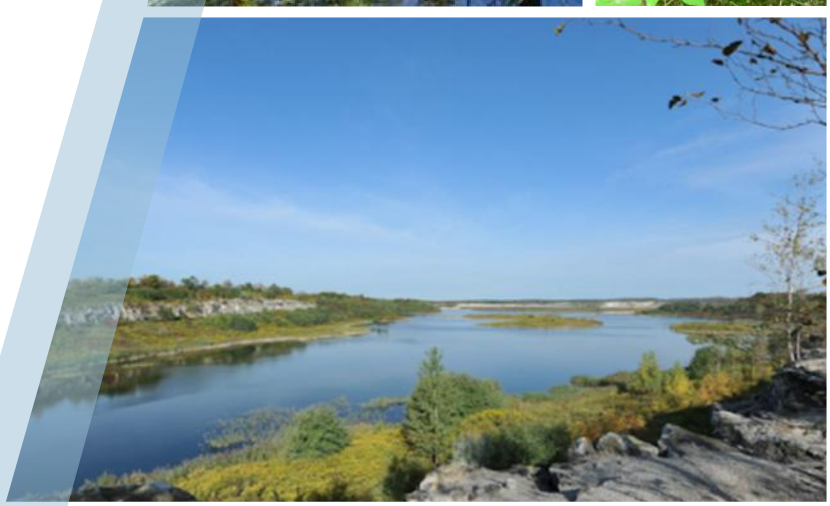
Geology and Water Resources Assessment Report

Dufferin Aggregates
Milton Quarry East Extension
Region of Halton

Dufferin Aggregates,
a division of CRH Canada Group Inc.



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List of Acronyms

AES	Atmospheric Environment Service
AMP	Adaptive Environmental Management and Protection Plan
AMSL	Above Mean Sea Level
ARA	Aggregate Resources Act
BMPs	Best Management Practices
ARIP	Aggregate Resource Inventory Paper
cm/s	Centimetres per second
CH	Conservation Halton
CNN	Canadian Climate Normal
Dufferin	Dufferin Aggregates
ECA	Environmental Compliance Approval
EIA	Environmental Impact Assessment
EWCB	Environment Canada Water Balance Model
GHD	GHD Limited
GEC	Goodban Ecological Consulting Inc.
GTA	Greater Toronto Area
GWRA	Geology and Water Resources Assessment
ha	Hectares
HEC-HMS	Hydrologic Engineering Center -Hydrological Modeling System
HFRT	Hilton Falls Reservoir Tributary
Igpm	Imperial gallons per minute
JART	Joint Agency Review Team
JESA	Jefferson Salamander Complex
km	Kilometre
L/m	Litres per minute
L/s	Litres per second
m	Metre
m^3/yr	Cubic metres per year

List of Acronyms (continued)

mm	Millimetres
MECP	Ministry of Environment, Conservation and Parks
MHBC	MHBC Planning Limited
MNDMNRF	Ministry of Northern Development, Mines, Natural Resources and Forestry
MQEE	Milton Quarry East Extension
NEC	Niagara Escarpment Commission
NETR	Natural Environment Technical Report
OGS	Ontario Geological Survey
ODWQS	Ontario Drinking Water Quality Standards
OWRA	Ontario Water Resources Act
PTTW	Permit To Take Water
PWQO	Provincial Water Quality Objectives
ToR	Terms of Reference
SCADA	Supervisory Control and Data Acquisition System
SGRA	Significant Groundwater Recharge Area
SWP	Source Water Protection
Town Line	Nassagaweya Esquesing Town Line
WMS	Water Management System
WHPA	Wellhead Protection Area

1. Introduction and Policy Context

1.1 Report Overview

GHD Limited (GHD) was retained by Dufferin Aggregates (Dufferin), a division of CRH Canada Group Inc. to assist in the development of an Application to extend the existing and approved Milton Quarry in the Region of Halton, Ontario. The proposed quarry extension lands are located in Part of Lots 11 and 12, Concession 1, Geographic Township of Esquesing, Town of Halton Hills, Regional Municipality of Halton. Refer to Figures 1.1 and 1.2.

GHD's role involved completing a geology and water resources assessment for the proposed Milton Quarry East Extension (MQEE) and surrounding lands as well as assisting in the development of mitigation and rehabilitation plans as they relate to water resources. This assessment included consideration of karst bedrock conditions and hazard lands. GHD also worked in collaboration with Goodban Ecological Consulting Inc. (GEC) in the development of measures to integrate the MQEE into the existing Adaptive Environmental Management and Protection Plan (AMP) for the Milton Quarry as documented separately in an AMP Addendum (GHD and GEC, December, 2021).

The proposed MQEE property is 30.2 hectares (ha) located with the existing East Cell to the north, the existing North Quarry to the west, and the existing Main Quarry to the southwest and south (refer to Figure 1.3). The proposed 15.9 ha MQEE extraction area is contiguous with the existing East Cell (i.e. it would be extracted as part of the East Cell) and separated from the North Quarry by the closed portion of Nassagaweya-Esquesing Town Line (Town Line) to the west. The remainder of the property will be maintained and protected for conservation uses. Activities outside the extraction area will be limited to monitoring, environmental mitigation (including the water management system), and ecological enhancement.

The maximum potential dolostone reserve (including both the Amabel and underlying Reynales Formations) in the proposed MQEE is approximately 15 million tonnes.

The mining plan for the proposed MQEE includes extending the East Cell to the south following approval and removal of the common setback on the south side of the East Cell. Dewatering of the combined extraction cell will continue as needed to facilitate operations under typical dry quarry floor conditions at Milton Quarry. Water resources in the vicinity of the proposed MQEE will be protected by the recharge of water to the groundwater flow system and diffuse discharge to two areas with wetland pools; one to the east (Wetland U1) and another to the south (two pools in the upper portion of Wetland W36). The rehabilitation of the proposed MQEE will follow the existing rehabilitation plan for the East Cell, filling the quarried area as part of the East Cell lake to allow more passive maintenance of the groundwater flow regime and associated water resources.

The potential influence of the proposed quarry on the groundwater is bounded by existing hydrogeologic features (which are hereafter referred to as hydrogeologic boundaries). Therefore, the study area is defined by the limits of these boundaries, including the existing Milton Quarry cells to the north, west, and south. The Niagara Escarpment lies to the southeast the study area.

The geology and water resources assessment is based upon information collected specifically for the proposed MQEE as well as information collected in support of studies and ongoing monitoring for the current Milton Quarry. Available information from the adjacent lands and regional/literature sources were also incorporated into the assessment. The terms of reference (ToR) (GHD, March 26, 2021) of the study were developed with input from the Joint Agency Review Team (JART) with consideration given to the Region of Halton's Aggregate Resource Manual and applicable government policies. The ToR document has been included herein for reference in Appendix H.

The study of the proposed MQEE lands and surrounding area commenced more than 40 years ago. Over this time extensive investigation and evaluation has occurred and a truly vast amount of data has been collected. The existing Milton Quarry Extension characterization, impact assessment, mitigation measures, and monitoring plan (refer to AMP) were thoroughly vetted through an extensive JART and public consultation process; evaluated and approved by all related government agencies, including the Provincial Joint Board and Cabinet; and the approved plans, including mitigation measures, have been successfully operating since 2007. The ongoing monitoring and performance assessment is thoroughly reported to, and reviewed by, relevant government agencies with support from their consultants as warranted. This rigorous approval and operating quarry review process provides the highest standard of care for protection of water resources.

The various approvals and agreements related to aggregate extraction at the Site have resulted in the development of an environmental monitoring program and the establishment and operation of a Water Management System (WMS) that supports aggregate extraction activities and facilitates water storage/handling, mitigation of water-related environmental features, and long-term rehabilitation. Dufferin has already committed to integrate the subject site into the state-of-the-art WMS and AMP that are already in place and have been operating at the Milton Quarry and the Milton Quarry Extension since 2007. The water mitigation system has effectively maintained groundwater levels around the perimeter of the Milton Quarry Extension protecting and enhancing surrounding water resources including water-dependent ecological features.

All approval agencies are familiar with the AMP and the hydrologic and natural environment data collection and assessment that is provided through annual reports and the on-line data sharing system (WebDT) that allows agencies direct access to hydrogeological data (and other information) at any time. The AMP also requires a comprehensive 5-Year Review to make any adjustments necessary to make sure the groundwater is maintained to an acceptable level thereby protecting the ecological features dependent upon it. The AMP was approved by the agencies and through annual reporting, as well as the recent 5-Year Review, it has been demonstrated that the proposed mitigation system has protected and enhanced natural heritage features surrounding the extension. The water management system for the MQEE will be a straightforward addition to the existing system using the same proven techniques for mitigation.

The understanding and operating basis for the existing Milton Quarry, along with the additional studies described in this Geology and Water Resources Assessment (GWRA) report form the basis for this application. Existing information on Milton Quarry can be found in the 5-Year AMP Review report that was recently completed (GHD, WSP, and GEC, January 24, 2020) and provided to the agencies for review. This extensive document provides a comprehensive report and evaluation of all relevant data and findings. In addition to the 5-Year Review and the on-line WebDT data sharing system, a comprehensive annual water monitoring report is provided and presented to the agencies at an annual agency water meeting, as well as other specific documents that are prepared from time-to-time.

The GWRA was conducted in coordination with the natural environment studies as described in the Natural Environment Technical Report and Environmental Impact Assessment [NETR/EIA] (GEC, December, 2021) and the other planning and technical disciplines including MHBC Planning Limited as described in the Planning Summary Report (MHBC, December, 2021).

This report is organized into the following sections:

- Section 2.0 Regional Setting
- Section 3.0 Field Investigations
- Section 4.0 Proposed MQEE Geology
- Section 5.0 Proposed MQEE Hydrology, including Hazard Lands Considerations
- Section 6.0 Proposed MQEE Hydrogeology, including Karst Considerations
- Section 7.0 Water Chemistry
- Section 8.0 Mining Plan
- Section 9.0 Water Resource Mitigation
- Section 10.0 Water Resources Impact Assessment
- Section 11.0 Summary and Conclusions
- Section 12.0 Recommendations
- Section 13.0 Reference
- Figures[1]
- Tables
- Appendices

The qualifications of the authors of this report are summarized in their Curricula Vitae included in Appendix I.

1.2 Policy Context

This water resources assessment report has been prepared to address the applicable requirements of the:

- Aggregate Resources Act for a Level 1 and 2 impact assessment
- The Niagara Escarpment Plan (2017)
- The Provincial Policy Statement (2020)
- The Region of Halton Official Plan

1 Map figures prepared for this report are oriented 45 degrees west of True North. All map figures are aligned in the "Plan North" orientation, which is drawn with north toward the top of the page and south toward the bottom. Directions referenced in the report are identified as the general direction of the page. Major roads, for example Town Line, are referenced to the page as the general north-south direction. This convention has been adopted from the Site Plans and Planning Summary Report to improve readability and to ensure consistency in map illustration

- The Town of Halton Hills Official Plan

The key considerations of the document include:

- Key hydrologic features include permanent and intermittent streams, lakes, seepage areas springs, and wetlands
- Protect the quality and quantity of key hydrologic features
- Minimize potential negative impacts, including cross-subwatershed impacts
- Ensure municipal drinking water supply and designated vulnerable areas are protected
- Protect vulnerable surface water and groundwater features and their hydrologic functions
- Maintain linkages and related functions between surface water and groundwater features
- Protect private and agricultural water supplies
- Evaluating and preparing for the impacts of changing climate to water resource systems at the watershed level
- Planning for efficient and sustainable use of water resources
- Identify mitigative and monitoring measures to protect, improve, or restore sensitive surface water features, sensitive groundwater features and their hydrologic functions.
- Assess natural hazards to ensure risk to public safety is minor and could be mitigated in accordance with provincial standards.

2. Regional Setting

2.1 Overview

The proposed MQEE is located in the Town of Halton Hills, above and to the west of the Niagara Escarpment. The rock that is proposed for extraction is the high quality dolostone of the Amabel Formation as well as the thin underlying dolostone of the Reynales Formation. The Niagara Escarpment forms the eastern limit of the Amabel Formation in Ontario. The Niagara Escarpment was formed by the erosion of the softer shales which occur beneath the more erosion-resistant dolostone caprock (Amabel Formation in the Milton area).

The Amabel Formation is well understood from both aggregate resource and water resource perspectives. It is currently quarried (or was previously quarried) at several locations in the vicinity of the Site, including:

- Dufferin's existing Milton Quarry
- Former Halton Crushed Stone quarry located immediately west of Dufferin Aggregates' existing quarry
- Former Milton Limestone quarry on the Milton Outlier
- Nelson Aggregate quarry south of Milton
- Dufferin's Acton quarry

The Amabel dolostone is a light to medium grey to buff, thick to massively bedded, porous, fossiliferous dolomitized limestone (commonly referred to as dolostone). The bedrock is variably fractured and weathered and is generally devoid of major anomalous features in the Milton Quarry area.

The proposed MQEE is located within the watershed of 16 Mile Creek, which is also referred to as Oakville Creek. The watershed is situated almost exclusively within the Region of Halton. The creek is comprised of three main branches, which are named West, Middle, and East 16 Mile Creek.

The proposed MQEE is located within the headwaters of the West 16 Mile Creek, which is above the Niagara Escarpment as shown on Figure 1.3 and Figure 2.6. The Tributaries to West 16 Mile that are in the vicinity of the Milton Quarry include the intermittent Hilton Falls Reservoir Tributary (HFRT) and the Sixth Line Tributary (these names have been traditionally used by the Study Team for ease of reference). The Sixth Line Tributary flows parallel to the northern edge of the West Cell and East Cell of the Milton Quarry (beyond the limit of extraction) before turning south along Sixth Line and passing west of the North Quarry.

The area of the Milton Quarry is comprised of a poorly drained dolostone plain, which is characteristic of many areas west of the Niagara Escarpment where the Amabel is close to ground surface. The existing land use in the area is a mixture of farmland, rural residential, natural areas (either forest or wetland areas), surface water reservoirs, and existing quarries.

The Amabel dolostone generally forms the uppermost water bearing zone in the study area. The majority of recharge of the Amabel Aquifer occurs during the spring freshet period, when water levels may rise by as much as 6 to 7 metres from seasonal lows. Water levels decline from the spring through the fall to seasonal lows which have been observed to occur as late as December or January. Additional recharge may be experienced during extreme precipitation events or during the fall wet season depending upon actual climatic conditions.

Regional groundwater flow is generally towards the south due to the southwest dip of the Amabel Formation and the truncation of the Amabel to the east along the Escarpment (refer to Figure 2.6). Groundwater flow discharges locally to creeks and wetlands as well as regionally to the Escarpment. Quarry dewatering also collects groundwater flow locally, and this is largely pumped out to the groundwater recharge system to recharge groundwater or discharged to surface water flow for mitigation of wetlands or as otherwise agreed with CH. The regional groundwater flow patterns largely mimic the surface water drainage patterns, particularly during high water periods.

During high water periods, groundwater discharges to a number of creeks and wetlands in the area. As the water levels decline during the spring through fall period, the areal extent and rate of groundwater discharge diminishes. Wetlands that receive surface water flow and groundwater discharge in the spring may be dry later in the year. Flows and the extent of flowing reaches in the creeks also decrease dramatically following the spring freshet as a result of the cessation of surface runoff and diminishing groundwater discharge.

Further explanation of the regional setting is provided in the following sections:

- Section 2.2 Regional Physiography
- Section 2.3 Regional Geology

- Section 2.4 Regional Hydrology
- Section 2.5 Regional Hydrogeology

2.2 Regional Physiography

The proposed MQEE occurs within the northern portion of the Flamborough Plain physiographic region and near the adjacent Horseshoe Moraines physiographic region (Chapman and Putnam, 1984) as shown on Figure 2.1. The Flamborough Plain region is characterized primarily by the presence of a limestone (dolostone) plain with relatively thin overburden. Bedrock occurs at the surface in some areas, particularly near the edge of the Escarpment. Overburden present in the area generally consists of bouldery glacial till, sand and gravel, or organic soils. In the region of the Site, (Figure 2.1) the plain is bounded by the Galt Moraine to the northwest and the north-south trending Niagara Escarpment on the east. Some northwest/southeast trending drumlins also occur to the northwest of the Site.

2.3 Regional Geology

2.3.1 Overburden

The proposed MQEE and surrounding area above the Niagara Escarpment is covered by a Bedrock Drift Complex which is extensive but discontinuous (Karrow, 1991). This complex consists primarily of thin bouldery till which is variable in thickness, and often is sufficiently thick to subdue the bedrock topography. Dolostone bedrock outcrop and thin drift occurs northwest and northeast of the proposed MQEE with minor organic material, stony sand Wentworth Till and silt to clayey silt Halton Till overlying bedrock. An extensive area of Wentworth Till occurs further to the north and northwest.

Overburden must be removed prior to quarrying the Amabel dolostone. Therefore, the generally thin overburden in the study area enhances the viability of Amabel extraction in the area. The thin stony overburden has also decreased the usefulness of the lands for agricultural purposes.

The area below the escarpment consists primarily of an extensive area of silt to clayey silt Halton Till which overlies shale bedrock. Localized areas of fine-grained glaciolacustrine deposits overlie the till and are comprised of massive to laminated silt and clay. In addition, some buried valleys consisting of outwash and ice-contact sands and/or gravels occur near the base of the Escarpment. The overburden beneath the Escarpment varies in thickness up to about 40 m.

2.3.2 Bedrock

The proposed MQEE and surrounding area is underlain by Paleozoic sedimentary rocks of Silurian and older Ordovician ages. These Paleozoic sedimentary rocks form the Michigan Basin. The bedrock formations of the Michigan Basin gently dip (decline in elevation) to the southwest at a rate of approximately 4 to 9 m per kilometre (km) toward the centre of the Basin in Michigan. The eastern limit of the Basin forms the Niagara Escarpment. The Site and surrounding area above (west) of the Escarpment is underlain by the Amabel Formation of Middle Silurian age as presented on Figures 2.3 and 2.4.

The Niagara Escarpment occurs to the southeast of the MQEE and forms the major bedrock and topographic feature in the area. It originated as a result of differential weathering and erosion of easily weathered and eroded thick shale formations which underlie the more massive and resistant Amabel dolostone caprock. The relief of the Escarpment varies from about 50 to 60 m, and the vertical cliff lessens in height and prominence northward towards Limehouse.

Some re-entrant valleys occur in the area, including the Campbellville Re-entrant west of Milton which forms a ramp up the Escarpment which is used by Highway 401 (Karrow, 1991). The smaller Acton Re-entrant is located to the north extending into Acton from Limehouse. In addition, the Milton Outlier is located south of the proposed MQEE and Highway 401 and consists of an isolated knob of elevated bedrock which is capped with resistant Amabel dolostone. Isolation of this outlier occurred as a result of erosion by a glaciofluvial system.

The Escarpment cuts through the bedrock strata from the Amabel caprock to the Queenston Formation. The Escarpment cliff face (where present) is primarily comprised of the Amabel caprock. The underlying Reynales, Cabot Head, Manitoulin, and Whirlpool Formations are present in the study area but are truncated to the east by the Niagara Escarpment. The Queenston Formation continues to the east of the Escarpment forming the red shale bedrock in that area.

The name "Amabel"[2] is the traditional name used for the aggregate resource bedrock formation at the Milton Quarry (and elsewhere). The traditional names are used in this study for consistency with existing reports and approvals. The updates in nomenclature do not alter the characteristics of the associated bedrock.

The Amabel Formation generally ranges from approximately 10 to 40 m thick, although some areas exhibit lesser or greater thicknesses, and consists of light to medium grey to buff, thick massive to irregularly bedded, porous, fossiliferous dolostone rock. The dolostone is generally medium to coarse grained, and the porosity is variable and may be intergranular to vuggy in nature. Structural features that occur within the Amabel Formation include fractures, joints, and bedding planes. Horizontal fractures, which occur at various orientations, can be laterally extensive and are often associated with geological discontinuities. Vertical fractures commonly intersect the horizontal fractures. Vertical fractures predominantly occur at two orientations, with strikes ranging from 20 to 80 degrees; and 110 to 130 degrees relative to compass north (Lapcevic et al., 1993; Nadon and Gale, 1981).

Fracturing and dissolution features generally occur variably throughout the Amabel. The upper weathered zone of the rock generally has a higher incidence of these characteristics. Large porous reefal structures and significant karstic features are occasionally reported in the Amabel and can be a concern for groundwater flow if encountered due to their high permeability. No significant features such as these have been identified in the Milton Quarry area (refer to Section 4.0).

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[2] Historically, the Amabel was considered to include two bedrock units, the overlying Eramosa Member (which is not present in the Study Area but has been reported to the north by AECOM and AquaResource, 2014) and the underlying "Unsubdivided Amabel". However, more recently (Armstrong and Carter, 2010) the Eramosa Member is included with the overlying Guelph Formation (also not present in the Study Area). Therefore, what was formerly referred to as the "Unsubdivided Amabel" is now simply referred to as the Amabel.

More recently, the Ontario Geological Survey (OGS) has made proposed revisions the Silurian age stratigraphic nomenclature (Brunton and Brintnell, 2011, Cramer et al. 2011). The Unsubdivided Amabel has been replaced by the Rochester Formation (thin to absent in the Study Area), the thick Gasport Formation, and the thinner overlying Goat Island Formation (generally absent in the Milton Quarry area, but may exist to the north). The Reynales has been replaced by several thin units including the Merriton, Rockway, and Irondequoit Formations.

Karst is a term that is applied to dissolution features found in soluble bedrock materials (e.g., limestone, dolostone, gypsum, salt). Karst exhibits a range of landforms from small pitting in the bedrock surface, to solution widened fractures and joints, to cavernous dissolution and cave systems. The development of karst features is slow to occur and are related to bedrock composition, bedrock structure, and hydrological and chemical processes acting on the bedrock (Ford and Williams, 1989). The formation of significant solution widened fractures and joints, along with cave systems can result in a subsurface hydrological regime dominated by rapid flow and drainage along these pathways.

Fracturing and jointing occur variably throughout the Amabel Formation. Some of these fractures and joints exhibit minor dissolution features related to the weathering of the bedrock. The upper weathered zone of the bedrock generally exhibits a higher incidence of solution widened fractures and joints within the upper several metres compared to deeper within the bedrock. The solution widened fractures and joints has resulted in the formation of a shallow bedrock hydrological regime which exhibits minor amounts of solution enhanced drainage. Deeper within the bedrock, limited solution widened fractures and joints are found.

Large porous reefal structures are occasionally reported in the Amabel in Ontario, and if hydraulically interconnected to significant karstic features (e.g., solution widened fractures and joints), can be a concern for groundwater control if encountered because of their associated high permeability. These large porous reefal structures may require mitigation to reduce their effect on groundwater flow. However, no such large high permeability or karst features have been identified in the Milton Quarry area.

At the Milton Quarry, small reefal mounds have been noted to occur within the Amabel Formation; however, these have not been associated with high groundwater flow fractures and joints, and are not a groundwater flow concern as they do not have a high associated permeability or where found at depth, do not have strong interconnection to the shallow, more weathered bedrock zone.

The Amabel is underlain by the Reynales Formation. The Reynales Formation is generally a thin (2 to 3 m) grey-brown, fine-grained, interbedded argillaceous dolostone with occasional thin shale laminae. Horizontal fractures occur parallel to the thin bedding planes.

The Amabel and Reynales Formations can be grouped together for characterization purposes. The Reynales is thin and the contact between the Amabel and Reynales Formations is generally not evident from water well records. Figure 2.5 presents the elevation of the bottom of the Reynales Formation in the study area, generated by interpolation of available data from Milton Quarry, Acton Quarry, as well as more distant locations (e.g., Guelph).

The Cabot Head Formation underlies the Reynales Formation. The Cabot Head Formation is comprised of a grey-green, finely laminated shale that gradually changes into a reddish shaley limestone. The Cabot Head shale is approximately 15 to 20 m thick.

The Cabot Head Formation is underlain by the Manitoulin Formation which is approximately 6 m thick. The Manitoulin Formation is a light grey crystalline argillaceous limestone with several interbedded layers of shale.

The Manitoulin Formation is underlain by the Whirlpool Formation, which is approximately 4 m thick. The Whirlpool Formation is a light brown-grey, thickly bedded, fine-grained quartz sandstone.

The Whirlpool Sandstone is underlain by the Queenston Formation, which is approximately 150 m thick. The Queenston is comprised of a red, fissile, calcareous shale that is interbedded with grey-green argillaceous limestone.

2.4 Regional Hydrology

The proposed MQEE is located within the watershed of 16 Mile Creek. The watershed is situated almost exclusively within the Region of Halton with a small segment in the Region of Peel. The creek is comprised of three main branches, which have been named the West, Middle and East 16 Mile Creek. The proposed MQEE is located within the headwaters of the West 16 Mile Creek, which is above the Niagara Escarpment southwest of Acton. There is a distinct difference in the hydrology of the portions of the Creek above and below the Niagara Escarpment due the differences in topography, geology, surficial soils, land use, channel gradient and incision, as well as reservoir regulation of flow by Conservation Halton.

The headwaters of the West 16 Mile Creek are characterized by an abundance of depressed, poorly drained areas, as well as numerous on-line ponds (man-made and beaver ponds) and riparian wetlands, all of which dampen the storm runoff response and enhance infiltration and evapotranspiration.

The West 16 Mile Creek above the Niagara Escarpment is comprised of numerous tributaries. For ease of reference within this report, these tributaries have been named the Sixth Line Tributary, Fifth Line Tributary, Fourth Line Tributary, Hilton Falls Reservoir Tributary, and Campbellville Pond Tributary, as shown on Figure 2.6.

The Sixth Line Tributary is located north of the existing Milton Quarry (West Cell and East Cell) and borders the west side of the North Quarry. The Sixth Line Tributary is perennially flowing and well defined in the reach adjacent to the Milton Quarry Extension. Creek flow measurements indicate that the Sixth Line Tributary is generally in a "gaining" condition (groundwater discharge area) between 15 Sideroad to the northeast and the Sixth Line south culvert to the west.

The general direction of surface drainage for the MQEE lands is south towards the Hilton Falls Reservoir Tributary (HFRT) and the Main Quarry. Drainage is generally poor with the majority of surface water directly infiltrating or pooling before infiltrating or evapotranspirating. The HFRT has a larger pooled area within Wetland W44. Downstream of this area the HFRT is intermittent and reinfiltrates or flows overland into the Main Quarry during high water periods.

From the headwaters above the Niagara Escarpment, West 16 Mile Creek flows southeasterly through Milton to its outlet at Lake Ontario in Oakville. The portions of the West 16 Mile Creek and its tributaries within urban Milton have been lined with concrete for flood control purposes. Urban Milton is subject to severe flooding during a Regulatory Storm. The Middle and East branches confluence near Britannia and Trafalgar Roads. The West branch confluences downstream of this point, near Lower Baseline Road and Highway 25.

The Tributary to the east of the MQEE is referred to as the Speyside Tributary. The Speyside Tributary has discontinuous flow above the Escarpment. This Tributary flows (seasonally) into the Middle 16 Mile Creek.

2.5 Regional Hydrogeology Above Escarpment

Above the Niagara Escarpment, the groundwater flow regime in the study area is dominated by the Amabel Aquifer (Holysh, 1995 and 1997; Turner, 1978; CRA 2000 and 2008; EarthFX, 2013). The Amabel Aquifer forms the eastern portion of the Guelph-Amabel Aquifer which extends from the Niagara Peninsula to the Bruce Peninsula. The Guelph Formation overlies the Amabel Formation (i.e., above the Eramosa Member) to the west of the proposed Study area but is not present in the study area. The extent of the Amabel, its moderate to high yield, proximity to ground surface, and generally potable water quality make it a principal source of water for private and municipal water supplies above the Niagara Escarpment.

In general, the groundwater yield from the Amabel Formation is variable, but more than adequate for private domestic users. Well yields in excess of 225 L/min (50 Igpm) are not uncommon.

The nearest municipal supply wells in the Amabel are in Acton. The Acton water supply utilizes both overburden and Amabel bedrock wells. The Milton water supply wells are located beyond (south of) the Escarpment in the Campbellville Re-Entrant Buried Valley sediments as shown on Figure 2.7. The Milton Quarry is not located within any designated Source Water Protection (SWP) areas (i.e. it is outside any Wellhead Protection Areas – WHPAs).

There are no known communal water supplies in the Milton Quarry area and there are no private or public water supply wells that could be potentially affected by the proposed MQEE. The closest water supply wells are 1.2 km or more away and hydraulically isolated from the proposed MQEE. Those to the north and west are on the far side of the existing quarry excavation while those to the east and south are below the Escarpment and hence beyond the Amabel Aquifer groundwater flow system.

The area above the Niagara Escarpment can generally be interpreted as a region of high groundwater recharge. The thin, relatively permeable, overburden cover allows the infiltration of precipitation to the Amabel Formation. The Amabel Aquifer is generally unconfined in the study area with a water table within 10 m of the bedrock surface.

The Amabel generally acts as a single hydrostratigraphic unit due to its high degree of vertical interconnection. Groundwater flow is primarily horizontal within the Amabel as it is underlain by the Cabot Head shale which forms a competent lower permeability aquitard limiting groundwater flow to lower formations.

The Reynales Formation is very thin relative to the overlying and underlying bedrock of the Amabel and Cabot Head Formations (respectively) and generally has hydraulic properties ranging between those of the adjacent formations. The Reynales is therefore not highly significant in terms of the overall groundwater flow system. For the purposes of this study, the Reynales is lumped together with the Amabel Aquifer due to the difficulty in distinguishing these two units from non-corehole drilling records and the identified occurrence of water movement in the Reynales.

Groundwater in the Amabel Aquifer discharges to both local and regional features. Regional groundwater flow within the bedrock aquifer occurs in a general southerly direction towards the Escarpment and the limit of the Amabel (Figure 2.8). The groundwater elevation information presented on Figure 2.8 represents the information derived from historical water well records in 2000 prior to extraction of the North Quarry, West Cell, or East Cell and alteration of the associated flow regime.

Groundwater flow which reaches the Escarpment may follow one of several pathways:

- Discharge as a spring from the escarpment face or lower talus (rock fall) slope.
- Discharge through the subsurface via vertical fracturing of the Amabel and underlying formations near the Escarpment, or through talus at the Escarpment to groundwater flow systems below the Escarpment.
- Discharge through the subsurface (as above) where the Escarpment face is buried (i.e., where the Amabel subcrops rather than outcrops).

Some groundwater discharges to local springs, ponds, wetlands, and creeks upgradient of the Escarpment. Much of this groundwater discharge is seasonal in nature. A higher occurrence of groundwater discharge to surface water is evident near the Escarpment, as the Escarpment is generally downgradient relative to groundwater flow and downstream relative to creek flow.

Due to the general proximity of the water table to ground surface and the thin overburden soil, the groundwater flow patterns generally mimic the surface water flow patterns (i.e., topography). The interpreted regional limits of the watershed boundary shown on Figure 2.6 were selected using data from water well records and topography information to coincide with the surface water catchment and the limit of the Amabel.

Local variations in the flow patterns occur as a result of groundwater-surface water interactions related to creeks, ponds, and wetlands as well as existing dewatering operations currently being conducted to facilitate quarrying in the area. These local patterns include groundwater highs associated with local recharge and discharge areas.

A regional groundwater flow divide occurs several kilometres north of Milton Quarry (west of Acton Quarry) as based on the groundwater contours presented by Turner (1978, Figure 2.5). This area coincides with the eastern portion of the Moffat Moraine which consists primarily of sandy till, and limited bedrock outcrop (Figures 2.1 and 2.2).

Reported values of hydraulic conductivity for the Amabel Formation are summarized in Table 2.1. The hydraulic conductivity of the Amabel Formation is dependent on the degree of fracturing, etc. and thus is locally variable, however, typical values of hydraulic conductivity for the Amabel Formation are generally in the range of 10^{-2} to 10^{-4} centimetres per second (cm/s).

Available information on the hydraulic conductivity of formations below the Amabel Formation is detailed in Table 2.2. The typical hydraulic conductivity of the Cabot Head Formation is at least two orders of magnitude lower than that of the Amabel Formation indicating that the quantity of groundwater flow through this formation is limited.

The Manitoulin and Whirlpool Formations exhibit low to moderate hydraulic conductivities and hence limited groundwater flow given their modest thickness (4 m and 6 m, respectively).

3. Field Investigations

The existing information provides a robust understanding of the geology, hydrology, and hydrogeology conditions associated with the Milton Quarry and MQEE lands. As described in Section 1 above, a vast amount of site investigation and monitoring has been completed for the Milton Quarry area and continues on an ongoing basis as part of the comprehensive monitoring and mitigation program that is required under the various approvals for the Milton Quarry. All of this information is reported to, and reviewed by, the agencies on a regular basis, as well as being available to the public.

In addition to the existing information and ongoing data collection for the Milton Quarry, extensive additional investigation and monitoring activities have been undertaken as part of the MQEE application as documented in this report. These investigations add significantly to the knowledge basis developed for the existing Milton Quarry and initiated baseline monitoring that is appropriate for AMP-related performance monitoring requirements following an approval of the proposed MQEE.

The results of field investigations that were conducted specifically for the proposed MQEE or existing information on, or directly relevant to the MQEE assessment, are described in this report and the collected data is presented in the respective appendices

Appendix A	Topography and Instrumentation Survey
Appendix B	Overburden and Bedrock Stratigraphy Logs and Grain Size Analysis Logs
Appendix C	Surface Water Level Monitoring Data and Hydrographs
Appendix D	Groundwater Level Monitoring Data and Hydrographs

Due to the extent of other information available for Milton Quarry, the reader is referred to the following sources of Milton Quarry information if it is desired to make reference to them:

- Milton Quarry 5-Year AMP Review (GHD, including contributions by GEC and WSP, January 4, 2020): This report includes a comprehensive compendium of Milton Quarry data up to 2018.
- 2020 Annual Water Monitoring Report (GHD, including contributions by GEC and WSP, March, 2021 as well as other years): These annual reports include an updated compendium of monitoring data for Milton Quarry for the relevant year.

A brief description of the field investigations for the proposed MQEE is provided below.

3.1 Topography and Instrumentation Survey

An overall study area plan was developed as presented on Figure 3.1, incorporating geographic features from Ontario Base Mapping, property ownership boundaries, and field instrumentation information. Instrumentation and monitoring locations in the vicinity of the northern cells (North Quarry, East Cell, and West Cell) are presented on Figure 3.2.

Topographic mapping of the study area and surrounding region were surveyed using aerial photography with ground truthing. Topography and monitoring instrumentation in the vicinity of the MQEE lands are presented on the MQEE Base Plan on Figure 3.3. This information is overlaid on an air photo from 2019 on Figure 3.4, and with topographic elevation contours on Figure 3.4a. Survey and field instrumentation details are summarized in Appendix A.

3.2 Overburden and Bedrock Investigations and Instrumentation

Over 340 boreholes have been drilled and monitoring wells installed for geological and hydrogeological investigations at the Milton Quarry, including locations in the MQEE area for prior investigations. These past efforts provide a reliable understanding of the geologic and hydrogeologic conditions across the MQEE property and adjacent areas. Additional subsurface investigations and monitoring well installations were conducted to provide some further detailed information within and adjacent to the proposed extraction area and to provide suitable long-term performance monitoring well locations.

The additional investigations carried out for the proposed MQEE include the drilling of 8 new boreholes at 6 locations in February and March 2020 and February 2021. In each of the 8 boreholes, monitoring wells were installed (i.e., 8 new monitoring wells), with two of the locations having nested shallow and deep monitoring wells [denoted as OW78-20 through OW83-21 on Figure 3.3 with shallow and deep nested monitoring well intervals denoted as "S" and "D", respectively].

The boreholes were drilled by setting a 4-inch steel casing grouted into the top of bedrock and drilling to the base of the Reynales Formation using HQ core drilling techniques. The monitoring wells were completed as open bedrock hole wells with a loose-fit PVC screen/riser (to prevent caving) as is typically done at Milton Quarry. The deep interval of the nested monitoring wells were completed with a 10-foot (nominally 3-metre) well screen surrounded by a sand back extending slightly beyond the screen interval with grouting of the remainder of the borehole. A GHD geologist logged these boreholes and prepared stratigraphic and well instrumentation logs as included in Appendix B. These locations along with the previously completed boreholes/monitoring wells in the MQEE area are shown on Figure 3.3.

A total of 33 test pits were excavated within the proposed extraction area and along the potential WMS alignment to determine the overburden thickness and characterization. These locations are denoted as TP01-20 to TP22-20 and TP26-20 to TP36-20 on Figure 3.3. Stratigraphic logs for all these test pits and grain size analysis results for selected representative overburden samples are also included in Appendix B.

3.3 Surface Water Level Monitoring

There are several historical surface water monitoring locations in the area of the proposed MQEE, including 2 locations in proximity to the south and southeast of the proposed MQEE extraction area (SG5 and SG6, respectively). SG5 has water level monitoring data from 1999 to 2007 and 2020 to present while SG6 has data from 1999 to present.

The MQEE studies included establishing 10 new staff gauges at key wetland locations determined in collaboration with GEC [denoted as SG57 through SG66 on Figure 3.3]. These locations are east and south of the proposed MQEE extraction area. They include SG66 in Wetland U1 which is 50 metres east of the proposed extraction area.

Manual water level measurements are collected monthly at all 12 of these surface water monitoring locations. Water level transducers were installed at 9 of these surface water monitoring locations, including SG66 in Wetland U1 and three locations in Wetland W36 (SG5, SG57, and SG58). In addition, monthly qualitative observations are made at the location of a spring flowing into the northeast corner of Wetland W41 (beside SG61) where a small diameter pipe (approximately 1-inch diameter) and seep discharge water to Wetland W41. This pipe appears to have been placed by an unknown party for the collection of a small spring or seep.

These additional surface water monitoring locations greatly enhance the historical surface water level monitoring network in this area and facilitate better understanding of surface water/groundwater interactions and correlation between the water resources and ecology resources findings.

Surface water instrumentation details are summarized in Appendix A (Table A.2). Surface water level monitoring data and hydrographs are presented in Appendix C.

3.4 Groundwater Level Monitoring

Regular groundwater elevation monitoring has been conducted by Dufferin since 1989 for the Milton Quarry and has included more than 340 monitoring wells and collection of over 150,000 water level measurements. Presently a monthly monitoring program is underway which includes most of the available monitoring wells, piezometers, staff gauges which are available. Domestic well water levels are also monitored on a quarterly basis. More frequent (including continuous) monitoring is conducted at selected locations.

In addition to relying on the extensive existing hydrogeologic information, regular water level monitoring is being conducted at all available monitoring wells shown on Figure 3.3 in the area of the proposed MQEE. There are 27 monitoring wells located on the MQEE lands or areas to the south and east. These locations include the 8 new monitoring wells installed in 2020 and 2021 (refer to Section 3.2 description above) plus previously installed monitoring wells on these lands that were not monitored in recent years. Manual water level measurements are completed monthly at the majority of these locations. A limited number of monitoring wells have quarterly monitoring based on their location relative to other monitoring wells and the assessment of the proposed MQEE. Water level transducers were installed at 15 monitoring wells of greater relevance to the proposed MQEE assessment and potential locations for long-term performance monitoring.

Monitoring well instrumentation details are summarized in Appendix A (Table A.1). Groundwater level monitoring data and hydrographs are presented in Appendix D.

3.5 Water Quality Data

Water quality and the underlying water chemistry have been extensively evaluated at the Milton Quarry and continue to be monitored through the provisions of the WMS and the private well water supply monitoring program under the AMP and the Ontario Water Resources Act (OWRA) approvals. Based on the results of these monitoring programs to date and a substantial assessment completed for the 5-Year AMP Review (GHD, 2020), there is no indication that Dufferin's operations have had any adverse water quantity or quality effects on residential wells or water resources in the vicinity of the quarry. These previous assessments have demonstrated the continued suitability of recharge water for mitigation and the proposed MQEE will not alter the water quality. Therefore, further assessment of the suitability of recharge water for mitigation is not necessary and the assessment herein focuses on the baseline characteristics of water chemistry on the MQEE lands as requested by the Region of Halton.

Water chemistry sampling was undertaken in early 2021 to provide additional baseline data. This data includes results of groundwater and surface water sampling at locations associated with the water resources (wetlands) to the east and south of the proposed MQEE extraction area. Discussion relating to water chemistry and the current MQEE monitoring results is provided in Section 7 with the associated data presented in Tables 7.1 and 7.2.

4. Site Geology

4.1 Overview

The site-specific characterization of the geology of the proposed MQEE is presented in this section of the report, including a description of the aggregate resource.

The proposed MQEE lands are on the south slope of the topographic and bedrock high located along the south side of the East Cell where the ground surface rises as high as elevation of approximately 347 m above mean sea level (AMSL) (refer to Figure 4.1). The natural ground surface declines radially away from the height of land towards the Sixth Line Tributary to the north and west, the Escarpment to the east, and the Main Quarry to the south. To the north and west, the natural topography has been altered by the Milton Quarry extraction to date.

Within the proposed extraction area for the MQEE, the ground surface varies from a local high of 347 m AMSL in the northwest area to a low of 334 m AMSL in the southwest corner.

The geology profile in the proposed MQEE area is shown on two cross-sections shown on Figure 4.1. The north-south cross-section A-A' is shown on Figure 4.2 and the west-east cross-section B-B' is shown on Figure 4.3. The cross-sections illustrate the geologic profile, subsurface investigation locations (boreholes and monitoring well intervals are depicted), groundwater levels as described in Section 6, and surface features such as property and extraction limits, wetland boundaries, etc. Broader cross-sections depicting the overall Milton Quarry setting, including the Niagara Escarpment and deeper geologic formations are shown in the WRA Report (CRA, 2000).

The glacial overburden generally exists as a thin veneer of glacial drift on top of the bedrock. The overburden ranges in thickness from 0 to approximately 4 m within the extraction area (refer to Figure 4.4). The overburden material is generally comprised of fine-grained material.

The bedrock geology of the proposed MQEE is consistent with that in the existing Milton Quarry to the north, west, and south as well as the nearby (former) Halton Crushed Stone and Acton quarries. The Amabel dolostone is the uppermost bedrock unit.

The Amabel dolostone is generally similar to the high quality stone encountered in the Main Quarry. Investigation and mining results indicate the rock mass has modest variability and does not contain any significant anomalies such as large reefal zones or karst features.

The combined bedrock aggregate resource of the Amabel and Reynales Formations ranges from approximately 29 to 41 m in thickness as shown on Figure 4.8. This relatively thick rock mass results in a greater ratio of rock production to extraction area than in some thinner resource areas.

The bedrock formations underlying the Amabel and Reynales (i.e. Cabot Head, Manitoulin, Whirlpool, and Queenston) are consistent with the regional setting presented in Section 2.1.

A summary of stratigraphic contacts information is presented in Table 4.1.

The proposed MQEE will provide approximately 15 million tonnes of high quality dolostone resource to the Greater Toronto Area (GTA).

4.2 Overburden

The overburden in the MQEE area is similar to that found in most of the Milton Quarry lands. It occurs as a thin veneer of glacial drift deposits overlying bedrock. The overburden is generally fine-grained with cobbles and boulders.

The nature and extent of overburden was investigated through a series of test pits excavated on the lands as well as available borehole information. Investigation locations are shown on Figure 4.1. A total of 33 test pits were excavated in February 2020. There were 23 located within or immediately adjacent to the proposed extraction footprint. The remainder were located on land to the east associated with the proposed WMS alignment and a low-lying area that had been previously disturbed.

The overburden was logged for each test pit and a total of 14 representative soil samples were submitted for grain size analyses. The test pit logs and grain size analysis results are included in Appendix B and the grain size analyses are summarized in Table 4.2.

The overburden ranges in thickness over the extraction area from approximately 0 to 4 m. The individual measured thicknesses are shown on Figure 4.4 and tabulated in Table 4.1. The average estimated thickness within the extraction area is 1.3 m with a total estimated overburden volume of 210,000 cubic metres (m^3).

The overburden material is generally comprised of finer-grained silt and clay soils to poorly sorted silty or clayey sands and gravels with very limited occurrence of cleaner sand and gravel. Gravel, cobbles, and boulders were commonly observed as part of the soil matrix. All but one of the 14 samples that were analyzed for grain-size analysis demonstrated at least 24 percent silt and clay content.

4.3 Bedrock/Geology

4.3.1 Amabel Formation

The Amabel Formation is the uppermost bedrock unit present in the proposed MQEE. The dolostone of the Amabel Formation is the same bedrock that is extracted at the existing Milton Quarry. The Amabel Formation dolostone is generally described as a light to medium grey to buff, fossiliferous, medium to coarse-grained, dolomitized limestone.

The top of bedrock surface in the vicinity of the MQEE is part of the south side of the large mound described in Section 4.1 (refer to Figure 4.5). The bedrock surface exhibits a moderate degree of large-scale undulation within this broader feature and is generally reflected in the ground surface.

The bedrock surface within the proposed extraction area has a local high point of approximately 345 m AMSL in the north-central area as identified at borehole BH6-60 and test pits TP-03-20 and TP04-20. This bedrock general declines to the west and to the south with the lowest elevation of approximately 331.5 m AMSL identified in the southwest area corresponding to the lower topography in this area.

Further to the east, the bedrock surface and topography decline from near the proposed extraction limit, south towards the area of Wetlands W36 and W41 that exhibit elevations in the range of 328 to 332 m AMSL.

The bottom surface of the Amabel Formation (top of Reynales Formation) (refer to Figure 4.6) is gently undulating with a dip of 2 to 5 m per km (i.e., slope of 0.2 to 0.5 percent) in the west direction (southwest in true coordinates). The base of the Amabel ranges from approximately 307 to 305 m AMSL in the proposed extraction area.

The resultant isopach (thickness) of the Amabel demonstrates a relatively consistent thick zone of rock ranging from approximately 26 to 38 m in the proposed extraction area. The combined thickness of the Amabel and Reynales ranges from approximately 29 to 41 m as shown on Figure 4.8.

The Amabel dolostone exhibits thick to massive bedding. Weathered portions of the rock are light grey to buff in colour, while unweathered portions are typically medium grey with darker bands. The weathered zones are primarily in the upper portion of the bedrock although some weathered zones are also visible at depth within the Amabel.

The Amabel is typically medium to coarse grained fossiliferous saccharoidal (sugary) dolostone. Vugs or small angular cavities in the rock are estimated to constitute approximately 2 to 5 percent of the rock volume and generally range from 2 to 10 millimetres (mm) in size. Zones of increased vugginess do exist but they appear to be discontinuous.

The colour and texture of the dolostone and the presence of iron staining indicate that some weathering of the Amabel has occurred throughout its sequence with the highest degree of weathering in the upper and middle portions. The topographical relief of the Amabel is associated with differential erosion of the bedrock surface. Some low areas may be associated with zones of less competent rock that have been eroded.

4.3.2 Reynales Formation

The Reynales Formation underlies the Amabel Formation. The bottom surface of the Reynales Formation (i.e. top of Cabot Head) is also relatively smooth as shown on Figure 4.7 with a local dip of 2 to 5 m per km (i.e., slope of 0.2 to 0.5 percent) in the plan west direction, similar to that of the Amabel.

The Reynales Formation was observed to consist of medium grey, fine-grained to very fine-grained argillaceous dolostone with greenish-grey shale laminae. The observed Reynales thickness ranges from approximately 2 to 3 m in the vicinity of the proposed extraction area.

4.3.3 Underlying Formations

The following descriptions are provided for the formations underlying the Amabel and Reynales Formations. New coreholes were not necessary to be drilled through the underlying Cabot Head, Manitoulin, Whirlpool or Queenston Formations in the proposed MQEE area due to the availability of information from the adjacent North Quarry and Main Quarry areas, the general consistency of these formations, and the fact that these formations will not be extracted for aggregate. Further information on these underlying formations is available in the WRA report (CRA 2000) and the Milton Quarry Extension Geologic Study Report (JHL, May 2000).

The nearest existing corehole to the proposed extraction area which penetrates through the Cabot Head Formation into the Manitoulin Formation is BH36 located approximately 150 m to the west within the North Quarry. The deeper formations were penetrated at BH6 at the Main Quarry. The following descriptions primarily reflect the conditions at these boreholes.

Cabot Head Formation

The Cabot Head Formation was observed at BH36 to be approximately 14 m thick. The rock consists of blue-grey calcareous, fissile shale with numerous soft zones and red-brown dolostone interbeds. In the Main Quarry several borings penetrated the Cabot Head Formation where the thickness was approximately 18 m. A thickness of 18.2 m was observed at BH6.

Manitoulin Formation

The Manitoulin Formation was observed to be 6.3 m thick at BH6 (and at least 4.4 m thick at BH36). The Manitoulin Formation at BH36 consists of shale and dolostone. The shale is grey and fissile. The dolostone is grey-white and fine-grained, and accounts for 35 to 40 percent of the recovered core.

Whirlpool Formation

The Whirlpool Formation was observed at BH6 to be 4 m thick. The Whirlpool Formation at that location consists of pale brown fine-grained sandstone with occasional shale lamina.

Queenston Formation

The Queenston Formation of the Ordovician period was observed at corehole OGS-83-1 in the main quarry to be approximately 150 m thick. The Queenston Formation at that location consists of maroon and pale gray-green shale.

4.4 Aggregate Resource

The proposed extraction area for the MQEE was delineated based primarily on various planning and ecological factors as described in the Planning Summary Report and the NETR/EIA and is shown on Figure 4.1.

The dolostone resource proposed for extraction includes both the Amabel dolostone and the Reynales dolostone.

The Province has identified in the Aggregate Resource Inventory Paper (ARIP 184 – Region of Halton, 2009) that "Bedrock of the Amabel Formation is identified as an important high-quality crushed stone resource … suitable for the production of many aggregate products."

The Amabel is described in ARIP 184 as consisting "… mainly of medium-crystalline, fossiliferous, medium- to massive-bedded dolostone and is well suited for the production of road building and construction aggregate. The Amabel is considered to be a resource of provincial significance for these products. (Telford, Liberty and Bond, 1976)".

The Amabel has been quarried at a number of locations since the 1960s to provide high quality construction aggregates to the western GTA market. These locations include: Acton Quarry, Milton Quarry, Former Halton Crushed Stone, Former Milton Limestone, and Nelson Quarry.

The Reynales dolostone has also been demonstrated to be suitable for production of aggregate products at Milton Quarry through the ongoing production and testing of such aggregate products by Dufferin Aggregates.

The proposed MQEE will provide approximately 15 million tonnes of high quality dolostone resource to the Greater Toronto Area (GTA) similar to the Existing Quarry. This resource estimate has been developed using the stratigraphic surfaces (top of Amabel and top of Cabot Head/bottom of Reynales) presented in Section 4.3 to develop a combined Amabel and Reynales) dolostone resource isopach as shown on Figure 4.8. A typical rock density of 2.67 tonnes per cubic metre (2,670 kg/m^3) is used. The substantial depth of the Amabel and Reynales resource in the proposed MQEE (approximately 36 m thick on average) provides a large (beneficial) ratio of aggregate produced to the area of land disturbed.

The total available dolostone resource within the MQEE extraction area itself is estimated to be approximately 15 million tonnes, comprised of 14 million tonnes of Amabel dolostone and 1 million tonnes of Reynales dolostone. In addition, the removal of the southern setback over the common extraction boundary of the East Cell will provide an additional 350,000 tonnes of resource (325,000 tonnes of Amabel dolostone and 25,000 tonnes of Reynales dolostone).

5. Site Hydrology

5.1 Overview

The general direction of surface drainage for the MQEE lands is southwest towards the Main Quarry. Some of the lands to the east of the proposed extraction area drain south toward the HFRT which also drains into the Main Quarry. The surface water catchment information and surface water features for the broader area are shown on Figure 5.1. The local drainage related to the proposed MQEE extraction area is shown on Figure 5.2 along with the underlying topographic information.

Drainage is generally limited with the majority of surface water directly infiltrating or pooling before infiltrating or evapotranspirating. The HFRT channel “HF-1 Tributary” to the southeast of the MQEE lands exhibits perennial water in a large pool area within Wetland W44; however, it becomes intermittent downstream where it drains into the Main Quarry.

Other Dufferin Quarry lands to the north and west (outside the extracted area of the East Cell, West Cell, and North Quarry) drain primarily to the Sixth Line Tributary to the north and west or to the Main Quarry. To the north and west of the MQEE lands, the current extent of quarrying has intercepted any associated runoff and the water is managed as part of the fully-integrated Milton Quarry WMS.

5.2 Climate and Water Balance

The precipitation that falls on the Milton Quarry area is distributed along several pathways, including surface water runoff, recharge to groundwater, and evapotranspiration. These water cycle pathways are shown schematically on Figure 5.3 with representative values for the Milton Quarry area. Some of these distribution values are derived from climate-related monitoring while others are derived from water balance analysis and modelling as described below.

Hydrologic monitoring has been implemented since 1991 as part of the existing quarry monitoring program. The detailed results for this program are reported under separate cover in the Annual Monitoring Reports and in the 5-Year AMP Review. The following provides some highlights of the monitoring and water balance evaluation findings.

Rain data for the spring, summer and fall months has been collected at Milton Quarry since 1991. These data have been augmented with precipitation data (snow and rain) recorded at the Acton Wastewater Treatment Plant by Conservation Halton and at the Georgetown Environment Canada Atmospheric Environment Service (AES) station during the winter months. The average 30-year annual precipitation is 866 mm. The individual yearly precipitation totals and averages are presented in Table 5.1. Approximately 83 percent of the total yearly precipitation occurs in the form of rain, with the remainder as snow.

Pan evaporation data have also been collected since 1991. These data have been converted to lake evaporation using a lake correction factor of 0.7 and adjusting for winter evaporation/sublimation when the pan is not in operation. The resulting yearly evaporation totals and averages are presented in Table 5.2. The calculated annual average evaporation rate is 672 mm/year. The rate recorded by Dufferin is consistent with the long-term Daily average lake evaporation. Rates over 6 mm/day have been recorded several times during summer months.

The Milton Quarry water balance was updated in the 5-Year AMP Review Report and is applicable to the MQEE lands. The water balance was evaluated using the Environment Canada Water Balance Model (EWCB) and the Hydrologic Engineering Center – Hydrological Modeling System (HEC-HMS) using the Canadian Climate Normals period (1981-2010). The key water balance parameters for the area include the following average annual values:

- Precipitation 866 mm
- Evapotranspiration 573 mm
- Surface Runoff 60 mm
- Groundwater Recharge 233 mm

Within the quarry cells all runoff is captured and directed to the WMS Reservoir for storage and beneficial use. The evapotranspiration rate can vary based on quarry conditions, generally comprising:

- Dry quarry floor – evaporation (no vegetation) 300 mm
- Lake/Reservoir – evaporation 672 mm
- Vegetated landform – evapotranspiration 573 mm

These parameters have been refined since initial development more than 20 years ago and have been employed and verified to be appropriate through various water budget evaluations for the Site. The details of the latest refinement are documented in Section 8.2 and Appendix K of the 5-Year AMP Review and are further discussed and evaluated in Section 10.2.2 and Appendix G herein through implementation in the current water budget evaluations for the proposed MQEE.

5.2.1 Climate Change Considerations

Changing climate conditions are evaluated through two additional climate scenarios (total of three scenarios) and are applied to the water budget for the Site. Long-term variability in water budget conditions has the potential to affect the duration of lake filling of the quarry lakes; however, a water surplus continues to be predicted for the Site under all conditions evaluated, as presented in Section 10.2.2.1 and Appendix G.

The first parameter set employed in the water budget is estimated for the Canadian Climate Normals (CCN) period from 1981 to 2010 and is representative of baseline (observed long-term average) conditions, as discussed above. Two additional climate change scenarios are evaluated that represent potential future conditions in the latter part of the century representative of the 2050s and 2080s. The parameters applied are representative of a 30-year average (similar to the CCN values) centered on the years identified and are representative of potential future long-term average conditions.

The key water balance parameters for the 2050's period include the following average annual values:

- Precipitation 937 mm
- Evapotranspiration 646 mm
- Surface Runoff 40 mm
- Groundwater Recharge 251 mm

The key water balance parameters for the 2080's period include the following average annual values:

- Precipitation 1003 mm
- Evapotranspiration 707 mm
- Surface Runoff 28 mm
- Groundwater Recharge 268 mm

The results show an increase for all of the variables (except runoff) between the baseline period and the two future climate periods. Infiltration is projected to increase by 18 mm/year in the 2050s and by 35 mm/year in the 2080s as compared to the baseline period. Similarly, evapotranspiration will increase by 39 mm/year in the 2050s and by 82 mm/year in the 2080s. Runoff will decrease because of higher evapotranspiration from the surface and top soil layer and higher infiltration from the deeper soil layer in the future. It is to be noted that the runoff does not include the groundwater recharge (infiltration component). The total streamflow (runoff + infiltration), on the other hand, will increase due to increasing infiltration in the future.

These results are in accordance with the numerous climate change studies which suggest an increasing trend in air temperature and precipitation in the representative atmospheric concentration pathways "RCP8.5" scenario towards the end of the 21st century (Simonovic, 2018; Werner, 2011; IPCC, 2013). Higher air temperature will result in higher evapotranspiration rates. This will cause an increase in precipitation and hence a rise in the infiltration volumes as well.

The application of these climate scenarios and water balance parameters is discussed further in Section 10.2, Section 10.3, and Appendix G.

5.3 Hilton Falls Reservoir Tributary

Hilton Falls Reservoir Tributary

As shown on Figure 2.6, the Hilton Falls Reservoir Tributary (HFRT) is a tributary to 16 Mile Creek that originates in the lands northeast of the Main Quarry. The catchment area for the HFRT includes MQEE lands; however, to the south of these lands the catchment is intercepted by the Main Quarry. The intercepted water is handled by the existing WMS with surface water being discharged from the Main Quarry to the downstream reach of the HFRT. This discharge is coordinated and managed with CH, as discussed further below.

The HFRT originates at the northeast portion of Wetland W44 and also includes flow from Wetland W41 as shown on Figure 5.2 with label HF-1 Tributary. The Wetland W44 area of the tributary is a broad area that consistently exhibits year-round water as indicated by available aerial photography and historic monitoring and observations at SG10. The HFRT is fed by runoff as well as flow from one or more springs or seeps. A small perennial seep has been identified in the northeast area of Wetland W41, immediately adjacent to SG61 as described further in Section 6.8.3.

Between the Wetland W44 area and the Main Quarry, flow is typically intermittent, with inflow into the Main Quarry typically ceasing by June as demonstrated by historic field observations and monitoring at location SW21.

Other historical points of drainage from the HFRT catchment include a secondary channel at the extreme east end of the Main Quarry(labelled HF-2 Tributary on Figure 5.2) and Wetland W36 near Town Line. Neither of these drainage pathways exhibit flow into the Main Quarry under current (extracted) quarry conditions except possibly during very wet periods such as extreme precipitation or snowmelt events.

The portion of the HFRT that historically traversed the Main Quarry area has been intercepted by, and routed through, the quarry in agreement with CH and the MNDMNRF. Surface and groundwater that enters the Main Quarry that is in excess of the evaporation and/or operational demands is ultimately collected in the Reservoir. A minimum of 700,000 m^3/year of water is released from the Reservoir to the downstream reach of the HFRT west of the Main Quarry as agreed with CH. This will remain unchanged as part of the proposed MQEE.

Within the HFRT catchment area, there are a number of wetlands as shown on Figure 5.1 and Figure 5.2. Wetland U1 is a seasonal pool in the open field area east of the proposed extraction footprint. The remaining wetlands are located to the south and east within the woodland area. Of these distant wetlands, Wetland W41 has perennial surface water present supported by the small spring as indicated above. The remaining wetlands within the Natural Environment Study Area (generally within 120 m of the proposed extraction footprint) have intermittent pools, drying out seasonally.

Staff gauges were installed to measure water levels in selected wetlands in coordination with the natural environment study by GEC. These staff gauge (SG) locations are shown on Figure 5.2. Further details on these wetlands are provided in the Natural Environment Report and an analysis of groundwater-surface water interactions is presented in Section 6.8 of this report.

Based on observations by GHD and GEC, there has not been any surface water runoff from the MQEE lands in recent years (GEC observations commenced in early spring 2019 and GHD observations commenced in winter 2020). These observations are consistent with the generally poorly developed drainage pathways, shallow overburden, and depth to groundwater that are all consistent with a high degree of infiltration. While Wetland U1 has a small drainage ditch extending south to W36, there is no evidence of flow and it is concluded that any historic flow was likely supported by a higher groundwater level regime in the past (refer to Section 6.8.1).

Therefore, it is expected that most of the water that might otherwise move as surface water runoff in the broader area actually infiltrates to groundwater within the local area of the MQEE. During very wet periods such as extreme precipitation or snowmelt events some runoff may still occur; however, no evidence of such runoff has been observed. These considerations are conservatively incorporated into the following assessment and proposed quarry mitigation plans as described in Section 5.4 and Section 9.

5.4 Proposed MQEE Surface Water Drainage

This section evaluates the potential effects of the proposed Extension on surface water drainage. As described above, it is concluded that in the local MQEE area, most water that is expected to be surface runoff (estimated to be 60 mm per annum) actually infiltrates. However, the following analysis conservatively quantifies the potential effect if such water is in fact available as runoff (i.e., worst case scenario for potential impacts related to surface runoff), while the mitigation measures described in Section 9 are designed to be suitable whether or not there is any surface runoff.

The surface water drainage and catchment areas for the MQEE lands are shown on Figure 5.2. The total HFRT drainage catchment north and east of the of the Main Quarry is 133.2 ha. The proposed extraction area of 15.9 ha is located on a local topographic high and there is no upstream drainage onto the extraction area.

As presented on Figure 5.2, the majority of the proposed MQEE extraction area (84%) currently drains to the south towards Wetland W36. With a small area (14%) in the northwest draining west towards Town Line and the existing North Quarry.

Part of the proposed extraction area drains to Wetland U1 prior to reaching Wetland W36. Wetland U1 is a shallow pool located east of the proposed MQEE extraction area as described in the Natural Environment Report. Wetland U1 was instrumented with a staff gauge (SG66) and a monitoring well nest immediately to the west in early 2020. A topography and wetland boundary survey were also completed in 2020 in collaboration with GEC and this information is presented on Figure 5.4

The maximum observed water depth in Wetland U1 during the spring was approximately 30 cm in 2020 and 22 cm in 2021. There is a shallow drainage path that enters the pond from the north side and an overflow drainage channel that extends south to Wetland W36; however, no water has been observed in these drainage channels.

The proposed extraction area drainage includes 4 sub-catchments as shown on Figure 5.2:

- 2.2 ha draining from the northwest corner to the North Quarry
- 4.2 ha draining southeast to Wetland U1
- 3.5 ha draining overland to the drainage ditch extending downstream from Wetland U1 to Wetland W36
- 6.0 ha draining south to Wetland W36

The drainage for Wetland U1 includes a total area of 10.5 ha upstream of U1. Therefore, the proposed extraction area draining to Wetland U1 (4.2 ha) represents approximately 40 percent of the total drainage for Wetland U1. The drainage for Wetland W36 includes that of Wetland U1 and comprises a total area of 39.6 ha. Of this area, 35 percent (13.7 ha) is comprised of overland drainage originating within the MQEE extraction area. No other wetland contributing drainage areas will be altered as a result of the proposed MQEE.

As described above, field observations by GHD and GEC indicate that there is little to no actual surface runoff from the proposed extraction area or other MQEE lands except possibly during extreme precipitation and snowmelt events (none observed). The generally shallow permeable soil, depth to groundwater, and sustained vegetative cover facilitate relatively rapid infiltration and evapotranspiration of precipitation. These observations are substantiated by the surface water monitoring data for Wetland U1 which indicates the water level did not rise above the outflow ditch invert during 2020 or 2021 (i.e., a maximum water level of 317.8 m AMSL was observed in 2020 compared to an outflow invert of approximately 318.1 m AMSL). They are also consistent with the low surface runoff determined from the water balance modelling (Section 5.2 above).

Based on review of historical aerial photography and analysis by GEC (refer to the NETR/EIA) Wetland U1 appears to be intermittently wet; however, there is no indication from the photography or field observations by GHD or GEC that there is any substantial or sustained flow in the ditch leading away from Wetland U1 to the south.

The total amount of runoff from the proposed extraction area will be captured by the quarry and made available to the WMS for storage and beneficial re-use. As previously committed by Dufferin, the existing WMS will be expanded to protect, maintain, and enhance the water resources and related ecological features in the area of the proposed MQEE. In particular, these measures will include protection and/or enhancement of Wetland U1 and Wetland W36. Therefore, there are no negative influences on surface water resources anticipated from the proposed MQEE and the proposed mitigation measures are designed to enhance the hydroperiod and ecological conditions of these wetlands. Refer to Section 6, Section 9, and Section 10.2 as well as the NETR/EIA for further information.

5.5 Natural Hazard Lands

Potential natural hazards are identified where present and assessed below. In general, hazard land (natural) includes lands that could be unsafe for development because of naturally occurring processes associated with flooding, erosion, dynamic beaches, or unstable soil or bedrock. These areas have been identified in the vicinity of the MQEE and best management practices (BMPs) are incorporated into the proposed MQEE plans. The potential for human-made hazards associated with the proposed MQEE are discussed separately in Section 8.

The regulatory limits for floodplain, headwater, meander belt, stable top of bank, and wetland hazards in the MQEE vicinity have been obtained from Conservation Halton in the MQEE vicinity. An overlay of these potential hazard considerations is presented on Figure 5.5. The nearest natural hazards include:

- Wetland Hazard U1 located 50 m to the east
- Wetland Hazard W36 located 110 m to the south
- Wetland Hazard V2 located 70 m to the northeast within the Milton Quarry East Cell licence area

The hazard land buffer zone for Wetland U1 lies entirely outside the proposed MQEE extraction limit but within the proposed Licence boundary, including a limited portion of the WMS. Activities within this area will be controlled, and suitable BMPs will be applied, to protect against erosional impacts to wetland U1. These operational requirements are included on the Site Plans and specific provisions for the establishment of the WMS are described in the AMP.

The hazard land buffer zone for Wetland W36 lies entirely outside the proposed MQEE extraction limit and outside the proposed Licence boundary. There will be no quarry operational activities within these areas; however, some limited WMS installation work may occur to enhance Wetland W36 with a diffuse discharge and to optimize the recharge well system effectiveness relative to the protection and enhancement of water resources associated with Wetland W36. Activities within this area will be controlled, and suitable BMPs will be applied, to protect against erosional impacts to Wetland W36. These operational requirements are included on the Site Plans and specific provisions for the establishment of the WMS are described in the AMP based on proven practices that have been previously established and implemented at Milton and Acton Quarry.

Wetland V2 lies within the East Cell Licence limit but outside the East Cell extraction limit and outside the proposed East Extension Licence limit. The hazard land buffer zone for wetland V2 lies entirely outside the proposed MQEE extraction limit but a portion of it lies within the proposed MQEE Licence boundary, including a limited portion of the WMS. Suitable measures have been previously implemented within the East Cell Licence limit to prevent any impacts to Wetland V2 arising from quarry operations or WMS establishment activities. Activities within the MQEE Licence limit will be controlled, and suitable BMPs will be applied, to protect against erosional impacts to wetland V2. These operational requirements are included on the Site Plans and specific provisions for the establishment of the WMS are described in the AMP.

It is noted that an assessment of karst has been completed as part of this study for the purpose of inclusion in the hydrogeologic evaluation. This assessment in included in Section 6.5 with a further review by Dr. Worthington of Worthington Groundwater Inc. included in Appendix E. Given the proposed type of development (i.e., aggregate extraction), karst topography is not anticipated to be a relevant hazard.

The quarry operations and WMS establishment have the potential to result in erosion and other impacts within these wetland areas; however, standard erosion control measures and best management practices (BMPs) can effectively prevent any such impacts and are described in greater detail in Section 9.

6. Site Hydrogeology

6.1 Overview

The hydrogeology of the MQEE area is relatively straightforward. The dominant hydrogeological unit is a 20 to 40 m thick unconfined dolomitic bedrock aquifer consisting of the Amabel and Reynales Formations. Underlying the bedrock aquifer is the approximately 14 to 18 m thick Cabot Head shale, which acts as a regional and local aquitard. Overlying the bedrock aquifer is a relatively thin layer of glacial overburden that remains unsaturated except in localized topographical depressions such as creeks and wetlands or during major recharge events. The elevation of the groundwater table is typically observed in the upper portion of the Amabel Formation.

The entire groundwater flow system is driven by recharge of the bedrock aquifer from precipitation with groundwater flow directions in the bedrock aquifer typically mimicking topography. A groundwater mound exists to the northeast of the proposed MQEE extraction area, centred around the topographic high on the Dufferin lands southeast of the East Cell where the groundwater high is now maintained by the existing recharge well system.

Groundwater flows in a generally radial pattern away from the mound, moving south and southwest through the proposed MQEE area discharging to the extracted areas of the existing quarry to the west, wetlands to the south, and the Main Quarry further south.

In some locations there are depressions in the topography that are intersected by the groundwater table. In some of these locations ponds, wetlands, springs, and streams occur, the majority of which are intermittent.

Groundwater flow in the Amabel Aquifer occurs primarily through the fractures and minor dissolution features in the bedrock. The Amabel is sufficiently well connected and generally lacks major bedding controls on groundwater flow such as may occur in the presence of marked changes in lithology. The Aquifer can therefore be reasonably represented as an equivalent porous medium for the purposes of this study. This is a common approach employed in most fractured rock groundwater flow studies.

Typically, in a dolomitic aquifer there are some variations in hydraulic conductivity resulting from the structure of rock and specifically the fracture pattern. Studies completed in the area of the proposed MQEE and broader Milton Quarry area indicate the bulk hydraulic conductivity of the Amabel aquifer is generally on the order of 10^{-4} to 10^{-2} cm/s.

The following sections will discuss the various aspects of the proposed Extension hydrogeology in greater detail.

6.2 Hydrostratigraphy

Based on the hydrogeologic conditions present in the proposed MQEE, there are five distinct hydrostratigraphic units:

- Overburden
- Amabel Aquifer (including Reynales Formation)
- Cabot Head/Manitoulin Aquitard
- Whirlpool Semi-Aquifer
- Queenston Aquitard

The hydrostratigraphic units are separated based on their lithology and permeability. Only the upper three units play an active role in the groundwater flow regime relevant to the proposed MQEE.

Overburden

The overburden is typically 1 to 3 m thick in the proposed MQEE extraction area and Licence area with some outcrops apparent and a maximum observed thickness of 3.8 m at the north limit of the proposed extraction area. The overburden is generally moderately permeable due to its variable make-up and shallow depth. The area to the east also has generally thin overburden as identified by available borehole data and field observations of bedrock outcrops. The overburden is not an aquifer. It is typically unsaturated and, even in the broader Milton Quarry area, there is no domestic use of water from the overburden.

Amabel Aquifer

The Amabel Aquifer, consisting of the Amabel and Reynales Formations represents the uppermost aquifer in the proposed MQEE area and the broader area above the Escarpment. The Amabel Aquifer is under unconfined (water table) conditions. The Amabel exhibits moderate permeability and a large, saturated thickness. These two units have been combined as a single hydrogeologic unit in this evaluation as well as in previous studies. The saturated thickness ranges from approximately 35 m in the mound area northeast of the proposed MQEE extraction area to 15 m on the northwest side of the proposed MQEE extraction area where it has been partially dewatered by the existing quarry extraction.

Cabot Head/Manitoulin Aquitard

The Cabot Head and Manitoulin Formations consist of approximately 20 m of shale and dolostone of a generally low hydraulic conductivity. Hydraulic conductivity testing results (refer to Section 6.4) indicate that the hydraulic conductivities of both the Cabot Head shale and Manitoulin dolomite are 3 to 5 orders of magnitude lower than the Amabel dolomite. This variation in hydraulic conductivity makes an excellent aquitard that limits vertical flow of groundwater below the Amabel Aquifer.

Whirlpool Semi-Aquifer

Underlying the Cabot Head/Manitoulin aquitard is the sandstone of the Whirlpool Formation. The Whirlpool exhibits a low to moderate hydraulic conductivity, and a limited thickness of approximately 4 m. Although it has significant confining pressure in the vicinity of the proposed MQEE it may have sufficient capacity to be used for domestic water supplies in some areas. The Whirlpool Formation does not play a major role in groundwater flow in the study area.

Queenston Aquitard

The Queenston aquitard consists of approximately 150 m of shale at low hydraulic conductivity, providing a highly effective aquitard.

6.3 Groundwater Elevations

In the proposed MQEE area, groundwater flow within the Amabel Aquifer is generally southwest from the groundwater mound located southeast of the East Cell. Further east, the groundwater flow moves towards the southeast, discharging locally to wetlands, tributary creeks above the Escarpment, or the Escarpment itself.

Groundwater elevations have been contoured for spring 2020, fall 2020, and spring 2021 as shown on Figures 6.1, 6.2, and 6.3, respectively. These monitoring events generally represent the seasonal high (spring) and low (fall) groundwater periods. Spring 2020 groundwater levels were higher than those in spring 2021 due to climatic conditions. At nested monitoring well locations, the groundwater elevation contours represent the water level in the shallowest bedrock monitor.

The groundwater elevations are flatter in the southwest part of the mound with the gradient steepening towards the wetlands to the southeast (gradient of approximately 0.02 m/m) and even moreso towards the existing quarry (gradient of approximately 0.03 m/m to 0.06 m/m to the west and northwest area of the proposed MQEE extraction limits).

In each set of groundwater contours similar groundwater flow patterns are evident with the fall groundwater levels (Figure 6.2) being 1 to 7 m lower than those in the spring (Figure 6.1). In April 2020 the peak elevation near BH70 is approximately 340 m AMSL. This dropped to approximately 336 m AMSL in October 2020. Groundwater elevations in discharge areas can vary more or less than this amount depending upon how the discharge feature interacts with the groundwater flow system. Figure 6.4 presents an isopach of the groundwater level decline from April to October 2020.

In the event that Dufferin proceeds with a shallow extraction bench above the groundwater table, the maximum potential groundwater elevation surface for the MQEE area was predicted for current conditions as shown on Figure 6.5 and described herein. The April 2020 spring freshet groundwater elevations were reviewed relative to historical climatic conditions and surface drainage in the vicinity of Wetland U1. It is anticipated that higher groundwater elevations could occur in a climatically wet year; however, the peak groundwater elevation would be limited by ground surface and surficial drainage features. The maximum achievable water elevation in Wetland U1, provided on Figure 5.4, is controlled by an outlet channel with a peak elevation of 338.1 m AMSL. This elevation is approximately 1 m above the maximum groundwater elevation measured in OW78S/D-20 in April 2020, suggesting a potential upper limit on groundwater levels. To account for anticipated variability in climatic conditions and the effect of surficial drainage, the maximum predicted water table has been developed by adding 1 m to the April 2020 interpreted groundwater elevations presented on Figure 6.1. This calculated groundwater table surface presented on Figure 6.5 provides a reasonable estimate of the maximum potential groundwater table.

Groundwater level variations at individual monitoring wells are shown as temporal hydrographs on Figures 6.6 through 6.8. Figure 6.6 presents hydrographs for three nested monitoring well locations. Figures 6.7 and 6.8 present hydrographs for a number of monitoring wells in the northern and southern (respectively) portions of the MQEE area as well as background locations (OW68-07, and BH112). Figures 6.7 and 6.8 are presented in both a long-term view (Figures 6.7a and 6.8a) as well as a short-term view commencing in 2020 (Figures 6.7b and 6.8b). These hydrographs are discussed below.

The groundwater elevations presented on Figure 6.6 support the determination that the Amabel behaves as a single hydrostratigraphic unit. These conditions have been observed elsewhere in the Amabel Aquifer (e.g., Acton and Caledon) as well as in other areas of the Milton Quarry. Within the local area of the proposed MQEE, the water levels at the three monitoring well nests OW3-3-I/II/III, OW78S/D-20, and OW79S/D-20 demonstrate that vertical hydraulic head differences are minor (generally within centimetres) between different elevations within the Amabel (refer to Figure 6.6). These small vertical head differences are consistent with a single hydrostratigraphic unit characterization of the Amabel aquifer. The vertical gradients are generally neutral to slightly downward during high water period and neutral to slightly upward during the lower water period as evident on Figure 6.6; however, the water level differences are generally very small.

Groundwater elevations fluctuate dramatically during the year based on seasonal effects except in some discharge areas where a relatively consistent surface water levels dampen these fluctuations (refer to Figure 6.4, 6.7, and 6.8). The highest water levels typically occur during the spring freshet (March and April) although sometimes a major winter melt event can result in a spike in groundwater levels before the freshet (e.g. refer to OW68-07 in January 2020 on hydrograph in Appendix D). Following the spring peak, groundwater levels generally decline through the rest of the year to the late fall or even the following winter as described below.

Some of the groundwater elevations in the northern group of monitoring wells exhibit an influence or control from the East Cell recharge system operation (e.g. OW71-08, BH71, OW79S/D-20) or East Cell dewatering (e.g. OW3-80) . In the more southerly and distant monitoring wells (OW69-08, BH65, and BH66) the monitoring data do not indicate any appreciable influence associated with quarry operations; however, some older (pre-monitoring) influence may have occurred closer to the existing quarry at BH64 as described in Section 6.8.2 (below).

The October 2020 conditions were within the range of other fall water levels. The lowest seasonal water levels observed in recent years occur in December or January at levels as much as 7 m (or more) below seasonal highs.

6.4 Hydraulic Characteristics

The hydraulic characteristics of the Amabel Aquifer at the Milton Quarry are well understood from the results of over 40 years of monitoring, testing, and evaluation. The past testing programs have included single well response tests (or packer tests) and longer-term groundwater pumping tests. These tests involved collecting hydraulic data for determining the hydraulic parameters of transmissivity and hydraulic conductivity. Generally pumping tests are representative of the bulk properties of the bedrock aquifer while single well response tests are indicative of localized variations in hydraulic conductivity. In addition to these pumping and single well response tests, the ongoing groundwater recharge operation and long-term monitoring program provide extensive additional insight into the hydraulic characteristics of the Amabel Aquifer.

The single well response test and pumping test results are summarized below and further details may be found in the WRA report (CRA, May 2000). The broader understanding from all the operational and monitoring data has been incorporated into the groundwater simulation model and the groundwater recharge system design as documented in this report and the AMP 5-Year Review.

6.4.1 Single Well Response Tests

Numerous single well response tests (or packer tests) have been completed to estimate the local hydraulic conductivity around boreholes. Single well response tests were completed in 1997/1998 as part of the study for the Milton Quarry Extension. Historically, tests were also completed by Dufferin (in 1989/1990) and Nadon and Gale (1981) at the Main Quarry. The results of these tests are summarized in Table 6.1.

In general, these results demonstrated the hydraulic conductivity of the Amabel Aquifer was higher than that of the underlying aquitard formed by the Cabot Head Shale. No definite spatial trend (horizontal or vertical) was observed in the calculated hydraulic conductivity values for the Amabel Aquifer. The data suggest a generally slightly more permeable zone at shallow to intermediate depths which is consistent with what is expected from weathering of the Amabel.

The single well response test results for the Amabel Formation indicate a geometric mean of hydraulic conductivity on the order of 1×10^{-3} to 1×10^{-5} cm/s. The hydraulic conductivity for the Cabot Head Formation varies from approximately 1×10^{-4} to 1×10^{-8} cm/s, with the higher values representing isolated features within the broader rock matrix or permeability enhancement directly below the quarry floor resulting from quarry disturbance.

6.4.2 Pumping Tests

Several pumping tests have been conducted in the vicinity of the Milton Quarry to estimate the bulk hydraulic conductivity of the Amabel. Long-term pumping tests were performed at pumping wells

PW1 and PW2 in the West Cell and East Cell areas. Two pumping tests were completed in the MQEE area at pumping well TW1-80 (one in 1980 and the second in 1999). A pumping test was also conducted by Nadon and Gale (1981) at the Main Quarry. The results of these tests are summarized in Table 6.1. The analyses for the PW1, PW2, and TW1-80 (1999) tests are summarized below with an emphasis on TW1-80 due to its proximity to the MQEE extraction area.

PW1

A 15-day pumping test was conducted at PW1 in December 1997/January 1998. The pumping rate ranged from 12.2 L/s (160 Igpm) to 4.7 L/s (62 Igpm) during the test with an average rate of 6.0 L/s (80 Igpm). A total drawdown of about 22.4 m (73.5 feet) occurred in pumping well PW1. The drawdown in the observation wells located within about 30 m of the pumping well, varied from about 2.5 to 4.0 m (8.2 to 13.1 feet). Observation wells located in excess of 100 m from the pumping well showed a decline in water levels of less than 0.1 m (0.33 feet) which is attributed to seasonal decline.

The hydraulic conductivity values calculated for individual wells varied from 3.2×10^{-3} to 5.8×10^{-3} cm/s, with a geometric mean of hydraulic conductivity of 4.4×10^{-3} cm/s. In comparison, a hydraulic conductivity of 2.9×10^{-3} cm/s was calculated using the Thiem method of analyzing the combined responses of all the monitoring wells.

PW2

An 18-day pumping test was conducted at PW2 in November/December 1997. The pumping rate was initially 5.7 L/s (75 Igpm) but was adjusted downward during the test resulting in an average pumping rate of 5.2 L/s (69 Igpm).

A total drawdown of about 13.8 m (45 feet) occurred in pumping well PW2. The drawdown in the observation wells located within about 30 m of the pumping well, generally varied from about 3.8 to 4.6 m (12.5 to 15 feet). An exception was the water level at OW2-4, located at about 20 m from the pumping well, which declined 12.1 m (40 feet) indicating a very high degree of local connection with the pumping well. Observation wells located in excess of 100 m from the pumping well showed a decline in water levels of less than 0.1 m (0.33 feet) which is attributed to seasonal decline.

The hydraulic conductivity values calculated for the wells varied from 1.2×10^{-3} to 1.0×10^{-2} cm/s, with a geometric mean of hydraulic conductivity of 3.2×10^{-3} cm/s for all wells. In comparison, a hydraulic conductivity of 2.0×10^{-3} cm/s was calculated using the Thiem method of analyzing the combined responses of all the monitoring wells.

TW1-80

The test pumping well TW1-80 was originally test pumped in March 1980 at a rate of 1.9 L/s (25 Igpm) for a duration of 24 hours. The results indicated a near equilibrium condition in the pumping well and observation wells located within about 5 m of the pumping well after approximately 12 hours of pumping. As such, the response to pumping in nearby observation wells was very limited in area. The estimated range of hydraulic conductivity from this test is 3×10^{-4} to 8×10^{-4} cm/s.

A second TW1-80 test occurred over 72 hours in July 1999 at a pumping rate of 1.8 L/s (24 Igpm). A total drawdown of about 17.6 m (58 feet) occurred in pumping well TW1-80. The drawdown in the observation wells located within about 50 m of the pumping well, varied from about 1.0 to 1.7 m (3.3 to 5.6 feet). Observation wells located in excess of 200 m from the pumping well showed a decline in water levels of less than 0.1 m (0.33 feet) which is attributed to seasonal decline.

The hydraulic conductivity values calculated for individual wells varied from 1.6 x 10^{-3} to 7.0 x 10^{-3} cm/s, with a geometric mean of hydraulic conductivity of 2.7 x 10^{-3} cm/s. A hydraulic conductivity of 1.4 x 10^{-3} cm/s was calculated using the Thiem method of analyzing the combined responses of all monitoring wells.

Nadon and Gale

Two pumping tests were performed on well DQ-4 in the Main Quarry in the Amabel dolostone, with transmissivity values ranging from 1.2 to 3.6 cm^2/s. For a saturated thickness of 12 m, the transmissivity values correspond to a range of hydraulic conductivities from 1 x 10^{-3} to 3 x 10^{-3} cm/s (Nadon & Gale, 1981).

6.4.3 Summary of Results

The pumping test data provide a better indication of the bulk hydraulic conductivity of the Amabel as they represent a larger rock mass than the single well response tests. The pumping and single well response testing results are summarized in Table 6.1.

The pumping test results generally indicate the Amabel hydraulic conductivity to be 2 x 10^{-3} to 4 x 10^{-3} cm/s with calculated values ranging from 2.0 x 10^{-4} to 1.0 x 10^{-2} cm/s. These results are within the generally reported range of 10^{-4} to 10^{-2} cm/s for the Amabel.

There is no clear distinction of differing zones of hydraulic conductivity values. The water yield from the two TW1-80 pumping tests and the calculated hydraulic conductivity from the 1980 pumping test at TW1-80 are, however, appreciably lower than at the other two locations nearby (PW1 and PW2), suggesting a possible localized lower hydraulic conductivity zone near TW1-80.

The single well response test data indicate a slightly lower hydraulic conductivity than the pumping test results but are not representative of the bulk hydraulic conductivity of the Amabel due to the localized nature of these tests.

6.5 Karst Assessment

The potential for karst influences on the groundwater flow system and protection of water resources has been evaluated at the Milton Quarry as well as a number of other quarries in the Amabel dolostone in southern Ontario. As with almost any carbonate bedrock system, some weathering and dissolution of the bedrock has occurred and may be referred to as karstification. Therefore, the potential effects of karstification (i.e. the extent of weathering/dissolution) is a common consideration of bedrock hydrogeologic evaluations in carbonate bedrock systems.

No major karst features (e.g. caves, sinkholes, or large conduits) have been identified at the Milton Quarry or the nearby Acton Quarry (CRA, November 2008). The following describes the information considered as part of the karst assessment for the proposed MQEE.

Nature of Bedrock

Major karst features such as caves are much more common in limestone bedrock than in dolostone. The much slower dissolution rate in dolostone results in a more distributed pattern of flow and few (if any) large karst features. This results in dolostone aquifers typically behaving more like a porous media than limestone aquifers.

Topography and Drainage

Beyond the minerology of the Amabel dolostone, the key driver for the development of significant karst features is the accumulation and infiltration of large amounts of surface water with low dissolved carbonate minerals (i.e. soft water). The topography and drainage in the area of the proposed MQEE is devoid of features that would facilitate the accumulation of large amounts of surface water and there are no sinking streams that would represent a sustained and concentrated source of surface water infiltration into the bedrock. Therefore, there are not areas that are indicated to be sources or originators for enhanced dissolution of bedrock evident in the modern landscape.

Furthermore, the topography does not demonstrate any sinkholes or caves within the proposed MQEE area which might be indicators of large solution cavities in the bedrock.

Direct Bedrock Observations

The Milton Quarry provides extensive exposure of the subsurface nature of the Amabel bedrock through the bedrock extraction process. Quarries are relatively unique in this ability to directly inspect the full thickness of the bedrock on an ongoing basis as the extraction face advances in the quarry. GHD personnel have been involved in such observations for over two decades at both the Milton Quarry and the Acton Quarry. During this time period no substantial or continuous karstic features have been observed by GHD or reported to GHD by others in the North Quarry, West Cell, or East Cell area. It is noted that in the near-Escarpment area (less than 300 m), some glacio-fluvial outwash features have been identified in the literature or through observation (e.g. Speyside Tributary at the crest of the Escarpment). These conditions are not an indication of significant karst features in the MQEE area.

Groundwater Monitoring and Investigations

The hydrogeologic investigations of the Milton Quarry area include extensive bedrock drilling, hydraulic testing, and water level monitoring. These investigations have not identified any significant bedrock voids or major enhanced permeability features. The contouring of groundwater levels do not reveal unexpected patterns that would suggest karstic groundwater flow influences such as convergence of groundwater flow to an enhanced permeability feature or recharge from a sinking stream.

Springs

There are a number of springs in the broader Milton Quarry area and one small noted spring in Wetland W41 southeast of the MQEE (refer to Section 6.8.3). These springs are not indicators of significant karstification or flow conduits.

To the west of the North Quarry there is a spring emanating from a low rock ledge along the edge of the floodplain of Sixth Line Tributary. The bedrock in the North Quarry has been extracted upgradient of this spring to a distance of 150 m. During the extraction period, the spring flow has been maintained or enhanced by the groundwater recharge system and no conduit or preferential flow zone was encountered in the quarry excavation. Therefore, while this spring indicates a higher local permeability of surficial bedrock and concentrated groundwater discharge to Sixth Line Tributary, it does not demonstrate the existence of a significant or substantial karst conduit or flow system in the area. Furthermore, the implemented mitigation measures have been effective in maintaining this spring.

To the north of the East Cell there is a spring that flows from a historic pumphouse wet well discharging through a pipe. This spring appears to discharge flow associated with a vertical fracture/crevasse system extending perpendicular to the groundwater flow direction in the area. Based on all the available information it is a relatively shallow local feature and does not indicate the existence of a significant or substantial karst conduit or flow system in the area. Some additional seepage may discharge along the short channel leading down to the Sixth Line Tributary to the north. The implemented mitigation measures have been effective in maintaining this spring as the quarry extraction advances towards the area.

To the southeast of the MQEE extraction limit (430 m) a small spring/seep area flows into the northeast corner of Wetland W41 as described in Section 6.8.3. Based on all the available information it is a small, shallow local feature and does not indicate the existence of a significant or substantial karst conduit or flow system in the area.

Groundwater Mitigation Performance

It is recognized that the proposed MQEE will have a dewatering influence that may extend to water resources features if the associated groundwater drawdown is not mitigated. Therefore, it is imperative that the proposed mitigation measures are effective in the context of expected conditions as well as potentially unanticipated conditions. The mitigation measures proposed for the MQEE have been implemented and proven to be successful for mitigation of the existing quarry influences of the North Quarry, West Cell, and East Cell as described above and in more detail in the 5-Year AMP Review report and the Annual Monitoring reports. Furthermore, the existing and proposed mitigation plans include a number of response actions and contingency measures that would provide an effective mitigation solution in the event an unanticipated large karst conduit or other permeability feature is encountered during the proposed MQEE extraction.

Groundwater Quality Consideration

Analysis was undertaken to determine the potential for the dissolution of dolomite by the mitigation recharge water, as discussed in detail below in Section 7. The results of the geochemical modelling demonstrate that the recharge water is super-saturated with respect to dolomite and would tend to promote the precipitation of dolomite, rather than dissolution. The pH of the recirculation water, generally around 8.3, provides supporting evidence that the recirculation water is in equilibrium with the formation. Dolomite would not dissolve in the recharge water unless the pH drops below 7.5 (maintaining all other parameters the same).

An additional geochemical simulation was completed to assess the mixing of recharge water with MQEE groundwater. The 2020 average recharge water was mixed with average MQEE groundwater (average concentrations from winter 2021 sampling event) at a ratio of 3:1 (i.e., comprised of 75% recharge water). No dissolution is predicted to occur at equilibrium for these conditions and mixing ratios. These exercises demonstrate that the dolostone of the Amabel Formation is not anticipated to be subject to any substantial dissolution by the recirculation of recharge water in the vicinity of the recharge alignment.

Through these analyses it is evident that the MQEE will not increase any natural karstification processes in the area.

Summary Discussion

The various evaluations included in this report consider the potential karstification of the dolostone bedrock and its influence on the proposed MQEE. Karstification is a normal type of water-driven weathering that is typical of carbonate bedrock in areas such as southern Ontario. The relatively slow dissolution rate of the Amabel dolostone (relative to limestone), the carbonate-rich overburden, and the limited surface water closed-catchment areas result in a lack of large karst features in the area of Milton Quarry.

Karst considerations were thoroughly evaluated as part of the previous Milton Quarry Extension approvals and it was determined that there were no unusual challenges arising from karstification for the Milton Quarry Extension. It was determined that the then-proposed Milton Quarry Extension characterization and proposed mitigation measures sufficiently addressed any considerations related to potential karstification. These measures have proven to be effective in protecting water resources, including bedrock springs. The extraction of the North Quarry, West Cell, and East Cell over the last 23 years of involvement by GHD and the assessment of the proposed MQEE have revealed no significant karst features and no hydrogeologic conditions that could not be addressed by the approved mitigation measures.

Dufferin has retained Dr. Stephen Worthington to review the proposed MQEE and this assessment of the potential influence of karst conditions on the mitigation plans. Dr. Worthington's review is provided in Appendix E to this report (Worthington Groundwater, December 2021). Dr. Worthington has reviewed the current quarry conditions and other available information and provides the following overall conclusion:

"Consequently, it is concluded that karst issues are most unlikely to be a concern in the development of the East Extension and if karst issues were encountered, the mitigation and monitoring plan described by GHD would ensure the protection of water resources."

Based on the above facts and the additional evaluation included in this report and Dr. Worthington's review, there is unlikely to be any significant or unanticipated karstic influence on the proposed MQEE and there are suitable protective measures included in the proposed mitigation measures and AMP to address any unanticipated conditions if they are encountered.

6.6 Groundwater Use

There is no potential for groundwater use interference from the proposed MQEE.

The Amabel Aquifer is the source of groundwater for supply wells above the Escarpment. As described in Section 2.4, the closest private landowner with a water supply well is more than 1,200 metres from the MQEE extraction area (refer to Figure 6.9) and there are no residents or water supply well users within the potential zone of influence of the proposed MQEE. The MQEE lands are also outside all Source Water Protection (SWP) designated Wellhead Protection Areas (WHPAs) as shown on Figure 2.7. Therefore, there are no groundwater use interference considerations related to the proposed MQEE.

The water supply wells that are within the Amabel Aquifer in the Milton Quarry area are located to the north and west of the quarry, hydrogeologically separated from the MQEE lands by the other quarry areas and addressed by the existing Milton Quarry monitoring and mitigation measures. Dufferin has conducted extensive private wells surveys in the past and conducts a regular monitoring and liaison program with residents in the area surrounding with Milton Quarry to ensure water supplies are protected and any water supply concerns are promptly addressed. This program will continue during extraction of the proposed MQEE. Refer to the Annual Monitoring Report for further information.

6.7 Quarry Zone of Influence

The existing groundwater drawdown zone of influence from the Milton Quarry and the potential zone of influence vary due to a number of factors. Influence from quarry dewatering in the absence of mitigation has been observed at distances greater than 500 m in some areas depending upon hydrogeologic conditions.

The actual extent of the zone of influence will depend upon a number of factors, including:

- Bedrock hydraulic characteristics
- Depth of dewatering
- Existing groundwater discharge (dewatering) features - both natural and man-made
- Climatic and seasonal variations
- Mitigation measures

Groundwater flow within the Amabel aquifer supports water resources, including private water supply wells, cold water fisheries, and wetlands. The AMP incorporates comprehensive mitigation measures to prevent any adverse effects on water resources from either a water quantity or water quality perspective. Under active quarry conditions, mitigation measures include operation of the WMS consisting of quarry dewatering and discharge to the Reservoir and drawing water from the Reservoir for use in a groundwater recharge system based on a series of recharge (injection) wells along appropriate segments of the quarry perimeter. The groundwater recharge system is designed to generally maintain or enhance the natural groundwater levels in the vicinity of the wetlands and other water dependent features around the quarry and beyond. The existing on-Site wetlands within the zone of influence (Wetlands V2, W7, and W8) are maintained by the WMS through the direct addition of water through a diffused discharge. Accordingly, similar measures are proposed for the MQEE and include enhancement of Wetlands U1 and W36.

In order to responsibly consider the variability of the potential zone of influence of the proposed MQEE dewatering, a proactive and conservative approach incorporating the proven groundwater recharge mitigation measures, has been adopted as discussed in Section 1 and Section 9. This approach will prevent drawdown from extending out to water resources features that might otherwise be negatively affected. Effectively, the zone of drawdown influence will be limited to less than the distance to nearby wetlands, with the exception of Wetlands U1 and W36 which will be mitigated and enhanced by the proposed mitigation measures described in Section 9.

6.8 Water Resources Features and Groundwater - Surface Water Interactions

The surface water features in the area of Milton Quarry typically exhibit a close relationship to groundwater levels for at least part of the year. It is therefore important to understand the groundwater-surface water interactions. The water resources features for consideration in the MQEE area include several wetland areas and a low-lying area that may have a groundwater-surface water connection. Each of these features is evaluated as described below.

6.8.1 On-Site Wetland U1

Wetland U1 is a shallow intermittent pool located approximately 50 m east of the proposed MQEE extraction area as described in Section 5.4 and the NETR/EIA. It was instrumented with a staff gauge (SG66) and a monitoring well nest immediately to the west in early 2020 and the collected data is presented on Figure 6.10.

Examination of the available water level information reveals that the wetland had a short hydroperiod in 2020, drying out as early as late April and confirmed to be dry during field inspection on May 13, 2020. The groundwater level immediately west of the pool at monitoring well OW78S/D-20 reached a peak water level of approximately 337.1 m AMSL in early April 2020 but was consistently below the bottom of the pool (ground surface minima of 337.34 m AMSL). The upgradient groundwater levels may have been similar or slightly higher than the Wetland U1 elevation based on the groundwater level at OW3-2-II but it is uncertain given the distance from this monitoring well to Wetland U1.

In 2021, lower groundwater and surface water levels occurred as a result of climatic conditions. Wetland U1 had a peak surface water level of 337.73 m AMSL and dried out by May 13, 2021. At no time was the groundwater level at OW78S/D-20 (to the west) or OW3-2-II (at distance to the northeast) above the base of the wetland in 2021.

Although no water level measurements are available, GEC observed somewhat greater water depth in Wetland U1 in spring 2019 as described in the NETR/EIA. This observation is consistent with the generally wetter spring conditions in 2019 relative to 2020 and 2021 (refer to Section 6.3 and the associated hydrographs).

There is groundwater-surface water interaction influencing Wetland U1. Based on the available information, Wetland U1 exhibits very little depth and duration of water presence. The observed water presence results from direct precipitation and potentially some limited local runoff during extremely wet conditions. Groundwater support from the northeast may also occur during brief periods during high groundwater level conditions. Water that accumulates in Wetland U1 evaporates and infiltrates to groundwater at a modest combined rate of approximately 24 mm/day based on observed water level conditions in 2020 and 2021. This rate is higher than would occur from evaporation alone during the spring hydroperiod, demonstrating that some infiltration to groundwater occurs.

Wetland U1 is located approximately 580 m from the Main Quarry and 440 m from the North Quarry and is interpreted to be within the historic zone of influence of both the Main Quarry and the North Quarry. It is concluded that the Wetland U1 area may have experienced higher groundwater levels and a greater degree of groundwater support and interaction in the past. Such a past interaction with groundwater would help explain the past excavation of the drainage ditch leading south away from the wetland pool as well as the ecological observations reported by GEC in the NETR/EIA.

6.8.2 Wetland W36

Wetland W36 is a shallow intermittent pool drainage system located south of the proposed MQEE extraction area as described in Section 5.4 and the NETR/EIA. The wetland at its closest point is approximately 110 m from the MQEE extraction limit; however, the upper instrumented pools where surface water has been observed are located further at approximately 160 to 220 m.

It was originally instrumented with a staff gauge (SG5) and a monitoring well nest immediately to the north in 1999 and monitored from 1999 to 2006. Additional staff gauges SG57 and SG58 as well as monitoring well OW82-20 to the northwest were added in winter 2020 and monitoring was re-initiated. An additional monitoring well, OW83-21, was installed to the north of the upper (east) portion of Wetland W36 in February 2021. The collected data commencing in 2020 is presented on Figure 6.12. Historical monitoring data is included in Appendix C and Appendix D (surface water and groundwater, respectively) on individual instrument hydrographs.

Examination of the available water level information reveals that the upper portion of Wetland W36 (i.e., at staff gauges SG57 and SG58) had a short hydroperiod in 2020, drying out by early to mid-June 2020. No water presence was observed in the middle portion of Wetland W36 (i.e., at staff gauge SG5).

The groundwater level at BH64, immediately north of the wetland, reached a peak water level of approximately 332.0 m AMSL in March and April 2020 which is approximately the base of the wetland in that vicinity (SG5). The groundwater level at BH64 was consistently below the bottom of the pool areas upstream at SG57 and SG58. The ground surface in deeper areas of these pool areas is approximately 332.4 to 332.5 m AMSL as represented by staff gauges SG57 and SG58. The groundwater levels to the north of the east end of the wetland is higher than at BH64 based on the pattern of groundwater flow in the area and demonstrated by the subsequent installation of monitoring well OW83-21 as shown on Figure 6.11.

In 2021, surface water pooled in the upper two pool areas within Wetland W36 in March following the rise of the groundwater level above the base of the wetland pools as shown at monitoring well OW83-21. These pools dried out in May 2021. The area around SG5 and BH64 was consistently observed to be dry in spring 2021.

There is a strong groundwater-surface water interaction influencing the upper (eastern) area of Wetland W36. Groundwater flow discharge to the eastern part of Wetland W36 occurs during high groundwater level periods. If sufficient groundwater and precipitation accumulate in the Wetland W36 pool areas, they may overflow to the west down the W36 drainage path towards the Main Quarry; however, this condition has not been observed in 2020 or 2021. Water present in the wetland is likely lost to evapotranspiration and infiltration to groundwater. No surface water flow has been observed or indicated to be reaching the Main Quarry to the west, in fact no surface water has been observed in recent years (including 2020 and 2021) in the area of SG5 or further west.

Wetland W36 is located with the historic zone of influence of the Milton Quarry and the distance from the Main Quarry to the monitored area is 275 m and greater. It is expected therefore to have experienced higher groundwater levels and a greater degree of groundwater support and interaction in the past. Available long-term monitoring data such as at monitoring well MW4 (monitoring extends from 1990 to present at the MW4/4A/4B/4C series of proximal locations as included in Appendix D) at the edge of the Main Quarry to the west of Wetland W36 demonstrate the dewatering influence of the quarry development. The water level available at MW4 (installed in 1990) and BH64 (installed in 1999) indicate that the influence on groundwater support for Wetland W36 had occurred prior to 1999. Such a past interaction with groundwater would also help explain the now dry portion of the wetland and drainage pathway extending to the Main Quarry to the west.

6.8.3 Wetland W41 and Wetland W46

Wetland W41 is a variable wetland feature located approximately 300 m (at its nearest point) southeast of the proposed MQEE extraction limit. The wetland features both intermittent pool areas as well as perennial flowing water discharging from a spring/seep located at its extreme northeast corner near staff gauge SG61. Water in this wetland drains out to the HFRT to the south along the flowpath from the southeast corner as shown on Figure 5.2. Wetland W46 is a series of small intermittent pools located nearly 500 m east of the proposed MQEE extraction limit and northeast of Wetland W41. The wetland character for both of these wetlands is described in the NETR/EIA.

The spring flows from a small pipe emerging from near a walking path and flow emerges from the pipe and surrounding granular material during higher water period. The pipe was installed for unknown reasons prior to Dufferin’s ownership of the property. During lower water level periods, the spring flow consists only of seepage from the surrounding material and there is no flow from the pipe.

Wetland W41 was originally instrumented at its western limit with a staff gauge (SG6), drive point (DP6) and monitoring well (BH65) in 1999 and monitored from 1999 to present. Additional staff gauges SG59, SG60, and SG61 as well as monitoring well OW81-20 to the northwest were added in winter 2020 and monitoring expanded to the new locations.

In consultation with GEC, two of the wetland pools forming Wetland W46 (Wetland W46a and Wetland W46b) were selected for instrumentation with staff gauges in winter 2020 and water level monitoring commenced for these locations.

The collected data commencing in 2020 is presented on Figure 6.12 and Figure 6.13 for the western and eastern areas, respectively. Figure 6.13 also includes surface water level readings for the two instrumented pools, Wetland W46a and Wetland W46b, that are shown on Figure 5.2. Historical monitoring data is included in Appendix C and Appendix D (surface water and groundwater, respectively) on individual instrument hydrographs.

Examination of the available water level information for the western area of Wetland W41 on Figure 6.12 reveals that the western and north-central area of the wetland has a longer hydroperiod than Wetland W36, extending to the beginning of July and re-wetting at various times during the summer and early fall in 2020 before becoming continuously wet as groundwater levels to the north rose in October 2020. The groundwater level at monitoring well BH65 is clearly higher than the surface water level indicating groundwater discharge to the wetland during more than half of the year, including winter, spring, summer, and into September in at least some areas. In 2021, the pools in the western and north-central area of Wetland W41 retained water through the winter, spring, and summer.

Examination of the available water level information for the eastern area of Wetland W41 on Figure 6.13 reveals that the eastern area of the wetland has a perennial hydroperiod resulting from the spring/seep emanating adjacent to SG61. The groundwater levels at monitoring wells to the north (OW81-20, OW80-20, and OW69-08) are all consistently above the wetland and spring/seep elevation which is consistent with the discharge of groundwater to the north side of Wetland W41.

Water was observed slowly flowing out of Wetland W41 by GEC on July 24, and GEC and GHD on August 2, 2021. The flow emanates from a stand of Yellow Birch and White Cedar with deep organic soils and it forms a narrow wetland swale approximately 0.3 m wide. Surface water is discontinuous upgradient of the swale that outlets from Wetland W41. Iron precipitate was observed where the flow of water starts. Regular (monthly) observations are collected at the outlet of Wetland W41 for ongoing assessment of conditions in this area.

The Wetland W46 pools a and b (instrumented by SG63 and SG62, respectively) dried out at the staff gauges in the late summer in 2020; however, a small amount of water was observed to remain in Wetland W46a. Similar conditions were observed in 2021 with water being retained through the summer in Wetland W46a and dry-out occurring in Wetland W46b. It is likely that there is a relatively direct groundwater-surface water interaction at the Wetland W46 pools due to the rock nature of the terrain and the pool water level elevations which lie between upgradient and downgradient groundwater levels most of the time.

Monitoring well BH66 located to the southeast of Wetland W41 and Wetland W46 exhibits a groundwater level that is consistently 2 to 4 m below that of the wetland surface water elevations as illustrated on Figure 6.13. These conditions indicate that some of the water in Wetlands W41 and W46 is likely infiltrating to the south side and making its way further southeast as groundwater flow.

6.8.4 Wetland W56

Wetland W56 is a shallow isolated wetland feature with extremely limited hydroperiod located near the east limit of Dufferin's MQEE property, approximately 500 m from the proposed extraction limit. The wetland character is described in the Natural Environment report.

Wetland W56 was instrumented with a staff gauge (SG64) during the winter of 2020 and monitoring wells (OW79S/D-20 and OW80-20) were installed to the west of Wetland W56 at the same time. Monitoring well OW69-08 was installed immediately east of Wetland W56 in 2008 and has been monitored since that time. The collected data commencing in 2020 is presented on Figure 6.14. Historical monitoring data is included in Appendix C and Appendix D (surface water and groundwater, respectively) on individual instrument hydrographs.

Examination of the available water level information for Wetland W56 reveals that the wetland experienced only brief periods of surface water presence during the early spring (March and April) of 2020 and possibly in February and March 2021. Groundwater levels to the west of Wetland W56 (100 m) are higher than the wetland during the winter and spring monitoring period, indicating the potential for groundwater discharge to Wetland W56. These groundwater levels drop below the base of the wetland in the summer and fall of 2020. To the east of Wetland W56, the groundwater level at monitoring well OW69-08 (20 m) is briefly above the base of Wetland W56 during periods in March 2020; however, it is consistently below the surface water level in Wetland W56 (when surface water is present) in 2020 and 2021.

The observed groundwater and surface water levels indicate that Wetland W56 may receive very limited groundwater discharge from the north and west during high groundwater level periods. Water that does accumulate in Wetland W56 infiltrates to groundwater to the east and south in addition to evapotranspirating.

6.8.5 Low-Lying Area in Northeastern Lobe of Proposed MQEE Licence

A low-lying area is present in the northeastern lobe of the proposed MQEE licence area and appears to be seasonally wet based on examination of aerial photographs. Spoil piles are located adjacent the low-lying area and suggest the area was at least partially excavated by a previous owner. In addition, vehicle tracks are present and indicate that the area has historically been used by recreational all-terrain or off-road vehicles. This area was evaluated by GEC and GHD as part of the proposed MQEE studies to understand its character and hydraulic characteristics.

The investigation included installation of a monitoring well nest on the west side (OW79S/D-20) and a staff gauge in a previously dug-out depression. The water level monitoring data for these instruments as well as additional monitoring locations to the north and south are shown on Figure 6.15. Several test pits were also completed in the vicinity to evaluate the depth and nature of the overburden.

Examination of the available water level information for the low-lying area demonstrates that it does not have any direct groundwater-surface water interaction. It experienced only brief periods of surface water presence in the dug-out feature during the winter and early spring of 2020 and 2021. The broader area beyond the dugout did not exhibit pooling. Groundwater levels to the north (100 m) are higher than the dugout during the spring and early summer (as controlled by the East Cell groundwater recharge operations) indicating some potential for groundwater discharge to this area; however the brief, spiked-nature of surface water presence in the dugout pool suggests it is likely mostly influence by local precipitation runoff and collection in the dugout pool. The groundwater level at the adjacent well OW79S/D-20 reached slightly above the base of the dugout in April 2020 but remained below the observed peak surface water levels suggesting that water in the dugout may have been infiltrating to groundwater in addition to evapotranspirating. In 2021, the groundwater level at OW79S/D remained below the base of the wetland. To the south, the groundwater levels at OW80-20 and OW69-08 remained well below the base of the dugout throughout 2020 and 2021 (to date).

6.8.6 Other Off-Site Wetlands

Numerous other wetlands and tributary drainage systems exist to the east and southeast of the proposed MQEE as identified in the NERT/EIA and shown on Figure 5.1 and Figure 5.2. These features are part of the group of wetlands referred to as the Eastern Wetlands (also including the Wetlands W36, W41, W46, and W56 as above) and the Speyside Tributary System. These features were evaluated as part of the studies for the Milton Quarry Extension as described in the Water

Resources Assessment report (CRA, May 2000) and the Natural Environment Report (Ecoplans, May 2000). They are located beyond the primary features of interest relative to the proposed MQEE that are described above and hence will be protected by the mitigation measures planned for these closer features. A summary of the characterization information is provided herein for completeness.

Eastern Wetlands

Other Eastern Wetlands (located beyond Wetlands W36, W41, W46, and W56) lie between the proposed MQEE and the Speyside Tributary and adjacent Escarpment.

The wetlands were evaluated based on the investigation and monitoring of the wetlands and groundwater regime, topographic information, and field observations by Ecoplans, GEC, and GHD (formerly CRA). In summary, the eastern wetlands have variable characteristics but generally occur in topographically low areas. In addition to surface water contributions, some of these areas are in hydraulic communication with the Amabel bedrock and receive groundwater discharge for varying durations. Some wetlands receive groundwater discharge only during the high water table conditions in the spring, while others may receive permanent groundwater discharge.

Speyside Tributary System

The Speyside Tributary is an intermittent (or ephemeral) channel with a high proportion of ponded/on-line wetland area (wetlands W25, W26/27, and W35). The Tributary and associated wetlands are collectively referred to as the Speyside Tributary system due to their interconnected nature.

The flow in the Tributary is not permanent as observed downstream of W35 near OW15-82 and at the Bruce Trail crossing upstream of the Escarpment. Wetlands W25 and W35 include large open water areas with permanent surface water. These areas result from surface water runoff, groundwater discharge, and blocking of the flow channel by beaver dams, a small bedrock ridge, and likely fill placement where an old road crosses near monitoring well OW15-82. Observed groundwater levels west and east of W35 indicate that groundwater discharges to W35 from both west and east sides during high groundwater conditions. Surface water may recharge groundwater on the east side during lower groundwater level conditions. Wetlands W29, W30, and W31 are located in a topographic low between the monitored wetlands and W35; during winter groundwater discharge to these wetlands is demonstrated by dark patches of fresh ice, and soft areas.

7. Water Chemistry

7.1 Overview

Water quality and the underlying water chemistry have been extensively evaluated at the Milton Quarry and continues to be monitored through the provisions of the WMS and the private well water supply monitoring program under the AMP and the Ontario Water Resources Act (OWRA) approvals. Based on the results of these monitoring programs to date and a substantial assessment completed for the 5-Year AMP Review (GHD,2020), there is no indication that Dufferin's operations have had any adverse water quantity or quality effects on residential wells or water resources in the vicinity of the quarry. These previous assessments have demonstrated the continued suitability of recharge water for mitigation and the proposed MQEE will not alter the water quality. Therefore, further assessment of the suitability of recharge water for mitigation is not necessary and the assessment herein focuses on the baseline characteristics of water chemistry on the MQEE lands.

Water chemistry sampling was undertaken in early 2021 to provide additional baseline data. This data includes results of groundwater and surface water sampling at locations associated with the water resources (wetlands) to the east and south of the proposed MQEE extraction area. The chemistry results for groundwater and surface water were generally within the range of what would be expected in ambient groundwater and surface water in the Milton Quarry area and more generally in southern Ontario.

The Amabel groundwater chemistry within the proposed MQEE area is similar to background water quality in the vicinity of the quarry. The groundwater is good potable water; although it is hard as would be expected in the carbonate environment. Within the MQEE area, the groundwater chemistry results demonstrate that the groundwater is somewhat independent of the groundwater recharge system, even in the area south of the East Cell recharge system where it would otherwise appear to be downgradient of the recharge system. The recharge system supports the groundwater mound and groundwater flow away from the mound, as reflected in the groundwater elevation contours (refer to Section 6.3); however, chemistry on MQEE lands is reflective of natural infiltration and groundwater recharge.

Surface water samples collected from the pool in Wetland W41 in winter and spring 2021 exhibit water chemistry that is generally similar to the groundwater samples. This correlation substantiates the characterization that groundwater is a source of water for these wetland pools. It is possible that they also receive some surface water runoff contribution during spring runoff conditions and significant rain events; however, runoff is very limited in the area with most water infiltrating to groundwater (refer to Section 5.4).

7.2 Groundwater Chemistry

Groundwater samples were collected in the area of the proposed MQEE for the analysis of general inorganic chemistry parameters and dissolved metals on February 18 and 19, 2021 and on June 2, 2021 at selected monitoring locations as shown on Figure 7.1. Analytical results are presented in Table 7.1 along with historic groundwater chemistry data, WMS (recharge) water chemistry data, and the Ontario Drinking Water Quality Standards (ODWQS) for comparison purposes. It is noted that the ODWQS are applicable to municipal water supply systems and are not applicable to ambient groundwater conditions or private water supplies; however, they are a useful basis for comparison to understand general water quality.

Water quality in the Amabel Formation in the proposed MQEE, represented by monitoring wells OW78D-20, OW78S-20, OW79D-20, OW79S-20, OW80-20, OW81-20, OW82-20, and OW83-21, is generally within the ODWQS levels. The aesthetic objective for hardness (80-100 mg/L) was lower than the measured values at each location, but the local groundwater is known for being hard and remains a good source of potable water (although it is not in use for water supply in the MQEE area). One nested location (OW78S-20/OW78D-20) exhibited concentrations over the aesthetic objectives for iron, manganese, and total dissolved solids (TDS).

Two shallow and deep well pairs were sampled in February 2021 (OW78S-20, OW78D-20, OW79S-20 and OW79D-20) and one well pair in June 2021 (OW78S-20, OW78D-20). The shallow

(S) wells are screened in the water table and the deep (D) wells are screened at the base of the Amabel formation. In general, the sample results are similar between the February and June events. As discussed above, some variability is observed at the OW78 well nest, particularly in the shallow monitor OW78S-20. The variability observed at this location is potentially due to nearby infiltration from Wetland U1.

A comprehensive evaluation of water resources related to the previous Milton Quarry Extension was presented in the Water Resources Assessment (WRA; CRA, 2000). Water chemistry parameters were summarized in Table 7.1 of that report, and that historical summary (historical range) has been included in Table 7.1 of this report for comparison with the current water chemistry results from the MQEE area.

For every parameter for which a comparison can be made to the historical range, the concentrations in the MQEE area are consistent with the historical range. All parameters measured in 2021 overlap with the historical range of values. The water chemistry in the MQEE area is of good quality and is similar to that identified prior to extraction of the North Quarry and the previous Extension.

7.3 Surface Water Chemistry

Surface water samples were collected on February 19, 2021 from Wetland W41 at two locations (SG6 and SG61) and on June 2, 2021 at the same locations for the analysis of general inorganic parameters, total (unfiltered) metals and dissolved (filtered) metals. Analytical results are presented in Table 7.2 and were compared with the Provincial Water Quality Objectives (PWQO) for characterization purposes. Other wetlands, including Wetland U1 and Wetland 36, were dry at the time of both sampling events.

The unfiltered sample results at all locations, with the exception of the June sample at SG6, exhibited zinc concentrations above the PWQO level. Concentrations of zinc in these surface water samples were within the range of those measured in groundwater (Table 7.1) and zinc has been measured at similar concentrations historically. The concentrations of zinc measured in 2021 were consistent with those presented for surface water in the WRA (CRA, 2000) where over half of the historical data were above the PWQOs. Several samples had concentrations of cadmium and phosphorus that were above the PWQOs; although cadmium was only marginally above (i.e., 0.000211 and 0.000222 vs 0.00020 mg/L). Two other parameters (aluminum and lead) were marginally above the PWQOs at SG61 in June 2021 but had previously been below the PWQOs in February 2021. Concentrations of these parameters were not reflective of dissolved concentrations in groundwater and were associated with solid particles in the unfiltered sample, as described below.

A filtered sample was also collected at each surface water sampling location to provide analytical results for dissolved metals. These results can be compared with those of total metals and the difference between the two is attributable to the association of metals with solid particles that have been filtered from the dissolved sample. Where there is little or no difference in metals concentrations between total and dissolved results, it can be inferred that most of that metal is in the dissolved state. PWQOs are applied to total metals; there is no applicable water quality criteria or objective specific to dissolved metals for surface water in Ontario.

The majority of metals with detections in surface water were primarily associated with the dissolved phase. The major cations (calcium, magnesium, sodium, potassium) were all primarily present in the dissolved phase, as would be expected. Other metals generally present as dissolved in the surface water samples collected at the Site included arsenic, barium, molybdenum, rubidium, selenium, silicon, strontium, uranium, and zinc.

Aluminum and phosphorus were non-detect in all dissolved metals samples, indicating that the detections in the unfiltered samples were attributable to particulate matter. Other metals almost exclusively associated with particulate matter included lead, manganese, and nickel. The following metals were associated with solids or the dissolved phase, depending on the sample: cadmium, copper, iron, and thallium.

The parameters that exhibited concentrations above the PWQO concentrations applied to the analytical results for total metals had, for the most part, concentrations associated with the presence of particulate matter in the samples. Concentrations of aluminum, phosphorus, and lead were all associated with particulate matter. Where cadmium was measured above the PWQO concentration, those samples were associated primarily with the presence of particulate matter. Zinc was the only metal that was above the PWQO concentration and was present in the dissolved phase.

In general, the surface water at Wetland W41 is of good quality and is supported primarily by groundwater discharge.

7.4 Recharge Water Chemistry and Dissolution Potential

GHD evaluated the water chemistry of the recharge system and reported the results as a component of the 5-Year AMP Review (GHD, 2020). In that report, samples collected from the water management system (WMS) between 2013 and 2018 were compared with historical results to assess any changes over time in metals or general chemistry parameters. Descriptive statistics were used to assess changes over time from 2013 to 2018 (since the commencement of extraction in the Extension to the time of writing) and to assess statistical differences in the mean concentrations prior to (2003 to 2012) and after commencement of extraction in the Extension (2013 to 2018). The full details of the analyses are provided in Appendix H of the 5-Year AMP Review (GHD, 2020).

Of the 32 parameters used in the statistical assessment of trends, the majority had decreasing trends or no significant trends with only a limited number of parameters exhibiting an apparent increase. The results from the recharge wells (RW101B-07, RW109C-07, and RW209A-09), North Quarry Sump (SW38), and Reservoir Outfall (SW52B) exhibited similar changes over time. This was expected due to the similar origin of water within the quarry areas and the integrated management (mixing) of water through the Reservoir.

A comparison was made between the Reservoir Outfall (SW52B) and the recharge wells (RW101B-07, RW109C-07, and RW209A-09), representing distant locations of the WMS. The trends in chemistry observed at these locations were nearly indistinguishable and further attest to the mixing and consistency of WMS water quality from the Reservoir and recharge system described above.

The quality of water tested in the WMS was generally good, meeting effluent limits and comparison guidelines as well as supporting natural resource features (wetlands and 6th Line Tributary) as described in the ecological assessment reports contained in Appendix I and J of the 5-Year AMP Review (GHD, 2020) and the NETR/EIA.

Geochemical modelling was also conducted to evaluate the potential for the dissolution of dolomite by the mitigation use of recharge water. Dolomite is the mineral that makes up the majority of the dolostone rock of the Amabel Formation. The average concentrations of major ions, pH, and temperature for 2020 in the recharge water (SW52B) were evaluated to determine the potential for promoting the dissolution of dolomite. The geochemical modeling software PHREEQC Interactive v.3.3.7.11094 (Parkhurst and Appelo, 2013) was used to assess the potential for the dissolution of dolomite by the recharge water under equilibrium conditions. Equilibrium conditions represent the maximum potential dissolution, are rarely reached in the natural environment, and are therefore conservative for estimation of dissolution capacity.

The results of the geochemical modelling demonstrate that the recharge water is super-saturated with respect to dolomite and would tend to promote the precipitation of dolomite, rather than dissolution. The pH of the recirculation water, generally around 8.3, provides supporting evidence that the recirculation water is in equilibrium with the formation. Dolomite would not dissolve in the recharge water unless the pH drops below 7.5 (maintaining all other parameters the same).

An additional geochemical simulation was completed to assess the mixing of recharge water with MQEE groundwater in the area between the recharge wells and the quarry extraction limit. The 2020 average recharge water was mixed with average MQEE groundwater (average concentrations from winter 2021 sampling event) at a ratio of 3:1 (i.e., comprised of 75% recharge water) for comparison purposes. No dissolution is predicted to occur at equilibrium for these conditions and mixing ratio. These exercises demonstrate that the dolostone of the Amabel Formation is not anticipated to be subject to any substantial dissolution by the recirculation of recharge water in the vicinity of the recharge alignment.

7.5 Water Chemistry Comparison

Groundwater and surface water chemistry are similar in the area of the MQEE. This was also concluded in the WRA (CRA, 2000), where wells sampled in the area of the West and East Extensions prior to quarrying activities were compared with surface samples collected along the 6th Line Tributary. With the exceptions noted above, parameters measured in groundwater and surface water fall into the same general ranges. This substantiates the conclusion that Wetland W41 is largely supported by groundwater discharge.

One of the most common approaches to graphically represent the geochemical character of groundwater samples is through the use of a Piper diagram. A Piper diagram plots the major ions as percentages of milli-equivalents in two base triangles, one for cations and one for anions. The major cations are sodium and potassium (Na^+ and K^+), calcium (Ca^{2+}), and magnesium (Mg^{2+}). The major anions are chloride (Cl^-), carbonate and bicarbonate (CO_3^{2-} and HCO_3^-), and sulphate (SO_4^{2-}). The apex of each triangle (or ternary plot) represents 100% concentration of one ion or ion group. The data points in the two triangles are then projected onto a central grid (diamond). Each sample collected is represented by three data points: one on each triangle and one in the diamond.

The main purpose of the Piper diagram is to show clustering of data points to identify whether samples have similar compositions (or geochemical 'types') or to distinguish between samples with differing compositions. The results from samples collected at the Reservoir Outfall (SW52B) have been used to represent the quarry-related and recharge water in the WMS. All available samples collected at SW52B through the end of 2020 were included in the assessment updating the analysis presented in the 5-Year AMP Review. These results were plotted to compare quarry water composition with samples collected from groundwater and surface water in the MQEE, and the results are presented on Figure 7.2.

The major ion composition of water discharging from the Reservoir has remained consistent with minor fluctuations since monthly sampling began at SW52B in 2006. The recently collected data from the WMS (SW52B; 2019 and 2020) fit within the same cluster in the apex of the central diamond. This area of the diamond is dominated by relatively higher concentrations of sulphate and chloride. Concentrations of the major ions in the WMS are similar to the range measured in the Cabot Head Shale Formation (Table 7.3 in the WRA; CRA, 2000), which indicates mixing of groundwater from the Amabel and the Cabot Head Formations (note: water in the quarry cells contacts the shaley beds in the Reynales and Cabot Head as a result of the mining disturbance of the bedrock immediately below the quarry floor).

The groundwater chemistry exhibited in the MQEE observation wells and Wetland W41 varies from the WMS recharge water from the Reservoir. The geochemical "type" of the water in these samples plots to the left side of the central diamond. These water samples are predominantly calcium-bicarbonate type and are characteristic of many of the residential wells located north of 6th Line Tributary (e.g., DW129) as presented in the 5-Year AMP Review (GHD, 2020). The calcium-bicarbonate type is typical of shallow groundwater in a limestone-dolostone system dominated by natural recharge.

The WMS provides support of groundwater levels on the MQEE lands with particular support for the groundwater mound to the southeast of the East Cell and flow divide in the vicinity of OW70-08; however, geochemical separation exists within the central diamond of the Piper plot and indicates that the WMS recharge water has experienced limited mixing with the water in the MQEE area to the south. This finding supports that limited recharge water flows to the south into the MQEE area and mixing occurs over a relatively short distance from the recharge wells. While additional mixing may be anticipated to occur in the future as a result of the MQEE mitigation, the recharge water has been demonstrated to be of good quality suitable for mitigation and no adverse water quality effects on water resources are anticipated in the vicinity of the quarry.

8. Mining Plan

8.1 Overview

A summary description of basic elements of the mining plan for the proposed MQEE is presented in this section. Details are provided on the Site Plans.

The proposed MQEE provides approximately 15 million tonnes of dolostone resource to the Milton Quarry as described in Section 4.4. This resource is sufficient to extend the life of the quarry by approximately 2 to 3 years assuming the Main Quarry processing plant is used and 5.5 million tonnes of aggregate is shipped each year. An alternate extraction scenario would extend the quarry life by approximately 7 to 8 years assuming 2.0 million tonnes of aggregate is shipped each year. This scenario assumes the permanent processing plant in the Main Quarry is decommissioned and a new portable processing plant in the East Cell and a portable plant in the Main Quarry are used.

The proposed MQEE mining plan has been integrated with the existing Milton Quarry operations and the East Cell extraction in particular to minimize the overall disturbance from the quarry operations. The proposed MQEE will be extracted as a southward extension of the East Cell and water resources mitigation will be provided by the extension of the existing WMS (refer to Figure 8.1). Following completion of extraction activities, the proposed MQEE will be rehabilitated into terrestrial, lake, and wetland features integrated with the contiguous East Cell lake and surrounding landscape as described in Section 9.

A fuel/maintenance program and emergency spill response plan will be instituted in the MQEE similar to the existing operations (refer to Section 8.5).

8.2 Quarry Phasing and Lifts

The proposed MQEE will be extracted in 2 phases as a continuation or extension of the East Cell extraction. The East Cell extraction will proceed southward, removing the common setback and rerouting of the WMS to the south of the MQEE extraction area as shown on Figure 8.1.

The bulk of the bedrock resource is comprised of the Amabel dolostone that will typically be removed by drilling and blasting in one or two lifts. The underlying Reynales dolostone may be extracted as a separate lower lift (by drilling and blasting or other excavation) and is included in the resource estimates.

Quarry operations will include first clearing and grubbing vegetation followed by removal of overburden. Bedrock extraction will occur by drilling and blasting the bedrock. Blasted rock will be transferred by truck to the existing primary crusher in the Main Quarry or be transferred by truck, loader, or conveyor to an in-pit primary crusher and processing plant that will be located in the East Cell as described in Section 8.1.

The active quarry area will be dewatered via a sump and piped discharge system in conjunction with the East Cell which is presently being dewatered. The sump(s) will be established and modified as required to efficiently dewater the extraction area. Water will be collected and handled in the integrated WMS. Overall water consumption by extraction and processing operations is not expected to increase significantly from existing operations. The only extraction-related water demand in the proposed MQEE is the water used for dust control.

Interim mitigation measures will be provided by extending the existing WMS recharge system to the south and east of the MQEE extraction area. The extended WMS will protect or enhance the water resources to the southeast that might otherwise be affected in the absence of mitigation. The mitigation during the active quarry extraction and lake filling period is discussed further in Section 9.

8.3 Operations Water Management

The proposed MQEE operations involve no significant additional consumptive water uses such as aggregate washing, as these activities will continue similar to past and current operations. These operations may continue to occur in the Main Quarry area or moved to the East Cell area. The operations water handling components for the proposed MQEE involve:

- Quarry dewatering
- Surface water runoff control

- Dust control

These components are discussed further in the following sections.

The WMS and recharge system operations are described further in Section 9.

8.3.1 Quarry Dewatering

The extraction operations will be completed in a dry (dewatered) state and hence dewatering of the extraction area will be required. The existing Permit To Take Water (PTTW) and Environmental Compliance Approval (ECA) will be amended as necessary.

Infiltrating groundwater and precipitation water will be collected and diverted into the existing integrated WMS system and rehabilitation program for the Main Quarry, North Quarry, West Cell, and East Cell. Any excess water (i.e., not required for mitigation system storage or pumping) will be handled in an appropriate manner through the WMS to optimize the beneficial use of all available water.

The active quarry area will be dewatered using sumps constructed through the quarry floor, into the top of the Cabot Head shale (up to approximately 5 m below the quarry floor). The sump(s) will be established and modified as required to efficiently dewater the extraction area. Water will be pumped from the sump(s) and conveyed through a watermain to the WMS in the North Quarry or Main Quarry.

8.3.2 Surface Water Runoff Control

The proposed MQEE lands are generally situated on topographically high areas (Figure 8.1). Surface water runoff patterns will therefore be primarily away from the extraction areas in their current direction. Stripping operations will include appropriate measures (e.g., berming) to ensure that no problematic surface water runoff into the quarry occurs. The assessment of the alterations to existing runoff patterns is presented in Section 9.2 and Section 10.2.

8.3.3 Dust Control Water Consumption

The only extraction related water consumption in the proposed MQEE is water for dust control. Dust control is required for the working face area and haul route to the primary crusher and processing plant. Dust control involves relatively minor amounts of water consumption as presented in the water budget analysis in Section 10.3. Most dust control water is lost to evaporation.

8.4 Human-Made Hazards

The 2020 Provincial Policy Statement provides the following with respect to human-made hazards:

"Development on, abutting or adjacent to lands affected by mine hazards; oil, gas and salt hazards; or former mineral mining operations, mineral aggregate operations or petroleum resource operations may be permitted only if rehabilitation or other measures to address and mitigate known or suspected hazards are under way or have been complete."

While mineral aggregate mining operations exist on three sides of the proposed MQEE, all areas have Site Plans approved by MNDMNRF and include rehabilitation measures for the mitigation of potential hazards. There are currently no known or suspected human-made hazards on adjacent lands.

A substantial buffer exists between the MQEE area proposed for extraction and adjacent lands. The closest landowner to the MQEE area is the Region of Halton (Cox Tract) where a setback has been provided from the property limit. As identified above, no suspected human-made hazards currently exist, nor will long-term human-made hazards be created through the proposed development. The rehabilitation plans for the MQEE area provide mitigation of potential human-made hazards and the proposed MQEE will not preclude future development on adjacent lands.

8.5 Fuel/Maintenance Management and Spill Response Plans

Historical operating experience and aggregate extraction operating data indicate that there is little potential risk of adverse effects resulting from fuel handling and maintenance activities at aggregate extraction operations including quarries.

For the proposed MQEE, all fuel handling and equipment maintenance activities will be undertaken in such a manner to minimize the risk and magnitude of any potential release to the environment. Dufferin maintains, trains, and adheres to comprehensive fuel management and spill response plans which are part of their Environmental Management System. Some of the key components of these plans are summarized below.

There will be no bulk fuel storage in the proposed MQEE. Mobile equipment will be refueled in the Main Quarry. Non-mobile equipment (e.g., crusher, if present) will be refueled using fuel trucks and any spills will be immediately cleaned-up in accordance with Dufferin's Spill Response Plan.

Similarly, equipment maintenance will be performed at the Main Quarry Maintenance Facilities (or off-site) to the extent feasible. When maintenance must be conducted in the proposed MQEE, appropriate care will be taken and any spills will be immediately cleaned up in accordance with Dufferin's Spill Response Plan.

9. Water Resources Mitigation

9.1 Overview

Mitigation measures will be implemented in conjunction with the mining of the proposed MQEE to prevent unacceptable influences to Wetland U1, Wetland W36, and other off-site water resources that include wetlands to the east and southeast. The proposed mitigation measures will enhance the conditions in Wetland U1 and the upper portion of Wetland W36 by increasing the water level (depth) and extending the hydroperiod in the wetland pools to optimize them for their desired ecological functions, including amphibian breeding, as described in the NETR/EIA. Dufferin has achieved similar wetland enhancements through mitigation in the past for Wetlands W5 and V2 at Milton Quarry as well as at their Acton Quarry (refer to the NETR/EIA for further information on such enhancements).

The mitigation measures will consist of an extension of the existing interim mitigation measures (during quarrying and lake filling) and rehabilitation mitigation measures consistent with the approved and presently operating measures at the Milton Quarry. An addendum to the existing comprehensive AMP has been prepared to incorporate the addition of the proposed MQEE into the existing AMP program.

The existing and proposed mitigation measures are described in this section. An assessment of the resultant impacts from the integrated mining and mitigation activities is presented in Section 10.

There is little to no surface water runoff from the MQEE extraction area, and any existing runoff is captured by either the existing quarry, Wetland U1, or Wetland W36. While Wetlands U1 and W36 currently receive some surface water contribution, the amount received is not sufficient for consistent successful reproduction of key species (e.g., JESA) as described in the NETR/EIA. A central component of the mitigation plan is to provide enhancement of Wetlands U1 and the upper portion of Wetland W36 by optimizing the water depth and hydroperiod using diffuse water discharges into these features as is presently done for Wetlands V2, W7, and W8 in the existing quarry.

In the absence of any mitigation, the flow of groundwater into the quarry, which is induced by the required dewatering below the water table, will reduce groundwater availability to water resources in the area. Therefore, mitigation of potential groundwater influence is also necessary and will be accomplished through the injection of water at recharge wells, as has been successfully implemented for the existing quarry.

The water resources that have been identified for protection or enhancement by the proposed MQEE mitigation measures, include:

- Wetland U1 and Wetland W36
- Wetlands east of the MQEE area, including: Wetland W41 and to a lesser extent, Wetlands W46 and W56
- Other features beyond the above wetlands, including the HFRT and Speyside Tributary

These water resources features are identified in Sections 5 and 6 of this report and the natural environment features are described with respect to their character and significance in the NETR/EIA.

The existing mitigation measures and AMP provide comprehensive protection for private water supply wells in the area of the Milton Quarry. As identified in Section 6.6, there are no private or public water supply wells that could be potentially affected by the proposed MQEE. No further measures related to water supply wells are necessary for the proposed MQEE.

The primary mitigation design objectives include:

- Maintaining the existing groundwater regime close to existing conditions during all critical periods for the natural features and organisms which are directly dependent on groundwater (refer to NETR/EIA and AMP Addendum).
- Optimizing the water depth and hydroperiod for Wetland U1 and the upper portion of Wetland W36 to enhance ecological conditions.
- Maximizing the degree of "passivity" of the mitigation measures.
- Ensuring the mitigation measures are "adjustable" and responsive, and can be fine-tuned to adapt to specific needs over time, based on an integrated monitoring and contingency response program as described in the AMP Addendum.

- Considering functions and values of the environmental receptors in the context of the broader natural systems.

The driving factor for the mitigation measures that are anticipated to be required are the water dependent wetland ecological features which can be sensitive to changes in surface water contribution or groundwater level affecting the hydroperiod. Therefore, the principal purpose of the mitigation measures is to maintain groundwater levels and surface water contributions to wetlands around the perimeter of the proposed MQEE and thereby protect surrounding water resources. Maintaining groundwater levels adjacent to the extraction limits will ensure that the existing groundwater levels and flows are sustained for the water resource features beyond. No changes are proposed to wetland catchment areas with the exception of Wetlands U1 and W36, which will include mitigation and enhancement through the installation of diffuse discharges to enhance their present conditions as described above.

The mitigation measures that will be utilized for the proposed MQEE include:

- Progressive extraction and rehabilitation.
- Implementation of an interim groundwater recharge system.
- Implementation of a seasonal diffuse discharge system to recharge Wetland U1 and the upper portion of Wetland W36 during interim and long-term conditions, consistent with approved operating systems for Wetlands W7, W8, and V2 for the existing quarry.
- Creation of lakes for quarry rehabilitation and passive groundwater support.
- Possible seasonal long-term (post-quarrying and lake filling) groundwater recharge system operation along the south and east perimeter of the MQEE consistent with the potential seasonal recharge approved for the East Cell.

The proposed interim recharge system for the MQEE is a simple extension of the existing system that is in place and operating effectively at the Milton Quarry as shown on Figure 9.1. The extension will provide recharge capacity to the east and south of the proposed MQEE area and replace the existing watermain located in the setback on the south side of the East Cell (setback is proposed to be removed). The Milton Quarry groundwater recharge well system was developed and implemented in 2007 consistent with the concepts and recommendations for planned aggregate extraction operation by Department of Fisheries and Oceans (Blackport et al., 1995), Ministry of Natural Resources (MNR, 1993), and Credit Valley Conservation (O'Neill, 1993 and CVC, 1998). The diffuse discharges proposed for Wetland U1 and Wetland W36 are similar to, the diffuse discharges that are operating effectively in three wetlands at Milton Quarry; the first of which commenced operation in 2009. The proposed new diffuse discharges have an optimized design to minimize their footprint and improve their human aesthetic upon installation consistent with the subsequent installations at the Acton Quarry.

The purpose of the AMP is to recognize the inherent variability in the natural environment. Rather than implement a "static" design which may not be the optimal system for the actual conditions encountered, a flexible system has been developed that can be adapted or optimized based on observed performance ensuring superior overall mitigation. This approach has been implemented at the Milton Quarry for the protection of water resources and has been demonstrated to be an effective approach in achieving the objectives of protection and enhancement of water resources.

The AMP approach has subsequently been recommended at other quarries and is an approved requirement for Dufferin's Acton Quarry.

The AMP facilitates addressing the uncertainty or variability in the mitigation requirements through an organized process of design, implementation, monitoring, evaluation, and optimization. The mining and mitigation plans for the Milton Quarry and the proposed MQEE are ideally suited to the AMP approach due to the spatially large extent, the gradual development over time, and the natural variability of both the hydrogeological and biological conditions.

The AMP requirements for the proposed MQEE are provided in a separate AMP Addendum report prepared by GHD in collaboration with GEC.

The AMP Addendum includes additions to the comprehensive monitoring and mitigation implementation system of the AMP. The layout of the water monitoring network and the recharge system is shown on Figure 9.1. The Wetland U1 and Wetland W36 diffuse discharges and an initial set of recharge wells will be installed and verified to be effective prior to extraction below the water table. The recharge system will be constructed so that additional recharge wells may be readily added as necessary to maintain suitable groundwater levels to protect water resources.

The AMP Addendum will include both Performance and Supplemental monitoring consistent with the AMP. Performance monitoring will include groundwater levels at a series of 4 additional trigger wells and the surface water levels in Wetland U1 and 2 pool areas in the upper portion of Wetland W36 as shown on Figure 9.1 (represented by staff gauges SG66, SG57, and SG58). These provide a total of 7 target water level monitoring locations.

Proposed trigger wells have been proactively installed and are shown highlighted with a green triangle on Figure 9.1, including (from southwest to northeast): OW83-21, OW81-20, OW80-20, and OW79D-20. These locations will have target water levels and the recharge system operation will be adjusted to maintain these targets. Extensive Supplemental monitoring will include additional collection and analysis of information on water levels, water budget, and ecology. This Supplemental monitoring information will be used so that all relevant aspects of water resources protection are appropriately considered.

The long-term conditions for the Milton Quarry rely primarily upon passive rehabilitation using lakes to support groundwater levels and associated water resources with some active management to control lake levels and provide diffuse discharge to some surrounding wetlands. This rehabilitation approach is extended to the MQEE lands with the extension of the East Cell lake into the MQEE extraction area along with creation of terrestrial and wetland habitat as illustrated on Figure 9.2.

As described above, once lake filling is complete under rehabilitation conditions, the overall groundwater recharge system will largely no longer be required as the lake system will provide the necessary groundwater support. Continued pond-to-pond transfers (pumping of water from the Reservoir to the East Cell Lake with gravity flow to the other lakes) are anticipated to be necessary to maintain the optimum lake levels. Relative to the MQEE, some post-quarrying operation of the diffuse wetland discharges will likely be required on a seasonal basis to maintain the optimum hydroperiods for Wetland U1 and Wetland W36 similar to that which may be required for Wetlands V2, W7, and W8 around the East Cell. It is also possible that limited seasonal groundwater recharge may still be required to the east of the East Cell consistent with existing approvals. This provision is also applicable to the proposed MQEE to maintain optimum seasonal high groundwater levels to optimally support water resources in this area in conjunction with such measures for the East Cell.

The AMP and AMP Addendum include provisions to further evaluate these considerations as the rehabilitation program is implemented to ensure suitable long-term protection and enhancement of water resources is achieved. The analyses for the proposed MQEE would be integrated into the analysis for the existing quarry consistent with the existing approved AMP and Site Plan provisions.

9.2 Surface Water

The surface water influences of the proposed MQEE quarry operation and rehabilitation include changes to drainage areas, land use (evapotranspiration) and the groundwater system. Changes to drainage areas are limited to the catchments for Wetland U1 and W36 and are the central focus of surface water related mitigation efforts which have been described above and are further detailed in the following subsections. Section 10 presents a complete impact assessment including surface water aspects.

The proposed MQEE extraction will not alter total drainage areas for the Sixth Line Tributary or the downstream portion of the HFRT. The minor changes that will occur pertain only to drainage that already flows into the Milton Quarry and hence will have no appreciable influence on the water quantity of the regional drainage system or watershed.

The runoff to the eastern wetlands and Speyside Tributary system will not be affected with the possible exception of any local drainage to Wetland U1 and Wetland W36 as described in Section 5.4. Any potential influence related to these water resources will be mitigated by the groundwater-related mitigation and rehabilitation measures described in Section 9.3 and Section 9.4.

Water quality will not be appreciably changed by quarry activities as evidenced by monitoring of existing quarry operations and mitigation conditions (as discussed in Section 7 and Section 10).

Appropriate stormwater management and erosion control measures will be incorporated into the Site Plans and AMP as described in Sections 8.3.2, 8.4, and 8.5. Any excess water (from groundwater or surface water) will be managed through the existing and expanded Milton Quarry dewatering systems and WMS. These facilities will provide suitable mitigation (e.g., sediment and erosion control) with respect to both water quality (i.e., turbidity) and water quantity considerations.

In conclusion, since the anticipated potential changes to the surface water resources are relatively minor, the groundwater mitigation measures are protective of surface water resources, and proper management of stormwater and potential erosion will be provided, no additional surface water related mitigation is required beyond the operations water management system for quarry discharge and the mitigation measures described in the remainder of Section 9 which include enhancement of Wetland U1 and the upper portion of Wetland W36.

The impact assessment related to surface water is included in Section 10.

9.3 Interim Recharge Mitigation Measures

The interim mitigation measures proposed during the active quarry extraction and lake filling period involve the extension of the existing successful mitigation system operating at the Milton North Quarry and Extension Quarry as described in Section 1. This system extension will protect and enhance the adjacent Wetland U1 and Wetland W36 as well as protecting or enhancing other wetlands that are located to the east and southeast from the potential influence of quarry dewatering.

As stated in Section 9.1, the water resources that have been identified for protection or enhancement by the proposed MQEE mitigation measures, include:

- Wetland U1 and Wetland W36
- Other wetlands south and east of the MQEE area, including (but not limited to): W41, W46, and W56
- Other water resources features beyond these wetlands, including wetlands and the HFRT and Speyside Tributary

The existing WMS for the Milton Quarry is illustrated on Figure 8.1 and includes:

- Reservoir in the Main Quarry with a total capacity of 5.5 million m^3
- An outfall (via gravity or pumped flow) from the Reservoir to the HFRT on the west side of the Main Quarry or to the Lake/Wetland area within the Main Quarry
- A recharge system pumping station on the north side of the Reservoir to feed the recharge well and wetland mitigation system that surrounds the North Quarry, West Cell, and East Cell
- A watermain that extends from the recharge pumping station around the mitigation loop
- Control huts spaced around the mitigation loop to control and monitor flow from the watermain to individual recharge wells and diffuse discharges to wetlands
- Recharge wells located between the extraction limit and the surrounding groundwater resources to maintain groundwater levels at the associated trigger well locations
- Diffuse discharges into three wetlands to directly maintain their pool water level and hydroperiod at target levels defined in accordance with the AMP
- Trigger wells located beyond the extraction limits and recharge wells to monitor the groundwater levels. Target water levels are defined for each trigger well in accordance with the AMP
- Response and contingency mitigation measures
- Quarry dewatering and operations facilities, including: dewatering from the North Quarry, West Cell, and East Cell to the Main Quarry Reservoir (or East Side operations area of Main Quarry)
- Central Sump pumping station to dewater the East Side of the Main Quarry into the Reservoir and to provide water from the Reservoir to the East Side operations area if needed

This existing WMS has been in place and successfully operating to protect water resources since 2007 as described in the 5-Year AMP Review and Annual Monitoring reports.

The mitigation system for the proposed MQEE is a simple extension of this existing WMS as shown on Figure 9.1. The existing Reservoir and recharge pumping station have sufficient capacity to accommodate the extension of the WMS for the proposed MQEE. The specific WMS components that will be required include:

- Diffuse discharges into Wetland U1 and 2 pool areas within the upper portion of Wetland W36
- Recharge wells located to the east and south of the proposed MQEE extraction limit
- Extension and rerouting of the watermain that is currently in the setback on the south side of the East Cell
- Control huts located along the watermain alignment to service the diffuse discharge and recharge wells

Figure 9.1 presents the conceptual design layout of these components and they are described further below. The AMP Addendum provides additional details on these components and their installation.

The dewatering of the proposed MQEE extraction area would be conducted as an extension of the existing East Cell dewatering works and activities with all dewatering flow directed to the Main Quarry Reservoir or other quarry storage area as part of the integrated handling of all water at Milton Quarry.

9.3.1 Diffuse Discharges into Wetland U1 and Wetland W36

As described in Section 5, Section 6.8.1, and the NETR/EIA, Wetland U1 is an intermittent pool located in a former open-field area. The wetland has a single contiguous pool area with limited drainage area.

The water regime in Wetland U1 will be maintained and actually enhanced through the implementation of the proposed mitigation measures, specifically the seasonal addition of water with a diffuse discharge from the WMS. This mitigation approach allows the water level to be raised to an optimum high spring water level and to be maintained for a suitably long hydroperiod to support existing and desired ecological functions as determined by the natural environment considerations described in the NETR/EIA and AMP.

As also described in Section 5 and Section 6.8.2 and the NETR/EIA, Wetland W36 is a linear wetland drainage feature in the woodland that has some deeper areas that exhibit intermittent pools.

The water regime in Wetland W36 will be maintained and actually enhanced through the implementation of the proposed mitigation measures, specifically the seasonal addition of water with diffuse discharges to 2 pool areas in the upper portion of Wetland W36 as represented by staff gauges SG57 and SG58. This mitigation approach allows the water level to be raised to an optimum high spring water level and to be maintained for a suitably long hydroperiod to support existing and desired ecological functions as determined by the natural environment considerations described in the NETR/EIA and AMP. It is not intended to create a continuous flow or discharge along the broader length of Wetland W36; however, based on the micro-conditions and climatic inputs, some surface flow may occur along portions of the feature, particularly during wet periods.

Downstream (west) of the SG57 pool area, Wetland W36 exhibits a more channelized character and an absence of surface water. Within the central segment of Wetland W36, there remains a low potential for groundwater interaction with the wetland (downstream of the SG57/SG58 pool areas to the vicinity of SG5). In the area of SG5, only occasional, short-duration water presence has been observed in the past and no water has been observed in 2020 or 2021. In this area the mitigation objective will be to prevent drying of the wetland (e.g., drying of substrate) relative to existing conditions. The adjacent groundwater recharge well system and upstream diffuse discharges will be operated with the goals of preventing MQEE-induced drying and potentially enhancing wetland conditions. The Supplemental monitoring program and a defined response action plan described in the AMP Addendum will ensure there is suitable mitigation protection for this area.

Further west (downstream) of SG5 in Wetland W36, the groundwater level is well below the base of the wetland and there is no potential for groundwater support or discharge to the wetland. Therefore, direct mitigation protection and associated monitoring is not necessary in this area.

The proposed diffuse discharges for Wetland U1 and the upper portion of Wetland W36 include a granular bed located in a deeper area of the wetland pool fed by a buried feeder pipe extending from an adjacent watermain control hut as shown on Figure 9.1. This approach has been used successfully at Milton Quarry as demonstrated by the operating wetland diffuse discharges for wetlands V2, W7, and W8 to the northeast of the MQEE area. The approach has been further refined for the Acton Quarry mitigation system. The Acton Quarry system has been approved by the agencies and 7 of these wetland diffuse discharges have been constructed at Acton Quarry with 2 in present operation. Further design details and suitable installation safeguards for environmental features are described in the AMP Addendum consistent with the Acton Quarry refinements to the diffuse discharge design.

9.3.2 Recharge Wells

Recharge wells are used to maintain the groundwater levels beyond the extraction limit to protect or enhance the water resources features. The recharge, or injection, of water into the wells supports the groundwater levels beyond the extraction limit. The recharge system is operated to maintain groundwater levels that are at, or above, target water levels at trigger wells. Maintaining the groundwater levels in this way ensures the natural or desired flow of groundwater occurs beyond the extraction area to suitably support the water resources (wetlands) in the potential area of influence from quarry dewatering.

The Milton Quarry pioneered the use of recharge wells for this purpose with extensive testing programs and has operated the Milton Quarry recharge well system successfully since spring 2007 on a full-time basis.

Recharge wells are planned along the east and south side of the proposed MQEE extraction limit in proximity to the watermain alignment. The watermain is located at a practical distance from the extraction limit on the east side to provide a separation distance between the recharge wells and the actual quarry extraction cell to help limit recirculation of recharge water into the extraction cell. To the south of the MQEE, the proposed recharge wells are generally closer to the extraction limit due to the location of the adjacent woodland boundary and Wetland W36.

Recharge wells will be generally located relatively close to the watermain to limit the length of feeder lines, but will deviate where it is considered advantageous with respect to recharge effectiveness and ecological conditions allow. Where possible, recharge wells will be located in open field areas; however, in limited instances recharge wells may be advanced into treed areas such as in the areas along existing openings or trails south of the proposed MQEE. Any such advancements into, or in close proximity to, treed areas will be done under the supervision of a qualified ecologist as has been done successfully in the past at both Milton Quarry and Acton Quarry.

Figure 9.1 shows conceptual or preliminary recharge well locations based on predictive analysis (refer to Section 10 discussion on hydrogeologic simulation results), field siting considerations, and practical experience with the existing recharge wells system. The initial WMS installation will not include recharge wells at all the locations shown. Recharge wells will be installed and verified to be effective prior to extraction below the water table in the MQEE and additional recharge wells will be added if necessary, based on the recharge system performance as the extraction (and hence the dewatering influence) advances, increasing the recharge requirement. The recharge system design readily facilitates these enhancements and they are routinely done now for the existing recharge system.

The recharge wells are designed as open-hole wells that fully penetrate the Amabel Formation to provide broad groundwater support over the entire depth of the Amabel aquifer. Each well is fed from a nearby control hut through a buried feeder line. The recharge well flow will be controlled to maintain recharge that supports a groundwater level that is at, or above, the target level in the nearby trigger wells. The target levels will be established based on existing groundwater levels as well as natural environment consideration with seasonal and annual variations consistent with the existing target levels at Milton Quarry as described in the AMP Addendum.

Further recharge well design details and suitable installation safeguards for environmental features are described in the AMP Addendum consistent with the Acton Quarry refinements.

9.3.3 Watermain Extension and Control Huts

The watermain and control huts facilitate the delivery, control, and monitoring of water pumped from the Reservoir in the Main Quarry (by the Recharge Pumping Station) to the individual diffuse discharges and recharge wells. The existing watermain and control hut network will be extended to encompass the proposed MQEE extraction area and mitigation requirements as described herein and illustrated on Figure 9.1.

The existing watermain for the Milton Quarry WMS passes through the setback on the south side of the East Cell. This setback is proposed to be removed (following approval) to allow the MQEE to be extracted as a continuation of the East Cell. Therefore this watermain must be relocated. The proposed extension of the WMS includes rerouting this watermain from the southwest corner of the East Cell (at the east side of the Town Line road watermain crossing), south along the Town Line setback and around the south and east side of the proposed MQEE extraction area as shown on Figure 9.1. The detailed design of the WMS extension may result in some variation of this alignment in accordance with the AMP.

On the south side of the proposed MQEE, the watermain is situated within a defined 10-metre wide zone outside the woodland limit as defined in the Natural Environment Report and on the Site Plans.

The watermain extends further to the east of the proposed MQEE extraction limit on the east side to increase the separation distance of the recharge wells from the extraction limit as described in Section 9.3.2 above. The alignment shown on Figure 9.1 is based on practical consideration of this separation distance, vegetation, and topography.

The WMS alignment also includes a branch that extends to the east as shown on Figure 9.1. This branch provides flexibility to facilitate placement of recharge wells in this area to optimize the existing East Cell recharge well network and additional recharge wells required for the proposed MQEE to minimize the required total number of operating recharge wells and flow.

The control huts are small building enclosures that allow multiple recharge connections to the watermain. These above-ground control huts increase safety and operational efficiency for the recharge system by avoiding the need for below grade equipment that would require confined-space access as well as larger excavations. Each control hut will allow connection and supply of at least 4 recharge wells/diffuse discharges with associated control and metering of flow and pressure. Consistent with the existing WMS, each control hut will also incorporate a bag-filter system to provide for removal of possible fine particles from the recharge flow that can arise from precipitation and sedimentation processes in the watermain.

9.4 Quarry Rehabilitation

The proposed rehabilitation plan for the MQEE is a relatively minor adjustment of the existing rehabilitation plan that will serve to enhance the overall Milton Quarry rehabilitation plan as described in the Natural Environment Report and the Planning Summary Report.

From a water resource perspective, the objective of the rehabilitation plan is to create an end use that is protective of, or enhances, the existing water resource and ecological features with the minimum active management or engineering works necessary to achieve this objective. To best satisfy this objective, the existing Milton Quarry rehabilitation plan includes allowing portions of the North Quarry, West Cell, and East Cell to be filled with water to create three separate lakes. These three lakes will provide passive support to the surrounding groundwater recharge system, minimizing the need for any active (pumped) recharge in the long term.

The rehabilitation of the MQEE will include the extension of the East Cell lake area to include the MQEE extraction area as shown on Figure 9.2. Within the MQEE, overburden or other suitable excess soil will be placed to create a variety of landforms, wetland, and lake features and habitats. The lake will include exposed quarry wall areas, particularly in the southeast portion of the extraction area that will serve to support the existing groundwater levels in this area that support the surrounding wetlands.

During the lake filling period the recharge system will continue to operate to maintain groundwater levels in the study area and the water level in Wetland U1 and the upper portion of Wetland W36. As the lake level rises during filling, the recirculation rate of water back into the quarry will reduce due to the lowering of the hydraulic gradient between the recharge alignment and the quarry water level, thereby reducing the recharge system flow and reliance.

9.4.1 Background on Existing Approved Rehabilitation

As identified above, the existing approved rehabilitation plan for the Milton Quarry includes the creation of three separate lakes in the North Quarry, West Cell, and East Cell. The levels of these lakes are determined primarily to be protective of the Sixth Line Tributary and associated wetlands to the west and north. Following the filling of the three lakes, limited active mitigation will continue to be necessary and is included in the existing approvals and legal agreement requirements. These existing requirements include:

- Seasonal pumping and gravity flow to maintain the three lake levels as well as managing dewatering flow from the east side of the Main Quarry and the North Quarry, returning it to the Reservoir
- Seasonal pumping to maintain the optimum water level and hydroperiod in the three on-Site wetlands
- Possible seasonal operation of a limited portion of the recharge well system to support the eastern wetlands

Maintaining the three lakes at controlled elevations (through pumping and gravity flows) will allow the passive mitigation of water resources associated with the Sixth Line Tributary system, private water supply wells, and the western wetland by maintaining the lakes at a higher elevation than these water resources. This control requires seasonal pumping to the East Cell lake and controlled gravity overflow cascading to the West Cell and then the North Quarry. Any excess water in the North Quarry will be pumped back to the Main Quarry.

The three on-Site Wetlands (V2, W7, and W8) are located within the Licence limit of the East Cell. These wetlands are in close proximity to the extraction limit and are at elevations that are slightly above the planned East Cell lake level. It is anticipated that these wetlands will require some continued seasonal recharge. Therefore, the Milton Quarry approvals include the continued use of the existing diffuse discharges following lake filling to ensure the optimum natural environment conditions are maintained. This is the same as the proposed approach for Wetland U1 and W36.

Under the existing Milton Quarry plans and approvals, the eastern wetlands will be partially mitigated by the creation of the three lakes, however the East Cell lake level may not be high enough to fully mitigate all the wetlands, particularly those that are close to the East Cell and particularly during the spring and early summer period. The potential limitations include the relative elevations (i.e., the lake levels may not reach a sufficient elevation to support groundwater discharge to these features) and the dampening of seasonal water levels as discussed below. To fully mitigate the wetlands to the east under rehabilitation conditions, limited seasonal post-quarrying operation of the interim groundwater recharge well system may be required in this area as a requirement of the existing approvals. This aspect will be evaluated in detail as part of the ongoing monitoring and mitigation program in accordance with the AMP as the quarry develops and the East Cell lake filling is completed. The same approach is proposed for the MQEE since the extraction area forms part of the East Cell lake.

Although the lakes will tend to dampen the natural groundwater level fluctuations, the resultant natural seasonal fluctuations in the bedrock away from the lake may be great enough to allow ephemeral/intermittent flooding of wetlands once the lakes are full.

9.4.2 MQEE Rehabilitation

As described above, the proposed MQEE rehabilitation plan is an extension of the existing approved comprehensive Milton Quarry rehabilitation plan. The extension of the plan for the MQEE includes the passive support of the surrounding groundwater level with a lake, the support and enhancement of the adjacent wetland U1 and Wetland W36 through the seasonal use of the diffuse discharge mitigation, and the potential seasonal use of a limited portion of the recharge well system in combination with the East Cell requirements. The planning and natural environment aspects of the plan are described in the NETR/EIA and the Planning Summary report.

The created East Cell/MQEE lake will have an elevation of approximately 333 m AMSL. This is the approved lake level for the East Cell and is suitable for the proposed extension of the lake into the MQEE area. The AMP and AMP Addendum include provisions to review, and refine this level, if warranted, prior to completion of final rehabilitation.

The lake level will passively support the groundwater levels to the south and east of the proposed MQEE through the quarry walls exposed to the lake as well as leakage through excess soil material placed in the lake area. The planned strategic placement of the excess soils and the generally permeable nature of the quarry walls of the Amabel aquifer allow the lake level to suitably support groundwater levels as further discussed in Section 10.

The proposed diffuse discharge system will continue to be used on a seasonal basis to maintain the optimum water regime in Wetland U1 and the upper portion of Wetland W36 in support of natural environment conditions. This operation would be the same as the long-term operations planned for Wetlands V2, W7, and W8 as part of the existing Milton Quarry requirements and approvals.

Also similar to the existing Milton Quarry, the passive groundwater level support provided by the lake may not result in the optimum high seasonal groundwater levels in the spring relative to the natural environment functions of the nearby wetlands. Furthermore, the location of the proposed MQEE recharge wells provides for advantages to some of the existing recharge well locations associated with the East Cell and may benefit the operational effectiveness of any necessary recharge well operations for the existing quarry rehabilitation. Therefore, it is proposed to consider potential seasonal recharge well operation of some of the proposed MQEE interim recharge well system. The needs for any such operations would be very limited in terms of the seasonal duration, number of wells, and recharge flows relative to the requirements during the interim extraction and lake filling period.

Monitoring is proposed to continue beyond the interim (extraction and lake filling) period to both ensure the protection of water resources and to assist in managing the lake level and control. These programs are identified in the AMP Addendum and will be reviewed and refined during the active quarry extraction and lake filling monitoring periods.

9.5 Response Action and Contingency Mitigation Measures

The mitigation measures planned for the proposed MQEE will provide appropriate protection of all water resources receptors as demonstrated by the ongoing successful performance of the same measures at the Milton Quarry. The implementation, operation, and monitoring of these mitigation measures will be carried out under the program established in the AMP Addendum. The AMP and AMP Addendum facilitate a careful process of monitoring, identification of concerns or unanticipated effects, and swift implementation of appropriate mitigative measures. This approach enables ongoing identification and management of potential contingency situations through continued monitoring and response actions.

In the unexpected event that a need is determined for mitigation measures beyond those planned for the initial MQEE WMS implementation, various routine response actions and contingency measures are available. The following list identifies many of the expected routine response action as well as other actions that may be taken in a contingency scenario. These measures are essentially the same as those approved for the existing quarry and identified in the AMP.

- Increasing or adjusting recharge flows to individual recharge wells
- Increasing flow to recharge system by increasing flow (pressure) from recharge pumping station
- Refurbish or replace existing recharge wells that are not performing adequately
- Adding recharge wells (including possible use of inclined recharge wells) or diffuse discharges
- Additional monitoring (e.g. additional water level monitoring locations or ecological monitoring) to further characterize conditions and evaluate potential changes to target levels and/or mitigation operation (including further automation)
- Increasing capacity of recharge system (e.g., adding control huts, local feeder water lines, increased watermain/feeder size, pumping station upgrade)
- Modify blasting activities in close proximity to recharge wells to minimize local effects of blast-induced fracturing beyond the quarry face
- Consider other possible means of supplying water to affected features (e.g., alternate recharge system alignment, recharge ponds, diffuse discharge to wetlands, or other means)
- Localized grouting of high permeability bedrock feature
- Hydraulic buttress construction
- Temporary or longer-term cessation of bedrock extraction below the water table in an affected area

The AMP and AMP Addendum provide additional information on the applicability and implementation of all response actions and potential contingency measures if and as warranted.

Specific contingency measures have been established by Dufferin to respond to any spill of hazardous material (refer to Section 8.5).

10. Water Resources Impact Assessment

10.1 Overview

The extraction and mitigation plan for the proposed MQEE bedrock resource is designed to prevent unacceptable negative effects and maximize the short and long-term benefits to water resources in the vicinity of the proposed MQEE to provide an overall enhancement of water resources. In particular, the water regime in Wetland U1 and the upper portion of Wetland W36 will be maintained and enhanced through the implementation of the MQEE mitigation measures, specifically the seasonal addition of water with a diffuse discharge from the WMS to raise the water level to an optimum spring level and to be maintained for a suitably long hydroperiod to support existing and desired ecological functions as described in the NETR/EIA. The WMS will also include recharge wells operated to maintain suitable groundwater levels to support groundwater flow and associated water resources to the east.

A comprehensive performance monitoring program will be implemented to monitor the mitigation measures which will protect the water resources in the vicinity of the proposed MQEE as well as demonstrate the performance of these measures. Prior to the commencement of extraction in the MQEE, the existing Milton Quarry WMS will be proactively extended around the MQEE area to ensure that the necessary mitigation is in place and verified to be effective.

Under rehabilitated quarry conditions, the extension of the East Cell lake into the MQEE area will increase the extent and diversity of water resources (wetland and lake habitats) in the area and minimize the need for ongoing management while protecting and enhancing existing and future water resources. The rehabilitation plan includes the extension of the East Cell lake as well as creation of terrestrial/island and wetland areas as shown on Figure 9.2 The additional MQEE lake/wetland surface area is an increase of 10.4 ha to the East Cell lake for a combined total area of 48.1 ha.

The net use of water by the proposed MQEE is relatively small. Water consumed by the proposed MQEE quarry operations and lake evaporation is limited and can be accommodated within the Milton Quarry water budget, as described below and presented in detail in Appendix G.

An impact assessment for the proposed MQEE development with mitigation is presented herein. An assessment of potential surface water related impacts is presented in Section 10.2. The impact assessment for the identified groundwater-related resources in the vicinity of the proposed MQEE is presented in Section 10.3, including water quality and source water protection considerations. Section 10.4 presents an assessment of the potential cumulative effects of the proposed MQEE development and Section 10.5 summarizes the overall assessment of water resources impacts and benefits.

10.2 Surface Water Assessment

The following discusses the potential changes to surface water conditions, and their significance, as a result of the operation and rehabilitation of the proposed MQEE. This assessment includes two main components: the direct influence in changes to surface water flow (runoff) as a result of the proposed MQEE extraction; and the effect on water budget from the extraction and rehabilitation changes to land use.

10.2.1 Surface Water Flow (Runoff)

As described in Section 5.4 and Sections 6.8.1 and 6.8.2, there is currently little to no runoff generated from the MQEE area. While no runoff has been observed to date, any runoff generated within the proposed MQEE extraction limit would ultimately discharge to existing quarry areas, Wetland U1, or Wetland W36. The proposed extraction will not change the contributing drainage areas for any other MQEE wetlands or surface water features due to a natural topographic high (catchment divide) located east of the proposed MQEE extraction limit. Given the conditions observed to date, the effect of the proposed extraction on runoff to Wetlands U1 and W36 would likely be negligible; however, enhancement is proposed for these features so mitigation measures have been included. Therefore, there is not anticipated to be any negative effect on surface water flow from the proposed MQEE.

The proposed MQEE extraction area is 15.9 ha and any runoff that may presently occur from this area to the surrounding landscape will be intercepted by the quarry, infiltrate to groundwater, or evapotranspirate. Presently 2.2 ha of the area that will be intercepted by the proposed MQEE drains to the west (refer to Figure 5.2) and any present runoff would be captured by the existing quarry excavations or evapotranspirate. The balance of the proposed MQEE extraction area (13.7 ha) presently drains to the Wetland W36 drainage system that comprises a total of 39.6 ha. The sub-area drainage to Wetland U1 is 10.5 ha, of which 4.2 ha will be removed by the proposed MQEE extraction.

There is no potential for effects downstream of Wetland W36 as the catchment is intercepted by the Main Quarry. Therefore, any surface water flow that is intercepted by the proposed MQEE represents water that presently either evapotranspirates or is captured by the Milton Quarry as groundwater or surface water inflow.

As previously indicated, there is little to no runoff evident in the MQEE area and any such runoff that occurs would be on an extremely infrequent basis during extreme precipitation and snow-melt events. No runoff from these areas was observed in 2020 or 2021 by GHD or by GEC in prior years when access was available for monitoring. It is possible that there is some very local drainage or interflow to Wetland U1 and Wetland W36; however, based upon the shallow, generally permeable overburden soils, it is anticipated that the vast majority of precipitation in the proposed MQEE area infiltrates to groundwater or evapotranspirates with limited potential for appreciable runoff flow.

The quarry operations and WMS establishment have the potential to result in erosion impacts within the catchment area; however, standard erosion control measures and best management practices (BMPs) can effectively prevent any such impacts. There are no hazard land considerations within the proposed MQEE extraction area as described in Section 5.5 and Section 8.4. The standard erosion control and BMPs necessary to protect water resources are incorporated on the proposed MQEE Site Plans and AMP as identified in Section 8.3.2, Section 8.4, and Section 9.2.

Based on the extremely limited potential for runoff from the proposed MQEE area, it is not anticipated that there will be any negative impacts from the proposed MQEE extraction. Any runoff that presently occurs is an occasional event and not a consistent or normal part of the present functioning of the water resources in the catchment area. The water resources within the catchment area that includes the proposed MQEE will be protected and enhanced by the mitigation measures described in Section 9.3 and discussed further in Section 10.3 below.

10.2.2 Surface Water Balance

Another potential effect of the quarrying of the proposed MQEE and the associated rehabilitation plan is a modification of the annual water balance resulting from the altered land use of the proposed MQEE. The modifications to the local water balance will be small, with changes that include:

- Increased amount of water available to overall system during the operation of the proposed MQEE due to reduced evapotranspiration (operational water requirements are similar to existing operations).
- Reduction in water available to overall system in rehabilitated conditions due to increased lake surface area and associated evaporation.

These water balance increases and reductions are small components of the overall Milton Quarry area water budget, as presented in detail in Appendix G. The magnitude of water surplus by land type is summarized below:

	Vegetated Open Space (mm)	Dry Quarry Floor (mm)	Rehabilitation Quarry as Open Water (mm)
Precipitation	866	866	866
Evapotranspiration	573	300	672
Runoff	60	566	194
Infiltration	233	0 (runoff)	0 (runoff)
Water Surplus	293	566	194

It is evident from review of these water balance values, that the development of the dry quarry conditions results in an increase in water availability (water surplus) from the proposed MQEE area due to the reduction in evapotranspiration and capture of any runoff. The water balance will have a net increase in water surplus of 43,407 m^3/year over the 15.9 ha extraction area of the proposed MQEE, as presented in Table 10.1

Under rehabilitation conditions, the 15.9 ha area of the proposed MQEE extraction area will be converted into 5.5 ha of terrestrial/island landscape and 10.4 ha of lake or wetland. The net affect will be a decrease in water surplus of 10,593 m^3/year relative to existing conditions.

The changes described above are small in the context of the Milton Quarry WMS water budget that has typical inflows of approximately 6,000,000 m^3/year, and a safety factor of 500,000 m^3/year. The calculated reduction in water availability under rehabilitation conditions (10,593 m^3) is less than 0.2 percent of the typical inflow to the quarry and incorporates the measures necessary to enhance the two wetland areas into the future.

The water budget presented in Section 10.3 incorporates these changes to the water balance in terms of the water budget for the water that is actively managed by the quarry and demonstrates that the proposed MQEE is acceptable from both a water budget (Site level) and a surface water balance (watershed) perspective.

10.2.2.1 Impact of Climate Change

The evaluation presented above is based on parameters estimated for the Canadian Climate Normals (CCN) period from 1981 to 2010 and is representative of baseline (observed long-term average) conditions. As discussed in Section 5.2.1, assessment was undertaken for the evaluation of changing climate conditions. Two additional climate change scenarios were evaluated that represent potential future conditions representative of the 2050s and 2080s. The parameters applied are representative of a 30-year average (similar to the CCN values) centered on the years identified and are representative of future long-term average conditions.

The key differences between the current climate scenario and the most distant scenario evaluated (2080's) are an estimated increase in precipitation of 137 mm/year, an increase in evapotranspiration of 82 mm/year, and an increase in lake evaporation of 176 mm/yr. Modest changes in runoff and infiltration also occur on the order of 30 mm/year. Given the lake areas present under the rehabilitation condition, a small reduction in water surplus is predicted in the future.. These potential changes would have only a limited influence on the availability of water associated with the Milton Quarry. The existing and proposed WMS provides opportunities for future optimization to maximize the beneficial use of water and protect the surrounding water resources from some of the potential effects of climate change. The effect on the quarry water budget is evaluated in Section 10.3.3.3.

It is noted that short-term variability (e.g., drought) is not a concern now or in the future due to the substantial volume of water in storage at the Site. In the event of severe water availability reduction, the lake filling process could be temporarily postponed, and water could be drawn from storage to sustain operation of the mitigation system. Once rehabilitation is complete, the Reservoir will continue to function as a substantial buffer for the system and provide lake top-up as required.

10.3 Groundwater Assessment

10.3.1 Overview

The preceding Section (10.2) demonstrates that no negative impacts are anticipated from the proposed MQEE from an overall hydrological perspective. This section presents a more specific discussion of the assessment in the context of the proposed MQEE development and mitigation measures, and protection of specific water resource features.

Groundwater and surface water regimes will be appropriately maintained as part of the proposed implementation of the AMP Addendum for the MQEE. There are no anticipated negative effects on water resources. The water resources of concern are the wetlands to the south and east of the proposed MQEE extraction area. These water resources will be maintained or enhanced by the proposed mitigation, rehabilitation, and monitoring measures described in Section 9 and the AMP. There are no water supply wells that have the potential to be influenced by the proposed MQEE.

One of the tools used in this assessment was the Milton Quarry hydrogeologic simulation model. The simulation model is typically used to estimate future conditions for comparison to help evaluate and support the mining, mitigation, and rehabilitation plans in conjunction with extensive analyses of hydrologic, hydrogeologic, ecologic, and engineering factors by the Milton Quarry project team. The model was recently updated and reported in the AMP 5-Year Review and was further updated and refined for use in this assessment. The model development and simulation approach is summarized below and simulation results are used as a guide in the presentation of the impact assessment for the proposed development and mitigation of the MQEE.

Detailed water budget analyses are also conducted in conjunction with the hydrologic water balance assessment (Section 10.2.2) and groundwater modelling (Section 10.3.2). The Milton Quarry water budget was also recently updated and reported in the AMP 5-Year Review and was further updated for use in this assessment (Section 10.3.3). These water budget analyses are integrated into the following assessment.

10.3.2 Hydrogeologic Simulation Model Approach

The hydrogeologic simulation model is a mathematical computer model of the groundwater flow system that provides a tool to integrate various aspects of the geology, water level, and water flow conditions of the "real world" that can then be adjusted to reflect potential changes in the real world conditions – such as the changes that may occur from quarry dewatering, mitigation, rehabilitation lake filling, or other groundwater influences. Due to the inherent variability in the real world, the model results are necessarily approximations of real-world conditions and are most useful when applied on a comparative basis and interpreted in the context of all the available characterization information and mitigation plans. This is how the modelling tool has been utilized in this assessment. Ultimately the successful implementation of the proposed mitigation and rehabilitation measures is demonstrated by the monitoring and response program documented in the AMP Addendum.

The hydrogeologic model was constructed using the regional and site characterization information and calibrated to water level and flow information. The model represents the hydrogeologic (including geology) conditions in three dimensions, including the processes of groundwater recharge (infiltration of precipitation), flow through the Amabel Aquifer, discharge of water to surface water features, dewatering by the Milton Quarry, and regional truncation of the Amabel by the Escarpment.

The Milton Quarry model was originally developed for the Milton Quarry Extension application (CRA, May 2000) and has continued to evolve through periodic updates and ongoing use for analysis and refinement of the WMS as the Milton Quarry has developed over the last two decades. For this study, the model construction and calibration was refined to include geologic and hydrogeologic information collected from the proposed MQEE area as described in the preceding sections of this report. The model input parameters were also refined to further improve the model calibration, particularly to the new water level information in the MQEE area. The analyses of the proposed MQEE were then undertaken in the context of the baseline conditions of the approved, existing quarry. Detailed documentation of the hydrogeologic modelling work is included in Appendix F.

The simulated flow components were incorporated into a so-called "quarry design" water budget to examine the availability of water for mitigation, discharge, and lake filling under interim extraction and rehabilitation conditions. The details of the quarry design water budget calculations are presented in Appendix G.

10.3.3 Hydrogeologic Assessment

The proposed mitigation and rehabilitation measures and AMP/AMP Addendum are designed to provide both proactive and responsive mitigation of water resources to ensure they are suitably protected and enhanced as described in Section 9. This adaptive management approach relies upon ongoing performance monitoring and adaptation to ensure success, rather than relying upon predictions or calculations of theoretical impacts. Such predictions or estimates of potential system behaviour are, however, helpful to assist in understanding and illustrating the intended performance of the water-related systems as presented below. Where and/or when encountered conditions or mitigation performance vary from those represented in this analysis, measures are available and will be implemented to ensure the appropriate protection and enhancement of water resources is achieved in accordance with the AMP Addendum. Fundamentally, the protection of water resources and related ecological features does not rely on any predictive analysis but rather on the adaptive management approach and its sound implementation of monitoring results, scientific knowledge, and proven mitigation measures.

The assessment includes the comparison of conditions under the proposed interim extraction and long-term rehabilitation conditions with the proposed MQEE to the approved interim and rehabilitation conditions for the existing quarry. The compared conditions were evaluated using consistent input data (including long-term average climatic conditions) so that the comparison of results is indicative of the quarry development conditions, not other transient factors.

The current approved existing quarry extraction and rehabilitation conditions are used as the basis for comparison of proposed future conditions with the MQEE. For the hydrogeologic simulations, this condition is represented using the calibrated model, modified to account for approved full extraction and/or rehabilitation with required mitigation and to reflect long-term average climate conditions.

The corresponding quarry water budget analyses for existing approved conditions and also with the proposed MQEE conditions are summarized in Table 10.2 and include both active extraction and rehabilitation conditions.

Under the existing approved quarry conditions, the calculated available annual water volume within the quarry for storage or discharge/mitigation under existing quarry active extraction conditions is 1,311,804 m^3. The calculated available annual water volume within the quarry for storage or discharge/mitigation under existing quarry approved rehabilitation conditions is 788,473 m^3. The decrease in water availability between the active extraction and rehabilitation scenarios is attributed to the change in land type and associated increase in evapotranspiration, as discussed in the context of the proposed MQEE area in Section 10.2.

It is important to note that the mitigation measures planned for the extraction period will also be necessary during the lake-filling period; however, the mitigation demand will decrease as the lake fills and the drawdown caused by the quarry extraction decreases. All analyses presented in this report are based on mitigation being provided as necessary to protect the water resources beyond the cessation of aggregate extraction operations. The combined active extraction and lake-filling period is referred to as the interim conditions period. This basis is reflected in the requirements of the AMP/AMP Addendum.

10.3.3.1 Interim Conditions

The proposed MQEE under interim conditions with the quarry operating were evaluated to ensure that appropriate quarry operations and mitigation measures could be implemented throughout all stages of quarry development, including post-extraction lake filling until the final long-term rehabilitation state is achieved, as described in Section 9 and the AMP/AMP Addendum. From the perspective of potential impacts to water resources, the worst-case scenario is the simultaneous full extraction of all quarry areas as this scenario represents the maximum potential dewatering influence relative to the surrounding water resources. Therefore, this scenario is conservatively used as the basis for assessment of potential impacts.

Under extraction conditions, the quarry cells are dewatered which results in a potential dewatering influence to the surrounding water resources. The existing quarry has approved mitigation measures to mitigate the drawdown to protect water resources from this potential effect. It is proposed to extend the existing mitigation measures as described in Section 9 and the AMP Addendum to provide the appropriate protection of water resources and these conditions were evaluated in this assessment.

The simulated hydrogeologic conditions shown on Figure 10.1 demonstrate that the proposed mitigation of water resources during the interim period will generally maintain or raise groundwater levels in the vicinity of the proposed MQEE area. This is consistent with expected results based on the characteristics of the site, the successful operation of the existing mitigation system, and the proposed mitigation for the MQEE. As described in Section 9.3, the interim mitigation uses a combination of diffuse discharges for Wetland U1 and the upper portion of Wetland W36 and groundwater recharge wells.

The diffuse discharges proposed for Wetland U1 and the upper portion of Wetland W36 will allow an optimum seasonal hydroperiod and water depth to be maintained for these wetland pools similar to the three on-Site wetlands associated with the East Cell (Wetlands W7, W8 and V2). This mitigation approach has been demonstrated to be highly effective, enabling the wetland ecological functions to be maintained and enhanced as described in the Natural Environment Technical Report and EIA.

The groundwater recharge system will support groundwater levels to the east and south of the proposed MQEE extraction area in the same manner that the existing recharge well system supports groundwater levels to the west, north, and east of the existing quarry. Figure 10.1 demonstrates the proposed layout and effectiveness of the recharge system for the proposed MQEE. The positive (green) contour lines reflect the increase in simulated groundwater levels resulting from the proposed MQEE extraction and mitigation. The combined use of the diffuse discharge and groundwater recharge in the area southeast of the proposed MQEE extraction area can be used to increase the existing water level and hydroperiod for the upper portion of Wetland W36 to achieve the desired enhancement of ecological conditions. There are no areas influencing water resources where the groundwater level is not maintained (decreases are shown with negative (purple) contour lines) or raised under these representative simulation conditions.

The simulated groundwater discharge to Wetland W41 confirms that the proposed mitigation measures as reflected by the simulation results presented on Figure 10.1 will maintain or enhance groundwater support to this feature. The simulated discharge values are as follows (refer to Appendix F):

- Existing Approved Interim Quarry Conditions (without MQEE): 38 L/min
- Existing Approved plus proposed MQEE Interim Conditions: 45 L/min

As identified above, the simulation results are provided for assessment and illustration purposes. The actual performance of the mitigation measures and protection of water resources will rely on the implementation, operation, monitoring, and response action provisions of the AMP/AMP Addendum.

The water budget calculations for these conditions are presented in Table 10.2. These calculations included consideration of the water that is actively managed by the quarry water management system, including water utilized for discharge/mitigation to the surface water features and recharge wells as shown on Figure 10.1 as well as the ongoing requirement to discharge a minimum of 700,000 m3/year to HFRT from the Main Quarry.

The total annual available water inflow to the quarry for the proposed full extraction condition with the MQEE is simulated to be 7,369,573 m^3. The necessary water to provide all the associated mitigation and enhancement by surface water discharge and groundwater recharge is 5,121,645 m^3. The net available volume is slightly greater than under existing quarry conditions, increasing by 24,083 m^3 to 1,335,887 m^3 as a result of the increased quarry extraction area and associated capture of water along with reduced evapotranspiration. There is clearly sufficient water available to provide the proposed mitigation and enhancement for water resources associated with the MQEE area and the existing quarry.

10.3.3.2 Rehabilitation Conditions

The rehabilitation of the proposed MQEE involves the extension of the East Cell Lake as well as creation of terrestrial landforms and shoreline wetlands as described in Section 9.4. Under rehabilitation conditions, the integrated lake system, including the East Cell and MQEE areas, will help passively support the surrounding groundwater flow system. As with the existing quarry rehabilitation plan, some limited active management will continue in the form of water transfers to store and discharge water for optimal use. These transfers include the seasonal top-up of lake levels and continued seasonal diffuse discharge to a limited number of wetlands in proximity to the extraction limit. Seasonal variations in lake levels and surface water features are expected to occur based on climatic variations; however, some transfers of water will be necessary to ensure seasonally appropriate lake levels are maintained and to compensate for seepage of water between quarry phases.

Wetland U1 and the upper portion of Wetland W36 are anticipated to require seasonal diffuse discharge operation in the long-term to maintain the desired enhanced water regime in these wetlands; similar to the existing approved condition for the three wetlands adjacent to the East Cell. The addition of Wetland U1 and Wetland W36 to this group is straight-forward and will not significantly affect the required water resource management efforts or complexity.

As per the existing approved Milton Quarry Extension, if monitoring indicates the final lake level is high enough to support the eastern wetlands and sufficient seasonal fluctuations in water levels occur, the groundwater recharge system operation will be discontinued. Due to the variability and uncertainty inherent in the hydrogeologic system, this cannot be definitively established at this time. Therefore, the proposed MQEE may require extension or modification of the potential seasonal recharge system operation approved for the East Cell and has been allowed for in the proposed MQEE rehabilitation plans. If necessary, the operations would be limited in terms of the seasonal duration, number of wells, and recharge flows relative to the requirements during the interim period. The need for seasonal operation of recharge wells in support of eastern wetlands will be evaluated as lake filling concludes in accordance with existing approvals.

The simulation results presented on Figure 10.2 include the operation of groundwater recharge wells along the east and south sides of the East Cell (as currently approved) and extended south to provide recharge along the perimeter of the proposed MQEE. The operation of the wells will assure that the water level and seasonal variations of the wetlands can be maintained. The combined influence of the rehabilitation lake, seasonal diffuse discharges, and possible limited seasonal use of recharge wells will support groundwater levels to the east and south of the proposed MQEE extraction area in the same manner that the existing approved rehabilitation measures support related water resources.

The positive (green) contour lines on Figure 10.2 reflect the increase in simulated groundwater levels resulting from the proposed MQEE rehabilitation measures. The combined use of the diffuse discharges and possibly groundwater recharge in the area southeast of the proposed MQEE extraction area can be used to increase the existing water level and hydroperiod for Wetland U1 and the upper portion of Wetland W36 to achieve the desired enhancement of ecological conditions. There are no areas influencing water resources where the groundwater level is not maintained (decreases are shown with negative (purple) contour lines) or raised under these representative simulation conditions.

As presented in Section 10.3.3.1, relative to the interim quarry conditions, the simulated groundwater discharge to Wetland W41 confirms that the proposed rehabilitation mitigation measures as reflected by the simulation results presented on Figure 10.2 will maintain or enhance groundwater support to this feature. The simulated discharge values are as follows (refer to Appendix F):

- Existing Approved Rehabilitation Quarry Condition (without MQEE): 36 L/min
- Existing Approved plus proposed MQEE Rehabilitation Condition: 44 L/min

The water budget calculations for the rehabilitation scenario demonstrate that there is little change in the overall availability of water under the quarry rehabilitation conditions associated with the proposed MQEE. There is some reduction in water under rehabilitation conditions relative to extraction conditions associated with increased evapotranspiration losses as the dry exposed quarry floor is rehabilitated (as discussed in Section 10.2). The calculated quarry water budget presented in Table 10.2 reflects this reduction but also reflects less inflow of water in the quarry due to the reduction (or elimination in some areas) of groundwater inflow due to the elevated water levels within the quarry cells (lakes). While these increased water levels do not result in any loss of water to the watershed, they do result in less water being directly available in the quarry that can undergo active water management.

The total annual available water inflow to the quarry is 1,966,632 m^3. This available volume is slightly more than under the existing quarry rehabilitation conditions; however, additional mitigation and enhancement of existing water resources is being accomplished at the same time (i.e., total recharge is also greater). The rehabilitation condition with the proposed MQEE represents a decrease of only 32,352 m^3 per year in the amount of water under active management (less than 2 percent of the available quarry water). This analysis demonstrates that there is clearly sufficient water available to provide the proposed rehabilitation mitigation and enhancement for water resources associated with the MQEE area and the existing quarry.

The calculated average annual amount of water necessary to maintain the quarry lakes is simulated to be approximately 140,000 m^3 in addition to the simulated recharge volume of 440,000 m^3 (approximately 850 L/min). The actual flow rates will fluctuate over the course of the year with climatic variations and possibly targeted lake level fluctuations. The current pumping station (top up supply) and North Quarry (return) capacities greatly exceed these requirements. Overall, the rehabilitation pumping volumes/flows will be much lower than those under interim conditions and will require less active management as lake filling proceeds.

10.3.3.3 Assessment of Lake Filling Time and Impact of Climate Change

The water budget analyses were also used to forecast the time period necessary to fill the rehabilitation lakes, including sensitivity analyses. These sensitivity analyses included consideration of a safety factor and potential future climate change influences as described below.

The estimated time required to fill the proposed lakes will largely depend on how much of the available water is discharged off site during the lake filling period, versus what is used to increase storage for lake filling. Following the completion of lake filling, all water would be discharged over time, although some fraction of available water could be temporarily retained for later release to maximize overall benefits to water resources. For the purposes of this assessment, it is assumed that during the lake filling period, assumed to commence in 2024, only the minimum required amount of water will be discharged to the HFRT (700,000 m^3/year).

The amount of available water over time is estimated as the average of the conditions at the end of extraction and at the completion of lake filling. Variations will occur over time as rehabilitation progresses and climatic conditions vary; however, the water storage capacity of the Reservoir and quarry cells being filled allow these variations to be buffered.

The “base condition” forecast for lake filling uses all the available water under Canadian Climate Normal (CCN) period from 1981 to 2021. Under the base condition, the forecast completion of all lake filling, including the proposed MQEE, is extended approximately 3 years to 2045.

Consistent with prior analysis, a safety factor of up to 500,000 m^3/year was also considered in the water budget for lake filling in order to provide a conservative analysis of potential filling time. Table 10.3 present the forecast filling times reserving 250,000 m^3/year and 500,000 m^3/year. Assuming the full safety factor amount (500,000 m^3) is not available for lake filling and climatic conditions remain similar over the lake filling period, the addition of the MQEE extends the completion of lake filling by approximately 8 years (from 2057 to 2065) vs. the 3 years calculated for the base case.

As discussed in Section 5.2.1, assessment was also undertaken for the evaluation of changing climate conditions. Two additional climate change scenarios were evaluated that represent potential future conditions representative of the 2050s and 2080s. The parameters applied are representative of a 30-year average (similar to the CCN values) centered on the years identified and are considered generally representative of future long-term average conditions. The key differences between the current climate scenario and the most distant scenario evaluated (2080’s) are an estimated increase in precipitation of 137 mm/year, an increase in evapotranspiration of 82 mm/year, and an increase in lake evaporation of 176 mm/yr. Modest changes in runoff and infiltration also occur on the order of 30 mm/year. Given the lake areas present under the rehabilitation condition, a small reduction in water surplus is predicted in the future.

The influence of the proposed MQEE on lake filling time does not appreciably change as evidenced by the results presented in Table 10.3. The incremental filling time incurred is approximately 2-3 years in the base condition and 8-9 years if the full safety factor is reserved (i.e. withheld from lake filling). The estimated surplus for the Site (with the proposed MQEE) is 683,000 m^3/year under the predicted 2080’s conditions. A significant surplus is present for all proposed configurations and climatic conditions evaluated and indicates that a water budget safety factor of at least 500,000 m^3/year continues to remain available for all future water surplus analyses.

Furthermore, it should be noted that short-term variability (e.g., drought) is not a concern now or in the future due to the substantial volume of water in storage at the Site. In the event of severe water availability reduction, the lake filling process could be temporarily postponed, and water could be drawn from storage to sustain operation of the mitigation system. Once rehabilitation is complete, the Reservoir will continue to function as a substantial buffer for the system and provide lake top-up as required.

10.3.3.4 Summary

In summary, the proposed interim mitigation and rehabilitation measures will protect or enhance the surrounding water resources. This conclusion has been illustrated through the use of the groundwater modelling and water budget tools but is ultimately based on the understanding of the site characteristics, implementation of appropriate mitigation and rehabilitation measures, and assured through the performance-based monitoring, analysis, and response actions required by the AMP and AMP Addendum.

10.3.4 Water Quality

The proposed MQEE is not expected to result in any unacceptable changes in water quality. The water quality receptors of potential concern are the nearby wetlands and general groundwater flow system that will receive recharge water from the mitigation system. There are no potable water supplies in the area of the proposed MQEE (refer to Section 6.6). The extensive monitoring of water quality conditions for the existing quarry operations and WMS demonstrate that the water quality remains suitable for the intended use and consistently satisfies the MECP effluent criteria in place for the existing quarry.

The effects of aggregate operations on water quality are generally limited. As discussed in Section 7.4, because the existing quarry and proposed MQEE represent areas of groundwater inflow and extraction, any changes in water quality will generally be exposed to the surrounding environment only through the discharge of water from the WMS. The addition of the proposed MQEE to the Milton WMS will not change the water quality.

The principal effects of potential significance that may potentially occur regarding water within the quarry environment include temporary increases in suspended solids/turbidity, increases in ammonia levels (particularly the unionized ammonia fraction which is of importance to aquatic organisms), and bacteria arising from natural sources to the water accumulated in storage. These influences are already present in the Milton Quarry and the resultant water quality is suitable for intended uses.

Water that is collected from the proposed MQEE dewatering operations will be handled in the same manner as existing quarry dewatering flows. The water will be pumped to the Main Quarry Reservoir or other operation area that provides vast attenuation capacity and opportunity for testing of water quality. The water quality data presented in Section 7 demonstrates that the resultant water in the Reservoir that is used in the recharge system to supply water to wetlands and groundwater recharge wells is generally similar (potable hardwater characteristic of carbonate aquifers in southern Ontario) to existing groundwater in the MQEE area, including the baseline water quality collected from the proposed MQEE area in February and June 2021.

Furthermore, the ecological monitoring by GEC of wetlands that receive recharge to the surface water directly from the WMS (i.e., Wetlands W7, W8, and V2 around the East Cell) as well as wetlands that are supported by the groundwater recharge system (e.g. Wetlands W5 northwest of the West Cell) demonstrate that the recharge water quality is suitable to support and enhance these wetland habitats as described in the NETR/EIA.

In summary, the proposed MQEE will not result in any negative or unacceptable effects on water quality in the Milton Quarry WMS or affect its suitability for use for mitigation of wetlands and groundwater flow by the WMS. All water discharged off site (to surface water or groundwater) will be required to meet appropriate effluent criteria as is typically regulated by MECP through Ontario Water Resources Act Environmental Compliance Approval (ECA) conditions and presently occurs for the existing quarry.

10.3.5 Source Water Protection Considerations

The Clean Water Act of 2006 requires communities to develop science-based protection plans for their existing and future drinking water sources. Areas are defined for the protection of water quality and water quantity and are referred to as Wellhead Protection Areas (WHPAs) in the context of groundwater supply. The Milton Quarry and proposed MQEE are located outside of all Wellhead Protection Areas (WHPAs), as presented on Figure 2.7. However, a broad area above the Niagara Escarpment, including the proposed MQEE lands, has been identified as being an area of Significant Groundwater Recharge (SGRA). These areas support groundwater recharge on a broad watershed scale and support downgradient natural features and water users.

A key feature of the proposed MQEE is the extension of the existing WMS. Recharge wells are used to maintain the groundwater levels beyond the extraction limit to protect or enhance the water resources features. The recharge system is operated to maintain groundwater levels that are at, or above, target water levels at trigger wells. Maintaining the groundwater levels in this way ensures the natural or desired flow of groundwater occurs beyond the extraction area to suitably support the water resources (wetlands) in the potential area of influence from quarry dewatering. The overall groundwater recharge will be maintained or enhanced in the SGRA as part of the proposed MQEE.

The aquifer in the vicinity of the Milton Quarry was designated as a Highly Vulnerable Aquifer (HVA). A Highly Vulnerable Aquifer is defined as a subsurface geologic formation that is a source of drinking water, which could relatively easily be impacted by the release of pollutants on the ground surface. The designation in the vicinity of the Milton Quarry is attributed to the nature of the aquifer (shallow fractured bedrock) and relatively thin overburden. The proposed MQEE will not change the vulnerability classification of the aquifer in the area. Dufferin manages its lands with an environmental management plan that includes measures to suitably address any unintended release of hazardous materials (refer to Section 8.5).

10.4 Cumulative Effects

The water resources characterization and impact assessments presented in this report have considered the potential for cumulative effects that may arise from the development of the proposed

MQEE. The proposed MQEE has been designed and evaluated in manner that is fully integrated with the existing quarry. The AMP/AMP Addendum and its mitigation, monitoring, and response actions directly ensure the protection or enhancement of features and functions related to water resources in the vicinity of Milton Quarry and the proposed MQEE. There are no known other forms of development identified in the immediate study area (refer to the Planning Summary Report,) that would contribute to a significant cumulative effect on water resources in the area of Milton Quarry.

The assessments presented in this report demonstrate that the proposed MQEE is acceptable from a water resources perspective in combination with the Milton Quarry, including surface water, groundwater, water budget, and water quality considerations. Furthermore, the proposed MQEE provides the potential to enhance some of the existing water resources features such as Wetland U1 and the upper portion of Wetland W36 and the rehabilitation plan increases the diversity of water resources in the area, contributing benefit to the natural environment as described in the Natural Environment Report Technical Report and EIA as well as the Planning Summary Report. Therefore, the proposed MQEE will not have any negative cumulative effects.

10.5 Summary of Overall Water Impact and Benefits

In consideration of all aspects of the proposed MQEE relating to groundwater and surface water resources, the proposed MQEE protects all related water resources from impacts and provides the opportunity to enhance two wetland areas, Wetland U1 and the upper portion of Wetland W36.

The proposed MQEE extends the protection and enhancement of existing water resources in the vicinity of Milton Quarry through the extension of existing proven mitigation measures and the long-term rehabilitation plan for Milton Quarry. These mitigation measures have been previously reviewed and approved by all agencies for the Milton Quarry and have been demonstrated to be successful through their continuous operation since 2007 with ongoing monitoring and review by the agencies. The protection provided for water resources and related ecological features prevents any unacceptable effects, while the proposed plans provide a range of habitat creation (including additional areas of lake, wetland, and terrestrial habitat) and as described in the NETR/EIA and the Planning Summary report.

11. Summary and Conclusions

GHD was retained by Dufferin Aggregates to conduct the Geology and Water Resources Assessment as part of an Application for the proposed MQEE in the Town of Halton Hills in the Region of Halton, Ontario. GHD's role involved completing a geology and water resources assessment for the proposed MQEE and surrounding lands as well as assisting in the development of mitigation and rehabilitation plans as they relate to water resources. This assessment included consideration of karst bedrock conditions and hazard lands. GHD also worked in collaboration with Goodban Ecological Consulting (GEC) in the development of suitable measures to integrate the MQEE into the existing Adaptive Environmental Management and Protection Plan (AMP) for the Milton Quarry as documented separately in the AMP Addendum (GHD and GEC, December, 2021).

The proposed MQEE lands are located in Part of Lots 11 and 12, Concession 1, Geographic Township of Esquesing, Town of Halton Hills, Regional Municipality of Halton. The proposed MQEE licence area is 30.2 ha is located with the existing East Cell to the north, the existing North Quarry to the west, and the existing Main Quarry at some distance to the southwest and south. The proposed 15.9 ha MQEE extraction area is contiguous with the existing East Cell (i.e. it would be extracted as part of the East Cell). The remainder of the property will be maintained and protected for conservation uses. Activities outside the extraction area will be limited to monitoring, environmental mitigation, and ecological enhancement.

Extensive field investigations were conducted by GHD and others in support of the Geology and Water Resources Assessment. These investigations add to the extensive knowledge base developed by Dufferin (and others) for the Milton Quarry area. The information provided in this report and the AMP Addendum is appropriate to satisfy the MNDMNRF requirements of the Provincial Standards for a Level 2 Hydrogeological Report, Category 2, Class "A" Quarry Below Water, as summarized below, and the water resources policies of the Provincial Policy Statement, Niagara Escarpment Plan, Region of Halton Official Plan, and the Town of Halton Hills Official Plan.

Provincial Standard	Section of this Report in Which Information is Located
(a) water wells	Sections 2.5, 6.6, 9.1, and 10.3
(b) springs	Sections 3.3, 5.3, 6.5, 6.8.3
(c) groundwater aquifers	Sections 2.5, 3.4, 6.0, 7.2 and 10.3
(d) surface water courses and bodies	Sections 2.4, 3.3, 5.0, 6.8, 9.2, and 10.2
(e) discharge to surface water	Sections 5.3, 6.8, 9.2, 9.3 and 10.2
(f) proposed water diversion, storage and drainage facilities on site	Sections 5.4, 8.3, 9.2-9.3, and 10.2
(g) methodology	Sections 8.0 and 9.0 and AMP Addendum
(h) description of the physical setting including local geology, hydrogeology, and surface water systems	Sections 2.0, 4.0, 5.0, and 6.0
(i) water budget	Section 10.0 and Appendix G
(j) impact assessment	Section 10.0
(k) mitigation measures including trigger mechanisms	Section 9.0 and AMP Addendum
(l) contingency plan	Sections 8.5 and 9.5 and AMP Addendum
(m) monitoring plan(s)	Sections 3.0, and AMP Addendum
(n) technical support data in the form of tables, graphs and figures, usually appended to the report	Figures, Tables, and technical appendices are appended to the text of this report

All of the key policy considerations identified in Section 1.2 have been addressed as summarized below:

- Key hydrologic features, including permanent and intermittent streams, lakes, seepage areas springs, and wetlands have been identified, characterized, and will be protected or enhanced
- The quality and quantity of the key hydrologic features will be protected or enhanced and no surface water features will be removed
- There will be no negative water-related impacts, including no cross-subwatershed impacts

- There will be no influence on municipal drinking water supply or designated vulnerable areas
- All related surface water and groundwater features and their hydrologic functions will be protected or enhanced
- The existing linkages and related functions between surface water and groundwater features will be maintained and functionally enhanced in some instances
- There will be no influence on private domestic or agricultural water supplies
- The potential effects of changing climatic conditions have been evaluated and the proposed measures provide opportunity to mitigate some of the broad watershed scale climate effects on water resources in the local area
- The integrated water management system efficiently optimizes the management of water in the quarry for the benefit of sustaining and enhancing local water resources and contributing on the larger watershed scale
- The proposed MQEE includes comprehensive plans documented in the AMP Addendum that identify mitigation and monitoring measures to protect, improve, or restore sensitive surface water features, sensitive groundwater features and their hydrologic functions as well as comprehensive response action and reporting requirements
- Natural hazards have been assessed and there is no significant risk to public safety that will not be managed by the associated approvals in accordance with provincial standards

Based on the Geology and Water Resources Assessment, and the planned mitigation measures and operating basis provided by the AMP and AMP Addendum, the water resources on the adjacent lands will be protected or enhanced. Therefore, it is concluded that the proposed MQEE is acceptable from a geology and water resources perspective based on the overall design, management, and rehabilitation plans presented in this report and the AMP Addendum.

12. Recommendations

Based on the findings and conclusions presented herein, the following recommendations are provided:

1. Implement and operate the proposed water management system mitigation and rehabilitation measures, including any necessary response actions, in accordance with the AMP Addendum
2. Conduct the water and ecology monitoring program and reporting in accordance with the AMP Addendum
3. Amend the OWRA approvals as necessary to reflect the aspects of the water management measures relevant to those approvals
4. Extend the implementation of the Milton Quarry Contingency and Pollution Prevention Plan to include the MQEE

All of Which is Respectfully Submitted,

GHD

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LEGEND

- 360 EXISTING GROUND CONTOUR
- ROAD
- RAILROAD
- MUNICIPAL BOUNDARY
- PROPERTY BOUNDARY
- DUFFERIN OWNED LICENSED
- DUFFERIN OWNED BUFFER
- DUFFERIN LEASED
- EXTENSION LICENCE LIMIT
- LICENSED EXTRACTION LIMIT
- EXTENSION EXTRACTION LIMIT
- BRUCE TRAIL (APPROXIMATE)
- LANEWAY/TRAIL
- WETLAND IDENTIFIED AS PROVINCIALLY SIGNIFICANT
- OTHER WETLAND
- SIGNIFICANT WOODLANDS
- MONITORING WELL LOCATION
- SURFACE WATER MEASUREMENT LOCATION
- STAFF GAUGE LOCATION
- TEST PIT LOCATION
- BOREHOLE LOCATION
- WATERMAIN (AS-BUILT/EXISTING)
- PROPOSED WATERMAIN
- CONTROL VALVE HUTS
- DIFFUSE DISCHARGE
- RECHARGE WELL
- PRELIMINARY TARGET MONITORING LOCATIONS

Map Orientation: Directions referenced in the report are identified as the general direction of the page from the Existing Quarry Licensed Area. Major roads, for example Sixth Line and Town Line, are referenced to the page, as the general north-south direction. This convention has been adopted from the Site Plans and Planning Summary Report to improve readability and ensure consistency in map illustration.

SOURCES:

- BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES
  © QUEEN'S PRINTER 1997
- TOPOGRAPHIC INFORMATION FOR AREAS OTHER THAN W8 AND V2 OBTAINED FROM NORTHWAY MAP TECHNOLOGY LIMITED. CONTOURS WERE DRAWN FROM SPRING 1997 AERIAL PHOTOGRAPHY UTILIZING EXISTING CONTROL. CONTOUR INTERVAL IS 1 METRE.
- TOPOGRAPHIC INFORMATION FOR W8 FROM MARCH 11, 2002 SURVEY USING 1 METRE CONTOUR INTERVAL.
- TOPOGRAPHIC INFORMATION FOR V2 FROM JUNE 24/25, 2002 SURVEY USING 1 METRE CONTOUR INTERVAL.
- MAIN QUARRY CONTOURS REVISED TO REFLECT 2001 EXISTING CONDITIONS (CRA DRAWING 10978-10(028)GN-WA002).
- BOUNDARY INFORMATION COMPILED FROM SURVEYS AND SKETCHES PREPARED BY FRED G, CUNNINGHAM, ONTARIO LANDS SURVEYORS, MILTON, ONTARIO, DECEMBER 2,1997.

GHD

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978-200**
Date **December 2021**

LEGEND KEY

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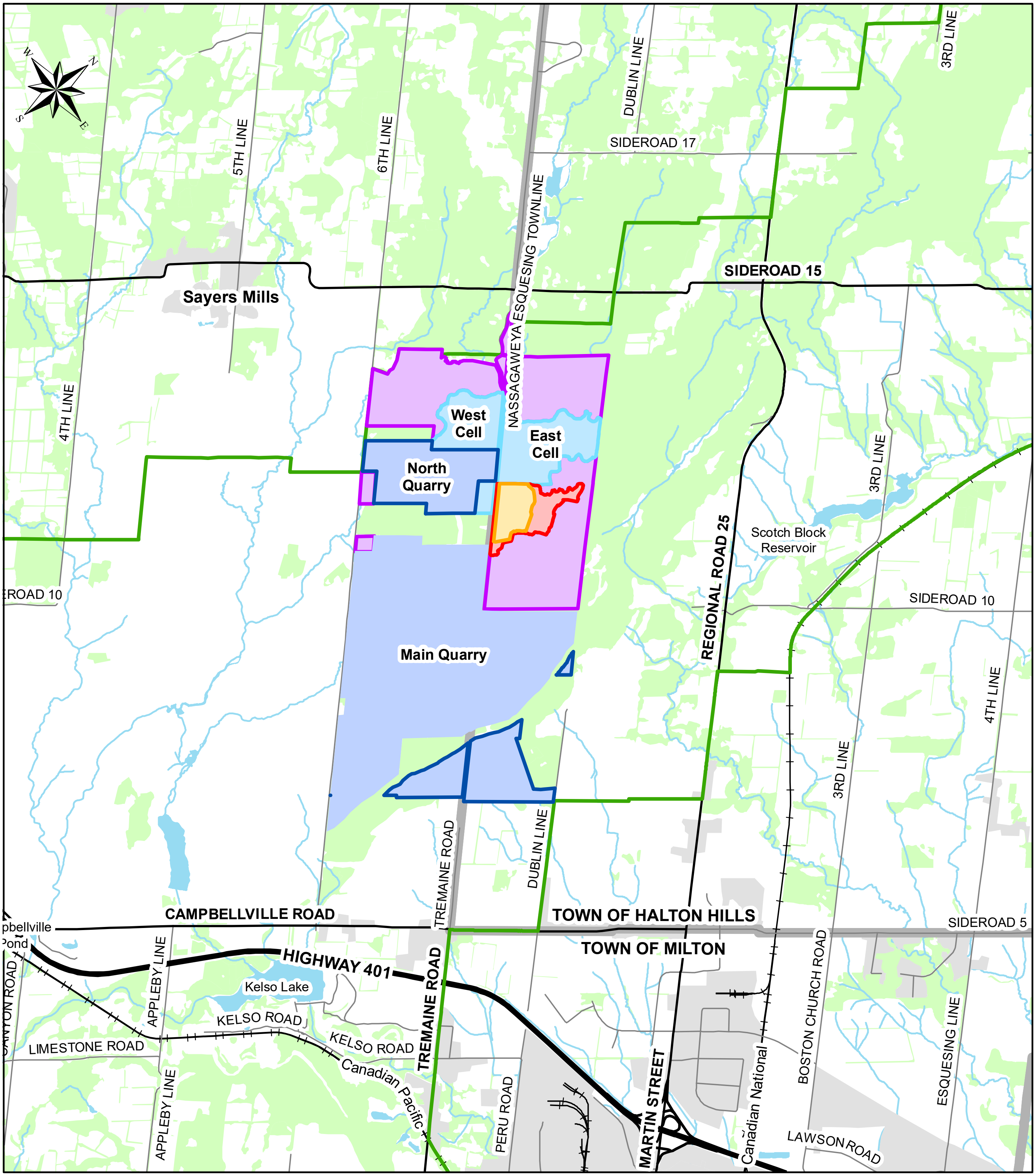

Figure 1.1

Location

Milton Quarry East Extension
Part of Lots 11 and 12, Concession 1
(Geographic Township of Esquesing)
Town of Halton Hills
Regional Municipality of Halton

Legend

- Proposed Milton Quarry East Extension - Licence Boundary
- Proposed Milton Quarry East Extension - Limit of Extraction
- Milton Quarry (1962)
- Milton Quarry Extension (2007)
- Other Lands Owned by Dufferin
- Niagara Escarpment Plan Boundary
- Built up Area

DATE November 2021

SOURCES
Land Information Ontario
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0 250 500 1,000 1,500 2,000
Meters (1:50,000)

N:\Brian\9061DJ Dufferin - Milton Quarry East Extension\Drawings - Must be in NAD 27\Figures for Other Consultants\Figures for GHD\GIS\9061DJ - Figure 1 - Location.mxd

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE

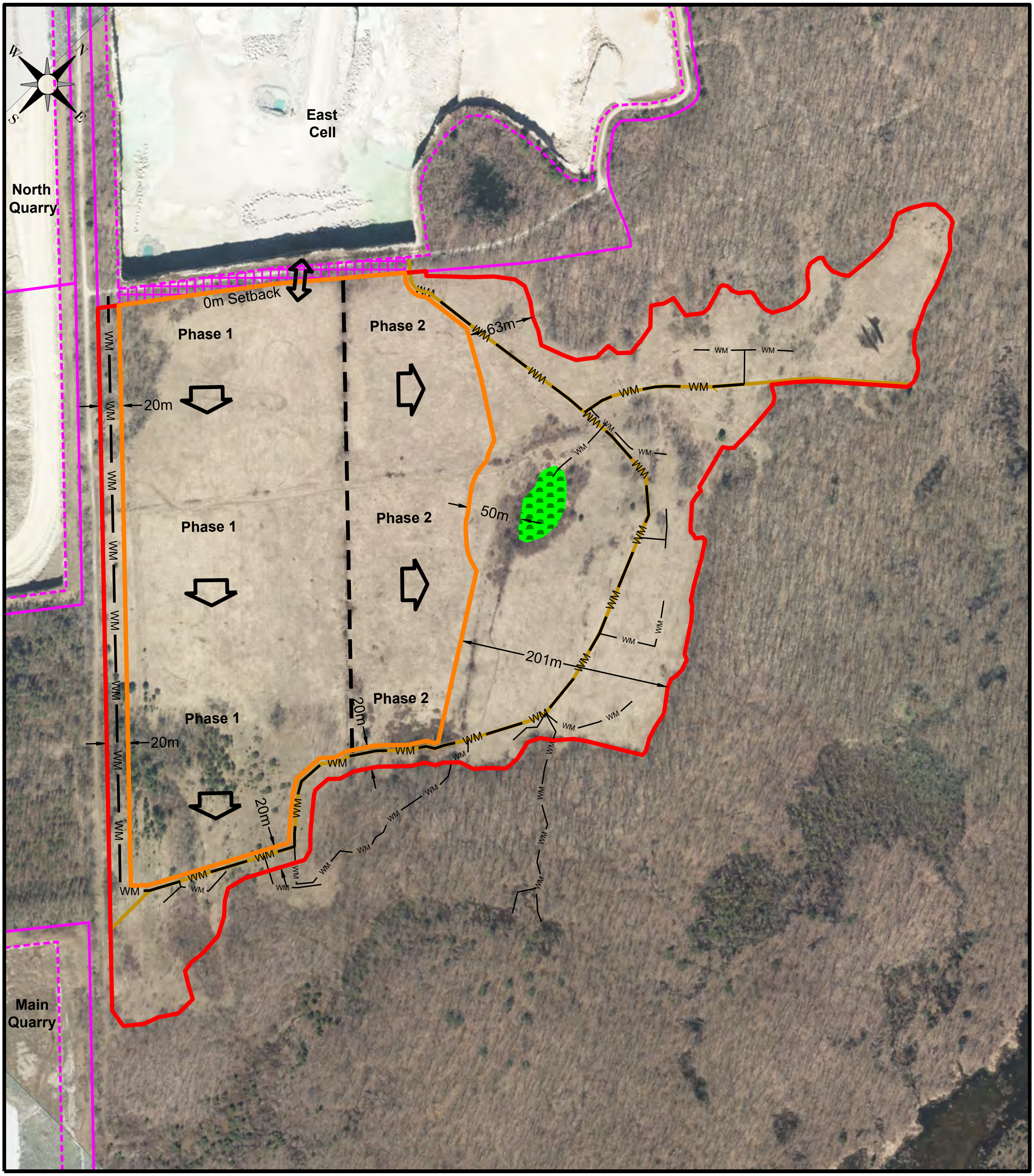


Figure 1.2
Phasing Plan

Milton Quarry East Extension
Part of Lots 11 and 12, Concession 1
(Geographic Township of Esquesing)
Town of Halton Hills
Regional Municipality of Halton

Legend

- Proposed Milton Quarry East Extension - Licence Boundary
- Proposed Milton Quarry East Extension - Limit of Extraction
- Existing Licence Boundaries
- Existing Limits of Extraction
- East Cell Setback Removal
- WM Main Watermain / Service Access
- WM Feeder Line
- Site Entrance
- Phase Direction
- Phase Boundary
- Existing Wetland U1

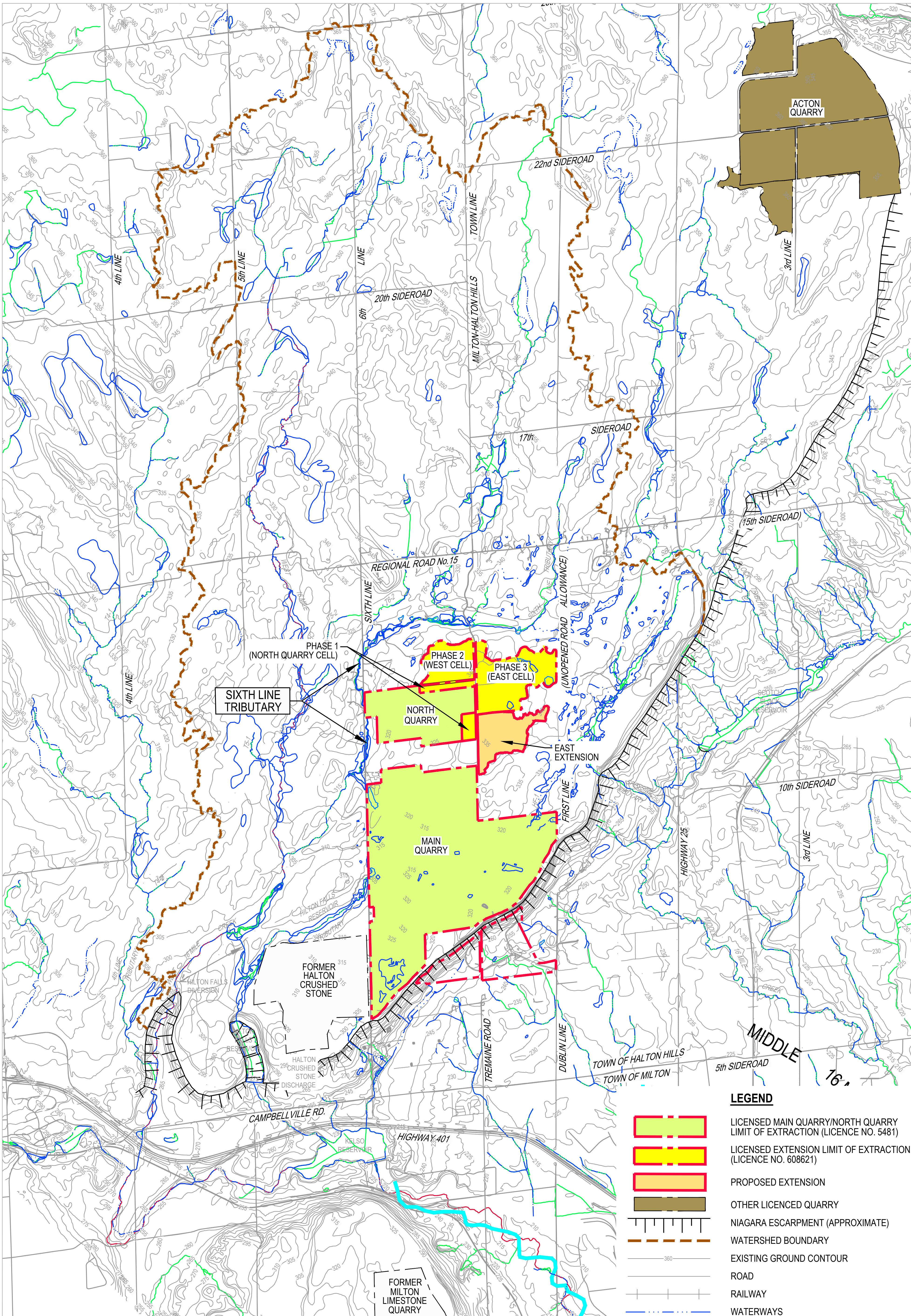
Date November 2021

Sources
Milton Quarry East Extension Operational Plan prepared by MHBC dated November 2021

Scale - 1:5000
0 75 150 Meters

N:\Brian\9061DJ Dufferin - Milton Quarry East Extension\Drawings - Must be in NAD 27\Planning Report Figures and Schedules\AutoCAD - UTM NAD27\9061DJ - Figures 3 to 5 - Limit of Extraction and Schematics.dwg

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE



SOURCE:
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WATERSHED BOUNDARY BASED ON SURFACE WATER CATCHMENTS PROVIDED BY CONSERVATION HALTON, OCTOBER 2010.

