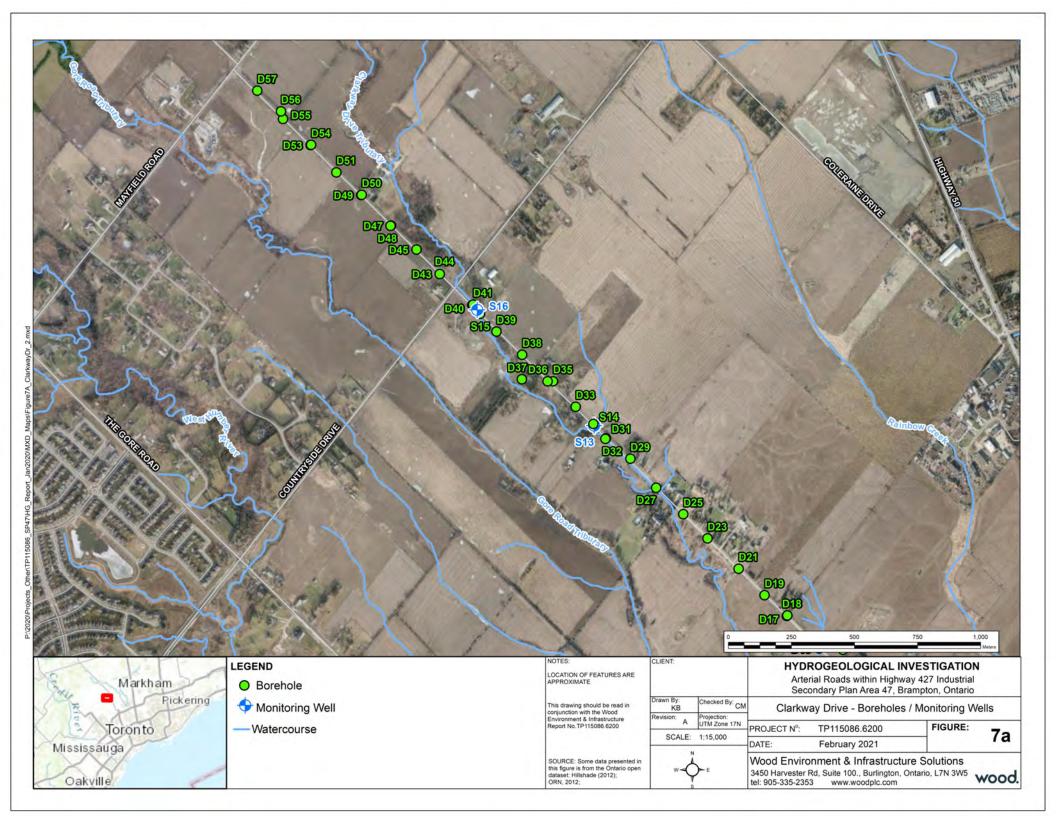


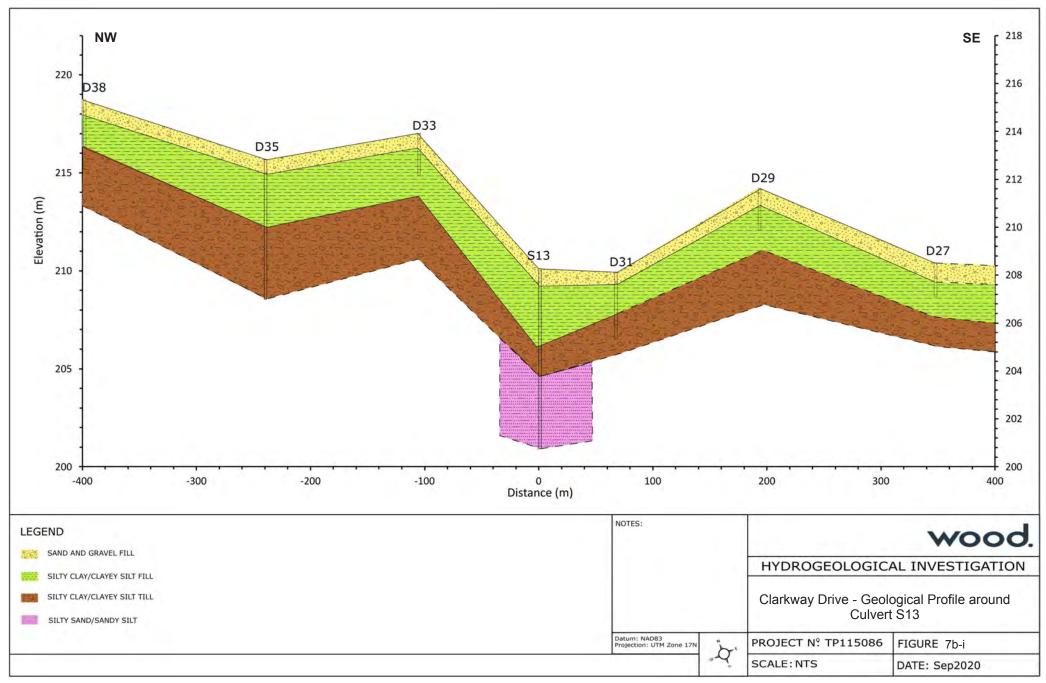


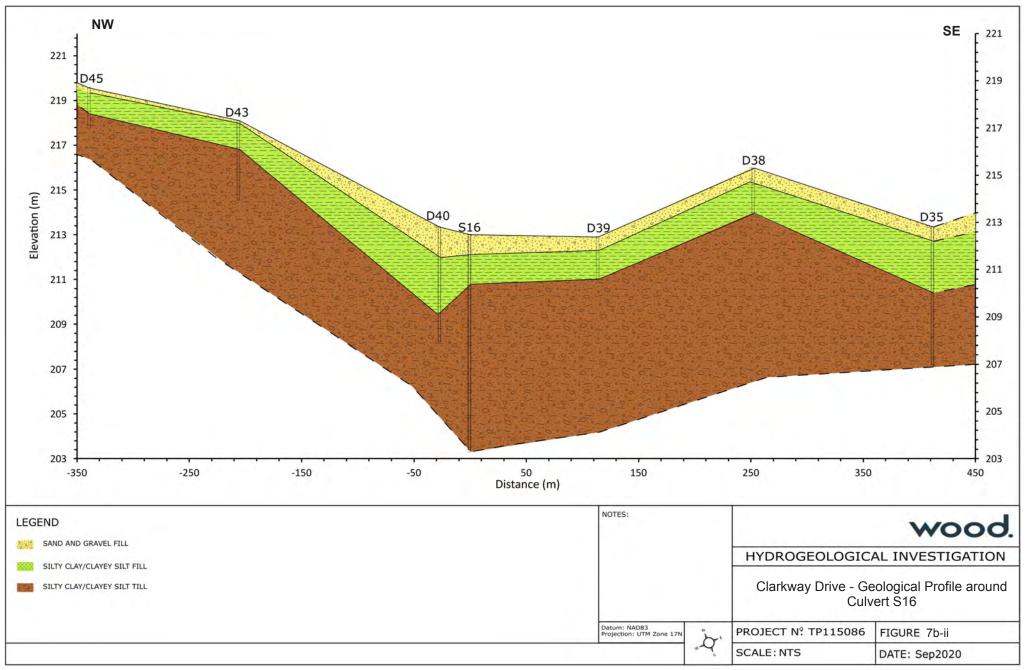


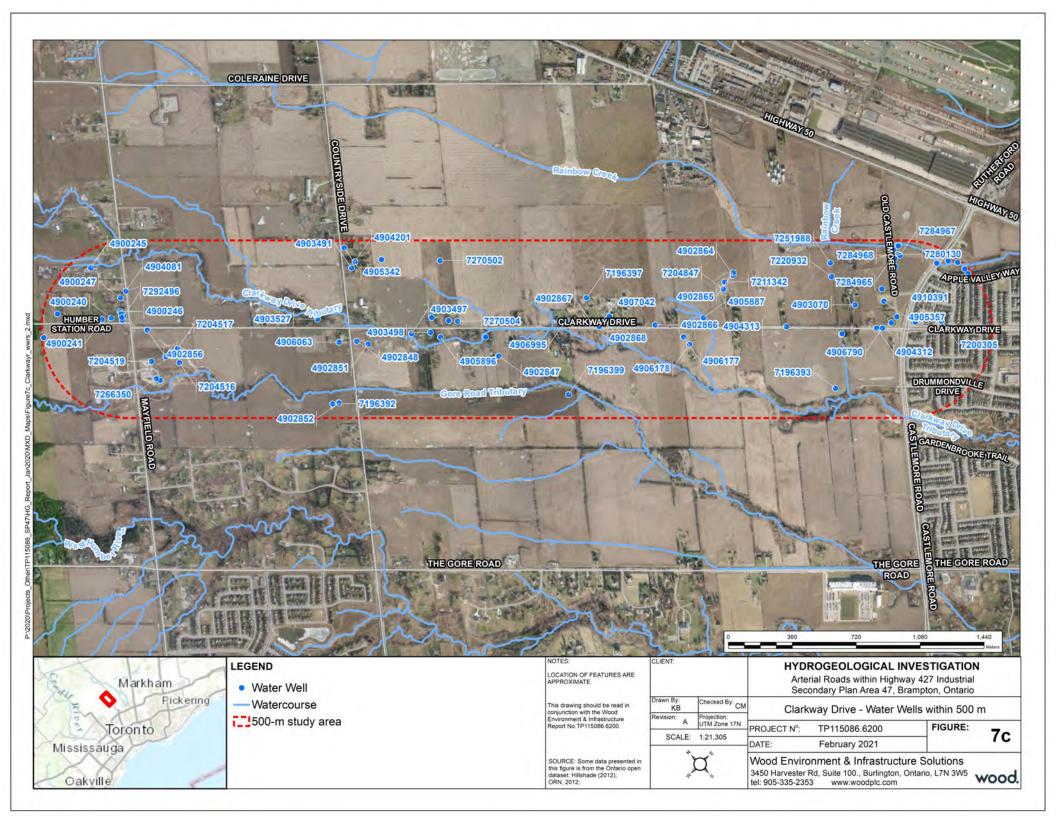


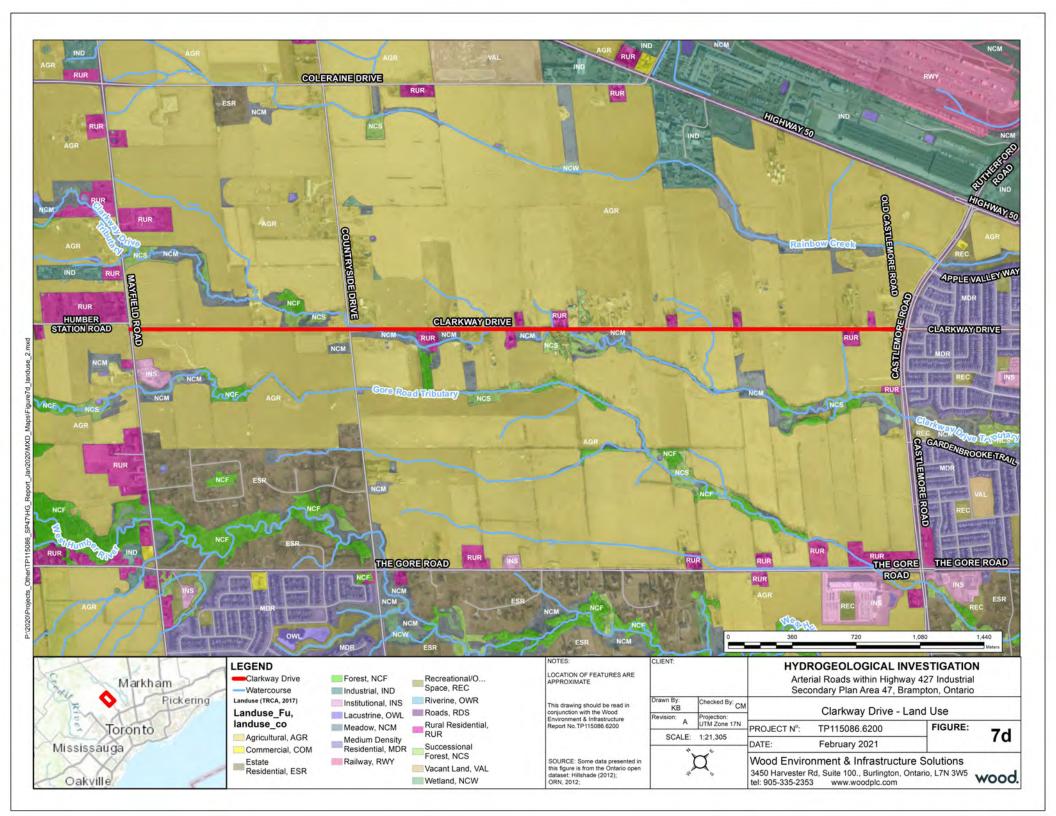


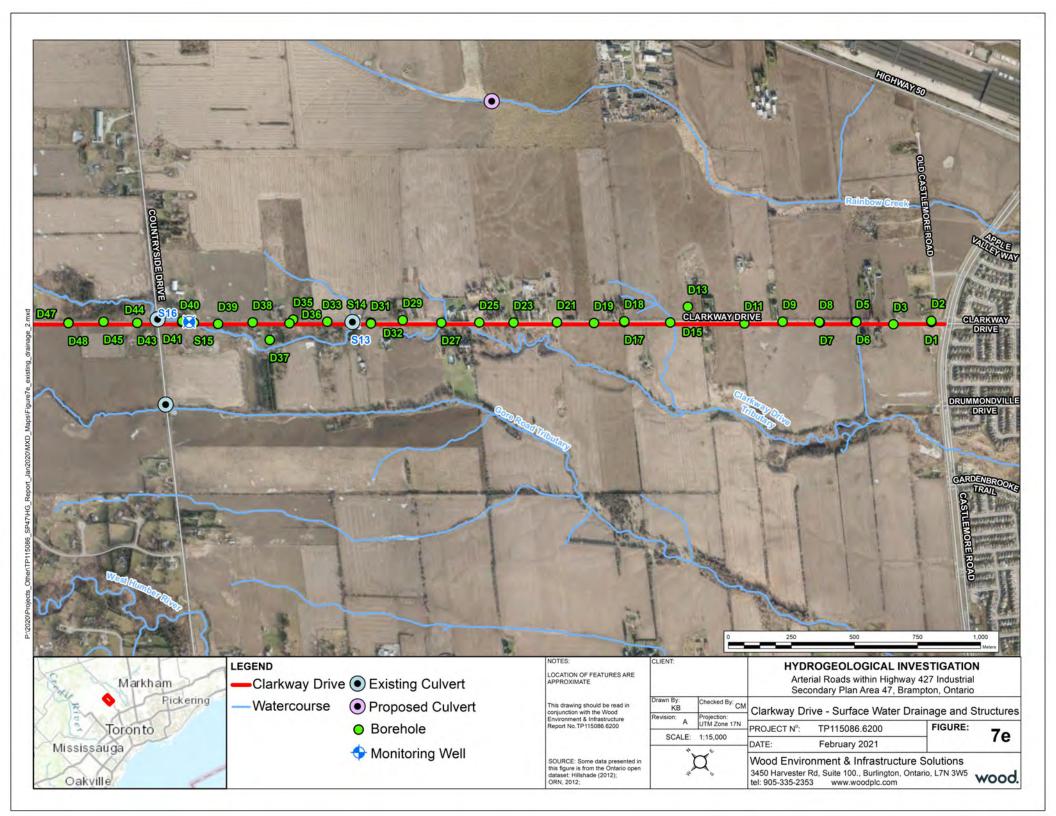


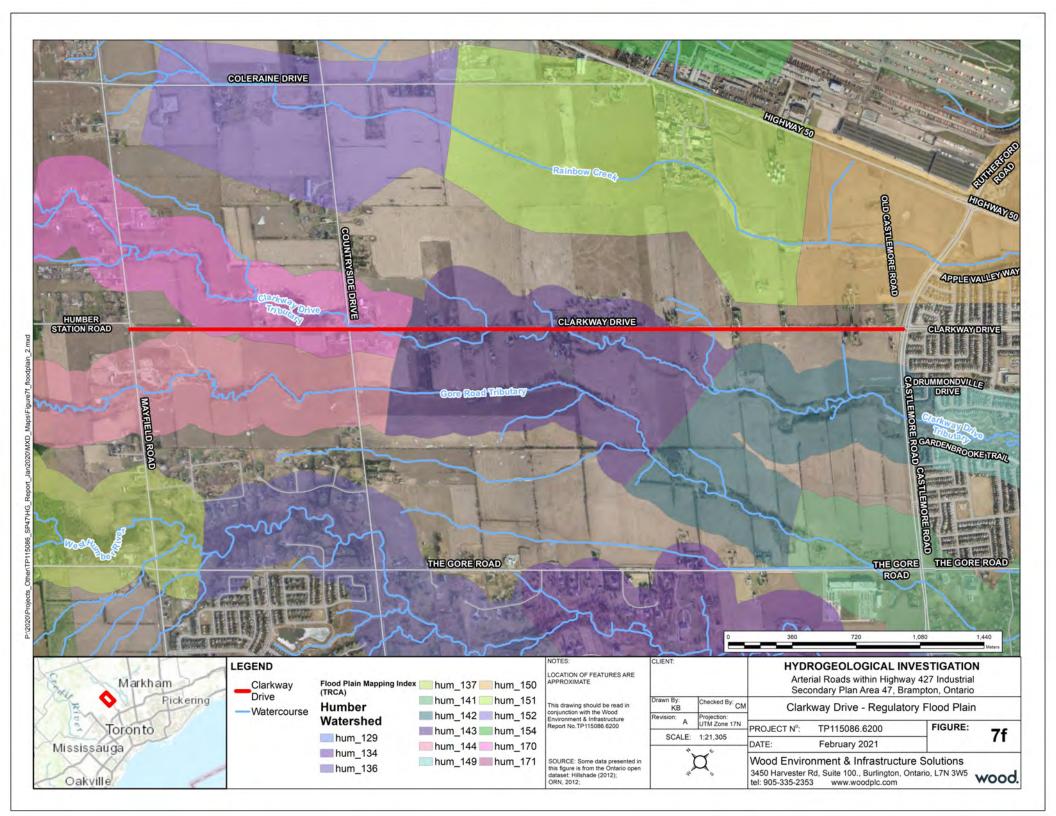


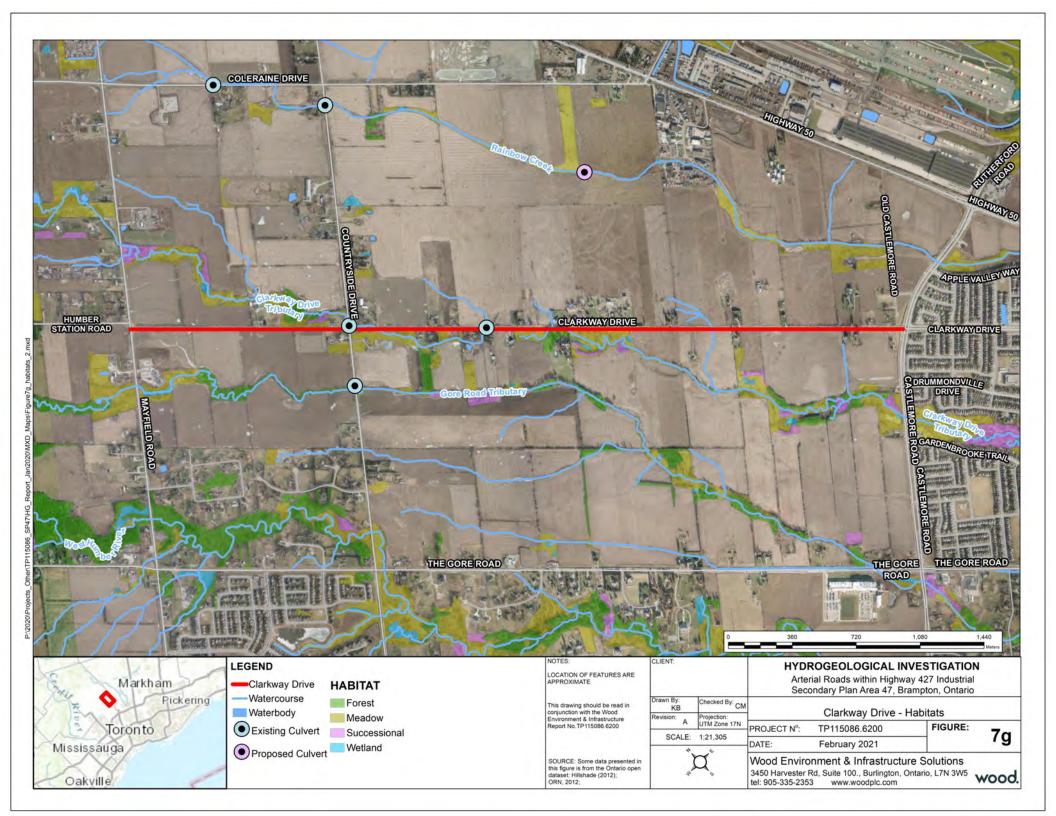


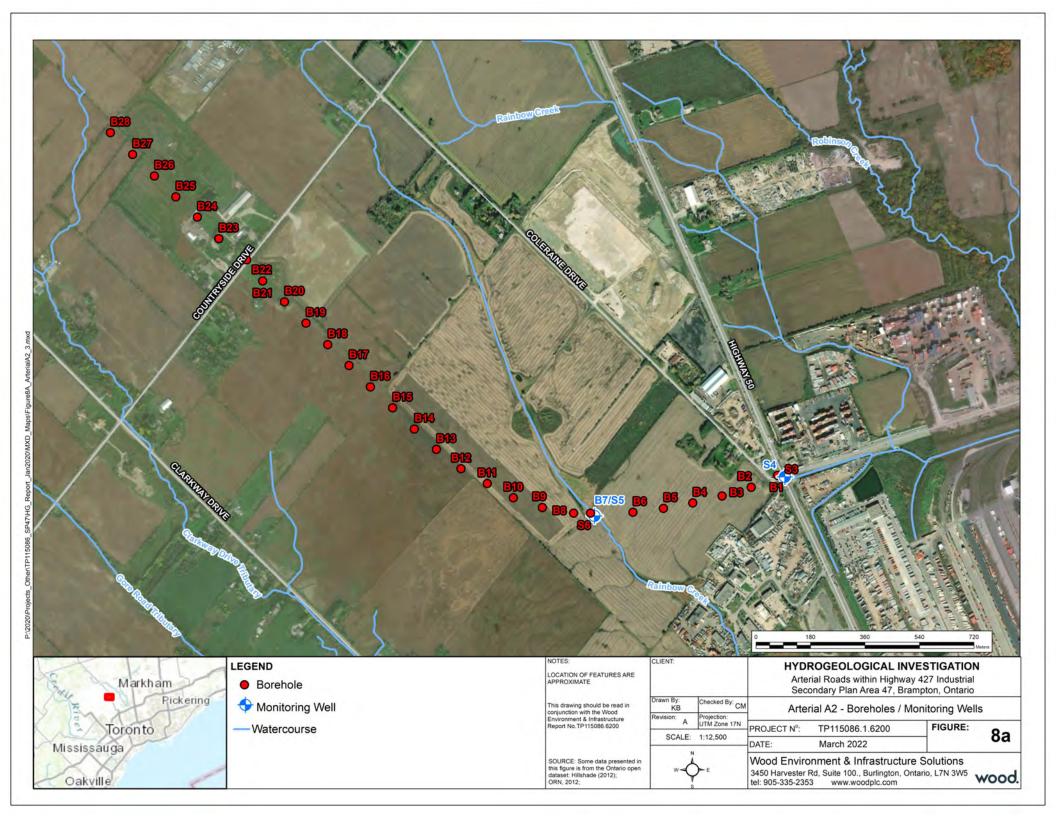


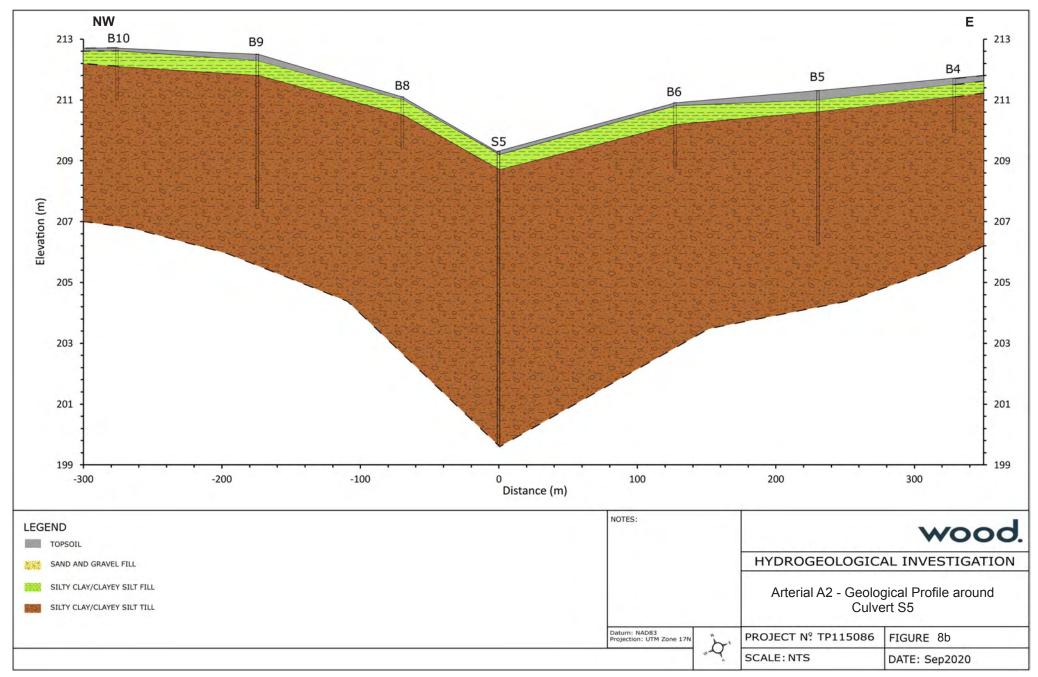


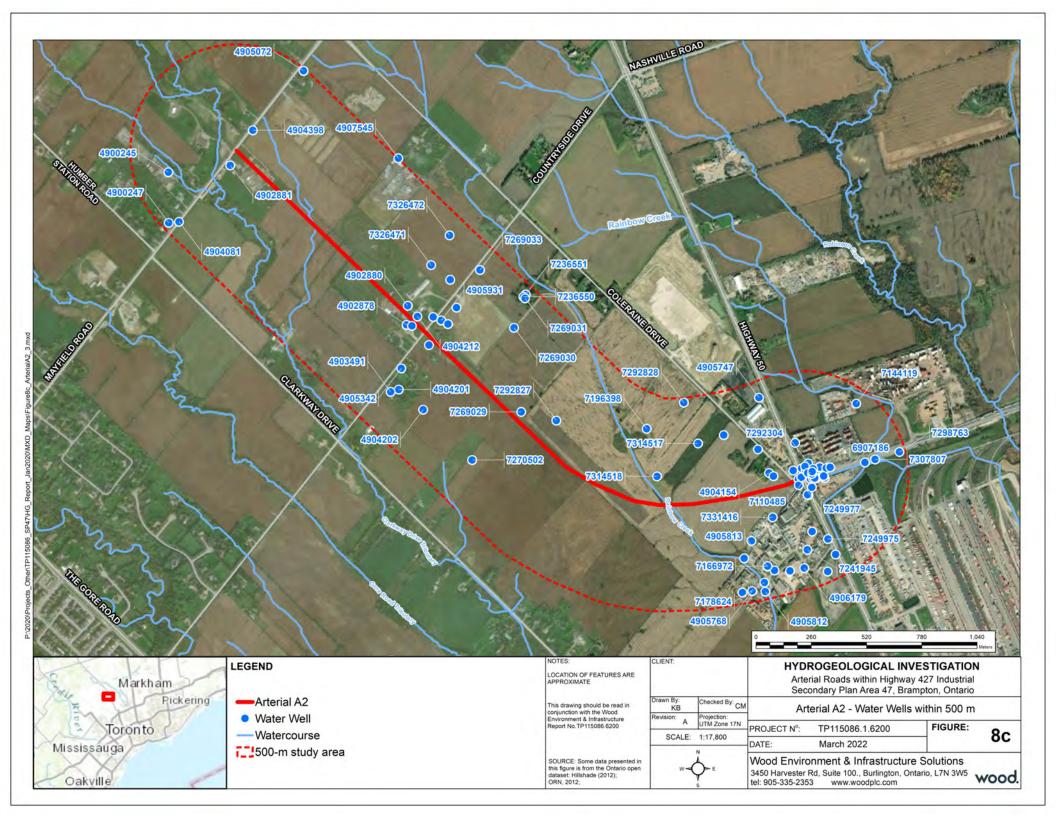


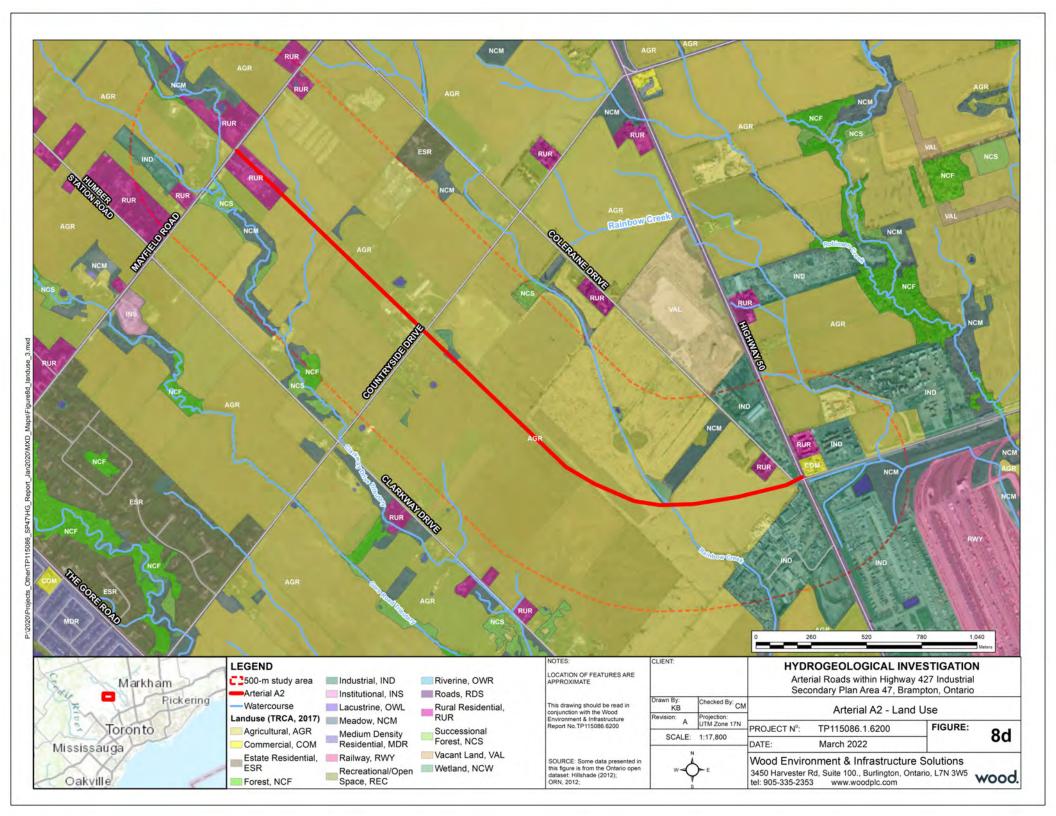


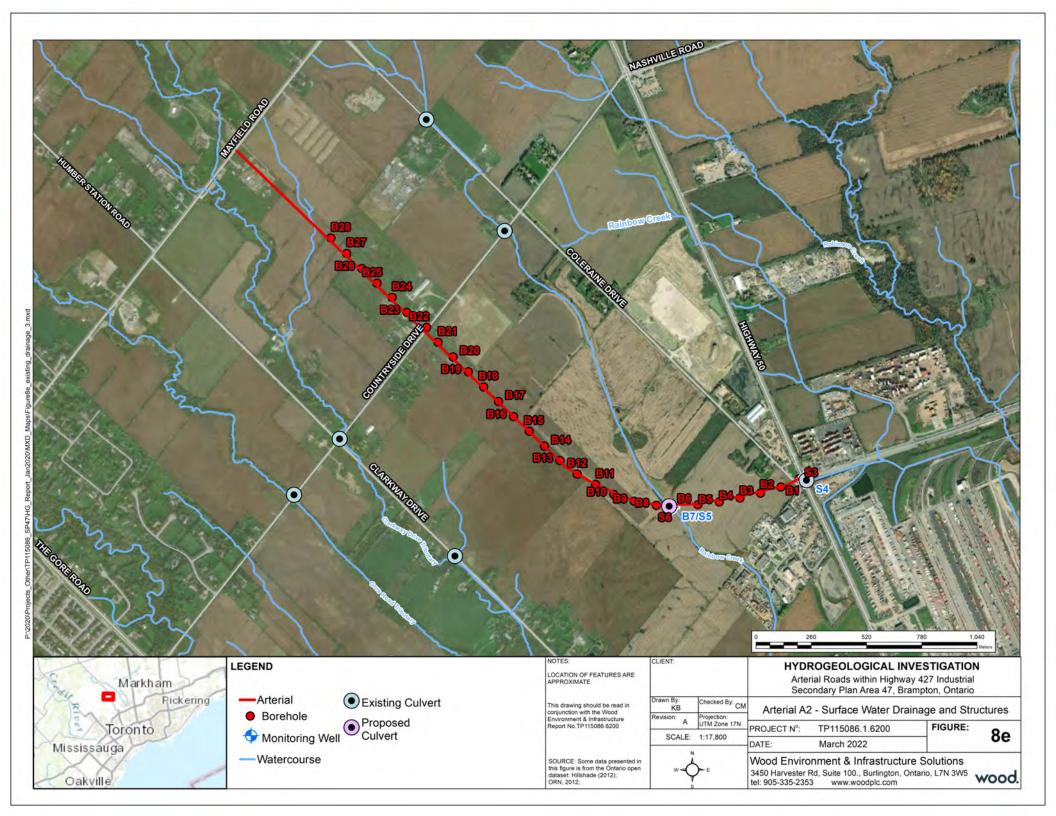


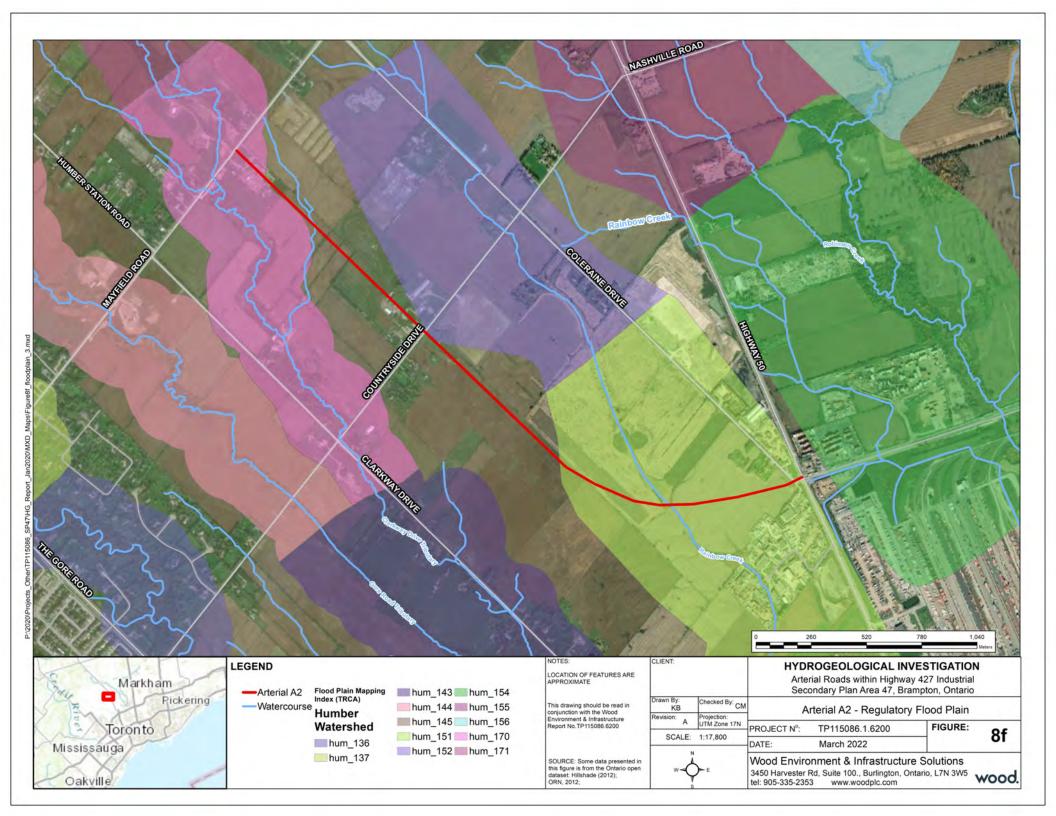


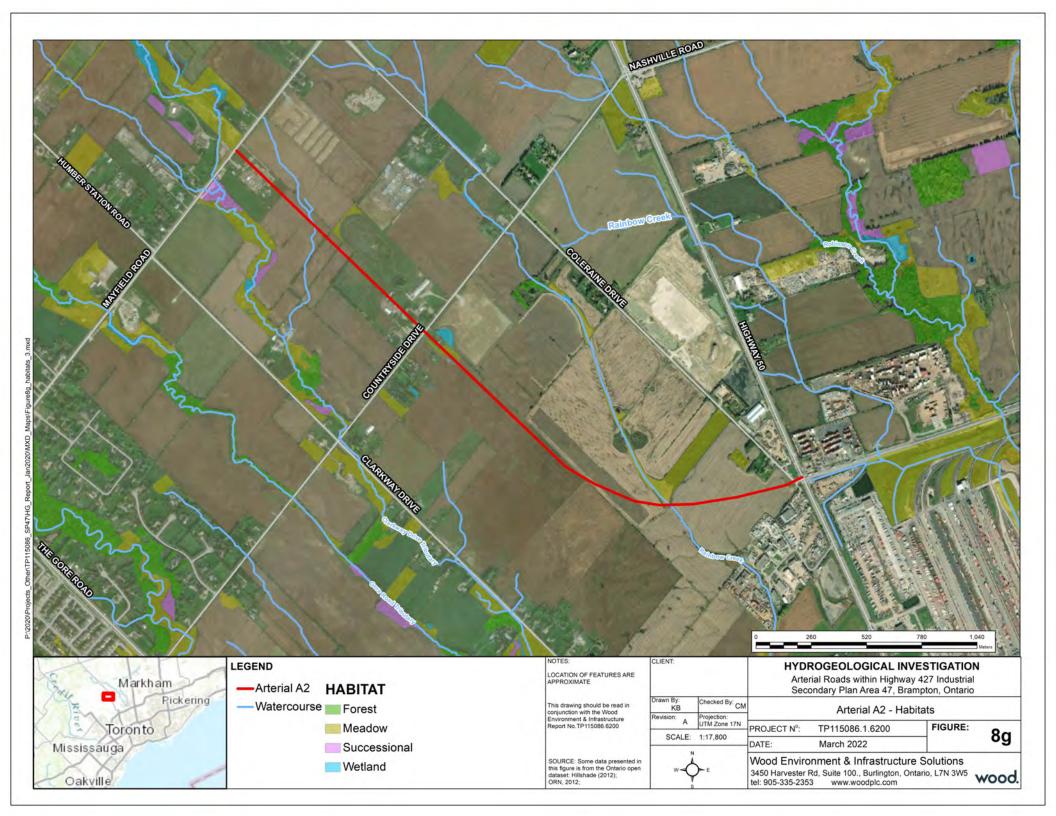


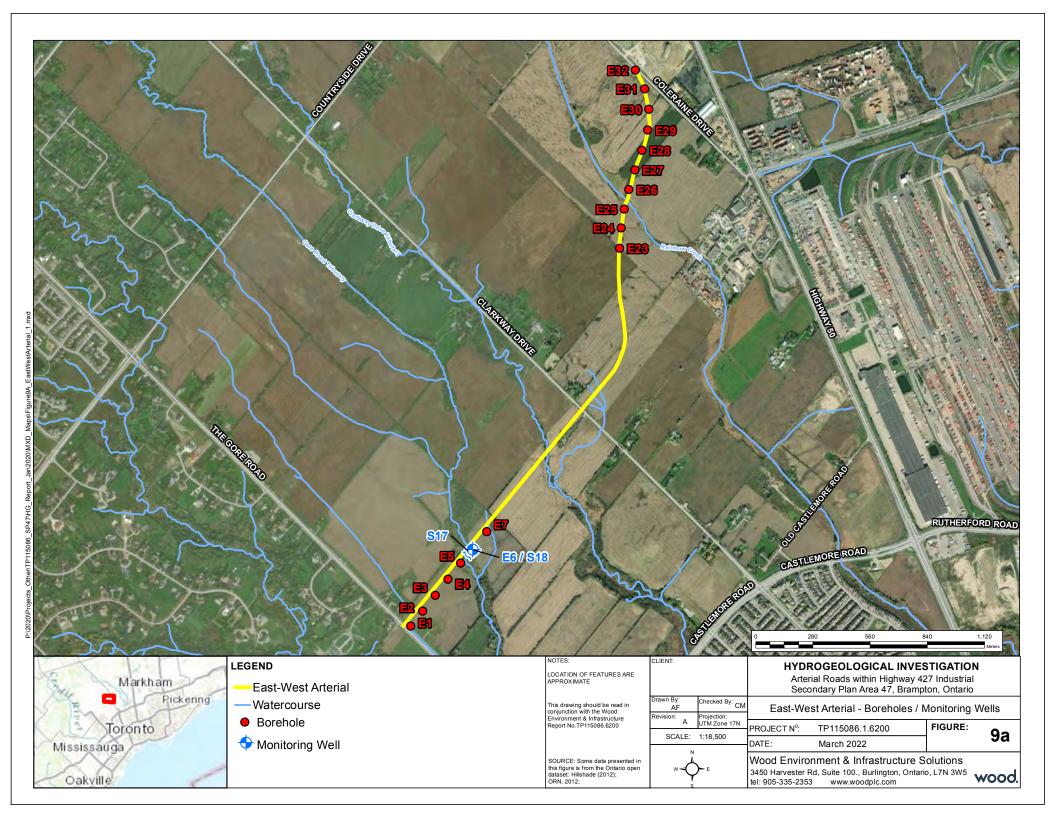


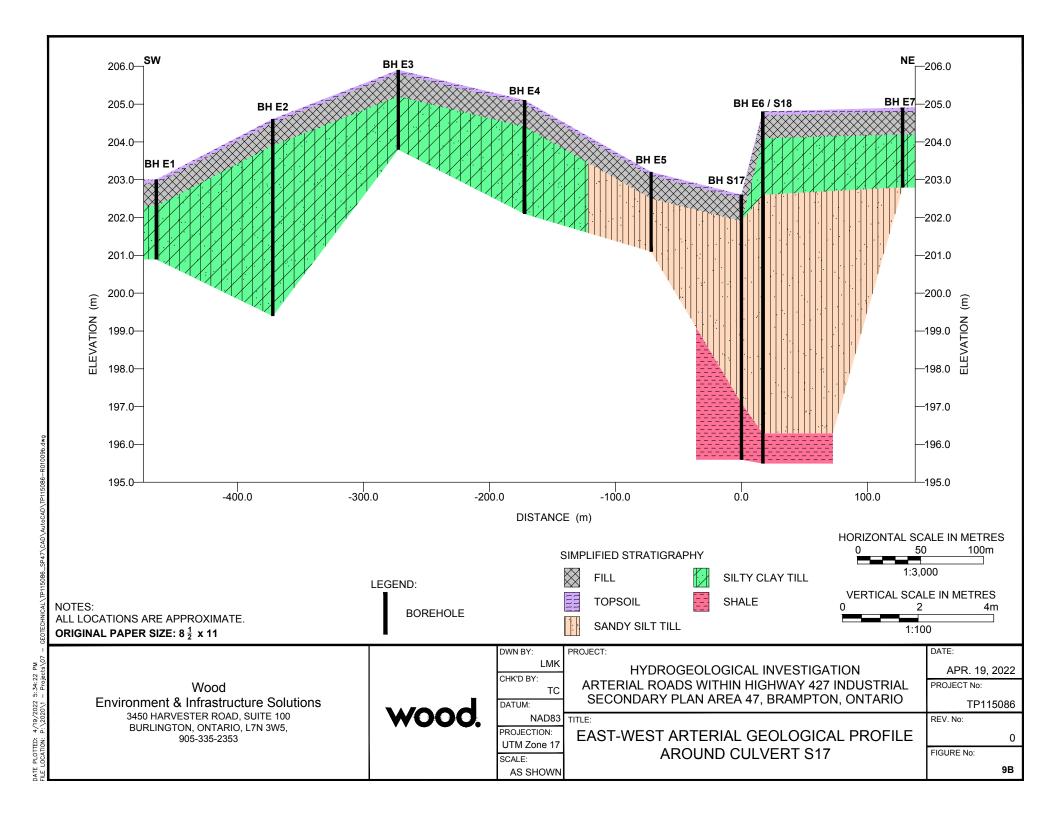


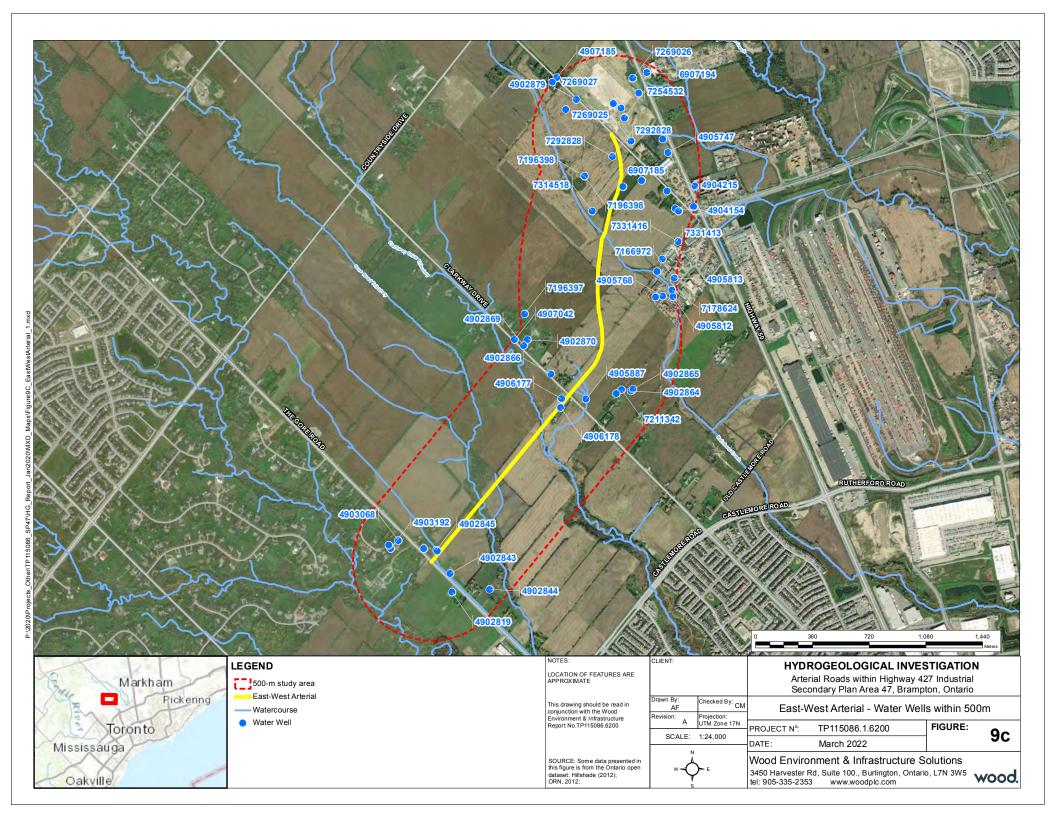


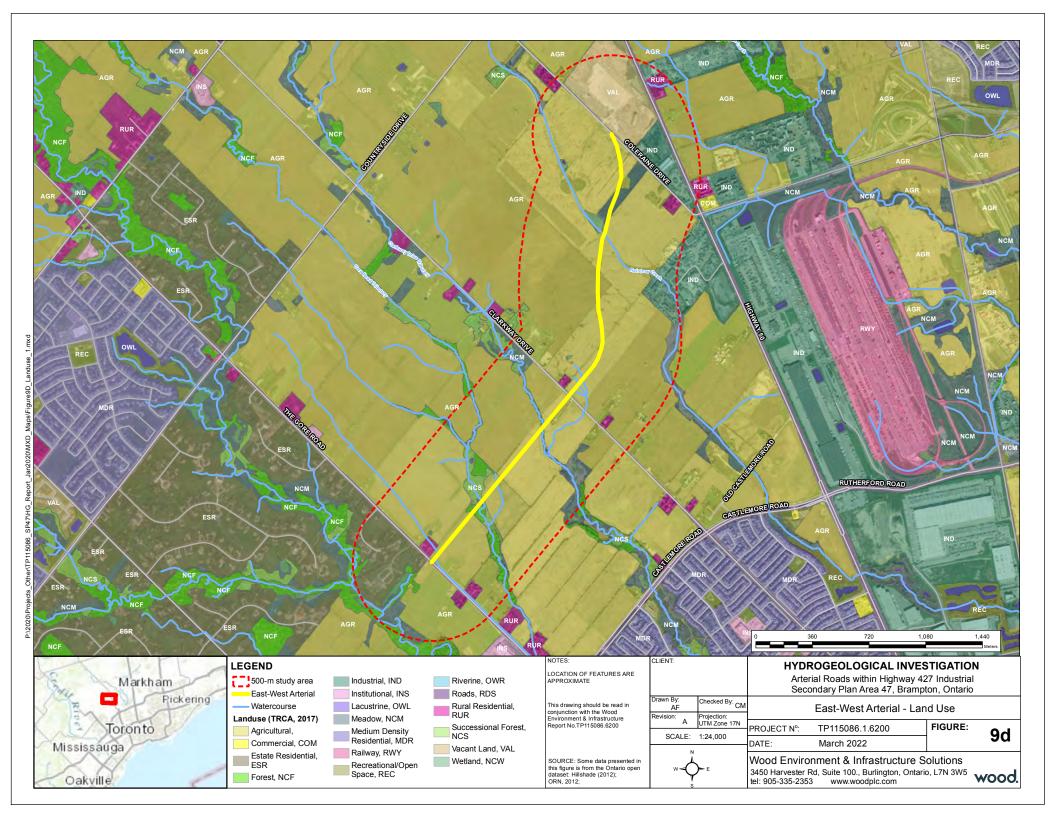


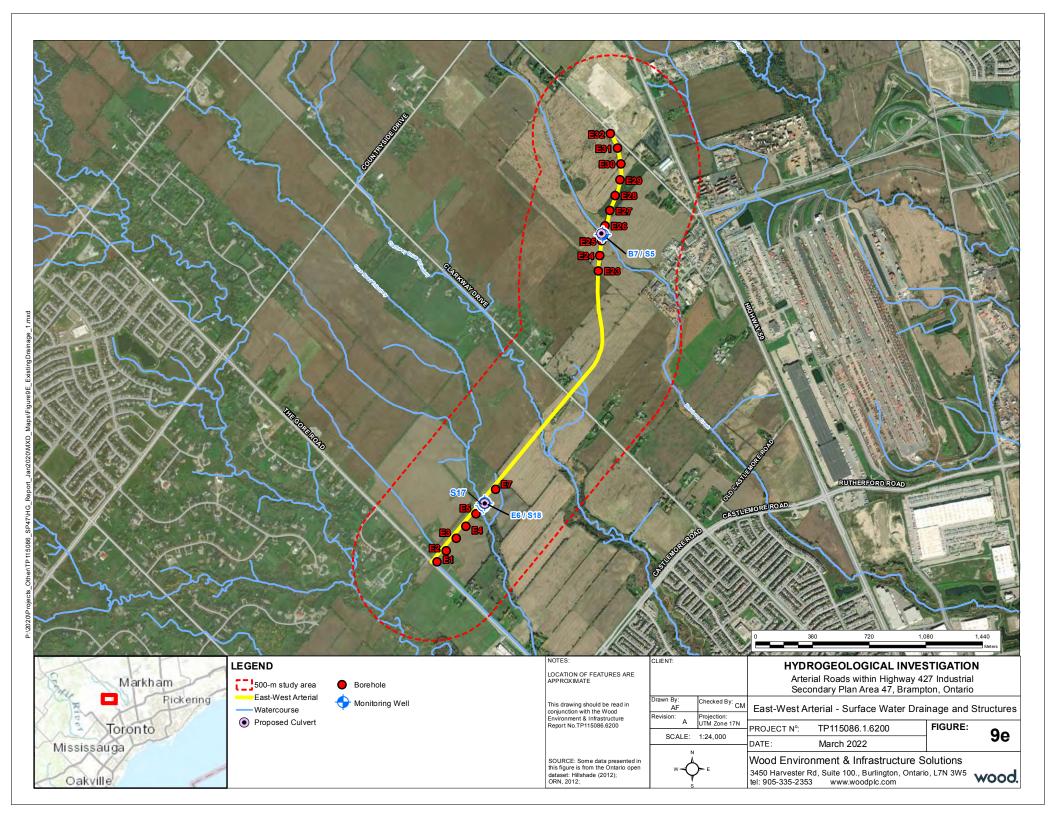


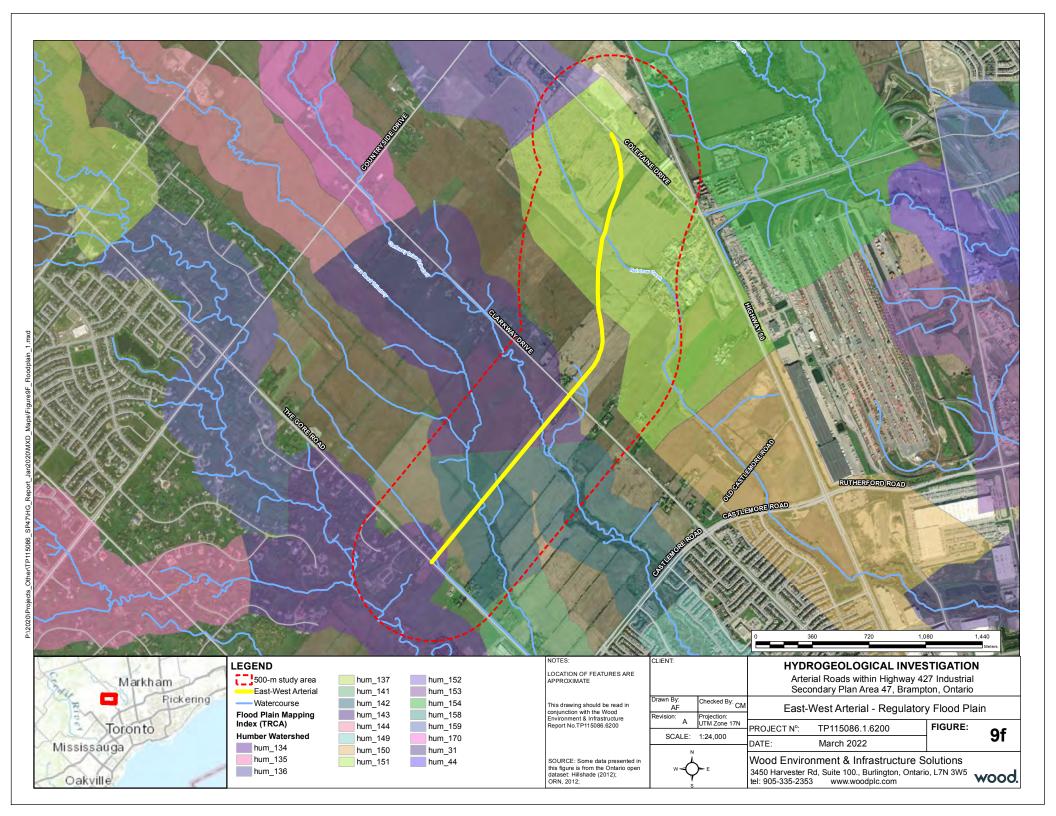


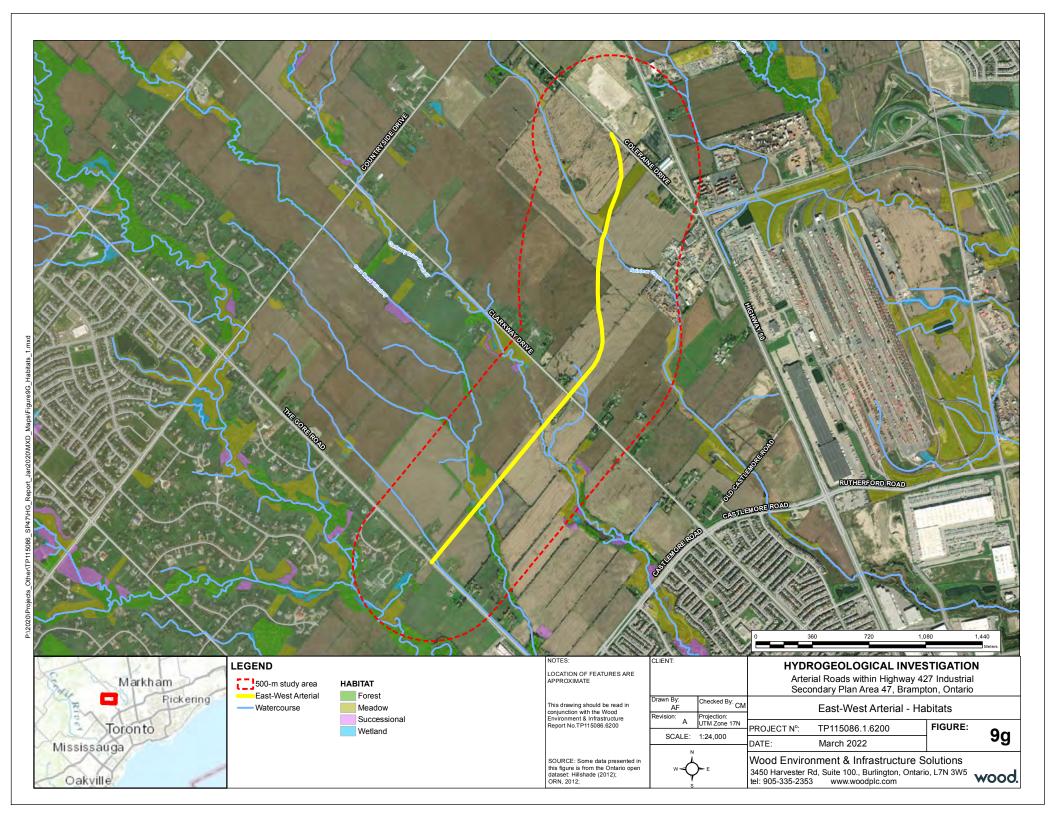












wood.

# Table 1 Monitoring Well Details and Groundwater Levels



Table 1: Monitoring Well Details and Groundwater Levels

Well Name	S	31	S	34	9	55	S	37	S	10	S	12	S	13	S	16	S	17
Screened Unit	oiltu	clay	silty	clay,	silty	clay,	silty	clay,	silty	clay,	silty	sand,	silty clay /	clayey silt,	silty	clay,	silty sand	/ sandy silt
Screened Offit	Silty	ciay	sand	ly silt	claye	ey silt	claye	ey silt	claye	ey silt	sand	y silt	silty sand	/ sandy silt	claye	ey silt	sh	ale
K (m/s)	1.2 >	<b>√</b> 10 <sup>-6</sup>	-	-	7.8 >	< 10 <sup>-9</sup>	4.0 >	< 10 <sup>-7</sup>	4.7 >	۲10 <sup>-8</sup>	2.9 ×	: 10 <sup>-8</sup>	8.1 >	10 <sup>-7</sup>	3.7 x	< 10 <sup>-9</sup>	1.1 :	< 10 <sup>-7</sup>
Ground Surface Elevation	22	2.8	24	0.6	20	9.3	24	7.8	24	3.8	21:	o E	24	0.2	24	3.1	20	2.6
(m AMSL)	22	2.8	21	0.6	20	9.3	21	7.0	21	3.0	21.	3.5	21	0.2	21	3.1	20	2.0
Stickup (m AGS)	-0.	.13	-	-	0.	66	-0.	.13	-0.	.14	-0.	80	-0.	.11	-0	.17	0.	87
Screen Top (m BGS)	6	.1	6	.1	6	.1	6	.1	6	.1	2	.7	4	.6	6	.1	3	.8
Screen Bottom (m BGS)	9	.2	9	.2	9	.2	9	.2	9	.2	5	.8	7	.7	9	.2	6	.9
Well Depth (m BGS)	0	.1			8	0	0	.2	0	2	5	-	7	.6	0	.2	0	.4
measured	9	. 1	•	-	0	.0	9	.2	9	.3	5	.5	7	.0	55	.2	0	.4
Date	WL	WL	WL	WL	WL	WL	WL	WL	WL	WL	WL	WL	WL	WL	WL	WL	WL	WL
Date	(m BGS)	(m AMSL)	(m BGS)	(m AMSL)	(m BGS)	(m AMSL)	(m BGS)	(m AMSL)	(m BGS)	(m AMSL)	(m BGS)	(m AMSL)	(m BGS)	(m AMSL)	(m BGS)	(m AMSL)	(m BGS)	(m AMSL)
24-Apr-20	1.80	221.00					1.72	216.08					1.17	209.03	3.08	210.02		
4-May-20	0.87	221.93	-	-	-0.68	209.98	1.71	216.09	0.90	212.90	1.44	212.06	1.39	208.81	3.22	209.88		
12-May-20	0.91	221.89	-	-	-0.49	209.79	1.87	215.93	1.04	212.76	1.50	212.00	1.41	208.79	3.16	209.94		
26-Jan-22			-														3.31	199.3

### NOTES:

m/s - metres per second m AMSL - metres above mean sea level

-- not measured

Screen tops and bottoms are from borehole logs.

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Appendix A
Borehole Logs

### **EXPLANATION OF BOREHOLE LOG**

This form describes some of the information provided on the borehole logs, which is based primarily on examination of the recovered samples, and the results of the field and laboratory tests. Additional description of the soil/rock encountered is given in the accompanying geotechnical report.

### **GENERAL INFORMATION**

Project details, borehole number, location coordinates and type of drilling equipment used are given at the top of the borehole log.

### **SOIL LITHOLOGY**

### Elevation and Depth

This column gives the elevation and depth of inferred geologic layers. The elevation is referred to the datum shown in the Description column.