GHD

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978-200**
Date **December 2021**

REGIONAL MAP

FIGURE 1.3

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA003.dwg
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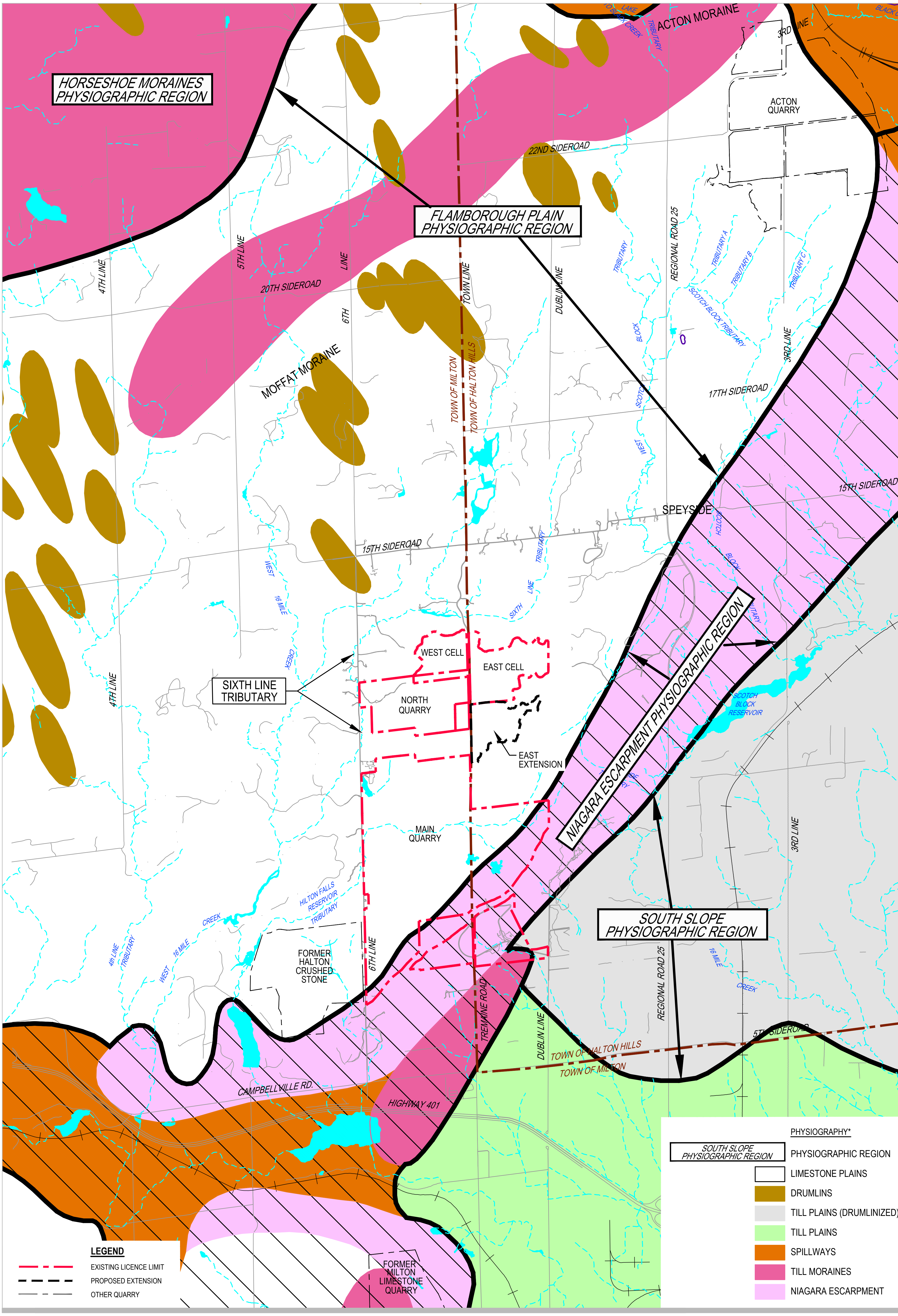


*SOURCE:
ONTARIO GEOLOGICAL SURVEY, 2007. PHYSIOGRAPHY OF SOUTHERN ONTARIO. MISCELLANEOUS RELEASE - DATA 228.

0 400 800 1200m

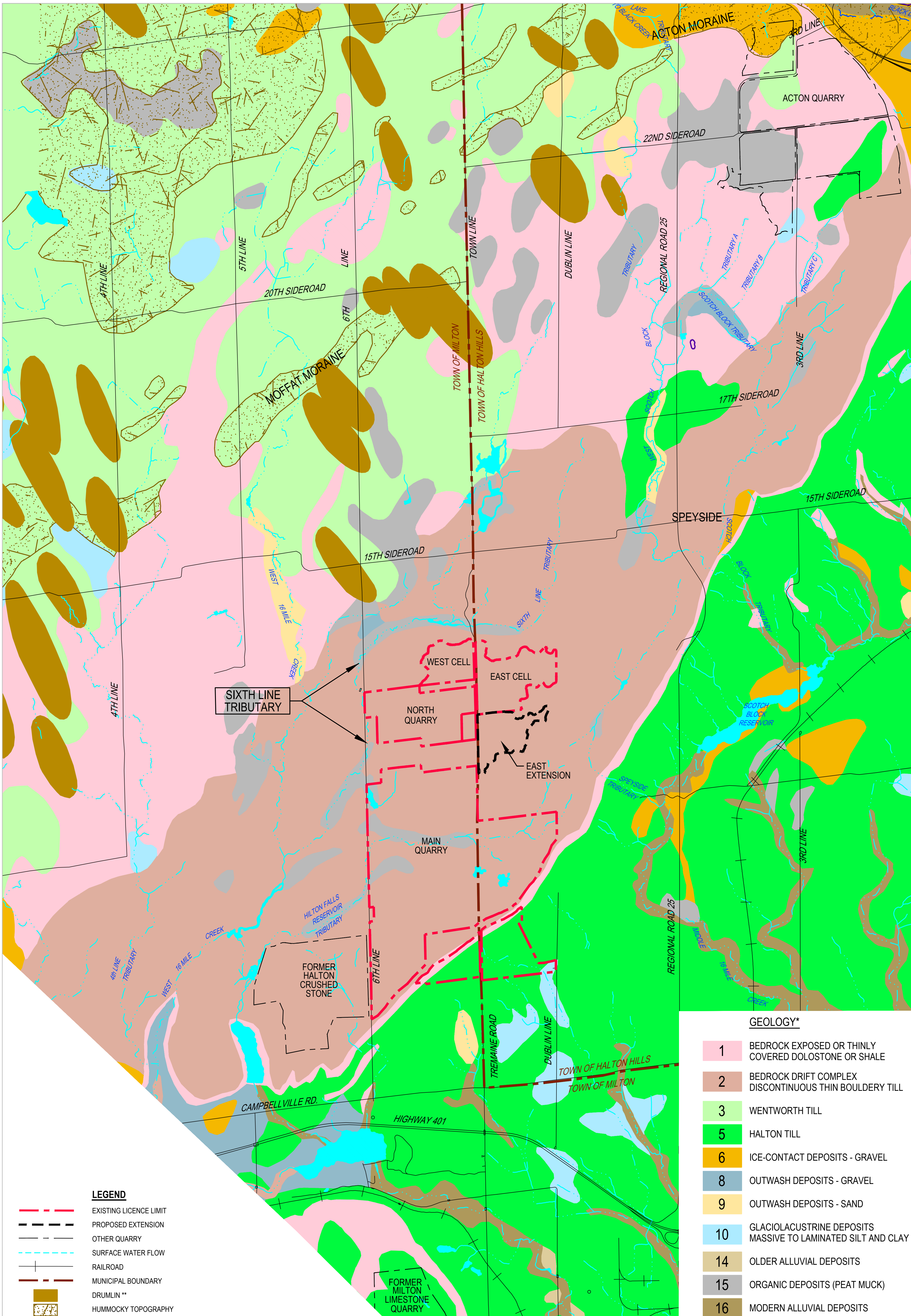
Coordinate System: UTM17m NAD27

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

REGIONAL PHYSIOGRAPHY

FIGURE 2.1



*SOURCE:
ONTARIO GEOLOGICAL SURVEY, 2003. SURFICIAL GEOLOGY OF SOUTHERN ONTARIO. MISCELLANEOUS RELEASE - DATA 128.
**SOURCE: ONTARIO GEOLOGICAL SURVEY, 2007. PHYSIOGRAPHY OF SOUTHERN ONTARIO. MISCELLANEOUS RELEASE - DATA 228.

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Coordinate System: UTM17m NAD27

GHD

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

REGIONAL SURFICIAL GEOLOGY

Project No. 10978-200
Date December 2021

FIGURE 2.2

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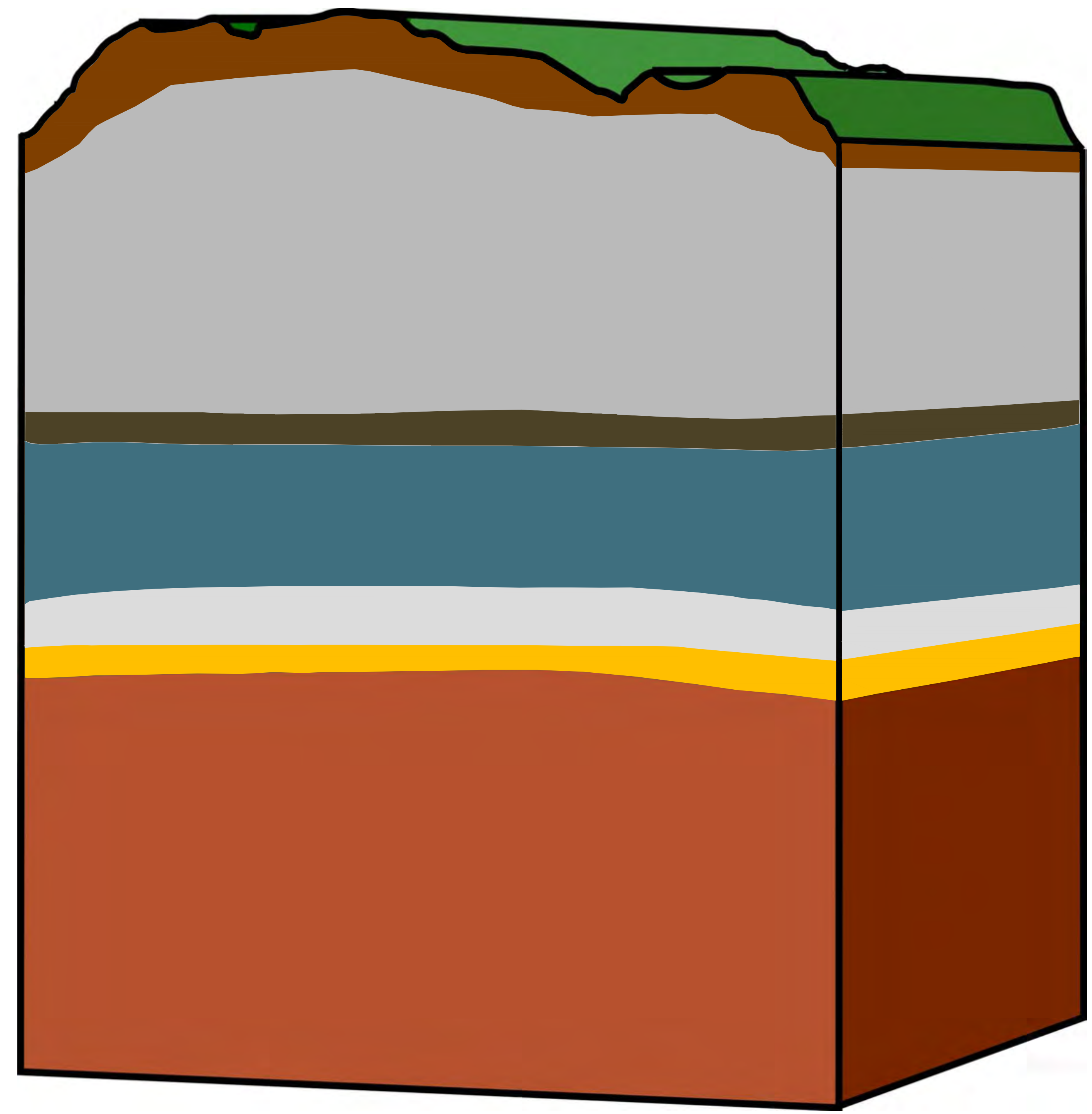
PERIOD	GROUP	FORMATION	MEMBER (DESCRIPTION)	APPROXIMATE THICKNESS
MIDDLE SILURIAN	ALBERMARLE	AMABEL	UNSUBDIVIDED AMABEL (Crystalline Dolostone)	10 - 40 m
	CLINTON	REYNALES	(Argillaceous Dolostone)	2 - 3 m
LOWER SILURIAN	CATARACT	CABOT HEAD	(Shale)	10 - 20 m
		MANITOULIN	(Dolostone with Shaley Partings)	3 - 8 m
		WHIRLPOOL	(Sandstone)	3 - 5 m
UPPER ORDIVICIAN	RICHMOND	QUEENSTON	(Red Shale)	150 m



NOTE:
THE TRADITIONAL AMABEL AND REYNALES NAMES ARE USED IN THIS STUDY; THE AMABEL CORRESPONDS TO THE PROPOSED GASPORT FORMATION OF THE LOCKPORT GROUP AND THE REYNALES CORRESPONDS TO THE PROPOSED FOSSIL HILL AND ROCKAWAY FORMATIONS OF THE CLINTON GROUP (BRUNTON AND BRINTNELL, 2011).

GHD

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

BEDROCK STRATIGRAPHY

Project No. 10978-200
Date December 2021

FIGURE 2.3

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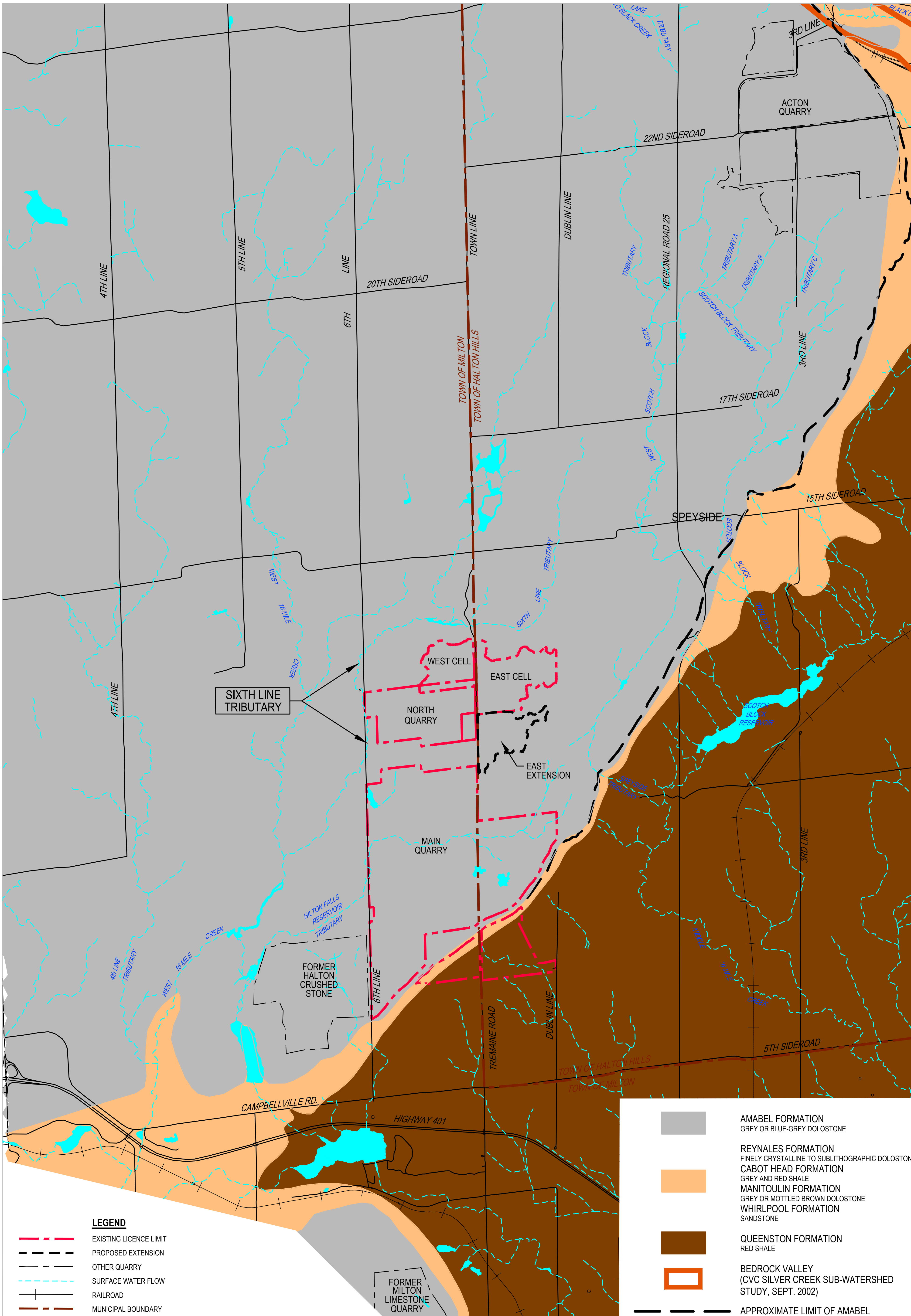

SOURCE:
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NOTE:
UPPERMOST BEDROCK FORMATION SHOWN BASED ON MINISTRY OF NATURAL RESOURCES MAPPING. TELFORD, 1976. BOND ET AL., 1976.

0 400 800 1200m

Coordinate System: UTM17m NAD27

GHD

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

REGIONAL BEDROCK GEOLOGY

Project No. 10978-200
Date December 2021

FIGURE 2.4

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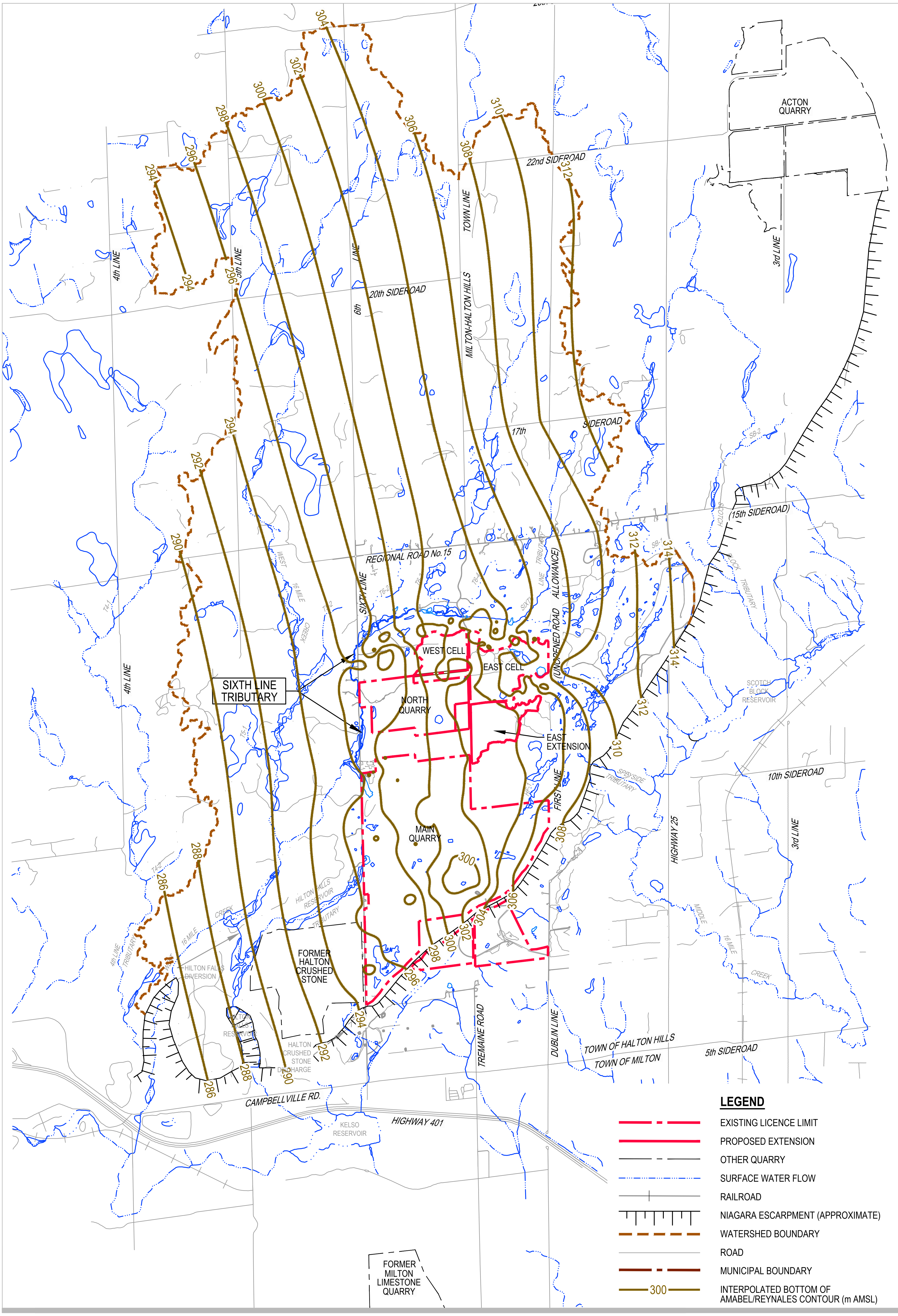

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WATERSHED BOUNDARY BASED ON SURFACE WATER CATCHMENTS PROVIDED BY CONSERVATION HALTON, OCTOBER 2010.

GHD

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

REGIONAL BOTTOM OF AMABEL/REYNALES

FIGURE 2.5

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA015.dwg
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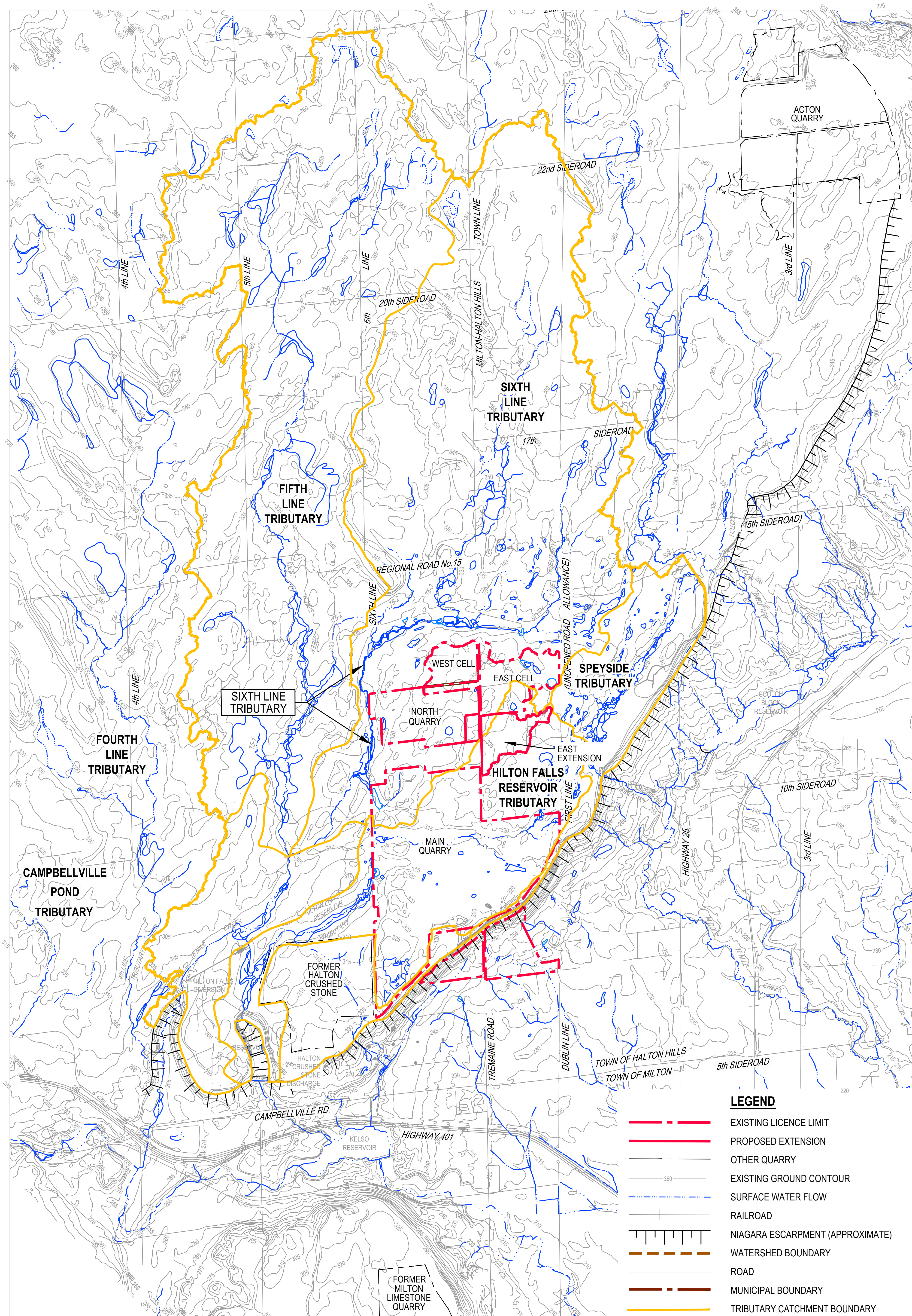

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CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

REGIONAL SURFACE WATER SYSTEM AND WATERSHED BOUNDARIES

Project No. 10978-200
Date December 2021

FIGURE 2.6

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA012.dwg
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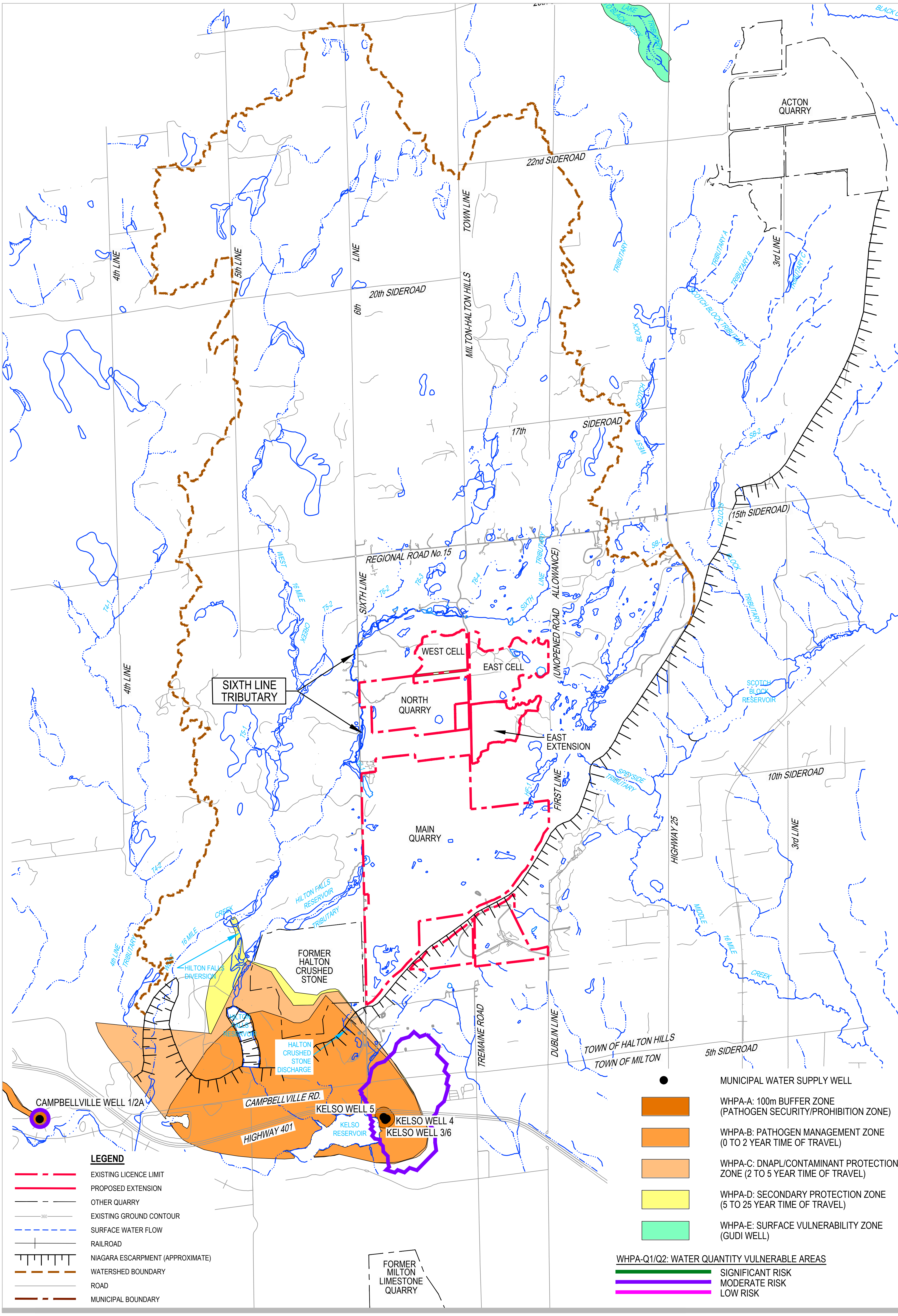

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WELLHEAD PROTECTION AREAS (WHPAs) FROM APPROVED UPDATED ASSESSMENT REPORT: CREDIT VALLEY SOURCE PROTECTION AREA, APPROVED JULY 2015, FIGURES 4.24, 4.25, 4.26, 4.27 AND 5.3.

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

MUNICIPAL WATER SUPPLY WELLS

Project No. 10978-200
Date December 2021

FIGURE 2.7

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA008.dwg
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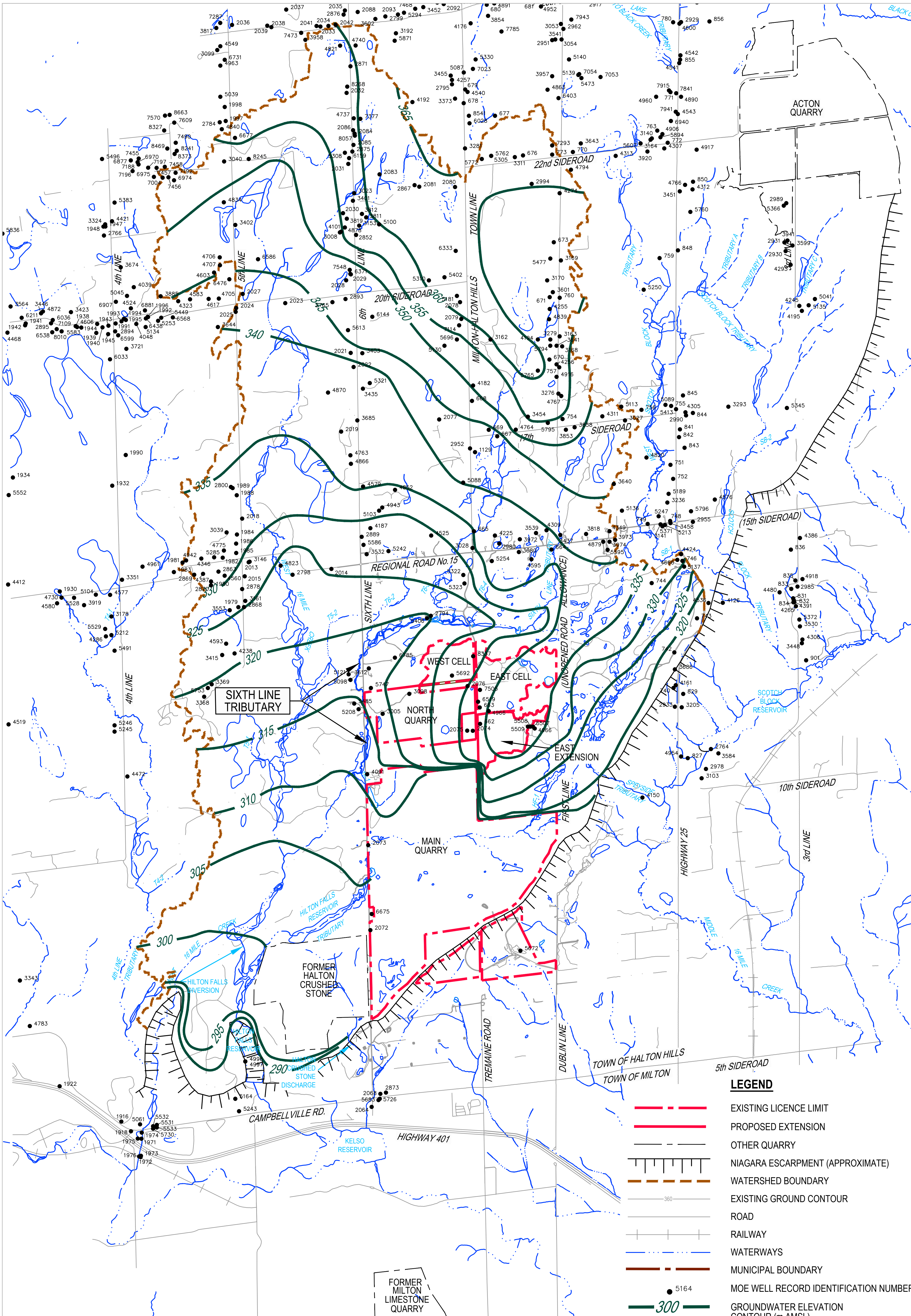

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NOTE:
APPROXIMATE WELL LOCATIONS AND GROUNDWATER ELEVATIONS ARE FROM MOE DRILLING RECORDS EXTRACTED FOR 2000 GWRA.

0 400 800 1200m

Coordinate System: UTM17m NAD27

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

REGIONAL GROUNDWATER FLOW

Project No. 10978-200
Date December 2021

FIGURE 2.8

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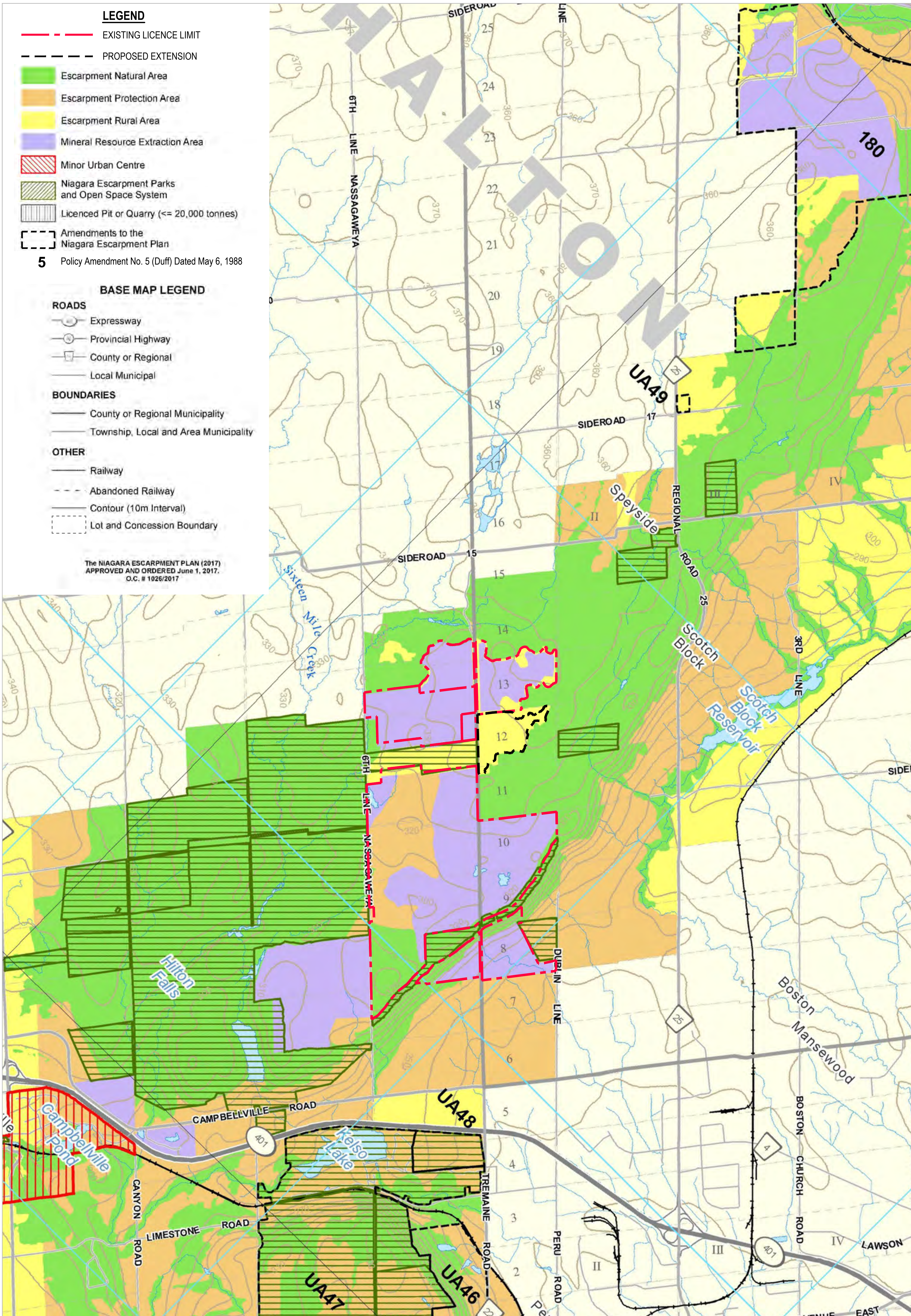

SOURCE:
NIAGARA ESCARPMENT PLAN 3, JUNE 2017.

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Coordinate System:
UTM17m NAD27

GHD

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

NIAGARA ESCARPMENT
PLAN LAND USE

Project No. 10978-200
Date December 2021

FIGURE 2.9

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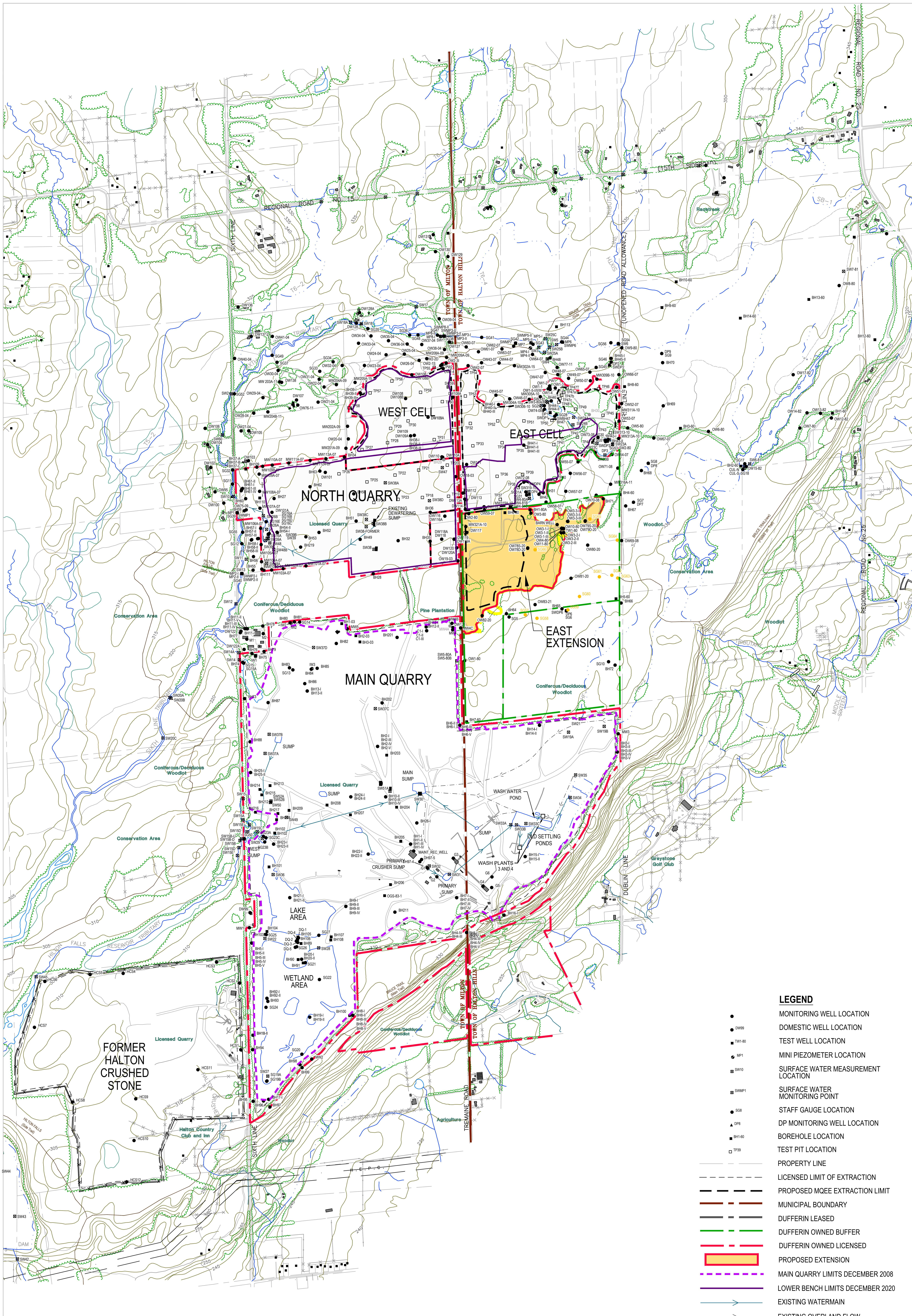

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES
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CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

MILTON QUARRY BASE PLAN

FIGURE 3.1

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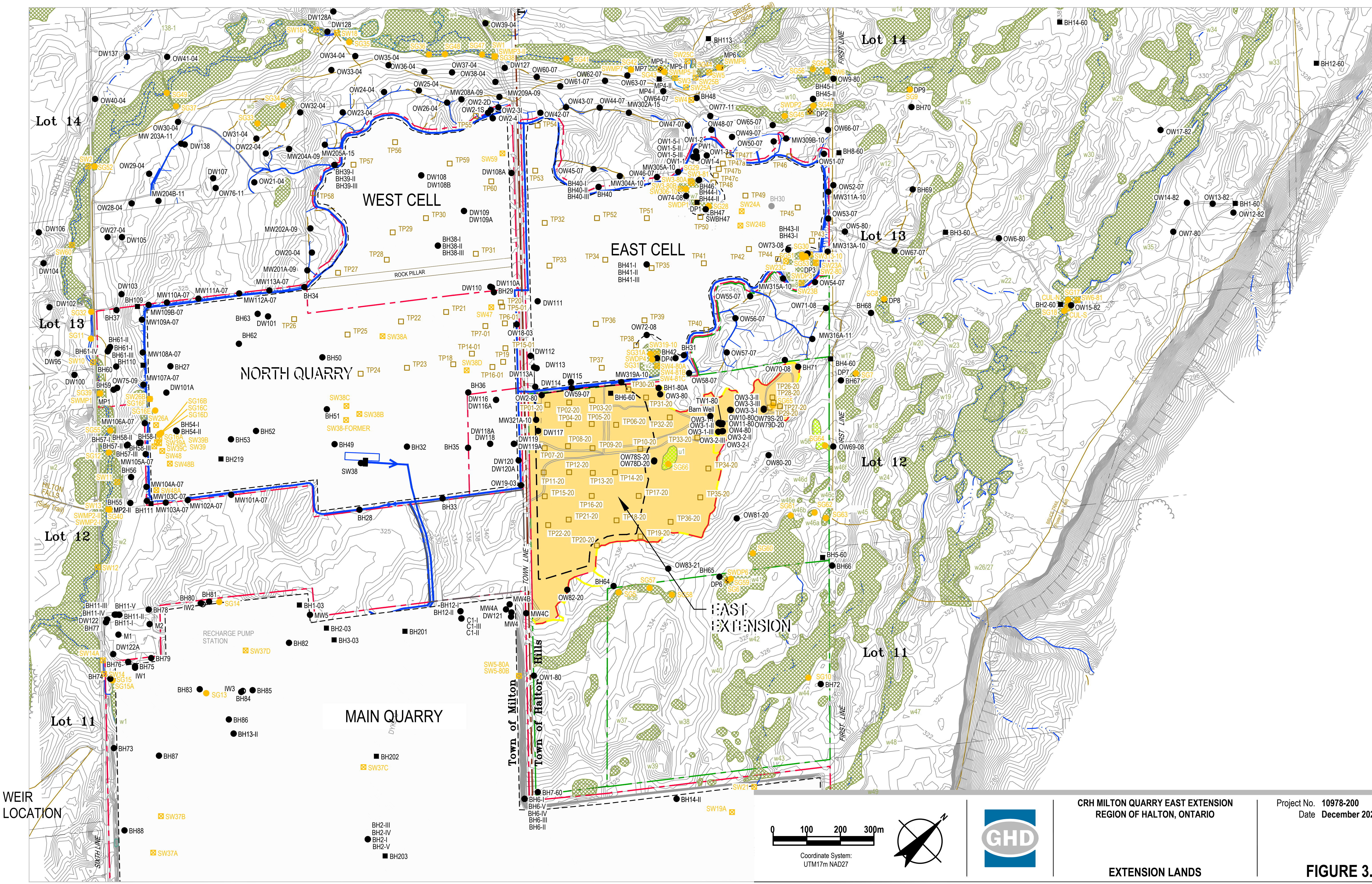

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

EXTENSION LANDS

FIGURE 3.2

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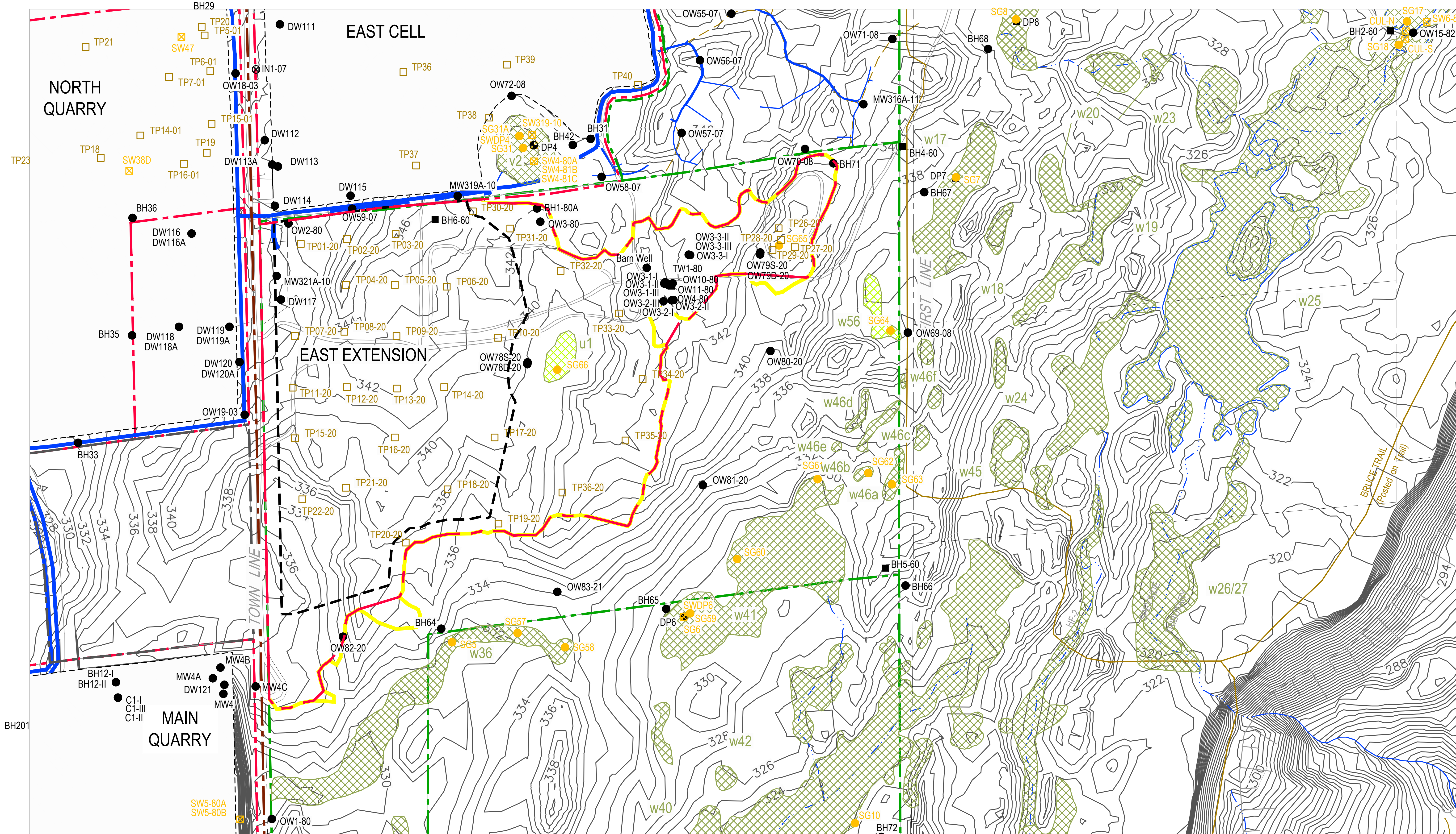

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

MQEE BASE PLAN

Project No. 10978-200
Date December 2021

FIGURE 3.3

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA001.dwg
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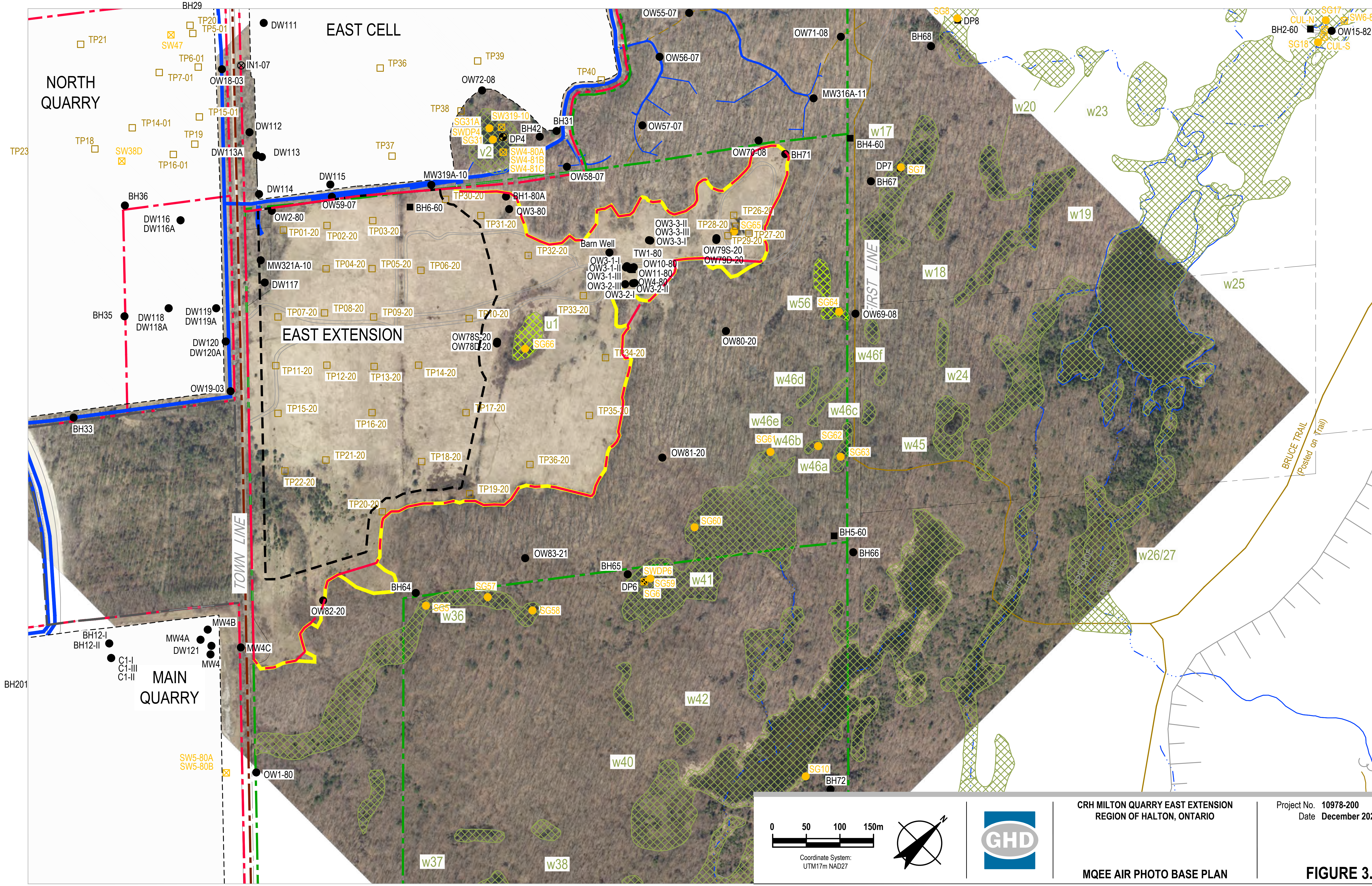

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

MQEE AIR PHOTO BASE PLAN

FIGURE 3.4

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA001.dwg
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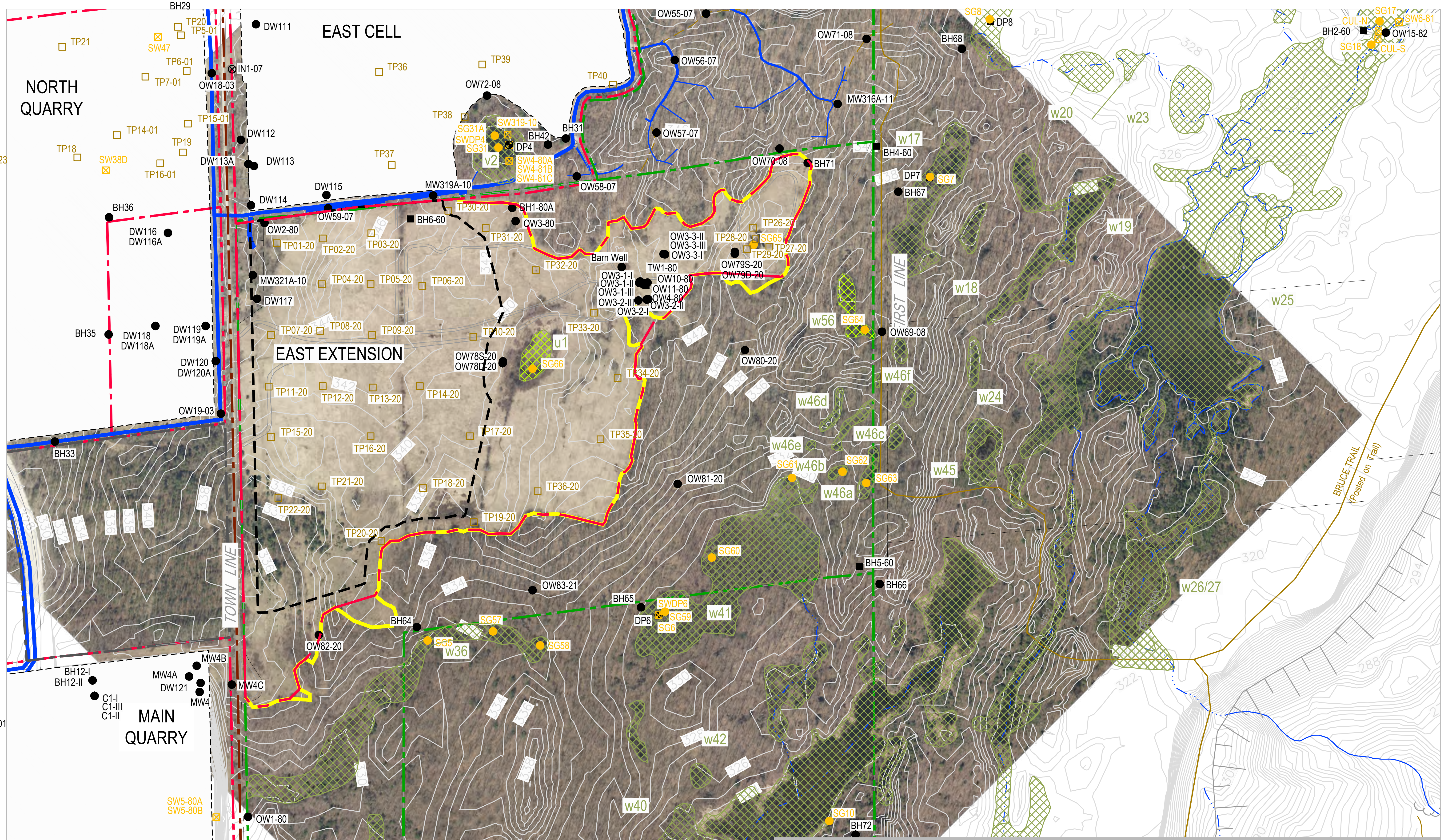


CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

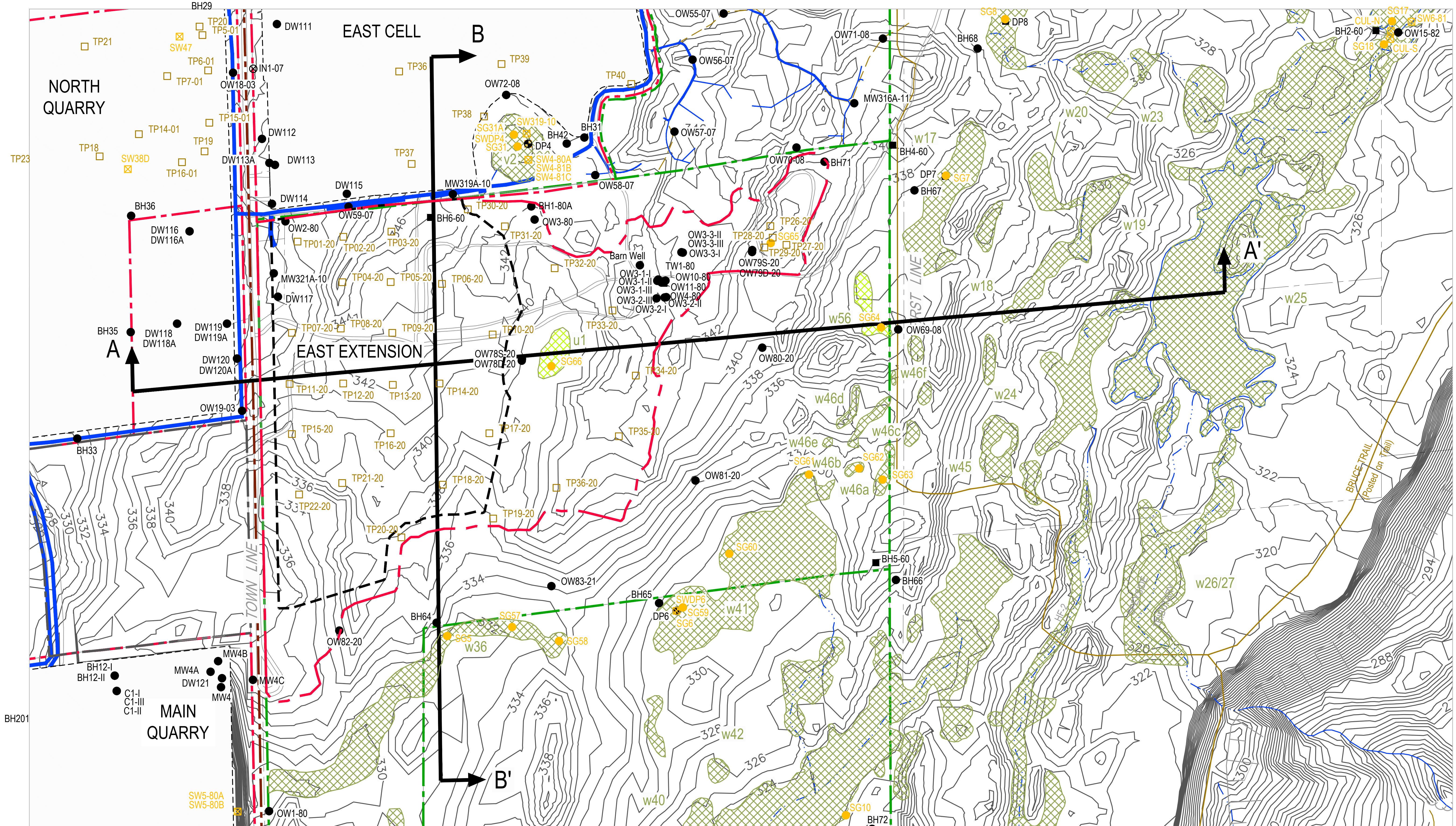
Project No. 10978-200
Date December 2021

MQEE AIR PHOTO BASE PLAN

FIGURE 3.4a

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA001.dwg
Plot Date: 07 December 2021 2:38 PM

Image: 2019 Halton Region Orthoimagery from First Base Solutions.



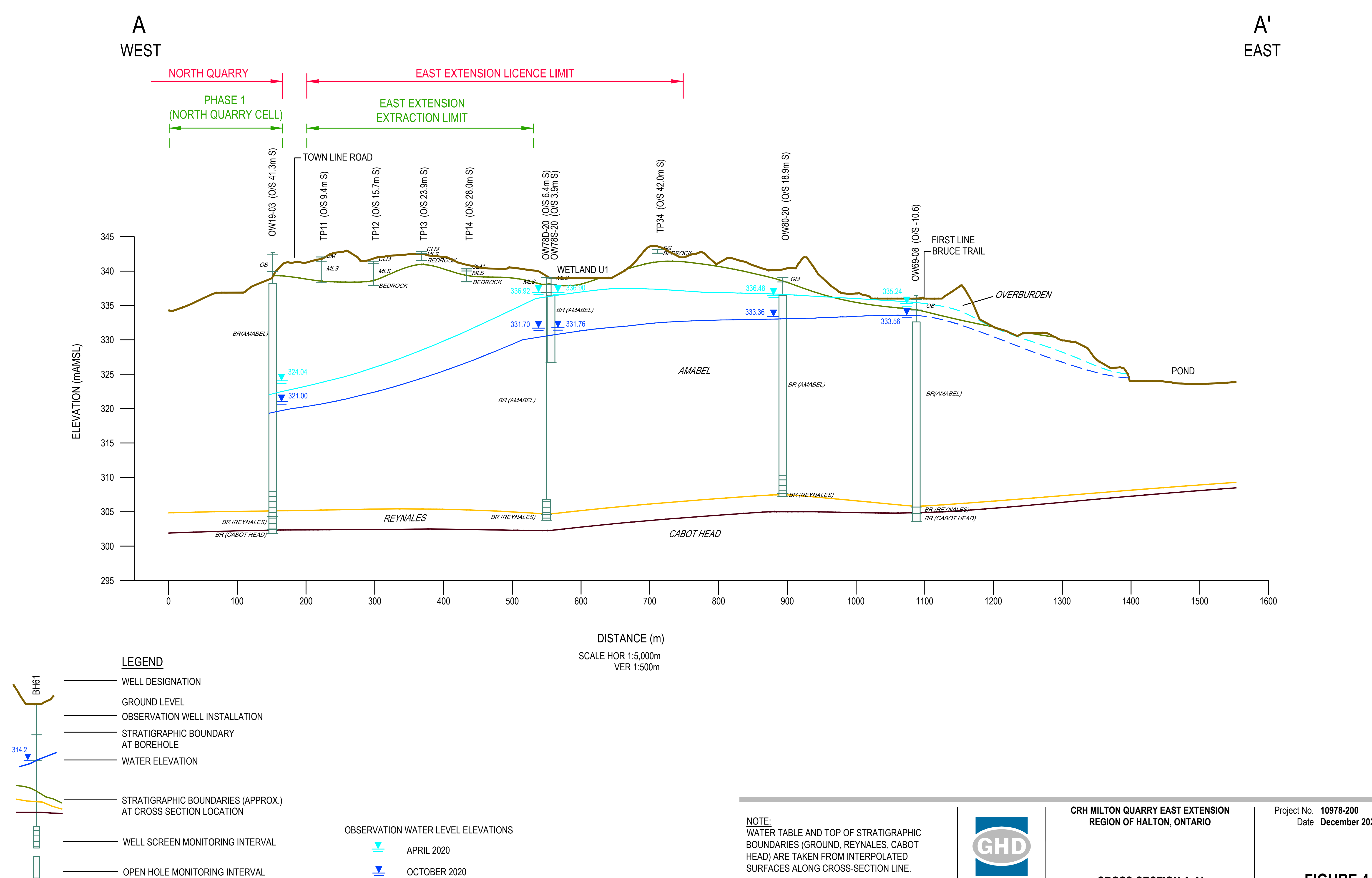
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

CROSS-SECTION LOCATIONS

FIGURE 4.1

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA001.dwg
Plot Date: 07 December 2021 2:38 PM



NOTE:
WATER TABLE AND TOP OF STRATIGRAPHIC BOUNDARIES (GROUND, REYNALES, CABOT HEAD) ARE TAKEN FROM INTERPOLATED SURFACES ALONG CROSS-SECTION LINE.

GHD

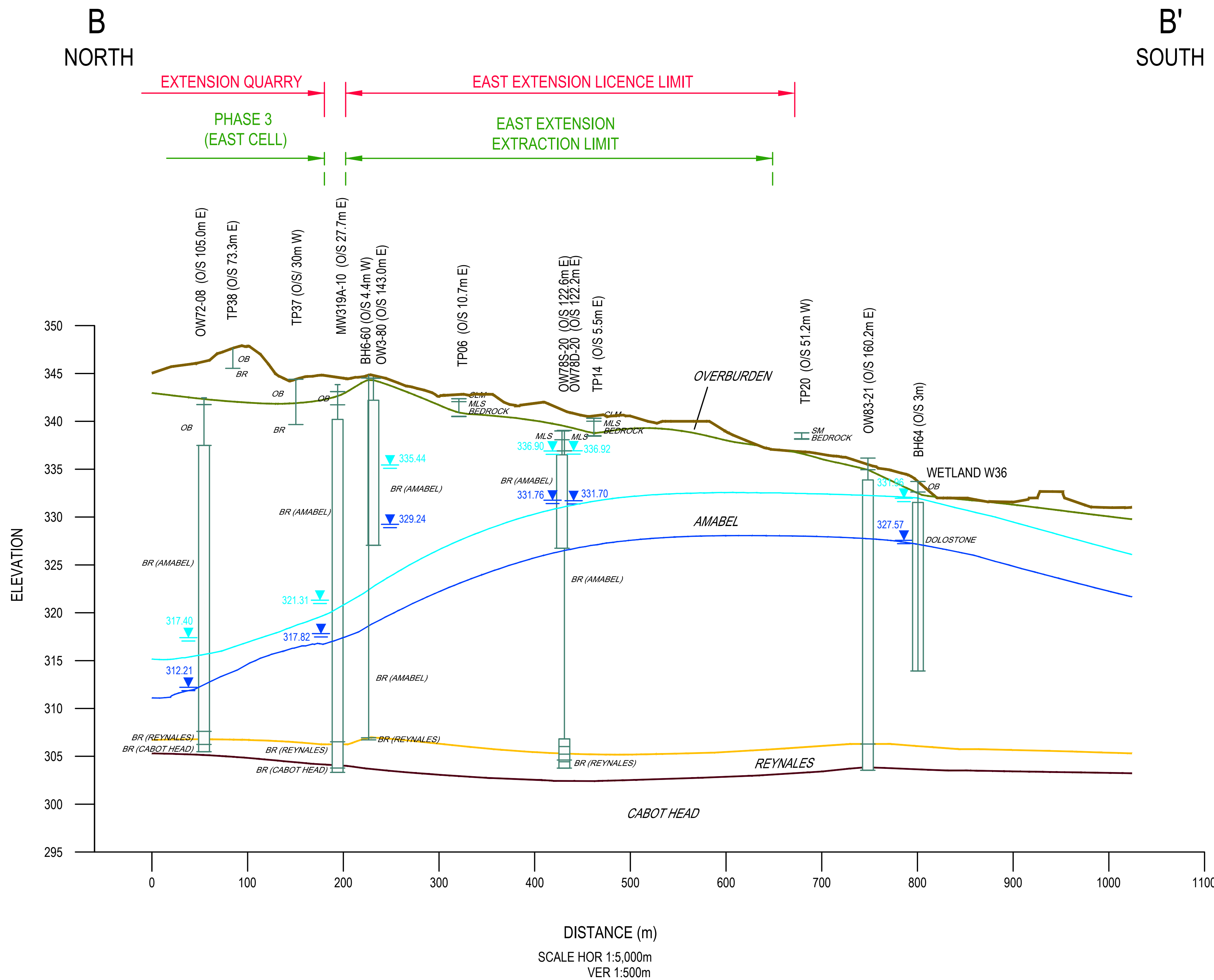
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

CROSS-SECTION A-A'

Project No. **10978-200**
Date **December 2021**

FIGURE 4.2

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA001.dwg
Plot Date: 08 December 2021 9:48 AM



LEGEND

- WELL DESIGNATION
- GROUND LEVEL
- OBSERVATION WELL INSTALLATION
- STRATIGRAPHIC BOUNDARY AT BOREHOLE
- WATER ELEVATION
- STRATIGRAPHIC BOUNDARIES (APPROX.) AT CROSS SECTION LOCATION
- WELL SCREEN MONITORING INTERVAL
- OPEN HOLE MONITORING INTERVAL

OBSERVATION WATER LEVEL ELEVATIONS

- APRIL 2020
- OCTOBER 2020

NOTE:
WATER TABLE AND TOP OF STRATIGRAPHIC BOUNDARIES (GROUND, REYNALES, CABOT HEAD) ARE TAKEN FROM INTERPOLATED SURFACES ALONG CROSS-SECTION LINE.

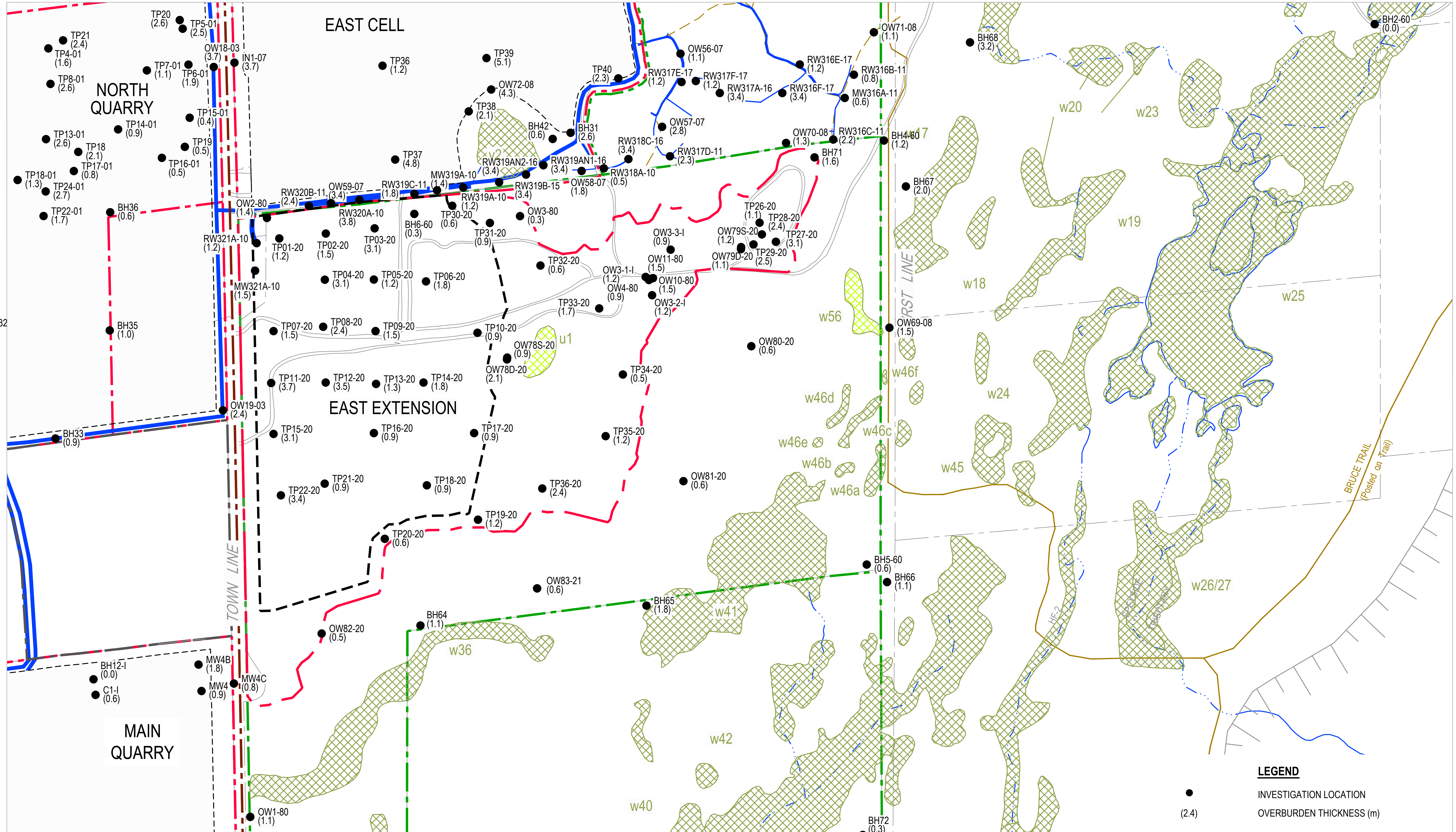
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

CROSS-SECTION B-B'

Project No. 10978-200
Date December 2021

FIGURE 4.3

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA001.dwg
Plot Date: 08 December 2021 9:47 AM



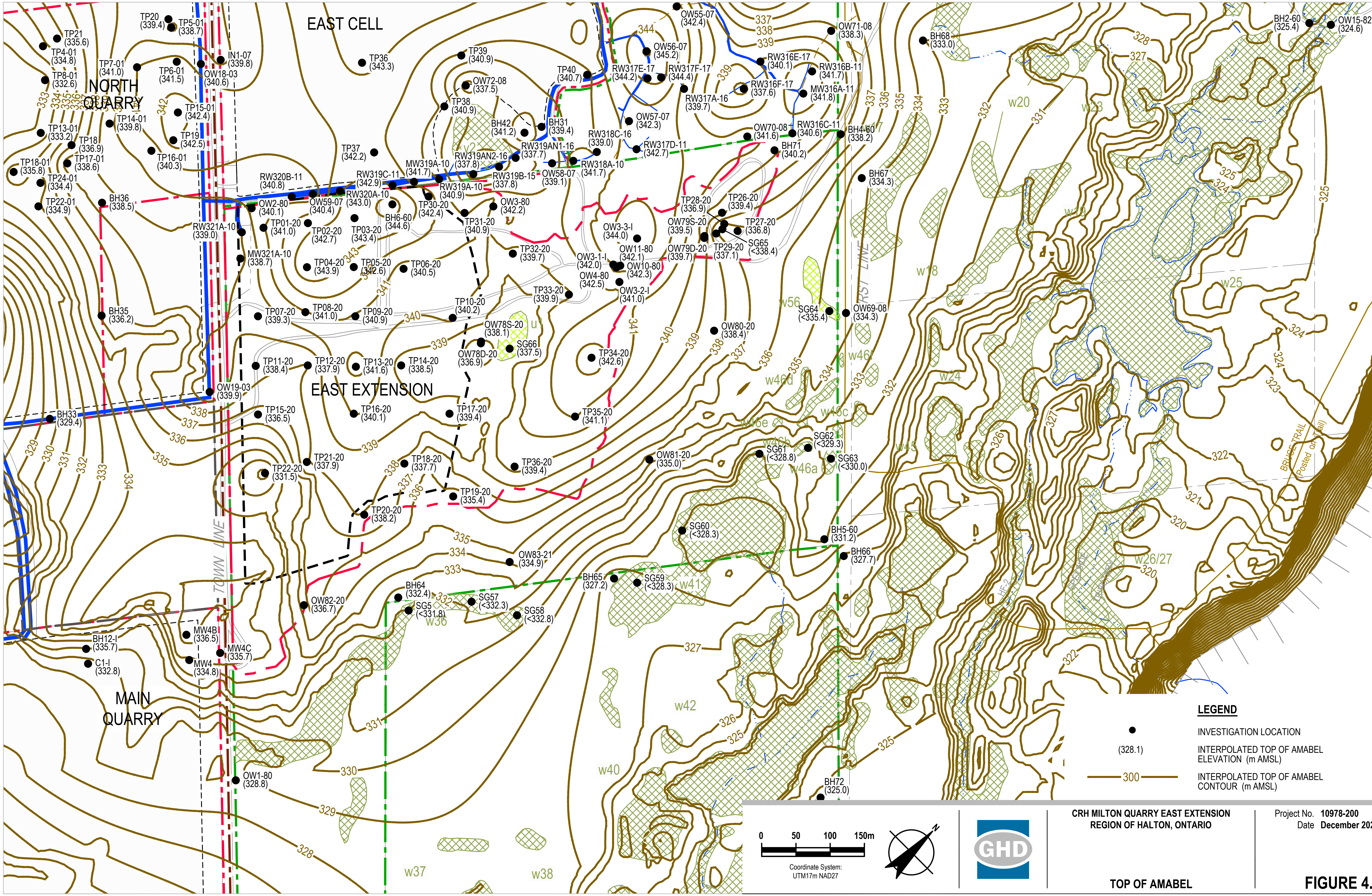
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

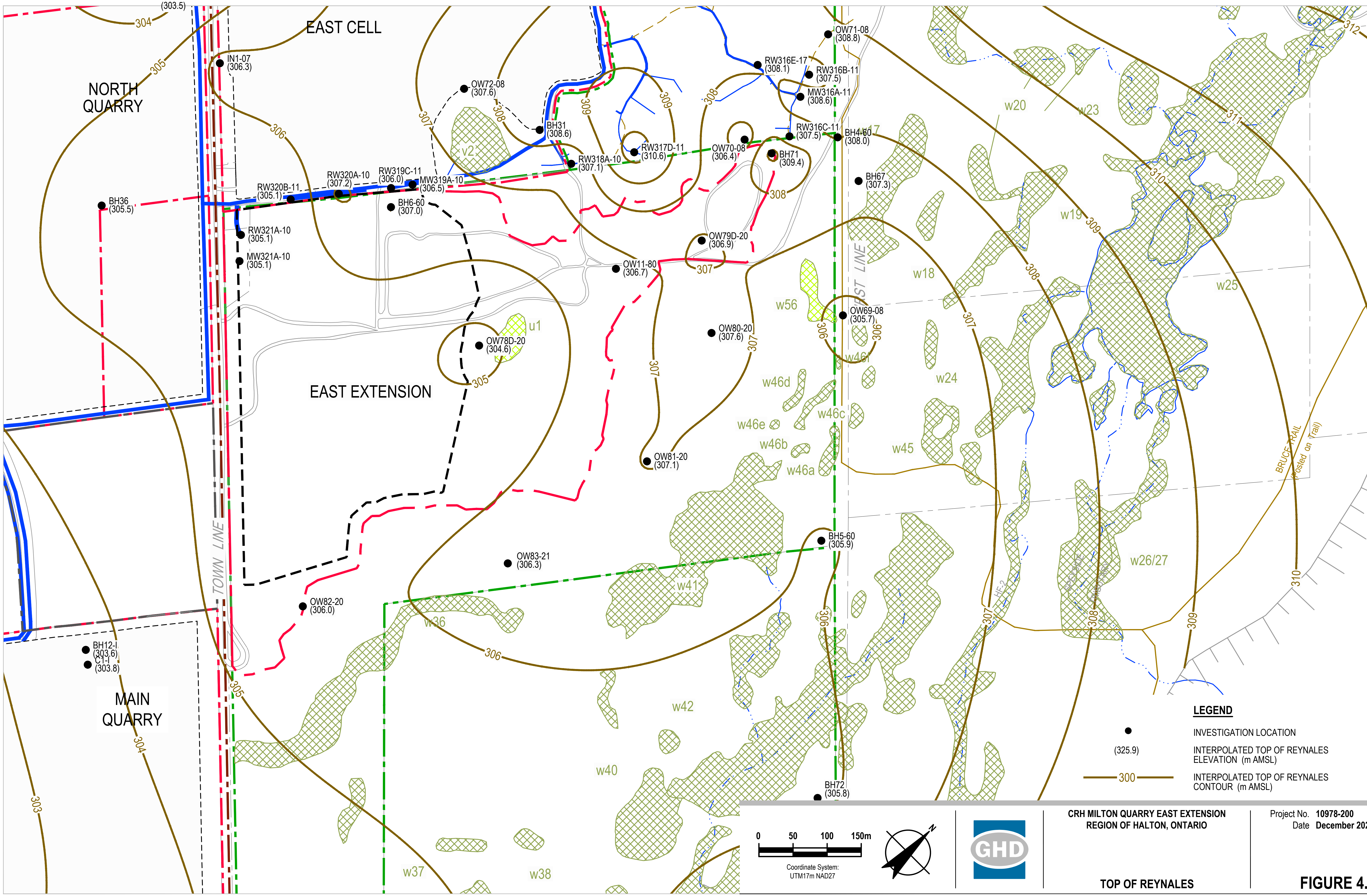
OVERBURDEN DEPTHS

FIGURE 4.4

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA023.dwg
Plot Date: 07 December 2021 2:44 PM



Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA021.dwg
Plot Date: 10 December 2021 8:15 AM



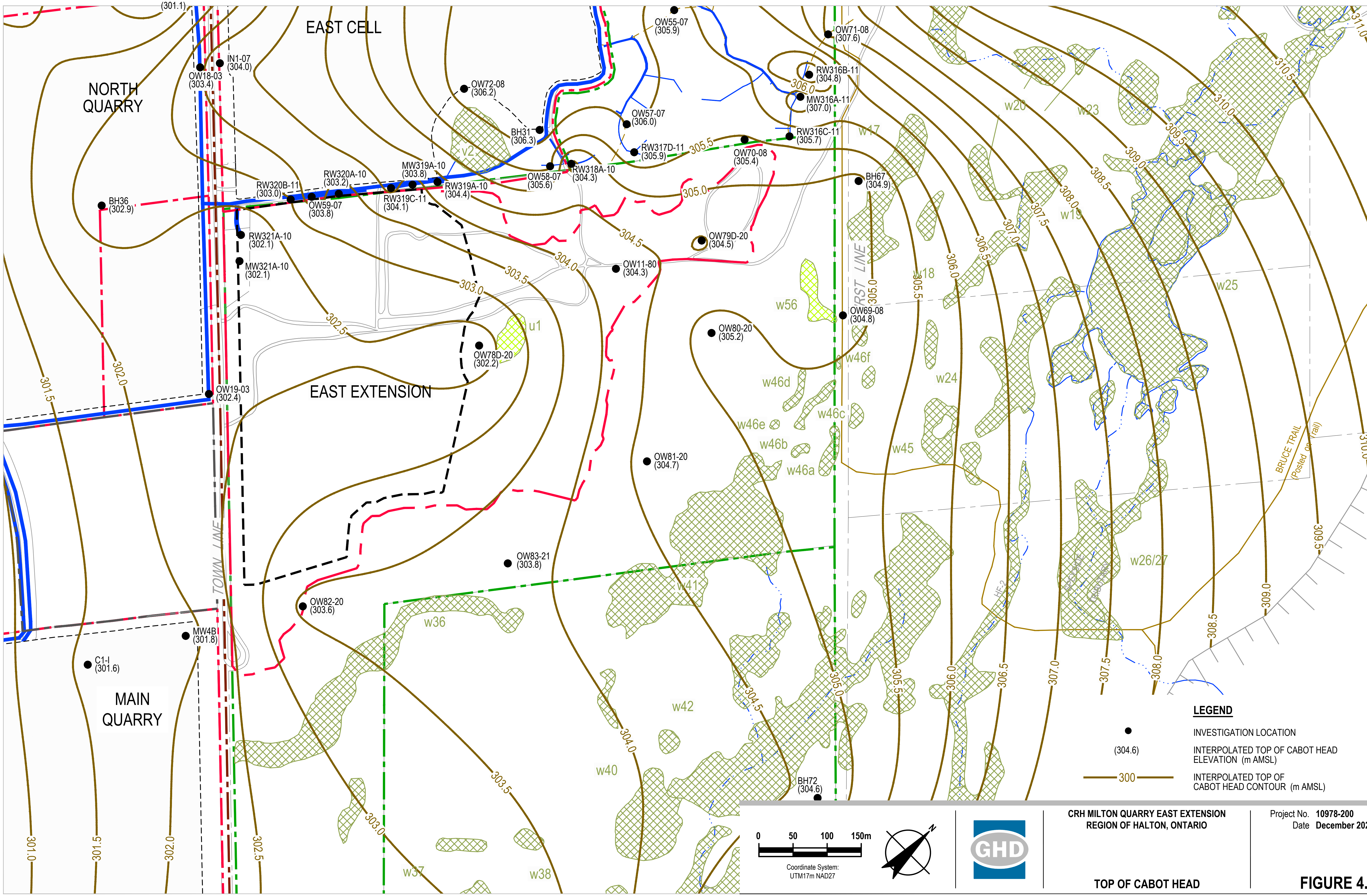
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

TOP OF REYNALES

Project No. 10978-200
Date December 2021

FIGURE 4.6

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA020.dwg
Plot Date: 10 December 2021 8:16 AM



CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

TOP OF CABOT HEAD

Project No. 10978-200
Date December 2021

FIGURE 4.7

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA016.dwg
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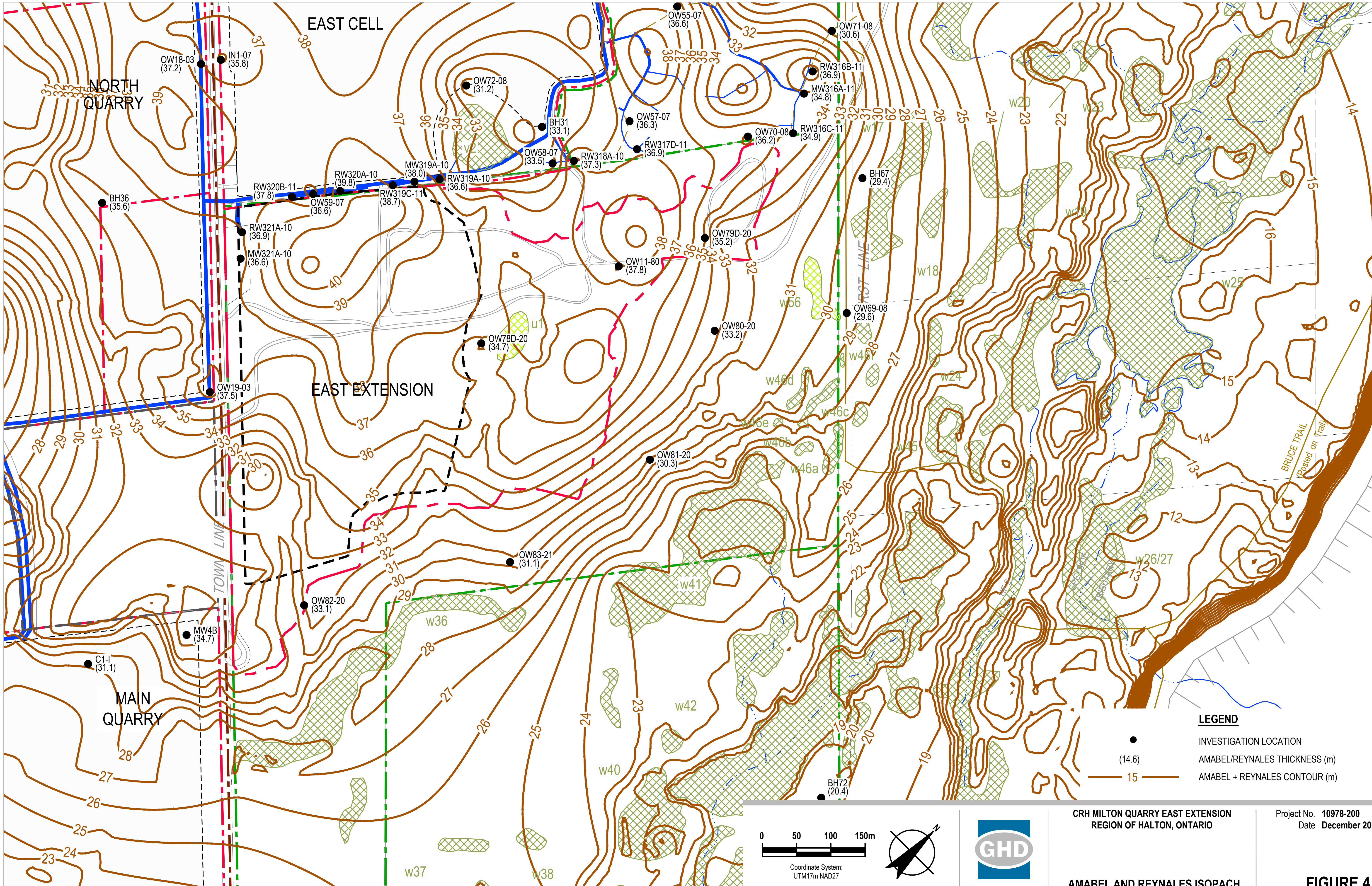


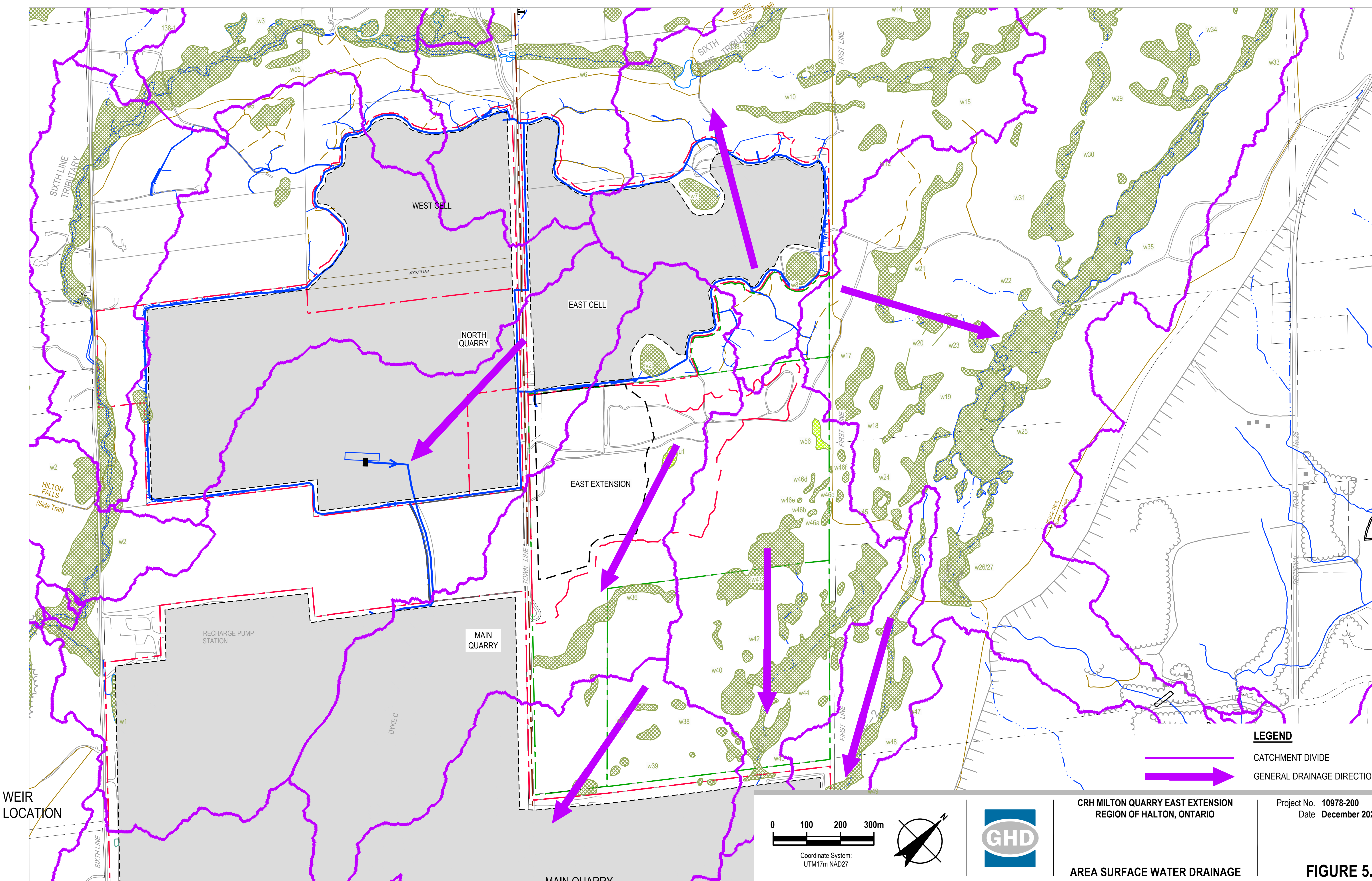
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

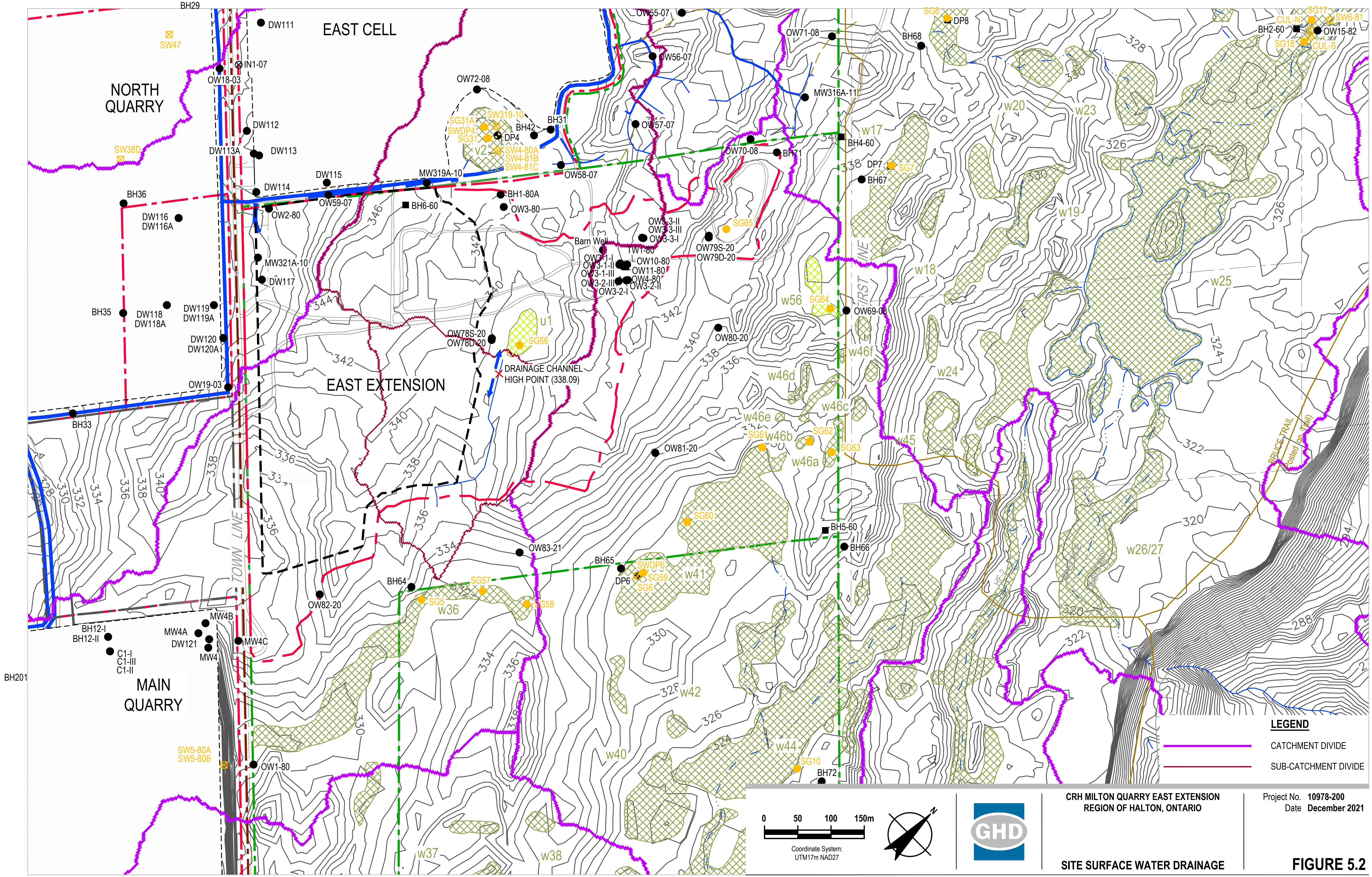
AMABEL AND REYNALES ISOPACH

FIGURE 4.8

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA022.dwg
Plot Date: 07 December 2021 2:44 PM



Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA018.dwg
Plot Date: 09 December 2021 8:25 AM



CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

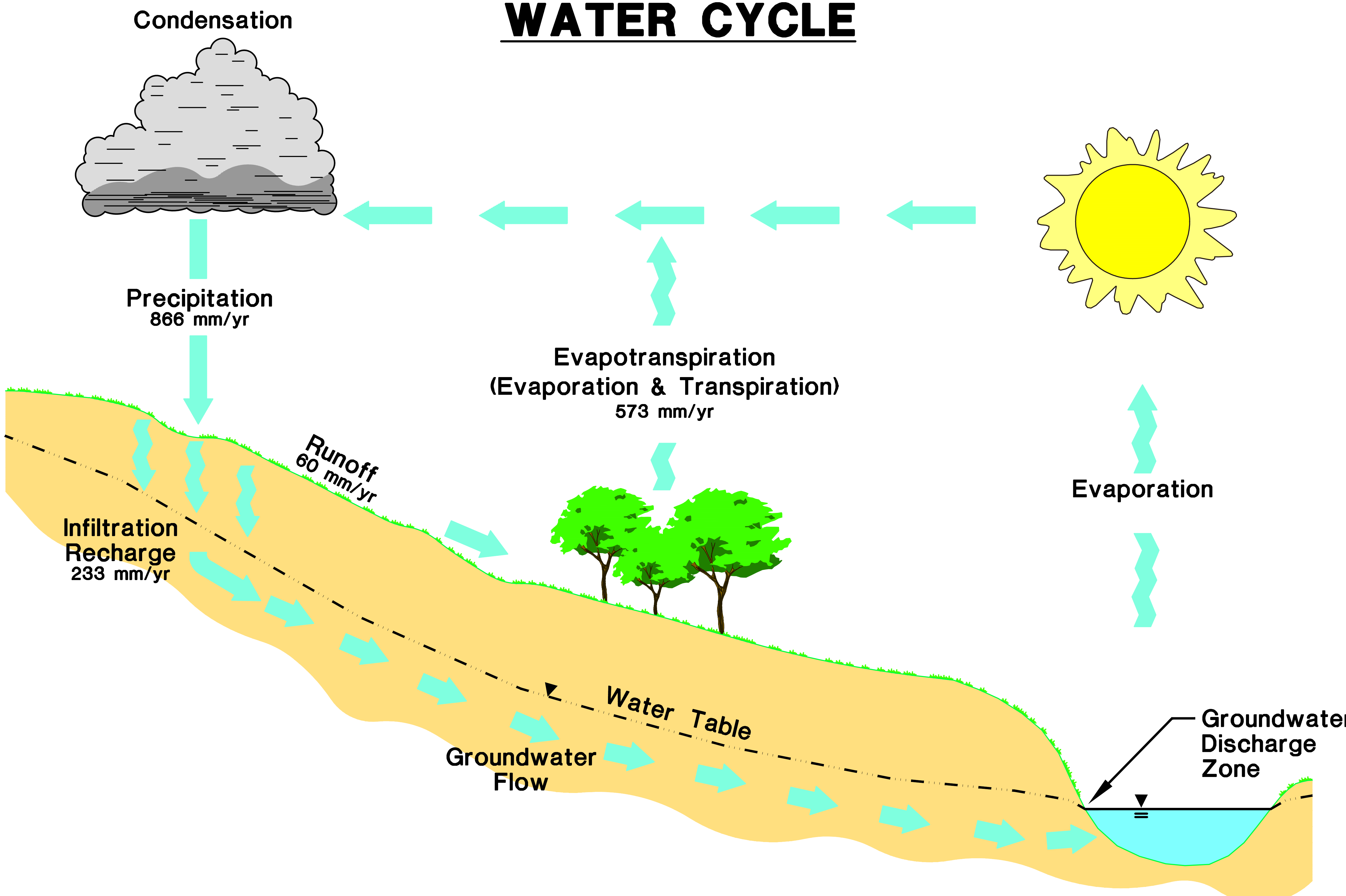
Project No. 10978-200
Date December 2021

SITE SURFACE WATER DRAINAGE

FIGURE 5.2

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA013.dwg
Plot Date: 07 December 2021 2:41 PM

WATER CYCLE



Recharge	=	Precipitation	-	Evapotranspiration	-	Runoff
233 mm/yr		866 mm/yr		573 mm/yr		60 mm/yr

VALUES SHOWN REPRESENT TYPICAL LONG-TERM HYDROLOGIC DISTRIBUTION (REFER TO SECTION 5.2).

GHD

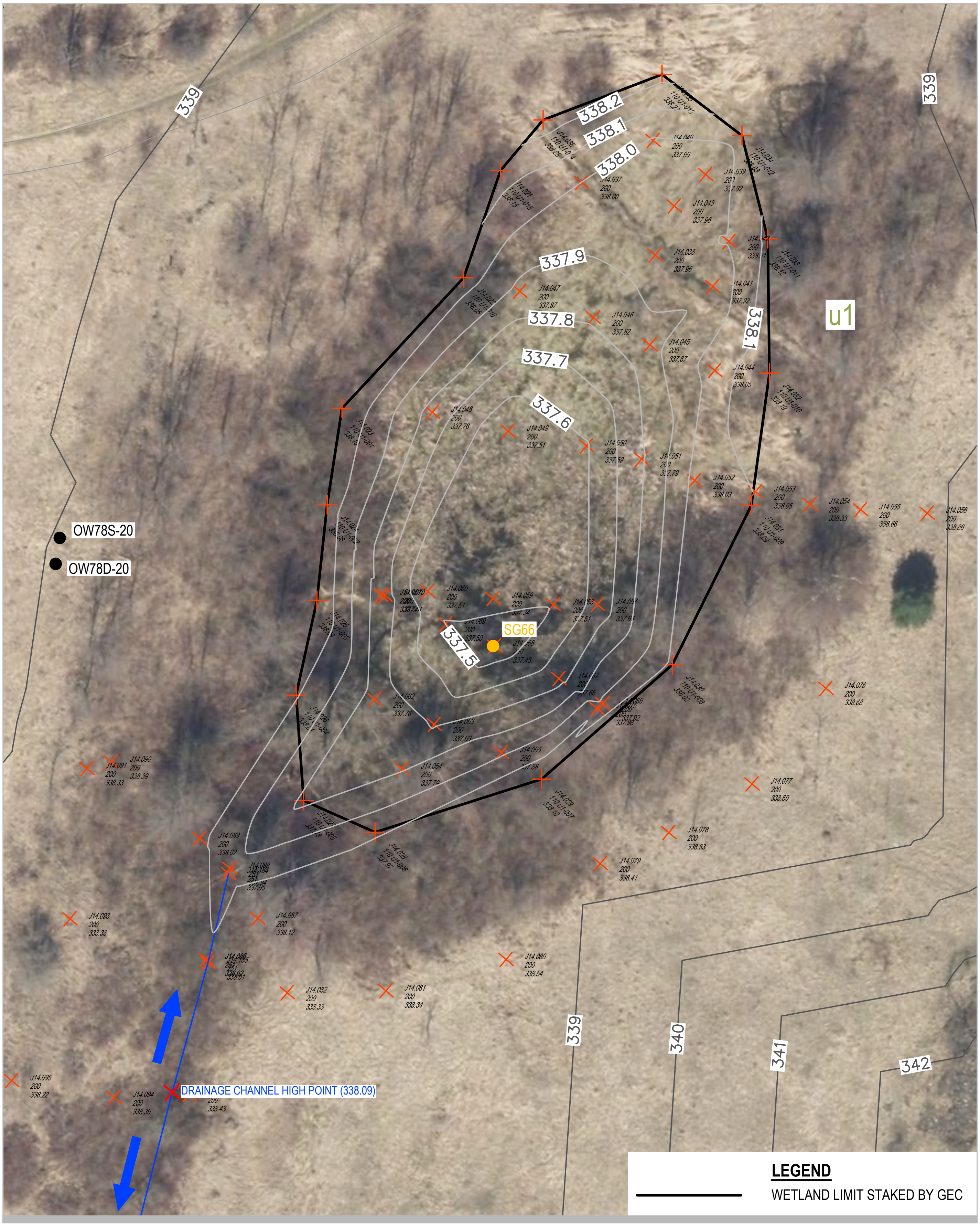
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

WATER CYCLE SCHEMATIC

Project No. 10978-200
Date December 2021

FIGURE 5.3

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA005.DWG
Plot Date: 08 December 2021 9:49 AM



0 5 10 15m

1:500

Coordinate System: UTM17m NAD27

N

GHD

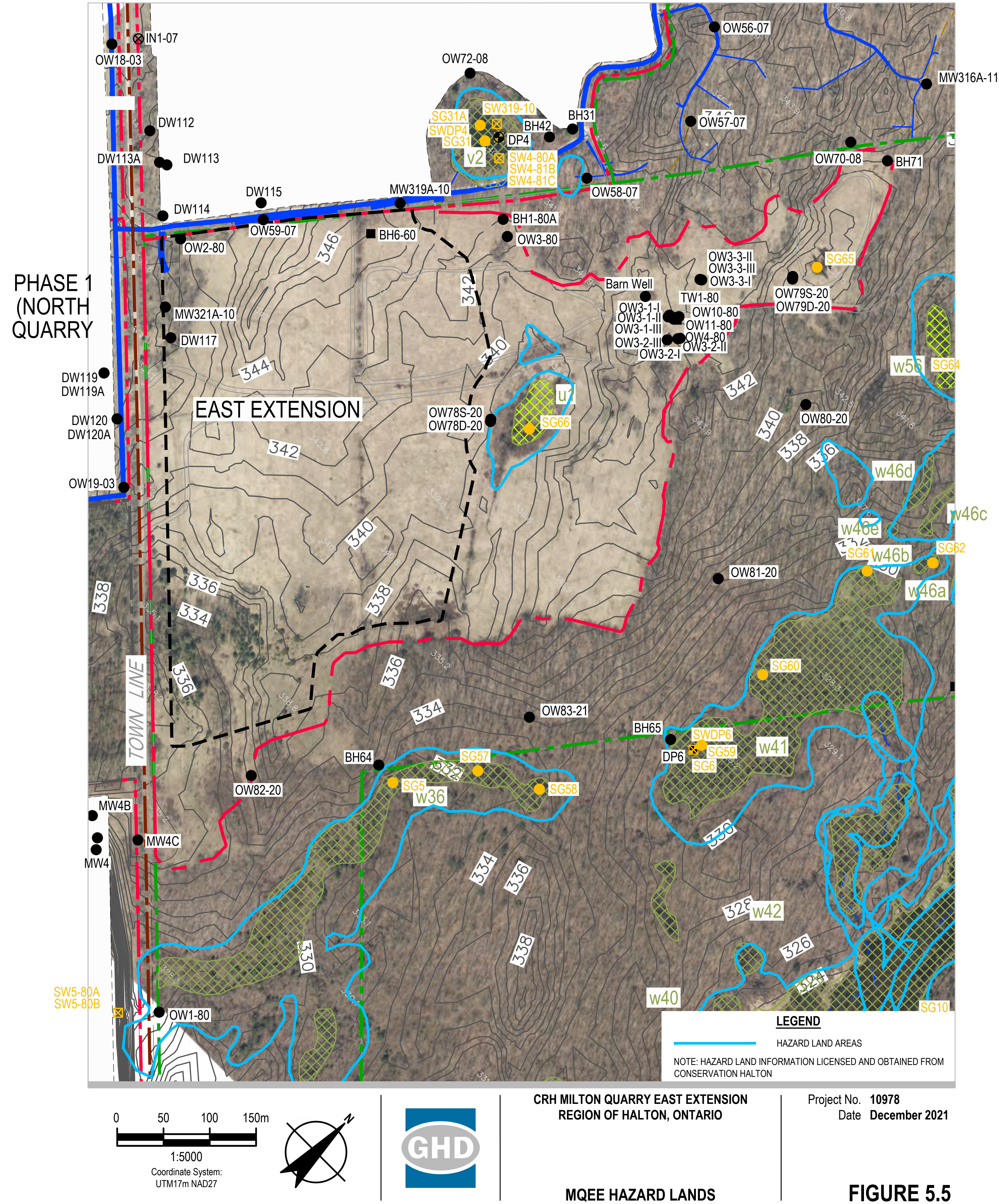
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

WETLAND U1 DETAILS

Project No. **10978**
Date **December 2021**

FIGURE 5.4

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA030.dwg
Plot Date: 07 December 2021 2:46 PM



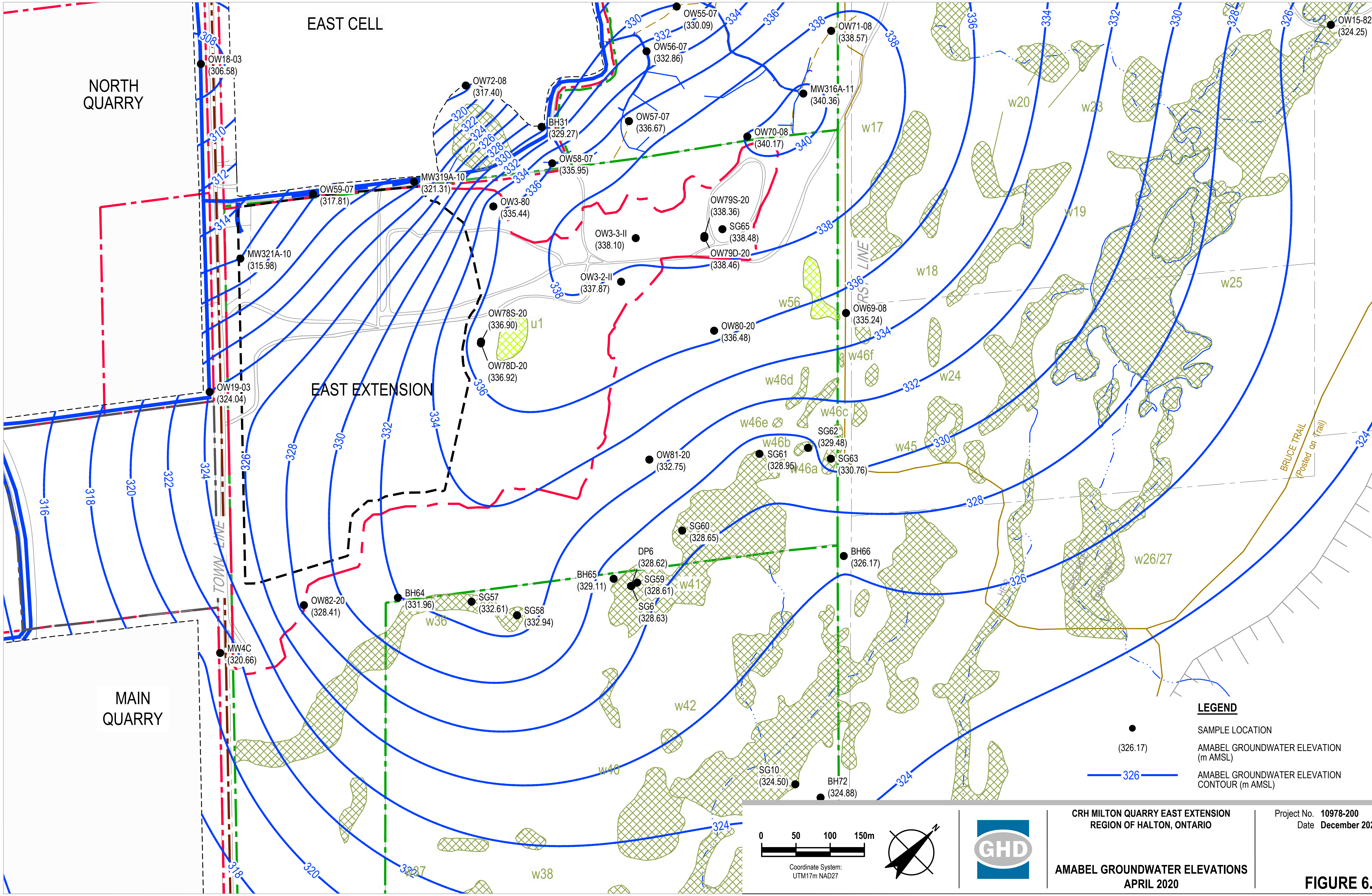
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

MQEE HAZARD LANDS

FIGURE 5.5

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA028.dwg
Plot Date: 07 December 2021 2:46 PM



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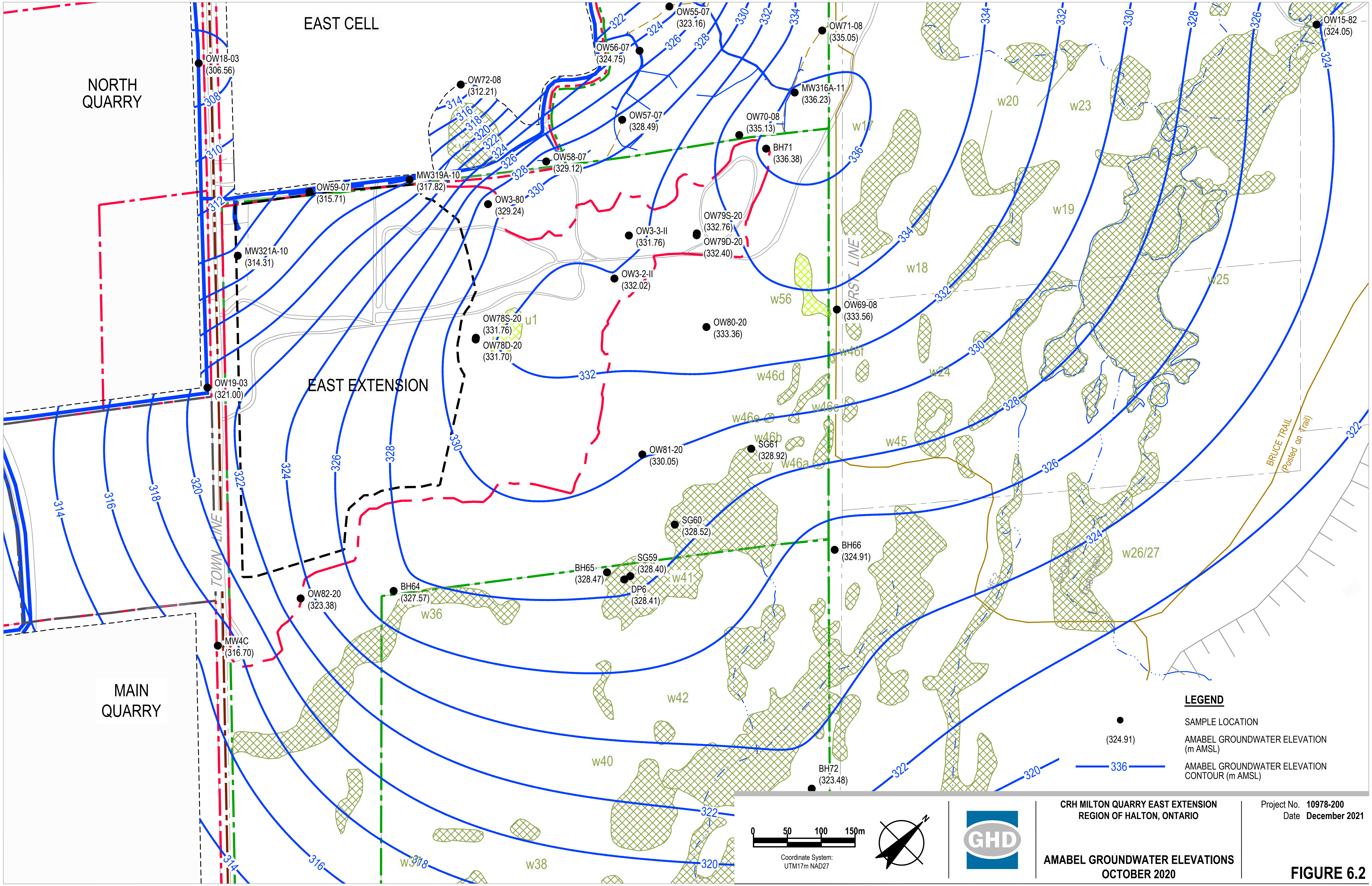

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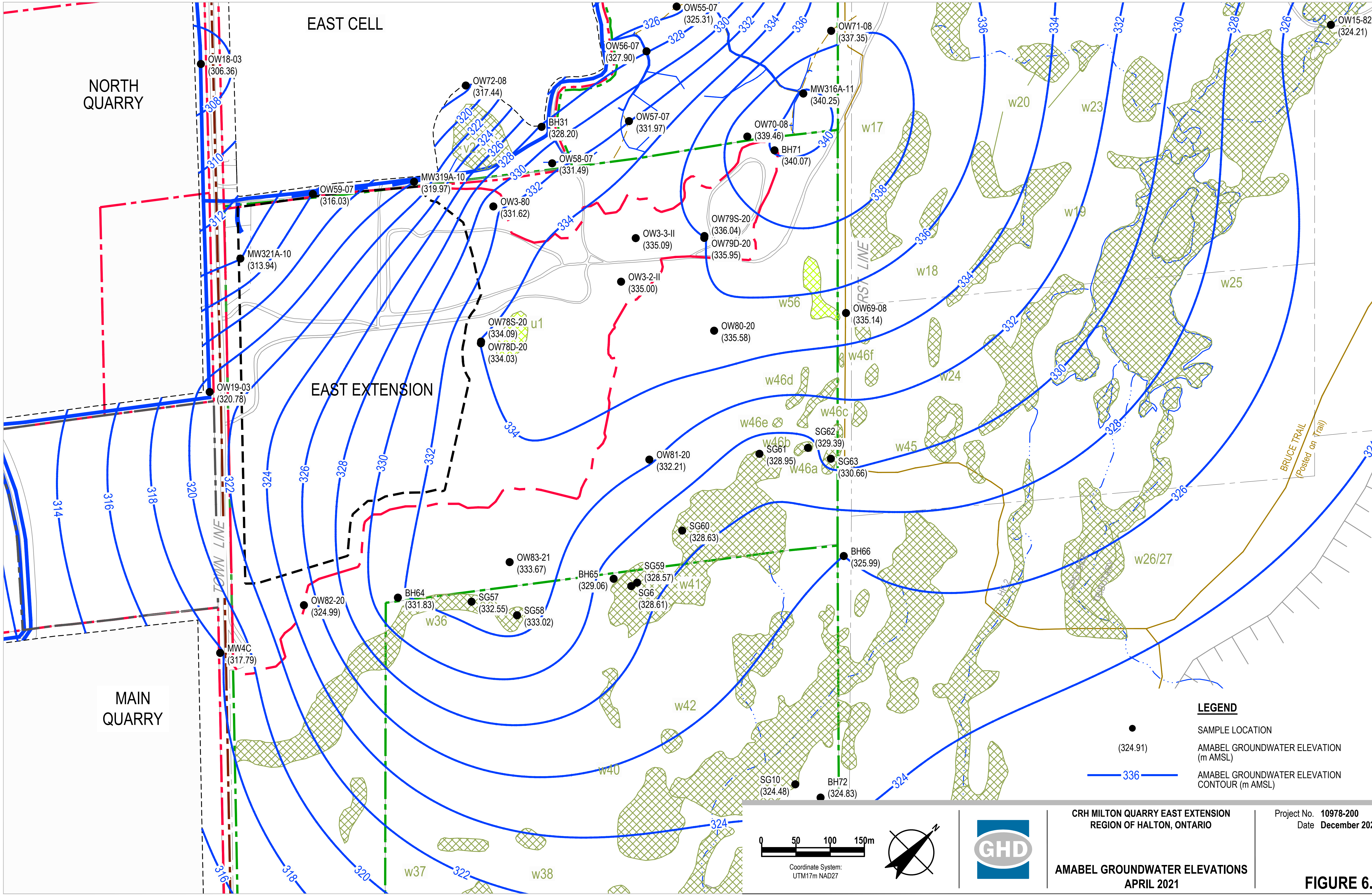


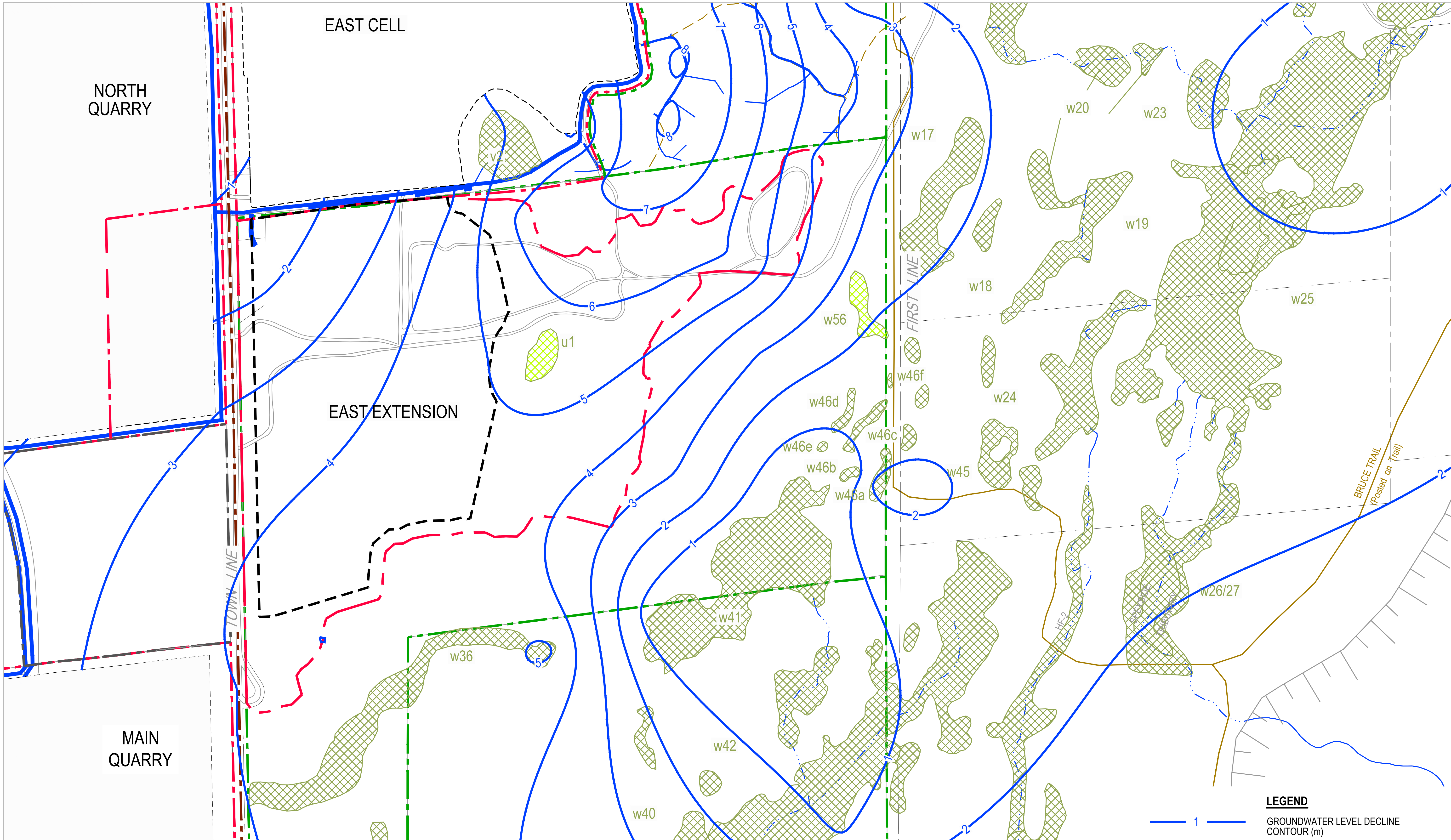
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

AMABEL GROUNDWATER ELEVATIONS
APRIL 2021

FIGURE 6.3

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA031.dwg
Plot Date: 07 December 2021 2:47 PM



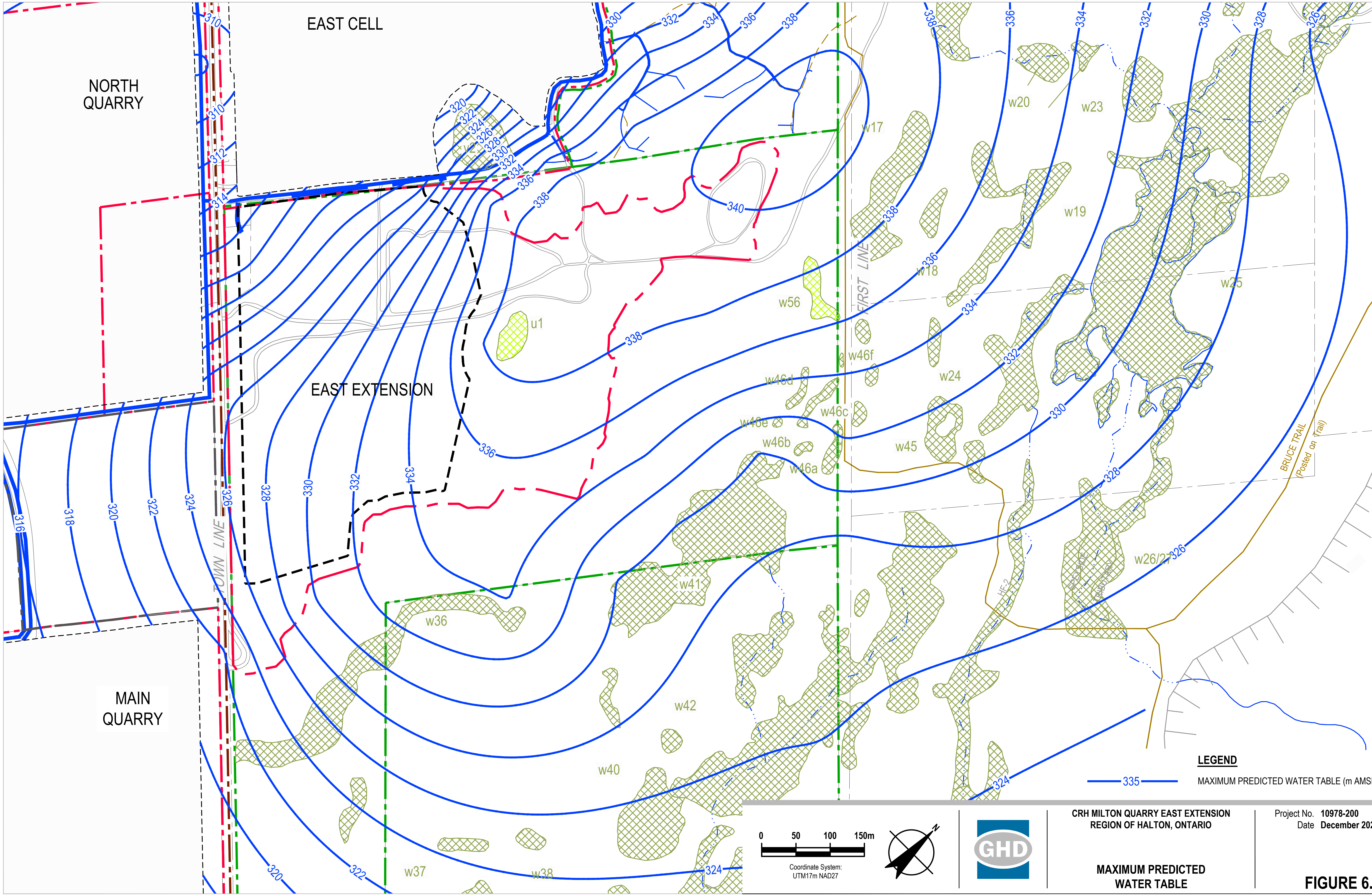
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

GROUNDWATER LEVEL RANGE
APRIL - OCTOBER 2020

FIGURE 6.4

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA026.dwg
Plot Date: 07 December 2021 2:45 PM



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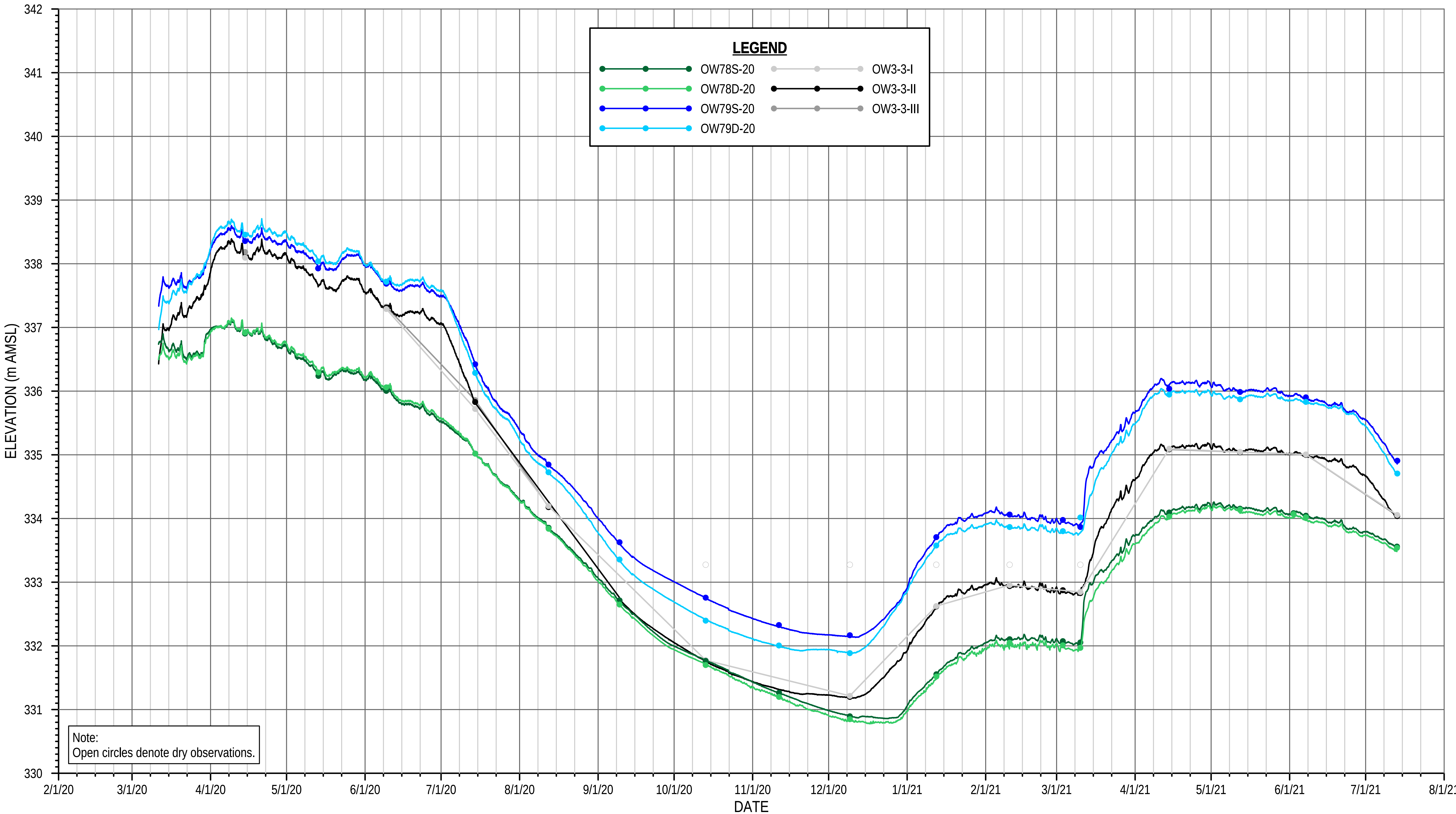


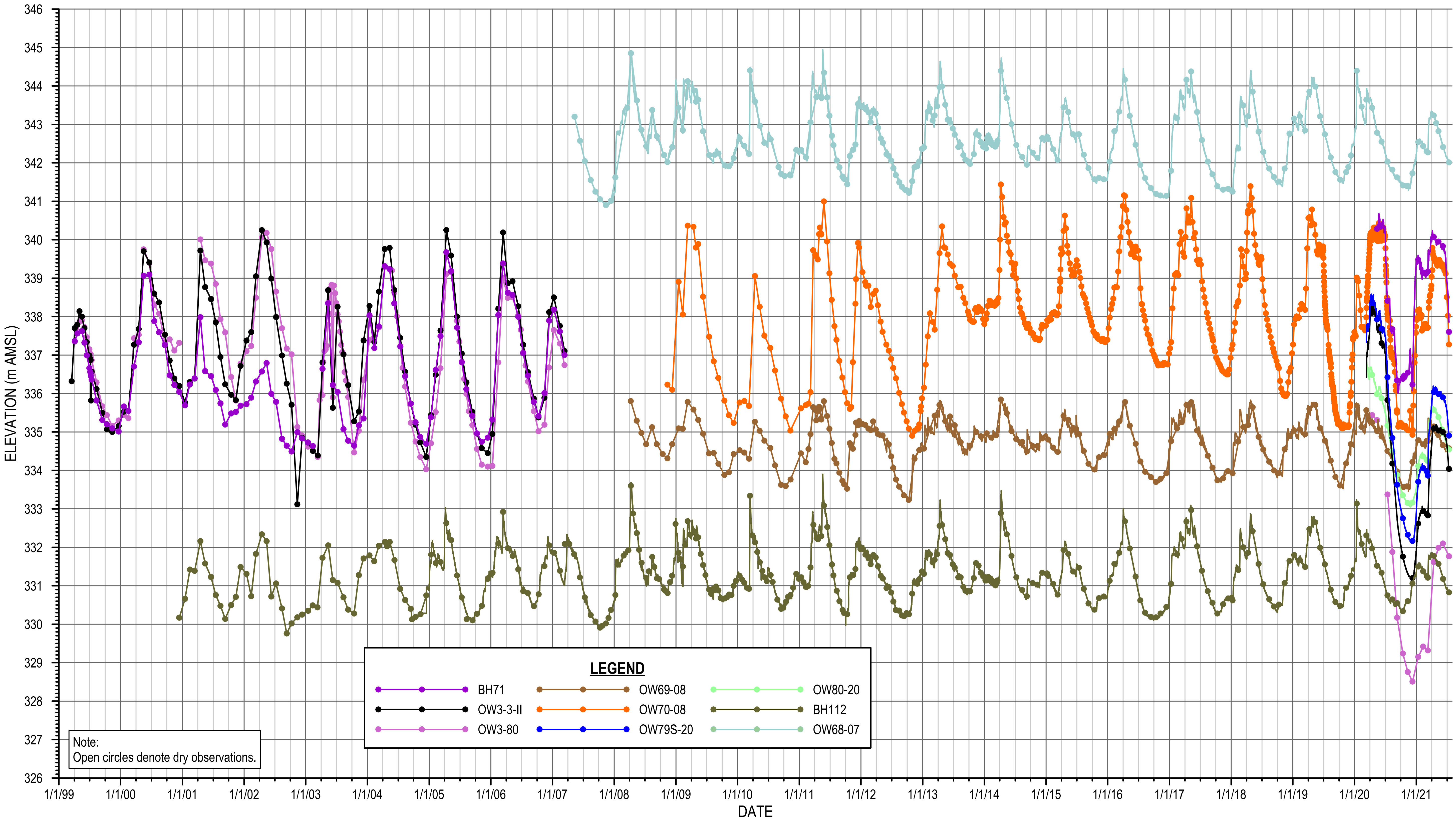
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **September 2021**

HYDROGRAPH - NESTED WELLS

FIGURE 6.6

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Figure 6.6 - Nested Wells.grf
Plot Date: September 17 2021 11:09 AM



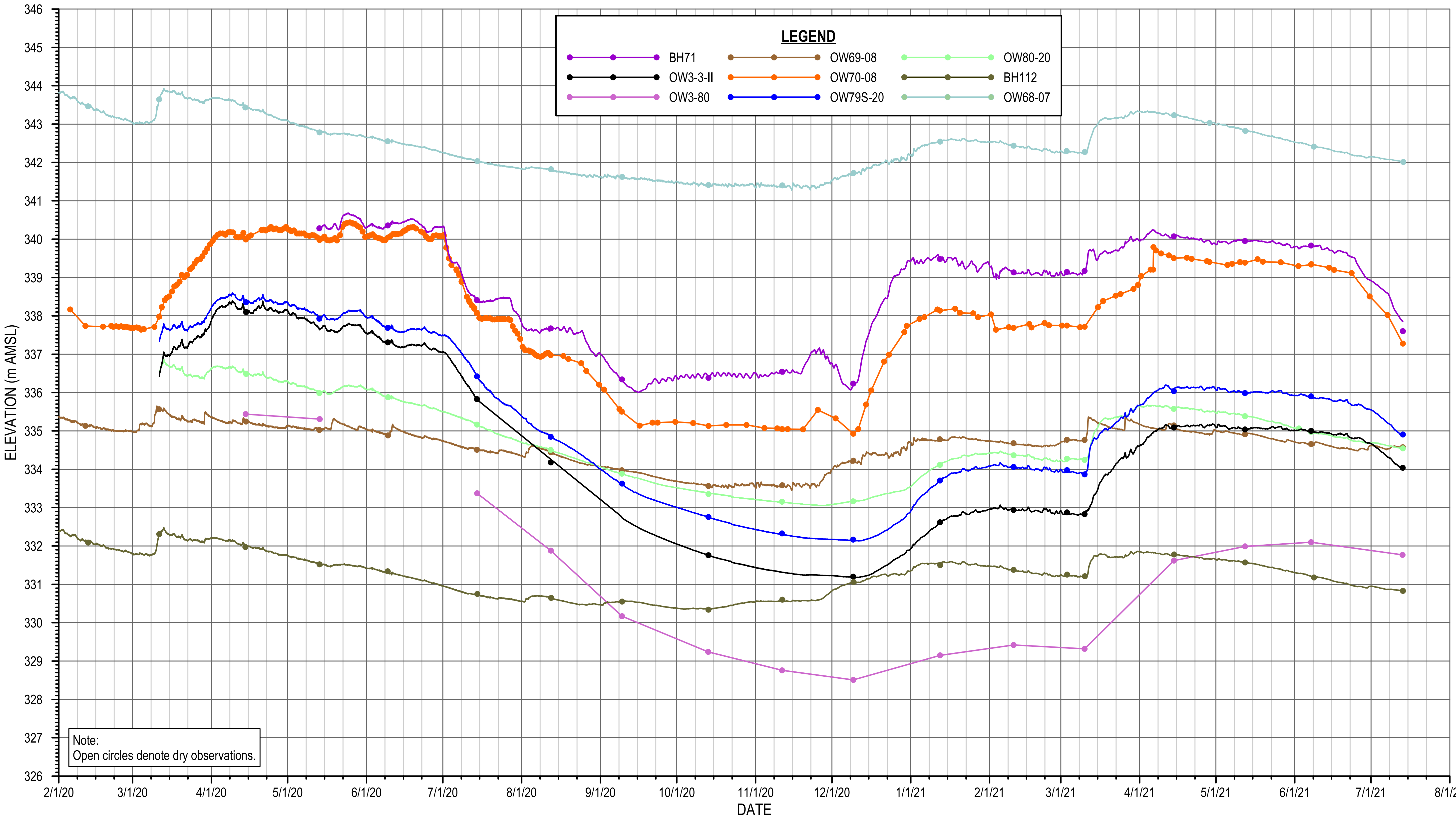
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - NORTHERN WELLS

FIGURE 6.7a

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Figure 6.7a - MQEE Northern Wells.grf
Plot Date: December 01 2021 11:12 AM



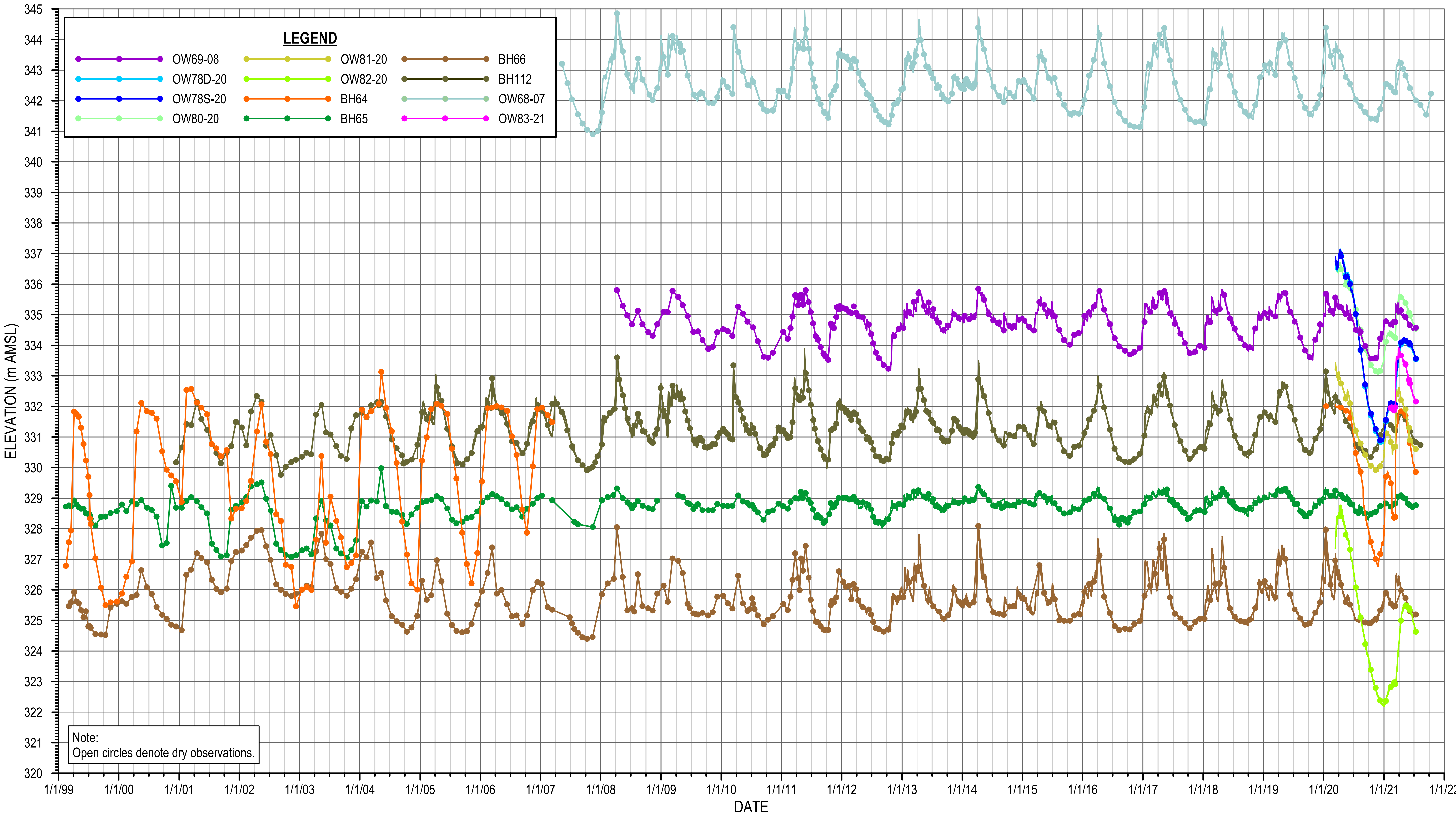
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - NORTHERN WELLS

FIGURE 6.7b

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Figure 6.7b - MQEE Northern Wells.grf
Plot Date: December 01 2021 11:12 AM



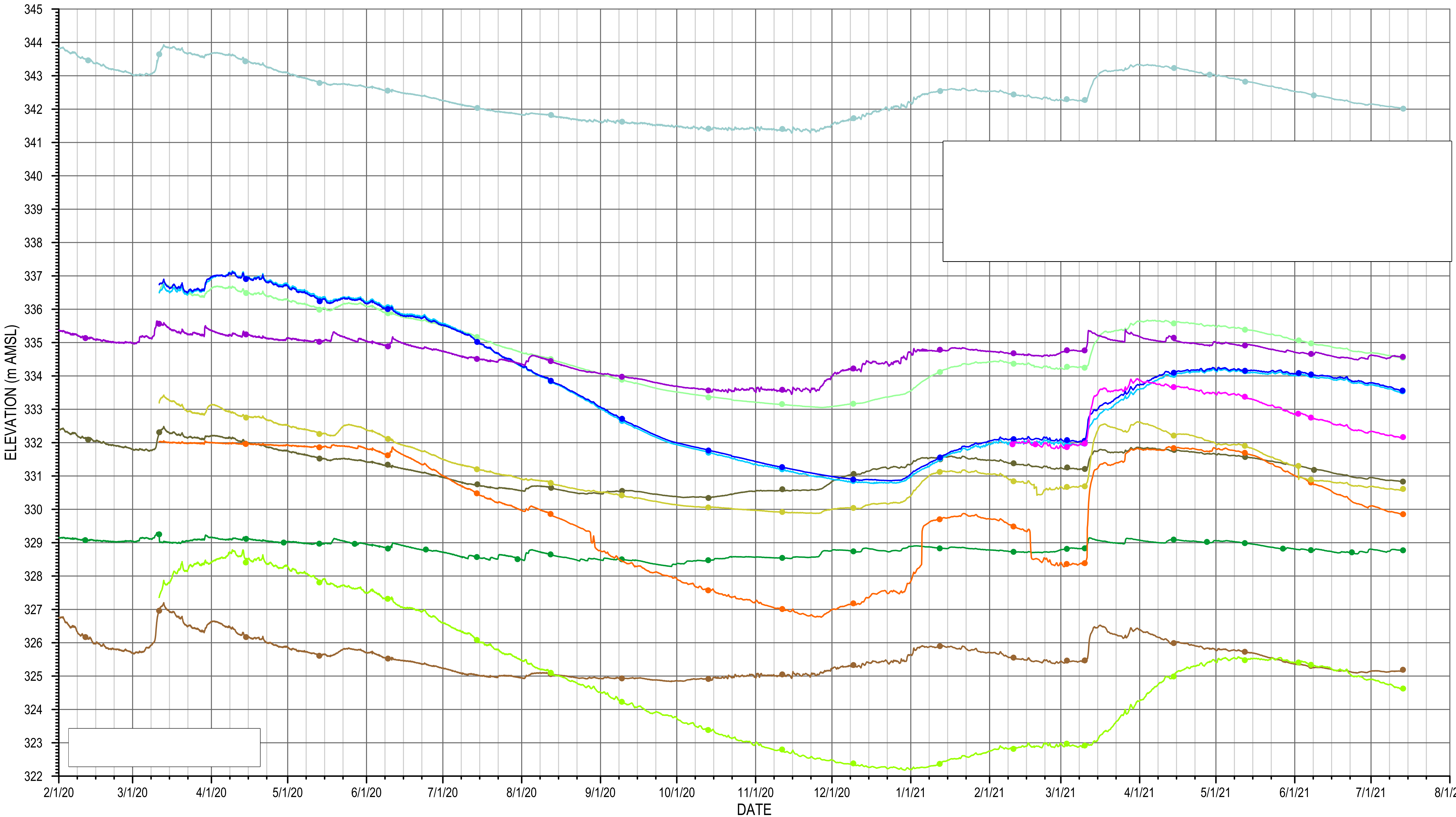
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - SOUTHERN WELLS

Project No. 10978
Date December 2021

FIGURE 6.8a

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Figure 6.8a - MQEE Southern Wells.grf
Plot Date: December 01 2021 11:12 AM



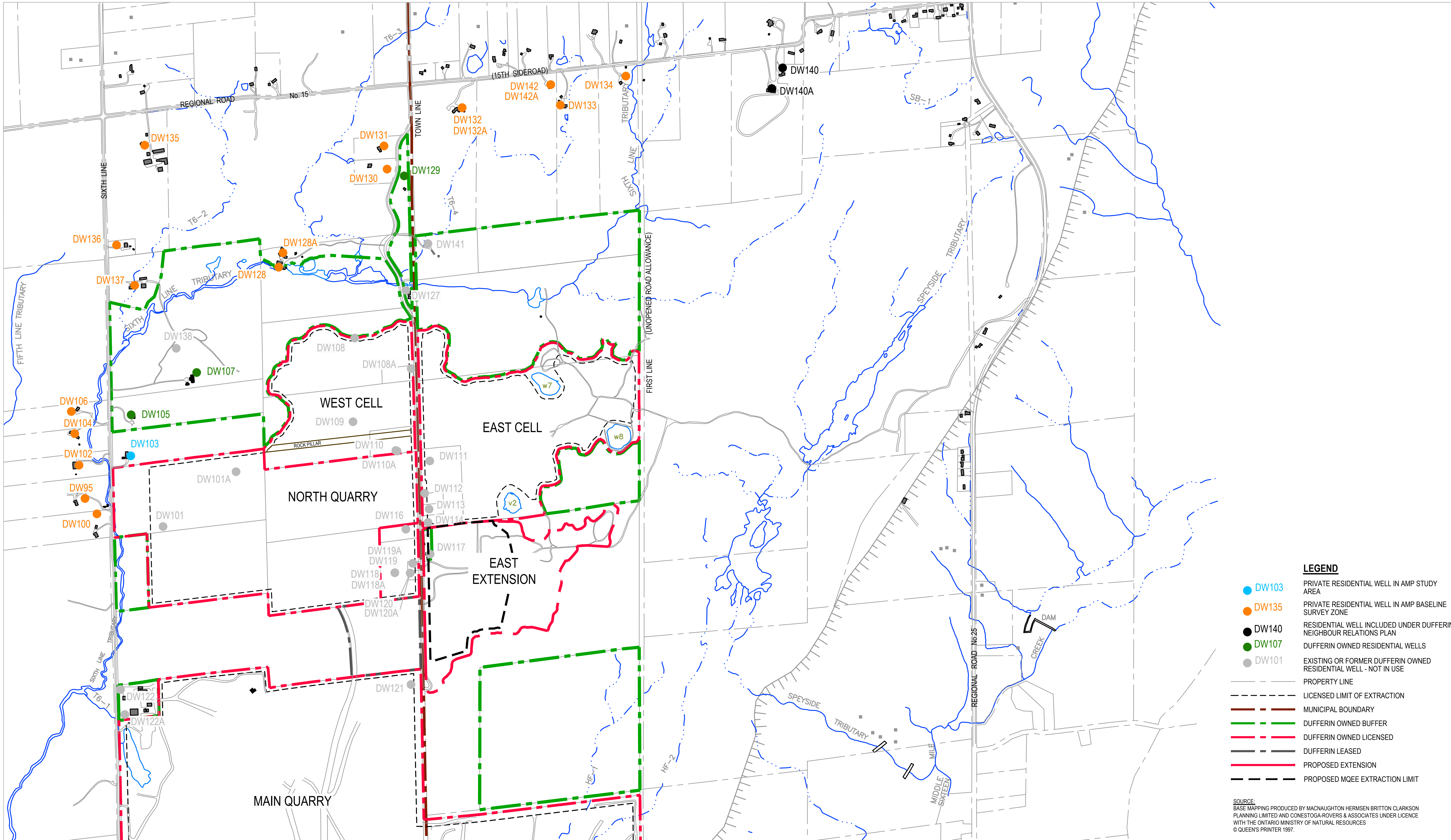
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978
Date December 2021

HYDROGRAPH - SOUTHERN WELLS

FIGURE 6.8b

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Figure 6.8b - MQEE Southern Wells.grf
Plot Date: December 01 2021 11:12 AM



CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

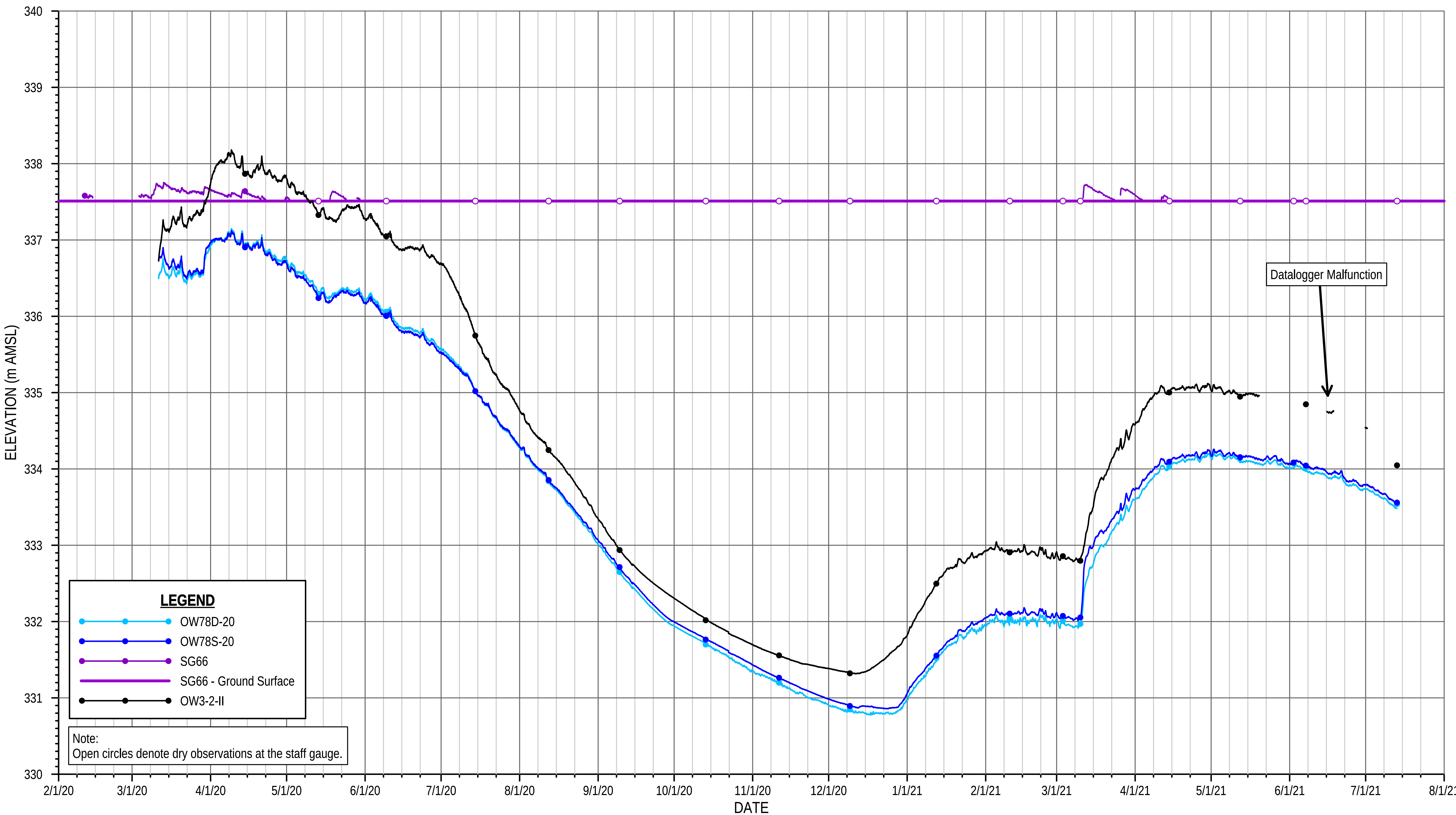
PRIVATE WATER SUPPLY WELLS

Project No. 10978-200
Date December 2021

GHD

FIGURE 6.9

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA010.dwg
Plot Date: 07 December 2021 2:40 PM



MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **November 2021**

HYDROGRAPH - WETLAND U1

FIGURE 6.10

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Figure 6.10 - U1.grf
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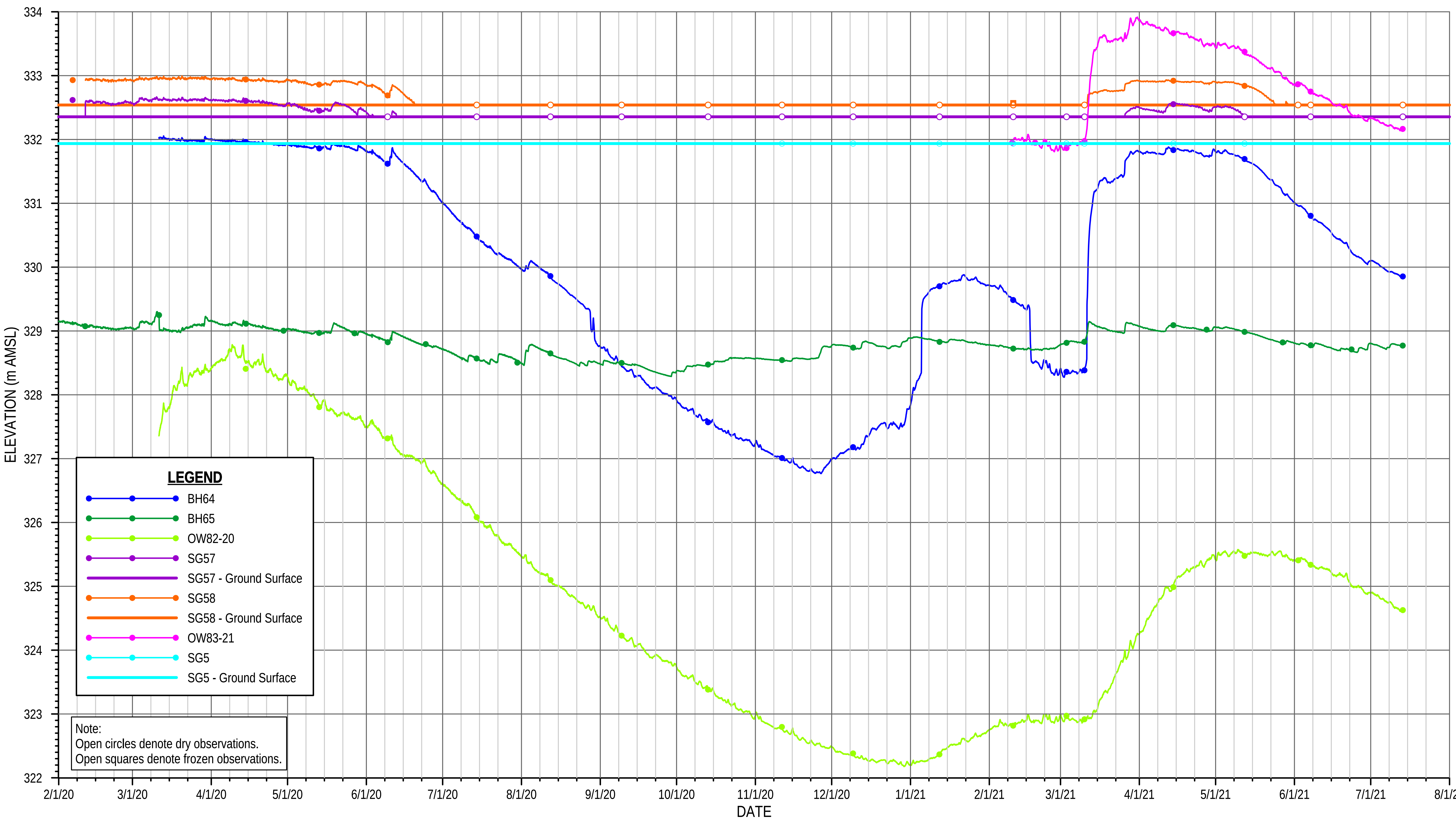

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **September 2021**

HYDROGRAPH - WETLAND W36

FIGURE 6.11

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Figure 6.11 - W36.grf
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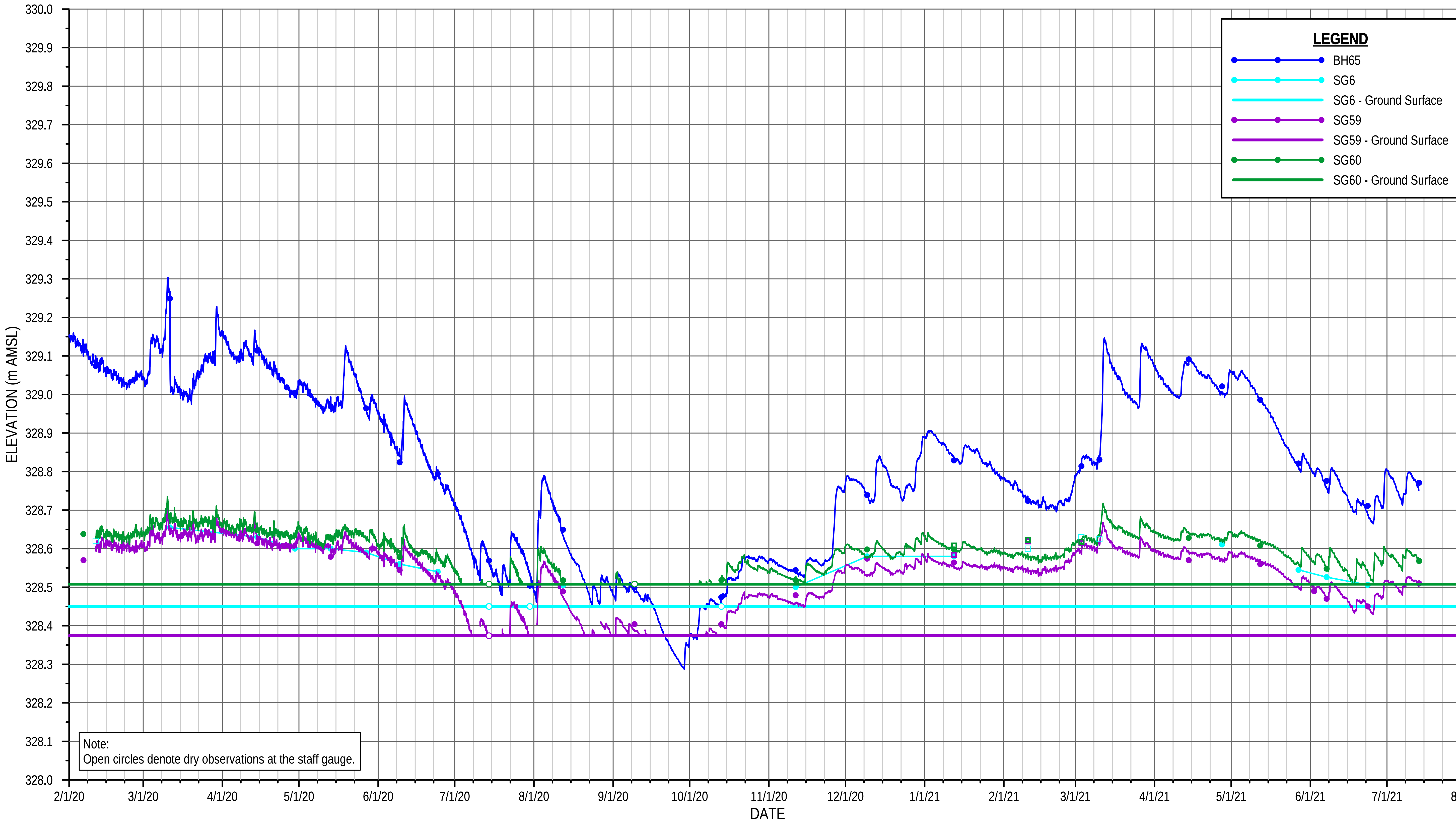


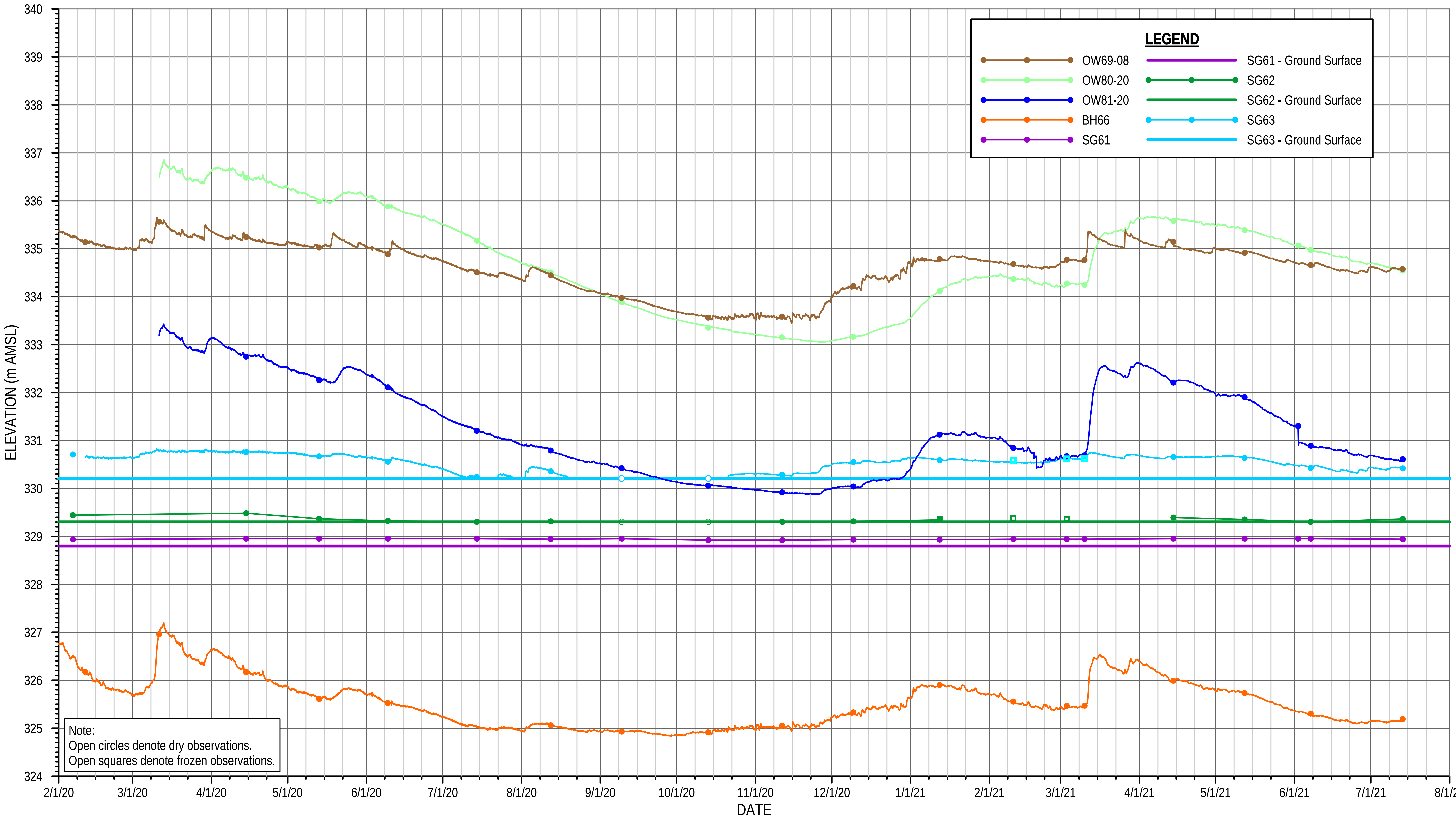
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **September 2021**

HYDROGRAPH - WETLAND W41 WEST

FIGURE 6.12

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Figure 6.12 - W41 West.grf
Plot Date: September 17 2021 11:09 AM



GHD

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH
WETLAND W41 EAST - W46

Project No. 10978
Date September 2021

FIGURE 6.13

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Figure 6.13 - W41 East - W46.grf
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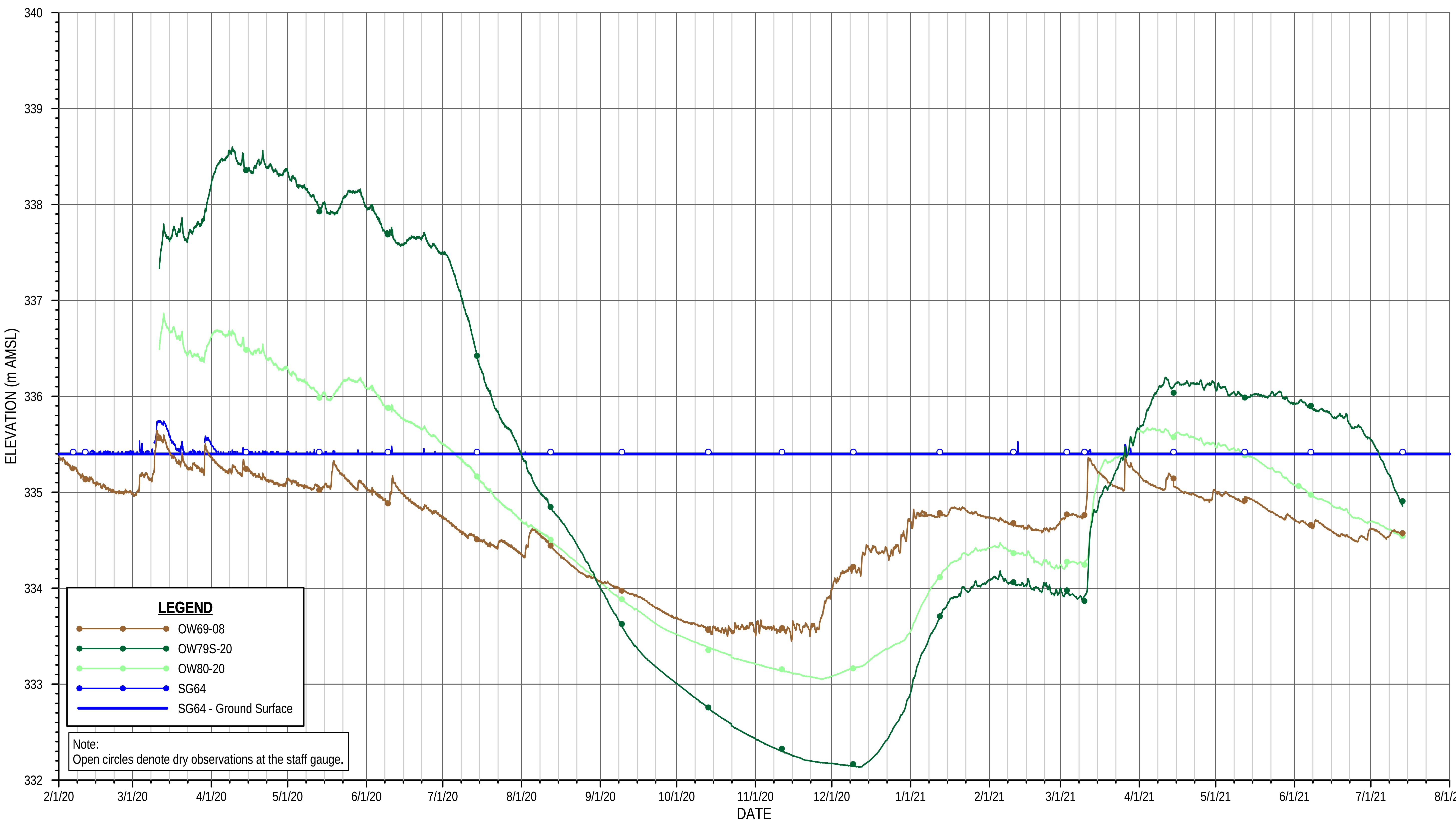


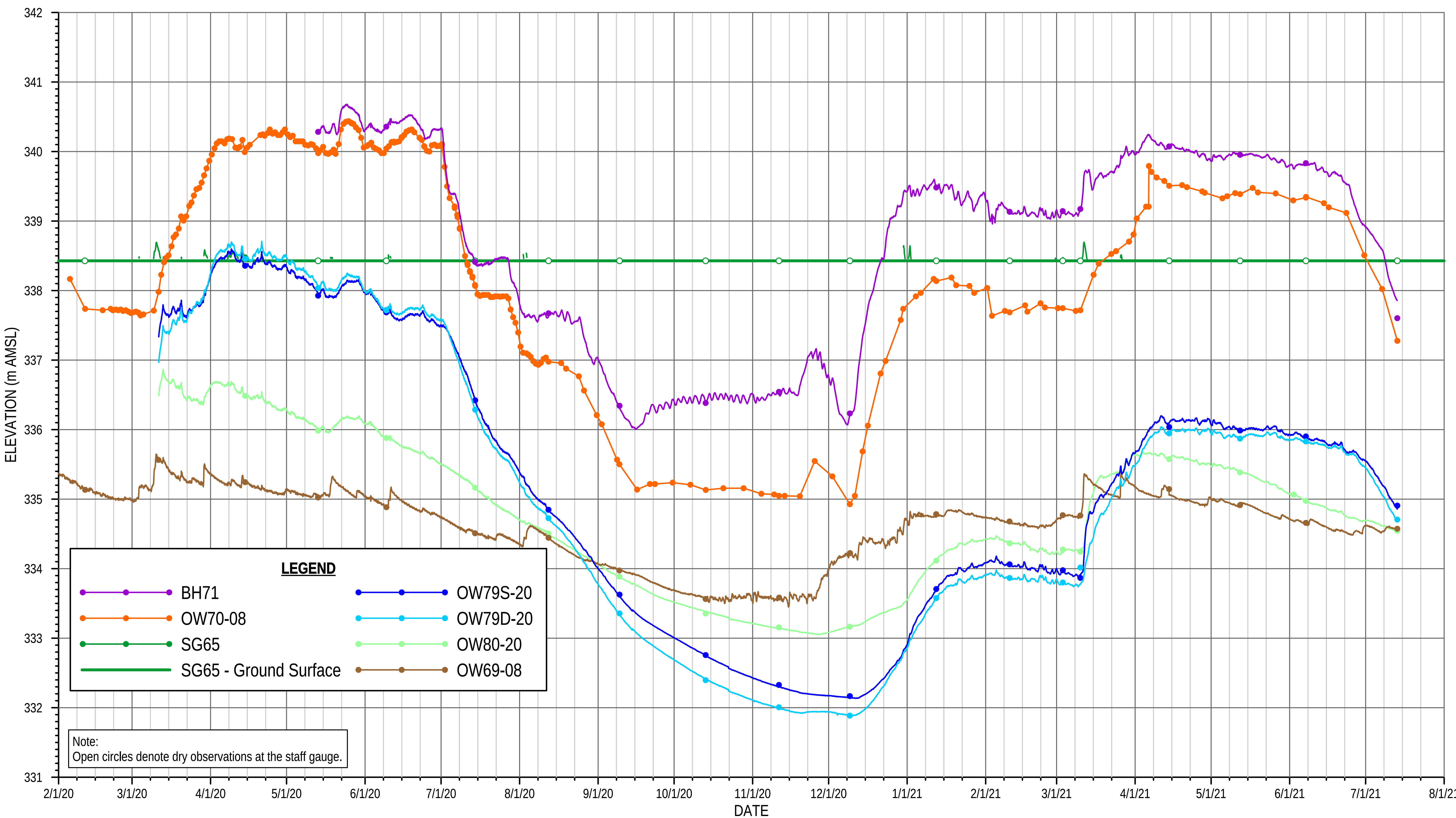
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978
Date September 2021

HYDROGRAPH - WETLAND W56

FIGURE 6.14

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Figure 6.14 - W56.grf
Plot Date: September 17 2021 11:09 AM



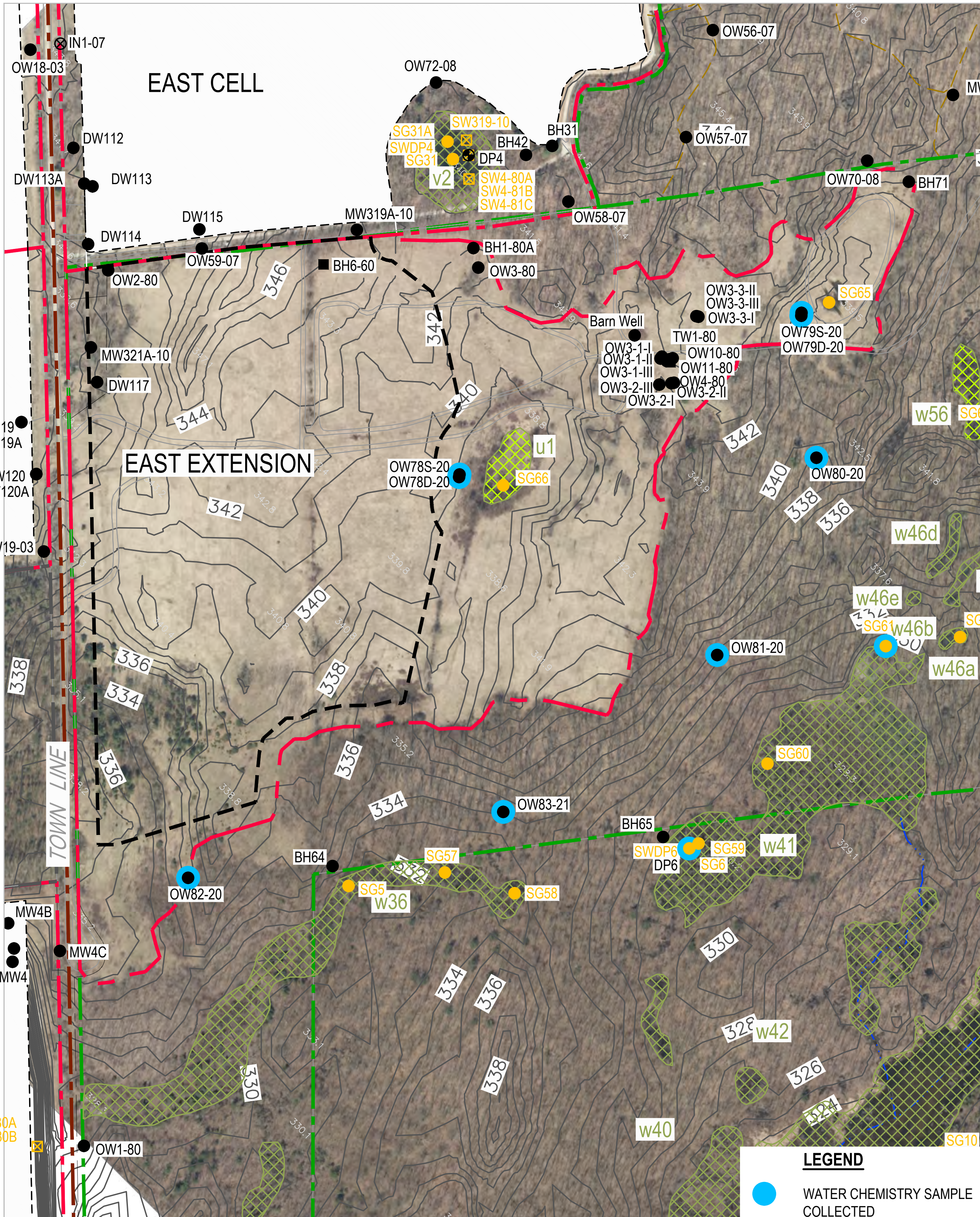
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH
LOW-LYING AREA IN EAST LOBE

Project No. **10978**
Date **September 2021**

FIGURE 6.15

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Figure 6.15 - East Lobe.grf
Plot Date: September 17 2021 11:09 AM



0 50 100 150m

1:5000

Coordinate System:
UTM17m NAD27

N

GHD

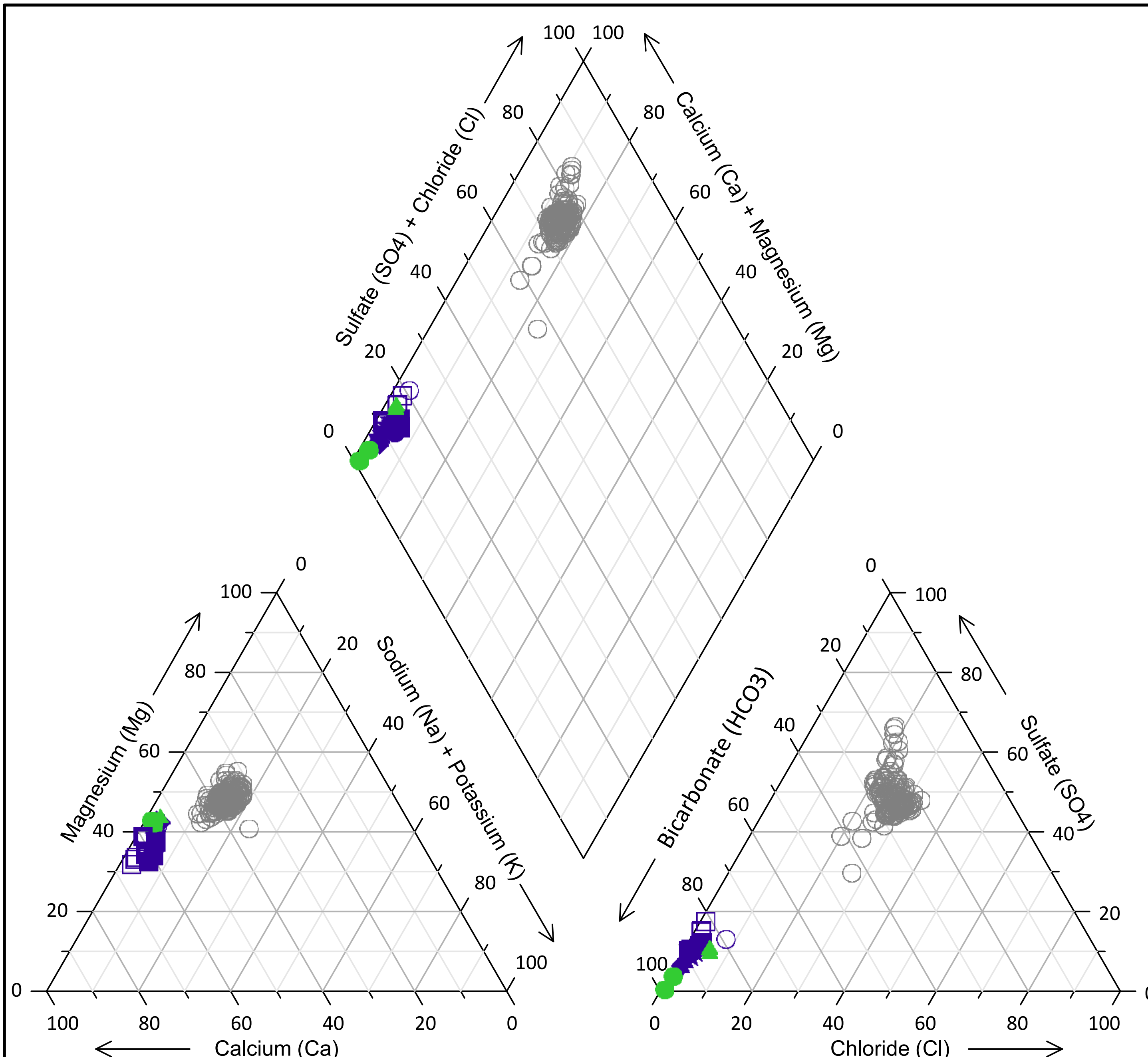
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

2021 MQEE BASELINE
WATER CHEMISTRY
SAMPLING LOCATIONS

Project No. **10978**
Date **December 2021**

FIGURE 7.1

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA029.dwg
Plot Date: 07 December 2021 2:46 PM



LEGEND

SW52B - Reservoir Outfall
9/2006 to 12/2020

East Extention Observation Wells
OW78S-20
OW78D-20
OW79S-20
OW79D-20
OW80-20
OW81-20
OW82-20
OW83-21

Wetland W41
SG6
SG61

NOTE:
MQEE GROUNDWATER AND SURFACE WATER SAMPLES
COLLECTED FEBRUARY AND JUNE 2021

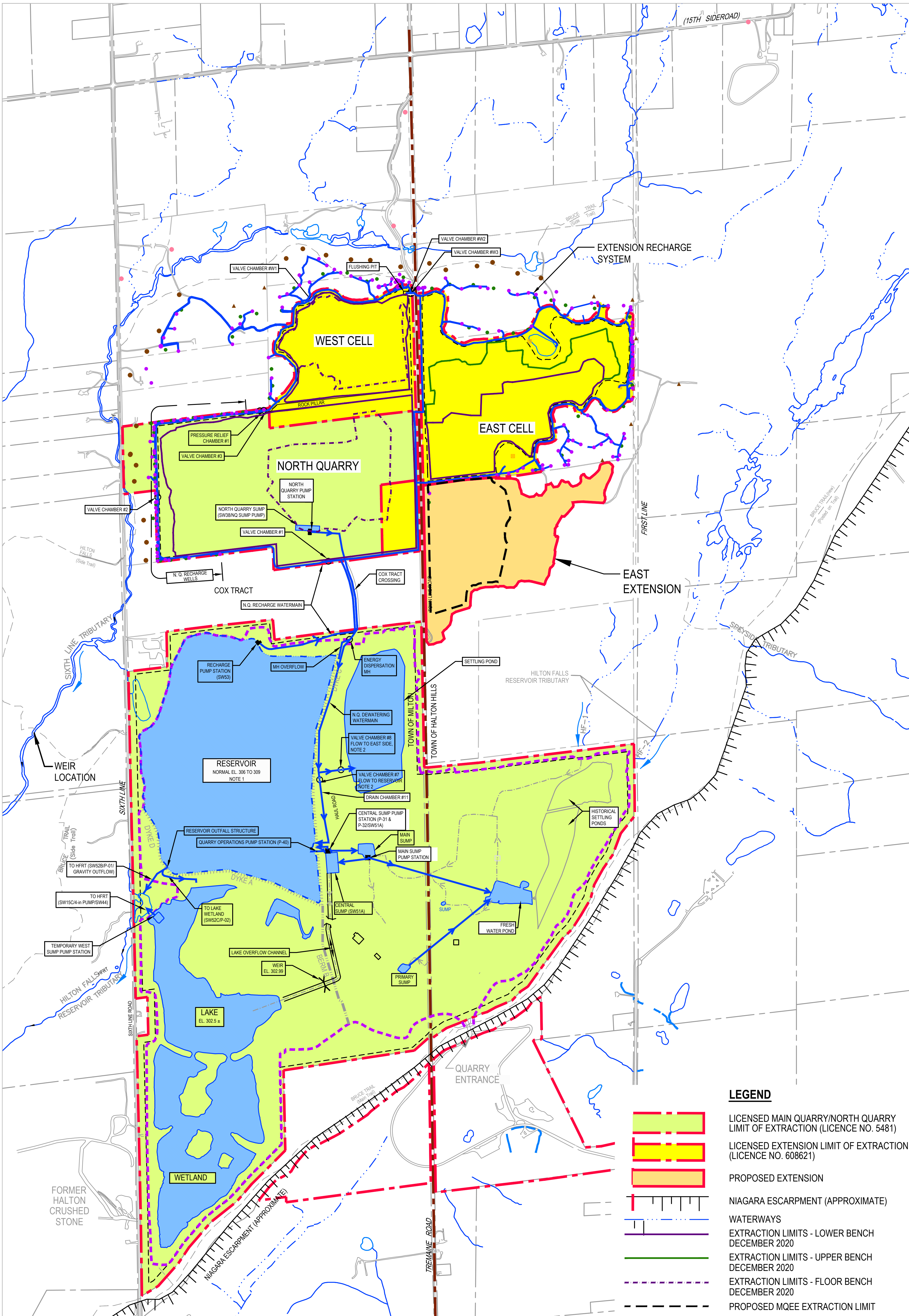
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

10978-304
July 16, 2021

RESERVOIR AND EAST EXTENSION GEOCHEMICAL DATA
PIPER PLOT

FIGURE 7.2

HG file: \\ghdnet\ghd\CA\Waterloo\Legacy\Hg\010,000 to 014,999\10978\10978-304-03 - geochem eval\Piper\10287-SW52B-EE locs.grf



SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES

0 150 300 450m

Coordinate System: UTM17m NAD27

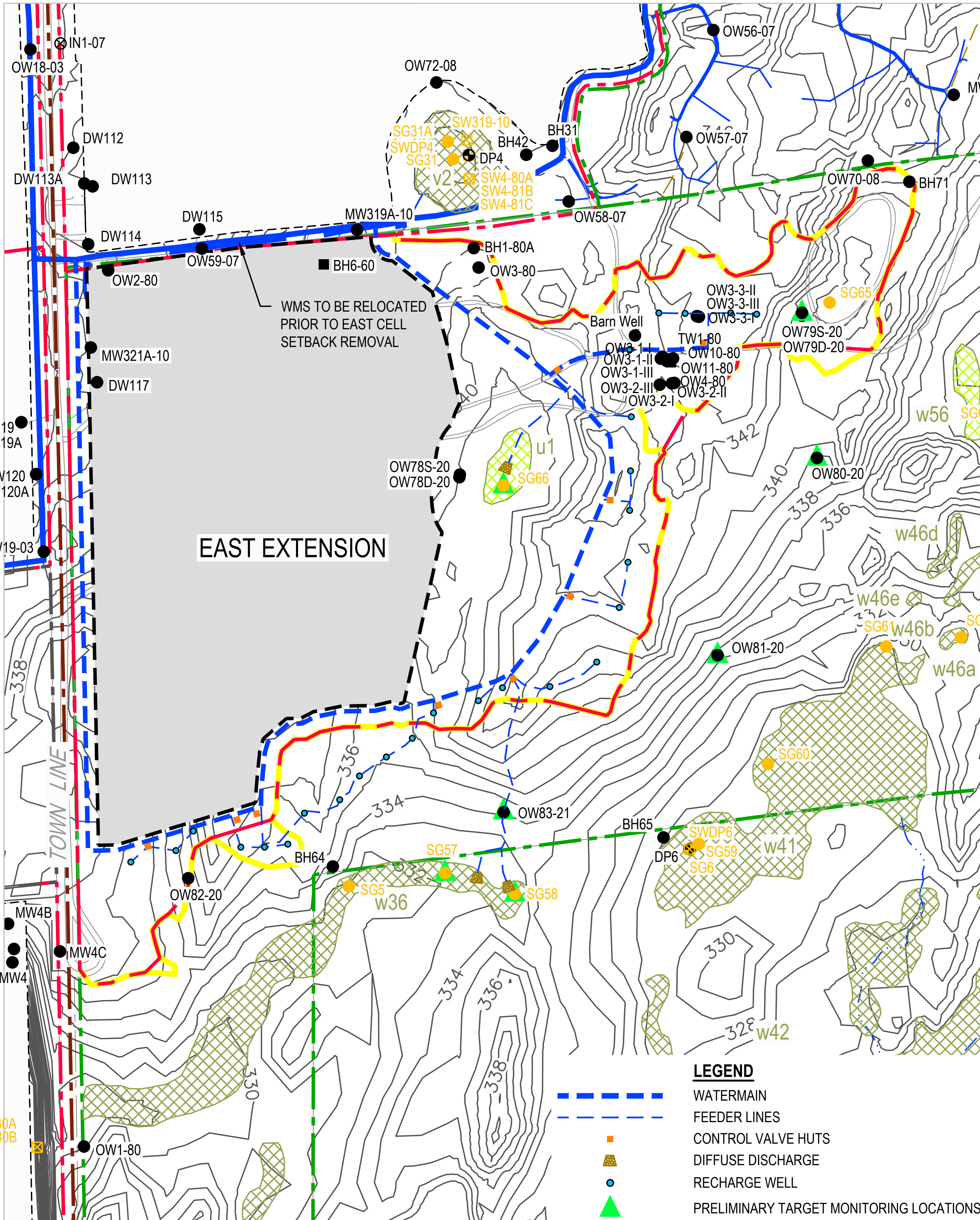
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

EXISTING CONDITIONS AND WATER MANAGEMENT SYSTEM OVERVIEW

FIGURE 8.1

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA011.dwg
Plot Date: 07 December 2021 2:40 PM



0 50 100 150m

1:5000

Coordinate System:
UTM17m NAD27

N

GHD

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

PROPOSED MQEE INTERIM WATER MANAGEMENT SYSTEM LAYOUT

Project No. **10978**
Date **December 2021**

FIGURE 9.1

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA027.dwg
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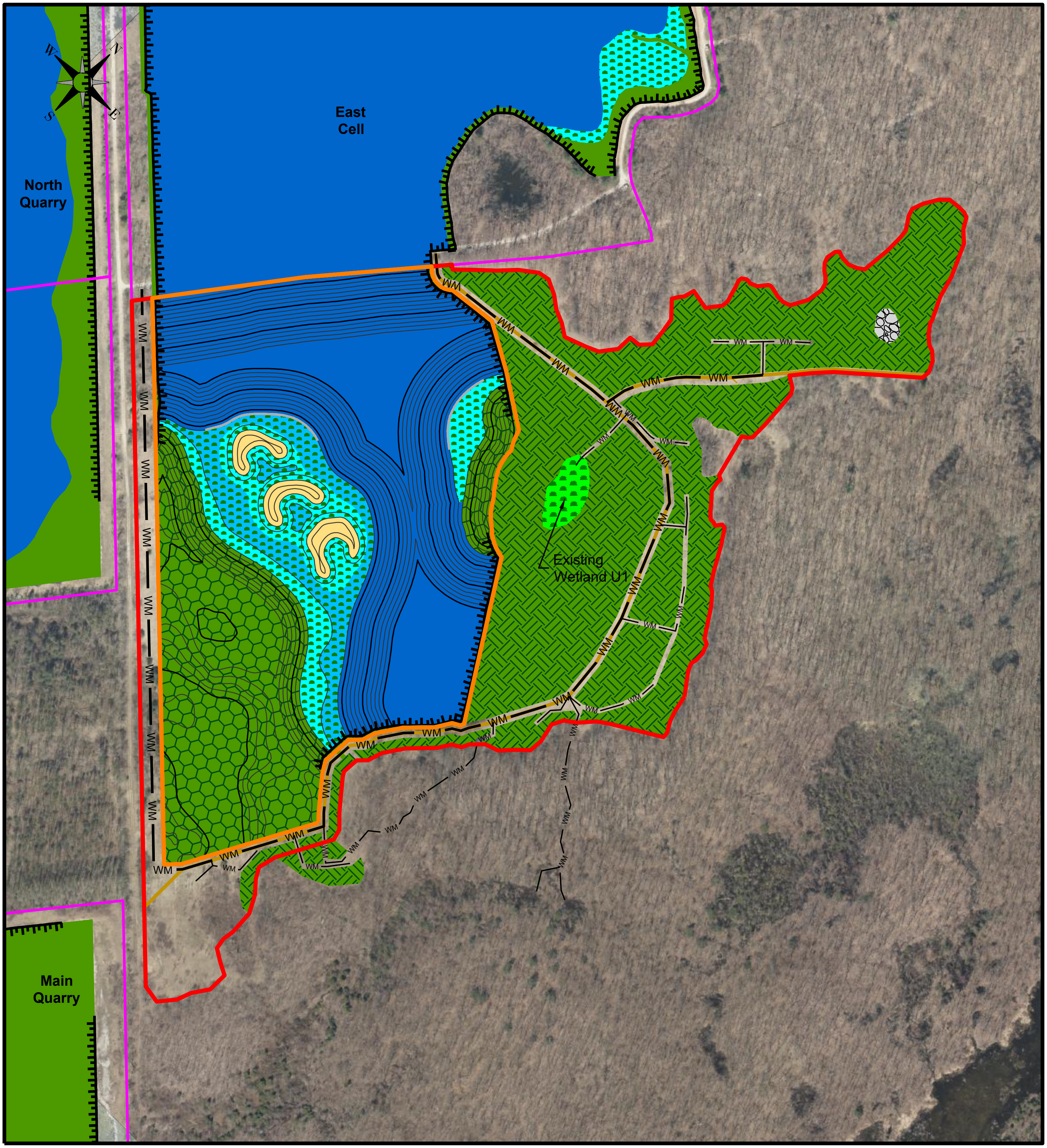


Figure 9.2

Rehabilitation and Ecological Enhancement Plan Schematic

Milton Quarry East Extension

Part of Lots 11 and 12, Concession 1
(Geographic Township of Esquesing)
Town of Halton Hills
Regional Municipality of Halton

Legend

- Proposed Milton Quarry East Extension - Licence Boundary
- Proposed Milton Quarry East Extension - Limit of Extraction
- Main Watermain / Service Access
- Feeder Line
- Rocky Shoal
- Shallow / Deep Wetland
- Deep Lake
- Islands
- Forested Area: Within Extraction Limit
- Forested Area: Outside Extraction Limit
- Snake Hibernaculum
- Cliff Face

Date December 2021

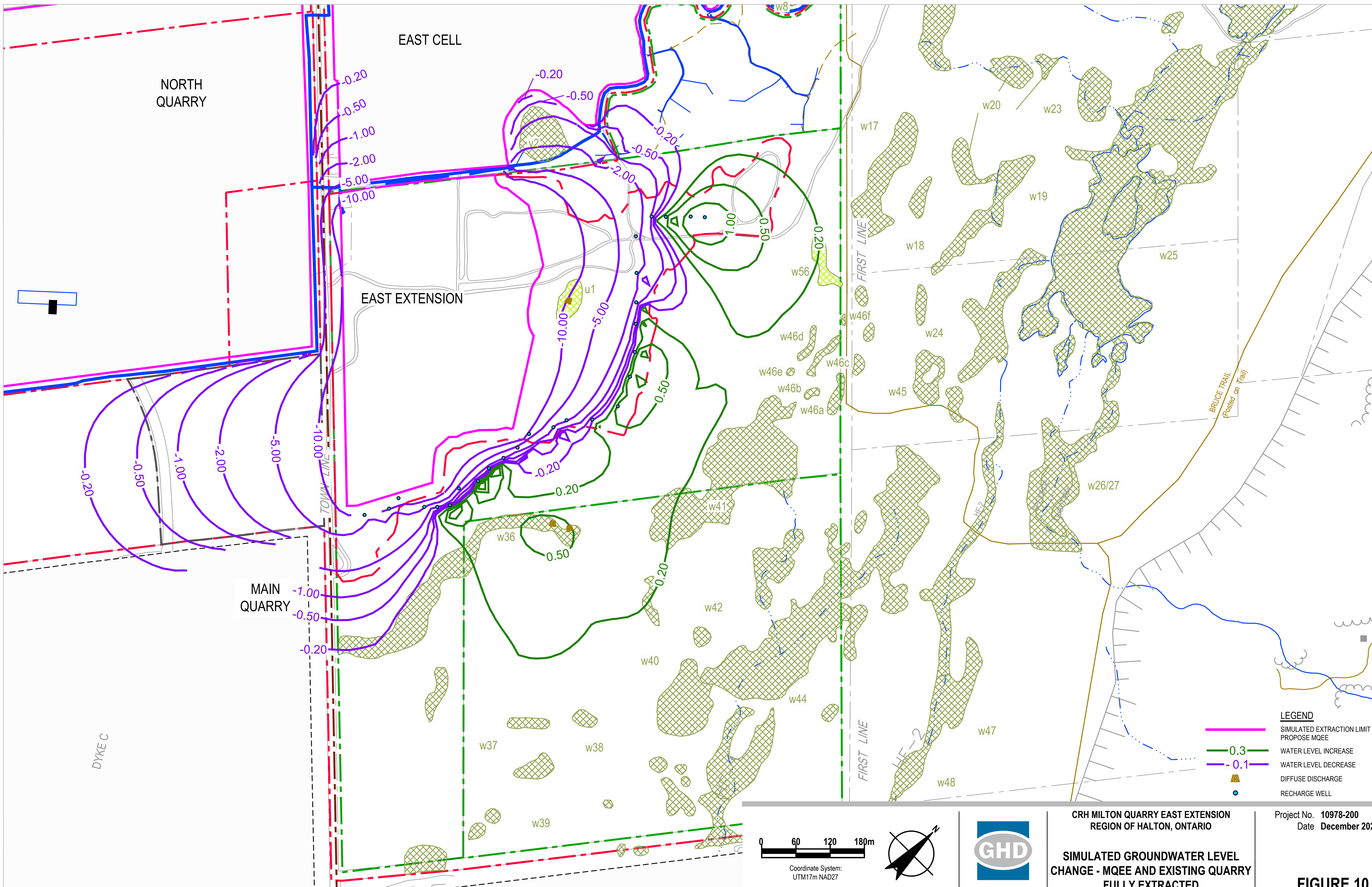
Sources
Milton Quarry East Extension Rehabilitation Plan prepared by MHBC dated December 2021

Scale - 1:5000

0 75 150 Meters

N:\Brian\9061DJ Dufferin - Milton Quarry East Extension\Drawings - Must be in NAD 27\Planning Report Figures and Schedules\AutoCAD - UTM NAD27\9061DJ - Figures 3 to 5 - Limit of Extraction and Schematics.dwg

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE



GHD

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

SIMULATED GROUNDWATER LEVEL CHANGE - MQEE AND EXISTING QUARRY FULLY EXTRACTED

FIGURE 10.1

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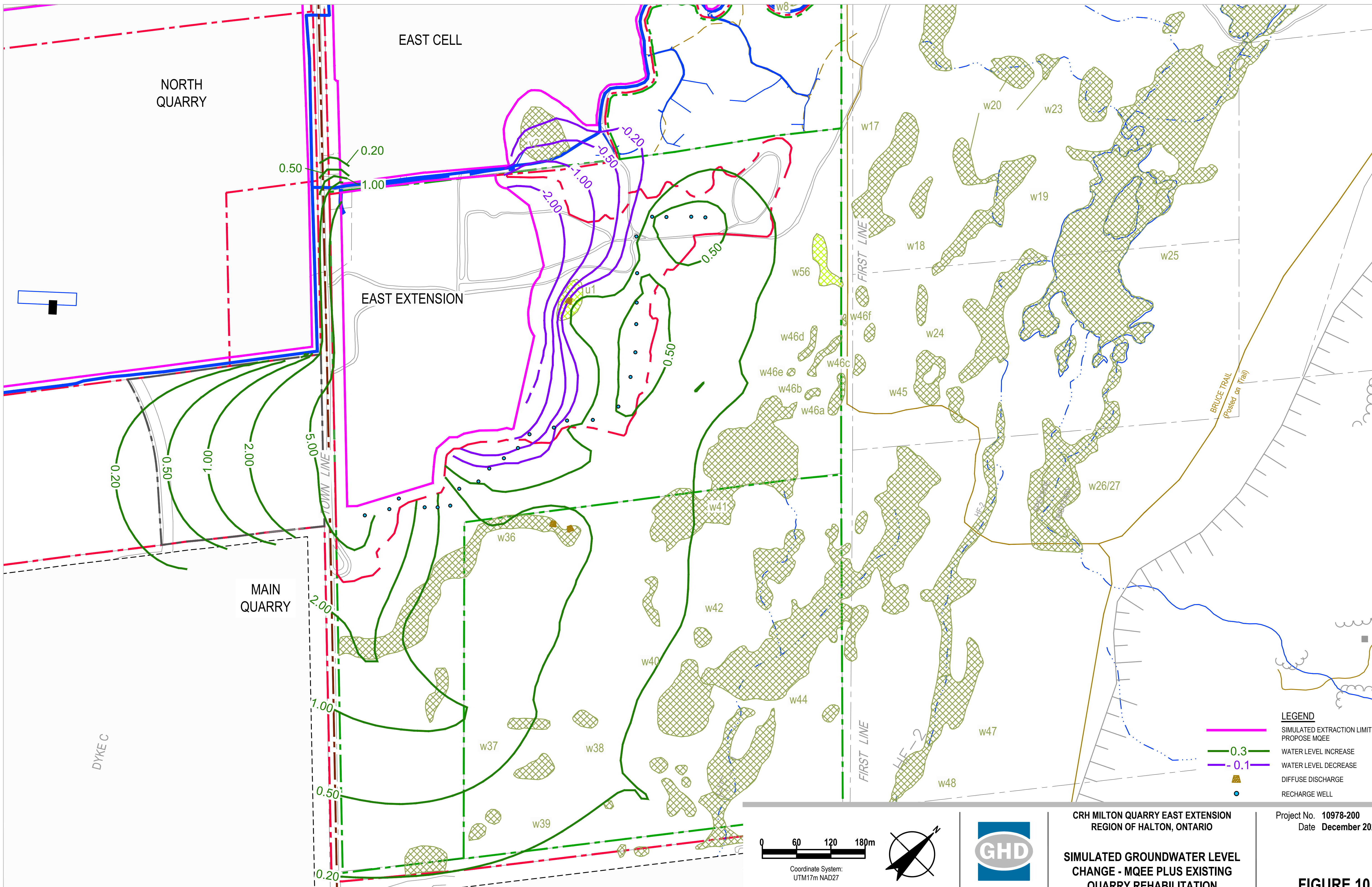


CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

SIMULATED GROUNDWATER LEVEL CHANGE - MQEE PLUS EXISTING QUARRY REHABILITATION

FIGURE 10.2

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(164)\010978(RPT164)GN-WA033.dwg
Plot Date: 07 December 2021 2:47 PM

Table 2.1

Reported Hydraulic Conductivity Values of Amabel
Milton Quarry East Extension
Region of Halton, Ontario

Location	Hydraulic Conductivity (cm/s)		Test Method	Source
	Range	Mean		
Acton Quarry	1.0×10^{-6} to 2×10^{-3}	2×10^{-4}	Packer and Constant Head	Dixon et al., 1989 and 1990
Milton Quarry	10^{-5} to 10^{-2}	10^{-4} - 10^{-3}	Various	Various
Halton Region	4.6×10^{-4} to 3.5×10^{-3}	2×10^{-3}	-	Holysh, 1997
Blue Springs Creek Area	5.0×10^{-4} to 6×10^{-2}	3×10^{-2}	Pumping Tests	Coward and Barouch, 1979
City of Guelph (Guelph Amabel)	6.0×10^{-6} to 9×10^{-2}	1×10^{-3}	Various	Various

Table 2.2

Reported Hydraulic Conductivity Values of Geologic Units Below Amabel
Milton Quarry East Extension
Region of Halton, Ontario

Formation	**Hydraulic Conductivity (cm/s)**	
	Range	**Mean**
Reynales	2×10^{-7} to 2×10^{-3}	6×10^{-5}
Cabot Head	4×10^{-11} to 4×10^{-4}	3×10^{-6}
Manitoulin	4×10^{-9} to 1×10^{-5}	5×10^{-6}
Whirlpool	2×10^{-4} to 3×10^{-4}	3×10^{-4}
Queenston	5×10^{-8} to 7×10^{-7}	2×10^{-7}

Source – Dixon et al., 1989 and 1990

Table 4.1

Stratigraphic Contacts Summary
Milton Quarry East Extension
Region of Halton, Ontario

Location	NAD 83 Easting (m)	NAD 83 Northing (m)	NAD 27 Easting (m)	NAD 27 Northing (m)	Ground Surface Top Elevation (m)	Overburden Thickness (m)	Top of Amabel Elevation (m)	Amabel Thickness (m)	Top of Reynales Elevation (m)	Reynales Thickness (m)	Top of Cabot Head Elevation (m)
BARN WELL	--	--	583105	4822692	--	--	--	--	--	--	--
BH14-I	--	--	583840	4821815	329.80	0.30	329.50	24.30	305.20	2.40	302.80
BH1-80A	--	--	582937.4079	4822642.1994	341.10	--	--	--	--	--	--
BH4-60	--	--	583238.0512	4823065.6146	339.414	1.22	338.20	30.18	308.02	--	--
BH5-60	--	--	583639.2759	4822630.5802	331.852	0.61	331.24	25.30	305.94	--	--
BH64	--	--	583259.248	4822130.45	333.52	1.10	332.42	--	--	--	--
BH65	--	--	583462.537	4822372.919	329.02	1.80	327.22	--	--	--	--
BH66	--	--	583676.568	4822633.305	328.83	1.10	327.73	--	--	--	--
BH6-60	--	--	582847.3738	4822530.2174	344.925	0.30	344.62	37.58	307.04	--	--
BH67	--	--	583305.037	4823042.032	336.26	2.00	334.26	27.00	307.26	2.40	304.86
BH6-I	--	--	583520	4821495	323.80	0.30	323.50	18.60	304.90	2.40	302.50
BH71	--	--	583186.252	4822980.506	341.78	1.60	340.18	30.80	309.38	--	--
BH72	--	--	583901.969	4822360.095	325.28	0.30	324.98	19.20	305.78	1.20	304.58
BH7-60	--	--	583533.6868	4821537.1022	324.855	0.30	324.55	21.03	303.52	--	--
DP6	--	--	583487.808	4822382.616	328.28	--	--	--	--	--	--
DP7	--	--	583321.844	4823086.707	334.99	--	--	--	--	--	--
DW119	582762.95917	4822441.10492	582751.29817	4822219.34792	335.50	--	--	--	--	--	--
DW119A	582762.95917	4822441.10492	582751.29817	4822219.34792	335.50	--	--	--	--	--	--
DW120	582807.96012	4822416.10542	582796.29912	4822194.34842	335.00	--	--	--	--	--	--
DW120A	582807.96012	4822416.10542	582796.29912	4822194.34842	335.00	--	--	--	--	--	--
DW121	583112.96931	4822081.10921	583101.30831	4821859.35221	333.00	--	--	--	--	--	--
MW319A-10	--	--	582846.55	4822575.85	343.10	1.37	341.73	35.21	306.52	2.74	303.78
MW321A-10	--	--	582746.423	4822317.266	340.19	1.52	338.67	33.53	305.14	3.05	302.09
MW4	--	--	583108	4821850	335.70	0.90	334.80	--	--	--	--
MW4B	--	--	583079.021	4821873.115	338.35	1.83	336.525	--	--	--	301.78
MW4C	--	--	583132.628	4821889.333	336.41	0.76	335.65	--	--	--	--
OW10-80	--	--	583146.088	4822702.24	343.81	1.52	342.29	--	--	--	--
OW11-80	--	--	583144.556	4822699.465	343.58	1.52	342.06	35.36	306.70	2.44	304.26
OW1-80	--	--	583280.269	4821774.027	329.84	1.07	328.77	--	--	--	--
OW19-03	--	--	582852.38	4822147.86	342.36	2.44	339.92	--	--	--	302.43
OW2-80	--	--	582706.086	4822380.952	341.50	1.37	340.13	--	--	--	--
OW3-1-I	--	--	583137.733	4822696.116	343.20	1.19	342.00	--	--	--	--
OW3-2-I	--	--	583162.037	4822684.517	342.24	1.20	341.04	--	--	--	--
OW3-3-I	--	--	583135.432	4822747.645	344.89	0.90	343.99	--	--	--	--
OW3-80	--	--	582953.83	4822632.33	342.54	0.30	342.24	--	--	--	--
OW4-80	--	--	583143.908	4822696.321	343.42	0.91	342.51	--	--	--	--
OW58-07	--	--	582970.021	4822737.543	340.95	1.83	339.12	--	--	--	305.59
OW59-07	--	--	582754.594	4822458.741	343.75	3.36	340.39	--	--	--	303.82
OW69-08	--	--	583428.04	4822886.51	335.86	1.52	334.34	28.65	305.69	0.92	304.77
OW70-08	--	--	583144.03	4822966.68	342.93	1.29	341.64	35.29	306.35	0.91	305.44
OW78D-20	--	--	583082.2	4822478.115	339.051	2.13	336.92	32.31	304.61	2.40	302.21
OW78S-20	--	--	583080.713	4822480.148	338.994	0.91	338.08	--	--	--	--
OW79D-20	--	--	583204.16	4822817.67	340.757	1.07	339.69	32.83	306.86	2.40	304.46

Table 4.1

Stratigraphic Contacts Summary
Milton Quarry East Extension
Region of Halton, Ontario

Location	NAD 83 Easting (m)	NAD 83 Northing (m)	NAD 27 Easting (m)	NAD 27 Northing (m)	Ground Surface Top Elevation (m)	Overburden Thickness (m)	Top of Amabel Elevation (m)	Amabel Thickness (m)	Top of Reynales Elevation (m)	Reynales Thickness (m)	Top of Cabot Head Elevation (m)
OW79S-20	--	--	583202.32	4822819.738	340.739	1.22	339.52	--	--	--	--
OW80-20	--	--	583310.122	4822732.061	339.035	0.61	338.42	30.78	307.64	2.40	305.24
OW81-20	--	--	583376.221	4822532.091	335.590	0.61	334.98	27.92	307.06	2.40	304.66
OW82-20	--	--	583169.763	4822025.09	337.123	0.46	336.66	30.66	306.00	2.40	303.60
OW83-21	--	--	583337.81	4822282.04	335.547	0.61	334.94	28.65	306.29	--	--
SG10	--	--	583861.993	4822358.696	--	--	--	--	--	--	--
SG5	--	--	583283.404	4822127.839	331.83	--	--	--	--	--	--
SG6	--	--	583488.386	4822383.735	328.37	--	--	--	--	--	--
SG7	--	--	583321.851	4823088.218	335.00	--	--	--	--	--	--
TP01-20	--	--	582738.52	4822372.93	342.187	1.22	340.97	--	--	--	--
TP02-20	--	--	582779.532	4822423.603	344.201	1.52	342.68	--	--	--	--
TP03-20	--	--	582822.489	4822476.871	346.460	3.05	343.41	--	--	--	--
TP04-20	--	--	582824.123	4822377.119	346.994	3.05	343.94	--	--	--	--
TP05-20	--	--	582872.236	4822425.593	343.827	1.22	342.61	--	--	--	--
TP06-20	--	--	582925.451	4822475.214	342.365	1.83	340.54	--	--	--	--
TP07-20	--	--	582824.152	4822275.807	340.807	1.52	339.29	--	--	--	--
TP08-20	--	--	582868.812	4822329.034	343.399	2.44	340.96	--	--	--	--
TP09-20	--	--	582924.718	4822376.42	342.429	1.52	340.91	--	--	--	--
TP10-20	--	--	583026.925	4822475.286	341.150	0.91	340.24	--	--	--	--
TP11-20	--	--	582873.03	4822222.402	342.049	3.66	338.39	--	--	--	--
TP12-20	--	--	582926.311	4822276.575	341.446	3.51	337.94	--	--	--	--
TP13-20	--	--	582977.337	4822324.942	342.879	1.32	341.56	--	--	--	--
TP14-20	--	--	583022.805	4822373.019	340.324	1.83	338.49	--	--	--	--
TP15-20	--	--	582925.607	4822174.477	339.546	3.05	336.50	--	--	--	--
TP16-20	--	--	583023.641	4822274.225	340.964	0.91	340.05	--	--	--	--
TP17-20	--	--	583122.51	4822373.042	340.317	0.91	339.41	--	--	--	--
TP18-20	--	--	583127.347	4822274.94	338.632	0.91	337.72	--	--	--	--
TP19-20	--	--	583211.657	4822291.505	336.633	1.22	335.41	--	--	--	--
TP20-20	--	--	583138.702	4822180.766	338.792	0.61	338.18	--	--	--	--
TP21-20	--	--	583024.961	4822175.861	338.818	0.91	337.91	--	--	--	--
TP22-20	--	--	582993.339	4822121.244	334.885	3.35	331.54	--	--	--	--
TP26-20	--	--	583196.544	4822861.958	340.552	1.13	339.42	--	--	--	--
TP27-20	--	--	583231.33	4822859.248	339.813	3.05	336.76	--	--	--	--
TP28-20	--	--	583210.396	4822852.744	339.227	2.35	336.88	--	--	--	--
TP29-20	--	--	583211.982	4822834.531	339.559	2.47	337.09	--	--	--	--
TP30-20	--	--	582876.715	4822575.691	343.000	0.61	342.39	--	--	--	--
TP32-20	--	--	583022.679	4822603.654	340.279	0.61	339.67	--	--	--	--
TP33-20	--	--	583122.922	4822619.377	341.649	1.74	339.91	--	--	--	--
TP34-20	--	--	583211.409	4822577.447	343.137	0.52	342.62	--	--	--	--
TP35-20	--	--	583255.183	4822499.709	342.281	1.22	341.06	--	--	--	--
TP36-20	--	--	583244.293	4822385.648	341.828	2.44	339.39	--	--	--	--
TW1-80	--	--	583147.299	4822698.172	343.44	--	--	--	--	--	--

Table 4.2

Summary of Overburden Grain-Size Analysis Results
Milton Quarry East Extension
Region of Halton, Ontario

Test Pit No.	Sample [(1)] No.	Depth (m)	Grain Size Distribution Gravel %	Sand %	Clay/Silt %	Soil Description
TP01-20`	GS1	0.00m - 0.30m	5	68	27	silty-clayey sand, trace gravel
TP01-20	GS2	0.61m - 1.22m	17	43	40	sand and silt-clay, some gravel
TP02-20	GS2	0.33m - 1.07m	58	33	9	sandy gravel, trace silt-clay
TP02-20	GS3	1.07m - 1.52m	10	25	65	sandy silt, some clay, some gravel
TP04-20	GS2	0.30m - 3.05m	29	44	27	gravelly, silty-clayey sand
TP06-20	GS2	0.30m - 1.83m	40	36	24	silty-clayey gravel and sand
TP07-20	GS1	0.00m - 0.30m	7	68	25	silty-clayey sand, trace gravel
TP11-20	GS2	0.61m - 3.66m	26	49	25	gravelly, silty-clayey sand
TP12-20	GS2	0.30m - 2.13m	28	45	27	gravelly silty sand, trace clay
TP14-20	GS2	0.30m - 1.52m	20	37	43	gravelly sand and silt-clay
TP16-20	GS2	0.91m	6	41	53	sand and silty-clay, trace gravel
TP22-20	GS2	1.83m	10	38	52	silt and sand, some gravel, trace clay
TP28-20	Soil Pile	Composite	24	41	35	silty gravelly sand, trace clay
TP31-20	Soil Pile	0.43m - 0.95m	7	43	50	sand and silt-clay, trace gravel

Note:

(1) Fourteen representative samples were submitted for analysis from the larger number of samples collected during the test pitting process.

Table 5.1

Annual Precipitation Summary
Milton Quarry East Extension
Region of Halton, Ontario

Year	Supplemented Milton Quarry Precipitation Data (mm) (1)	Supplemented Georgetown WWTP Precipitation Data (mm)
1991	871	909
1992	1077	1066
1993	814	789
1994	913	823
1995	983	953
1996	1008	1061
1997	724	776
1998	691	753
1999	869	849
2000	994	997
2001	730	770
2002	671	613
2003	829	808
2004	775	752
2005	810	781
2006	983	977
2007	627	614
2008	1004	1024
2009	893	916
2010	861	864
2011	1038	1001
2012	772	756
2013	971	1037
2014	875	817
2015	794	763
2016	767	738
2017	966	961
2018	917	798
2019	911	958
29-Year Mean (1991 to 2019)	867	859
138-Year Mean (1882 to 2019)	N/A	830

Note:

(1) The Milton Quarry rain gauge is typically closed for the winter months each year (December through March). Acton WWTP and Georgetown WWTP data was used to supplement the missing months of the Milton Quarry data.

Table 5.2

Annual Lake Evaporation Summary
Milton Quarry East Extension
Region of Halton, Ontario

Year	Measured Milton Quarry Lake Evaporation (mm) (1)	Supplemented Milton Quarry Lake Evaporation (mm) (2)
1991	674	778
1992	549	675
1993	527	663
1994	605	757
1995	639	759
1996 (3)	-	-
1997 (3)	-	-
1998 (3)	-	-
1999 (3)	-	-
2000	573	684
2001	647	766
2002	632	717
2003	625	706
2004	592	676
2005	587	680
2006	566	630
2007	637	730
2008	588	631
2009	569	606
2010	568	632
2011	602	698
2012	562	654
2013	468	570
2014	535	607
2015	571	654
2016	598	653
2017	506	594
2018	535	625
2019	430	556
29-Year Mean (1991 to 2019)	575	668
138-Year Mean (1882 to 2019)	N/A	N/A

Notes:

(1) Annual evaporation values for 1991 to 1998 are as reported in the Dames & Moore Canada 1998 Annual Monitoring Report. Reliable evaporation data was not available during 1996 to 1999. From 2001 onward, when Site evaporation data have been unavailable, the resulting data gaps have been addressed by using the historical average evaporation data for the Site.
(2) Over-winter evaporation is estimated to be 154 mm and is added to measured lake evaporation data from May to October. Per analysis presented in the 5-year AMP Report.
(3) Evaporation pan was not operating. Lake evaporation values could not be determined.

Table 6.1

Summary of Hydraulic Conductivity Tests – Amabel Formation
Milton Quarry East Extension
Region of Halton, Ontario

Test	Range of Hydraulic Conductivities (cm/s)	Geometric Mean of Hydraulic Conductivities (cm/s)	Thiem Analysis (cm/s)
Packer Tests			
Nadon & Gale	1.1E-05 - 5.7E-03	1.4E-03	not available
1989-1990 Single Well Response Tests	8.1E-07 - 3.7E-05	1.7E-05	not available
1997-1998 Single Well Response Tests	8.6E-05 - 6.5E-04	2.4E-04	not available
Pumping Tests			
PW1	3.2E-03 - 5.8E-03	4.4E-03	2.9E-03
PW2	1.2E-03 - 1.0E-02	3.2E-03	2.0E-03
TW1-80 (1999)	1.6E-04 - 7.0E-03	2.7E-03	1.4E-03
DQ-4	1.0E-03 - 3.0E-03	not available	not available

Table 7.1

Summary of Groundwater Quality Data
Milton Quarry East Extension
Region of Halton, Ontario

Sample Location:						OW78D-20	OW78D-20	OW78D-20	OW78S-20	OW78S-20	OW78S-20	OW79D-20	OW79S-20	OW80-20	OW80-20	OW81-20	OW81-20	OW82-20	OW82-20	OW83-21	OW83-21
Sample ID:						GW-10978-021821-RC-001	GW-10978-021821-RC-002	GW-10978-060221-RC-06	GW-10978-021821-RC-003	GW-10978-060221-RC-04	GW-10978-060221-RC-05	GW-10978-021821-RC-006	GW-10978-021821-RC-005	GW-10978-021821-RC-004	GW-10978-060221-RC-07	GW-10978-021921-RC-007	GW-10978-060221-RC-02	GW-10978-021921-RC-009	GW-10978-060221-RC-03	GW-10978-021921-RC-008	GW-10978-060221-RC-01
Sample Date:						2/18/2021	2/18/2021 (Duplicate)	6/2/2021	2/18/2021	6/2/2021	6/2/2021 (Duplicate)	2/18/2021	2/18/2021	2/18/2021	6/2/2021	2/19/2021	6/2/2021	2/19/2021	6/2/2021	2/19/2021	6/2/2021
Parameters	**Units**	**ODWQS**	**Historical Range[3]**	**WMS Range[4]**	**Current GW Range[5] February-June, 2021**																
Field Parameters																					
pH, Field	s.u.	6.5-8.5	7.3 - 7.9	7.07 - 8.93	6.68 - 7.71	7.00	7.00	7.30	6.68	7.04	7.04	7.46	7.45	7.71	7.34	7.27	7.21	7.33	7.42	7.40	6.75
Temperature, Field	Deg C	-	-	-	-	8.0	8.0	11.0	8.1	10.2	10.2	7.5	7.2	7.1	10.3	5.9	10.1	7.9	10.7	7.8	10.6
Metals																					
Aluminum (Dissolved)	mg/L	0.1[2]	-	0.01 - 0.275	0.0071 - 0.0317	0.0074	0.0106	0.0317	ND (0.0050)	ND (0.0050)	ND (0.0050)	0.0071	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050)
Antimony (Dissolved)	mg/L	0.006	-	0.00011 - 0.00052	0.00011 - 0.00018	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	0.00015	0.00015	ND (0.00010)	ND (0.00010)	0.00011	ND (0.00010)	0.00018	0.00018	ND (0.00010)	0.00011	0.00014	0.00011
Arsenic (Dissolved)	mg/L	0.01	-	0.00097 - 0.017	0.00019 - 0.00456	0.00305	0.00306	0.00278	0.00345	0.00084	0.00085	0.00456	0.00019	0.00041	0.00039	0.00096	0.00055	0.00411	0.00052	0.00107	0.00139
Barium (Dissolved)	mg/L	1	-	0.00605 - 0.0373	0.0296 - 0.464	0.143	0.138	0.143	0.464	0.341	0.334	0.127	0.0296	0.0455	0.0509	0.0911	0.0654	0.0950	0.0637	0.0652	0.0424
Beryllium (Dissolved)	mg/L	-	-	-	-	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Bismuth (Dissolved)	mg/L	-	-	-	-	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)
Boron (Dissolved)	mg/L	5	-	0.054 - 0.23	0.01 - 0.056	0.039	0.041	0.036	0.014	0.011	0.011	0.010	0.013	0.012	0.012	0.014	0.010	0.056	0.011	0.016	0.020
Cadmium (Dissolved)	mg/L	0.005	-	0.000014 - 0.00113	0.0000059 - 0.000188	ND (0.0000050)	ND (0.0000050)	ND (0.0000050)	0.0000478	0.000188	0.000179	ND (0.0000050)	0.0000875	0.0000683	0.0000555	0.0000059	0.0000461	0.0000169	0.0000810	0.0000626	0.0000633
Caesium (Dissolved)	mg/L	-	-	-	-	0.000013	0.000012	0.000021	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)
Calcium (Dissolved)	mg/L	-	72.4 - 100	39.5 - 117	58.1 - 139	83.3	88.5	76.3	139	124	121	75.2	76.4	75.5	69.9	75.2	69.5	79.0	77.3	62.5	58.1
Chromium (dissolved)	mg/L	0.05	-	0.00052 - 0.00322	-	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Cobalt (Dissolved)	mg/L	-	-	0.0001 - 0.00075	0.00018 - 0.00331	ND (0.00010)	ND (0.00010)	ND (0.00010)	0.00331	0.00143	0.00141	0.00054	ND (0.00010)	0.00018	ND (0.00010)	0.00072	0.00075	0.00024	0.00018	0.00024	0.00040
Copper (Dissolved)	mg/L	1[1]	-	0.001 - 0.0027	0.00025 - 0.00186	ND (0.00020)	ND (0.00020)	0.00025	0.00096	0.00183	0.00186	ND (0.00020)	0.00126	0.00041	0.00049	0.00038	0.00040	0.00167	0.00056	0.00182	0.00033
Iron (Dissolved)	mg/L	0.3[1]	<0.02 - 0.09	0.05 - 0.46	0.019 - 0.764	0.097	0.094	0.087	**0.764**	0.068	0.066	0.096	ND (0.010)	ND (0.010)	ND (0.010)	0.037	0.019	0.081	ND (0.010)	ND (0.010)	0.019
Lead (Dissolved)	mg/L	0.01	-	0.00011 - 0.0003	0.000062 - 0.00137	ND (0.000050)	ND (0.000050)	ND (0.000050)	0.00113	0.000607	0.000546	ND (0.000050)	0.00137	0.000168	0.000174	0.000128	0.000216	0.000106	0.000157	0.000062	0.000067
Lithium (Dissolved)	mg/L	-	-	-	-	0.0035	0.0037	0.0039	0.0019	0.0025	0.0025	0.0017	ND (0.0010)	0.0011	0.0019	0.0013	0.0017	0.0050	ND (0.0010)	ND (0.0010)	0.0021
Magnesium (Dissolved)	mg/L	-	20.8 - 41.4	25.6 - 76.7	26.9 - 40.9	28.8	28.4	30.1	40.9	38.9	38.8	27.4	34.3	32.9	32.6	32.8	33.1	26.9	30.6	27.1	27.5
Manganese (Dissolved)	mg/L	0.05[1]	<0.01 - 0.04	0.001 - 0.021	0.0025 - 0.308	0.0153	0.0149	0.0113	**0.308**	**0.0809**	**0.0779**	0.0329	ND (0.00050)	0.00250	0.00253	0.00703	0.00512	0.0271	0.00889	0.00618	0.00399
Molybdenum (Dissolved)	mg/L	-	-	0.00151 - 0.00951	0.00137 - 0.00673	0.00247	0.00255	0.00232	0.00224	0.00155	0.00160	0.00482	0.00137	0.00222	0.00205	0.00294	0.00261	0.00673	0.00608	0.00443	0.00431
Nickel (Dissolved)	mg/L	-	-	0.00182 - 0.0102	0.00083 - 0.00605	ND (0.00050)	ND (0.00050)	ND (0.00050)	0.00605	0.00512	0.00489	0.00115	0.00086	0.00174	0.00083	0.00419	0.00411	0.00207	0.00398	0.00188	0.00242
Phosphorous (Dissolved)	mg/L	-	-	-	-	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Potassium (Dissolved)	mg/L	-	<1.0 - 4.0	2.4 - 7	0.637 - 5.22	4.62	4.48	4.54	5.22	4.61	4.58	0.940	0.637	0.964	0.967	2.25	1.84	1.75	0.725	4.43	3.83
Rubidium (Dissolved)	mg/L	-	-	-	-	0.00248	0.00243	0.00257	0.00181	0.00188	0.00184	0.00080	0.00079	0.00085	0.00081	0.00183	0.00138	0.00149	0.00077	0.00239	0.00183
Selenium (Dissolved)	mg/L	0.05	-	-	-	ND (0.000050)	ND (0.000050)	ND (0.000050)	0.000912	0.00203	0.00195	ND (0.000050)	0.000320	0.000175	0.000111	0.000446	0.000299	0.000113	0.000624	0.000476	0.000312
Silicon (Dissolved)	mg/L	-	-	0.1 - 1.3	2.26 - 4.25	3.75	3.73	3.65	4.25	3.59	3.61	3.55	2.69	2.75	2.71	2.84	2.63	3.24	2.53	2.30	2.26
Silver (Dissolved)	mg/L	-	-	-	-	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)
Sodium (Dissolved)	mg/L	200[1]	0.9 - 27.6	13.8 - 36	1.56 - 7.53	7.03	6.90	4.75	2.79	2.77	2.72	7.53	4.91	2.70	2.76	2.64	2.15	5.07	1.56	2.03	2.32
Strontium (Dissolved)	mg/L	-	-	0.691 - 2.78	0.0643 - 1.8	1.72	1.80	1.63	0.154	0.120	0.122	1.24	0.0643	0.186	0.191	0.221	0.151	1.46	0.230	0.206	0.209
Sulphur (Dissolved)	mg/L	-	-	-	6.11 - 31.7	13.9	13.7	13.2	31.7	23.4	23.5	11.1	15.3	10.2	9.68	7.98	6.11	12.0	10.9	6.42	6.19
Tellurium (Dissolved)	mg/L	-	-	-	-	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)
Thallium (Dissolved)	mg/L	-	-	-	-	ND (0.000010)	ND (0.000010)	0.000021	0.000291	0.000204	0.000208	0.000015	0.000058	0.000050	0.000042	0.000179	0.000106	0.000040	0.000081	0.000109	0.000121

Table 7.1

Summary of Groundwater Quality Data

Milton Quarry East Extension
Region of Halton, Ontario

Sample Location:						**OW78D-20**	**OW78D-20**	**OW78D-20**	**OW78S-20**	**OW78S-20**	**OW78S-20**	**OW79D-20**	**OW79S-20**	**OW80-20**	**OW80-20**	**OW81-20**	**OW81-20**	**OW82-20**	**OW82-20**	**OW83-21**	**OW83-21**
Sample ID:						**GW-10978-021821-RC-001**	**GW-10978-021821-RC-002**	**GW-10978-060221-RC-06**	**GW-10978-021821-RC-003**	**GW-10978-060221-RC-04**	**GW-10978-060221-RC-05**	**GW-10978-021821-RC-006**	**GW-10978-021821-RC-005**	**GW-10978-021821-RC-004**	**GW-10978-060221-RC-07**	**GW-10978-021921-RC-007**	**GW-10978-060221-RC-02**	**GW-10978-021921-RC-009**	**GW-10978-060221-RC-03**	**GW-10978-021921-RC-008**	**GW-10978-060221-RC-01**
Sample Date:						**2/18/2021**	**2/18/2021 (Duplicate)**	**6/2/2021**	**2/18/2021**	**6/2/2021**	**6/2/2021 (Duplicate)**	**2/18/2021**	**2/18/2021**	**2/18/2021**	**6/2/2021**	**2/19/2021**	**6/2/2021**	**2/19/2021**	**6/2/2021**	**2/19/2021**	**6/2/2021**
Parameters	**Units**	**ODWQS**	**Historical Range(3)**	**WMS Range(4)**	**Current GW Range(5) February-June, 2021**																
Thorium (Dissolved)	mg/L	-	-	-	-	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Tin (Dissolved)	mg/L	-	-	0.00011 - 0.005	0.00015 - 0.00379	0.00026	0.00028	0.00077	0.00373	0.00091	0.00107	0.00257	0.00379	0.00023	ND (0.00010)	0.00172	0.00246	0.00121	0.00015	ND (0.00010)	ND (0.00010)
Titanium (Dissolved)	mg/L	-	-	0.00038 - 0.0063	-	ND (0.00040) DLI	ND (0.00030)	0.00114	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)
Tungsten (Dissolved)	mg/L	-	-	-	-	ND (0.00010)	ND (0.00010)	0.00010	0.00017	0.00015	0.00018	0.00018	0.00022	0.00020	ND (0.00010)	ND (0.00010)	0.00010	0.00012	ND (0.00010)	ND (0.00010)	ND (0.00010)
Uranium (Dissolved)	mg/L	0.02	-	-	-	0.000691	0.000725	0.000285	0.00249	0.00311	0.00322	0.00162	0.000555	0.000486	0.000408	0.000525	0.000463	0.000644	0.00170	0.000671	0.000726
Vanadium (Dissolved)	mg/L	-	-	0.001 - 0.0013	-	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Zinc (Dissolved)	mg/L	5(1)	<0.01 - 0.48	0.0031 - 0.544	0.0021 - 0.936	0.0022	0.0021	0.0026	0.652	0.936	0.901	0.0089	0.185	0.122	0.0942	0.128	0.107	0.110	0.417	0.130	0.131
Zirconium (Dissolved)	mg/L	-	-	-	-	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)
General Chemistry																					
Alkalinity, Bicarbonate	mg/L	-	-	68 - 236	242 - 405	285	285	252	405	373	365	262	262	301	261	293	281	274	269	248	242
Alkalinity, Carbonate	mg/L	-	-	-	-	ND (2.0)	ND (2.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (2.0)	ND (1.0)
Alkalinity, Hydroxide	mg/L	-	-	-	-	ND (2.0)	ND (2.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (2.0)	ND (1.0)
Alkalinity, Total (As CaCO3)	mg/L	500(2)	258 - 311	68 - 240	242 - 405	285	285	252	405	373	365	262	262	301	261	293	281	274	269	248	242
Ammonia-N	mg/L	-	-	0.023 - 0.512	0.01 - 0.096	0.094	0.096	0.086	0.054	0.015	0.013	0.010	ND (0.010)	ND (0.010)	ND (0.010)	0.012	ND (0.010)	0.087	ND (0.010)	0.024	ND (0.010)
Chloride	mg/L	250(1)	1.4 - 27.1	39.1 - 117	2.4 - 17.9	6.44	6.49	6.17	3.41	3.90	3.88	3.95	17.9	6.91	7.04	4.17	3.58	2.79	1.92	2.40	2.14
Conductivity	µmhos/cm	-	517 - 737	422 - 1060	481 - 862	599	600	594	859	850	862	517	564	569	541	568	576	559	591	481	490
Dissolved organic carbon (DOC) (dissolved)	mg/L	5(1)	<0.5 - 1.3	-	1.26 - 8.39	1.51	1.36	**8.39**	2.77	2.57	3.18	1.56	1.46	1.27	1.73	1.26	1.64	1.59	2.24	1.57	3.93
Hardness (Dissolved)	mg/L	80-100(2)	295 - 420	208 - 580	258 - 516	**326**	**338**	**314**	**516**	**470**	**463**	**301**	**332**	**324**	**309**	**323**	**310**	**308**	**319**	**267**	**258**
Nitrate (as N)	mg/L	10	<0.05 - 1.34	0.023 - 0.7	0.027 - 0.206	ND (0.020)	ND (0.020)	ND (0.020)	0.077	0.178	0.178	ND (0.020)	0.206	0.055	0.048	0.027	ND (0.020)	ND (0.020)	0.058	0.101	0.171
Nitrite (as N)	mg/L	1	-	-	-	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Orthophosphate (dissolved)	mg/L	-	-	-	-	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)	ND (0.0030)
Sulfate	mg/L	500(1)	14 - 75	89.9 - 385	15.6 - 84.2	36.6	37.0	35.0	84.2	64.0	64.1	29.8	41.2	26.3	26.2	21.5	16.7	32.0	30.1	17.5	15.6
Total Dissolved Solids (TDS)	mg/L	500(1)	-	255 - 790	247 - 512	344	345	348	**512**	**511**	**501**	305	361	327	353	312	296	317	334	260	247
Total Organic Carbon (TOC)	mg/L	-	-	1 - 20.1	1.17 - 3.98	1.57	1.59	1.72	3.90	3.75	3.98	1.29	1.27	1.49	1.71	1.35	2.14	1.17	1.93	1.18	1.47
Total Suspended Solids (TSS)	mg/L	-	-	0.5 - 30	8.3 - 633	117	112	41.7	125	129	98.4	26.1	8.3	242	211	21.3	155	133	633	14.4	ND (3.0)
Turbidity	NTU	-	-	0.25 - 3.56	1.81 - 289	68.8	77.7	29.9	113	97.1	88.3	12.6	3.57	231	206	22.3	112	62.8	289	22.2	1.81
Un-ionized Ammonia	mg/L	-	-	0.000184 - 0.0473	0.000032- 0.000416	0.000180	0.000184	0.000416	0.0000496	0.000037	0.000032	0.000053	ND (0.000051)	ND (0.000091)	ND (0.000050)	0.000038	ND (0.000037)	0.000352	ND (0.000062)	0.000113	ND (0.000013)

Notes:

Bold - concentration greater than the ODWQS
ND - Non-detect at associated value.
- Not applicable.
ODWS - Ontario Drinking Water Quality Standards, June 2006
(1) Aesthetic Objective
(2) Operational Guideline
(3) Historical range in groundwater per Table 7.1 of the WRAR, 2000
(4) Historical range of SW52B, representative of the WMS; total metals were measured at SW52B (WQA, 2019)
(5) Range of detections measured in this event

Table 7.2

Summary of Surface Water Quality Data
Milton Quarry East Extension
Region of Halton, Ontario

Sample Location:			**SG6**	**SG6**	**SG61**	**SG61**	**SG61**
Sample ID:			**SW-10978-021921-RC-002**	**SW-10978-060221-RC-02**	**SW-10978-021921-RC-001**	**SW-10978-021921-RC-003**	**SW-10978-060221-RC-01**
Sample Date:			**2/19/2021**	**6/2/2021**	**2/19/2021**	**2/19/2021**	**6/2/2021**
Parameters	**Units**	**PWQO**					
Field Parameters							
pH, Field	s.u.	6.5-8.5	7.09	6.94	7.37	7.37	6.78
Temperature, Field	Deg C	-	3.2	15.1	5.8	5.8	9.3
Metals							
Aluminum	mg/L	0.075	0.0311	0.0093	ND (0.0050)	0.0070	**0.0887**
Antimony	mg/L	0.02	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Arsenic	mg/L	0.005	0.00013	0.00022	0.00013	0.00015	0.00035
Barium	mg/L	-	0.0317	0.0351	0.0221	0.0224	0.0246
Beryllium	mg/L	0.011	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Bismuth	mg/L	-	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)
Boron	mg/L	0.2	ND (0.010)	0.012	ND (0.010)	ND (0.010)	ND (0.010)
Cadmium	mg/L	0.0002	**0.000211**	ND (0.0000050)	0.000130	0.000135	**0.000222**
Caesium	mg/L	-	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	0.000020
Calcium	mg/L	-	69.1	77.1	79.6	81.7	78.3
Chromium Total	mg/L	0.001	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Cobalt	mg/L	0.0009	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	0.00010
Copper	mg/L	0.005	0.00162	ND (0.00050)	0.00078	0.00054	0.00156
Iron	mg/L	0.3	ND (0.010)	0.061	ND (0.010)	0.011	0.149
Lead	mg/L	0.005	0.000099	0.000162	0.000165	0.000504	**0.00538**
Lithium	mg/L	-	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
Magnesium	mg/L	-	31.7	36.1	35.9	36.1	36.4
Manganese	mg/L	-	ND (0.00050)	0.0167	ND (0.00050)	0.00183	0.0266
Molybdenum	mg/L	0.04	0.00173	0.000745	0.000730	0.000730	0.000826
Nickel	mg/L	0.025	0.00090	ND (0.00050)	ND (0.00050)	ND (0.00050)	0.00080
Phosphorous	mg/L	0.01	**0.084**	**0.051**	ND (0.050)	ND (0.050)	ND (0.050)

Table 7.2

Summary of Surface Water Quality Data
Milton Quarry East Extension
Region of Halton, Ontario

Sample Location:			**SG6**	**SG6**	**SG61**	**SG61**	**SG61**
Sample ID:			**SW-10978-021921-RC-002**	**SW-10978-060221-RC-02**	**SW-10978-021921-RC-001**	**SW-10978-021921-RC-003**	**SW-10978-060221-RC-01**
Sample Date:			**2/19/2021**	**6/2/2021**	**2/19/2021**	**2/19/2021**	**6/2/2021**
Parameters	**Units**	**PWQO**					
Metals (cont'd)							
Potassium	mg/L	-	2.48	0.868	0.322	0.323	0.403
Rubidium	mg/L	-	0.00127	0.00049	0.00025	0.00026	0.00052
Selenium	mg/L	0.1	0.000323	0.000121	0.000217	0.000213	0.000188
Silicon	mg/L	-	1.92	2.84	2.38	2.35	2.63
Silver	mg/L	0.0001	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)
Sodium	mg/L	-	1.48	1.50	3.69	3.65	4.09
Strontium	mg/L	-	0.0520	0.0620	0.0711	0.0703	0.0720
Sulphur	mg/L	-	3.92	1.02	12.3	12.4	11.6
Tellurium	mg/L	-	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)
Thallium	mg/L	0.0003	0.000020	ND (0.000010)	0.000011	0.000012	0.000031
Thorium	mg/L	-	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Tin	mg/L	-	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	0.00013
Titanium	mg/L	-	ND (0.00030)	0.00032	ND (0.00030)	ND (0.00030)	0.00175
Tungsten	mg/L	0.03	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Uranium	mg/L	0.005	0.000587	0.000077	0.000427	0.000440	0.000462
Vanadium	mg/L	0.006	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Zinc	mg/L	0.03	**0.176**	0.0032	**0.0836**	**0.0857**	**0.105**
Zirconium	mg/L	0.004	0.00021	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)
Dissolved Metals							
Aluminum (Dissolved)	mg/L	-	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050)
Antimony (Dissolved)	mg/L	-	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Arsenic (Dissolved)	mg/L	-	0.00012	0.00020	0.00015	0.00016	0.00012
Barium (Dissolved)	mg/L	-	0.0321	0.0333	0.0233	0.0235	0.0220
Beryllium (Dissolved)	mg/L	-	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)

Table 7.2

Summary of Surface Water Quality Data
Milton Quarry East Extension
Region of Halton, Ontario

Sample Location:			**SG6**	**SG6**	**SG61**	**SG61**	**SG61**
Sample ID:			**SW-10978-021921-RC-002**	**SW-10978-060221-RC-02**	**SW-10978-021921-RC-001**	**SW-10978-021921-RC-003**	**SW-10978-060221-RC-01**
Sample Date:			**2/19/2021**	**6/2/2021**	**2/19/2021**	**2/19/2021**	**6/2/2021**
Parameters	**Units**	**PWQO**					
Dissolved Metals (cont'd)							
Bismuth (Dissolved)	mg/L	-	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)
Boron (Dissolved)	mg/L	-	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Cadmium (Dissolved)	mg/L	-	0.0000782	0.0000054	0.000139	0.000141	0.000122
Caesium (Dissolved)	mg/L	-	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)	ND (0.000010)
Calcium (Dissolved)	mg/L	-	70.2	76.3	81.8	82.1	75.8
Chromium (dissolved)	mg/L	-	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Cobalt (Dissolved)	mg/L	-	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Copper (Dissolved)	mg/L	-	0.00074	0.00027	0.00067	0.00282 DTC	0.00074
Iron (Dissolved)	mg/L	-	ND (0.010)	0.039	ND (0.010)	ND (0.010)	ND (0.010)
Lead (Dissolved)	mg/L	-	ND (0.000050)	ND (0.000050)	0.000067	0.000155	0.000056
Lithium (Dissolved)	mg/L	-	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)
Magnesium (Dissolved)	mg/L	-	32.1	35.4	37.1	36.7	37.3
Manganese (Dissolved)	mg/L	-	ND (0.00050)	0.00810	ND (0.00050)	ND (0.00050)	0.00054
Molybdenum (Dissolved)	mg/L	-	0.00165	0.000768	0.000735	0.000785	0.000768
Nickel (Dissolved)	mg/L	-	0.00053	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Phosphorous (Dissolved)	mg/L	-	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Potassium (Dissolved)	mg/L	-	2.33	0.778	0.329	0.335	0.320
Rubidium (Dissolved)	mg/L	-	0.00118	0.00043	0.00027	0.00026	0.00027
Selenium (Dissolved)	mg/L	-	0.000362	0.000173	0.000298	0.000299	0.000160
Silicon (Dissolved)	mg/L	-	2.07	2.62	2.41	2.43	2.36
Silver (Dissolved)	mg/L	-	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)	ND (0.000050)
Sodium (Dissolved)	mg/L	-	1.58	1.62	3.75	3.72	4.25
Strontium (Dissolved)	mg/L	-	0.0539	0.0631	0.0716	0.0723	0.0692
Sulphur (Dissolved)	mg/L	-	4.64	1.29	13.1	13.1	11.0
Tellurium (Dissolved)	mg/L	-	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)

Table 7.2

Summary of Surface Water Quality Data
Milton Quarry East Extension
Region of Halton, Ontario

Sample Location:			**SG6**	**SG6**	**SG61**	**SG61**	**SG61**
Sample ID:			**SW-10978-021921-RC-002**	**SW-10978-060221-RC-02**	**SW-10978-021921-RC-001**	**SW-10978-021921-RC-003**	**SW-10978-060221-RC-01**
Sample Date:			**2/19/2021**	**6/2/2021**	**2/19/2021**	**2/19/2021**	**6/2/2021**
Parameters	**Units**	**PWQO**					
Dissolved Metals (cont'd)							
Thallium (Dissolved)	mg/L	-	0.000018	ND (0.000010)	0.000014	0.000012	ND (0.000010)
Thorium (Dissolved)	mg/L	-	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Tin (Dissolved)	mg/L	-	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Titanium (Dissolved)	mg/L	-	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)	ND (0.00030)
Tungsten (Dissolved)	mg/L	-	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Uranium (Dissolved)	mg/L	-	0.000546	0.000081	0.000415	0.000415	0.000386
Vanadium (Dissolved)	mg/L	-	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)	ND (0.00050)
Zinc (Dissolved)	mg/L	-	0.173	0.0051	0.0962	0.0987	0.0774
Zirconium (Dissolved)	mg/L	-	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)	ND (0.00020)
General Chemistry							
Alkalinity, Bicarbonate	mg/L	-	287	332	292	294	284
Alkalinity, Carbonate	mg/L	-	ND (2.0)	ND (1.0)	ND (2.0)	ND (2.0)	ND (1.0)
Alkalinity, Hydroxide	mg/L	-	ND (2.0)	ND (1.0)	ND (2.0)	ND (2.0)	ND (1.0)
Alkalinity, Total (As CaCO3)	mg/L	-	287	332	292	294	284
Ammonia-N	mg/L	-	0.011	ND (0.010)	ND (0.010)	ND (0.010)	0.011
Chloride	mg/L	-	1.91	1.65	13.3	13.2	14.0
Conductivity	μmhos/cm	-	532	592	627	623	642
Dissolved organic carbon (DOC) (dissolved)	mg/L	-	2.37	12.8	2.05	2.17	3.59
Hardness (Dissolved)	mg/L	-	307	336	357	356	343
Nitrate (as N)	mg/L	-	0.112	ND (0.020)	0.165	0.161	0.132
Nitrite (as N)	mg/L	-	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)	ND (0.010)
Orthophosphate (dissolved)	mg/L	-	ND (0.0030)	0.0055	ND (0.0030)	ND (0.0030)	ND (0.0030)
Sulfate	mg/L	-	10.4	1.08	35.2	35.2	30.6
Total Dissolved Solids (TDS)	mg/L	-	288	332	352	357	343

Table 7.2

Summary of Surface Water Quality Data
Milton Quarry East Extension
Region of Halton, Ontario

Sample Location:			**SG6**	**SG6**	**SG61**	**SG61**	**SG61**
Sample ID:			**SW-10978-021921-RC-002**	**SW-10978-060221-RC-02**	**SW-10978-021921-RC-001**	**SW-10978-021921-RC-003**	**SW-10978-060221-RC-01**
Sample Date:			**2/19/2021**	**6/2/2021**	**2/19/2021**	**2/19/2021**	**6/2/2021**
Parameters	**Units**	**PWQO**					
General Chemistry (cont'd)							
Total Organic Carbon (TOC)	mg/L	-	2.70	16.1	1.85	1.82	3.80
Total Suspended Solids (TSS)	mg/L	-	5.5	13.9	ND (3.0)	ND (3.0)	6.4
Turbidity	NTU	-	4.57	2.43	0.11	1.13	3.25
Un-ionized Ammonia	mg/L	0.02	0.000018	ND (0.000029)	ND (0.000038)	ND (0.000038)	0.000014

Notes:

ND - Non-detect at associated detection limit.
- Not applicable.
Bold - concentration greater than the PWQO
PWQO - Provincial Water Quality Objectives, July 1994

Table 10.1

Extraction Area Water Balance for Proposed MQEE
Milton Quarry East Extension
Region of Halton, Ontario

Land Type	**Precipitation (mm/year)**	**Evapotransipiration (mm/year)**	**Water Surplus (mm/year)**
Vegetated Open Space	866	573	293
Dry Quarry Floor	866	300	566
Rehabilitation Lake	866	672	194

Area by Land Type	**Existing MQEE Land Use (ha)**	**Proposed MQEE at End of Extraction (ha)**	**Proposed MQEE at Rehabilitation (ha)**
Vegetated Area	15.9	0.0	5.2
Dry Quarry Area	0.0	15.9	0.0
Rehabilitation Lake Area	0.0	0.0	10.7

Watershed Surplus	**Existing MQEE Land Use (m^3/year)**	**Proposed MQEE at End of Extraction (m^3/year)**	**Proposed MQEE at Rehabilitation (m^3/year)**
Calculated Surplus	46,587	89,994	35,994
Change from Approved	-	43,407	-10,593

Table 10.2

Predictive Site Water Budget for Approved and Proposed MQEE Conditions - Canadian Climate Normals
Milton Quarry East Extension
Region of Halton, Ontario

	Interim Extraction Condition			Rehabilitation Condition		
Inflows	**Approved Quarry (m^3/year)**	**Approved Quarry Plus MQEE (m^3/year)**	**Difference (m^3/year)**	**Approved Quarry (m^3/year)**	**Approved Quarry Plus MQEE (m^3/year)**	**Difference (m^3/year)**
Dry Quarry Recharge	1,744,185	1,834,662	90,477	1,055,638	1,055,638	--
Lake Quarry Recharge	234,548	234,548	--	470,552	490,749	20,197
Groundwater Inflow	5,338,444	5,222,300	-116,144	269,505	325,849	56,344
Upstream Runoff	86,368	78,063	-8,305	86,368	94,396	8,028
Total Inflows	**7,403,546**	**7,369,573**	**-33,973**	**1,882,063**	**1,966,632**	**84,569**
Outflows						
Recharge System	5,180,453	5,121,645	-58,808	326,461	442,394	115,932
Quarry Operations	150,000	150,000	--	--	--	--
Required Outflow to HFRT	700,000	700,000	--	700,000	700,000	--
Escarpment Leakage	35,320	35,320	--	35,320	35,320	--
Vertical Leakage	25,969	26,720	751	31,808	32,797	989
Total Outflows	**6,091,742**	**6,033,686**	**-58,057**	**1,093,590**	**1,210,511**	**116,921**
Calculated Available Annual Surplus	**1,311,804**	**1,335,887**	**24,084**	**788,473**	**756,121**	**-32,352**

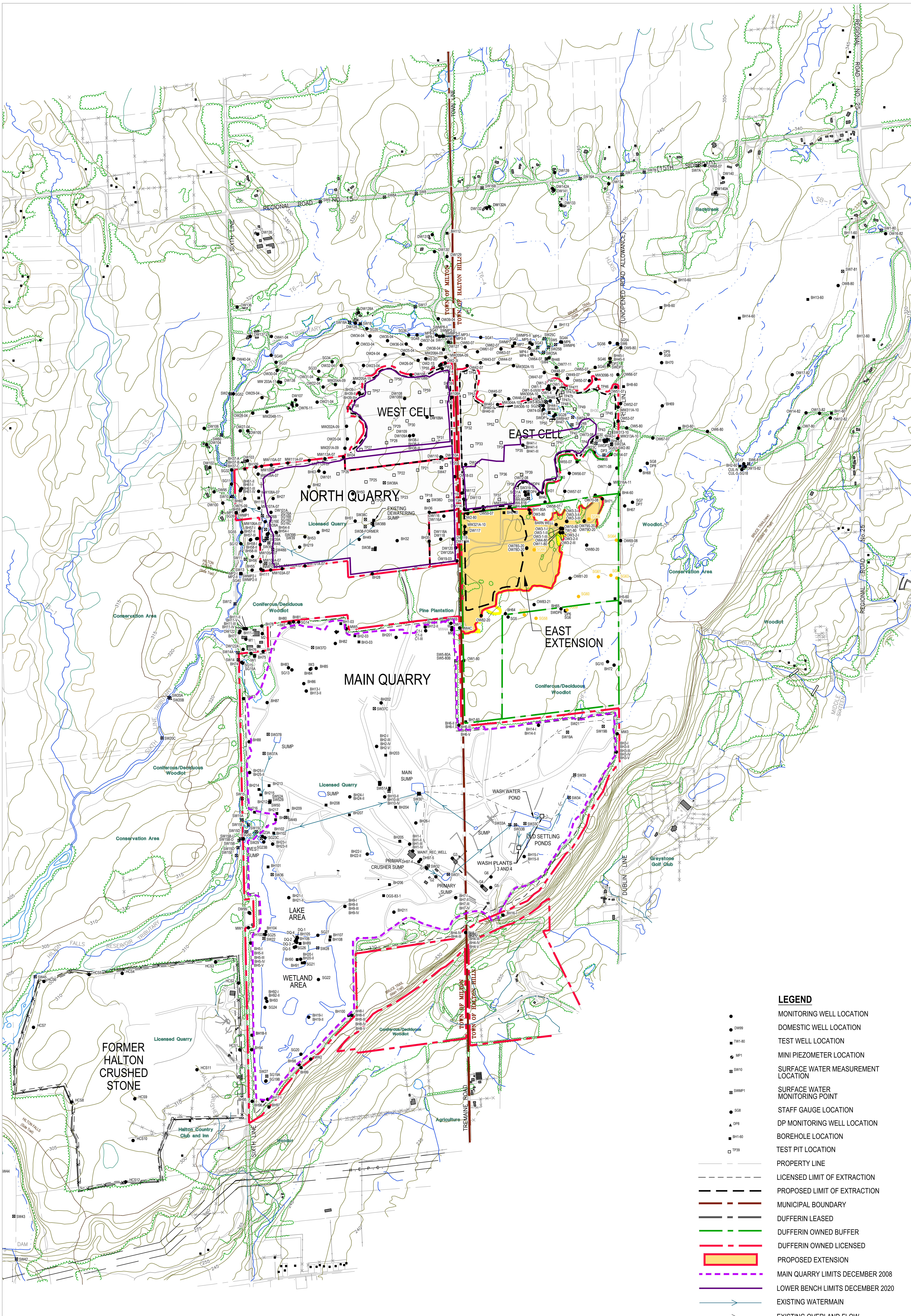
Table 10.3

Lake Filling Sensitivity Analysis
Milton Quarry East Extension
Region of Halton, Ontario

	Year of Quarry Rehabilitation for Canadian Climate Normals (1981-2010)		Year of Quarry Rehabilitation for 2050s		Year of Quarry Rehabilitation for 2080s	
Safety Factor or Condition	**Approved Condition (m^3/yr)**	**Proposed MQEE Condition (m^3/yr)**	**Approved Condition (m^3/yr)**	**Proposed MQEE Condition (m^3/yr)**	**Approved Condition (m^3/yr)**	**Proposed MQEE Condition (m^3/yr)**
No Safety Factor	2042	2045	2043	2045	2043	2046
Half Safety Factor	2047	2051	2048	2053	2049	2053
Full Safety Factor	2057	2065	2060	2069	2062	2071

Appendices

Appendix A
Topography and Instrumentation Survey



SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES
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0 200 400 600m

Coordinate System:
UTM17m NAD27

GHD

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978-200**
Date **December 2021**

MILTON QUARRY BASE PLAN

A.1

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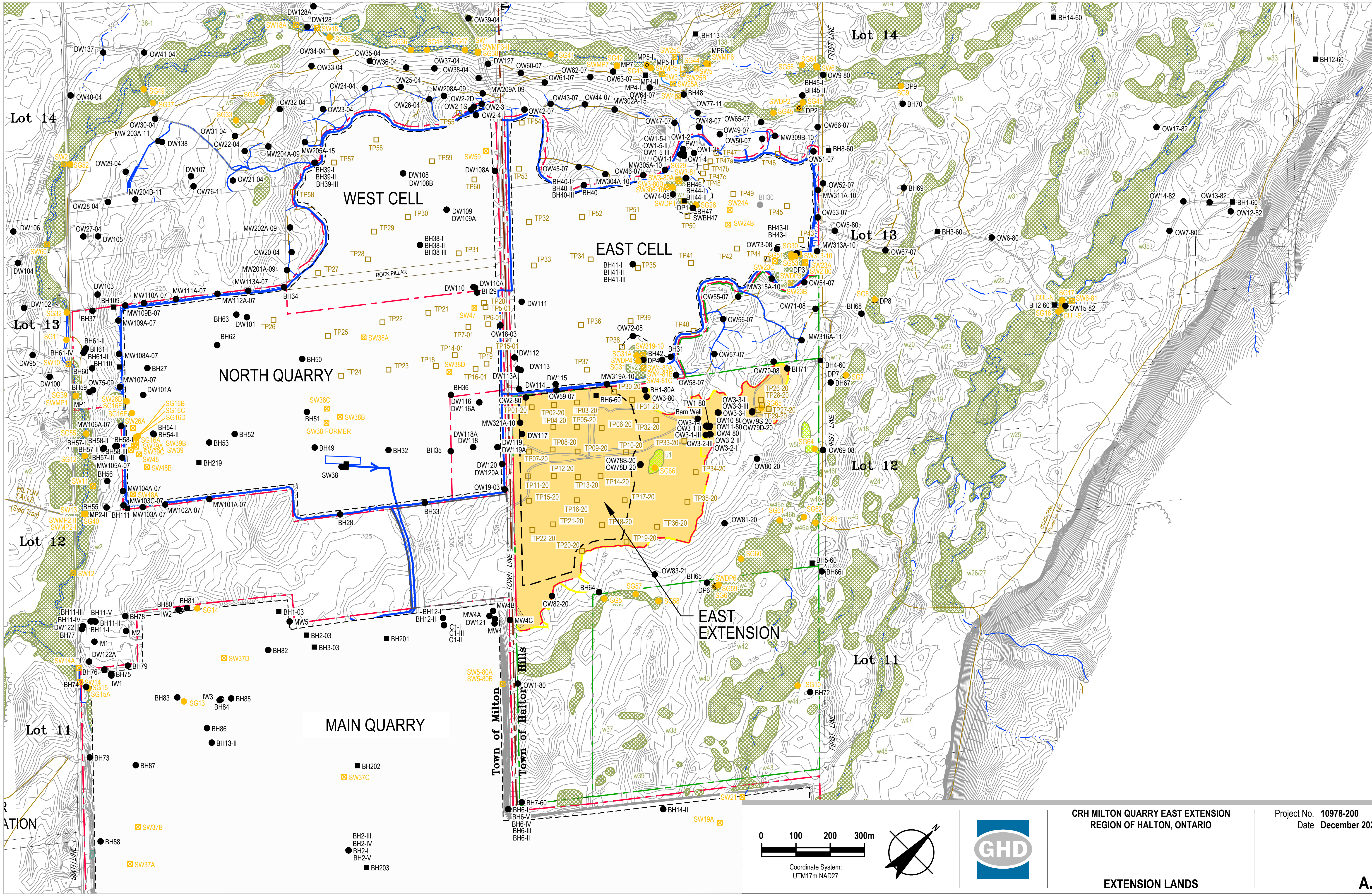
Plot Date: 07 December 2021 2:42 PM



CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. 10978-200
Date December 2021

EXTENSION LANDS

A.2

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Plot Date: 07 December 2021 2:38 PM

Table A.1

Stratigraphic Summary - Locations within Focus Area
Milton Quarry East Extension
Dufferin Milton Quarry
Region of Halton, Ontario

Location	Type	Diameter (1) (mm)	Screened Interval (m AMSL)	Filter Pack (m AMSL)	Seal (m AMSL)	Backfill (m AMSL)	Easting (m)	Northing (m)	Ground Surface (m AMSL)	Measuring Point Elevation (m AMSL)	Geologic Formation Screened
BH1-80A	S	32					582937.4	4822642.2	341.10	341.68	Overburden
BH6-I	P	51	276.8 - 276.2	277.3 - 275.8	277.90 - 277.30	323.8 - 277.9	583520.0	4821495.0	323.80	323.88	Whirlpool Formation
BH6-II	P	51	282.6 - 282.0	283.0 - 281.9	282.70 - 283.00		583520.0	4821495.0	323.80	323.79	Manitoulin Formation
BH6-III	P	51	296.6 - 296.0	298.0 - 295.9	298.60 - 298.00	323.8 - 298.6	583520.0	4821495.0	323.80	324.02	Cabot Head Formation
BH6-IV	P	51	302.6 - 302.0	303.8 - 301.9	304.40 - 303.80	323.8 - 304.4	583520.0	4821495.0	323.80	324.32	Reynales and Cabot Head Formations
BH6-V	S	51	312.2 - 309.3	314.7 - 309.2	315.40 - 314.70	323.8 - 315.4	583520.0	4821495.0	323.80	324.91	Middle and Lower portions, Amabel Formation
BH14-I	P	51	306.3 - 305.7	306.7 - 305.6	307.50 - 306.70	329.8 - 307.5	583840.0	4821815.0	329.80	330.97	Lower portion, Amabel Formation
BH14-II	S	51	327.3 - 321.5	328.0 - 321.4	329.80 - 328.00		583840.0	4821815.0	329.80	330.70	Upper portion, Amabel Formation
BH64	O	95	331.52 - 313.75		Surface		583259.2	4822130.5	333.52	334.55	Amabel Formation
BH65	O	95	326.52 - 319.81		Surface		583462.5	4822372.9	329.02	330.50	Amabel Formation
BH66	O	89	327.00 - 297.43		Surface		583676.6	4822633.3	328.83	329.65	Amabel, Reynales, and Cabot Head Formations
BH67	O	102	333.82 - 297.55		Surface		583305.0	4823042.0	336.26	337.07	Amabel, Reynales, and Cabot Head Formations
BH71	O	102	339.08 - 304.98		Surface		583186.3	4822980.5	341.78	342.19	Amabel and Reynales Formations
BH72	O	89	324.06 - 302.42		Surface		583902.0	4822360.1	325.28	325.62	Amabel, Reynales, and Cabot Head Formations
DW114	O	unknown	26.7 ft bgs	-- --	Surface	-- --	582675.0	4822385.0	--	--	Amabel
DW117	O	unknown	21.6 ft bgs	-- --	Surface	-- --	582774.0	4822298.0	--	--	Amabel
DW119	O	unknown	-- 315.50	-- --	Surface	-- --	582763.0	4822441.1	335.50	--	Amabel
DW120	O	unknown	-- 319.00	-- --	Surface	-- --	582808.0	4822416.1	335.00	--	Amabel
DW120A	O	unknown	-- 308.20	-- --	Surface	-- --	582808.0	4822416.1	335.00	--	Amabel
DW121	O	unknown	-- 317.90	-- --	Surface	-- --	583113.0	4822081.1	333.00	--	Amabel
MW319A-10	O	150	340.82 - 303.33		343.10 - 340.20		582846.6	4822575.9	343.10	343.83	Amabel and Reynales Formation
MW321A-10	O	150	335.77 - 301.78		340.19 - 335.77		582746.4	4822317.3	340.19	340.94	Amabel and Reynales Formation
MW4	O	150	333.30 - 308.40		335.71 - 333.31		583108.0	4821850.0	335.70	336.45	Amabel/Reynales (water table)
MW4A	O	150					583082.0	4821854.9	336.53	337.41	Amabel/Reynales (water table)
MW4B	O	150	335.85 - 301.78		338.80 - 336.30		583079.0	4821873.1	338.35	338.79	Amabel/Reynales (water table)
MW4C	O	150	335.65 - 302.88		336.41 - 335.65		583132.6	4821889.3	336.41	336.72	Amabel/Reynales (water table)
OW1-80	S	38					583280.3	4821774.0	329.84	Damaged	
OW2-80	O	89	339.70 - 331.10				582706.1	4822381.0	341.50	341.90	Amabel
OW3-80	O	76	342.20 - 327.05				582953.9	4822632.3	342.54	343.01	Amabel
OW4-80	S	38	342.51 - 335.47				583143.9	4822696.3	343.42	343.97	Amabel
OW3-1-I	O	89	341.62 - 303.82		Surface		583137.7	4822696.1	343.20	343.72	Amabel, Reynales, and Cabot Head Formations
OW3-1-II	O	89	341.78 - 325.98		Surface		583138.0	4822693.8	343.20	343.88	Amabel Formation
OW3-1-III	O	89	341.60 - 332.42		Surface		583138.0	4822694.9	343.20	343.72	Amabel Formation
OW3-2-I	O	89	340.17 - 305.07		Surface		583162.0	4822684.5	342.24	342.84	Amabel, Reynales, and Cabot Head Formations
OW3-2-II	O	89	340.44 - 325.34		Surface		583163.5	4822686.6	342.39	343.04	Amabel Formation
OW3-2-III	O	89	340.24 - 332.54		Surface		583154.8	4822675.4	342.05	342.77	Amabel Formation
OW3-3-I	O	89	343.30 - 303.00		Surface		583135.4	4822747.6	344.89	345.24	Amabel, Reynales, and Cabot Head Formations
OW3-3-II	O	89	343.53 - 326.53		Surface		583133.6	4822746.6	344.81	345.32	Amabel Formation
OW3-3-III	O	89	343.44 - 334.34		Surface		583134.5	4822747.1	344.87	345.30	Amabel Formation
OW10-80	P	38					583146.1	4822702.2	343.81	Damaged	
OW11-80	P	38	299.50 - 298.59				583144.6	4822699.5	343.58	343.72	Cabot Head

Table A.1

Stratigraphic Summary - Locations within Focus Area
Milton Quarry East Extension
Dufferin Milton Quarry
Region of Halton, Ontario

Location	Type	Diameter (1) (mm)	Screened Interval (m AMSL)	Filter Pack (m AMSL)	Seal (m AMSL)	Backfill (m AMSL)	Easting (m)	Northing (m)	Ground Surface (m AMSL)	Measuring Point Elevation (m AMSL)	Geologic Formation Screened
OW19-03	O	76	338.21 - 301.82		344.21 - 338.21		582852.4	4822147.9	342.36	342.98	Amabel, Reynales, and Cabot Head Formations
OW58-07	O	76	339.12 - 304.68		340.95 - 339.12		582970.0	4822737.5	340.82	341.33	Amabel, Reynales, and Cabot Head Formations
OW59-07	O	76	340.39 - 303.21		343.75 - 340.39		582754.6	4822458.7	343.63	344.06	Amabel, Reynales, and Cabot Head Formations
OW68-07	O	76	346.81 - 308.10				582259.4	4824732.0	346.81	347.01	Amabel, Reynales, and Cabot Head Formations
OW69-08	O	72	334.34 - 303.55		335.86 - 332.61		583428.0	4822886.5	335.86	336.48	Amabel, Reynales, and Cabot Head Formations
OW70-08	O	72	341.34 - 304.07		342.93 - 339.68		583144.0	4822966.7	342.93	343.44	Amabel, Reynales, and Cabot Head Formations
OW71-08	O	72	338.26 - 306.10		339.32 - 336.32		583121.5	4823162.4	339.33	339.98	Amabel, Reynales, and Cabot Head Formations
OW78D-20	P	96	306.82 - 303.77		339.05 - 307.35		583082.2	4822478.1	339.05	339.87	Amabel and Reynales Formations
OW78S-20	O	96	336.55 - 326.74		338.99 - 336.55		583080.7	4822480.1	338.99	339.99	Amabel Formation
OW79D-20	P	96	308.54 - 305.49		340.76 - 309.15		583204.2	4822817.7	340.76	341.70	Amabel and Reynales Formations
OW79S-20	O	96	338.00 - 328.32		340.74 - 338.00		583202.3	4822819.7	340.74	341.61	Amabel Formation
OW80-20	O	96	336.45 - 307.19		339.04 - 336.45		583310.1	4822732.1	339.04	339.99	Amabel and Reynales Formations
OW81-20	O	96	332.85 - 306.42		335.59 - 332.85		583376.2	4822532.1	335.59	336.30	Amabel and Reynales Formations
OW82-20	O	96	334.38 - 304.93		337.12 - 334.38		583169.8	4822025.1	337.12	338.00	Amabel and Reynales Formations
OW83-21	O	96	334.05 - 303.54		335.55 - 334.05		583337.8	4822282.2	335.55	336.16	Amabel, Reynales, and Cabot Head Formations

Notes:

(m AMSL) Metres above mean sea level
P Piezometer
S Standpipe
In 2012, MW27, BH38, BH54-I, BH54-II, BH63, DW101, DW101A, BH62, DW108A, DW108B and OW2-4 were abandoned by Ontario Water Well Services Inc. in preparation for quarry advancement.
(1) Diameter is borehole diameter

Table A.2

Stratigraphic Summary - Staff Gauge Locations
Milton Quarry East Extension
Region of Halton, Ontario

Location	Easting (m)	Northing (m)	Ground Surface Elevation (m AMSL)	Measuring Point Elevation (m AMSL)
SG5	583283.06	4822127.18	332.06	331.94
SG6	583487.94	4822382.94	328.58	328.41
DP6	583487.808	4822382.616	328.28	329.42
SG10	583862.21	4822347.64	--	324.07
SG57	583339.48	4822201.73	332.35	332.33
SG58	583400.07	4822235.04	332.51	332.46
SG59	583490.67	4822392.30	328.58	328.20
SG60	583483.43	4822492.78	328.27	328.44
SG61	583483.94	4822651.74	328.80	328.78
SG62	583527.96	4822708.00	329.26	329.21
SG63	583562.84	4822720.50	330.03	330.21
SG64	583408.81	4822871.29	335.39	335.42
SG65	583213.88	4822845.34	338.42	338.43
SG66	583117.52	4822502.26	337.49	337.51

Table A.3

Stratigraphic Summary - Test Pit Locations
Milton Quarry East Extension
Region of Halton, Ontario

Location	Easting (m)	Northing (m)	Ground Surface Elevation (m AMSL)
TP01-20	582738.52	4822372.93	342.187
TP02-20	582779.53	4822423.60	344.201
TP03-20	582822.49	4822476.87	346.460
TP04-20	582824.12	4822377.12	346.994
TP05-20	582872.24	4822425.59	343.827
TP06-20	582925.45	4822475.21	342.365
TP07-20	582824.15	4822275.81	340.807
TP08-20	582868.81	4822329.03	343.399
TP09-20	582924.72	4822376.42	342.429
TP10-20	583026.93	4822475.29	341.150
TP11-20	582873.03	4822222.40	342.049
TP12-20	582926.31	4822276.58	341.446
TP13-20	582977.34	4822324.94	342.879
TP14-20	583022.81	4822373.02	340.324
TP15-20	582925.61	4822174.48	339.546
TP16-20	583023.64	4822274.23	340.964
TP17-20	583122.51	4822373.04	340.317
TP18-20	583127.35	4822274.94	338.632
TP19-20	583211.66	4822291.51	336.633
TP20-20	583138.70	4822180.77	338.792
TP21-20	583024.96	4822175.86	338.818
TP22-20	582993.34	4822121.24	334.885
TP26-20	583196.54	4822861.96	340.552
TP27-20	583231.33	4822859.25	339.813
TP28-20	583210.40	4822852.74	339.227
TP29-20	583211.98	4822834.53	339.559
TP30-20	582876.72	4822575.69	343.000
TP31-20	582930.89	4822595.81	341.879
TP32-20	583022.68	4822603.65	340.279
TP33-20	583122.92	4822619.38	341.649
TP34-20	583211.41	4822577.45	343.137
TP35-20	583255.18	4822499.71	342.281
TP36-20	583244.29	4822385.65	341.828

Appendix B
Overburden and Bedrock Stratigraphy Logs and Grain Size Analysis Logs

B.1
Borehole and Monitoring Well Logs

TABLE 1

OVERBURDEN OBSERVATION WELL LOG

BH1-80A

FROM	TO	DESCRIPTION
0	11	Clayey Sand and Gravel

Water found - 5 feet

Standpipe installed

TABLE 2

UNCASED BEDROCK OBSERVATION WELL LOGS

OW1-80

FROM	TO (Feet)	DESCRIPTION
0	3.5	Clayey Loam Till
3.5	55	Limestone

Water found - 7 feet

OW2-80

FROM	TO (Feet)	DESCRIPTION
0	4.5	Clayey Loam Till
4.5	55	Limestone

Water found - 17 feet
- 22 feet

OW3-80

FROM	TO	DESCRIPTION
0	1	Clayey Loam Till
1	55	Limestone

Water found - 25 feet

TABLE 2 (Continued)

OW4-80

FROM	TO (Feet)	DESCRIPTION
0	3	Clayey Loam Till
3	55	Limestone

Water found - 29 feet

OW5-80

FROM	TO (Feet)	DESCRIPTION
0	3	Clayey Loam Till
3	55	Limestone

Water found - 21 feet

OW6-80

FROM	TO (Feet)	DESCRIPTION
0	1	Clayey Loam Till
1	55	Limestone

Water found - 11 feet
- 50 feet

OW7-80

FROM	TO (Feet)	DESCRIPTION
0	2.5	Clayey Loam Till
2.5	38	Limestone

Water found - 20 feet
- 30 feet

The following is a report on the core drilling of our properties at Speyside.

Hole #1 58.0' drilled

Overburden 1.0'

Amabel Formation 49.0'

Dolomite -- medium grain, buff grey coloured, thick bedding, top 5'-0" weathered, good to fair

Reynales Formation 8.0'

Dolomite -- fine grain, medium grey to greenish grey shale seams and pyrite crystals

Hole #2 31.2' drilled

Amabel Formation 31.0'

Dolomite -- medium grain, light grey to light buff grey, thick bedded, finely pitted, weathered along joints -- 12.5 ft.

-- medium to fine grain, bluish grey, shale and pyrite seams, segregations -- 1.0 ft. poor material

-- medium grain, light grey to light bluish grey, thick bedded with minor shale seams and stylolites 17.5 ft.

Reynales Formation 0.2'

Dolomite -- fine grained, light grey to bluish grey, thick bedding, shale and scattered pyrites

Hole #3 94.0' drilled

Overburden 1.0'

Amabel Formation 86.0'

Dolomite -- medium grained, light buff grey, thick bedded fine pitted -- good material

Reynales Formation 7.0'

Dolomite -- fine grained, argillaceous, medium grey to medium greenish grey, shale seams and scattered pyrite crystals

Hole #4 103.2' drilled

Overburden 4.0'

Amabel Formation 99.0'

Dolomite -- medium to coarse grained, light grey colour, medium pitted -- 24 ft.

-- fine to medium grained, blue grey, minor thin shale seams -- 8.5 ft.

-- medium grained, light grey, deeply pitted to cavernous in some sections -- 7.5 ft.

-- medium to coarse grained, light grey with light bluish grey mottled sections, finely pitted with minor shale seams -- 59.0 ft. -- good material

Reynales Formation 0.2'

Dolomite -- fine grained, argillaceous, medium grey to medium greenish grey, shale seams and scattered pyrite crystals

Hole #5 89.0' drilled

Overburden 2.0'

Amabel Formation 83.0'

Dolomite -- medium grained, light buff grey, pitted -- 83.0 ft. -- sound dolomite

Reynales Formation 4.0'

Dolomite -- fine grained, argillaceous, medium grey to medium greenish grey, shale seams and scattered pyrites

Hole #6 125.0' drilled

Overburden 1.0'

Amabel Formation 123.3'

Dolomite -- medium to fine grained, light grey to light brownish grey to medium grey mottled -- 30.0 ft.

-- medium brownish grey, medium to fine grained, finely pitted -- 14.0 ft.

-- medium grained, light brownish grey, finely pitted 79.3 ft. Moderately soft and porous

Reynales Formation 0.7'

Dolomite -- fine grained argillaceous, medium grey to medium greenish grey, shale seams

Hole #7 78.0' drilled

Overburden 1.0'

Amabel Formation 69.0'

Dolomite -- medium to fine grained, light grey to light brownish grey in colour, finely pitted -- 69.0' Sound, moderately soft and slightly porous

Reynales Formation 8.0'

Dolomite -- pale buff grey, very fine grained and highly argillaceous, frequent greenish grey shale seams. A concentration of pyrite and glanconite in the lower 1.5 ft.

JAGGER HIMS LIMITED
CONSULTING ENGINEERS

BOREHOLE NO. 6

PROJECT NAME HYDROGEOLOGICAL INVESTIGATION DUFFERIN QUARRY - MILTON
PROJECT NO. 89085
CLIENT DUFFERIN AGGREGATES
DATE October 16, 1989
BOREHOLE TYPE HQ DIAMOND DRILL HOLE
FIELD SUPERVISOR JTB
GROUND ELEVATION 323.8 m.a.s.l.
ENGINEER DEJ / AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	REMARKS
0.0 – ±0.3	TOPSOIL	Not sampled
±0.3 – 18.9	DOLOSTONE: Pale brown becoming light grey with dark grey bands at ±2.5 m, medium to coarse grained fossiliferous black subhorizontal styolites visible in light grey and dark grey dolostone, occasional vug to 4 mm (2 to 5% of rock), numerous subhorizontal and subvertical fractures, fractures show rusty discolouration, lower contact at sharp change in texture. (Amabel Formation).	Highly fractured dolostone with visibl[e] discolouration
18.9 – 21.3	DOLOSTONE: Light grey, fine crystalline, green shale laminae (<1 mm) and interbeds (<20 mm), visible pyrite at ±20.8 m, no weathered fractures (Reynales Formation).	
21.3 – 39.5	SHALE: Greenish grey with beds of reddish brown fissile, non-calcareous, occasional soft zone to ±26.0 m and at ±34.0 m to 34.8 m, several interbeds of reddish brown to light grey bioclastic dolostone and light grey argillaceous dolostone, light grey bioclastic dolostone interbeds with occasional vug to 5 mm at 36.5 to 37.7 m, no weathered fractures. Upper contact shows pyrite to ±21.4 m. Lower contact at top of dolostone (Cabot Head Formation).	Transitional Contact (at 39.5)

STRATIGRAPHY | MONITOR DETAILS I II III IV V

SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)
1RC			100	67
2RC			100	75
3RC			100	86
4RC			90	66
5RC			95	76
6RC			96	76
7RC			99	99
8RC			95	95
9RC			92	92
10RC			86	86
11RC			100	100
12RC			96	96

CONE PENETRATION — SPT 'N' VALUE — SHEAR STRENGTH
WATER CONTENT % — W_P — W_L

JAGGER HIMS LIMITED
CONSULTING ENGINEERS

BOREHOLE NO. 6

PROJECT NAME: HYDROGEOLOGICAL INVESTIGATION DUFFERIN QUARRY - MILTON
PROJECT NO. 89085
CLIENT: DUFFERIN AGGREGATES
DATE: October 16, 1989
BOREHOLE TYPE: HQ DIAMOND DRILL HOLE
FIELD SUPERVISOR: JTB
GROUND ELEVATION: 323.8 m.a.s.l.
ENGINEER: DEJ / AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS (I II)	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION / SPT 'N' VALUE / SHEAR STRENGTH	WATER CONTENT % (Wp WL)	REMARKS
40.0	**DOLOSTONE AND SHALE:** Light grey dolostone and greenish grey shale, interbedded. Dolostone fine to medium crystalline; shale fissile, occasional vug (<10 mm) and pocket of calcite (30 mm) at ±45.3 m and occasional soft zone, no weathered fractures. (Manitoulin Formation).			13RC			94	94			
				14RC			94	84			
45.8	**SANDSTONE:** Pale brown fine grained, quartzose, variable carbonate content, occasional shale lamina, shale beds <30 mm at ±45.8 m to 46.1 m, pyrite at lower contact, no weathered fractures. (Whirlpool Formation)			15RC			100	100			Transitional contact
49.8				16RC			94	94			
50.9	**SHALE:** Dark greyish green, fissile, soft zones, fractured (Queenston Formation)		Monitors in separate boreholes								

Borehole terminated at ±50.9 m in shale

May 2000

JAGGER HIMS LIMITED
CONSULTING ENGINEERS

BOREHOLE NO. 14

PROJECT NAME: HYDROGEOLOGICAL INVESTIGATION DUFFERIN QUARRY - MILTON
PROJECT NO.: 89085
CLIENT: DUFFERIN AGGREGATES
DATE: November 2, 1989
BOREHOLE TYPE: HQ DIAMOND DRILL HOLE
FIELD SUPERVISOR: JTB/SH
GROUND ELEVATION: 329.8 m.a.s.l.
ENGINEER: DEJ / AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	REMARKS
0.0	TOPSOIL						Not Sampled
0.3	DOLOSTONE: Light grey with occasional tan zone to ±23.5 m, becoming light grey with dark grey bands, medium to coarse grained fossiliferous, black stylolites in grey dolostone, occasional vug to 4 mm, numerous fractures to ±10.0 m, fractures show orange - brown discolouration. Lower contact at sharp change in texture. (Amabel Formation)	1RC			-	-	
		2RC			97	97	
		3RC			-	-	
		4RC			-	-	
		5RC			100	100	
		6RC			100	100	
		7RC			100	100	
24.6	DOLOSTONE: Light grey, fine crystalline greyish green shale laminae, some shale interbeds (±20 to 50 cm) and occasional vug (<10 mm), no weathered fractures. (Reynales Formation)	8RC			100	100	
27.0		9RC			100	100	
27.8	SHALE: Greyish green, fissile, no weathered fractures. (Cabot Head Formation)						
	Borehole terminated at ±27.8 m in shale.						

MONITOR DETAILS (I, II): Monitors in separate boreholes

CONE PENETRATION: SPT 'N' VALUE; SHEAR STRENGTH
WATER CONTENT %: W P, W L
STRATIGRAPHY

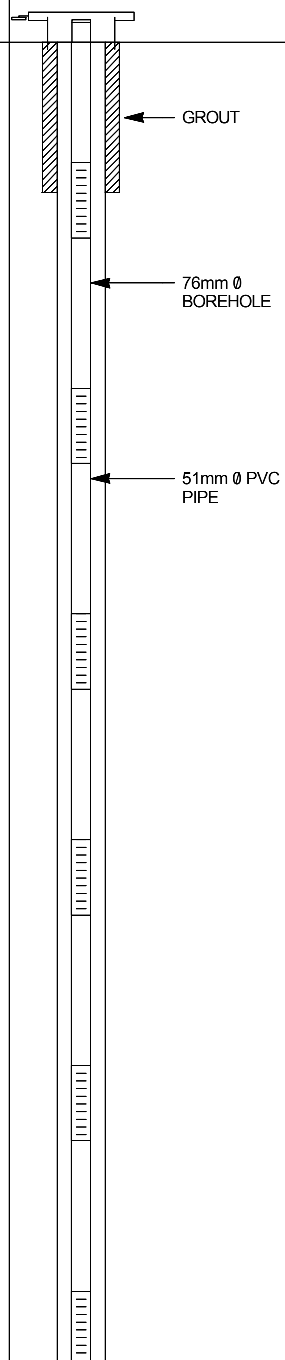
May 2000

STRATIGRAPHIC AND INSTRUMENTATION LOG
(BEDROCK)

PROJECT NAME: MILTON QUARRY	HOLE DESIGNATION: OW64-07
PROJECT NUMBER: 10978-34	DATE COMPLETED: February 22, 2007
CLIENT: DUFFERIN AGGREGATES	DRILLING METHOD: AIR DRILLING
LOCATION: REGION OF HALTON, ONTARIO	FIELD PERSONNEL: C. HOLEYWELL

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %	
	TOP OF CASING	330.96					
	GROUND SURFACE	330.34					
	OVERBURDEN						
	BEDROCK (AMABEL/REYNALES DOLOMITE FORMATION)	327.29					
	SHALE (CABOT HEAD FORMATION)	304.13					
	END OF BOREHOLE @ 26.82m BGS	303.52					

Depth scale (m BGS): 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

BOREHOLE NO. 65

PROJECT NAME: MILTON QUARRY EXTENSION | PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES | DATE: JANUARY 19, 1999
BOREHOLE TYPE: 95 mm AIRTRACK | GEOLOGIST: MJK
GROUND ELEVATION: 329.02 mASL | REVIEWER: DSM

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / Wp WL	REMARKS
0	OVERBURDEN										100 mm STEEL CASING TO 2.5 m
1.8	DOLOSTONE										
9.3	BOREHOLE TERMINATED AT 9.3 m IN DOLOSTONE										

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

May 2000
Jacques Whitford Limited

BOREHOLE NO. 66

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: MARCH 1999
BOREHOLE TYPE: 89 mm AIRTRACK
GEOLOGIST: MJK
GROUND ELEVATION: 328.83 mASL
REVIEWER: DSM

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0	OVERBURDEN										102 mm STEEL CASING TO 1.83 m
1.1	DOLOSTONE										
2											
4											
6											
8											
10											
12											
14											
16											
18											
20											

BOREHOLE NO. 66

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: MARCH 1999
BOREHOLE TYPE: 89 mm AIRTRACK
GEOLOGIST: MJK
GROUND ELEVATION: 328.83 mASL
REVIEWER: DSM

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE: TYPE	SAMPLE: 'N' VALUE	SAMPLE: % WATER	SAMPLE: % RECOVERY	SAMPLE: RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
20–22.6											
22.6	GREY SHALE										
25.9	SHALE										
31.4	BOREHOLE TERMINATED AT 31.4 m IN SHALE										

Depth scale: 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40

BOREHOLE NO. 67

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: FEBRUARY 1999
BOREHOLE TYPE: 102 mm AIRTRACK
GEOLOGIST: MJK
GROUND ELEVATION: 336.26 mASL
REVIEWER: DSM

DEPTH (m)		STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE					CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
					TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)			
0		OVERBURDEN										127 mm STEEL CASING TO 2.44 m
2	2.0	DOLOSTONE										
4												
6												
8												
10												
12												
14												
16												
18												
20												

BOREHOLE NO. 67

PROJECT NAME: MILTON QUARRY EXTENSION

PROJECT NO.: 890085.25

CLIENT: DUFFERIN AGGREGATES

DATE: FEBRUARY 1999

BOREHOLE TYPE: 102 mm AIRTRACK

GEOLOGIST: MJK

GROUND ELEVATION: 336.26 mASL

REVIEWER: DSM

DEPTH (m)		STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
20–30	29.0											
30–31.4	31.4	GREY SHALE										
31.4–38.7	38.7	SHALE										
38.7–40		BOREHOLE TERMINATED AT 38.7 m IN SHALE										

Depth scale: 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40

BOREHOLE NO. 71

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: MARCH 18-19, 1999
BOREHOLE TYPE: HQ(64 mm) DIAMOND DRILL CORE
GEOLOGIST: FJK
GROUND ELEVATION: 341.78 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	"N" VALUE	% WATER	% RECOVERY	RQD (%)	REMARKS
0 – 1.6	CLAYEY SILT: SOME SAND, OCCASIONAL SMALL PEBBLES, MEDIUM BROWN.								STEEL CASING SET AT 2.7 m
1.6	DOLOSTONE: BUFF BROWN AND LIGHT GREY TO 9.1 m; MEDIUM TO COARSE GRAINED; MODERATELY WEATHERED APPEARANCE TO 9.1 m; FOSSILIFEROUS; 1% TO 3% VUG CONTENT; OCCASIONAL FRACTURES DISCOLOURED DARK BUFF BROWN (AMABEL FORMATION)								DRILL PENETRATION RATE (m/min)
2–4				1RC			51	13	
4–6				2RC			100	66	0.17
6	- RARE STYLOLITES FROM 6.3 m TO 12.4 m			3RC			100	84	0.16
8				4RC			100	81	0.20
9–10	- BUFF GREY TO BLUEISH GREY COLOUR BANDING FROM 9.1 m TO 32.5 m; FRESH APPEARANCE MEDIUM GRAINED WITH NUMEROUS FOSSIL FRAGMENTS FROM 9.1 m TO 34.7 m; 3% TO 7% VUG CONTENT FROM 9.8 m TO 12.4 m			5RC			100	100	0.18
11				6RC			91	66	0.11
12	- OCCASIONAL STYLOLITES FROM 12.4 m TO 34.7 m; 1% TO 3% VUG CONTENT FROM 12.4 m TO 32.5 m			7RC			100	100	0.18
14	- 13.9 m TO 14.8 m RUSTY FRACTURES AND DISCOLOURED ROCK ZONE			8RC			100	97	0.20
16	- DISCOLOURED FRACTURES AT 16.1 m AND 16.9 m			9RC			100	95	0.18
17				10RC			100	95	0.18
18–19	- BUFF COLOUR 16.0 m TO 19.8 m			11RC			100	96	0.24
20				12RC			100	90	0.24

CONE PENETRATION: "N" VALUE 10 20 30; SHEAR STRENGTH. WATER CONTENT %: 10 20 30; Wp WL.

BOREHOLE NO. 71

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: MARCH 18-19, 1999
BOREHOLE TYPE: HQ(64 mm) DIAMOND DRILL CORE
GEOLOGIST: FJK
GROUND ELEVATION: 341.78 mASL
REVIEWER: AJC

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 (W_P – W_L)	REMARKS
20	DOLOSTONE: (CONTINUED)										DRILL PENETRATION RATE (m/min)
22	– BECOMING MEDIUM GRAINED WITH LARGE FOSSIL FRAGMENTS 19.4 m TO 27.6 m			13RC			99	85			0.20
				14RC			100	100			0.24
24	– FRACTURES WITH ± 100 mm DISCOLOURATION ZONES 24.3 m AND 24.6 m			15RC			98	98			0.21
26	– VUG CONTENT INCREASES TO 6% TO 8% 25.0 m TO 27.9 m			16RC			100	94			0.27
				17RC			99	87			0.29
28	– LESS FOSSIL DEBRIS FROM 27.6 m TO 34.7 m										
	– MEDIUM GRAINED FROM 29.1 m TO 32.5 m			18RC			99	94			0.27
30				19RC			100	99			0.27
32											
32.4				20RC			91	79			0.23
	DOLOSTONE: GREENISH GREY; FINE GRAINED ARGILLACEOUS DOLOSTONE WITH OCCASIONAL SHALE PARTINGS AT 34.7 m (REYNALES FORMATION)										
34				21RC			100	87			0.10
				22RC			100				0.15
36											
36.8				23RC							
	BOREHOLE TERMINATED AT 36.8 m IN DOLOSTONE										
38											
40											

BOREHOLE NO. 72

PROJECT NAME: MILTON QUARRY EXTENSION | PROJECT NO.: 890085.25

CLIENT: DUFFERIN AGGREGATES | DATE: MARCH 1999

BOREHOLE TYPE: 89 mm AIRTRACK | GEOLOGIST: MJK

GROUND ELEVATION: 325.28 mASL | REVIEWER: DSM

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE "N" VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0 – 0.3	OVERBURDEN										102 mm STEEL CASING TO 1.22 m
0.3 – 19.5	DOLOSTONE										
19.5 – 20	GREY SHALE										

BOREHOLE NO. 72

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: MARCH 1999
BOREHOLE TYPE: 89 mm AIRTRACK
GEOLOGIST: MJK
GROUND ELEVATION: 325.28 mASL
REVIEWER: DSM

DEPTH (m)		STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / Wp WL	REMARKS
20	20.7	GREY SHALE CONTINUED										
22	22.9	SHALE										
24		BOREHOLE TERMINATED AT 22.9 m IN SHALE										
26												
28												
30												
32												
34												
36												
38												
40												

DAMES & MOORE CANADA

BOREHOLE MW4-89

Client: Dufferin Aggregates — Project No.: 16778-007

Project: Milton Quarry

Borehole Location: Milton, Ontario

Driller: O'Connor Well Drilling — Date Drilled: 89/11/9

Drilling Supervised By: J. Baxter

Drilling Method: Air Rotary

Monitoring Well Data - Pipe:

- Screen:

Other Monitors:

Elevation: (covered over in 1998)

- Datum: Geodetic
- Ground surface: 335.7m
- Measuring Pt.: 336.45

Sample Type

SS - Split Spoon
WA - Wash
AU - Auger
DT - Disturbed
RX - Rock Core

Well screen (water level elev.m year/month/day)

Gas monitor screen (vapour reading. year/month/day)

Elev. (m) / Depth (m)	Soil Description	Depth Scale (ft.)	Depth Scale (m)	Monitoring Details	Sample Num.	Int.	Type	N val.
334.8 / 0.9	Sand and Gravel - Organic rich sand with limestone cobbles							
	Limestone - brown	5 / 10 / 15	2 / 4	cemented 150mm steel casing				
329.6 / 6.1		20	6	10/11/89				
	Limestone - grey	25 / 30 / 35 / 40 / 45 / 50 / 55 / 60 / 65 / 70 / 75	8 / 10 / 12 / 14 / 16 / 18 / 20 / 22	open hole			DT	
303.6		80 / 85	24 / 26	open hole				
308.4 / 27.3	End of Borehole	90 / 95 / 100 / 105 / 110	28 / 30 / 32 / 34					

Prepared By: Ian Judd-Henrey — Checked By: John Weeraratne — Date Prepared:

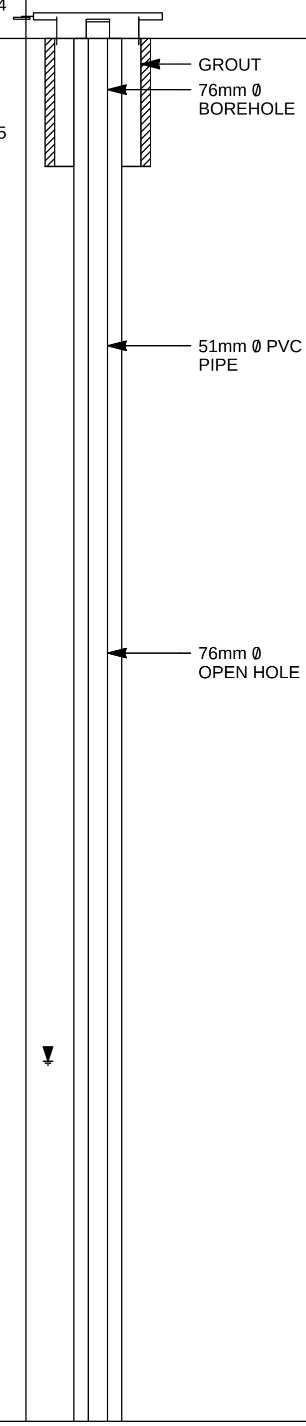
Note: This borehole log was prepared for hydrogeological and/or environmental assessment purposes and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by, Dames & Moore Canada personnel before use by others.

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: DUFFERIN QUARRY
PROJECT NUMBER: 10978-25
CLIENT: DUFFERIN AGGREGATES
LOCATION: REGION OF HALTON, ONTARIO

HOLE DESIGNATION: MW4B
DATE COMPLETED: July 16, 2003
DRILLING METHOD: ROTARY PERCUSSION
FIELD PERSONNEL: D. BERRIMAN

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
	TOP OF RISER	338.785				
	GROUND SURFACE	338.354				
	OVERBURDEN					
2	DOLOSTONE (Amabel Formation)	336.525				
4						
6						
8						
10						
12						
14						
16						
18						
20						
22						
24						
26						



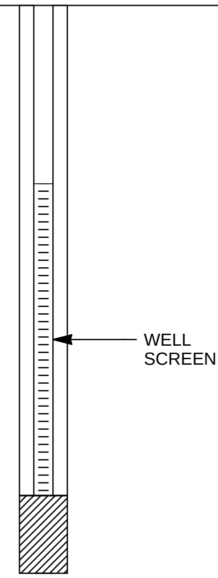
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
STATIC WATER LEVEL ▼ JULY 22, 2003

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: DUFFERIN QUARRY
PROJECT NUMBER: 10978-25
CLIENT: DUFFERIN AGGREGATES
LOCATION: REGION OF HALTON, ONTARIO

HOLE DESIGNATION: MW4B
DATE COMPLETED: July 16, 2003
DRILLING METHOD: ROTARY PERCUSSION
FIELD PERSONNEL: D. BERRIMAN

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
28						
30						
32						
34						
35	- DOLOSTONE (Reynales Formation) at 35.00m BGS					
36						
	SHALE (Cabot Head) - contact is approximate	301.778				
38	END OF BOREHOLE @ 38.10m BGS	300.254				
40						
42						
44						
46						
48						
50						
52						



WELL DETAILS
Screened interval:
307.874 to 301.778m AMSL
30.480 to 36.576m BGS
Length: 6.1m
Diameter: 51mm
Slot Size: #10
Material: PVC

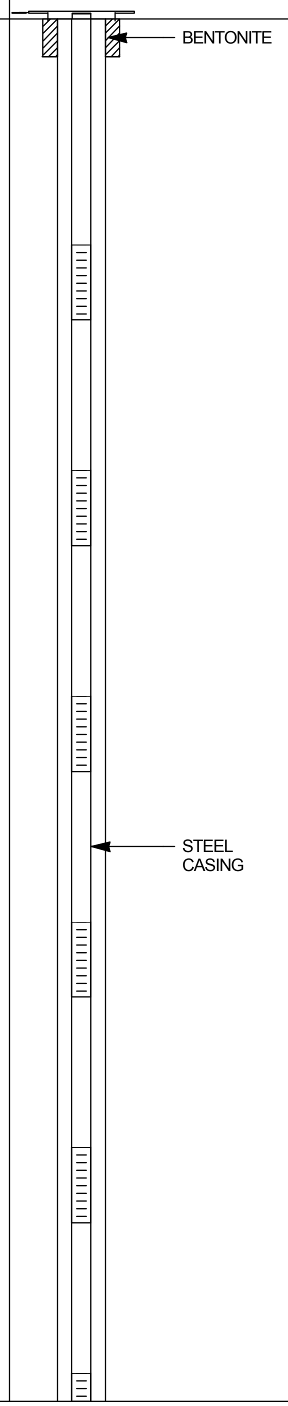
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
STATIC WATER LEVEL ▼ JULY 22, 2003

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: MILTON QUARRY
PROJECT NUMBER: 10978-11
CLIENT: DUFFERIN AGGREGATES
LOCATION: MILTON, ONTARIO

HOLE DESIGNATION: MW4C
DATE COMPLETED: March 22, 2007
DRILLING METHOD: ROTARY PERCUSSION
FIELD PERSONNEL: C. HOLEYWELL

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m BGS	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %	
	GROUND SURFACE	336.41					
	OVERBURDEN						
	DOLOSTONE (Amabel Formation)	335.65					
2							
4							
6							
8							
10							
12							
14							
16							
18							
20							
22							
24							
26							



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: MILTON QUARRY
PROJECT NUMBER: 10978-11
CLIENT: DUFFERIN AGGREGATES
LOCATION: MILTON, ONTARIO

HOLE DESIGNATION: MW4C
DATE COMPLETED: March 22, 2007
DRILLING METHOD: ROTARY PERCUSSION
FIELD PERSONNEL: C. HOLEYWELL

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m BGS	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %	
	SHALE (Cabot Head Formation)	303.49					
	END OF BOREHOLE @ 33.53m BGS	302.88					

Depth scale: 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

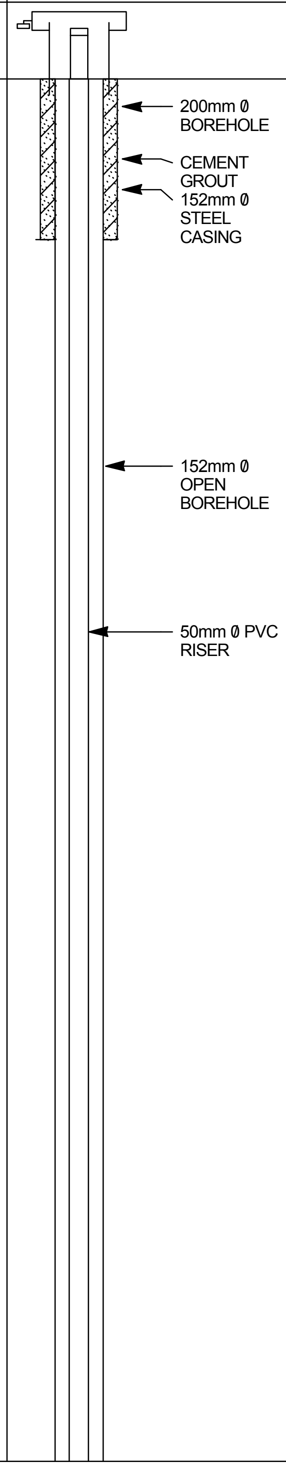
STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: EAST CELL RECHARGE SYSTEM
PROJECT NUMBER: 10978
CLIENT: DUFFERIN AGGREGATES
LOCATION: MILTON QUARRY

HOLE DESIGNATION: MW319A-10
DATE COMPLETED: 2/10/2010
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: R. CURRY

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	TOP OF CASING	343.83					
	GROUND SURFACE	343.10					
	SILT, brown						
	DOLOSTONE (Amabel Formation), white	341.73					
	- yellow at 9.14m BGS						
	- grey at 24.38m BGS						

Depth scale (m BGS): 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: EAST CELL RECHARGE SYSTEM
PROJECT NUMBER: 10978
CLIENT: DUFFERIN AGGREGATES
LOCATION: MILTON QUARRY

HOLE DESIGNATION: MW319A-10
DATE COMPLETED: 2/10/2010
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: R. CURRY

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
36.78	DOLOSTONE (Reynales Formation), shale, dark grey	306.52	50mm Ø PVC SCREEN				
39.32	SHALE (Cabot Head Formation), green	303.78					
39.78	END OF BOREHOLE @ 39.78m BGS Note: Stratigraphy based on driller's records	303.32					

Depth scale: 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48

WELL DETAILS
Screened interval:
306.32 to 303.32m AMSL
36.78 to 39.78m BGS
Length: 3m
Diameter: 50mm
Slot Size: #10
Material: PVC

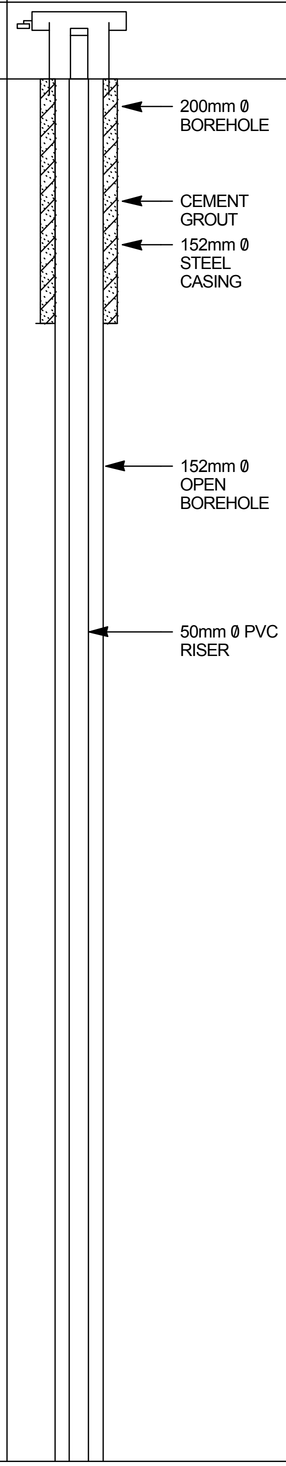
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: EAST CELL RECHARGE SYSTEM
PROJECT NUMBER: 10978
CLIENT: DUFFERIN AGGREGATES
LOCATION: MILTON QUARRY

HOLE DESIGNATION: MW321A-10
DATE COMPLETED: 2/23/2010
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: R. CURRY

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
	TOP OF CASING	340.94					
	GROUND SURFACE	340.19					
	SILT (TILL), fine sand and stone, brown						
2	DOLOSTONE (Amabel Formation), brown/yellow, fractured	338.67					
4	- yellow/white at 3.66m BGS						
6							
8							
10							
12							
14							
16							
18							
20							
22	- grey at 21.34m BGS						
24							



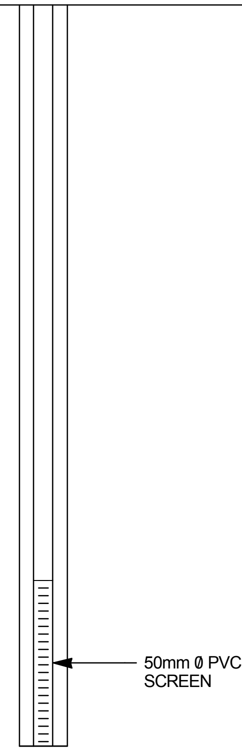
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: EAST CELL RECHARGE SYSTEM
PROJECT NUMBER: 10978
CLIENT: DUFFERIN AGGREGATES
LOCATION: MILTON QUARRY

HOLE DESIGNATION: MW321A-10
DATE COMPLETED: 2/23/2010
DRILLING METHOD: AIR ROTARY
FIELD PERSONNEL: R. CURRY

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' VALUE
26							
28							
30							
32							
34							
	DOLOSTONE (Reynales Formation), shale, dark grey	305.14					
36			50mm Ø PVC SCREEN				
38	SHALE (Cabot Head Formation), green	302.09					
	END OF BOREHOLE @ 38.40m BGS Note: Stratigraphy based on driller's records	301.79	WELL DETAILS Screened interval: 304.79 to 301.79m AMSL 35.40 to 38.40m BGS Length: 3m Diameter: 50mm Slot Size: #10 Material: PVC				
40							
42							
44							
46							
48							



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

TABLE 1

OVERBURDEN OBSERVATION WELL LOG

BH1-80A

FROM	TO	DESCRIPTION
0	11	Clayey Sand and Gravel

Water found - 5 feet

Standpipe installed

TABLE 2

UNCASED BEDROCK OBSERVATION WELL LOGS

OW1-80

FROM	TO (Feet)	DESCRIPTION
0	3.5	Clayey Loam Till
3.5	55	Limestone

Water found - 7 feet

OW2-80

FROM	TO (Feet)	DESCRIPTION
0	4.5	Clayey Loam Till
4.5	55	Limestone

Water found - 17 feet
- 22 feet

OW3-80

FROM	TO	DESCRIPTION
0	1	Clayey Loam Till
1	55	Limestone

Water found - 25 feet

BOREHOLE NO. OW3-1-I

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: FEBRUARY, 1999
BOREHOLE TYPE: 89 mm AIRTRACK
GEOLOGIST: WDN
GROUND ELEVATION: 343.20 mASL
REVIEWER: DSM

DEPTH (m)		STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE: TYPE	SAMPLE: 'N' VALUE	SAMPLE: % WATER	SAMPLE: % RECOVERY	SAMPLE: RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 Wp WL	REMARKS
0	1.2	OVERBURDEN										102 mm STEEL CASING TO 1.8 m
2		DOLOSTONE										GEOLOGY BASED ON DRILLER'S RECORD
4												
6												
8												
10												
12												
14												
16												
18												
20												

BOREHOLE NO. OW3-1-I

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: FEBRUARY, 1999
BOREHOLE TYPE: 89 mm AIRTRACK
GEOLOGIST: WDN
GROUND ELEVATION: 343.20 mASL
REVIEWER: DSM

DEPTH (m)		STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE					CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
					TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)			
20												
22												
24												
26												
28												
30												
32												
34												
36												
38	38.7	SHALE										
40	39.9	BOREHOLE TERMINATED AT 39.9 m IN SHALE										

BOREHOLE NO. OW3-1-II

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: FEBRUARY, 1999
BOREHOLE TYPE: 89 mm AIRTRACK
GEOLOGIST: WDN
GROUND ELEVATION: 343.20 mASL
REVIEWER: DSM

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE: TYPE	SAMPLE: 'N' VALUE	SAMPLE: % WATER	SAMPLE: % RECOVERY	SAMPLE: RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0 – 1.2	OVERBURDEN										102 mm STEEL CASING TO 1.5 m
1.2 – 18.0	DOLOSTONE										GEOLOGY BASED ON DRILLER'S RECORD
18.0	BOREHOLE TERMINATED AT 18.0 m IN DOLOSTONE										

May 2000

Jacques Whitford Limited

BOREHOLE NO. OW3-1-III

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: FEBRUARY, 1999
BOREHOLE TYPE: 89 mm AIRTRACK
GEOLOGIST: WDN
GROUND ELEVATION: 343.20 mASL
REVIEWER: DSM

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0 – 1.2	OVERBURDEN										102 mm STEEL CASING TO 1.4 m
1.2 – 11.3	DOLOSTONE										GEOLOGY BASED ON DRILLER'S RECORD
11.3	BOREHOLE TERMINATED AT 11.3 m IN DOLOSTONE										

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

May 2000

Jacques Whitford Limited

BOREHOLE NO. OW3-2-I

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: FEBRUARY, 1999
BOREHOLE TYPE: 89 mm AIRTRACK
GEOLOGIST: WDN
GROUND ELEVATION: 342.24 mASL
REVIEWER: DSM

DEPTH (m)		STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0		OVERBURDEN										102 mm STEEL CASING TO 2.0 m
	1.2	DOLOSTONE										GEOLOGY BASED ON DRILLER'S RECORD
2												
4												
6												
8												
10												
12												
14												
16												
18												
20												

BOREHOLE NO. OW3-2-I

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: FEBRUARY, 1999
BOREHOLE TYPE: 89 mm AIRTRACK
GEOLOGIST: WDN
GROUND ELEVATION: 342.24 mASL
REVIEWER: DSM

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE: TYPE	SAMPLE: 'N' VALUE	SAMPLE: % WATER	SAMPLE: % RECOVERY	SAMPLE: RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / Wp WL	REMARKS
20–31.0											
31.0	LIMESTONE SOFT										
33.5	DOLOSTONE										
35.3	SHALE										
37.7	BOREHOLE TERMINATED AT 37.7 m IN SHALE										

Depth scale: 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40

BOREHOLE NO. OW3-2-II

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: FEBRUARY, 1999
BOREHOLE TYPE: 89 mm AIRTRACK
GEOLOGIST: WDN
GROUND ELEVATION: 342.39 mASL
REVIEWER: DSM

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE: TYPE	SAMPLE: 'N' VALUE	SAMPLE: % WATER	SAMPLE: % RECOVERY	SAMPLE: RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / Wp WL	REMARKS
0	OVERBURDEN										102 mm STEEL CASING TO 2.0 m
1.2	DOLOSTONE										GEOLOGY BASED ON DRILLER'S RECORD
17.7	BOREHOLE TERMINATED AT 17.7 m IN DOLOSTONE										

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

May 2000

Jacques Whitford Limited

BOREHOLE NO. OW3-2-III

PROJECT NAME: MILTON QUARRY EXTENSION — PROJECT NO.: 890085.25

CLIENT: DUFFERIN AGGREGATES — DATE: FEBRUARY, 1999

BOREHOLE TYPE: 89 mm AIRTRACK — GEOLOGIST: WDN

GROUND ELEVATION: 342.05 mASL — REVIEWER: DSM

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE: TYPE	SAMPLE: 'N' VALUE	SAMPLE: % WATER	SAMPLE: % RECOVERY	SAMPLE: RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / Wp WL	REMARKS
0 – 1.2	OVERBURDEN										102 mm STEEL CASING TO 1.8 m
1.2 – 10.3	DOLOSTONE										GEOLOGY BASED ON DRILLER'S RECORD AT 5.5 m WATER COMING INTO HOLE AT 8.7 m FRACTURED ZONE WITH WATER
10.3	BOREHOLE TERMINATED AT 10.3 m IN DOLOSTONE										

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

May 2000

Jacques Whitford Limited

BOREHOLE NO. OW3-3-I

PROJECT NAME: MILTON QUARRY EXTENSION

PROJECT NO.: 890085.25

CLIENT: DUFFERIN AGGREGATES

DATE: FEBRUARY, 1999

BOREHOLE TYPE: 89 mm AIRTRACK

GEOLOGIST: WDN

GROUND ELEVATION: 344.89 mASL

REVIEWER: DSM

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE: TYPE	SAMPLE: 'N' VALUE	SAMPLE: % WATER	SAMPLE: % RECOVERY	SAMPLE: RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / WP WL	REMARKS
0											
0.9	OVERBURDEN										102 mm STEEL CASING TO 1.4 m
	DOLOSTONE										GEOLOGY BASED ON DRILLER'S RECORD
2											
4											
6											
8											
10											
12											
14											
16											
18											
20											

BOREHOLE NO. OW3-3-I

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: FEBRUARY, 1999
BOREHOLE TYPE: 89 mm AIRTRACK
GEOLOGIST: WDN
GROUND ELEVATION: 344.89 mASL
REVIEWER: DSM

DEPTH (m)		STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE "N" VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / Wp WL	REMARKS
20												
22												
24												
26												
28												
30												
32												
34												
36												
38												
	39.5	SHALE										
	39.5	DOLOSTONE										
40												

PROJECT NAME: MILTON QUARRY EXTENSION **PROJECT NO.:** 890085.25

CLIENT: DUFFERIN AGGREGATES **DATE:** FEBRUARY, 1999

BOREHOLE TYPE: 89 mm AIRTRACK **GEOLOGIST:** WDN

GROUND ELEVATION: 344.89 mASL **REVIEWER:** DSM

DEPTH (m)		STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 SHEAR STRENGTH	WATER CONTENT % 10 20 30 W_P W_L	REMARKS
40												
	41.4											
42		SHALE										
	42.3	BOREHOLE TERMINATED AT 42.3 m IN SHALE										
44												
46												
48												
50												
52												
54												
56												
58												
60												

BOREHOLE NO. OW3-3-II

PROJECT NAME: MILTON QUARRY EXTENSION
PROJECT NO.: 890085.25
CLIENT: DUFFERIN AGGREGATES
DATE: FEBRUARY, 1999
BOREHOLE TYPE: 89 mm AIRTRACK
GEOLOGIST: WDN
GROUND ELEVATION: 344.89 mASL
REVIEWER: DSM

DEPTH (m)		STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE: TYPE	SAMPLE: 'N' VALUE	SAMPLE: % WATER	SAMPLE: % RECOVERY	SAMPLE: RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0	0.9	OVERBURDEN										102 mm STEEL CASING TO 1.3 m
2		DOLOSTONE										GEOLOGY BASED ON DRILLER'S RECORD
4												
6												
8												
10												
12												
14												
16												
18	18.8											
20		BOREHOLE TERMINATED AT 18.8 m IN DOLOSTONE										

May 2000

Jacques Whitford Limited

BOREHOLE NO. OW3-3-III

PROJECT NAME: MILTON QUARRY EXTENSION — **PROJECT NO.:** 890085.25

CLIENT: DUFFERIN AGGREGATES — **DATE:** FEBRUARY, 1999

BOREHOLE TYPE: 89 mm AIRTRACK — **GEOLOGIST:** WDN

GROUND ELEVATION: 344.87 mASL — **REVIEWER:** DSM

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE: TYPE	SAMPLE: 'N' VALUE	SAMPLE: % WATER	SAMPLE: % RECOVERY	SAMPLE: RQD (%)	CONE PENETRATION "N" VALUE 10 20 30 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0 – 0.9	OVERBURDEN										102 mm STEEL CASING TO 1.4 m
0.9 – 10.9	DOLOSTONE										GEOLOGY BASED ON DRILLER'S RECORD
10.9	BOREHOLE TERMINATED AT 10.9 m IN DOLOSTONE										

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

TABLE 2 (Continued)

OW4-80

FROM	TO (Feet)	DESCRIPTION
0	3	Clayey Loam Till
3	55	Limestone

Water found - 29 feet

OW5-80

FROM	TO (Feet)	DESCRIPTION
0	3	Clayey Loam Till
3	55	Limestone

Water found - 21 feet

OW6-80

FROM	TO (Feet)	DESCRIPTION
0	1	Clayey Loam Till
1	55	Limestone

Water found - 11 feet
- 50 feet

OW7-80

FROM	TO (Feet)	DESCRIPTION
0	2.5	Clayey Loam Till
2.5	38	Limestone

Water found - 20 feet
- 30 feet

TABLE 3

CASED BEDROCK OBSERVATION WELL LOGS

OW10-80

FROM	TO (Feet)	DESCRIPTION
0	1	Topsoil
1	5	Clay with Stones
5	33	Grey Limestone
33	56	Light Brown Limestone
56	90	Light Grey Limestone
90	120	Medium Grey Limestone

OW11-80

FROM	TO (Feet)	DESCRIPTION
0	1	Topsoil
1	5	Clay with Stones
5	33	Grey Limestone
33	56	Light Brown Limestone
56	90	Light Grey Limestone
90	122	Medium Grey Limestone
122	129	Greenish Grey Limestone
129	135	Grey Shale
135	145	Red Shale

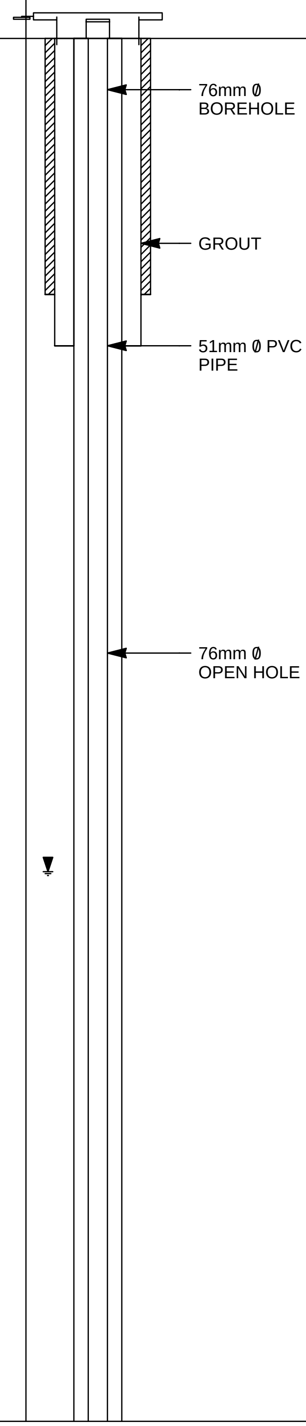
STRATIGRAPHIC AND INSTRUMENTATION LOG
(BEDROCK)

PROJECT NAME: DUFFERIN QUARRY
PROJECT NUMBER: 10978-05
CLIENT: DUFFERIN AGGREGATES
LOCATION: REGION OF HALTON, ONTARIO

HOLE DESIGNATION: OW19-03
DATE COMPLETED: July 17, 2003
DRILLING METHOD: ROTARY PERCUSSION
FIELD PERSONNEL: DAN BANKS

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
	TOP OF RISER	342.976				
	GROUND SURFACE	342.36				
	OVERBURDEN					
2.44	DOLOSTONE (Amabel Formation)	339.92				

Depth scale: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26



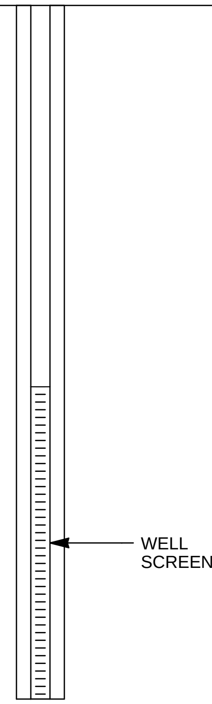
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
STATIC WATER LEVEL ▼ JULY 22, 2003

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: DUFFERIN QUARRY
PROJECT NUMBER: 10978-05
CLIENT: DUFFERIN AGGREGATES
LOCATION: REGION OF HALTON, ONTARIO

HOLE DESIGNATION: OW19-03
DATE COMPLETED: July 17, 2003
DRILLING METHOD: ROTARY PERCUSSION
FIELD PERSONNEL: DAN BANKS

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
28						
30						
32						
34						
36						
38	- DOLOSTONE (Reynales Formation)					
40	SHALE (Cabot Head) - contact is approximate	302.43				
	END OF BOREHOLE @ 40.54m BGS	301.82				
42						
44						
46						
48						
50						
52						



WELL DETAILS
Screened interval:
307.91 to 301.82m AMSL
34.44 to 40.54m BGS
Length: 6.1m
Diameter: 51mm
Slot Size: #10
Material: PVC

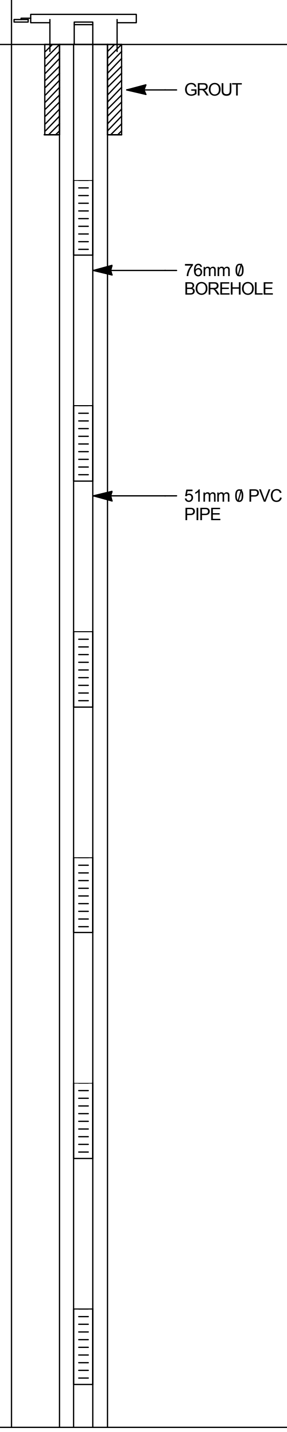
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
STATIC WATER LEVEL ▼ JULY 22, 2003

STRATIGRAPHIC AND INSTRUMENTATION LOG
(BEDROCK)

PROJECT NAME: MILTON QUARRY
PROJECT NUMBER: 10978-34
CLIENT: DUFFERIN AGGREGATES
LOCATION: REGION OF HALTON, ONTARIO

HOLE DESIGNATION: OW58-07
DATE COMPLETED: March 19, 2007
DRILLING METHOD: AIR DRILLING
FIELD PERSONNEL: C. HOLEYWELL

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %	
	TOP OF CASING	341.44					
	GROUND SURFACE	340.95					
	OVERBURDEN						
2	BEDROCK (AMABEL/REYNALES DOLOMITE FORMATION)	339.12					
4							
6							
8							
10							
12							
14							
16							
18							
20							
22							
24							
26							



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG
(BEDROCK)

PROJECT NAME: MILTON QUARRY
PROJECT NUMBER: 10978-34
CLIENT: DUFFERIN AGGREGATES
LOCATION: REGION OF HALTON, ONTARIO

HOLE DESIGNATION: OW58-07
DATE COMPLETED: March 19, 2007
DRILLING METHOD: AIR DRILLING
FIELD PERSONNEL: C. HOLEYWELL

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
	SHALE (CABOT HEAD FORMATION)	305.59				
	END OF BOREHOLE @ 36.27m BGS	304.68				

Depth scale: 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54

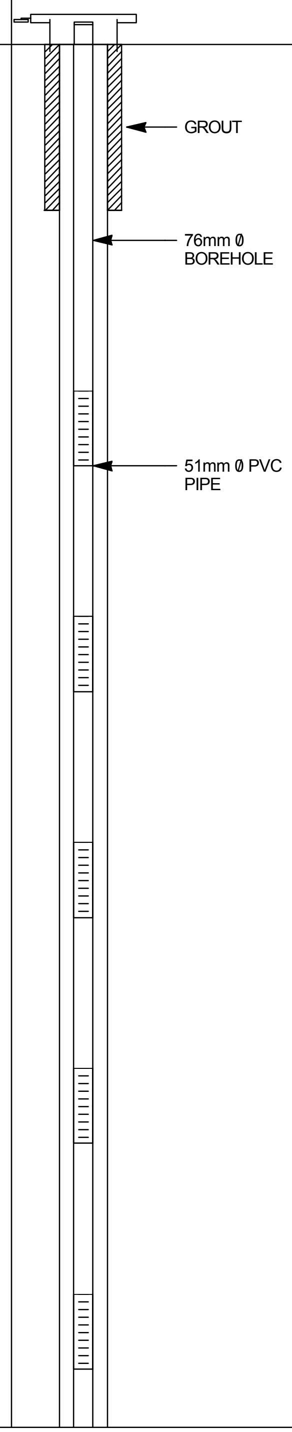
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG
(BEDROCK)

PROJECT NAME: MILTON QUARRY
PROJECT NUMBER: 10978-34
CLIENT: DUFFERIN AGGREGATES
LOCATION: REGION OF HALTON, ONTARIO

HOLE DESIGNATION: OW59-07
DATE COMPLETED: March 22, 2007
DRILLING METHOD: AIR DRILLING
FIELD PERSONNEL: C. HOLEYWELL

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
	TOP OF CASING	344.17				
	GROUND SURFACE	343.75				
	OVERBURDEN					
3.36	BEDROCK (AMABEL/REYNALES DOLOMITE FORMATION)	340.39				



Depth scale (m BGS): 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26

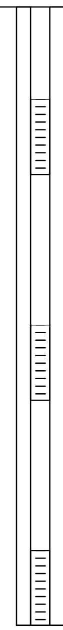
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: MILTON QUARRY
PROJECT NUMBER: 10978-34
CLIENT: DUFFERIN AGGREGATES
LOCATION: REGION OF HALTON, ONTARIO

HOLE DESIGNATION: OW59-07
DATE COMPLETED: March 22, 2007
DRILLING METHOD: AIR DRILLING
FIELD PERSONNEL: C. HOLEYWELL

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
30						
32						
34						
36						
38						
40	SHALE (CABOT HEAD FORMATION)	303.82				
	END OF BOREHOLE @ 40.54m BGS	303.21				
42						
44						
46						
48						
50						
52						
54						



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: MILTON QUARRY
PROJECT NUMBER: 10978-34
CLIENT: DUFFERIN AGGREGATES
LOCATION: REGION OF HALTON, ONTARIO

HOLE DESIGNATION: OW69-08
DATE COMPLETED: March 19, 2008
DRILLING METHOD: ROTARY PERCUSSION
FIELD PERSONNEL: M. SCHRIVER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
	TOP OF CASING	336.49				
	TOP OF RISER	336.15				
	GROUND SURFACE	335.86				
	OVERBURDEN					
	AMABEL FORMATION	334.34	95mm Ø STEEL CASING WITH CEMENT			
2						
4						
	- water bearing fracture at 5.33m BGS					
6						
8						
10						
	- fracture, void at 11.13m BGS					
12						
14						
16						
	- fracture, void at 16.92m BGS		50mm PVC PIPE			
18						
20						
22			72mm Ø BOREHOLE			
24						
26						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: MILTON QUARRY
PROJECT NUMBER: 10978-34
CLIENT: DUFFERIN AGGREGATES
LOCATION: REGION OF HALTON, ONTARIO

HOLE DESIGNATION: OW69-08
DATE COMPLETED: March 19, 2008
DRILLING METHOD: ROTARY PERCUSSION
FIELD PERSONNEL: M. SCHRIVER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
30	REYNALES FORMATION	305.69				
	CABOT HEAD FORMATION - red shale at 32.00m BGS	304.77				
32	END OF BOREHOLE @ 32.31m BGS	303.55				

Depth scale (m BGS): 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54

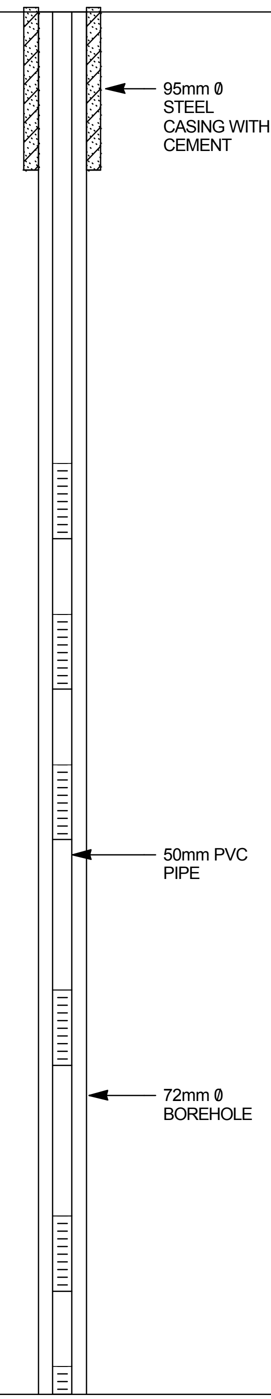
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: MILTON QUARRY
PROJECT NUMBER: 10978-34
CLIENT: DUFFERIN AGGREGATES
LOCATION: REGION OF HALTON, ONTARIO

HOLE DESIGNATION: OW70-08
DATE COMPLETED: March 20, 2008
DRILLING METHOD: ROTARY PERCUSSION
FIELD PERSONNEL: M. SCHRIVER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
	TOP OF CASING	343.44				
	TOP OF RISER	343.14				
	GROUND SURFACE	342.93				
	OVERBURDEN					
	AMABEL FORMATION	341.64				
8	- water bearing fracture at 7.92m BGS					
10	- water bearing fracture at 9.75m BGS					
16	- water bearing fracture at 16.31m BGS					
22	- fracture at 21.34m BGS					



Depth scale (m BGS): 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26

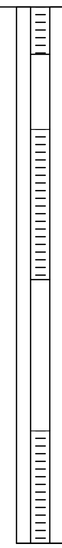
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG (BEDROCK)

PROJECT NAME: MILTON QUARRY
PROJECT NUMBER: 10978-34
CLIENT: DUFFERIN AGGREGATES
LOCATION: REGION OF HALTON, ONTARIO

HOLE DESIGNATION: OW70-08
DATE COMPLETED: March 20, 2008
DRILLING METHOD: ROTARY PERCUSSION
FIELD PERSONNEL: M. SCHRIVER

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	MONITOR INSTALLATION	RUN NUMBER	CORE RECOVERY %	RQD %
36.4	REYNALES FORMATION	306.35				
37.3	CABOT HEAD FORMATION - red shale at 38.10m BGS	305.44				
38.86	END OF BOREHOLE @ 38.86m BGS	304.07				



Depth scale (m BGS): 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54

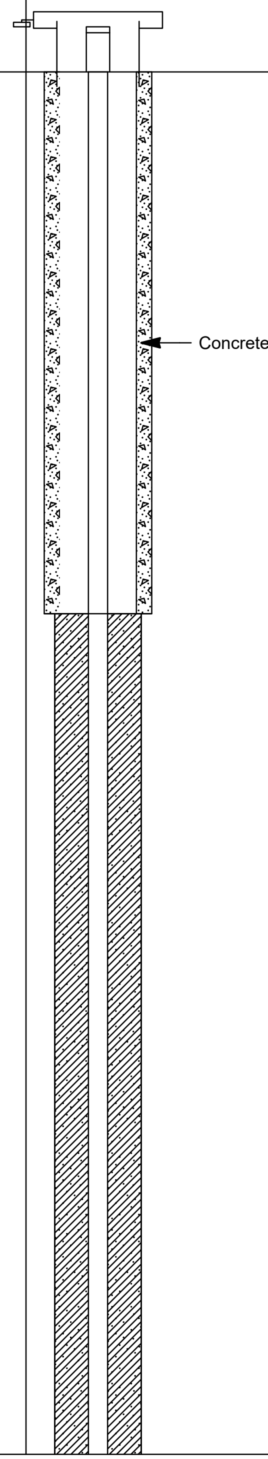
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW78D-20
DATE COMPLETED: 5 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	NORTHING: 4822478.1 / EASTING: 583082.2 — TOP OF RISER / GROUND SURFACE	339.87 / 339.05					
0.0–1.05	SANDY SILT, with clay and gravel, trace cobbles, stiff, some plasticity, dark brown, moist to wet, organic material present						
1.05–1.50	BOULDER-AMABEL DOLOSTONE, fissile, weathered	337.98	Concrete				
1.50–2.13	SILT, with sand and gravel, stiff, cohesive, reddish brown, moist	337.53					
2.13–	AMABEL DOLOSTONE, dark to light grey, medium crystallization, sacchroidal, fossiliferous, vug/void and fossil molds, brachiapods, crinoids, corals	336.92					
	- vug at 3.38m BGS						
	- vug, secondary crystallization present at 4.19m BGS						
	- mottled dark and light grey at 5.03m BGS						
	- stylolites at 5.41m BGS						
	- iron oxidation present in fissure at 6.46m BGS						
	- calcite secondary crystallization in fissure at 6.77m BGS						



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW78D-20
DATE COMPLETED: 5 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- mottled grey to light grey, fissures reduced at 7.01m BGS						
	- large stylolite at 7.24m BGS						
7.5	- fracture, secondary crystallization in clay fines present at 7.54m BGS						
8.0	- stylolite at 8.15m BGS						
8.5							
9.0	- fractured vug, secondry crystallization and brown clay at 8.99m BGS						
	- fractures/vug with secondary crystallization and brown clay at 9.07m BGS						
9.5	- fracture with brown fines and crystallization at 9.20m BGS						
	- vuggy zone, vugs 0.5 to 3cm from 9.57 to 10.67m BGS						
10.0							
10.5							
11.0	- fracture at 11.00m BGS						
	- stylolite at 11.20m BGS						
11.5	- fracture, secondary crystallization present at 11.49m BGS						
12.0	- fracture at 12.04m BGS						
12.5	- stylolite, vuggy zone, argilliceous, slight weathering around vugs, clay minerals infilling vugs and stylolites, vugs <1mm to 3cm from 12.31 to 13.81m BGS						
13.0							
13.5							

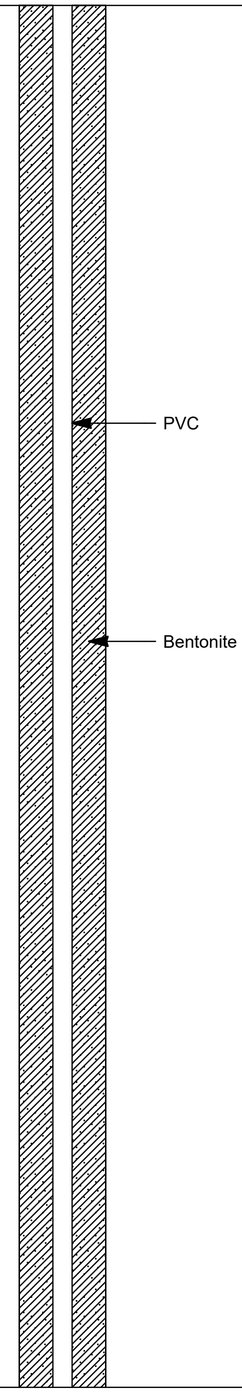
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW78D-20
DATE COMPLETED: 5 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- fracture, slight weathering or mineralization at 14.23m BGS						
14.5	- fracture, slight weathering or mineralization at 14.48m BGS						
	- stylolite at 14.55m BGS						
15.0							
15.5							
16.0	- stylolite and vug at 16.08m BGS		PVC				
	- stylolites from 16.38 to 16.46m BGS						
16.5							
17.0	- stylolite and fracture with secondary mineralization at 17.10m BGS		Bentonite				
	- slight weathering, 1-inch vugs, several small stylolites present in zone from 17.22 to 17.83m BGS						
17.5							
18.0							
18.5	- stylolite at 18.59m BGS						
19.0							
19.5	- stylolite at 19.51m BGS						
	- increase in porosity from 19.57 to 22.48m BGS						
20.0							
20.5							



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW78D-20
DATE COMPLETED: 5 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
21.5							
22.0							
22.5							
23.0	- stylolite at 23.01m BGS						
	- fracture at 23.32m BGS						
23.5							
24.0	- fracture, with second crystalization at 23.93m BGS						
24.5							
25.0							
	- fracture and vug at 25.22m BGS						
25.5	- styrolites from 25.42 to 26.14m BGS						
26.0	- fracture, slight weathering at 26.14m BGS						
26.5	- stylolite at 26.44m BGS						
	- stylolite at 26.75m BGS						
27.0							
27.5	- stylolite at 27.49m BGS						

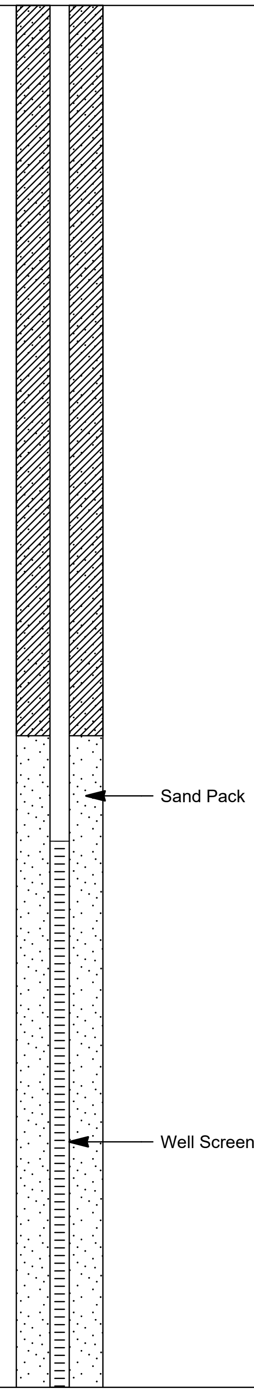
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW78D-20
DATE COMPLETED: 5 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- increase in porosity from 28.04 to 29.57m BGS						
28.5							
29.0	- stylolites, minor stylolites every 2 inches to 1 ft from 28.96 to 34.20m BGS						
29.5							
30.0							
30.5							
31.0							
31.5							
32.0			Sand Pack				
32.5							
33.0							
33.5			Well Screen				
34.0							
34.5	REYNALES FORMATION-DOLOSTONE, dark grey, shale partings and lamindations, fine grained, argilliceous, little porosity, pyrite present	304.61					



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW78D-20
DATE COMPLETED: 5 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- clay seam, grey at 34.67m BGS - clay seam, grey at 35.20m BGS						
	END OF BOREHOLE @ 35.28m BGS	303.77	WELL DETAILS Screened interval: 306.82 to 303.77AMSL 32.23 to 35.28m BGS Length: 3.05m Diameter: 51mm Slot Size: #10 Material: PVC Sand Pack: 307.35 to 303.77AMSL 31.70 to 35.28m BGS Material: Silica				
35.5							
36.0							
36.5							
37.0							
37.5							
38.0							
38.5							
39.0							
39.5							
40.0							
40.5							
41.0							
41.5							

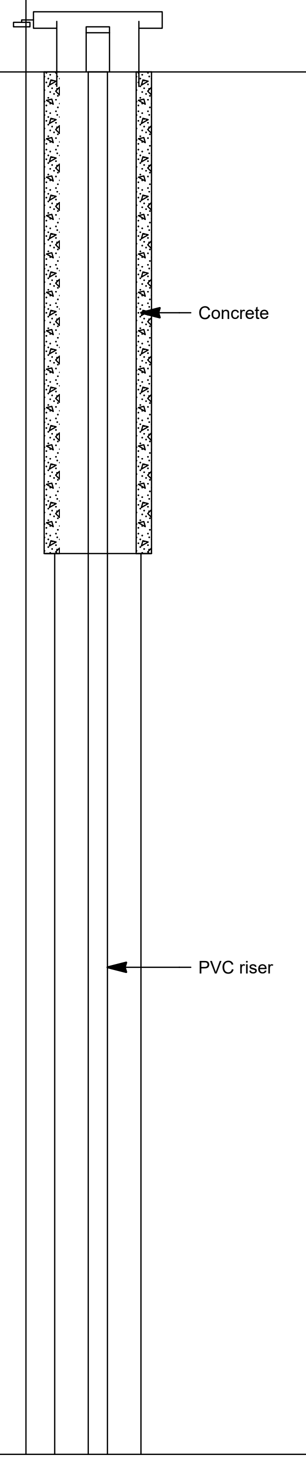
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW78S-20
DATE COMPLETED: 6 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: INTERVAL	SAMPLE: REC (%)	SAMPLE: 'N' Value
	NORTHING: 4822480.1 / EASTING: 583080.7 — TOP OF RISER / GROUND SURFACE	339.99 / 338.99					
0.0–0.91	SANDY SILT, with clay and gravel, trace cobbles, stiff, semi-plastic, dark brown to brown, moist to wet, organic material present						
0.91	AMABEL FORMATION-DOLOSTONE, dark to light grey, medium crystallization, sacchroidal, fossiliferrous, vug/void and fossil molds, brachipods, crinoids, corals - vugs 51mm to 3cm, some secondary crystallization in voids/vugs - vugs/voids throughout - weathered from 1.83 to 2.13m BGS	338.08					
	- vug at 3.38m BGS						
	- vug, secondary crystallization present at 4.19m BGS - fractured, slightly weathered at 4.42m BGS						
	- mottled dark and light grey at 5.03m BGS						
	- stylolites at 5.41m BGS						
	- iron oxidation present in fissure at 6.46m BGS - calcite secondary crystallization in fissure at 6.77m BGS						



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW78S-20
DATE COMPLETED: 6 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- mottled grey to light grey, fissures reduced at 7.01m BGS						
	- large stylolite at 7.24m BGS						
7.5	- fracture, secondary crystallization in clay fines present at 7.54m BGS						
8.0	- stylolite at 8.15m BGS						
8.5							
9.0	- fractured vug, secondry crystallization and brown clay at 8.99m BGS						
	- fractures/vug with secondary crystallization and brown clay at 9.07m BGS						
9.5	- fracture with brown fines and crystallization at 9.20m BGS						
	- vuggy zone, vugs 0.5 to 3cm from 9.57 to 10.67m BGS						
10.0							
10.5							
11.0	- fracture at 11.00m BGS						
	- stylolite at 11.20m BGS						
11.5	- fracture, secondary crystallization present at 11.49m BGS						
12.0	- fracture at 12.04m BGS						
	END OF BOREHOLE @ 12.25m BGS	326.74	WELL DETAILS Open Hole Interval: 336.55 to 326.74AMSL 2.44 to 12.25m BGS				
12.5							
13.0							
13.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

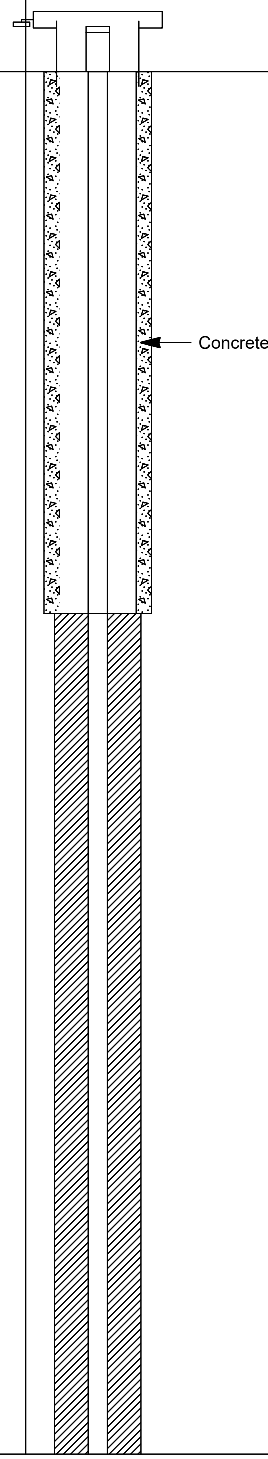
STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW79D-20
DATE COMPLETED: 6 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	NORTHING: 4822817.7 / TOP OF RISER	341.70					
	EASTING: 583204.2 / GROUND SURFACE	340.76					
0.0–0.76	TOPSOIL, silt with sand, clay and gravel, trace cobbles, stiff, semi-plastic, dark brown moist, organic material persent	340.00					
0.76–1.07	SANDY SILT, with gravel, trace cobbles, stiff, cohesive, brown, moist	339.69					
1.07–	AMABEL FORMATION-DOLOSTONE, dark to white-grey, medium crystallization, sacchroidal, fossiliferous, slightly weathered, vug/void and fossil molds, crinoids, coral, brachiopods, fractured and vuggy						
4.0	- large vug, fractures with secondary mineralization in fractures from 4.05 to 9.60m BGS						
4.5	- vugs and fractures, secondary crystallization present at 4.50m BGS						
5.1	- vugs and fractures, secondary crystallization present at 5.11m BGS						
5.3	- color change to grey, vugs and fractures, secondary crystallization present at 5.30m BGS						
5.4	- vugs and fractures, secondary crystallization present at 5.41m BGS						
5.7	- vugs and fractures, secondary crystallization present at 5.72m BGS						
6.25	- vugs and fractures, secondary crystallization present at 6.25m BGS						

Depth scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW79D-20
DATE COMPLETED: 6 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- vugs and fractures, secondary crystallization present at 7.16m BGS						
7.5	- vugs and fractures, secondary crystallization present at 7.24m BGS						
8.0	- vugs and fractures, secondary crystallization present at 8.05m BGS						
	- vugs and fractures, secondary crystallization present at 8.32m BGS						
8.5	- vugs and fractures, secondary crystallization present at 8.76m BGS						
9.0							
9.5	- vugs and fractures, secondary crystallization present at 9.45m BGS						
	- vugs and fractures, secondary crystallization present at 9.60m BGS						
10.0	- increased fine grained (argilliceous), color is mottled grey and dark grey at 9.68m BGS						
	- fractured stylolites at 9.88m BGS						
	- fractured stylolites at 10.21m BGS						
10.5	- fractured stylolites at 10.42m BGS						
11.0	- vuggy zone at 11.13m BGS						
11.5	- vuggy zone at 11.43m BGS						
	- void from 11.67 to 11.95m BGS						
12.0	- vug, large vugs, secondary crystallation from 12.12 to 12.25m BGS						
12.5	- dark grey, argilliceous from 12.28 to 12.73m BGS						
	- shaley seam, color becomes mottled light to dark grey at 12.42m BGS						
13.0	- large vug/fracture, secondary crystallization at 12.86m BGS						
13.5	- increased porosity at 13.56m BGS						
	- stylolite fracture, secondary crystallization in						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW79D-20
DATE COMPLETED: 6 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	fractures at 13.87m BGS						
14.5	- stylolite fracture, secondary crystallization in fractures at 14.48m BGS - stylolite fracture, secondary crystallization in fractures at 14.69m BGS						
15.0	- stylolite fracture, secondary crystallization in fractures at 15.16m BGS						
15.5	- stylolite at 15.47m BGS						
16.0	- fracture/stylolite, secondary crystallization at 16.25m BGS		PVC				
16.5							
17.0	- vug/void, sidorite crystals present from 16.82 to 16.99m BGS - argilliceous, shaley, dark grey to black seams from 16.92 to 17.37m BGS		Bentonite				
17.5							
18.0							
18.5	- fracture with secondary crystallization and fines at 18.44m BGS - fracture with secondary crystallization and fines at 18.52m BGS						
19.0	- minor stylolites at 18.93m BGS						
19.5	- fracture, secondary crystallization at 19.35m BGS						
20.0							
20.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW79D-20
DATE COMPLETED: 6 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- fracture, secondary crystallization at 21.26m BGS						
21.5							
22.0							
22.5							
23.0							
23.5							
24.0							
24.5							
25.0	- minor fractures at 25.09m BGS - minor fractures at 25.22m BGS						
25.5							
26.0	- minor fractures at 26.14m BGS						
26.5							
27.0							
27.5	- minor fractures, increased porosity at 27.77m BGS						

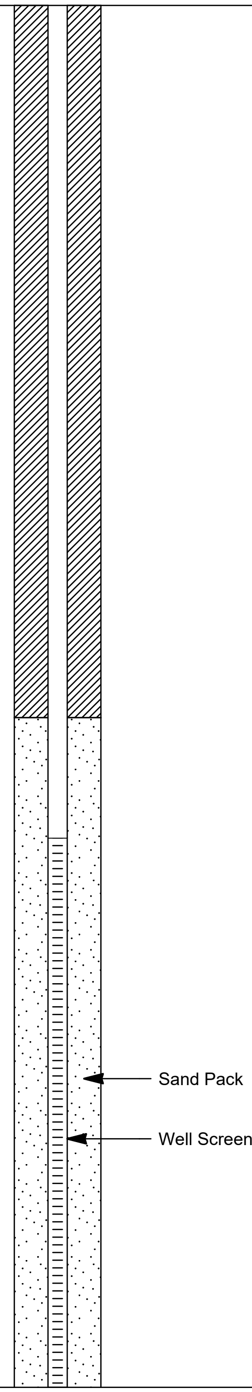
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW79D-20
DATE COMPLETED: 6 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- minor fractures at 27.97m BGS						
28.5	- verticle inclined fracture ~70 degrees, secondary crystallation, brown fines present, iron oxidation from 28.44 to 28.58m BGS						
29.0							
29.5	- argilliceous, shaley partings, dark grey to black from 29.38 to 29.49m BGS - stylolite with shaley material, black at 29.49m BGS - fractures, brown fines and secondary crystallization from 29.87 to 29.99m BGS						
30.0							
30.5							
31.0	- verticle fractures and stylolites, argilliceous, shaley material in stylolites from 31.24 to 31.62m BGS						
31.5							
32.0	- fracture, brown, secondary crystallization at 32.22m BGS						
32.5							
33.0	- shaley seams and stylolites from 33.01 to 33.10m BGS						
33.5							
34.0	- clay seams at 33.95m BGS	306.86					
	REYNALES FORMATION-DOLOSTONE, dark grey, shale partings and lamindations, fine grained, argilliceous, little porosity, pyrite present - clay seams at 34.06m BGS - clay seams at 34.63m BGS - clay seams at 34.66m BGS						
34.5							



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW79D-20
DATE COMPLETED: 6 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- vug, calcite crystals present, pyrite nodules through Reynales, shale partings and laminations at 34.90m BGS	305.49					
35.5	END OF BOREHOLE @ 35.27m BGS		WELL DETAILS Screened interval: 308.54 to 305.49AMSL 32.22 to 35.27m BGS Length: 3.05m Diameter: 51mm Slot Size: #10 Material: PVC Sand Pack: 309.15 to 305.49AMSL 31.61 to 35.27m BGS				
36.0							
36.5							
37.0							
37.5							
38.0							
38.5							
39.0							
39.5							
40.0							
40.5							
41.0							
41.5							

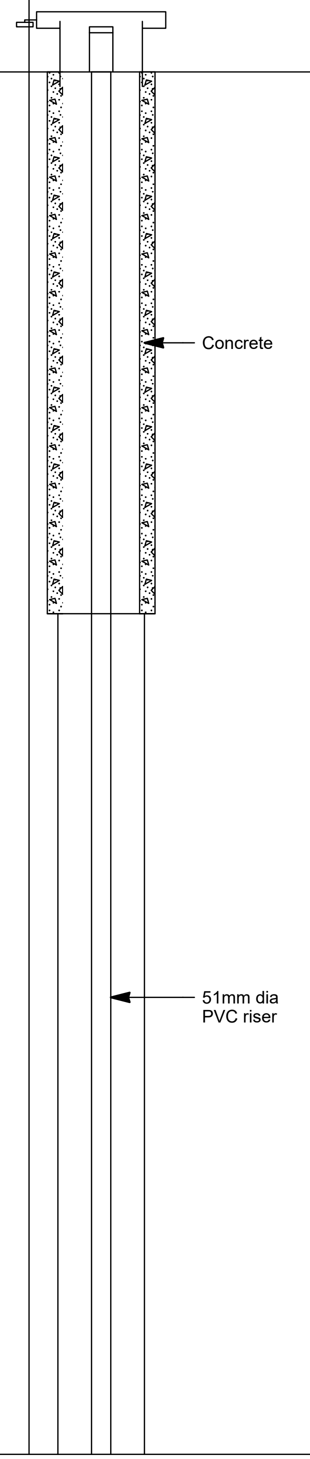
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW79S-20
DATE COMPLETED: 6 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE: NUMBER	INTERVAL	REC (%)	'N' Value
	NORTHING: 4822819.7 EASTING: 583202.3 TOP OF RISER / GROUND SURFACE	341.61 / 340.74					
0.0–1.22	SILT, with sand and clay and gravel, trace cobbles, stiff, semi-plastic, dark brown, moist, organics present						
1.22	AMABEL FORMATION-DOLOSTONE, dark to white-grey, medium crystallization, sacchroidal, fossiliferrous, slightly weathered, vug/void and fossil molds, crinoids, corals, brachiods, fractures and vuggy	339.52					
4.05	- large vug, fractures with secondary mineralization in fractures from 4.05 to 9.60m BGS						
4.50	- vugs and fractures, secondary crystallization present at 4.50m BGS						
5.11	- vugs and fractures, secondary crystallization present at 5.11m BGS						
5.30	- color change to grey, vugs and fractures, secondary crystallization present at 5.30m BGS						
5.41	- vugs and fractures, secondary crystallization present at 5.41m BGS						
5.72	- vugs and fractures, secondary crystallization present at 5.72m BGS						
6.25	- vugs and fractures, secondary crystallization present at 6.25m BGS						

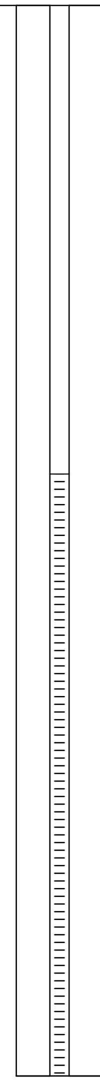


NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East	HOLE DESIGNATION: OW79S-20
PROJECT NUMBER: 11208056-200	DATE COMPLETED: 6 February 2020
CLIENT: Dufferin Aggregates	DRILLING METHOD: 4 1/4 HSA/HQ Core
LOCATION: Region of Halton, Ontario	FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- vugs and fractures, secondary crystallization present at 7.16m BGS						
7.5	- vugs and fractures, secondary crystallization present at 7.24m BGS						
8.0	- vugs and fractures, secondary crystallization present at 8.05m BGS						
	- vugs and fractures, secondary crystallization present at 8.32m BGS						
8.5	- vugs and fractures, secondary crystallization present at 8.76m BGS						
9.0							
9.5	- vugs and fractures, secondary crystallization present at 9.45m BGS						
	- vugs and fractures, secondary crystallization present at 9.60m BGS						
10.0	- increased fine grained (argilliceous), color is mottled grey and dark grey at 9.68m BGS						
	- fractured stylolites at 9.88m BGS						
	- fractured stylolites at 10.21m BGS						
10.5	- fractured stylolites at 10.42m BGS						
11.0	- vuggy zone at 11.13m BGS						
11.5	- vuggy zone at 11.43m BGS						
	- void from 11.67 to 11.95m BGS						
12.0	- vug, large vugs, secondary crystallation from 12.12 to 12.25m BGS						
	- dark grey, argilliceous at 12.28m BGS						
12.5	END OF BOREHOLE @ 12.42m BGS	328.32	WELL DETAILS Open Hole Interval: 338.00 to 328.32AMSL 2.74 to 12.42m BGS				
13.0							
13.5							



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW80-20
DATE COMPLETED: 10 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	NORTHING: 4822732.1 EASTING: 583310.1 TOP OF RISER / GROUND SURFACE	339.99 / 339.04					
0.0–0.61	SANDY SILT, cobbles, boulders, clay and gravel infill, brown, moist, organics, roots present		Concrete				
0.61	AMABEL FORMATION-DOLOSTONE, dark to white-grey, medium crystallization, sacchroidal, fossiliferrous, slight weathering, vug/void and fossil molds, crinoids, coral brachiopods, overburden infilling, voids and fractures	338.43					
	- vuggy, infilled with sand, bedrock is fractured and vuggy at 1.37m BGS						
	- stylolites at 4.36m BGS						
	- stylolites from 5.72 to 5.79m BGS						
	- voids (vugs) from 5.88 to 6.25m BGS						
	- mottled colouring, mudstone, abundant vugs and voids with secondary crystallization from 6.25 to 8.84m BGS						

Depth scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
HOLE DESIGNATION: OW80-20
PROJECT NUMBER: 11208056-200
DATE COMPLETED: 10 February 2020
CLIENT: Dufferin Aggregates
DRILLING METHOD: 4 1/4 HSA/HQ Core
LOCATION: Region of Halton, Ontario
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
7.5							
8.0	- 1mm to 15mm brecciated angular pieces in a mudstone matrix from 7.85 to 8.02m BGS - void, secondary crystallization, brown crystals from 8.02 to 8.23m BGS						
8.5	- mudstone, laminations inclined 45 degrees, light grey to dark bands from 8.23 to 8.38m BGS - mottled grey with vugs and secondary crystallization at 8.38m BGS						
9.0	- void from 8.84 to 9.07m BGS - competent dolostone, reduced porosity from 9.07 to 10.06m BGS						
9.5							
10.0	- increased porosity, mudstone, vuggy and voids at 10.06m BGS - stylolite, clay infilled at 10.15m BGS						
10.5	- large vugs from 10.29 to 10.59m BGS						
11.0	- fracture at 11.09m BGS - stylolite with vertical fracturing/jointing at 11.28m BGS						
11.5	- fracture and jointing at 11.64m BGS - clay seam, brown, mottled and increase in porosity at 11.81m BGS						
12.0	- stylolite at 12.19m BGS						
12.5	- verticle fracture from 12.53 to 12.73m BGS						
13.0	- fracture at 12.95m BGS - fracture at 13.20m BGS						
13.5	- fracture at 13.53m BGS - vug, siderite crystals at 13.64m BGS - stylolites at 13.94m BGS						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW80-20
DATE COMPLETED: 10 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
			PVC riser				
14.5	- stylolites at 14.55m BGS - stylolites at 14.69m BGS - stylolites at 14.78m BGS - stylolites at 14.97m BGS						
15.0							
15.5	- stylolites at 15.47m BGS						
16.0	- vertical and horizontal joints and fractures from 16.15 to 16.38m BGS - stylolites at 16.28m BGS						
16.5	- vugs at 16.38m BGS - stylolites at 16.61m BGS - stylolites at 16.69m BGS - stylolites at 16.76m BGS						
17.0							
17.5	- vugs at 17.60m BGS - stylolites, vugs at 17.89m BGS						
18.0	- stylolites at 18.01m BGS - multiple minor stylolites at 18.29m BGS - large stylolite/fractures at 18.41m BGS						
18.5							
19.0	- large stylolite/fractures at 19.05m BGS						
19.5	- increased fines in matrix, slightly argilliceous from 19.81 to 20.73m BGS						
20.0	- stylolites, shaley seams at 19.90m BGS - stylolites, shaley seams at 20.03m BGS - stylolites, shaley seams at 20.04m BGS - vertical joints from 20.15 to 20.27m BGS						
20.5	- stylolites, shaley seams at 20.21m BGS - fracture at 20.65m BGS						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW80-20
DATE COMPLETED: 10 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
21.5							
22.0							
22.5							
23.0							
23.5							
24.0	- large stylolites at 24.00m BGS - large stylolites at 24.14m BGS						
24.5							
25.0	- large stylolites at 25.02m BGS - large stylolites at 25.21m BGS						
25.5	- large stylolites, fracture with shaley material at 25.53m BGS						
26.0							
26.5	- large stylolites at 26.58m BGS						
27.0	- large stylolites at 26.91m BGS						
27.5	- large stylolites at 27.36m BGS - large stylolites at 27.52m BGS						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW80-20
DATE COMPLETED: 10 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
28.5							
29.0							
29.5							
30.0							
30.5	- large stylolites at 30.40m BGS						
31.0	- large stylolites at 31.12m BGS						
31.5	REYNALES FORMATION-DOLOSTONE, dark grey, shaley partings and laminations, fine grained, argilliceous, little porosity, pyrite present	307.64					
32.0	END OF BOREHOLE @ 31.85m BGS	307.19	WELL DETAILS Open Hole Interval 336.45 to 307.19AMSL 2.59 to 31.85m BGS				
32.5							
33.0							
33.5							
34.0							
34.5							

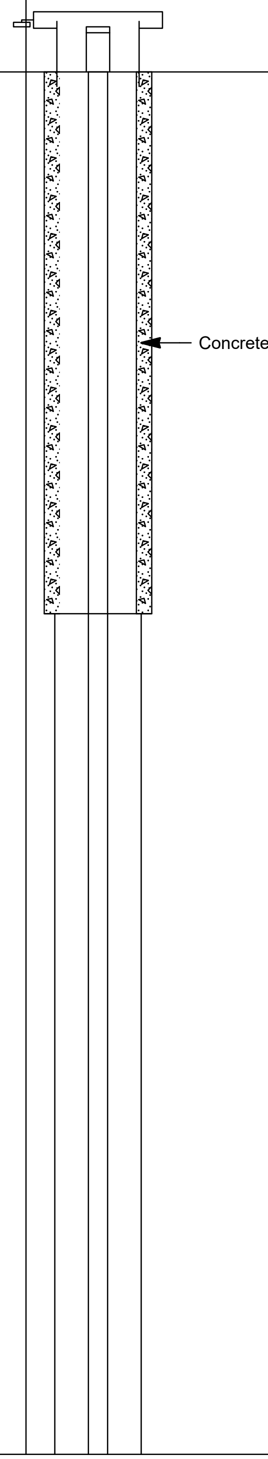
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW81-20
DATE COMPLETED: 10 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	INTERVAL	REC (%)	'N' Value
	NORTHING: 4822532.1 / EASTING: 583376.2 — TOP OF RISER / GROUND SURFACE	336.30 / 335.59					
0.0–0.61	SANDY SILT, with clay, cobbles, gravel, brown, moist, organic, roots and leaves present						
0.61	AMABEL FORMATION-DOLOSTONE, white-grey, medium crystallization, sacchroidal, fossilization, slight weathering, vug/void and fossil molds, crinoids, coral, brachiopods	334.98					
	- weathering disappears, some fracturing in rock at 1.22m BGS						
	- fracture at 3.14m BGS						
	- fracture at 3.47m BGS						
	- fracture at 3.58m BGS						
	- vuggy zone from 3.89 to 4.80m BGS						
	- vuggy zone from 5.39 to 5.94m BGS						
	- minor fractures at 6.25m BGS						
	- minor fracture at 6.43m BGS						
	- fracture, brown clay, secondary crystallization at 6.63m BGS						
	- stylolites at 6.68m BGS						



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW81-20
DATE COMPLETED: 10 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- stylolites at 6.92m BGS - stylolites at 6.95m BGS						
7.5	- increasing argilliceous minor stylolites present from 7.44 to 8.38m BGS - fracture, slight weathering, brown clay at 7.68m BGS - secondary crystallization at 7.77m BGS						
8.0	- increase in porosity from 7.99 to 9.45m BGS						
8.5	- stylolite at 8.46m BGS						
9.0							
9.5	- stylolites at 9.54m BGS - stylolites at 9.75m BGS						
10.0	- stylolites at 9.98m BGS - stylolites at 10.39m BGS						
10.5	- stylolites at 10.82m BGS - stylolites at 10.90m BGS						
11.0	- stylolites at 11.00m BGS - stylolites at 11.13m BGS - increased porosity from 11.37 to 12.19m BGS						
11.5							
12.0	- stylolites at 12.04m BGS - stylolites at 12.19m BGS						
12.5	- large vug at 12.56m BGS - fracturing at 12.86m BGS						
13.0	- fracturing at 13.26m BGS		PVC riser				
13.5	- vuggy zone from 13.44 to 13.59m BGS - increased porosity from 13.59 to 15.47m BGS						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW81-20
DATE COMPLETED: 10 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- vuggy at 14.23m BGS						
14.5							
15.0							
	- fracture, secondary crystallization, black shaley material at 15.27m BGS						
15.5							
	- stylolites, minor to bottom of Amabel at 15.67m BGS						
16.0							
16.5							
	- fracture, fines and black shaley material at 16.79m BGS						
17.0							
17.5							
	- minor fracture, slight weathering at 17.86m BGS						
18.0							
18.5							
19.0							
19.5							
20.0							
20.5							
	- sphalerite crystal at 20.85m BGS						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW81-20
DATE COMPLETED: 10 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- stylolite with shaley material at 20.91m BGS						
	- fracture, slight weathering, secondary crystallization at 20.96m BGS						
21.5							
	- fracture, dark clay in seam at 21.76m BGS						
22.0							
22.5							
	- vuggy from 22.92 to 23.09m BGS						
23.0							
23.5							
24.0							
	- vuggy from 24.08 to 24.61m BGS						
24.5							
25.0							
25.5							
26.0							
	- fracture, dark grey shaley material in seam at 26.44m BGS						
26.5							
27.0							
27.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW81-20
DATE COMPLETED: 10 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

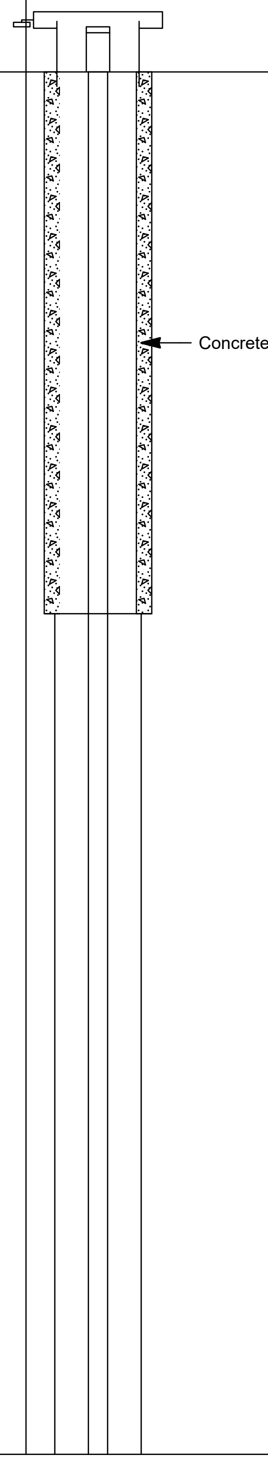
DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
28.5	REYNALES FORMATION-DOLOSTONE, dark grey, shaley partings and laminations, fine grained, argilliceous, little porosity, pyrite present	307.06					
29.0							
	END OF BOREHOLE @ 29.17m BGS	306.42	WELL DETAILS Open Hole Interval: 332.85 to 306.42AMSL 2.74 to 29.17m BGS				
29.5							
30.0							
30.5							
31.0							
31.5							
32.0							
32.5							
33.0							
33.5							
34.0							
34.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East	HOLE DESIGNATION: OW82-20
PROJECT NUMBER: 11208056-200	DATE COMPLETED: 12 February 2020
CLIENT: Dufferin Aggregates	DRILLING METHOD: 4 1/4 HSA/HQ Core
LOCATION: Region of Halton, Ontario	FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	NORTHING: 4822025.1 EASTING: 583169.8 TOP OF RISER GROUND SURFACE	338.00 337.12					
	TOPSOIL, silt with clay and sand, trace gravel, stiff, low plasticity, dark brown, moist, organic material present, roots, leaves						
0.5	AMABEL FORMATION-DOLOSTONE, dark to white-grey, medium crystallization, sacchroidal, fossiliferous, weathered to 3.65m BGS, vugs, voids, fossil molds, crinoids, brachiapods, corals	336.66					
1.0							
1.5			Concrete				
2.0							
2.5							
3.0							
3.5							
4.0							
4.5	- fracture, secondary crystallization at 4.42m BGS - fracture at 4.57m BGS - stylolite at 4.75m BGS						
5.0	- fractured from 5.09 to 5.33m BGS						
5.5							
6.0							
6.5	- fracture with secondary crystallization from 6.49 to 6.63m BGS						



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW82-20
DATE COMPLETED: 12 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
7.5							
8.0							
8.5	- fractures, vertical or horizontal, sporatic secondary crystallization present, increased porosity from 8.46 to 9.07m BGS						
9.0							
9.5	- vug, fracture at 9.37m BGS - vertical fracture from 9.48 to 9.75m BGS						
10.0	- fracture, increased fines and mud, color changed to grey at 9.91m BGS - fracture at 10.27m BGS						
10.5	- fracture at 10.76m BGS						
11.0	- fracture, secondary crystallization at 11.19m BGS						
11.5	- fracture, secondary crystallization at 11.67m BGS - fracture, secondary crystallization at 11.92m BGS						
12.0	- color change to light grey, decreased porosity at 12.25m BGS						
12.5	- fracture with secondary crystallization at 12.44m BGS - fracture at 12.53m BGS - fracture with secondary crystallization at 12.73m BGS						
13.0	- small stylolite at 13.34m BGS						
13.5	- fractures and small vugs at 13.50m BGS - small 1.27cm vugs from 13.72 to 13.81m BGS						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
HOLE DESIGNATION: OW82-20
PROJECT NUMBER: 11208056-200
DATE COMPLETED: 12 February 2020
CLIENT: Dufferin Aggregates
DRILLING METHOD: 4 1/4 HSA/HQ Core
LOCATION: Region of Halton, Ontario
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	INTERVAL	REC (%)	'N' Value
14.5			PVC riser				
	- fractures at 14.86m BGS						
15.0							
	- fractures at 15.16m BGS						
	- fracture with secondary crystallization at 15.30m BGS						
15.5							
	- fracture with secondary crystallization at 15.77m BGS						
16.0	- increased porosity, increased fines at 16.03m BGS						
16.5							
17.0							
	- fracture at 17.10m BGS						
	- fracture at 17.28m BGS						
	- stylolite at 17.43m BGS						
17.5	- vug with secondary crystallization, minor stylolites every 5.08cm to 23.77m BGS, decreased porosity and color changed to light grey at 17.56m BGS						
18.0							
	- fracture at 18.29m BGS						
18.5	- fracture with secondary crystallization from 18.52 to 18.75m BGS						
19.0	- fracture at 19.02m BGS						
19.5							
	- stylolite at 19.84m BGS						
20.0							
20.5							
	- fracture/stylolite, color changed to grey, increased porosity and slightly argiliceous at						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW82-20
DATE COMPLETED: 12 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	20.79m BGS - fracture with secondary crystallization at 21.15m BGS - stylolite at 21.26m BGS						
21.5							
22.0	- fracture with secondary crystallization at 22.17m BGS						
22.5	- fracture at 22.48m BGS - fracture with secondary crystallization at 22.78m BGS						
23.0	- stylolite at 22.95m BGS						
23.5	- fracture at 23.50m BGS						
24.0							
24.5							
25.0	- fracture at 25.05m BGS						
25.5							
26.0	- fracture, vuggy with secondary crystallization at 26.14m BGS						
26.5							
27.0	- fracture/stylolite at 27.36m BGS						
27.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW82-20
DATE COMPLETED: 12 February 2020
DRILLING METHOD: 4 1/4 HSA/HQ Core
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	- fracture at 27.97m BGS						
28.5	- fracture with secondary crystallization at 28.47m BGS						
29.0	- stylolite with secondary crystallization at 28.88m BGS						
29.5							
30.0	- fracture with secondary crystallization at 30.10m BGS						
30.5	- stylolite at 30.57m BGS						
31.0							
	REYNALES FORMATION-DOLOSTONE, dark grey, laminations and shaley partings, fine grained, argilliceous, no visible porosity, pyrite present	306.00					
31.5	- clay seams at 31.32m BGS						
32.0	- clay seams at 31.93m BGS - clay seams at 32.00m BGS						
	END OF BOREHOLE @ 32.19m BGS	304.93	WELL DETAILS Open Hole Interval: 334.38 to 304.93AMSL 2.74 to 32.19m BGS				
32.5							
33.0							
33.5							
34.0							
34.5							

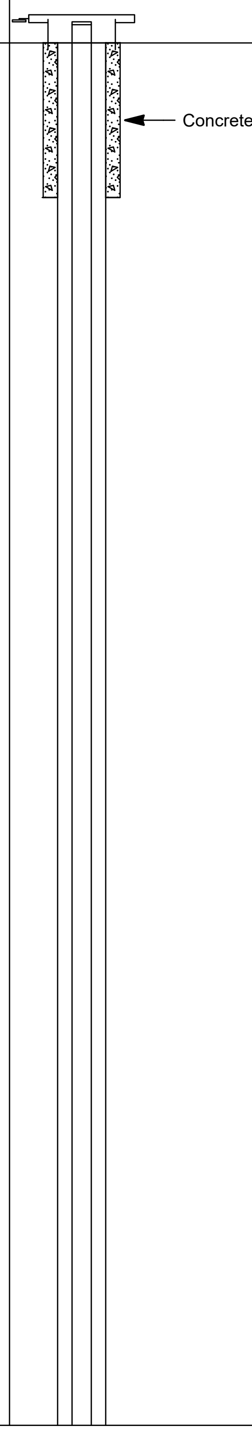
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW83-21
DATE COMPLETED: 9 February 2021
DRILLING METHOD: 6.25" HSA/4" Air Rotary
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	NORTHING: 4822282.2 / EASTING: 583337.8 — TOP OF RISER / GROUND SURFACE	336.16 / 335.55					
	TOPSOIL, sandy silt, with gravel and cobbles, dark brown, moist, roots, leaves						
	AMABEL FORMATION, dolostone Dante, white-grey, medium crystallization, sacchroidol, fossiliferous, vug/void and fossil mold porosity, corals, crinoids, brachoipods	334.94					
5	- wet at 5.18m BGS						
8	- vuggy zone from 8.53 to 8.69m BGS						
12	- vuggy zone from 12.19 to 12.80m BGS						



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW83-21
DATE COMPLETED: 9 February 2021
DRILLING METHOD: 6.25" HSA/4" Air Rotary
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
16	- vuggy zone from 15.85 to 16.46m BGS						
17							
18							
19	- vuggy zone from 19.51 to 19.81m BGS						
20							
21							
22							
23							
24							
25							
26							
27							
28							
29	REYNALES FORMATION, dolostone, dark grey, laminations, fine grained, to microcrystalline, shaley partings, argilliceous,	306.29					

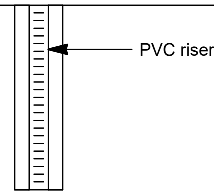
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: Milton Extension East
PROJECT NUMBER: 11208056-200
CLIENT: Dufferin Aggregates
LOCATION: Region of Halton, Ontario

HOLE DESIGNATION: OW83-21
DATE COMPLETED: 9 February 2021
DRILLING METHOD: 6.25" HSA/4" Air Rotary
FIELD PERSONNEL: M. Waldick

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (%)	SAMPLE 'N' Value
	no visible fossils, pyrite						
31							
32	CABOT HEAD-SHALE, green-grey, laminations, amorphous, fissile, caleoreons, laminations, no visible fossils	303.85					
	END OF BOREHOLE @ 32.00m BGS	303.54	WELL DETAILS Open Hole Interval: 334.05 to 303.54AMSL 1.68 to 32.01m BGS				
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

B.2
Test Pit Logs

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation: TP01-20**
Project Number: 11208056	**Contractor:**	**Date Started:** February 5, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 342.19 m AMSL(1)	**Date Completed:** February 5, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:** R. Bay

Location: (refer to test pit location map)

Easting: 582739 *Northing: 4822373* **Elev.:** 342.19

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.31	SILTY CLAYEY SAND, trace GRAVEL, topsoil with rootlets, dark brown, very moist Gravel 5%, Sand 68%, Clay&Silt 27%	GS1	0.0 - 0.31	26.2
0.31		1.22	SAND and SILT-CLAY, some GRAVEL, some cobbles/boulders, brown, very moist Gravel 17%, Sand 43%, Clay&Silt 40%	GS2	0.5 - 1.22	13.8
1.22		1.52	BEDROCK			
			End of Test Pit at 1.52 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation:** TP02-20	
Project Number: 11208056	**Contractor:**	**Date Started:**	February 5, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 344.20 m AMSL(1)	**Date Completed:**	February 5, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	R. Bay

Location: (refer to test pit location map)

Easting: 582779.5 *Northing:* 4822423. *Elev.:* 344.20

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.33	SILTY CLAY, some sand, topsoil with rootlets, dark brown, moist	GS1	0.00 - 0.33	-
0.33		1.07	SANDY GRAVEL, trace SILT-CLAY, some cobbles/boulders, reddish brown, very moist Gravel 58%, Sand 33%, Clay&Silt 9%	GS2	0.33 - 1.07	10.5
1.07		1.52	SANDY SILT, some CLAY, some GRAVEL, trace to some cobbles, greenish brown, moist Gravel 10%, Sand 25%, Silt 54%, Clay 11%	GS3	1.07 - 1.52	19.1
1.52		1.60	BEDROCK			
			End of Test Pit at 1.60 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation:** TP03-20	
Project Number: 11208056	**Contractor:**	**Date Started:**	February 5, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 346.46 m AMSL[(1)]	**Date Completed:**	February 5, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	R. Bay

Location: (refer to test pit location map)

Easting: 582822.5 **Northing:** 422477 **Elev.:** 346.46

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.31	SILTY CLAY, some sand, topsoil with rootlets, dark brown, moist	GS1	0.0 - 0.31	-
0.31		3.05	SILT, trace sand and gravel, trace clay, trace to some cobbles/boulders, reddish brown, very moist	GS2	0.31 - 3.05	-
3.05		3.10	BEDROCK			
			End of Test Pit at 3.10 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name:	**Geotechnical Investigation - Milton East Extension Test Pitting**		**Test Pit Designation: TP04-20**
Project Number:	**11208056**	**Contractor:**	**Date Started:** **February 5, 2020**
Client:	**Dufferin Aggregates**	**Surface Elevation:** **346.99 m AMSL[(1)]**	**Date Completed:** **February 5, 2020**
Location:	**Milton Quarry, Milton, Ontario**	**Test Pit Method:** **Excavator**	**GHD Supervisor:** **R. Bay**

Location: (refer to test pit location map)

Easting: ***582824.1*** ***Northing:*** ***4822377.*** **Elev.:** **346.99**

Depth (m bgs) From	At	To	*Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors*	*Sample No.*	*Sample Interval (m.BGS)*	*Moisture Content (%)*
0.0		0.31	SILTY CLAY, some sand, topsoil with rootlets, dark brown, moist	GS1	0.00 - 0.31	-
0.31		3.05	GRAVELLY SILTY CLAYEY SAND, some cobbles/boulders, brown, very moist Gravel 29%, Sand 44%, Clay&Silt 27%	GS2	0.31 - 3.05	8.4
3.05		3.10	BEDROCK			
			End of Test Pit at 3.10 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation:** TP05-20	
Project Number: 11208056	**Contractor:**	**Date Started:**	February 5, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 343.83 m AMSL[(1)]	**Date Completed:**	February 5, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	R. Bay

Location: (refer to test pit location map)

Easting: 582872.2 **Northing:** 4822425. **Elev.:** 343.83

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.31	SILTY CLAY, some sand, topsoil with rootlets, dark brown, moist	GS1	0.00 - 0.31	-
0.31		1.22	SAND AND SILT, with gravel, trace clay, some cobbles, reddish brown, very moist	GS2	0.31 - 1.22	-
1.22		1.25	BEDROCK			
			End of Test Pit at 1.25 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting			**Test Pit Designation: TP06-20**
Project Number: 11208056	**Contractor:**		**Date Started:** February 5, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 342.37 m AMSL(1)		**Date Completed:** February 5, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator		**GHD Supervisor:** R. Bay

Location: (refer to test pit location map)

Easting: 582925.5 **Northing:** 4822475. **Elev.:** 347.37

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.31	SILTY CLAY, some sand, topsoil with rootlets, dark brown, moist	GS1	0.0 - 0.31	-
0.31		1.83	SILTY CLAYEY GRAVEL and SAND, trace to some cobbles/boulders, reddish brown, very moist Gravel 40%, Sand 36%, Clay&Silt 24%	GS2	0.31 - 1.83	10.3
1.83		1.88	BEDROCK			
			End of Test Pit at 1.88 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation:** TP07-20	
Project Number: 11208056	**Contractor:**	**Date Started:**	February 5, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 340.81 m AMSL[(1)]	**Date Completed:**	February 5, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	R. Bay

Location: (refer to test pit location map)

***Easting:* 582824.2** ***Northing:* 4822275.** **Elev.:** **340.81**

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.31	SILTY CLAYEY SAND, trace GRAVEL topsoil with rootlets, dark brown, moist Gravel 7%, Sand 68%, Clay&Silt 25%	GS1	0 - 0.31	20.7
0.31		1.52	SAND AND SILT, with gravel, trace clay, some cobbles/boulders, reddish brown, very moist	GS2	0.31 - 1.52	-
1.52		1.57	BEDROCK			
			End of Test Pit at 1.57 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation:** TP08-20	
Project Number: 11208056	**Contractor:**	**Date Started:**	February 5, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 343.40 m AMSL(1)	**Date Completed:**	February 5, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	R. Bay

Location: (refer to test pit location map)

Easting: 582869 *Northing:* 4822329 Elev.: 343.40

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.31	SILTY CLAY, some sand, topsoil with rootlets, dark brown, moist	GS1	0.0 - 0.31	-
0.31		2.44	SAND AND SILT, with gravel, trace clay, trace to some cobbles/boulders, reddish brown, very moist	GS2	0.31 - 2.44	-
2.44		2.49	BEDROCK			
			End of Test Pit at 2.49 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name:	**Geotechnical Investigation - Milton East Extension Test Pitting**		**Test Pit Designation: TP09-20**
Project Number: 11208056	**Contractor:**		**Date Started:** February 5, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 342.43 m AMSL(1)		**Date Completed:** February 5, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator		**GHD Supervisor:** R. Bay

Location: (refer to test pit location map)

Easting: 582924.7 **Northing:** 4822376. **Elev.:** 342.43

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.31	SILTY CLAY, some sand, topsoil with rootlets, dark brown, moist	GS1	0.0 - 0.31	-
0.31		1.52	SAND AND SILT, with gravel, trace clay, trace to some cobbles/boulders, reddish brown, very moist	GS2	0.31 - 1.52	-
1.52		1.57	BEDROCK			
			End of Test Pit at 1.57 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting			**Test Pit Designation: TP10-20**
Project Number: 11208056	**Contractor:**		**Date Started:** February 6, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 341.15 m AMSL(1)		**Date Completed:** February 6, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator		**GHD Supervisor:** R. Bay

Location: (refer to test pit location map)

Easting: 583026.9 *Northing:* 4822475. Elev.: 341.15

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.91	GRAVELLY SAND, some cobbles, rootlets, dark brown, moist	GS1	0.0 - 0.91	-
0.91		0.96	BEDROCK			
			End of Test Pit at 0.96 metres BGS			

Geologic Profile

Notes:
(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation:** TP11-20	
Project Number: 11208056	**Contractor:**	**Date Started:**	February 6, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 342.05 m AMSL(1)	**Date Completed:**	February 6, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	R. Bay

Location: (refer to test pit location map)

Easting: 582873 ***Northing:*** 4822222. **Elev.:** 342.05

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.61	SILTY SAND, some gravel, rootlets, dark brown, moist	GS1	0.0 - 0.61	-
0.61		3.66	GRAVELLY SILTY-CLAYEY SAND, brown, moist Gravel 26%, Sand 49%, Clay&Silt 25%	GS2	0.61 - 3.66	9.4
			End of Test Pit at 3.66 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name:	**Geotechnical Investigation - Milton East Extension Test Pitting**		**Test Pit Designation: TP12-20**
Project Number:	**11208056**	**Contractor:**	**Date Started:** **February 5, 2020**
Client:	**Dufferin Aggregates**	**Surface Elevation:** **341.45 m AMSL[(1)]**	**Date Completed:** **February 5, 2020**
Location:	**Milton Quarry, Milton, Ontario**	**Test Pit Method:** **Excavator**	**GHD Supervisor:** **R. Bay**

Location: (refer to test pit location map)

Easting:* *582926.3 ***Northing:* *4822276.*** **Elev.:** **341.45**

Depth (m bgs) From	At	To	*Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors*	*Sample No.*	*Sample Interval (m.BGS)*	*Moisture Content (%)*
0.0		0.31	SILTY CLAY, some sand, topsoil with rootlets, dark brown, moist	GS1	0.0 - 0.31	-
0.31		3.51	GRAVELLY SILTY SAND, trace CLAY, cobbles/boulders, brown, very moist Gravel 28%, Sand 45%, Silt 23%, Clay 4%	GS2	0.31 - 3.51	8.6
3.51		3.55	BEDROCK			
			End of Test Pit at 3.55 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation: TP13-20**	
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 5, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 342.88 m AMSL(1)	**Date Completed:**	**February 5, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

***Easting:* 582977.3** ***Northing:* 4822324.** **Elev.: 342.88**

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.31	SILTY CLAY, some sand, topsoil with rootlets, dark brown, moist	GS1	0.0 - 0.31	-
0.31		1.32	SAND AND SILT, with gravel, trace clay, some cobbles/boulders, brown, very moist	GS2	0.31 - 1.32	-
1.32		1.35	BEDROCK			
			End of Test Pit at 1.35 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation: TP14-20**	
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 5, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 340.32 m AMSL[(1)]	**Date Completed:**	**February 5, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

Easting: ***583022.8*** ***Northing:*** ***4822373.*** **Elev.:** **340.32**

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.31	SILTY CLAY, some sand, topsoil with rootlets, dark brown, moist	GS1	0.0 - 0.31	-
0.31		1.83	GRAVELLY SAND and SILT-CLAY, trace to some cobbles/boulders, brown, very moist Gravel 20%, Sand 37%, Clay&Silt 43%	GS2	0.31 - 1.83	18.2
1.83		1.88	BEDROCK			
			End of Test Pit at 1.88 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting			**Test Pit Designation:** TP15-20
Project Number: 11208056	**Contractor:**	**Date Started:**	February 6, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 339.55 m AMSL(1)	**Date Completed:**	February 6, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	R. Bay

Location: (refer to test pit location map)

Easting: 582925.6 **Northing:** 4822174. **Elev.:** 339.55

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.61	GRAVELLY SAND, some silt, rootlets, brown, moist	GS1	0.0 - 0.61	-
0.61		3.05	SILTY SAND, some gravel, brown, moist	GS2	0.61 - 3.05	-
			End of Test Pit at 3.05 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation: TP16-20**	
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 6, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 340.96 m AMSL(1)	**Date Completed:**	**February 6, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

***Easting:* 583023.6** ***Northing:* 4822274.** **Elev.: 340.96**

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.91	SAND and SILT-CLAY, trace GRAVEL	GS1	0.0 - 0.91	-
			Gravel 6%, Sand 41%, Clay&Silt 53%	GS2	0.91 - 0.96	18.3
0.91		0.96	BEDROCK			
			End of Test Pit at 0.96 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name:	**Geotechnical Investigation - Milton East Extension Test Pitting**		**Test Pit Designation: TP17-20**
Project Number:	**11208056**	**Contractor:**	**Date Started:** February 6, 2020
Client:	**Dufferin Aggregates**	**Surface Elevation:** 340.32 m AMSL[1]	**Date Completed:** February 6, 2020
Location:	**Milton Quarry, Milton, Ontario**	**Test Pit Method:** Excavator	**GHD Supervisor:** R. Bay

Location: (refer to test pit location map)

Easting: 583122.5 Northing: 5E+06 Elev: 340.32

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.91	GRAVELLY SAND, dark brown, moist	GS1	0.0 - 0.91	-
				GS2	0.91 - 0.96	-
0.91		0.96	BEDROCK			
			End of Test Pit at 0.96 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation: TP18-20**	
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 6, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 338.63 m AMSL[(1)]	**Date Completed:**	**February 6, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

Easting: 583127.3 **Northing:** 5E+06 **Elev:** 338.63

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.91	GRAVELLY SAND, dark brown, moist	GS1	0.0 - 0.91	-
				GS2	0.91 - 0.96	-
0.91		0.96	BEDROCK			
			End of Test Pit at 0.96 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name:	**Geotechnical Investigation - Milton East Extension Test Pitting**		**Test Pit Designation: TP19-20**
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 6, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 336.63 m AMSL(1)	**Date Completed:**	**February 6, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

Easting: 583211.7 Northing: 4822291. Elev.: 336.63

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		1.22	SILTY SAND, some gravel, rootlets, dark brown, moist	GS1	0.0 - 1.00	-
	1.00		brown	GS2	1.00 - 1.22	-
1.22		1.25	BEDROCK			
			End of Test Pit at 1.25 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation: TP20-20**	
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 6, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 338.79 m AMSL[(1)]	**Date Completed:**	**February 6, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

***Easting:* 583138.7** ***Northing:* 4822180.** **Elev.: 338.79**

Depth (m bgs) From	At	To	*Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors*	*Sample No.*	*Sample Interval (m.BGS)*	*Moisture Content (%)*
0.0		0.61	SILTY SAND, some gravel, rootlets, dark brown, moist	GS1	0.0 - 0.61	-
0.61		0.66	BEDROCK			
			End of Test Pit at 0.66 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name:	**Geotechnical Investigation - Milton East Extension Test Pitting**	**Test Pit Designation: TP21-20**	
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 6, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 338.82 m AMSL(1)	**Date Completed:**	**February 6, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.91	SILTY SAND, some gravel, rootlets, dark brown, moist	GS1	0.0 - 0.91	-
0.91		0.96	BEDROCK			
			End of Test Pit at 0.96 metres BGS			

Location: (refer to test pit location map)

Easting: 583025 *Northing:* 4822175. **Elev.:** 338.82

Geologic Profile

Notes:

(1) metres above mean sea level

Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name:	**Geotechnical Investigation - Milton East Extension Test Pitting**		**Test Pit Designation: TP22-20**
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 6, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 334.89 m AMSL(1)	**Date Completed:**	**February 6, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

Easting: 582993.3 **Northing:** 4822121. **Elev.:** 334.89

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.91	SILTY SAND, some gravel, dark brown, moist	GS1	0.0 - 0.91	-
0.91		3.35	SILT and SAND, some GRAVEL, trace CLAY, brown, moist Gravel 10%, Sand 38%, Silt 49%, Clay 3%	GS2	0.91 - 3.35	14.7
			End of Test Pit at 3.35 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation: TP26-20**	
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 7, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 340.55 m AMSL(1)	**Date Completed:**	**February 7, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

Easting: 583196.5 ***Northing:*** 4822861. **Elev.:** 340.55

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		1.13	SILTY SAND, trace gravel, cobbles, rootlets, dark brown, moist	GS1	0.0 - 0.50	-
	0.50		trace gravel, brown	GS2	0.50 - 1.13	-
1.13		1.16	BEDROCK			
			End of Test Pit at 1.16 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation: TP27-20**	
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 7, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 339.81 m AMSL(1)	**Date Completed:**	**February 7, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

***Easting:* 583231.3** ***Northing:* 4822859.** **Elev.: 339.81**

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.61	SILTY SAND, some gravel, cobbles, rootlets, dark brown, moist	GS1	0.0 - 0.61	-
0.61		3.05	SANDY SILT, trace gravel, brown, very moist	GS2	0.61 - 3.05	-
3.05		3.10	BEDROCK			
			End of Test Pit at 3.10 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation:** TP28-20	
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 7, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 339.23 m AMSL(1)	**Date Completed:**	**February 7, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

Easting: 583210.4 *Northing:* 4822852. Elev.: 339.23

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.58	GRAVELLY SILTY CLAYEY SAND		0.0 - 0.58	
0.58		2.35	Gravel 24%, Sand 41%, Silt 29%, Clay 6%	GS-Pile	0.58 - 2.35	9.4
2.35		2.40	BEDROCK			
			End of Test Pit at 2.40 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation: TP29-20**	
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 7, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 339.56 m AMSL[(1)]	**Date Completed:**	**February 7, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

Easting: 583212 ***Northing:*** 5E+06 **Elev.:** 339.56

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.46	SILTY SAND, some gravel, rootlets, dark brown, moist	GS1	0.0 - 0.46	-
0.46		2.47	SANDY SILT, trace gravel, brown, very moist	GS2	0.46 - 2.47	-
2.47		2.50	BEDROCK			
			End of Test Pit at 2.50 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting			**Test Pit Designation: TP30-20**
Project Number: 11208056	**Contractor:**		**Date Started:** February 6, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 343.00 m AMSL(1)		**Date Completed:** February 6, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator		**GHD Supervisor:** R. Bay

Location: (refer to test pit location map)

Easting: 582876.7 **Northing:** 4822575. **Elev.:** 343.00

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.61	GRAVELLY SAND, some cobbles, rootlets, dark brown, moist	GS1	0.0 - 0.61	-
0.61		0.65	BEDROCK			
			End of Test Pit at 0.65 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting			**Test Pit Designation: TP32-20**
Project Number: 11208056	**Contractor:**		**Date Started:** February 6, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 340.28 m AMSL(1)		**Date Completed:** February 6, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator		**GHD Supervisor:** R. Bay

Location: (refer to test pit location map)

Easting: 583022.7 *Northing:* 4822603. Elev.: 340.28

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.61	GRAVELLY SAND, some cobbles, rootlets, dark brown, moist	GS1	0.0 - 0.61	-
0.61		0.65	BEDROCK			
			End of Test Pit at 0.65 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation: TP33-20**	
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 6, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 341.65 m AMSL(1)	**Date Completed:**	**February 6, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

Easting: 583122.9 **Northing:** 4822619. **Elev.:** 341.65

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		1.74	SILTY SAND, trace gravel, rootlets, dark brown, moist		0.0 - 0.50	
	0.50		trace gravel, brown	GS-Pile	0.50 - 1.74	20.6
1.74		1.81	BEDROCK			
			End of Test Pit at 1.81 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name:	**Geotechnical Investigation - Milton East Extension Test Pitting**		**Test Pit Designation: TP34-20**
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 6, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 343.14 m AMSL[(1)]	**Date Completed:**	**February 6, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

Easting: **583211.4** *Northing:* **4822577.** **Elev.:** **343.14**

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.52	GRAVELLY SAND, some cobbles, rootlets, dark brown, moist	GS1	0.0 - 0.52	-
0.52		0.55	BEDROCK			
			End of Test Pit at 0.55 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name:	**Geotechnical Investigation - Milton East Extension Test Pitting**	**Test Pit Designation: TP35-20**	
Project Number: 11208056	**Contractor:**	**Date Started:**	**February 6, 2020**
Client: Dufferin Aggregates	**Surface Elevation:** 342.28 m AMSL(1)	**Date Completed:**	**February 6, 2020**
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:**	**R. Bay**

Location: (refer to test pit location map)

***Easting:* 583255.2** ***Northing:* 4822499.** **Elev.: 342.28**

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		1.22	SANDY SILT, trace gravel, rootlets, brown, moist	GS1	0.0 - 0.60	-
	0.60		trace gravel, brown	GS2	0.60 - 1.22	-
1.22		1.25	BEDROCK			
			End of Test Pit at 1.25 metres BGS			

Geologic Profile

Notes:

(1) metres above mean sea level

☐ Grain Size Analysis

TEST PIT STRATIGRAPHY LOG

Project Name: Geotechnical Investigation - Milton East Extension Test Pitting		**Test Pit Designation: TP36-20**
Project Number: 11208056	**Contractor:**	**Date Started:** February 6, 2020
Client: Dufferin Aggregates	**Surface Elevation:** 341.83 m AMSL(1)	**Date Completed:** February 6, 2020
Location: Milton Quarry, Milton, Ontario	**Test Pit Method:** Excavator	**GHD Supervisor:** R. Bay

Location: (refer to test pit location map)
Easting: 583244 **Northing:** 4822386 **Elev.:** 341.83

Depth (m bgs) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval (m.BGS)	Moisture Content (%)
0.0		0.76	GRAVELLY SAND, some silt, rootlets, dark brown, moist	GS-Pile	0.0 - 0.76	13.1
0.76		2.44	SILTY SAND, some gravel, brown, moist		0.76 - 2.44	
2.44		2.47	BEDROCK			
			End of Test Pit at 2.47 metres BGS			

Geologic Profile

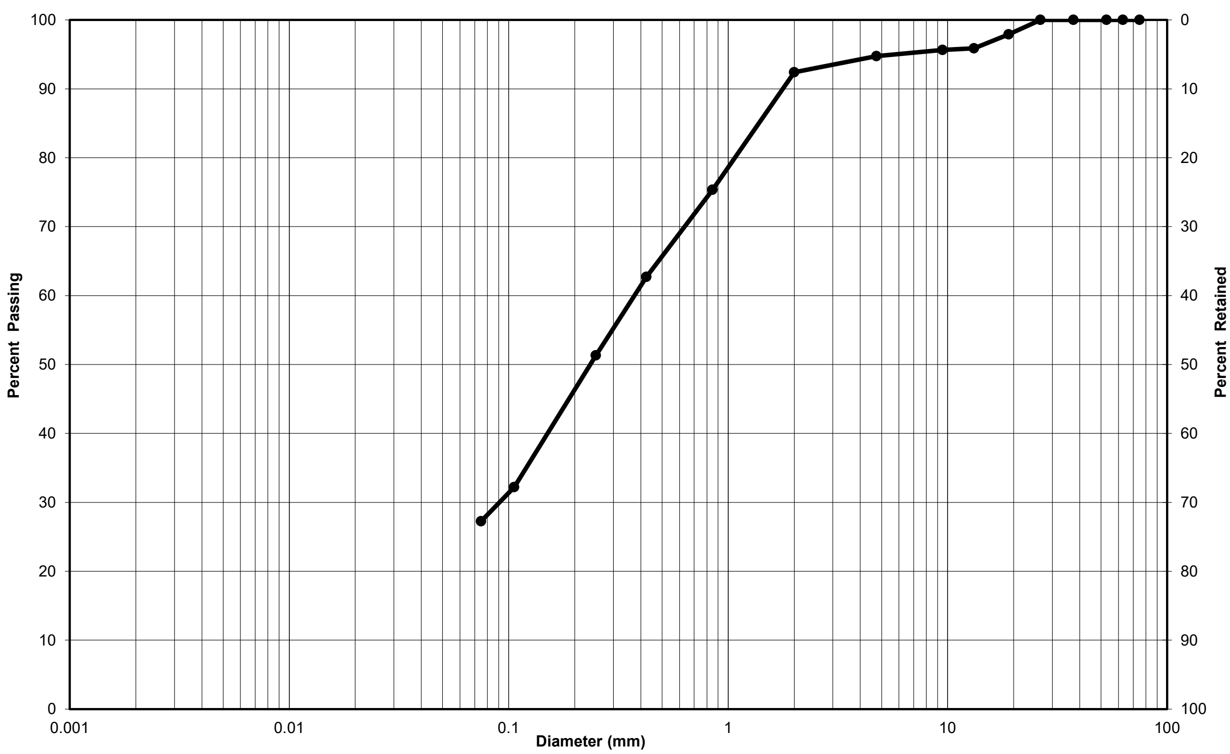
Notes:
(1) metres above mean sea level

☐ Grain Size Analysis

B.3
Grain Size Analysis Logs

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-1
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186
Borehole No.:	TP1	Sample No.:	GS1
Depth:	0.0 ft - 1.0 ft (0.00 m - 0.30 m)	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

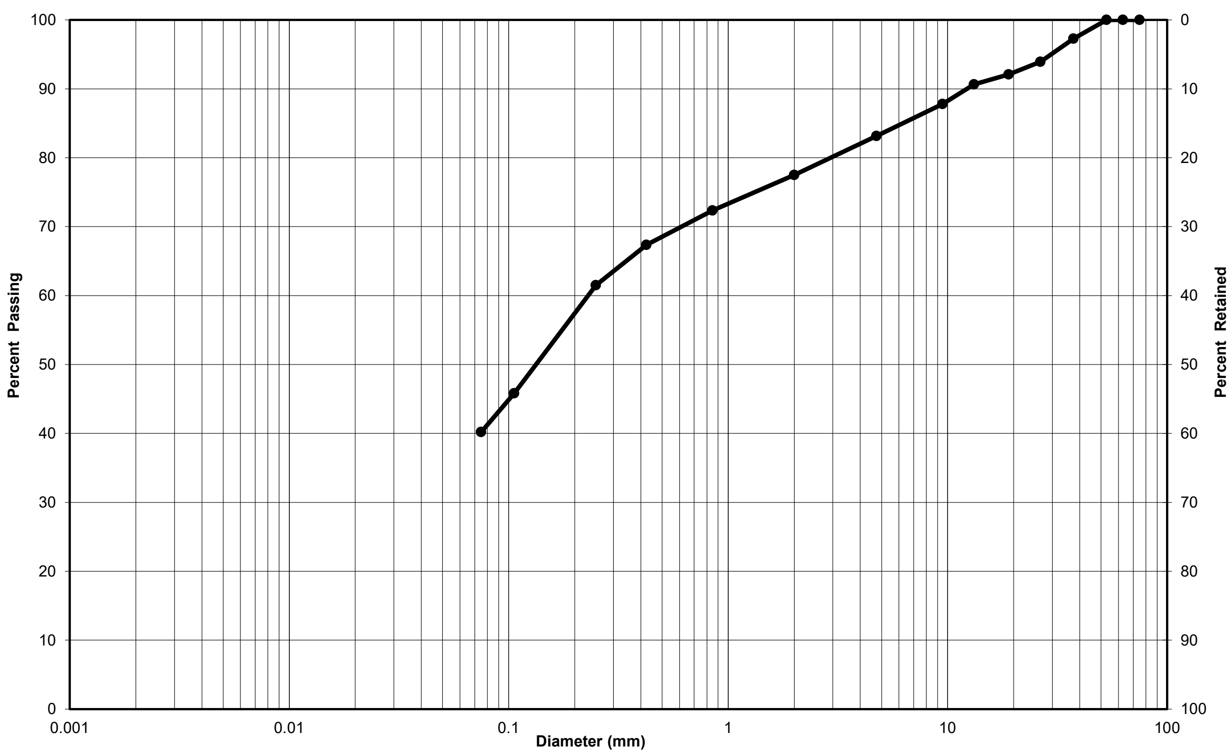
Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
silty-clayey Sand, trace gravel	5	68	27
Clay-size particles (<0.002 mm):			

Remarks: As received moisture = 26.2%

Performed by:	Melanie Mitchell	**Date:**	February 13, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 19, 2020

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-2
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186
Borehole No.:	TP1	Sample No.:	GS2
Depth:	2.0 ft - 4.0 ft (0.61 m - 1.22 m)	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
Sand and Silt-Clay, some gravel	17	43	40
Clay-size particles (<0.002 mm):			

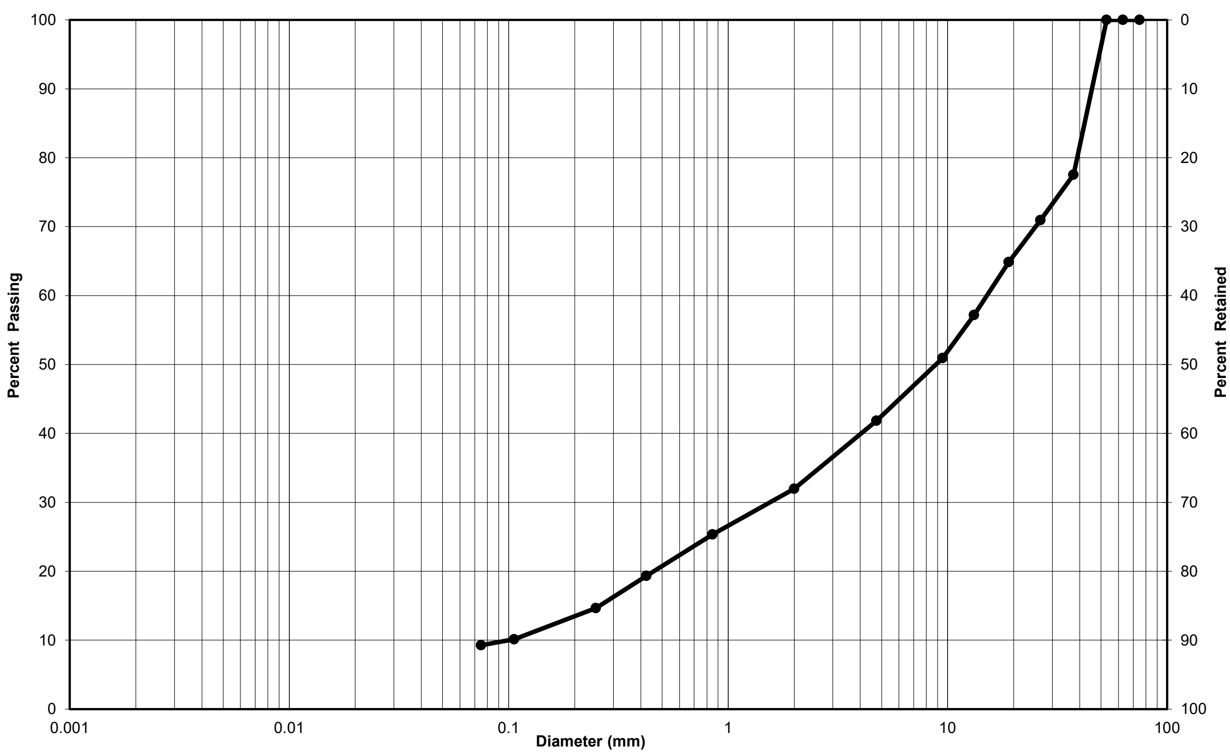
Remarks: As received moisture = 13.8%

Performed by:	Melanie Mitchell	**Date:**	February 13, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 19, 2020

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-3
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186

Borehole No.:	TP2	Sample No.:	GS2
Depth:	1.08 ft - 3.5 ft (0.33 m - 1.07 m)	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
sandy Gravel, trace silt-clay	58	33	9

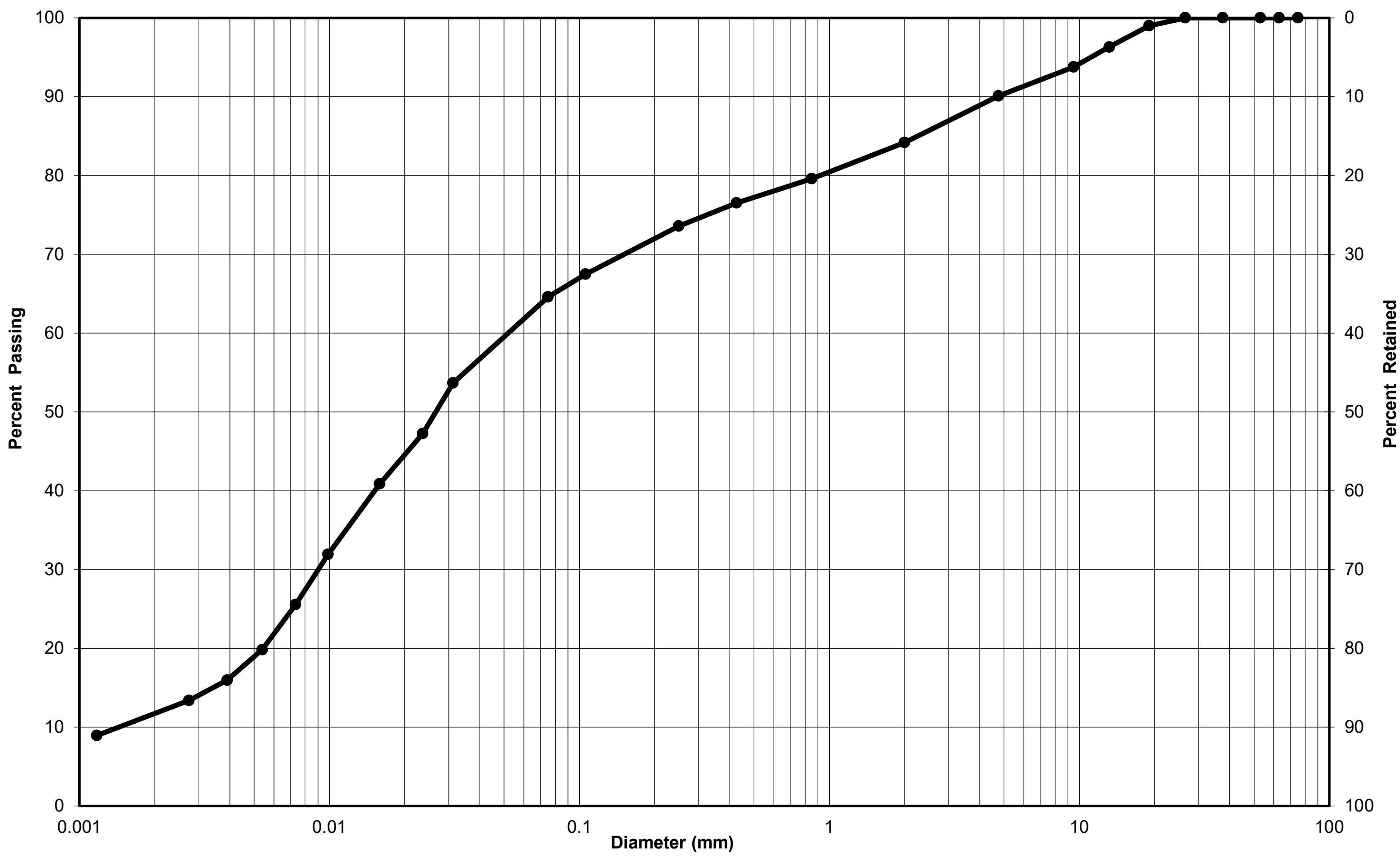
Remarks: As received moisture = 10.5%

Performed by:	Melanie Mitchell	**Date:**	February 13, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 19, 2020

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-4
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186

Borehole No.:	TP2	Sample No.:	GS3
Depth:	3.5 ft - 5.0 ft (1.07 m - 1.52 m)	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

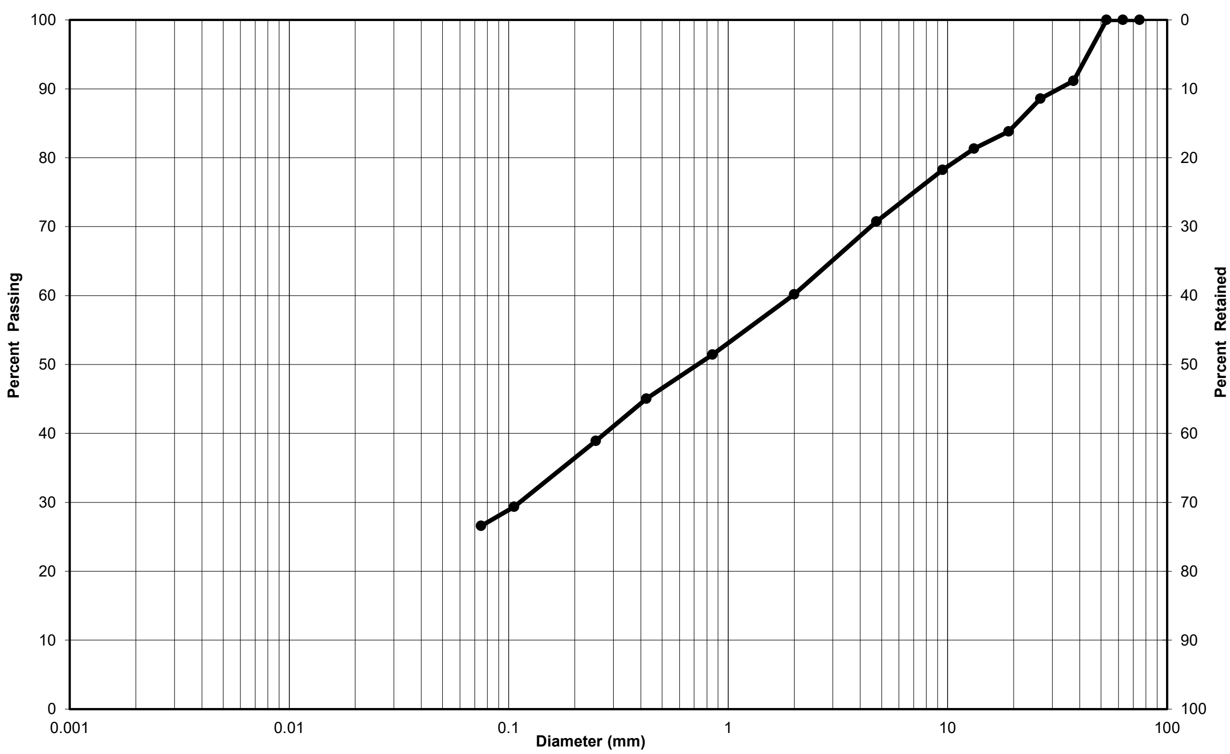
Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
sandy Silt, some clay, some gravel	10	25	65
Clay-size particles (<0.002 mm):			11 %

Remarks: As received moisture = 19.1%

Performed by:	Muhammad Rauf	**Date:**	February 25, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 26, 2020

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-5
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186
Borehole No.:	TP4	Sample No.:	GS2
Depth:	1.0 ft - 10.0 ft (0.30 m - 3.05 m)	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

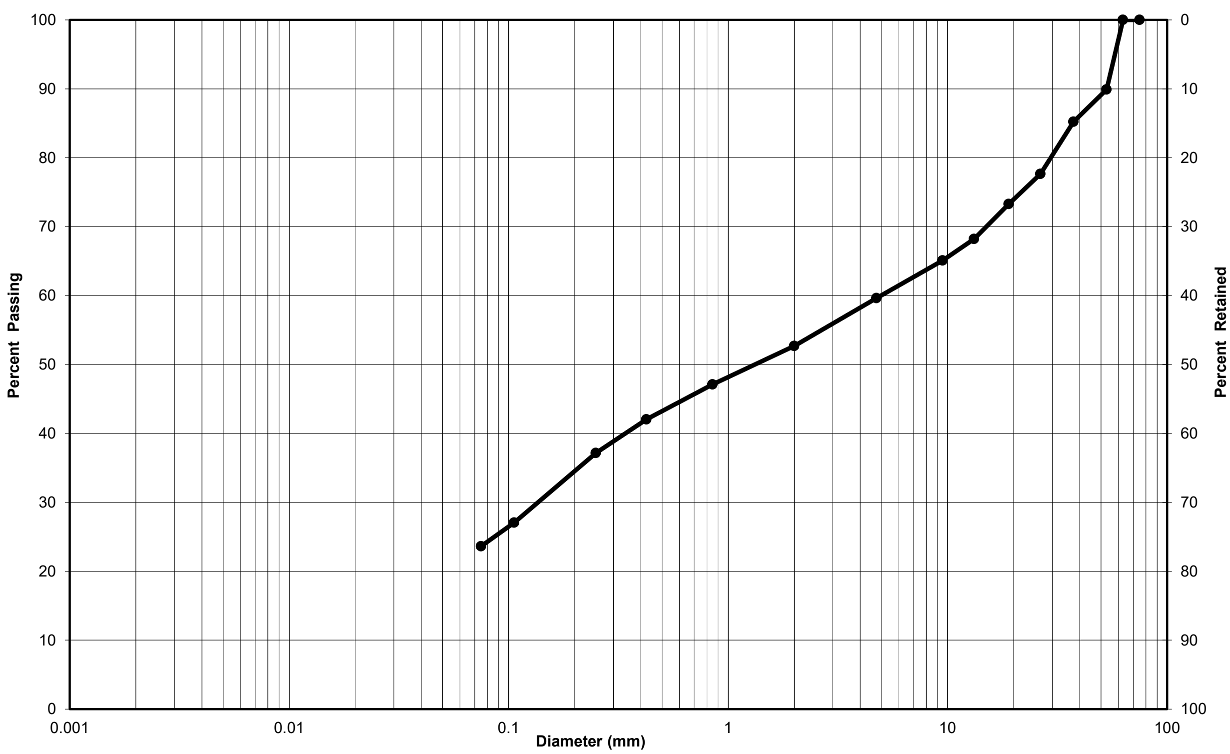
Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
gravelly, silty-clayey Sand	29	44	27
Clay-size particles (<0.002 mm):			

Remarks: As received moisture = 8.4%

Performed by:	Melanie Mitchell	**Date:**	February 13, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 19, 2020

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-6
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186
Borehole No.:	TP6	Sample No.:	GS2
Depth:	1.0 ft - 6.0 ft (0.30 m - 1.83 m)	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

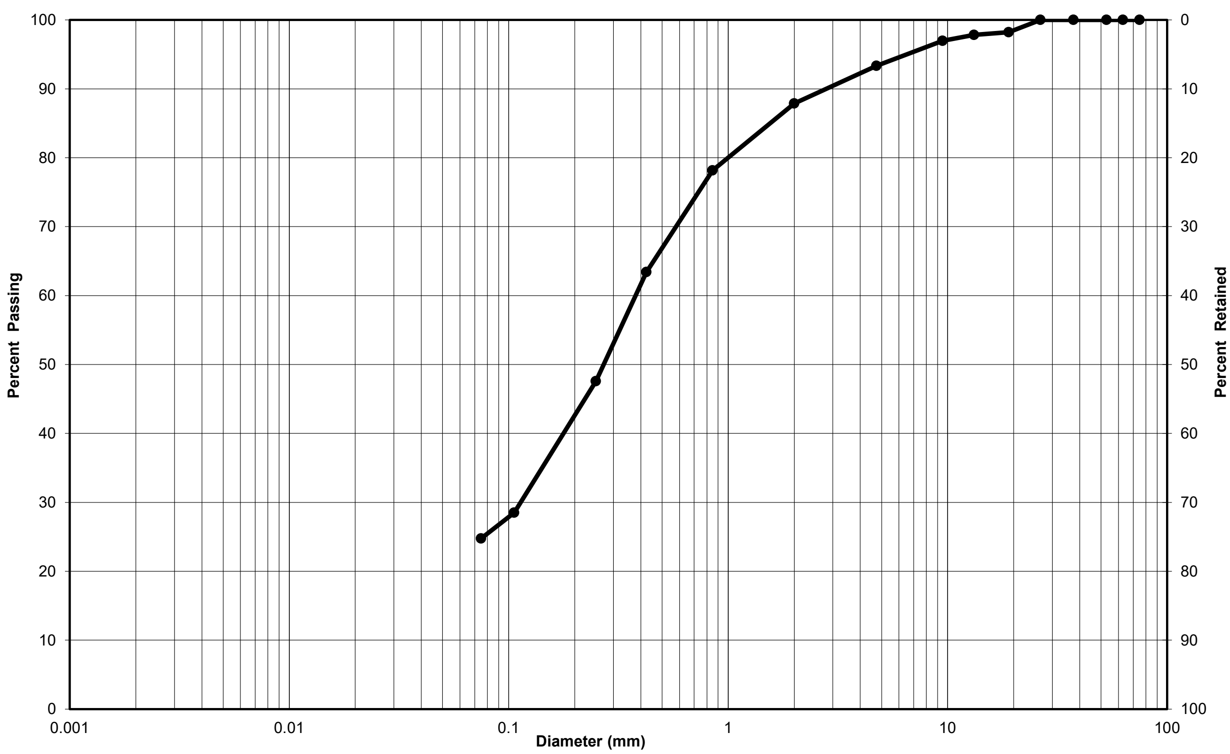
Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
silty-clayey Gravel and Sand	40	36	24
Clay-size particles (<0.002 mm):			

Remarks: As received moisture = 10.3%

Performed by:	Melanie Mitchell	**Date:**	February 13, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 19, 2020

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-7
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186
Borehole No.:	TP7	Sample No.:	GS1
Depth:	0.0 ft - 1.0 ft (0.00 m - 0.30 m)	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

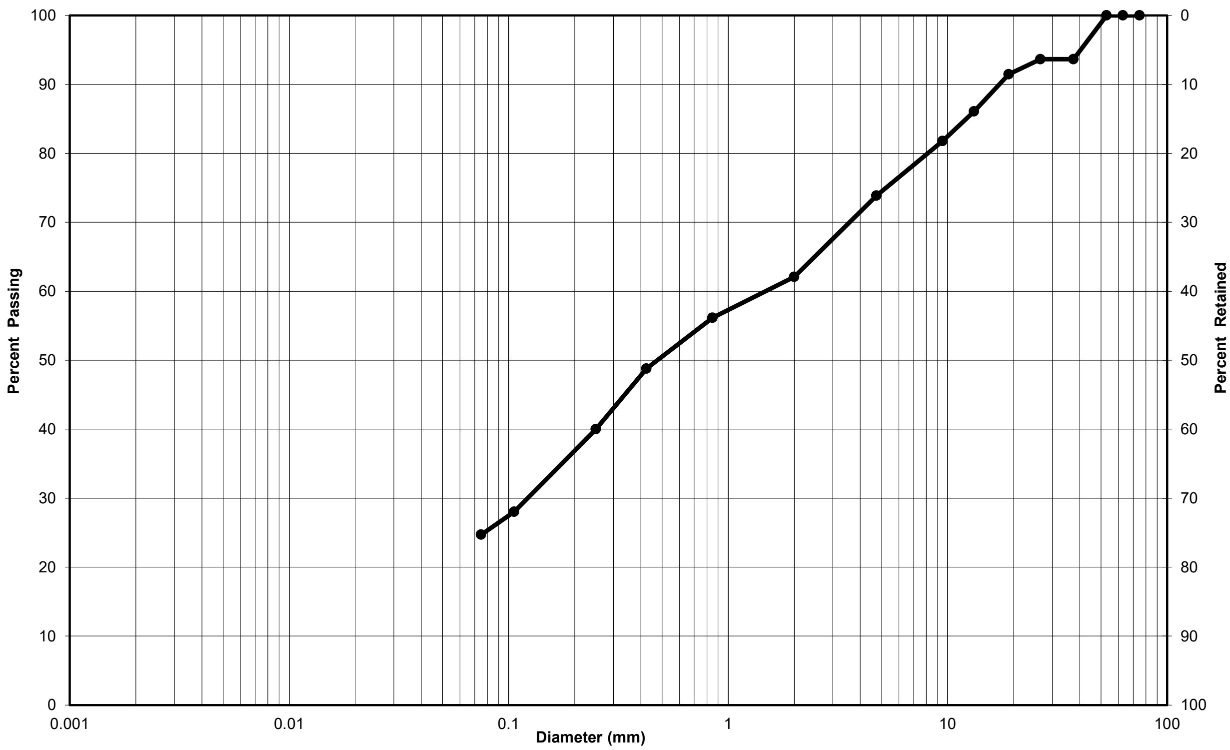
Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
silty-clayey Sand, trace gravel	7	68	25
Clay-size particles (<0.002 mm):			

Remarks: As received moisture = 20.7%

Performed by:	Melanie Mitchell	**Date:**	February 13, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 19, 2020

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-15
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186
Borehole No.:	TP11	Sample No.:	GS2
Depth:	2.0 ft - 12.0 ft (0.61 m - 3.66 m)	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

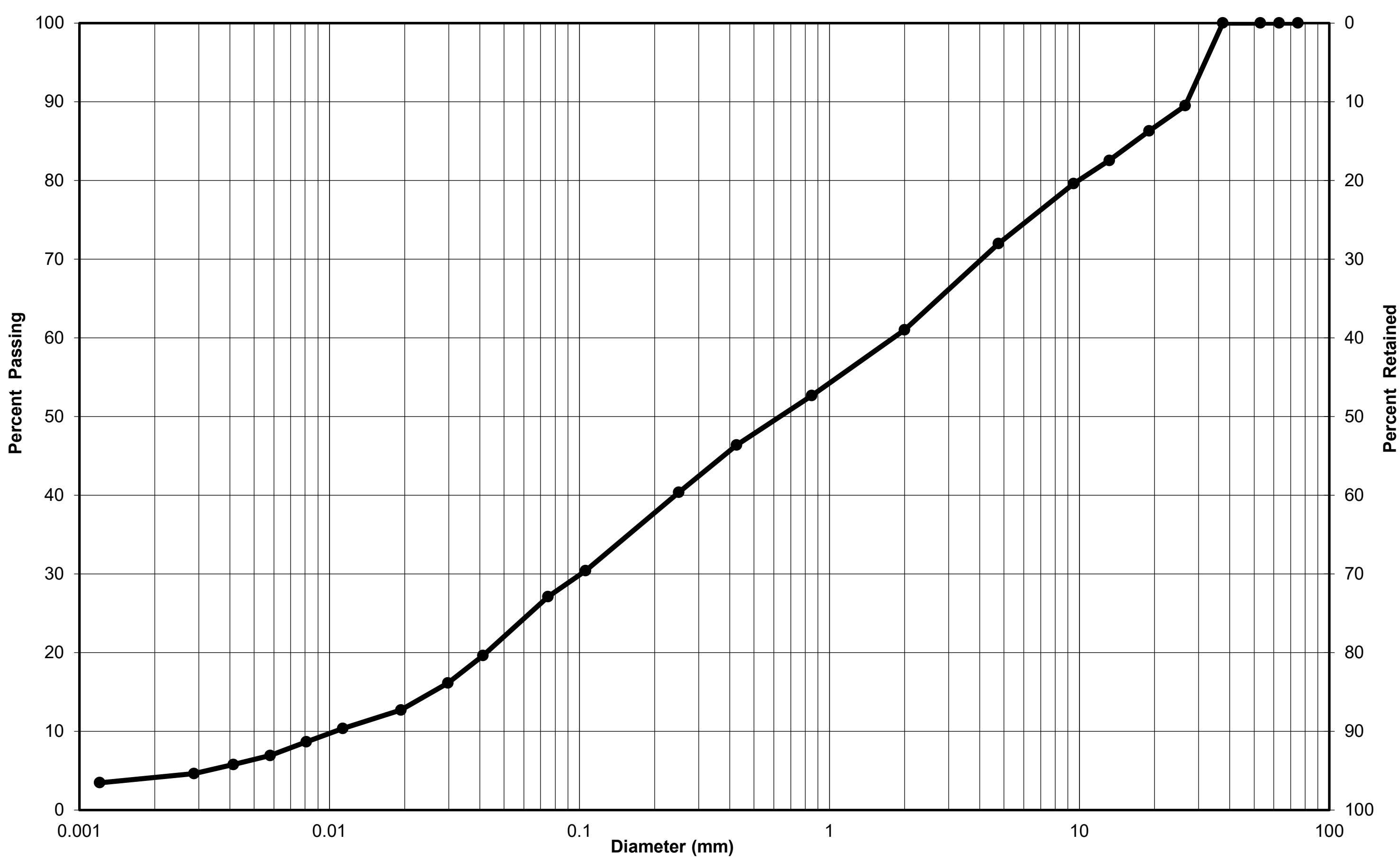
Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
gravelly, silty-clayey Sand	26	49	25
Clay-size particles (<0.002 mm):			

Remarks: As received moisture = 9.4%

Performed by:	Melanie Mitchell	**Date:**	February 13, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 19, 2020

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-8
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186
Borehole No.:	TP12	Sample No.:	GS2
Depth:	1.0 ft - 7.0 ft (0.30 m - 2.13 m)	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

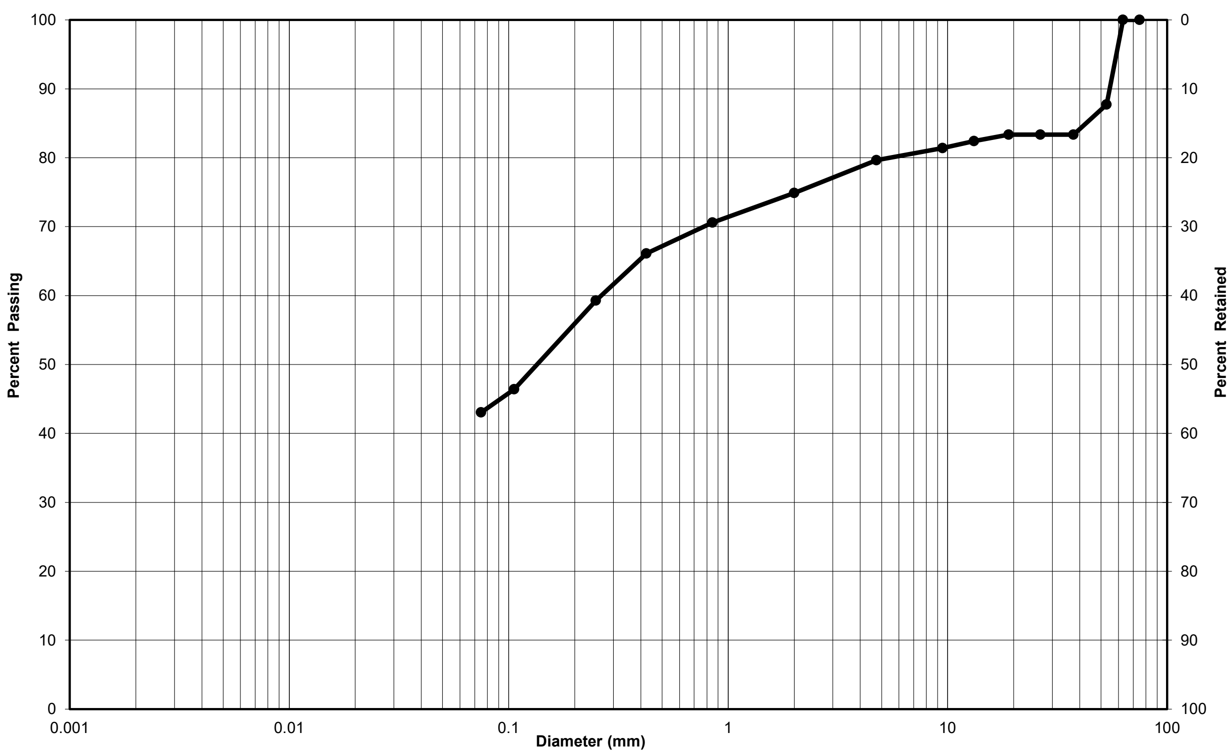
Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
gravelly silty Sand, trace clay	28	45	27
Clay-size particles (<0.002 mm):			4 %