## Lithology Plot

This column presents a graphic depiction of the soil and rock stratigraphy encountered within the borehole.

### Description

This column gives a description of the soil stratums, based on visual and tactile examination of the samples augmented with field and laboratory test results. Each stratum is described according to the *Modified Unified Soil Classification System*.

The compactness condition of cohesionless soils (SPT) and the consistency of cohesive soils (undrained shear strength) are defined as follows (Ref. Canadian Foundation Engineering Manual):

Compac	tness of
<u>Cohesionless</u> <u>Soils</u>	SPT N-Value
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	> 50

Consistency of	<u>Undrained</u>	Shear Strength
Cohesive Soils	<u>kPa</u>	<u>psf</u>
Very soft	0 to 12	0 to 250
Soft	12 to 25	250 to 500
Firm	25 to 50	500 to 1000
Stiff	50 to 100	1000 to 2000
Very stiff	100 to 200	2000 to 4000
Hard	Over 200	Over 4000

### Soil Sampling

Sample types are abbreviated as follows:

SS	Split Spoon	TW	Thin Wall Open (Pushed)	RC	Rock Core
AS	Auger Sample	TP	Thin Wall Piston (Pushed)	WS	Washed Sample

Additional information provided in this section includes sample numbering, sample recovery and numerical testing results.

### Field and Laboratory Testing

Results of field testing (e.g., SPT, pocket penetrometer, and vane testing) and laboratory testing (e.g., natural moisture content, and limits) executed on the recovered samples are plotted in this section.

### Instrumentation Installation

Instrumentation installations (monitoring wells, piezometers, inclinometers, etc.) are plotted in this section. Water levels, if measured during fieldwork, are also plotted. These water levels may or may not be representative of the static groundwater level depending on the nature of soil stratum where the piezometer tips are located, the time elapsed from installation to reading and other applicable factors.

### Comments

This column is used to describe non-standard situations or notes of interest.

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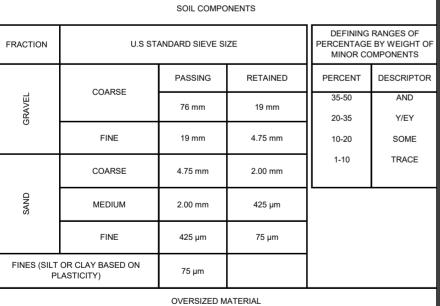
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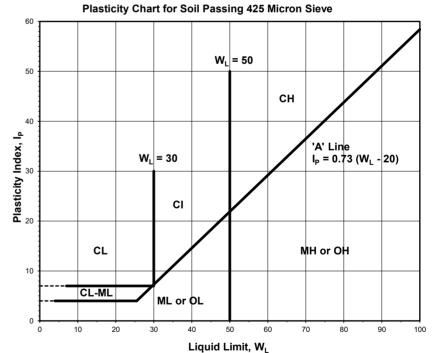
MODIFIED \* UNIFIED CLASSIFICATION SYSTEM FOR SOILS

\*The soil of each stratum is described using the Unified Soil Classification System (Technical Memorandum 36-357 prepared by Waterways Experiment Station, Vicksburg, Mississippi, Corps of Engineers, U.S Army. Vol. 1

March 1953.) modified slightly so that an inorganic clay of "medium plasticity" is recognized.

			March 1	953.) modified slightly so that an inorganic clay of "medium plasticity" is recognized.	
	MAJOR DIVISION		GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA
WEIGHT	THAN HALF RACTION 14.75mm	CLEAN GRAVELS	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	$C_u = D_{60} > 4$ ; $C_C = (D_{90})^2 = 1 \text{ to } 3$ $D_{10} D_{10} X D_{60}$
BY WEI	RAVELS MORE THAN HAL THE COARSE FRACTION LARGER THAN 4.75mm	(TRACE OR NO FINES)	GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
AN HALF	GRAVELS MORE THE COARSE F LARGER THAN	DIRTY GRAVELS (WITH SOME OR	GM	SILTY GRAVELS, GRAVEL-SAND- SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I LESS THAN 4
ORE TH, HAN 75µ	ō	MORE FINES)	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	ATTERBERG LIMITS ABOVE "A" LINE OR P.I MORE THAN 7
SOILS (MORE THAN HALF BY LARGER THAN 75µm)	AALLER	CLEAN SANDS (TRACE OR NO	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_u = \frac{D_{60}}{D_{10}} > 6; C_C = \frac{(D_{30})^2}{D_{10}} = 1 \text{ to } 3$
VAINED S	SANDS MORE THAN HALF THE COARSE FRACTION SMALLER THAN 4.75mm	FINES)	SP	POORLY GRADED GRAVELS, GRAVEL- SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
COARSE GRAINED L	MORE THAN	DIRTY SANDS (WITH SOME OR	SM	SILTY SANDS, SAND-SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I LESS THAN 4
° CO/		MORE FINES)	SC	CLAYEY SANDS, SAND-CLAY MIXTURES	ATTERBERG LIMITS ABOVE "A" LINE OR P.I MORE THAN 7
HT SMALLER	SILTS BELOW "A" LINE NEGLIGIBLE ORGANIC CONTENT	W <sub>L</sub> < 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	
BY WEIGHT	SILTS B NEGLIG C	W <sub>L</sub> > 50	МН	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS	CLASSIFICATION IS BASED UPON PLASTICITY CHART
ORE THAN HALF E THAN 75µm)	CLAYS ABOVE "A" LINE NEGLIGIBLE ORGANIC CONTENT	W <sub>L</sub> < 30	CL	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY OR SILTY CLAYS, LEAN CLAYS	(SEE BELOW)
AORE TH THAN	ABOVE GIBLE OI CONTEN	30 < W <sub>L</sub> < 50	CI	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS	
SOILS (N		W <sub>L</sub> > 50	СН	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
RAINED	FINE-GRAINED SOILS (MORE THA THA ORGANIC SLITS CLAYS ABOY & CLAYS ABOY NEGLIGIBLE "A" LINE CONT		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	WHENEVER THE NATURE OF THE FINES CONTENT HAS NOT
FINE-GI			ОН	ORGANIC CLAYS OF HIGH PLASTICITY	BEEN DETERMINED, IT IS DESIGNATED BY THE LETTER "F", E.G SF IS A MIXTURE OF SAND WITH SILT OR CLAY
	HIGH ORGANIC SOILS		Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOUR OR ODOUR, AND OFTEN FIBROUS TEXTURE





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ROUNDED OR SUBROUNDED: COBBLES 76 mm TO 200 mm BOULDERS > 200 mm

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wood.

NOT ROUNDED:

ROCK FRAGMENTS > 76 mm ROCKS > 0.76 CUBIC METRE IN VOLUME

Note 1: Soils are classified and described according to their engineering properties

Note 2: The modifying adjectives used to define the actual or estimated percentage range by weight of minor components are consistent with the Canadian Foundation Engineering Manual.

Project Number: TP115086				<b>o.</b>	<u>BH</u>	<u>A1</u>											W	00	d.
Pro	ject Number:	TP115086							Drilling	g Location:	Coleraine Dr N:4853212	., NBL, St	a. 0+000	E:605	646	L	ogged by:	MS	
Pro	ject Client:	City of Brampton							Drilling	g Method:	150 mm So	lid Stem A	Augers			c	compiled b	y: <b>PR</b>	
Pro	ject Name:	Arterial Road Network Secondary Plan Area (	within H	lighwa	y 427 l	Industr	rial		_ Drillino	g Machine:	Truck Mount	ed Drill				R	Reviewed b	oy: <b>SM/</b> [	OP
Pro	ject Location:								_ Date \$	Started:	Jan 21, 2020	Date	Comple	ted: <u>Ja</u> ı	n 21, 20	<b>20</b> R	Revision N	o.: <u>0, 12</u>	2/1/20
	LITH	OLOGY PROFILE		SC	IL SA	MPLI	NG			FIELD	TESTING		TESTI						
							(%)				tionTesting	▲ COV (LE		OV (LEL)	NOIT		COMM &		
ĕ		DESCRIPTION		e	mber	(%	00 (%		E z	O SPT   MTO Vane*	PPT • DCPT Nilcon Vane*	△ COV (pr	4 6 om) □ T	OV (ppm)	FION		GRAIN	SIZE	
ogy P				le Ty	le Nu	/ery (	Z Z	<u>E</u>	ATIO	△ Intact ▲ Remould	<ul> <li>♦ Intact</li> <li>♦ Remould</li> </ul>	W <sub>P</sub>	00 300 W	400 W <sub>L</sub>	SUME VLLA		DISTRIB (%		
Lithology Plot	Goodatic Ground 9	Surface Elevation: 215.5 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	<b>DEPTH</b> (m)	ELEVATION	* Undrained She	ear Strength (kPa)	Plastic 20	40 60	Liquid 80	INSTRUMENTATION INSTALLATION	GR	SA	SI	CL
~	al	bout 180 mm ASPHALT	215.3	-7				-											
$\overset{\sim}{\otimes}$	\	Sand and Gravel FILL moist	21 <b>5.2</b> 0.3					+	045										
₩	tro	dark grey/brown Silty Clay FILL ace gravel, trace organics		SS	1	100	10	Ē	215 -	0		25							
₩	ua	ice graver, trace organics						<u> </u>											
$\bowtie$				SS	2	83	25	ļ '				14							
$\bowtie$			214.0					_	214 -			14							
		brown/grey SILTY CLAY TILL	1.5					-											
	t	race sand, trace gravel very stiff to hard		SS	3	100	37	_ _ 2				18							
								Ė											
		cobbles/boulders		00		00	27	-	213 -	1									
				SS	4	83	37			0		14							
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 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD OF BOREHOLE N	<b>o.</b>	BH A	<u>A2</u>								wood.
Pro	oject Number: TP115086						Drilling	Location:	Coleraine Dr. N:4853213	, NBL, Sta. 0+000 E:60	648	Logged by: MS
Pro	eject Client: City of Brampton						Drilling	Method:	150 mm Soli	d Stem Augers		Compiled by: PR
Pro	oject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	lighwa	y 427 I	ndustr	ial		Drilling	Machine:	Truck Mounte	ed Drill		Reviewed by: SM/DP
Pro	oject Location: Brampton, Ontario						Date S	Started:	Jan 21, 2020	Date Completed: Ja	n 21, 202	20 Revision No.: 0, 12/1/20
	LITHOLOGY PROFILE	SC	IL SA	MPLI	NG			FIELD	resting	LAB TESTING Soil Vapour Reading		
Jot	DESCRIPTION	фе	ımber	(%)	(%)	(c)	(E) NO		PPT • DCPT	△ COV (LEL) ■ TOV (LEL) 2 4 6 8 △ COV (ppm) □ TOV (ppm) 100 200 300 400	NSTRUMENTATION NSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION
Lithology Plot	Geodetic Ground Surface Elevation: 215.4 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	<b>DEPTH</b> (m)	ELEVATION	△ Intact ▲ Remould  * Undrained She 20 40	<ul> <li>Intact</li> <li>Remould</li> <li>ar Strength (kPa)</li> <li>60</li> <li>80</li> </ul>	W <sub>P</sub> W W <sub>L</sub> ■ Eliquid 20 40 60 80	INSTRUM INSTALLA	<b>(%)</b> GR SA SI CL
	Sand and Gravel FILL moist	SS	1	100	61	-						Ground frozen to about 300 mm below surface
$\overset{\circ}{\Longrightarrow}$	214.9 dark grey/brown 0.5		·		•	-	215 -					
	Silty Clay FILL trace sand, trace gravel, with oxidation	SS	2	100	10	- - - - 1	-	0	as			
	brown 1.2 SILTY CLAY / CLAYEY SILT TILL trace sand, tarce gravel	SS	3	100	29	- - -	214 -	0				
<i>XX</i>	very stiff 213.5  END OF BOREHOLE 1.8					_	-				.	

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada Tel. No.: (905) 415-2632 www.woodplc.com

N:4853330														ood.		
Proj	ject Number:	TP115086							Drilling	Location:		r., SBL, Sta.	0+150 E:605	516	Logged by:	MS
Proj	ject Client:	City of Brampton							Drilling	g Method:	150 mm So	lid Stem Au	gers		Compiled by:	PR
Proj	ject Name:	Arterial Road Network v Secondary Plan Area (A	within H	lighwa	y 427 l	Industr	ial		Drilling	g Machine:	Truck Mount	ted Drill			Reviewed by:	SM/DP
Proj	ject Location:	Brampton, Ontario	uea 41)						Date 9	Started:	Jan 21, 2020	Date C	completed: <u>Jar</u>	n 21, 2020	Revision No.:	0, 12/1/20
	LITH	OLOGY PROFILE		SC	IL SA	MPLI	NG			FIELD	TESTING		ESTING			
Lithology Plot		DESCRIPTION  urface Elevation: 216.3 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	ear Strength (kPa)	△ COV (LEL)  2 4  △ COV (ppm  100 200	W W <sub>L</sub>	INSTRUMENTATION INSTALLATION	COMMEN & GRAIN SI DISTRIBUT (%)	ZE
***	ak	out 200 mm ASPHALT Sand and Gravel FILL	216.1 21 <b>6.0</b>					-								
		moist dark grey/brown Silty Clay FILL ce gravel, trace organics	21 <b>6.0</b> 0.3	SS	1	50	9	-	216 -	0		29				
				ss	2	100	12	- 1 - - -	215 -	0		o 26				
				SS	3	100	7	- - - - - 2		0		o 22				
		brown  CLAY / CLAYEY SILT TILL  ace sand. trace gravel  very stiff	214.0 2.3			400		- - - - - - - - - - -	214 <del>-</del> 214 -							
		vory out	213.3	SS	4	100	21	- 3	Z . = .	0	· · · · · · · · · · · · · · · · · · ·	14			3 18	52 27

 $\frac{\nabla}{2}$  Groundwater encountered on completion of drilling on  $\frac{1/21/2020}{2}$  at a depth of:  $\frac{2.7 \text{ m}}{2}$ .

R	ECORD	OF BOREHOLE	No.	<u>BH</u>	<u> A5</u>								WC	od.
Pro	ject Number:	TP115086						Drilling	g Location:	Coleraine Dr., N:4853441	, NBL, Sta. 0+300 E:605	108	Logged by:	<u>MS</u>
	ject Client:	City of Brampton							g Method:	150 mm Soli	d Stem Augers			PR
	ject Name:	Arterial Road Network within Secondary Plan Area (Area 4	n Highwa 17)	ay 427	Industr	ial			g Machine:	Truck Mounte			Reviewed by:	
Pro	ject Location:	Brampton, Ontario						Date S	Started:	Jan 21, 2020	Date Completed: <u>Jar</u>	21, 2020	Revision No.:	0, 12/1/20
	LITH	OLOGY PROFILE	S	DIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading	_	00141511	
Lithology Plot		DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould  * Undrained She	PPT ● DCPT  Nilcon Vane*  ◇ Intact ◆ Remould  ear Strength (kPa)	△ COV (LEL) ■ TOV (LEL) 2 4 6 8 △ COV (ppm) □ TOV (ppm) 100 200 300 400    W <sub>P</sub> W W <sub>L</sub>   Plastic Liquid	INSTRUMENTATION INSTALLATION  D	COMMENT & GRAIN SIZ DISTRIBUTI (%)	ZE
	Geodetic Ground S	out 200 mm ASPHALT	.3	0)	<u> </u>	0)	-	, ш	20 40	60 80	20 40 60 80	==   -		
$\overset{\times\!\!\!\times}{\times}$		Sand and Gravel FILL 216 moist 0	.2				Ē							
	tra	brown Silty Clay FILL ce gravel, trace organics	ss	1	79	12	- - - - - - 1	216 -	0	28				
	SILTY	CLAY / CLAYEY SILT TILL race sand, trace gravel 215	.2	2	100	18		215 —	0	<b>a</b>				
		very stiff 1 END OF BOREHOLE	J											
	od ESIS a Divia													

 $\frac{\textstyle \bigvee}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	RECORD OF BOREHOLE No. BH A7																		1	<b>NC</b>	00	<b>d</b> .	
Pro	ject Number:	TP115086							Drilling	g Locatio	n:	Cole	raine Di 53491	r., SBL,	Sta. 0	+450	E:605	353	L	ogged	by:	MS	
Pro	ject Client:	City of Brampton							Drilling	Method	1:			lid Sten	n Aug	ers			(	Compile	d by:	PR	
Pro	ject Name:	Arterial Road Network	within H	lighwa	y 427 I	ndustr	ial		Drilling	g Machin	e:	Truc	k Mount	ted Drill					F	Reviewe	ed by:	SM/DP	
Pro	ject Location:	Secondary Plan Area ( Brampton, Ontario	Area 47)						Date 9	Started:		Jan 2	21, 2020	Da	te Co	mple	ted: <u>Ja</u> ı	n 21, 20	<b>20</b> F	Revision	n No.:	0, 12/1	/20_
	LITH	IOLOGY PROFILE		SC	IL SA	MPLI	NG			FIE	LD T	EST	ING		<b>B TE</b>								
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT  MTO Va  △ Intact  ▲ Rem	□ F ane* i ould	Nilcoi ♦ In	DCPT  n Vane*	△ COV 2 △ COV 100 W <sub>P</sub> ■ Plasti 20	(LEL) 4 (ppm) 200 W	■ To 6	OV (LEL) 8	INSTRUMENTATION INSTALLATION	GR	GRA DISTE	(%)	ZE ION	CL
	a	Surface Elevation: 218.2 m bout 180 mm ASPHALT	218.0	0)	0)		0)	-	218 -	20	-40		:	2,0	-40		:						
$\overset{\infty}{\approx}$	h	Sand and Gravel FILL moist	21 <b>0.2</b> 0.3					E															
		dark grey Silty Clay FILL trace gravel	217.2	SS	1	75	11	-		0				8									
	SILTY	brown / CLAY / CLAYEY SILT TILL trace sand, trace gravel very stiff		SS	2	100	20	- 1 - - -	217 -	0				3									
<u> XX</u>		END OF BOREHOLE	216.6 1.5					-	-		-												
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 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD OF BOREHOLE N	<u>BH</u>	<u> 88</u>								WO	od.	
Pro	oject Number: TP115086						Drilling	Location:	Coleraine Dr.	., SBL, Sta. 0+450 E:605	353		MS
Pro	oject Client: City of Brampton						Drilling	Method:	N:4853490 150 mm Sol	lid Stem Augers		_ Compiled by:	PR
Pro	oject Name: Arterial Road Network within I Secondary Plan Area (Area 47	Highwa	ay 427 I	ndustr	ial		Drilling	Machine:	Track Mount	ted Drill		_ Reviewed by:	SM/DP
Pro	oject Location: Brampton, Ontario	,					Date S	started:	Jan 23, 2020	Date Completed: <u>Jar</u>	23, 2020	_ Revision No.:	0, 12/1/20
	LITHOLOGY PROFILE	SC	OIL SA	MPLI	NG			FIELD 1	TESTING	LAB TESTING			
,	DESCRIPTION	0	lber	<u></u>	SPT 'N' / RQD (%)		(E)	O SPT 🗆	ionTesting PPT ● DCPT	Soil Vapour Reading  ▲ COV (LEL) ■ TOV (LEL)  2 4 6 8  △ COV (ppm) □ TOV (ppm)	INSTRUMENTATION INSTALLATION	COMMENT & GRAIN SIZ	E
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	- RG	DЕРТН (m)	ELEVATION	MTO Vane*  △ Intact  ▲ Remould	Nilcon Vane*  ◇ Intact  ◆ Remould	100 200 300 400 W <sub>L</sub>	CLAT	DISTRIBUTION (%)	ON
Lithok	Geodetic Ground Surface Elevation: 217.9 m	Samp	Samp	Recov	SPT 'I	DEPT	ELEV	* Undrained She	ear Strength (kPa)	Plastic Liquid 20 40 60 80	INSTE INSTA	GR SA S	I CL
	Sand and Gravel FILL trace organics					-	-						
₩	moist 217.5 brown 0.5	SS	1	100	14	-	-	0	a				
$\bowtie$	Silty Clay FILL trace gravel					-	=						
$\bowtie$		SS	2	83	8	- 1	217 —	0		<b>.</b>			
	216.7 brown 1.2					E	=						
	SILTY CLAY / CLAYEY SILT TILL trace sand, trace gravel very stiff	SS	3	25	20	-	-			<b>3</b> · · · · · · · · · · · · · · · · · · ·			
	216.1 END OF BOREHOLE 1.8					-							
	I .	1	1	1	1	1		1			- 1		

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada Tel. No.: (905) 415-2632 www.woodplc.com

K	ECORD	No.	. <u>I</u>	<u>BH</u> .	<u> </u>									wood.	
Pro	ject Number:	TP115086							Drilling	g Location:	Coleraine E N:4853597	Or., NBL, S	ta. 0+600 E:60	5252	Logged by: MS
Pro	ject Client:	City of Brampton							Drilling	g Method:	150 mm S	olid Stem /	Augers		Compiled by: PR
Pro	ject Name:	Arterial Road Network wit Secondary Plan Area (Are	hin Higi a 47)	hwa	y 427 I	ndustr	rial		Drilling	g Machine:	Truck Mou	nted Drill			Reviewed by: SM/DP
Pro	ject Location:		,						Date 9	Started:	Jan 21, 202	.0Date	Completed: Ja	an 21, 202	20 Revision No.: 0, 12/1/20
	LITH	OLOGY PROFILE		so	IL SA	MPLI	NG			FIELD	TESTING		TESTING		
olot		DESCRIPTION		/be	umber	(%)	SPT 'N' / RQD (%)	e e	(m) NC	○ SPT □ MTO Vane*	ationTesting  PPT ● DCPT  Nilcon Vane*	T	/apour Reading EL) ■ TOV (LEL) 4 6 8 pm) □ TOV (ppm 200 300 400	J ⊱z I	COMMENTS & GRAIN SIZE DISTRIBUTION
Lithology Plot			'	Sample Type	Sample Number	Recovery (%)	PT 'N' T	<b>DEPTH</b> (m)	ELEVATION	<ul> <li>△ Intact</li> <li>▲ Remould</li> <li>* Undrained Sh</li> </ul>	<ul> <li>Intact</li> <li>Remould</li> </ul> ear Strength (kPa)	W <sub>P</sub> ■ Plastic	W W <sub>L</sub> → Liquid	ISTRUM	(%)
	Geodetic Ground S	Surface Elevation: 219.1 m bout 190 mm ASPHALT	218.9	ΰ	Ø	ď	Ø	_	219 -	20 40	60 80	20	40 60 80	==	GR SA SI CL
XXX XXX	<b>\</b>	Sand and Gravel FILL 2 moist	21 <b>6.2</b> 0.3					+		ļļ					
		dark grey/dark brown Silty Clay FILL trace gravel	218.2	ss	1	75	10	- - - -	-	0		a o 13			
	SILTY trace sa	brown/grey ' CLAY / CLAYEY SILT TILL ind, trace gravel, trace cobbles very stiff to hard	0.9	SS	2	63	21	- 1 - - - -	218 -	0		17			
			5	SS	3	100	72	- - - - 2	217 -		0	12			
			5	ss	4	100	44	-			)	as °13			
			5	ss	5	100	66	3	216 -		0	a o 13			
		grey		SS	6	100	34	- - - - 4	215 —	0		® °11			
			-					-							
		2	214.1	SS	7	100	33	- 5				<b>a</b> ○ <sub>11</sub>			
CV AZ		END OF BOREHOLE	5.0					5							

 $\frac{\textstyle \sum}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD	OF BOREHOL	E No	o. <u>l</u>	BH A	<u> A10</u>									W	ood.
Pro	ject Number:	TP115086							Drilling	Location:	Coleraine Dr.	, NBL, Sta.	0+600 E:605	253	Logged by:	MS
Pro	ject Client:	City of Brampton							Drilling	g Method:	N:4853600 150 mm Sol	id Stem Au	gers		Compiled by:	PR
Pro	ject Name:	Arterial Road Network w Secondary Plan Area (A	vithin H	ighwa	y 427 l	ndustr	ial		Drilling	g Machine:	Track Mounte	ed Drill			Reviewed by:	SM/DP
Pro	ject Location:	Brampton, Ontario	uca 41)						Date S	Started:	Jan 23, 2020	Date C	completed: <u>Jar</u>	1 23, 2020	Revision No.:	0, 12/1/20
	LITH	OLOGY PROFILE		SO	IL SA	MPLI	NG			FIELD	TESTING		ESTING our Reading			
Lithology Plot		DESCRIPTION  urface Elevation: 219.0 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane* △ Intact ▲ Remould	Nilcon Vane*	△ COV (LEL)  2 4  △ COV (ppm  100 200	TOV (LEL) 6 8 1 TOV (ppm) 300 400  W WL Cliquid	INSTRUMENTATION	GRAIN SI DISTRIBUT (%)	ZE
	\	Sand and Gravel FILL some topsoil moist brown/grey	218.8 0.2	SS	1	100	8	-	-	0					27 60	(13)
		Silty Clay FÍLL trace gravel	-	SS	2	83	12	- - - - - - 1	218 —	0						
		brown CLAY / CLAYEY SILT TILL race sand, trace gravel	217.8 1.2	SS	3	83	24	- ' - - - -	210 - - - -	0						
<b>3</b> 3		very stiff  END OF BOREHOLE	217.2 1.8					-	-							
						<u> </u>	1				1 1	: :	1 1			

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

Project Client: City of Brampton Drilling Method: N:4853720 150 mm Solid Stem Augers Compiled Project Name: Project Name: Secondary Plan Area (Area 47) Project Location: Brampton, Ontario    Drilling Method: Truck Mounted Drill Reviewed Secondary Plan Area (Area 47)   Date Started: Jan 21, 2020 Date Completed: Jan 21, 2020 Revision Note that the project Location Penetration Testing Penetration Testing CoV (LEL) COV (DRIVE) COV (DRIVE	<b>/00</b> d.	WC								•	<u> A11</u>	BH_	<b>o.</b>	D OF BOREHOLE N	RECORD
Project Client: City of Brampton  Drilling Method: 150 mm Solid Stem Augers  Compiled Sacondary Plan Area (Area 47)  Project Location: Brampton, Ontario  Drescription  Description  Descri		Logged by:	117	0+750 E:605	., SBL, Sta.	Coleraine Dr	g Location:	_ Drilling						er: <b>TP115086</b>	Project Number
Project Location   Brampton, Ontario   Date Started:   Jan 21, 2020   Date Completed:   Jan 21, 2020   Revision N	by: PR	Compiled by:		gers	id Stem Au		g Method:	_ Drilling						City of Brampton	Project Client:
Date Started:   Jan 21, 2020   Date Completed:   Jan 21, 2020   Revision N	by: SM/DP	Reviewed by:			ed Drill	Truck Mount	g Machine:	_ Drilling		rial	Industi	y 427	lighwa	Arterial Road Network within I	Project Name:
DESCRIPTION	No.: <u>0, 12/1/20</u>	Revision No.:	1 21, 202	ompleted: <b>Ja</b>	Date C	Jan 21, 2020	Started:	_ Date S						on: Brampton, Ontario	Project Location
DESCRIPTION				ESTING	LAB T	TESTING	FIELD			NG	MPLI	IL SA	SC	THOLOGY PROFILE	LITI
Sand and Gravel FilL	& N SIZE BUTION	COMMENT & GRAIN SIZ DISTRIBUTI (%)	NSTRUMENTATION NSTALLATION	TOV (LEL)  6 8  1 TOV (ppm)  300 400  W WL  Liquid	△ COV (LEL)  2 4  △ COV (ppm 100 200  W <sub>P</sub> Plastic	tionTesting  PPT	Penetra ○ SPT □  MTO Vane* △ Intact ▲ Remould * Undrained Sh		DEPTH (m)					DESCRIPTION	thology Plot
Moist   0.3					2,0 4,0	: :	20 40		-	0)		0)	0)	about 200 mm ASPHALT 219.7	
SILTY CLAY / CLAYEY SILT TILL trace sand, trace gravel, cobbles/boulders stiff to hard  SS 2 58 14					o 24		0	219 —	+ - - - -	12	25	1	SS	moist 0.3 dark grey Silty Clay FILL gravel, trace organics, trace cobbles 219.0	trace gra
SS 4 100 38 217 — 0 8 0 <sub>14</sub>					1 0		0	-	1 	14	58	2	SS	LTY CLAY / CLAYEY SILT TILL sand, trace gravel, cobbles/boulders	SILT trace sal
216.8					14		0	218 -	- - - 2 -	28	83	3	SS		
END OF BOREHOLE 3.0					¹ °0 14		0	217 —	- - - - - - - 3	38	100	4	SS		

 $\frac{\textstyle \sum}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

	ECORD  oject Number:	OF BOREHOL	E No	<b>).</b>	BH.	<u>A13</u>	•		Deili:	a Location:	Coloraina D	, NDI 940 0±000 F.000	:one	wood.
	oject Number:	City of Brampton								g Location: g Method:	N:4853836	., NBL, Sta. 0+900 E:609 lid Stem Augers	0006	Logged by: MS Compiled by: PR
	oject Name:	Arterial Road Network w	ithin H	inhwa	v 427	Industi	rial			Machine:	Truck Mount	-		Reviewed by: SM/DP
	-	Secondary Plan Area (Ar Brampton, Ontario	rea 47)	giiwa	y	maaot			- '	Started:	Jan 21, 2020		n 21, 2020	
	LITH	OLOGY PROFILE	- 1	90	NI SV	MPLI	NG			FIEI D	TESTING	LAB TESTING		
	LIII	OLOGI FROFILE		30	IL SP	AIVIF LI				Penetra	ationTesting	Soil Vapour Reading  ▲ COV (LEL) ■ TOV (LEL)	NOI	COMMENTS &
Lithology Plot	Geodetic Ground S	DESCRIPTION  Surface Elevation: 220.2 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	MTO Vane* △ Intact ▲ Remould	<ul> <li>♦ Intact</li> <li>♦ Remould</li> </ul> ear Strength (kPa)	2 4 6 8 Δ COV (ppm) □ TOV (ppm) 100 200 300 400 W <sub>p</sub> W W <sub>t</sub> B → Plastic Liquid 20 40 60 80	INSTRUMENTATION INSTALLATION	GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL
<b>***</b>	al	bout 200 mm ASPHALT Sand and Gravel FILL	220.0 21 <b>9.9</b>					-	220 -					
	\	moist dark grey/grey Silty Clay FILL nd, trace gravel, trace organics	21 <b>9.9</b> 0.3	SS	1	67	9	- - - -		0		3		
			218.6	SS	2	83	14	- - - - - -	219 -	0		3		
		brown  CLAY / CLAYEY SILT TILL sand to sandy, trace gravel, cobbles/boulders hard	1.5	SS	3	100	36	- 2		O-		1		
			217 <u>.9</u> 2.3					- 7	218 -					
		SILTY SAND trace clay, trace gravel very dense wet	217.3	SS	4	100	82		Z : = :		0	3		
11.11.		END OF BOREHOLE	2.9											
Wo	od E&IS, a Divis	ion of Wood							:::::::::::::::::::::::::::::::::::::::	1/04/0000 -4 -	donth of: 2.4 m			

Canada Limited

R	ECORD	OF BOREHOL	E No	o. <u> </u>	BH	<u> A15</u>											W	00	d.
Pro	oject Number:	TP115086							Drilling	g Location:	Coleraine I	)r., S	SBL, Sta.	1+050 E:60	4898		Logged by:	MS	<b>—</b>
Pro	oject Client:	City of Brampton							Drilling	g Method:	N:4853934 150 mm S	olid	Stem Aug	jers			Compiled by	: <u>PR</u>	
Pro	oject Name:	Arterial Road Network v	vithin H	ighwa	y 427 I	ndustr	ial		Drilling	g Machine:	Truck Mou	nted	l Drill				Reviewed by	: <u>SM/I</u>	DP
Pro	oject Location:	Secondary Plan Area (A Brampton, Ontario	rea 47)						Date S	Started:	Jan 22, 202	:0	Date Co	ompleted: Ja	n 22, 20	20	Revision No.	: <u>0, 12</u>	2/1/20
	LITH	OLOGY PROFILE		SC	IL SA	MPLII	NG			FIELD	TESTING			ESTING ur Reading			0011115	NTO	
					_		(%)		(E)		rationTesting  ☐ PPT ● DCP	_	COV (LEL)	■ TOV (LEL) 6 8	INSTRUMENTATION		COMME &		
Jot		DESCRIPTION		фе	Sample Number	(%)	SQD (	<u> </u>		MTO Vane	e* Nilcon Vane	Δ		□ TOV (ppm) 300 400	TION		GRAIN S DISTRIBL		
Lithology Plot				Sample Type	Se N	Recovery (%)	'N' / RQD	DEРТН (m)	ELEVATION	△ Intact ▲ Remould	<ul><li>♦ Intact</li><li>♦ Remould</li></ul>		W <sub>P</sub> V		RUM		(%)	,,,,	
Litho	Geodetic Ground §	Surface Elevation: 221.5 m		Sam	Sam	Reco	SPT	DEP	ELE		Shear Strength (kPa) 40 60 80		Plastic 20 40	Liquid 60 80	INST	GR	SA	SI	CL
<b>-</b> ≟:	al	out 190 mm ASPHALT out 110 mm CONCRETE	221.3 22 <b>0.2</b>					-						: :					
$\otimes$	<b>₹</b>	dark grey Silty Clay FILL	0.3					Ė	221 -						1				
$\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\mathsf{$	tra	ce gravel, trace organics		SS	1	46	10	-				a							
X	SUTV	brown CLAY / CLAYEY SILT TILL	220.6 0.9					- - 1	-						1				
	SILIT t	race sand, trace gravel firm to stiff	220.0	SS	2	100	8			0		<b>a</b>							
<i>X</i> / <i>y</i>	1	END OF BOREHOLE	220.0 1.5						220 -			T			1				
													- : :						

 $\frac{\textstyle \sum}{\scriptstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada Tel. No.: (905) 415-2632 www.woodplc.com

		OF BOREHOLE N	lo.	<u>BH</u>	<u> </u>	•						W	ood.
	ject Number:								g Location:	N:4854053	., NBL, Sta. 1+200 E:60		MS
	ject Client:	City of Brampton							g Method:		id Stem Augers	Compiled by	
	ject Name:	Arterial Road Network within Secondary Plan Area (Area 47 Brampton, Ontario	Hignwa ')	ay 427	Industi	riai		. `	g Machine:	Truck Mount		Reviewed b	
PIC	ject Location:	Brampton, Ontario						Date	Started:	Jan 22, 2020	Date Completed: <u>Ja</u>	Revision No	.: <u>0, 12/1/20</u>
	LITH	OLOGY PROFILE	sc	DIL SA	MPLI	NG	-		FIELD	TESTING	LAB TESTING Soil Vapour Reading	Z COMME	INTO
Lithology Plot	Geodetic Ground S	DESCRIPTION  Surface Elevation: 222.5 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	<b>DEPTH</b> (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	<ul> <li>Intact</li> <li>Remould</li> <li>ear Strength (kPa)</li> </ul>	▲ COV (LEL)  2 4 6 8  △ COV (ppm) TOV (ppm) 100 200 300 400  W <sub>P</sub> W W <sub>L</sub> Plastic 20 40 60 80	COMMENTATION INSTRUMENTATION STALLATION DISTRIBIC (%)  GR SA  GR SA	SIZE JTION
~~~	al	bout 200 mm ASPHALT					-		: :				
		Sand and Gravel FILL 220.2 moist 0.3 grey/brown Silty Clay FILL trace sand and gravel	ss	1	83	9	+ - - - - - -	222 -	0		O <sub>23</sub>		
		221.0		2	83	6	- 1 - - - -	221 -	0		32		
		brown 1.5  'CLAY / CLAYEY SILT TILL  race sand, trace gravel  very stiff to hard	ss	3	100	20	- - - - - 2 -	-	0	E	026		
		cobbles /boulders	SS	4	100	41	- - - - - -	220 -	C	<b>1</b>	<sup>1</sup> °13		
			ss	5	100	101	- 3 - - - - -	219 —		101	14		
		greyish brown	SS	6	100	45	- - - 4 -	- - - -		) ii	1 0		
		217.5 END OF BOREHOLE 5.0		7	100	34	- - - - - - 5	218 -	0	18	0 25		
	d ESIS a Divia												

 $\frac{\textstyle \sum}{\scriptstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada Tel. No.: (905) 415-2632 www.woodplc.com

R	ECORD OF BOREHOLE N	Ο.	BH.	<u> </u>									wood.	
Pro	ject Number: TP115086						Drilling	Location:	Coleraine Dr., N:4854054	NBL, Sta.	1+200 E:604	785	Logged by: MS	
Pro	ject Client: City of Brampton						Drilling	Method:	150 mm Solid		gers		Compiled by: PR	
	ject Name: Arterial Road Network within I Secondary Plan Area (Area 47	Highwa )	ay 427	Industr	ial		Drilling	Machine:	Truck Mounte				Reviewed by: SM/DP	
Pro	ject Location: Brampton, Ontario	-					Date S	Started:	Jan 22, 2020	Date C	ompleted: <u>Ja</u>	n 22, 202	20 Revision No.: 0, 12/1/20	
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD.	TESTING		ESTING our Reading	7	COMMENTO	
Lithology Plot	DESCRIPTION  Geodetic Ground Surface Elevation: 222.9 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	PPT ● DCPT  Nilcon Vane*  ◇ Intact ◆ Remould  ear Strength (kPa)	COV (LEL) 2 4 COV (ppm) 100 200	TOV (LEL)  6 8  1 TOV (ppm)  300 400  W WL  Liquid	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)	
	Sand and Gravel FILL trace organics	ss	1	100	17		-	0						
	moist 222.5 brown/dark brown 0.4 Silty Clay FILL	_	!	100	17	E	-							
<b>***</b>	trace gravel, with oxidation	SS	2	83	12	-	222 —	0	20					
$\bigotimes$	221.7					<u></u> 1 − 1	-							
	brown 1.2  SILTY CLAY / CLAYEY SILT TILL  trace sand, trace gravel	SS	3	100	22	<u>-</u> -	-	0						
	very stiff 221.1  END OF BOREHOLE 1.8					Ē								
	END OF BOILE 1.0													

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada Tel. No.: (905) 415-2632 www.woodplc.com

R	ECORD OF BOREHOLE N	ο.	BH.	A19							WC	<u>o</u>	
Pro	oject Number: TP115086						Drilling	g Location:	Coleraine Dr N:4854134	., SBL, Sta. 1+350 E:604	701	_ Logged by:	MS
Pro	oject Client: City of Brampton						Drilling	g Method:		lid Stem Augers		_ Compiled by:	PR
Pro	oject Name: Arterial Road Network within I	lighwa	ay 427	Industr	ial		Drilling	g Machine:	Truck Mount	ed Drill		_ Reviewed by:	SM/DP
Pro	Secondary Plan Area (Area 47) oject Location: Brampton, Ontario						Date 9	Started:	Jan 22, 2020	Date Completed: Ja	n 22, 2020	_ Revision No.:	0, 12/1/20
	LITHOLOGY PROFILE	sc	DIL SA	MPLI	NG	_		FIELD	TESTING	LAB TESTING Soil Vapour Reading	7	COMMENT	
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	tionTesting  PPT ● DCPT  Nilcon Vane*  ◇ Intact ◆ Remould	▲ COV (LEL) ■ TOV (LEL)  2 4 6 8  △ COV (ppm) □ TOV (ppm)  100 200 300 400  W <sub>P</sub> W W <sub>L</sub>	NSTRUMENTATION INSTALLATION	COMMENT & GRAIN SIZ DISTRIBUTI (%)	<u>'</u> E
Litho	Geodetic Ground Surface Elevation: 222.6 m	Sam	Sam	Rea	SPT	DEP	EE	* Undrained She 20 40	ear Strength (kPa) 60 80	Plastic Liquid 20 40 60 80	SN S	GR SA S	SI CL
XXX	about 200 mm ASPHALT  222.4  Sand and Gravel FILL  220.9					-							
▓	\ moist 0.3					Ė							
$\overset{\times}{\times}$	dark grey/brown Silty Clay FILL trace sand, trace organics	ss	1	100	12		222 -			28			
$\overset{\otimes}{\otimes}$		SS	2	67	12	- 1 - - -	:			17			
<b>XX</b>	221.1 brown 1.5					-	221 -						
	SILTY CLAY / CLAYEY SILT TILL trace sand, trace gravel hard	ss	3	100	34	_ _ _ 2		0	ρ	15			
	219.6	ss	4	100	57	- - - - 3	220 -		0	10			
	END OF BOREHOLE 3.0					Ĭ							
	od E&IS. a Division of Wood	_	_	_	_	_	_		·			·	

Canada Limited

 $\stackrel{\underline{\vee}}{\underline{=}}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada Tel. No.: (905) 415-2632 www.woodplc.com

R	ECORD OF BOREHOLE N	0.	BH.	A20								wood.
Pro	oject Number: TP115086						Drilling	Location:	Coleraine Dr N:4854133	r., SBL, Sta. 1+350 E:604	693	Logged by: MS
	oject Client: City of Brampton						Drilling	g Method:	150 mm So	lid Stem Augers		Compiled by: PR
Pro	oject Name: Arterial Road Network within I Secondary Plan Area (Area 47)	lighwa	ay 427	Industr	ial			g Machine:	Track Mount	ted Drill		Reviewed by: SM/DP
Pro	pject Location: Brampton, Ontario						Date S	Started:	Jan 23, 2020	Date Completed: Jai	1 23, 2020	Revision No.: <u>0, 12/1/20</u>
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING		
					(%				tionTesting	Soil Vapour Reading  COV (LEL) TOV (LEL)  4 6 8	NOIT	COMMENTS &
ţ	DESCRIPTION	e e	mber	(%	SPT 'N' / RQD (%)		E Z	O SPT   MTO Vane*	PPT • DCPT Nilcon Vane*	2 4 6 8 △ COV (ppm) □ TOV (ppm) 100 200 300 400	INSTRUMENTATION INSTALLATION O	<b>GRAIN SIZE</b>
Lithology Plot		Sample Type	Sample Number	Recovery (%)	Ä,	DЕРТН (m)	ELEVATION	△ Intact ▲ Remould	♦ Intact	W <sub>P</sub> W W <sub>L</sub>	ALLA.	DISTRIBUTION (%)
Lithol	Geodetic Ground Surface Elevation: 222.4 m	Samp	Samp	Reco	SPT	DEPT	ELE)	* Undrained She 20 40	ear Strength (kPa) 60 80	Plastic Liquid 20 40 60 80	LSNI LSNI LSNI	R SA SI CL
	Sand and Gravel FILL moist 222.1					-	-					
$\approx$	dark grey/brown 0.3 Silty Clay FILL	SS	1	100	26	_	222 -	0		<b>4</b> · · · · · · · · · · · · · · · · · · ·		
$\overset{ ext{}}{ ext{}}$	trace gravel, trace organics, trace cobbles					Ė	-					
$\bowtie$	221.3	SS	2	100	12	_ 1	-	0				
XX	brown 221.2 SILTY CLAY / CLAYEY SILT TILL 1.2						-					
	trace sand, trace gravel											
	END OF BOREHOLE											

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada Tel. No.: (905) 415-2632 www.woodplc.com

R	ECORD	OF BOREH	OLE N	o. <u> </u>	BH	<u>A21</u>								WC	od.
	ject Number:									Location:	N:4854257	, NBL, Sta. 1+500 E:60	4576	_ Logged by:	MS
	oject Client:	City of Brampton			407.1					Method:	-	id Stem Augers		-	PR
	oject Name:	Arterial Road Netw Secondary Plan Ar Brampton, Ontario	ea (Area 47)	ignwa	ıy 427 I	naustr	iai			Machine:	Truck Mounte	Date Completed: J	an 22 2020	Reviewed by:	
PIC									Date	Started:	Jan 22, 2020	Date Completed: J	an 22, 2020	_ Revision No.:	0, 12/1/20
	LITH	OLOGY PROFILE	:	SC	IL SA	MPLII	NG	_			TESTING	LAB TESTING Soil Vapour Reading	z	COMMEN	TS
Lithology Plot	Geodetic Ground S	DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	PPT DCPT  Nilcon Vane*  Intact Remould  near Strength (kPa)	▲ COV (LEL) ■ TOV (LEL 2 4 6 8 △ COV (ppm) □ TOV (ppm 100 200 300 400  W <sub>P</sub> W W <sub>L</sub> ■ O U U U U U U U U U U U U U U U U U U	STRUMENTAT	& GRAIN SIZ DISTRIBUT (%)	ZE
<b>XXX</b>		oout 200 mm ASPHALT Sand and Gravel FILL	223.0 22 <b>0,<u>9</u></b> 0. <b>3</b>					-	223 —						
	\	moist dark grey Silty Clay FILL ace sand, trace organics		SS	1	50	10	- - - -	-	0	48				
		greyish brown	221.9 221. <del>4</del>	SS	2	58	9	- 1 - - -	222 -	0	<b>B</b>				
<u> </u>	\ t	CLAY / CLAYEY SILT race sand, trace gravel stiff END OF BOREHOLE	TILL 1.5					-							
	od E&IS, a Divisi nada Limited	ion of Wood	∑ No freesta	anding (	groundw	vater me	asured	in oper	n boreho	le on complet	tion of drilling.				

RI	ECORD OF BOREHOLE N	lo.	<u>BH</u>	A23	/ B	H S	1						WC	ood.
Pro.	ject Number: TP115086						Drilling	g Location:	Coleraine Dr	., SBL, Sta. 1+6	550 E:6044	181	Logged by:	MS
Pro	ject Client: City of Brampton						Drilling	g Method:	N:4854343 150 mm Sol	id Stem Auger	s		Compiled by:	PR
Pro	ject Name: Arterial Road Network within	Highwa	ay 427	Indust	rial		Drilling	g Machine:	Truck Mount	ed Drill			Reviewed by:	SM/DP
Pro	Secondary Plan Area (Area 47 ject Location: Coleraine Drive, Brampton, O						Date	Started:	Jan 20, 2020	Date Com	oleted: <u>Jan</u>	20, 2020	Revision No.:	0, 3/30/21
	LITHOLOGY PROFILE	sc	OIL SA	MPLI	NG			FIELD	TESTING	LAB TES				
					(%)				ationTesting	Soil Vapour R  COV (LEL)		INSTALLATION  O	COMMEN &	ITS
ĕ	DESCRIPTION	l e	Sample Number	(%	0D (8		E N	O SPT   MTO Vane*	PPT • DCPT Nilcon Vane*	△ COV (ppm) □ 100 200 30	TOV (ppm)	ATOIT NOIT	GRAIN SI	
ogy P		le Ty	le Nu	Recovery (%)	Z Z	Œ) H	ELEVATION	△ Intact ▲ Remould	♦ Intact ♦ Remould	W <sub>P</sub> W	W <sub>L</sub>	ALLA	DISTRIBUT (%)	ION
Lithology Plot	Geodetic Ground Surface Elevation: 222.8 m	Sample Type	Samp	Reco	SPT 'N' / RQD	DEPTH	E.E.	* Undrained Sh 20 40	near Strength (kPa) 0 60 80	Plastic 20 40 6	Liquid 0 80	LSNI LSNI LSNI	R SA	SI CL
~~~	about 200 mm ASPHALT 222.6					-					į,			
▩	brown 220,5 Sand and Gravel FILL 0.3 trace to some silt					ŧ								
▓	moist	SS	1	100	7	E	222 -			24				
畿	dark grey/brown Silty Clay / Clayey Silt FILL trace gravel, trace organics					<u> </u>	222 -	] <u>.</u>				<b>¥</b>		
燚	auso g.u.o., auso organiso	SS	2	100	5	Ė .				23	:			
▓						_				23				
▓				400		Ė	221 -							
❈		SS	3	100	8	- - 2				31				
$\overset{\otimes}{\mathcal{U}}$						ŧ								
	SILTY CLAY TILL trace to some sand, trace gravel,	SS	4	100	30	-								
	cobbles/boulders very stiff to hard		"	100	30	E	220 -	1		<sup>3</sup> 016				
						3								
		SS	5	83	53	-				N D		1	18	48 33
						Ē				16				.0
						‡	219 -	]						
	grey	SS	6	100	28	<u> </u>				o 21				
						_				21				
						1		<u> </u>						
		SS	7	100	71	Ē	218 -			13				
						— 5 -				13				
						Ē								
						Ė								
						-	217 -							
						6								
		ss	8	100	33	Ė				22				
						+	216 -							
						_ _ 7	210							
						Ė								
						-								
		SS	9	100	86 /	ŧ	215 -		86	<b>1</b> 0.				
		33	9	100	280mn	n- 8			280	mm 13				
						E Z	Z							
						-		<u> </u>						
						-	214 -	]						
						9		1						
	213.4		10	80	50 / 100mn				50 100 mm	17				
	END OF BOREHOLE 9.4													
Noc Can	od E&IS, a Division of Wood ada Limited	water en	counter	ed on co	ompletio	on of dril	lling on	1/20/2020 at a	a depth of: <u>8.2 m</u> .	Cave in de	pth after rem	oval of augers	: <u>9.1 m</u> .	

▼ Groundwater depth observed on <u>5/12/2020</u> at a depth of: <u>0.9 m</u>.

# RECORD OF BOREHOLE No. BH A23 / BH S1



Project Number: TP115086 Project Name: Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47)

Project Location: Coleraine Drive, Brampton, Ontario

	LITHOLOGY PROFILE	sc	IL SA	MPLII	NG			FIELD TESTING	LAB TESTING					
								PenetrationTesting	Soil Vapour Reading  ▲ COV (LEL) ■ TOV (LEL)	INSTRUMENTATION INSTALLATION		COMM 8		
t	DESCRIPTION	l ø	nber	(%	SPT 'N' / RQD (%)		ELEVATION (m)	O SPT □ PPT ● DCPT	2 4 6 8 △ COV (ppm) □ TOV (ppm)	-NTA NOI	_	<b>GRAIN</b>	SIZE	
gy PI	2200141 11011	e Typ	e Nur	ery (9	1'/R	E	ATIO	MTO Vane* Nilcon Vane*  △ Intact ◇ Intact  ▲ Remould ◆ Remould	100 200 300 400 W <sub>L</sub>	SUME LLAT	L	DISTRIE (%)	BUTION	
Lithology Plot		Sample Type	Sample Number	Recovery (%)	PT 'N	DEPTH (m)	:LEV	* Undrained Shear Strength (kPa) 20 40 60 80	Plastic Liquid 20 40 60 80	NSTA NSTA	GR	SA	SI	CL
	50 mm dia. monitoring well with flushmount	0,	0,		0)			20 40 00 00	20 40 00 00					
	protective casing installed (depth below ground surface):													
	Concrete: 0.0 - 0.3 m Sand: 0.3 - 0.6 m													
	Bentonite: 0.6 - 5.5 m Sand Filter: 5.5 - 6.1 m													
	Screen: 6.1 - 9.1 m  Groundwater measurements in monitoring well													
	(depth below ground surface):													
	24 Apr 2020: 1.8 m 4 May 2020: 0.9 m													
	12 May 2020: 0.9 m													

LITHOLOGY PROFILE  SOIL SAMPLING  FIELD TESTING  LAB TESTING  Soil Vapour Reading  COMMENTS  Soil Vapour Reading  A COV (LEL)  TO COV (LEL)  A GRAIN SIZE  DISTRIBUTION  DESCRIPTION  DESCR	RI	ECORD	OF BOREHOLE N	0.	BH	<u>A25</u>	<u> </u>						wood.
Project Claims   City of Brampton   Completed by   PR	Proj	ject Number:	TP115086						Drilling	g Location:	Coleraine Di	r., NBL, Sta. 1+800 E:604	381 Logged by: MS
Project Location:   Brampton, Ontation   Date Started:   Jan 22, 2020   Date Completed:   Jan 22, 2020   Revision No:   0, 12/11/2	Proj	ject Client:							_ Drilling	g Method:		lid Stem Augers	Compiled by: PR
LITHOLOGY PROFILE   SOIL SAMPLING	Pro	ect Name:	Secondary Plan Area (Area 47)	-lighwa )	y 427	Indust	rial		_ Drilling	g Machine:	Truck Moun		
DESCRIPTION   Secondario Granul Surface Elevation 725.0 m   Second	Pro	ect Location:	Brampton, Ontario						_ Date \$	Started:	Jan 22, 2020	Date Completed: <u>Jar</u>	n 22, 2020 Revision No.: 0, 12/1/20
DESCRIPTION		LITH	IOLOGY PROFILE	SC	IL SA	MPLI	NG			FIELD	TESTING		-
Sand and Gravel Fill	Lithology Plot	Geodetic Ground S	Surface Elevation: 225.0 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)		O SPT □  MTO Vane* △ Intact ▲ Remould * Undrained Sh	PPT	△ COV (LEL) ■ TOV (LEL)  2 4 6 8  △ COV (ppm) □ TOV (ppm) 100 200 300 400  W <sub>P</sub> W W <sub>L</sub> ■ O Ulquid	COMMENTS  REPRINTATION  INSTRIBUTION  (%)  GR SA SI CL
greybrown Sity Clay FILL trace gravel, trace cobbles 224.1    Drown/grey   SILTY CLAY   CLAYET SILT TILL   trace sand, trace gravel, cobbles/boulders   SS   2   100   25	<b>***</b>	a	bout 200 mm ASPHALT 224.8					-					
Silty Clay / Clayer Silt Title   Trace sand, trace gravel, cobbles/boulders very stiff to hard   SS   2   100   25			grey/brown Silty Clay FILL ace gravel trace cobbles		1	100	13			0		<sup>13</sup>	
grey  SS 4 100 76/ 180mm 13  SS 5 100 91		SILTY trace sand	brown/grey 0.9 / CLAY / CLAYEY SILT TILL	SS	2	100	25	1	224 -	0		•	
SS 5 100 91				SS	3	75	31	2	223 —	0		a ° <sub>13</sub>	
SS 5 100 91				SS	4	100		-  -  -  -  -  -			76 0 180 mi	n °13	
SS 6 92 57 O B 011  SS 7 100 74 O B 012				SS	5	100	91	3	222 -		01	a o	
SS 7 100 74 O 0 0 12			 grey					- - - - - - - 4	221 —				
$220.0$ $\perp$				SS	6	92	57	-  -  -  -  -  -			0 1	• °11	
			220.0	ss	7	100	74	Ė,	220		0 1	a o 12	

 $\frac{\textstyle \sum}{\scriptstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

RECORD OF BOREHOLE No. BH A26 WOOD.														4
Project Number: TP115086						Drilling Location:		Coleraine Dr., NBL, Sta. 1+800 E:604384 N:4854450 150 mm Solid Stem Augers				Logged by: MS		
Project Client: City of Brampton												Method:	Compiled by: PR	
Project Name: Arterial Road Network within Highway 4 Secondary Plan Area (Area 47)				y 427 Industrial			Drilling Machine:		Truck Mounted Drill				Reviewed by: SM/DP	
Project Location: Brampton, Ontario							Date 9	Started:	Jan 22, 2020	Date	Completed: <u>Ja</u>	n 22, 2020	Revision No.: <u>0, 12/1</u>	20
LITHOLOGY PROFILE			SOIL SAMPLING								B TESTING			
					(%		=		ionTesting	▲ COV (LEI	pour Reading L) TOV (LEL) 6 8	INSTRUMENTATION INSTALLATION	COMMENTS &	
lot	DESCRIPTION	be be	Sample Number	(%)	SPT 'N' / RQD (%)	٦	E N	O SPT   MTO Vane*	PPT ● DCPT Nilcon Vane*		n)   TOV (ppm)	TION	GRAIN SIZE DISTRIBUTION	
Lithology Plot		Sample Type	Je N	Recovery (%)	ž.	DЕРТН (m)	ELEVATION	△ Intact ▲ Remould	♦ Intact	W <sub>P</sub>	W W <sub>L</sub>	ALLA	(%)	
Litho	Geodetic Ground Surface Elevation: 224.4 m	Sam	Sam	Reco	SPT	DEP.	ELE	* Undrained She 20 40	ear Strength (kPa) 60 80	Plastic 20 4	Liquid 0 60 80	INST	GR SA SI	CL
$\bowtie$	Sand and Gravel FILL trace organics	SS	_	100	10	1 1		0						
	moist 224.0 dark grey/brown 0.4	33	1	100	19	_	224 -							
$\bowtie$	Silty Clay FILL trace gravel, trace cobbles					-	-							
$\bowtie$		SS	2	100	18	- 1	-	0						
***	223.2 brown 1.2					F								
	SILTY CLAY / CLAYEY SILT TILL trace sand, trace gravel	SS	3	100	40	-	223 -							
	hard 222.6  END OF BOREHOLE 1.8									- : :				
	END OF BUREFIOLE 1.0													
											: :			

 $\frac{\textstyle \sum}{\textstyle -}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREHOLE N	Ο.	BH	A27	•							wood.
Pro	ject Number:	TP115086						Drilling	Location:	Coleraine Di N:4854566	r., SBL, Sta. 1+950 E:604	250	Logged by: MS
	ect Client:	City of Brampton						-	Method:	150 mm So	olid Stem Augers		Compiled by: PR
	ect Name:	Arterial Road Network within F Secondary Plan Area (Area 47)	lighwa )	ay 427	Industr	rial		-	Machine:	Truck Moun			Reviewed by: SM/DP
Pro	ject Location:	Brampton, Ontario						Date S	started:	Jan 22, 2020	Date Completed: <u>Ja</u>	n 22, 2020	Revision No.: <u>0, 12/1/20</u>
	LITH	OLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading	-	00111151150
Lithology Plot	Geodetic Ground S	DESCRIPTION  Surface Elevation: 226.8 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	<ul> <li>♦ Intact</li> <li>♦ Remould</li> </ul> ear Strength (kPa)	△ COV (LEL) ■ TOV (LEL)  2 4 6 8  △ COV (ppm) □ TOV (ppm) 100 200 300 400  W <sub>e</sub> W W <sub>t</sub> ■	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL
	al	bout 250 mm ASPHALT 226.6					F	-					
		Sand and Gravel FILL 226.5 moist 0.3 brown Silty Clay FILL ace gravel, trace cobbles	SS	1	100	13	-	226 —	0		o o 16		
		225.3 brown 1.5	SS	2	100	29	- 1 - - - -	- - - -	0		13		
		CLAY / CLAYEY SILT TILL d, trace gravel, cobbles/boulders hard	ss	3	100	41	_ - - 2 -	225 — - - -	©	)	12		
			SS	4	100	57	- - - - -	224 —		· · · · · · · · · · · · · · · · · · ·	a o <sub>12</sub>		
<i>3</i> 22		223.8 <b>END OF BOREHOLE</b> 3.0					<u> </u>		1 1	1 1			
		ion of Wood											

 $\frac{\textstyle \sum}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

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RI	RECORD OF BOREHOLE No. BH A28														WOO	od.
	ject Number:	TP115086							Drilling	Location:	N:4854566		ta. 1+950 E:604	1250	Logged by: MS	
Pro	ject Client:	City of Brampton								g Method:	150 mm Sc		Augers		Compiled by: PR	
	ject Name:	Arterial Road Network Secondary Plan Area	k within H (Area 47)	ighwa	y 427 l	Industr	ial		Drilling	g Machine:	Truck Moun				Reviewed by: SM	/DP
Pro	ject Location:	Brampton, Ontario							Date S	Started:	Jan 22, 2020	<b>)</b> Date	Completed: Ja	n 22, 202	20 Revision No.: <u>0, 1</u>	2/1/20
	LITH	IOLOGY PROFILE		SC	OIL SA	MPLI	NG				TESTING	Soil	TESTING Vapour Reading	z	COMMENTS	
Lithology Plot	Geordatic Ground S	DESCRIPTION  Surface Elevation: 226.8 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane* △ Intact ▲ Remould	ear Strength (kPa)	2 COV (p 100 W <sub>P</sub> Plastic	EL) TOV (LEL) 4 6 8 pm) TOV (ppm) 200 300 400 W WL Liquid 40 60 80	INSTRUMENTATION INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	<b>I</b>
$\bowtie$		Sand and Gravel FILL moist		SS	1	100	46	-				Ga				
₩			226.2	33	'	100	40	-								
		brown Silty Clay FILL	0.6					Ē	226 -							
$\bowtie$		trace gravel	225.6	SS	2	100	12	- 1		0						
·		END OF BOREHOLE	225.6 1.2					f						1		
												:				
												:				
												:				
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 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREH	IOLE N	<b>)</b> .	BH	A29								WC	ood.
Pro	ject Number:	_							-	g Location:	N:4854675	or., NBL, Sta. 2+100 E:60	1157	Logged by:	MS
Pro	ject Client:	City of Brampton							Drilling	g Method:	150 mm Sc	olid Stem Augers			PR
Pro	ject Name:	Arterial Road Netv Secondary Plan A	vork within H rea (Area 47)	ighwa	y 427 l	ndustr	ial		Drilling	g Machine:	Truck Moun			Reviewed by:	SM/DP
Pro	ject Location:	Brampton, Ontario	<u>, , , , , , , , , , , , , , , , , , , </u>						Date S	Started:	Jan 22, 2020	Date Completed: <u>Ja</u>	n 22, 2020	Revision No.:	0, 12/1/20
	LITH	OLOGY PROFILE	<b>=</b>	SC	IL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading	7	COMMEN	2
					Ę.		(%)		(E)		ationTesting PPT • DCPT	▲ COV (LEL) ■ TOV (LEL)	NSTRUMENTATION INSTALLATION	COMMEN®	
Plot		DESCRIPTION		ype	Sample Number	(%)	SPT 'N' / RQD (%)	Ê		MTO Vane*	Nilcon Vane*	△ COV (ppm) □ TOV (ppm)	ATION	GRAIN SIZ DISTRIBUT	
Lithology				Sample Type	Dle N	Recovery (%)	ż	<b>DEPTH</b> (m)	ELEVATION	△ Intact ▲ Remould	<ul><li>♦ Intact</li><li>♦ Remould</li></ul>	W <sub>P</sub> W W <sub>L</sub>	TALLY	(%)	
Lith	Geodetic Ground S	urface Elevation: 228.6 m		Sam	Sam	Rea	SPT	DEP	EE	* Undrained Sh 20 40	near Strength (kPa) 60 80	Plastic Liquid 20 40 60 80	NN G	SR SA S	SI CL
XXX		Sand and Gravel FILL	228.4 0.2					-	-						
$\overset{\otimes}{\otimes}$		moist	0.2					Ē							
❈				SS	1	100	44	-	228 -		)····				
$\overset{\sim}{\otimes}$		brown	227.7 0.9					- 1		· · · · · · · · · · · · · · · · · · ·					
$\overset{\times}{\otimes}$	tra	Silty Clay FILL ce gravel, trace cobble	s 227.1	SS	2	100	18	- -							
~~		END OF BOREHOLE	1.5					_					1		
												: :			