Remarks: As received moisture = 8.6%

Performed by:	Muhammad Rauf	**Date:**	February 25, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 26, 2020

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-9
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186
Borehole No.:	TP14	Sample No.:	GS2
Depth:	1.0 ft - 5.0 ft (0.30 m - 1.52 m)	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
gravelly Sand and Silt-Clay	20	37	43
Clay-size particles (<0.002 mm):			

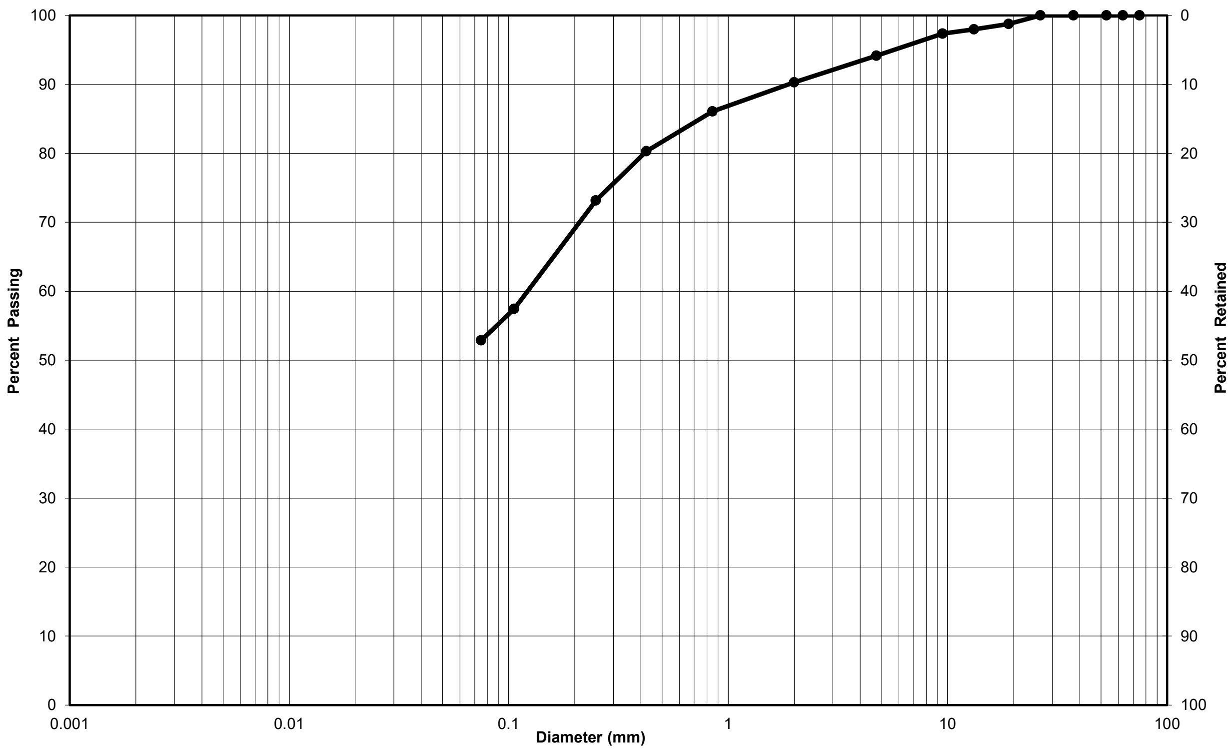
Remarks: As received moisture = 18.2%

Performed by:	Melanie Mitchell	**Date:**	February 13, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 19, 2020

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-10
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186

Borehole No.:	TP16	Sample No.:	GS2
Depth:	3.0 ft (0.91 m)	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

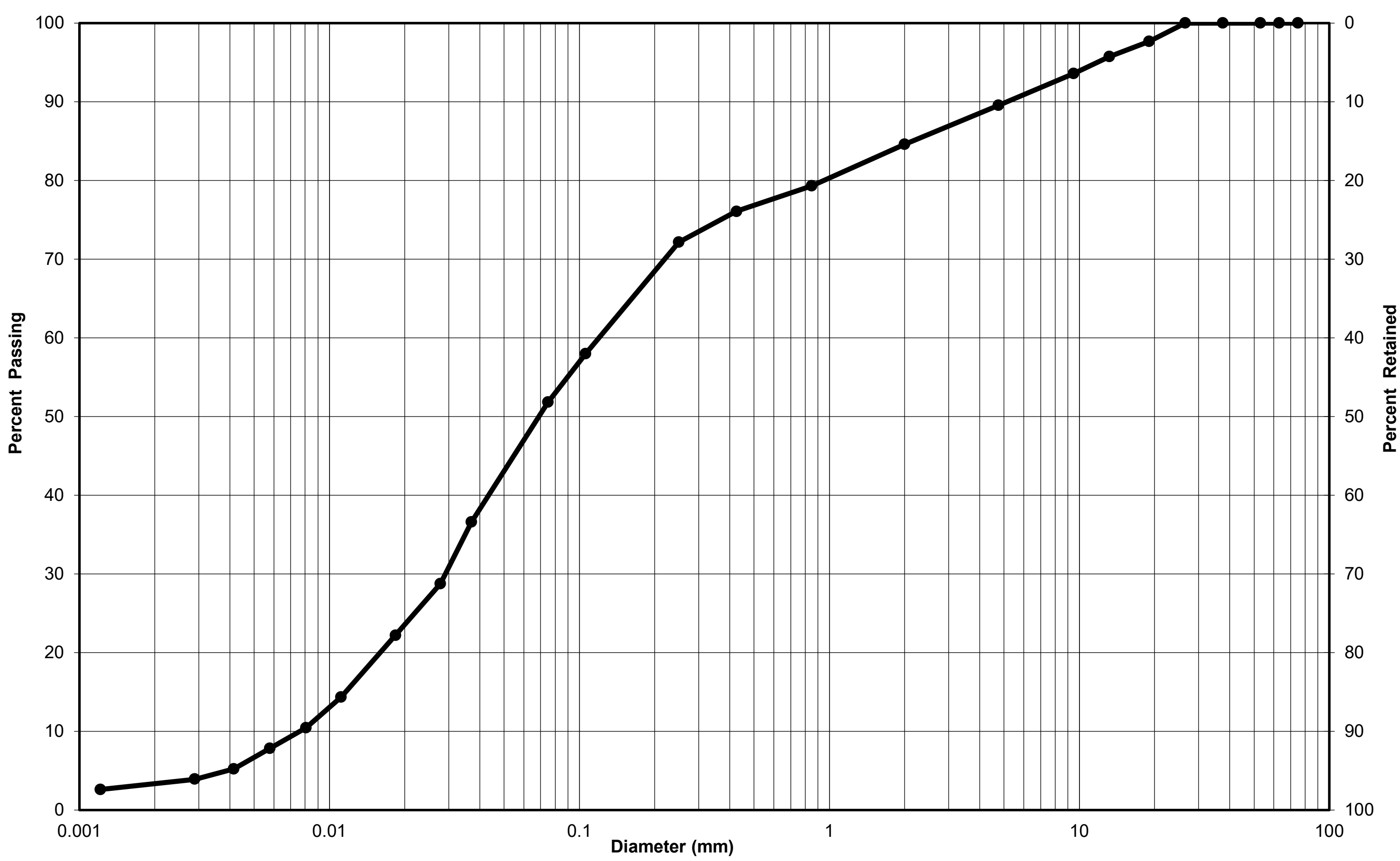
Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
Sand and Silt-Clay, trace gravel	6	41	53
Clay-size particles (<0.002 mm):			

Remarks: As received moisture = 18.3%

Performed by:	Melanie Mitchell	**Date:**	February 13, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 19, 2020

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-11
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186
Borehole No.:	TP22	Sample No.:	GS2
Depth:	6.0 ft (1.83 m)	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

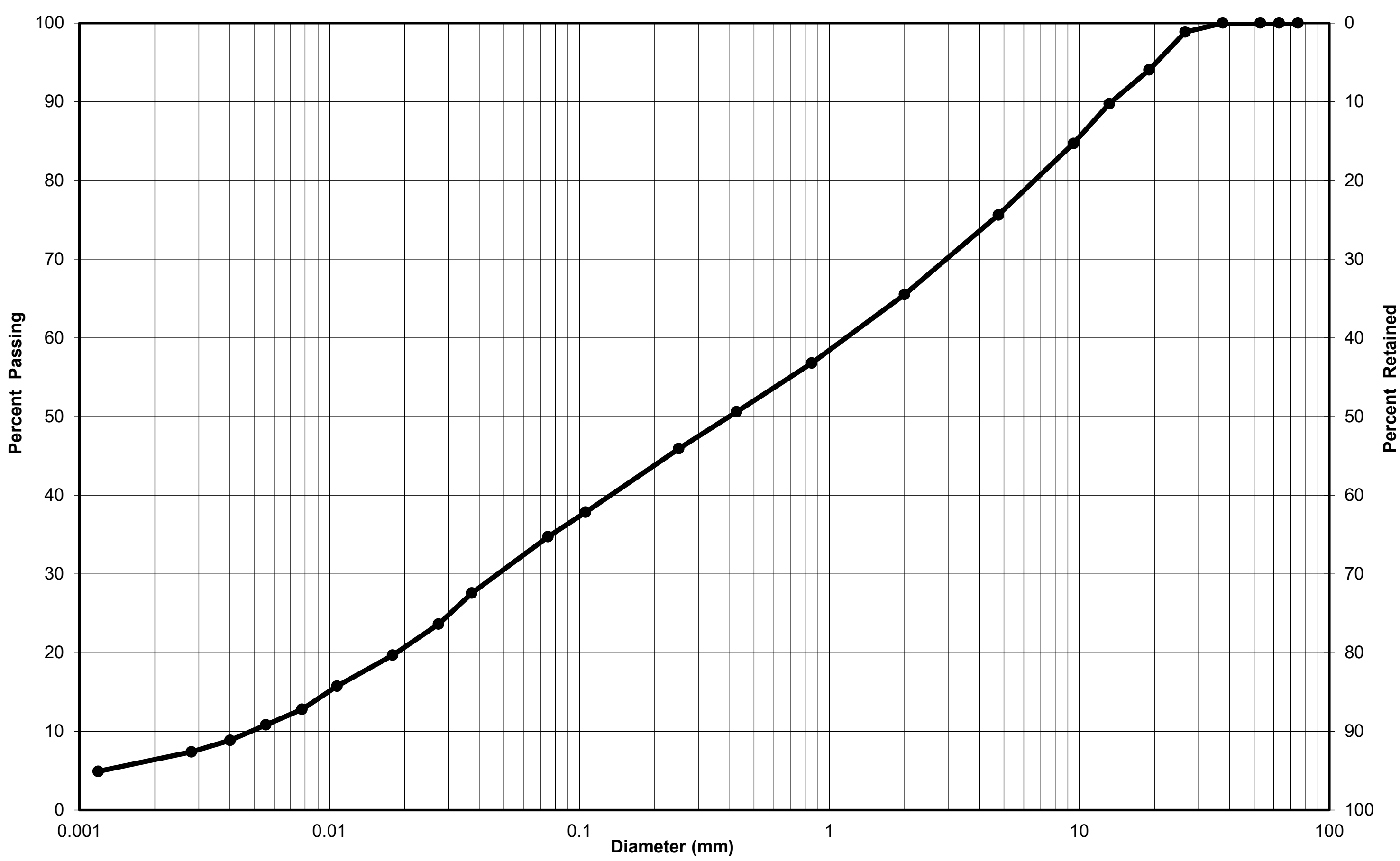
Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
Silt and Sand, some gravel, trace clay	10	38	52
Clay-size particles (<0.002 mm):			3 %

Remarks: As received moisture = 14.7%

Performed by:	Muhammad Rauf	**Date:**	February 25, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 26, 2020

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-16
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186
Borehole No.:	TP28	Sample No.:	Soil Pile
Depth:	-	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

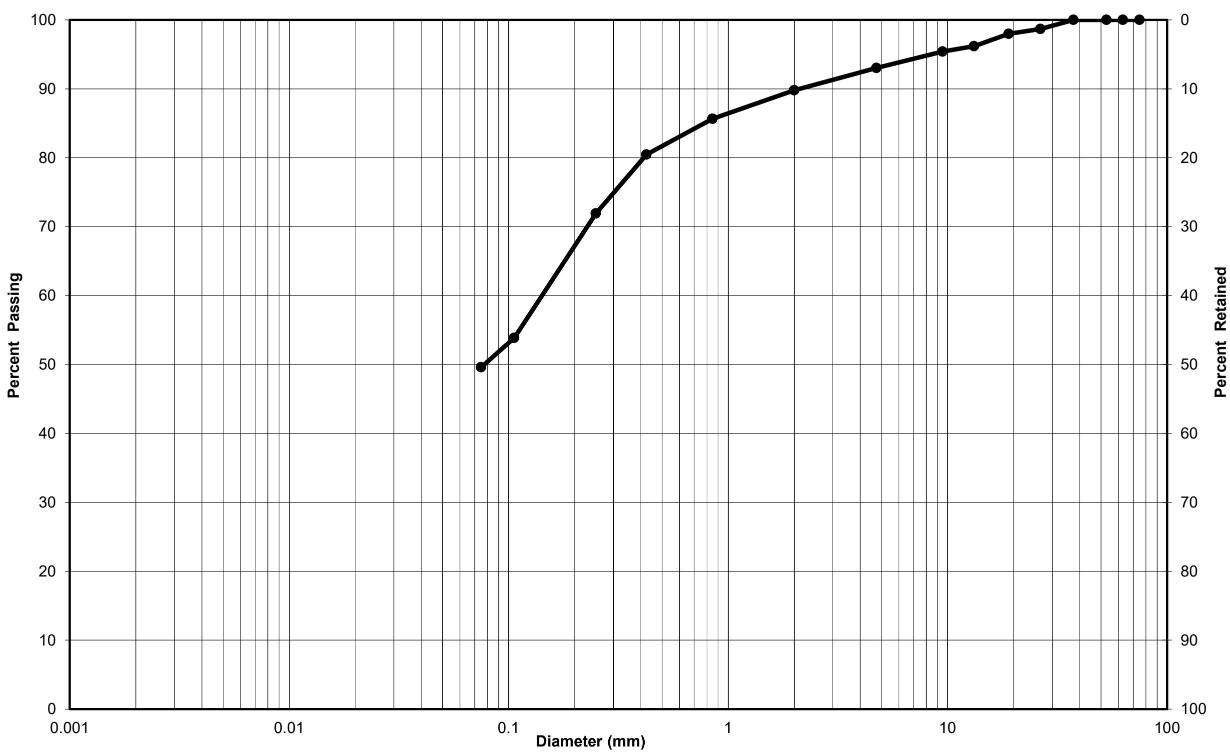
Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
silty gravelly Sand, trace clay	24	41	35
Clay-size particles (<0.002 mm):			6 %

Remarks: As received moisture = 9.4%

Performed by:	Muhammad Rauf	**Date:**	February 25, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 26, 2020

Particle-Size Analysis of Soils
MTO LS-702 (Geotechnical)

Client:	Dufferin Aggregates	**Lab No.:**	WLA 1038-12
Project, Site:	Speyside Assessment - Test Pit Investigation, Miton Quarry, Ontario	**Project No.:**	11208056-186
Borehole No.:	TP31	Sample No.:	Soil Pile
Depth:	1.4 ft - 3.1 ft (0.43 m - 0.95 m)	Enclosure:	-



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

Soil Description	Gravel (%)	Sand (%)	Clay & Silt (%)
Sand and Silt-Clay, trace gravel	7	43	50
Clay-size particles (<0.002 mm):			

Remarks: As received moisture = 24.3%

Performed by:	Melanie Mitchell	**Date:**	February 13, 2020
Verified by:	Abdul Hafeez Khan, P.Eng.; Laboratory Manager	**Date:**	February 19, 2020

Appendix C
Surface Water Level Monitoring Data and Hydrographs

Table C.1

Surface Water Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	SG5 Elevation (m AMSL)	SG6 Elevation (m AMSL)	SG57 Elevation (m AMSL)	SG58 Elevation (m AMSL)	SG59 Elevation (m AMSL)	SG60 Elevation (m AMSL)	SG61 Elevation (m AMSL)	SG62 Elevation (m AMSL)	SG63 Elevation (m AMSL)	SG64 Elevation (m AMSL)	SG65 Elevation (m AMSL)	SG66 Elevation (m AMSL)	SG7 Elevation (m AMSL)	SG10 Elevation (m AMSL)	SW4-81C Elevation (m AMSL)	SW5-80A Elevation (m AMSL)	SW5-80B Elevation (m AMSL)	SWDP6 Elevation (m AMSL)
2/20/1980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.49	--	--
4/11/1980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.55	--	--
5/27/1980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.54	--	--
6/27/1980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.40	--	--
8/13/1980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.34	--	--
9/4/1980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.19	328.19	--
10/31/1980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.35	--
12/8/1980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.48	--
2/9/1981	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.49	328.45	--
5/5/1981	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.47	--
8/31/1981	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.43	--
11/7/1981	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.51	--
2/11/1982	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Snow	Snow	Snow	--
5/1/1982	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Flooded	--	328.63	--
8/13/1982	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	328.45	--
11/30/1982	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.62	--
3/17/1999	--	328.62	--	--	--	--	--	--	--	--	--	--	335.28	--	--	--	--	--
4/5/1999	Dry	328.59	--	--	--	--	--	--	--	--	--	--	335.36	--	--	--	--	--
4/20/1999	Dry	328.59	--	--	--	--	--	--	--	--	--	--	335.41	324.68	--	--	--	--
5/3/1999	Dry	328.57	--	--	--	--	--	--	--	--	--	--	335.38	324.68	--	--	--	--
5/17/1999	Dry	328.52	--	--	--	--	--	--	--	--	--	--	335.30	324.64	--	--	--	--
6/1/1999	Dry	328.54	--	--	--	--	--	--	--	--	--	--	335.25	324.65	--	--	--	--
6/15/1999	Dry	328.46	--	--	--	--	--	--	--	--	--	--	335.09	324.60	--	--	--	--
7/14/1999	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.47	--	--	--	--
8/12/1999	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.35	--	--	--	--
9/15/1999	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.34	--	--	--	--
10/12/1999	Dry	328.46	--	--	--	--	--	--	--	--	--	--	Dry	324.37	--	--	--	--
11/12/1999	Dry	328.49	--	--	--	--	--	--	--	--	--	--	335.05	324.56	--	--	--	--
12/20/1999	Dry	328.45	--	--	--	--	--	--	--	--	--	--	335.14	324.62	--	--	--	--
1/20/2000	Snow	Snow	--	--	--	--	--	--	--	--	--	--	Frozen	Frozen	--	--	--	--
2/16/2000	Snow	Snow	--	--	--	--	--	--	--	--	--	--	Snow	Snow	--	--	--	--
3/20/2000	Dry	328.51	--	--	--	--	--	--	--	--	--	--	335.06	324.68	--	--	--	--
4/17/2000	Dry	328.57	--	--	--	--	--	--	--	--	--	--	335.23	324.76	--	--	--	--
5/16/2000	332.03	328.65	--	--	--	--	--	--	--	--	--	--	335.45	324.88	--	--	--	--
6/19/2000	332.06	328.64	--	--	--	--	--	--	--	--	--	--	335.53	324.91	--	--	--	--
7/18/2000	332.08	328.66	--	--	--	--	--	--	--	--	--	--	335.54	324.86	--	--	--	--
8/16/2000	332.02	328.69	--	--	--	--	--	--	--	--	--	--	335.49	324.84	--	--	--	--
9/19/2000	Dry	328.54	--	--	--	--	--	--	--	--	--	--	335.30	--	--	--	--	--
10/17/2000	Dry	328.49	--	--	--	--	--	--	--	--	--	--	Dry	324.73	--	--	--	--
11/14/2000	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.62	--	--	--	--
12/13/2000	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	Frozen	--	--	--	--
1/16/2001	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.58	--	--	--	--
2/13/2001	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Snow	Frozen	--	--	--	--
3/14/2001	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.68	--	--	--	--
4/17/2001	Dry	328.49	--	--	--	--	--	--	--	--	--	--	335.24	324.69	--	--	--	--
5/15/2001	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.49	--	--	--	--
6/19/2001	Dry	328.45	--	--	--	--	--	--	--	--	--	--	Dry	324.53	--	--	--	--
7/17/2001	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.28	--	--	--	--
8/14/2001	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	Dry	--	--	--	--
9/11/2001	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	Dry	--	--	--	--
10/16/2001	Dry	328.54	--	--	--	--	--	--	--	--	--	--	Dry	324.23	--	--	--	--
11/13/2001	Dry	328.59	--	--	--	--	--	--	--	--	--	--	335.05	324.53	--	--	--	--
12/11/2001	Dry	328.62	--	--	--	--	--	--	--	--	--	--	335.10	324.58	--	--	--	--
1/15/2002	Dry	Frozen	--	--	--	--	--	--	--	--	--	--	Frozen	324.60	--	--	--	--
2/12/2002	Frozen	Frozen	--	--	--	--	--	--	--	--	--	--	Frozen	Frozen	--	--	--	--
3/12/2002	Dry	Frozen	--	--	--	--	--	--	--	--	--	--	Frozen	324.64	--	--	--	--
4/16/2002	331.99	328.57	--	--	--	--	--	--	--	--	--	--	335.20	324.78	--	--	--	--
5/14/2002	332.00	328.68	--	--	--	--	--	--	--	--	--	--	335.13	324.53	--	--	--	--
6/11/2002	Dry	328.52	--	--	--	--	--	--	--	--	--	--	335.02	324.48	--	--	--	--
7/9/2002	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.46	--	--	--	--
8/13/2002	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.37	--	--	--	--
9/10/2002	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.35	--	--	--	--
10/9/2002	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	Dry	--	--	--	--
11/12/2002	Dry	Dry	--	--	--	--	--	--	--	--	--	--	335.02	Dry	--	--	--	--
12/10/2002	Snow	Snow	--	--	--	--	--	--	--	--	--	--	Snow	Frozen	--	--	--	--
1/14/2003	--	--	--	--	--	--	--	--	--	--	--	--	Snow	Snow	--	--	--	--
1/15/2003	Snow	Snow	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2003	Dry	Snow	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/12/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.21	324.57	--	--	--	--
3/13/2003	Dry	Frozen	--	--	--	--	--	--	--	--	--	--	Frozen	Frozen	--	--	--	--
4/1/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.47	--	--	--	--	--
4/10/2003	Dry	328.64	--	--	--	--	--	--	--	--	--	--	335.47	324.65	--	--	--	--
4/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.51	--	--	--	--	--
4/22/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.49	--	--	--	--	--
4/29/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.44	--	--	--	--	--
5/5/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.46	--	--	--	--	--
5/13/2003	Dry	328.58	--	--	--	--	--	--	--	--	--	--	335.54	--	--	--	--	--
5/14/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	324.69	--	--	--	--
5/20/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.50	--	--	--	--	--
5/27/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.54	--	--	--	--	--
6/3/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.51	--	--	--	--	--
6/10/2003	Dry	328.46	--	--	--	--	--	--	--	--	--	--	335.52	324.85	--	--	--	--
6/17/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.50	--	--	--	--	--
6/24/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.40	--	--	--	--	--

Table C.1

Surface Water Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	SG5 Elevation (m AMSL)	SG6 Elevation (m AMSL)	SG57 Elevation (m AMSL)	SG58 Elevation (m AMSL)	SG59 Elevation (m AMSL)	SG60 Elevation (m AMSL)	SG61 Elevation (m AMSL)	SG62 Elevation (m AMSL)	SG63 Elevation (m AMSL)	SG64 Elevation (m AMSL)	SG65 Elevation (m AMSL)	SG66 Elevation (m AMSL)	SG7 Elevation (m AMSL)	SG10 Elevation (m AMSL)	SW4-81C Elevation (m AMSL)	SW5-80A Elevation (m AMSL)	SW5-80B Elevation (m AMSL)	SWDP6 Elevation (m AMSL)
7/1/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.33	--	--	--	--	--
7/8/2003	Dry	Dry	--	--	--	--	--	--	--	--	--	--	335.35	324.76	--	--	--	--
7/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.17	--	--	--	--	--
7/22/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.13	--	--	--	--	--
7/30/2003	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--	--
8/5/2003	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--	--
8/12/2003	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.38	--	--	--	--
8/19/2003	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--	--
8/27/2003	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--	--
9/9/2003	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.33	--	--	--	--
10/14/2003	Dry	Dry	--	--	--	--	--	--	--	--	--	--	335.02	324.57	--	--	--	--
11/11/2003	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.62	--	--	--	--
12/9/2003	Dry	328.69	--	--	--	--	--	--	--	--	--	--	335.50	324.67	--	--	--	--
1/13/2004	331.99	328.65	--	--	--	--	--	--	--	--	--	--	335.53	324.78	--	--	--	--
2/10/2004	--	328.65	--	--	--	--	--	--	--	--	--	--	335.53	324.78	--	--	--	--
3/9/2004	332.01	328.69	--	--	--	--	--	--	--	--	--	--	335.48	324.82	--	--	--	--
4/13/2004	--	328.64	--	--	--	--	--	--	--	--	--	--	336.37	324.83	--	--	--	--
4/26/2004	332.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/11/2004	--	328.66	--	--	--	--	--	--	--	--	--	--	335.89	324.79	--	--	--	--
5/13/2004	332.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/2004	--	328.61	--	--	--	--	--	--	--	--	--	--	335.49	--	--	--	--	--
6/9/2004	Dry	--	--	--	--	--	--	--	--	--	--	--	--	324.77	--	--	--	--
6/24/2004	--	--	--	--	--	--	--	--	--	--	--	--	335.38	--	--	--	--	--
7/14/2004	Dry	328.53	--	--	--	--	--	--	--	--	--	--	335.17	324.69	--	--	--	--
7/27/2004	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--	--
8/11/2004	Dry	328.51	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--	--
8/12/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	324.58	--	--	--	--
9/14/2004	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.53	--	--	--	--
10/12/2004	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.37	--	--	--	--
11/9/2004	Dry	328.60	--	--	--	--	--	--	--	--	--	--	Dry	324.43	--	--	--	--
12/14/2004	Dry	328.60	--	--	--	--	--	--	--	--	--	--	Dry	324.57	--	--	--	--
1/11/2005	Frozen	328.64	--	--	--	--	--	--	--	--	--	--	335.66	--	--	--	--	--
1/12/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	324.68	--	--	--	--
2/8/2005	Frozen	328.67	--	--	--	--	--	--	--	--	--	--	335.48	324.66	--	--	--	--
3/8/2005	Frozen	328.69	--	--	--	--	--	--	--	--	--	--	335.59	324.66	--	--	--	--
4/12/2005	Dry	328.66	--	--	--	--	--	--	--	--	--	--	335.60	324.71	--	--	--	--
5/10/2005	Dry	328.65	--	--	--	--	--	--	--	--	--	--	335.59	324.83	--	--	--	--
6/14/2005	Dry	328.55	--	--	--	--	--	--	--	--	--	--	Damaged	324.75	--	--	--	--
6/28/2005	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--	--
7/12/2005	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.57	--	--	--	--
7/26/2005	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--	--
8/9/2005	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.43	--	--	--	--
9/13/2005	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Damaged	324.36	--	--	--	--
10/11/2005	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.39	--	--	--	--
11/8/2005	Dry	328.54	--	--	--	--	--	--	--	--	--	--	Dry	324.47	--	--	--	--
12/13/2005	Frozen	Frozen	--	--	--	--	--	--	--	--	--	--	Frozen	324.63	--	--	--	--
1/10/2006	332.04	328.62	--	--	--	--	--	--	--	--	--	--	335.09	324.64	--	--	--	--
2/14/2006	332.00	328.67	--	--	--	--	--	--	--	--	--	--	335.33	324.73	--	--	--	--
3/14/2006	332.00	328.72	--	--	--	--	--	--	--	--	--	--	335.38	324.78	--	--	--	--
4/11/2006	Dry	328.64	--	--	--	--	--	--	--	--	--	--	335.30	324.81	--	--	--	--
5/9/2006	332.01	328.64	--	--	--	--	--	--	--	--	--	--	335.28	--	--	--	--	--
5/10/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	324.80	--	--	--	--
6/12/2006	Dry	328.60	--	--	--	--	--	--	--	--	--	--	335.16	324.80	--	--	--	--
6/27/2006	--	--	--	--	--	--	--	--	--	--	--	--	335.02	--	--	--	--	--
7/11/2006	Dry	328.52	--	--	--	--	--	--	--	--	--	--	Dry	324.66	--	--	--	--
7/25/2006	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--	--
8/8/2006	Dry	328.55	--	--	--	--	--	--	--	--	--	--	Dry	324.72	--	--	--	--
9/12/2006	Dry	Dry	--	--	--	--	--	--	--	--	--	--	Dry	324.55	--	--	--	--
10/10/2006	Dry	328.58	--	--	--	--	--	--	--	--	--	--	Dry	324.63	--	--	--	--
11/14/2006	Dry	328.63	--	--	--	--	--	--	--	--	--	--	335.14	324.68	--	--	--	--
12/12/2006	Dry	328.65	--	--	--	--	--	--	--	--	--	--	335.30	324.68	--	--	--	--
1/9/2007	332.00	328.67	--	--	--	--	--	--	--	--	--	--	335.32	324.66	--	--	--	--
2/13/2007	332.00	328.70	--	--	--	--	--	--	--	--	--	--	Frozen	324.67	--	--	--	--
3/13/2007	Frozen	328.67	--	--	--	--	--	--	--	--	--	--	335.28	324.63	--	--	--	--
4/10/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	324.66	--	--	--	--
5/8/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	324.66	--	--	--	--
6/12/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	324.67	--	--	--	--
7/10/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	324.48	--	--	--	--
7/24/2007	--	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2007	--	Dry	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--
9/11/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--
10/9/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--
11/14/2007	--	Dry	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--
12/12/2007	--	Snow	--	--	--	--	--	--	--	--	--	--	--	Snow	--	--	--	--
1/8/2008	--	328.67	--	--	--	--	--	--	--	--	--	--	--	324.56	--	--	--	--
2/12/2008	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	Frozen	--	--	--	--
3/18/2008	--	328.64	--	--	--	--	--	--	--	--	--	--	--	Frozen	--	--	--	--
4/8/2008	--	328.72	--	--	--	--	--	--	--	--	--	--	--	324.61	--	--	--	--
5/13/2008	--	328.65	--	--	--	--	--	--	--	--	--	--	--	324.53	--	--	--	--
6/11/2008	--	328.72	--	--	--	--	--	--	--	--	--	--	--	324.50	--	--	--	--
6/27/2008	--	328.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2008	--	328.54	--	--	--	--	--	--	--	--	--	--	--	324.61	--	--	--	--
7/22/2008	--	328.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2008	--	328.62	--	--	--	--	--	--	--	--	--	--	--	324.63	--	--	--	328.56

Table C.1

Surface Water Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	SG5 Elevation (m AMSL)	SG6 Elevation (m AMSL)	SG57 Elevation (m AMSL)	SG58 Elevation (m AMSL)	SG59 Elevation (m AMSL)	SG60 Elevation (m AMSL)	SG61 Elevation (m AMSL)	SG62 Elevation (m AMSL)	SG63 Elevation (m AMSL)	SG64 Elevation (m AMSL)	SG65 Elevation (m AMSL)	SG66 Elevation (m AMSL)	SG7 Elevation (m AMSL)	SG10 Elevation (m AMSL)	SW4-81C Elevation (m AMSL)	SW5-80A Elevation (m AMSL)	SW5-80B Elevation (m AMSL)	SWDP6 Elevation (m AMSL)
9/10/2008	--	328.60	--	--	--	--	--	--	--	--	--	--	--	324.74	--	--	--	--
10/15/2008	--	328.58	--	--	--	--	--	--	--	--	--	--	--	324.74	--	--	--	328.48
11/11/2008	--	328.84	--	--	--	--	--	--	--	--	--	--	--	324.75	--	--	--	--
12/10/2008	--	328.66	--	--	--	--	--	--	--	--	--	--	--	324.78	--	--	--	328.60
1/14/2009	--	Inaccessible	--	--	--	--	--	--	--	--	--	--	--	Frozen	--	--	--	Inaccessible
2/10/2009	--	Inaccessible	--	--	--	--	--	--	--	--	--	--	--	Frozen	--	--	--	--
3/10/2009	--	Inaccessible	--	--	--	--	--	--	--	--	--	--	--	Frozen	--	--	--	Inaccessible
4/14/2009	--	328.69	--	--	--	--	--	--	--	--	--	--	--	324.86	--	--	--	328.60
5/12/2009	--	328.67	--	--	--	--	--	--	--	--	--	--	--	324.94	--	--	--	328.60
6/9/2009	--	328.63	--	--	--	--	--	--	--	--	--	--	--	324.91	--	--	--	328.55
6/23/2009	--	328.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/15/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	324.85	--	--	--	--
7/28/2009	--	328.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.51
8/11/2009	--	328.61	--	--	--	--	--	--	--	--	--	--	--	324.88	--	--	--	328.53
9/8/2009	--	Dry	--	--	--	--	--	--	--	--	--	--	--	324.86	--	--	--	Dry
10/15/2009	--	328.56	--	--	--	--	--	--	--	--	--	--	--	324.79	--	--	--	328.47
11/10/2009	--	328.56	--	--	--	--	--	--	--	--	--	--	--	324.80	--	--	--	328.48
12/8/2009	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	324.78	--	--	--	Frozen
1/12/2010	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	324.78	--	--	--	328.51
2/9/2010	--	328.66	--	--	--	--	--	--	--	--	--	--	--	324.75	--	--	--	Frozen
3/9/2010	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	Frozen	--	--	--	328.58
4/13/2010	--	Damaged	--	--	--	--	--	--	--	--	--	--	--	324.86	--	--	--	328.58
5/11/2010	--	Destroyed	--	--	--	--	--	--	--	--	--	--	--	324.87	--	--	--	--
6/8/2010	--	328.53	--	--	--	--	--	--	--	--	--	--	--	324.86	--	--	--	--
6/22/2010	--	328.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/6/2010	--	328.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2010	--	328.47	--	--	--	--	--	--	--	--	--	--	--	324.87	--	--	--	--
7/22/2010	--	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2010	--	Dry	--	--	--	--	--	--	--	--	--	--	--	324.79	--	--	--	Dry
9/14/2010	--	Dry	--	--	--	--	--	--	--	--	--	--	--	324.61	--	--	--	--
10/12/2010	--	Dry	--	--	--	--	--	--	--	--	--	--	--	324.66	--	--	--	--
11/9/2010	--	328.46	--	--	--	--	--	--	--	--	--	--	--	324.71	--	--	--	--
12/14/2010	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	Frozen	--	--	--	--
1/11/2011	--	328.55	--	--	--	--	--	--	--	--	--	--	--	Frozen	--	--	--	--
2/8/2011	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	Frozen	--	--	--	--
3/8/2011	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	324.58	--	--	--	Frozen
4/12/2011	--	328.58	--	--	--	--	--	--	--	--	--	--	--	324.68	--	--	--	328.59
5/10/2011	--	328.58	--	--	--	--	--	--	--	--	--	--	--	324.75	--	--	--	328.59
6/14/2011	--	328.59	--	--	--	--	--	--	--	--	--	--	--	324.75	--	--	--	328.61 Dup 329.20
6/28/2011	--	328.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.58
7/12/2011	--	Dry	--	--	--	--	--	--	--	--	--	--	--	324.66	--	--	--	328.48
7/28/2011	--	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2011	--	Dry	--	--	--	--	--	--	--	--	--	--	--	324.53	--	--	--	Dry
8/26/2011	--	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
9/13/2011	--	Dry	--	--	--	--	--	--	--	--	--	--	--	324.48	--	--	--	Dry
10/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--
10/18/2011	--	328.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.44
11/15/2011	--	328.53	--	--	--	--	--	--	--	--	--	--	--	324.67	--	--	--	328.56
12/14/2011	--	328.55	--	--	--	--	--	--	--	--	--	--	--	324.68	--	--	--	328.57
1/10/2012	--	328.57	--	--	--	--	--	--	--	--	--	--	--	324.68	--	--	--	Ice
2/14/2012	--	328.59	--	--	--	--	--	--	--	--	--	--	--	324.63	--	--	--	Frozen
3/13/2012	--	328.62	--	--	--	--	--	--	--	--	--	--	--	324.50	--	--	--	328.62
4/10/2012	--	328.55	--	--	--	--	--	--	--	--	--	--	--	324.56	--	--	--	328.55
5/8/2012	--	328.57	--	--	--	--	--	--	--	--	--	--	--	324.65	--	--	--	328.57
6/12/2012	--	328.52	--	--	--	--	--	--	--	--	--	--	--	324.66	--	--	--	328.54
6/28/2012	--	328.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2012	--	Dry	--	--	--	--	--	--	--	--	--	--	--	324.51	--	--	--	Dry
7/26/2012	--	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2012	--	Dry	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	Dry
9/11/2012	--	Dry	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	Dry
10/10/2012	--	Dry	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	Dry
11/13/2012	--	328.53	--	--	--	--	--	--	--	--	--	--	--	324.64	--	--	--	328.53
12/11/2012	--	328.54	--	--	--	--	--	--	--	--	--	--	--	324.66	--	--	--	328.55
1/8/2013	--	328.52	--	--	--	--	--	--	--	--	--	--	--	324.68	--	--	--	328.53
2/12/2013	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	324.68	--	--	--	Frozen
3/12/2013	--	328.70	--	--	--	--	--	--	--	--	--	--	--	324.65	--	--	--	328.71
4/10/2013	--	328.64	--	--	--	--	--	--	--	--	--	--	--	324.68	--	--	--	328.65
5/14/2013	--	328.60	--	--	--	--	--	--	--	--	--	--	--	324.74	--	--	--	328.60
6/11/2013	--	328.63	--	--	--	--	--	--	--	--	--	--	--	324.83	--	--	--	328.64
7/9/2013	--	328.59	--	--	--	--	--	--	--	--	--	--	--	324.79	--	--	--	328.60
7/25/2013	--	328.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/2013	--	328.49	--	--	--	--	--	--	--	--	--	--	--	324.75	--	--	--	328.50
8/29/2013	--	328.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/2013	--	328.46	--	--	--	--	--	--	--	--	--	--	--	324.65	--	--	--	328.46
9/25/2013	--	328.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/8/2013	--	328.54	--	--	--	--	--	--	--	--	--	--	--	324.72	--	--	--	328.55
11/12/2013	--	328.57	--	--	--	--	--	--	--	--	--	--	--	324.70	--	--	--	328.57
12/10/2013	--	328.57	--	--	--	--	--	--	--	--	--	--	--	324.67	--	--	--	Frozen
1/14/2014	--	328.65	--	--	--	--	--	--	--	--	--	--	--	324.66	--	--	--	328.74
2/11/2014	--	328.61	--	--	--	--	--	--	--	--	--	--	--	324.65	--	--	--	328.60
3/11/2014	--	328.65	--	--	--	--	--	--	--	--	--	--	--	324.66	--	--	--	Frozen
4/8/2014	--	328.73	--	--	--	--	--	--	--	--	--	--	--	324.73	--	--	--	328.73
5/13/2014	--	328.63	--	--	--	--	--	--	--	--	--	--	--	324.82	--	--	--	328.62
6/10/2014	--	328.58	--	--	--	--	--	--	--	--	--	--	--	324.85	--	--	--	328.57

Table C.1

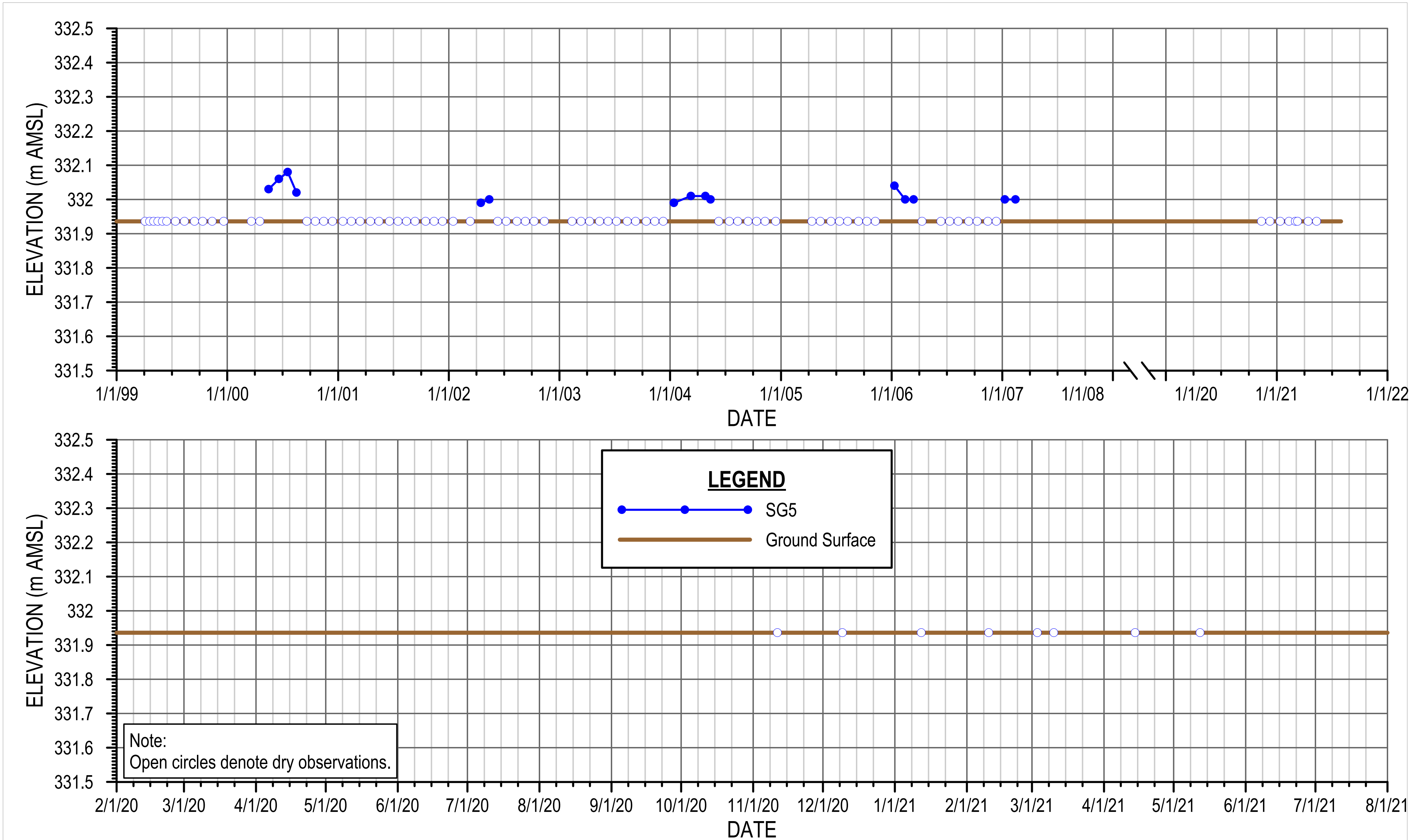
Surface Water Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	SG5 Elevation (m AMSL)	SG6 Elevation (m AMSL)	SG57 Elevation (m AMSL)	SG58 Elevation (m AMSL)	SG59 Elevation (m AMSL)	SG60 Elevation (m AMSL)	SG61 Elevation (m AMSL)	SG62 Elevation (m AMSL)	SG63 Elevation (m AMSL)	SG64 Elevation (m AMSL)	SG65 Elevation (m AMSL)	SG66 Elevation (m AMSL)	SG7 Elevation (m AMSL)	SG10 Elevation (m AMSL)	SW4-81C Elevation (m AMSL)	SW5-80A Elevation (m AMSL)	SW5-80B Elevation (m AMSL)	SWDP6 Elevation (m AMSL)
7/8/2014	--	328.51	--	--	--	--	--	--	--	--	--	--	--	324.80	--	--	--	328.50
7/22/2014	--	328.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	324.83	--	--	--	--
8/13/2014	--	328.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.54
8/27/2014	--	328.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.50
9/9/2014	--	328.52	--	--	--	--	--	--	--	--	--	--	--	324.80	--	--	--	328.52
9/25/2014	--	328.55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.53
10/14/2014	--	328.54	--	--	--	--	--	--	--	--	--	--	--	324.86	--	--	--	328.54
11/11/2014	--	328.56	--	--	--	--	--	--	--	--	--	--	--	324.82	--	--	--	328.56
12/9/2014	--	328.57	--	--	--	--	--	--	--	--	--	--	--	324.78	--	--	--	328.57
1/13/2015	--	Ice	--	--	--	--	--	--	--	--	--	--	--	324.78	--	--	--	Ice
2/12/2015	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	324.77	--	--	--	Frozen
3/11/2015	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	324.76	--	--	--	Frozen
4/14/2015	--	328.64	--	--	--	--	--	--	--	--	--	--	--	324.70	--	--	--	328.63
5/12/2015	--	328.63	--	--	--	--	--	--	--	--	--	--	--	324.77	--	--	--	328.62
6/10/2015	--	328.60	--	--	--	--	--	--	--	--	--	--	--	324.79	--	--	--	328.60
7/14/2015	--	328.58	--	--	--	--	--	--	--	--	--	--	--	324.81	--	--	--	328.58
8/12/2015	--	328.49	--	--	--	--	--	--	--	--	--	--	--	324.69	--	--	--	328.50
9/9/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	324.58	--	--	--	--
9/10/2015	--	dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	dry
10/14/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	324.52	--	--	--	--
10/15/2015	--	328.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.46
11/10/2015	--	328.54	--	--	--	--	--	--	--	--	--	--	--	324.63	--	--	--	328.54
12/8/2015	--	328.54	--	--	--	--	--	--	--	--	--	--	--	324.62	--	--	--	328.54
1/12/2016	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	Frozen	--	--	--	Frozen
2/9/2016	--	328.60	--	--	--	--	--	--	--	--	--	--	--	324.62	--	--	--	328.59
3/9/2016	--	328.65	--	--	--	--	--	--	--	--	--	--	--	324.60	--	--	--	328.57
4/12/2016	--	328.66	--	--	--	--	--	--	--	--	--	--	--	324.67	--	--	--	328.66
5/10/2016	--	328.61	--	--	--	--	--	--	--	--	--	--	--	324.57	--	--	--	328.60
6/14/2016	--	328.50	--	--	--	--	--	--	--	--	--	--	--	324.51	--	--	--	328.51
7/12/2016	--	Dry	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	328.14
7/28/2016	--	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2016	--	Dry	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	Dry
8/26/2016	--	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/13/2016	--	Dry	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	Dry
9/29/2016	--	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/12/2016	--	Dry	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	Dry
11/8/2016	--	328.49	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	328.48
12/13/2016	--	328.52	--	--	--	--	--	--	--	--	--	--	--	324.46	--	--	--	328.50
1/10/2017	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	Frozen	--	--	--	Frozen
2/14/2017	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	324.54	--	--	--	Frozen
3/14/2017	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	Frozen	--	--	--	Frozen
4/11/2017	--	328.65	--	--	--	--	--	--	--	--	--	--	--	324.61	--	--	--	328.62
4/26/2017	--	328.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/5/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	Rejected	--	--	--	--
5/9/2017	--	328.66	--	--	--	--	--	--	--	--	--	--	--	324.59	--	--	--	328.64
5/26/2017	--	328.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/13/2017	--	328.59	--	--	--	--	--	--	--	--	--	--	--	324.52	--	--	--	328.57
6/28/2017	--	328.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	324.49	--	--	--	--
7/12/2017	--	328.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.51
7/26/2017	--	328.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/15/2017	--	328.47	--	--	--	--	--	--	--	--	--	--	--	324.47	--	--	--	328.46
8/31/2017	--	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/12/2017	--	Dry	--	--	--	--	--	--	--	--	--	--	--	324.40	--	--	--	--
9/28/2017	--	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/11/2017	--	Dry	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	Dry
11/14/2017	--	328.51	--	--	--	--	--	--	--	--	--	--	--	324.40	--	--	--	328.49
12/12/2017	--	Ice	--	--	--	--	--	--	--	--	--	--	--	324.40	--	--	--	Ice
1/9/2018	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	324.42	--	--	--	Frozen
2/12/2018	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.57
2/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	Frozen	--	--	--	--
3/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	324.49	--	--	--	--
3/14/2018	--	328.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.59
4/10/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	324.51	--	--	--	--
4/11/2018	--	328.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2018	--	328.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/8/2018	--	328.62	--	--	--	--	--	--	--	--	--	--	--	324.56	--	--	--	328.62
5/23/2018	--	328.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2018	--	328.56	--	--	--	--	--	--	--	--	--	--	--	324.46	--	--	--	328.55
6/28/2018	--	328.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2018	--	328.50	--	--	--	--	--	--	--	--	--	--	--	324.43	--	--	--	--
7/24/2018	--	328.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2018	--	328.49	--	--	--	--	--	--	--	--	--	--	--	324.42	--	--	--	328.48
8/30/2018	--	328.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/11/2018	--	328.48	--	--	--	--	--	--	--	--	--	--	--	324.42	--	--	--	328.48
10/10/2018	--	328.55	--	--	--	--	--	--	--	--	--	--	--	324.45	--	--	--	328.54
11/13/2018	--	328.59	--	--	--	--	--	--	--	--	--	--	--	324.49	--	--	--	NA
12/11/2018	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	324.52	--	--	--	328.59
1/8/2019	--	328.63	--	--	--	--	--	--	--	--	--	--	--	324.51	--	--	--	Ice
2/11/2019	--	Frozen	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Frozen
2/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	324.56	--	--	--	--
3/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	324.58	--	--	--	--
3/14/2019	--	328.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Frozen

Table C.1

Surface Water Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	SG5 Elevation (m AMSL)	SG6 Elevation (m AMSL)	SG57 Elevation (m AMSL)	SG58 Elevation (m AMSL)	SG59 Elevation (m AMSL)	SG60 Elevation (m AMSL)	SG61 Elevation (m AMSL)	SG62 Elevation (m AMSL)	SG63 Elevation (m AMSL)	SG64 Elevation (m AMSL)	SG65 Elevation (m AMSL)	SG66 Elevation (m AMSL)	SG7 Elevation (m AMSL)	SG10 Elevation (m AMSL)	SW4-81C Elevation (m AMSL)	SW5-80A Elevation (m AMSL)	SW5-80B Elevation (m AMSL)	SWDP6 Elevation (m AMSL)
4/9/2019	--	328.76	--	--	--	--	--	--	--	--	--	--	--	324.54	--	--	--	328.66
4/25/2019	--	328.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.64
5/14/2019	--	328.77	--	--	--	--	--	--	--	--	--	--	--	324.55	--	--	--	328.67
5/30/2019	--	328.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/11/2019	--	328.57	--	--	--	--	--	--	--	--	--	--	--	324.51	--	--	--	328.62
6/27/2019	--	328.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.59
7/9/2019	--	328.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.55
7/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	324.44	--	--	--	--
7/25/2019	--	328.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Rejected
8/13/2019	--	Dry	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	Dry
8/29/2019	--	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/2019	--	Dry	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	Dry
10/8/2019	--	Dry	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	Dry
11/12/2019	--	328.52	--	--	--	--	--	--	--	--	--	--	--	324.48	--	--	--	328.57
12/10/2019	--	328.56	--	--	--	--	--	--	--	--	--	--	--	324.51	--	--	--	328.60
1/14/2020	--	328.60	--	--	--	--	--	--	--	--	--	--	--	324.53	--	--	--	328.64
2/6/2020	--	--	332.62	332.93	328.57	328.64	328.94	329.44	330.71	Dry	--	--	--	--	--	--	--	--
2/11/2020	--	Ice	--	--	--	--	--	--	--	Dry	Dry	337.58	--	324.46	--	--	--	Ice
3/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	324.51	--	--	--	--
3/11/2020	--	328.66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.64
4/14/2020	--	328.63	332.61	332.94	328.61	328.65	328.95	329.48	330.76	Dry	338.48	337.64	--	324.50	--	--	--	328.62
4/29/2020	--	328.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	324.45	--	--	--	--
5/13/2020	--	328.60	332.45	332.86	328.58	328.63	328.95	329.37	330.67	Dry	Dry	Dry	--	--	--	--	--	328.59
5/27/2020	--	328.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/9/2020	--	328.56	Dry	332.69	328.54	328.58	328.95	329.32	330.56	Dry	Dry	Dry	--	324.43	--	--	--	328.54
6/24/2020	--	328.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/14/2020	--	Dry	Dry	Dry	Dry	Dry	328.95	329.30	330.24	Dry	Dry	Dry	--	Dry	--	--	--	Dry
7/30/2020	--	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.34
8/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	324.41	--	--	--	--
8/12/2020	--	328.51	Dry	Dry	328.49	328.52	328.94	329.31	330.36	Dry	Dry	Dry	--	--	--	--	--	328.51
9/9/2020	--	--	Dry	Dry	328.40	328.51	328.95	Dry	Dry	Dry	Dry	Dry	--	324.37	--	--	--	--
10/13/2020	--	Dry	Dry	Dry	328.40	328.52	328.92	Dry	Dry	Dry	Dry	Dry	--	--	--	--	--	Dry
10/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry	--	--	--	--
11/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	324.39	--	--	--	--
11/11/2020	Dry	328.50	Dry	Dry	328.48	328.52	328.92	329.30	330.28	Dry	Dry	Dry	--	--	--	--	--	328.49
12/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	324.44	--	--	--	--
12/9/2020	Dry	328.58	Dry	Dry	328.57	328.60	328.93	329.31	330.55	Dry	Dry	Dry	--	--	--	--	--	Frozen
1/12/2021	Dry	328.58	Dry	Dry	328.56	326.85 Dup 328.60	328.93	329.34	330.59	Dry	Dry	Dry	--	324.47	--	--	--	328.57
2/9/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	324.48	--	--	--	--
2/10/2021	Dry	Frozen	Dry	Dry	Frozen	Frozen	328.94	Frozen	Frozen	Dry	Dry	Dry	--	--	--	--	--	Frozen
3/3/2021	Dry	Frozen	Dry	Frozen	Frozen	Frozen	328.94	Frozen	Frozen	Dry	Dry	Dry	--	--	--	--	--	Frozen
3/9/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	327.97	--	--	--	--
3/10/2021	Dry	Frozen	Dry	Dry	Frozen	Frozen	328.94	Frozen	Frozen	Dry	Dry	Dry	--	--	--	--	--	Frozen
4/13/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	324.48	--	--	--	--
4/14/2021	Dry	Inaccessible	332.55	333.02	328.57	328.63	328.95	329.39	330.66	Dry	Dry	337.52	--	--	--	--	--	Inaccessible
4/27/2021	--	328.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/11/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	324.46	--	--	--	--
5/12/2021	Dry	Missing	Dry	332.84	328.56	328.61	328.95	329.35	330.64	Dry	Dry	Dry	--	--	--	--	--	Inaccessible
5/27/2021	--	328.55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/2/2021	--	--	--	Dry	328.59	--	328.95	--	--	--	--	Dry	--	--	--	--	--	--
6/7/2021	--	328.53	Dry	Dry	328.47	328.55	328.95	329.30	330.43	Dry	Dry	Dry	--	--	--	--	--	Inaccessible
6/8/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	324.41	--	--	--	--
6/23/2021	--	328.51	--	--	328.45	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2021	--	Inaccessible	Dry	Dry	328.51	328.57	328.94	329.36	330.41	Dry	Dry	Dry	--	324.43	--	--	--	Inaccessible



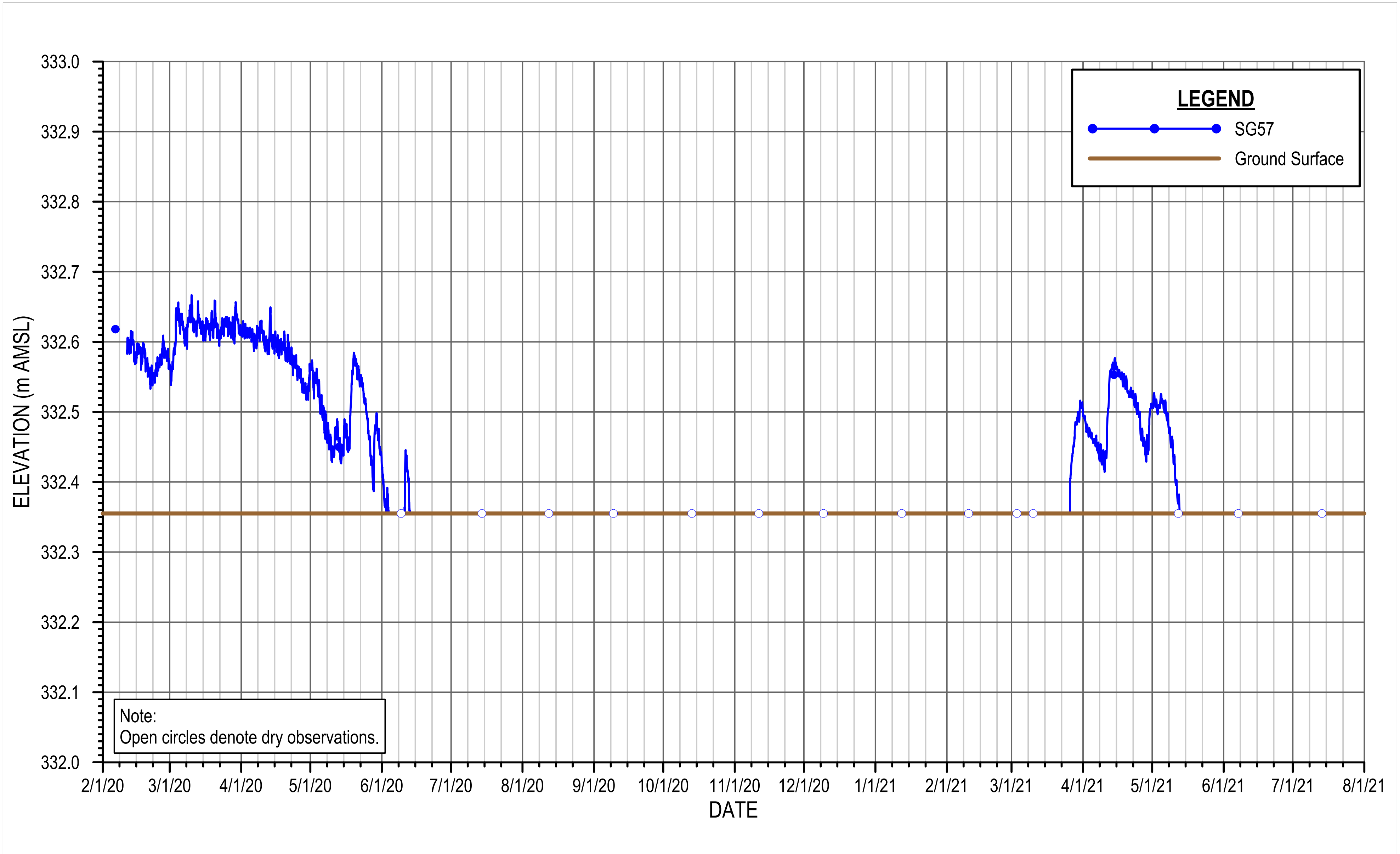
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - SG5

Project No. **10978**
Date **November 2021**

FIGURE C.1

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\SG5.grf
Plot Date: November 25 2021 11:11 AM



MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - SG57

Project No. **10978**
Date **July 2021**

FIGURE C.2

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\Report 164\SG57.grf
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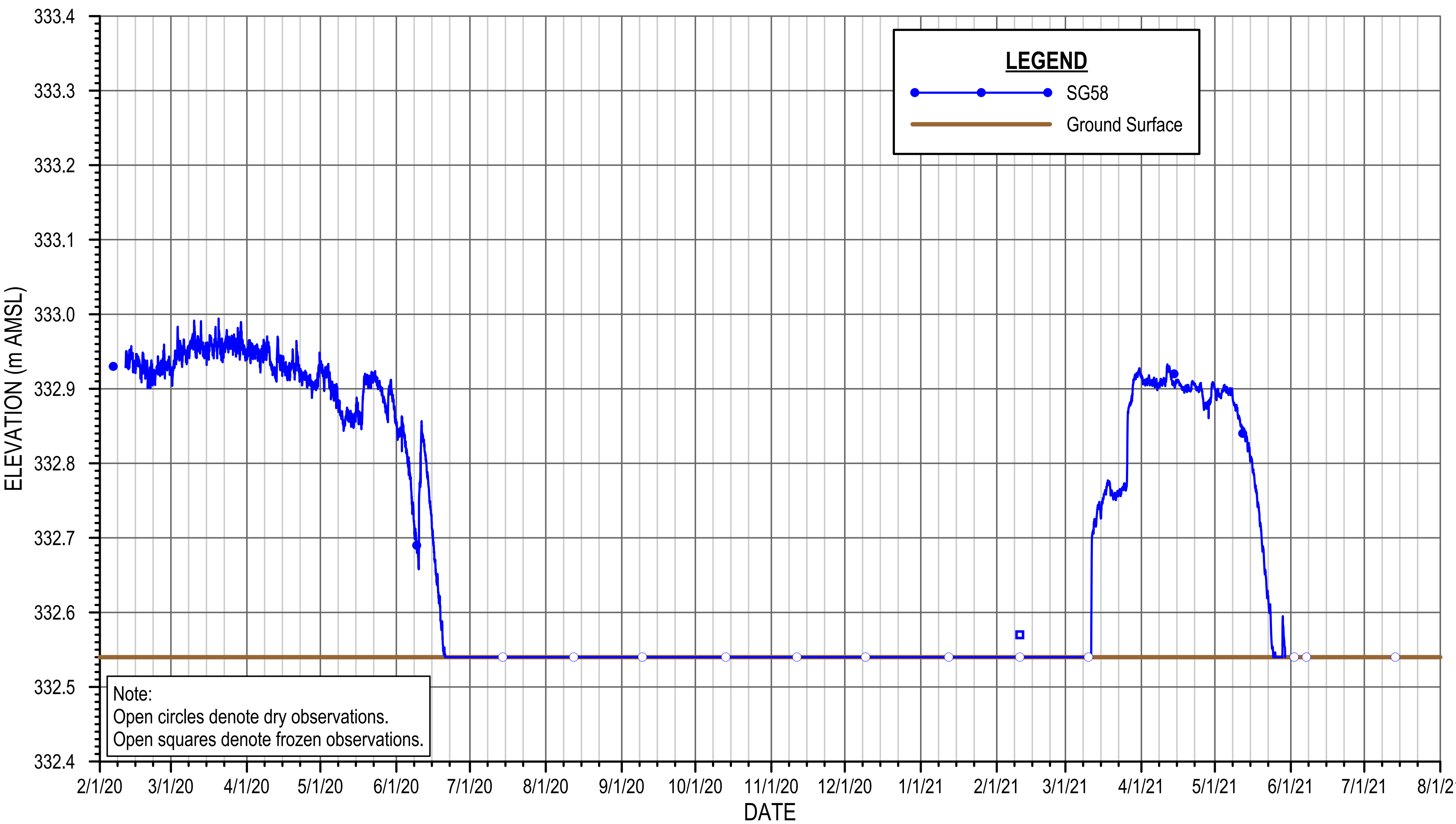

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - SG58

Project No. **10978**
Date **July 2021**

FIGURE C.3

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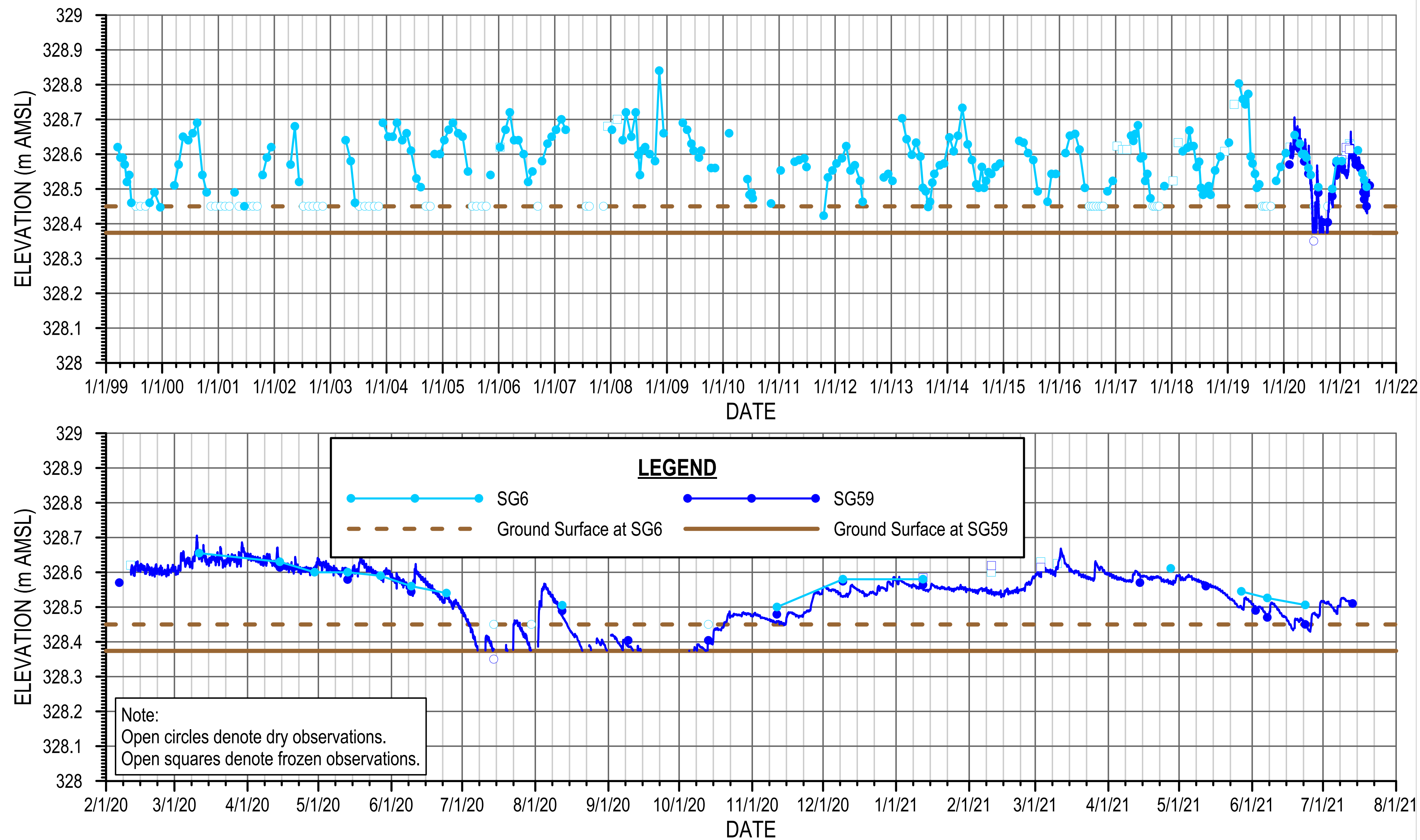

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **November 2021**

HYDROGRAPH - SG59 AND SG6

FIGURE C.4

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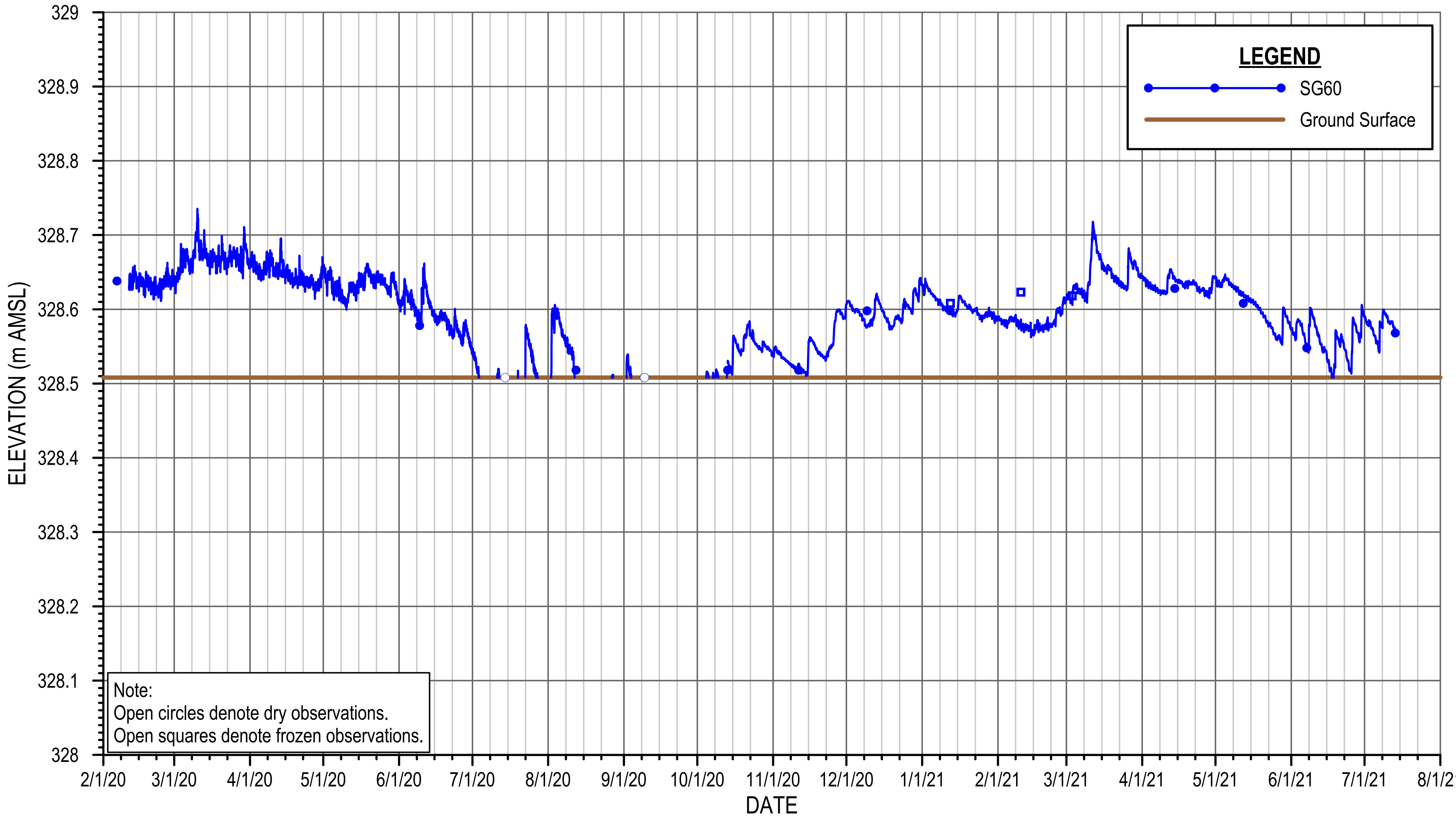

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - SG60

Project No. **10978**
Date **July 2021**

FIGURE C.5

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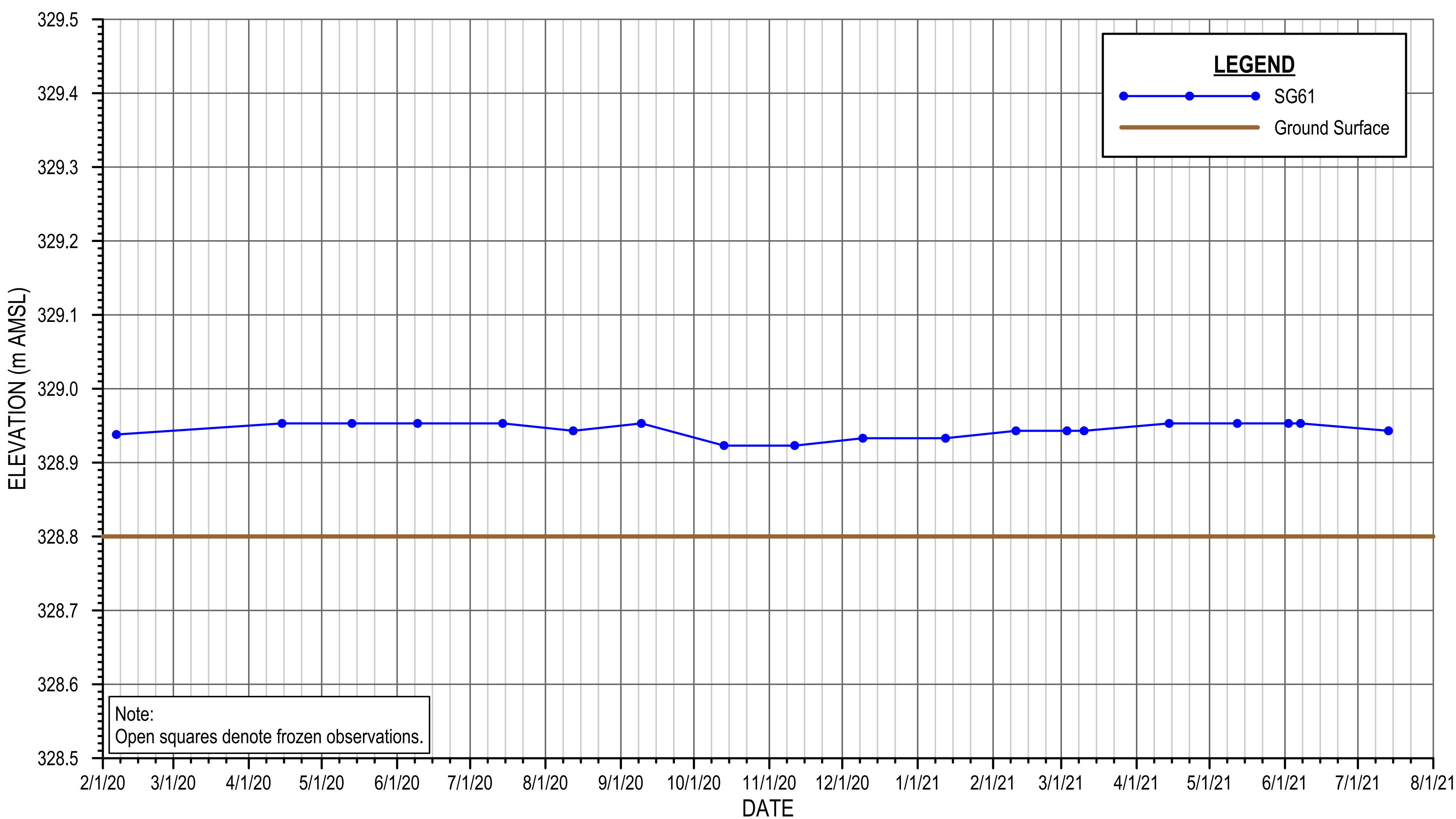

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - SG61

Project No. **10978**
Date **July 2021**

FIGURE C.6

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\Report 164\SG61.grf
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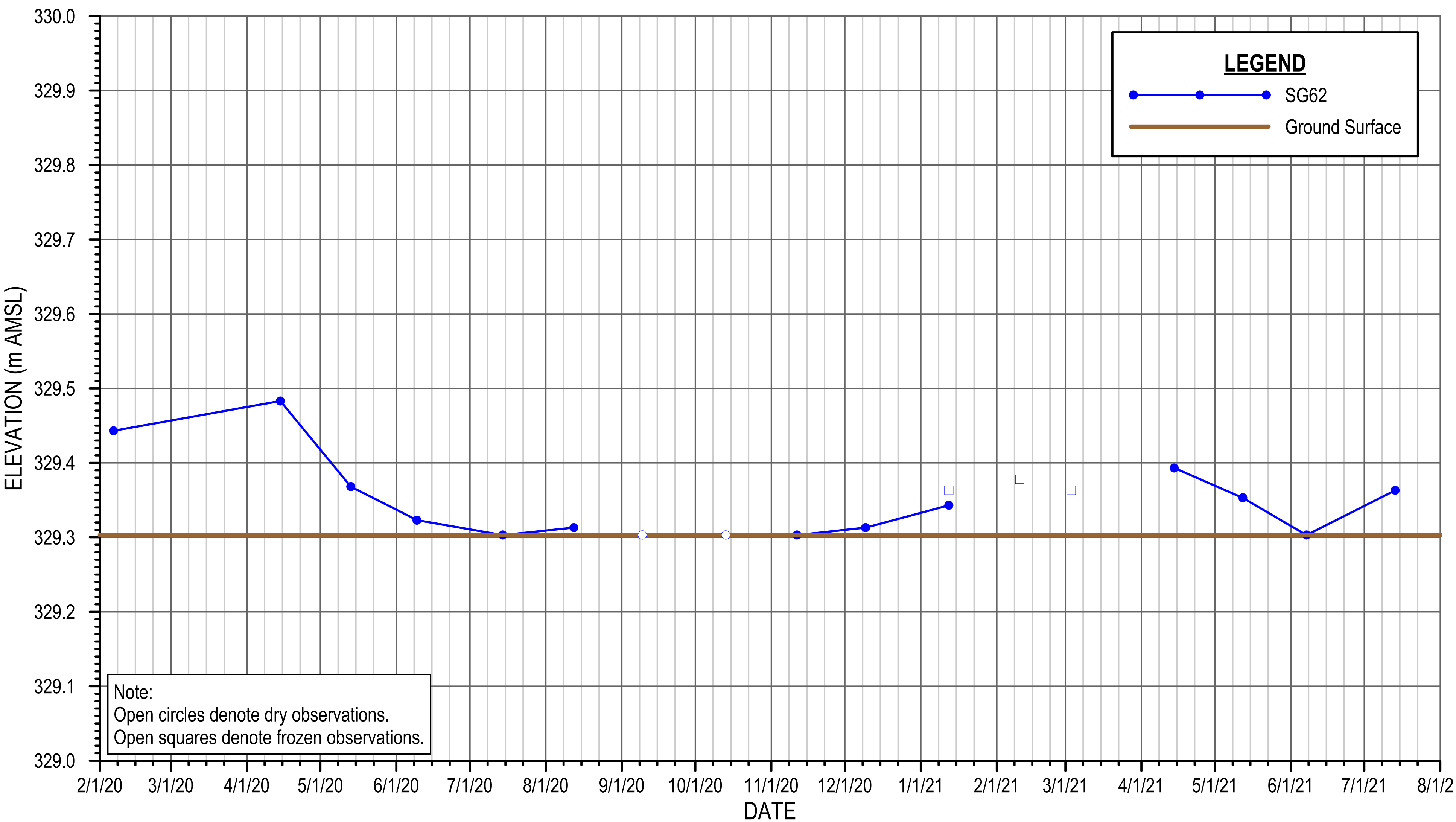

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **July 2021**

HYDROGRAPH - SG62

FIGURE C.7

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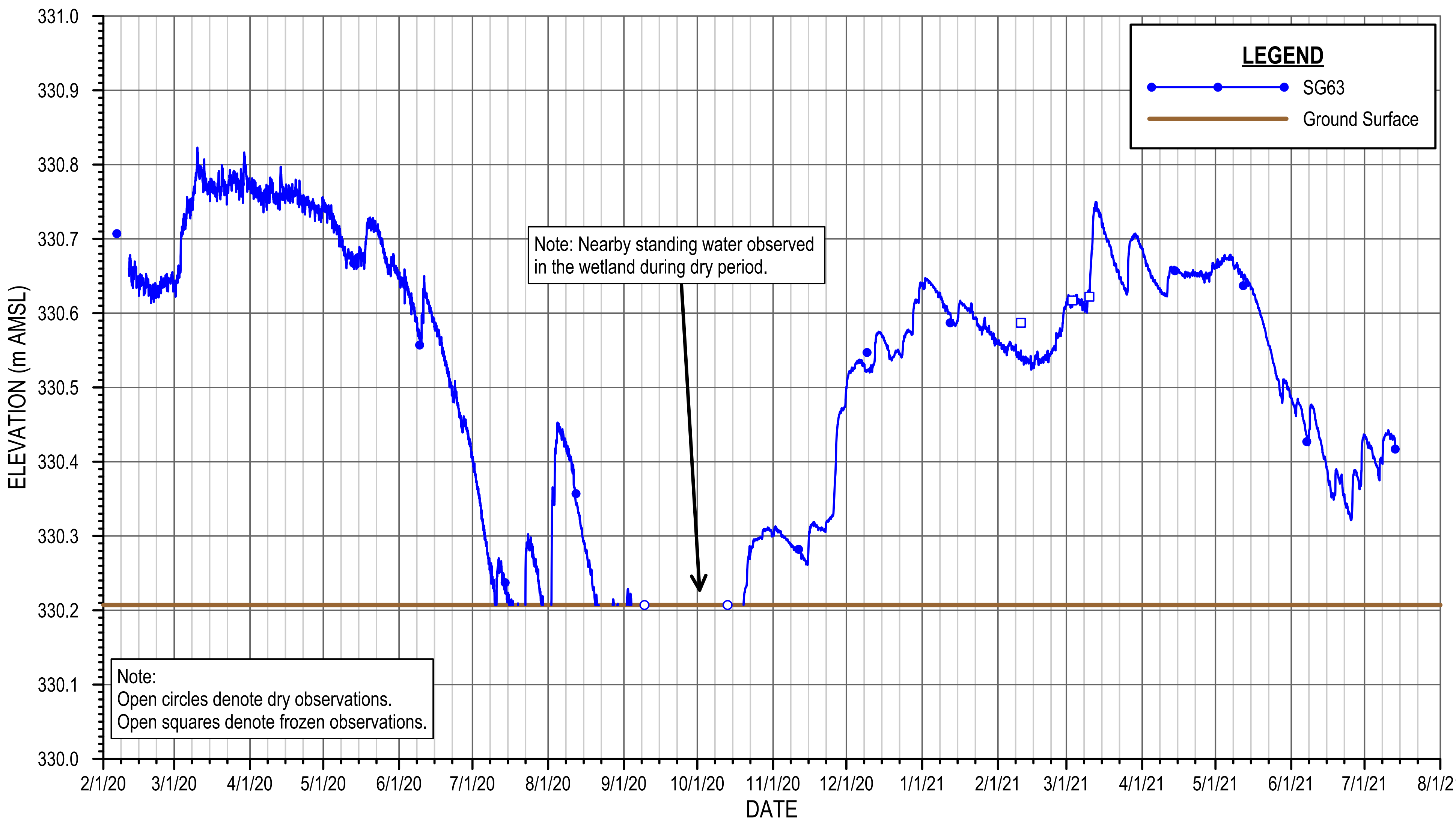

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - SG63

Project No. **10978**
Date **July 2021**

FIGURE C.8

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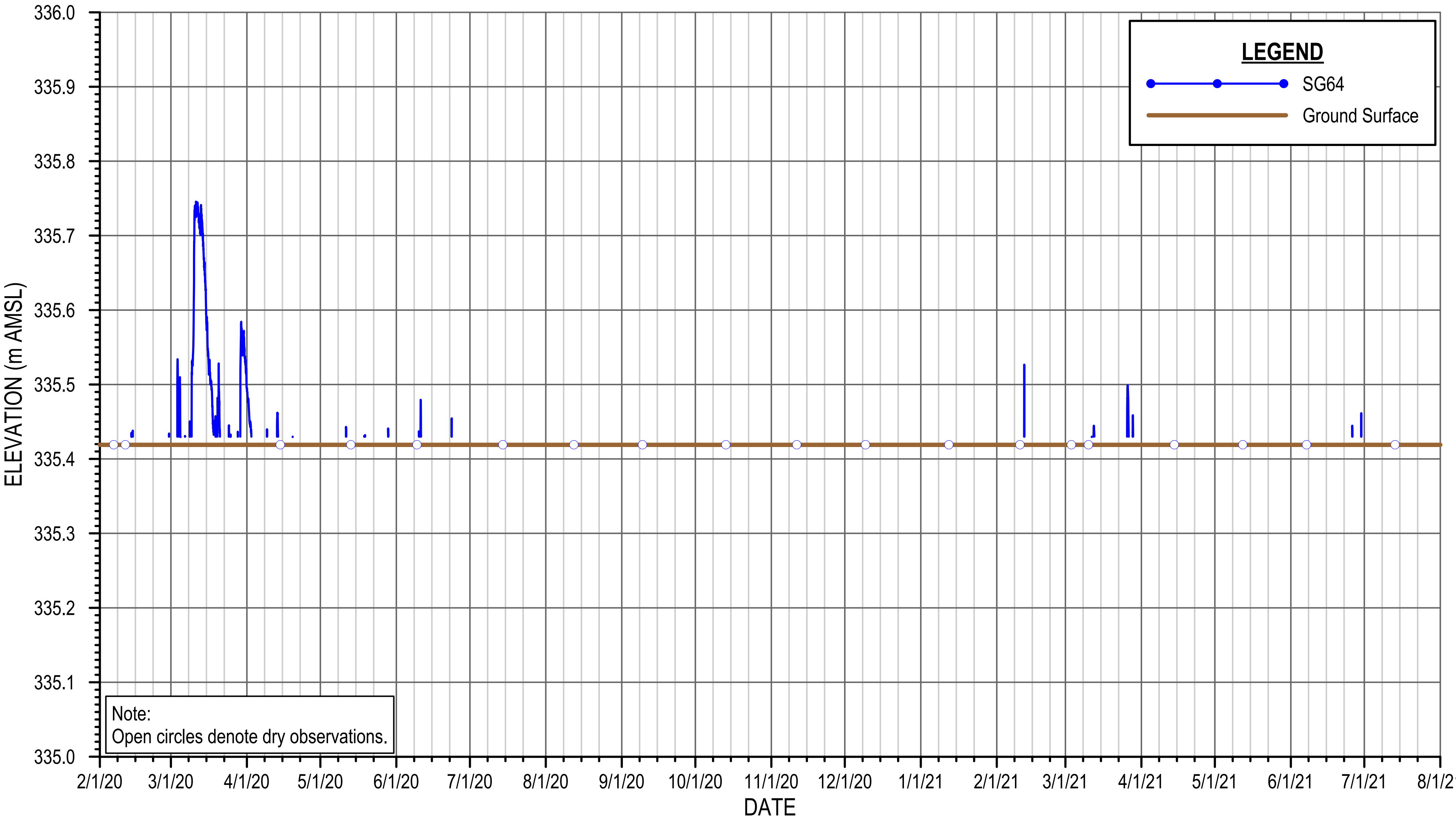

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - SG64

Project No. **10978**
Date **July 2021**

FIGURE C.9

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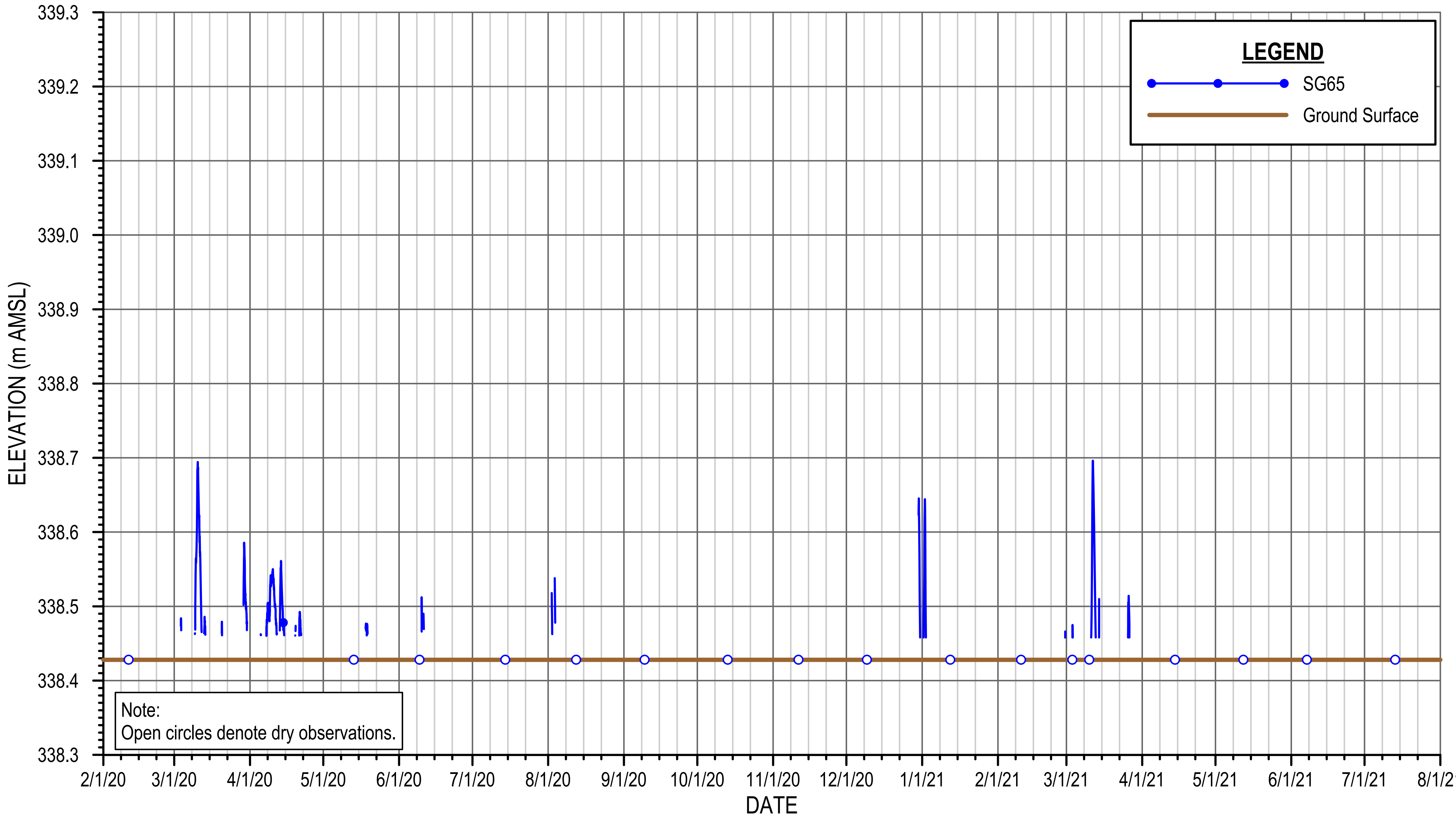

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - SG65

Project No. **10978**
Date **July 2021**

FIGURE C.10

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\Report 164\SG65.grf
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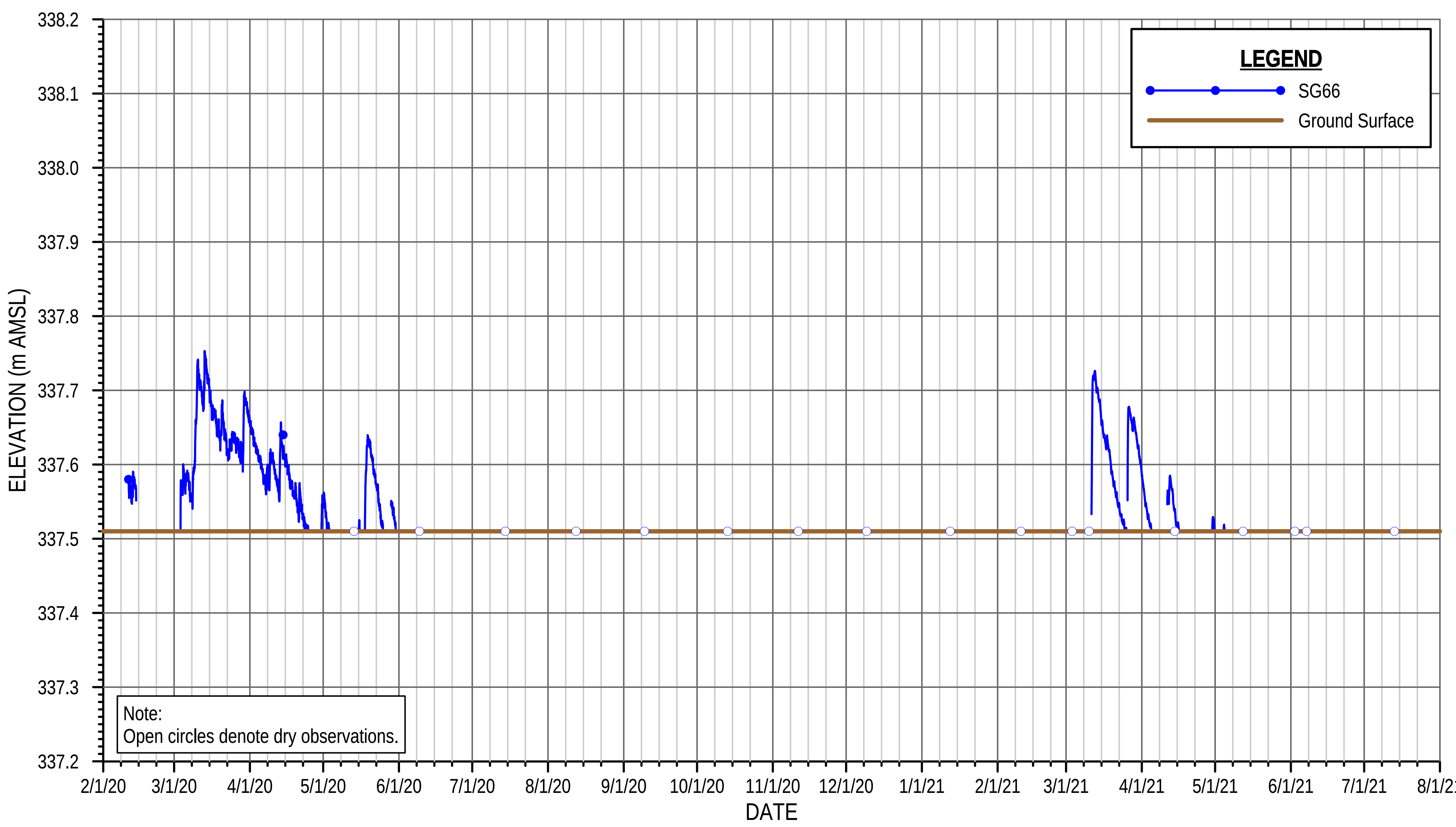

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **October 2021**

HYDROGRAPH - SG66

FIGURE C.11

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\SG66.grf
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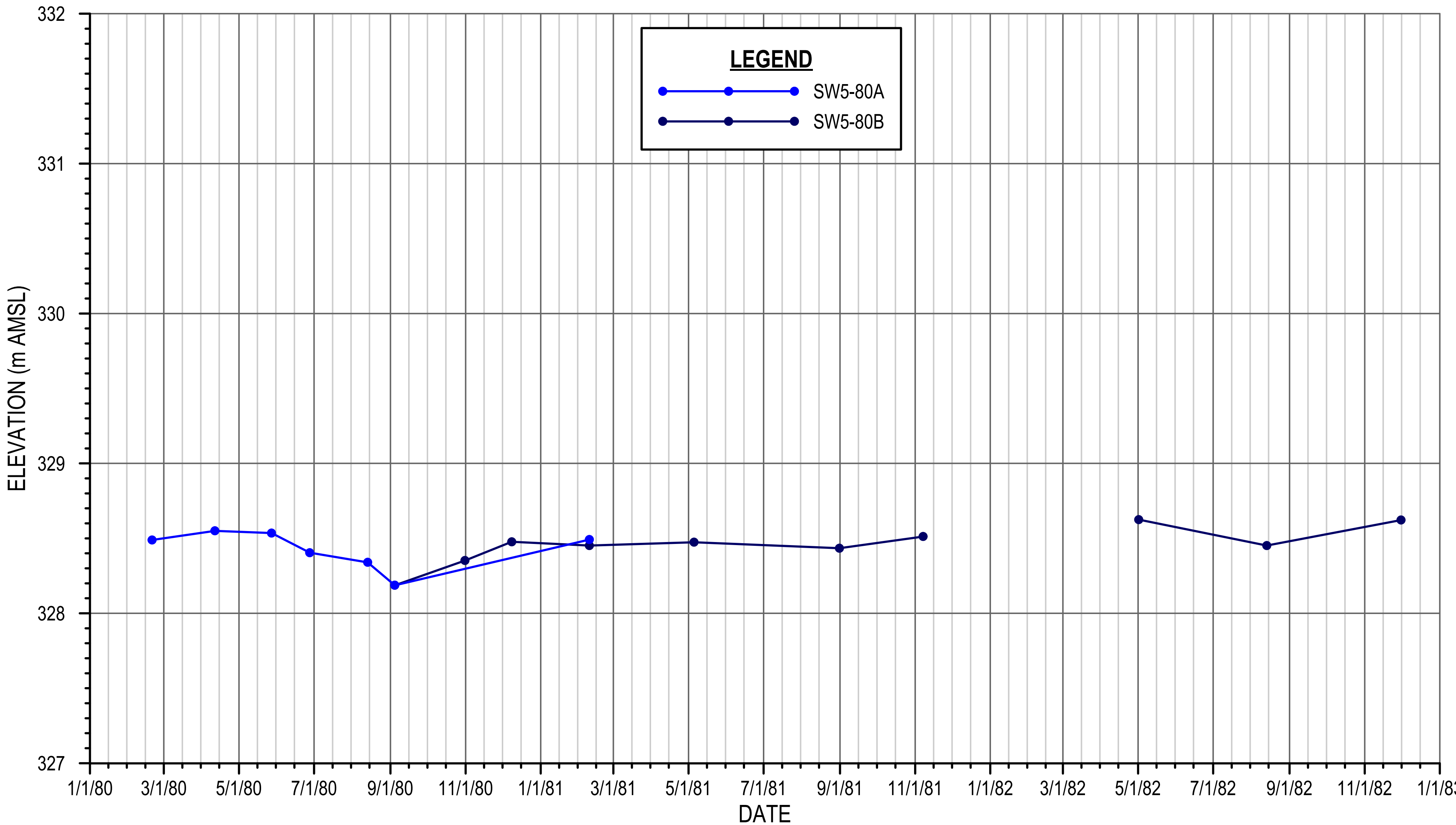

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - SW5-80A/B

Project No. **10978**
Date **July 2021**

FIGURE C.12

HEG file: N:\CA\Waterloo\Projects\662\010978\Grapher\Report 164\SW5-80AB.grf
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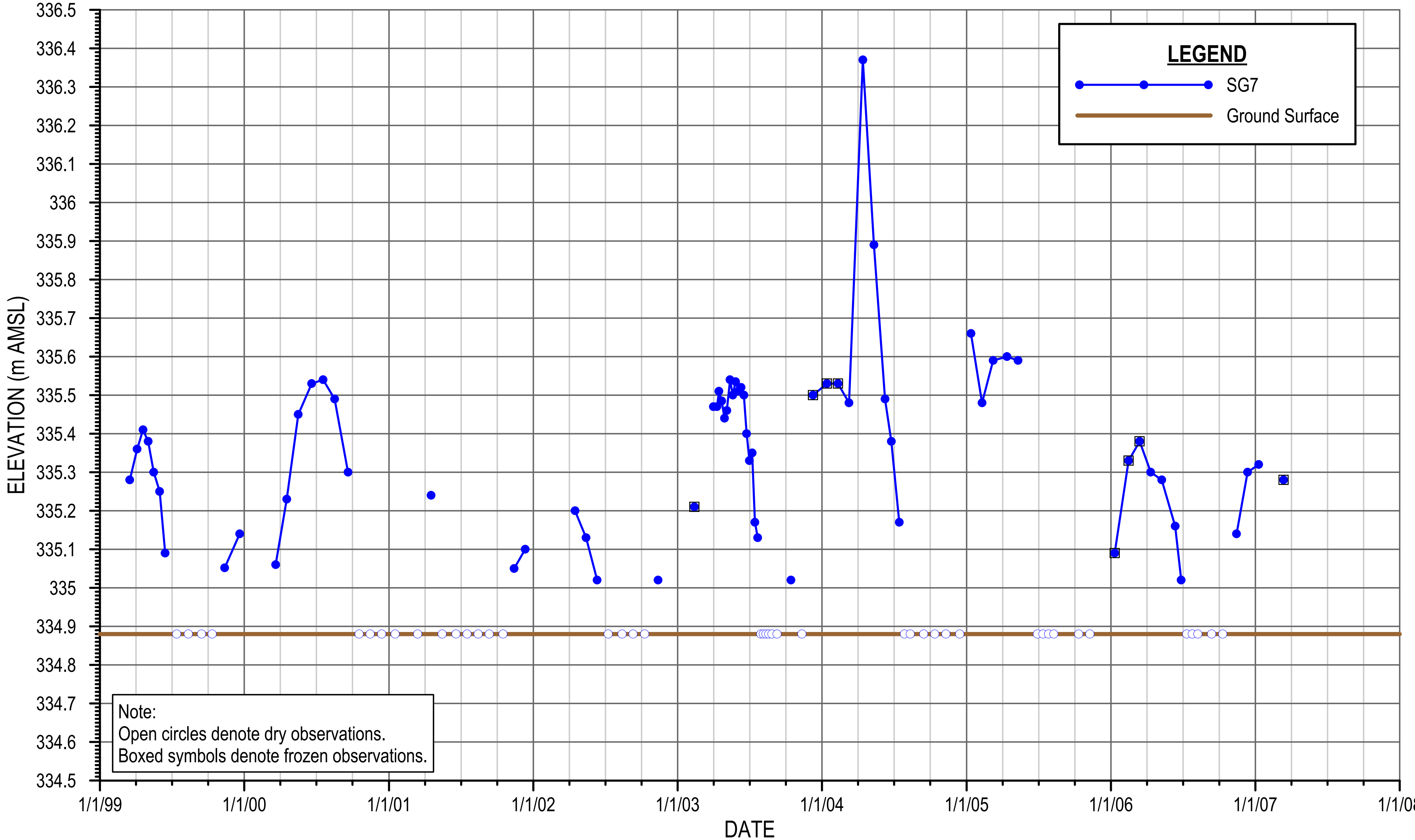

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **November 2021**

HYDROGRAPH - SG7

FIGURE C.13

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\SG7.grf
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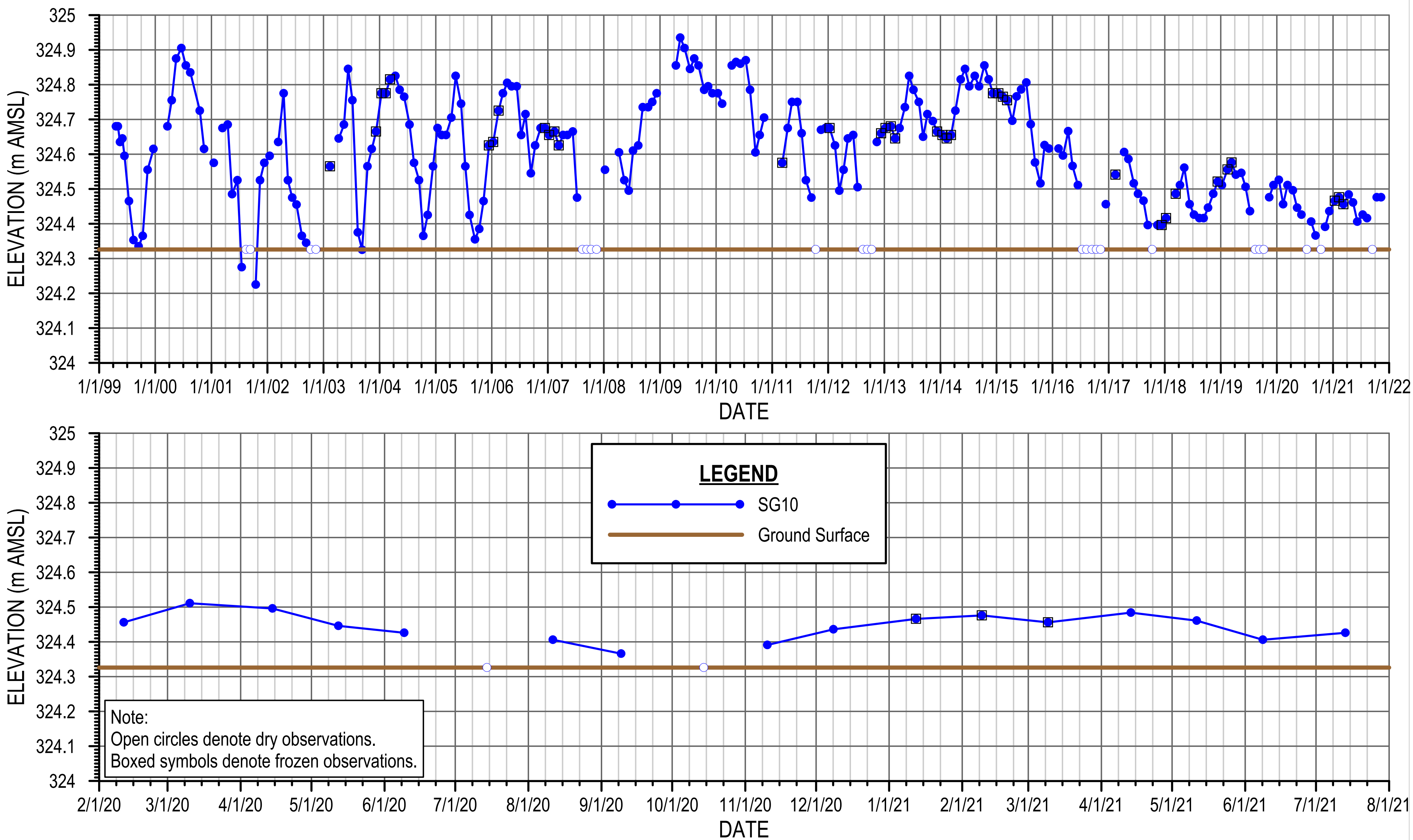

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - SG10

Project No. 10978
Date November 2021

FIGURE C.14

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\SG10.grf
Plot Date: November 25 2021 12:11 PM

Appendix D
Groundwater Level Monitoring Data and Hydrographs

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
2/6/1980	339.29	339.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/13/1980	337.81	338.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/1980	340.03	340.55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/27/1980	339.41	341.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/1980	338.54	339.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/1980	337.93	338.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/4/1980	337.44	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/31/1980	336.84	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/8/1980	336.83	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/9/1981	336.80	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/5/1981	338.64	339.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/1981	337.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/7/1981	338.54	338.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/1982	Frozen	Snow	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/23/1982	--	339.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/1/1982	--	340.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/1982	--	338.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/30/1982	338.13	Dry	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/29/1989	--	--	--	--	--	--	--	322.62	323.68	--	--	--	--	--	--	--	--
12/7/1989	--	--	282.28	319.52	318.64	319.09	319.65	322.81	323.69	--	--	--	--	--	--	--	--
12/12/1989	--	--	282.19	319.51	318.59	319.04	319.64	322.88	323.85	--	--	--	--	--	--	--	--
12/20/1989	--	--	282.13	319.42	318.52	318.98	319.54	322.88	323.92	--	--	--	--	--	--	--	--
1/3/1990	--	--	282.12	319.31	318.44	318.85	319.45	322.82	323.88	--	--	--	--	--	--	--	--
1/10/1990	--	--	282.23	319.44	318.41	318.77	319.57	322.95	323.95	--	--	--	--	--	--	--	--
1/17/1990	--	--	282.08	319.48	318.37	318.72	319.60	322.95	323.96	--	--	--	--	--	--	--	--
1/24/1990	--	--	282.20	320.29	318.35	318.67	320.32	323.90	325.35	--	--	--	--	--	--	--	--
1/31/1990	--	--	282.12	320.34	318.32	318.64	320.38	324.20	325.60	--	--	--	--	--	--	--	--
2/14/1990	--	--	282.13	320.60	318.27	318.58	320.62	324.78	326.28	--	--	--	--	--	--	--	--
2/28/1990	--	--	282.04	321.12	318.22	318.54	321.06	325.48	327.11	--	--	--	--	--	--	--	--
3/14/1990	--	--	282.17	320.98	318.18	318.50	320.98	325.52	327.63	--	--	--	--	--	--	--	--
3/28/1990	--	--	282.04	320.99	317.78	318.47	320.47	325.06	326.70	--	--	--	--	--	--	--	--
4/12/1990	--	--	282.01	320.50	318.08	318.43	320.51	325.04	326.47	--	--	--	--	--	--	--	--
5/23/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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2/20/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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4/15/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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6/24/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/16/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/15/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/15/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/25/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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12/16/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/17/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/30/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/2/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/20/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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8/24/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/27/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/27/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/17/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/27/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/17/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/15/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/15/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/26/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/25/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/22/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
8/18/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/16/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/15/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/23/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/23/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/1995	--	--	--	--	--	--	310.51	--	--	--	--	--	--	--	--	--	--
5/15/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/1995	--	--	--	--	--	--	310.47	--	--	--	--	--	--	--	--	--	--
6/27/1995	--	--	--	--	--	--	310.49	--	--	--	--	--	--	--	--	--	--
6/30/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/25/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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11/28/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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3/29/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/1996	--	--	--	--	--	--	310.47	--	--	--	--	--	--	--	--	--	--
5/31/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/19/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/20/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/3/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/29/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/30/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/21/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/28/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/23/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/29/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/17/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/27/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/24/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/31/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/25/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/18/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/5/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/6/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/26/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/6/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/26/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/7/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/16/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/5/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/6/1998	--	--	--	--	308.20	305.60	Dry	--	--	--	--	--	--	--	--	--	--
5/29/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/21/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/15/1998	--	--	--	--	307.90	305.27	Dry	--	--	--	--	--	--	--	--	--	--
10/16/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/29/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/4/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/19/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/26/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
11/27/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/15/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/29/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/15/1999	--	--	--	--	--	--	--	--	--	326.78	328.72	--	--	--	--	--	--
2/16/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/5/1999	--	--	--	--	--	--	--	--	--	327.56	328.76	325.47	335.22	--	--	--	--
3/17/1999	--	--	--	--	--	--	--	--	--	327.94	328.72	325.60	335.24	--	--	328.60	Frozen
3/31/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/1999	--	--	--	--	--	--	--	--	--	331.82	328.92	325.93	335.57	337.36	--	328.56	335.50
4/12/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/1999	--	--	282.01	307.20	307.58	305.14	310.46	--	--	331.75	328.79	325.62	335.52	337.56	324.79	328.55	335.43
4/22/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/1999	--	--	--	--	--	--	--	--	--	331.66	328.71	325.56	335.45	--	324.71	328.59	335.48
5/7/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/17/1999	--	--	--	--	--	--	--	--	--	331.30	328.65	325.34	335.35	337.62	324.55	328.48	335.30
5/19/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/1/1999	--	--	--	--	--	--	--	--	--	330.77	328.65	325.10	335.34	337.32	324.47	328.48	335.27
6/15/1999	--	--	--	--	--	--	--	--	--	330.23	328.50	325.30	335.10	336.99	324.41	328.42	335.13
6/30/1999	--	--	--	--	--	--	--	--	--	329.70	328.47	324.80	334.95	336.66	--	328.41	334.97
7/1/1999	--	--	--	--	--	--	--	--	--	--	328.48	324.81	--	--	--	--	--
7/5/1999	--	--	--	--	--	--	--	--	--	--	--	--	334.92	336.56	--	328.41	335.22
7/6/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/1999	--	--	--	--	--	--	--	--	--	329.10	328.46	324.81	334.87	336.53	--	328.42	334.86
7/10/1999	--	--	--	--	--	--	--	--	--	328.33	328.42	324.80	334.79	336.45	--	328.37	334.80
7/13/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/14/1999	--	--	--	--	--	--	--	--	--	328.16	328.32	324.76	334.70	336.36	323.77	328.18	334.69
7/20/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/5/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/1999	--	--	--	--	--	--	--	--	--	327.03	328.10	324.55	334.31	335.82	323.32	328.07	334.32
8/24/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/26/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/3/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/9/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/15/1999	--	--	--	--	--	--	--	--	--	326.07	328.38	324.54	334.08	335.31	323.09	328.24	334.25
9/17/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/27/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/12/1999	--	--	--	--	--	--	--	--	--	325.50	328.39	324.53	334.04	335.20	323.10	328.39	334.33
10/20/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/29/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/3/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/8/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/1999	--	--	281.83	306.57	307.21	305.26	Dry	--	--	325.59	328.50	325.43	335.02	335.09	323.31	328.48	335.10
11/18/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/24/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/8/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/1999	--	--	--	--	--	--	--	--	--	325.62	328.57	325.55	335.15	335.01	324.56	328.47	335.08
12/21/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/30/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/18/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/20/2000	--	--	--	--	--	--	--	--	--	325.88	328.79	325.63	335.17	335.66	324.62	Frozen	Frozen
1/28/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/2/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/15/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/16/2000	--	--	--	--	--	--	--	--	--	326.43	328.57	325.55	335.09	335.54	324.53	Frozen	Frozen
2/17/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/29/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/8/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/20/2000	--	--	--	--	--	--	--	--	--	326.93	328.89	325.77	335.41	336.70	324.69	328.48	335.10
3/22/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/23/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/17/2000	--	--	281.94	307.39	306.95	305.23	Dry	--	--	331.18	328.80	325.84	335.47	337.33	324.62	328.56	335.26
5/3/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/15/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/16/2000	--	--	--	--	--	--	--	--	--	332.12	328.93	326.64	335.60	339.06	325.07	328.62	335.50
5/30/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
5/31/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2000	--	--	--	--	--	--	--	--	--	331.84	328.68	326.09	335.67	339.09	324.96	328.65	335.54
7/4/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2000	--	--	--	--	--	--	--	--	--	331.79	328.61	325.87	335.59	337.88	324.59	328.64	335.54
7/26/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/15/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/16/2000	--	--	--	--	--	--	--	--	--	331.60	328.39	325.45	335.39	337.59	324.50	328.61	335.49
8/29/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/11/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/19/2000	--	--	--	--	--	--	--	--	--	330.54	327.45	325.18	335.17	337.26	324.04	328.41	335.29
9/29/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2000	--	--	282.07	307.31	306.70	305.55	Blocked	--	--	--	--	--	--	--	--	--	--
10/17/2000	--	--	--	--	--	--	--	--	--	329.93	327.53	325.05	334.88	336.47	323.87	328.44	334.89
10/25/2000	--	--	281.99	307.13	306.67	305.51	--	--	--	--	--	--	--	--	--	--	--
11/13/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/14/2000	--	--	282.12	307.04	306.64	305.46	--	--	--	329.74	329.40	324.86	334.77	336.22	323.80	328.41	334.87
11/30/2000	--	--	282.03	306.90	306.62	305.41	--	--	--	--	--	--	--	--	--	--	--
12/13/2000	--	--	282.08	306.85	306.60	305.39	--	--	--	329.55	328.68	324.80	334.59	336.04	323.60	Frozen	Frozen
12/21/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2000	--	--	282.03	306.77	306.58	305.38	--	--	--	--	--	--	--	--	--	--	--
1/16/2001	--	--	282.07	306.71	306.56	305.33	--	--	--	328.88	328.68	324.68	334.42	335.69	323.40	Frozen	Frozen
1/31/2001	--	--	282.20	306.71	306.55	305.31	--	--	--	--	--	--	--	--	--	--	--
2/13/2001	--	--	282.03	308.42	306.53	305.29	--	--	--	--	--	326.49	335.34	336.23	324.04	Frozen	Frozen
2/14/2001	--	--	--	--	--	--	--	--	--	332.54	328.91	--	--	--	--	--	--
2/27/2001	--	--	282.06	309.28	306.52	305.31	--	--	--	--	--	--	--	--	--	--	--
3/13/2001	--	--	282.35	308.72	306.46	305.33	--	--	--	--	--	--	--	--	--	--	--
3/14/2001	--	--	--	--	--	--	--	--	--	332.57	329.03	326.66	335.43	336.39	324.15	Frozen	Frozen
3/26/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/2001	--	--	282.08	308.64	306.48	305.35	--	--	--	--	--	--	--	--	--	--	--
4/17/2001	--	--	--	--	--	--	--	--	--	332.13	328.90	327.20	335.77	337.98	324.64	327.57	335.41
5/2/2001	--	--	282.28	308.79	306.45	305.42	--	--	--	--	--	--	--	--	--	--	--
5/15/2001	--	--	--	--	--	--	--	--	--	331.96	328.70	327.04	335.58	336.58	324.31	328.22	335.33
5/28/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/7/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2001	--	--	--	--	--	--	--	--	--	331.74	328.49	326.90	335.47	336.45	324.22	328.12	335.29
7/17/2001	--	--	--	--	--	--	--	--	--	330.77	327.51	326.33	334.06	336.09	323.64	328.07	335.11
8/14/2001	--	--	--	--	--	--	--	--	--	330.63	327.30	326.03	333.76	335.74	323.37	327.95	334.87
9/11/2001	--	--	--	--	--	--	--	--	--	330.37	327.09	325.92	333.62	335.19	323.11	327.93	334.81
9/12/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/16/2001	--	--	--	--	--	--	--	--	--	330.57	327.13	326.04	333.73	335.48	323.22	328.10	334.95
11/13/2001	--	--	--	--	--	--	--	--	--	328.33	328.62	326.94	335.03	335.52	323.27	328.17	334.97
12/11/2001	--	--	--	--	--	--	--	--	--	328.65	328.74	327.24	335.14	335.68	323.67	328.24	335.05
1/15/2002	--	--	--	--	--	--	--	--	--	328.67	328.86	327.29	335.06	335.72	323.71	328.21	335.03
2/12/2002	--	--	--	--	--	--	--	--	--	328.91	329.03	327.47	335.18	335.89	324.17	Frozen	Frozen
3/12/2002	--	--	--	--	--	--	--	--	--	329.56	329.38	327.71	335.53	336.31	324.53	328.27	335.12
3/26/2002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/16/2002	--	--	--	--	--	--	--	--	--	331.18	329.45	327.93	335.71	336.57	325.01	328.62	335.32
5/14/2002	--	--	--	--	--	--	--	--	--	332.07	329.51	327.95	335.79	336.79	325.12	328.65	335.30
6/11/2002	--	--	--	--	--	--	--	--	--	330.84	328.98	327.43	335.32	335.99	324.25	328.37	335.12
6/25/2002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2002	--	--	--	--	--	--	--	--	--	330.44	328.59	326.98	335.17	335.78	324.21	328.32	335.05
8/13/2002	--	--	--	--	--	--	--	--	--	328.47	327.51	326.18	334.34	334.82	323.36	328.13	334.86
9/10/2002	--	--	--	--	--	--	--	--	--	328.25	327.30	326.00	334.09	334.64	323.16	328.12	334.74
9/24/2002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/8/2002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/9/2002	--	--	--	--	--	--	--	--	--	326.82	327.14	325.87	333.92	334.49	322.42	327.94	334.73
11/12/2002	--	--	282.13	306.73	305.97	306.84	Dry	--	--	326.75	327.08	325.80	333.86	334.99	322.35	327.96	334.77
12/10/2002	--	--	--	--	--	--	--	--	--	325.47	327.13	325.87	334.01	334.83	322.53	Frozen	Frozen
1/2/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/14/2003	--	--	--	--	--	--	--	--	--	--	--	--	334.25	334.72	322.62	--	Frozen
1/15/2003	--	--	--	--	--	--	--	--	--	326.01	327.29	326.00	--	--	--	Frozen	--
2/11/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Frozen	--
2/12/2003	--	--	--	--	--	--	--	--	--	326.10	327.35	326.14	334.43	334.63	322.83	--	Frozen
3/11/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/13/2003	--	--	--	--	--	--	--	--	--	326.00	327.16	326.10	334.09	Snow	Snow	Frozen	Frozen
3/18/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/1/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.58	--	--	--	335.39
4/10/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.50	336.64	324.79	328.54	335.56
4/11/2003	--	--	--	--	--	--	--	--	--	327.64	328.33	327.27	--	--	--	--	--
4/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.66	--	--	--	335.50
4/22/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.59	--	--	--	335.49
4/29/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.52	--	--	--	335.43
5/5/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.57	--	--	--	335.45
5/13/2003	--	--	--	--	--	--	--	--	--	330.38	328.91	327.84	335.68	338.35	--	328.41	335.47
5/14/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.83	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
5/20/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.63	--	--	--	335.48
5/27/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.72	--	--	--	335.51
6/3/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.65	--	--	--	335.46
6/10/2003	--	--	--	--	--	--	--	--	--	327.54	328.26	327.01	335.15	336.22	324.39	328.32	335.48
6/17/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.62	--	--	--	335.50
6/24/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.51	--	--	--	335.42
7/1/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.39	--	--	--	335.32
7/2/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2003	--	--	--	--	--	--	--	--	--	329.05	328.10	326.84	335.19	336.04	324.36	328.21	335.29
7/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.19	--	--	--	335.17
7/16/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.14	--	--	--	335.10
7/30/2003	--	--	--	--	--	--	--	--	--	--	--	--	334.96	--	--	--	334.96
8/5/2003	--	--	--	--	--	--	--	--	--	--	--	--	334.96	--	--	--	334.93
8/12/2003	--	--	--	--	--	--	--	--	--	328.25	327.35	326.06	334.95	335.07	323.31	328.12	334.90
8/18/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/19/2003	--	--	--	--	--	--	--	--	--	--	--	--	334.84	--	--	--	334.86
8/27/2003	--	--	--	--	--	--	--	--	--	--	--	--	334.81	--	--	--	334.91
9/2/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/9/2003	--	--	--	--	--	--	--	--	--	327.72	327.19	325.94	334.70	334.77	323.10	328.06	334.95
9/23/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2003	--	--	--	--	--	--	--	--	--	326.74	327.05	325.81	334.58	334.64	322.96	328.05	334.89
10/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/30/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2003	--	--	--	--	--	--	--	--	--	326.88	327.29	326.04	335.33	335.17	323.25	328.06	335.17
11/12/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/28/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2003	--	--	--	--	--	--	--	--	--	327.13	327.62	326.35	335.53	335.35	323.50	328.62	335.60
12/19/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2004	--	--	--	--	--	--	--	--	--	331.89	328.90	327.25	335.55	338.03	324.79	Frozen	Frozen
1/16/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2004	--	--	--	--	--	--	--	--	--	331.66	328.72	327.07	335.43	--	324.11	328.57	335.55
2/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	337.18	--	--	--
2/24/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/9/2004	--	--	--	--	--	--	--	--	--	331.84	328.92	327.55	335.64	337.74	325.10	328.55	335.57
3/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/13/2004	--	--	--	--	--	--	--	--	--	--	328.89	326.39	335.70	339.31	324.95	328.59	--
4/16/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2004	--	--	--	--	--	--	--	--	--	332.09	--	--	--	--	--	--	--
4/29/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/11/2004	--	--	--	--	--	--	--	--	--	333.13	329.97	326.55	335.72	339.23	--	328.57	335.51
5/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.96	--	--
5/25/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/2004	--	--	--	--	--	--	--	--	--	--	328.74	325.66	335.53	338.34	--	328.55	335.48
6/9/2004	--	--	--	--	--	--	--	--	--	331.95	--	--	--	--	324.62	--	--
6/24/2004	--	--	--	--	--	--	--	--	--	--	--	--	335.40	--	--	--	335.35
6/25/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2004	--	--	--	--	--	--	--	--	--	331.19	328.55	325.13	335.11	--	--	--	--
7/14/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	337.22	324.09	328.46	335.19
7/27/2004	--	--	--	--	--	--	--	--	--	--	--	--	334.92	--	--	--	Dry
7/28/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/2004	--	--	--	--	--	--	--	--	--	330.15	328.53	324.97	334.84	336.45	--	328.44	334.81
8/12/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	323.78	--	--
8/30/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/14/2004	--	--	--	--	--	--	--	--	--	328.23	328.44	324.86	334.45	335.73	323.41	328.40	334.46
9/16/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/21/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/30/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/12/2004	--	--	--	--	--	--	--	--	--	327.16	328.15	324.63	334.11	335.25	322.88	328.10	Dry
10/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/26/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/9/2004	--	--	--	--	--	--	--	--	--	326.21	328.46	324.77	334.07	334.87	322.90	328.43	Dry
11/23/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/14/2004	--	--	--	--	--	--	--	--	--	326.01	328.68	325.15	334.80	334.69	324.02	Frozen	Frozen
12/15/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/11/2005	--	--	--	--	--	--	--	--	--	330.22	328.86	326.30	335.36	335.38	--	Frozen	Inaccessible
1/12/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.82	--	--
1/13/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/28/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
2/8/2005	--	--	--	--	--	--	--	--	--	330.99	328.90	325.68	335.47	336.61	--	Frozen	335.50
2/9/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.79	--	--
2/22/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/8/2005	--	--	--	--	--	--	--	--	--	331.91	328.94	325.83	335.54	337.49	324.85	Frozen	335.61
3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2005	--	--	--	--	--	--	--	--	--	332.09	329.06	326.97	335.76	339.67	324.99	328.59	335.51
4/26/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2005	--	--	--	--	--	--	--	--	--	332.02	328.97	326.28	335.66	339.18	324.89	328.58	335.50
5/24/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/14/2005	--	--	--	--	--	--	--	--	--	331.75	328.66	325.22	335.30	337.71	324.35	328.48	335.23
6/15/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2005	--	--	--	--	--	--	--	--	--	--	--	--	335.06	--	--	--	335.04
7/12/2005	--	--	--	--	--	--	--	--	--	330.62	328.29	324.85	334.69	336.81	324.67	328.15	334.67
7/26/2005	--	--	--	--	--	--	--	--	--	--	--	--	334.47	--	--	--	334.47
8/9/2005	--	--	--	--	--	--	--	--	--	329.64	328.17	324.66	334.34	336.11	323.24	328.05	334.33
8/10/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	334.16	--	--	--	Dry
9/13/2005	--	--	--	--	--	--	--	--	--	327.87	328.22	324.61	334.07	335.42	322.98	328.11	Dry
9/14/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/27/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/11/2005	--	--	--	--	--	--	--	--	--	326.84	328.34	324.65	333.98	334.96	323.10	328.27	Dry
10/12/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	334.85
10/25/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/8/2005	--	--	--	--	--	--	--	--	--	326.21	328.37	324.88	334.13	334.74	323.33	328.47	Dry
11/9/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/22/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/1/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2005	--	--	--	--	--	--	--	--	--	327.21	328.56	325.52	334.91	334.85	323.61	Frozen	Frozen
12/22/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/10/2006	--	--	--	--	--	--	--	--	--	329.55	328.86	325.96	335.29	335.32	324.74	328.49	335.31
1/11/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/2006	--	--	--	--	--	--	--	--	--	331.94	329.02	326.55	335.60	338.04	324.90	328.72	335.50
3/14/2006	--	--	--	--	--	--	--	--	--	331.96	329.13	327.39	335.82	339.38	325.17	328.49	335.54
3/15/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/2006	--	--	--	--	--	--	--	--	--	332.01	329.06	325.88	335.63	338.62	324.88	328.59	335.50
5/9/2006	--	--	--	--	--	--	--	--	--	331.97	328.96	325.99	335.58	338.56	--	328.58	335.46
5/10/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.79	--	--
5/16/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2006	--	--	--	--	--	--	--	--	--	331.85	328.80	325.53	335.43	337.99	324.60	328.53	335.36
6/13/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2006	--	--	--	--	--	--	--	--	--	--	--	--	335.21	--	--	--	335.15
7/11/2006	--	--	--	--	--	--	--	--	--	331.02	328.63	325.13	335.06	337.05	324.07	328.36	334.94
7/25/2006	--	--	--	--	--	--	--	--	--	--	--	--	335.12	--	--	--	335.07
8/8/2006	--	--	--	--	--	--	--	--	--	330.42	328.70	325.16	335.03	336.46	324.24	328.47	335.04
9/12/2006	--	--	--	--	--	--	--	--	--	328.63	328.39	324.87	334.41	335.78	323.73	328.26	334.41
9/13/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2006	--	--	--	--	--	--	--	--	--	327.87	328.65	325.16	334.69	335.41	324.12	328.55	334.72
10/11/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/14/2006	--	--	--	--	--	--	--	--	--	330.04	328.82	325.99	335.36	336.01	324.74	328.55	335.33
12/11/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/2006	--	--	--	--	--	--	--	--	--	331.91	329.00	326.25	335.57	337.89	324.93	328.62	335.51
12/13/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/19/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/9/2007	--	--	--	--	--	--	--	--	--	331.96	329.08	326.20	335.63	338.18	324.91	328.60	335.51
1/10/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/13/2007	--	--	--	--	--	--	--	--	--	331.71	Frozen	325.44	335.40	337.61	324.42	328.56	Frozen
3/13/2007	--	--	--	--	--	--	--	--	--	331.48	328.93	325.35	335.41	337.00	324.62	328.57	335.63
4/10/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.90	--	--
5/8/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.71	--	--
5/11/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.26	--	--
6/26/2007	--	--	--	--	--	--	--	--	--	--	--	325.10	--	--	--	--	--
7/10/2007	--	--	--	--	--	--	--	--	--	--	--	324.90	--	--	323.64	--	--
7/11/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/24/2007	--	--	--	--	--	--	--	--	--	--	328.22	324.72	--	--	--	328.08	--
8/14/2007	--	--	--	--	--	--	--	--	--	--	328.14	324.60	--	--	323.07	327.97	--
9/11/2007	--	--	--	--	--	--	--	--	--	--	--	324.45	--	--	322.80	--	--
10/9/2007	--	--	--	--	--	--	--	--	--	--	--	324.40	--	--	322.60	--	--
11/13/2007	--	--	--	--	--	--	--	--	--	--	--	324.46	--	--	--	--	--
11/14/2007	--	--	--	--	--	--	--	--	--	--	328.05	--	--	--	322.35	328.02	--
12/12/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--	322.97	328.43	--
12/13/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/8/2008	--	--	--	--	--	--	--	--	--	--	328.93	325.85	--	--	324.93	328.58	--
1/14/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/12/2008	--	--	--	--	--	--	--	--	--	--	329.03	326.21	--	--	324.81	328.56	--
2/13/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/18/2008	--	--	--	--	--	--	--	--	--	--	329.10	--	--	--	324.87	328.57	--
3/20/2008	--	--	--	--	--	--	--	--	--	--	--	326.36	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
4/8/2008	--	--	--	--	--	--	--	--	--	--	329.31	328.05	--	--	--	328.63	--
4/9/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--	325.19	--	--
5/13/2008	--	--	--	--	--	--	--	--	--	--	329.00	326.42	--	--	--	328.56	--
6/10/2008	--	--	--	--	--	--	--	--	--	--	--	325.33	--	--	--	328.54	--
6/11/2008	--	--	--	--	--	--	--	--	--	--	328.86	--	--	--	324.37	--	--
6/27/2008	--	--	--	--	--	--	--	--	--	--	328.78	--	--	--	--	328.52	--
7/8/2008	--	--	--	--	--	--	--	--	--	--	--	325.40	--	--	--	--	--
7/9/2008	--	--	--	--	--	--	--	--	--	--	328.66	--	--	--	324.15	328.47	--
7/22/2008	--	--	--	--	--	--	--	--	--	--	328.77	325.29	--	--	--	328.52	--
8/12/2008	--	--	--	--	--	--	--	--	--	--	328.91	326.51	--	--	324.87	328.55	--
9/9/2008	--	--	--	--	--	--	--	--	--	--	--	325.47	--	--	--	--	--
9/10/2008	--	--	--	--	--	--	--	--	--	--	328.75	--	--	--	324.50	328.51	--
10/14/2008	--	--	--	--	--	--	--	--	--	--	--	325.40	--	--	--	--	--
10/15/2008	--	--	--	--	--	--	--	--	--	--	328.67	--	--	--	324.34	328.48	--
11/11/2008	--	--	--	--	--	--	--	--	--	--	328.64	325.32	--	--	324.32	328.50	--
12/8/2008	--	--	--	--	--	--	--	--	--	--	328.92	--	--	--	324.84	--	--
12/9/2008	--	--	--	--	--	--	--	--	--	--	--	325.88	--	--	--	--	--
12/10/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.58	--
1/13/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/14/2009	--	--	--	--	--	--	--	--	--	--	Inaccessible	--	--	--	324.89	Inaccessible	--
1/16/2009	--	--	--	--	--	--	--	--	--	--	--	326.14	--	--	--	--	--
2/10/2009	--	--	--	--	--	--	--	--	--	--	Inaccessible	325.61	--	--	324.80	Inaccessible	--
2/11/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/10/2009	--	--	--	--	--	--	--	--	--	--	Inaccessible	--	--	--	325.10	Inaccessible	--
3/11/2009	--	--	--	--	--	--	--	--	--	--	--	327.03	--	--	--	--	--
4/14/2009	--	--	--	--	--	--	--	--	--	--	329.09	326.95	--	--	325.05	328.60	--
4/28/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/12/2009	--	--	--	--	--	--	--	--	--	--	329.04	326.55	--	--	324.98	328.59	--
5/13/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/9/2009	--	--	--	--	--	--	--	--	--	--	328.85	--	--	--	324.73	328.59	--
6/10/2009	--	--	--	--	--	--	--	--	--	--	--	325.55	--	--	--	--	--
6/18/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/2009	--	--	--	--	--	--	--	--	--	--	328.80	325.41	--	--	--	328.53	--
6/25/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/2/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/15/2009	--	--	--	--	--	--	--	--	--	--	328.64	325.23	--	--	324.29	328.45	--
7/16/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/23/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2009	--	--	--	--	--	--	--	--	--	--	328.73	325.21	--	--	--	328.49	--
7/30/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/6/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/2009	--	--	--	--	--	--	--	--	--	--	328.80	--	--	--	324.48	328.54	--
8/12/2009	--	--	--	--	--	--	--	--	--	--	--	325.19	--	--	--	--	--
8/14/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/18/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/20/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/8/2009	--	--	--	--	--	--	--	--	--	--	328.60	--	--	--	324.36	328.44	--
9/9/2009	--	--	--	--	--	--	--	--	--	--	--	325.25	--	--	--	--	--
10/14/2009	--	--	--	--	--	--	--	--	--	--	--	325.16	--	--	--	--	--
10/15/2009	--	--	--	--	--	--	--	--	--	--	328.60	--	--	--	324.32	328.47	--
11/10/2009	--	--	--	--	--	--	--	--	--	--	328.60	325.27	--	--	324.35	328.48	--
12/8/2009	--	--	--	--	--	--	--	--	--	--	328.81	325.78	--	--	324.68	328.53	--
12/23/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/12/2010	--	--	--	--	--	--	--	--	--	--	328.75	325.81	--	--	324.60	328.54	--
2/9/2010	--	--	--	--	--	--	--	--	--	--	328.74	325.56	--	--	324.46	Frozen	--
3/9/2010	--	--	--	--	--	--	--	--	--	--	328.75	325.39	--	--	324.49	328.57	--
4/13/2010	--	--	--	--	--	--	--	--	--	--	329.09	326.46	--	--	324.96	328.58	--
4/16/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/11/2010	--	--	--	--	--	--	--	--	--	--	328.89	325.56	--	--	324.76	328.57	--
6/8/2010	--	--	--	--	--	--	--	--	--	--	328.85	325.31	--	--	324.52	328.54	--
6/22/2010	--	--	--	--	--	--	--	--	--	--	328.76	325.37	--	--	--	328.50	--
7/6/2010	--	--	--	--	--	--	--	--	--	--	328.78	325.72	--	--	--	328.51	--
7/13/2010	--	--	--	--	--	--	--	--	--	--	328.72	325.55	--	--	324.47	328.49	--
7/22/2010	--	--	--	--	--	--	--	--	--	--	328.64	325.37	--	--	--	328.46	--
8/10/2010	--	--	--	--	--	--	--	--	--	--	328.53	325.16	--	--	324.13	328.37	--
9/14/2010	--	--	--	--	--	--	--	--	--	--	328.29	--	--	--	323.68	328.17	--
9/15/2010	--	--	--	--	--	--	--	--	--	--	--	324.87	--	--	--	--	--
10/12/2010	--	--	--	--	--	--	--	--	--	--	328.54	325.02	--	--	323.96	328.45	--
10/13/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/9/2010	--	--	--	--	--	--	--	--	--	--	328.60	--	--	--	324.19	328.48	--
11/10/2010	--	--	--	--	--	--	--	--	--	--	--	325.14	--	--	--	--	--
12/2/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/3/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/6/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/8/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
12/9/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/10/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/14/2010	--	--	--	--	--	--	--	--	--	--	328.82	--	--	--	324.72	Frozen / 328.53	--
12/15/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/17/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/21/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/28/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/30/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/3/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/11/2011	--	--	--	--	--	--	--	--	--	--	328.74	325.54	--	--	324.49	328.51	--
2/3/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/7/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/8/2011	--	--	--	--	--	--	--	--	--	--	328.65	325.34	--	--	324.20	Frozen / 328.51 / Frozen	--
2/9/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/15/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/16/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/17/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/18/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/23/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/2011	--	--	--	--	--	--	--	--	--	--	328.88	325.78	--	--	--	--	--
2/25/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/1/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/2/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/3/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/7/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/8/2011	--	--	--	--	--	--	--	--	--	--	Frozen	326.33	--	--	324.92	Frozen	--
3/9/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/10/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/15/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/16/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/17/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/23/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/2011	--	--	--	--	--	--	--	--	--	--	329.00	327.20	--	--	--	--	--
4/5/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/6/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/7/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2011	--	--	--	--	--	--	--	--	--	--	328.99	326.38	--	--	324.96	328.58	--
4/13/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/14/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/18/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/19/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/2011	--	--	--	--	--	--	--	--	--	--	--	325.99	--	--	--	--	--
4/21/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/25/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/27/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/28/2011	--	--	--	--	--	--	--	--	--	--	329.20	327.03	--	--	--	--	--
4/29/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/2/2011	--	--	--	--	--	--	--	--	--	--	329.05	327.02	--	--	--	--	--
5/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2011	--	--	--	--	--	--	--	--	--	--	329.01	326.62	--	--	324.98	328.59	--
5/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/17/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/18/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/19/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/20/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/25/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/2011	--	--	--	--	--	--	--	--	--	--	329.16	327.44	--	--	--	--	--
5/30/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
6/14/2011	--	--	--	--	--	--	--	--	--	--	328.95	326.40	--	--	324.95	328.60	--
6/24/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2011	--	--	--	--	--	--	--	--	--	--	328.84	325.67	--	--	--	328.57	--
7/7/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2011	--	--	--	--	--	--	--	--	--	--	328.63	325.30	--	--	324.26	328.48	--
7/21/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2011	--	--	--	--	--	--	--	--	--	--	328.36	324.96	--	--	--	328.23	--
7/29/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2011	--	--	--	--	--	--	--	--	--	--	328.44	324.94	--	--	--	328.38	--
8/16/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	323.65	--	--
8/17/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/26/2011	--	--	--	--	--	--	--	--	--	--	328.35	324.81	--	--	--	Dry	--
9/13/2011	--	--	--	--	--	--	--	--	--	--	328.19	324.70	--	--	323.35	328.11	--
9/19/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/20/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/22/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/23/2011	--	--	--	--	--	--	--	--	--	--	328.25	324.69	--	--	--	--	--
9/26/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/27/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/30/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/3/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/5/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/6/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/7/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/11/2011	--	--	--	--	--	--	--	--	--	--	--	324.69	--	--	323.21	--	--
10/12/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/13/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/17/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/18/2011	--	--	--	--	--	--	--	--	--	--	328.48	--	--	--	--	328.43	--
10/19/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/20/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/21/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/24/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/25/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/26/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/27/2011	--	--	--	--	--	--	--	--	--	--	328.84	325.50	--	--	--	--	--
10/28/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/31/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/1/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/2/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/3/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/4/2011	--	--	--	--	--	--	--	--	--	--	--	325.65	--	--	--	--	--
11/7/2011	--	--	--	--	--	--	--	--	--	--	328.69	--	--	--	--	--	--
11/8/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/14/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/15/2011	--	--	--	--	--	--	--	--	--	--	328.71	325.60	--	--	324.60	328.56	--
11/21/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/25/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/29/2011	--	--	--	--	--	--	--	--	--	--	328.85	325.75	--	--	--	--	--
11/30/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/14/2011	--	--	--	--	--	--	--	--	--	--	329.00	326.60	--	--	324.89	328.57	--
12/15/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/21/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/28/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/10/2012	--	--	--	--	--	--	--	--	--	--	329.01	326.25	--	--	324.88	Ice	--
1/20/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/24/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/26/2012	--	--	--	--	--	--	--	--	--	--	329.02	326.10	--	--	--	--	--
1/31/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/2012	--	--	--	--	--	--	--	--	--	--	328.96	326.13	--	--	324.78	Frozen	--
2/23/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/2012	--	--	--	--	--	--	--	--	--	--	328.98	325.69	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
3/13/2012	--	--	--	--	--	--	--	--	--	--	329.04	326.19	--	--	324.88	328.62	--
3/21/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/2012	--	--	--	--	--	--	--	--	--	--	328.90	326.02	--	--	--	--	--
4/10/2012	--	--	--	--	--	--	--	--	--	--	328.86	325.66	--	--	324.51	328.56	--
4/19/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/8/2012	--	--	--	--	--	--	--	--	--	--	328.86	325.44	--	--	324.51	328.57	--
5/29/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/30/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2012	--	--	--	--	--	--	--	--	--	--	328.77	--	--	--	324.26	328.53	--
6/13/2012	--	--	--	--	--	--	--	--	--	--	--	325.36	--	--	--	--	--
6/19/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2012	--	--	--	--	--	--	--	--	--	--	328.63	325.19	--	--	--	NA	--
7/10/2012	--	--	--	--	--	--	--	--	--	--	328.38	324.95	--	--	323.72	328.22	--
7/17/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/26/2012	--	--	--	--	--	--	--	--	--	--	328.21	324.75	--	--	--	328.07	--
8/14/2012	--	--	--	--	--	--	--	--	--	--	328.23	324.71	--	--	323.37	328.11	--
8/15/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/30/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/11/2012	--	--	--	--	--	--	--	--	--	--	328.18	324.63	--	--	323.16	328.09	--
9/12/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/25/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/27/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2012	--	--	--	--	--	--	--	--	--	--	328.31	324.70	--	--	323.22	328.25	--
10/25/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/30/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/13/2012	--	--	--	--	--	--	--	--	--	--	328.74	325.75	--	--	324.54	328.52	--
11/16/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/28/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/29/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/5/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/11/2012	--	--	--	--	--	--	--	--	--	--	328.80	325.74	--	--	324.69	328.54	--
12/19/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/21/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/27/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/8/2013	--	--	--	--	--	--	--	--	--	--	328.78	325.75	--	--	324.60	328.52	--
1/18/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/24/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/12/2013	--	--	--	--	--	--	--	--	--	--	329.03	326.25	--	--	324.86	Frozen	--
2/26/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/7/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/12/2013	--	--	--	--	--	--	--	--	--	--	329.22	326.36	--	--	325.06	328.71	--
3/21/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/27/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/10/2013	--	--	--	--	--	--	--	--	--	--	329.25	326.74	--	--	325.07	328.65	--
4/24/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/25/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/7/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/14/2013	--	--	--	--	--	--	--	--	--	--	329.05	326.13	--	--	324.89	328.59	--
5/17/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/23/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/28/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/10/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/11/2013	--	--	--	--	--	--	--	--	--	--	329.14	325.67	--	--	324.98	328.64	--
6/21/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2013	--	--	--	--	--	--	--	--	--	--	328.96	325.46	--	--	324.68	328.59	--
7/12/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/19/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2013	--	--	--	--	--	--	--	--	--	--	328.73	--	--	--	--	328.51	--
7/30/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/31/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/2013	--	--	--	--	--	--	--	--	--	--	328.70	325.29	--	--	324.24	328.50	--
8/22/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/2013	--	--	--	--	--	--	--	--	--	--	328.63	--	--	--	--	328.46	--
8/30/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
9/5/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/2013	--	--	--	--	--	--	--	--	--	--	328.61	325.05	--	--	324.01	328.46	--
9/13/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/19/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/25/2013	--	--	--	--	--	--	--	--	--	--	328.73	--	--	--	--	328.52	--
9/26/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/2/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/8/2013	--	--	--	--	--	--	--	--	--	--	328.76	325.17	--	--	324.38	328.54	--
10/10/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/15/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/17/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/21/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/23/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/29/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/30/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/4/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/7/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/2013	--	--	--	--	--	--	--	--	--	--	328.87	325.99	--	--	324.71	328.57	--
11/18/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/19/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/25/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/27/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/6/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/10/2013	--	--	--	--	--	--	--	--	--	--	328.84	325.62	--	--	324.49	Frozen	--
12/16/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/17/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/24/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/27/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/31/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/3/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/10/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/14/2014	--	--	--	--	--	--	--	--	--	--	328.99	325.60	--	--	324.80	Frozen	--
1/20/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/21/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/3/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/7/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2014	--	--	--	--	--	--	--	--	--	--	328.90	325.52	--	--	Inaccessible	Frozen	--
2/14/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.44	--	--
2/18/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/21/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/3/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/4/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/10/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/11/2014	--	--	--	--	--	--	--	--	--	--	328.94	325.60	--	--	324.49	Frozen	--
3/17/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/19/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/20/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/25/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/31/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/3/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/7/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/8/2014	--	--	--	--	--	--	--	--	--	--	329.36	328.09	--	--	325.22	--	--
4/9/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	328.72	--
4/14/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/16/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/21/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/24/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/30/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/5/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/7/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/12/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/13/2014	--	--	--	--	--	--	--	--	--	--	329.12	326.41	--	--	324.95	328.62	--
5/20/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/22/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
5/28/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/2/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/9/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/10/2014	--	--	--	--	--	--	--	--	--	--	328.93	325.66	--	--	324.64	328.57	--
6/11/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/2/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/3/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2014	--	--	--	--	--	--	--	--	--	--	328.76	325.27	--	--	324.32	328.50	--
7/14/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/16/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/21/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2014	--	--	--	--	--	--	--	--	--	--	328.73	--	--	--	--	328.49	--
7/23/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/31/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/5/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/7/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.41	--	--
8/13/2014	--	--	--	--	--	--	--	--	--	--	328.82	325.22	--	--	--	328.52	--
8/18/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/20/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/25/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/26/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/27/2014	--	--	--	--	--	--	--	--	--	--	328.68	--	--	--	--	328.49	--
8/28/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/4/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/8/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/9/2014	--	--	--	--	--	--	--	--	--	--	328.71	325.18	--	--	324.26	328.52	--
9/15/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/18/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/22/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/25/2014	--	--	--	--	--	--	--	--	--	--	328.80	--	--	--	--	328.53	--
9/29/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/1/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/6/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/9/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2014	--	--	--	--	--	--	--	--	--	--	328.76	325.46	--	--	324.50	328.53	--
10/20/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/22/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/23/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/27/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/29/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/3/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/5/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2014	--	--	--	--	--	--	--	--	--	--	328.78	325.48	--	--	324.53	328.56	--
11/17/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/20/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/24/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/26/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/1/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/4/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/8/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2014	--	--	--	--	--	--	--	--	--	--	328.87	325.86	--	--	324.67	328.57	--
12/15/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/17/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/18/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/30/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/5/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/8/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/12/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2015	--	--	--	--	--	--	--	--	--	--	328.90	325.69	--	--	324.56	Ice	--
1/19/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/21/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/26/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/29/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
2/2/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/4/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/9/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/12/2015	--	--	--	--	--	--	--	--	--	--	328.84	325.39	--	--	324.33	Frozen	--
2/13/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/17/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/19/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/23/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/25/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/26/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/2/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/5/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/9/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/11/2015	--	--	--	--	--	--	--	--	--	--	328.79	--	--	--	324.21	Frozen	--
3/16/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/18/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/23/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/25/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/26/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/27/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/30/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/1/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/6/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/8/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/13/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/14/2015	--	--	--	--	--	--	--	--	--	--	329.16	326.80	--	--	325.01	328.63	--
4/20/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/22/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/27/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/30/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/4/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/6/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/11/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/12/2015	--	--	--	--	--	--	--	--	--	--	329.06	325.90	--	--	324.91	328.62	--
5/19/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/21/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/25/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/27/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/1/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/10/2015	--	--	--	--	--	--	--	--	--	--	328.98	325.59	--	--	324.76	328.60	--
6/15/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/17/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/18/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/22/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/29/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/1/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/6/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/14/2015	--	--	--	--	--	--	--	--	--	--	328.83	--	--	--	324.73	328.58	--
7/15/2015	--	--	--	--	--	--	--	--	--	--	--	325.69	--	--	--	--	--
7/20/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/29/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/4/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/6/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2015	--	--	--	--	--	--	--	--	--	--	328.64	325.00	--	--	324.22	328.50	--
8/17/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/19/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/24/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/26/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/8/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/9/2015	--	--	--	--	--	--	--	--	--	--	--	324.99	--	--	323.95	--	--
9/10/2015	--	--	--	--	--	--	--	--	--	--	328.49	--	--	--	--	328.39	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
9/14/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/16/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/21/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/23/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/30/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/6/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/8/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/13/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2015	--	--	--	--	--	--	--	--	--	--	--	324.99	--	--	323.90	--	--
10/15/2015	--	--	--	--	--	--	--	--	--	--	328.53	--	--	--	--	328.46	--
10/19/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/21/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/22/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/26/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/2/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/3/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/4/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/9/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2015	--	--	--	--	--	--	--	--	--	--	328.65	325.16	--	--	324.23	328.54	--
11/16/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/18/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/23/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/24/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/30/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/8/2015	--	--	--	--	--	--	--	--	--	--	328.63	325.22	--	--	324.27	328.53	--
12/14/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/17/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/21/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/30/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/4/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/11/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/12/2016	--	--	--	--	--	--	--	--	--	--	328.92	325.94	--	--	324.86	Frozen	--
1/18/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/20/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/25/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/1/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/3/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/8/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/9/2016	--	--	--	--	--	--	--	--	--	--	328.97	326.19	--	--	324.84	328.59	--
2/16/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/17/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/25/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/29/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/3/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/7/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/9/2016	--	--	--	--	--	--	--	--	--	--	329.14	326.27	--	--	324.95	328.57	--
3/14/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/16/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/21/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/23/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/30/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/4/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/6/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2016	--	--	--	--	--	--	--	--	--	--	329.07	327.13	--	--	325.13	328.65	--
4/18/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/25/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/27/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/28/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/2/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/4/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/9/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2016	--	--	--	--	--	--	--	--	--	--	328.98	325.78	--	--	324.74	328.60	--
5/16/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
5/18/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/19/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/24/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/25/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/30/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/1/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/9/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/13/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/14/2016	--	--	--	--	--	--	--	--	--	--	328.66	325.24	--	--	324.12	328.50	--
6/20/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/21/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/4/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2016	--	--	--	--	--	--	--	--	--	--	328.27	324.82	--	--	323.61	Dry	--
7/18/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/20/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2016	--	--	--	--	--	--	--	--	--	--	328.29	--	--	--	--	--	--
8/2/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/3/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2016	--	--	--	--	--	--	--	--	--	--	328.13	324.68	--	--	323.42	328.06	--
8/15/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/22/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/24/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/26/2016	--	--	--	--	--	--	--	--	--	--	328.35	--	--	--	--	--	--
8/29/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/30/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/6/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/7/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/12/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/13/2016	--	--	--	--	--	--	--	--	--	--	328.30	324.73	--	--	323.34	328.24	--
9/19/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/21/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/26/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/2016	--	--	--	--	--	--	--	--	--	--	328.20	--	--	--	--	--	--
10/3/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/5/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/11/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/12/2016	--	--	--	--	--	--	--	--	--	--	328.35	324.70	--	--	323.25	328.29	--
10/17/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/19/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/24/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/26/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/31/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/2/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/7/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/8/2016	--	--	--	--	--	--	--	--	--	--	328.54	324.88	--	--	323.44	328.48	--
11/14/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/16/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/21/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/23/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/29/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/30/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/5/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2016	--	--	--	--	--	--	--	--	--	--	328.56	324.98	--	--	323.80	328.50	--
12/19/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/21/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/28/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/2/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/4/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/9/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/10/2017	--	--	--	--	--	--	--	--	--	--	328.80	325.81	--	--	324.72	Frozen	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
1/16/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/18/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/25/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/1/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/6/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/8/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/13/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/2017	--	--	--	--	--	--	--	--	--	--	329.01	326.14	--	--	324.84	Frozen	--
2/15/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/1/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/6/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/8/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/13/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/2017	--	--	--	--	--	--	--	--	--	--	Frozen	326.53	--	--	324.89	Frozen	--
3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/22/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/27/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/3/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/4/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/10/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/2017	--	--	--	--	--	--	--	--	--	--	329.18	327.36	--	--	325.10	328.60	--
4/17/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/19/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/24/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2017	--	--	--	--	--	--	--	--	--	--	329.17	--	--	--	--	328.62	--
5/1/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/8/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/9/2017	--	--	--	--	--	--	--	--	--	--	329.21	327.65	--	--	325.14	328.64	--
5/15/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/17/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/24/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/2017	--	--	--	--	--	--	--	--	--	--	329.28	--	--	--	--	328.66	--
5/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/31/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/7/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/13/2017	--	--	--	--	--	--	--	--	--	--	328.93	325.75	--	--	324.66	328.57	--
6/19/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/22/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2017	--	--	--	--	--	--	--	--	--	--	328.93	--	--	--	--	328.58	--
6/30/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/4/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.19	--	--
7/12/2017	--	--	--	--	--	--	--	--	--	--	328.77	325.22	--	--	--	328.50	--
7/18/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/19/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/24/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/26/2017	--	--	--	--	--	--	--	--	--	--	328.78	--	--	--	--	328.51	--
7/31/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/2/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/15/2017	--	--	--	--	--	--	--	--	--	--	328.64	325.06	--	--	323.91	328.46	--
8/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/28/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/30/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/2017	--	--	--	--	--	--	--	--	--	--	328.53	--	--	--	--	328.39	--
9/5/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/6/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/11/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/12/2017	--	--	--	--	--	--	--	--	--	--	328.51	324.92	--	--	323.70	328.37	--
9/15/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/18/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
9/25/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/27/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/2017	--	--	--	--	--	--	--	--	--	--	328.31	--	--	--	--	328.18	--
10/2/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/4/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/11/2017	--	--	--	--	--	--	--	--	--	--	328.35	324.74	--	--	323.45	328.27	--
10/16/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/18/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/25/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/30/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/31/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/6/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/8/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/13/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/14/2017	--	--	--	--	--	--	--	--	--	--	328.56	324.95	--	--	323.66	328.50	--
11/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/22/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/27/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/4/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/6/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/11/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/2017	--	--	--	--	--	--	--	--	--	--	328.60	325.05	--	--	323.90	Ice	--
12/18/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/27/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/28/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/2/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/3/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/8/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/9/2018	--	--	--	--	--	--	--	--	--	--	328.54	325.05	--	--	--	Frozen	--
1/15/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/17/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/22/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/29/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/5/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/8/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/12/2018	--	--	--	--	--	--	--	--	--	--	328.82	325.67	--	--	--	Frozen	--
2/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.52	--	--
2/20/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/21/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/26/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/5/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/7/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/12/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.81	--	--
3/14/2018	--	--	--	--	--	--	--	--	--	--	329.02	326.19	--	--	--	328.57	--
3/19/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/21/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/26/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/29/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/2/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/9/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/10/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.84	--	--
4/11/2018	--	--	--	--	--	--	--	--	--	--	329.08	326.22	--	--	--	328.59	--
4/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/17/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/18/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/23/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/25/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2018	--	--	--	--	--	--	--	--	--	--	329.30	--	--	--	--	328.65	--
4/30/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/2/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/7/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/8/2018	--	--	--	--	--	--	--	--	--	--	329.19	326.72	--	--	324.95	--	--
5/14/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/16/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/22/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
5/23/2018	--	--	--	--	--	--	--	--	--	--	329.11	--	--	--	--	328.61	--
5/28/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/30/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/4/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/11/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2018	--	--	--	--	--	--	--	--	--	--	328.88	325.40	--	--	324.37	328.55	--
6/14/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/18/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/20/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2018	--	--	--	--	--	--	--	--	--	--	328.88	--	--	--	--	328.56	--
6/29/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/3/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/4/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2018	--	--	--	--	--	--	--	--	--	--	328.73	325.12	--	--	323.99	328.48	--
7/16/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/23/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/24/2018	--	--	--	--	--	--	--	--	--	--	328.66	--	--	--	--	328.45	--
7/25/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/1/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/7/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2018	--	--	--	--	--	--	--	--	--	--	328.62	324.98	--	--	323.81	328.47	--
8/20/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/22/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/23/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/27/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/30/2018	--	--	--	--	--	--	--	--	--	--	328.62	--	--	--	--	328.48	--
9/4/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/5/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/11/2018	--	--	--	--	--	--	--	--	--	--	328.59	324.95	--	--	323.71	328.47	--
9/17/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/19/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/26/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/1/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/3/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/9/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2018	--	--	--	--	--	--	--	--	--	--	328.68	325.02	--	--	323.94	328.55	--
10/15/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/17/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/22/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/29/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/31/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/5/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/7/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/13/2018	--	--	--	--	--	--	--	--	--	--	328.85	325.41	--	--	324.56	NA	--
11/16/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/19/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/21/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/26/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/28/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/3/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/5/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/10/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/11/2018	--	--	--	--	--	--	--	--	--	--	328.92	326.21	--	--	324.81	328.59	--
12/17/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/19/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/27/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/31/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/8/2019	--	--	--	--	--	--	--	--	--	--	329.02	326.28	--	--	324.87	328.62	--
1/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
1/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/28/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2019	--	--	--	--	--	--	--	--	--	--	Frozen	326.06	--	--	--	Frozen	--
2/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.85	--	--
2/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/26/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.64	--	--
3/14/2019	--	--	--	--	--	--	--	--	--	--	329.10	325.76	--	--	--	Frozen	--
3/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/3/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/9/2019	--	--	--	--	--	--	--	--	--	--	329.24	327.03	--	--	325.04	328.65	--
4/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/25/2019	--	--	--	--	--	--	--	--	--	--	329.24	--	--	--	--	328.64	--
4/29/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/14/2019	--	--	--	--	--	--	--	--	--	--	329.31	327.01	--	--	325.11	328.66	--
5/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/29/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/30/2019	--	--	--	--	--	--	--	--	--	--	329.18	--	--	--	--	328.63	--
6/3/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/11/2019	--	--	--	--	--	--	--	--	--	--	329.05	325.86	--	--	324.78	328.35	--
6/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2019	--	--	--	--	--	--	--	--	--	--	328.95	--	--	--	--	--	--
6/28/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/29/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/3/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2019	--	--	--	--	--	--	--	--	--	--	328.81	325.36	--	--	--	328.55	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
7/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.19	--	--
7/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2019	--	--	--	--	--	--	--	--	--	--	328.81	--	--	--	--	--	--
7/29/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/31/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/3/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/5/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/2019	--	--	--	--	--	--	--	--	--	--	328.57	325.06	--	--	323.76	328.39	--
8/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/26/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/28/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/2019	--	--	--	--	--	--	--	--	--	--	328.50	--	--	--	--	Dry	--
8/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/3/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/5/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/2019	--	--	--	--	--	--	--	--	--	--	328.40	324.86	--	--	323.54	328.28	--
9/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/26/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
10/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/8/2019	--	--	--	--	--	--	--	--	--	--	328.50	324.90	--	--	323.49	328.43	--
10/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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11/12/2019	--	--	--	--	--	--	--	--	--	--	328.73	325.25	--	--	324.25	328.57	--
11/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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12/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/10/2019	--	--	--	--	--	--	--	--	--	--	328.92	325.60	--	--	324.83	328.60	--
12/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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12/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/31/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/14/2020	--	--	--	--	--	--	--	--	--	--	329.20	327.96	--	--	325.19	Frozen	--
1/16/2020	--	--	--	--	--	--	--	--	--	332.01	--	--	--	--	--	--	--
1/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
2/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2020	--	--	--	--	--	--	--	--	--	--	329.07	326.17	--	--	324.86	Ice	--
2/18/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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3/11/2020	--	--	--	--	--	--	--	--	--	--	329.25	326.96	--	--	--	328.64	--
3/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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4/9/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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4/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/14/2020	--	--	--	--	--	--	--	--	--	331.96	329.11	326.17	--	Inaccessible	324.88	328.62	--
4/15/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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4/29/2020	--	--	--	--	--	--	--	--	--	--	329.00	--	--	--	--	--	--
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5/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
5/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.54	--	--
5/13/2020	--	--	--	--	--	--	--	--	--	331.86	328.97	325.61	--	340.28	--	328.59	--
5/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/15/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/17/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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5/27/2020	--	--	--	--	--	--	--	--	--	--	328.96	--	--	--	--	--	--
5/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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5/31/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/1/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/9/2020	--	--	--	--	--	--	--	--	--	331.62	328.82	325.52	--	340.36	324.30	328.55	--
6/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/17/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/18/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/2020	--	--	--	--	--	--	--	--	--	--	328.79	--	--	--	--	328.53	--
6/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/1/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/6/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/14/2020	--	--	--	--	--	--	--	--	--	330.48	328.57	Rejected	--	338.41	323.76	328.38	--
7/15/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/24/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/2020	--	--	--	--	--	--	--	--	--	--	328.50	--	--	--	--	--	--
7/31/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
8/1/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/6/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	323.93	--	--
8/12/2020	--	--	--	--	--	--	--	--	--	329.86	328.65	325.06	--	337.67	--	328.50	--
8/17/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/24/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/9/2020	--	--	--	--	--	--	--	--	--	Rejected	328.50	324.93	--	336.34	323.62	328.41	--
9/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/13/2020	--	--	--	--	--	--	--	--	--	327.57	328.47	324.91	--	336.38	--	328.41	--
10/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	323.48	--	--
10/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/9/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	323.67	--	--
11/11/2020	--	--	--	--	--	--	--	--	--	327.01	328.54	325.05	--	336.54	--	328.49	--
11/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.39	--	--
12/9/2020	--	--	--	--	--	--	--	--	--	327.18	328.74	325.33	--	336.23	--	Frozen	--
12/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/4/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/11/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/12/2021	--	--	--	--	--	--	--	--	--	329.70	328.83	325.90	--	339.48	324.74	Frozen	--
1/18/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/20/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/25/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/28/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/1/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/3/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/8/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/9/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.42	--	--
2/10/2021	--	--	--	--	--	--	--	--	--	329.49	328.72	325.55	--	339.13	--	Frozen	--
2/16/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/17/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/19/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/1/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/3/2021	--	--	--	--	--	--	--	--	--	328.36	328.81	325.46	--	339.14	--	Frozen	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	Barn Well Elevation (m AMSL)	BH1-80A Elevation (m AMSL)	BH6-I Elevation (m AMSL)	BH6-II Elevation (m AMSL)	BH6-III Elevation (m AMSL)	BH6-IV Elevation (m AMSL)	BH6-V Elevation (m AMSL)	BH14-I Elevation (m AMSL)	BH14-II Elevation (m AMSL)	BH64 Elevation (m AMSL)	BH65 Elevation (m AMSL)	BH66 Elevation (m AMSL)	BH67 Elevation (m AMSL)	BH71 Elevation (m AMSL)	BH72 Elevation (m AMSL)	DP6 Elevation (m AMSL)	DP7 Elevation (m AMSL)
3/8/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/9/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.44	--	--
3/10/2021	--	--	--	--	--	--	--	--	--	328.38	328.83	325.47	--	339.17	--	Frozen	--
3/15/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/17/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/18/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/22/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/29/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/31/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/1/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/6/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/7/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/9/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/13/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.83	--	--
4/14/2021	--	--	--	--	--	--	--	--	--	331.83	329.09	325.99	--	340.07	--	Inaccessible	--
4/19/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/21/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/27/2021	--	--	--	--	--	--	--	--	--	--	329.02	--	--	--	--	--	--
4/28/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/5/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/7/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/11/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.62	--	--
5/12/2021	--	--	--	--	--	--	--	--	--	331.69	328.99	325.73	--	339.95	--	Inaccessible	--
5/17/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/19/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/25/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/27/2021	--	--	--	--	--	--	--	--	--	--	328.82	--	--	--	--	--	--
5/31/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/2/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/7/2021	--	--	--	--	--	--	--	--	--	330.80	328.78	325.30	--	339.83	--	Inaccessible	--
6/8/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	324.02	--	--
6/14/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/21/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/2021	--	--	--	--	--	--	--	--	--	--	328.71	--	--	--	--	--	--
6/28/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2021	--	--	--	--	--	--	--	--	--	329.85	328.77	325.19	--	337.60	323.97	Inaccessible	--
7/19/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/21/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
2/6/1980	--	--	--	--	--	--	--	--	--	--	--	--	328.63	Dry
3/13/1980	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/1980	--	--	--	--	--	--	--	--	--	--	--	--	328.92	339.05
5/27/1980	--	--	--	--	--	--	--	--	--	--	--	--	329.72	338.83
6/27/1980	--	--	--	--	--	--	--	--	--	--	--	--	328.58	Dry
8/13/1980	--	--	--	--	--	--	--	--	--	--	--	--	328.46	Dry
9/4/1980	--	--	--	--	--	--	--	--	--	--	--	--	328.25	Dry
10/31/1980	--	--	--	--	--	--	--	--	--	--	--	--	328.46	Dry
12/8/1980	--	--	--	--	--	--	--	--	--	--	--	--	328.68	Dry
2/9/1981	--	--	--	--	--	--	--	--	--	--	--	--	328.47	Dry
5/5/1981	--	--	--	--	--	--	--	--	--	--	--	--	328.76	Dry
8/31/1981	--	--	--	--	--	--	--	--	--	--	--	--	328.62	Dry
11/7/1981	--	--	--	--	--	--	--	--	--	--	--	--	328.99	Dry
2/11/1982	--	--	--	--	--	--	--	--	--	--	--	--	328.80	Dry
3/23/1982	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/1/1982	--	--	--	--	--	--	--	--	--	--	--	--	329.12	Dry
8/13/1982	--	--	--	--	--	--	--	--	--	--	--	--	328.58	Dry
11/30/1982	--	--	--	--	--	--	--	--	--	--	--	--	329.12	--
11/29/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/3/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/10/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/17/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/24/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/23/1990	--	--	--	--	--	--	331.10	--	--	--	--	--	--	--
6/15/1990	--	--	--	--	--	--	330.24	--	--	--	--	--	--	--
8/11/1990	--	--	--	--	--	--	329.61	--	--	--	--	--	--	--
1/15/1991	--	--	--	--	--	--	329.61	--	--	--	--	--	--	--
2/20/1991	--	--	--	--	--	--	330.21	--	--	--	--	--	--	--
3/19/1991	--	--	--	--	--	--	330.51	--	--	--	--	--	--	--
4/15/1991	--	--	--	--	--	--	331.21	--	--	--	--	--	--	--
5/22/1991	--	--	--	--	--	--	330.23	--	--	--	--	--	--	--
6/24/1991	--	--	--	--	--	--	329.99	--	--	--	--	--	--	--
7/16/1991	--	--	--	--	--	--	329.90	--	--	--	--	--	--	--
8/15/1991	--	--	--	--	--	--	329.57	--	--	--	--	--	--	--
9/15/1991	--	--	--	--	--	--	329.21	--	--	--	--	--	--	--
10/25/1991	--	--	--	--	--	--	328.90	--	--	--	--	--	--	--
11/3/1991	--	--	--	--	--	--	328.94	--	--	--	--	--	--	--
12/16/1991	--	--	--	--	--	--	329.36	--	--	--	--	--	--	--
1/17/1992	--	--	--	--	--	--	329.50	--	--	--	--	--	--	--
1/27/1992	--	--	--	--	--	--	329.63	--	--	--	--	--	--	--
2/27/1992	--	--	--	--	--	--	329.90	--	--	--	--	--	--	--
3/30/1992	--	--	--	--	--	--	330.23	--	--	--	--	--	--	--
4/2/1992	--	--	--	--	--	--	330.29	--	--	--	--	--	--	--
6/20/1992	--	--	--	--	--	--	330.08	--	--	--	--	--	--	--
7/20/1992	--	--	--	--	--	--	329.79	--	--	--	--	--	--	--
8/24/1992	--	--	--	--	--	--	329.90	--	--	--	--	--	--	--
9/29/1992	--	--	--	--	--	--	330.28	--	--	--	--	--	--	--
10/27/1992	--	--	--	--	--	--	330.28	--	--	--	--	--	--	--
11/27/1992	--	--	--	--	--	--	330.98	--	--	--	--	--	--	--
12/17/1992	--	--	--	--	--	--	330.37	--	--	--	--	--	--	--
1/24/1993	--	--	--	--	--	--	330.90	--	--	--	--	--	--	--
2/24/1993	--	--	--	--	--	--	330.56	--	--	--	--	--	--	--
3/24/1993	--	--	--	--	--	--	330.24	--	--	--	--	--	--	--
4/24/1993	--	--	--	--	--	--	330.08	--	--	--	--	--	--	--
5/26/1993	--	--	--	--	--	--	330.01	--	--	--	--	--	--	--
6/24/1993	--	--	--	--	--	--	330.33	--	--	--	--	--	--	--
7/30/1993	--	--	--	--	--	--	330.08	--	--	--	--	--	--	--
8/27/1993	--	--	--	--	--	--	329.74	--	--	--	--	--	--	--
9/17/1993	--	--	--	--	--	--	329.54	--	--	--	--	--	--	--
10/15/1993	--	--	--	--	--	--	329.68	--	--	--	--	--	--	--
11/15/1993	--	--	--	--	--	--	329.79	--	--	--	--	--	--	--
12/22/1993	--	--	--	--	--	--	329.80	--	--	--	--	--	--	--
1/26/1994	--	--	--	--	--	--	332.30	--	--	--	--	--	--	--
2/25/1994	--	--	--	--	--	--	333.84	--	--	--	--	--	--	--
3/28/1994	--	--	--	--	--	--	334.32	--	--	--	--	--	--	--
4/22/1994	--	--	--	--	--	--	330.65	--	--	--	--	--	--	--
5/26/1994	--	--	--	--	--	--	329.49	--	--	--	--	--	--	--
6/23/1994	--	--	--	--	--	--	328.66	--	--	--	--	--	--	--
7/22/1994	--	--	--	--	--	--	328.54	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
8/18/1994	--	--	--	--	--	--	328.30	--	--	--	--	--	--	--
9/16/1994	--	--	--	--	--	--	328.11	--	--	--	--	--	--	--
10/28/1994	--	--	--	--	--	--	328.40	--	--	--	--	--	--	--
11/15/1994	--	--	--	--	--	--	328.54	--	--	--	--	--	--	--
12/22/1994	--	--	--	--	--	--	328.88	--	--	--	--	--	--	--
1/23/1995	--	--	--	--	--	--	328.95	--	--	--	--	--	--	--
2/23/1995	--	--	--	--	--	--	328.17	--	--	--	--	--	--	--
3/28/1995	--	--	--	--	--	--	327.68	--	--	--	--	--	--	--
5/3/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/15/1995	--	--	--	--	--	--	327.56	--	--	--	--	--	--	--
6/15/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/1995	--	--	--	--	--	--	328.08	--	--	--	--	--	--	--
7/17/1995	--	--	--	--	--	--	328.48	--	--	--	--	--	--	--
8/25/1995	--	--	--	--	--	--	328.80	--	--	--	--	--	--	--
9/28/1995	--	--	--	--	--	--	329.39	--	--	--	--	--	--	--
10/24/1995	--	--	--	--	--	--	330.08	--	--	--	--	--	--	--
11/28/1995	--	--	--	--	--	--	330.48	--	--	--	--	--	--	--
12/22/1995	--	--	--	--	--	--	330.57	--	--	--	--	--	--	--
1/29/1996	--	--	--	--	--	--	330.56	--	--	--	--	--	--	--
2/28/1996	--	--	--	--	--	--	330.51	--	--	--	--	--	--	--
3/29/1996	--	--	--	--	--	--	329.93	--	--	--	--	--	--	--
4/26/1996	--	--	--	--	--	--	330.76	--	--	--	--	--	--	--
5/3/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/31/1996	--	--	--	--	--	--	330.16	--	--	--	--	--	--	--
6/6/1996	--	--	--	--	--	--	329.83	--	--	--	--	--	--	--
7/19/1996	--	--	--	--	--	--	328.60	--	--	--	--	--	--	--
8/29/1996	--	4.14	--	--	--	--	328.27	--	--	--	--	--	--	--
9/20/1996	--	--	--	--	--	--	328.49	--	--	--	--	--	--	--
10/3/1996	--	--	--	--	--	7.28	--	--	--	--	--	--	--	--
11/29/1996	--	4.01	--	--	--	8.52	--	--	--	--	--	--	--	--
12/2/1996	--	--	--	--	--	--	326.71	--	--	--	--	--	--	--
12/23/1996	--	--	--	--	--	--	328.10	--	--	--	--	--	--	--
12/30/1996	--	--	--	--	--	--	328.34	--	--	--	--	--	--	--
1/27/1997	--	--	--	--	--	--	328.37	--	--	--	--	--	--	--
1/30/1997	--	--	--	--	--	--	328.23	--	--	--	--	--	--	--
2/21/1997	--	1.34	--	--	--	6.22	--	--	--	--	--	--	--	--
2/24/1997	--	--	--	--	--	--	329.15	--	--	--	--	--	--	--
3/24/1997	--	--	--	--	--	--	327.88	--	--	--	--	--	--	--
4/28/1997	--	--	--	--	--	--	327.40	--	--	--	--	--	--	--
5/23/1997	--	2.43	--	--	--	--	--	--	--	--	--	--	--	--
5/26/1997	--	--	--	--	--	--	326.17	--	--	--	--	--	--	--
5/29/1997	--	2.43	--	--	--	--	--	--	--	--	--	--	--	--
6/5/1997	6.18	--	--	--	--	--	--	--	--	--	--	--	--	--
6/17/1997	--	--	--	--	--	10.88	--	--	--	--	--	--	--	--
6/24/1997	--	--	--	--	--	--	323.94	--	--	--	--	--	--	--
7/30/1997	--	--	--	--	--	--	322.96	--	--	--	--	--	--	--
8/27/1997	--	--	--	--	--	--	322.29	--	--	--	--	--	--	--
8/29/1997	9.16	6.04	--	--	--	--	--	--	--	--	--	--	--	--
9/2/1997	--	--	--	--	--	14.15	--	--	--	--	--	--	--	--
9/24/1997	--	--	--	--	--	--	321.98	--	--	--	--	--	--	--
10/31/1997	--	--	--	--	--	--	319.63	--	--	--	--	--	--	--
11/25/1997	--	--	--	--	--	--	318.76	--	--	--	--	--	--	--
12/16/1997	11.13	8	--	--	--	18.02	--	--	--	--	--	--	--	--
12/18/1997	--	--	--	--	--	--	317.53	--	--	--	--	--	--	--
1/27/1998	--	--	--	--	--	--	317.42	--	--	--	--	--	--	--
2/5/1998	10.44	--	--	--	--	--	--	--	--	--	--	--	--	--
2/6/1998	--	7.82	--	9.42	--	17.92	--	--	--	--	--	--	--	--
2/26/1998	--	--	--	--	--	--	317.30	--	--	--	--	--	--	--
3/6/1998	9.12	7.42	--	9.1	--	17.84	--	--	--	--	--	--	--	--
3/26/1998	--	--	--	--	--	--	319.38	--	--	--	--	--	--	--
4/7/1998	--	3.26	3.68	4.84	5.09	17.41	--	--	--	--	--	--	--	--
4/16/1998	6.11	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/1998	--	--	--	--	--	--	319.97	--	--	--	--	--	--	--
5/5/1998	--	--	--	--	--	--	319.82	--	--	--	--	--	--	--
5/6/1998	6.25	3.23	3.61	4.75	5.12	17.37	--	--	--	--	--	--	--	--
5/29/1998	--	--	--	--	--	--	319.38	--	--	--	--	--	--	--
6/21/1998	8.09	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/1998	--	--	--	--	--	--	318.67	--	--	--	--	--	--	--
6/26/1998	--	5.14	5.52	6.73	7.05	17.94	--	--	--	--	--	--	--	--
7/17/1998	--	--	--	--	--	--	Buried	--	--	--	--	--	--	--
8/13/1998	9.94	7.1	7.37	8.63	9.06	--	--	--	--	--	--	--	--	--
10/15/1998	11.51	--	--	--	--	--	--	--	--	--	--	--	--	--
10/16/1998	--	8.94	9.49	--	10.69	--	--	--	--	--	--	--	--	--
10/29/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/4/1998	--	--	--	--	--	--	--	319.93	--	--	--	--	--	--
11/19/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/26/1998	--	--	--	--	--	--	--	319.81	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
11/27/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/15/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/1998	--	--	--	--	--	--	--	319.68	--	--	--	--	--	--
1/29/1999	--	--	--	--	--	--	--	319.53	--	--	--	--	--	--
2/15/1999	13.05	--	--	--	--	--	--	--	--	--	--	--	--	--
2/16/1999	--	--	11.11	--	12.27	--	--	--	--	--	--	--	--	--
2/24/1999	--	--	--	--	--	--	--	319.50	--	--	--	--	--	--
3/5/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/17/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/31/1999	--	--	--	--	--	--	--	320.07	--	--	--	--	--	--
4/5/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	331.87
4/12/1999	--	--	--	--	--	--	--	320.51	--	--	--	--	--	--
4/20/1999	--	--	--	--	--	--	--	320.66	--	--	--	--	--	332.28
4/22/1999	--	--	--	--	--	--	--	320.69	--	--	--	--	--	--
5/3/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	332.59
5/7/1999	10.94	--	10.15	--	10.37	--	--	--	--	--	--	--	--	--
5/17/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	332.66
5/19/1999	--	--	--	--	--	--	--	320.87	--	--	--	--	--	--
6/1/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	332.50
6/30/1999	--	--	--	--	--	--	--	320.68	--	--	--	--	--	332.28
7/1/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/6/1999	--	--	--	--	--	--	--	320.64	--	--	--	--	--	--
7/7/1999	11.45	--	--	--	--	--	--	--	--	--	--	--	--	332.20
7/10/1999	11.68	--	--	--	--	--	--	--	--	--	--	--	--	332.07
7/13/1999	--	--	--	--	--	--	--	320.58	--	--	--	--	--	--
7/14/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	332.07
7/20/1999	--	--	--	--	--	--	--	320.51	--	--	--	--	--	--
7/27/1999	--	--	--	--	--	--	--	320.41	--	--	--	--	--	--
8/5/1999	--	--	--	--	--	--	--	320.37	--	--	--	--	--	--
8/10/1999	--	--	--	--	--	--	--	320.33	--	--	--	--	--	--
8/12/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	331.55
8/24/1999	--	--	--	--	--	--	--	320.15	--	--	--	--	--	--
8/26/1999	--	--	--	--	--	--	--	320.14	--	--	--	--	--	--
9/3/1999	12.46	--	10.85	--	11.93	--	--	--	--	--	--	--	--	--
9/9/1999	--	--	--	--	--	--	--	319.96	--	--	--	--	--	--
9/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
9/17/1999	--	--	--	--	--	--	--	319.87	--	--	--	--	--	--
9/27/1999	--	--	--	--	--	--	--	319.77	--	--	--	--	--	--
9/29/1999	--	--	--	--	--	--	--	319.76	--	--	--	--	--	--
10/12/1999	--	--	--	--	--	--	--	319.65	--	--	--	--	--	Dry
10/20/1999	--	--	--	--	--	--	--	319.61	--	--	--	--	--	--
10/29/1999	--	--	--	--	--	--	--	319.37 / 319.50	--	--	--	--	--	--
11/3/1999	--	--	--	--	--	--	--	319.47	--	--	--	--	--	--
11/8/1999	13.17	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/1999	--	--	11.51	--	12.66	--	--	--	--	--	--	--	--	--
11/12/1999	--	--	--	--	--	--	--	319.40	--	--	--	--	--	Dry
11/18/1999	--	--	--	--	--	--	--	319.35	--	--	--	--	--	--
11/24/1999	--	--	--	--	--	--	--	319.32	--	--	--	--	--	--
12/2/1999	--	--	--	--	--	--	--	319.42	--	--	--	--	--	--
12/8/1999	--	--	--	--	--	--	--	319.26	--	--	--	--	--	--
12/16/1999	--	--	--	--	--	--	--	319.22	--	--	--	--	--	--
12/20/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
12/21/1999	--	--	--	--	--	--	--	319.22	--	--	--	--	--	--
12/22/1999	--	--	--	--	--	--	--	319.38	--	--	--	--	--	--
12/30/1999	--	--	--	--	--	--	--	319.18	--	--	--	--	--	--
1/6/2000	--	--	--	--	--	--	--	319.19	--	--	--	--	--	--
1/18/2000	--	--	--	--	--	--	--	319.19	--	--	--	--	--	--
1/20/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
1/28/2000	--	--	--	--	--	--	--	319.18	--	--	--	--	--	--
2/2/2000	--	--	--	--	--	--	--	319.23	--	--	--	--	--	--
2/10/2000	--	--	--	--	--	--	--	319.25	--	--	--	--	--	--
2/15/2000	--	--	--	--	--	--	--	319.22	--	--	--	--	--	--
2/16/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
2/17/2000	--	--	--	--	--	--	--	319.26	--	--	--	--	--	--
2/28/2000	--	--	--	--	--	--	--	319.43	--	--	--	--	--	--
2/29/2000	12.96	--	11.59	--	12.72	--	--	--	--	--	--	--	--	--
3/8/2000	--	--	--	--	--	--	--	319.61	--	--	--	--	--	--
3/20/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
3/22/2000	--	--	--	--	--	--	--	319.81	--	--	--	--	--	--
3/23/2000	--	--	--	--	--	--	--	319.80	--	--	--	--	--	--
4/5/2000	--	--	--	--	--	--	--	319.96	--	--	--	--	--	--
4/17/2000	--	--	--	--	--	--	--	319.90	--	--	--	--	--	331.70
5/3/2000	--	--	--	--	--	--	--	320.34	--	--	--	--	--	--
5/15/2000	--	--	--	--	--	--	--	320.63	--	--	--	--	--	--
5/16/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	332.60
5/30/2000	--	--	--	--	--	--	--	321.07	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
5/31/2000	8.45	--	6.7	--	8.17	--	--	--	--	--	--	--	--	--
6/19/2000	--	--	--	--	--	--	--	321.23	--	--	--	--	--	332.29
7/4/2000	--	--	--	--	--	--	--	321.40	--	--	--	--	--	--
7/13/2000	--	--	--	--	--	--	--	321.42	--	--	--	--	--	--
7/18/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	335.46
7/26/2000	--	--	--	--	--	--	--	321.32	--	--	--	--	--	--
8/15/2000	--	--	--	--	--	--	--	321.23 / 321.25	--	--	--	--	--	--
8/16/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	335.12
8/29/2000	--	--	--	--	--	--	--	321.14	--	--	--	--	--	--
8/31/2000	8.88	--	5.98	--	7.98	--	--	--	--	--	--	--	--	--
9/11/2000	--	--	--	--	--	--	--	321.03	--	--	--	--	--	--
9/19/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	334.29
9/29/2000	--	--	--	--	--	--	--	320.78	--	--	--	--	--	--
10/10/2000	--	--	--	--	--	--	--	320.66	--	--	--	--	--	--
10/17/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	333.42
10/25/2000	--	--	--	--	--	--	--	320.40	--	--	--	--	--	--
11/13/2000	11.14	--	9.68	--	10.5	--	--	--	--	--	--	--	--	--
11/14/2000	--	--	--	--	--	--	--	320.12	--	--	--	--	--	332.58
11/30/2000	--	--	--	--	--	--	--	319.83	--	--	--	--	--	--
12/13/2000	--	--	--	--	--	--	--	319.60	--	--	--	--	--	Dry
12/21/2000	11.87	--	11.22	--	--	--	--	--	--	--	--	--	--	--
12/29/2000	--	--	--	--	--	--	--	319.41	--	--	--	--	--	--
1/16/2001	--	--	--	--	--	--	--	319.18	--	--	--	--	--	Dry
1/31/2001	--	--	--	--	--	--	--	319.04	--	--	--	--	--	--
2/13/2001	--	--	--	--	--	--	--	319.04	--	--	--	--	--	--
2/14/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
2/27/2001	--	--	--	--	--	--	--	319.82	--	--	--	--	--	--
3/13/2001	--	--	--	--	--	--	--	320.53	--	--	--	--	--	--
3/14/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
3/26/2001	9.84	--	8.36	--	9.6	--	--	--	--	--	--	--	--	--
3/28/2001	--	--	--	--	--	--	--	320.81	--	--	--	--	--	--
4/17/2001	--	--	--	--	--	--	--	321.43	--	--	--	--	--	331.89
5/2/2001	--	--	--	--	--	--	--	321.60	--	--	--	--	--	--
5/15/2001	--	--	--	--	--	--	--	321.63	--	--	--	--	--	331.69
5/28/2001	--	--	--	--	--	--	--	321.55	--	--	--	--	--	--
6/7/2001	--	--	--	--	--	--	--	321.45	--	--	--	--	--	--
6/19/2001	9.48	--	7.55	--	8.75	--	--	321.37	--	--	--	--	--	331.60
7/17/2001	--	--	--	--	--	--	--	320.98	--	--	--	--	--	330.89
8/14/2001	--	--	--	--	--	--	--	320.55	--	--	--	--	--	Dry
9/11/2001	12.38	--	10.91	--	--	--	--	320.07	--	--	--	--	--	Dry
9/12/2001	--	--	--	--	11.73	--	--	--	--	--	--	--	--	--
10/16/2001	--	--	--	--	--	--	--	319.48	--	--	--	--	--	Dry
11/13/2001	--	--	--	--	--	--	--	319.15	--	--	--	--	--	Dry
12/11/2001	14.75	--	12.58	--	Dry	--	--	319.11	--	--	--	--	--	Dry
1/15/2002	--	--	--	--	--	--	--	319.76	--	--	--	--	--	Dry
2/12/2002	--	--	--	--	--	--	--	319.38	--	--	--	--	--	Dry
3/12/2002	--	--	--	--	--	--	--	318.74	--	--	--	--	--	Dry
3/26/2002	11.96	--	10.63	--	11.17	--	--	--	--	--	--	--	--	--
4/16/2002	--	--	--	--	--	--	--	319.38	--	--	--	--	--	331.84
5/14/2002	--	--	--	--	--	--	--	319.96	--	--	--	--	--	331.53
6/11/2002	--	--	--	--	--	--	--	318.47	--	--	--	--	--	Dry
6/25/2002	11.2	--	9.42	--	9.89	--	--	--	--	--	--	--	--	--
7/9/2002	--	--	--	--	--	--	--	318.23	--	--	--	--	--	Dry
8/13/2002	--	--	--	--	--	--	--	317.77	--	--	--	--	--	Dry
9/10/2002	--	--	--	--	--	--	--	317.40	--	--	--	--	--	Dry
9/24/2002	15.76	--	13.26	--	13.8	--	--	--	--	--	--	--	--	--
10/8/2002	--	--	--	--	--	--	--	316.72	--	--	--	--	--	--
10/9/2002	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
11/12/2002	--	--	--	--	--	--	--	Dry	--	--	--	--	--	Dry
12/10/2002	--	--	--	--	--	--	--	Dry	--	--	--	--	--	Dry
1/2/2003	13.87	--	14.24	--	--	--	--	--	--	--	--	--	--	--
1/14/2003	--	--	--	--	--	--	--	Dry	--	--	--	--	--	Dry
1/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2003	--	--	--	--	--	--	--	Dry	--	--	--	--	--	--
2/12/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
3/11/2003	--	--	--	--	--	--	--	Dry	--	--	--	--	--	--
3/13/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	Snow
3/18/2003	18.44	--	16.19	--	16.78	--	--	--	--	--	--	--	--	--
3/24/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/1/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/10/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	331.80
4/15/2003	--	--	--	--	--	--	--	Dry	--	--	--	--	--	--
4/22/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/5/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/13/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	331.92
5/14/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
5/20/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/27/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/10/2003	--	--	--	--	--	--	--	316.77	--	--	--	--	--	Dry
6/17/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/1/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/2/2003	16.34	--	13.79	--	13.69	--	--	--	--	--	--	--	--	--
7/8/2003	--	--	--	--	--	--	--	316.95	--	--	--	--	--	Dry
7/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/16/2003	--	--	--	--	--	--	--	Inaccessible	--	--	--	--	--	--
7/17/2003	--	--	--	--	--	--	--	--	318.83	--	--	--	--	--
7/22/2003	--	--	--	--	--	--	--	--	318.82	--	--	--	--	--
7/30/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/5/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2003	--	--	--	--	--	--	--	--	318.26	--	--	--	--	Dry
8/18/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/19/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/27/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/2003	19.29	--	16.12	--	16.12	--	--	--	--	--	--	--	--	--
9/9/2003	--	--	--	--	--	--	--	--	317.72	--	--	--	--	Dry
9/23/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2003	--	--	--	--	--	--	--	--	317.16	--	--	--	--	Dry
10/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2003	--	--	--	--	--	--	--	--	316.83	--	--	--	--	--
10/30/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2003	--	--	--	--	--	--	--	--	316.68	--	--	--	--	Dry
11/12/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/28/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
12/19/2003	--	--	--	--	--	--	--	--	317.26	--	--	--	--	--
1/13/2004	--	--	--	--	--	--	--	--	317.86	--	--	--	--	Dry
1/16/2004	--	--	16.29	--	--	--	--	--	--	--	--	--	--	--
2/10/2004	--	--	--	--	--	--	--	--	318.10	--	--	--	--	--
2/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
2/24/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/9/2004	--	--	--	--	--	--	--	--	318.14	--	--	--	--	331.90
3/11/2004	--	--	16.25	--	--	--	--	--	--	--	--	--	--	--
3/24/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/13/2004	--	--	--	--	--	--	--	--	319.76	--	--	--	--	Dry
4/16/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/11/2004	--	--	--	--	--	--	--	--	320.66	--	--	--	--	Dry
5/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/25/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/2004	17.88	--	14.75	--	13.96	--	--	--	--	--	--	--	--	Dry
6/9/2004	--	--	--	--	--	--	--	--	320.21	--	--	--	--	--
6/24/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
7/14/2004	--	--	--	--	--	--	--	--	319.41	--	--	--	--	--
7/27/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2004	--	--	--	--	--	--	--	--	318.72	--	--	--	--	--
8/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
8/12/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/30/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/2004	Damaged	--	17.45	--	Damaged	--	--	--	--	--	--	--	--	--
9/14/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
9/16/2004	--	--	--	--	--	--	--	--	317.88	--	--	--	--	--
9/21/2004	--	--	--	--	--	--	--	--	317.81	--	--	--	--	--
9/30/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/12/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
10/13/2004	--	--	--	--	--	--	--	--	317.37	--	--	--	--	--
10/26/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/9/2004	--	--	--	--	--	--	--	--	316.68	--	--	--	--	Dry
11/23/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/14/2004	--	--	--	--	--	--	--	--	316.19	--	--	--	--	--
12/15/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
12/20/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/2004	--	--	Dry	--	--	--	--	--	--	--	--	--	--	--
1/11/2005	--	--	--	--	--	--	--	--	316.05	--	--	--	--	Dry
1/12/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/28/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
2/8/2005	--	--	--	--	--	--	--	--	316.81	--	--	--	--	Dry
2/9/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/8/2005	--	--	--	--	--	--	--	--	317.46	--	--	--	--	Dry
3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2005	--	--	--	--	--	--	--	--	318.87	--	--	--	--	Dry
4/26/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2005	--	--	--	--	--	--	--	--	320.07	--	--	--	--	Dry
5/24/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/14/2005	--	--	--	--	--	--	--	--	319.68	--	--	--	--	Dry
6/15/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2005	--	--	--	--	--	--	--	--	319.11	--	--	--	--	Dry
7/26/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2005	--	--	--	--	--	--	--	--	318.49	--	--	--	--	--
8/10/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
8/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/13/2005	--	--	--	--	--	--	--	--	317.96	--	--	--	--	--
9/14/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
9/27/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/11/2005	--	--	--	--	--	--	--	--	317.36	--	--	--	--	Dry
10/12/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/25/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/8/2005	--	--	--	--	--	--	--	--	316.86	--	--	--	--	--
11/9/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
11/22/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/1/2005	Inaccessible	--	Inaccessible	--	18.87	--	--	--	--	--	--	--	--	--
12/13/2005	--	--	--	--	--	--	--	--	316.43	--	--	--	--	Dry
12/22/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/10/2006	--	--	--	--	--	--	--	--	316.24	--	--	--	--	--
1/11/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
2/14/2006	--	--	--	--	--	--	--	--	317.61	--	--	--	--	Dry
3/14/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/15/2006	--	--	--	--	--	--	--	--	318.86	--	--	--	--	Dry
4/11/2006	--	--	--	--	--	--	--	--	319.99	--	--	--	--	Dry
5/9/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2006	--	--	--	--	--	--	--	--	320.09	--	--	--	--	Dry
5/16/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
6/13/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2006	--	--	--	--	--	--	--	--	319.64	--	--	--	--	Dry
7/25/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2006	--	--	--	--	--	--	--	--	319.95	--	--	--	--	Dry
9/12/2006	--	--	--	--	--	--	--	--	318.57	--	--	--	--	--
9/13/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
10/10/2006	--	--	--	--	--	--	--	--	318.17	--	--	--	--	--
10/11/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
11/14/2006	--	--	--	--	--	--	--	--	317.84	--	--	--	--	Dry
12/11/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
12/13/2006	--	--	--	--	--	--	--	--	318.45	--	--	--	--	--
12/19/2006	--	--	17.79	--	--	--	--	--	--	--	--	--	--	--
1/9/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
1/10/2007	--	--	--	--	--	--	--	--	Destroyed	--	--	--	--	--
2/13/2007	--	--	--	--	--	--	--	--	Destroyed	--	--	--	--	Dry
3/13/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	Dry
4/10/2007	--	--	--	--	--	--	--	--	--	318.58	--	--	--	--
5/8/2007	--	--	--	--	--	--	--	--	--	318.23	--	--	--	--
5/11/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2007	--	--	--	--	--	--	--	--	--	317.95	--	--	--	--
6/26/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2007	--	--	--	--	--	--	--	--	--	316.68	--	--	--	--
7/24/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2007	--	--	--	--	--	--	--	--	--	315.84	--	--	--	--
9/11/2007	--	--	--	--	--	--	--	--	--	315.36	--	--	--	--
10/9/2007	--	--	--	--	--	--	--	--	--	314.93	--	--	--	--
11/13/2007	--	--	--	--	--	--	--	--	--	314.46	--	--	--	--
11/14/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2007	--	--	--	--	--	--	--	--	--	314.26	--	--	--	--
1/8/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/14/2008	--	--	--	--	--	--	--	--	--	314.23	--	--	--	--
2/12/2008	--	--	--	--	--	--	--	--	--	314.98	--	--	--	--
2/13/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/18/2008	--	--	--	--	--	--	--	--	--	316.62	--	--	--	--
3/20/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
4/8/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/9/2008	--	--	--	--	--	--	--	--	--	320.04	--	--	--	--
5/13/2008	--	--	--	--	--	--	--	--	--	320.10	--	--	--	--
6/10/2008	--	--	--	--	--	--	--	--	--	318.81	--	--	--	--
6/11/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2008	--	--	--	--	--	--	--	--	--	317.98	--	--	--	--
7/9/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2008	--	--	--	--	--	--	--	--	--	317.09	--	--	--	--
9/9/2008	--	--	--	--	--	--	--	--	--	316.91	--	--	--	--
9/10/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2008	--	--	--	--	--	--	--	--	--	315.38	--	--	--	--
10/15/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2008	--	--	--	--	--	--	--	--	--	315.90	--	--	--	--
12/8/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2008	--	--	--	--	--	--	--	--	--	315.70	--	--	--	--
12/10/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2009	--	--	--	--	--	--	--	--	--	318.12	--	--	--	--
1/14/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/16/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2009	--	--	--	--	--	--	--	--	--	317.76	--	--	--	--
3/10/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/11/2009	--	--	--	--	--	--	--	--	--	319.81	--	--	--	--
4/14/2009	--	--	--	--	--	--	--	--	--	320.72	--	--	--	--
4/28/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/12/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/13/2009	--	--	--	--	--	--	--	--	--	320.52	--	--	--	--
6/9/2009	--	--	--	--	--	--	--	--	--	319.11	--	--	--	--
6/10/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/18/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/2/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/15/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/16/2009	--	--	--	--	--	--	--	--	--	317.75	--	--	--	--
7/23/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/6/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/2009	--	--	--	--	--	--	--	--	--	316.71	--	--	--	--
8/18/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/20/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/8/2009	--	--	--	--	--	--	--	--	--	315.94	--	--	--	--
9/9/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2009	--	--	--	--	--	--	--	--	--	315.76	--	--	--	--
10/15/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2009	--	--	--	--	--	--	--	--	--	315.31	--	--	--	--
12/8/2009	--	--	--	--	--	--	--	--	--	314.82	--	--	--	--
12/23/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/12/2010	--	--	--	--	--	--	--	--	--	315.00	--	--	--	--
2/9/2010	--	--	--	--	--	--	--	--	--	315.33	--	--	--	--
3/9/2010	--	--	--	--	--	--	--	--	--	315.33	327.49	313.62	--	--
4/13/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/16/2010	--	--	--	--	--	--	--	--	--	318.59	333.92	315.25	--	--
5/11/2010	--	--	--	--	--	--	--	--	--	318.25	334.74	316.01	--	--
6/8/2010	--	--	--	--	--	--	--	--	--	317.43	334.33	315.94	--	--
6/22/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/6/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2010	--	--	--	--	--	--	--	--	--	316.68	333.86	--	--	--
7/22/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2010	--	--	--	--	--	--	--	--	--	316.30	332.88	315.37	--	--
9/14/2010	--	--	--	--	--	--	--	--	--	--	330.70	--	--	--
9/15/2010	--	--	--	--	--	--	--	--	--	315.85	--	314.89	--	--
10/12/2010	--	--	--	--	--	--	--	--	--	315.47	--	314.42	--	--
10/13/2010	--	--	--	--	--	--	--	--	--	--	--	314.43	--	--
11/9/2010	--	--	--	--	--	--	--	--	--	314.85	327.97	313.90	--	--
11/10/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/2010	--	--	--	--	--	--	--	--	--	--	327.47 / 327.48 / 327.47 / 327.48 / 327.48	--	--	--
12/3/2010	--	--	--	--	--	--	--	--	--	--	327.47 / 327.47 / 327.47	314.95 / 314.86 / 313.86 / 314.57 / 314.74 / 314.81	--	--
12/6/2010	--	--	--	--	--	--	--	--	--	--	--	315.80 / 315.82 / 315.83	--	--
12/7/2010	--	--	--	--	--	--	--	--	--	--	327.43 / 327.43 / 327.44	314.96 / 314.79 / 314.89 / 315.08 / 315.90	--	--
12/8/2010	--	--	--	--	--	--	--	--	--	--	327.43 / 327.42 / 327.42	314.38 / 314.39 / 314.41	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
12/9/2010	--	--	--	--	--	--	--	--	--	--	327.42 / 327.42 / 327.41	314.19	--	--
12/10/2010	--	--	--	--	--	--	--	--	--	--	327.42 / 327.42 / 327.42	--	--	--
12/13/2010	--	--	--	--	--	--	--	--	--	--	327.38 / 327.38 / 327.38	--	--	--
12/14/2010	--	--	--	--	--	--	--	--	--	314.73	327.39 / 327.39 / 327.38 / 327.38	313.64	--	--
12/15/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/2010	--	--	--	--	--	--	--	--	--	--	327.38 / 327.38 / 327.37	--	--	--
12/17/2010	--	--	--	--	--	--	--	--	--	--	327.38 / 327.39 / 327.36	--	--	--
12/20/2010	--	--	--	--	--	--	--	--	--	--	327.36 / 327.35 / 327.35	--	--	--
12/21/2010	--	--	--	--	--	--	--	--	--	--	327.35 / 327.35 / 327.35	--	--	--
12/22/2010	--	--	--	--	--	--	--	--	--	--	327.34 / 327.34 / 327.35 / 327.35 / 327.35	--	--	--
12/23/2010	--	--	--	--	--	--	--	--	--	--	327.34 / 327.33 / 327.34	--	--	--
12/28/2010	--	--	--	--	--	--	--	--	--	--	327.31 / 327.31 / 327.31	--	--	--
12/29/2010	--	--	--	--	--	--	--	--	--	--	327.30 / 327.30 / 327.30	--	--	--
12/30/2010	--	--	--	--	--	--	--	--	--	--	327.30 / 327.30 / 327.29	--	--	--
1/3/2011	--	--	--	--	--	--	--	--	--	--	327.28 / 327.28 / 327.28	--	--	--
1/4/2011	--	--	--	--	--	--	--	--	--	--	327.27	--	--	--
1/11/2011	--	--	--	--	--	--	--	--	--	314.85	327.26	313.49	--	--
2/3/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/7/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/8/2011	--	--	--	--	--	--	--	--	--	314.71	327.10	313.31	--	--
2/9/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/15/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/16/2011	--	--	--	--	--	--	--	--	--	--	327.14 / 327.10 / 327.15 / 327.14 / 327.13	313.31 / 313.31 / 313.31 / 313.31 / 313.31	--	--
2/17/2011	--	--	--	--	--	--	--	--	--	--	327.18 / 327.19 / 327.19	313.31 / 313.31 / 313.31	--	--
2/18/2011	--	--	--	--	--	--	--	--	--	--	327.20 / 327.20	313.31 / 313.31 / 313.31	--	--
2/22/2011	--	--	--	--	--	--	--	--	--	--	327.29 / 327.28 / 327.28	313.30 / 313.30 / 313.30	--	--
2/23/2011	--	--	--	--	--	--	--	--	--	--	327.30 / 327.30 / 327.32	313.29 / 313.29 / 313.30	--	--
2/24/2011	--	--	--	--	--	--	--	--	--	--	327.34 / 327.36 / 327.33	313.29 / 313.30 / 313.30	--	--
2/25/2011	--	--	--	--	--	--	--	--	--	--	327.36 / 327.34 / 327.36 / 327.36	313.30 / 313.29 / 313.29 / 313.29	--	--
2/28/2011	--	--	--	--	--	--	--	--	--	--	327.41 / 327.41 / 327.40	313.28 / 313.28 / 313.29	--	--
3/1/2011	--	--	--	--	--	--	--	--	--	--	327.42 / 327.42 / 327.42 / 327.42 / 327.42	313.28 / 313.28 / 313.28 / 313.28 / 313.28	--	--
3/2/2011	--	--	--	--	--	--	--	--	--	--	327.42 / 327.42 / 327.41	313.27 / 313.27 / 313.27	--	--
3/3/2011	--	--	--	--	--	--	--	--	--	--	327.42 / 327.44 / 327.43	313.27 / 313.27 / 313.27	--	--
3/4/2011	--	--	--	--	--	--	--	--	--	--	327.46 / 327.46 / 327.46	313.27 / 313.27 / 313.27	--	--
3/7/2011	--	--	--	--	--	--	--	--	--	--	327.53 / 327.55 / 327.53	313.28 / 313.27 / 313.27	--	--
3/8/2011	--	--	--	--	--	--	--	--	--	314.97	327.57 / 327.56 / 327.57	313.27 / 313.27 / 313.27	--	--
3/9/2011	--	--	--	--	--	--	--	--	--	--	327.64 / 327.64 / 327.65	313.28 / 313.29 / 313.28	--	--
3/10/2011	--	--	--	--	--	--	--	--	--	--	327.70 / 327.70 / 327.71 / 327.70 / 327.73	313.29 / 313.30 / 313.29 / 313.30 / 313.29	--	--
3/11/2011	--	--	--	--	--	--	--	--	--	--	327.84 / 327.81 / 327.81	313.30 / 313.30 / 313.31	--	--
3/14/2011	--	--	--	--	--	--	--	--	--	--	328.22 / 328.21 / 328.20	313.34 / 313.33 / 313.33	--	--
3/15/2011	--	--	--	--	--	--	--	--	--	--	328.43 / 328.45 / 328.41	313.36 / 313.36 / 313.35	--	--
3/16/2011	--	--	--	--	--	--	--	--	--	--	328.70 / 328.68 / 328.68	313.39 / 313.39 / 313.39	--	--
3/17/2011	--	--	--	--	--	--	--	--	--	--	328.88	313.41	--	--
3/23/2011	--	--	--	--	--	--	--	--	--	--	331.00	313.74	--	--
3/24/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2011	--	--	--	--	--	--	--	--	--	--	334.01	314.62	--	--
4/6/2011	--	--	--	--	--	--	--	--	--	--	334.18 / 334.17 / 334.14 / 334.07 / 334.14 / 334.15	314.68	--	--
4/7/2011	--	--	--	--	--	--	--	--	--	--	334.32 / 334.30 / 334.26 / 334.43 / 334.45 / 334.27 / 334.48	--	--	--
4/11/2011	--	--	--	--	--	--	--	--	--	--	335.06 / 335.04 / 335.04	--	--	--
4/12/2011	--	--	--	--	--	--	--	--	--	319.23	334.97 / 334.99 / 334.95 / 334.96	315.12 / 315.07	--	--
4/13/2011	--	--	--	--	--	--	--	--	--	--	335.10 / 335.06 / 335.08	--	--	--
4/14/2011	--	--	--	--	--	--	--	--	--	--	335.14 / 335.13 / 335.05 / 335.09 / 335.07 / 335.10 / 335.09	--	--	--
4/18/2011	--	--	--	--	--	--	--	--	--	--	335.34 / 335.33 / 335.34	--	--	--
4/19/2011	--	--	--	--	--	--	--	--	--	--	335.35 / 335.36 / 335.38	--	--	--
4/20/2011	--	--	--	--	--	--	--	--	--	--	335.59 / 335.59 / 335.59	--	--	--
4/21/2011	--	--	--	--	--	--	--	--	--	--	335.50 / 335.45	315.63 / 315.66	--	--
4/25/2011	--	--	--	--	--	--	--	--	--	--	336.05 / 335.96 / 336.02	316.49 / 316.35 / 315.89	--	--
4/26/2011	--	--	--	--	--	--	--	--	--	--	336.29 / 336.24 / 336.26	317.08 / 316.98 / 317.03	--	--
4/27/2011	--	--	--	--	--	--	--	--	--	--	336.42 / 336.45 / 336.37	317.39 / 317.34 / 317.45	--	--
4/28/2011	--	--	--	--	--	--	--	--	--	--	336.57 / 336.57 / 336.62	317.36 / 317.56 / 317.36	--	--
4/29/2011	--	--	--	--	--	--	--	--	--	--	336.64 / 336.64 / 336.64	317.35 / 317.35 / 317.37	--	--
5/2/2011	--	--	--	--	--	--	--	--	--	--	336.97	317.81	--	--
5/4/2011	--	--	--	--	--	--	--	--	--	--	337.10	318.16	--	--
5/10/2011	--	--	--	--	--	--	--	--	--	320.48	337.40	318.54	--	--
5/11/2011	--	--	--	--	--	--	--	--	--	--	337.43	318.80	--	--
5/17/2011	--	--	--	--	--	--	--	--	--	--	338.27 / 338.24 / 338.25	319.91 / 319.96 / 319.92	--	--
5/18/2011	--	--	--	--	--	--	--	--	--	--	338.38 / 338.41 / 338.35	320.04 / 319.98 / 319.95	--	--
5/19/2011	--	--	--	--	--	--	--	--	--	--	338.74 / 338.88 / 338.83 / 338.83 / 338.77	320.54 / 320.51 / 320.37 / 320.41 / 320.50	--	--
5/20/2011	--	--	--	--	--	--	--	--	--	--	339.07 / 339.08 / 339.10	320.48 / 320.47 / 320.43	--	--
5/25/2011	--	--	--	--	--	--	--	--	--	--	339.33	319.92	--	--
5/26/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/30/2011	--	--	--	--	--	--	--	--	--	--	340.66	--	--	--
6/3/2011	--	--	--	--	--	--	--	--	--	--	339.10	319.98	--	--
6/8/2011	--	--	--	--	--	--	--	--	--	--	339.01 / 339.02	320.08 / 320.08	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
6/14/2011	--	--	--	--	--	--	--	--	--	321.36	338.67	319.79	--	--
6/24/2011	--	--	--	--	--	--	--	--	--	--	338.20 / 338.16	319.53 / 319.49	--	--
6/28/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/2011	--	--	--	--	--	--	--	--	--	--	337.29	318.57	--	--
7/12/2011	--	--	--	--	--	--	--	--	--	319.56	337.09	318.43	--	--
7/21/2011	--	--	--	--	--	--	--	--	--	--	336.72 / 336.70	318.13 / 318.16	--	--
7/25/2011	--	--	--	--	--	--	--	--	--	--	336.45	--	--	--
7/27/2011	--	--	--	--	--	--	--	--	--	--	336.29	--	--	--
7/28/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/29/2011	--	--	--	--	--	--	--	--	--	--	336.24	--	--	--
8/4/2011	--	--	--	--	--	--	--	--	--	--	--	317.59	--	--
8/8/2011	--	--	--	--	--	--	--	--	--	--	335.69	--	--	--
8/9/2011	--	--	--	--	--	--	--	--	--	318.38	335.67	317.57	--	--
8/16/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/2011	--	--	--	--	--	--	--	--	--	--	335.00 / 334.98	317.32 / 317.34	--	--
8/26/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/13/2011	--	--	--	--	--	--	--	--	--	317.00	--	316.77	--	--
9/19/2011	--	--	--	--	--	--	--	--	--	--	332.59	--	--	--
9/20/2011	--	--	--	--	--	--	--	--	--	--	332.49	--	--	--
9/22/2011	--	--	--	--	--	--	--	--	--	--	332.38 / 332.45 / 332.44 / 332.37 / 332.36	--	--	--
9/23/2011	--	--	--	--	--	--	--	--	--	--	332.39 / 332.41 / 332.41 / 332.42	316.52	--	--
9/26/2011	--	--	--	--	--	--	--	--	--	--	332.31 / 332.30 / 332.24	--	--	--
9/27/2011	--	--	--	--	--	--	--	--	--	--	332.27 / 332.26 / 332.26	--	--	--
9/28/2011	--	--	--	--	--	--	--	--	--	--	332.23 / 332.23 / 332.23	--	--	--
9/29/2011	--	--	--	--	--	--	--	--	--	--	332.17 / 332.22 / 332.17 / 332.17 / 332.17	--	--	--
9/30/2011	--	--	--	--	--	--	--	--	--	--	332.11	--	--	--
10/3/2011	--	--	--	--	--	--	--	--	--	--	331.80 / 331.80 / 331.80 / 331.81 / 331.80	316.22 / 316.24 / 316.25 / 316.23 / 316.23	--	--
10/4/2011	--	--	--	--	--	--	--	--	--	--	331.74 / 331.74 / 331.74	316.19 / 316.19 / 316.19	--	--
10/5/2011	--	--	--	--	--	--	--	--	--	--	331.68 / 331.68 / 331.67	316.14 / 316.14 / 316.15	--	--
10/6/2011	--	--	--	--	--	--	--	--	--	--	331.61 / 331.61 / 331.61 / 331.61	316.11 / 316.12 / 316.12 / 316.11	--	--
10/7/2011	--	--	--	--	--	--	--	--	--	--	--	316.19 / 316.09 / 316.38 / 316.32	--	--
10/11/2011	--	--	--	--	--	--	--	--	--	316.34	--	317.47 / 317.51 / 317.46 / 317.54 / 317.56	--	--
10/12/2011	--	--	--	--	--	--	--	--	--	--	--	317.81 / 317.77 / 317.76	--	--
10/13/2011	--	--	--	--	--	--	--	--	--	--	--	318.12 / 318.05 / 318.07	--	--
10/14/2011	--	--	--	--	--	--	--	--	--	--	--	318.38 / 318.36 / 318.36	--	--
10/17/2011	--	--	--	--	--	--	--	--	--	--	--	318.42 / 318.61 / 318.57 / 318.66 / 318.51	--	--
10/18/2011	--	--	--	--	--	--	--	--	--	--	--	317.81 / 317.75 / 317.70	--	--
10/19/2011	--	--	--	--	--	--	--	--	--	--	331.62 / 331.66 / 330.98 / 331.72	--	--	--
10/20/2011	--	--	--	--	--	--	--	--	--	--	331.87 / 331.87 / 331.79 / 331.79	--	--	--
10/21/2011	--	--	--	--	--	--	--	--	--	--	331.67 / 331.66 / 331.65	--	--	--
10/24/2011	--	--	--	--	--	--	--	--	--	--	331.64 / 331.63 / 331.62	--	--	--
10/25/2011	--	--	--	--	--	--	--	--	--	--	331.53 / 331.53 / 331.53 / 331.53	--	--	--
10/26/2011	--	--	--	--	--	--	--	--	--	--	331.60 / 331.62 / 331.61	316.27 / 316.25	--	--
10/27/2011	--	--	--	--	--	--	--	--	--	--	331.58 / 331.55 / 331.54	--	--	--
10/28/2011	--	--	--	--	--	--	--	--	--	--	331.49 / 331.16 / 331.21 / 331.09 / 331.13	--	--	--
10/31/2011	--	--	--	--	--	--	--	--	--	--	330.83 / 330.82 / 330.82	315.88	--	--
11/1/2011	--	--	--	--	--	--	--	--	--	--	--	315.88 / 315.83 / 315.83 / 315.80 / 315.85	--	--
11/2/2011	--	--	--	--	--	--	--	--	--	--	--	315.96 / 315.95 / 315.94	--	--
11/3/2011	--	--	--	--	--	--	--	--	--	--	--	315.98 / 315.99 / 315.98	--	--
11/4/2011	--	--	--	--	--	--	--	--	--	--	--	315.91 / 315.87 / 315.92 / 315.92	--	--
11/7/2011	--	--	--	--	--	--	--	--	--	--	330.48	315.76	--	--
11/8/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2011	--	--	--	--	--	--	--	--	--	--	331.21 / 331.25 / 331.20	317.15 / 317.21 / 317.10	--	--
11/14/2011	--	--	--	--	--	--	--	--	--	--	331.38	318.09	--	--
11/15/2011	--	--	--	--	--	--	--	--	--	316.04	331.41	318.24	--	--
11/21/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/25/2011	--	--	--	--	--	--	--	--	--	--	332.02	319.67 / 319.69	--	--
11/29/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/30/2011	--	--	--	--	--	--	--	--	--	--	332.35	320.29	--	--
12/2/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2011	--	--	--	--	--	--	--	--	--	--	333.09	320.25	--	--
12/13/2011	--	--	--	--	--	--	--	--	--	--	333.15 / 333.19 / 333.41	320.23 / 320.04 / 319.91	--	--
12/14/2011	--	--	--	--	--	--	--	--	--	316.33	333.17 / 333.14	319.54 / 319.57	--	--
12/15/2011	--	--	--	--	--	--	--	--	--	--	333.29	319.49	--	--
12/16/2011	--	--	--	--	--	--	--	--	--	--	333.09	318.76	--	--
12/21/2011	--	--	--	--	--	--	--	--	--	--	333.33	317.97	--	--
12/28/2011	--	--	--	--	--	--	--	--	--	--	333.40	317.14	--	--
12/29/2011	--	--	--	--	--	--	--	--	--	--	333.42 / 333.39	317.12 / 317.11	--	--
1/6/2012	--	--	--	--	--	--	--	--	--	--	333.54	316.62	--	--
1/10/2012	--	--	--	--	--	--	--	--	--	317.74	333.52	316.40	--	--
1/20/2012	--	--	--	--	--	--	--	--	--	--	333.58	316.26	--	--
1/24/2012	--	--	--	--	--	--	--	--	--	--	333.63 / 333.63	316.30 / 316.28	--	--
1/26/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/2012	--	--	--	--	--	--	--	--	--	318.70	333.90	316.34	--	--
2/23/2012	--	--	--	--	--	--	--	--	--	--	333.88 / 333.88	316.46 / 316.43	--	--
2/28/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
3/13/2012	--	--	--	--	--	--	--	--	--	318.72	334.13	316.39	--	--
3/21/2012	--	--	--	--	--	--	--	--	--	--	334.99 / 335.00	316.38 / 316.36	--	--
3/28/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/10/2012	--	--	--	--	--	--	--	--	--	318.63	336.20	316.69	--	--
4/19/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/2012	--	--	--	--	--	--	--	--	--	--	336.33 / 336.32	316.71 / 316.72	--	--
4/26/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/8/2012	--	--	--	--	--	--	--	--	--	317.88	336.34	316.74	--	--
5/29/2012	--	--	--	--	--	--	--	--	--	--	335.80 / 335.79	316.68 / 316.69	--	--
5/30/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2012	--	--	--	--	--	--	--	--	--	317.00	335.41	316.55	--	--
6/13/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2012	--	--	--	--	--	--	--	--	--	--	335.17	316.44	--	--
6/28/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2012	--	--	--	--	--	--	--	--	--	316.54	334.27	316.46	--	--
7/17/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2012	--	--	--	--	--	--	--	--	--	--	333.97	316.14	--	--
7/26/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2012	--	--	--	--	--	--	--	--	--	316.18	--	--	--	--
8/15/2012	--	--	--	--	--	--	--	--	--	--	332.29	315.80	--	--
8/29/2012	--	--	--	--	--	--	--	--	--	--	331.38 / 331.36	315.58	--	--
8/30/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/11/2012	--	--	--	--	--	--	--	--	--	315.87	--	--	--	--
9/12/2012	--	--	--	--	--	--	--	--	--	--	330.57	315.28	--	--
9/25/2012	--	--	--	--	--	--	--	--	--	--	330.01 / 330.00	315.13	--	--
9/27/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2012	--	--	--	--	--	--	--	--	--	315.72	331.39	314.95	--	--
10/25/2012	--	--	--	--	--	--	--	--	--	--	332.11 / 332.11	314.79 / 314.78	--	--
10/30/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/13/2012	--	--	--	--	--	--	--	--	--	315.40	--	--	--	--
11/16/2012	--	--	--	--	--	--	--	--	--	--	330.30	314.61	--	--
11/28/2012	--	--	--	--	--	--	--	--	--	--	329.74 / 329.74	314.55 / 314.57	--	--
11/29/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/5/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/11/2012	--	--	--	--	--	--	--	--	--	315.43	330.33	315.84	--	--
12/19/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/2012	--	--	--	--	--	--	--	--	--	--	330.06 / 330.04	318.00 / 318.00	--	--
12/21/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/27/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/8/2013	--	--	--	--	--	--	--	--	--	315.67	329.72	315.44	--	--
1/18/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/24/2013	--	--	--	--	--	--	--	--	--	--	329.96 / 329.95	315.07 / 315.08	--	--
1/30/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/12/2013	--	--	--	--	--	--	--	--	--	317.08	330.87	315.30	--	--
2/26/2013	--	--	--	--	--	--	--	--	--	--	331.14 / 331.15	315.61 / 315.62	--	--
2/28/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/7/2013	--	--	--	--	--	--	--	--	--	--	331.15	--	--	--
3/12/2013	--	--	--	--	--	--	--	--	--	317.83	331.36	315.93	--	--
3/21/2013	--	--	--	--	--	--	--	--	--	--	333.20 / 333.21	316.09 / 316.08	--	--
3/27/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/10/2013	--	--	--	--	--	--	--	--	--	320.00	--	--	--	--
4/24/2013	--	--	--	--	--	--	--	--	--	--	338.23 / 338.20	318.83 / 318.86	--	--
4/25/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/7/2013	--	--	--	--	--	--	--	--	--	--	338.02	319.47	--	--
5/10/2013	--	--	--	--	--	--	--	--	--	--	338.36	320.14	--	--
5/14/2013	--	--	--	--	--	--	--	--	--	320.82	338.34	319.99	--	--
5/17/2013	--	--	--	--	--	--	--	--	--	--	338.28	319.83	--	--
5/23/2013	--	--	--	--	--	--	--	--	--	--	338.34 / 338.37	319.94 / 319.98	--	--
5/28/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/10/2013	--	--	--	--	--	--	--	--	--	--	337.95	319.38	--	--
6/11/2013	--	--	--	--	--	--	--	--	--	319.66	--	--	--	--
6/21/2013	--	--	--	--	--	--	--	--	--	--	337.71	319.04	--	--
6/26/2013	--	--	--	--	--	--	--	--	--	--	337.69 / 337.67	319.15 / 319.13	--	--
6/27/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/2013	--	--	--	--	--	--	--	--	--	--	337.33	318.93	--	--
7/9/2013	--	--	--	--	--	--	--	--	--	319.05	337.27	318.94	--	--
7/12/2013	--	--	--	--	--	--	--	--	--	--	337.06	318.79	--	--
7/19/2013	--	--	--	--	--	--	--	--	--	--	336.86	318.81	--	--
7/25/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/31/2013	--	--	--	--	--	--	--	--	--	--	336.37	318.46	--	--
8/8/2013	--	--	--	--	--	--	--	--	--	--	336.00	318.33	--	--
8/12/2013	--	--	--	--	--	--	--	--	--	--	335.79	318.30	--	--
8/13/2013	--	--	--	--	--	--	--	--	--	318.20	335.76	318.29	--	--
8/22/2013	--	--	--	--	--	--	--	--	--	--	335.39 / 335.35	318.21 / 318.18	--	--
8/29/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/30/2013	--	--	--	--	--	--	--	--	--	--	334.99	318.13	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
9/5/2013	--	--	--	--	--	--	--	--	--	--	334.63	317.87	--	--
9/10/2013	--	--	--	--	--	--	--	--	--	317.37	334.36	317.90	--	--
9/13/2013	--	--	--	--	--	--	--	--	--	--	334.17	317.80	--	--
9/19/2013	--	--	--	--	--	--	--	--	--	--	333.85	317.74	--	--
9/25/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/26/2013	--	--	--	--	--	--	--	--	--	--	333.51 / 333.52	317.59 / 317.56	--	--
10/2/2013	--	--	--	--	--	--	--	--	--	--	333.26	317.44	--	--
10/8/2013	--	--	--	--	--	--	--	--	--	316.76	332.95	317.21	--	--
10/10/2013	--	--	--	--	--	--	--	--	--	--	332.92	317.26	--	--
10/15/2013	--	--	--	--	--	--	--	--	--	--	332.77	317.04	--	--
10/17/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/21/2013	--	--	--	--	--	--	--	--	--	--	332.60	317.16	--	--
10/23/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2013	--	--	--	--	--	--	--	--	--	--	332.29	317.06	--	--
10/29/2013	--	--	--	--	--	--	--	--	--	--	332.27 / 332.26	317.06 / 317.05	--	--
10/30/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/4/2013	--	--	--	--	--	--	--	--	--	--	332.17	317.05	--	--
11/7/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/2013	--	--	--	--	--	--	--	--	--	316.65	332.17	317.06	--	--
11/18/2013	--	--	--	--	--	--	--	--	--	--	332.25	317.16	--	--
11/19/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/25/2013	--	--	--	--	--	--	--	--	--	--	332.16	317.12	--	--
11/27/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/2013	--	--	--	--	--	--	--	--	--	--	332.14	317.16	--	--
12/6/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2013	--	--	--	--	--	--	--	--	--	--	332.10	317.18	--	--
12/10/2013	--	--	--	--	--	--	--	--	--	316.68	332.05	317.13	--	--
12/16/2013	--	--	--	--	--	--	--	--	--	--	331.94	316.75	--	--
12/17/2013	--	--	--	--	--	--	--	--	--	--	331.99 / 331.98	316.82 / 316.82	--	--
12/24/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/27/2013	--	--	--	--	--	--	--	--	--	--	331.80	316.61	--	--
12/31/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/3/2014	--	--	--	--	--	--	--	--	--	--	331.68	316.53	--	--
1/6/2014	--	--	--	--	--	--	--	--	--	--	331.74	316.62	--	--
1/10/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2014	--	--	--	--	--	--	--	--	--	--	331.68	316.55	--	--
1/14/2014	--	--	--	--	--	--	--	--	--	315.70	--	--	--	--
1/20/2014	--	--	--	--	--	--	--	--	--	--	331.73	316.84	--	--
1/21/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/2014	--	--	--	--	--	--	--	--	--	--	331.87	316.85	--	--
1/31/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/3/2014	--	--	--	--	--	--	--	--	--	--	331.97	316.91	--	--
2/7/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2014	--	--	--	--	--	--	--	--	--	--	332.09	317.05	--	--
2/11/2014	--	--	--	--	--	--	--	--	--	316.90	--	--	--	--
2/14/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/18/2014	--	--	--	--	--	--	--	--	--	--	332.15	317.16	--	--
2/21/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/2014	--	--	--	--	--	--	--	--	--	--	--	317.19	--	--
2/27/2014	--	--	--	--	--	--	--	--	--	--	332.19 / 332.15	317.30 / 317.30	--	--
2/28/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/3/2014	--	--	--	--	--	--	--	--	--	--	332.02	317.16	--	--
3/4/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/10/2014	--	--	--	--	--	--	--	--	--	--	332.13	317.28	--	--
3/11/2014	--	--	--	--	--	--	--	--	--	316.94	--	--	--	--
3/17/2014	--	--	--	--	--	--	--	--	--	--	331.99	317.26	--	--
3/19/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/20/2014	--	--	--	--	--	--	--	--	--	--	332.00 / 332.00	317.19 / 317.17	--	--
3/24/2014	--	--	--	--	--	--	--	--	--	--	332.00	317.13	--	--
3/25/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/31/2014	--	--	--	--	--	--	--	--	--	--	333.27	317.15	--	--
4/3/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/7/2014	--	--	--	--	--	--	--	--	--	--	336.04	317.68	--	--
4/8/2014	--	--	--	--	--	--	--	--	--	NA	--	--	--	--
4/9/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/14/2014	--	--	--	--	--	--	--	--	--	--	337.85	318.88	--	--
4/16/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/21/2014	--	--	--	--	--	--	--	--	--	--	338.27	319.69	--	--
4/24/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/2014	--	--	--	--	--	--	--	--	--	--	338.36	320.24	--	--
4/30/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/5/2014	--	--	--	--	--	--	--	--	--	--	338.53	320.23	--	--
5/7/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/12/2014	--	--	--	--	--	--	--	--	--	--	338.41	320.41	--	--
5/13/2014	--	--	--	--	--	--	--	--	--	321.32	--	--	--	--
5/20/2014	--	--	--	--	--	--	--	--	--	--	338.27	320.17	--	--
5/22/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/2014	--	--	--	--	--	--	--	--	--	--	338.15	320.01	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
5/28/2014	--	--	--	--	--	--	--	--	--	--	338.08 / 338.10	319.92 / 319.89	--	--
6/2/2014	--	--	--	--	--	--	--	--	--	--	337.96	319.84	--	--
6/5/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/9/2014	--	--	--	--	--	--	--	--	--	--	337.69	319.54	--	--
6/10/2014	--	--	--	--	--	--	--	--	--	320.14	--	--	--	--
6/11/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/2014	--	--	--	--	--	--	--	--	--	--	337.44	319.28	--	--
6/19/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/2014	--	--	--	--	--	--	--	--	--	--	337.16	318.97	--	--
6/25/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2014	--	--	--	--	--	--	--	--	--	--	337.06	318.86	--	--
7/2/2014	--	--	--	--	--	--	--	--	--	--	336.86	318.71	--	--
7/3/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/2014	--	--	--	--	--	--	--	--	--	--	336.74	318.70	--	--
7/8/2014	--	--	--	--	--	--	--	--	--	319.16	--	--	--	--
7/14/2014	--	--	--	--	--	--	--	--	--	--	336.42	318.28	--	--
7/16/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/21/2014	--	--	--	--	--	--	--	--	--	--	336.09	318.11	--	--
7/22/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/23/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2014	--	--	--	--	--	--	--	--	--	--	335.90	318.05	--	--
7/31/2014	--	--	--	--	--	--	--	--	--	--	335.72 / 335.73	317.95 / 317.96	--	--
8/5/2014	--	--	--	--	--	--	--	--	--	--	335.41	317.88	--	--
8/7/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/2014	--	--	--	--	--	--	--	--	--	--	335.05	317.79	--	--
8/12/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/2014	--	--	--	--	--	--	--	--	--	318.12	--	--	--	--
8/18/2014	--	--	--	--	--	--	--	--	--	--	334.65	317.60	--	--
8/20/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/25/2014	--	--	--	--	--	--	--	--	--	--	334.26	317.43	--	--
8/26/2014	--	--	--	--	--	--	--	--	--	--	334.25 / 334.24	317.44 / 317.44	--	--
8/27/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/28/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/2014	--	--	--	--	--	--	--	--	--	--	333.97	317.38	--	--
9/4/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/8/2014	--	--	--	--	--	--	--	--	--	--	333.63	317.23	--	--
9/9/2014	--	--	--	--	--	--	--	--	--	317.31	--	--	--	--
9/15/2014	--	--	--	--	--	--	--	--	--	--	339.74	317.18	--	--
9/18/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/22/2014	--	--	--	--	--	--	--	--	--	--	333.13	317.04	--	--
9/25/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/2014	--	--	--	--	--	--	--	--	--	--	332.90	317.06	--	--
10/1/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/6/2014	--	--	--	--	--	--	--	--	--	--	332.66	317.01	--	--
10/9/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2014	--	--	--	--	--	--	--	--	--	316.83	332.35	316.95	--	--
10/20/2014	--	--	--	--	--	--	--	--	--	--	332.17	316.89	--	--
10/22/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/23/2014	--	--	--	--	--	--	--	--	--	--	332.04	316.83	--	--
10/27/2014	--	--	--	--	--	--	--	--	--	--	331.93	316.77	--	--
10/29/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/3/2014	--	--	--	--	--	--	--	--	--	--	331.81	316.78	--	--
11/5/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2014	--	--	--	--	--	--	--	--	--	--	331.67	316.70	--	--
11/11/2014	--	--	--	--	--	--	--	--	--	316.59	--	--	--	--
11/17/2014	--	--	--	--	--	--	--	--	--	--	331.66	316.81	--	--
11/20/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/24/2014	--	--	--	--	--	--	--	--	--	--	331.59	316.88	--	--
11/26/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/1/2014	--	--	--	--	--	--	--	--	--	--	331.34	316.52	--	--
12/4/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/8/2014	--	--	--	--	--	--	--	--	--	--	331.41	316.61	--	--
12/9/2014	--	--	--	--	--	--	--	--	--	316.51	--	--	--	--
12/15/2014	--	--	--	--	--	--	--	--	--	--	331.41	316.60	--	--
12/17/2014	--	--	--	--	--	--	--	--	--	--	331.43	316.61	--	--
12/18/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/2014	--	--	--	--	--	--	--	--	--	--	331.42	316.61	--	--
12/23/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2014	--	--	--	--	--	--	--	--	--	--	331.38	316.52	--	--
12/30/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/5/2015	--	--	--	--	--	--	--	--	--	--	331.40	316.49	--	--
1/8/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/12/2015	--	--	--	--	--	--	--	--	--	--	331.50	316.55	--	--
1/13/2015	--	--	--	--	--	--	--	--	--	316.54	--	--	--	--
1/19/2015	--	--	--	--	--	--	--	--	--	--	331.62	316.60	--	--
1/21/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/26/2015	--	--	--	--	--	--	--	--	--	--	331.68	316.63	--	--
1/29/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
2/2/2015	--	--	--	--	--	--	--	--	--	--	331.71	316.62	--	--
2/4/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/9/2015	--	--	--	--	--	--	--	--	--	--	331.68	316.63	--	--
2/12/2015	--	--	--	--	--	--	--	--	--	316.66	--	--	--	--
2/13/2015	--	--	--	--	--	--	--	--	--	--	331.68	316.66	--	--
2/17/2015	--	--	--	--	--	--	--	--	--	--	331.69	--	--	--
2/19/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/23/2015	--	--	--	--	--	--	--	--	--	--	331.51	316.58	--	--
2/25/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/26/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/2015	--	--	--	--	--	--	--	--	--	--	331.67	316.58	--	--
3/2/2015	--	--	--	--	--	--	--	--	--	--	331.70	316.61	--	--
3/5/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/9/2015	--	--	--	--	--	--	--	--	--	--	331.73	316.64	--	--
3/11/2015	--	--	--	--	--	--	--	--	--	316.56	--	--	--	--
3/16/2015	--	--	--	--	--	--	--	--	--	--	331.84	316.68	--	--
3/18/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/23/2015	--	--	--	--	--	--	--	--	--	--	332.39	316.58	--	--
3/24/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/25/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/26/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/27/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/30/2015	--	--	--	--	--	--	--	--	--	--	333.94	316.69	--	--
4/1/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/6/2015	--	--	--	--	--	--	--	--	--	--	--	316.69	--	--
4/8/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/13/2015	--	--	--	--	--	--	--	--	--	--	335.67	316.84	--	--
4/14/2015	--	--	--	--	--	--	--	--	--	316.95	--	--	--	--
4/20/2015	--	--	--	--	--	--	--	--	--	--	336.68	317.17	--	--
4/22/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/27/2015	--	--	--	--	--	--	--	--	--	--	337.18	317.43	--	--
4/29/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/30/2015	--	--	--	--	--	--	--	--	--	--	337.37	317.86	--	--
5/4/2015	--	--	--	--	--	--	--	--	--	--	337.38	318.16	--	--
5/6/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/11/2015	--	--	--	--	--	--	--	--	--	--	337.67	318.75	--	--
5/12/2015	--	--	--	--	--	--	--	--	--	319.32	--	--	--	--
5/19/2015	--	--	--	--	--	--	--	--	--	--	337.65	318.88	--	--
5/21/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/25/2015	--	--	--	--	--	--	--	--	--	--	337.58	319.04	--	--
5/27/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/1/2015	--	--	--	--	--	--	--	--	--	--	--	318.86	--	--
6/3/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/2015	--	--	--	--	--	--	--	--	--	--	337.42	318.84	--	--
6/10/2015	--	--	--	--	--	--	--	--	--	319.06	--	--	--	--
6/15/2015	--	--	--	--	--	--	--	--	--	--	337.18	318.70	--	--
6/17/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/18/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/22/2015	--	--	--	--	--	--	--	--	--	--	337.11	318.70	--	--
6/24/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2015	--	--	--	--	--	--	--	--	--	--	337.05	318.61	--	--
6/29/2015	--	--	--	--	--	--	--	--	--	--	337.10	318.72	--	--
7/1/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/6/2015	--	--	--	--	--	--	--	--	--	--	337.13	318.75	--	--
7/8/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2015	--	--	--	--	--	--	--	--	--	--	337.17	319.07	--	--
7/14/2015	--	--	--	--	--	--	--	--	--	319.08	--	--	--	--
7/15/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/20/2015	--	--	--	--	--	--	--	--	--	--	337.07	319.03	--	--
7/22/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2015	--	--	--	--	--	--	--	--	--	--	336.76	318.82	--	--
7/29/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/4/2015	--	--	--	--	--	--	--	--	--	--	336.46	318.74	--	--
8/6/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2015	--	--	--	--	--	--	--	--	--	--	336.07	318.78	--	--
8/11/2015	--	--	--	--	--	--	--	--	--	--	336.03 / 336.04	318.72	--	--
8/12/2015	--	--	--	--	--	--	--	--	--	318.47	--	--	--	--
8/17/2015	--	--	--	--	--	--	--	--	--	--	335.68	318.56	--	--
8/19/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/24/2015	--	--	--	--	--	--	--	--	--	--	335.41	318.43	--	--
8/26/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/2015	--	--	--	--	--	--	--	--	--	--	334.96	318.19	--	--
9/2/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/8/2015	--	--	--	--	--	--	--	--	--	--	334.72	318.10	--	--
9/9/2015	--	--	--	--	--	--	--	--	--	317.74	--	--	--	--
9/10/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
9/14/2015	--	--	--	--	--	--	--	--	--	--	334.43	317.77	--	--
9/16/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/21/2015	--	--	--	--	--	--	--	--	--	--	334.14	317.72	--	--
9/23/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/2015	--	--	--	--	--	--	--	--	--	--	333.83	--	--	--
9/29/2015	--	--	--	--	--	--	--	--	--	--	--	317.75	--	--
9/30/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/6/2015	--	--	--	--	--	--	--	--	--	--	333.56	317.54	--	--
10/8/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/13/2015	--	--	--	--	--	--	--	--	--	--	333.46	317.65	--	--
10/14/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/15/2015	--	--	--	--	--	--	--	--	--	316.94	--	--	--	--
10/19/2015	--	--	--	--	--	--	--	--	--	--	333.18	317.35	--	--
10/21/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/22/2015	--	--	--	--	--	--	--	--	--	--	333.01 / 333.02	317.09 / 317.10	--	--
10/26/2015	--	--	--	--	--	--	--	--	--	--	332.82	316.99	--	--
10/28/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/2/2015	--	--	--	--	--	--	--	--	--	--	332.68	--	--	--
11/3/2015	--	--	--	--	--	--	--	--	--	--	--	316.95	--	--
11/4/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/9/2015	--	--	--	--	--	--	--	--	--	--	332.47	316.94	--	--
11/10/2015	--	--	--	--	--	--	--	--	--	316.64	--	--	--	--
11/16/2015	--	--	--	--	--	--	--	--	--	--	332.25	316.93	--	--
11/18/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/23/2015	--	--	--	--	--	--	--	--	--	--	332.10	316.97	--	--
11/24/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/30/2015	--	--	--	--	--	--	--	--	--	--	331.89	316.88	--	--
12/2/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/2015	--	--	--	--	--	--	--	--	--	--	331.77	317.02	--	--
12/8/2015	--	--	--	--	--	--	--	--	--	316.48	--	--	--	--
12/14/2015	--	--	--	--	--	--	--	--	--	--	331.81	318.32	--	--
12/16/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/17/2015	--	--	--	--	--	--	--	--	--	--	331.73	318.30	--	--
12/21/2015	--	--	--	--	--	--	--	--	--	--	331.69	318.86	--	--
12/23/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2015	--	--	--	--	--	--	--	--	--	--	331.66	319.23	--	--
12/30/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/4/2016	--	--	--	--	--	--	--	--	--	--	331.54	318.54	--	--
1/6/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/11/2016	--	--	--	--	--	--	--	--	--	--	331.78	318.17	--	--
1/12/2016	--	--	--	--	--	--	--	--	--	316.33	--	--	--	--
1/18/2016	--	--	--	--	--	--	--	--	--	--	331.93	317.48	--	--
1/20/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/25/2016	--	--	--	--	--	--	--	--	--	--	332.05	317.38	--	--
1/27/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/1/2016	--	--	--	--	--	--	--	--	--	--	332.12	316.73	--	--
2/3/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/8/2016	--	--	--	--	--	--	--	--	--	--	332.44	317.07	--	--
2/9/2016	--	--	--	--	--	--	--	--	--	316.45	--	--	--	--
2/16/2016	--	--	--	--	--	--	--	--	--	--	332.65	316.85	--	--
2/17/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2016	--	--	--	--	--	--	--	--	--	--	332.66	316.61	--	--
2/24/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/25/2016	--	--	--	--	--	--	--	--	--	--	332.88	316.79	--	--
2/29/2016	--	--	--	--	--	--	--	--	--	--	333.01	316.75	--	--
3/3/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/7/2016	--	--	--	--	--	--	--	--	--	--	333.50	316.90	--	--
3/9/2016	--	--	--	--	--	--	--	--	--	316.96	--	--	--	--
3/14/2016	--	--	--	--	--	--	--	--	--	--	335.19	317.52	--	--
3/16/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/21/2016	--	--	--	--	--	--	--	--	--	--	336.43	317.88	--	--
3/23/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/2016	--	--	--	--	--	--	--	--	--	--	337.29	318.83	--	--
3/30/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/4/2016	--	--	--	--	--	--	--	--	--	--	338.27	319.69	--	--
4/6/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/2016	--	--	--	--	--	--	--	--	--	--	338.82	320.99	--	--
4/12/2016	--	--	--	--	--	--	--	--	--	322.00	--	--	--	--
4/18/2016	--	--	--	--	--	--	--	--	--	--	338.82	321.42	--	--
4/20/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/25/2016	--	--	--	--	--	--	--	--	--	--	338.73	321.78	--	--
4/27/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/28/2016	--	--	--	--	--	--	--	--	--	--	338.66	321.83	--	--
5/2/2016	--	--	--	--	--	--	--	--	--	--	338.53	321.64	--	--
5/4/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/9/2016	--	--	--	--	--	--	--	--	--	--	338.24	321.12	--	--
5/10/2016	--	--	--	--	--	--	--	--	--	320.90	--	--	--	--
5/16/2016	--	--	--	--	--	--	--	--	--	--	338.05	320.83	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
5/18/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/19/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/24/2016	--	--	--	--	--	--	--	--	--	--	337.74	320.38	--	--
5/25/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/30/2016	--	--	--	--	--	--	--	--	--	--	337.49	319.96	--	--
6/1/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/2016	--	--	--	--	--	--	--	--	--	--	337.20	319.78	--	--
6/9/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/13/2016	--	--	--	--	--	--	--	--	--	--	336.73	319.19	--	--
6/14/2016	--	--	--	--	--	--	--	--	--	319.47	--	--	--	--
6/20/2016	--	--	--	--	--	--	--	--	--	--	336.33	319.14	--	--
6/21/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2016	--	--	--	--	--	--	--	--	--	--	335.77	318.84	--	--
6/28/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/2016	--	--	--	--	--	--	--	--	--	--	335.54	318.67	--	--
7/4/2016	--	--	--	--	--	--	--	--	--	--	335.09	318.67	--	--
7/5/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2016	--	--	--	--	--	--	--	--	--	--	334.45	318.34	--	--
7/12/2016	--	--	--	--	--	--	--	--	--	318.66	--	--	--	--
7/18/2016	--	--	--	--	--	--	--	--	--	--	334.02	318.20	--	--
7/20/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2016	--	--	--	--	--	--	--	--	--	--	333.35	318.12	--	--
7/27/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/2/2016	--	--	--	--	--	--	--	--	--	--	332.74	317.77	--	--
8/3/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2016	--	--	--	--	--	--	--	--	--	--	332.12	317.56	--	--
8/9/2016	--	--	--	--	--	--	--	--	--	317.82	--	--	--	--
8/15/2016	--	--	--	--	--	--	--	--	--	--	331.54	317.39	--	--
8/17/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/22/2016	--	--	--	--	--	--	--	--	--	--	331.15	317.28	--	--
8/24/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/26/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/2016	--	--	--	--	--	--	--	--	--	--	330.72	317.23	--	--
8/30/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/2016	--	--	--	--	--	--	--	--	--	--	330.60	317.31	--	--
9/6/2016	--	--	--	--	--	--	--	--	--	--	330.34	317.36	--	--
9/7/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/12/2016	--	--	--	--	--	--	--	--	--	--	330.05	317.28	--	--
9/13/2016	--	--	--	--	--	--	--	--	--	316.95	--	--	--	--
9/19/2016	--	--	--	--	--	--	--	--	--	--	329.74	317.22	--	--
9/21/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/26/2016	--	--	--	--	--	--	--	--	--	--	329.16	317.22	--	--
9/29/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/3/2016	--	--	--	--	--	--	--	--	--	--	328.79	317.09	--	--
10/5/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/11/2016	--	--	--	--	--	--	--	--	--	--	328.34	317.02	--	--
10/12/2016	--	--	--	--	--	--	--	--	--	316.59	--	--	--	--
10/17/2016	--	--	--	--	--	--	--	--	--	--	327.97	317.06	--	--
10/19/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/24/2016	--	--	--	--	--	--	--	--	--	--	327.72	316.86	--	--
10/26/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/31/2016	--	--	--	--	--	--	--	--	--	--	327.25	316.83	--	--
11/2/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/7/2016	--	--	--	--	--	--	--	--	--	--	327.08	316.79	--	--
11/8/2016	--	--	--	--	--	--	--	--	--	316.47	--	--	--	--
11/14/2016	--	--	--	--	--	--	--	--	--	--	326.81	316.78	--	--
11/16/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/21/2016	--	--	--	--	--	--	--	--	--	--	326.68	316.68	--	--
11/23/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/29/2016	--	--	--	--	--	--	--	--	--	--	326.60	316.73	--	--
11/30/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/5/2016	--	--	--	--	--	--	--	--	--	--	326.54	316.59	--	--
12/7/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/2016	--	--	--	--	--	--	--	--	--	--	--	316.59	--	--
12/13/2016	--	--	--	--	--	--	--	--	--	316.15	--	--	--	--
12/19/2016	--	--	--	--	--	--	--	--	--	--	326.44	316.38	--	--
12/21/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/2016	--	--	--	--	--	--	--	--	--	--	326.44	316.45	--	--
12/28/2016	--	--	--	--	--	--	--	--	--	--	326.49	316.37	--	--
12/29/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/2/2017	--	--	--	--	--	--	--	--	--	--	326.44	316.32	--	--
1/4/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/9/2017	--	--	--	--	--	--	--	--	--	--	326.44	316.32	--	--
1/10/2017	--	--	--	--	--	--	--	--	--	316.02	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
1/16/2017	--	--	--	--	--	--	--	--	--	--	326.74	316.33	--	--
1/18/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/23/2017	--	--	--	--	--	--	--	--	--	--	327.02	316.43	--	--
1/25/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/2017	--	--	--	--	--	--	--	--	--	--	327.16	316.41	--	--
2/1/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/6/2017	--	--	--	--	--	--	--	--	--	--	327.20	316.47	--	--
2/8/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/13/2017	--	--	--	--	--	--	--	--	--	--	327.20	316.48	--	--
2/14/2017	--	--	--	--	--	--	--	--	--	316.81	--	--	--	--
2/15/2017	--	--	--	--	--	--	--	--	--	--	327.30	316.62	--	--
2/21/2017	--	--	--	--	--	--	--	--	--	--	327.32	316.63	--	--
2/22/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/2017	--	--	--	--	--	--	--	--	--	--	327.46	316.60	--	--
3/1/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/6/2017	--	--	--	--	--	--	--	--	--	--	327.87	316.80	--	--
3/8/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/13/2017	--	--	--	--	--	--	--	--	--	--	328.39	316.97	--	--
3/14/2017	--	--	--	--	--	--	--	--	--	318.85	--	--	--	--
3/20/2017	--	--	--	--	--	--	--	--	--	--	328.89	317.41	--	--
3/22/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/27/2017	--	--	--	--	--	--	--	--	--	--	329.49	317.47	--	--
3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/3/2017	--	--	--	--	--	--	--	--	--	--	329.90	317.49	--	--
4/4/2017	--	--	--	--	--	--	--	--	--	--	330.10	317.87	--	--
4/5/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/10/2017	--	--	--	--	--	--	--	--	--	--	330.67	318.15	--	--
4/11/2017	--	--	--	--	--	--	--	--	--	321.17	--	--	--	--
4/17/2017	--	--	--	--	--	--	--	--	--	--	330.95	318.46	--	--
4/19/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/24/2017	--	--	--	--	--	--	--	--	--	--	330.95	318.97	--	--
4/26/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/1/2017	--	--	--	--	--	--	--	--	--	--	331.05	319.52	--	--
5/3/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/8/2017	--	--	--	--	--	--	--	--	--	--	331.28	320.20	--	--
5/9/2017	--	--	--	--	--	--	--	--	--	322.83	--	--	--	--
5/15/2017	--	--	--	--	--	--	--	--	--	--	331.12	320.33	--	--
5/17/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/23/2017	--	--	--	--	--	--	--	--	--	--	330.69	320.35	--	--
5/24/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/29/2017	--	--	--	--	--	--	--	--	--	--	330.15	320.09	--	--
5/31/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/2017	--	--	--	--	--	--	--	--	--	--	330.19	319.58	--	--
6/7/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/13/2017	--	--	--	--	--	--	--	--	--	320.92	329.45	318.69	--	--
6/19/2017	--	--	--	--	--	--	--	--	--	--	--	318.42	--	--
6/22/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2017	--	--	--	--	--	--	--	--	--	--	328.62	318.09	--	--
6/28/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/2017	--	--	--	--	--	--	--	--	--	--	328.55	318.06	--	--
7/4/2017	--	--	--	--	--	--	--	--	--	--	328.35	NA	--	--
7/5/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2017	--	--	--	--	--	--	--	--	--	--	327.88	NA	--	--
7/11/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2017	--	--	--	--	--	--	--	--	--	319.75	--	--	--	--
7/18/2017	--	--	--	--	--	--	--	--	--	--	327.26	317.52	--	--
7/19/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/24/2017	--	--	--	--	--	--	--	--	--	--	326.80	317.33	--	--
7/26/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/31/2017	--	--	--	--	--	--	--	--	--	--	326.49	317.15	--	--
8/2/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2017	--	--	--	--	--	--	--	--	--	--	326.00	316.92	--	--
8/9/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2017	--	--	--	--	--	--	--	--	--	--	325.75	316.90	--	--
8/15/2017	--	--	--	--	--	--	--	--	--	318.72	--	--	--	--
8/21/2017	--	--	--	--	--	--	--	--	--	--	325.41	316.65	--	--
8/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/28/2017	--	--	--	--	--	--	--	--	--	--	325.16	316.41	--	--
8/30/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/5/2017	--	--	--	--	--	--	--	--	--	--	324.94	--	--	--
9/6/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/11/2017	--	--	--	--	--	--	--	--	--	--	324.80	316.00	--	--
9/12/2017	--	--	--	--	--	--	--	--	--	317.83	--	--	--	--
9/15/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/18/2017	--	--	--	--	--	--	--	--	--	--	324.66	315.84	--	--
9/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
9/25/2017	--	--	--	--	--	--	--	--	--	--	324.70	315.67	--	--
9/27/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/2017	--	--	--	--	--	--	--	--	--	--	324.66	315.53	--	--
10/2/2017	--	--	--	--	--	--	--	--	--	--	324.57	315.44	--	--
10/4/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2017	--	--	--	--	--	--	--	--	--	--	324.36	315.34	--	--
10/11/2017	--	--	--	--	--	--	--	--	--	316.96	--	--	--	--
10/16/2017	--	--	--	--	--	--	--	--	--	--	324.29	315.22	--	--
10/18/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/23/2017	--	--	--	--	--	--	--	--	--	--	324.24	315.19	--	--
10/25/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/30/2017	--	--	--	--	--	--	--	--	--	--	324.13	315.13	--	--
10/31/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/6/2017	--	--	--	--	--	--	--	--	--	--	324.07	315.07	--	--
11/8/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/13/2017	--	--	--	--	--	--	--	--	--	--	323.95	314.97	--	--
11/14/2017	--	--	--	--	--	--	--	--	--	316.46	--	--	--	--
11/20/2017	--	--	--	--	--	--	--	--	--	--	323.91	314.93	--	--
11/22/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/23/2017	--	--	--	--	--	--	--	--	--	--	323.86	314.89	--	--
11/27/2017	--	--	--	--	--	--	--	--	--	--	323.85	314.81	--	--
11/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/4/2017	--	--	--	--	--	--	--	--	--	--	323.72	314.81	--	--
12/6/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/11/2017	--	--	--	--	--	--	--	--	--	--	323.60	314.75	--	--
12/12/2017	--	--	--	--	--	--	--	--	--	316.34	--	--	--	--
12/18/2017	--	--	--	--	--	--	--	--	--	--	323.57	314.60	--	--
12/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/27/2017	--	--	--	--	--	--	--	--	--	--	323.49	314.36	--	--
12/28/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/2/2018	--	--	--	--	--	--	--	--	--	--	323.45	314.30	--	--
1/3/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/8/2018	--	--	--	--	--	--	--	--	--	--	323.45	314.22	--	--
1/9/2018	--	--	--	--	--	--	--	--	--	316.07	--	--	--	--
1/15/2018	--	--	--	--	--	--	--	--	--	--	323.57	314.21	--	--
1/17/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/22/2018	--	--	--	--	--	--	--	--	--	--	323.41	314.15	--	--
1/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/29/2018	--	--	--	--	--	--	--	--	--	--	323.57	314.18	--	--
1/30/2018	--	--	--	--	--	--	--	--	--	--	323.54	314.14	--	--
1/31/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/5/2018	--	--	--	--	--	--	--	--	--	--	323.49	314.09	--	--
2/8/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/12/2018	--	--	--	--	--	--	--	--	--	316.04	323.45	314.03	--	--
2/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/20/2018	--	--	--	--	--	--	--	--	--	--	323.77	314.09	--	--
2/21/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/26/2018	--	--	--	--	--	--	--	--	--	--	324.06	314.34	--	--
2/28/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/5/2018	--	--	--	--	--	--	--	--	--	--	324.45	314.37	--	--
3/7/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/12/2018	--	--	--	--	--	--	--	--	--	--	324.90	314.46	--	--
3/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/2018	--	--	--	--	--	--	--	--	--	317.60	--	--	--	--
3/19/2018	--	--	--	--	--	--	--	--	--	--	325.43	314.56	--	--
3/21/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/26/2018	--	--	--	--	--	--	--	--	--	--	325.35	314.61	--	--
3/28/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/29/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/2/2018	--	--	--	--	--	--	--	--	--	--	325.28	314.82	--	--
4/5/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/9/2018	--	--	--	--	--	--	--	--	--	--	325.27	314.93	--	--
4/10/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/2018	--	--	--	--	--	--	--	--	--	318.28	--	--	--	--
4/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/17/2018	--	--	--	--	--	--	--	--	--	--	325.11	315.18	--	--
4/18/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/23/2018	--	--	--	--	--	--	--	--	--	--	325.01	315.34	--	--
4/24/2018	--	--	--	--	--	--	--	--	--	--	325.04	315.44	--	--
4/25/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/30/2018	--	--	--	--	--	--	--	--	--	--	325.78	315.68	--	--
5/2/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/7/2018	--	--	--	--	--	--	--	--	--	--	324.38	315.90	--	--
5/8/2018	--	--	--	--	--	--	--	--	--	321.66	--	--	--	--
5/14/2018	--	--	--	--	--	--	--	--	--	--	324.47	316.21	--	--
5/16/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/22/2018	--	--	--	--	--	--	--	--	--	--	324.22	316.29	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
5/23/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/28/2018	--	--	--	--	--	--	--	--	--	--	322.23	316.25	--	--
5/30/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/4/2018	--	--	--	--	--	--	--	--	--	--	321.98	316.11	--	--
6/6/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/11/2018	--	--	--	--	--	--	--	--	--	--	321.39	316.07	--	--
6/12/2018	--	--	--	--	--	--	--	--	--	320.00	321.25	316.07	--	--
6/14/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/18/2018	--	--	--	--	--	--	--	--	--	--	320.90	315.92	--	--
6/20/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2018	--	--	--	--	--	--	--	--	--	--	320.47	315.57	--	--
6/27/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/29/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/3/2018	--	--	--	--	--	--	--	--	--	--	320.05	315.27	--	--
7/4/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2018	--	--	--	--	--	--	--	--	--	--	319.85	315.18	--	--
7/10/2018	--	--	--	--	--	--	--	--	--	319.08	--	--	--	--
7/16/2018	--	--	--	--	--	--	--	--	--	--	319.59	314.96	--	--
7/18/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/23/2018	--	--	--	--	--	--	--	--	--	--	319.30	314.78	--	--
7/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/2018	--	--	--	--	--	--	--	--	--	--	319.01	314.64	--	--
8/1/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/7/2018	--	--	--	--	--	--	--	--	--	--	318.67	314.48	--	--
8/8/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/2018	--	--	--	--	--	--	--	--	--	--	318.46	314.39	--	--
8/14/2018	--	--	--	--	--	--	--	--	--	318.03	--	--	--	--
8/20/2018	--	--	--	--	--	--	--	--	--	--	318.39	314.28	--	--
8/22/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/23/2018	--	--	--	--	--	--	--	--	--	--	318.37	314.28	--	--
8/27/2018	--	--	--	--	--	--	--	--	--	--	318.27	314.21	--	--
8/29/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/30/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/4/2018	--	--	--	--	--	--	--	--	--	--	318.11	314.07	--	--
9/5/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/2018	--	--	--	--	--	--	--	--	--	--	318.03	314.02	--	--
9/11/2018	--	--	--	--	--	--	--	--	--	317.16	--	--	--	--
9/17/2018	--	--	--	--	--	--	--	--	--	--	317.93	313.94	--	--
9/19/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/24/2018	--	--	--	--	--	--	--	--	--	--	317.82	313.83	--	--
9/26/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/1/2018	--	--	--	--	--	--	--	--	--	--	317.79	313.73	--	--
10/3/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/9/2018	--	--	--	--	--	--	--	--	--	--	317.74	313.65	--	--
10/10/2018	--	--	--	--	--	--	--	--	--	316.64	--	--	--	--
10/15/2018	--	--	--	--	--	--	--	--	--	--	317.68	313.59	--	--
10/17/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/22/2018	--	--	--	--	--	--	--	--	--	--	317.62	313.51	--	--
10/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/29/2018	--	--	--	--	--	--	--	--	--	--	317.56	313.42	--	--
10/31/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/5/2018	--	--	--	--	--	--	--	--	--	--	317.51	313.33	--	--
11/7/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/2018	--	--	--	--	--	--	--	--	--	--	317.45	313.26	--	--
11/13/2018	--	--	--	--	--	--	--	--	--	316.39	--	--	--	--
11/16/2018	--	--	--	--	--	--	--	--	--	--	317.42	313.30	--	--
11/19/2018	--	--	--	--	--	--	--	--	--	--	317.35	313.25	--	--
11/21/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/26/2018	--	--	--	--	--	--	--	--	--	--	317.29	313.22	--	--
11/28/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/3/2018	--	--	--	--	--	--	--	--	--	--	317.22	313.16	--	--
12/5/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/10/2018	--	--	--	--	--	--	--	--	--	--	317.21	313.10	--	--
12/11/2018	--	--	--	--	--	--	--	--	--	316.45	--	--	--	--
12/17/2018	--	--	--	--	--	--	--	--	--	--	317.27	313.08	--	--
12/19/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/24/2018	--	--	--	--	--	--	--	--	--	--	317.28	313.07	--	--
12/27/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/31/2018	--	--	--	--	--	--	--	--	--	--	317.31	313.07	--	--
1/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/7/2019	--	--	--	--	--	--	--	--	--	--	317.36	313.13	--	--
1/8/2019	--	--	--	--	--	--	--	--	--	316.82	--	--	--	--
1/14/2019	--	--	--	--	--	--	--	--	--	--	317.43	313.24	--	--
1/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/21/2019	--	--	--	--	--	--	--	--	--	--	317.53	313.36	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
1/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/28/2019	--	--	--	--	--	--	--	--	--	--	317.69	313.52	--	--
1/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/2019	--	--	--	--	--	--	--	--	--	--	317.76	313.57	--	--
2/4/2019	--	--	--	--	--	--	--	--	--	--	317.86	313.68	--	--
2/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2019	--	--	--	--	--	--	--	--	--	317.51	317.88	313.76	--	--
2/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/19/2019	--	--	--	--	--	--	--	--	--	--	318.02	313.86	--	--
2/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/26/2019	--	--	--	--	--	--	--	--	--	--	318.10	314.00	--	--
2/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/4/2019	--	--	--	--	--	--	--	--	--	--	318.21	314.21	--	--
3/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/11/2019	--	--	--	--	--	--	--	--	--	--	318.44	314.30	--	--
3/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/2019	--	--	--	--	--	--	--	--	--	318.46	--	--	--	--
3/18/2019	--	--	--	--	--	--	--	--	--	--	318.94	314.40	--	--
3/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/25/2019	--	--	--	--	--	--	--	--	--	--	319.48	314.59	--	--
3/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/1/2019	--	--	--	--	--	--	--	--	--	--	319.89	314.84	--	--
4/3/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/8/2019	--	--	--	--	--	--	--	--	--	--	320.34	315.22	--	--
4/9/2019	--	--	--	--	--	--	--	--	--	321.30	--	--	--	--
4/15/2019	--	--	--	--	--	--	--	--	--	--	320.56	315.39	--	--
4/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/22/2019	--	--	--	--	--	--	--	--	--	--	320.81	315.45	--	--
4/23/2019	--	--	--	--	--	--	--	--	--	--	321.08	315.66	--	--
4/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/2019	--	--	--	--	--	--	--	--	--	--	321.22	315.66	--	--
5/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/6/2019	--	--	--	--	--	--	--	--	--	--	321.46	315.97	--	--
5/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/13/2019	--	--	--	--	--	--	--	--	--	--	321.66	316.27	--	--
5/14/2019	--	--	--	--	--	--	--	--	--	322.36	--	--	--	--
5/21/2019	--	--	--	--	--	--	--	--	--	--	321.60	316.33	--	--
5/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/27/2019	--	--	--	--	--	--	--	--	--	--	321.55	316.45	--	--
5/29/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2019	--	--	--	--	--	--	--	--	--	--	321.38	316.45	--	--
6/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/10/2019	--	--	--	--	--	--	--	--	--	--	321.23	316.46	--	--
6/11/2019	--	--	--	--	--	--	--	--	--	321.03	--	--	--	--
6/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/17/2019	--	--	--	--	--	--	--	--	--	--	320.89	316.28	--	--
6/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/2019	--	--	--	--	--	--	--	--	--	--	320.65	316.21	--	--
6/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/29/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/2/2019	--	--	--	--	--	--	--	--	--	--	320.29	316.04	--	--
7/3/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2019	--	--	--	--	--	--	--	--	--	--	319.99	315.89	--	--
7/9/2019	--	--	--	--	--	--	--	--	--	319.88	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
7/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/15/2019	--	--	--	--	--	--	--	--	--	--	--	315.74	--	--
7/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2019	--	--	--	--	--	--	--	--	--	--	319.42	315.61	--	--
7/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/29/2019	--	--	--	--	--	--	--	--	--	--	319.18	315.49	--	--
7/31/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/3/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/5/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/6/2019	--	--	--	--	--	--	--	--	--	--	318.88	315.36	--	--
8/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2019	--	--	--	--	--	--	--	--	--	--	318.54	315.20	--	--
8/13/2019	--	--	--	--	--	--	--	--	--	318.93	--	--	--	--
8/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/19/2019	--	--	--	--	--	--	--	--	--	--	318.24	315.01	--	--
8/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/26/2019	--	--	--	--	--	--	--	--	--	--	318.13	314.94	--	--
8/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/28/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/3/2019	--	--	--	--	--	--	--	--	--	--	317.97	314.84	--	--
9/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/5/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/9/2019	--	--	--	--	--	--	--	--	--	--	317.83	314.66	--	--
9/10/2019	--	--	--	--	--	--	--	--	--	318.22	--	--	--	--
9/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/16/2019	--	--	--	--	--	--	--	--	--	--	317.72	314.60	--	--
9/17/2019	--	--	--	--	--	--	--	--	--	--	317.73	314.57	--	--
9/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/23/2019	--	--	--	--	--	--	--	--	--	--	317.62	314.55	--	--
9/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/26/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/30/2019	--	--	--	--	--	--	--	--	--	--	317.52	314.43	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
10/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/7/2019	--	--	--	--	--	--	--	--	--	--	317.44	314.35	--	--
10/8/2019	--	--	--	--	--	--	--	--	--	317.24	--	--	--	--
10/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/15/2019	--	--	--	--	--	--	--	--	--	--	317.35	314.27	--	--
10/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/21/2019	--	--	--	--	--	--	--	--	--	--	317.27	314.18	--	--
10/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/26/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2019	--	--	--	--	--	--	--	--	--	--	317.18	314.09	--	--
10/29/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/31/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/3/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/4/2019	--	--	--	--	--	--	--	--	--	--	317.08	314.06	--	--
11/5/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2019	--	--	--	--	--	--	--	--	--	--	317.00	313.95	--	--
11/12/2019	--	--	--	--	--	--	--	--	--	316.60	--	--	--	--
11/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/18/2019	--	--	--	--	--	--	--	--	--	--	316.93	313.93	--	--
11/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/21/2019	--	--	--	--	--	--	--	--	--	--	316.91	313.84	--	--
11/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/25/2019	--	--	--	--	--	--	--	--	--	--	316.87	313.83	--	--
11/26/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/28/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/2019	--	--	--	--	--	--	--	--	--	--	316.81	313.76	--	--
12/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2019	--	--	--	--	--	--	--	--	--	--	316.76	313.69	--	--
12/10/2019	--	--	--	--	--	--	--	--	--	316.50	--	--	--	--
12/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/2019	--	--	--	--	--	--	--	--	--	--	316.71	313.53	--	--
12/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/2019	--	--	--	--	--	--	--	--	--	--	316.67	313.45	--	--
12/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/31/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2020	--	--	--	--	--	--	--	--	--	--	316.71	313.30	--	--
1/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2020	--	--	--	--	--	--	--	--	--	--	316.81	313.38	--	--
1/14/2020	--	--	--	--	--	--	--	--	--	317.88	--	--	--	--
1/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/20/2020	--	--	--	--	--	--	--	--	--	--	317.48	313.52	--	--
1/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/2020	--	--	--	--	--	--	--	--	--	--	Rejected	313.92	--	--
1/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/3/2020	--	--	--	--	--	--	--	--	--	--	318.93	314.30	--	--
2/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
2/10/2020	--	--	--	--	--	--	--	--	--	--	319.19	314.72	--	--
2/11/2020	--	--	--	--	--	--	--	--	--	320.16	--	--	--	--
2/18/2020	--	--	--	--	--	--	--	--	--	--	319.40	315.28	--	--
2/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/2020	--	--	--	--	--	--	--	--	--	--	319.35	315.44	--	--
2/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/1/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/2/2020	--	--	--	--	--	--	--	--	--	--	319.35	315.61	--	--
3/3/2020	--	--	--	--	--	--	--	--	--	--	319.41	315.65	--	--
3/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/9/2020	--	--	--	--	--	--	--	--	--	--	319.29	315.54	--	--
3/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/11/2020	--	--	--	--	--	--	--	--	--	319.82	--	--	--	--
3/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/15/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/16/2020	--	--	--	--	--	--	--	--	--	--	319.71	315.53	--	--
3/17/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/18/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/23/2020	--	--	--	--	--	--	--	--	--	--	320.27	315.63	--	--
3/24/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/27/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/30/2020	--	--	--	--	--	--	--	--	--	--	320.56	315.71	--	--
3/31/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/1/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/6/2020	--	--	--	--	--	--	--	--	--	--	320.90	315.76	--	--
4/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/9/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/13/2020	--	--	--	--	--	--	--	--	--	--	321.31	315.98	--	--
4/14/2020	--	--	--	--	--	--	--	--	--	320.66	--	--	--	--
4/15/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/2020	--	--	--	--	--	--	--	--	--	--	321.34	315.98	--	--
4/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/24/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/27/2020	--	--	--	--	--	--	--	--	--	--	321.33	315.92	--	--
4/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/1/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/4/2020	--	--	--	--	--	--	--	--	--	--	321.34	315.91	--	--
5/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/6/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/9/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/11/2020	--	--	--	--	--	--	--	--	--	--	321.25	315.89	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
5/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/13/2020	--	--	--	--	--	--	--	--	--	319.85	--	--	--	--
5/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/15/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/17/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/18/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/19/2020	--	--	--	--	--	--	--	--	--	--	321.10	315.77	--	--
5/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/24/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/25/2020	--	--	--	--	--	--	--	--	--	--	321.03	315.73	--	--
5/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/27/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/28/2020	--	--	--	--	--	--	--	--	--	--	321.09	315.73	--	--
5/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/31/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/1/2020	--	--	--	--	--	--	--	--	--	--	321.03	315.64	--	--
6/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/2020	--	--	--	--	--	--	--	--	--	--	320.85	315.53	--	--
6/9/2020	--	--	--	--	--	--	--	--	--	319.54	--	--	--	--
6/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/2020	--	--	--	--	--	--	--	--	--	--	320.70	315.42	--	--
6/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/17/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/18/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/22/2020	--	--	--	--	--	--	--	--	--	--	320.68	315.48	--	--
6/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/29/2020	--	--	--	--	--	--	--	--	--	--	320.52	315.32	--	--
6/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/1/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/6/2020	--	--	--	--	--	--	--	--	--	--	320.41	315.26	--	--
7/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2020	--	--	--	--	--	--	--	--	--	--	320.28	315.22	--	--
7/14/2020	--	--	--	--	--	--	--	--	--	318.83	--	--	--	Dry
7/15/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/20/2020	--	--	--	--	--	--	--	--	--	--	320.16	315.17	--	--
7/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/24/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2020	--	--	--	--	--	--	--	--	--	--	320.17	315.18	--	--
7/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/31/2020	--	--	--	--	--	--	--	--	--	--	320.16	315.10	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
8/1/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/4/2020	--	--	--	--	--	--	--	--	--	--	320.24	315.12	--	--
8/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/6/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2020	--	--	--	--	--	--	--	--	--	--	320.00	315.03	--	--
8/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2020	--	--	--	--	--	--	--	--	--	318.14	--	--	--	--
8/17/2020	--	--	--	--	--	--	--	--	--	--	319.41	314.94	--	--
8/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/24/2020	--	--	--	--	--	--	--	--	--	--	318.93	314.84	--	--
8/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/2020	--	--	--	--	--	--	--	--	--	--	318.60	314.74	--	--
9/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/8/2020	--	--	--	--	--	--	--	--	--	--	318.33	314.63	--	--
9/9/2020	--	--	--	--	--	--	--	--	--	317.39	--	--	--	--
9/14/2020	--	--	--	--	--	--	--	--	--	--	318.14	314.54	--	--
9/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/21/2020	--	--	--	--	--	--	--	--	--	--	317.95	314.49	--	--
9/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/2020	--	--	--	--	--	--	--	--	--	--	317.91	314.52	--	--
9/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/5/2020	--	--	--	--	--	--	--	--	--	--	317.87	314.39	--	--
10/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/13/2020	--	--	--	--	--	--	--	--	--	316.70	317.82	314.31	--	Dry
10/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/19/2020	--	--	--	--	--	--	--	--	--	--	317.74	314.25	--	--
10/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/26/2020	--	--	--	--	--	--	--	--	--	--	317.68	314.18	--	--
10/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/2/2020	--	--	--	--	--	--	--	--	--	--	317.61	314.06	--	--
11/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/9/2020	--	--	--	--	--	--	--	--	--	--	317.51	313.95	--	--
11/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2020	--	--	--	--	--	--	--	--	--	316.54	--	--	--	--
11/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/16/2020	--	--	--	--	--	--	--	--	--	--	317.45	313.86	--	--
11/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/23/2020	--	--	--	--	--	--	--	--	--	--	317.37	313.80	--	--
11/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/26/2020	--	--	--	--	--	--	--	--	--	--	317.33	313.76	--	--
11/30/2020	--	--	--	--	--	--	--	--	--	--	317.35	313.75	--	--
12/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/2020	--	--	--	--	--	--	--	--	--	--	317.31	313.62	--	--
12/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2020	--	--	--	--	--	--	--	--	--	316.40	--	--	--	--
12/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/14/2020	--	--	--	--	--	--	--	--	--	--	317.26	313.55	--	--
12/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/21/2020	--	--	--	--	--	--	--	--	--	--	317.24	313.56	--	--
12/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2020	--	--	--	--	--	--	--	--	--	--	317.12	313.46	--	--
12/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/4/2021	--	--	--	--	--	--	--	--	--	--	317.12	313.42	--	--
1/6/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/11/2021	--	--	--	--	--	--	--	--	--	--	317.11	313.37	--	--
1/12/2021	--	--	--	--	--	--	--	--	--	316.37	--	--	--	Dry
1/18/2021	--	--	--	--	--	--	--	--	--	--	317.11	313.35	--	--
1/20/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/25/2021	--	--	--	--	--	--	--	--	--	--	317.13	313.30	--	--
1/27/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/28/2021	--	--	--	--	--	--	--	--	--	--	317.07	313.26	--	--
2/1/2021	--	--	--	--	--	--	--	--	--	--	317.10	313.30	--	--
2/3/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/8/2021	--	--	--	--	--	--	--	--	--	--	317.19	313.33	--	--
2/9/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2021	--	--	--	--	--	--	--	--	--	316.49	--	--	--	--
2/16/2021	--	--	--	--	--	--	--	--	--	--	317.35	313.38	--	--
2/17/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/19/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2021	--	--	--	--	--	--	--	--	--	--	317.45	313.41	--	--
2/24/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/1/2021	--	--	--	--	--	--	--	--	--	--	317.40	313.37	--	--
3/3/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	DW114 Elevation (m AMSL)	DW119 Elevation (m AMSL)	DW119A Elevation (m AMSL)	DW120 Elevation (m AMSL)	DW120A Elevation (m AMSL)	DW121 Elevation (m AMSL)	MW4 Elevation (m AMSL)	MW4A Elevation (m AMSL)	MW4B Elevation (m AMSL)	MW4C Elevation (m AMSL)	MW319A-10 Elevation (m AMSL)	MW321A-10 Elevation (m AMSL)	OW1-80 Elevation (m AMSL)	OW2-80 Elevation (m AMSL)
3/8/2021	--	--	--	--	--	--	--	--	--	--	317.46	313.39	--	--
3/9/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/10/2021	--	--	--	--	--	--	--	--	--	316.56	--	--	--	--
3/15/2021	--	--	--	--	--	--	--	--	--	--	317.76	313.39	--	--
3/17/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/18/2021	--	--	--	--	--	--	--	--	--	--	318.01	313.41	--	--
3/22/2021	--	--	--	--	--	--	--	--	--	--	318.36	313.44	--	--
3/24/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/29/2021	--	--	--	--	--	--	--	--	--	--	318.88	313.50	--	--
3/31/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/1/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2021	--	--	--	--	--	--	--	--	--	--	319.40	313.70	--	--
4/6/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/7/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/9/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2021	--	--	--	--	--	--	--	--	--	--	319.84	313.85	--	--
4/13/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/14/2021	--	--	--	--	--	--	--	--	--	317.79	--	--	--	--
4/19/2021	--	--	--	--	--	--	--	--	--	--	320.26	314.06	--	--
4/21/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2021	--	--	--	--	--	--	--	--	--	--	320.37	314.14	--	--
4/27/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/28/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/2021	--	--	--	--	--	--	--	--	--	--	320.69	314.38	--	--
5/5/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/7/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2021	--	--	--	--	--	--	--	--	--	--	320.79	314.47	--	--
5/11/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/12/2021	--	--	--	--	--	--	--	--	--	318.53	--	--	--	--
5/17/2021	--	--	--	--	--	--	--	--	--	--	320.89	314.55	--	--
5/19/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/25/2021	--	--	--	--	--	--	--	--	--	--	321.06	314.71	--	--
5/26/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/27/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/31/2021	--	--	--	--	--	--	--	--	--	--	321.04	314.70	--	--
6/2/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2021	--	--	--	--	--	--	--	--	--	--	321.20	314.81	--	--
6/7/2021	--	--	--	--	--	--	--	--	--	318.58	321.13	314.76	--	--
6/8/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/14/2021	--	--	--	--	--	--	--	--	--	--	321.24	314.83	--	--
6/16/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/21/2021	--	--	--	--	--	--	--	--	--	--	321.38	314.89	--	--
6/23/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2021	--	--	--	--	--	--	--	--	--	--	321.29	314.75	--	--
6/30/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/2021	--	--	--	--	--	--	--	--	--	--	321.38	314.78	--	--
7/7/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2021	--	--	--	--	--	--	--	--	--	--	321.37	314.73	--	--
7/13/2021	--	--	--	--	--	--	--	--	--	317.94	--	--	--	Dry
7/19/2021	--	--	--	--	--	--	--	--	--	--	321.42	314.76	--	--
7/21/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
2/6/1980	--	--	--	--	--	--	--	--	--	339.36	338.79	--	--	--
3/13/1980	--	--	--	--	--	--	--	--	--	338.35	337.50	337.74	337.54	--
4/11/1980	--	--	--	--	--	--	--	--	--	340.06	339.87	339.75	339.73	--
5/27/1980	--	--	--	--	--	--	--	--	--	339.88	339.33	339.24	339.22	--
6/27/1980	--	--	--	--	--	--	--	--	--	339.22	338.29	338.20	338.22	--
8/13/1980	--	--	--	--	--	--	--	--	--	338.25	337.49	337.40	337.42	--
9/4/1980	--	--	--	--	--	--	--	--	--	337.79	337.16	337.08	337.09	--
10/31/1980	--	--	--	--	--	--	--	--	--	336.97	336.49	336.44	336.45	--
12/8/1980	--	--	--	--	--	--	--	--	--	337.06	336.60	336.55	336.55	--
2/9/1981	--	--	--	--	--	--	--	--	--	336.96	336.56	336.51	336.54	--
5/5/1981	--	--	--	--	--	--	--	--	--	339.18	338.52	338.45	338.44	--
8/31/1981	--	--	--	--	--	--	--	--	--	--	337.02	336.97	336.97	--
11/7/1981	--	--	--	--	--	--	--	--	--	339.04	338.72	338.64	338.63	--
2/11/1982	--	--	--	--	--	--	--	--	--	Snow	337.87	337.80	337.88	--
3/23/1982	--	--	--	--	--	--	--	--	--	339.40	--	--	--	--
5/1/1982	--	--	--	--	--	--	--	--	--	340.15	339.97	339.85	339.81	--
8/13/1982	--	--	--	--	--	--	--	--	--	338.19	337.53	337.44	337.43	--
11/30/1982	--	--	--	--	--	--	--	--	--	338.09	337.80	337.74	337.72	--
11/29/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/3/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/10/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/17/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/24/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/23/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/15/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/20/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/19/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/15/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/22/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/16/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/15/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/15/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/25/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/3/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/17/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/30/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/2/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/20/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/20/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/24/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/27/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/27/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/17/1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/27/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/17/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/15/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/15/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/26/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/25/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/22/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
8/18/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/16/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/15/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/23/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/23/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/15/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/25/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/24/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/28/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/29/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/29/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/31/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/19/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/20/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/3/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/29/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/30/1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/21/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/28/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/23/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/29/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/17/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/27/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/24/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/31/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/25/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/18/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/5/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/6/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/26/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/6/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/26/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/7/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/16/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/5/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/6/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/29/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/21/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/15/1998	--	--	--	--	--	--	--	--	--	--	336.09	--	335.60	--
10/16/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/29/1998	--	--	--	--	--	--	--	--	--	--	335.42	--	334.70	--
11/4/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/19/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/26/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
11/27/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/15/1998	--	--	--	--	--	--	--	--	--	--	Dry	--	334.41	--
12/23/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/29/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/16/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/5/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/17/1999	336.34	336.50	336.18	336.34	336.35	336.22	336.30	336.32	336.27	--	336.33	--	336.13	--
3/31/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/1999	337.62	337.80	--	337.64	337.66	337.52	337.64	337.70	337.71	337.35	337.99	--	336.69	--
4/12/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/1999	337.72	337.88	Blocked	337.68	337.68	337.56	337.81	337.79	337.82	337.57	337.71	--	337.40	--
4/22/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/1999	338.02	338.18	Blocked	337.99	337.98	337.87	338.12	338.14	338.14	337.86	337.96	--	337.64	--
5/7/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/17/1999	337.89	338.05	Blocked	337.83	337.82	337.72	337.99	338.00	338.02	337.91	337.86	--	337.57	--
5/19/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/1/1999	337.59	337.75	Blocked	337.52	337.52	337.42	337.59	337.70	337.70	337.73	337.57	--	337.32	--
6/15/1999	337.23	337.40	337.09	337.17	337.17	337.21	337.33	337.34	337.35	337.47	337.21	--	337.02	--
6/30/1999	--	337.06	336.77	336.84	336.81	336.72	336.98	336.99	337.00	337.15	336.86	--	336.68	--
7/1/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/1999	--	336.98	336.70	336.74	336.74	336.63	336.90	336.91	336.92	--	336.77	--	336.58	--
7/6/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/1999	336.78	336.94	336.64	336.71	336.71	336.59	336.86	336.87	336.88	337.03	336.75	--	336.58	--
7/10/1999	335.28	335.33	335.32	335.04	334.99	335.04	335.77	335.82	335.85	336.92	Dry	--	335.55	--
7/13/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/14/1999	336.49	336.66	336.50	336.44	336.42	336.30	336.56	336.57	336.57	336.87	336.45	--	335.89	--
7/20/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/5/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/1999	335.94	336.08	335.80	335.88	335.88	335.73	336.03	336.12	336.04	336.29	--	--	335.86	--
8/24/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/26/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/3/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/9/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/15/1999	335.37	335.38	335.37	335.30	335.30	335.14	335.46	335.50	335.45	335.67	Dry	--	335.31	--
9/17/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/27/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/12/1999	334.97	335.13	334.83	334.91	334.91	334.74	335.06	335.07	335.08	335.44	Dry	--	334.99	--
10/20/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/29/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/3/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/8/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/1999	334.96	335.12	334.81	334.92	334.93	334.75	334.99	335.00	335.00	335.16	Dry	--	334.91	--
11/18/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/24/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/8/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/1999	335.08	335.24	334.95	335.08	335.08	334.96	335.16	335.16	335.16	335.30	Dry	--	335.00	--
12/21/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/30/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/18/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/20/2000	335.46	335.64	335.36	335.48	335.48	335.36	335.53	335.53	335.56	335.44	Dry	--	335.41	--
1/28/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/2/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/15/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/16/2000	335.47	335.62	335.32	335.44	335.48	335.31	335.54	335.55	335.55	335.36	Dry	--	335.46	--
2/17/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/29/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/8/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/20/2000	337.22	337.38	337.07	337.20	337.20	337.07	337.26	337.27	337.29	337.44	337.31	--	336.97	--
3/22/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/23/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/17/2000	337.47	337.63	337.42	337.42	337.44	337.30	337.64	337.68	337.60	337.53	337.56	--	337.16	--
5/3/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/15/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/16/2000	339.44	339.59	339.30	339.38	339.38	339.25	--	339.70	--	339.75	339.55	--	338.80	--
5/30/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
5/31/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2000	339.14	339.30	339.02	339.04	339.05	338.92	339.29	339.41	338.95	339.40	339.24	--	338.62	--
7/4/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2000	338.48	338.64	338.34	338.41	338.40	338.33	338.61	338.60	338.65	338.31	338.56	--	338.28	--
7/26/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/15/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/16/2000	338.19	338.35	337.94	338.12	338.11	338.04	338.40	338.37	338.44	338.08	338.23	--	337.90	--
8/29/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/11/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/19/2000	337.45	337.61	337.19	337.27	337.27	337.19	337.57	337.53	337.61	337.31	337.52	--	337.32	--
9/29/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/17/2000	336.80	336.96	336.66	336.74	336.73	336.59	336.86	336.86	336.90	337.41	336.86	--	336.73	--
10/25/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/13/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/14/2000	336.30	336.46	336.17	336.16	336.24	336.08	336.27	336.39	336.31	337.12	336.38	--	336.26	--
11/30/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2000	336.08	336.24	335.99	335.99	336.03	335.95	336.08	336.20	336.12	337.32	336.16	--	336.01	--
12/21/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/16/2001	335.62	335.77	335.50	335.49	335.60	335.45	335.61	335.77	335.71	Snow	Dry	--	Snow	--
1/31/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/13/2001	--	--	--	--	--	--	--	--	--	--	--	--	Snow	--
2/14/2001	335.96	336.14	335.84	335.92	336.03	335.89	336.15	336.30	336.23	--	Dry	--	--	--
2/27/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/13/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/2001	337.70	337.86	337.61	336.03	336.12	335.98	336.23	336.39	336.32	Snow	Dry	--	Snow	--
3/26/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/17/2001	339.49	339.65	339.37	338.31	338.42	338.35	339.55	339.72	339.78	340.01	339.62	--	339.18	--
5/2/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/15/2001	338.61	338.63	338.42	338.42	338.53	338.44	338.60	338.77	338.80	339.47	339.51	--	338.42	--
5/28/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/7/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2001	338.16	338.21	338.21	337.97	337.98	337.87	338.33	338.46	338.50	339.38	338.13	--	337.90	--
7/17/2001	337.58	337.61	337.62	337.32	337.37	337.22	337.72	337.85	337.89	338.85	337.49	--	337.34	--
8/14/2001	336.72	336.88	336.58	336.42	336.47	336.32	336.82	336.95	336.99	337.93	336.79	--	336.94	--
9/11/2001	336.14	336.30	336.00	336.07	336.08	335.95	336.12	336.24	336.28	337.59	336.23	--	336.18	--
9/12/2001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/16/2001	335.67	335.84	335.47	335.72	335.74	335.58	335.83	335.97	336.00	336.43	Dry	--	335.66	--
11/13/2001	335.69	335.85	335.57	335.65	335.65	335.51	335.74	335.83	335.85	335.82	Dry	--	335.69	--
12/11/2001	336.59	336.74	336.46	336.58	336.57	336.45	336.63	336.72	336.73	336.78	336.35	--	336.45	--
1/15/2002	337.25	337.40	337.12	337.30	337.28	337.10	337.29	337.38	337.39	337.10	337.36	--	337.18	--
2/12/2002	337.49	337.64	337.34	337.56	337.52	337.36	337.51	337.60	337.61	337.24	337.62	--	337.29	--
3/12/2002	338.92	339.07	338.89	338.87	338.87	339.07	339.04	339.05	339.11	338.49	339.06	--	338.62	--
3/26/2002	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/16/2002	340.06	340.22	339.94	340.00	340.01	339.97	340.23	340.25	340.43	340.06	340.24	--	339.37	--
5/14/2002	339.72	339.88	339.61	339.64	339.65	339.60	339.94	339.93	340.01	340.18	339.86	--	339.39	--
6/11/2002	338.78	338.94	338.67	338.70	338.71	338.66	339.00	338.99	339.06	339.76	338.92	--	338.46	--
6/25/2002	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2002	337.90	338.06	337.76	337.82	337.83	337.72	337.98	337.99	338.03	338.65	337.99	--	337.71	--
8/13/2002	336.86	337.01	336.72	336.79	336.79	336.68	336.94	336.99	336.93	337.70	336.93	--	--	--
9/10/2002	336.14	336.29	336.01	336.09	336.09	335.98	336.25	336.26	336.28	337.17	336.23	--	336.14	--
9/24/2002	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/8/2002	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/9/2002	335.60	335.75	335.45	335.53	335.54	335.38	335.71	335.71	335.72	337.02	Dry	--	335.64	--
11/12/2002	335.00	335.16	334.87	334.94	334.95	334.80	335.11	333.12	335.10	335.13	Dry	--	335.07	--
12/10/2002	334.75	334.91	334.61	334.69	334.70	334.53	334.84	334.85	334.86	334.91	Dry	--	334.81	--
1/2/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/14/2003	334.56	334.73	Dry	334.50	334.51	334.34	334.57	334.73	334.63	334.62	Dry	--	Snow	--
1/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/12/2003	334.41	334.57	Dry	334.36	334.37	334.19	334.51	334.51	334.52	Snow	Dry	--	Snow	--
3/11/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/13/2003	334.29	334.45	Dry	334.25	334.25	334.08	334.39	334.39	334.39	334.35	Dry	--	Snow	--
3/18/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/2003	--	--	--	--	--	--	--	--	--	335.83	--	--	--	--
4/1/2003	--	--	--	--	--	--	--	--	--	335.96	--	--	--	--
4/10/2003	336.86	337.01	336.71	336.89	336.89	336.74	336.81	336.81	336.83	335.96	336.96	--	336.70	--
4/11/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/15/2003	--	--	--	--	--	--	--	--	--	336.82	--	--	--	--
4/22/2003	--	--	--	--	--	--	--	--	--	337.11	--	--	--	--
4/29/2003	--	--	--	--	--	--	--	--	--	337.15	--	--	--	--
5/5/2003	--	--	--	--	--	--	--	--	--	337.24	--	--	--	--
5/13/2003	338.59	338.74	338.44	338.57	338.58	338.47	338.68	338.69	338.77	337.79	338.73	--	338.09	--
5/14/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
5/20/2003	--	--	--	--	--	--	--	--	--	338.08	--	--	--	--
5/27/2003	--	--	--	--	--	--	--	--	--	338.74	--	--	--	--
6/3/2003	--	--	--	--	--	--	--	--	--	338.83	--	--	--	--
6/10/2003	335.61	335.78	335.55	335.59	335.63	335.48	335.64	335.63	335.66	335.90	336.28	--	335.42	--
6/17/2003	--	--	--	--	--	--	--	--	--	338.81	--	--	--	--
6/24/2003	--	--	--	--	--	--	--	--	--	338.61	--	--	--	--
7/1/2003	--	--	--	--	--	--	--	--	--	338.35	--	--	--	--
7/2/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2003	338.06	338.21	337.91	338.00	337.99	337.90	338.19	338.26	338.18	338.06	338.15	--	337.95	--
7/15/2003	--	--	--	--	--	--	--	--	--	337.88	--	--	--	--
7/16/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2003	--	--	--	--	--	--	--	--	--	337.61	--	--	--	326.71
7/30/2003	--	--	--	--	--	--	--	--	--	337.26	--	--	--	--
8/5/2003	--	--	--	--	--	--	--	--	--	337.08	--	--	--	--
8/12/2003	336.78	336.93	336.63	336.80	336.79	336.70	336.95	337.02	337.04	337.03	Dry	--	336.75	--
8/18/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	325.41
8/19/2003	--	--	--	--	--	--	--	--	--	336.56	--	--	--	--
8/27/2003	--	--	--	--	--	--	--	--	--	336.34	--	--	--	--
9/2/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/9/2003	336.06	336.23	335.93	336.02	336.01	335.92	336.15	336.22	336.24	335.91	Dry	--	336.07	324.55
9/23/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	324.14
10/14/2003	334.97	335.09	334.97	334.94	334.99	334.84	335.21	335.28	335.30	334.47	Dry	--	334.89	--
10/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	323.40
10/28/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/30/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	322.01
11/11/2003	335.50	335.65	335.35	335.48	335.49	335.38	335.53	335.53	335.55	335.03	Dry	--	335.36	--
11/12/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	322.84
11/28/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	322.73
12/9/2003	337.39	337.54	337.24	337.40	337.41	337.30	337.38	337.38	337.40	336.35	337.51	--	337.08	323.15
12/19/2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2004	338.17	338.33	338.04	338.15	338.16	338.04	338.64	338.28	338.34	337.39	338.29	--	337.97	324.95
1/16/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2004	337.24	337.40	337.12	337.24	337.24	337.12	337.34	337.34	337.40	--	337.36	--	--	325.30
2/24/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	324.19
3/9/2004	338.52	338.68	338.40	338.52	338.53	338.40	338.64	338.65	338.70	337.72	338.07	--	338.03	324.99
3/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	326.00
4/13/2004	339.54	339.70	339.41	339.48	339.48	339.41	339.74	339.76	339.82	339.29	339.78	--	339.31	--
4/16/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	327.63
4/26/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	327.99
5/11/2004	339.47	339.48	339.49	339.42	339.45	339.38	339.61	339.79	339.76	--	339.63	--	339.21	328.14
5/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/25/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	328.33
5/26/2004	--	--	--	--	--	--	--	--	--	339.20	--	--	--	--
6/8/2004	338.52	338.68	338.39	338.45	338.46	338.37	338.67	338.69	338.74	338.63	338.63	--	338.47	327.52
6/9/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/2004	--	--	--	--	--	--	--	--	--	338.01	--	--	--	--
6/25/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	328.08
7/13/2004	337.32	337.50	337.19	337.26	337.27	337.16	337.44	337.45	337.49	337.23	337.42	--	337.27	--
7/14/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	325.63
7/27/2004	--	--	--	--	--	--	--	--	--	336.67	--	--	--	--
7/28/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	325.88
8/10/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/2004	336.44	336.60	336.29	336.39	336.39	336.26	336.56	336.57	336.62	336.18	336.53	--	336.33	--
8/12/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	324.97
8/30/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	324.33
9/10/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/14/2004	335.60	335.75	335.45	335.55	335.54	335.39	335.73	335.74	335.76	335.24	Dry	--	335.54	323.53
9/16/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/21/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/30/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	323.06
10/12/2004	335.06	335.22	334.92	335.01	335.02	334.85	335.19	335.19	335.22	334.75	Dry	--	335.01	322.93
10/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/26/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	322.62
11/9/2004	334.60	334.75	Dry	334.55	334.56	Dry	334.72	334.73	334.74	334.35	Dry	--	334.67	322.36
11/23/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	322.16
12/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	321.96
12/14/2004	334.26	334.41	Dry	334.22	334.22	Dry	334.35	334.35	334.37	334.03	Dry	--	334.31	--
12/15/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	321.82
12/22/2004	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/11/2005	335.53	335.68	335.38	335.57	335.57	Dry	335.44	335.44	335.46	334.71	Dry	--	335.35	--
1/12/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	321.62
1/28/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	321.69

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
2/8/2005	336.45	336.62	336.30	336.39	336.66	336.20	336.49	336.49	336.51	335.52	336.56	--	336.27	321.76
2/9/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	321.83
3/8/2005	337.60	337.75	337.46	337.60	337.59	337.47	337.64	337.64	337.68	336.66	337.72	--	337.37	322.06
3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	322.37
4/12/2005	340.04	340.08	340.04	339.99	339.99	339.94	340.24	340.25	340.41	339.11	340.20	--	339.54	325.68
4/26/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	326.91
5/10/2005	339.38	339.54	339.25	339.31	339.32	339.25	339.58	339.59	339.65	339.16	339.51	--	339.16	327.55
5/24/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	327.62
6/14/2005	337.87	338.03	337.74	337.82	337.82	337.11	338.00	338.00	338.03	337.89	337.97	--	337.76	--
6/15/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	327.09
6/28/2005	--	--	--	--	--	--	--	--	--	337.35	--	--	--	326.45
7/12/2005	336.92	337.07	336.78	336.86	336.86	336.74	337.03	337.04	337.06	336.83	337.01	--	336.78	325.93
7/26/2005	--	--	--	--	--	--	--	--	--	336.38	--	--	--	325.38
8/9/2005	336.16	336.32	336.02	336.11	336.11	335.96	336.28	336.29	336.31	335.99	336.25	--	336.06	324.68
8/10/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/23/2005	--	--	--	--	--	--	--	--	--	335.54	--	--	--	324.07
9/13/2005	335.41	335.56	335.27	335.35	335.36	Dry	335.52	335.53	335.54	335.18	Dry	--	335.37	--
9/14/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	324.08
9/27/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	322.94
10/11/2005	334.84	334.99	334.69	334.79	334.80	Dry	334.95	334.96	334.97	334.56	Dry	--	333.91	322.56
10/12/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/25/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	322.25
11/8/2005	334.46	334.62	Dry	334.42	334.42	Dry	334.58	334.58	334.59	334.15	Dry	--	334.53	321.92
11/9/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/22/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	321.72
12/1/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2005	334.37	334.71	Dry	334.37	334.38	334.21	334.45	334.45	334.47	334.10	Dry	--	334.33	321.51
12/22/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	321.48
1/10/2006	334.90	335.05	334.74	334.92	334.92	334.75	334.96	334.95	334.96	334.12	Dry	--	334.73	321.36
1/11/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/2006	338.15	338.31	338.00	338.17	338.17	338.04	338.23	338.21	338.26	336.81	338.28	--	337.88	322.61
3/14/2006	340.09	340.25	339.97	340.07	340.08	340.05	340.18	340.19	340.47	339.00	340.29	--	339.02	--
3/15/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	324.07
4/11/2006	338.72	338.87	338.58	338.66	338.67	338.57	338.86	338.87	338.90	338.49	338.82	--	338.49	326.87
5/9/2006	338.75	338.91	338.61	338.69	338.70	338.60	338.92	338.92	338.96	338.50	--	--	338.54	--
5/10/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	327.10
5/16/2006	--	--	--	--	--	--	--	--	--	--	338.70	--	--	--
6/12/2006	338.14	338.29	338.00	338.08	338.08	337.97	338.27	338.27	338.30	338.03	338.23	--	337.99	--
6/13/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	326.92
6/27/2006	--	--	--	--	--	--	--	--	--	337.66	--	--	--	--
7/11/2006	337.15	337.30	337.01	337.09	337.09	336.98	337.27	337.27	337.30	337.07	337.24	--	337.04	326.16
7/25/2006	--	--	--	--	--	--	--	--	--	336.73	--	--	--	--
8/8/2006	336.45	336.60	336.31	336.39	336.40	336.26	336.56	336.56	336.58	336.31	336.54	--	336.36	325.16
9/12/2006	335.75	335.90	335.60	335.70	335.70	335.54	335.87	335.87	335.88	335.54	Dry	--	335.75	324.11
9/13/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2006	335.27	335.42	335.13	335.23	335.23	335.06	335.38	335.38	335.39	335.02	Dry	--	335.29	323.30
10/11/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/14/2006	335.86	336.01	335.72	335.85	335.87	335.71	335.89	335.89	335.92	335.19	Dry	--	335.80	322.61
12/11/2006	--	--	--	--	--	--	--	--	--	336.68	--	--	--	--
12/12/2006	338.02	338.43	337.93	338.09	338.09	337.97	338.09	338.12	338.15	--	Dry	--	337.82	--
12/13/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	323.52
12/19/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/9/2007	338.40	338.56	338.27	338.38	338.39	338.28	338.50	338.50	338.58	337.65	338.54	--	338.14	--
1/10/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	324.63
2/13/2007	337.63	337.79	337.49	337.59	337.59	337.46	337.76	337.76	337.79	337.30	337.73	--	337.55	325.44
3/13/2007	336.98	337.14	336.83	336.94	336.94	336.80	337.10	337.11	337.12	336.74	337.08	--	336.85	325.20
4/10/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	326.04
5/8/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	326.44
5/11/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	325.85
6/26/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	325.03
7/24/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	323.58
9/11/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	322.59
10/9/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	321.69
11/13/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	321.11
11/14/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	322.81
1/8/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	320.60
1/14/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/12/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	320.70
2/13/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/18/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	Snow
3/20/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
4/8/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/9/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	324.21
5/13/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	326.40
6/10/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	325.10
6/11/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	323.34
7/9/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	322.08
9/9/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	321.37
9/10/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	320.56
10/15/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	320.09
12/8/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	319.74
12/10/2008	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	321.01
1/14/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/16/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	321.78
3/10/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/11/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	323.02
4/14/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	324.29
4/28/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/12/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/13/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	324.80
6/9/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	324.14
6/10/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/18/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/2/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/15/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/16/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	322.58
7/23/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/6/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/18/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	321.24
8/20/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/8/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	320.49
9/9/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	319.68
10/15/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	318.87
12/8/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	318.46
12/23/2009	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/12/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	318.15
2/9/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	318.19
3/9/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	318.10
4/13/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/16/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	319.72
5/11/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	320.22
6/8/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	319.82
6/22/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/6/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	319.22
7/22/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	318.67
9/14/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/15/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	318.07
10/12/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	317.73
10/13/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/9/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	317.41
11/10/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/3/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	317.17 / 317.17
12/6/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	317.14 / 317.14
12/7/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	317.12 / 317.13
12/8/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	317.11 / 317.11

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
12/9/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	317.10
12/10/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/14/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	317.05
12/15/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/17/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/21/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/28/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/30/2010	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/3/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.78
2/3/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/7/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/8/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.60
2/9/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/15/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/16/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.58
2/17/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.59 / 316.58
2/18/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.59 / 316.59
2/22/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.57 / 316.57
2/23/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.58 / 316.57
2/24/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.57 / 316.57
2/25/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.56 / 316.57
2/28/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.56 / 316.55
3/1/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.56 / 316.56
3/2/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.55
3/3/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.55 / 316.55
3/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.56 / 316.56
3/7/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.56 / 316.56
3/8/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.56 / 316.56
3/9/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.58 / 316.56
3/10/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.58 / 316.58
3/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.61 / 316.60
3/14/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.68 / 316.64
3/15/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.72 / 316.71
3/16/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.75 / 316.74
3/17/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	316.82
3/23/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	318.66
4/6/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/7/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.06
4/13/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/14/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/18/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/19/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/21/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.69
4/25/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.17
4/27/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.26
4/28/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.32
4/29/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.35
5/2/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.51
5/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	321.13
5/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/17/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	321.63
5/18/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	321.76
5/19/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	321.85
5/20/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	321.95
5/25/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	323.04
5/26/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/30/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	324.02
6/8/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	324.29

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
6/14/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	324.33
6/24/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	323.60
7/21/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/29/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	322.40
8/16/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/26/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/13/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	321.05
9/19/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/20/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/22/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/23/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/26/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/27/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/30/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/3/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.28 / 320.28 / 320.28 / 320.28 / 320.28
10/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.24 / 320.24 / 320.24
10/5/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.20 / 320.20 / 320.20
10/6/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.17 / 320.17 / 320.17 / 320.16
10/7/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.13 / 320.13 / 320.13 / 320.13 / 320.14
10/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.05 / 320.06 / 320.08 / 320.07
10/12/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.06 / 320.06 / 320.06
10/13/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.09 / 320.09 / 320.09
10/14/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	320.13 / 320.12 / 320.11
10/17/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.98 / 319.98 / 319.98 / 319.98
10/18/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.92 / 319.91 / 319.91
10/19/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/20/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/21/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/24/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/25/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/26/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/27/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/31/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.57
11/1/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.52 / 319.52 / 319.52 / 319.52 / 319.53
11/2/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.53 / 319.52 / 319.52
11/3/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.50 / 319.51 / 319.52
11/4/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.44 / 319.42 / 319.44 / 319.44
11/7/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.39
11/8/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.39
11/10/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.35
11/11/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.34
11/14/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/15/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.24
11/21/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.12
11/25/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/29/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/30/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.02
12/2/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.04
12/13/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.09
12/14/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.12
12/15/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.25
12/16/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.14
12/21/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.38
12/28/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	319.54
12/29/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	319.97
1/10/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	320.03
1/20/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	320.38
1/24/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/26/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	320.62
1/31/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	321.07
2/23/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
3/13/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	321.33
3/21/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/10/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	321.55
4/19/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/8/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	321.30
5/29/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/30/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	320.68
6/13/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	320.12
7/17/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/26/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	319.52
8/15/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/30/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/11/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	318.97
9/12/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/25/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/27/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	318.54
10/25/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/30/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/13/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	318.11
11/16/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/28/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/29/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/5/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	318.01
12/7/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/11/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	318.01
12/19/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	318.00
12/20/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/21/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	318.11
12/27/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	318.07
1/8/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	318.11
1/18/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	318.21
1/24/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/12/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	318.98
2/26/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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3/7/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/12/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	320.28
3/21/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/27/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/10/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	321.50
4/24/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/25/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/7/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/14/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	323.80
5/17/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/23/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/28/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/10/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/11/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	323.42
6/21/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	322.76
7/12/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/19/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/31/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	322.10
8/22/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/30/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
9/5/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	321.49
9/13/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/19/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/25/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/26/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/2/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/8/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	320.83
10/10/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/15/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/17/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/21/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/23/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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10/30/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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11/7/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	320.27
11/18/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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12/9/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/10/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	320.32
12/16/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/17/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/24/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/27/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/31/2013	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/3/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/10/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/14/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	320.35
1/20/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/21/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/3/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/7/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	320.45
2/14/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/18/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/21/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/3/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/4/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/10/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/11/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	320.66
3/17/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/19/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/20/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/25/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/31/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/3/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/7/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/8/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	321.05
4/9/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/14/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/16/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/21/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/24/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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5/5/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/7/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/12/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/13/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	323.90
5/20/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/22/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
5/28/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/2/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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6/10/2014	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
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7/15/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
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4/11/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	323.03
4/18/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/25/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/27/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/28/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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5/4/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/9/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	324.42
5/16/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
5/18/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/19/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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6/20/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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7/18/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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8/15/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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9/13/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	321.55
9/19/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/21/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/26/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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10/12/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	320.93
10/17/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/19/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/24/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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10/28/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/31/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/2/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/7/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/8/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	320.48
11/14/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/16/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/21/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/23/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/29/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/30/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/5/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	319.86
12/19/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/21/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/28/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/2/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/4/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/9/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/10/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	319.50

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
1/16/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/18/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/25/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/1/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/6/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/8/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/13/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	319.69
2/15/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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3/6/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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3/13/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	320.81
3/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/22/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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3/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/3/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/4/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/10/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	322.32
4/17/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/19/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/24/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/1/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/8/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/9/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	324.29
5/15/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/17/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/24/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/29/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/31/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/7/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/13/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	324.99
6/19/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/22/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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7/5/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	324.05
7/18/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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7/24/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/26/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/31/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/2/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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8/9/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/15/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	322.85
8/21/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/28/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/30/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/5/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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9/12/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	322.01
9/15/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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9/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
9/25/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/27/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/2/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/4/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/11/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	321.12
10/16/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/18/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/23/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/25/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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11/13/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/14/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	320.39
11/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/22/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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12/6/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/11/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	319.97
12/18/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/27/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/28/2017	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/2/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/3/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/8/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/9/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	319.44
1/15/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/17/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/22/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/29/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/5/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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2/12/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	319.06
2/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/20/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/21/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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4/11/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	321.02
4/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/17/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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5/8/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	323.07
5/14/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
5/23/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/28/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/30/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/4/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/11/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	323.62
6/14/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/18/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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6/25/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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7/4/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	322.89
7/16/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/23/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/1/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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8/8/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	Rejected
8/20/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/22/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/23/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/27/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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9/5/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/11/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	321.14
9/17/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/19/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/26/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/1/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/3/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/9/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	320.56
10/15/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/17/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/22/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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10/31/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/5/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/7/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	319.90
11/16/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/19/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/21/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/26/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/28/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/3/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/5/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/10/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/11/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	319.57
12/17/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/19/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/27/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/31/2018	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	319.81
1/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
1/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/28/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	320.70
2/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/26/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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3/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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3/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	321.62
3/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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4/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	323.04
4/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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5/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	324.66
5/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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5/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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6/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	325.02
6/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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6/28/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/29/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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7/3/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	324.23

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
7/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/29/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/31/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/3/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/5/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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8/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	323.14
8/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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9/5/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	322.41
9/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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9/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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9/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
10/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	321.44
10/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/26/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/29/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/31/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/1/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/3/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/5/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/7/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/8/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	320.66
11/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/14/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/15/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/17/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/19/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/21/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/22/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/26/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/27/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/28/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/4/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/6/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/10/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	320.20
12/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/18/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/24/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/31/2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	320.01
1/16/2020	337.84	--	337.83	--	--	--	--	--	--	--	--	--	--	--
1/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
2/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	322.69
2/18/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/1/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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3/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	323.21
3/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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3/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/17/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/18/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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4/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/6/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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4/9/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/14/2020	--	--	--	--	337.87	--	338.10	338.10	338.18	335.44	--	--	--	324.04
4/15/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/24/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/27/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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4/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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5/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/6/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/9/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
5/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/13/2020	--	--	--	--	337.33	--	Rejected	Rejected	Rejected	335.31	--	--	--	323.90
5/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/15/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/17/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/18/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/24/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/27/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/31/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/1/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/9/2020	--	--	--	--	337.05	--	337.29	337.31	337.32	Rejected	--	--	--	323.58
6/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/17/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/18/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/1/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/6/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/14/2020	335.66	335.84	335.53	335.74	335.75	335.58	335.72	335.83	335.86	333.37	Dry	--	335.56	322.88
7/15/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/24/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/31/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
8/1/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/3/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/6/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2020	--	--	--	--	334.25	--	334.20	334.18	334.18	331.88	--	--	--	322.27
8/17/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/24/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/9/2020	333.28	332.92	Dry	--	332.94	--	--	--	--	330.17	--	--	--	321.66
9/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/5/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/13/2020	--	--	--	332.01	332.02	--	331.78	331.76	Dry	329.24	--	--	--	321.00
10/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/20/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/4/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/9/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2020	331.39	331.53	Dry	--	331.56	--	--	--	--	328.76	--	--	--	Rejected
11/13/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/19/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/25/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/26/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2020	--	--	--	--	331.32	--	331.22	331.20	Dry	328.51	--	--	--	320.10
12/11/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/21/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12/30/2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/4/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/11/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/12/2021	332.37	332.51	Dry	332.49	332.50	Dry	332.63	332.62	Dry	329.15	Dry	--	332.26	319.70
1/18/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/20/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/25/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1/28/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/1/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/3/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/8/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/9/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2021	--	--	--	--	332.91	--	332.96	332.94	Dry	329.42	--	--	--	319.61
2/16/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/17/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/19/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/1/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/3/2021	--	--	--	--	332.86	--	--	332.87	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW3-1-I Elevation (m AMSL)	OW3-1-II Elevation (m AMSL)	OW3-1-III Elevation (m AMSL)	OW3-2-I Elevation (m AMSL)	OW3-2-II Elevation (m AMSL)	OW3-2-III Elevation (m AMSL)	OW3-3-I Elevation (m AMSL)	OW3-3-II Elevation (m AMSL)	OW3-3-III Elevation (m AMSL)	OW3-80 Elevation (m AMSL)	OW4-80 Elevation (m AMSL)	OW10-80 Elevation (m AMSL)	OW11-80 Elevation (m AMSL)	OW19-03 Elevation (m AMSL)
3/8/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/9/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/10/2021	--	--	--	--	332.80	--	332.85	332.83	Dry	329.32	--	--	--	319.85
3/15/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/17/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/18/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/22/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/29/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3/31/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/1/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/6/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/7/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/9/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/13/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/14/2021	--	--	--	--	335.00	--	335.10	335.09	335.08	331.62	--	--	--	320.78
4/19/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/21/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/27/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4/28/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/5/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/7/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/11/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/12/2021	--	--	--	--	334.95	--	335.05	335.04	335.04	331.99	--	--	--	321.58
5/17/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/19/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/25/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/27/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5/31/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/2/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/7/2021	--	--	--	--	334.85	--	335.01	335.00	335.00	332.10	--	--	--	321.86
6/8/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/14/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/21/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2021	333.92	334.07	Dry	334.05	334.05	Dry	334.06	334.04	334.04	331.77	Dry	--	333.77	321.64
7/19/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/21/2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
2/6/1980	--	--	--	--	--	--	--	--	--	--	--	--	--
3/13/1980	--	--	--	--	--	--	--	--	--	--	--	--	337.37
4/11/1980	--	--	--	--	--	--	--	--	--	--	--	--	340.01
5/27/1980	--	--	--	--	--	--	--	--	--	--	--	--	339.46
6/27/1980	--	--	--	--	--	--	--	--	--	--	--	--	338.41
8/13/1980	--	--	--	--	--	--	--	--	--	--	--	--	337.59
9/4/1980	--	--	--	--	--	--	--	--	--	--	--	--	337.26
10/31/1980	--	--	--	--	--	--	--	--	--	--	--	--	336.60
12/8/1980	--	--	--	--	--	--	--	--	--	--	--	--	336.72
2/9/1981	--	--	--	--	--	--	--	--	--	--	--	--	336.68
5/5/1981	--	--	--	--	--	--	--	--	--	--	--	--	338.65
8/31/1981	--	--	--	--	--	--	--	--	--	--	--	--	337.13
11/7/1981	--	--	--	--	--	--	--	--	--	--	--	--	338.87
2/11/1982	--	--	--	--	--	--	--	--	--	--	--	--	337.99
3/23/1982	--	--	--	--	--	--	--	--	--	--	--	--	--
5/1/1982	--	--	--	--	--	--	--	--	--	--	--	--	340.12
8/13/1982	--	--	--	--	--	--	--	--	--	--	--	--	337.62
11/30/1982	--	--	--	--	--	--	--	--	--	--	--	--	337.95
11/29/1989	--	--	--	--	--	--	--	--	--	--	--	--	--
12/7/1989	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/1989	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/1989	--	--	--	--	--	--	--	--	--	--	--	--	--
1/3/1990	--	--	--	--	--	--	--	--	--	--	--	--	--
1/10/1990	--	--	--	--	--	--	--	--	--	--	--	--	--
1/17/1990	--	--	--	--	--	--	--	--	--	--	--	--	--
1/24/1990	--	--	--	--	--	--	--	--	--	--	--	--	--
1/31/1990	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/1990	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/1990	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/1990	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/1990	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/1990	--	--	--	--	--	--	--	--	--	--	--	--	--
5/23/1990	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/1990	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/1990	--	--	--	--	--	--	--	--	--	--	--	--	--
1/15/1991	--	--	--	--	--	--	--	--	--	--	--	--	--
2/20/1991	--	--	--	--	--	--	--	--	--	--	--	--	--
3/19/1991	--	--	--	--	--	--	--	--	--	--	--	--	--
4/15/1991	--	--	--	--	--	--	--	--	--	--	--	--	--
5/22/1991	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/1991	--	--	--	--	--	--	--	--	--	--	--	--	--
7/16/1991	--	--	--	--	--	--	--	--	--	--	--	--	--
8/15/1991	--	--	--	--	--	--	--	--	--	--	--	--	--
9/15/1991	--	--	--	--	--	--	--	--	--	--	--	--	--
10/25/1991	--	--	--	--	--	--	--	--	--	--	--	--	--
11/3/1991	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/1991	--	--	--	--	--	--	--	--	--	--	--	--	--
1/17/1992	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/1992	--	--	--	--	--	--	--	--	--	--	--	--	--
2/27/1992	--	--	--	--	--	--	--	--	--	--	--	--	--
3/30/1992	--	--	--	--	--	--	--	--	--	--	--	--	--
4/2/1992	--	--	--	--	--	--	--	--	--	--	--	--	--
6/20/1992	--	--	--	--	--	--	--	--	--	--	--	--	--
7/20/1992	--	--	--	--	--	--	--	--	--	--	--	--	--
8/24/1992	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/1992	--	--	--	--	--	--	--	--	--	--	--	--	--
10/27/1992	--	--	--	--	--	--	--	--	--	--	--	--	--
11/27/1992	--	--	--	--	--	--	--	--	--	--	--	--	--
12/17/1992	--	--	--	--	--	--	--	--	--	--	--	--	--
1/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--
4/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/1993	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/1993	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/1993	--	--	--	--	--	--	--	--	--	--	--	--	--
8/27/1993	--	--	--	--	--	--	--	--	--	--	--	--	--
9/17/1993	--	--	--	--	--	--	--	--	--	--	--	--	--
10/15/1993	--	--	--	--	--	--	--	--	--	--	--	--	--
11/15/1993	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/1993	--	--	--	--	--	--	--	--	--	--	--	--	--
1/26/1994	--	--	--	--	--	--	--	--	--	--	--	--	--
2/25/1994	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/1994	--	--	--	--	--	--	--	--	--	--	--	--	--
4/22/1994	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/1994	--	--	--	--	--	--	--	--	--	--	--	--	--
6/23/1994	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/1994	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
8/18/1994	--	--	--	--	--	--	--	--	--	--	--	--	--
9/16/1994	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/1994	--	--	--	--	--	--	--	--	--	--	--	--	--
11/15/1994	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/1994	--	--	--	--	--	--	--	--	--	--	--	--	--
1/23/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
2/23/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
5/15/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
6/15/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
6/30/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
8/25/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
9/28/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
10/24/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
11/28/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/1995	--	--	--	--	--	--	--	--	--	--	--	--	--
1/29/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
3/29/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
5/31/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
6/6/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
7/19/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
9/20/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
10/3/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
11/29/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
12/23/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
12/30/1996	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
1/30/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
2/21/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
4/28/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
5/23/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
5/29/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
6/5/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
6/17/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
8/27/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
9/24/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
10/31/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
11/25/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
12/18/1997	--	--	--	--	--	--	--	--	--	--	--	--	--
1/27/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
2/5/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
2/6/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
2/26/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
3/6/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
3/26/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
4/7/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
4/16/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
5/5/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
5/6/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
5/29/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
6/21/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
10/15/1998	--	--	--	--	--	--	--	--	--	--	--	--	336.25
10/16/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
10/29/1998	--	--	--	--	--	--	--	--	--	--	--	--	335.41
11/4/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
11/19/1998	--	--	--	--	--	--	--	--	--	--	--	--	335.20
11/26/1998	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
11/27/1998	--	--	--	--	--	--	--	--	--	--	--	--	335.23
12/15/1998	--	--	--	--	--	--	--	--	--	--	--	--	335.09
12/23/1998	--	--	--	--	--	--	--	--	--	--	--	--	--
1/29/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
2/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
2/16/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
2/24/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
3/5/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
3/17/1999	--	--	--	--	--	--	--	--	--	--	--	--	336.34
3/31/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/1999	--	--	--	--	--	--	--	--	--	--	--	--	337.73
4/12/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
4/20/1999	--	--	--	--	--	--	--	--	--	--	--	--	337.70
4/22/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
5/3/1999	--	--	--	--	--	--	--	--	--	--	--	--	338.02
5/7/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
5/17/1999	--	--	--	--	--	--	--	--	--	--	--	--	337.87
5/19/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
6/1/1999	--	--	--	--	--	--	--	--	--	--	--	--	337.55
6/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	337.20
6/30/1999	--	--	--	--	--	--	--	--	--	--	--	--	336.87
7/1/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
7/5/1999	--	--	--	--	--	--	--	--	--	--	--	--	336.81
7/6/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
7/7/1999	--	--	--	--	--	--	--	--	--	--	--	--	336.74
7/10/1999	--	--	--	--	--	--	--	--	--	--	--	--	NA
7/13/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
7/14/1999	--	--	--	--	--	--	--	--	--	--	--	--	336.46
7/20/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
8/5/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/1999	--	--	--	--	--	--	--	--	--	--	--	--	335.96
8/24/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
8/26/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
9/3/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
9/9/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
9/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	335.39
9/17/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
9/27/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
10/12/1999	--	--	--	--	--	--	--	--	--	--	--	--	335.00
10/20/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
10/29/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
11/3/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
11/8/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
11/12/1999	--	--	--	--	--	--	--	--	--	--	--	--	334.99
11/18/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
11/24/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
12/2/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
12/8/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
12/16/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/1999	--	--	--	--	--	--	--	--	--	--	--	--	335.14
12/21/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
12/30/1999	--	--	--	--	--	--	--	--	--	--	--	--	--
1/6/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
1/18/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
1/20/2000	--	--	--	--	--	--	--	--	--	--	--	--	335.54
1/28/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
2/2/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
2/15/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
2/16/2000	--	--	--	--	--	--	--	--	--	--	--	--	335.51
2/17/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
2/28/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
2/29/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
3/8/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
3/20/2000	--	--	--	--	--	--	--	--	--	--	--	--	337.26
3/22/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
3/23/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
4/5/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
4/17/2000	--	--	--	--	--	--	--	--	--	--	--	--	337.43
5/3/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
5/15/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
5/16/2000	--	--	--	--	--	--	--	--	--	--	--	--	339.51
5/30/2000	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
5/31/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2000	--	--	--	--	--	--	--	--	--	--	--	--	339.20
7/4/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2000	--	--	--	--	--	--	--	--	--	--	--	--	338.51
7/26/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
8/15/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
8/16/2000	--	--	--	--	--	--	--	--	--	--	--	--	338.21
8/29/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
8/31/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
9/11/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
9/19/2000	--	--	--	--	--	--	--	--	--	--	--	--	337.40
9/29/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
10/17/2000	--	--	--	--	--	--	--	--	--	--	--	--	336.81
10/25/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
11/13/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
11/14/2000	--	--	--	--	--	--	--	--	--	--	--	--	336.34
11/30/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2000	--	--	--	--	--	--	--	--	--	--	--	--	336.05
12/21/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2000	--	--	--	--	--	--	--	--	--	--	--	--	--
1/16/2001	--	--	--	--	--	--	--	--	--	--	--	--	335.68
1/31/2001	--	--	--	--	--	--	--	--	--	--	--	--	--
2/13/2001	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/2001	--	--	--	--	--	--	--	--	--	--	--	--	336.19
2/27/2001	--	--	--	--	--	--	--	--	--	--	--	--	--
3/13/2001	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/2001	--	--	--	--	--	--	--	--	--	--	--	--	336.27
3/26/2001	--	--	--	--	--	--	--	--	--	--	--	--	--
3/28/2001	--	--	--	--	--	--	--	--	--	--	--	--	--
4/17/2001	--	--	--	--	--	--	--	--	--	--	--	--	338.54
5/2/2001	--	--	--	--	--	--	--	--	--	--	--	--	--
5/15/2001	--	--	--	--	--	--	--	--	--	--	--	--	338.46
5/28/2001	--	--	--	--	--	--	--	--	--	--	--	--	--
6/7/2001	--	--	--	--	--	--	--	--	--	--	--	--	--
6/19/2001	--	--	--	--	--	--	--	--	--	--	--	--	338.06
7/17/2001	--	--	--	--	--	--	--	--	--	--	--	--	337.42
8/14/2001	--	--	--	--	--	--	--	--	--	--	--	--	336.75
9/11/2001	--	--	--	--	--	--	--	--	--	--	--	--	336.18
9/12/2001	--	--	--	--	--	--	--	--	--	--	--	--	--
10/16/2001	--	--	--	--	--	--	--	--	--	--	--	--	335.72
11/13/2001	--	--	--	--	--	--	--	--	--	--	--	--	335.74
12/11/2001	--	--	--	--	--	--	--	--	--	--	--	--	336.63
1/15/2002	--	--	--	--	--	--	--	--	--	--	--	--	337.31
2/12/2002	--	--	--	--	--	--	--	--	--	--	--	--	337.55
3/12/2002	--	--	--	--	--	--	--	--	--	--	--	--	339.01
3/26/2002	--	--	--	--	--	--	--	--	--	--	--	--	--
4/16/2002	--	--	--	--	--	--	--	--	--	--	--	--	340.22
5/14/2002	--	--	--	--	--	--	--	--	--	--	--	--	339.83
6/11/2002	--	--	--	--	--	--	--	--	--	--	--	--	338.89
6/25/2002	--	--	--	--	--	--	--	--	--	--	--	--	--
7/9/2002	--	--	--	--	--	--	--	--	--	--	--	--	337.93
8/13/2002	--	--	--	--	--	--	--	--	--	--	--	--	336.88
9/10/2002	--	--	--	--	--	--	--	--	--	--	--	--	336.18
9/24/2002	--	--	--	--	--	--	--	--	--	--	--	--	--
10/8/2002	--	--	--	--	--	--	--	--	--	--	--	--	--
10/9/2002	--	--	--	--	--	--	--	--	--	--	--	--	335.64
11/12/2002	--	--	--	--	--	--	--	--	--	--	--	--	335.05
12/10/2002	--	--	--	--	--	--	--	--	--	--	--	--	334.79
1/2/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
1/14/2003	--	--	--	--	--	--	--	--	--	--	--	--	334.59
1/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
2/12/2003	--	--	--	--	--	--	--	--	--	--	--	--	334.46
3/11/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
3/13/2003	--	--	--	--	--	--	--	--	--	--	--	--	334.34
3/18/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
4/1/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
4/10/2003	--	--	--	--	--	--	--	--	--	--	--	--	336.91
4/11/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
4/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
4/22/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
5/5/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
5/13/2003	--	--	--	--	--	--	--	--	--	--	--	--	338.70
5/14/2003	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
5/20/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
5/27/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
6/10/2003	--	--	--	--	--	--	--	--	--	--	--	--	334.97
6/17/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
7/1/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
7/2/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2003	--	--	--	--	--	--	--	--	--	--	--	--	338.11
7/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
7/16/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
7/17/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
8/5/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2003	--	--	--	--	--	--	--	--	--	--	--	--	336.79
8/18/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
8/19/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
8/27/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
9/2/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
9/9/2003	--	--	--	--	--	--	--	--	--	--	--	--	336.11
9/23/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.03
10/15/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
10/28/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
10/30/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2003	--	--	--	--	--	--	--	--	--	--	--	--	335.54
11/12/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
11/28/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2003	--	--	--	--	--	--	--	--	--	--	--	--	337.44
12/19/2003	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	338.26
1/16/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	337.31
2/24/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
3/9/2004	--	--	--	--	--	--	--	--	--	--	--	--	338.65
3/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
3/24/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
4/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	339.64
4/16/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
4/26/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
5/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	339.58
5/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
5/25/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
5/26/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
6/8/2004	--	--	--	--	--	--	--	--	--	--	--	--	338.58
6/9/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
6/24/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	337.36
7/14/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
8/11/2004	--	--	--	--	--	--	--	--	--	--	--	--	336.48
8/12/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
8/30/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
9/10/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
9/14/2004	--	--	--	--	--	--	--	--	--	--	--	--	335.64
9/16/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
9/21/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
9/30/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
10/12/2004	--	--	--	--	--	--	--	--	--	--	--	--	335.11
10/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
10/26/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
11/9/2004	--	--	--	--	--	--	--	--	--	--	--	--	334.65
11/23/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
12/14/2004	--	--	--	--	--	--	--	--	--	--	--	--	334.31
12/15/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
12/20/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
12/22/2004	--	--	--	--	--	--	--	--	--	--	--	--	--
1/11/2005	--	--	--	--	--	--	--	--	--	--	--	--	335.58
1/12/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
1/28/2005	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
2/8/2005	--	--	--	--	--	--	--	--	--	--	--	--	336.52
2/9/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
2/22/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
3/8/2005	--	--	--	--	--	--	--	--	--	--	--	--	337.65
3/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
4/12/2005	--	--	--	--	--	--	--	--	--	--	--	--	340.17
4/26/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
5/10/2005	--	--	--	--	--	--	--	--	--	--	--	--	339.47
5/24/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
6/14/2005	--	--	--	--	--	--	--	--	--	--	--	--	337.92
6/15/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
6/28/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2005	--	--	--	--	--	--	--	--	--	--	--	--	336.95
7/26/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2005	--	--	--	--	--	--	--	--	--	--	--	--	336.20
8/10/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
8/23/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
9/13/2005	--	--	--	--	--	--	--	--	--	--	--	--	335.45
9/14/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
9/27/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
10/11/2005	--	--	--	--	--	--	--	--	--	--	--	--	334.89
10/12/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
10/25/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
11/8/2005	--	--	--	--	--	--	--	--	--	--	--	--	334.51
11/9/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
11/22/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
12/1/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2005	--	--	--	--	--	--	--	--	--	--	--	--	334.44
12/22/2005	--	--	--	--	--	--	--	--	--	--	--	--	--
1/10/2006	--	--	--	--	--	--	--	--	--	--	--	--	334.98
1/11/2006	--	--	--	--	--	--	--	--	--	--	--	--	--
2/14/2006	--	--	--	--	--	--	--	--	--	--	--	--	338.25
3/14/2006	--	--	--	--	--	--	--	--	--	--	--	--	340.28
3/15/2006	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/2006	--	--	--	--	--	--	--	--	--	--	--	--	338.79
5/9/2006	--	--	--	--	--	--	--	--	--	--	--	--	338.82
5/10/2006	--	--	--	--	--	--	--	--	--	--	--	--	--
5/16/2006	--	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2006	--	--	--	--	--	--	--	--	--	--	--	--	338.18
6/13/2006	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2006	--	--	--	--	--	--	--	--	--	--	--	--	--
7/11/2006	--	--	--	--	--	--	--	--	--	--	--	--	337.18
7/25/2006	--	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2006	--	--	--	--	--	--	--	--	--	--	--	--	336.48
9/12/2006	--	--	--	--	--	--	--	--	--	--	--	--	335.79
9/13/2006	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10/2006	--	--	--	--	--	--	--	--	--	--	--	--	335.32
10/11/2006	--	--	--	--	--	--	--	--	--	--	--	--	--
11/14/2006	--	--	--	--	--	--	--	--	--	--	--	--	335.92
12/11/2006	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/2006	--	--	--	--	--	--	--	--	--	--	--	--	338.16
12/13/2006	--	--	--	--	--	--	--	--	--	--	--	--	--
12/19/2006	--	--	--	--	--	--	--	--	--	--	--	--	--
1/9/2007	--	--	--	--	--	--	--	--	--	--	--	--	338.50
1/10/2007	--	--	--	--	--	--	--	--	--	--	--	--	--
2/13/2007	--	--	--	--	--	--	--	--	--	--	--	--	337.68
3/13/2007	--	--	--	--	--	--	--	--	--	--	--	--	337.02
4/10/2007	339.53	331.08	--	--	--	--	--	--	--	--	--	--	--
5/8/2007	--	331.45	--	--	--	--	--	--	--	--	--	--	--
5/11/2007	339.00	--	--	--	--	--	--	--	--	--	--	--	--
6/12/2007	338.37	330.98	--	--	--	--	--	--	--	--	--	--	--
6/26/2007	--	--	--	--	--	--	--	--	--	--	--	--	--
7/10/2007	337.43	330.13	--	--	--	--	--	--	--	--	--	--	--
7/11/2007	--	--	--	--	--	--	--	--	--	--	--	--	--
7/24/2007	--	--	--	--	--	--	--	--	--	--	--	--	--
8/14/2007	336.42	328.81	--	--	--	--	--	--	--	--	--	--	--
9/11/2007	335.82	327.85	--	--	--	--	--	--	--	--	--	--	--
10/9/2007	335.24	326.91	--	--	--	--	--	--	--	--	--	--	--
11/13/2007	334.68	325.97	--	--	--	--	--	--	--	--	--	--	--
11/14/2007	--	--	--	--	--	--	--	--	--	--	--	--	--
12/12/2007	--	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2007	334.34	325.46	--	--	--	--	--	--	--	--	--	--	--
1/8/2008	334.23	325.25	--	--	--	--	--	--	--	--	--	--	--
1/14/2008	--	--	--	--	--	--	--	--	--	--	--	--	--
2/12/2008	--	325.54	--	--	--	--	--	--	--	--	--	--	--
2/13/2008	335.42	--	--	--	--	--	--	--	--	--	--	--	--
3/18/2008	337.28	327.19	--	--	--	--	--	--	--	--	--	--	--
3/20/2008	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
4/8/2008	--	--	335.80	--	--	--	--	--	--	--	--	--	--
4/9/2008	340.71	331.94	--	341.16	--	--	--	--	--	--	--	--	--
5/13/2008	339.89	333.15	335.29	339.74	--	--	--	--	--	--	--	--	--
6/10/2008	338.78	331.85	334.97	338.51	--	--	--	--	--	--	--	--	--
6/11/2008	--	--	--	--	--	--	--	--	--	--	--	--	--
6/27/2008	--	--	--	--	--	--	--	--	--	--	--	--	--
7/8/2008	337.94	330.33	334.68	337.67	--	--	--	--	--	--	--	--	--
7/9/2008	--	--	--	--	--	--	--	--	--	--	--	--	--
7/22/2008	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2008	337.91	328.68	335.12	337.99	--	--	--	--	--	--	--	--	--
9/9/2008	337.49	328.02	334.68	337.62	--	--	--	--	--	--	--	--	--
9/10/2008	--	--	--	--	--	--	--	--	--	--	--	--	--
10/14/2008	336.70	326.99	334.43	336.79	--	--	--	--	--	--	--	--	--
10/15/2008	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2008	336.03	326.16	334.31	336.23	--	--	--	--	--	--	--	--	--
12/8/2008	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2008	335.80	325.59	334.68	336.10	--	--	--	--	--	--	--	--	--
12/10/2008	--	--	--	--	--	--	--	--	--	--	--	--	--
1/13/2009	338.86	328.07	--	--	--	--	--	--	--	--	--	--	--
1/14/2009	--	--	--	--	--	--	--	--	--	--	--	--	--
1/16/2009	--	--	335.09	338.91	--	--	--	--	--	--	--	--	--
2/10/2009	338.03	--	335.08	338.06	--	--	--	--	--	--	--	--	--
2/11/2009	--	328.52	--	--	--	--	--	--	--	--	--	--	--
3/10/2009	--	--	--	--	--	--	--	--	--	--	--	--	--
3/11/2009	340.30	330.76	335.78	340.37	--	--	--	--	--	--	--	--	--
4/14/2009	340.45	332.32	335.58	340.34	--	--	--	--	--	--	--	--	--
4/28/2009	340.16	--	--	339.80	--	--	--	--	--	--	--	--	--
5/12/2009	340.15	--	335.31	339.89	--	--	--	--	--	--	--	--	--
5/13/2009	--	332.85	--	--	--	--	--	--	--	--	--	--	--
6/9/2009	339.08	331.51	--	--	--	--	--	--	--	--	--	--	--
6/10/2009	--	--	334.95	338.52	--	--	--	--	--	--	--	--	--
6/18/2009	338.80	331.01	--	--	--	--	--	--	--	--	--	--	--
6/23/2009	--	--	--	--	--	--	--	--	--	--	--	--	--
6/25/2009	338.61	330.66	--	--	--	--	--	--	--	--	--	--	--
7/2/2009	338.41	330.28	--	--	--	--	--	--	--	--	--	--	--
7/9/2009	338.14	329.82	--	--	--	--	--	--	--	--	--	--	--
7/15/2009	--	--	334.44	--	--	--	--	--	--	--	--	--	--
7/16/2009	338.01	329.57	--	337.48	--	--	--	--	--	--	--	--	--
7/23/2009	337.80	329.21	--	--	--	--	--	--	--	--	--	--	--
7/28/2009	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/2009	337.60	328.82	--	--	--	--	--	--	--	--	--	--	--
8/6/2009	337.37	328.47	--	--	--	--	--	--	--	--	--	--	--
8/11/2009	--	--	--	--	--	--	--	--	--	--	--	--	--
8/12/2009	--	--	334.45	336.84	--	--	--	--	--	--	--	--	--
8/14/2009	337.16	328.09	--	--	--	--	--	--	--	--	--	--	--
8/17/2009	--	--	--	--	--	--	--	--	--	--	--	--	--
8/18/2009	--	--	--	--	--	--	--	--	--	--	--	--	--
8/20/2009	337.08	327.91	--	--	--	--	--	--	--	--	--	--	--
9/8/2009	336.57	326.84	--	336.41	--	--	--	--	--	--	--	--	--
9/9/2009	--	--	334.17	--	--	--	--	--	--	--	--	--	--
10/14/2009	335.75	325.31	333.88	335.82	--	--	--	--	--	--	--	--	--
10/15/2009	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2009	335.24	324.63	333.95	335.44	--	--	--	--	--	--	--	--	--
12/8/2009	334.92	--	334.42	335.24	--	--	--	--	--	--	--	--	--
12/23/2009	--	323.98	--	--	--	--	--	--	--	--	--	--	--
1/12/2010	335.21	323.82	334.52	335.77	--	--	--	--	--	--	--	--	--
2/9/2010	335.28	323.81	334.46	335.81	--	--	--	--	--	--	--	--	--
3/9/2010	335.18	323.71	334.30	335.68	--	--	--	--	--	--	--	--	--
4/13/2010	--	Destroyed	335.26	339.06	--	--	--	--	--	--	--	--	--
4/16/2010	339.08	--	--	--	--	--	--	--	--	--	--	--	--
5/11/2010	338.50	Destroyed	335.03	338.26	--	--	--	--	--	--	--	--	--
6/8/2010	337.81	Destroyed	334.77	337.51	--	--	--	--	--	--	--	--	--
6/22/2010	--	--	--	--	--	--	--	--	--	--	--	--	--
7/6/2010	--	--	--	--	--	--	--	--	--	--	--	--	--
7/13/2010	337.40	327.56	334.58	337.19	--	--	--	--	--	--	--	--	--
7/22/2010	--	--	--	--	--	--	--	--	--	--	--	--	--
8/10/2010	336.77	326.96	334.13	336.60	--	--	--	--	--	--	--	--	--
9/14/2010	335.89	--	--	--	--	--	--	--	--	--	--	--	--
9/15/2010	--	325.79	333.62	335.87	--	--	--	--	--	--	--	--	--
10/12/2010	335.30	--	333.59	335.41	--	--	--	--	--	--	--	--	--
10/13/2010	--	324.80	--	--	--	--	--	--	--	--	--	--	--
11/9/2010	334.80	323.84	--	335.04	--	--	--	--	--	--	--	--	--
11/10/2010	--	--	333.76	--	--	--	--	--	--	--	--	--	--
12/2/2010	335.02 / 335.03 / 334.87 / 335.03 / 335.02	--	--	--	--	--	--	--	--	--	--	--	--
12/3/2010	335.48 / 335.55 / 335.52	323.43 / 323.42 / 323.43 / 323.41 / 323.42 / 323.40	--	--	--	--	--	--	--	--	--	--	--
12/6/2010	336.08 / 336.08 / 336.07	323.46 / 323.45 / 323.45	--	--	--	--	--	--	--	--	--	--	--
12/7/2010	336.14 / 336.15 / 336.13	323.42 / 323.42 / 323.44 / 323.43 / 323.43	--	--	--	--	--	--	--	--	--	--	--
12/8/2010	336.23 / 336.20 / 336.23	323.40 / 323.40 / 323.40	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
12/9/2010	336.29 / 336.30 / 336.28	323.38	--	--	--	--	--	--	--	--	--	--	--
12/10/2010	336.38 / 336.39 / 336.40	--	--	--	--	--	--	--	--	--	--	--	--
12/13/2010	336.62 / 336.62 / 336.62	--	--	--	--	--	--	--	--	--	--	--	--
12/14/2010	336.67 / 336.66 / 336.68	323.33	--	--	--	--	--	--	--	--	--	--	--
12/15/2010	336.72 / 336.73 / 336.71	--	--	--	--	--	--	--	--	--	--	--	--
12/16/2010	336.81 / 336.81 / 336.80	--	--	--	--	--	--	--	--	--	--	--	--
12/17/2010	336.83	--	--	--	--	--	--	--	--	--	--	--	--
12/20/2010	336.96 / 336.96 / 336.95	--	--	--	--	--	--	--	--	--	--	--	--
12/21/2010	336.99 / 336.99 / 337.00	--	--	--	--	--	--	--	--	--	--	--	--
12/22/2010	336.56 / 337.04 / 336.50 / 336.53 / 336.62	--	--	--	--	--	--	--	--	--	--	--	--
12/23/2010	336.25 / 336.23 / 336.24	--	--	--	--	--	--	--	--	--	--	--	--
12/28/2010	335.77 / 335.77 / 335.77	--	--	--	--	--	--	--	--	--	--	--	--
12/29/2010	335.70 / 335.71 / 335.70	--	--	--	--	--	--	--	--	--	--	--	--
12/30/2010	335.66 / 335.66 / 335.66	--	--	--	--	--	--	--	--	--	--	--	--
1/3/2011	335.50 / 335.50 / 335.50	--	--	--	--	--	--	--	--	--	--	--	--
1/4/2011	335.49	--	--	--	--	--	--	--	--	--	--	--	--
1/11/2011	335.34	323.10	334.44	335.62	--	--	--	--	--	--	--	--	--
2/3/2011	335.25 / 335.23 / 335.22 / 335.19 / 335.11	--	--	--	--	--	--	--	--	--	--	--	--
2/4/2011	335.39 / 335.36 / 335.38	--	--	--	--	--	--	--	--	--	--	--	--
2/7/2011	335.70 / 335.69 / 335.70	--	--	--	--	--	--	--	--	--	--	--	--
2/8/2011	335.66 / 335.68 / 335.75 / 335.67 / 335.70	322.94	334.21	335.70	--	--	--	--	--	--	--	--	--
2/9/2011	335.62 / 335.62 / 335.62	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2011	335.58 / 335.58 / 335.58	--	--	--	--	--	--	--	--	--	--	--	--
2/11/2011	335.54 / 335.54 / 335.54	--	--	--	--	--	--	--	--	--	--	--	--
2/14/2011	335.46 / 335.50 / 335.49	--	--	--	--	--	--	--	--	--	--	--	--
2/15/2011	335.39 / 335.38 / 335.39	--	--	--	--	--	--	--	--	--	--	--	--
2/16/2011	--	323.07 / 323.11 / 323.12 / 322.99 / 323.09	--	--	--	--	--	--	--	--	--	--	--
2/17/2011	--	323.19 / 323.22 / 323.19	--	--	--	--	--	--	--	--	--	--	--
2/18/2011	--	323.21 / 323.24 / 323.23	--	--	--	--	--	--	--	--	--	--	--
2/22/2011	--	323.27 / 323.26 / 323.26	--	--	--	--	--	--	--	--	--	--	--
2/23/2011	--	323.30 / 323.28 / 323.29	--	--	--	--	--	--	--	--	--	--	--
2/24/2011	--	323.32 / 323.29 / 323.29	334.56	335.74	--	--	--	--	--	--	--	--	--
2/25/2011	335.37	323.30 / 323.26 / 323.28 / 323.27	--	--	--	--	--	--	--	--	--	--	--
2/28/2011	--	323.34 / 323.32 / 323.30	--	--	--	--	--	--	--	--	--	--	--
3/1/2011	--	323.34 / 323.33 / 323.33 / 323.36 / 323.33	--	--	--	--	--	--	--	--	--	--	--
3/2/2011	--	323.32 / 323.33 / 323.33	--	--	--	--	--	--	--	--	--	--	--
3/3/2011	--	323.34 / 323.33 / 323.32	--	--	--	--	--	--	--	--	--	--	--
3/4/2011	--	323.38 / 323.37 / 323.39	--	--	--	--	--	--	--	--	--	--	--
3/7/2011	--	323.41 / 323.40 / 323.42	--	--	--	--	--	--	--	--	--	--	--
3/8/2011	--	323.40 / 323.40 / 323.42	334.94	336.04	--	--	--	--	--	--	--	--	--
3/9/2011	--	323.47 / 323.45 / 323.49	--	--	--	--	--	--	--	--	--	--	--
3/10/2011	335.80 / 335.78	323.48 / 323.50 / 323.52 / 323.51 / 323.53	--	--	--	--	--	--	--	--	--	--	--
3/11/2011	--	323.59 / 323.56 / 323.57	--	--	--	--	--	--	--	--	--	--	--
3/14/2011	--	323.68 / 323.70 / 323.69	--	--	--	--	--	--	--	--	--	--	--
3/15/2011	--	323.82 / 323.82 / 323.81	--	--	--	--	--	--	--	--	--	--	--
3/16/2011	--	323.94 / 323.93 / 323.96	--	--	--	--	--	--	--	--	--	--	--
3/17/2011	--	324.06	--	--	--	--	--	--	--	--	--	--	--
3/23/2011	338.97	325.27	--	--	--	--	--	--	--	--	--	--	--
3/24/2011	--	--	335.64	339.73	--	--	--	--	--	--	--	--	--
4/5/2011	339.33	327.65	335.57	339.61	--	--	--	--	--	--	--	--	--
4/6/2011	339.34 / 339.35 / 339.34 / 339.34 / 339.35 / 339.34	327.37 / 327.36 / 327.36 / 327.34 / 327.37 / 327.36	--	--	--	--	--	--	--	--	--	--	--
4/7/2011	339.34 / 339.34 / 339.35 / 339.34 / 339.33 / 339.37 / 339.37	327.34 / 327.40 / 327.51 / 327.47 / 327.39 / 327.52 / 327.42	--	--	--	--	--	--	--	--	--	--	--
4/11/2011	339.49 / 339.50 / 339.48	328.04 / 328.04 / 328.02	--	--	--	--	--	--	--	--	--	--	--
4/12/2011	339.35 / 339.36 / 339.35	327.94 / 327.91 / 327.92 / 327.92	335.30	339.57	--	--	--	--	--	--	--	--	--
4/13/2011	339.35 / 339.35 / 339.35	328.04 / 328.00 / 328.05	--	--	--	--	--	--	--	--	--	--	--
4/14/2011	339.30 / 339.25 / 339.24 / 339.30 / 339.27 / 339.30 / 339.30 / 339.32	328.07 / 328.06 / 328.06 / 328.09 / 328.05 / 328.07 / 328.06 / 328.10	--	--	--	--	--	--	--	--	--	--	--
4/18/2011	339.37 / 339.37 / 339.36	328.41 / 328.42 / 328.44	--	--	--	--	--	--	--	--	--	--	--
4/19/2011	339.36 / 339.36 / 339.37	328.45 / 328.45 / 328.47	--	--	--	--	--	--	--	--	--	--	--
4/20/2011	339.54 / 339.54 / 339.53	328.69 / 328.70 / 328.69	335.53	339.49	--	--	--	--	--	--	--	--	--
4/21/2011	339.51 / 339.54	328.52 / 328.50	--	--	--	--	--	--	--	--	--	--	--
4/25/2011	339.77 / 340.01 / 340.04	328.98 / 328.92 / 328.90	--	--	--	--	--	--	--	--	--	--	--
4/26/2011	340.23 / 340.20 / 340.25	329.22 / 329.25 / 329.17	--	--	--	--	--	--	--	--	--	--	--
4/27/2011	340.35 / 340.35 / 340.38	329.46 / 329.49 / 329.39	--	--	--	--	--	--	--	--	--	--	--
4/28/2011	340.51 / 340.50 / 340.50	329.73 / 329.70 / 329.80	335.65	340.15	--	--	--	--	--	--	--	--	--
4/29/2011	340.59 / 340.58 / 340.54	329.80 / 329.80 / 329.80	--	--	--	--	--	--	--	--	--	--	--
5/2/2011	340.58	330.30	335.59	340.32	--	--	--	--	--	--	--	--	--
5/4/2011	340.61	330.58	--	--	--	--	--	--	--	--	--	--	--
5/10/2011	340.53	331.29	335.36	340.16	--	--	--	--	--	--	--	--	--
5/11/2011	340.50	331.39	335.32	340.14	--	--	--	--	--	--	--	--	--
5/17/2011	340.90 / 340.90 / 341.01	332.12 / 332.09 / 332.12	--	--	--	--	--	--	--	--	--	--	--
5/18/2011	340.91 / 340.94 / 340.92	332.20 / 332.18 / 332.27	--	--	--	--	--	--	--	--	--	--	--
5/19/2011	341.07 / 341.06 / 341.06 / 341.05 / 341.10	332.73 / 332.74 / 332.65 / 332.68 / 332.75	--	--	--	--	--	--	--	--	--	--	--
5/20/2011	341.04 / 341.03 / 341.04	333.31 / 333.19 / 333.26	--	--	--	--	--	--	--	--	--	--	--
5/25/2011	340.80	334.00	--	--	--	--	--	--	--	--	--	--	--
5/26/2011	--	--	335.80	341.00	--	--	--	--	--	--	--	--	--
5/30/2011	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2011	340.54	333.76	--	--	--	--	--	--	--	--	--	--	--
6/8/2011	340.56 / 340.56	333.66 / 333.67	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
6/14/2011	340.24	333.26	335.41	339.96	--	--	--	--	--	--	--	--	--
6/24/2011	339.77 / 339.74	332.70 / 332.71 / 332.70	--	--	--	--	--	--	--	--	--	--	--
6/28/2011	--	--	335.08	339.13	--	--	--	--	--	--	--	--	--
7/7/2011	339.06	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2011	338.88	331.40	334.71	338.44	--	--	--	--	--	--	--	--	--
7/21/2011	338.53 / 338.57	330.87 / 330.86	--	--	--	--	--	--	--	--	--	--	--
7/25/2011	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/2011	--	--	--	--	--	--	--	--	--	--	--	--	--
7/28/2011	338.23	330.40	334.30	337.75	--	--	--	--	--	--	--	--	--
7/29/2011	--	--	--	--	--	--	--	--	--	--	--	--	--
8/4/2011	337.92	--	--	--	--	--	--	--	--	--	--	--	--
8/8/2011	--	--	--	--	--	--	--	--	--	--	--	--	--
8/9/2011	337.81	329.89	334.18	337.40	--	--	--	--	--	--	--	--	--
8/16/2011	--	--	--	--	--	--	--	--	--	--	--	--	--
8/17/2011	337.51 / 337.48	329.36 / 329.36	--	--	--	--	--	--	--	--	--	--	--
8/26/2011	--	--	333.94	336.85	--	--	--	--	--	--	--	--	--
9/13/2011	336.60	328.03	333.73	336.42	--	--	--	--	--	--	--	--	--
9/19/2011	--	--	--	--	--	--	--	--	--	--	--	--	--
9/20/2011	--	--	--	--	--	--	--	--	--	--	--	--	--
9/22/2011	336.30 / 336.30 / 336.29 / 336.30 / 336.30	327.53 / 327.49 / 327.49 / 327.53 / 327.53	--	--	--	--	--	--	--	--	--	--	--
9/23/2011	336.32 / 336.28 / 336.32 / 336.32	327.50 / 327.50 / 327.51 / 327.51	333.64	--	--	--	--	--	--	--	--	--	--
9/26/2011	336.24 / 336.24 / 336.24	327.37 / 327.36 / 327.35	--	--	--	--	--	--	--	--	--	--	--
9/27/2011	336.21 / 336.20 / 336.21	327.33 / 327.34 / 327.33	--	--	--	--	--	--	--	--	--	--	--
9/28/2011	336.19 / 336.18 / 336.19	327.27 / 327.27 / 327.29	--	336.04	--	--	--	--	--	--	--	--	--
9/29/2011	336.18 / 336.20 / 336.17 / 336.18 / 336.19	327.31 / 327.29 / 327.29 / 327.28	--	--	--	--	--	--	--	--	--	--	--
9/30/2011	336.16 / 336.16	327.24 / 327.28 / 327.27	--	--	--	--	--	--	--	--	--	--	--
10/3/2011	--	327.00 / 326.99 / 327.00 / 327.00 / 327.00	--	--	--	--	--	--	--	--	--	--	--
10/4/2011	--	326.96 / 326.95 / 326.96	--	--	--	--	--	--	--	--	--	--	--
10/5/2011	--	326.90 / 326.91	--	--	--	--	--	--	--	--	--	--	--
10/6/2011	--	326.84 / 326.86 / 326.85 / 326.85	--	--	--	--	--	--	--	--	--	--	--
10/7/2011	--	326.78 / 326.79 / 326.80 / 326.80	--	--	--	--	--	--	--	--	--	--	--
10/11/2011	335.84	326.74 / 326.79 / 326.77 / 326.77 / 326.74	333.52	335.75	--	--	--	--	--	--	--	--	--
10/12/2011	--	326.75 / 326.75 / 326.77	--	--	--	--	--	--	--	--	--	--	--
10/13/2011	--	326.81 / 326.82 / 326.82	--	--	--	--	--	--	--	--	--	--	--
10/14/2011	--	326.90 / 326.89 / 326.89	--	--	--	--	--	--	--	--	--	--	--
10/17/2011	--	326.69 / 326.69 / 326.69 / 326.69 / 326.69	--	--	--	--	--	--	--	--	--	--	--
10/18/2011	--	326.57 / 326.58 / 326.58	--	--	--	--	--	--	--	--	--	--	--
10/19/2011	335.69 / 335.69 / 335.69 / 335.68	326.63 / 326.64 / 326.59 / 326.64	--	--	--	--	--	--	--	--	--	--	--
10/20/2011	335.72 / 335.72 / 335.72 / 335.72	326.76 / 326.74 / 326.75	--	--	--	--	--	--	--	--	--	--	--
10/21/2011	335.68 / 335.68 / 335.69	326.55 / 326.56 / 326.56	--	--	--	--	--	--	--	--	--	--	--
10/24/2011	335.69 / 335.69 / 335.69	326.59 / 326.59 / 326.58	--	--	--	--	--	--	--	--	--	--	--
10/25/2011	335.65 / 335.65 / 335.65 / 335.65	326.51 / 326.49 / 326.49 / 326.49	--	--	--	--	--	--	--	--	--	--	--
10/26/2011	335.67 / 335.67 / 335.66 / 335.69	326.57 / 326.57 / 326.54 / 326.56	--	--	--	--	--	--	--	--	--	--	--
10/27/2011	335.65 / 335.65 / 335.66	326.53 / 326.51 / 326.49	334.71	335.60	--	--	--	--	--	--	--	--	--
10/28/2011	335.63 / 335.63 / 335.63 / 335.63 / 335.63	326.43 / 326.41 / 326.42 / 326.42 / 326.41	--	--	--	--	--	--	--	--	--	--	--
10/31/2011	335.64 / 335.64 / 335.63	326.30 / 326.30 / 326.29	--	--	--	--	--	--	--	--	--	--	--
11/1/2011	--	326.21 / 326.72 / 326.45 / 326.36 / 326.32	--	--	--	--	--	--	--	--	--	--	--
11/2/2011	--	328.20 / 328.30 / 328.05	--	--	--	--	--	--	--	--	--	--	--
11/3/2011	--	328.78 / 328.74 / 328.71	--	--	--	--	--	--	--	--	--	--	--
11/4/2011	--	329.41 / 329.36 / 329.30 / 328.37	334.62	335.65	--	--	--	--	--	--	--	--	--
11/7/2011	335.60	326.65	--	--	--	--	--	--	--	--	--	--	--
11/8/2011	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10/2011	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2011	336.33 / 336.36 / 336.30	330.78 / 330.92 / 331.05	--	--	--	--	--	--	--	--	--	--	--
11/14/2011	336.72	333.09	334.56	336.82	--	--	--	--	--	--	--	--	--
11/15/2011	336.80	333.41	--	--	--	--	--	--	--	--	--	--	--
11/21/2011	--	--	--	--	--	--	--	--	--	--	--	--	--
11/25/2011	337.69 / 337.68	335.98 / 335.98	--	--	--	--	--	--	--	--	--	--	--
11/29/2011	--	--	334.92	338.34	--	--	--	--	--	--	--	--	--
11/30/2011	338.17	336.36	--	--	--	--	--	--	--	--	--	--	--
12/2/2011	--	--	335.24	338.98	--	--	--	--	--	--	--	--	--
12/9/2011	339.19	336.91	--	--	--	--	--	--	--	--	--	--	--
12/13/2011	339.38 / 339.19 / 339.22	336.80 / 336.44 / 336.73	--	--	--	--	--	--	--	--	--	--	--
12/14/2011	339.16 / 339.14	334.85 / 335.20	335.17	339.92	--	--	--	--	--	--	--	--	--
12/15/2011	339.22	334.17	--	--	--	--	--	--	--	--	--	--	--
12/16/2011	339.14	333.14	--	--	--	--	--	--	--	--	--	--	--
12/21/2011	339.23	331.44	335.28	339.80	--	--	--	--	--	--	--	--	--
12/28/2011	339.00	329.86	--	--	--	--	--	--	--	--	--	--	--
12/29/2011	338.98 / 338.99	329.64	--	--	--	--	--	--	--	--	--	--	--
1/6/2012	339.01	328.93	--	--	--	--	--	--	--	--	--	--	--
1/10/2012	338.88	328.70	335.21	339.16	--	--	--	--	--	--	--	--	--
1/20/2012	338.78	328.46	--	--	--	--	--	--	--	--	--	--	--
1/24/2012	338.73 / 338.76	328.50 / 328.51	--	--	--	--	--	--	--	--	--	--	--
1/26/2012	--	--	335.18	338.90	--	--	--	--	--	--	--	--	--
1/31/2012	--	--	--	338.81	--	--	--	--	--	--	--	--	--
2/14/2012	338.66	328.56	335.09	338.81	--	--	--	--	--	--	--	--	--
2/23/2012	338.49 / 338.49	328.66 / 328.68	--	--	--	--	--	--	--	--	--	--	--
2/28/2012	--	--	335.05	338.25	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
3/13/2012	338.65	328.45	335.27	338.59	--	--	--	--	--	--	--	--	--
3/21/2012	338.74 / 338.74	328.56	--	--	--	--	--	--	--	--	--	--	--
3/28/2012	--	--	335.06	338.68	--	--	--	--	--	--	--	--	--
4/10/2012	338.73	329.31	334.95	338.30	--	--	--	--	--	--	--	--	--
4/19/2012	338.57 / 338.56	--	--	--	--	--	--	--	--	--	--	--	--
4/20/2012	--	329.44	--	--	--	--	--	--	--	--	--	--	--
4/26/2012	--	--	--	337.87	--	--	--	--	--	--	--	--	--
5/8/2012	338.40	329.42	334.91	337.61	--	--	--	--	--	--	--	--	--
5/29/2012	338.02 / 338.02	329.20 / 329.19	--	--	--	--	--	--	--	--	--	--	--
5/30/2012	--	--	--	337.27	--	--	--	--	--	--	--	--	--
6/12/2012	337.81	328.88	--	--	--	--	--	--	--	--	--	--	--
6/13/2012	--	--	334.68	337.12	--	--	--	--	--	--	--	--	--
6/19/2012	337.64	328.67	--	--	--	--	--	--	--	--	--	--	--
6/28/2012	--	--	334.36	336.90	--	--	--	--	--	--	--	--	--
7/10/2012	337.11	328.15	334.06	336.67	--	--	--	--	--	--	--	--	--
7/17/2012	336.97	--	--	--	--	--	--	--	--	--	--	--	--
7/18/2012	--	327.98	--	--	--	--	--	--	--	--	--	--	--
7/26/2012	--	--	333.76	336.40	--	--	--	--	--	--	--	--	--
8/14/2012	--	--	333.58	336.02	--	--	--	--	--	--	--	--	--
8/15/2012	336.21	327.11	--	--	--	--	--	--	--	--	--	--	--
8/29/2012	335.86 / 335.86	326.58 / 326.55	--	--	--	--	--	--	--	--	--	--	--
8/30/2012	--	--	--	335.73	--	--	--	--	--	--	--	--	--
9/11/2012	--	--	333.35	335.51	--	--	--	--	--	--	--	--	--
9/12/2012	335.54	326.04	--	--	--	--	--	--	--	--	--	--	--
9/25/2012	335.30 / 335.30	325.65 / 325.62	--	--	--	--	--	--	--	--	--	--	--
9/27/2012	--	--	--	335.28	--	--	--	--	--	--	--	--	--
10/10/2012	335.15	325.38	333.23	335.09	--	--	--	--	--	--	--	--	--
10/25/2012	335.09 / 335.10	325.70 / 325.71	--	--	--	--	--	--	--	--	--	--	--
10/30/2012	--	--	--	334.90	--	--	--	--	--	--	--	--	--
11/13/2012	--	--	334.30	335.03	--	--	--	--	--	--	--	--	--
11/16/2012	335.05	325.39	--	--	--	--	--	--	--	--	--	--	--
11/28/2012	334.98 / 334.98	325.18 / 325.20	--	--	--	--	--	--	--	--	--	--	--
11/29/2012	--	--	--	335.09	--	--	--	--	--	--	--	--	--
12/5/2012	--	--	--	335.09	--	--	--	--	--	--	--	--	--
12/7/2012	--	--	--	335.11	--	--	--	--	--	--	--	--	--
12/11/2012	335.68	329.14	334.53	335.20	--	--	--	--	--	--	--	--	--
12/19/2012	--	--	--	335.55	--	--	--	--	--	--	--	--	--
12/20/2012	336.38 / 336.36	333.57 / 333.57	--	--	--	--	--	--	--	--	--	--	--
12/21/2012	--	--	--	335.66	--	--	--	--	--	--	--	--	--
12/27/2012	--	--	--	335.88	--	--	--	--	--	--	--	--	--
1/8/2013	335.86	326.36	334.57	336.15	--	--	--	--	--	--	--	--	--
1/18/2013	--	--	--	336.75	--	--	--	--	--	--	--	--	--
1/24/2013	336.64 / 336.65	325.82 / 325.79	--	--	--	--	--	--	--	--	--	--	--
1/30/2013	--	--	--	337.49	--	--	--	--	--	--	--	--	--
2/12/2013	337.61	326.40	335.08	338.09	--	--	--	--	--	--	--	--	--
2/26/2013	337.51 / 337.51	326.68 / 326.63	--	--	--	--	--	--	--	--	--	--	--
2/28/2013	--	--	--	337.87	--	--	--	--	--	--	--	--	--
3/7/2013	--	--	--	--	--	--	--	--	--	--	--	--	--
3/12/2013	337.52	326.76	335.42	337.66	--	--	--	--	--	--	--	--	--
3/21/2013	338.54 / 338.54	327.18 / 327.20	--	--	--	--	--	--	--	--	--	--	--
3/27/2013	--	--	--	338.70	--	--	--	--	--	--	--	--	--
4/10/2013	--	--	335.70	339.65	--	--	--	--	--	--	--	--	--
4/24/2013	340.47 / 340.46	332.19 / 332.19	--	--	--	--	--	--	--	--	--	--	--
4/25/2013	--	--	--	340.35	--	--	--	--	--	--	--	--	--
5/7/2013	339.95	332.16	--	339.81	--	--	--	--	--	--	--	--	--
5/10/2013	340.10	332.49	--	--	--	--	--	--	--	--	--	--	--
5/14/2013	340.09	332.68	335.28	339.78	--	--	--	--	--	--	--	--	--
5/17/2013	340.00	332.79	--	--	--	--	--	--	--	--	--	--	--
5/23/2013	339.95 / 339.96	333.03 / 333.04	--	--	--	--	--	--	--	--	--	--	--
5/28/2013	--	--	--	339.62	--	--	--	--	--	--	--	--	--
6/10/2013	339.71	332.74	--	--	--	--	--	--	--	--	--	--	--
6/11/2013	--	--	335.40	339.38	--	--	--	--	--	--	--	--	--
6/21/2013	339.71	332.81	--	--	--	--	--	--	--	--	--	--	--
6/26/2013	339.69 / 339.66	332.91 / 332.92	--	--	--	--	--	--	--	--	--	--	--
6/27/2013	--	--	--	339.32	--	--	--	--	--	--	--	--	--
7/5/2013	339.43	332.68	--	--	--	--	--	--	--	--	--	--	--
7/9/2013	339.36	332.62	335.17	339.07	--	--	--	--	--	--	--	--	--
7/12/2013	339.38	332.46	--	--	--	--	--	--	--	--	--	--	--
7/19/2013	339.31	332.01	--	--	--	--	--	--	--	--	--	--	--
7/25/2013	--	--	--	--	--	--	--	--	--	--	--	--	--
7/30/2013	--	--	--	338.77	--	--	--	--	--	--	--	--	--
7/31/2013	339.06	331.73	--	--	--	--	--	--	--	--	--	--	--
8/8/2013	338.98	331.68	--	--	--	--	--	--	--	--	--	--	--
8/12/2013	338.91	331.58	--	--	--	--	--	--	--	--	--	--	--
8/13/2013	338.89	331.56	334.73	338.78	--	--	--	--	--	--	--	--	--
8/22/2013	338.72 / 338.71	331.33 / 331.29	--	--	--	--	--	--	--	--	--	--	--
8/29/2013	--	--	--	338.49	--	--	--	--	--	--	--	--	--
8/30/2013	338.63	330.99	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
9/5/2013	338.46	330.54	--	--	--	--	--	--	--	--	--	--	--
9/10/2013	338.42	330.44	334.49	338.35	--	--	--	--	--	--	--	--	--
9/13/2013	338.37	330.31	--	--	--	--	--	--	--	--	--	--	--
9/19/2013	338.32	330.10	--	--	--	--	--	--	--	--	--	--	--
9/25/2013	--	--	--	338.13	--	--	--	--	--	--	--	--	--
9/26/2013	338.28 / 338.28	330.09 / 330.11	--	--	--	--	--	--	--	--	--	--	--
10/2/2013	338.21	329.86	--	338.03	--	--	--	--	--	--	--	--	--
10/8/2013	338.06	329.55	334.64	337.92	--	--	--	--	--	--	--	--	--
10/10/2013	338.08	329.54	--	--	--	--	--	--	--	--	--	--	--
10/15/2013	338.07	329.47	--	--	--	--	--	--	--	--	--	--	--
10/17/2013	--	--	--	337.89	--	--	--	--	--	--	--	--	--
10/21/2013	337.99	329.30	--	--	--	--	--	--	--	--	--	--	--
10/23/2013	--	--	--	337.87	--	--	--	--	--	--	--	--	--
10/28/2013	337.96	328.96	--	--	--	--	--	--	--	--	--	--	--
10/29/2013	337.95 / 337.94	328.94 / 328.97	--	--	--	--	--	--	--	--	--	--	--
10/30/2013	--	--	--	337.87	--	--	--	--	--	--	--	--	--
11/4/2013	338.03	328.85	--	--	--	--	--	--	--	--	--	--	--
11/7/2013	--	--	--	338.18	--	--	--	--	--	--	--	--	--
11/12/2013	338.14	328.56	335.00	338.23	--	--	--	--	--	--	--	--	--
11/18/2013	338.26	328.22	--	--	--	--	--	--	--	--	--	--	--
11/19/2013	--	--	--	338.12	--	--	--	--	--	--	--	--	--
11/25/2013	338.17	328.24	--	--	--	--	--	--	--	--	--	--	--
11/27/2013	--	--	--	338.25	--	--	--	--	--	--	--	--	--
12/2/2013	338.18	328.22	--	--	--	--	--	--	--	--	--	--	--
12/6/2013	--	--	--	338.20	--	--	--	--	--	--	--	--	--
12/9/2013	338.13	328.30	--	--	--	--	--	--	--	--	--	--	--
12/10/2013	338.10	328.23	334.89	338.20	--	--	--	--	--	--	--	--	--
12/16/2013	338.01	328.08	--	--	--	--	--	--	--	--	--	--	--
12/17/2013	338.03 / 338.02	328.14 / 328.15	--	338.15	--	--	--	--	--	--	--	--	--
12/24/2013	--	--	--	337.94	--	--	--	--	--	--	--	--	--
12/27/2013	337.88	327.83	--	--	--	--	--	--	--	--	--	--	--
12/31/2013	--	--	--	337.81	--	--	--	--	--	--	--	--	--
1/3/2014	337.89	327.53	--	--	--	--	--	--	--	--	--	--	--
1/6/2014	337.98	327.55	--	--	--	--	--	--	--	--	--	--	--
1/10/2014	--	--	--	337.94	--	--	--	--	--	--	--	--	--
1/13/2014	338.06	327.33	--	--	--	--	--	--	--	--	--	--	--
1/14/2014	--	--	334.96	338.08	--	--	--	--	--	--	--	--	--
1/20/2014	338.27	327.38	--	--	--	--	--	--	--	--	--	--	--
1/21/2014	--	--	--	338.28	--	--	--	--	--	--	--	--	--
1/27/2014	338.33	327.89	--	--	--	--	--	--	--	--	--	--	--
1/31/2014	338.31 / 338.33	--	--	338.42	--	--	--	--	--	--	--	--	--
2/3/2014	338.28	328.31	--	--	--	--	--	--	--	--	--	--	--
2/7/2014	--	--	--	338.39	--	--	--	--	--	--	--	--	--
2/10/2014	338.26	328.66	--	--	--	--	--	--	--	--	--	--	--
2/11/2014	--	--	334.85	338.31	--	--	--	--	--	--	--	--	--
2/14/2014	--	--	--	--	--	--	--	--	--	--	--	--	--
2/18/2014	338.21	328.83	--	--	--	--	--	--	--	--	--	--	--
2/21/2014	--	--	--	338.36	--	--	--	--	--	--	--	--	--
2/24/2014	338.19	328.72	--	--	--	--	--	--	--	--	--	--	--
2/27/2014	338.26 / 338.23	328.80 / 328.79	--	--	--	--	--	--	--	--	--	--	--
2/28/2014	--	--	--	338.29	--	--	--	--	--	--	--	--	--
3/3/2014	338.13	328.55	--	--	--	--	--	--	--	--	--	--	--
3/4/2014	--	--	--	338.29	--	--	--	--	--	--	--	--	--
3/10/2014	338.23	328.83	--	--	--	--	--	--	--	--	--	--	--
3/11/2014	--	--	334.91	338.40	--	--	--	--	--	--	--	--	--
3/17/2014	338.17	328.41	--	--	--	--	--	--	--	--	--	--	--
3/19/2014	--	--	--	338.36	--	--	--	--	--	--	--	--	--
3/20/2014	338.27 / 338.27	328.36 / 328.34	--	--	--	--	--	--	--	--	--	--	--
3/24/2014	338.32	328.07	--	--	--	--	--	--	--	--	--	--	--
3/25/2014	--	--	--	338.48	--	--	--	--	--	--	--	--	--
3/31/2014	338.85	328.07	--	339.21	--	--	--	--	--	--	--	--	--
4/3/2014	--	--	--	340.00	--	--	--	--	--	--	--	--	--
4/7/2014	340.57	329.90	--	--	--	--	--	--	--	--	--	--	--
4/8/2014	--	--	335.84	341.44	--	--	--	--	--	--	--	--	--
4/9/2014	--	--	--	--	--	--	--	--	--	--	--	--	--
4/14/2014	340.90	331.82	--	--	--	--	--	--	--	--	--	--	--
4/16/2014	--	--	--	341.11	--	--	--	--	--	--	--	--	--
4/21/2014	340.75	332.53	--	--	--	--	--	--	--	--	--	--	--
4/24/2014	340.62 / 340.61	--	--	340.59	--	--	--	--	--	--	--	--	--
4/29/2014	340.53	332.74	--	--	--	--	--	--	--	--	--	--	--
4/30/2014	--	--	--	340.40	--	--	--	--	--	--	--	--	--
5/5/2014	340.66	332.85	--	--	--	--	--	--	--	--	--	--	--
5/7/2014	--	--	--	340.45	--	--	--	--	--	--	--	--	--
5/12/2014	340.39	332.97	--	--	--	--	--	--	--	--	--	--	--
5/13/2014	--	--	335.49	340.11	--	--	--	--	--	--	--	--	--
5/20/2014	340.34	332.67	--	--	--	--	--	--	--	--	--	--	--
5/22/2014	--	--	--	339.95	--	--	--	--	--	--	--	--	--
5/26/2014	340.11	332.55	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
5/28/2014	340.01 / 340.02	332.48 / 332.46	--	339.68	--	--	--	--	--	--	--	--	--
6/2/2014	339.84	332.29	--	--	--	--	--	--	--	--	--	--	--
6/5/2014	--	--	--	339.62	--	--	--	--	--	--	--	--	--
6/9/2014	339.63	331.98	--	--	--	--	--	--	--	--	--	--	--
6/10/2014	--	--	335.02	339.41	--	--	--	--	--	--	--	--	--
6/11/2014	--	--	--	--	--	--	--	--	--	--	--	--	--
6/16/2014	339.47	331.69	--	--	--	--	--	--	--	--	--	--	--
6/19/2014	--	--	--	339.08	--	--	--	--	--	--	--	--	--
6/23/2014	339.42	331.38	--	339.23	--	--	--	--	--	--	--	--	--
6/25/2014	--	--	--	339.32	--	--	--	--	--	--	--	--	--
6/26/2014	339.43	331.26	--	--	--	--	--	--	--	--	--	--	--
7/2/2014	339.38	331.05	--	--	--	--	--	--	--	--	--	--	--
7/3/2014	--	--	--	339.38	--	--	--	--	--	--	--	--	--
7/7/2014	339.35	330.92	--	--	--	--	--	--	--	--	--	--	--
7/8/2014	--	--	334.81	339.00	--	--	--	--	--	--	--	--	--
7/14/2014	339.14	330.60	--	--	--	--	--	--	--	--	--	--	--
7/16/2014	--	--	--	338.67	--	--	--	--	--	--	--	--	--
7/21/2014	338.91	330.28	--	--	--	--	--	--	--	--	--	--	--
7/22/2014	--	--	--	--	--	--	--	--	--	--	--	--	--
7/23/2014	--	--	--	338.46	--	--	--	--	--	--	--	--	--
7/28/2014	338.83	330.13	--	--	--	--	--	--	--	--	--	--	--
7/31/2014	338.72 / 338.75	329.95 / 329.98	--	338.23	--	--	--	--	--	--	--	--	--
8/5/2014	338.63	329.83	--	--	--	--	--	--	--	--	--	--	--
8/7/2014	--	--	--	338.10	--	--	--	--	--	--	--	--	--
8/11/2014	338.52	329.64	--	--	--	--	--	--	--	--	--	--	--
8/12/2014	--	--	--	--	--	--	--	--	--	--	--	--	--
8/13/2014	--	--	334.74	338.06	--	--	--	--	--	--	--	--	--
8/18/2014	338.41	329.36	--	--	--	--	--	--	--	--	--	--	--
8/20/2014	--	--	--	337.96	--	--	--	--	--	--	--	--	--
8/25/2014	338.27	329.05	--	--	--	--	--	--	--	--	--	--	--
8/26/2014	338.26 / 338.22	329.02 / 329.04	--	--	--	--	--	--	--	--	--	--	--
8/27/2014	--	--	--	--	--	--	--	--	--	--	--	--	--
8/28/2014	--	--	--	337.83	--	--	--	--	--	--	--	--	--
9/2/2014	338.15	328.85	--	--	--	--	--	--	--	--	--	--	--
9/4/2014	--	--	--	337.78	--	--	--	--	--	--	--	--	--
9/8/2014	337.96	328.54	--	--	--	--	--	--	--	--	--	--	--
9/9/2014	--	--	334.49	337.71	--	--	--	--	--	--	--	--	--
9/15/2014	338.03	328.35	--	--	--	--	--	--	--	--	--	--	--
9/18/2014	--	--	--	337.81	--	--	--	--	--	--	--	--	--
9/22/2014	337.89	328.08	--	--	--	--	--	--	--	--	--	--	--
9/25/2014	--	--	--	337.70	--	--	--	--	--	--	--	--	--
9/29/2014	337.79	328.00	--	--	--	--	--	--	--	--	--	--	--
10/1/2014	--	--	--	337.58	--	--	--	--	--	--	--	--	--
10/6/2014	337.72	327.80	--	--	--	--	--	--	--	--	--	--	--
10/9/2014	--	--	--	337.59	--	--	--	--	--	--	--	--	--
10/14/2014	--	327.56	334.63	337.57	--	--	--	--	--	--	--	--	--
10/20/2014	337.66	327.41	--	--	--	--	--	--	--	--	--	--	--
10/22/2014	--	--	--	337.48	--	--	--	--	--	--	--	--	--
10/23/2014	337.63	327.37	--	--	--	--	--	--	--	--	--	--	--
10/27/2014	337.58	327.35	--	--	--	--	--	--	--	--	--	--	--
10/29/2014	--	--	--	337.42	--	--	--	--	--	--	--	--	--
11/3/2014	337.45	327.50	--	--	--	--	--	--	--	--	--	--	--
11/5/2014	--	--	--	337.42	--	--	--	--	--	--	--	--	--
11/10/2014	337.34	327.51	--	--	--	--	--	--	--	--	--	--	--
11/11/2014	--	--	334.63	337.43	--	--	--	--	--	--	--	--	--
11/17/2014	337.34	327.65	--	--	--	--	--	--	--	--	--	--	--
11/20/2014	--	--	--	337.39	--	--	--	--	--	--	--	--	--
11/24/2014	337.34	327.72	--	--	--	--	--	--	--	--	--	--	--
11/26/2014	--	--	--	337.43	--	--	--	--	--	--	--	--	--
12/1/2014	337.38	327.36	--	--	--	--	--	--	--	--	--	--	--
12/4/2014	--	--	--	337.69	--	--	--	--	--	--	--	--	--
12/8/2014	337.50	327.49	--	--	--	--	--	--	--	--	--	--	--
12/9/2014	--	--	334.83	337.79	--	--	--	--	--	--	--	--	--
12/15/2014	337.53	327.56	--	--	--	--	--	--	--	--	--	--	--
12/17/2014	337.52	327.60	--	--	--	--	--	--	--	--	--	--	--
12/18/2014	--	--	--	337.77	--	--	--	--	--	--	--	--	--
12/22/2014	337.49	327.61	--	--	--	--	--	--	--	--	--	--	--
12/23/2014	--	--	--	337.77	--	--	--	--	--	--	--	--	--
12/29/2014	337.51	327.54	--	--	--	--	--	--	--	--	--	--	--
12/30/2014	--	--	--	337.77	--	--	--	--	--	--	--	--	--
1/5/2015	337.57	327.58	--	--	--	--	--	--	--	--	--	--	--
1/8/2015	--	--	--	337.91	--	--	--	--	--	--	--	--	--
1/12/2015	337.65	327.70	--	--	--	--	--	--	--	--	--	--	--
1/13/2015	--	--	334.80	337.89	--	--	--	--	--	--	--	--	--
1/19/2015	337.70	327.86	--	--	--	--	--	--	--	--	--	--	--
1/21/2015	--	--	--	337.97	--	--	--	--	--	--	--	--	--
1/26/2015	337.67	327.96	--	--	--	--	--	--	--	--	--	--	--
1/29/2015	--	--	--	337.92	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
2/2/2015	337.66	328.05	--	--	--	--	--	--	--	--	--	--	--
2/4/2015	--	--	--	338.08	--	--	--	--	--	--	--	--	--
2/9/2015	337.67	327.88	--	--	--	--	--	--	--	--	--	--	--
2/12/2015	--	--	334.59	338.11	--	--	--	--	--	--	--	--	--
2/13/2015	337.67	327.73	--	--	--	--	--	--	--	--	--	--	--
2/17/2015	337.71	--	--	--	--	--	--	--	--	--	--	--	--
2/19/2015	--	--	--	338.12	--	--	--	--	--	--	--	--	--
2/23/2015	337.61	327.40	--	--	--	--	--	--	--	--	--	--	--
2/25/2015	337.67	--	--	--	--	--	--	--	--	--	--	--	--
2/26/2015	--	--	--	338.08	--	--	--	--	--	--	--	--	--
2/27/2015	--	327.37	--	--	--	--	--	--	--	--	--	--	--
3/2/2015	337.60	327.38	--	--	--	--	--	--	--	--	--	--	--
3/5/2015	--	--	--	338.03	--	--	--	--	--	--	--	--	--
3/9/2015	337.62	327.39	--	--	--	--	--	--	--	--	--	--	--
3/11/2015	--	--	334.48	338.08	--	--	--	--	--	--	--	--	--
3/16/2015	337.79	327.42	--	--	--	--	--	--	--	--	--	--	--
3/18/2015	--	--	--	338.27	--	--	--	--	--	--	--	--	--
3/23/2015	338.27	327.38	--	338.66	--	--	--	--	--	--	--	--	--
3/24/2015	--	--	--	338.74	--	--	--	--	--	--	--	--	--
3/25/2015	--	--	--	338.98	--	--	--	--	--	--	--	--	--
3/26/2015	--	--	--	338.91	--	--	--	--	--	--	--	--	--
3/27/2015	--	--	--	339.23	--	--	--	--	--	--	--	--	--
3/30/2015	338.93	327.81	--	339.62	--	--	--	--	--	--	--	--	--
4/1/2015	--	--	--	339.77	--	--	--	--	--	--	--	--	--
4/6/2015	339.20	328.12	--	--	--	--	--	--	--	--	--	--	--
4/8/2015	--	--	--	339.67	--	--	--	--	--	--	--	--	--
4/13/2015	339.94	328.64	--	--	--	--	--	--	--	--	--	--	--
4/14/2015	--	--	335.42	340.23	--	--	--	--	--	--	--	--	--
4/20/2015	340.22	330.10	--	--	--	--	--	--	--	--	--	--	--
4/22/2015	--	--	--	340.63	--	--	--	--	--	--	--	--	--
4/27/2015	340.20	331.10	--	--	--	--	--	--	--	--	--	--	--
4/29/2015	--	--	--	340.30	--	--	--	--	--	--	--	--	--
4/30/2015	340.19	331.48	--	--	--	--	--	--	--	--	--	--	--
5/4/2015	340.03	331.38	--	--	--	--	--	--	--	--	--	--	--
5/6/2015	--	--	--	339.84	--	--	--	--	--	--	--	--	--
5/11/2015	339.94	331.68	--	--	--	--	--	--	--	--	--	--	--
5/12/2015	--	--	335.32	339.66	--	--	--	--	--	--	--	--	--
5/19/2015	339.73	331.93	--	--	--	--	--	--	--	--	--	--	--
5/21/2015	--	--	--	339.39	--	--	--	--	--	--	--	--	--
5/25/2015	339.59	331.98	--	--	--	--	--	--	--	--	--	--	--
5/27/2015	--	--	--	339.23	--	--	--	--	--	--	--	--	--
6/1/2015	339.53	331.90	--	--	--	--	--	--	--	--	--	--	--
6/3/2015	--	--	--	339.07	--	--	--	--	--	--	--	--	--
6/5/2015	--	--	--	339.08	--	--	--	--	--	--	--	--	--
6/8/2015	339.53	332.02	--	339.13	--	--	--	--	--	--	--	--	--
6/10/2015	--	--	335.10	339.13	--	--	--	--	--	--	--	--	--
6/15/2015	339.48	331.82	--	--	--	--	--	--	--	--	--	--	--
6/17/2015	--	--	--	339.08	--	--	--	--	--	--	--	--	--
6/18/2015	--	--	--	339.14	--	--	--	--	--	--	--	--	--
6/22/2015	339.46	331.71	--	--	--	--	--	--	--	--	--	--	--
6/24/2015	--	--	--	339.32	--	--	--	--	--	--	--	--	--
6/25/2015	339.43	--	--	--	--	--	--	--	--	--	--	--	--
6/26/2015	--	331.53	--	--	--	--	--	--	--	--	--	--	--
6/29/2015	339.64	331.56	--	--	--	--	--	--	--	--	--	--	--
7/1/2015	--	--	--	339.47	--	--	--	--	--	--	--	--	--
7/6/2015	339.51	331.63	--	--	--	--	--	--	--	--	--	--	--
7/8/2015	--	--	--	339.32	--	--	--	--	--	--	--	--	--
7/13/2015	339.40	331.79	--	--	--	--	--	--	--	--	--	--	--
7/14/2015	--	--	--	--	--	--	--	--	--	--	--	--	--
7/15/2015	--	--	334.94	339.17	--	--	--	--	--	--	--	--	--
7/20/2015	339.26	331.80	--	--	--	--	--	--	--	--	--	--	--
7/22/2015	--	--	--	339.01	--	--	--	--	--	--	--	--	--
7/27/2015	339.04	331.61	--	--	--	--	--	--	--	--	--	--	--
7/29/2015	--	--	--	338.79	--	--	--	--	--	--	--	--	--
8/4/2015	338.86	331.47	--	--	--	--	--	--	--	--	--	--	--
8/6/2015	--	--	--	338.59	--	--	--	--	--	--	--	--	--
8/10/2015	338.73	331.33	--	--	--	--	--	--	--	--	--	--	--
8/11/2015	338.70 / 338.69	331.30 / 331.29	--	--	--	--	--	--	--	--	--	--	--
8/12/2015	--	--	334.50	338.53	--	--	--	--	--	--	--	--	--
8/17/2015	338.59	331.04	--	--	--	--	--	--	--	--	--	--	--
8/19/2015	--	--	--	338.48	--	--	--	--	--	--	--	--	--
8/24/2015	338.45	330.84	--	--	--	--	--	--	--	--	--	--	--
8/26/2015	--	--	--	338.35	--	--	--	--	--	--	--	--	--
8/31/2015	338.26	330.50	--	--	--	--	--	--	--	--	--	--	--
9/2/2015	--	--	--	338.21	--	--	--	--	--	--	--	--	--
9/8/2015	338.10	330.28	--	--	--	--	--	--	--	--	--	--	--
9/9/2015	--	--	334.17	338.10	--	--	--	--	--	--	--	--	--
9/10/2015	--	--	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
9/14/2015	337.95	330.00	--	--	--	--	--	--	--	--	--	--	--
9/16/2015	--	--	--	337.98	--	--	--	--	--	--	--	--	--
9/21/2015	337.81	329.79	--	--	--	--	--	--	--	--	--	--	--
9/23/2015	--	--	--	337.88	--	--	--	--	--	--	--	--	--
9/28/2015	--	--	--	--	--	--	--	--	--	--	--	--	--
9/29/2015	337.67	329.64	--	--	--	--	--	--	--	--	--	--	--
9/30/2015	--	--	--	337.77	--	--	--	--	--	--	--	--	--
10/6/2015	337.49	329.42	--	--	--	--	--	--	--	--	--	--	--
10/8/2015	--	--	--	337.62	--	--	--	--	--	--	--	--	--
10/13/2015	337.31	329.39	--	--	--	--	--	--	--	--	--	--	--
10/14/2015	--	--	334.02	337.58	--	--	--	--	--	--	--	--	--
10/15/2015	--	--	--	--	--	--	--	--	--	--	--	--	--
10/19/2015	337.31	329.10	--	--	--	--	--	--	--	--	--	--	--
10/21/2015	--	--	--	337.50	--	--	--	--	--	--	--	--	--
10/22/2015	337.20 / 337.20	328.98 / 328.97	--	--	--	--	--	--	--	--	--	--	--
10/26/2015	337.14	328.60	--	--	--	--	--	--	--	--	--	--	--
10/28/2015	--	--	--	337.53	--	--	--	--	--	--	--	--	--
11/2/2015	337.17	--	--	--	--	--	--	--	--	--	--	--	--
11/3/2015	--	328.34	--	--	--	--	--	--	--	--	--	--	--
11/4/2015	--	--	--	337.43	--	--	--	--	--	--	--	--	--
11/9/2015	337.13	328.18	--	--	--	--	--	--	--	--	--	--	--
11/10/2015	--	--	334.34	337.42	--	--	--	--	--	--	--	--	--
11/16/2015	337.05	327.93	--	--	--	--	--	--	--	--	--	--	--
11/18/2015	--	--	--	337.40	--	--	--	--	--	--	--	--	--
11/23/2015	337.00	327.79	--	--	--	--	--	--	--	--	--	--	--
11/24/2015	--	--	--	337.37	--	--	--	--	--	--	--	--	--
11/30/2015	336.95	327.62	--	--	--	--	--	--	--	--	--	--	--
12/2/2015	--	--	--	337.43	--	--	--	--	--	--	--	--	--
12/7/2015	336.92	327.96	--	--	--	--	--	--	--	--	--	--	--
12/8/2015	--	--	334.40	337.38	--	--	--	--	--	--	--	--	--
12/14/2015	336.93	328.80	--	--	--	--	--	--	--	--	--	--	--
12/16/2015	--	--	--	337.34	--	--	--	--	--	--	--	--	--
12/17/2015	336.88	329.05	--	--	--	--	--	--	--	--	--	--	--
12/21/2015	336.85	329.10	--	--	--	--	--	--	--	--	--	--	--
12/23/2015	--	--	--	337.40	--	--	--	--	--	--	--	--	--
12/29/2015	336.85	330.86	--	--	--	--	--	--	--	--	--	--	--
12/30/2015	--	--	--	337.40	--	--	--	--	--	--	--	--	--
1/4/2016	--	329.41	--	--	--	--	--	--	--	--	--	--	--
1/6/2016	--	--	--	337.70	--	--	--	--	--	--	--	--	--
1/11/2016	337.66	329.10	--	--	--	--	--	--	--	--	--	--	--
1/12/2016	--	--	334.95	337.98	--	--	--	--	--	--	--	--	--
1/18/2016	337.85	328.70	--	--	--	--	--	--	--	--	--	--	--
1/20/2016	--	--	--	338.20	--	--	--	--	--	--	--	--	--
1/25/2016	337.97	328.55	--	--	--	--	--	--	--	--	--	--	--
1/27/2016	--	--	--	338.33	--	--	--	--	--	--	--	--	--
2/1/2016	338.01	328.48	--	--	--	--	--	--	--	--	--	--	--
2/3/2016	--	--	--	338.47	--	--	--	--	--	--	--	--	--
2/8/2016	338.37	328.77	--	--	--	--	--	--	--	--	--	--	--
2/9/2016	--	--	335.07	338.76	--	--	--	--	--	--	--	--	--
2/16/2016	338.51	328.91	--	--	--	--	--	--	--	--	--	--	--
2/17/2016	--	--	--	338.77	--	--	--	--	--	--	--	--	--
2/22/2016	338.47	328.80	--	--	--	--	--	--	--	--	--	--	--
2/24/2016	--	--	--	338.77	--	--	--	--	--	--	--	--	--
2/25/2016	338.73	329.00	--	--	--	--	--	--	--	--	--	--	--
2/29/2016	338.45	329.00	--	--	--	--	--	--	--	--	--	--	--
3/3/2016	--	--	--	339.17	--	--	--	--	--	--	--	--	--
3/7/2016	339.15	329.24	--	--	--	--	--	--	--	--	--	--	--
3/9/2016	--	--	335.27	339.70	--	--	--	--	--	--	--	--	--
3/14/2016	339.52	329.77	--	--	--	--	--	--	--	--	--	--	--
3/16/2016	--	--	--	340.07	--	--	--	--	--	--	--	--	--
3/21/2016	339.91	330.46	--	--	--	--	--	--	--	--	--	--	--
3/23/2016	--	--	--	340.33	--	--	--	--	--	--	--	--	--
3/28/2016	340.41	331.49	--	--	--	--	--	--	--	--	--	--	--
3/30/2016	--	--	--	340.88	--	--	--	--	--	--	--	--	--
4/4/2016	340.73	333.15	--	--	--	--	--	--	--	--	--	--	--
4/6/2016	--	--	--	341.16	--	--	--	--	--	--	--	--	--
4/11/2016	340.76	334.36	--	--	--	--	--	--	--	--	--	--	--
4/12/2016	--	--	335.78	341.14	--	--	--	--	--	--	--	--	--
4/18/2016	340.61	334.28	--	--	--	--	--	--	--	--	--	--	--
4/20/2016	--	--	--	340.78	--	--	--	--	--	--	--	--	--
4/25/2016	340.40	334.20	--	--	--	--	--	--	--	--	--	--	--
4/27/2016	--	--	--	340.46	--	--	--	--	--	--	--	--	--
4/28/2016	340.35	333.92	--	--	--	--	--	--	--	--	--	--	--
5/2/2016	340.19	333.79	--	--	--	--	--	--	--	--	--	--	--
5/4/2016	--	--	--	340.20	--	--	--	--	--	--	--	--	--
5/9/2016	339.90	333.42	--	--	--	--	--	--	--	--	--	--	--
5/10/2016	--	--	335.16	339.92	--	--	--	--	--	--	--	--	--
5/16/2016	339.84	333.08	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
5/18/2016	--	--	--	339.62	--	--	--	--	--	--	--	--	--
5/19/2016	--	--	--	339.66	--	--	--	--	--	--	--	--	--
5/24/2016	339.56	332.70	--	--	--	--	--	--	--	--	--	--	--
5/25/2016	--	--	--	339.83	--	--	--	--	--	--	--	--	--
5/30/2016	339.40	332.45	--	--	--	--	--	--	--	--	--	--	--
6/1/2016	--	--	--	339.65	--	--	--	--	--	--	--	--	--
6/3/2016	--	--	--	339.66	--	--	--	--	--	--	--	--	--
6/6/2016	339.25	332.24	--	--	--	--	--	--	--	--	--	--	--
6/9/2016	--	--	--	339.55	--	--	--	--	--	--	--	--	--
6/13/2016	339.01	331.78	--	339.79	--	--	--	--	--	--	--	--	--
6/14/2016	--	--	334.69	339.82	--	--	--	--	--	--	--	--	--
6/20/2016	338.82	331.51	--	--	--	--	--	--	--	--	--	--	--
6/21/2016	--	--	--	339.74	--	--	--	--	--	--	--	--	--
6/27/2016	338.59	331.13	--	--	--	--	--	--	--	--	--	--	--
6/28/2016	--	--	--	339.72	--	--	--	--	--	--	--	--	--
6/30/2016	338.44	330.91	--	--	--	--	--	--	--	--	--	--	--
7/4/2016	338.35	330.69	--	--	--	--	--	--	--	--	--	--	--
7/5/2016	--	--	--	339.51	--	--	--	--	--	--	--	--	--
7/11/2016	338.13	330.15	--	--	--	--	--	--	--	--	--	--	--
7/12/2016	--	--	334.23	338.74	--	--	--	--	--	--	--	--	--
7/18/2016	337.97	329.79	--	--	--	--	--	--	--	--	--	--	--
7/20/2016	--	--	--	338.33	--	--	--	--	--	--	--	--	--
7/22/2016	--	--	--	338.32	--	--	--	--	--	--	--	--	--
7/25/2016	337.81	329.41	--	--	--	--	--	--	--	--	--	--	--
7/27/2016	--	--	--	338.17	--	--	--	--	--	--	--	--	--
7/28/2016	--	--	--	--	--	--	--	--	--	--	--	--	--
8/2/2016	337.59	328.87	--	--	--	--	--	--	--	--	--	--	--
8/3/2016	--	--	--	338.02	--	--	--	--	--	--	--	--	--
8/8/2016	337.44	328.53	--	--	--	--	--	--	--	--	--	--	--
8/9/2016	--	--	333.96	337.90	--	--	--	--	--	--	--	--	--
8/15/2016	337.30	328.15	--	--	--	--	--	--	--	--	--	--	--
8/17/2016	--	--	--	337.69	--	--	--	--	--	--	--	--	--
8/22/2016	337.18	327.84	--	--	--	--	--	--	--	--	--	--	--
8/24/2016	--	--	--	337.54	--	--	--	--	--	--	--	--	--
8/26/2016	--	--	--	--	--	--	--	--	--	--	--	--	--
8/29/2016	337.15	327.61	--	--	--	--	--	--	--	--	--	--	--
8/30/2016	--	--	--	337.52	--	--	--	--	--	--	--	--	--
9/2/2016	337.01	327.55	--	--	--	--	--	--	--	--	--	--	--
9/6/2016	336.98	327.44	--	--	--	--	--	--	--	--	--	--	--
9/7/2016	--	--	--	337.40	--	--	--	--	--	--	--	--	--
9/12/2016	336.91	327.18	--	--	--	--	--	--	--	--	--	--	--
9/13/2016	--	--	333.82	337.30	--	--	--	--	--	--	--	--	--
9/19/2016	336.77	326.93	--	--	--	--	--	--	--	--	--	--	--
9/21/2016	--	--	--	337.11	--	--	--	--	--	--	--	--	--
9/26/2016	336.82	326.61	--	--	--	--	--	--	--	--	--	--	--
9/29/2016	--	--	--	337.02	--	--	--	--	--	--	--	--	--
10/3/2016	336.64	326.36	--	--	--	--	--	--	--	--	--	--	--
10/5/2016	--	--	--	336.96	--	--	--	--	--	--	--	--	--
10/11/2016	336.50	326.00	--	--	--	--	--	--	--	--	--	--	--
10/12/2016	--	--	333.70	336.87	--	--	--	--	--	--	--	--	--
10/17/2016	336.51	325.77	--	--	--	--	--	--	--	--	--	--	--
10/19/2016	--	--	--	336.81	--	--	--	--	--	--	--	--	--
10/24/2016	336.33	325.43	--	--	--	--	--	--	--	--	--	--	--
10/26/2016	--	--	--	336.73	--	--	--	--	--	--	--	--	--
10/28/2016	336.10	--	--	--	--	--	--	--	--	--	--	--	--
10/31/2016	336.09	325.11	--	--	--	--	--	--	--	--	--	--	--
11/2/2016	--	--	--	336.75	--	--	--	--	--	--	--	--	--
11/7/2016	336.06	325.00	--	--	--	--	--	--	--	--	--	--	--
11/8/2016	--	--	333.78	336.75	--	--	--	--	--	--	--	--	--
11/14/2016	336.18	324.78	--	--	--	--	--	--	--	--	--	--	--
11/16/2016	--	--	--	336.76	--	--	--	--	--	--	--	--	--
11/21/2016	--	324.51	--	--	--	--	--	--	--	--	--	--	--
11/23/2016	--	--	--	336.74	--	--	--	--	--	--	--	--	--
11/29/2016	336.18	324.40	--	--	--	--	--	--	--	--	--	--	--
11/30/2016	--	--	--	336.80	--	--	--	--	--	--	--	--	--
12/5/2016	336.14	324.30	--	--	--	--	--	--	--	--	--	--	--
12/7/2016	--	--	--	336.77	--	--	--	--	--	--	--	--	--
12/12/2016	336.14	324.27	--	--	--	--	--	--	--	--	--	--	--
12/13/2016	--	--	333.92	336.77	--	--	--	--	--	--	--	--	--
12/19/2016	336.16	324.16	--	--	--	--	--	--	--	--	--	--	--
12/21/2016	--	--	--	336.76	--	--	--	--	--	--	--	--	--
12/22/2016	336.20	324.17	--	--	--	--	--	--	--	--	--	--	--
12/28/2016	336.20	324.26	--	--	--	--	--	--	--	--	--	--	--
12/29/2016	--	--	--	337.04	--	--	--	--	--	--	--	--	--
1/2/2017	336.18	324.27	--	--	--	--	--	--	--	--	--	--	--
1/4/2017	--	--	--	337.18	--	--	--	--	--	--	--	--	--
1/9/2017	336.41	324.29	--	--	--	--	--	--	--	--	--	--	--
1/10/2017	--	--	334.76	337.34	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
1/16/2017	336.88	324.65	--	--	--	--	--	--	--	--	--	--	--
1/18/2017	--	--	--	338.22	--	--	--	--	--	--	--	--	--
1/23/2017	337.31	324.92	--	--	--	--	--	--	--	--	--	--	--
1/25/2017	--	--	--	338.73	--	--	--	--	--	--	--	--	--
1/30/2017	337.70	324.99	--	--	--	--	--	--	--	--	--	--	--
2/1/2017	--	--	--	339.09	--	--	--	--	--	--	--	--	--
2/6/2017	337.89	324.96	--	--	--	--	--	--	--	--	--	--	--
2/8/2017	--	--	--	339.13	--	--	--	--	--	--	--	--	--
2/13/2017	337.99	324.94	--	--	--	--	--	--	--	--	--	--	--
2/14/2017	--	--	335.09	339.14	--	--	--	--	--	--	--	--	--
2/15/2017	338.22	325.02	--	--	--	--	--	--	--	--	--	--	--
2/21/2017	Rejected	325.05	--	--	--	--	--	--	--	--	--	--	--
2/22/2017	--	--	--	339.08	--	--	--	--	--	--	--	--	--
2/27/2017	338.78	325.13	--	--	--	--	--	--	--	--	--	--	--
3/1/2017	--	--	--	339.89	--	--	--	--	--	--	--	--	--
3/6/2017	339.30	325.41	--	--	--	--	--	--	--	--	--	--	--
3/8/2017	--	--	--	340.20	--	--	--	--	--	--	--	--	--
3/13/2017	339.26	325.51	--	--	--	--	--	--	--	--	--	--	--
3/14/2017	--	--	335.25	340.01	--	--	--	--	--	--	--	--	--
3/20/2017	339.17	325.66	--	--	--	--	--	--	--	--	--	--	--
3/22/2017	--	--	--	339.67	--	--	--	--	--	--	--	--	--
3/27/2017	339.14	325.62	--	--	--	--	--	--	--	--	--	--	--
3/29/2017	--	--	--	339.56	--	--	--	--	--	--	--	--	--
4/3/2017	339.38	325.61	--	--	--	--	--	--	--	--	--	--	--
4/4/2017	339.64	325.91	--	--	--	--	--	--	--	--	--	--	--
4/5/2017	--	--	--	340.07	--	--	--	--	--	--	--	--	--
4/10/2017	340.32	326.12	--	--	--	--	--	--	--	--	--	--	--
4/11/2017	--	--	335.70	340.82	--	--	--	--	--	--	--	--	--
4/17/2017	340.10	326.21	--	--	--	--	--	--	--	--	--	--	--
4/19/2017	--	--	--	340.45	--	--	--	--	--	--	--	--	--
4/24/2017	340.24	326.30	--	--	--	--	--	--	--	--	--	--	--
4/26/2017	--	--	--	340.61	--	--	--	--	--	--	--	--	--
5/1/2017	340.09	326.13	--	--	--	--	--	--	--	--	--	--	--
5/3/2017	--	--	--	340.45	--	--	--	--	--	--	--	--	--
5/8/2017	340.66	326.26	--	--	--	--	--	--	--	--	--	--	--
5/9/2017	--	--	335.77	341.09	--	--	--	--	--	--	--	--	--
5/15/2017	340.31	326.00	--	--	--	--	--	--	--	--	--	--	--
5/17/2017	--	--	--	340.46	--	--	--	--	--	--	--	--	--
5/23/2017	339.77	325.66	--	--	--	--	--	--	--	--	--	--	--
5/24/2017	--	--	--	340.05	--	--	--	--	--	--	--	--	--
5/26/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
5/29/2017	339.96	325.48	--	--	--	--	--	--	--	--	--	--	--
5/31/2017	--	--	--	340.18	--	--	--	--	--	--	--	--	--
6/5/2017	339.59	325.10	--	--	--	--	--	--	--	--	--	--	--
6/7/2017	--	--	--	339.75	--	--	--	--	--	--	--	--	--
6/13/2017	339.19	324.50	335.04	339.46	--	--	--	--	--	--	--	--	--
6/19/2017	339.01	324.26	--	--	--	--	--	--	--	--	--	--	--
6/22/2017	--	--	--	339.37	--	--	--	--	--	--	--	--	--
6/26/2017	338.77	324.00	--	--	--	--	--	--	--	--	--	--	--
6/28/2017	--	--	--	339.48	--	--	--	--	--	--	--	--	--
6/30/2017	338.64	324.02	--	--	--	--	--	--	--	--	--	--	--
7/4/2017	338.52	323.91	--	--	--	--	--	--	--	--	--	--	--
7/5/2017	--	--	--	339.36	--	--	--	--	--	--	--	--	--
7/10/2017	338.35	323.55	--	--	--	--	--	--	--	--	--	--	--
7/11/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
7/12/2017	--	--	334.70	338.92	--	--	--	--	--	--	--	--	--
7/18/2017	338.10	323.29	--	--	--	--	--	--	--	--	--	--	--
7/19/2017	--	--	--	338.71	--	--	--	--	--	--	--	--	--
7/24/2017	338.02	323.04	--	--	--	--	--	--	--	--	--	--	--
7/26/2017	--	--	--	338.51	--	--	--	--	--	--	--	--	--
7/31/2017	337.77	322.99	--	--	--	--	--	--	--	--	--	--	--
8/2/2017	--	--	--	338.35	--	--	--	--	--	--	--	--	--
8/8/2017	337.54	322.77	--	--	--	--	--	--	--	--	--	--	--
8/9/2017	--	--	--	338.11	--	--	--	--	--	--	--	--	--
8/14/2017	337.45	322.75	--	--	--	--	--	--	--	--	--	--	--
8/15/2017	--	--	334.38	337.97	--	--	--	--	--	--	--	--	--
8/21/2017	337.26	322.37	--	--	--	--	--	--	--	--	--	--	--
8/23/2017	--	--	--	337.83	--	--	--	--	--	--	--	--	--
8/28/2017	337.09	321.93	--	--	--	--	--	--	--	--	--	--	--
8/30/2017	--	--	--	337.68	--	--	--	--	--	--	--	--	--
8/31/2017	--	--	--	--	--	--	--	--	--	--	--	--	--
9/5/2017	336.99	321.63	--	--	--	--	--	--	--	--	--	--	--
9/6/2017	--	--	--	337.54	--	--	--	--	--	--	--	--	--
9/11/2017	336.79	321.42	--	--	--	--	--	--	--	--	--	--	--
9/12/2017	--	--	334.07	337.44	--	--	--	--	--	--	--	--	--
9/15/2017	--	--	--	337.38	--	--	--	--	--	--	--	--	--
9/18/2017	336.57	321.21	--	--	--	--	--	--	--	--	--	--	--
9/20/2017	--	--	--	337.21	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
9/25/2017	336.49	321.02	--	--	--	--	--	--	--	--	--	--	--
9/27/2017	--	--	--	337.10	--	--	--	--	--	--	--	--	--
9/28/2017	336.39	321.02	--	--	--	--	--	--	--	--	--	--	--
10/2/2017	336.34	320.93	--	--	--	--	--	--	--	--	--	--	--
10/4/2017	--	--	--	336.94	--	--	--	--	--	--	--	--	--
10/10/2017	336.36	320.89	--	--	--	--	--	--	--	--	--	--	--
10/11/2017	--	--	333.74	336.88	--	--	--	--	--	--	--	--	--
10/16/2017	336.24	320.77	--	--	--	--	--	--	--	--	--	--	--
10/18/2017	--	--	--	336.80	--	--	--	--	--	--	--	--	--
10/23/2017	336.19	320.68	--	--	--	--	--	--	--	--	--	--	--
10/25/2017	--	--	--	336.75	--	--	--	--	--	--	--	--	--
10/30/2017	336.13	320.62	--	--	--	--	--	--	--	--	--	--	--
10/31/2017	--	--	--	336.68	--	--	--	--	--	--	--	--	--
11/6/2017	335.99	320.81	--	--	--	--	--	--	--	--	--	--	--
11/8/2017	--	--	--	336.60	--	--	--	--	--	--	--	--	--
11/13/2017	336.00	320.60	--	--	--	--	--	--	--	--	--	--	--
11/14/2017	--	--	333.79	336.58	--	--	--	--	--	--	--	--	--
11/20/2017	335.93	320.51	--	--	--	--	--	--	--	--	--	--	--
11/22/2017	--	--	--	336.55	--	--	--	--	--	--	--	--	--
11/23/2017	335.88	--	--	--	--	--	--	--	--	--	--	--	--
11/27/2017	335.85	320.46	--	--	--	--	--	--	--	--	--	--	--
11/29/2017	--	--	--	336.52	--	--	--	--	--	--	--	--	--
12/4/2017	335.82	320.41	--	--	--	--	--	--	--	--	--	--	--
12/6/2017	--	--	--	336.50	--	--	--	--	--	--	--	--	--
12/11/2017	335.79	320.20	--	--	--	--	--	--	--	--	--	--	--
12/12/2017	--	--	333.98	336.50	--	--	--	--	--	--	--	--	--
12/18/2017	335.81	319.70	--	--	--	--	--	--	--	--	--	--	--
12/20/2017	--	--	--	336.62	--	--	--	--	--	--	--	--	--
12/27/2017	335.73	319.29	--	--	--	--	--	--	--	--	--	--	--
12/28/2017	--	--	--	336.93	--	--	--	--	--	--	--	--	--
1/2/2018	335.75	319.10	--	--	--	--	--	--	--	--	--	--	--
1/3/2018	--	--	--	337.15	--	--	--	--	--	--	--	--	--
1/8/2018	335.77	318.97	--	--	--	--	--	--	--	--	--	--	--
1/9/2018	--	--	333.92	337.27	--	--	--	--	--	--	--	--	--
1/15/2018	335.87	319.12	--	--	--	--	--	--	--	--	--	--	--
1/17/2018	--	--	--	337.62	--	--	--	--	--	--	--	--	--
1/22/2018	335.91	318.98	--	--	--	--	--	--	--	--	--	--	--
1/24/2018	--	--	--	337.84	--	--	--	--	--	--	--	--	--
1/29/2018	336.18	319.31	--	--	--	--	--	--	--	--	--	--	--
1/30/2018	336.27	319.32	--	--	--	--	--	--	--	--	--	--	--
1/31/2018	--	--	--	338.26	--	--	--	--	--	--	--	--	--
2/5/2018	336.40	319.23	--	--	--	--	--	--	--	--	--	--	--
2/8/2018	--	--	--	338.37	--	--	--	--	--	--	--	--	--
2/12/2018	336.52	319.12	334.75	338.41	--	--	--	--	--	--	--	--	--
2/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--
2/20/2018	336.78	319.42	--	--	--	--	--	--	--	--	--	--	--
2/21/2018	--	--	--	338.81	--	--	--	--	--	--	--	--	--
2/26/2018	337.83	320.83	--	--	--	--	--	--	--	--	--	--	--
2/28/2018	--	--	--	339.75	--	--	--	--	--	--	--	--	--
3/5/2018	338.28	320.79	--	--	--	--	--	--	--	--	--	--	--
3/7/2018	--	--	--	339.58	--	--	--	--	--	--	--	--	--
3/12/2018	338.37	320.61	--	--	--	--	--	--	--	--	--	--	--
3/13/2018	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/2018	--	--	335.13	339.30	--	--	--	--	--	--	--	--	--
3/19/2018	338.26	320.47	--	--	--	--	--	--	--	--	--	--	--
3/21/2018	--	--	--	338.97	--	--	--	--	--	--	--	--	--
3/26/2018	338.10	320.27	--	--	--	--	--	--	--	--	--	--	--
3/28/2018	--	--	--	338.99	--	--	--	--	--	--	--	--	--
3/29/2018	--	--	--	339.12	--	--	--	--	--	--	--	--	--
4/2/2018	338.24	320.16	--	339.71	--	--	--	--	--	--	--	--	--
4/5/2018	--	--	--	340.19	--	--	--	--	--	--	--	--	--
4/9/2018	338.81	319.75	--	340.69	--	--	--	--	--	--	--	--	--
4/10/2018	--	--	--	--	--	--	--	--	--	--	--	--	--
4/11/2018	--	--	335.18	340.76	--	--	--	--	--	--	--	--	--
4/13/2018	--	--	--	340.75	--	--	--	--	--	--	--	--	--
4/17/2018	339.33	319.62	--	--	--	--	--	--	--	--	--	--	--
4/18/2018	--	--	--	340.90	--	--	--	--	--	--	--	--	--
4/23/2018	340.36	320.85	--	--	--	--	--	--	--	--	--	--	--
4/24/2018	340.47	321.54	--	--	--	--	--	--	--	--	--	--	--
4/25/2018	--	--	--	341.39	--	--	--	--	--	--	--	--	--
4/26/2018	--	--	--	--	--	--	--	--	--	--	--	--	--
4/30/2018	340.45	321.35	--	--	--	--	--	--	--	--	--	--	--
5/2/2018	--	--	--	341.09	--	--	--	--	--	--	--	--	--
5/7/2018	340.00	320.46	--	--	--	--	--	--	--	--	--	--	--
5/8/2018	--	--	335.64	340.75	--	--	--	--	--	--	--	--	--
5/14/2018	339.60	320.15	--	--	--	--	--	--	--	--	--	--	--
5/16/2018	--	--	--	340.16	--	--	--	--	--	--	--	--	--
5/22/2018	339.25	319.26	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
5/23/2018	--	--	--	339.86	--	--	--	--	--	--	--	--	--
5/28/2018	338.98	318.61	--	--	--	--	--	--	--	--	--	--	--
5/30/2018	--	--	--	339.61	--	--	--	--	--	--	--	--	--
6/4/2018	338.76	318.24	--	--	--	--	--	--	--	--	--	--	--
6/6/2018	--	--	--	339.53	--	--	--	--	--	--	--	--	--
6/11/2018	338.49	317.94	--	--	--	--	--	--	--	--	--	--	--
6/12/2018	--	317.94	334.87	339.40	--	--	--	--	--	--	--	--	--
6/14/2018	338.28	--	--	--	--	--	--	--	--	--	--	--	--
6/15/2018	--	--	--	339.35	--	--	--	--	--	--	--	--	--
6/18/2018	338.17	317.65	--	339.45	--	--	--	--	--	--	--	--	--
6/20/2018	--	--	--	339.50	--	--	--	--	--	--	--	--	--
6/25/2018	337.88	317.31	--	339.48	--	--	--	--	--	--	--	--	--
6/27/2018	--	--	--	339.55	--	--	--	--	--	--	--	--	--
6/28/2018	--	--	--	--	--	--	--	--	--	--	--	--	--
6/29/2018	--	--	--	339.50	--	--	--	--	--	--	--	--	--
7/3/2018	337.66	317.02	--	--	--	--	--	--	--	--	--	--	--
7/4/2018	--	--	--	338.98	--	--	--	--	--	--	--	--	--
7/9/2018	--	316.83	--	--	--	--	--	--	--	--	--	--	--
7/10/2018	--	--	334.54	338.67	--	--	--	--	--	--	--	--	--
7/16/2018	337.33	316.62	--	--	--	--	--	--	--	--	--	--	--
7/18/2018	--	--	--	338.30	--	--	--	--	--	--	--	--	--
7/23/2018	337.17	316.42	--	--	--	--	--	--	--	--	--	--	--
7/24/2018	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/2018	--	--	--	338.09	--	--	--	--	--	--	--	--	--
7/30/2018	337.01	316.24	--	--	--	--	--	--	--	--	--	--	--
8/1/2018	--	--	--	337.92	--	--	--	--	--	--	--	--	--
8/7/2018	336.83	316.06	--	--	--	--	--	--	--	--	--	--	--
8/8/2018	--	--	--	337.77	--	--	--	--	--	--	--	--	--
8/13/2018	336.62	315.97	--	--	--	--	--	--	--	--	--	--	--
8/14/2018	--	--	334.23	337.64	--	--	--	--	--	--	--	--	--
8/20/2018	336.50	315.87	--	--	--	--	--	--	--	--	--	--	--
8/22/2018	--	--	--	337.47	--	--	--	--	--	--	--	--	--
8/23/2018	336.32	315.92	--	--	--	--	--	--	--	--	--	--	--
8/27/2018	336.27	315.86	--	--	--	--	--	--	--	--	--	--	--
8/29/2018	--	--	--	337.32	--	--	--	--	--	--	--	--	--
8/30/2018	--	--	--	--	--	--	--	--	--	--	--	--	--
9/4/2018	336.02	315.74	--	--	--	--	--	--	--	--	--	--	--
9/5/2018	--	--	--	337.18	--	--	--	--	--	--	--	--	--
9/10/2018	335.92	315.66	--	--	--	--	--	--	--	--	--	--	--
9/11/2018	--	--	334.00	337.07	--	--	--	--	--	--	--	--	--
9/17/2018	335.86	315.54	--	--	--	--	--	--	--	--	--	--	--
9/19/2018	--	--	--	336.95	--	--	--	--	--	--	--	--	--
9/24/2018	335.79	315.44	--	--	--	--	--	--	--	--	--	--	--
9/26/2018	--	--	--	336.85	--	--	--	--	--	--	--	--	--
10/1/2018	335.75	315.35	--	--	--	--	--	--	--	--	--	--	--
10/3/2018	--	--	--	336.73	--	--	--	--	--	--	--	--	--
10/9/2018	335.57	315.28	--	--	--	--	--	--	--	--	--	--	--
10/10/2018	--	--	333.93	336.66	--	--	--	--	--	--	--	--	--
10/15/2018	335.49	315.19	--	--	--	--	--	--	--	--	--	--	--
10/17/2018	--	--	--	336.33	--	--	--	--	--	--	--	--	--
10/22/2018	335.34	315.10	--	--	--	--	--	--	--	--	--	--	--
10/24/2018	--	--	--	336.13	--	--	--	--	--	--	--	--	--
10/29/2018	335.30	315.06	--	--	--	--	--	--	--	--	--	--	--
10/31/2018	--	--	--	336.02	--	--	--	--	--	--	--	--	--
11/5/2018	335.25	314.97	--	--	--	--	--	--	--	--	--	--	--
11/7/2018	--	--	--	335.96	--	--	--	--	--	--	--	--	--
11/12/2018	335.21	314.89	--	--	--	--	--	--	--	--	--	--	--
11/13/2018	--	--	334.55	335.94	--	--	--	--	--	--	--	--	--
11/16/2018	335.22	314.86	--	--	--	--	--	--	--	--	--	--	--
11/19/2018	335.19	314.80	--	--	--	--	--	--	--	--	--	--	--
11/21/2018	--	--	--	335.94	--	--	--	--	--	--	--	--	--
11/26/2018	335.13	314.76	--	--	--	--	--	--	--	--	--	--	--
11/28/2018	--	--	--	335.99	--	--	--	--	--	--	--	--	--
12/3/2018	335.23	314.68	--	--	--	--	--	--	--	--	--	--	--
12/5/2018	--	--	--	336.30	--	--	--	--	--	--	--	--	--
12/10/2018	335.38	314.64	--	--	--	--	--	--	--	--	--	--	--
12/11/2018	--	--	334.89	336.57	--	--	--	--	--	--	--	--	--
12/17/2018	335.53	314.64	--	--	--	--	--	--	--	--	--	--	--
12/19/2018	--	--	--	336.67	--	--	--	--	--	--	--	--	--
12/24/2018	335.55	314.64	--	--	--	--	--	--	--	--	--	--	--
12/27/2018	--	--	--	337.05	--	--	--	--	--	--	--	--	--
12/31/2018	335.63	314.66	--	--	--	--	--	--	--	--	--	--	--
1/2/2019	--	--	--	337.28	--	--	--	--	--	--	--	--	--
1/7/2019	335.92	314.73	--	--	--	--	--	--	--	--	--	--	--
1/8/2019	--	--	335.04	337.80	--	--	--	--	--	--	--	--	--
1/14/2019	336.12	314.82	--	--	--	--	--	--	--	--	--	--	--
1/16/2019	--	--	--	337.94	--	--	--	--	--	--	--	--	--
1/21/2019	336.21	315.19	--	--	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
1/23/2019	--	--	--	338.01	--	--	--	--	--	--	--	--	--
1/28/2019	336.32	315.57	--	--	--	--	--	--	--	--	--	--	--
1/30/2019	--	--	--	337.96	--	--	--	--	--	--	--	--	--
1/31/2019	336.33	315.70	--	--	--	--	--	--	--	--	--	--	--
2/4/2019	336.40	316.02	--	--	--	--	--	--	--	--	--	--	--
2/6/2019	--	--	--	337.98	--	--	--	--	--	--	--	--	--
2/11/2019	336.71	315.96	335.07	338.19	--	--	--	--	--	--	--	--	--
2/13/2019	--	--	--	--	--	--	--	--	--	--	--	--	--
2/19/2019	336.79	316.06	--	--	--	--	--	--	--	--	--	--	--
2/20/2019	--	--	--	338.33	--	--	--	--	--	--	--	--	--
2/26/2019	336.80	316.16	--	--	--	--	--	--	--	--	--	--	--
2/27/2019	--	--	--	338.30	--	--	--	--	--	--	--	--	--
3/4/2019	336.85	316.35	--	--	--	--	--	--	--	--	--	--	--
3/6/2019	--	--	--	338.21	--	--	--	--	--	--	--	--	--
3/11/2019	336.74	316.46	--	--	--	--	--	--	--	--	--	--	--
3/12/2019	--	--	--	--	--	--	--	--	--	--	--	--	--
3/14/2019	--	--	334.94	338.18	--	--	--	--	--	--	--	--	--
3/18/2019	337.36	316.77	--	--	--	--	--	--	--	--	--	--	--
3/20/2019	--	--	--	338.73	--	--	--	--	--	--	--	--	--
3/25/2019	338.04	316.60	--	--	--	--	--	--	--	--	--	--	--
3/27/2019	--	--	--	339.78	--	--	--	--	--	--	--	--	--
4/1/2019	338.47	316.65	--	--	--	--	--	--	--	--	--	--	--
4/3/2019	--	--	--	340.57	--	--	--	--	--	--	--	--	--
4/8/2019	338.75	316.71	--	--	--	--	--	--	--	--	--	--	--
4/9/2019	--	--	335.60	340.59	--	--	--	--	--	--	--	--	--
4/15/2019	338.71	316.77	--	--	--	--	--	--	--	--	--	--	--
4/17/2019	--	--	--	340.37	--	--	--	--	--	--	--	--	--
4/22/2019	338.41	317.45	--	--	--	--	--	--	--	--	--	--	--
4/23/2019	338.58	318.31	--	--	--	--	--	--	--	--	--	--	--
4/24/2019	--	--	--	340.79	--	--	--	--	--	--	--	--	--
4/25/2019	--	--	--	--	--	--	--	--	--	--	--	--	--
4/29/2019	337.74	317.17	--	--	--	--	--	--	--	--	--	--	--
5/1/2019	--	--	--	340.42	--	--	--	--	--	--	--	--	--
5/6/2019	--	318.53	--	--	--	--	--	--	--	--	--	--	--
5/8/2019	--	--	--	340.40	--	--	--	--	--	--	--	--	--
5/13/2019	336.88	317.82	--	--	--	--	--	--	--	--	--	--	--
5/14/2019	--	--	335.70	340.13	--	--	--	--	--	--	--	--	--
5/21/2019	336.48	317.97	--	--	--	--	--	--	--	--	--	--	--
5/22/2019	--	--	--	339.70	--	--	--	--	--	--	--	--	--
5/27/2019	336.08	318.11	--	--	--	--	--	--	--	--	--	--	--
5/29/2019	--	--	--	339.62	--	--	--	--	--	--	--	--	--
5/30/2019	--	--	--	--	--	--	--	--	--	--	--	--	--
6/3/2019	336.09	318.12	--	339.73	--	--	--	--	--	--	--	--	--
6/4/2019	--	--	--	339.78	--	--	--	--	--	--	--	--	--
6/5/2019	--	--	--	339.88	--	--	--	--	--	--	--	--	--
6/6/2019	--	--	--	339.87	--	--	--	--	--	--	--	--	--
6/7/2019	--	--	--	339.83	--	--	--	--	--	--	--	--	--
6/8/2019	--	--	--	339.78	--	--	--	--	--	--	--	--	--
6/9/2019	--	--	--	339.75	--	--	--	--	--	--	--	--	--
6/10/2019	336.05	318.09	--	339.75	--	--	--	--	--	--	--	--	--
6/11/2019	--	--	335.10	339.66	--	--	--	--	--	--	--	--	--
6/12/2019	--	--	--	339.65	--	--	--	--	--	--	--	--	--
6/13/2019	--	--	--	339.73	--	--	--	--	--	--	--	--	--
6/14/2019	--	--	--	339.69	--	--	--	--	--	--	--	--	--
6/15/2019	--	--	--	339.72	--	--	--	--	--	--	--	--	--
6/16/2019	--	--	--	339.72	--	--	--	--	--	--	--	--	--
6/17/2019	336.00	317.87	--	339.69	--	--	--	--	--	--	--	--	--
6/19/2019	--	--	--	339.67	--	--	--	--	--	--	--	--	--
6/20/2019	--	--	--	339.71	--	--	--	--	--	--	--	--	--
6/21/2019	--	--	--	339.65	--	--	--	--	--	--	--	--	--
6/22/2019	--	--	--	339.59	--	--	--	--	--	--	--	--	--
6/23/2019	--	--	--	339.62	--	--	--	--	--	--	--	--	--
6/24/2019	335.79	317.77	--	339.58	--	--	--	--	--	--	--	--	--
6/25/2019	--	--	--	339.63	--	--	--	--	--	--	--	--	--
6/26/2019	--	--	--	339.68	--	--	--	--	--	--	--	--	--
6/27/2019	--	--	--	339.70	--	--	--	--	--	--	--	--	--
6/28/2019	--	--	--	339.75	--	--	--	--	--	--	--	--	--
6/29/2019	--	--	--	339.83	--	--	--	--	--	--	--	--	--
6/30/2019	--	--	--	339.73	--	--	--	--	--	--	--	--	--
7/1/2019	--	--	--	339.53	--	--	--	--	--	--	--	--	--
7/2/2019	335.51	317.54	--	339.34	--	--	--	--	--	--	--	--	--
7/3/2019	--	--	--	339.18	--	--	--	--	--	--	--	--	--
7/4/2019	--	--	--	339.04	--	--	--	--	--	--	--	--	--
7/5/2019	--	--	--	338.91	--	--	--	--	--	--	--	--	--
7/6/2019	--	--	--	338.79	--	--	--	--	--	--	--	--	--
7/7/2019	--	--	--	338.66	--	--	--	--	--	--	--	--	--
7/8/2019	334.94	317.31	--	338.52	--	--	--	--	--	--	--	--	--
7/9/2019	--	--	334.77	338.40	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
7/10/2019	--	--	--	338.32	--	--	--	--	--	--	--	--	--
7/11/2019	--	--	--	338.27	--	--	--	--	--	--	--	--	--
7/12/2019	--	--	--	338.18	--	--	--	--	--	--	--	--	--
7/13/2019	--	--	--	338.09	--	--	--	--	--	--	--	--	--
7/14/2019	--	--	--	337.98	--	--	--	--	--	--	--	--	--
7/15/2019	334.52	317.10	--	337.91	--	--	--	--	--	--	--	--	--
7/16/2019	--	--	--	337.90	--	--	--	--	--	--	--	--	--
7/17/2019	--	--	--	337.86	--	--	--	--	--	--	--	--	--
7/18/2019	--	--	--	337.81	--	--	--	--	--	--	--	--	--
7/19/2019	--	--	--	337.81	--	--	--	--	--	--	--	--	--
7/20/2019	--	--	--	337.80	--	--	--	--	--	--	--	--	--
7/21/2019	--	--	--	337.77	--	--	--	--	--	--	--	--	--
7/22/2019	334.48	316.92	--	337.74	--	--	--	--	--	--	--	--	--
7/23/2019	--	--	--	337.72	--	--	--	--	--	--	--	--	--
7/24/2019	--	--	--	337.69	--	--	--	--	--	--	--	--	--
7/25/2019	--	--	--	337.66	--	--	--	--	--	--	--	--	--
7/29/2019	334.03	316.71	--	--	--	--	--	--	--	--	--	--	--
7/31/2019	--	--	--	337.27	--	--	--	--	--	--	--	--	--
8/1/2019	--	--	--	337.14	--	--	--	--	--	--	--	--	--
8/2/2019	--	--	--	337.10	--	--	--	--	--	--	--	--	--
8/3/2019	--	--	--	337.06	--	--	--	--	--	--	--	--	--
8/4/2019	--	--	--	337.02	--	--	--	--	--	--	--	--	--
8/5/2019	--	--	--	336.99	--	--	--	--	--	--	--	--	--
8/6/2019	333.67	316.51	--	336.96	--	--	--	--	--	--	--	--	--
8/7/2019	--	--	--	336.93	--	--	--	--	--	--	--	--	--
8/8/2019	--	--	--	336.91	--	--	--	--	--	--	--	--	--
8/9/2019	--	--	--	336.87	--	--	--	--	--	--	--	--	--
8/10/2019	--	--	--	336.85	--	--	--	--	--	--	--	--	--
8/11/2019	--	--	--	336.82	--	--	--	--	--	--	--	--	--
8/12/2019	333.49	316.29	--	336.81	--	--	--	--	--	--	--	--	--
8/13/2019	--	--	334.25	336.78	--	--	--	--	--	--	--	--	--
8/14/2019	--	--	--	336.68	--	--	--	--	--	--	--	--	--
8/16/2019	--	--	--	336.51	--	--	--	--	--	--	--	--	--
8/17/2019	--	--	--	336.44	--	--	--	--	--	--	--	--	--
8/18/2019	--	--	--	336.36	--	--	--	--	--	--	--	--	--
8/19/2019	333.13	316.05	--	336.30	--	--	--	--	--	--	--	--	--
8/20/2019	--	--	--	336.24	--	--	--	--	--	--	--	--	--
8/21/2019	--	--	--	336.22	--	--	--	--	--	--	--	--	--
8/22/2019	--	--	--	336.21	--	--	--	--	--	--	--	--	--
8/23/2019	--	--	--	336.20	--	--	--	--	--	--	--	--	--
8/24/2019	--	--	--	336.21	--	--	--	--	--	--	--	--	--
8/25/2019	--	--	--	336.18	--	--	--	--	--	--	--	--	--
8/26/2019	332.94	315.98	--	336.18	--	--	--	--	--	--	--	--	--
8/27/2019	--	--	--	336.16	--	--	--	--	--	--	--	--	--
8/28/2019	--	--	--	336.11	--	--	--	--	--	--	--	--	--
8/29/2019	--	--	--	336.05	--	--	--	--	--	--	--	--	--
8/30/2019	--	--	--	336.00	--	--	--	--	--	--	--	--	--
8/31/2019	--	--	--	335.91	--	--	--	--	--	--	--	--	--
9/1/2019	--	--	--	335.87	--	--	--	--	--	--	--	--	--
9/2/2019	--	--	--	335.84	--	--	--	--	--	--	--	--	--
9/3/2019	332.54	315.86	--	335.80	--	--	--	--	--	--	--	--	--
9/4/2019	--	--	--	335.75	--	--	--	--	--	--	--	--	--
9/5/2019	--	--	--	335.71	--	--	--	--	--	--	--	--	--
9/6/2019	--	--	--	335.68	--	--	--	--	--	--	--	--	--
9/7/2019	--	--	--	335.64	--	--	--	--	--	--	--	--	--
9/8/2019	--	--	--	335.61	--	--	--	--	--	--	--	--	--
9/9/2019	332.39	315.69	--	335.56	--	--	--	--	--	--	--	--	--
9/10/2019	--	--	333.83	335.53	--	--	--	--	--	--	--	--	--
9/11/2019	--	--	--	335.51	--	--	--	--	--	--	--	--	--
9/12/2019	--	--	--	335.49	--	--	--	--	--	--	--	--	--
9/13/2019	--	--	--	335.47	--	--	--	--	--	--	--	--	--
9/14/2019	--	--	--	335.46	--	--	--	--	--	--	--	--	--
9/15/2019	--	--	--	335.45	--	--	--	--	--	--	--	--	--
9/16/2019	332.22	315.59	--	335.43	--	--	--	--	--	--	--	--	--
9/17/2019	331.99	315.63	--	335.40	--	--	--	--	--	--	--	--	--
9/18/2019	--	--	--	335.37	--	--	--	--	--	--	--	--	--
9/19/2019	--	--	--	335.35	--	--	--	--	--	--	--	--	--
9/20/2019	--	--	--	335.32	--	--	--	--	--	--	--	--	--
9/21/2019	--	--	--	335.30	--	--	--	--	--	--	--	--	--
9/22/2019	--	--	--	335.28	--	--	--	--	--	--	--	--	--
9/23/2019	331.77	315.58	--	335.25	--	--	--	--	--	--	--	--	--
9/24/2019	--	--	--	335.22	--	--	--	--	--	--	--	--	--
9/25/2019	--	--	--	335.21	--	--	--	--	--	--	--	--	--
9/26/2019	--	--	--	335.22	--	--	--	--	--	--	--	--	--
9/27/2019	--	--	--	335.24	--	--	--	--	--	--	--	--	--
9/28/2019	--	--	--	335.27	--	--	--	--	--	--	--	--	--
9/29/2019	--	--	--	335.28	--	--	--	--	--	--	--	--	--
9/30/2019	331.58	315.46	--	335.28	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
10/1/2019	--	--	--	335.27	--	--	--	--	--	--	--	--	--
10/2/2019	--	--	--	335.24	--	--	--	--	--	--	--	--	--
10/7/2019	331.41	315.34	--	335.22	--	--	--	--	--	--	--	--	--
10/8/2019	--	--	333.61	335.21	--	--	--	--	--	--	--	--	--
10/9/2019	--	--	--	335.21	--	--	--	--	--	--	--	--	--
10/10/2019	--	--	--	335.20	--	--	--	--	--	--	--	--	--
10/11/2019	--	--	--	335.16	--	--	--	--	--	--	--	--	--
10/12/2019	--	--	--	335.16	--	--	--	--	--	--	--	--	--
10/13/2019	--	--	--	335.14	--	--	--	--	--	--	--	--	--
10/14/2019	--	--	--	335.14	--	--	--	--	--	--	--	--	--
10/15/2019	331.21	315.21	--	335.13	--	--	--	--	--	--	--	--	--
10/16/2019	--	--	--	335.13	--	--	--	--	--	--	--	--	--
10/17/2019	--	--	--	335.12	--	--	--	--	--	--	--	--	--
10/18/2019	--	--	--	335.10	--	--	--	--	--	--	--	--	--
10/19/2019	--	--	--	335.11	--	--	--	--	--	--	--	--	--
10/20/2019	--	--	--	335.13	--	--	--	--	--	--	--	--	--
10/21/2019	331.07	315.13	--	335.14	--	--	--	--	--	--	--	--	--
10/22/2019	--	--	--	335.13	--	--	--	--	--	--	--	--	--
10/23/2019	--	--	--	335.11	--	--	--	--	--	--	--	--	--
10/24/2019	--	--	--	335.10	--	--	--	--	--	--	--	--	--
10/25/2019	--	--	--	335.12	--	--	--	--	--	--	--	--	--
10/26/2019	--	--	--	335.18	--	--	--	--	--	--	--	--	--
10/27/2019	--	--	--	335.20	--	--	--	--	--	--	--	--	--
10/28/2019	331.01	315.03	--	335.15	--	--	--	--	--	--	--	--	--
10/29/2019	--	--	--	335.14	--	--	--	--	--	--	--	--	--
10/30/2019	--	--	--	335.12	--	--	--	--	--	--	--	--	--
10/31/2019	--	--	--	335.14	--	--	--	--	--	--	--	--	--
11/1/2019	--	--	--	335.16	--	--	--	--	--	--	--	--	--
11/2/2019	--	--	--	335.18	--	--	--	--	--	--	--	--	--
11/3/2019	--	--	--	335.16	--	--	--	--	--	--	--	--	--
11/4/2019	330.94	314.99	--	335.15	--	--	--	--	--	--	--	--	--
11/5/2019	--	--	--	335.13	--	--	--	--	--	--	--	--	--
11/6/2019	--	--	--	335.12	--	--	--	--	--	--	--	--	--
11/7/2019	--	--	--	335.13	--	--	--	--	--	--	--	--	--
11/8/2019	--	--	--	335.14	--	--	--	--	--	--	--	--	--
11/9/2019	--	--	--	335.15	--	--	--	--	--	--	--	--	--
11/10/2019	--	--	--	335.14	--	--	--	--	--	--	--	--	--
11/11/2019	330.69	314.91	--	335.14	--	--	--	--	--	--	--	--	--
11/12/2019	--	--	334.18	335.15	--	--	--	--	--	--	--	--	--
11/13/2019	--	--	--	335.15	--	--	--	--	--	--	--	--	--
11/14/2019	--	--	--	335.16	--	--	--	--	--	--	--	--	--
11/15/2019	--	--	--	335.15	--	--	--	--	--	--	--	--	--
11/16/2019	--	--	--	335.14	--	--	--	--	--	--	--	--	--
11/17/2019	--	--	--	335.17	--	--	--	--	--	--	--	--	--
11/18/2019	330.55	314.84	--	335.16	--	--	--	--	--	--	--	--	--
11/19/2019	--	--	--	335.17	--	--	--	--	--	--	--	--	--
11/20/2019	--	--	--	335.16	--	--	--	--	--	--	--	--	--
11/21/2019	--	314.82	--	335.15	--	--	--	--	--	--	--	--	--
11/22/2019	--	--	--	335.14	--	--	--	--	--	--	--	--	--
11/23/2019	--	--	--	335.16	--	--	--	--	--	--	--	--	--
11/24/2019	--	--	--	335.14	--	--	--	--	--	--	--	--	--
11/25/2019	330.34	314.79	--	335.13	--	--	--	--	--	--	--	--	--
11/26/2019	--	--	--	335.13	--	--	--	--	--	--	--	--	--
11/27/2019	--	--	--	335.15	--	--	--	--	--	--	--	--	--
11/28/2019	--	--	--	335.18	--	--	--	--	--	--	--	--	--
12/2/2019	330.97	314.75	--	335.51	--	--	--	--	--	--	--	--	--
12/4/2019	--	--	--	335.66	--	--	--	--	--	--	--	--	--
12/6/2019	--	--	--	335.73	--	--	--	--	--	--	--	--	--
12/9/2019	332.49	314.71	--	335.94	--	--	--	--	--	--	--	--	--
12/10/2019	--	--	334.68	336.03	--	--	--	--	--	--	--	--	--
12/13/2019	--	--	--	336.31	--	--	--	--	--	--	--	--	--
12/16/2019	333.19	314.65	--	336.68	--	--	--	--	--	--	--	--	--
12/18/2019	--	--	--	336.88	--	--	--	--	--	--	--	--	--
12/20/2019	--	--	--	337.02	--	--	--	--	--	--	--	--	--
12/23/2019	333.85	314.65	--	337.41	--	--	--	--	--	--	--	--	--
12/24/2019	--	--	--	337.47	--	--	--	--	--	--	--	--	--
12/31/2019	--	--	--	337.60	--	--	--	--	--	--	--	--	--
1/6/2020	333.69	314.58	--	337.53	--	--	--	--	--	--	--	--	--
1/8/2020	--	--	--	337.49	--	--	--	--	--	--	--	--	--
1/13/2020	334.04	316.75	--	--	--	--	--	--	--	--	--	--	--
1/14/2020	--	--	335.68	339.02	--	--	--	--	--	--	--	--	--
1/16/2020	--	--	--	--	--	--	--	--	--	--	--	--	--
1/20/2020	334.21	314.99	--	--	--	--	--	--	--	--	--	--	--
1/22/2020	--	--	--	338.92	--	--	--	--	--	--	--	--	--
1/27/2020	333.75	315.71	--	--	--	--	--	--	--	--	--	--	--
1/29/2020	--	--	--	338.55	--	--	--	--	--	--	--	--	--
2/3/2020	333.48	316.20	--	--	--	--	--	--	--	--	--	--	--
2/5/2020	--	--	--	338.17	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
2/10/2020	333.20	316.57	--	--	--	--	--	--	--	--	--	--	--
2/11/2020	--	--	335.13	337.74	--	--	--	--	--	--	--	--	--
2/18/2020	333.14	316.92	--	337.72	--	--	--	--	--	--	--	--	--
2/21/2020	--	--	--	337.74	--	--	--	--	--	--	--	--	--
2/22/2020	--	--	--	337.72	--	--	--	--	--	--	--	--	--
2/23/2020	--	--	--	337.73	--	--	--	--	--	--	--	--	--
2/24/2020	332.98	316.97	--	337.72	--	--	--	--	--	--	--	--	--
2/25/2020	--	--	--	337.73	--	--	--	--	--	--	--	--	--
2/26/2020	--	--	--	337.71	--	--	--	--	--	--	--	--	--
2/27/2020	--	--	--	337.72	--	--	--	--	--	--	--	--	--
2/28/2020	--	--	--	337.70	--	--	--	--	--	--	--	--	--
2/29/2020	--	--	--	337.68	--	--	--	--	--	--	--	--	--
3/1/2020	--	--	--	337.69	--	--	--	--	--	--	--	--	--
3/2/2020	332.98	317.09	--	337.70	--	--	--	--	--	--	--	--	--
3/3/2020	333.09	317.10	--	337.68	--	--	--	--	--	--	--	--	--
3/4/2020	--	--	--	337.64	--	--	--	--	--	--	--	--	--
3/5/2020	--	--	--	337.66	--	--	--	--	--	--	--	--	--
3/9/2020	333.10	316.95	--	337.71	--	--	--	--	--	--	--	--	--
3/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--
3/11/2020	--	--	335.56	337.98	--	--	--	--	--	--	--	--	--
3/12/2020	--	--	--	338.23	--	--	--	--	--	--	--	--	--
3/13/2020	--	--	--	338.41	--	--	--	--	--	--	--	--	--
3/14/2020	--	--	--	338.47	--	--	--	--	--	--	--	--	--
3/15/2020	--	--	--	338.51	--	--	--	--	--	--	--	--	--
3/16/2020	333.68	316.98	--	338.64	--	--	--	--	--	--	--	--	--
3/17/2020	--	--	--	338.77	--	--	--	--	--	--	--	--	--
3/18/2020	--	--	--	338.81	--	--	--	--	--	--	--	--	--
3/19/2020	--	--	--	338.89	--	--	--	--	--	--	--	--	--
3/20/2020	--	--	--	339.07	--	--	--	--	--	--	--	--	--
3/21/2020	--	--	--	339.01	--	--	--	--	--	--	--	--	--
3/22/2020	--	--	--	339.07	--	--	--	--	--	--	--	--	--
3/23/2020	334.99	317.18	--	339.22	--	--	--	--	--	--	--	--	--
3/24/2020	--	--	--	339.27	--	--	--	--	--	--	--	--	--
3/25/2020	--	--	--	339.37	--	--	--	--	--	--	--	--	--
3/26/2020	--	--	--	339.46	--	--	--	--	--	--	--	--	--
3/27/2020	--	--	--	339.48	--	--	--	--	--	--	--	--	--
3/28/2020	--	--	--	339.55	--	--	--	--	--	--	--	--	--
3/29/2020	--	--	--	339.66	--	--	--	--	--	--	--	--	--
3/30/2020	335.65	317.34	--	339.76	--	--	--	--	--	--	--	--	--
3/31/2020	--	--	--	339.87	--	--	--	--	--	--	--	--	--
4/1/2020	--	--	--	339.96	--	--	--	--	--	--	--	--	--
4/2/2020	--	--	--	340.05	--	--	--	--	--	--	--	--	--
4/3/2020	--	--	--	340.12	--	--	--	--	--	--	--	--	--
4/4/2020	--	--	--	340.15	--	--	--	--	--	--	--	--	--
4/5/2020	--	--	--	340.15	--	--	--	--	--	--	--	--	--
4/6/2020	336.00	317.46	--	340.12	--	--	--	--	--	--	--	--	--
4/7/2020	--	--	--	340.18	--	--	--	--	--	--	--	--	--
4/8/2020	--	--	--	340.19	--	--	--	--	--	--	--	--	--
4/9/2020	--	--	--	340.18	--	--	--	--	--	--	--	--	--
4/10/2020	--	--	--	340.06	--	--	--	--	--	--	--	--	--
4/11/2020	--	--	--	340.05	--	--	--	--	--	--	--	--	--
4/12/2020	--	--	--	340.07	--	--	--	--	--	--	--	--	--
4/13/2020	335.95	317.81	--	340.17	--	--	--	--	--	--	--	--	--
4/14/2020	--	--	335.24	339.99	336.92	336.90	338.46	338.36	336.49	332.75	328.41	--	--
4/15/2020	--	--	--	340.06	--	--	--	--	--	--	--	--	--
4/16/2020	--	--	--	340.10	--	--	--	--	--	--	--	--	--
4/20/2020	336.38	317.87	--	340.24	--	--	--	--	--	--	--	--	--
4/21/2020	--	--	--	340.25	--	--	--	--	--	--	--	--	--
4/22/2020	--	--	--	340.23	--	--	--	--	--	--	--	--	--
4/23/2020	--	--	--	340.27	--	--	--	--	--	--	--	--	--
4/24/2020	--	--	--	340.32	--	--	--	--	--	--	--	--	--
4/25/2020	--	--	--	340.26	--	--	--	--	--	--	--	--	--
4/26/2020	--	--	--	340.28	--	--	--	--	--	--	--	--	--
4/27/2020	336.32	317.87	--	340.24	--	--	--	--	--	--	--	--	--
4/28/2020	--	--	--	340.24	--	--	--	--	--	--	--	--	--
4/29/2020	--	--	--	340.28	--	--	--	--	--	--	--	--	--
4/30/2020	--	--	--	340.32	--	--	--	--	--	--	--	--	--
5/1/2020	--	--	--	340.25	--	--	--	--	--	--	--	--	--
5/2/2020	--	--	--	340.21	--	--	--	--	--	--	--	--	--
5/3/2020	--	--	--	340.23	--	--	--	--	--	--	--	--	--
5/4/2020	336.13	317.94	--	340.15	--	--	--	--	--	--	--	--	--
5/5/2020	--	--	--	340.15	--	--	--	--	--	--	--	--	--
5/6/2020	--	--	--	340.15	--	--	--	--	--	--	--	--	--
5/7/2020	--	--	--	340.15	--	--	--	--	--	--	--	--	--
5/8/2020	--	--	--	340.10	--	--	--	--	--	--	--	--	--
5/9/2020	--	--	--	340.09	--	--	--	--	--	--	--	--	--
5/10/2020	--	--	--	340.11	--	--	--	--	--	--	--	--	--
5/11/2020	336.11	317.94	--	340.10	--	--	--	--	--	--	--	--	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
5/12/2020	--	--	--	340.05	--	--	--	--	--	--	--	--	--
5/13/2020	--	--	335.02	339.98	336.29	336.24	338.04	337.93	335.99	332.26	327.81	--	--
5/14/2020	--	--	--	340.02	--	--	--	--	--	--	--	--	--
5/15/2020	--	--	--	340.07	--	--	--	--	--	--	--	--	--
5/16/2020	--	--	--	339.98	--	--	--	--	--	--	--	--	--
5/17/2020	--	--	--	339.97	--	--	--	--	--	--	--	--	--
5/18/2020	--	--	--	339.99	--	--	--	--	--	--	--	--	--
5/19/2020	335.96	317.83	--	340.01 / 340.03	--	--	--	--	--	--	--	--	--
5/20/2020	--	--	--	339.97	--	--	--	--	--	--	--	--	--
5/21/2020	--	--	--	340.11	--	--	--	--	--	--	--	--	--
5/22/2020	--	--	--	340.32	--	--	--	--	--	--	--	--	--
5/23/2020	--	--	--	340.40	--	--	--	--	--	--	--	--	--
5/24/2020	--	--	--	340.43	--	--	--	--	--	--	--	--	--
5/25/2020	335.94	317.81	--	340.44	--	--	--	--	--	--	--	--	--
5/26/2020	--	--	--	340.41 / 340.42	--	--	--	--	--	--	--	--	--
5/27/2020	--	--	--	340.40	--	--	--	--	--	--	--	--	--
5/28/2020	335.81	317.81	--	340.35	--	--	--	--	--	--	--	--	--
5/29/2020	--	--	--	340.31	--	--	--	--	--	--	--	--	--
5/30/2020	--	--	--	340.20	--	--	--	--	--	--	--	--	--
5/31/2020	--	--	--	340.06	--	--	--	--	--	--	--	--	--
6/1/2020	335.58	317.75	--	340.08	--	--	--	--	--	--	--	--	--
6/2/2020	--	--	--	340.10	--	--	--	--	--	--	--	--	--
6/3/2020	--	--	--	340.13	--	--	--	--	--	--	--	--	--
6/4/2020	--	--	--	340.06	--	--	--	--	--	--	--	--	--
6/5/2020	--	--	--	340.04	--	--	--	--	--	--	--	--	--
6/6/2020	--	--	--	340.02	--	--	--	--	--	--	--	--	--
6/7/2020	--	--	--	339.98	--	--	--	--	--	--	--	--	--
6/8/2020	335.51	317.65	--	339.98	--	--	--	--	--	--	--	--	--
6/9/2020	--	--	334.88	340.04	336.06	336.00	337.72	337.69	335.88	332.11	327.32	--	--
6/10/2020	--	--	--	340.08	--	--	--	--	--	--	--	--	--
6/11/2020	--	--	--	340.14	--	--	--	--	--	--	--	--	--
6/12/2020	--	--	--	340.13 / 340.14	--	--	--	--	--	--	--	--	--
6/13/2020	--	--	--	340.14	--	--	--	--	--	--	--	--	--
6/14/2020	--	--	--	340.15	--	--	--	--	--	--	--	--	--
6/15/2020	335.43	317.52	--	340.21 / 340.20	--	--	--	--	--	--	--	--	--
6/16/2020	--	--	--	340.24	--	--	--	--	--	--	--	--	--
6/17/2020	--	--	--	340.29 / 340.29	--	--	--	--	--	--	--	--	--
6/18/2020	--	--	--	340.31	--	--	--	--	--	--	--	--	--
6/19/2020	--	--	--	340.32	--	--	--	--	--	--	--	--	--
6/20/2020	--	--	--	340.28	--	--	--	--	--	--	--	--	--
6/22/2020	335.45	317.55	--	340.20	--	--	--	--	--	--	--	--	--
6/23/2020	--	--	--	340.17	--	--	--	--	--	--	--	--	--
6/24/2020	--	--	--	340.08 / 340.07	--	--	--	--	--	--	--	--	--
6/25/2020	--	--	--	340.01	--	--	--	--	--	--	--	--	--
6/26/2020	--	--	--	340.00	--	--	--	--	--	--	--	--	--
6/27/2020	--	--	--	340.09	--	--	--	--	--	--	--	--	--
6/28/2020	--	--	--	340.10	--	--	--	--	--	--	--	--	--
6/29/2020	335.33	317.40	--	340.08 / 340.08	--	--	--	--	--	--	--	--	--
6/30/2020	--	--	--	340.08	--	--	--	--	--	--	--	--	--
7/1/2020	--	--	--	340.09 / 340.11	--	--	--	--	--	--	--	--	--
7/2/2020	--	--	--	339.78	--	--	--	--	--	--	--	--	--
7/3/2020	--	--	--	339.50	--	--	--	--	--	--	--	--	--
7/4/2020	--	--	--	339.33	--	--	--	--	--	--	--	--	--
7/6/2020	--	317.35	--	339.21 / 339.19	--	--	--	--	--	--	--	--	--
7/7/2020	--	--	--	339.06 / 339.09	--	--	--	--	--	--	--	--	--
7/8/2020	--	--	--	338.89 / 338.90	--	--	--	--	--	--	--	--	--
7/10/2020	--	--	--	338.50	--	--	--	--	--	--	--	--	--
7/11/2020	--	--	--	338.37 / 338.39	--	--	--	--	--	--	--	--	--
7/12/2020	--	--	--	338.27 / 338.28	--	--	--	--	--	--	--	--	--
7/13/2020	333.45	317.30	--	338.20 / 338.19	--	--	--	--	--	--	--	--	--
7/14/2020	--	--	334.51	338.07 / 338.08	335.02	335.02	336.29	336.42	335.17	331.20	326.08	--	335.80
7/15/2020	--	--	--	337.95	--	--	--	--	--	--	--	--	--
7/16/2020	--	--	--	337.92	--	--	--	--	--	--	--	--	--
7/17/2020	--	--	--	337.94	--	--	--	--	--	--	--	--	--
7/18/2020	--	--	--	337.94	--	--	--	--	--	--	--	--	--
7/19/2020	--	--	--	337.94	--	--	--	--	--	--	--	--	--
7/20/2020	332.48	317.20	--	337.91	--	--	--	--	--	--	--	--	--
7/21/2020	--	--	--	337.91	--	--	--	--	--	--	--	--	--
7/22/2020	--	--	--	337.92	--	--	--	--	--	--	--	--	--
7/23/2020	--	--	--	337.92	--	--	--	--	--	--	--	--	--
7/24/2020	--	--	--	337.91	--	--	--	--	--	--	--	--	--
7/25/2020	--	--	--	337.92	--	--	--	--	--	--	--	--	--
7/26/2020	--	--	--	337.92	--	--	--	--	--	--	--	--	--
7/27/2020	332.43	317.19	--	337.89	--	--	--	--	--	--	--	--	--
7/28/2020	--	--	--	337.73	--	--	--	--	--	--	--	--	--
7/29/2020	--	--	--	337.62	--	--	--	--	--	--	--	--	--
7/30/2020	--	--	--	337.54	--	--	--	--	--	--	--	--	--
7/31/2020	331.99	317.11	--	337.40	--	--	--	--	--	--	--	--	--