 $\frac{\textstyle \sum}{\scriptstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada Tel. No.: (905) 415-2632 www.woodplc.com

RECORD OF BOREHOLE No. BH A30  Project Number: TP115086 Drilling Location: Coleraine Dr., NBL, Sta. 2+100 E:604159 N:4854679 Logged by:													
Proj	ect Number: TP115086						Drilling	Location:		r., NBL, Sta. 2+100 E:604	159	Logged by: MS	
Proj	ect Client: City of Brampton						Drilling	Method:	150 mm So	lid Stem Augers		Compiled by: PR	
Proj	ect Name: Arterial Road Network within H Secondary Plan Area (Area 47)	lighwa	ıy 427 l	ndustr	ial		Drilling	Machine:	Track Mount	ted Drill		Reviewed by: SM/DP	
Proj	ect Location: Brampton, Ontario						Date S	started:	Jan 23, 2020	Date Completed: Ja	n 23, 20	20 Revision No.: 0, 12/1/20	
	LITHOLOGY PROFILE	SC	OIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	Penetra ○ SPT □  MTO Vane* △ Intact ▲ Remould	tionTesting  PPT	Soil Vapour Reading  ▲ COV (LEL) ■ TOV (LEL)  2 4 6 8  △ COV (ppm) □ TOV (ppm)  100 200 300 400  W <sub>P</sub> W W <sub>L</sub> ■ ○ ● Uiquid	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)	
, Ē	Geodetic Ground Surface Elevation: 228.7 m Sand and Gravel FILL	Sa	Sa	Re	S		ᆸ	20 40		20 40 60 80	22	GR SA SI CL	
	some topsoil moist 228.2	SS	1	100	16	- - -	-	0		3		30 57 (13)	
	dark grey/brown 0.5  Silty Clay FILL  trace gravel, with oxidation  227.5	SS	2	100	13	- - - - 1	228 -	0	ē	3			
	brown 1.2  SILTY CLAY / CLAYEY SILT TILL  trace sand, trace gravel, cobbles/boulders hard	SS	3	100	38	- - - -	227 —	0		•			
SK 281	226.9 END OF BOREHOLE 1.8					_							

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

K	ECORD	OF BOREHOLE N	<u>A31</u>								wood.		
Pro	ject Number:	TP115086						Drilling	Location:	Coleraine Di	r., SBL, Sta. 2+250 E:6040	75	Logged by: MS
Pro	ject Client:	City of Brampton						Drilling	Method:	150 mm So	lid Stem Augers		Compiled by: PR
Pro	ject Name:	Arterial Road Network within F Secondary Plan Area (Area 47)	lighwa	y 427 I	Industr	ial		Drilling	Machine:	Truck Moun	ted Drill		Reviewed by: SM/DP
Pro	ject Location:							Date 9	Started:	Jan 22, 2020	Date Completed: Jan	22, 202	20 Revision No.: 0, 12/1/20
	LITH	OLOGY PROFILE	SC	IL SA	MPLI	NG			FIELD	TESTING	LAB TESTING		
Lithology Plot	Goodetic Ground 9	DESCRIPTION  Surface Elevation: 230.7 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	tionTesting  PPT	Soil Vapour Reading  ▲ COV (LEL) ■ TOV (LEL)  2 4 6 8  △ COV (ppm) □ TOV (ppm)  100 200 300 400  W <sub>P</sub> W W <sub>L</sub> ■ □  Plastic Liquid  20 40 60 80	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
~~~	al	bout 200 mm ASPHALT 230.5					-	<u> </u>			1 1 1 1		
		Sand and Gravel FILL 0.2 moist 229.8	SS	1	100	38	<del>-</del> - - - - -	230 -	0		<b>∞</b> 5		
		grey/brown 0.9 Silty Clay FILL trace gravel  229.2 brown/brownish grey 1.5	SS	2	100	16	1 - - - - -	-	0		21		
		brown/brownish grey  'CLAY / CLAYEY SILT TILL d, trace gravel, cobbles/boulders  very stiff to hard	SS	3	100	27	2	229 -	0		3 O. 14		
			SS	4	100	29		228 —	0	1	<sup>3</sup> O <sub>15</sub>		
			SS	5	100	39	.— 3 - - - - -	- - - -			14		
			SS	6	92	44	- - - 4 - -	227 -		)	o 13		
		225.7 END OF BOREHOLE 5.0	ss	7	100	36	- - - - - - 5	226 -	0		13		

 $\frac{\textstyle \sum}{\scriptstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

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	<b>ECORD</b> ject Number:	OF BOREHO	DLE No	<b>o.</b>	BH :	<u>S2</u>			Drilline	g Location:	Coleraine Dr	., NBL, Sta. 1+650 E:604	1486		od.
	ject Client:	City of Brampton								g Method:	N:4854343	lid Stem Augers		_	PR
	ject Name:	Arterial Road Netwo	rk within H	lighwa	v 427 l	Industr	ial			g Machine:	Track Mount			Reviewed by:	
		Secondary Plan Area Brampton, Ontario	(Area 47)		,					Started:	Jan 20, 2020		n 20. 2020	Revision No.:	,
			1							_				•	
Plot	LITH	OLOGY PROFILE  DESCRIPTION				MPLII	NG (%) N. / N.		(E) N	Penetra	TESTING  ationTesting  PPT ● DCPT  Nilcon Vane*	LAB TESTING  Soil Vapour Reading  COV (LEL) ■ TOV (LEL)  2 4 6 8  △ COV (ppm) □ TOV (ppm)	NSTRUMENTATION INSTALLATION	COMMENT & GRAIN SIZ	E
Lithology P	Geodetic Ground S	urface Elevation: 222.4 m DOUT 200 mm ASPHALT		Sample Type	Sample Number	Recovery (%)	SPT 'N' / R	DEPTH (m)	ELEVATION	△ Intact ▲ Remould	<ul> <li>♦ Intact</li> <li>♦ Remould</li> <li>ear Strength (kPa)</li> </ul>	100 200 300 400  W <sub>P</sub> W W <sub>L</sub> Plastic Liquid 20 40 60 80	INSTRUME INSTALLA	DISTRIBUTIO (%) R SA SI	
××		brown	222.3 22 <b>0.1</b>					-							
	Sill	Sand and Gravel FILL trace to some silt moist dark grey/brown y Clay / Clayey Silt FILL ce gravel, trace organics	0.3	SS	1	100	8	-  -  -  -  -  -  -	222 -	0		3 O 24			
	ua	ce gravel, trace organics		SS	2	42	8	- '  -  -  -  -	221 -	0		ū °26			
		brown	220.2	SS	3	75	7	- - - 2		0		o 26			
		brown CLAY / CLAYEY SILT TIL I, trace gravel, cobbles/boi very stiff to hard		SS	4	100	29	- - - - - - - 3	220 -	0	E	13			
				SS	5	46	42		219 -		)	12			
		grey		SS	6	100	28	- - - 4 - - -	218 -	0	E	o <sup>2</sup> 1			
				ss	7	100	19	- - - - - 5	210	<b>○</b>		3 O. 16			
								- - - - - -	217 –						
								- 6 -							
				SS	8	100	35	-  -  -  -	216 -	0		21			
								- 7 - - - -	215 -						
								-	213						
				SS	9	100	36	- - 8 <b>-</b>		0		11			
								- - - -	214 -						
			040.4	SS	10	100	50 /	— 9 - -			50 100 mm	a			
KX.		END OF BOREHOLE	213.1 9.4				100mm				100 mm	10			
<b>Can</b> 50 \	od E&IS, a Divis ada Limited /ogell Road, Unit	s 3 & 4	☑ No freesta	anding (	groundv	vater me	easured	in open	boreho	ole on complet	ion of drilling.	Cave in depth after re	moval of augers	:: <u>7.9 m</u> .	

RI	ECORD OF BOREHOLE N	0.	BH (	<u>C1</u>										W	00	d.
Pro	ject Number: TP115086						Drilling	Location:	Countryside N:4852294	Dr., EBL, S	ta. 0+000 E:6	03645	Lo	gged by:	MS	
Pro	ject Client: City of Brampton						Drilling	Method:	150 mm So	lid Stem Au	gers		Co	mpiled by:	SN	
Pro	ject Name: Arterial Road Network within H Secondary Plan Area (Area 47)	lighwa	ay 427 I	ndustr	ial		Drilling	Machine:	Track Moun	ted Drill			Re	eviewed by	: <u>SM /</u>	DP
Pro	ject Location: Brampton, Ontario						Date S	Started:	Mar 25, 2020	Date C	ompleted: Ma	ır 25, 202	20 Re	evision No.	: <u>0, 2/</u> 8	8/21
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG		I	FIELD	TESTING	LAB T	ESTING					
Lithology Plot	DESCRIPTION  Geodetic Ground Surface Elevation: 215.8 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	Penetra ○ SPT □  MTO Vane* △ Intact ▲ Remould	PPT ● DCPT  Nilcon Vane*  Intact Remould  Par Strength (kPa)	Soil Vap  ▲ COV (LEL)  2 4  △ COV (ppm  100 200	our Reading TOV (LEL) 6 8 0 TOV (ppm) 300 400 W W Liquid	INSTRUMENTATION INSTALLATION		COMMEI & GRAIN S DISTRIBU (%)	SIZE	CL
<b>***</b>	about 100 mm ASPHALT         215.7           brown         0.1					-										
	Sand and Gravel FILL moist 214.9	SS	1	83	12	<del>-</del> - - - -	215 —	0		3						
	grey 0.9  Silty Clay / Clayey Silt FILL  trace to some sand, trace gravel, trace organics	SS	2	92	8	- 1 - - - - -	- - - -	0		3:	7					
		SS	3	100	8	- - - - 2 -	214 -	0		26	•		0	14	48	38
	SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel, cobbles/boulders hard	SS	4	100	40		213 -			0 14						

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD OF	BOREHOLE N	0.	<u>BH</u>	<u>C2</u>									W	ood.
Pro	ject Number: TP1	15086						Drilling	Location:	Countryside	Dr., EBL,	Sta. 0+000 E:	603646	Logged by:	<u>MS</u>
Pro	ject Client: City	of Brampton						Drilling	Method:	N:4852295 150 mm Sol	id Stem A	ugers		Compiled by:	SN
Pro	ject Name: Arte	rial Road Network within I ondary Plan Area (Area 47	Highwa	ay 427	Industr	ial		Drilling	Machine:	Track Mount	ed Drill			Reviewed by:	SM / DP
Pro	ject Location: Bran	npton, Ontario	,					Date S	Started:	Mar 25, 2020	Date	Completed: Ma	ar 25, 202	<b>0</b> Revision No.:	0, 2/8/21
	LITHOLO	GY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING	LAB	TESTING apour Reading	_ [		
Lithology Plot	DES	CCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	<ul> <li>Intact</li> <li>Remould</li> </ul> ear Strength (kPa)	△ COV (LE 2	TOV (LEL)	INSTRUMENTATION INSTALLATION	COMMEN & GRAIN S DISTRIBU (%)	IZE
		brown ind Gravel FILL moist	ss	1	75	6	-	-	0		1				
	Silty Clay	dark grey 0.6 / Clayey Silt FILL					- - -	-							
$\overset{\times\!\!\!\!\times}{\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!$	trace sa	and, trace gravel	SS	2	100	7	_ 1 1	214 -	0						
		213.2	SS	3	100	19	- - -	-	0		1				
***	END C	DF BOREHOLE 1.8									:				
											:				
											:				
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 $\frac{\textstyle \sum}{\textstyle -}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREHOL	LE N	<b>o.</b> !	<u>BH (</u>	<u>C3</u>								WC	od.		
Pro	ject Number:	TP115086							Drilling	g Location:	Countrys	ide E	r., WBL,	Sta. 0+150 E	:603738	Logged by:	<u>MS</u>
Pro	ject Client:	City of Brampton							Drilling	g Method:	N:485242 150 mm	Soli	d Stem Au	igers		Compiled by:	SN
Pro	ject Name:	Arterial Road Network Secondary Plan Area (A	within H	ighwa	y 427 I	ndustr	ial		Drilling	g Machine:	Track Mo	unte	d Drill			Reviewed by:	SM / DP
Pro	ject Location:	Brampton, Ontario	Alea 41)						Date 9	Started:	Mar 25, 2	020	Date C	Completed: M	ar 25, 2020	Revision No.:	0, 2/8/21
	LITH	OLOGY PROFILE		SO	IL SA	MPLI	NG			FIELD	TESTING	i		TESTING	_ [		
					er		(%)		(E)		tionTesting	CPT	COV (LEL		NSTRUMENTATION NSTALLATION	COMMEN & GRAIN SIZ	
Lithology Plot		DESCRIPTION		Туре	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	Œ		MTO Vane* △ Intact	Intact	ne*	100 200		MEN' LATIO	DISTRIBUT	
holog				Sample Type	ample	ecover	ž L	<b>DEPTH</b> (m)	ELEVATION	▲ Remould  * Undrained Sh	<ul> <li>Remou</li> <li>ear Strength (k</li> </ul>	ld	W <sub>P</sub> ■ Plastic	W W <sub>L</sub> → Liquid	STRU	(%)	
: ****	Geodetic Ground S	Surface Elevation: 216.5 m about 90 mm ASPHALT	216.4	Š	Ss	Re	S	<u> </u>	<u> </u>	20 40	60 80	+	20 40		<u> </u>	GR SA S	SI CL
$\overset{\text{**}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}}{\overset{\text{*}}{\overset{\text{*}}}{\overset{\text{*}}{\overset{\text{*}}}{\overset{\text{*}}{\overset{\text{*}}}{\overset{\text{*}}{\overset{\text{*}}}{\overset{\text{*}}{\overset{\text{*}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}}{\overset{\text{*}}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}}{\overset{\text{*}}}{\overset{\text{*}}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}}{\overset{\text{*}}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{*}}{\overset{\text{*}}}{\overset{\text{*}}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}}{\overset{\text{*}}}{\overset{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{*}}}{\overset{\text{*}}}{\overset{*}}}{\overset{\text{*}}}}{\overset{\text{*}}}}{\overset{\text{*}}}}{\overset{\text{*}}}{\overset{\text{*}}}{\overset{*}}}{\overset{\text{*}}}{\overset{*}}}{\overset{*}}}{\overset{\text{*}}}{\overset{*}}}{\overset{*}}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}{\overset{*}}{\overset{*}}{\overset{*}}{\overset{*}}}{\overset{*}}}{\overset{*}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}}{\overset{*}}{\overset{*}}{\overset{*}}}{\overset{*}}{$	h	brown Sand and Gravel FILL	216.4 216.2 0.3					-	-								
$\bowtie$	\	moist dark brown / brown	/	SS	1	83	5	-	216 —								
$\overset{}{\cancel{\cancel{}}}$	trace sa	ty Clay / Clayey Silt FILL nd, trace gravel, trace organic	cs <u>215.6</u>					Ε.									
	SILTY	brown / CLAY / CLAYEY SILT TILL trace sand, trace gravel stiff	0.9	SS	2	100	9	- 1 - - -	-	0							
XX		END OF BOREHOLE	215.0 1.5					_	215 -						-		
															•		

 $\frac{\textstyle \sum}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREHOL	E No	o. <u>l</u>	BH (	<u>C5</u>									wood
Pro	ject Number:	TP115086							Drilling	Location:	Countryside	Dr., EBL,	Sta. 0+300 E:6	03831	Logged by: MS
Pro	ject Client:	City of Brampton							Drilling	g Method:	N:4852531 150 mm So	olid Stem A	ugers		Compiled by: SN
Pro	ject Name:	Arterial Road Network w Secondary Plan Area (Ar	ithin H	ighwa	y 427 I	ndusti	rial		Drilling	g Machine:	Track Moun	ted Drill			Reviewed by: SM / DP
Pro	ject Location:	Brampton, Ontario	ica 41)						Date 9	Started:	Mar 25, 2020	<b>D</b> Date	Completed: Ma	r 25, 202	20 Revision No.: 0, 2/8/21
	LITH	OLOGY PROFILE		SO	IL SA	MPLI	NG			FIELD	resting	LAB	TESTING apour Reading		
Lithology Plot	Geodetic Ground S	DESCRIPTION  Surface Elevation: 214.6 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	ionTesting PPT	△ COV (LE 2 100 100 2 W <sub>P</sub> Plastic	### TOV (LEL)  ### TOV (ppm)  ### TOV (ppm)  ### TOV (ppm)  ### Use	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
***	al	bout 100 mm ASPHALT brown	214.5 0.1									:			
		Sand and Gravel FILL moist dark grey	213.8 0.8	SS	1	83	30	-  -  -  -  -	214 -	0		<b>5</b> 5			
	<b>Sil</b> trace sa	ty Clay / Claye) Silt FILL nd, trace gravel, trace organics	ŀ	SS	2	100	38	- 1 - - - - -	-	0		10			
	SILT <sup>*</sup> trace	brown  Y SAND / SANDY SILT TILL  to some clay, trace gravel dense to very dense moist to wet	1.5	SS	3	83	46	_ _ _ _ 2	213 -		)	10			
				SS	4	100	82	-  -  -  -  -	212 -		0	a o 12			
1		grey						- 3 ∑	Z :						
		3 /	-	SS	5	100	69	-  -  -  -  -	211 -		0	o 21			
			-	SS	6	79	52	- - 4 <b>2</b> - - - -	•		0	a °17			
1			209.7	SS	7	100	55 / 150mm	E	210 -		55 150 mm	B 0 20			
ظ∴1		END OF BOREHOLE	4.9				10011111				150 Hilli	. 20			
	od E&IS, a Divis	ion of Wood $\nabla$	Fround	ater en	counter	ed on co	ompletio	n of dril	ling on '	3/25/2020 at a	depth of: <u>3.0 m</u>	Cav	e in depth after ren	noval of a	iders: 40 m

	ECORD OF BOREHOLE N									wood.			
	oject Number: TP115086						_	Location:	N:4852529		Sta. 0+300 E:6	03832	Logged by: MS
	oject Client: City of Brampton						_	Method:	150 mm Sol		igers		Compiled by: SN
	pject Name: Arterial Road Network within I Secondary Plan Area (Area 47 Brampton, Ontario	Highwa )	ay 427	Industr	rial		Drilling Date S	Machine: tarted:	Mar 25, 2020		Completed: Ma	r 25, 2020	Revision No.: <b>SM / DP O</b> Revision No.: <b>0, 2/8/21</b>
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING		TESTING pour Reading	_	
Lithology Plot	DESCRIPTION  Geodetic Ground Surface Elevation: 214.6 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	ear Strength (kPa)	▲ COV (LEL	D) ■ TOV (LEL)	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
	brown <b>Sand and Gravel FILL</b> moist	SS	1	83	11	-	-	· •					
	brown 0.6 Silty Clay / Clayey Silt FILL trace sand, trace to some gravel	ss	2	88	34	- - - - - - 1	214 —	0					
	213.4	ss	3	100	75	- - - - -	213 —		0 6				
	END OF BOREHOLE												

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

RE	ECORD (	OF BOREHOL	E No	o. <u>l</u>	BH (	<u>C7</u>									WC	od.
		TP115086							_	Location:	N:4852640		Sta. 0+450 E:	603917	Logged by:	MS
_	•	City of Brampton							_	Method:	150 mm So		igers			SN
-		Arterial Road Network v Secondary Plan Area (A Brampton, Ontario	within H Area 47)	lighwa	y 427 I	ndustr	ial		_	Machine: Started:	Track Mount		Completed: Ma	r 25, 2020	Revision No.:	
	LITHO	LOGY PROFILE		SO	IL SA	MPLII	NG			FIELD	TESTING		TESTING		_	
Lithology Plot	Geodetic Ground Sur	DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	ear Strength (kPa)	▲ COV (LEL 2 4	n) □ TOV (ppm) 0 300 400  W W <sub>L</sub> Liquid	INSTRUMENTATION INSTALLATION	COMMEN & GRAIN SI, DISTRIBUT (%)	ZE
<b>XX</b>		brown	216.4 0.1					-	-							
		and and Gravel FILL moist dark grey	215.9 0.6	SS	1	50	15	-	216 —	0	1	о 3				
	tra SILTY O	Clay / Clayey Silt FILL tice sand, trace gravel  brown  CLAY / CLAYEY SILT TILL to some sand, trace gravel	215.5 1.1	SS	2	100	16	_ 1 - - -	- - - -	0		s o <sub>13</sub>				
		very stiff to hard		SS	3	100	28	- - - - 2	215 — - - - -	0		¹ °16				
		grey		SS	4	100	32	- - - - -	214 —	0		³ °15				
		ND OF BOREHOLE	213.5 3.0					_ 3	-			15	1 1			

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD	OF BOREHOL	E No	<b>).</b>	BH	<u>C8</u>									W	ood.
	ject Number:	TP115086							Drilling	g Location:	N:4852650		Sta. 0+450 E:	603915	Logged by:	MS
Pro	ject Client:	City of Brampton							_ Drilling	g Method:	150 mm Sol		ugers		Compiled by:	SN
	ject Name:	Arterial Road Network v Secondary Plan Area (A	within H Area 47)	ighwa	y 427 l	ndustr	ial			g Machine:	Track Mount				Reviewed by:	
Pro	ject Location:	Brampton, Ontario							_ Date S	Started:	Mar 25, 2020	Date	Completed: Ma	r 25, 2020	Revision No.:	0, 2/8/21
	LITH	OLOGY PROFILE		SC	IL SA	MPLI	NG			FIELD	TESTING		TESTING apour Reading	7	COMMEN	ITC
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	<b>DEPTH</b> (m)	ELEVATION (m)	O SPT □  MTO Vane* △ Intact ▲ Remould	<ul><li>♦ Intact</li><li>♦ Remould</li></ul>	△ COV (LE 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	TOV (LEL) 4 6 8 m) □ TOV (ppm) 00 300 400 W W <sub>L</sub>	INSTRUMENTATION INSTALLATION	& GRAIN SI DISTRIBUT (%)	ZE
<u></u>	Geodetic Ground S	Surface Elevation: 216.6 m brown		Sar	Sar	Rec	SP	DEF		* Undrained Sh 20 40	ear Strength (kPa) 60 80	Plastic 20 4	Liquid 0 60 80	S S	GR SA	SI CL
<b>X</b>		Sand and Gravel FILL moist	216.0	SS	1	42	9	- - -	216 -	0		1				
	SILTY trace	brown  CLAY / CLAYEY SILT TILL  to some sand, trace gravel very stiff to hard	0.6	SS	2	100	22	- - - 1		0		1				
			214.8	SS	3	58	49	- - -	215 -		O	1				
AZV.		END OF BOREHOLE	1.8						•			:				

 $\frac{\textstyle \sum}{\textstyle -}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD	OF BOREHO	LE N	<b>o.</b> !	BH (	<u>C9</u>												V	<b>VO</b> (	od.	,
Pro	oject Number:	TP115086							Drilling	Location:	Č	Countryside I:4852761	Dr., EBL	., Sta.	0+600 E:6	04016	L	ogged b	y: <u>M</u>	S	_
Pro	oject Client:	City of Brampton							Drilling	Method:	-	150 mm So	lid Stem	Auger	s		c	ompiled	by: <u>S</u>	N	_
Pro	oject Name:	Arterial Road Network Secondary Plan Area	within H	lighwa	y 427 I	ndustr	ial		Drilling	g Machine:	Ī	rack Mount	ed Drill				F	eviewed	by: <u><b>Si</b></u>	/I / DP	_
Pro	oject Location:	Brampton, Ontario	(Al ea 41)						Date 9	Started:	<u>N</u>	Mar 25, 2020	Dat	e Com	pleted: Ma	ar 25, 20	<b>20</b> F	evision l	No.: <u>0,</u>	2/8/21	-
	LITH	OLOGY PROFILE		SC	IL SA	MPLI	NG			FIELD	) TE	STING		3 TES	TING	_			45150		_
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT [  MTO Vane  △ Intact  ▲ Remoule  * Undrained	□ PP e*   1 d   •	nTesting  PT   DCPT  Nilcon Vane*  Intact   Remould  Strength (kPa)  60   80	▲ COV (	Depm) □ 200 3	TOV (LEL) 6 8 TOV (ppm) 00 400 W <sub>L</sub> Liquid 50 80	INSTRUMENTATION INSTALLATION	GR	GRAII DISTRI	MENTS & N SIZE BUTIO %)		
	Geodetic Ground S	Surface Elevation: 218.3 m bout 110 mm ASPHALT	218.2 0.1	0)	0)	ш	0)	-	<u> </u>	2,0	+0		2,0	40 (		==					_
	Sil	Sand and Gravel FILL moist dark grey / brown ty Clay / Clayey Silt FILL	217.9 ——0.6	ss	1	83	10	- - - -	218 -	0			3								
	SILTY	nd, trace gravel, trace organ brown CCLAY / CLAYEY SILT TILL to some sand, trace gravel very stiff	0.9	SS	2	100	20	_ 1 - -	217 -	0			3								
<b>32</b> 2		END OF BOREHOLE	216.8 1.5																		
													-								
											:			:							

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREHOL	E N	0.	BH (	C11									Wo	<u>o</u>
Pro	ject Number:	TP115086							Drilling	Location:	Countryside N:4852893	Dr., WBL,	Sta. 0+750 E:	604113	Logged by:	MS
Pro	ject Client:	City of Brampton							Drilling	Method:	150 mm Sc	olid Stem A	ugers		Compiled by:	SN
Pro	ject Name:	Arterial Road Network v Secondary Plan Area (A	vithin H	lighwa	y 427 I	ndustr	ial		Drilling	Machine:	Track Moun	ted Drill			Reviewed by:	SM / DP
Pro	ject Location:	Brampton, Ontario							Date S	Started:	Mar 27, 2020	<b>0</b> Date	Completed: Ma	ar 27, 2020	Revision No.:	0, 2/8/21
	LITH	OLOGY PROFILE		SO	IL SA	MPLI	NG			FIELD	TESTING		TESTING			
							(9)			1	tionTesting	▲ COV (LE	apour Reading L) ■ TOV (LEL)	NO NO	COMMENT &	S
ot		DESCRIPTION		Φ	nber	<u>@</u>	%) QC	_	Ē		PPT • DCPT	△ COV (pp	4 6 8 m) □ TOV (ppm)	A NO	GRAIN SIZ	
gy PI		220014II 11011		е Тур	e Nur	ery (9	/ R(	Ē	ATIO	MTO Vane*  △ Intact  ▲ Remould	Nilcon Vane*  ◇ Intact  ◆ Remould	100 20 W <sub>P</sub>	00 300 400 W W <sub>L</sub>	LLAT	DISTRIBUTI (%)	ON
Lithology Plot				Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEРТН (m)	ELEVATION		ear Strength (kPa) 60 80	Plastic 20 4	Liquid 0 60 80	INSTRUMENTATION INSTALLATION	GR SA S	I CL
~	Geodetic Ground 3	bout 120 mm ASPHALT	215.0 0.1	U)	0)	ш	0)	-	215 —	20 40		2,0 4	0 00 00	==		
₩		brown Sand and Gravel FILL moist	0.1					-	-							
₩		moiot	214.4	SS	1	83	21	-	-	0		2				
	Sil	dark grey / grey ty Clay / Clayey Silt FILL	0.8					<u> </u>	-							
$\bowtie$	trace sand, t	race to some gravel, trace orga	anics	SS	2	100	18	- 1 - -	214 -			 				
XX				00	2	100	10	-	-			9				
$\bowtie$								Ē	-							
$\bowtie$				SS	3	92	7	- - - 2		0		20				
XX			212.9					- 1	213 -							
	SILTY	brown / brownish grey / CLAY / CLAYEY SILT TILL to some sand, trace gravel	2.2						-							
	trace	very stiff to hard		SS	4	100	17	-	-	0		n 0 17				
								_ 3	-							
								} `	212 -			-				
				SS	5	100	29	E	-	0		17				
								Ė	-							
		grey						- - 4	-							
				SS	6	83	22	_	211 -	0		as o 13				
								-	-							
				00	-	00	0.4	F 7	7 -							
			210.0	SS	7	83	34	- 5 =	Z - = -	0		12				
M/K		END OF BOREHOLE	5.2						210 -							
										: :						

 $\frac{\nabla}{z}$  Groundwater encountered on completion of drilling on  $\underline{3/27/2020}$  at a depth of:  $\underline{4.9~\text{m}}$ .

R	ECORD OF BOREHOLE N	Ο.	ВН	C12									wood.
Pro	ject Number: TP115086						Drilling	Location:	Countryside N:4852900	Dr., WBL,	Sta. 0+750 E:	604113	Logged by: MS
Pro	ject Client: City of Brampton						Drilling	Method:	150 mm So	lid Stem A	ugers		Compiled by: SN
Pro	ject Name: Arterial Road Network within I	Highwa	ay 427 I	Industr	ial		Drilling	Machine:	Track Mount	ed Drill			Reviewed by: SM / DP
Pro	Secondary Plan Area (Area 47 ject Location: Brampton, Ontario	)					Date S	Started:	Mar 25, 2020	Date	Completed: Ma	ır 25, 202	20 Revision No.: <u>0, 2/8/21</u>
	LITHOLOGY PROFILE	SC	OIL SA	MPLI	NG			FIELD	TESTING		TESTING		
					(%		-		tionTesting	▲ COV (LE	apour Reading L) ■ TOV (LEL) I 6 8	NOIL	COMMENTS &
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	MTO Vane* △ Intact ▲ Remould * Undrained Sho	ear Strength (kPa)	△ COV (ppr 100 20 W <sub>P</sub> Plastic	m)	INSTRUMENTATION INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
	Geodetic Ground Surface Elevation: 213.6 m   about 100 mm TOPSOIL   213.5		ű	Ř	S	_	<u> </u>	20 40	60 80	20 4	0 60 80	22	GR SA SI CL
	brown 0.1 Sand and Gravel FILL moist 213.0	SS	1	75	6	- - -	213 —	0		3			
	dark brown / brown 0.6  Silty Clay / Clayey Silt FILL  trace sand, trace gravel	ss	2	100	6	- - - - 1	-	0		3			
₩	212.4 END OF BOREHOLE 1.2					-							
										:			
										: :			
		i .	1	Ì	1	ı		1 : :		: :		1	

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD OF	BOREHOL	_E No	o. <u>l</u>	BH (	<u>C13</u>												W	<b>'OC</b>	d.
Pro	ject Number: TP11	5086							Drilling	Location:	Country N:48529	yside I	Dr., EBL,	Sta. 0+9	900 E:6	04197	Lo	ogged by:	MS	
Pro	ject Client: City	of Brampton							Drilling	Method:	150 mn	n Soli	d Stem A	ugers			C	ompiled b	y: <u><b>SN</b></u>	
Pro	ject Name: Arter	rial Road Network ondary Plan Area (A	within H	ighwa	y 427 l	ndustr	ial		Drilling	Machine:	Track N	lounte	d Drill				R	eviewed I	ру: <u><b>SM</b> /</u>	DP
Pro	ject Location: <u>Bran</u>	npton, Ontario	-104 -11)						Date S	Started:	<u>Mar 27,</u>	2020	Date	Comple	ted: Ma	r 27, 20	<b>20</b> R	evision N	o.: <u>0, 2/</u>	8/21
	LITHOLOG	GY PROFILE		SO	IL SA	MPLI	NG			FIELD	TESTIN	G		TESTI						
Lithology Plot		CRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould  * Undrained Sh	♦ Intact ♦ Remonstrate ear Strength	DCPT _ ane* ould (kPa)	COV (LE 2 100 2 100 2 W <sub>P</sub> Plastic	4 6 om) □ T 00 300 W	OV (LEL)  8  OV (ppm)  400  W <sub>L</sub> Liquid	INSTRUMENTATION INSTALLATION	<b>[</b> GR	COMM & GRAIN DISTRIB (%	SIZE UTION	CL
~~~	Geodetic Ground Surface E about 14	0 mm ASPHALT	218.9	S	S	<u>«</u>	S	_	ш .	20 40	60 8	0	20 4	10 60	80	22	GIV	- JA		- CL
	dark t Silty Clay trace sand, trac	brown nd Gravel FILL moist brown / brown / Clayey Silt FILL e gravel, trace organic		ss	1	83	11		- - - -	0		25	°16							
	trace to som	rown/grey / CLAYEY SILT TILL e sand, trace gravel e stiff to hard	0.9	SS	2	100	17	— 1 - - - -	218	0		8	017							
			-	SS	3	100	23	- - - - 2 -	217 —	0		es	O 15							
			215.9	SS	4	100	30			0		25	°17							
<u> 28.82</u>	END O	F BOREHOLE	3.0					<del> 3</del>	216 —				:		-					
													:		:					

 $\frac{\textstyle \sum}{\scriptstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

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Project Number: TP115086  Project Client: City of Brampton  Project Name: Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47)  Project Location: Brampton, Ontario  Drilling Method: 150 mm Solid Stem Augers  Drilling Machine: Track Mounted Drill  Reviewed by: Mar 27, 2020  Date Completed: Mar 27, 2020  Revision No.: PenetrationTesting Solid Vapour Reading	RI	ECORD	OF BOREHO	LE N	<b>o.</b>	BH (	<u>C15</u>									WOO	bd
Project Client: City of Brampton  Project Name: Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47)  Project Location: Brampton, Ontario  Date Started: Date Started: Mar 27, 2020 Date Completed: Mar 27, 2020 Date Completed: Mar 27, 2020 Revision No.:     Complete Date Started: Date Started: Mar 27, 2020 Date Completed: Mar 27, 2020 Date Completed: Mar 27, 2020 Date Completed: Mar 27, 2020 Penetration Testing Completed: Mar 27, 2020 Penetration Testing Completed: Mar 27, 2020 Date Completed: Mar 27, 2020 Penetration Testing Completed: Mar 27, 2020 Penetratio	Pro	ject Number:	TP115086						Drilling	Location:	Countryside	Dr., WBL,	Sta. 1+050 E	:604285	***		
Project Location: Brampton, Ontario  Date Started: Mar 27, 2020 Date Completed: Mar 27, 2020 Revision No.:  LITHOLOGY PROFILE  SOIL SAMPLING  PenetrationTesting OSPT PPT DESCRIPTION  DESC	Project Client: City of Brampton									Drilling	g Method:		lid Stem A	ugers		Compiled by: SN	
Date Started:   Mar 27, 2020   Date Completed:   Mar 20, 20 40 60 80   Date Completed:   Mar 20, 20										Drilling	g Machine:	Track Moun	ted Drill			Reviewed by: SM	/ DP
DESCRIPTION	Pro	ect Location:	Brampton, Ontario	(Area 47)						Date S	Started:	Mar 27, 2020	Date	Completed: M	ar 27, 202	0 Revision No.: <u>0, 2</u>	/8/21
PenetrationTesting   Set   PenetrationTesting   Penetra		LITH	OLOGY PROFILE		SC	IL SA	MPLII	NG	_		FIELD	TESTING				COMMENTS	
about 130 mm ASPHALT 219.6 brown 0.1 Sand and Gravel FILL moist 219.2 moist 0.6 Gark grey / brown Silty Clay / Clayey Silt FILL trace sand, trace to some gravel, trace organgiqs.8 brown 0.9 SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel firm to stiff 218.2	Lithology Plot	Geodetic Ground S			Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)		O SPT □  MTO Vane*  △ Intact ▲ Remould  * Undrained She	PPT	△ COV (LE 2	EL) TOV (LEL)  4 6 8 m) TOV (ppm) 00 300 400  W WL Liquid	INSTRUMENTATION	& GRAIN SIZE DISTRIBUTION (%)	CL
Sand and Gravel FILL moist 0.6 dark grey / brown Silty Clay / Clayey Silt FILL trace sand, trace to some gravel, trace organges, 8  brown 0.9 SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel firm to stiff 218.2	***	al	oout 130 mm ASPHALT	219.6 0.1	·				-								
brown 0.9 SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel firm to stiff 218.2		Silt	Sand and Gravel FILL moist dark grey / brown ty Clay / Clayey Silt FILL	219.2 ——0.6	SS	1	100	16	- - - - -	219 -	0						
END OF BOREHOLE 15		SILTY	brown  CLAY / CLAYEY SILT TILL to some sand, trace gravel	- 0.9	SS	2	100	10	- - 1 - - -	-	0						
	***		END OF BOREHOLE							<u>-</u>							

 $\frac{\textstyle \sum}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREHOL	E No	o. <u>l</u>	ВН	C17									WC	od.
Pro	ject Number:	TP115086							Drilling	Location:	Countryside N:4853230	Dr., EBL, S	Sta. 1+200 E:6	04386	_ Logged by:	MS
Pro	ject Client:	City of Brampton							Drilling	g Method:	150 mm So	lid Stem Au	ugers		Compiled by:	SN
Pro	ject Name:	Arterial Road Network w Secondary Plan Area (Ar	ithin H	ighwa	y 427 I	ndustr	ial		Drilling	Machine:	Track Mount	ted Drill			_ Reviewed by:	SM / DP
Pro	ject Location:	Brampton, Ontario	rea 41)						Date 9	Started:	Mar 27, 2020	Date (	Completed: Ma	r 27, 2020	_ Revision No.:	0, 2/8/21
	LITH	OLOGY PROFILE		SO	IL SA	MPLI	NG			FIELD	TESTING	LAB <sup>-</sup>	TESTING			
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	Penetra ○ SPT □  MTO Vane* △ Intact ▲ Remould * Undrained Shi	rtionTesting  PPT	Soil Val COV (LEL 2 4 COV (ppn 100 20 W <sub>P</sub> Plastic	pour Reading  1) TOV (LEL)  6	NSTRUMENTATION NSTALLATION	COMMEN & GRAIN SI DISTRIBUT (%)	ZE
XXX	Geodetic Ground S		219.8	Ø	Ø	œ	o o	-	<u>, ш</u>	20 40	60 80	20 40	60 80	== `	<u> </u>	<u> </u>
	Silt trace sar	moist dark brown / brown y Clay / Clayey Silt FILL nd, trace gravel, trace organics	0.1 219.5 0.4 219.0 0.9	SS	1	100	11	- - - - - - - - - 1	219 —	0		o 15				
	trace	brown / brownish grey SILTY CLAY TILL to some sand, trace gravel stiff to hard		SS	2	88	14	- '  -  -  -  -  -	- - - - -	0		<sup>0</sup> 16				
				SS	3	100	24	- - 2 - -	218 -	0		15				
			-	SS	4	100	41	- 3	217 —	0	E	<sup>0</sup> 15				
				SS	5	100	30	-	- - - -	0		a o 15				
		grey	-	SS	6	50	14	- - 4 - - -	216 -	0	E	N O 18				
		END OF BOREHOLE	214.9 5.0	SS	7	100	20	- - - - - - 5	215 —	0		17●			1 11	50 38

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD OF BOREHOLE N	Ο.	<u>BH</u>	<u>C18</u>								wood.
Pro	oject Number: TP115086						Drilling	Location:	Countryside l N:4853229	Dr., EBL, Sta. 1+200 E:	604388	Logged by: MS
Pro	oject Client: City of Brampton							Method:	150 mm Soli	id Stem Augers		Compiled by: SN
	oject Name: Arterial Road Network within I Secondary Plan Area (Area 47	Highwa )	ay 427	Industr	ial			Machine:	Track Mounte			Reviewed by: SM / DP
Pro	oject Location: Brampton, Ontario	-					Date 9	Started:	Apr 1, 2020	Date Completed: A	or 1, 2020	Revision No.: 0, 2/8/21
	LITHOLOGY PROFILE	SC	OIL SA	MPLI	NG			FIELD .	TESTING	LAB TESTING Soil Vapour Reading		0014151170
Lithology Plot	DESCRIPTION  Geodetic Ground Surface Elevation: 219.9 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	PPT	△ COV (ELL) ■ TOV (LEL)  2 4 6 8  △ COV (ppm) □ TOV (ppm)  100 200 300 400  W <sub>P</sub> W W <sub>L</sub> ■ Uquid  20 40 60 80	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
	brown <b>Sand and Gravel FILL</b> moist	SS	1	88	5	- - -	-	0	63			
	brown 0.6  SILTY CLAY / CLAYEY SILT TILL  trace to some sand, trace gravel stiff to very stiff		2	100	12	- - - - - - 1	219 -	0		1		
	218.1	SS	3	100	19	<del>-</del> - - - -	-	0				
	END OF BOREHOLE 1.8											

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

RE	CORD	OF BOREHO	DLE N	ο.	ВН	C19	/ BI	Н В	22										٧	VC	000	<u>J.</u>
Proj	ect Number:	TP115086							Drilling	g Location:	N:	ountryside 4853360					604448		ogged b	-	MS	—
Proj	ect Client:	City of Brampton							Drilling	g Method:	_1	50 mm Sol	lid S	Stem A	ugers	1		c	ompiled	by:	SN	
Proj	ect Name:	Arterial Road Netwo	rk within H	lighwa	y 427	Industr	ial		Drilling	g Machine:	Tr	ack Mount	ted I	Orill				R	eviewed	by:	SM / DP	_
Proj	ect Location:	Brampton, Ontario	. (/404 4/)						Date S	Started:	<u>Ja</u>	n 23, 2020	)	_Date (	Comp	leted: <u>Ja</u>	n 23, 20	<b>20</b> R	evision	No.:	0, 2/8/21	1
	LITH	OLOGY PROFILE		SC	IL SA	MPLI	NG			FIELD	TES	STING		LAB Soil Va			_					
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	Penetra ○ SPT □  MTO Vane* △ Intact ▲ Remould  * Undrained Sh 20 40	PPT Ni ♦	DCPT  Icon Vane* Intact Remould	Δ	COV (LEL	o) = 6 0 30 W	TOV (LEL)  8  TOV (ppm) 0 400  W <sub>L</sub> Liquid	INSTRUMENTATION INSTALLATION	- J GR	GRAII DISTRI	& N SIZ	E ON	CL
	а	Surface Elevation: 209.0 m bout 200 mm ASPHALT	208.8	0)	0)		0)		-	20 40				20 40								
		Sand and Gravel FILL moist	0.2					-	-									33	58		(9)	
₩		brown/dark grey	208.4 0.6	SS	1	75	9			0			<b>.</b>									
▓		Silty Clay FILL trace gravel						-	-													
		Ü		SS		100	40	<u> </u>	208 -													
▓			207.5	33	2	100	18	-	-													
~~		END OF BOREHOLE	1.5											: :		:						
										: :												
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 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREHOLE N	0.	<u>BH</u>	C20										W	00	d.
Pro	ject Number:	TP115086						Drilling	g Location:	Countryside	Dr., WBL,	Sta. 1+350 E:	604492	Lo	gged by:	MS	
Pro	ject Client:	City of Brampton						Drilling	g Method:	N:4853362 150 mm Sc	olid Stem A	ugers		Co	ompiled by:	SN	
Pro	ject Name:	Arterial Road Network within H Secondary Plan Area (Area 47)	lighwa	ay 427	Industr	ial		Drilling	g Machine:	Track Moun	ted Drill			R	eviewed by	: <u>SM / </u>	DP
Pro	ject Location:	Brampton, Ontario						Date S	Started:	Apr 1, 2020	Date (	Completed: Ap	or 1, 2020	Re	evision No.	0, 2/8	3/21
	LITH	OLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING		TESTING pour Reading	_ [				
						(%)		(E)		tionTesting PPT • DCPT	▲ COV (LEI	.) TOV (LEL)	INSTRUMENTATION INSTALLATION		COMMEI &		
Plot		DESCRIPTION	фе	Sample Number	(%)	SPT 'N' / RQD (%)	<u> </u>		MTO Vane*	Nilcon Vane*	△ COV (ppn	n) □ TOV (ppm) 0 300 400	TION	г	GRAIN S DISTRIBU		
lology F			Sample Type	Se N	Recovery (%)	ž	DEРТН (m)	ELEVATION	<ul> <li>△ Intact</li> <li>▲ Remould</li> </ul>	<ul><li>♦ Intact</li><li>♦ Remould</li></ul>	W <sub>P</sub>	W W <sub>L</sub>	RUM ALLA	-	(%)		
<b>⇒</b> ∣	Geodetic Ground S	urface Elevation: 220.2 m	Sam	Sam	Reco	SPT	DEP	EFE	* Undrained Sh 20 40	ear Strength (kPa) 60 80	Plastic 20 40	Liquid 0 60 80	INST	GR	SA	SI	CL
$\boxtimes$		brown Sand and Gravel FILL					-	220 -	: :		: :						
$\bowtie$		moist 219.8	SS	1	100	16	Ė	220			<b>d</b>		1				
燚	Silt	dark grey / brown 0.5 cy Clay / Clayey Silt FILL cace to some gravel, trace organics					-										
$\overset{x}{\bowtie}$	uace sand, u	ace to some graver, trace organics	SS	2	67	11	- - - 1				<b>4</b> · · · · ·						
燹		219.0 END OF BOREHOLE 1.2					<u> </u>	-									
		was terminated due to the close															
	prox	imity of existing watermain															
			i e	1	1	l	i		1 1 1		1 : :		1 1				