Table D.1

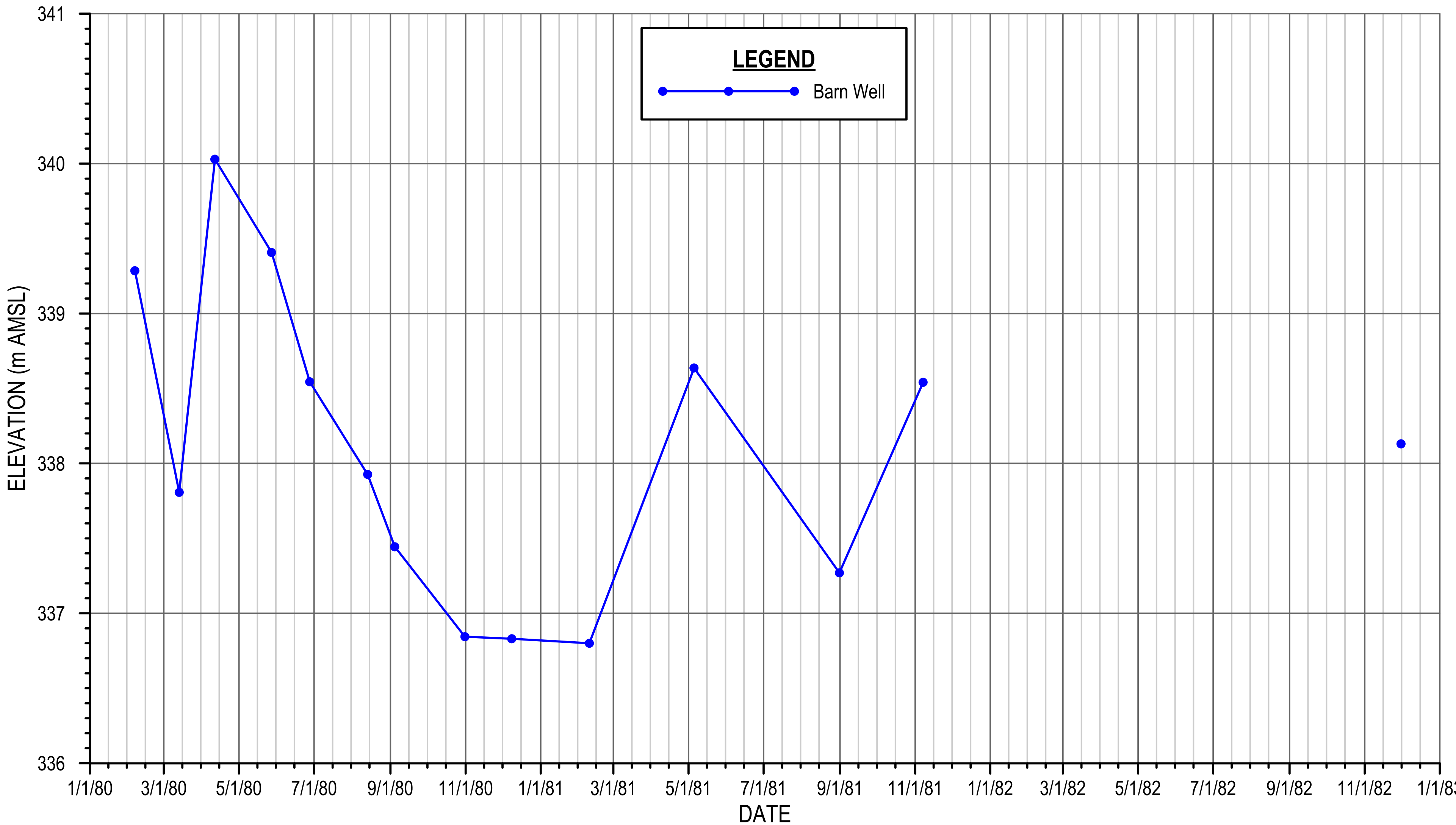
Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
8/1/2020	--	--	--	337.19	--	--	--	--	--	--	--	--	--
8/2/2020	--	--	--	337.11	--	--	--	--	--	--	--	--	--
8/3/2020	--	--	--	337.10	--	--	--	--	--	--	--	--	--
8/4/2020	331.79	317.08	--	337.08	--	--	--	--	--	--	--	--	--
8/5/2020	--	--	--	337.05	--	--	--	--	--	--	--	--	--
8/6/2020	--	--	--	336.99	--	--	--	--	--	--	--	--	--
8/7/2020	--	--	--	336.95	--	--	--	--	--	--	--	--	--
8/8/2020	--	--	--	336.93	--	--	--	--	--	--	--	--	--
8/9/2020	--	--	--	336.96	--	--	--	--	--	--	--	--	--
8/10/2020	331.79	317.04	--	337.02	--	--	--	--	--	--	--	--	--
8/11/2020	--	--	--	337.04	--	--	--	--	--	--	--	--	--
8/12/2020	--	--	334.44	336.98	333.84	333.85	334.73	334.85	334.51	330.79	325.10	--	--
8/17/2020	331.34	316.91	--	336.96	--	--	--	--	--	--	--	--	--
8/19/2020	--	--	--	336.88	--	--	--	--	--	--	--	--	--
8/24/2020	330.87	316.67	--	336.77	--	--	--	--	--	--	--	--	--
8/26/2020	--	--	--	336.56	--	--	--	--	--	--	--	--	--
8/31/2020	330.45	316.49	--	336.21	--	--	--	--	--	--	--	--	--
9/2/2020	--	--	--	336.08	--	--	--	--	--	--	--	--	--
9/8/2020	330.14	316.27	--	335.57	--	--	--	--	--	--	--	--	--
9/9/2020	--	--	333.97	335.50	332.65	332.71	333.36	333.63	333.89	330.42	324.23	--	--
9/14/2020	329.91	316.14	--	--	--	--	--	--	--	--	--	--	--
9/16/2020	--	--	--	335.14	--	--	--	--	--	--	--	--	--
9/21/2020	329.68	316.02	--	335.22	--	--	--	--	--	--	--	--	--
9/23/2020	--	--	--	335.22	--	--	--	--	--	--	--	--	--
9/28/2020	329.48	315.96	--	--	--	--	--	--	--	--	--	--	--
9/30/2020	--	--	--	335.24	--	--	--	--	--	--	--	--	--
10/5/2020	329.29	315.80	--	--	--	--	--	--	--	--	--	--	--
10/7/2020	--	--	--	335.21	--	--	--	--	--	--	--	--	--
10/13/2020	329.12	315.71	333.56	335.13	331.70	331.76	332.40	332.76	333.36	330.06	323.38	--	--
10/14/2020	--	--	--	--	--	--	--	--	--	--	--	--	--
10/19/2020	329.03	315.62	--	--	--	--	--	--	--	--	--	--	--
10/20/2020	--	--	--	335.16	--	--	--	--	--	--	--	--	--
10/26/2020	328.99	315.57	--	--	--	--	--	--	--	--	--	--	--
10/28/2020	--	--	--	335.16	--	--	--	--	--	--	--	--	--
11/2/2020	328.86	315.44	--	--	--	--	--	--	--	--	--	--	--
11/4/2020	--	--	--	335.08	--	--	--	--	--	--	--	--	--
11/9/2020	328.82	315.34	--	335.07	--	--	--	--	--	--	--	--	--
11/10/2020	--	--	--	--	--	--	--	--	--	--	--	--	--
11/11/2020	--	--	333.58	335.05	331.20	331.26	332.01	332.33	333.16	329.92	322.80	--	--
11/13/2020	--	--	--	335.05	--	--	--	--	--	--	--	--	--
11/16/2020	328.76	315.24	--	--	--	--	--	--	--	--	--	--	--
11/19/2020	--	--	--	335.04	--	--	--	--	--	--	--	--	--
11/23/2020	328.75	315.16	--	--	--	--	--	--	--	--	--	--	--
11/25/2020	--	--	--	335.55	--	--	--	--	--	--	--	--	--
11/26/2020	328.63	315.19	--	--	--	--	--	--	--	--	--	--	--
11/30/2020	328.75	315.19	--	--	--	--	--	--	--	--	--	--	--
12/2/2020	--	--	--	335.33	--	--	--	--	--	--	--	--	--
12/7/2020	328.76	315.08	--	--	--	--	--	--	--	--	--	--	--
12/8/2020	--	--	--	--	--	--	--	--	--	--	--	--	--
12/9/2020	--	--	334.22	334.93	330.85	330.89	331.89	332.17	333.17	330.04	322.38	--	--
12/11/2020	--	--	--	335.05	--	--	--	--	--	--	--	--	--
12/14/2020	328.80	315.03	--	335.69	--	--	--	--	--	--	--	--	--
12/16/2020	--	--	--	336.06	--	--	--	--	--	--	--	--	--
12/21/2020	329.05	315.00	--	336.81	--	--	--	--	--	--	--	--	--
12/23/2020	--	--	--	336.99	--	--	--	--	--	--	--	--	--
12/29/2020	329.26	314.86	--	337.58	--	--	--	--	--	--	--	--	--
12/30/2020	--	--	--	337.74	--	--	--	--	--	--	--	--	--
1/4/2021	329.44	314.86	--	337.92	--	--	--	--	--	--	--	--	--
1/6/2021	--	--	--	337.97	--	--	--	--	--	--	--	--	--
1/11/2021	329.59	314.81	--	338.17	--	--	--	--	--	--	--	--	--
1/12/2021	--	--	334.78	338.14	331.52	331.55	333.58	333.71	334.12	331.12	322.37	--	332.59
1/18/2021	329.62	314.80	--	338.19	--	--	--	--	--	--	--	--	--
1/20/2021	--	--	--	338.08	--	--	--	--	--	--	--	--	--
1/25/2021	329.69	314.84	--	338.07	--	--	--	--	--	--	--	--	--
1/27/2021	--	--	--	337.97	--	--	--	--	--	--	--	--	--
1/28/2021	329.61	314.83	--	--	--	--	--	--	--	--	--	--	--
2/1/2021	329.65	314.95	--	338.04	--	--	--	--	--	--	--	--	--
2/3/2021	--	--	--	337.64	--	--	--	--	--	--	--	--	--
2/8/2021	329.62	315.10	--	337.71	--	--	--	--	--	--	--	--	--
2/9/2021	--	--	--	--	--	--	--	--	--	--	--	--	--
2/10/2021	--	--	334.68	337.69	332.05	332.10	333.87	334.06	334.37	330.84	322.82	331.95	--
2/16/2021	329.66	315.29	--	337.79	--	--	--	--	--	--	--	--	--
2/17/2021	--	--	--	337.70	--	--	--	--	--	--	--	--	--
2/19/2021	--	--	--	--	--	--	--	--	--	--	--	331.95	--
2/22/2021	329.66	315.38	--	337.82	--	--	--	--	--	--	--	--	--
2/24/2021	--	--	--	337.76	--	--	--	--	--	--	--	--	--
3/1/2021	329.56	315.34	--	337.75	--	--	--	--	--	--	--	--	--
3/3/2021	--	--	334.77	337.75	332.01	332.07	333.80	333.98	334.28	330.67	322.97	331.87	--

Table D.1

Groundwater Level Monitoring Data
Milton Quarry East Extension
Region of Halton, Ontario

Date	OW58-07 Elevation (m AMSL)	OW59-07 Elevation (m AMSL)	OW69-08 Elevation (m AMSL)	OW70-08 Elevation (m AMSL)	OW78D-20 Elevation (m AMSL)	OW78S-20 Elevation (m AMSL)	OW79D-20 Elevation (m AMSL)	OW79S-20 Elevation (m AMSL)	OW80-20 Elevation (m AMSL)	OW81-20 Elevation (m AMSL)	OW82-20 Elevation (m AMSL)	OW83-21 Elevation (m AMSL)	TW1-80 Elevation (m AMSL)
3/8/2021	329.51	315.34	--	337.71	--	--	--	--	--	--	--	--	--
3/9/2021	--	--	--	--	--	--	--	--	--	--	--	--	--
3/10/2021	--	--	334.76	337.72	331.97	332.05	334.02	333.87	334.25	330.69	322.92	331.98	--
3/15/2021	329.91	315.26	--	338.23	--	--	--	--	--	--	--	--	--
3/17/2021	--	--	--	338.39	--	--	--	--	--	--	--	--	--
3/18/2021	330.10	315.23	--	--	--	--	--	--	--	--	--	--	--
3/22/2021	330.42	315.24	--	338.53	--	--	--	--	--	--	--	--	--
3/24/2021	--	--	--	338.57	--	--	--	--	--	--	--	--	--
3/29/2021	330.59	315.37	--	338.70	--	--	--	--	--	--	--	--	--
3/31/2021	--	--	--	338.81	--	--	--	--	--	--	--	--	--
4/1/2021	--	--	--	339.04	--	--	--	--	--	--	--	--	--
4/5/2021	331.47	315.66	--	339.21	--	--	--	--	--	--	--	--	--
4/6/2021	--	--	--	339.79 / 339.21	--	--	--	--	--	--	--	--	--
4/7/2021	--	--	--	339.71	--	--	--	--	--	--	--	--	--
4/9/2021	--	--	--	339.63	--	--	--	--	--	--	--	--	--
4/12/2021	331.48	315.92	--	339.58	--	--	--	--	--	--	--	--	--
4/13/2021	--	--	--	--	--	--	--	--	--	--	--	--	--
4/14/2021	--	--	335.14	339.51	334.03	334.09	335.95	336.04	335.58	332.21	324.99	333.67	--
4/19/2021	331.49	316.21	--	339.52	--	--	--	--	--	--	--	--	--
4/21/2021	--	--	--	339.49	--	--	--	--	--	--	--	--	--
4/26/2021	331.50	316.34	--	--	--	--	--	--	--	--	--	--	--
4/27/2021	--	--	--	339.43	--	--	--	--	--	--	--	--	--
4/28/2021	--	--	--	339.41	--	--	--	--	--	--	--	--	--
5/3/2021	331.48	316.59	--	--	--	--	--	--	--	--	--	--	--
5/5/2021	--	--	--	339.33	--	--	--	--	--	--	--	--	--
5/7/2021	--	--	--	339.36	--	--	--	--	--	--	--	--	--
5/10/2021	331.49	316.72	--	339.40	--	--	--	--	--	--	--	--	--
5/11/2021	--	--	--	--	--	--	--	--	--	--	--	--	--
5/12/2021	--	--	334.91	339.39	334.14	334.15	335.87	335.99	335.39	331.91	325.48	333.38	--
5/17/2021	331.53	316.82	--	339.48	--	--	--	--	--	--	--	--	--
5/19/2021	--	--	--	339.41	--	--	--	--	--	--	--	--	--
5/25/2021	331.55	316.97	--	--	--	--	--	--	--	--	--	--	--
5/26/2021	--	--	--	339.40	--	--	--	--	--	--	--	--	--
5/27/2021	--	--	--	--	--	--	--	--	--	--	--	--	--
5/31/2021	331.50	316.97	--	--	--	--	--	--	--	--	--	--	--
6/2/2021	--	--	--	339.30	334.07	334.08	--	--	335.07	331.30	325.41	332.87	--
6/3/2021	331.64	317.13	--	--	--	--	--	--	--	--	--	--	--
6/7/2021	331.61	317.08	334.66	339.35 / 339.34	334.02	334.04	335.83	335.90	334.98	330.89	325.34	332.75	--
6/8/2021	--	--	--	--	--	--	--	--	--	--	--	--	--
6/14/2021	331.66	317.15	--	339.26	--	--	--	--	--	--	--	--	--
6/16/2021	--	--	--	339.20	--	--	--	--	--	--	--	--	--
6/21/2021	331.65	317.27	--	--	--	--	--	--	--	--	--	--	--
6/23/2021	--	--	--	339.12	--	--	--	--	--	--	--	--	--
6/28/2021	331.51	317.16	--	--	--	--	--	--	--	--	--	--	--
6/30/2021	--	--	--	338.51	--	--	--	--	--	--	--	--	--
7/5/2021	331.25	317.24	--	--	--	--	--	--	--	--	--	--	--
7/7/2021	--	--	--	338.02	--	--	--	--	--	--	--	--	--
7/12/2021	330.92	317.24	--	--	--	--	--	--	--	--	--	--	--
7/13/2021	--	--	334.57	337.28	333.54	333.56	334.71	334.91	334.55	330.61	324.63	332.17	334.11
7/19/2021	330.63	317.29	--	--	--	--	--	--	--	--	--	--	--
7/21/2021	--	--	--	336.97	--	--	--	--	--	--	--	--	--



GHD

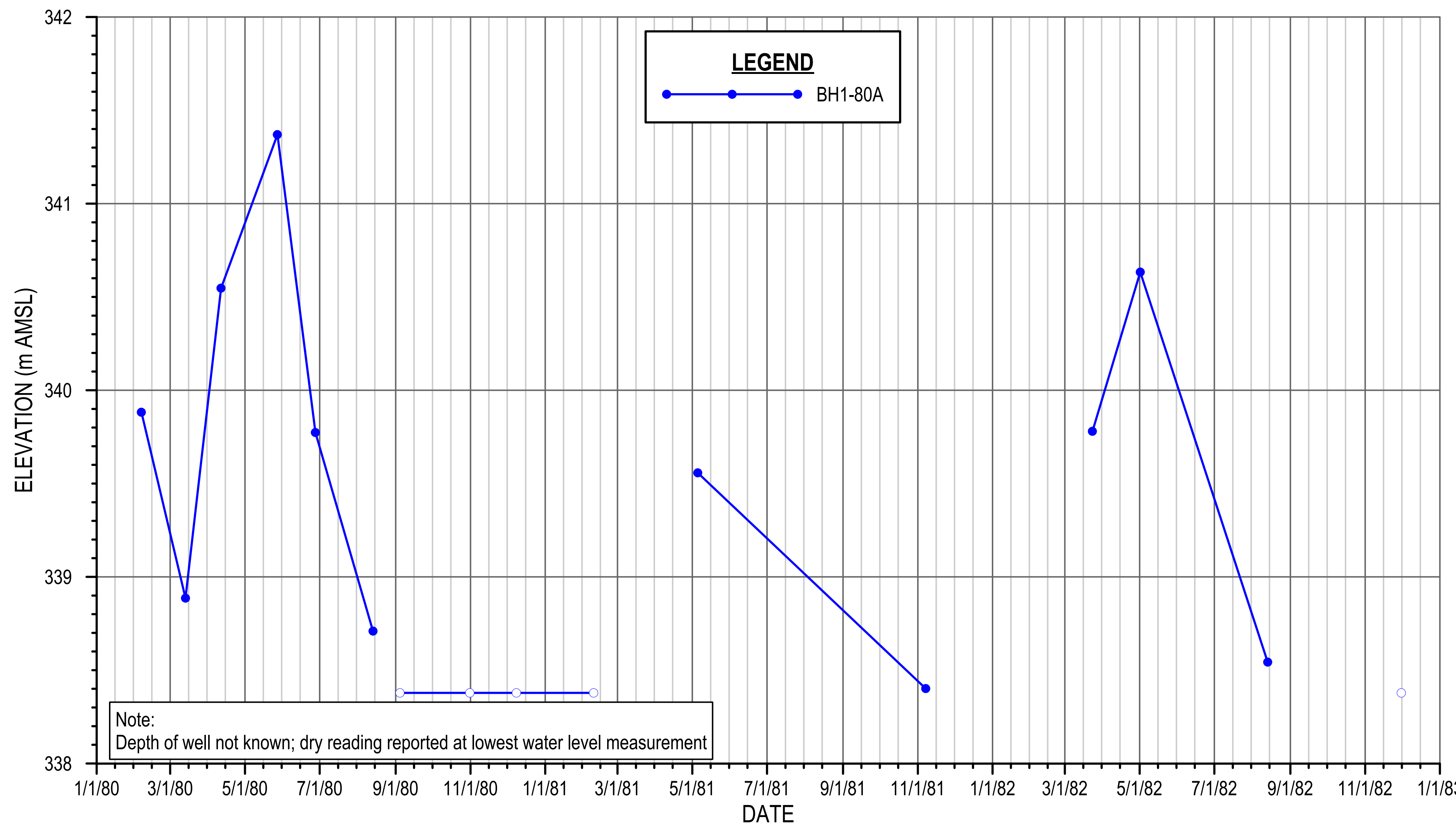
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - BARN WELL

FIGURE D.1

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\Barn Well.grf
Plot Date: December 01 2021 11:12 AM

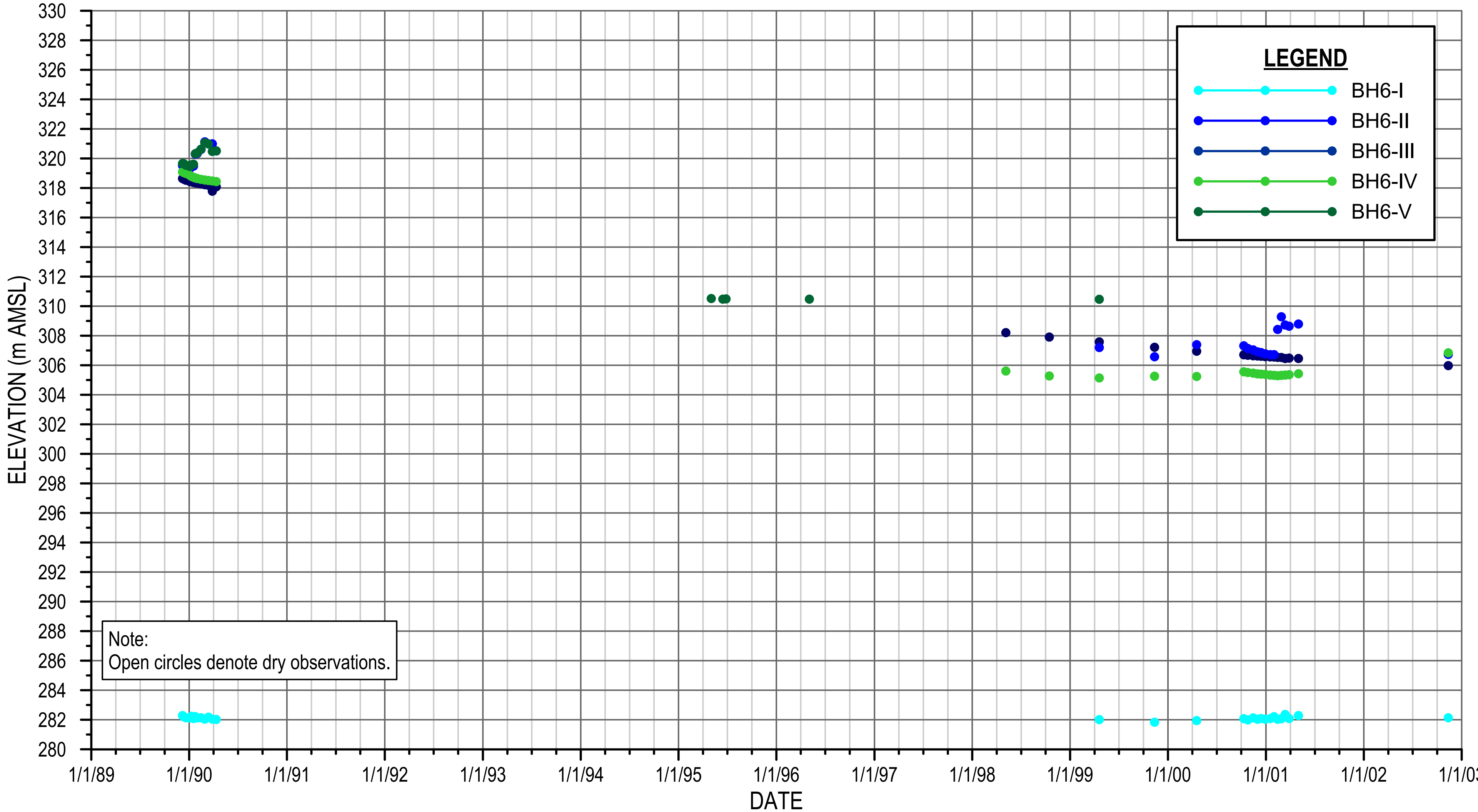


MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - BH1-80A

FIGURE D.2



MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - BH6 SERIES

FIGURE D.4

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\BH6 Series.grf
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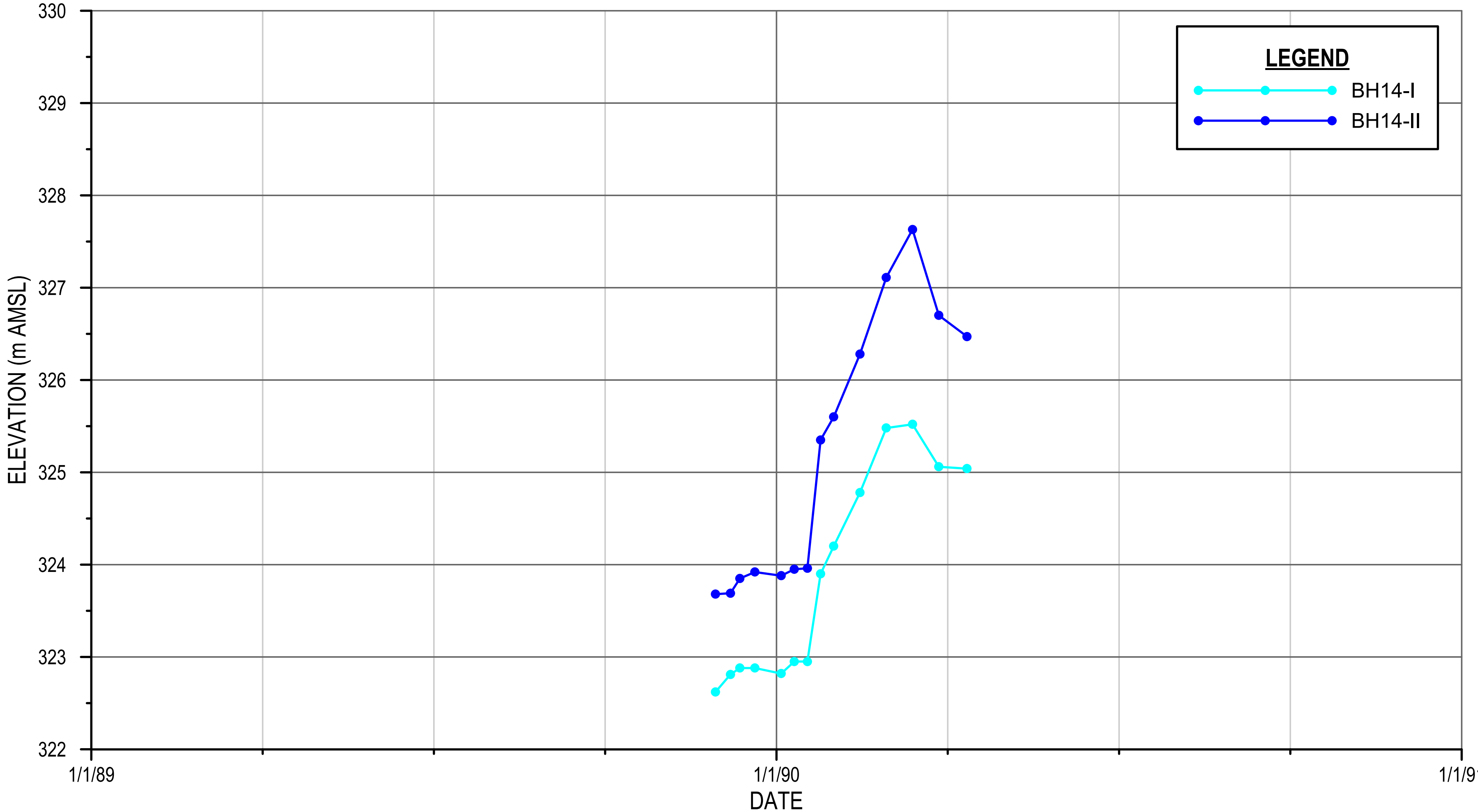

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - BH14 SERIES

Project No. **10978**
Date **December 2021**

FIGURE D.3

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\BH14 Series.grf
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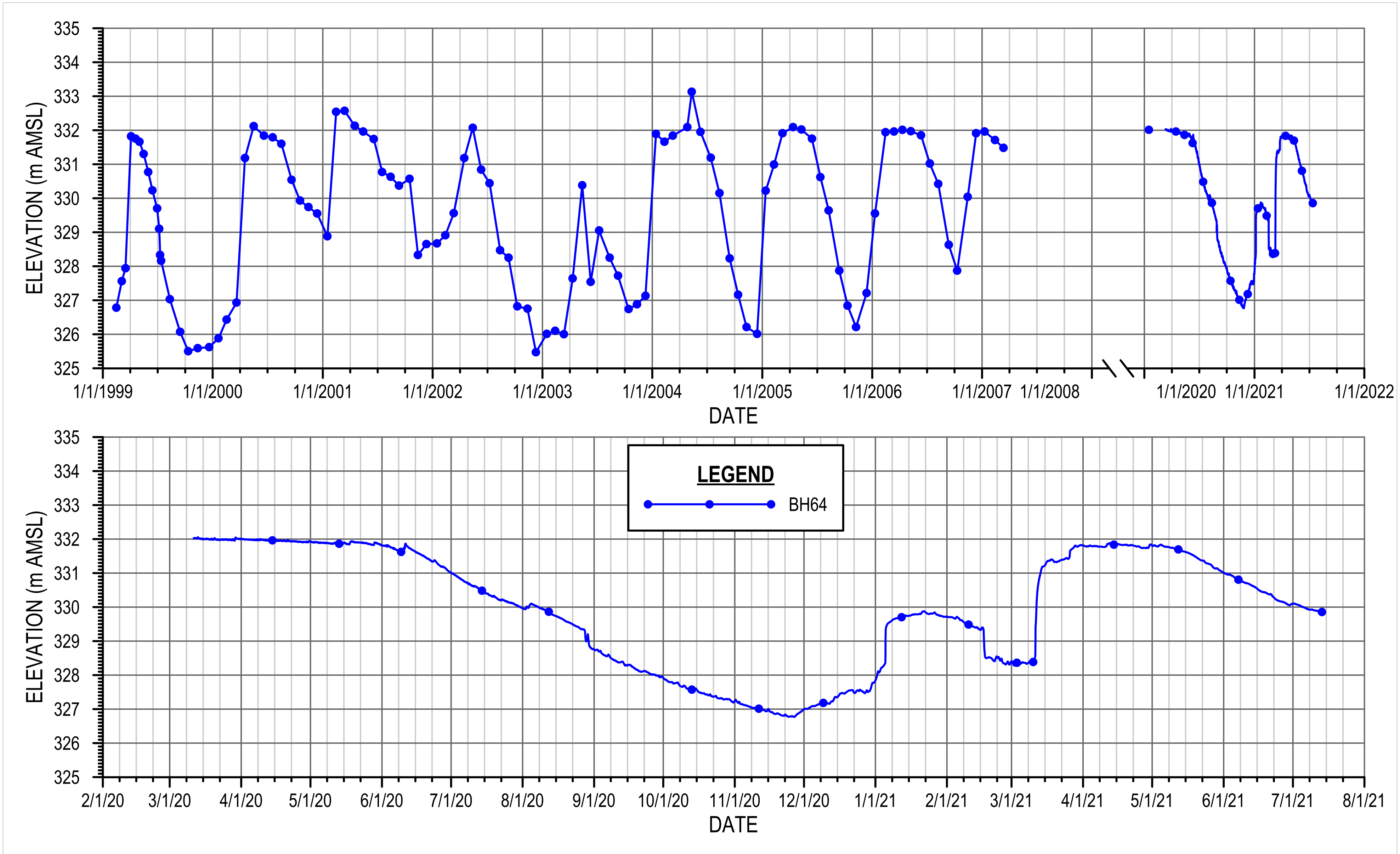

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - BH64

FIGURE D.5

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\BH64.grf
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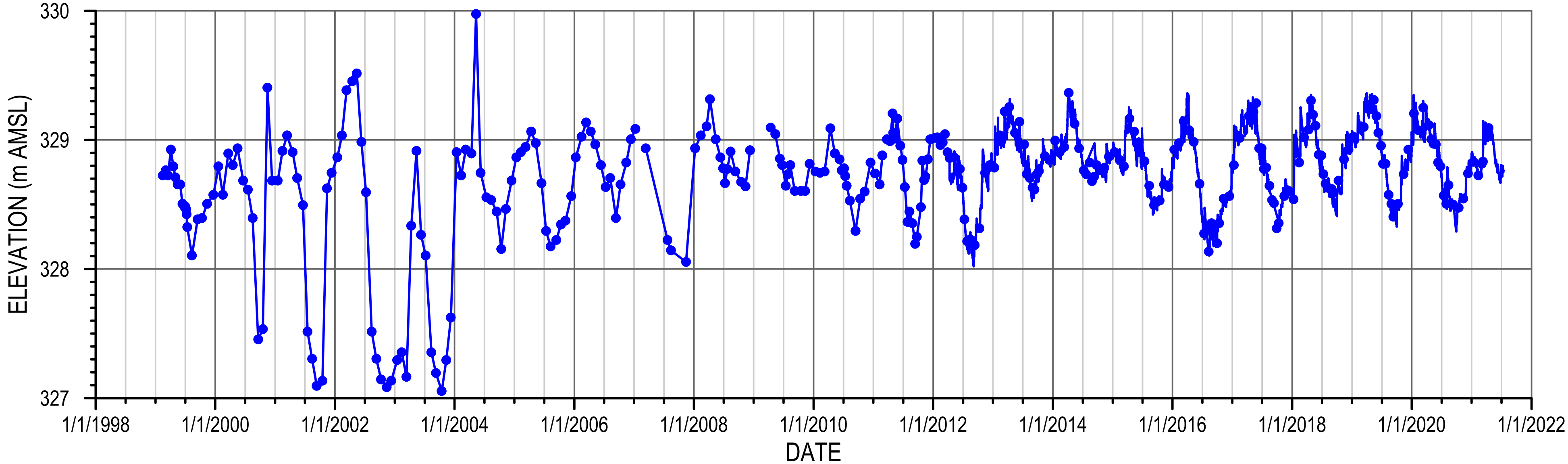

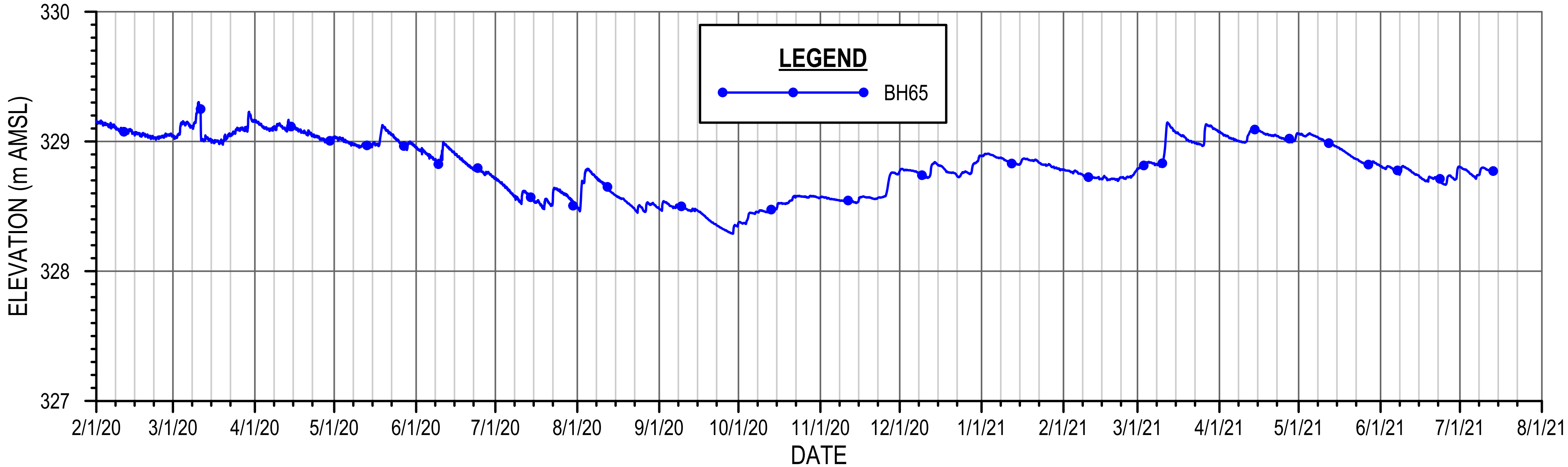

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - BH65

Project No. **10978**
Date **December 2021**

FIGURE D.6

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\BH65.grf
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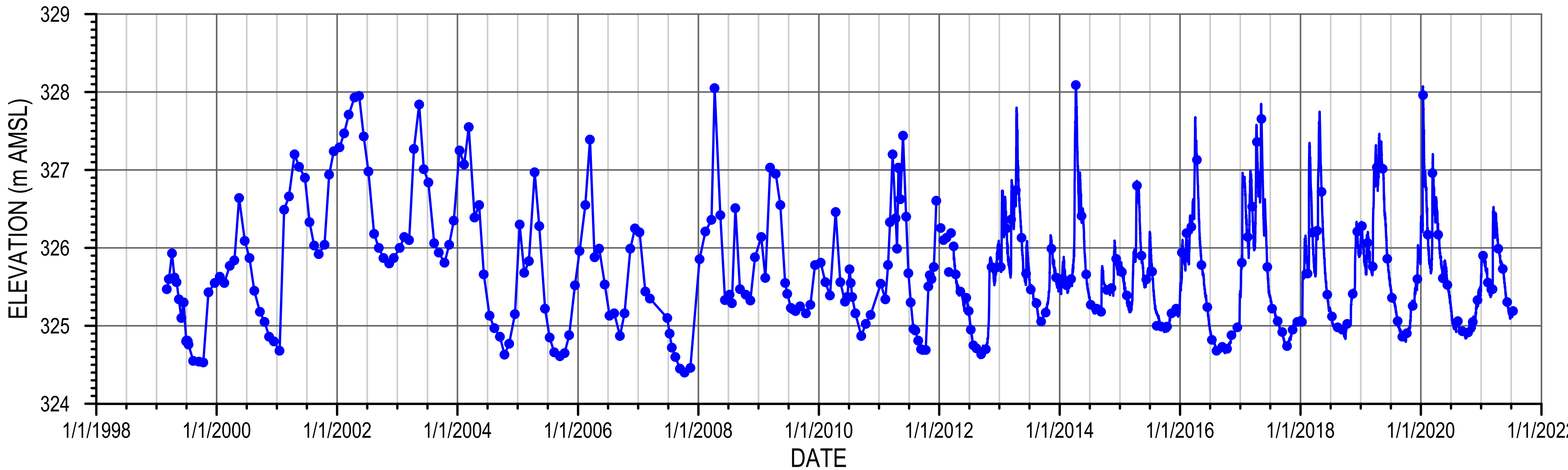

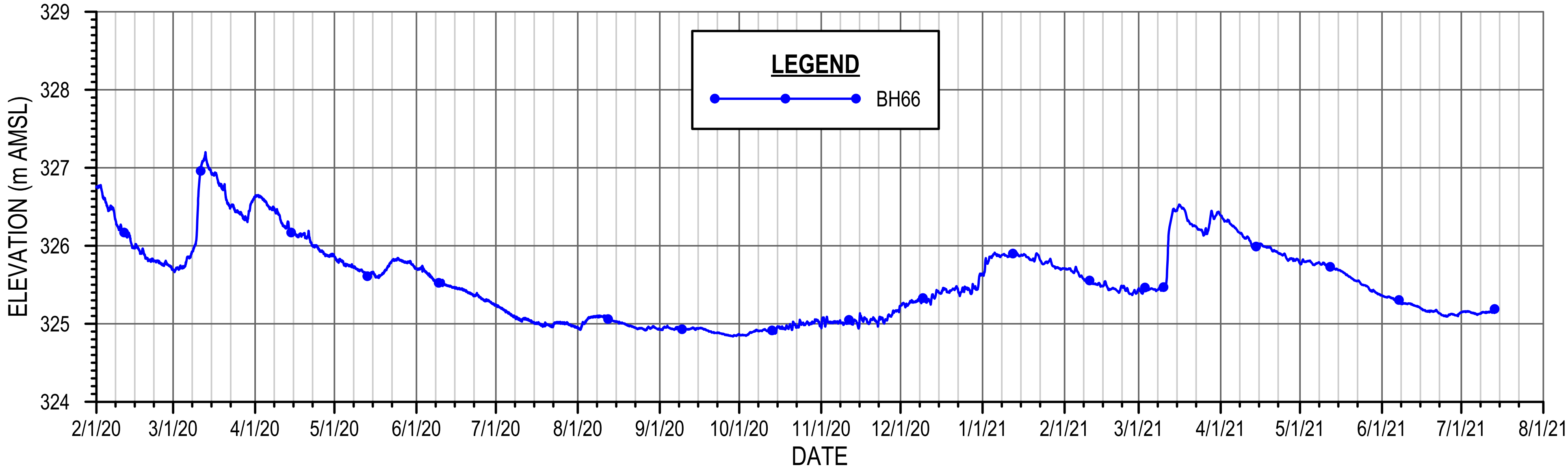

GHD

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - BH66

FIGURE D.7

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\BH66.grf
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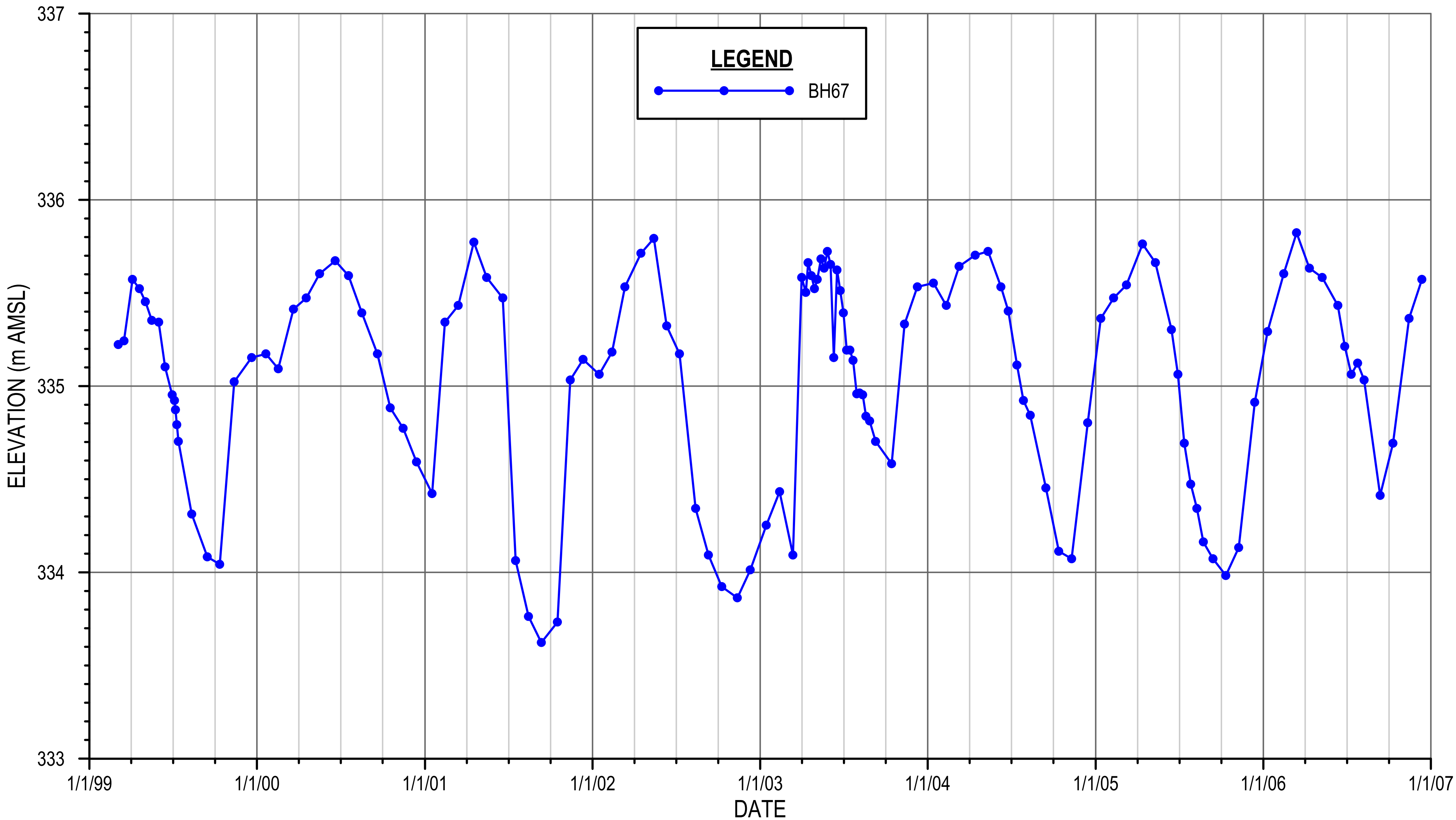

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - BH67

FIGURE D.8

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\BH67.grf
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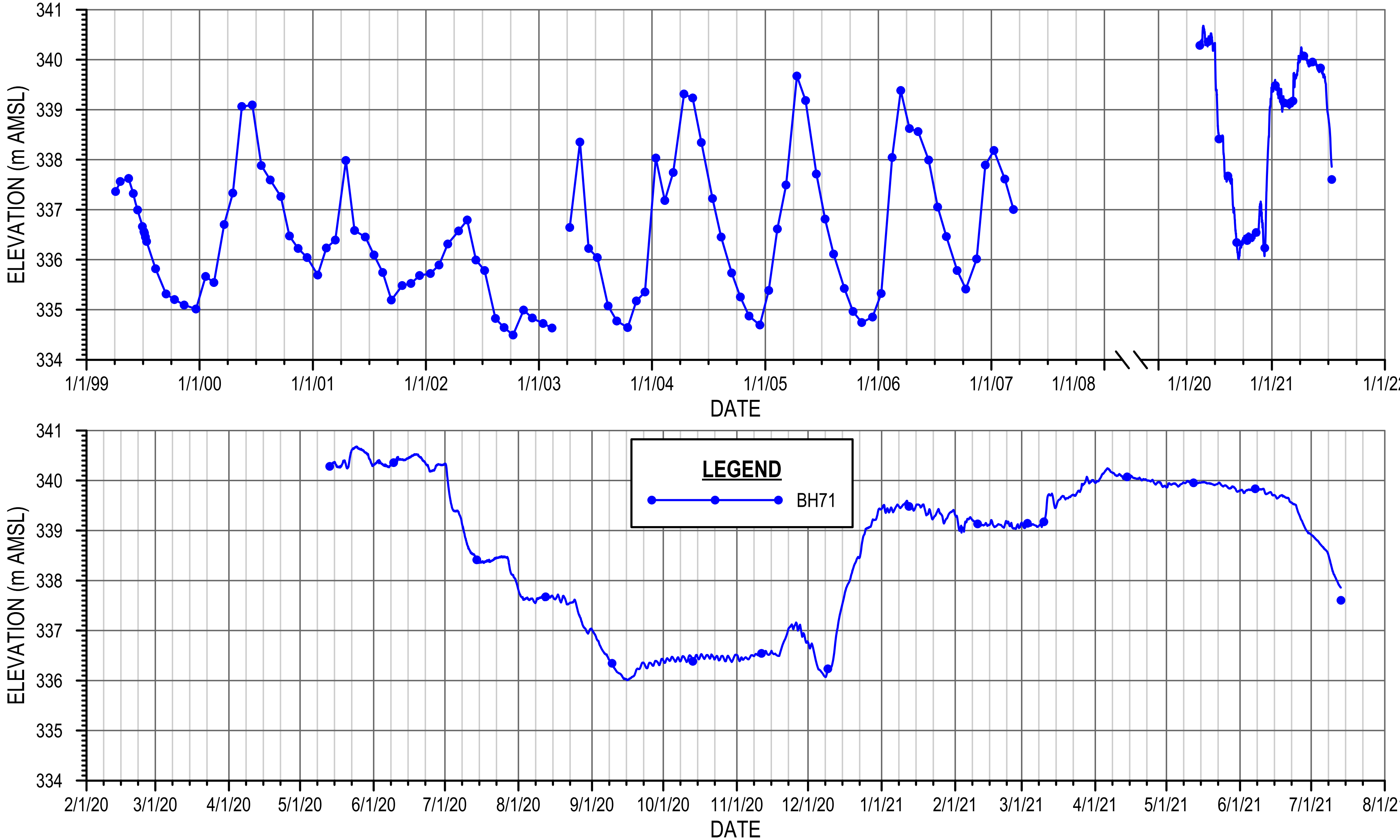

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - BH71

FIGURE D.9

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\BH71.grf
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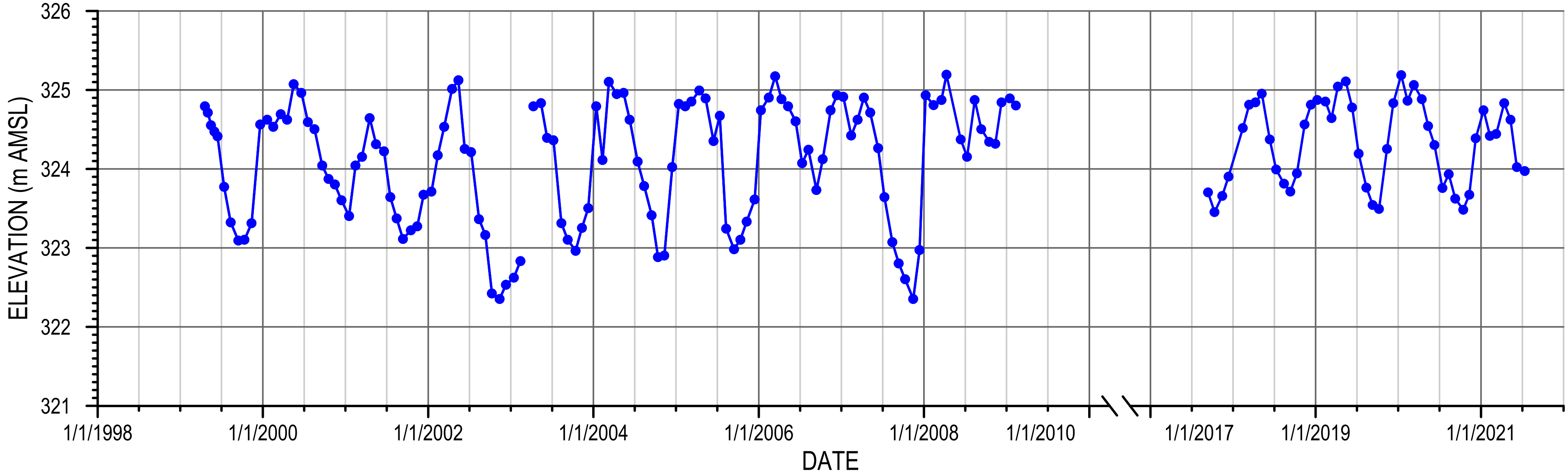

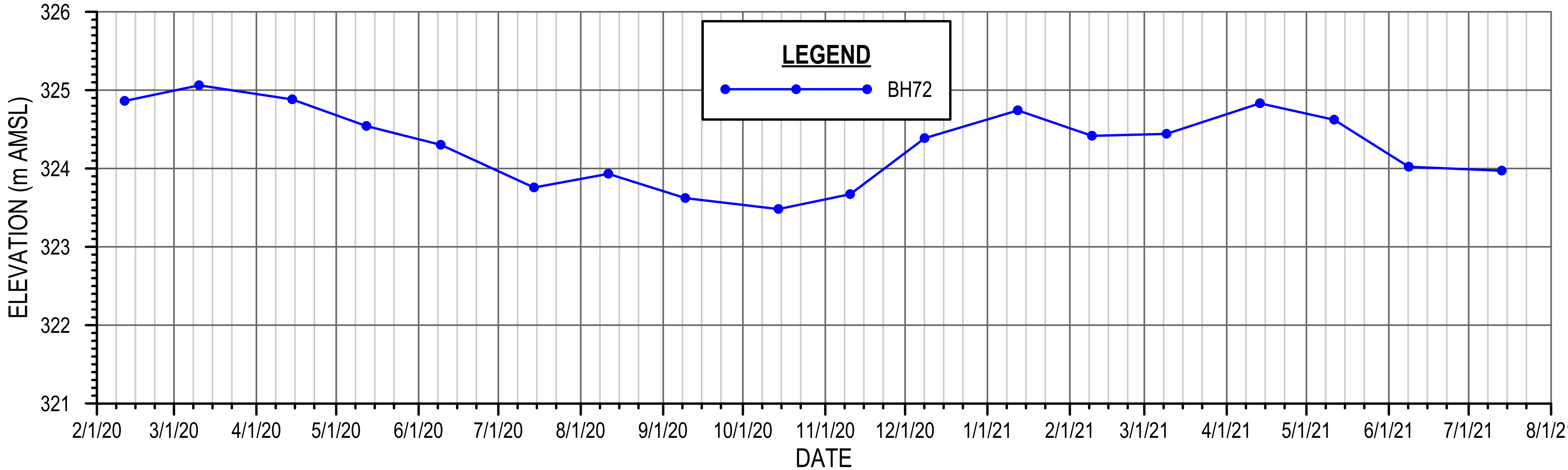

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - BH72

Project No. **10978**
Date **December 2021**

FIGURE D.10

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\BH72.grf
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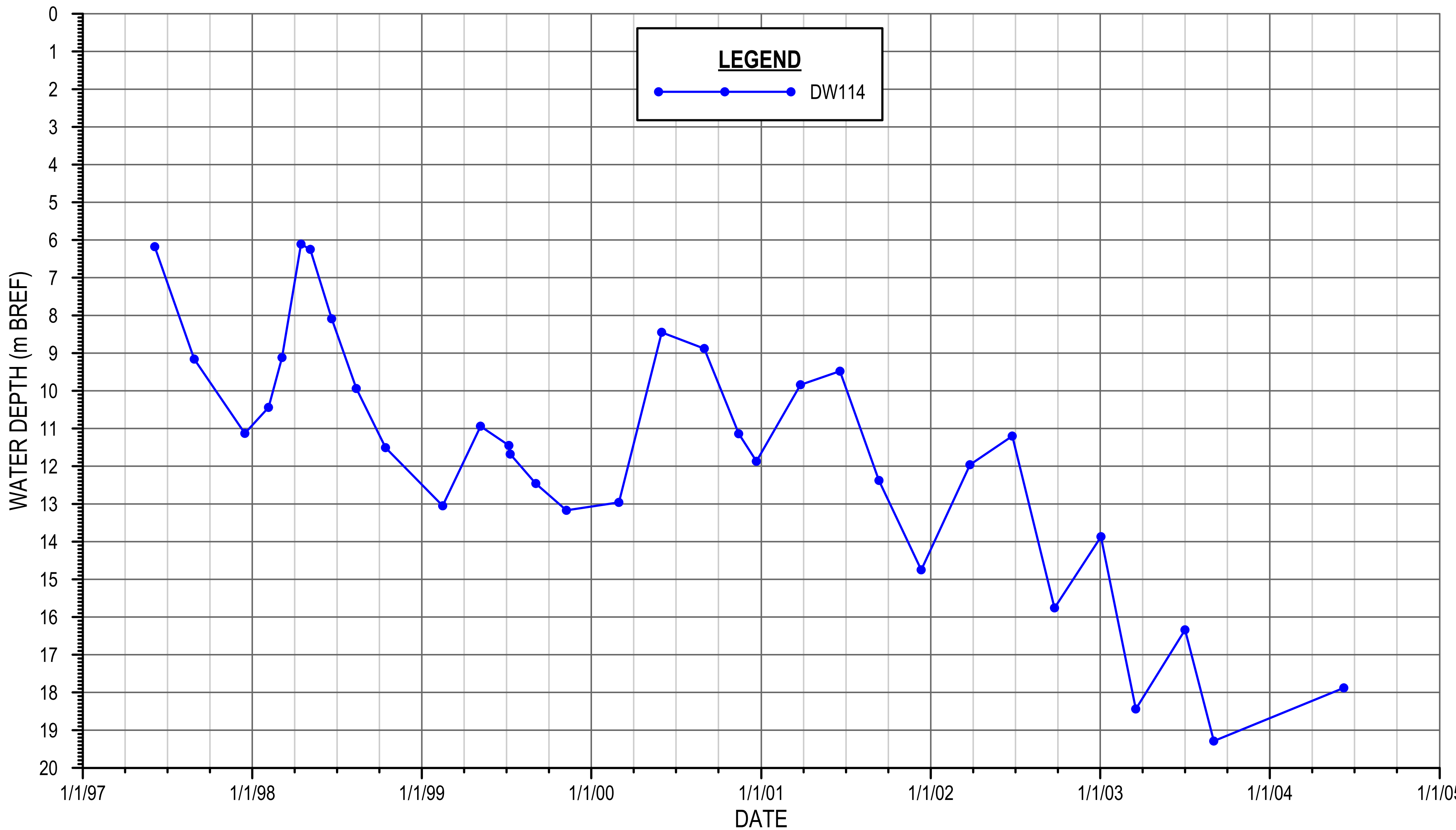

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - DW114

Project No. **10978**
Date **December 2021**

FIGURE D.11

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\DW114.grf
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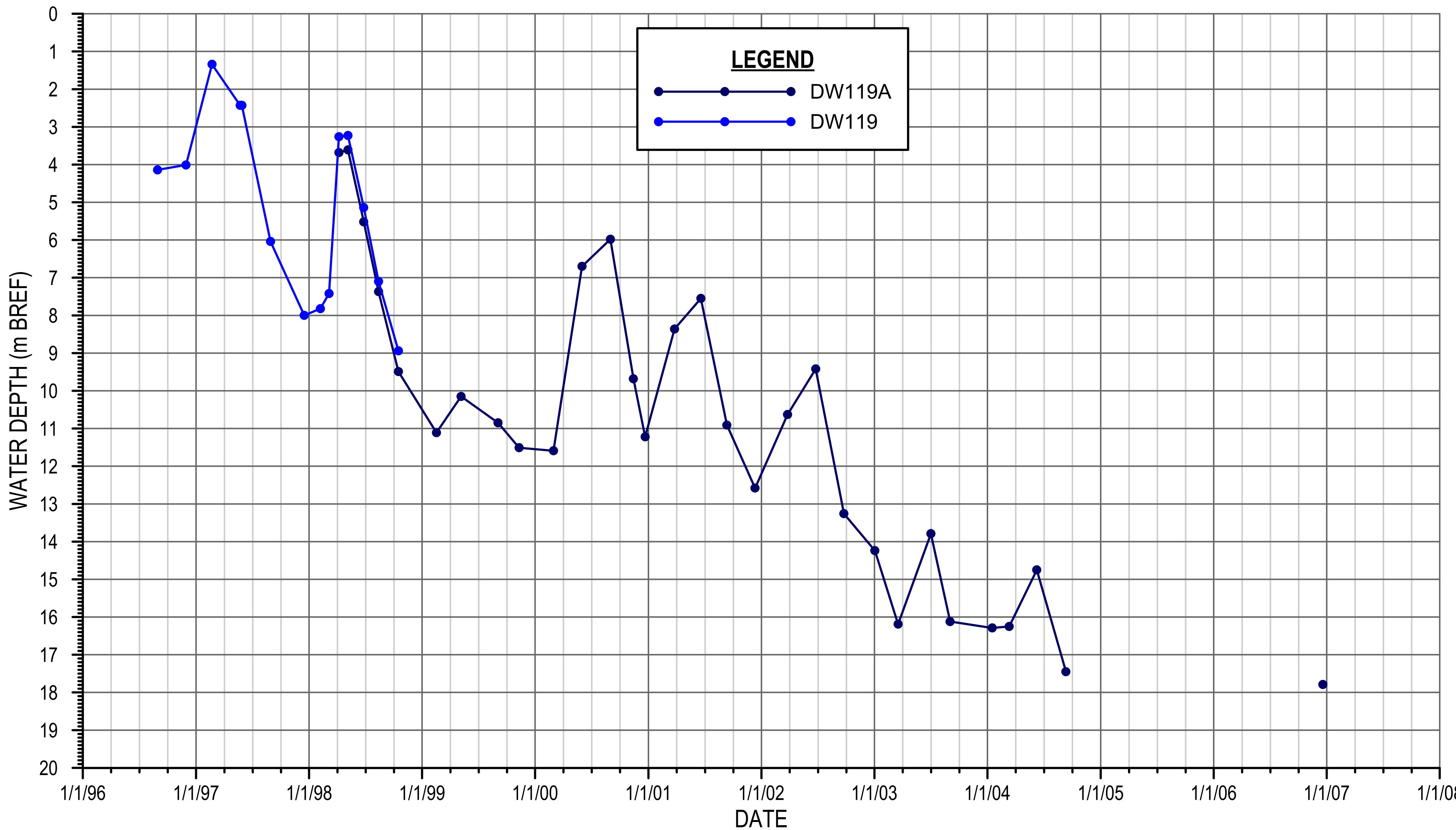

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - DW119

Project No. **10978**
Date **December 2021**

FIGURE D.12

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\DW119.grf
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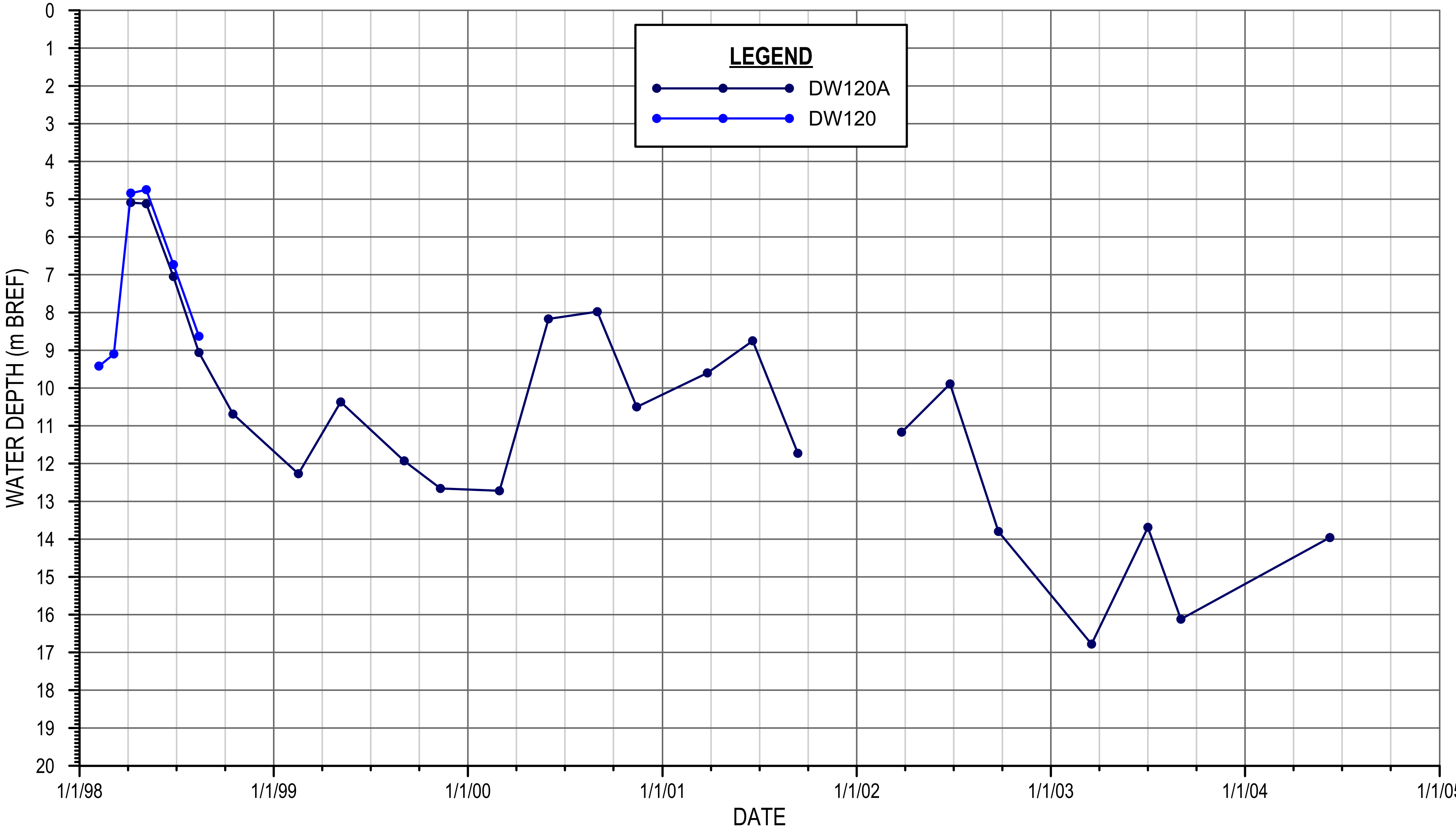

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - DW120

Project No. **10978**
Date **December 2021**

FIGURE D.13

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\DW120.grf
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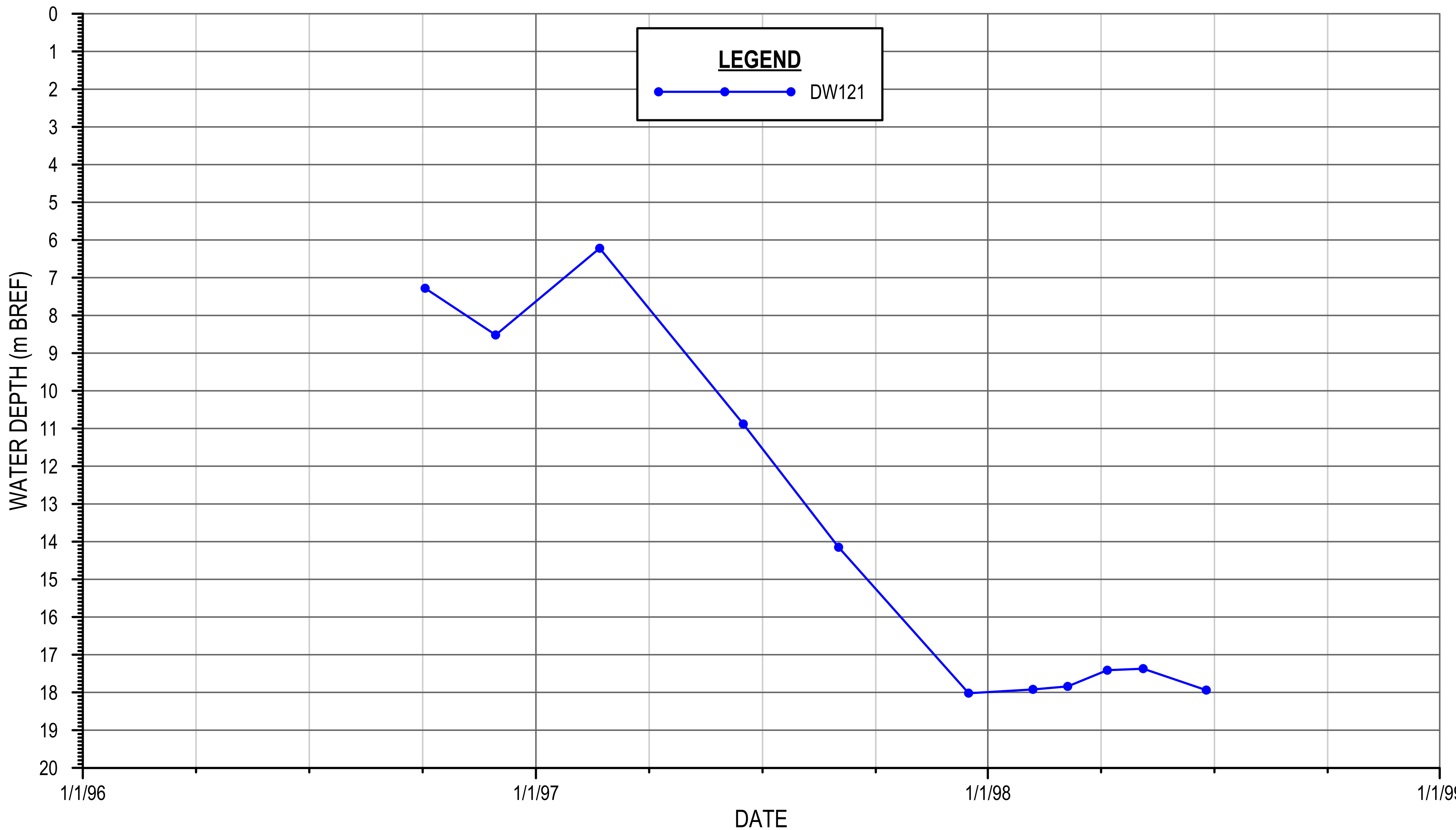

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - DW121

Project No. **10978**
Date **December 2021**

FIGURE D.14

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\DW121.grf
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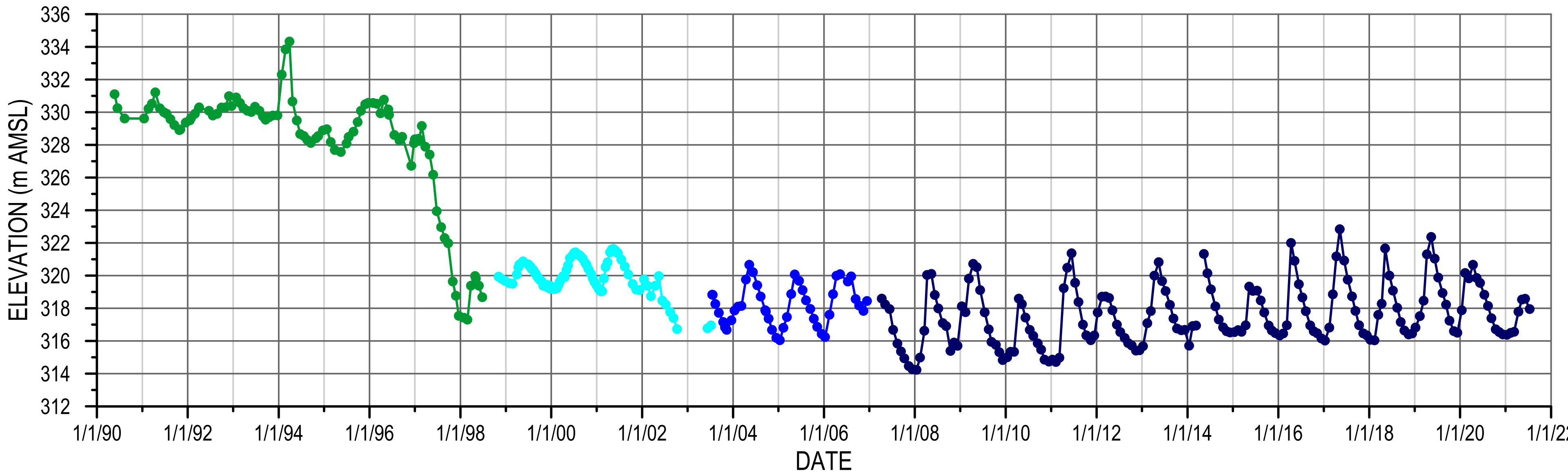
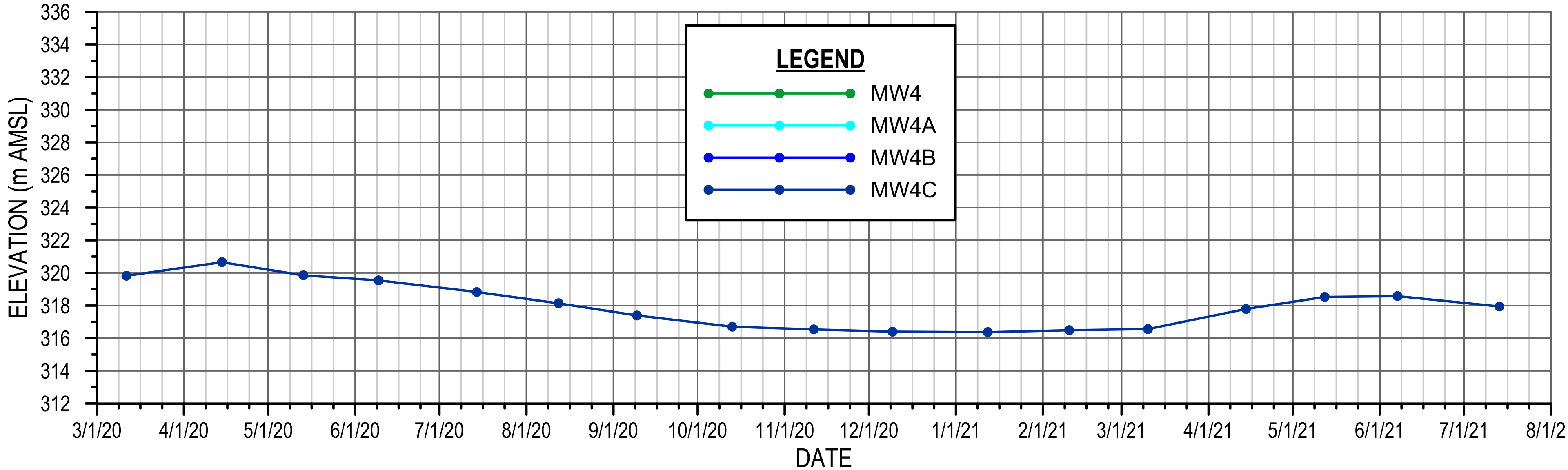




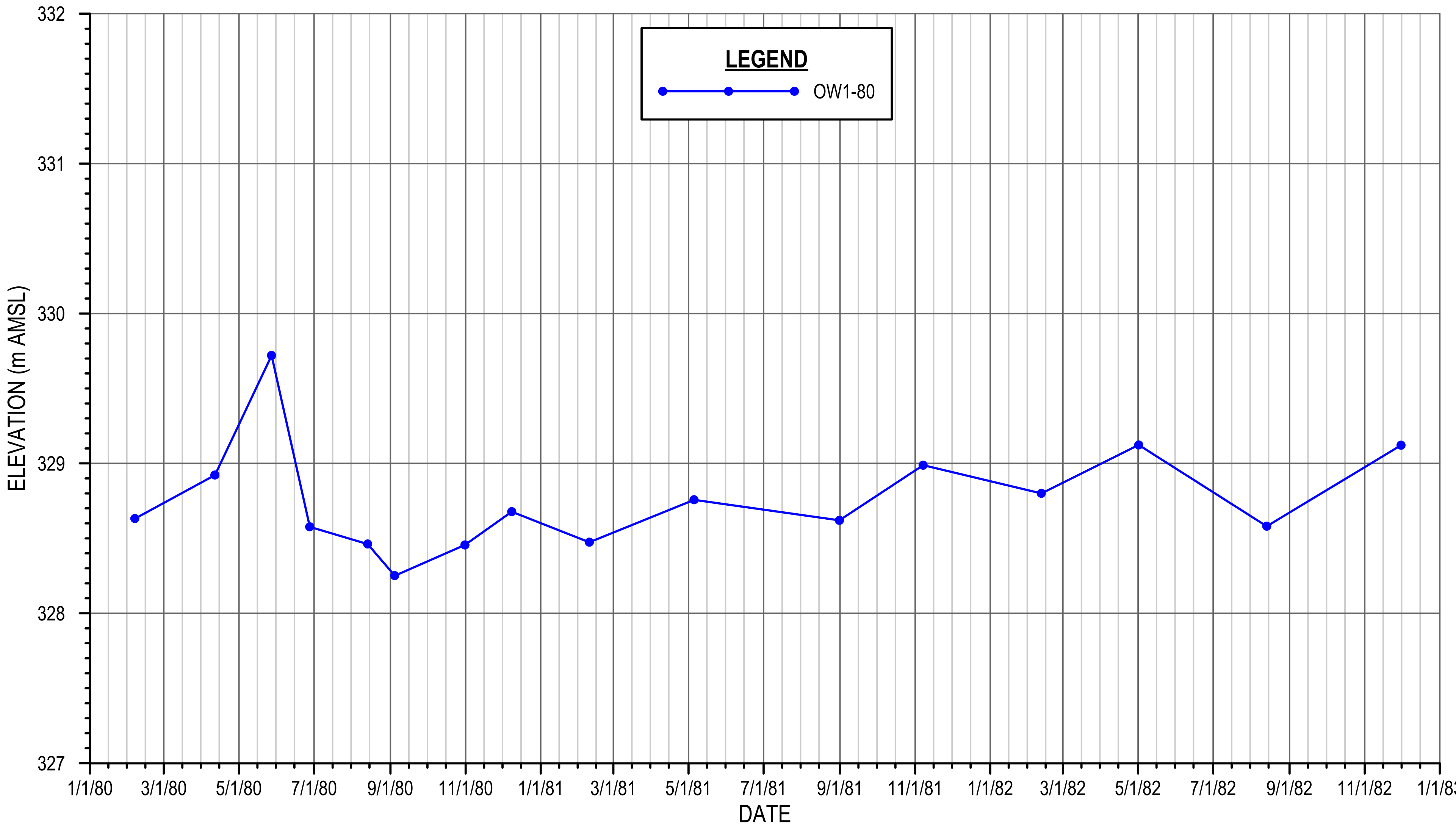
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - MW4 SERIES

Project No. **10978**
Date **December 2021**

FIGURE D.15

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\MW4 Series.grf
Plot Date: December 01 2021 11:12 AM



MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW1-80

Project No. **10978**
Date **December 2021**

FIGURE D.16

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW1-80.grf
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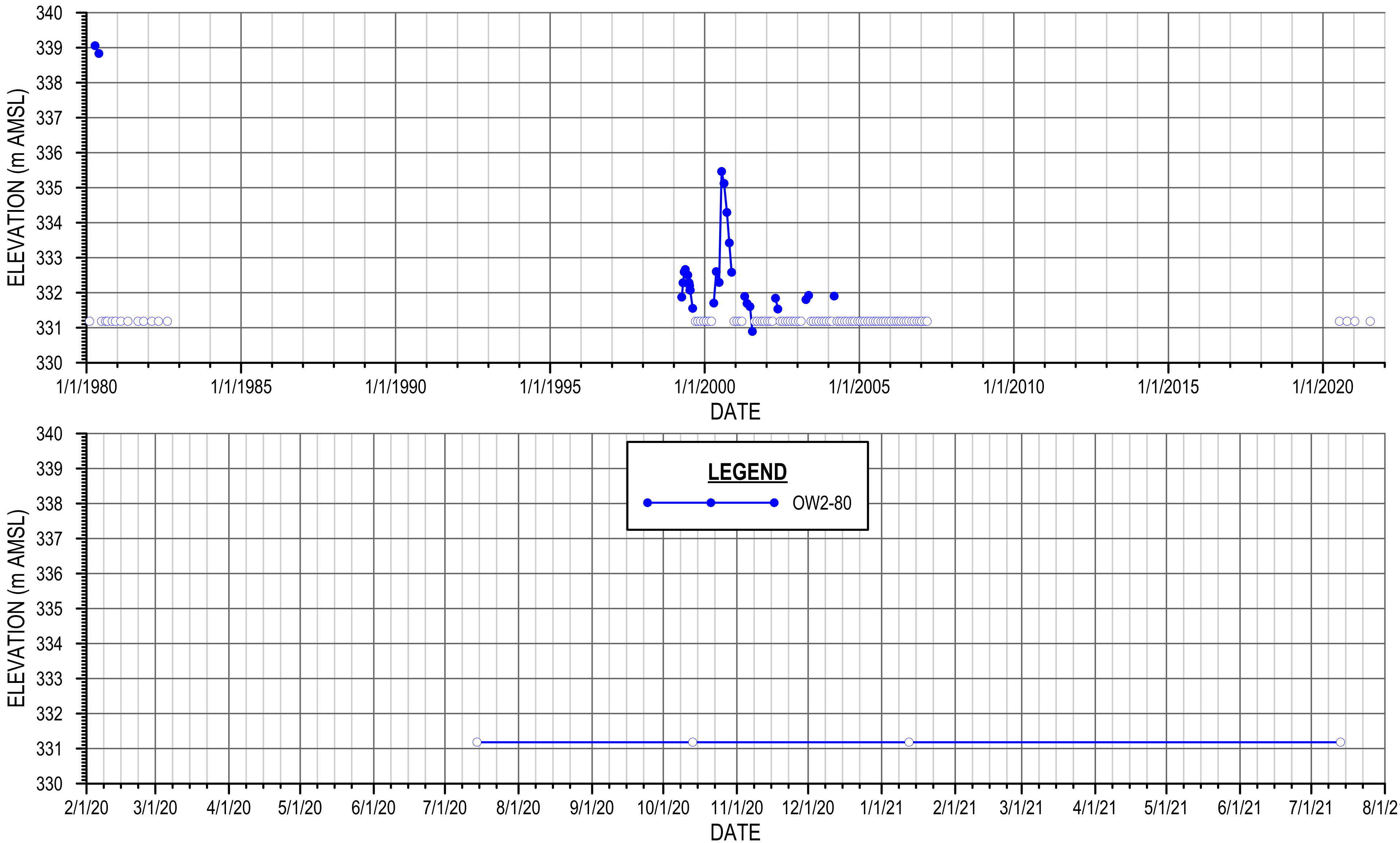

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW2-80

Project No. **10978**
Date **December 2021**

FIGURE D.20

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW2-80.grf
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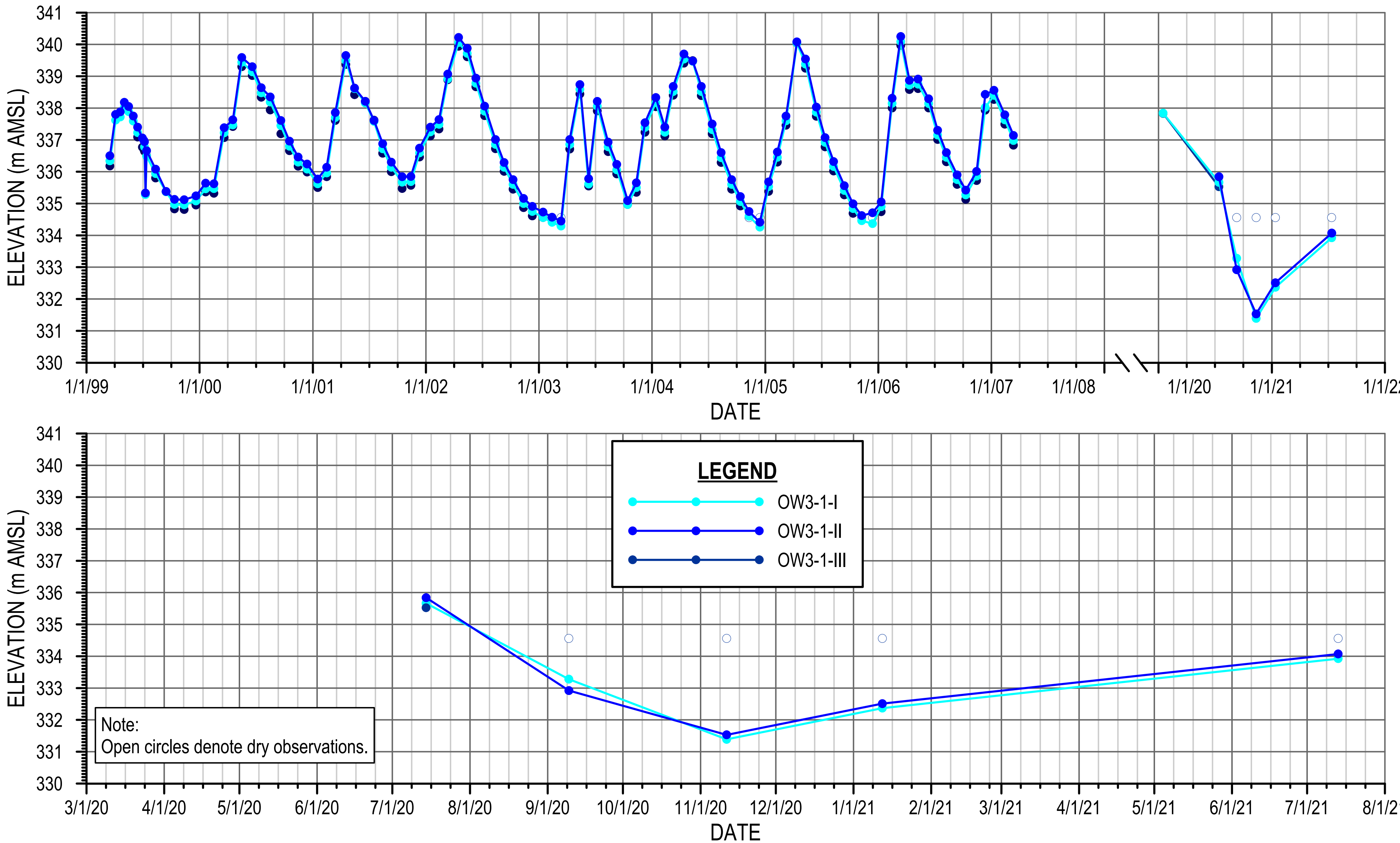


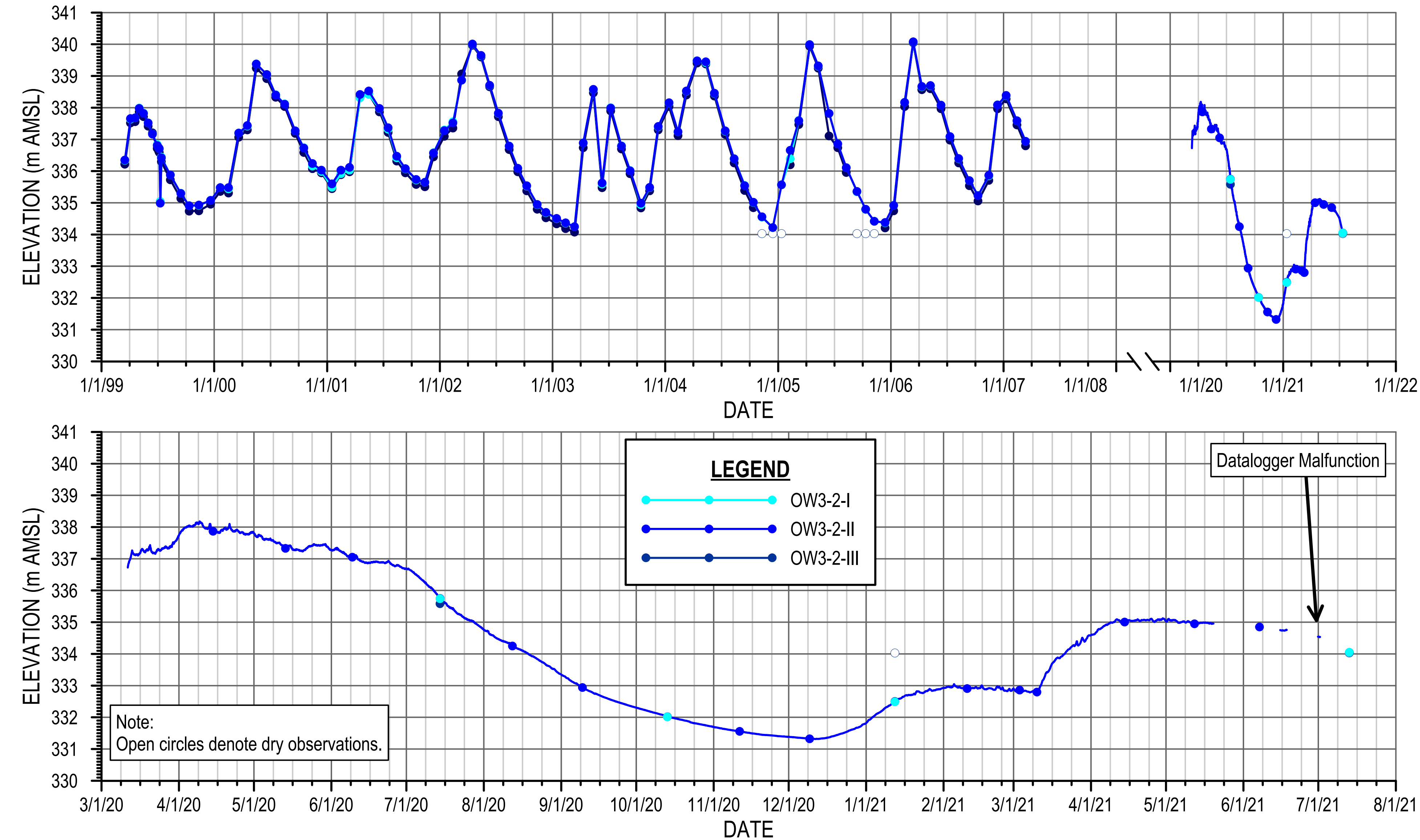
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW3-1 SERIES

Project No. **10978**
Date **December 2021**

FIGURE D.21

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW3-1 Series.grf
Plot Date: December 09 2021 9:12 AM



MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW3-2 SERIES

Project No. **10978**
Date **December 2021**

FIGURE D.22

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW3-2 Series.grf
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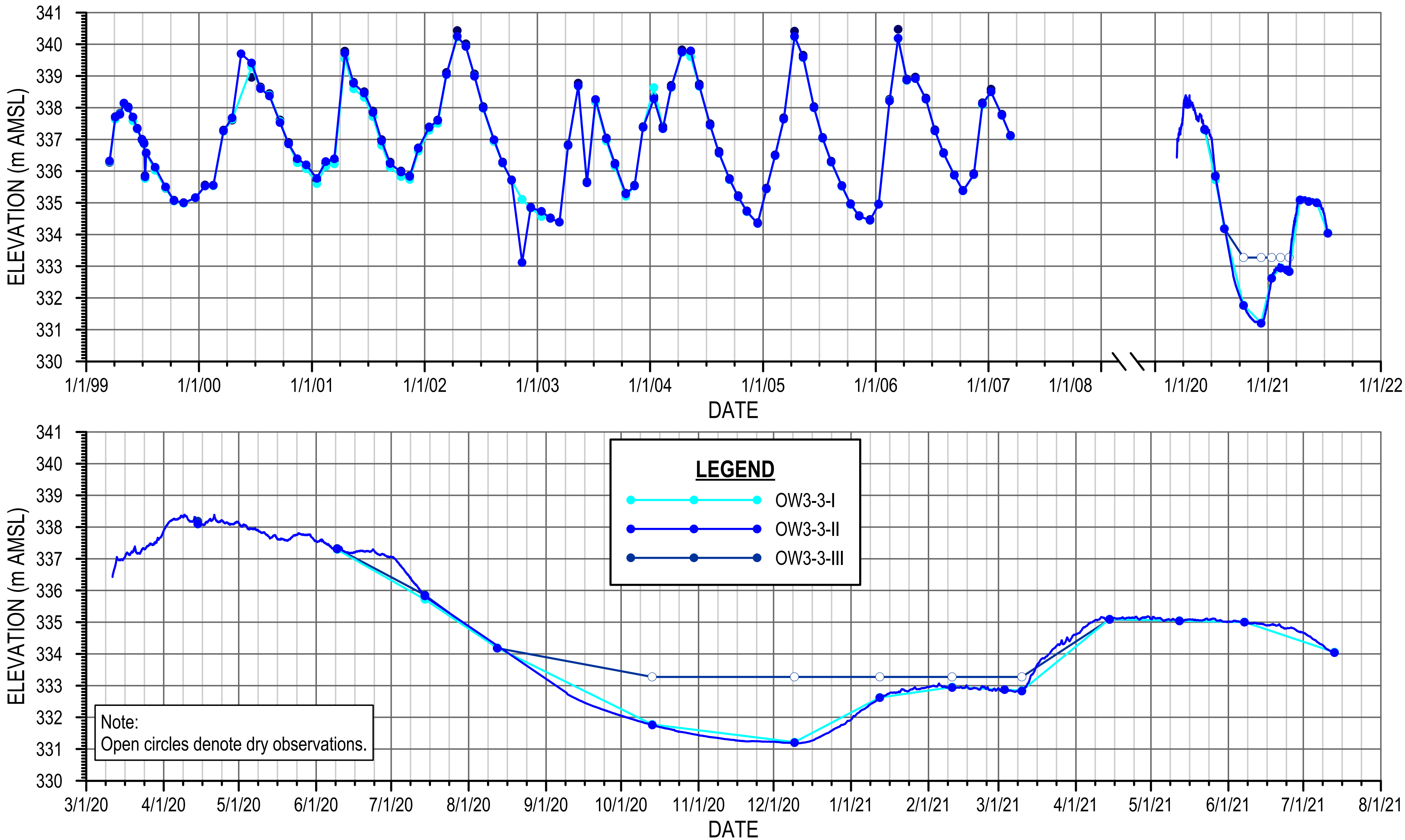


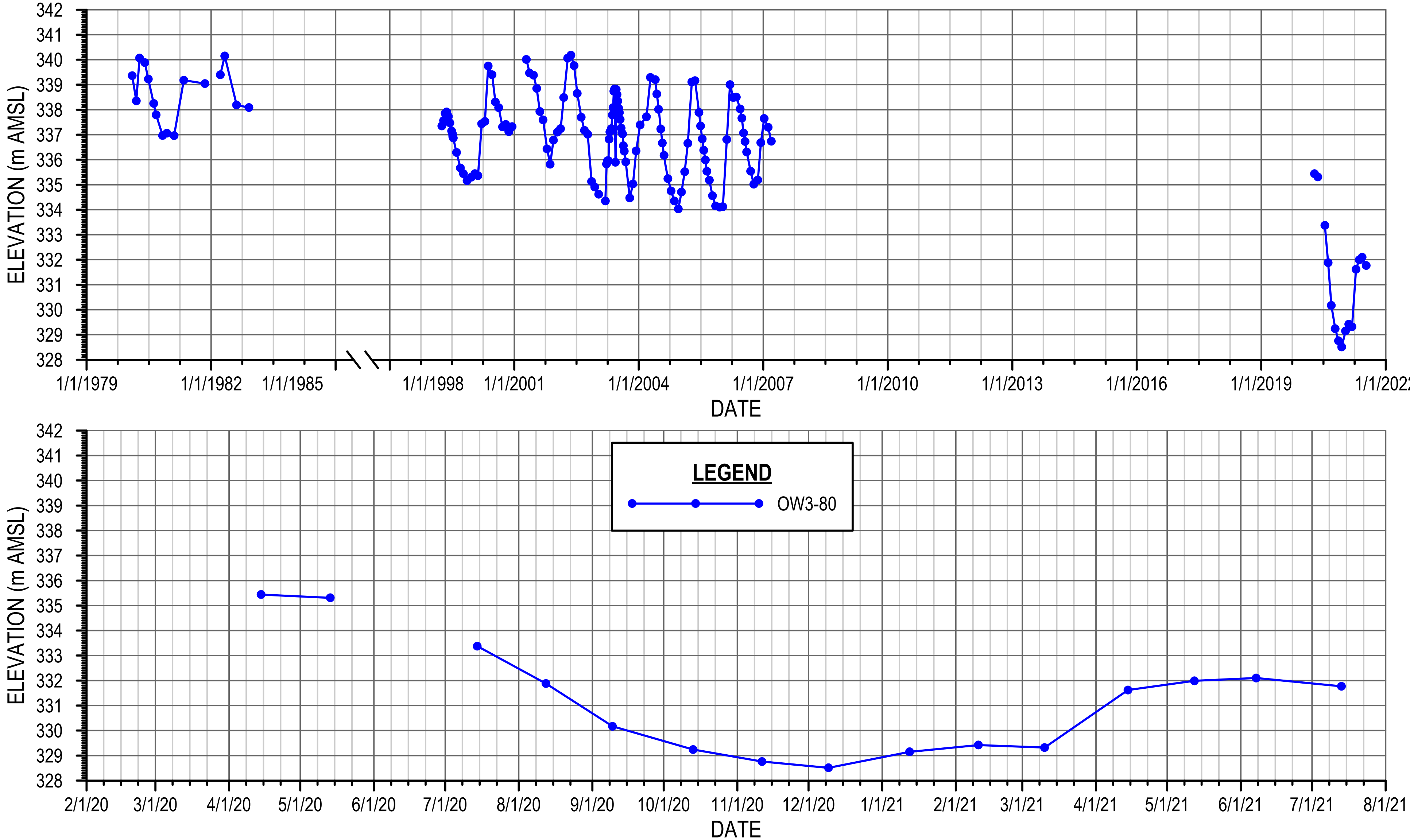
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW3-3 SERIES

Project No. **10978**
Date **December 2021**

FIGURE D.23

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW3-3 Series.grf
Plot Date: December 01 2021 11:12 AM



MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - OW3-80

FIGURE D.24

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW3-80.grf
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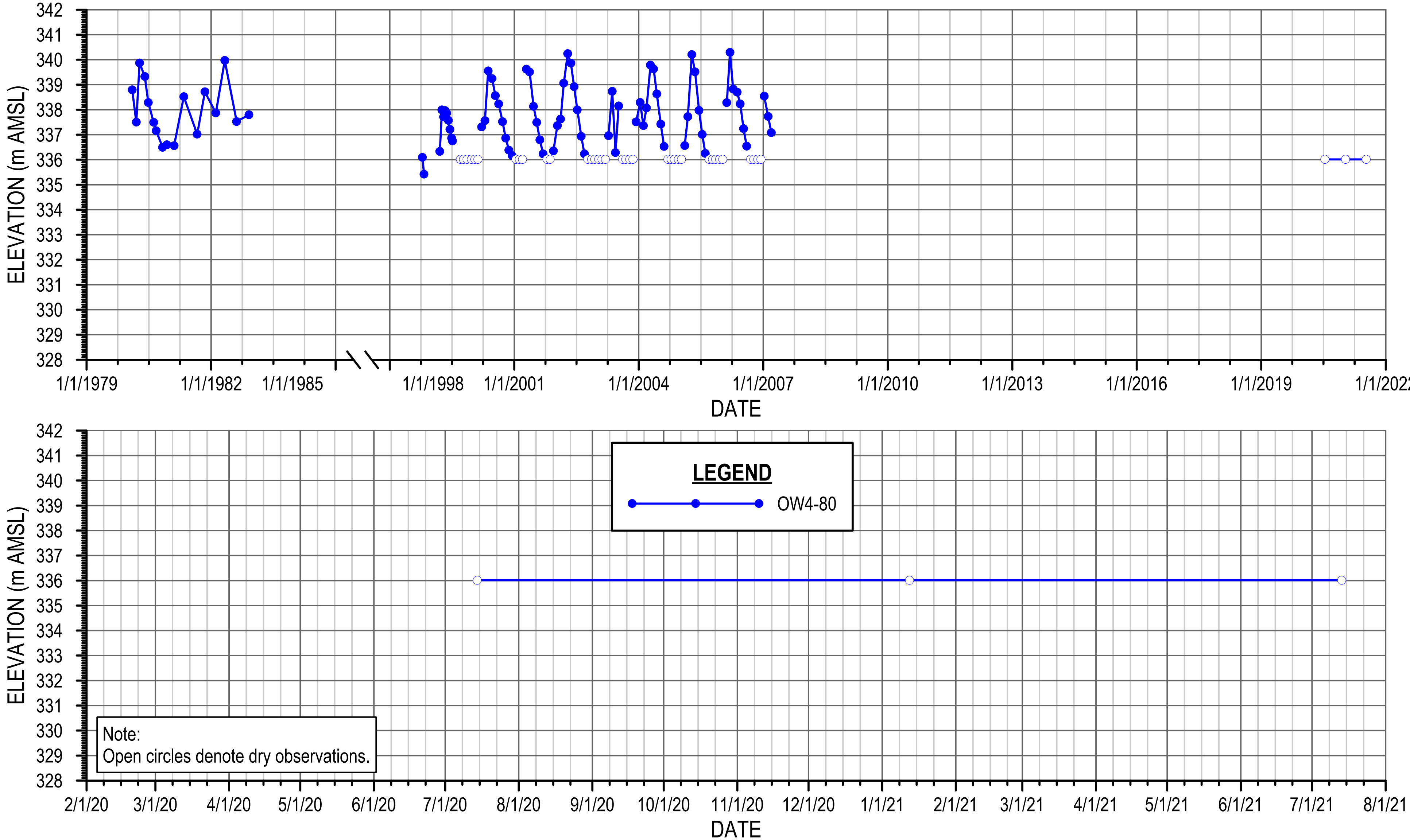


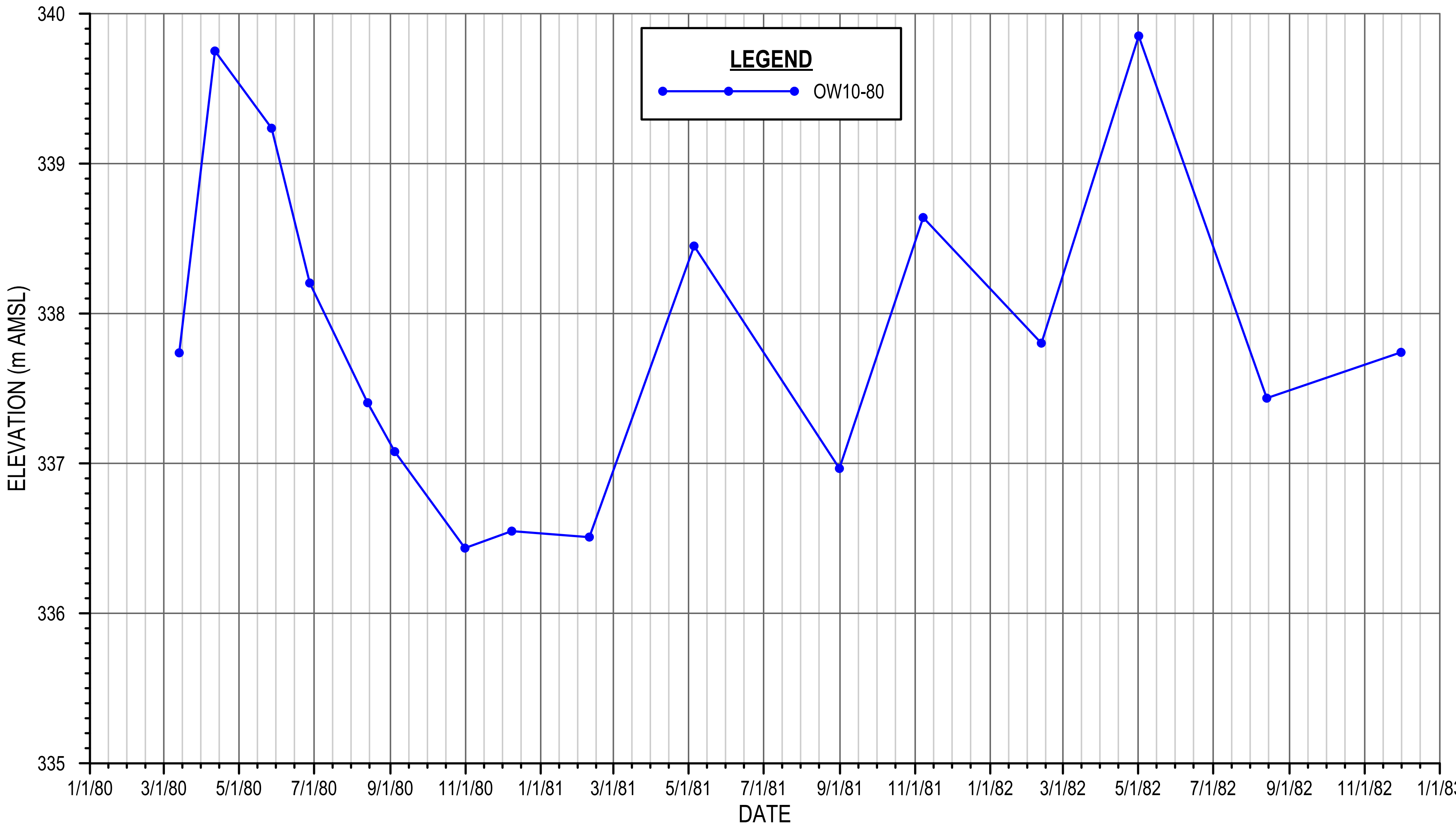
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW4-80

Project No. **10978**
Date **December 2021**

FIGURE D.25

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW4-80.grf
Plot Date: December 01 2021 11:12 AM

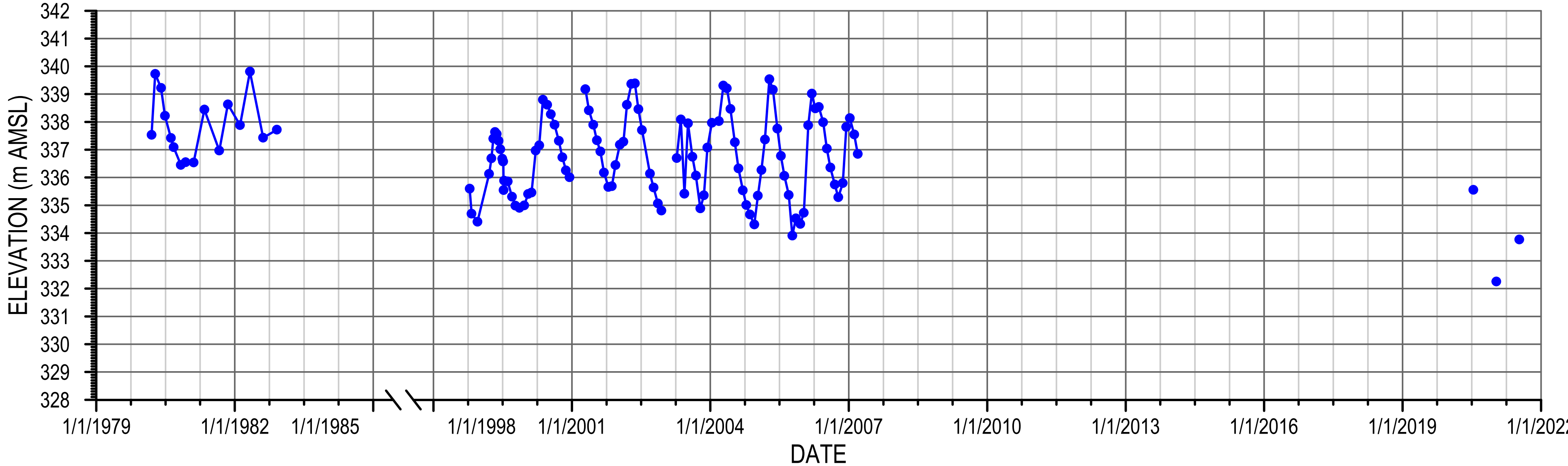


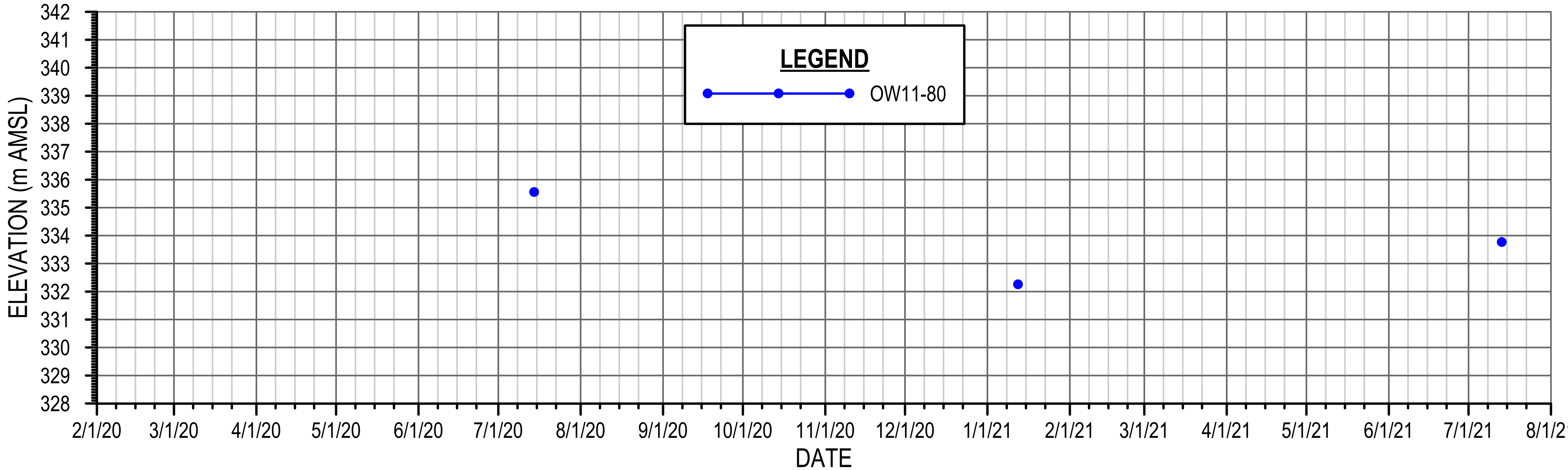
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW10-80

Project No. **10978**
Date **December 2021**

FIGURE D.17





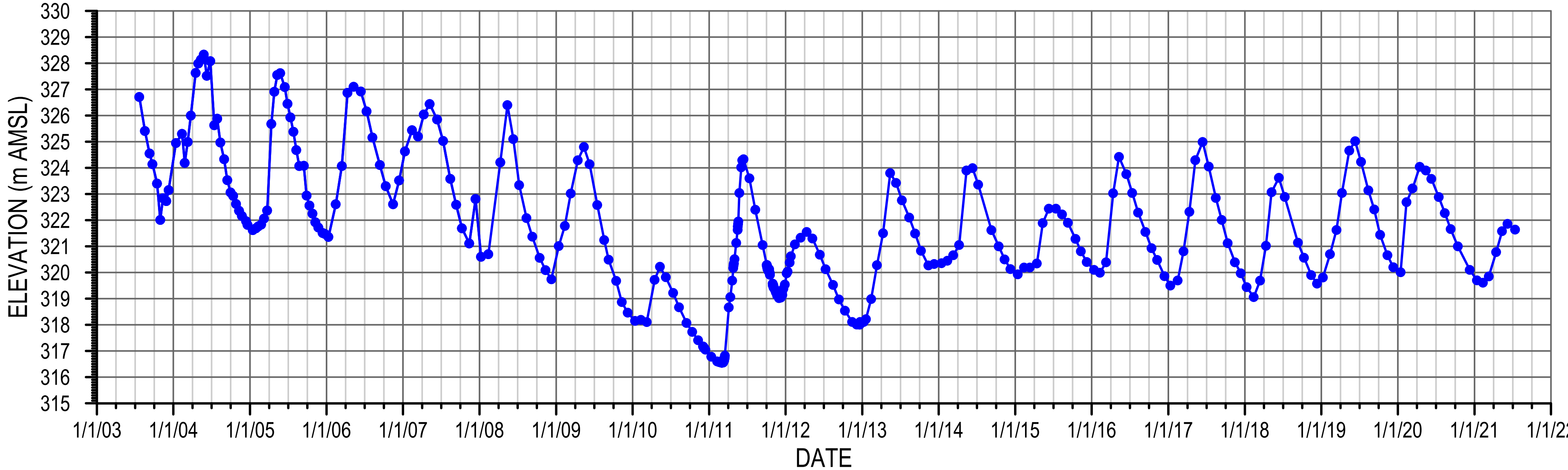
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

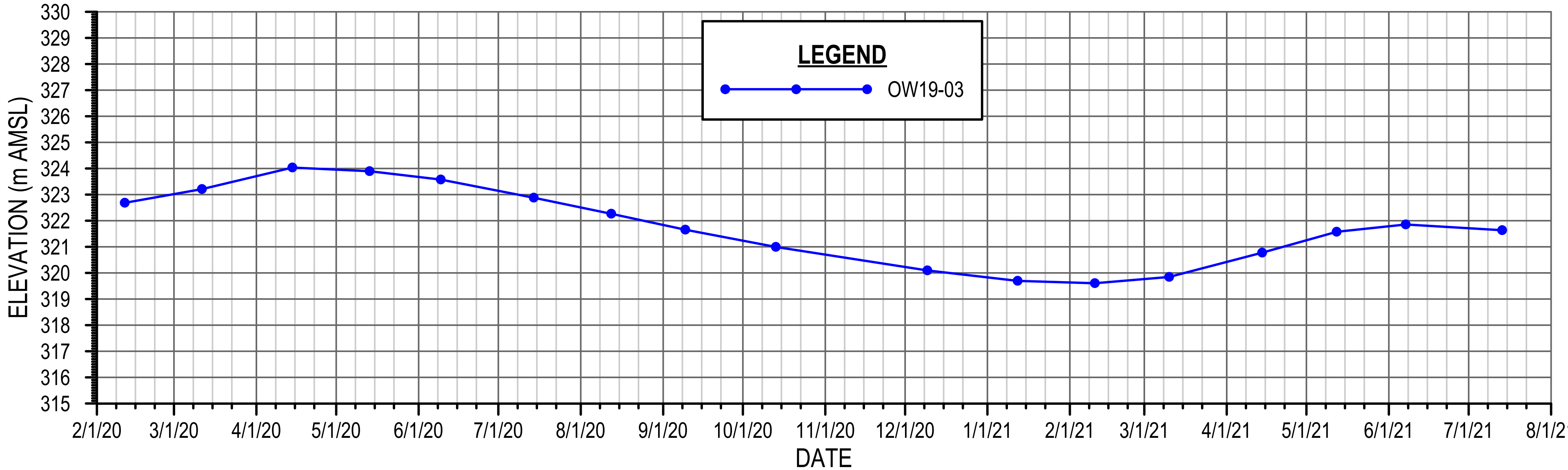
HYDROGRAPH - OW11-80

Project No. **10978**
Date **December 2021**

FIGURE D.18

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW11-80.grf
Plot Date: December 01 2021 11:12 AM





MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - OW19-03

FIGURE D.19

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW19-03.grf
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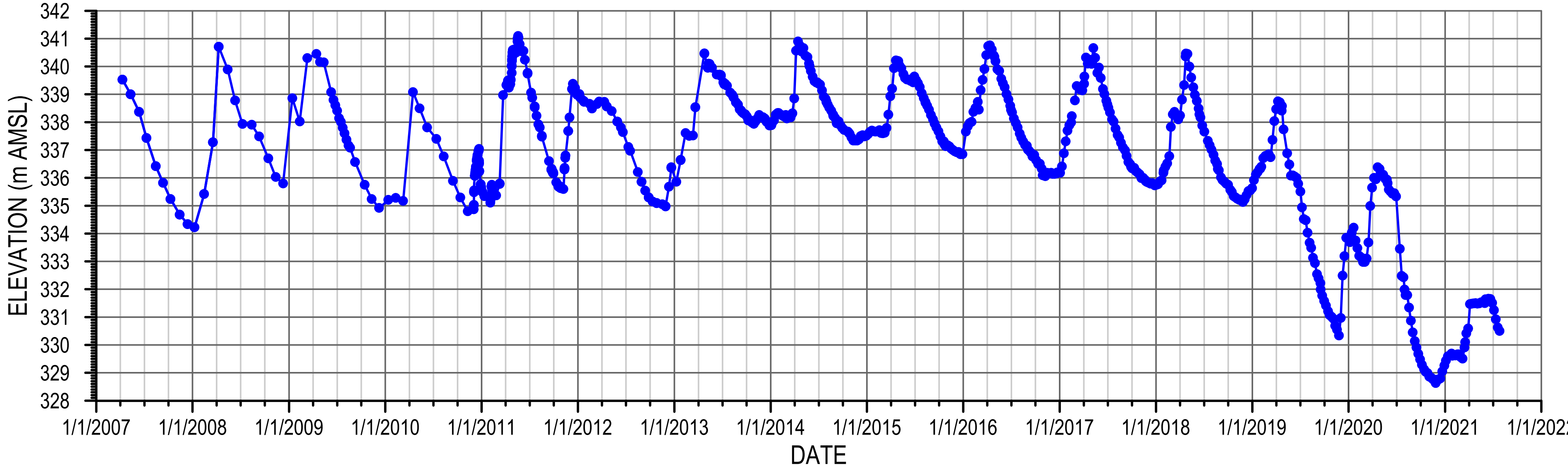

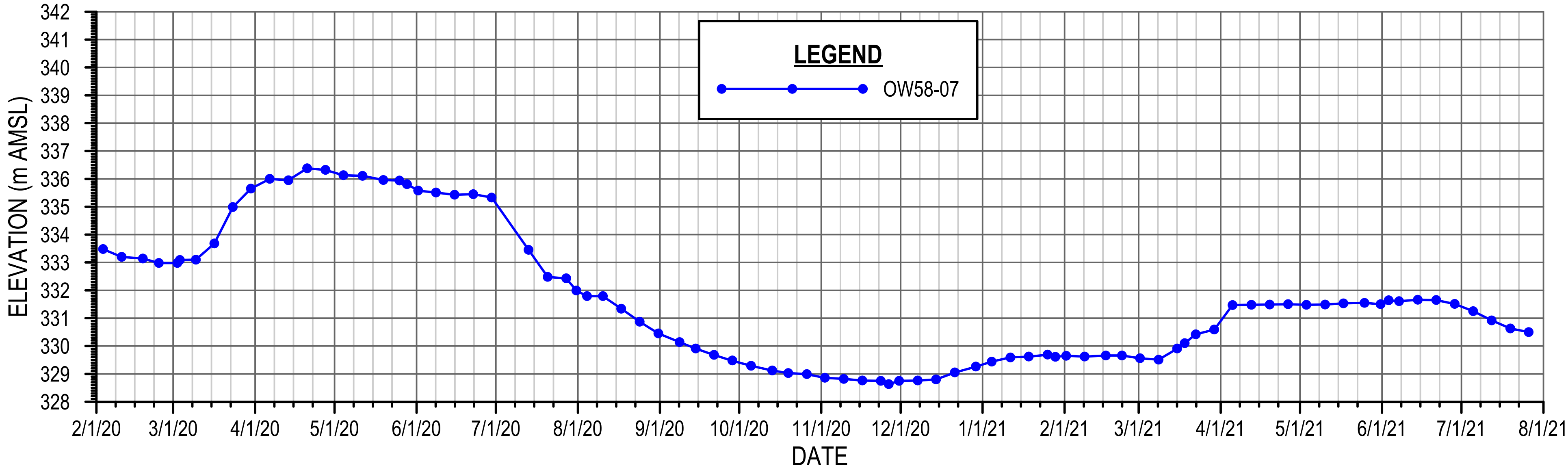

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW58-07

Project No. **10978**
Date **December 2021**

FIGURE D.26

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW58-07.grf
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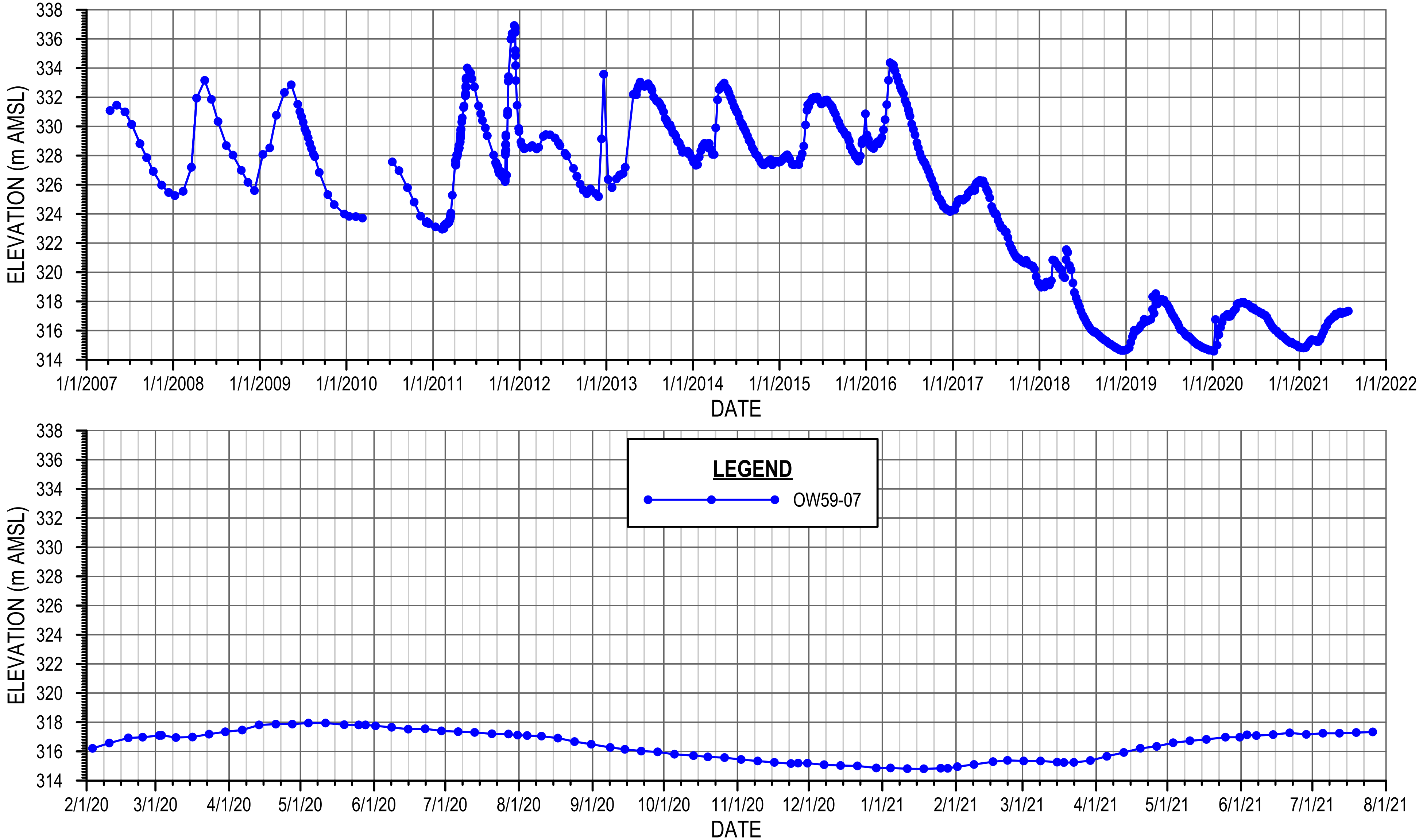

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - OW59-07

FIGURE D.27

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW59-07.grf
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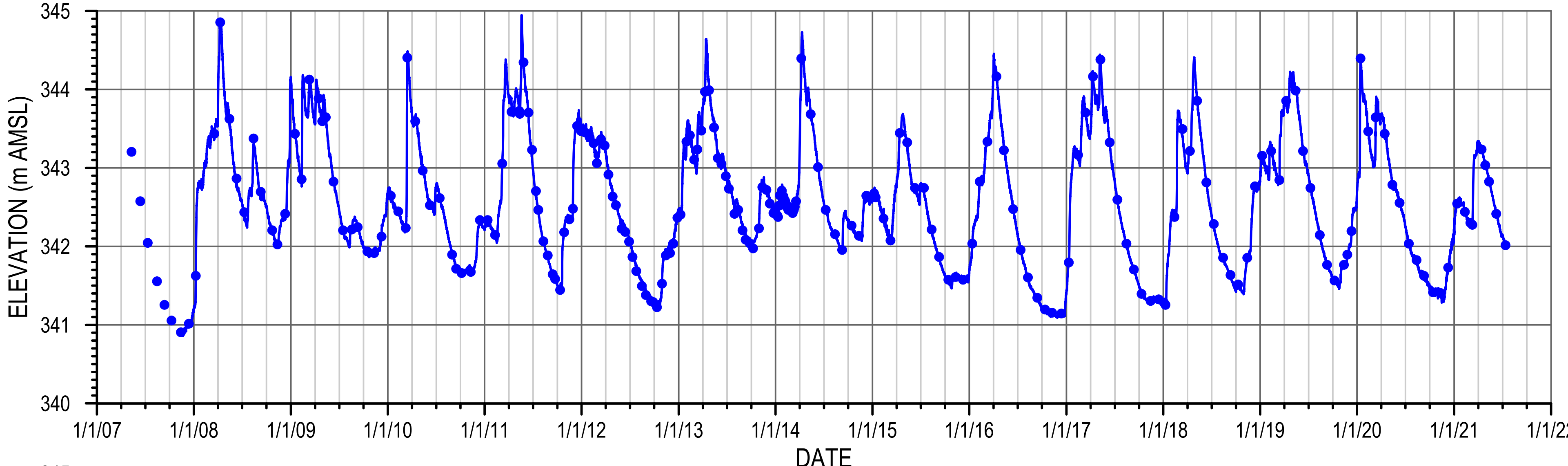

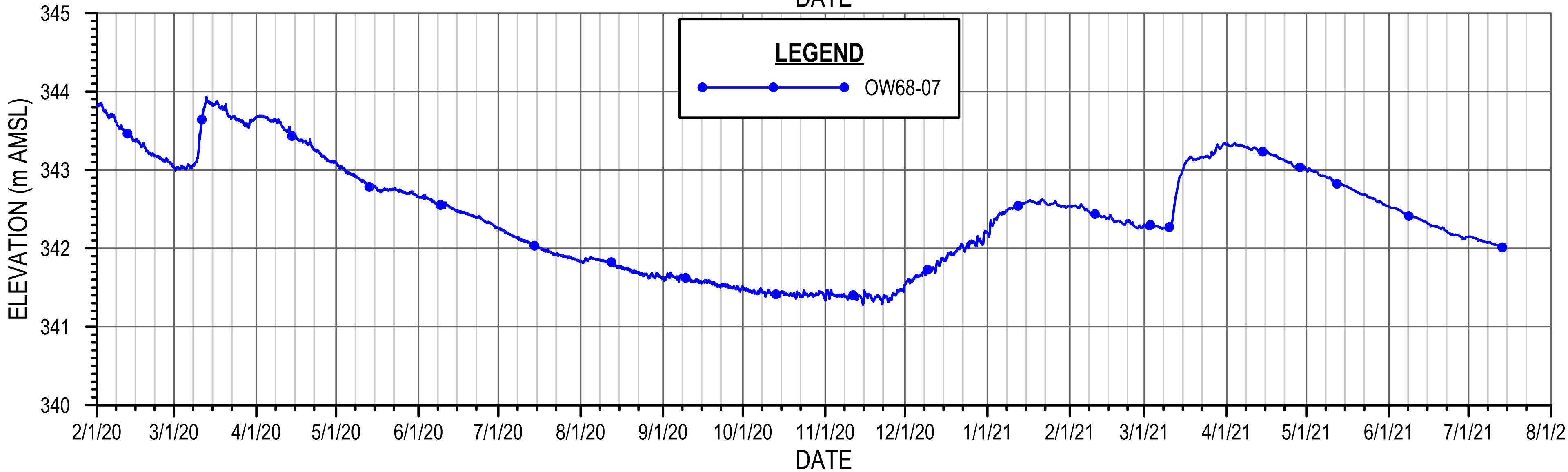

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW68-07

Project No. **10978**
Date **December 2021**

FIGURE D.28

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW68-07.grf
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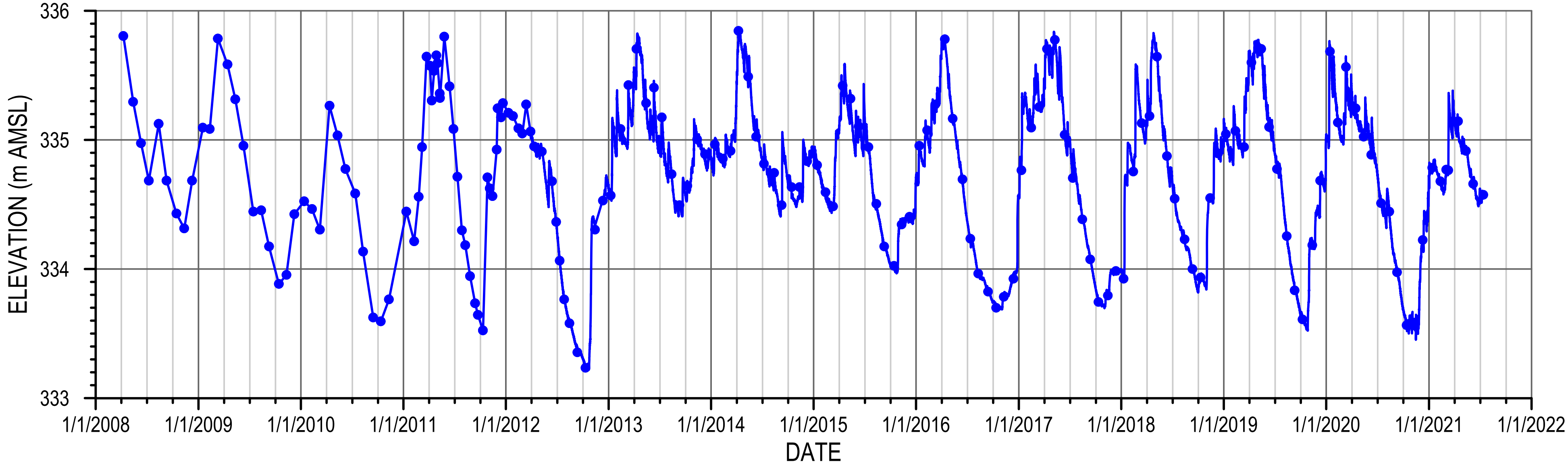
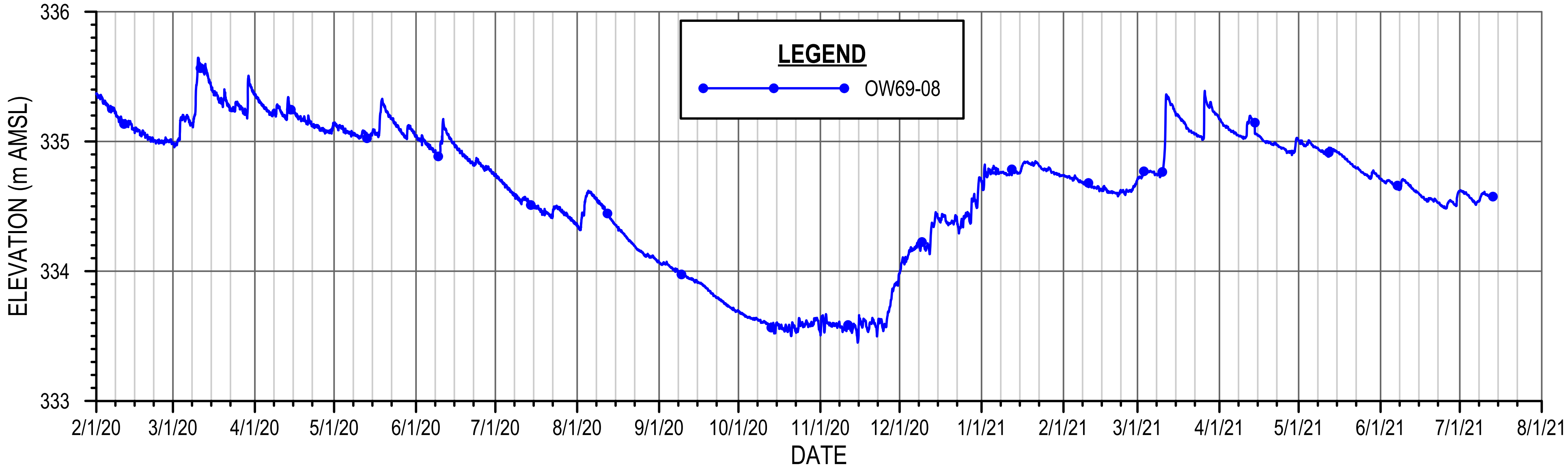




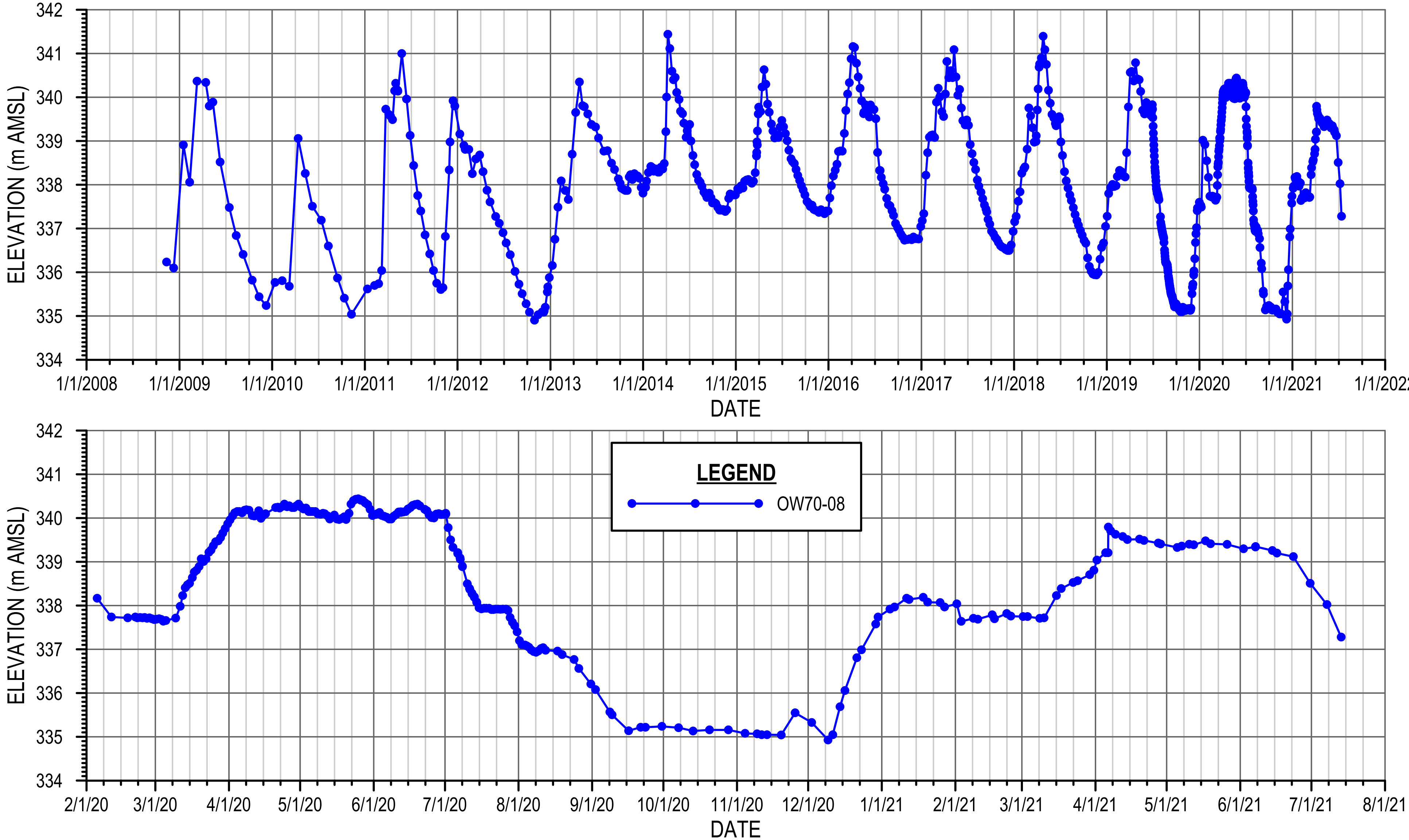
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW69-08

Project No. **10978**
Date **December 2021**

FIGURE D.29

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW69-08.grf
Plot Date: December 01 2021 11:12 AM



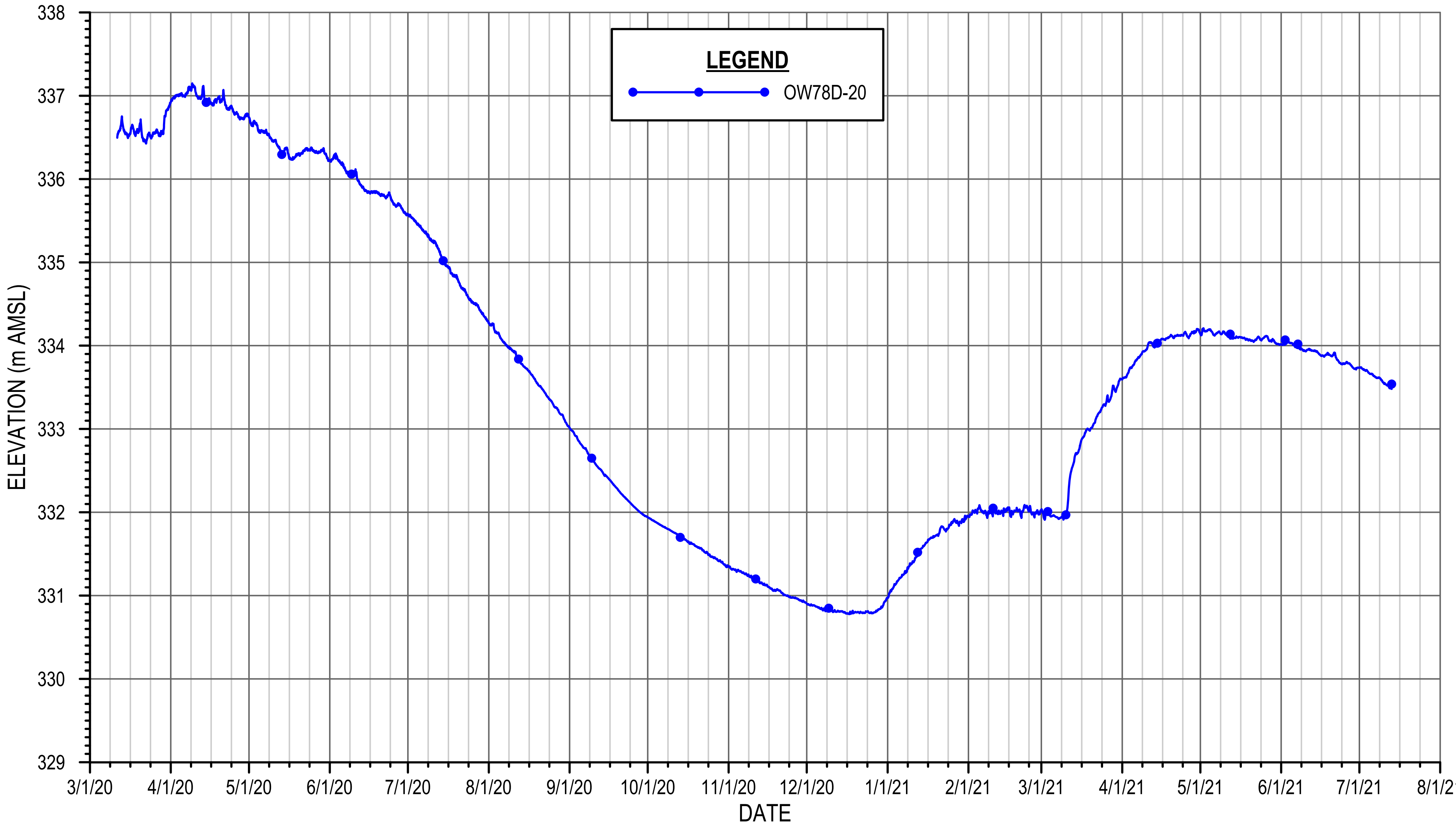
MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - OW70-08

FIGURE D.30

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW70-08.grf
Plot Date: December 01 2021 11:12 AM



MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - OW78D-20

FIGURE D.31

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW78D-20.grf
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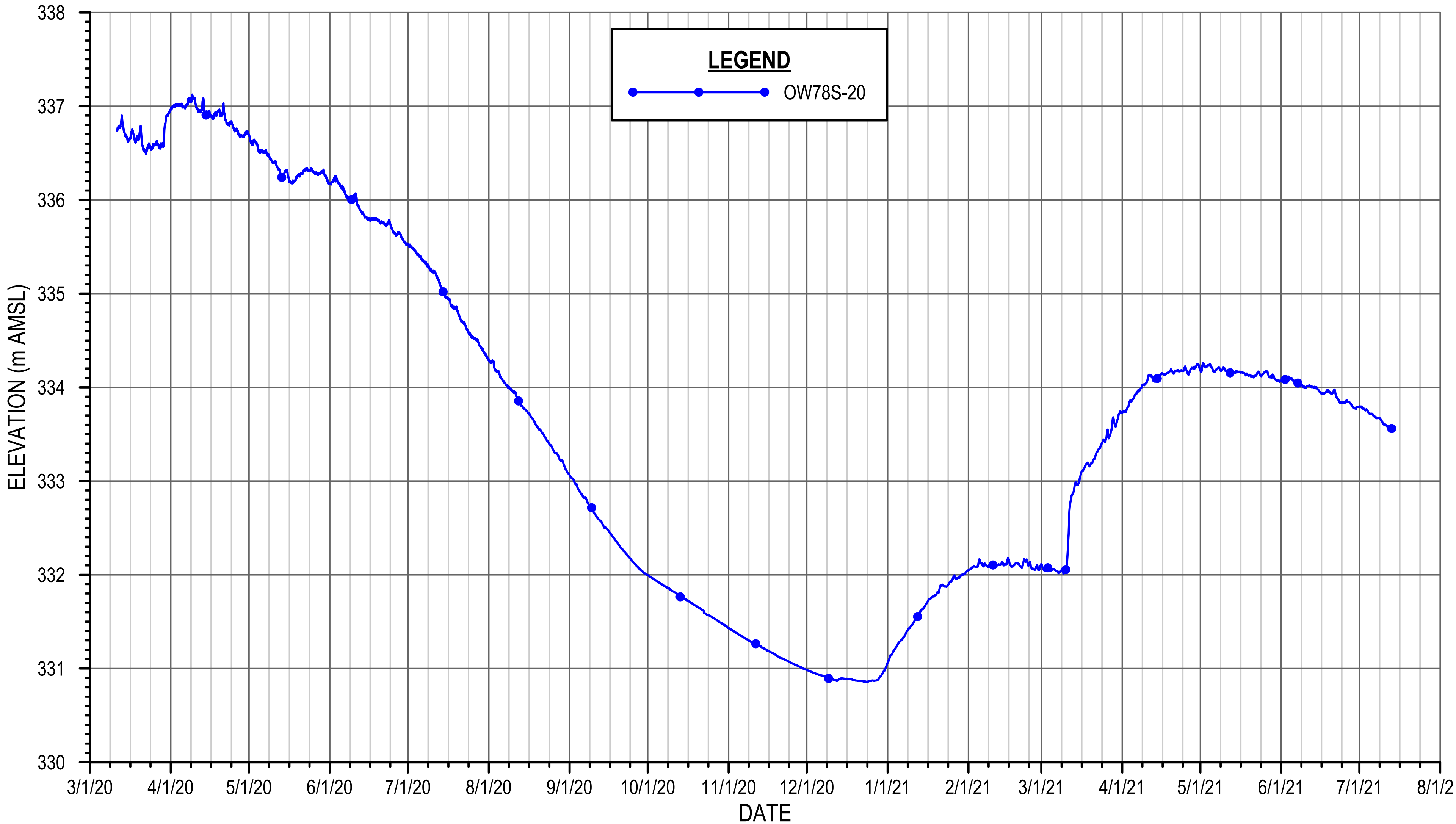

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW78S-20

Project No. **10978**
Date **December 2021**

FIGURE D.32

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW78S-20.grf
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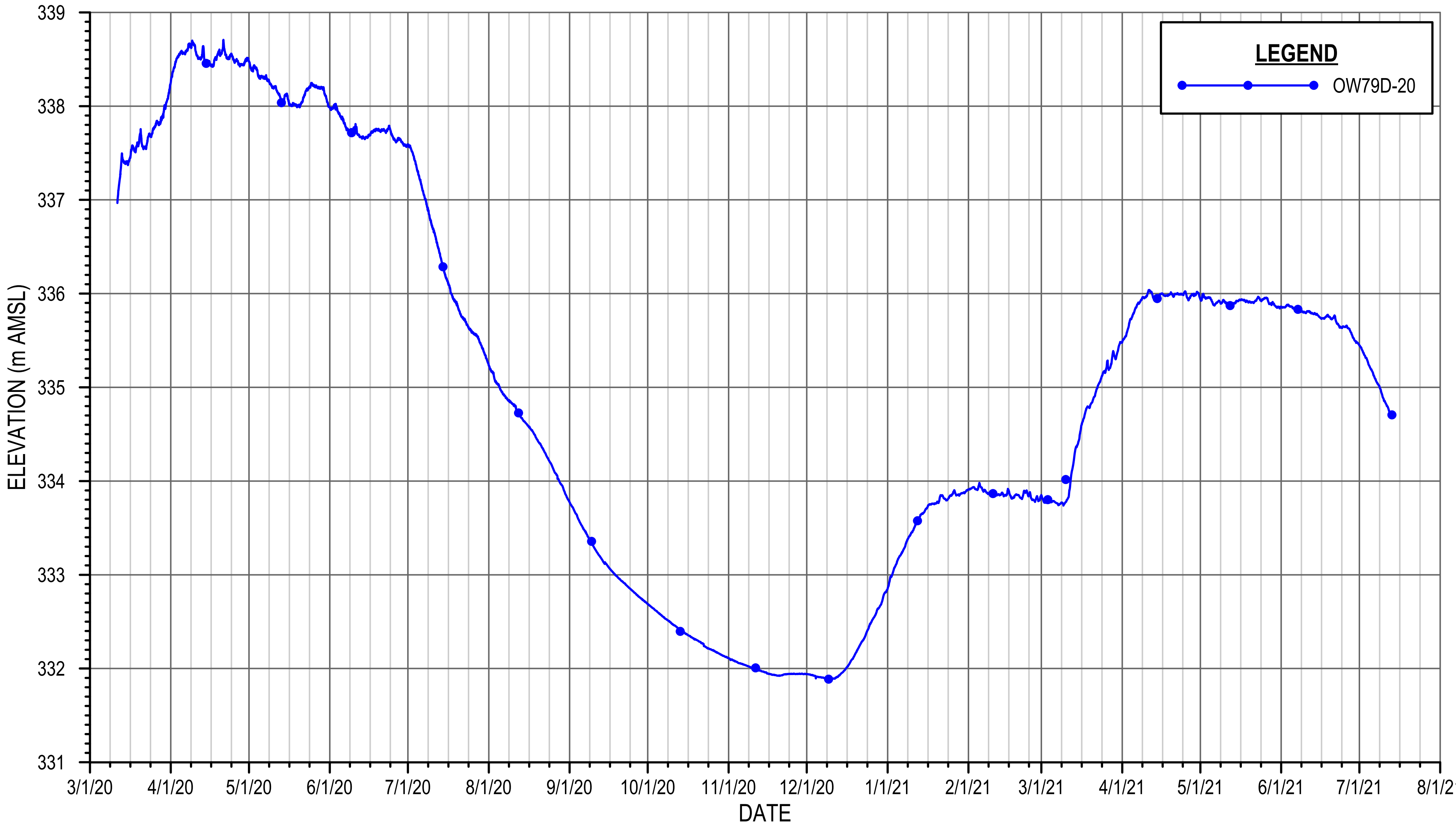

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW79D-20

Project No. **10978**
Date **December 2021**

FIGURE D.33

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW79D-20.grf
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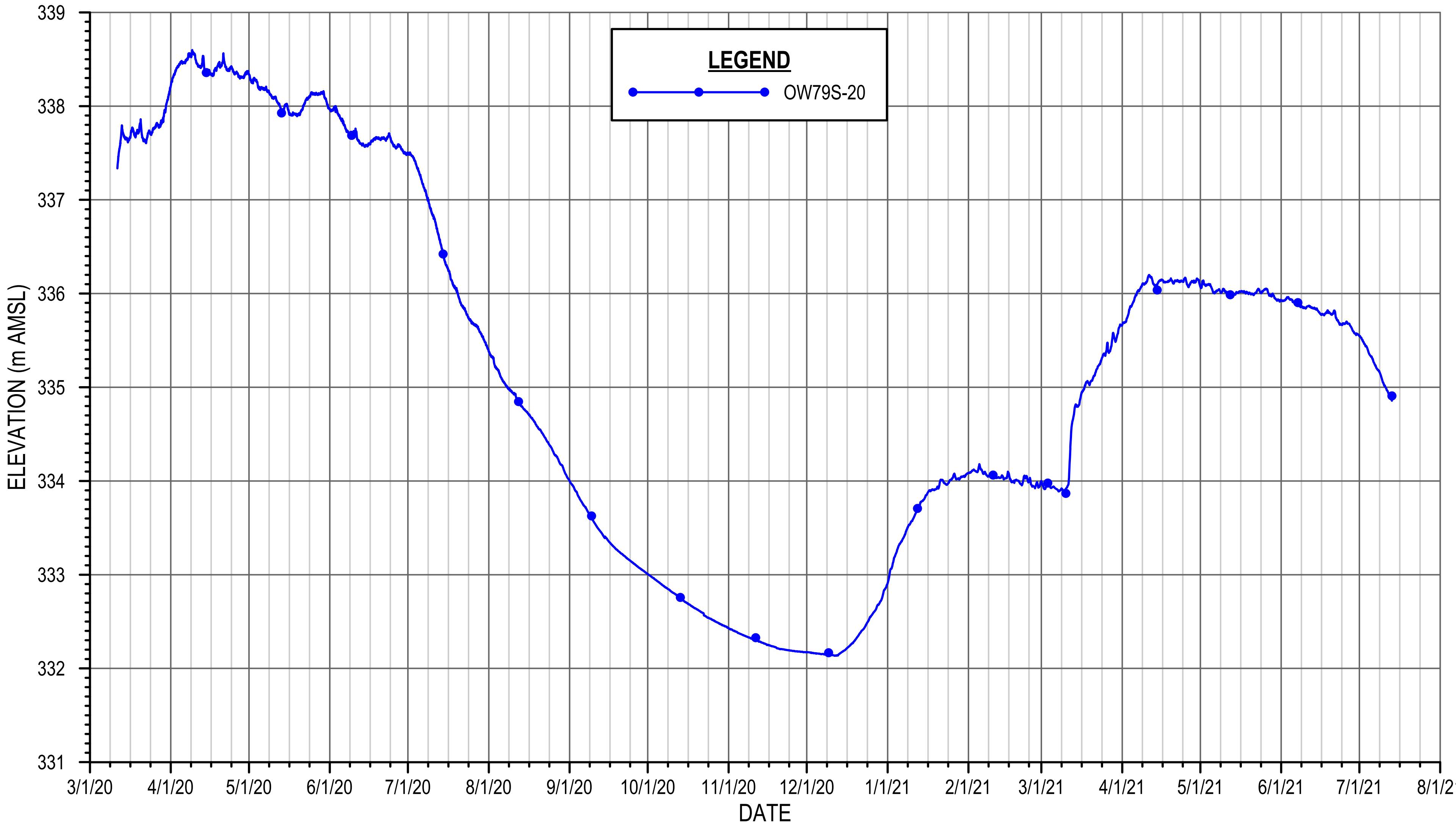

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW79S-20

Project No. **10978**
Date **December 2021**

FIGURE D.34

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW79S-20.grf
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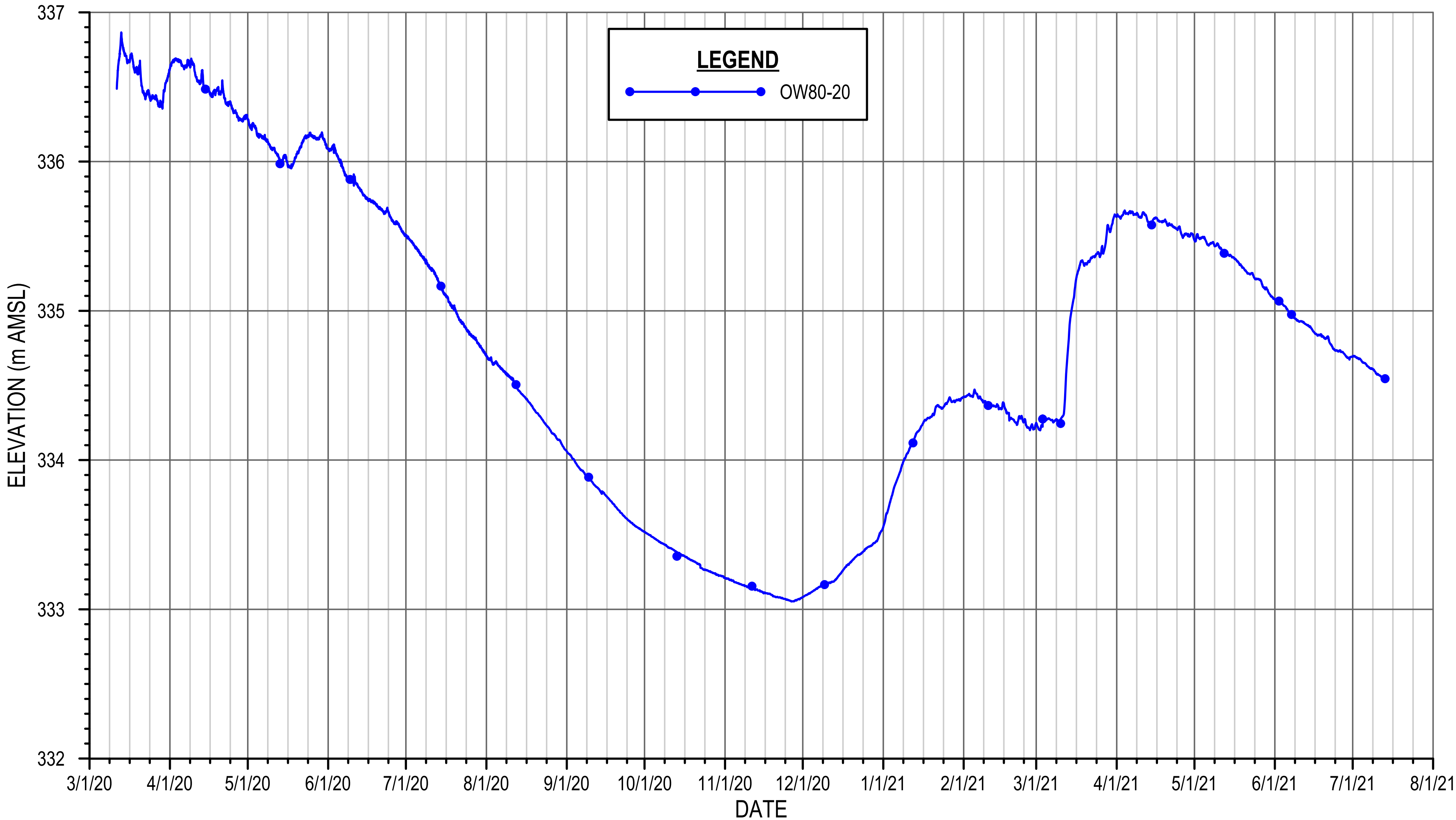

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW80-20

Project No. **10978**
Date **December 2021**

FIGURE D.35

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW80-20.grf
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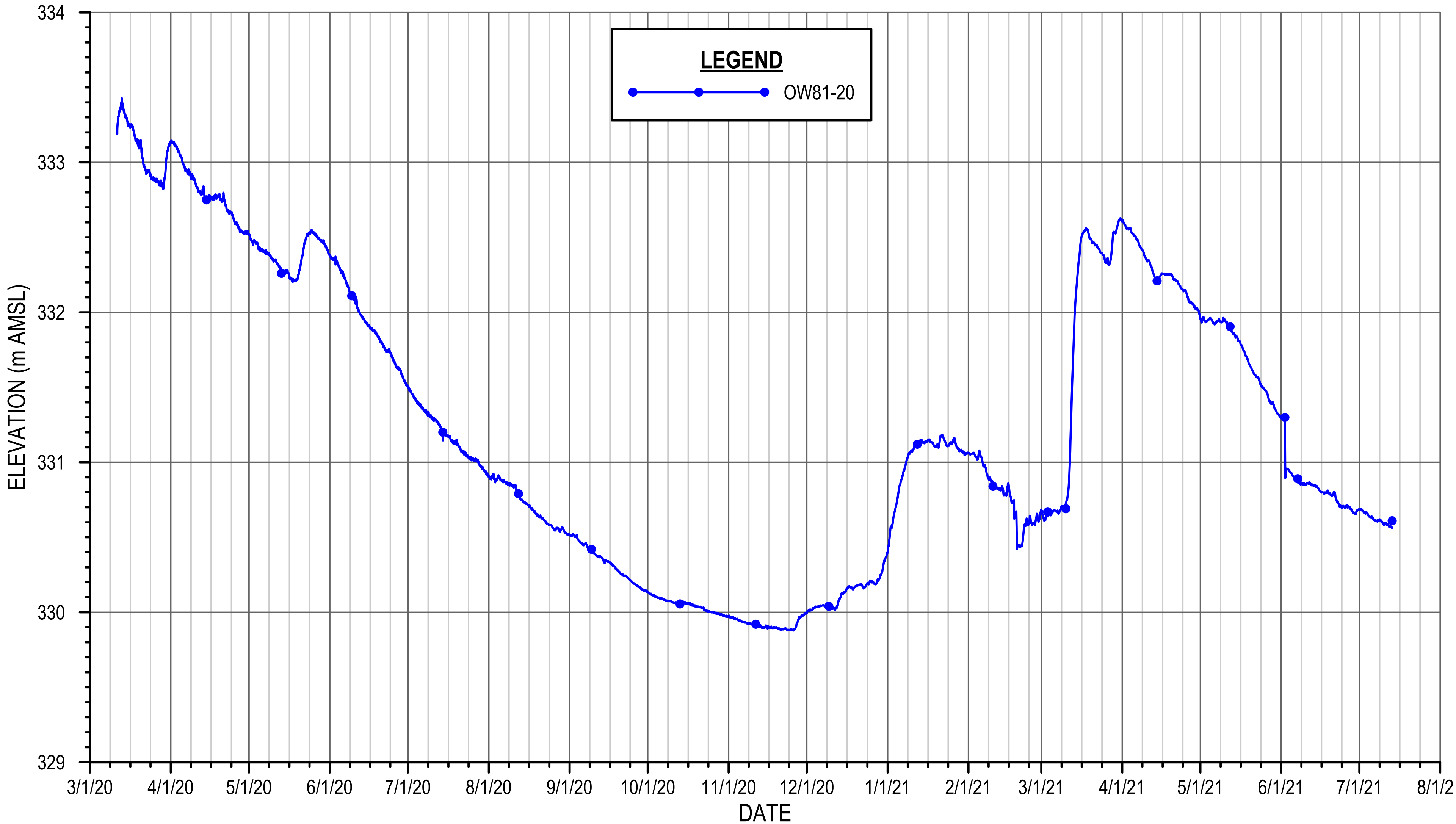

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - OW81-20

FIGURE D.36

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW81-20.grf
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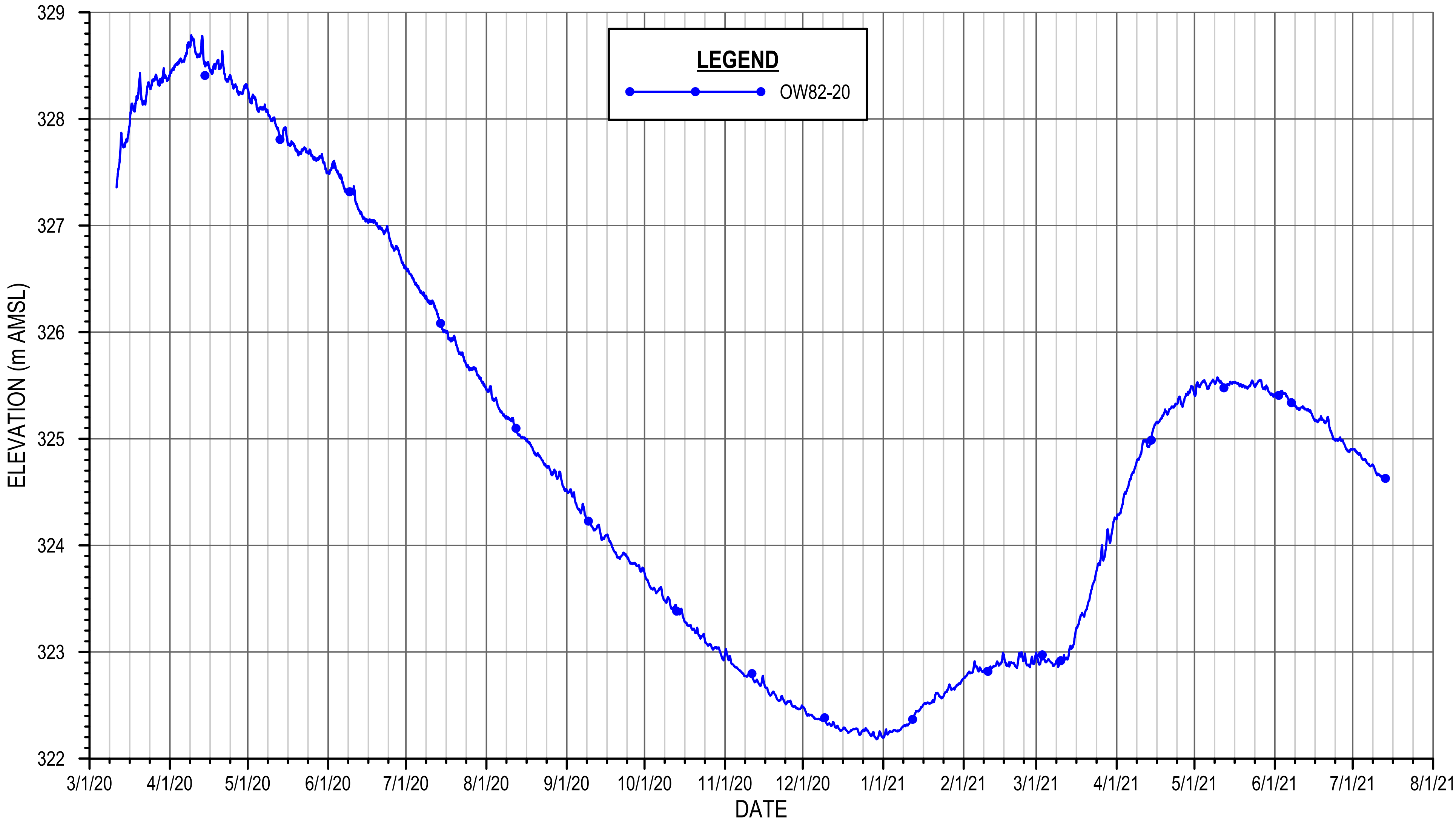

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - OW82-20

FIGURE D.37

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW82-20.grf
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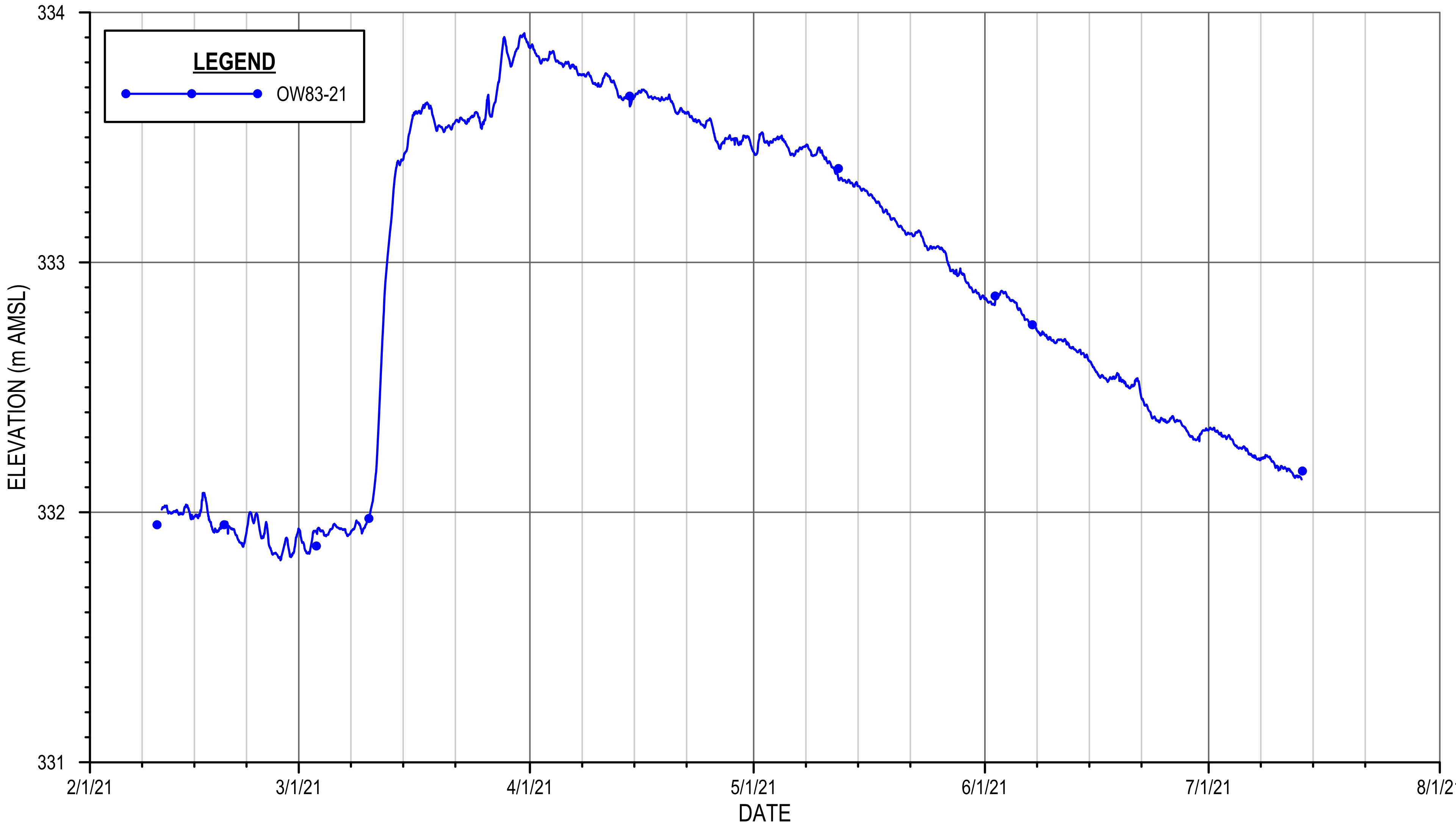

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

HYDROGRAPH - OW83-21

Project No. **10978**
Date **December 2021**

FIGURE D.38

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\OW83-21.grf
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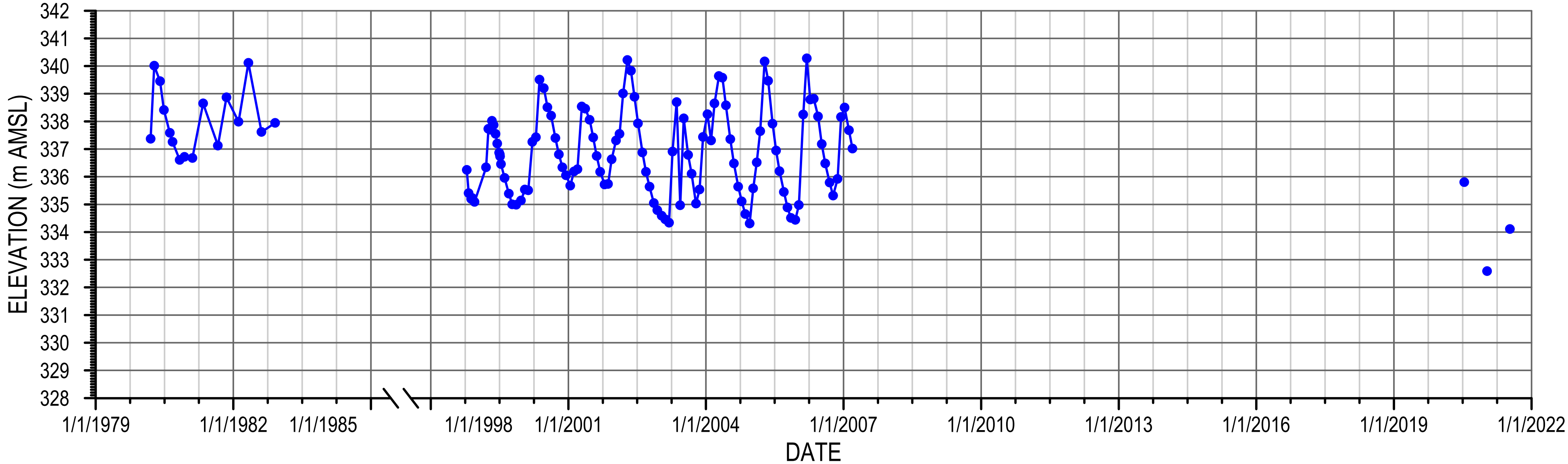

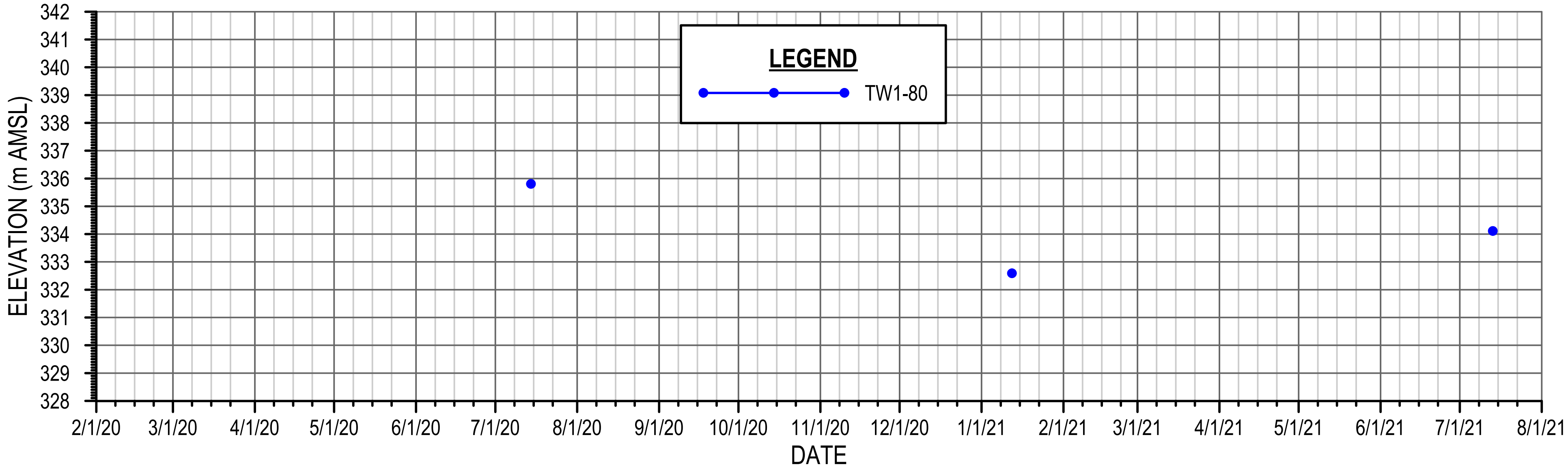

GHD

MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HYDROGRAPH - TW1-80

FIGURE D.39

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Grapher\Report 164\Appendix D\TW1-80.grf
Plot Date: December 01 2021 11:12 AM

Appendix E
Karst Assessment Review

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December 2, 2021

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Review of GHD Karst Assessment for the proposed East Extension to Milton Quarry

1. Introduction and Scope

Pursuant to your request, Worthington Groundwater has conducted a review of the karst assessment completed by GHD Limited (GHD) for the proposed East Extension of the CRH Dufferin Aggregates Milton Quarry located in the Town of Halton Hills, Ontario. The review findings are documented in this letter. A copy of my curriculum vitae is attached.

The scope of this review included a field inspection of Milton Quarry, review of the existing quarry conditions and associated water resources mitigation measures and associated performance, and review of the GHD karst assessment presented in Section 6 of the "Geology and Water Resources Assessment (GWRA) report (GHD, 2021a). Relevant portions of other documents and information related to Milton Quarry were also reviewed, including the Milton Quarry Extension 5-Year AMP Review, 2013-2018 (GHD, 2020) and the Milton Quarry 2020 Annual Water Monitoring Report (GHD, 2021b).

2. Background on Karst

Karst is a geomorphological term that refers to a landscape that exhibits solutional erosion of outcropping bedrock and associated hydrological features such as sinking streams and springs. It is common on limestone and dolostone, which are moderately soluble, as well as on the more highly-soluble halite and gypsum rocks. All four rocks occur in Ontario, with limestone and dolostone often forming prominent escarpments such as the Niagara Escarpment, and halite and gypsum being so soluble that they have been completely dissolved away at the surface. Limestone and dolostone are collectively referred to as carbonate rocks. Dissolution of the bedrock enhances the permeability of carbonate rocks so that in some areas the permeability is high enough that carbonate aquifers are able to transmit the entire water surplus (i.e. precipitation minus evapotranspiration). In these situations there is an absence of surface streams. Where lower-permeability rocks or sediments are adjacent to limestone or dolostone, then streams flowing onto the carbonate rocks may lose all their flow into the bedrock, in which case they are referred to as sinking streams. These streams often have low solute concentrations and substantial dissolution occurs when they flow onto carbonate bedrock, enlarging fractures to form conduits and sometimes caves. Many hundreds of sinking streams are known in southern Ontario, of which some dozens have known caves associated with them.

The solution of limestone and dolostone vary with the carbon dioxide concentration. In areas of bare rock, dissolved carbon dioxide in recharge water equilibrates with the 400 ppm concentration in the atmosphere, and the solubility limit is <50 mg/L. Where there are thick soils and a vegetation cover then plants and microorganisms can raise the soil water carbon dioxide to >1%, resulting in greater dissolution and solute concentrations are often >300 mg/L. Caves are more likely to be formed in limestone than in dolostone because the dissolution rate is about twenty times higher.

There are a range of definitions of the term "karst aquifer". There are five common ones (Worthington et al., 2017). The defining characteristic of the five definitions are that a karst aquifer is characterized by:

a) the presence of caves
b) a karstic landscape, or "karst terrain" on the surface
c) the presence of turbulent flow in conduits
d) the presence of hydraulic conductivities > 10^{-6} m/s
e) the presence of solutionally-enlarged fractures.

The use of different definitions can result on conflicting views on whether specific areas have karst aquifers. If any of the first three definitions is used than a majority of southern Ontario carbonate aquifers would not be classified as karstic. If either of the last two definitions is used than a majority of southern Ontario carbonate aquifers would be classified as karstic. However, it is not the definition that is important in evaluating an aquifer but rather how karst processes may have affected the function of the aquifer.

There are two major karst considerations associated with development in karst areas. The first is the extent of preferential flow paths, especially those associated with recharge at sinking streams. These result in faster groundwater velocities and less predictable flow directions than in lithologies that are less soluble, such as shale or sand. This is particularly the case where there are substantial (e.g. >10 L/s) sinking streams or springs.

A second karst consideration is that dissolution of the bedrock may result in an uneven bedrock surface and the possibility of collapse of voids created by dissolution. This creates a potential hazard for building structures in karst areas, and "karst topography". However, this risk applies to built structures and is not relevant to this quarry application.

2.1 Major advances in understanding karst aquifers

There have been substantial advances in the scientific understanding of karst aquifers over time. These are described below. The scientific understanding of how karst aquifers develop was poorly known until the 1970s. Berner and Morse (1974) conducted lab experiments and showed that the dissolution of limestone slows exponentially as chemical equilibrium is approached. There were many subsequent experiments in the following 25 years that confirmed this. With advances in computer power, it became possible to carry out numerical simulations of how karstification proceeds, with the first one being by Dreybrodt (1990). These increased in sophistication over time, especially in the following 15 years, culminating in a book (Dreybrodt et al., 2005). Figures 1, 2a, and 2c are taken from that book.

Figure 1 shows the time to breakthrough for flow underneath a dam that is built on limestone. Breakthrough is defined as the time when the flow regime changes from laminar to turbulent, and coincides with the time when there would start to be noticeable flow underneath a dam. The figure shows that for the case where there is no dissolved calcium carbonate in the reservoir water (i.e. $c_{in}/c_{eq} = 0$), then breakthrough would occur after 30-90 years for the four different scenarios modelled. The time to breakthrough increases with the concentration of calcium in the reservoir water, becoming hundreds of years rather than decades once the ratio c_{in}/c_{eq} exceeds 0.8. The highest c_{in}/c_{eq} ratio modelled is 0.925, but the trends can be extrapolated, and would show that the time to breakthrough would surpass 1000 years once c_{in}/c_{eq} exceeds about 0.95.

Figure 2 was published in Worthington and Ford (2009), with Figures 2a and 2c being copied from Dreybrodt et al. (2005), and Figures 2b and 2d being added to show the distribution of fracture sizes. The simulations in Figure 2a and 2c shows a grid of fractures of variable apertures, with recharge water at three locations (black dots) on the left and discharge on the right of the figure. Figure 2c has zero dissolved calcium carbonate ($cin/c_{eq} = 0$) at the three recharge points. This results in preferential dissolution along one major fracture flow path from each recharge point, with there being rapid dissolution along these flow paths (i.e. warmer colours - orange and red). The simulation is terminated after 16,700 years when flow becomes turbulent. Figure 2c was similar to what had been modelled for the previous 15 years, and implied that karstification always resulted in the formation of caves. If there were no caves then presumably the karst was immature and caves would eventually develop.

Figure 2a was a revelation because it graphically showed for the first time that karstification does not necessarily result in the formation of caves. The only changes in conditions from Figure 2c is that the calcium concentration in the recharge water is set to 98% of saturation (i.e. $c_{in}/c_{eq} = 0.98$). The result is dramatically different from Figure 2c, with rapid dissolution being totally absent (i.e. no orange or red colours) and moderate dissolution (i.e. green colours) occurring along many flow paths. This explains why large conduits are rarely found in dolostone quarries in Ontario, and why flow into quarries below the water table is widespread, discharging from many small fractures.

Figures 2a is relevant for percolation recharge, and Figure 2c for sinking stream recharge. The simulations in Figure 2 are for limestone, and it's been shown that the focused pattern of preferential flow is less common in dolostone than in limestone, due to the slower approach to chemical saturation (Worthington, 2015). This explains why caves are much less common in dolostone than in limestone.

3 Site visit

A five-hour site visit was made on June 25, 2021 with Richard Murphy and Kyle Fritz of GHD. Starting on the eastern side of the North Quarry, we had a good view of the rock wall on the west side of the quarry (Figure 3). Recharge wells to the west of this face maintain water levels in the aquifer. There is some flow into the quarry, and the distributed nature of this flow is indicated by the dark-coloured wet rock in Figure 3.

We walked east across the East Extension area, visiting a large enclosed depression (Figure 4). The pole next to the person in Figure 4 is SG65, and this staff gauge is located in an old tire rut that is approximately 30 cm deep. More than a year of transducer data at this location show that it is usually dry but occasionally has up to 26 cm of water for up to a few days. The tall grass precluded a thorough examination of the depression, but there appears to be no focused flow or discrete sinkpoints in this depression, as so it appears not to have a karstic function.

We then headed east to the largest spring that GHD staff have located to the east of the proposed East Extension. The spring is located at the edge of wetland w41, and had a flow of <1 L/s when we visited it. The flow varies seasonally, reducing to a trickle in the summer. Figure 5 show a view of SG61 and the wetland from beside the spring.

We then headed west through the woodland and north up a dry channel to Wetland U1, and then west to the road. The dry channel did not appear to serve any karstic function.

4 Interpretation of karstification in East Extension area

There are a number of enclosed depressions in the East Extension area, and many more between the East Extension and the Niagara Escarpment. These depressions are often occupied by wetlands, which indicate that they do not perform a karstic function (i.e. have concentrated recharge via sinkholes). The tall grasses in the open fields at the time of the field trip precluded a thorough investigation of the possible karstic functioning of any depressions. However, it does appear that such functioning would be minor, with little focused recharge to the aquifer in the extension area.

The combination of distributed recharge and the bedrock being dolostone rather than limestone favours a distributed pattern of many small (e.g. 0.1 mm - 1 mm) solutionally-enlarged fractures in the bedrock. This is supported by the evidence from discharge from nearby existing quarry faces such as are shown in Figure 3.

5 Review of Interpretation of karstification in East Extension area

The proposed East Extension of the Milton Quarry includes mitigation measures to support groundwater levels through use of groundwater recharge wells and to directly support or enhance water levels and hydroperiods in wetland pools though the use of diffuse discharges. In the absence of mitigation measures, these water resources may be influenced by dewatering associated with the extraction of the East Extension dolostone bedrock. These water resources and mitigation measures are described in detail in the GWRA (particularly Sections 6, 9, and 10).

GHD's analysis is based upon a detailed study of the site characteristics and operating experience with the existing quarry development and mitigation measures. Their analysis includes an assessment of karst considerations (Section 6.5 of the GWRA). I have reviewed their assessment and am in agreement with their conclusions that there is no indication of "…significant karst features and no hydrogeologic conditions that could not be addressed by the approved mitigation measures."

Two key karst-related considerations with the proposed mitigation measures for the East Extension are included for specific discussion below:

- Effectiveness of the groundwater recharge mitigation system
- Potential for dissolution of dolostone bedrock associated with groundwater recharge and lakes

5.1 Suitability of groundwater recharge system

The mitigation system for the East Extension proposed by GHD relies on the successful implementation and operation of the groundwater recharge well system to support groundwater levels and diffuse discharges to wetland pools to support and enhance the wetland pool hydroperiods. Obviously these systems need to be highly effective to achieve the mitigation objectives.

It is not necessary to rely solely upon hydrogeologic principles or predictions of the performance of these measures to assess their potential effectiveness. These same systems have been in continuous use since 2007 and 2009 in the case of recharge wells and diffuse discharges, respectively. There is now extensive experience at the Milton Quarry of successfully using recharge wells and diffuse discharges to maintain water levels. This experience clearly demonstrates that these systems are effective and suitable for the intended use.

5.2 Potential for dissolution of dolostone bedrock associated with groundwater recharge and lakes

The proposed mitigation measures include the use of groundwater recharge wells over extended periods of time (decades or more) and the proposed rehabilitation plan includes maintaining lakes that will result in some seepage between and beyond the lakes. A relevant consideration for these long term conditions is whether there may be excessive dissolution of the bedrock over time that may cause solutional enlargement of fractures that increase rates of seepage and hence increase the mitigation effort required to maintain protection of water resources.

As described in Section 2.1, some of the early computer simulations (in the 1990s) showed that substantial discharge could occur within decades of lake filling or recharge well operation. The more refined simulation in Figure 1 shows that this time is substantially longer when the ratio c_{in}/c_{eq} exceeds 0.8. Geochemical modelling was also conducted (GHD, 2021) to evaluate the potential for the dissolution of dolomite by the mitigation recharge water as dolomite is the mineral that makes up the majority of the dolostone rock of the Amabel Formation. The average concentrations of major ions, pH, and temperature for 2020 in the recharge water (SW52B) were evaluated to determine the potential for promoting the dissolution of dolomite.

The results of the geochemical modelling demonstrate that the recharge water is super-saturated with respect to dolomite and would tend to promote the precipitation of dolomite (e.g., $c_{in}/c_{eq} > 1.0$) , rather than dissolution. The pH of the recirculation water, generally around 8.3, provides supporting evidence that the recirculation water is in equilibrium with the formation. Dolomite would not dissolve in the recharge water unless the pH drops below 7.5 (maintaining all other parameters the same).

The recharge water is sourced from the Main Quarry Reservoir and it is anticipated that the future quarry lake water quality will be similarly high in dissolved carbonate minerals and therefore not aggressive with respect to dissolution of the dolostone bedrock. Therefore the potential for future solution enhancement of fractures and associated increases in seepage rates is not a concern.

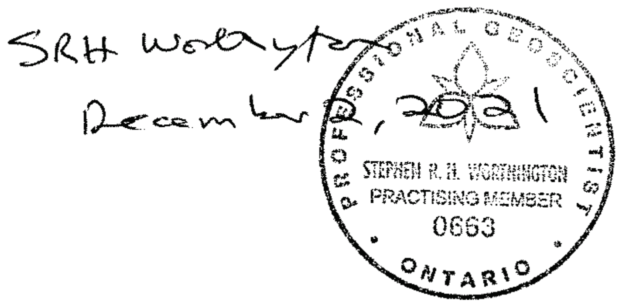
6. Conclusions

Consequently, it is concluded that karst issues are most unlikely to be a concern in the development of the East Extension and if karst issues were encountered, the mitigation and monitoring plan described by GHD would ensure the protection of water resources.

The combined analysis of the karst conditions by GHD and as described in this review is adequate to assess the potential effects of karstification related to the East Extension and conclude that there are no issues of concern for the protection of water resources.

Sincerely,

Worthington Groundwater



Stephen R.H. Worthington, Ph.D., P.Geo.

Encl. References
Figures 1-5
Curriculum Vitae

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Figures

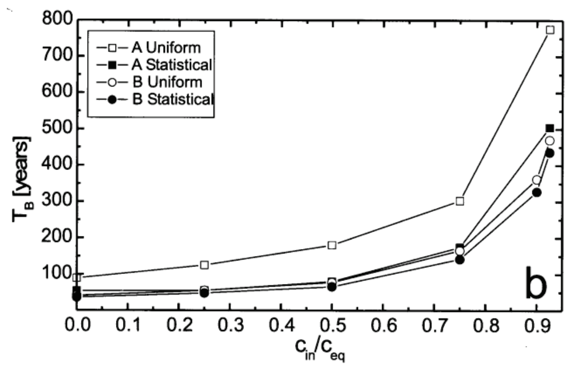

Figure 1. Time to breakthrough (i.e. the time when turbulent flow commences) as a function of calcium concentration in a reservoir (c_{in}) as a ratio of the maximum calcium concentration at geochemical equilibrium (c_{eq}). (from Figure 6.9b in Dreybrodt et al., 2005).

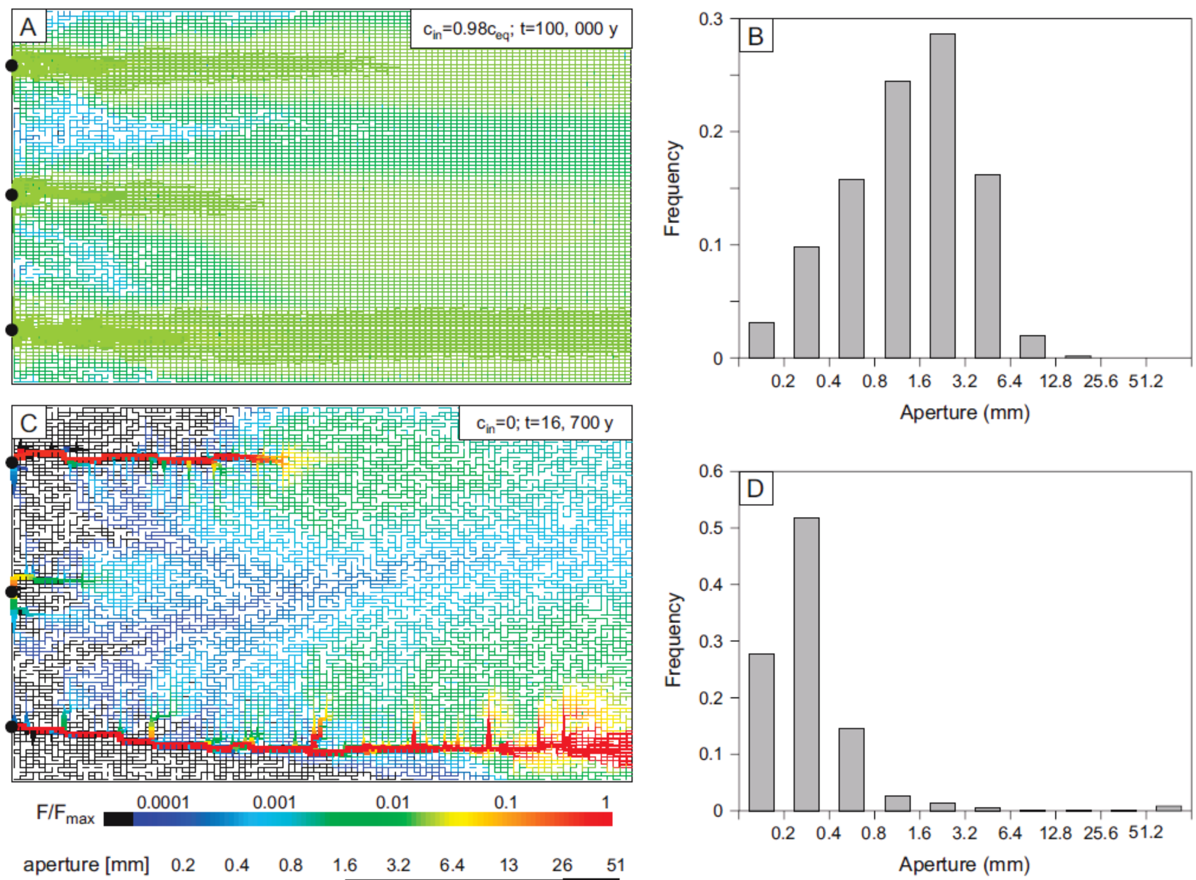

Figure 2. **Numerical simulations of dissolution in fracture systems at the time of breakthrough, showing contrasts as a result of differing the saturation with respect to calcite for aquifer recharge. (A) $c_{in} = 0.98\ c_{eq}$; (B) aperture distribution for (A); (C) $c_{in} = 0$; (D) aperture distribution for (C). F/F_{max} represent the dissolution rate with respect to the maximum rate of 4×10^{-12} mol/cm²/s (A and C after Dreybrodt et al. 2005).**

Figure 2 was published in Worthington and Ford, 2009.

Figure 3. View westwards across Milton North Quarry, showing the southern part (top) and the northern part (bottom) of the quarry face. The widespread dark-coloured areas show that distributed nature of discharge from the quarry face.

Figure 4. Views looking north across an enclosed depression in the East Extension lands. The pole in front of the person is SG65.

Figure 5. Looking approximately southwards to SG61 from beside a small spring.

Curriculum Vitae - Dr. Stephen R.H. Worthington

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Profile

After graduating with an honours degree in Geology and Geography at the University of Sheffield, England, Steve Worthington worked as a geologist in the oil industry and explored caves around the world in his spare time. He moved to Hamilton, Ontario in 1982 to study carbonate aquifers at McMaster University, and researched karst geomorphology and hydrogeology in West Virginia (M.Sc., 1984) and karst hydrogeology in the Canadian Rocky Mountains (Ph.D., 1991). He has carried out research on limestone and dolostone (karst) aquifers in more than twenty countries.

Since 1993 Dr. Worthington has worked as an independent consultant in ten US states, in Canada, Jamaica, Ireland, the U.K. and China. He has specialized in characterizing carbonate aquifers using both borehole methods as well as karst techniques such as tracer tests and spring monitoring. His consulting work has included water supply, water rights, source protection for wells and springs, groundwater contamination, bedrock stability, and feasibility projects on landfills, quarries, and residential developments.

University Education

Honours B.A., Geology/Geography, University of Sheffield, Sheffield, U.K., 1970
Thesis title: The geology of the Altarnun area, Cornwall.

M.Sc., McMaster University, Hamilton, Ontario, Canada, 1984
Thesis title: Paleodrainage of an Appalachian fluviokarst, Friars Hole, West Virginia.

Ph.D., McMaster University, Hamilton, Ontario, Canada, 1991
Thesis title: Karst hydrogeology of the Canadian Rocky Mountains.

Memberships

Association of Professional Geoscientists of Ontario (P. Geo., Practising member number 0663)
Cave and Karst Science journal, member of editorial advisory board
Geological Society of America (Fellow)
International Association of Hydrogeologists, Commission on Karst Hydrogeology
National Speleological Society (USA), Honorary Life Member
Journal of Hydrology, Associate Editor

Languages

English, French, German, some Spanish

Project experience

- Field investigations and testimony as an expert witness on hydrogeology at the Walkerton Inquiry, a public inquiry that investigated the reasons for seven deaths and 2300 illnesses from bacterial contamination of a carbonate aquifer in Ontario.

- Testimony as an expert witness at environmental assessment hearings on hydrogeology in Ontario, on proposals for an industrial landfill (Steetley), two residential developments (Castle Glen, Elora), four bedrock quarries (Milton, Nelson, Duntroon, Hidden) and one sand and gravel pit (Durham).

- Member of advisory panels on numerical modelling, water use restrictions, and tracer testing in the Edwards aquifer in Texas.

- Member of review panel advising the Forest Service in Alaska on its regulations for logging in karst areas.

- Review of feasibility reports on proposed landfills on carbonate rocks in Wisconsin and Ontario, and a diamond mine in carbonate rocks in Ontario.

- Evaluation of karst issues affecting development of quarries in Ontario and England, and residential developments, wind farms, and a deep underground nuclear waste repository in Ontario.

- Evaluation of storage and flow through carbonate aquifers in two water rights cases in Utah.

- Evaluation of hydrogeology at contaminated sites on carbonates in Ontario, Indiana, Tennessee, Kentucky, New York, Puerto Rico, and Jamaica and on unconsolidated sediments in Ontario

- Evaluation of causes of failure of a breached canal wall in carbonates in New York.

- Investigation of remedial options to reduce inflow to a sub-water table limestone quarry in Maryland.

- Evaluation of significance of karst at the Eramosa Karst (Ontario) in connection with its designation as an Area of Natural and Scientific Interest, and in the expansion area for Nahanni National Park (Northwest Territories)

- Evaluation of hydrogeology of karst areas in Chongqing and Guangxi, China for International Geopark and World Heritage Site status

- Review of source protection methodology for springs and municipal wells in limestone and dolostone aquifers in Ontario and in Ireland

Field research on carbonate rocks

Rocky Mountains, Canada - 9 months in 1985-1987 for PhD
Nahanni and N. McKenzie Mountains, NWT, Canada - 6 weeks in 1984, 2006, 2007
West Virginia, USA - 3 months in 1982-1984 for MSc
Papua New Guinea - 7 months in 1978 and 1982
Ethiopia - 3 months in 1972
Also field trips of about a month in Australia, Austria, Belize, Bulgaria, Cayman Islands, China, Dominican Republic, Greece, Guatemala, Mexico, Morocco, New Zealand, Puerto Rico, Spain, and Turkey.

Other professional experience

2015	Instructor of short course on "Groundwater in carbonate rocks", University of Birmingham, England
2006-2008	Instructor, National Ground Water Association short courses: "Introduction to karst hydrology", San Antonio, April 2006 "Hydrogeology of karst aquifers", San Antonio, November 2006 "Hydrogeology of karst aquifers", San Antonio, May 2008
1995-1999	Research Associate, McMaster University. Investigation of hydrogeology of dolomite bedrock contaminated by PCBs, Smithville, Ontario as part of the US EPA cooperative project "Groundwater flow and capture zone dynamics in fractured carbonate aquifers", with University of Waterloo, National Water Research Institute, and University of Utah.
1992-1997	Instructor of first year to fourth year undergraduate courses on geomorphology, fluvial geomorphology, environmental hazards and climatology, McMaster University and University of Toronto.
1991-1995	Research on hydrogeology of fractured limestones and dolostones in Southern Ontario and Kentucky, McMaster University.
1982-1991	Graduate studies on hydrogeology and geomorphology of carbonates.
1973-1977	Geologist in oil industry in Europe and Africa.

Research interests

- Has studied carbonate aquifers in 27 countries (Australia, Austria, Belize, Bulgaria, Canada, China, Cayman Islands, Dominican Republic, Ethiopia, France, Germany, Greece, Guatemala, Ireland, Italy, Jamaica, Mexico, Morocco, New Zealand, Papua New Guinea, Puerto Rico, Slovenia, Spain, Switzerland, Turkey, United Kingdom, United States)

- Has conducted more than 200 groundwater tracer tests to wells and springs in Canada, the United States, Mexico, Papua New Guinea and Great Britain.

- Has specialized since 1993 in integrating borehole and spring monitoring techniques to comprehensively characterize flow and transport in carbonate aquifers.

- Has made more than 70 presentations on the hydrogeology of carbonate aquifers, at conferences in Canada, USA, UK, Ireland, Austria, France, Italy, Spain, Turkey, and China.

Peer reviews

Has conducted peer reviews of papers on bedrock aquifers for the following journals: Acta Carsologica, Geological Society of America Bulletin, Cave and Karst Science, Earth Surface Processes and Landforms, Environmental Earth Sciences, Environmental Forensics, Environmental Pollution, Geomorphology, Geoscience Canada, Groundwater, Hydrogeology Journal, International Journal of Speleology, Journal of Cave and Karst Studies, Journal of Hydrology, Journal of the American Water Resources Association, Reviews of Geophysics, Sedimentary Geology, Water Resources Research. Has also reviewed grant proposals and papers for conferences and books, and has been an Associate Editor of the Journal of Hydrology since 2014.

Publications in peer-reviewed journals

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Appendix F
Groundwater Modelling

Groundwater Flow Modelling

Milton Quarry East Extension (MQEE)
Town of Halton Hills, Ontario

Dufferin Aggregates,
a division of CRH Canada Group Inc.

GHD | 455 Phillip Street Unit #100A Waterloo Ontario N2L 3X2 Canada | 1112345 | 10 | Report No 169 | December 10 2021

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1. Introduction

1.1 Purpose

GHD Limited (GHD) was retained by Dufferin Aggregates (Dufferin), a division of CRH Canada Group Inc. to assist in the development of an application to extend the existing and approved Milton Quarry in the Region of Halton, Ontario (refer to Figures 1.1 to 1.3 of the main report). The proposed Milton Quarry East Extension (MQEE) lands are located in Part of Lot 12, Concession 1, Geographic Township of Esquesing, Town of Halton Hills, Regional Municipality of Halton.

The existing groundwater flow model was originally developed for the Milton Quarry Extension application (CRA, 2000) and was updated in 2011 for the Pre-Extraction Report to reflect the additional site characterization that had been completed since 2000. The 2011 update to the groundwater flow model is referred to herein as the Pre-Extraction Model.

The groundwater flow model was further updated as part of the 5-Year AMP Review in 2019. The 2019 update (herein referred to as the 5-Year Review Model) incorporated additional data collected, and on-Site experience gained since the Pre-Extraction Model was developed. The basic geology and model geometry were not changed as the previous model construction was well-defined by the data available at that time. Improvements to the Pre-Extraction Model predominantly related to the actual versus planned mining and Water Management System (WMS) expansion which had occurred since 2010. An updated recharge distribution at the sub-watershed level was also applied to the model.

The 2021 update (referred to as the MQEE Model) updated the hydrogeological stratigraphy with new data collected since 2011 primarily in the MQEE area. The model discretization was refined in the MQEE area and additional calibration targets were added.

The updated groundwater flow model is used for the following purposes:

- To confirm that the hydrogeologic characterization of the Site remains appropriate around the MQEE area
- To evaluate and assist with the design of WMS expansion in the MQEE area
- To assist with the confirmation that long-term rehabilitation lake levels are appropriate
- To refine the groundwater inflow component of the water budget for the MQEE

Information provided herein primarily relates to model construction and changes made since the 5-Year Review Model was developed, and to the design of the MQEE. The assessment of the proposed MQEE, which includes the use of the model as noted above, is documented in the main report, particularly Section 10.

The following Section 1.2 provides a summary of the prior stages of model development for reference.

1.2 Previous Studies

1.2.1 Original Model (2000)

In 2000 a groundwater flow model (documented in Appendix D of Volume 1 of the Water Resources Assessment Report - CRA, 2000) was developed for the Site and surrounding area to estimate future conditions in order to help evaluate and support the mining and mitigation plans for the Extension Quarry.

The model was constructed using the United States Geological Survey (USGS) program MODFLOW (a sophisticated three-dimensional finite-difference groundwater flow model) with the Amabel and Reynales Formations characterized as a single hydrostratigraphic unit and simulated as one integrated-depth layer. The model had 216 rows and 212 columns and represented an area of 10.4 kilometres (km) by 12.3 km. The model grid in the vicinity of the Site was refined to a grid cell spacing of 10 m by 10 m.

Calibration of the single layer integrated-depth groundwater flow model developed in 2000 was good despite there being an area of low simulated water levels in the vicinity of the West Cell (Phase 2). At the time, it was believed that the reason for the actual higher than simulated water levels observed in this area was likely due to a lower hydraulic conductivity value in this vicinity. The simulated water levels in this area were low by approximately 2 metres (m) which was relatively small compared to the observed 25 m water level variation over the study area. In order to be conservative, however, an adjustment was made to the West Cell rehabilitation lake level to compensate for the potential difference.

This model and its related results were reviewed and accepted by all the agencies and Joint Agency Review Team (JART) responsible for the review and approval of the Milton Quarry Extension.

1.2.2 Pre-Extraction Model (2011)

In 2011, the model domain was modified and represented by a somewhat smaller area of 6.9 km by 12.3 km. The finite difference grid cell size was refined to 2.5 m by 2.5 m in the vicinity of the Extension, expanding up to 160 m by 160 m cells at edges of the model. The model was vertically subdivided into three model layers. The top model layer (Layer 1) was of uniform thickness and generally represented the overburden. The second model layer (Layer 2) was used to represent the shallow bedrock zone which is generally more weathered. The remaining deeper Amabel and Reynales form the bulk of the bedrock aquifer in the model and were represented by model Layer 3.

The groundwater flow model updated in 2011 (i.e., the Pre-Extraction Model) provided a good match to the July 2010 observed groundwater elevations and flow directions, which are considered representative of long-term average conditions. The results compared well to the groundwater flow model developed in 2000. The hydraulic conductivities were modified slightly to incorporate the higher permeability of the overburden and weathered bedrock in layers 1 and 2 of the 2011 model, respectively. The lower hydraulic conductivity zone was expanded in the vicinity of the East Cell. The recharge rate was increased from 200 to 225 millimetres per year (mm/year), primarily reflecting the slightly higher than average conditions observed in July 2010. The Pre-Extraction Model was also calibrated to the observed flows in the V2 wetland and North Quarry Recharge Wells. A good match was obtained to the observed flow in the V2 wetland; however, the calibrated North Quarry

Recharge Well flows under predicted observed flow by 36 percent. The under-prediction likely results due to localized variability in the bedrock and recirculation of injected water back to the quarry. Overall, the Pre-Extraction Model provided a reasonable representation of observed conditions, and an improvement over the original model developed in 2000.

This updated model was reviewed by the agencies, including a detailed model review by the Region of Halton hydrogeology staff and the Region's consultant Hatch (now Amec). This review found the model to be suitable and appropriate for the intended use.

1.2.3 5-Year Review Model (2019)

The 5-Year AMP Review (GHD, 2019) considered all aspects of the AMP from a broader context than the annual review. The 5-Year Review Model was developed to support the further development of the Site water budget, mitigation measures, and to assist with future work including the confirmation of long-term system parameters for rehabilitation (e.g., lake levels). The 5-Year Review Model incorporated water level and flow data collected in 2017, an updated recharge distribution applied at the sub-watershed level, a variable hydraulic conductivity distribution, and an update to the representation of the Sixth Line Tributary. Through the incorporation of water level and flow data collected in 2017 the model was updated to reflect difference in actual versus planned mining and Water Management System (WMS) expansion and operation.

This model was included in the 5-Year AMP Review report that was submitted to the agencies for review in January 2020. No concerns regarding the model were identified.

1.3 Milton Quarry East Extension

This Appendix documents the incremental changes/updates made to the 5-Year Review Model to develop the MQEE Model, and the application of the MQEE Model to simulate the approved existing quarry after full extraction, the existing quarry and MQEE after full extraction, and rehabilitation conditions for the approved existing quarry and MQEE.

1.4 Report Organization

The report is organized as follows:

Section 1	Introduction
Section 2	Hydrogeologic and Hydrologic Conditions
Section 3	Conceptual Hydrogeological Model
Section 4	Simulation Program Selection
Section 5	Groundwater Flow Model Construction
Section 6	Groundwater Flow Model Calibration
Section 7	Quarry Design Simulations
Section 8	Summary
Section 9	References

2. Hydrogeologic and Hydrologic Conditions

The hydrogeologic and hydrologic conditions were described in detail in previous reports (CRA 2000 and GHD, 2019). A brief overview of the primary components of the groundwater flow system, which is unchanged from previous reports, is presented here.

The following summarizes the geology and hydrostratigraphic conditions:

- Stratigraphy, in sequence from ground to depth, is comprised of the following units:

Stratigraphic Unit	Description	Approximate Thickness (metres)
Overburden	Glacial Drift/Till (fine-grained to some sand and gravel)	0 – 10
Amabel Formation	Grey dolostone	10 – 40
Reynales Formation	Light buff to grey dolostone with interbedded green/grey shale	2 – 3
Cabot Head Formation	Green to grey shale with red interbedded shale and sandstone	14 – 20
Manitoulin Formation	Grey dolostone with green to grey shale seams	6 – 7
Whirlpool Formation	Sandstone	3 – 5
Queenston Formation	Red shale	150

- The Amabel Formation is the primary water-bearing unit and acts as a regional aquifer.
- The Amabel and Reynales Formations may be treated as a single hydrostratigraphic unit that is the principal hydrogeological unit relevant to the existing Milton Quarry and the Extension.
- The Cabot Head Formation (shale) and Manitoulin Formation (a shaley dolostone) generally produce low water yields (i.e., have low hydraulic conductivity) and act as a significant regional aquitard.
- The Amabel to Whirlpool Formations are regionally extensive to the west and north but are truncated by the Niagara Escarpment to the south and east. The uppermost bedrock below the Escarpment is typically the red shale of the Queenston Formation.
- Seeps and springs occur at the escarpment face in some areas.
- Surface topography is variable due, in part, to the irregular surface of Amabel Formation, as well as varying overburden thickness
- In the study area, groundwater flow directions are greatly influenced by the presence of a groundwater mound centred on the southeast boundary of the East Cell, east of the MQEE.
- Numerous creeks exist throughout the area, receiving groundwater discharge in many locations.
- Groundwater discharge to the creeks is known to occur based on observed surface water gains and groundwater elevation data.

- Groundwater - surface water interactions occur under ephemeral (seasonal) and perennial (year-round) conditions.
- Groundwater flow occurs under unconfined conditions in most areas.
- Groundwater flow in the region is controlled by precipitation, surface water features, bedrock topography, and human activities such as quarry dewatering/discharge and groundwater recharge (operation of the WMS).
- Groundwater flow through the Amabel Aquifer can be characterized as primarily horizontal with vertical hydraulic gradients being generally negligible.

3. Conceptual Hydrogeologic Model

The conceptual hydrogeologic model was developed to represent the observed hydrogeologic conditions described in Section 2. The conceptual model consists of a model domain, boundary conditions, and a representation of the observed stratigraphy. The assumptions used for the model conceptualization are as follows:

- The predominant groundwater flow system in the vicinity of the Site occurs in the Amabel Aquifer.
- The equivalent porous media representation is suitable for the intended purpose and scale of study as discussed in Section 6 of the main report.
- The model domain limits and boundary conditions are based on large-scale hydrogeologic features and flow patterns.
- The Amabel Formation behaves as a single hydrostratigraphic unit with allowance for a more permeable upper weathered zone. The thin Reynales Formation is considered to be a part of the Amabel flow system. On a Site-scale, Figure F3.1 shows the top of Amabel, Figure F3.2 shows the bottom of Amabel, Figure F3.3 shows the Amabel Thickness, and Figure F3.4 shows the bottom of the Reynales.
- The Amabel Aquifer flow system is recharged by infiltration of precipitation entering the top of the model domain.
- The Amabel Aquifer flow system is bounded on the bottom by the relatively impermeable Cabot Head shale unit. Figure F3.4 shows the bottom of the Amabel/Reynales Formation which is also the top of the Cabot Head Formation.
- The Cabot Head Formation and Manitoulin Formation act as a significant regional aquitard and are represented as a no-flow boundary condition forming the bottom of the groundwater flow model domain.
- To the south and southeast, the groundwater flow system is constrained by the Niagara Escarpment and existing Halton Crushed Stone and Milton Main Quarries. These are represented in the model as head-dependent drain boundaries due to the termination of Amabel and Reynales Formations.
- The west, north, and eastern model boundaries are watershed boundaries which approximately coincide with groundwater flow divides and are represented as no-flow boundaries. The

watershed boundaries are based on surface water catchments defined by Conservation Halton and are illustrated on Figure F1.1.

- Hydrological features (e.g., creeks and wetlands) are represented as head-dependent drain boundaries which reflect their characterization as generally being groundwater discharge zones.
- The Sixth Line Tributary flows parallel to the northern edge of the West and East Cells (beyond the limit of extraction) before turning south along Sixth Line. Creek flow measurements indicate that the Sixth Line Tributary is generally in a "gaining condition (groundwater discharge area)" however, localized groundwater recharge has occasionally been observed, particularly in areas of high topographic relief (e.g., adjacent to SW18 in the area north-west of the West Cell). The Sixth Line Tributary is therefore represented as a river boundary condition to allow the simulation of both groundwater recharge and discharge to/from the Sixth Line Tributary.
- In general, the quarry acts as a groundwater discharge zone. It is therefore represented a head-dependent drain boundary condition.
- Steady-state simulations can adequately represent average annual conditions and are conservative in respect to predictions of quarry dewatering influences.

4. Simulation Program Selection

The simulation program selection to develop the numerical groundwater flow model for the Site was based on the following considerations:

- The ability of the program to represent the key components of the CSM.
- The demonstrated verification that the program correctly represents the hydrogeologic processes being considered.
- The proven acceptance of the program by regulatory agencies and the scientific/engineering community.
- The ability of the program to represent the proposed and existing quarry design.
- The ability of the program to provide a reasonable numerical solution in consideration of the complexity of the hydrogeological conditions at the Site.

4.1 Groundwater Flow Model

MODFLOW-NWT (Niswonger et al., 2011) was selected for use in this study as a suitable evolution of the previous models that were also built using the MODFLOW family of programs. MODFLOW-NWT was developed by the (USGS) and is capable of simulating steady-state or transient groundwater flow in two or three dimensions. Like other MODFLOW programs, MODFLOW-NWT uses a finite-difference method leading to a numerical approximation that allows for a description of and solution to complex groundwater flow problems. A rectangular grid is superimposed over the study area to horizontally subdivide the region of interest into a number of rectangular cells, and then the study area is subdivided vertically using layers. Hydraulic properties are assigned to the model cells consistent with the hydrogeologic unit that falls within each cell. Groundwater flow is formulated as a differential water balance for every model cell and hydraulic head is solved at the centre of every model cell. MODFLOW-NWT allows for the specification of flows associated with wells, areal groundwater recharge, rivers, drains, streams, and other groundwater sources/sinks.

The MODFLOW-NWT program was specifically selected to simulate groundwater flow for this modelling study due to its ability to efficiently solve complex groundwater flow simulations characterized by drying and rewetting of model cells such as those encountered in the simulation of dewatering scenarios. This is particularly advantageous for simulation of dry quarry cells for extraction and recharge mitigation simulation scenarios. MODFLOW-NWT is a standalone version of MODFLOW-2005 (Harbaugh, 2005), which is an update to the original MODFLOW (McDonald and Harbaugh, 1988) and MODFLOW-2000 (Harbaugh et al., 2000). MODFLOW has been extensively verified and is readily accepted by many regulatory agencies throughout North America and Europe. MODFLOW-NWT is capable of representing the hydrogeologic components of the conceptual model for the Site. The Newton Solver (NWT) and the Upstream Weighting (UPW) package included in MODFLOW-NWT were employed to solve the groundwater flow equation. For convergence, the solution technique required the satisfaction of both hydraulic head and flow residual criteria providing a rigorous and reliable simulated water balance throughout the model domain.

4.2 Parameter Estimation

The calibration of the groundwater flow model was aided through the use of the parameter estimation program PEST, which is an acronym for Parameter Estimation (Watermark Numerical Computing, 2016). PEST is a model-independent parameter estimator that has become a groundwater industry standard for groundwater flow model calibration. It has a powerful inversion engine, which provides the ability to set bounds on model input parameters such as hydraulic conductivity and groundwater recharge. PEST was used in conjunction with pilot points (Doherty et al., 2010). Pilot points are a spatial parameterization device that can be used to estimate an initial hydraulic conductivity distribution. PEST conveys to MODFLOW-NWT input parameter values that vary within their specified bounds with the objective of establishing optimal input parameter values that minimize the error between observed and simulated calibration targets. For each run of input parameters, PEST calculates objective function values (OFVs) at each model calibration target location. OFVs represent the error between calculated versus measured values at each calibration target location. PEST automatically makes changes to the input parameter values (within their specified bounds) to reduce OFVs, selecting the run that exhibits the lowest overall OFVs as the optimal solution.

4.3 Graphical User Interface

The graphical user interface (GUI) Groundwater Vistas 8 (Rumbaugh, 2020) was used as the interface between the assembled hydrogeologic data and the required MODFLOW-NWT and MT3DMS input files. The GUI facilitates pre- and post-processing of MODFLOW-NWT and MT3DMS input/output files.

5. Groundwater Flow Model Construction

The groundwater flow model construction is presented in the following sections in terms of the spatial domain and discretization, boundary condition implementation, and hydraulic properties that are applied.

5.1 Spatial Domain and Discretization

- The MQEE Model revised the 5-Year Review Model by removing unused rows and columns around the periphery of the model, adding additional 2.5 m-wide rows on the south end of the MQEE area to refine the representation of the MQEE area, and adding additional columns near the eastern edge of the model domain to refine discretization of model cells representing escarpment drains to improve the overall model mass balance.
- The overall model domain has dimensions of 6.4 km by 11.3 km, oriented parallel to Town Line Road (Figure F5.1), which represents a 46-degree clockwise rotation for the model domain. The NAD 27 UTM coordinate system is used.
- The finite-difference grid used for model calibration consists of 881 rows and 990 columns and is presented on Figure F5.2.
- The finite-difference grid cell size is 2.5 m by 2.5 m in the vicinity of the approved Quarry Extension and the MQEE, expanding up to 160-m by 160-m cells at edges of the model (Figure F5.2).
- The Amabel and Reynales Formations are characterized as one hydrostratigraphic unit.
- The model is vertically subdivided into three model layers. The top model layer (Layer 1) is of uniform thickness and generally represents the overburden. Layer 1 is at most partially saturated though in most areas it is fully unsaturated (i.e., the water table is below the bottom of Layer 1). The second model layer (Layer 2) is used to represent the shallow bedrock zone which is generally more weathered and therefore may exhibit a higher permeability, much of layer 2 is also unsaturated. The remaining deeper Amabel and Reynales form the bulk of the bedrock in the model and are represented by model Layer 3.
- The base of model Layer 1 is set at 2 m below ground surface (bgs) and generally includes the thin overburden layer. The weathered bedrock zone is assumed to be 3 m thick and applied across the whole model domain as the upper bedrock zone. There are areas immediately adjacent to the Escarpment where there is less than 5 m from ground surface to the top of the Cabot Head; in these locations the thickness of Layer 3 is set to 0.2 m with the Layers 1 and 2 thicknesses being proportionally allocated.
- The bottom of the Reynales Formation (top of Cabot Head) surface was interpolated based on available borehole data (Table F5.1) as well as regional information from water well records and other available information as previously identified (CRA, 2011) with updated borehole data collected since 2010, particularly in the MQEE area. The surface is presented on Figure F5.3 and was created in Surfer 20 (Golden Software, 2021) by interpolating the borehole data using Kriging with linear drift (i.e., universal Kriging which is typically applied when Kriging geologic surfaces to represent the underlying linear trend in bedrock stratigraphy).

- The ground surface, though not directly required in MODFLOW for an unconfined aquifer, was imported from Ontario Base Map (OBM) and Site-specific mapping (at 1-m elevation contour intervals based on air photo interpretation).

5.2 Boundary Condition Implementation

- Implemented boundary conditions consistent with the conceptual hydrogeologic model are presented on Figure F5.4.
- GHD developed an updated recharge distribution through the application of HEC-HMS (Appendix K in the 5-Year AMP Review – GHD, 2020), which is applied at the sub-watershed level. The applied recharge rates and sub-watershed locations are presented on Figure F5.5. The applied recharge rates range from 205 to 259 mm/yr and represent the long-term (1981 to 2010) estimated average recharge rate for each of the sub-watersheds. A recharge rate of 233 mm/yr is applied to areas of the model domain located outside of the sub-watersheds, corresponding to the average of the recharge rates applied in the sub-watersheds. To represent an area where no runoff is observed in the vicinity of the East Cell, an additional site-specific recharge zone was added as shown on Figure F5.5. A recharge rate of 293 mm/yr is applied to represent increased recharge corresponding to limited or no runoff observed in that area (i.e., the sum of recharge plus runoff applied elsewhere).
- A no-flow boundary condition is applied at the base of the model to reflect the low permeability Cabot Head shale.
- A seepage face along the Escarpment corresponding to the termination of the Amabel and Reynales is represented by drain cells in Layer 3 of the model. Escarpment drain conductances range in value from 108 to 6912 square metres per day (m^2/day). Conductances are a calibrated parameter; however, they were initially estimated based on grid cell dimensions and the permeability of the aquifer material using Equation (1), as follows:

$$C = \frac{KLW}{M} \qquad (1)$$

Where:

C = conductance (m^2/day)

K = hydraulic conductivity of drain-bottom sediments (m/day)

L = drain cell length (m)

W = drain cell width (m)

M = thickness of drain cell bedding material (m)

- Conductance of the V2 wetland was refined during the calibration process from the value applied in the Pre-Extraction and 5-Year Review Models.
- River boundary conditions are applied in Layer 2 of the model to represent the W7 and W8 wetlands.
- A no-flow boundary condition is applied along the topographic watershed boundaries occurring approximately north, east, and west of the Study Area.

- Creeks and wetlands are primarily represented by drain cells in Layer 2 of the model to allow groundwater to discharge to these features but prevent them from acting as a source of groundwater recharge. This characterization was selected to provide a conservative representation under quarrying conditions (i.e., prevent watercourses from acting as artificial sources of recharge to groundwater). Drain cell elevations for some wetlands near the quarry cells were revised during the recalibration process, based on current mapping and survey data as well as observed surface water conditions.
- River cells in Layer 1 are applied to a section of Hilton Falls Reservoir southwest of the Main Quarry to represent a potential groundwater discharge area and so that surface flow may be drawn into the ground due to the dewatering influence of the nearby Halton Crushed Stone Quarry. River cells are used to simulate the V2 wetland. The Sixth Line Tributary is also represented using river cells to improve the representation of groundwater/surface water interactions in areas of high topographic relief (e.g., in the vicinity of SW18).
- Discharge elevations for drain cells representing creeks/wetlands are set based upon available topographic mapping and survey information. Topographic mapping at 1-m elevation contour intervals based on air photo interpretation is available in the Site vicinity; however, OBM mapping is utilized for the remainder of the model domain.
- The existing quarries are represented by drain cells in model Layer 3 to reflect the drainage condition due to quarry dewatering. Quarry drain cell stages are approximated based on the observed water levels within the quarry floor. Head elevations of the drain cells are set to approximately 305 m above mean sea level (AMSL) or slightly higher where the top of the Cabot Head Formation is higher (e.g., part of East Cell). Quarry drain cell conductances were adjusted as part of the calibration process as described in Section 6; however, in most instances the cell geometry and formation hydraulic conductivity dictated the calculated conductance. Areas within the quarry drain boundary were set to a no-flow boundary condition.
- The groundwater recharge system was installed around the perimeter of the Extension of the North Quarry to maintain the baseflow conditions in Sixth Line Tributary. As mining progressed into the West and East Cells, the groundwater recharge system was operated with higher flows and additional recharge wells to maintain appropriate water levels surrounding the Extension. The operation of the North Quarry, East Cell and West Cell Groundwater Recharge Systems were simulated by the placement of constant head cells at the location of recharge wells. This functionally matches the operation of the WMS. Varying flowrates are provided to recharge wells to maintain the head at specified control points (recharge monitoring wells) and downgradient monitors (Trigger Wells). Additional flow is automatically provided to recharge wells (in the model and in practice) with the advancement of extraction in an effort to maintain the target heads (target levels).

5.3 Hydraulic Properties

- Hydraulic properties applied within the model domain consist of hydraulic conductivity values and boundary condition conductance values.

- Hydraulic conductivity zones and values specified in Layers 1 and 2 were revised slightly from those in the Pre-Extraction Model (CRA, 2011) and 5-Year Review Model (GHD, 2019), with some of the high conductivity zones removed south of wetland W36.
- The hydraulic conductivity distribution in Layer 3 was assigned as a single variable hydraulic conductivity zone to allow for natural variation in bedrock hydraulic properties. Hydraulic conductivity in Layer 3 was calibrated based on the values applied in the 5-Year Review Model (GHD, 2019).
- The specification of parameter zones permits parameter estimation within Layer 3 through PEST, using pilot points.
- Hydraulic conductivity values within the model domain were estimated within reasonable bounds based on the available hydraulic conductivity testing results and were adjusted during the model calibration process. The hydraulic conductivity range is generally consistent though slightly wider with that specified previously. The resultant (calibrated) distribution provides a better representation of the groundwater level flow conditions evidenced by the additional data collection for the MQEE area.

6. Groundwater Flow Model Calibration

Groundwater flow model calibration is the process of adjusting model input parameter and boundary condition specifications such that simulated results provide a reasonable representation of observed groundwater flow conditions at the Site. The objective is to determine a combination of input parameters to produce a numerical solution that best matches the observed groundwater elevations, observed groundwater flow directions, and observed flow rates at the Site.

6.1 Calibration Targets

Selection of steady-state model calibration datasets should consider whether the available groundwater elevation monitoring captures the following:

- The range in groundwater flow conditions observed at the Site.
- Groundwater stresses/boundary conditions (i.e., extraction rates/stage elevations) represent the range of conditions affecting groundwater elevations and flow directions.
- Provides spatial coverage of the model domain with measurements at the majority of the monitoring well locations.
- Includes the key area of interest within the model domain.

The Site monitoring network includes monitoring well/surface water gauge locations both within and surrounding the area of interest. A review of available data by CRA (2011) found that the July 2010 water levels appeared to be most representative of average conditions, though slightly above average. July 2010 also represents a period where little or no recharge was applied through recharge wells in the Extension for demonstration or operation purposes. The July 2010 dataset was retained as a calibration target dataset for the 5-Year Review Model (GHD, 2019) and MQEE Model to provide a reasonable representation of average groundwater flow conditions in the Study Area with limited influence from mitigation measures.

For the MQEE Model calibration, the July 2010 data was retained and augmented with the number of head targets being increased through the use of additional "hybrid 2010" data. The additional data points include water levels in wetlands that are interpreted to generally reflect the groundwater table, and the use of groundwater levels for other periods which, like July 2010, also represent average annual conditions. This approach maximizes the number of calibration targets available for consideration by retaining monitoring locations used for the July 2010 dataset that have been decommissioned and are no longer available. The hybrid 2010 approach also allows incorporation of calibration targets for most of the various new monitoring locations installed in the MQEE area.

Within the active model area, groundwater levels measured at 203 locations were selected as model calibration targets (presented in Table F6.1). Hybrid targets (as above) are identified in Table F6.1. The selected model calibration targets are mostly located in Layer 3, with some locations in Layers 1 and 2. Two monitoring wells, OW18-03 and OW19-03 located immediately east of the North Quarry that were removed from the calibration set for the 5-Year Review Model due to their close proximity to the North Quarry have been restored to help improve the calibration of groundwater level drawdown and hydraulic conductivity in the area east of the North Quarry due to the importance of this area for the MQEE analyses.

In addition to the July 2010 calibration dataset, average annual conditions representative of 2017 (based on groundwater elevations at Trigger Wells) were applied in a calibration verification scenario (Average Annual 2017). Estimated daily elevations were developed using linear interpolation between (typically) weekly water level measurements collected at the trigger wells. The daily water level elevations were averaged to produce average annual groundwater elevations for each of the 31 Trigger Wells adjacent the Northern Cells (North Quarry, West Cell, and East Cell). Groundwater elevation targets are presented in Table F6.2.

The WMS allows for substantial control of water levels in the natural environment, and this flexibility is reflected in the model. WMS components in the model, mostly represented by constant head boundary condition cells, were adjusted to obtain a close match to the average annual 2017 groundwater elevations at the Trigger Wells. The intent of the calibration verification is to assess the ability of the model to match changing hydrogeologic conditions at the quarry.

GHD applied available flow rate measurements and estimates as calibration targets for both the July 2010 and Average Annual 2017 conditions. Measurements include measured flow rates at recharge wells and the total estimated groundwater inflow (predominantly recirculation) to the combined Northern Cells. It should be noted that flow is not necessarily matched at individual recharge wells due to the local variability of bedrock conditions intercepted by individual recharge wells. The flow is matched based on total recharge provided to a particular quarry cell. Flow calibration targets for both the July 2010 and Average Annual 2017 conditions are presented in Table F6.3.

In summary, the objectives of the MQEE Model calibration are to match regional groundwater elevation contour patterns, localized groundwater flow patterns and elevations, WMS flows, and quarry groundwater inflow for both the July 2010 and Average Annual 2017 conditions.

6.2 Model Calibration Methodology

The groundwater flow field through the model domain was simulated under steady-state conditions for each calibration target dataset (i.e., July 2010 and Average Annual 2017 datasets). The solution to the groundwater flow equation was obtained using the numerical solver with specified convergence criteria. As described in Section 4.1, the NWT solver and the UPW package implemented in MODLFLOW-NWT were used. The convergence criteria were specified as 0.0001 m for the maximum hydraulic head change and 0.2 to 0.5 cubic metre per day (m^3/d) for the maximum flow residual throughout the model domain.

Model calibration was conducted in an iterative manner by adjusting the hydraulic conductivity values of the model layers and the conductance of drain and river cells. PEST was applied to aid the model calibration process as an automated means to optimize model input parameter values within reasonable or expected ranges.

Model calibration was evaluated both qualitatively and quantitatively. Qualitative evaluations included visually comparing the simulated versus observed groundwater elevations and groundwater flow directions, as well as the spatial distribution of calibration residuals. Calibration residuals are calculated as the observed minus the simulated groundwater elevation at each calibration target location. A negative residual value indicates that the observed groundwater elevation is over-predicted, and a positive residual value indicates that the observed groundwater elevation is under-predicted.

Another quantitative assessment of the calibration was conducted by comparing the difference between simulated versus observed recharge system (well) flows and groundwater inflow for July 2010 and Average Annual 2017 conditions (Table F6.3).

A quantitative assessment of calibration was conducted by examining the calibration residual statistics. Statistics such as the residual mean, absolute residual mean, and sum of residual values squared (referred to as the 'residual sum of squares'), and residual standard deviation were calculated to quantify an overall measure of the discrepancy between observed and simulated groundwater elevations provided by the calibrated model. The model calibration process aims to minimize these residual statistics.

A further quantitative measure of calibration was provided by the simulated volumetric water balance reported by MODFLOW-NWT, indicating the quantities of flow into and out of the model domain via the groundwater flow components specified in the model (i.e., recharge rates, recharge and discharge at drain and river cell boundaries, etc.). The volumetric water balance was reviewed to ensure that the total inflows and outflows were consistent with the conceptual model, and to ensure that the discrepancy between simulated inflow and outflows is less than 1 percent, indicating that a satisfactory numerical convergence was obtained for the solution of the groundwater flow equation.

6.3 Groundwater Flow Model Calibration Results

As described previously, the groundwater flow model was calibrated to observed July 2010 and Average Annual 2017 groundwater elevations and observed flows. Input parameters were adjusted to provide a reasonable representation of observed groundwater elevations and flows under these conditions. This section presents the calibrated results.

Final simulated steady-state groundwater elevations for the flow condition representing July 2010 are presented on Figure F6.1 on a regional scale. The groundwater elevations represent layer 3 of the model as that layer is continuously saturated across the model domain and best represents local aquifer conditions. Simulated elevations in Layers 1 and 2, where saturated, match the Layer 3 elevations with only minor variations. Visual comparison of the simulated groundwater levels/flow directions to regional groundwater elevation contours in areas away from the quarries (Figure 2.6 of CRA, 2000) shows that the simulated groundwater levels are a reasonable representation of observed regional groundwater flow conditions.

The simulated groundwater elevations at each calibration target location within the model domain, as well as the residuals, are presented in Tables F6.1 and F6.2 for July 2010 and Average Annual 2017 conditions, respectively. Simulated groundwater elevations at the Site-scale are presented on Figure F6.2a and F6.2b, for July 2010 and Average Annual 2017 conditions, respectively.

Visual comparison of the simulated July 2010 groundwater levels (Figure F6.2a) and July 2010 observed groundwater elevation contours (Figure F6.3) show a reasonable match between observed and simulated groundwater elevations. Similar to the observed flow conditions, the simulated groundwater flow is directed radially outward from the groundwater mound centred on the southeast part of the East Cell. This naturally-occurring groundwater mound is also somewhat supported by the recharge of water from V2 mitigation flows. As groundwater moves from the mound, it discharges to the river cells representing Sixth Line Tributary, to the drain cells representing the quarry limits, and to the drain cells representing the termination of the Amabel and Reynales Formations at the Escarpment to the east. Groundwater discharge also occurs to the Speyside Tributary and various wetlands. The locations and orientations of model-simulated groundwater flow divides are similar to observed conditions.

Residuals of observed and simulated groundwater elevations are plotted on Figures F6.4a and F6.4b for July 2010 and average annual 2017 conditions, respectively. For the July 2010 calibration condition the normalized residual standard deviation and normalized residual absolute mean are improved in the current MQEE Model relative to the Pre-Extraction and 5-Year Review Models. In addition, residuals are typically less than 1 m and much less than the seasonal water level variations at the monitoring well locations. The relatively small magnitude of the over- and under-predictions indicates the model calibration is good and the model is suitable for use in evaluating groundwater level conditions associated with the Milton Quarry.

Substantial calibration improvements have been made in the areas of OW69-08 and OW6-80 (see Figure 6.4 of CRA, 2011) where residuals improved by 3.0 m and 0.31 m respectively between the Pre-Extraction Model and the MQEE Model. Scatter plots of observed versus simulated groundwater elevations are presented on Figures F6.5a and F6.5b for July 2010 and Average Annual 2017 conditions, respectively. Figures F6.5a and F6.5b both show that there is a reasonable distribution of plotted points above and below the exact match illustrated by the diagonal line. It is noted that the largest residual occurs at OW18-03 which is immediately adjacent to the North Quarry face and therefore subject to a high degree of local model variability.

The residual statistics for the July 2010 and the Average Annual 2017 condition are summarized on figures F6.5a and F6.5b, respectively. For the July 2010 calibration data set, the MQEE Model provides a residual mean of 0.33 m, an absolute residual mean of 0.68 m, a residual sum of squares of 182.12 m^2, and residual standard deviation of 0.89 m. For the Average Annual 2017 conditions, the calibrated MQEE Model provides a residual mean of -0.27 m, an absolute residual mean of 0.57 m, a residual sum of squares of 20.18 m^2, and residual standard deviation of 0.76 m. Lower values of these parameters reflect a better match of modelled to observed conditions. The residual statistics for both the July 2010 and Average Annual 2017 calibration conditions are considered to be excellent, with small residuals supporting the conclusion that a reasonable calibration was obtained to observed conditions.

Table F6.4 presents a comparison of the July 2010 residual statistics between the Pre-Extraction Model, the 5-Year Review Model, and the MQEE Model. Overall, calibration of the MQEE Model for the July 2010 data set is comparable to the Pre-Extraction and 5-Year Review Models although some calibration residual statistics have increased slightly as a result of the much larger number of targets.

As indicated on Figures F6.5a and F6.5b, the residual standard deviation for the July 2010 and the Average Annual 2017 condition are 1.5 % and 2.9 % of the observed groundwater elevation range in their respective data sets. Spitz and Moreno (1996) suggest that the residual standard deviation should be less than about 10 percent of the range in measured groundwater elevations used as calibration targets. The residual standard deviation for the calibrated model lies well below this metric and indicates an excellent match between the simulated and observed conditions.

Flow calibration targets are presented for both the July 2010 and Average Annual 2017 conditions in Table F6.3. The total simulated North Quarry recharge well flow for July 2010 is 926 L/min and the observed July 2010 North Quarry Recharge Well flow is 1,222 L/min. Simulated flows represent approximately 75 percent of the observed rate and represent some improvement relative to the Pre-Extraction Model. The difference (296 L/min) is attributed to higher actual recirculation of recharge water to the North Quarry relative to the ideal conditions simulated by the model. It should be noted that increased recirculation does not result in a loss of water availability to the Site and does not represent a concern with respect to longer-term water budget considerations or mitigation system effectiveness.

Groundwater inflow simulated for the July 2010 condition is solely attributable to water accumulation in the North Quarry, as the extraction had not occurred in the East or West Cells at that time. The simulated groundwater inflow to the North Quarry is less than the observed rate by 146 L/min. In practice, 296 L/min of additional recharge is applied by the WMS (as above) and 146 L/min of additional groundwater inflow occurs. This is expected given that the difference in recharge flows is attributed to recirculation of water to the North Quarry and confirms that the water is accounted for.

Groundwater inflow to the North Quarry, West Cell, and East Cell closely matches observed conditions for the Average Annual 2017 condition.

The volumetric water budget for the calibrated model was examined for the model calibration to the July 2010 and average annual 2017 conditions. A discrepancy of less than 1 percent occurs in the water budget between the simulated inflow and outflows for both cases, which demonstrates that good numerical convergence was achieved throughout the model domain.

6.3.1 Hydraulic Conductivity Distribution

The available hydraulic conductivity testing results provide a range of typical hydraulic conductivity values over the study area. Consistent with previous models, a further improvement in the match to observed groundwater conditions was obtained by varying hydraulic conductivity values for the deeper Amabel Formation (model Layer 3) during the model calibration process. The calibrated model uses an isotropic (1:1) ratio for horizontal versus vertical conductivities throughout, as the Amabel is vertically well-connected.

Two hydraulic conductivity zones were assigned to both model Layers 1 and 2, which represent the overburden materials and weathered bedrock. One hydraulic conductivity zone is used to represent the majority of the model domain with a hydraulic conductivity value of 4.1 x 10^{-3} cm/s (3.5 m/day), while the second zone is assigned along the tributaries and in wetland areas coinciding with more weathered bedrock zones in Layer 2 and the generally thinner and/or more permeable overburden in these areas and is assigned a hydraulic conductivity value of 2.3 x 10^{-2} cm/s (20 m/day). The second zone was only applied in areas closer to the Milton Quarry (south of 15 Sideroad) and north of wetland W36 as areas further removed from the Milton Quarry have less bearing on the model results.

In model Layer 3, a continuously variable hydraulic conductivity distribution was assigned to reflect natural variation in hydraulic conductivity within the Amabel/Reynales Formation. Of the 692,546 active model cells in Layer 3, 95% have an assigned hydraulic conductivity between 9 x 10^{-5} cm/s and 4 x 10^{-3} cm/s. This provides a good fit to the reported range of approximately 10^{-4} cm/s to 10^{-2} cm/s, as discussed in greater detail in Section 6.4 of the Main Report. The hydraulic conductivity range applied in the MQEE Model is generally consistent with the ranges applied in the Pre-Extraction (GHD, 2011) and 5-Year Review Models (GHD, 2019). The calibrated hydraulic conductivity assigned in Layer 3 is shown on Figure F6.7.

Through calibration of the various models (Pre-Extraction Model, 5-Year Review Model, and MQEE Model), it was identified that a lower hydraulic conductivity zone in the vicinity of East Cell extending towards the Escarpment provided the best match to observed groundwater elevations. It was also determined that higher hydraulic conductivity values assigned in the vicinity of the Sixth Line Tributary and to the area between the West Cell and the Sixth Line Tributary improved model calibration to observed groundwater elevations and groundwater flow rates. With the additional data in the MQEE area, it appears that this lower hydraulic conductivity zone trends further to the southwest than was previously evident. This trend was incorporated into the MQEE Model and improves the model calibration in the MQEE area.

Through the application of a variable hydraulic conductivity distribution which allows gradual variation in hydraulic conductivity within the Amabel/Reynales Formation in Layer 3, the overall model match to observed groundwater elevations and flow conditions was improved relative to the previous model calibration. In particular the model representation of the MQEE area and the mitigation recharge flows are notably improved in the MQEE Model.

7. Quarry Design Simulations

Four predictive simulations were completed to help assess potential future quarry conditions as presented in Section 10 of the main report, including support of the water budget assessment detailed in Appendix G. The model results were used to compare proposed MQEE conditions to existing approved conditions. The four predictive simulations carried out using the MQEE Model include:

Interim Conditions	• Approved Existing Quarry Fully Extracted (with the North Quarry, East Cell, and West Cell remaining dewatered)
	• Existing Quarry Fully Extracted Plus MQEE (with the North Quarry, East Cell, West Cell, and East Extension remaining dewatered)
Rehabilitation Conditions	• Approved Existing Quarry Rehabilitation (lakes in the North Quarry, East Cell, and West Cell)
	• Existing Quarry Rehabilitation Plus MQEE (lakes in the North Quarry, East Cell, West Cell, and East Extension)

These conditions were simulated using the MQEE Model running under steady-state annual average conditions as described in Section 7.1 and Section 7.2.

7.1 Interim Conditions

7.1.1 Approved Existing Quarry Fully Extracted

The purpose of this scenario is to represent the approved baseline conditions for the interim extraction period of the Milton Quarry with the existing approved Quarry fully extracted and mitigation measures represented to maintain groundwater elevations and surface water conditions consistent with current approvals. This simulation provides the basis of comparison for the MQEE interim (fully extracted) condition described in Section 7.1.2

- The North Quarry, East Cell, and West Cell are fully quarried and represented as dry extraction cells with no major surface water present in the extraction areas.
- Quarry cell dewatering is represented using drain boundary condition cells around the perimeter of the quarry.
- Drain boundary condition cell elevations are assigned to be 305 m AMSL for the North Quarry and West Cell, and 308 m AMSL for the East Cell.
- 150 constant head boundary condition cells are used to represent WMS recharge wells. The locations of the constant head cells are presented on Figure F7.1. The fixed head of the recharge wells was calibrated to prevent or minimize drawdown in their vicinity relative to the base case (July 2010 conditions).
- The simulated groundwater elevation contours are presented on Figure F7.1 and the related water budget flows are presented in Table F7.1.
- These results are discussed as part of the impact assessment presented in Main Report Section 10 and the water budget evaluation included in Appendix G.

7.1.2 Existing Quarry Fully Extracted Plus MQEE

The purpose of this scenario is to represent the full approved quarry, described in Section 7.1.1 above, with the addition of the proposed MQEE extraction and associated mitigation measures. This simulation is used to assess the mitigation measures associated with the MQEE.

- Additional drain cells were added along the MQEE quarry limits to represent the full extraction of the MQEE.
- Drain boundary condition cell elevations are assigned to be 305 m AMSL for the North Quarry and West Cell, and 308 m AMSL for the East Cell and MQEE.
- 168 constant head boundary condition cells were used to represent WMS recharge wells including 26 additional constant head cells which were added to Layer 3 to represent proposed WMS recharge wells in the MQEE area. The locations of the constant head cells are presented on Figure F7.2.
- River cells were used to represent the diffuse discharge mitigation flow to two additional MQEE-related wetlands pools associated with Wetland U1 and Wetland W36 (particularly two pools around SG57 and SG58). The river cell conductance was set to 0.55 m^2/day (equivalent of a hydraulic conductivity of approximately 6.4×10^{-5} cm/s). This value corresponds to the lowest value identified during calibration of flows for existing on-Site Wetlands W7, W8, and V2. This value was used for the new diffuse discharges in Wetlands U1 and W36 so the groundwater recharge and support from these features is not overstated. Actual recharge rates may be higher which would provide a greater degree of groundwater support from the supply of diffuse discharge to these wetlands.
- The simulated groundwater elevation contours are presented on Figure F7.2 and the related water budget flows are presented in Table F7.1.
- The difference between the simulated groundwater level conditions for the Approved Existing Quarry Fully Extracted (Figure 7.1) and the Existing Quarry Fully Extracted Plus MQEE (Figure 7.2) is shown on Figure 7.3.
- The impact assessment is presented in the main report (Section 10) and the water budget evaluation is included in Appendix G.

7.2 Rehabilitation Conditions

7.2.1 Approved Existing Quarry Rehabilitation

The purpose of this scenario is to simulate the approved rehabilitation condition after the existing quarry extraction is complete and the quarry has been allowed to fill with water. In this scenario, lakes are created in the North Quarry, East Cell, and West Cell. This simulation provides the basis of comparison for the proposed MQEE rehabilitation condition described in Section 7.2.2

- Cells with drain boundary conditions used to represent the quarry face were replaced with constant head boundary conditions to represent the quarry lakes.
- To represent the proposed lake elevations, constant head elevations were assigned to be 318.5 m AMSL for the North Quarry, 326.0 m AMSL for the West Cell, and 333.0 m AMSL for the East Cell.
- A total of 42 constant head boundary condition cells were used to represent WMS recharge wells on the east side of the East Cell. Under the existing Milton Quarry plans and approvals, the eastern wetlands will be partially mitigated by the creation of the three lakes, however the East Cell lake level may not be high enough to fully mitigate all the wetlands, particularly those that

are close to the East Cell and particularly during the spring and early summer period. The potential limitations include the relative elevations (i.e., the lake levels may not reach a sufficient elevation to support groundwater discharge to these features) and the dampening of seasonal water levels. To fully mitigate the wetlands to the east under rehabilitation conditions, limited seasonal post-quarrying operation of the interim groundwater recharge well system may be required in this area. This aspect will be evaluated in detail as part of the ongoing monitoring and mitigation program in accordance with the AMP as the quarry develops and the East Cell lake filling is completed. The locations of the constant head cells are presented on Figure F7.4.

- The simulated groundwater elevation contours are presented on Figure F7.4 and the related water budget flows are presented in Table F7.1.
- These results are discussed as part of the impact assessment presented in Main Report Section 10 and the water budget evaluation included in Appendix G.

7.2.2 Existing Quarry Rehabilitation Plus MQEE

The purpose of this scenario is to simulate the rehabilitation condition for Existing Quarry plus the MQEE and to compare that condition to the approved rehabilitation condition described in Section 7.2.1. This rehabilitation is designed to extend the East Cell Lake into the East Extension.

- Drain boundary condition cells used to represent the MQEE quarry limits were replaced with constant head boundary condition cells to represent a quarry lake. This scenario provides a conservative representation of the rehabilitation conditions as the proposed landform creation in the MQEE area may help support surrounding groundwater levels. The simulated scenario therefore provides a conservative representation of the potential need for seasonal recharge operation in the long term.
- Constant head elevations for the East Extension quarry lake were assigned to be 333.0 m AMSL, consistent with the approved rehabilitation lake level for the East Cell.
- The potential limited seasonal use of the wetland diffuse discharge and recharge well system for ensuring that surface water resources are maintained or enhanced in the vicinity of the East Cell (as approved) and MQEE are represented in this simulation. A total of 68 constant head boundary condition cells were used to represent WMS recharge wells including 26 additional constant head cells which were added to Layer 3 to represent proposed WMS recharge wells in the area of the MQEE. The locations of the constant head cells are presented on Figure F7.5.
- The difference between the simulated groundwater level conditions for the Approved Existing Quarry Rehabilitation (Figure 7.4) and the Approved Existing Quarry Rehabilitation plus MQEE (Figure F7.5) are shown on Figure 7.6.
- The impact assessment is presented in the main report (Section 10) and the water budget evaluation is included in Appendix G.

8. Summary

GHD updated the existing groundwater flow model (5-Year Review Model) for the Site, incorporating additional hydrogeologic information, particularly around the MQEE area. The updated groundwater flow model (MQEE Model) was developed using the USGS's MODFLOW-NWT groundwater flow model. GHD recalibrated the MQEE Model to provide a reasonable representation of the groundwater elevations and groundwater flow directions for an expanded calibration dataset representative of the July 2010 (i.e., average annual) condition, and model performance was verified using an Average Annual 2017 condition simulation. Model calibration was also compared against observed July 2010 and Average Annual 2017 Recharge Well flow rates for the East Cell, West Cell, and North Quarry, and it provides a reasonable match. The model input parameters (e.g., hydraulic conductivity and recharge) applied in the calibrated model are consistent with observed Site conditions.

The calibrated model input parameters are considered reasonable and appropriate for providing a calibrated groundwater flow model suitable for use as a predictive tool to be applied to assess the proposed MQEE, refine components of the water budget, to evaluate and plan future WMS expansion in the MQEE area, and to assist with water management confirmation studies required in the future to confirm the long-term WMS parameters such as the rehabilitation lake levels.

Quarry design simulations were performed to evaluate interim conditions (existing and proposed MQEE quarries fully extracted), and rehabilitation conditions (approved existing quarry rehabilitation vs. approved existing quarry rehabilitation plus MQEE). These predictive simulations may be used to evaluate the potential for mitigation measures such as additional recharge wells to maintain or enhance groundwater flow systems and related water resources under the proposed MQEE conditions.

9. References

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All of Which is Respectfully Submitted,

GHD

Dec. 10, 2021

David R. Barton, GIT

Philip Sheffield, P. Eng.

Dec. 10, 2021

Dec. 10, 2021

Kyle Fritz, P.Eng.

J. Richard Murphy, P. Eng.

LEGEND

- ROAD
- RAILROAD
- MUNICIPAL BOUNDARY
- PROPERTY BOUNDARY
- DUFFERIN OWNED LICENSED
- DUFFERIN OWNED BUFFER
- DUFFERIN LEASED
- EXTENSION LICENCE LIMIT
- LICENSED EXTRACTION LIMIT
- EXTENSION EXTRACTION LIMIT
- BRUCE TRAIL (APPROXIMATE)
- LANEWAY/TRAIL
- WETLAND IDENTIFIED AS PROVINCIALLY SIGNIFICANT
- OTHER WETLAND
- SIGNIFICANT WOODLANDS
- MAIN QUARRY LIMITS DECEMBER 2008

SOURCES:

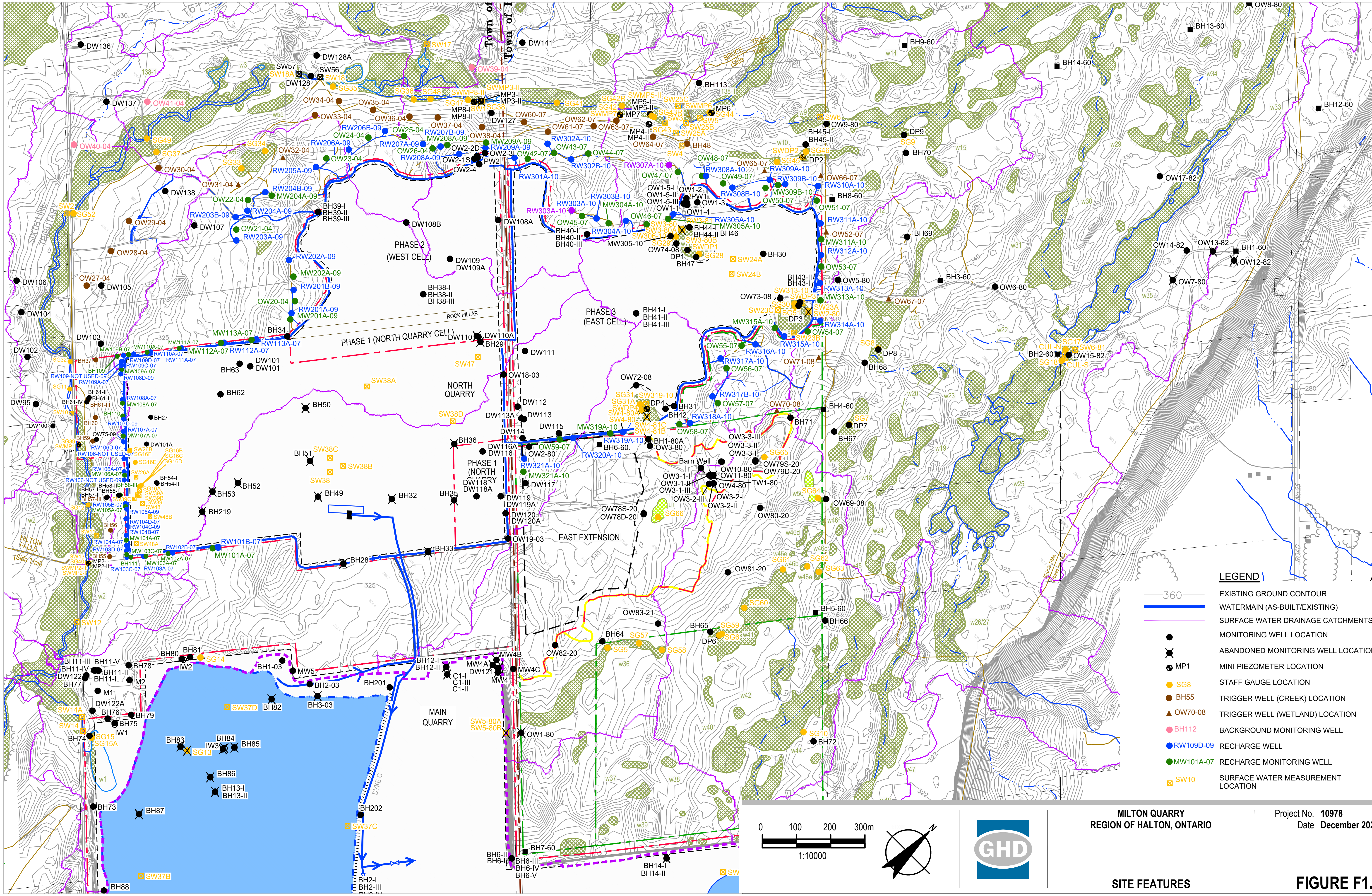
- BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES
  © QUEEN'S PRINTER 1997
- TOPOGRAPHIC INFORMATION FOR AREAS OTHER THAN W8 AND V2 OBTAINED FROM NORTHWAY MAP TECHNOLOGY LIMITED. CONTOURS WERE DRAWN FROM SPRING 1997 AERIAL PHOTOGRAPHY UTILIZING EXISTING CONTROL. CONTOUR INTERVAL IS 1 METRE.
- TOPOGRAPHIC INFORMATION FOR W8 FROM MARCH 11, 2002 SURVEY USING 1 METRE CONTOUR INTERVAL.
- TOPOGRAPHIC INFORMATION FOR V2 FROM JUNE 24/25, 2002 SURVEY USING 1 METRE CONTOUR INTERVAL.
- MAIN QUARRY CONTOURS REVISED TO REFLECT 2001 EXISTING CONDITIONS (CRA DRAWING 10978-10(028)GN-WA002).
- BOUNDARY INFORMATION COMPILED FROM SURVEYS AND SKETCHES PREPARED BY FRED G, CUNNINGHAM, ONTARIO LANDS SURVEYORS, MILTON, ONTARIO, DECEMBER 2,1997.

GHD

MILTON QUARRY
REGION OF HALTON, ONTARIO

LEGEND KEY

Project No. **10978**
Date **December 2021**



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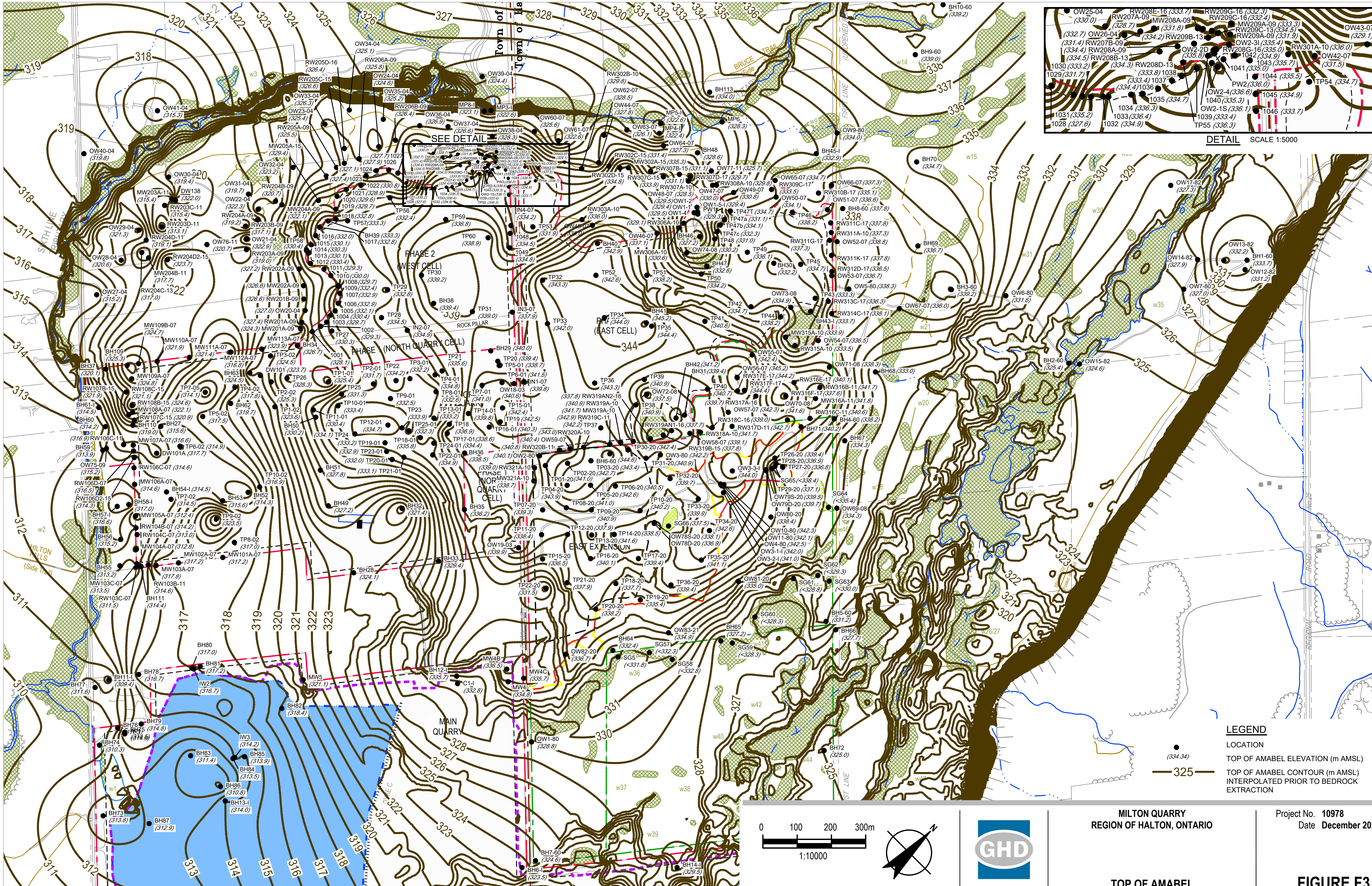

MILTON QUARRY
REGION OF HALTON, ONTARIO

TOP OF AMABEL

Project No. 10978
Date December 2021

FIGURE F3.1

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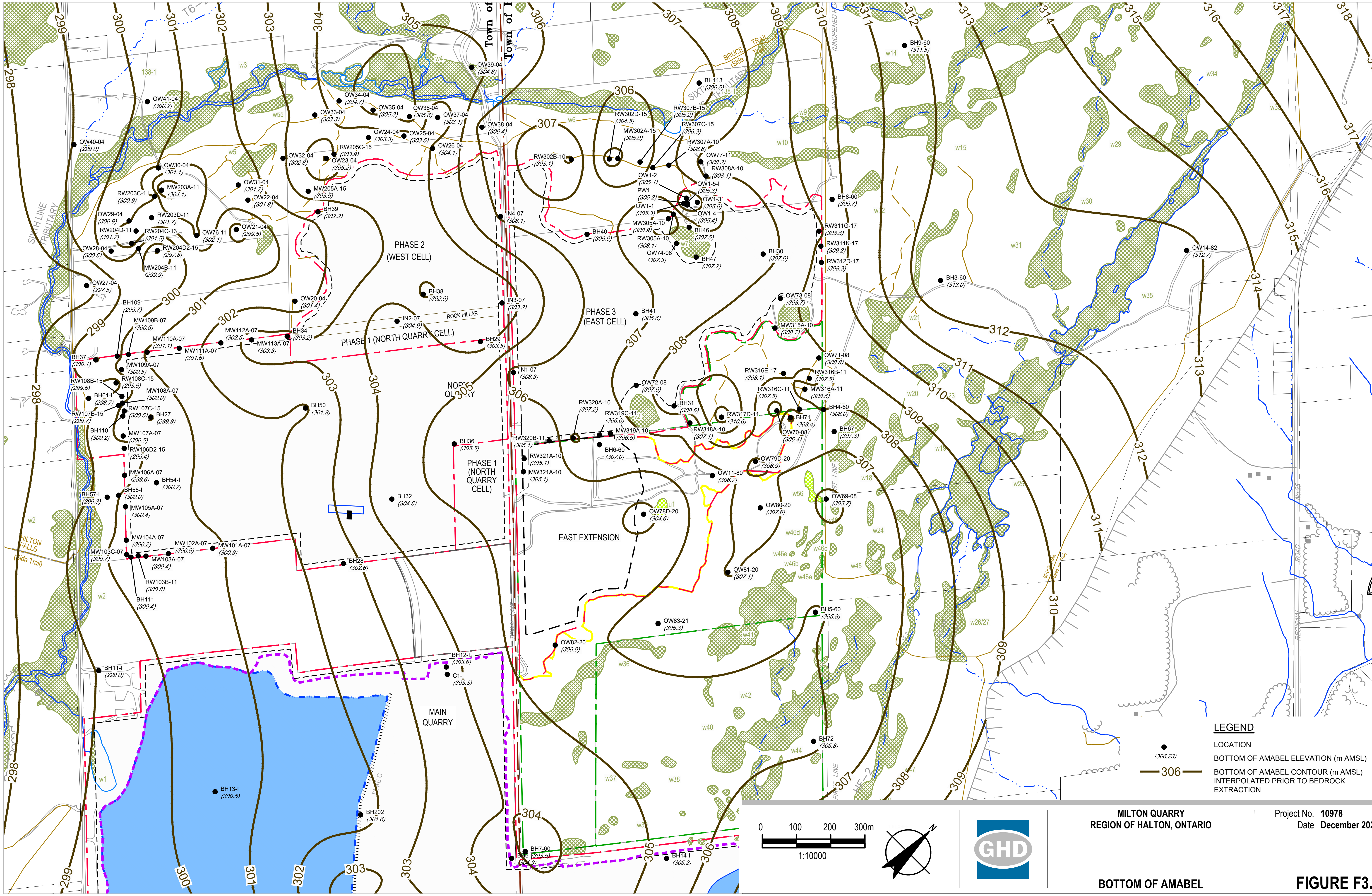

MILTON QUARRY
REGION OF HALTON, ONTARIO

BOTTOM OF AMABEL

Project No. 10978
Date December 2021

GHD

FIGURE F3.2

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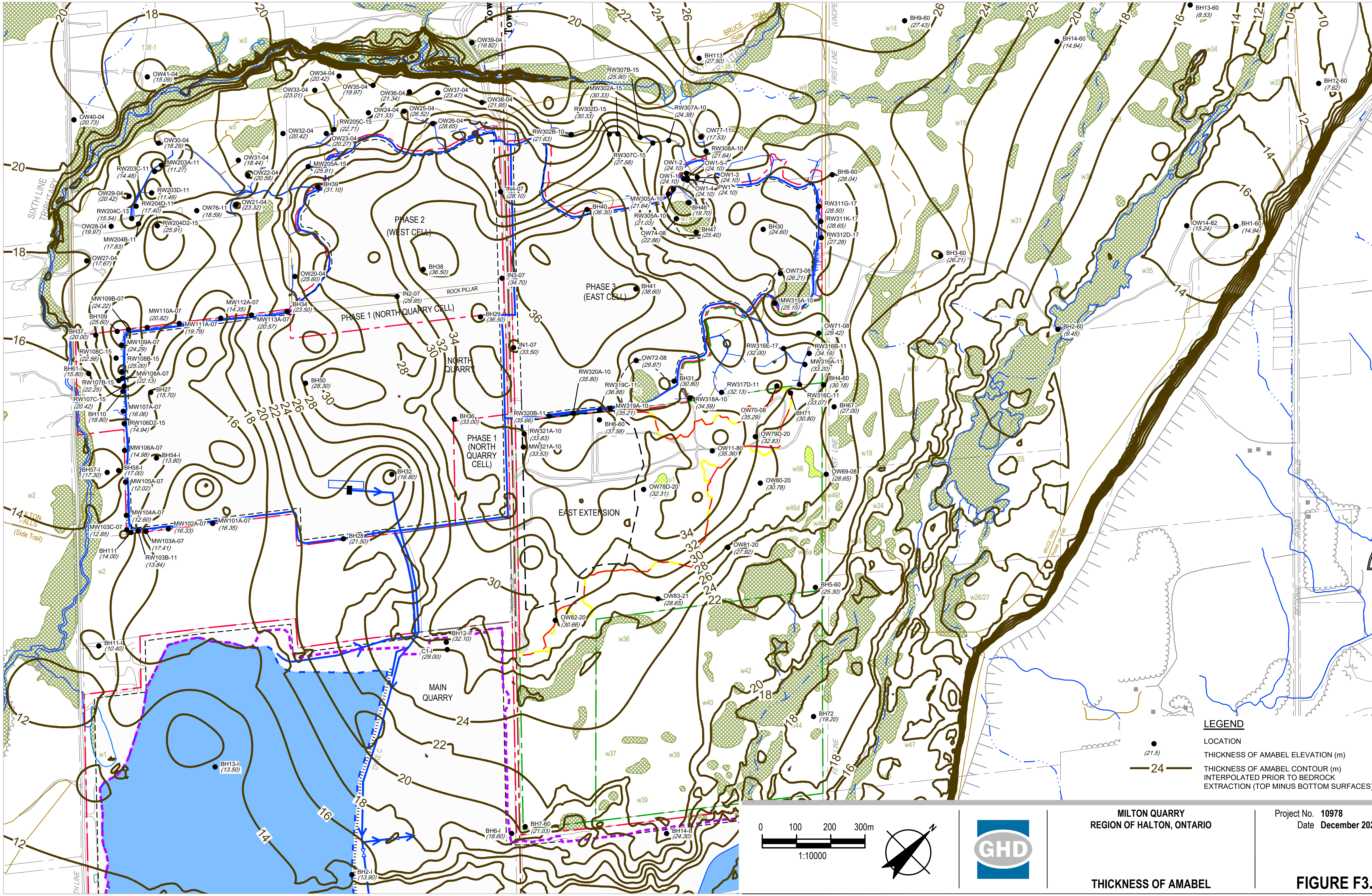

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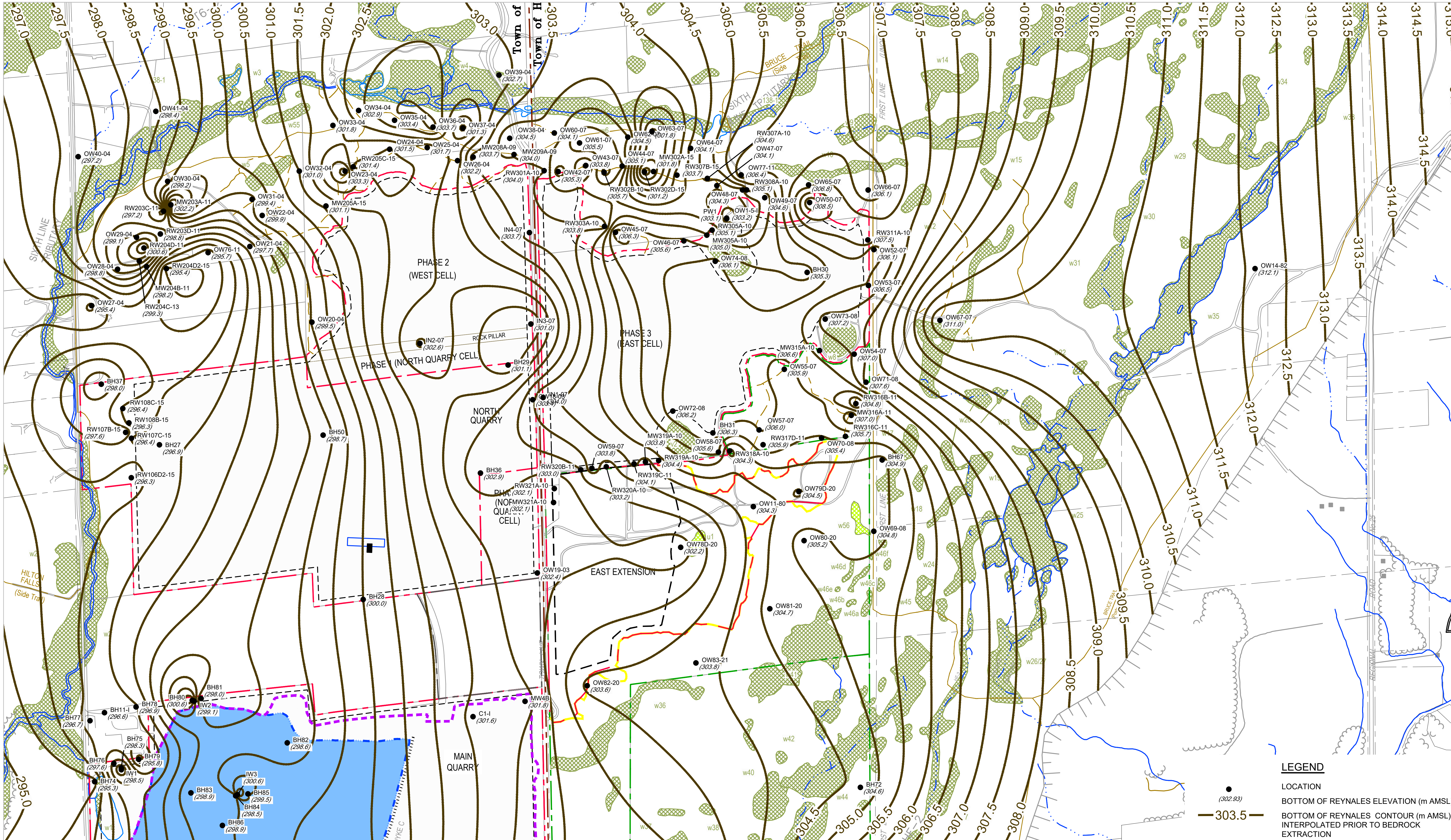

MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. 10978
Date December 2021

BOTTOM OF REYNALES

FIGURE F3.4

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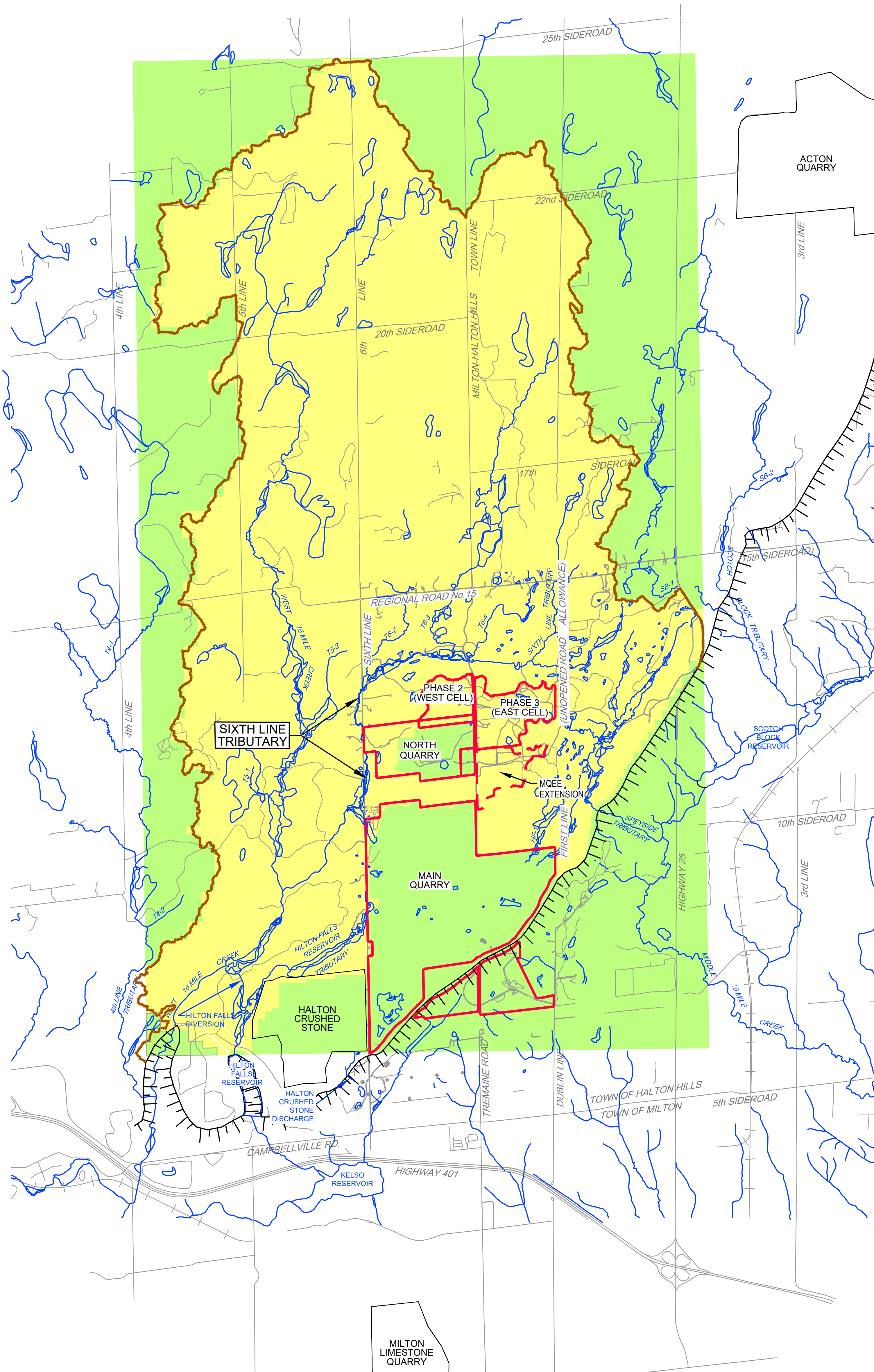

LEGEND

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- LICENSED EXTENSION LIMIT OF EXTRACTION (LICENCE NO. 608621)
- NIAGARA ESCARPMENT (APPROXIMATE)
- WATERSHED BOUNDARY
- ROAD
- RAILWAY
- WATERWAYS
- ACTIVE MODEL CELL
- INACTIVE MODEL CELL (NO-FLOW CELL)

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES QUEEN'S PRINTER 1997.

WATERSHED BOUNDARY BASED ON SURFACE WATER CATCHMENTS PROVIDED BY CONSERVATION HALTON, OCTOBER 2010.

0 500 1000 1500m
1:50000

GHD

MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

HORIZONTAL MODEL DOMAIN

FIGURE F5.1

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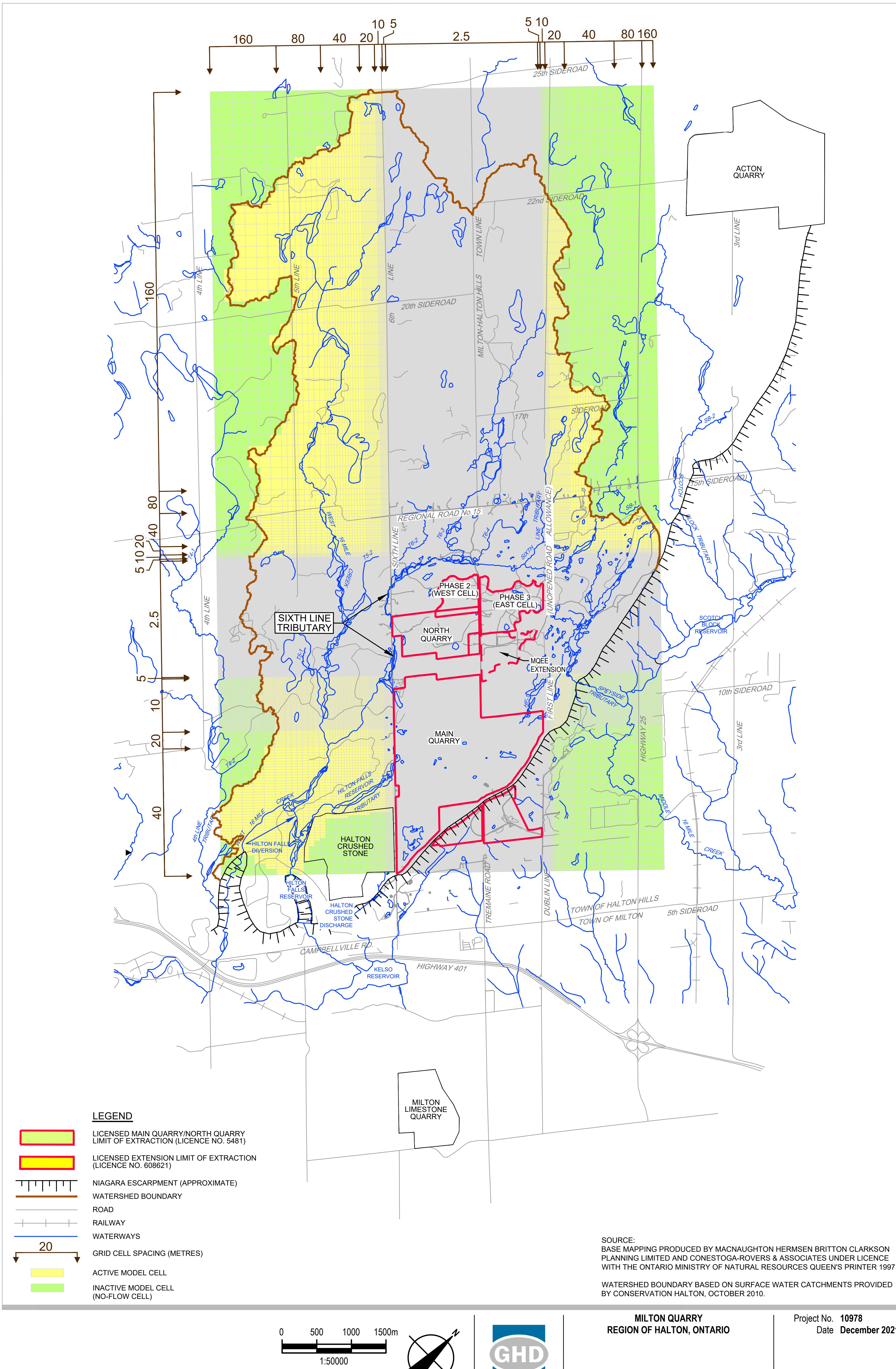

MILTON QUARRY
REGION OF HALTON, ONTARIO

GRID DISCRETIZATION

Project No. **10978**
Date **December 2021**

FIGURE F5.2

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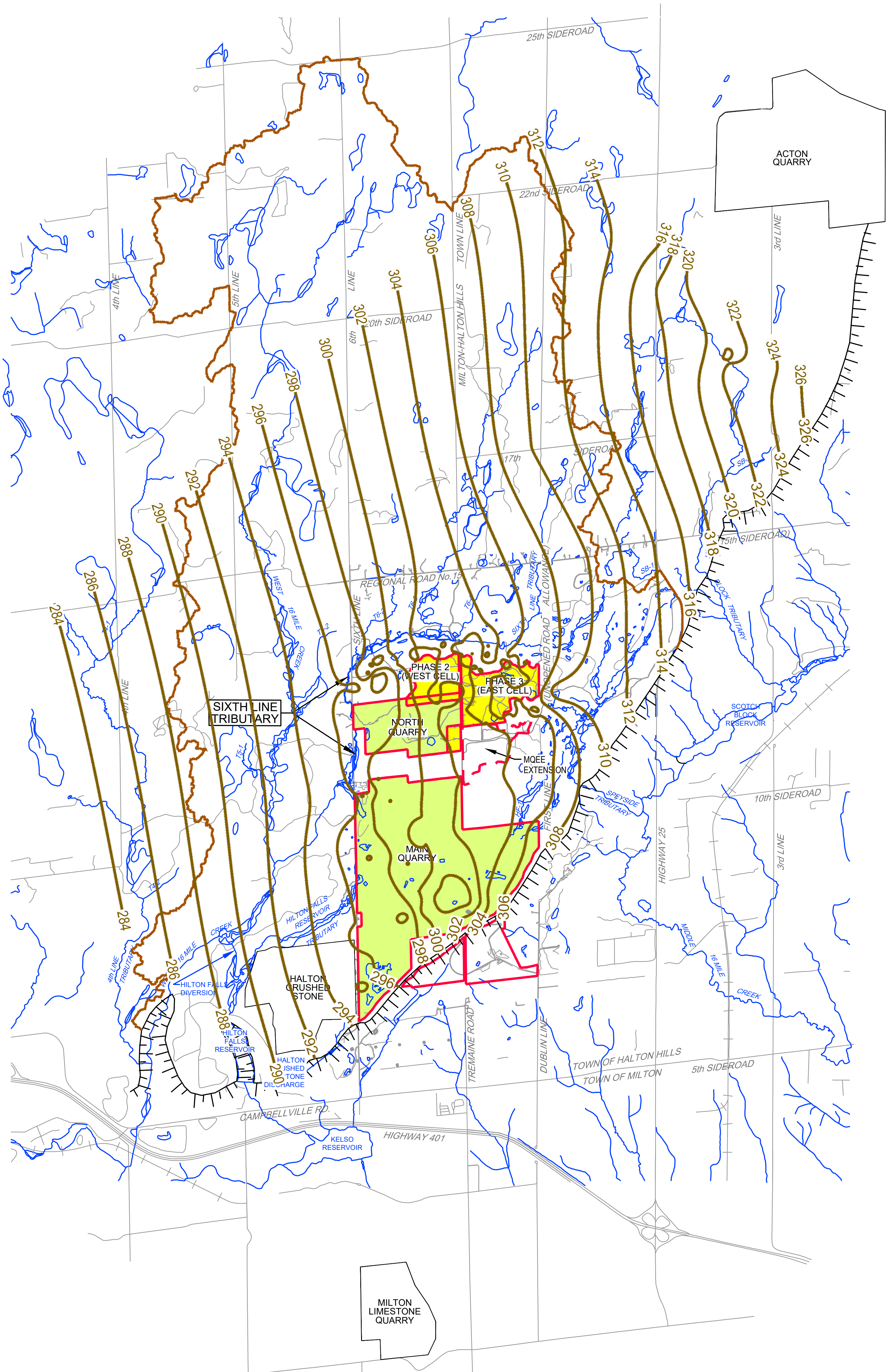

LEGEND

LICENSED MAIN QUARRY/NORTH QUARRY LIMIT OF EXTRACTION (LICENCE NO. 5481)

LICENSED EXTENSION LIMIT OF EXTRACTION (LICENCE NO. 608621)

NIAGARA ESCARPMENT (APPROXIMATE)

WATERSHED BOUNDARY

ROAD

RAILWAY

WATERWAYS

286 REGIONAL BOTTOM OF AMABEL/REYNALES

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES QUEEN'S PRINTER 1997.

WATERSHED BOUNDARY BASED ON SURFACE WATER CATCHMENTS PROVIDED BY CONSERVATION HALTON, OCTOBER 2010.

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MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

REGION BOTTOM OF AMABEL/REYNALES

FIGURE F5.3

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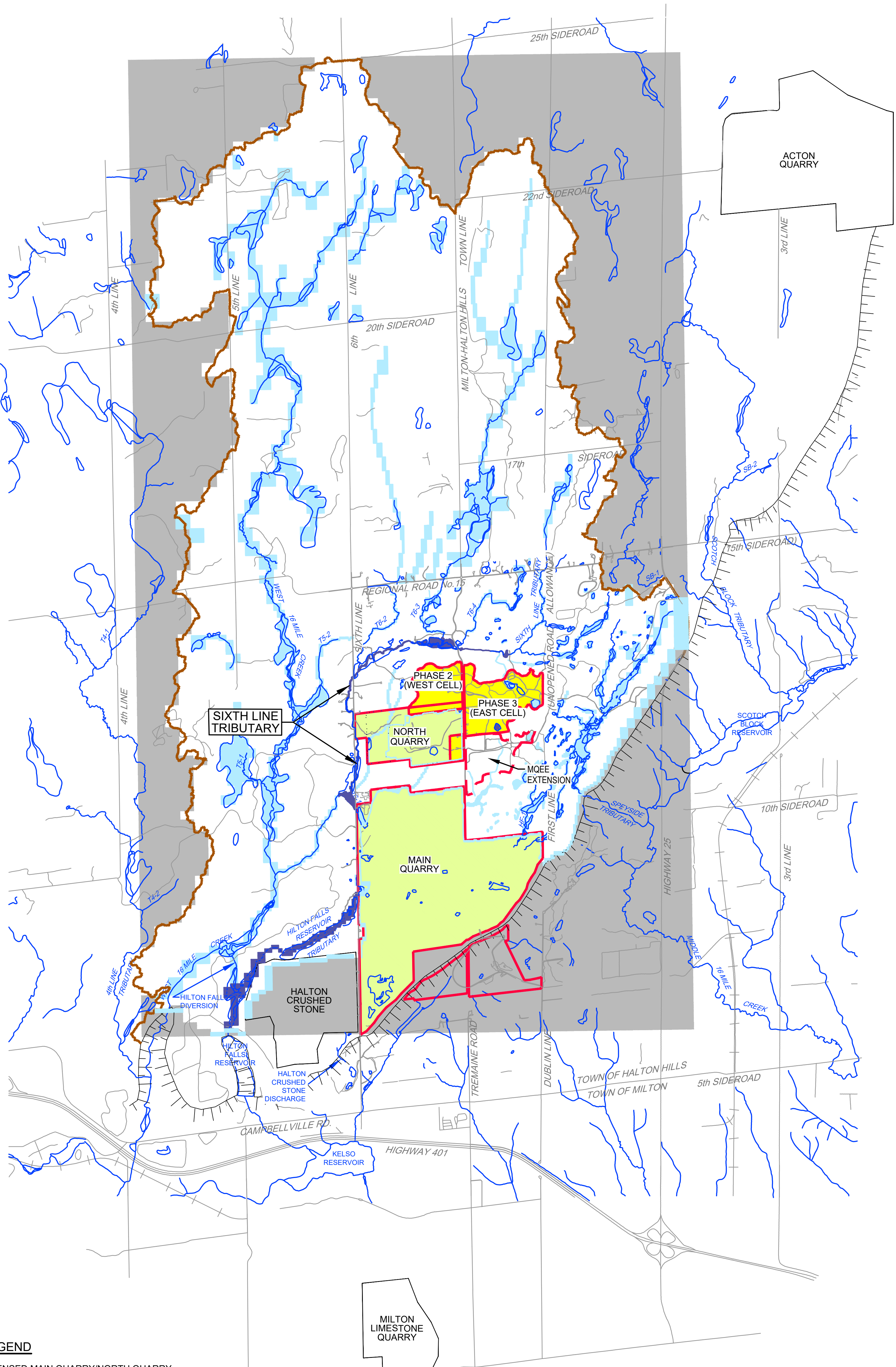

LEGEND

- LICENSED MAIN QUARRY/NORTH QUARRY LIMIT OF EXTRACTION (LICENCE NO. 5481)
- LICENSED EXTENSION LIMIT OF EXTRACTION (LICENCE NO. 608621)
- NIAGARA ESCARPMENT (APPROXIMATE)
- WATERSHED BOUNDARY
- ROAD
- RAILWAY
- WATERWAYS
- DRAIN
- RIVER
- NO FLOW
- CONSTANT HEAD

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES QUEEN'S PRINTER 1997.

WATERSHED BOUNDARY BASED ON SURFACE WATER CATCHMENTS PROVIDED BY CONSERVATION HALTON, OCTOBER 2010.

0 500 1000 1500m
1:50000

MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

MODEL BOUNDARY CONDITIONS

FIGURE F5.4

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(169)\10978-GHD-0000-RPT-EN-0109_WA-169.dwg
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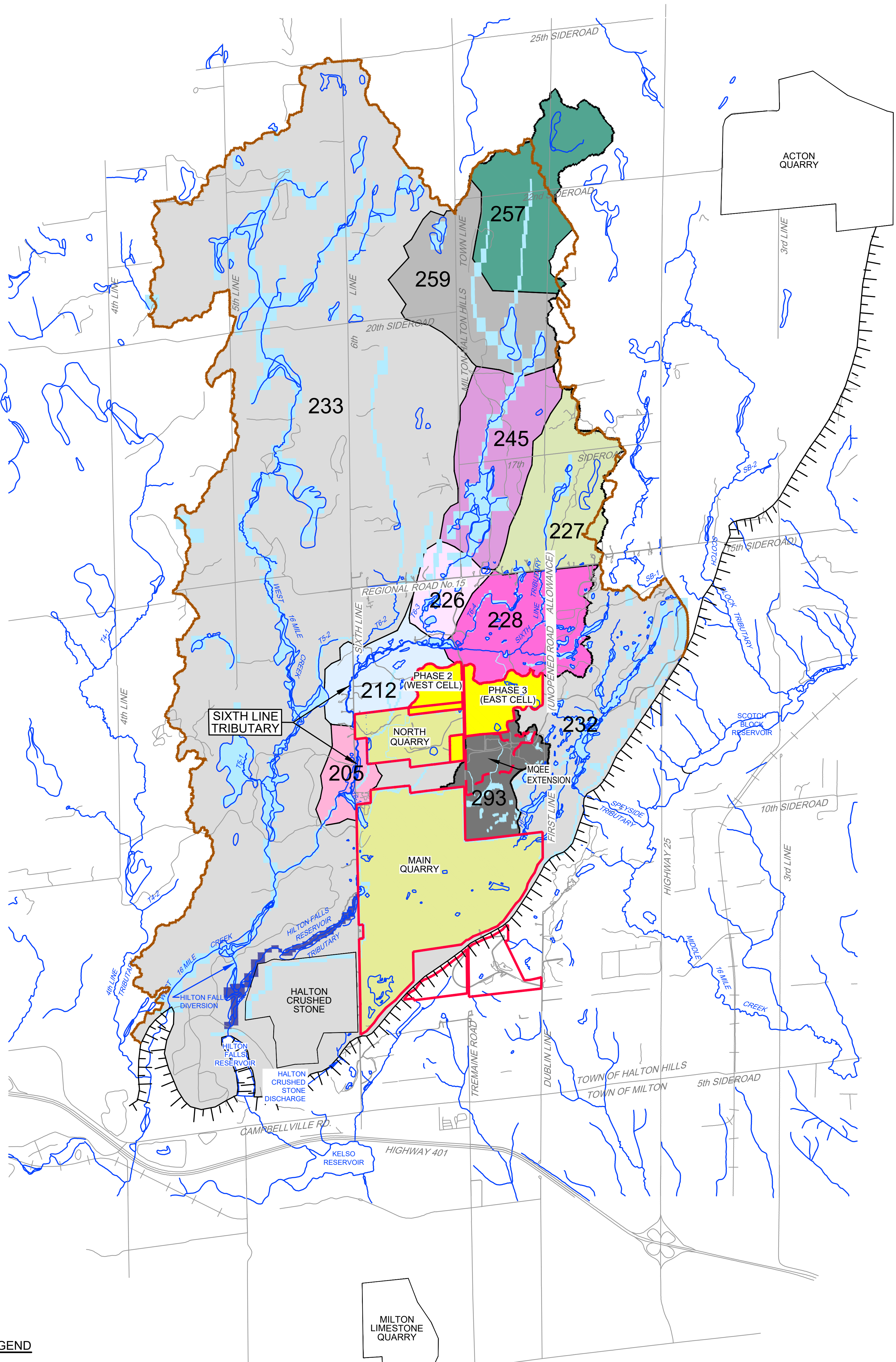

LEGEND

- LICENSED MAIN QUARRY/NORTH QUARRY LIMIT OF EXTRACTION (LICENCE NO. 5481)
- LICENSED EXTENSION LIMIT OF EXTRACTION (LICENCE NO. 608621)
- NIAGARA ESCARPMENT (APPROXIMATE)
- WATERSHED BOUNDARY
- ROAD
- RAILWAY
- WATERWAYS
- DRAIN
- RIVER
- 257 RECHARGE ZONE
- RECHARGE RATE (mm/yr)

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES QUEEN'S PRINTER 1997.

WATERSHED BOUNDARY BASED ON SURFACE WATER CATCHMENTS PROVIDED BY CONSERVATION HALTON, OCTOBER 2010.

0 500 1000 1500m
1:50000

MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. 10978
Date December 2021

APPLIED RECHARGE ZONES

FIGURE F5.5

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(169)\10978-GHD-0000-RPT-EN-0110_WA-169.dwg
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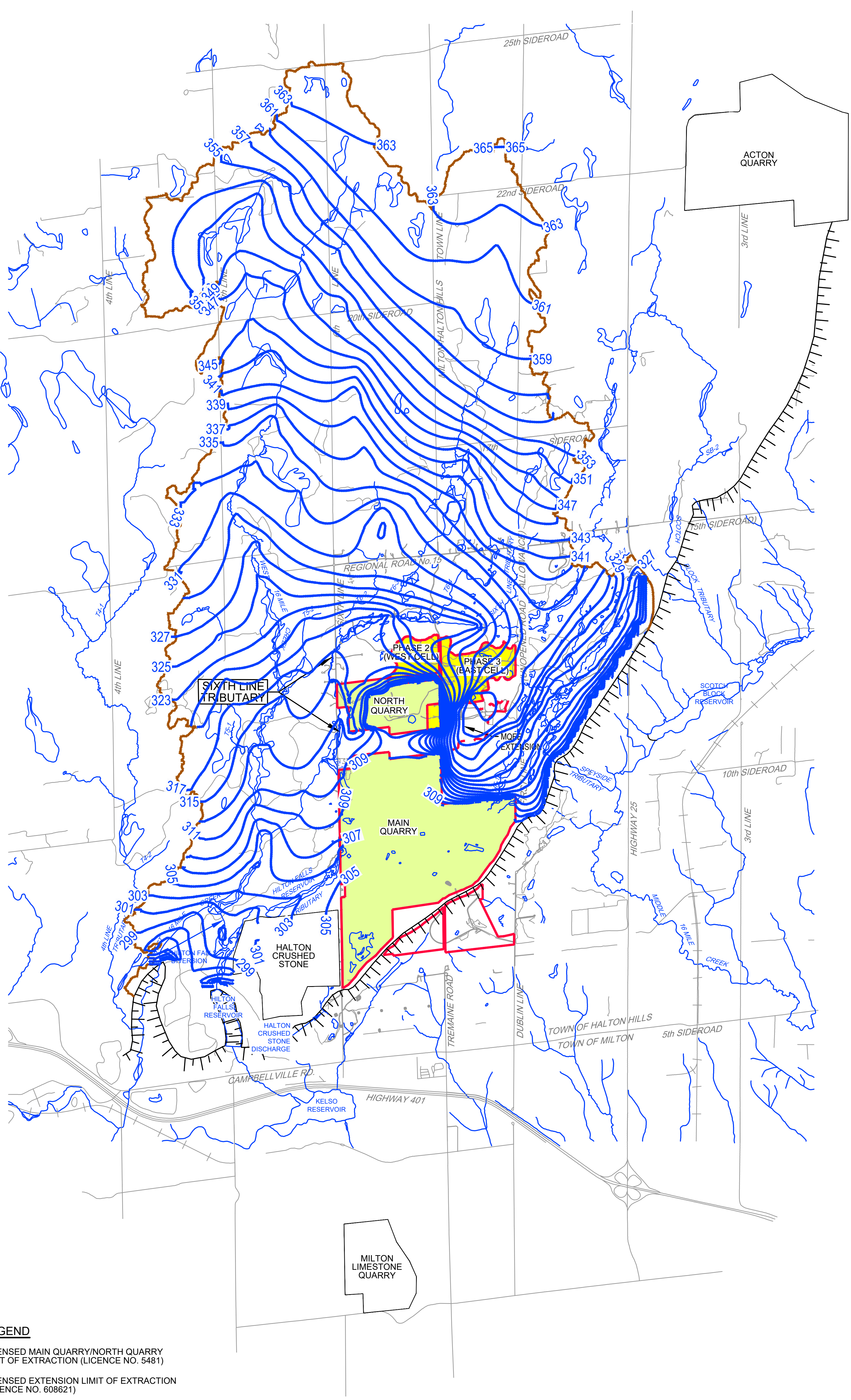


LEGEND

- LICENSED MAIN QUARRY/NORTH QUARRY LIMIT OF EXTRACTION (LICENCE NO. 5481)
- LICENSED EXTENSION LIMIT OF EXTRACTION (LICENCE NO. 608621)
- NIAGARA ESCARPMENT (APPROXIMATE)
- WATERSHED BOUNDARY
- ROAD
- RAILWAY
- WATERWAYS
- 325 SIMULATED GROUNDWATER ELEVATION CONTOUR

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES QUEEN'S PRINTER 1997.

WATERSHED BOUNDARY BASED ON SURFACE WATER CATCHMENTS PROVIDED BY CONSERVATION HALTON, OCTOBER 2010.

0 500 1000 1500m
1:50000

GHD

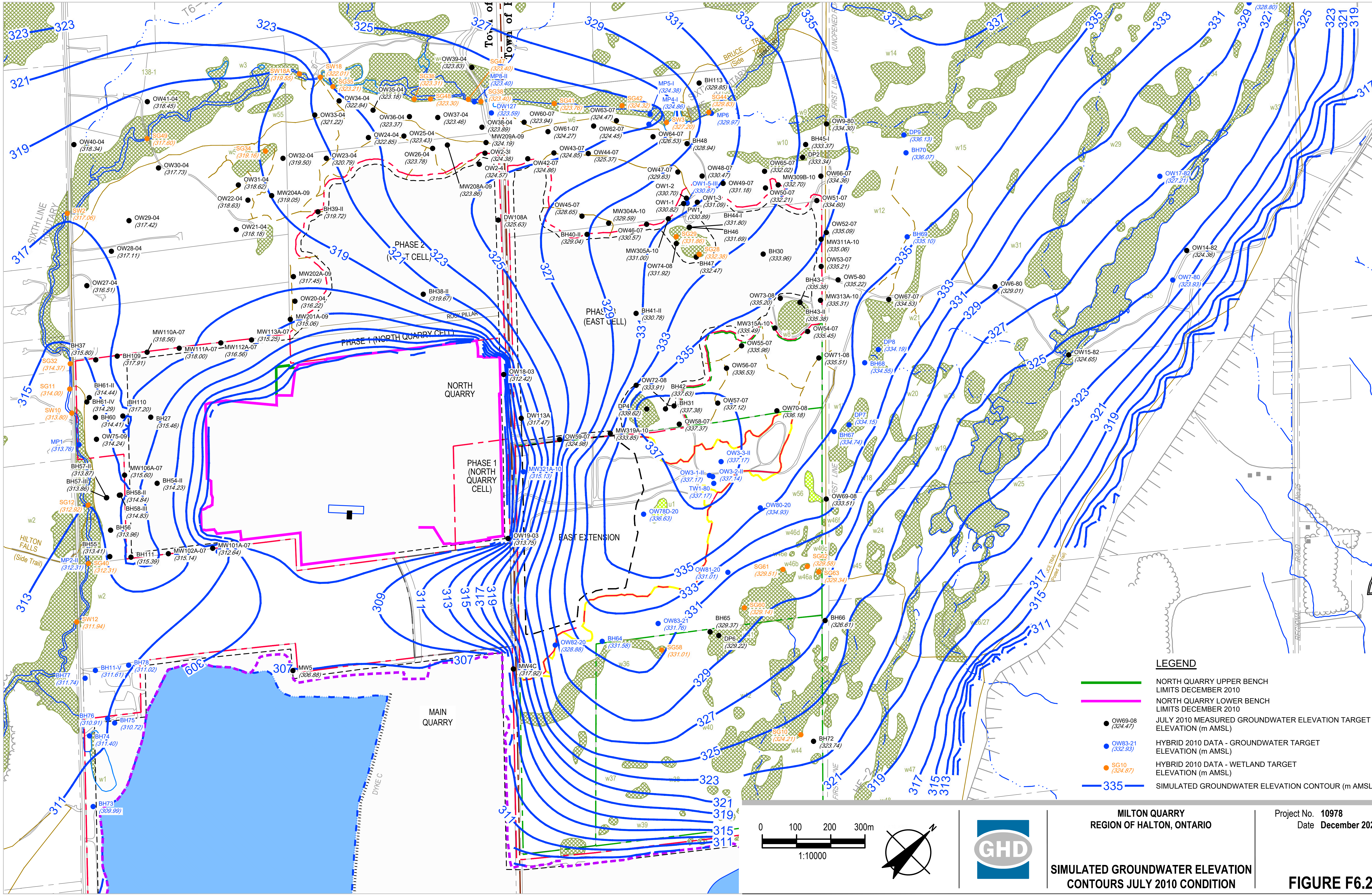
MILTON QUARRY
REGION OF HALTON, ONTARIO

SIMULATED REGIONAL GROUNDWATER ELEVATION CONTOURS JULY 2010 CONDITION

Project No. **10978**
Date **December 2021**

FIGURE F6.1

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(169)\10978-GHD-0000-RPT-EN-0111_WA-169.dwg
Plot Date: 02 December 2021 8:30 AM



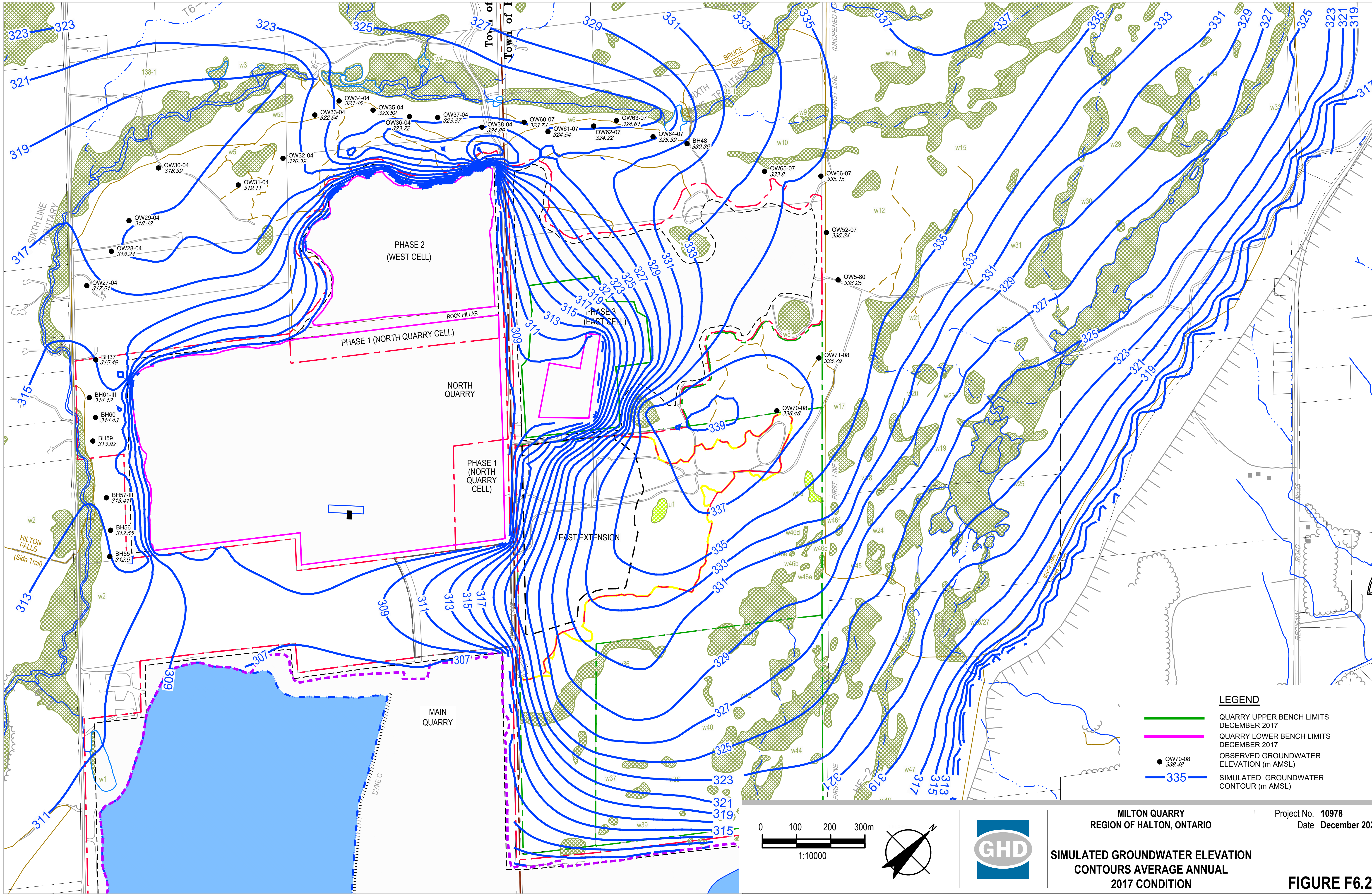
MILTON QUARRY
REGION OF HALTON, ONTARIO

SIMULATED GROUNDWATER ELEVATION CONTOURS JULY 2010 CONDITION

Project No. 10978
Date December 2021

FIGURE F6.2a

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(169)\10978-GHD-0000-RPT-EN-0112_WA-169.dwg
Plot Date: 02 December 2021 8:30 AM



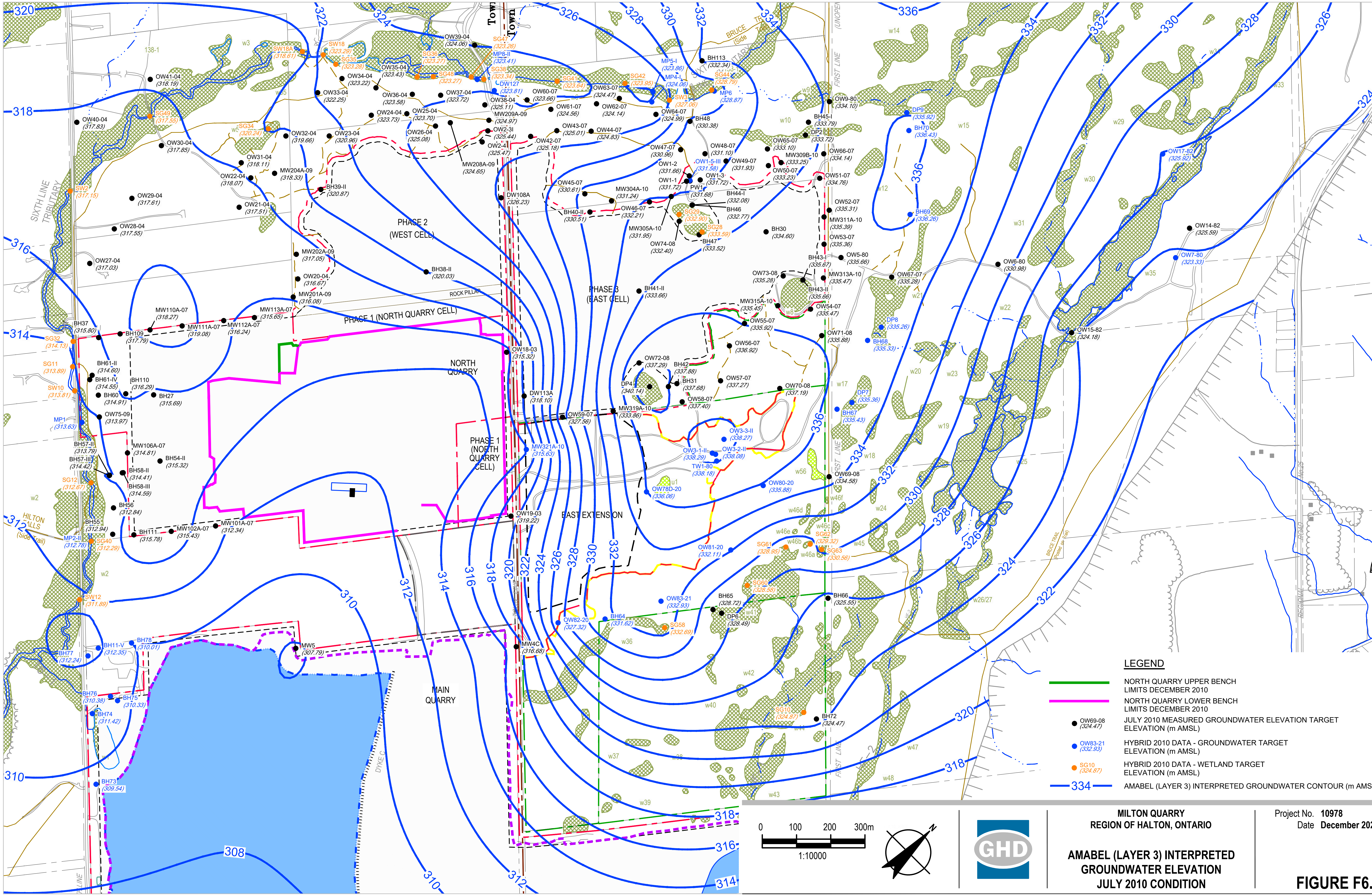
MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. 10978
Date December 2021

SIMULATED GROUNDWATER ELEVATION CONTOURS AVERAGE ANNUAL 2017 CONDITION

FIGURE F6.2b

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(169)\10978-GHD-0000-RPT-EN-0113_WA-169.dwg
Plot Date: 02 December 2021 8:30 AM



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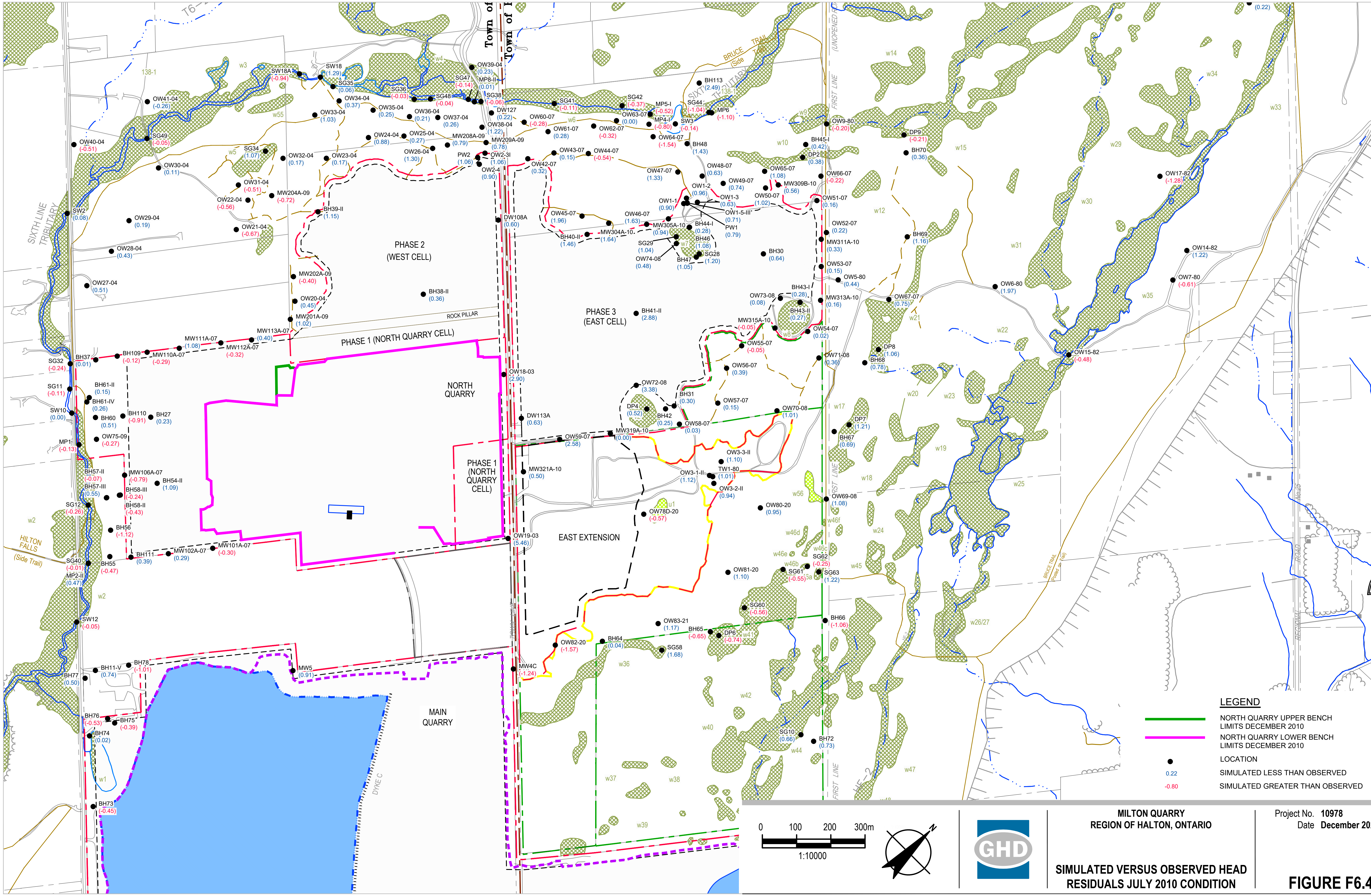


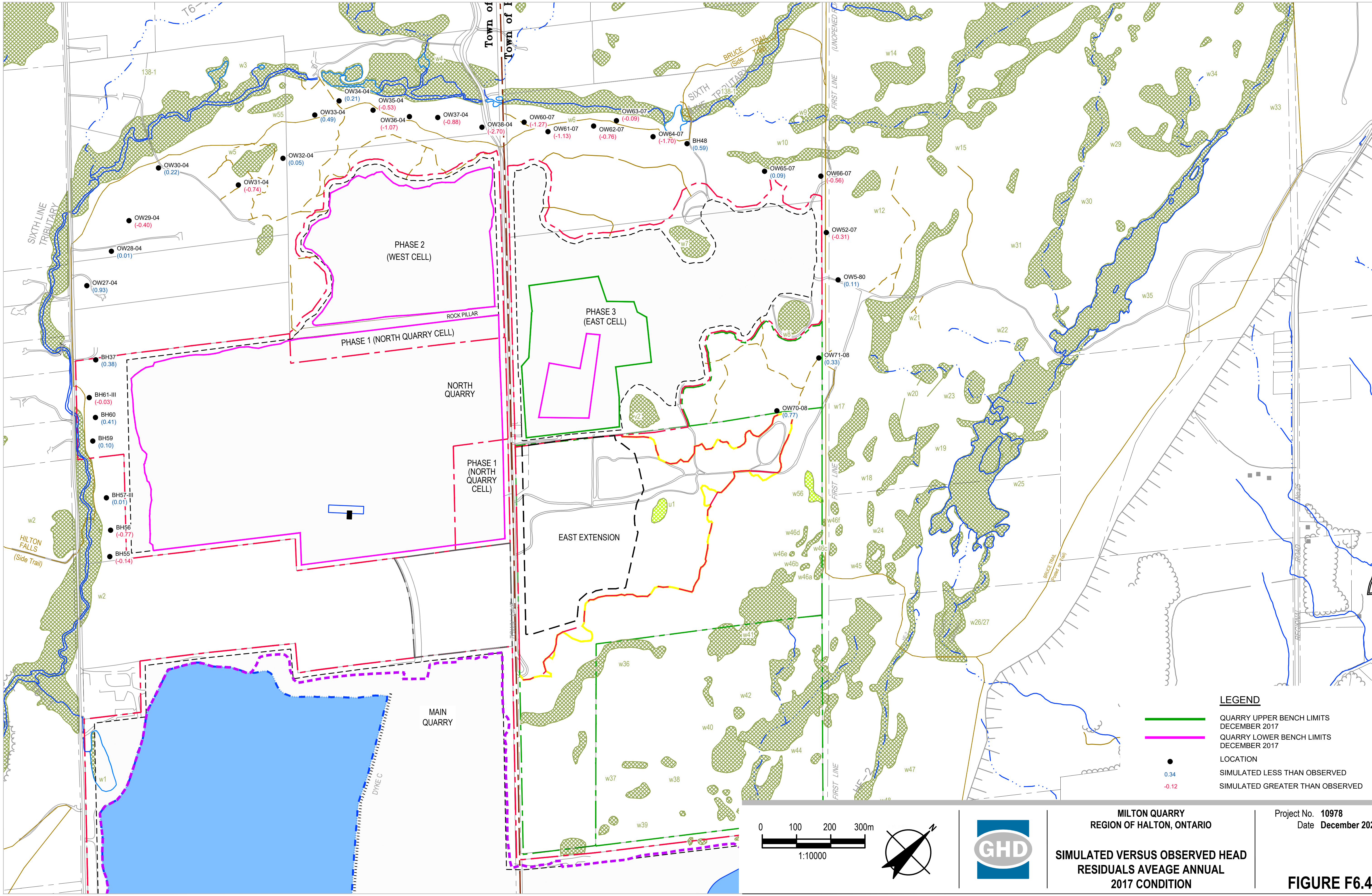
MILTON QUARRY
REGION OF HALTON, ONTARIO

SIMULATED VERSUS OBSERVED HEAD RESIDUALS JULY 2010 CONDITION

Project No. 10978
Date December 2021

FIGURE F6.4a

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(169)\10978-GHD-0000-RPT-EN-0115_WA-169.dwg
Plot Date: 02 December 2021 8:31 AM



0 100 200 300m

1:10000

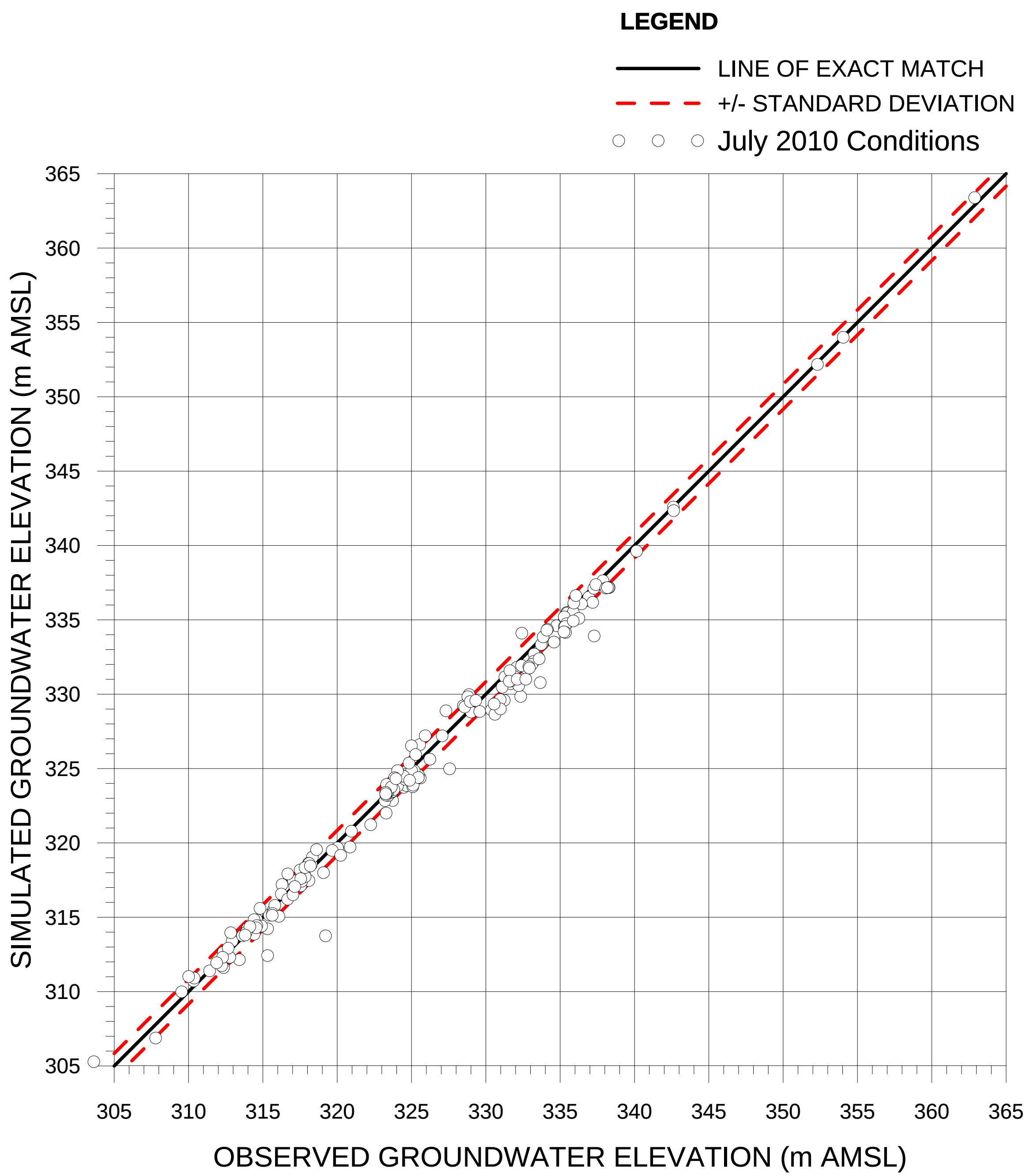
MILTON QUARRY
REGION OF HALTON, ONTARIO

SIMULATED VERSUS OBSERVED HEAD RESIDUALS AVEAGE ANNUAL 2017 CONDITION

Project No. 10978
Date December 2021

FIGURE F6.4b

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(169)\10978-GHD-0000-RPT-EN-0116_WA-169.dwg
Plot Date: 02 December 2021 8:31 AM



CALIBRATION STATISTICS

NUMBER OF OBSERVATIONS =	203
RESIDUAL MEAN (m) =	0.33
ABSOLUTE RESIDUAL MEAN (m) =	0.68
RESIDUAL STANDARD DEVIATION (m) =	0.89
RESIDUAL SUM OF SQUARES (m^2) =	182.12
MINIMUM RESIDUAL (m) =	-1.68
MAXIMUM RESIDUAL (m) =	5.46
OBSERVED HEAD RANGE (m) =	59.25
STANDARD DEVIATION/HEAD RANGE =	0.015
SCALED ABSOLUTE RESIDUAL (m) =	0.01

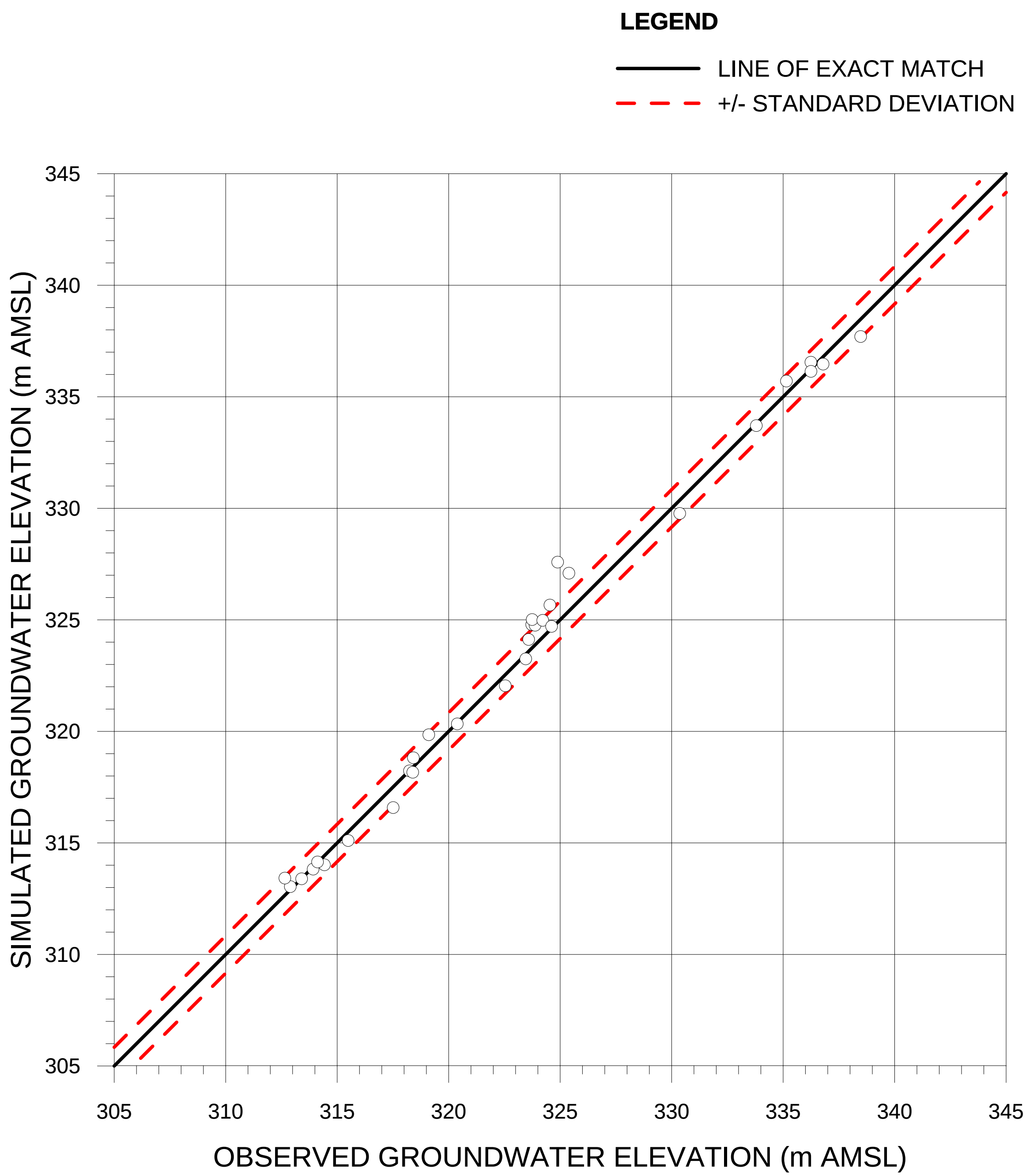
MILTON QUARRY
Region of Halton, Ontario

Project No. **10978**
Date **December 2021**

SCATTER PLOT OF SIMULATED VERSUS OBSERVED GROUNDWATER ELEVATIONS JULY 2010 CONDITION

FIGURE F6.5a

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Workshare\010978-REPORTS\010978-RPT-169-MQEE-Groundwater-Flow-Model-Update\Figures\Grapher\Figure_6.5a_2010_v032.019_Calibration_Gray_Titleblock.grf
Plot Date: December 02 2021 1:12 PM



CALIBRATION STATISTICS

NUMBER OF OBSERVATIONS =	31
RESIDUAL MEAN (m) =	-0.27
ABSOLUTE RESIDUAL MEAN (m) =	0.57
RESIDUAL STANDARD DEVIATION (m) =	0.76
RESIDUAL SUM OF SQUARES (m^2) =	20.18
MINIMUM RESIDUAL (m) =	-2.70
MAXIMUM RESIDUAL (m) =	0.93
OBSERVED HEAD RANGE (m) =	25.82
STANDARD DEVIATION/HEAD RANGE =	0.029
SCALED ABSOLUTE RESIDUAL (m) =	-0.010

MILTON QUARRY
Region of Halton, Ontario

SCATTER PLOT OF SIMULATED VERSUS OBSERVED GROUNDWATER ELEVATIONS AVERAGE 2017 CONDITION

Project No. **10978**
Date **December 2021**

FIGURE F6.5b

HEG file: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Workshare\010978-REPORTS\010978-RPT-169-MQEE-Groundwater-Flow-Model-Update\Figures\Grapher\Figure_6.5b_2017_v032.152_Calibration_New_Gray_Titleblock.grf
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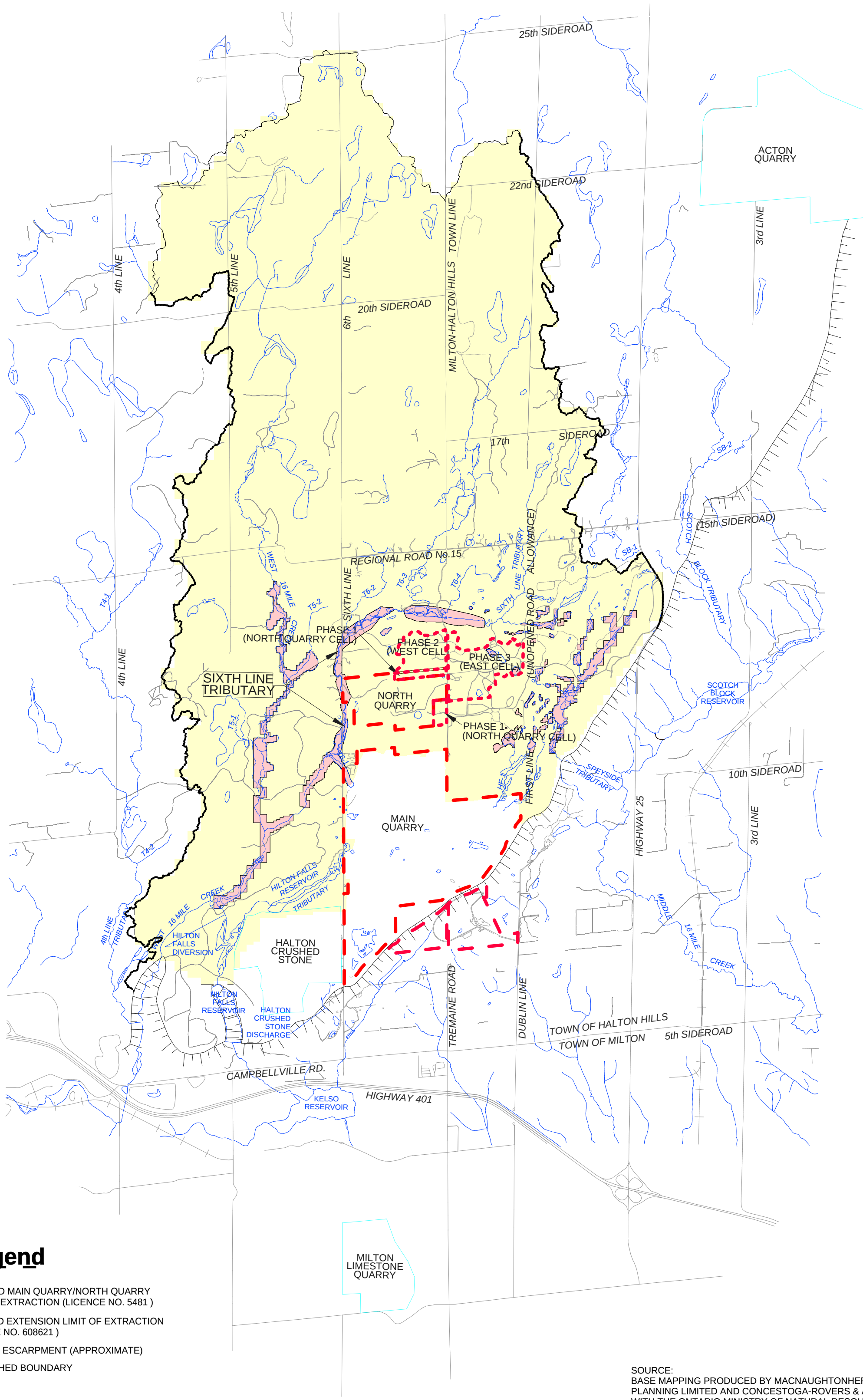


Legend

- LICENSED MAIN QUARRY/NORTH QUARRY LIMIT OF EXTRACTION (LICENCE NO. 5481)
- LICENSED EXTENSION LIMIT OF EXTRACTION (LICENCE NO. 608621)
- NIAGARA ESCARPMENT (APPROXIMATE)
- WATERSHED BOUNDARY
- ROAD
- RAILWAY
- WATERWAYS
- K = 3.5 m/day (Kx:Kz=1:1)
- K = 20 m/day (Kx:Kz=1:1)

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTONHERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONCESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES QUEEN'SPRINTER 1997.

WATERSHED BOUNDARY BASED ON THE SURFACE WATER CATCHMENTS PROVIDED BY CONSERVATION HALTON, OCTOBER 2010.

0 125 250 375m

N

GHD

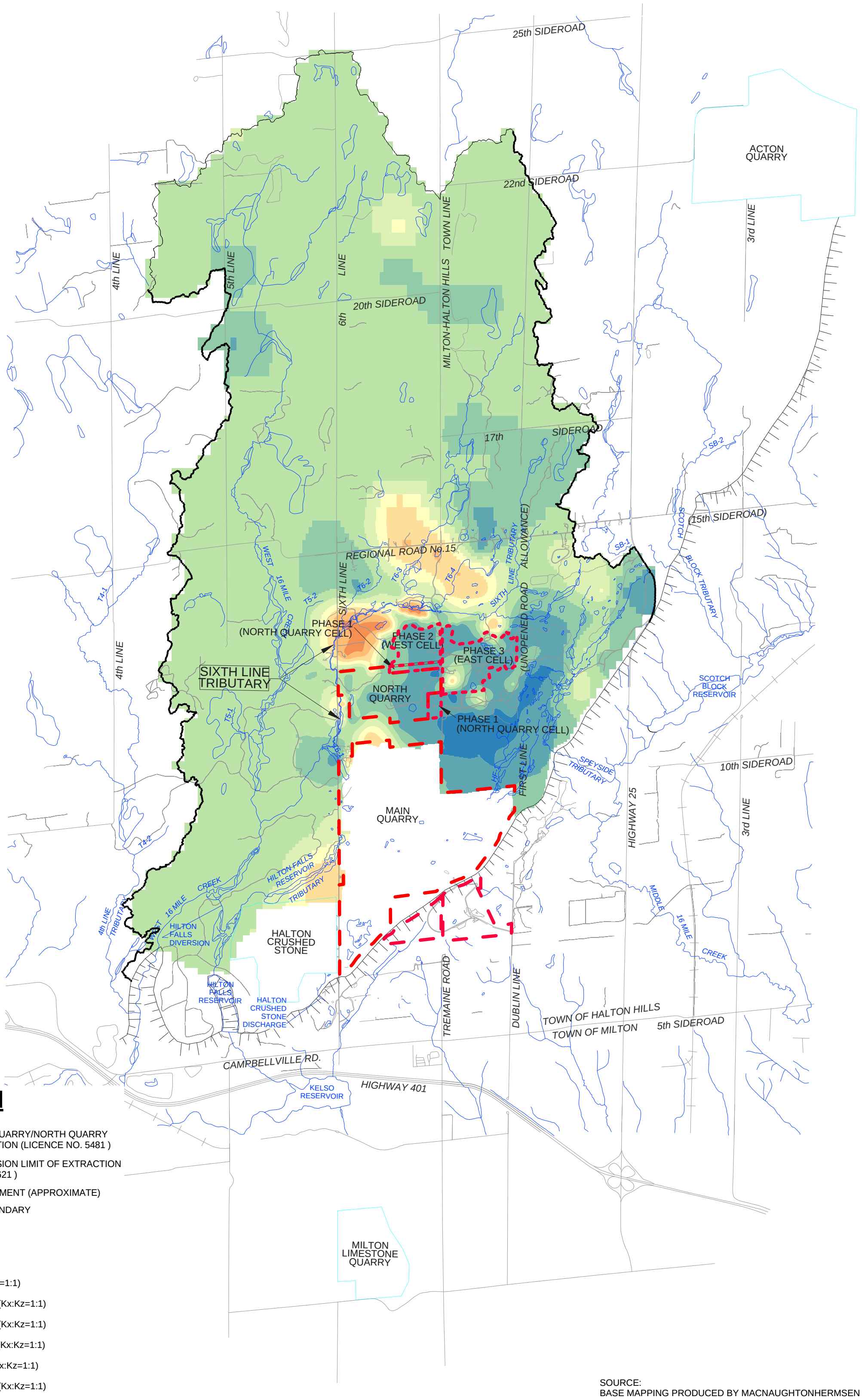
MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

CALIBRATED HYDRAULIC CONDUCTIVITY MODEL LAYERS 1 AND 2

FIGURE F6.6

Filename: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Workshare\010978-REPORTS\010978-RPT-169-MQEE-Groundwater-Flow-Model-Update\Figures\Surfer\Figure_6.6_L_1_2_K_Distribution.srf
Plot Date: November 2021



Legend

LICENSED MAIN QUARRY/NORTH QUARRY LIMIT OF EXTRACTION (LICENCE NO. 5481)
LICENSED EXTENSION LIMIT OF EXTRACTION (LICENCE NO. 608621)
NIAGARA ESCARPMENT (APPROXIMATE)
WATERSHED BOUNDARY
ROAD
RAILWAY
WATERWAYS
K > 4.5 m/day (Kx:Kz=1:1)
K = 4.0 to 4.5 m/day (Kx:Kz=1:1)
K = 3.5 to 4.0 m/day (Kx:Kz=1:1)
K = 3.0 to 3.5 m/day (Kx:Kz=1:1)
K = 2.5 to 3 m/day (Kx:Kz=1:1)
K = 2.0 to 2.5 m/day (Kx:Kz=1:1)
K = 1.5 to 2.0 m/day (Kx:Kz=1:1)
K = 1.0 to 1.5 m/day (Kx:Kz=1:1)
K = 0.5 to 1.0 m/day (Kx:Kz=1:1)
K = 0.1 to 0.5 m/day (Kx:Kz=1:1)
K < 0.1 m/day (Kx:Kz=1:1)

SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTONHERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONCESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES QUEEN'SPRINTER 1997.

WATERSHED BOUNDARY BASED ON THE SURFACE WATER CATCHMENTS PROVIDED BY CONSERVATION HALTON, OCTOBER 2010.

0 125 250 375m

N

GHD

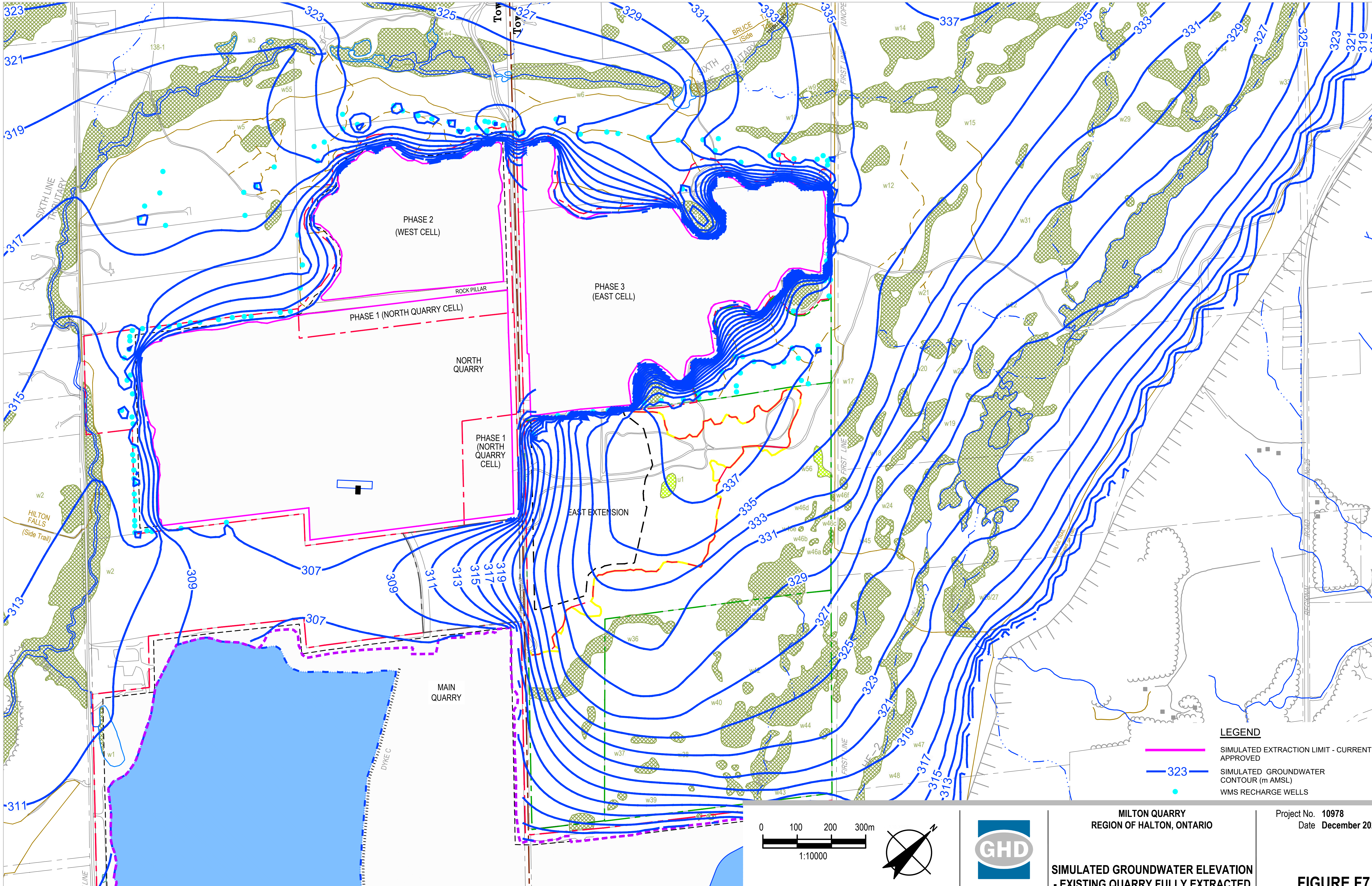
MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

CALIBRATED HYDRAULIC CONDUCTIVITY
MODEL LAYER 3

FIGURE F6.7

Filename: \\ghdnet\ghd\CA\Waterloo\Projects\662\010978\Workshare\010978-REPORTS\010978-RPT-169-MQEE-Groundwater-Flow-Model-Update\Figures\Surfer\Figure_6.7_L_3_K_Distribution.srf
Plot Date: November 2021



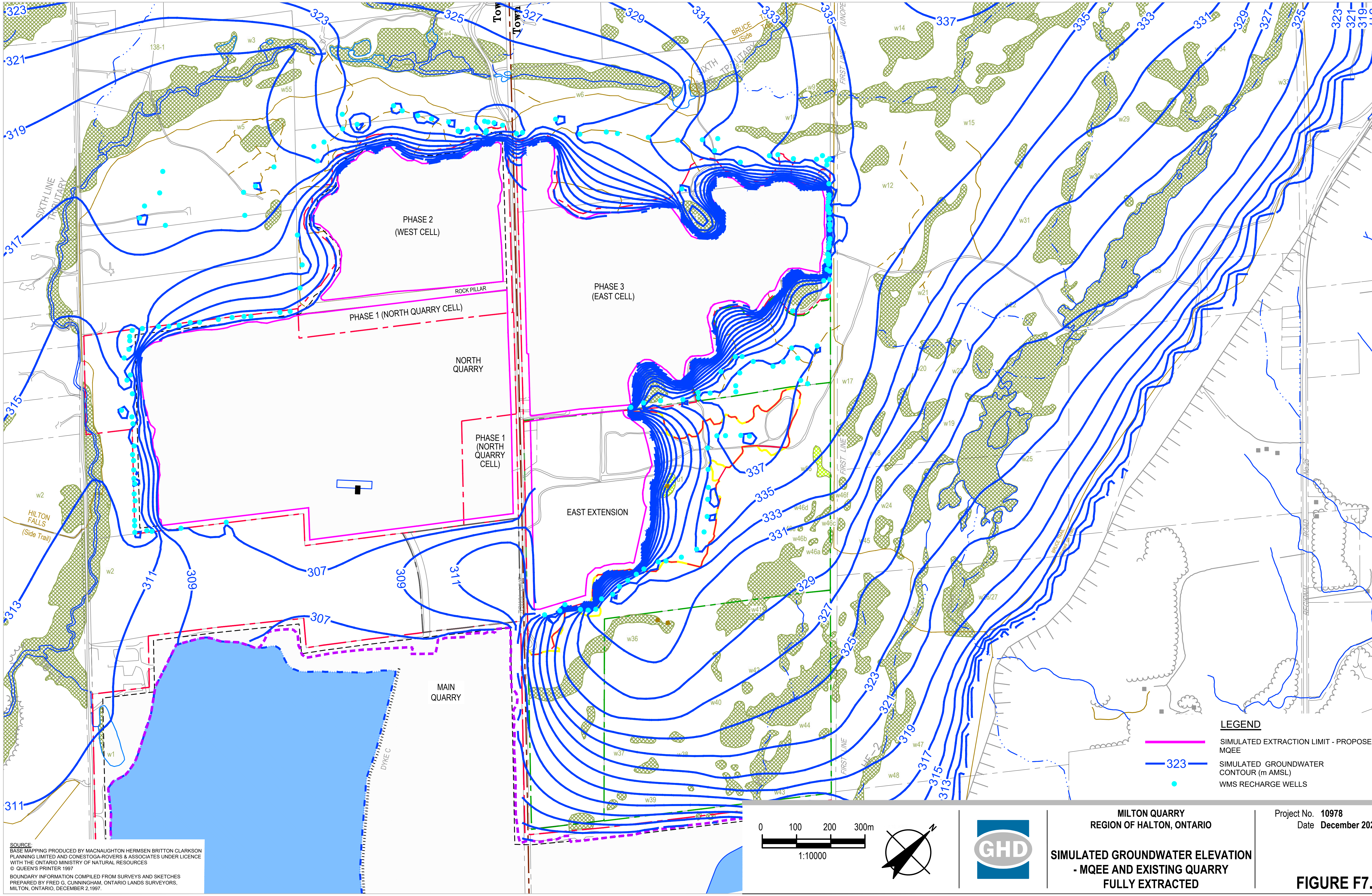
MILTON QUARRY
REGION OF HALTON, ONTARIO

SIMULATED GROUNDWATER ELEVATION
- EXISTING QUARRY FULLY EXTRACTED

Project No. 10978
Date December 2021

FIGURE F7.1

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(169)\10978-GHD-0000-RPT-EN-0117_WA-169.dwg
Plot Date: 02 December 2021 8:31 AM



SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES
© QUEEN'S PRINTER 1997

BOUNDARY INFORMATION COMPILED FROM SURVEYS AND SKETCHES PREPARED BY FRED G, CUNNINGHAM, ONTARIO LANDS SURVEYORS, MILTON, ONTARIO, DECEMBER 2,1997.

MILTON QUARRY
REGION OF HALTON, ONTARIO

SIMULATED GROUNDWATER ELEVATION - MQEE AND EXISTING QUARRY FULLY EXTRACTED

Project No. 10978
Date December 2021

FIGURE F7.2

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(169)\10978-GHD-0000-RPT-EN-0118_WA-169.dwg
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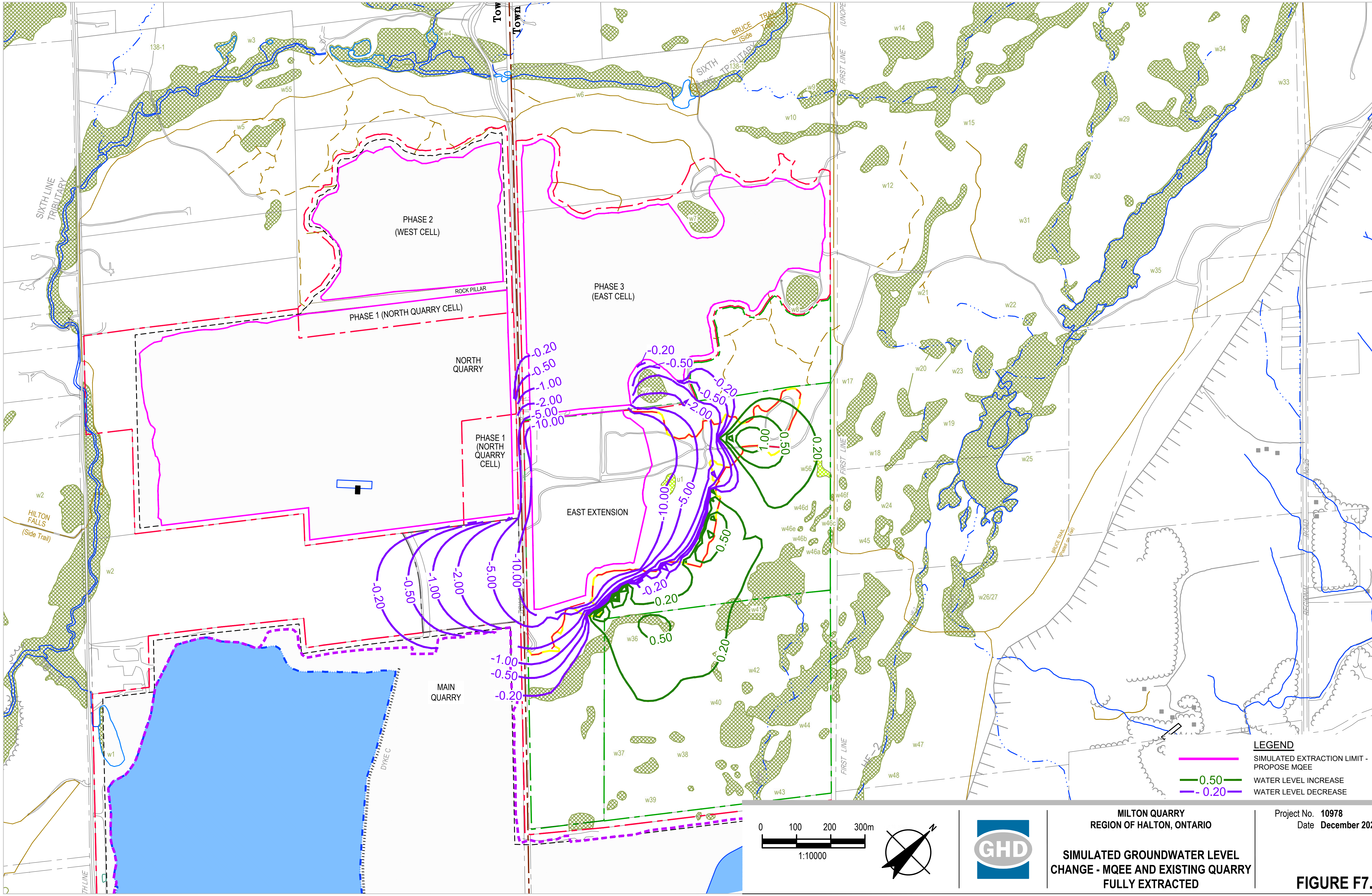


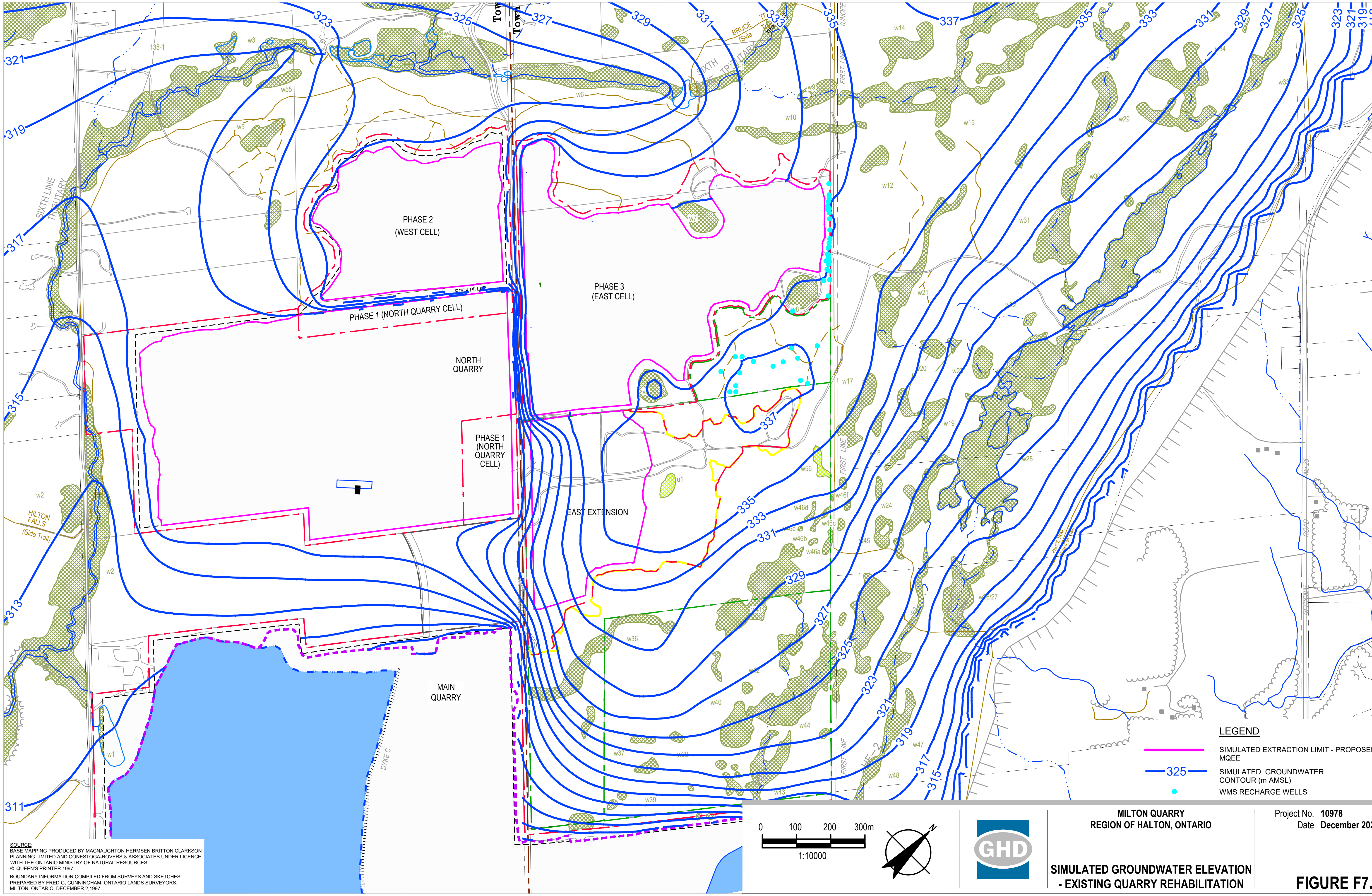
MILTON QUARRY
REGION OF HALTON, ONTARIO

SIMULATED GROUNDWATER LEVEL CHANGE - MQEE AND EXISTING QUARRY FULLY EXTRACTED

Project No. 10978
Date December 2021

FIGURE F7.3

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(169)\10978-GHD-0000-RPT-EN-0119_WA-169.dwg
Plot Date: 02 December 2021 8:32 AM



SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES
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BOUNDARY INFORMATION COMPILED FROM SURVEYS AND SKETCHES PREPARED BY FRED G. CUNNINGHAM, ONTARIO LANDS SURVEYORS, MILTON, ONTARIO, DECEMBER 2,1997.

GHD

MILTON QUARRY
REGION OF HALTON, ONTARIO

Project No. 10978
Date December 2021

SIMULATED GROUNDWATER ELEVATION
- EXISTING QUARRY REHABILITATION

FIGURE F7.4

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(169)\10978-GHD-0000-RPT-EN-0120_WA-169.dwg
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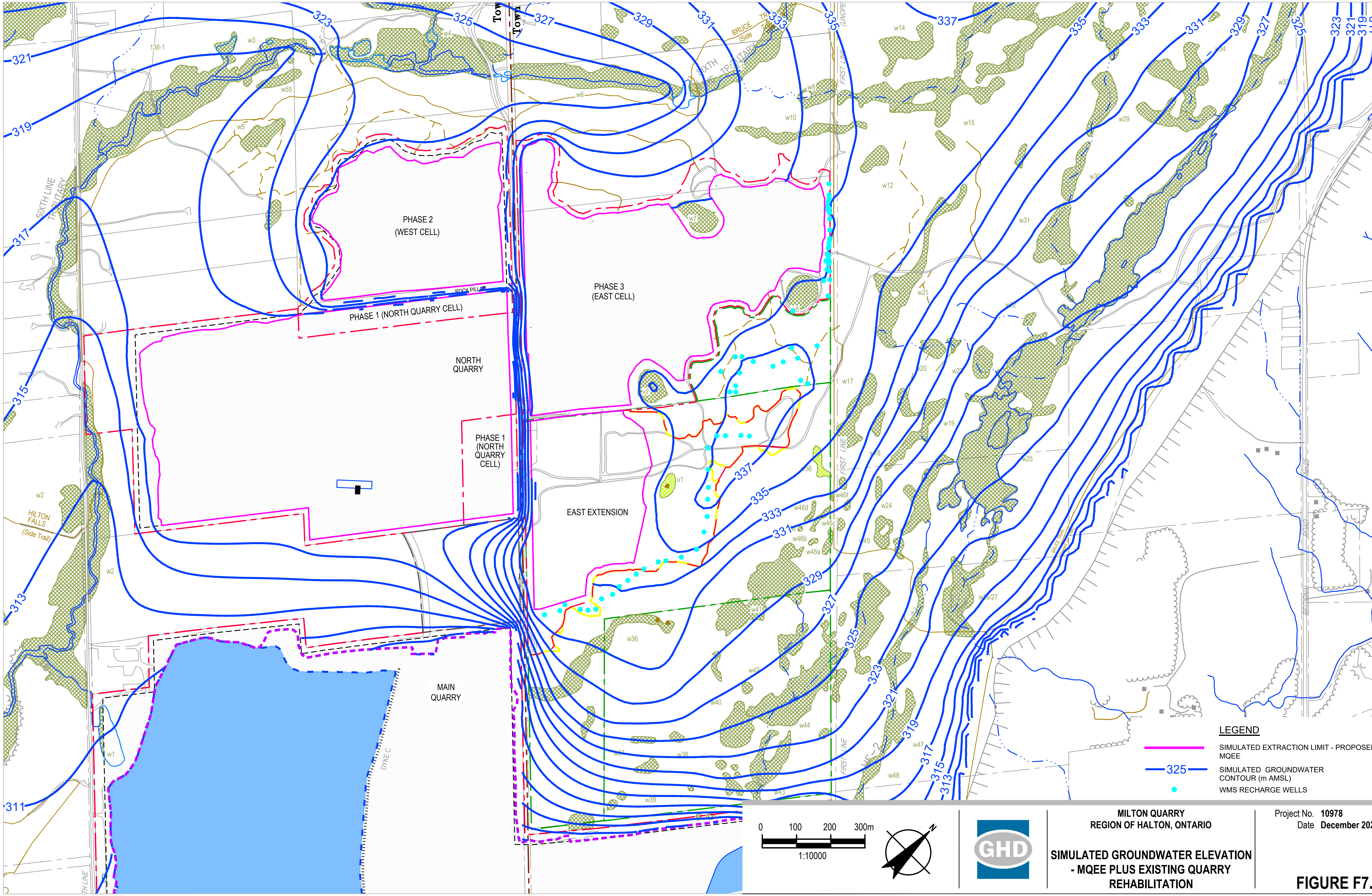

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(169)\10978-GHD-0000-RPT-EN-0121_WA-169.dwg
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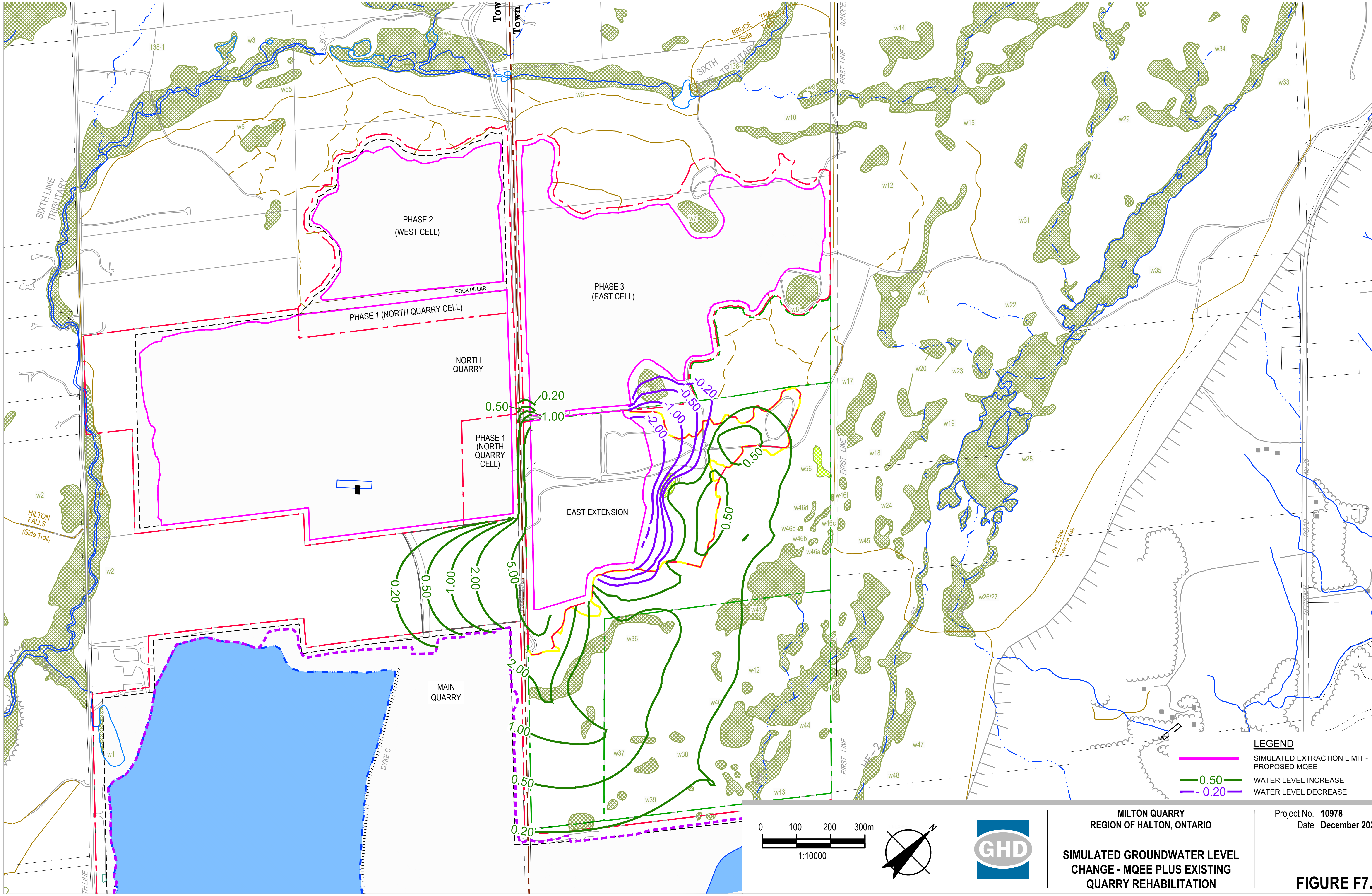

MILTON QUARRY
REGION OF HALTON, ONTARIO

SIMULATED GROUNDWATER LEVEL CHANGE - MQEE PLUS EXISTING QUARRY REHABILITATION

Project No. 10978
Date December 2021

FIGURE F7.6

Filename: N:\CA\Waterloo\Legacy\CAD\drawings\10000s\10978\10978-REPORTS\10978(169)\10978-GHD-0000-RPT-EN-0122_WA-169.dwg
Plot Date: 02 December 2021 8:33 AM

Table F5.1

Summary of Bottom of Reynales Elevations
Milton Quarry Extension
Region of Halton, Ontario

Borehole Name	Ground Surface Top Elevation (m AMSL)	Bottom of Reynales	
		Depth (m bgs)	Elevation (m AMSL)
A. Milton Quarry			
BH1-I	305.11	4.70	300.41
BH2-I	317.82	16.40	301.42
BH3-I	328.21	21.20	307.01
BH4-I	323.62	20.30	303.32
BH5-I	315.04	18.10	296.94
BH6-I	323.80	21.30	302.50
BH7-I	305.60	4.40	301.20
BH8-I	313.50	17.20	296.30
BH9-I	301.60	6.10	295.50
BH10-II	302.90	3.20	299.70
BH11-I	317.64	21.00	296.64
BH14-I	329.80	27.00	302.80
BH15-I	307.70	2.50	305.20
BH16-I	305.80	1.20	304.60
BH17-I	315.10	19.60	295.50
BH18-I	300.60	5.20	295.40
BH19-I	300.30	3.90	296.40
BH20-I	301.20	4.10	297.10
BH21-I	301.50	4.70	296.80
BH22-I	303.40	3.50	299.90
BH23-I	301.50	4.60	296.90
BH24-I	302.10	4.20	297.90
BH25-I	309.80	12.40	297.40
BH27	320.73	23.80	296.93
BH28	327.50	27.50	300.00
BH29	342.03	40.90	301.13
BH30	339.89	34.60	305.29
BH31	342.00	35.70	306.30
BH36	339.05	36.20	302.85
BH37	320.59	22.60	297.99
BH50	332.30	33.60	298.70
BH66	328.83	25.90	302.93
BH67	336.26	31.40	304.86
BH69	339.85	35.40	304.45
BH72	325.28	20.70	304.58
BH73	315.93	19.81	296.12
BH74	313.91	18.60	295.31
BH75	318.15	19.81	298.34
BH76	317.42	19.81	297.61
BH77	317.73	21.03	296.70
BH78	318.86	21.95	296.91
BH79	318.31	22.55	295.76
BH80	320.06	19.51	300.55
BH81	319.07	21.03	298.04
BH82	320.53	21.95	298.58
BH83	315.70	16.77	298.93
BH84	316.89	18.44	298.45
BH85	318.13	18.60	299.53
BH86	318.41	19.50	298.91
BH87	314.91	17.38	297.53
BH88	314.47	16.77	297.70
BH89	300.88	6.71	294.17

Table F5.1

Summary of Bottom of Reynales Elevations
Milton Quarry Extension
Region of Halton, Ontario

Borehole Name	Ground Surface Top Elevation (m AMSL)	Bottom of Reynales Depth (m bgs)	Bottom of Reynales Elevation (m AMSL)
A. Milton Quarry (cont'd)			
BH91	301.86	5.03	296.83
BH92-I	303.82	8.23	295.59
BH93	303.21	7.38	295.83
BH94	321.22	24.69	296.53
BH95	308.94	14.63	294.31
BH96	316.09	16.76	299.33
BH97	313.92	18.59	295.33
BH98	311.84	16.76	295.08
BH99	310.86	16.76	294.10
BH100	312.52	16.46	296.06
BH202	304.75	4.72	300.03
BH203	303.12	3.12	300.00
BH208	302.26	3.68	298.58
BH209	302.06	4.70	297.36
BH212	301.71	4.67	297.04
BH213	302.87	7.26	295.61
C1-I	333.36	31.73	301.63
G1	323.51	23.83	299.68
G2	302.51	4.29	298.22
G3	300.93	3.81	297.12
G4	305.56	8.44	297.12
G5	305.74	3.96	301.78
G6	304.98	4.05	300.93
IN1-07	343.45	39.50	303.95
IN2-07	338.19	35.60	302.59
IN3-07	342.82	41.80	301.02
IN4-07	339.42	35.70	303.72
IW1	318.28	19.80	298.48
IW2	319.78	20.73	299.05
IW3	317.34	16.76	300.58
MW1	312.74	16.70	296.04
MW2	312.55	15.10	297.45
MW201A-09	328.69	26.50	302.19
MW202A-09	329.84	29.60	300.24
MW204A-09	324.73	21.34	303.39
MW208A-09	333.05	29.31	303.74
MW209A-09	334.34	30.32	304.02
MW3	325.24	20.00	305.24
MW306A-10	334.85	29.87	304.98
MW315A-10	337.08	30.45	306.63
MW319A-10	343.10	39.32	303.78
MW321A-10	340.19	38.10	302.09
MW4B	338.35	36.58	301.78
MW4C	336.41	32.92	303.49
OGS-83-1	305.08	4.28	300.80
OW1-5-I	334.32	31.10	303.22
OW3-1-I	343.20	38.70	304.50
OW3-2-I	342.24	35.50	306.74
OW3-3-I	344.89	41.40	303.49
OW11-80	343.58	39.32	304.26
OW14-82	329.16	17.07	312.09
OW18-03	344.21	40.84	303.37

Table F5.1

Summary of Bottom of Reynales Elevations
Milton Quarry Extension
Region of Halton, Ontario

Borehole Name	Ground Surface Top Elevation (m AMSL)	Bottom of Reynales	
		Depth (m bgs)	Elevation (m AMSL)
A. Milton Quarry (cont'd)			
OW19-03	342.36	39.93	302.43
OW20-04	328.19	28.65	299.54
OW21-04	323.61	25.91	297.70
OW22-04	323.10	23.16	299.94
OW23-04	328.63	25.30	303.33
OW24-04	330.25	28.80	301.45
OW25-04	332.17	30.48	301.69
OW26-04	333.62	31.40	302.22
OW27-04	318.24	22.86	295.38
OW28-04	321.33	22.56	298.77
OW29-04	322.08	23.02	299.06
OW30-04	319.97	20.73	299.24
OW31-04	321.33	21.95	299.38
OW32-04	323.85	22.86	300.99
OW33-04	326.75	24.99	301.76
OW34-04	325.43	22.55	302.88
OW35-04	326.61	23.17	303.44
OW36-04	327.65	23.93	303.72
OW37-04	327.80	26.51	301.29
OW38-04	328.91	24.38	304.53
OW39-04	324.99	22.26	302.73
OW40-04	320.06	22.86	297.20
OW41-04	321.07	22.70	298.37
OW42-07	335.14	29.87	305.27
OW43-07	334.02	30.18	303.84
OW44-07	335.30	30.18	305.12
OW45-07	340.44	34.14	306.30
OW46-07	338.19	32.62	305.57
OW47-07	334.24	30.18	304.06
OW48-07	335.98	31.70	304.28
OW49-07	335.70	31.09	304.61
OW50-07	338.03	29.57	308.46
OW51-07	337.49	33.22	304.27
OW52-07	340.28	34.14	306.14
OW53-07	339.16	32.62	306.54
OW54-07	337.52	30.48	307.04
OW55-07	342.44	36.58	305.86
OW56-07	346.25	36.88	309.37
OW57-07	345.03	39.02	306.01
OW58-07	340.95	35.36	305.59
OW59-07	343.75	39.93	303.82
OW60-07	326.34	22.25	304.09
OW61-07	330.19	24.69	305.50
OW62-07	329.23	24.69	304.54
OW63-07	326.83	25.00	301.83
OW64-07	330.34	26.21	304.13
OW65-07	335.42	28.65	306.77
OW66-07	338.40	32.31	306.09
OW67-07	336.89	25.91	310.98
OW68-07	346.81	37.19	309.62
OW69-08	335.86	31.09	304.77
OW70-08	342.93	37.49	305.44

Table F5.1

Summary of Bottom of Reynales Elevations
Milton Quarry Extension
Region of Halton, Ontario

Borehole Name	Ground Surface Top Elevation (m AMSL)	Bottom of Reynales Depth (m bgs)	Bottom of Reynales Elevation (m AMSL)
A. Milton Quarry (cont'd)			
OW71-08	339.32	31.69	307.63
OW72-08	341.75	35.51	306.24
OW73-08	336.76	29.56	307.20
OW74-08	335.07	28.96	306.11
OW75-09	316.61	19.50	297.11
PW1	334.23	31.10	303.13
RW103C-07	315.92	20.73	295.19
RW104B-07	318.36	19.20	299.16
RW104C-07	317.62	22.86	294.76
RW106D-07	318.89	22.56	296.33
RW201A-09	328.67	28.00	300.67
RW201B-09	327.83	24.50	303.33
RW202A-09	329.78	26.00	303.78
RW203A-09	323.73	21.20	302.53
RW203B-09	322.57	20.40	302.17
RW204A-09	322.93	21.00	301.93
RW204B-09	323.79	20.70	303.09
RW205A-09	328.53	25.30	303.23
RW206A-09	329.21	25.90	303.31
RW207A-09	332.01	27.40	304.61
RW207B-09	332.93	27.30	305.63
RW208A-09	337.30	35.10	302.20
RW209A-09	334.82	32.00	302.82
RW301A-10	337.18	33.22	303.96
RW302B-10	334.03	28.35	305.68
RW303A-10	340.06	36.27	303.79
RW306A-10	335.54	30.45	305.09
RW307A-10	332.67	28.04	304.63
RW308A-10	335.56	30.48	305.08
RW311A-10	338.25	30.75	307.50
RW315A-10	337.16	28.35	308.81
RW318A-10	342.15	37.80	304.35
RW319A-10	342.15	37.80	304.35
RW320A-10	346.80	43.59	303.21
RW321A-10	340.18	38.10	302.08
B. Acton Quarry			
BH5-03	349.78	11.73	338.05
OW1C1	340.38	12.10	328.28
OW2M	339.53	8.20	331.33
OW3Q	327.40	5.80	321.60
OW4M	339.50	10.70	328.80
OW5C3	340.74	4.80	335.94
OW6C1	340.10	0.50	339.60
OW7Q	340.80	9.40	331.40
OW8Q	357.00	35.10	321.90
OW13C2	361.80	34.28	327.52
OW14C1	363.29	36.30	326.99
OW15C1	355.50	19.19	336.31
OW16C1	359.40	34.20	325.20
OW17R	357.65	28.44	329.21
OW22C	341.50	5.50	336.00

Table F5.1

Summary of Bottom of Reynales Elevations
Milton Quarry Extension
Region of Halton, Ontario

Borehole Name	Ground Surface Top Elevation (m AMSL)	Bottom of Reynales Depth (m bgs)	Bottom of Reynales Elevation (m AMSL)
B. Acton Quarry (cont'd)			
OW23C1	356.30	30.80	325.50
OW32C1	328.20	2.10	326.10
OW33C1	326.90	2.40	324.50
OW34Q	330.50	2.40	328.10
OW35Q	356.57	36.90	319.67
OW44-07	357.23	31.25	325.98
OW47-07	357.92	35.06	322.86
OW49-07	355.44	34.44	321.00
OW68-07	355.25	34.37	320.88
OW74-09	346.75	22.25	324.50
OW75-09	358.35	32.92	325.43
OW76-09	351.94	30.79	321.15
OW77-09	358.88	38.94	319.94
OW78-09	349.05	25.91	323.14
OW80-09	350.38	30.02	320.36
OW81-09	349.31	28.80	320.51
OW82-09	349.23	27.82	321.41
OW85-09	348.83	29.57	319.26
OW87-09	348.32	28.04	320.28
OW88-09	352.09	32.61	319.48
OW89-10	343.34	20.04	323.30
OW90-10	362.52	46.86	315.66
MW1-I	360.85	39.30	321.55
MW2-I	360.89	34.60	326.29
MW3-I	352.54	18.50	334.04
MW4-I	359.95	35.60	324.35
MW5-I	353.07	23.40	329.67
MW6-I	353.32	34.80	318.52
MW7-I	355.64	33.90	321.74
MW8-I	351.86	27.00	324.86
MW9-I	354.84	23.50	331.34
MW10-I	354.31	31.60	322.71
MW11-I	349.37	19.70	329.67
MW12-I	353.48	33.00	320.48
MW13-I	350.41	25.30	325.11

Table F6.1

Groundwater Elevations and Residuals - July 2010
Milton Quarry Extension
Region of Halton, Ontario

Well Label	Target Source	Layer	July 2010 Groundwater Level (m AMSL)	Simulated Groundwater Level (MQEE Model) (m AMSL)	Residual Difference [(1)] (m)
BH109	(a)	3	317.79	317.91	-0.12
BH110	(a)	3	316.29	317.20	-0.91
BH111	(a)	3	315.78	315.39	0.39
BH112	(a)	3	331.28	331.16	0.12
BH113	(a)	3	332.34	329.85	2.49
BH27	(a)	3	315.69	315.46	0.23
BH30	(a)	3	334.60	333.96	0.64
BH31	(a)	3	337.68	337.38	0.30
BH37	(a)	3	315.80	315.80	0.01
BH38-II	(a)	3	320.03	319.67	0.36
BH39-II	(a)	3	320.87	319.72	1.15
BH40-II	(a)	3	330.51	329.04	1.46
BH41-II	(a)	3	333.66	330.78	2.88
BH42	(a)	2	337.88	337.63	0.25
BH43-I	(a)	2	335.67	335.38	0.28
BH43-II	(a)	1	335.66	335.38	0.27
BH44-I	(a)	2	332.08	331.80	0.28
BH45-I	(a)	3	333.79	333.37	0.42
BH46	(a)	3	332.77	331.69	1.08
BH47	(a)	3	333.52	332.47	1.05
BH48	(a)	2	330.38	328.94	1.43
BH54-II	(a)	3	315.32	314.23	1.09
BH55	(a)	3	312.94	313.41	-0.47
BH56	(a)	3	312.84	313.96	-1.12
BH57-II	(a)	2	313.79	313.87	-0.07
BH57-III	(a)	3	314.42	313.86	0.55
BH58-III	(a)	3	314.59	314.83	-0.24
BH58-II	(a)	2	314.41	314.84	-0.43
BH60	(a)	3	314.91	314.41	0.51
BH61-II	(a)	3	314.60	314.44	0.15
BH61-IV	(a)	2	314.55	314.29	0.26
BH65	(a)	3	328.72	329.37	-0.65
BH66	(a)	3	325.55	326.61	-1.06
BH72	(a)	3	324.47	323.74	0.73
DP2	(a)	1	333.72	333.34	0.38
DP4	(a)	1	340.14	339.62	0.52
DP6	(a)	1	328.49	329.22	-0.74
DW108A	(a)	3	326.23	325.63	0.60
DW113A	(a)	3	318.10	317.47	0.63
MW1	(a)	3	303.63	305.29	-1.66
MW101A-07	(a)	3	312.34	312.64	-0.30
MW102A-07	(a)	3	315.43	315.14	0.29
MW106A-07	(a)	3	314.81	315.60	-0.79
MW110A-07	(a)	3	318.27	318.56	-0.29
MW111A-07	(a)	3	319.08	318.00	1.08
MW112A-07	(a)	3	316.24	316.56	-0.32
MW113A-07	(a)	3	315.65	315.25	0.40
MW201A-09	(a)	3	316.08	315.06	1.02
MW202A-09	(a)	3	317.05	317.45	-0.40
MW204A-09	(a)	3	318.33	319.05	-0.72
MW208A-09	(a)	3	324.65	323.86	0.79
MW209A-09	(a)	3	324.97	324.19	0.78
MW304A-10	(a)	3	331.24	329.59	1.64
MW305A-10	(a)	3	331.95	331.00	0.94
MW309B-10	(a)	3	333.25	332.70	0.56
MW311A-10	(a)	3	335.39	335.06	0.33
MW313A-10	(a)	3	335.47	335.31	0.16

Table F6.1

Groundwater Elevations and Residuals - July 2010
Milton Quarry Extension
Region of Halton, Ontario

Well Label	Target Source	Layer	July 2010 Groundwater Level (m AMSL)	Simulated Groundwater Level (MQEE Model) (m AMSL)	Residual Difference [(1)] (m)
MW315A-10	(a)	3	335.45	335.49	-0.05
MW319A-10	(a)	3	333.86	333.85	0.00
MW3	(a)	3	313.42	312.15	1.27
MW4C	(a)	3	316.68	317.92	-1.24
MW5	(a)	3	307.79	306.88	0.91
OW1-1	(a)	3	331.72	330.82	0.90
OW1-2	(a)	3	331.66	330.70	0.96
OW1-3	(a)	3	331.72	331.09	0.63
OW14-82	(a)	3	325.59	324.36	1.22
OW15-82	(a)	3	324.18	324.65	-0.48
OW18-03	(a)	3	315.32	312.42	2.90
OW19-03	(a)	3	319.22	313.75	5.46
OW20-04	(a)	3	316.67	316.22	0.45
OW21-04	(a)	3	317.51	318.18	-0.67
OW22-04	(a)	3	318.07	318.63	-0.56
OW23-04	(a)	3	320.96	320.79	0.17
OW2-3I	(a)	3	325.44	324.38	1.06
OW2-4	(a)	3	325.47	324.57	0.90
OW24-04	(a)	3	323.73	322.85	0.88
OW25-04	(a)	3	323.70	323.43	0.27
OW26-04	(a)	3	325.08	323.78	1.30
OW27-04	(a)	3	317.03	316.51	0.51
OW28-04	(a)	3	317.55	317.11	0.43
OW29-04	(a)	3	317.61	317.42	0.19
OW30-04	(a)	3	317.85	317.73	0.11
OW31-04	(a)	3	318.11	318.62	-0.51
OW32-04	(a)	3	319.66	319.50	0.17
OW33-04	(a)	3	322.25	321.22	1.03
OW34-04	(a)	3	323.22	322.84	0.37
OW35-04	(a)	3	323.43	323.18	0.25
OW36-04	(a)	3	323.58	323.37	0.21
OW37-04	(a)	3	323.72	323.46	0.26
OW38-04	(a)	3	325.11	323.89	1.22
OW39-04	(a)	3	324.06	323.83	0.23
OW40-04	(a)	3	317.83	318.34	-0.51
OW41-04	(a)	3	318.19	318.45	-0.26
OW42-07	(a)	3	325.18	324.86	0.32
OW43-07	(a)	3	325.01	324.85	0.15
OW44-07	(a)	3	324.83	325.37	-0.54
OW45-07	(a)	3	330.61	328.65	1.96
OW46-07	(a)	3	332.21	330.57	1.63
OW47-07	(a)	3	330.96	329.63	1.33
OW48-07	(a)	3	331.10	330.47	0.63
OW49-07	(a)	3	331.93	331.18	0.74
OW50-07	(a)	3	333.23	332.21	1.02
OW51-07	(a)	3	334.76	334.60	0.16
OW52-07	(a)	3	335.31	335.09	0.22
OW53-07	(a)	3	335.36	335.21	0.15
OW54-07	(a)	3	335.47	335.45	0.02
OW55-07	(a)	3	335.92	335.96	-0.05
OW56-07	(a)	3	336.92	336.53	0.39
OW57-07	(a)	3	337.27	337.12	0.15
OW5-80	(a)	3	335.66	335.22	0.44
OW58-07	(a)	3	337.40	337.37	0.03
OW59-07	(a)	3	327.56	324.98	2.58
OW60-07	(a)	3	323.66	323.94	-0.28
OW61-07	(a)	3	324.56	324.27	0.28

Table F6.1

Groundwater Elevations and Residuals - July 2010
Milton Quarry Extension
Region of Halton, Ontario

Well Label	Target Source	Layer	July 2010 Groundwater Level (m AMSL)	Simulated Groundwater Level (MQEE Model) (m AMSL)	Residual Difference [(1)] (m)
OW62-07	(a)	3	324.14	324.45	-0.32
OW63-07	(a)	3	324.47	324.47	0.00
OW64-07	(a)	3	324.99	326.53	-1.54
OW65-07	(a)	3	333.10	332.02	1.08
OW66-07	(a)	3	334.14	334.36	-0.22
OW67-07	(a)	3	335.28	334.53	0.75
OW6-80	(a)	3	330.98	329.01	1.97
OW68-07	(a)	3	342.61	342.58	0.03
OW69-08	(a)	3	334.58	333.51	1.08
OW70-08	(a)	3	337.19	336.18	1.01
OW71-08	(a)	3	335.88	335.51	0.36
OW72-08	(a)	3	337.29	333.91	3.38
OW73-08	(a)	3	335.28	335.20	0.08
OW74-08	(a)	3	332.40	331.92	0.48
OW75-09	(a)	3	313.97	314.24	-0.27
OW9-80	(a)	3	334.10	334.30	-0.20
PW1	(a)	3	331.68	330.89	0.79
PW2	(a)	3	325.46	324.40	1.06
BH11-V	(b)	3	312.35	311.61	0.74
BH64	(b)	3	331.62	331.58	0.04
BH67	(b)	3	335.43	334.74	0.69
BH68	(b)	3	335.33	334.55	0.78
BH69	(b)	3	336.26	335.10	1.16
BH70	(b)	3	336.43	336.07	0.36
BH73	(b)	3	309.54	309.99	-0.45
BH74	(b)	3	311.42	311.40	0.02
BH75	(b)	3	310.33	310.72	-0.39
BH76	(b)	3	310.38	310.91	-0.53
BH77	(b)	3	312.24	311.74	0.50
BH78	(b)	3	310.01	311.02	-1.01
BW1	(b)	3	332.42	334.10	-1.68
BW2	(b)	3	342.63	342.34	0.29
BW3-S	(b)	3	354.04	354.00	0.04
DP7	(b)	1	335.36	334.15	1.21
DP8	(b)	1	335.26	334.19	1.06
DP9	(b)	2	335.92	336.13	-0.21
DW127	(b)	3	323.81	323.59	0.22
MP1	(b)	1	313.63	313.76	-0.13
MP2-II	(b)	1	312.78	312.31	0.47
MP4-I	(b)	2	324.06	324.86	-0.80
MP5-I	(b)	2	323.86	324.38	-0.52
MP6	(b)	2	328.87	329.97	-1.10
MP8-II	(b)	2	323.41	323.40	0.01
MW321A-10	(b)	3	315.63	315.13	0.50
OW1-5-III	(b)	2	331.58	330.87	0.71
OW17-82	(b)	3	325.92	327.21	-1.28
OW3-1-II	(b)	3	338.29	337.17	1.12
OW3-2-II	(b)	3	338.08	337.14	0.94
OW3-3-II	(b)	3	338.27	337.17	1.10
OW7-80	(b)	3	323.33	323.93	-0.61
OW8-80	(b)	3	329.02	328.80	0.22
OW78D-20	(b)	3	336.06	336.63	-0.57
OW80-20	(b)	3	335.88	334.93	0.95
OW81-20	(b)	3	332.11	331.01	1.10
OW82-20	(b)	3	327.32	328.88	-1.57
OW83-21	(b)	3	332.93	331.76	1.17
TW1-80	(b)	3	338.18	337.17	1.01

Table F6.1

Groundwater Elevations and Residuals - July 2010
Milton Quarry Extension
Region of Halton, Ontario

Well Label	Target Source	Layer	July 2010 Groundwater Level (m AMSL)	Simulated Groundwater Level (MQEE Model) (m AMSL)	Residual Difference [(1)] (m)
OW105-18	(b)	3	362.88	363.39	-0.51
OW106-18	(b)	3	352.31	352.17	0.14
SG10	(a)	1	324.87	324.21	0.66
SG11	(a)	2	313.89	314.00	-0.11
SG12	(a)	1	312.67	312.92	-0.26
SG28	(a)	1	333.59	332.38	1.20
SG29	(a)	2	332.90	331.86	1.04
SG32	(a)	2	314.13	314.37	-0.24
SG34	(a)	2	320.24	319.16	1.07
SG35	(a)	2	323.28	323.21	0.06
SG36	(a)	2	323.27	323.31	-0.03
SG38	(a)	2	323.34	323.40	-0.06
SG40	(a)	1	312.29	312.31	-0.01
SG41	(a)	2	323.64	323.76	-0.11
SG42	(a)	2	323.95	324.32	-0.37
SG44	(a)	2	328.79	329.83	-1.04
SG47	(a)	2	323.26	323.40	-0.14
SG48	(a)	2	323.27	323.30	-0.04
SG49	(a)	2	317.55	317.60	-0.05
SG58	(c)	1	332.69	331.01	1.68
SG60	(c)	1	328.58	329.14	-0.56
SG61	(c)	1	328.95	329.51	-0.55
SG62	(c)	1	329.32	329.58	-0.25
SG63	(c)	1	330.56	329.34	1.22
SW10	(a)	2	313.81	313.80	0.00
SW12	(a)	1	311.89	311.94	-0.05
SW18	(a)	2	323.29	322.01	1.29
SW1-80	(a)	1	325.28	325.94	-0.67
SW2	(a)	2	317.15	317.06	0.08
SW3	(a)	1	327.06	327.20	-0.14
SW7-81	(a)	1	329.59	328.84	0.75
SW18A	(a)	2	318.61	319.55	-0.94

Number of Observations	203	
Residual Mean	0.33	m
Absolute Residual Mean	0.68	m
Residual Standard Deviation	0.89	m
Residual Sum of Squares	182.12	m^2
Minimum Residual	-1.68	m
Maximum Residual	5.46	m
Observed Head Range	59.25	m
Standard Deviation/Head Range	0.015	m/m
Residual Absolute Mean/Head Range	1.1	%

Notes:

(1) Residual difference equals the observed groundwater level minus the simulated groundwater level
(a) July 2010 Measured Groundwater Elevation Target
(b) Hybrid 2010 Data - Groundwater Target
(c) Hybrid 2010 Data - Wetland Target

Table F6.2

Groundwater Elevations and Residuals - Average Annual 2017 Condition
Milton Quarry Extension
Region of Halton, Ontario

Well Label	Model Layer	Annual Average 2017 Groundwater Level (m AMSL)	Simulated Groundwater Level (2017 Model) (m AMSL)	Residual Difference (1) (m)
BH37	3	315.49	315.11	0.38
BH48	3	330.36	329.77	0.59
BH55	3	312.90	313.04	-0.14
BH56	3	312.65	313.42	-0.77
BH57-III	3	313.41	313.39	0.01
BH59	3	313.92	313.83	0.10
BH60	3	314.43	314.02	0.41
BH61-III	3	314.12	314.15	-0.03
OW27-04	3	317.51	316.58	0.93
OW28-04	3	318.24	318.23	0.01
OW29-04	3	318.42	318.82	-0.40
OW30-04	3	318.39	318.17	0.22
OW31-04	3	319.11	319.85	-0.74
OW32-04	3	320.39	320.34	0.05
OW33-04	3	322.54	322.04	0.49
OW34-04	3	323.46	323.25	0.21
OW35-04	3	323.59	324.12	-0.53
OW36-04	3	323.72	324.79	-1.07
OW37-04	3	323.87	324.76	-0.88
OW38-04	3	324.89	327.59	-2.70
OW52-07	3	336.24	336.55	-0.31
OW5-80	3	336.25	336.14	0.11
OW60-07	3	323.74	325.01	-1.27
OW61-07	3	324.54	325.66	-1.13
OW62-07	3	324.22	324.98	-0.76
OW63-07	3	324.61	324.71	-0.09
OW64-07	3	325.39	327.09	-1.70
OW65-07	3	333.80	333.71	0.09
OW66-07	3	335.15	335.70	-0.56
OW70-08	3	338.48	337.70	0.77
OW71-08	3	336.79	336.47	0.33

Number of Observations	31	
Residual Mean	-0.27	m
Absolute Residual Mean	0.57	m
Residual Standard Deviation	0.76	m
Residual Sum of Squares	20.18	m^2
Minimum Residual	-2.70	m
Maximum Residual	0.93	m
Observed Head Range	25.82	m
Residual Standard Deviation/Head Range	0.029	m/m
Residual Absolute Mean/Head Range	2.2	%

Note:

(1) Residual different equals the observed groundwater level minus the simulated groundwater level

Table F6.3

Flow Calibration Targets
Milton Quarry Extension
Region of Halton, Ontario

		Recharge Flows (L/min)							Quarry Flows (L/min)				
Model	**Notes**	**North Quarry**	**West Cell**	**East Cell**	**Wetland V2**	**Wetland W7**	**Wetland W8**	**Total**	**Main Quarry**	**North Quarry**	**West Cell**	**East Cell**	**Total**
	2010 Flow Target	*1222*	-	-	117	-	-	-	-	1423	-	-	-
2010_v032.020	July 2010 Conditions	926	-	-	133	-	-	1059	658	1277	-	-	1935
	2017 Flow Target	*1478*	*2591*	*794*	*86*	*67*	*29*	*4863*	*666*	-	-	-	*4380*
2017_v032.154	Average 2017 Conditions	1478	2591	752	171	27	1	5021	617	2047	1483	611	4759

Table F6.4

Comparison of MQEE Model, 5-Year Review Model, and Pre-Extraction Model July 2010 Residual Statistics
Milton Quarry Extension
Region of Halton, Ontario

Well Label	Layer	July 2010 Groundwater Level (m AMSL)	Simulated Groundwater Level (Pre-Extraction Model) (m AMSL)	Residual Difference [(1)] (m)	Simulated Groundwater Level (5-Year Review Model) (m AMSL)	Residual Difference [(1)] (m)	Simulated Groundwater Level (MQEE Model) (m AMSL)	Residual Difference [(1)] (m)
BH109	3	317.79	317.44	0.35	317.94	-0.15	317.91	-0.12
BH110	3	316.29	317.06	-0.77	317.44	-1.15	317.20	-0.91
BH111	3	315.78	315.45	0.33	315.94	-0.16	315.39	0.39
BH112	3	331.28	332.57	-1.29	332.34	-1.06	331.16	0.12
BH113	3	332.34	330.11	2.23	330.36	1.98	329.85	2.49
BH27	3	315.69	315.79	-0.10	316.28	-0.59	315.46	0.23
BH30	3	334.60	335.00	-0.40	334.24	0.36	333.96	0.64
BH31	3	337.68	337.84	-0.16	337.21	0.47	337.38	0.30
BH37	3	315.80	315.59	0.21	315.78	0.02	315.80	0.01
BH38-II	3	320.03	319.99	0.04	319.20	0.83	319.67	0.36
BH39-II	3	320.87	320.73	0.13	320.27	0.59	319.72	1.15
BH40-II	3	330.51	330.43	0.08	329.25	1.26	329.04	1.46
BH41-II	3	333.66	334.27	-0.61	332.95	0.71	330.78	2.88
BH42	2	337.88	338.24	-0.36	337.70	0.18	337.63	0.25
BH43-I	2	335.67	335.67	0.00	335.14	0.53	335.38	0.28
BH43-II	1	335.66	335.67	-0.01	335.14	0.52	335.38	0.27
BH44-I	2	332.08	333.50	-1.42	332.54	-0.46	331.80	0.28
BH45-I	3	333.79	333.92	-0.13	334.05	-0.26	333.37	0.42
BH46	3	332.77	332.51	0.26	332.52	0.25	331.69	1.08
BH47	3	333.52	333.36	0.16	333.13	0.39	332.47	1.05
BH48	2	330.38	328.90	1.48	329.28	1.10	328.94	1.43
BH54-II	3	315.32	314.21	1.11	314.62	0.70	314.23	1.09
BH55	3	312.94	313.68	-0.74	313.83	-0.89	313.41	-0.47
BH56	3	312.84	314.08	-1.24	314.33	-1.49	313.96	-1.12
BH57-II	2	313.79	314.02	-0.23	314.24	-0.45	313.87	-0.07
BH57-III	3	314.42	314.03	0.39	314.23	0.19	313.86	0.55
BH58-III	3	314.59	314.94	-0.35	315.39	-0.80	314.83	-0.24
BH58-II	2	314.41	314.94	-0.53	315.37	-0.96	314.84	-0.43
BH60	3	314.91	314.45	0.46	314.57	0.34	314.41	0.51
BH61-II	3	314.60	314.44	0.16	314.55	0.05	314.44	0.15
BH61-IV	2	314.55	314.30	0.25	314.39	0.16	314.29	0.26
BH65	3	328.72	327.22	1.50	328.32	0.40	329.37	-0.65
BH66	3	325.55	324.91	0.64	326.58	-1.03	326.61	-1.06
BH72	3	324.47	322.37	2.10	323.47	1.00	323.74	0.73
DP2	1	333.72	333.92	-0.20	334.04	-0.32	333.34	0.38
DP4	1	340.14	340.09	0.05	340.08	0.06	339.62	0.52
DP6	1	328.49	327.13	1.36	328.18	0.31	329.22	-0.74
DW108A	3	326.23	326.71	-0.48	325.80	0.43	325.63	0.60
DW113A	3	318.10	318.76	-0.66	316.77	1.33	317.47	0.63
MW1	3	303.63	305.97	-2.34	306.00	-2.37	305.29	-1.66
MW101A-07	3	312.34	312.31	0.03	312.68	-0.34	312.64	-0.30
MW102A-07	3	315.43	315.17	0.26	315.51	-0.08	315.14	0.29
MW106A-07	3	314.81	315.03	-0.22	316.08	-1.27	315.60	-0.79
MW110A-07	3	318.27	318.14	0.13	318.84	-0.57	318.56	-0.29
MW111A-07	3	319.08	318.20	0.88	318.47	0.61	318.00	1.08
MW112A-07	3	316.24	316.23	0.01	316.98	-0.74	316.56	-0.32
MW113A-07	3	315.65	315.33	0.32	315.99	-0.34	315.25	0.40
MW201A-09	3	316.08	315.89	0.19	316.40	-0.32	315.06	1.02
MW202A-09	3	317.05	318.33	-1.28	317.95	-0.90	317.45	-0.40
MW204A-09	3	318.33	319.99	-1.66	319.37	-1.04	319.05	-0.72
MW208A-09	3	324.65	324.01	0.64	324.22	0.43	323.86	0.79
MW209A-09	3	324.97	324.26	0.71	324.65	0.32	324.19	0.78
MW304A-10	3	331.24	330.78	0.46	329.80	1.44	329.59	1.64
MW305A-10	3	331.95	331.95	0.00	331.98	-0.03	331.00	0.94
MW309B-10	3	333.25	333.53	-0.28	333.78	-0.53	332.70	0.56
MW311A-10	3	335.39	335.49	-0.10	334.75	0.64	335.06	0.33
MW313A-10	3	335.47	335.49	-0.02	335.12	0.35	335.31	0.16
MW315A-10	3	335.45	335.79	-0.34	335.26	0.19	335.49	-0.05
MW319A-10	3	333.86	334.06	-0.20	333.34	0.52	333.85	0.00
MW3	3	313.42	312.86	0.56	314.74	-1.32	312.15	1.27
MW4C	3	316.68	315.01	1.67	315.64	1.04	317.92	-1.24
MW5	3	307.79	306.48	1.31	306.49	1.30	306.88	0.91
OW1-1	3	331.72	331.55	0.17	332.00	-0.28	330.82	0.90
OW1-2	3	331.66	331.41	0.25	331.96	-0.30	330.70	0.96
OW1-3	3	331.72	331.80	-0.08	332.28	-0.56	331.09	0.63
OW14-82	3	325.59	323.75	1.84	326.52	-0.93	324.36	1.22
OW15-82	3	324.18	324.36	-0.18	326.08	-1.90	324.65	-0.48
OW18-03	3	315.32	312.85	2.47			312.42	2.90
OW19-03	3	319.22	313.71	5.51			313.75	5.46
OW20-04	3	316.67	317.00	-0.33	317.18	-0.51	316.22	0.45
OW21-04	3	317.51	319.17	-1.66	318.57	-1.06	318.18	-0.67
OW22-04	3	318.07	319.56	-1.49	318.93	-0.86	318.63	-0.56
OW23-04	3	320.96	321.42	-0.46	321.22	-0.26	320.79	0.17
OW2-3I	3	325.44	324.49	0.95	324.88	0.56	324.38	1.06
OW2-4	3	325.47	324.98	0.48	325.06	0.40	324.57	0.90
OW24-04	3	323.73	322.86	0.87	322.70	1.03	322.85	0.88
OW25-04	3	323.70	323.51	0.19	323.44	0.26	323.43	0.27
OW26-04	3	325.08	323.99	1.09	324.04	1.04	323.78	1.30
OW27-04	3	317.03	316.52	0.50	316.62	0.40	316.51	0.51
OW28-04	3	317.55	317.34	0.21	317.33	0.22	317.11	0.43

Table F6.4

Comparison of MQEE Model, 5-Year Review Model, and Pre-Extraction Model July 2010 Residual Statistics
Milton Quarry Extension
Region of Halton, Ontario

Well Label	Layer	July 2010 Groundwater Level (m AMSL)	Simulated Groundwater Level (Pre-Extraction Model) (m AMSL)	Residual Difference [(1)] (m)	Simulated Groundwater Level (5-Year Review Model) (m AMSL)	Residual Difference [(1)] (m)	Simulated Groundwater Level (MQEE Model) (m AMSL)	Residual Difference [(1)] (m)
OW29-04	3	317.61	317.71	-0.10	317.59	0.02	317.42	0.19
OW30-04	3	317.85	317.86	-0.01	317.81	0.04	317.73	0.11
OW31-04	3	318.11	319.46	-1.35	318.88	-0.77	318.62	-0.51
OW32-04	3	319.66	320.26	-0.60	319.85	-0.19	319.50	0.17
OW33-04	3	322.25	321.21	1.04	321.21	1.04	321.22	1.03
OW34-04	3	323.22	322.40	0.82	322.63	0.59	322.84	0.37
OW35-04	3	323.43	323.06	0.37	323.08	0.35	323.18	0.25
OW36-04	3	323.58	323.41	0.17	323.41	0.17	323.37	0.21
OW37-04	3	323.72	323.55	0.17	323.61	0.11	323.46	0.26
OW38-04	3	325.11	323.92	1.19	324.19	0.92	323.89	1.22
OW39-04	3	324.06	323.73	0.33	324.00	0.06	323.83	0.23
OW40-04	3	317.83	318.88	-1.05	318.43	-0.60	318.34	-0.51
OW41-04	3	318.19	319.05	-0.86	318.67	-0.48	318.45	-0.26
OW42-07	3	325.18	325.33	-0.15	325.24	-0.06	324.86	0.32
OW43-07	3	325.01	325.25	-0.24	325.31	-0.30	324.85	0.15
OW44-07	3	324.83	325.77	-0.94	325.66	-0.83	325.37	-0.54
OW45-07	3	330.61	329.63	0.98	327.27	3.34	328.65	1.96
OW46-07	3	332.21	331.84	0.37	331.58	0.63	330.57	1.63
OW47-07	3	330.96	329.98	0.98	330.54	0.42	329.63	1.33
OW48-07	3	331.10	331.06	0.04	331.91	-0.81	330.47	0.63
OW49-07	3	331.93	331.94	-0.01	332.60	-0.67	331.18	0.74
OW50-07	3	333.23	333.04	0.19	333.57	-0.34	332.21	1.02
OW51-07	3	334.76	335.10	-0.34	334.42	0.34	334.60	0.16
OW52-07	3	335.31	335.48	-0.17	334.75	0.56	335.09	0.22
OW53-07	3	335.36	335.54	-0.18	335.03	0.33	335.21	0.15
OW54-07	3	335.47	335.55	-0.08	335.22	0.25	335.45	0.02
OW55-07	3	335.92	336.32	-0.40	335.45	0.47	335.96	-0.05
OW56-07	3	336.92	336.70	0.22	335.90	1.02	336.53	0.39
OW57-07	3	337.27	336.84	0.43	336.41	0.86	337.12	0.15
OW5-80	3	335.66	335.32	0.34	335.07	0.59	335.22	0.44
OW58-07	3	337.40	337.40	0.00	337.02	0.38	337.37	0.03
OW59-07	3	327.56	326.73	0.81	325.24	2.30	324.98	2.58
OW60-07	3	323.66	323.96	-0.30	324.39	-0.73	323.94	-0.28
OW61-07	3	324.56	324.35	0.21	324.77	-0.21	324.27	0.28
OW62-07	3	324.14	324.56	-0.42	324.94	-0.80	324.45	-0.32
OW63-07	3	324.47	324.50	-0.03	324.94	-0.47	324.47	0.00
OW64-07	3	324.99	326.29	-1.30	326.25	-1.26	326.53	-1.54
OW65-07	3	333.10	332.90	0.20	333.42	-0.32	332.02	1.08
OW66-07	3	334.14	334.76	-0.62	334.36	-0.22	334.36	-0.22
OW67-07	3	335.28	333.71	1.57	334.05	1.23	334.53	0.75
OW6-80	3	330.98	328.70	2.28	330.14	0.84	329.01	1.97
OW68-07	3	342.61	343.35	-0.74	343.53	-0.92	342.58	0.03
OW69-08	3	334.58	330.50	4.08	332.08	2.50	333.51	1.08
OW70-08	3	337.19	335.39	1.80	335.50	1.69	336.18	1.01
OW71-08	3	335.88	335.08	0.80	335.02	0.86	335.51	0.36
OW72-08	3	337.29	337.21	0.08	335.98	1.31	333.91	3.38
OW73-08	3	335.28	335.65	-0.37	334.97	0.31	335.20	0.08
OW74-08	3	332.40	332.94	-0.54	332.58	-0.18	331.92	0.48
OW75-09	3	313.97	314.24	-0.28	314.39	-0.43	314.24	-0.27
OW9-80	3	334.10	334.42	-0.32	334.42	-0.32	334.30	-0.20
PW1	3	331.68	331.62	0.06	332.08	-0.40	330.89	0.79
PW2	3	325.46	324.66	0.80	324.91	0.55	324.40	1.06
BH11-V	3	312.35					311.61	0.74
BH64	3	331.62					331.58	0.04
BH67	3	335.43					334.74	0.69
BH68	3	335.33					334.55	0.78
BH69	3	336.26					335.10	1.16
BH70	3	336.43					336.07	0.36
BH73	3	309.54					309.99	-0.45
BH74	3	311.42					311.40	0.02
BH75	3	310.33					310.72	-0.39
BH76	3	310.38					310.91	-0.53
BH77	3	312.24					311.74	0.50
BH78	3	310.01					311.02	-1.01
BW1	3	332.42					334.10	-1.68
BW2	3	342.63					342.34	0.29
BW3-S	3	354.04					354.00	0.04
DP7	1	335.36					334.15	1.21
DP8	1	335.26					334.19	1.06
DP9	2	335.92					336.13	-0.21
DW127	3	323.81					323.59	0.22
MP1	1	313.63					313.76	-0.13
MP2-II	1	312.78					312.31	0.47
MP4-I	2	324.06					324.86	-0.80
MP5-I	2	323.86					324.38	-0.52
MP6	2	328.87					329.97	-1.10
MP8-II	2	323.41					323.40	0.01
MW321A-10	3	315.63					315.13	0.50
OW1-5-III	2	331.58					330.87	0.71
OW17-82	3	325.92					327.21	-1.28

Table F6.4

Comparison of MQEE Model, 5-Year Review Model, and Pre-Extraction Model July 2010 Residual Statistics
Milton Quarry Extension
Region of Halton, Ontario

Well Label	Layer	July 2010 Groundwater Level (m AMSL)	Simulated Groundwater Level (Pre-Extraction Model) (m AMSL)	Residual Difference (1) (m)	Simulated Groundwater Level (5-Year Review Model) (m AMSL)	Residual Difference (1) (m)	Simulated Groundwater Level (MQEE Model) (m AMSL)	Residual Difference (1) (m)
OW3-1-II	3	338.29					337.17	1.12
OW3-2-II	3	338.08					337.14	0.94
OW3-3-II	3	338.27					337.17	1.10
OW7-80	3	323.33					323.93	-0.61
OW8-80	3	329.02					328.80	0.22
OW78D-20	3	336.06					336.63	-0.57
OW80-20	3	335.88					334.93	0.95
OW81-20	3	332.11					331.01	1.10
OW82-20	3	327.32					328.88	-1.57
OW105-18	3	362.88					363.39	-0.51
OW106-18	3	352.31					352.17	0.14
SG10	1	324.87					324.21	0.66
SG11	2	313.89					314.00	-0.11
SG12	1	312.67					312.92	-0.26
SG28	1	333.59					332.38	1.20
SG29	2	332.90					331.86	1.04
SG32	2	314.13					314.37	-0.24
SG34	2	320.24					319.16	1.07
SG35	2	323.28					323.21	0.06
SG36	2	323.27					323.31	-0.03
SG38	2	323.34					323.40	-0.06
SG40	1	312.29					312.31	-0.01
SG41	2	323.64					323.76	-0.11
SG42	2	323.95					324.32	-0.37
SG44	2	328.79					329.83	-1.04
SG47	2	323.26					323.40	-0.14
SG48	2	323.27					323.30	-0.04
SG49	2	317.55					317.60	-0.05
SG58	1	332.69					331.01	1.68
SG60	1	328.58					329.14	-0.56
SG61	1	328.95					329.51	-0.55
SG62	1	329.32					329.58	-0.25
SG63	1	330.56					329.34	1.22
SW10	2	313.81					313.80	0.00
SW12	1	311.89					311.94	-0.05
SW18	2	323.29					322.01	1.29
SW1-80	1	325.28					325.94	-0.67
SW2	2	317.15					317.06	0.08
SW3	1	327.06					327.20	-0.14
SW7-81	1	329.59					328.84	0.75
SW18A	2	318.61					319.55	-0.94
TW1-80	3	338.18					337.17	1.01
OW83-21	3	332.93					331.76	1.17

	Pre-Extraction Model		5-Year Review Model		MQEE Model	
Number of Observations	132		130		203	
Residual Mean	0.18	m	0.09	m	0.33	m
Absolute Residual Mean	0.66	m	0.66	m	0.68	m
Residual Standard Deviation	1.00	m	0.85	m	0.89	m
Residual Sum of Squares	136.52	m^2	95.54	m^2	182.12	m^2
Minimum Residual	-2.34	m	-2.37	m	-1.68	m
Maximum Residual	5.51	m	3.34	m	5.46	m
Head Range	38.98	m	38.98	m	59.25	m
Residual Standard Deviation/Head Range	0.026	m/m	0.022	m/m	0.015	m/m
Residual Absolute Mean/Head Range	1.69	%	1.68	%	1.1	%

Notes:

(1) Residual different equals the observed groundwater level minus the simulated groundwater level
(2) OW18-03 and OW19-03 restored

Table F6.5

Summary of Calibration Sensitivity Analysis Simulation Results
Milton Quarry Extension
Region of Halton, Ontario

Run	Varied Calibrated Model Input Parameter (and Applied Variation)	Residual Statistics: Residual Mean (m)	Residual Statistics: Absolute Residual Mean (m)	Residual Statistics: Residual Sum of Squares (m^2)	Comments on the Qualitative Match Between the Sensitivity Case and the Calibrated Model
Base Case	MQEE Model (July 2010 Conditions)	0.33	0.68	181	
Scenario 1	Recharge (multiplied by a factor of 1.1)	0.15	0.61	153	Slight improvement on model, however average recharge of 255.3 mm/year is too high.
Scenario 2	Recharge (divided by a factor of 1.1)	0.51	0.79	229	Worse match than calibrated model
Scenario 3	Hydraulic Conductivity (all cells in layer 3 multiplied by a factor of 2)	1.74	1.92	139	The increase in hydraulic conductivity results in unacceptable residuals and poor correlation to observed groundwater flow conditions
Scenario 4	Hydraulic Conductivity (all cells in layer 3 divided by a factor of 2)	-0.45	0.77	216	The decrease in hydraulic conductivity results in unacceptable residuals and poor correlation to observed groundwater flow conditions
Scenario 5	Conductance of Drain and River Cells Representing Creeks/Wetlands (multiplied by a factor of 10)	0.39	0.68	187	Increase in conductance has essentially no effect on model, however large mass balance error
Scenario 6	Conductance of Drain and River Cells Representing Creeks/Wetlands (divided by a factor of 10)	0.2	0.65	161	Simular result to the calibrated model
Scenario 7	Conductance of Drain Cells Representing Quarry Limits (multiplied by a factor of 2)	0.33	0.68	181	Increase in conductance has essentially no effect
Scenario 8	Conductance of Drain Cells Representing Quarry Limits (divided by a factor of 2)	0.33	0.68	181	Decrease in conductance has essentially no effect
Scenario 9	Elevation of Drain Cells Representing Escarpment (increased by 9.9 m)	0.25	0.7	198	Worse match than calibrated model
Scenario 10	Elevations & Conductance of Drain Cells Representing Escarpment (elevation increased by 0.9 m/conductance decreased by a factor of 10,000)	0.21	0.72	225	Worse match than calibrated model

Table F7.1

Water Budget Flows
Milton Quarry Extension
Region of Halton, Ontario

		Recharge Flows (L/min)										Quarry Flows (L/min)					
Model	**Notes**	**North Quarry**	**West Cell**	**East Cell**	**East Extension**	**Wetland V2**	**Wetland W7**	**Wetland W8**	**Wetland U1**	**Wetland W36**	**Total**	**Main Quarry**	**North Quarry**	**West Cell**	**East Cell**	**East Expansion**	**Total**
MQEE 2010_v032.020	*2010 Flow Target*	*1222*	-	-	-	117	-	-	-	-	-	-	1423	-	-	-	-
	July 2010 Conditions	926	-	-	-	133	-	-	-	-	1059	658	1277	-	-	-	1935
MQEE 2017_v032.154	*2017 Flow Target*	*1478*	*2591*	*794*	-	*86*	*67*	*29*	-	-	*4863*	*666*	-	-	-	-	*4380*
	Average 2017 Conditions	1478	2591	752	-	171	27	0.7	-	-	5021	617	2047	1483	611	-	4759
	Approved Extraction Flow Target Flow Target	*1493*	*2944*	*1986*	-	162	761	381	-	-	*9513*	-	-	-	-	-	*9513*
MQEE 2023_v032.272	Approved Quarry - Full Extraction	1738	1651	5175	-	161	754	378	-	-	9856	618	2156	1072	6311	-	10157
MQEE 2023_v032.274	Approved Quarry - Rehab	-	-	317	-	156	69	79	-	-	621	840	1475	-963	-839	-	513
MQEE EEFE_v032.325	MQEE - Full Extraction	1738	1651	4347	572	161	754	378	118	25	9744	598	2003	1072	4902	1361	9936
MQEE EERH_v032.425	MQEE - Rehab	-	-	314	87	160	69	79	110	22	842	880	1706	-963	-814	-189	620

Notes:

Positive flows are flows into quarry
Negave flows are flows out of quarry

Appendix G
Water Budget Evaluations

Water Budget Assessment

Milton Quarry East Extension (MQEE)
Region of Halton

Dufferin Aggregates
a division of CRH Canada Group Inc.

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Appendix A Climate Change Water Budget Scenarios

1. Introduction

GHD Limited (GHD) was retained by Dufferin Aggregates (Dufferin), a division of CRH Canada Group Inc. to assist in the development of an Application to extend the existing and approved Milton Quarry in the Region of Halton, Ontario (refer to Figure 1.1). GHD's role involves completing a geology and water resources assessment for the proposed Milton Quarry East Extension (MQEE) and surrounding lands as well as assisting in the development of mitigation and rehabilitation plans as they relate to water resources. The water budget assessment herein is provided in support of the MQEE application to confirm that sufficient water is available for the mitigation measures, including groundwater recharge, final rehabilitation, operations use, and the existing Main Quarry requirement to discharge to the Hilton Falls Reservoir Tributary in accordance with Dufferin’s legal agreement with Conservation Halton.

The mining plan for the proposed MQEE includes expanding the East Cell to the south following approval and removal of the common setback on the south side of the East Cell. Dewatering of the combined extraction cell will continue as needed to facilitate operations under typical dry quarry floor conditions. Water resources in the vicinity of the proposed MQEE will be protected by the recharge of water to the groundwater flow system and diffuse discharge to two wetland pools to the east (Wetland U1 and Wetland W36). The rehabilitation of the proposed MQEE will follow the existing rehabilitation plan for the East Cell, filling the quarried area to expand the East Cell lake, to allow for passive maintenance of the groundwater flow regime and associated water resources.

All approval agencies are familiar with the AMP and the hydrologic and natural environment data collection and assessment that is provided through annual reporting. The water budget and associated parameters were recently updated as a component of the comprehensive 5-Year AMP Review submitted to the agencies in January 2020. The description and information relating to water budget parameter development has been re-iterated herein for completeness.

Since the 5-Year AMP Review no changes have been made to the water budget with the exception of parameters relating to quarry geometry or groundwater inflow. Quarry geometry is revised for future predictive scenarios to include the proposed MQEE footprint. A similar update has been completed for the groundwater flow model (GHD, 2021) and the revised mitigation recharge rates and groundwater inflow predictions are incorporated into this assessment.

2. Background

The water budget for the Site is important to the overall operation, planning, and general management of water handling activities at the Site and provides the basis for the estimation of lake filling durations. Critically, the water budget facilitates the analysis and confirmation that sufficient water will be available for future mitigation and rehabilitation requirements necessary to protect water resources. Existing conditions and an overview of the Water Management System (WMS) are presented on Figure 2.1 for reference.