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD OF BOREHOLE N	<b>o.</b>	BH (	<u>C21</u>								wood.
Pro	oject Number: TP115086						Drilling	Location:		Dr., EBL, Sta. 1+500 E:6	04570	_ Logged by: MS
Project Client: City of Brampton							Drilling	Method:	N:4853458 150 mm Soli	d Stem Augers		Compiled by: SN
Pro	oject Name: Arterial Road Network within H	lighwa	ıy 427 I	ndustr	ial		Drilling	Machine:	Track Mounte	ed Drill		Reviewed by: SM / DP
Pro	Secondary Plan Area (Area 47)  oject Location: Brampton, Ontario						Date S	Started:	Mar 27, 2020	Date Completed: Ma	r 27, 2020	Revision No.: <u>0, 2/8/21</u>
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading	_	00111151170
Lithology Plot	DESCRIPTION  Geodetic Ground Surface Elevation: 221.3 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	Nilcon Vane*	▲ COV (LEL) ■ TOV (LEL)  2 4 6 8  △ COV (ppm) □ TOV (ppm) 100 200 300 400  W <sub>P</sub> W W <sub>L</sub> Plastic Liquid 20 40 60 80	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
~~~	about 200 mm ASPHALT 221.1					-	-					
	brown 0.2  Sand and Gravel FILL 220.8  moist 0.5  dark grey / brown	SS	1	100	9	- - -	221 —	0				
	Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace organics 220.4 brown SILTY CLAY / CLAYEY SILT TILL					- - - 1	-					
	trace to some sand, trace gravel stiff 219.7	SS	2	100	14		220 -	0	A			
	END OF BOREHOLE 1.5											

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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		OF BOREHOL TP115086	E No	<b>)</b> .	BH	<u>C23</u>			Drilling	J Location:	Countricido	Dr Wei	Sta. 1+650 E:	20464E	WO(	od.
	-	City of Brampton								Method:	N:4853563 150 mm Sol			004040	Compiled by: SI	
	-	Arterial Road Network v	vithin H	iahwa	v 427 l	ndustr	rial			Machine:	Track Mount		go. 0		Reviewed by: SI	
		Secondary Plan Area (A Brampton, Ontario	rea 47)							Started:	Mar 27, 2020		Completed: Ma	r 27, 2020		
	LITHO	DLOGY PROFILE		SC	IL SA	MPLI	NG			FIELD :	TESTING	LAB Soil Va	TESTING pour Reading	_	00040450170	
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	<b>DEPTH</b> (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	tionTesting  PPT	▲ COV (LE	_) ■ TOV (LEL) 6 8 n) □ TOV (ppm) 0 300 400  W WL	NSTRUMENTATION NSTALLATION	GRAIN SIZE DISTRIBUTIO (%)  GR SA SI	
~	abo	out 150 mm ASPHALT brown	221.2 0.1	0)	0)		0)	- "		20 40	00 00	20 4	0 00 00			
	Silty	and and Gravel FILL moist  dark grey / Clay / Clayey Silt FILL d, trace gravel, trace organics	220.7 0.6 220.4	ss	1	100	16	- - - - -	221 -	0		<sup>30</sup> 5				
	SILTY	orown / brownish grey CLAY / CLAYEY SILT TILL o some sand, trace gravel, cobbles/boulders firm to hard	° 0.9	SS	2	100	8	- 1 - - - -	220 —	0		³ °16				
				SS	3	100	23	- - - 2 -	-	0		14				
				SS	4	100	41		219 -	0	E	³ °13				
				SS	5	100	44	- 3 - - - - -	218 —		)	₃ ⊙ 10				
				SS	6	100	30	- - 4 - -	217 —	0	E	<sup>3</sup> 0				
		grey	216.1	SS	7	100	18	- - - - - - 5	-	0		ı				
		END OF BOREHOLE	5.2													

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD OF BOREHOLE N	<b>o.</b>	BH	C24								wood
Pro	oject Number: TP115086						Drilling	Location:	Countryside N:4853568	Dr., WBL, Sta. 1+65	E:604647	Logged by: MS
Pro	oject Client: City of Brampton						Drilling	g Method:		lid Stem Augers		Compiled by: SN
Pro	oject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	lighwa	ıy 427 l	ndustr	ial		Drilling	g Machine:	Track Mounte	ed Drill		Reviewed by: SM / DP
Pro	oject Location: Brampton, Ontario						Date S	Started:	Apr 1, 2020	Date Completed	Apr 1, 2020	Revision No.: 0, 2/8/21
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading		
			_		(%)		Œ		tionTesting PPT • DCPT	▲ COV (LEL) ■ TOV 2 4 6 8		COMMENTS &
Plot	DESCRIPTION	ype	Sample Number	(%)	SPT 'N' / RQD (%)	Ê		MTO Vane*		△ COV (ppm) □ TOV 100 200 300 40	M T O T	GRAIN SIZE DISTRIBUTION
Lithology Plot		Sample Type	) ple	Recovery (%)	ż	DEРТН (m)	ELEVATION	△ Intact ▲ Remould	◆ Remould	W <sub>P</sub> W V	TALL	(%)
Ę Ę	Geodetic Ground Surface Elevation: 220.9 m	Sam	Sam	Reo	SPT	DEP		* Undrained She	ear Strength (kPa) 60 80	Plastic Liqu 20 40 60 8		GR SA SI CL
₩	brown Sand and Gravel FILL moist	SS	1	67	5	-			200	3		
₩	220.3		•			_						
$\bowtie$	dark grey 0.6 Silty Clay / Clayey Silt FILL			400		-	220					
₩	trace sand, trace gravel, trace organics 219.7	SS	2	100	15	<u> </u>	220 -	0	143			
	brown 1.2 SILTY CLAY / CLAYEY SILT TILL					Ė						
	trace to some sand, trace gravel, cobbles/boulders	SS	3	58	22	_		0	<b>a</b>	3		
<i>3</i> /X	very stiff 219.1 <b>END OF BOREHOLE</b> 1.8					-					-	

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD OF BOREHOLE N	ο.	BH (	C25									WC	od.
Pro	ject Number: TP115086						Drilling	Location:	Countryside	Dr., EBL,	Sta. 1+800 E:6	04747	_ Logged by:	MS
Pro	ject Client: <u>City of Brampton</u>						Drilling	g Method:	N:4853682 150 mm So	lid Stem A	ugers		_ Compiled by:	SN
Pro	ject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	lighwa	ay 427 I	Industr	ial		Drilling	Machine:	Track Mount	ed Drill			_ Reviewed by:	SM / DP
Pro	ject Location: Brampton, Ontario						Date S	Started:	Mar 27, 2020	Date	Completed: Ma	r 27, 2020	_ Revision No.:	0, 2/8/21
	LITHOLOGY PROFILE	sc	DIL SA	MPLI	NG			FIELD	TESTING		TESTING			
					(%			1	tionTesting	Soil Va  COV (LE)	apour Reading L) ■ TOV (LEL) 4 6 8	NSTRUMENTATION NSTALLATION	COMMENT &	rs
to	DESCRIPTION	e e	Sample Number	(%	SPT 'N' / RQD (%)	=	E N	○ SPT □ MTO Vane*	PPT • DCPT Nilcon Vane*	△ COV (ppr	m) □ TOV (ppm) 00 300 400	TION	GRAIN SIZ	ZE
Lithology Plot		Sample Type	ole Nu	Recovery (%)	, , , , , , , , , , , , , , ,	DEРТН (m)	ELEVATION	△ Intact ▲ Remould	♦ Intact	W <sub>P</sub>	W W <sub>L</sub>	ALLA	(%)	ION
Lithol	Geodetic Ground Surface Elevation: 220.9 m	Samp	Samp	Reco	SPT	DEP'	ELE	* Undrained She 20 40	ear Strength (kPa) 60 80	Plastic 20 4	Liquid 0 60 80	INST	GR SA S	SI CL
***	<b>about 150 mm ASPHALT</b> 220.7 brown 0.1						-							
$\ggg$	Sand and Gravel FILL moist 220.3					Ē	-							
	dark grey 0.6	SS	1	100	11	_	-	0		<sup>30</sup> 4				
***	Silty Clay / Clayey Silt FILL 219.9  trace sand, trace gravel, trace organics brown /brownish grey					- 1	220 -							
	SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel	ss	2	100	14	E	-	0		12				
	stiff to hard					-	-							
		SS	3	100	25	-	219 -	0		13				
						_ 2				13				
						_	-							
						È	-							
	247.0	SS	4	100	46	-	218 -			12				
ZYXz	217.8 END OF BOREHOLE 3.0					- 3			: :					
								1						

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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RI	ECORD OF BOREHOLE N	Ο.	BH	C27	' / Bl	H S	<u>7</u>						WC	000	4
⊃ro <sub>.</sub>	ject Number: TP115086						Drilling	g Location:	Countryside N:4853816	Dr., WBL, Sta.	1+950 E:0	604850	_ Logged by:	MS	_
Pro	ject Client: City of Brampton						Drilling	g Method:		lid Stem Augers	S		Compiled by:	SN	
	ject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	lighwa )	ay 427	Indust	rial			g Machine:	Track Mount				Reviewed by:		
Pro <sub>.</sub>	ject Location: Brampton, Ontario						Date	Started:	Mar 26, 2020	Date Comp	oleted: Ma	r 26, 2020	_ Revision No.:	0, 4/1/2	1
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG				TESTING	LAB TES' Soil Vapour R	eading	z	COMMEN	TS	
			ja ja		(%)		Ê	1	ationTesting PPT • DCPT	▲ COV (LEL) ■ 2 4 6	8	INSTRUMENTATION INSTALLATION	& GRAIN SI		
y Plot	DESCRIPTION	Туре	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	Œ	NOF	MTO Vane* △ Intact	Nilcon Vane* ♦ Intact	△ COV (ppm) □ 100 200 30 W <sub>P</sub> W	TOV (ppm) 00 400 W <sub>L</sub>	LATIO	DISTRIBUT		
Lithology		Sample Type	ample	ecove	P Z	DEРТН (m)	ELEVATION		Remould ear Strength (kPa)	■ <del>○</del> Plastic	Liquid	ISTRI ISTAL	(%) GR SA	SI	CL
<b>→</b>	Geodetic Ground Surface Elevation: 217.8 m           about 130 mm ASPHALT         217.6           brown         0.1	S	S	<u> </u>	S	_	Ш	20 40	60 80	20 40 6	0 80		or or	-	OL
▓	Sand and Gravel FILL trace to some silt					E									
▓	moist	SS	1	83	17	E	217 -	0		30 <sub>4</sub>					
$\stackrel{\otimes}{\otimes}$	dark brown / dark grey 0.9					_ _ 1									
▓	Silty Clay / Clayey Silt FILL some sand, trace to some gravel, trace organics	ss	2	100	11	-				22					
▓						F		<u> </u>				¥			
▓		SS	3	100	13	-	216 -	0		°23					
$\boxtimes$						— 2 - -									
	SAND AND SILT TILL trace clay, trace gravel	ss	4	24	40								1 40	52	7
	dense	55	4	21	40	- <u>-</u>	Z 215 -	<u> </u>		21			1 40	52	′
	brown 214.8 3.0 SILTY CLAY / CLAYEY SILT TILL					3 3									
	trace to some sand, trace gravel, cobbles/boulders	SS	5	100	59	-			· · · · · · · · · · · · · · · · · · ·	18					
	hard					-	044	]							
		ss	6	100	62 / 150mm	- - 4	214 -		62 150 mm	10					
						-			130 11111						
					55.1	Ė			55						
		SS	7	100	55 / 150mm	-	213 -		55 150 mm	17 o					
						5 - -									
						-									
						-	212 -								
						- - 6									
	grey	ss	8	25	67	-			· · · · · · · · · · · · · · · · · · ·	o 21					
						-				21					
						- - - 7	211 -								
						-									
						_		1							
		ss	9	100	44	-	210 -		3						
				100		— 8 - -				26					
						Ė									
						<u> -</u>  -	209 -	1							
						- - 9		1							
		000	40	2-		<u> </u>		1							
	208.0	SS	10	67	50	<u> </u>		1		18					
- 414	END OF BOREHOLE 9.8														
Can	ada Lillited   -						-		depth of: <u>2.7 m</u> .						
0 V	/ogell Road, Units 3 & 4	ater de	ptn obse	erved or	ı <u>5/4/202</u>	<u>:u</u> at a	ueptn of	: <u>1./ m</u> .							

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## RECORD OF BOREHOLE No. BH C27 / BH S7



Project Number:	TP115086	Project Name: Arterial Road Network within Highway 427 Industrial Secondary Plan Area
		(Area 47)

Project Location: Brampton, Ontario

FIU	ect Location. Brampton, Ontario													
	LITHOLOGY PROFILE	SC	IL SA	MPLII	NG			FIELD TESTING	LAB TESTING Soil Vapour Reading	_			-NTO	
					(%		<u>-</u>	PenetrationTesting	▲ COV (LEL) ■ TOV (LEL)	INSTRUMENTATION INSTALLATION		COMM 8		
ot	DESCRIPTION	e	mber	(%	ар (°	_	_ <u>E</u>	O SPT □ PPT ● DCPT	△ COV (ppm) □ TOV (ppm) 100 200 300 400	ATU	_	<b>GRAIN</b>	SIZE	
gy PI		э Тур	ınN e	ery (9	'' R	E)	Ę	MTO Vane* Nilcon Vane*  △ Intact	100 200 300 400 W <sub>P</sub> W W <sub>L</sub>	UME		ISTRIE (%)	SUTION	
Lithology Plot		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	* Undrained Shear Strength (kPa)	Plastic Liquid	ISTR	0.0			01
	50 mm dia. monitoring well with flushmount	Ø	Ø	Δ.	S	۵	Ш	20 40 60 80	20 40 60 80	22	GR	SA	SI	CL
	protective casing installed (depth below ground surface):													
	Concrete: 0.0 - 0.3 m													
	Sand: 0.3 - 0.6 m Bentonite: 0.6 - 5.5 m													
	Sand Filter: 5.5 - 6.1 m Screen: 6.1 - 9.1 m													
	Groundwater measurement in the monitoring well													
	(depth below ground):													
	24 Apr 2020: 1.7 m 4 May 2020: 1.7 m													
	12 May 2020: 1.9 m													

		OF BOREHOLE	E No	o. <u>l</u>	<u>BH</u>	<u>C29</u>			D 1111		• • • • •	D		wood.
	oject Number: oject Client:	City of Brampton								g Location: g Method:	N:4853935	Dr., EBL, Sta. 2+100 E:6	04945	Logged by: MS Compiled by: SN
	oject Name:	Arterial Road Network wi	ithin H	lighwa	v 427	Indust	rial			Machine:	Track Mount			Reviewed by: SM / DP
	ject Location:	Secondary Plan Area (Are	ea 47)		,					Started:	Mar 19, 2020		r 19, 2020	
	LITH	OLOGY PROFILE		SO	IL SA	MPLI	NG			FIELD	TESTING	LAB TESTING		
Lithology Plot		DESCRIPTION  Burface Elevation: 221.4 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	Penetra ○ SPT □  MTO Vane* △ Intact ▲ Remould	tionTesting  PPT	Soll Vapour Reading	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
<b>***</b>	al	brown brown	221.2 22 <b>9</b> . <b>1</b>					-	:					
	Sil	Sand and Gravel FILL moist dark grey /grey ty Clay / Clayey Silt FILL nd, trace gravel, trace organics	0.3	SS	1	100	18	- - - - -	221 -	0		20		
			219.9	SS	2	83	11	1 - - - - -	220 -	0		23		
		brown  ' CLAY / CLAYEY SILT TILL  to some sand, trace gravel hard	1.5	SS	3	100	36	_ - - - 2	-	O	E .	ı o <sub>15</sub>		
				SS	4	100	55 / 150mm	- - - - -	219 -		55 150 mm	1 0 13		
				SS	5	100	50 / 100mm	- - 3 - - - -	218 —	5	0 0 100 mm	1 O <sub>12</sub>		
		grey		SS	6	100	50 / 100mm	- - - - - - 4	- - -		0 0 100 mm	1.0		
			040.5	SS	7	100	74 / 150mm	- - - - -	217 -		74 0 150 mm	1 012		
<i>XX</i>	1	END OF BOREHOLE	216.5 4.9				13011111				150 mm	12		
Wo	od E&IS, a Divis	ion of Wood				· .	<del>'</del> .	<u> </u>		le en completi	4	-		

R	ECORD OF BOREHOLE N	<b>o.</b>	BH	<u>C30</u>									wood	
Pro	oject Number: TP115086						Drilling	Location:	Countryside I N:4853931	Dr., EBL, S	ta. 2+100 E:6	04944	Logged by: MS	_
Pro	oject Client: City of Brampton						Drilling	g Method:	150 mm Soli	d Stem Au	gers		Compiled by: SN	_
	oject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	lighwa	ay 427 l	Industr	ial			g Machine:	Track Mounte				Reviewed by: SM / DP	_
Pro	oject Location: Brampton, Ontario						Date S	Started:	Mar 19, 2020	Date Co	ompleted: Ma	r 19, 2020	D Revision No.: <u>0, 2/8/21</u>	-
	LITHOLOGY PROFILE	SC	OIL SA	MPLII	NG			FIELD	TESTING		ESTING our Reading	-	001115150	
Lithology Plot	DESCRIPTION  Geodetic Ground Surface Elevation: 221.0 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane* △ Intact ▲ Remould	PPT ● DCPT	△ COV (LEL)  2 4  △ COV (ppm)  100 200	■ TOV (LEL) 6 8 □ TOV (ppm)	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL	_
$\bigotimes$	brown Sand and Gravel FILL 220.7 moist 0.8	SS	1	83	10	-	-	0						
	dark grey /brown Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace organics	ss	2	100	19	- - - - - -	-	. O	49.					
<b>※</b>	219.8 brown 1.2					1  	220 -							
	SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel very stiff 219.2	SS	3	25	17	-	-	0	<b>B</b>					
A 2 IV	END OF BOREHOLE 1.8													

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD OF BOREHOLE I	No.	BH	C31								W	ood.
Pro	oject Number: TP115086						_ Drilling	g Location:	Countryside N:4854046	Dr., WBL, Sta. 2+250 E	:605023	Logged by:	MS
Pro	oject Client: City of Brampton						_ Drillino	g Method:	150 mm So	lid Stem Augers		Compiled by:	SN
Pro	oject Name: Arterial Road Network within Secondary Plan Area (Area 4		ay 427	Industi	rial		_ Drilling	g Machine:	Track Mount	ted Drill		Reviewed by	SM / DP
Pro	oject Location: Brampton, Ontario	,					_ Date \$	Started:	Mar 19, 2020	Date Completed: Ma	ar 19, 2020	Revision No.:	0, 2/8/21
	LITHOLOGY PROFILE	S	OIL SA	AMPLI	NG			FIELD	TESTING	LAB TESTING			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	(m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact	tionTesting  PPT ● DCPT  Nilcon Vane*  ◇ Intact	Soil Vapour Reading	INSTRUMENTATION INSTALLATION	COMMEI & GRAIN S DISTRIBU	SIZE
tholog		ample	ample	ecove	Ņ	<b>DEPTH</b> (m)	-EVA	▲ Remould  * Undrained She	◆ Remould ear Strength (kPa)	Plastic Liquid	STRU	(%)	
Ē	Geodetic Ground Surface Elevation: 221.7 m about 150 mm ASPHALT 221.		ő	Ř	S		<u>                                     </u>	20 40	60 80	20 40 60 80	<u> </u>	GR SA	SI CL
	Sand and Gravel FILL moist  dark grey /brown Silty Clay / Clayey Silt FILL	1 00	1	83	11	-  -  -  -  -  -	221 -	0		°5 °0 °12			
	trace sand, trace gravel, trace organics	SS 2	2	100	9	1 - 1		0		021			
Z	brown SILTY SAND TILL trace to some clay, trace gravel dense to very dense wet to moist		3	100	38	- - - - - 2	☑ . = . 220 -	0		° 15		- 67	31 2
		SS	4	100	94	-  -  -  -  -  -	<b>⊒</b> 219 −		OI	a 0 15			
	END OF BOREHOLE 3.					— 3					1		

Groundwater encountered on completion of drilling on 3/19/2020 at a depth of: 1.5 m. 
Cave in depth after removal of augers: 2.7 m.

R	ECORD OF BOREHOLE N	<b>o.</b>	ВН	C32									wood.
Pro	eject Number: TP115086						Drilling	Location:	Countryside N:4854047	Dr., WBL	., Sta. 2+250 E	605023	Logged by: MS
Pro	ject Client: City of Brampton						Drilling	g Method:	150 mm So	lid Stem	Augers		Compiled by: SN
Pro	oject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	lighwa	ay 427 l	Industr	ial		Drilling	g Machine:	Track Mount	ed Drill			Reviewed by: SM / DP
Pro	oject Location: Brampton, Ontario						Date 9	Started:	Mar 19, 2020	Date	Completed: Ma	ar 19, 202	20 Revision No.: 0, 2/8/21
	LITHOLOGY PROFILE	SC	OIL SA	MPLI	NG			FIELD	TESTING		TESTING		
					(%)				tionTesting	▲ COV (L	Vapour Reading .EL) ■ TOV (LEL)	NOIL	COMMENTS &
ŏ	DESCRIPTION	e d	Sample Number	(%	SPT 'N' / RQD (%)	_	E Z	O SPT   MTO Vane*	PPT • DCPT Nilcon Vane*	△ COV (p	4 6 8 ppm) □ TOV (ppm) 200 300 400	NSTRUMENTATION INSTALLATION	GRAIN SIZE
ogy P		le Tyl	le Nu	Recovery (%)	Z Z	DEРТН (m)	ELEVATION	△ Intact ▲ Remould	♦ Intact	W <sub>P</sub>	W W <sub>L</sub>	ALLA:	DISTRIBUTION (%)
Lithology Plot	Geodetic Ground Surface Elevation: 221.7 m	Sample Type	Samp	Reco	SPT	DEP1	ELEV	* Undrained She 20 40	ear Strength (kPa) 60 80	Plastic 20	Liquid 40 60 80	INSTI INST	GR SA SI CL
<b>***</b>	brown Sand and Gravel FILL					-			: :	:			
₩	moist	SS	1	50	8	_				3		1	
₩	221.1 dark grey 0.6 Silty Clay / Clayey Silt FILL					<u> </u>	221 -					1	
₩	trace sand, trace gravel, trace organics	SS	2	100	13	_ _ 1		0		3			
₩	220.5 brown 1.2					Ė							
$\mathcal{V}$	SILTY SAND / SANDY SILT TILL trace to some clay, trace gravel	SS	3	100	33	- -	-			; 3 :			
X	dense wet 219.8					-	220 -					]	
	END OF BOREHOLE 1.8												
										:			
										:			
										:			
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										:			
										:			
										:			

 $\frac{\textstyle \sum}{\textstyle -}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREHOL	E No	o. <u>l</u>	BH (	<u>C33</u>										WC	000	4
Pro	ject Number:	TP115086							Drilling	g Location:	Countryside	Dr., EBL	, Sta. 2+400 E:	605131	L	.ogged by:	<u>MS</u>	_
Pro	ject Client:	City of Brampton							Drilling	g Method:	N:4854170 150 mm Sc	lid Stem	Augers		0	Compiled by:	SN	
Pro	ject Name:	Arterial Road Network w Secondary Plan Area (Ar	rithin H	ighwa	y 427 I	ndustr	ial		Drilling	g Machine:	Track Moun	ted Drill			F	Reviewed by:	SM / D	P
Pro	ject Location:	Brampton, Ontario							Date 9	Started:	Mar 19, 202	<b>)</b> Date	Completed: M	ar 19, 202	<b>0</b> F	Revision No.:	0, 2/8/2	21
	LITH	OLOGY PROFILE		SO	IL SA	MPLII	NG			FIELD	TESTING		TESTING /apour Reading			00141451	<b>T</b> 0	
					٠.		(%)		Ê		tionTesting PPT • DCPT	▲ COV (L	EL) TOV (LEL) 4 6 8	NSTRUMENTATION INSTALLATION		COMMEN &		
Plot		DESCRIPTION		уре	Sample Number	(%)	'N' / RQD (%)	Ê		MTO Vane*	Nilcon Vane*  ♦ Intact	△ COV (p	pm)	ATION		GRAIN SI DISTRIBUT		
Lithology				Sample Type	n eldı	Recovery (%)	Ņ	<b>DEPTH</b> (m)	ELEVATION		◆ Remould	W <sub>P</sub>	W W <sub>L</sub>	TRU		(%)		
Ě	Geodetic Ground S	urface Elevation: 221.8 m		San	San	Rec	SPT	DEF		* Undrained Sh 20 40	ear Strength (kPa) 60 80	Plastic 20	Liquid 40 60 80	S S S	GR	SA	SI	CL
$\otimes$		DIOWII	221.7 0.1					-										
$\overset{\times\!\!\!\times}{\times}$	`	HOISE	221.3 					-										
❈	Silt	dark grey / brown y Clay / Clayey Silt FILL id, trace gravel, trace organics	220.0	SS	1	83	12	_	221 -			8						
		brown  CLAY / CLAYEY SILT TILL	0.9					1										
	trace	to some sand, trace gravel very stiff	220.2	SS	2	100	22	-		0		<b>a</b>						
7.0		END OF BOREHOLE	1.5															
												:						
												:						
												:						
												:						
												:						

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD												\	NC	00	d						
Pro	ject Number:	TP115086							Drilling	Location:	Co	untryside	Dr.,	, WBL, S	Sta. 2	:+550 E:	605211	l	ogged	,	<u>MS</u>	<u> </u>
Pro	ject Client:	City of Brampton							Drilling	Method:	N:	4854296 50 mm So	lid S	Stem Au	ıgers			(	Compile	d by:	SN	
Pro	ject Name:	Arterial Road Network	within H	ighwa	y 427 I	ndustr	ial		Drilling	Machine:	Tra	ack Mount	ted I	Drill				F	Reviewe	d by:	SM / D	)P
Pro	ject Location:	Secondary Plan Area ( Brampton, Ontario	Area 4/)						Date S	Started:	Ma	ar 19, 2020	)	_Date C	Comp	leted: Ma	r 19, 20	<b>20</b> F	Revision	No.:	0, 2/8/	21
	LITH	OLOGY PROFILE		SO	IL SA	MPLII	NG	_		FIELD				LAB 1 Soil Vap	our Re	ading	z		COM	MEN	TS	
Lithology Plot	Goodetic Ground S	DESCRIPTION Surface Elevation: 220.6 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	Penetro O SPT □  MTO Vane* △ Intact ▲ Remould * Undrained Si 20 40	PPT Nii	DCPT  Icon Vane* Intact Remould  rength (kPa)	Δ	2 4 COV (ppm 100 200	6 0 300 W	W <sub>L</sub> € Liquid	INSTRUMENTATION INSTALLATION	GR	GRA DISTR	& IN SI IBUT (%)	ZE	CL
<b>***</b>	al	bout 100 mm ASPHALT brown	220.5 0.1					-														
	Sil	Sand and Gravel FILL moist dark grey /brown ty Clay / Clayey Silt FILL trace sand, trace gravel	220.2 ——0.6 219.7	SS	1	100	10	- - - - -	220 —	0			83									
	SILTY	brownish grey  ' CLAY / CLAYEY SILT TILL to some sand, trace gravel hard	nα	SS	2	100	45	- - 1 - - - -	- - - -		Э		as									
<u> </u>		END OF BOREHOLE	1.5						_													
																-						
																-						
																-						
																-						

 $\frac{\textstyle \sum}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD												V	VC	000	4						
Pro	oject Number:	TP115086							Drilling	Location:	Co	untryside 854406	Dr.	, WBL, S	Sta. 2	+700 E:	605295	I	_ogged b	,	MS	_
Pro	ject Client:	City of Brampton							Drilling	Method:	15	0 mm So	lid S	Stem Au	gers			(	Compile	d by:	SN	
Pro	oject Name:	Arterial Road Network	within H	ighwa	y 427 I	ndustr	ial		Drilling	Machine:	Tra	ck Moun	ted I	Drill					Reviewe	d by:	SM / D	<u>P</u>
Pro	oject Location:	Brampton, Ontario	Alea 41)						Date 9	Started:	Ma	r 19, 2020	)	_Date C	ompl	eted: Ma	ır 19, 20	<b>20</b>	Revision	No.:	0, 2/8/2	21
	LITH	OLOGY PROFILE		SO	IL SA	MPLI	NG			FIELD	TES	TING		LAB T			7		2014			
Lithology Plot	Condatio Count 5	DESCRIPTION  Surface Elevation: 220.0 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	Penetra ○ SPT □  MTO Vane* △ Intact ▲ Remould * Undrained St 20 40	PPT Nild	DCPT con Vane* Intact Remould ength (kPa)	Δ	COV (LEL 2 4 COV (ppm 100 200	6 ) 300 W	TOV (LEL) 8 TOV (ppm) 400 W <sub>L</sub> Liquid	INSTRUMENTATION INSTALLATION	GR	GRAI DISTR	& IN SIZ IBUT %)	ZE ION	CL
_ ‱	a a	bout 90 mm ASPHALT brown	220.0- 0.1	0,	0,		0,	-	-		-			20 10		:						
	Sil	Sand and Gravel FILL moist brown ty Clay / Clayey Silt FILL	219.6 0. <b>4</b>	SS	1	100	16	- - - - -	-	0			 263 - · · ·			)						
	SILTY	brown CLAY / CLAYEY SILT TILL to some sand, trace gravel hard	219.1 0.9	SS	2	83	47	- 1 - - -	219 -		0		 20 · · · ·									
<i>32</i> 22		END OF BOREHOLE	218.5 1.5						-													
																-						
											:				:	-						

 $\frac{\textstyle \sum}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

		OF BOREH	IOLE No	<b>).</b>	BH :	<u>S8</u>			Drilling	a Location:	Countracido	Dr. EDI Sto 4±050 Er	C040E4	WOO Logged by: MS	d.	
Project Number: TP115086  Project Client: City of Brampton									_	g Location: g Method:	Countryside Dr., EBL, Sta. 1+950 E:604854 N:4853824 150 mm Solid Stem Augers			Logged by: MS  Compiled by: SN		
Project Name:		Arterial Road Network within Highway 427 Industrial							_	g Machine:	Track Mounted Drill			Reviewed by: SM / DP		
Secondary Plan Area (Area 47) Project Location: Brampton, Ontario									_ Date \$	Started:	Mar 26, 2020	r 26, 2020 Date Completed: Mar 26, 2020		Revision No.: 0, 2/5	8/21	
LITH		OLOGY PROFILE		SOIL SAMPLING						FIELD	TESTING LAB TESTING Soil Vapour Reading		_			
Lithology Plot	Geodetic Ground S	DESCRIPTION  urface Elevation: 219.5 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	<ul> <li>♦ Intact</li> <li>♦ Remould</li> </ul> near Strength (kPa)	COV (LEL)   TOV (LEL)   TOV (LEL)   TOV (LEL)   TOV (LEL)   TOV (LEL)   TOV (ppm)   100 200 300 400   W <sub>P</sub> W W <sub>L</sub>   Tov   W <sub>L</sub>   W <sub>L</sub>	INSTRUMENTATION INSTALLATION O	COMMENTS & GRAIN SIZE DISTRIBUTION (%)	CL	
$\otimes$		brown	$-\frac{219.4}{0.1}$					Ė								
	•	Sand and Gravel FILL trace to some silt moist dark brown	218.6 0.9	SS	1	42	15	- - - - - -	219 -	0		012				
$\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}$	Silty Clay / Clayey Silt FILL some sand, trace to some gravel, trace organics		SS	2	92	6	- ' - - -	218 -	0		°16					
$\overset{\times}{\approx}$			217.3	SS	3	83	6	- - - 2		0		°28				
	SILTY trace	brown  ' SAND / SANDY SILT 1  to some clay, trace gravery dense moist	2.2 FILL	SS	4	100	56	- 7 	∑ = 217 -		0	o <sub>9</sub>				
		brown  CLAY / CLAYEY SILT  to some sand, trace gra  cobbles/boulders  hard	71LL 3.0	SS	5	33	45	- 3 - - - - - -	216 —		<b>&gt;</b>	o 17				
			-	SS	6	100	72 / 150mm	- - - 4 - 4			72 O 150 mm	18				
	trace	 e to some shale fragmer	nts .	SS	7	100	50 / 80mm	F	215 -		50 80 mm	o <sub>12</sub>				
								- 5 - - - - -	214 –							
		arov.	-					- - - - 6 -								
	grey		SS	8	100	60	- - - -	213 -		0	17					
								7 - - - - -	242							
			-	SS	9	100	31	- - - - - 8	212 -	0		28				
								- - - -	211 -							
								- - - 9 - -								
		END OF BOREHOLE	209.9 9.7	SS	10	100	50	<u> </u>	210 -		.O	16				
			0.7													
Can	od E&IS, a Divisi ada Limited		∑ Groundwa	ater en	counter	ed on co	ompletio	n of dr	illing on	<u>3/26/2020</u> at a	depth of: <u>2.4 m</u> .					

	ECORD OF BOREH  ect Number: TP115086	IULE No.	<u>BH</u>	<u> </u>			Drilling Lo	cation.	Countryeide	Dr., WBL, Sta. 0+700 E:	604080	WOOC Logged by: MS
•	iect Client: City of Brampton						Drilling Me		N:4852848	id Stem Augers	001000	Compiled by: SN
_	iect Name: Arterial Road Netw	vork within High	way 427	7 Indust	rial		_ _ Drilling Ma	chine:	Track Mount			Reviewed by: SM / DP
Proj	Secondary Plan Artect Location: Brampton, Ontario						_ Date Start	ed:	Mar 18, 2020	Date Completed: Ma	ar 18, 2020	Revision No.: 0, 2/8/21
	LITHOLOGY PROFILE	:   9	SOIL S	AMPL	ING	1		FIFI D	TESTING	LAB TESTING		
Lithology Plot	DESCRIPTION  Geodetic Ground Surface Elevation: 214.4 m	Sample Type	)er		SPT 'N' / RQD (%)	DEPTH (m)	VATION (m)	Penetration SPT   TO Vane* Intact Remould	ionTesting  PPT	Soil Vapour Reading	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)  R SA SI C
<b>***</b>	<u>about 150 mm ASPHALT</u>	$-\frac{214.3}{214.3}$				-						
	Sand and Gravel FILL trace to some silt moist dark brown Silty Clay / Clayey Silt FIL trace to some sand, trace to som	0.3 SS	5 1	100	9		214			19		
	trace to some sand, trace to som	e gravei	2	83	8	- 1 - - - -	213			23		
	brown to grey SILTY CLAY / CLAYEY SILT		3	100	7	- - - - 2				°19 °15		
	trace sand to sandy, trace to som cobbles/boulders firm to hard	e gravel,	6 4	100	53	- - - -	212 —		0	N 0		
						3	=======================================					
	grey	ss	5 5	100	19		211 —	·		14		
		=\$8	8	0	50 / 30mm	- - - 4		5	0 30 mm			
	sandy	ss	s 7	100	50 /		210 —	5	0 80 mm	3 a <del>g</del> : :		2 32 47 9
					80mm	- 5 -	] ]		80 mm	9: : :		
						- - - -	209 —					
		SS	8 8	100	50 / 100mn	6 - 6		5	0 100 mm	° 11		
						- - - -	208 —					
						7	1					
					05.	Ē	207		GE.			
		SS	9	100	65 / 150mm	F	<u></u>		65 150 mm	14		
						- 8 - -	<u></u>					
						- - - -	206 —					
				400	65 /	9	=		65			
	END OF BOREHOLE	205.0 SS 9.4	3 10	100	150mn	n <u>C</u>	205 —		65 150 mm	15		
	d E&IS, a Division of Wood ada Limited	∑ No freestandin	g ground	dwater m	easured	I in ope	en borehole or	n completion	on of drilling.			

R	ECORD OF BOREHOLE N	<b>o.</b>	<u>BH</u>	<u>S10</u>	i								W	ood.
Pro	oject Number: TP115086						_ Drillin	g Location:	Countryside	Dr., EBL, Sta.	0+700 E:6	04082	Logged by:	MS
Pro	oject Client: City of Brampton						Drilling	g Method:	N:4852848 150 mm Sol	lid Stem Auger	's		Compiled by:	SN
Pro	oject Name: Arterial Road Network within I		ay 427	Industr	rial		Drilling	g Machine:	Track Mount	ed Drill			Reviewed by:	SM / DP
Pro	Secondary Plan Area (Area 47) oject Location: Brampton, Ontario	)					_ Date :	Started:	Mar 18, 2020	Date Com	pleted: Ma	r 18, 2020	Revision No.:	0, 3/30/21
	LITHOLOGY PROFILE	SC	OIL SA	MPLI	NG			FIELD	TESTING	LAB TES				
					(%)		E		ationTesting	Soil Vapour F  COV (LEL)  4	TOV (LEL)	INSTRUMENTATION INSTALLATION	COMMEN &	TS
₫	DESCRIPTION	l e	Sample Number	(%	g G	2	E) N	MTO Vane*	PPT ● DCPT Nilcon Vane*	△ COV (ppm) □	T T	AT NOT NOT NOT NOT NOT NOT NOT NOT NOT NO	GRAIN SI DISTRIBUT	
ogy F		le Ty	Je N	very (	'N' / RQD	트	ATIC	<ul> <li>△ Intact</li> <li>▲ Remould</li> </ul>	<ul> <li>Intact</li> <li>Remould</li> </ul>	W <sub>P</sub> W	W <sub>L</sub>	ALLA	(%)	ION
Lithology Plot	Geodetic Ground Surface Elevation: 213.8 m	Sample Type	Samp	Recovery (%)	SPT	<b>DEPTH</b> (m)	ELEVATION	* Undrained Sh 20 40	near Strength (kPa) 60 80	Plastic	Liquid 50 80	TSNI TSNI TSNI	R SA	SI CL
_ XXX	about 150 mm ASPHALT   213.6   brown   219.8			_	-7	-						* *		
	Sand and Gravel FILL 0.3					ŧ								
$\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\mathsf$	moist brown	ss	1	100	7			]0		16 °16	<u> </u>			
$\overset{\infty}{}$	Silty Clay / Clayey Silt FILL trace to some gravel					<u> </u>	213 -	-				<b>■</b>		
$\bowtie$	Ŭ	SS	2	100	9	- 1 - -		]		o 22				
$\bowtie$	212.3					-				22				
	brown to grey 1.5 SILTY CLAY / CLAYEY SILT TILL					-	040							
	trace sand to sandy, trace to some gravel, cobbles/boulders	SS	3	83	19	_ _ 2	212 -			18				
	very stiff to hard					-								
						-		]						
		SS	4	75	25		211 -	= :0		<sup>3</sup> 015	<u>.</u>			
						_ _ 3	211	<b>-</b>			<u> </u>			
	grey	00	_	400				]						
		SS	5	100	15	-		] 0		12				
					64 /	-	210 -	]	64 O					
	sandy, cobbles / boulders	SS	6	100	150mm	4		1	150 mm	8		3	1 29	33 7
						-		]						
						Ė		<b>]</b>			<u>.</u>			
		SS	7	100	53 / 150mm	-	209 -	1 1 1	53 150 mm	16				
						5		1						
						-		-		· · · · · · · · · · · · · · · · · · ·				
						-	208 -							
		SS	8	100	62 /	<del>-</del> 6		]	62					
		33	0	100	62 / 150mm	1		1	62 150 mm	19				
						-								
						-	207 -							
						— 7 -		<u> </u>						
						-								
		SS	9	100	75 / 150mm	Ė		<u> </u>	75	1 0				
		"			150mm	-	206 -		75 150 mn	12				
						- <sup>7</sup>	<u></u>	]						
						<u> </u>	=	]						
						-		1						
						- - - 9	205 -	1						
		SS	10	100	50 /	ŧĬ		<b>]</b>	50	13				
1/X	204.4 END OF BOREHOLE 9.4	۳			100mm				50 0 100 mm	13				
Woo	od E&IS, a Division of Wood  Groundw	vater en	counter	ed on co	ompletio	n of dr	illing on	<u>3/18/2020</u> at a	depth of: <u>8.2 m</u> .					

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▼ Groundwater depth observed on <u>5/4/2020</u> at a depth of: <u>0.9 m</u>.

## RECORD OF BOREHOLE No. BH S10



Project Number: TP115086 Project Name: Arterial Road Network within Highway 427 Industrial Secondary Plan Area
(Area 47)

Project Location: Brampton, Ontario

LITHOLOGY PROFILE SOIL SAMPLING FIELD TESTING LAB TESTING Soil Vapour Reading **COMMENTS** INSTRUMENTATION INSTALLATION PenetrationTesting ▲ COV (LEL) ■ TOV (LEL)
2 4 6 8 Ξ O SPT □ PPT ● DCPT GRAIN SIZE DISTRIBUTION Sample Number SPT 'N' / RQD **DESCRIPTION** Lithology Plot Sample Type ELEVATION MTO Vane\* Nilcon Vane\* Ξ W<sub>P</sub> W<sub>L</sub>
Liquid
80 W (%) DEPTH \* Undrained Shear Strength (kPa) 20 40 60 80 20 40 60 SA SI 50 mm dia. monitoring well with flushmount protective casing installed (depth below ground surface): Concrete: 0.0 - 0.3 m Sand: 0.3 - 0.6 m Bentonite: 0.6 - 5.5 m Sand Filter: 5.5 - 6.1 m Screen: 6.1 - 9.1 m Groundwater measurement in the monitoring well (depth below ground): 4 May 2020: 0.9 m 12 May 2020: 1.0 m

RI	ECORD	OF BORE	HOLE N	<b>o.</b>	BH	<u>S11</u>									W	00	d.
Pro	ject Number:	TP115086							Drilling	g Location:	Countryside N:4852560	Dr., WBL, Sta	. 0+350 E:	603849	_ Logged by:	MS	
Pro	ject Client:	City of Bramptor	1						Drilling	g Method:		id Stem Auge	rs		_ Compiled by	SN	
Pro	ject Name:	Arterial Road Ne Secondary Plan	twork within H	lighwa	y 427	Industr	ial		Drilling	g Machine:	Track Mount	ed Drill			_ Reviewed by	: <u>SM/I</u>	DP
Pro	ject Location:	Brampton, Ontar							Date	Started:	Mar 24, 2020	Date Com	npleted: Ma	r 24, 2020	_ Revision No.	0, 2/8	/21
	LITH	OLOGY PROFIL	E	SC	IL SA	MPLI	NG			FIELD	TESTING	LAB TES					
							(%)				ationTesting	Soil Vapour  COV (LEL)  4	Reading TOV (LEL)	INSTRUMENTATION	COMME &	NTS	
t d		DESCRIPTION		be	Sample Number	(%	g) Qo	2	E)	O SPT   MTO Vane*	PPT • DCPT  Nilcon Vane*	△ COV (ppm)	7 7 ☐ TOV (ppm) 300 400	TION	GRAIN S DISTRIBL		
Lithology Plot				Sample Type	ole Nu	Recovery (%)	'N' / RQD	DЕРТН (m)	ELEVATION	△ Intact ▲ Remould	<ul> <li>Intact</li> <li>Remould</li> </ul>	W <sub>P</sub> W	W <sub>L</sub>	ALLA	(%)	TION	
Lithol	Geodetic Ground S	urface Elevation: 213.2 m	n	Samp	Samp	Reco	SPT	DEP'	ELE	* Undrained Sh 20 40	ear Strength (kPa) 60 80	Plastic	Liquid 60 80	INST	GR SA	SI	CL
XXX		oout 200 mm ASPHA						-	213 -								
₩	\$	Sand and Gravel FILI trace to some silt	L					Ē									
$\overset{\sim}{\bowtie}$		moist dark grey/brown	212.6 0.6	SS	1	100	9	-				so					
▓	Silt trace to	y Clay / Clayey Silt For some gravel, trace of	FILL organics					- 1									
▓				SS	2	83	7	-	212 -			18					
▓								ŧ					ļ				
▓				SS	3	100	16	<u>-</u>				21					
▓			211.0					F 2 Z	Z = <b>211</b> -			21					
Ž	SILTY SAND	brown to grey						- = -	= 211 -								
1	t	TILL race clay, trace grave	el	SS	4	100	46	-			0 .	°16					
H		dense to very dense moist to wet						-				· · · · · · · · · · · · · · · · · · ·	÷				
X								— 3 - -	210 -								
//				SS	5	83	39	-				16					
								-									
$\mathcal{U}$		grey						- 4									
V)				SS	6	83	44		209 -		) 4	. o□ 12	<u>.</u>		1 42	55	2
//								<u> </u>									
И				-00	_			- -									
$\mathcal{M}$				SS	7	83	35	- - 5				15					
X								-	208 -								
								-		1							
И								-					<u> </u>				
X								<del>-</del> 6	207				<u> </u>				
1				SS	8	88	35	-	207 -			15	<u> </u>				
$\mathcal{U}$								F	•				<u>.</u>				
X								- - - 7									
1								-	206 -								
$ \mathcal{I} $								<u> </u>	_								
		grey	205.4 7.8	SS	9	100	55 / 150mm	ţ ₽			55 0 150 mm	10 12					
	SILTY trace sand	CLAY / CLAYEY SIL I to sandy, trace to so	T TILL					8			150 mm						
	cobble	es/boulders, shale frag hard	gments					-	205 -								
								-					<u> </u>				
													<u> </u>				
			204.0	SS	10	100	50 /	— 9 —	004		50		<u> </u>				
		END OF BOREHOLE					80mm		<del>- 204 -</del>		80 mm	10					
	d E&IS, a Divisi ada Limited	on of Wood	∑ Groundw	ater en	counter	ed on co	mpletic	n of dril	lling on	3/24/2020 at a	depth of: 2.1 m.	■ Cave in d	epth after ren	noval of auger	rs: <u>7.6 m</u> .		
	ogell Road, Unit																
Can Tel.	ada No.: (905) 415-2		a qualified Geoter	chnical E	ngineer.	Also, bo	rehole in	formatio	n should	nding of all pote be read in conju	ntial conditions pre unction with the geo	sent and require in technical report for	terpretative ass r which it was	istance from		Scale: 1	1 : 53
	.woodplc.com		commissioned ar	iu ine ac	company	yıng Expl	ariation C	oreho	ule Logʻ.							Page: 1	of 1

		OF BOREHOLE NO	0.	<u>BH</u>	<u>S12</u>			Dain	7 l oc=#:	Country	Dr. EDI. 04- 01050 5-00055	wood.
	ject Number: ject Client:	City of Brampton						_	g Location: g Method:	N:4852567	Dr., EBL, Sta. 0+350 E:603857 lid Stem Augers	Logged by: MS  Compiled by: SN
	ject Name:	Arterial Road Network within H	liahwa	v 427	Industi	rial		-	g Machine:	Track Mount		Reviewed by: SM / DP
	ect Location:	Secondary Plan Area (Area 47)		.y	muusu	ilui		- `	Started:	Mar 24, 2020		
				0					_	,		
Lithology Plot		OLOGY PROFILE  DESCRIPTION  Surface Elevation: 213.5 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	Penetra ○ SPT □  MTO Vane* △ Intact ▲ Remould	<ul> <li>Intact</li> <li>Remould</li> </ul> ear Strength (kPa)	LAB TESTING  Soil Vapour Reading  COV (LEL)	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
~		brown 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3 11 213.3	•	3,	_	0,	-				₩ ₩	
	Sill	Sand and Gravel FILL trace to some silt moist 212.9 dark grey/ brown ty Clay / Clayey Silt FILL	SS	1	100	12	- - - - -	213 —	0			
	trace to	o some gravel, trace organics	SS	2	67	6	- 1 - - - -	212 -	0		<u> </u>	
		211.3	SS	3	83	7	- - - 2		0			
		brown to grey  / SAND / SANDY SILT TILL  trace gravel  compact to very dense  moist to wet	SS	4	75	20	3	211 -	0	2	s	
		grey	SS	5	83	36	- °	210 –	0			
			SS	6	100	91	- - 4 - -			O		
			SS	7	100	104	- - - - - - 5	209 -		104		
		207.7 END OF BOREHOLE 5.8		8	100	50 / 30mm	- 5 	208 —		50 30 mm		
	50 mm dia	minated due to Auger refusal at 5.8 m depth.)  In monitoring well with flushmount sing installed (depth below ground surface):				John				30 mm		
	Sand: Bentonite Sand Filt	:: 0.0 - 0.3 m 0.3 - 0.6 m :: 0.6 - 2.1 m er: 2.1 - 2.7 m 2.7 - 5.8 m										
		measurement in the monitoring well (depth below ground):										
	4 May 20 12 May 2	120: 1.4 m 1020: 1.5 m										
Can	d E&IS, a Divis ada Limited	- No freesta							ole on complet	ion of drilling.		

R	ECORD	OF BOREHOL	E No	<b>).</b>	BH_	<u>D1</u>											WO	od.
Pro	ject Number:	TP115086							Drilling	Location:	Clarkwa N:48506	ay Dr.,	NBL, Sta	. 0+000	E:606	251	Logged by: M	s
Pro	ject Client:	City of Brampton							Drilling	Method:			d Stem A	ugers			Compiled by: S	<u>N</u>
	ject Name:	Arterial Road Network ( Secondary Plan Area (A	(rea 47		y 427 l	Industr	ial		Drilling	Machine:	Track N	lounte	d Drill				Reviewed by: <u>S</u>	<u>M</u>
Pro	ject Location:	Clarkway Drive, Brampt	ton, Ont	ario					Date 9	Started:	Feb 18,	2020	Date	Complet	ed: Fel	b 18, 2020	Revision No.: 0	3/25/21
	LITH	IOLOGY PROFILE		SO	IL SA	MPLI	NG			FIELD	TESTIN	G		TESTIN apour Readi		_		
Lithology Plot	Geodetic Ground 8	DESCRIPTION Surface Elevation: 205.6 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □ MTO Vane △ Intact ▲ Remould	* Nilcon V  Ontact Remo	DCPT ane* ould (kPa)	2 COV (DE	L) TC	OV (LEL) 8 OV (ppm)	INSTRUMENTATION INSTALLATION	GRAIN SIZE DISTRIBUTIO (%)	
<b>***</b>	a	bout 150 mm ASPHALT brown	205.5 0.1					-		:			:		:			
		Sand and Gravel FILL moist	204.8	SS	1	100	94	- - - - -	205 -			O <b>B</b> D,	3					
	Sil	brown  Ity Clay / Clayey Silt FILL  trace sand, trace gravel	0.8	SS	2	100	29	_ 1 	- - -	0			o 17					
		brown  ( CLAY / CLAYEY SILT TILL  to some sand, trace gravel	204.1 1.5	SS	3	100	27	- - - -	204 -									
		very stiff to hard			-			- - 2 - -	- - - -				<sup>0</sup> 14					
			-	SS	4	100	36	-	203 -			25	°14					
<u>XX</u>		END OF BOREHOLE	202.6 3.0					<del>-</del> 3		:	: :		: :	: :	-			
	d ERIS a Divis									:			- : :					

 $\frac{\nabla}{2}$  No freestanding groundwater measured in open borehole on completion of drilling.

RECO	RD OF BOREHOLE N	<b>o.</b>	BH I	<u>D2</u>								wood.
Project Nur	mber: <b>TP115086</b>						Drilling	Location:	Clarkway Dr.	., NBL, Sta. 0+000 E:606	254	Logged by: MS
Project Clie	ent: City of Brampton						Drilling	Method:	N:4850680 150 mm So	lid Stem Augers		Compiled by: SN
Project Na	me: Arterial Road Network within H Secondary Plan Area (Area 47)	lighwa	y 427 I	ndustr	ial		Drilling	Machine:	Track Mount	ted Drill		Reviewed by: SM
Project Loc	cation: Clarkway Drive, Brampton, Ont	ario					Date S	started:	Feb 18, 2020	Date Completed: Fe	b 18, 2020	Revision No.: <u>0, 3/25/21</u> _
	LITHOLOGY PROFILE	SC	IL SA	MPLI	NG			FIELD 1	TESTING	LAB TESTING		
Lithology Plot	DESCRIPTION  Ground Surface Elevation: 206.0 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	(ш) НТӨЭО	ELEVATION (m)	O SPT □  MTO Vane* △ Intact ▲ Remould	ear Strength (kPa)	Soil Vapour Reading  ▲ COV (LEL) ■ TOV (LEL)  2 4 6 8  △ COV (ppm) □ TOV (ppm)  100 200 300 400  W <sub>0</sub> W W  Plastic  20 40 60 80	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL
	about 50 mm TOPSOIL 205.97 brown					-	-	: :				
tr	Silty Clay / Clayey Silt FILL race sand, trace gravel, trace organics 205.5	SS	1	75	6	-		0		•		
<b>\</b> \	brown 20 <b>5.</b> 5 Sand and Gravel FILL 0.6					-	-					
	brown Silty Clay / Clayey Silt FILL trace sand, trace gravel 204.8	SS	2	100	15	- 1	205 —	0		•		
	brown 1.2  SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel, cobbles/boulders	SS	3	100	36	-	-	0		3		
3XX	hard 204.1 <b>END OF BOREHOLE</b> 1.8						<del></del>					

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD	OF BOREHO	DLE N	o. <u> </u>	BH	<u>D3</u>								WO	od.
	oject Number:								_	Location:	N:4850776	., SBL, Sta. 0+150 E:60	6138	_	MS
	oject Client:	City of Brampton	de socialações I I	:	407 1		:-1		_	Method:	150 mm Sol	lid Stem Augers			SN
	oject Name:	Arterial Road Networ Secondary Plan Area Clarkway Drive, Bran	(Area 47)		y 427 i	naustr	ıaı		_	Machine: Started:	Feb 18, 2020		eb 18. 2020	Revision No	
			, , , , , ,			MDI	\ <u>\</u>	1					T 1	-	,
	LITH	OLOGY PROFILE		SC		MPLII		<u> </u> 	=	Penetra		LAB TESTING  Soil Vapour Reading  COV (LEL) ■ TOV (LEL)  2 4 6 8	NOIL	COMMENT &	s
Lithology Plot	Geodetic Ground S	DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	MTO Vane* △ Intact ▲ Remould	Nilcon Vane*	COV (ppm)	STRUME	GRAIN SIZ DISTRIBUTI (%)	ON
<b>**</b>		brown	205.8 0.1												
	Silt	brown brown  Y Clay / Clayey Silt FILL	205.4 0.6	SS	1	79	12	- <u>□</u>	- 7 - - -	0	<b>G</b>	3			
	tı	race sand, trace gravel	204.6 20 <b>1</b> : <b>4</b>	SS	2	100	16	- 1 - 1 	205 -	0		<b>3</b>			
<u> X</u>	trace	CLAY / CLAYEY SILT TIL to some sand, trace grave very stiff END OF BOREHOLE	L ₁₅⊓					_							
	od E&IS, a Divisi nada Limited	ion of Wood	Z Groundw	ater en	countere	ed on co	mpletio	n of drill	ling on 2	2/18/2020 at a	a depth of: <u>0.6 m</u> .				

R	ECORD	OF BOREHO	OLE N	<b>0.</b>	<u>BH</u>	<u>D5</u>									wood
Pro	ject Number:	TP115086							Drilling	Location:	Clarkway Dr N:4850884	., NBL, Sta. 0	+300 E:606	039	Logged by: MS
Pro	ject Client:	City of Brampton							Drilling	Method:	150 mm So	lid Stem Auge	ers		Compiled by: SN
Pro	ject Name:	Arterial Road Netwo			y 427	Industr	rial		Drilling	Machine:	Track Moun	ted Drill			Reviewed by: SM
Pro	ject Location:		mpton, Ont	tario					Date 9	Started:	Feb 18, 2020	Date Cor	mpleted: Fel	b 18, 202	0 Revision No.: 0, 3/25/21_
	LITH	OLOGY PROFILE		SC	DIL SA	MPLI	NG			FIELD	TESTING	LAB TE			
Lithology Plot	Geodetic Ground S	DESCRIPTION Surface Elevation: 205.7 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	<ul> <li>♦ Intact</li> <li>♦ Remould</li> </ul> ear Strength (kPa)	Soil Vapour  COV (LEL)  2 4  COV (ppm)  100 200  Wp W  Plastic  20 40	■ TOV (LEL) 6 8	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
<b>***</b>	al	bout 110 mm ASPHALT brown	205.6_ 0.1					-	-						
	Sil	Sand and Gravel FILL moist brown ty Clay / Clayey Silt FILL	205.1 0.6	SS	1	100	20		205 —	0		°6			
	SILTY	brown/grey  CLAY / CLAYEY SILT TI		SS	2	100	9	- 1 - - -	-	0		19			
	trace	to some sand, trace grave cobbles/boulders stiff	ei,	SS	3	58	11	- - - - 2	204 -	0		<b>8</b> 0 16			
				SS	4	0	9	- - - - -	203 —	0		<b>a</b>			
				SS	5	17	14	3	-	0		22			
				SS	6	75	10	- - - 4 -	202 -	0		o 21			
				SS	7	100	11	-	201 —	0		a o 15			
<i>XX</i>		END OF BOREHOLE	200.7 5.0					5 [	-			: :			
	od E&IS, a Divis	ion of Wood	∑ No freesta	anding (	ground	vater me	easured	in oper	n boreho	le on complet	ion of drilling.	Cave in	depth after ren	noval of au	gers: 5.0 m.

RI	ECORD	OF BOREHOL	E No	ο.	вн	<u>D6</u>										W	ood.
Pro	ject Number:	TP115086							Drilling	g Location:	Clarkway Dr	., NBL, S	ta. 0+300 E:60	6040	Log	ged by:	MS
Pro	ject Client:	City of Brampton							Drilling	g Method:	N:4850886 150 mm So	lid Stem	Augers		Con	npiled by:	SN
Pro	ject Name:	Arterial Road Network	within H	ighwa	y 427	Industr	rial		Drilling	g Machine:	Track Mount	ted Drill			Rev	iewed by:	SM
Pro	ject Location:	Secondary Plan Area (A Clarkway Drive, Brampt							Date S	Started:	Feb 18, 2020	)Date	Completed: Fo	eb 18, 202	0 Rev	ision No.:	0, 3/25/21
_	LITH	OLOGY PROFILE		SC	IL SA	MPLI	NG			FIELD	TESTING		TESTING				
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould  * Undrained She	ear Strength (kPa)	△ COV (L 2 △ COV (F 100 W <sub>P</sub> Plastic	Vapour Reading EL) ■ TOV (LEL) 4 6 8 ppm) □ TOV (ppm) 200 300 400  W W L Liquid	]	DI	COMMEN & GRAIN SI STRIBUT (%)	ZE TION
⇉		brown		ώ	ΐ	œ	S		206 -	20 40	60 80	20	40 60 80	==	GR	SA	SI CL
		Sand and Gravel FILL moist brown	205.5	SS	1	100	17	- Z	Z -	0		8 8			36	49	(15)
		CLAY / CLAYEY SILT TILL to some sand, trace gravel firm to stiff	-	SS	2	33	8	- 1 - 1	205 -	0		14					
		END OF BOREHOLE	204.3	SS	3	25	8	-	-	0		13		-			

 $\frac{\nabla}{2}$  Groundwater encountered on completion of drilling on <u>2/18/2020</u> at a depth of: <u>0.6 m</u>.

R	ECORD	OF BOREHOL	E No	<b>o.</b>	BH	<u>D7</u>												V	00	od.
Pro	ject Number:	TP115086							Drilling	g Location	n: [	Clarkway Dr. N:4850986	., SBL, St	a. 0+45	60 E:605	935	L	ogged by	/: <u>M</u> S	3
Pro	ject Client:	City of Brampton							Drilling	Method:		150 mm So	lid Stem	Augers			c	ompiled	by: <u><b>SN</b></u>	<u> </u>
Pro	ject Name:	Arterial Road Network v Secondary Plan Area (A			y 427 I	ndustr	ial		Drilling	g Machine	e: ]	Γrack Mount	ed Drill				F	eviewed	by: <u><b>SN</b></u>	1
Pro	ject Location:	Clarkway Drive, Brampt	ton, Ont	ario					Date 9	Started:	Ē	eb 18, 2020	Date	Comp	leted: Fe	b 18, 20	<b>20</b> F	evision l	No.: <u>0,</u>	3/25/21
	LITH	IOLOGY PROFILE		SO	IL SA	MPLI	NG			FIEL	D TI	ESTING		TEST						
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT  MTO Var  △ Intact  ▲ Remou	□ PF	nTesting PT   DCPT  Nilcon Vane* Intact Remould  Strength (kPa) 60 80	△ COV (L 2 △ COV (p 100 : W <sub>P</sub> Plastic	4 6	TOV (LEL)  8  TOV (ppm) 0 400  W <sub>L</sub> Liquid	INSTRUMENTATION INSTALLATION	GR	GRAII ISTRII	MENTS & N SIZE BUTIOI %)	<b>N</b>
_ ‱	Geodetic Ground	Surface Elevation: 205.9 m bout 100 mm ASPHALT	205.8 0.1	U)	0)	ш.	0)	-	<u> </u>	2,0	40	00 80	2,0	40 00	- 60 :	_==				
		Sand and Gravel FILL moist  dark grey  Ity Clay / Clayey Silt FILL	205.3	SS	1	100	36		-		0	6	<sup>3</sup> 011							
	trace sa	nd, trace gravel, trace organic	s ·	SS	2	100	10	- 1 - - -	205 -	0			23							
			-	SS	3	100	6	- - - - 2	Z 204 –	0			o 2	B						
	SILTY	brown  CLAY / CLAYEY SILT TILL	- <u>203.7</u> 2.3						-											
	trace	e to some sand, trace gravel very stiff  END OF BOREHOLE	202.9	SS	4	100	20	- - - - - 3	203 -				15							
															-					

 $\frac{\nabla}{z}$  Groundwater encountered on completion of drilling on <u>2/18/2020</u> at a depth of: <u>1.8 m</u>.

RI	ECORD OF BOREHO	LE No.	<u>BH</u>	<u>D8</u>								wood
Pro	ject Number: TP115086						Drilling	Location:	Clarkway Dr.	., SBL, Sta. 0+450 E:6059	35	Logged by: MS
Pro	ject Client: City of Brampton						Drilling	Method:	N:4850984 150 mm Sol	lid Stem Augers		Compiled by: SN
Pro	ject Name: Arterial Road Network Secondary Plan Area (	within Highwa	ay 427	Industi	rial		Drilling	Machine:	Track Mount	ed Drill		Reviewed by: SM
Pro	ject Location: Clarkway Drive, Bramp	oton, Ontario					Date S	started:	Feb 18, 2020	Date Completed: <u>Fet</u>	18, 202	20 Revision No.: 0, 3/25/21
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD '	TESTING	LAB TESTING Soil Vapour Reading	_	
Lithology Plot	DESCRIPTION  Geodetic Ground Surface Elevation: 205.6 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane* △ Intact ▲ Remould	<ul> <li>Intact</li> <li>Remould</li> </ul> ear Strength (kPa)	Solv Vajavo reasing y	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	brown <b>Sand and Gravel FILL</b> trace cobbles moist	ss	1	83	22	- - -	-	0		ş		
▓		ss	2	0	NA	= =	Z <sub>205</sub> –					
***	END OF BOREHOLE	0.9				_						Borehole was terminated due to the existing utility cables.
	Borehole was terminated due to the exisit cable.	ng Bell										existing utility cables.

 $\frac{\nabla}{z}$  Groundwater encountered on completion of drilling on <u>2/18/2020</u> at a depth of: <u>0.6 m</u>.

Project Location: Clarkway Drive, Brampton, Ontario  Date Started: Feb 19, 2020 Date Completed: Feb 19, 2020 Revision No.: 0, 3/2:  LITHOLOGY PROFILE SOIL SAMPLING  FIELD TESTING  LAB TESTING  Soil Vapour Reading  PenetrationTesting  PenetrationTesting  Soil Vapour Reading  PenetrationTesting  Soil Vapour Reading  PenetrationTesting  OSPT PPT DCPT  SOIL SAMPLING  FIELD TESTING  COMMENTS  A COV (LEL) TOV (LEL)  COMMENTS  A COV (COV (ppm) D TOV (pp	RE	CORD	OF BOREHOL	E No	o. <u>l</u>	BH	<u>D9</u>								WC	od	
Project Client: City of Brampton  Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47)  Project Location: Clarkway Drive, Brampton, Ontario  Bolt Started: Track Mounted Drill  Reviewed by: SM  Revie	Proje	ect Number:	TP115086							Drilling	g Location:	Clarkway Dr.	, NBL, Sta. 0+600 E:605	832	Logged by:	MS	_
Date Completed:   Feb 19, 2020   Date Completed:   Feb 19, 2020   Date Completed:   Feb 19, 2020   Revision No.:   0, 3/2	Proje	ect Client:	City of Brampton							Drilling	g Method:	150 mm Sol	lid Stem Augers		Compiled by:	SN	-
Date Completed:   Feb 19, 2020   Date Completed:   Feb 19, 2020   Date Completed:   Feb 19, 2020   Revision No.:   0, 3/2	Proje	ect Name:	Arterial Road Network	within H	ighwa	y 427 I	ndustr	ial		Drilling	g Machine:	Track Mount	ed Drill		Reviewed by:	SM	_
DESCRIPTION	Proje	ect Location:	Clarkway Drive, Bramp	ton, Ont	ario					Date 9	Started:	Feb 19, 2020	Date Completed: Fe	b 19, 2020	Revision No.:	0, 3/25/21	_
DESCRIPTION		LITH	OLOGY PROFILE		so	IL SA	MPLII	NG			FIELD	TESTING					$\exists$
About 100 mm ASPHALT   206.9								(%				-	▲ COV (LEL) ■ TOV (LEL)	NOI		TS	
About 100 mm ASPHALT   206.9	jg		DESCRIPTION		be	ımber	(%	go (	<u>-</u>				△ COV (ppm) □ TOV (ppm)	TION	GRAIN SIZ	ZE	
About 100 mm ASPHALT   206.9	ogy				ole Ty	ole Nu	very (	Ž.	<u>5</u>	ATIC	△ Intact	Intact	W <sub>P</sub> W W <sub>L</sub>	ALLA		ION	
Sand and Gravel FilLL   SS 1 75 27   Silty Clay / Clayey Silt FilLL   trace sand, trace gravel, cobbles   SS 2 83 12   SI 205.5   SI 205.5   SI 205.5   SI 206.9		Seodetic Ground S	Surface Elevation: 207.0 m		Samp	Samp	Reco	SPT	DEPT	E.E.	* Undrained Sh 20 40	ear Strength (kPa) 60 80	Plastic Liquid	LSNI LSNI G	R SA :	SI CL	_
Sand and Gravel FILL moist  SS 1 75 27  206.1  grey 0.9 Silty Clay / Clayey Silt FILL trace sand, trace gravel, cobbles SS 2 83 12  205.5	×	al		206.9 0.1					-	_							
206.1  206.1  grey Silty Clay / Clayey Silt FILL trace sand, trace gravel, cobbles SS 2 83 12  - 1 206  - 1 206  - 1 206  - 1 206  - 1 206	$\otimes$	:	Sand and Gravel FILL	ŀ					-								
grey 0.9 Silty Clay / Clayey Silt FILL trace sand, trace gravel, cobbles SS 2 83 12 - 1 206 - 205.5	$\otimes$				SS	1	75	27	E				<b>3</b>				
Silty Clay / Člaýey Silt FILL trace sand, trace gravel, cobbles  SS 2 83 12	▩		grev						<u>-</u>								
END OF BOREHOLE 1.5		Silt trace	ty Clay / Clayey Silt FILL sand, trace gravel, cobbles		SS	2	83	12	Ė .	206 -			<b>3</b>				
ENU OF EXPRENUE 1.5	▩		END OF DODELIOLE	205.5					-								
			END OF BOREHOLE	1.5													
											: :						
Wood E&IS, a Division of Wood											<u> </u>						_

 $\frac{\square}{2}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada Tel. No.: (905) 415-2632 www.woodplc.com

R	ECORD OF BOREHOLE	No.	<u>BH</u>	D11								wood.
Pro	ject Number: TP115086						Drilling	Location:	Clarkway Di N:4851199	., SBL, Sta. 0+750 E:605	720	Logged by: MS
Pro	ject Client: City of Brampton						Drilling	g Method:		lid Stem Augers		Compiled by: SN
Pro	ject Name: Arterial Road Network within Secondary Plan Area (Area 4	n Highw	ay 427	Industi	rial		Drilling	g Machine:	Track Moun	ted Drill		Reviewed by: SM
Pro	ject Location: Clarkway Drive, Brampton, C	Ontario					Date S	Started:	Feb 19, 2020	Date Completed: Fe	b 19, 2020	Revision No.: <u>0, 3/25/21</u>
	LITHOLOGY PROFILE	S	OIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading		
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)		tionTesting  PPT ● DCPT  Nilcon Vane*  ◇ Intact  ◆ Remould		INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
Lithol	Geodetic Ground Surface Elevation: 207.9 m about 90 mm ASPHALT 207		Samp	Reco	SPT	DEPT	ELEV	* Undrained She 20 40	ear Strength (kPa) 60 80	Plastic Liquid 20 40 60 80	INSTI INSTI	R SA SI CL
<b>***</b>	brown 207	.9 .6				-						
	Sand and Graver FILL 0 moist brown Silty Clay / Clayey Silt FILL	.3 SS	1	75	38	-	- - - -	0		80 6		
	trace sand, trace gravel	ss	2	100	14	- - 1 -	207 -	0		B 0 15		
	SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel	.4 .5	3	83	11	-  -  -  -		0		a °20		
	stiff to very stiff					_ 2 _ _	206 -			20		
		ss	4	100	11	-	205 -	0		0 15		
		ss	5	100	22	- 3 - - - -	-	0		a o 16		
	grey					- - - - 4	204 -					
		SS	6	92	19	-  -  -		0		a o 14		
	202 END OF BOREHOLE 5	.9 .0	7	100	16	- - - - - 5	203 -	0		as 0 15		
	END OF BOREFIOLE 5	.0										
Woo	od E&IS. a Division of Wood											

 $\frac{\sqrt{2}}{2}$  No freestanding groundwater measured in open borehole on completion of drilling.

RECORD OF BOREHOLE No. BH D13													wood
Pro	ject Number: TP115086						Drilling	Location:	Clarkway Dr N:4851318	r., NBL, Sta.	. 0+900 E:605	607	Logged by: MS
Pro	ject Client: City of Brampton						Drilling	g Method:	150 mm So	olid Stem Au	ugers		Compiled by: SN
Pro	ject Name: Arterial Road Network within H Secondary Plan Area (Area 47)	lighwa	y 427 I	ndusti	rial		Drilling	g Machine:	Track Moun	ted Drill			Reviewed by: SM
Pro	ject Location: Clarkway Drive, Brampton, Ont	tario					Date S	Started:	Feb 19, 2020	Date 0	Completed: Fel	o 19, 2020	Revision No.: <u>0, 3/25/21</u>
	LITHOLOGY PROFILE	SC	IL SA	MPLI	NG			FIELD	TESTING		TESTING		
					(%		=		tionTesting	Soil Vap	pour Reading .) ■ TOV (LEL) 6 8	INSTRUMENTATION INSTALLATION	COMMENTS &
Jot	DESCRIPTION	фе	Sample Number	(%)	SPT 'N' / RQD (%)	<u></u>	E N	○ SPT □ MTO Vane*	PPT • DCPT Nilcon Vane*		n)	TION	GRAIN SIZE DISTRIBUTION
Lithology Plot		Sample Type	ple N	Recovery (%)	, N	DEРТН (m)	ELEVATION	△ Intact ▲ Remould	<ul><li>♦ Intact</li><li>♦ Remould</li></ul>	W <sub>P</sub>	W W <sub>L</sub>	IRUM IALLA	(%)
Lith	Geodetic Ground Surface Elevation: 209.3 m	San	Sarr	Reg	SPT	DEP	E	* Undrained She 20 40	ear Strength (kPa) 60 80	Plastic 20 40	Liquid ) 60 80	INS.	GR SA SI CL
	about 100 mm ASPHALT 209.2 brown 0.1 Sand and Gravel FILL						209 -						
$\bowtie$	moist 208.6	SS	1	100	50 / 150mm	-	-	5	0 150 mm	80 4			
	brown / grey 0.7  Silty Clay / Clayey Silt FILL					_							
$\overset{**}{{\otimes}}$	trace sand, trace gravel, cobbles/boulders					1							
	207.9 brown / grey 1.4	SS	2	83	10	-	208 -	0		13			
	SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel,					-							
	cobbles/boulders stiff to very stiff	SS	3	54	18	- - - 2		0		14			
						<u>-</u>	207 -						
						Ė							
		SS	4	100	19	_	-	0		as o 14			
<i>XX</i>	206.2 <b>END OF BOREHOLE</b> 3.0					— 3	-			: :	1 1		
											1 1		

 $\frac{\textstyle \sum}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD	OF BOREH	HOLE N	<b>o.</b>	BH	<u>D15</u>								WC	ood.
Pro	ject Number:	TP115086							Drilling	g Location:	Clarkway Dr	., SBL, Sta. 1+050 E:605	513	Logged by:	MS
Pro	ject Client:	City of Brampton							Drilling	g Method:	N:4851403 150 mm So	lid Stem Augers		Compiled by:	SN
Pro	ject Name:	Arterial Road Nety	work within H	lighwa	ıy 427 I	ndustr	ial		Drilling	g Machine:	Track Mount	ted Drill		Reviewed by:	SM
Pro	ject Location:	Secondary Plan A Clarkway Drive, B	rea (Area 47) Brampton, Ont	ario					Date	Started:	Feb 19, 2020	Date Completed: Fe	b 19, 2020	Revision No.:	0, 3/25/21
	LITH	OLOGY PROFILI	E	SC	DIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading	_		<del></del>
							(%)		(E)		tionTesting PPT • DCPT	▲ COV (LEL) ■ TOV (LEL)	NSTRUMENTATION INSTALLATION	COMMEN &	
Plot		DESCRIPTION		фе	Sample Number	(%)	'N' / RQD (%)	5		MTO Vane*	Nilcon Vane*  ♦ Intact	△ COV (ppm) □ TOV (ppm) 100 200 300 400	TON	GRAIN SI	
ogy F				Sample Type	le N	Recovery (%)	'N' / F	DЕРТН (m)	ELEVATION	<ul> <li>△ Intact</li> <li>▲ Remould</li> </ul>	<ul><li>♦ Intact</li><li>♦ Remould</li></ul>	W <sub>P</sub> W W <sub>L</sub>	ALLA	(%)	1014
Lithology	Geodetic Ground S	urface Elevation: 209.5 m		Sam	Samp	Reco	SPT	DEP.	ELE)	* Undrained Sh 20 40	ear Strength (kPa) 60 80	Plastic Liquid 20 40 60 80	RNI TSNI TSNI	SR SA	SI CL
××	al	brown	T 209.4 0.1					-							
$\bowtie$	:	Sand and Gravel FILL moist						-							
$\overset{x}{\bowtie}$				SS	1	100	44	-	209 -		)	<b>a</b> i i i i	1 1		
燚		dark grev	208.6 0.9					<u> </u>	z :	ļ <u>i</u> i					
$\overset{\times}{\otimes}$	Silt t	dark grey cy Clay / Clayey Silt Fli race sand, trace gravel	LL U.S	SS	2	67	15	- ' - -		0		<b>3</b>			
₩		END OF BOREHOLE	208.0 1.5					_	208 -						
A/c	d E818 - Did-	ion of Wood						<u> </u>							
	od E&IS, a Divisi	011 01 ¥¥00u		ater en	countere	ed on co	mpletio	n of dri	lling on :	2/19/2020 at a	depth of: 0.9 m.	. Region of the contract of th	noval of augers	s: 14 m	

R	ECORD OF BOREHOLE N	lo.	BH	D17								wood
Pro	ject Number: TP115086						Drilling	Location:	Clarkway Dr. N:4851532	, NBL, Sta. 1+200 E:605	385	Logged by: MS
Pro	ject Client: City of Brampton						Drilling	g Method:	150 mm Sol	lid Stem Augers		Compiled by: SN
	ject Name: Arterial Road Network within Secondary Plan Area (Area 47	Highwa ')	ay 427 I	Industr	ial			g Machine:	Track Mount			Reviewed by: SM
Pro	ject Location: Clarkway Drive, Brampton, O	ntario					Date S	Started:	Apr 1, 2020	Date Completed: Ap	r 1, 2020	Revision No.: <u>0, 3/25/21</u>
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading	7	COMMENTS
Lithology Plot	DESCRIPTION  Geodetic Ground Surface Elevation: 210.5 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	ionTesting  PPT	▲ COV (LEL) ■ TOV (LEL) 2 4 6 8  △ COV (ppm) □ TOV (ppm) 100 200 300 400  W <sub>p</sub> W W <sub>t</sub> ■ Uquid 20 40 60 80	INSTRUMENTATION INSTALLATION	& GRAIN SIZE DISTRIBUTION (%)
_ 	Geodetic Ground Surface Elevation: 210.5 m about 100 mm ASPHALT 210.4 brown					-				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	Sand and Gravel FILL moist	SS	1	83	37	+ - - - - -	210 -	0		3		
	brown / dark grey 1.2 Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace organics	ss	2	92	9	- 1 - - - - - -	209 -	0		3		
		ss	3	88	10	- - - 2 -	-	0	6	3		
		SS	4	100	11	- 3	208 -	0		3		
		ss	5	100	10		207 —	0		3		
	grey SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel stiff	SS	6	100	10	- - - 4 - - -		0		3		
	205.3	SS	7	83	11	5	206 -	0		1		
ava.	END OF BOREHOLE 5.2											
Woo	od E&IS, a Division of Wood	water on	counter	od on co	mplotio	n of dri	illing on	1/1/2020 at a d	epth of: 4.6 m.	<u> </u>		

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R	ECORD	OF BOREHOLE N	lo.	<u>BH</u>	<u>D18</u>								WO	od.
	ject Number:	-							g Location:	N:4851534	, NBL, Sta. 1+200 E:6053	87		<u>MS</u>
	ject Client: ject Name:	City of Brampton	Hadam	107	l.a.d a.t.				g Method:		id Stem Augers		- · · · -	SN
	•	Arterial Road Network within Secondary Plan Area (Area 4 Clarkway Drive, Brampton, O	7)	ay 427	inausti	ıaı			g Machine: Started:	Track Mounte Apr 1, 2020	Date Completed: Apr	1. 2020	Reviewed by: Servision No.:	
				211 04	MADL	NO.		1				.,vv		,, 0.20.21
	LIIH	OLOGY PROFILE	50	JIL 34	MPLI					TESTING ationTesting	LAB TESTING  Soil Vapour Reading  ▲ COV (LEL) ■ TOV (LEL)	Z O	COMMENT	S
Lithology Plot		DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	PPT • DCPT	2 4 6 8  △ COV (ppm) □ TOV (ppm) 100 200 300 400  W <sub>P</sub> W W <sub>L</sub> Plastic Liquid	INSTALLATION	& GRAIN SIZI DISTRIBUTIO (%)  SR SA SI	ON
❈		burface Elevation: 210.1 m brown Sand and Gravel FILL	<u>σ</u>	- o	I II	o o	-	—	20 40	60 80	20 40 60 80	==	3.0 3.1 3.	
$\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}$		moist	ss	1	83	12	-	- - -	0	(8	1			
		209.0 dark grey 1.7		2	75	13	- - - 1	209 – 7	0		1			
$\overset{\times}{\sim}$	Sill trace sar	ty Clay / Clayey Silt FILL nd, trace gravel, trace organics	ss	3	63	8			0		1			
₩		END OF BOREHOLE 1.8												
	d ESIS a Divia									: :	: : : :			

 $\frac{\nabla}{\pi}$  Groundwater encountered on completion of drilling on 4/1/2020 at a depth of: 1.2 m.

RI	ECORD OF BOREHOL	E N	0.	ВН	D19									\	NOC	od.
Pro	ject Number: TP115086							Drilling	Location:		., SBL, Sta	a. 1+350 E:605	297	Logged	by: MS	
Pro	ject Client: City of Brampton							Drilling	Method:	N:4851614 150 mm So	lid Stem A	lugers		Compile	d by: SN	
Pro	ject Name: Arterial Road Network Secondary Plan Area (A			y 427 l	ndustr	rial		Drilling	Machine:	Track Mount	ted Drill			Reviewe	ed by: SM	
Pro	ject Location: Clarkway Drive, Bramp	ton, Ont	tario					Date S	Started:	Feb 19, 2020	Date	Completed: Fel	b 19, 202	20 Revision	No.: <u>0, 3</u>	/25/21
	LITHOLOGY PROFILE		SC	IL SA	MPLI	NG			FIELD	TESTING		TESTING				
Lithology Plot	DESCRIPTION  Geodetic Ground Surface Elevation: 210.6 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	<ul> <li>♦ Intact</li> <li>♦ Remould</li> </ul> ear Strength (kPa)	△ COV (LE 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	apour Reading L) TOV (LEL) 4 6 8 m) D TOV (ppm) 00 300 400 W WL Liquid 40 60 80	INSTRUMENTATION INSTALLATION	GRA DISTR	IMENTS & IN SIZE RIBUTION (%)	CL
<b>XX</b>	about 90 mm ASPHALT brown	218.5 8.1					-	-								
	Sand and Gravel FILL moist brown / dark grey Silty Clay / Clayey Silt FILL trace sand, trace gravel	210.0 0.6 209.7	SS	1	100	47		210 -		0	<b>a</b> o 5					
	grey SILTY CLAY TILL trace to some sand, trace gravel stiff to very stiff	<del></del>	SS	2	58	13	- 1 - <u>5</u> - <del>5</del>	Z - - - - 209 -	0		19					
			SS	3	79	23	- - - 2 -		0	•	16			2 22	49	27
		207.6	SS	4	83	29	<u>-</u> - - - - - - 3	208 -	0		16					
	END OF BOREHOLE	3.0														

 $\frac{\nabla}{2}$  Groundwater encountered on completion of drilling on <u>2/19/2020</u> at a depth of: <u>1.2 m</u>.

R	ECORD	OF BORE	HOLE N	<b>o.</b>	BH	<u>D21</u>												W	00	d.
Pro	ject Number:	TP115086							Drilling	g Location:	Clar N·48	kway Dr. 351719	, NBL, S	ta. 1+5	00 E:605	194	ا	Logged by:	MS	
Pro	ject Client:	City of Brampton							Drilling	g Method:	150	mm Sol	id Stem	Augers	<b>S</b>			Compiled by:	SN	
	ject Name:	Arterial Road Net Secondary Plan A	work within H Area (Area 47)	ighwa	ıy 427 l	ndustr	ial		Drilling	g Machine:	Trac	k Mount						Reviewed by	SM	
Pro	ject Location:	Clarkway Drive, E	Brampton, Ont	ario					Date S	Started:	Feb	19, 2020	Date	Comp	oleted: Fe	b 19, 20	20	Revision No.	0, 3/2	25/21
	LITH	OLOGY PROFIL	E	SC	IL SA	MPLII	NG			FIELD	TES	ΓING		TEST Vapour Re		-		0011115		
					L		(%)		Œ.	Penetra O SPT		sting  DCPT	▲ COV (L	.EL) ■ 4 6	TOV (LEL)	INSTRUMENTATION INSTALLATION		COMME &		
Plot		DESCRIPTION		ype	Sample Number	(%)	'N' / RQD (%)	Ê		MTO Vane	Nilco	on Vane*	△ COV (p	pm) 🗆 200 30	TOV (ppm) 0 400	ATION		GRAIN S DISTRIBU		
Lithology				Sample Type	nple N	Recovery (%)	/ 'N' -	DEPTH (m)	ELEVATION	△ Intact ▲ Remould	<b>♦</b> 1	ntact Remould	W <sub>P</sub>	W	W <sub>L</sub>	TRUN		(%)		
Ē	Geodetic Ground S	urface Elevation: 209.0 m bout 90 mm ASPHAL	T 200.0	San	San	Rec	SPT	DEF	==	* Undrained St 20 40	ear Stre	ngth (kPa) 80	Plastic 20	40 60	Liquid 0 80	NS NS	GR	SA	SI	CL
$\bigotimes$		brown Sand and Gravel FILL	0.1					-				;								
$\overset{\otimes}{\otimes}$		cobbles/boulders moist		SS	1	79	48	-			0									
$\overset{\infty}{\otimes}$							.0	-												
$\overset{x}{\otimes}$								1	208 -											
$\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{$			007.5	SS	2	42	29	- =					3							
***		END OF BOREHOLE	207.5 1.5					-												
															:					
													:		-					
													:							
													:		1					
													:		-					
													:							
												:	:		-					
															-					
													:							
															-					
															-					

 $\frac{\nabla}{z}$  Groundwater encountered on completion of drilling on  $\underline{2/19/2020}$  at a depth of:  $\underline{1.2 \text{ m}}$ .

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R	ECORD O	F BOREH	OLE N	o. <u>l</u>	BH I	D23											W	000	d.
Pro	oject Number: TF	2115086							Drilling	Location:	Clarkway I N:4851839	r., SBL	Sta. 1+6	50 E:605	071	Log	ged by:	MS	_
Pro	oject Client: Ci	ty of Brampton							Drilling	Method:	150 mm S	olid Ste	m Auger	s		Cor	mpiled by:	SN	
Pro	oject Name: Ar	terial Road Netwecondary Plan Ar	ork within H	ighwa	y 427 I	ndustr	ial		Drilling	Machine:	Track Mou	nted Dri	ll			Rev	iewed by	: <u>SM</u>	
Pro	pject Location: CI	arkway Drive, Br	ampton, Ont	ario					Date S	Started:	Feb 19, 20	2 <b>0</b> _D	ate Com	oleted: Fe	b 19, 20	<b>20</b> Rev	ision No.:	0, 3/25	/21
	LITHOL	OGY PROFILE		SO	IL SA	MPLI	NG			FIELD	TESTING		AB TES						
Lithology Plot	DE	ESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □ MTO Vane △ Intact ▲ Remould	<ul> <li>Intact         <ul> <li>Remould</li> </ul> </li> <li>hear Strength (kPa)</li> </ul>	△ CO 2 △ CO 100 W <sub>F</sub>	4 (ppm) □ 200 30 W	TOV (LEL)	INSTRUMENTATION INSTALLATION	(	COMMEI & GRAIN S STRIBU (%)	SIZE	CL
<u> </u>	about	t 90 mm ASPHALT brown	209.1- 0:1-	0,	0,		0,	-	209 -			- 20							
		d and Gravel FILL moist	208.3	SS	1	58	35	- - - - -	209 — - - - -	0		80 4							
	Silty CI trace	grey lay / Clayey Silt FIL sand, trace gravel	207.7	SS	2	75	11	- 1 - <u>5</u> - <del>5</del> - <del>5</del>	<u></u> 208 −	0		<b>a</b> ○ <sub>10</sub>	3						
	trace to s	brown AY / CLAYEY SILT 1 come sand, trace gra ard to very stiff		SS	3	100	30	- - - - 2 -	207 —	0		<b>a</b> o <sub>1</sub>	9						
		grey		SS	4	100	36	- - - - - -	-	0		B 0,	10						
				SS	5	100	22	- 3 - - - - - - -	206 -	0		<b>a</b> 0	10						
				ss	6	0	18	- 4 - 4	205 —	0		<b>B</b> 01	9						
			204.2	SS	7	22	19	- - - - - 5	- - - -	0		<b>B</b> 0	21						
		O OF BOREHOLE	5.0																
												:	i						

 $\frac{\nabla}{z}$  Groundwater encountered on completion of drilling on <u>2/19/2020</u> at a depth of: <u>1.2 m</u>.

R	RECORD OF BOREHOLE No. BH D25  roject Number: TP115086																wood.
Pro	ject Number:	TP115086							Drilling	Location	: [	Clarkway Dr. N:4851935	., NBL, St	a. 1+800	E:604	975	Logged by: MS
Pro	ject Client:	City of Brampton							Drilling	Method:	-	150 mm So	lid Stem A	Augers			Compiled by: SN
Pro	ject Name:	Arterial Road Netv	work within H	lighwa	ay 427	Industr	rial		Drilling	Machine	: 1	rack Mount	ted Drill				Reviewed by: SM
Pro	ject Location:	Clarkway Drive, B	rampton, Ont	tario					Date S	Started:	Ē	eb 24, 2020	Date	Comple	ted: Fel	b 24, 20	20 Revision No.: 0, 3/25/21
	LITH	OLOGY PROFILE	E	SC	OIL SA	MPLI	NG			FIEL	D TE	STING		TESTI			
							(%		Œ.	1		nTesting	▲ COV (LE	apour Read EL) ■ 1 4 6	TOV (LEL)	INSTRUMENTATION INSTALLATION	COMMENTS &
Jot		DESCRIPTION		ed/	Sample Number	(%)	SPT 'N' / RQD (%)	<u> </u>		MTO Van	ie* l	Nilcon Vane*	△ COV (pr		TOV (ppm) 400	ENTA	GRAIN SIZE DISTRIBUTION
Lithology Plot				Sample Type	ble N	Recovery (%)	Ž	DEРТН (m)	ELEVATION	△ Intact ▲ Remou	ıld •	Intact Remould	W <sub>P</sub>	W	W <sub>L</sub>	RUM TALL	(%)
Litho	Geodetic Ground S	Surface Elevation: 209.1 m		Sam	Sam	Rec	SPT	DEP			Shear 40	Strength (kPa) 60 80	Plastic 20	40 60	Liquid 80	LSNI LNS	GR SA SI CL
<b>***</b>		brown	0.1					Ė									
$\bowtie$	,	Sand and Gravel FILL moist		00		400	00	-	-								
$\bowtie$			208.1	SS	1	100	28	-	-				<sup>30</sup> 5				
	Sil	grey ty Clay / Clayey Silt FIL	0.9 L <b>L</b>					- - 1 - 1	208 —								
$\bowtie$	t	race sand, trace gravel		SS	2	100	12	- <u>-</u>	Z :	0 0			14				
	QII TV	grey ' CLAY / CLAYEY SILT	207.5 1.5					<u> </u>									
	trace	to some sand, trace gr stiff to firm	avel	SS	3	83	10	- - - 2	-	0			13				
								- 1	207 —								
			-						•								
				SS	4	83	7	-	-	0			18				
		END OF BOREHOLE	206.0 3.0					- - 3	-				1	1 1	-		
										:			:				
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Woo	od E&IS, a Divis	ion of Wood	∑ Groundw	ater en	counter	ed on co	nmnletio	n of dri	lling on 2	2/24/2020 a	t a de	epth of: 1.2 m.	Cav	e in denti	n after ren	noval of a	augere: 2.4 m

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K	ECORD	OF BOREHOLE N	<b>o.</b>	BH_	<u>D27</u>								WO	od.
Pro	ject Number:	TP115086						_	Location:	N:4852040	SBL, Sta. 1+950 E:604	367		MS
	ject Client:	City of Brampton						_	g Method:	-	d Stem Augers			SN
	ject Name:	Arterial Road Network within I Secondary Plan Area (Area 47)	)	ıy 427 l	ndustr	ial		_	Machine:	Track Mounte			Reviewed by:	
Pro	ject Location:	Clarkway Drive, Brampton, On	tario					Date S	Started:	Feb 24, 2020	Date Completed: Fe	24, 2020	Revision No.:	0, 3/25/21
	LITH	OLOGY PROFILE	SC	IL SA	MPLII	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading	7	COMMENT	
Lithology Plot		DESCRIPTION	Sample Type	Sample Number	Recovery (%)	T 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	PPT	COV (LEL)	INSTRUMENTATION INSTALLATION O	COMMENT & GRAIN SIZ DISTRIBUTI (%)	Έ
<u> </u>	Geodetic Ground S	Surface Elevation: 208.6 m bout 90 mm ASPHALT 208.5-	Sar	Sar	Re	SPT	DE		20 40	ear Strength (kPa) 60 80	20 40 60 80	gg G	R SA S	I CL
		brown Sand and Gravel FILL moist 207.7	ss	1	100	26	- - - - - - - - - -	208 —	0	63				
	Sil trace sa	ty Clay / Clayey Silt FILL nd, trace gravel, trace organics 207.1	SS	2	100	7	1 - - - -	- - - -	0	8				
		END OF BOREHOLE 1.5												
	od ESIS a Divia													

 $\frac{\sum}{\sum}$  No freestanding groundwater measured in open borehole on completion of drilling.

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RI	ECORD	OF BOREHOL	E No	o. <u>l</u>	BH	D29								WC	od.
Proj	ect Number:	TP115086							Drilling	Location:	Clarkway Dr. N:4852155	., NBL, Sta. 2+100 E:604	765	Logged by:	MM
Proj	ect Client:	City of Brampton							Drilling	g Method:	150 mm So	lid Stem Augers		Compiled by:	SN
Proj	ect Name:	Arterial Road Network w Secondary Plan Area (A	vithin Hi	ighwa	y 427 l	ndustr	ial		Drilling	g Machine:	Track Mount	ted Drill		Reviewed by:	SM
Proj	ect Location:	Clarkway Drive, Brampto	on, Ont	ario					Date S	Started:	Feb 25, 2020	Date Completed: Fe	b 25, 2020	Revision No.:	0, 3/25/21
	LITH	OLOGY PROFILE		so	IL SA	MPLII	NG			FIELD	TESTING	LAB TESTING	_		
							(%		<u>E</u>	1	ationTesting PPT • DCPT	Soil Vapour Reading  COV (LEL) TOV (LEL)  4 6 8	INSTRUMENTATION INSTALLATION	COMMENT &	rs
Dot Dot		DESCRIPTION		,pe	Sample Number	(%)	SPT 'N' / RQD (%)	Ê		MTO Vane*	Nilcon Vane*	△ COV (ppm) □ TOV (ppm) 100 200 300 400	TION	GRAIN SIZ	ZE ION
Lithology				Sample Type	ple N	Recovery (%)	'N'	DЕРТН (m)	ELEVATION	△ Intact ▲ Remould	<ul><li>♦ Intact</li><li>♦ Remould</li></ul>	W <sub>P</sub> W W <sub>L</sub>	TRUM TALLA	(%)	
Ĕ	Geodetic Ground S	ourface Elevation: 211.7 m		Sam	Sam	Red	SPT	DEP		* Undrained Sh 20 40	ear Strength (kPa) 60 80	Plastic Liquid 20 40 60 80	S S G	R SA S	SI CL
××		brown	211.6 0.2	SS	1	83	7	-		0					
▓	Silt t	ty Clay / Clayey Silt FILL race sand, trace gravel		33	'	63	,	-							
▩			Ī					Ē	211 -						
▓				SS	2	100	17	- - 1		0					
▓			ŀ					-							
▩				SS	3	92	20	-		0					
₩		END OF BOREHOLE	209.9 1.8						210 -						
Moo	d E&IS. a Divis	ion of Wood 🗸								<u> </u>					

11	ECORD	OF BOREHOL	LE NO	0.	<u>BH</u>	<u>D31</u>	•								wood.
Pro	oject Number:	TP115086							Drilling	Location:	N:4852236		a. 2+250 E:604	668	Logged by: MD
	oject Client:	City of Brampton							-	g Method:	150 mm So		Augers		Compiled by: SN
	oject Name:	Secondary Plan Area (A	Area 47)		ıy 427	Industi	rial			Machine:	Track Mount		Commission Fa	L 40 0000	Reviewed by: SM
PIC		Clarkway Drive, Bramp	ton, On						Date	Started:	Feb 12, 2020		Completed: Fe	12, 2020	Revision No.: 0, 3/25/21
	LITH	OLOGY PROFILE		SC	OIL SA	MPLI	NG				TESTING	Soil V	TESTING apour Reading	z	COMMENTS
Lithology Plot	Geodetic Ground S	DESCRIPTION  Surface Elevation: 210.0 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	<ul> <li>♦ Intact</li> <li>♦ Remould</li> </ul> ear Strength (kPa)	2 COV (p) 100 2 W <sub>P</sub> Plastic	EL) TOV (LEL) 4 6 8 cm) D TOV (ppm) 200 300 400  W W Liquid 40 60 80	STRUMENTAT	& GRAIN SIZE DISTRIBUTION (%)
<b>***</b>	al	brown	209.9 0.1					-							
▓	:	Sand and Gravel FILL moist		SS	1	94	68	-	-		0 1	80 <sub>4</sub>			
▓		dark brown Sandy Silt FILL	209.3 0.7					Ē	-						
燚	trace	e to some clay, trace gravel		SS	2	100	9	_ _ 1	209 -	0		14			
▓								F	-						
燚				SS	3	100	9	Ē	-	0		23			
燚			207.9					_ 2	208 -			23			
***************************************		grey CLAY / CLAYEY SILT TILL	2.1					-							
	trace	to some sand, trace gravel firm to stiff		SS	4	100	8	_		0		s ° 15			
								- - - 3	207 -			:			
				SS	5	100	9			0		13			
<i>XX</i>		END OF BOREHOLE	206.5 3.5					_	-			13		-	
Wa															_

 $\frac{\textstyle \sum}{\scriptstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

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RI	ECORD OF BOREHOLE N	Ο.	BH I	D32									WO	od.
Pro	ject Number: TP115086						Drilling	Location:	Clarkway Dr. N:4852234	, SBL, Sta	a. 2+250 E:6040	666	_ Logged by:	MD
Pro	ject Client: City of Brampton						Drilling	Method:	150 mm Sol	id Stem A	ugers		Compiled by:	SN
	ject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	')	ıy 427 I	Industr	ial		_	Machine:	Track Mount				_ Reviewed by:	
Pro	ject Location: Clarkway Drive, Brampton, On	itario					Date S	started:	Feb 12, 2020	Date	Completed: Fel	b 12, 2020	_ Revision No.:	0, 3/25/21
	LITHOLOGY PROFILE	SC	OIL SA	MPLII	NG				TESTING		TESTING apour Reading	z	COMMENT	6
Lithology Plot	DESCRIPTION  Geodetic Ground Surface Elevation: 208.3 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	ear Strength (kPa)	△ COV (LE 2	EL) TOV (LEL) 4 6 8 m) □ TOV (ppm) 00 300 400  W W <sub>L</sub> Liquid 10 60 80	NSTRUMENTATION NSTALLATION	GRAIN SIZ  DISTRIBUTI  (%)  GR SA S	ZE ON
~	about 110 mm ASPHALT 208.1 brown 0.1	<u> </u>			0,	<u>-</u>	_		: :	:				
	Sand and Gravel FILL     moist   207.6     brown / dark brown   0.6		1	100	41	- - -	208 —	0		j				
	Sandy Silt FILL trace tclay, trace gravel moist	ss	2	92	10	_ _ _ 1	-	0		ļ				
	brown 1.2  Silty Clay / Clayey Silt FILL some sand, trace gravel		3	83	13	-	207 -	0		1				
<b>***</b>	END OF BOREHOLE 1.8									:				
										:				

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	CORD	OF BOREHO	LE No	<b>).</b>	BH	D33								WO	od.
Proj	ect Number:								Drilling	g Location:	N:4852361	, NBL, Sta. 2+400 E:604	548		MD
	ect Client:	City of Brampton								g Method:	•	id Stem Augers			SN
	ect Name:	Arterial Road Network Secondary Plan Area (	(Area 47)		y 427 I	ndustr	ial			g Machine:	Track Mounte		h 42 2020	Reviewed by:	
Pioj		Clarkway Drive, Bram	pton, Ont						Date	Started:	Feb 13, 2020	Date Completed: Fe	D 13, 2020	Revision No.:	0, 3/25/21
	LITH	OLOGY PROFILE		SC	IL SA	MPLII	NG				TESTING	LAB TESTING Soil Vapour Reading	z	COMMENT	rs
Lithology Plot	Condutio Ground	DESCRIPTION Surface Elevation: 214.0 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	PPT ● DCPT	▲ COV (LEL)	INSTRUMENTATION INSTALLATION 0	& GRAIN SIZ DISTRIBUTI (%)	ZE ON
_ 	a	bout 110 mm ASPHALT brown	213.9 0.1	SS	1	89	41	-			1 1				
▓		Sand and Gravel FILL moist			·										
▩	Sil	dark brown ty Clay / Clayey Silt FILL	<u>213.3</u> 0.7					-							
	1	race sand, trace gravel	-	SS	2	100	14	- 1 - - -	213 -	0	<b>A</b>				
			212.0	SS	3	100	20	- - - -		0	ES				
		END OF BOREHOLE	2.0												
	d ESIS a Divia														

 $\frac{\textstyle \bigvee}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD OF BOREHOLE N	<b>o.</b>	BH	D35								wood
Pro	ject Number: TP115086						Drilling	Location:	Clarkway Dr. N:4852462	, SBL, Sta. 2+550 E:6044	<b>158</b>	_ Logged by: MD
Pro	ject Client: City of Brampton						Drilling	Method:	150 mm Sol	lid Stem Augers		Compiled by: SN
	ject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	1	y 427 I	ndustr	ial		Drilling	Machine:	Track Mounte	ed Drill		Reviewed by: SM
Pro	ject Location: Clarkway Drive, Brampton, On	tario					Date S	Started:	Feb 12, 2020	Date Completed: Fet	12, 2020	Revision No.: <u>0, 3/25/21</u>
	LITHOLOGY PROFILE	SC	IL SA	MPLI	NG			FIELD '	TESTING	LAB TESTING Soil Vapour Reading	7	COMMENTS
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  Δ Intact A Remould  * Undrained She	itionTesting  PPT	▲ COV (LEL) ■ TOV (LEL)  2 4 6 8  △ COV (ppm) □ TOV (ppm) 100 200 300 400  W <sub>P</sub> W W <sub>L</sub> Plastic Liquid	INSTRUMENTATION INSTALLATION	GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL
<u>∵</u>	Geodetic Ground Surface Elevation: 212.9 m           212.8         brown         0.1	S	S	м_	S	_		20 40	60 80	20 40 60 80	22	SIX SA SI CE
<b>X</b>	Sand and Gravel FILL moist about 130 mm ASPHALT 212.2	SS	1	89	46	-	- - - -		)	4		
	grey 0.7  Silty Clay / Clayey Silt FILL  trace to some sand, trace gravel, trace wood  fragments in SS2	SS	2	100	11	- - - 1 -	212	0		3 O <sub>15</sub>		
<b>**</b>		SS	3	67	5	-  -  -  -	-	0	i i i i i i i i i i i i i i i i i i i	3 O 16		
<b>**</b>						2 	211 —					
<b>※</b>	210.0	SS	4	89	9		210 —	0	G	20		
	brown 2.9  SILTY CLAY / CLAYEY SILT TILL  trace to some sand, trace gravel  very stiff to stiff	SS	5	89	16	_ 3 - - - -	- - - -	0	CR	a O 18		
						- - - - - - 4	209 —					
	grey					- - - -	- - -					
	207.9 END OF BOREHOLE 5.0	SS	6	89	14	- - - - - 5	208 -	0	CS.	s O.		
	END OF BOXERIOLE 3.0											

 $\frac{\textstyle \sum}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

RI	ECORD OF BOREHOLE N	Ο.	<u>BH</u>	D36								WC	ood.
Pro	ject Number: TP115086						Drilling	Location:	Clarkway Dr.	, SBL, Sta. 2+550 E:604	137	_ Logged by:	MD
Pro	ject Client: City of Brampton						Drilling	g Method:	N:4852462 150 mm Soli	id Stem Augers		_ Compiled by:	SN
Pro	ject Name: Arterial Road Network within I Secondary Plan Area (Area 47	Highwa	ay 427	Industr	rial		Drilling	g Machine:	Track Mounte	ed Drill		_ Reviewed by:	SM
Pro	ject Location: Clarkway Drive, Brampton, On	) Itario					Date	Started:	Feb 12, 2020	Date Completed: Fell	12, 2020	_ Revision No.:	0, 3/25/21
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING			
			١.		(%		Œ	1	tionTesting PPT • DCPT	Soil Vapour Reading  ▲ COV (LEL) ■ TOV (LEL)  2 4 6 8	NOIL	COMMEN &	TS
<u>B</u> ot	DESCRIPTION	ype	Sample Number	(%)	SPT 'N' / RQD (%)	Ê		MTO Vane*		△ COV (ppm) □ TOV (ppm) 100 200 300 400	INSTRUMENTATION INSTALLATION	GRAIN SIZ DISTRIBUT	ZE ION
Lithology		Sample Type	N eld	Recovery (%)	ż	DЕРТН (m)	ELEVATION		◆ Remould	W <sub>P</sub> W W <sub>L</sub>	TALL	(%)	
Ĕ XXX	Geodetic Ground Surface Elevation: 211.9 m	San	San	Rec	SPT	DEF		* Undrained Sho	ear Strength (kPa) 60 80	Plastic Liquid 20 40 60 80	SS S	GR SA	SI CL
▩	brown <b>Sand and Gravel FILL</b> moist	SS	1	75	34	-				3			
畿	211.3					Ė							
▓	grey 0.6  Silty Clay / Clayey Silt FILL  trace to some sand, trace gravel	SS	,	83	12	_	211 -						
❈	trace to some same, trace graver	33	2	63	13	— 1 -	211		Ī				
畿						Ē							
▓	210.1	SS	3	75	13	_	•		a	<b>3</b> · · · · · · · · · · · · · · · · · · ·			
···	END OF BOREHOLE 1.8												

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREHOL	E N	0.	BH_	D37	-							wood.
Pro	ject Number:	TP115086							Drilling	Location:	Clarkway Dr. N:4852470	, NBL, Sta. 2+700 E:604	335	Logged by: MD
Pro	ject Client:	City of Brampton							Drilling	Method:	150 mm Sol	id Stem Augers		Compiled by: SN
	ject Name:	Arterial Road Network ( Secondary Plan Area (A	Area 47)		ıy 427	Indust	rial		Drilling	Machine:	Track Mount			Reviewed by: SM
Pro	ject Location:	Clarkway Drive, Brampt	ton, On	tario					_ Date S	Started:	Feb 13, 2020	Date Completed: Fel	b 13, 2020	_ Revision No.: <u>0, 3/25/21</u>
	LITH	OLOGY PROFILE		SC	IL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading	_	
Lithology Plot	Geodetic Ground S	DESCRIPTION Surface Elevation: 214.5 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	<ul> <li>Intact</li> <li>Remould</li> <li>ear Strength (kPa)</li> </ul>	COV (LEL)	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
<b>***</b>	a	brown brown	214.3 0.1					-						
$\bowtie$		Sand and Gravel FILL moist		SS	1		17	-	214 —	0	***************************************	2		
$\overset{\sim}{\approx}$		grey / brown	213.8 0.7					‡						
$\bowtie$	Sil	ty Clay / Clayey Silt FILL trace sand, trace gravel		SS	2	100	9	1	-	0		•		
$\bowtie$								Ė	242					
$\bowtie$				SS	3	0	0	ŧ	213 -					
$\overset{\infty}{}$				- 55	,	0	"	2	-					
$\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{x$								<u> </u>	•					
$\bowtie$				SS	4	100	16	Ė	212 -	0	· · · · · · · · · · · · · · · · · · ·	<b>3</b>		
<b>***</b>			21 <u>1.6</u> 2.9					ŧ.	-					
	SILTY trace	CLAY / CLAYEY SILT TILL to some sand, trace gravel	2.5	SS	5	22	27	<u></u>		0				
		very stiff	210.9	- 33	3	22	21	Ē.	211 -					
7/7 very sun														
Wor	od E&IS. a Divis	ion of Wood		I'				<u> </u>		<u> </u>				
			vo rreesta	anding	groundv	vater me	asured	ın ope	n poreho	ie on complet	ion of drilling.	Cave in depth after ren	novai of augei	is. <u>Z.1 m</u> .

R	ECORD OF BOREHOLE N	0.	ВН	D38									wood.
Pro	ject Number: TP115086						Drilling	Location:	Clarkway Dr N:4852567	, NBL, St	a. 2+700 E:604	336	Logged by: MD
Pro	ject Client: City of Brampton						Drilling	g Method:	150 mm So	id Stem A	Augers		Compiled by: SN
Pro	ject Name: Arterial Road Network within H Secondary Plan Area (Area 47)	lighwa	ay 427 I	Industr	ial		Drilling	g Machine:	Track Mount	ed Drill			Reviewed by: SM
Pro	ject Location: Clarkway Drive, Brampton, Ont	tario					Date S	Started:	Feb 13, 2020	Date	Completed: Fe	b 13, 20	20 Revision No.: 0, 3/25/21
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING		TESTING apour Reading	-	COMMENTO
			_		(%)		Ê		tionTesting PPT • DCPT	▲ COV (LE	EL) TOV (LEL) 4 6 8	INSTRUMENTATION INSTALLATION	COMMENTS &
Plot	DESCRIPTION	уре	Sample Number	(%)	SPT 'N' / RQD (%)	Ê		MTO Vane*	Nilcon Vane*	△ COV (pp	om) □ TOV (ppm)	ENT	GRAIN SIZE DISTRIBUTION
Lithology Plot		Sample Type	ble N	Recovery (%)	ż	DEРТН (m)	ELEVATION	△ Intact ▲ Remould		W <sub>P</sub>	W W <sub>L</sub>	TRUN	(%)
Ĕ	Geodetic Ground Surface Elevation: 215.3 m	Sarr	Sam	Reg	SPT	DEP	E	* Undrained She 20 40	ear Strength (kPa) 60 80	Plastic 20	Liquid 40 60 80	SNS	GR SA SI CL
$\bowtie$	brown Sand and Gravel FILL moist	SS	1	75	18	-	215 -						
$\bowtie$	214.7	00		"	10	-							
	grey / brown 0.6 Silty Clay / Clayey Silt FILL					Ē							
$\bowtie$	trace to some sand, trace gravel	SS	2	83	12	- - 1		0		3			
$\bowtie$						-	214 -						
₩		SS	3	75	9	-		0					
<u></u>	213.4 END OF BOREHOLE 1.8						-						
										:			
										:			
										:			
										:			
										:			
										:			
										:			
										:			
										:			
										:			

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD OF BOREHOLE N	0.	ВН	D39											W	000	9
Pro	oject Number: TP115086						Drilling	Location:	Clarkway Dr.	, SBL	, Sta. 2	2+850 E:6042	234	ı	Logged by:	MD	_
Pro	oject Client: City of Brampton						Drilling	Method:	N:4852659 150 mm Sol	id Ste	m Aug	jers		(	Compiled by:	SN	
Pro	oject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	Highwa	ay 427	Industr	ial		Drilling	Machine:	Track Mount	ed Dri	ill				Reviewed by:	SM	
Pro	oject Location: Clarkway Drive, Brampton, On	) itario					Date S	Started:	Feb 12, 2020	D	ate Co	mpleted: Fel	12, 202	<u>0</u> I	Revision No.:	0, 3/25	5/21
	LITHOLOGY PROFILE	sc	DIL SA	MPLII	NG			FIELD	TESTING			ESTING ur Reading	7		COMMEN	T0	
			_		(%)		Œ		tionTesting PPT • DCPT	▲ CO	V (LEL)	■ TOV (LEL) 6 8	INSTRUMENTATION INSTALLATION		COMMEN &		
Plot	DESCRIPTION	ype	Sample Number	(%)	SPT 'N' / RQD (%)	Ē		MTO Vane*	Nilcon Vane*	△ CO		□ TOV (ppm) 300 400	ATION		GRAIN SI DISTRIBUT		
Lithology Plot		Sample Type	ble N	Recovery (%)	ż	DЕРТН (m)	ELEVATION	△ Intact ▲ Remould	<ul><li>♦ Intact</li><li>♦ Remould</li></ul>	W,		•	IRUN PALL/		(%)		
Γİ	Geodetic Ground Surface Elevation: 213.0 m about 150 mm ASPHALT 212.9	Sam	Sam	Rea	SPT	DEP		* Undrained Sho 20 40	ear Strength (kPa) 60 80	Pla 20	stic 40	Liquid 60 80	NS NS	GR	SA	SI	CL
<b>XX</b>	brown 0.1					-											
$\bowtie$	Sand and Gravel FILL moist	SS	1	89	34	_	-	0									
$\overset{XX}{\Leftrightarrow}$						ŧ	-										
$\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}$	Sandy Silt FILL trace to some clay, trace gravel	SS	2	100	9	_ _ 1	212 -	0									
$\overset{\otimes}{\otimes}$						-	-										
<b>※</b>	211.0 END OF BOREHOLE 2.0	SS	3	72	9		-	0									
										:	:						
											:						
											:						
										:	-						
										:	:						
											:						
											:						
Mar	od E&IS. a Division of Wood									- :	- :						

Canada Limited

 $\stackrel{\underline{\vee}}{\underline{=}}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD OF BOREHOLE N	Ο.	вн	D40								wood.
Pro	oject Number: TP115086				Clarkway Dr., N:4852764	, SBL, Sta. 2+850 E:604	138	Logged by: MD				
Pro	eject Client: City of Brampton						Drilling	g Method:	150 mm Soli	id Stem Augers		Compiled by: SN
Pro	oject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	Highwa )	ıy 427	Industr	ial		Drilling	g Machine:	Track Mounte	ed Drill		Reviewed by: SM
Pro	oject Location: Clarkway Drive, Brampton, On	itario					Date S	Started:	Feb 13, 2020	Date Completed: Fel	13, 2020	Revision No.: <u>0, 3/25/21</u>
	LITHOLOGY PROFILE	SC	IL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading	7	COMMENTS
			ь Б		(%)		Ê		PPT • DCPT	▲ COV (LEL) ■ TOV (LEL) 2 4 6 8	NSTRUMENTATION NSTALLATION	COMMENTS &
Bot	DESCRIPTION	lype	qunp	(%)/	RQD	Ξ		MTO Vane*	Nilcon Vane*  ♦ Intact	△ COV (ppm) □ TOV (ppm) 100 200 300 400	ATIO	GRAIN SIZE DISTRIBUTION
Lithology Plot		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION		◆ Remould ear Strength (kPa)	W <sub>P</sub> W W <sub>L</sub> ■ O	STALI	(%)
ij	Geodetic Ground Surface Elevation: 212.9 m about 150 mm ASPHALT 212.8	-	Sa	Re		<u> </u>	<u> </u>	20 40	60 80	20 40 60 80		R SA SI CL soil in the ditch ~ 216 mm thick.
$\bowtie$	brown 0.1 Sand and Gravel FILL	SS	1	100	50 / 150mm	Ė			50 150 mm	!		
$\overset{ imes}{ imes}$	moist					-						
$\overset{ imes}{ imes}$		ss	2	89	20	<u>-</u>	212 -					
$\overset{\sim}{\sim}$	211.5		_		20	<b> </b>						
$\overset{\sim}{\otimes}$	grey 211.5 1.4 Silty Clay / Clayey Silt FILL trace to some sand, trace gravel					F						
$\overset{ imes}{ imes}$	trace to some sand, trace gravel	ss	3	83	10	F		0	8	ı		
$\overset{\sim}{\sim}$						2	211 -					
$\overset{\otimes}{\otimes}$						<u>-</u> -						
₩		SS	4	56	7	- <u>-</u>	Z .	0	*	'		
$\overset{ imes}{ imes}$						- 3 - 3	210 -					
$\overset{ imes}{ imes}$		SS	5	50	16			0	<b>S</b>	1 1 1 1		
$\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}{\overset{x}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}{\overset{x}}}{\overset{x}}}{\overset{x}}$						-						
$\overset{ imes}{ imes}$						_	200					
<b>※</b>						<u> </u>	209 -					
	trace to some sand, trace gravel firm to stiff					-						
		-		94		F				, i i i i i		
	207.9 END OF BOREHOLE 5.0	SS	6	94	8	_ 5	208 -	0		·		
	END OF BOREHOLE 5.0											
	od E&IS, a Division of Wood adda Limited	water en	counter	ed on co	mpletio	n of dril	ling on 2	2/13/2020 at a	depth of: <u>2.7 m</u> .			

RI	ECORD	OF BOREHOL	E No	o. <u> </u>	BH	D41									W	200	d
Proj	ject Number:	TP115086							Drilling	Location:	Clarkway Dr.	, NBL, Sta. 3+000 E:604	141	Lo	gged by:	MD	<u> </u>
	ject Client:	City of Brampton							Drilling	Method:	N:4852766 150 mm Sol	lid Stem Augers		Co	ompiled by:	SN	
Pro	ject Name:	Arterial Road Network w	vithin H	ighwa	y 427 I	ndustr	ial		Drilling	Machine:	Track Mount	ed Drill		Re	eviewed by:	SM	
Proj	ject Location:	Secondary Plan Area (A Clarkway Drive, Brampto	rea 47) on, Ont	ario					Date S	Started:	Feb 13, 2020	Date Completed: Fe	b 13, 20	<b>20</b> Re	evision No.:	0, 3/2	5/21
	LITH	OLOGY PROFILE		so	IL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading	_				
Lithology Plot		DESCRIPTION  urface Elevation: 213.9 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	ear Strength (kPa)	□ COV (LEL) □ TOV (LEL)  2 4 6 8 □ COV (ppm) □ TOV (ppm) 100 200 300 400    W <sub>P</sub> W W <sub>L</sub> □ Plastic Liquid 20 40 60 80	NSTRUMENTATION NSTALLATION		COMMEN & GRAIN SI DISTRIBUT (%)	ZE	CL
_ ₩	ab	pout 110 mm ASPHALT brown	213.8 0.1				50 /	-	-			1 1 1 1		25	F0.	40	2
	\$	Brown Sand and Gravel FILL moist	0.1	SS	1	100	150mm	- - - -	- - -		150 mm	\$D_4		35	50	13	2
			212.6 1.3	SS	2	89	45	_ 1 	213 -		) [	10.					
	Silt trace	grey y Clay / Clayey Silt FILL to some sand, trace gravel	1.3	SS	3	100	12	- - - -	212 —	0		o 0 16					
▩		END OF BOREHOLE	211.7 2.1					_ 2 _	-			10					

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD OF BOREHOLI	E No	o. <u>l</u>	BH I	D43												W	20	od.
Pro	ject Number: TP115086							Drilling	Location:	Clarkway Dr N:4852887	., S	BL, Sta	ı. 3+1	50 E:6040	009	!	Logged by:	MD	
Pro	ject Client: City of Brampton							Drilling	Method:	150 mm So			uger	s		'	Compiled by:	SN	
	ject Name: Arterial Road Network wi Secondary Plan Area (Are	ea 47)		y 427 I	ndustr	ial		Drilling	Machine:	Track Mount	ed	Drill					Reviewed by	SM	
Pro	ject Location: Clarkway Drive, Brampto	on, Ont	ario					Date S	Started:	Feb 11, 2020	)	_Date	Com	pleted: Fel	b 11, 202	20	Revision No.	0, 3	/25/21
	LITHOLOGY PROFILE		SO	IL SA	MPLI	NG			FIELD	TESTING				TING	7		COMME	LITC.	
				16		(%)		(E)		tionTesting PPT • DCPT	•	COV (LE	L) =	TOV (LEL)	INSTRUMENTATION INSTALLATION		COMMEI &		
Plot	DESCRIPTION		ype	Sample Number	(%)	SPT 'N' / RQD (%)	Ê		MTO Vane* △ Intact	Nilcon Vane*  ◇ Intact	Δ	COV (pp	m) 🗆 00 3	TOV (ppm) 00 400	AENT		GRAIN S DISTRIBU		
Lithology Plot			Sample Type	nple N	Recovery (%)	Ņ	DЕРТН (m)	ELEVATION	▲ Remould	Remould		W <sub>P</sub>	W	W <sub>L</sub>	TALL		(%)		
Lith	Geodetic Ground Surface Elevation: 217.5 m about 130 mm ASPHALT	217.3_	Sar	Sar	Rec	SP	DE		20 40	60 80		Plastic 20 4	ю 6	Liquid 80 80	S S	GR	SA	SI	CL
		217.3 219:2 0.3	ss	1	83	10								<u>.</u>					
$\bowtie$	moist  dark grey /brown		33	'	03	12		217 -	0		4 								
$\bowtie$	Silty Clay / Clayey Silt FILL trace sand, trace gravel	ŀ						-											
$\bowtie$			SS	2	100	12	1 -	-	0			°17							
		216.1 1.4					-	216 -											
	SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel	İ	ss	3	100	27			0			0							
	very stiff to hard			3	100		_ _ 2	-				<sup>0</sup> 15							
								-											
			SS	4	100	44	_	215 -	C	) [	 B	) 14		: :					
		ŀ					-	-				ļ							
	grey	ŀ					_ _ 3	-					: :						
		214.0	SS	5	89	44		214 -	C	)	3	<sup>0</sup> 15	: :	: :::					
<u> </u>	END OF BOREHOLE	3.5						214					:						
													-						
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													-						
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Mod	od E&IS. a Division of Wood													-					

 $\frac{\sqrt{2}}{2}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD OF BOREHOLE N	<b>o.</b>	BH	D44									wood.
Pro	ject Number: TP115086						Drilling	Location:	Clarkway Dr.	., SBL, Sta	. 3+150 E:6040	007	Logged by: MD
Pro	ject Client: City of Brampton						Drilling	g Method:	N:4852886 150 mm Sol	lid Stem A	ugers		Compiled by: SN
Pro	ject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	lighwa	ıy 427 I	ndustr	ial		Drilling	g Machine:	Track Mount	ed Drill			Reviewed by: SM
Pro	ject Location: Clarkway Drive, Brampton, On	tario					Date 9	Started:	Feb 11, 2020	Date	Completed: Fel	b 11, 202	20 Revision No.: 0, 3/25/21
	LITHOLOGY PROFILE	SC	IL SA	MPLI	NG			FIELD :	TESTING		TESTING		
Plot	DESCRIPTION	ype	Sample Number	(%)	SPT 'N' / RQD (%)	(E	(m) NO	O SPT □ MTO Vane*	ionTesting  PPT ● DCPT  Nilcon Vane*	▲ COV (LE 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	apour Reading L) ■ TOV (LEL) 4 6 8 m) □ TOV (ppm) 00 300 400	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION
Lithology Plot		Sample Type	mple ∧	Recovery (%)	/ 'N' T	DЕРТН (m)	ELEVATION	△ Intact ▲ Remould  * Undrained She	<ul> <li>Intact</li> <li>Remould</li> </ul> ar Strength (kPa)	W <sub>P</sub> ■ Plastic	W W <sub>L</sub>	STRUN	(%)
₹	Geodetic Ground Surface Elevation: 216.8 m  Sand and Gravel FILL 216.7	Sa	Sa	Re	SP		ᆸ	20 40	60 80	20 4		22	GR SA SI CL
	brown / dark grey  Silty Clay / Clayey Silt FILL  trace to some sand, trace gravel, trace organics	SS	1	83	8	-		0		<b>2</b>			
	215.6	SS	2	75	16	- - - 1	216 -	0		<b>3</b>			
	brown 1.2  SILTY CLAY / CLAYEY SILT TILL  trace to some sand, trace gravel very stiff	SS	3	88	27	- - -		0		3			
28282	215.0 END OF BOREHOLE 1.8						215 -						

 $\frac{\textstyle \sum}{\scriptstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREHOL	_E No	<b>o.</b> !	BH	D45													\	VO	00	<b>J</b> .
Pro	ject Number:	TP115086							Drilling	g Location	ո։	Clarkwa N:48529	y Dr.	, NBL, S	ta. 3+3	800 E:603	917	I	ogged	by: <u>I</u>	MD	
Pro	ject Client:	City of Brampton							Drilling	g Method:		150 mm	Sol	id Stem	Auger	s		(	Compile	d by:	SN	
Pro	ject Name:	Arterial Road Network			y 427 l	ndustr	ial		Drilling	g Machine	e:	Track M	ount	ed Drill					Reviewe	d by:	SM	
Pro	ject Location:	Clarkway Drive, Bramp							Date 9	Started:		Feb 11,	2020	Date	e Com	pleted: Fe	b 11, 20	20	Revision	No.: <u>(</u>	), 3/25/2	21_
	LITH	OLOGY PROFILE		SC	IL SA	MPLI	NG			FIEL	D T	ESTING	3			TING					_	
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	(m) H	ELEVATION (m)		□ P ne*	onTesting PT ● D Nilcon Va ◇ Intact ◆ Remo	OCPT ane*	▲ COV (I 2 △ COV (I	4 opm) □	TOV (LEL) 6 8 TOV (ppm) 00 400 W <sub>L</sub>	INSTRUMENTATION INSTALLATION		GRA DISTR	MENT & IN SIZ IBUTI (%)	E	
itholo	Goodetic Ground	Surface Elevation: 218.8 m		Sample	Sample	Zecov.	SPT 'N	DEРТН (m)	ELEV/			r Strength (	kPa)	Plastic 20		Liquid 80 80	NSTR	GR	SA	(	(	CL
_	а	bout 130 mm ASPHALT Sand and Gravel FILL	218.7 218:5	0,	0,		0,	-			:		,									
$\overset{**}{\otimes}$	Sil	brown / grey	0.3	SS	1	100	9	_						2								
$\overset{ imes}{ imes}$	1	trace sand, trace gravel						-	218 -													
$\bowtie$				SS	2	83	14	- - 1					· · · · · · · · · · · · · · · · · · ·	3								
	SII TV	brown / grey	217.6 1.2					Ė														
		e to some sand, trace gravel hard		SS	3	100	36	-			0		· · · · · · · · · · · · · · · · · · ·	<b>.</b>								
<i>XX</i>		END OF BOREHOLE	217.0 1.8					-	217 -		-						1					
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 $\frac{\sum}{z}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD	OF BOREHOL	E No	o. <u> </u>	BH	D47									wood
Pro	ject Number:	TP115086							Drilling	Location:	Clarkway Dr., N:4853079	SBL, Sta.	3+450 E:6038	316	Logged by: MD
Pro	ject Client:	City of Brampton							Drilling	Method:	150 mm Soli	id Stem Au	gers		Compiled by: SN
Pro	ject Name:	Arterial Road Network v Secondary Plan Area (A	within H	ighwa	y 427 I	ndustr	ial		Drilling	g Machine:	Track Mounte	ed Drill			Reviewed by: SM
Pro	ject Location:	Clarkway Drive, Brampt	ton, Ont	ario					Date 9	Started:	Feb 11, 2020	Date C	ompleted: Fel	11, 202	20 Revision No.: 0, 3/25/21
	LITH	OLOGY PROFILE		SO	IL SA	MPLI	NG			FIELD '	TESTING		ESTING		
Lithology Plot		DESCRIPTION  urface Elevation: 219.9 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	PPT ● DCPT	△ COV (LEL)  2 4  △ COV (ppm)  100 200	) □ TOV (ppm) 300 400 W W <sub>L</sub> ⊕ Liquid	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
<b>***</b>	ab	out 160 mm ASPHALT Sand and Gravel FILL	219.8	·				-							
	Silt	dark brown / grey y Clay / Clayey Silt FILL ace sand, trace gravel	219: <del>8</del> 0.3	SS	1	83	8	-  -  -  -	- - - -	0	CS	°21			
<b>**</b>			218.5	SS	2	89	12	1	219	0	25	°17			
		brown / grey  CLAY / CLAYEY SILT TILL to some sand, trace gravel very stiff to hard	1.4	SS	3	100	18		-	0		o <sub>14</sub>			
			-					_ 2 _ _ _	218 -						
			-	SS	4	100	41	<u> </u>	217 -	0	<b>G</b> 9	°14			
			-	SS	5	100	37	3	-	0	Ç9	014			
		 grey						- - - - 4	216 -						
								- - - -	-						
		END OF BOREHOLE	214.9 5.0	SS	6	94	17	- - - - 5	215 -	0	69	17			
Woo	od E&IS, a Divisi	on of Wood					<u> </u>			lo on completi					

Canada Limited

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R	ECORD	OF BOREHOL	E No	o. <u>l</u>	BH	D48														V	VC	000	4
Pro	ject Number:	TP115086							Drilling	g Locatio	on:	Clark N:485	way Dr	., SE	BL, Sta.	3+45	0 E:603	814	l	.ogged b	'	MD	_
Pro	ject Client:	City of Brampton							Drilling	g Metho	d:	150 r	nm So	lid S	Stem A	ugers			(	Compiled	by:	SN	
Pro	ject Name:	Arterial Road Network w Secondary Plan Area (A	vithin H	ighwa	y 427 I	ndustr	ial		Drilling	g Machir	ne:	Track	Mount	ted I	Drill				F	Reviewed	d by:	SM	
Pro	ject Location:	Clarkway Drive, Brampto	on, Ont	ario					Date S	Started:		<u>Feb 1</u>	1, 2020	)	_Date (	Comp	leted: Fe	b 11, 20	<b>20</b> F	Revision	No.:	0, 3/25/	21_
	LITH	OLOGY PROFILE		SO	IL SA	MPLI	NG			FIE	LD 1	ESTI	NG		LAB Soil Va			_					
					_		(%)		(E)	Pe O SPT		ionTest	ing DCPT	•	COV (LEL	_) ■	TOV (LEL)	INSTRUMENTATION INSTALLATION			&		
Plot		DESCRIPTION		ype	Sample Number	(%)	SPT 'N' / RQD (%)	Ê		мто у			Vane*		COV (ppn 100 20	n) 🗆 0 300	TOV (ppm) 400	ATION 7		GRAI DISTRI			
Lithology Plot				Sample Type	N eld	Recovery (%)	ż	DЕРТН (m)	ELEVATION	△ Intac ▲ Rem	nould	♦ Re	emould		W <sub>P</sub>	W	W <sub>L</sub>	IRUM IALL/			%)	•	
Ĕ	Geodetic Ground S	Surface Elevation: 219.9 m		Sarr	Sarr	Red	SPT	DEP		* Undrain 20	ned She 40	ar Streng 60	th (kPa) 80		Plastic 20 40	6,0	Liquid 80	NS.	GR	SA	\$	SI	CL
		Sand and Gravel FILL  dark grey ty Clay / Clayey Silt FILL	219.7 0.1	SS	1	75	4	-	-					<b>a</b> a									
$\bowtie$	t	trace sand, trace gravel			·			Ė	-														
$\bowtie$								-	219 -	1													
$\bowtie$			218.6	SS	2	100	12	- - 1	-					<b>3</b>									
	SILTY	brown / CLAY / CLAYEY SILT TILL	1.2						-														
		to some sand, trace gravel very stiff		SS	3	100	24	_	-	0	)			<b>a</b>									
<i>XX</i>		END OF BOREHOLE	218.0 1.8					-	-														
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 $\frac{\textstyle \sum}{\scriptstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD OF BOREHOLE	No	<b>).</b>	ВН	D49	1								Wo	od.
Pro	oject Number: TP115086							Drilling	Location:	Clarkway Dr N:4853200	., NBL, Sta	. 3+600 E:603	698	Logged by:	MD
Pro	oject Client: City of Brampton							Drilling	Method:	150 mm So	lid Stem A	ugers		Compiled by:	SN
Pro	oject Name: Arterial Road Network with Secondary Plan Area (Area		ighwa	y 427 I	Industr	ial		Drilling	Machine:	Track Mount	ted Drill			Reviewed by:	SM
Pro	oject Location: Clarkway Drive, Brampton	, Ont	ario					Date S	Started:	Feb 12, 2020	)Date	Completed: Fel	b 12, 202	Revision No.:	0, 3/25/21
	LITHOLOGY PROFILE		SC	IL SA	MPLI	NG			FIELD	TESTING		TESTING			
Lithology Plot	DESCRIPTION  Geodetic Ground Surface Elevation: 220.8 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	<ul> <li>♦ Intact</li> <li>♦ Remould</li> </ul> ear Strength (kPa)	△ COV (LE 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	apour Reading L) ■ TOV (LEL) 1 6 8 m) □ TOV (ppm) 00 300 400  W WL	INSTRUMENTATION INSTALLATION	COMMENT & GRAIN SIZ DISTRIBUTI (%)	ZE ON
<b>***</b>	about 120 mm ASPHALT 2 Sand and Gravel FILL 2	20.6 28:4					-								
	brown / grey Silty Clay / Clayey Silt FILL trace sand, trace gravel	0.3	SS	1	83	6	-  -  -	220 —	0	E	a o 14				
			SS	2	89	10	- - - 1 -	-	0		a °24				
<b>**</b>			SS	3	100	8	-	219 -	0	e	o 16				
<b>※</b>	brown 3 SILTY CLAY TILL	18.6 2.1					2	- - -							
	trace to some sand, trace gravel very stiff		SS	4	100	23	-  -  -	218 -	0		a o 14				
	grey	-	ss	5	100	28	3	- - -	0	ē	a o <u>∎ •</u>			2 19 4	8 31
XX	2 END OF BOREHOLE	17.3 3.5						-							

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

ECORD OF BOREHOLE N	<b>o.</b> ]	BH	D50								wood.
ject Number: TP115086						Drilling	Location:	Clarkway Dr.,	, NBL, Sta. 3+600 E:603	700	Logged by: MD
ject Client: City of Brampton						Drilling	Method:	150 mm Soli	id Stem Augers		Compiled by: SN
Secondary Plan Area (Area 47)	)	y 427 I	ndustr	ial		Drilling	Machine:	Track Mounte			Reviewed by: SM
ject Location: Clarkway Drive, Brampton, On	tario					Date S	started:	Feb 12, 2020	Date Completed: Fe	b 12, 2020	Provision No.: 0, 3/25/21
LITHOLOGY PROFILE	SC	IL SA	MPLI	NG			FIELD '	TESTING	LAB TESTING	_	0014451170
DESCRIPTION  Geodetic Ground Surface Elevation: 220.8 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane* △ Intact ▲ Remould * Undrained She	PPT	▲ COV (LEL) ■ TOV (LEL) 2 4 6 8	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
brown / grey 0.1 Silty Clay / Clayey Silt FILL	SS	1	79	7	- - -		0				
trace sand, trace gravel, trace organics											
219.6	SS	2	83	13	- - 1	-	0	<b></b>			
brown 1.2 SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel very stiff	SS	3		24	-  -  -  -	-	0				
219.0 END OF BOREHOLE 1.8						219 -	: :				
j	ject Number: TP115086 ject Client: City of Brampton ject Name: Arterial Road Network within Insecondary Plan Area (Area 47) ject Location: Clarkway Drive, Brampton, On  LITHOLOGY PROFILE  DESCRIPTION  Geodetic Ground Surface Elevation: 220.8 m Sand and Gravel FILL 220.7 brown / grey 0.1 Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace organics  219.6 brown SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel very stiff 219.0	ject Number: TP115086 ject Client: City of Brampton ject Name: Arterial Road Network within Highwa Secondary Plan Area (Area 47) ject Location: Clarkway Drive, Brampton, Ontario  LITHOLOGY PROFILE SC  DESCRIPTION  Geodetic Ground Surface Elevation: 220.8 m Sand and Gravel FILL 220.7 Drown / grey Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace organics  SS  219.6  brown SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel very stiff 219.0	ject Number: TP115086  ject Client: City of Brampton  ject Name: Arterial Road Network within Highway 427 I Secondary Plan Area (Area 47)  ject Location: Clarkway Drive, Brampton, Ontario  LITHOLOGY PROFILE SOIL SA  DESCRIPTION  DESCRIPTION  Geodetic Ground Surface Elevation: 220.8 m Sand and Gravel FILL 220.7  Drown / grey Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace organics  SS 2  SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel very stiff  219.0	ject Number: TP115086  ject Client: City of Brampton  ject Name: Arterial Road Network within Highway 427 Industr Secondary Plan Area (Area 47)  ject Location: Clarkway Drive, Brampton, Ontario  LITHOLOGY PROFILE SOIL SAMPLII  DESCRIPTION  DESCRIPTION  Add Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description Description D	ject Client:  City of Brampton  Ject Name:  Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47)  Ject Location:  Clarkway Drive, Brampton, Ontario  LITHOLOGY PROFILE  DESCRIPTION  DES	ject Number:    City of Brampton	ject Number: TP115086 Drilling ject Client: City of Brampton Drilling ject Name: Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47) ject Location: Clarkway Drive, Brampton, Ontario Date S  LITHOLOGY PROFILE SOIL SAMPLING  DESCRIPTION   ject Number: TP115086  ject Client: City of Brampton  ject Name: Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47)  ject Location: Clarkway Drive, Brampton, Ontario  Description  D	ject Number: TP115086  City of Brampton  Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47)  Ject Location: Clarkway Drive, Brampton, Ontario  Drilling Method: Track Mounter Secondary Plan Area (Area 47)  Clarkway Drive, Brampton, Ontario  Date Started: Feb 12, 2020  LITHOLOGY PROFILE  SOIL SAMPLING  Penetration Testing O SPT □ PPT ● DCPT MTO Vane* Alliact A Remould Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact Intact	ject Number: TP115086  City of Brampton  Jorilling Location: Drilling Method: Drilling Met	Drilling Location:   Clarkway Dr., NBL, Sta. 3+600 E:603700   N:4853201   150 mm Solid Stem Augers	
 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREHOL	E No	<b>).</b>	BH	<u>D51</u>	1							WO	od.
Pro	ject Number:	TP115086							Drilling	g Location:	N:4853290	SBL, Sta. 3+750 E:603	599	_	MD
	ject Client:	City of Brampton								g Method:		d Stem Augers		· · · · · · ·	SN
	ject Name:	Arterial Road Network v Secondary Plan Area (A	Area 47)		y 427 l	Industr	ial			g Machine: Started:	Track Mounte		h 44 2020	Reviewed by: S	
FIO		Clarkway Drive, Brampt	ton, Ont					_	Date		Feb 11, 2020	Date Completed: Fe	11, 2020	Revision No.: 0	, 3/25/21
	LITH	OLOGY PROFILE		SC	IL SA	MPLII	NG				TESTING	LAB TESTING Soil Vapour Reading	Z	COMMENTS	6
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	<b>DEPTH</b> (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	PPT • DCPT	▲ COV (LEL) ■ TOV (LEL) 2 4 6 8 Δ COV (ppm) TOV (ppm) 100 200 300 400  W <sub>P</sub> W <sub>V</sub> W <sub>L</sub> ■ O Plastic Liquid 20 40 60 80	NSTRUMENTATION INSTALLATION 0	& GRAIN SIZE DISTRIBUTIO (%)	<u> </u>
_ ‱	alt	Surface Elevation: 221.5 m DOUT 100 mm ASPHALT Sand and Gravel FILL	221.4 229:2	0)	0)		0)	-		20 40		20 40 00 00			
		dark brown ty Clay / Clayey Silt FILL race sand, trace gravel	0.2	SS	1	89	9	-  -  -  -	221 -	0	<b>1</b> 5				
$\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}{\overset{\times}$				SS	2	100	7	- - - 1		0	23				
	SILTY	brown / grey CLAY / CLAYEY SILT TILL to some sand, trace gravel	- <u>220.1</u> 1.4		_			-	220 -						
		very stiff  END OF BOREHOLE	219.5 2.0	SS	3	100	27	-	-	0					
	od ESIS a Divid	1													

 $\frac{\textstyle \bigvee}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

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	ECORD  ject Number:	OF BOREHOL	_E No	0.	<u>BH</u>	<u>D53</u>	<u> </u>		Drilling	g Location:	Clarkway Dr	., NBL, Sta. 3+900 E:6034	Logged by: MD
	ject Client:	City of Brampton							_	Method:	N:4853398	lid Stem Augers	Compiled by: SN
	ject Name:	Arterial Road Network	within H	lighwa	y 427	Indust	rial			g Machine:	Track Mount	-	Reviewed by: SM
Pro	ject Location:	Secondary Plan Area (A Clarkway Drive, Bramp	Area 47) ton, Ont	tario					_ Date \$	Started:	Feb 12, 2020	Date Completed: Fet	<b>12, 2020</b> Revision No.: <b>0, 3/25/21</b>
	LITH	OLOGY PROFILE		SC	OIL SA	MPLI	NG	Ι		FIELD	TESTING	LAB TESTING	
Lithology Plot		DESCRIPTION Surface Elevation: 222.0 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEРТН (m)	ELEVATION (m)	Penetra ○ SPT □  MTO Vane* △ Intact ▲ Remould	ntionTesting  PPT	Soil Vapour Reading  ▲ COV (LEL) ■ TOV (LEL)  2 4 6 8  △ COV (ppm) □ TOV (ppm) 100 200 300 400  W <sub>P</sub> W W <sub>L</sub> ■ □ □ Plastic Liquid 20 40 60 80	COMMENTS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL
<b>***</b>	al	bout 130 mm ASPHALT Sand and Gravel FILL	221.9 221.7					-			: :		
	Sil trace sa	brown / dark grey ty Clay / Clayey Silt FILL nd, trace gravel, trace organic	0.3	SS	1	94	13	-		0	ē	6 6	
				SS	2	100	10	1	221 -	0	ē	°13	
				SS	3	100	16	-		0	g	a 0 15	
	SILTY	brown / grey  CLAY / CLAYEY SILT TILL to some sand, trace gravel	219.9 2.1					2	220 -				
	uuss	very stiff to hard		SS	4	100	29	-3		0	ē	<sup>0</sup> 15	
		grey		SS	5	100	22		219 -	0	ē	0 16	
								- - - - 4	218 –				
				SS	6	100	36	<u> </u> -		0		<b>A</b> 0	
W		END OF BOREHOLE	217.0 5.0				"	- 5	217 -			13	
224	d ESIS a Didd								21/				

 $\frac{\textstyle \sum}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD OF BOREHOLE N	Ο.	<u>BH</u>	<u>D54</u>									wood
Pro	ject Number: TP115086						Drilling	Location:	Clarkway Dr., N:4853399	NBL, Sta.	3+900 E:603	499	Logged by: MD
Pro	ject Client: City of Brampton						Drilling	Method:	150 mm Soli	d Stem Au	gers		Compiled by: SN
Pro	ject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	Highwa	ay 427 I	Industr	ial		Drilling	Machine:	Track Mounte	ed Drill			Reviewed by: SM
Pro	ject Location: Clarkway Drive, Brampton, On	tario					Date S	Started:	Feb 12, 2020	Date C	ompleted: Fel	b 12, 202	Revision No.: <u>0, 3/25/21</u>
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD :	TESTING		ESTING our Reading	_	
Lithology Plot	DESCRIPTION  Geodetic Ground Surface Elevation: 221.7 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	PPT	△ COV (LEL) 2 4 △ COV (ppm) 100 200	■ TOV (LEL) 6 8 □ TOV (ppm)	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
$\stackrel{\bar{\times}}{\otimes}$	Sand and Gravel FILL   221.6	SS	1	100	6	-	-	0					
***	trace sand, trace gravel  221.1  brown 0.6					-	221 -						
	SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel firm to very stiff	SS	2	83	7	- - 1		0	as				
		SS	3	33	23		-	0					
	219.9 END OF BOREHOLE 1.8					-	220 —						

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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Project Clease   Cycle of Empression   Cyc			OF BOREHOL	LE No	0.	<u>BH</u>	<u>D55</u>	_							wood.
Project Name: Secondary Plan Area (Area 47) Project Location: Clarkway Drive, Brampton, Ontario    Date Started:   Feb 11, 2020   Date Completed: Feb 11, 2020   Revision No.: 0, 3/25/21		-										N:4853502			
Project Location: Clarkway Drive, Brampton, Ontario  Date Started: Feb 11, 2020 Date Completed: Feb 11, 2020 Revision No.: 0, 3/25/21    Comment		-		within U	liabua	427	Indust	rial		_			-		
LITHOLOGY PROFILE   SOIL SAMPLING		=	Secondary Plan Area (A	Area 47)		ıy 421	muusu	ııaı		- `					
DESCRIPTION				1					1			,		, , , , , , , , , , , , , , , , , , ,	<u> </u>
DESCRIPTION		LITH	OLOGY PROFILE		SC	OIL SA	MPLI	NG					Soil Vapour Reading	z	COMMENTS
Sand and Gravel FILL   222.4	Lithology Plot	Geodetic Ground S			Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)		O SPT □  MTO Vane*  △ Intact ▲ Remould  * Undrained Sh	PPT ● DCPT  Nilcon Vane*  ◇ Intact ◆ Remould  dear Strength (kPa)	2 4 6 8 △ COV (ppm) □ TOV (ppm) 100 200 300 400 W <sub>P</sub> W W <sub>L</sub> ■ O Description	INSTRUMENTATIC INSTALLATION B B C D D	& GRAIN SIZE DISTRIBUTION (%)
Sitty Clay / Clayey Sitt FILL trace sand, trace gravel   SS   2   94   24   -1	<b>**</b>	а	bout 150 mm ASPHALT						-						
SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel hard  SS 3 100 30 2 2		Sil	brown / grey ty Clay / Clayey Silt FILL		SS	1	89	12	-	222 -	0	1	5		
SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel hard  SS 3 100 30 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	$\overset{\times\!\!\!\!\times}$				SS	2	94	24	_ _ 1	-	0		□ ° <sub>15</sub>		
SS 3 100 30 2 30 5 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 38 5 100 30 5 100 30 5 100 30 5 100 30 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100 5 100		SILTY	CLAY / CLAYEY SILT TILL	<u>221.1</u> 1.4					- - -	221 -					
SS 5 100 38 - O 0 18		trace			SS	3	100	30	2		0		15		
SS 5 100 38 - O 0 18					SS	4	100	59	- - - -	220 -		0 1	<b>3</b> O		
219.0 SS 5 100 38 0 18									-				10		
////// Z19.0				240.0	ss	5	100	38	- 3 - - -	-	0		a o 18		
	<u> </u>		END OF BOREHOLE												

 $\frac{\textstyle \sum}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

• 🚺	ECOKD O	F BOREHOLE	NO.	BH	<u>D56</u>									WO	od
Prc	oject Number: TF	2115086						Drilling	Location:	Clarkway Dr.	, SBL, Sta. 4+0	050 E:6033	380	* * * •	<u>/ID</u>
Pro	oject Client: Ci	ty of Brampton						Drilling	Method:	N:4853532 150 mm Sol	id Stem Auger	's		Compiled by:	<u>SN</u>
Pro	oject Name: Ar	terial Road Network with econdary Plan Area (Area	in Highwa	y 427 I	ndustr	ial		Drilling	Machine:	Track Mounte	ed Drill			Reviewed by: §	<u>SM</u>
Pro	pject Location: CI	arkway Drive, Brampton,	Ontario					Date S	started:	Feb 11, 2020	Date Com	pleted: Fel	b 11, 2020	Revision No.: 0	, 3/25/21
	LITHOL	OGY PROFILE	so	IL SA	MPLI	NG			FIELD	TESTING	LAB TES		_		_
Lithology Plot	DE	ESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane* △ Intact ▲ Remould	Nilcon Vane*  ♦ Intact	▲ COV (LEL) 2 4 △ COV (ppm)	TOV (LEL) 6 8	INSTRUMENTATION	COMMENT: & GRAIN SIZI DISTRIBUTIO (%)	E DN
❈	3	d and Gravel FILL 22		Š	Re	SF	<u> </u>	<u> </u>	20 40			60 80	<u> </u>	GR SA SI	CL
	bro <b>Silty Cl</b> trace sand, tr	lay / Clayey Silt FILL race gravel, trace organics 22	0.2 SS 1.4	1	75	8	- - - -	- - -	0		3				
	trace to s	brown AY / CLAYEY SILT TILL ome sand, trace gravel stiff to very stiff	0.6 SS	2	92	15	- - - 1 -	221 —	0		3				
			ss	3	46	26	- - - -	-	0		3				
100	END		0.2 1.8												

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD	OF BOREHOL	E N	<b>o.</b> <u>l</u>	BH	<u>D57</u>														,	W	00	d.
Pro	ject Number:	TP115086							Drilling	g Location	n:	Clark	way Dr 53614	., NBL	_, Sta	. 4+2	00 E:603	286		Logge	d by:	MD	
Pro	ject Client:	City of Brampton							Drilling	g Method	:	150	mm So	lid St	em Aı	ugers	i			Compi	led by:	SN	
Pro	ject Name:	Arterial Road Network			ıy 427 l	Industr	rial		Drilling	g Machine	э:	Tracl	k Moun	ted Dr	ill					Reviev	ved by:	SM	
Pro	ject Location:	Secondary Plan Area (A Clarkway Drive, Brampt	ton, Ont	ario					Date 9	Started:		Feb 1	12, 2020	<u> </u>	Date (	Comp	leted: Fe	b 12, 20	020	Revision	on No.:	0, 3/2	25/21
	LITH	OLOGY PROFILE		SC	IL SA	MPLI	NG			FIEL	D T	EST	ING		AB Soil Va		ΓING						
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT  MTO Va  △ Intact  ▲ Remo  * Undrainer	□ P ne* uld d Shea	Nilcoi ◇ In ◆ R	DCPT  n Vane* tact emould gth (kPa)	△ CC 22 △ CC 10 W ■ PI:	OV (LEL 2 4 OV (ppn 00 20 V <sub>P</sub>	o) = 6 0 30 W	TOV (LEL)  8  TOV (ppm) 0 400  W <sub>L</sub> Liquid	INSTRUMENTATION INSTALLATION	GR	GR DIST	MMEN & AIN S RIBU (%)	IZE	CL
 =	a	Surface Elevation: 223.6 m about 85 mm ASPHALT	223.5 223:4	o o	o o	I I'E	o	-	<u>ш</u>	20	40	60	80	20	0 40	) 60	80	==	- Cit				
		out 180 mm CONCRETE dark grey	223:4 0.3	SS	1	94	6	-						<b>a</b>									
$\bowtie$	Sil	ty Clay / Clayey Silt FILL trace sand, trace gravel	222.9		-		ļ -	-	223 -					Ī									
	SILTY	brown / grey CLAY / CLAYEY SILT TILL	0.7					Ė		1													
	trace	to some sand, trace gravel stiff to very stiff		SS	2	100	13	— 1 -		0				<b>a</b>									
								Ē										İ					
								<u> </u>	222 -	<u> </u>								i					
			221.6	SS	3	89	20	_						<b>ds</b> :									
21.Z.Y.		END OF BOREHOLE	2.0												- :	- :							
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 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

	ECORD OF BOREHOLE N  ject Number: TP115086	Ο.	<u>BH</u>	<u>S13</u>			Drilling	g Location:	Clarkway Dı	r., SBL, Sta.	2+275 E:604	621	Logged by		pd.
Pro	ject Client: City of Brampton						– Drilling	g Method:	N:4852286	olid Stem Au			Compiled I		
Pro	ject Name: Arterial Road Network within h		ay 427	Industi	rial		_ Drilling	g Machine:	Track Moun	ted Drill			Reviewed	by: SM	
Pro	Secondary Plan Area (Area 47) ject Location: Clarkway Drive, Brampton, On						_ Date \$	Started:	Feb 25, 2020	Date C	ompleted: Fe	eb 25, 2020	Revision N	lo.: <u>0, 3</u>	/30/21
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING		ESTING				
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould  * Undrained Sh	tionTesting  PPT	△ COV (LEL)  2 4  △ COV (ppm 100 200  Wp Plastic	W W <sub>L</sub> ← Liquid	INSTRUMENTATION INSTALLATION	GRAIN DISTRIE (%	SIZE BUTION (6)	
: <u>`</u>	Geodetic Ground Surface Elevation: 210.2 m about 80 mm ASPHALT 210.1	ΐ	ű	Ř	S S	_		20 40	60 80	20 40	60 80	<u> </u>	GR SA	SI	CL
	brown Sand and Gravel FILL trace to some silt moist	SS	1	100	62	- - - - - -	210 -		0	4					
	greyish brown 1.0  Silty Clay / Clayey Silt FILL  trace to some sand, trace to some gravel, trace organics	SS	2	63	8	- 1 - 1 1	209 -	0		6		<b>y</b> =			
		SS	3	100	15	- - - 2	208 -	0		as o					
		SS	4	100	9	3		0		<b>A</b> ○∏ 12					
		ss	5	100	7		207 —	0		a o 15					
						- - 4 - -	206 -								
	very stiff	ss	6	100	27	5	205 -	0		12			3 16	50	31
	grey 204.6  SILTY SAND / SAND AND SILT TILL trace clay, trace gravel, cobbles/boulders					6									
	loose to very dense moist to wet	SS	7	133	22		204 -	О		o 19					
						- - - 7 - - - -	203 -								
		SS	8	100	9	- - - - 8 -	202 —	0		a o					
					<b>EE</b> 1	- - - - - - 9			.55						
	END OF BOREHOLE 9.3	SS	9	100	55 / 130mn		201 -		130 mm	14		10.40.40			
	od E&IS, a Division of Wood  Groundy	vater en	Counter	ed on co	nmoletic	n of de	rilling on	2/25/2020 at a	depth of: <u>4.3 m</u>	Cave i	n depth after re	moval of augo	ers: 15 m		
50 V Rich Can Tel.	/ogell Road, Units 3 & 4 mmond Hill, Ontario, L4B 3K6 ada  Borehole details	ater dep	oth obse	not cons	5/12/20	020 at norough	a depth o	of: 1.4 m.	ntial conditions prinction with the ge	esent and require	interpretative as:			Scale	e: 1 : 53

Scale: 1 : 53 Page: 1 of 2

## RECORD OF BOREHOLE No. BH S13



Project Number: TP115086 Project Name: Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47)

Project Location: Clarkway Drive, Brampton, Ontario

	LITHOLOGY PROFILE	90	IL SA	MDIII	NG.			FIELD TESTING	LAB TESTING					
	LITHOLOGI PROFILE	30	IL SA	IVIT'L					Soil Vapour Reading  COV (LEL) TOV (LEL)	NO		СОММ		
			ber	_	SPT 'N' / RQD (%)		Ê	O SPT □ PPT ● DCPT	2 4 6 8	INSTRUMENTATION INSTALLATION		& GRAIN	SIZF	
, Plot	DESCRIPTION	Туре	Numk	y (%)	RQ	Œ	<u>N</u>	MTO Vane* Nilcon Vane*  △ Intact ◇ Intact	△ COV (ppm) □ TOV (ppm) 100 200 300 400	MEN	D	ISTRIB	UTION	
Lithology Plot		Sample Type	Sample Number	Recovery (%)	,'N'	ОЕРТН (m)	ELEVATION (m)	▲ Remould ◆ Remould	W <sub>P</sub> W W <sub>L</sub>	TALL		(%)	)	
Lith	50 marks and the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	Sar	Sar	Rec	SP	DEI		* Undrained Shear Strength (kPa) 20 40 60 80	Plastic Liquid 20 40 60 80	SNS	GR	SA	SI	CL
	50 mm dia. monitoring well with flushmount protective casing installed (depth below ground surface):													
	Sand: 0.0 - 0.6 m													
	Bentonite: 0.6 - 4.0 m Sand Filter: 4.0 - 7.6 m													
	Screen: 4.6 - 9.1 m													
	Groundwater measurements in monitoring well (depth below ground surface):													
	12 May 2020: 1.4 m													
		l				l			: : : :					

RI	ECORD OF BOREHOLI	E No	o. <u>l</u>	BH :	<u> S14</u>								W	bod
Pro	ect Number: TP115086							Drilling	Location:	Clarkway Dr.	., NBL, Sta. 2+275 E:604	618	Logged by:	ММ
Pro	ect Client: City of Brampton							Drilling	Method:	N:4852293 150 mm Sol	lid Stem Augers		Compiled by:	SN
Pro	ect Name: Arterial Road Network wi		ighwa	y 427 I	ndustr	ial		Drilling	Machine:	Track Mount	ed Drill		Reviewed by:	SM
Pro	Secondary Plan Area (Are cet Location: Clarkway Drive, Brampto	ea 47) n, Ont	ario					Date S	Started:	Feb 25, 2020	Date Completed: Fe	b 25, 2020	Revision No.:	0, 3/25/21
	LITHOLOGY PROFILE		SO	IL SA	MPLI	NG	1		FIELD	TESTING	LAB TESTING			
										ationTesting	Soil Vapour Reading  COV (LEL) TOV (LEL)	NO NO	COMMEN	TS
#	DESCRIPTION		ø)	per		%) Q		Œ.		PPT • DCPT	2 4 6 8 △ COV (ppm) □ TOV (ppm)	A TO NO	& GRAIN SI	
gy Pic	DESCRIPTION		е Тур	e Nun	ery (%	I'/RG	E T	Į	MTO Vane*  △ Intact  ▲ Remould	Nilcon Vane*  ◇ Intact  ◆ Remould	100 200 300 400 W <sub>P</sub> W W <sub>L</sub>	UME	DISTRIBUT (%)	ION
Lithology Plot			Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION	1	near Strength (kPa)	Plastic Liquid 20 40 60 80	NSTRUMENTATION NSTALLATION BS		SI CL
 ‱	Geodetic Ground Surface Elevation: 210.0 m about 90 mm ASPHALT	209.9 0:1	0)	0)	ш	U)	-		20 40		20 40 00 60			
	grey Sand and Gravel FILL trace to some silt moist		SS	1	100	67	-  -  -  -			0 4	<sup>10</sup> 4			
			SS	2	63	30	- - - 1	209 -	0		1			
	brown to grey Silty Clay / Clayey Silt FILL trace to some sand, trace to some gravel	208.7 1.2					-  -  -  -	-			o 11			
			SS	3	92	14	_ _ _ 2	208 -	0		15			
							-  -  -							
		-	SS	4	63	6	-	207 -	0		s 0 14			
			SS	5	100	10	— 3 - - -	207	0		ı o.			
							-  -  -  -	-			12			
		205.9 4.1					- 4 - \ - \ - \ -	206 -						
	SILTY CLAY / ČLÁYEY SILT TILL trace to some sand, trace gravel soft to stiff						-  -  -  -							
			SS	6	83	3	- - - - 5	205 -	0		16			
							- - -	-						
							- - - -	204 -						
		-	SS	7	133	13	- 6 - -	204 -	0		022			
											22			
		202.8					_ — 7	203 -						
	grey SILTY SAND / SAND AND SILT TILL trace clay, trace gravel dense to very dense	7.2					-  -  -  -	-						
	moist to wet		SS	8	67	31	- - - - 8	202 -	0		21	- Non-pi		47 2
		-					-  -  -							
							-  -  -							
M		200 7	SS	9	100	60 /	— 9 - -	201 -		60	3 0:			
	END OF BOREHOLE	9.3	33	J	100	150mm				150 mm	T 13			
	d E&IS, a Division of Wood	roundwa	ater end	countere	ed on co	mpletio	n of dril	ling on 2	<u>2/25/2020</u> at a	a depth of: <u>4.1 m</u> .				
50 V	ogell Road, Units 3 & 4													
Cana Tel.	No.: (905) 415-2632 a qualifie	d Geotec	chnical E	ngineer.	Also, box	rehole in	formatio	n should	nding of all pote be read in conj	ential conditions pre unction with the geo	sent and require interpretative ass technical report for which it was	sistance from		Scale: 1 : 53
	.woodplc.com	ioned an	d the ac	company	ring'Expla	anation o	f Boreho	ole Log'.					Pa	nge: 1 of 1

RI	ECORD OF BOREHOLE N	<b>o.</b>	BH :	<u>S15</u>								W	00	2
Pro	ject Number: TP115086						Drilling	g Location:		SBL, Sta. 3+325 E:6041	169	Logged by		•
Pro	ject Client: City of Brampton						Drilling	g Method:	N:4852729 150 mm Solid	Stem Augers		Compiled b	y: <b>SN</b>	
Pro	ject Name: Arterial Road Network within H	lighwa	ıy 427 l	Indust	rial		Drilling	g Machine:	Track Mounted	d Drill		Reviewed	oy: <b>SM</b>	
Pro	Secondary Plan Area (Area 47) ject Location: Clarkway Drive, Brampton, Ont	tario					Date	Started:	Feb 24, 2020	Date Completed: Fet	24, 2020	Revision N	o.: <u>0, 3/2</u>	25/21
	LITHOLOGY PROFILE	SC	OIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING				
Plot	DESCRIPTION		Sample Number		SPT 'N' / RQD (%)	Ê	(m) NO	Penetra O SPT   MTO Vane*	tionTesting  PPT ● DCPT  Nilcon Vane*	Soil Vapour Reading COV (LEL) ■ TOV (LEL) 2 4 6 8	INSTRUMENTATION INSTALLATION B	COMM 8 GRAIN DISTRIE	SIZE	
Lithology Plot		Sample Type	N eldr	Recovery (%)	ż	DEРТН (m)	ELEVATION	△ Intact ▲ Remould	♦ Intact ♦ Remould	W <sub>P</sub> W W <sub>L</sub>	TALL	(%		
Lith	Geodetic Ground Surface Elevation: 212.7 m	San	San	Reo	SPT	DEF		* Undrained Sho 20 40	ear Strength (kPa) 60 80	Plastic Liquid 20 40 60 80	GR GR	SA	SI	CL
	about 100 mm ASPHALT 212.6 grey Sand and Gravel FILL					Ė								
	trace to some silt moist	SS	1	79	37	-	212 -	0	<b>8</b> 0 <sub>3</sub>	3				
	brown 0.9  Silty Clay / Clayey Silt FILL trace to some sand, trace to some gravel	SS	2	42	14	- 1 - - -		0		°16				
		SS	3	100	8	- - - - - 2	211 -	0	68	°20				
	210.5 grey 2.2 SILTY CLAY / CLAYEY SILT TILL trace sand to sandy, trace gravel,	SS	4	185	25	-  -  -  -		0		20				
	cobbles/boulders very stiff to hard					3	210 -		60					
		SS	5	100	68 / 180mm	-  -  -  -			68 180 mm	O16				
						Ė	209 -	1						
		SS	6	46	20	4 - - - -		0	es .	°11				
		SS	7	100	67 / 250mm	- - - - - 5	208 -		67 250 mm	C <b>44</b> 0	6	31	46	17
						6	207 -							
		SS	8	100	92 / 250mm		206 -		92 0 8 250 I	o mm18				
						- - - 7 -	200							
						-  -  -  -	205 -							
		SS ——	9	89	94	8			Os	°22				
						- - - -	204 -							
						- 9								
	203.2	ss	10	100	59 / 150mm	È	_		59 0 150 mm	o 19				
: n/X	END OF BOREHOLE 9.4					<u> </u>	<u> </u>		100 11111					
	od E&IS, a Division of Wood V No freest	anding :	around	vater m	agurad	in one	n horeba	le on completi	on of drilling	☐ Cave in depth after rem	noval of augore:	9.4 m		
Can	ada Limited  'ogell Road, Units 3 & 4	anung (	groundV	vatet II)6	Jasured	iii opel	n borem	no on completi	on or arming.	■] Cave in depth after rem	iovai oi augers: _	<u>∪.≒ III</u> .		
Rich Can	mond Hill, Ontario, L4B 3K6 ada Borehole details :	as prese	nted, do	not cons	titute a th	norough	understa	nding of all poter	ntial conditions preser	nt and require interpretative ass	istance from		Çaçla:	1 - 50
Tel.	No.: (905) 415-2632 a qualified Geotecommissioned ar	chnical E nd the ac	ngineer. company	Also, bo ying'Expl	renole in lanation o	formation of Boreh	on should ole Log'.	pe read in conju	nction with the geoted	cnnical report for which it was			Scale: Page: 1	

R	ECORD OF BOREHOLE N	o.      !	BH	<u>S16</u>									WC	od	
Pro	eject Number: TP115086							g Location:	N:4852745		3+325 E:604	158	_ Logged by:	MS	_
Pro	eject Client: City of Brampton						Drilling	g Method:	150 mm So	lid Stem Au	gers		_ Compiled by:	SN	-
Pro	ject Name: Arterial Road Network within H Secondary Plan Area (Area 47)	lighwa	ıy 427 I	ndustr	ial		Drilling	g Machine:	Track Mount	ted Drill			_ Reviewed by:	SM	-
Pro	ject Location: Clarkway Drive, Brampton, Ont	tario					Date S	Started:	Feb 24, 2020	Date C	ompleted: Fe	b 24, 2020	_ Revision No.:	0, 3/30/21	-
	LITHOLOGY PROFILE	SC	IL SA	MPLII	NG				TESTING	Soil Vapo	ESTING our Reading	. ,	COMMEN		٦
			<u></u>		(%)		Ê		ationTesting PPT • DCPT	▲ COV (LEL)	TOV (LEL)	NSTRUMENTATION NSTALLATION	&		
P P	DESCRIPTION	ype	Sample Number	(%)	SPT 'N' / RQD (%)	Œ		MTO Vane*	Nilcon Vane*		) □ TOV (ppm) 300 400	AENT,	GRAIN SIZ DISTRIBUT		
Lithology Plot		Sample Type	nple N	Recovery (%)	ż	ОЕРТН (	ELEVATION	△ Intact ▲ Remould	♦ Intact ♦ Remould	<b>-</b>	W W <sub>L</sub>	TRUN	(%)		
Ė	Geodetic Ground Surface Elevation: 213.0 m about 90 mm ASPHALT 213.0-	Sar	Sar	Rec	SP		_ =	* Undrained She	ear Strength (kPa) 60 80	Plastic 20 40	Liquid 60 80		GR SA	SI CL	$\dashv$
▩	about 90 mm ASPHALT 213.0- grey Sand and Gravel FILL	<u> </u>	<u> </u>	<u> </u>	<u> </u>	ŧ	-	<u></u>							
▩	trace to some silt moist	SS	1	100	32	-	-			<b>A</b>					
▩	212.1	ا ا				E	-	1 1		11					
▩	dark grey 0.9 Silty Clay / Clayey Silt FILL					1	212 -	1							
▩	trace to some sand, trace to some gravel	SS	2	83	14	Ė	-		F	12					
▩		$\Box$		$\vdash$		ŧ	-	1		l					
▩		SS	3	100	8	F	-	0		a o 24					
▩		$\vdash \vdash$			-	<u> </u>	211 —	<b>.</b>							
	brown to grey 2.2  SILTY CLAY / CLAYEY SILT TILL  trace to some sand, trace gravel,					Ė	-	1							
	cobbles/boulders very stiff to hard	SS	4	100	22	-	-			°16					
						3	210 —	1							
		<u>_</u>				Ė	2 IU - -								
		SS	5	100	37	-	-			a 0 14					
						‡	-	-							
		SS	6	100	29	4	209 —	0							
		33	6	100	25	F	-	1		<sup>0</sup> 12					
						‡	-	<u> </u>		ļ <u>.</u>					
	grey	SS	7	100	62	E	-		0 6	<b>a</b> ° <sub>9</sub>					
		$\vdash \vdash$		-	<u> </u>	5	208 -	1							
						F	-	1							
						Ė	-	1							
						E	-	1 1							
		SS	8	100	50 /	6	207 —	5	50 100 mm	a o <sub>12</sub>					
			$\vdash$		100mm	ŧ	-		100 mm	12					
						E	-	<u> </u>							
						- - 7	206 —	<u> </u>							
						Ė	-								
		l				E	-	]							
		SS	9	100	70 / 150mm	<u>.</u>	-	1	70 150 mm	<b>8</b> 0					
						8	205 —	<u> </u>							
						Ė	-	1							
						E	-	1							
						F	-	<u> </u>							
		$\vdash$			-	- 9  -  -	204 —	<u> </u>		li.					
		SS	10	100	71	E	-	]	· · · · · · · · · · · · · · · · · · ·	a o 16					
	203.3	<u> </u>			<u> </u>	<u> </u>		1	- : : :	10					
	END OF BOREHOLE 9.8		<u> </u>	<u> </u>	<u></u>	<u>L</u>		: :		: :					

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada Tel. No.: (905) 415-2632 www.woodplc.com  $\frac{\nabla}{2}$  No freestanding groundwater measured in open borehole on completion of drilling.

 $\frac{\mathbf{Y}}{\mathbf{Z}}$  Groundwater depth observed on <u>5/12/2020</u> at a depth of: <u>3.2 m</u>.

## RECORD OF BOREHOLE No. BH S16



Project Number: TP115086 Project Name: Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47)

Project Location: Clarkway Drive, Brampton, Ontario

	LITHOLOGY PROFILE	SC	IL SA	MPLII	NG			FIELD TESTING	LAB TESTING					
								PenetrationTesting	Soil Vapour Reading  ▲ COV (LEL) ■ TOV (LEL)	INSTRUMENTATION INSTALLATION		COMM &		
t l	DESCRIPTION	Φ	nber	(9)	%) QC	_	E .	O SPT □ PPT ● DCPT	2 4 6 8 △ COV (ppm) □ TOV (ppm)	NTA1		<b>GRAIN</b>	SIZE	
gy Pi	Decoral How	e Typ	N N	ery (%	I'/ R(	E -	Į Į	MTO Vane* Nilcon Vane*  △ Intact ◇ Intact  ▲ Remould ◆ Remould	100 200 300 400 W <sub>L</sub>	UME		ISTRIE %)	UTION	
Lithology Plot		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEРТН (m)	ELEVATION (m)	* Undrained Shear Strength (kPa)	Plastic Liquid 20 40 60 80	NSTR NSTA	GR	SA	SI	CL
_	50 mm dia. monitoring well with flushmount	0)	0)	ш	0)		ш	20 40 60 80	20 40 00 00	_==				
	protective casing installed (depth below ground surface):													
	Concrete: 0.0 - 0.3 m Sand: 0.3 - 0.6 m													
	Bentonite: 0.6 - 5.5 m Sand Filter: 5.5 - 6.1 m													
	Screen: 6.1 - 9.1 m													
	Groundwater measurements in monitoring well (depth below ground surface):													
	12 May 2020: 3.2 m													

RE	CORD OF BOREHOLE N	0.	ВН	<u>B1</u>								wood.
Proje	ct Number: TP115086						Drilling	Location:	Arterial A2,	Sta. 0+000 E:606238 N:4	852654	Logged by: MS
Proje	ct Client: City of Brampton						Drilling	Method:	150 mm So	lid Stem Augers		Compiled by: PR
Proje	ct Name: Arterial Road Network within F Secondary Plan Area (Area 47)	lighwa	ay 427 I	Industr	ial		Drilling	Machine:	Truck Mount	ted Drill		Reviewed by: SM/DP
Proje	ct Location: Brampton, Ontario						Date S	started:	Jan 10, 2020	Date Completed: <u>Ja</u>	n 10, 202	0 Revision No.: 0, 1/5/21
	LITHOLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING		
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	Penetra ○ SPT □  MTO Vane* △ Intact ▲ Remould	tionTesting  PPT	Soil Vapour Reading	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
Ξ G∈	eodetic Ground Surface Elevation: 211.5 m about 140 mm ASPHALT 211.4	Š	Š	Ř	S		<u> </u>	20 40	60 80	20 40 60 80	ZZ	GR SA SI CL
	brown 0.1  Sand and Gravel FILL  moist  210.7	SS	1	100	27	- - - -	211 —	•		•		32 56 (12)
	brown/dark grey 0.8  Sitty Clay FILL some sand, trace to some gravel, trace organics	SS	2	100	12	- - - 1 - -	- - - -	0				
<b>×</b>	210.0 END OF BOREHOLE 1.5					-	210 -					

 $\frac{\textstyle \sum}{\scriptstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

## RECORD OF BOREHOLE No. BH B2 Project Number: TP115086 Arterial A2, Sta. 0+100 E:606151 N:4852615 **Drilling Location:** Logged by: Project Client: City of Brampton Drilling Method: 150 mm Solid Stem Augers Project Name: Arterial Road Network within Highway 427 Industrial Drilling Machine: Track Mounted Drill Reviewed by: SM/DP Secondary Plan Area (Area 47) Project Location: Jan 23, 2020 Date Completed: Jan 23, 2020 Revision No.: 0, 1/5/21 Brampton, Ontario Date Started: LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING LAB TESTING COMMENTS** NSTRUMENTATION NSTALLATION PenetrationTesting COV (LEL) TOV (LEL) Ξ O SPT □ PPT ● DCPT **GRAIN SIZE** Sample Numbe SPT 'N' / RQD Plot **DESCRIPTION** ecovery (%) Nilcon Vane\* ◇ Intact ◆ Remould Sample Type MTO Vane\* Ξ ELEVATION 200 300 DISTRIBUTION △ Intact ▲ Remould ithology. Wn W (%) DEPTH Undrained Shear Strength (kPa) Plastic Liquid GR SA CL 60 SI Geodetic Ground Surface Elevation: 210.2 m about 300 mm TOPSOIL 40 60 20 210 SS 75 7 0 °30 brown Silty Clay FILL (reworked soil) SILTY CLAY / CLAYEY SILT TILL trace sand, trace gravel very stiff to hard 17 °13 SS 2 100 209 SS 3 100 22 013 2 208 cobbles/boulders °13 45 0 SS 4 100 brown SILTY SAND 207 some gravel very dense 5 75 65 33 wet $\underline{\nabla}$ brown/grey SILTY CLAY / CLAYEY SILT TILL trace sand, trace gravel SS 6 83 34 $\cap$ °11 hard to very stiff 206 grey 011 SS 7 100 27 0 END OF BOREHOLE

Wood E&IS, a Division of Wood Canada Limited

 $\frac{\nabla}{2}$  Groundwater encountered on completion of drilling on <u>1/23/2020</u> at a depth of: <u>3.7 m</u>.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada Tel. No.: (905) 415-2632 www.woodplc.com

R	ECORD OF	BOREHOLE N	<b>o.</b>	BH	<u>B3</u>									W	ood.
Pro	ject Number: TP11	5086						Drilling	Location:	Arterial A2,	Sta. 0+200	E:606056 N:4	852586	Logged by:	MS
Pro	ject Client: City o	of Brampton						Drilling	Method:	150 mm So	lid Stem Au	igers		Compiled by:	PR
Pro	ject Name: Arteri	al Road Network within H	lighwa	ıy 427 l	ndustr	ial		Drilling	Machine:	Track Mount	ted Drill			Reviewed by	: SM/DP
Pro	ject Location: Bram	pton, Ontario						Date S	Started:	Jan 23, 2020	Date 0	Completed: <u>Jar</u>	n 23, 202	Revision No.:	0, 1/5/21
	LITHOLOG	Y PROFILE	SC	IL SA	MPLI	NG			FIELD	TESTING		TESTING bour Reading			
Lithology Plot	DESC	CRIPTION evation: 211.8 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould	<ul> <li>♦ Intact</li> <li>♦ Remould</li> </ul> ear Strength (kPa)	▲ COV (LEL	D) ■ TOV (LEL)	INSTRUMENTATION INSTALLATION	COMMEI & GRAIN S DISTRIBU (%)	SIZE
~~~	about 200	mm TOPSOIL 211.6					-				: :				
<b>X</b>	Silty trace grave (rew	grey/brown 0.2 Clay FILL el, trace organics orked soil) 211.1	SS	1	58	5	-	-	0		30				
	SILTY CLAY / trace sand, trace of	brown 0.7  CLAYEY SILT TILL gravel, cobbles/boulders stiff to hard	SS	2	100	21	- 	211	0		N ○ 12				
			SS	3	100	28	- - - - - - 2	210 —	0		a o 12				
	brov	vnish grey	SS		400	40	- - - -	-							
		208.8	33	4	100	46	- - - 3	209 —		D	12				
ZV.A.	END OF	BOREHOLE 3.0									: :				