The AMP requires that the water budget for the Milton Quarry be evaluated on a regular basis to ensure that sufficient water is available for ongoing and future mitigation, operational, and rehabilitation requirements. Per the AMP, the objectives of the water budget evaluation include:

- Verify that the amount of water available/in storage is consistent with the water budget forecasts to confirm the representativeness of the overall water budget calculations
- Identify if more or less water is available than forecasted such that filling time and associated operational and cost aspects can be appropriately addressed
- Establish the annual distribution of the water from the reservoir in accordance with the agreed water hierarchy
- Establish the amount of "excess" water that may be available
- Confirm the representativeness of key water budget parameter values which have the potential to significantly affect the reliability of the long-term water budget calculations in a negative manner (i.e., potentially less water available than forecast)
- Identify and adapt to any long-term trends in water budget availability that are evidenced by monitoring data and/or recognized by the scientific community

Annual verification of the water budget is completed to meet the objectives identified above; however, periodic assessments are also completed to review and adjust input parameters to the water budget calculations. The water budget parameters for the Main Quarry, and Northern Cells (comprising of the North Quarry, West Cell, and East Cell) were originally developed for the Water Resources Assessment Report (CRA, 2000). A formal update of water budget parameters occurred in 2011 and was documented in the Pre-Extraction Report for the Phase 2 Extension (CRA, 2011a). The most recent update was completed as a component of the 5-Year AMP Review.

The update completed for the 5-Year AMP Review included assessment of parameters to the water budget, and evaluation of water budget data collected between 2011 and 2018. The analysis included more sophisticated surface water hydrological models developed and calibrated for the 5-Year AMP Review. Water budget assessments completed prior to the 5-Year AMP Review assessment focused on the Reservoir and the Site as a whole; however, the 5-Year AMP Review also added individual water budget evaluations for the Lake/Wetland area of the Main Quarry, the Main Quarry as a whole (including the Reservoir), and the Northern Cells.

The analysis herein has been updated and now includes the evaluation of data collected through 2020. Refinement/re-calibration of the groundwater model has been completed to reflect the proposed MQEE footprint. Analysis is also completed to address climate change considerations, and to consider how future climatic conditions may affect the duration of lake filling and the rehabilitation water budget for the Site.

3. Water Budget Input Parameters

Water budget input parameters are documented below in four categories including climatic, spatial, measured, and simulated or estimated. The processes discussed are illustrated on Figure 3.1.

3.1 Climatic Input Parameters

Climatic input parameters, discussion of recent minor adjustments, and high-level methodology are documented herein; however, it is noted that the detailed assessment for development and refinement of climatic input parameters was previously provided in the GHD report entitled, "Surface Water Modelling and Groundwater Recharge Assessment" (GHD, 2019) and formed Appendix K of the 5-Year AMP Review. As with all water budget parameters, confirmation of the appropriateness of these parameters is included herein through their application in the various water budgets assessed at the Site.

The Environment Canada Water Balance (ECWB) model and HEC-HMS were used in conjunction with measured data for the Site to develop current and future (climate change) parameters. Where available, data from the hydrometeorologic monitoring station at the Site was used. Data collection including air temperature, precipitation, and evaporation began in 1991; however, data through the winter months are supplemented with data from nearby monitoring stations. Data is reviewed and reported in the annual monitoring report each year.

3.1.1 Precipitation

Annual precipitation totals measured (and supplemented) at the Site are applied within individual water budgets for the Reservoir, Main Quarry Lake/Wetland, Main Quarry, Northern Cells, and Site. For future water budget estimates, the long-term average precipitation applied is 866 mm per year, and is estimated using the Canadian Climate Normals period (1981-2010). The revised precipitation estimate represents a 22-mm per year decrease from the value previously applied (CRA, 2011).

The ECWB and HEC-HMS model were run for two future climate scenarios: 2050s scenario (2041-2070), and 2080s (2071-2100). Future climate predictions forecast increased precipitation in this region. The average annual precipitation for these climate change scenarios is 937 mm per year, and 1003 mm per year, respectively.

3.1.2 Evapotranspiration

Evapotranspiration is applied to areas outside the extraction limits and is used in the estimation of upstream runoff. The ECWB and HEC-HMS models estimate evapotranspiration to be 573 mm per year for the Canadian Climate Normals period (1981-2010). This estimate represents an increase of 51 mm per year relative to the previous value applied. The same evapotranspiration rate (573 mm per year) was applied for both review and predictive water budgets.

The ECWB and HEC-HMS model were run for two future climate scenarios: 2050s scenario (2041-2070), and 2080s (2071-2100). The average annual evapotranspiration for these climate change scenarios is 646 mm per year, and 707 mm per year, respectively.

3.1.3 Dry Quarry Evapotranspiration and Recharge Rates

Dry quarry evapotranspiration is the portion of precipitation in the quarry footprint that is lost to evaporation and transpiration from non-vegetated or partially/sparsely vegetated areas of the Site after runoff and infiltration processes have occurred. Historically, dry quarry evapotranspiration has been estimated for the Site using the Main Quarry water budget. The current undertaking also allowed for the estimation of dry quarry evapotranspiration through the application of the ECWB model. The ECWB model estimates that dry quarry evapotranspiration ranges from 306 mm per year to 616 mm per year, and averages 435 mm per year for the Canadian Climate Normals period (1981-2010). This estimate represents a substantial increase in evapotranspiration (135 mm per year) relative to the value of 300 mm per year historically applied (CRA, 2011c). Following a review of water budgets from 2011 to 2018 the dry quarry evapotranspiration applied for the Main Quarry and Northern Cells was not modified (i.e., the 300-mm per year value was retained) as there is no indication of less water being available than historically estimated. It is concluded that the ECWB model was not designed for the specific conditions of a dry quarry floor environment and is therefore not fully representative. Updated water budget evaluations through 2020 for both the Main Quarry and Northern Cells continue to suggest that a long-term dry quarry evapotranspiration rate of 300 mm per year remains appropriate.

Future climatic scenarios were completed using the ECWB model. Estimated average annual dry quarry evapotranspiration increased by 48 mm for the 2050s scenario, and 101 mm for the 2080s scenario. While there are no indications that dry quarry evapotranspiration should be greater than 300 mm per year, the climate change scenario water budgets conservatively apply 348 mm per year (300 mm plus 48 mm), and 401 mm (300 mm plus 101 mm) of dry quarry evapotranspiration for the 2050s and 2080s scenarios, respectively.

Dry quarry recharge is the portion of precipitation that becomes runoff or infiltration from dry quarry areas and is calculated as average annual precipitation minus dry quarry evapotranspiration. The resultant dry quarry recharge rate is multiplied by the dry quarry areas and is listed as an inflow component to the water budget. The inflow components are titled, Dry Quarry Recharge in Main Quarry" and "Dry Quarry Recharge in Northern Cells" for the respective areas of the Site.

3.1.4 Lake Evaporation and Quarry Recharge Rates

Evaporation from water bodies at the Site is estimated using measured pan evaporation data collected from 1991 to 2018. A lake correction factor of 0.70 is applied to the pan evaporation data, and an estimate has been developed for winter months (and partially monitored months). The calculated lake evaporation rate during 1991 to 2018 period is 672 mm per year. Review of data through 2020 suggests the lake evaporation rate may be conservatively high and remains appropriate.

Lake evaporation for future climatic scenarios was calculated using the Hamon equation and the ECWB model. The average annual lake evaporation is estimated to be 770 mm per year and 848 mm per year for the 2050s and 2080s scenarios, respectively.

Lake quarry recharge is the remaining portion of precipitation after evaporation has occurred on lake or wetland surfaces and is calculated as total annual precipitation minus lake evaporation. The resultant lake quarry recharge rate is multiplied by the lake and wetland areas and is listed as an inflow component to the water budget titled, "Lake Quarry Recharge".

3.1.5 Surface Runoff Rate

Surface or overland runoff is the remaining portion of precipitation after evapotranspiration and infiltration (groundwater recharge) processes have occurred, and is calculated on an average annual basis. Surface runoff is calculated as average annual precipitation minus evapotranspiration minus infiltration. The long-term average annual runoff rate is estimated to be 60 mm per year (866 mm minus 573 mm minus 233 mm) and represents a 106 mm decrease relative to the value previously applied (CRA, 2011c).

Surface runoff for future climatic scenarios is calculated in the manner identified above. For the 2050s scenario a runoff rate of 40 mm per year is applied (937 mm minus 646 mm minus 251 mm), and for the 2080s scenario a runoff rate of 28 mm per year is applied (1003 mm minus 707 mm minus 28 mm).

The surface runoff rate for predictive MQEE water budget scenarios recognize that a portion of the extraction area will be rehabilitated with landforms above the lake level. Runoff from these landforms to the quarry lake has been included as a component of surface or upstream runoff and utilizes evapotranspiration rates dependent on the climatic scenario under evaluation (e.g., CCN, 2050s, 2080s).

3.1.6 Groundwater Recharge

Groundwater recharge (infiltration) represents the portion of precipitation that enters the groundwater flow system, and is a key input parameter to the groundwater flow model. Previously, recharge was estimated using literature values for the area and calibration within the groundwater flow model. Application of the HEC-HMS surface water model allows for development of groundwater recharge estimates on a sub-watershed level, and provides a spatial distribution of varying recharge. Groundwater recharge is estimated to be 233 mm per year using a spatial average for the watershed (area upstream of SW20). The recharge rates are applied spatially within the groundwater flow model where available, and a rate of 233 mm per year (watershed average) is applied in areas outside the domain of the surface water model. The groundwater infiltration rate represents a moderate increase of (on average) 8 mm per year relative to the previous value applied in the 2011 pre-extraction model update (225 mm per year), and 33 mm per year relative to the original groundwater flow model (200 mm per year) developed for the Water Resources Assessment Report (CRA, 2000). Confirmation of the appropriateness of the groundwater recharge rate is supported by the groundwater flow model calibration (GHD,2021).

Future groundwater recharge rates of 251 mm per year and 268 mm per year are estimated using HEC-HMS for the 2050s and 2080s climatic scenarios, respectively. If applied in the groundwater flow model, these elevated groundwater recharge rates would result in increased groundwater inflow to the quarry. To remain conservative the elevated groundwater recharge rates are not applied for future predictions of groundwater inflow. While not currently applied, these estimated groundwater recharge rates may be utilized in future assessments for evaluation of predicted versus observed conditions at the Site. It is anticipated that the long-term value of these estimates will be realized through ongoing assessment and in future reviews.

3.2 Spatial Input Parameters

Development of spatial input parameters is completed using aerial imagery and mapping, the groundwater flow model, and mine plans for future predictions. Methodology for the development of these areas has not changed substantially relative to historic evaluations; however, the current analysis has been updated to reflect actual and future conditions as currently known, as well as the proposed MQEE.

3.2.1 Total Quarried Area

The total quarried area reflects the area of the Site where extraction has occurred to date. The total quarried area represents a modestly smaller area than the extraction limit due to rehabilitation (e.g., overburden sloping) requirements. The Main Quarry area of 3,074,096 m^2 has not been adjusted since the previous evaluation in 2011; however, the actual extraction areas have been calculated and applied for the period from 2011 to 2020. Development of future areas (current to completion of extraction) have been estimated based on proposed mine plans provided by Dufferin to GHD and as anticipated for the MQEE. For the purposes of modelling and water budget evaluation, the quarry-related areas are categorized into several types as follows.

3.2.2 Area of No-Flow Cells

No-flow cells are applied within the groundwater flow model in areas where full extraction has occurred (e.g., areas that are no longer physically within the groundwater flow system). These inactive model cells are surrounded by a drain boundary condition that collects groundwater inflow to the excavation. During upper bench extraction, a portion of the aquifer remains in place, so it is also kept active within the model domain. The calculated area between the external "total quarried area" and internal "no-flow cells" represents the area that remains active until extracted to full depth.

The area is tracked to prevent double counting water given that it is included within the water budget as a dry quarry area, and also receives groundwater recharge (as discussed above) within the groundwater flow model. A correction is applied to the "Dry Quarry Recharge in Northern Cells" inflow component equal to the groundwater recharge rate (233 mm per year) multiplied by the area discussed above.

3.2.3 Lake and Wetland Areas

Lake and wetland areas within the Main Quarry include the Reservoir, Lake, and operational ponds. The areas for these features are taken at the maximum extent, and a correction for annual variation in footprint is no longer undertaken for the Reservoir. This change marginally reduces the calculated volume of water available to the quarry annually and is conservative to the water budget and lake filling schedule. It is recognized that the specific location and size of settling ponds within the Main Quarry may change from time-to-time, but the overall area required for the function of settling will remain approximately the same. It is not anticipated that these areas will change substantially during operation of the Site. Once operations cease the ponds will likely convert to dry landforms; however, to remain conservative the areas are still carried forward as part of the lake area. If these areas are converted to land types associated with less evapotranspiration in the future a modest amount of additional water will be available for lake filling.

Lake and wetland areas during lake filling and rehabilitation are calculated using the current footprint of the North Quarry and West Cell, the anticipated footprint of the East Cell, and the proposed footprint of the MQEE at completion of extraction. Existing footprints within the North Quarry and West Cell represent a marginally smaller area than the extraction limit given overburden sloping to top of rock. Horizontal extraction is largely complete in these areas, so the current limit of extraction has been applied for future lake filling and rehabilitation water budgets. The area within each cell is converted from dry quarry to lake area the first year filling commences, and represents the step change in net available water to the Site.

Lake filling for the MQEE commences in the same year as East Cell lake filling and has been treated as a contiguous filling area. A portion of the MQEE is anticipated to be rehabilitated with landforms above the lake elevation. These areas are not converted to lake/wetland areas and are instead tracked as a component of the upstream runoff area, as discussed above in Section 3.1.5.

3.2.4 Dry Quarry Area in Main Quarry and Northern Cells

The dry quarry area for the Main Quarry and Northern Cells is equal to total quarried area less the lake and wetland areas and represents the balance of extraction areas that are not typically occupied by water. During extraction, the dry quarry area in the Northern Cells increases annually to match the proposed mining plan. As extraction occurs over a given area in the quarry the area is then converted to dry quarry area. Upon commencement of lake filling (i.e., in the first year of filling) the dry quarry area or individual cell is converted to lake and wetland area, representative of the condition present at rehabilitation.

3.2.5 Approximate Upstream Area

The upstream runoff areas generally contribute to the Main Quarry; however, small components of the catchment are captured by the East Cell and MQEE excavations. The area is adjusted during the first year of extraction. The rate of runoff generation (surface runoff rate) was previously updated for the 5-Year AMP Review to reflect the latest analysis of hydrologic conditions. Upstream runoff is a calculated inflow and is estimated using the upstream runoff area and the surface runoff rate identified above. The upstream runoff area is revised for MQEE assessment scenarios to include the area of the excavation that will be rehabilitated with landforms above the lake level. It is anticipated that all runoff from these areas will report to combined East Cell/MQEE quarry lake.

3.3 Measured Values

The Site includes a wide array of instrumentation essential to accurate water budget development. These input parameters are readily measurable, and are the most accurate components of the water budget.

3.3.1 Metered Flow

Flow meters are installed at the Site to measure all pumped transfers of water. Measured water transfers include water budget components titled, "North Quarry Sump", "Central Sump", "Recharge System", "Operation's Use (P-40)", and "Main Quarry Lake/Wetlands Discharge to HFRT".

Outflows titled, "Reservoir Discharge to HFRT", and "Discharge to Main Quarry Lake/Wetlands" are measured by open channel meters (OCM) and have an associated relationship with depth of discharge over a v-notch weir.

A brief description of each flow component is provided below:

- North Quarry Sump
  - Total volume pumped from the Northern Cells to the Reservoir (or Main Quarry Operations area).

- Includes water sourced from groundwater inflow and dry quarry recharge in the Northern Cells.

- Central Sump
  - Surplus water from aggregate washing, dry quarry recharge, overland inflow, and groundwater inflow to the Main Quarry that is discharged to the Reservoir.
- Recharge System
  - Total volume of water pumped from the Recharge Pumping Station to the WMS for mitigation.
- Reservoir Discharge to HFRT
  - Total volume of water discharged from the Reservoir to the Hilton Falls Reservoir Tributary (HFRT),and represents one of two off-Site surface water discharges.
- Discharge to Main Quarry Lake/Wetlands
  - Total volume of water discharged from the Reservoir to the Main Quarry Lake/Wetlands.
- Main Quarry Lake/Wetlands Discharge to HFRT
  - Total discharge from the Main Quarry Lake/Wetland to the HFRT, and is the second off-Site surface water discharge location.
- Operation's Use (P-40)
  - Consumption or taking of water directly from the Reservoir for operation's uses including water for dust suppression or aggregate washing.

3.3.2 Change in Storage

The storage of water at the Site is quantified for the Reservoir and Main Quarry Lake/Wetland through ongoing monitoring of water levels and the application of a stage-storage curve. Water levels are routinely measured, and are correlated to a volume of water held in storage. The change in storage is calculated using an interpolated water level for January 1 and December 31 for the year identified. It should be noted that the change in storage is relevant to water budgets within a specific year, but on a long-term basis is assumed to be net zero.

3.4 Simulated and Estimated Parameters

Direct measurement of water budget input parameters is not always possible, so a number of techniques are used to refine and estimate these values. Parameters requiring simulation or estimation include dry quarry recharge, vertical leakage, escarpment leakage, groundwater inflow, and quarry operations. These parameters are discussed below.

3.4.1 Dry Quarry Evapotranspiration and Recharge

Application of the ECWB model and HEC-HMS allows for estimation of dry quarry evapotranspiration; however, review of the water budgets developed for 2011 to 2020 do not provide any indication that less water is available than historically estimated. Therefore, the dry quarry evapotranspiration rate of 300 mm per year has not been adjusted.

3.4.2 Vertical Leakage

Historic estimation of vertical leakage was completed using vertical leakage rates of 4.7 mm per year for dry quarry areas, and 9.5 mm per year for lakes and wetland areas. These rates are reasonable estimates and have not been revised in the current analysis.

3.4.3 Escarpment Leakage

A historic analysis (Dames and Moore Canada, April 1998) estimated leakage to the escarpment at a rate of 244,300 cubic metres per year. This value was previously considered to be conservatively high but was retained as a precautionary measure. Review of water budgets between 2011 and 2018 suggested that this value was overestimated by nearly an order of magnitude. A Darcy flow estimate indicated that discharge from the escarpment was on the order of 35,000 cubic metres per year. This lower value was used for the 5-Year AMP Review and has been retained herein. While some uncertainty remains with respect to escarpment leakage, ongoing water budget reviews (and future AMP Reviews) will continue to evaluate this estimate.

3.4.4 Groundwater Inflow

Numerical simulation and modelling tools have been applied at the Site to assist with groundwater inflow estimation since initial evaluations in the early 2000's. Numerous updates and revisions to the groundwater flow model have taken place since that time, with major updates and re-calibration occurring in 2011 for the Pre-Extraction Report, and in 2019 for the 5-Year AMP Review.

A further update to the groundwater flow model was completed for the assessment herein and has been documented in Appendix F of the main report. The residual statistics for both calibration conditions are considered to be excellent, with small residuals supporting the conclusion that a reasonable calibration was obtained to observed conditions. The calibrated MQEE groundwater flow model is suitable for use as a predictive tool to be applied to assess the MQEE, refine components of the water budget, to evaluate and plan future WMS expansion in the MQEE.

Simulations were completed for the years 2010, 2017, 2023 (Approved Extraction), 2026 (MQEE Extraction), and the rehabilitation (lakes full) conditions. Groundwater inflow increases with advancement of the extraction limit and has a near-linear relationship on a long-term basis. Given this relationship, linear interpolation is applied for estimation of groundwater inflow for conditions interim to the simulations identified above. Some minor annual variability between the simulated and observed conditions is likely; however, these variations are minimized on a longer-term basis and do not affect the conclusions of the water budgeting exercise (i.e., variability may be observed in the water budget for a given wet or dry year but are averaged to net zero over the longer review period).

3.4.5 Quarry Operations

Consumption of water by the Site is predominantly related to dust control and aggregate washing activities. A calculation of the estimated volume of water used for operations is documented each year in the Annual Monitoring Report. The estimate includes the measured volume of water applied for dust control, estimated consumption during washing, total water shipped off-Site within the aggregate, and evaporation. The calculation includes an evaporation component of consumption (30,000 cubic metres per year). To avoid double-counting, this evaporation amount is removed from the annually reported total for the analysis herein as evaporation has already accounted for within the dry quarry evapotranspiration estimate.

Operational consumption of water averaged approximately 150,000 cubic metres per year between 2011 and 2020 and is carried in future water budgets at this rate. It is assumed that consumption of water for operational use ends upon cessation of extraction.

4. Water Budget Evaluation and Review

The water budget evaluation presented below is intended to verify and confirm the appropriateness of the parameters selected through the review of observed data. The water budgets for the Reservoir and Site (as a whole) are reviewed annually; however, additional water budget analyses were completed to provide further isolation of parameters and improve confidence in estimated results. Three additional water budgets were developed as part of the 5-Year AMP Review and have been updated with data through 2020. These water budgets are completed for the Main Quarry Lake/Wetland, Main Quarry, and Northern Cells. Data collected at the Site is reviewed between 2011 and 2020, and represents the period of time since the pre-extraction water budget was developed. Additional data (3 years) is included prior to commencement of below water extraction in the Extension for the benefit of the analysis, and was possible given the conditions simulated with the groundwater flow model.

4.1 Reservoir Water Budget Evaluation

Inflow and outflow data for the Reservoir are reviewed annually, and a monthly water budget is routinely provided as a component of the Annual Monitoring Report (AMR). The Reservoir water budget evaluation is presented in Table 4.1.

The average annual Reservoir water budget difference prior to the 5-Year AMP Review was measured to be -137,680 cubic metres per year using the previous water budget parameters. This indicated that less water was observed to be available than indicated by the water budget; however, the difference is relatively small given the total measured flow. All differences discussed are normalized against total flow and are directly comparable to the calibration of flow meters in the field (e.g., a flow meter calibrated within 5% of true would be expected to produce a normalized difference within 5%). The normalized differences are calculated on an annual basis, are averaged over the review period, and reported as an aggregate number. The normalized difference indicates that on average 1.8% less water is available than calculated. The absolute[1] normalized difference is approximately 2.5%. While the prior water budget parameters performed adequately, improvements were made as discussed below.

The 5-Year AMP Review revisions to the Reservoir water budget parameters included an updated lake evaporation rate (and associated lake quarry recharge), and the addition of vertical and horizontal leakage components. No additional adjustments were made to these parameters for the assessment herein. The average water budget difference for the 2011 to 2020 review period is

1 Absolute normalized difference is a measure of the typical difference within a given year and does not allow for balancing of differences over time (i.e., over-prediction in year one, and under-prediction in year two could balance in the average difference, but do not in the absolute difference)

reduced to -8,703 cubic metres per year using the revised water budget parameters. The normalized difference indicates that on average 0.2% less water is available than calculated, and average absolute difference is reduced to 1.2%. Both of these metrics are within (below) the expected level of variability for a water budget analysis.

The original parameters provided a reasonable match of calculated versus observed conditions; however, the revised parameters improve the accuracy of the Reservoir water budget. This confirms that the inflow and outflow parameters are reasonable and are suitable for application within other water budgets.

4.2 Main Quarry Lake/Wetland Water Budget Evaluation

A water budget for the Main Quarry Lake/Wetland area is completed as a standalone analysis to provide insight into leakage parameters associated with the Main Quarry. These components are not directly measurable and must therefore be estimated. Key parameters for review include leakage from the Reservoir to the Lake/Wetland (an inflow component) and escarpment/vertical leakage (an outflow component). The Main Quarry Lake/Wetland water budget evaluation is provided in Table 4.2.

As discussed in Section 3.4.3, Darcy flow approximations were completed for both the Reservoir and escarpment leakage components for the 5-Year AMP Review. These revised estimates remain appropriate and were applied herein. In addition to the supplemental analysis completed, future evaluations (5-Year AMP Reviews) will provide further opportunity for additional parameter refinement and confirmation.

The average water budget difference for the 2011 to 2020 review period was -7,263 cubic metres per year. The normalized difference indicates that on average 2.7% less water is observed to be available than calculated, and average absolute difference is 8.0%. It should be noted that the Main Quarry Lake/Wetland has a constructed overflow returning excess water to the Central Sump. While rare, overflow did occur in 2020 during a precipitation and melt event in January (approximately 80 mm of precipitation plus meltwater). This overflow resulted in a larger than typical difference in 2020. Both metrics presented above are within (below) the expected level of variability for this component of the water budget analysis; particularly when consideration is given to the inherent difficulty in parameter estimation identified.

4.3 Main Quarry Water Budget Evaluation

The Main Quarry water budget is an intermediary step between the Reservoir, Main Quarry Lake/Wetland, and Site water budgets, and is has been updated within the current analysis to provide additional review of inflow and outflow parameters. The Main Quarry water budget evaluation is provided in Table 4.3.

Numerous parameters in the water budget remain the same for both the Reservoir, Main Quarry Lake/Wetland, and Main Quarry analyses including escarpment and vertical leakage. The cross-confirmation of water budget parameters provide additional support with respect to parameter appropriateness. It should be noted that while the parameters are fundamentally the same, the individual values may vary depending on the relevant area or geometry. For example, the length of escarpment relevant to the Main Quarry water budget is longer than the associated length for the

Main Quarry Lake/Wetland water budget. As a result, escarpment leakage applied within the Main Quarry water budget is greater than that applied for the Main Quarry Lake/Wetland.

In addition to the parameters identified above, dry quarry evapotranspiration and groundwater inflow are also notably included. Neither of these parameters can be directly measured and require further analysis for their development. Both surface and groundwater modelling analyses were previously conducted to assist with parameter estimation and refinement.

Dry quarry evapotranspiration was estimated by the surface water model to be greater than the historical value of 300 mm per year; however, review of the water budget does not indicate that less water is observed to be available. Therefore, the dry quarry evapotranspiration has not been increased beyond the rate historically applied. Groundwater inflow to the Main Quarry is estimated by the groundwater model to be approximately 325,000 cubic metres per year, and is simulated or interpolated to match conditions present through the life of the quarry.

Review of the Main Quarry water budget between 2011 and 2020 indicates that on average 68,566 cubic metres per year more water is observed to be available for off-Site discharge than predicted by the water budget (conservative). The average normalized difference is 0.9% and absolute normalized difference is 2.7%. Both of these metrics are within (below) the expected level of variability for this component of the water budget analysis and indicate that the calculated and estimated water budget parameters produce a good match to observed conditions.

4.4 Northern Cells Water Budget Evaluation

In addition to the Main Quarry Lake/Wetland and Main Quarry water budget evaluations, a review of North Quarry and Extension water budget conditions was undertaken for the 5-Year AMP Review. The Northern Cells water budget evaluation represents an intermediary analysis as a component of the Site water budget. The water budget for the Northern Cells has the fewest number of parameters and the largest variability yet provides useful insight to the water budget for the Site. The Northern Cells water budget evaluation is provided in Table 4.4.

Review of the water budget for the period from 2011 to 2020 indicates that on average -9,838 cubic metres per year less water is observed to be available than predicted by the water budget. The average normalized difference is -0.2% and absolute normalized difference is 6.7%. Increased variability in the absolute normalized difference is likely attributable to the estimation of groundwater inflow using the steady-state groundwater flow model. The model simulates average annual conditions, so any year that does not reflect "near average" groundwater inflow conditions will exhibit deviation from the simulated groundwater inflow component. On a longer-term basis (i.e., as cumulative conditions become more "average") the simulated inflow becomes more representative of observed conditions and the difference decreases. This allows for the use of average annual simulated groundwater inflow for the 10-year evaluation period with little effect on the average normalized difference. Both the normalized and absolute normalized difference metrics are within (below) the expected level of variability for this component of the water budget analysis and indicate that the calculated, simulated, and estimated water budget parameters produce a good match to observed conditions.

4.5 Site Water Budget Review

Analysis and review of parameter values developed from the Reservoir, Main Quarry Lake/Wetland, Main Quarry, and Northern Cell water budgets were completed for the purpose of providing insight and refinement to the Site water budget. Inflows and outflows to the Site water budget were developed as discussed above, and no further adjustments were made when compiled for the overall assessment. The water budget parameters are reviewed for the Site from 2011 to 2020 in Table 4.5.

The annual surplus is estimated for monitoring years 2011 to 2020 and is compared to observed surplus. Estimated annual surplus for the 2011 to 2020 period was approximately 860,000 cubic metres per year, while observed annual surplus was approximately 920,000 cubic metres per year (neither value has a safety factor associated). On average approximately 60,000 cubic metres per year more water is observed to be available than predicted by the water budget (i.e. the water budget calculation is conservatively low). The average normalized difference is 1.0% and absolute normalized difference is 3.7%. These metrics are within (below) the expected level of variability for the Site water budget analysis and indicate that the calculated and estimated water budget parameters produce a good match to observed conditions.

Examining individual years, the largest negative difference (i.e., shortfall) was approximately 410,000 cubic metres per year, which is less than the water budget safety factor used for approvals (CRA, 2000) and Section 8 (500,000 cubic metres per year). Further discussion with respect to safety factor appropriateness is provided in Section 8.

5. Future Predictions

A predictive Site water budget is applied to assist with estimation of water surplus during future extraction and lake filling periods for both the approved and proposed MQEE conditions. Components of the future predictive budget remain the same as those applied for the Site water budget review between 2011 and 2020 (above), except as identified as below.

5.1 Adjustments to Water Budget Input Parameters

Groundwater Inflow

Predictive simulations were completed for the years 2023 (approved extraction condition), 2026 (proposed MQEE extraction condition), and rehabilitation. The existing footprint for the North Quarry and West Cell were applied for both the approved and proposed MQEE conditions. The East Cell excavation was simulated for the approved condition using the mine plan provided to GHD by Dufferin. The proposed MQEE condition was simulated using the proposed MQEE extraction limit and was simulated as a continuous excavation from the approved East Cell. The proposed MQEE extraction limit and conceptual WMS are presented on Figure 5.1.

The approved condition at final rehabilitation ("End Filling NQ") is simulated through the application of constant head cells for the North Quarry, West Cell, and East Cell. The simulations are completed with lake levels of 318.5 m, 326 m, and 333 m for the North Quarry, West Cell, and East Cell, respectively. The MQEE rehabilitation condition is simulated as a continuous extension of the East

Cell lake and the same elevation (333 m) is applied using constant head cells in the model. The rehabilitation scenario also includes the use of the long-term wetland mitigation measures and contingency seasonal use of a limited portion of the recharge system consistent with the existing approved rehabilitation conditions.

Recharge System

Incremental recharge flow associated with extraction is estimated by increasing assigned heads at recharge wells. In general, the operation of recharge wells is based on water levels at adjacent recharge monitoring wells. This dynamic was replicated in the model and a head-based management approach was simulated.

It is not possible to precisely predict target levels forward in time (e.g., for 2023 and 2026 simulations) due to the variability of climatic conditions, so the simulated WMS was operated to average target levels assigned for the 2010 model calibration scenario. This approach removes year-to-year variability associated with changing target levels and allows for estimation of incremental recharge flows (and recirculating groundwater inflow) that are solely attributable to advancement of extraction. Minor annual variations will occur between the groundwater inflow/recharge predicted herein and observed WMS flows for operation and mitigation. While some minor short-term (annual) variation is expected, the difference is anticipated to be small on a long-term average basis (i.e., climatically wet and dry periods will balance in the longer term) and to be balanced through the use of on-site water storage in the Reservoir and other areas. Therefore, the anticipated annual variability has little or no impact on this water budgeting exercise and the simulated groundwater inflow rates remain suitable for the current evaluation.

The annual flow to the North Quarry and West Cell WMS components is consistent for the simulated approved and MQEE conditions as both are substantially extracted. Increases in recharge flow during the extraction period are predominantly (if not completely) associated with extraction of the East Cell and subsequently, the MQEE.

It is assumed that the recharge demand within a given quarry area returns to zero upon completion of lake filling, except for the East Cell and MQEE. Long-term rehabilitation of both the East Cell and MQEE includes the use of diffuse discharge wetland supplies and the possible contingency seasonal use of recharge wells. It is anticipated that two additional MQEE wetlands (U1 and W36) may require seasonal top-up to provide the planned enhancement of existing ecological conditions. Accordingly, these features are included in the groundwater flow model and water budget.

Quarry Operations

Consumption of water for quarry operations is estimated to be approximately 150,000 cubic metres per year for future water budgets while extraction is ongoing. It is assumed that aggregate washing and off-Site shipping no longer occur upon completion of extraction, and consequently the consumption of water is reduced to zero.

Climate

The estimation of water budget conditions in the immediate future (e.g., through to full extraction) is completed in the same manner for both approved and proposed MQEE conditions using CCN parameters representative of current climatic conditions.

5.2 Future Predictive Water Budgets

The future water budget for the Site is estimated for discrete conditions when a step change in parameter values occurs. Linear interpolation is applied to estimate interim water budget conditions between these changes consistent with past water budget evaluations. The step changes correspond to commencement and completion of lake filling within each of the Northern Cells. Upon commencement of lake filling, the associated quarry cell is converted from dry quarry area to lake and wetland area, and evaporation increases. For MQEE scenarios the rehabilitated land uses are considered and apportioned between either lake and wetland area or upstream area for calculation of contributing runoff. During lake filling the recharge system flow is assumed to linearly decrease from the rate estimated at full extraction to the rate estimated at quarry rehabilitation.

North Quarry and West Cell recharge system flow at rehabilitation is zero; however, some WMS components remain on the south and east side of the East Cell for both the approved and MQEE conditions. Total groundwater inflow varies between the inflow rate upon completion of extraction and the outflow rate associated with the quarry lake at rehabilitation. The rate of groundwater inflow for extraction and rehabilitation conditions is unique for each quarry cell, and variation between these rates occurs depending on the quarry lake being filled.

At rehabilitation, the net quarry lake top-up rate for the approved quarry is anticipated to be approximately 325 L/min with an additional 625 L/min of WMS support required for seasonal top-up of wetlands and remaining recharge wells (total of 950 L/min). With the addition of the MQEE the lake top-up rate decreases slightly to 250 L/min; however, additional support of 850 L/min is provided by the WMS (total of 1,100 L/min). Total recharge and lake top-up requirements are approximately 10% greater than under the approved condition. This difference is attributed to the additional flow requirements and re-distribution of water for proposed enhancements (e.g., diffuse discharges for Wetlands U1 and W36) planned as part of this project.

The water budget for current approved conditions is presented in Table 5.1 and indicates that a surplus of 1,311,804 cubic metres per year is estimated to be available when extraction is complete. Over the lake filling period the surplus is estimated to vary from 788,473 to 1,502,578 cubic metres per year, with the minimum occurring when all quarry lakes are full and rehabilitation is complete.

The proposed MQEE water budget conditions are presented in Table 5.2 and indicate that a surplus of 1,335,887 cubic metres per year is estimated at full extraction. The surplus estimate varies from 756,121 to 1,526,664 cubic metres per year over the lake filling period. Similar to the approved conditions water budget, the minimum available surplus is estimated to occur at quarry rehabilitation when lake filling is complete. The similar water budget and water surplus results are expected given the central location of the MQEE relative to existing approved areas to the north (East Cell), west (North Quarry), and south (Main Quarry). In general, the water availability and water budget conditions at the Site are not anticipated to change appreciably with the proposed MQEE.

The surplus estimates provided above have not been adjusted or reduced to include the water budget safety factor (500,000 cubic metres per year); however, both water budgets indicate that the full safety factor amount remains available throughout the life of the quarry. Further discussion regarding safety factor appropriateness is provided below in Section 8. Surplus water is produced by the Site beyond the safety factor amount for current and proposed conditions and lake filling will proceed for all conditions anticipated.

5.3 Evaluation of Climate Change

Changing climate conditions are evaluated in three scenarios using three parameter sets. The first parameter set is estimated for the Canadian Climate Normals (CCN) period from 1981 to 2010 and is representative of baseline (observed long-term average) conditions. Two additional climate change scenarios are evaluated that represent potential future conditions representative of the 2050s and 2080s. The parameters applied are representative of a 30-year average (similar to the CCN values) centered on the years identified and are representative of future long-term average conditions.

The Site surplus has been estimated for each of the three climatic scenarios evaluated. Approved and proposed MQEE conditions are provided side-by-side for comparison of the estimated surplus in Table 5.3. In general, the differences between the existing approved and proposed MQEE conditions are modest. Under current climatic conditions the Site surplus at rehabilitation for the existing approved condition is approximately 790,000 cubic metres per year and is approximately 755,000 cubic metres per year with the addition of the MQEE. These surplus estimates are reduced by approximately 75,000 cubic metres per year under forecasted 2080's climatic conditions; however, a substantial surplus in excess of the safety factor exists for all conditions evaluated. The water budget tables for individual scenarios have been included for reference in Appendix A.

Short-term variability (e.g., drought) is not a concern during lake filling due to the substantial volume of water in storage at the Site. In the event of severe water availability reduction, the lake filling process would be temporarily postponed, and water could be drawn from storage to sustain operation of the mitigation system. Therefore, short-term drought climatic scenarios are not explicitly evaluated.

A surplus is present for all climatic conditions evaluated and indicates that a water budget safety factor of at least 500,000 cubic metres per year is available for all future water surplus analyses.

6. Revised Lake Filling Times

The Site water budget is applied to estimate filling times for quarry lakes. The lake filling volumes are estimated between elevation 302 m and 318.5 m for the North Quarry, 305 m and 326 m for the West Cell, and 308 m and 333 m for the East Cell. The lake filling volume for the MQEE is estimated using elevations of 305 m and 333 m and consideration has been given to the proposed rehabilitation landform. The average floor elevation for the MQEE is an approximate average of the two adjacent areas, the North Quarry and the East Cell. Final floor elevations will be surveyed, and filling times will be revised based on actual conditions prior to the commencement of lake filling.

The lake storage volumes associated with the North Quarry, West Cell, and East Cell are marginally reduced from historic estimates that applied the licenced extraction limit. The current assessment applies the anticipated extraction limits that are moderately smaller due to overburden sloping to top of bedrock. Filling volumes are estimated to be approximately 8,147,615 cubic metres for the North Quarry, 3,541,428 cubic metres for the West Cell, 9,333,788 cubic metres for the East Cell, and 1,892,884 cubic metres for the MQEE. A saturation deficit porosity of 30% has been assumed for the rehabilitation landforms in the MQEE and the associated pore volume is included in the filling estimate. Volumes will be finalized prior to commencement of filling to reflect final extraction and rehabilitation conditions.

Lake filling for all scenarios commences in 2024 following completion of extraction in the approved quarry. The start of lake filling has not been adjusted for the proposed MQEE condition as lake filling can proceed in the West Cell concurrent with extraction. A sensitivity analysis for lake filling has been completed for both the approved and proposed MQEE conditions using the three climatic conditions. Lake filling is estimated to be complete for the approved quarry between 2057 and 2062 based on CCN and 2080s water budget conditions. With the addition of the MQEE the quarry filling time is anticipated to be complete between 2065 and 2071 for CCN and 2080's climatic conditions.

The lake filling time is anticipated to be extended modestly for the proposed MQEE conditions due to the additional volume required for filling and a slightly lower Site surplus; however, it is anticipated that surplus water will be produced by the Site beyond the safety factor amount (500,000 cubic metres per year) for all approved and proposed MQEE conditions and lake filling will proceed for all future conditions anticipated. The precise lake filling time will depend greatly on the rate of extraction and rehabilitation, final WMS performance, any safety factor amount that is actually available, and climatic conditions. These aspects will be reviewed as part of future AMP Reviews.

7. Excess Water Estimate

It should be noted that the identification of excess water for discharge does not affect the 700,000 cubic metres per year of discharge committed to the HFRT. Based on the current analyses the water budget is sustainable and excess water will continue to be available in the future.

Given the modest change in water budget results above associated with the proposed MQEE it would be reasonable to expect similar volumes of excess water will be available for discharge in the future. No changes are proposed at this time with respect to the calculation or allocation of Excess Water for discharge. Ongoing management of the quarry Reservoir and WMS mitigation operations will continue to dictate the amount of contingency capacity in reserve, and ultimately the availability of storage for excess water.

Excess water for discharge may not be identified during the lake filling period as anticipated by the legal agreement with Conservation Halton; however, Dufferin will continue to optimize water handling activities in collaboration with Conservation Halton.

8. Appropriateness of the Safety Factor Amount

The intent of the water budget safety factor is to reserve a portion of the anticipated surplus from the Site to account for potential unforeseen conditions and it institutes additional conservatism in the water budget determinations. The analysis presented above confirms that the safety factor remains available for a wide range of climatic and operational conditions and no indication of reduced water availability has been observed for the Site.

Although it could be considered whether the safety factor remains necessary or could be reduced, it is recommended to continue to consider the safety factor for at least the remaining extraction period to provide a buffer for extreme climatic conditions or mitigation operation variability over the shorter term. Therefore, the safety factor of 500,000 cubic metres per year remains appropriate at this time and will continue to be considered for both approved and proposed MQEE conditions.

9. Water Budget Conclusions and Recommendations

Input parameters to the water budget have been reviewed and revised where appropriate through the application of 5-Year AMP surface water model and refined MQEE groundwater model. New analyses for the Main Quarry Lake/Wetland, Main Quarry, and Northern cells were presented in the 5-Year AMP Review and have been carried forward in the current assessment. These new analyses assisted with parameter estimation and continue to allow for cross-confirmation of parameters between water budgets.

Data is reviewed for the period between 2011 and 2020 (nominally since the pre-extraction water budget update). Observed conditions are applied to provide confirmation of the appropriateness of water budget parameters. The water surplus is calculated for the Site as the amount of water that is available beyond that needed for mitigation and for discharge to the HFRT (minimum of 700,000 cubic metres per year). The water budget estimates that the annual surplus for the 2011 to 2020 period was approximately 850,000 cubic metres per year, while observed annual surplus was approximately 900,000 cubic metres per year (neither value has a safety factor associated). On average approximately 50,000 cubic metres per year more water is observed to be available than predicted by the water budget (conservative). The average normalized difference is 1.0% and absolute normalized difference is 3.7%. These metrics are within (below) the expected level of variability for the Site water budget analysis and indicate that the calculated and estimated water budget parameters produce a good match to observed conditions.

Subsequent to confirmation of the water budget parameters and surplus estimation, predictive evaluations were undertaken for approved and proposed MQEE extraction and rehabilitation conditions. The water budget for approved conditions indicates that a surplus of 1,311,804 cubic metres per year is estimated to be available when extraction is complete. Over the lake filling period the surplus is estimated to vary from 788,473 to 1,502,578 cubic metres per year, with the minimum occurring when all quarry lakes are full and rehabilitation is complete. The proposed MQEE water budget indicates that a surplus of 1,335,887 cubic metres per year is estimated at full extraction. The surplus estimate varies from 756,121 to 1,526,664 cubic metres per year over the lake filling period. The proposed MQEE water budget conditions remain similar to the conditions currently approved and the full safety factor amount (500,000 cubic metres per year) remains available for all active extraction, lake filling, and rehabilitation scenarios evaluated.

Changing climate conditions are evaluated using three long-term climatic scenarios for both the approved and MQEE conditions. The first parameter set is estimated for the Canadian Climate Normals (CCN) period from 1981 to 2010 and is representative of baseline (observed long-term average) conditions. Two additional climate change scenarios are evaluated that represent potential future conditions representative of the 2050s and 2080s. The parameters applied are representative of a 30-year average (similar to the CCN values) centered on the years identified and are representative of future long-term average conditions. A surplus is present for all climatic conditions evaluated. For current approved conditions the surplus ranges from 714,958 cubic metres per year to 788,473 cubic metres per year. For proposed MQEE conditions the surplus ranges from 683,142 cubic metres per year to 756,121 cubic metres per year. Surplus conditions for the proposed MQEE are substantially similar to approved conditions and remain similar under the varying climatic conditions evaluated.

Lake filling is estimated to be complete for the approved condition between 2057 and 2062 based on the CCN, 2050s, and 2080s climatic scenarios. For proposed MQEE conditions (and the same climatic scenarios) lake filling is anticipated to be complete between 2065 and 2071. It should be noted that these estimates include the full safety factor of 500,000 cubic metres per year. If the full safety factor is available for lake filling the quarry lakes would be complete in the first half of the 2040's for approved or proposed MQEE conditions.

The precise lake filling time will depend greatly on the rate of extraction and rehabilitation, final WMS performance, any safety factor amount that is not actually available, and actual climatic conditions. These aspects will be reviewed as part of future AMP Reviews. The lake filling time is anticipated to be extended modestly for the proposed MQEE conditions due to the additional volume required for filling; however, it is anticipated that surplus water will be produced by the Site beyond the safety factor amount for all approved and proposed MQEE conditions and lake filling will proceed for all future conditions anticipated.

10. References

CRA, 2000. Water Resources Assessment Report, Milton Quarry Extension, Regional of Halton, Ontario. Prepared for Dufferin Aggregates, May 2000.

CRA, 2011. Groundwater Modelling Pre-Extraction Update, Milton Quarry Extension, Region of Halton, Ontario, Prepared for Dufferin Aggregates, November 2011.

GHD, 2021. Milton Quarry East Extension Groundwater Flow Model Update, Milton Quarry East Extension, Region of Halton, Ontario, Prepared for Dufferin Aggregates, December 2021.

All of Which is Respectfully Submitted,

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LEGEND

360 EXISTING GROUND CONTOUR
ROAD
RAILROAD
MUNICIPAL BOUNDARY
PROPERTY BOUNDARY
DUFFERIN OWNED LICENSED
DUFFERIN OWNED BUFFER
DUFFERIN LEASED
EXTENSION LICENCE LIMIT
LICENSED EXTRACTION LIMIT
EXTENSION EXTRACTION LIMIT
BRUCE TRAIL (APPROXIMATE)
LANEWAY/TRAIL
WETLAND IDENTIFIED AS PROVINCIALLY SIGNIFICANT
OTHER WETLAND
SIGNIFICANT WOODLANDS
MONITORING WELL LOCATION
SURFACE WATER MEASUREMENT LOCATION
STAFF GAUGE LOCATION
TEST PIT LOCATION
BOREHOLE LOCATION
WATERMAIN (AS-BUILT/EXISTING)
PROPOSED WATERMAIN
CONTROL VALVE HUTS
DIFFUSE DISCHARGE
RECHARGE WELL
PRELIMINARY TARGET MONITORING LOCATIONS

Map Orientation: Directions referenced in the report are identified as the general direction of the page from the Existing Quarry Licensed Area. Major roads, for example Sixth Line and Town Line, are referenced to the page, as the general north-south direction. This convention has been adopted from the Site Plans and Planning Summary Report to improve readability and ensure consistency in map illustration.

SOURCES:

- BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES
© QUEEN'S PRINTER 1997
- TOPOGRAPHIC INFORMATION FOR AREAS OTHER THAN W8 AND V2 OBTAINED FROM NORTHWAY MAP TECHNOLOGY LIMITED. CONTOURS WERE DRAWN FROM SPRING 1997 AERIAL PHOTOGRAPHY UTILIZING EXISTING CONTROL. CONTOUR INTERVAL IS 1 METRE.
- TOPOGRAPHIC INFORMATION FOR W8 FROM MARCH 11, 2002 SURVEY USING 1 METRE CONTOUR INTERVAL.
- TOPOGRAPHIC INFORMATION FOR V2 FROM JUNE 24/25, 2002 SURVEY USING 1 METRE CONTOUR INTERVAL.
- MAIN QUARRY CONTOURS REVISED TO REFLECT 2001 EXISTING CONDITIONS (CRA DRAWING 10978-10(028)GN-WA002).
- BOUNDARY INFORMATION COMPILED FROM SURVEYS AND SKETCHES PREPARED BY FRED G, CUNNINGHAM, ONTARIO LANDS SURVEYORS, MILTON, ONTARIO, DECEMBER 2,1997.

GHD

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

LEGEND KEY

Project No. 10978-200
Date December 2021

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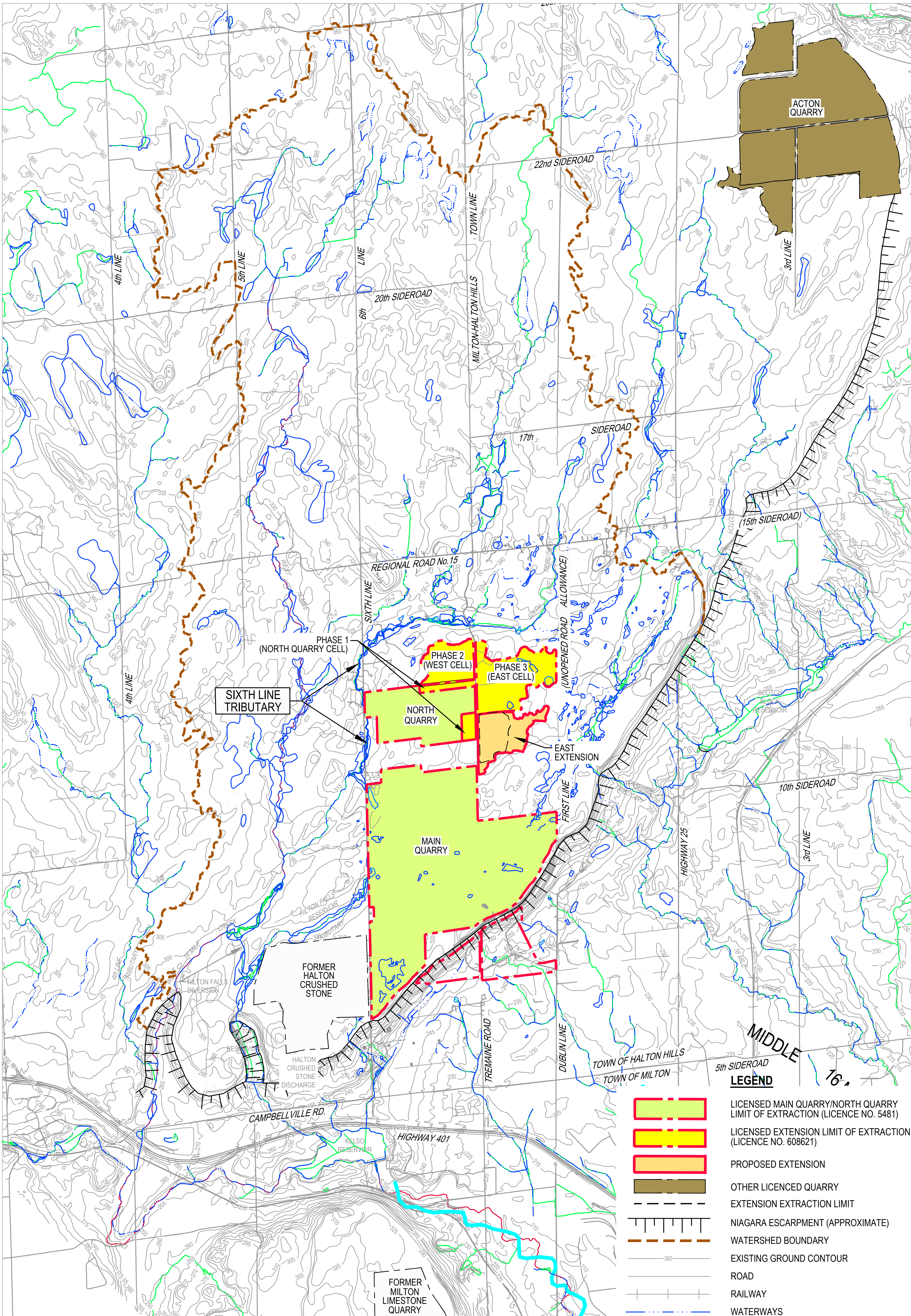

SOURCE:
MAP REPRODUCED USING DATA DERIVED FROM MINISTRY OF NATURAL RESOURCES, QUEEN'S PRINTER OF ONTARIO, 2007, AMENDED WITH DATA FROM CONSERVATION HALTON, 2006.

WATERSHED BOUNDARY BASED ON SURFACE WATER CATCHMENTS PROVIDED BY CONSERVATION HALTON, OCTOBER 2010.

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CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

Project No. **10978**
Date **December 2021**

REGIONAL MAP

FIGURE 1.1

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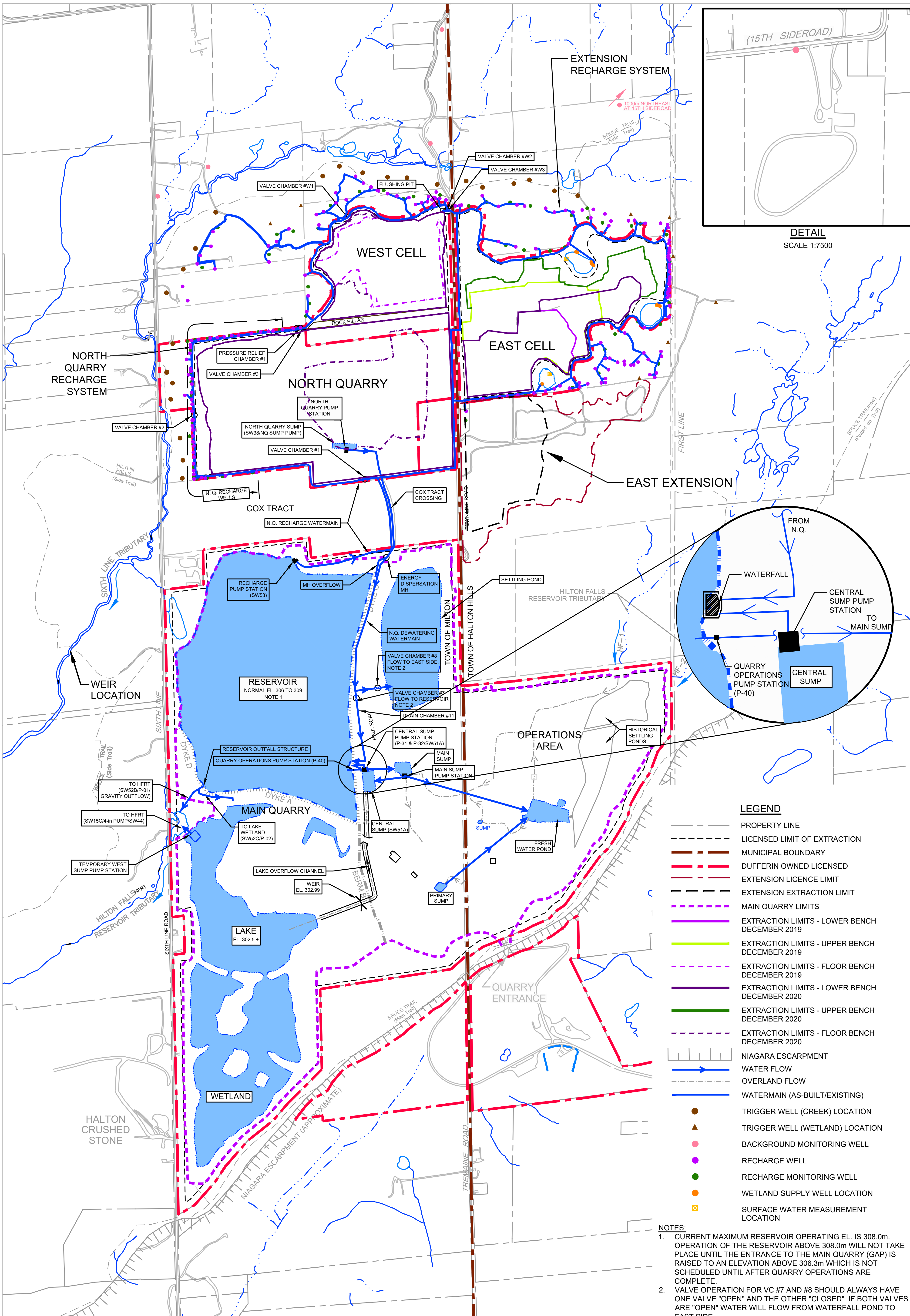
Plot Date: 07 December 2021 2:26 PM



SOURCE:
BASE MAPPING PRODUCED BY MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED AND CONESTOGA-ROVERS & ASSOCIATES UNDER LICENCE WITH THE ONTARIO MINISTRY OF NATURAL RESOURCES

0 150 300 450m

Coordinate System: UTM17m NAD27

CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

EXISTING CONDITIONS AND WATER MANAGEMENT SYSTEM OVERVIEW

Project No. 10978
Date December 2021

FIGURE 2.1

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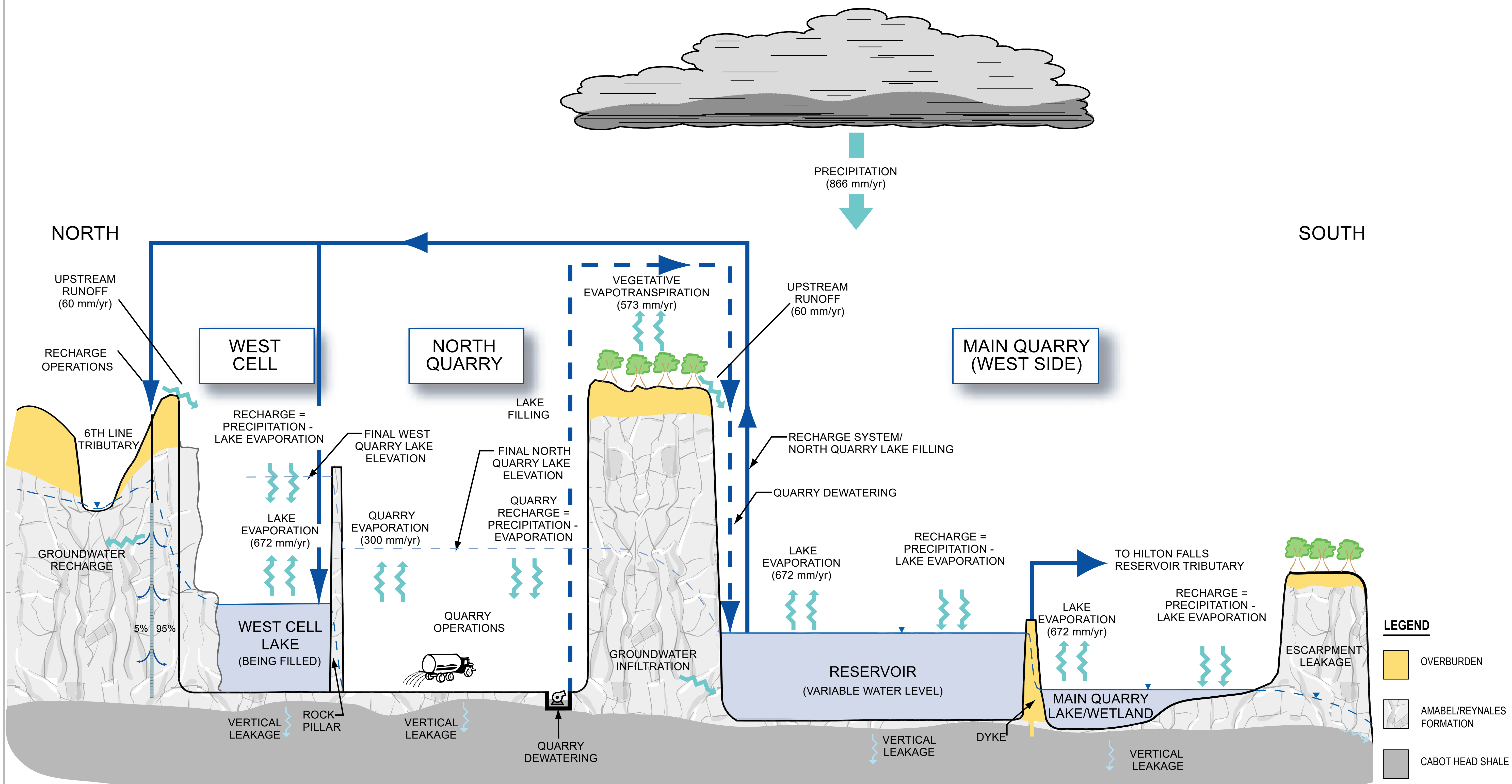
Plot Date: 07 December 2021 2:26 PM



NOTES:

- NOT TO SCALE: VERTICAL AXIS HAS BEEN EXAGGERATED BY FACTOR OF 25 IN ORDER TO SHOW THE VARIOUS FEATURES
- APPROXIMATELY BASED ON FIGURE E.1 OF REVISED AMP

0 400 800 1200m

Coordinate System: UTM17m NAD27

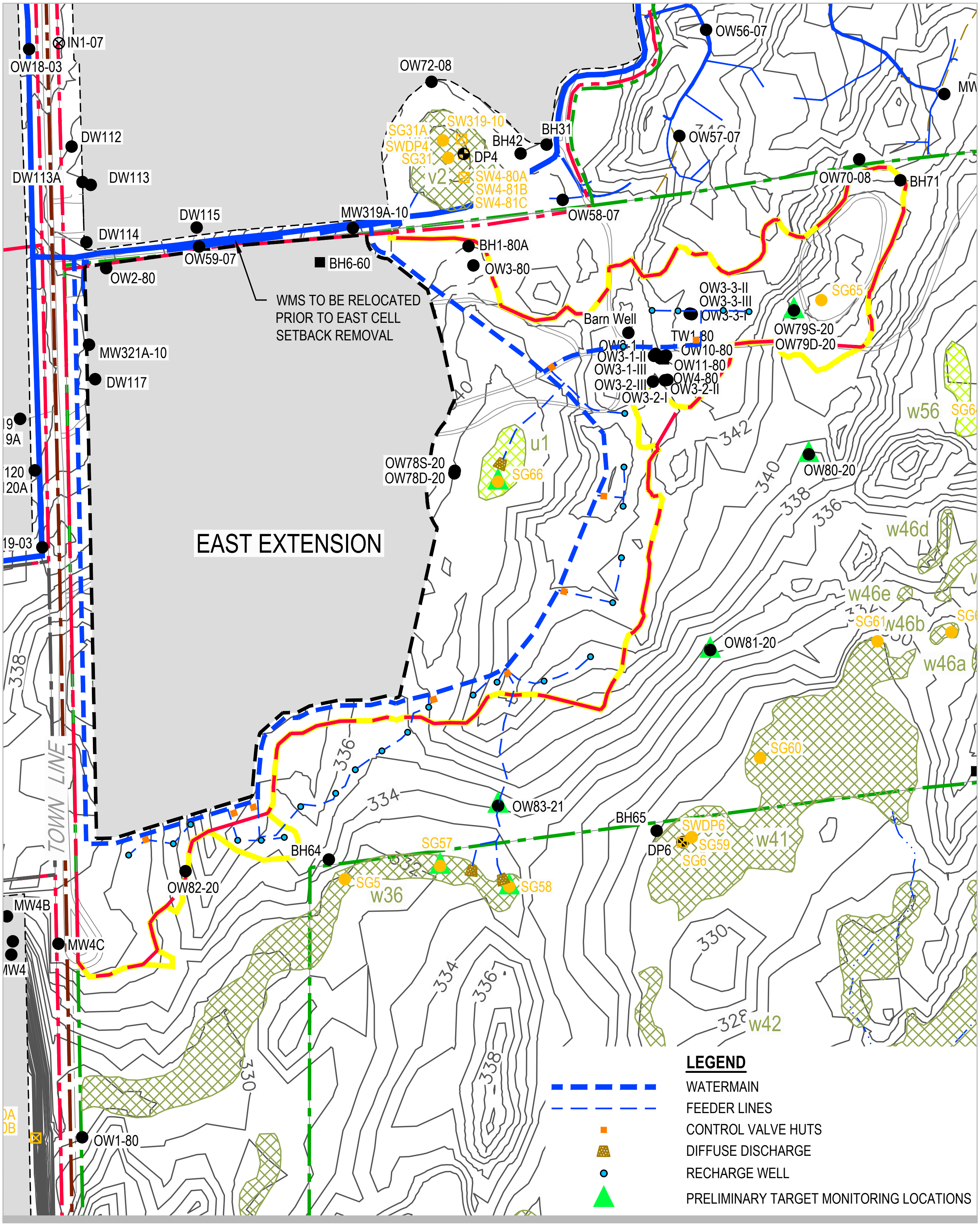
WATER BUDGET SCHEMATIC
CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

REGIONAL MAP

Project No. 010978-200
Date November 2021

FIGURE 3.1

Filename: HEG: 10978/VIZ/AI/10978-181-figure8-1 v02.ai
Plot Date: JUN 12/2019



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Coordinate System:
UTM17m NAD27

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CRH MILTON QUARRY EAST EXTENSION
REGION OF HALTON, ONTARIO

PROPOSED MQEE INTERIM WATER MANAGEMENT SYSTEM LAYOUT

Project No. **10978**
Date **December 2021**

FIGURE 5.1

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Plot Date: 07 December 2021 2:27 PM

Table 4.1

Reservoir Water Budget Evaluation
MQEE Water Budget Update
Dufferin Milton Quarry
Region of Halton, Ontario

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Inflows (m^3)											
North Quarry Sump	1,206,275	1,009,569	2,063,415	2,032,193	2,761,722	2,742,631	2,909,818	2,720,170	3,389,754	3,862,218	2,469,776
Central Sump	2,207,732	1,246,832	1,392,956	1,756,322	995,644	1,121,748	1,624,585	1,301,694	1,369,406	1,514,387	1,453,131
Lake Quarry Recharge	235,327	81,740	277,925	193,626	96,560	78,912	257,749	202,049	245,772	150,697	182,036
Total Inflow	**3,649,334**	**2,338,141**	**3,734,296**	**3,982,141**	**3,853,926**	**3,943,292**	**4,792,152**	**4,223,913**	**5,004,932**	**5,527,302**	**4,104,943**
Outflows (m^3)											
Recharge System	1,334,528	1,247,103	1,867,215	2,591,198	3,221,984	3,126,542	2,717,740	2,917,421	2,991,631	3,936,458	2,595,182
Reservoir Discharge to HFRT	2,487,799	1,131,538	1,525,496	1,133,521	450,185	587,562	1,210,369	1,278,339	1,775,299	1,688,975	1,326,908
Transfer to Main Quarry Lake/Wetlands	61,384	251	228	14,718	16,831	56	34,634	5,671	85,943	719	22,044
Leakage to Main Quarry	112,451	112,451	112,451	112,451	112,451	112,451	112,451	112,451	112,451	112,451	112,451
Operation's Use (P-40)	340	43,766	78,546	44,246	146,020	115,422	183,976	148,696	89,664	196,848	104,752
Vertical Leakage	6,583	6,583	6,583	6,583	6,583	6,583	6,583	6,583	6,583	6,583	6,583
Total Outflow	**4,003,085**	**2,541,692**	**3,590,519**	**3,902,717**	**3,954,054**	**3,948,616**	**4,265,753**	**4,469,161**	**5,061,572**	**5,942,034**	**4,167,920**
Change in Storage (m^3)											
Reservoir	-410,375	-286,081	110,777	12,544	-293,260	48,913	518,501	52,369	41,034	-511,233	-71,681
Total Observed Change	-410,375	-286,081	110,777	12,544	-293,260	48,913	518,501	52,369	41,034	-511,233	-71,681
Calculated Change	-353,752	-203,551	143,777	79,424	-100,129	-5,325	526,399	-245,249	-56,640	-414,732	-62,978
Difference (Observed - Calculated)											
Difference (m^3)	-56,623	-82,530	-32,999	-66,880	-193,131	54,237	-7,897	297,618	97,673	-96,501	-8,703
Total Handling (m^3)	7,652,419	4,879,833	7,324,815	7,884,858	7,807,980	7,891,908	9,057,905	8,693,074	10,066,503	11,469,337	8,272,863
Normalized Difference (%)	-0.7%	-1.7%	-0.5%	-0.8%	-2.5%	0.7%	-0.1%	3.4%	1.0%	-0.8%	-0.2%
Absolute Normalized Difference (%)	0.7%	1.7%	0.5%	0.8%	2.5%	0.7%	0.1%	3.4%	1.0%	0.8%	1.2%

Table 4.2

Main Quarry Wetland Water Budget Evaluation
MQEE Water Budget Update
Dufferin Milton Quarry
Region of Halton, Ontario

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Inflows (m^3)											
Lake Quarry Recharge	138,713	48,181	163,822	114,133	56,917	46,515	151,930	119,097	144,870	88,828	107,301
Runoff - Vegetated Wetland Areas (Precip-ET)	271,804	116,240	232,487	183,436	128,935	113,167	229,827	200,881	197,471	162,513	183,676
Transfer from Reservoir to Main Quarry Lake/Wetlands	61,384	251	228	14,718	16,831	56	34,634	5,671	85,943	719	22,044
Leakage from Reservoir to Main Quarry Lake/Wetlands	74,967	74,967	74,967	74,967	74,967	74,967	74,967	74,967	74,967	74,967	74,967
Groundwater Inflow	3,770	3,770	3,770	3,770	3,770	3,770	3,770	3,770	3,770	3,770	3,770
Total Inflow	**550,638**	**243,410**	**475,275**	**391,025**	**281,421**	**238,476**	**495,129**	**404,387**	**507,022**	**330,798**	**391,758**
Outflows (m^3)											
Main Quarry Lake/Wetlands Discharge to HFRT	547,013	375,589	403,118	389,166	269,516	175,565	364,449	313,009	518,788	255,672	361,189
Escarpment Leakage	17,660	17,660	17,660	17,660	17,660	17,660	17,660	17,660	17,660	17,660	17,660
Vertical Leakage	3,880	3,880	3,880	3,880	3,880	3,880	3,880	3,880	3,880	3,880	3,880
Total Outflow	**568,554**	**397,130**	**424,659**	**410,707**	**291,057**	**197,106**	**385,990**	**334,550**	**540,329**	**277,213**	**382,729**
Change in Storage (m^3)											
Main Quarry Lake/Wetland	113,581	-166,609	103,045	-48,558	-21,947	-4,084	46,432	103,597	12,623	-120,420	1,766
Total Observed Change	113,581	-166,609	103,045	-48,558	-21,947	-4,084	46,432	103,597	12,623	-120,420	1,766
Calculated Change	-17,915	-153,719	50,617	-19,682	-9,636	41,370	109,139	69,838	-33,307	53,585	9,029
Difference (Observed - Calculated)											
Difference (m^3)	131,496	-12,890	52,429	-28,876	-12,312	-45,455	-62,707	33,760	45,930	-174,006	-7,263
Total Handling (m^3)	1,119,192	640,540	899,934	801,731	572,477	435,582	881,118	738,937	1,047,350	608,011	774,487
Normalized Difference (%)	11.7%	-2.0%	5.8%	-3.6%	-2.2%	-10.4%	-7.1%	4.6%	4.4%	-28.6%	-2.7%
Absolute Normalized Difference (%)	11.7%	2.0%	5.8%	3.6%	2.2%	10.4%	7.1%	4.6%	4.4%	28.6%	8.0%

Table 4.3

Main Quarry Water Budget Evaluation
MQEE Water Budget Update
Dufferin Milton Quarry
Region of Halton, Ontario

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Inflows (m^3)											
North Quarry Sump	1,206,275	1,009,569	2,063,415	2,032,193	2,761,722	2,742,631	2,909,818	2,720,170	3,389,754	3,862,218	2,469,776
Groundwater Inflow	342,597	339,550	336,511	333,473	330,434	327,387	324,349	324,437	324,525	324,613	330,787
Dry Quarry Recharge in Main Quarry	1,376,351	880,029	1,250,913	1,094,417	920,532	870,227	1,242,427	1,150,075	1,139,194	1,027,662	1,095,183
Lake Quarry Recharge	410,571	142,610	484,892	337,817	168,467	137,677	449,691	352,512	428,796	262,919	317,595
Upstream Runoff	347,388	0	246,663	120,998	0	0	230,531	159,254	150,857	64,776	132,047
Total Inflow	**3,683,182**	**2,371,759**	**4,382,394**	**3,918,898**	**4,181,154**	**4,077,923**	**5,156,816**	**4,706,448**	**5,433,125**	**5,542,188**	**4,345,389**
Outflows (m^3)											
Recharge System	1,334,528	1,247,103	1,867,215	2,591,198	3,221,984	3,126,542	2,717,740	2,917,421	2,991,631	3,936,458	2,595,182
Reservoir Discharge to HFRT	2,487,799	1,131,538	1,525,496	1,133,521	450,185	587,562	1,210,369	1,278,339	1,775,299	1,688,975	1,326,908
Main Quarry Lake/Wetlands Discharge to HFRT	547,013	375,589	403,118	389,166	269,516	175,565	364,449	313,009	518,788	255,672	361,189
Escarpment Leakage	35,320	35,320	35,320	35,320	35,320	35,320	35,320	35,320	35,320	35,320	35,320
Quarry Operations	178,910	182,844	120,444	153,016	131,019	153,892	134,145	99,259	134,703	161,955	145,019
Vertical Leakage	20,252	20,252	20,252	20,252	20,252	20,252	20,252	20,252	20,252	20,252	20,252
Total Outflow	**4,603,822**	**2,992,646**	**3,971,845**	**4,322,473**	**4,128,276**	**4,099,133**	**4,482,275**	**4,663,600**	**5,475,993**	**6,098,632**	**4,483,869**
Change in Storage (m^3)											
Reservoir	-410,375	-286,081	110,777	12,544	-293,260	48,913	518,501	52,369	41,034	-511,233	-71,681
Main Quarry Lake/Wetland	113,581	-166,609	103,045	-48,558	-21,947	-4,084	46,432	103,597	12,623	-120,420	1,766
Total Observed Change	-296,794	-452,691	213,823	-36,014	-315,207	44,829	564,933	155,967	53,657	-631,653	-69,915
Calculated Change	-920,640	-620,887	410,549	-403,575	52,879	-21,210	674,541	42,848	-42,868	-556,443	-138,481
Difference (Observed - Calculated)											
Difference (m^3)	623,845	168,196	-196,726	367,561	-368,086	66,039	-109,608	113,119	96,525	-75,210	68,566
Total Handling (m^3)	8,287,004	5,364,404	8,354,238	8,241,371	8,309,430	8,177,055	9,639,091	9,370,048	10,909,118	11,640,820	8,829,258
Normalized Difference (%)	7.5%	3.1%	-2.4%	4.5%	-4.4%	0.8%	-1.1%	1.2%	0.9%	-0.6%	0.9%
Absolute Normalized Difference (%)	7.5%	3.1%	2.4%	4.5%	4.4%	0.8%	1.1%	1.2%	0.9%	0.6%	2.7%
Summary of Offsite Discharge											
Reservoir Discharge to HFRT	2,487,799	1,131,538	1,525,496	1,133,521	450,185	587,562	1,210,369	1,278,339	1,775,299	1,688,975	1,326,908
Main Quarry Lake/Wetlands Discharge to HFRT	547,013	375,589	403,118	389,166	269,516	175,565	364,449	313,009	518,788	255,672	361,189
Total Discharge to HFRT	3,034,812	1,507,127	1,928,614	1,522,687	719,701	763,127	1,574,818	1,591,348	2,294,087	1,944,647	1,688,097
Excess Beyond 700,000 m^3	2,334,812	807,127	1,228,614	822,687	19,701	63,127	874,818	891,348	1,594,087	1,244,647	988,097

Table 4.4

Northern Cells Water Budget Evaluation
MQEE Water Budget Update
Dufferin Milton Quarry
Region of Halton, Ontario

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Inflows (m^3)											
Groundwater Inflow	886,102	1,101,651	1,316,611	1,531,572	1,746,532	1,962,081	2,177,041	2,649,580	3,122,118	3,595,952	2,008,924
Dry Quarry Recharge in Northern Cells	348,935	278,295	450,205	410,294	385,307	402,359	620,805	595,536	620,585	594,583	470,690
Total Inflow	**1,235,037**	**1,379,946**	**1,766,817**	**1,941,865**	**2,131,839**	**2,364,440**	**2,797,846**	**3,245,116**	**3,742,704**	**4,190,535**	**2,479,614**
Outflows (m^3)											
North Quarry Sump	1,206,275	1,009,569	2,063,415	2,032,193	2,761,722	2,742,631	2,909,818	2,720,170	3,389,754	3,862,218	2,469,776
Total Outflow	**1,206,275**	**1,009,569**	**2,063,415**	**2,032,193**	**2,761,722**	**2,742,631**	**2,909,818**	**2,720,170**	**3,389,754**	**3,862,218**	**2,469,776**
Difference (Observed - Calculated)											
Difference (m^3)	-28,763	-370,377	296,598	90,328	629,883	378,191	111,971	-524,945	-352,950	-328,317	-9,838
Total Handling (m^3)	2,441,312	2,389,516	3,830,232	3,974,058	4,893,560	5,107,072	5,707,664	5,965,286	7,132,457	8,052,752	4,949,391
Normalized Difference (%)	-1.2%	-15.5%	7.7%	2.3%	12.9%	7.4%	2.0%	-8.8%	-4.9%	-4.1%	-0.2%
Absolute Normalized Difference (%)	1.2%	15.5%	7.7%	2.3%	12.9%	7.4%	2.0%	8.8%	4.9%	4.1%	6.7%

Table 4.5

Site Water Budget Review
MQEE Water Budget Update
Dufferin Milton Quarry
Region of Halton, Ontario

Timeline or Condition (as of year end)	Input Parameters (1) Total Quarried Area (m^2)	(2) Area of No-Flow Cells (m^2)	(3) Annual Precipitation (mm)	(4) Annual Lake Evaporation (mm)	(5) Lake and Wetland Areas (m^2)	(6) Dry Quarry Area in Main Quarry (m^2)	(7) Dry Quarry Area in Northern Cells (m^2)	(8) Approximate Upstream Area (m^2)
2011	3,578,510	3,478,510	1038	698	1,209,010	1,865,086	504,414	1,497,648
2012	3,713,280	3,613,280	772	654	1,209,010	1,865,086	639,184	1,497,648
2013	3,780,083	3,680,083	971	570	1,209,010	1,865,086	705,987	1,497,648
2014	3,813,018	3,713,018	887	607	1,209,010	1,865,086	738,922	1,497,648
2015	3,901,973	3,801,973	794	654	1,209,010	1,865,086	827,877	1,439,471
2016	3,986,377	3,886,377	767	653	1,209,010	1,865,086	912,281	1,439,471
2017	4,042,623	3,937,992	966	594	1,209,010	1,865,086	968,527	1,439,471
2018	4,069,965	3,990,348	917	625	1,209,010	1,865,086	995,869	1,439,471
2019	4,126,745	4,030,724	911	556	1,209,010	1,865,086	1,052,649	1,439,471
2020	4,203,300	4,084,807	851	634	1,209,010	1,865,086	1,129,204	1,439,471
Average	3,921,587	3,821,711	887	625	1,209,010	1,865,086	847,491	1,462,742

Notes:

(1) Refers to total extracted area of East Cell, West Cell, North Quarry, and Main Quarry (3,074,096 m^2) at the end of the year referenced.
(2) Estimated based on observed conditions or anticipated conditions as provided within the mine plan.
Represents the area where only an upper bench has been extracted.
(3) Measured and supplemented observed annual precipitation. Predictive scenarios apply: CCN(1981-2010) = 866 mm, 2050s = 937 mm, 2080s = 1003 mm.
See 5-Year AMP Review Appendix E for observed data, and Appendix K for predictive values.
(4) Measured and corrected pan evaporation for May-Oct, plus an over-winter estimate of 154 mm.
Predictive scenarios apply: CCN(1981-2020) = 672 mm, 2050s = 770 mm, 2080s = 848 mm. See 5-Year AMP Review Appendix K.
(5) Refers to Wetland Lake (408,468 m^2), Reservoir (692,967 m^2 at maximum stage), and operation's ponds (107,575 m^2).
(6) Refers to total extracted area in Main Quarry (3,074,096 m^2) - (5) "Lake and Wetland Areas" (1,209,010 m^2).
(7) Equals (1) "Total Quarried Area" - (5) "Lake and Wetland Areas" - (6) "Dry Quarry Area in Main Quarry". Upon commencement of lake filling the cell being filled is removed from (7) "Dry Quarry Area in Northern Cells" and added to (5) "Lake and Wetland Areas".
(8) Estimated upstream areas contributing runoff to the quarry. Adjusted based on area of extraction.

Timeline or Condition (as of year end)	Inflows (9) Dry Quarry Recharge in Main Quarry (m^3/yr)	(10) Dry Quarry Recharge in Northern Cells (m^3/yr)	(11) Lake Quarry Recharge (m^3/yr)	(12) Groundwater Inflow (m^3/yr)	(13) Upstream Runoff (m^3/yr)	Outflows (14) Recharge System (m^3/yr)	(15) Quarry Operations (m^3/yr)	(16) Outflow to HFRT (m^3/yr)	(17) Escarpment Leakage (m^3/yr)	(18) Vertical Leakage (m^3/yr)
2011	1,376,351	348,935	410,571	1,228,699	347,388	1,334,528	178,910	3,034,812	35,320	22,622
2012	880,029	278,295	142,610	1,441,201	0	1,247,103	182,844	1,507,127	35,320	23,256
2013	1,250,913	450,205	484,892	1,653,123	246,663	1,867,215	120,444	1,928,614	35,320	23,570
2014	1,094,417	410,294	337,817	1,865,044	120,998	2,591,198	153,016	1,522,687	35,320	23,724
2015	920,532	385,307	168,467	2,076,966	0	3,221,984	131,019	719,701	35,320	24,143
2016	870,227	402,359	137,677	2,289,468	0	3,126,542	153,892	763,127	35,320	24,539
2017	1,242,427	620,805	449,691	2,501,390	230,531	2,717,740	134,145	1,574,818	35,320	24,804
2018	1,150,075	595,536	352,512	2,974,016	159,254	2,917,421	99,259	1,591,348	35,320	24,932
2019	1,139,194	620,585	428,796	3,446,643	150,857	2,991,631	134,703	2,294,087	35,320	25,199
2020	1,027,662	594,583	262,919	3,920,565	64,776	3,936,458	161,955	1,944,647	35,320	25,559
Average	1,095,183	470,690	317,595	2,339,711	132,047	2,595,182	145,019	1,688,097	35,320	24,235

Timeline or Condition (as of year end)	Total (19) Total Inflows (m^3/yr)	(20) Total Outflows (m^3/yr)	Change in Storage (21) Reservoir (m^3/yr)	(22) Main Quarry Lake/Wetland (m^3/yr)	(23) Observed Change in Storage (m^3/yr)	(24) Calculated Change in Storage (m^3/yr)	Water Budget Difference (25) Difference (Observed - Calculated) (m^3/yr)	(26) Total Water Handling (m^3/yr)	(27) Normalized Difference (%)	(28) Absolute Normalized Difference (%)	Site Water Surplus (29) Observed Available Annual Surplus (m^3/yr)	(30) Calculated Available Annual Surplus (m^3/yr)	(31) Surplus Difference (Observed - Calculated) (m^3/yr)
2011	3,711,945	4,606,193	-410,375	113,581	-296,794	-894,248	597,454	8,318,137	7.2%	7.2%	2,038,018	1,440,564	597,454
2012	2,742,136	2,995,650	-286,081	-166,609	-452,691	-253,514	-199,176	5,737,785	-3.5%	3.5%	354,436	553,613	-199,176
2013	4,085,796	3,975,163	110,777	103,045	213,823	110,633	103,190	8,060,959	1.3%	1.3%	1,442,437	1,339,247	103,190
2014	3,828,570	4,325,946	12,544	-48,558	-36,014	-497,376	461,362	8,154,516	5.7%	5.7%	786,673	325,311	461,362
2015	3,551,272	4,132,167	-293,260	-21,947	-315,207	-580,895	265,688	7,683,438	3.5%	3.5%	-295,506	-561,194	265,688
2016	3,699,731	4,103,421	48,913	-4,084	44,829	-403,689	448,518	7,803,152	5.7%	5.7%	107,956	-340,562	448,518
2017	5,044,844	4,486,827	518,501	46,432	564,933	558,018	6,916	9,531,671	0.1%	0.1%	1,439,751	1,432,836	6,916
2018	5,231,394	4,668,281	52,369	103,597	155,967	563,113	-407,146	9,899,674	-4.1%	4.1%	1,047,315	1,454,461	-407,146
2019	5,786,075	5,480,941	41,034	12,623	53,657	305,134	-251,477	11,267,015	-2.2%	2.2%	1,647,744	1,899,221	-251,477
2020	5,870,505	6,103,939	-511,233	-120,420	-631,653	-233,434	-398,219	11,974,444	-3.3%	3.3%	612,994	1,011,213	-398,219
Average	4,355,227	4,487,853	-71,681	1,766	-69,915	-132,626	62,711	8,843,079	1.0%	3.7%	918,182	855,471	62,711

Notes:

(9) (9) "Dry Quarry Recharge in Main Quarry" = (6) "Dry Quarry Area in Main Quarry" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 300 mm per year.
(10) (9) "Dry Quarry Recharge in Northern Cells" = (6) "Dry Quarry Area in Northern Cells" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 300 mm per year.
(11) (11) "Lake Quarry Recharge" = (5) "Lake and Wetland Areas" x [(3) "Annual Precipitation" - (4) "Annual Lake Evaporation"]/1000.
(12) Groundwater inflow is estimated for all calibration, review, and predictive estimates through application of the groundwater flow model.
(13) (13) "Upstream Runoff" = (8) "Approximate Upstream Area" x [(3) "Annual Precipitation" - Evapotranspiration - Infiltration]. Inflow is only introduced where a surplus for runoff exists.
Evapotranspiration applied is CCN(1981-2010) = 573 mm, 2050s = 646 mm, 2080s = 707 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario.
Infiltration applied is CCN(1981-2010) = 233 mm, 2050s = 251 mm, 2080s = 268 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario.
(14) Recharge system flows are measured by the WMS for all calibration and review water budgets. Recharge system flows are estimated by the groundwater flow model for predictive water budgets, but do not vary with climatic conditions. Groundwater infiltration is estimated to increase for 2050s and 2080s climatic scenarios as a result of additional precipitation. The increase in groundwater recharge and resultant increase in groundwater inflow are conservatively excluded.
(15) Consumption of water by quarry operations is estimated annually, and reported in the annual monitoring report. The value applied is equal to the reported annual consumption less 30,000 m^3/year (removes evaporation component of annual estimate as it is accounted for by dry quarry evaporation).
Predictive water budgets apply an average rate of 150,000 m^3/year.
(16) Outflow to the HFRT is measured and totalized annually for all calibration and review water budgets. Future predictive water budgets assume 700,000 m^3 (required) of discharge occurs per year.
(17) Escarpment leakage is estimated through Darcy flow approximation as discussed in Section 8.2.4 of the 5-Year AMP Review.
(18) Vertical leakage from quarry areas. Based on a leakage rate of 4.7 mm/year for dry areas and 9.5 mm/year for lakes (per AMP (CRA, December 2011).
(19) Sum of inflow components.
(20) Sum of outflow components.
(21) Change in storage within the Main Quarry Reservoir is calculated using interpolated elevations for January 1 and December 31, and an associated stage-storage curve. Cumulative long-term change is net zero for all predictive water budgets.
(22) Change in storage within Main Quarry Lake/Wetland is calculated using interpolated elevations for January 1 and December 31, and an associated stage-storage curve. Cumulative long-term change is net zero for all predictive water budgets.
(23) (23) "Observed Change in Storage" = (21) "Reservoir" + (22) "Main Quarry Lake/Wetland".
(24) (24) "Calculated Change in Storage" = (19) "Total Inflows" - (20) "Total Outflows".
(25) (25) "Difference (Observed - Calculated)" = (23) "Observed Change in Storage" - (24) "Calculated Change in Storage". Positive values indicate more water is observed to be available than predicted by the water budget calculation.
(26) (26) "Total Water Handling" = (19) "Total Inflows" + (20) "Total Outflows".
(27) Difference is normalized against all measured or estimated inflows and outflows. Positive values indicate more water is observed to be available than predicted by the water budget calculation.
(27) "Normalized Difference" = (25) "Difference (Observed - Calculated)" / (26) "Total Water Handling"
(28) Absolute normalized difference is calculated to provide an alternative metric that doesn't allow for offsetting error (e.g., a 10% over-prediction and 10% under-prediction could balance to a normalized difference of 0%, but absolute normalized discrepancy would remain at 10%).
(28) "Absolute Normalized Difference" = abs[(27) "Normalized Difference"]
(29) (29) "Observed Available Annual Surplus" = (16) "Outflow to HFRT" - 700,000 m^3/year + (23) "Observed Change in Storage". Represents excess water produced by the Site.
(30) Annual surplus estimated by the water budget calculations. (30) "Calculated Available Annual Surplus" = (19) "Total Inflows" - (20) "Total Outflows" + (16) "Outflow to HFRT" - 700,000 m^3.
(31) (31) "Surplus Difference (Observed - Calculated)" = (29) "Observed Available Annual Surplus" - (30) "Calculated Available Annual Surplus". Positive values indicate more water is observed to be available than predicted by the water budget calculation.

Table 5.1

Predictive Site Water Budget for Approved Conditions - Canadian Climate Normals
MQEE Water Budget Update
Dufferin Milton Quarry
Region of Halton, Ontario

Timeline or Condition (as of year end)	Input Parameters							
	(1) Total Quarried Area (m^2)	(2) Area of No-Flow Cells (m^2)	(3) Annual Precipitation (mm)	(4) Annual Lake Evaporation (mm)	(5) Lake and Wetland Areas (m^2)	(6) Dry Quarry Area in Main Quarry (m^2)	(7) Dry Quarry Area in Northern Cells (m^2)	(8) Approximate Upstream Area (m^2)
2017	4,042,623	3,937,992	966	594	1,209,010	1,865,086	968,527	1,439,471
2018	4,069,965	3,990,348	917	625	1,209,010	1,865,086	995,869	1,439,471
2019	4,139,858	4,035,009	911	556	1,209,010	1,865,086	1,065,762	1,439,471
2020	4,217,538	4,097,638	851	634	1,209,010	1,865,086	1,143,442	1,439,471
2021	4,256,796	4,165,372	866	672	1,209,010	1,865,086	1,182,700	1,439,471
2022	4,285,258	4,242,787	866	672	1,209,010	1,865,086	1,211,162	1,439,471
2023	4,290,610	4,290,610	866	672	1,209,010	1,865,086	1,216,514	1,439,471
Start Filling WC	4,290,610	4,290,610	866	672	1,408,836	1,865,086	1,016,688	1,439,471
End Filling WC	4,290,610	4,290,610	866	672	1,408,836	1,865,086	1,016,688	1,439,471
Start Filling EC	4,290,610	4,290,610	866	672	1,782,188	1,865,086	643,336	1,439,471
End Filling EC	4,290,610	4,290,610	866	672	1,782,188	1,865,086	643,336	1,439,471
Start Filling NQ	4,290,610	4,290,610	866	672	2,425,524	1,865,086	0	1,439,471
End Filling NQ	4,290,610	4,290,610	866	672	2,425,524	1,865,086	0	1,439,471

Notes:

(1) Refers to total extracted area of East Cell, West Cell, North Quarry, and Main Quarry (3,074,096 m^2) at the end of the year referenced.
(2) Estimated based on observed conditions or anticipated conditions as provided within the mine plan.
Represents the area where only an upper bench has been extracted.
(3) Measured and supplemented observed annual precipitation. Predictive scenarios apply: CCN(1981-2010) = 866 mm, 2050s = 937 mm, 2080s = 1003 mm.
See 5-Year AMP Review Appendix E for observed data, and Appendix K for predictive values.
(4) Measured and corrected pan evaporation for May-Oct, plus an over-winter estimate of 154 mm.
Predictive scenarios apply: CCN(1981-2020) = 672 mm, 2050s = 770 mm, 2080s = 848 mm. See 5-Year AMP Review Appendix K.
(5) Refers to Wetland Lake (408,468 m^2), Reservoir (692,967 m^2 at maximum stage), and operation's ponds (107,575 m^2).
(6) Refers to total extracted area in Main Quarry (3,074,096 m^2) - (5) "Lake and Wetland Areas" (1,209,010 m^2).
(7) Equals (1) "Total Quarried Area" - (5) "Lake and Wetland Areas" - (6) "Dry Quarry Area in Main Quarry". Upon commencement of lake filling the cell being filled is removed from (7) "Dry Quarry Area in Northern Cells" and added to (5) "Lake and Wetland Areas".
(8) Estimated upstream areas contributing runoff to the quarry. Adjusted based on area of extraction.

Timeline or Condition (as of year end)	Inflows					Outflows					Total		Site Water Surplus	
	(9) Dry Quarry Recharge in Main Quarry (m^3/yr)	(10) Dry Quarry Recharge in Northern Cells (m^3/yr)	(11) Lake Quarry Recharge (m^3/yr)	(12) Groundwater Inflow (m^3/yr)	(13) Upstream Runoff (m^3/yr)	(14) Recharge System (m^3/yr)	(15) Quarry Operations (m^3/yr)	(16) Required Outflow to HFRT (m^3/yr)	(17) Escarpment Leakage (m^3/yr)	(18) Vertical Leakage (m^3/yr)	(19) Total Inflows (m^3/yr)	(20) Total Outflows (m^3/yr)	(21) Observed Available Annual Surplus (m^3/yr)	(22) Calculated Available Annual Surplus (m^3/yr)
2017	1,242,427	620,805	449,691	2,501,390	230,531	2,717,740	134,145	700,000	35,320	24,804	5,044,844	3,612,009	1,439,751	1,432,836
2018	1,150,075	595,536	352,512	2,974,016	159,254	2,917,421	99,259	700,000	35,320	24,932	5,231,394	3,776,933	1,047,315	1,454,461
2019	1,139,194	626,537	428,796	3,446,643	150,857	2,991,631	134,703	700,000	35,320	25,261	5,792,027	3,886,915	1,647,744	1,905,112
2020	1,027,662	602,100	262,919	3,920,565	64,776	3,936,458	161,955	700,000	35,320	25,626	5,878,022	4,859,359	612,994	1,018,663
2021	1,055,638	648,107	234,548	4,393,191	86,368	4,333,620	150,000	700,000	35,320	25,810	6,417,852	5,244,750	--	1,173,102
2022	1,055,638	675,622	234,548	4,865,818	86,368	4,757,036	150,000	700,000	35,320	25,944	6,917,994	5,668,301	--	1,249,694
2023	1,055,638	688,547	234,548	5,338,444	86,368	5,180,453	150,000	700,000	35,320	25,969	7,403,546	6,091,742	--	1,311,804
Start Filling WC	1,055,638	575,445	273,314	5,338,444	86,368	5,180,453	--	700,000	35,320	26,928	7,329,211	5,942,701	--	1,386,509
End Filling WC	1,055,638	575,445	273,314	4,586,685	86,368	4,312,624	--	700,000	35,320	26,928	6,577,451	5,074,872	--	1,502,578
Start Filling EC	1,055,638	364,128	345,744	4,586,685	86,368	4,312,624	--	700,000	35,320	28,720	6,438,564	5,076,664	--	1,361,900
End Filling EC	1,055,638	364,128	345,744	1,514,918	86,368	1,239,832	--	700,000	35,320	28,720	3,366,797	2,003,873	--	1,362,925
Start Filling NQ	1,055,638	0	470,552	1,514,918	86,368	1,239,832	--	700,000	35,320	31,808	3,127,476	2,006,961	--	1,120,516
End Filling NQ	1,055,638	0	470,552	269,505	86,368	326,461	--	700,000	35,320	31,808	1,882,063	1,093,590	--	788,473

Notes:

(9) (9) "Dry Quarry Recharge in Main Quarry" = (6) "Dry Quarry Area in Main Quarry" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 300 mm per year.
(10) (9) "Dry Quarry Recharge in Northern Cells" = (6) "Dry Quarry Area in Northern Cells" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 300 mm per year.
(11) (11) "Lake Quarry Recharge" = (5) "Lake and Wetland Areas" x [(3) "Annual Precipitation" - (4) "Annual Lake Evaporation"]/1000.
(12) Groundwater inflow is estimated for all calibration, review, and predictive estimates through application of the groundwater flow model.
(13) (13) "Upstream Runoff" = (8) "Approximate Upstream Area" x [(3) "Annual Precipitation" - Evapotranspiration - Infiltration]. Inflow is only introduced where a surplus for runoff exists.
Evapotranspiration applied is CCN(1981-2010) = 573 mm, 2050s = 646 mm, 2080s = 707 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario.
Infiltration applied is CCN(1981-2010) = 233 mm, 2050s = 251 mm, 2080s = 268 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario.
(14) Recharge system flows are measured by the WMS for all calibration and review water budgets. Recharge system flows are estimated for predictive water budgets by the groundwater flow model; however, do not vary with climatic conditions. Groundwater infiltration is estimated to increase for 2050s and 2080s climatic scenarios as a result of additional precipitation. The increase in groundwater recharge and resultant increase in groundwater inflow are conservatively excluded.
(15) Consumption of water by quarry operations is estimated annually, and reported in the annual monitoring report. The value applied is equal to the reported annual consumption less 30,000 m^3/year (removes evaporation component of annual estimate as it is accounted for by dry quarry evaporation).
Predictive water budgets apply an average rate of 150,000 m^3/year.
(16) Outflow to the HFRT is measured and totalized annually for all calibration and review water budgets. Future predictive water budgets assume 700,000 m^3 (required) of discharge occurs per year.
(17) Escarpment leakage is estimated through Darcy flow approximation as discussed in Section 8.2.4 of the 5-Year AMP Review.
(18) Vertical leakage from quarry areas. Based on a leakage rate of 4.7 mm/year for dry areas and 9.5 mm/year for lakes (per AMP (CRA, December 2011).
(19) Sum of inflow components.
(20) Sum of outflow components.
(21) (21) "Observed Available Annual Surplus" = (29) "Observed Available Annual Surplus" from Table 8.5.
(22) Annual surplus estimated by the water budget calculations. (22) "Calculated Available Annual Surplus" = (19) "Total Inflows" - (20) "Total Outflows".

Table 5.2

Predictive Site Water Budget for Proposed MQEE Conditions - Canadian Climate Normals
MQEE Water Budget Update
Dufferin Milton Quarry
Region of Halton, Ontario

	Input Parameters							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Timeline or Condition (as of year end)	Total Quarried Area (m^2)	Area of No-Flow Cells (m^2)	Annual Precipitation (mm)	Annual Lake Evaporation (mm)	Lake and Wetland Areas (m^2)	Dry Quarry Area in Main Quarry (m^2)	Dry Quarry Area in Northern Cells (m^2)	Approximate Upstream Area (m^2)
2017	4,042,623	3,937,992	966	594	1,209,010	1,865,086	968,527	1,439,471
2018	4,069,965	3,990,348	917	625	1,209,010	1,865,086	995,869	1,439,471
2019	4,139,858	4,035,009	911	556	1,209,010	1,865,086	1,065,762	1,439,471
2020	4,217,538	4,097,638	851	634	1,209,010	1,865,086	1,143,442	1,439,471
2021	4,256,796	4,165,372	866	672	1,209,010	1,865,086	1,182,700	1,439,471
2022	4,285,258	4,242,787	866	672	1,209,010	1,865,086	1,211,162	1,439,471
2023	4,290,610	4,290,610	866	672	1,209,010	1,865,086	1,216,514	1,439,471
2024	4,370,536	4,343,894	866	672	1,209,010	1,865,086	1,296,440	1,301,050
2025	4,450,463	4,397,178	866	672	1,209,010	1,865,086	1,376,367	1,301,050
2026	4,450,463	4,450,463	866	672	1,209,010	1,865,086	1,376,367	1,301,050
Start Filling WC	4,450,463	4,450,463	866	672	1,408,836	1,865,086	1,176,541	1,301,050
End Filling WC	4,450,463	4,450,463	866	672	1,408,836	1,865,086	1,176,541	1,301,050
Start Filling EC & MQEE	4,450,463	4,450,463	866	672	1,886,296	1,865,086	643,336	1,356,795
End Filling EC & MQEE	4,450,463	4,450,463	866	672	1,886,296	1,865,086	643,336	1,356,795
Start Filling NQ	4,450,463	4,450,463	866	672	2,529,632	1,865,086	0	1,356,795
End Filling NQ	4,450,463	4,450,463	866	672	2,529,632	1,865,086	0	1,356,795

Notes:

(1) Refers to total extracted area of East Cell, West Cell, North Quarry, and Main Quarry (3,074,096 m^2) at the end of the year referenced.
(2) Estimated based on observed conditions or anticipated conditions as provided within the mine plan.
Represents the area where only an upper bench has been extracted.
(3) Measured and supplemented observed annual precipitation. Predictive scenarios apply: CCN(1981-2010) = 866 mm, 2050s = 937 mm, 2080s = 1003 mm.
See 5-Year AMP Review Appendix E for observed data, and Appendix K for predictive values.
(4) Measured and corrected pan evaporation for May-Oct, plus an over-winter estimate of 154 mm.
Predictive scenarios apply: CCN(1981-2020) = 672 mm, 2050s = 770 mm, 2080s = 848 mm. See 5-Year AMP Review Appendix K.
(5) Refers to Wetland Lake (408,468 m^2), Reservoir (692,967 m^2 at maximum stage), and operation's ponds (107,575 m^2).
(6) Refers to total extracted area in Main Quarry (3,074,096 m^2) - (5) "Lake and Wetland Areas" (1,209,010 m^2).
(7) Equals (1) "Total Quarried Area" - (5) "Lake and Wetland Areas" - (6) "Dry Quarry Area in Main Quarry". Upon commencement of lake filling the cell being filled is removed from (7) "Dry Quarry Area in Northern Cells" and added to (5) "Lake and Wetland Areas".
(8) Estimated upstream areas contributing runoff to the quarry. Adjusted based on area of extraction.

	Inflows					Outflows					Total		Site Water Surplus	
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Timeline or Condition (as of year end)	Dry Quarry Recharge in Main Quarry (m^3/yr)	Dry Quarry Recharge in Northern Cells (m^3/yr)	Lake Quarry Recharge (m^3/yr)	Groundwater Inflow (m^3/yr)	Upstream Runoff (m^3/yr)	Recharge System (m^3/yr)	Quarry Operations (m^3/yr)	Required Outflow to HFRT (m^3/yr)	Escarpment Leakage (m^3/yr)	Vertical Leakage (m^3/yr)	Total Inflows (m^3/yr)	Total Outflows (m^3/yr)	Observed Available Annual Surplus (m^3/yr)	Calculated Available Annual Surplus (m^3/yr)
2017	1,242,427	620,805	449,691	2,501,390	230,531	2,717,740	134,145	700,000	35,320	24,804	5,044,844	3,612,009	1,439,751	1,432,836
2018	1,150,075	595,536	352,512	2,974,016	159,254	2,917,421	99,259	700,000	35,320	24,932	5,231,394	3,776,933	1,047,315	1,454,461
2019	1,139,194	626,537	428,796	3,446,643	150,857	2,991,631	134,703	700,000	35,320	25,261	5,792,027	3,886,915	1,647,744	1,905,112
2020	1,027,662	602,100	262,919	3,920,565	64,776	3,936,458	161,955	700,000	35,320	25,626	5,878,022	4,859,359	612,994	1,018,663
2021	1,055,638	648,107	234,548	4,393,191	86,368	4,333,620	150,000	700,000	35,320	25,810	6,417,852	5,244,750	--	1,173,102
2022	1,055,638	675,622	234,548	4,865,818	86,368	4,757,036	150,000	700,000	35,320	25,944	6,917,994	5,668,301	--	1,249,694
2023	1,055,638	688,547	234,548	5,338,444	86,368	5,180,453	150,000	700,000	35,320	25,969	7,403,546	6,091,742	--	1,311,804
2024	1,055,638	727,577	234,548	5,299,659	78,063	5,160,814	150,000	700,000	35,320	26,345	7,395,486	6,072,479	--	1,323,006
2025	1,055,638	766,608	234,548	5,260,979	78,063	5,141,230	150,000	700,000	35,320	26,720	7,395,837	6,053,270	--	1,342,567
2026	1,055,638	779,023	234,548	5,222,300	78,063	5,121,645	150,000	700,000	35,320	26,720	7,369,573	6,033,686	--	1,335,887
Start Filling WC	1,055,638	665,922	273,314	5,222,300	78,063	5,121,645	--	700,000	35,320	27,680	7,295,238	5,884,645	--	1,410,593
End Filling WC	1,055,638	665,922	273,314	4,470,542	78,063	4,253,816	--	700,000	35,320	27,680	6,543,479	5,016,816	--	1,526,664
Start Filling EC & MQEE	1,055,638	364,128	365,941	4,470,542	94,396	4,253,816	--	700,000	35,320	29,709	6,350,646	5,018,845	--	1,331,800
End Filling EC & MQEE	1,055,638	364,128	365,941	1,459,211	94,396	1,355,775	--	700,000	35,320	29,709	3,339,315	2,120,804	--	1,218,510
Start Filling NQ	1,055,638	0	490,749	1,459,211	94,396	1,355,775	--	700,000	35,320	32,797	3,099,994	2,123,892	--	976,101
End Filling NQ	1,055,638	0	490,749	325,849	94,396	442,394	--	700,000	35,320	32,797	1,966,632	1,210,511	--	756,121

Notes:

(9) (9) "Dry Quarry Recharge in Main Quarry" = (6) "Dry Quarry Area in Main Quarry" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 300 mm per year.
(10) (9) "Dry Quarry Recharge in Northern Cells" = (6) "Dry Quarry Area in Northern Cells" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 300 mm per year.
(11) (11) "Lake Quarry Recharge" = (5) "Lake and Wetland Areas" x [(3) "Annual Precipitation" - (4) "Annual Lake Evaporation"]/1000.
(12) Groundwater inflow is estimated for all calibration, review, and predictive estimates through application of the groundwater flow model.
(13) (13) "Upstream Runoff" = (8) "Approximate Upstream Area" x [(3) "Annual Precipitation" - Evapotranspiration - Infiltration]. Inflow is only introduced where a surplus for runoff exists.
Evapotranspiration applied is CCN(1981-2010) = 573 mm, 2050s = 646 mm, 2080s = 707 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario.
Infiltration applied is CCN(1981-2010) = 233 mm, 2050s = 251 mm, 2080s = 268 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario.
(14) Recharge system flows are measured by the WMS for all calibration and review water budgets. Recharge system flows are estimated for predictive water budgets by the groundwater flow model; however, do not vary with climatic conditions. Groundwater infiltration is estimated to increase for 2050s and 2080s climatic scenarios as a result of additional precipitation. The increase in groundwater recharge and resultant increase in groundwater inflow are conservatively excluded.
(15) Consumption of water by quarry operations is estimated annually, and reported in the annual monitoring report. The value applied is equal to the reported annual consumption less 30,000 m^3/year (removes evaporation component of annual estimate as it is accounted for by dry quarry evaporation).
Predictive water budgets apply an average rate of 150,000 m^3/year.
(16) Outflow to the HFRT is measured and totalized annually for all calibration and review water budgets. Future predictive water budgets assume 700,000 m^3 (required) of discharge occurs per year.
(17) Escarpment leakage is estimated through Darcy flow approximation as discussed in Section 8.2.4 of the 5-Year AMP Review.
(18) Vertical leakage from quarry areas. Based on a leakage rate of 4.7 mm/year for dry areas and 9.5 mm/year for lakes (per AMP (CRA, December 2011).
(19) Sum of inflow components.
(20) Sum of outflow components.
(21) (21) "Observed Available Annual Surplus" = (29) "Observed Available Annual Surplus" from Table 8.5.
(22) Annual surplus estimated by the water budget calculations. (22) "Calculated Available Annual Surplus" = (19) "Total Inflows" - (20) "Total Outflows".

Table 5.3

Estimated Water Surplus Variability due to Climate Change
MQEE Water Budget Update
Dufferin Milton Quarry
Region of Halton, Ontario

Timeline or Condition	Estimated Site Surplus for Canadian Climate Normals (1981-2010): Approved Condition (m^3/yr)	Estimated Site Surplus for Canadian Climate Normals (1981-2010): Proposed MQEE Condition (m^3/yr)	Estimated Site Surplus in 2050's: Approved Condition (m^3/yr)	Estimated Site Surplus in 2050's: Proposed MQEE Condition (m^3/yr)	Estimated Site Surplus for 2080's: Approved Condition (m^3/yr)	Estimated Site Surplus for 2080's: Proposed MQEE Condition (m^3/yr)
Start Filling WC	1,386,509	1,410,593	1,385,962	1,416,491	1,389,245	1,423,513
End Filling WC	1,502,578	1,526,664	1,502,031	1,532,561	1,505,315	1,539,584
Start Filling EC/MQEE	1,361,900	1,331,800	1,342,685	1,312,432	1,336,634	1,307,072
End Filling EC/MQEE	1,362,925	1,218,510	1,343,710	1,199,142	1,337,659	1,193,782
Start Filling NQ	1,120,516	976,101	1,069,134	924,566	1,047,000	903,123
End Filling NQ	788,473	756,121	737,091	704,585	714,958	683,142

Table 6.1

Lake Filling Sensitivity Analysis
MQEE Water Budget Update
Dufferin Milton Quarry
Region of Halton, Ontario

	Year of Quarry Rehabilitation for Canadian Climate Normals (1981-2010)			Year of Quarry Rehabilitation for 2050's			Year of Quarry Rehabilitation for 2080's	
Safety Factor or Condition	**Approved Condition (m^3/yr)**	**Proposed MQEE Condition (m^3/yr)**		**Approved Condition (m^3/yr)**	**Proposed MQEE Condition (m^3/yr)**		**Approved Condition (m^3/yr)**	**Proposed MQEE Condition (m^3/yr)**
No Safety Factor (Baseline)	2042	2045		2043	2045		2043	2046
Half Safety Factor	2047	2051		2048	2053		2049	2053
Full Safety Factor	2057	2065		2060	2069		2062	2071

Appendices

Appendix A
Climate Change Water Budget Scenarios

Table A.1

Predictive Site Water Budget for Approved Conditions - 2050's
MQEE Water Budget Update
Dufferin Milton Quarry
Region of Halton, Ontario

Timeline or Condition (as of year end)	Input Parameters (1) Total Quarried Area (m²)	(2) Area of No-Flow Cells (m²)	(3) Annual Precipitation (mm)	(4) Annual Lake Evaporation (mm)	(5) Lake and Wetland Areas (m²)	(6) Dry Quarry Area in Main Quarry (m²)	(7) Dry Quarry Area in Northern Cells (m²)	(8) Approximate Upstream Area (m²)
2017	4,042,623	3,937,992	966	594	1,209,010	1,865,086	968,527	1,439,471
2018	4,069,965	3,990,348	917	625	1,209,010	1,865,086	995,869	1,439,471
2019	4,139,858	4,035,009	911	556	1,209,010	1,865,086	1,065,762	1,439,471
2020	4,217,538	4,097,638	851	634	1,209,010	1,865,086	1,143,442	1,439,471
2021	4,256,796	4,165,372	866	672	1,209,010	1,865,086	1,182,700	1,439,471
2022	4,285,258	4,242,787	866	672	1,209,010	1,865,086	1,211,162	1,439,471
2023	4,290,610	4,290,610	866	672	1,209,010	1,865,086	1,216,514	1,439,471
Start Filling WC	4,290,610	4,290,610	937	770	1,408,836	1,865,086	1,016,688	1,439,471
End Filling WC	4,290,610	4,290,610	937	770	1,408,836	1,865,086	1,016,688	1,439,471
Start Filling EC	4,290,610	4,290,610	937	770	1,782,188	1,865,086	643,336	1,439,471
End Filling EC	4,290,610	4,290,610	937	770	1,782,188	1,865,086	643,336	1,439,471
Start Filling NQ	4,290,610	4,290,610	937	770	2,425,524	1,865,086	0	1,439,471
End Filling NQ	4,290,610	4,290,610	937	770	2,425,524	1,865,086	0	1,439,471

Notes:

(1) Refers to total extracted area of East Cell, West Cell, North Quarry, and Main Quarry (3,074,096 m^2) at the end of the year referenced.
(2) Estimated based on observed conditions or anticipated conditions as provided within the mine plan.
Represents the area where only an upper bench has been extracted.
(3) Measured and supplemented observed annual precipitation. Predictive scenarios apply: CCN(1981-2010) = 866 mm, 2050s = 937 mm, 2080s = 1003 mm.
See 5-Year AMP Review Appendix E for observed data, and Appendix K for predictive values.
(4) Measured and corrected pan evaporation for May-Oct, plus an over-winter estimate of 154 mm.
Predictive scenarios apply: CCN(1981-2020) = 672 mm, 2050s = 770 mm, 2080s = 848 mm. See 5-Year AMP Review Appendix K.
(5) Refers to Wetland Lake (408,468 m^2), Reservoir (692,967 m^2 at maximum stage), and operation's ponds (107,575 m^2).
(6) Refers to total extracted area in Main Quarry (3,074,096 m^2) - (5) "Lake and Wetland Areas" (1,209,010 m^2).
(7) Equals (1) "Total Quarried Area" - (5) "Lake and Wetland Areas" - (6) "Dry Quarry Area in Main Quarry". Upon commencement of lake filling the cell being filled is removed from (7) "Dry Quarry Area in Northern Cells" and added to (5) "Lake and Wetland Areas".
(8) Estimated upstream areas contributing runoff to the quarry. Adjusted based on area of extraction.

Timeline or Condition (as of year end)	Inflows (9) Dry Quarry Recharge in Main Quarry (m³/yr)	(10) Dry Quarry Recharge in Northern Cells (m³/yr)	(11) Lake Quarry Recharge (m³/yr)	(12) Groundwater Inflow (m³/yr)	(13) Upstream Runoff (m³/yr)	Outflows (14) Recharge System (m³/yr)	(15) Quarry Operations (m³/yr)	(16) Required Outflow to HFRT (m³/yr)	(17) Escarpment Leakage (m³/yr)	(18) Vertical Leakage (m³/yr)	Total (19) Total Inflows (m³/yr)	(20) Total Outflows (m³/yr)	Site Water Surplus (21) Observed Available Annual Surplus (m³/yr)	(22) Calculated Available Annual Surplus (m³/yr)
2017	1,242,427	620,805	449,691	2,501,390	230,531	2,717,740	134,145	700,000	35,320	24,804	5,044,844	3,612,009	1,439,751	1,432,836
2018	1,150,075	595,536	352,512	2,974,016	159,254	2,917,421	99,259	700,000	35,320	24,932	5,231,394	3,776,933	1,047,315	1,454,461
2019	1,139,194	626,537	428,796	3,446,643	150,857	2,991,631	134,703	700,000	35,320	25,261	5,792,027	3,886,915	1,647,744	1,905,112
2020	1,027,662	602,100	262,919	3,920,565	64,776	3,936,458	161,955	700,000	35,320	25,626	5,878,022	4,859,359	612,994	1,018,663
2021	1,055,638	648,107	234,548	4,393,191	86,368	4,333,620	150,000	700,000	35,320	25,810	6,417,852	5,244,750	--	1,173,102
2022	1,055,638	675,622	234,548	4,865,818	86,368	4,757,036	150,000	700,000	35,320	25,944	6,917,994	5,668,301	--	1,249,694
2023	1,055,638	688,547	234,548	5,338,444	86,368	5,180,453	150,000	700,000	35,320	25,969	7,403,546	6,091,742	--	1,311,804
Start Filling WC	1,098,535	598,829	235,276	5,338,444	57,579	5,180,453	--	700,000	35,320	26,928	7,328,663	5,942,701	--	1,385,962
End Filling WC	1,098,535	598,829	235,276	4,586,685	57,579	4,312,624	--	700,000	35,320	26,928	6,576,903	5,074,872	--	1,502,031
Start Filling EC	1,098,535	378,925	297,625	4,586,685	57,579	4,312,624	--	700,000	35,320	28,720	6,419,349	5,076,664	--	1,342,685
End Filling EC	1,098,535	378,925	297,625	1,514,918	57,579	1,239,832	--	700,000	35,320	28,720	3,347,583	2,003,873	--	1,343,710
Start Filling NQ	1,098,535	0	405,063	1,514,918	57,579	1,239,832	--	700,000	35,320	31,808	3,076,095	2,006,961	--	1,069,134
End Filling NQ	1,098,535	0	405,063	269,505	57,579	326,461	--	700,000	35,320	31,808	1,830,681	1,093,590	--	737,091

Notes:

(9) (9) "Dry Quarry Recharge in Main Quarry" = (6) "Dry Quarry Area in Main Quarry" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 348 mm per year.
(10) (9) "Dry Quarry Recharge in Northern Cells" = (6) "Dry Quarry Area in Northern Cells" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 348 mm per year.
(11) (11) "Lake Quarry Recharge" = (5) "Lake and Wetland Areas" x [(3) "Annual Precipitation" - (4) "Annual Lake Evaporation"]/1000.
(12) Groundwater inflow is estimated for all calibration, review, and predictive estimates through application of the groundwater flow model.
(13) (13) "Upstream Runoff" = (8) "Approximate Upstream Area" x [(3) "Annual Precipitation" - Evapotranspiration - Infiltration]. Inflow is only introduced where a surplus for runoff exists.
Evapotranspiration applied is CCN(1981-2010) = 573 mm, 2050s = 646 mm, 2080s = 707 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario.
Infiltration applied is CCN(1981-2010) = 233 mm, 2050s = 251 mm, 2080s = 268 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario.
(14) Recharge system flows are measured by the WMS for all calibration and review water budgets. Recharge system flows are estimated for predictive water budgets by the groundwater flow model; however, do not vary with climatic conditions. Groundwater infiltration is estimated to increase for 2050s and 2080s climatic scenarios as a result of additional precipitation. The increase in groundwater recharge and resultant increase in groundwater inflow are conservatively excluded.
(15) Consumption of water by quarry operations is estimated annually, and reported in the annual monitoring report. The value applied is equal to the reported annual consumption less 30,000 m^3/year (removes evaporation component of annual estimate as it is accounted for by dry quarry evaporation).
Predictive water budgets apply an average rate of 150,000 m^3/year.
(16) Outflow to the HFRT is measured and totalized annually for all calibration and review water budgets. Future predictive water budgets assume 700,000 m^3 (required) of discharge occurs per year.
(17) Escarpment leakage is estimated through Darcy flow approximation as discussed in Section 8.2.4 of the 5-Year AMP Review.
(18) Vertical leakage from quarry areas. Based on a leakage rate of 4.7 mm/year for dry areas and 9.5 mm/year for lakes (per AMP (CRA, December 2011).
(19) Sum of inflow components.
(20) Sum of outflow components.
(21) (21) "Observed Available Annual Surplus" = (29) "Observed Available Annual Surplus" from Table 8.5.
(22) Annual surplus estimated by the water budget calculations. (22) "Calculated Available Annual Surplus" = (19) "Total Inflows" - (20) "Total Outflows".

Table A.2

Predictive Site Water Budget for Approved Conditions - 2080's
MQEE Water Budget Update
Dufferin Milton Quarry
Region of Halton, Ontario

Timeline or Condition (as of year end)	Input Parameters							
	(1) Total Quarried Area (m^2)	(2) Area of No-Flow Cells (m^2)	(3) Annual Precipitation (mm)	(4) Annual Lake Evaporation (mm)	(5) Lake and Wetland Areas (m^2)	(6) Dry Quarry Area in Main Quarry (m^2)	(7) Dry Quarry Area in Northern Cells (m^2)	(8) Approximate Upstream Area (m^2)
2017	4,042,623	3,937,992	966	594	1,209,010	1,865,086	968,527	1,439,471
2018	4,069,965	3,990,348	917	625	1,209,010	1,865,086	995,869	1,439,471
2019	4,139,858	4,035,009	911	556	1,209,010	1,865,086	1,065,762	1,439,471
2020	4,217,538	4,097,638	851	634	1,209,010	1,865,086	1,143,442	1,439,471
2021	4,256,796	4,165,372	866	672	1,209,010	1,865,086	1,182,700	1,439,471
2022	4,285,258	4,242,787	866	672	1,209,010	1,865,086	1,211,162	1,439,471
2023	4,290,610	4,290,610	866	672	1,209,010	1,865,086	1,216,514	1,439,471
Start Filling WC	4,290,610	4,290,610	1003	848	1,408,836	1,865,086	1,016,688	1,439,471
End Filling WC	4,290,610	4,290,610	1003	848	1,408,836	1,865,086	1,016,688	1,439,471
Start Filling EC	4,290,610	4,290,610	1003	848	1,782,188	1,865,086	643,336	1,439,471
End Filling EC	4,290,610	4,290,610	1003	848	1,782,188	1,865,086	643,336	1,439,471
Start Filling NQ	4,290,610	4,290,610	1003	848	2,425,524	1,865,086	0	1,439,471
End Filling NQ	4,290,610	4,290,610	1003	848	2,425,524	1,865,086	0	1,439,471

Notes:

(1) Refers to total extracted area of East Cell, West Cell, North Quarry, and Main Quarry (3,074,096 m^2) at the end of the year referenced.
(2) Estimated based on observed conditions or anticipated conditions as provided within the mine plan. Represents the area where only an upper bench has been extracted.
(3) Measured and supplemented observed annual precipitation. Predictive scenarios apply: CCN(1981-2010) = 866 mm, 2050s = 937 mm, 2080s = 1003 mm. See 5-Year AMP Review Appendix E for observed data, and Appendix K for predictive values.
(4) Measured and corrected pan evaporation for May-Oct, plus an over-winter estimate of 154 mm. Predictive scenarios apply: CCN(1981-2020) = 672 mm, 2050s = 770 mm, 2080s = 848 mm. See 5-Year AMP Review Appendix K.
(5) Refers to Wetland Lake (408,468 m^2), Reservoir (692,967 m^2 at maximum stage), and operation's ponds (107,575 m^2).
(6) Refers to total extracted area in Main Quarry (3,074,096 m^2) - (5) "Lake and Wetland Areas" (1,209,010 m^2).
(7) Equals (1) "Total Quarried Area" - (5) "Lake and Wetland Areas" - (6) "Dry Quarry Area in Main Quarry". Upon commencement of lake filling the cell being filled is removed from (7) "Dry Quarry Area in Northern Cells" and added to (5) "Lake and Wetland Areas".
(8) Estimated upstream areas contributing runoff to the quarry. Adjusted based on area of extraction.

Timeline or Condition (as of year end)	Inflows					Outflows					Total		Site Water Surplus	
	(9) Dry Quarry Recharge in Main Quarry (m^3/yr)	(10) Dry Quarry Recharge in Northern Cells (m^3/yr)	(11) Lake Quarry Recharge (m^3/yr)	(12) Groundwater Inflow (m^3/yr)	(13) Upstream Runoff (m^3/yr)	(14) Recharge System (m^3/yr)	(15) Quarry Operations (m^3/yr)	(16) Required Outflow to HFRT (m^3/yr)	(17) Escarpment Leakage (m^3/yr)	(18) Vertical Leakage (m^3/yr)	(19) Total Inflows (m^3/yr)	(20) Total Outflows (m^3/yr)	(21) Observed Available Annual Surplus (m^3/yr)	(22) Calculated Available Annual Surplus (m^3/yr)
2017	1,242,427	620,805	449,691	2,501,390	230,531	2,717,740	134,145	700,000	35,320	24,804	5,044,844	3,612,009	1,439,751	1,432,836
2018	1,150,075	595,536	352,512	2,974,016	159,254	2,917,421	99,259	700,000	35,320	24,932	5,231,394	3,776,933	1,047,315	1,454,461
2019	1,139,194	626,537	428,796	3,446,643	150,857	2,991,631	134,703	700,000	35,320	25,261	5,792,027	3,886,915	1,647,744	1,905,112
2020	1,027,662	602,100	262,919	3,920,565	64,776	3,936,458	161,955	700,000	35,320	25,626	5,878,022	4,859,359	612,994	1,018,663
2021	1,055,638	648,107	234,548	4,393,191	86,368	4,333,620	150,000	700,000	35,320	25,810	6,417,852	5,244,750	--	1,173,102
2022	1,055,638	675,622	234,548	4,865,818	86,368	4,757,036	150,000	700,000	35,320	25,944	6,917,994	5,668,301	--	1,249,694
2023	1,055,638	688,547	234,548	5,338,444	86,368	5,180,453	150,000	700,000	35,320	25,969	7,403,546	6,091,742	--	1,311,804
Start Filling WC	1,122,781	612,046	218,370	5,338,444	40,305	5,180,453	--	700,000	35,320	26,928	7,331,947	5,942,701	--	1,389,245
End Filling WC	1,122,781	612,046	218,370	4,586,685	40,305	4,312,624	--	700,000	35,320	26,928	6,580,187	5,074,872	--	1,505,315
Start Filling EC	1,122,781	387,288	276,239	4,586,685	40,305	4,312,624	--	700,000	35,320	28,720	6,413,299	5,076,664	--	1,336,634
End Filling EC	1,122,781	387,288	276,239	1,514,918	40,305	1,239,832	--	700,000	35,320	28,720	3,341,532	2,003,873	--	1,337,659
Start Filling NQ	1,122,781	0	375,956	1,514,918	40,305	1,239,832	--	700,000	35,320	31,808	3,053,961	2,006,961	--	1,047,000
End Filling NQ	1,122,781	0	375,956	269,505	40,305	326,461	--	700,000	35,320	31,808	1,808,548	1,093,590	--	714,958

Notes:

(9) (9) "Dry Quarry Recharge in Main Quarry" = (6) "Dry Quarry Area in Main Quarry" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 401 mm per year.
(10) (9) "Dry Quarry Recharge in Northern Cells" = (6) "Dry Quarry Area in Northern Cells" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 401 mm per year.
(11) (11) "Lake Quarry Recharge" = (5) "Lake and Wetland Areas" x [(3) "Annual Precipitation" - (4) "Annual Lake Evaporation"]/1000.
(12) Groundwater inflow is estimated for all calibration, review, and predictive estimates through application of the groundwater flow model.
(13) (13) "Upstream Runoff" = (8) "Approximate Upstream Area" x [(3) "Annual Precipitation" - Evapotranspiration - Infiltration]. Inflow is only introduced where a surplus for runoff exists. Evapotranspiration applied is CCN(1981-2010) = 573 mm, 2050s = 646 mm, 2080s = 707 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario. Infiltration applied is CCN(1981-2010) = 233 mm, 2050s = 251 mm, 2080s = 268 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario.
(14) Recharge system flows are measured by the WMS for all calibration and review water budgets. Recharge system flows are estimated for predictive water budgets by the groundwater flow model; however, do not vary with climatic conditions. Groundwater infiltration is estimated to increase for 2050s and 2080s climatic scenarios as a result of additional precipitation. The increase in groundwater recharge and resultant increase in groundwater inflow are conservatively excluded.
(15) Consumption of water by quarry operations is estimated annually, and reported in the annual monitoring report. The value applied is equal to the reported annual consumption less 30,000 m^3/year (removes evaporation component of annual estimate as it is accounted for by dry quarry evaporation). Predictive water budgets apply an average rate of 150,000 m^3/year.
(16) Outflow to the HFRT is measured and totalized annually for all calibration and review water budgets. Future predictive water budgets assume 700,000 m^3 (required) of discharge occurs per year.
(17) Escarpment leakage is estimated through Darcy flow approximation as discussed in Section 8.2.4 of the 5-Year AMP Review.
(18) Vertical leakage from quarry areas. Based on a leakage rate of 4.7 mm/year for dry areas and 9.5 mm/year for lakes (per AMP (CRA, December 2011).
(19) Sum of inflow components.
(20) Sum of outflow components.
(21) (21) "Observed Available Annual Surplus" = (29) "Observed Available Annual Surplus" from Table 8.5.
(22) Annual surplus estimated by the water budget calculations. (22) "Calculated Available Annual Surplus" = (19) "Total Inflows" - (20) "Total Outflows".

Table A.3

Predictive Site Water Budget for Proposed MQEE Conditions - 2050's
MQEE Water Budget Update
Dufferin Milton Quarry
Region of Halton, Ontario

Timeline or Condition (as of year end)	Input Parameters (1) Total Quarried Area (m^2)	(2) Area of No-Flow Cells (m^2)	(3) Annual Precipitation (mm)	(4) Annual Lake Evaporation (mm)	(5) Lake and Wetland Areas (m^2)	(6) Dry Quarry Area in Main Quarry (m^2)	(7) Dry Quarry Area in Northern Cells (m^2)	(8) Approximate Upstream Area (m^2)
2017	4,042,623	3,937,992	966	594	1,209,010	1,865,086	968,527	1,439,471
2018	4,069,965	3,990,348	917	625	1,209,010	1,865,086	995,869	1,439,471
2019	4,139,858	4,035,009	911	556	1,209,010	1,865,086	1,065,762	1,439,471
2020	4,217,538	4,097,638	851	634	1,209,010	1,865,086	1,143,442	1,439,471
2021	4,256,796	4,165,372	866	672	1,209,010	1,865,086	1,182,700	1,439,471
2022	4,285,258	4,242,787	866	672	1,209,010	1,865,086	1,211,162	1,439,471
2023	4,290,610	4,290,610	866	672	1,209,010	1,865,086	1,216,514	1,439,471
2024	4,370,536	4,343,894	866	672	1,209,010	1,865,086	1,296,440	1,301,050
2025	4,450,463	4,397,178	866	672	1,209,010	1,865,086	1,376,367	1,301,050
2026	4,450,463	4,450,463	866	672	1,209,010	1,865,086	1,376,367	1,301,050
Start Filling WC	4,450,463	4,450,463	937	770	1,408,836	1,865,086	1,176,541	1,301,050
End Filling WC	4,450,463	4,450,463	937	770	1,408,836	1,865,086	1,176,541	1,301,050
Start Filling EC	4,450,463	4,450,463	937	770	1,886,296	1,865,086	643,336	1,356,795
End Filling EC	4,450,463	4,450,463	937	770	1,886,296	1,865,086	643,336	1,356,795
Start Filling NQ	4,450,463	4,450,463	937	770	2,529,632	1,865,086	0	1,356,795
End Filling NQ	4,450,463	4,450,463	937	770	2,529,632	1,865,086	0	1,356,795

Notes:

(1) Refers to total extracted area of East Cell, West Cell, North Quarry, and Main Quarry (3,074,096 m^2) at the end of the year referenced.
(2) Estimated based on observed conditions or anticipated conditions as provided within the mine plan.
Represents the area where only an upper bench has been extracted.
(3) Measured and supplemented observed annual precipitation. Predictive scenarios apply: CCN(1981-2010) = 866 mm, 2050s = 937 mm, 2080s = 1003 mm.
See 5-Year AMP Review Appendix E for observed data, and Appendix K for predictive values.
(4) Measured and corrected pan evaporation for May-Oct, plus an over-winter estimate of 154 mm.
Predictive scenarios apply: CCN(1981-2020) = 672 mm, 2050s = 770 mm, 2080s = 848 mm. See 5-Year AMP Review Appendix K.
(5) Refers to Wetland Lake (408,468 m^2), Reservoir (692,967 m^2 at maximum stage), and operation's ponds (107,575 m^2).
(6) Refers to total extracted area in Main Quarry (3,074,096 m^2) - (5) "Lake and Wetland Areas" (1,209,010 m^2).
(7) Equals (1) "Total Quarried Area" - (5) "Lake and Wetland Areas" - (6) "Dry Quarry Area in Main Quarry". Upon commencement of lake filling the cell being filled is removed from (7) "Dry Quarry Area in Northern Cells" and added to (5) "Lake and Wetland Areas".
(8) Estimated upstream areas contributing runoff to the quarry. Adjusted based on area of extraction.

Timeline or Condition (as of year end)	Inflows (9) Dry Quarry Recharge in Main Quarry (m^3/yr)	(10) Dry Quarry Recharge in Northern Cells (m^3/yr)	(11) Lake Quarry Recharge (m^3/yr)	(12) Groundwater Inflow (m^3/yr)	(13) Upstream Runoff (m^3/yr)	Outflows (14) Recharge System (m^3/yr)	(15) Quarry Operations (m^3/yr)	(16) Required Outflow to HFRT (m^3/yr)	(17) Escarpment Leakage (m^3/yr)	(18) Vertical Leakage (m^3/yr)	Total (19) Total Inflows (m^3/yr)	(20) Total Outflows (m^3/yr)	Site Water Surplus (21) Observed Available Annual Surplus (m^3/yr)	(22) Calculated Available Annual Surplus (m^3/yr)
2017	1,242,427	620,805	449,691	2,501,390	230,531	2,717,740	134,145	700,000	35,320	24,804	5,044,844	3,612,009	1,439,751	1,432,836
2018	1,150,075	595,536	352,512	2,974,016	159,254	2,917,421	99,259	700,000	35,320	24,932	5,231,394	3,776,933	1,047,315	1,454,461
2019	1,139,194	626,537	428,796	3,446,643	150,857	2,991,631	134,703	700,000	35,320	25,261	5,792,027	3,886,915	1,647,744	1,905,112
2020	1,027,662	602,100	262,919	3,920,565	64,776	3,936,458	161,955	700,000	35,320	25,626	5,878,022	4,859,359	612,994	1,018,663
2021	1,055,638	648,107	234,548	4,393,191	86,368	4,333,620	150,000	700,000	35,320	25,810	6,417,852	5,244,750	--	1,173,102
2022	1,055,638	675,622	234,548	4,865,818	86,368	4,757,036	150,000	700,000	35,320	25,944	6,917,994	5,668,301	--	1,249,694
2023	1,055,638	688,547	234,548	5,338,444	86,368	5,180,453	150,000	700,000	35,320	25,969	7,403,546	6,091,742	--	1,311,804
2024	1,055,638	727,577	234,548	5,299,659	78,063	5,160,814	150,000	700,000	35,320	26,345	7,395,486	6,072,479	--	1,323,006
2025	1,055,638	766,608	234,548	5,260,979	78,063	5,141,230	150,000	700,000	35,320	26,720	7,395,837	6,053,270	--	1,342,567
2026	1,055,638	779,023	234,548	5,222,300	78,063	5,121,645	150,000	700,000	35,320	26,720	7,369,573	6,033,686	--	1,335,887
Start Filling WC	1,098,535	692,982	235,276	5,222,300	52,042	5,121,645	--	700,000	35,320	27,680	7,301,135	5,884,645	--	1,416,491
End Filling WC	1,098,535	692,982	235,276	4,470,542	52,042	4,253,816	--	700,000	35,320	27,680	6,549,377	5,016,816	--	1,532,561
Start Filling EC & MQEE	1,098,535	378,925	315,011	4,470,542	68,264	4,253,816	--	700,000	35,320	29,709	6,331,277	5,018,845	--	1,312,432
End Filling EC & MQEE	1,098,535	378,925	315,011	1,459,211	68,264	1,355,775	--	700,000	35,320	29,709	3,319,946	2,120,804	--	1,199,142
Start Filling NQ	1,098,535	0	422,449	1,459,211	68,264	1,355,775	--	700,000	35,320	32,797	3,048,458	2,123,892	--	924,566
End Filling NQ	1,098,535	0	422,449	325,849	68,264	442,394	--	700,000	35,320	32,797	1,915,097	1,210,511	--	704,585

Notes:

(9) (9) "Dry Quarry Recharge in Main Quarry" = (6) "Dry Quarry Area in Main Quarry" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 348 mm per year.
(10) (9) "Dry Quarry Recharge in Northern Cells" = (6) "Dry Quarry Area in Northern Cells" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 348 mm per year.
(11) (11) "Lake Quarry Recharge" = (5) "Lake and Wetland Areas" x [(3) "Annual Precipitation" - (4) "Annual Lake Evaporation"]/1000.
(12) Groundwater inflow is estimated for all calibration, review, and predictive estimates through application of the groundwater flow model.
(13) (13) "Upstream Runoff" = (8) "Approximate Upstream Area" x [(3) "Annual Precipitation" - Evapotranspiration - Infiltration]. Inflow is only introduced where a surplus for runoff exists.
Evapotranspiration applied is CCN(1981-2010) = 573 mm, 2050s = 646 mm, 2080s = 707 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario.
Infiltration applied is CCN(1981-2010) = 233 mm, 2050s = 251 mm, 2080s = 268 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario.
(14) Recharge system flows are measured by the WMS for all calibration and review water budgets. Recharge system flows are estimated for predictive water budgets by the groundwater flow model; however, do not vary with climatic conditions. Groundwater infiltration is estimated to increase for 2050s and 2080s climatic scenarios as a result of additional precipitation. The increase in groundwater recharge and resultant increase in groundwater inflow are conservatively excluded.
(15) Consumption of water by quarry operations is estimated annually, and reported in the annual monitoring report. The value applied is equal to the reported annual consumption less 30,000 m^3/year (removes evaporation component of annual estimate as it is accounted for by dry quarry evaporation).
Predictive water budgets apply an average rate of 150,000 m^3/year.
(16) Outflow to the HFRT is measured and totalized annually for all calibration and review water budgets. Future predictive water budgets assume 700,000 m^3 (required) of discharge occurs per year.
(17) Escarpment leakage is estimated through Darcy flow approximation as discussed in Section 8.2.4 of the 5-Year AMP Review.
(18) Vertical leakage from quarry areas. Based on a leakage rate of 4.7 mm/year for dry areas and 9.5 mm/year for lakes (per AMP (CRA, December 2011).
(19) Sum of inflow components.
(20) Sum of outflow components.
(21) (21) "Observed Available Annual Surplus" = (29) "Observed Available Annual Surplus" from Table 8.5.
(22) Annual surplus estimated by the water budget calculations. (22) "Calculated Available Annual Surplus" = (19) "Total Inflows" - (20) "Total Outflows".

Table A.4

Predictive Site Water Budget for Proposed MQEE Conditions - 2080's
MQEE Water Budget Update
Dufferin Milton Quarry
Region of Halton, Ontario

Timeline or Condition (as of year end)	Input Parameters (1) Total Quarried Area (m^2)	(2) Area of No-Flow Cells (m^2)	(3) Annual Precipitation (mm)	(4) Annual Lake Evaporation (mm)	(5) Lake and Wetland Areas (m^2)	(6) Dry Quarry Area in Main Quarry (m^2)	(7) Dry Quarry Area in Northern Cells (m^2)	(8) Approximate Upstream Area (m^2)
2017	4,042,623	3,937,992	966	594	1,209,010	1,865,086	968,527	1,439,471
2018	4,069,965	3,990,348	917	625	1,209,010	1,865,086	995,869	1,439,471
2019	4,139,858	4,035,009	911	556	1,209,010	1,865,086	1,065,762	1,439,471
2020	4,217,538	4,097,638	851	634	1,209,010	1,865,086	1,143,442	1,439,471
2021	4,256,796	4,165,372	866	672	1,209,010	1,865,086	1,182,700	1,439,471
2022	4,285,258	4,242,787	866	672	1,209,010	1,865,086	1,211,162	1,439,471
2023	4,290,610	4,290,610	866	672	1,209,010	1,865,086	1,216,514	1,439,471
2024	4,370,536	4,343,894	866	672	1,209,010	1,865,086	1,296,440	1,301,050
2025	4,450,463	4,397,178	866	672	1,209,010	1,865,086	1,376,367	1,301,050
2026	4,450,463	4,450,463	866	672	1,209,010	1,865,086	1,376,367	1,301,050
Start Filling WC	4,450,463	4,450,463	1003	848	1,408,836	1,865,086	1,176,541	1,301,050
End Filling WC	4,450,463	4,450,463	1003	848	1,408,836	1,865,086	1,176,541	1,301,050
Start Filling EC	4,450,463	4,450,463	1003	848	1,886,296	1,865,086	643,336	1,356,795
End Filling EC	4,450,463	4,450,463	1003	848	1,886,296	1,865,086	643,336	1,356,795
Start Filling NQ	4,450,463	4,450,463	1003	848	2,529,632	1,865,086	0	1,356,795
End Filling NQ	4,450,463	4,450,463	1003	848	2,529,632	1,865,086	0	1,356,795

Notes:

(1) Refers to total extracted area of East Cell, West Cell, North Quarry, and Main Quarry (3,074,096 m^2) at the end of the year referenced.
(2) Estimated based on observed conditions or anticipated conditions as provided within the mine plan. Represents the area where only an upper bench has been extracted.
(3) Measured and supplemented observed annual precipitation. Predictive scenarios apply: CCN(1981-2010) = 866 mm, 2050s = 937 mm, 2080s = 1003 mm. See 5-Year AMP Review Appendix E for observed data, and Appendix K for predictive values.
(4) Measured and corrected pan evaporation for May-Oct, plus an over-winter estimate of 154 mm. Predictive scenarios apply: CCN(1981-2020) = 672 mm, 2050s = 770 mm, 2080s = 848 mm. See 5-Year AMP Review Appendix K.
(5) Refers to Wetland Lake (408,468 m^2), Reservoir (692,967 m^2 at maximum stage), and operation's ponds (107,575 m^2).
(6) Refers to total extracted area in Main Quarry (3,074,096 m^2) - (5) "Lake and Wetland Areas" (1,209,010 m^2).
(7) Equals (1) "Total Quarried Area" - (5) "Lake and Wetland Areas" - (6) "Dry Quarry Area in Main Quarry". Upon commencement of lake filling the cell being filled is removed from (7) "Dry Quarry Area in Northern Cells" and added to (5) "Lake and Wetland Areas".
(8) Estimated upstream areas contributing runoff to the quarry. Adjusted based on area of extraction.

Timeline or Condition (as of year end)	Inflows (9) Dry Quarry Recharge in Main Quarry (m^3/yr)	(10) Dry Quarry Recharge in Northern Cells (m^3/yr)	(11) Lake Quarry Recharge (m^3/yr)	(12) Groundwater Inflow (m^3/yr)	(13) Upstream Runoff (m^3/yr)	Outflows (14) Recharge System (m^3/yr)	(15) Quarry Operations (m^3/yr)	(16) Required Outflow to HFRT (m^3/yr)	(17) Escarpment Leakage (m^3/yr)	(18) Vertical Leakage (m^3/yr)	Total (19) Total Inflows (m^3/yr)	(20) Total Outflows (m^3/yr)	Site Water Surplus (21) Observed Available Annual Surplus (m^3/yr)	(22) Calculated Available Annual Surplus (m^3/yr)
2017	1,242,427	620,805	449,691	2,501,390	230,531	2,717,740	134,145	700,000	35,320	24,804	5,044,844	3,612,009	1,439,751	1,432,836
2018	1,150,075	595,536	352,512	2,974,016	159,254	2,917,421	99,259	700,000	35,320	24,932	5,231,394	3,776,933	1,047,315	1,454,461
2019	1,139,194	626,537	428,796	3,446,643	150,857	2,991,631	134,703	700,000	35,320	25,261	5,792,027	3,886,915	1,647,744	1,905,112
2020	1,027,662	602,100	262,919	3,920,565	64,776	3,936,458	161,955	700,000	35,320	25,626	5,878,022	4,859,359	612,994	1,018,663
2021	1,055,638	648,107	234,548	4,393,191	86,368	4,333,620	150,000	700,000	35,320	25,810	6,417,852	5,244,750	--	1,173,102
2022	1,055,638	675,622	234,548	4,865,818	86,368	4,757,036	150,000	700,000	35,320	25,944	6,917,994	5,668,301	--	1,249,694
2023	1,055,638	688,547	234,548	5,338,444	86,368	5,180,453	150,000	700,000	35,320	25,969	7,403,546	6,091,742	--	1,311,804
2024	1,055,638	727,577	234,548	5,299,659	78,063	5,160,814	150,000	700,000	35,320	26,345	7,395,486	6,072,479	--	1,323,006
2025	1,055,638	766,608	234,548	5,260,979	78,063	5,141,230	150,000	700,000	35,320	26,720	7,395,837	6,053,270	--	1,342,567
2026	1,055,638	779,023	234,548	5,222,300	78,063	5,121,645	150,000	700,000	35,320	26,720	7,369,573	6,033,686	--	1,335,887
Start Filling WC	1,122,781	708,277	218,370	5,222,300	36,429	5,121,645	--	700,000	35,320	27,680	7,308,158	5,884,645	--	1,423,513
End Filling WC	1,122,781	708,277	218,370	4,470,542	36,429	4,253,816	--	700,000	35,320	27,680	6,556,400	5,016,816	--	1,539,584
Start Filling EC & MQEE	1,122,781	387,288	292,376	4,470,542	52,930	4,253,816	--	700,000	35,320	29,709	6,325,917	5,018,845	--	1,307,072
End Filling EC & MQEE	1,122,781	387,288	292,376	1,459,211	52,930	1,355,775	--	700,000	35,320	29,709	3,314,586	2,120,804	--	1,193,782
Start Filling NQ	1,122,781	0	392,093	1,459,211	52,930	1,355,775	--	700,000	35,320	32,797	3,027,015	2,123,892	--	903,123
End Filling NQ	1,122,781	0	392,093	325,849	52,930	442,394	--	700,000	35,320	32,797	1,893,653	1,210,511	--	683,142

Notes:

(9) (9) "Dry Quarry Recharge in Main Quarry" = (6) "Dry Quarry Area in Main Quarry" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 401 mm per year.
(10) (9) "Dry Quarry Recharge in Northern Cells" = (6) "Dry Quarry Area in Northern Cells" x [(3) "Annual Precipitation" - Dry Quarry Evaporation]/1000. Dry Quarry Evaporation is estimated to be 401 mm per year.
(11) (11) "Lake Quarry Recharge" = (5) "Lake and Wetland Areas" x [(3) "Annual Precipitation" - (4) "Annual Lake Evaporation"]/1000.
(12) Groundwater inflow is estimated for all calibration, review, and predictive estimates through application of the groundwater flow model.
(13) (13) "Upstream Runoff" = (8) "Approximate Upstream Area" x [(3) "Annual Precipitation" - Evapotranspiration - Infiltration]. Inflow is only introduced where a surplus for runoff exists. Evapotranspiration applied is CCN(1981-2010) = 573 mm, 2050s = 646 mm, 2080s = 707 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario. Infiltration applied is CCN(1981-2010) = 233 mm, 2050s = 251 mm, 2080s = 268 mm. The CCN estimate is applied for calibration and review water budgets, in addition to the future predictive CCN (average) scenario.
(14) Recharge system flows are measured by the WMS for all calibration and review water budgets. Recharge system flows are estimated for predictive water budgets by the groundwater flow model; however, do not vary with climatic conditions. Groundwater infiltration is estimated to increase for 2050s and 2080s climatic scenarios as a result of additional precipitation. The increase in groundwater recharge and resultant increase in groundwater inflow are conservatively excluded.
(15) Consumption of water by quarry operations is estimated annually, and reported in the annual monitoring report. The value applied is equal to the reported annual consumption less 30,000 m^3/year (removes evaporation component of annual estimate as it is accounted for by dry quarry evaporation). Predictive water budgets apply an average rate of 150,000 m^3/year.
(16) Outflow to the HFRT is measured and totalized annually for all calibration and review water budgets. Future predictive water budgets assume 700,000 m^3 (required) of discharge occurs per year.
(17) Escarpment leakage is estimated through Darcy flow approximation as discussed in Section 8.2.4 of the 5-Year AMP Review.
(18) Vertical leakage from quarry areas. Based on a leakage rate of 4.7 mm/year for dry areas and 9.5 mm/year for lakes (per AMP (CRA, December 2011).
(19) Sum of inflow components.
(20) Sum of outflow components.
(21) (21) "Observed Available Annual Surplus" = (29) "Observed Available Annual Surplus" from Table 8.5.
(22) Annual surplus estimated by the water budget calculations. (22) "Calculated Available Annual Surplus" = (19) "Total Inflows" - (20) "Total Outflows".

about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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Appendix H
Study Terms of Reference

Memorandum

Updated: March 26, 2021

To:	Brian Zeman, MHBC	Ref. No.:	010978
From:	Nicholas Fitzpatrick/Kyle Fritz/Richard Murphy/we/290		
CC:	Kevin Mitchell (CRH); Anthony Goodban (GEC)		

Subject: **Terms of Reference: Geology and Water Resources Assessment Report, Including Karst and Hazard Lands Consideration Proposed Dufferin Aggregates Milton Quarry East Extension Region of Halton, Ontario**

1. Introduction and Background

GHD has been retained by Dufferin Aggregates, a division of CRH Canada Group Inc. (Dufferin) to provide them with advice pertaining to geology, hydrogeology, and surface water resources in connection with a proposal to extend the Milton Quarry. GHD's advice will include site characterization and impact assessment, as well as recommendations related to monitoring, mitigation, and rehabilitation. This memorandum presents the proposed Terms of Reference (ToR) for this advice. The relevant data, analysis, conclusions, and recommendations will be documented in the Geology and Water Resources Assessment Report. The water and natural resources teams are working in an integrated manner to ensure alignment between the analyses and recommendations presented in the GWRA and Natural Environment Reports.

GHD has also prepared a separate ToR in collaboration with Goodban Ecological Consulting (GEC) pertaining to advice related to an Adaptive Environmental Management and Protection Plan (AMP).

The proposed extension of the Milton Quarry, referred to as the Milton Quarry East Extension (MQEE), represents a proposed extraction area of approximately 16 hectares bounded by the existing East Cell to the north, the existing North Quarry to the west, and the existing Main Quarry at some distance to the southwest and south. The proposed MQEE extraction area is contiguous with the existing East Cell (i.e., it would be extracted as part of the East Cell) and separated from the North Quarry by the Town Line to the west.

These Terms of Reference (ToR) have been prepared in consideration of the comprehensive understanding that already exists with respect to the geology, hydrogeology, and surface water resources in the area of the Milton Quarry, and the existing mitigation measures that have a long proven record of successful operation and protection of water resources and related ecological features. Guidelines available from review agencies, including the Ministry of Natural Resources and Forestry Standards for a Class A Quarry below the water table, the Region of Halton Aggregate Resources Reference Manual, and the Niagara Escarpment Plan, were also considered.

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The study of the proposed MQEE lands and surrounding area commenced more than 40 years ago. Over this time extensive investigation and evaluation has occurred and a truly vast amount of data has been collected. The existing Milton Quarry characterization, impact assessment, mitigation measures, and monitoring plan (refer to AMP) were thoroughly vetted through an extensive Joint Agency Review Team (JART) and public consultation process; evaluated and approved by all related government agencies, including the Provincial Joint Board and Cabinet; and the approved plans, including mitigation measures have been successfully operating since 2007. The ongoing monitoring and performance assessment is thoroughly reported to, and reviewed by, relevant government agencies with support from their consultants as warranted. This rigorous approval and operating quarry review process represents the highest known standard of care for any aggregate extraction operation in Ontario or elsewhere.

Dufferin has already committed to integrate the subject site into the state-of-the-art water management system (WMS) and AMP that are already in place and have been operating at the Milton Quarry and Milton Quarry Extension since 2007. The water mitigation system has effectively maintained groundwater levels around the perimeter of the Milton Quarry Extension protecting surrounding water resources including water-dependent ecological features. All approval agencies are familiar with the AMP and the hydrologic and natural environment data collection and assessment that is provided through annual reports and the WebDT data sharing system that allows agencies direct access to hydrogeological data (and other information) at any time. The AMP also requires a comprehensive 5-year review to make any adjustments necessary to make sure the groundwater is maintained to an acceptable level thereby protecting the ecological features dependent upon it. The AMP was approved by the agencies and through annual reporting, as well as a recent 5-year review, has demonstrated that the proposed mitigation system has protected and enhanced natural heritage features surrounding the extension. The water management system for the MQEE will be a straightforward addition to the existing system using the same proven techniques for mitigation.

The reliable understanding and operating basis for the existing Milton Quarry, along with the additional studies described in this ToR, form the basis for the advice and recommendations GHD is preparing related to the proposed MQEE. Existing information on Milton Quarry can be found in the recent 5-Year AMP Review report that was recently completed (GHD, WSP, and GEC, January 24, 2020) and provided to the agencies for review. This extensive document provides a comprehensive report and evaluation of all relevant data and findings. In addition to the 5-Year Review and the on-line WebDT data sharing system, a comprehensive annual water monitoring report is provided and presented to the agencies as well as other specific documents that are prepared from time-to-time.

2. Geology

The Milton Quarry, including the MQEE lands, is situated above the Niagara Escarpment in an area of Amabel dolostone overlain by relatively thin glacial drift deposits. The geologic conditions are well known from the ongoing bedrock extraction operations, historic investigations on and around the MQEE lands, as well as additional studies undertaken as part of this ToR, including:

- 33 new test pits were excavated to determine overburden thickness and characterization (denoted as TPxx-20 on Figure 1)

- 8 new boreholes were drilled to install monitoring wells at 6 locations and these boreholes were also used to determine overburden thickness and depth of Amabel dolostone overlying the Reynales and Cabot Head Formations (denoted as OW78-20 through OW83-21 on Figure 1)
- Updated stratigraphic surfaces will be prepared incorporating the new information
- Geologic cross-sections through the MQEE extraction area and surrounding lands will be prepared
- The bedrock resource volume/tonnage will be calculated based on the available information

Investigative locations are shown on the attached Figure 1.

3. Surface Water and Hazard Lands

The MQEE lands are an upland area with no surface water features within the proposed extraction area. The key surface water feature for consideration is a small seasonal wetland pool referred to as Wetland U1, which is located east of the extraction area. There are also a number of seasonal and permanent pools located further to the east and southeast that form part of the Halton Escarpment Wetland Complex. Based on historic and ongoing data collection it is known that some of these wetlands are directly supported by the groundwater table.

In addition to the existing surface water level information, the following additional studies are being undertaken as part of this ToR:

- 10 new staff gauges were installed at key wetland locations determined in collaboration with GEC (denoted as SG57 through SG66 on Figure 1). These locations are east and south of the proposed MQEE extraction area, enhancing the historical surface water level monitoring network in this area
- Water level transducers were installed at 8 of these surface water monitoring locations
- Water level hydrographs will be prepared for all monitoring locations to assess water level trends and hydroperiods
- Groundwater-surface water interactions will be evaluated as part of the hydrogeology evaluations (Section 4, below)
- Topographic drainage areas will be delineated, including identification of non-draining depressions
- Hazard Land information has been obtained from Conservation Halton and reviewed relative to the proposed MQEE area. No Hazard Land concerns are anticipated beyond consideration of the adjacent wetland areas due to the upland nature of the MQEE lands

Investigative locations are shown on the attached Figure 1.

4. Hydrogeology

In the Milton Quarry area, the groundwater table generally resides in the Amabel dolostone forming an unconfined aquifer. The so-called Amabel Aquifer is a regionally extensive aquifer system (comprised of the thick Amabel and thin Reynales dolostones) and is the primary groundwater resource in the Milton Quarry area. The aquifer is underlain by the Cabot Head shale which forms a regional aquitard. The Amabel Aquifer is routinely used for private water supply wells and supports some of the seasonal and permanent wetlands in the area.

In addition to relying on the extensive existing hydrogeologic information, including over 340 monitoring wells, multiple pumping tests (including 2 conducted on the MQEE lands at TW1-80), over 150,000 water level measurements and analysis over more than 40 years, the following additional studies are being undertaken as part of this ToR:

- 8 new monitoring wells were installed at 6 locations, including nested monitoring wells at 2 of these locations (denoted as OW78-20 through OW83-21 on Figure 1 with shallow and deep nested monitoring well intervals denoted as "S" and "D", respectively)
- Water level monitoring is being conducted at 27 monitoring wells located on the MQEE lands and areas to the east and south (including some locations that were already part of monitoring programs)
- Water level transducers were installed in 15 of these monitoring wells
- Water level hydrographs will be prepared for all monitoring locations to assess seasonal variations and year-over-year variations where longer term data is available
- Specific combinations of monitoring locations will be utilized to assess water level variations with depth and to compare surface water and groundwater level conditions
- Groundwater level contours will be prepared for spring and fall monitoring events consistent with standard practices for the Existing Milton Quarry. Water levels for these events will also be reflected on the cross-sections
- Groundwater-surface water interactions will be assessed using field observations, combination groundwater/surface water hydrographs, and comparison of groundwater contours to ground surface elevations/topography
- No private water supply well survey is necessary as there are no private lands or water supply wells within 1.2 kilometres of the MQEE extraction area (refer to MHBC letter for September 4, 2020, Figure #13). The water supply wells that are within the Amabel Aquifer are located to the north and west, hydrogeologically separated from the MQEE lands by the other quarry areas and addressed by the existing Milton Quarry monitoring and mitigation measures
- The MQEE lands are outside all Source Water Protection (SWP) designated Wellhead Protection Areas (WHPAs) and therefore no SWP-related studies are necessary as part of this ToR
- Groundwater quality conditions have been extensively evaluated at the Milton Quarry and continue to be monitored through the provisions of the WMS and the private well water supply monitoring program under the AMP and the Ontario Water Resources Act (OWRA) approvals. No additional water quality sampling is necessary for the purpose of assessing the potential impact to water resources for the proposed MQEE; however, additional water quality sampling was undertaken in early 2021 to provide additional baseline water quality data as requested by the Region. This data includes groundwater and

surface water quality sampling at locations associated with the water resources (wetlands) to the east and south of the proposed MQEE extraction area. Adjustments to the existing Milton Quarry monitoring program may be included in the recommended monitoring requirements pursuant to the AMP or the OWRA approvals

Investigative locations are shown on the attached Figure 1.

The various evaluations described in Sections 2, 3, and 4 will include consideration of potential karstification of the dolostone bedrock. Karstification is a normal type of water-driven weathering that is typical of carbonate bedrock in areas such as southern Ontario. The relatively low solubility of the Amabel dolostone (relative to limestone or gypsum), the carbonate-rich overburden, and the limited surface water closed-catchment areas result in low degrees of weathering or karstification in the area of Milton Quarry.

Karst considerations were thoroughly evaluated as part of the previous Milton Quarry Extension approvals and it was determined by the Region of Halton hydrogeologist at that time as well as by the Joint Board, that there were no unusual or demanding challenges arising from karstification for the Milton Quarry Extension. It was determined that the then-proposed Milton Quarry Extension characterization and proposed mitigation measures sufficiently addressed any considerations related to potential karstification. These measures have proven to be effective in protecting water resources, including bedrock springs that had been indicated to be reliant on karst features by parties opposed to the Extension. The quarry extraction of the North Quarry, West Cell, and East Cell over the last 23 years of involvement by GHD have revealed no significant karst features and no hydrogeologic conditions that could not be addressed by the approved mitigation measures.

Based on the above facts, a separate study based solely on potential karst considerations is not necessary and has not been included in this ToR.

5. Impact Assessment, Mitigation, and Rehabilitation Measures

As identified in Section 1 (above) Dufferin has already committed to integrate the subject site into the state-of-the-art water management system (WMS) and AMP that are already in place and have been operating at the Milton Quarry and Milton Quarry Extension since 2007. In the absence of mitigation measures, the extension of the Milton Quarry below the water table in the MQEE lands would result in a lowering of the surrounding groundwater levels and would be expected to have a negative influence on some of the nearby groundwater-dependent wetlands. The water mitigation system has effectively maintained groundwater levels around the perimeter of the Milton Quarry Extension protecting surrounding water resources including water dependent ecological features. The water management system for the MQEE will be a straightforward addition to the existing system using the same proven techniques for mitigation.

As part of this ToR, GHD will evaluate the potential requirements to adapt the WMS to maintain, or enhance, the existing approved groundwater levels to the east and south of the proposed MQEE extraction area. This will include evaluation and design of additional recharge wells, diffuse discharge(s), watermain, and related equipment as necessary to achieve the mitigation and enhancement objectives for the proposed MQEE. The proposed adaptation of the WMS will be described in the GWRA as well as in the AMP Addendum and the Site Plans.

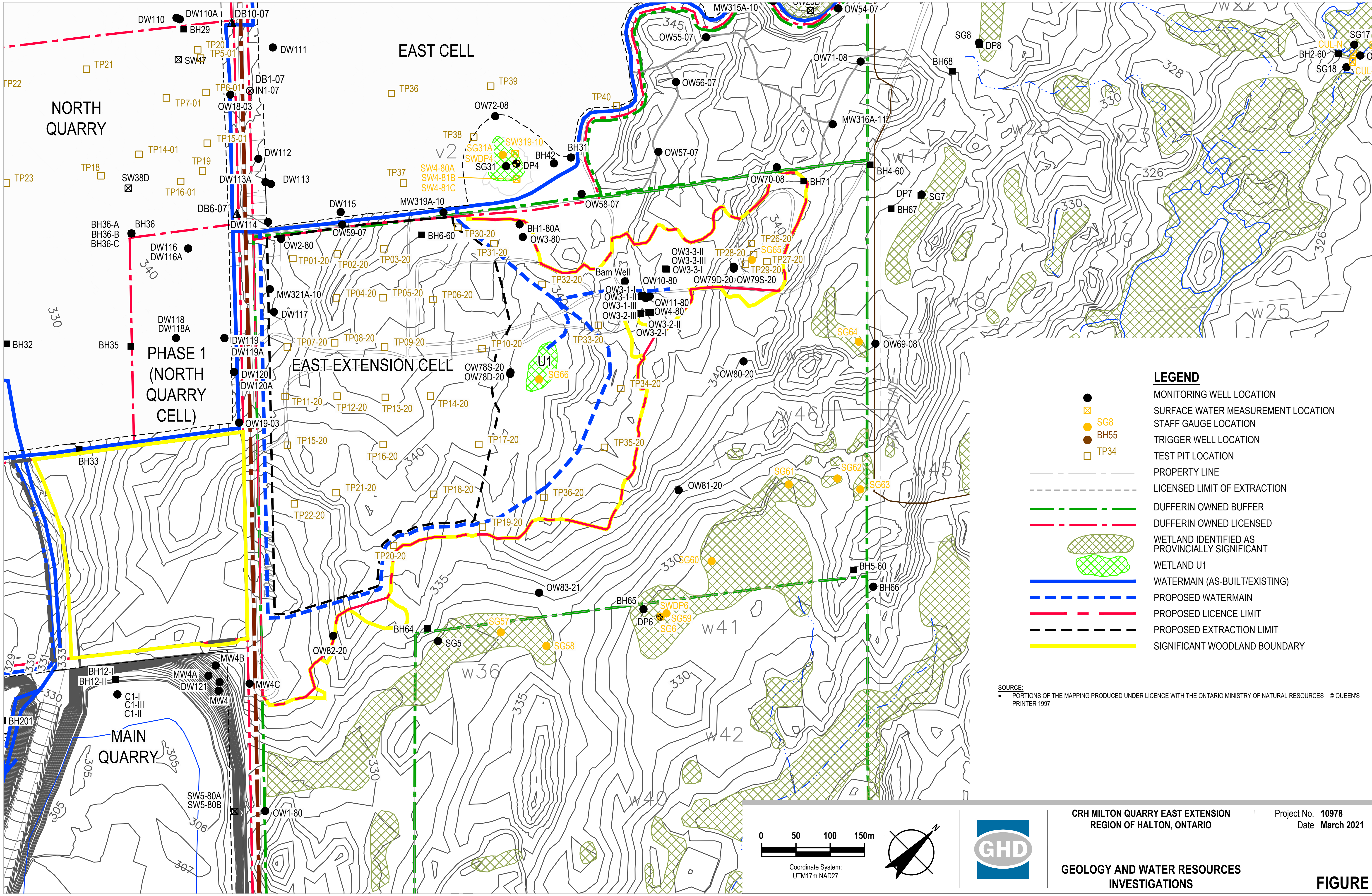
The evaluation will include a groundwater modelling analysis to estimate potential numbers and locations of recharge wells, recharge and dewatering flows, water budget, and lake filling times. These analyses will build on the groundwater and surface water analyses that have been ongoing over the last 20 years of Milton Quarry evaluation. The most recent version of the models, as reported in the 5-Year AMP Review, will be updated with the information obtained under this ToR and recent monitoring and WMS operating information.

The proposed MQEE extraction and licence areas exhibit little to no surface water flow, with only one notable surface water body, Wetland U1. Regardless, the changes in catchment areas and potential influence on runoff and discharge will be evaluated and quantified using the topographic mapping and surface water modelling results from the 5-Year AMP Review. Wetland U1 and the more distant wetlands (e.g. W36 and W41) are primarily groundwater-dependant features and will be protected or enhanced by the proposed groundwater mitigation measures.

The mitigation and rehabilitation measures will be designed to protect against potential negative effects to water resources and related ecological features. This evaluation will compare the proposed interim extraction groundwater and surface water condition to the existing approved interim extraction condition for full extraction with mitigation. Similarly, the proposed rehabilitation condition will be compared to the existing approved rehabilitation condition. To the extent feasible and practical, these measures will also be designed to enhance existing conditions where it is evident that a net environmental benefit can be achieved.

This impact assessment and design analysis will include a water budget assessment, extending the assessments that are presently undertaken for the existing quarry and WMS.

Suitable monitoring and adaptive management measures would also be identified as described in the ToR for the AMP, reported separately.



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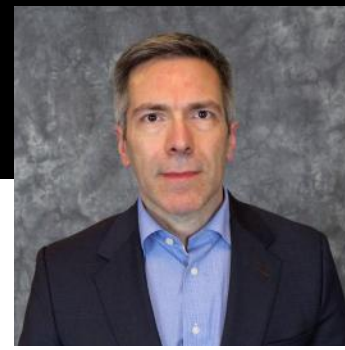
Appendix I
Curricula Vitae

A GHD Principal

J. Richard Murphy M.A.Sc., B.A.Sc.

Engineer, Hydrogeologist
Operations Manager



Location
Waterloo, Ontario, Canada

Experience
30 years

Qualifications/Accreditations
- 1991, M.A.Sc., Civil Engineering (Water Resources)
- 1989, B.A.Sc., Systems Design Engineering

Key technical skills
- Hydrogeology and Water Resources
- Contaminated Site Assessment and Remediation
- Aggregate Resource Development

Memberships
- Professional Engineers of Ontario (PEO)
- National Groundwater Association (NGWA)
- Ontario Stone Sand & Gravel Association (OSSGA)

Relevant experience summary

Mr. Murphy is a professional engineer specializing in hydrogeology and water resources evaluation and design.

Mr. Murphy's project experience over three decades includes contaminated site assessment and remediation, numerical and analytical modeling, aggregate resource development, landfills, and water supply; working in both overburden and bedrock environments.

Mr. Murphy capably manages/executes all project aspects ranging from technical evaluations, project management, strategic planning, agency and public consultation, to providing expert witness evidence.

Mr. Murphy is also the Operations Manager for GHD Ontario Property and Environment Markets.

Aggregate Resources Development Services

Mr. Murphy has been responsible for the evaluation of water resources, hydrogeology, and environmental management matters pertaining to aggregate resource development. The scope of work has included site investigation, impact assessment, water management design and engineering for dewatering and mitigation systems, stakeholder consultation and approvals, expert witness testimony, and implementation of approved systems. Representative projects include:

- Armbro Pinchin Aggregate Pit, Town of Caledon, Ontario
- Dufferin Milton Quarry, Regional of Halton, Ontario
- Dufferin Acton Quarry, Regional of Halton, Ontario
- Dufferin Flamboro Quarry, City of Hamilton, Ontario
- Dufferin Paris Pit, Paris, Ontario
- Dufferin Cedar Creek Pit, Cambridge, Ontario
- Dufferin Bark Lake Quarry, Haliburton, Ontario
- Caledon Sand and Gravel Inc. Pit, Town of Caledon, Ontario
- Proposed Rockfort Quarry, Town of Caledon, Ontario
- Armbro Esker Lake Pit, Brampton, Ontario
- Lafarge Ravena Plant and Quarry, Albany County, New York
- Lafarge Woodstock Plant and Quarry, Ontario
- Lafarge Joppa Plant and Quarry, Illinois
- Nelson Quarry, Burlington, Ontario
- Penny's Lawrence Pit, Douglas County, Kansas
- River Valley Developments Dolime Quarry, Guelph, Ontario

Remedial Investigation/Feasibility Studies

Mr. Murphy has been responsible for evaluating hydrogeologic conditions for a number of Remedial Investigation/Feasibility Studies. Duties included hydrogeologic characterization, planning of supplemental investigations, calculation of groundwater flow and contaminant migration rates, prediction of required pumping rates and durations for potential remedial alternatives and recommendation of hydrogeologically suitable remedial alternatives. Evaluation techniques involved both analytical and numerical simulation techniques. Representative projects are listed below:

- Novak Farm Site, Chenango County, New York
- Former Hart Chemical, Guelph, Ontario
- Bristol Aerospace, Winnipeg, Manitoba
- Phelps Dodge Landfill Remediation, Maspeth, New York
- VacAir Alloys Division, Frewsburg, New York
- Fons and Old Wayne Landfills, Ypsilanti Township, Michigan
- Textile Road Site, Ypsilanti Township, Michigan
- Pristine Site, Reading, Ohio
- Henkel Site, Hamilton, Ontario
- Sealand Restoration Site, Lisbon, New York

Remedial Design/Remedial Actions

Mr. Murphy has been responsible for the design of groundwater and soil remediation systems. Duties have included hydrogeologic characterization, planning of supplemental investigations, determination of suitable cleanup objectives, specification of the locations and flow rates for groundwater extraction systems, prediction of performance impacts due to design and operational variations. Evaluation techniques have involved both analytical and numerical simulation methods.

Representative projects are listed below:

- Summit National Superfund Site, Deerfield, Ohio
- Spiegelberg Site, Livingston County, Michigan
- Hyde Park Landfill, Niagara Falls, New York
- Buffalo Avenue Plant, Niagara Falls, New York
- S-Area Site, Niagara Falls, New York
- Former Hart Chemical, Guelph, Ontario
- Former Uniroyal Chemical, Elmira, Ontario
- G&H Landfill, Macomb County, Michigan
- Pfohl Brothers Landfill, Cheektowaga, New York
- Libbey Glass, Toledo, Ohio
- Caterpillar, East Peoria, Illinois
- Miami County Incinerator Site, Miami County, Ohio
- Fisher Calo Site, Kingsbury, Indiana
- Rockaway Borough Well Field Site, Rockaway Borough, New Jersey
- Schenectady International, Inc. Site, Rotterdam Junction, New York
- Hooker/Rucco Site, Hicksville, New York
- Rocky Hill Municipal Well/Montgomery Township Housing Development Superfund Sites, Somerset County, New Jersey
- JIS Landfill, South Brunswick, New Jersey

Water Supply/Wellhead Protection Studies

Mr. Murphy has been responsible for the evaluation of hydrogeologic impacts and wellhead protection areas for municipal and commercial groundwater supplies. Evaluation of techniques employed include numerical steady state and transient groundwater flow and capture zone simulations, vulnerability assessment, and evaluation of studies by others. Representative projects are listed below:

- Waterloo Landfill Site. Confirmation of findings of Erb Street Well Field Evaluation, Region of Waterloo, Ontario
- Sauble Beach Groundwater Supply Study, Township of Ambel, Ontario
- Fisher Calo Site, Kingsbury, Indiana
- Ontario Source Water Protection Projects:
  - Various client site assessments
  - Saugeen/Grey Sauble Vulnerability Study and Threats Assessment

Solid Waste Management Sites

Mr. Murphy has been responsible for planning and carrying out water quality impact assessments for existing and proposed solid waste management sites. Duties included site characterization, contaminant migration simulation, impact prediction, and recommendations for engineered systems. Simulation techniques range from analytical models to numerical models involving unsaturated and multidimensional solution domains. Representative projects are listed below:

- Waterloo Landfill, Waterloo, Ontario
- Keele Valley Landfill, Toronto, Ontario
- St. Marys Landfill, St. Marys, Ontario
- Valentine Road Landfill, Kincardine, Ontario
- Mid Huron Landfill, Goderich, Ontario
- Greenlane Landfill, Southwold, Ontario
- Sarnia Landfill, Sarnia, Ontario
- Cedartown Municipal Landfill, Cedartown, Georgia
- Wauconda Landfill, Chicago, Illinois
- East Bethel Landfill, East Bethel, Minnesota

Other Related Areas of Interest

Recognized (Certifications/Trainings)

- Licensed Professional Engineer: Ontario
- Designated Consulting Engineer: Ontario
- Clayey Barriers for Mitigation of Contaminant Impact, University of Western Ontario, 1992

Expert Testimony

Mr. Murphy has provided expert witness testimony (depositions, Trial, and Hearings) on various aspects of hydrogeology, water resources, site investigation, analysis and remediation, including groundwater flow and contaminant transport issues, water resources, and engineering, for the following projects:

– Royal Oak Site, Royal Oak, Michigan
– Proposed South Quarry Landfill Development, Town of Flamborough, Ontario
– Armbro Pinchin Aggregate Pit Development, Town of Caledon, Ontario
– 217 Fay Avenue, Addison, Illinois
– Rocky Hill Municipal Well/Montgomery Township Housing Development Superfund Sites, Somerset County, New Jersey
– Dufferin Aggregates Milton Quarry Extension, Region of Halton, Ontario
– Proposed Rockfort Quarry Development, Town of Caledon, Ontario
– Proposed Nelson Quarry Extension, Burlington, Ontario
– Halton Regional Official Plan Amendment No. 38, Region of Halton, Ontario
– Dufferin Aggregates Acton Quarry Extension, Town of Halton Hills, Ontario
– Dufferin Paris Pit, Brant County, Ontario

Publications/Presentations

– Protecting Water Resources with a Groundwater Recharge Well System at the Dufferin Aggregates Milton Quarry", International Association of Hydrogeologists Canadian National Conference, October 27 30, 2015 (with W.T. Armes and N. Fitzpatrick).
– "Safeguarding our future" OSSGA, Avenues, Volume 4, Issue 1 (with Brian Zeman).
– "Adaptive Management Plans in Aggregate Resources: A Good Idea and/or The New Normal?", Ontario Stone Sand and Gravel Association Annual General Meeting February 2012 (with D. Hanratty, J. Buhlman, and B. Clarkson).
– "Predicting Redox Dependent Natural Attenuation at the Plattsburgh Air Force Base", The Fifth International Symposium on In Situ and On Site Bioremediation, San Diego, California, April 19 22, 1999 (with G.R. Carey, P.J. Van Geel, E.A. McBean, and F.A. Rovers).
– "Visualizing Natural Attenuation Trends", The Fifth International Symposium on In Situ and On Site Bioremediation, San Diego, California, April 19 22, 1999 (with G.R. Carey, P.J. Van Geel, E.A. McBean, and F.A. Rovers).
– "BIOREDOX MT3DMS: A Coupled Biodegradation Redox Model for Simulating Natural and Enhanced Bioremediation of Organic Pollutants V2.0 User's Guide and Verification Manual", Conestoga Rovers & Associates, Waterloo, Ontario, Canada, 1999 (with G.R. Carey and P.J. Van Geel).
– "Coupled Biodegradation Redox Modeling to Simulate Natural Attenuation Processes at the Plattsburgh Air Force Base (New York)", MODFLOW'98, Golden, Colorado, October 5 7, 1998 (with G.R. Carey, P.J. Van Geel, E.A. McBean, and F.A. Rovers).
– "An Efficient Screening Approach for Modeling Natural Attenuation", MODFLOW'98, Golden, Colorado, October 6 8, 1998 (with G.R. Carey, P.J. Van Geel, and E.A. McBean).
– "Full Scale Field Application of a Coupled Biodegradation Redox Model (BIOREDOX)", First International Conference on Remediation of Chlorinated and Recalcitrant Compounds, May 18 21, 1998, Monterey, California (with G.R. Carey, P.J. Van Geel, E.A. McBean, and F.A. Rovers).
– “Application of an Innovative Visualization Method for Demonstrating Intrinsic Remediation at a Landfill Superfund Site", Petroleum Hydrocarbons & Organic Chemicals in Ground Water Conference, American Petroleum Institute and National Ground Water Association, Houston, TX, November 1996 (with G.R. Carey, M.G. Mateyk, G.T. Turchan, E.A. McBean, and F.A. Rovers).
– "Two Phase Flow in a Variable Aperture Fracture", Water Resources Research, Vol. 29, No. 10, October 1993 (with N.R. Thomson).

Career history

2018 - present	GHD, Operations Manager
1991 - present	GHD, Principal
1990	J.F. Sykes & Associates Limited
1990	Neil Thomson Engineering Services
1989 - 1991	University of Waterloo, Teaching Assistant
1988 - 1989	GHD

Thomas Guoth P. ENG.

Technical Director

Location

Ontario, Canada

Experience

30 years

Qualifications/Accreditations

- Civil Engineering (Water Resources, Hydrogeology Specialization), (currently Dalhousie University)1992
- B.A.Sc., Geological Engineering, University of Toronto, 1985

Memberships

- Registered Professional Engineer, Ontario
- Project Management Professional (PMP)
- Qualified Person (QP_{ESA}) for Environmental Site Assessments as defined in Ontario Regulation 153/04

Relevant experience summary

Thomas has 30 years of experience in managing complex multi disciplinary projects involving large teams of engineering and environmental professionals. Thomas has extensive working knowledge in the areas of design/implementation of Phase I/One and Phase II/Two Environmental Site Assessments (ESAs) and hydrogeological site investigations as well as preparation/implementation of Remedial Options and Feasibility Studies, Remedial Action Plans, soil/groundwater management plans, remedial design, and construction administration. Thomas is an active participant in the Excess Soil Engagement Group for the Ontario Ministry of the Environment, Conservation and Parks (MECP) representing the OSSGA. Thomas is also working with MECP, APGO and PEO on the preparation of a Guidance document for practitioners on the management of excess soils. He is also on committee with OPSE and MECP for the preparation of technical document and best management practices of excess soil for the aggregate industry.

Linear Infrastructure

Environmental and Geotechnical Services Scarborough Subway Extension

Role: Project Manager
Client: Toronto Transit Commission (TTC)
Location: Toronto, Ontario
Date(s): August 2015 – Present

Project Manager for the provision of geo environmental and geotechnical consulting services for the Toronto Transit Commission (TTC) Scarborough Subway extension project. Services include advancement/ installation of boreholes/monitoring wells, soil/groundwater sample collection and geotechnical testing along the proposed alignment.

Environmental and Geotechnical Services

Role: Project Director/Manager
Client: Toronto Transit Commission (TTC)
Location: Toronto, Ontario
Date(s): 1998 – 2009 and April 2015 – Present

Project Manager for the provision of geo environmental consulting services for the Toronto Transit Commission (TTC) from 1998 to 2009. This program included the completion of Phase II ESAs, subsurface investigations and geotechnical investigations at the:

- Danforth, Birchmount, and Lansdowne Bus Garages
- Union, Lawrence, Victoria, Castle Frank, North York Centre and Museum Subway Stations
- Jane Station (assessment of dewatering activities)
- Wilson Garage
- Greenwood Garage
- Mount Denis Bus Garage
- Eglinton Bus Garage
- Hillcrest Complex
- Eglinton Light Rapid Transit (LRT) system

Environmental and Geotechnical Services

Role: Project Director/Manager
Client: Metrolinx
Location: Toronto, Ontario
Date(s): 2009 – 2013

Project manager for provision of environmental consulting services to Metrolinx under a standing offer agreement for properties that Metrolinx owns or is

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leasing to third parties, or properties that Metrolinx was purchasing as part of the expansion of transportation services in the Greater Toronto Area. Activities completed included Phase One and Two ESAs, subsurface investigations, DSSs, and Property Condition Assessments (PCAs). The DSSs evaluated the potential for the presence of designated substances as defined and regulated by O.Reg. 490/09 "Designated Substances". The PCAs consisted of the assessment of construction details, physical performance, and attributes of the buildings and systems, and was completed in general accordance with the American Society for Testing and Materials (ASTM) standard E 2018 08: “Standard Guide for the Property Condition Assessments” (Baseline Property Condition Assessment Process). Work was completed both in publically accessible areas and areas that are restricted from public access.

Environmental Services | MTO Arrow Road Facility

Role: Project Director/Manager
Client: Infrastructure Ontario
Location: Toronto, Ontario
Date(s): 2011 – 2014

Project manager and Director for the Environmental and Geotechnical Investigation of the MTO Arrow Road facility, to support the development of a new traffic information centre. Scope of work included a Phase One ESA, Phase Two ESA, geotechnical investigation, and follow up delineation activities. GHD subsequently completed a Risk Evaluation to develop Risk Based remediation target concentrations. Soils with concentrations above these target concentrations were subsequently removed for off Site disposal. Risk Management requirements for the property were also developed, to ensure that environmental conditions are protective for future occupants. A Designated Substances Survey was also completed to assist with the development of abatement specifications for asbestos containing shingles on a salt dome.

Southeast Collector Trunk Sewer

Role: Project Manager
Client: The Regional Municipality of York
Location: York Region, Ontario
Date(s): 2004 – Present

Project Manager for the hydrogeology/geotechnical component of an Individual Environmental Assessment for the Southeast Collector Trunk sewer for York Region to assess potential impacts on groundwater and surface resources from the construction of a proposed deep trunk sanitary sewer that would be constructed using tunneling methodologies.

Project Manager for the Hydrogeological/Geotechnical component of the Design phase of the Southeast Collector Trunk Sewer project. Tasks included project management/coordination, data evaluation, interpretation aquifer and flow system delineation, chemistry data evaluation, initiation/interpretation of pumping tests and preparation of supporting documentation for Permit to Take Water.

Highway 7 Road Widening

Role: Project Director
Client: Dufferin Construction for Ministry of Transportation
Location: Pickering, Ontario
Date(s): 2011 – 2013

Retained by Dufferin Construction to provide environmental compliance monitoring in support of highway lane widening. The project consisted of widening 12 km of highway and nine stream crossings containing species regulated by the Endangered Species Act. Coordinated the removal of sediment from two stream crossings, which was approved by the Ontario Ministry of Natural Resources (MNR), the local conservation authority, and Fisheries and Oceans Canada (DFO).

Moffat Creek Sanitary Trunk Sewer

Role: Peer Reviewer
Client: Waterloo Region
Location: Cambridge, Ontario
Date(s): 2011

Provided Corporate Direction and Peer review for the hydrogeological investigation and permit to take water application for the 1,250 m long Moffat Creek Sanitary Trunk Sewer. The sewer was installed using micro tunneling methods.

Environmental Site Assessments

Thomas has been responsible for the design, completion and management of several Phase II Site Assessment Investigations and Remedial/Feasibility Studies in Canada. The duties included the scoping of the activities, design of hydrogeologic investigations, interpretation of hydrogeologic and chemistry data, determination of fate and transport, the design and evaluation of remedial alternatives, aquifer hydraulic testing, and the design/interpretation of monitoring programs. Thomas was the QPESA for some of the representative projects presented below in which a Record of Site Condition was filed on the Environmental Site Registry:

Vendor of Record for Environmental and Geotechnical Services

Role: Project Director/Manager
Client: Infrastructure Ontario
Location: Toronto, Ontario
Date(s): 2011 – Present

Project Director and Manager for providing environmental consulting services to Infrastructure Ontario (formerly Ontario Realty Corporation) in support of property transactions, property divestures, property developments and due diligence activities.

Managed over 100 projects that included Phase One and Two ESA undertaken in accordance with O.Reg. 153/04, as amended, requirements, remedial activities, risk assessments (Screening Level Risk Assessments and Tier 3 RAs), and designated substance surveys. Responsible for budget, scope and schedule control.

Environmental Site Assessment and Remediation-Southern Region

Role: Project Manager
Client: Infrastructure Ontario
Location: 11 Centre Avenue, Toronto, Ontario
Date(s): 2013 – Present

GHD was retained in 2013 to complete Phase One and Two ESAs to O.Reg. 153/04 in support of Record of Site Condition (RSC) filing, Hydrogeological Investigations, Geotechnical Investigations, and a Geothermal Investigation for the proposed New Toronto Courthouse (NTC) located at 11 Centre Avenue in Toronto, Ontario. The NTC site is approximately 0.7 hectares (1.5 acres) in size and located in an area of downtown Toronto that was developed for commercial, community, industrial, and residential purposes prior to 1890. To support the filing of a RSC, Phase One and Two ESA and soil remediation activities were undertaken to address metals/inorganics, PHCs, and PAH impacts to soil. In conjunction with the soil remediation activities, a risk assessment is being undertaken to address cadmium, sodium, and chloride impacts to groundwater. GHD has been providing contract administration and oversight services for the soil remediation phase since August 2016. Soil remediation activities commenced in November 2017 and to date over 28,000 tonnes of impacted soil has been excavated. Thomas is the project manager and QPESA responsible for ensuring is completed to the requirements of the regulation and the filing of the RSC.

Land Assessment and Remediation Program

Role: Project Director/Manager
Client: Hydro One Networks Inc.
Location: Toronto, Ontario
Date(s): 1999 – Present

Project Director/Project Manager for completion of Phase I and II ESAs, screening level risk assessments, Tier 3 risk assessments, remedial option and feasibility studies, remedial cost estimates, and remediation throughout Ontario at real estate site, distribution stations and transmission stations for Hydro One Land Assessment and Remediation program.

Environmental Peer Review of Potentially Contaminated Sites – Land Conveyances

Role: Project Director/Manager
Client: City of Toronto
Location: Toronto, Ontario
Date(s): 2014 – Present

Project Director and Manager for providing peer review services pertaining to conveyance of contaminated lands to the City of Toronto and lands owned by the City of Toronto. Detailed knowledge on the policies and procedures is required and providing advice to City on proposed changes to their policies. Thomas is the QPESA providing peer review services to the City.

Environmental and Geotechnical Services

Role: Project Director/Manager
Client: Build Toronto
Location: Toronto, Ontario
Date(s): 2011 – Present

Project Manager for City of Toronto for completion of Phase One and Two ESAs, screening level risk assessments, remedial options and feasibility studies and geotechnical investigations at several surplus properties throughout Toronto. This included properties at 2 Bicknell Rd, 28 Bathurst Street, 123/130 Harbour Street, 805 Don Mills Road. For the 2 Bicknell property, Thomas was the QP^{ESA} responsible for the completion of a Phase One ESA, Phase Two ESA and risk assessment in support of the filing of RSC. The RSC was filed in 2016.

Environmental and Geotechnical Services

Role: Project Director
Client: Toronto Port Lands Company
Location: Toronto, Ontario
Date(s): 2010 – Present

Project Manager for provision of environmental consulting services under a Vendor of Record agreement with Toronto Port Lands. Projects included groundwater monitoring programs, Subsurface Investigations/Phase Two ESAs and Certificate of Property Use (CPU) monitoring. Project included Cherry Street Phase II ESA –Phase II ESA to assist TPLC in an environmental exit audit for a tenant at one of their properties. The project consisted of developing and implementing a soil and groundwater sampling strategy at an accelerated schedule to not only assess the areas of potential environmental concern identified in previous work but to clearly establish the baseline conditions at the property for comparison to any potential environmental impairments related to the tenant's long term industrial operation. 595 Commissioners Street Road Widening – Completion of Phase One ESA, Phase Two ESA and a Record of Site Condition submission for a parcel of land that will be conveyed to the City of Toronto. All deliverables for this project will be reviewed through the City of Toronto's Harmonized Peer review process. CRA has currently completed the Phase One ESA to identify the areas of potential environmental concern. Preparations are currently underway to complete the Phase Two ESA component of the project to investigate the areas of potential environmental concern. The project may include a remedial component if impacts are identified.

Vendor of Record for Environmental and Geotechnical Services

Role: Project Director/Manager
Client: Waterfront Toronto
Location: Toronto, Ontario
Date(s): 2011 – Present

Project Manager for the provision of geo environmental and geotechnical consulting services for Waterfront Toronto. Projects included completion of environmental, hydrogeology and geotechnical investigations in the Port Lands in support of the due diligence and project planning phase of the Port Lands Flood Protection and Enabling Infrastructure Project. Project included the advancement/installation of more than 100 boreholes/ monitoring wells and working within a large stakeholder group that included the City of Toronto, TPLC, TRCA, MECP, planners, earthworks engineers, and cost estimators.

Peer Review, Environmental and Remedial Services

Role: Project Director/Manager
Client: Deere Canada
Location: Woodstock, Ontario
Date(s): 2017 – Present

Project Manager and Director for the peer review of remedial activities completed at a former manufacturing facility in Woodstock. Based on the review, prepared remedial options and feasibility study to assess for removal of contaminants at source and for boundary control. Completed high vacuum dual phase extraction pilot scale study to assess this option for source control. Studies included collection of soil vapour and groundwater samples during pilot study. Currently assessing options for long term management of site and risk management options.

Ontario Place Redevelopment Due Diligence

Role: Project Manager
Client: Infrastructure Ontario
Location: Toronto, Ontario
Date(s): 2013 – 2015

Managed environmental, risk assessments, geotechnical investigations, building condition surveys for the redevelopment of Ontario place. GHD (formerly CRA) undertook geotechnical, hydrogeological, and environmental assessments, and additional supporting services in the potential redevelopment of the Ontario Place property. Carried out investigations to develop a preliminary understanding of opportunities and constraints on the Ontario Place lands in preparation for future redevelopment. The work included a total of thirty three (33) boreholes advanced across the Site, including seventeen (17) boreholes on the existing man made island, four (4) boreholes in the parking lot areas, four (4) boreholes in the waterways, and eight (8) boreholes in the open water (in the lake). The work included installing monitoring wells, coring rock, conducting single well response tests, and conducting in situ packer tests (where rock coring was carried out into bedrock). A Blanket Drilling License was obtained from Ministry of Natural Resources for all land and in water boreholes under the 'Oil, Gas, and Salt Resources Act'. In addition, authorization was acquired from the Toronto Port Authority for the in water boreholes. CRA prepared a comprehensive Geotechnical/ Hydrogeological report which included design/construction considerations for the types of developments that could be supported, a Building Condition Assessment report which documented the construction details, physical performance and attributes of the property's systems for the property building; and a Structural Steel Inspection report which included a review of steel structures and its coatings by visual and non destructive testing by a certified CSA W178.2 inspector, and a Baseline Conditions report.

Stormwater Quality Facility and Outlet Tunnel

Role: Project Manager
Client: Waterfront Toronto
Location: Toronto, Ontario
Date(s): 2011 – Present

Managed geotechnical, hydrogeological and environmental investigation, and provided design support, for the design and construction of a stormwater water treatment facility and outfall tunnel through bedrock on City owned lands in Toronto, Ontario. Tunnel traverses major rail line into Toronto, a major highway (Don Valley Parkway) and a sensitive hydro installation. Recommendations included deep foundations (>12 m) for treatment plant, shaft design, groundwater control, tunnel design, rock bolting and liner design. An environmental site assessment was also undertaken in conjunction with the geotechnical to characterize soils for off site management or disposal. Results from these activities was used to develop soil management plan and supporting documentation for Permit to Take Water application. This project involved coordination and consultation with project stakeholders such as the Water Toronto and City of Toronto Environmental staff to ensure incorporation of risk management measures to be incorporated into the design of the stormwater facility. Risk management measures included preparation of health and safety plan and soil management plan for City workers.

Lakeview Generating Station

Role: Project Manager
Client: Ontario Power Generation
Location: Mississauga, Ontario
Date(s): 2006 – Present

Project Manager for environmental consulting services for Ontario Power Generation for Lakeview Generating Station (GS) for potential redevelopment. Provided consulting services for the review and compilation of laws, regulations and guidelines pertaining to the demolition of Lakeview GS. Assisted OPG for environmental guidance for demolition of Lakeview

GS. Included completion of Phase One and Two ESAs to O.Reg. 153/04 standards, remedial options evaluation, surface water regrading plan for the coal yard and the filing of a RSC for the coal yard portion.

Lower Don Land Environmental Assessment

Role: Project Manager
Client: Aecom/Waterfront Toronto
Location: Toronto, Ontario
Date(s): 2008 – 2009

Managed geotechnical assessments for the Class EA for the redevelopment of the Lower Don Lands. Assessment and geotechnical recommendations were provided for Don River Diversion, several bridges crossing water channels and rail, underground utility installation, stormwater retention treatment systems, Cherry Street underpass and shoreline filling and protection works. The geotechnical assessment was augmented with environmental sampling to obtain a further understanding of the environmental conditions/constraints.

Excess Soil Management

Technical Peer Reviewer for Site Plan Application

Role: Project Reviewer
Client: Town of Uxbridge
Location: Uxbridge, Ontario
Date(s): 2017 – Present

Technical peer reviewer for site plan application and site development agreement for placement of excess fill in portion of active sand and gravel pit. Responsibilities include review of hydrogeological, environmental site assessment, haul route, storm water management, spill management, geotechnical and site grading plan reports submitted in support of application.

Excess Soil Management Jurisdictional Review

Role: Project Director/Manager
Client: Ministry of the Environment
Location: Toronto, Ontario
Date(s): 2014 – 2015

Project Manager/Director for the review of excess soil management regulations, policies and procedures in our jurisdictions within and outside of North America. The review also included municipal by-laws (i.e., site alteration by-laws) in Ontario on the management of excess soils. The review was undertaken in support of the proposed MECP Strategic Framework for the management of excess soils. The information collected was presented in spreadsheet to MECP.

Review of Excess Soil Receiving Sites

Role: Project Manager
Client: Various Clients/Greater Toronto Area
Location: Toronto, Ontario
Date(s): 2012 – Present

Project manager for review of receiving sites of excess soils for various clients in the GTA. Responsibilities included reviewing background documentation (Phase I and II ESA reports, geotechnical reports, etc) prepared for the receiving site, site characterization review, location to sensitive features, etc to confirm acceptable of receiving site for receipt of excess soils. Receiving sites reviewed included former sand and gravel pits in Mount Albert, Milton and Stouffville.

Environmental Consulting Services Excess Soil Management Plan, Operations Facility | City of Kitchener

Role: Project Manager
Client: City of Kitchener
Location: Kitchener, Ontario
Date(s): 2018 – Present

Project manager for the review of the management of excess soils at the Kitchener Operations Facility and preparation of excess soil management plan. Responsibilities included reviewing background documentation, provide suggestions and recommendations for the management of excess soil with respect to the proposed on-site and Excess Soil Regulation, and review/edit/development of tender specifications for the re-use/disposal of those excess soils.

Career history

1992 - present	GHD, Toronto, ON, Principal/Vice President Named Principal/Vice President, 2005 Named Associate, 2002
1990 - 1992	Porter Dillon Limited, Junior Engineer
1990	Environment Canada, Hydrogeologist (Work Term)
1989 - 1990	Technical University of Nova Scotia, Teaching Assistant
1987 - 1989	R.S. Middleton Exploration Services Ltd., Senior/Project Geologist
1985 - 1986	Orequest Consultants Ltd., Geologist

Other Related Areas of Interest

Publications and Presentations

- Theory of Flow through Porous Media, University of Waterloo, 1993
- Groundwater Resource Development, University of Waterloo, 1995

Papers

- "The Potential for Groundwater Contamination from the Application of Triazine Herbicides", a Master of Engineering Thesis presented to the Technical University of Nova Scotia, Halifax, Nova Scotia, 1991.
- "Remedial Approach for Petroleum Hydrocarbon Contaminated Groundwater at a TTC Bus Garage in Toronto, Ontario". A. Drevininkas, P. Laurin, S. Harris, T. Guoth, and R. Pasqualoni. 33rd Annual General Conference for the Canadian Society for Civil Engineering, June 2 to 4, 2005.

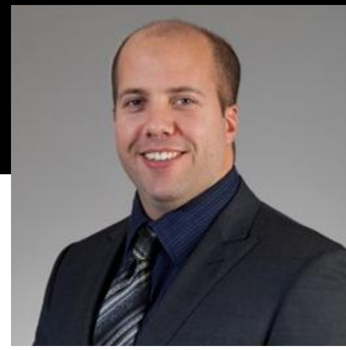
Presentations

- Proposed Excess Soil Regulation April 2018 – What Does this Mean for the Aggregate Industry? OSSGA Environmental Management Workshop. October 11, 2018.
- Proposed Excess Soil Regulation – What Does it Mean for the Aggregate Industry?. OSSGA AGM Meeting February 22, 2018
- Clean Fill, What is Waste and Where Can You Put it? Environmental Law and Regulation in Ontario, October 25, 2012. Speakers Thomas Guoth Conestoga-Rovers & Associates and John Buhlman, WeirFoulds LLP.
- Are You Being Asked if Your Products meet "Table 1"? Discover new information from OSSGA studies. Ontario Stone Sand and Gravel Association Annual General Meeting. February 27, 2013. Speaker

A GHD Associate

Andrew Betts M.A.Sc., P.Eng.

Project Director



Location

Waterloo, Ontario, Canada

Experience

14 years

Qualifications/Accreditations

- Registered Professional Engineer: Ontario and Nova Scotia
- M.A.Sc. Water Resource Engineering, 2013
- B.Eng., Water Resources Engineering, 2007

Key technical skills

- Water Resource Modelling, Design, and Construction
- Water Distribution Modelling
- Hydrologic, Hydraulic, and Water Quality Modelling

Memberships

- Member, Environment Canada Road Salt Working Group and Salt Vulnerable Area Subgroup

Relevant experience summary

Andrew is a Project Director and is the Business Group Leader for GHD's Integrated Water Management Group. He has over 14 years of experience in water resource modelling, design, and construction, and is a licensed engineer in Ontario and Nova Scotia. Andrew has experience as design engineer on numerous surface water projects including, water distribution modelling studies, stormwater asset management, green infrastructure design and environmental monitoring. Andrew's technical background specializes in hydrologic, hydraulic and water quality modelling, stormwater management, low impact development design, erosion control, and litigation support.

Project experience

Transient Analysis and Strategic Options Study

Project Director |
District of Municipality of Muskoka | Bracebridge, ON, Canada | 2021

GHD was retained by the District of Muskoka to investigate transient conditions in the existing water distribution system. A recent failure in a section of the distribution system resulted in a Boil Water Advisor for the District. The objective of GHD's investigation was to determine if transient pressures were the cause or part of the cause of the failure. In addition, GHD was asked to undertake a high-level strategic water system review to consider methods to reduce water security risks associated with this pipeline.

Water Network Modelling

Project Director / Peer Reviewer |
City of Belleville | Belleville, ON, Canada 2019 – Ongoing

Andrew assisted with the review of water network modelling for the City of Belleville. A watermain upgrade was being considered, and the modelling was used to confirm network operation under the proposed alternatives. GHD also conducted various hydraulic modelling analyses to study the feasibility of proposed capital projects in the City and provide recommendations on preferred designs for the capital projects based on the findings in the analyses.

Muskoka New Developments Water and Wastewater Modelling

Project Director / Peer Reviewer |
District of Municipality of Muskoka | Muskoka, ON, Canada | 2017 – Ongoing

Andrew reviewed water and wastewater modelling results and reporting in support of development applications for the District Municipality of Muskoka. The

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data for each development were entered into InfoWater and InfoSWMM water and wastewater model for the community, and model results are compared to the model results without the development. Deficiencies due to the development were highlighted and solutions to address the deficiencies were proposed.

Joshua Creek Flood Mitigation Opportunities Study

Project Director |
Town of Oakville | Oakville, ON, Canada

GHD prepared a flood mitigation opportunities study on Joshua Creek for the Town of Oakville. The study involves work to characterize the current flood risk conditions along Joshua Creek downstream of Upper Middle Road, and to recommend solutions to mitigate the flood risk. Comprehensive hydrologic and hydraulic models of the watershed were developed, and flood risk sites were identified through GIS-integrated review of modelling results.

Chaudière Island Floodplain Mapping

Project Manager/Technical Lead |
Windmill Development Group | Ottawa, ON, Canada

GHD was retained by Windmill Development Group to develop a floodplain map for Chaudière Island and 1-kilometer of shoreline in Hull, Quebec along the Ottawa River. Windmill was converting the island and portions of the shoreline from a heavy industrial site to a multi-use residential and commercial community. Andrew acted as the Project Manager and Technical Lead. He coordinated with City and Conservation Authority regulators and performed all hydraulic modelling efforts. The hydraulic modelling involved updating the existing Rideau Valley Conservation Authority HEC-RAS model to include greater detail (i.e., more cross-sections and hydraulic structures) in the vicinity of the project site using GIS (HEC-GeoRAS) based on the site topographic data. The hydraulic model was used to performed steady flow analysis and floodplain delineation for the 100-year flood event.

Floodplain Delineation Study

Project Manager/Lead Hydraulic Modeller |
Town of Antigonish | Antigonish, NS, Canada

GHD was retained by the Town of Antigonish to undertake a floodplain delineation study. The objectives of the assignment were to use hydrologic and hydraulic models to identify the flooding extents during the 1:20 and 1:100-year flood events, analyze and identify potential ice jamming locations, and develop a general understanding of the hydrologic and hydraulic effects of widening the Trans-Canada Highway 104 through the Town. Andrew was the Project Manager and Technical Lead on the project and performed all client communication and modelling efforts. As part of the project, Andrew assisted the client in navigating future planning opportunities in the town by identifying locations where development could occur with minimal additional flood proofing within the flood fringe.

Former Willow Run Powertrain

Design Project Manager/Technical Lead |
RACER | Ypsilanti, MI, US

Design coordinator and technical lead responsible for design of a post-demolition storm water management plan for the former Willow Run Powertrain facility, approximately 270 acres, in Ypsilanti, Michigan. Project tasks involved installation of sewer flow monitoring equipment, development of detailed hydrologic and hydraulic models, and completion of a storm water management design package. Stormwater Management features included concrete lined collection channels that drained the former plant slab and directed stormwater to a lined dry/vegetated detention basin. Construction was completed in 2018.

Hawkesbury Lagoon Design and Closure Plan – Ottawa River and Lagoon Hydrodynamic Model

Technical Lead Hydraulic Modeller |
MNRF | Hawkesbury, ON, Canada

GHD was retained to prepare a Design and Closure Plan and construction oversight for a 260,000 cubic meter fibre-bearing sludge lagoon from a pulp and paper mill. The lagoon was constructed of dykes between islands within the Ottawa River and the chemicals of concern included heavy metals, polycyclic aromatic hydrocarbons (PAHs), phenols, volatile organic compounds (VOCs), and hydrogen sulfide (H_2S). The remedial solution involved the development of a landfill containment cell that would allow for the natural attenuation of leachate and a lagoon attenuation channel and assimilation pond. Andrew developed a hydrologic/hydraulic model of the proposed landfill and designed the stormwater management controls. In addition, Andrew developed a 2-D hydrodynamic model of the Ottawa River, lagoon attenuation channel and assimilation pond. The 2-D model was used to design the attenuation channel and assimilation pond to ensure velocities in the lagoon we low enough, during multiple flow events, to promote the settling of particles.

Carolyn Creek Regulatory Floodplain Mapping

Technical Lead Hydraulic Modeller |
Credit Valley Conservation Authority | Mississauga, ON, Canada

GHD was retained by the Credit Valley Conservation Authority (CVC) to update floodplain mapping for Carolyn Creek as a part of the National Disaster Mitigation Program (NDMP). Carolyn Creek is a tributary, which discharges into the Credit River immediately upstream of Eglinton Avenue West. GHD built a hydraulic model, and provide updated floodplain mapping of Carolyn Creek to CVC to reflect the latest state of development in the watershed. The hydraulic model was developed for the purpose of generating flood lines and floodplain mapping for the 100-year and the Regional (Hurricane Hazel) storm events.

Sackville Rivers Floodplain Study

Technical Lead Hydraulic Modeller |
Halifax Regional Municipality | Halifax, NS, Canada

The Sackville River is a complex river system. Intensive urbanization and climate change are becoming significant factors altering the existing flood regime in the watershed. The main objectives of this first phase of the project were to perform preliminary floodplain modelling and collect information so that the floodplain mapping for the Sackville Rivers could be updated. GHD completed the following tasks to achieve the project objectives:

- Statistical flood and sea level frequency analyses, including joint probability analysis
- High-level hydraulic floodplain modelling and floodplain delineation for the lower Sackville River
- Topo-bathymetric survey data collection
- Historical review of flooding factors, including the largest precipitation events and the regional rainfall events

Seaton Lands Floodplain Mapping

Technical Lead Hydraulic Modeller |
Infrastructure Ontario | Pickering, ON, Canada

GHD performed floodplain mapping for the Seaton Lands within the City of Pickering for a large scale proposed development project. Andrew was technical lead for floodplain mapping of the Whitevale Creek, Ganatsekiagon Creek, Urfe Creek, Brougham Creek, and a small tributary of the West Duffins Creek within the Seaton MESP study area.

GM Romulus Plant Renovation Floodplain Investigation

Technical Lead Hydraulic Modeller |
Romulus, MI, US

GHD prepared a floodplain investigation for the proposed development at the GM Romulus Powertrain Facility in order to meet State permitting requirements. The proposed development is within the floodplain of the McClaughrey Drain. GHD developed a HEC-RAS model of the McClaughrey Drain in order to assess the change in energy gradeline elevation between existing and proposed conditions, and demonstrate that the is no harmful interference with the discharge or stage of the watercourse based on Michigan Department of Environmental Quality Hydraulic Report Guidelines.

Caledon Village Flood Mitigation Study

Technical Advisor |
Town of Caledon | Caledon, ON, Canada

GHD was retained to identify and assess opportunities to alleviate flooding within Credit River Subwatershed #16 in Caledon, Ontario. Andrew performed the technical peer-review of the hydrologic and hydraulic modelling, which was completed using a combination of PCSWMM and Geo HEC-RAS to assess the existing condition and potential alternatives for flood mitigation. The project is currently ongoing.

Environmental Remediation

Design Engineer/Modeller |
Confidential Client | Southern Indiana, US

GHD was retained to conduct a large remedial project to remove contamination from a creek and surrounding floodplain resulting in a complete reconstruction of the natural channel. Restoration initiatives included natural channel design, wetland and upland design. Andrew assisted in the natural channel design as well as:

- Developed a detailed stormwater management plan for an 18-acre landfill, which involved design of five stormwater management ponds, channels/storm sewer, energy dissipaters, and associated sediment and erosion control plan
- Performed the Revised Universal Soil Loss (RUSLE) calculation within the Arc-View GIS environment which allowed calculation of the soil loss erosion automatically, from digital watershed information
- Provided construction oversight for the construction of approximately 3,000 feet of natural channel and 6-acre wetland
- Developed and maintained a wireless stream and environmental monitoring network

Hanksville Diversion Reconstruction

Hydrodynamic Modeller |
Confidential Client | Hanksville, UT, US

GHD was retained for the site assessment, design and construction of a diversion structure consisting of a relatively low-profile, concrete gravity structure. The diversion structure consisted of ground improvements, cut-off wall, foundation, and ogee-weir with sluice gates spanning the river channel section. Andrew analyzed the river flood flow regime, using a 2D hydrodynamic model, to predict floodplain extents and shear velocities for erosion protection. The 2D model was also used to support the design and construction of a wing wall to protect a diversion structure from erosion forces.

Oceanographic Model Study of the Tignish/Jude's Point Harbour

Hydrologic Modeller |
PWGSC | Prince County, PEI, Canada

Developed a coupled 1D hydrologic (HEC-HMS) and assisted in the development of a 3D hydrodynamic model (GEMSS) for the existing harbour and for the proposed harbour expansion. The model included tidal dynamics for simulating the interaction of the harbor and estuaries with the Gulf of St. Lawrence. Andrew evaluated potential environmental effects of the proposed harbour expansion. A new harbor configuration was determined through incrementally modelling changes to the harbor with the objective to reduce coastal and environmental impacts, deposition and retention, flushing and wave action. Andrew also aided in the design of a salt marsh island in the estuaries of Tignish River as an economic means of disposing dredge spoils associated with the proposed harbor expansion.

Kanawha River Investigation

Hydrodynamic Modeller |
Monsanto | Nitro, WV, US

GHD was retained to complete an Engineering Evaluation/Cost Analysis under the non-time critical Removal Action Program of USEPA. The consent Decree for the Site requires the investigation of a 14-mile stretch of the river in the area of Nitro, West Virginia. One of the tasks was to perform a sediment stability evaluation of the sediments in the river. Andrew developed a 2D hydrodynamic model to predict 100-Year floodplain elevation and shear velocities to identify potential sites for erosion along the banks of the Kanawha River for the purpose of contaminated sediment transport.

Drain Screening Facility Design and Optimization

Hydrodynamic Modeller |
City of Hamburg | Buffalo, NY, US

Performed a detailed 2D hydrodynamic modelling (FESWM) of the existing and proposed conditions of the Hamburg Drain between Washington Street and Michigan Avenue with the objectives of determining the optimal configuration of wing walls in the screening facility to achieve even division of flow to the screens, and determining the change in head loss for existing and proposed conditions in the Drain. Andrew aided in optimizing the configuration by iteratively modelling the system to provide even division of flow to the screens, and tested the configurations under different flow distribution scenarios. The preferred configuration was selected based on the smallest head losses with uniform distribution of flow.

Project experience – Litigation Support

- Modelling and design related to flooding issues under the Municipal Drain Act – Amberly Beach, Ontario
- Evaluation of dam floodway and gate performance – OH
- Evaluation of the effects of re-building a floodway at a dam on downstream flooding – Grand Lake St. Mary’s, OH
- Floodplain and erosion modelling due to roadway expansion – Ashville, NC
- Modelling and research related to a severe flooding accident on the Illinois River – Marseilles, Il
- Impacts to water quantity caused by resource investigation – St. John’s, NL
- Investigation to the source of sediment within a watershed – Lower Big Creek, AR
- Erosion control assessment on a solar farm – Cochrane, ON
- Flood impacts from road expansion – Aurora, ON

Other related areas of experience

Recognized (Certifications/Trainings)

- ROSGEN Level 2 Stream Restoration 2017
- ROSGEN Level 1 Stream Restoration 2016
- MIKE SHE Integrated Watershed Modelling Training Workshop, 2011
- Water Quantity and Quality Modelling and Monitoring, University of Guelph, 2011
- Finite Element Methods, University of Guelph, 2011
- Assessment of Engineering Risk, University of Guelph, 2011
- 2D Hydrodynamic Flow and Transport, SMS 2009

Papers Presented and Published in Conference Proceedings and Refereed Journals

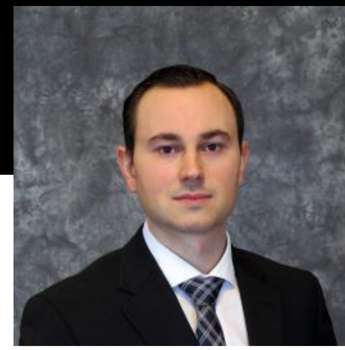
- Lembcke, D., Thompson, B., Read, K., Betts, A., Singaraja, D. 2017. Reducing Road Salt Application by Considering Winter Maintenance Needs in Parking Lot Design. Journal of Green Building. Vol 12, No. 2.
- Betts, A.R., Gharabaghi, B., McBean, E., Levison, J., Parker, B., 2015. Salt Vulnerability Assessment Methodology for Drinking Water Wells. Journal of Hydrology. Vol 531 pp. 523 533.
- Betts, A.R., Gharabaghi, B. and McBean, E.A. 2014. Salt vulnerability assessment methodology for urban streams. Journal of Hydrology. Vol. 517 pp. 877 888.
- Betts, A., W. Trenouth, B. Gharabaghi, and B. Kilgour. 2012. Chloride Vulnerability Identification and Mitigation Project. Presentation at the Annual Ontario Ministry of Transportation Maintenance Technology Symposium.

Career history

2007 - present	GHD, Municipal Engineer
2010	University of Guelph

Kyle Fritz B.A.Sc.

Engineer, Hydrogeologist



Location

Waterloo, Ontario, Canada

Experience

10 years

Qualifications/Accreditations

– B.A.Sc., Honors Civil Engineering, Water Resources Option, 2013

Key technical skills

– Hydrogeology and Water Resources
– Contaminated Sites Assessment and Remediation
– Aggregate Resource Development

Memberships

– Professional Engineers of Ontario (PEO)

Relevant experience summary

Mr. Fritz is a professional engineer specializing in hydrogeology and water resources evaluation and design. Project experience includes hydrogeologic investigation and assessment, water resource evaluation, numerical modelling, water management design and implementation, and bedrock grouting. Mr. Fritz has a good grasp on environmental science including the interactive relationships of meteorology, hydrology, hydrogeology, and geology. Mr. Fritz has dealt with water management and resource conservation on numerous projects and has a strong understanding of both the quality and the quantity of water in above and below ground resources. In addition to this experience, Mr. Fritz participates in strategic planning and agency and public consultation.

Milton Quarry

Project Manager |
Dufferin Aggregates | Region of Halton, Ontario, Canada | May 2009 - Current

Responsible for providing or coordinating engineering, hydrogeology, water managements operations, and compliance services to Dufferin Aggregates, a division of CRH (Canada) Inc., at their Milton quarry in the Region of Halton, Ontario.

GHD operates the water management (mitigation) system (WMS), conducts all water related performance and compliance monitoring, and supports the client with consulting assistance for all environment related considerations at this site.

Key roles include:

– Hydrogeologic evaluation and plan development for future WMS improvements
– Development of multi-year CAPEX forecasts based on mine development plans and anticipated hydrogeologic conditions
– Ongoing data evaluation and communication of emerging issues to the client
– Preparation of an annual report in satisfaction of PTTW, ECA, and legal requirements
– Presentation of monitoring results to agencies at the annual meeting

Acton Quarry

Project Manager |
Dufferin Aggregates | Acton, Ontario, Canada | May 2017 - Current

Responsible for providing or coordinating engineering, hydrogeology, operation, and compliance services to Dufferin Aggregates, a division of CRH (Canada) Inc., at their Acton quarry in the Town of Halton Hills, Ontario.

Key roles include:

– Ongoing water management between watersheds, water budgeting, and conservation
– Coordination and review of ECA sampling and PTTW monitoring programs
– Ongoing assessment of compliance in reflection of changing site conditions
– Ongoing and annual evaluation of water resources and associated reporting
– Water management system design and engineering for water handling systems

– Preparation of an annual report in satisfaction of PTTW, ECA, and legal requirements
– Presentation of monitoring results to agencies at the annual meeting

Paris Pit

Project Engineer | Hydrogeologist
Dufferin Aggregates | Paris, Ontario, Canada |
May 2016 - Current

Responsible for providing or coordinating engineering, hydrogeology, operation, and compliance services to Dufferin Aggregates, a division of CRH (Canada) Inc., at their Paris Pit in Paris, Ontario.

Key roles include:

– Coordination and review of ECA sampling and PTTW monitoring programs
– Ongoing review of conditions to ensure compliance with environmental “triggers”
– Hydrogeologic evaluation of pumping effects on bedrock and overburden aquifers used for municipal water supply

Guelph Dolime

Project Engineer | Hydrogeologist
River Valley Developments Inc. | Guelph, Ontario |
May 2013 - Current

Worked closely with stakeholders to develop long-term closure and rehabilitation plans.

– Involved a substantial evaluation of wellfield pumping effects from a multi-aquifer municipal water supply system
– All borehole logs, water levels, and pumping records for the southwest quadrant were reviewed during the evaluation
– Numerical modelling was undertaken for assessment of current and future proposed conditions

Beardmore Tannery

Project Manager |
Maple Leaf Foods | Acton, Ontario, Canada |
May 2013 - Current

Ongoing management and coordination of a multi disciplinary team conducting environmental monitoring. Completion of data evaluation, program review, and reporting in satisfaction of the environmental compliance approval (ECA) for the site.

– Coordination and review of the environmental monitoring program and management of a multi-disciplinary team.
– Ongoing review and evaluation of groundwater, surface water, and landfill gas monitoring results.
– Monitoring and assessment of drawdown associated with adjacent construction dewatering (pumping) in an overburden aquifer.
– Preparation and submission of environmental monitoring reports in satisfaction of the ECA requirements.

Career history

2013 - present	GHD
2009 – 2012	GHD (Engineering Work Terms)

about GHD

GHD is one of the world's leading professional services companies operating in the global markets of water, energy and resources, environment, property and buildings, and transportation. We provide engineering, environmental, and construction services to private and public sector clients.

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Richard Murphy
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