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD OF BOREHOLE	E No	o. <u>l</u>	BH I	<u>B4</u>									WC	od.
Pro	ject Number: TP115086							Drilling	Location:	Arterial A2, St	ta. 0+300	E:605958 N:4	852563	_ Logged by:	MS
Pro	ject Client: City of Brampton							Drilling	Method:	150 mm Soli	d Stem Au	gers		_ Compiled by:	PR
Pro	ject Name: Arterial Road Network wit	thin H	ighwa	y 427 I	ndustr	ial		Drilling	Machine:	Track Mounte	ed Drill			_ Reviewed by:	SM/DP
Pro	Secondary Plan Area (Are ject Location: Brampton, Ontario	a 41)						Date S	Started:	Jan 23, 2020	Date C	completed: <u>Jar</u>	n 23, 2020	_ Revision No.:	0, 1/5/21
	LITHOLOGY PROFILE		so	IL SA	MPLI	NG			FIELD '	TESTING	LAB T	ESTING			
						(9)				-	▲ COV (LEL)	our Reading TOV (LEL)	NSTRUMENTATION NSTALLATION	COMMEN®	rs
ot	DESCRIPTION		e	mber	(%	SPT 'N' / RQD (%)		E z	○ SPT □ MTO Vane*	PPT DCPT	2 4 △ COV (ppm	6 8 ) □ TOV (ppm)	TOT	GRAIN SI	
ogy PI			е Тук	e Nu	ery (	ج / ج آ	E	ATIO	△ Intact ▲ Remould	Nilcon Vane*  ◇ Intact ◆ Remould		W W <sub>L</sub>	SUME	DISTRIBUT (%)	ION
Lithology Plot	Occade the Occasional Octations Eleventhers 244.7		Sample Type	Sample Number	Recovery (%)	PT "	<b>DEPTH</b> (m)	ELEVATION	1	ear Strength (kPa)	Plastic 20 40	Liquid 60 80	NSTF NSTA		SI CL
	Geodetic Ground Surface Elevation: 211.7 m about 200 mm TOPSOIL	211.5	0)	0)	ь	0)		-	20 40		20 40				
$\bowtie$	dark brown Silty Clay FILL	0.2	SS	1	83	5	-	-	0						
***	(reworked soil)	211.1 0.6					Ė	211 —							ļ
	brown SILTY CLAY / CLAYEY SILT TILL		SS	2	100	13		211 -							
	trace sand, trace gravel stiff to very stiff						<u></u> 1 − 1	-							ļ
							-	-							ļ
			SS	3	100	24	-	210 -	0	<b>1</b>					ļ
<u> </u>	END OF BOREHOLE	1.8													
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 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada Tel. No.: (905) 415-2632 www.woodplc.com

R	ECORD	OF BOREHOLE N	<b>o.</b>	<u>BH</u>	<u>B5</u>									wood
Pro	ject Number:	TP115086						Drilling	g Location:	Arterial A2,	Sta. 0+400	E:605861 N:4	852545	Logged by: MS
Pro	ject Client:	City of Brampton						_ Drilling	g Method:	150 mm So	lid Stem A	ugers		Compiled by: PR
Pro	ject Name:	Arterial Road Network within H	lighwa	ıy 427	Industi	rial		Drilling	g Machine:	Track Mount	ted Drill			Reviewed by: SM/DP
Pro	ject Location:	Secondary Plan Area (Area 47) Brampton, Ontario						Date S	Started:	Jan 23, 2020	Date	Completed: <u>Ja</u>	n 23, 202	0 Revision No.: 0, 1/5/21
	LITH	OLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING	LAB	TESTING		
Lithology Plot		DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould  * Undrained She	tionTesting PPT   DCPT  Nilcon Vane*    Intact    Remould ear Strength (kPa)	△ COV (LE  2 4  △ COV (ppr  100 20  W <sub>P</sub> Plastic	m) □ TOV (ppm) 00 300 400 W W <sub>L</sub> ⊕ Liquid	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
	Geodetic Ground	Surface Elevation: 211.3 m bout 300 mm TOPSOIL	Ø	o o	Ľ	S S	-	<u> ш</u>	20 40	60 80	20 4	0 60 80	==	
<b>X</b>	Λ	211.0   dark grey/brown   Silty Clay FILL   trace gravel   210.6   (reworked soil)   0.5	SS	1	83	6	- - -	211 -	0		17			
		brown  / CLAY / CLAYEY SILT TILL  d, trace gravel, cobbles/boulders  stiff to hard	SS	2	100	10	- - 1 -	210 -	0		☑ O 14			
			SS	3	100	18	- - - - - - 2		0		o 13			
							[  -	209 -						
			SS	4	100	35			0		a °13			
		grey	SS	5	100	28	3	208 -	0		11			
			SS	6	100	20	- - - 4 - - -	207 -	0		N 0			
		206.2	SS	7	100	17	-	-	0		a o 14			
:AZ:K		END OF BOREHOLE 5.0												

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREH	OLE N	<b>o.</b>	BH	<u>B6</u>														1	VC	00	d.
Pro	ject Number:	TP115086							Drilling	Location	n: ,	Arteria	I A2, S	Sta. 0+5	00 E	:6057	759 N:4	852529	L	.ogged	by:	ММ	
Pro	ject Client:	City of Brampton							Drilling	Method:		150 m	m So	lid Sten	n Aug	ers			0	Compile	d by:	PR	
Pro	ject Name:	Arterial Road Netwo	ork within H	lighwa	y 427 l	Industr	rial		Drilling	g Machine	: '	Track	Mount	ted Drill					F	Reviewe	d by:	SM/DP	
Pro	ject Location:	Brampton, Ontario							Date S	Started:		Feb 7,	2020	Da	ite Co	mplet	ted: Fel	b 7, 202	<b>0</b> F	Revision	No.:	0, 1/5/2	21
	LITH	OLOGY PROFILE		SC	IL SA	MPLI	NG			FIEL	D T	ESTIN	NG		AB TE			_					
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT  MTO Var  △ Intact  ▲ Remou	□ P ne* uld I Shea	onTestin  PT ●  Nilcon \	DCPT Vane* ct nould	△ COV 2 △ COV 100 W <sub>P</sub> Plast	(LEL) 4 (ppm) 200 W	■ T0 6 10 300	OV (LEL)  8  OV (ppm)  400  W <sub>L</sub> iquid	INSTRUMENTATION INSTALLATION		GRA DISTR	(%)	ΖE	CI.
<u> </u>	Geodetic Ground S	Surface Elevation: 210.9 m bout 150 mm TOPSOIL	210.8	Š	ű	Ř	S	-	<u> </u>	20	40	60	80	20	40	60	80	<u> </u>	GR	SA		ol .	CL
<b>**</b>	Sil tr	brown ty Clay / Clayey Silt FILL ace sand, trace rootlets (reworked soil)	210.2	SS	1	83	6	-  -  -  -	- - - -	0				<b>a</b>									
	SILTY trace	brown  CLAY / CLAYEY SILT T sand to sandy, trace grav	0.7 ILL	SS	2	100	20	- - 1	210 -	0													
		very stiff				100	20	-															
				SS	3	100	29		209 -	0				8									
		END OF BOREHOLE	208.8 2.1					— 2 -	209		:					- :							
															-								
										:				:	-								

 $\frac{\textstyle \sum}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD OF BOREHOLE N	Ο.	BH	B7 /	BH	<u>S5</u>	<u>i</u>						V	VOO	d
Pro	oject Number: TP115086						_ Drilling	g Location:	Arterial A2,	Sta. 0+600 E:6	605633 N:4	852520	Logged b	y: <u>MS</u>	
Pro	oject Client: City of Brampton						_ Drilling	g Method:	150 mm So	lid Stem Auge	rs		Compiled	by: PR	
Pro	oject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	Highwa	ıy 427	Indust	rial		_ Drillin	g Machine:	Track Mount	ted Drill			Reviewed	by: <u>SM/</u> [	DP
Pro	oject Location: Brampton, Ontario						_ Date :	Started:	Feb 26, 2020	Date Com	pleted: Fe	b 26, 2020	Revision	No.: <u>0, 3/</u>	30/21
	LITHOLOGY PROFILE	SC	DIL SA	AMPLI	NG			FIELD	TESTING	LAB TES					
					(%		=	1	ationTesting PPT • DCPT	Soil Vapour  COV (LEL)		NSTRUMENTATION NSTALLATION		MENTS &	
əlot	DESCRIPTION	d/be	umber	(%)	Sab (	Ê	(E) NC	MTO Vane*	Nilcon Vane*	△ COV (ppm) E	TOV (ppm)			N SIZE BUTION	
Lithology Plot		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEРТН (m)	EVATION	△ Intact ▲ Remould	<ul><li>♦ Intact</li><li>♦ Remould</li></ul>	W <sub>P</sub> W	W <sub>L</sub>	TRUM TALL		%)	
Litho	Geodetic Ground Surface Elevation: 209.3 m about 150 mm TOPSOIL 209.2	Sam	Sam	Rea	SPT	DEP		* Undrained Sh 20 40	near Strength (kPa) 60 80	Plastic 20 40	Liquid 60 80	SNI	GR SA	SI	CL
<b>***</b>	about 150 mm TOPSOIL	SS	1	100	6		209 -			40	<u>.</u> j				
₩	trace to some gravel, trace organics					Ė	209			40					
	brown to grey 0.7  SILTY CLAY / CLAYEY SILT TILL					ŧ									
	trace sand to sandy, trace to some gravel firm to hard	SS	2	100	8	— 1 -		0	ı	25					
						F	208 -								
						Ė									
		SS	3	100	27	- - 2				12					
						Ė	007								
	grey	ss	4	100	50	E	207 -		0 1		<u>.</u>				
		33	4	100	30	E			·	°13	<u> </u>				
						3					ļļ				
		SS	5	100	69		206 -	ļ	0 1	<b>a</b> 0,1	<u> </u>				
	205.6					Ė					<u> </u>				
7	grey 3.7 SAND AND SILT TILL					- 4									
	trace clay, trace gravel firm to hard	SS	6	83	58	- 4			0 1	12			4 43	50	3
	grey	-				Ē	205 -		64						
	grey 4.5 SILTY CLAY / CLAYEY SILT TILL trace sand to sandy, trace to some gravel,	SS	7	100	64 / 150mn	1			150 mm	10					
	cobbles/boulders hard					- 5									
							204 -								
						-									
							<u></u>				1				
		SS	8	100	62 /	<u></u> 6 - -			62	<b>a</b> 0					
		-		100	150mm	<u>†</u>	203 -		62 150 mm	13	<u> </u>				
						<u> </u>									
						-	202 -	]			ļļ				
						F									
		SS	9	100	66										
						- 8 - -				24					
						E	201 -								
						-									
						_ _ 9									
						Ę '	<b>₽</b> 200 -	1							
		SS	10	100	39	Ē				23					
CVX	199.6 END OF BOREHOLE 9.8			+		†									
	od E&IS, a Division of Wood  Groundw	vater en	counter	red on co	ompletio	n of dr	rilling on	<u>2/26/2020</u> at a	depth of: <u>5.8 m</u>	. 🖫 Cave in d	epth after ren	noval of auge	ers: <u>9.1 m</u> .		
50 \	/oqell Road, Units 3 & 4						-								
Car	No : (005) 415 2632 a qualified Geote	echnical E	Engineer	. Also, bo	rehole in	formati	on should	nding of all pote be read in coni	ential conditions pre	esent and require in	terpretative ass	istance from		Scale:	1:53
	v.woodplc.com commissioned ar	nd the ac	compan	ying'Éxpl	anation o	of Boreh	nole Log'.		3	•					l of 2

Scale: 1 : 53 Page: 1 of 2

## RECORD OF BOREHOLE No. BH B7 / BH S5



Project Number:	TP115086	Project Name: Arterial Road Network within Highway 427 Industrial Secondary Plan Area
-		(Area 47)

Project Location: Brampton, Ontario

	LITHOLOGY PROFILE	sc	IL SA	MPLI	NG			FIELD TESTING	LAB TESTING			
								PenetrationTesting	Soil Vapour Reading  ▲ COV (LEL) ■ TOV (LEL)	INSTRUMENTATION INSTALLATION	COMMEN	TS
_	DESCRIPTION	0	pper	<u> </u>	%) Q		E E	O SPT □ PPT ● DCPT	2 4 6 8	TAT ON	& GRAIN SI	ZE
y Plo	DESCRIPTION	Type	N	ly (%	/RG	Œ	ĕ	MTO Vane* Nilcon Vane*  △ Intact ◇ Intact  ▲ Remould ◆ Remould	△ COV (ppm) □ TOV (ppm) 100 200 300 400 W <sub>P</sub> W W <sub>L</sub>	JME LATI	DISTRIBUT	ION
Lithology Plot		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEРТН (m)	ELEVATION (m)	▲ Remould ◆ Remould * Undrained Shear Strength (kPa)	$W_P$ $W$ $W_L$ Plastic Liquid	STRU	(%)	
=	50 mm dia. monitoring well with flushmount	Š	Š	ž	S	٥	П	20 40 60 80	20 40 60 80	ZZ	GR SA	SI CL
	50 mm dia. monitoring well with flushmount protective casing installed (depth below ground surface):											
	Sand: 0.0 - 0.6 m											
	Bentonite: 0.6 - 5.5 m Sand Filter: 5.5 - 9.1 m Screen: 6.1 - 9.1 m											
	Groundwater measurements in monitoring well (depth below ground surface):											
	4 May 2020: -0.7 m (above ground) 12 May 2020: -0.5 m (above ground)											
	12 May 2020: -0.5 m (above ground)											

R	ECORD OF BOREHOLE N	lo.	<u>BH</u>	<u>B8</u>								wood.
Pro	ject Number: TP115086						Drilling	Location:	Arterial A2, S	ta. 0+700 E:605564 N:4	852529	Logged by: MS
Pro	ject Client: City of Brampton						Drilling	Method:	150 mm Soli	id Stem Augers		Compiled by: PR
Pro	ject Name: Arterial Road Network within Secondary Plan Area (Area 47)	Highwa	ay 427	Industr	ial		Drilling	Machine:	Track Mounte	ed Drill		Reviewed by: SM/DP
Pro	ject Location: Brampton, Ontario	')					Date 9	Started:	Feb 20, 2020	Date Completed: Fel	20, 202	0 Revision No.: 0, 1/5/21
	LITHOLOGY PROFILE	SC	OIL SA	MPLI	NG			FIELD .	TESTING	LAB TESTING Soil Vapour Reading		
y Plot	DESCRIPTION	Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	(m)	(m) NOIL	O SPT □  MTO Vane*  △ Intact	PPT ● DCPT Nilcon Vane*	△ COV (LEL) ■ TOV (LEL)  2 4 6 8  △ COV (ppm) □ TOV (ppm)  100 200 300 400  W <sub>P</sub> W W <sub>L</sub>	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
Lithology Plot	Constable Comment Confirms Elevations 244.4	Sample Type	sample	Secove	N TAS	DEРТН (m)	ELEVATION	▲ Remould  * Undrained She 20 40	ear Strength (kPa)	Plastic Liquid 20 40 60 80	NSTRI	(70) GR SA SI CL
<u> </u>	Geodetic Ground Surface Elevation: 211.1 m  about 100 mm TOPSOIL 211.0  dark brown 0.1		0)	<u> </u>	0)	-	211 -	20 40	00 00	20 40 60 60		<u> </u>
	Silty Clay FILL trace gravel, trace organics (reworked soil) 210.5 brown 0.6		1	100	9	-	-	0	<b>4</b> 3			
	SILTY CLAY CLAY SILT TILL trace sand, trace gravel very stiff to hard	SS	2	100	22	- - - 1	210 —	0				
	209.4		3	44	36	-  -  -	-	0.	<b>B</b> 3			
	END OF BOREHOLE 1.7	<u>'</u>										

 $\frac{\textstyle \sum}{\scriptstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

·	15086											wood.
iect Client· City							Drilling	Location:	Arterial A2, S	ta. 0+800 E:6054	161 N:485254	Logged by: MS
out onlors. <u>Orty</u>	of Brampton						Drilling	Method:	150 mm Sol	id Stem Augers		Compiled by: PR
ect Name: Arte	rial Road Network within	Highwa	ıy 427 I	ndustr	ial		Drilling	Machine:	Track Mount	ed Drill		Reviewed by: SM/DP
ject Location: Brai	ondary Plan Area (Area 47 mpton, Ontario	') 					Date S	started:	Feb 20, 2020	Date Complet	ted: <b>Feb 20,</b>	2020 Revision No.: 0, 1/5/21
LITHOLO	GY PROFILE	SC	IL SA	MPLI	NG			FIELD '	TESTING	LAB TESTI		
	CRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould  * Undrained She	tionTesting  PPT		STRUMENTATION  STRUMENTATION  On the principle of the pri	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
about 1	00 mm TOPSOIL 212.3		ί	œ	Ø	_	<u> </u>	20 40	60 80	20 40 60	80 22	GR SA SI CL
Silt trace gra	ty Clay FILL vel, trace organics	SS	1	100	15	- - - -	212 -	0		o 36		
trace sand ar cobl	brown 0.7  // CLAYEY SILT TILL  nd sandy, trace gravel, bles/boulders	SS	2	100	13	- - - 1 - - - -	- - - - - - 211 —	0	I B	1 0		
		SS	3	100	34	- - - - - 2	-	0		18		
	grey	SS	4	100	68	- - - - - - -	210 -		0 #	011		
		SS	5	100	48		209 —		O	1 0 11		
		SS	6	100	72	- 4 - 5 - 5	∠ - 208 –		0 8	1 011		
	207.4	SS	7	100	49	- - - - - 5	-		0 .	1 0 13		
	about 1  d Sitit trace gra (re SILTY CLAY trace sand ar cobb	Sitly Clay FILL trace gravel, trace organics (reworked soil)	about 100 mm TOPSOIL 212.3  dark brown Sitty Clay FILL trace gravel, trace organics (reworked soil) 211.8  Drown SILTY CLAY / CLAYEY SILT TILL trace sand and sandy, trace gravel, cobbles/boulders stiff to hard  SS  SS  SS  SS  SS  SS  SS	SS   1   SS   SS   1   100   1	SS   1   100   15	SS   1   100   15   100   15   15   15   1	SS   1   100   15   212   21	SS   1   100   15   212   2   2   2   2   2   2   2   2	SS   1   100   15   212   2   2   2   2   2   2   2   2	SS   1   100   15   212   3   36   36   36   36   36   36   36	SS   1   100   15   212   2   3   3   3   3   3   3   3   4   2   2   3   3   3   3   3   3   3   3	

 $\frac{\nabla}{z}$  Groundwater encountered on completion of drilling on <u>2/20/2020</u> at a depth of: <u>4.3 m</u>.

R	ECORD	OF BOREHOL	E No	o. <u>l</u>	BH	<u>B10</u>														W	0	00	1
Pro	ject Number:	TP115086							Drilling	Location	:	Arteria	I A2, S	Sta. (	0+900	E:60	5365 N:4	852580		Logged by	: ]	MS	_
Pro	ject Client:	City of Brampton							Drilling	Method:		150 mi	m Sol	lid S	tem Au	ugers				Compiled b	ру: <u>I</u>	PR	
Pro	ject Name:	Arterial Road Network w Secondary Plan Area (A	vithin H	ighwa	y 427 I	ndustr	ial		Drilling	Machine	:	Track N	Mount	ed E	Orill					Reviewed	by:	SM/DP	
Pro	ject Location:	Brampton, Ontario							Date S	Started:		Feb 20,	, 2020	)	_Date 0	Compl	eted: Fe	b 20, 20	20	Revision N	o.: <u>(</u>	0, 1/5/21	_
	LITH	OLOGY PROFILE		so	IL SA	MPLI	NG			FIEL	D T	ESTIN	IG		LAB Soil Val	TEST pour Rea		_					
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)		□ F ne*	OnTesting PT ● Nilcon \ ◇ Intac ◆ Rem	DCPT /ane*	Δ (	COV (LEL 2 4	.) <b>=</b> 6	TOV (LEL) 8 TOV (ppm)	INSTRUMENTATION INSTALLATION		GRAIN DISTRIE	SIZ SUTI	E	
Litho	Geodetic Ground S	Surface Elevation: 212.7 m		Sam	Sam	Reco	SPT	DEP	ELE	* Undrained 20	Shea 40	r Strength	(kPa) 80		Plastic 20 40	60	Liquid 80	INST	GR	SA	S	(	CL
<b>***</b>	а	dark brown	212.6 0.2	SS	1	79	8	-															
$\overset{**}{\Longrightarrow}$	tra	Silty Clay FILL ace gravel, trace organics (reworked soil)	212.1	55	ı	19	0	-	-														
	SILTY	brown/brownish grey CLAY / CLAYEY SILT TILL	0.6					-	212														
	t d	race sand, trace gravel very stiff to hard		SS	2	100	18	- - 1	-	0													
		,	ŀ					-	-				 !										
			211.0	SS	3	100	54	-	-			0	E										
		END OF BOREHOLE	1.7								-												
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 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREHOL	E No	<b>)</b>	ВН	B11	ı								W	ood.
Pro	ject Number:	TP115086							Drilling	Location:	Arterial A2,	Sta. 1+000 I	E:605279 N:4	852627	Logged by:	MS
Pro	ject Client:	City of Brampton							Drilling	Method:	150 mm So	lid Stem Aug	gers		Compiled by:	PR
Pro	ject Name:	Arterial Road Network w Secondary Plan Area (Ar	vithin H	ighwa	y 427 I	ndustr	ial		Drilling	Machine:	Track Mount	ted Drill			_ Reviewed by:	SM/DP
Pro	ject Location:	Brampton, Ontario	lea 41)						Date S	Started:	Feb 20, 2020	Date Co	ompleted: Fel	20, 2020	Revision No.:	0, 1/5/21
	LITH	OLOGY PROFILE	I	SO	IL SA	MPLII	NG			FIELD	TESTING	LAB T	ESTING			
Lithology Plot	Geodetic Ground S	DESCRIPTION  urface Elevation: 212.3 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	tionTesting  PPT	△ COV (LEL)  2 4  △ COV (ppm)  100 200	□ TOV (LEL)  6 8 □ TOV (ppm) 300 400  W WL Liquid 60 80	INSTRUMENTATION INSTALLATION	COMMEN & GRAIN SI DISTRIBUT (%)	ZE
<b>X</b>		Sity Clay FILL ce gravel, trace organics (reworked soil) brown	212.2 0.1 211.6 0.7	SS	1	100	16	- - - - -	212 -	0		°25				
	trace	SILTY CLAY TILL sand to sandy, trace gravel very stiff to hard	-	SS	2	100	25	- - 1 - - - -	211 —	0	ī	13				
		brownish grey	-	SS	3	100	43	_ - - 2 -	210 —	C	)	13			2 24	49 25
		END OF BOREHOLE	209.3	SS	4	100	56	- - - - - - - 3	- - - - -		0 .	°13				

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

		OF BOREHOL	E No	o. <u> </u>	BH_	<u>B12</u>	ı									wood.
	ject Number:									Location:	Arterial A2,				852676	
	ject Client:	City of Brampton								Method:	150 mm Sc			5		Compiled by: PR
	ject Name: ject Location:	Arterial Road Network v Secondary Plan Area (A Brampton, Ontario	vithin H rea 47)	lighwa	y 427	Industr	ial			Machine: Started:	Track Moun			oleted: <u>Fel</u>	o 20, 20	Reviewed by: <b>SM/DP</b> 20 Revision No.: <b>0, 1/5/21</b>
	LITH	OLOGY PROFILE		SO	IL SA	MPLI	NG			FIELD	TESTING		B TES			
Lithology Plot	Geodetic Ground S	DESCRIPTION Surface Elevation: 214.3 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	<ul> <li>♦ Intact</li> <li>♦ Remould</li> </ul> rear Strength (kPa)	▲ COV	4 (ppm) D 200 30	TOV (LEL)  8 8  TOV (ppm) 00 400  W <sub>L</sub> Liquid	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
<b>***</b>	а	dark brown Silty Clay FILL	214.1 0.2	SS	1	83	17	-	214 -	0				: :;		
		ace gravel, trace organics (reworked soil) greyish brown CCLAY / CLAYEY SILT TILL	213.6 - —0.6					-	-							
	SILT I	trace sand, trace gravel very stiff to hard		SS	2	100	24	- - 1 -	213 -	0						
		END OF BOREHOLE	212.6 1.7	SS	3	100	69	-	-		0					

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD OF BOREHOLE N	<b>o.</b>	BH	B13									WC	od.
Pro	ject Number: TP115086						Drilling	g Location:	Arterial A2,	Sta. 1+200	E:605111 N:4	1852740	• • • •	MS
Pro	ject Client: City of Brampton						Drilling	g Method:	150 mm So	lid Stem A	ugers		Compiled by:	PR
Pro	ject Name: Arterial Road Network within F Secondary Plan Area (Area 47)	lighwa	y 427 I	ndustr	rial		Drilling	g Machine:	Track Mount	ted Drill			Reviewed by:	SM/DP
Pro	ject Location: Brampton, Ontario						Date S	Started:	Feb 20, 2020	Date	Completed: Fe	b 20, 2020	Revision No.:	0, 1/5/21
	LITHOLOGY PROFILE	SC	IL SA	MPLI	NG			FIELD T	ESTING		TESTING			
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □ F  MTO Vane*  △ Intact ▲ Remould	onTesting  PPT	△ COV (LEI 2 4 △ COV (ppr 100 20	m) □ TOV (ppm) 00 300 400 W W <sub>L</sub>	NSTRUMENTATION NSTALLATION	COMMENT & GRAIN SIZ DISTRIBUTI (%)	ΖE
Ę.	Geodetic Ground Surface Elevation: 215.7 m about 100 mm TOPSOIL 215.6_	Sar	Sar	Rec	SP	DE		20 40	ar Strength (kPa) 60 80	Plastic 20 4	Liquid 0 60 80	88	GR SA S	SI CL
$\bigotimes$	dark brown/brown 0.1 Silty Clay FILL trace gravel, trace organics (reworked soil) 215.0	SS	1	75	8	-	215 —	0		32	2			
	brown SILTY CLAY / CLAYEY SILT TILL trace sand, trace gravel, cobbles/boulders hard to very stiff	SS	2	54	36	- - - 1 - -		0	ſ	o 17				
		SS	3	100	44	- - - - - - 2	214 —	0		1 O				
		SS	4	100	64	-  -  -  -  -	-		0 1	<sup>3</sup> 013				
		SS	5	100	39	- - - 3 - -	213							
	grey					- - - - - 4	212 -			13				
	<b>,</b>	SS	6	100	19	-  -  -  -  -	- - - -	0	ı	13				
	210.7 END OF BOREHOLE 5.0	SS	7	100	21	- - - - 5	211 —	0		12				

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREHOL	E No	o. <u> </u>	BH	<u>B14</u>												W	00	d.
Pro	ject Number:	TP115086								g Location:	<u>Arterial</u>	A2, St	ta. 1+300	E:605	5038 N:4	852807		Logged by:	MS	
	ject Client:	City of Brampton							Drilling	g Method:			d Stem A	ugers				Compiled by		
	ject Name:	Arterial Road Network v Secondary Plan Area (A	vithin H rea 47)	ighwa	y 427 l	Industr	ial		Drilling	g Machine:	Track M	ounte						Reviewed by	/: <u>SM/I</u>	DP
Pro	ject Location:	Brampton, Ontario							Date S	Started:	<u>Jan 24, 2</u>	2020	Date	Comple	eted: <u>Ja</u>	n 24, 202	20	Revision No	.: <u>0, 1/</u>	5/21
	LITH	OLOGY PROFILE		SC	IL SA	MPLII	NG				TESTING			TEST apour Rea		z		COMME	NTC	
					J.		(%)		<u>E</u>		ationTesting I PPT ● □		▲ COV (LE	L) =	TOV (LEL) 8	INSTRUMENTATION INSTALLATION		&		
<u>B</u> ot		DESCRIPTION		ype	Sample Number	(%)	'N' / RQD (%)	Ê		MTO Vane	* Nilcon Va	ane*	△ COV (ppi 100 20	m) 🗆 00 300	TOV (ppm) 400	AENT		GRAIN S DISTRIBL		
Lithology				Sample Type	nple h	Recovery (%)	/ .N. J	DEРТН (m)	ELEVATION	△ Intact ▲ Remould	◆ Remo	uld	W <sub>P</sub>	W	W <sub>L</sub>	TALL		(%)		
=	Geodetic Ground S	urface Elevation: 217.1 m		Sar	Sar	Rec	SPT	DE			hear Strength (I 0 60 80		Plastic 20 4	0 60	Liquid 80	888	GR	SA	SI	CL
	aı	drak brown / brown	216.9 0.2	SS	1	100	7	-		-										
▓	tra	Silty Clay FILL ce gravel, trace organics	216.5					_												
	011 77	(reworked soil) brown	0.6					-												
	SILIY	cLAY / CLAYEY SILT TILL race sand, trace gravel very stiff to hard		SS	2	100	25	- - 1	216 -			• • • • • • • • • • • • • • • • • • •								
		very sun to hard	ŀ					-												
				SS	3	100	56	-			· · · o	🛦								
		END OF BOREHOLE	215.2 1.8																	
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 $\frac{\textstyle \sum}{\textstyle =}$  No freestanding groundwater measured in open borehole on completion of drilling.

RI	ECORD	OF BOREHOL	E No	<b>o.</b>	<u>BH</u>	<u>B15</u>	•								wood.
Proj	ject Number:	TP115086							Drilling	g Location:	Arterial A2,	Sta. 1+400 I	E:604966 N:4	852877	Logged by: MS
Proj	ject Client:	City of Brampton							Drilling	g Method:	150 mm So	olid Stem Aug	gers		Compiled by: PR
Proj	ject Name:	Arterial Road Network v Secondary Plan Area (A	within H	ighwa	y 427	Industr	ial		Drilling	g Machine:	Track Moun	ted Drill			Reviewed by: SM/DP
Proj	ject Location:	Brampton, Ontario	uea 41)						Date	Started:	Jan 24, 2020	Date Co	ompleted: <u>Jar</u>	n 24, 202	0 Revision No.: 0, 1/5/21
	LITH	IOLOGY PROFILE		SC	IL SA	MPLI	NG	_		FIELD '	TESTING		ESTING our Reading	_	
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould  * Undrained She	ctionTesting  PPT	△ COV (LEL)  2 4  △ COV (ppm)  100 200  W <sub>P</sub> V  Plastic	■ TOV (LEL) 6 8 □ TOV (ppm) 300 400	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
<u> </u>	Geodetic Ground a	Surface Elevation: 217.3 m bout 150 mm TOPSOIL	217.2	Ø	S	<u>~</u>	S	_	Ш	20 40	60 80	20 40	60 80	22	GR GA GI GE
		dark brown / brown Silty Clay FILL trace gravel (reworked soil) brown	0.2 216.8 0.6	SS	1	100	6	-  -  -  -	217 -	0		a o 28			
		CLAY / CLAYEY SILT TILL trace sand, trace gravel hard		SS	2	100	32	- 1 - 1 	216 -	0		<sup>©</sup> 10			
			-	SS	3	100	35			0		as ⊙ 14			
			-					- 2 - - - -	215 —						
		END OF BOREHOLE	214.3	SS	4	100	52	- - - - 3			O	13			

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

R	ECORD	OF BOREHOL	E No	o. <u>l</u>	BH_	<u>B16</u>												W	00	d.
Pro	ject Number:	TP115086							Drilling	g Location:	Arteri	al A2, S	Sta. 1+50	0 E:60	04893 N:4	852946	L	ogged by:	MS	
Pro	ject Client:	City of Brampton							Drilling	g Method:	150 r	nm So	lid Stem	Augers	\$		c	ompiled by	PR	
Pro	ject Name:	Arterial Road Network ( Secondary Plan Area (A	within H	ighwa	y 427 l	ndustr	ial		Drilling	g Machine:	Track	Mount	ed Drill				R	eviewed by	: <u>SM/D</u>	P
Pro	ject Location:	Brampton, Ontario							Date S	Started:	Jan 2	4, 2020	Dat	e Comp	oleted: <u>Ja</u>	n 24, 202	20 R	evision No.	: <u>0, 1/5</u>	5/21
	LITH	OLOGY PROFILE		SO	IL SA	MPLII	NG			FIELD	TESTI	NG		3 TES Vapour R		_				
					_		(%)		Œ	1	tionTest	-	▲ COV (	vapourik LEL) ■ 4 6	TOV (LEL)	INSTRUMENTATION INSTALLATION		COMME &		
<u>Bot</u>		DESCRIPTION		уре	Sample Number	(%)	'N' / RQD (%)	Ê		MTO Vane*	Nilcon	Vane*	△ COV (i	opm) 🗆 200 30	TOV (ppm) 00 400	ENT/		GRAIN S DISTRIBU		
Lithology				Sample Type	N əldı	Recovery (%)	ż	<b>DEPTH</b> (m)	ELEVATION	△ Intact ▲ Remould		emould	W <sub>P</sub>	W	W <sub>L</sub>	TRUN		(%)		
<u><u><u> </u></u></u>	Geodetic Ground S	urface Elevation: 217.9 m		San	San	Rec	SPT	DEF		* Undrained Sh 20 40		th (kPa) 80	Plastic 20	40 6	Liquid 0 80	SNS	GR	SA	SI	CL
<b>X</b>	aı	drak brown / brown	217.8 0.2	SS	1	100	8	-					g							
❈		Silty Clay FILL trace gravel (reworked soil)	217.4	00	•			-												
	SILTY	brown CLAY / CLAYEY SILT TILL	0.6					-												
	tı	race sand, trace gravel very stiff to hard		SS	2	100	21	1	217 -				3 · · · · · · · · · · · · · · ·							
			ŀ					-												
				SS	3	100	56	-			0		3 }							
XX		END OF BOREHOLE	216.1 1.8					<u> </u>												
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 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD OF BOREHOLE N	Ο.	BH	B17										W	00	d.
Pro	ject Number: TP115086						Drilling	Location:	Arterial A2,	Sta. 1+600	E:604822 N:4	853017	۱	ogged by:	MS	
Pro	ject Client: City of Brampton						Drilling	Method:	150 mm Sc	olid Stem A	ugers		(	Compiled b	y: <b>PR</b>	
Pro	ject Name: Arterial Road Network within I Secondary Plan Area (Area 47)	Highwa	ay 427 I	Industr	ial		Drilling	Machine:	Track Moun	ted Drill			F	Reviewed b	oy: <b>SM/</b> [	DP
Pro	ject Location: Brampton, Ontario	, 					Date 9	Started:	Jan 24, 2020	<b>)</b> Date	Completed: <u>Ja</u>	n 24, 202	<u>:0</u> F	Revision N	o.: <u>0, 1/</u>	5/21
	LITHOLOGY PROFILE	SC	OIL SA	MPLI	NG			FIELD	TESTING		TESTING					
					(%)				tionTesting	▲ COV (LE	apour Reading	NOL		COMMI &	_	
<u>t</u>	DESCRIPTION	e e	Sample Number	(%	SPT 'N' / RQD (%)		E Z	O SPT   MTO Vane*	PPT • DCPT Nilcon Vane*	△ COV (pp	4 6 8 m) □ TOV (ppm) 00 300 400	INSTRUMENTATION INSTALLATION		GRAIN	SIZE	
Lithology Plot		Sample Type	le Nu	Recovery (%)	Z Z	DEРТН (m)	ELEVATION	△ Intact ▲ Remould	<ul> <li>♦ Intact</li> <li>♦ Remould</li> </ul>	100 2 W <sub>P</sub>	00 300 400 W W <sub>L</sub>	ALLA		DISTRIB (%		
Lithol	Geodetic Ground Surface Elevation: 218.5 m	Samp	Samp	Reco	SPT	DEP1	ELEV	* Undrained Sho 20 40	ear Strength (kPa) 60 80	Plastic 20 4	Liquid 10 60 80	INST INST	GR	SA	SI	CL
XXX	about 150 mm TOPSOIL         218.3           dark brown / brown         0.2					-										
₩	Silty Clay FILL (reworked soil) 217.9	SS	1	100	8	_	218 -	0		3	1					
	brown 0.6 SILTY CLAY TILL					ŧ										
	trace sand to sandy, trace gravel, cobbles/boulders	SS	2	100	21	_ _ 1		0		<b>A</b>						
	very stiff to hard			100	21	-				a °16						
						1	217 -									
		SS	3	100	30	-				19 ± 19			5	21	47	27
						_ 2	-									
						Ė				:						
		ss	4	100	42	-	216 -	0		a ○ 15						
						Ε.	-									
						- 3 - -	-									
		SS	5	100	50	-	215 -		0	13						
						F										
	grey					- - 4										
	<i>.</i>	SS	6	100	39	_		0		a o 14						
						-	214 -									
		SS	7	100	29	_				as o 13						
262	213.4 END OF BOREHOLE 5.0					- 5				13						
										:						
										:						
										:						
										:						
										:						
										:						

 $\frac{\nabla}{\pi}$  No freestanding groundwater measured in open borehole on completion of drilling.

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RE	ECORD	OF BOREHOLE N	<b>o.</b>	<u>BH</u>	<u>B18</u>									WC	ood.
Proj	ect Number:	TP115086						Drilling	g Location:	Arterial A2, S	Sta. 1+700 E:604	752 N:48	853086	_ Logged by:	MS
Proj	ect Client:	City of Brampton						Drilling	g Method:	150 mm Soli	id Stem Augers			_ Compiled by:	PR
Proj	ect Name:	Arterial Road Network within F	lighwa	y 427	Industr	ial		Drilling	g Machine:	Track Mounte	ed Drill			_ Reviewed by:	SM/DP
Proj	ect Location:	Secondary Plan Area (Area 47) Brampton, Ontario						Date S	Started:	Jan 24, 2020	Date Comple	eted: <u>Jar</u>	24, 2020	_ Revision No.:	0, 1/5/21
	LITH	OLOGY PROFILE	SC	IL SA	MPLI	NG			FIELD	TESTING	LAB TESTI Soil Vapour Read		7	COMMENT	TO.
				_		(%)		(E)		tionTesting PPT • DCPT	▲ COV (LEL) ■ 1	FOV (LEL)	INSTRUMENTATION INSTALLATION	COMMEN &	
bo		DESCRIPTION	e di	Sample Number	(%)	SPT 'N' / RQD (%)	Ê		MTO Vane*		△ COV (ppm) □ 1 100 200 300	ΓΟV (ppm) 400	TION	GRAIN SIZ DISTRIBUT	
Lithology			Sample Type	Dle N	Recovery (%)	.N.	DEРТН (m)	ELEVATION	△ Intact ▲ Remould	♦ Intact ♦ Remould	W <sub>P</sub> W	W <sub>L</sub>	ALL/	(%)	
Lit	Geodetic Ground S	iurface Elevation: 219.2 m	Sam	Sam	Rea	SPT	DEP	ELE	* Undrained She 20 40	ear Strength (kPa) 60 80	Plastic 20 40 60	Liquid 80	LSNI LSNI	GR SA	SI CL
XX	al	bout 150 mm TOPSOIL         219.1           drak brown / brown         0.2					-	219 -							
▓		Silty Clay FILL trace gravel	SS	1	100	8	_			<b>a</b>	<b>1</b> · · · · · · · · · · · · · · · · · · ·	;			
		brown 0.6					-								
	SILTY trace sand	d, tarce gravel, cobbles/boulders	ss	2	100	20	- - 1				<b>,</b>				
		very stiff to hard					ļ .	218 -				;			
			SS	3	100	43	_								
		217.4			100	70	-		1 1 1	<b>"</b>					
		END OF BOREHOLE 1.8						_							
												:			
									: :			:			

R	ECORD	OF BOREHOL	E N	ο.	ВН	B19									W	ood.
Pro	ject Number:	TP115086							Drilling	Location:	Arterial A2, S	Sta. 1+800	E:604680 N:4	853157	Logged by:	MS
Pro	ject Client:	City of Brampton							Drilling	Method:	150 mm So	lid Stem A	ugers		Compiled by:	PR
Pro	ject Name:	Arterial Road Network ( Secondary Plan Area (A	within H	lighwa	ıy 427 l	Industr	ial		Drilling	Machine:	Track Mount	ed Drill			Reviewed by:	SM/DP
Pro	ject Location:	Brampton, Ontario							Date S	Started:	Jan 24, 2020	Date	Completed: Ja	n 24, 202	Revision No.:	0, 1/5/21
	LITH	OLOGY PROFILE		SC	IL SA	MPLI	NG			FIELD	TESTING		TESTING			
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact ▲ Remould  * Undrained She	ear Strength (kPa)	△ COV (LE 2	apour Reading  L)	NSTRUMENTATION INSTALLATION	COMMEN & GRAIN SI DISTRIBUT (%)	IZE
<u> </u>	Geodetic Ground	Surface Elevation: 219.5 m about 200 mm TOPSOIL	219.3	Ø	ί	œ	S	_	Ш	20 40	60 80	20 4	0 60 80	==	GR SA	SI CL
<b>※</b>	\	dark brown/brown Silty Clay FILL trace gravel (reworked soil)	0.2 218.9 0.¢	SS	1	100	7	-  -  -  -  -	219 —	0		17				
	SILTY	brown Y CLAY / CLAYEY SILT TILL trace sand, trace gravel very stiff to hard		SS	2	100	29	- - - 1 - -	-	0	E	<sup>3</sup> 0				
				SS	3	83	37	_ - - - - 2	218 -	0	6	s o 16				
		greyish brown						<u>-</u> - - - -	217 —							
			046 F	SS	4	100	40	Ε.	=	0		14				
XXX		END OF BOREHOLE	216.5 3.0					- 3			: :	:		1		

 $\stackrel{\textstyle \nabla}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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R	ECORD	OF BOREHOL	E No	o. <u>l</u>	BH	<u>B20</u>									wood
Pro	ject Number:	TP115086							Drilling	Location:	Arterial A2, S	Sta. 1+900	E:604609 N:4	853227	Logged by: MS
Pro	ject Client:	City of Brampton							Drilling	Method:	150 mm Sol	id Stem A	ugers		Compiled by: PR
Pro	ject Name:	Arterial Road Network w	/ithin H	ighwa	y 427 I	ndustr	ial		Drilling	Machine:	Track Mount	ed Drill			Reviewed by: SM/DP
Pro	ject Location:	Secondary Plan Area (Ar Brampton, Ontario	rea 47)						Date S	Started:	Jan 24, 2020	Date (	Completed: <u>Ja</u>	n 24, 202	0 Revision No.: 0, 1/5/21
	LITH	OLOGY PROFILE		SO	IL SA	MPLII	NG			FIELD	TESTING		TESTING pour Reading	7	COMMENTS
Lithology Plot	Geodetic Ground S	DESCRIPTION  Gurface Elevation: 219.9 m		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEРТН (m)	ELEVATION (m)	O SPT □  MTO Vane* △ Intact ▲ Remould	<ul> <li>Intact</li> <li>Remould</li> </ul> ear Strength (kPa)	▲ COV (LEL	D) ■ TOV (LEL)	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
<b>***</b>	al	drak grey / brown Silty Clay FILL	219.8 0.1	ss	1	75	9	-	-			1			
		trace gravel (reworked soil)	219.3 0.6					-	-						
	SILTY t	race sand, trace gravel very stiff to hard		SS	2	100	26	- - 1	219 <del>-</del>	0		]			
				SS	3	100	56		Z - = - - -		0	1			
<b>XX</b>		END OF BOREHOLE	218.1 1.8					-							
												: :			

 $\frac{\nabla}{z}$  Groundwater encountered on completion of drilling on <u>1/24/2020</u> at a depth of: <u>1.2 m</u>.

R	ECORD	OF BOREHOL	E No	o. <u>I</u>	BH I	<u>B21</u>								wood
Pro	ject Number:	TP115086							Drilling	Location:	Arterial A2, S	Sta. 2+000 E:604537 N:4	853296	Logged by: MS
Pro	ject Client:	City of Brampton							Drilling	Method:	150 mm Sol	id Stem Augers		Compiled by: PR
	ject Name:	Arterial Road Network v Secondary Plan Area (A	within H Area 47)	ighwa	y 427 I	ndustr	ial		Drilling	Machine:	Track Mount			Reviewed by: SM/DP
Pro	ject Location:	Brampton, Ontario							Date 9	Started:	Jan 24, 2020	Date Completed: Jar	24, 2020	Revision No.: <u>0, 1/5/21</u>
	LITH	OLOGY PROFILE		SO	IL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading		
Lithology Plot		DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	tionTesting  PPT	A COV (ELL)	NSTRUMENTATION NSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
5	Geodetic Ground S	bout 200 mm TOPSOIL	220.6	ιχ	ιχ	Ř	ß		<u>                                     </u>	20 40	60 80	20 40 60 80	ZZ	GR SA SI CL
		grey / dark brown / brown Silty Clay FILL ce gravel, trace organics (reworked soil)	0.2	SS	1	100	12	- - - - -	220 —	0		s 0 14		
				SS	2	100	9	- 1 - - -	-	0	E	o 22		
			218.6	SS	3	100	9	- - - - - 2	219 -	0		39		
	SILTY	brown  CLAY / CLAYEY SILT TILL race sand, trace gravel stiff to hard	2.2	SS	4	100	13	+		0	E	3 O <sub>17</sub>		
				ss	5	100	27	- 3 - - - - - - -	-	•		16		
		grey		SS	6	100	22	- - - 4 - - -	217 —	0	B	<sup>3</sup> O <sub>17</sub>		
		END OF BOREHOLE	215.8 5.0	SS	7	22	30	- - - - - 5	216 -	0		<sup>3</sup> °20		

Groundwater encountered on completion of drilling on 1/24/2020 at a depth of: 2.7 m. Cave in depth after removal of augers: 4.3 m.

R	ECORD	OF BOREHO	LE N	0.	ВН	B22	ı											W	000	Ĺ
Pro	ject Number:	TP115086							Drilling	Location:	Ar	terial A2, S	Sta. 2+100	) (Cou	ıntryside D	r.)	L	ogged by:	MS	_
Pro	ject Client:	City of Brampton							Drilling	g Method:	1	604484 N: 50 mm Sol	id Stem A	Auger	s		c	compiled by	: <u>PR</u>	_
Pro	ject Name:	Arterial Road Network	within H	lighwa	y 427 I	ndustr	ial		Drilling	g Machine:	Tr	uck Mount	ed Drill				F	Reviewed by	: SM/DP	
Pro	ject Location:	Secondary Plan Area ( Brampton, Ontario	Area 41)						Date 9	Started:	<u>Ja</u>	n 23, 2020	Date	Com	pleted: <u>Jar</u>	n 23, 202	<u>0</u> F	Revision No.	<u>0, 1/5/21</u>	
	LITH	OLOGY PROFILE		SO	IL SA	MPLI	NG			FIELD	TE	STING			TING					
							(%)			Penetra		-	▲ COV (LI		TOV (LEL)	NOIL		COMME &	NTS	
ot		DESCRIPTION		e C	Sample Number	(%	SPT 'N' / RQD (%)		Ē Z	O SPT   MTO Vane*		DCPT  Icon Vane*	△ COV (pr	pm) 🗆	6 8 TOV (ppm) 600 400	INSTRUMENTATION INSTALLATION		GRAIN S		
ogy P				Sample Type	le Nu	Recovery (%)	Z Z	DEРТН (m)	ATIO	△ Intact ▲ Remould	$\Diamond$	Intact Remould	W <sub>P</sub>		W <sub>L</sub>	RUME ALLA:		DISTRIBU (%)	TION	
Lithology Plot	Geodetic Ground S	urface Elevation: 220.5 m		Samp	Samp	Reco	SPT	DEP1	ELEVATION	* Undrained She 20 40	ear S	trength (kPa) 0 80	Plastic 20	40 6	Liquid 50 80	INST	GR	SA	SI CI	L
~~~	ak	out 200 mm ASPHALT	220.3					-						1			22	F0	(0)	
$\bowtie$	;	Sand and Gravel FILL moist	0.2					Ė	220 -								33	58	(9)	
$\overset{\sim}{\bowtie}$		brown/dark grey	219.9 0.6	SS	1	75	9	-	-	0			<b>.</b>							
$\bowtie$		Silty Clay FILL trace gravel						- - - 1	-			: <u>:</u>		ļ						
$\bowtie$				SS	2	100	18	<u> </u>	-	0			; ;							
$\bowtie$			219.0						219 -											
		END OF BOREHOLE	1.5																	
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 $\frac{\textstyle \sum}{\textstyle -}$  No freestanding groundwater measured in open borehole on completion of drilling.

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RECORD	OF BOREHOLE No	). <u>I</u>	BH I	<u> 323</u>								W	ood.
Project Number:	TP115086						Drilling	Location:	Arterial A2, Sta	a. 2+200 E:604392 N:48	53436	_ Logged by:	AS
Project Client:	City of Brampton						Drilling	Method:	Solid Stem Au	igers		_ Compiled by:	KC/ZF
Project Name:	Arterial Road Network within Hi Plan Area (Area 47)	ghway	/ 427 In	dustria	al Secor	ndary	Drilling	Machine:	MST Bomb			_ Reviewed by:	SM/DP
Project Location:	Proposed East-West Arterial Ro	ad, Bra	ampto	1			Date S	tarted:	Jan 26, 2022	Date Completed:	1 26, 2022	_ Revision No.:	0, 3/10/22
LITH	HOLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading	7		
Lithology Plot Geodetic Ground	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	○ SPT □ MTO Vane* △ Intact ▲ Remould	PPT	\[ \begin{array}{c c c c c c c c c c c c c c c c c c c	INSTRUMENTATION INSTALLATION	COMMEN & GRAIN SI DISTRIBUT (%) GR SA	ZE
	brown Silty Clay FILL nd, trace gravel, trace organics, oxidation	SS	1	100	36	-	221 -	O.	43	°22			
		SS	2	38	18	- 1  - - -	220 -	0	F83	<sup>0</sup> 20			
	218.8	ss	3	100	22	- - - - 2 -	219 -	O · · · ·	<b>69</b>	020			
trace to s	brown 2.3 SILTY CLAY TILL ome sand, trace to some gravel, oxidation hard 218.0	ss	4	100	31	- - - - - - - 3	-			014			

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PROJECT INTERNAL PETISONS DIRECTORY WITHIN Highway 427 Industrial Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondary Office Secondar	RE	CORD	OF BOREHOLE No	<u> 324</u>									W	00	d.		
Project Name: Project Name: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Project Location: Pr	Proje	ect Number:	TP115086					Drilling	g Location:	Arterial A2, Sta	a. 2+300	E:604321 N:48	53507	* *			
Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Project Location:   Proj	Proje	ect Client:							Drilling	g Method:	Solid Stem Au	ugers			Compiled by	KC/ZF	<u> </u>
COMMENTS   Soil Vapour Reading   COMMENTS   Soil Vapour Reading   COMMENTS	Proje	ect Name:	Arterial Road Network within H	ighway	/ 427 ln	ndustria	al Seco	ondary	Drilling	g Machine:	MST Bomb				Reviewed by	SM/DI	<u>P</u>
DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION   DESCRIPTION	Proje	ect Location:	Proposed East-West Arterial Ro	ad, Bra	ampto	n			Date S	Started:	Jan 26, 2022	Date (	Completed: <u>Jar</u>	26, 2022	Revision No.	<u>0, 3/10</u>	0/22
PenetrationTesting   Section   Toy (new   Normal   Norm		LITH	IOLOGY PROFILE	SC	OIL SA	MPLI	NG			FIELD	TESTING						
Caravelly Sand FILL   Trace clay, organics   Trace cobbles   SS   1   100   100							(%			1	-	COV (LE	L) TOV (LEL)	NOIT		NTS	
Caravelly Sand FILL   Trace clay, organics   Trace cobbles   SS   1   100   100	olot		DESCRIPTION	be	mper	(%)	go (°	2	E)		1/	2 COV (pp	m)   TOV (ppm)	ATUDIT	GRAIN		
Caravelly Sand FILL   Trace clay, organics   Trace cobbles   SS   1   100   100	logy F			ple T)	ple N	very	, 'A'	<u>5</u>	VATIC	△ Intact ▲ Remould	♦ Intact Remould			ALLA			
Caravelly Sand FILL   Trace clay, organics   Drown   Drown   Silty Clay FILL   Some sand, trace gravel, trace organics, oxidation   SS   2   54   19   1   221	Litho	Seodetic Ground	Surface Elevation: 221.9 m	Sam	Sam	Reco	SPT	DEP	ELE				Liquid 0 60 80	INST	GR SA	SI	CL
Moist   221.3			dark brown Gravelly Sand FILL	SS	1	100	100	-				) 					
Sity Clay FILL some sand, trace gravel, trace organics, oxidation  SS 2 54 19 1 221 0 30  trace cobbles  SS 3 83 15 2 220 0 18	₩		moist					ŧ				. 0					
some sand, trace gravel, trace organics, oxidation  SS 2 54 19 - 1 221 - 0 15  SS 3 83 15 - 2 220 - 0 18			brown 0.6					ŧ	:								
trace cobbles  SS 3 83 15 - 2 220 - 10 18	₩	some sar	nd, trace gravel, trace organics,	SS	2	54	19	- - 1	221 -			<sup>0</sup> 15					
219.8								-				30					
219.8								ŧ									
219.8	₩		trace cobbles	SS	3	83	15	Ė	220 -		<b>.</b>	O <sub>18</sub>					
	▓		219.8					— 2 -	220 -								
			END OF BOREHOLE 2.1														
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Mond ESIS a Division of Wood			r														

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 $\frac{\square}{2}$  No freestanding groundwater measured in open borehole on completion of drilling.

#### Project Number: TP115086 Drilling Location: Arterial A2, Sta. 2+400 E:604250 N:4853574 Logged by: Project Client: Drilling Method: Solid Stem Augers City of Brampton Compiled by: KC/ZF Arterial Road Network within Highway 427 Industrial Secondary Drilling Machine: Plan Area (Area 47) Proposed East-West Arterial Road, Brampton Date Started: Project Name: MST Bomb SM/DP Reviewed by: Project Location: Jan 26, 2022 Date Completed: Jan 26, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING LAB TESTING** INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting COV (LEL) TOV (LEL) Ê O SPT ☐ PPT ● DCPT Sample Number **GRAIN SIZE** TOV (ppm) 'N' / RQD COV (ppm) Plot **DESCRIPTION** Recovery (%) MTO Vane\* Nilcon Vane △ Intact ◇ Intact ▲ Remould ◆ Remould ELEVATION 100 200 300 400 DISTRIBUTION DEPTH (m) ithology I W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic SA CL Surface Elevation: 222.5 r 40 60 20 Silty Clay FILL some sand, trace gravel, trace organics, 022 92 15 oxidation 222 brown SILTY CLAY/CLAYEY SILT TILL some sand, trace to some gravel, trace cobbles, trace organics, oxidation very stiff to hard SS 2 100 16 0 221 100 o 17 26 2 220 °16 SS 100 38 0 SS 5 100 36 °16 219 19 35 SS 6 100 19 Ó 10 49 40 218 SS 018 75 16 0 5 217. END OF BOREHOLE Wood E&IS, a Division of Wood $\stackrel{ extstyle op}{=}$ No freestanding groundwater measured in open borehole on completion of drilling.

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RECORD OF BOREHOLE No. BH B25

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RI	ECORD	OF BOREHOLE No	). <u>I</u>	<u>BH I</u>	<u> 326</u>									W	00	d.
Proj	ject Number:	TP115086						Drilling	Location:	Arterial A2, S	sta. 2+500 E:604179 N:48	53643	Lo	gged by:	<u>AS</u>	
Project Client: City of Brampton								Drilling	Method:	Solid Stem A	Augers		Co	mpiled by:	KC/ZF	<u> </u>
Proj	ject Name:	Arterial Road Network within Hi	ghway	y 427 Ir	ndustria	al Seco	ndary	Drilling	Machine:	MST Bomb			Re	eviewed by:	SM/D	Р
Proj	ject Location:	Plan Area (Area 47) Proposed East-West Arterial Ro	ad, Br	ampto	n			Date S	tarted:	Jan 26, 2022	Date Completed: Ja	n 26, 2022	2 Re	evision No.:	0, 3/10	0/22
	LITH	OLOGY PROFILE	SC	OIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING Soil Vapour Reading	7		0011151	ITO.	
				  -		(%)		Ê	ı	tionTesting PPT • DCPT	▲ COV (LEL) ■ TOV (LEL) 2 4 6 8	INSTRUMENTATION INSTALLATION		COMMEN &		
Plot		DESCRIPTION	lype	Sample Number	(%) /	SPT 'N' / RQD (%)	Ê	ELEVATION (m)	MTO Vane* △ Intact		△ COV (ppm) □ TOV (ppm) 100 200 300 400	ATIOI		GRAIN SI DISTRIBUT		
Lithology Plot			Sample Type	nple !	Recovery (%)	, Z	DEPTH (m)	EVAT	▲ Remould	Remould  ear Strength (kPa)	$W_P$ $W$ $W_L$ Plastic Liquid	STALL		(%)		
₹ 🗮	Geodetic Ground S	Surface Elevation: 222.9 m brown	Sar	Sar	Re .	S	<u> </u>	<u> </u>	20 40	60 80	20 40 60 80	22	GR	SA	SI	CL
▓	some san	Silty Clay FILL d, trace gravel, trace organics,	SS	1	100	17	-	-	0		15					
▩		oxidation					E									
▩							F .	222 -								
$\bowtie$			SS	2	100	13	<u>-</u> 1 - -	-	0		30 30					
$\frac{8}{2}$		<u>221.5</u> brown 1.4					-	-								
	SILTY some s	CLAY / CLAYEY SILT TILL and, trace gravel, oxidation	SS	3	100	28	-	-			10					
		very stiff 220.8					- 2	221 -			15					
		END OF BOREHOLE 2.1														
Woo.	od F&IS. a Divisio	on of Wood 🗸 🗸 .					<u> </u>		<u> </u>							

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#### Project Number: TP115086 Drilling Location: Arterial A2, Sta. 2+600 E:604107 N:4853714 Logged by: Project Client: Drilling Method: Solid Stem Augers KC/ZF City of Brampton Compiled by: Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47) Proposed East-West Arterial Road, Brampton Date Started: Project Name: MST Bomb SM/DP Reviewed by: Project Location: Jan 26, 2022 Date Completed: Jan 26, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING** LAB TESTING INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) Ê ○ SPT □ PPT ● DCPT Sample Number **GRAIN SIZE** TOV (ppm) 'N' / RQD COV (ppm) Plot **DESCRIPTION** Recovery (%) DEPTH (m) ELEVATION DISTRIBUTION 100 200 300 400 ithology F W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic SA CL 40 60 20 brown Silty Clay FILL some sand, trace gravel, trace organics, oxidation °31 SS 71 9 223 °26 SS 2 100 15 0 222 brown SILTY CLAY / CLAYEY SILT TILL 18 31 some sand, trace gravel, oxidation hard 100 28 52 53 2 221 017 SS 100 73 0 220.3 3.0 END OF BOREHOLE Wood E&IS, a Division of Wood

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RECORD OF BOREHOLE No. BH B27

 $\stackrel{ extstyle op}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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RE	ECORD	OF BOREHOLE No	o. <u>l</u>	<u>BH I</u>	<u> 328</u>										W	00	d.
Proj	ect Number:	TP115086					Drilling	g Location:	Arterial A2, S	Sta. 2+700 E	::604034 N:48	53786	Lo	gged by:	AS	_	
Proj	ect Client:	City of Brampton						Drilling	g Method:	Solid Stem A	Augers			C	ompiled by:	KC/ZF	=
Proj	ect Name:	Arterial Road Network within H	ighway	y 427 Ir	ndustria	al Seco	ndary	Drilling	y Machine:	MST Bomb				R	eviewed by:	SM/D	Р
Proj	ect Location:	Plan Area (Area 47) Proposed East-West Arterial Ro	ad, Br	ampto	n			Date S	started:	Jan 26, 2022	Date Co	ompleted: <u>Jar</u>	n 26, 202	2 R	evision No.:	0, 3/10	0/22
	LITH	OLOGY PROFILE	SC	OIL SA	MPLI	NG			FIELD	TESTING		ESTING	_				
				_		(%)		<u> </u>		tionTesting PPT • DCPT	▲ COV (LEL)	our Reading TOV (LEL) 6 8	INSTRUMENTATION INSTALLATION		COMMEN &	ITS	
Blot		DESCRIPTION	ype	Sample Number	(%)	SPT 'N' / RQD (%)	Ê	ELEVATION (m)	MTO Vane*		△ COV (ppm)	□ TOV (ppm)	MENT/ ATION		GRAIN S		
Lithology Plot			Sample Type	nple N	Recovery (%)	ż	DEРТН (m)	VATI	▲ Remould	◆ Remould	VV <sub>P</sub>	W W <sub>L</sub>	TRUN		(%)		
£ .		Surface Elevation: 223.4 m dark brown and black	San	San	Red	SP	DE		* Undrained She 20 40	ear Strength (kPa) 60 80	Plastic 20 40	Liquid 60 80	SN INS	GR	SA	SI	CL
▩		Silty Clay FILL ome sand, trace gravel	SS	1	83	22	-	223 -			28						
▩		222.7							<b>.</b>		20						
	SILTY	brown 0.7  CLAY / CLAYEY SILT TILL					-										
	some sar	nd, trace gravel, trace organics, oxidation very stiff	SS	2	100	23	— 1 -		0	ı	o 15						
		very sun					E	222 -	1								
					400	0.7	E										
		221.2	SS	3	100	27	_ _ 2		0		16						
<u> </u>		END OF BOREHOLE 2.1															
	d ESIS a Divisi								<u> </u>	* *	: :	1 1					

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 $\frac{\square}{2}$  No freestanding groundwater measured in open borehole on completion of drilling.

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Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Comparison   Com	R	ECORD	OF BORE	HOLE N	<b>o.</b>	BH :	<u>S3</u>									V	VOC	bd
Proport   Case   Proport   Proport   Case   Proport   C	Pro	ject Number:	TP115086							Drilling	g Location:	Arterial A2	at Hwy 50	E:606278 N:48	52633	Logged b	y: <u>MS</u>	/ RM
Secondary Plant Array (Area 47)   Delay Sterior   Delay Ster	Pro	ject Client:	City of Brampton	1						Drilling	g Method:	150 mm S	olid Stem A	Augers		Compiled	by: PR	
Date   Surface   Date	Pro	ject Name:				y 427 I	ndustr	ial		Drilling	g Machine:	Track Mour	nted Drill			Reviewed	by: SN	/DP
DESCRIPTION	Pro	ject Location:								Date S	Started:	Jan 10, 020	2Date	Completed: Jai	n 10, 0202	Revision	No.: <u>0, 3</u>	3/31/21
DESCRIPTION    S		LITH	OLOGY PROFIL	.E	SC	IL SA	MPLI	NG			FIELD	TESTING						
Such and expert protein  Sund and General PLL  200  Sulfy Clay (Clays) gift and such as some graved install  SS 2 75 16 1  Dute to be some such or benefit and in some graved install  SS 2 75 16 1  CO								(9)					▲ COV (LE	EL) TOV (LEL)	NOI		_	
Such and expert protein  Sund and General PLL  200  Sulfy Clay (Clays) gift and such as some graved install  SS 2 75 16 1  Dute to be some such or benefit and in some graved install  SS 2 75 16 1  CO	ot		DESCRIPTION		96	mber	(%	%) gb					△ COV (pp	om)   TOV (ppm)	ATOI	GRAI	N SIZE	.
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Vood E&IS, a Division of Wood anada Limited  © Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 anada  el. No.: (905) 415-2632  © SS 10 100 150 150 1 150 mm									Ė	202 -								
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Richmond Hill, Ontario, L4B 3K6  Canada el. No.: (905) 415-2632 el. No.: (905) 425-2632 Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Explanation of Borehole Log:	Can	ada Limited		≚ Groundw	ater en	countere	ed on co	mpletio	n of drill	ling on :	<u>1/10/202</u> at a d	depth of: 7.0 m	•					
rel. No.: (905) 415-2632 a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissing/Explanation in Sperable Log:	Rich	mond Hill, Ontar	s 3 & 4 io, L4B 3K6	Borehole details	as prese	nted. do	not cons	titute a th	orough :	understa	nding of all note	ntial conditions of	resent and regi	uire interpretative ass	istance from			
	Tel.	No.: (905) 415-2	632	Engineer.	Also, bo	rehole inf	formatio	n should	be read in conju	ınction with the ge	eotechnical rep	ort for which it was						

	ECORD  ject Number:	OF BOREHOLE No.	Ο.	<u>BH</u>	<u>S4</u>			Drilling	Location:	Arterial A2 at	Hwy 50 E:606254 N:48	352631	Logged by:	od.
	ject Client:	City of Brampton						_	Method:		d Stem Augers			PR
⊃rc	ject Name:	Arterial Road Network within H	lighwa	ay 427	Industr	ial		Drilling	Machine:	Track Mounte	d Drill		Reviewed by:	SM/DP
		Secondary Plan Area (Area 47) Brampton, Ontario							Started:	Jan 10, 0202	Date Completed: <u>Ja</u>	n 10, 0202	Revision No.:	0, 3/31/21
	LITH	OLOGY PROFILE	SC	DIL SA	MPLI	NG			FIELD	TESTING	LAB TESTING			
Lithology Plot	Geodetic Ground S	DESCRIPTION  urface Elevation: 210.6 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DЕРТН (m)	ELEVATION (m)	O SPT □  MTO Vane*  △ Intact  ▲ Remould	PPT ● DCPT  Nilcon Vane*  ◇ Intact ◆ Remould  ear Strength (kPa)	Soil Vapour Reading	NSTRUMENTATION INSTALLATION	COMMENT & GRAIN SIZ DISTRIBUTI (%)	ZE
		brown Sand and Gravel FILL moist	ss	1	42	45	-	210 -		)	°7			
	Sili trace to som	dark brown / black 0.9 y Clay / Clayey Silt FILL e sand, trace to some gravel, trace organics	SS	2	83	11	- - - 1 - - -	-	0	as .	°22			
			ss	3	75	9	- - - - - 2	209 -	0	63	°29			
			SS	4	100	9	- - - - - - -	208 -	0	83	<sup>0</sup> 25			
		206.8	SS	5	67	11	3 - - - - -	207 —	0	20	o <sub>29</sub>			
	some	brown 3.7  SILTY CLAY TILL sand to sandy, trace gravel, cobbles/boulders stiff to hard	ss	6	100	59	- - - 4 - -	-		O 8	o <sub>11</sub>			
			SS	7	100	101	- - - - - 5	206 -		101	09			
		grey					- - - - -	205 -						
			SS	8	100	46	- 6 - - - - -	204 -		) <b>B</b>	010			
							- - - 7 - -	- - - -						
			SS	9	100	45	- \ - \ - 8	203 -		) <b>"</b>	014			
							- - - -	202 -						
//	SANE trace clay	Y SILT / SILTY SAND TILL trace gravel, cobbles/boulders very dense wet	SS	10	100	55	9	-		0 4	o <sub>16</sub>			
1		200.8 9.8					-	201 —			10 : : :	eletele eletere		
	d E&IS, a Divis ada Limited	on of Wood $\begin{tabular}{ll} $\underline{\underline{\nabla}}$ & Groundw \end{tabular}$	vater en	counter	ed on co	mpletic	on of drilli	ing on <u>'</u>	I <u>/10/202</u> at a c	lepth of: <u>7.6 m</u> .		1 1		

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# RECORD OF BOREHOLE No. BH S4



Project Number: TP115086 Project Name: Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47)

Project Location: Brampton, Ontario

1 10	ect Location. <b>brampton, Ontario</b>							T	T			•		
_	LITHOLOGY PROFILE	SC	IL SA	MPLI	NG			FIELD TESTING	LAB TESTING Soil Vapour Reading	z		СОММ	ENTO	
			L.		(%)		F F	PenetrationTesting  ○ SPT □ PPT ● DCPT	▲ COV (LEL) ■ TOV (LEL)	INSTRUMENTATION INSTALLATION		&		
jo l	DESCRIPTION	e d	Sample Number	(%)	SPT 'N' / RQD (%)	<del>ر</del>	ELEVATION (m)		△ COV (ppm) □ TOV (ppm) 100 200 300 400	ENT		GRAIN DISTRIB	SIZE	
agy F		le Ty	le N	/ery (	N'/ R	ᄩ	ATIC	MTO Vane* Nilcon Vane*  △ Intact ◇ Intact  ▲ Remould ◆ Remould	W <sub>P</sub> W W <sub>L</sub>	RUM!		13 I KIB (%)	) )	
Lithology Plot		Sample Type	Samp	Recovery (%)	PT '	ОЕРТН (m)	Ë	* Undrained Shear Strength (kPa) 20 40 60 80	Plastic Liquid 20 40 60 80	NST NST/	GR	SA	SI	CL
	END OF BOREHOLE	0,	0)	ш.	0)			20 40 00 00	20 40 00 00					
	50 mm dia. monitoring well with flushmount protective casing installed (depth below ground													
	surface):													
	Sand: 0.0 - 0.6 m													
	Bentonite: 0.6 - 5.8 m Sand Filter: 5.5 - 9.1 m													
	Screen: 6.1 - 9.1 m													
		l												

RI	ECORD	OF BOREHOLE N	lo.	<u>BH</u>	<u>S6</u>									W	ood.
Proj	ject Number:	TP115086						Drilling	g Location:	Arterial A2, S	Sta. 0+600	E:605620 N:4	1852529	_ Logged by:	MS
Proj	ject Client:	City of Brampton						_ Drilling	g Method:	150 mm Sol	lid Stem A	ugers		_ Compiled by:	PR
Proj	ject Name:	Arterial Road Network within Secondary Plan Area (Area 47)		ay 427	Indust	rial		_ Drillino	g Machine:	Track Mount	ted Drill			_ Reviewed by:	SM/DP
Proj	ect Location:	Brampton, Ontario						_ Date \$	Started:	Feb 26, 2020	Date	Completed: Fe	eb 26, 2020	_ Revision No.:	0, 1/5/21
	LITH	OLOGY PROFILE	sc	DIL SA	MPLI	NG			FIELD	TESTING		TESTING			
Lithology Plot		DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	DEPTH (m)	ELEVATION (m)	1	tionTesting  PPT	▲ COV (LE 2	apour Reading EL) TOV (LEL) 4 6 8 m) TOV (ppm) 00 300 400 W WL	INSTRUMENTATION	COMMEN & GRAIN SI DISTRIBUT (%)	ZE
Litho	Geodetic Ground S	urface Elevation: 209.0 m		Sam	Reco	SPT	DEP.	ELE	* Undrained Sh 20 40	ear Strength (kPa) 60 80	Plastic 20 4	Liquid 10 60 80	INST	GR SA	SI CL
	Silt	out 100 mm TOPSOIL 208.9 dark brown 0.1 y Clay / Clayey Silt FILL ace to some gravel, trace organics 208.3	SS	1	100	4	- - - -		0		1	°47			
		brown to grey 0.7 CLAY / CLAYEY SILT TILL to some sand, trace gravel, cobbles/boulders firm to hard	ss	2	100	5	- - - 1 - - -	208 -	0		s °28				
			SS	3	100	10	- - - - - - 2	207 —	0	6	0 19				
			SS	4	100	35	- - - - -		0	ē	o 15				
		grey	SS	5	100	57	- 3 - - - - -	206 -		O	15				
			SS	6	100	62	- - - - - - - -	205 -		O E	3 °9				
			SS	7	100	108	- - - - - - 5	204 -		108	0 12				
							- ·	∑ = = 203 -							
			SS	8	100	69 / 150mm	- I	200		69 150 mm	16				
							- - 7 - - - -	202 -							
			ss	9	100	83	- - - - 8 - - -	201 –		O @	20				
			ss	10	100	43	- - - - - - - - - - - - - - - - - - -	200 -		)	23				
		199.3 END OF BOREHOLE 9.8					-								
\A/-											:				
50 V Rich Cana Tel. I	d E&IS, a Divising a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limited a Limit	s 3 & 4 io, L4B 3K6	s as prese	ented, do Engineer.	not cons	titute a th	orough	understa	nding of all pote	depth of: 5.5 m.  ntial conditions prenction with the geo	esent and requ	e in depth after re			Scale: 1 : 53

RI	ECORD	OF BOREHOL	E No	). <u>I</u>	<u> 3H E</u>	<u>=1</u>								W	ood.
Project Number: Project Client: Project Name: Project Location:		TP115086								Location:	E-W Arterial R	Road, Sta. 0+000 E:60458	* * * *	MS	
		City of Brampton  Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47) Brampton, Ontario							Drilling Method: Drilling Machine:		150 mm Solid	d Stem Augers	_ Compiled by:	ZF/KC	
											Truck Mounte	d Drill		_ Reviewed by:	SM/DP
									Date S	tarted:	Jan 11, 2022	Date Completed:	n 11, 2022	_ Revision No.:	0, 3/10/22
LITH		OLOGY PROFILE		SOIL SAMPLING					LION (m) O SF	FIELD	D TESTING LAB TESTING Soil Vapour Reading		7		
Lithology Plot	DESCRIPTION			Sample Type Sample Number Recovery (%) SPT 'N / RQD (%)		(m)	O SPT ☐ PPT ● DCPT ☐ DT ☐ DT ☐ DT ☐ DT ☐ DT ☐ DT ☐ DT ☐			△ COV (LEL) ■ TOV (LEL) 2 4 6 8 △ COV (ppm) □ TOV (ppm) 100 200 300 400	INSTALLATION	COMMEN & GRAIN SI DISTRIBUT	& AIN SIZE RIBUTION		
tholog				ample	ample	ecove	'n. Ld	DEPTH (m)	LEVA		◆ Remould near Strength (kPa)	Plastic Liquid	ISTRU	<b>(%)</b> GR SA	SI CI
<u></u>		Surface Elevation: 203.0 m bout 100 mm TOPSOIL	202.9 0.1	Ø	ιö	œ	<u>w</u>	-	<u> </u>	20 40	60 80	20 40 60 80	22	GR SA	SI CL
	trac	brown Silty Clay FILL ce gravel, trace organics	202.4	SS	1	42	10	_ _ _	-	0	<b>a</b>	022			
	SILTY	brown  / CLAY / CLAYEY SILT TILL  trace gravel, oxidation firm to stiff	0.7	SS	2	46	10	- - - 1	202 -	0	49	<sup>o</sup> 25			
	grey		-	ss	3	75	7	-	-	0		0 24			
		END OF BOREHOLE	200.9					— 2 -	201 —						
								<u> </u>		] ; ;		1 1 1			
Woo	d E&IS, a Divisi	ion of Wood									oletion of drilling				

Canada Limited

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#### Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 0+100 E:604641 N:4850507 Logged by: Project Client: Drilling Method: 150 mm Solid Stem Augers ZF/KC City of Brampton Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: Track Mounted Drill SM/DP Reviewed by: Project Location: Brampton, Ontario Date Started: Jan 11, 2022 Date Completed: Jan 11, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING** LAB TESTING NSTRUMENTATION NSTALLATION **COMMENTS** PenetrationTesting COV (LEL) TOV (LEL) Ê O SPT ☐ PPT ● DCPT Sample Number **GRAIN SIZE** 'N' / RQD COV (ppm) TOV (ppm) Plot **DESCRIPTION** Recovery (%) MTO Vane\* Nilcon Vane △ Intact ◇ Intact ▲ Remould ◆ Remould DISTRIBUTION 100 200 300 400 DEPTH (m) ithology ' W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic SA CL about 76 mm TOPSOIL 40 60 20 204.5 dark brown SS 38 °28 Silty Clay FILL trace gravel, trace cobbles, trace organics/rootlets 203.9 204 SILTY CLAY TILL trace sand, trace gravel, oxidation very stiff to hard 014 SS 2 100 15 0 brownish grey 203 50 26 14 2 SS 100 44 202 0 grey SS 5 83 32 201 °13 SS 6 71 26 0 200 4 SS 7 79 29 0 about 100 mm of sandy seam with gravel 5 o 17 199.4 END OF BOREHOLE

Wood E&IS, a Division of Wood Canada Limited

RECORD OF BOREHOLE No. BH E2

 $\stackrel{ extstyle op}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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# Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 0+200 E:604703 N:4850585 Logged by: Project Client: Drilling Method: 150 mm Solid Stem Augers ZF/KC City of Brampton Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: SM/DP Track Mounted Drill Reviewed by: Project Location: Brampton, Ontario Date Started: Jan 11, 2022 Date Completed: Jan 11, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING** LAB TESTING INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) Ê ○ SPT □ PPT ● DCPT Sample Number **GRAIN SIZE** 'N' / RQD TOV (ppm) COV (ppm) Plot **DESCRIPTION** Recovery (%) DEPTH (m) DISTRIBUTION 100 200 300 400 -ithology W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic SA CL about 76 mm TOPSOIL 40 60 20 dark brown °28 SS 42 Silty Clay FILL some sand, trace gravel, trace organics brown / brownish grey SILTY CLAY TILL some sand to sandy, trace gravel, oxidation stiff to very stiff 205 °17 SS 2 100 14 0 18 **29** 100 Ö 50 204 2 203.7 END OF BOREHOLE Wood E&IS, a Division of Wood $\stackrel{ extstyle op}{=}$ No freestanding groundwater measured in open borehole on completion of drilling. Canada Limited

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified Geotechnical Engineer or Professional Geoscientist. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Explanation of Borehole Log'.

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RECORD OF BOREHOLE No. BH E3

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### Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 0+300 E:604766 N:4850663 Logged by: Project Client: Drilling Method: 150 mm Solid Stem Augers City of Brampton ZF/KC Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: SM/DP Track Mounted Drill Reviewed by: Project Location: Brampton, Ontario Date Started: Jan 11, 2022 Date Completed: Jan 11, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING** LAB TESTING INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) ○ SPT □ PPT ● DCPT Sample Number **GRAIN SIZE** 'N' / RQD TOV (ppm) COV (ppm) Plot **DESCRIPTION** Recovery (%) DEPTH (m) ELEVATION DISTRIBUTION 100 200 300 400 ithology, W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic SA CL about 76 mm TOPSOIL 40 60 20 205.0 205 dark brown o<sub>26</sub> SS 79 Silty Clay FILL trace sand, trace gravel, trace organics SILTY CLAY TILL trace to some sand, trace gravel, oxidation stiff to hard °15 SS 2 100 12 204 0 100 21 0 2 203 trace cobbles SS 33 49 0 END OF BOREHOLE Wood E&IS, a Division of Wood

Canada Limited

RECORD OF BOREHOLE No. BH E4

 $\stackrel{ extstyle op}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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# Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 0+400 E:604828 N:4850742 Logged by: Project Client: Drilling Method: 150 mm Solid Stem Augers City of Brampton ZF/KC Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: Track Mounted Drill Reviewed by: SM/DP Project Location: Brampton, Ontario Date Started: Jan 11, 2022 Date Completed: Jan 11, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING** LAB TESTING INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) Ê ○ SPT □ PPT ● DCPT Sample Number **GRAIN SIZE** 'N' / RQD TOV (ppm) COV (ppm) Plot **DESCRIPTION** Recovery (%) DEPTH (m) ELEVATION DISTRIBUTION 100 200 300 400 ithology ' W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic 60 SA CL about 100 mm TOPSOIL 40 60 20 dark brown / brown 203 SS 83 0 Silty Clay FILL some sand, trace gravel, trace organics brown SANDY SILT TILL trace clay, trace gravel, oxidation clay seams in SS2 loose to compact SS 2 100 6 °21 202 moist 100 29 0 17 2 201.1 END OF BOREHOLE Wood E&IS, a Division of Wood

Canada Limited

RECORD OF BOREHOLE No. BH E5

 $\stackrel{ extstyle op}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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#### RECORD OF MONITORING WELL No. BH S17 Project Number: TP115086 Drilling Location: E-W Arterial Road, Culvert E:604874 N:4850797 Logged by: Project Client: Drilling Method: ZF/KC City of Brampton 150 mm Solid Stem Augers Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: Track Mounted Drill Reviewed by: SM/DP Project Location: Brampton, Ontario Date Started: Jan 12, 2022 Date Completed: Jan 12, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE SOIL SAMPLING **FIELD TESTING LAB TESTING** NSTRUMENTATION NSTALLATION **COMMENTS** PenetrationTesting COV (LEL) TOV (LEL) O SPT ☐ PPT ● DCP1 Sample Number **GRAIN SIZE** 'N' / RQD COV (ppm) TOV (ppm) **DESCRIPTION** Recovery (%) 100 200 300 400 DISTRIBUTION DEPTH (m) ithology, W. W W (%) Liquid \* Undrained Shear Strength (kPa) Plastic SA CL 60 d Surface Elevation: 202.6 m about 100 mm TOPSOIL 40 60 20 dark brown / brown o 17 SS 100 9 Sandy Silt FILL trace clay, trace gravel, trace cobbles, trace organics moist 2019 202 brown SILTY SAND / SANDY SILT TILL trace clay, trace gravel, trace cobbles, oxidation in SS2 and SS3 SS 2 100 68 0 very dense 201 100 88 0 2 SS 100 50+ grey 200 100 50+ 199 100 50+ 0 ∑ = 198 °9 50+ SS 100 0 5 197.1 grey WEATHERED SHALE 197 SS 8 100 72 0 mixed with clayey soil 196 SS 9 100 60+ END OF BOREHOLE 50 mm dia. monitoring well with 1.0 m stick-up protective casing installed (depth below ground surface): Bentonite: 0.0 - 3.5 m Sand Filter: 3.5 - 6.9 m Screen: 3.8 - 6.9 m Wood E&IS, a Division of Wood $\overline{\underline{\sl}}$ Groundwater level was inferred from soil conditions during drilling Canada Limited

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#### RECORD OF BOREHOLE No. BH E6 / S18 Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 0+500 E:604885 N:4850810 Logged by: Project Client: Drilling Method: ZF/KC City of Brampton 150 mm Solid Stem Augers Compiled by: Arterial Road Network within Highway 427 Industrial Secondary Drilling Machine: Plan Area (Area 47) Project Name: Track Mounted Drill Reviewed by: SM/DP Project Location: Brampton, Ontario Date Started: Jan 12, 2022 Date Completed: Jan 12, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE SOIL SAMPLING **FIELD TESTING LAB TESTING** NSTRUMENTATION NSTALLATION **COMMENTS** PenetrationTesting COV (LEL) TOV (LEL) O SPT ☐ PPT ● DCP1 Sample Number **GRAIN SIZE** 'N' / RQD COV (ppm) TOV (ppm) Plot **DESCRIPTION** Recovery (%) Sample Type 100 200 300 400 DISTRIBUTION DEPTH (m) ithology I W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic SA CL Surface Elevation: 204.8 m about 76 mm TOPSOIL 40 60 20 dark brown / brown SS 100 6 °29 Silty Clay FILL trace gravel, trace cobbles, trace organics brown 204 SILTY CLAY TILL trace gravel, trace cobbles, oxidation 012 SS 2 100 30 0 hard 203 100 36 14 2 brown SILTY SAND / SANDY SILT TILL trace clay, trace gravel, case cobbles, oxidation SS 4 100 50+ 0 in SS5 very dense 202 moist 8 SS 5 100 50+ 0 201 grey and wet <sup>0</sup>13 SS 6 100 84+ 0 010 100 50+ O SS 200 5 199 100 50+ SS 8 198 0 SS 9 100 50+ 0 34 59 197 196.3 grey Weathered SHALE 196 0 SS 10 100 50+ 195.4 END OF BOREHOLE 9.3 Wood E&IS, a Division of Wood $\stackrel{\textstyle abla}{=}$ Groundwater level was inferred from soil conditions during drilling ■ Cave in depth after removal of augers: 4.6 m. Canada Limited 50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified Geotechnical Engineer or Professional Geoscientist. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Explanation of Borehole Log'. Scale: 1:53 Tel. No.: (905) 415-2632

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## Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 0+600 E:604955 N:4850896 Logged by: Project Client: Drilling Method: ZF/KC City of Brampton 150 mm Solid Stem Augers Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: SM/DP Track Mounted Drill Reviewed by: Project Location: Brampton, Ontario Date Started: Jan 12, 2022 Date Completed: Jan 12, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING** LAB TESTING INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) Ê ○ SPT □ PPT ● DCPT Sample Number **GRAIN SIZE** 'N' / RQD TOV (ppm) COV (ppm) Plot **DESCRIPTION** Recovery (%) DEPTH (m) DISTRIBUTION 100 200 300 400 -ithology W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic SA CL odetic Ground Surface Elevation: 204.9 m about 76 mm TOPSOIL 40 60 20 dark brown / brown 27 SS 33 5 Silty Clay FILL some sand, trace gravel, trace organics brown SILTY CLAY/CLAYEY SILT TILL some sand, trace gravel, oxidation very stiff to hard 204 17 °13 SS 2 100 O 17 32 14 100 36 0 46 203 -- 2 202.8 END OF BOREHOLE Wood E&IS, a Division of Wood $\stackrel{ extstyle op}{=}$ No freestanding groundwater measured in open borehole on completion of drilling.

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RECORD OF BOREHOLE No. BH E7

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# Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 2+200 E:605606 N:4852284 Logged by: Project Client: Drilling Method: 150 mm Solid Stem Augers City of Brampton ZF/KC Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: Track Mounted Drill Reviewed by: SM/DP Project Location: Brampton, Ontario Date Started: Jan 13, 2022 Date Completed: Jan 13, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING** LAB TESTING INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) Ê ○ SPT □ PPT ● DCPT Sample Number **GRAIN SIZE** TOV (ppm) 'N' / RQD COV (ppm) Plot **DESCRIPTION** Recovery (%) DEPTH (m) ELEVATION DISTRIBUTION 100 200 300 400 -ithology W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic SA CL odetic Ground Surface Elevation: 210.7 m about 76 mm TOPSOIL 40 60 20 dark brown / brown °28 Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace organics, oxidation SS 100 3 210 brown / light brown SILTY CLAY / CLAYEY SILT TILL some sand to sandy, trace gravel, oxidation stiff to very stiff 018 SS 2 100 10 0 209 15**25** 100 27 0 2 208.5 END OF BOREHOLE

Wood E&IS, a Division of Wood Canada Limited

RECORD OF BOREHOLE No. BH E23

 $\stackrel{ extstyle op}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

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Tel. No.: (905) 415-2632 www.woodplc.com Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified Geotechnical Engineer or Professional Geoscientist. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Explanation of Borehole Log'.

Scale: 1 : 53

#### Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 2+300 E:605614 N:4852383 Logged by: Project Client: Drilling Method: 150 mm Solid Stem Augers City of Brampton ZF/KC Compiled by: Arterial Road Network within Highway 427 Industrial Secondary Drilling Machine: Plan Area (Area 47) Project Name: Track Mounted Drill Reviewed by: SM/DP Project Location: Brampton, Ontario Date Started: Jan 13, 2022 Date Completed: Jan 13, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING LAB TESTING** INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) Ê ○ SPT □ PPT ● DCPT Sample Number **GRAIN SIZE** TOV (ppm) 'N' / RQD COV (ppm) Plot **DESCRIPTION** Recovery (%) ELEVATION DISTRIBUTION 100 200 300 400 DEPTH (m) -ithology W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic 60 SA CL about 76 mm TOPSOIL 40 60 20 dark brown / brown °26 Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace organics 100 10 SILTY CLAY / CLAYEY SILT TILL 210 trace to some sand, trace gravel, trace cobbles, oxidation 012 SS 2 100 22 Ö very stiff to hard 209 100 27 011 2 brownish grey SS 100 36 208 0 END OF BOREHOLE Wood E&IS, a Division of Wood

Canada Limited

RECORD OF BOREHOLE No. BH E24

 $\stackrel{ extstyle op}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Tel. No.: (905) 415-2632

www.woodplc.com

### Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 2+400 E:605628 N:4852476 Logged by: Project Client: Drilling Method: 150 mm Solid Stem Augers City of Brampton ZF/KC Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: Track Mounted Drill Reviewed by: SM/DP Project Location: Brampton, Ontario Date Started: Jan 13, 2022 Date Completed: Jan 13, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING LAB TESTING** INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) Ê ○ SPT □ PPT ● DCPT Sample Number **GRAIN SIZE** TOV (ppm) 'N' / RQD COV (ppm) Plot **DESCRIPTION** Recovery (%) ELEVATION DISTRIBUTION 100 200 300 400 DEPTH (m) -ithology W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic 60 SA CL odetic Ground Surface Elevation: 209.3 m about 76 mm TOPSOIL 40 60 20 dark brown / brown Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace organics SS 100 209 0 °30 SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel, trace cobbles, oxidation 013 SS 2 100 12 0 stiff to hard 208 sandy/silty seams 100 32 13 0 2 207.2 END OF BOREHOLE

Wood E&IS, a Division of Wood Canada Limited

RECORD OF BOREHOLE No. BH E25

 $\overline{\supseteq}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada

Tel. No.: (905) 415-2632 www.woodplc.com

#### Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 2+500 E:605650 N:4852571 Logged by: Project Client: Drilling Method: 150 mm Solid Stem Augers City of Brampton ZF/KC Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: Track Mounted Drill Reviewed by: SM/DP Project Location: Brampton, Ontario Date Started: Jan 13, 2022 Date Completed: Jan 13, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE SOIL SAMPLING **FIELD TESTING LAB TESTING** INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) Ê O SPT ☐ PPT ● DCP1 Sample Number **GRAIN SIZE** TOV (ppm) 'N' / RQD COV (ppm) Plot **DESCRIPTION** Recovery (%) ELEVATION DISTRIBUTION 100 200 300 400 DEPTH (m) ithology I W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic 60 SA CL detic Ground Surface Elevation: 210.0 m about 76 mm TOPSOIL 40 60 20 dark brown / brown 022 Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace organics SS 100 12 SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel, oxidation to SS5 209 °13 SS 2 100 17 O very stiff to hard 100 20 12 2 208 o<sub>12</sub> SS 100 40 Ó 3 207 grey 012 5 100 23 O SANDY SILT / SILT TILL 206 trace clay, trace gravel, dense to very dense moist to wet SS 6 100 55 0 012 SS 7 79 37 0 clayey seams 5 205 204.8 END OF BOREHOLE Wood E&IS, a Division of Wood

Canada Limited

RECORD OF BOREHOLE No. BH E26

 $\stackrel{ extstyle op}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6

Tel. No.: (905) 415-2632 www.woodplc.com

## RECORD OF BOREHOLE No. BH E27 Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 2+600 E:605680 N:4852668 Logged by: Project Client: Drilling Method: City of Brampton 150 mm Solid Stem Augers ZF/KC Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: Track Mounted Drill Reviewed by: SM/DP Project Location: Brampton, Ontario Date Started: Jan 13, 2022 Date Completed: Jan 13, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING** LAB TESTING INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) 6 ○ SPT □ PPT ● DCPT Sample Number **GRAIN SIZE** 'N' / RQD TOV (ppm) COV (ppm) Plot **DESCRIPTION** Recovery (%) DEPTH (m) ELEVATION DISTRIBUTION 100 200 300 400 ithology ' W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic 60 SA CL nd Surface Elevation: 211.1 m about 100 mm TOPSOIL 40 60 20 211 dark brown / brown °29 SS 75 5 Silty Clay FILL trace sand, trace gravel, trace organics SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel, trace cobbles, oxidation SS 2 100 21 210 Ö o : very stiff 100 27 011 0 2 208.9 209 -END OF BOREHOLE

Wood E&IS, a Division of Wood Canada Limited

 $\stackrel{ extstyle op}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6

Tel. No.: (905) 415-2632 www.woodplc.com

#### Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 2+700 E:605714 N:4852764 Logged by: Project Client: Drilling Method: 150 mm Solid Stem Augers City of Brampton ZF/KC Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: Track Mounted Drill Reviewed by: SM/DP Project Location: Brampton, Ontario Date Started: Jan 13, 2022 Date Completed: Jan 13, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING LAB TESTING** INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) Ê ○ SPT □ PPT ● DCPT Sample Number **GRAIN SIZE** TOV (ppm) 'N' / RQD COV (ppm) Plot **DESCRIPTION** Recovery (%) ELEVATION DISTRIBUTION 100 200 300 400 DEPTH (m) ithology I W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic SA CL about 100 mm TOPSOIL 40 60 20 dark brown / brown . 36 Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace cobbles SS 83 3 212 SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel, trace cobbles, oxidation 014 SS 2 100 12 0 sandy pockets in SS2 stiff to hard 211 13 32 0 2 210 13 SS 8 40 Ò END OF BOREHOLE 3.0 Wood E&IS, a Division of Wood

Canada Limited

RECORD OF BOREHOLE No. BH E28

 $\stackrel{ extstyle op}{=}$  No freestanding groundwater measured in open borehole on completion of drilling.

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Tel. No.: (905) 415-2632

www.woodplc.com

# Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 2+800 E:605743 N:4852863 Logged by: Project Client: Drilling Method: City of Brampton 150 mm Solid Stem Augers ZF/KC Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: Track Mounted Drill Reviewed by: SM/DP Project Location: Brampton, Ontario Date Started: Jan 13, 2022 Date Completed: Jan 13, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING** LAB TESTING INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) Ê ○ SPT □ PPT ● DCPT Sample Number **GRAIN SIZE** 'N' / RQD TOV (ppm) COV (ppm) Plot **DESCRIPTION** Recovery (%) DEPTH (m) ELEVATION DISTRIBUTION 100 200 300 400 -ithology W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic 60 SA CL odetic Ground Surface Elevation: 213.5 m about 76 mm TOPSOIL 40 60 20 dark brown / brown °28 Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace organics 92 9 213 SILTY CLAY / CLAYEY SILT TILL trace to some sand, trace gravel, oxidation very stiff 011 SS 2 100 15 0 212 100 10 12 20 Ó 2 211.3 END OF BOREHOLE

Wood E&IS, a Division of Wood Canada Limited

RECORD OF BOREHOLE No. BH E29

 $\overline{\geq}$  No freestanding groundwater measured in open borehole on completion of drilling.

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Tel. No.: (905) 415-2632 www.woodplc.com Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified Geotechnical Engineer or Professional Geoscientist. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Explanation of Borehole Log'.

Scale: 1 : 53

Page: 1 of 1

#### Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 2+900 E:605749 N:4852965 Logged by: Project Client: Drilling Method: 150 mm Solid Stem Augers ZF/KC City of Brampton Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: Track Mounted Drill SM/DP Reviewed by: Project Location: Brampton, Ontario Date Started: Jan 13, 2022 Date Completed: Jan 13, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING** LAB TESTING NSTRUMENTATION NSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) Ê O SPT ☐ PPT ● DCP1 Sample Number **GRAIN SIZE** 'N' / RQD COV (ppm) TOV (ppm) Plot **DESCRIPTION** Recovery (%) ELEVATION DISTRIBUTION 100 200 300 400 DEPTH (m) ithology I W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic SA CL about 76 mm TOPSOIL 40 60 20 dark brown / brown Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace organics SS 100 6 °26 214 brown SILTY CLAY / CLAYEY SILT TILL some sand to sandy, trace gravel, oxidation very stiff to hard SS 2 100 17 O 213 100 20 012 2 212 012 SS 100 33 0 greyish brown 211 SS 5 100 28 012 13 **24** SS 6 100 23 Ö 24 52 23 210 SS 011 100 20 Ó 5 209.2 END OF BOREHOLE Wood E&IS, a Division of Wood $\begin{tabular}{ll} $\supseteq$ No freestanding groundwater measured in open borehole on completion of drilling. \end{tabular}$

Canada Limited

RECORD OF BOREHOLE No. BH E30

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6

Tel. No.: (905) 415-2632 www.woodplc.com

R	ECORD	OF BOREHOLE No	). <u>I</u>	BH E	<u> </u>								W	ood.
Project Number: TP115086  Project Client: City of Brampton  Project Name: Arterial Road Network  Plan Area (Area (A))		TP115086	i							E-W Arterial F	Road, Sta. 3+000 E:60572	* * * * * * * * * * * * * * * * * * * *	MS	
		City of Brampton  Arterial Road Network within Highway 427 Industrial Secondary Plan Area (Area 47)							Method:	150 mm Soli	id Stem Augers	_ Compiled by:	ZF/KC	
									Machine:	Track Mounte	ed Drill		_ Reviewed by:	SM/DP
Project Location: Brampton, Ontario		Brampton, Ontario						Date S	started:	Jan 13, 2022	Date Completed:	13, 2022	_ Revision No.:	0, 3/10/22
LITHOLOGY PROFILI		OLOGY PROFILE	SOIL SAMPLING					FIEL	FIELD	TESTING	LAB TESTING Soil Vapour Reading	_		
Lithology Plot	Geodetic Ground S	DESCRIPTION Surface Elevation: 214.9 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' / RQD (%)	<b>DEPTH</b> (m)	ELEVATION (m)	○ SPT □  MTO Vane* △ Intact ▲ Remould	tionTesting  PPT	Soli Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading Vapoul reading	INSTRUMENTATION INSTALLATION	COMMEN & GRAIN SI DISTRIBUT (%)	ZE
$\boxtimes$	a	ty Clay / Clayey Silt FILL	ss	1	100	10	-		0		29			
▩	trace san	d, trace gravel, trace organics 214.2					-				29			
	SILTY trace to sor	brown 0.7 CLAY / CLAYEY SILT TILL ne sand, trace gravel, oxidation very stiff	SS	2	100	19	- - - 1 - -	214 -	Ó	£	o <sub>12</sub>			
		212.7	ss	3	100	20	- - - - - 2	213 -	· · · · · · · · · · · · · · · · · · ·		12			
77,		END OF BOREHOLE 2.1							: :					
									h h	· · · · · · · · · · · · · · · · · · ·				
									, , , , , , , , , , , , , , , , , , ,					
Woo	d E&IS, a Divisio	on of Wood 🗸		<u> </u>			<u> </u>		<u> </u>	pletion of drilling				

Canada Limited

50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6 Canada Tel. No.: (905) 415-2632 www.woodplc.com

#### Project Number: TP115086 Drilling Location: E-W Arterial Road, Sta. 3+100 E:605683 N:4853156 Logged by: Project Client: Drilling Method: 150 mm Solid Stem Augers City of Brampton ZF/KC Compiled by: <u>Arterial Road Network within Highway 427 Industrial Secondary</u> Drilling Machine: Plan Area (Area 47) Project Name: Track Mounted Drill Reviewed by: SM/DP Project Location: Brampton, Ontario Date Started: Jan 13, 2022 Date Completed: Jan 13, 2022 Revision No.: 0, 3/10/22 LITHOLOGY PROFILE **SOIL SAMPLING FIELD TESTING LAB TESTING** INSTRUMENTATION INSTALLATION **COMMENTS** PenetrationTesting ▲ COV (LEL) ■ TOV (LEL) ○ SPT □ PPT ● DCPT Sample Number **GRAIN SIZE** TOV (ppm) 'N' / RQD COV (ppm) Plot **DESCRIPTION** Recovery (%) ELEVATION DISTRIBUTION 100 200 300 400 DEPTH (m) ithology, W<sub>L</sub> W. W (%) \* Undrained Shear Strength (kPa) Plastic 60 SA CL detic Ground Surface Elevation: 215.0 m about 76 mm TOPSOIL 40 60 20 214.9 dark brown / brown o\_1.0 Silty Clay / Clayey Silt FILL trace sand, trace gravel, trace cobbles, trace SS 100 5 organics 214.3 brown SILTY CLAY / CLAYEY SILT TILL some sand, trace gravel, trace cobbles, oxidation 214 011 SS 2 100 17 O very stiff to hard 100 18 12 213 - 2 brownish grey SS 100 33 0 212 END OF BOREHOLE Wood E&IS, a Division of Wood $\stackrel{ extstyle op}{=}$ No freestanding groundwater measured in open borehole on completion of drilling.

Canada Limited

RECORD OF BOREHOLE No. BH E32

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wood.

# Appendix B Hydraulic Conductivity Analyses

Report: Hydrogeological Investigation

Location: Coleraine Drive, Brampton, ON

Title: Single Well Response Test Analysis - BH S1

Project: Arterial Road within Highway 427 Industrial Secondary Plan Area (Area 47)

Wood Project No.: TP115086
Client: City of Brampton

Monitoring Well Details

wood

Well ID: BH S1

Ground Surface: - mASL
Casing Radius: 0.025 metres
Borehole Radius: 0.076 metres

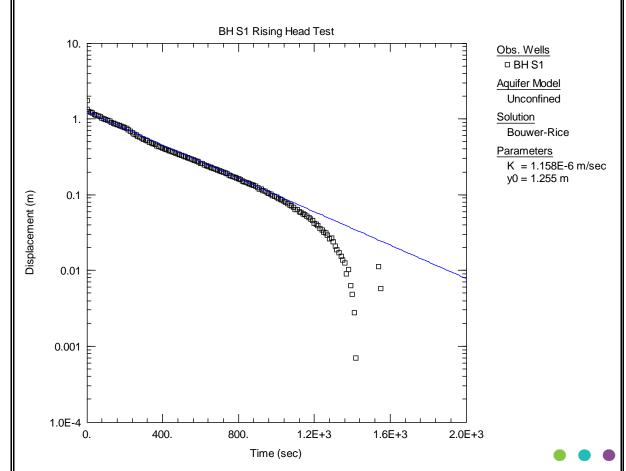
Top of screen: 6.10 mBGS 93.90 mASL Bottom of screen: 9.10 mBGS 90.90 mASL Bottom of borehole: 9.40 mBGS 90.60 mASL

Screened Material: Silty Clayey Silt Till

**Test Analysis** 

Solution Method: Bouwer-Rice
Test Method: Rising Head Test
Aquifer Model: Unconfined

Estimated K value: 1.2E-06 m/s



Report: Hydrogeological Investigation

Location: Countryside Drive, Brampton, ON

Title: Single Well Response Test Analysis - BH S7

Project: Arterial Road within Highway 427 Industrial Secondary Plan Area (Area 47)

Wood Project No.: TP115086
Client: City of Brampton

Monitoring Well Details

wood

Well ID: BH S7

Ground Surface: - mASL
Casing Radius: 0.025 metres
Borehole Radius: 0.076 metres

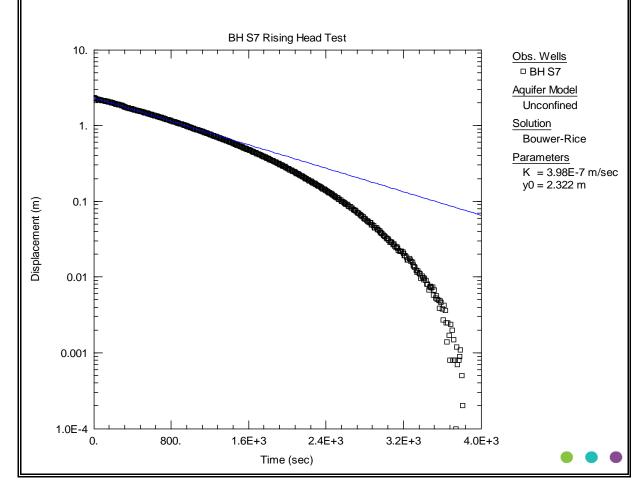
Top of screen: 6.10 mBGS 93.90 mASL Bottom of screen: 9.10 mBGS 90.90 mASL Bottom of borehole: 9.80 mBGS 90.20 mASL

Screened Material: Silty Clay/ Clayey Silt Till

**Test Analysis** 

Solution Method: Bouwer-Rice
Test Method: Rising Head Test
Aquifer Model: Unconfined

Estimated K value: 4.0E-07 m/s



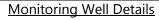
Report: Hydrogeological Investigation

Location: Countryside Drive, Brampton, Ontario

Title: Single Well Response Test Analysis - BH S10

Project: Arterial Road within Highway 427 Industrial Secondary Plan Area (Area 47)

Wood Project No.: TP115086
Client: City of Brampton



wood

Well ID: BH S10

Ground Surface: - mASL
Casing Radius: 0.025 metres
Borehole Radius: 0.076 metres

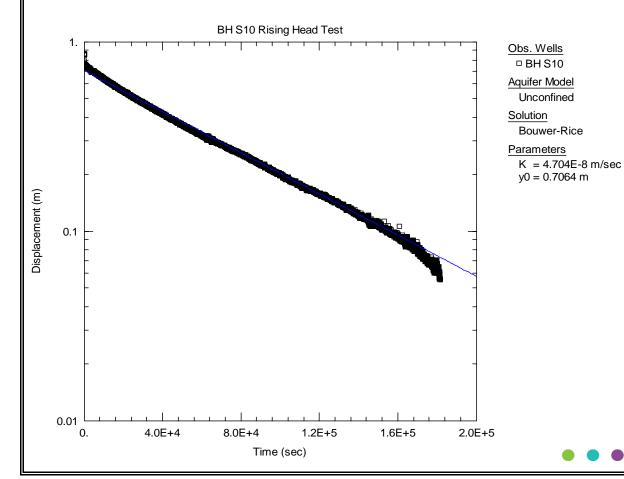
Top of screen:6.10mBGS93.90mASLBottom of screen:9.10mBGS90.90mASLBottom of borehole:9.40mBGS90.60mASL

Screened Material: Silty Clay/ Clayey Silt Till

**Test Analysis** 

Solution Method: Bouwer-Rice
Test Method: Rising Head Test
Aquifer Model: Unconfined

Estimated K value: 4.7E-08 m/s



**Hydrogeological Investigation** Report:

Location: Countryside Drive, Brampton, Ontario

Title: Single Well Response Test Analysis - BH S12

**Project:** Arterial Road within highway 427 Industrial Secondary Plan Area (Area 47)

**Wood Project No.: TP115086** Client: **City of Brampton** 

# **Monitoring Well Details**

Well ID: BH S12

**Ground Surface:** mASL Casing Radius: 0.025 metres Borehole Radius: 0.076 metres

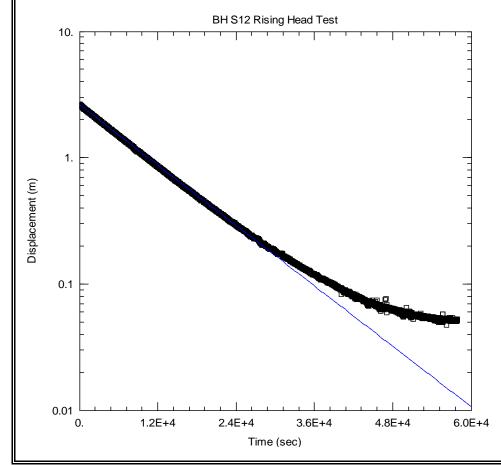
2.70 Top of screen: mBGS 97.30 mASL Bottom of screen: 5.80 mBGS 94.20 mASL Bottom of borehole: 5.80 mBGS 94.20 mASL

Screened Material: Silty Sand/Sandy Silt

**Test Analysis** 

Solution Method: Bouwer-Rice Test Method: Rising Head Test

Aquifer Model: Unconfined Estimated K value: 2.9E-08 m/s



Obs. Wells

□ BH S12

Aquifer Model

Unconfined

Solution

Bouwer-Rice

Parameters

K = 2.86E-8 m/sec

wood

y0 = 2.628 m

Report: Hydrogeological Investigation

Location: Clarkway Drive, Brampton, ON

Title: Single Well Response Test Analysis - BH S13

Project: Arterial Road within Highway 427 Industrial Secondary Plan Area (Area 47)

Wood Project No.: TP115086
Client: City of Brampton

# Monitoring Well Details

wood

Well ID: BH S13

Ground Surface: - mASL
Casing Radius: 0.025 metres
Borehole Radius: 0.076 metres

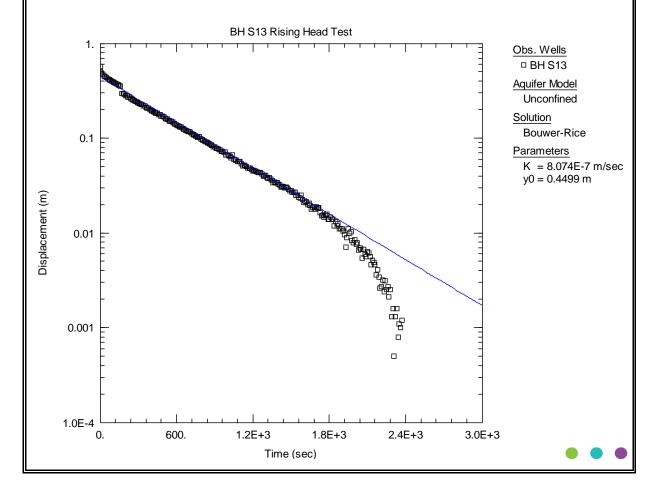
Top of screen:4.60mBGS95.40mASLBottom of screen:7.60mBGS92.40mASLBottom of borehole:9.80mBGS90.20mASL

Screened Material: Silty Clay/Clayey Silt Till & Sandy Silt/Silty Sand

**Test Analysis** 

Solution Method: Bouwer-Rice
Test Method: Rising Head Test

Aquifer Model: Unconfined Estimated K value: **8.1E-07 m/s** 



Report: Hydrogeological Investigation

Location: Clarkway Drive, Brampton, ON

Title: Single Well Response Test Analysis - BH S16

Project: Arterial Road within Highway 427 Industrial Secondary Plan Area (Area 47)

Wood Project No.: TP115086
Client: City of Brampton

# **Monitoring Well Details**

wood

Well ID: BH S16

Ground Surface: - mASL
Casing Radius: 0.025 metres
Borehole Radius: 0.076 metres

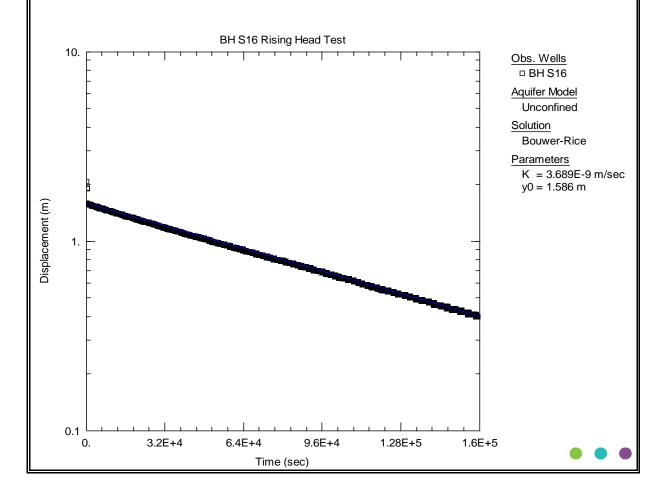
Top of screen: 6.10 mBGS 93.90 mASL Bottom of screen: 9.10 mBGS 90.90 mASL

Screened Material: Silty Clay/Clayey Silt Till

# **Test Analysis**

Solution Method: Bouwer-Rice
Test Method: Rising Head Test
Aquifer Model: Unconfined

Estimated K value: 3.7E-09 m/s



Report: Hydrogeological Investigation

Location: Arterial A2, Brampton, ON

Title: Single Well Response Test Analysis - BH S5

Project: Arterial Road within Highway 427 Industrial Secondary Plan Area (Area 47)

Wood Project No.: TP115086
Client: City of Brampton

<b>Monitoring</b>	Well	<b>Details</b>

wood

Well ID: BH S5

Ground Surface: - mASL
Casing Radius: 0.025 metres
Borehole Radius: 0.076 metres

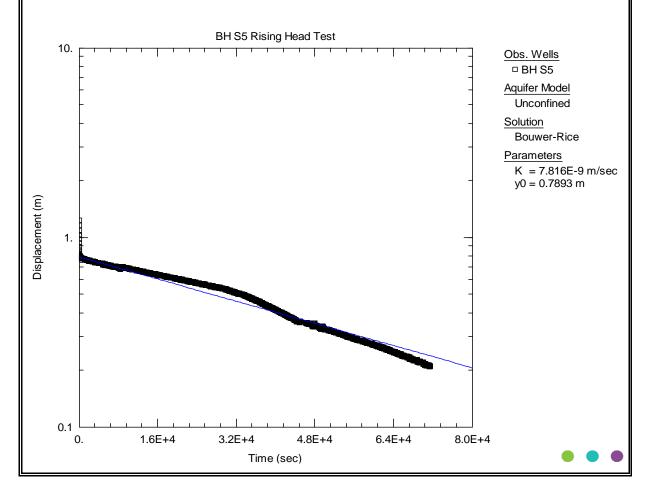
Top of screen: 6.10 mBGS 93.90 mASL Bottom of screen: 9.10 mBGS 90.90 mASL Bottom of borehole: 9.80 mBGS 90.20 mASL

Screened Material: Silty Clayey Silt Till

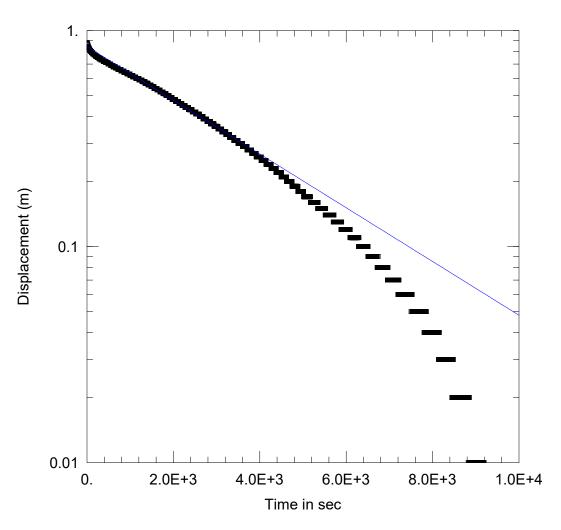
Test Analysis

Solution Method: Bouwer-Rice
Test Method: Rising Head Test
Aquifer Model: Unconfined

Estimated K value: 7.8E-09 m/s







## WELL TEST ANALYSIS

## PROJECT INFORMATION

Company: Wood
Client: City of Brampton Project: TP115086

Location: Brampton (Area 47)

Test Well: BH S17 Test Date: 26 Jan 22

AQUIFER DATA

Saturated Thickness: 3.56 m Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (BH S17)

Static Water Column Height: 3.56 m Initial Displacement: 0.88 m Total Well Penetration Depth: 3.56 m

Screen Length: 3.1 m Well Radius: 0.075 m

SOLUTION

Solution Method: Bouwer-Rice

y0 = 0.8436 m

Aquifer Model: Unconfined

Casing Radius: 0.025 m

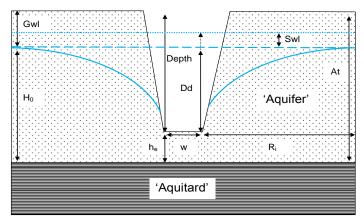
K = 1.113E-7 m/sec

wood.

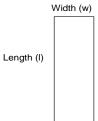
# Appendix C Dewatering Rate Estimates

	Dewatering Rate Estimation - Unconfined Trench					
Project No.: Project Name: Client:	Project Name: Environmental Assessment Study of Arterial Roads within Hwy. 427 Industrial SPA47					
Location: Description:	Brampton, Ontario Installation of box Culvert S1 across Coleraine Dr. using open-cut excavation	Performed by:	Cameron McCann			
Date:			Tomas Cihula			

EXCAVATION INFO					
Length, I (m)	10.0				
Width, w (m)	9.0				
Depth (m BGS)	4.0				



Plan View



Radius of Influence (R<sub>i</sub>) calculated with the Sichardt equation  $R_i = 3000(H_0 - h_e)\sqrt{K}$ 

Groundwater Inflow (Q) to the excavation calculated with the Dupuit solution combining: 1) radial steady-state for inflow to trench ends, and 2) linear steady-state for inflow to trench sides.

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln{\left(\frac{2R_i + w}{w}\right)}} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

Bh	Gwl Measured Groundwater Level (m BGS)	Swl Estimated Seasonal Fluctuation above Gwl (m)	K Hydraulic Conductivity (m/s)	At 'Aquifer' Thickness (m BGS)	H <sub>0</sub> Ambient Head above 'Aquitard' (m)	h <sub>e</sub> Head above 'Aquitard' at Excavation (m)	Dd Drawdown (m)	R <sub>i</sub> Sichardt Calculation (m)	R <sub>i</sub> User Defined (m)	Q Groundwater Inflow (m³/d)
S1	0.87	0.50	1.2E-06	5.0	4.6	1.0	3.6	11.9		6.9
Maximum									6.9	
	etric Mean		1.2E-06	5.00	4.63	1.00	3.63	11.9		6.9
K Arithn	K Arithmetic Mean			5.00	4.63	1.00	3.63	11.9		6.9

Uncertainty Factor	3	Maximum x SF	(K Geometric Mean) x SF	(K Arithmetic Mean ) x SF
Q Groundwater Inflow (m <sup>3</sup> /c	d)	20.7	20.7	20.7
Uncertainty Factor	3	S(Maximum K x SF)	S(K Geometric Mean × SF)	S(K Arithmetic Mean × SF)
R <sub>i</sub> Radius of Influence, Sich	ert (m)	20.7	20.7	20.7

- m BGS = metres below ground surface
- The user defined R<sub>i</sub> is used for the calculation of groundwater inflow (Q) if specified

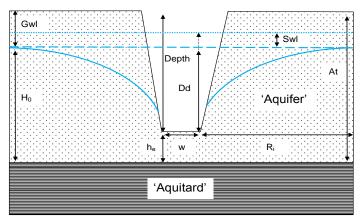
  Geometric mean calculation is applied only to the hydraulic conductivity (K) other input parameters for the Dupuit and Sichardt equation use the arithmetic average

  The calculated groundwater inflows for the arithmetic and geometric mean both use the Sichardt R<sub>i</sub> calculated from the respective mean K
- If the depth of the excavation is below the base of the 'Aquifer' then the head at the excavation is set at the top of the 'Aquitard' (i.e.  $h_e = 0$ )

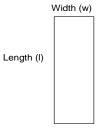
Comments

	Dewatering Rate Estimation - Unconfined Trench					
Project No.: Project Name: Client:	Project Name: Environmental Assessment Study of Arterial Roads within Hwy. 427 Industrial SPA47					
Location: Description:	Brampton, Ontario	Performed by:	Cameron McCann			
Date:	19 January 2021	Checked by:	Tomas Cihula			

EXCAVATION INFO						
Length, I (m)	15.0					
Width, w (m)	3.0					
Depth (m BGS)	4.0					



## Plan View



Radius of Influence (R<sub>i</sub>) calculated with the Sichardt equation  $R_i = 3000(H_0 - h_e)\sqrt{K}$ 

Groundwater Inflow (Q) to the excavation calculated with the Dupuit solution combining: 1) radial steady-state for inflow to trench ends, and 2) linear steady-state for inflow to trench sides.

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln{\left(\frac{2R_i + w}{w}\right)}} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

Bh	Gwl Measured Groundwater Level (m BGS)	Swl Estimated Seasonal Fluctuation above Gwl (m)	K Hydraulic Conductivity (m/s)	At 'Aquifer' Thickness (m BGS)	H <sub>0</sub> Ambient Head above 'Aquitard' (m)	h <sub>e</sub> Head above 'Aquitard' at Excavation (m)	Dd Drawdown (m)	R <sub>i</sub> Sichardt Calculation (m)	R <sub>i</sub> User Defined (m)	Q Groundwater Inflow (m³/d)
S1	0.87	0.50	1.2E-06	5.0	4.6	1.0	3.6	11.9		5.7
Maximum									5.7	
	etric Mean		1.2E-06	5.00	4.63	1.00	3.63	11.9		5.7
K Arithn	K Arithmetic Mean			5.00	4.63	1.00	3.63	11.9		5.7

Uncertainty Factor	3	Maximum x SF	(K Geometric Mean) x SF	(K Arithmetic Mean ) x SF
Q Groundwater Inflow (m <sup>3</sup> /	d)	17.1	17.1	17.1
Uncertainty Factor	3	S(Maximum K x SF)	S(K Geometric Mean × SF)	S(K Arithmetic Mean × SF)
R <sub>i</sub> Radius of Influence, Sich	nert (m)	20.7	20.7	20.7

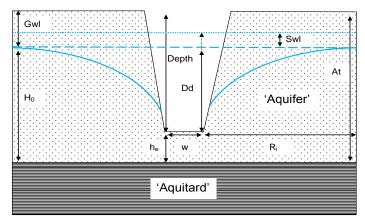
- m BGS = metres below ground surface
- The user defined R<sub>i</sub> is used for the calculation of groundwater inflow (Q) if specified

  Geometric mean calculation is applied only to the hydraulic conductivity (K) other input parameters for the Dupuit and Sichardt equation use the arithmetic average

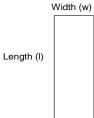
  The calculated groundwater inflows for the arithmetic and geometric mean both use the Sichardt R<sub>i</sub> calculated from the respective mean K

	Dewatering Rate Estimation - Unconfined Trench					
Project No.: Project Name: Client:	Project Name: Environmental Assessment Study of Arterial Roads within Hwy. 427 Industrial SPA47					
Location: Description:	Brampton, Ontario Installation of box Culvert S7 across Countryside Dr. using open-cut excavation	Performed by:	Cameron McCann			
Date:	19 January 2021	Checked by:	Tomas Cihula			

EXCAVATION INFO						
Length, I (m)	10.0					
Width, w (m)	9.0					
Depth (m BGS)	4.0					



Plan View



Radius of Influence (R<sub>i</sub>) calculated with the Sichardt equation  $R_i = 3000(H_0 - h_e)\sqrt{K}$ 

Groundwater Inflow (Q) to the excavation calculated with the Dupuit solution combining: 1) radial steady-state for inflow to trench ends, and 2) linear steady-state for inflow to trench sides.

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln{\left(\frac{2R_i + w}{w}\right)}} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

Bh	Gwl Measured Groundwater Level (m BGS)	Swl Estimated Seasonal Fluctuation above Gwl (m)	K Hydraulic Conductivity (m/s)	At 'Aquifer' Thickness (m BGS)	H <sub>0</sub> Ambient Head above 'Aquitard' (m)	h <sub>e</sub> Head above 'Aquitard' at Excavation (m)	Dd Drawdown (m)	R <sub>i</sub> Sichardt Calculation (m)	R <sub>i</sub> User Defined (m)	Q Groundwater Inflow (m³/d)
S7	1.71	1.00	4.0E-07	5.0	4.3	1.0	3.3	6.2		3.1
Maximum									3.1	
K Geom	etric Mean		4.0E-07	5.00	4.29	1.00	3.29	6.2		3.1
K Arithmetic Mean			4.0E-07	5.00	4.29	1.00	3.29	6.2		3.1

Uncertainty Factor 3		Maximum x SF	(K Geometric Mean) x SF	(K Arithmetic Mean ) x SF
Q Groundwater Inflow (m <sup>3</sup> /	(d)	9.4	9.4	
Uncertainty Factor	3	S(Maximum K x SF)	S(K Geometric Mean × SF)	S(K Arithmetic Mean × SF)
R <sub>i</sub> Radius of Influence, Sich	hert (m)	10.8	10.8	10.8

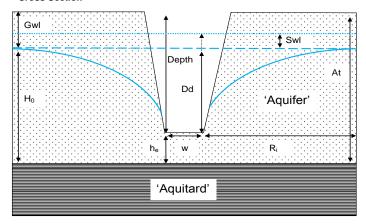
- m BGS = metres below ground surface
- The user defined R<sub>i</sub> is used for the calculation of groundwater inflow (Q) if specified

  Geometric mean calculation is applied only to the hydraulic conductivity (K) other input parameters for the Dupuit and Sichardt equation use the arithmetic average

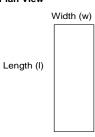
  The calculated groundwater inflows for the arithmetic and geometric mean both use the Sichardt R<sub>i</sub> calculated from the respective mean K

Dewatering Rate Estimation - Unconfined Trench						
Project No.: Project Name: Client:	Project Name: Environmental Assessment Study of Arterial Roads within Hwy. 427 Industrial SPA47					
Location: Description:		Performed by:	Cameron McCann			
Date:			Tomas Cihula			

EXCAVATION INFO					
Length, I (m)	10.0				
Width, w (m)	9.0				
Depth (m BGS)	4.0				



## Plan View



Radius of Influence (R<sub>i</sub>) calculated with the Sichardt equation  $R_i = 3000(H_0 - h_e)\sqrt{K}$ 

Groundwater Inflow (Q) to the excavation calculated with the Dupuit solution combining: 1) radial steady-state for inflow to trench ends, and 2) linear steady-state for inflow to trench sides.

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln \left(\frac{2R_i + w}{w}\right)} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

Bh	Gwl Measured Groundwater Level (m BGS)	Swl Estimated Seasonal Fluctuation above Gwl (m)	K Hydraulic Conductivity (m/s)	At 'Aquifer' Thickness (m BGS)	H <sub>0</sub> Ambient Head above 'Aquitard' (m)	h <sub>e</sub> Head above 'Aquitard' at Excavation (m)	Dd Drawdown (m)	R <sub>i</sub> Sichardt Calculation (m)	R <sub>i</sub> User Defined (m)	Q Groundwater Inflow (m³/d)
S10	0.90	0.90	4.7E-08	5.0	5.0	1.0	4.0	2.6		1.0
	Maximum								1.0	
	etric Mean		4.7E-08	5.00	5.00	1.00	4.00	2.6		1.0
K Arithn	netic Mean		4.7E-08	5.00	5.00	1.00	4.00	2.6		1.0

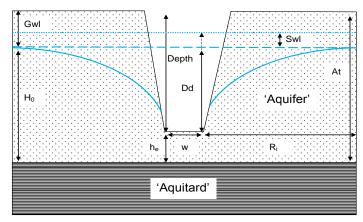
Uncertainty Factor	3	Maximum x SF	(K Geometric Mean) x SF	(K Arithmetic Mean ) x SF
Q Groundwater Inflow (m <sup>3</sup> /	d)	3.1	3.1	
Uncertainty Factor	3	S(Maximum K x SF)	S(K Geometric Mean × SF)	S(K Arithmetic Mean × SF)
R <sub>i</sub> Radius of Influence, Sich	nert (m)	4.5 4.5		4.5

- m BGS = metres below ground surface
- The user defined R, is used for the calculation of groundwater inflow (Q) if specified

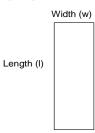
  Geometric mean calculation is applied only to the hydraulic conductivity (K) other input parameters for the Dupuit and Sichardt equation use the arithmetic average
  The calculated groundwater inflows for the arithmetic and geometric mean both use the Sichardt R<sub>1</sub> calculated from the respective mean K

Dewatering Rate Estimation - Unconfined Trench						
Project No.: Project Name: Client:	Project Name: Environmental Assessment Study of Arterial Roads within Hwy. 427 Industrial SPA47					
Location: Description:		Performed by:	Cameron McCann			
Date:			Tomas Cihula			

EXCAVATION INFO					
Length, I (m)	10.0				
Width, w (m)	9.0				
Depth (m BGS)	4.0				



## Plan View



Radius of Influence (R<sub>i</sub>) calculated with the Sichardt equation  $R_i = 3000(H_0 - h_e)\sqrt{K}$ 

Groundwater Inflow (Q) to the excavation calculated with the Dupuit solution combining: 1) radial steady-state for inflow to trench ends, and 2) linear steady-state for inflow to trench sides.

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln{\left(\frac{2R_i + w}{w}\right)}} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

Bh	Gwl Measured Groundwater Level (m BGS)	Swl Estimated Seasonal Fluctuation above Gwl (m)	K Hydraulic Conductivity (m/s)	At 'Aquifer' Thickness (m BGS)	H <sub>0</sub> Ambient Head above 'Aquitard' (m)	h <sub>e</sub> Head above 'Aquitard' at Excavation (m)	Dd Drawdown (m)	R <sub>i</sub> Sichardt Calculation (m)	R <sub>i</sub> User Defined (m)	Q Groundwater Inflow (m³/d)
S12	1.44	1.00	2.9E-08	5.0	4.6	1.0	3.6	1.8		0.7
Maximum								0.7		
	etric Mean		2.9E-08	5.00	4.56	1.00	3.56	1.8		0.7
K Arithn	K Arithmetic Mean			5.00	4.56	1.00	3.56	1.8		0.7

Uncertainty Factor 3	Maximum x SF	(K Geometric Mean) x SF	(K Arithmetic Mean ) x SF		
Q Groundwater Inflow (m <sup>3</sup> /d)	2.2 2.2		2.2		
Uncertainty Factor 3	S(Maximum K × SF)	S(K Geometric Mean × SF)	S(K Arithmetic Mean × SF)		
R <sub>i</sub> Radius of Influence, Sichert (m)	3.2	3.2 3.2			

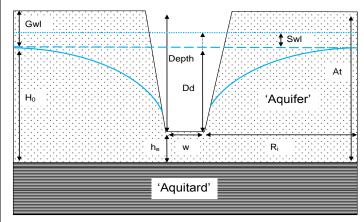
- m BGS = metres below ground surface
- The user defined R<sub>i</sub> is used for the calculation of groundwater inflow (Q) if specified

  Geometric mean calculation is applied only to the hydraulic conductivity (K) other input parameters for the Dupuit and Sichardt equation use the arithmetic average

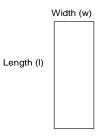
  The calculated groundwater inflows for the arithmetic and geometric mean both use the Sichardt R<sub>i</sub> calculated from the respective mean K

	Dewatering Rate Estimation - Unconfined Trench					
Project No.: Project Name: Client:	Project Name: Environmental Assessment Study of Arterial Roads within Hwy. 427 Industrial SPA47					
Location: Description:	Brampton, Ontario Installation of utilities beneath Countryside Dr. using open-cut excavation	Performed by:	Cameron McCann			
Date:	19 January 2021	Checked by:	Tomas Cihula			

EXCAVATION INFO					
Length, I (m)	15.0				
Width, w (m)	3.0				
Depth (m BGS)	4.0				



## Plan View



Radius of Influence (R<sub>i</sub>) calculated with the Sichardt equation  $R_i = 3000(H_0 - h_e)\sqrt{K}$ 

Groundwater Inflow (Q) to the excavation calculated with the Dupuit solution combining: 1) radial steady-state for inflow to trench ends, and 2) linear steady-state for inflow to trench sides.

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln{\left(\frac{2R_i + w}{w}\right)}} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

Bh	Gwl Measured Groundwater Level (m BGS)	Swl Estimated Seasonal Fluctuation above Gwl (m)	K Hydraulic Conductivity (m/s)	At 'Aquifer' Thickness (m BGS)	H <sub>0</sub> Ambient Head above 'Aquitard' (m)	h <sub>e</sub> Head above 'Aquitard' at Excavation (m)	Dd Drawdown (m)	R <sub>i</sub> Sichardt Calculation (m)	R <sub>i</sub> User Defined (m)	Q Groundwater Inflow (m³/d)
S7	1.71	1.00	4.0E-07	5.0	4.3	1.0	3.3	6.2		2.6
S10	0.90	0.90	4.7E-08	5.0	5.0	1.0	4.0	2.6		0.9
S12	1.44	1.00	2.9E-08	5.0	4.6	1.0	3.6	1.8		0.6
Maximu									0.0	
									2.6	
			8.2E-08	5.00	4.62	1.00	3.62	3.1		1.1
K Arithn	etic Mean		1.6E-07	5.00	4.62	1.00	3.62	4.3		1.6

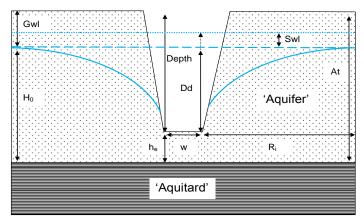
Uncertainty Factor	3	Maximum x SF	(K Geometric Mean) x SF	(K Arithmetic Mean ) × SF
Q Groundwater Inflow (m <sup>3</sup> /c	d)	7.8	3.3	4.8
Uncertainty Factor	3	S(Maximum K x SF)	S(K Geometric Mean × SF)	S(K Arithmetic Mean × SF)
R <sub>i</sub> Radius of Influence, Sich	ert (m)	11.9	5.4	7.5

- m BGS = metres below ground surface
- The user defined R, is used for the calculation of groundwater inflow (Q) if specified

  Geometric mean calculation is applied only to the hydraulic conductivity (K) other input parameters for the Dupuit and Sichardt equation use the arithmetic average
  The calculated groundwater inflows for the arithmetic and geometric mean both use the Sichardt R<sub>1</sub> calculated from the respective mean K
- If the depth of the excavation is below the base of the 'Aquifer' then the head at the excavation is set at the top of the 'Aquitard' (i.e.  $h_e = 0$ ) Comments

	Dewatering Rate Estimation - Unconfined Trench					
Project No.: Project Name: Client:	Project Name: Environmental Assessment Study of Arterial Roads within Hwy. 427 Industrial SPA47					
Location: Description:	Brampton, Ontario Installation of box Culvert S13 across Clarkway Dr. using open-cut excavation	Performed by:	Cameron McCann			
Date:	19 January 2021	Checked by:	Tomas Cihula			

EXCAVATION INFO						
Length, I (m)	10.0					
Width, w (m)	9.0					
Depth (m BGS)	4.0					



Plan View

Width (w) Length (I)

Radius of Influence (R<sub>i</sub>) calculated with the Sichardt equation  $R_i = 3000(H_0 - h_e)\sqrt{K}$ 

Groundwater Inflow (Q) to the excavation calculated with the Dupuit solution combining: 1) radial steady-state for inflow to trench ends, and 2) linear steady-state for inflow to trench sides.

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln{\left(\frac{2R_i + w}{w}\right)}} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

Bh	Gwl Measured Groundwater Level (m BGS)	Swl Estimated Seasonal Fluctuation above Gwl (m)	K Hydraulic Conductivity (m/s)	At 'Aquifer' Thickness (m BGS)	H <sub>0</sub> Ambient Head above 'Aquitard' (m)	h <sub>e</sub> Head above 'Aquitard' at Excavation (m)	Dd Drawdown (m)	R <sub>i</sub> Sichardt Calculation (m)	R <sub>i</sub> User Defined (m)	Q Groundwater Inflow (m³/d)
S13	1.39	1.00	8.1E-07	5.0	4.6	1.0	3.6	9.7		5.3
	Maximum									5.3
	etric Mean		8.1E-07	5.00	4.61	1.00	3.61	9.7		5.3
K Arithn	etic Mean		8.1E-07	5.00	4.61	1.00	3.61	9.7		5.3

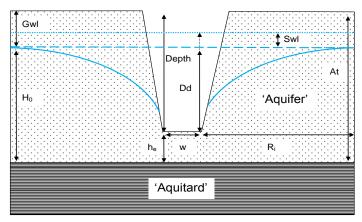
Uncertainty Factor	3	Maximum x SF	(K Geometric Mean) x SF	(K Arithmetic Mean ) x SF
Q Groundwater Inflow (m <sup>3</sup> /c	d)	16.0	16.0	16.0
Uncertainty Factor	3	S(Maximum K × SF)	S(K Geometric Mean × SF)	S(K Arithmetic Mean × SF)
R <sub>i</sub> Radius of Influence, Sich	ert (m)	16.9	16.9	16.9

- m BGS = metres below ground surface
- The user defined R, is used for the calculation of groundwater inflow (Q) if specified

  Geometric mean calculation is applied only to the hydraulic conductivity (K) other input parameters for the Dupuit and Sichardt equation use the arithmetic average
  The calculated groundwater inflows for the arithmetic and geometric mean both use the Sichardt R<sub>1</sub> calculated from the respective mean K

	Dewatering Rate Estimation - Unconfined Trench					
Project No.: Project Name: Client:	Project Name: Environmental Assessment Study of Arterial Roads within Hwy. 427 Industrial SPA47					
Location: Description:	Brampton, Ontario Installation of box Culvert S16 across Clarkway Dr. using open-cut excavation	Performed by:	Cameron McCann			
Date:	19 January 2021	Checked by:	Tomas Cihula			

EXCAVATION INFO						
Length, I (m)	10.0					
Width, w (m)	9.0					
Depth (m BGS)	4.0					



Plan View

Width (w) Length (I)

Radius of Influence (R<sub>i</sub>) calculated with the Sichardt equation  $R_i = 3000(H_0 - h_e)\sqrt{K}$ 

Groundwater Inflow (Q) to the excavation calculated with the Dupuit solution combining: 1) radial steady-state for inflow to trench ends, and 2) linear steady-state for inflow to trench sides.

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln{\left(\frac{2R_i + w}{w}\right)}} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

Bh	Gwl Measured Groundwater Level (m BGS)	Swl Estimated Seasonal Fluctuation above Gwl (m)	K Hydraulic Conductivity (m/s)	At 'Aquifer' Thickness (m BGS)	H <sub>0</sub> Ambient Head above 'Aquitard' (m)	h <sub>e</sub> Head above 'Aquitard' at Excavation (m)	Dd Drawdown (m)	R <sub>i</sub> Sichardt Calculation (m)	R <sub>i</sub> User Defined (m)	Q Groundwater Inflow (m³/d)
S16	3.20	1.00	3.7E-09	5.0	2.8	1.0	1.8	0.3		0.2
Maximum									0.2	
	etric Mean		3.7E-09	5.00	2.80	1.00	1.80	0.3		0.2
K Arithm	etic Mean		3.7E-09	5.00	2.80	1.00	1.80	0.3		0.2

Uncertainty Factor	3	Maximum x SF	(K Geometric Mean) x SF	(K Arithmetic Mean ) x SF
Q Groundwater Inflow (m <sup>3</sup> /c	d)	0.5	0.5	0.5
Uncertainty Factor	3	S(Maximum K x SF)	S(K Geometric Mean × SF)	S(K Arithmetic Mean × SF)
R <sub>i</sub> Radius of Influence, Sich	ert (m)	0.6	0.6	0.6

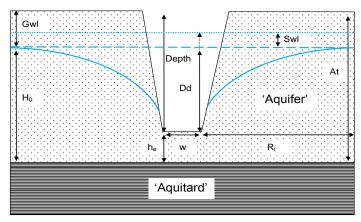
- m BGS = metres below ground surface
- The user defined R<sub>i</sub> is used for the calculation of groundwater inflow (Q) if specified

  Geometric mean calculation is applied only to the hydraulic conductivity (K) other input parameters for the Dupuit and Sichardt equation use the arithmetic average

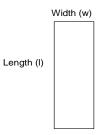
  The calculated groundwater inflows for the arithmetic and geometric mean both use the Sichardt R<sub>i</sub> calculated from the respective mean K

	Dewatering Rate Estimation - Unconfined Trench					
Project No.: Project Name: Client:	Project Name: Environmental Assessment Study of Arterial Roads within Hwy. 427 Industrial SPA47					
Location: Description:	Brampton, Ontario Installation of utilities beneath Clarkway Dr. using open-cut excavation	Performed by:	Cameron McCann			
Date:	19 January 2021	Checked by:	Tomas Cihula			

EXCAVATION INFO						
Length, I (m)	15.0					
Width, w (m)	3.0					
Depth (m BGS)	4.0					



## Plan View



Radius of Influence (R<sub>i</sub>) calculated with the Sichardt equation  $R_i = 3000(H_0 - h_e)\sqrt{K}$ 

Groundwater Inflow (Q) to the excavation calculated with the Dupuit solution combining: 1) radial steady-state for inflow to trench ends; and 2) linear steady-state for inflow to trench sides.

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln\left(\frac{2R_i + w}{w}\right)} + 2IK \frac{(H_0^2 - h_e^2)}{2R_i}$$

Bh	Gwl Measured Groundwater Level (m BGS)	Swl Estimated Seasonal Fluctuation above Gwl (m)	K Hydraulic Conductivity (m/s)	At 'Aquifer' Thickness (m BGS)	H <sub>0</sub> Ambient Head above 'Aquitard' (m)	h <sub>e</sub> Head above 'Aquitard' at Excavation (m)	Dd Drawdown (m)	R <sub>i</sub> Sichardt Calculation (m)	R <sub>i</sub> User Defined (m)	Q Groundwater Inflow (m³/d)
S13	1.39	1.00	8.1E-07	5.0	4.6	1.0	3.6	9.7		4.4
S16	3.20	1.00	3.7E-09	5.0	2.8	1.0	1.8	0.3		0.1
Maximu										4.4
	etric Mean		5.5E-08	5.00	3.71	1.00	2.71	1.9		0.7
K Arithmetic Mean			4.1E-07	5.00	3.71	1.00	2.71	5.2		2.2

Uncertainty Factor 3	Maximum × SF	(K Geometric Mean) x SF	(K Arithmetic Mean ) x SF	
Q Groundwater Inflow (m <sup>3</sup> /d)	13.2	2.1	6.7	
Uncertainty Factor 3	S(Maximum K × SF)	S(K Geometric Mean × SF)	S(K Arithmetic Mean × SF)	
R <sub>i</sub> Radius of Influence, Sichert (m)	12.7	12.7 3.3		

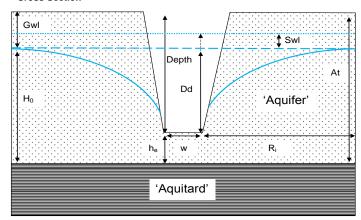
- m BGS = metres below ground surface
- The user defined R<sub>i</sub> is used for the calculation of groundwater inflow (Q) if specified

  Geometric mean calculation is applied only to the hydraulic conductivity (K) other input parameters for the Dupuit and Sichardt equation use the arithmetic average

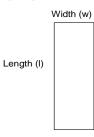
  The calculated groundwater inflows for the arithmetic and geometric mean both use the Sichardt R<sub>i</sub> calculated from the respective mean K
- If the depth of the excavation is below the base of the 'Aquifer' then the head at the excavation is set at the top of the 'Aquitard' (i.e.  $h_e = 0$ ) Comments

	<b>Dewatering Rate Estimation - Unconfined Trench</b>		
Project No.: Project Name: Client:	TP115086 / 1 / 6200 Environmental Assessment Study of Arterial Roads within Hwy. 427 Industrial SPA47 City of Brampton		wood.
Location: Description:	Brampton, Ontario	Performed by:	Cameron McCann
Date:	Installation of box Culvert S5 across Arterial A2 using open-cut excavation  19 January 2021		Tomas Cihula

EXCAVATION INFO						
Length, I (m)	10.0					
Width, w (m)	9.0					
Depth (m BGS)	4.0					



## Plan View



Radius of Influence (R<sub>i</sub>) calculated with the Sichardt equation  $R_i = 3000(H_0 - h_e)\sqrt{K}$ 

Groundwater Inflow (Q) to the excavation calculated with the Dupuit solution combining: 1) radial steady-state for inflow to trench ends, and 2) linear steady-state for inflow to trench sides.

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln \left(\frac{2R_i}{W}\right)} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

Bh	Gwl Measured Groundwater Level (m BGS)	Swl Estimated Seasonal Fluctuation above Gwl (m)	K Hydraulic Conductivity (m/s)	At 'Aquifer' Thickness (m BGS)	H <sub>0</sub> Ambient Head above 'Aquitard' (m)	h <sub>e</sub> Head above 'Aquitard' at Excavation (m)	Dd Drawdown (m)	R <sub>i</sub> Sichardt Calculation (m)	R <sub>i</sub> User Defined (m)	Q Groundwater Inflow (m³/d)
S5	0.00	0.00	7.8E-09	5.0	5.0	1.0	4.0	1.1		0.4
Maximum									0.4	
	etric Mean		7.8E-09	5.00	5.00	1.00	4.00	1.1		0.4
K Arithn	etic Mean		7.8E-09	5.00	5.00	1.00	4.00	1.1		0.4

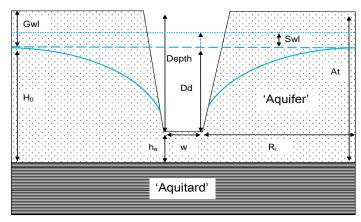
Uncertainty Factor	3	Maximum x SF	(K Geometric Mean) x SF	(K Arithmetic Mean ) × SF
Q Groundwater Inflow (m <sup>3</sup> /c	d)	1.2	1.2	1.2
Uncertainty Factor	3	S(Maximum K × SF)	S(K Geometric Mean × SF)	S(K Arithmetic Mean × SF)
R <sub>i</sub> Radius of Influence, Sich	ert (m)	1.8	1.8	1.8

- m BGS = metres below ground surface
- The user defined R, is used for the calculation of groundwater inflow (Q) if specified

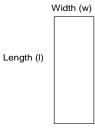
  Geometric mean calculation is applied only to the hydraulic conductivity (K) other input parameters for the Dupuit and Sichardt equation use the arithmetic average
  The calculated groundwater inflows for the arithmetic and geometric mean both use the Sichardt R<sub>1</sub> calculated from the respective mean K
- If the depth of the excavation is below the base of the 'Aquifer' then the head at the excavation is set at the top of the 'Aquitard' (i.e.  $h_e = 0$ ) Comments

	Dewatering Rate Estimation - Unconfined Trench		
Project No.: Project Name: Client:	TP115086 / 1 / 6200 Environmental Assessment Study of Arterial Roads within Hwy. 427 Industrial SPA47 City of Brampton		wood.
Location: Description:	Brampton, Ontario Installation of utilities beneath Arterial A2 using open-cut excavation	Performed by:	Cameron McCann
Date:	19 January 2021	Checked by:	Tomas Cihula

EXCAVATION INFO						
Length, I (m)	15.0					
Width, w (m)	3.0					
Depth (m BGS)	4.0					



## Plan View



Radius of Influence (R<sub>i</sub>) calculated with the Sichardt equation  $R_i = 3000(H_0 - h_e)\sqrt{K}$ 

Groundwater Inflow (Q) to the excavation calculated with the Dupuit solution combining: 1) radial steady-state for inflow to trench ends, and 2) linear steady-state for inflow to trench sides.

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln{\left(\frac{2R_i + w}{w}\right)}} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

Bh	Gwl Measured Groundwater Level (m BGS)	Swl Estimated Seasonal Fluctuation above Gwl (m)	K Hydraulic Conductivity (m/s)	At 'Aquifer' Thickness (m BGS)	H <sub>0</sub> Ambient Head above 'Aquitard' (m)	h <sub>e</sub> Head above 'Aquitard' at Excavation (m)	Dd Drawdown (m)	R <sub>i</sub> Sichardt Calculation (m)	R <sub>i</sub> User Defined (m)	Q Groundwater Inflow (m³/d)
S5	0.00	0.00	7.8E-09	5.0	5.0	1.0	4.0	1.1		0.3
Maximum									0.3	
	etric Mean		7.8E-09	5.00	5.00	1.00	4.00	1.1		0.3
K Arithn	netic Mean		7.8E-09	5.00	5.00	1.00	4.00	1.1		0.3

Uncertainty Factor 3		Maximum x SF	(K Geometric Mean) x SF	(K Arithmetic Mean ) × SF	
Q Groundwater Inflow (m <sup>3</sup> /c	d)	1.0	1.0	1.0	
Uncertainty Factor	3	S(Maximum K × SF)	S(K Geometric Mean × SF)	S(K Arithmetic Mean × SF)	
R <sub>i</sub> Radius of Influence, Sich	ert (m)	1.8	1.8	1.8	

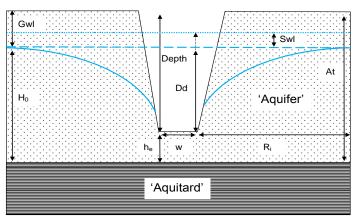
- m BGS = metres below ground surface
- The user defined R<sub>i</sub> is used for the calculation of groundwater inflow (Q) if specified

  Geometric mean calculation is applied only to the hydraulic conductivity (K) other input parameters for the Dupuit and Sichardt equation use the arithmetic average

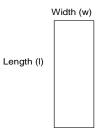
  The calculated groundwater inflows for the arithmetic and geometric mean both use the Sichardt R<sub>i</sub> calculated from the respective mean K

	Dewatering Rate Estimation - Unconfined Trench				
Project No.: Project Name: Client:	Project Name: Environmental Assessment Study of Arterial Roads within Hwy. 427 Industrial SPA47				
Location: Description:	Brampton, Ontario Installation of box Culvert S17 across East-West Arterial using open-cut excavation	Performed by:	Tomas Cihula		
Description: Date:	19 April 2022	Checked by:	Nick Schmidt		

EXCAVATION INFO						
Length, I (m)	10.0					
Width, w (m)	9.0					
Depth (m BGS)	4.0					



## Plan View



Radius of Influence (R<sub>i</sub>) calculated with the Sichardt equation  $R_i = 3000(H_0 - h_e)\sqrt{K}$ 

Groundwater Inflow (Q) to the excavation calculated with the Dupuit solution combining: 1) radial steady-state for inflow to trench ends, and 2) linear steady-state for inflow to trench sides.

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln \left(\frac{2R_i}{W}\right)} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

Bh	Gwl Measured Groundwater Level (m BGS)	Swl Estimated Seasonal Fluctuation above Gwl (m)	K Hydraulic Conductivity (m/s)	At 'Aquifer' Thickness (m BGS)	H <sub>0</sub> Ambient Head above 'Aquitard' (m)	h <sub>e</sub> Head above 'Aquitard' at Excavation (m)	Dd Drawdown (m)	R <sub>i</sub> Sichardt Calculation (m)	R <sub>i</sub> User Defined (m)	Q Groundwater Inflow (m³/d)
S17	3.31	1.00	1.1E-07	5.0	2.7	1.0	1.7	1.7		0.9
Maximum									0.9	
	etric Mean		1.1E-07	5.00	2.69	1.00	1.69	1.7		0.9
K Arithn	etic Mean		1.1E-07	5.00	2.69	1.00	1.69	1.7		0.9

Uncertainty Factor	3	Maximum x SF	(K Arithmetic Mean ) x SF	
Q Groundwater Inflow (m <sup>3</sup> /	d)	2.8	2.8	2.8
Uncertainty Factor	3	S(Maximum K x SF)	S(K Geometric Mean × SF)	S(K Arithmetic Mean × SF)
R <sub>i</sub> Radius of Influence, Sich	nert (m)	2.9	2.9	2.9

- m BGS = metres below ground surface
- The user defined R<sub>i</sub> is used for the calculation of groundwater inflow (Q) if specified

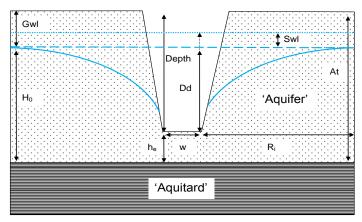
  Geometric mean calculation is applied only to the hydraulic conductivity (K) other input parameters for the Dupuit and Sichardt equation use the arithmetic average

  The calculated groundwater inflows for the arithmetic and geometric mean both use the Sichardt R<sub>i</sub> calculated from the respective mean K
- If the depth of the excavation is below the base of the 'Aquifer' then the head at the excavation is set at the top of the 'Aquitard' (i.e.  $h_e = 0$ )

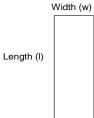
Comments

	Dewatering Rate Estimation - Unconfined Trench				
Project No.: Project Name: Client:	Project Name: Environmental Assessment Study of Arterial Roads within Hwy. 427 Industrial SPA47				
Location: Description:	Brampton, Ontario	Performed by:	Tomas Cihula		
Description: Date:	Installation of utilities beneath East-West Arterial using open-cut excavation 19 April 2022	Checked by:	Nick Schmidt		

EXCAVATION INFO				
Length, I (m)	15.0			
Width, w (m)	3.0			
Depth (m BGS)	4.0			



Plan View



Radius of Influence (R<sub>i</sub>) calculated with the Sichardt equation  $R_i = 3000(H_0 - h_e)\sqrt{K}$ 

Groundwater Inflow (Q) to the excavation calculated with the Dupuit solution combining: 1) radial steady-state for inflow to trench ends, and 2) linear steady-state for inflow to trench sides.

$$Q = \pi K \frac{(H_0^2 - h_e^2)}{\ln{\left(\frac{2R_i + w}{w}\right)}} + 2lK \frac{(H_0^2 - h_e^2)}{2R_i}$$

Bh	Gwl Measured Groundwater Level (m BGS)	Swl Estimated Seasonal Fluctuation above Gwl (m)	K Hydraulic Conductivity (m/s)	At 'Aquifer' Thickness (m BGS)	H <sub>0</sub> Ambient Head above 'Aquitard' (m)	h <sub>e</sub> Head above 'Aquitard' at Excavation (m)	Dd Drawdown (m)	R <sub>i</sub> Sichardt Calculation (m)	R <sub>i</sub> User Defined (m)	Q Groundwater Inflow (m³/d)
S5	0.00	0.00	7.8E-09	5.0	5.0	1.0	4.0	1.1		0.3
S17	3.31	1.00	1.1E-07	5.0	2.7	1.0	1.7	1.7		0.8
Maximum							0.8			
K Geom	etric Mean		2.9E-08	5.00	3.85	1.00	2.85	1.5		0.5
K Arithmetic Mean			5.9E-08	5.00	3.85	1.00	2.85	2.1		0.8

Uncertainty Factor	3	Maximum x SF	(K Geometric Mean) x SF	(K Arithmetic Mean ) x SF
Q Groundwater Inflow (m <sup>3</sup> /c	d)	2.3	1.6	2.3
Uncertainty Factor	3	S(Maximum K × SF)	S(K Geometric Mean × SF)	S(K Arithmetic Mean × SF)
R <sub>i</sub> Radius of Influence, Sich	ert (m)	4.9	2.5	3.6

- m BGS = metres below ground surface
- The user defined R<sub>i</sub> is used for the calculation of groundwater inflow (Q) if specified

  Geometric mean calculation is applied only to the hydraulic conductivity (K) other input parameters for the Dupuit and Sichardt equation use the arithmetic average

  The calculated groundwater inflows for the arithmetic and geometric mean both use the Sichardt R<sub>i</sub> calculated from the respective mean K

wood.

Appendix D
Limitations



## **LIMITATIONS**

- 1. The work performed in the preparation of this report and the conclusions presented are subject to the following:
  - (a) The Standard Terms and Conditions which form a part of our Professional Services Contract
  - (b) The Scope of Services
  - (c) Time and Budgetary limitations as described in our Contract
  - (d) The Limitations stated herein.
- 2. No other warranties or representations, either expressed or implied, are made as to the professional services provided under the terms of our Contract, or the conclusions presented.
- 3. The conclusions presented in this report were based, in part, on visual observations of the Site and attendant structures. Our conclusions cannot and are not extended to include those portions of the Site or structures, which are not reasonably available, in Wood's opinion, for direct observation.
- 4. The environmental conditions at the Site were assessed, within the limitations set out above, having due regard for applicable environmental regulations as of the date of the inspection. A review of compliance by past owners or occupants of the Site with any applicable local, provincial or federal by-laws, orders-in-council, legislative enactments and regulations was not performed.
- 5. The Site history research included obtaining information from third parties and employees or agents of the owner. No attempt has been made to verify the accuracy of any information provided, unless specifically noted in our report.
- 6. Where testing was performed, it was carried out in accordance with the terms of our contract providing for testing. Other substances, or different quantities of substances testing for, may be present on Site and may be revealed by different or other testing not provided for in our contract.
- 7. Because of the limitations referred to above, different environmental conditions from those stated in our report may exist. Should such different conditions be encountered, Wood must be notified in order that it may determine if modifications to the conclusions in the report are necessary.
- 8. The utilization of Wood's services during the implementation of any remedial measures will allow Wood to observe compliance with the conclusions and recommendations contained in the report. Wood's involvement will also allow for changes to be made as necessary to suit field conditions as they are encountered.
- 9. This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or contract. Any use which any third party makes of the report, in whole or the part, or any reliance thereon or decisions made based on any information or conclusions in the report is the sole responsibility of such third party. Wood accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on the report or anything set out therein.
- 10. This report is not to be given over to any third party for any purpose whatsoever without the written permission of Wood.
- 11. Provided that the report is still reliable, and less than 12 months old, Wood will issue a third-party reliance letter to parties that the client identifies in writing, upon payment of the then current fee for such letters. All third parties relying on Wood's report, by such reliance agree to be bound by our proposal and Wood's standard reliance letter. Wood's standard reliance letter indicates that in no event shall Wood be liable for any damages, howsoever arising, relating to third-party reliance on Wood's report. No reliance by any party is permitted without such agreement.

Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited