Wildfield Village Secondary Plan
Caledon
Local Subwatershed Study
Phase 1 Report

November 15, 2024

Submitted by:

SCS Consulting Group Ltd
30 Centurian Drive, Suite 100
Markham, ON L3R 8B8

GEI Consultants Inc.
330 Trillium Drive, Unit D
Kitchener, ON N2E 3J2

Project Number: 2630

Table of Contents

List of Appendices

List of Figures

Appendix A2

Appendix B1

Appendix C1

Appendix D1

Appendix E2

List of Tables

Appendix B2

Appendix C3

Appendix D2

1.0 Introduction

Wildfield Village is located within the Region of Peel, in the Town of Caledon, within the Region's Urban Boundary. The lands are designated as 2051 New Urban Area in the Region of Peel Official Plan (April 2022). Through the Region's Settlement Area Boundary Expansion (SABE) Study, Community Lands, of which Wildfield Village is included, have been identified to be developed for residential purposes including associated roads, infrastructure, utilities, institutions, retail, parks and open space.

1.1 Purpose

This Local Subwatershed Study (LSS) has been prepared by SCS Consulting Group Ltd. and GEI in support of the Secondary Plan for Wildfield Village. Per Town of Caledon correspondence (Cassie Schembri, Town of Caledon, March 28, 2024), the intent of the LSS is to "develop a sustainable development plan for the subject growth area in Caledon by protecting and enhancing the natural and human environments through the implementation of the direction, targets, criteria and guidance of the Region of Peel Scoped Subwatershed Study (SWS) prepared by Wood (2022). The LSS will confirm, refine and implement a Natural Heritage System (NHS) and the water resource management approach that will protect, rehabilitate, and enhance the natural and water-based environments within the Secondary Plan area, and the surrounding lands in the subwatershed."

The LSS has been prepared in accordance with the approved Terms of Reference dated August 23, 2024 (refer to **Appendix A1**). The LSS will address a range of environmental and servicing matters associated with the Wildfield Village Secondary Plan (WVSP) area, including the protection and management of surface water, groundwater, fluvial geomorphology, and terrestrial and aquatic resources. The LSS will also identify the NHS and municipal servicing needs, including stormwater management, sanitary and water servicing and site grading requirements.

The LSS serves to:

- Address the relevant natural features and functions identified in the Provincial Policy Statement (PPS; MMAH 2020), Region of Peel Official Plan, and Town of Caledon Official Plan;

- Provide the foundation for the layout of the Secondary Plan by defining and delineating elements such as the NHS, transportation and servicing networks, and the location of stormwater management (SWM) facilities;

- Follow the direction and guidance of the Region of Peel Scoped SWS (Wood., 2022) confirming targets and criteria based on site specific data obtained through the Secondary Plan level study; and,

- Define measures to protect and/or enhance the NHS.

The LSS will be completed in three phases as follows:

- Phase 1 – Characterization of Existing Conditions and Baseline Inventory

- Phase 2 - Analysis, Impact Assessment, Mitigation and Recommendations

- Phase 3 - Implementation, Monitoring and Adaptive Management

This report fulfills the requirements of the Phase 1 LSS. As the Secondary Plan process proceeds, this report will be amended to include future Phases 2 and 3, in addition to incorporating revisions to the Phase 1 report to address agency comments. The purpose of the current Phase 1 report is to characterize the existing conditions and develop a baseline inventory of the natural heritage features, flood and erosion hazards, and, groundwater and surface water resources for the WVSP area.

1.2 Study Area

The WVSP area is approximately 358.1 hectares (ha) in size, and is located in the Town of Caledon, and the Region of Peel. The WVSP area is bound by Centreville Creek Road to the west, Mayfield Road to the south, the planned Highway 413 Transportation Corridor to the north and the West Humber River to the east. Refer to **Figure 1.1** in **Appendix A2** for the location of the Secondary Plan area. **Figure 1.2** (**Appendix A2**) shows the ownership for the WVPS area with approximately 57% of the lands owned by parties participating in the LSS and the Secondary Plan process.

The WVSP area is dominated by active agricultural lands, with scattered wetlands and headwater drainage features (HDFs) occurring on the tableland. The West Humber River and its associated valley occur north and east of the WVSP area, within the Greenbelt Plan (2017) area. The valley consists of woodland and wetland habitat. Residential homes front onto portions of the roads bordering the WVPS area.

The WVSP area will be the study area basis for the LSS; however, there are several study components that will have study areas that will go beyond the WVSP limits as follows.

1.2.1 Natural Heritage Study Area

The Natural Heritage Study Area (NHSA) will consist of the WVSP area plus the 120 m adjacent lands to study and assess natural heritage features.

1.2.2 Geomorphic Study Area

The geomorphic assessment will be undertaken for watercourses within the WVSP area, as well as receiving watercourses for a distance of approximately 250 m downstream of the WVSP area. Recognizing that these reaches flow on lands that are not participating in the current study, where appropriate, these geomorphic assessments will be completed within the road right-of-way, or through desktop-based methods.

1.2.3 Hydrologic Study Area

The WVSP is located within the upper reaches of the Humber River watershed and is identified as being in the West Humber subwatershed. The hydrologic modelling will encompass the WVSP area, in addition to external drainage from lands upstream that flow through the WVSP area. The hydrologic analysis will also include flow nodes downstream of the WVSP area to Lake Ontario in accordance with the Final Report Humber River Hydrology Update (Toronto and Region Conservation Authority, 2018).

1.3 Background Information

1.3.1 Reports

In preparation of the LSS, the following reports have been reviewed and referenced:

- Humber River Watershed Characterization Report (TRCA, 2023);
- Region of Peel Settlement Area Boundary Expansion Study (SABE), (2022);
- Scoped Subwatershed Study (SWS), Part A: Existing Conditions and Characterization (Final Report) Settlement Area Boundary Expansion, Region of Peel (Wood., 2022);
- Scoped Subwatershed Study (SWS), Part B: Detailed Studies and Impact Assessment (Final Report), Settlement Area Boundary Expansion, Region of Peel, (Wood., 2022);
- Scoped Subwatershed Study (SWS), Part C: Implementation Plan (Final Report), Settlement Area Boundary Expansion, Region of Peel (Wood., 2022).
- Approved Assessment Report: Toronto and Region Source Protection Area (CTC Source Protection Committee, 2022);
- Region of Peel Water and Wastewater Master Plan (2020);
- Technical Memorandum, Peel Scoped Subwatershed Study (SWS) – Groundwater “Areas of Concern” mapping (Oak Ridges Moraine Groundwater Programs (ORMGP), 2020);
- Final Report Humber River Hydrology Update (TRCA, 2018);
- Humber River State of the Watershed Reports (TRCA, 2008);
- Humber River Watershed Plan (TRCA, 2008);

- Listen to Your River: A Report Card on the Health of the Humber River Watershed (TRCA, 2007);
- Groundwater Modelling of the Oak Ridges Moraine Area (Kassenaar, J.D.C. and Wexler, E.J., 2006); and,
- The Physiography of Southern Ontario (Chapman and Putnam, 1984).

1.3.2 Policies, Guidelines and Legislation

The following policies, guidelines, and legislation have been reviewed with respect to preparing the LSS:

- Town of Caledon Official Plan (2024);
- Future Caledon Draft Official Plan (2024);
- Ontario Regulation 41/24: Prohibited Activities, Exemptions and Permits (2024);
- Draft Town of Caledon Growth Management Phasing Plan and Financial Impact Assessment Presentation (2023);
- Municipal Consolidated Linear Infrastructure Environmental Compliance Approvals, Ministry of Environment, Conservation and Parks (MECP), (June 2023);
- Region of Peel Official Plan (2022);
- Approved CTC Source Protection Plan (CTC Source Protection Committee, 2022);
- A Place to Grow; Growth Plan for the Greater Golden Horseshoe (2020);
- Development Standards Manual, Town of Caledon, Version 5 (2019);
- Erosion and Sediment Control Guide for Urban Construction (TRCA, 2019);
- Technical Guidelines for Flood Hazard Mapping (TRCA and other Conservation Authorities, 2017);
- Wetland Water Balance Risk Evaluation (TRCA, 2017);
- Geotechnical Engineering Design and Submission Requirements (TRCA November 2017);
- Greenbelt Plan (May 2017);
- Wetland Water Balance Monitoring Protocol (TRCA, 2016);
- Crossings Guideline for Valley and Stream Corridors (TRCA, 2015);
- TRCA Master Environmental and Servicing Plan Guideline (TRCA, 2015);
- Evaluation, Classification, and Management of Headwater Drainage Features (HDF) Guidelines (CVC & TRCA, 2014);
- Hydrogeological Assessment Submissions- Conservation Authority Guidelines to Support Development Applications (Conservation Ontario 2013);
- Ministry of Municipal Affairs and Housing (MMAH) Supplementary Guidelines SG-6, Percolation Time and Soil Descriptions, (MMAH 2012)

- Stormwater Management Criteria, Toronto and Region Conservation Authority Version 1.0 (August 2012);
- Ministry of Natural Resources: Natural Heritage Reference Manual: Second Edition (OMNR 2010);
- TRCA/CVC Low Impact Development Stormwater Management Planning and Design Guide (2010);
- https://wiki.sustainabletechnologies.ca/wiki/Main_Page
- Peel Region Storm and Sanitary Sewer Use By-Law 53-2010 (Peel Region, 2010)
- Humber River Watershed Plan Implementation Guide (TRCA, 2008);
- Species at Risk in Ontario (SARO) List, regulation to the Endangered Species Act (ESA 2007);
- Channel Modification Design and Submission Requirements (TRCA, 2007);
- Belt Width Delineation Procedures (TRCA, 2004);
- Ministry of Environment (MOE) Stormwater Management Planning and Design Manual (March 2003);
- Technical Guide for River & Stream Systems: Erosion Hazard Limit (MNRF, 2002);
- The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority (TRCA, November 28, 2014).
- Ministry of Transportation (MTO) Drainage Management Manual (1997).

1.3.3 Base Mapping

The following data sets have been utilized in preparing the mapping utilized in the LSS:

- LiDAR 1.0 m Contours from Geohub, 2024
- Topographic Survey prepared by R-PE Surveying Ltd, October 2023
- Roads and Lot Fabric, Region of Peel
- Digital Imagery, First Base Solutions, 2002, 2013 and 2022.
- Watercourses, TRCA 2018
- Humber River Hydrologic Catchments, Civica 2018
- Humber River Floodplain Mapping, Cole Engineering, May 2018
- O.L. White. 1973. Bedrock topography, Bolton, Southern Ontario; Ontario Geological Survey, Preliminary Map P.470, Scale 1:50000
- Aerial photographs from 1960, 1976, and 1988, National Air Photo Library
- Digital imagery from 1954, University of Toronto Aerial Imagery Database (University of Toronto, 2024)
- Ministry of Environment, Conservation and Parks (MECP). Water Well Information System, Data Catalogue. Retrieved from: https://data.ontario.ca/dataset/well-records

- Ontario Geological Survey 2011. 1:250,000 scale bedrock geology of Ontario. Ontario Geological Survey. Miscellaneous Release---Data 126-Revision 1.
- Ontario Geological Survey. 2010. Surficial geology of Southern Ontario. Ontario Geological Survey. Miscellaneous Release--Data 128-Revised.
- Ontario Geological Survey. 2000. Quaternary geology, seamless coverage of the Province of Ontario. Ontario Geological Survey. Data Set 14---Revised.
- Ontario Ministry of the Environment, Conservation and Parks. 2021. Source Protection Information Atlas. Retrieved from: https://www.lioapplications.lrc.gov.on.ca/SourceWaterProtection/index.html?viewer=SourceWaterProtection.SWPViewer&locale=en-CA
- Ontario Ministry of Natural Resources. 2024. Ontario Watershed Information Tool. Retrieved from: https://www.lioapplications.lrc.gov.on.ca/OWIT/index.html?viewer=OWIT.OWIT&locale=en-CA
- Gao, C., Shirota, J., Kelly, R. I., Brunton, F.R., van Haaften, S. 2006. Bedrock topography and overburden thickness mapping, southern Ontario. Ontario Geological Survey. Miscellaneous Release--Data 207.
- Armstrong, D.K. and Dodge, J.E.P. 2007. Paleozoic Geology Map of Southern Ontario. Ontario Geological Survey. Miscellaneous Release--Data 219.

1.3.4 Models

The following models have been utilized in the technical analysis completed as part of the LSS:

- Humber River Visual Otthymo Hydrologic Model (TRCA, 2018)
- Humber River Zone 2 HEC-RAS Hydraulic Model (TRCA, 2018)

The following reports contain the methodology and results for regional groundwater modelling, including the WVSP area, and have been referenced as part of the LSS:

- York Tier 3, results summarized in “Tier 3 Water Budget – Water Quantity Risk Level Assignment Study, Regional Municipality of York, Phase 1 Model Development Report,” by Earthfx, dated February 2013.
- TRCA 2008 PRMS, results summarized in “Humber River Watershed, Scenario Modelling and Analysis Report,” by TRCA, 2008.

1.3.5 Natural Heritage Resources

The following resources were reviewed for information relating to natural heritage features and species that may be found in the NHSA:

- The Ministry of Natural Resources and Forestry (MNRF) Land Information Ontario (LIO) database (2024);
- The Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre (NHIC) database (MNRF 2024);
- Bird Studies Canada's Atlas of Breeding Birds of Ontario (BSC et al. 2006);
- Ontario Nature's Reptile and Amphibian Atlas (2020);
- Toronto Entomologists' Association's (TEA) Ontario Butterfly and Moth Atlases (2023, 2020);
- DFO Aquatic Species at Risk Mapping (2023); and,
- Other sources (e.g.-watershed management plans, fisheries management plans).

The results of these background reviews are discussed in the following sections. This information assisted in defining the search effort and target species for studies on and immediately adjacent to the NHSA.

1.3.5.1 Land Information Ontario Natural Features Summary

Based on the MNRF Land Information Ontario (LIO) geographic database, no provincially significant wetlands or earth science areas occur on or within 120 m of the NHSA. However, the Gooseville Moraine Candidate Earth Science ANSI is located immediately north of the NHSA (north of Healey Road).

1.3.5.2 Natural Heritage Information Centre

The NHIC database (MNRF, 2024) was searched for records of provincially significant plants, vegetation communities and wildlife on, and in the vicinity of, the NHSA. The database provides occurrence database 1 km^2 area squares, with nine squares overlapping at least a portion of the NHSA.

Within these squares, the search revealed six records of species listed as threatened or endangered on the SARO list or Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1-S3 species):

Species listed as threatened or endangered on the SARO list:

- Eastern Meadowlark (*Sturnella magna*) – Threatened;
- Bobolink (*Dolichonyx oryzivorus)* – Threatened; and,
- Redside Dace (*Clinostomus elongatus*) – Endangered.

Species listed as Special Concern on the SARO list or identified as an S1-S3 species:

- Wood Thrush (*Hylocichla mustelina*) – Special Concern;
- Eastern Wood- Pewee (*Contopus virens*) – Special Concern; and,
- American Brook Lamprey (*Lethenteron appendix*) – S3.

1.3.5.3 Ontario Breeding Bird Atlas

The Ontario Breeding Bird Atlas contains detailed information on the population and distribution status of Ontario birds (BSC et al. 2006). The data is presented on 100 km^2 area squares with two squares overlapping a portion of the NHSA (17PJ05 and 17NJ95). It should be noted that the NHSA may be a small component of the overall bird atlas squares, and therefore it is unlikely that all bird species are found within the NHSA. Habitat type, availability and size are all contributing factors in bird species presence and use.

A total of 122 species were recorded in the atlas squares that overlap with the NHSA. The following species of interest are noted:

Species listed as Threatened or Endangered on the SARO list:

- Acadian Flycatcher (*Empidonax virescens*) – Endangered;
- Prothonotary Warbler (*Protonotaria citrea*) – Endangered;
- Red-headed Woodpecker (*Melanerpes erythrocephalus*)--Endangered;
- Whip-poor-will (*Antrostomus vociferus*) – Threatened;
- Chimney Swift (*Chaetura pelagica*) – Threatened
- Bank Swallow (*Riparia riparia*) – Threatened;
- Eastern Meadowlark – Threatened and,
- Bobolink – Threatened.

Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1-S3 species):

- Eastern Wood-Pewee – Special Concern;
- Wood Thrush – Special Concern;
- Common Nighthawk (*Chordeiles minor*) – Special Concern;
- Barn Swallow (*Hirundo rustica*)- Special Concern;
- Golden-winged Warbler (*Vermivora chrysoptera*) – Special Concern;
- Grasshopper Sparrow (*Ammodramus savannarum*) – Special Concern;
- Upland Sandpiper (*Bartramia longicauda*)-S2B; and
- Purple Martin (*Progne subis*) – S3B-.

1.3.5.4 Ontario Nature's Reptile and Amphibian Atlas

The Ontario Reptile and Amphibian Atlas contains detailed information on the population and distribution status of Ontario herpetofauna (Ontario Nature 2020). The data is presented on 100 km2 area squares with two squares overlapping the NHSA (17PJ05 and 17NJ95). It should be noted that the NHSA are a small component of the overall atlas squares, and therefore it is unlikely that all herpetofauna species are found within the NHSA. Habitat type, availability and size are all contributing factors in herpetofauna species presence and use.

A total of 18 species were recorded in the atlas square that overlaps with the NHSA, of which three are salamander and lizard species, nine are frog and toad species, two are turtle species and four are snake species. Of these species, the following species of interest were noted:

Species of Conservation Concern (i.e., listed as Special Concern on the SARO List or identified as an S1–S3 species):

- Eastern Ribbonsnake (Thamnophis saurita)- Special Concern; and,
- Snapping Turtle (Chelydra serpentina)– Special Concern.

1.3.5.5 Ontario Butterfly and Moth Atlases

The Ontario Butterfly and Moth Atlases (Toronto Entomologists' Association 2020, 2023) contain detailed information on the population and distribution status of Ontario butterflies and moths. The data is presented on 100 km^2 area squares with two squares overlapping a portion of the NHSA (17PJ05 and 17NJ95). It should be noted that the NHSA is a small component of the overall atlas squares, and therefore it is unlikely that all butterfly and moth species are found within the NHSA. Habitat type, availability and size are all contributing factors in butterfly and moth species presence and use.

A total of 64 species were recorded in the atlas square that overlaps with the NHSA, of which 46 are butterfly species and 18 are moth species. Of these species, one Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1-S3 species) was noted: Monarch (*Danaus plexippus*)- Special Concern.

1.3.5.6 Aquatic Species at Risk Distribution Mapping

Aquatic species at risk distribution mapping (DFO 2024) was reviewed to identify any known occurrences of aquatic SAR, including fish and mussels, within the subwatershed where the NHSA is located. One aquatic SAR was noted (Redside Dace) for the West Humber River, located along the east edge of the NHSA. The West Humber River is expected to be considered occupied Redside Dace habitat.

1.3.5.7 West Humber River Fish Community

The Humber River Fisheries Management Plan (FMP; MNR and TRCA 2005) states that the West Humber River subwatershed is dominated by agricultural land-uses within a highly impermeable clay soil. The West Humber River subwatershed contains the least amount of riparian vegetation out of the entire Humber River watershed. Historically the West Humber River supported species such as American Brook Lamprey (Lethenteron appendix), Brassy Minnow (*Hydognathus hankinsoni*), Brook Trout (*Salvelinus fontinalis*), Mottled Scuplin (*Cottus bairdii*), Redside Dace (*Clinostomus elongatus*), Smallmouth Bass (*Micropterus dolomieu*), Stonecat (*Noturus flavus*) and Yellow Perch (*Perca flavescens*).

As of 2001, only 17 fish species were found within the watershed, with the fish community dominated by warmwater species. The FMP notes there is potential for the above noted species to still persist within the subwatershed. As illustrated on Figure 2 of the FMP (Stream Order for the Humber River Watershed), first and fourth order streams are found on the NHSA. No instream barriers are illustrated within the vicinity of the NHSA on Figure 10 (Instream Barriers in the Humber River Watershed) of the FMP.

Figure 22 of the FMP (Locations of the Aquatic Habitat Categories in the Humber River Watershed) of the FMP illustrates the portion of the West Humber River in the NHSA as intermediate riverine warmwater habitat. Small riverine warmwater habitat was also identified in reaches within the NHSA. The FMP notes that small riverine warmwater habitats have poor infiltration rates and minimal groundwater inputs, causing many of the reaches to dry up during the summer months or are reduced to standing pools of water.

1.3.5.8 Humber River Watershed Characterization Report

The Humber River Watershed Characterization Report (TRCA; 2023) Map 6 Watercourse and Headwater Drainage Feature Hydrology Function Classification identifies the West Humber River in the NHSA as having Important hydrologic functions, while the majority of other reaches in the NHSA are shown as having Valued/Contributing hydrologic functions. A small number of reaches in the NHSA are identified as having Limited/Recharge hydrologic functions.

1.3.5.9 Citizen Science Database

The iNaturalist (2024) database is a large citizen science-based identification and data collection app. It allows any citizen to submit observations to be reviewed and identified by other naturalists and scientists to help provide accurate species observations. As the observations can be submitted by anyone, and the records are not officially vetted, the data obtained from this tool should not be used as a clear indicator of species presence, and species may be filtered out based on habitat and target survey efforts.

This online database was examined to identify observations made within the NHSA that were research grade. The following species of interest are noted:

- Species listed as Threatened or Endangered on the SARO list:
    - Rapids Clubtail (*Phanogomphus quadricolor*) – Endangered
- Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1-S3 species):
    - Snapping Turtle (*Chelydra serpentina*) – Special Concern; and,
    - Barn Swallow – Special Concern

Four observations of Rapids Clubtail were noted east of the NHSA. Coordinates for Endangered species are obscured in iNaturalist; however, the observations are generally within 2 km of the NHSA. One observation of Barn Swallow was noted generally within 1 km southwest of the NHSA. One Snapping Turtle was observed nesting 2 km southwest of the NHSA along Goreway Drive.

The eBird (2024) database is a large citizen science-based project with a goal to gather bird diversity information in the form of checklists of birds, archive it, and share it to power new data-driven approaches to science, conservation and education. As the observations can be submitted by anyone, and the records are not officially vetted, the data obtained from this tool should not be used as a clear indicator of species presence, and species may be filtered out based on habitat and target survey efforts. This online database was examined to identify observations made within and adjacent to the NHSA. However, no significant species were found within the WVSP area or the NHSA.

1.3.5.10 Species at Risk Assessment Tool

Mapped natural heritage features on the landscape were cross-referenced with species-specific habitat requirements through GEI's Species at Risk Assessment Tool (SARAT) to determine potential Species at Risk (SAR) habitat in the NHSA. The SARAT includes all potential and known habitats for every species at risk listed under the ESA, and municipalities where these species are known to occur, where indicated in individual species assessment and/or recovery strategy reports.

1.3.6 Additional Data

Additional data is still required to supplement background information presented in the sections above. This includes both groundwater monitoring and surface water chemistry sampling. Monitoring of groundwater within the monitoring wells installed in the WVSP area will continue until summer of 2025. This will provide two years of monitoring across most of the participating lands, and one year of monitoring at Parcels 5 and 9 (refer to **Figure 2.1, Appendix A2**) that joined the study in the summer of 2024. The last round of surface water chemistry sampling will occur in the fall of 2024 for a wet and dry event. Flow monitoring will also continue into the fall of 2024.

2.0 Natural Heritage Features and Hazards

2.1 Planning and Policy Context

An assessment of the quality and extent of natural heritage features found on and adjacent to the NHSA was completed. Ecological opportunities and constraints to development were evaluated in the context of the requirements of the following regulatory agencies, local and regional municipalities, and/or legislation:

- Town of Caledon Official Plan (2024);
- Future Caledon Draft Official Plan (2024);
- Peel Region Official Plan (2022);
- Greenbelt Plan (2017);
- Toronto Region Conservation Authority (TRCA);
- Provincial Policy Statement (MMAH; 2020);
- Provincial Endangered Species Act (ESA; 2007);
- Migratory Birds Convention Act (2017); and,
- Federal Fisheries Act (2019).

The relevant portions of each of these, as they apply to the NHSA and the development potential, are discussed in the following sections.

2.1.1 Town of Caledon Official Plan (2024 Consolidation)

Parts of the NHSA are designated as “Prime Agricultural Area” on Schedule A of the Caledon Official Plan (OP). The West Humber River and its valley, as well as a tributary and headwater drainage feature, in the WVSP area are designated “Environmental Policy Area” on Schedule A (**Figure 2.1, Appendix B1**).

“Environmental Policy Area” encompasses “Natural Core Areas” and “Natural Corridors” within the Town of Caledon OP. Section 5.7.3.1.1 of the Caledon OP states that major development and site alteration is not permitted within lands designated “Environmental Policy Area”. Minor refinements to the limits of an “Environmental Policy Area” may be made through environmental studies without the need for an OP Amendment. Major modifications to an “Environmental Policy Area” require an OP Amendment. Natural Core Areas and Natural Corridors are defined within Table 3.1 of the OP as including the following features:

Natural Core Areas:

- All Woodland Core Areas;
- All Wetland Core Areas;

- All Niagara Escarpment Natural Areas;
- All Life Science Area of Natural and Scientific Interest;
- All Environmentally Significant Areas;
- All Significant Habitat of Threatened and Endangered Species; and,
- All Greenbelt and Oak Ridges Moraine Key Natural Heritage Features and Key Hydrological Features.

Natural Corridors:

- All Core Fishery Resource Areas; and,
- All Valley and Stream Corridors.

These components are subject to detailed land use policies for Environmental Protection Areas in Section 5.7 of the Caledon OP.

2.1.2 Future Caledon Official Plan (Draft, 2024)

The Town of Caledon’s Future Caledon Draft OP (2024) was adopted by Council on March 26, 2024. This OP is not yet in force and effect as it must still be approved by the Ministry of Municipal Affairs and Housing. On Schedule B2 of the Future Caledon Draft OP, the WVSP area is noted as part of the “New Urban Area 2051”. Schedule B4 denotes proposed Land Uses for the New Urban Area; the WVSP area includes “New Community Area” and “Natural Features and Areas”.

It is anticipated that through the WVSP Official Plan Amendment (OPA) process, with the support of this LSS, that final detailed land uses designations will be determined and will facilitate future site-specific land development applications by individual landowners.

The Future Caledon Draft OP refers to the Region of Peel Scoped SWS (Wood., 2022) in Section 13.9 in reference to the delineation of a preliminary Natural Environment System for New Community Areas and New Employment Areas. This Section outlines the requirements for a local SWS to be completed for each secondary plan area within these “New Urban Areas” in Section 13.9.1. The “Natural Features and Areas” outlined in Schedule B4 for the New Urban Areas have been preliminarily defined through the SABE (see below for more details on the SABE reports); however, it is assumed that these areas will be further refined and updated based on more targeted desktop and field investigations through this LSS.

In general, the LSS should provide recommendations for updated “Natural Environment System” that includes “Natural Features and Areas” including:

- Provincially Significant Wetlands (PSW);
- Woodlands meeting one or more of the criteria for Core Area woodland on Table 1 of the Region of Peel Official Plan;
- Significant Valleylands;
- Environmentally Sensitive or Significant Areas;
- Provincial Life Science Areas of Natural and Scientific Interest (ANSIs);
- Escarpment Natural Area designation of the Niagara Escarpment Plan; and,
- Valley and stream corridors meeting one or more of the criteria for Core Area valley and stream corridors in Table 2 of the Region of Peel OP.

As well as “Supporting Features and Areas” inclusive of:

- Evaluated non-provincially significant wetlands;
- Unevaluated wetlands;
- Woodlands meeting one or more of the criteria for a natural areas and corridors woodland in Table 1 of the Region of Peel OP;
- Cultural woodlands and cultural savannahs within the urban system meeting one or more of the criteria for a potential natural area and corridor woodland in Table 1 of the Region of Peel OP;
- Any other woodland greater than 0.5 hectares that does not meet the criteria for a natural areas and corridors (NAC) woodland in Table 1 of the Region of Peel OP;
- Significant Wildlife Habitat (SWH) meeting one or more of the criteria in the Ministry of Natural Resources and Forestry significant wildlife habitat technical guide, but located outside of an applicable provincial plan area;
- Fish habitat;
- Habitat of aquatic SAR; and,
- Habitat of endangered species and threatened species.

Appropriate buffers for natural heritage features are to be established based on the LSS assessments.

The Future Caledon OP (2024) also brings in additional climate change considerations. In 2010, the Town of Caledon created its first Community Climate Change Action Plan (CCCAP), furthering their climate action efforts in 2017 by signing on to the Global Covenant of Mayors for Climate and Energy (GCOM). The Town created a Future Climate Projections Report (2018) to better understand anticipated trends and impacts of climate change on the community. The climate change objectives and policy directions outlined in Chapter 5 of the Future Caledon OP aim to support the corporate goals, actions, and strategies identified in the newest version of the Resilient Caledon CCCAP, released in 2021. The Resilient Caledon Plan combines adaptation and mitigation actions to reduce GHG emissions and help the community prepare for climate change. The Future Caledon – Our Official Plan (2024), highlights the need to address climate change through a series of objectives and policy decisions that support the corporate goals, actions, and strategies in the Resilient CCCAP.

2.1.3 Peel Region Official Plan (2022)

As of July 1, 2024, the Region of Peel Official Plan (Peel OP) constitutes an official plan of Peel's lower-tier municipalities. As such, the Town of Caledon is now responsible for the interpretation and implementation of the Peel OP.

The Peel OP (2022) identifies the WVSP area as part of the Urban System, overlayed with the 2052 New Urban Area as shown on Schedule E-1 ("Regional Structure"). The West Humber River corridor is identified within the Greenlands System containing Core Areas (Schedules C-1; "Greenlands System", and C-2 "Core Areas of the Greenlands System in Peel") (**Figure 2.1**, **Appendix B1**). In addition, several Natural Areas and Corridors (NAC) and Potential Natural Areas and Corridors (PNAC) are identified within and adjacent to the WVSP area shown on Figure 7 ("Regional Greenlands System- Core Areas Natural Areas and Corridors and Potential Natural Areas and Corridors") of the Peel OP (2022).

The Peel OP (2022) defines Core Areas of the Greenlands System as:

- Significant Wetlands;
- Significant Coastal Wetlands;
- Woodlands meeting one or more of the criteria for Core Area woodland in Table 1 of the Peel OP;
- Environmentally Sensitive or Significant Areas;
- Provincial Life Science Areas of Natural and Scientific Interest;
- Escarpment Natural Areas of the Niagara Escarpment Plan; and
- Valley and Stream Corridors that meet criteria outlined in Table 2 of the ROP.

NAC are defined as:

- Evaluated non-provincially significant wetlands and coastal wetlands;
- Woodlands meeting one or more of the criteria for NAC woodland in Table 1 of the Peel OP;

- Significant wildlife habitat;
- Fish habitat;
- Habitat of aquatic species at risk;
- Habitat of endangered and threatened species;
- regionally significant life science Areas of Natural and Scientific Interest;
- Provincially significant earth science Areas of Natural and Scientific Interest;
- Escarpment Protection Areas of the Niagara Escarpment Plan;
- The Lake Ontario shoreline and littoral zone and other natural lakes and their shorelines;
- Any other valley and stream corridors that have not been defined as part of the Core Areas;
- Sensitive headwater areas and sensitive ground water discharge areas; and,
- Any other natural features and functional areas interpreted as part of the Greenlands System Natural Areas and Corridors.

PNAC are defined as:

- Unevaluated wetlands and coastal wetlands;
- Cultural woodlands and cultural savannahs within the Urban System meeting one or more of the criteria for PNAC woodland in Table 1 of the Peel OP (2022);
- Regionally significant earth science Areas of Natural and Scientific Interest;
- Sensitive ground water recharge areas;
- Portions of Historic shorelines;
- Open space portions of the Parkway Belt West Plan Area;
- Enhancement areas, buffers and linkages; and,
- Any other natural features and functional areas interpreted as part of the Greenlands System Potential Natural Areas and Corridors.

The Official Plan review (Peel 2051) also identified the need for a Community Energy and Emissions Reduction Plan (CEERP) and Climate Adaptation Plan (CAP) to be completed for each new secondary plan area. The CEERP aims to address the feasibility, planning and implementation requirements around energy matters such as net zero annual energy usage, alternative and renewable energy systems, and electric vehicle charging infrastructure. A CAP should address risk and vulnerability related matters for the built and natural environment, public health and water resource systems and provide direction to implement recommendations to reduce community and environmental vulnerability to changing climate conditions and extreme weather events.

As part of the review of the Region of Peel's Official Plan review (Peel Official Plan review (Peel 2051+) the Region conducted a SABE Study including a technical study on climate change entitle Opportunities for Climate Change Mitigation, Energy and Emissions Reductions, which establishes a vision for the SABE area to be a low carbon community with the ultimate goal of transitioning to net zero over time. The Town of Caledon has incorporated this policy direction in its draft Official Plan (2024), including policies that prioritize climate change at the forefront of land use planning decisions. Goal 2.4.1(a) in the Town's draft Official Plan update is to achieve a built form and system of infrastructure that mitigates the Town's contribution to climate change and enhances resiliency to its impacts.

The main purpose of the SABE was to summarize findings of technical studies for a broad area in southern part of the Town of Caledon and to assess the most appropriate location for new urban lands and appropriate settlement growth. As part of the Peel Region SABE Study, a SWS was conducted to inform recommendations for the natural environment and provide base level guidelines for future, detailed subwatershed studies completed as part of the OPA process. The details of the studies undertaken are described in the subsequent section.

2.1.4 Settlement Area Boundary Expansion (SABE) Environmental Screening Report & Scoped SWS

To better understand the environmental conditions, impacts, and management opportunities, an Environmental Screening Report (Wood, 2020) was prepared for the Region of Peel, and followed by the Scoped SWS (Parts A, B & C; Wood, 2022). The WVSP area falls within the SABE boundary, and thus the desktop data presented in the Environmental Screening Report (Wood et al., 2020) and the SABE Scoped SWS (Part A, B, & C; Wood et. al., 2022) were used to inform this LSS.

In order to define the preliminary NHS for the SABE, the following feature classes were identified and integrated into the NHS.

Key Features: features and areas that are recommended to be protected as part of a connected NHS and include:

- Woodlands;
- Wetlands;
- Valleylands;
- Environmentally Sensitive/Significant Areas;
- Significant Wildlife Habitat;
- Fish Habitat;
- Provincially significant Life Science and Earth Science ANSIs;

- Regionally significant Life Science ANSIs;
- Habitat for Endangered and Threatened Species;
- HDFs identified as Protection or Conservation;
- Key Natural Heritage Features as defined in the Greenbelt Plan and the Growth Plan;
- Key Hydrologic Features as defined in the Greenbelt Plan and the Growth Plan; and,
- Sand Barrens, Savannahs, and Grasslands (as per Provincial Plans or ELC classifications).

Supporting Features: features and areas that are not identified as Key Features but meet criteria as Supporting Features and require further assessment as part of a local SWS to determine if they meet Key Feature criteria or to evaluate their functions, interactions and contributions to the NHS in order to determine how they are managed. These include:

- Woodlands;
- Wetlands;
- Valleylands;
- Regionally significant Earth Science ANSIs;
- HDFs identified as Mitigation;
- Successional habitats; and,
- Open aquatic habitats.

Other Features: those features and areas that are not Key or Supporting features but meet criteria as 'Other Features'. This category may include small and/or isolated features, features or areas requiring further assessment to determine their status as potential key or supporting features. These include:

- Woodlands;
- Wetlands;
- Successional habitats; and,
- Open aquatic habitats.

The Scoped SWS (Wood, 2022) also outlines recommended targets for the NHS within the SABE area. These targets are recommendations that should be explored through the LSS to support the identification and planning of the NHS. Targets for feature types are as follows:

- Natural cover: no net loss;

- Wetlands: no net loss of wetland cover; increase total wetland cover through NHS enhancements;
- Valley and Stream corridors: no net loss of ecological and hydrological functions; increase natural cover within these corridors through enhancements;
- Successional/Open Habitats: Maintain important existing successional / open habitats contiguous to other features and areas of the NHS; increase representation and quality of open country habitats across the landscape through NHS enhancement opportunities; strive to create at least one habitat area with a minimum size threshold of 5 ha;
- Aquatic: achieve 75% naturally vegetated watercourse length through protection, enhancement or restoration;
- Sand Barrens, Savannahs, Grasslands: protect these where they occur; and,
- NHS Enhancements: identify and distribute enhancement opportunities across the NHS to support a robust and sustainable system; increase natural cover by 30%.

2.1.5 The Greenbelt Plan

The Greenbelt Plan (2017) works to permanently protect environmentally sensitive areas due to their ecological value within the Golden Horseshoe. It is intended to enhance the natural landscapes by working to facilitate the connection of environmentally significant areas and reduce fragmentation of the landscape. Protection is offered also to permanent agricultural areas ensuring the permanency and sustainability of natural resources.

The Greenbelt Plan Area is located northeast and east of the WVSP area and contains the NHS. As described within Section 3.2 of the Greenbelt Plan (2017), the Protected Countryside contains a Natural System component of a NHS and a Water Resource System (WRS). The NHS includes core and linkage areas of the Protected Countryside with the highest concentration of sensitive and significant natural features and functions, while the WRS is made up of both ground and surface water features, areas and their associated functions.

The NHS protects natural heritage, hydrologic and/or landform features (key hydrologic areas, key hydrologic features and key natural heritage features) that contribute to conserving Ontario's biodiversity and the ecological integrity of the Greenbelt itself. As described within Section 3.2.2 of the Greenbelt Plan (2017), new developments and/or site alterations must show that there are no negative impacts on the key natural heritage features or key hydrologic features of their functions.

2.1.6 Bill 23 and Ontario Regulation 41/24

Effective January 1, 2023, following the implementation of Bill 23, the role of Conservation Authorities in reviewing development applications has changed. Previously, the TRCA reviewed planning application submissions associated with future development of properties within its jurisdictional boundaries. In addition, the TRCA provided planning and technical advice to planning authorities to assist them in fulfilling their responsibilities regarding natural hazards, natural heritage, and other relevant policy areas pursuant to the Planning Act, as both a watershed-based resource management agency and through planning advisory services, in addition to their regulatory responsibilities. With the changes associated with Bill 23, the commenting role Conservation Authorities will play in Planning Act applications may vary from municipality to municipality.

Effective April 1, 2024, Ontario Regulation (O. Reg.) 41/24: Prohibited Activities, Exemptions and Permits has come into force, replacing the former O. Reg. 166/06: Toronto and Region Conservation Authority: Development, Interference with Wetlands, Alterations to Shorelines and Watercourses Regulation. O. Reg. 41/24 allows Conservation Authorities to implement Section 28 Conservation Authorities Act, 1990 (amended 2024), which states under Section 28(1) that:

“28 (1) No person shall carry on the following activities, or permit another person to carry on the following activities, in the area of jurisdiction of an authority:

a) Activities to straighten, change, divert or interfere in any way with the existing channel of a river, creek, stream or watercourse or to change or interfere in any way with a wetland.

b) Development activities in areas that are within the authority’s area of jurisdiction and are,

    i) hazardous lands,

    ii) wetlands,

    iii) river or stream valleys the limits of which shall be determined in accordance with the regulations,

    iv) areas that are adjacent or close to the shoreline of the Great Lakes-St. Lawrence River System or to an inland lake and that may be affected by flooding, erosion or dynamic beach hazards, such areas to be further determined or specified in accordance with the regulations, or

v) other areas in which development should be prohibited or regulated, as may be determined by the regulations. 2017, c. 23, Sched. 4, s. 25."

Pursuant to O. Reg. 41/24, any interference with or development in or on areas stated in the Conservation Authorities Act (e.g., hazardous lands, wetlands, river or stream valleys) requires permission from the Conservation Authority. The Conservation Authority may issue permits under Section 28.1 and may attach conditions on the permits per Section 9(1) of the Regulation. A review of TRCA's Regulation mapping shows that the NHSA includes regulated areas including a watercourse, HDFs and unevaluated wetlands.

The TRCA's Living Cities Policies (2014) document contains the principles, goals, objectives and policies approved by the TRCA for their planning and development approvals process. This document outlines policies related to the determination of the Natural System and recommends buffer widths for natural heritage features such as woodlands, wetlands, and valley and stream corridors.

2.1.7 Provincial Policy Statement (PPS)

The PPS (MMAH, 2020) provides direction on matters of provincial interest related to land use planning and development. It "…supports a comprehensive, integrated and long-term approach to planning…". The PPS is to be read in its entirety and land use planners and decision-makers need to consider all relevant policies and how they work together.

This report addresses those policies that are specific to Natural Heritage (section 2.1 of the PPS) with some reference to other policies with relevance to Natural Heritage and impact assessment considerations and areas of overlap (e.g., those related to Efficient and Resilient Development and Land Use Patterns, section 1.1; Sewage, Water and Stormwater, section 1.6.6; Water, section 2.2; Natural Hazards, section 3.1).

Eight types of significant natural heritage features are defined in the PPS, as follows:

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat (SWH);

- Fish habitat;
- Habitat of endangered and threatened species; and,
- Significant areas of natural and scientific interest (ANSIs).

Development and site alteration shall not be permitted in significant wetlands, or in significant coastal wetlands. Development and site alteration shall not be permitted in significant woodlands, significant valleylands, SWH or significant ANSIs, unless it is demonstrated that there will be no negative impacts on the natural features or their ecological functions.

Development and site alteration shall not be permitted in the habitat of endangered and threatened species or in fish habitat, except in accordance with provincial and federal requirements. Development and site alteration may be permitted on lands adjacent to fish habitat provided it has been demonstrated that there will be no negative impacts on the natural feature or their ecological functions.

2.1.8 Ontario Endangered Species Act (ESA)

The provincial ESA (2007) was developed to:

- Identify Species at Risk (SAR), based upon best available science;
- Protect SAR and their habitats and to promote the recovery of SAR; and,
- Promote stewardship activities that would support those protection and recovery efforts.

The ESA (2007) protects all threatened, endangered and extirpated species listed on the Species at Risk in Ontario (SARO) list. These species are legally protected from harm or harassment and their associated habitats are legally protected from damage or destruction, as defined under the ESA (2007).

2.1.9 Migratory Birds Convention Act

This federal legislation protects the nests and offspring of listed migratory bird species from destruction or disturbance. In its application, it requires that best management practices be implemented to detect and avoid disturbance to active nests during development activities.

2.1.10 Federal Fisheries Act

The Department of Fisheries and Oceans Canada (DFO) administers the federal Fisheries Act, which defines fish habitat as “spawning grounds and other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes” [subsection (2)1]. The Fisheries Act prohibits the death of fish by means other than fishing [subsection 34.4 (1)] and the harmful alteration, disruption or destruction of fish habitat [HADD; subsection 35. (1)]. A HADD is defined as “any temporary or permanent change to fish habitat that directly or indirectly impairs the habitat’s capacity to support one or more life processes” (DFO 2019).

Some projects may be eligible for exemption from the DFO review process, as specified under Step 3 of the DFO Fish and Fish Habitat Protection Program review process (DFO 2019b; e.g., clear-span bridges and bridge maintenance projects where DFO mitigation measures are applied, artificial waterbodies with no hydrological connection to occupied fish habitat, and projects that follow the Standards and Codes of Practice defined by DFO). All other projects or activities that have the potential to impact fish or fish habitat should be submitted to DFO through the “Request for Review” process. DFO will review the proposed project to determine whether there is potential to (1) impact an aquatic species at risk, (2) cause the death of fish or (3) result in HADD of fish habitat. The death of fish by means other than fishing or a HADD of fish habitat can be authorized by DFO under paragraphs 34.4(2)(b) or 35(2)(b) of the Fisheries Act. Authorizations require the preparation and submission of an application package identifying the impacts on fish and fish habitat as well as the avoidance, mitigation and offsetting measures that will be implemented as well as any monitoring that is proposed.

2.2 Natural Heritage

2.2.1 Terrestrial Connectivity

The NHSA is situated in the West – Main Branch Humber River secondary subwatershed unit (TRCA 2008) which is characterized as containing little habitat with small, fragmented patches that are mostly constrained to valley corridors and tableland forests (TRCA 2008). Figure 3-11 (Terrestrial System – Existing Conditions Landscape Analysis) of the Humber River Watershed Plan (TRCA 2008) displays the habitat patch quality of the identified natural heritage features within the NHSA as a mix of fair and poor.

The West – Main Branch Humber River secondary subwatershed is dominated by agriculture in the north and urbanized in the south. A such, the West Humber River valley is expected to serve as a primary wildlife corridor and linkage for terrestrial, semi-aquatic and aquatic species. North of Healey Road, the West Humber River corridor extends beyond King Street, where it reaches the Main Humber River subwatershed.

Here, the Main Humber River is generally surrounded by large woodlands and wetlands and includes several conservation areas such as the Bolton Resource Management Tract, the Nashville Conservation Reserve, the Cold Creek Conservation Area and the Albion Hills Conservation Park, allowing species to move north south, east and west across the landscape. Contiguous forest cover protects wildlife while they are foraging, migrating, mating and/or overwintering. South of Mayfield Road, the West Humber River is surrounded by residential developments before converging with the Lower Humber River at Claireville Conservation Area.

The existing road network surrounding the NHSA serves as a significant barrier to wildlife movement and includes busy roads. Specifically, Mayfield Road is a major arterial roadway for Caledon and Brampton. With increased population projected for the Town of Caledon, it is anticipated that Humber Station Road and Healey Road will be widened and become busier and will pose an increased risk to wildlife movement. Wildlife passage opportunities are recommended to be assessed during Phase 2 of the LSS.

2.2.2 Natural Heritage Field Investigations

Ecological field investigations were completed for the NHSA from 2021 through 2024, as detailed in **Table 2.1** (**Appendix B2**). The field program was designed with consideration of data collected during the background NHIC and wildlife atlas searches, preliminary SAR screening, and aerial photo interpretation. The following ecological surveys were completed for the participating ownerships within the NHSA:

- Botanical Inventory and Ecological Land Classification (ELC);
- Wetland Evaluations;
- Amphibian Call Count Surveys;
- Snake Visual Encounter Surveys;
- Turtle Basking Surveys;
- Breeding Bird Surveys;
- Bat Habitat Assessment;
- Bat Acoustic Monitoring;
- Drone Imagery Analysis;
- Stem Density Plot;
- Aquatic Habitat Assessment;
- Headwater Drainage Feature Assessment; and
- Fish Community Sampling.

Ecological survey methodology is found in **Appendix B3**.

2.2.3 Species at Risk

GEI's SARAT was utilized to assess the NHSA for SAR. The self-screening results showed that the NHSA has potential suitable habitat for thirteen (13) SAR. Refer to **Table 2.2 (Appendix B2)** for a detailed list of potential SAR in the NHSA.

2.2.4 Ecological Land Classification

The NHSA is dominated by active agricultural lands with some natural vegetation communities including scattered small and isolated marsh wetlands and a deciduous swamp and cultural woodland located in the south-central area. There are also small cultural woodlands and thickets, as well as linear systems of marshes and wet meadows along some of the tributaries and drainages.

ELC mapping of the NHSA is shown on **Figure 2.2** (**Appendix B1**). All non-participating ownerships were assessed using air photo interpretation. A description of each ELC type is provided in **Table 2.3** (**Appendix B2**). No provincially rare vegetation communities were present on the NHSA (NHIC, 2024).

2.2.5 Botanical Inventory

Botanical inventories completed in the NHSA recorded a total of 228 species (i.e., taxa, inclusive of subspecies, varieties, and hybrids). Of these, 54% are native to Ontario and 46% are exotic. A complete list of species documented from the NHSA is provided in **Table 2.4** (**Appendix B2**).

The majority of the native plants (89%) are ranked S5 (secure in Ontario). Twelve species (10%) are ranked S4 (apparently secure in Ontario), while none are ranked S1-S3. Eleven locally rare species were observed, as per the Peel Region rarity rankings (Varga et al. 2005). None of the locally rare species are considered rare in Ontario, and none had a co-efficient of conservatism value of 9 or 10.

No Species at Risk or provincially rare plants were identified within the NHSA.

Local plant rarity is based on the number of population occurrences for a given area. For Peel Region, a plant is considered rare if it has ten (10) or fewer known occurrences, the data of which is derived primarily from historical checklists, MNRF reports, site records, and herbaria records (Varga et al. 2005). Overall, eleven (11) locally rare plants were observed in the NHSA. These were:

- Tall Beggarticks (*Bidens vulgata; R1*)
    - Rare in MAM2-10 and MAM2-2 communities.
- Pennsylvania Smartweed (*Persicaria pensylvanica; R3*)

  - Rare in MAS2-1 and MAM2-2 communities.
- Common Bedstraw (*Galium aparine; R4*)
  - Rare in MAM2-2 communities.
- Peach-Leaved Willow (*Salix amygdaloides; R6*)
  - Rare in MAS2-1, MAM2-10, MAM2-2 and SWD3-3 communities.
- Sandbar Willow (*Salix interior; R5*)
  - Rare in MAM2-10 community.
- White Spruce (*Picea glauca; R3*)
  - Rare in CUT1 community.
- Star Duckweed (*Lemna trisulca; R4*)
  - Abundant in SAF1-3 community.
- Necklace Sedge (*Carex projecta; R4*)
  - Rare in CUT1 community.
- Short-Awned Foxtail (*Alopecurus aequalis* var. *aequalis; R3*)
  - Rare along the margins of agricultural fields.
- Eastern Mannagrass (*Glyceria septentrionalis* var. *septentrionalis; R2*)
  - Occasional in MAS2-1 communities.
- Strict Blue-Eyed Grass (*Sisyrinchium montanum*; R5)
  - Rare in agricultural pasture

2.2.6 Drone Imagery Analysis

Ecological Land Classification practices subdivide the vertical structure of vegetation into four categories: canopy, subcanopy, understory, and ground cover. Woodlands within the Town are recognized as having >25% tree canopy cover (in part). Traditional survey methods require the surveyor to visually estimate canopy cover percent, which can be a difficult task to complete accurately. Surveyors must determine the height range of woody cover that constitutes the canopy and estimate percent-cover while excluding lower woody strata, such as the subcanopy and understory. This task can be simple in mature, full canopy forests but becomes complex in communities that vary in structure and size.

Recognizing the subjectivity associated with visual estimates of canopy cover in culturally influenced natural features, GEI developed an objective approach to quantifying the canopy cover, used in conjunction with standard ELC surveys. The approach is to generate a 3D model of the feature, identify pixels representing a specified elevation and then quantify those pixels relative to the ELC polygon.

The drone flight path was prepared using Drone Deploy software, the results of which provided 595 overlapping images. A 3D model of the WVSP area was then prepared in Drone Deploy using a process known as Structure from Motion. This data served as the Digital Surface Model (DSM), representing the heights of natural and artificial objects on the landscape.

To calculate height values, a Digital Terrain Model (DTM) of the WVSP area was obtained from the MNRF, which provided baseline terrain elevation values. Feature heights were calculated by subtracting the DSM from the DTM.

In order to calculate canopy cover percent, the minimum canopy height was determined to start at 12m – the value of which was used for subsequent cover calculations. This height was chosen because it most accurately accounts for the transition from upper subcanopy to lower canopy within this feature. Many of the tall shrubs – particularly European Buckthorn (*Rhamnus cathartica*) were quite mature, reaching heights of approximately 8m to 12m at their tallest, which should not be factored into woodland canopy calculations.

The results of this analysis are illustrated on **Figure 2.3** (**Appendix B1**), which shows all areas of the overall feature having live tree canopy greater than 12m in height. The outcome of this analysis resulted in refinements to the ELC mapping – most notably adjustments to the boundaries of the buckthorn shrub thickets, as well as the addition of a cultural woodland unit (**Figure 2.2, Appendix B1**).

These results show that the cultural woodland community (CUW1) has 56% canopy cover, the deciduous swamp (SWD3-2) has 40% canopy cover, and each of the buckthorn thickets (THDM2-6) have no more than 22% canopy cover. Further details are provided in **Table 2.5** (**Appendix B2**).

Results of the tree canopy cover mapping as well as the calculated values were reviewed on site and appeared to appropriately reflect existing conditions. These results were used and applied for ELC purposes. It is recognized that the Town defines European Buckthorn as a “tree” and therefore requires the buckthorn thickets to be treated as part of the contiguous woodland. In contrast, ELC guidelines explicitly exclude European Buckthorn from the definition of “tree”.

2.2.7 Stem Density Plots

Recognizing that stem density is often another consideration when identifying woodlands, a stem density assessment was completed in the buckthorn thickets and cultural woodland to determine if the features satisfy the Forestry Act (1990) definition of woodland, which differs from the ELC definition. The results of the stem density analysis show that the larger of the two buckthorn thickets as well as the cultural woodland satisfy the Forestry Act definition of woodland, whereas the smaller of the buckthorn thickets did not (**Table 2.6**, **Appendix B2**). The larger buckthorn thicket met one of the four stem density thresholds (1000 trees, of any size, per hectare); the majority of those stems were young Green Ash seedlings that were below DBH height. These results exclude European Buckthorn.

When applying language from the Town's Official Plan (i.e., treating European Buckthorn as a tree and including it in the stem density analysis), all of the buckthorn thickets meet the Towns definition of woodland.

The Town defines "woodland" as:

a) a tree crown cover of over 60 percent of the ground, determinable from aerial photography, or

b) a tree crown cover of over 25 percent of the ground, determinable from aerial photography, together with on-ground stem density requirements.

Based on these definitions and the work completed by GEI, and through additional correspondence with the Town, each of the buckthorn thickets (and the cultural woodland) are to be treated as woodland since (when including European Buckthorn), the tree crown cover exceeds 60%.

2.2.8 Feature Staking

The limits of wetlands and driplines were staked by TRCA, the Town of Caledon, and GEI on November 7, 2023, as identified on **Figure 2.2** (**Appendix B1**). Due to the late season, TRCA requested to revisit the SWD3-2 staking in 2024 during the appropriate growing season. This staking occurred on September 20, 2024.

The Town of Caledon has requested to stake the Buckthorn Shrub Thickets to determine the limit of the features. This is anticipated to occur in the fall of 2024.

2.2.9 Wetland Evaluation

Wetland communities on participating lands (**Figure 1.2, Appendix A2**) were evaluated under the Ontario Wetland Evaluation System (OWES) (2022). Wetland units smaller than 2 ha were evaluated if there was rationale to warrant a full evaluation. If rationale did not exist, the wetlands were not evaluated and treated as non-significant. Overall, seven wetlands were evaluated, of which only the Silver Maple Mineral Deciduous Swamp (SWD3-2) met the criteria to be considered provincially significant. This wetland had a score of 217 under the Special Features component, which was influenced by the presence of terrestrial crayfish, Wood Thrush, and Black Ash – all of which are provincially significant species. The Significant Wetland is illustrated on **Figure 2.2** (**Appendix B1**).

2.2.10 Calling Amphibians Survey

A total of five amphibian species were heard calling within the WVSP area during the three rounds of call count surveys (**Table 2.7**, **Appendix B2**). Station locations are illustrated on **Figure 2.4** (**Appendix B1**). The species heard calling were the American Toad (*Anaxyrus americanus*), Western Chorus Frog (*Pseudacris tristeriata*), Gray Treefrog (*Hyla versicolor*), Green Fog (*Lithobates clamitans*), and Wood Frog (*Lithobates sylcaticus*). All of these species are provincially ranked S5 (common and secure) or S4 (apparently common and secure).

2.2.11 Reptile Survey

2.2.11.1 Snake Visual Encounter Survey

Snake visual encounter surveys were conducted in the agricultural (AG) and fallow lands, along the edges of a shrub thicket (THDM) and deciduous swamp (SWD) and within farm and residential properties in 2021 (**Figure 2.4**, **Appendix B1**). These surveys revealed there is no suitable habitat within the NHSA as there were no rocks, logs or debris located below the frost line. In 2024, Parcels 5 and 9 (**Figure 1.2, Appendix A2**) became participating ownerships and three rounds of surveys were conducted looking under rocks, logs and debris. No snake species were observed during the surveys (**Table 2.8**, **Appendix B2**). No suitable hibernacula locations were identified during the surveys.

2.2.11.2 Turtle Basking Survey

One turtle species was observed within the NHSA. Seven Midland Painted Turtles (*Chrysemys picta marginata*) were observed at station BS1 in a Cattail Mineral Shallow Marsh (MAS2-1) during round 1 (**Figure 2.4**, **Appendix B1**). This species is provincially ranked as S4 (apparently common and secure). All species observed in the NHSA are listed in **Table 2.9** (**Appendix B2**).

2.2.12 Breeding Bird Surveys

A total of fifty-two (52) bird species were observed within the NHSA in 2022. Of this total, eleven (11) species are confirmed, twenty-two (22) are probable, and fourteen (14) are possible breeders on the WVSP area. The remaining five (5) bird species are considered non-breeders, flyovers, or migrants. Seven additional species were observed only on surrounding lands within 120 m. The observed breeding bird species are discussed in the sections below. All species observed on the WVSP area are listed in **Table 2.10A** and **Table 2.10B** (**Appendix B2**).

A total of forty-six (46) (98%) of the confirmed, probable or possible breeders are provincially ranked S5 (common and secure), S4 (apparently common and secure) or SNA (species not native to Ontario). One bird species is considered provincially rare (S1-S3; NHIC 2024) and is discussed in the sections below.

- **Upland Sandpiper** (*Bartramia longicauda*) (S2B); a pair was observed in fallow fields on May 31, 2022 near Point Count (PC) 5 and PC 2. Suitable breeding habitat was present as the species prefers short vegetation combined with bare soil in continuous patches greater than 30 ha (pers.obs. P.Burke). These fields had been ploughed last in 2021 or early spring of 2022 and left fallow. No further breeding evidence was observed on this date however their secretive behaviour suggested nesting activity. During the second round of surveys, the fields were observed to have been recently ploughed and had become unsuitable. A singing male Upland Sandpiper was observed approximately 150 m to the west on the bordering agricultural lands on this visit.

The following Species at Risk were observed on, or adjacent to (within 120 m), the NHSA. Survey stations are illustrated on **Figure 2.4** (**Appendix B1**):

- **Bobolink: Threatened in Ontario;** 11 individuals were detected during round one and seven were detected during round two, on non-participating hayfields within the NHSA east of The Gore Road. Probable breeding was observed in these hayfields east of PC 10 that provided suitable breeding habitat. One individual was observed flying over the NHSA at PC 10 however no suitable habitat was observed in this location.
- **Eastern Meadowlark: Threatened in Ontario;** Three individuals were observed during round one and four during round two within the hayfields located east of The Gore Road. This provided probable breeding evidence in suitable breeding habitat.
- **Wood Thrush: Special Concern in Ontario;** one male was detected on both surveys in the Mineral Swamp Deciduous Swamp (SWD3-2) at PC22. This provided probable breeding evidence in suitable breeding habitat.
- **Barn Swallow: Special Concern in Ontario;** foraging individuals were noted over the WVSP area during both rounds of surveys. An outbuilding shed on a non-participating property west of PC25 contained at least one nesting pair. No other breeding evidence or suitable structures were observed

A total of twenty-eight (28) bird species were observed within the two new participating ownerships (Parcels 5 and 9, **Figure 1.2, Appendix A2**) in 2024. Of this total, seven (7) species are confirmed, six (6) are probable, and seven (7) are possible breeders. The remaining eight (8) bird species are considered non-breeders, flyovers, or migrants. Three additional species were observed only on surrounding lands within 120 m. The observed breeding bird species are discussed in the sections below. All species observed on Parcels 5 and 9 (**Figure 1.2, Appendix A2**) are listed in **Table 2.10B** (**Appendix B2**).

A total of eleven (11) (73%) of the confirmed, probable, or possible breeders are provincially ranked S5 (common and secure), S4 (apparently common and secure) or

SNA (species not native to Ontario). Four (4) bird species are considered provincially rare (S1-S3; NHIC 2024) and are discussed in the sections below.

The following Species at Risk and rare species were observed during the 2024 surveys:

- **Bobolink: Threatened in Ontario;**
  - At Parcel 5, during round one a Bobolink was observed singing at PC 5-4 in an alfalfa field that had been recently harvested. The monoculture alfalfa had been planted within the last three years and did not provide any thatch or grasses with which a Bobolink could build a nest and provide proper shelter. The habitat here is unsuitable breeding habitat, and it is expected that the Bobolink had visited from more suitable habitat in fields to the south-east of Centreville Creek Road.
  - A second Bobolink was heard during round one at PC 5-6, calling from an alfalfa hayfield on a non-participating property to the south-east. By round two, the alfalfa had been removed and the field seeded with soy. No Bobolinks were observed during rounds 2 or 3 at Parcel 5.
  - In Parcel 9, eight male Bobolink were observed singing from within, or just outside of PC 9-2 during round one. By the time of the round two survey, the fallow field and the small, low-quality hayfield at Parcel 9 had been tilled and re-planted in soy, in accordance with Section 4.1 of Ontario Regulation 242/08 under the Endangered Species Act (2007). As a result, Bobolink was not subsequently detected and there is no suitable habitat present on Parcel 9.
- **Eastern Meadowlark: Threatened in Ontario;** During round 1 there was an Eastern Meadowlark heard and observed calling at PC 5-2 in a small field of mature Rye that had been planted the previous year. While the Rye remained in the southern portion of PC 5-2, it had already been harvested in the northern portion and the ground remained with only stubble. By round two, the northern portion had been seeded with sorghum. No Eastern Meadowlarks were observed in rounds 2 or 3 as the rye, sorghum, soy in the field adjacent to the north, and corn in the adjacent field to the south did not provide suitable habitat for this species.
- **Barn Swallow: Special Concern in Ontario;** Barn Swallows were observed foraging over parcels 5 and 9 during both rounds 1 and 2 of breeding bird surveys. Two rounds of targeted Barn Swallow Nest Surveys were undertaken on both parcels during breeding bird surveys. Five active nests were confirmed in suitable structures at Parcel 5, while no nests were observed at Parcel 9.
- **Upland Sandpiper (S3B);** During round 2, one Upland Sandpiper was heard vocalizing at PC 5-2 from a narrow, approximately 4-5m wide, strip of long grass border between the field access lane and the seeded corn field to the south. This grass border was mostly occupied by 1 to 2 rows of plastic-wrapped round hay

bales as “baleage”. No suitable habitat occurs on Parcel 5, and none of the adjacent fields provide vegetation cover suitable for this species to nest and forage. There appear to be small Meadow Marsh communities off-property, within the soy field to the north-east of parcel 5 that may provide suitable habitat for this species.

2.2.13 Bat Habitat and Bat Acoustic Monitoring Surveys

2.2.13.1 Bat Habitat Assessment

With respect to maternity colony SWH, vegetation communities including Mineral Cultural Woodland (CUW1), Silver Maple Mineral Deciduous Swamp (SWD3-2) and Swamp Maple Mineral Deciduous Swamp (SWD3-3), surveyed in the NHSA meet the minimum density criteria for significance (>10 suitable roosting trees/ha). Although the CUW1 meets the minimum density criteria it does not meet the ecosite criteria to be considered bat maternity colony SWH.

With respect to SAR bats, the Mineral Cultural Woodlands (CUW1) and Swamp Maple Mineral Deciduous Swamp (SWD3-2) contain features that may be used by SAR bats. Several barn structures and a residence within Parcel 5 and a residence at Parcel 9 were identified as providing potential bat habitat.

The results of the bat habitat assessment are presented in **Table 2.11** (**Appendix B2**).

2.2.13.2 Bat Acoustic Monitoring

Four (4) bat species were confirmed to be present within the woodlands: Big Brown Bat *(Eptesicus fuscus),* Silver-haired Bat *(Lasionycteris noctivagans),* Hoary Bat *(Lasiurus cinereus*) and Eastern Red Bat (*Lasiurus borealis*). During 40 detector evenings of acoustic surveys 528 calls were recorded and identifiable to species.

Of the 465 calls that were identifiable to species, 122 were Big Brown Bat, 217 were Silver-haired Bat, 125 were Hoary Bat, and one was Eastern Red Bat **(Table 2.12, Appendix B2)**.

2.2.14 Aquatic Habitat Assessment

An aquatic habitat assessment for a small tributary of the West Humber River situated in the southeast portion of the NHSA (Reaches H5S1/S2/S3; **Figure 2.2, Appendix B1**) was conducted. The tributary is fed by two headwater drainage features that initiate in the south-central portion of the NHSA. Reach H5S3 was delineated immediately downstream of the confluence, flowing into reach H5S2 after approximately 50m. H5S2 continues flowing through an agricultural field before becoming more sinuous and entrenched, marking the beginning of reach H5S1. Reach H5S1 flows a short distance through a shrub thicket before flowing under The Gore Road, offsite. The aquatic assessment for the feature is characterized as follows.

As reach H5S3 is limited in length, and very similar to H5S2, they were treated as one reach. The feature was observed to have intermittent flow with natural stream morphology. The channel's morphology displayed a low degree of meandering and a moderate gradient.

The feature consisted mostly of runs, with some deeper pockets containing standing water. The riparian vegetation was limited to terrestrial grass and small shrubs. Short grasses were also present in the channel, lining the bed between sequential pools.

The mean bankfull width was measured to be 3.0 m with a mean depth of about 0.5 m. The wetted width and depth were variable throughout the reach due to the intermittent nature of the flow. Bank material consisted mostly of silt and sand. Pool substrate consisted of sand and silt, while some larger cobbles and gravel particles were observed throughout some runs. No fish were observed in the reach during the aquatic habitat assessment. Water temperature was warm (>20 degrees Celsius), and the entirety of the reach was unshaded.

Reach H5S1 became much more entrenched and sinuous downstream of reach H5S2. The feature was observed to have perennial flow in a natural stream morphology. The channel's morphology displayed a high degree of meandering and a moderate gradient.

The feature consisted of pools and riffles, with variable flow velocity. A knickpoint was observed at the midpoint of the reach. Several portions along the channel were severely degraded, evident in slumping occurring along undercut meander bends as well as a suspended armour layer observed at the undercuts. Riparian vegetation consisted of tall grasses, shrubs, and scattered trees.

The mean bankfull width was measured to be 1.8 m with a mean depth of about 1.0 m. The wetted width was approximately 0.7 m throughout the reach, while the average depth of flowing water was measured at 0.15 m. Bank material consisted mostly of silt and sand. Pool substrate consisted of sand and silt, while riffles consisted of gravel and some larger cobbles. No fish were observed in the reach during the aquatic habitat assessment. Water temperature was warm (>20 degrees Celsius), and approximately 50% of the reach was shaded by trees.

2.2.15 Headwater Drainage Feature (HDF) Assessment

The NHSA supports a number of headwater drainage features (HDFs; **Figure 2.2**, **Appendix B1**) that feed the West Humber River and its tributaries. TRCA policies require HDFs to be identified and managed in accordance with their Evaluation, Classification and Management of Headwater Drainage Features Guideline (CVC and TRCA 2014).

Headwater drainage features are defined as non-permanently flowing drainage features that contribute to the overall health of the watershed. As such, the selection of the appropriate management recommendations is required to adequately protect or mitigate the feature and its ecological functions from any proposed development.

As per the HDF guidelines, GEI completed three rounds of surveys between 2021, 2022 and 2024, and identified seven HDFs in the NHSA. The West Humber River is located immediately northeast and east of the NHSA and is fed by HDFs within the east portion of the NHSA. The western HDFs flowing under Centreville Creek Road feed a smaller west tributary of the West Humber River located west of the NHSA. The west and east tributaries of the West Humber River merge approximately 2.7 km south of the NHSA.

2.2.15.1 Classification

GEI utilized the guidance provided in Part Two of the HDF Guidelines (CVC and TRCA 2014), which addresses the approach for the assessment and classification of the HDFs. By design, the HDF Guidelines are focused on the classification of ephemeral and intermittent headwater drainage features and are not intended to characterize those features that are watercourses.

2.2.15.2 Management Recommendations

Management recommendations for all HDFs were decided upon utilizing Part Three of the HDF Guidelines (CVC and TRCA 2014). This section of the Guidelines provides guidance in linking the habitat classification information with the proposed management approach for each HDF. The guidelines and information collected from the surveys were utilized to determine management recommendations. All HDF reaches and their management recommendations are depicted on **Figure 2.2** (**Appendix B1**).

It is important to acknowledge that as with any guidelines, the HDF Guidelines are intended to have flexibility to best reflect additional considerations regarding the site-specific nature of features, such as historical straightening for agricultural purposes, impairment related to surrounding agricultural or residential land use, the replication of wetland habitat functions, and compatibility with land uses. As such, there are situations where recommendations are made for an alternative management recommendation based on site specific understanding of these additional factors.

The application of the HDF Guidelines to existing site conditions results in recommendation for protection, conservation, mitigation, or no management. Strict application of the HDF Guidelines to certain HDFs that are wetlands or have upstream wetlands would result in management recommendations of Protection.

The HDFs in the NHSA have been negatively impacted by agricultural and residential land uses, including straightening and impairment (i.e., siltation due to ploughing through, or up to, the edge of the feature, and pollution resulting from fertilizers), as well as reduction of riparian habitat. Some HDFs are connected to small wetlands that are isolated with limited species diversity. The HDFs and associated wetlands are generally low-functioning features that would be difficult to maintain in an urban setting. These features are proposed for removal with replication of their functions through stormwater management, LIDs, and/or wetland creation..

It is acknowledged that some HDFs are located on non-participating lands, and as such GEI used air photo interpretation and on the ground observations from participating property boundaries. Considering the existing anthropogenic land uses (agricultural, residential, commercial) and cultural vegetation communities, as well as the designated residential land use, it is reasonable to anticipate these lands will be urbanized and that maintenance of HDFs and/or small wetlands will be difficult. Provided that future studies do not observe any significant habitat, and that HDF functions can be replicated, it is also reasonable to assume that these HDFs will be removed and replicated as described above.

Management recommendations are provided in **Table 2.13** (**Appendix B2**).

The HDF Guidelines suggest implementation techniques for each of the 'Protection', 'Conservation', 'Mitigation' and 'No management required' recommendations. The HDF Guideline recommendation for implementation techniques is provided below.

2.2.15.3 Mitigation

All of the Mitigation management recommendations are made for reaches on the tableland within agricultural or residential lands. Here, they are generally ephemeral and intermittent swales that convey flow during the freshet but are otherwise dry, with some reaches being ploughed through.

All reaches have an Interpreted Management Recommendation of Mitigation, based on the anticipated ability to replicate HDFs and associated wetland ,functions through the provision of baseflow and on-site compensation of wetland habitat as conceptually shown on **Figure 2.5 (Appendix B1**).

As noted in the HDF Guidelines, Mitigation management allows for the replication of the function of the HDF to:

- Replication functions by lot level conveyance measures (e.g., vegetated swales connected to the natural heritage system, as feasible and/or Low Impact Development (LID) stormwater options;
- Replicate on-site flow and outlet flows at the top end of the system to maintain feature functions; and,

- Specific implementation techniques to replicate functions should be determined at the MESP stage and may include traditional storm sewers and/or LID measures.

2.2.16 Fish Community Sampling

Fish community sampling was completed in 2022 and 2024 within the small tributary of the West Humber River (Reaches H5S1/S2/S3), headwater drainage features, as well as culverts at the surrounding road crossings. Fish sampling locations are illustrated on **Figure 2.4 (Appendix B1)**.

No fish were captured within any of the sampling reaches in 2022. Fathead Minnow (*Pimephales promelas)* and Brook Stickleback (*Culaea inconstans*) were caught in 2024 at one culvert at The Gore Road and one culvert at Mayfield Road. The results of the fish community sampling can be found in **Table 2.14** (**Appendix B2**). These fish species are provincially ranked S5 (common and secure) and are identified as warm water species.

GEI conducted groundwater and surface water monitoring, as further detailed in **Section 3.4** below. The results indicate that the participating HDFs, tributary and wetlands are primarily surface water driven features, although there is potential for seasonal interflow (shallow subsurface lateral flow) during the spring. Exceptions include HDF H3S1A/H5S4 located at the south end of the NHSA, as well as two small (<0.10 ha) and isolated Cattail Mineral Shallow Marsh communities located in the north end of the NHSA, that were found to be fed by groundwater.

2.2.17 Staking of Natural Heritage Features

The limits of wetlands and driplines were staked by TRCA, the Town of Caledon, and GEI on November 7, 2023, as identified on **Figure 2.2** (**Appendix B1**). Due to the late season, TRCA requested to revisit the SWD3-2 staking in 2024 during the appropriate growing season. This staking occurred on September 20, 2024.

The Town of Caledon requested to stake the Buckthorn Shrub Thickets to determine the limits of the feature. The consultant team is in discussions with the Town regarding the Buckthorn Thickets. This section of the LSS will be updated during Phase 2.

2.3 Natural Hazards

2.3.1 Erosion Hazard Identification

Tributary H5S1/S2/S3 crosses the WVSP area, which eventually feeds into the West Humber River (**Figure 2.6, Appendix B1**). The Humber River watershed is situated in the TRCA's jurisdiction, spanning 900 km^2 of land that includes portions of local municipalities of Caledon, King, Brampton, Mississauga, and Toronto (TRCA 2023).

Geomorphic investigations and assessments have been completed to identify erosion hazards including:

- Reviewing historic and recent aerial imagery, particularly with respect to deriving stream corridor dynamics such as meander belt, 100-year erosion risk;
- Reviewing existing geomorphic mapping from the Scoped SWS (Wood, 2022) and refining based on site specific investigations;
- Conducting reach delineations, rapid assessments and detailed geomorphic field assessments within watercourses; and,
- Completing meander belt width assessments for higher order streams.

Climate and geology play an important role to influence the form and processes of the watercourse. Geological influences on patterns and rates of river change include landscape configuration, material availability, and erodibility of the substrate. Climatic fluctuations influence water balance and vegetation patterns, which impact flow regimes and the production, supply, and transport of sediment. The following sections provide an understanding of the physical setting of the Humber River tributary and provide context to the active fluvial geomorphological processes in the WVSP area.

The WVSP area lies within the South Slope physiographic region (Chapman & Putnam 2007). This is a sloping plain that extends from the boundary with the Oak Ridges Moraine, southwards, and is underlain by glacial till. Bedrock in this region consists of shale, limestone, dolostone, and siltstone. The soil types in this physiographic region are predominantly clay with some clay loam, and loam. The topography is relatively smooth, and infiltration is low due to the clay content. As a result, runoff rates are high. Surficial geology consists of clay to silt-textured till (OGS, 2010). Refer to **Section 3.1** below for additional information on the geology of the WVSP area.

2.3.1.1 Historical Assessment

Historical aerial photographs of the watercourse in the vicinity of the WVSP area were reviewed to determine changes to the channel and surrounding land use and land cover. Historic analyses provide insight into how past channel adjustments and modifications have contributed to current channel form and processes.

Aerial photographs from 1960, 1976, and 1988, obtained from the National Air Photo Library, were compared with digital imagery from 1954, obtained from the University of Toronto Aerial Imagery Database (University of Toronto, 2024) and from 2002, 2013 and 2022, obtained from First Base Solutions.

In 1954, the surrounding land use was mainly agricultural. Properties, separated by hedgerows, consisted of agricultural fields, small wood lots, and residential dwellings. The West Humber River traverses the property to the northeast of the WVSP area, and small drainage features conveying flow from the agricultural fields were observed.

There are existing residences located along Centreville Creek Road, and The Gore Road within the WVSP area.

Apart from some new additional residences being constructed along The Gore Road, no significant changes were noted between 1954 and 1960. By 1976, a portion of the WVSP area at the corner of Mayfield Road and Centreville Creek Road had been partially developed, and a new residential property had been constructed along Mayfield Road. Additionally, the intersection at The Gore Road and Mayfield Road had been realigned.

No significant changes, apart from the construction of small new properties in the vicinity of the WVSP area, were noted between 1976 and 1988. By 2002, the properties lining the WVSP area had continued to expand, with small roads leading into the interior of the WVSP area. No notable changes were observed between 2002 and 2013.

By 2022, the property to the southeast of the WVSP area had been changed significantly. Previously an empty field, the entire lot had been filled with over 200 townhouses. The southeast corner of the WVSP area was expanded slightly. A parking lot had closed the distance between the watercourse and the property. Construction was also initiated within the previous decade, and silt fencing was put up along the southern floodplain.

2.3.1.2 Reach Delineation

Reaches are defined as sections of river along which boundary conditions are sufficiently uniform such that the river maintains a near consistent structure (Brierley and Fryirs 2005). Reaches are typically delineated based on changes in channel planform, gradient, valley form, physiography, land cover, flow inputs, channel disturbances, and past channel modifications. Due to spatial variability in the modifying and controlling influences of channel form, two reaches situated immediately upstream or downstream of each other could show a marked difference in planform (TRCA 2004).

Two headwater drainage features collect water in the WVSP area’s central agricultural fields before conveying flow towards Tributary H5S1/S2/S3 in the southeastern corner. The confluence of the two drainage features marked the upstream extent of the first reach, defined as H5S3. The watercourse flows to the east before exiting the extent of the agricultural field and entering a grassy area, and which point a reach break marking the beginning of reach H5S2 was placed. Reach H5S2 continued to flow through the grassy area adjacent to the agricultural field before becoming more entrenched and sinuous. As such, a reach break was placed before this change in planform and definition, delineating reach H5S1. Reach H5S1 extended to the crossing at The Gore Road. The reach delineation was subsequently verified during the field investigation. A reach map is provided in **Figure 2.7** (**Appendix B1**).

2.3.1.3 Field Investigation

A field investigation was completed for reaches H5S3, H5S2, and H5S1 the West Humber River tributary on May 24, 2023, and consisted of a Rapid Geomorphic Assessment (RGA), a modified Rapid Stream Assessment Technique (RSAT) and classification of the reach using the Downs Method (Thorne et al., 1997).

The RGA (MOE, 2003) documents observed indicators of channel instability. Observations made during the field investigation are quantified using an index that identifies channel sensitivity based on evidence of aggradation, degradation, channel widening, and planform adjustment. The index produces values that indicate whether the channel is stable/in regime (score <0.20), stressed/transitional (score 0.21-0.40), or adjusting (score >0.41).

The RSAT (Galli, 1996) provides an assessment of the channel by also considering the ecological function of the stream. Observations under the modified RSAT include channel stability, channel scouring/sediment deposition, physical instream habitat, water quality, and riparian habitat condition. The RSAT scores rank the channel as maintaining a poor (<13), fair (13-24), good (25-34), or excellent (35-42) degree of stream health.

The Downs Method, as outlined in Thorne et al. (1997), was developed based on adjustment processes and trends of channel change and links these processes and trends to the fluvial and sediment processes responsible for driving channel change. This system classifies streams as stable, depositional, laterally migrating, enlarging, compound, recovering, or undercutting.

The upstream extent of H5S3 forms at the confluence of two headwater drainage features, which convey flow from the central agricultural fields towards the eastern corner of the WVSP area. At this point, the watercourse shows minimal definition, existing as a shallow-flowing channel with little to no riparian or instream vegetation. In areas where instream vegetation was present it existed as immature, short grass. The riparian buffer extended greater than 5 channel widths in dimension on either side. Although distinct pools and runs could not be discerned, some point bars, coarse material deposits, and silt deposits were observed, suggesting that active sediment transport occurs within the watercourse during some flow regimes. The dominant habitat type consisted of runs. Where defined, bankfull widths ranged between 2.0 – 4.5 m, while bankfull depths ranged between 0.25 – 1.0 m. Bed substrate was mostly composed of sand, silt, and clay, with some pockets of coarser material. Bank angles were shallow, ranging between 0 to 30°, and erosion was noted on approximately 5 to 30% of banks.

The RGA produced a score of 0.13, which indicated that the reach was in regime. The dominant process observed in the channel was aggradation. The RSAT score of 18 indicated that this reach was in a fair state of ecological health. Riparian and instream habitat conditions were noted to be the main limiting factor, evident by the embedded riffle substrate and lobate bar formation, as well as a lack of mature riparian vegetation. The Downs Method (Thorne et al., 1997) classified this reach as M – lateral migration, which is characterized by erosion on one bank and deposition on the other.

No geomorphic differences were observed between reach H5S3 and reach H5S2. As such, they were considered one reach during the field investigation. Instead of flowing through an agricultural field in reach H5S3, reach H5S2 flows through a grassy meadow.

Reach H5S1 is established at the beginning of a heavily eroded stretch of channel, directly downstream of reach H5S2. This portion of the feature showed significant entrenchment / basal scour throughout the reach, resulting in steep banks and an incised bed. Plant roots, visible due to undercutting, were observed along the first half of reach H5S1. Point bars are slightly more established and vegetated with taller grasses than in the previous reaches. Past the steep banks, riparian vegetation exists as grasses, shrubs, and in the downstream half of the reach, trees. The riparian buffer extended greater than 5 channel widths in dimension on either side. Distinct pools and riffles, as well as some point bars, coarse material deposits, and silt deposits were observed, suggesting that active sediment transport occurs within the watercourse during some flow regimes. The dominant habitat type consisted of runs. Where defined, bankfull widths ranged between 1.5 to 2.5 m, while bankfull depths ranged between 1.0 to 2.0 m. Bed substrate was mostly composed of sand, silt, and clay, with some pockets of coarser material. Some coarse material deposits were associated with a knickpoint. An armour layer was visible in the bank’s substrate, indicating that the channel had incised through a previously present bed layer. Bank angles were steep, ranging between 60 to 90°, and erosion was noted on approximately 30 to 60% of banks.

The RGA produced a score of 0.33, which indicated that the reach was in transition / stressed. The dominant process observed in the channel was degradation. The RSAT score of 24 indicated that this reach was in a fair state of ecological health. Channel stability was noted to be the main limiting factor, evident by the basal scour, undercutting, and general symptoms of erosion throughout the channel. The Downs Method classified this reach as E – enlarging which is characterized by erosion on one bank and deposition on the other.

Rapid assessment results are summarized in **Table 2.16A** (**Appendix B2**). A photographic record of existing conditions is provided in **Appendix B4**.

2.3.2 Meander Belt Delineation

Streams and rivers are dynamic features on the landscape, and their configuration and position on the floodplain changes as part of meander evolution, development and migration processes. When development or other activities are contemplated near a watercourse, it is desirable to designate a corridor that is intended to contain the complete natural meander and migration tendencies of the channel. The space that a meandering watercourse occupies on its floodplain, and in which all these natural processes occur, is referred to as the meander belt (TRCA, 2004). In the case of unconfined systems, the erosion hazard allowance consists of the meander belt and an access allowance. In the case of confined systems, the erosion hazard allowance consists of the stable slope allowance and toe erosion allowance, in addition to the access allowance.

As Tributary H5S1/S2/S3 within the WVSP area is situated in an unconfined valley, a meander belt width was delineated for reaches H5S1, H5S2, and H5S3. Due to geomorphic similarities, the meander belt delineation was combined for reaches H5S2 and H5S3. The TRCA (2004) Belt Width Delineation Procedures document was created to recommend a protocol for delineation of meander belt for river systems within the TRCA's jurisdiction but is accepted by Conservation Authorities throughout Ontario as a primary method for delineating the belt width. The method involves drawing lines tangential to the outside meander bends of the planform, including the historical position of the watercourse. The perpendicular distance between these two lines represents the meander belt width. A factor of safety, calculated using the historical migration rates of the channel, is added to the preliminary meander belt. The final meander belt was found to be 15 m for H5S1, H5S2, and H5S3. The limits of the meander belt are shown in **Figure 2.7** in **Appendix B1**.

2.3.3 Slope Stability Hazards

The WVSP area is in the Humber River Watershed, which is within the jurisdiction of Toronto and Region Conservation Authority (TRCA). The West Humber River within the Greenbelt Plan Area is located east of The Gore Road and east of the WVSP area. A tributary of the West Humber River is located south Mayfield Road and south of the WVSP area. This is shown on **Figure 2.8** in **Appendix B1**. Online Regulation Mapping from TRCA shows that West Humber River is a Regulated Area, and therefore the methodology to determine long-term development setbacks associated with slope stability must comply with TRCA policy guidelines.

The West Humber River is part of a confined valley system, which typically consists of a watercourse, floodplain, and slope. It is noted that other surface water features on or near the WVSP area are likely unconfined valley systems and therefore are not subject to slope stability setbacks and are not included in the scope of this slope stability and erosion hazard assessment. The West Humber River also flows to the north of the northern WVSP area boundary where it crosses The Gore Road. This stretch of the river was not included in the preliminary slope stability assessment because the planned Highway 413 Transportation Corridor will separate the river and WVSP area. The slope area included in the assessment is shown on **Figure 2.8** in **Appendix B1**.

To support preliminary constraints and opportunities mapping, as further detailed in **Section 2.5.2**, a preliminary slope stability assessment was conducted which included:

- Review of the high-level top of bank linework publicly available from the TRCA.
- Creating four (4) cross-sections through the confined valley system based on topographic LiDAR data available for the WVSP area.
- Determining conservative estimates for the toe erosion allowance and stable slope allowance used to estimate the Long-Term Stable Top of Slope (LTSTOS).
- Plan and profile views of the LTSTOS and overall Erosion Hazard Limit.

At the time of this report, it was not possible to access the confined valley system of West Humber River to the east or south of the WVSP area. No on-site visual inspections were conducted, nor were site specific boreholes advanced to determine soil and groundwater conditions. The findings presented in this assessment are based exclusively on publicly available information. As such, the Erosion Hazard Limit is considered highly conservative and are likely to be a maximum extent of the constraint. Visual slope inspections, physical top of bank staking, subsurface drilling investigations, refined topographical information, site-specific detailed slope stability analysis, etc. will refine the setbacks shown, if conducted.

2.3.4 Slope Stability Setbacks and Policy

TRCA provides policy requirements and technical guidance for developments within slope and erosion hazard zones based on the following documents:

- “The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority,” by TRCA, dated November 28, 2014.
- “Technical Guide on River and Stream Systems: Erosion Hazard Limit,” by the Ministry of Natural Resources (MNR), dated 2002.

The above noted guidelines are consistent with discussion on slope stability policies and guidelines within the Scoped SWS reports.

The West Humber River is within a TRCA Regulated Area and is subject to these policy guidelines. Included in these policy guidelines are setbacks in which all new development must be set behind. The following allowances are applicable for the confined valley system at the Study Area:

- **Toe Erosion Allowance:** This setback is an estimate of the distance the toe of slope will move over the next 100 years. This can be based on a site-specific fluvial geomorphology study, average annual recession rate based on 25 years of data or based on set values provided by the MNRF depending on the soil type encountered. If the watercourse is greater than 15 m away from the slope toe, no toe erosion allowance is typically required.

- **Stable Slope Allowance:** This setback is associated with determining the inclination of the slope that achieves a minimum factor of safety of 1.5. In some cases, the existing slope inclination may meet this minimum requirement. In lieu of detailed geotechnical engineering analysis, a conservative estimate for the stable slope inclination of 3H:1V can typically be applied.

- **Erosion Access Allowance:** An additional 10 m setback (for development, new buildings) is applied to allow for emergency access, routine maintenance of the slope and potential erosion areas, and to create an additional buffer between the development and the potential erosion hazard.

The toe erosion allowance and stable slope allowance combine to form the Long-Term Stable Top of Slope (LTSTOS). When the LTSTOS is combined with the Erosion Access Allowance, this total setback line is the Erosion Hazard Limit from which all new development or redevelopment must be set behind, per TRCA guidelines. The above setbacks are applicable to sites where there is a confined valley system only. These policies are not applicable for unconfined systems, where the Erosion Hazard Limit is defined by the meander belt allowance or flooding hazard limit, plus an additional allowance (beyond the scope of work of the slope stability assessment).

2.3.5 Scoped SWS Overview

In the Scoped SWS: Part A report, (Wood, 2022) a desktop level assessment was completed to estimate the potential for instability for slopes identified in the SABE boundary. The ranking system followed the MNR Slope Rating Chart methodology to estimate if the slopes have a low, slight, or moderate risk for instability. The report summarized the risk as follows:

- **Low risk** for slope instability means the slopes are likely stable and would only require a site inspection and letter report to confirm the slope is stable.
- **Slight risk** for slope instability means the slopes are typically stable but require a site inspection and conservative slopes stability analysis to verify if the existing slope is stable.
- **Moderate risk** for slope instability means the slopes may or may not be stable in their current form, and a geotechnical subsurface investigation is required. The stable top of slope may not coincide with the current top of slope.

On-site visual slope inspections were not completed by Wood (2022), so some assumptions were required in their assessment. They also used a digital elevation model, surficial geology mapping, and aerial imagery. Wood (2022) notes that future studies are required to confirm the rating and investigation requirements. Figure No. G-C3 within the Part A SABE report shows mapping with the risk evaluation for West Humber River watershed, and it includes the WVSP Study area. The West Humber River flowing south along the eastern side of the WVSP area was identified as having low to slight risk for slope instability. Figure No. G-C3 within the Scoped SWS: Part A report (Wood, 2022) also shows a small tributary in the northwestern corner of the WVSP area as having a low risk for instability; however, based on GEI's visual inspection on site, that feature is unconfined and does not require a slope stability assessment. A photograph of the unconfined feature is provided in **Appendix B5**.

The Scoped SWS: Part A report, (Wood, 2022) also provides commentary on the policy requirements related to slope and erosion hazards, along with high-level discussion on the toe erosion allowance, stable slope allowance, and erosion access allowance. Scoped SWS: Part B report, (Wood, 2022) contains similar geotechnical information and the assessment for slope risk in the WVSP area remains the same. Figure D-2 in the Part B SABE report shows low to slight risk for instability along the main West Humber River tributary within the Study Area.

2.3.6 Preliminary Slope Stability Assessment

2.3.6.1 Topography, Slope Geometry and Top of Bank

The slope geometry for the analysis was determined by creating a total of four (4) cross sections through the West Humber River confined valley using a LiDAR DEM, which included 0.5 m contour spacing. The cross-sections are included as **Figures 2.9A to 2.9D** and the locations are shown on **Figure 2.8** (refer to **Appendix B1**). The cross-sections were created in locations appearing to represent the worst-case conditions, such as where the watercourse is close to the slope toe and/or where the slope is steeper. Additional cross-sections with closer spacing would be required when the slope stability setbacks are refined during more detailed studies.

The confined valley system is outside of the participating lands, so physical top of bank staking was not possible. The top of bank location shown on **Figure 2.8** (**Appendix B1**) is taken from publicly available TRCA linework for the area which shows the estimated top of bank (typically established from LiDAR data). Field staking for the top of bank will be required if/when there is permission to enter the tableland and valley locations. The edge of the watercourse for starting the toe erosion allowance was also taken from TRCA linework.

2.3.6.2 Preliminary Analysis for Slope Stability Setbacks

The preliminary analysis below was completed using highly conservative assumptions. The confined valley system is not within participating lands, so visual slope inspections and field investigations could not be completed at this time. More detailed analysis will be required if/when permission to enter the area is granted, and a detailed field investigation can be completed, to further refine the setbacks.

2.3.6.2.1 Toe Erosion Allowance

The toe erosion allowance is a horizontal distance typically measured out from the bankfull width of a watercourse, existing water level of the watercourse, or bottom of the watercourse channel as deemed appropriate based on the site-specific conditions. The toe erosion allowance applied is based on numerous considerations such as: proximity of the watercourse to the slope toe, the presence of existing erosion, average and peak velocity within the watercourse, susceptibility of the soils at the slope toe to erosion, extent of vegetation, fluvial geomorphological processes, etc. Due to the varied and complex nature of determining toe erosion, multiple simplified methods are available for determining this toe erosion allowance, including:

- Using a value of 15 m if no information is available (as is the case for this study);
- Use of an average annual recession rate based on a minimum of 25 years data, and extrapolated to a 100-year planning horizon;
- A fluvial geomorphological study based on a minimum of 25 years of record; and,
- Use of the table “Determination of Toe Erosion Allowance” provided within MNR technical guidelines (2002) as provided below.

A conservative toe erosion allowance of 15 m was selected as limited data was available as part of this study. This toe erosional allowance can be refined per **Table 2.16B (Appendix B2)** in the future if more detailed fluvial geomorphology studies, visual slope inspections, or location-specific borehole investigations are completed using the MNR table below (MNR, 2002).

2.3.6.2.2 Stable Slope Allowance

MNR guidelines allow a factor of safety (FOS) between 1.3 to 1.5 for active land use (e.g. a habitable structure, commercial building, storage/warehousing, etc.) when determining the stable slope inclination. TRCA guidelines require a minimum FOS of 1.5. **Table 2.17 (Appendix B2)** is taken from the MNR provincial guideline (MNR 2002).

Based on these guidelines and TRCA guidelines, a minimum FOS of 1.5 is required to determine the stable slope inclination.

For this preliminary assessment, detailed stability analysis has not been completed. As such, a stable slope inclination of 3H:1V is applied across the WVSP area which is considered to be a safe slope inclination when limited data is available. The stable slope inclination can be refined through additional analysis after a location-specific subsurface investigation is completed. Based on the nearby boreholes advanced within the WVSP area west of the valley, the valley slopes might consist of stiff to hard or dense to very dense glacial till deposits, which would achieve an FOS of 1.5 or greater at an inclination of 3H:1V.

2.3.6.2.3 Long-Term Stable Top of Slope (LTSTOS)

The LTSTOS combines the toe erosion allowance with the stable slope allowance. The LTSTOS position is shown on **Figure 2.8 (Appendix B1)**, on the cross-sections on **Figures 2.9A to 2.9D (Appendix B1)**, and an LTSTOS model is shown on **Figure 2.10 (Appendix B1**)**.** The LTSTOS position ranges from being set back 13.8 to 26.3 m from the TRCA top of slope for the West Humber River at the cross-section locations. The LTSTOS setback estimations are summarized in **Table 2.18 (Appendix B2)**.

The LTSTOS position between and beyond the specific cross-section locations, as shown on **Figure 2.8 (Appendix B1)**, was estimated using the specific setback distances from each cross-section location, and based on review of the slope height, inclination, and location of the watercourse within the valley.

2.3.6.2.4 Erosion Hazard Limit and Total Slope Setbacks

The TRCA policy guidelines require an additional setback of 10 m from the LTSTOS position for the Erosion Access Allowance. The Erosion Access Allowance is applied beyond the LTSTOS to allow for emergency access, routine maintenance of the slope and potential erosion areas, and to create an additional buffer between the development and the potential erosion hazard. This allowance forms the total setback distance related to slope and erosion hazards, called the Erosion Hazard Limit. The 10 m Erosion Access Allowance is shown in plan view on **Figure 2.8 (Appendix B1**), with the green line on the figure representing the Erosion Hazard Limit. The Erosion Hazard Limit is also shown on the cross-sections. The overall Erosion Hazard Limit is shown is for preliminary constraints mapping and to identify areas where future detailed studies could occur to refine the setbacks. Additional commentary is below.

2.3.6.3 Commentary on Future Slope Stability Studies

As discussed in **Section 2.3.3**, it was not possible to access the confined valley system of West Humber River to the east or south of the WVSP area. No on-site visual inspections were conducted, nor were site specific boreholes advanced to determine soil and groundwater conditions.

Future slope stability studies should consider the following details:

- Visual slope inspections, physical top of bank staking, subsurface drilling investigations, obtaining refined topographical information, and completing site-specific detailed slope stability analysis can be used to refine the setbacks.

- Based on the preliminary analysis conducted, it can be confirmed that further slope stability analysis and review will be required from the intersection of

Mayfield Road and The Gore Road to 1,000 m north of the intersection, and 300 m east to 300 m west of this intersection. Beyond this (i.e. farther than 1,000 m north of the intersection of Mayfield Road and The Gore Road), the watercourse is sufficiently setback from the WVSP area that further detailed studies are not specifically recommended, unless the study area changes in the future.

- The LTSTOS cuts into Mayfield Road in two locations and into The Gore Road in two locations. Three of these locations appear to correspond with culverts crossing below the roadways. There is an inherent expectation that municipal infrastructure and the roadways will be maintained in the long-term. Discussion with the TRCA and other governing bodies could define the roadways at the LTSTOS separately from the results of any slope stability analysis based on this.

- For the features south of Mayfield Road, a 15 m toe erosion allowance from the watercourse and a 3H:1V stable slope allowance were similarly used to determine the LTSTOS. It is possible that some of these features could be unconfined systems, but this could be determined through future field investigations.

- The slope stability setbacks identified in this preliminary assessment serve as critical components for the constraints and opportunities mapping in the WVSP area. These setbacks, based on conservative estimates using publicly available data, delineate areas that may require further geotechnical investigation to refine development constraints accurately. While these preliminary setbacks help in identifying potential limitations for development, they are not definitive boundaries but rather guidelines that highlight zones where additional detailed studies are necessary to align fully with the TRCA policy guidelines.

2.3.7 Flood Hazards

2.3.7.1 Floodplain Mapping

The West Humber River is located to the east of The Gore Road and the WVSP area. Through the TRCA Flood Plain Mapping Program, the regulatory floodlines have been delineated for the West Humber River adjacent to the WVSP area. Refer to Map Sheets 137 and 138 in **Appendix B6** for the floodplain mapping. Map Sheet 137 also shows the floodline for a tributary to the West Humber River that enters the WVSP area east of The Gore Road, approximately 500 m north of Mayfield Road. The floodline and associated 10 m development setback for both the West Humber River and the tributary are shown on **Figure 2.11 (Appendix B1**).

A recent update to the TRCA Flood Plain Mapping Program has produced Regional Storm floodlines for six (6) HDFs located within the WVSP area. Refer to the TRCA Flood Plain Map Sheets 251, 252 and 253 provided in **Appendix B6**. These Regional Storm floodlines have been included on **Figure 2.11** (**Appendix B1**) noting that these drainage features do not have defined bed and banks and therefore, cannot be classified as a watercourse under O.Reg. 41/24. As such, there is no regulatory floodplain associated with these features and should not be considered flood hazards. In accordance with the approved LSS Terms of Reference (refer to **Appendix A1**), the TRCA Regional Storm floodlines have been shown on **Figure 2.11 (Appendix B1)** but a 10 m development setback to the flood hazard has not been applied to these HDFs as the function of the feature is for conveyance of flows only.

2.3.7.2 Flood Vulnerable Areas

There is one existing Flood Vulnerable Area (FVA) located downstream of the WVSP, the Albion Road Flood Vulnerable Cluster as identified in the Humber River Watershed Characterization Report (TRCA, 2023), that has been assessed in this LSS (refer to **Appendix B6** for Map 26). This FVA, located at the confluence of the West Humber and Lower Main Humber branches in northern Etobicoke, includes sixty-six (66) flood vulnerable structures including residential and institutional buildings (Region of Peel Scoped SWS, Wood, 2022).

Region of Peel Scoped SWS (Wood., 2022) evaluated this FVA based on updates to the Humber River hydrologic modelling (TRCA, 2018) to consider full build-out of the Whitebelt lands including the development of the WVSP area. The FVA was evaluated with respect to the hydraulic performance based on potential increases in flood elevations and the width of floodplain, as well as analysing the potential increase in flood damages within the FVA by evaluating the flood damage cost. The conclusion of the analysis was that unmitigated development within the Whitebelt lands upstream of the Albion Road FVA would result in increases in the risk and frequency of flooding (Wood., 2022). As such, all future development within those lands, including the WVSP area, require stormwater management (SWM) to mitigate the impacts to the FVA during the 2 through 100 year, and Regional (Hurricane Hazel) storm events. Further characterization of the FVA is provided in the Region of Peel Scoped SWS (Wood., 2022).

2.4 Natural Heritage System Evaluation

Eight types of natural features are identified in the PPS (MMAH 2020):

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat;
- Fish habitat;
- Habitat of endangered and threatened species; and
- Significant areas of natural and scientific interest.

The presence/absence of these natural features within the WVSP area are discussed in the subsequent sections below. The Natural Heritage Reference Manual (MNR 2010), Town of Caledon's OP (2024), Peel Region's OP (2022) and O. Reg. 41/24 were referenced to assess the potential significance of other natural features, and their associated forms and functions on the landscape.

Based on a desktop review of background information as well as municipal, regional and provincial policy documents, the following environmental constraints have been identified and have informed the development potential for the NHSA. These features and their associated buffers are identified on **Figure 2.5 (Appendix B1)**.

2.4.1 Significant Wetlands

GEI assessed the provincial significance of wetlands using current Ontario Wetland Evaluation System (OWES) protocol (MNRF 2022), and determined which wetlands meet the criteria for significance. The Silver Maple Mineral Deciduous Swamp (SWD3-2) meets the criteria to be considered provincially significant and is illustrated on **Figure 2.2 (Appendix B1)**. All other wetland communities are either too small (<2 ha) to meet the OWES size criteria or were evaluated as non-significant.

Silver Maple Mineral Deciduous Swamp (SWD3-2), this wetland is associated with a Mineral Cultural Woodland (CUW1) and Buckthorn Deciduous Shrub Thickets (THDM2-6) surrounded by agricultural fields. The OWES report identified four locally rare plants species, one endangered species (Black Ash- *Fraxinus nigra*) and species of Special Concern (Wood Thrush and Terrestrial Crayfish).

2.4.2 Significant Woodlands

Significant woodlands are identified by the planning authority in consideration of criteria established by the MNRF. Under the Natural Heritage Reference Manual (MHRM; 2010), woodlands are defined as:

"…treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon, provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. Woodlands include treed areas, woodlots or forested areas and vary in their level of significance at the local, regional and provincial levels."

Woodlands, as defined by the Peel OP, include woodlots, cultural woodlands, cultural savannahs, plantations and forested areas and may also contain remnant of old growth forests. They further define woodlands as any area greater than 0.5 ha that has:

a) A tree crown cover of over 60% of ground, determinable from aerial photography, or;
b) A tree crown cover of over 25% of the ground, determinable from aerial photography, together with on-ground stem estimates of at least:
    i. 1,000 trees of any size per hectare;
    ii. 750 trees measuring over five centimeters in diameter at breast height (1.37m), per hectare;
    iii. 500 trees measuring over 12 centimeters in diameter at breast height (1.37m), per hectare; or
    iv. 250 trees measuring over 20 centimeters in diameter at breast height (1.37m), per hectare (densities based on the Forestry Act of Ontario 1998); and, which have a minimum average width of 40 meters or more measured to crown edges.

Based on this definition, the CUW1/SWD3-2 complex is considered a woodland and will be further assessed for significance.

The Peel OP (2022) further evaluates woodlands as being Core Area, NAC, PNAC. The requirements for this classification are derived from Table 1 (Criteria and Thresholds for the Identification of Core Areas, Natural Areas and Corridors (NAC) and Potential Areas and Corridors (PNAC) Woodlands of the Peel OP. The Region of Peel considers NAC and Core woodlands to be significant. The woodlands within the NHSA were assessed using these criteria and were found to be Core Area and NAC woodlands and are therefore considered to be Significant Woodlands (**Figure 2.2**, **Appendix B1**). A summary of the assessment is provided below.

Mineral Cultural Woodland (CUW1)/Silver Maple Deciduous Swamp (SWD3-2): This feature meets the NAC size criteria of being >0.5 ha and having Significant Species and Communities (Eastern Wood Pewee [Special Concern]).

Forest (FO)/ Cultural Woodland (CUW) (East of The Gore Road and associated with the West Humber River valley): This feature meets the Core Woodland size criteria of being >4 ha.

2.4.3 Candidate Significant Valleylands

Significant valleylands should be defined and designated by the planning authority. General guidelines for determining significance of these features are presented in the NHRM (MNR 2010) for Policy 2.1 of the PPS. Recommended criteria for designating significant valleylands include prominence as a distinctive landform, degree of naturalness, and importance of its ecological functions, restoration potential, and historical and cultural values.

A well-defined valley surrounding the West Humber River occurs along the east end of the NHSA. The valley merits consideration for significance due to its landform prominence (well-defined valley morphology with steep slopes and meander belt) and is considered a candidate significant valleyland.

2.4.4 Significant Wildlife Habitat

Significant wildlife habitat (SWH) is one of the more complex natural heritage features to identify and evaluate. There are several provincial documents that discuss identifying and evaluating SWH including the NHRM (MNR 2010), the Significant Wildlife Habitat Technical Guide (MNR 2000), and the SWH Eco-Region Criterion Schedules (MNRF 2015a and MNRF 2015b). As discussed previously, the NHSA is located in two Eco-Regions: 6E and 7E. Therefore, the NHSA was assessed using both 6E and 7E Criterion Schedules) MNRF 2015a and MNRF 2015b). Refer to **Table 2.15 (Appendix B2)** for a summary of the SWH assessment completed for the WVSP area.

There are four general types of SWH:

- Seasonal concentration areas;
- Rare and specialized habitats;
- Habitat for species of special concern; and
- Animal movement corridors.

2.4.4.1 Seasonal Concentration Areas

Seasonal Concentration areas are those sites where large numbers of a species gather together at one time of the year, or where several species congregate. Seasonal concentration areas include deer yards; wintering sites for snakes, bats, raptors, and turtles; waterfowl staging and molting areas, bird nesting colonies, shorebird staging areas, and migratory stopover areas for passerines or butterflies. Only the best examples of these concentration areas are usually designated as significant wildlife habitat. Areas that support Special Concern species or provincially vulnerable to imperiled species (S1-S3), or if a large proportion of the population may be lost if the habitat is destroyed, are examples of seasonal concentration areas which should be designated as significant.

2.4.4.2 Rare or Specialized Habitats

Rare and specialized habitat are two separate components. Rare habitats are those vegetation communities that are considered rare in the province. S-Ranks are rarity rankings applied to species at the 'state', or in Canada at the provincial level, and are part of a system developed under the auspices of the Natural Conservancy (Arlington, VA). Generally, community types with S-Ranks of S1 to S3 (extremely rare to rare-uncommon in Ontario), as defined by the NHIC (MNRF 2023), could qualify. It is to be assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant. Specialized habitats are microhabitats that are critical to some wildlife species. The NHRM (MNR 2010) defines specialized habitats as those that provide for species with highly specific habitat requirements; areas with exceptionally high species diversity or highly specialized habitat requirements; areas with exceptionally high species diversity or community diversity; and areas that provide habitat that greatly enhances species survival.

2.4.4.3 Habitat for Species of Conservation Concern

Species of conservation concern include those that are provincially rare (S1 to S3), provincially historic records (SH) and Special Concern species. Several specialized wildlife habitats are also included in this SWH category, i.e., terrestrial crayfish habitat and significant breeding bird habitats for marsh, open country and early successional bird species.

Habitats of species of conservation concern do not include habitats of endangered or threatened species as identified by the ESA (2007). Endangered and threatened species are discussed in **Section 2.4.6** below.

2.4.4.4 Animal Movement Corridors

Animal movement corridors are areas that are traditionally used by wildlife to move from one habitat to another. This is usually in response to different seasonal habitat requirements, including areas used by amphibians between breeding and summer/over-wintering habitats called amphibian movement corridors.

Table 14 (Appendix B2) assesses all types of SWH relevant to the NHSA considering the ecological data collected by GEI.

As detailed in the table~~s~~, the following SWH types are present on the NHSA. The confirmed SWH is shown on **Figure 2.2 (Appendix B1)**:

- Seasonal Concentration Areas of Animals
    - Turtle Overwintering Area within a Cattail Shallow Mineral Marsh (MAS2-1).
- Species of Conservation Concern
    - Terrestrial Crayfish within a Silver Maple Mineral Deciduous Swamp (SWD3-2), Shallow Mineral Meadow Marsh (MAM2) and a Cattail Shallow Mineral Marsh (MAS2-1); and
    - Wood Thrush (Special Concern) within the SWD3-2/CUW1 located at the south-central portion of the NHSA.

The following Candidate SWH types have potential to occur in the adjacent West Humber River valley located north and east of The Gore Road:

- Seasonal Concentration Areas of Animals:
    - Candidate Bat Maternity Colonies
- Specialized Wildlife Habitat:
    - Candidate Bald Eagle and Osprey Nesting, Foraging and Perching Habitat (West Humber River corridor)
    - Candidate Seeps and Springs
- Species of Conservation Concern:
    - Candidate Marsh Bird Breeding Habitat
    - Candidate Wood Thrush, Eastern Wood-Pewee.

2.4.5 Fish Habitat

Fish habitat, as defined in the federal Fisheries Act, C.F-14, means “spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes.” Fish, as defined in S.2 of the Fisheries Act, C.F-14, includes “parts of fish, shellfish, crustaceans, marine animals and eggs, sperm, larvae, spat and juvenile stages of fish, crustaceans and marine animals” (DFO 2019).

The TRCA’s Humber River Fisheries Management Plan (2005) identifies on Figure 22 the portion of the West Humber River in the NHSA as Intermediate Riverine Warmwater habitat. Small riverine warmwater habitat was also identified in reaches within the NHSA.

As detailed in **Section 2.2.16**, GEI conducted fish community sampling within the NHSA. No fish were captured on participating ownerships; however, Brook Stickleback and Fathead Minnow were captured at culverts along The Gore Road and Mayfield Road.

One Brook Stickleback was observed in May 2024 during HDF surveys in a small and isolated pool along HDF H12A1, approximately 130 m upstream of Mayfield Road. The pool was in an agricultural field and the HDF had been ploughed through and planted with wheat, representing very low-quality fish habitat.

2.4.6 Habitat of Endangered and Threatened Species

Species designated as Threatened or Endangered in Ontario are afforded both individual and habitat protection under ESA (2007). In order to identify the presence of any Threatened or Endangered species a background information review and detailed field investigations were completed within the NHSA.

The background review identified that a number of SAR could potentially be present within the NHSA. To assess habitat suitability and species presence/absence a number of targeted surveys were undertaken. A discussion of the potential for endangered and threatened SAR and their habitat within the NHSA is provided in **Table 2.2** (**Appendix B2**).

Redside Dace occupied habitat occurs in the West Humber River located north and east of the NHSA in the Greenbelt Plan Area. Redside Dace contributing habitat is anticipated to be absent within the NHSA, due to the receiving occupied Redside Dace watercourse having an average bankfull width >7.5 m, as per Ontario Regulation 293/11. This will be confirmed with MECP through their Information Gathering Form process.

Eastern Meadowlark and Bobolink were observed in suitable habitat (hayfields) located within the NHSA east of The Gore Road. No suitable habitat for these species occurs on participating lands in the NHSA.

Rapids Clubtail was identified through background review and may be present along the West Humber River. This species prefers large streams and rivers with wooded shorelines and riffle and pool features.

No bat SAR were identified with the NHSA participating ownerships during the acoustic monitoring. Habitat for bat SAR may be present within the well forested West Humber River valley along the east end of the NHSA.

Species at Risk will be addressed with MECP through their Information Gathering Form process after the Phase 2 Impact Assessment portion of the LSS is complete and potential impact to SAR are better understood.

2.4.7 Other Features

Other wetlands (non-significant) have been identified throughout the NHSA as mineral meadow marsh, mineral shallow marsh, and deciduous swamp communities (**Figure 2.2**, **Appendix B1**). The wetland communities are small in size, ranging from 1.8 ha to 0.02 ha, with the SWD and MAM2 communities the largest in size.

The Caledon OP states that:

> "New development will not be permitted in Other Wetlands unless it can be demonstrated that such development will not result in the degradation of ecosystem integrity, to the satisfaction of the Town, the Conservation Authority, the Ministry of Natural Resources and Forestry, or other delegated authority".

One other woodland (non-significant) has been identified as a small (0.5 ha) cultural woodland located southwest of the corner of Mayfield Road and the Gore Road, within 120m of the WVSP area (**Figure 2.2**, **Appendix B1**).

The Caledon OP states that:

> "New development will not be permitted in Other Woodlands unless it can be demonstrated that such development will not result in the degradation of ecosystem integrity, to the satisfaction of the Town and Ministry of Natural Resources and Forestry, or other delegated approval authority."

Areas of Natural and Scientific Interest (ANSI) must also be considered. Gooseville Moraine is a Candidate Earth Science ANSI and is immediately north of the WVSP area (**Figure 2.1**, **Appendix B1**).

2.4.8 Key Ecological Features and Functions

An analysis of existing natural heritage features in the NHSA was completed, followed by an evaluation of their significance against criteria in the Significant Wildlife Technical

Guide and Eco-region 6E and 7E Criteria Schedules (MNRF 2015a and 2015b), as well as under criteria recommended in the Peel Region OP (2022) and NHRM (MNR 2010).

These analyses identified the following key natural heritage features and natural hazards as present, within the NHSA:

- Significant Wetland;
- Unevaluated and Other Wetlands;
- Significant Woodlands;
- Other Woodlands;
- Candidate Significant Valleyland;
- Fish Habitat;
- Habitat of endangered and threatened species (Redside Dace, Bobolink, Eastern Meadowlark); and,
- Significant Wildlife Habitat including:
    - Seasonal Concentration Areas of Animals (Candidate Bat Maternity Colonies, Candidate Bald Eagle and Osprey Habitat and Turtle Overwintering Areas).
    - Species of Conservation Concern (Terrestrial Crayfish and Wood Thrush)
  - Floodplain (as estimated by the TRCA);
  - Meanderbelt; and
  - Long-term Stable Top of Slope.

2.5 Preliminary Natural Heritage System

The preliminary NHS (**Figure 2.5**, **Appendix B1**) is founded upon a sound technical understanding of the extent and quality of natural heritage features and functions, and natural hazards that meet the definition of NHS components as described in the Town of Caledon OP and Peel OP.

The constraints and opportunity analysis serves to:

a) Identify significant and sensitive biophysical features and functions that could potentially constrain how the NHSA is developed; and,
b) Identify potential opportunities for enhancement of the natural features and ecological functions in association with the future development.

The proposed NHS represents an interconnected system of natural features and functions, including valley and stream corridors, wetlands, woodlands, significant wildlife habitat of endangered and threatened species, fish habitat, and their Vegetation Protection Zones/buffers.

The proposed stormwater management strategy, as to be detailed in Phase 2 of this LSS, will include Low Impact Development (LID) techniques to support existing watercourses and wetlands, as well as the HDF and wetland compensation areas, with the goal of achieving a net ecological gain compared to existing conditions.

2.5.1 Vegetation Protection Zones (VPZs) and Setbacks

Minimum VPZs are to be established in accordance with municipal, regional and provincial policies. All natural heritage features (significant and non-significant) will require VPZs to ensure the protection of their form and function over the long-term. Final VPZs cannot be confirmed within the LSS process until detailed investigations (e.g., final feature-based water balance assessments) have been completed.

It is recognized that buffers play an important role in mitigation where development is proposed adjacent; however, vegetated buffers can provide further benefits than simply protection to the NHS. Table 13-1 of the NHRM (2010) identifies several functions and benefits of buffers including reduction of light and noise, space for tree-fall, protection of root zones, enhancement of woodland interior, attenuation of runoff, etc. Setbacks are established to preserve natural hazards from potential development pressures.

The VPZs and setbacks are based on the following policy guidance:

- TRCA's Living City Policies (2014);
- Town of Caledon's OP (2024 Consolidation);
- Peel OP (2022);
- The Greenbelt Plan (2017); and
- Section 29 of O. Reg. 831/21 (Habitat).

The SABE Scoped SWS does not provide any VPZ or setback recommendations.

For the purposes of the Secondary Plan, minimum VPZs are recommended within this LSS. It is anticipated that final VPZs will be established through site specific Environmental Impact Studies (EIS).

2.5.1.1 TRCA Review

Within Section 7.3.1.4 of the Living City Policies (2014), the following setbacks are prescribed for natural hazards:

- 10 m buffer from the greater of long-term stable top of slope/bank, stable toe of slope, regulatory flood plain and/or meander belt; and
- 30 m buffer from Significant Wetlands or a 10 m buffer for all other wetlands.

Other natural heritage setbacks provided within the Living City Policies are not included since the Conservation Authority no longer provides commentary on natural heritage considerations (refer to **Section 2.1.6**).

2.5.1.2 Town OP Review

The current in-force Caledon OP (2024 Consolidation) has no defined buffer/setback width requirements for natural heritage features; instead, it outlines that Secondary Plans require a SWS to include “confirmation of the boundaries and appropriate buffers for protection, restoration and enhancement of the Natural Environment System” (Section 5.5.9).

Section 13.9.5 of the Future Caledon Draft OP (2024) states that “minimum buffer widths will be established in local subwatershed or equivalent studies prepared to the satisfaction of the Town”. Section 13.9.6 further states that “final buffer width(s) within New Community Areas and New Employment Areas will be determined through an environmental impact study, prepared to the satisfaction of the Town”. As a result, minimum buffer widths presented within Section 13.8 of the Official Plan do not apply.

An additional 5 m buffer is applied to significant valleylands in accordance with the Town’s requirements within existing settlement areas outside of Provincial Plan areas. This is also a consistent setback requirement within other jurisdictions for significant valleylands (e.g., Halton Region).

2.5.1.3 Region OP Review

The Region does not provide buffer/setback requirements; rather, it defers to the Greenbelt Plan (2017) or the Town’s requirements.

2.5.1.4 Greenbelt Plan Review

In accordance with Section 3.2.5 of the Greenbelt Plan (2017), a minimum VPZ of 30 m is required for wetlands, seepage areas and springs, fish habitat, permanent and intermittent streams, lakes and significant woodlands. All other KNHFs and KHFs (e.g., valleylands) require a VPZ which “is of sufficient width to protect the key natural heritage feature or key hydrologic feature and its functions form the impacts of the proposed change and associated activities”.

2.5.1.5 Species at Risk Requirements

No setbacks are prescribed for noted SAR observed in the NHSA.

Section 29 of O. Reg. 831/21 defines the limits of occupied (regulated) Redside Dace habitat as 30 m from meander belt width; however, this is anticipated to occur within the Greenbelt, located east of The Gore Road.

Candidate SAR bat habitat was identified within the Greenbelt Plan (2017) Area and is expected to be retained. There are no setback requirements prescribed by MECP for SAR bats; however, suitable woodlands may be prescribed protection in accordance with Woodland policies.

Eastern Meadowlark and Bobolink habitat may only be removed in accordance with Part 4 of O. Reg. 830/21.

2.5.2 WVSP Preliminary Natural Heritage System

In accordance with Section 3.2.5.1 of the Greenbelt Plan (2017), wetlands, seepage areas and springs, fish habitat, permanent and intermittent streams, lakes and significant woodlands will have a minimum of a 30 m VPZ applied. Valleylands and other features/hazards located outside of the Greenbelt Plan Area and within the WVSP area will have the following minimum VPZs and setbacks:

- 30 m from Significant Wetlands or 10 m from non-significant wetlands (using the staked wetland boundary);
- 10 m from woodlands (using the staked dripline boundary);
- 15 m from significant valleylands or 10 m from non-significant valleylands (using the greater of long-term stable top of slope or staked top of bank boundary for confined systems; or the greater of meander belt or floodline boundary for unconfined systems); and
- 15 m from warmwater baitfish habitat.

The preliminary NHS limits are the ‘greater of’ the various natural heritage feature buffers as noted above, including the conceptual HDF and wetland compensation areas as described in **Section 2.2.13.2.**

The preliminary NHS limits are shown on **Figure 2.5** (**Appendix B1**).

3.0 Groundwater

To characterize the geotechnical and hydrogeological conditions on site, a subsurface investigation consisting of a borehole drilling and monitoring well installation program was conducted. GEI is continuing monthly groundwater within the monitoring wells installed in the WVSP area until the summer of 2025. This will provide two years of monitoring across most of the participating lands, and one year of monitoring at Parcels 5 and 9 that joined the study in the summer of 2024. The last round of surface water chemistry sampling will occur in the fall of 2024 for a wet and dry event. The results from 2024 will be included in the final LSS with any additional data obtained during the end of 2024 and into 2025 provided as an addendum to this LSS following completion of the monitoring.

The WVSP area is shown on **Figure 3.1 (Appendix C1)**, a site location plan is provided as **Figure 3.2**, Surface elevation contours are shown on **Figures 3.3A and 3.3B (Appendix C1)**, a borehole location plan for the overall area is shown on **Figure 3.4 (Appendix C1)**, and the borehole locations overlaid onto an aerial image with observed natural features is provided as Figures **3.5A and 3.5B (Appendix C1)**.

3.1 Geological and Hydrogeological Setting

3.1.1 Source Water Protection

The WVSP area is in the Toronto Source Protection Area, the CTC Source Protection Region, and as noted, is in the jurisdiction of the TRCA. The following documents shall be used in determination of the regulatory requirements when it comes to maintaining hydrogeological function within the WVSP area:

- Approved CTC Source Protection Plan, CTC Source Protection Committee, February 23, 2022.
- Approved Assessment Report: Toronto and Region Source Protection Area, CTC Source Protection Committee, February 23, 2022.

Based on Source Water Protection online mapping, the following is noted:

- Wellhead Protection Area (WHPA): The WVSP area is not located within a WHPA Zone, Q1 or Q2 (**Figure 3.6, Appendix C1**).
- Intake Protection Zone (IPZ): The study area is not located within IPZ (**Figure 3.7, Appendix C1**).
- Highly Vulnerable Aquifer (HVA): The north portion, central and southeastern portion of the WVSP area is partially located within an HVA (**Figure 3.8, Appendix C1**).

- Significant Groundwater Recharge Area (SGRA): The WVSP area is not located within an SGRA (**Figure 3.9, Appendix C1**).
- The WVSP area is not located within the Oak Ridges Moraine or Niagara Escarpment.

It is noted the north, central and southeastern portion of the WVSP area is located within an HVA. HVA's are determined through desktop studies and are mapped based on how shallow the water table is, depth to the aquifer and the coarseness of the material. HVA's are large scale mapping used in supporting Well Head Protection Areas. Study area specific information helps to provide actual stratigraphic and hydrogeological conditions.

The HVA is an aquifer that has the potential for increased risk to contamination due to its proximity to the ground surface or the presence of surrounding geological materials with high permeability. For instance, clay layers provide a natural barrier due to their low permeability, offering protection to underlying aquifers, whereas materials like sand and fractured bedrock are highly permeable and lack such protective properties. The faster the water is able to flow through the ground to an aquifer, the more vulnerable the area is to contamination.

Typically, within the WVSP area the groundwater level is near surface which is contributing to portions of the WSVP area being classified as HVA's. Within the WVSP area, the general stratigraphy in the north, central and southeastern portions is clay and silt to sandy silt glacial till (Halton Till) which is considered relatively low permeability material and represents an aquitard setting. Consequently, the study area specific information indicates that the area would not qualify as an HVA.

Regardless of whether the study area qualifies as an HVA or not, the potential for contamination as a result of development activities are being considered as part of subsequent phases of development studies. For example, the risk associated with activities such as the application of handling and storage of road salt, fuel and snow will be evaluated in Phases 2 and 3 of this LSS.

3.1.2 Regional Physiography and Geology

From a regional perspective the WVSP area is located primarily within the physiographic region known as the South Slope per Chapman and Putnam (1984). The South Slope is noted to be present at the southernmost flank of the Oak Ridges Moraine, and glacial till is typically encountered (soil types are mostly clay to loam). Runoff tends to be higher and infiltration tends to be lower in the South Slope as the terrain is not hummocky like the Oak Ridges Moraine (TRCA, 2008) and the finer-grained soils restrict infiltration. The physiographic landform mapping shows that the northern and central part of the WVSP area within the South Slope consist of Till Plains (Drumlinized).

The southern most part of the WSVP area near Mayfield Road is located within the physiographic region called the Peel Plain (Chapman and Putnam, 1984). The Peel Plain is characterized by flat to undulating topography. Soils in this region tend to be low-permeability clays, deposited when glacial meltwater ponded over a layer of low permeability deposits. The landform in this area consists of beveled till plains. Infiltration also tends to be low in the Peel Plains (TRCA, 2008).

Ontario Geological Survey surficial geological mapping indicates the site and surrounding area is surfaced predominantly by either glaciolacustrine deposits comprising of clay to silt-textured till (generally in the northern and central part of the WVSP area) or by fine-textured glaciolacustrine deposits of mainly clays and silts (generally in the southern third of the WVSP area). Modern alluvial deposits of clay, silt, sand or gravel may exist along the West Humber River east of The Gore Road.

The bedrock in the WVSP area corresponds to the Georgian Bay Formation, consisting of shale and limestone. Bedrock topography mapping (O.L. White. 1973)) shows bedrock sloping from near an elevation of 240 m in the northwestern corner of the Study Area, down to near 192 to 205 m along the West Humber River to the east of the WVSP area. The topography also shows bedrock sloping down to near elevation 215 m in the southwestern corner of the WVSP area.

Drawing GW-1 from the Scoped SWS: Part A (Wood, 2022) shows the landform and region mapping. Drawings GW-2 and GW-4 from the Scoped SWS: Part A (Wood, 2022) show bedrock geology and surficial geology, respectively.

3.1.3 Regional Stratigraphic Units and Cross-sections

"Humber River Watershed, Scenario Modelling and Analysis Report" (TRCA, 2008), *"Technical Memorandum, Peel Scoped Subwatershed Study (SWS) – Groundwater "Areas of Concern" mapping"* (ORMGP, 2020), and the Scoped SWS: Part A (Wood, 2022) provide regional cross-sections and summaries of the main stratigraphic units below the Region of Peel and Humber River Watershed.

ORMGP (2020) contains a north-south cross section along Airport Road, about 2.5 km west of the WVSP area, which shows subsurface stratigraphy primarily consisting of Halton Till. Closer to Mayfield Road, the Halton Till may be underlain by a thinner deposit of Lower Newmarket Till above the bedrock surface. Near Old School Road, the Oak Ridges Aquifer Complex (ORAC) is shown below the Halton Till and above the bedrock surface. The cross-section is included in **Appendix C2**.

"Humber River Watershed, Scenario Modelling and Analysis Report" TRCA (2008) shows a generalized cross-section through West Humber River, cut north-to-south. The section shows Mayfield Road being underlain by recent sediments at grade, then a thick deposit of Halton Till, then ORAC above the bedrock surface. The cross-section is included in **Appendix C2**.

Drawing GW-6A from Wood (2022) shows a stratigraphic cross-section along Mayfield Road, including the intersection with West Humber River just east of the WVSP area. The cross-section shows the WVSP area is likely underlain by a thick zone of Halton Till at grade, then potentially a zone of Newmarket Till above the bedrock surface. A local zone of ORAC is shown at / east of the West Humber River, interbedded between the Halton and Newmarket Till deposits, potentially near elevation 210 to 215 m.

Drawing GW-6J from the Scoped SWS: Part A (Wood, 2022) shows another stratigraphic cross-section along The Gore Road, including the crossing with West Humber River which is immediately north of the WVSP area. Drawing GW-6J indicates that south of the West Humber River crossing of Mayfield Road, the Halton Till then Newmarket Till is expected above the bedrock. Bedrock is shown to undulate near an elevation of 200 m. A local zone of potential ORAC is shown near an elevation of 220 m between the Halton and Newmarket Till deposits.

Halton Till, Oak Ridges Deposits and Newmarket Till are part of the Late Wisconsin Glacial Complex, deposited approximately 13,000 to 20,000 years ago.

Halton Till varies in composition but is known to generally consist of sandy silt to clayey silt till interbedded with silt, clay, sand and gravel (Kassenaar and Wexler, 2006). Figure B126 from Kassenaar and Wexler (2006) estimates the thickness of Halton Till could be on the order of 5 to 10 m thick or greater in the Study Area. This forms the Halton Aquitard hydrostratigraphic unit. The map is included in **Appendix C2.**

The Oak Ridges Moraine (ORM) sediments consist of interbedded fine sands and silts, locally with coarse, diffusely-bedded sands, heterogenous gravels, and clay laminae (Kassenaar and Wexler, 2006). Kassenaar and Wexler (2006) state the following:

> "There remains considerable uncertainty about the origin and nature of sand and gravel deposits identified on the flanks of the moraine. The borehole and water well record database show the presence of significant sand bodies lying either within a single till unit or sandwiched between two different till units, particularly in the low-lying areas south of the moraine. These deposits may be associated with the sedimentological processes that created the moraine and therefore lie on top of the Newmarket Till or, alternatively, they may be isolated sand bodies within the Newmarket Till. If they do correspond to Oak Ridges deposition, then there is a greater probability that they are hydraulically connected to the ORM.

> Alternatively, if they are an element of the Newmarket Till, they would more likely be hydraulically isolated from the ORM."

Figure B125 from Kassenaar and Wexler (2006) indicates there could be localized zones of ORM sediments near the WVSP area, on the order of approximately 1 to 5 m thick. North of the WVSP area, the ORM sediments could be thicker and more continuous. The ORM sediments form the ORAC hydrostratigraphic unit. Sand deposits located below surficial glacial tills along the flanks of the ORM deposits are included in the ORAC, but in areas remote from the ORM, the sands are locally discontinuous and typically less than 10 m thick (TRCA, 2008). The WVSP area is south of the ORM in the South Slope and Peel Plain physiographic regions, and there could be locally discontinuous areas of the ORAC (where encountered). The map is included in **Appendix C2**.

Figure B124 from Kassenaar and Wexler (2006) indicates there could be some local zones of Newmarket Till below the Halton Till, on the order of about 5 m thick. Newmarket Till is generally a massive and over consolidated deposit with a matrix consisting primarily of silty sand to sandy silt with gravel. It can contain thin interbeds of sand and silt, rarely contain clay laminae, and can contain discontinuous sand interbeds about 1 to 2 m thick (Kassenaar and Wexler, 2006). This forms the Newmarket Aquitard hydrostratigraphic unit. The map is included in **Appendix C2**.

3.1.4 Hydrostratigraphy

The regional hydrostratigraphic units are summarized above in **Section 3.1.3**. Table 3.1 (**Appendix C3**) summarizes the units that could be encountered within the WVSP area in accordance with the Scoped SWS (Wood, 2022).

Additionally, Section 2.3.1.3 of Peel Region's Scoped SWS: Part A (Wood, 2022), included a hydrostratigraphic interpretation of the Halton Till, further breaking it down into four (4) distinct units, including the:

- Upper Fractured Till Unit at the top, which was described as massive and generally weathered with vertical fracturing that extended up to 5 mbgs;
- Middle Till Complex that consisted of massive till layers with interbeds of staggered silt to sand and gravel with components exhibiting varying degrees of weathering;
- underlain by Glaciolacustrine Deposits of layers of fine-grained glaciolacustrine clayey silts and silty clays of varying thicknesses; and,
- over Lower Till Complex with similar characteristics to the Middle Till Complex, but not as variable.

Of particular importance in the WVSP area is the Upper Fractured Till Unit which can be a relatively active groundwater flow zone as it can exhibit a significantly higher relative conductivity, approximately 2 to 3 orders of magnitude higher than the underlying till materials (albeit still considered to be relatively low conductivity). The flow in this unit is considered to be primarily lateral towards surrounding depressional features (wetlands, streams, etc.). Predominant water movement can be laterally through this unit or overland, depending on the groundwater level and the relative locations of depressional features.

Additionally, where stream reaches have incised far enough into or through the till, ephemeral discharge locations (seeps) may be observed. If the stream reaches have incised entirely through the till into the underlying Oak Ridges Moraine Deposits, more permanent groundwater discharge may be observed.

These conditions were investigated for features within the participating lands of the WVSP Area, with the findings discussed below in Section 3.1.7. The lands along the West Humber River (east of the WVSP area) could not be assessed in detail at this time, because permission to enter the lands has not been granted.

3.1.5 Groundwater Areas of Concern

ORMGP (2020) authored a Technical Memorandum, “Peel Scoped Subwatershed (SWS) Study – Groundwater Areas of Concern Mapping” (August 18, 2020). The memo states the following:

> This memo has outlined the various factors that have been considered to prepare “Areas of Concern” mapping for the Region of Peel SWS study area. These areas can be used by Peel Region, the Town of Caledon and the TRCA to inform the development approval process and applicable requirements for pre- and post-development necessary regarding groundwater investigation and control.

The purpose of the above-referenced Technical Memorandum was to create Areas of Concern mapping related to certain hydrogeological settings for regions within or near Oak Ridges Moraine, to assist other public agencies to identify where more in-depth study could be considered. The two key Areas of Concern include the following:

- Where the Oak Ridges Aquifer Complex (ORAC) is 5 m thick or greater. The ORAC is typically overlain by Halton Till.
- Where groundwater levels within the ORAC are either above the ground surface (artesian) or within 4 m of the ground surface.

Figure 24 from the memo shows that the majority of the WVSP area does not contain an Area of Concern as defined above. Small, localized areas are shown at the eastern and northwestern parts of the Study Area where groundwater within the ORAC could be within 4 m of the ground surface. These locations are near the Greenbelt lands. This condition is also shown along the alignment of West Humber River, along the eastern side of the WVSP area. Figure 24 shows a potential minor isolated area in the southwestern corner where the ORAC could be 5 m thick or greater, and there may be another localized area in the northeast (near the Greenbelt lands). This condition is also shown more widely to the north of the WVSP area. The mapping is included in **Appendix C2.**

It is noted that the Areas of Concern mapping was generated as a guide, and was not based on detailed, site-specific information. The subsurface investigation carried out by GEI (discussed below) advanced boreholes at / near the Areas of Concern and did not encounter ORAC below the WVSP area. Based on this, no Areas of Concern were identified on the WVSP area. Properties at the southwestern portion of the WVSP area, and east of The Gore Road along the West Humber River, were not participating and subsurface investigations could not be completed in those areas at this time.

The Groundwater Areas of Concern map from ORMGP is also included as Drawing GW-8a in the Part A SABE (Wood, 2022).

Drawing GW-5a from Wood (2022) shows that the thickness of the Halton Till unit could be less than 3 m local to the West Humber River valley (not shown elsewhere within the WVSP area).

3.1.6 Visual Inspection of Site

Site inspections were carried out to assess the presence of surface water features. This included an inspection of surface and groundwater interactions and associated features; inspection of areas of discharge (actual or potential); inspection of any swales and drainage courses; evidence of phreatophytic vegetation, which may indicate seasonally high groundwater levels, groundwater discharge or seepage.

The topography within the study region (within 500 m of the WVSP area) slopes down from the northwest to the southeast towards West Humber River. Local to the WVSP area, the northwestern portion of the WVSP area is near elevation 249.1 m, the southeast portion is at an elevation near 221.1 m, and there is a maximum difference in elevation across the WVSP area of about 28 m, as measured at the borehole locations.

There appears to be a surface water divide in the northwestern WVSP area, based on visual observations and as shown on the topography mapping on **Figure 3.3A (Appendix C1)**. The mapping shows an area of elevated topography forming a ridge. The land slopes to the east and west of the elevated ridge. The drainage features observed also generally flow east or west away from the elevated area.

3.1.7 Subsurface Conditions

3.1.7.1 Field Methodology and Procedures

The borehole locations were laid out in the field by GEI staff prior to commencement of drilling operations. The locations of underground utilities were coordinated with private and public locating companies.

Borehole ground surface elevations and coordinates (referencing NAD 83 geodetic datum) were surveyed by GEI with a Topcon HiPer SR GPS Survey unit. The elevations are provided on the borehole logs in **Appendix C4.** Borehole locations are shown on **Figures 3.4, 3.5A** and **3.5B (Appendix C1)**.

The fieldwork for the drilling program was carried out between April 27 and May 4, 2023. A total of forty-six (46) boreholes were drilled to a maximum depth of 8.1 m (elevation 214.7 m). At select borehole locations a deep well and a shallow well were installed to allow for nested wells to be installed as described below. Borehole logs are provided in **Appendix C4**.

The boreholes were advanced by a drilling subcontractor retained and supervised by GEI using a track-mounted drill rig, solid and hollow stem augers, and standard soil sampling equipment. Sampling was conducted using a 51 mm O.D. Split Spoon (SS) sampler. Standard Penetration Test (SPT) “N” Values (N values) were recorded for the sampled intervals as the number of blows required to drive an SS sampler 305 mm into the soil using a 63.5 kg drop hammer falling 750 mm, in accordance with ASTM D1586. In each borehole soil sampling was conducted at 0.75 m intervals for the upper 3.0 m and at 1.5 m intervals thereafter.

Thirty-three (33) monitoring wells were installed on participating lands within the WVSP area, within selected boreholes. Of these Thirty-three (33), fourteen (14) were completed as individual monitoring wells and nineteen (19) were completed as nested monitoring wells / piezometers. Locations labelled with a “D” demarks the deeper well and the “S” label demarks the shallow piezometer. The wells/piezometers were installed within WVSP area to facilitate long-term groundwater monitoring (horizontal and vertical gradients), sampling, and in-situ testing. Monitoring well construction is shown on the borehole logs in **Appendix C4.**

The GEI field staff examined and classified characteristics of the soils encountered in the boreholes, including the presence of fill materials, groundwater observations during and upon completion of the drilling, recorded observations of borehole construction, and processed the recovered samples. All recovered soil samples were logged in the field, carefully packaged, and transported to GEI’s laboratory for more detailed examination and classification.

In GEI's laboratory, the samples were classified as to their visual and textural characteristics. Fifteen (15) representative samples of the major soil units from the boreholes were selected and submitted to our laboratory for grain size analysis. An additional six (6) grain sizes were conducted in conjunction with the infiltration testing scope. Grain size results are provided in **Appendix C5**.

The borehole locations are shown on **Figures 3.4, 3.5A** and **3.5B (Appendix C1)** and detailed subsurface conditions are presented on the borehole logs in **Appendix C4**. The soil conditions encountered at the borehole locations are summarized below. A stratigraphic cross-section across the property as aligned on **Figure 3.4** is included as **Figure 3.11 (Appendix C1)**. The stratigraphy discussed below pertain to Boreholes 1 to 41 and BH/MW101 to 105 advanced by GEI in 2023 and 2024, respectively. Boreholes were also advanced by other consultants on Parcels 5 and 9, encountering consistent soil conditions. The other borehole locations are shown on **Figures 3.4, 3.5A** and **3.5B (Appendix C1)** and the borehole logs are included in **Appendix C4**.

3.1.7.2 Stratigraphy

It should be noted that the conditions indicated on the borehole logs are for specific locations only and can vary between and beyond the locations. The soil boundaries indicated on the borehole logs and subsurface profile are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones and should not be interpreted as exact planes of geological change.

In addition, the descriptions provided in the borehole logs are inferred from a variety of factors, including: visual observations of the soil samples retrieved, laboratory testing, measurements prior to and after drilling, and the drilling process itself (speed of drilling, shaking/grinding of the augers, etc.).

In general, the boreholes uniformly encountered Halton Till below grade. Local areas encountered cohesionless glacial till, likely the Newmarket Till unit, and bedrock was inferred to have been encountered underlying the glacial till deposits in some borehole locations as further described below.

3.1.7.2.1 Topsoil and Organics

A surficial topsoil layer was encountered at the ground surface at all of the borehole locations except for Boreholes NP-41D and NP-41S, ranging in thickness from 50 to 760 mm. The topsoil found in Borehole 12-D and 12-S was found to be mixed with peat.

Underlying the topsoil / peat in Boreholes 12-D and 12-S, a deposit of silt and organics with roots was encountered from 0.8 to 1.5 m below grade (elevation 246.0 to 245.2 m). The deposit was firm, black to grey, and moist.

3.1.7.2.2 Clay and Silt Glacial Till (Halton Till)

Below the topsoil, a deposit of clay and silt glacial till was found in all boreholes. The deposit was overlain by a section of weathered/disturbed material which is common for a farmed field. The glacial till typically contained trace to some sand, trace to no gravel, with inferred cobbles and boulders. The deposit was encountered between the surface and 0.76 m below grade (elevation 218.9 to 249.0 m). The deposit extended to depths of 2.3 m to beyond the depth of the investigation at a maximum depth of 6.6 m (elevation 217.0 to 243.3 m). The glacial till was moist with moisture contents ranging between 9 and 30%, and the colour was typically brown, turning grey with depth.

The N values in this layer ranged between 4 and 30 indicating a soft to hard (generally very stiff to stiff) consistency. It is typical for glacial till to have a competent upper crust underlain by a softer layer below, which was a trend typically observed in the boreholes.

Twenty grain size analysis tests for this layer were submitted to the lab for analysis, and the results are in **Appendix C5**. The testing shows that the glacial till typically contains 0 to 14% gravel, 2 to 20% sand, 29 to 46% silt, and 41 to 67% clay.

This relatively uniform and widespread clay and silt glacial till is interpretated to be the Halton Till unit, forming the low-permeability Halton Aquitard.

3.1.7.2.3 Cohesionless Glacial Till (Newmarket Till)

Cohesionless glacial till deposits were encountered underlying the clay and silt glacial till in Boreholes 4-D, 5, 21, 24, 26-D, 27, 36, 37, 38-D, 38-S, and 39-D at depths of 2.3 to 6.4 m below grade (elevation 241.7 m to 215.4 m). The cohesionless glacial till underling the clay and silt glacial till typically was encountered on the northern and eastern portion of the WVSP area. The cohesionless glacial till extended to depths of 6.1 to 7.6 m (elevation 228.3 to 218.9 m) or beyond the depth of drilling at 5.0 to 8.1 m (elevation 241.3 to 214.7 m). The glacial till deposits had a cohesionless matrix consisting of silty sand, to silt, to silt and sand, containing trace to some clay, trace to some gravel, and inferred cobbles and boulders. Trace shale fragments were occasionally observed. The deposits were brown to grey and moist to wet, with measured moisture contents ranging from 8 to 21%. The N values ranged from 16 to greater than 50 blows, indicating a compact to very dense (generally very dense) relative density.

Three grain size analysis tests for these layers were submitted to the lab for analysis, and the results are in **Appendix C5.** The testing shows that the glacial till typically contains 2 to 13% gravel, 18 to 53% sand, 34 to 58% silt, and 9 to 13% clay.

Based on the regional stratigraphic units discussed previously in Section 3.1.3, it is expected that these cohesionless glacial till deposits encountered below the Halton Till and typically above the bedrock are part of the Newmarket Till unit, forming the Newmarket Aquitard.

A 1.6 m thick layer of compact, cohesionless sandy silt glacial till was encountered interbedded within the clay and silt till in Borehole 18-D. This interbedded layer is expected to be part of the Halton Till unit, where the unit locally contains less clay. These variations in the Halton Till are noted previously in Sections 3.1.3 and 3.1.4.

3.1.7.2.4 Cohesionless Sands and Silts

A sand deposit was encountered below the clay and silt glacial till in Borehole 20 at 6.4 m below grade (elevation 232.9 m). The borehole terminated in the cohesionless deposits at 6.6 m below grade (elevation 232.7 m). The sand contained trace gravel and was noted as brown and wet with a moisture content of 14%. The N values was 19 blows, indicating a compact relative density.

In Borehole 26-D, silt with some sand was encountered below the silt glacial till. The silt extended from 6.1 m to beyond the depth of drilling at 6.6 m (elevation 222.0 to 221.6 m). The silt was grey, moist, and very dense.

In Borehole 39-D, a layer of sandy silt with trace clay was interbedded between the upper cohesive and the lower cohesionless till deposits. The sandy silt was grey, moist, and very dense.

It is estimated that these local, discontinuous zones of sand or silt are part of the Halton Till or Newmarket Till units, which are known to contain these types of deposits as local interbeds.

3.1.7.2.5 Inferred Bedrock

Inferred bedrock was encountered below the glacial till in Boreholes 24, 28-D, 29, and 36 at a depth of 3.4 to 7.6 m below grade (elevation 218.9 to 228.3 m). The bedrock extended beyond the depth of the investigation between 4.6 and 7.7 meters below grade (elevation 218.8 to 228.1 meters). The bedrock was described as weathered to highly weathered grey shale. The N values were all greater than 50 blows.

Based on the recovered split spoon samples, it is inferred that the bedrock is of the Georgian Bay Formation. Rock coring to confirm the weathering profile, type of bedrock, hard layers, quality, etc. was beyond the scope of work.

The depth and elevation of the inferred bedrock encountered in the boreholes is summarized in **Table 3.2 (Appendix C3)**.

3.1.8 Groundwater Seepage

Characterization of the hydrology of the WVSP area requires consideration of interaction between groundwater and surface water features. Installation of wells and review of the groundwater table relative to the surface water elevation of the surface water features and wetlands provides some quantitative data to account for baseflow contributions to groundwater. However, these are limited by their fixed location. To characterize additional locations along the surface water features, data can be obtained through seepage meter testing.

As such, GEI conducted groundwater seepage meter readings within selected surface water and wetland features to quantify the amount of groundwater flux within the WVSP area. These measurements provide a more direct assessment of seepage and allow for a better understanding of mitigation measures that may be required if any reduction in baseflow will occur. This assessment is coupled with piezometer and staff gauge data to create a more fulsome understanding of the surface water and groundwater interactions for these hydrologic features.

Groundwater seepage meter testing was completed April 24 to 28, 2023, during spring freshet when temperatures were above zero degrees Celsius. To better understand baseflow seasonal variation and contribution of these features to the local hydrogeologic regime, groundwater and surface water interactions were characterized in one (1) tributary and three (3) wetlands as shown on **Figures 3.35A** and **3.5B (Appendix C1).** While all are presumed to operate in an integrated surface and groundwater hydrologic regime across the WVSP area, features are spatially separated.

Locations of the monitoring sites can be seen on the **Figures 3.4, 3.5A** and **3.5B (Appendix C1)**. The results of the seepage meter testing are included in **Table 3.3** in **Appendix C2 (Appendix C1)**.

3.1.8.1 Groundwater Seepage Methods and Measurements

Seepage meters work through insertion into stream / wetland bed materials. Seepage meters then collect water through a segmented area for a minimum of one hour in a manner consistent with Rosenberry & LaBaugh (2008). Water that flows through the segmented area is collected in thin-walled plastic bags through a sealed opening in the seepage meter. While submergence of the seepage meter outlet is required to operate the seepage meter, full submergence of the seepage meter is the preferred method for operating.

Three different (3) groundwater seepage meter sizes were used to acquire a minimum of three (3) measures at each of four (4) locations to determine seepage rates. The smaller meter has a surface area of 594 cm^2 and the larger meters have a surface area of 2,565 and 2,642 cm^2 respectively. Seepage meters had variable length sidewalls, with smaller meters having shorter sidewalls. Seepage meters were paired to natural feature dimensions and estimated bed sediment depths, with preference given to larger meters which facilitate sampling through a larger sample area. Equilibration of the seepage meters post installation was limited to the time required to position meters and allow water flow to equilibrate between inside and outside of the meter, approximately 5-10 minutes. Only small meters were used in the rivulet. A combination of larger and smaller meters were used in wetland features. Site Photographs showing the emplaced meters during the investigation are provided in **Appendix C6**.

Temporary installation of four (4) 4' (1.28 m) drive point piezometers occurred during the first site visit, on April 24, 2023. Piezometers were 3 ft lengths of ¾" pipe, instrumented with 1 ft stainless steel fine mesh slotted screens and a stainless-steel driving tip at one end. Piezometers were hand driven into the ground such that the top of well screens were positioned approximately 15-25 cm below ground surface. Installation depths targeted the approximate depth envelopes of seepage meter sidewalls and sampled materials while providing good material seal at the top boundary of the piezometer screen. Drive points were installed local (1 to 2 m) to the proposed seepage meter replicate sites within the feature site and allowed to equilibrate for three (3) days prior to seepage metering being conducted. Point measures of hydraulic head and surface water elevations were calculated as the distance between the top of the screen and the ground surface for each piezometer, then extrapolated to the general monitoring location to quantify coarse characteristic differences in head for all seepage meters within that monitoring location. This associated data was analyzed in association with the groundwater seepage meters and staff gauges to gain a more comprehensive understanding of the near surface groundwater flow regime during the measurement period.

No multipliers were used in the reporting of collected seepage meter data. Discharge (Q) and specific discharge (q) were both calculated based on Rosenberry & LaBaugh (2008) using:

$$Q = \frac{V}{t} \qquad \text{eq. 1}$$

$$q = \frac{Q}{a} \qquad \text{eq. 2}$$

where:
Q is the seepage rate (cm^3/hr)
v is the volume (cm^3)
t is the time (sec)
q is the Flux or specific discharge (cm/hr)
A is the area of the seepage meter (cm^2)

3.1.8.2 Groundwater Seepage Discussion and Calculations

Individual groundwater seepage test results are shown in **Table 3.3** in **Appendix C3**. Resultant average seepage values and piezometer screen elevations of drive point piezometers are summarized in **Table 3.4 (Appendix C3)**. Groundwater seepage over the study period contributed to 2.3 to 4.5 cm/day of surface water discharge during the study period. All seepage rates fall within a 'moderate' range (1 to 10 cm/day) for fine-grained soils (e.g. silt, clay) and on the low end for coarse grained soils (e.g. gravel and sand). Seepage in the Benthic materials were higher relative to silt seepage rates at the WVSP area.

Staff gauge measurements were converted to Surface Water Elevations for comparison across monitoring modalities and provide a surface water elevation baseline at each monitoring location (i.e. SG 1, SG 5, SG 12, and SG 16). For wetland features (SG 5, SG 12, SG 16), the relationship between staff gauge and piezometer measures was better related than for the low-flow rivulet. For the rivulet (SG 1) the water column appeared more as puddles and localized depressions and as such, staff gauge and piezometer water levels were less well related.

The drive point piezometer for the rivulet (DP1) exhibits no difference between water levels measured at-depth and at the surface for the seepage metering period. This indicates that no hydraulic head gradient is observed over this distance (of approximately 1.5 ft or 46 cm). Average seepage rates are however consistent with those observed at the SG 12 site, a wetland site with soft silt bed materials, where a downward (recharging) gradient of 2.3 cm/cm was observed. Where seepage from silty substrate materials was observed, individual hydraulic gradient results are somewhat inconclusive. Gradient behaviours measured at DP 1 and DP 12 may be more indicative of piezometer equilibration times in silt materials which require periods longer than employed during the current investigation. In future, a longer equilibration time is recommended in low flow river and rivulet features and where finer grained materials exist. In the near-surface piezometers DP 5 and DP 16, small but notable differences were observed between surface water level and at-depth hydraulic head values over the relatively short measuring distances and indicated discharge, which are consistent with seepage metering behaviours.

It should be noted that higher resolution mini piezometer measurements directly adjacent to seepage meters provide replicate specific hydraulic head values and may be most indicative of materials being sampled by seepage meters. However, proximal measures, while susceptible to natural variability in subsurface materials and localized flow paths, present a more practical option. Flow in hyporheic zones (stream bed zones) are known to be especially variable and dynamic, depending on the hydrologic conditions of the streambed and regional water table. Controls in the hyporheic zone include the hydraulic conductivity of layered bed materials, sediment composition, channel morphology, seasonality, and surface water flows (Reidel, 2022). Finer materials are generally considered to be less transmissive and low channel gradients and fine sediments with low interstitial flows are known to limit stream-hyporheic connectivity and dynamism (Kashara and Hill, 2007).

In this investigation we used seepage meters to account for seepage in both wetland (stable) and rivulet (flowing) surface water features. During the study period, one ephemeral wetland feature was excluded from the original field work plan due to installation limitations. While surface water levels were adequate to for the investigation to take place and capture seepage flows, dense inundated organic materials prevented installation without significant destruction of the material and its hydrologic characteristics. This feature was abandoned as an object of study in favour of higher density study across those features exhibiting more favourable installation characteristics. Given the nature of observed materials and low flows observed in features across the WVSP area, coupled with the low (topographical) gradient nature of rivulet features across the WVSP area, broad generalizations may be drawn for features exhibiting similar flow and material characteristics. Seepage rates for measured features may be loosely extrapolated to the unstudied feature, however the presence of macropores in living root systems should not be discounted in groundwater / surface water flows and storage estimates.

3.1.9 Infiltration Testing

In accordance with the "Low Impact Development Stormwater Management Planning and Design Guide," (Dated 2010, by CVC and TRCA), GEI conducted infiltration testing using a Guelph Permeameter to determine the saturated hydraulic conductivity in the vertical direction.

Measurement of the field-saturated hydraulic conductivity (Kfs) was carried out using a Guelph Permeameter apparatus (Model 2800K1) on May 19 and 26, 2023, at eight (8) locations. The Guelph Permeameter testing was conducted in 60 mm diameter hand-augured boreholes completed to depths of 0.30 to 0.55 m below existing grade ensuring saturated soils were not encountered. Results of the Guelph Permeameter testing are provided in **Appendix C7** and are discussed below.

The GEI field staff examined and classified characteristics of the soils encountered in the hand-augured boreholes, including the presence of fill materials, and made groundwater observations during and upon completion of the boreholes. All recovered soil samples were logged in the field, carefully packaged and transported to the laboratory for more detailed examination and classification. In the laboratory, the samples were classified as to their visual and textural characteristics and geotechnical laboratory testing for grain size was carried out on six (6) representative samples with the results provided in **Appendix C5**.

The infiltration testing was conducted according to the requirements laid out in the *"Low Impact Development Stormwater Management Planning and Design Guide,"* (Dated 2010, by CVC and TRCA). The method used on WVSP area is summarized below:

- GEI conducted infiltration testing using a Guelph Permeameter to determine the saturated hydraulic conductivity in the vertical direction. An infiltration test was conducted in select hand-augured boreholes on WVSP area. Guelph

Permeameter testing was carried out at depths of 0.30 to 0.55 m below existing grade.
- The testing did not occur during a precipitation event nor within 24 hours of a significant rainfall event, and the temperature was above freezing.
- The saturated hydraulic conductivity was converted to infiltration rate using the approximate relationships provided within Table 7.1 of Appendix C of *"Low Impact Development Stormwater Management Planning and Design Guide,"* (Dated 2010, by CVC and TRCA) and applying the appropriate factor of safety based on Table 7.2 in Appendix C of the CVC design guide.

The hand-augured boreholes encountered clay and silt glacial till throughout the depth of the augering. No seepage or groundwater was encountered in the hand-augured boreholes. Based on the borehole findings from the drilling investigation completed at the WVSP area, the clay and silt till typically extends to 3 m or deeper below grade. The hand auger and test locations are shown on **Figures 3.4, 3.5A** and **3.5B (Appendix C1).** The hand augured-borehole findings are summarized in the **Tables 3.5** and **3.6 (Appendix C3)**:

Measurement of the field-saturated hydraulic conductivity (K_{fs}) was carried out in eight (8) hand-augured boreholes using a Guelph Permeameter apparatus (Model 2800K1) on May 19 and 26, 2023.

The field-saturated hydraulic conductivity of the soil was calculated using the one-head method which is calculated as follows:

$$K_{fs} = \frac{C_1 Q_1}{2H_1^2 + \pi a^2 C_1 + 2\pi \frac{H_1}{a^*}}$$

Where:C_1 = shape factor
Q = flow rate (cm^3/s)
H_1 = water column height (cm)
a = well radius (cm)
α* = alpha factor (0.01 to 0.36 cm^{-1})

Hydraulic conductivity and infiltration rate are two different concepts and conversion from one parameter to another must account for the hydraulic gradient and consequently cannot be done through unit conversion. In accordance with the CVC guidelines, the infiltration rate was determined as per the relationship with the field-saturated hydraulic conductivity provided in the CVC/TRCA guideline, which is summarized in **Table 3.7 (Appendix C3)**.

Infiltration rate is the inverse of percolation time. The approximate relationship (as provided in Figure C1 of the CVC guideline) in which the infiltration rate can be directly calculated from saturated hydraulic conductivity is as follows:

$$K_{fs} = 6 * 10^{-11}(I)^{3.7363}$$

A factor of safety is then applied to the calculated infiltration rate to account for soil variability, gradual accumulation of fine soil sediments during the lifespan of the facility, and compaction during construction. A higher factor of safety is applied if a soil with a lower infiltration rate is encountered within 1.5 m of the base of the infiltration measure.

The results of the infiltration tests are included in **Appendix C7** and are summarized in **Table 3.8 (Appendix C3)**.

Appendix C of *"Low Impact Development Stormwater Management and Planning Design Guide"* (Version 1.0, 2010, by CVC and TRCA) suggests safety factors to be applied to infiltration rates. The recommended factor of safety for the clay and silt glacial till is 2.5 as the nearby boreholes show the cohesive glacial till extends an additional 1.5 m below the infiltration test elevation.

The Guelph Permeameter test at GP 5 encountered saturated soil conditions and a steady-state rate of fall was not achieved. The results showed water was entering the apparatus, possibly indicating the test was occurring below the groundwater table. Steady-state rate of fall was not achieved at GP 3 and GP 8, possibly due to the low permeability of the soil or a higher groundwater table.

Where measured, the factored infiltration rate of the clay and silt glacial till (Halton Till) was 7.3 to 10.4 mm/hr. It is noted infiltration cannot occur below the groundwater table and in general, the glacial till can limit infiltration.
Additionally, it is required that all infiltration type LID measures be kept at least 1 m above the seasonally high groundwater level. Keeping the LID features at least 1 m above the seasonally high groundwater level could present a challenge due to the high groundwater table within the WSVP area. Additional in-situ testing should be completed at the specific location and elevation of any proposed LID measures prior to detailed design. Further recommendations with respect to LID measures will be provided as part of Phases 2 and 3 of this LSS.

3.2 Water Balance and Groundwater Recharge

3.2.1 Water Balance Components

A water balance is an accounting of the water resources within a given area. The water balance equates the precipitation (P) over a given area to the summation of the change in groundwater storage (S), evapotranspiration/evaporation (ET), surface water runoff (R) and infiltration (I) using the following equation:

$$\mathrm{P} = S + I + ET + R$$

The components of the water balance vary in space and time and depend on climatic conditions as well as the soil and land cover conditions (i.e., rainfall intensity, land slope, soil hydraulic conductivity and vegetation). For example, runoff occurs at a higher percentage during periods of snowmelt when the ground is frozen or during intense rainfall events.

Precise measurement of the water balance components is difficult, and as such, approximations and simplifications are made to characterize the water balance of a property. Field observations of the drainage conditions, land cover and soil types, groundwater levels and local climatic records are important inputs to the water balance calculations.

- **Precipitation (P):** For the purposes of approximating the annual precipitation at this WVSP area, the monthly rainfall between 1981 and 2010 was used based on Environment Canada historical weather data for the Woodbridge Ontario weather station (Climate ID 6159575, Latitude 43.78 N, Longitude - 79.6 W, Elevation 164 metres), which is located about 11.9 km southeast of the WVSP area.
- **Storage (S):** Although there are groundwater storage gains and losses on a short-term basis, the net change in groundwater storage on a long-term basis is assumed to be zero.
- **Evapotranspiration/Evaporation (PET):** The evapotranspiration and evaporation components vary based on the characteristics of the land surface cover (i.e., type of vegetation, soil moisture conditions, perviousness of surfaces, etc.). Potential evapotranspiration refers to the water loss from a vegetated surface to the atmosphere under conditions of an unlimited water supply. Evaporation occurs from a hard surface (such as flat rooftops, asphalt, gravel parking areas, etc.).

Water Surplus (R + I): The difference between the mean precipitation and evapotranspiration is referred to as the water surplus. The water surplus is divided into two parts: as surface or overland runoff (R) and the infiltration into the surficial soil (I). The infiltration is comprised of two end member components: one component that moves vertically downward to underlying aquifers (referred to as percolation, deep infiltration or net recharge) and a second component that moves laterally through the near surface soil profile or shallow soils as interflow that re-emerges locally to surface (i.e., as runoff) at some short distance and time following precipitation.

3.2.2 Regional Climate

The average temperature and precipitation data was taken from Environment Canada Woodbridge station 1981 to 2010. The annual information is presented below:

Average Temperature: T (°C)	7.60
Unadjusted Potential Evapotranspiration: U (mm)	510.1
Adjusting Factor for U (Latitude 44°)	-
Adjusted Potential Evapotranspiration - PET (mm)	604.0

It is noted that the above are average values, which are representative in a regional context. Seasonal and annual variations of these values are expected. The long-term groundwater recharge and discharge rates are determined by these average values.

Climate trends were discussed in the Humber River Watershed Plan (TRCA, 2008) and were based on an analysis of climate parameters between two climate periods (1961-1990 and 1981-2010). The findings as described in the Watershed Plan are:

- Air temperature is increasing (0.7 degrees Celsius on average between the two time periods).
- Very hot days above 30 degrees Celsius and 35 degrees Celsius have increased.
- Very cold days between -10 degrees Celsius and -20 degrees Celsius have decreased.
- Total annual precipitation generally increased in the watershed by 3.3%.
- The growing season is increasing.

3.2.3 Approach and Methodology

The analytical approach (Thornwaithe and Mather) to calculate the water balance involves monthly soil-moisture balance calculations to determine the pre-development infiltration volumes. The detailed water balance calculation is provided in **Appendix C8**, which is summarized in this and subsequent sections of the report. The following assumptions were used as part of the soil-moisture balance calculations:

- A soil moisture balance approach assumes that soils do not release water as potential recharge while a soil moisture deficit exists.
- During wetter periods, any excess of precipitation over evapotranspiration first goes to restore soil moisture. Considering the nature of the near surface soils (clay and silt glacial till, encountered uniformly across the WVSP area), a soil moisture storage capacity of 75 mm was used for the WVSP area which is vegetated with

mainly with agricultural crops. 350 mm was used for the mature forests in the northeastern portion of the WVSP area.

- Once the soil moisture deficit is overcome, any further excess water can then pass through the soil as infiltration and either become interflow (indirect runoff) or recharge (deep infiltration).

Monthly potential evapotranspiration calculations accounting for latitude, climate and the actual evapotranspiration and water surplus components of the water balance based on the monthly precipitation and soil moisture conditions was calculated. The *MECP SWM Planning and Design Manual* (2003) methodology for calculating total infiltration based on topography, soil type and land cover was used, and a corresponding infiltration factor was calculated for pre- and post-development conditions. The water surplus was multiplied by the infiltration factor to determine both the pre-existing and post-condition annual volumes for run-off and infiltration for the property.

It is noted that the infiltration and runoff values presented in **Appendix C8** are estimates only. Single values are used for the water balance calculations, but it is important to understand that infiltration rates are dependent upon the hydraulic conductivity of the surficial soils which may vary over several orders of magnitude. As such, the margins of error for the calculated infiltration and runoff component values are potentially quite large. These margins of error are recognized, but for the purposes of this assessment, the numbers used in the water balance calculations are considered reasonable estimates based on the site-specific conditions and useful for comparison of pre- to post-development conditions.

3.2.4 Pre-Development Water Balance

The total WSVP Area is 358.1 ha in size. The detailed water balance calculations are included in **Appendix C8**. **Table 3.9 (Appendix C3)** summarizes the existing site condition (pre-development) water balance for the WVSP Area. These calculations suggest that the total yearly target for infiltration across the WVSP Area is 307,550 m^3/year.

Based on the calculations in **Appendix C8**, the potential infiltration for the WVSP area ranges from about 91 mm/year (agricultural land) to 78 mm per year (treed areas).

The ORMGP provided GEI with two groundwater models that contain the Wildfield LSS WVSP area:

- York Tier 3, results summarized in “Tier 3 Water Budget – Water Quantity Risk Level Assignment Study, Regional Municipality of York, Phase 1 Model Development Report,” by Earthfx, dated February 2013.

- TRCA 2008 PRMS, results summarized in “Humber River Watershed, Scenario Modelling and Analysis Report,” by TRCA, 2008.

The 2008 TRCA modelling (Figure 4.3-4 from their report) shows that 50-100 mm per year of potential infiltration and groundwater recharge is expected for the WVSP area. The online TRSPA Water Balance Tool from TRCA also provides data on potential precipitation, evapotranspiration, runoff and recharge based on a regional assessment. The online tool suggests precipitation is about 865 mm/year, evapotranspiration ranges from about 563 to 595 mm/year, runoff ranges from 220 to 245 mm/year, and recharge (infiltration) ranges from about 50 to 150 mm/year (but typically 100 mm/year or less).

The water balance results determined for the WSVP Area found about 800 mm/year of precipitation, 604 mm/year of potential evapotranspiration, about 118 to 169 mm/year of runoff, and about 78 to 91 mm/year of infiltration (depending on vegetation cover). These results are comparable to the TRSPA Water Balance Tool values, considering the online tool was created from a regional assessment. The guidance document from the online tool also notes that it’s results can be supplanted by site-specific modelling. The WVSP Area results are also comparable to the results from the higher end of the TRCA 2008 model.

Therefore, the results from the Thornthwaite and Mather methodology are corroborated. The uniform low-permeability soil (Halton Till) that has been identified in the WVSP Area makes Thornthwaite and Mather methodology the ideal approach for calculating potential infiltration and groundwater recharge.

3.3 Water Supply Wells

3.3.1 MECP Water Well Records and Existing Water Wells

MECP water well records were obtained within 500 metres of the WVSP area to assess the general nature of the groundwater resource in near vicinity of the WVSP area, and historical/current uses of wells in the area. One hundred and eighteen (118) well records were found, the approximate MECP well locations are shown on **Figure 3.10 (Appendix C1)** and a well records summary table is included as **Table 3.10** in **Appendix C3.**

The wells were installed for the following uses:

- Sixty-six (66) of the records indicate domestic use.
- Ten (10) of the records indicate monitoring use/test hole.
- Seven (7) of the records indicate not used.
- Twenty-Seven (27) of the records did not specify the use and are of unknown use.

- One (1) of the records indicate public supply use.
- Seven (7) of the records indicate livestock use.

The stratigraphic descriptions within the MECP monitoring well records are typically inaccurate due to the methodology in which they are determined (observations of cuttings and lack of consistency between descriptions of soil between different drillers). Though this is the case, an overall sense of the deep stratigraphy can be determined by looking at commonalities between most stratigraphic descriptions and where the wells were terminated in an aquifer. The well records typically indicate silty sand or sandy silt (potentially glacial till in some locations), then clay, then sand and gravel, then shale. Bedrock was encountered in several wells at depths ranging from 11.6 to 61.3 m below existing grade. The noted domestic and municipal water supply wells were installed in sand or sand and gravel units typically screened between 15.2 to 54.9 metres below existing grade. Based on the well records with available well screen information the deeper sand and gravel units would most likely be part of the Oak Ridges Aquifer Complex (ORAC). The domestic and municipal supply wells screened within the ORAC to the north appear to be outside of the Wildfield Secondary Plan Area. The wells screened within ORAC to the northeast and southeast appear to be within the Wildfiled Secondary Plan Area, but not within the participating properties. A larger portion of groundwater recharge for the ORAC would most likely not come from surface water as approximately 7.6 to 57.6 m of clay and silt glacial till (Halton Till) is overlying the aquifer reducing local infiltration and recharge.

3.3.2 Private Well Survey

A door-to-door water well survey within 500 m of the Property was completed in June 2024 to ground water usage in the WVSP area. Based on the private well survey, it was concluded that sixty-one (61) sites within a 500-m radius of the Property were supplied by domestic wells. Letters were dropped off at each property. No homeowners responded to requests for information regarding their wells. A copy of the private well survey and a list of addresses visited is appended in **Appendix C9**. The location of the wells surveyed are presented in **Figure 3.10 (Appendix C1)**.

3.3.3 Groundwater Quality

To characterize the existing groundwater quality and assess the suitability for discharge of pumped groundwater to the surface or the existing storm/sanitary sewer system during potential future dewatering activities, six (6) unfiltered and six (6) filtered groundwater samples were collected from BH/MWs 5, 18D, 26D, 33D and 38D, on May 18, 2023, and BH/MW105 on August 22, 2024.

Prior to collection of the samples, approximately three (3) standing well volumes of groundwater were purged from the well. The samples were collected and placed into pre-cleaned laboratory- supplied vials and/or bottles provided with analytical test group specific preservatives, as required. Dedicated nitrile gloves were used during sample handling. The field filtered samples were run through a 75 µm filter. The samples were submitted to CALA- accredited Eurofins Environmental Laboratory for analysis.

For the assessment purposes, the analytical results were compared to Peel Region Storm and Sanitary Sewer Use Bylaw 53-2010; PWQO. The parameters were compared to both background conditions and the applicable site condition standards. O. Reg. 153/04, as amended, Table 1 is considered to be background conditions. The applicable site condition standards were determined to be Table 8. The results of the groundwater chemistry are presented in the laboratory Certificates of Analysis provided in **Appendix C10** and are summarized in **Table 3.11 (Appendix C3)**.

The unfiltered groundwater samples collected from the monitoring locations had select exceedances compared to the Peel Region Storm and Sanitary Sewer Use By-Law and PWQO. No exceedances were found when compared to O.Reg. 153/04 Table 1 and 8 all types of property uses. The filtered groundwater samples collected had fewer select samples exceed for PWQO. Based on the filtered results the filtration reduced the exceedances of the select parameters. It is expected that during construction dewatering, the pumped water is to be first discharged to a sedimentation tank and/or a silt/sediment bag, at a minimum before being discharged.

The unfiltered groundwater samples exceeded for PWQO metals and Peel Region Storm and Sanitary Sewer Use By-Law for one or more of TSS, Manganese, Cobalt, Boron, Uranium, Silver, Iron, Cadmium, Cobalt, Copper, Nickel, Zinc, Vanadium and Zirconium. In comparison, the filtered groundwater samples met the PWQO metals standards, with the exception of one (1) or more of Cobalt, Boron, Uranium and Silver.

Based on the sampling methodology for the collection of groundwater, it is common for unfiltered and turbid samples have elevated metals reported due to the acid perseverative interacting with the soil grains suspended in the sample. Unfiltered samples can be used to represent water quality in cases where the soil is disturbed, and no treatment processes are put in place to reduce TSS.

Filtered samples provide an approximation of the ambient groundwater conditions without soil disruption, or where TSS removal is applied during construction. The filtered results indicate that precautions beyond TSS removal may be required to permit groundwater dewatering discharge to surface water during construction activities.

However, it is noted that low-level metal concentrations (including cobalt) were also detected in surface water under low-flow conditions. This supports the likelihood that cobalt concentrations are naturally elevated in the broader area and can be attributed to background conditions (i.e. are not considered to be anthropogenic). Consequently, the occurrence of naturally elevated metals, and whether treatment is required, should be considered when developing the discharge plan.

3.4 Groundwater Monitoring

3.4.1 Groundwater Level Monitoring

Thirty-three (33) monitoring wells were installed on the site, within selected boreholes. Fourteen (14) were instrumented as monitoring wells, and nineteen (19) were instrumented as deep/shallow nested piezometers. The monitoring wells/piezometers were installed to facilitate the measurements of stabilized groundwater levels. A 50 mm diameter PVC monitoring well was installed in all monitoring wells and 25 mm diameter PVC monitoring well was installed in all nested piezometers with a 1.5 to 3.0-metre-long screen. Monitoring well and nested piezometers construction and groundwater measurements are shown on the borehole logs in **Appendix C4**. A summary table is included as **Table 3.12** in **Appendix C3** showing well construction details, the strata screened, and the groundwater level readings. Dataloggers were also installed in selected monitoring wells to record continuous groundwater level data. Hydrographs showing the continuous data, along with manual reading data, are in **Appendix C11**.

The stabilized groundwater levels in the installed monitoring wells were measured to range between approximately elevation 247.7 to 219.2 m, or about 0.06 to 5.83 m below grade. Groundwater levels show seasonal fluctuations and vary in response to prevailing climate conditions, as shown on the hydrographs. The seasonal groundwater level fluctuations were measured by the data loggers installed in wells across the site. Hydrographs were created to illustrate the data.The groundwater elevation range matched with the manual measured range of 247.7 to 219.2 m asl. The surface water elevation range based on the data loggers and hydrographs ranged from 249.2 to 219.7 m asl.

It is noted in BH/MW28 Deep and Shallow nested well, artesian groundwater conditions were encountered and the groundwater table was measured to be above ground surface by about 0.16 m or more. The deep well was screened in the Halton Till and upper bedrock, whereas the shallow well was screened within the glacial till. A specific cohesionless unit was not encountered in the borehole within the glacial till or at the till-bedrock interface. A sand seam could exist at the well screen depth. Borehole 28 was drilled in a depressed area with lower grades than the surrounding land; if a confined deposit or sand seam dips down relative to the surrounding grade, artesian conditions can develop.

An approximate groundwater contour plan is provided as **Figure 3.12 (Appendix C1)**. Based on this plan, local groundwater flow on the site appears to have a general trend towards the east, southeast towards the West Humber River. On the northwestern and southwestern portion of the site the groundwater contour flow appears to head towards the southwest. It is noted that the groundwater contours were interpolated and extrapolated beyond the points of data (i.e. well locations) for the remainder of Study Area, with interpretation required for the non-participating properties where a field investigation could not be completed. Additional monitoring well locations are needed in those locations, particularly along West Humber River, to improve the accuracy of the groundwater contour plan.

Based on the groundwater contours shown on **Figure 3.12 (Appendix C1)**, a groundwater flow divide is evident in the northwestern section of the WVSP area. A groundwater flow divide is a boundary from which flow occurs in different directions. The flow divide is generally located in an area where there is elevated topography compared to the surrounding lands, as shown on **Figure 3.3A (Appendix C1)**. The land slopes to the east and west of the elevated ridge. The groundwater flow also appears to be consistent with the surface water patterns by having a southeast flow towards the West Humber River and southwest flow towards tributaries of the West Humber River.

3.4.2 Groundwater and Surface Water Interactions

Monitoring of groundwater water levels began in May 2023 and finished in April 2024. Additional groundwater levels are being monitored until the summer of 2025. Monitoring of surface water levels began in April 2023 and completed in April 2024. Monitored wetlands and tributaries were selected based on their proximity to the disturbed area. On May 15 and 16, 2023, sixteen (16) staff gauges (SG) were installed within select wetlands, tributaries, headwater drainage features, or similar surface water features on site. A total of ten (10) monitoring wells were installed within selected boreholes on WVSP area. Nested monitoring wells / piezometers were installed in eighteen (18) boreholes which allow simultaneous monitoring of deeper and shallower groundwater conditions in or near the surface water features such as wetlands and watercourses, allowing for evaluation of the vertical hydraulic gradient and groundwater-surface water interactions within the feature.

Dataloggers were placed at seven (7) of the staff gauges (SG1, SG5, SG7, SG11, SG12, SG13 and SG16) and within five (5) monitoring wells / piezometers. The dataloggers were set to record hourly water levels and temperature. Manual measurements of the groundwater and surface water levels were taken monthly from May 2023 to April 2024 and dataloggers were calibrated based on the manual groundwater elevation measurements. A barologger was also placed to record the air temperature and pressure to compensate the groundwater dataloggers for barometric pressure. Monitoring of these staff gauges and monitoring wells / piezometers and was completed in April 2024. All monitoring locations are shown on **Figures 3.4, 3.5A** and **3.5B (Appendix C1)** and hydrographs appended in **Appendix C11**.

It is noted that the hydraulic gradient has been interpreted from the monitoring wells/nested piezometer data as the staff gauges on their own are not conducive to interpreting hydraulic gradient. The surface/groundwater connection has been interpreted based on the water levels from the staff gauges measured throughout the year. The interpreted monitoring well/nested piezometer and staff gauge data is provided as **Table 3.13** in **Appendix C3**.

3.4.3 Hydraulic Conductivity Testing

Rising head tests were completed in monitoring wells MW5, 16, 18, 19, 26, 27, 33, 36 and 38 from May 16 to 18, 2023. Additional rising head tests were completed in monitoring wells BH/MW101, 103, MW4 (Pinchin) and MW8 (Pinchin) from August 21 to 22, 2024. Water was manually purged from monitoring wells using an inertial pump. The static water level was measured prior to the start of testing, and the change in water level was monitored using an electronic level logger. The level loggers were left in the monitoring wells for up to several hours to allow for adequate recovery of the groundwater. The tests were completed to estimate the horizontal hydraulic conductivity (K) of the soils at the well screen depths.

Hydraulic conductivity values were calculated from the rising head test data using Hvorslev's solution (1951) where the well screen was fully saturated and Dagan's solution (1978) where the groundwater table straddled the well screen. The semi-log plots for the results are provided in **Appendix C12** and are summarized in the **Table 3.14 (Appendix C3**).

In addition to the above-noted permeability data, the hydraulic conductivity of the soils encountered on site was estimated from grain size distribution curves (as provided in **Appendix C5** and summarized in **Table 3.15, Appendix C3**) as a check.

According to Freeze and Cherry (1979), the typical range in hydraulic conductivity is as follows:

Glacial Till:	10^{-6} m/s to 10^{-12} m/s
Clay	10^{-9} m/s to 10^{-12} m/s
Silt:	10^{-5} m/s to 10^{-9} m/s
Sand:	10^{-2} m/s to 10^{-5} m/s

The in-situ hydraulic conductivities measured in the field are within the expected ranges for the various deposits consisting of silty sand to silt glacial till, or clay and silt glacial till based on Freeze and Cherry and the estimates from the grain size data.

3.5 WVSP Area Hydrogeologic Conceptual Model Summary

The overall hydrogeological conceptual model for the WVSP area is summarized below, based on the data and analysis from the previous **Sections 3.1** to **3.4**.

Both the regional geologic mapping and the boreholes advanced across the WVSP area are consistent. The mapping indicates the site is located in a Till Plain to the south of the Oak Ridges Moraine. The WVSP area is dominated by uniformly encountered Halton Till. Locally, a cohesionless glacial till, likely the Newmarket Till unit, was encountered. The till units are underlain by shale bedrock of the Georgian Bay Formation. The geologic conditions are considered to be consistent across the WVSP area.

The overburden till units are composed of low permeability, silt dominated, soils that limit infiltration and groundwater migration. The till units were found to be consistent across the area with no specific areas of high infiltration (higher permeability) or groundwater migration observed.

Based on the geologic conditions, the hydrogeologic conditions in the area are also considered to be consistent across the WVSP area and include limited infiltration and groundwater migration. The WVSP area has limited occurrence of surface water features that occur as incised channels within active agricultural fields. Groundwater flow, albeit limited, is expected to be dominated by flow in the upper weathered till units and interflow. Hydraulic gradients are expected to follow topography, with groundwater flow towards the southeast and the West Humber River for the majority of the WVSP area. Groundwater and surface water flows in a limited area in the northwest of the WVSP area are expected to be westerly, towards the West Tributary of the West Humber River. Local upwards gradients are expected in the overburden in the vicinity of the surface water features.

Infiltration rates are expected to be consistent across the WVSP area and in the range from about 91 mm/year (agricultural land) to 78 mm/year (treed areas), based on both the TRCA models and the Thornthwaite and Mather methodology used specifically for the WVSP area. The low infiltration is typical of large glacial till plains.

Surface water features generally form “parallel” or “dendritic” drainage patterns and also indicate consistent geology over the WVSP area. Flows are expected to be predominantly surface water fed, with high variability flow (and typically higher peak flows) controlled by precipitation events due to high runoff, limited natural storm water attenuation, and limited base flow contributions. Consistent with the geology, no evidence of point source, or significant zones of groundwater discharge were encountered. Baseflow of surface water systems are likely based on accumulation of relatively low volume inputs through low hydraulic conductivity soils over the length of the surface water channels.

4.0 Surface Water

4.1 Hydrologic Assessment

4.1.1 Existing Drainage

As previously noted, the WVPS area is dominated by active agricultural lands, with scattered wetlands and headwater drainage features occurring on the tableland. The West Humber River and its associated valley occur north and east of the WVSP area. Existing drainage patterns for the WVSP area (358.1 ha) are shown on **Figures 4.1** and **4.2 (Appendix D1)**.

An inventory of existing drainage culverts was undertaken based on field visits, a review of engineering drawings for The Gore Road and Mayfield Road from the Region of Peel, Culvert Inspection Reports from the Region of Peel, and topographic survey prepared by R-PE Surveying Ltd. (refer to **Appendix D2**). There were seventeen (17) culverts identified within the WVSP area (Culvert ID #1 through #17), as shown on **Figure 4.2 (Appendix D1)**.

The WVSP area is located within five (5) catchments of the West Humber River subwatershed as follows, Catchments 36.10, 36.11, 38.04, 38.05 and 38.06. Drainage from these catchments is shown on **Figure 4.1 (Appendix D1)** and can be described as follows:

- Catchments 36.10 and 36.11 generally drain southerly towards existing culverts crossing under Centreville Creek Road identified as Culverts #3 through #8.
- Drainage from Catchment 38.04 is split between draining southeasterly to Mayfield Road and draining easterly towards The Gore Road. The flows from Catchment 38.04 cross Mayfield Road via Culverts #9 and #10, and cross The Gore Road via Culvert #11.
- Catchment 38.05 is located north of Mayfield Road encompassing a small drainage area on the west side of The Gore Road which drains easterly to the West Humber River via Culvert #12.
- Catchment 38.06 spans across The Gore Road. The lands on the west side of the road generally drain easterly towards existing culverts under The Gore Road, identified as Culverts #13 through #17. Lands on the east side of The Gore Road drain to a tributary of the West Humber River which flows southeasterly, parallel to the road, joining with the West Humber River approximately 500 m north of Mayfield Road.

The five (5) catchments have been further discretized into subcatchments as shown on **Figure 4.2 (Appendix D1)** and described in **Table 4.1 (Appendix D3)**.

4.1.2 Stormwater Management Criteria

The following stormwater management criteria have been established based on the greatest requirements of each of the design guidelines and standards listed in **Section 1.3**, through discussions with agencies and review of previous studies. The stormwater management criteria are summarized below in **Table 4.2 (Appendix D3).** The Humber River unit flow target release rates are provided in **Appendix D4.**

4.1.3 Regional Storm Event Quantity Control Targets

The most recent hydrologic model for the Humber River watershed was obtained from the TRCA in January 2024. The Regional (Hurricane Hazel) Storm event pre-development peak flow was obtained for each catchment from the existing conditions scenario of the hydrologic model. Per discussions with TRCA (Dilnesaw Chekol, TRCA and Andrea Keeping, SCS Consulting Group Ltd., September 23, 2024) the total existing conditions catchment peak flow was divided by the total catchment area to get a quantity control target unit rate, as summarized in **Table 4.3 (Appendix D3)**.

To facilitate the development of quantity control targets for stormwater management (SWM) during the Regional Storm event, the TRCA catchments were discretized into subcatchments within the WVSP area, as outlined in **Section 4.1**. Refer to **Figure 4.2 (Appendix D1)** for an illustration of the subcatchments. The target unit rates for each catchment, per **Table 4.3 (Appendix D3)**, were then applied to the subcatchment pre-development area in order to establish target flows for SWM facilities. Refer to **Table 4.4 (Appendix D3)** for the quantity control target flows for the subcatchments within the WVSP area.

In addition to providing post- to pre-development quantity controls for the Regional Storm event, it is required that there are no increases in peak flow in downstream FVAs (refer to **Table 4.2, Appendix D3**). The Regional Storm event peak flows at nodes downstream of the WVSP area, including within the FVA identified in **Section 2.3.7.2**, have been summarized in **Table 4.5 (Appendix D3)**. These nodal peak flows are to be utilized in Phase 2 of this LSS to confirm that the proposed SWM measures will mitigate any potential increases in peak flow downstream of the WVSP area. Refer to **Appendix D5** for the hydrologic model schematic, node location, summary output for the nodes specified and a digital link to the hydrologic modelling files.

4.2 Geomorphic Assessment

4.2.1 Erosion Thresholds

Fluvial geomorphic assessments are underway, with detailed geomorphic assessments being completed at reference reaches downstream of the WVSP area and within the GSA. The detailed geomorphic assessment consists of:

- A survey of the longitudinal profile of the bed and bankfull, to establish an energy gradient for the stream;
- A survey of cross sections at riffles and pools to establish a reference channel cross sectional geometry;
- Detailed characterization of bed and bank substrate (e.g., through pebble counts);
- Characterization of riparian vegetation, to determine extents of vegetation control on bank erosion.

In natural systems, watercourses regularly see flows that entrain and transport sediment. This is part of the natural process that maintains natural channel form (TRCA 2012, CVC 2015). The erosion threshold represents the magnitude of flow at which bed and/or bank sediment within a reach is entrained. Specifically, the erosion threshold provides a depth, velocity, discharge, or shear stress at which sediment of a particular size (usually the median grain size) may potentially begin to move. This does not necessarily mean systemic erosion (i.e., widening or degradation of the channel); it simply indicates a flow which may potentially entrain sediment (CVC 2015).
As noted, erosion and deposition are natural processes that occur within watercourses. Issues arise when changes in the watershed's hydrology result in an increase or decrease in the frequency of period of erosive events. The objective, therefore, is to minimize the risk of exacerbating existing rates of erosion in the watercourse in the post-development condition.

There are several approaches that may be applied to determine the erosion threshold for a reach. These require information regarding the mean channel slope, cross-sectional dimensions, assessment of roughness, and substrate information (e.g., grain size), as obtained from the detailed geomorphic assessment. The TRCA (2012) Stormwater Management Criteria document provides a brief list of methods and resources for estimating thresholds for a range of conditions. The CVC (2015) Fluvial Geomorphic Guidelines document similarly provides a similar list of methods and resources. These methods may be based on the critical shear stress or the critical velocity. These parameters refer to the shear stress or velocity, based on the sediment size or class, at which sediment is entrained. For the shear stress approaches, when the mean shear stress in the channel exceeds the critical shear stress, sediment entrainment can be expected to occur. Similarly, for the velocity approaches, sediment entrainment occurs when the mean velocity in the channel exceeds the critical velocity. Critical shear stress or velocity for a given grain size can be calculated using empirical methods (e.g., Neill, 1967; Miller et al., 1977; Komar, 1987, etc.), or by graphical analysis, by referring to a chart (e.g., Hjulstrom, 1967; Chow, 1959). Authors such as Fischenich (2001), Julien (1998), Chang (1988), etc., provide tables of compiled permissible shear stresses and velocities for a range of sediment sizes.

The findings of the geomorphic assessment will be used to inform the erosion threshold for each reach. The results of the geomorphic field assessments and determination of the erosion thresholds will be included in Phase 2 of this LSS.

4.2.2 Erosion Exceedance Analysis

An erosion exceedance analysis is required per the approved LSS Terms of Reference (**Appendix A1).** Utilizing the erosion thresholds as outlined above in **Section 4.2.1**, a continuous simulation hydrological model will be utilized to complete an erosion exceedance analysis for pre-development, post-development without mitigation and post-development with mitigation scenarios. The following parameters will be considered: cumulative time of exceedance, cumulative effective velocity, cumulative effective discharge, and cumulative effective work. The hydrologic modelling to establish pre-development conditions will be completed as part of Phase 2 of this LSS.

4.3 Feature Based Water Balance

In accordance with the approved LSS Terms of Reference (**Appendix A1)** wetland screening and water balance risk evaluation is required to identify which individual wetlands (onsite and on adjacent lands) will have hydrologic changes and be at risk for negative impacts to their form and/or function based on the proposed Secondary Plan land uses. Identified wetlands that are assessed through the screening and risk evaluation to be at risk for negative impacts to their form and/or function, are then to be assessed further to first identify options to avoid impacts.

Where impacts are not avoidable for a given wetland, feature based water balance assessment is required. This will include continuous simulation hydrologic modelling (including, pre-development, post-development without mitigation and post-development with mitigation) to assess suitable options to maintain pre-development wetland hydrology post-development. This may include augmentation of clean water to the feature via the implementation of LID measures. The hydrologic modelling to establish pre-development hydrologic conditions to at-risk wetlands will be completed as part of Phase 2 of this LSS.

4.4 Monitoring

4.4.1 Surface Water Monitoring

A baseflow and surface water level monitoring program is being carried out using nested piezometers, staff gauges and data loggers installed in or near the tributaries and wetlands to evaluate groundwater elevations and baseflow conditions in the nearby surface water features. Seepage meter testing was carried out in selected locations to provide additional quantitative data on potential baseflow. This helped to determine the groundwater base flow conditions to tributaries/wetlands, the impact that development may have on these features, and to complete a feature-based water balance. The surface monitoring data is included in **Table 3.13** in **Appendix C3** and surface water hydrographs are in **Appendix C11**.

4.4.2 Surface Water Quality

In the overall Humber River watershed, surface water quality is variable, with poorest conditions often in the lower watershed. The contaminants of particular concern in the watershed are chlorides (mainly from road salts), phosphorous (fertilizers and sewage cross connections), metals (from natural and industrial sources), E. coli bacteria (sewage/animal waste).

Surface water quality testing was completed for the spring season monitoring period. The results are included in **Appendix C13** and more details will be provided in a future updated report once the full surface water monitoring program is completed.

5.0 Municipal Servicing

Historical municipal servicing plans and drawings have been obtained from the Region of Peel and the Town of Caledon to confirm the existing infrastructure present in the surrounding area.

Planned sanitary and water servicing improvements in the Region of Peel and Town of Caledon have been established through the Region of Peel Water and Wastewater Master Plan (2020), Region of Peel Settlement Boundary Expansion (SABE) Water and Wastewater Servicing Analysis (2022), and ongoing coordination with the Region of Peel.

Refer to **Sections 5.1** and **5.2** for further details on the existing and planned, sanitary and water servicing available for the WVSP area.

5.1 Sanitary Servicing

There are no existing sanitary sewers within the WVSP area or on the arterial roads immediately surrounding the WVSP area. An existing 1200 mm diameter sanitary sewer is located on The Gore Road approximately 615 m south of Mayfield Road. There is also an existing sanitary sewer (size to be confirmed) located on McVean Drive at the intersection with Countryside Drive approximately 1.25 km south of the WVSP area.

Draft Development Charge Project Mapping (2024) was obtained from Region of Peel staff which illustrates preliminary sanitary projects to support the full buildout of the SABE including the WVSP area. The draft mapping is provided in **Appendix E1**. The projects and construction timing shown are preliminary and subject to change.

As illustrated on the Draft Development Charge Project Mapping (2024), refer to **Appendix E1**, a 750 mm diameter sanitary sewer is proposed on The Gore Road through the WVSP area connecting to the existing 1200 mm diameter sanitary sewer approximately 615 m south of Mayfield Road. The McVean Drive sanitary sewer is proposed to be extended north of Mayfield Road on Centreville Creek Road along the frontage of the WVSP area with diameters ranging from 525 to 675 mm.

The WVSP area can be serviced by connections to either of the planned sanitary sewers with the drainage areas and populations to be confirmed in Phase 2 of this LSS.

5.2 Water Supply and Distribution

Per the Peel Water and Wastewater Master Plan (2020), the WVSP area is within Pressure Zone 6 which has a serviceable elevation of 214.5 m – 259.1 m. The WSVP is located within the East Region of Peel transmission system. The system is fed from Lake

Ontario and treated at the Arthur P. Kennedy Water Treatment Plant (HLP1C, HLP2C). Water storage and distribution for the WVSP area is provided by the Tullamore Reservoir (ES4) and Pumping Station (LLP5E, HLP6E) and the Bolton Elevated Tanks (BS6).

Existing 200 mm diameter watermains are located on Centreville Creek Road, Healey Road, and The Gore Road. Existing 300 mm (PD6), 600 mm (PD5), and 750 mm (PD6) diameter watermains are located on Mayfield Road between Centreville Creek Road and The Gore Road. The existing watermain systems are illustrated on **Figure 5.1 (Appendix E2**).

Per the Draft Region of Peel Water Development Charge Mapping (refer to **Appendix E3**), several watermains are planned to be constructed on the arterial roads surrounding the WVSP area. This includes a 600 mm diameter watermain on The Gore Road, a 400 mm diameter watermain on Healey Road, a 400 mm diameter watermain on Centreville Creek Road from Mayfield Road to the approximate middle of the WVSP area, a mid-block 400 mm diameter watermain, and a 900 mm diameter sub-transmission main on Healey Road. Refer to **Figure 5.1 (Appendix E2)** and **Appendix E3** for the location of the planned water servicing infrastructure.

The WVSP area can be serviced with water via local connections to the planned watermains located on Centreville Creek Road, The Gore Road, Mayfield Road (300 mm diameter only), and the mid-block connection.

APPENDICES

APPENDIX A

SECTION 1

APPENDIX A1

APPROVED TERMS OF REFERENCE

Wildfield Village
Town of Caledon, Ontario

Local Subwatershed Study (LSS)

Terms of Reference

Submitted to:
Wildfield Village Landowners Group Inc.
c/o The Arutip Group
25 William Andrew Avenue
Stouffville, ON L4A 3S4

Submitted by:
GEI Consultants Ltd.
100 Ahrens Street West, Unit 201
Kitchener, Ontario N1G 3G9
519-342-3488

SCS Consulting Ltd.
30 Centurian Drive, Suite 100
Markham, Ontario L3R 8B8
905-475-1900

Revised August 2024
Version 3.0 Final

Revisions Registry

Identification	Date	Description of Issued and/or Revision
Wildfield CEISMP Terms of Reference	January 18, 2024	1st Submission to Town
Wildfield LSS Terms of Reference	May 31, 2024	2nd Submission to Town, TRCA and Region of Peel
Wildfield LSS Terms of Reference	August 23, 2024	3rd Submission to Town, TRCA and Region of Peel

Table of Contents

List of Figures

1.0 Introduction

1.1 Purpose

Wildfield Village is located within Peel Region, in the Town of Caledon, within the Region's Urban Boundary. The lands are designated as 2051 New Urban Area in the Peel Region Official Plan (April 2022).

The Wildfield Village Landowners Group are initiating a Local Subwatershed Study (LSS) to support a Secondary Plan process for Wildfield Village. As indicated by the Town of Caledon, the intent of the LSS is to "develop a sustainable development plan for the subject growth area in Caledon by protecting and enhancing the natural and human environments through the implementation of the direction, targets, criteria and guidance of the Region of Peel's Scoped Subwatershed Study (Wood et al., 2022). The LSS will confirm, refine and implement a Natural Heritage System (NHS) and the water resource management approach that will protect, rehabilitate, and enhance the natural and water-based environments within the Secondary Plan Area, and the surrounding lands in the subwatershed."

The proposed scope of work for the LSS is outlined in the following sections. The LSS will address a range of environmental and servicing matters associated with the Wildfield Village Secondary Plan (WVSP) area, including the protection and management of surface water, groundwater, fluvial geomorphology, and terrestrial and aquatic resources. The LSS will also identify the NHS and municipal servicing needs, including stormwater management, sanitary and water servicing and site grading requirements.

The LSS serves to:

- Address the relevant natural features and functions identified in the Provincial Policy Statement (PPS; MMAH 2020), Region of Peel Official Plan, and Town of Caledon Official Plan;
- Provide the foundation for the layout of the Secondary Plan by defining and delineating elements such as the NHS, transportation and servicing networks, and the location of stormwater management (SWM) facilities;
- Follow the direction and guidance of the Scoped Subwatershed Study (Wood et al., 2022) confirming targets and criteria based on site specific data obtained through the Secondary Plan level study; and,

- Define measures to protect and/or enhance the NHS to achieve a robust, healthy NHS.

This Terms of Reference (TOR) was developed with reference to the Region of Peel TOR dated June 2024, originally provided as Appendix F to the Scoped Subwatershed Study (Wood et al., 2022) and the Town of Caledon LSS TOR dated May 2023. It provides guidance for preparation of the LSS, and allows for future modifications to scope and content based on comments and on-going consultation with the Town, TRCA and Region.

As noted in the TRCA TOR guidelines, the LSS will include three phases of reporting including:

- Phase 1 – Characterization of Existing Conditions and Baseline Inventory
- Phase 2 - Analysis, Impact Assessment, Mitigation and Recommendations
- Phase 3 - Implementation, Monitoring and Adaptive Management

The LSS report will be submitted by phase, with the subsequent phase being prepared while the agencies are reviewing and preparing comments on the previous phase. This will allow adequate review time and opportunity to provide comment, while allowing the Study Team to proceed with the next phase ensuring that the overall Secondary Plan process timelines can be achieved.

Each phase of the LSS will include the following study components: natural heritage features, natural hazards; geology; hydrogeology; hydrology; geomorphology; and, municipal servicing. The individual study components will be integrated across the various disciplines in all three phases of the LSS.

The TRCA's Environmental Impact Statement Guidelines (October 2014) and the TRCA's Master Environmental Servicing Plan Guideline (March 2015), will be utilized when preparing the LSS. The LSS will also follow all requirements of the Region of Peel Official Plan, Town of Caledon Official Plan, and the TRCA.

1.2 Study Area

Wildfield Village Secondary Plan (WVSP) area is approximately 358.08 ha in size and is bound by Planned Highway 413 Transportation Corridor to the north, the Greenbelt Plan and The Gore Road to the east, Mayfield Road to the south and Centreville Creek Road to the west (**Figure 1**) and is herein referred to as the WVSP Area. The WVSP area will be the basis for the LSS; however, there are several study components that will have study areas that will go beyond the WVSP limits as follows.

1.2.1 Natural Heritage Study Area

The Natural Heritage Study Area (NHSA) will consist of the WVSP area plus the 120 m adjacent lands. The 120 m adjacent lands allow for the assessment of potential negative impacts on significant features.

1.2.2 Geomorphic Study Area

The geomorphic assessment will be undertaken for watercourses within the WVSP area, as well as receiving watercourses for a distance of approximately 250 m downstream of the study area. The assessment for the downstream reaches will be used to assess the impacts of the proposed development to these reaches, from a geomorphic perspective. Recognizing that these reaches flow on lands that are not participating in the current study, where appropriate, these geomorphic assessments will be completed within the road right-of-way, or through desktop-based methods.

1.2.3 Hydrologic Study Area

The WVSP is located within the upper reaches of the Humber River and is identified as being in the West Humber subwatershed. The Hydrologic study area (HSA) will encompass the WVSP area, in addition to external drainage from lands upstream that flow through the WVSP area. The HSA will also include key flow nodes downstream of the WVSP area to Lake Ontario. These flow nodes will be utilized to compare post development flows to pre-development flows to assess potential impacts and develop mitigation plans specific to the WVSP.

1.3 Existing Land Use and Ownership

The WVPS Area is dominated by active agricultural lands, with scattered wetlands and headwater drainage features occurring on the tableland. The West Humber River and its associated valley occur north and east of the Study Area, within the Greenbelt Plan area. This valley consists of woodland and wetland habitat. Residential homes front onto portions of the roads bordering the WVPS Area.

Wildfield Village is comprised of relatively even mix of participating and non-participating properties. **Figure 2** shows the ownership for the WVPS Area with approximately 57% of the lands participating in the Secondary Plan process including the LSS.

1.4 Background Studies and Guidelines

There are numerous studies, plans, guidelines, etc. that will provide input and guidance to the preparation of the LSS. The following list outlines a number of these studies noting that it is not an exhaustive list and that additional information obtained while preparing the LSS will be including in the final report:

- Region of Peel Official Plan (2022);
- Region of Peel Settlement Area Boundary Expansion Study (SABE), (2022);
- Scoped Subwatershed Study (SSS), Part A: Existing Conditions and Characterization (Final Report), Settlement Area Boundary Expansion, Region of Peel, (Wood., 2022);
- Scoped Subwatershed Study (SSS), Part B: Detailed Studies and Impact Assessment (Final Report), Settlement Area Boundary Expansion, Region of Peel, (Wood., 2022);
- Scoped Subwatershed Study (SSS), Part C: Implementation Plan (Final Report), Settlement Area Boundary Expansion, Region of Peel, (Wood., 2022);
- Region of Peel Water and Wastewater Master Plan (2020);
- Town of Caledon: Development Standards Manual (2019);
- Town of Caledon Official Plan (March 2024);
- Draft Town of Caledon Growth Management Phasing Plan and Financial Impact Assessment Presentation (2023);
- Municipal Consolidated Linear Infrastructure Environmental Compliance Approvals, Ministry of Environment, Conservation and Parks (MECP), (June 2023);
- A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2020);
- Mayfield Road Improvements (Airport Road to Coleraine Drive) Class Environmental Assessment – Environmental Study Report, (Stantec, 2013);
- Development Charges Background Study – Consolidation Report, The Regional Municipality of Peel (Watson & Associates Economists Ltd., 2020)
- 2051 Transportation Master Plan, Peel Region,

- Species at Risk in Ontario (SARO) List, regulation to the Endangered Species Act, 2007 (ESA);

- Ministry of Natural Resources: Natural Heritage Reference Manual: Second Edition (OMNR 2010);

- Humber River Watershed Plan (TRCA, 2008) and any on-going updates including the Humber River Watershed Characterization Report (TRCA, 2023);

- Humber River Watershed Plan Implementation Guide (TRCA, 2008);

- Humber River State of the Watershed Reports (TRCA, 2008);

- Final Report Humber River Hydrology Update (TRCA, 2018);

- Listen to Your River: A Report Card on the Health of the Humber River Watershed (TRCA, 2007);

- Humber River Fisheries Management Plan (MNR and TRCA, 2005);

- TRCA Master Environmental and Servicing Plan Guideline (TRCA, 2015);

- Evaluation, Classification, and Management of Headwater Drainage Features Guidelines (CVC & TRCA, 2014);

- TRCA Guidelines for Review of SWM Pond Location with Respect to Groundwater Conditions;

- TRCA Stormwater Management Criteria Document (TRCA, 2012);

- Erosion and Sediment Control Guide for Urban Construction (TRCA, 2019);

- Crossings Guideline for Valley and Stream Corridors (TRCA, 2015);

- Channel Modification Design and Submission Requirements (TRCA, 2007);

- Technical Guidelines for Flood Hazard Mapping (TRCA and other Conservation Authorities, 2017);

- TRCA/CVC Low Impact Development Stormwater Management Planning and Design Guide (February 2024) https://wiki.sustainabletechnologies.ca/index.php?title=Main_Page&oldid=15953;

- Geotechnical Engineering Design and Submission Requirements (TRCA November 2017);
- Hydrogeological Assessment Submissions- Conservation Authority Guidelines to Support Development Applications (Conservation Ontario 2013);
- Technical Guide for River & Stream Systems: Erosion Hazard Limit (MNRF, 2002);
- Ministry of the Environment Water Well Records;
- Approved CTC Source Protection Plan (CTC Source Protection Committee, 2022); and,
- Approved Assessment Report: Toronto and Region Source Protection Area (CTC Source Protection Committee, 2022)

1.5 Technical Advisory Committee (TAC)

A Technical Advisory Committee will be formed consisting of members from the Town, TRCA, the Region and the Consulting Team. Through the completion of the LSS analyses, regular monthly meetings will be held to discuss technical matters, as needed.

2.0 Phase 1- Subwatershed Characterization and Integration

The scope of work in Phase 1 includes the characterization of existing conditions and development of a baseline inventory, as well as the cross-synthesis of the various disciplines, as outlined in the following sections. Tasks relating to the understanding of the existing inter-relationships between groundwater, surface water, and natural heritage features and delineation of the NHS and are presented in Sections 2.2.3 and 2.2.4, respectively.

2.1 Background Information Review

a) Compile and review existing studies, plans, mapping, etc.

b) Summarize existing policies, guidelines, and legislation affecting LSS study components.

c) Identify data gaps and make suggestions for continued monitoring to fill the data gaps during Phases 2 and 3 of the LSS.

2.2 Natural Heritage and Hazards

2.2.1 Natural Heritage Assessment

a) Characterize natural heritage features through ecological inventories on participating lands of the NHSA as outlined in Sections 2.2.1.1 through 2.2.1.9. Non-participating lands of the NHSA will be assessed through a desktop analysis, including air photo interpretation.

b) Summarize all pertinent information relating to the data collection including dates and times of field visits, names of surveyors, and weather conditions.

c) Document protocols for the various surveys and prepare mapping to identify the location of all sampling/survey efforts.

d) Conduct a Species at Risk Screening exercise.

2.2.1.1 Ecological Land Classification (ELC) and Botanical Surveys (completed)

a) Prepare ELC mapping to identify vegetation communities and other important features on and adjacent to the property, including a description of vegetation within ELC units (to the extent possible).

b) Prepare ELC Mapping to identify significant species and feature locations.

c) Complete an assessment of terrestrial connectivity.

2.2.1.2 Breeding Bird Surveys

a) Conduct conventional breeding bird surveys (completed);

2.2.1.3 Calling Amphibian Surveys

a) Complete call surveys within suitable habitat areas that have the potential to undergo direct or indirect impacts from adjacent development (completed);

2.2.1.4 Reptile Surveys

a) Complete Snake and turtle surveys to determine if there is suitable reptile habitat in the NHSA (completed);

2.2.1.5 Aquatic Habitat Assessment

a) Undertake a visual survey of existing in-stream and riparian conditions along and adjacent to the watercourses (completed);

2.2.1.6 Fish Community Sampling

a) Conduct Fish Community sampling to confirm the distribution and extent of direct fish habitat in the watercourses, and to identify species diversity and relative abundance (complete);

2.2.1.7 Headwater Drainage Feature (HDF) Assessments

a) Characterize all hydrologic features utilizing the TRCA’s Interim Guidelines for the “Evaluation, Classification, and Management of Headwater Drainage Features” (2014) including watercourses, natural areas providing flood storage attenuation, depression storage, recharge areas, seepage areas or springs, and HDFs (complete);

2.2.1.8 Bat Habitat Assessment and Bat Acoustic Monitoring Surveys

a) Conduct bat habitat and acoustic monitoring surveys to understand the presence/absence of Species at Risk (SAR) bats and bat Significant Wildfield Habitat (complete);

2.2.1.9 Staking of Natural Heritage Features

a) Undertake staking of all natural features (e.g. dripline, top-of-bank, and wetlands) on participating landowner parcels with TRCA and the Town of Caledon .

b) Provide a survey copy of the staked lines stamped by an Ontario Land Surveyor.

2.2.2 Natural Hazards

2.2.2.1 Erosion Hazards

a) Complete a geomorphic analysis to support the erosion hazard delineation for applicable tributaries within the WVSP area (i.e., meander belt delineation for unconfined valley systems, and calculation of the toe erosion allowance for confined valley systems), following established protocols.

b) For the Phase 1 report, a preliminary, desktop level slope stability assessment will be completed for confined valley systems along the east side of the WVSP Area. The confined valley in the north of the WVSP Area is north of the Planned Highway 413 Transportation Corridor and will not be assessed. The assessment will include using LiDAR topographic data and conservative assumptions for toe erosion allowances and stable slope inclinations, to estimate the long-term stable top of slope in accordance with TRCA Guidelines. Commentary will be provided to identify where detailed slope stability assessments are required to be completed as part of the Draft Plan of Subdivision process, including preparing cross-sections of steep, or long, or unstable slopes in valley corridors in accordance with TRCA Geotechnical Guidelines. Slope conditions shall be investigated and modelled, and slope stability assessed as part of detailed geotechnical studies completed in support of Draft Plan of Subdivision applications.

2.2.2.2 Flood Hazards

a) Review and verify available TRCA hydraulic models (both engineered and estimated HEC-RAS models) and floodplain mapping for the tributaries of the Humber River located within the WVSP area.
b) Delineate floodlines for watercourses (defined bed and bank) within the WVSP area, not previously mapped by TRCA, as required.
c) Identify existing Flood Vulnerable Areas (FVAs) downstream of the WVSP area that will potentially be impacted from future development in the WVSP area.

2.2.3 Natural Heritage System Evaluation

a) Describe existing natural heritage conditions in the NHSA, including aquatic and terrestrial features and functions.

b) Identify and analyze key ecological features and functions, with consideration to whether any refinements to the (additions or minor deletions) are warranted based on current site data.

c) Identify key features and ecological functions, including the natural heritage features identified in the PPS (MMAH 2020), Region of Peel Official Plan (2022), Caledon Official Plan (2024), SABE SSS (Wood, 2022), and Humber River Watershed Characterization Report (TRCA, 2023), within the NHSA and on adjacent lands that may be affected by development, to the extent possible using aerial photography.

d) Identify features (e.g., certain vegetation communities that support concentrations of significant species, structures, habitat elements) that would qualify as significant habitat (i.e. Significant Wildlife Habitat screening).

e) Identify key features and/or functions that contribute significantly to the ecological integrity or importance of the proposed NHS.

f) Identify the natural heritage system for the NHSA area and document sensitivities to changes in land uses.

g) Identify habitats that support species that have designations under the Endangered Species Act or the Species At Risk Act; and provincially significant areas under the Provincial Policy Statement (2014) such as significant valley lands, significant woodlands, significant wildlife habitat and significant wetlands. Also identify species and communities of concern as ranked by TRCA, as well as Locally Significant Features and Areas pursuant to applicable municipal and TRCA policies.

2.2.4 Opportunities and Constraints Mapping

a) Prepare Opportunities and Constraints mapping that would include: watercourses, protected HDFs, existing flood limits (if defined bed and bank), erosion limits, meander belt widths, staked top-of-bank, long-term stable top-of-bank, wetland and dripline boundaries, linkages and enhancement areas.

b) Identify minimum buffers for natural features and natural hazards (flooding and erosion) required by any applicable provincial plans, municipal policies and/or TRCA policies.

c) Delineate the Natural Heritage System (NHS) based on the established constraints, hazards and associated buffers. The LSS will work towards confirming the environmentally appropriate limits of development and appropriate uses within the NHS. The final limits of development will be established through the more detailed analysis at the Draft Plan of Subdivision stage once feature based water balance assessments have been completed.

d) Utilize this mapping to integrate into the proposed land use concept, looking at alternatives for locations of stormwater management facilities, parks and open space, as well as for consideration when siting potential uses in the NHS (i.e., infrastructure, trails, etc.). This mapping will ultimately feed into establishing the limit of development through more detailed study at the Draft Plan of Subdivision stage of the development process.

2.3 Groundwater

2.3.1 Geological and Hydrogeological Setting

a) Characterize the existing geological and hydrogeological setting. Results from the studies outlined in Section 1.4 shall be used to build upon the current understanding of geology and groundwater systems determined from the review of past studies.

b) Identify site stratigraphy and hydrostratigraphy.

c) Identify areas of groundwater recharge and discharge.

d) Determine hydraulic properties of stratigraphic units including those units that transmit groundwater to natural features such as watercourses and wetlands.

e) Delineate shallow and deeper groundwater flow patterns and hydraulic gradients in the WVSP area.

f) Identify groundwater-dependent natural features and characterize their relationship with the local surface water/groundwater flow conditions.

g) Quantify baseflow contributions to streams and/or wetlands in the WVSP area.

h) Complete surface and subsurface soils analysis, including groundwater conditions and inter-relationships with environmental features such as watercourses and wetlands (i.e., sources of water to feature).

2.3.2 Water Balance for Groundwater Recharge

a) Obtain the available groundwater model(s) from the Oak Ridges Moraine Groundwater Program and/or the Region of Peel.

b) Review the applicability of the available groundwater model(s) to the WVSP area in comparison to the Thornthwaite and Mather Methodology.

c) Utilizing the Town’s preferred groundwater model(s), estimate the pre-development overall site water balance to determine the existing annual site infiltration and runoff rates.

d) Set targets to meet average annual infiltration volumes for meeting overall site water balance for groundwater recharge.

2.3.3 Water Supply Wells

a) Complete a desktop assessment of existing water supply wells to identify the local use of groundwater resources in the study area. The online MECP Water Well Record database shall be used to determine the potential nearby water users for the desktop assessment. A door-to-door private well survey will be completed for all houses within 500 m of the WVSP area.

b) Establish baseline groundwater levels and quality of nearby well users; which should be used to support the development of a baseline aquifer monitoring program. The baseline conditions will be determined using the door-to-door private well survey of all houses within 500 m of the WVSP area, where a questionnaire will be provided including questions about water quality and yield. Any responses received back from the well owners will be incorporated into the report. In-situ testing and sampling of the private wells will not be completed as part of the LSS in support of the Secondary Plan process.

2.3.4 Monitoring

a) Provide a summary of groundwater monitoring completed for the WVSP area and identify any data gaps for long-term monitoring by the Town of Caledon.

2.4 Surface Water

2.4.1 Hydrologic Assessment

a) Characterize the existing hydrologic setting.

b) Identify existing storm drainage patterns and external drainage impacting the WVSP area.

c) Survey and undertake field inspection of existing culverts, as necessary, including a map showing locations and sizes.

d) Provide a summary of applicable stormwater management criteria for quantity, quality and erosion control. Include the Humber River unit rates for quantity control of 2 through 100 year storm events.

e) Review and verify TRCA Humber River Watershed existing conditions hydrology model (Visual Otthymo) based on existing land use and topography.

f) Discretize the Regional storm event TRCA Humber River Watershed existing conditions hydrology model (Visual Otthymo) for the purposes of establishing pre-development targets for stormwater management for the WVSP area.

g) Report Regional storm event peak flows from the TRCA Humber River Watershed existing conditions hydrology model (Visual Otthymo) at key flow nodes downstream of the WVSP area down to Lake Ontario.

2.4.2 Geomorphic Assessment

a) Delineate reaches based on assessment of geomorphic form and processes, following a review of current aerial photographs, surficial geology and topographic mapping.

b) Complete rapid geomorphic assessments for defined watercourse reaches within the WVSP area and immediately downstream, to document active geomorphic processes and stream health, and to characterize the reaches based on their sensitivity to erosion. This will help to identify locations requiring detailed erosion assessments.

c) Complete detailed geomorphic assessments for receiving watercourses located downstream of the proposed stormwater management facilities (5, based on the current stormwater management plan). The detailed geomorphic assessment to consist of a survey of the longitudinal profile for an appropriate length of stream, minimum of 5 cross-sections, characterization of riparian vegetation, bed substrate and bank materials, and calculation of an estimate of bankfull discharge.

d) Develop erosion thresholds (i.e., the critical discharge required to entrain the bed and/or bank materials) for the five receiving watercourses, following standardized approaches (primarily the TRCA’s Stormwater Management Criteria among others).

e) Complete erosion exceedance analysis under existing conditions using the results of the continuous simulation hydrological modelling. The following parameters will be considered to establish baseline conditions: cumulative time of exceedance, cumulative effective velocity, cumulative effective discharge, and cumulative effective work.

2.4.3 Feature Based Water Balance Assessment

a) Complete wetland screening and water balance risk evaluation to identify under proposed development conditions which individual wetlands (onsite and on adjacent lands) will have changes to their hydrology to be at risk for negative impacts to their form and/or function.

b) Identified wetlands that are assessed through the screening/risk evaluation to be at risk for negative impacts to their form and/or function, are to be assessed further to first identify options to avoid impacts. Where impacts are not avoidable for a given wetland, continuous simulation hydrological modelling (including, pre-development, post-development without mitigation and post-development with mitigation) is to be completed to assess suitable options to maintain pre-development wetland hydrology post-development (e.g., hydrologic inputs from Low Impact Development measures).

2.4.4 Monitoring

a) Provide a summary of existing conditions surface water quality monitoring completed for the WVSP area.

b) Undertake surface water quality monitoring for the WVSP area generally as follows:

   i. Complete six (6) surface water quality monitoring events between April and December 2024 with surface water quality samples collected at each station for one (1) wet and one (1) dry event for each season.

   ii. Collect two (2) grab samples for each wet weather event; one grab sample must be collected during the onset of the storm and one grab sample must be collected during the recession of the storm. A “dry” weather event is considered to be an event completed where precipitation has not occurred within the previous 72 hours. A “wet” weather event is considered to be any precipitation event of 5 mm or more in a 24-hour time period.

   iii. Analyze the grab samples for each wet weather and dry weather event for the following contaminants:

      - Oil and Grease
      - Total Phosphorus
      - Anions (Nitrate, Nitrite, Phosphate, Chloride)
      - Ammonia
      - Total Kjeldahl Nitrogen (TKN)
      - Conductivity
      - Total Solids (TS)

- Total Suspended Solids (TSS)
- Biochemical Oxygen Demand (BOD5)
- PH/alkalinity
- Total Coliforms/Fecal Coliforms/E.Coli
- PAH
- Metals (Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, P, K, Se, Si, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn, Zr)
- Hardness as $CaCO_3$
- Turbidity

iv. Field measurements of the following contaminants will be measured using a water quality probe during the sampling event:

- Dissolved Oxygen
- PH
- Salinity
- Temperature

2.4.5 Municipal Servicing

a) Provide an overview of existing and/or planned servicing infrastructure, sanitary and water, that will be utilized to service the WVSP area including quantification of available capacity, and identification of logical connection points.

3.0 Phase 2: Impact Assessment

The results of the Phase 1 Study will be utilized to complete the analysis required for Phase 2. Phase 2 will introduce the land use plan, and will consist of an assessment of the potential for impacts on natural heritage features and functions, as well as on groundwater and surface water that might result from the proposed development.

3.1 Natural Heritage

a) Complete an integrated assessment of potential negative impacts of the land use plan and climate change on terrestrial and aquatic systems, including a discussion related to the potential magnitude and longevity of impacts on the NHS.

b) Assess wetland data in accordance with the updated Ontario Wetland Evaluation System (OWES; MNRF 2022) and submit to the Town of Caledon for their records. Complete a wetland water balance risk evaluation for all wetlands identified in the NHSA.

c) Identify restoration/enhancement opportunities using the Town of Caledon's Official Plan mapping and policies, TRCA's Terrestrial Natural Heritage System Strategy, and the applicable watershed plan(s).

d) Develop strategies to mitigate impacts to Species at Risk, including Redside Dace (*Clinostomus elongatus*).

e) Demonstrate conformity of the land use plan with applicable policies, including the PPS, Regional and Local Municipal Official Plans, the Conservation Authorities Act, the federal Species at Risk Act, and the provincial Endangered Species Act.

3.2 Groundwater

a) Identify potential impacts of the proposed land use and climate change to local groundwater resources and groundwater-dependent supported features based on implementation of the land use plan. This is to include assessment of the impact on local groundwater flow patterns, infiltration and recharge, discharge patterns, and the effects on existing well users and the natural environment, including a reduction in infiltration, impacts to natural flow system(s), and changes to groundwater and surface water quality.

b) Undertake a preliminary assessment of dewatering requirements during the installation of services based on the conceptual servicing plan prepared for the WVSP area. Should dewatering be required, assess the potential impacts on the natural flow regime and potential impacts to nearby water supply wells and natural features.

c) Utilizing the selected groundwater model(s), estimate the post-development overall water balance for the WVSP area to determine the future annual infiltration and runoff rates due to the proposed development.

d) Discuss the impact of reduced infiltration and increased runoff volumes on the natural environment within the WVSP area.

e) Assess potential impacts to existing wellhead protection zones (if any) that may result during the construction and post-construction periods and increases to the aquifer vulnerability.

3.3 Surface Water

3.3.1 Hydrologic Assessment

a) Discretize the TRCA Humber River Watershed future conditions hydrology model (Visual Otthymo) for the purposes of establishing post-development uncontrolled flows for the WVSP area.

b) Update the TRCA future conditions hydrologic model for the 2 through 100 year and Regional storm events (Visual Otthymo), to reflect proposed future land uses within the WVSP area in accordance with the land use plan.

c) Report post development uncontrolled peak flows and compare to pre-development peak flows for the 2 through 100 year and Regional storm events at key nodes downstream of the WVSP area to Lake Ontario.

d) Assess the implications of uncontrolled future flows in existing downstream flood vulnerable areas validating the need for end-of-pipe SWM facilities providing control of post development flows to pre-development levels for the

Regional storm event.

e) In consultation with the Town and TRCA, complete a climate change assessment consisting of evaluating the hydrologic impacts of the proposed land use under future climate change scenario(s).

3.3.2 Geomorphic Assessment

a) Prepare a detailed scope of work for future post development erosion assessment(s) to determine stormwater management requirements for erosion control (i.e. extended detention depth and duration) and water balance (i.e. retention depth). The post development erosion assessment(s) will be completed at the next stage of the development process in support of Draft Plan of Subdivision applications. Refer to Section 4.4 for future study requirements.

b) Establish which properties within the WVSP area will require post development detailed erosion assessments in support of Draft Plan of Subdivision applications. This will be dependent on proposed SWM facility and storm outfall locations.

3.3.3 Feature Based Water Balance Assessment

a) Identify natural features requiring feature-based water balance assessments to mitigate future development impacts resulting from implementation of the proposed land use plan. The post development feature-based water balance impact assessments for these features will be completed at the next stage of the development process in support of Draft Plan of Subdivision applications. Refer to Section 4.4 for future study requirements.

b) Establish which properties within the WVSP area will require feature-based water balance assessments in support of Draft Plan of Subdivision applications. This will be dependent on the locations of the natural features requiring mitigation, as well as the location of the development causing the impact to the feature.

3.3.4 Hydraulic Assessment

a) Based on the results of the HDF Assessment and delineation of existing flood hazards completed in Phase 1, identify where modifications to the floodplain are required based on the land use concept.

b) Where required, complete preliminary cut and fill balance analysis to ensure that the conveyance of flood flows will remain unaffected.

3.4 Municipal Servicing

3.4.1 Grading

a) Prepare a Preliminary Grading Plan showing centreline road grades based on the conceptual road alignments.

b) Provide direction to more detailed grading analyses to be completed at the Draft Plan of Subdivision stage of the development process.

c) Identify any areas where grading is required within the NHS for the implementation of infrastructure, trails or roads and assess potential impacts from grading on natural features and functions of the NHS.

3.4.2 Sanitary Sewer Servicing

a) Complete conceptual sanitary flow generation calculations based on the land use plan.

b) Prepare preliminary design and layout of internal trunk sanitary servicing system within the WVSP area.

c) Provide confirmation of conformance of the plan to the most current Region of Peel Water and Wastewater Master Plan.

d) Confirm capacity of existing downstream sanitary infrastructure to facilitate any proposed interim and ultimate servicing strategies through consultation with Region staff.

e) Identify potential impacts to the NHS from the proposed sanitary sewer servicing strategy.

3.4.3 Water Supply and Distribution

a) Develop a conceptual fire and peak daily water demand associated with the land use plan.

b) Identify the preliminary alignment and design of the internal distribution water supply system, and associated connection points to the external system.

c) Provide confirmation of conformance of the plan to the most current Region of Peel Water and Wastewater Master Plan.

d) Identify potential impacts to the NHS from the proposed water supply and distribution strategy.

e) Hydrant testing/pressure monitoring to be conducted, as required.

4.0 Phase 3: Management, Implementation and Monitoring

4.1 Management and Implementation

4.1.1 Natural Heritage

a) Develop a Restoration and Enhancement Plan for the NHS that will enhance the ecological integrity and function, optimize biodiversity and restore natural features. This plan will also establish ecological targets to guide the design of site-specific restoration/enhancement initiatives.

b) Confirm that any proposed feature removals and compensation initiatives are technically feasible, including identification and quantification of those features that are proposed to be removed, and confirmation that:

   i. the restoration and enhancement strategy is of an appropriate scale, particularly when replicating and compensating for features that will be removed from the landscape; and,

   ii. the locations for restoration and enhancement are feasible for the type of the restoration or enhancement initiative that is proposed, in consideration of local site conditions.

c) Confirm that any proposed feature removals and compensation/restoration appropriately addresses policy and regulation requirements of the agencies having jurisdiction.

d) Prepare an implementation strategy to guide the timing/sequencing of implementation of the various restoration and enhancement initiatives in consideration of the following:

   i. Land ownership;

   ii. Sequencing of servicing and build-out;

   iii. Seasonal timing;

   iv. Habitat protection requirements;

   v. Requirements for the establishment of the restored areas;

vi. Practical considerations including site accessibility and construction logistics; and,

vii. Responsibilities for implementation.

e) Prepare a management plan that will address care of plantings, invasive species control, and other adaptive management initiatives that may be required to ensure that the restoration and enhancement initiatives become established and evolve to attain the defined ecological targets.

4.1.2 Groundwater

a) Provide preliminary recommendations and measures to be considered during construction to mitigate impacts to local groundwater resources resulting from dewatering.

b) Develop a post development Low Impact Development (LID) strategy to mitigate impacts to the water balance caused by decreases in infiltration and increases in runoff.

c) Identify potential surface water infiltration opportunities based on soils information, depth to the water table, and aquifer vulnerability.

4.1.3 Surface Water

a) Develop a Stormwater Management (SWM) strategy, including LID measures and end of pipe SWM facilities that achieves the SWM criteria for quantity (post to pre control for the 2 through 100 year and Regional storm events), quality (Enhanced level), and erosion control, in addition to mitigating impacts to water balance. Natural heritage, groundwater and surface water impact assessments shall be considered when developing the SWM strategy.

b) Determine the required storage volumes to control post development flows to pre-development levels on a catchment basis for the 2 through 100 year and Regional storm events.

c) Verify the SWM strategy conformance with the criteria developed as part of the Phase 1 Study.

d) Identify additional systems such as Clean Water Collector (CWC) systems, required to support LID measures as part of the overall water balance mitigation strategy and/or any feature specific water balance mitigation strategy, where required.

e) Provide general design criteria for end-of-pipe SWM facilities that will work toward mitigating the impacts from the land use plan. The criteria will provide guidance at the next stage in the development process in support of Draft Plan of Subdivisions for sizing and grading of SWM facilities.

f) Provide an overview of timing, phasing and cost sharing requirements for end-of-pipe SWM facilities.

4.1.4 Municipal Servicing

a) Identify any mitigation measures required to amend any water pressure exceedances encountered to support the proposed development of the WVSP area including, but not limited to, remediation and improvements to the existing water infrastructure to ensure water pressures are within Town standards.

b) Provide timing and phasing recommendations for the construction of municipal services.

4.2 Monitoring Plan

a) Prepare a Monitoring Plan to monitor the subwatershed response to the proposed land use change such that impacts can be distinguished from natural trends at an early stage. This will provide an ability to focus future monitoring (to be completed by the Town, Region and/or TRCA) to help determine the how/why/frequency of potential impacts and will assess cause-effect relationships between the environment and land use change.

b) Include the preparation of construction and post-construction environmental monitoring plans that will establish monitoring objectives, responsibilities, requirements, and timing for monitoring of components of the NHS where warranted. Consultation with agencies will be required to obtain input to a monitoring plan to yield targeted, useful data that will satisfy specific monitoring objectives.

c) Identify key features and functions that are to be monitored, and associated protection goals and objectives. Provide performance targets for evaluation of the proposed mitigation measures. Formulate a Monitoring Plan to monitor the success of the mitigation measures in relation to the performance targets.

d) Items that are recommended to be monitored over the long term include:

   i. Water quality and quantity, including stormwater system performance;

   ii. Fisheries and aquatic resources;

   iii. Groundwater quality and quantity;

   iv. Stream morphology and slope stability;

   v. Terrestrial resources including woodlands, wetlands, flora and fauna, Environmentally Sensitive Areas, Areas of Natural or Scientific Interest, terrestrial linkages, buffer areas, invasive species, natural system encroachments, and natural system edge management; and,

   vi. Feature Based and Site Water balance and the effectiveness of infiltration measures.

e) Address costs and responsibilities for monitoring, and length of time for monitoring within the Monitoring Plan.

4.3 Adaptive Management Plan

a) Prepare an Adaptive Management Plan (AMP) that will suggest adaptive responses where impacts are being observed through the monitoring program.

b) Provide metrics for evaluating the monitoring results in relation to the management targets.

c) Identify components of the proposed mitigation measures that can be adjusted in response to monitoring results should adaptation be required.

d) In preparation of the AMP, give consideration to the MECP broad-based community monitoring plans that support the Consolidated Linear Infrastructure ECA process, if available.

e) Discuss responses to changing conditions or anticipated impacts, which may include more aggressive monitoring.

f) Working in coordination with the Climate Adaptation Plan scope, and through further consultation with the Town and TRCA, incorporate potential climate change considerations within the proposed management and implementation strategy, demonstrating compliance with the Town of Caledon's Community Climate Change Action Plan and the Region of Peel's Climate Change Master Plan.

4.4 Future Study Requirements

4.4.1 Comprehensive Servicing and Stormwater Study

Following completion of the LSS and subsequent to the Secondary Plan process, individual properties may proceed with development applications for Draft Plan of Subdivision approval. In support of the first Draft Plan of Subdivision application(s) within the WVSP area, a Comprehensive Servicing and Stormwater Study (CSSS) will be required for the entire WVSP area. Subsequent Draft Plan of Subdivision applications would then be required to update or amend the initial CSSS to accompany each Draft Plan submission that follows.

The purpose of the CSSS will to provide a comprehensive servicing and stormwater management (SWM) plan for the entire WVSP area. It will involve preparation of a Comprehensive Concept Plan for the WVSP area, utilizing the proposed Draft Plan of Subdivision(s) and preparing concept plans for future and non-participating lands. A Terms of Reference for the CSSS will be provided as part of the Phase 3 Study of the LSS.

4.4.2 Draft Plan of Subdivision Studies

Consistent with the Town of Caledon's requirements for Draft Plan of Subdivision applications, the following studies (associated with the LSS) will be required at the next stage of the development process:

a) Environmental Impact Study (EIS) including establishing Limits of Development
b) Geotechnical Study
c) Hydrogeological and Water Balance Study (HWBS)
d) Functional Servicing and Stormwater Management Report (FSSR)
e) Detailed Erosion Assessment (as needed)
f) Feature Based Water Balance Assessment (as needed)

Prepared By:

GEI Consultants

George Buckton

George Buckton, M.F.C.
416-816-2246
gbuckton@geiconsultants.com

SCS Consulting Group Ltd.

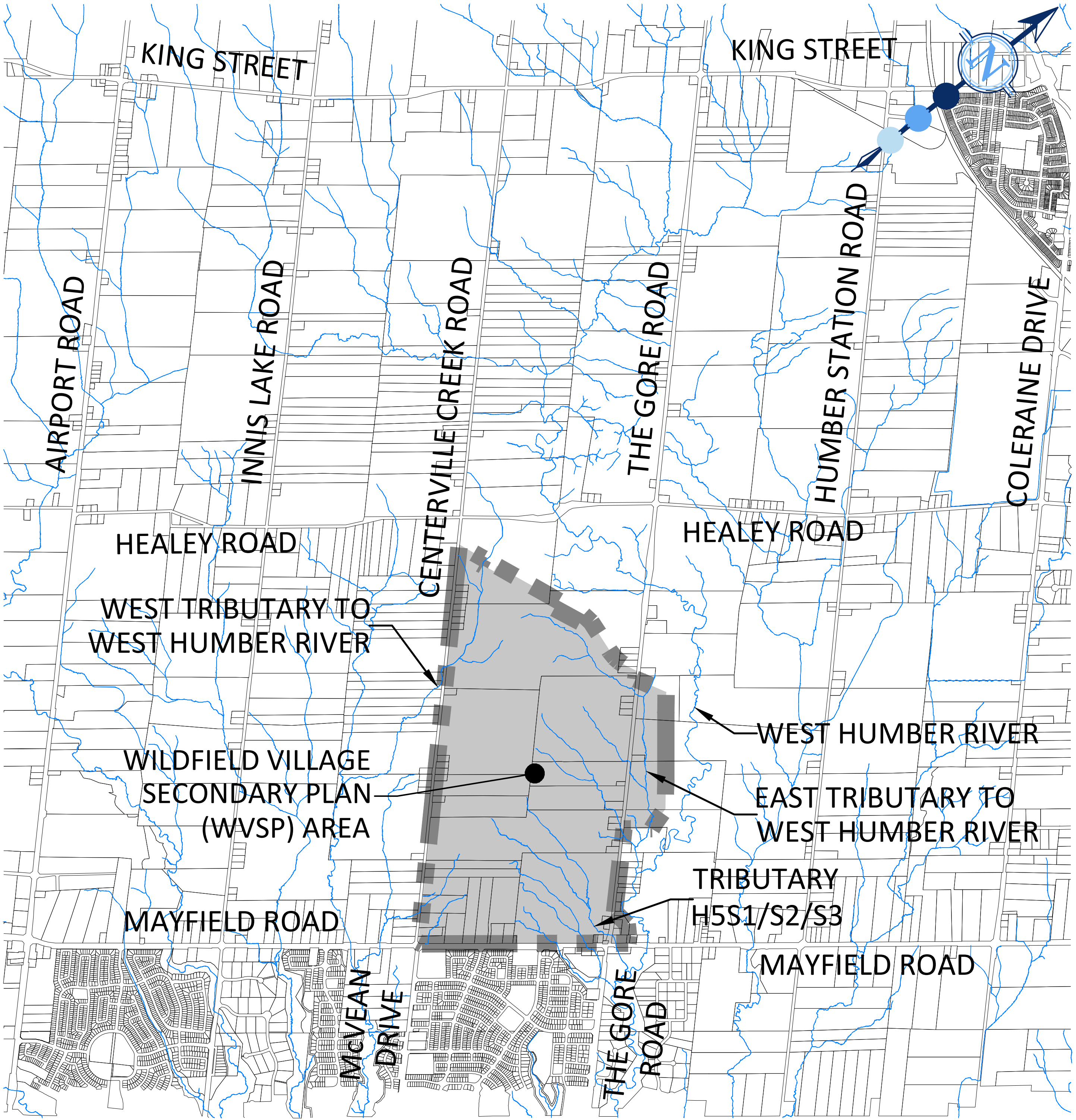
Andrea Keeping

Andrea Keeping, P.Eng.
416-997-4040
akeeping@scsconsultinggroup.com

Figure 1: Wildfield Village Secondary Plan Area

APPENDIX A2

FIGURES



SCS consulting group ltd

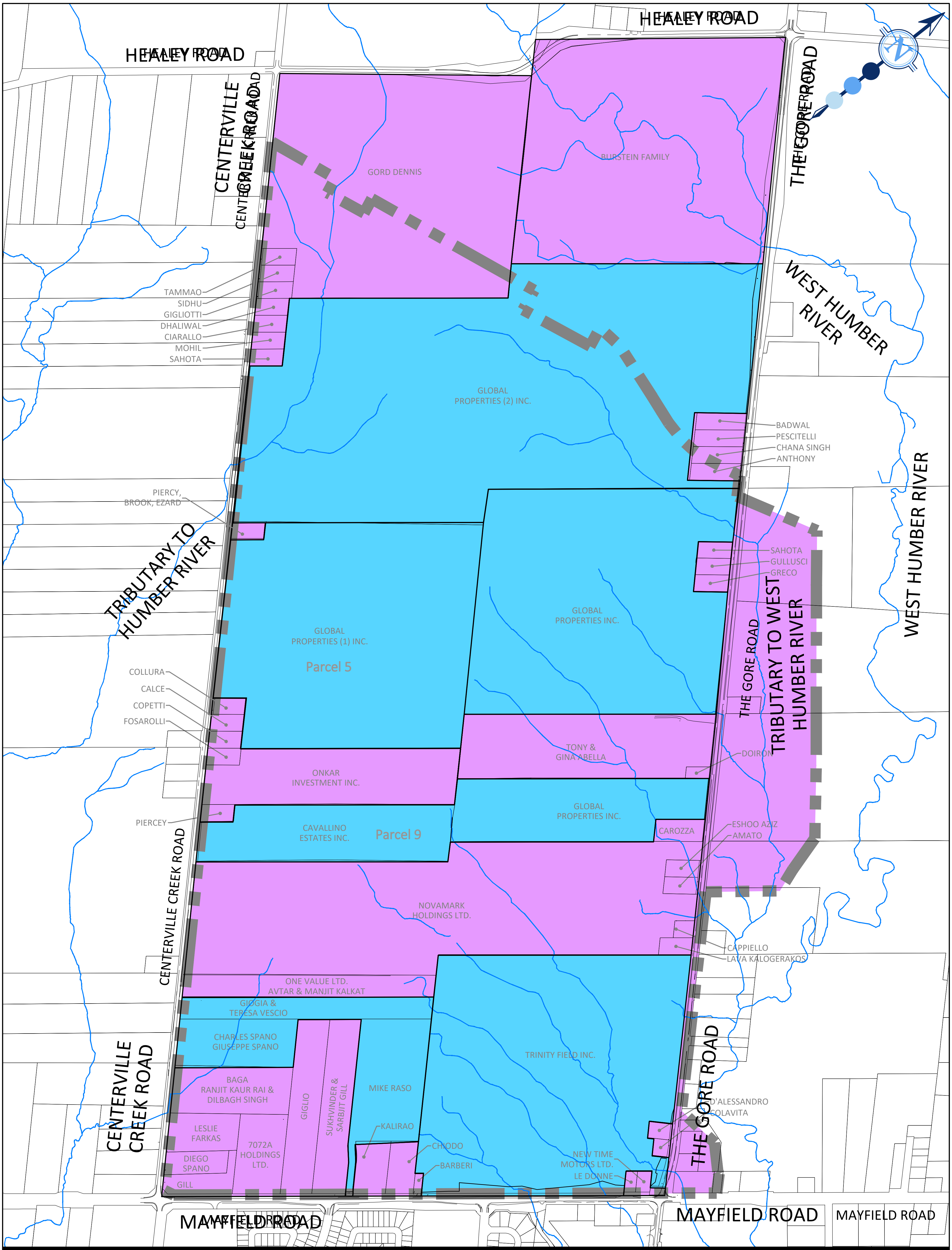
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

WILDFIELD VILLAGE

KEY PLAN

DESIGNED BY: R.R.B.	CHECKED BY: A.R.K.	PROJECT No: 2630	FIGURE No: 1.1
SCALE: N.T.S.	DATE: SEPTEMBER 2024		

File: P:\2630 Wildfield Village\Drawings\LSS\Fig\Report Figures\2630P-LOCT-1.1.dwg — Revised by <JNELLAS> : Thu, Oct 03 2024 — 9:56am



LEGEND:

▬ ▪ ▪ ▬ WILDFIELD VILLAGE SECONDARY PLAN (WVSP) AREA LIMITS

— WATERCOURSE (TRCA, 2018)

🟦 PARTICIPATING LANDOWNERS

🟪 NON-PARTICIPATING LANDOWNERS

WILDFIELD VILLAGE

LANDOWNERSHIP

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

DESIGNED BY:	R.R.B.	CHECKED BY:	A.R.K.
SCALE:	1:10000	DATE:	SEPTEMBER 2024

PROJECT No: 2630

FIGURE No: 1.2

File: P:\2630 Wildfield Village\Drawings\LSS\Fig\Report Figures\2630P-LAND-OWNR-1.2.dwg - Revised by <JNELLAS> : Fri, Sep 27 2024 - 11:10am

APPENDIX B

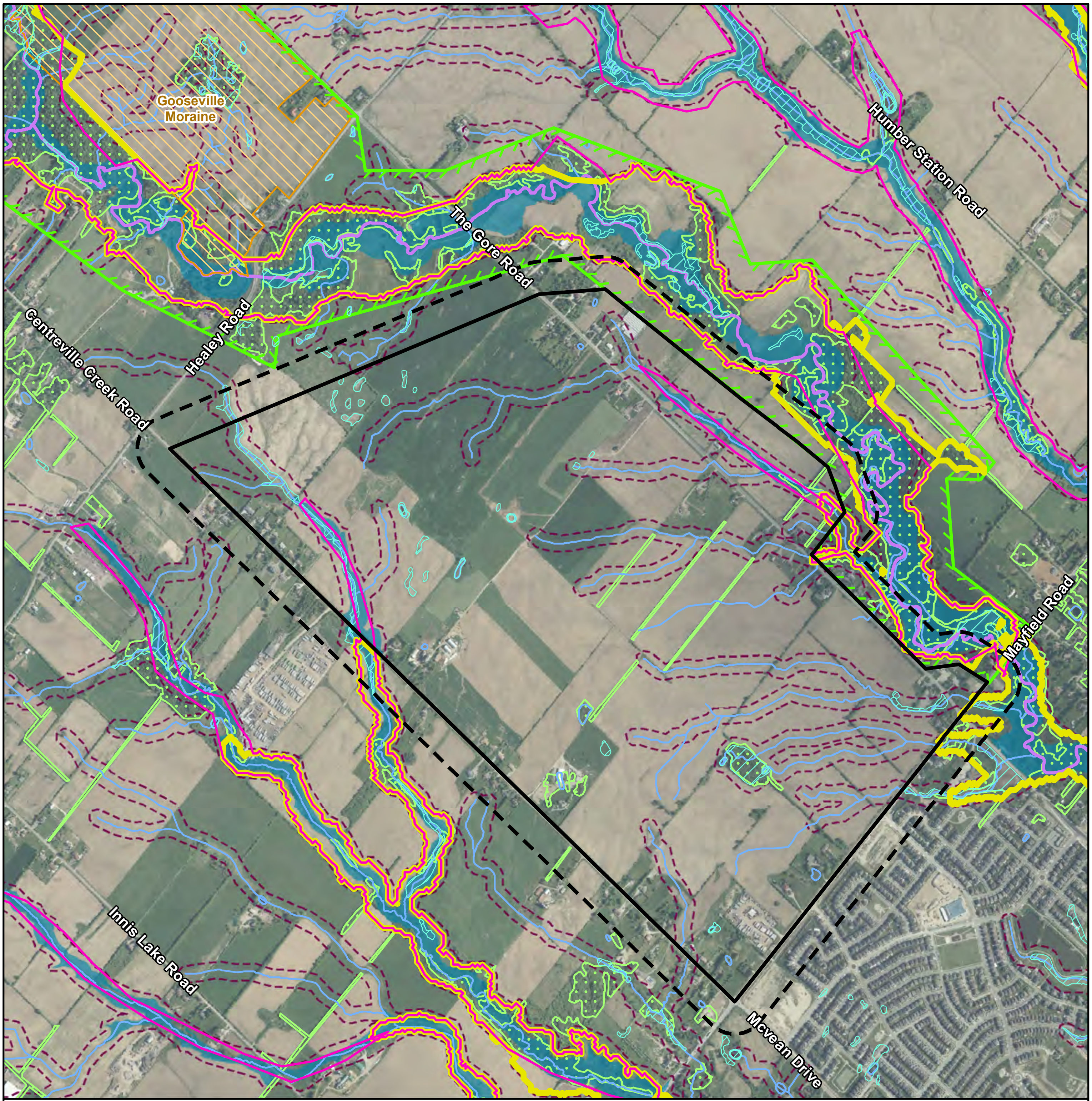
SECTION 2

APPENDIX B1

FIGURES

SCS consulting group ltd

GEI Consultants



NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024; © Toronto Region Conservation Authority, 2024; © Region of Peel, 2024; © Town of Caledon, 2024; © Fisheries and Oceans Canada, 2024.
3. Orthoimagery © First Base Solutions, 2024. Imagery taken in 2020.

Legend

- Wildfield Secondary Plan Area
- Adjacent 120m
- Watercourse (TRCA)
- Waterbody (Land Information Ontario)
- Aquatic Species at Risk - Fish
- Candidate Earth Science ANSI
- Core Area of the Greenlands System (Region of Peel OP; Schedule A)
- Environmental Policy Area (Town of Caledon OP)
- Greenbelt Natural Heritage System
- TRCA Floodplain (Estimate)
- Wetland - Not evaluated per OWES (Land Information Ontario)
- Wooded Area (Land Information Ontario)
- TRCA Regulated Area

Project 2100463

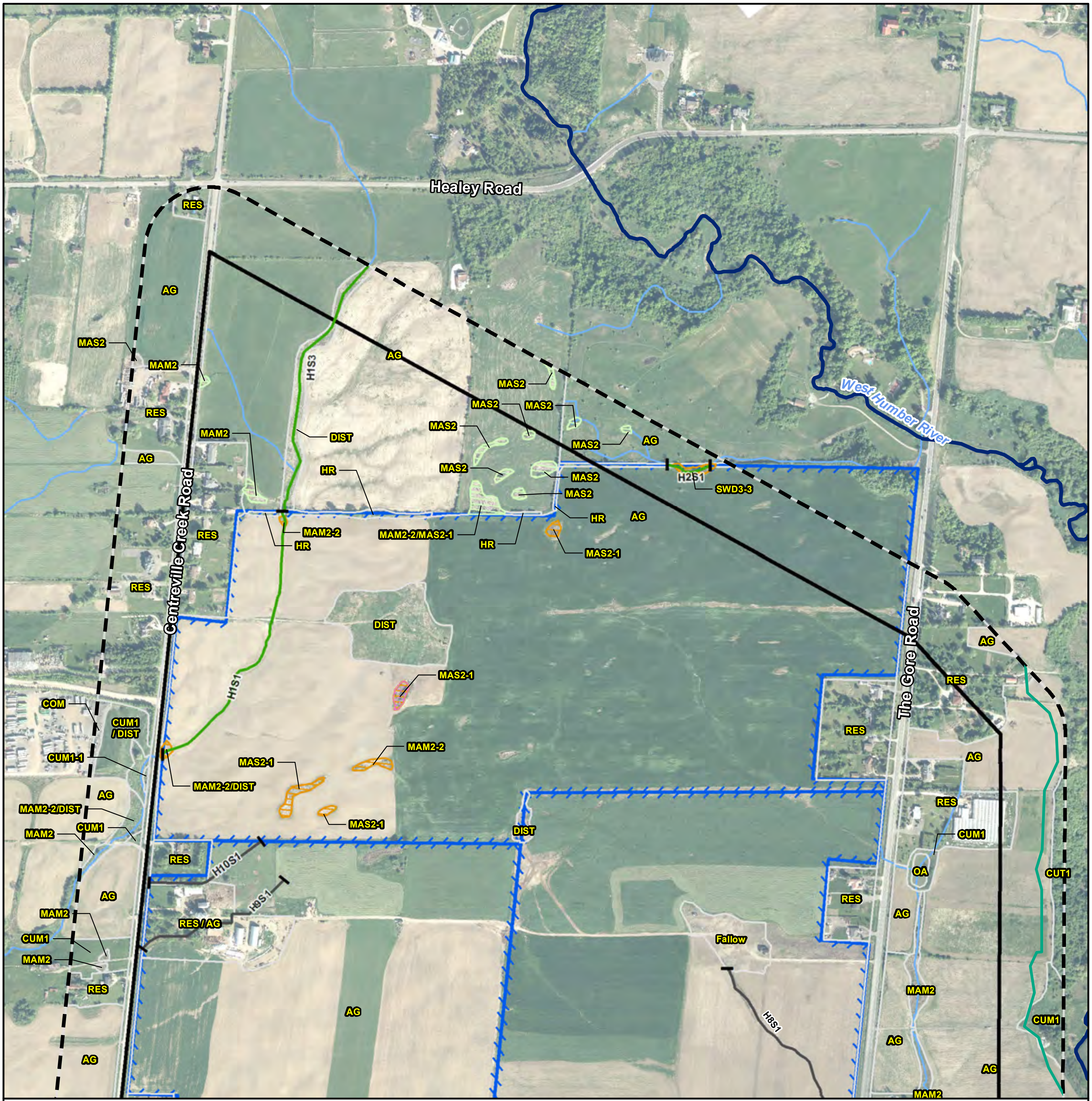
Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Figure 2.1
Designated Natural Heritage Features

0 200 m
1:20,000
N

GEI Consultants

Path: \\bos-pzcc-1\data_storage\Working\WILDFIELD VILLAGE LANDOWNER GROUP\2100463 Town of Caledon\05_GIS\figures\report_figures\2024 04 subwatershed study\2100463_rpt_fig2.1_designated_natural_heritage_features.mxd Date Saved: Friday, November 15, 2024



Project 2100463

NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024; © Toronto Region Conservation Authority, 2021.
3. Orthoimagery © First Base Solutions, 2021. Imagery taken in 2020.

* Non-participating lands were assessed through air photo interpretation to the ELC Ecosite level.

Legend

- ▭ Wildfield Secondary Plan Area
- ▭ Adjacent 120m
- ▨ Participating Landowner
- ▭ Ecological Land Classification*
- — Potential Watercourse or Headwater Drainage Feature
- — West Humber River
- — Preliminary Long Term Stable Top of Slope (GEI Consultants Ltd.)
- ▨ Significant Woodland

Staked Limits (Sept 20, 2024)

- — Wetland Staked by TRCA and GEI
- — Dripline - CUW1 (GEI)

Headwater Drainage Feature Management Recommendations

- — Mitigation
- — No Management Required

Wetland Evaluation (GEI Consultants Ltd.)

- ▨ Significant Wetland
- ▨ Other Wetland
- ▨ Unevaluated Wetland

Significant Wildlife Habitat

- 🟨 Turtle Overwintering Area
- ▭ Species of Conservation Concern (Terrestrial Crayfish)
- 🟩 Species of Conservation Concern (Wood Thrush)

ELC LEGEND

AG, Agricultural
COM, Commercial
CUM1 / DIST, Mineral Cultural Meadow/Disturbed
CUM1 / MAM2, Mineral Cultural Meadow/Mineral Meadow Marsh
CUM1 / OA, Mineral Cultural Meadow/Open Aquatic
CUM1, Mineral Cultural Meadow
CUM1-1 (mowed), Mineral Cultural Meadow
CUP3, Coniferous Plantation
CUT1, Mineral Cultural Thicket
CUW1, Mineral Cultural Woodland
DIST / CUM1, Disturbed/Mineral Cultural Meadow
DIST, Disturbed
Drain, Drain
FOC, Coniferous Forest
FOC2-2, Dry – Fresh White Cedar Coniferous Forest
FOD7, Fresh-Moist Lowland Deciduous Forest
FOM, Mixed Forest
Fallow, Fallow
HR, Hedgerow
Lawn, Lawn
MA, Marsh
MAM2 / DIST, Mineral Meadow Marsh / Disturbed
MAM2 / Drain, Mineral Meadow Marsh / Drain
MAM2, Mineral Meadow Marsh
MAM2-10, Forb Mineral Meadow Marsh
MAM2-2, Reed Canary Grass Mineral Meadow Marsh
MAM2-2/DIST, Reed-canary Grass Mineral Meadow Marsh/Disturbed
MAM2-2/MAS2-1, Reed Canary Grass Mineral Meadow Marsh/Cattail Mineral Shallow Marsh
MAS2, Mineral Shallow Marsh
MAS2-1, Cattail Mineral Shallow Marsh
OA, Open Aquatic
RES / AG, Residential/Agicultural
RES, Residential
SA, Shallow Aquatic
SWD3-2, Silver Maple Mineral Deciduous Swamp
SWD3-3, Swamp Maple Mineral Deciduous Swamp
THDM2-6, Buckthorn Deciduous Shrub Thicket

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Figure 2.2
Observed Natural Heritage Features

0 100 m
1:10,000

N

GEI Consultants

Path: \\bos-pzcc-1\data_storage\Working\WILDFIELD VILLAGE LANDOWNER GROUP\2100463 Town of Caledon\05_GIS\figures\report_figures\2024 04 subwatershed study\2100463_rpt_fig2.2_ObservedNHF.mxd Date Saved: Thursday, November 14, 2024

NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024; © Toronto Region Conservation Authority, 2021.
3. Orthoimagery © First Base Solutions, 2021. Imagery taken in 2020.

* Non-participating lands were assessed through air photo interpretation to the ELC Ecosite level.

Legend

- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Ecological Land Classification*
- Watercourse (GEI Consultants Ltd.)
- Potential Watercourse or Headwater Drainage Feature
- West Humber River
- Preliminary Long Term Stable Top of Slope (GEI Consultants Ltd.)
- Meander Belt (GEI)
- Significant Woodland

Staked Limits (Sept 20, 2024)

- Wetland Staked by TRCA and GEI
- Dripline - CUW1 (GEI)

Headwater Drainage Feature

Management Recommendations

- Mitigation
- No Management Required

Wetland Evaluation (GEI Consultants Ltd.)

- Significant Wetland
- Other Wetland
- Unevaluated Wetland

Fish Habitat

- Fish Observation Location
- Fish Habitat (Watercourse)

Significant Wildlife Habitat

- Turtle Overwintering Area
- Species of Conservation Concern (Terrestrial Crayfish)
- Species of Conservation Concern (Wood Thrush)

ELC LEGEND

AG, Agricultural
COM, Commercial
CUM1 / DIST, Mineral Cultural Meadow/Disturbed
CUM1 / MAM2, Mineral Cultural Meadow/Mineral Meadow Marsh
CUM1 / OA, Mineral Cultural Meadow/Open Aquatic
CUM1, Mineral Cultural Meadow
CUM1-1 (mowed), Mineral Cultural Meadow
CUP3, Coniferous Plantation
CUT1, Mineral Cultural Thicket
CUW1, Mineral Cultural Woodland
DIST / CUM1, Disturbed/Mineral Cultural Meadow
DIST, Disturbed
Drain, Drain
FOC, Coniferous Forest
FOC2-2, Dry – Fresh White Cedar Coniferous Forest
FOD7, Fresh-Moist Lowland Deciduous Forest
FOM, Mixed Forest
Fallow, Fallow
HR, Hedgerow
Lawn, Lawn
MA, Marsh
MAM2 / DIST, Mineral Meadow Marsh / Disturbed
MAM2 / Drain, Mineral Meadow Marsh / Drain
MAM2, Mineral Meadow Marsh
MAM2-10, Forb Mineral Meadow Marsh
MAM2-2, Reed Canary Grass Mineral Meadow Marsh
MAM2-2/DIST, Reed-canary Grass Mineral Meadow Marsh/Disturbed
MAM2-2/MAS2-1, Reed Canary Grass Mineral Meadow Marsh/Cattail Mineral Shallow Marsh
MAS2, Mineral Shallow Marsh
MAS2-1, Cattail Mineral Shallow Marsh
OA, Open Aquatic
RES / AG, Residential/Agicultural
RES, Residential
SA, Shallow Aquatic
SWD3-2, Silver Maple Mineral Deciduous Swamp
SWD3-3, Swamp Maple Mineral Deciduous Swamp
THDM2-6, Buckthorn Deciduous Shrub Thicket

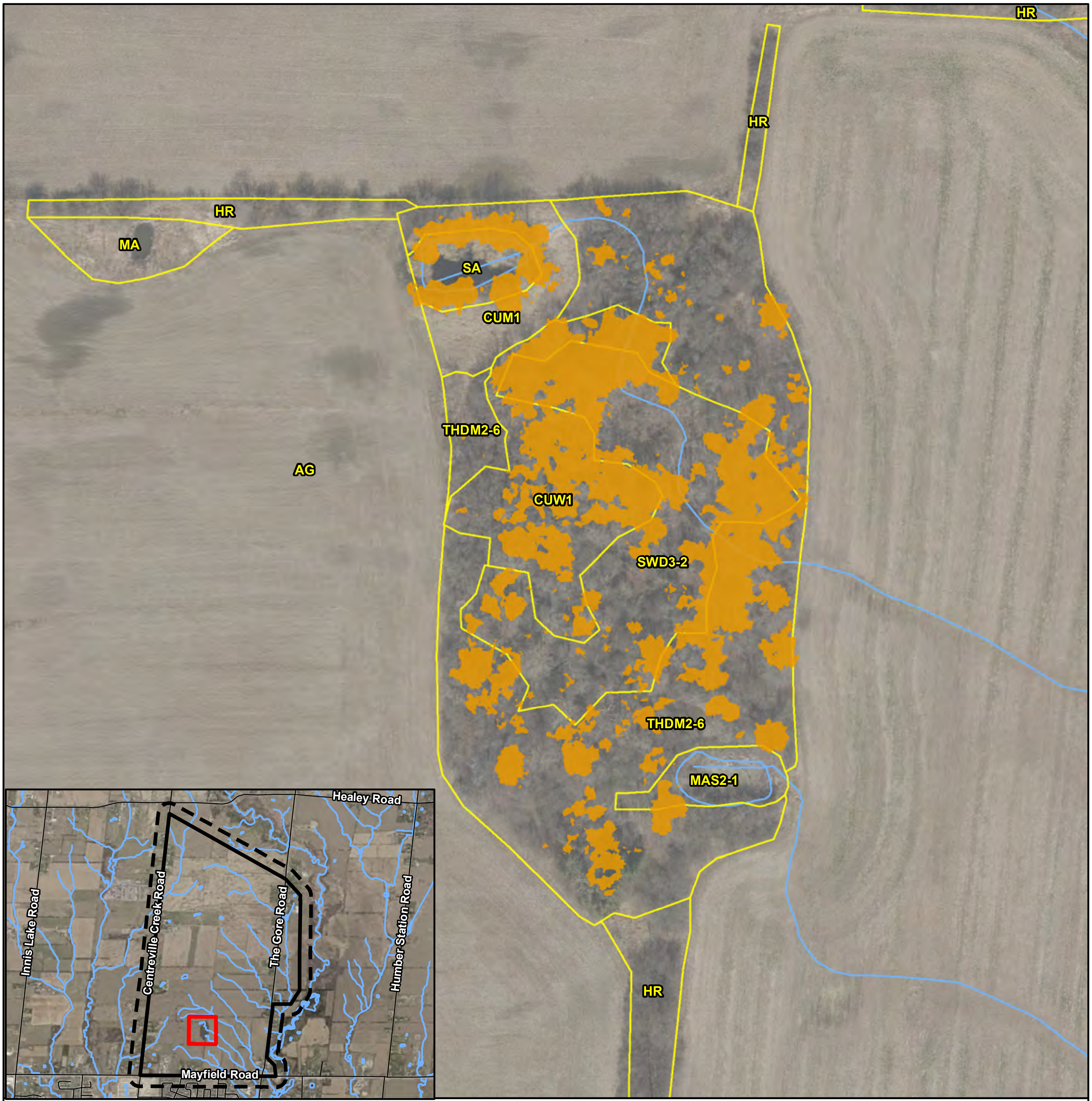
Project 2100463

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Figure 2.2
Observed Natural Heritage Features

GEI Consultants

Path: \\bos-pzcc-1\data_storage\Working\WILDFIELD VILLAGE LANDOWNER GROUP\2100463 Town of Caledon\05_GIS\figures\report_figures\2024 04 subwatershed study\2100463_rpt_fig2.2_ObservedNHF.mxd Date Saved: Thursday, November 14, 2024



Project 2100463

NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024; © Toronto Region Conservation Authority, 2024.
3. Orthoimagery © First Base Solutions, 2024. Imagery taken in 2022.

* The Wildfield Village Study area was assessed through air photo interpretation to the ELC Ecosite level, with the exception of the Solmar-owned participating lands, which were ground-truthed to the ELC Vegetation Type level.

Legend

▭ Wildfield Village Study Area
⬚ Adjacent 120m
▭ Ecological Land Classification*
▬ Canopy Height (>12 m)
— Watercourse (TRCA)
▭ Waterbody

ELC LEGEND

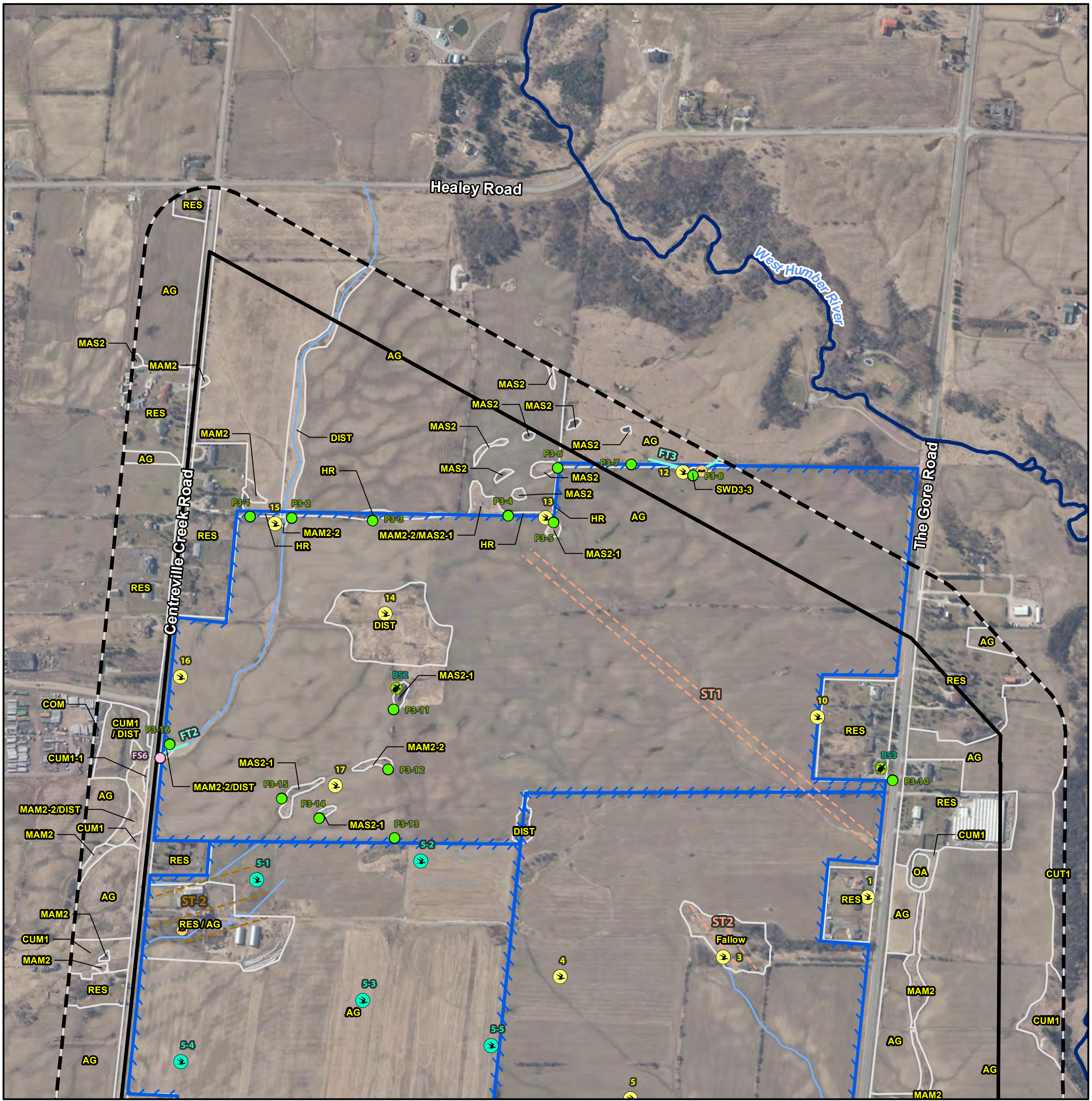
AG, Agricultural
CUM1, Mineral Cultural Meadow
CUW1, Mineral Cultural Woodland
FODM4-9, Dry-Fresh Basswood Deciduous Forest
HR, Hedgerow
MA, Marsh
MAS2-1, Cattail Mineral Shallow Marsh
SA, Shallow Aquatic
SWD3-2, Silver Maple Mineral Deciduous Swamp
THDM2-6, Buckthorn Deciduous Shrub Thicket

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Figure 2.3
Canopy Cover Analysis

0 20 m
1:1,500
N

Path: \\bos-pzcc-1\data_storage\Working\WILDFIELD VILLAGE LANDOWNER GROUP\2100463 Town of Caledon\05_GIS\figures\report_figures\2024 04 subwatershed study\2100463_rpt_fig2.3_canopy_analysis.mxd Date Saved: Friday, October 4, 2024



NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024; © Toronto Region Conservation Authority, 2021.
3. Orthoimagery © First Base Solutions, 2021. Imagery taken in 2019.

* The Wildfield Village Study area was assessed through air photo interpretation to the ELC Ecosite level, with the exception of the Solmar-owned participating lands, which were ground-truthed to the ELC Vegetation Type level.

Legend

- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Ecological Land Classification*
- Observed Headwater Drainage Features (GEI)
- West Humber River
- ● Amphibian Call Count Stations (2022)
- ● Amphibian Call Count Stations (2024)
- Turtle Basking Stations
- Breeding Bird Survey Stations (2022)
- Breeding Bird Survey Stations (2024)
- Bat Habitat Assessment
- ● Bat Acoustic Detector Stations (2022)
- ● Fish Community Sampling Locations (2024)
- Fish Community Sampling Locations (2022)
- Snake Visual Encounter Transects (2021-2022)
- Snake Visual Encounter Transects (2024)

ELC LEGEND
AG, Agricultural
COM, Commercial
CUM1 / DIST, Mineral Cultural Meadow/Disturbed
CUM1 / MAM2, Mineral Cultural Meadow/Mineral Meadow Marsh
CUM1 / OA, Mineral Cultural Meadow/Open Aquatic
CUM1, Mineral Cultural Meadow
CUM1-1 (mowed), Mineral Cultural Meadow
CUP3, Coniferous Plantation
CUT1, Mineral Cultural Thicket
CUW1, Mineral Cultural Woodland
DIST / CUM1, Disturbed/Mineral Cultural Meadow
DIST, Disturbed
Drain, Drain
FOC, Coniferous Forest
FOC2-2, Dry – Fresh White Cedar Coniferous Forest
FOD7, Fresh-Moist Lowland Deciduous Forest
FODM4-9, Dry-Fresh Basswood Deciduous Forest
FOM, Mixed Forest
Fallow, Fallow
HR, Hedgerow
Lawn, Lawn
MA, Marsh
MAM2 / DIST, Mineral Meadow Marsh / Disturbed
MAM2 / Drain, Mineral Meadow Marsh / Drain
MAM2, Mineral Meadow Marsh
MAM2-10, Forb Mineral Meadow Marsh
MAM2-2, Reed Canary Grass Mineral Meadow Marsh
MAM2-2/DIST, Reed-canary Grass Mineral Meadow Marsh/Disturbed
MAM2-2/MAS2-1, Reed Canary Grass Mineral Meadow Marsh/Cattail Mineral Shallow Marsh
MAS2, Mineral Shallow Marsh
MAS2-1, Cattail Mineral Shallow Marsh
OA, Open Aquatic
RES / AG, Residential/Agicultural
RES, Residential
SA, Shallow Aquatic
SWD3-2, Silver Maple Mineral Deciduous Swamp
SWD3-3, Swamp Maple Mineral Deciduous Swamp
THDM2-6, Buckthorn Deciduous Shrub Thicket

Project 2100463

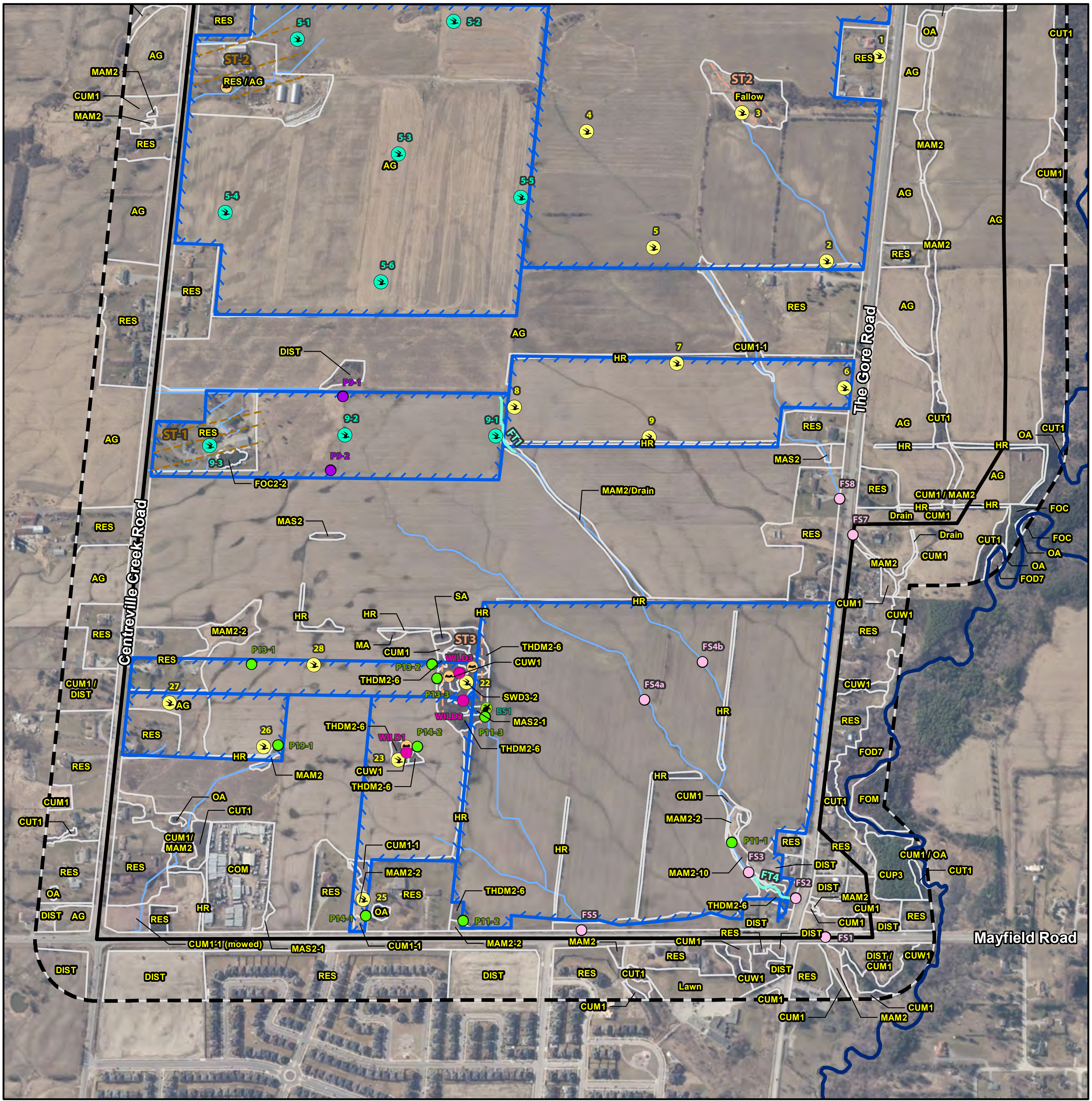
Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Figure 2.4
Survey Stations

0 100 m
1:10,000

N

GEI Consultants



NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024; © Toronto Region Conservation Authority, 2021.
3. Orthoimagery © First Base Solutions, 2021. Imagery taken in 2019.

* The Wildfield Village Study area was assessed through air photo interpretation to the ELC Ecosite level, with the exception of the Solmar-owned participating lands, which were ground-truthed to the ELC Vegetation Type level.

Legend

- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Ecological Land Classification*
- Observed Headwater Drainage Features (GEI)
- West Humber River
- ● Amphibian Call Count Stations (2022)
- ● Amphibian Call Count Stations (2024)
- Turtle Basking Stations
- Breeding Bird Survey Stations (2022)
- Breeding Bird Survey Stations (2024)
- Bat Habitat Assessment
- ● Bat Acoustic Detector Stations (2022)
- ● Fish Community Sampling Locations (2024)
- Fish Community Sampling Locations (2022)
- Snake Visual Encounter Transects (2021-2022)
- Snake Visual Encounter Transects (2024)

ELC LEGEND

AG, Agricultural
COM, Commercial
CUM1 / DIST, Mineral Cultural Meadow/Disturbed
CUM1 / MAM2, Mineral Cultural Meadow/Mineral Meadow Marsh
CUM1 / OA, Mineral Cultural Meadow/Open Aquatic
CUM1, Mineral Cultural Meadow
CUM1-1 (mowed), Mineral Cultural Meadow
CUP3, Coniferous Plantation
CUT1, Mineral Cultural Thicket
CUW1, Mineral Cultural Woodland
DIST / CUM1, Disturbed/Mineral Cultural Meadow
DIST, Disturbed
Drain, Drain
FOC, Coniferous Forest
FOC2-2, Dry – Fresh White Cedar Coniferous Forest
FOD7, Fresh-Moist Lowland Deciduous Forest
FODM4-9, Dry-Fresh Basswood Deciduous Forest
FOM, Mixed Forest
Fallow, Fallow
HR, Hedgerow
Lawn, Lawn
MA, Marsh
MAM2 / DIST, Mineral Meadow Marsh / Disturbed
MAM2 / Drain, Mineral Meadow Marsh / Drain
MAM2, Mineral Meadow Marsh
MAM2-10, Forb Mineral Meadow Marsh
MAM2-2, Reed Canary Grass Mineral Meadow Marsh
MAM2-2/DIST, Reed-canary Grass Mineral Meadow Marsh/Disturbed
MAM2-2/MAS2-1, Reed Canary Grass Mineral Meadow Marsh/Cattail Mineral Shallow Marsh
MAS2, Mineral Shallow Marsh
MAS2-1, Cattail Mineral Shallow Marsh
OA, Open Aquatic
RES / AG, Residential/Agicultural
RES, Residential
SA, Shallow Aquatic
SWD3-2, Silver Maple Mineral Deciduous Swamp
SWD3-3, Swamp Maple Mineral Deciduous Swamp
THDM2-6, Buckthorn Deciduous Shrub Thicket

Project 2100463

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

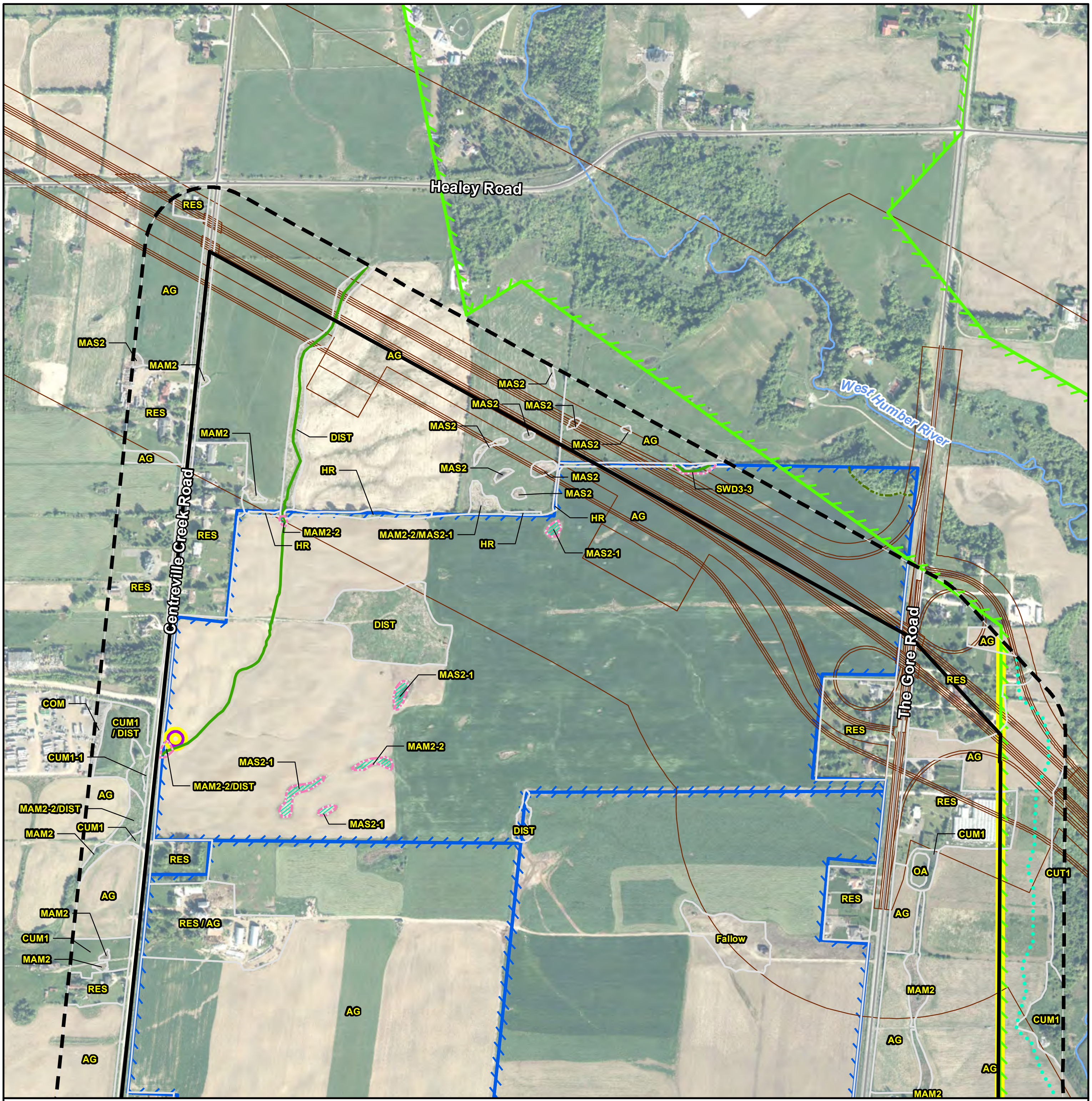
Figure 2.4
Survey Stations

0 100 m
1:10,500

N

GEI Consultants

Working\WILDFIELD VILLAGE LANDOWNER GROUP\2100463 Town of Caledon\05_GIS\figures\report_figures\2024 04 subwatershed study\2100463_rpt_fig02.4_survey_stations.mxd Date Saved: Friday, October 4, 2024



NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024; © Toronto Region Conservation Authority, 2024.
3. Orthoimagery © First Base Solutions, 2024. Imagery taken in May/June, 2020.

* The Wildfield Village Study area participating lands were ground-truthed to the ELC Vegetation Type level. Non-participating properties were assessed through air photo interpretation to the ELC Ecosite level.

Legend

- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Ecological Land Classification *
- Watercourse (TRCA)
- Approximate Highway 413 Alignment
- Greenbelt Natural Heritage System
- Wetlands for Removal
- -Total Wetlands Proposed for Removal (1.03 ha)
- ○ Conceptual HDF (Wetland) Compensation area(Size and Location to be Determined)
- Significant Wetland + 30 metres
- Other Wetland + 10m
- Woodland + 10 metres
- ● ● ● Preliminary Long Term Stable Top of Slope (Significant Valleyland) + 15 metres (GEI Consultants Ltd.)
- Wetland Staked by TRCA and GEI on November 7, 2023 and September 20, 2024
- Dripline Staked by TRCA and GEI on November 7, 2023

Headwater Drainage Feature

Management Recommendations

- Mitigation
- Preliminary Natural Heritage System

ELC LEGEND

AG, Agricultural
COM, Commercial
CUM1 / DIST, Mineral Cultural Meadow/Disturbed
CUM1 / MAM2, Mineral Cultural Meadow/Mineral Meadow Marsh
CUM1 / OA, Mineral Cultural Meadow/Open Aquatic
CUM1, Mineral Cultural Meadow
CUM1-1 (mowed), Mineral Cultural Meadow
CUP3, Coniferous Plantation
CUT1, Mineral Cultural Thicket
CUW1, Mineral Cultural Woodland
DIST / CUM1, Disturbed/Mineral Cultural Meadow
DIST, Disturbed
Drain, Drain
FOC, Coniferous Forest
FOC2-2, Dry – Fresh White Cedar Coniferous Forest
FOD7, Fresh-Moist Lowland Deciduous Forest
FOM, Mixed Forest
Fallow, Fallow
HR, Hedgerow
Lawn, Lawn
MA, Marsh
MAM2 / DIST, Mineral Meadow Marsh / Disturbed
MAM2 / Drain, Mineral Meadow Marsh / Drain
MAM2, Mineral Meadow Marsh
MAM2-10, Forb Mineral Meadow Marsh
MAM2-2, Reed Canary Grass Mineral Meadow Marsh
MAM2-2/DIST, Reed-canary Grass Mineral Meadow Marsh/Disturbed
MAM2-2/MAS2-1, Reed Canary Grass Mineral Meadow Marsh/Cattail Mineral Shallow Marsh
MAS2, Mineral Shallow Marsh
MAS2-1, Cattail Mineral Shallow Marsh
OA, Open Aquatic
RES / AG, Residential/Agicultural
RES, Residential
SA, Shallow Aquatic
SWD3-2, Silver Maple Mineral Deciduous Swamp
SWD3-3, Swamp Maple Mineral Deciduous Swamp
THDM2-6, Buckthorn Deciduous Shrub Thicket

Project 2100463

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

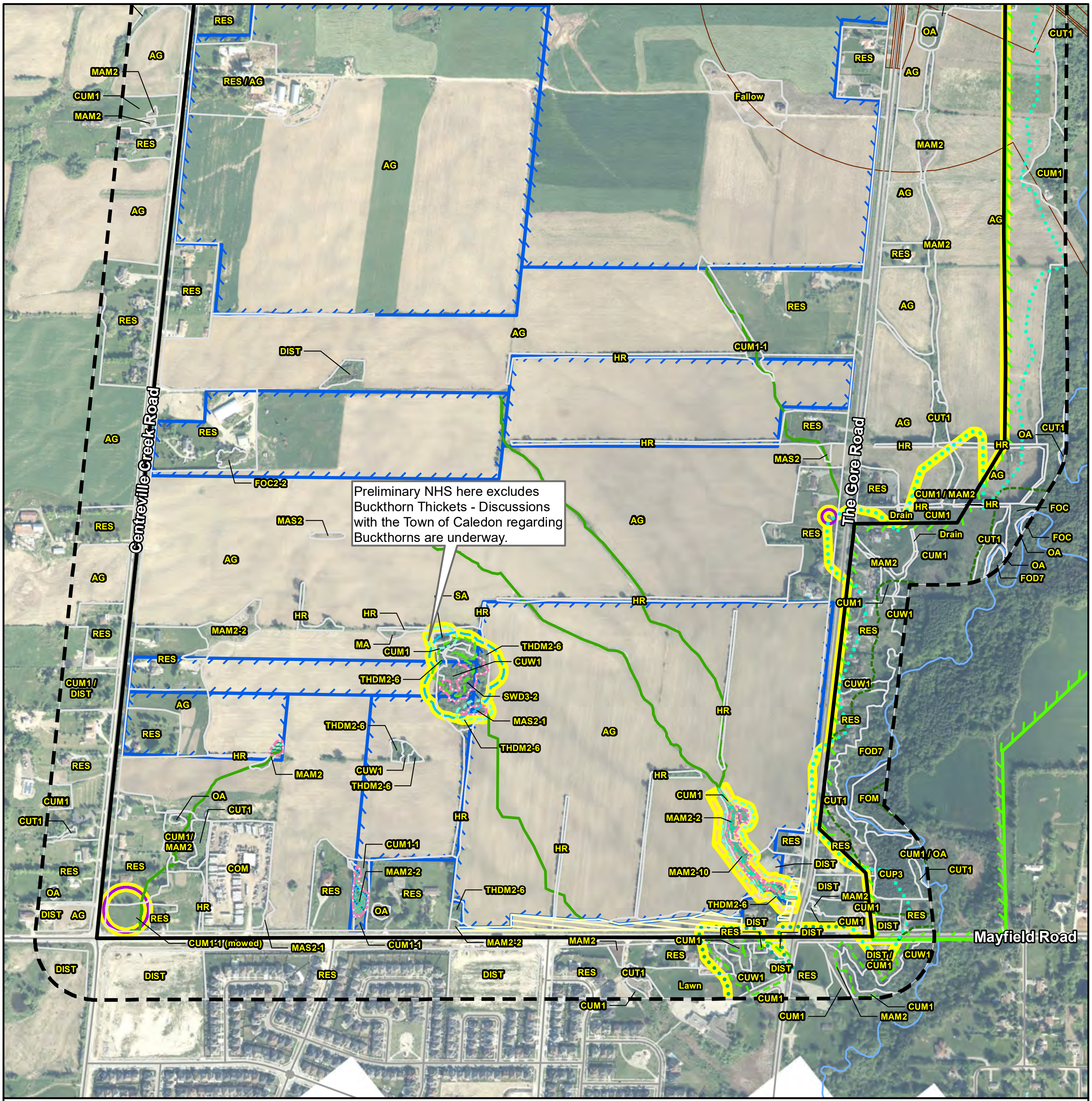
Figure 2.5
Natural Heritage Constraints and Opportunities

0 100 m
1:10,000

N

GEI Consultants

Path: \\bos-pzcc-1\data_storage\Working\WILDFIELD VILLAGE LANDOWNER GROUP\2100463 Town of Caledon\05_GIS\figures\report_figures\2024 04 subwatershed study\2100463_rpt_fig2.5_nh_constraints_opportunities_ownerships.mxd Date Saved: Friday, November 15, 2024



Preliminary NHS here excludes Buckthorn Thickets - Discussions with the Town of Caledon regarding Buckthorns are underway.

NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024; © Toronto Region Conservation Authority, 2024.
3. Orthoimagery © First Base Solutions, 2024. Imagery taken in May/June, 2020.

* The Wildfield Village Study area participating lands were ground-truthed to the ELC Vegetation Type level. Non-participating properties were assessed through air photo interpretation to the ELC Ecosite level.

Legend

- Wildfield Secondary Plan Area
- Adjacent 120m
- Participating Landowner
- Road Easement
- Ecological Land Classification *
- Watercourse (TRCA)
- Watercourse (GEI)
- Approximate Highway 413 Alignment
- Greenbelt Natural Heritage System
- Wetlands for Removal
- -Total Wetlands Proposed for Removal (1.03 ha)
- Conceptual HDF (Wetland) Compensation area(Size and Location to be Determined)
- Significant Wetland + 30 metres
- Other Wetland + 10m
- Meander Belt + 10 metres (GEI)
- Woodland + 10 metres
- Significant Woodland + 30 metres
- Preliminary Long Term Stable Top of Slope (Significant Valleyland) + 10 metres (GEI Consultants Ltd.)
- Preliminary Long Term Stable Top of Slope (Significant Valleyland) + 15 metres (GEI Consultants Ltd.)
- Wetland Staked by TRCA and GEI on November 7, 2023 and September 20, 2024

Headwater Drainage Feature

Management Recommendations

- Mitigation
- Preliminary Natural Heritage System

ELC LEGEND

AG, Agricultural
COM, Commercial
CUM1 / DIST, Mineral Cultural Meadow/Disturbed
CUM1 / MAM2, Mineral Cultural Meadow/Mineral Meadow Marsh
CUM1 / OA, Mineral Cultural Meadow/Open Aquatic
CUM1, Mineral Cultural Meadow
CUM1-1 (mowed), Mineral Cultural Meadow
CUP3, Coniferous Plantation
CUT1, Mineral Cultural Thicket
CUW1, Mineral Cultural Woodland
DIST / CUM1, Disturbed/Mineral Cultural Meadow
DIST, Disturbed
Drain, Drain
FOC, Coniferous Forest
FOC2-2, Dry – Fresh White Cedar Coniferous Forest
FOD7, Fresh-Moist Lowland Deciduous Forest
FOM, Mixed Forest
Fallow, Fallow
HR, Hedgerow
Lawn, Lawn
MA, Marsh
MAM2 / DIST, Mineral Meadow Marsh / Disturbed
MAM2 / Drain, Mineral Meadow Marsh / Drain
MAM2, Mineral Meadow Marsh
MAM2-10, Forb Mineral Meadow Marsh
MAM2-2, Reed Canary Grass Mineral Meadow Marsh
MAM2-2/DIST, Reed-canary Grass Mineral Meadow Marsh/Disturbed
MAM2-2/MAS2-1, Reed Canary Grass Mineral Meadow Marsh/Cattail Mineral Shallow Marsh
MAS2, Mineral Shallow Marsh
MAS2-1, Cattail Mineral Shallow Marsh
OA, Open Aquatic
RES / AG, Residential/Agicultural
RES, Residential
SA, Shallow Aquatic
SWD3-2, Silver Maple Mineral Deciduous Swamp
SWD3-3, Swamp Maple Mineral Deciduous Swamp
THDM2-6, Buckthorn Deciduous Shrub Thicket

Project 2100463

Wildfield Local Subwatershed Study
Wildfield Village Landowners Group Inc.

Figure 2.5
Natural Heritage Constraints and Opportunities

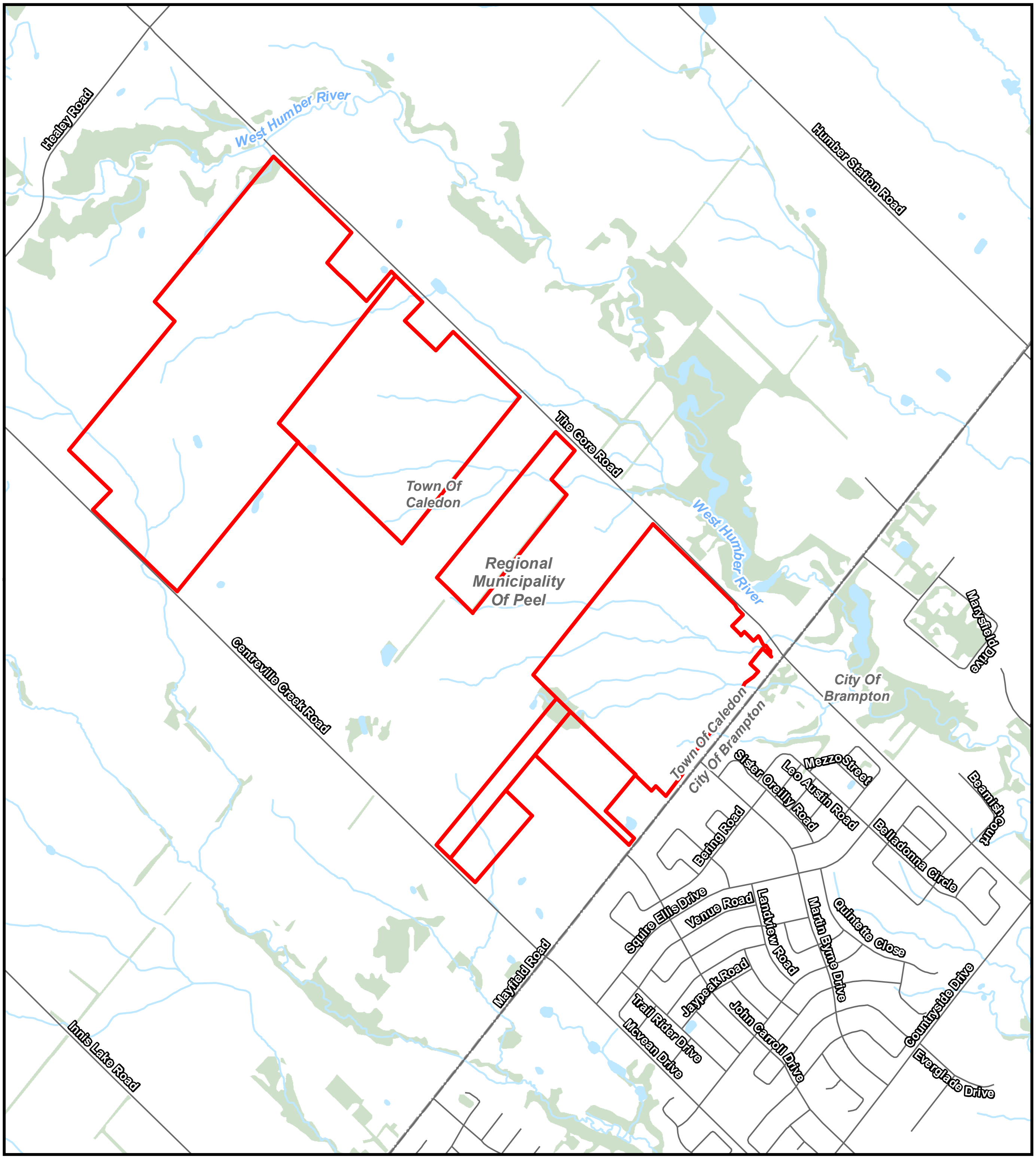
0 100 m

1:10,500

N

GEI Consultants

Path: \\bos-pzcc-1\data_storage\Working\WILDFIELD VILLAGE LANDOWNER GROUP\2100463 Town of Caledon\05_GIS\figures\report_figures\2024 04 subwatershed study\2100463_rpt_fig2.5_nh_constraints_opportunities_ownerships.mxd Date Saved: Friday, November 15, 2024



NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024.

Legend

🟥	Participating Properties	🟦	Waterbody
—	Road	🟩	Wooded Area
—	Watercourse		

N

0 200 400 m
1:20,000

Fluvial Geomorphology
Wildfield

Wildfield Village Landowners
Group Inc.

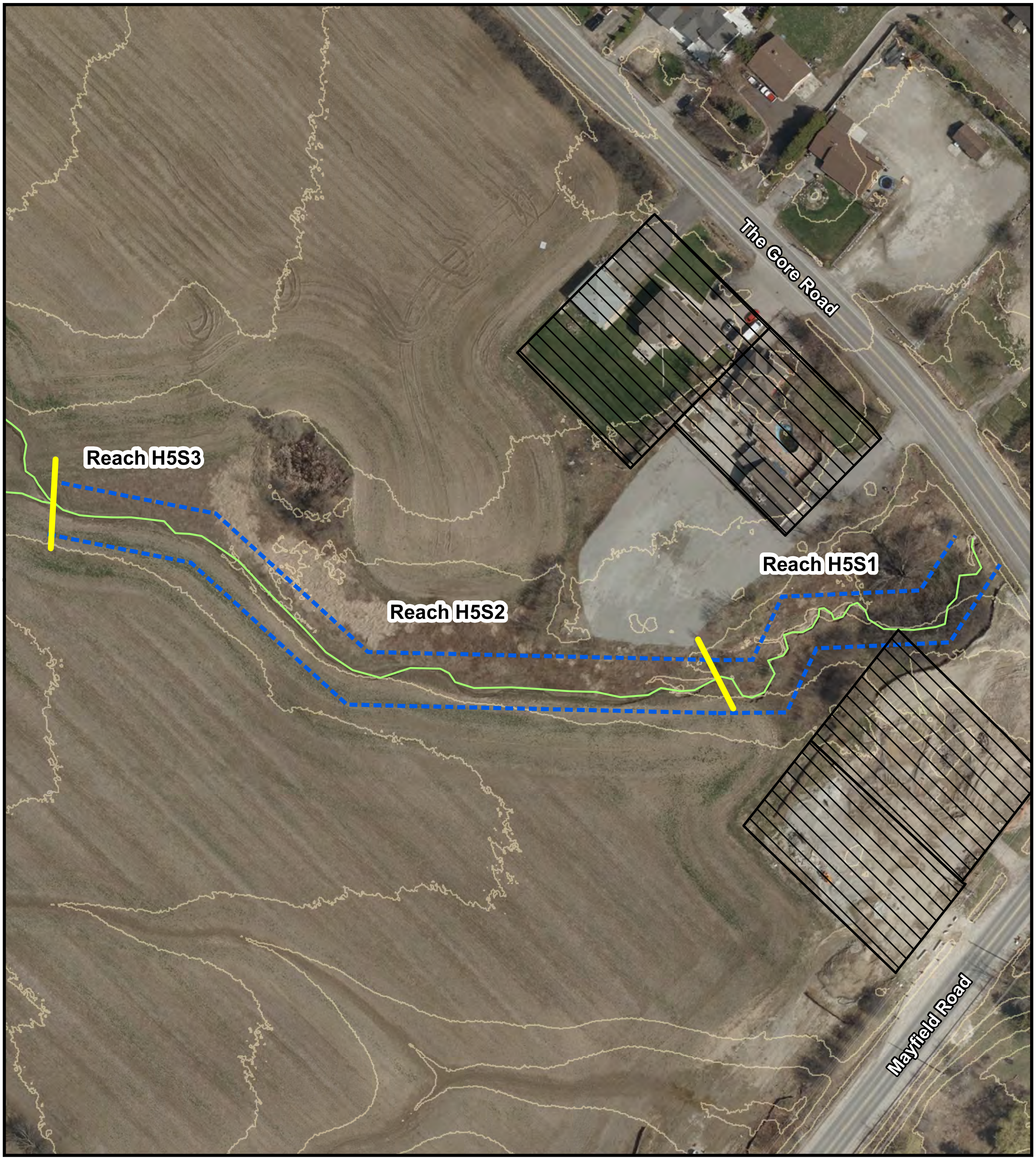
GEI Consultants

SITE LOCATION PLAN

Project 2100463

October 2024

Fig. 2.6



NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024.
3. Orthoimagery © First Base Solutions, 2024. Imagery taken in 2022.

Legend

▨ Non-Participating Property	Reach Breaks
Contours	2023 Watercourse Trace
Final Meander Belt	

N

0 20 40 m

1:1,600

Fluvial Geomorphology
Wildfield

Wildfield Village Landowners
Group Inc.

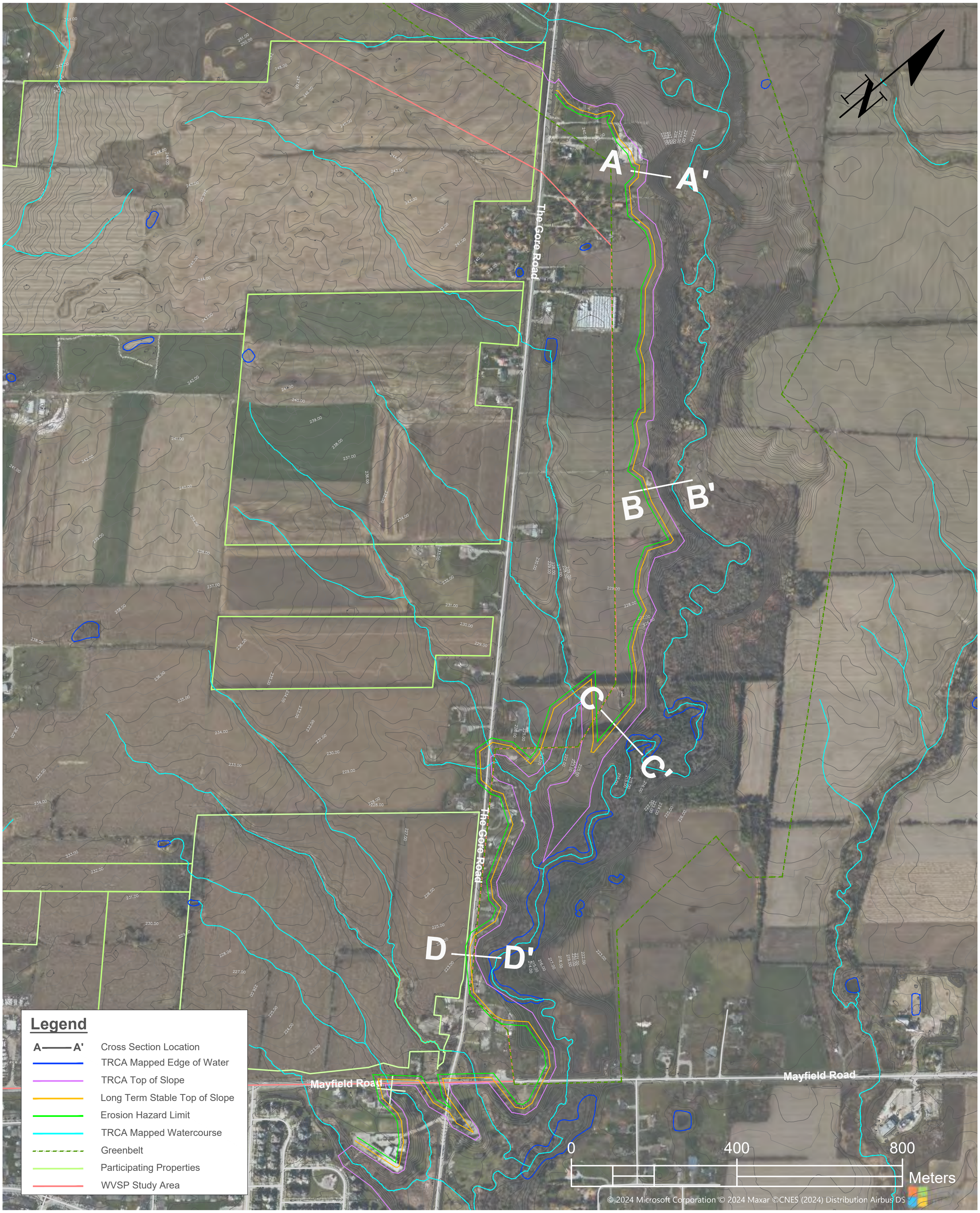
GEI Consultants

Project 2100463

REACH AND MEANDER BELT DELINEATION

October 2024

Fig. 2.7



© 2024 Microsoft Corporation © 2024 Maxar ©CNES (2024) Distribution Airbus DS

Preliminary Slope Stability Assessment
Wildfield Village Local Subwatershed Study
Caledon, Ontario

Wildfield Village Landowners Group Inc

GEI Consultants

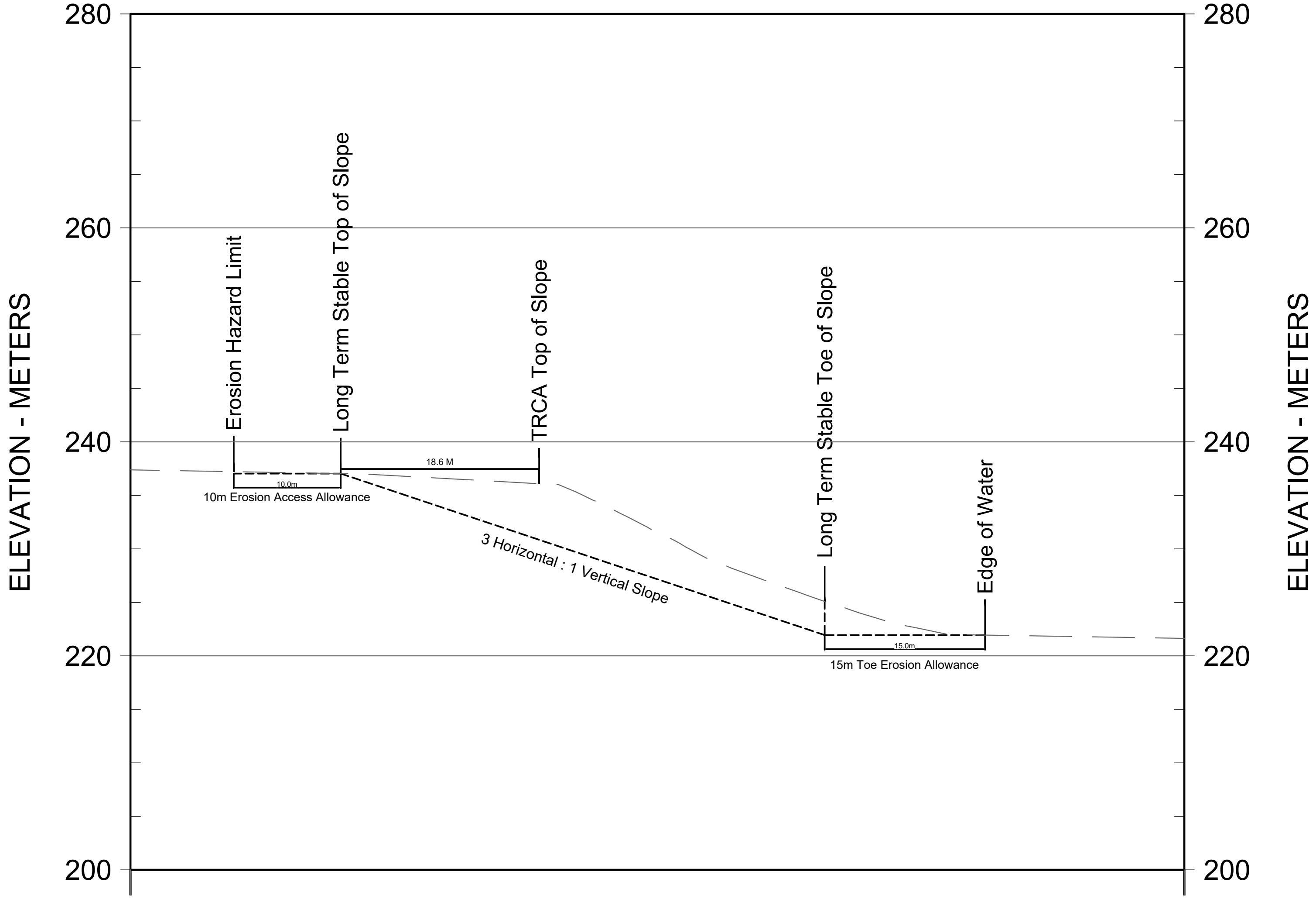
Project 2100463

Cross Section Location, LTSTOS & Erosion Hazard Limit Plan

Oct 2024

Fig. 2.8

CROSS SECTION A-A'



Preliminary Slope Stability Assessment
Wildfield Village Local Subwatershed Study
Caledon, Ontario

Wildfield Village Landowners Group Inc

GEI Consultants

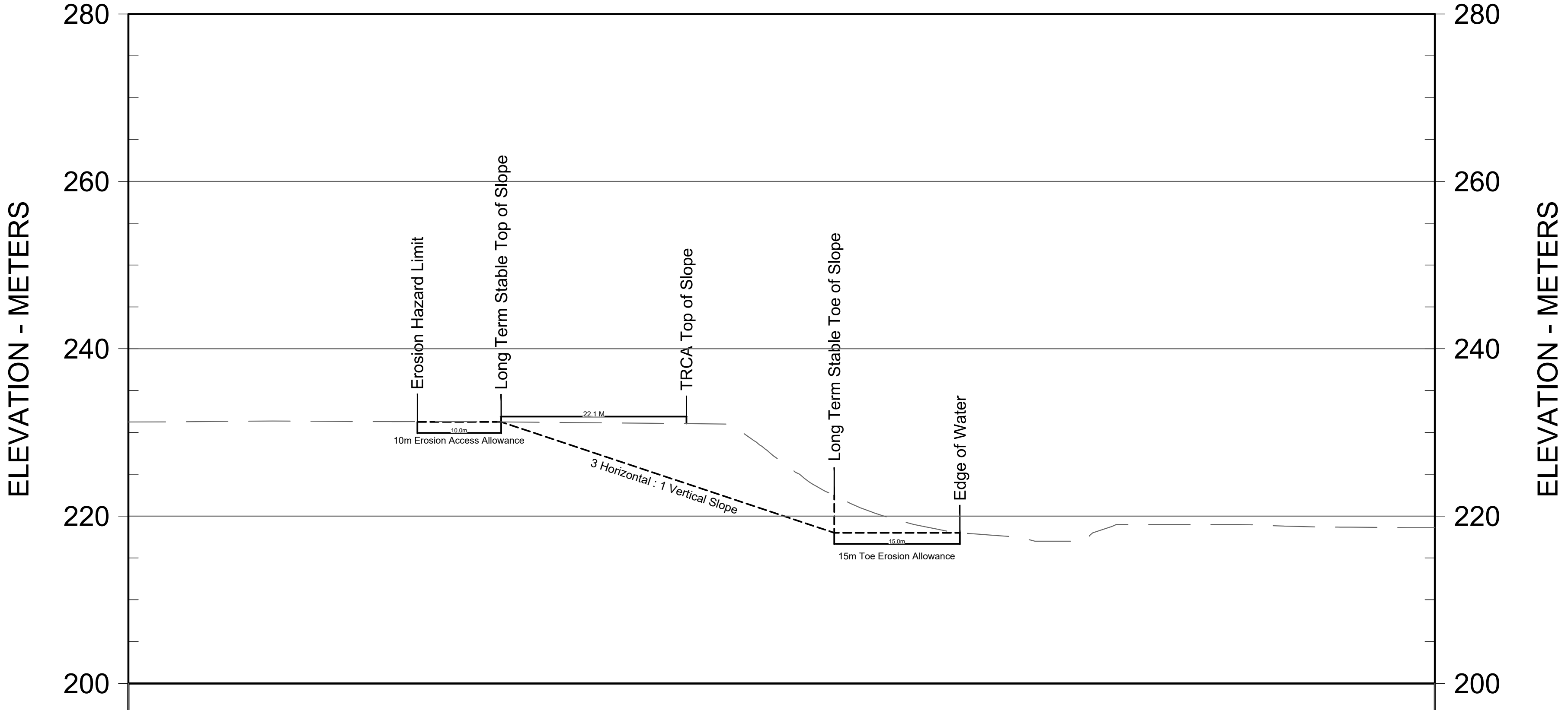
Project 2100463

Cross Section A-A'

Oct 2024

Fig. 2.9A

CROSS SECTION B-B'



Preliminary Slope Stability Assessment
Wildfield Village Local Subwatershed Study
Caledon, Ontario

Wildfield Village Landowners Group Inc

GEI Consultants

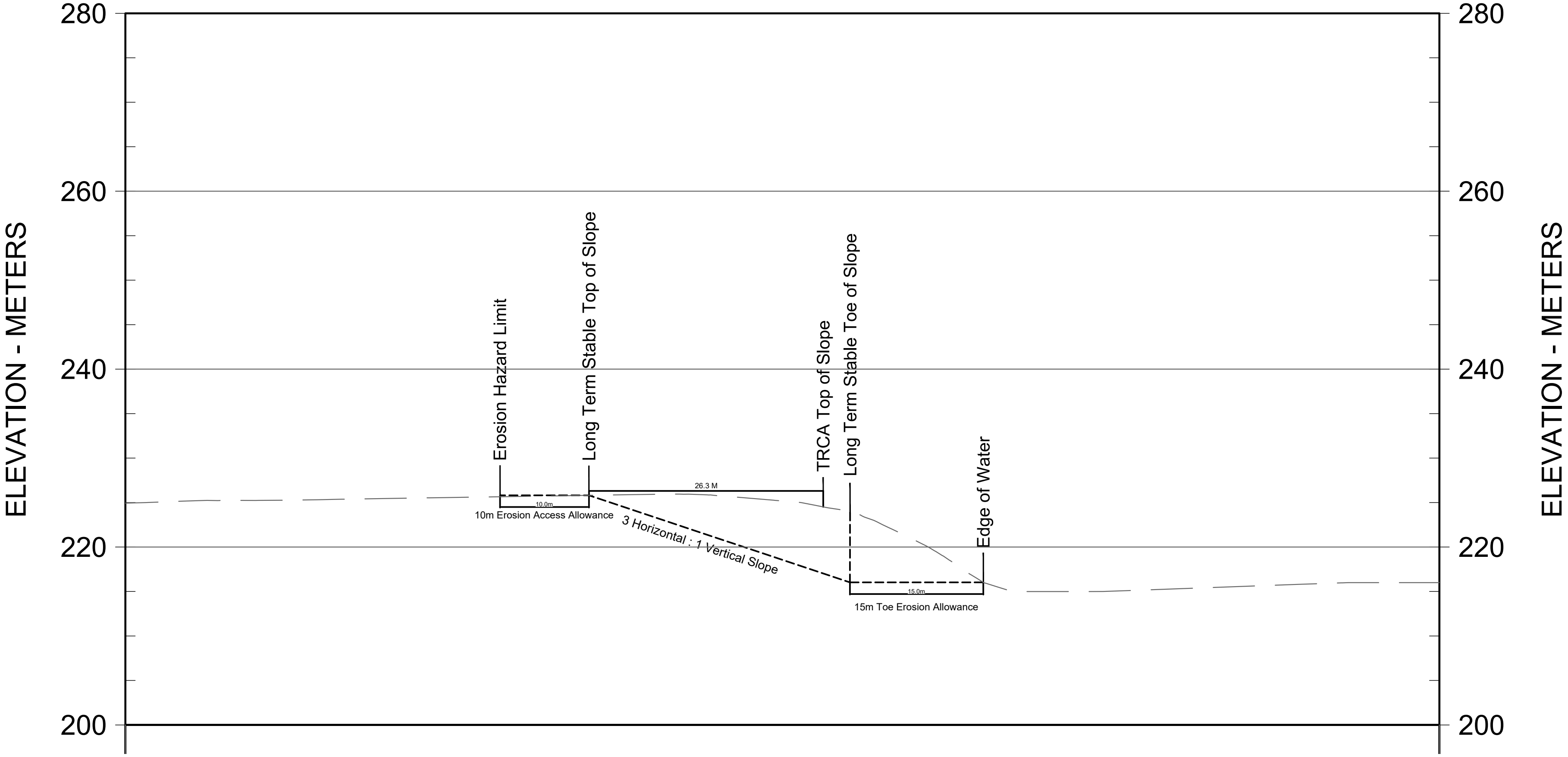
Cross Section B-B'

Project 2100463

Oct 2024

Fig. 2.9B

CROSS SECTION C-C'



Preliminary Slope Stability Assessment
Wildfield Village Local Subwatershed Study
Caledon, Ontario

Wildfield Village Landowners Group Inc

GEI Consultants

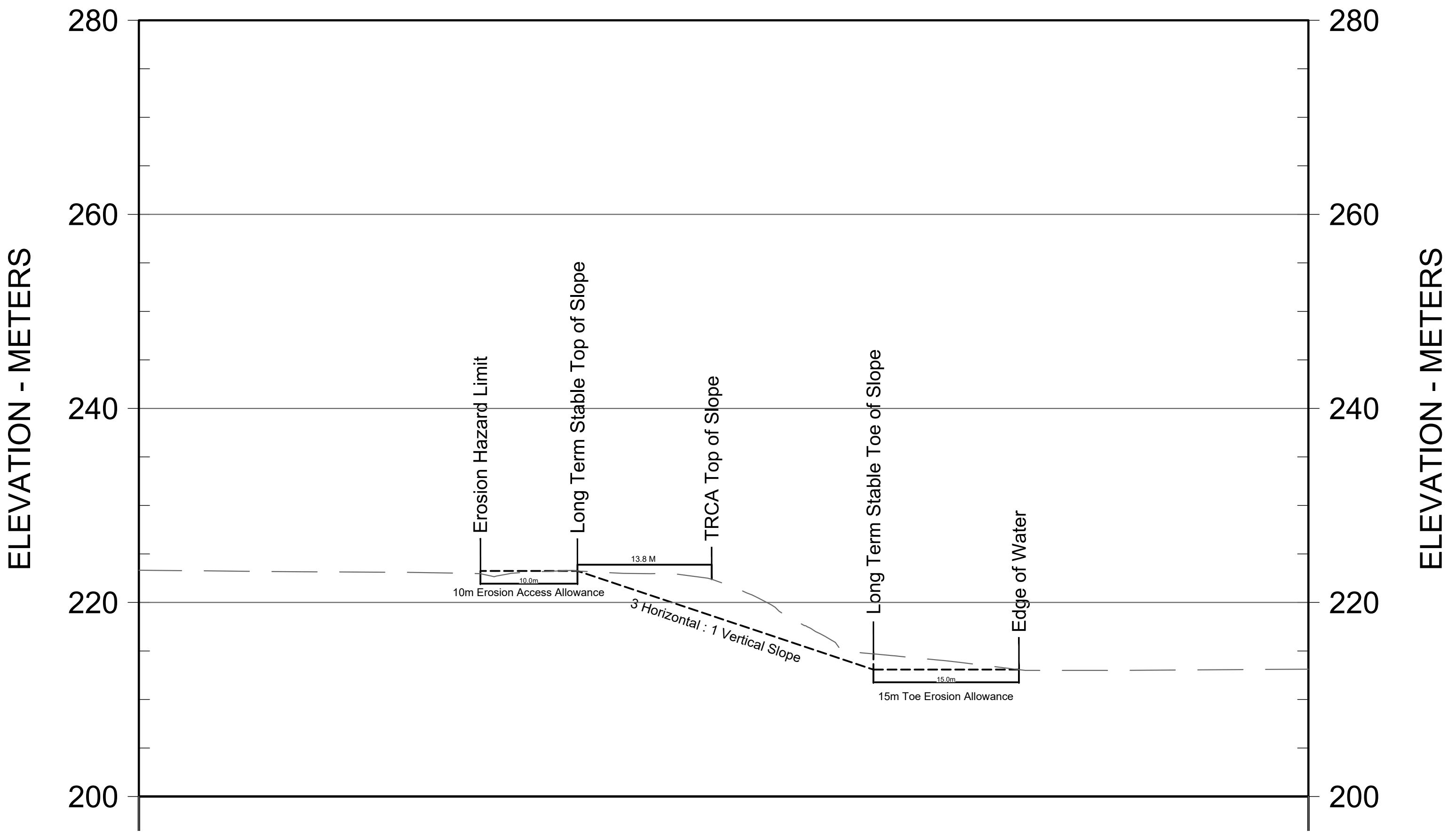
Cross Section C-C'

Project 2100463

Oct 2024

Fig. 2.9C

CROSS SECTION D-D'



Preliminary Slope Stability Assessment
Wildfield Village Local Subwatershed Study
Caledon, Ontario

Wildfield Village Landowners Group Inc

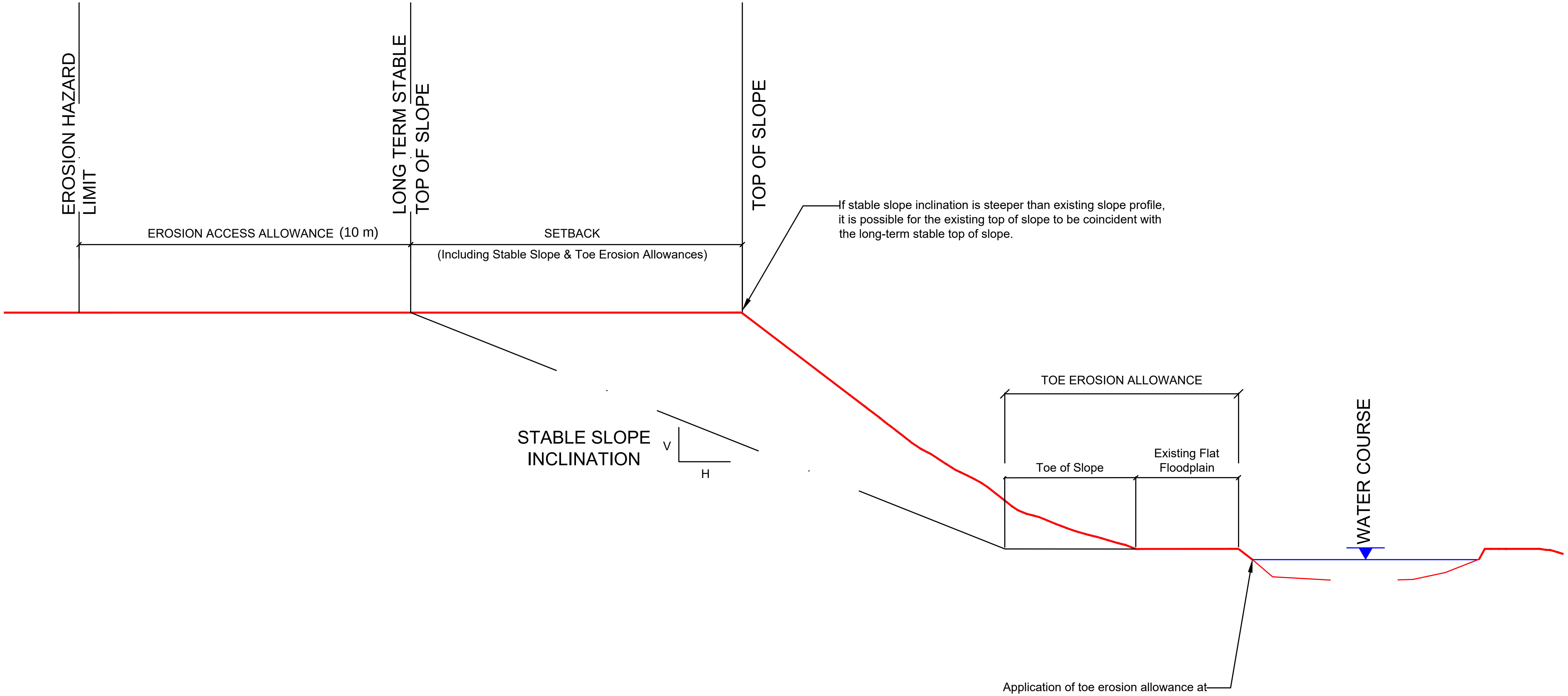
GEI Consultants

Cross Section D-D'

Project 2100463

Oct 2024

Fig. 2.9D



If stable slope inclination is steeper than existing slope profile, it is possible for the existing top of slope to be coincident with the long-term stable top of slope.

Application of toe erosion allowance at bankfull width of watercourse, typical water surface elevation, or base of watercourse as deemed appropriate based on site-specific conditions

GEI Consultants

Project:	Preliminary Slope Stability Assessment
Title:	Long Term Stable Top of Slope Model

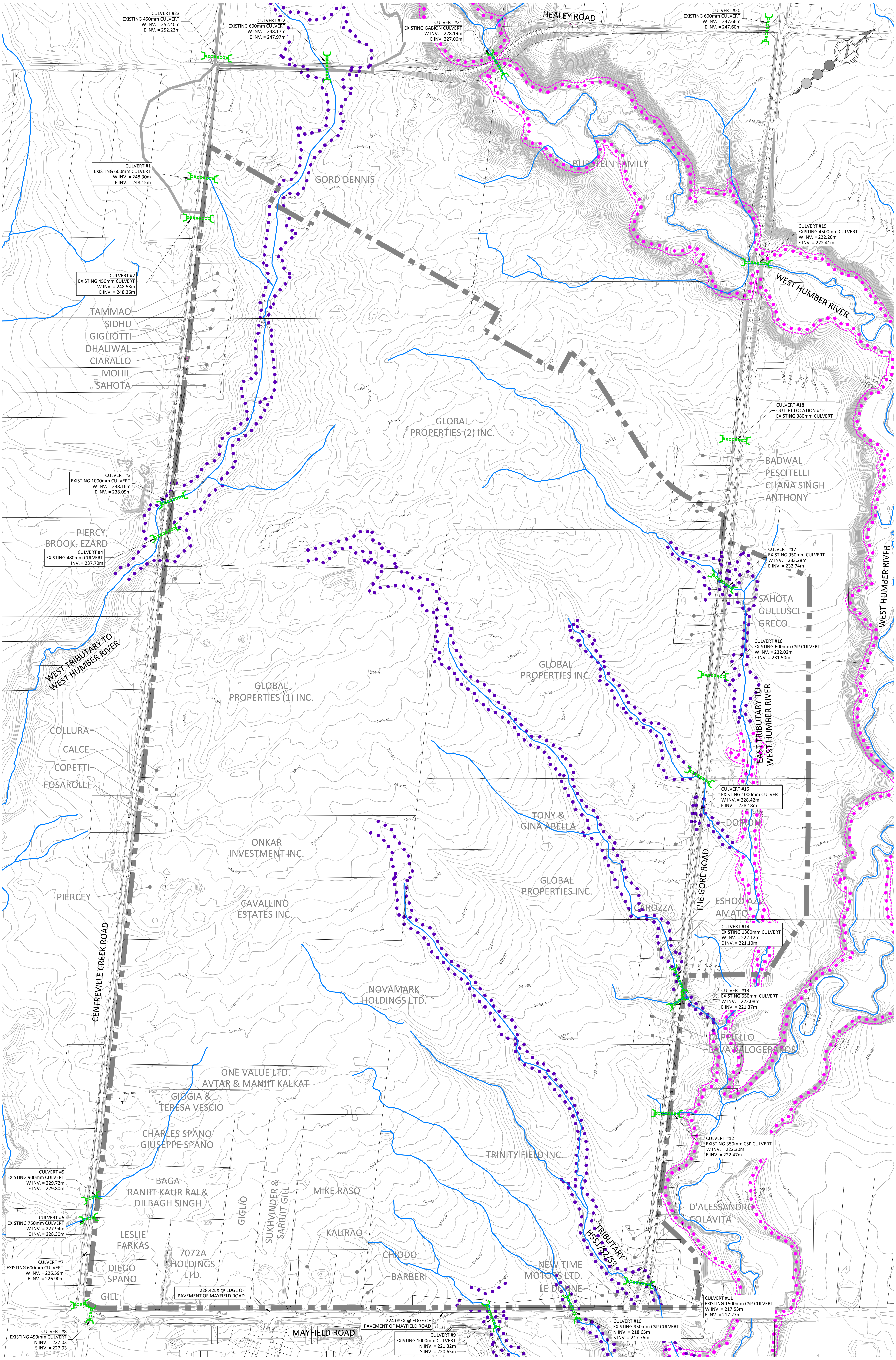
Wildfield Village Local Subwatershed Study

Date: Oct 2024

Project No.: 2400278

Scale: N.T.S

Figure No.: 2.10



LEGEND:

▬ ■ ■ ▬	WILDFIELD VILLAGE SECONDARY PLAN (WVSP) AREA LIMITS	● ● ● ● ● ● ● ●	WEST HUMBER RIVER REGULATORY FLOODLINE (TRCA, 2018)
──	WATERCOURSE (TRCA, 2018)	- - - - - - - -	WEST HUMBER RIVER REGULATORY FLOODLINE + 10m SETBACK (TRCA, 2018)
● ● ● ● ● ● ● ●	REGIONAL STORM EVENT FLOODLINE (TRCA, 2024)	]=====[	EXISTING CULVERT

SCS consulting group ltd

30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

WILDFIELD VILLAGE

EXISTING FLOODPLAIN MAPPING

DESIGNED BY:	R.R.B.	CHECKED BY:	A.R.K.
SCALE:	1:4000	DATE:	SEPTEMBER 2024

PROJECT No: 2630

FIGURE No: 2.11

File: P:\2630 Wildfield Village\Drawings\LSS\Fig\Report Figures\2630P-FLOD-EXST-2.11.dwg – Revised by <JNELLAS> : Fri, Oct 04 2024 – 3:02pm

APPENDIX B2

TABLES

Table 2.1: Field Studies and Natural Inventories (2021-2024)

SURVEYORS (SURNAME, INTL)	SURVEY ROUND	SURVEY TYPE	DATE	TIME		AIR TEMP (c°)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION COMMENTS
				START	END					
2021										
Rochon, M., Robinson O.	1	Headwater Drainage Feature Assessment	24-MR	09:45	15:13	8.9	79	80	3	None
Leslie, J., Lee, R.	1	Snake Survey and Turtle Basking Survey	7-AP	10:00	13:00	10	83	75	3	None
2022										
Leslie, J.	1	Bat Habitat Assessment	21-AP	13:30	17:00	12	94	25	2	None
Williamson, L.	1	Amphibian Call Count Survey	25- AP	20:30	23:30	12	100	100	2	Light showers
Nieroda, M., Cartwright, C.	1	Fish Community Sampling	2-MA	10:30	14:44	12	85	100	1	None
Williamson, L., Nieroda, M.	2	Amphibian Call Count Survey	2-MA	21:00	23:15	10	93	80	1	None
Leslie, J.	1	ELC and Botanical	9-MA	09:30	15:00	17	35	90	3	None

Table 2.1: Field Studies and Natural Inventories (2021-2024)

SURVEYORS (SURNAME, INTL)	SURVEY ROUND	SURVEY TYPE	DATE	TIME		AIR TEMP (c°)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION COMMENTS
				START	END					
		Inventory								
Kimble, B., Robinson, O.	2	Headwater Drainage Feature Assessment	18-MA	11:00	14:00	12	44	80	4	None
Burke, P.	1	Breeding Bird Survey	31-MA-2-JN	05:15	09:30	21	69	5	1	None
Williamson, L.	1	Bat Acoustic Monitoring Deployment	10-JN	09:40	12:00	20	50	0	4	None
Williamson, L., Cartwright, C.	3	Amphibian Call Count Survey	16-JN	21:15	23:00	27	36	0	3	None
Williamson, L.	2	Bat Acoustic Monitoring Retrieval	20-JN	10:00	12:00	21	36	75	2	None
Burke, P.	2	Breeding Bird Survey	21-23-JN	05:20	09:30	17	82	50	3	None
Leslie, J.	2	ELC and Botanical Inventory	14-JL	08:30	15:00	22	47	0	2	None
Leslie, J.	3	ELC and Botanical Inventory	19-JL	09:00	16:30	28	62	0	3	None
Nieroda, M.,	3	Headwater	3-AU	11:25	12:05	24	65	75	4	None

Table 2.1: Field Studies and Natural Inventories (2021-2024)

SURVEYORS (SURNAME, INTL)	SURVEY ROUND	SURVEY TYPE	DATE	TIME		AIR TEMP (c°)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION COMMENTS
				START	END					
Cartwright, C.		Drainage Feature Assessment								
Leslie, J.	1	Drone Imagery Analysis	24-AU	09:00	12:00	22	68	10	2	None
Leslie, J.	4	ELC and Botanical Inventory	15-SE	09:15	12:30	14	55	10	2	None
Williamson, L.	1	Turtle Basking Survey	25- OC	12:00	12:45	15	92	60	1	None
Williamson, L.	2	Turtle Basking Survey	27- OC	11:30	12:00	11	54	25	1	None
2023										
Buckton, G., Siddiqui, A.	1	Headwater Drainage Feature Assessment	13-AP	09:00	14:00	19	48	20	3	None
Mueller, L.	2	Headwater Drainage Feature Assessment	18-MA	09:00	14:00	10	52	20	3	None
Mueller, L.	1	Aquatic Habitat Assessment	24-MA	09:00	14:00	13	77	80	3	None

Table 2.1: Field Studies and Natural Inventories (2021-2024)

SURVEYORS (SURNAME, INTL)	SURVEY ROUND	SURVEY TYPE	DATE	TIME		AIR TEMP (c°)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION COMMENTS
				START	END					
Leslie, J	1	Feature Staking	07-NO	09:00	14:00	10	72	50	3	None
Leslie, J.	1	Stem Density Analysis	14-NO	09:00	14:00	5	82	50	3	None
Balsdon, M., Nieroda, M	1	Bat Habitat Assessment	15-DE	09:00	10:00	7	63	0	3	None
2024										
Nieroda, M., Lee, E.	1	Headwater Drainage Feature Assessment	10-AP	08:30	17:00	11	62	50	2	None
Lee, E.	1	Amphibian Call Count Survey	18-AP	21:29	21:37	N/A	72	65	0	None
Nieroda, M., Balsdon, M.	1	Snake Survey Bat Habitat Assessment	01-MA	09:00	11:00	10	100	50	2	None
Nieroda, M.	1	Snake Survey Bat Habitat Assessment	03-MA	9:00	9:55	10	70	0	2	None
Balsdon, M., Brunelle, P.	2	Snake Survey	10-MA	12:30	13:30	15	75	75	2	None
Nieroda, M.	2/3	Snake Survey	15-MA	15:00	17:00	16	70	0	2	None

Table 2.1: Field Studies and Natural Inventories (2021-2024)

SURVEYORS (SURNAME, INTL)	SURVEY ROUND	SURVEY TYPE	DATE	TIME		AIR TEMP (c°)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION COMMENTS
				START	END					
Nieroda, M.	3	Snake Survey	16-MA	09:00	09:46	17	68	10	1	None
Leslie, J.	1	Spring Botanical Survey	16-MA	09:00	15:00	17	68	10	1	None
Nieroda, M., Cartwright, C.	1	Fish Community Sampling	17-MA	08:30	13:30	16	83	75	1	None
Lee, E.	2	Amphibian Call Count Survey	27-MA	22:23	22:30	11	56	25	1	None
Martin, S.	1	Breeding Bird Survey and Barn Swallow Survey	30-MA	05:23	10:00	7	76	0	2	None
Nieroda, M., Brunelle, P.	2	Headwater Drainage Feature Assessment	31-MA	08:00	14:00	14	55	25	1	None
Martin, S.	2	Breeding Bird Survey and Barn Swallow Survey	19-JN	05:55	09:40	24	83	100	2	None
Lee, E.	3	Amphibian Call Count Survey	20-JN	21:35	21:50	23	88	90	1	None

Table 2.1: Field Studies and Natural Inventories (2021-2024)

SURVEYORS (SURNAME, INTL)	SURVEY ROUND	SURVEY TYPE	DATE	TIME		AIR TEMP (c°)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION COMMENTS
				START	END					
Martin, S.	3	Breeding Bird Survey	05-JL	06:22	08:17	19	78	30	2	None
Nieroda, M., Brunelle, P. Fleming, D. Love, S.	3	Headwater Drainage Feature Assessment	14-AU	08:30	12:30	22	59	0	3	None
Leslie, J.	2	Summer Botanical Survey	19-AU	09:00	15:00	15	83	100	3	None

LEGEND:

BEAUFORT WIND SPEED SCALE	
0	Calm (<1 km/hr)
1	Light Air (1-5 km/hr)
2	Light Breeze (6-11 km/hr)
3	Gentle Breeze (12-19 km/hr)
4	Moderate Breeze (20-28 km/hr)

MONTH (CODE)	
JA	January
FB	February
MR	March
AP	April
MA	May
JN	June
JL	July
AU	August
SE	September
OC	October
NO	November
DE	December

Table 2.2 Species at Risk Overview: Designations, Habitat Preferences and Potential Implications

Species Common Name	Species Scientific Name	Provincial Status	S Rank	Federal Status	Regulated Habitat	Most recent occurrence	Source	Ontario Range and Occurrences	Description of Suitable Habitat in Ontario	Habitat Suitability Assessment of Study Area
INSECTS										
Monarch	*Danaus plexippus*	SC	S2N, S4B	SC				In Canada, Monarchs are most abundant in southern Ontario and Quebec where milkweed plants and breeding habitat are widespread (MECP 2022)	Only the caterpillars feed on milkweed plants and are confined to meadows and open areas where milkweed grows. Adult butterflies can be found in more diverse habitats (MECP 2022)	Potential occurrence within CUM communities on the Subject Lands/within 120m.
Rapids Clubtail	*Phanogomphus quadricolor*	THR	S2	END	Regulated Habitat Protection July 1, 2012			The Rapids Clubtail has only been recorded in six rivers in southern and eastern Ontario: the Thames, Humber, Credit Grand, Nith and Mississippi (MECP 2022)	The Rapids clubtail is typically found in clear, cool medium-to-large rivers with gravel shallows and muddy pools. Larvae occupy quiet muddy pools. Adult males perch on exposed rocks and other projections in the rapids. Adult females typically inhabit forests along riverbanks, and only visit shallows and pools when they are ready to mate and lay eggs (MECP 2022).	Potentially found in the tributary of the West Humber River.
REPTILES										
Snapping Turtle	*Chelydra serpentina*	SC	S3	SC				In Ontario, the range of the Snapping Turtle is limited to southern Ontario (MECP 2022).	Snapping Turtles spend most of their lives in water. They prefer shallow waters so they can hide under the soft mud and leaf litter, with only their noses exposed to the surface to breathe. During the nesting season, from early to mid summer, females travel overland in search of a suitable nesting site, usually gravelly or sandy areas along streams (MECP 2022).	Potentially suitable habitat wetlands, ponds, and watercourses provide suitable habitat on the Subject Lands/within 120m.
Eastern Ribbonsnake	*Thamnophis saurita*	SC	S4	SC				In Ontario, this snake occurs throughout southern and eastern Ontario and is locally common in parts of the Bruce Peninsula, Georgian Bay and eastern Ontario (MECP 2022).	The Eastern Ribbonsnake is usually found close to water, especially in marshes, where it hunts for frogs and small fish. These snakes congregate in underground burrows or rock crevices to hibernate over winter (MECP 2022).	No suitable rock piles present within the Subject Lands.

Table 2.2 Species at Risk Overview: Designations, Habitat Preferences and Potential Implications

Species Common Name	Species Scientific Name	Provincial Status	S Rank	Federal Status	Regulated Habitat	Most recent occurrence	Source	Ontario Range and Occurrences	Description of Suitable Habitat in Ontario	Habitat Suitability Assessment of Study Area
BIRDS										
Eastern Meadowlark	*Sturnella magna*	THR	S4B, S3N	THR	General Habitat Desciption July 2, 2013			Eastern Meadowlark is widespread in Ontario and found mostly south of the Canadian Shield (MECP 2022).	Eastern Meadowlarks breed primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Small trees, shrubs or fence posts are used as elevated song perches (MECP 2022).	Potential for Eastern Meadowlark, CUM and AG communities are present on/within 120m of the Subject Lands
Bobolink	*Dolichonyx oryzivorus*	THR	S4B	THR	General Habitat Desciption July 2, 2013			Bobolink is widespread in Ontario and is found throughout the province, generally south of the boreal forest (MECP 2022).	Historically, Bobolinks lived in North American tallgrass prairie and other open meadows. With the clearing of native prairies, Bobolinks moved to living in hayfields. Bobolinks often build their small nests on the ground in dense grasses. Both parents usually tend to their young, sometimes with a third Bobolink helping (MECP 2022).	Potential Bobolink, CUM communities are present on/within 120m of the Subject Lands.
Wood Thrush	*Hylocichla mustelina*	SC	S4B	THR				The wood thrush is found all across southern Ontario. It is also found, but less common, along the north shore of Lake Huron, as far west as the southeastern tip of Lake Superior. There is a very small population near Lake of the Woods in northwestern Ontario, and there have been scattered sightings in the mixed forest of northern Ontario (MECP 2022)	The wood thrush lives in mature deciduous and mixed (conifer-deciduous) forests. They seek moist stands of trees with well-developed undergrowth and tall trees for singing perches. These birds prefer large forests, but will also use smaller stands of trees. They build their nests in living saplings, trees or shrubs, usually in sugar maple or American beech (MECP 2022)	Potential for Wood Thrush, deciduous swamp and deciduous forest located on/within 120m of the Subject Lands

Table 2.2 Species at Risk Overview: Designations, Habitat Preferences and Potential Implications

Species Common Name	Species Scientific Name	Provincial Status	S Rank	Federal Status	Regulated Habitat	Most recent occurrence	Source	Ontario Range and Occurrences	Description of Suitable Habitat in Ontario	Habitat Suitability Assessment of Study Area
Eastern Wood-pewee	*Contopus virens*	SC	S4B	SC				The eastern wood-pewee is found across most of southern and central Ontario, and in northern Ontario as far north as Red Lake, Lake Nipigon and Timmins (MECP 2022)	The eastern wood-pewee lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in intermediate-age mature forest stands with little understory vegetation (MECP 2022)	Suitable forested ecosites are present on/within 120m of the Subject Lands.
Acadian Flycatcher	*Empidonax virescens*	END	S1B	END	General Habitat Desciption July 2, 2013			In Ontario, the Acadian Flycatcher primarily lives in the warmer climate of southern Ontario's Carolinian forests. It needs large, undisturbed forests, often more than 40 hectares in size. It has also been known to nest at a few sites in the Greater Toronto Area but this is unusual. The Acadian Flycatcher population in Ontario is very small, with 25 to 75 breeding pairs recorded in 2010 (MECP 2022).	Typically found in mature, shady forests with ravines, or in forested swamps with a lot of maple and beech trees. Nests are placed at the tip of lower limbs on a tree and formed by loosely woven plant material. Acadian Flycatchers nest only in southwestern Ontario, mostly in large forests and forested ravines near the shore of Lake Erie (MECP 2022).	Unsuitable habitat, forested ecosites do not meet size criteria.
Bank Swallow	*Riparia riparia*	THR	S4B	THR				The bank swallow is found all across southern Ontario, with sparser populations scattered across northern Ontario. The largest populations are found along the Lake Erie and Lake Ontario shorelines, and the Saugeen River (which flows into Lake Huron) (MECP 2022).	Bank swallows nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable. The birds breed in colonies ranging from several to a few thousand pairs (MECP 2022).	Unsuitable habitat, there are no river or lake banks, and silt and/or sand stockpile deposits on Subject Lands.
Chimney Swift	*Chaetura pelagica*	THR	S3B	THR	General Habitat Desciption July 2, 2013			In Ontario, the species is most widely distributed in the Carolinian zone in the south and southwest of the province, but has been detected throughout most of the province south of the 49th parallel (MECP 2022).	They are more likely to be found in and around urban settlements where they nest and roost (rest or sleep) in chimneys and other manmade structures. They also tend to stay close to water as this is where the flying insects they eat congregate (MECP 2022).	Potential chimney swift habitat, West Humber river and Gore Road tributaries transect Subject Lands. Residential buildings found on/within 120 m of subject lands.

Table 2.2 Species at Risk Overview: Designations, Habitat Preferences and Potential Implications

Species Common Name	Species Scientific Name	Provincial Status	S Rank	Federal Status	Regulated Habitat	Most recent occurrence	Source	Ontario Range and Occurrences	Description of Suitable Habitat in Ontario	Habitat Suitability Assessment of Study Area
Barn Swallow	*Hirundo rustica*	SC	S4B	SC				The Barn Swallow may be found throughout southern Ontario and can range as far north as Hudson Bay, wherever suitable locations for nests exist (MECP 2022).	Barn Swallows often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. The species is attracted to open structures that include ledges where they can build their nests, which are often re-used from year to year. They prefer unpainted, rough-cut wood, since the mud does not adhere as well to smooth surfaces (MECP 2022).	Potential Barn Swallow as residential buildings are present on the Subject Lands/within 120m.
Upland Sandpiper	*Bartramia longicauda*		S2B					Upland Sandpipers live in grasslands in southern Ontario.	Upland Sandpipers live in grasslands.	Potential Upland Sandpiper, CUM and AG communities are present on/within 120m of Subject Lands
Prothonotary Warbler	*Protonotaria citrea*	END	S1B	END	General Habitat Protection June 30, 2008			In Canada, the Prothonotary warbler is only known to nest in southwestern Ontario, primarily along the north shore of Lake Erie. Over half of the small and declining population is found in Rondeau Provincial Park. In Ontario, the Prothonotary warbler is found in the warmer climate of the Carolinian deciduous forests. In 2005, it was estimated that there were only between 28-34 individuals in Ontario (MECP 2022).	The Prothornatory Warbler nests in small, shallow holes, found low in the trunks of dead or dying trees standing in or near flooded woodlands or swamps. They will also readily use properly placed artificial nest boxes (MECP 2022).	Potential Prothonotary Warbler, forested ecosites are present on the Subject Lands/within 120m.
Red-headed Woodpecker	*Melanerpes erythrocephalus*	END	S3	END				The Red-headed Woodpecker is found across southern Ontario, where it is widespread but rare (MECP 2022).	The Red-headed Woodpecker lives in open woodland and woodland edges and is often found in parks, golf courses and cemeteries that contain many dead trees, which the bird uses for nesting and perching (MECP 2022).	Potential Red-headed Woodpecker, forested ecosites are present on the Subject Lands/within 120m.

Table 2.2 Species at Risk Overview: Designations, Habitat Preferences and Potential Implications

Species Common Name	Species Scientific Name	Provincial Status	S Rank	Federal Status	Regulated Habitat	Most recent occurrence	Source	Ontario Range and Occurrences	Description of Suitable Habitat in Ontario	Habitat Suitability Assessment of Study Area
Eastern Whip-poor-will	*Antrostomus vociferus*	SC	S4B	THR				In Ontario they breed as far north as the shore of Lake Superior. Although Eastern Whip-poor-wills were once widespread throughout the central Great Lakes region of Ontario, their distribution in this area is now fragmented (MECP 2022).	The Eastern Whip-poor-will is usually found in areas with a mix of open and forested areas, such as savannahs, open woodlands or openings in more mature, deciduous, coniferous and mixed forests (MECP 2022)	Potential Eastern Whip-poor-will, forested ecosites are present on the Subject Lands/within 120m.
Common Nighthawk	*Chordeiles minor*	SC	S4B	THR				In Canada, the species is found in all provinces and territories except Nunavut. In Ontario, the Common Nighthawk occurs throughout the province except for the coastal regions of James Bay and Hudson Bay (MECP 2022)	Traditional Common Nighthawk habitat consists of open areas with little to no ground vegetation, such as logged or burned-over areas, forest clearings, rock barrens, peat bogs, lakeshores, and mine tailings. Although the species also nests in cultivated fields, orchards, urban parks, mine tailings and along gravel roads and railways, they tend to occupy natural sites (MECP 2022)	No logged or burned over areas, forest clearings, rock battres, peat bogs, lakeshores and mine tailings are not present on the Subject Lands/within 120m
Golden-winged Warbler	*Vermivora chrysoptera*	SC	S4B	THR				In Ontario, these birds breed in central-eastern Ontario, as far south as Lake Ontario and the St. Lawrence River, and as far north as the northern edge of Georgian Bay. Golden-winged Warblers have also been found in the Lake of the Woods area near the Manitoba border, and around Long Point on Lake Erie (MECP 2022)	Golden-winged Warblers prefer to nest in areas with young shrubs surrounded by mature forest – locations that have recently been disturbed, such as field edges, hydro or utility right-of-ways, or logged areas (MECP 2022)	No, while field edges are present within the Subject Lands, the Subject Lands are not located within the known occurrence range of this species.
Grasshopper Sparrow	*Ammodramus savannarum*	SC	S4B	SC				The Grasshopper Sparrow can be found throughout southern Ontario, but only occasionally on the Canadian Shield. It is most common where grasslands, hay or pasture dominate the landscape (MECP 2022).	It lives in open grassland areas with well-drained, sandy soil. It will also nest in hayfields and pasture, as well as alvars, prairies and occasionally grain crops such as barley. It prefers areas that are sparsely vegetated. Its nests are well-hidden in the field and woven from grasses in a small cup-like shape (MECP 2022).	Potential cultural meadow ecosites are present on the Subject Lands/within 120m.

Table 2.2 Species at Risk Overview: Designations, Habitat Preferences and Potential Implications

Species Common Name	Species Scientific Name	Provincial Status	S Rank	Federal Status	Regulated Habitat	Most recent occurrence	Source	Ontario Range and Occurrences	Description of Suitable Habitat in Ontario	Habitat Suitability Assessment of Study Area
Purple Martin	*Progne subis*		S3B					Purple Martin are found in southwest Ontario (Ontario Purple Martin Association 2023).	Purple Martins live in open areas near wetlands, swamps, and wet meadows. The can be found along forest edges, in mountain forests, shrubland, agricultural areas, farms and in urban settlements. Purple Martin almost exclusively nest in artificial roosting boxes (Ontario Purple Martin Association 2023).	No artificial roosting boxes are present on the Subject Lands/within 120m.
MAMMALS										
Eastern Small-footed Myotis	*Myotis leibii*	END	S2S3					The eastern small-footed bat has been found from south of Georgian Bay to Lake Erie and east to the Pembroke area. There are also records from the Bruce Peninsula, the Espanola area, and Lake Superior Provincial Park (MECP 2022)	In the spring and summer, eastern small-footed bats will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. In the winter, these bats hibernate, most often in caves and abandoned mines. They seem to choose colder and drier sites than similar bats and will return to the same spot each year (MECP 2022)	Potentially habitat present within forested ecosites.
Little Brown Myotis	*Myotis lucifugus*	END	S3	END				Widespread in southern Ontario and found as far north as Moose Factory and Favourable Lake (MECP 2022)	Bats are nocturnal. During the day they roost in trees and buildings. They often select attics, abandoned buildings and barns for summer colonies where they can raise their young. Little brown bats hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing (MECP 2022).	Potentially habitat present within forested ecosites.

Table 2.2 Species at Risk Overview: Designations, Habitat Preferences and Potential Implications

Species Common Name	Species Scientific Name	Provincial Status	S Rank	Federal Status	Regulated Habitat	Most recent occurrence	Source	Ontario Range and Occurrences	Description of Suitable Habitat in Ontario	Habitat Suitability Assessment of Study Area
Northern Myotis	*Myotis septentrionalis*	END	S3	END	General Habitat Protection January 24, 2013			The northern long-eared bat is found throughout forested areas in southern Ontario, to the north shore of Lake Superior and occasionally as far north as Moosonee, and west to Lake Nipigon (MECP 2022)	Northern long-eared bats are associated with boreal forests, choosing to roost under loose bark and in the cavities of trees. These bats hibernate from October or November to March or April, most often in caves or abandoned mines (MECP 2022).	Potentially habitat present within forested ecosites.
Tri-coloured Bat	*Perimyotis subflavus*	END	S3?	END				This bat is found in southern Ontario and as far north as Espanola near Sudbury. Because it is very rare, it has a scattered distribution (MECP 2022).	During the summer, the Tri-colored Bat is found in a variety of forested habitats. It forms day roosts and maternity colonies in older forest and occasionally in barns or other structures. They overwinter in caves where they typically roost by themselves rather than part of a group (MECP 2022).	Potentially habitat present within forested ecosites.
FISH										
Redside Dace	*Clinostomus elongatus*	END	S1	END	Regulated July 1, 2011			Redside Dace are found in a few tributaries of Lake Huron, in streams flowing into western Lake Ontario, the Holland River (which flows into Lake Simcoe) and Irvine Creek of the Grand River system (which flows into Lake Erie) (MECP 2022).	Redside Dace are found in pools and slow-moving areas of small streams and headwaters with gravel substrates. Overhanging vegetation is frequently found at the waters' edge where the fish leap out of the water to catch prey (MECP 2022).	Potential for Redside Dace, candidate habitat present on Subject Lands, present within the West Humber River tributary
American Brook Lamprey	*Lethenteron appendix*		S3					American Brook Lamprey range extends from west of Thunder Bay along the northern shores of the Great Lakes and includes the Ottawa River. In the Great Lakes, the species is found in tributaries of Lakes Superior, Michigan, Huron and Erie, but has not been found in Lake Ontario. Northern Brook Lamprey has also been documented in Lake Nipissing and its tributaries (MECP 2023).	Adults in gravel/sand riffles and runs of creeks and small to medium sized rivers with strong flow and clear waters; ammocoetes in sandy or silty pools; preferred water temperature range 9-12 degrees Celcius (Ontario Fishes 2023).	No the Subject Lands are not in the range where American Brook Trout are located.

Table 2.2 Species at Risk Overview: Designations, Habitat Preferences and Potential Implications

Species Common Name	Species Scientific Name	Provincial Status	S Rank	Federal Status	Regulated Habitat	Most recent occurrence	Source	Ontario Range and Occurrences	Description of Suitable Habitat in Ontario	Habitat Suitability Assessment of Study Area

Last Updated

S Rank: NHIC Biodiversity Explorer

Provinicial Status: March 2023

COSSARO Priority Species: May 2018 (http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/MNR_SAR_CSSR_MTNG_RSLTS_EN.html)

Federal Status: May 2018 (http://www.sararegistry.gc.ca/sar/index/default_e.cfm?stype=species&lng=e&inde

^no schedule or status in SARA, but listed in COSEWIC

Source

MECP (2023). Northern Brook Lamprey. Available online at: https://www.ontario.ca/page/northern-brook-lamprey#:~:text=In%20Ontario%2C%20the%20Northern%20Brook,been%20found%20in%20Lake%20Ontario.

Ontario Fishes (2023). American Brook Lamprey. Available online at: https://www.ontariofishes.ca/fish_detail.php?FID=4

Ontario Purple Martin Assocation (2023). Purple Martin Quick Facts from Animalia. Available online at: https://ontariopurplemartins.ca/biology/

SARO (2023). Species at Risk in Ontario List. Ontario Regulation 230/08. Consolidation Period January 25, 2023.

Table 2.3: Ecological Landscape Characterization (ELC) Community Descriptions

ELC TYPE	COMMUNITY DESCRIPTION	S-RANK (NHIC 2024)
FOREST		
Coniferous Forest		
FOC2-2 Dry-Fresh White Cedar Coniferous Forest	• Small, mid-age forest with canopy dominated by Eastern White Cedar (Thuja occidentalis). • Understory quite sparse, with infrequent occurrences of Showy Fly Honeysuckle (*Lonicera x bella*) and European Buckthorn (*Rhamnus cathartica*). • Ground cover also quite sparse, with infrequent occurrences of Garlic Mustard (*Alliaria petiolata*), Enchanter's Nightshade (*Circae canadensis*), and European Swallowwort (Vincetoxicum rossicum).	S5
THICKET		
Deciduous Thicket		
THDM2-6* Buckthorn Deciduous Shrub Thicket	• This community lacks a well-defined canopy layer but does include infrequent observations of Basswood, Green Ash (*Fraxinus pennsylvanica*), Sugar Maple, and Manitoba Maple (*Acer negundo)*. • The shrub layer is the dominant vegetation form of this community, which is dominated by mature European Buckthorn. Chokecherry and Showy Fly Honeysuckle (*Lonicera* x *bella)* were also occasionally observed. • Ground layer species commonly included Mayapple (*Podophyllum peltatum)*, Yellow Trout Lily, Yellow Avens (*Geum aleppicum),* Wild Strawberry (*Fragaria virginiana)* and Virginia Waterleaf.	N/A
CULTURAL		
Cultural Meadow		
CUM1-1 Dry – Moist Old Field Meadow	• This community lacks well-defined canopy and understory layers but does infrequently include woody species such as Eastern Cottonwood (*Populus deltoides),* European Buckthorn and Staghorn Sumac (*Rhus typhina*). • Abundant ground layer vegetation often included Garden Bird's Foot Trefoil (*Lotus corniculatus)*, Tall Goldenrod (*Solidago altissima* var. *altissima*), Kentucky Bluegrass (*Poa pratensis),* Common Dandelion (*Taraxacum officinale),* and Wild Carrot (*Daucus carota*).	N/A
Cultural Woodland		

ELC TYPE	COMMUNITY DESCRIPTION	S-RANK (NHIC 2024)
CUW1 Mineral Cultural Woodland	• Disturbed woodland containing anthropogenic waste piles as well as small CUT1 and MAM2 inclusions. • The canopy of this community consists of Trembling Aspen and infrequent Golden Weeping Willow (*Salix* x *sepulcralis)*. The subcanopy is also abundant in Trembling Aspen and White Mulberry (*Morus alba)*. • Understory vegetation includes European Buckthorn, Showy Fly Honeysuckle, Black Raspberry (*Rubus occidentalis)* and North American Red Raspberry (*Rubus idaeus* ssp. *strigosus*). • Ground layer of moderate density and including Wild Strawberry, White Avens (*Geum canadense),* Common Dandelion and Elecampane (*Inula helenium*).	N/A
SWAMP		
Deciduous Swamp		
SWD3-3 Mineral Deciduous Swamp	• Moderate canopy cover consisting of Freeman's Maple (*Acer* x *freemanii),* Manitoba Maple and White Elm (*Ulmus americana*). • Understory vegetation was sparse but did infrequently include European Buckthorn. • Abundant ground layer vegetation including Bittersweet Nightshade (*Solanum dulcamara*), Spotted Jewelweed (*Impatiens capensis)*, Devil's Beggarticks (*Bidens frondosa*), Reed-Canary Grass (*Phalaris arundinacea)* and Common Water-Parsnip (*Sium suave)*. • While there was no water in the summer or fall months, the soil was moist throughout this community.	S5
SWD3-2 Silver Maple Deciduous Swamp	• Moderate canopy cover consisting primarily of Silver Maple (*Acer saccharinum)* with occasional observations of Basswood, White Elm and Green Ash. Most of the ash in the canopy was dead. The subcanopy additionally consisted of Black Ash (*Fraxinus nigra).* • Understory vegetation included canopy saplings, European Buckthorn, Showy Fly Honeysuckle, Cottony Willow (*Salix eriocephala*) and Dewberry (*Rubus pubescens*). • Ground layer commonly included Eastern Star Sedge (*Carex radiata)*, Hop Sedge (*Carex lupulina)*, Fowl Mannagrass (*Glyceria striata)*, and Bittersweet Nightshade. • A few areas within the community had surface water approximately 15 cm in depth in the spring months.	S5
MARSH		
Meadow Marsh		

ELC TYPE	COMMUNITY DESCRIPTION	S-RANK (NHIC 2024)
MAM2-2 Reed-Canary Grass Mineral Meadow Marsh	• This community lacks well-defined canopy and understory layers, but did infrequently include Hybrid Crack Willow (*Salix* x *fragilis*), Corkscrew Willow (*Salix matsudana*), Peachleaf Willow (*Salix amygdaloides*) and European Buckthorn. • Reed-Canary Grass was the dominant species within the ground layer vegetation. Other species commonly observed included Fowl Bluegrass (*Poa palustris*), Panicled Aster (*Symphyotrichum lanceolatum*), Narrow-Leaved Cattail (*Typha angustifolia)*, and Creeping Bentgrass (*Agrostis stolonifera)*. • This community did not often have standing water, with some pools up to 5 cm in depth in the spring.	S5
MAM2-10 Forb Mineral Meadow Marsh	• This community lacked well-defined canopy and understory layers, but did infrequently include Hybrid Crack Willow, Manitoba Maple, and Peachleaf Willow. • Ground layer vegetation abundant in Panicled Aster. Other species observed include Reed-Canary Grass, Canada Thistle (*Cirsium arvense),* Creeping Bentgrass and New England Aster.	S4S5
Shallow Marsh		
MAS2-1 Cattail Mineral Shallow Marsh	• This community lacked well-defined canopy and understory layers, though Peachleaf Willow was infrequently observed in the canopy layer. • Dense ground layer vegetation was dominated by Narrow-Leaved Cattail and Blue Cattail (*Typha* x *glauca*). Other species commonly observed include Small Duckweed (*Lemna minor)*, Reed-Canary Grass, Bittersweet Nightshade, Fringed Willowherb (*Epilobium ciliatum)*, Fowl Bluegrass, and Common Water-Parsnip • All features of this community type had moist soil from spring through fall, with some features having standing water up to 40 cm in the spring and 18 cm in the summer.	S5

* Vegetation community codes marked with an asterisk are based on the naming protocols from the 2007 ELC update (2nd Approximation).

Table 2.4: Master Plant List

													LOCAL / REGIONAL STATUS			
ORDER	FAMILY	LATIN NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	OWES WETLAND SPECIES	WEEDINESS INDEX	INVASIVE EXOTIC RANK (Urban Forest Associates 2002)	PROVINCIAL STATUS (S-RANK)	GLOBAL STATUS (G-RANK)	COSSARO (MNRF)	COSEWIC STATUS	PEEL (Varga 2005)	TRCA (TRCA April 2016)	GTA (Varga 2005)	AUTHORITY
DICOTYLEDONS	Amaranthaceae	Amaranthus retroflexus	Redroot Amaranth		3		-1		SNA	G5			X	L+	X	L.
DICOTYLEDONS	Amaranthaceae	Atriplex patula	Spear Saltbush		-3				SNA	G5			X	L+?	X	L.
DICOTYLEDONS	Anacardiaceae	Rhus typhina	Staghorn Sumac	1	3				S5	G5			X	L5	X	L.
DICOTYLEDONS	Anacardiaceae	Toxicodendron radicans var. rydbergii	Western Poison Ivy	2	0				S5	G5			X	L5	X	(Small ex Rydberg) Erskine
DICOTYLEDONS	Apiaceae	Cicuta bulbifera	Bulbous Water-Hemlock	5	-5	I			S5	G5			X	L4	X	L.
DICOTYLEDONS	Apiaceae	Daucus carota	Wild Carrot		5		-2		SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Apiaceae	Sium suave	Common Water-Parsnip	4	-5	I			S5	G5			X	L4	X	Walter
DICOTYLEDONS	Apocynaceae	Asclepias syriaca	Common Milkweed	0	5				S5	G5			X	L5	X	L.
DICOTYLEDONS	Apocynaceae	Vincetoxicum rossicum	European Swallowwort		5			1	SNA	GNR			X	L+	X	(Kleopow) Barbaricz
DICOTYLEDONS	Asteraceae	Achillea millefolium	Common Yarrow		3		-1		SNA	G5			X	L+	X	L.
DICOTYLEDONS	Asteraceae	Ambrosia artemisiifolia	Common Ragweed	0	3				S5	G5			X	L5	X	L.
DICOTYLEDONS	Asteraceae	Arctium lappa	Great Burdock		3				SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Asteraceae	Arctium minus	Common Burdock		3		-2		SNA	G?T?			X	L+	X	(Hill) Bernh.
DICOTYLEDONS	Asteraceae	Artemisia biennis	Biennial Wormwood		-3		-1		SNA	G5			X	L+	X	Willd.
DICOTYLEDONS	Asteraceae	Bidens cernua	Nodding Beggarticks	2	-5	I			S5	G5			X	L5	X	L.
DICOTYLEDONS	Asteraceae	Bidens frondosa	Devil's Beggarticks	3	-3	I			S5	G5			X	L5	X	L.
DICOTYLEDONS	Asteraceae	Bidens vulgata	Tall Beggarticks	5	0	T			S5	G5			R1	L4	U	Greene
DICOTYLEDONS	Asteraceae	Carduus acanthoides ssp. acanthoides	Spiny Plumeless Thistle		5		-1		SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Asteraceae	Cichorium intybus	Wild Chicory		5		-1		SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Asteraceae	Cirsium arvense	Canada Thistle		3		-1	1	SNA	GNR			X	L+	X	(L.) Scop.
DICOTYLEDONS	Asteraceae	Cirsium vulgare	Bull Thistle		3		-1		SNA	G5			X	L+	X	(Savi) Tenore
DICOTYLEDONS	Asteraceae	Erigeron annuus	Annual Fleabane	0	3				S5	G5			X	L5	X	(L.) Pers.
DICOTYLEDONS	Asteraceae	Erigeron canadensis	Canada Horseweed	0	3				S5	G5			X	L5	X	(L.)
DICOTYLEDONS	Asteraceae	Eurybia macrophylla	Large-Leaved Aster	5	5				S5	G5			X	L5	X	(L.) Cassini
DICOTYLEDONS	Asteraceae	Euthamia graminifolia	Grass-Leaved Goldenrod	2	0				S5	G5			X	L5	X	(L.) Nutt.
DICOTYLEDONS	Asteraceae	Inula helenium	Elecampane		3	T	-2	4	SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Asteraceae	Lactuca serriola	Prickly Lettuce		3		-1		SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Asteraceae	Matricaria discoidea	Pineappleweed		3				SNA	G5			X	L+	X	de Candolle
DICOTYLEDONS	Asteraceae	Solidago altissima var. altissima	Tall Goldenrod	1	3				S5	GNR			X	L5	X	L.
DICOTYLEDONS	Asteraceae	Solidago flexicaulis	Zigzag Goldenrod	6	3				S5	G5			X	L5	X	L.
DICOTYLEDONS	Asteraceae	Solidago nemoralis var. nemoralis	Grey-Stemmed Goldenrod (var. nemora	2	5				S5	G5T?			X	L5	X	Aiton
DICOTYLEDONS	Asteraceae	Sonchus arvensis ssp. arvensis	Field Sow-Thistle		3				SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Asteraceae	Sonchus asper	Prickly Sow-Thistle		3		-1		SNA	GNR			X	L+	X	(L.) Hill
DICOTYLEDONS	Asteraceae	Symphyotrichum cordifolium	Heart-Leaved Aster	5	5				S5	G5			X	L5	X	(L.) G.L. Nesom
DICOTYLEDONS	Asteraceae	Symphyotrichum ericoides var. ericoide	White Heath Aster	4	3				S5	G5T5			X	L5	X	(L.) G.L. Nesom
DICOTYLEDONS	Asteraceae	Symphyotrichum lanceolatum ssp. lanc	Panicled Aster (ssp. lanceolatum)	3	-3	I			S5	G5T5			X	L5	X	(Willd.) G.L. Nesom
DICOTYLEDONS	Asteraceae	Symphyotrichum lateriflorum var. later	Calico Aster	3	0	T			S5	G5T5			X	L5	X	(L.) Á. & D. Löve
DICOTYLEDONS	Asteraceae	Symphyotrichum novae-angliae	New England Aster	2	-3				S5	G5			X	L5	X	(L.) G.L. Nesom
DICOTYLEDONS	Asteraceae	Taraxacum officinale	Common Dandelion		3		-2		SNA	G5			X	L+	X	F.H. Wiggers
DICOTYLEDONS	Asteraceae	Tripleurospermum inodorum	Scentless Chamomile		0		-1		SNA	GNR			X	L+	X	(L.) Schultz-Bip.
DICOTYLEDONS	Balsaminaceae	Impatiens capensis	Spotted Jewelweed	4	-3	I			S5	G5			X	L5	X	Meerburgh
DICOTYLEDONS	Berberidaceae	Podophyllum peltatum	May-Apple	5	3				S5	G5			X	L5	X	L.
DICOTYLEDONS	Betulaceae	Ostrya virginiana	Eastern Hop-Hornbeam	4	3				S5	G5			X	L5	X	(Miller) K. Koch
DICOTYLEDONS	Boraginaceae	Hydrophyllum virginianum var. virginia	Virginia Waterleaf	6	0				S5	G5			X	L5	X	L.
DICOTYLEDONS	Brassicaceae	Alliaria petiolata	Garlic Mustard		0		-3	1	SNA	G5			X	L+	X	(M. Bieb.) Cavara & Grande
DICOTYLEDONS	Brassicaceae	Erysimum cheiranthoides	Wormseed Wallflower		3		-1		S5?				X	L+	X	L.
DICOTYLEDONS	Brassicaceae	Lepidium campestre	Field Peppergrass		5		-1		SNA	GNR			X	L+	X	(L.) W.T. Aiton
DICOTYLEDONS	Brassicaceae	Sinapis arvensis	Corn Mustard		5		-1		SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Brassicaceae	Thlaspi arvense	Field Pennycress		5		-1		SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Caprifoliaceae	Dipsacus fullonum	Common Teasel		3		-1	3	SNA	G?T?			X	L+	X	L.
DICOTYLEDONS	Caprifoliaceae	Lonicera x bella	Showy Fly Honeysuckle		3		-3		SNA	GNR			X	L+	X	Zabel
DICOTYLEDONS	Caryophyllaceae	Dianthus armeria ssp. armeria	Deptford Pink		5		-1		SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Celastraceae	Euonymus obovatus	Running Strawberry Bush	6	5				S4	G5			X	L3	X	Nutt.
DICOTYLEDONS	Convolvulaceae	Convolvulus arvensis	Field Bindweed		5		-1	3	SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Cornaceae	Cornus alternifolia	Alternate-Leaved Dogwood	6	3				S5	G5			X	L5	X	L. f.
DICOTYLEDONS	Cornaceae	Cornus sericea	Red-Osier Dogwood	2	-3	I*			S5	G5			X	L5	X	L.
DICOTYLEDONS	Cucurbitaceae	Echinocystis lobata	Wild Cucumber	3	-3	T			S5	G5			X	L5	X	(Michx.) Torr. & A. Gray
DICOTYLEDONS	Euphorbiaceae	Euphorbia virgata	Leafy Spurge		5		-2		SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Fabaceae	Lotus corniculatus	Garden Bird's-Foot Trefoil		3		-2	2	SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Fabaceae	Medicago lupulina	Black Medick		3		-1	4	SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Fabaceae	Medicago sativa ssp. sativa	Alfalfa (ssp. sativa)		5		-1	4	SNA	GNRTNR			X	L+	X	L.
DICOTYLEDONS	Fabaceae	Melilotus albus	White Sweet-Clover		3		-3	2	SNA	GNR			X	L+	X	Medik.
DICOTYLEDONS	Fabaceae	Robinia pseudoacacia	Black Locust		3		-3	2	SNA	G5			X	L+	X	L.
DICOTYLEDONS	Fabaceae	Trifolium hybridum	Alsike Clover		3		-1		SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Fabaceae	Trifolium pratense	Red Clover		3		-2	4	SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Fabaceae	Trifolium repens	White Clover		3		-1	4	SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Fabaceae	Vicia cracca	Tufted Vetch		5		-1	2	SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Fagaceae	Fagus grandifolia	American Beech	6	3				S4	G5			X	L4	X	Ehrhart
DICOTYLEDONS	Fagaceae	Quercus macrocarpa	Bur Oak	5	3	T			S5	G5			X	L4	X	Michaux
DICOTYLEDONS	Geraniaceae	Geranium robertianum	Herb-Robert	2	3		-2		S5	G5			X	L+?	X	L.
DICOTYLEDONS	Grossulariaceae	Ribes rubrum	European Red Currant		5	T	-2		SNA	G4G5			X	L+	X	L.
DICOTYLEDONS	Haloragaceae	Myriophyllum sp.	Water-Milfoil species													
DICOTYLEDONS	Hypericaceae	Hypericum perforatum ssp. perforatum	Common St. John's-Wort		5		-3	4	SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Lamiaceae	Lycopus uniflorus	Northern Water-Horehound	5	-5	I			S5	G5			X	L5	X	Michaux
DICOTYLEDONS	Lamiaceae	Prunella vulgaris ssp. vulgaris	Common Self-Heal		0		-1		S5	G5T?			X	L+	X	L.
DICOTYLEDONS	Lythraceae	Lythrum salicaria	Purple Loosestrife		-5	I	-3	1	SNA	G5			X	L+	X	L.
DICOTYLEDONS	Malvaceae	Abutilon theophrasti	Velvetleaf		3		-1	3	SNA	GNR			X	L+	X	Medikus
DICOTYLEDONS	Malvaceae	Tilia americana	Basswood	4	3				S5	G5			X	L5	X	L.
DICOTYLEDONS	Montiaceae	Claytonia virginica	Eastern Spring Beauty	5	3	T			S5	G5			X	L3	X	L.
DICOTYLEDONS	Moraceae	Morus alba	White Mulberry		0		-3	1	SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Oleaceae	Fraxinus americana	White Ash	4	3				S4	G5			X	L5	X	L.
DICOTYLEDONS	Oleaceae	Fraxinus nigra	Black Ash	7	-3	I			S4	G5	THR	THR	X	L4	X	Marshall
DICOTYLEDONS	Oleaceae	Fraxinus pennsylvanica	Red Ash	3	-3	T			S4	G5			X	L5	X	Marshall
DICOTYLEDONS	Onagraceae	Circaea canadensis ssp. canadensis	Canada Enchanter's Nightshade	2	3				S5	G5T5			X	L5	X	(L.) Hill
DICOTYLEDONS	Onagraceae	Epilobium ciliatum ssp. ciliatum	Northern Willowherb	3	-3	I*			S5	G5T?			X	L5	X	Raf.
DICOTYLEDONS	Onagraceae	Epilobium parviflorum	Small-Flowered Willowherb		3	T	-1		SNA	GNR			X	L+	X	Schreber
DICOTYLEDONS	Onagraceae	Oenothera parviflora	Small-Flowered Evening Primrose	1	3				S5	G4?			X	L3	X	L.
DICOTYLEDONS	Oxalidaceae	Oxalis stricta	European Wood-Sorrel	0	3				S5	G5			X	L5	X	L.
DICOTYLEDONS	Penthoraceae	Penthorum sedoides	Ditch-Stonecrop	4	-5	I			S5	G5			X	L4	X	L.
DICOTYLEDONS	Plantaginaceae	Plantago lanceolata	English Plantain		3		-1		SNA	G5			X	L+	X	L.
DICOTYLEDONS	Plantaginaceae	Plantago major	Common Plantain		3		-1		SNA	G5			X	L+	X	L.
DICOTYLEDONS	Polygonaceae	Fallopia convolvulus	Eurasian Black Bindweed		3		-1		SNA	GNR			X	L+	X	(L.) Á. Löve
DICOTYLEDONS	Polygonaceae	Persicaria hydropiper	Marshpepper Smartweed		-5	I			SNA	GNR			X	L+?	X	(L.) Delarbre
DICOTYLEDONS	Polygonaceae	Persicaria lapathifolia	Pale Smartweed	2	-3	T			S5	G5			X	L5	X	(L.) Delarbre
DICOTYLEDONS	Polygonaceae	Persicaria maculosa	Spotted Lady's-Thumb		-3	T	-1		SNA	G3G5			X	L+	X	Gray
DICOTYLEDONS	Polygonaceae	Persicaria pensylvanica	Pennsylvania Smartweed	3	-3	I			S5	G5			R3	L4	R	(L.) M. Gómez de la Maza
DICOTYLEDONS	Polygonaceae	Polygonum aviculare ssp. aviculare	Prostrate Knotweed		3		-1		S4?	GNRTNR			X	L+	X	L.
DICOTYLEDONS	Polygonaceae	Rumex crispus	Curled Dock		0	T	-2		SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Portulacaceae	Portulaca grandiflora	Garden Portulaca		5				SNA	GNR				L+	X	Hooker
DICOTYLEDONS	Primulaceae	Lysimachia arvensis	Scarlet Pimpernel		3		-1		SNA	GNR			X	L+	X	(L.) U.Manns & Anderb.

Table 2.4: Master Plant List

													LOCAL / REGIONAL STATUS			
ORDER	FAMILY	LATIN NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	OWES WETLAND SPECIES	WEEDINESS INDEX	INVASIVE EXOTIC RANK (Urban Forest Associates 2002)	PROVINCIAL STATUS (S-RANK)	GLOBAL STATUS (G-RANK)	COSSARO (MNRF)	COSEWIC STATUS	PEEL (Varga 2005)	TRCA (TRCA April 2016)	GTA (Varga 2005)	AUTHORITY
DICOTYLEDONS	Ranunculaceae	Actaea rubra ssp. rubra	Red Baneberry	6	3				S5	G5			X	L5	X	(Aiton) Willdenow
DICOTYLEDONS	Ranunculaceae	Ranunculus abortivus	Kidney-Leaved Buttercup	2	0				S5	G5			X	L5	X	L.
DICOTYLEDONS	Ranunculaceae	Ranunculus sceleratus	Cursed Buttercup	2	-5	I			S5	G5			X	L5	X	L.
DICOTYLEDONS	Rhamnaceae	Rhamnus cathartica	European Buckthorn		0	T	-3	1	SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Rosaceae	Crataegus monogyna var. monogyna	English Hawthorn		3		-1	3	SNA	G5			X	L+	X	Jacquin
DICOTYLEDONS	Rosaceae	Crataegus punctata	Dotted Hawthorn	4	5				S5	G5			X	L5	X	Jacquin
DICOTYLEDONS	Rosaceae	Fragaria virginiana	Wild Strawberry	2	3				S5	G5			X	L5	X	Miller
DICOTYLEDONS	Rosaceae	Geum aleppicum	Yellow Avens	2	0	T			S5	G5			X	L5	X	Jacquin
DICOTYLEDONS	Rosaceae	Geum canadense	White Avens	3	0	T			S5	G5			X	L5	X	Jacquin
DICOTYLEDONS	Rosaceae	Geum fragarioides	Barren Strawberry	5	5				S5	G5			X	L4	X	(Michx.) Smedmark
DICOTYLEDONS	Rosaceae	Geum laciniatum	Rough Avens	4	-3	T			S4	G5			X	L4	U	Murray
DICOTYLEDONS	Rosaceae	Potentilla recta	Sulphur Cinquefoil		5		-2		SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Rosaceae	Prunus serotina var. serotina	Black Cherry	3	3				S5	G5			X	L5	X	Ehrhart
DICOTYLEDONS	Rosaceae	Prunus virginiana var. virginiana	Chokecherry	2	3				S5	G5T?			X	L5	X	L.
DICOTYLEDONS	Rosaceae	Rubus idaeus ssp. strigosus	North American Red Raspberry	2	3				S5	G5T5			X	L5	X	(Michaux) Focke
DICOTYLEDONS	Rosaceae	Rubus occidentalis	Black Raspberry	2	5				S5	G5			X	L5	X	L.
DICOTYLEDONS	Rosaceae	Rubus pubescens	Dewberry	4	-3	I*			S5	G5			X	L4	X	Raf.
DICOTYLEDONS	Rubiaceae	Galium aparine	Common Bedstraw	4	3				S5	G5			R4	L5	U	L.
DICOTYLEDONS	Rubiaceae	Galium mollugo	Smooth Bedstraw		5		-2	2	SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Salicaceae	Populus deltoides ssp. deltoides	Eastern Cottonwood	4	0	T			S5	G5T5			X	L5	X	Bartram ex Marshall
DICOTYLEDONS	Salicaceae	Populus tremuloides	Trembling Aspen	2	0	T			S5	G5			X	L5	X	Michaux
DICOTYLEDONS	Salicaceae	Salix amygdaloides	Peach-Leaved Willow	6	-3	T			S5	G5			R6	L4	X	Andersson
DICOTYLEDONS	Salicaceae	Salix eriocephala	Cottony Willow	4	-3	T			S5	G5			X	L5	X	Michaux
DICOTYLEDONS	Salicaceae	Salix interior	Sandbar Willow	1	-3	T			S5	GNR			R5	L5	X	Rowlee
DICOTYLEDONS	Salicaceae	Salix matsudana	Corkscrew Willow						SNA	GNR				L+		Koidzumi
DICOTYLEDONS	Salicaceae	Salix petiolaris	Meadow Willow	3	-3	I			S5	G5			X	L4	X	J.E. Smith
DICOTYLEDONS	Salicaceae	Salix x fragilis	Hybrid Crack Willow			T	-3	3	SNA	GNA			XSR	L+	X	L.
DICOTYLEDONS	Salicaceae	Salix x sepulcralis	Golden Weeping Willow						SNA	GNA			XSR	L+	X	Simonkai
DICOTYLEDONS	Sapindaceae	Acer negundo	Manitoba Maple	0	0	T		1	S5	G5			X	L+?	X	L.
DICOTYLEDONS	Sapindaceae	Acer saccharinum	Silver Maple	5	-3	I			S5	G5			X	L4	X	L.
DICOTYLEDONS	Sapindaceae	Acer saccharum	Sugar Maple	4	3				S5	G5			X	L5	X	Marshall
DICOTYLEDONS	Sapindaceae	Acer x freemanii	Freeman's Maple	6	-5	I			SNA	GNA			XSR	L4	X	E. Murray
DICOTYLEDONS	Scrophulariaceae	Verbascum thapsus ssp. thapsus	Common Mullein		5		-2		SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Solanaceae	Solanum dulcamara	Bittersweet Nightshade		0	T	-2	3	SNA	GNR			X	L+	X	L.
DICOTYLEDONS	Ulmaceae	Ulmus americana	White Elm	3	-3	T			S5	G5			X	L5	X	L.
DICOTYLEDONS	Verbenaceae	Verbena hastata	Blue Vervain	4	-3	I			S5	G5			X	L5	X	L.
DICOTYLEDONS	Violaceae	Viola labradorica	Labrador Violet	3	0				S5	G5			X	L5	X	Schrank
DICOTYLEDONS	Violaceae	Viola sororia	Woolly Blue Violet	4	0	T			S5	G5			X	L5	X	Willdenow
DICOTYLEDONS	Vitaceae	Parthenocissus vitacea	Thicket Creeper	4	3				S5	G5			X	L5	X	(Knerr) Hitchcock
DICOTYLEDONS	Vitaceae	Vitis riparia	Riverbank Grape	0	0				S5	G5			X	L5	X	Michaux
GYMNOSPERMS	Pinaceae	Picea glauca	White Spruce	6	3	T			S5	G5			R3	L3	X	(Moench) Voss
MONOCOTYLEDONS	Alismataceae	Alisma triviale	Northern Water-Plantain	1	-5	I			S5	G5			X	L5		L.
MONOCOTYLEDONS	Araceae	Lemna minor	Small Duckweed	5	-5	I			S5	G5			X	L5	X	L.
MONOCOTYLEDONS	Araceae	Lemna trisulca	Star Duckweed	6	-5	I			S5	G5			R4	L3	U	L.
MONOCOTYLEDONS	Asparagaceae	Asparagus officinalis	Garden Asparagus		3		-1		SNA	G5?			X	L+	X	L.
MONOCOTYLEDONS	Asparagaceae	Convallaria majalis var. majalis	European Lily-Of-The-Valley		5		-2	3	SNA	G5			X	L+	X	L.
MONOCOTYLEDONS	Cyperaceae	Carex cristatella	Crested Sedge	3	-3	I			S5	G5			X	L5	X	Britton
MONOCOTYLEDONS	Cyperaceae	Carex gracillima	Graceful Sedge	4	3	T			S5	G5			X	L5	X	Schweinitz
MONOCOTYLEDONS	Cyperaceae	Carex intumescens	Bladder Sedge	6	-3	I			S5	G5			X	L4	X	Rudge
MONOCOTYLEDONS	Cyperaceae	Carex lupulina	Hop Sedge	6	-5	I			S5	G5			X	L4	X	Muhlenb. ex Willdenow
MONOCOTYLEDONS	Cyperaceae	Carex projecta	Necklace Sedge	5	-3	I			S5	G5			R4	L4	X	Mackenzie
MONOCOTYLEDONS	Cyperaceae	Carex radiata	Eastern Star Sedge	4	0	T			S5	G5			X	L5	X	(Wahlenb.) Small
MONOCOTYLEDONS	Cyperaceae	Carex retrorsa	Retrorse Sedge	5	-5	I			S5	G5			X	L4	X	Schweinitz
MONOCOTYLEDONS	Cyperaceae	Carex stipata var. stipata	Awl-Fruited Sedge	3	-5	I			S5	G5			X	L5	X	Muhlenb. ex Willdenow
MONOCOTYLEDONS	Cyperaceae	Carex vulpinoidea	Fox Sedge	3	-5	I			S5	G5			X	L5	X	Michaux
MONOCOTYLEDONS	Cyperaceae	Eleocharis obtusa	Blunt Spikerush	5	-5	I			S5	G5			U	L3	U	(Willd.) Schultes
MONOCOTYLEDONS	Cyperaceae	Schoenoplectus tabernaemontani	Soft-Stemmed Bulrush	5	-5	I			S5	G5			X	L4	X	(C.C. Gmelin) Palla
MONOCOTYLEDONS	Cyperaceae	Scirpus cyperinus	Common Woolly Bulrush	4	-5	I			S5	G5			X	L4	X	(L.) Kunth
MONOCOTYLEDONS	Juncaceae	Juncus bufonius	Toad Rush	1	-3	T			S5	G5			X	L5	X	L.
MONOCOTYLEDONS	Juncaceae	Juncus effusus ssp. solutus	Soft Rush (ssp. solutus)	4	-5	I			S5?	G5T5			X	L4	X	(Fernald & Wiegand) Hämet-Ahti
MONOCOTYLEDONS	Liliaceae	Erythronium americanum ssp. america	Yellow Trout Lily	5	5				S5	G5T5			X	L5	X	Ker Gawler
MONOCOTYLEDONS	Melanthiaceae	Trillium grandiflorum	White Trillium	5	3				S5	G5			X	L4	X	(Michx.) Salisbury
MONOCOTYLEDONS	Poaceae	Agrostis capillaris	Colonial Bentgrass		0		-1		SNA	GNR			X		X	L.
MONOCOTYLEDONS	Poaceae	Agrostis gigantea	Redtop		-3		-2		SNA	G4G5			X	L+	X	Roth
MONOCOTYLEDONS	Poaceae	Agrostis stolonifera	Creeping Bentgrass		-3	T			SNA	G5			X	L+?	X	L.
MONOCOTYLEDONS	Poaceae	Alopecurus aequalis var. aequalis	Short-Awned Foxtail	7	-5	I			S4	G5			R3	L3	U	Sobolewski
MONOCOTYLEDONS	Poaceae	Bromus inermis	Smooth Brome		5		-3	4	SNA	G5TNR			X	L+	X	Leysser
MONOCOTYLEDONS	Poaceae	Bromus japonicus	Japanese Brome		3		-1		SNA	GNR			X	L+	X	Thunberg ex Murray
MONOCOTYLEDONS	Poaceae	Echinochloa crus-galli	Large Barnyard Grass		-3	T	-1		SNA	GNR			X	L+	X	(L.) Palisot de Beauvois
MONOCOTYLEDONS	Poaceae	Elymus canadensis var. canadensis	Canada Wildrye	8	3				S5	G5TNR			E	L4	R	L.
MONOCOTYLEDONS	Poaceae	Elymus repens	Quackgrass		3		-3	3	SNA	GNR			X	L+	X	(L.) Gould
MONOCOTYLEDONS	Poaceae	Eragrostis pectinacea var. pectinacea	Tufted Lovegrass	0	0				S5	G5T5			X	L+?	X	(Michx.) Nees
MONOCOTYLEDONS	Poaceae	Glyceria septentrionalis var. septentric	Eastern Mannagrass	7	-5	I			S4	G5			R2	L3	R	Hitchcock
MONOCOTYLEDONS	Poaceae	Glyceria striata	Fowl Mannagrass	3	-5	I			S5	G5			X	L5	X	(Lam.) Hitchcock
MONOCOTYLEDONS	Poaceae	Hordeum jubatum ssp. jubatum	Foxtail Barley	0	0	T			S5?	G5T5			X	L+	X	L.
MONOCOTYLEDONS	Poaceae	Leersia oryzoides	Rice Cutgrass	3	-5	I			S5	G5			X	L5	X	(L.) Swartz
MONOCOTYLEDONS	Poaceae	Panicum capillare ssp. capillare	Common Panicgrass	0	0				S5	G5			X	L5	X	L.
MONOCOTYLEDONS	Poaceae	Panicum dichotomiflorum ssp. dichoto	Fall Panicgrass		-3		-1		SNA	G5			X	L+	X	Michaux
MONOCOTYLEDONS	Poaceae	Phalaris arundinacea var. arundinacea	Reed Canary Grass	0	-3	T		P	S5	GNR			X	L+?	X	L.
MONOCOTYLEDONS	Poaceae	Phleum pratense ssp. pratense	Common Timothy		3		-1		SNA	GNR			X	L+	X	L.
MONOCOTYLEDONS	Poaceae	Phragmites australis ssp. australis	European Reed		-3	T		1	SNA	G5T5			X	L+	X	(Cav.) Trinius ex Steudel
MONOCOTYLEDONS	Poaceae	Poa annua	Annual Bluegrass		3		-2		SNA	GNR			X	L+	X	L.
MONOCOTYLEDONS	Poaceae	Poa compressa	Canada Bluegrass		3				SNA	GNR			X	L+	X	L.
MONOCOTYLEDONS	Poaceae	Poa palustris	Fowl Bluegrass	5	-3	I			S5	G5			X	L5	X	L.
MONOCOTYLEDONS	Poaceae	Poa pratensis	Kentucky Bluegrass	0	3			2	S5	G5			X	L+	X	L.
MONOCOTYLEDONS	Poaceae	Setaria pumila ssp. pumila	Yellow Foxtail		0		-1	4	SNA	GNR			X	L+	X	(Poir.) Roemer & Schultes
MONOCOTYLEDONS	Poaceae	Sporobolus vaginiflorus var. vaginiflor	Sheathed Dropseed	1	5				SU	G5T5			X	L+?	X	(Torrey ex A. Gray) Alph. Wood
MONOCOTYLEDONS	Typhaceae	Typha angustifolia	Narrow-Leaved Cattail		-5	I		P	SNA	G5			X	L+	X	L.
MONOCOTYLEDONS	Typhaceae	Typha x glauca	Blue Cattail		-5	I		P	SNA	GNA			X	L+	X	Godron
MONOCOTYLEDONS	Xanthorrhoeaceae	Hemerocallis fulva	Orange Daylily		5		-3	4	SNA	GNR			X	L+	X	(L.) L.
PTERIDOPHYTES	Equisetaceae	Equisetum arvense	Field Horsetail	0	0	T			S5	G5			X	L5	X	L.

Table 2.4: Master Plant List

														LOCAL / REGIONAL STATUS			
ORDER	FAMILY	LATIN NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	OWES WETLAND SPECIES	WEEDINESS INDEX	INVASIVE EXOTIC RANK (Urban Forest Associates 2002)	PROVINCIAL STATUS (S-RANK)	GLOBAL STATUS (G-RANK)	COSSARO (MNRF)	COSEWIC STATUS		PEEL (Varga 2005)	TRCA (TRCA April 2016)	GTA (Varga 2005)	AUTHORITY
	STATISTICS																
	Species Diversity																
	Total Number of Species:	190															
	Native Species:	111	58%														
	Exotic Species:	79	42%														
	S1-S3 Species:	0	0%														
	S4 Species:	9	8%														
	S5 Species:	101	91%														
	Floristic Quality Assessment (FQA)																
	Mean Co-efficient of Conservatism (CC)	3.4															
	CC 0 - 3 = lowest sensitivity	54	49%														
	CC 4 - 6 = moderate sensitivity	51	46%														
	CC 7 - 8 = high sensitivity	4	4%														
	CC 9 - 10 = highest sensitivity	0	0%														
	Floristic Quality Index (FQI)	35															
	Weedy & Invasive Species																
	Mean Weediness Index (Oldham et al):	-1.6															
	-1 = low potential invasiveness	39	49%														
	-2 = moderate potential invasiveness	17	22%														
	-3 = high potential invasivenss	12	15%														
	Mean Exotic Rank (Urban Forest Associates):	3															
	Category 1	8	10%														
	Category 2	6	8%														
	Category 3	8	10%														
	Category 4	9	11%														
	Potentially Invasive (P)	3	4%														
	Wetland Species																
	Mean Wetness Index	0.7															
	Upland	31	16%														
	Facultative upland	68	36%														
	Facultative	28	15%														
	Facultative wetland	34	18%														
	Obligate wetland	26	14%														

Table 2.5: Drone Imagery Analysis

ELC Code	ELC Name	Required Tree Canopy Cover for ELC Code	Drone-derived Canopy Cover (%)
CUM1	Mineral Cultural Meadow	< 25%	14
CUW1	Mineral Cultural Woodland	Forests must have >60% canopy cover, though FOD7-series forests can have less (no defined minimum)	61
SWD3-2	Silver Maple Mineral Deciduous Swamp	>25%	39
THDM2-6_a	Buckthorn Deciduous Shrub Thicket	<25%	12
THDM2-6_b	Buckthorn Deciduous Shrub Thicket	<25%	1
THDM2-6_c	Buckthorn Deciduous Shrub Thicket	<25%	19

Table 2.6: Native Tree Density Analysis

ELC Code	Unit Area (ha)	Plot Coverage (%)	Native Tree Stems of any Size per Hectare	Native Tree Species Richness	Proportion of Native Stems that are Ash
THDM2-6	0.04	19	127	1	0%
THDM2-6	0.9	14	2759	11	78%

Table 2.7: Amphibian Call Count Survey Station Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE												WATER	
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)	Depth (CM)
2022															
1	11-3						1(1)	1(2)						Y	
2	11-3	X												Y	
3	11-3	X												N	
1	14-2	X												Y	
2	14-2	X												N	
1	13-3	X												Y	
2	13-3	X												Y	
3	13-3	X												N	
1	13-2		1(1)					1(3)						Y	
2	13-2										1(2)			Y	
3	13-2										1(2)			Y	
1	19-1	X												NA	
2	19-1	X												NA	
3	19-1	X												NA	
1	13-1		1(2)				1(7)	1(5)						Y	
2	13-1	X												NA	
3	13-1	X												NA	
1	3-3	X												Y	
2	3-3	X												NA	
3	3-3	X												N	
1	3-2	X												NA	
2	3-2	X												NA	
3	3-2	X												NA	
1	3-1	X												NA	

Table 2.7: Amphibian Call Count Survey Station Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE												WATER	
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)	Depth (CM)
2	3-1	X												NA	
3	3-1	X												NA	
1	3-16	X												Y	
2	3-16	X												N	
1	11-1	X												Y	
2	11-1	X												N	
1	11-2	X												Y	
2	11-2	X												N	
1	14-1	X												Y	
2	14-1	X												NA	
3	14-1	X												NA	
1	3-8							2(3)						Y	
2	3-8	X												Y	
3	3-8	X												NA	
1	3-7		2(3)											NA	
2	3-7	X												N/A	
3	3-7	X												NA	
1	3-6	X												NA	
2	3-6	X												N/A	
3	3-6	X												NA	
1	3-5							2(3)						Y	
2	3-5	X												Y	
3	3-5	X												Y	
1	3-4							2(2)						NA	
2	3-4										1(1)			NA	

Table 2.7: Amphibian Call Count Survey Station Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE												WATER	
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)	Depth (CM)
3	3-4				1(2)									NA	
1	3-11							1(2)						Y	
2	3-11	X												Y	
3	3-11				1(3)									Y	
1	3-12							1(1)						Y	
2	3-12	X												Y	
3	3-12	X												N	
1	3-13		3(5)											Y	
2	3-13	X												NA	
3	3-13	X												NA	
1	3-14	X												Y	
2	3-14	X												Y	
3	3-14	X												Y	
1	3-15	X												Y	
2	3-15	X												Y	
3	3-15	X												N	
1	3-10		2(3)											NA	
2	3-10	X												NA	
3	3-10									1(4)				NA	
2024															
1	9-1						1(5)	1(3)						NA	
2	9-1		1(2)											NA	
3	9-1	X												NA	
1	9-2						1(2)							NA	
2	9-2	X												NA	

Table 2.7: Amphibian Call Count Survey Station Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE												WATER	
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)	Depth (CM)
3	9-2	X												NA	

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOAM	No Amphibians	No amphibians despite survey effort
AMTO	American Toad	*Anaxyrus americanus*
FOTO	Fowler's Toad	*Anaxyrus fowleri*
GRTR	Gray Treefrog	*Hyla versicolor*
SPPE	Spring Peeper	*Pseudacris crucifer*
CHFR	Western Chorus Frog	*Pseudacris triseriata*
WOFR	Wood Frog	*Lithobates sylvaticus*
NLRF	Northern Leopard Frog	*Lithobates pipiens*
PIFR	Pickerel Frog	*Lithobates palustris*
GRFR	Green Frog	*Lithobates clamitans*
BULL	American Bullfrog	*Lithobates catesbeianus*
MIFR	Mink Frog	*Lithobates septentrionalis*

CALL CODES	
X	No amphibians heard
1	Calls can be counted without error
2	Calls overlap but can be reliably estimated
3	Calls overlap too much to estimate number

Note: For each species, the first number is the call code and the second number, which is in brackets, is the number of individuals of that species heard calling.

Table 2.8: Snake Survey Results

DATE SURVEYED	SURVEY ROUND	TRANSECT OR STATION NUMBER	SPECIES CODE														
			NOSN	EAGA	MISN	BRSN	RBSN	NWSN	RISN	BLRA	BUGA	FOSN	HOSN	MASS	RNSN	SGSN	QUSN
2021																	
AP 07	1	ST-1	X														
AP 07	1	ST-2	X														
AP 07	1	ST-3	X														
2024																	
MA 01	1	ST-1	X														
MA 10	2	ST-1	X														
MA 15	3	ST-1	X														
MA 03	1	ST-2	X														
MA 15	2	ST-2	X														
MA 16	3	ST-2	X														

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOSN	No snakes observed despite survey effort	
EAGA	Eastern Gartersnake	*Thamnophis sirtalis sirtalis*
MISN	Eastern Milksnake	*Lampropeltis triangulum*
BRSN	DeKay's Brownsnake	*Storeria dekayi*
RBSN	Northern Red-bellied Snake	*Storeria occipitomaculata occipitomaculata*
NWSN	Northern Watersnake	*Nerodia sipedon sipedon*
RASN	Gray Ratsnake	*Pantherophis spiloides*
RISN	Eastern Ribbonsnake	*Thamnophis sauritus*
BLRA	Blue Racer	*Coluber constrictor foxii*
BUGA	Butler's Gartersnake	*Thamnophis butleri*
FOSN	Eastern Foxsnake	*Pantherophis gloyd*
HOSN	Eastern Hog-nosed Snake	*Heterodon platifhinos*
MASS	Massassauga	*Sistrusus catenatus catenatus*
RNSN	Ring-necked Snake	*Diadophis punctatus*
SGSN	Smooth Greensnake	*Opheodrys vernalis*

DATE	
MONTH	CODE
January	JA
February	FE
March	MR
April	AP
May	MA
June	JN
July	JL
August	AU
September	SE
October	OC
November	NO
December	DE

Table 2.8: Snake Survey Results

QUSN	Queensnake	*Regina septemvittata*

Table 2.9: Turtle Survey Results

DATE SURVEYED	SURVEY ROUND	TRANSECT OR STATION NUMBER	SPECIES CODE								
			NOTU	MPTU	SNTU	MATU	BLTU	SSTU	WOTU	STIN	SPTU
07-AP-21	1	BS1	7								
25-OC-22	2	BS1	X								
27-OC-22	3	BS1	X								
07-AP-21	1	BS2	X								
25-OC-22	2	BS2	X								
27-OC-22	3	BS2	X								
07-AP-21	1	BS3	X								
25-OC-22	2	BS3	X								
27-OC-22	3	BS3	X								

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOTU	No turtles observed despite survey effort	
MPTU	Midland Painted Turtle	*Chrysemys picta marginata*
SNTU	Snapping Turtle	*Chelydra serpentina*
MATU	Northern Map Turtle	*Graptemys geographica*
BLTU	Blanding’s Turtle	*Emydoidea blandingii*
SSTU	Spiny Soft-shelled Turtle	*Apalone spinifera*
WOTU	Wood Turtle	*Glyptemys insculpta*
STIN	Stinkpot Turtle	*Stemotherus odoratus*
SPTU	Spotted Turtle	*Clemmys guttata*

DATE	
MONTH	CODE
January	JA
February	FE
March	MR
April	AP
May	MA
June	JN
July	JL
August	AU
September	SE
October	OC
November	NO
December	DE

Table 2.10A: Bird Species List

No.	X	Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	SARO (MECP)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
	X									
	X									
	X	Anseriformes								
	X	*Anatidae*								
		Canada Goose	CANG	*Branta canadensis*	S5	G5			X	OB-X
		Mallard	MALL	*Anas platyrhynchos*	S5	G5			X	PR-P
	X									
	X	Columbiformes								
	X	*Columbidae*								
		Rock Pigeon	ROPI	*Columba livia*	SNA	G5				PO-H
		Mourning Dove	MODO	*Zenaida macroura*	S5	G5				CO-FY
	X									
	X	Charadriiformes								
	X	*Charadriidae*								
		Killdeer	KILL	*Charadrius vociferus*	S4B	G5				CO-DD
	X									
	X	*Scolopacidae*								
		Upland Sandpiper	UPSA	*Bartramia longicauda*	S2B	G5			X	PR-P
		Spotted Sandpiper	SPSA	*Actitis macularius*	S5B	G5			X	PR-A
	X									
	X	*Laridae*								
		Ring-billed Gull	RBGU	*Larus delawarensis*	S5	G5			X	OB-X
	X									
	X	Pelecaniformes								
	X	*Ardeidae*								
		Great Blue Heron	GBHE	*Ardea herodias*	S4	G5			X	OB-X
	X									
	X	Accipitriformes								
	X	*Accipitridae*								
		Cooper's Hawk	COHA	*Accipiter cooperii*	S4	G5	NAR	NAR	X	PO-H
		Red-tailed Hawk	RTHA	*Buteo jamaicensis*	S5	G5	NAR	NAR	X	PO-H
	X									
	X	Piciformes								
	X	*Picidae*								
		Downy Woodpecker	DOWO	*Dryobates pubescens*	S5	G5				PO-H
		Northern Flicker	NOFL	*Colaptes auratus*	S5	G5				PR-P
	X									
	X	Falconiformes								
	X	*Falconidae*								
		American Kestrel	AMKE	*Falco sparverius*	S4	G5			X	PO-H
	X									
	X	Passeriformes								
	X	*Tyrannidae*								
		Great Crested Flycatcher	GCFL	*Myiarchus crinitus*	S5B	G5				PO-H
		Eastern Kingbird	EAKI	*Tyrannus tyrannus*	S4B	G5				PR-T
		Eastern Wood-Pewee	EAWP	*Contopus virens*	S4B	G5	SC	SC	X	PO-S
		Willow Flycatcher	WIFL	*Empidonax traillii*	S4B	G5			X	PR-T
		Eastern Phoebe	EAPH	*Sayornis phoebe*	S5B	G5				PR-V
	X									
	X	*Vireonidae*								
		Warbling Vireo	WAVI	*Vireo gilvus*	S5B	G5				PR-T
		Red-eyed Vireo	REVI	*Vireo olivaceus*	S5B	G5				PO-S
	X									
	X	*Corvidae*								
		Blue Jay	BLJA	*Cyanocitta cristata*	S5	G5				PR-T
		American Crow	AMCR	*Corvus brachyrhynchos*	S5	G5				PR-T
		Common Raven	CORA	*Corvus corax*	S5	G5				OB-X
	X									
	X	*Alaudidae*								
		Horned Lark	HOLA	*Eremophila alpestris*	S4	G5				CO-NE
	X									
	X	*Hirundinidae*								
		Tree Swallow	TRES	*Tachycineta bicolor*	S4S5B	G5				PO-H
		Cliff Swallow	CLSW	*Petrochelidon pyrrhonota*	S4S5B	G5			X	PO-H
		Barn Swallow	BARS	*Hirundo rustica*	S4B	G5	THR	SC		CO-AE
	X									
	X	*Paridae*								
		Black-capped Chickadee	BCCH	*Poecile atricapillus*	S5	G5				PR-T
	X									
	X	*Sittidae*								

Table 2.10A: Bird Species List

No.	X	Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	SARO (MECP)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
	X									
	X									
		Red-breasted Nuthatch	RBNU	*Sitta canadensis*	S5	G5			X	PO-H
	X									
	X	*Troglodytidae*								
		House Wren	HOWR	*Troglodytes aedon*	S5B	G5				PR-T
	X									
	X	*Polioptilidae*								
		Blue-gray Gnatcatcher	BGGN	*Polioptila caerulea*	S4B	G5				PO-S
	X									
	X	*Turdidae*								
		Wood Thrush	WOTH	*Hylocichla mustelina*	S4B	G4	THR	THR	X	PR-T
		American Robin	AMRO	*Turdus migratorius*	S5	G5				CO-FY
	X									
	X	*Mimidae*								
		Brown Thrasher	BRTH	*Toxostoma rufum*	S4B	G5			X	PR-T
		Northern Mockingbird	NOMO	*Mimus polyglottos*	S4	G5				PR-P
	X									
	X	*Sturnidae*								
		European Starling	EUST	*Sturnus vulgaris*	SNA	G5				CO-FY
	X									
	X	*Bombycillidae*								
		Cedar Waxwing	CEDW	*Bombycilla cedrorum*	S5	G5				PR-P
	X									
	X	*Passeridae*								
		House Sparrow	HOSP	*Passer domesticus*	SNA	G5				CO-AE
	X									
	X	*Fringillidae*								
		House Finch	HOFI	*Haemorhous mexicanus*	SNA	G5				PO-H
		Pine Siskin	PISI	*Spinus pinus*	S5	G5				OB-X
		American Goldfinch	AMGO	*Spinus tristis*	S5	G5				PR-P
	X									
	X	*Passerellidae*								
		Chipping Sparrow	CHSP	*Spizella passerina*	S5B, S3N	G5				PR-T
		Field Sparrow	FISP	*Spizella pusilla*	S4B, S3N	G5			X	PO-S
		Vesper Sparrow	VESP	*Pooecetes gramineus*	S4B	G5			X	CO-DD
		Savannah Sparrow	SAVS	*Passerculus sandwichensis*	S5B, S3N	G5			X	CO-CF
		Song Sparrow	SOSP	*Melospiza melodia*	S5	G5				CO-CF
		Swamp Sparrow	SWSP	*Melospiza georgiana*	S5B, S4N	G5				PO-S
	X									
	X	*Icteridae*								
		Bobolink	BOBO	*Dolichonyx oryzivorus*	S4B	G5	THR	THR		PR-T
		Eastern Meadowlark	EAME	*Sturnella magna*	S4B, S3N	G5	THR	THR		PR-T
		Baltimore Oriole	BAOR	*Icterus galbula*	S4B	G5				PR-T
		Red-winged Blackbird	RWBL	*Agelaius phoeniceus*	S5	G5				CO-CF
		Brown-headed Cowbird	BHCO	*Molothrus ater*	S5	G5				CO-FY
		Common Grackle	COGR	*Quiscalus quiscula*	S5	G5				PR-P
	X									
	X	*Parulidae*								
		Common Yellowthroat	COYE	*Geothlypis trichas*	S5B, S3N	G5				PR-T
		American Redstart	AMRE	*Setophaga ruticilla*	S5B	G5				PO-S
		Yellow Warbler	YWAR	*Setophaga petechia*	S5B	G5				PO-S
	X									
	X	*Cardinalidae*								
		Northern Cardinal	NOCA	*Cardinalis cardinalis*	S5	G5				PR-T
		Rose-breasted Grosbeak	RBGR	*Pheucticus ludovicianus*	S5B	G5				PO-S
	X									

Species Common Name and Scientific Name:	Chesser, R. T., K. J. Burns, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, P. C. Rasmussen, J. V. Remsen, Jr., D. F. Stotz, B. M. Winger, and K. Winker. 2018. Check-list of North American Birds (online). American Ornithological Society. Available online: http://checklist.aou.org/taxa
Species Code:	Consistent with the American Ornithologists' Union. 2018. Species 4-Letter-Codes. Available online: http://www.birdsontario.org/atlas/codes.jsp?lang=en&pg=species
Highest Breeding Evidence:	Codes assigned for breeding evidence are consistent with the Ontario Breeding Bird Atlas (OBBA). 2018. Breeding Evidence Codes. Available online: http://www.birdsontario.org/atlas/codes.jsp?lang=en&pg=breeding&sortorder=aou
S ranks:	Provincial ranks are from the Natural Heritage Information Centre; S1 (critically imperiled), S2 (imperlied), S3 (vulnerable), S4 (apparently secure), S5 (secure); ranks were updated using NHIC species list 2021. Available to download from: https://www.ontario.ca/page/get-natural-heritage-information

No.	X	Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	SARO (MECP)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
	X									
	X									

G ranks:	Global ranks are from the Natural Heritage Information Centre; G1 (extremely rare), G2 (very rare), G3 (rare to uncommon), G4 (common), G5 (very common); ranks were updated using NHIC species list 2021. Available to download from: https://www.ontario.ca/page/get-natural-heritage-information
SARO (MECP):	Ontario Species at Risk as listed by the Committee on the Status of Species at Risk in Ontario (from Ontario Regulation 230/08 Species at Risk in Ontario website: https://www.ontario.ca/laws/regulation/080230/); END - Endangered; THR - Threatened; SC - Special Concern; NAR - Not at Risk
COSEWIC:	Assessed Species at Risk at the national level as listed by the Committee on the Status of Endangered Wildlife in Canada (from COSEWIC: https://wildlife-species.canada.ca/species-risk-registry/sar/index/default_e.cfm); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk
SWH Indicator Species:	SWH refers to Significant Wildlife Habitat as defined by the MNRF (2015) Significant Wildlife Habitat Criteria Schedules for Ecoregions 7E and 6E (as appropriate for the Subject Lands). SWH indicator species are identified in this table and any potential SWH is discussed in the text of this report. Available online: http://www.townofnemi.on.ca/wp-content/uploads/2016/02/NEMI-OP-App-C-schedule-6e-jan-2015-access-ver-final-s.pdf

Table 2.10B: Bird Species List

No.	X	Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	SARO (MECP)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
	X									
	X									
	X	Anseriformes								
	X	*Anatidae*								
		Greater White-fronted Goose	GWFG	*Anser albifrons*	S3M	G5				
		Snow Goose	SNGO	*Anser caerulescens*	S5B	G5			X	
		Ross's Goose	ROGO	*Anser rossii*	S2B	G4			X	
		Brant	BRAN	*Branta bernicla*	S4M	G5			X	
		Cackling Goose	CACG	*Branta hutchinsii*	SUB, S4M	G5			X	
	X	Canada Goose	CANG	*Branta canadensis*	S5	G5			X	OB-X
		Mute Swan	MUSW	*Cygnus olor*	SNA	G5				
		Trumpeter Swan	TRUS	*Cygnus buccinator*	S4	G4		NAR	X	
		Tundra Swan	TUSW	*Cygnus columbianus*	S2B, S4N, S3M	G5			X	
		Wood Duck	WODU	*Aix sponsa*	S5B, S3N	G5			X	
		Blue-winged Teal	BWTE	*Spatula discors*	S3B, S4M	G5			X	
		Cinnamon Teal	CITE	*Spatula cyanoptera*	SNA	G5				
		Northern Shoveler	NSHO	*Spatula clypeata*	S4B, S4N, S5M	G5			X	
		Gadwall	GADW	*Mareca strepera*	S4B, S4N, S5M	G5			X	
		Eurasian Wigeon	EUWI	*Mareca penelope*	SNA	G5				
		American Wigeon	AMWI	*Mareca americana*	S4B, S4N, S5M	G5			X	
		American Black Duck	ABDU	*Anas rubripes*	S4	G5			X	
	X	Mallard	MALL	*Anas platyrhynchos*	S5	G5			X	OB-X
		Northern Pintail	NOPI	*Anas acuta*	S5B, S4N	G5			X	
		Green-winged Teal	GWTE	*Anas crecca*	S4B, S4N, S5M	G5			X	
		Canvasback	CANV	*Aythya valisineria*	S1B, S3N, S4M	G5			X	
		Redhead	REDH	*Aythya americana*	S2B, S4N, S4M	G5			X	
		Ring-necked Duck	RNDU	*Aythya collaris*	S5B, S4N	G5			X	
		Greater Scaup	GRSC	*Aythya marila*	S4B, S4N, S5M	G5			X	
		Lesser Scaup	LESC	*Aythya affinis*	S4B, S4N, S5M	G5			X	
		King Eider	KIEI	*Somateria spectabilis*	SHB, S2N	G5				
		Common Eider	COEI	*Somateria mollissima*	S1B	G5				
		Harlequin Duck	HADU	*Histrionicus histrionicus*	S2N	G4				
		Surf Scoter	SUSC	*Melanitta perspicillata*	S4B,S5N	G5			X	
		White-winged Scoter	WWSC	*Melanitta deglandi*	S4B,S4N	G5			X	
		Black Scoter	BLSC	*Melanitta americana*	S4	G5			X	
		Long-tailed Duck	LTDU	*Clangula hyemalis*	S3B, S5N	G5			X	
		Bufflehead	BUFF	*Bucephala albeola*	S5	G5			X	
		Common Goldeneye	COGO	*Bucephala clangula*	S5	G5			X	
		Barrow's Goldeneye	BAGO	*Bucephala islandica*	S2N	G5				
		Hooded Merganser	HOME	*Lophodytes cucullatus*	S5	G5			X	
		Common Merganser	COME	*Mergus merganser*	S5	G5			X	
		Red-breasted Merganser	RBME	*Mergus serrator*	S5	G5			X	
		Ruddy Duck	RUDU	*Oxyura jamaicensis*	S3B, S4N, S5M	G5			X	
	X									
	X	Galliformes								
		Odontiphoridae								
		Northern Bobwhite	NOBO	*Colinus virginianus*	S1?B	G4G5	END	END		
	X									
	X	*Phasianinae*								
		Gray Partridge	GRPA	*Perdix perdix*	SNA	G5				
		Ring-necked Pheasant	RNPH	*Phasianus colchicus*	SNA	G5				
		Ruffed Grouse	RUGR	*Bonasa umbellus*	S5	G5			X	
		Spruce Grouse	SPGR	*Falcipennis canadensis*	S5	G5			X	
		Willow Ptarmigan	WIPT	*Lagopus lagopus*	S4	G5				
		Sharp-tailed Grouse	STGR	*Tympauchus phasianellus*	S4	G5				
		Wild Turkey	WITU	*Meleagris gallopavo*	S5	G5			X	
	X									
	X	Podicipediformes								
	X	*Podicipedidae*								
		Pied-billed Grebe	PBGR	*Podilymbus podiceps*	S4B,S2N	G5			X	
		Horned Grebe	HOGR	*Podiceps auritus*	S1B, S3N, S4M	G5	SC	SC	X	
		Red-necked Grebe	RNGR	*Podiceps grisegena*	S3	G5	NAR	NAR	X	
		Eared Grebe	EAGR	*Podiceps nigricollis*	S2M	G5				
	X									
	X	Columbiformes								
	X	*Columbidae*								
	X	Rock Pigeon	ROPI	*Columba livia*	SNA	G5				CO-NE
		Eurasian Collared-Dove	ECDO	*Streptopelia decaocto*	SNA	G5				
	X	Mourning Dove	MODO	*Zenaida macroura*	S5	G5				PO-S
	X									
	X	Cuculiformes								
	X	*Cuculidae*								
		Yellow-billed Cuckoo	YBCU	*Coccyzus americanus*	S4B	G5				
		Black-billed Cuckoo	BBCU	*Coccyzus erythropthalmus*	S4S5B	G5			X	

Table 2.10B: Bird Species List

No.	X	Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	SARO (MECP)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
	X									
	X									
	X									
	X	Caprimulgiformes								
	X	*Caprimulgidae*								
		Common Nighthawk	CONI	*Chordeiles minor*	S4B	G5	SC	SC	X	
		Chuck-will's Widow	CWWI	*Antrostomus carolinensis*	SNA	G5				
		Eastern Whip-poor-will	EWWI	*Antrostomus vociferus*	S4B	G5	THR	THR		
	X									
	X	Apodiformes								
	X	*Apodidae*								
		Chimney Swift	CHSW	*Chaetura pelagica*	S3B	G4G5	THR	THR		
	X									
	X	*Trochilidae*								
		Ruby-throated Hummingbird	RTHU	*Archilochus colubris*	S5B	G5				
	X									
	X	Gruiformes								
	X	*Rallidae*								
		Yellow Rail	YERA	*Coturnicops noveboracensis*	S3B	G4	SC	SC	X	
		King Rail	KIRA	*Rallus elegans*	S1B	G4	END	END		
		Virginia Rail	VIRA	*Rallus limicola*	S4S5B	G5			X	
		Sora	SORA	*Porzana carolina*	S5B	G5			X	
		Common Gallinule	COGA	*Gallinula galeata*	S3B	G5			X	
		American Coot	AMCO	*Fulica americana*	S3B, S4N	G5	NAR	NAR	X	
	X									
	X	*Gruidae*								
		Sandhill Crane	SACR	*Antigone canadensis*	S5B, S3N	G5			X	
	X									
	X	Charadriiformes								
		Recurvirostridae								
		Black-necked Stilt	BNST	*Himantopus mexicanus*	SNA	G5				
		American Avocet	AMAV	*Recruvirostra americana*	S2M	G5				
	X									
	X	*Charadriidae*								
		Black-bellied Plover	BBPL	*Pluvialis squatarola*	S4M	G5			X	
		American Golden-Plover	AMGP	*Pluvialis dominica*	S2B, S4M	G5			X	
	X	Killdeer	KILL	*Charadrius vociferus*	S4B	G5				CO-FY
		Semipalmated Plover	SEPL	*Charadrius semipalmatus*	S4B, S5M	G5				
		Piping Plover	PIPL	*Charadrius melodus*	S1B	G3	END	END		
	X									
	X	*Scolopacidae*								
	X	Upland Sandpiper	UPSA	*Bartramia longicauda*	S2B	G5			X	PO-S
		Whimbrel	WHIM	*Numenius phaeopus*	S3B, S4M	G5			X	
		Hudsonian Godwit	HUGO	*Limosa haemastica*	S3B, S4M	G4	THR		X	
		Marbled Godwit	MAGO	*Limosa fedoa*	S2B	G5			X	
		Ruddy Turnstone	RUTU	*Arenaria interpres*	S4M	G5			X	
		Red Knot	REKN	*Calidris canutus*	S1M	G4	END	END		
		Stilt Sandpiper	STSA	*Calidris himantopus*	S3B, S4M	G5			X	
		Sanderling	SAND	*Calidris alba*	S4M	G5			X	
		Dunlin	DUNL	*Calidris alpina*	S4B, S5M	G5			X	
		Purple Sandpiper	PUSA	*Calidris maritima*	S2N	G5			X	
		Baird's Sandpiper	BASA	*Calidris bairdii*	S4M	G5			X	
		Least Sandpiper	LESA	*Calidris minutilla*	S4B, S5M	G5			X	
		White-rumped Sandpiper	WRSA	*Calidris fuscicollis*	S5M	G5			X	
		Buff-breasted Sandpiper	BBSA	*Calidris subruficollis*	S3M	G4	SC	SC		
		Pectoral Sandpiper	PESA	*Calidris melanotos*	S1B, S4M	G5			X	
		Semipalmated Sandpiper	SESA	*Calidris pusilla*	S3B, S4N	G5			X	
		Western Sandpiper	WESA	*Calidris mauri*	SNA	G5				
		Short-billed Dowitcher	SBDO	*Limnodromus griseus*	S3B, S4M	G5			X	
		Long-billed Dowitcher	LBDO	*Limnodromus scolopaceus*	S4M	G5				
		American Woodcock	AMWO	*Scolopax minor*	S4B	G5				
		Wilson's Snipe	WISN	*Gallinago delicata*	S5B	G5				
	X	Spotted Sandpiper	SPSA	*Actitis macularius*	S5B	G5			X	PO-S
		Solitary Sandpiper	SOSA	*Tringa solitaria*	S4B, S5M	G5				
		Greater Yellowlegs	GRYE	*Tringa melanoleuca*	S4B, S5M	G5				
		Willet	WILL	*Tringa semipalmata*	S2M	G5				
		Lesser Yellowlegs	LEYE	*Tringa flavipes*	S3S4B, S5M	G5	THR		X	
		Wilson's Phalarope	WIPH	*Phalaropus tricolor*	S2B, S4M	G5			X	
		Red-necked Phalarope	RNPH	*Phalaropus lobatus*	S3B, S4M	G4G5	SC	SC	X	
		Red Phalarope	REPH	*Phalaropus fulicarius*	S2M	G5				
	X									
	X	*Stercorariidae*								
		Pomarine Jaeger	POJA	*Stercorarius pomarinus*	S3M	G5				
		Parasitic Jaeger	PAJA	*Stercorarius parasiticus*	S1B, S4M	G5				

Table 2.10B: Bird Species List

No.	X	Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	SARO (MECP)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
	X									
	X									
		Long-tailed Jaeger	LTJA	*Stercorarius longicaudus*	S1M	G5				
	X									
	X	*Alcidae*								
		Black Guillemot	BLGU	*Cepphus grylle*	SNA	G5				
	X									
	X	*Laridae*								
		Black-legged Kittiwake	BLKI	*Rissa tridactyla*	S1M	G5				
		Sabine's Gull	SAGU	*Xema sabini*	S1M	G5				
		Bonaparte's Gull	BOGU	*Chroicocephalus philadelphi*	S5	G5				
		Black-headed Gull	BHGU	*Chroicocephalus ridibundus*	SNA	G5				
		Little Gull	LIGU	*Hydrocoloeus minutus*	S1S2B, S3M	G5			X	
		Laughing Gull	LAGU	*Leucophaeus atricilla*	SNA	G5				
		Franklin's Gull	FRGU	*Leucophaeus pipixcan*	S2M	G4G5				
	X	Ring-billed Gull	RBGU	*Larus delawarensis*	S5	G5			X	OB-X
		California Gull	CAGU	*Larus californicus*	SNA	G5				
		Herring Gull	HEGU	*Larus argentatus*	S4B,S5N	G5			X	
		Iceland Gull	ICGU	*Larus glaucoides*	S4N	G5				
		Lesser Black-backed Gull	LBGU	*Larus fuscus*	S3N, S4M	G5				
		Glaucous Gull	GLGU	*Larus hyperboreus*	S4N	G5				
		Great Black-backed Gull	GBBG	*Larus marinus*	S1B, S4N	G5			X	
		Caspian Tern	CATE	*Hydroprogne caspia*	S3B, S5M	G5	NAR	NAR	X	
		Black Tern	BLTE	*Chlidonias niger*	S3B, S4M	G4G5	SC	NAR	X	
		Common Tern	COTE	*Sterna hirundo*	S4B	G5	NAR	NAR	X	
		Arctic Tern	ARTE	*Sterna paradisaea*	S4B, S2M	G5				
		Forster's Tern	FOTE	*Sterna forsteri*	S3B	G5	DD	DD	X	
	X									
	X	Gaviiformes								
	X	*Gaviidae*								
		Red-throated Loon	RTLO	*Gavia stellata*	S2B, S4M	G5			X	
		Pacific Loon	PALO	*Gavia pacifica*	S3B	G5				
		Common Loon	COLO	*Gavia immer*	S5	G5	NAR	NAR	X	
	X									
	X	Suliformes								
	X	*Phalacrocoracidae*								
		Double-crested Cormorant	DCCO	*Phalacrocorax auritus*	S5B, S4N	G5	NAR	NAR		
	X									
	X	Pelecaniformes								
	X	*Pelecanidae*								
		American White Pelican	AWPE	*Pelecanus erythrorhynchos*	S3B, S4M	G4	THR	NAR		
	X									
	X	*Ardeidae*								
		American Bittern	AMBI	*Botaurus lentiginosus*	S5B	G5			X	
		Least Bittern	LEBI	*Ixobrychus exilis*	S4B	G4G5	THR	THR		
	X	Great Blue Heron	GBHE	*Ardea herodias*	S4	G5			X	OB-X
		Great Egret	GREG	*Ardea alba*	S2B	G5			X	
		Snowy Egret	SNEG	*Egretta thula*	SNA	G5				
		Green Heron	GRHE	*Butorides virescens*	S4B	G5			X	
		Black-crowned Night-Heron	BCNH	*Nycticorax nycticorax*	S3B,S2N, S4M	G5			X	
	X									
	X	Cathartiformes								
	X	*Cathartidae*								
		Black Vulture	BLVU	*Coragyps atratus*	SNA	G5				
		Turkey Vulture	TUVU	*Cathartes aura*	S5B, S3N	G5				
	X									
	X	Accipitriformes								
	X	*Pandionidae*								
		Osprey	OSPR	*Pandion haliaetus*	S5B	G5			X	
	X									
	X	*Accipitridae*								
		Golden Eagle	GOEA	*Aquila chrysaetos*	S1B, S4N	G5	END	NAR		
		Northern Harrier	NOHA	*Circus hudsonius*	S5B, S4N	G5	NAR	NAR	X	
		Sharp-shinned Hawk	SSHA	*Accipiter striatus*	S5	G5	NAR	NAR	X	
		Cooper's Hawk	COHA	*Accipiter cooperii*	S4	G5		NAR	X	
		Northern Goshawk	NOGO	*Accipiter gentilis*	S4	G5	NAR	NAR	X	
		Bald Eagle	BAEA	*Haliaeetus leucocephalus*	S4	G5	SC	NAR	X	
		Mississippi Kite	MIKI	*Ictinia mississipiensis*	SNA	G5				
		Red-shouldered Hawk	RSHA	*Buteo lineatus*	S4B, S2N	G5	NAR	NAR	X	
		Broad-winged Hawk	BWHA	*Buteo platypterus*	S5B	G5			X	
	X	Red-tailed Hawk	RTHA	*Buteo jamaicensis*	S5	G5		NAR	X	OB-X
		Rough-legged Hawk	RLHA	*Buteo lagopus*	S1B, S4N	G5	NAR	NAR	X	
	X									
	X	Strigiformes								

Table 2.10B: Bird Species List

No.	X	Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	SARO (MECP)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
	X									
	X									
	X	*Tytonidae*								
		Barn Owl	BARO	*Tyto alba*	S1	G5	END	END		
	X									
	X	*Strigidae*								
		Eastern Screech-Owl	EASO	*Megascops asio*	S4	G5		NAR		
		Great Horned Owl	GHOW	*Bubo virginianus*	S4	G5				
		Snowy Owl	SNOW	*Bubo scandiacus*	S4N	G5	NAR		X	
		Northern Hawk Owl	NHOW	*Surnia ulula*	S4	G5	NAR	NAR		
		Barred Owl	BDOW	*Strix varia*	S5	G5			X	
		Great Gray Owl	GGOW	*Strix nebulosa*	S4	G5	NAR	NAR		
		Long-eared Owl	LEOW	*Asio otus*	S4	G5				
		Short-eared Owl	SEOW	*Asio flammeus*	S4?B, S2S3N	G5	SC	THR	X	
		Boreal Owl	BOOW	*Aegolius funereus*	S4	G5	NAR	NAR		
		Northern Saw-whet Owl	NSOW	*Aegolius acadicus*	S5	G5				
	X									
	X	Coraciiformes								
	X	*Alcedinidae*								
		Belted Kingfisher	BEKI	*Megaceryle alcyon*	S5B, S4N	G5				
	X									
	X	Piciformes								
	X	*Picidae*								
		Red-headed Woodpecker	RHWO	*Melanerpes erythrocephalus*	S3	G5	END	END	X	
		Red-bellied Woodpecker	RBWO	*Melanerpes carolinus*	S5	G5				
		Yellow-bellied Sapsucker	YBSA	*Sphyrapicus varius*	S5B, S3N	G5			X	
		American Three-toed Woodpecker	ATTW	*Picoides dorsalis*	S4	G5				
		Black-backed Woodpecker	BBWO	*Picoides arcticus*	S5	G5				
		Downy Woodpecker	DOWO	*Dryobates pubescens*	S5	G5				
		Hairy Woodpecker	HAWO	*Dryobates villosus*	S5	G5				
		Northern Flicker	NOFL	*Colaptes auratus*	S5	G5				
		Pileated Woodpecker	PIWO	*Dryocopus pileatus*	S5	G5			X	
	X									
	X	Falconiformes								
	X	*Falconidae*								
		American Kestrel	AMKE	*Falco sparverius*	S4	G5			X	
		Merlin	MERL	*Falco columbarius*	S5	G5		NAR		
		Gyrfalcon	GYRF	*Falco rusticolus*	S3N	G5	NAR	NAR		
		Peregrine Falcon	PEFA	*Falco peregrinus*	S4	G4	NAR	NAR	X	
	X									
	X	Passeriformes								
	X	*Tyrannidae*								
		Great Crested Flycatcher	GCFL	*Myiarchus crinitus*	S5B	G5				
		Eastern Kingbird	EAKI	*Tyrannus tyrannus*	S4B	G5				
		Olive-sided Flycatcher	OSFL	*Contopus cooperi*	S4B	G4	SC	SC	X	
		Eastern Wood-Pewee	EAWP	*Contopus virens*	S4B	G5	SC	SC	X	
		Yellow-bellied Flycatcher	YBFL	*Empidonax flaviventris*	S5B	G5				
		Acadian Flycatcher	ACFL	*Empidonax virescens*	S1B	G5	END	END		
		Alder Flycatcher	ALFL	*Empidonax alnorum*	S5B	G5				
		Willow Flycatcher	WIFL	*Empidonax traillii*	S4B	G5			X	
		Least Flycatcher	LEFL	*Empidonax minimus*	S5B	G5				
		Eastern Phoebe	EAPH	*Sayornis phoebe*	S5B	G5				
	X									
	X	*Laniidae*								
		Loggerhead Shrike	LOSH	*Lanius ludovicianus*	S1B	G4	END	END		
		Northern Shrike	NSHR	*Lanius borealis*	S4B, S5N	G5				
	X									
	X	*Vireonidae*								
		White-eyed Vireo	WEVI	*Vireo griseus*	S1B	G5			X	
		Yellow-throated Vireo	YTVI	*Vireo flavifrons*	S4B	G5				
		Blue-headed Vireo	BHVI	*Vireo solitarius*	S5B	G5			X	
		Philadelphia Vireo	PHVI	*Vireo philadelphicus*	S5B	G5				
		Warbling Vireo	WAVI	*Vireo gilvus*	S5B	G5				
		Red-eyed Vireo	REVI	*Vireo olivaceus*	S5B	G5				
	X									
	X	*Corvidae*								
		Canada Jay	CAJA	*Perisoreus canadensis*	S5	G5				
	X	Blue Jay	BLJA	*Cyanocitta cristata*	S5	G5				PO-S
		Black-billed Magpie	BBMA	*Pica hudsonia*	S2	G5				
	X	American Crow	AMCR	*Corvus brachyrhynchos*	S5	G5				
		Fish Crow	FICR	*Corvus ossifragus*	S1B, S3N	G5				
		Common Raven	CORA	*Corvus corax*	S5	G5				
	X									
	X	*Alaudidae*								

Table 2.10B: Bird Species List

No.	X	Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	SARO (MECP)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
	X									
	X									
	X	Horned Lark	HOLA	*Eremophila alpestris*	S4	G5				PR-P
	X									
	X	*Hirundinidae*								
		Bank Swallow	BANS	*Riparia riparia*	S4B	G5	THR	THR		
		Tree Swallow	TRES	*Tachycineta bicolor*	S4S5B	G5				
	X	Northern Rough-winged Swallow	NRWS	*Stelgidopteryx serripennis*	S4B	G5			X	OB-X
		Purple Martin	PUMA	*Progne subis*	S3B	G5				
		Cliff Swallow	CLSW	*Petrochelidon pyrrhonota*	S4S5B	G5			X	
	X	Barn Swallow	BARS	*Hirundo rustica*	S4B	G5	SC	SC		CO-FY
	X									
	X	*Paridae*								
		Black-capped Chickadee	BCCH	*Poecile atricapillus*	S5	G5				
		Boreal Chickadee	BOCH	*Poecile hudsonicus*	S4	G5				
		Tufted Titmouse	TUTI	*Baeolophus bicolor*	S3	G5				
	X									
	X	*Sittidae*								
		Red-breasted Nuthatch	RBNU	*Sitta canadensis*	S5	G5			X	
		White-breasted Nuthatch	WBNU	*Sitta carolinensis*	S5	G5				
	X									
	X	*Certhiidae*								
		Brown Creeper	BRCR	*Certhia americana*	S5	G5				
	X									
	X	*Troglodytidae*								
		Carolina Wren	CAWR	*Thryothorus ludovicianus*	S4	G5				
		House Wren	HOWR	*Troglodytes aedon*	S5B	G5				
		Winter Wren	WIWR	*Troglodytes hiemalis*	S5B, S4N	G5			X	
		Sedge Wren	SEWR	*Cistothorus platensis*	S4B	G5	NAR	NAR	X	
		Marsh Wren	MAWR	*Cistothorus palustris*	S4B, S3N	G5			X	
	X									
	X	*Polioptilidae*								
		Blue-gray Gnatcatcher	BGGN	*Polioptila caerulea*	S4B	G5				
	X									
	X	*Regulidae*								
		Golden-crowned Kinglet	GCKI	*Regulus satrapa*	S5	G5				
		Ruby-crowned Kinglet	RCKI	*Regulus calendula*	S5B, S3N	G5				
	X									
	X	*Turdidae*								
		Eastern Bluebird	EABL	*Sialia sialis*	S5B, S4N	G5		NAR		
		Veery	VEER	*Catharus fuscescens*	S5B	G5			X	
		Gray-cheeked Thrush	GCTH	*Catharus minimus*	S4?B,S4M	G5				
		Swainson's Thrush	SWTH	*Catharus ustulatus*	S5B	G5				
		Hermit Thrush	HETH	*Catharus guttatus*	S5B, S4N	G5				
		Wood Thrush	WOTH	*Hylocichla mustelina*	S4B	G4	SC	THR	X	
	X	American Robin	AMRO	*Turdus migratorius*	S5	G5				PR-T
	X									
	X	*Mimidae*								
		Gray Catbird	GRCA	*Dumetella carolinensis*	S5B, S3N	G5				
		Brown Thrasher	BRTH	*Toxostoma rufum*	S4B	G5			X	
		Northern Mockingbird	NOMO	*Mimus polyglottos*	S4	G5				
	X									
	X	*Sturnidae*								
	X	European Starling	EUST	*Sturnus vulgaris*	SNA	G5				CO-FY
	X									
	X	*Bombycillidae*								
		Bohemian Waxwing	BOWA	*Bombycilla garrulus*	S4B, S5N	G5				
	X	Cedar Waxwing	CEDW	*Bombycilla cedrorum*	S5	G5				PR-P
	X									
	X	*Passeridae*								
	X	House Sparrow	HOSP	*Passer domesticus*	SNA	G5				CO-NE
	X									
	X	*Motacillidae*								
		American Pipit	AMPI	*Anthus rubescens*	S4B	G5				
	X									
	X	*Fringillidae*								
		Evening Grosbeak	EVGR	*Coccothraustes vespertinus*	S4	G5	SC	SC		
		Pine Grosbeak	PIGR	*Pinicola enucleator*	S4B, S5N	G5				
	X	House Finch	HOFI	*Haemorhous mexicanus*	SNA	G5				PO-S
		Purple Finch	PUFI	*Haemorhous purpureus*	S5	G5				
		Common Redpoll	CORE	*Acanthis flammea*	S5	G5				
		Hoary Redpoll	HORE	*Acanthis hornemanni*	SUB, S4N	G5				
		Red Crossbill	RECR	*Loxia curvirostra*	S5	G5				
		White-winged Crossbill	WWCR	*Loxia leucoptera*	S5	G5				

Table 2.10B: Bird Species List

No.	X	Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	SARO (MECP)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
	X									
	X									
		Pine Siskin	PISI	*Spinus pinus*	S5	G5				
	X	American Goldfinch	AMGO	*Spinus tristis*	S5	G5				PR-T
	X									
	X	*Calcariidae*								
		Lapland Longspur	LALO	*Calcarius lapponicus*	S3B, S4N	G5			X	
		Smith's Longspur	SMLO	*Calcarius pictus*	S4B	G4G5				
		Snow Bunting	SNBU	*Plectrophenax nivalis*	S4N	G5				
	X									
	X	*Passerellidae*								
		Grasshopper Sparrow	GRSP	*Ammodramus savannarum*	S4B	G5	SC	SC	X	
		Chipping Sparrow	CHSP	*Spizella passerina*	S5B, S3N	G5				
		Clay-colored Sparrow	CCSP	*Spizella pallida*	S4B	G5			X	
		Field Sparrow	FISP	*Spizella pusilla*	S4B, S3N	G5			X	
		Fox Sparrow	FOSP	*Passerella iliaca*	S5B, S3N	G5				
		American Tree Sparrow	ATSP	*Spizelloides arborea*	S5	G5				
		Dark-eyed Junco	DEJU	*Junco hyemalis*	S5	G5				
		White-crowned Sparrow	WCSP	*Zonotrichia leucophrys*	S5B, S3N	G5				
		Harris' Sparrow	HASP	*Zonotrichia querula*	S2B	G5	SC	SC		
		White-throated Sparrow	WTSP	*Zonotrichia albicollis*	S5	G5				
	X	Vesper Sparrow	VESP	*Pooecetes gramineus*	S4B	G5			X	PR-T
		LeConte's Sparrow	LCSP	*Ammospiza leconteii*	S5B	G5				
		Nelson's Sparrow	NESP	*Ammospiza nelsoni*	S4B	G5	NAR	NAR		
		Henslow's Sparrow	HESP	*Centronyx henslowii*	S1B	G4	END	END		
	X	Savannah Sparrow	SAVS	*Passerculus sandwichensis*	S5B, S3N	G5			X	CO-FY
	X	Song Sparrow	SOSP	*Melospiza melodia*	S5	G5				PR-T
		Lincoln's Sparrow	LISP	*Melospiza lincolnii*	S5B	G5				
		Swamp Sparrow	SWSP	*Melospiza georgiana*	S5B, S4N	G5				
		Eastern Towhee	EATO	*Pipilo erythrophthalmus*	S4B, S3N	G5			X	
	X									
	X	*Icteriidae*								
		Yellow-breasted Chat	YBCH	*Icteria virens*	S1B	G5	END	END	X	
	X									
	X	*Icteridae*								
		Yellow-headed Blackbird	YHBL	*Xanthocephalus xanthoceph*	S2B	G5			X	
	X	Bobolink	BOBO	*Dolichonyx oryzivorus*	S4B	G5	THR	THR		PO-H
	X	Eastern Meadowlark	EAME	*Sturnella magna*	S4B, S3N	G5	THR	THR		PO-H
		Western Meadowlark	WEME	*Sturnella neglecta*	S1B	G5			X	
		Orchard Oriole	OROR	*Icterus spurius*	S4B	G5				
		Baltimore Oriole	BAOR	*Icterus galbula*	S4B	G5				
	X	Red-winged Blackbird	RWBL	*Agelaius phoeniceus*	S5	G5				CO-FY
	X	Brown-headed Cowbird	BHCO	*Molothrus ater*	S5	G5				PO-S
		Rusty Blackbird	RUBL	*Euphagus carolinus*	S4B, S3N	G4	SC	SC		
		Brewer's Blackbird	BRBL	*Euphagus cyanocephalus*	S2	G5			X	
	X	Common Grackle	COGR	*Quiscalus quiscula*	S5	G5				OB-X
	X									
	X	*Parulidae*								
		Ovenbird	OVEN	*Seiurus aurocapilla*	S5B	G5			X	
		Worm-eating Warbler	WEWA	*Helmitheros vermivorum*	S1M	G5				
		Louisiana Waterthrush	LOWA	*Parkesia motacilla*	S2B	G5	THR	THR	X	
		Northern Waterthrush	NOWA	*Parkesia noveboracensis*	S5B	G5				
		Golden-winged Warbler	GWWA	*Vermivora chrysoptera*	S3B	G4	SC	THR	X	
		Blue-winged Warbler	BWWA	*Vermivora cyanoptera*	S4B	G5				
		Black-and-white Warbler	BAWW	*Mniotilta varia*	S5B	G5				
		Prothonotary Warbler	PRWA	*Protonotaria citrea*	S1B	G5	END	END		
		Tennessee Warbler	TEWA	*Leiothlypis peregrina*	S5B	G5				
		Orange-crowned Warbler	OCWA	*Leiothlypis celata*	S5B	G5				
		Nashville Warbler	NAWA	*Leiothlypis ruficapilla*	S5B	G5				
		Connecticut Warbler	CONW	*Oporornis agilis*	S5B	G4G5				
		Mourning Warbler	MOWA	*Geothlypis philadelphia*	S5B	G5				
		Kentucky Warbler	KEWA	*Geothlypis formosa*	S1M	G5				
		Common Yellowthroat	COYE	*Geothlypis trichas*	S5B, S3N	G5				
		Hooded Warbler	HOWA	*Setophaga citrina*	S4B	G5	NAR	NAR		
		American Redstart	AMRE	*Setophaga ruticilla*	S5B	G5				
		Kirtland's Warbler	KIWA	*Setophaga kirtlandii*	S1B	G3G4	END	END		
		Cape May Warbler	CMWA	*Setophaga tigrina*	S5B	G5				
		Cerulean Warbler	CERW	*Setophaga cerulea*	S2B	G4	THR	END	X	
		Northern Parula	NOPA	*Setophaga americana*	S5B	G5			X	
		Magnolia Warbler	MAWA	*Setophaga magnolia*	S5B	G5				
		Bay-breasted Warbler	BBWA	*Setophaga castanea*	S5B	G5				
		Blackburnian Warbler	BLWA	*Setophaga fusca*	S5B	G5			X	
		Yellow Warbler	YWAR	*Setophaga petechia*	S5B	G5				
		Chestnut-sided Warbler	CSWA	*Setophaga pensylvanica*	S5B	G5				

No.	X	Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	SARO (MECP)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
	X									
	X									
		Blackpoll Warbler	BLWA	*Setophaga striata*	S5B	G5				
		Black-throated Blue Warbler	BTBW	*Setophaga caerulescens*	S5B	G5			X	
		Palm Warbler	PAWA	*Setophaga palmarum*	S5B, S5M	G5				
		Pine Warbler	PIWA	*Setophaga pinus*	S5B, S3N	G5				
		Yellow-rumped Warbler	YRWA	*Setophaga coronata*	S5B, S4N	G5				
		Yellow-throated Warbler	YTWA	*Setophaga dominica*	S1M	G5				
		Prairie Warbler	PRAW	*Setophaga discolor*	S2B	G5	NAR	NAR	X	
		Black-throated Green Warbler	BTGW	*Setophaga virens*	S5B	G5			X	
		Canada Warbler	CAWA	*Cardellina canadensis*	S5B	G5	SC	THR	X	
		Wilson's Warbler	WIWA	*Cardellina pusilla*	S5B	G5				
	X									
	X	*Cardinalidae*								
		Summer Tanager	SUTU	*Piranga rubra*	S1M	G5				
		Scarlet Tanager	SCTA	*Piranga olivacea*	S5B	G5			X	
		Northern Cardinal	NOCA	*Cardinalis cardinalis*	S5	G5				
	X	Rose-breasted Grosbeak	RBGR	*Pheucticus ludovicianus*	S5B	G5				OB-X
		Blue Grosbeak	BLGR	*Passerina caerulea*	SNA	G5				
		Indigo Bunting	INBU	*Passerina cyanea*	S5B	G5				
		Dickcissel	DICK	*Spiza americana*	S2M	G5				
	X									

Species Common Name and Scientific Name:	Chesser, R. T., K. J. Burns, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, P. C. Rasmussen, J. V. Remsen, Jr., D. F. Stotz, B. M. Winger, and K. Winker. 2018. Check-list of North American Birds (online). American Ornithological Society. Available online: http://checklist.aou.org/taxa
Species Code:	Consistent with the American Ornithologists' Union. 2018. Species 4-Letter-Codes. Available online: http://www.birdsontario.org/atlas/codes.jsp?lang=en&pg=species
Highest Breeding Evidence:	Codes assigned for breeding evidence are consistent with the Ontario Breeding Bird Atlas (OBBA). 2018. Breeding Evidence Codes. Available online: http://www.birdsontario.org/atlas/codes.jsp?lang=en&pg=breeding&sortorder=aou
S ranks:	Provincial ranks are from the Natural Heritage Information Centre; S1 (critically imperiled), S2 (imperlied), S3 (vulnerable), S4 (apparently secure), S5 (secure); ranks were updated using NHIC species list 2021. Available to download from: https://www.ontario.ca/page/get-natural-heritage-information
G ranks:	Global ranks are from the Natural Heritage Information Centre; G1 (extremely rare), G2 (very rare), G3 (rare to uncommon), G4 (common), G5 (very common); ranks were updated using NHIC species list 2021. Available to download from: https://www.ontario.ca/page/get-natural-heritage-information
SARO (MECP):	Ontario Species at Risk as listed by the Committee on the Status of Species at Risk in Ontario (from Ontario Regulation 230/08 Species at Risk in Ontario website: https://www.ontario.ca/laws/regulation/080230/); END - Endangered; THR - Threatened; SC - Special Concern; NAR - Not at Risk
COSEWIC:	Assessed Species at Risk at the national level as listed by the Committee on the Status of Endangered Wildlife in Canada (from COSEWIC: https://wildlife-species.canada.ca/species-risk-registry/sar/index/default_e.cfm); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk
SWH Indicator Species:	SWH refers to Significant Wildlife Habitat as defined by the MNRF (2015) Significant Wildlife Habitat Criteria Schedules for Ecoregions 7E and 6E (as appropriate for the Subject Lands). SWH indicator species are identified in this table and any potential SWH is discussed in the text of this report. Available online: http://www.townofnemi.on.ca/wp-content/uploads/2016/02/NEMI-OP-App-C-schedule-6e-jan-2015-access-ver-final-s.pdf

Table 2.11: Suitable Bat Roosting Tree Density Survey Results

Area Identification Polygon Number	Community Type	Approx. Area Size (ha)	Survey Type (Transect/ Plot)	# of snag trees observed at >25 cm DBH	# of snag trees observed at >10 cm DBH	SWH Density (# of snag trees/ha at >25 cm DBH)
CUW1	Mineral Cultural Woodland	0.07	Transect	1	1	14.29
CUW1 (adjacent to SWD3-2)	Mineral Cultural Woodland	0.54	Transect	2	2	11.76
SWD3-2	Silver Maple Mineral Deciduous Swamp	0.8	Transect	10	10	12.5
SWD3-3	Swamp Maple Mineral Deciduous Swamp	0.1	Transect	0	0	-

Table 2.12: Bat Acoustic Survey Results

DATE 2022	SM4 ID		SPECIES CODE								
		NOBA	UNCA	LACI	LANO	EPFU	LABO	PESU	MYLU	MYSE	MYLE
JN 10-20	WILD1		1	0	10	2	1	0	0	0	0
JN 10-20	WILD2		71	53	116	63	0	0	0	0	0
JN 10-20	WILD3		105	72	91	57	0	0	0	0	0

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOBA	No Bats	No recorded despite survey effort
UNCA	Unidentified Calls	Unidentified Calls
LACI	Hoary Bat	*Lasiurus cinereus*
LANO	Silver-haired Bat	*Lasionycteris noctivagans*
EPFU	Big Brown Bat	*Eptesicus fuscus*
LABO	Eastern Red Bat	*Lasiurus borealis*
PESU	Tri-coloured Bat	*Perimyotis subflavus*
MYLU	Little Brown Bat	*Myotis lucifuga*
MYSE	Long-eared Bat	*Myotis septentrionalis*
MYLE	Small Footed Bat	*Myotis leibii*

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM*
	FUNCTION	MODIFIERS					
H1S1	FT – 7 (swale) FC – 2 (Round 1) FC– 2 (Round 2; 2022) FC – 1 (Round 2; 2024) FC– 1 (Round 3; 2022) **Contributing** – Reach was holding standing water during spring assessments and was dry by early summer. Considering the topography, it is anticipated this feature will display ephemeral flow.	Hydrology modified by adjacent and upstream agricultural activities.	**Limited** – Riparian area consists of active agricultural crops.	**Contributing** – No direct fish habitat.	**Limited** – The swale provides limited terrestrial function.	**Mitigation**	**Mitigation**
H1S3	FT – Unknown (Non-participating ownership) **Contributing** – (Assumed) Immediate downstream reach was classified as Contributing.	Hydrology modified by adjacent and upstream agricultural activities.	**Limited** – Riparian area consists of disturbed land and agricultural crops.	**Contributing** – No direct fish habitat.	**Unknown** (Non-participating ownership)	**Mitigation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM*
	FUNCTION	MODIFIERS					
H2S1	FT – 6 (wetland) FC – 4 (Round 1; 2022) FC – 2 (Round 1; 2024 FC – 2 (Round 2) FC – 1 (Round 3) **Valued** – Reach was flowing or holding standing water during spring assessments and was dry by summer	Hydrology modified by adjacent and upstream agricultural activities.	**Important** – Reach is a wetland	**Contributing** – No direct fish habitat.	**Important –** Wetland with calling amphibians	**Protection**	**Mitigation**
H3S1	FT – 7 (swale) FC – 4 (Round 1; 2022) FC – 2 (Round 1; 2024) FC– 3 (Round 2; 2022) FC – 2 (Round 2; 2024) FC– 1 (Round 3) **Valued** – Reach was flowing or holding standing water during spring assessments	Tile drain upstream. Hydrology modified by adjacent and upstream agricultural activities.	**Limited** – Riparian area consists of active agricultural crops.	**Contributing** – No direct fish habitat.	**Limited –** The swale provides limited terrestrial function.	**Mitigation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM*
	FUNCTION	MODIFIERS					
	and was dry by summer						
H3S1A	FT – 7 (swale) FC – 4 (Round 1) FC– 2/3 (Round 2) FC– 1 (Round 3) **Valued** – (Non-participating property) Reach was flowing upstream and downstream during early spring assessment; flowing upstream of reach and with standing water downstream of reach in late spring, and was dry by summer.	Hydrology modified by adjacent and upstream agricultural activities.	**Important** – Riparian wetland habitat	**Contributing** – No direct fish habitat.	**Unknown** (Non-participating ownership)	**Mitigation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM*
	FUNCTION	MODIFIERS					
H4S1	FT – 7 (swale) FC – 4 (Round 1; 2022) FC – 2 (Round 1; 2024) FC– 1 (Round 2; 2022) FC – 2 (Round 2; 2024) FC – 1 (Round 3; 2024) **Valued/Contributing** – Reach was flowing or holding standing water during spring assessments and was dry by summer	Hydrology modified by adjacent and upstream agricultural activities.	**Limited** – Riparian area consists of active agricultural crops.	**Contributing** – No direct fish habitat.	**Limited –** The swale provides limited terrestrial function.	**Mitigation**	**Mitigation**
H4S1A	FT – Unknown (Non-participating ownership) **Valued/Contributing** – (Non-participating ownership; Assumed as per upstream reach hydrology)	Reach surrounded by residential lands	**Limited** – Riparian area consists of mowed lawn.	**Contributing** – No direct fish habitat.	**Unknown** (Non-participating ownership)	**Mitigation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM*
	FUNCTION	MODIFIERS					
H4S1B	FT – Unknown (Non-participating ownership) **Valued/Contributing** – (Non-participating ownership; Assumed as per upstream reach hydrology)	Hydrology modified by adjacent and upstream agricultural activities.	**Important** – Riparian wetland habitat	**Contributing** – No direct fish habitat.	**Unknown** (Non-participating ownership)	**Protection**	**Mitigation**
H4S1C	FT – Unknown (Non-participating ownership) **Valued/Contributing** – (Non-participating ownership; Assumed as per upstream reach hydrology)	Reach surrounded by residential lands	**Limited** – Riparian area consists of mowed lawn.	**Contributing** – No direct fish habitat.	**Unknown** (Non-participating ownership)	**Protection (due to upstream wetland)**	**Mitigation**
H4S2	FT – 7 (swale) FC – 4 (Round 1; 2022) FC – 2 (Round 1; 2024) FC– 1 (Round 2; 2022) FC – 2 (Round 2; 2024)	Hydrology modified by adjacent and upstream agricultural activities.	**Limited** – Riparian area consists of active agricultural crops.	**Contributing** – No direct fish habitat.	**Limited –** The swale provides limited terrestrial function.	**Mitigation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM*
	FUNCTION	MODIFIERS					
	FC – 1 (Round 3; 2024) **Valued/Contributing** Reach was flowing or holding standing water during spring assessments and was dry by summer.						
H5S4	FT – 7 (swale) FC – 4 (Round 1) FC– 2 (Round 2; 2022) FC – 4 (Round 2; 2024) FC- 1 (Round 3) **Valued** – Reach was flowing or holding standing water during spring assessments and was dry by summer.	Hydrology modified by adjacent and upstream agricultural activities.	**Limited** – Riparian area consists of active agricultural crops.	**Contributing** – No direct fish habitat.	**Limited –** The swale provides limited terrestrial function.	**Mitigation**	**Mitigation**
H5S4A	FT – 7 (swale) FC – 4 (Round 1) FC– 2 (Round 2) FC- 1 (Round 3)	Hydrology modified by adjacent and upstream agricultural	**Limited** – Riparian area consists of active agricultural crops.	**Contributing** – No direct fish habitat.	**Limited –** The swale provides limited terrestrial function.	**Mitigation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM*
	FUNCTION	MODIFIERS					
	Valued – Reach was flowing or holding standing water during spring assessments and was dry by summer.	activities.					
H5S4B	FT – 7 (swale) FC – 4 (Round 1) FC– Unknown (Round 2) FC- 1 (Round 3) **Valued** – (Non-participating property) Downstream end of reach was flowing during early spring assessment, and was dry by summer	Hydrology modified by adjacent and upstream agricultural activities.	**Limited** – Riparian area consists of active agricultural crops.	**Contributing** – No direct fish habitat.	**Limited –** The swale provides limited terrestrial function.	**Mitigation**	**Mitigation**
H7S1	FT-6 (wetland) FC-2 (Round 1; 2022) FC – 1 (Round 1; 2024) FC-1 (Round 2; 2022)	Hydrology modified by adjacent and upstream agricultural activities.	**Important** – Reach is a wetland.	**Contributing** – No direct fish habitat.	**Valued** – General amphibian habitat	**Protection**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM*
	FUNCTION	MODIFIERS					
	Contributing – Feature was not present due to agricultural management during 2021 early spring assessments; however, this feature was present during 2022 assessments. Thus, a conservative flow condition was assumed within the feature for early spring. Feature was dry upon spring assessment in 2024.						
H7S2	FT – Unknown (Non-participating ownership) **Contributing** – (Non-participating ownerships; Assumed as per upstream wetland)	Reach surrounded by residential lands	**Unknown –** As per air photo interpretation there is potential for wetland habitat	**Contributing** – No direct fish habitat.	**Unknown –** Non-participating ownerships.	**Protection –** (it is acknowledged there is potential for this reach to be classified as protection due to potential wetland habitat)	**Mitigation**
H8S1	FT-7 (swale)		**N/A**	**N/A**	**N/A**	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM*
	FUNCTION	MODIFIERS					
	FC – 1 (Round 1; 2022) FC-2 (Round 1; 2024) FC-2 (Round 2; 2024) FC- 1 (Round 3; 2024) **Limited** – Reach was holding standing water during early and late spring assessments and was dry by summer.						
H9S1	FT-7 (swale) FC-2 (Round 1) FC-2 (Round 2) FC- 1 (Round 3) **Limited** – Reach was holding standing water during early and late spring assessments and was dry by summer		**N/A**	**N/A**	**N/A**	**No Management Required**	**No Management Required**
H10S1	FT-7 (swale) FC-2 (Round 1) FC-2 (Round 2)		**N/A**	**N/A**	**N/A**	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM*
	FUNCTION	MODIFIERS					
	FC- 1 (Round 3) **Limited** – Reach was holding standing water during early and late spring assessments and was dry by summer						
H11S1	FT-7 (swale) FC-2 (Round 1) FC-2 (Round 2) FC- 1 (Round 3) **Limited** – (Non-participating property) Reach was holding standing water during early and late spring assessments and was dry by summer		**N/A**	**N/A**	**N/A**	**No Management Required**	**No Management Required**
H13S1	FT-7 (swale) FC-2 (Round 1) FC-2 (Round 2) FC- 1 (Round 3)		**N/A**	**N/A**	**N/A**	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	**STEP 1. HYDROLOGY**		**STEP 2. RIPARIAN**	**STEP 3. FISH HABITAT**	**STEP 4. TERRESTRIAL HABITAT**	**MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES**	**INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM***
	FUNCTION	**MODIFIERS**					
	Limited – Reach was holding standing water during early and late spring assessments and was dry by summer						
H13S1A	FT-7 (swale) FC-2 (Round 1) FC-2 (Round 2) FC- 1 (Round 3) **Limited** – Reach was holding standing water during early and late spring assessments and was dry by summer		**N/A**	**N/A**	**N/A**	**No Management Required**	**No Management Required**
H12S1	FT-7 (swale) FC – 1 (Round 1; 2022) FC-2 (Round 1; 2024) FC-1 (Round 2; 2024) **Limited** – Reach was holding standing water during early		**N/A**	**N/A**	**N/A**	**No Management Required**	**No Management Required**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION PER HDFA GUIDELINES	INTERPRETED MANAGEMENT RECOMMENDATION – WILDFIELD VILLAGE CONSULTANT TEAM*
	FUNCTION	MODIFIERS					
	spring and was dry by late spring						
H12S2	FT-7 (swale) FC – 1 (Round 1; 2022) FC-2 (Round 1; 2024) FC-1 (Round 2; 2024) **Limited** – Reach was holding standing water during early spring and was dry by late spring		**N/A**	**N/A**	**N/A**	**No Management Required**	**No Management Required**
H12AS1	FT-7 (swale) FC – 1 (Round 1; 2022) FC-2 (Round 1; 2024) FC-1 (Round 2; 2024) **Contributing** – Reach was holding standing water during early spring and was dry by late spring. Wetland occurs upstream.	Actively managed agricultural field (row-crop)	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Valued** – This feature provides seasonal fish habitat for warmwater species (one individual Brook Stickleback).	**Limited –** The swale provides limited terrestrial function.	**Conservation**	**Mitigation**

Table 2.13: Headwater Drainage Feature Classification and Management Recommendations

LEGEND:

FT	Feature Types (1-defined natural channel, 2-channelized, 3-multi-thread, 4-no defined feature, 5-tiled drainage, 6-wetland, 7-swale, 8-roadside ditch, 9-online pond outlet)
FC	Flow Conditions (1-no surface water, 2-standing water, 3-interstitial flow, 4-surface flow minimal, 5-surface flow substantial)

Note: Codes correspond with Ontario Stream Assessment Protocol (OSAP) guidelines.

*The management recommendation per HDF Guidelines differs from the interpreted management recommendation from the Wildfield Village consultant team based on one or more of the following:

1. Ongoing expected impairment occurring due to existing agricultural activities. This includes use of fertilizers and ploughing through or to the edge of the feature, expected to result in pollution and siltation of indirect fish habitat. It is anticipated that downstream fish habitat can be improved by ending agricultural activities.
2. Capacity for on-site replication of HDF habitat functions through the proposed stormwater management plan, LIDs, and/or the creation of wetland habitat.

Table 2.14: Fish Community Sampling Results

2022									
Sampling Station	**H3S1, H3S2 (FT1)**	**H1S1 (FT2)**	**H2S1 (FT3)**	**H5S1, H5S2, H5S3 (FT4)**					
Species									
None	X	X	X	X					
2024									
Sampling Station	**Culvert at Mayfield Road, East of The Gore Road (FS1)**	**Culvert at The Gore Rd from HDF 5 (FS2)**	**H5S1, H5S2, H5S3, (FS3)**	**H5S4 (FS4a)**	**H5S4A (FS4b)**	**Culvert at Mayfield from HDF 12 (FS5)**	**H1S1 (FS6)**	**Culvert at The Gore Rd from H4S1C (east side; FS7)**	**Culvert at The Gore Rd from H4S1C (west side; FS8)**
Species									
Fathead Minnow (*Pimephales promelas)*	X							X	
Brook Stickleback (*Culaea inconstans*)	X								
None		X	X	X	X	DRY	X		X

Table 2.15: Significant Wildlife Habitat Assessment (6E & 7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
1. SEASONAL CONCENTRATION AREAS				
Waterfowl Stopover and Staging Areas (terrestrial)	No – The CUM and /CUT vegetation communities are considered too small to support sufficient numbers of species are present on the Study Area.	N/A	N/A	No – SWH type is not present
Waterfowl Stopover and Staging Areas (aquatic)	No – Suitable vegetation communities (MAS, SWD) are considered too small to support sufficient numbers of species are present on the Study Area.	N/A	N/A	No – SWH type is not present
Shorebird Migratory Stopover Areas	Yes – MAM vegetation communities are present within the Study Area.	No – Muddy, unvegetated shorelines not present.	N/A	No – SWH type is not present
Raptor Wintering Areas	Yes – Combinations of forested and upland vegetation communities are present within the Study Area.	No – Suitably sized (>20 ha) combinations of upland and forested habitat are not present within the Study Area.	N/A	No – SWH type is not present
Bat Hibernacula	No – Cave and Crevice communities are absent from the Study Area.	N/A	N/A	No – SWH type is not present

Table 2.15: Significant Wildlife Habitat Assessment (6E & 7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
Bat Maternity Colonies	Yes – Swamp (SWD) vegetation communities are present within and immediately adjacent to the Study Area.	Bat Habitat Assessments were completed and SWD3-2 was found to provide an appropriate snag density to be considered candidate bat maternity colony SWH.	Yes – Surveys targeting bats were completed. Both target species (i.e., Big Brown Bats and Silver-haired Bats) were found within all bat acoustic stations. However, sufficient numbers of the species recorded are too low to be considered SWH. These species are likely foraging within the Study Area.	No – SWH type is not present in the Study Area Candidate Bat Maternity Colonies are assumed for the large woodland associated with the West Humber River located north and east of The Gore Road.
Turtle Wintering Areas	Yes – suitable ecosite (SW, MA, OA, SA) are present within the Study Area.	Yes – suitable habitats are present. Three potentially suitable features were assessed. These included the following: BS1 (Cattail Mineral Shallow Marsh (MAS2-1)), BS2 (Cattail Mineral Shallow Marsh (MAS2-1)) and B3 (a ponded area on residential property on the Gore Road).	Yes – surveys targeting basking turtles in the early spring (i.e., April 2021 and Fall 2022) were completed. BS1: Seven Midland Painted Turtles were recorded within this feature during targeted surveys. This feature is associated with the MAS2-1 in the southern central portion of the Subject Lands.	Yes – SWH type is present at MAS2-1 (BS1)

Table 2.15: Significant Wildlife Habitat Assessment (6E & 7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
			BS2: A single Midland Painted Turtle was recorded within this feature, during targeted surveys. Two additional Midland Painted Turtles were observed incidentally in July at a MAS2-1, however, this is not deemed to indicate or confirm turtle overwintering behaviour. BS3: No turtles were recorded at this feature during targeted surveys.	
Reptile Hibernacula	Yes – ecosites are present on the Study Area.	Yes - suitable rocks, logs or debris were recorded during field investigations.	Yes - Snake visual encounters surveys were conducted within the Study Area. However, no snake species were identified and no suitable hibernacula was present.	No – SWH type is not present
Colonial Bird Nesting Sites (bank/cliff)	Yes – CUM and CUT vegetation communities are present on the Study Area.	No – Presence of exposed or eroding banks, hills, steep slopes and sand piles were not observed.	N/A	No – SWH type is not present

Table 2.15: Significant Wildlife Habitat Assessment (6E & 7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
Colonial Bird Nesting Sites (tree/shrubs)	Yes – SWD vegetation communities are present within the Study Area.	No – No nests were observed within the Study Area.	N/A	No – SWH type is not present
Colonial Bird Nesting Sites (ground)	No – No rocky islands or peninsulas are present on the Study Area.	N/A	N/A	No – SWH type is not present
Migratory Butterfly Stopover Areas	Yes – CUM and CUT vegetation communities are identified within the Study Area.	No – The Study Area is located more than 5 km from Lake Ontario.	N/A	No – SWH type is not present
Migratory Landbird Stopover Areas	Yes – FO and SW vegetation communities are identified within the Study Area.	No – The Study Area is located more than 5 km from Lake Ontario.	N/A	No – SWH type is not present
Deer Yarding Areas	No – Mapping from the MNRF LIO database did not depict any deer yarding areas on or adjacent to the Study Area.	N/A	N/A	No – SWH type is not present
Deer Winter Congregation Areas	No – Mapping from the MNRF LIO database did not depict any deer wintering areas on or adjacent to the Study Area.	N/A	N/A	No – SWH type is not present

Table 2.15: Significant Wildlife Habitat Assessment (6E & 7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
2. RARE VEGETATION COMMUNITIES OR SPECIALIZED HABITAT FOR WILDLIFE				
2a. Rare Vegetation Communities				
Rare Vegetation Types (cliffs, talus slopes, sand barrens, alvars, old-growth forests, savannahs, and tallgrass prairies)	No – None identified through the background information review or site reconnaissance.	N/A	N/A	No – SWH type is not present
Other Rare Vegetation Types (S1 to S3 communities)	No – None identified through the field investigations.	N/A	N/A	No – SWH type is not present
2b. Specialized Wildlife Habitat				
Waterfowl Nesting Area	Yes – MA, SA, and SWD vegetation communities are present within the Study Area.	Yes – Potentially suitable upland habitat adjacent wetlands habitat are present.	Yes – Breeding bird surveys were completed; however, an insufficient number of the target species and individuals were recorded.	No – SWH type is not present
Bald Eagle and Osprey Habitats	Yes – FOD and SWD ecosites are present within the Subject Lands.	No suitable treed habitats are associated with lakes, ponds or watercourses on the Study Area. No Osprey or Bald Eagle nests were observed during field investigations within the SWD3/2/FOD7 feature.	N/A	No – SWH type is not present Candidate SWH may be present in the large woodland associated with the West Humber River located north and east of The Gore Road.

Table 2.15: Significant Wildlife Habitat Assessment (6E & 7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
Woodland Raptor Nesting Habitat	Yes – FOD, SWD and CUW1 ecosites are present within the Study Area.	No – Woodlands within the Study Area are generally small and fragmented from on another. No suitable habitat (>30ha with >10ha of interior habitat) is present on the Study Area or adjacent lands.	N/A	No – SWH type is not present
Turtle Nesting Areas	Yes – MAS and SA ecosites are present within the Study Area.	No gravel or sandy area were observed during field investigations	N/A	No – SWH type is not present
Seeps and Springs	Yes – Forested ecosites are present within the Study Area.	None were recorded during field investigations	N/A	No – SWH type is not present
Woodland Amphibian Breeding Habitats (within or < 120m from woodland)	Yes – FOD and SWD ecosites are present within the Study Area.	Yes – potentially suitable woodland breeding habitats were identified within the Study Area.	Yes – Amphibian call surveys were completed; however, an insufficient number of individuals and species were recorded at each station. As such, no breeding habitats were confirmed significant.	No – SWH type is not present
Wetland Amphibian Breeding Habitats (wetland >120m from woodland)	Yes – SW, MA, and SA ecosites are present within the Study Area.	Yes – potentially suitable wetland breeding habitats were identified within the Study Area.	Yes – Amphibian call surveys were completed; however, an insufficient number of individuals and species were recorded at each station. As such, no breeding habitats were confirmed significant.	No – SWH type is not present

Table 2.15: Significant Wildlife Habitat Assessment (6E & 7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
Woodland Area-Sensitive Bird Breeding Habitat	Yes – FO and SW ecosites are present within and adjacent to the Study Area.	No – Woodlands on the Study Area are small and generally fragmented from on another. The required woodland size (>30 ha) and presence of interior habitat is not achieved.	N/A	No – SWH type is not present
3. SPECIES OF CONSERVATION CONCERN				
Marsh Bird Breeding Habitat	Yes – MAM and SA ecosites are present within and adjacent to the Subject Lands.	No – MAM2 communities within the Subject Lands lacked shallow water and dense emergent vegetation; however, suitable habitat may be present on lands owned by non-participating land owners.	N/A	No – SWH type is not present Candidate SWH habitat may be present within non-participating lands.
Open Country Bird Breeding Habitat	Yes – CUM vegetation communities are present on the Study Area.	No – Minimum size criteria is not met (>30 ha).	N/A	No – SWH type is not present
Shrub/Early Successional Bird Breeding Habitat	Yes – CUW and CUT vegetation communities are present within the Study Area.	No – Minimum size criteria is not met (>10 ha).	N/A	No – SWH type is not present

Table 2.15: Significant Wildlife Habitat Assessment (6E & 7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
Terrestrial Crayfish	Yes – MAM and SWD ecosites are present within the Subject Lands.	N/A	Yes – Observations of terrestrial crayfish were recorded in several locations within the Study Area. Approximately 80 chimneys (i.e., burrows) were noted in suitable habitat (SWD3-2), located in the southern central portion of the Study Area. Approximately 10 chimneys were recorded in suitable habitat (MAM2 at breeding bird PC 26) Two chimneys were recorded in suitable habitat (MAS2-1 at turtle basking station BS2) Ten chimneys were recorded in unsuitable disturbed habitat along the south-central portion of the Study Area east of amphibian station P3-13	Yes – SWH type is present within the SWD3-2, the MAM2 at PC26 and the MAS2-1 at BS2

Table 2.15: Significant Wildlife Habitat Assessment (6E & 7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
Special Concern and Rare Wildlife Species (based on the Secondary Source Review – Section 2.1)				
(i) Common Nighthawk (*Chordeiles minor*) - SC	N/A	No – preferred habitat types of the species (i.e., logged or burned-over areas, forest clearings, rock barrens, peat bogs, lakeshores, and mine tailing) are not present within the Study Area.	N/A	No – SWH type is not present
(ii) Eastern Wood-Pewee (*Contopus virens*) - SC	N/A	Possibly – Forested ecosites are present within the Study Area.	Yes – Breeding bird surveys were completed; however, the species was not present within the Study Area.	No- SWH type is not present
(iii) Barn Swallow (*Hirundo rustica*)- SC	N/A	Yes- Anthropogenic structures are present and adjacent to the Study Area.	Yes- Breeding bird surveys were completed, and the species was recorded foraging over the Study Area at PC 25, however no breeding evidence or suitable habitat structures were observed within the Study Area. An outbuilding shed on an adjacent non-participating land west of PC 25 contained at least one nesting pair of Barn Swallows.	No- SWH type is not present Candidate SWH habitat may be present within non-participating lands.

Table 2.15: Significant Wildlife Habitat Assessment (6E & 7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
(iv) Golden-winged Warbler (*Vermivora chrysoptera*)-SC	N/A	No – While field edges, a preferred habitat type of the species, is present within the Study Area; the Study Area are not located within the known occurrence range of the species (MECP 2021).	Yes – Breeding bird surveys were completed; however, the species was not present within the Study Area.	No – SWH type is not present
(v) Grasshopper Sparrow (*Ammodramus savannarum*)-SC	N/A	Yes – potentially suitable cultural meadow ecosites are present within the Study Area.	Yes – Breeding bird surveys were completed; however, the species was not present within the Study Area.	No – SWH type is not present
(vi) Purple Martin (*Progne subis*) – S3B	N/A	No – This species almost exclusively nests in artificial roosting boxes. No nesting boxes were present.	Yes – Breeding bird surveys were completed; however, the species was not present within the Study Area.	No – SWH type is not present
(vii) Wood Thrush (*Hylocichla mustelina*) - SC	N/A	Yes – Forested ecosites are present within the Study Area.	Yes – Breeding bird surveys were completed, and the species was recorded at PC 22 in suitable breeding habitat (SWD3-2)	Yes – SWH type is present within SWD3-2

Table 2.15: Significant Wildlife Habitat Assessment (6E & 7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
(viii) Upland Sandpiper (*Bartramia longicauda*) S3B	N/A	No - Suitable fallow fields were present within the Study Area during the first visit; however, plowing had occurred before the second visit which rendered the habitat unsuitable.	Yes – Breeding bird surveys were completed, and pair of Upland Sandpiper were observed in fallow fields near PC 5 to PC 2 in 2021. The species was recorded at Point Count 5 in suitable breeding habitat. In 2024, an Upland Sandpiper was heard vocalizing at PC 5-2. Due to active farming, suitable fallow fields are no longer present within the Study Area	No – SWH type is no longer present within the Study Area
(ix) Monarch (*Danaus plexippus*) - SC	N/A	Yes – potentially suitable cultural meadow ecosites are present within the Study Area.	Yes – A single Monarch was recorded at in cultural meadow habitat on the southern limit of Property 14; however, no milkweed, the food plant of the species was recorded within the vegetation community. As such, this feature is not considered suitable habitat	No – SWH type is not present

Table 2.15: Significant Wildlife Habitat Assessment (6E & 7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
(x) American Brook Lamprey (*Lampretra appendix*)-S3	N/A	Yes - potentially suitable watercourses may provide suitable habitat.	Yes- Fish community sampling was completed. No American Brook Lamprey were observed within the Study Area.	No- SWH type is not present.
(xi) Snapping Turtle (*Chelydra serpentina*)- SC	N/A	Yes – potentially suitable MAM wetlands, ponds and watercourses may provide suitable habitat.	Yes –surveys targeting basking turtles were completed. No Snapping Turtle were recorded within the Study Area.	No – SWH type is not present.
(xii) Eastern Ribbonsnake (*Thamnophis sauritus*)- SC	N/A	Yes - potentially suitable wetlands, ponds and watercourses may provide suitable habitat.	Yes- A snake visual encounter survey was completed. No Eastern Ribbonsnakes were recorded within the Study Area.	No- SWH type is not present.
4. ANIMAL MOVEMENT CORRIDORS				
Amphibian Movement Corridors	N/A	N/A: Since no Amphibian Breeding Amphibian Habitats (wetland or woodland) are present, no corridors are present.	N/A	No – SWH type is not present

Table 2.15: Significant Wildlife Habitat Assessment (6E & 7E)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	POTENTIAL FOR SWH TYPE PRESENCE?
Deer Movement Corridors	NA	NA – Mapping from the MNRF LIO database did not depict any deer wintering areas or deer yarding area on or adjacent to the Study Area.	N/A	No – SWH type is not present

Table 2.16: Rapid Assessment Results, Wildfield Village Secondary Plan Area

Reach	RGA Score and Condition	Dominant Mode of Adjustment	RSAT Score and Condition	Limiting Factor	Downs Method
H5S1	0.33 In Transition	Degradation	24 Fair	Channel Stability	E – Enlarging
H5S2	0.13 In Regime	Aggradation	18 Fair	Riparian / Instream Habitat Conditions	M – Lateral Migration

Table 2.17: MNR Determination of Minimum Toe Erosion Allowance

Minimum Toe Erosion Allowance – River within 15 m of Slope Toe				
Native Soil Structure at Slope Toe	**Evidence of Active Erosion or Bankfull Flow Velocity > Competent Flow Velocity**	**No evidence of Active Erosion or Flow Velocity << Competent Flow Velocity**		
		Bankfull Width		
		< 5 m	**5 to 30 m**	**> 30 m**
Hard Rock	0 to 2 m	0 m	0 m	1 m
Soft Rock or Cobbles/Boulders	2 to 5 m	0 m	1 m	3 m
Stiff to Hard Cohesive Soil, Coarse Granulars or Glacial Tills	5 to 8 m	1 m	2 m	4 m
Soft/Firm Cohesive Soil, Fine Granular or Fill	8 to 15 m	1 to 2 m	5 m	7 m

Table 2.18: MNR Design Factors of Safety for Slope Stability

Land Uses	Design Minimum Factor of Safety
Passive: no buildings near slope; farm field, bush, forest, timberland, woods, wasteland, badlands, tundra.	1.10
Light: no habitable structures near slope; recreational parks, golf courses, buried small utilities, tile beds, barns, garages, swimming pools, sheds, satellite dishes, dog houses.	1.20 to 1.30
Active: habitable or occupied structures near slope; residential, commercial, and industrial buildings, retaining walls, storage/warehousing of non-hazardous substances.	1.30 to 1.50
Infrastructure and Public Use: public use structures or buildings (i.e. hospitals, schools, stadiums), cemeteries, bridges, high voltage power transmission lines, towers, storage/warehousing of hazardous materials, waste management areas.	1.40 to 1.50

Table 2.19: Summary of Toe Erosion Allowance, Stable Slope Inclination and LTSTOS Setback

Cross-Section	Side of Valley Slope on Cross-Section	Preliminary Toe Erosion Allowance (m)	Preliminary Estimated Stable Slope Inclination (H:V)	Preliminary LTSTOS Setback from TRCA Top of Slope (m)
A-A	West	15.0	3:1	18.6
B-B	West	15.0	3:1	22.1
C-C	West	15.0	3:1	26.3
D-D	West	15.0	3:1	13.8

APPENDIX B3

ECOLOGICAL SURVEY METHODOLOGY

GEI Survey Methodology

1.1 Ecological Land Classification

Vegetation communities were first identified on aerial imagery and then verified in the field. Vegetation community types were confirmed, sampled and revised, if necessary, using the sampling protocol of the Ecological Land Classification (ELC) for Southern Ontario (Lee et al. 1998). ELC was completed to the finest level of resolution (Vegetation Type) where feasible. Species names generally follow nomenclature from the Database of Vascular Plants of Canada (Brouillet et al. 2010+).

1.2 Botanical Inventory

The provincial status of all plant species and vegetation communities is based on NHIC (2023). Identification of potentially sensitive native plant species is based on their assigned coefficient of conservation (CC) value, as determined by Oldman et al. (1995). This CC value, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters.

1.3 Drone Imagery Analysis

Ecological Land Classification in Ontario subdivides the vertical structure of vegetation into four categories: canopy, subcanopy, understory, and ground cover. Forest communities are recognized as having a >60% tree canopy cover, Cultural Woodlands have >35% to 60% tree canopy, Cultural Savannahs have 35%-35% tree canopy, and Cultural Thickets and Meadows have less than 25% tree canopy cover. Traditional survey methods require a ground-based surveyor to visually estimate the tree canopy cover percent, which can be simple in traditional mature forests but becomes complex in open-canopy communities-particularly when those communities are large and/or have complex boundaries where it’s difficult for the surveyor to estimate the community as a whole. To reduce this subjectivity, GEI developed an objective approach to quantify tree canopy cover. This approach uses drone imagery to create a 3-dimensional model of target vegetation communities. Using that data, GEI isolates imagery pixels representing a specified elevation to illustrate portions of vegetation communities occupied by tree canopy cover. This data can assist in determining or refining delineations of vegetation communities; percent tree canopy cover can subsequently be calculated by quantifying those pixels relative to the delineated ELC polygon.

A drone flight took place over the treed feature on the south-central portion of the Study Area. This feature was flown due to the observed prevalence of European Buckthorn with patchy occurrences of live and dead canopy trees. The flight path followed pre-defined transects, capturing images at specified distances along each transect. All 595 of the resulting images overlap one another, which allows for development of a 3D model using a process known as Structure from Motion completed using Drone Deploy software. This data served as the Digital Surface Model (DSM), representing the heights of natural objects on the landscape.

To calculate height values, a Digital Terrain Model (DTM) of the Study Area was obtained from the MNRF, which provided baseline elevation values. Feature heights were calculated by subtracting the DSM from the DTM.

Based on existing conditions, the tree canopy layer was determined to start at 12 m. This threshold was chosen because of the tall, dense European Buckthorn subcanopy that was present. The current ELC definition of “tree” is a woody species that typically adopts a single stem growth form, is capable of achieving a diameter greater than 9.5 cm and/or greater than 10 m in height and are included in the list of provincially accepted tree species (MNRF 2013). Through this, European Buckthorn is considered a tall shrub by ELC standards. By setting the height threshold at 12 m, the dense subcanopy of European Buckthorn was excluded from the calculation, allowing us to quantify the remaining live tree crown cover within the canopy.

GEI’s rationale for this type of analysis is that it reduces subjectivity, and it is repeatable. The aforementioned methodology was reviewed by MNRF remote sensing specialist Adam Hogg, who also assists in the development of ELC practices in Ontario.

1.4 Stem Density Plot

GEI completed stem density surveys within the treed features on the south-central portion of the Study Area. The ELC mapping of this feature as prepared by GEI shows the following vegetation community types:

- Buckthorn Deciduous Shrub Thicket (THDM2-6_a; 0.22 ha)
- Buckthorn Deciduous Shrub Thicket (THDM2-6_b; 0.08 ha)
- Buckthorn Deciduous Shrub Thicket (THDM2-6_c; 0.33 ha)

These community types were considered for the purpose of identifying areas that could satisfy the Town of Caledon definition of woodland.

As defined in the Town of Caledon Official Plan, woodlands are “ecosystems comprised of treed areas and the immediate biotic and abiotic environmental conditions on which they depend”. It further indicates that woodlands must have:

a) A tree crown cover of over 60% of the ground, determinable from aerial photography, or;

b) A tree crown cover of over 25% of the ground, determinable from aerial photography, together with on-ground stem estimates of at least:

i. 1,000 trees of any size per ha, or

ii. 750 trees measuring over five cm in diameter at breast height, per ha, or

iii. 500 trees measuring over 12 cm in diameter at breast height, per ha, or

iv. 250 trees measuring over 20 cm in diameter at breast height, per ha and, which have a minimum average width of 40 m or more measured to crown edges. The Town of Caledon also notes that “treed portions with less than the required stocking level will be considered part of the woodland as long as the combination of all treed units in the overall connected treed area meets the required stocking level”.

It further adds that “additional exclusions may be considered for treed communities which are dominated by invasive non-native tree species such as buckthorn (*Rhamnus* species) and Norway maple (*Acer plantanoides*), or others deemed to be highly invasive, that threaten the ecological functions or biodiversity of native communities. Such exceptions should be supported by site-specific studies that consider 1) the degree of threat posed; 2) any potential positive and/or negative impact on the ecological functions or biodiversity of nearby or adjacent native communities; and 3) the projected natural succession of the community. Communities where native tree species comprise approximately 10 percent or less of the tree crown cover and approximately 100 or fewer stems of native tree species of any size per hectare would be candidates for exclusion”.

This broad woodland definition indicates that European Buckthorn (*Rhamnus catharica*) is considered a “tree” by the Town of Caledon and must therefore be factored in when identifying woodland features. It should be noted, however, that since European Buckthorn is not a “tree” by ELC standards, the Town’s definition does not influence the results of ELC mapping and classifications (i.e., a Buckthorn dominated community with < 25% tree canopy cover, would continue to be mapped as a cultural thicket). All discussion herein regarding stem density and resulting woodland thresholds is strictly based on the Town’s definition and practices.

When factoring in European Buckthorn, the collective treed area satisfies the Town’s woodland criterion of having over 60% tree crown cover. However, since European Buckthorn is a recognized invasive species, the exclusion clause outlined by the Town allows GEI to review this feature and determine if it should be a candidate for exclusion.

Therefore, the stem density survey completed by GEI was undertaken for the purpose of calculating stem density of native tree species within portions of the treed area that appeared to be candidates for exclusion (i.e., within the Buckthorn Deciduous Shrub Thickets).

GEI used 5m radius circular plots for this stem density survey. The number of plots used was based on the area of each treed unit being assessed, targeting a minimum of 10 to 15% coverage of each unit. To reduce surveyor bias, plot locations were determined prior to going on site using imagery, making an effort to ensure plots proportionally reflect the variability of each treed area. GEI used a submeter-capable GPS unit to locate the pre-selected plot center and collected the necessary stem density within each plot.

1.5 Wetland Evaluation

A wetland evaluation following the Ontario Wetland Evaluation System (OWES) for Southern Ontario (MNRF 2022) considers a number of factors to determine significance. These factors include wetland boundaries, productivity, biodiversity, size, social and economic importance, hydrogeological function and special features. Each category has a scoring system, wherein certain points are tallied within each category. When a certain threshold of points have been reached the feature is considered provincially significant. Based on GEI's experience with other wetland evaluations in the vicinity of the Study Area, the special features category gives a strong indication as to whether wetlands are likely to be considered as provincially significant.

Any wetland units smaller than 2 ha and presently classified at provincially significant would automatically undergo a full evaluation (if requested by the client) based on the rationale that it is significant unless shown otherwise. Therefore, for unevaluated wetland units smaller than 2 ha, GEI first determined if rationale existed to warrant a full evaluation. Where it did, GEI completed a full evaluation following the OWES protocol using GEI's comprehensive field data. If rationale did not exist, the wetlands were not evaluated and treated as non-provincially significant. Through correspondence with MNRF, if those wetlands are presently in the LIO database, those wetlands would retain the classification of "unevaluated" since MNRF does not have a classification designation for those types of wetlands; if they are not currently in the LIO database, those wetlands would remain excluded.

1.6 Amphibian Call Count Surveys

These surveys followed standard protocols in the Great Lakes Marsh Monitoring Program (BSC 2003). Surveys were conducted on warm nights with little wind. Surveys commenced one half hour before dusk and end before midnight. Visits were at least 15 days apart and as per protocols. The first visit occurred within a minimum nighttime air temperature of 5°C, the second visit with a minimum of 10°C and the third visit with a minimum of 17°C. If noise from plane, road traffic and/or trains was present, monitoring was delayed and began during a quiet period.

Each station was surveyed for three minutes and a three-level call category system was used to identify the level and type of frog activity.

The standard levels are:

1) Individual calls do not overlap and calling individuals can be discreetly counted;
2) Calls of individuals sometimes overlap but number of individuals can still be estimated; and
3) Overlap among calls seems continuous (full chorus) and a count estimate is impossible.

Amphibians were recorded as within the station if they were within 100 m. All other species were recorded as incidental records heard outside the station.

1.7 Snake Visual Encounter Surveys

Preliminary aerial photography review was performed to identify suitable snake habitat, which may include cultural meadow, disturbed meadow, wetland edges, cultural woodland, cultural savannah, rural residence and farm buildings. Surveys focused on searching natural cover like rocks, logs and debris.

Transects were walked along the Study Area. Surveys were conducted between 9:00 and 17:00 under sunny conditions with air temperatures between 10°C and 25°C, or alternatively under overcast conditions where air temperatures are between 15°C and 30°C. On days when afternoon air temperature exceeds 25°C surveys were conducted between 8:00 and 12:00 or 17:00 and 20:00. Data recorded during snake surveys includes species observed and locations (UTM coordinates), air temperature, water temperature, start and end time, and weather conditions. Other wildlife observed during these surveys were also recorded. This survey methodology focuses on snake hibernacula features, to determine if these features occur on the Study Area. Survey methods are based on MNRF (2016) and Toronto Zoo (Caverhill et al. 2011) snake survey protocols and are also informed by species-specific habitat preferences.

1.8 Turtle Basking Surveys

Potentially suitable aquatic habitat for turtles was used using aerial photography (ponds, open wetlands, and riparian/ lacustrine areas). Surveys were conducted between 8:00 and 17:00 under sunny conditions with air temperatures between 5°C and 25°C, or alternatively under overcast conditions where air temperatures are between 15°C and 30°C. On days when afternoon air temperature exceeds 25°C surveys were conducted between 8:00 and 10:00. Binoculars were used to scan, from a distance, for 30 minutes, the edges and surface of each water body for basking turtles (COSEWIC 2008; MNRF 2015; Caverhill et al. 2011). Data recorded includes: water and air temperatures (Basking prevalent when air is warmer than water), vegetation composition around the water body, and presence of basking features (logs, floating vegetation mats, floating/ emergent debris such as tires).

1.9 Breeding Bird Surveys

Breeding bird surveys were conducted following protocol set forth by the Ontario Breeding Bird Atlas (Cadman et al. 2007), the Ontario Forest Bird Monitoring Program (Cadman et al. 1998) and the Marsh Monitoring Program (Bird Studies Canada 2014 and 2006).

Surveys were conducted between dawn and five hours after dawn with suitable wind conditions, no thick fog or precipitation (Cadman et al. 2007). Point count stations were located in various habitat types within the Study Area and combined with area searches to help determine the presence, variety and abundance of bird species. Each point count station was surveyed for 10 minutes for birds within 100 m outside 100 m. All species recorded on a point-count were mapped to provide specific spatial information and were observed for signs of breeding behaviour. Surveys were conducted at least 10 days apart.

During breeding bird surveys, vegetation was assessed for potential presence of Species at Risk habitat. If suitable habitat was encountered or individuals were observed standard protocols were utilized (in consultation with the Ministry of Natural Resources; MNRF).

1.10 Bat Habitat Assessment

Surveys were completed following MNRF survey guidelines as outlined in “Bats and Bat Habitats: Guidelines for Wind Power Projects” (MNR 2011), consultation with MNRF, and professional experience. Areas to be surveyed were determined using ELC mapping of the Study Area. Where present, targeted ELC communities included Deciduous Forests (FOD), Mixedwood Forests (FOM), Coniferous Forests (FOC), Deciduous Swamps (SWD), Mixedwood Swamps (SWC), and residential/disturbed areas were also targeted. Surveys were conducted during the leaf-off period on days when visibility was good.

All trees and snags greater than or equal to 10 cm diameter-at-breast height (DBH) were visually inspected using binoculars to document any cavities, leaf clusters, and loose or peeling bark that may or may not be present along the trunk or large branches. In addition, survey efforts also targeted oak and maple tree species to identify suitable maternity roost habitat for Tri-coloured Bats.

Each tree containing suitable cavities had the following recorded: UTM, species, DBH, approximate height, decay class, canopy cover, total number of cavities and height information for the top three cavities.

These results were then used to assess the quality of the area to provide bat maternity roost habitat, with areas with ≥10 cavities/ha determined to provide the greatest potential for bat maternity roost habitat in accordance with MNRF guidelines.

1.11 Bat Acoustic Monitoring

Acoustic monitoring stations were selected based on results from the bat habitat assessment survey. A Wildlife Acoustics Song Meter SM4BAT was deployed for 10 nights in June. The recorder microphone was elevated approximately 2 m above the ground to reduce background noise and echo.

1.12 Aquatic Habitat Assessment

The Aquatic Habitat Assessment consisted of a visual survey of existing instream and riparian habitat conditions along and adjacent to the watercourses running through the Study Area. The assessment took note of any of any of the following features:

- Hydrology (e.g. flowing or standing water);
- General watercourse morphology (e.g. riffle, run, pools);
- Wetted width and depth (at time of survey);
- Bed and bank substrate;
- Instream habitat (e.g. woody debris, aquatic vegetation, undercut banks);
- Presence of obstructions to fish movement (e.g. culverts, debris dams);
- Evidence of groundwater inputs (e.g. seeps or springs, iron flocculation/staining); and
- Riparian habitat.

1.13 Headwater Drainage Feature Assessment

Per the requirements of the Headwater Drainage Feature Assessment Guidelines (CVC and TRCA 2014), GEI completed three rounds of surveys to assess HDFs on the Study Area.

During the first visit, all areas of the Study Area were walked to identify potential headwater drainage features. Each headwater drainage feature observed was separated into specific reaches, per the guidance on reach delineation in the HDF Assessment Guidelines, and data collection was completed for each reach based on the Ontario Stream Assessment Protocols for Unconstrained Headwater Sampling, Section 4: Module 11 (Stanfield, et. 2010).

Following completion of all three rounds, the collected data was used to classify each headwater drainage feature, based on the HDF Assessment Guidelines.

1.14 Fish Community Sampling

Fish community sampling was completed to confirm the distribution and extent of direct fish habitat within watercourses and headwater drainage features on the Study Area, while also identifying species diversity and relative abundance.

GEI obtained a License to Collect Fish for Scientific Purposes from the MNRF to facilitate the collection efforts. During the sampling event, a Halltech HT-2000 Battery Backpack Electrofisher and two D-frame dip nets with a 500-micron mesh size was utilized to retrieve fish and semi-aquatic organisms (e.g., frogs) from the features. Sampling methodology was based off of the Ontario Stream Assessment Protocol standard single pass survey method (Stanfield 2013). Surveys were completed within a defined stretch throughout riffles, pools, and runs. Fish captured were transferred into an aerated bucket for processing and then identified to species level, enumerated and weighed before returning them into the feature at a downstream location.

APPENDIX B4

FLUVIAL GEOMORPHOLOGY PHOTOGRAPHIC RECORD

SCS consulting group ltd

GEI Consultants

Photographic Record

Photo 1 – Upstream extent of H5S3, located at the confluence of two drainage features. Photo taken facing upstream.

Photo 2 – Downstream view of H5S3, transitioning into H5S2.

Photo 3 – Staff gauge at downstream extent of H5S2, facing upstream.

Photo 4 – Knickpoint located at upstream extent of H5S1. Substrate consists of coarse particles embedded in a consolidated clay layer.

APPENDIX B4

FLUVIAL GEOMORPHIC ASSESSMENT

WILDFIELD VILLAGE LANDOWNER GROUP

MAY 29TH, 2023

PHOTOGRAPHIC RECORD

GEI Consultants

Photo 5 – Sharp meander bend with displaying undercutting in central portion of H5S1.

Photo 6 – Forested section of H5S1 near downstream extent. Degraded banks along pools containing silt.

Photo 7 – Downstream extent of H5S1, where the feature crosses under The Gore Road.

APPENDIX B4

FLUVIAL GEOMORPHIC ASSESSMENT

WILDFIELD VILLAGE LANDOWNER GROUP

MAY 29TH, 2023

PHOTOGRAPHIC RECORD

GEI Consultants

APPENDIX B5

PHOTOGRAPH OF UNCONFINED FEATURE

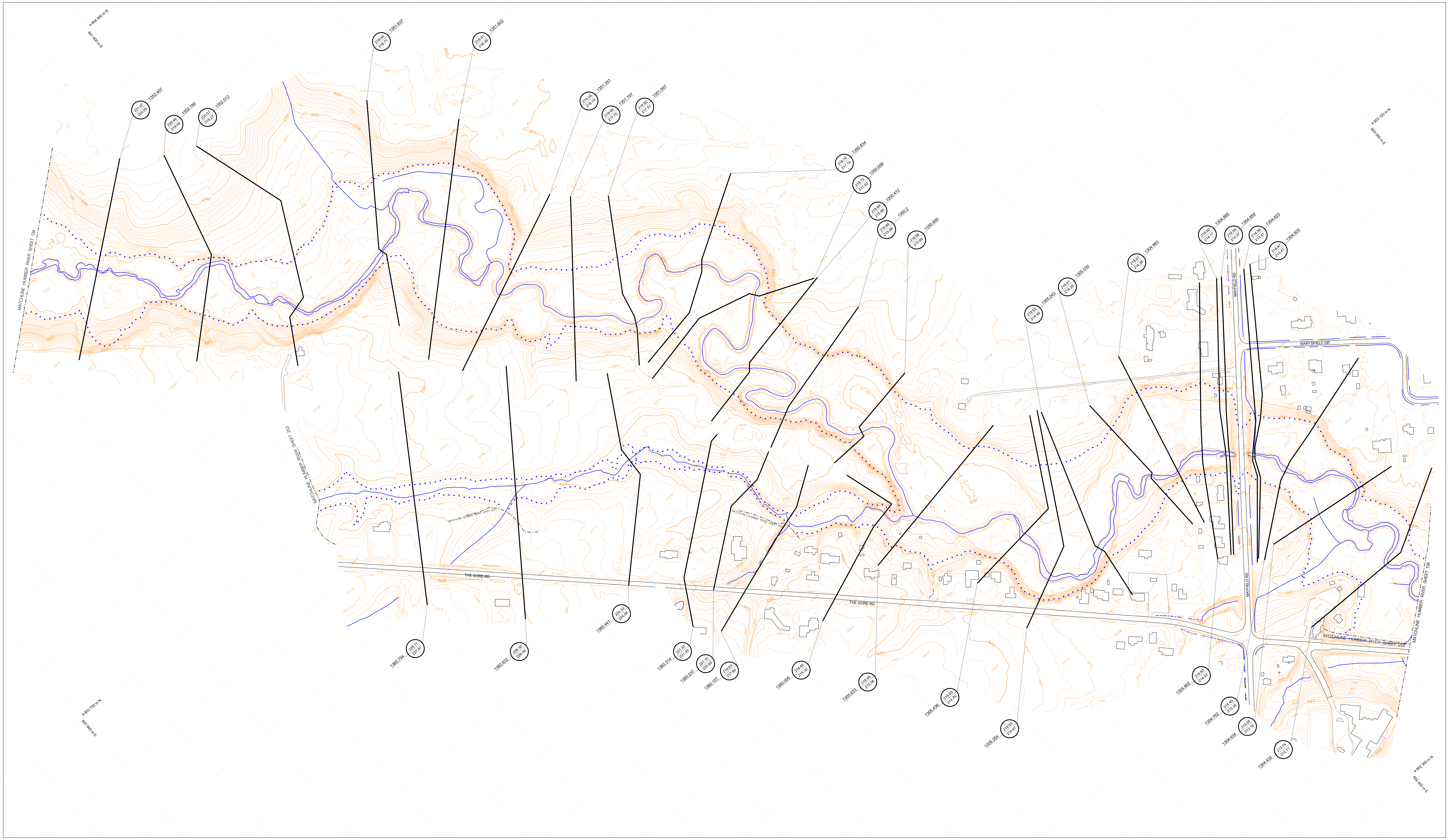
Photograph 1

Looking east into the WVSP area from Centreville Creek Road, showing the unconfined feature, originally identified in the Scoped SWS: Part A report, (Wood, 2022) as an area of potential slope instability.

(GEI, May 2024)

APPENDIX B6

TRCA Floodplain Mapping



R E V I S I O N S

NO.	DESCRIPTION	BY	DATE
1	Floodline removed at matchlines for Humber River sheet 253. Upstream of the most upstream matchline, topographic data removed and cross sections 1360.974-1361.306 removed. Floodline removed at matchline for Humber River sheet 252. These data has been superseded and can be found on Humber River sheet 252 and 253.	MDT	2024-05-30

LEGEND
Cross–Section Label
Cross–Section Leader Line
Regional Flood Elevation (m)
Cross–Section Number 14.060 172.00 172.00
100 Year Flood Elevation (m)
Cross–Section Length

REGULATORY FLOOD ELEVATION
IS THE HIGHER OF THE TWO
ELEVATIONS DISPLAYED

LEGEND

Contour Index
Contour 1 metre
Contour 0.5 metre
Contour Label 100
Spot Elevation . 100.10
Road
Parking Lot / Large Driveway
Rail Line —+——⊢
Bridge / Large Culvert
Water Feature
Ditch
Marsh
Building
Regulatory Flood Line • • • • •

The elevation data on this map was produced by TRCA from a DEM with 1.0 m grid resolution. The DEM was created using mass points with a vertical accuracy tolerance of +/- 0.10m RMSE on hard flat surfaces. The mass points were collected using LiDAR flown in 2014 by Airborne Imaging.

Downstream of Mayfield Rd.:

The planimetric data on this map was acquired from the City of Brampton Open Data Catalogue in 2017. The vintage of the data may not match with the elevation dataset and is for reference only.

Upstream of Mayfield Rd.:

The planimetric data on this map was compiled from a variety of sources of different vintage and may not match with the elevation dataset. This data is for reference only.

Building footprints were acquired from Peel Region in 2017.

The vertical datum is mean sea level as established by the Geodetic Survey of Canada.
CGVD 1928–1978 Ontario Adjusted Version

The horizontal datum is North American Datum 1983, U.T.M. 6° projection Zone 17, Central Meridian 81° W

Grid Interval 100 metres.

PLEASE NOTE:
FLOODLINE ELEVATIONS ARE SUBJECT TO CHANGE DUE TO REVISED INFORMATION.

Elevation Data provided by:

AIRBORNE IMAGING
A Clean Harbors Company

COLE ENGINEERING
70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
T:416.987.6161 / 905.940.6161 F:905.940.2064

PLEASE NOTE:
THE PROFESSIONAL ENGINEER'S STAMP VERIFIES THE FLOOD LINE AND ASSOCIATED DATA NOT THE MAP DATA UNLESS OTHERWISE NOTED

LICENSED PROFESSIONAL ENGINEER
O.F. SANDERS
PROVINCE OF ONTARIO

FLOOD PLAIN MAPPING PROGRAM

FLOODLINE APPROVED DATE: 2018-05-18

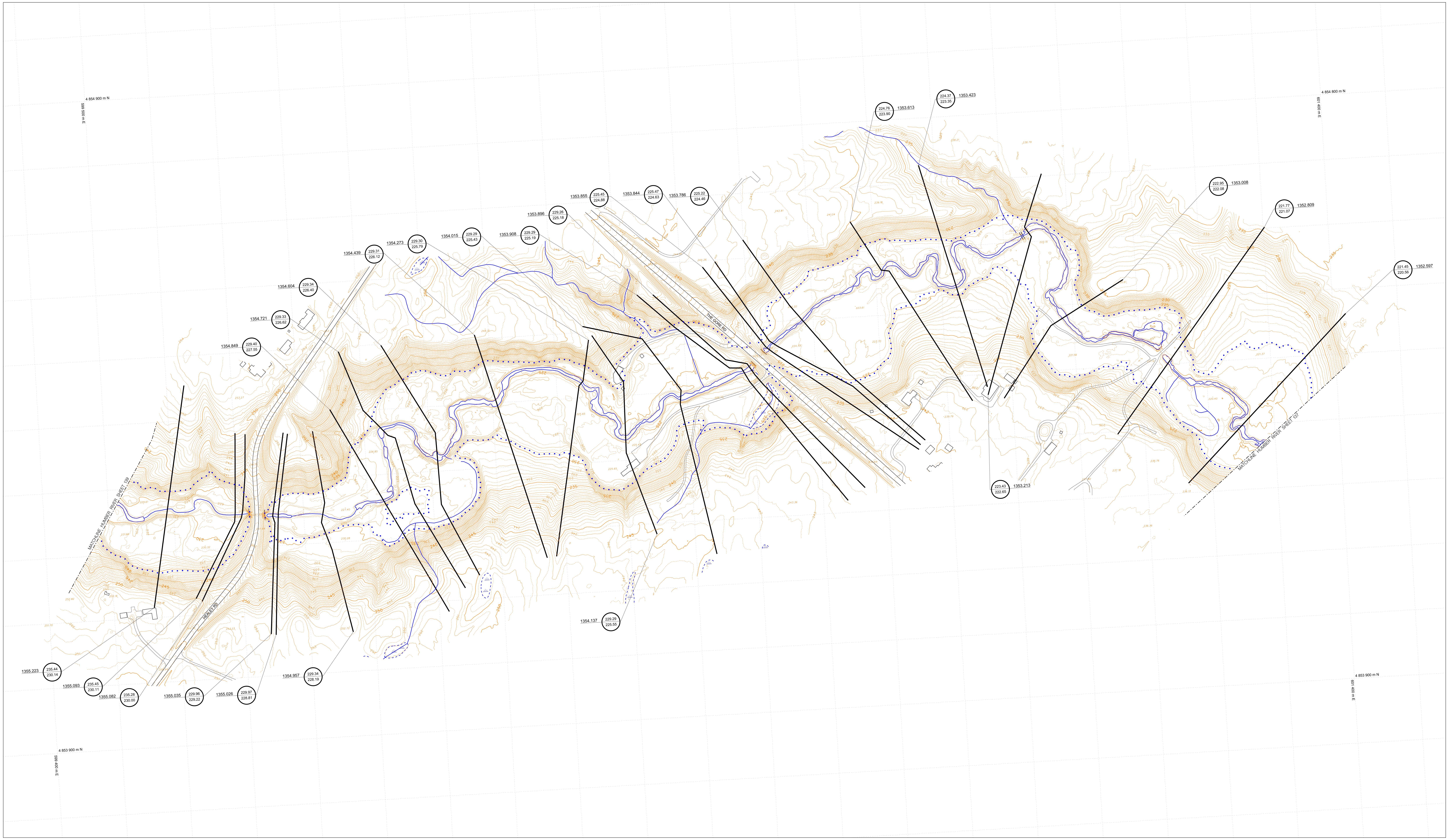
Toronto and Region Conservation
for The Living City®
5 Shoreham Drive Downsview Ontario M3N 1S4 (416) 661–6600

Scale 1:2000
100 Metres 0 100 200 Metres
200 Feet 0 200 400 600 800 1000 Feet

N

HUMBER RIVER

SHEET No. 137



REVISIONS

NO.	DESCRIPTION	BY	DATE

LEGEND
Cross–Section Label

Regional Flood Elevation (m)
Cross–Section Number 14.060
100 Year Flood Elevation (m)
172.00
172.00
Cross–Section Leader Line
Cross–Section Length

REGULATORY FLOOD ELEVATION
IS THE HIGHER OF THE TWO
ELEVATIONS DISPLAYED

LEGEND

Contour Index
Contour 1 metre
Contour 0.5 metre
Contour Label 100
Spot Elevation 100.10
Road
Parking Lot / Large Driveway
Rail Line
Bridge / Large Culvert
Water Feature
Ditch
Marsh
Building
Regulatory Flood Line • • • • •

The elevation data on this map was produced by TRCA from a DEM with 1.0 m grid resolution. The DEM was created using mass points with a vertical accuracy tolerance of +/- 0.10m RMSE on hard flat surfaces. The mass points were collected using LiDAR flown in 2014 by Airborne Imaging.

The planimetric data on this map was compiled from a variety of sources of different vintage and may not match with the elevation dataset. This data is for reference only.

Building footprints were acquired from Peel Region in 2017.

The vertical datum is mean sea level as established by the Geodetic Survey of Canada.
CGVD 1928-1978 Ontario Adjusted Version

The horizontal datum is North American Datum 1983, U.T.M. 6° projection Zone 17, Central Meridian 81° W

Grid Interval 100 metres.

PLEASE NOTE:
FLOODLINE ELEVATIONS ARE SUBJECT TO CHANGE DUE TO REVISED INFORMATION.

Elevation Data provided by:

AIRBORNE IMAGING
A Clean Harbors Company

COLE ENGINEERING
70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
T:416.987.6161 / 905.940.6161 F:905.940.2064

PLEASE NOTE:
THE PROFESSIONAL ENGINEER'S STAMP VERIFIES THE FLOOD LINE AND ASSOCIATED DATA NOT THE MAP DATA UNLESS OTHERWISE NOTED

LICENSED PROFESSIONAL ENGINEER
O.F. SANDERS
PROVINCE OF ONTARIO

FLOOD PLAIN MAPPING PROGRAM

FLOODLINE APPROVED DATE: 2018-05-18

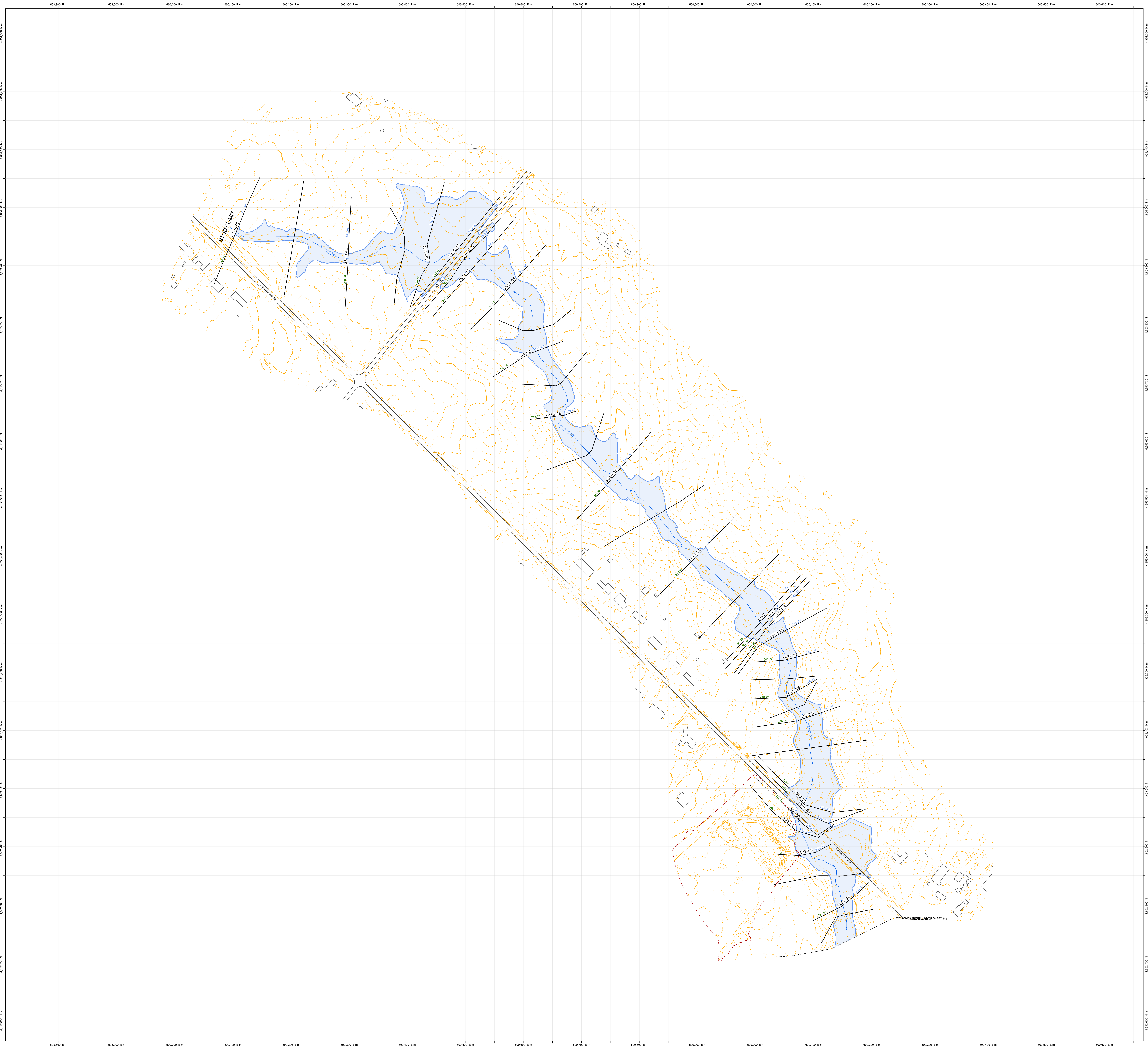
Toronto and Region Conservation
for The Living City

5 Shoreham Drive Downsview Ontario M3N 1S4 (416) 661–6600

Scale 1:2000
100 Metres 0 100 200 Metres
200 Feet 0 200 400 600 800 1000 Feet

HUMBER RIVER

SHEET No. 138



TRCA Flood Plain Mapping Program

Hydraulic Engineering Service Provided By:

Toronto and Region Conservation Authority

This map is a copy of the original map sheet sealed by Y. Qiao on May 30, 2024.
If the sealed map is required please contact TRCA. The professional engineer's seal and signature verifies the location of the flood line and the associated water surface elevations only

Map Note:

AIRBORNE IMAGING

The flood line on this map was produced from hydraulic modelling software using a digital elevation model (DEM) with 1m grid resolution. The DEM was created using bare earth mass points with a vertical accuracy tolerance of +/- 0.10 m on hard flat surfaces. The mass points were collected using LiDAR flown in 2014/2015 by Airborne Imaging. In select areas elevation data from 2019 was used. This data was collected using LiDAR flown in 2019 by Airborne Imaging, and uses the same specification as the 2014/2015 dataset.

The spot elevations shown on this map were produced by TRCA using the DEM mentioned above. The contour lines were produced by TRCA by smoothing the full resolution DEM to create smooth lines for cartographic display and should therefore be used as reference only. The river banks were produced by TRCA and are approximate, contours within close proximity are a result of interpolation from the DEM surface and should not be considered a true representation of the water surface or bathymetry.

Contour labels and spot elevations are represented as metres above sea level (masl).

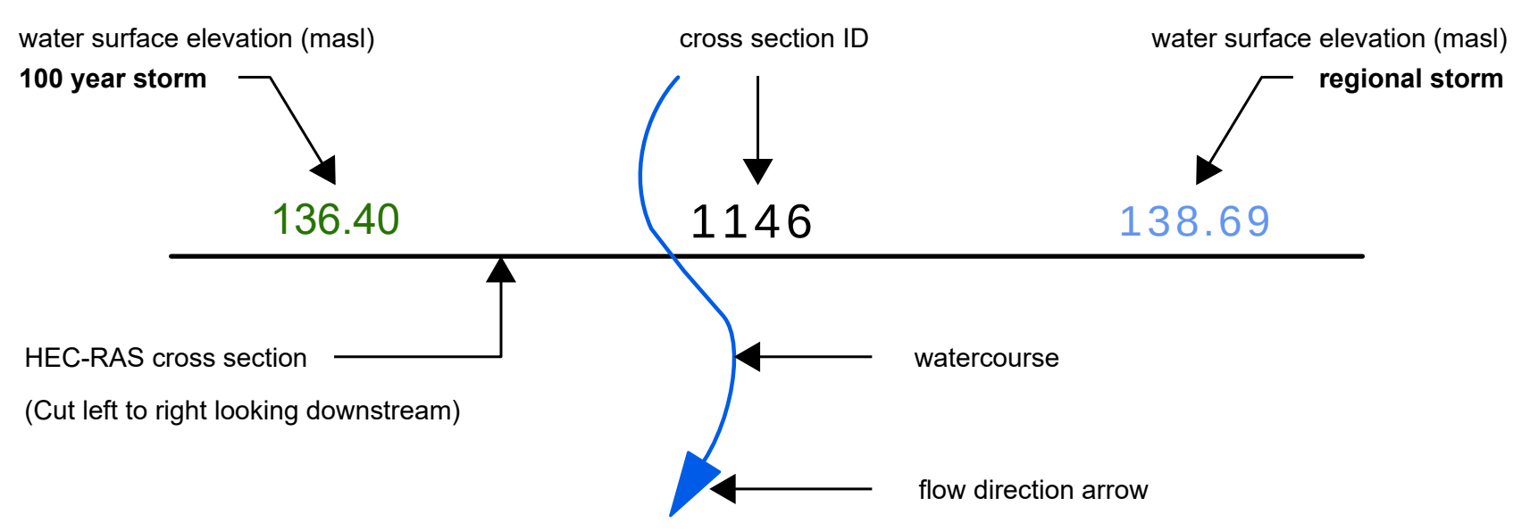
The planimetric data on this map were acquired from various sources with different collection dates and are provided for reference only. The building footprints were acquired from Region of Peel Open Data and City of Brampton in 2020.

The vertical datum is the Canadian Geodetic Vertical Datum of 1928:1978 Ontario Adjusted Version.
The horizontal datum is North American Datum of 1983, UTM 6° projection Zone 17,
Central Meridian 81° W.

Legend

Surface Contour		Road	—	Regulatory Flood Line	—
5m	—	Building	▭	Elevation Data From 2019	▭
1m	—	Bridge / Culvert	—	Regulatory Flood Plain	▨
0.5m	- - -	Waterbody	○		
Spot Elevation Point	+	Railway	—+—		

Hydraulic Model Legend:



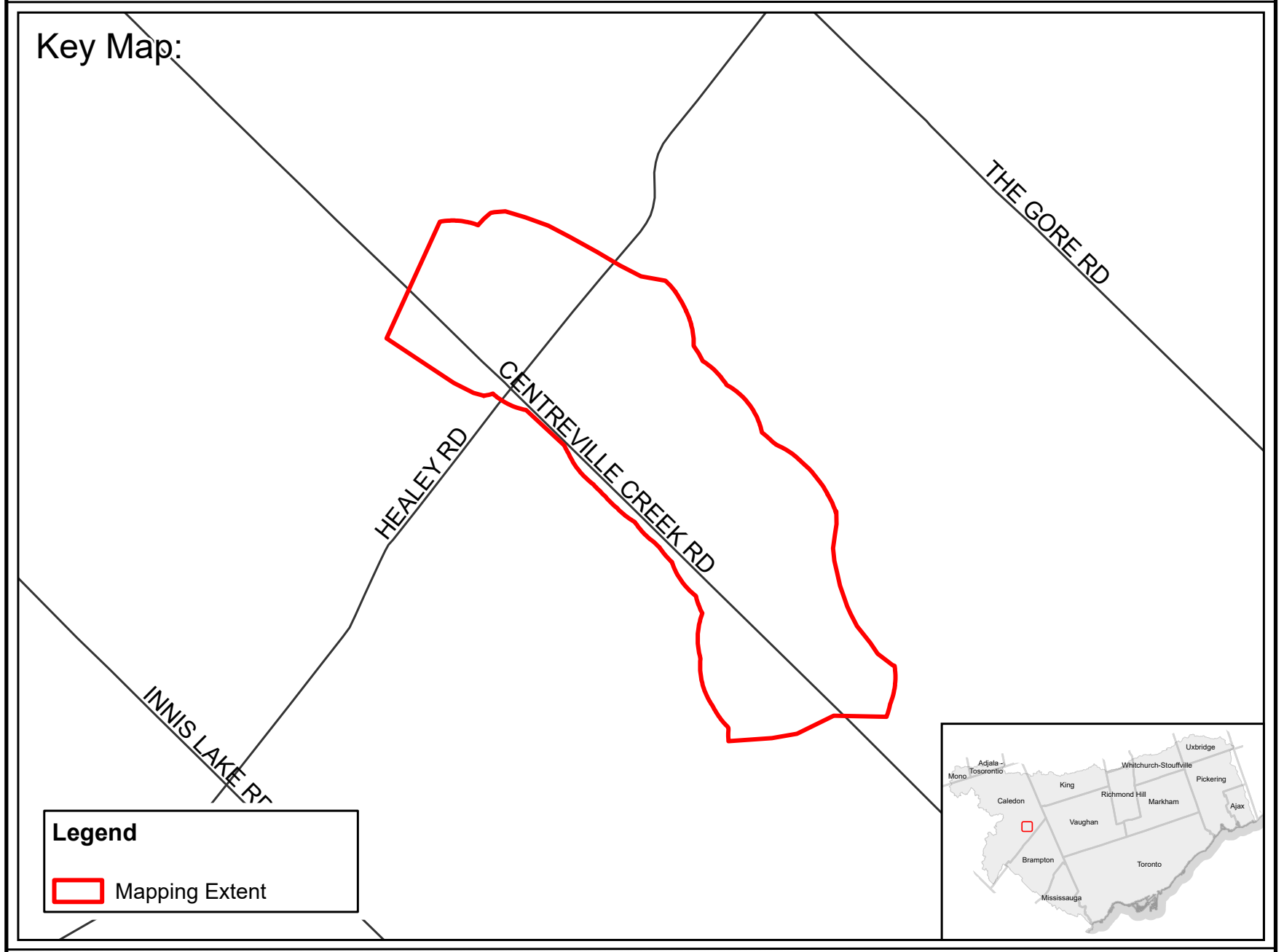
NOTE: The regulatory flood elevation is the greater of the regional storm or 100 year storm.

When the 100 year storm is greater, it is symbolized as follows: ***136.40***

SPILL 01 Indicates Spill, Spill ID and Approximate Flow Direction

Scale: 1:2,000

N



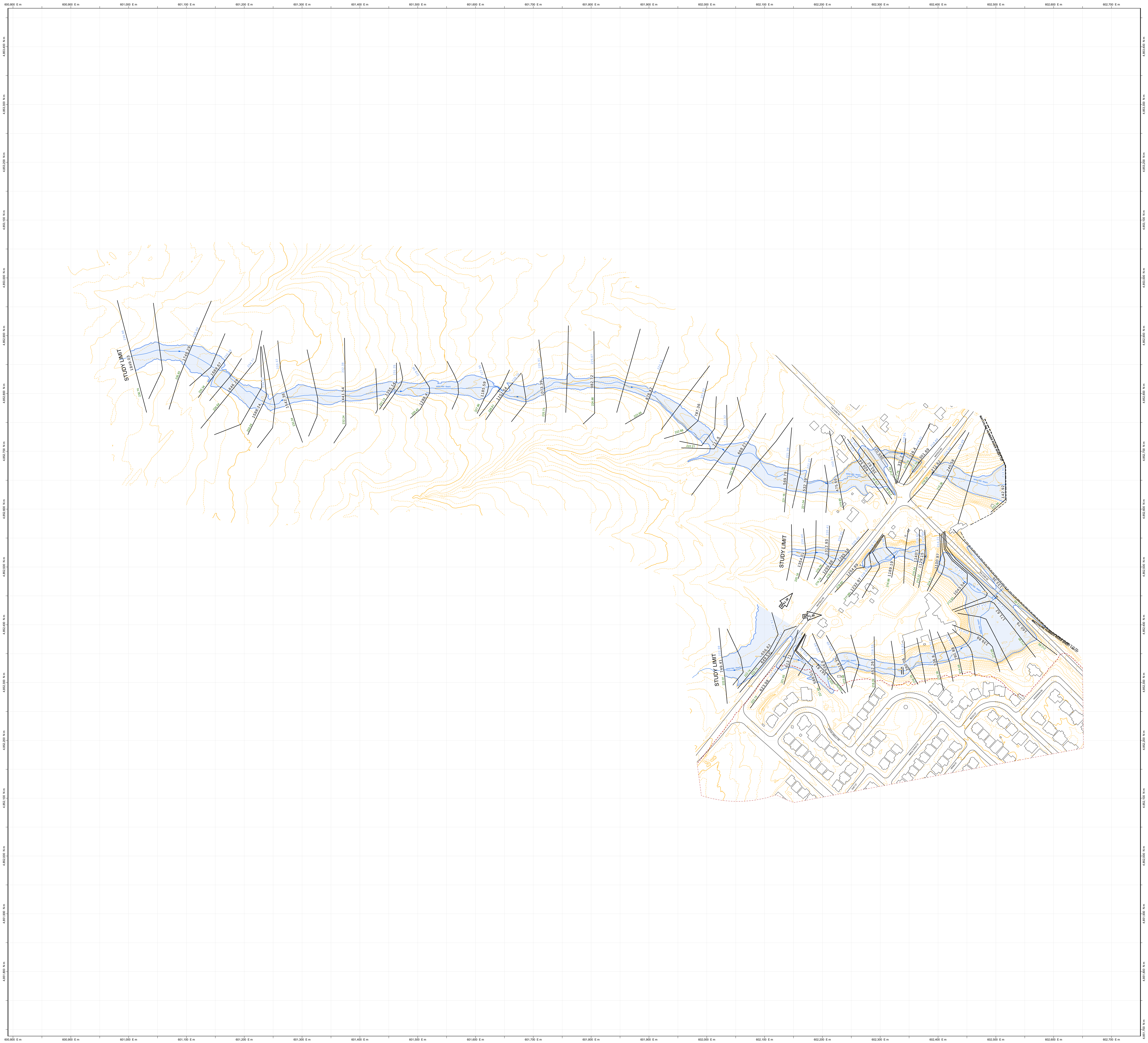
HUMBER RIVER

Sheet No.

251

Toronto and Region Conservation Authority

5 Shoreham Dr., Downsview, ON M3N 1S4 (416) 661 6600 info@trca.ca



TRCA Flood Plain Mapping Program

Hydraulic Engineering Service Provided By:

Toronto and Region Conservation Authority

This map is a copy of the original map sheet sealed by Y. Qiao on May 30, 2024.
If the sealed map is required please contact TRCA. The professional engineer's seal and signature verifies the location of the flood line and the associated water surface elevations only

Map Note:

AIRBORNE IMAGING

The flood line on this map was produced from hydraulic modelling software using a digital elevation model (DEM) with 1m grid resolution. The DEM was created using bare earth mass points with a vertical accuracy tolerance of +/- 0.10 m on hard flat surfaces. The mass points were collected using LiDAR flown in 2014/2015 by Airborne Imaging. In select areas elevation data from 2019 was used. This data was collected using LiDAR flown in 2019 by Airborne Imaging, and uses the same specification as the 2014/2015 dataset.

The spot elevations shown on this map were produced by TRCA using the DEM mentioned above. The contour lines were produced by TRCA by smoothing the full resolution DEM to create smooth lines for cartographic display and should therefore be used as reference only. The river banks were produced by TRCA and are approximate, contours within close proximity are a result of interpolation from the DEM surface and should not be considered a true representation of the water surface or bathymetry.

Contour labels and spot elevations are represented as metres above sea level (masl).

The planimetric data on this map were acquired from various sources with different collection dates and are provided for reference only. The building footprints were acquired from Region of Peel Open Data and City of Brampton in 2020.

The vertical datum is the Canadian Geodetic Vertical Datum of 1928:1978 Ontario Adjusted Version.
The horizontal datum is North American Datum of 1983, UTM 6° projection Zone 17,
Central Meridian 81° W.

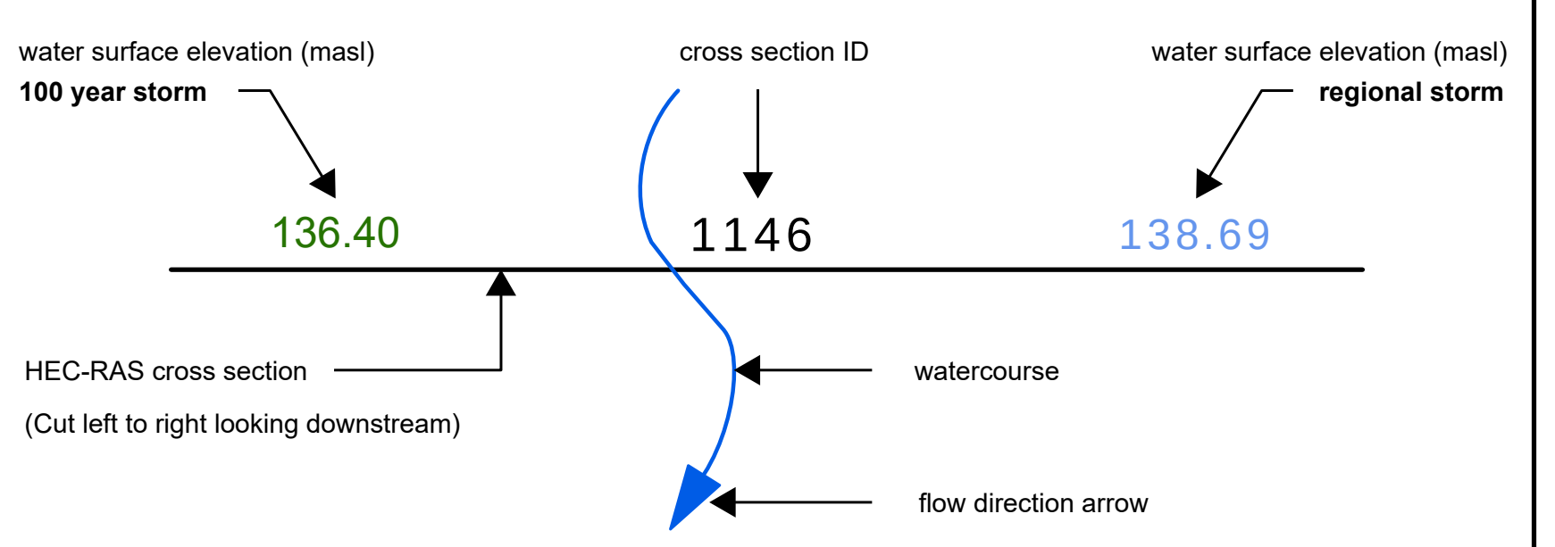
Legend

Surface Contour
5m —
1m —
0.5m - - -
Spot Elevation Point +

Road —
Building ▭
Bridge / Culvert —
Waterbody ⬭
Railway —+—

Regulatory Flood Line —
Elevation Data From 2019 ⬚
Regulatory Flood Plain ▨

Hydraulic Model Legend:



NOTE: The regulatory flood elevation is the greater of the regional storm or 100 year storm.

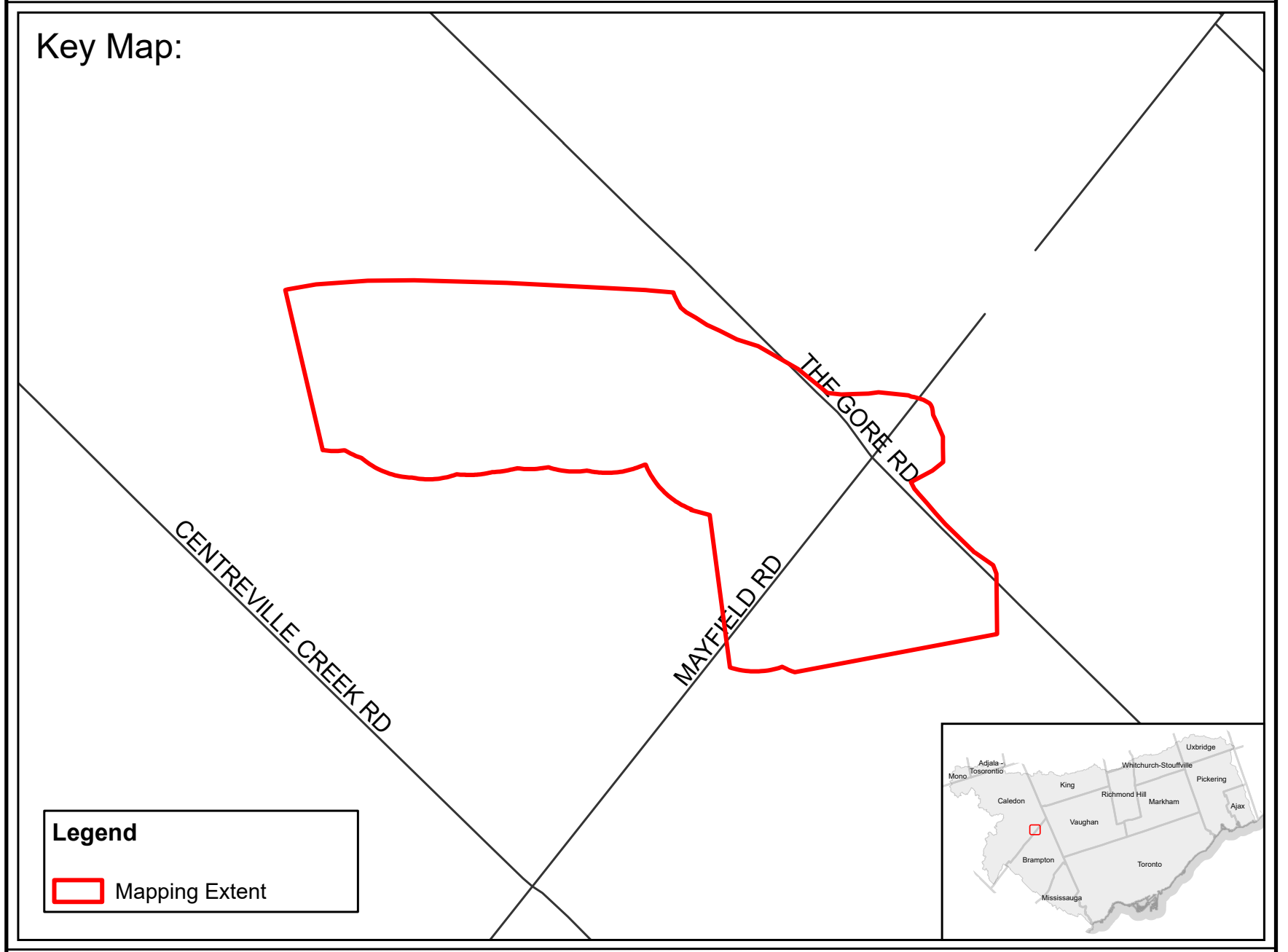
When the 100 year storm is greater, it is symbolized as follows: ***136.40***

SPILL 01 Indicates Spill, Spill ID and Approximate Flow Direction

N

Scale: 1:2,000

Key Map:



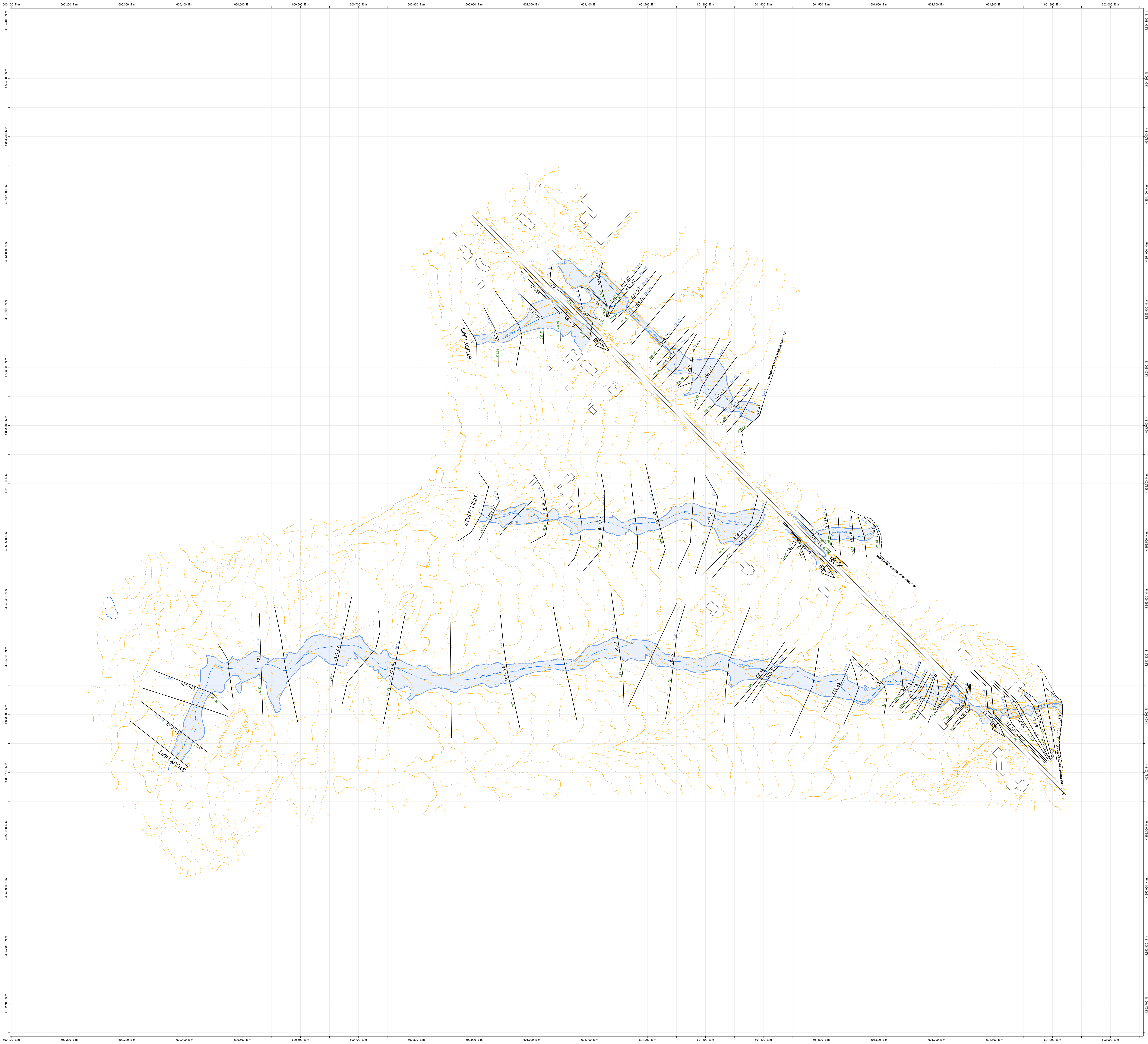
HUMBER RIVER

Sheet No.

252

Toronto and Region Conservation Authority

5 Shoreham Dr., Downsview, ON M3N 1S4 (416) 661 6600 info@trca.ca



TRCA Flood Plain Mapping Program

Hydraulic Engineering Service Provided By:

Toronto and Region Conservation Authority

This map is a copy of the original map sheet sealed by Y. Qiao on May 30, 2024.
If the sealed map is required please contact TRCA. The professional engineer's seal and signature verifies the location of the flood line and the associated water surface elevations only

Map Note:

The flood line on this map was produced from hydraulic modelling software using a digital elevation model (DEM) with 1m grid resolution. The DEM was created using bare earth mass points with a vertical accuracy tolerance of +/- 0.10 m on hard flat surfaces. The mass points were collected using LiDAR flown in 2014/2015 by Airborne Imaging.

The spot elevations shown on this map were produced by TRCA using the DEM mentioned above. The contour lines were produced by TRCA by smoothing the full resolution DEM to create smooth lines for cartographic display and should therefore be used as reference only. The river banks were produced by TRCA and are approximate, contours within close proximity are a result of interpolation from the DEM surface and should not be considered a true representation of the water surface or bathymetry.

Contour labels and spot elevations are represented as metres above sea level (masl).

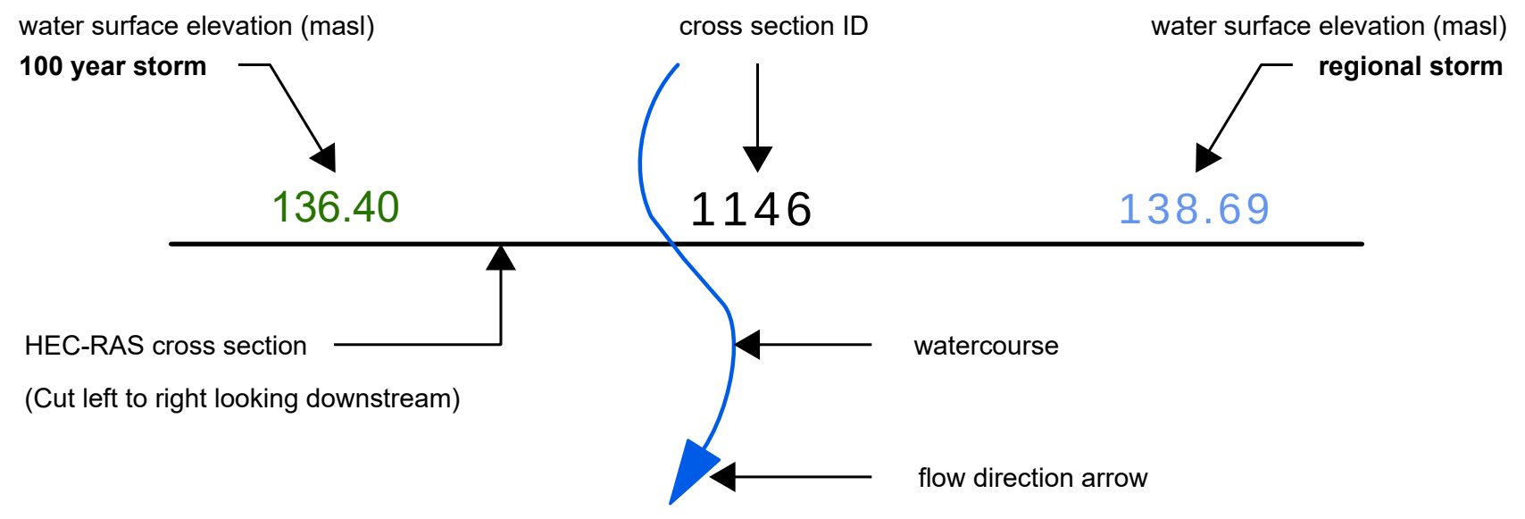
The planimetric data on this map were acquired from various sources with different collection dates and are provided for reference only. The building footprints were acquired from Region of Peel Open Data and City of Brampton in 2020.

The vertical datum is the Canadian Geodetic Vertical Datum of 1928:1978 Ontario Adjusted Version.
The horizontal datum is North American Datum of 1983, UTM 6° projection Zone 17,
Central Meridian 81° W.

Legend

Surface Contour		Road	—	Regulatory Flood Line	—
5m	—	Building	▭	Regulatory Flood Plain	▨
1m	—	Bridge / Culvert	—		
0.5m	- - -	Waterbody	⬭		
Spot Elevation Point	+	Railway	┼		

Hydraulic Model Legend:



NOTE: The regulatory flood elevation is the greater of the regional storm or 100 year storm.

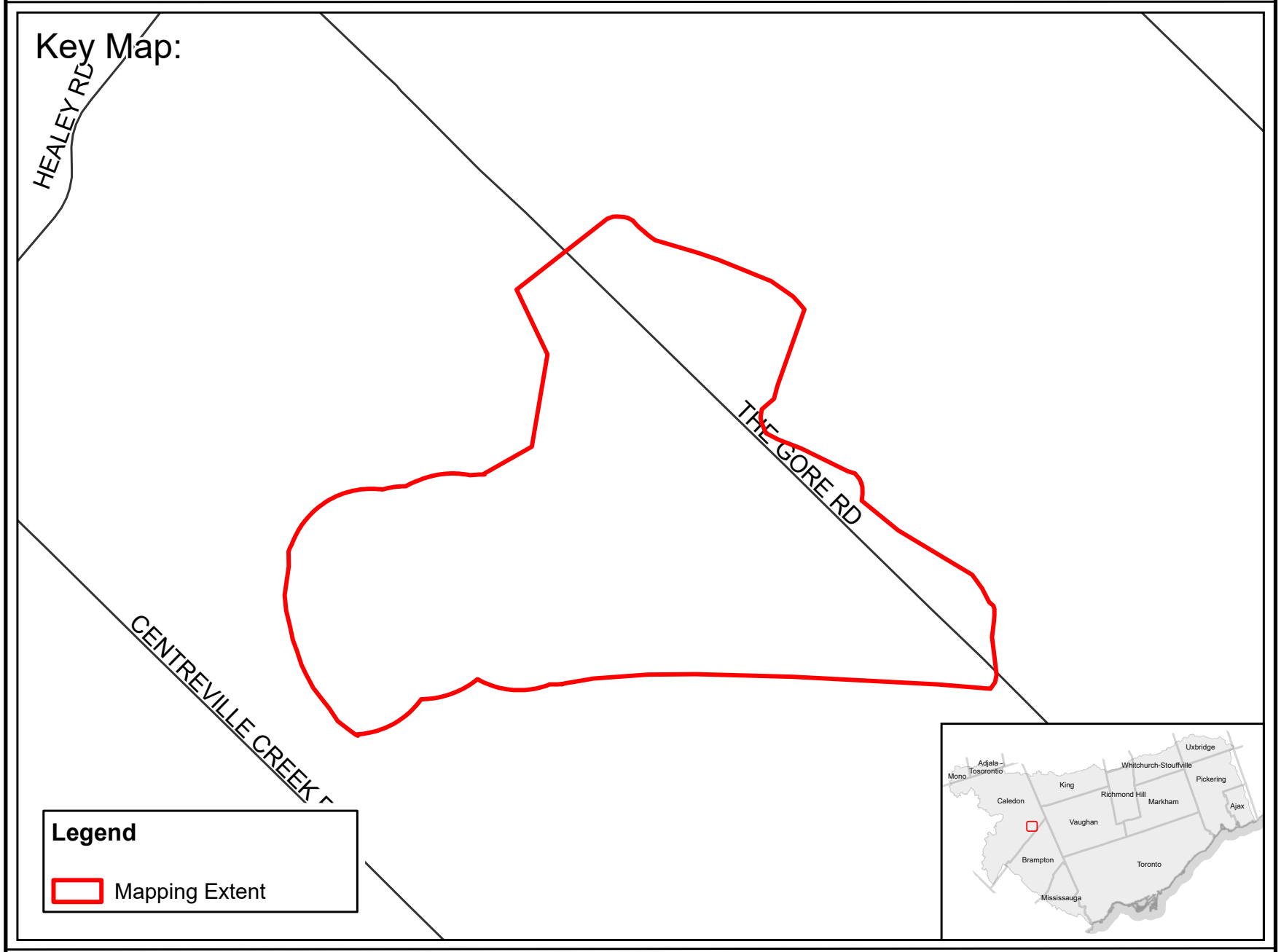
When the 100 year storm is greater, it is symbolized as follows: ***136.40***

SPILL 01 Indicates Spill, Spill ID and Approximate Flow Direction

N

Scale: 1:2,000

Key Map:



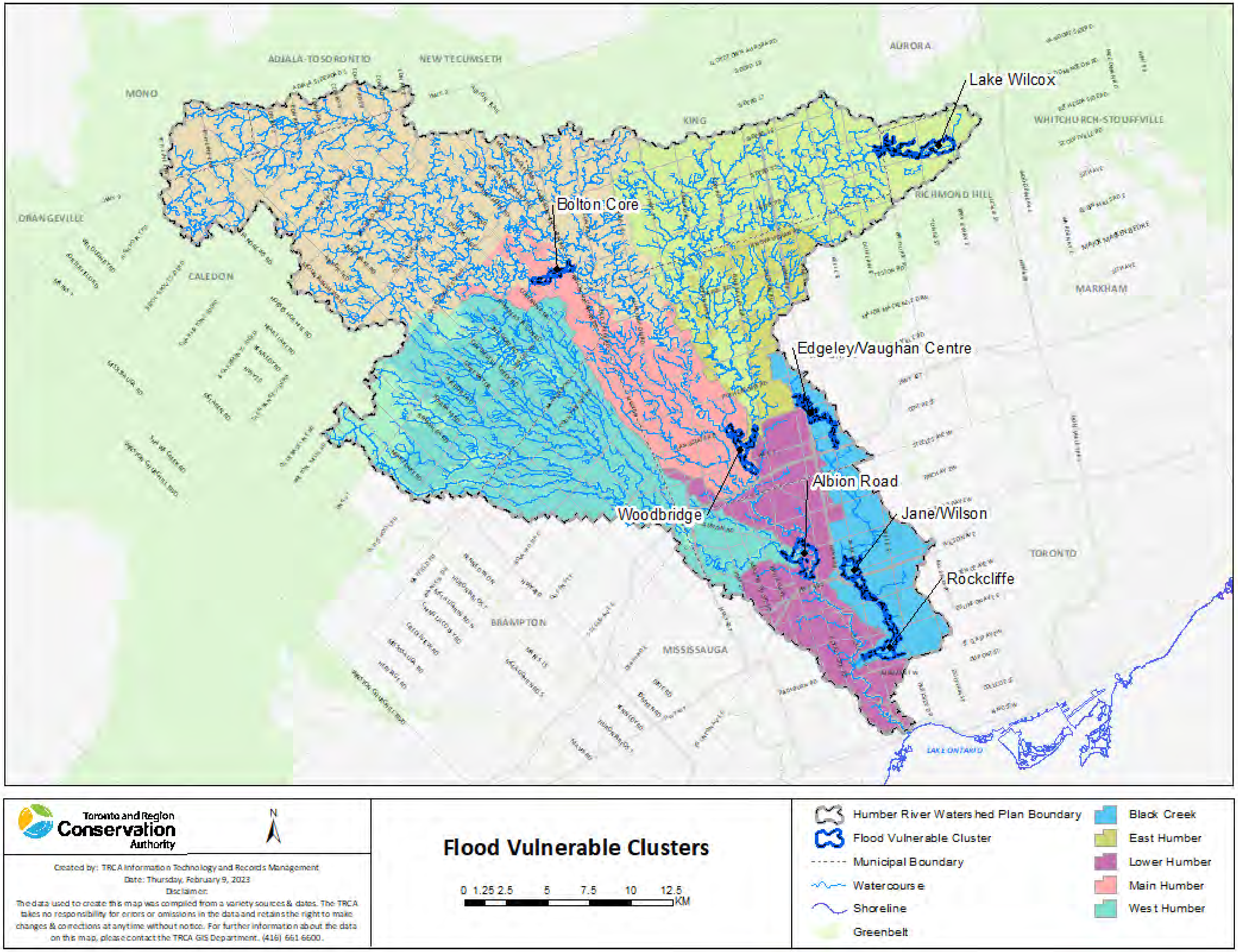
HUMBER RIVER

Sheet No.

253

Toronto and Region Conservation Authority

5 Shoreham Dr., Downsview, ON M3N 1S4 (416) 661 6600 info@trca.ca



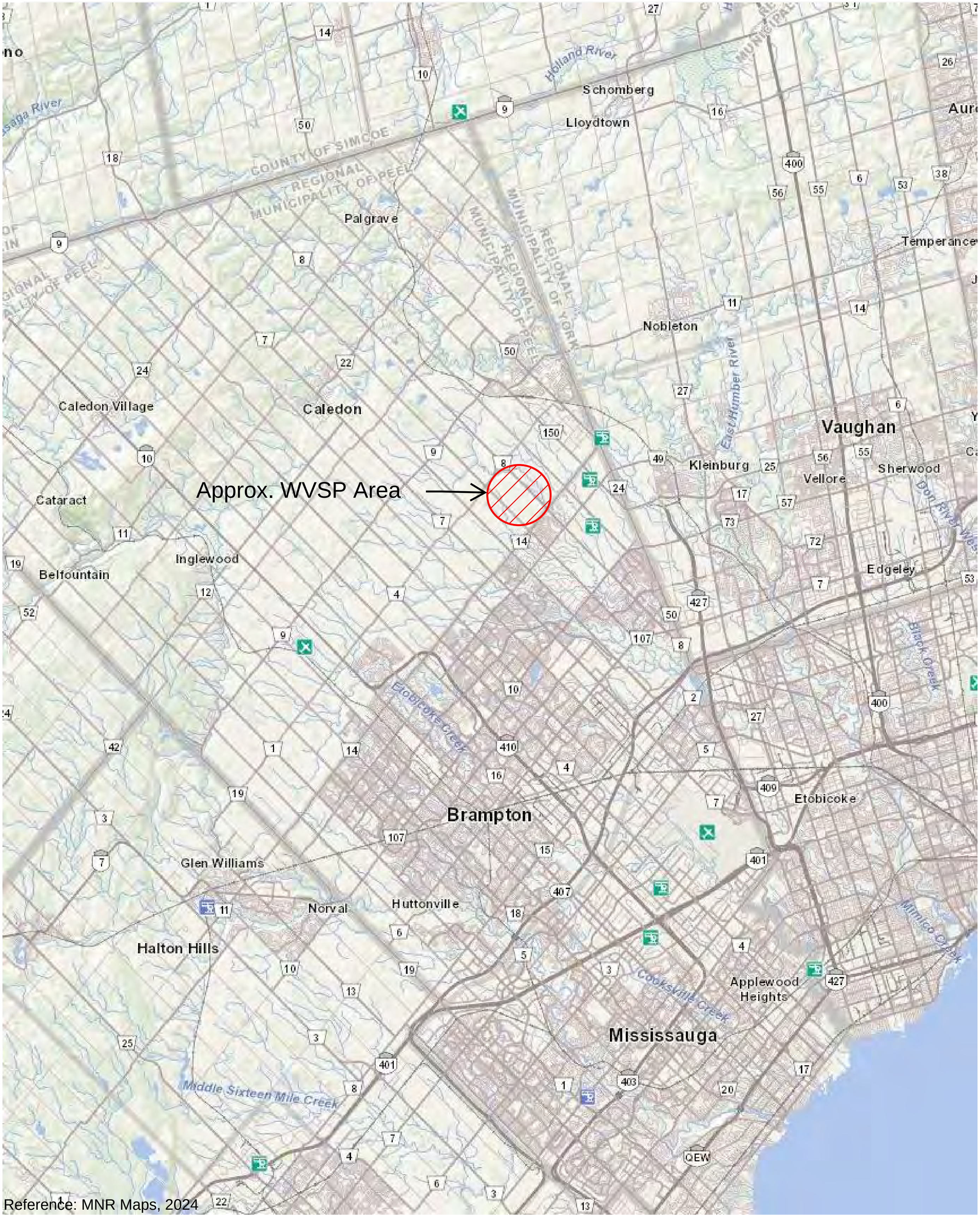
Map 26 - Flood Vulnerable Clusters

APPENDIX C

SECTION 2

APPENDIX C1

FIGURES



Reference: MNR Maps, 2024

N

Hydrogeological Investigation
Wildfield

Wildfield Village Landowners
Group Inc.

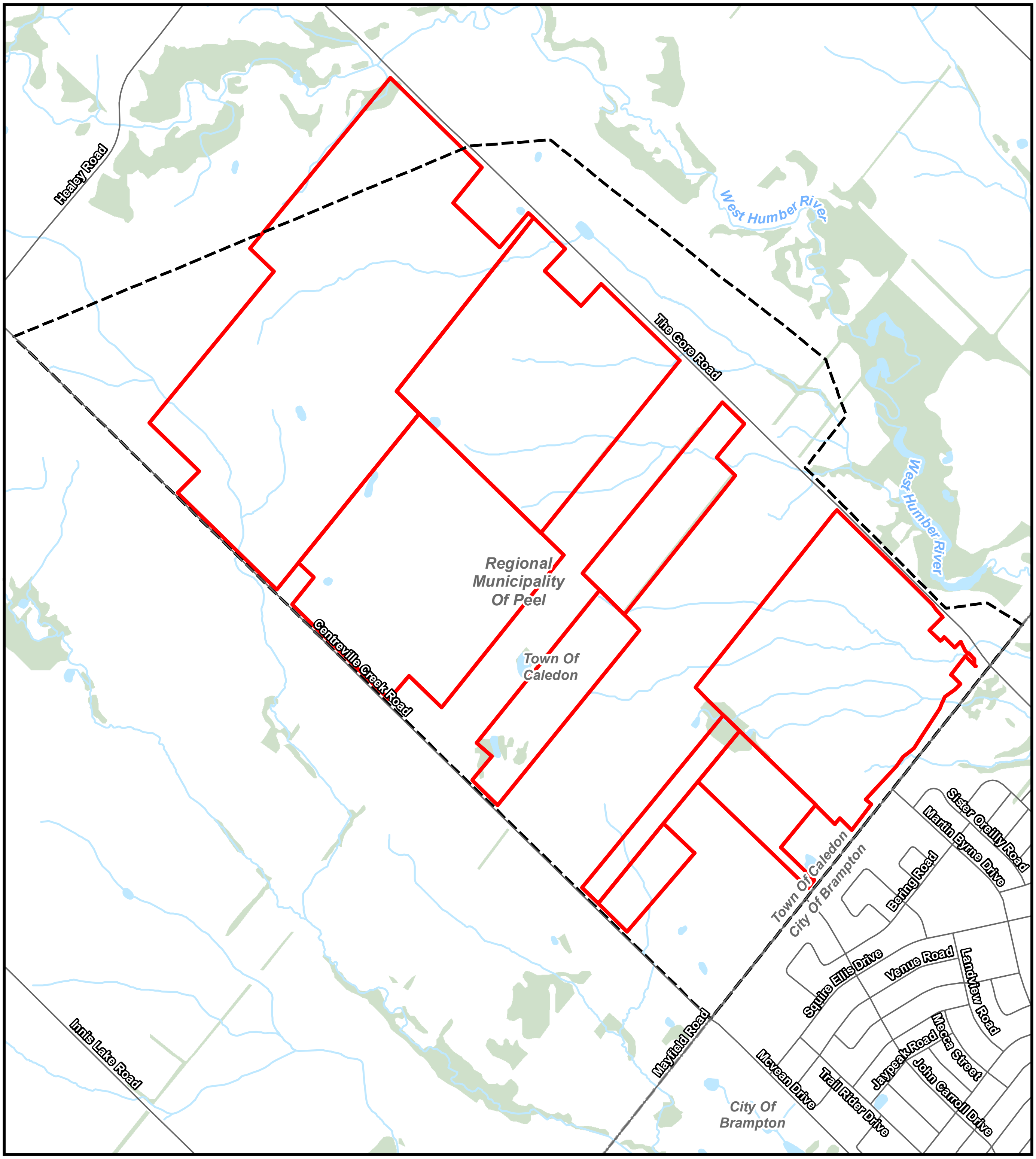
GEI Consultants

Project 2100463

WILDFIELD VILLAGE
SECONDARY PLAN AREA
SITE LOCATION PLAN

Oct. 2024

Fig. 3.1



NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024.

Legend

▭ Participating Properties	— Watercourse
⬚ Wildfield Village Secondary Plan Area	🟦 Waterbody
— Road	🟩 Wooded Area

N

0 200 400
m
1:17,000

Hydrogeological Investigation
Wildfield

Wildfield Village Landowners
Group Inc.

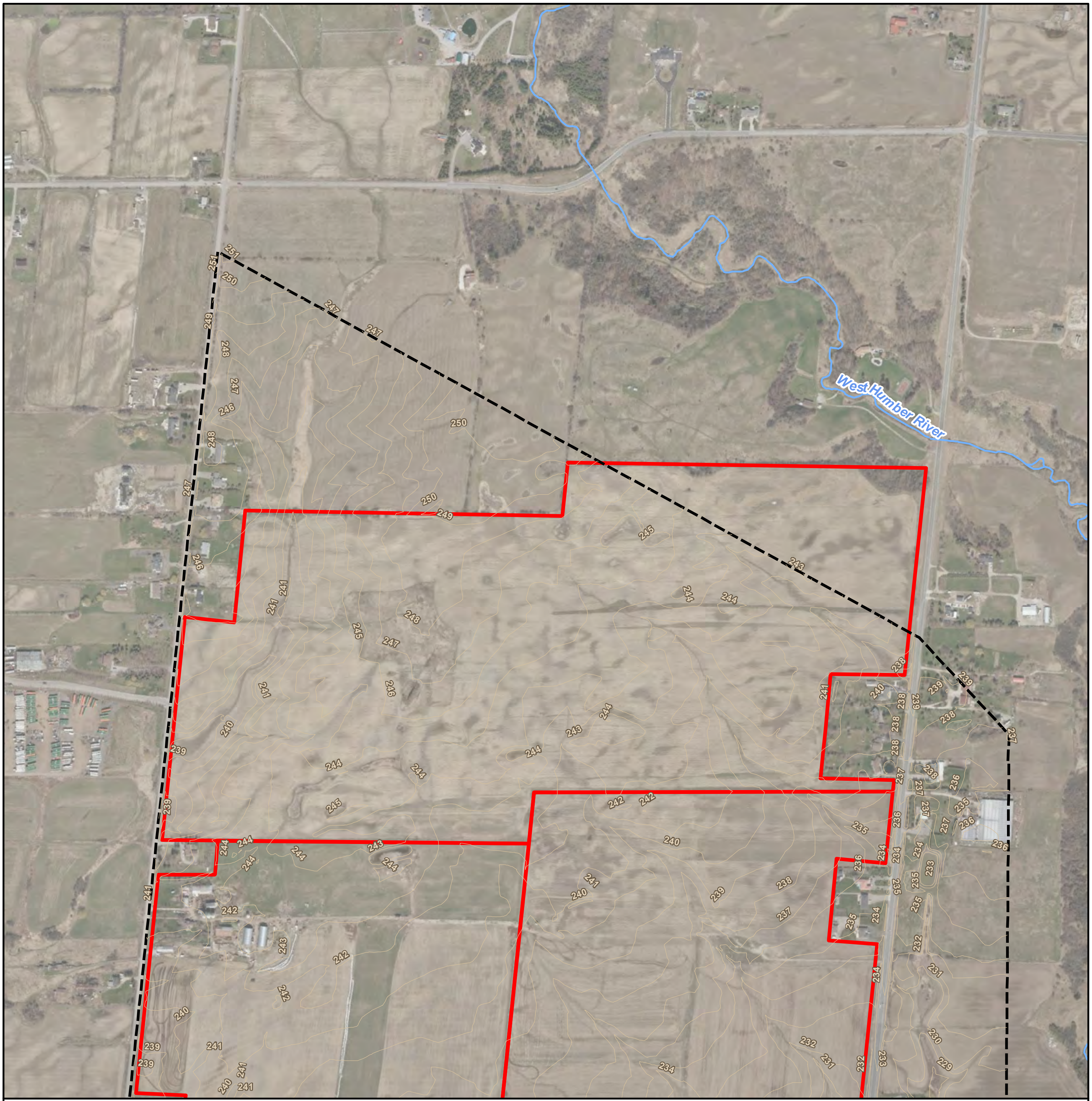
GEI Consultants

Project 2100463

SITE LOCATION PLAN

Sept. 2024

Fig. 3.2



NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024; © Toronto Region Conservation Authority, 2021.
3. Orthoimagery © First Base Solutions, 2024. Imagery taken in 2022.

* Non-participating lands were assessed through air photo interpretation to the ELC Ecosite level.

Legend

⬚	Wildfield Village Study Area
🟥	Participating Landowner
─	Watercourse (TRCA)
─	Surface Elevation Contour (masl)

Project 2100463

Hydrogeological Investigation
Wildfield Village Landowner Group

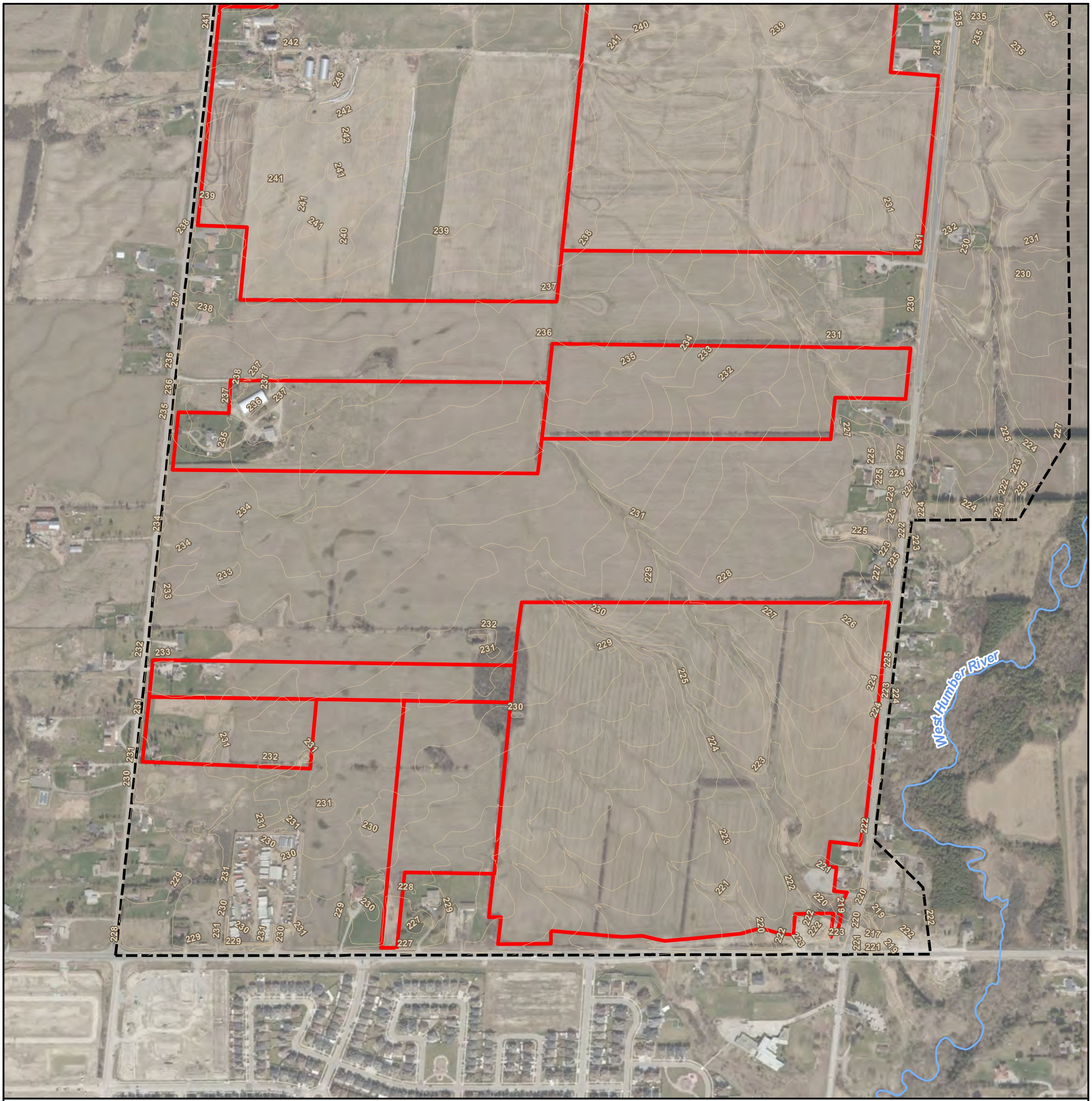
Figure 3.3A
Surface Elevation Countours

0 100 m
1:10,000

N

GEI Consultants

Path: \\bos-pzcc-1\Data_Storage\Working\WILDFIELD VILLAGE LANDOWNER GROUP\2100463 Town of Caledon\05_GIS\figures\report_figures\2024 08_HydroG_update\2100463_rpt_fig03_Surface_elevation.mxd Date Saved: Friday, September 27, 2024



NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024; © Toronto Region Conservation Authority, 2021.
3. Orthoimagery © First Base Solutions, 2024. Imagery taken in 2022.

* Non-participating lands were assessed through air photo interpretation to the ELC Ecosite level.

Legend

- Wildfield Village Study Area
- Participating Landowner
- Watercourse (TRCA)
- Surface Elevation Contour (masl)

Project 2100463

Hydrogeological Investigation
Wildfield Village Landowner Group

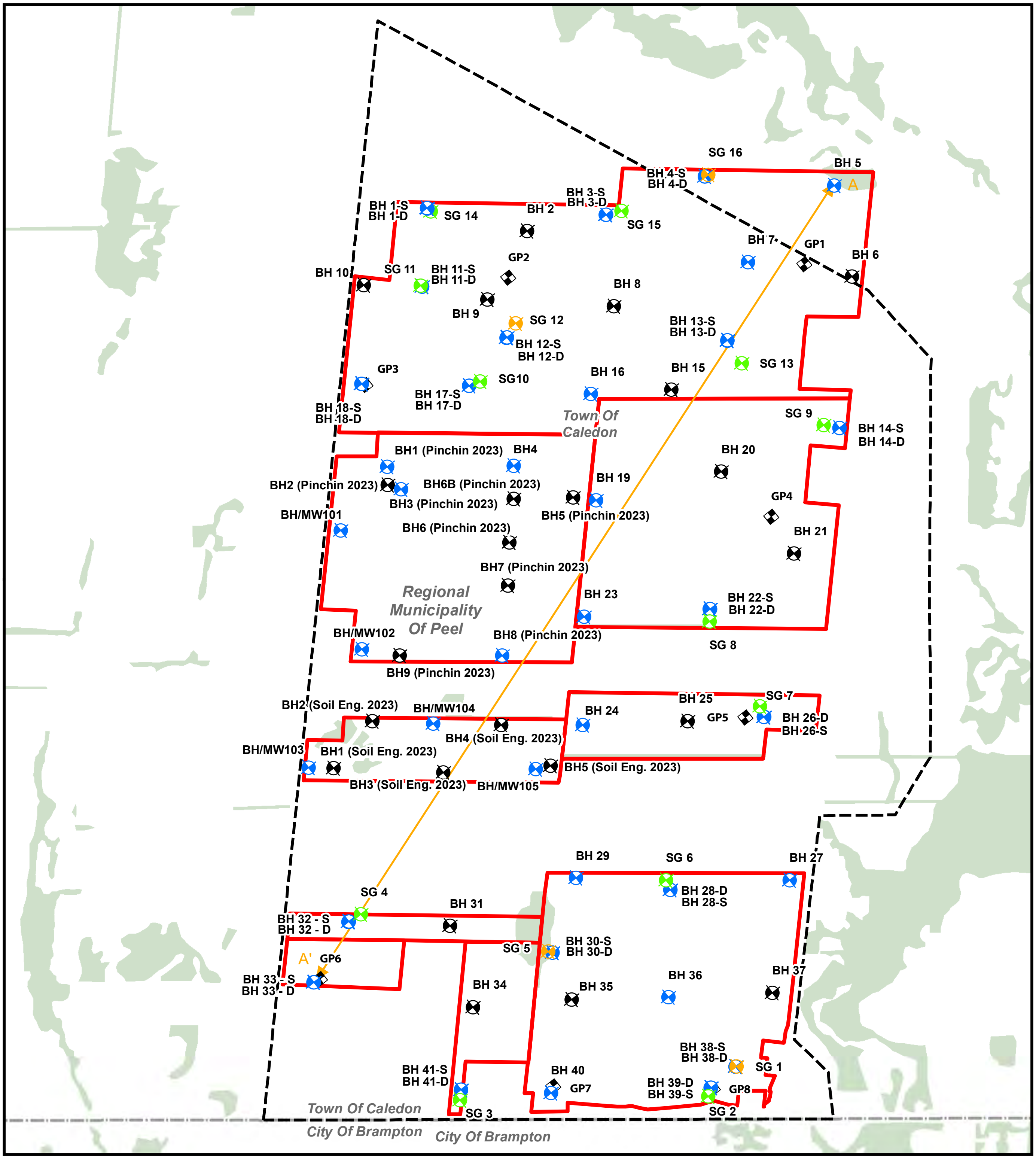
Figure 3.3B
Surface Elevation Countours

0 100 m
1:10,000

N

GEI Consultants

Path: \\bos-pzcc-1\Data_Storage\Working\WILDFIELD VILLAGE LANDOWNER GROUP\2100463 Town of Caledon\05_GIS\figures\report_figures\2024 08_HydroG_update\2100463_rpt_fig03_Surface_elevation.mxd Date Saved: Friday, September 27, 2024



NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024.

Legend

- 🟥 Participating Properties
- ⬚ Wildfield Village Secondary Plan Area
- 🟩 Wooded Area
- ⊕ Borehole Location
- ⊕ Borehole/Monitoring Well Location
- ⊕ Staff Gauge Location
- ⊕ Staff Gauge/Seepage Meter Location
- ▚ Guelph Permeameter
- ↔ Cross Section

N

0 100 200 m

1:15,000

Hydrogeological Investigation
Wildfield

Wildfield Village Landowners
Group Inc.

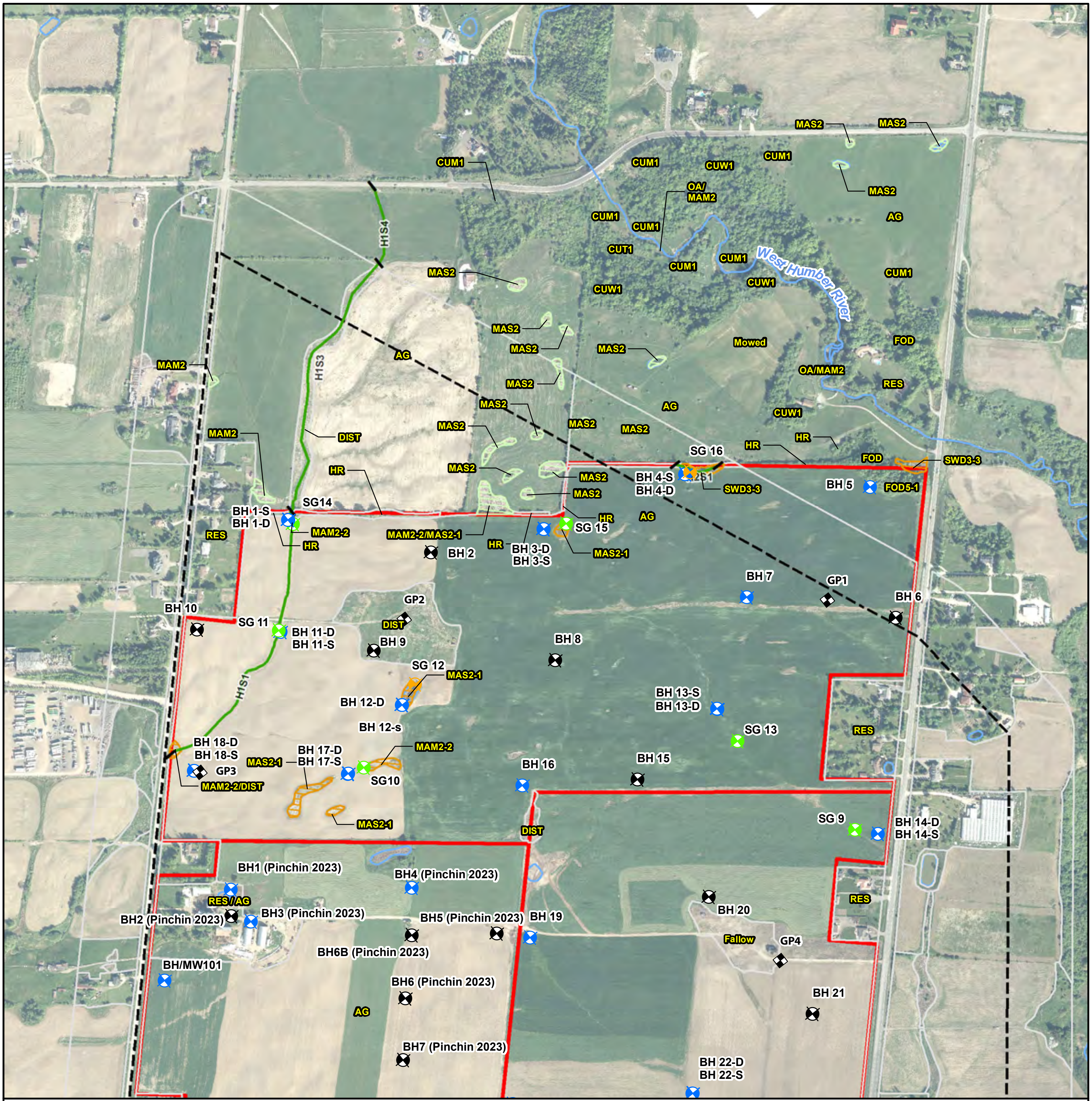
GEI Consultants

BOREHOLE LOCATION PLAN

Project 2100463

September 2024

Fig. 3.4



Project 2100463

NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024; © Toronto Region Conservation Authority, 2021.
3. Orthoimagery © First Base Solutions, 2021. Imagery taken in 2020.

* Non-participating lands were assessed through air photo interpretation to the ELC Ecosite level.

Legend

▭ Wildfield Village Study Area
🟥 Participating Landowner
▭ Ecological Land Classification *
▭ Waterbody
— Watercourse (TRCA)
⊕ Borehole Location
⊕ Borehole/Monitoring Well Location
⊕ Staff Gauge Location
⊕ Staff Gauge/Seepage Meter Location
▚ Guelph Permeameter

Headwater Drainage Feature Management Recommendations

— Mitigation
— Conservation
— Protection

Wetland Evaluation (GEI Consultants Ltd.)

▨ Other Wetland
▨ Unevaluated Wetland

ELC LEGEND
AG, Agricultural
COM, Commercial
CUM1, Mineral Cultural Meadow
CUM1-1, Mineral Cultural Meadow
CUT1, Mineral Cultural Thicket
CUW1, Mineral Cultural Woodland
DIST, Disturbed
FOD, Deciduous Forest
FOD5-1, Dry – Fresh Sugar Maple Deciduous Forest
FOD7, Fresh – Moist Lowland Deciduous Forest
Fallow, Fallow
HR, Hedgerow
MA, Marsh
MAM2, Mineral Meadow Marsh
MAM2-10, Forb Mineral Meadow Marsh
MAM2-2, Reed Canary Grass Mineral Meadow Marsh
MAS2, Mineral Shallow Marsh
MAS2-1, Cattail Mineral Shallow Marsh
Mowed, Mowed
OA, Open Aquatic
OA/MAM2, Open Aquatic/Mineral Meadow Marsh
RES, Residential
SA, Shallow Aquatic
SWD3-2, Silver Maple Mineral Deciduous Swamp
SWD3-3, Swamp Maple Mineral Deciduous Swamp
THDM2-6, Buckthorn Deciduous Shrub Thicket

Hydrogeological Investigation
Wildfield Village Landowner Group

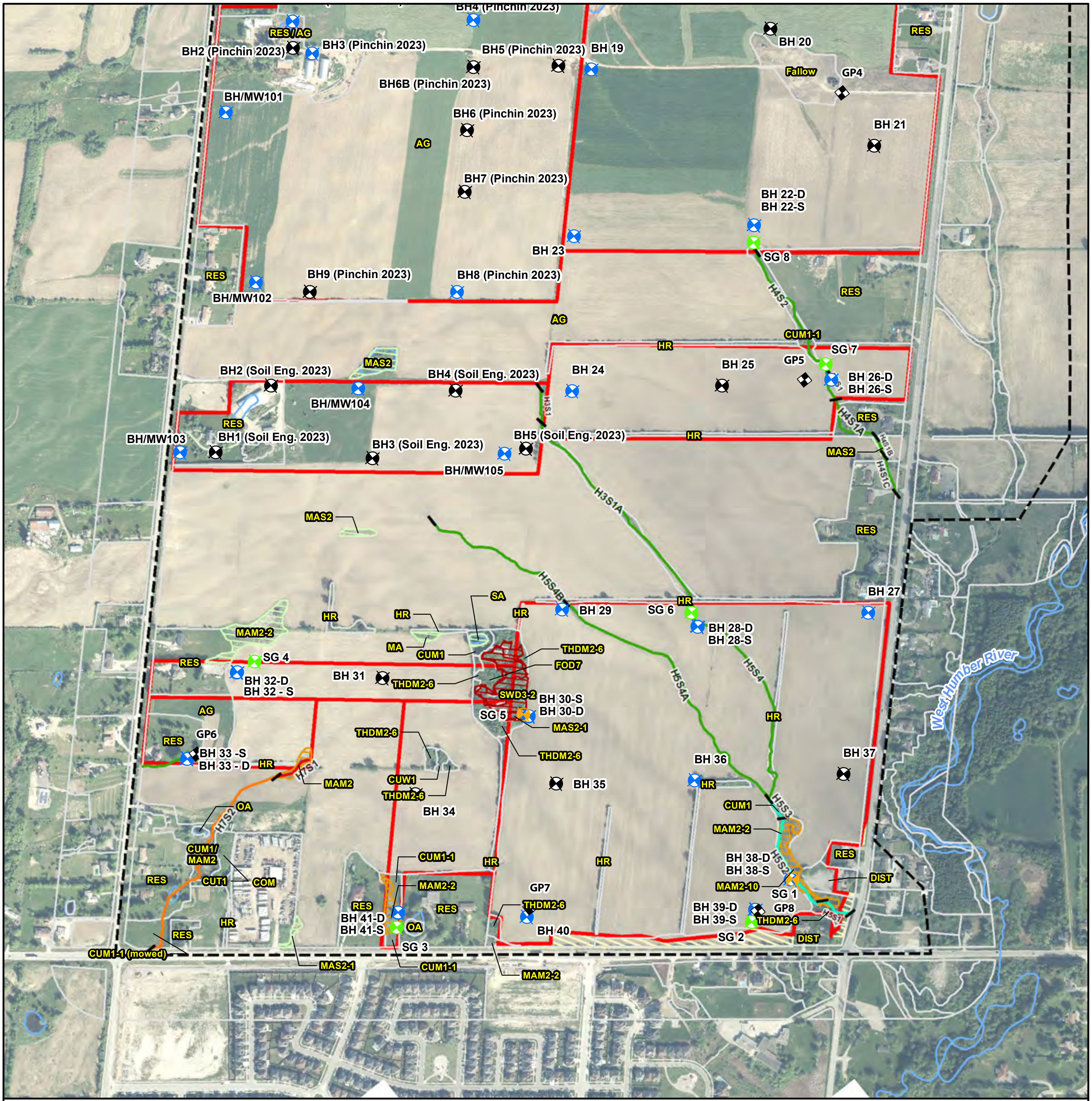
Figure 3.5A
Observed Natural Heritage Features with Borehole Locations

0 100 m
1:10,000

N

GEI Consultants

Path: \\bos-pzcc-1\Data_Storage\Working\WILDFIELD VILLAGE LANDOWNER GROUP\2100463 Town of Caledon\05_GIS\figures\report_figures\2024 08_HydroG_update\2100463_rpt_fig04B_observed_NHF_with_boreholes.mxd Date Saved: Friday, September 27, 2024



NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024; © Toronto Region Conservation Authority, 2021.
3. Orthoimagery © First Base Solutions, 2021. Imagery taken in 2020.

* Non-participating lands were assessed through air photo interpretation to the ELC Ecosite level.

Legend

- ⬚ Wildfield Village Study Area
- ▨ Road Easement
- 🟥 Participating Landowner
- ☐ Ecological Land Classification *
- Watercourse (GEI Consultants Ltd.)
- ☐ Waterbody
- Watercourse (TRCA)
- Borehole Location
- Borehole/Monitoring Well Location
- Staff Gauge Location
- Staff Gauge/Seepage Meter Location
- Guelph Permeameter

Headwater Drainage Feature Management Recommendations

- Mitigation
- Conservation
- Protection

Wetland Evaluation (GEI Consultants Ltd.)

- ▨ Significant Wetland
- ▨ Other Wetland
- ▨ Unevaluated Wetland

ELC LEGEND

AG, Agricultural
COM, Commercial
CUM1, Mineral Cultural Meadow
CUM1-1, Mineral Cultural Meadow
CUT1, Mineral Cultural Thicket
CUW1, Mineral Cultural Woodland
DIST, Disturbed
FOD, Deciduous Forest
FOD5-1, Dry – Fresh Sugar Maple Deciduous Forest
FOD7, Fresh – Moist Lowland Deciduous Forest
Fallow, Fallow
HR, Hedgerow
MA, Marsh
MAM2, Mineral Meadow Marsh
MAM2-10, Forb Mineral Meadow Marsh
MAM2-2, Reed Canary Grass Mineral Meadow Marsh
MAS2, Mineral Shallow Marsh
MAS2-1, Cattail Mineral Shallow Marsh
Mowed, Mowed
OA, Open Aquatic
OA/MAM2, Open Aquatic/Mineral Meadow Marsh
RES, Residential
SA, Shallow Aquatic
SWD3-2, Silver Maple Mineral Deciduous Swamp
SWD3-3, Swamp Maple Mineral Deciduous Swamp
THDM2-6, Buckthorn Deciduous Shrub Thicket

Project 2100463

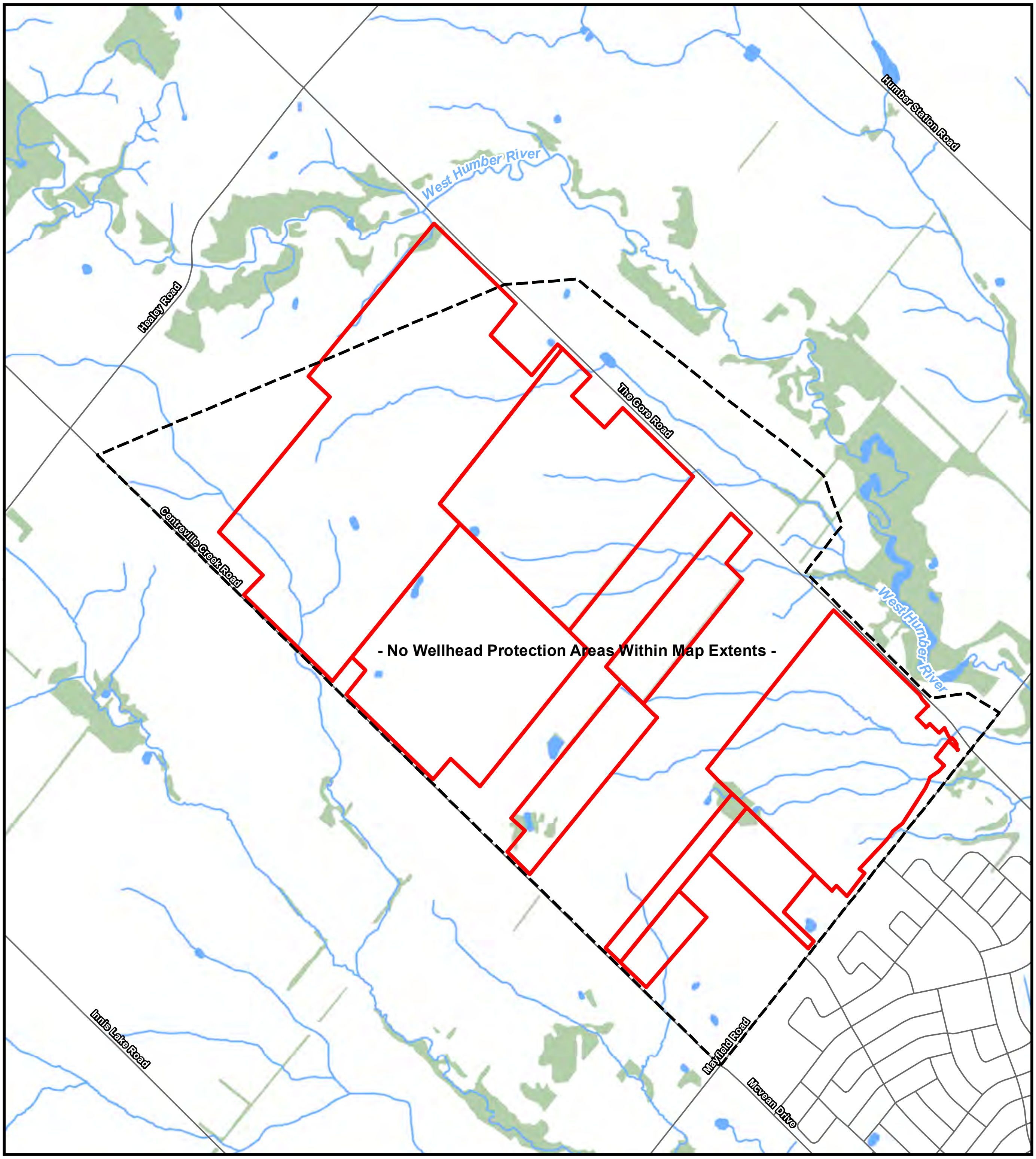
Hydrogeological Investigation
Wildfield Village Landowner Group

Figure 3.5B

Observed Natural Heritage Features with Borehole Locations

0 100 m
1:10,000
N

GEI Consultants



- No Wellhead Protection Areas Within Map Extents -

NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024.
3. Contains Information made available under the Toronto Region Conservation Authority Open Data Licence v1.0.

Legend

- ▭ Participating Properties
- ┅ Wildfield Village Secondary Plan Area
- — Road
- — Watercourse
- 🟦 Waterbody
- 🟩 Wooded Area

Wellhead Protection Areas (TRCA 2023)
Zone
- 🟫 A
- 🟫 B
- 🟥 C
- 🟧 C1
- 🟨 D
- 🟪 Q1/Q2

N

0 150 300
m
1:19,000

Hydrogeological Investigation
Wildfield

Wildfield Village Landowners
Group Inc.

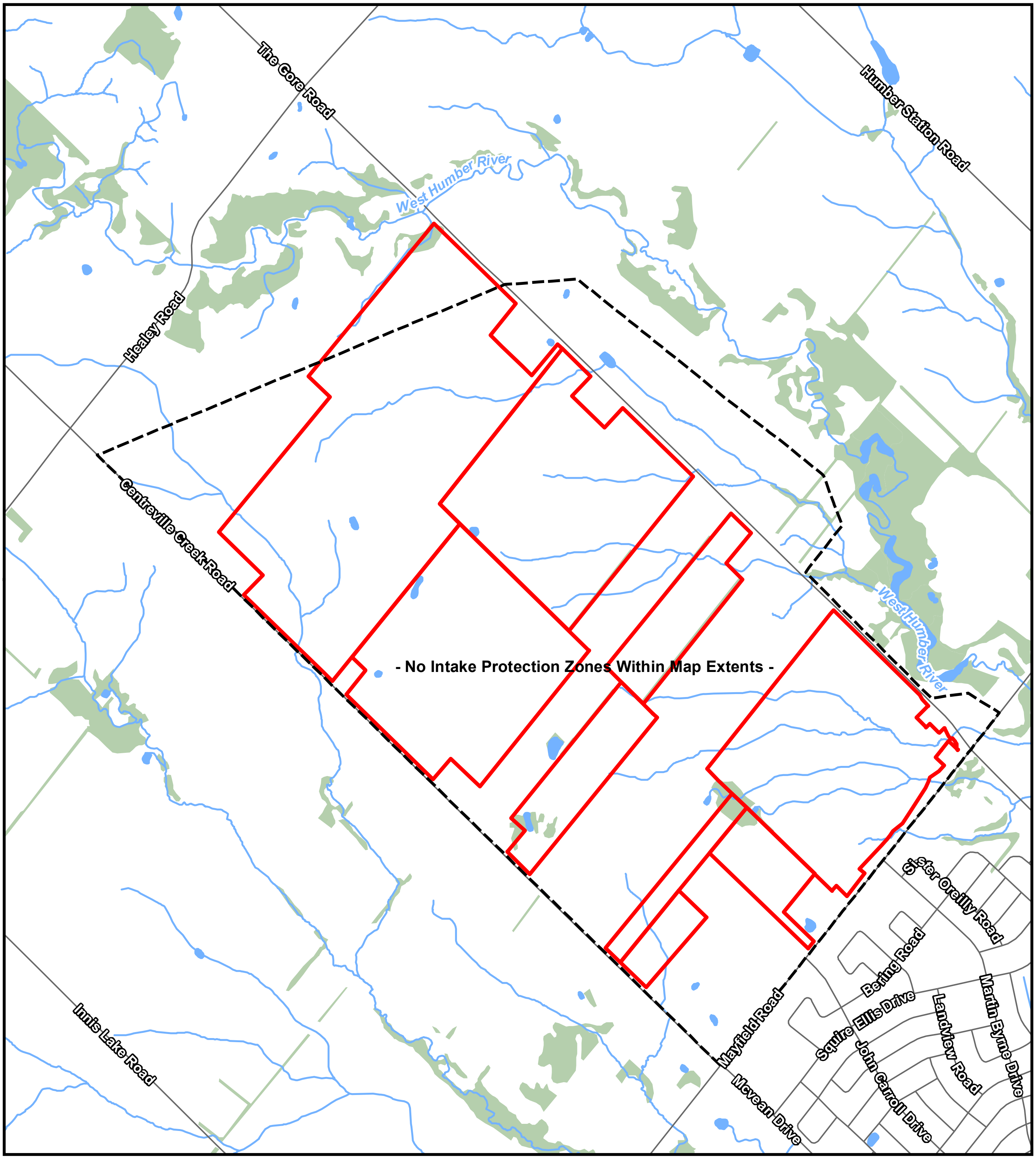
GEI Consultants

WELLHEAD PROTECTION
AREAS

Project 2100463

September 2024

Fig. 3.6



- No Intake Protection Zones Within Map Extents -

NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024.
3. Contains Information made available under the Toronto Region Conservation Authority Open Data Licence v1.0.

Legend

- 🟥 Participating Properties
- ⬚ Wildfield Village Secondary Plan Area
- — Road
- — Watercourse
- 🟦 Waterbody
- 🟩 Wooded Area

Intake Protection Zone (TRCA 2023)
Zone
- 🟦 1
- 🟦 2
- 🟦 3

N

0 150 300
m
1:19,000

Hydrogeological Investigation
Wildfield

Wildfield Village Landowners
Group Inc.

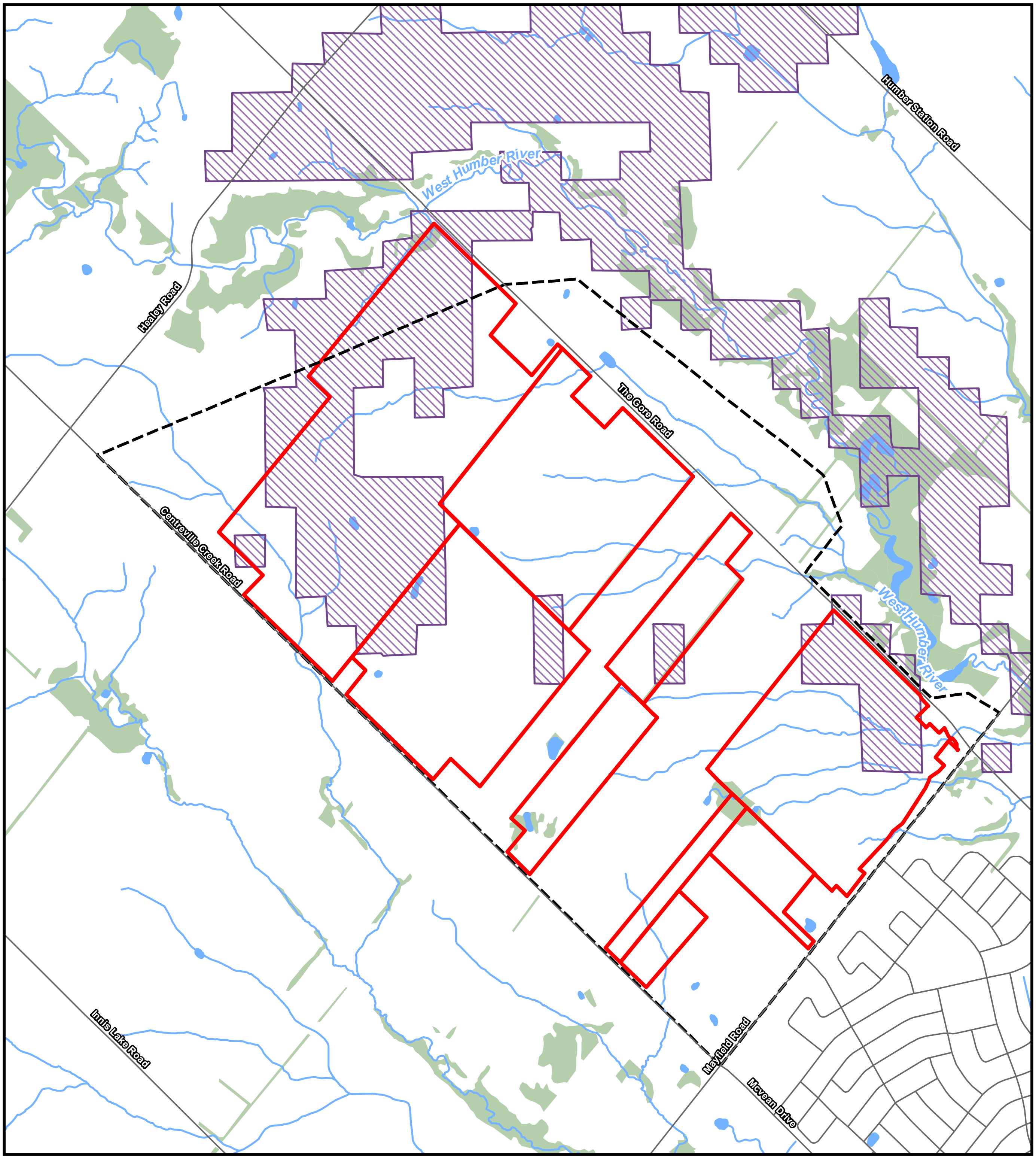
GEI Consultants

INTAKE PROTECTION ZONES

Project 2100463

September 2024

Fig. 3.7



NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024.
3. Contains Information made available under the Toronto Region Conservation Authority Open Data Licence v1.0.

Legend

▭ Participating Properties	🟦 Waterbody
⬚ Wildfield Village Secondary Plan Area	🟩 Wooded Area
— Road	▨ Highly Vulnerable Aquifer (TRCA 2023)
— Watercourse	

N

0 150 300
m
1:19,000

Hydrogeological Investigation
Wildfield

Wildfield Village Landowners
Group Inc.

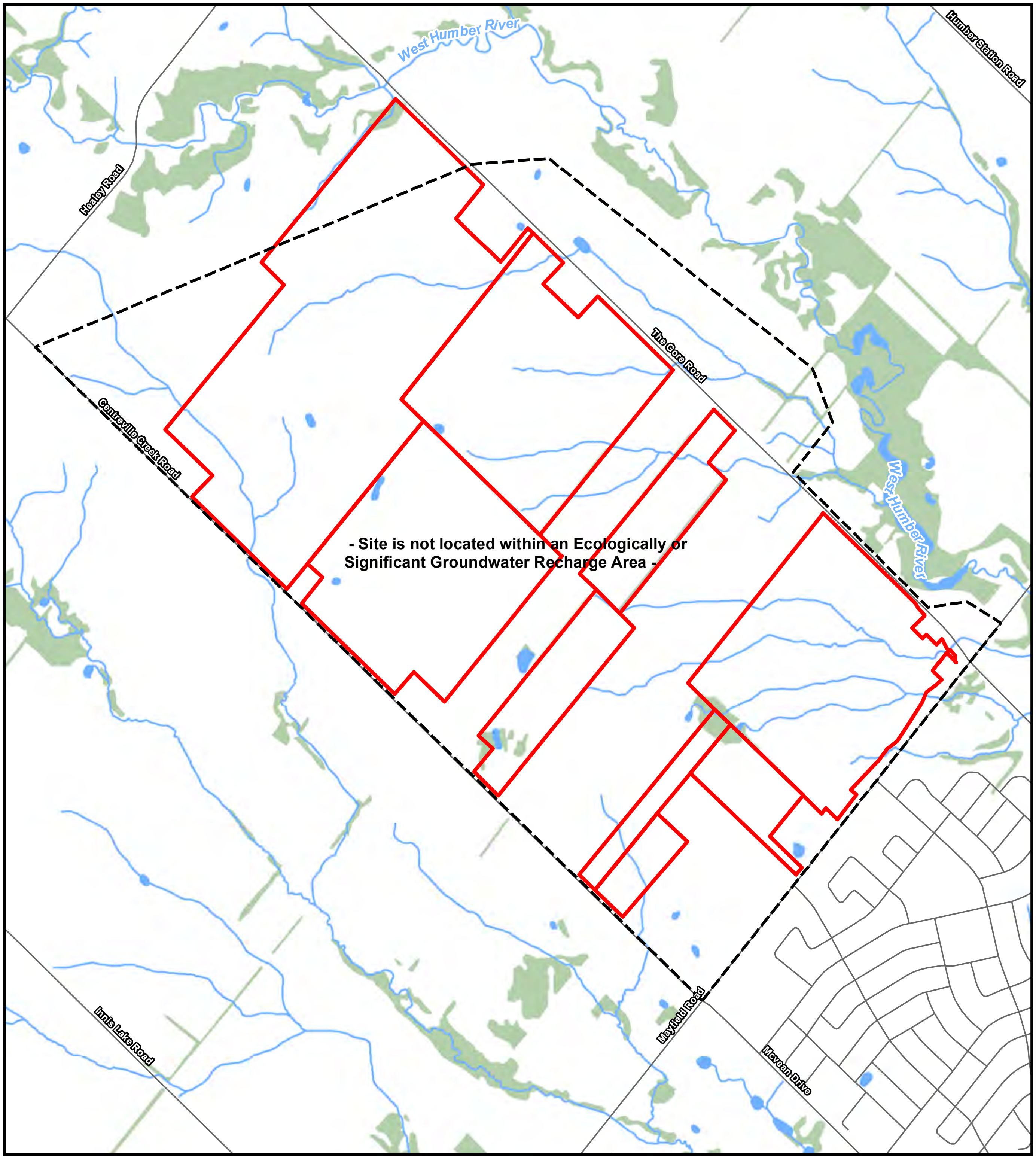
GEI Consultants

HIGHLY VULNERABLE
AQUIFER

Project 2100463

September 2024

Fig. 3.8



NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024.
3. Contains Information made available under the Toronto Region Conservation Authority Open Data Licence v1.0.

Legend

🟥	Participating Properties	🟩	Wooded Area
⬚	Wildfield Village Secondary Plan Area		**Significant Groundwater Recharge Area (TRCA 2023)**
—	Road		Vulnerability Score
—	Watercourse	🟩	2-4
🟦	Waterbody	🟨	6

N

0 150 300 m

1:17,750

Hydrogeological Investigation
Wildfield

Wildfield Village Landowners
Group Inc.

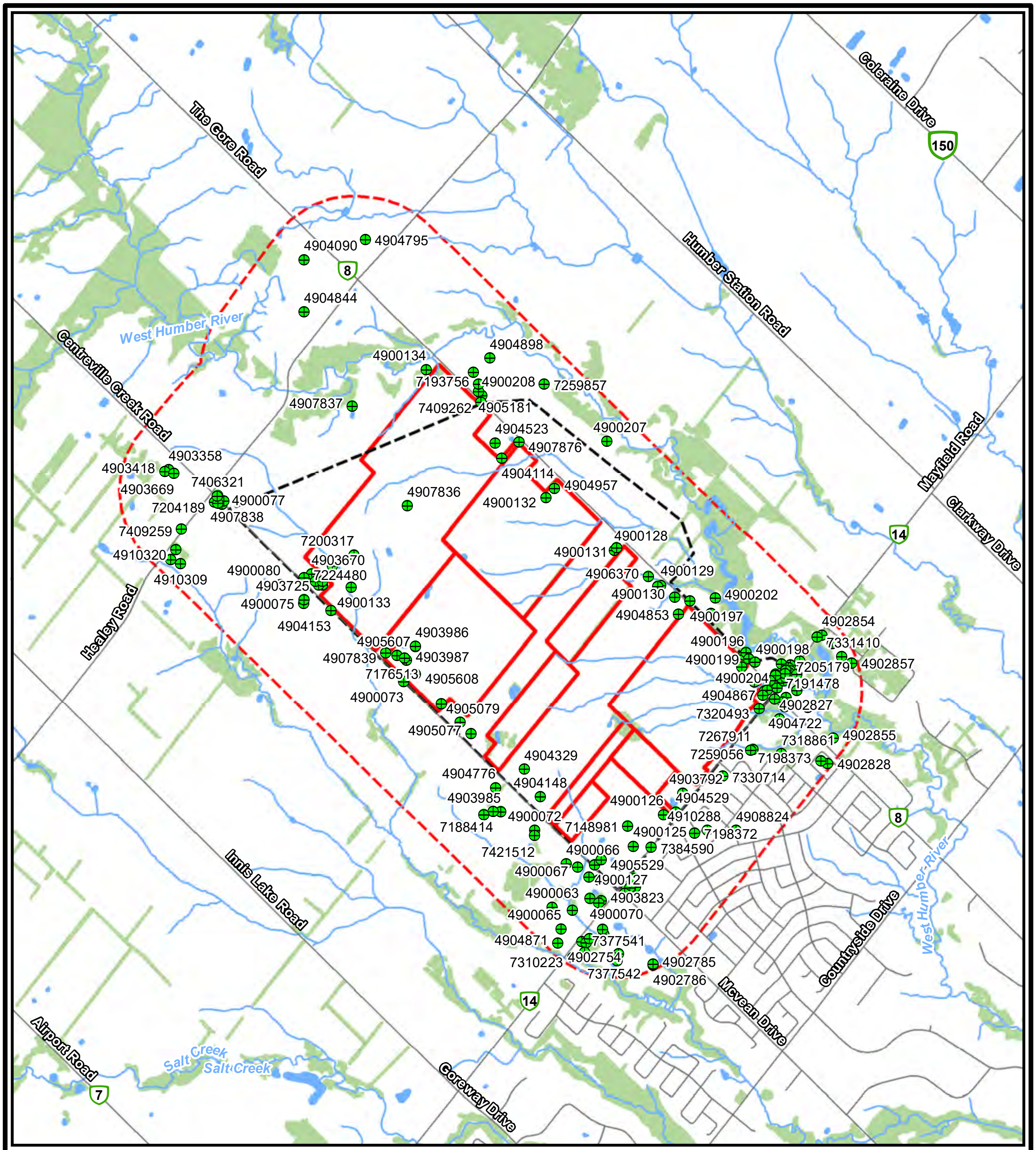
GEI Consultants

Project 2100463

ECOLOGICALLY AND SIGNIFICANT GROUNDWATER RECHARGE AREA

September 2024

Fig. 3.9



NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024.

Legend

🟥 Particpating Properties	Watercourse
▭ Wildfield Village Secondary Plan Area	🟦 Waterbody
▭ Study Area (plus approx. 500 m)	🟩 Wooded Area
Road	⊕ MECP Well Record Location

Hydrogeological Investigation
Wildfield

Wildfield Village Landowners
Group Inc.

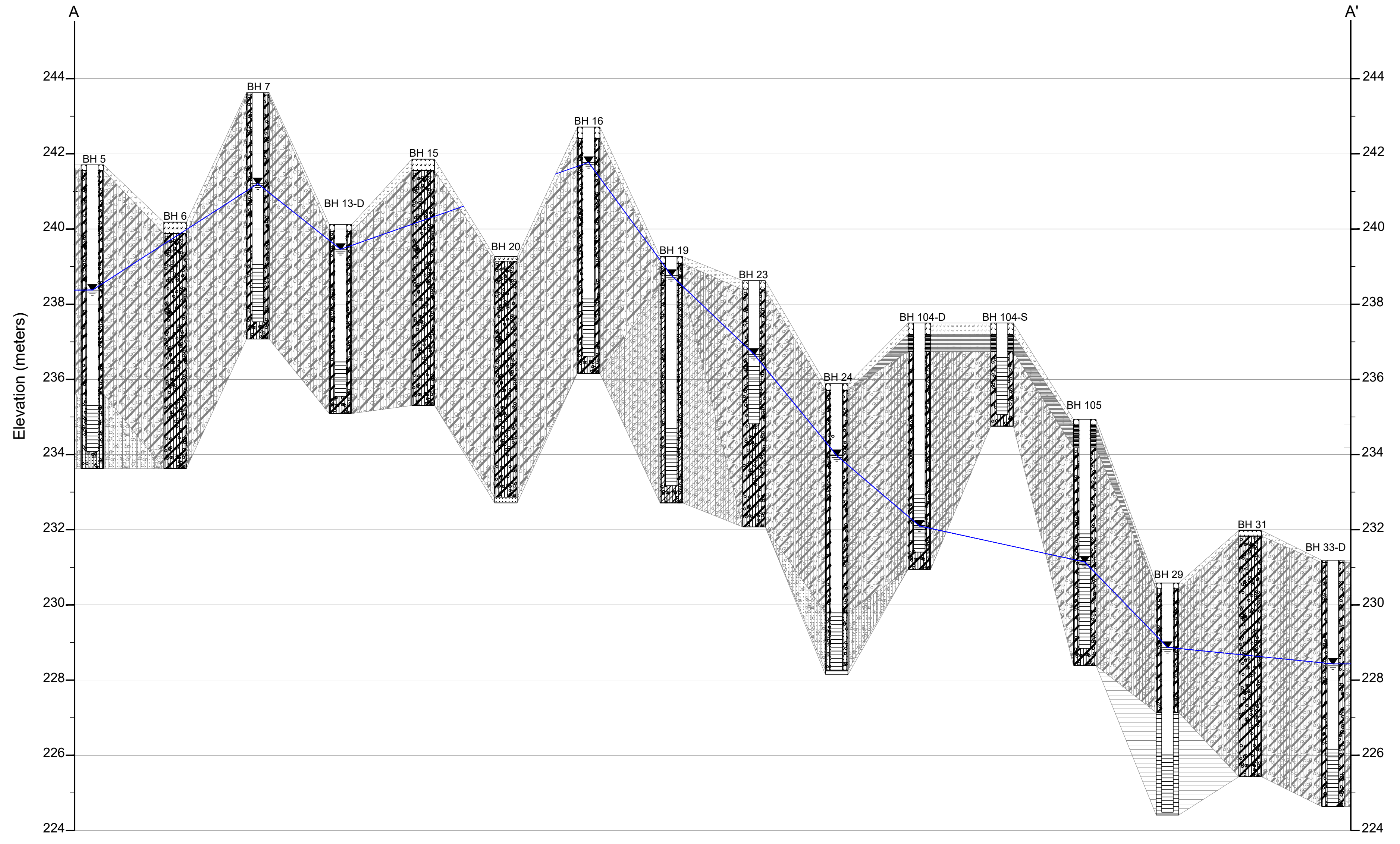
GEI Consultants

MECP WELL RECORD
LOCATIONS

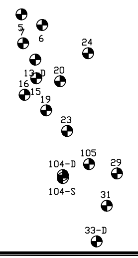
Project 2100463

September 2024

Fig. 3.10



PLAN VIEW:



LEGEND:

- ▨ TOPSOIL
- ▨ CLAY AND SILT GLACIAL TILL
- ▨ SILTY SAND GLACIAL TILL
- ▨ CLAY AND SILT GLACIAL TILL
- ▨ SAND
- ▨ SHALE
- ▤ WEATHERED
- ▼ WATER LEVEL IN MONITORING WELL

NOTES:

VERTICAL SCALE
0 1.0 2.0
METERS

METERS

N

Proposed Residential Development
Wildfield Village
Caledon, Ontario

Wildfield Village Landowners Group Inc.
Stouffville, Ontario

GEI Consultants

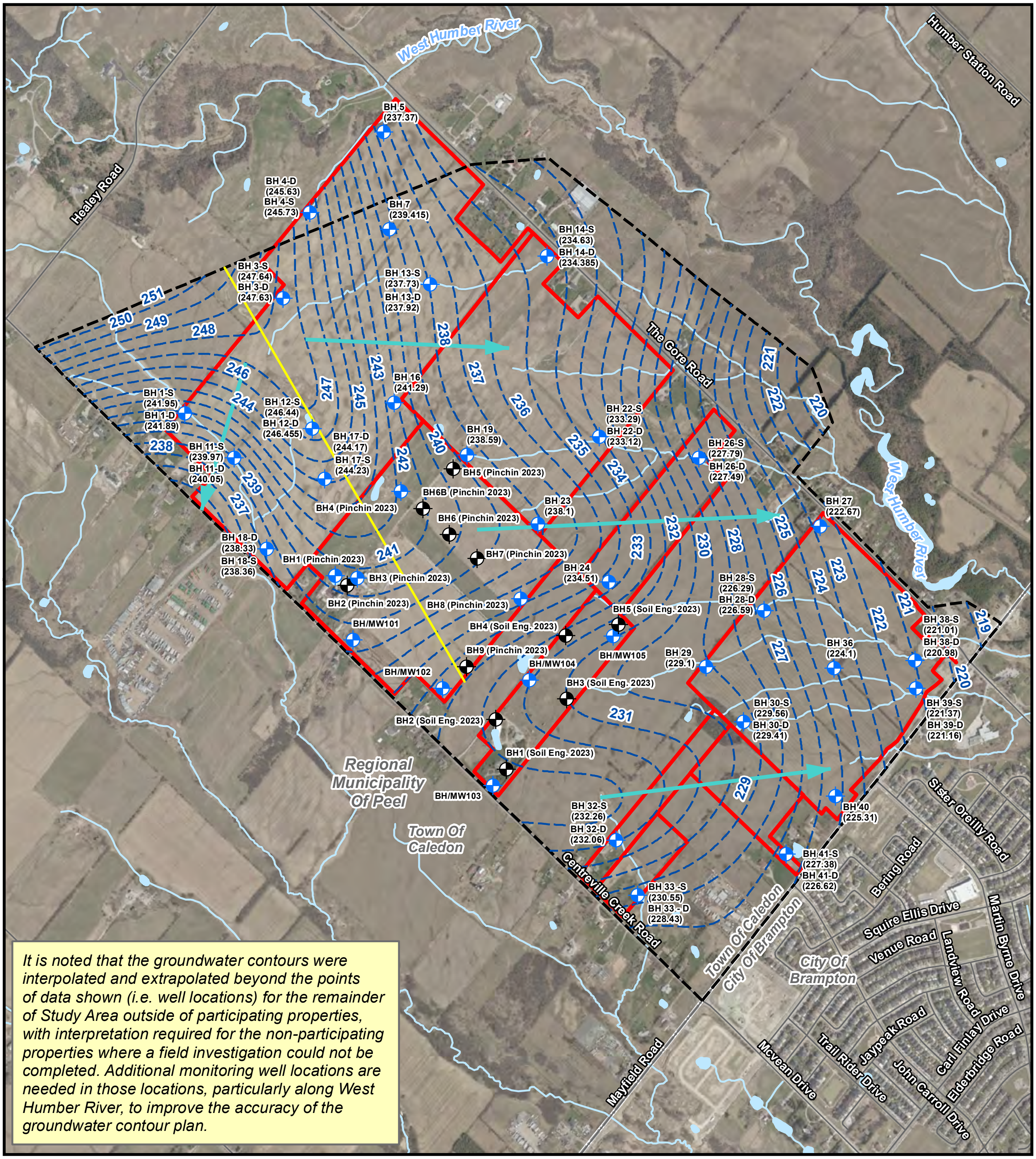
GEOLOGICAL CROSS SECTION A-A'

2100463

SEPT 2024

Fig. 3.11

\\MRK-MGIRON\ C:\Users\marvir3458\OneDrive - GEI Consultants, Inc\Desktop\Osman\2100463\2100463_BH9.dwg - 9/12/2024



It is noted that the groundwater contours were interpolated and extrapolated beyond the points of data shown (i.e. well locations) for the remainder of Study Area outside of participating properties, with interpretation required for the non-participating properties where a field investigation could not be completed. Additional monitoring well locations are needed in those locations, particularly along West Humber River, to improve the accuracy of the groundwater contour plan.

NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2024.
3. Orthoimagery Peel Region, 2024. Imagery taken in 2022.

Legend

- 🟥 Participating Properties
- ⬚ Wildfield Village Secondary Plan Area
- — Road
- — Watercourse
- ▭ Waterbody
- ⊕ Borehole Location
- ⊕ Borehole/Monitoring Well Location
- - - Groundwater Elevation Contours (m asl)
- [xx.xx] Groundwater Level (masl). Measured July 26, 2024
- → Interpreted Direction of Groundwater Flow
- — Ground Water Flow Divide

N

0 100 200
m
1:17,750

Hydrogeological Investigation
Wildfield

Wildfield Village Landowners
Group Inc.

GEI Consultants

GROUNDWATER CONTOURS

Project 2100463

September 2024

Fig. 3.12

APPENDIX C2

REGIONAL CROSS-SECTIONS AND GEOLOGICAL UNIT THICKNESS MAPPING

Peel Region/ORMGP/TRCA – Peel SWS Area - Groundwater "Areas of Concern" Mapping

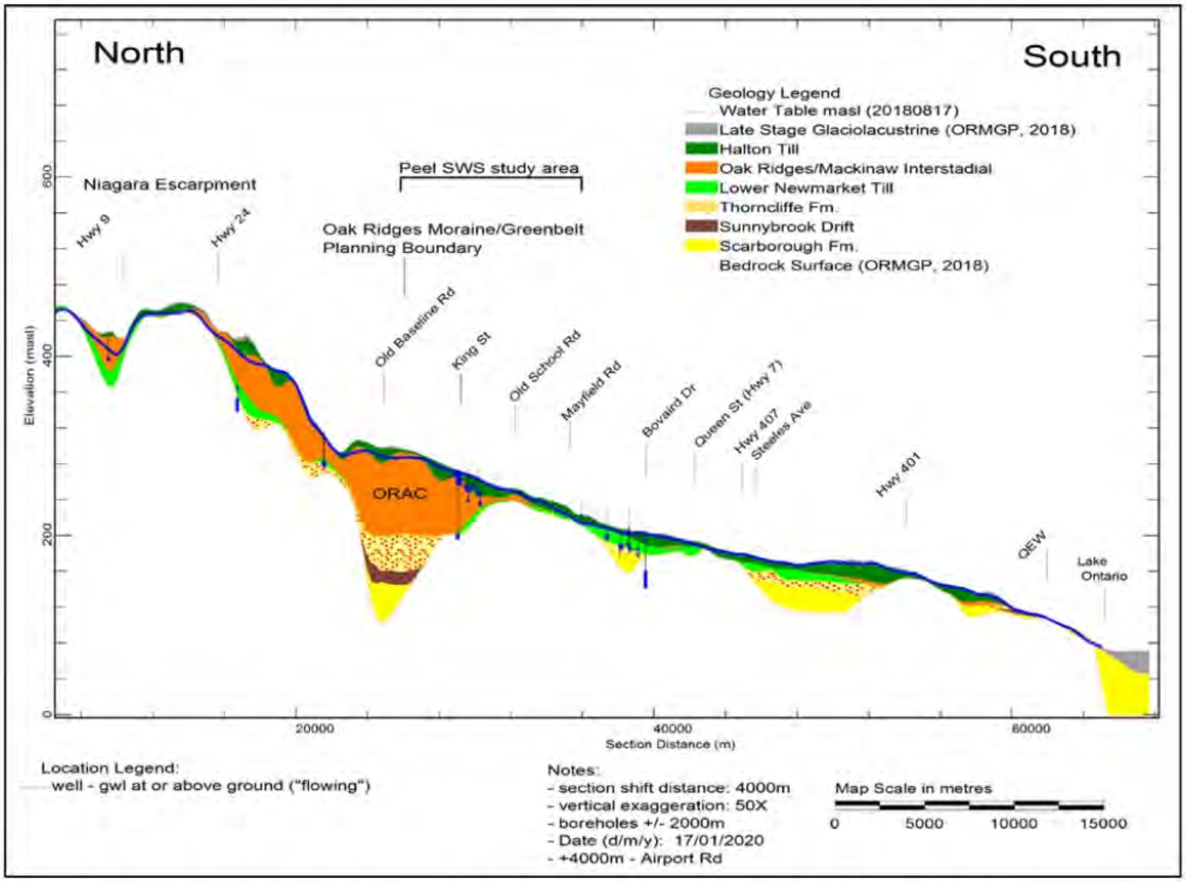


Figure 6: North-south cross-section along Airport Road through the study area. Interpreted geology from ORMGP, 2018 based on Earthfx Inc., 2006, 2014.

Source: Oak Ridges Moraine Groundwater Program (ORMGP). August 18, 2020. Technical Memorandum, Peel Scoped Subwatershed Study (SWS) – Groundwater "Areas of Concern" mapping.

Peel Region/ORMGP/TRCA – Peel SWS Area - Groundwater "Areas of Concern" Mapping

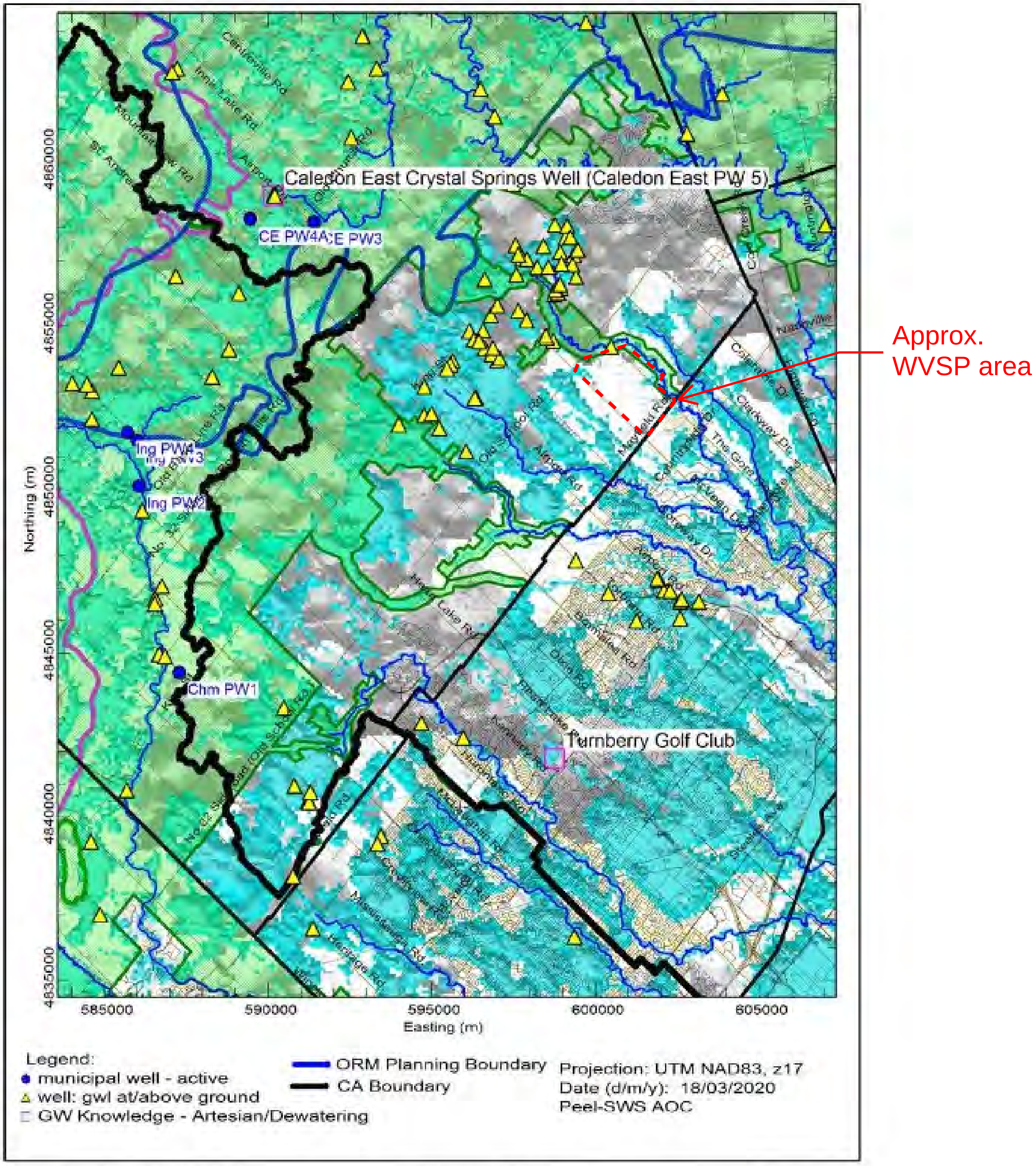


Figure 24: Peel SWS study area groundwater "Areas of Concern". Includes areas where water table is within 4 m of ground surface (blue shading) and/or ORAC is greater than 5 m thick (grey shading). Greenbelt delineated by green line.

V1 – August 18, 2020 Page 25 of 28

Source: Oak Ridges Moraine Groundwater Program (ORMGP). August 18, 2020. Technical Memorandum, Peel Scoped Subwatershed Study (SWS) – Groundwater "Areas of Concern" mapping.

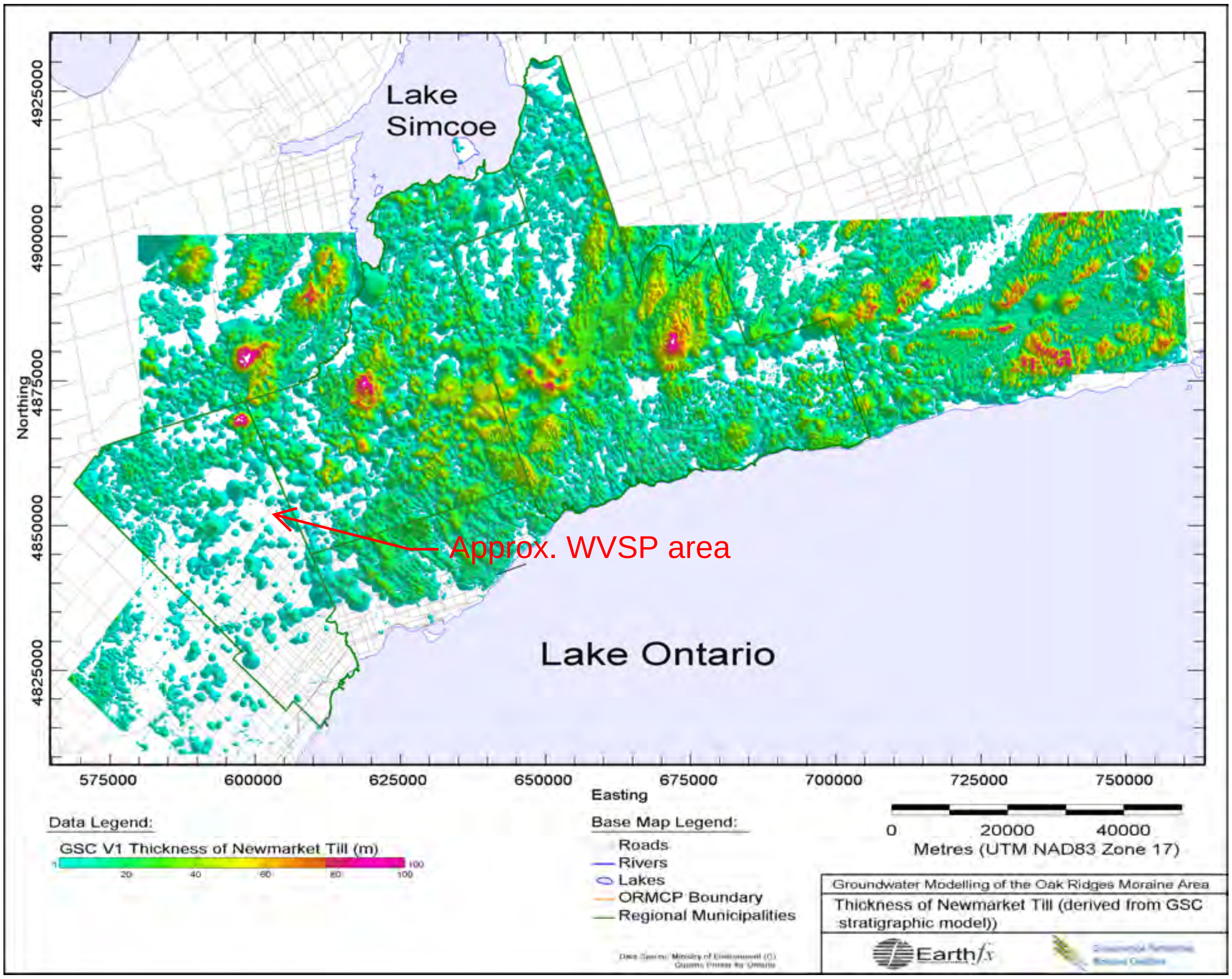


Figure B124: GSC Newmarket Till thickness (derived from Sharpe et al. 2002a)

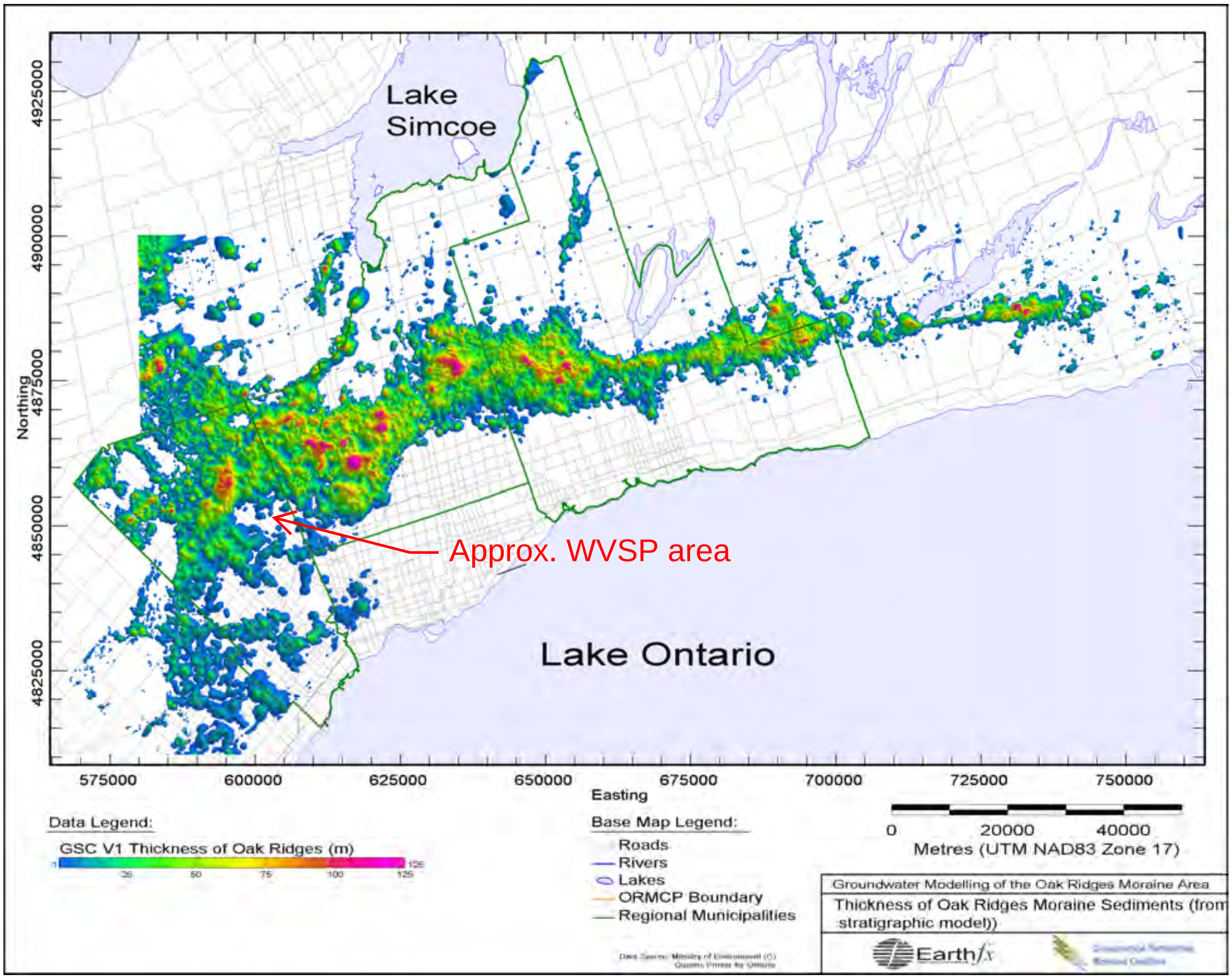


Figure B125: ORM sediment thickness (derived from Sharpe et al. 2002a)

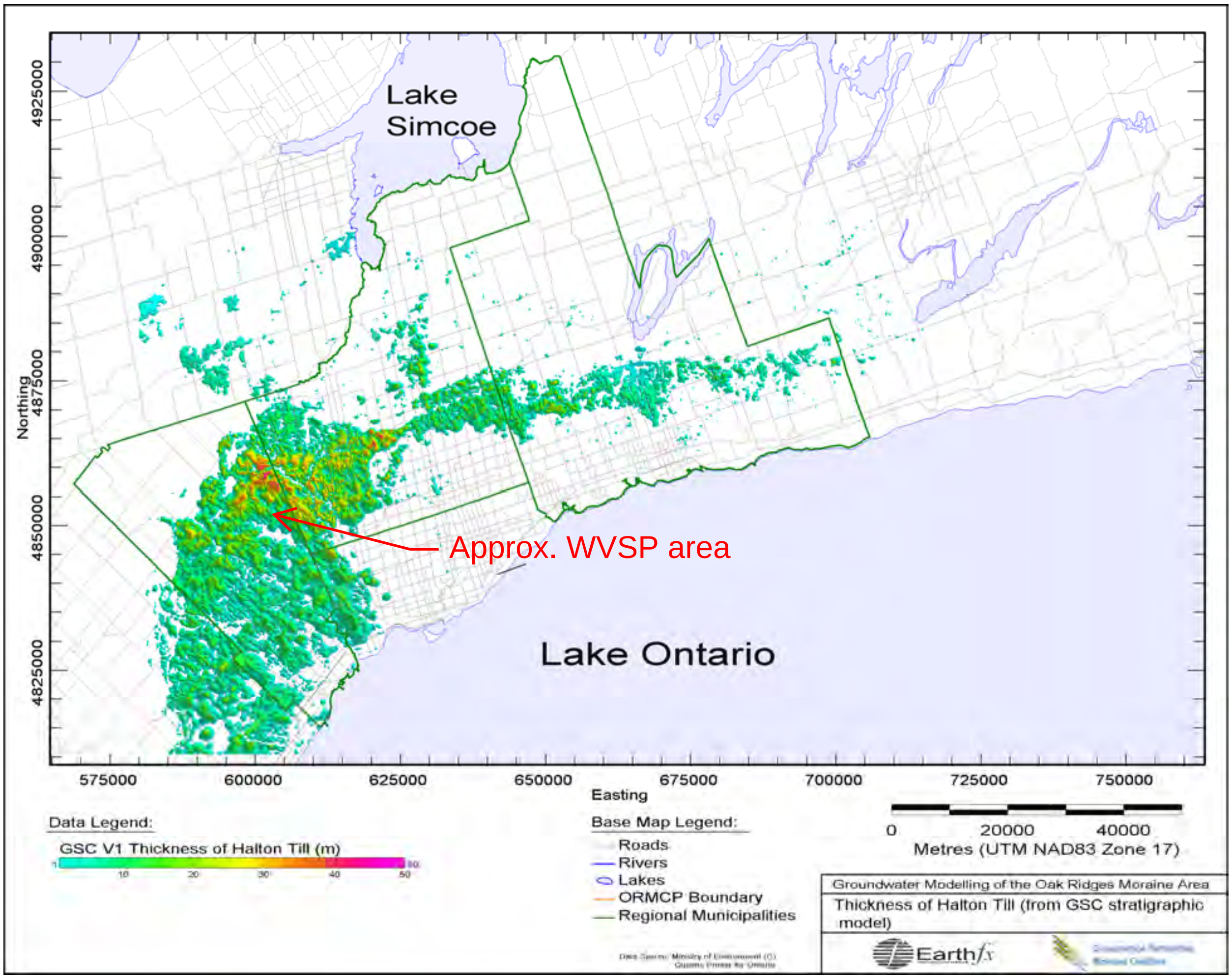
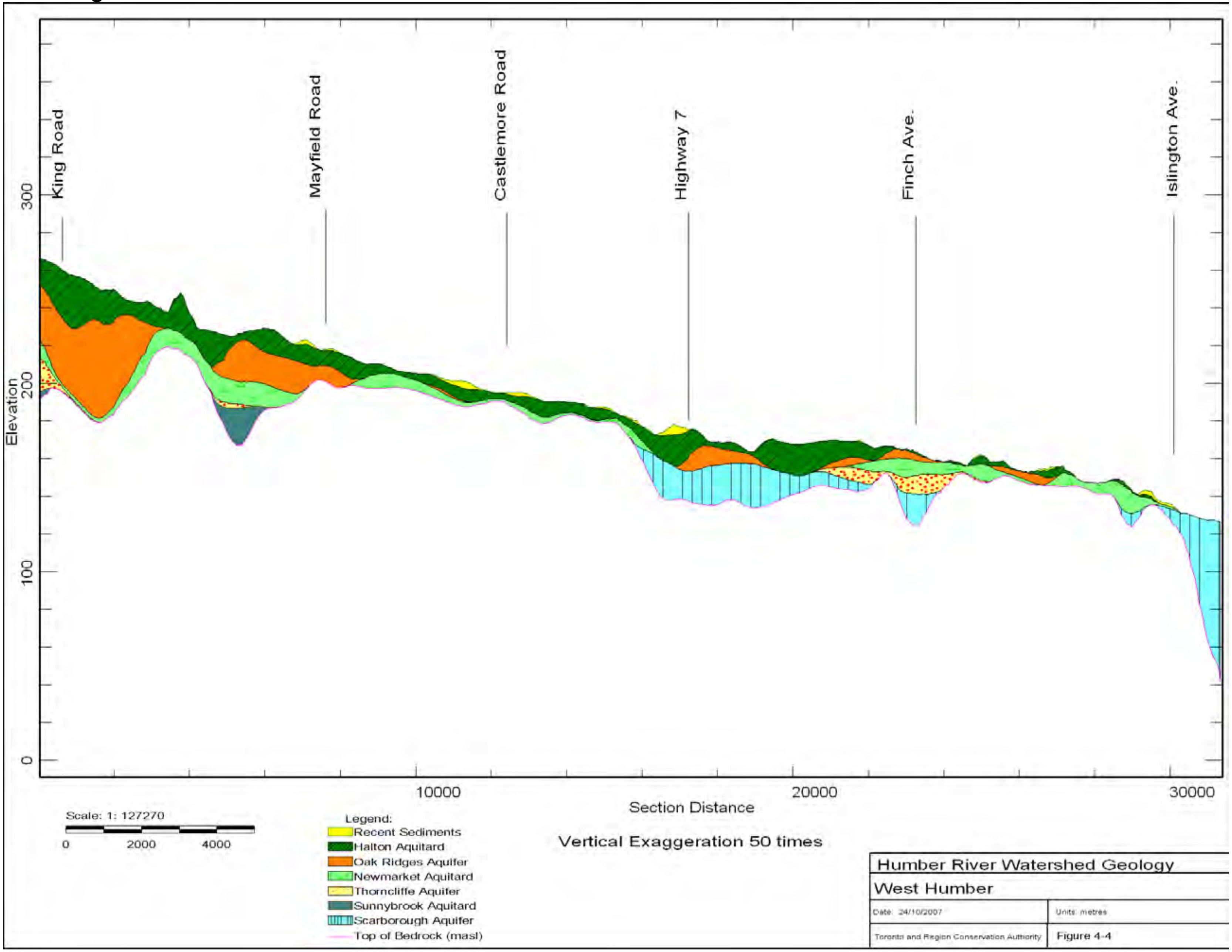


Figure B126: Thickness of Halton Till (derived from Sharpe et el. 2002a)

Source: Kassenaar, J.D.C. and Wexler, E.J., 2006. Groundwater Modelling of the Oak Ridges Moraine Area. CAMC-YPDT Technical Report #01-06.

Figure 2-7: Geologic Cross Section – West Humber River



Source: Toronto and Region Conservation Authority (TRCA). 2008. Humber River Watershed, Scenario Modelling and Analysis Report.

APPENDIX C3

TABLES

Table 3.1: Regional Hydrostratigraphy

Geological Unit	Lithology	Aquifer or Aquitard
Halton Till	Sandy silt to clayey silt till	Aquitard
Newmarket Till	Massive and frequently over consolidated stony and dense silty sand till	Aquitard
Oak Ridges Moraine Deposits	Fine sands and silts, with coarser sands and gravels that can dominate local areas	Aquifer
Georgian Bay Formation Bedrock	Thin beds of grey-green and grey-blue shales, calcareous siltstones, and silty to argillaceous limestones	Poor aquifers, except where sufficiently weathered or fractured

Table 3.2: Inferred Bedrock Depths / Elevations

Borehole Location	Depth to Inferred Bedrock (m)	Elevation of Inferred Bedrock (m)
BH 24	7.6	228.3
BH 28-D	3.4	223.0
BH 29	3.4	227.1
BH 36	6.2	218.9

Table 3.3: *Seepage Meter Testing for Wildfield Village*

Meter_ID	Meter Size	Start	End	Duration (h:m)	Duration in Decimal Hours	Total Volume (ml)	Q = V/t (ml/hr)	q (Height) = Q/A (cm/hr)	Height of Water in a Day (cm)	Average Seepage in a Day (cm)
SM1A_or	Orange	9:10	10:15	1:05	1.08	107	99	0.17	4.0	2.3
SM1B_or	Orange	9:15	10:20	1:05	1.08	47	43	0.07	1.8	
SM1C_or	Orange	9:22	10:22	1:00	1.00	111	111	0.04	1.0	
SM5A	Red	9:47	10:50	1:03	1.05	518	493	0.19	4.6	3.1
SM5B	Blue	9:50	10:53	1:03	1.05	334	318	0.12	2.9	
SM5C	Blue	9:52	10:55	1:03	1.05	219	209	0.08	1.9	
SM12A	Red	11:43	12:45	1:02	1.03	266	257	0.10	2.4	2.5
SM12B	Blue	11:45	12:50	1:05	1.08	430	397	0.15	3.6	
SM12C	Blue	11:48	12:52	1:04	1.07	126	118	0.04	1.1	
SM12B2	Orange	11:53	12:54	1:01	1.02	72	71	0.12	2.9	
SM16A	Red	13:48	14:53	1:05	1.08	261	241	0.09	2.3	4.5
SM16B	Blue	13:49	14:55	1:06	1.10	683	621	0.24	5.6	
SM16C	Blue	13:53	14:57	1:04	1.07	273	256	0.10	2.3	
SM16B2	Orange	13:49	14:56	1:07	1.12	212	190	0.32	7.7	

Surface Areas, Orange = 594 cm^2, Red = 2,565 cm^2, Blue = 2,642 cm^2

Table 3.4: Seepage Meter Results Summary

Test Location	Feature	Monitored Levels (m asl)				Hydraulic Gradient (cm/cm)	Bed Material	Seepage Meter Rates (cm/day)	
		Piezometer Screen Elev.	Ground Elev.	Groundwater Elev.	Surface Water Elev.			Average	Range
SG 1	Rivulet	218.85 to 219.15	219.28	219.37	219.37	0.0	Silt	2.3	3.0
SG 5	Wetland	229.98 to 230.28	230.43	230.81	230.76	0.3	Loose Benthic	3.1	2.7
SG 12	Wetland	246.59 to 246.89	247.01	247.15	247.43	-2.3	Silt	2.5	2.5
SG 16	Wetland	246.09 to 246.39	246.63	247.05	247.01	0.2	Dense Benthic	4.5	5.4

Table 3.5: Hand Auger Summary for GP1 to GP4

	GP 1	GP 2	GP 3	GP 4
GPS Coordinates (UTM Zone 17T)	N: 4854095 E: 600617	N: 4853459 E: 600157	N: 4852986 E: 600144	N: 4853611 E: 601086
Depth / Elevation Below Grade	0.30 m	0.45 m	0.40 m	0.50 m
Stratigraphy in Hand Auger	Silt & clay glacial till, some sand, trace gravel. Brown, moist	Silt & clay glacial till, trace sand. Brown, moist	Silty clay glacial till, trace sand. Brown, moist	Silt & clay glacial till, sandy, trace gravel. Brown, moist

Table 3.6: Hand Auger Summary for GP5 to GP8

	GP 5	GP 6	GP 7	GP 8
GPS Coordinates (UTM Zone 17T)	N: 4853226 E: 601460	N: 4851912 E: 601302	N: 4852219 E: 601909	N: 4852546 E: 602177
Depth / Elevation Below Grade	0.5 m	0.55 m	0.40 m	0.45 m
Stratigraphy in Hand Auger	Silt & clay glacial till, some sand, trace gravel. Brown, wet	Silt & clay glacial till, some sand, trace gravel. Brown, moist	Silty clay glacial till, some sand, some gravel. Brown, moist	Silt & clay glacial till, some sand, trace gravel. Brown, wet

Table 3.7: Approximate relationship between hydraulic conductivity, percolation time and infiltration rate

Hydraulic Conductivity, K_{fs} (cm/s)	Percolation Time, T (min/cm)	Infiltration Rate, I (mm/hr)
0.1	2	300
0.01	4	150
0.001	8	75
0.0001	12	50
0.00001	20	30
0.000001	50	12

Table 3.8: Infiltration Testing Results

GP Test Location	Depth (m)	Soil at Test Elevation	Field-Saturated Hydraulic Conductivity (cm/sec)	Infiltration Rate (mm/hr)	Factor of Safety	Factored Infiltration Rate (mm/hr)
GP 1	0.30	Silt & Clay Till	6.7×10^{-6}	22.4	2.5	9.0
GP 2	0.45	Silt & Clay Till	3.1×10^{-6}	18.3	2.5	7.3
GP 3	0.40	Silty Clay Till	Steady-state rate of fall not achieved			
GP 4	0.50	Silt & Clay Till	6.7×10^{-6}	22.4	2.5	9.0
GP 5	0.50	Silt & Clay Till	Steady-state rate of fall not achieved			
GP 6	0.55	Silt & Clay Till	3.9×10^{-6}	19.5	2.5	7.8
GP 7	0.40	Silty Clay Till	1.2×10^{-5}	26.1	2.5	10.4
GP 8	0.45	Silt & Clay Till	Steady-state rate of fall not achieved			

Table 3.9: Pre-Development (Existing Condition) Water Balance

Condition	Permeable Areas	Impermeable Areas	Average Annual Runoff Volume (m^3/year)	Average Annual Infiltration Volume (m^3/year)
Pre-Development Land Use	95% (Farmland, Forest)	5% (Impermeable Areas)	681,781	307,550

Table 3.10: MECP Water Well Record Summary

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
BRAMPTON CITY (TORON	17 601986 485188 2 W	2006/06 6809	2				0040 5	4910288 (Z45785) A031444	BRWN TILL 0015 GREY TILL 0035 GREY TILL 0043 GREY TILL 0045
BRAMPTON CITY (TORON	17 602402 485254 6 W	2012/11 7241	2			MT	0020 10	7191477 (Z160556) A121020	BRWN SILT SAND DNSE 0016 GREY SAND SILT WBRG 0030
BRAMPTON CITY (TORON	17 602411 485259 6 W	2012/11 7241	2			MT	0018 10	7191478 (Z160557) A140114	BRWN SILT SAND DNSE 0016 GREY SAND SILT WBRG 0028
BRAMPTON CITY (TORON	17 602392 485257 2 W	2012/11 7241	2			MT	0020 10	7191479 (Z160559) A140115	BRWN SAND SILT DNSE 0018 GREY SILT SAND WBRG 0030
BRAMPTON CITY (TORON	17 602233 485231 6 W	2015/09 7230						7259056 (C30320) A194799 P	
BRAMPTON CITY (TORON	17 602418 485270 8 W	2015/06 7501	2	UT 0004		MT	0015 10	7248969 (Z172772) A149180	BRWN CLAY SAND SILT 0025
BRAMPTON CITY (TORON CON 08 017	17 601695 485115 8 W	1964/07 1307	30	FR 0045	45///:	DO		4902785 ()	BRWN LOAM 0012 GREY CLAY 0045 FSND 0047 GREY CLAY 0062 GREY SHLE 0063
BRAMPTON CITY (TORON CON 08 017	17 601310 485128 3 W	1967/01 4813	7 7	FR 0078	35/75/3/3:0	DO		4902754 ()	FILL 0003 BRWN CLAY 0018 BLUE CLAY 0070 SHLE 0080

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
BRAMPTON CITY (TORON CON 08 017	17 601695 485116 3 W	1965/05 4813	7 7	FR 0075	40//12/ 4:0	DO		4902786 ()	YLLW CLAY 0028 BLUE CLAY 0062 HPAN 0074 SHLE 0080
BRAMPTON CITY (TORON CON 09 017	17 602141 485188 1 L	2001/06 1663				NU		4908824 (227423) A	
BRAMPTON CITY (TORON CON 09 017	17 601918 485186 7 W	2012/06 1660						7198372 (Z114538) A	
BRAMPTON CITY (TORON CON 09 017	17 602598 485225 4 W	2012/07 1660						7198373 (Z114539) A	
BRAMPTON CITY (TORON CON 09 017	17 602220 485231 1 W	7147						7267911 (C33960) P	
BRAMPTON CITY (TORON CON 09 017	17 602375 485248 3 W	1957/10 1307	36	FR 0051	26//3/:	PS		4902827 ()	BRWN LOAM 0015 GREY CLAY 0049 GREY SAND 0051
BRAMPTON CITY (TORON CON 09 017	17 602635 485224 3 W	1964/12 1308	30	FR 0042	32/40// 0:30	DO		4902828 ()	LOAM 0004 BRWN CLAY GRVL 0007 BRWN CLAY 0011 BLUE CLAY 0021 HPAN 0033 BLUE CLAY SAND 0043
BRAMPTON CITY (TORON CON 10 017	17 602528 485254 4 W	1975/08 1307	30	FR 0045	33/43/2 /1:0	DO		4904722 ()	BRWN LOAM 0012 GREY CLAY 0043 GREY SAND 0045

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
BRAMPTON CITY (TORON CON 10 017	17 602660 485288 8 W	1956/06 1307	36	FR 0040	8//8/:	DO		4902859 ()	BRWN CLAY 0015 GREY CLAY STNS 0040 GREY SAND GRVL 0042
BRAMPTON CITY (TORON CON 10 017	17 602605 485293 3 W	1947/06 4841	4 4	MN 0062	12///:	ST DO		4902854 ()	CLAY STNS 0040 SHLE 0062
BRAMPTON CITY (TORON CON 10 017	17 602665 485237 8 W	1950/09 2639	4	MN 0030	38///48: 0	DO	0067 2	4902855 ()	BRWN LOAM CLAY 0006 BLUE CLAY 0026 QSND 0066 GRVL STNS 0069
BRAMPTON CITY (TORON CON 10 017	17 602710 485281 8 W	1956/02 1308	24	FR 0026	18///:	DO		4902858 ()	BRWN CLAY 0010 BLUE CLAY 0026 BLUE SAND 0028
BRAMPTON CITY (TORON CON 10 017	17 602765 485278 3 W	1955/11 1308	24	FR 0039	15///:	DO		4902857 ()	BRWN CLAY 0015 BLUE CLAY 0030 SILT 0039
CALEDON TOWN (ALBION	17 600356 485280 8 W	2011/07 1663	30 4	UT	6///:	NU		7176513 (Z131472) A	
CALEDON TOWN (ALBION	17 602416 485274 4 W	2013/07 7241	2			MT	0012 10	7205179 (Z174211) A150544	BRWN LOAM LOOS 0001 BRWN SILT CLAY LOOS 0015 GREY SILT CLAY LOOS 0022
CALEDON TOWN (ALBION	17 602424 485275 6 W	7241	2			MT	0016 5	7205180 (Z174210) A150542	BRWN LOAM LOOS 0001 BRWN SILT CLAY LOOS 0015 GREY SILT CLAY LOOS 0021

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (ALBION	17 602376 485270 9 W	2015/06 7241	2			MT	0008 10	7245037 (Z209792) A181350	BLCK SOFT 0000 BRWN TILL SILT HARD 0010 GREY SILT CLAY HARD 0018
CALEDON TOWN (ALBION	17 601107 485428 2 W	2015/11 7230						7259857 (C32345) A194797 P	
CALEDON TOWN (ALBION CON 02 001	17 600847 485211 1 W	1975/10 1307	30	FR 0066	20/60/4 /1:0	DO		4904776 ()	BRWN LOAM 0012 GREY CLAY 0064 GRVL 0066
CALEDON TOWN (ALBION CON 02 001	17 601415 485150 3 W	1972/04 1307	30	FR 0076	20/73/6 /1:0	DO		4903823 ()	BRWN LOAM 0010 GREY CLAY 0075 GRVL 0076
CALEDON TOWN (ALBION CON 02 001	17 601181 485127 4 W	1976/05 1307	30	FR 0039	15/38/2 /1:0	DO		4904871 ()	BRWN LOAM 0010 GREY CLAY 0035 GREY SHLE 0039
CALEDON TOWN (ALBION CON 02 001	17 601402 485148 9 W	2015/08 7147	35.4	FR 0012				7248960 (Z218398) A	
CALEDON TOWN (ALBION CON 02 001	17 601200 485135 2 W	1961/04 1308	30 18	FR 0054	20///:	DO		4900065 ()	BRWN CLAY 0022 BLUE CLAY 0054 BLUE CLAY MSND 0062 GRVL 0063
CALEDON TOWN (ALBION CON 02 001	17 601056 485188 3 W	1962/01 1308	30	FR 0068	30///:	DO		4900072 ()	BRWN CLAY BLDR 0011 BLUE CLAY BLDR 0060 BLUE CLAY MSND 0068 GRVL 0069

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (ALBION CON 02 001	17 601354 4851518 W	1964/08 1308	6					4900070 () A	BRWN CLAY 0016 BLUE CLAY 0042
CALEDON TOWN (ALBION CON 02 001	17 601151 4851470 W	1956/08 1307	36	FR 0047	15//5/:	DO		4900063 ()	BRWN CLAY 0020 GREY CLAY 0047 GREY GRVL 0050
CALEDON TOWN (ALBION CON 02 001	17 601350 4851633 W	1962/02 1308	30	FR 0068	30///:	DO		4900068 ()	BRWN CLAY 0009 BLUE CLAY 0058 BLUE CLAY MSND 0068 GRVL 0069
CALEDON TOWN (ALBION CON 02 001	17 601227 4851703 W	1961/09 1308	36	FR 0070	26///:	DO		4900066 ()	PRDG 0042 BLUE CLAY 0060 BLUE CLAY MSND 0070 GRVL 0072
CALEDON TOWN (ALBION CON 02 001	17 601261 4851454 W	1961/04 1308	36 18	FR 0061	15///:	DO		4900064 ()	BRWN CLAY 0021 BLUE CLAY 0044 BLUE CLAY MSND 0061
CALEDON TOWN (ALBION CON 02 001	17 601288 4851686 W	1962/04 1308	30	FR 0062	40///:	DO		4900067 ()	BRWN CLAY 0009 BLUE CLAY 0038 BLUE CLAY MSND 0062 GRVL 0063
CALEDON TOWN (ALBION CON 02 002	17 600875 4851983 W	1972/11 3561	7	FR 0075	30/60/5/1:0	DO		4903985 ()	LOAM 0002 BLUE CLAY STNS 0040 BLUE CLAY 0075 GRVL 0077
CALEDON TOWN (ALBION CON 02 002	17 600783 4851964 W	2012/10 7147	5.9	FR 0002				7190285 (Z142273) A	

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (ALBION CON 02 002	17 600832 485198 4 W	2012/09 7147						7188414 (C19619) P	
CALEDON TOWN (ALBION CON 02 003	17 600351 485268 4 W	1963/07 1307	30	FR 0070	30//2/:	DO		4900073 ()	BRWN LOAM 0015 GREY CLAY 0067 GRVL 0070 GREY SHLE 0071
CALEDON TOWN (ALBION CON 02 004	17 599815 485312 3 W	1978/09 3108		SA 0106	24/119/ 1/2:0			4905424 () A	LOAM 0001 BRWN CLAY 0021 GREY CLAY 0042 GREY CLAY GVLY HARD 0072 BLUE SHLE 0120
CALEDON TOWN (ALBION CON 02 004	17 599959 485306 6 W	1973/06 1307	30	FR 0072	30/70/1 /1:0	DO		4904153 ()	BRWN LOAM 0015 GREY CLAY 0070 GREY GRVL SHLE 0072
CALEDON TOWN (ALBION CON 02 004	17 599813 485310 6 W	1964/08 3512	7	FR 0100	20/100/ 1/:	NU		4900075 () A	LOAM 0001 YLLW CLAY 0009 BLUE CLAY 0057 BLUE SHLE 0110
CALEDON TOWN (ALBION CON 02 005	17 599125 485339 2 W	2006/08 4011	4.71 2.27		7///:			4910320 (Z49740) A	
CALEDON TOWN (ALBION CON 02 005	17 599097 485333 9 W	1998/04 2552	30 40	FR 0024 FR 0044	16/49/1 /1:0	DO	0025 25	4908343 (177718)	BLCK LOAM 0001 BRWN CLAY HARD PCKD 0013 BLUE CLAY STNS HARD 0024 GREY SILT LYRD 0044 GREY FSND STNS LYRD 0051 GREY CLAY PCKD 0053
CALEDON TOWN (ALBION CON 02 005	17 599148 485331 6 W	2006/08 4011	0.34		7///:			4910309 (Z49741) A	

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (ALBION CON 02 005	17 599333 485364 6 W	2013/06 7147	5.9	FR 0002				7204189 (Z171540) A	
CALEDON TOWN (ALBION CON 02 005	17 599350 485364 1 W	2013/06 7147	5.9	FR 0002				7204191 (Z171541) A	
CALEDON TOWN (ALBION CON 02 005	17 599374 485364 0 W	1960/06 3512	7	FR 0037	16/23/6 /:	DO		4900077 ()	LOAM 0001 BLUE CLAY 0036 BLUE SHLE 0038
CALEDON TOWN (ALBION CON 02 005	17 599687 485320 6 W	1964/07 3512	7 7	SA 0088	20/80/3 /0:30	ST DO		4900080 ()	LOAM 0001 YLLW CLAY 0005 BLUE CLAY 0060 BLUE SHLE 0091
CALEDON TOWN (ALBION CON 02 006	17 599115 485380 3 W	1971/09 5206	7	FR 0052	26/65/9 /6:0	DO		4903669 ()	BRWN CLAY 0014 BLUE CLAY 0036 HPAN 0052 SHLE 0071
CALEDON TOWN (ALBION CON 02 006	17 599085 485382 3 W	1969/10 4919						4903358 ()	BRWN LOAM 0003 GREY CLAY 0040 GREY SHLE 0043
CALEDON TOWN (ALBION CON 02 006	17 599065 485381 3 W	1969/09 3513	5	FR 0050	25/50/4 /2:0	DO		4903418 ()	BRWN CLAY 0011 BLUE CLAY 0021 BLUE SHLE 0060
CALEDON TOWN (ALBION CON 03 001	17 601816 485198 1 W	1974/10 1307	30	FR 0050	25/48/2 /1:0	DO		4904529 ()	BRWN LOAM 0010 GREY CLAY 0045 GREY SHLE 0050

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (ALBION CON 03 001	17 601087 485206 3 W	1973/07 1307	30	FR 0064	20/60/4/1:0	DO		4904148 ()	BRWN LOAM 0013 GREY CLAY 0062 GRVL 0064
CALEDON TOWN (ALBION CON 03 001	17 601855 485208 3 W	1972/03 2643	7	UK 0140	20/134/2/2:0	DO		4903792 ()	BRWN CLAY 0011 BLUE CLAY 0050 BLUE SHLE 0140
CALEDON TOWN (ALBION CON 03 001	17 602297 485263 4 W	1976/04 1307	30	FR	15//6/1:0	DO		4904867 ()	BRWN LOAM 0010 GREY CLAY 0040 GREY SAND 0042
CALEDON TOWN (ALBION CON 03 001	17 601415 485172 3 W	1978/03 3814	30	FR 0055	25/25/3/1:0	DO		4905529 ()	UNKN 0055 GRVL 0060
CALEDON TOWN (ALBION CON 03 001	17 601525 485169 1 W	2010/06 7215	2			TH	0010 10	7152554 (Z121710) A100024	BRWN FILL DRY 0005 BRWN SAND DRY 0011 GREY SAND CLAY DRY 0020
CALEDON TOWN (ALBION CON 03 001	17 601589 485179 8 W	1961/09 1308	30	SA 0046		NU		4900125 () A	BRWN CLAY 0009 BLUE CLAY 0025 BLUE CLAY MSND BLDR 0037 BLUE SHLE 0050
CALEDON TOWN (ALBION CON 03 001	17 601380 485169 9 W	1967/05 3512	7 7	FR 0100	35/108/2/2:0	DO		4900127 ()	CLAY MSND 0023 BLUE CLAY 0034 MSND GRVL 0090 BLUE SHLE 0108
CALEDON TOWN (ALBION CON 03 001	17 601751 485196 7 W	1963/11 2613	5 5	FR 0008	68/100/1/1:0	DO		4900126 ()	BLUE CLAY 0042 BLUE SHLE 0100

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (ALBION CON 03 002	17 600715 485240 3 W	1977/03 3814	30	FR 0080	50/82/3/1:0	DO		4905077 ()	BRWN LOAM 0012 GREY CLAY 0080 GREY SAND WBRG 0085
CALEDON TOWN (ALBION CON 03 002	17 601001 485221 1 W	1972/12 3561	7	FR 0077	40/40/5/5:0	NU DO		4904329 ()	LOAM 0002 BRWN SAND CLAY 0035 BLUE CLAY STNS 0070 GRVL 0077
CALEDON TOWN (ALBION CON 03 002	17 600655 485246 3 W	1977/03 3814	30	FR 0072	40//5/1:0	DO		4905079 ()	BRWN LOAM 0012 GREY CLAY 0072 GREY CSND GRVL WBRG 0075
CALEDON TOWN (ALBION CON 03 002	17 601670 485324 7 W	1985/07 4919	30 30	UK 0020 UK 0035	15/40//0:30	DO		4906370 ()	BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY SAND PCKD 0045
CALEDON TOWN (ALBION CON 03 002	17 601719 485319 4 W	1985/07 4919	30 30	UK 0020 UK 0035	15/38//0:30	DO		4906371 ()	BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY SAND PCKD 0041
CALEDON TOWN (ALBION CON 03 002	17 601833 485304 5 W	1975/06 3561	7	FR 0091	15/90/2/2:0	DO		4904853 ()	LOAM 0002 BRWN CLAY 0010 BLUE CLAY 0090 GRVL 0091
CALEDON TOWN (ALBION CON 03 002	17 601811 485313 8 W	1959/10 2627	18	FR 0038	24///:	DO		4900130 ()	BRWN CLAY 0023 GREY CLAY 0042
CALEDON TOWN (ALBION CON 03 002	17 601486 485339 1 W	1957/08 1307	36	FR 0044	15//4/:	DO		4900128 ()	BRWN LOAM 0015 GREY CLAY STNS 0042 GREY MSND 0044

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (ALBION CON 03 002	17 601735 4853203 W	1959/08 1307	30	FR 0047	22//1/:	DO		4900129 ()	BRWN LOAM 0013 GREY CLAY STNS 0045 GREY MSND 0047
CALEDON TOWN (ALBION CON 03 002	17 601499 4853406 W	1964/11 1307	30	FR 0052	32//2/:	DO		4900131 ()	BRWN LOAM 0018 GREY CLAY 0050 GREY MSND 0052
CALEDON TOWN (ALBION CON 03 003	17 601165 4853723 W	1976/09 1307	30	FR 0082	60/80/1/1:0	DO		4904957 ()	BRWN LOAM 0013 GREY CLAY 0080 SAND 0082
CALEDON TOWN (ALBION CON 03 003	17 600555 4852563 W	1977/06 3561		SA 0110 SA 0140	50/135/1/2:0	DO		4905154 ()	LOAM 0002 BRWN CLAY 0020 BLUE CLAY 0080 BLUE CLAY SAND 0085 GRVL SHLE 0140
CALEDON TOWN (ALBION CON 03 003	17 600315 4852823 W	1979/10 3561	6		20/30/1/1:30	DO		4905607 ()	LOAM 0001 BLUE CLAY 0075 BLUE SHLE 0095
CALEDON TOWN (ALBION CON 03 003	17 600365 4852798 W	1972/11 3561	7	SA 0150	50/145/1/2:0	NU		4903987 () A	LOAM 0002 BLUE CLAY 0095 SHLE 0150
CALEDON TOWN (ALBION CON 03 003	17 600415 4852873 W	1972/11 3561	7	FR 0090 FR 0100	35/80/5/1:0	DO		4903986 ()	LOAM 0002 BRWN CLAY SAND 0030 BLUE CLAY 0090 SAND GRVL CLAY 0096 BLUE SHLE 0100
CALEDON TOWN (ALBION CON 03 003	17 600415 4852723 W	1979/09 3561						4905608 () A	LOAM 0001 BLUE CLAY 0070 BLUE SHLE 0095

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (ALBION CON 03 003	17 600415 485287 3 W	1979/09 3561						4905609 () A	LOAM 0001 BLUE CLAY 0075 BLUE SHLE 0100
CALEDON TOWN (ALBION CON 03 003	17 600972 485397 2 W	1993/04 1508						4907876 (144920)	
CALEDON TOWN (ALBION CON 03 003	17 600254 485283 5 W	1993/02 1129						4907839 (144917)	
CALEDON TOWN (ALBION CON 03 003	17 601117 485367 4 W	1947/07 4823	6		10///:	ST DO		4900132 () A	CLAY STNS 0050 SHLE 0068
CALEDON TOWN (ALBION CON 03 004	17 599875 485322 3 W	1971/09 5459	30 6	FR 0090	40///:	DO		4903726 ()	LOAM 0002 BRWN CLAY 0014 BLUE CLAY 0058 GREY SHLE 0100
CALEDON TOWN (ALBION CON 03 004	17 599915 485322 3 W	1979/02 3814	30	FR 0063	25/25/2 /1:0	DO		4905531 ()	SAND GRVL 0063
CALEDON TOWN (ALBION CON 03 004	17 600879 485388 6 W	1973/06 3316	5 5	FR 0120	47/80/2 /2:0	ST DO		4904114 ()	BRWN CLAY 0010 GREY CLAY 0068 GREY CLAY 0110 BLUE SHLE STNS 0115 BLUE SHLE 0138
CALEDON TOWN (ALBION CON 03 004	17 600844 485396 7 W	1974/11 1307	30	FR 0068	45/66/1 /1:0	DO		4904523 ()	BRWN LOAM 0012 GREY CLAY 0066 GREY FSND 0068

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (ALBION CON 03 004	17 599895 485320 3 W	1971/09 5459	30	FR 0095	45///:	DO		4903725 ()	LOAM 0001 BRWN CLAY 0015 BLUE CLAY 0060 GREY SHLE BLDR 0085 GREY SHLE 0100
CALEDON TOWN (ALBION CON 03 004	17 599915 485320 3 W	1971/09 5459	30 6	FR 0095	45///:	DO		4903724 ()	LOAM 0001 BRWN CLAY 0015 BLUE CLAY 0055 GREY SHLE BLDR 0080 GREY SHLE 0098
CALEDON TOWN (ALBION CON 03 004	17 599855 485326 3 W	1971/05 5206	7	FR 0056	18/75/1 /6:0	DO		4903670 ()	BRWN CLAY 0012 BLUE CLAY 0055 SILT MSND GRVL 0056 BLUE SHLE 0081
CALEDON TOWN (ALBION CON 03 004	17 600372 485362 9 L	1994/02 1129						4907836 (144915)	
CALEDON TOWN (ALBION CON 03 004	17 599815 485323 9 W	2014/06 7147	35.4	FR 0008				7224480 (Z180572) A	
CALEDON TOWN (ALBION CON 03 004	17 600083 485336 3 W	2013/01 4645					0006 56	7200317 (Z159707) A	
CALEDON TOWN (ALBION CON 03 004	17 600068 485319 3 W	1962/05 1308	30	FR 0061	43///:	DO		4900133 ()	BRWN CLAY 0018 BLUE CLAY 0045 BLUE CLAY MSND 0060 BLDR GRVL 0064
CALEDON TOWN (ALBION CON 03 005	17 600073 485416 4 W	1993/02 1129						4907837 (144914)	

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (ALBION CON 03 005	17 599383 485365 4 W	1993/02 1129						4907838 (144913)	
CALEDON TOWN (ALBION CON 03 005	17 600472 485436 3 W	1961/07 4823	5	FR 0100	- 5/40/2/:	DO	0099 4	4900134 ()	LOAM BLDR CLAY 0012 SILT 0015 CLAY MSND 0025 BLUE CLAY 0096 GRVL CLAY 0100 GRVL 0103
CALEDON TOWN (ALBION CON 03 006	17 599815 485467 3 W	1975/12 3903	6	FR 0170	51/170/ 2/10:0	DO	0170 10	4904844 ()	BRWN CLAY DNSE 0027 BLUE CLAY STNS 0115 BLUE CLAY SILT SAND 0135 BLUE CLAY STNS HARD 0170 BLUE SHLE GRVL FSND 0180 BLUE SHLE DNSE 0181
CALEDON TOWN (ALBION CON 03 006	17 599815 485495 3 W	1972/10 4610	5	FR 0189	68/86/4 /5:0	ST	0189 3	4904090 ()	PRDG 0005 BRWN CLAY 0018 BLUE CLAY 0189 BLUE SAND GRVL CLAY 0193 BLUE CLAY 0200 BLUE SHLE 0201
CALEDON TOWN (ALBION CON 04 001	17 602435 485277 3 W	1972/07 1307	30	FR 0042	20/40/6 /1:0	DO		4903873 ()	BRWN OBDN 0010 GREY CLAY 0040 GREY SAND 0042
CALEDON TOWN (ALBION CON 04 001	17 602386 485277 5 W	2013/07 7241	2			MT	0014 10	7205178 (Z174212) A150543	BRWN LOAM LOOS 0001 BRWN SILT CLAY LOOS 0019 GREY SILT CLAY LOOS 0024
CALEDON TOWN (ALBION CON 04 001	17 602186 485282 6 W	1960/03 1307	30	FR 0038	24//1/:	DO		4900196 ()	BRWN LOAM 0012 GREY CLAY STNS 0036 GREY MSND 0038
CALEDON TOWN (ALBION CON 04 001	17 601894 485311 7 W	1960/12 4823	4	SA 0113	80///:	NU		4900197 () A	LOAM 0004 BLUE CLAY BLDR 0020 BLUE CLAY 0077 GRVL 0081 CLAY MSND GRVL 0090 BLUE CLAY 0095 SHLE 0118

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (ALBION CON 04 001	17 602209 485280 6 W	1962/07 1307	30	FR 0060	30//1/:	DO		4900199 ()	BRWN LOAM 0012 GREY CLAY STNS 0059 MSND 0060 GREY SHLE 0061
CALEDON TOWN (ALBION CON 04 001	17 602029 485313 3 W	1964/10 1308	30	FR 0030	30/40/1 /1:0	DO		4900202 ()	LOAM 0001 BRWN CLAY 0020 BLUE CLAY 0030 MSND 0041
CALEDON TOWN (ALBION CON 04 001	17 602244 485278 7 W	1965/12 1308	30	FR 0028	22/40/1 /0:30	DO		4900204 ()	LOAM 0002 BRWN CLAY 0016 MSND CLAY 0028 MSND 0032 BLUE CLAY 0042
CALEDON TOWN (ALBION CON 04 001	17 602196 485284 1 W	1962/08 1307	30	FR 0060	32//2/:	DO		4900198 ()	BRWN LOAM 0012 GREY CLAY STNS 0059 MSND GRVL 0060
CALEDON TOWN (ALBION CON 04 002	17 601815 485327 3 W	1976/04 1307	30	FR 0052	20/48/4 /1:0	DO		4904869 ()	BRWN LOAM 0012 GREY CLAY 0050 GREY SAND 0052
CALEDON TOWN (ALBION CON 04 003	17 601446 485397 6 W	1965/12 4623	7 7	FR 0102 FR 0130	42/135/ 8/24:0	ST DO		4900207 ()	PRDG 0050 QSND 0060 CLAY SILT 0102 CLAY GRVL 0103 HPAN 0106 BLUE SHLE 0145
CALEDON TOWN (ALBION CON 04 004	17 600755 485424 3 W	1977/07 5206	6	FR 0145	45/120/ 5/2:0	DO	0145 5	4905181 ()	BRWN LOAM 0002 BRWN CLAY 0019 BLUE CLAY 0028 BLUE CLAY GRVL 0034 BLUE CLAY 0037 BLUE CLAY GRVL 0060 SILT 0090 FSND DRTY 0096 SILT 0138 GRVL DRTY 0150 SHLE 0152
CALEDON TOWN (ALBION CON 04 004	17 600815 485442 3 W	1975/04 5206	5	FR 0150	55/145/ 3/6:0	DO	0150 3	4904898 ()	BRWN CLAY 0040 BLUE CLAY 0150 SAND 0153

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (ALBION CON 04 004	17 600755 4854282 W	2012/12 7147	15	FR 0008				7193756 (Z142306) A	
CALEDON TOWN (ALBION CON 04 004	17 600772 4854223 W	1947/10 4823	5 5	FR 0160	60///:	ST DO		4900208 ()	CLAY MSND 0150 SHLE 0160
CALEDON TOWN (ALBION CON 04 006	17 600145 4855062 W	1975/11 5459	6	UK 0112	60/114/ 5/6:0	DO	0113 4	4904795 ()	BRWN CLAY 0007 BLUE CLAY 0031 BLUE CLAY STNS 0066 BLUE FSND 0093 BLUE CLAY FSND 0099 BLUE FSND 0112 BLUE CSND 0120
CALEDON TOWN (ALBION CON 06 027	17 599968 4853303 W	2005/06 6607	2	16			0017 5	4909886 (Z28277) A026599	BRWN SAND GRVL 0005 GREY CLAY GRVL 0022
CALEDON TOWN (BOLTON	17 601558 4851905 W	2010/06 7215				TH	0015 10	7148981 (Z116332) A100042	BRWN FILL SAND DRY 0005 BRWN CLAY TILL SILT 0012 GREY CLAY DRY 0025

Table 3.11: Summary of Groundwater Chemistry Testing

Monitoring Well Sample Location	Parameters Tested	Exceedance of Peel Region Storm and Sanitary Sewer Use By Law	Exceedances of PWQO	Exceedances of O.Reg.153/04, as amended, Table 1 and 8 All Types of Property Uses SCSs
BH/MW5 (Unfiltered)	Peel Region storm and sanitary sewer use by law; PWQO Metals; TSS; O.Reg. 153/04 Table 1 PHCs & VOCs	Storm: TSS and Manganese Sanitary: No Exceedances	PWQO: Cobalt Interim PWQO: Uranium	No Exceedances
BH/MW5 (Filtered)	PWQO Metals; TSS	--	PWQO: Cobalt Interim PWQO: Uranium	--
BH/MW18D (Unfiltered)	PWQO Metals; TSS; O.Reg. 153/04 Table 1 PHCs & VOCs	--	PWQO: Silver and Cobalt. Interim PWQO: Boron and Uranium	No Exceedances
BH/MW18D (Filtered)	PWQO Metals; TSS	--	PWQO: Silver and Cobalt Interim PWQO: Boron and Uranium	--
BH/MW26D (Unfiltered)	Peel Region storm and sanitary sewer use by law; PWQO Metals; TSS; O.Reg. 153/04 Table 1 PHCs & VOCs	Storm: Manganese Sanitary: No Exceedances	PWQO: Cobalt	No Exceedances
BH/MW26D (Filtered)	PWQO Metals; TSS	--	PWQO: Cobalt	--
BH/MW33D (Unfiltered)	PWQO Metals; TSS; O.Reg. 153/04 Table 1 PHCs & VOCs	--	PWQO: Cobalt Interim PWQO: Boron and Uranium	No Exceedances
BH/MW33D (Filtered)	PWQO Metals; TSS	--	PWQO: Cobalt Interim PWQO: Boron and Uranium	--
BH/MW38D (Unfiltered)	PWQO Metals; TSS; O.Reg. 153/04 Table 1 PHCs & VOCs	--	PWQO: Cobalt and Iron	No Exceedances
BH/MW38D (Filtered)	PWQO Metals; TSS	--	No Exceedances	--
BH/MW105 (Unfiltered)	PWQO Metals; TSS	--	PWQO: Cadmium, Cobalt, Copper, Iron, Nickel and Zinc Interim PWQO: Boron, Uranium, Vanadium and Zirconium	--
BH/MW105 (Filtered)	PWQO Metals; TSS	--	PWQO: Cobalt	--

Monitoring Well Sample Location	Parameters Tested	Exceedance of Peel Region Storm and Sanitary Sewer Use By Law	Exceedances of PWQO	Exceedances of O.Reg.153/04, as amended, Table 1 and 8 All Types of Property Uses SCSs
			Interim PWQO: Boron and Uranium	

Table 3.12: Groundwater Monitoring Summary

Monitoring Wells	Well Screen Location		Strata Screened	Groundwater Level Depth / Elev. (m)													
	Depth (m)	Elev. (m)		Highest Ground water Level	May 15/23	Jun. 6/23	Jul. 11/23	Aug. 8/23	Sept. 14/23	Oct. 19/23	Nov. 29/23	Dec. 20/23	Jan. 29/24	Feb. 27/24	Mar. 3/24	May 3/24	Aug. 20/24
BH/MW 1D	3.4 to 5.2	238.9 to 237.1	Clay & Silt Glacial Till	0.27 / 242.14	0.5 / 241.91	0.65 / 241.76	0.46 / 241.95	0.47 / 241.94	1.27 / 241.14	1.9 / 240.51	2.25 / 240.16	2.07 / 240.34	0.27 / 242.14	0.52 / 241.89	0.39 / 242.02	0.41 / 242	-
BH/MW 1S	1.2 to 3.4	241.1 to 238.9	Clay & Silt Glacial Till	0.26 / 242.11	2.42 / 239.95	1.49 / 240.1	0.57 / 241.8	0.46 / 241.91	1.3 / 241.07	1.87 / 240.5	2.29 / 240.08	2.41 / 239.96	0.81 / 241.56	0.47 / 241.9	0.42 / 241.95	0.26 / 242.11	-
BH/MW 3D	3.5 to 5.0	244.3 to 242.8	Clay & Silt Glacial Till	0.21 / 247.69	0.39 / 247.51	0.39 / 246.91	0.21 / 247.69	0.3 / 247.6	0.94 / 246.96	1.44 / 246.46	1.4 / 246.5	0.92 / 246.98	0.36 / 247.54	0.27 / 247.63	0.27 / 247.63	0.25 / 247.65	0.8 / 247.1
BH/MW 3S	1.5 to 3.0	246.4 to 244.9	Clay & Silt Glacial Till	0.22 / 247.7	2.13 / 245.79	1.01 / 246.2	0.23 / 247.69	0.31 / 247.61	0.9 / 247.02	1.49 / 246.43	1.4 / 246.52	0.95 / 246.97	0.38 / 247.54	0.28 / 247.64	0.39 / 247.53	0.22 / 247.7	0.89 / 247.03
BH/MW 4D	3.5 to 5.0	242.8 to 241.3	Clay & Silt Glacial Till; Silty Sand Till	0.47 / 245.89	0.54 / 245.82	0.91 / 245.45	0.68 / 245.68	0.88 / 245.48	1.97 / 244.39	2.72 / 243.64	3.3 / 243.06	3.74 / 242.62	0.98 / 245.38	0.73 / 245.63	0.63 / 245.73	0.47 / 245.89	2.52 / 243.84
BH/MW 4S	1.5 to 3.0	244.9 to 243.4	Clayey Silt Glacial Till	0.6 / 245.84	0.6 / 245.84	0.93 / 245.51	0.69 / 245.75	0.89 / 245.55	1.66 / 244.78	2.17 / 244.27	2.63 / 243.81	2.84 / 243.6	1.66 / 244.78	0.71 / 245.73	0.66 / 245.78	0.46 / 245.98	3.18 / 243.26
BH/MW 5	6.4 to 7.6	235.3 to 234.1	Silty Sand Glacial Till	2.81 / 238.96	2.81 / 238.96	3.67 / 238.1	3.33 / 238.44	4.75 / 237.02	5.59 / 236.18	6.33 / 235.44	7.13 / 234.64	Dry	5.67 / 236.1	4.4 / 237.37	3.98 / 237.79	3.04 / 238.73	5.76 / 236.01
BH/MW 7	4.6 to 6.1	239.0 to 237.5	Clay & Silt Glacial Till	1.8 / 241.9	5.69 / 238.01	4.8 / 239.0	2.42 / 241.28	1.8 / 241.9	2.55 / 241.15	3.51 / 240.19	4.44 / 239.26	4.71 / 238.99	4.74 / 238.96	4.29 / 239.42	3.5 / 240.2	2.54 / 241.16	2.58 / 241.12
BH/MW 11D	4.6 to 6.1	236.2 to 234.7	Clay & Silt Glacial Till	0.78 / 240.05	5.84 / 234.99	5.08 / 235.75	3.44 / 237.39	1.97 / 238.86	1.24 / 239.59	1.17 / 239.66	1.32 / 239.51	1.37 / 239.46	0.95 / 239.88	0.78 / 240.05	0.69 / 240.14	0.59 / 240.24	-
BH/MW 11S	1.5 to 4.0	239.2 to 236.7	Clay & Silt Glacial Till	0.43 / 240.36	2.87 / 237.92	2.48 / 238.31	0.43 / 240.36	0.51 / 240.28	0.83 / 239.96	1.08 / 239.71	1.07 / 239.72	1.11 / 239.68	0.46 / 240.33	0.82 / 239.97	0.66 / 240.13	0.6 / 240.19	-
BH/MW 12D	3.4 to 4.6	243.4 to 242.2	Clay & Silt Glacial Till	0.32 / 246.52	3.92 / 242.92	1.63 / 245.21	0.53 / 246.31	0.45 / 246.39	0.69 / 246.15	0.78 / 246.06	0.77 / 246.07	0.81 / 246.03	0.32 / 246.52	0.385 / 246.455	0.45 / 246.39	0.38 / 246.46	0.85 / 245.99
BH/MW 12S	1.2 to 3.0	245.6 to 243.8	Clay & Silt Glacial Till; Silt	0.35 / 246.55	0.51 / 246.39	0.61 / 246.29	0.53 / 246.37	0.52 / 246.38	0.72 / 246.18	0.81 / 246.09	0.79 / 246.11	0.75 / 246.15	0.35 / 246.55	0.46 / 246.44	0.48 / 246.42	0.41 / 246.49	0.82 / 246.08

Table 3.12: Groundwater Monitoring Summary

Monitoring Wells	Well Screen Location		Strata Screened	Groundwater Level Depth / Elev. (m)													
	Depth (m)	Elev. (m)		Highest Ground water Level	May 15/23	Jun. 6/23	Jul. 11/23	Aug. 8/23	Sept. 14/23	Oct. 19/23	Nov. 29/23	Dec. 20/23	Jan. 29/24	Feb. 27/24	Mar. 3/24	May 3/24	Aug. 20/24
BH/MW13D	3.7 to 4.6	236.4 to 235.5	Clay & Silt Glacial Till	0.66 / 239.51	4.35 / 235.82	3.61 / 236.56	0.66 / 239.51	0.72 / 239.45	1.55 / 238.62	2.36 / 237.81	3.29 / 236.88	3.52 / 236.65	2.4 / 237.77	2.25 / 237.92	1.69 / 238.48	0.96 / 239.21	1.52 / 238.66
BH/MW 13S	1.5 to 3.0	238.6 to 237.1	Clay & Silt Glacial Till	0.62 / 239.57	2.48 / 237.71	1.42 / 238.77	0.62 / 239.57	0.73 / 239.46	1.48 / 238.71	1.55 / 238.64	2.12 / 238.07	2.29 / 237.9	2.5 / 237.69	2.46 / 237.73	2.26 / 237.93	1.74 / 238.45	1.46 / 238.73
BH/MW 14D	3.7 to 4.6	231.0 to 230.0	Clay & Silt Glacial Till	0.25 / 234.55	3.91 / 230.89	2.64 / 232.16	0.52 / 234.28	0.64 / 234.16	2.17 / 232.63	3.44 / 231.36	3.96 / 230.84	2.88 / 231.92	0.25 / 234.55	0.42 / 234.39	0.41 / 234.39	0.27 / 234.53	1.52 / 233.28
BH/MW 14S	1.5 to 3.0	233.3 to 231.8	Clay & Silt Glacial Till	0.19 / 234.63	2.65 / 232.17	2.2 / 232.62	1.49 / 233.33	0.53 / 234.29	1.35 / 233.47	1.67 / 233.15	1.96 / 232.86	2.03 / 232.79	1.3 / 233.52	0.19/ 234.63	0.22 / 234.6	0.14 / 234.68	1.31 / 233.51
BH/MW16	4.6 to 6.1	238.1 to 236.6	Clay & Silt Glacial Till	0.9 / 241.87	4.56 / 238.21	1.54 / 241.23	0.94 / 241.83	0.9 / 241.87	1.25 / 241.52	1.73 / 241.04	2.28 / 240.49	2.39 / 240.38	1.72 / 241.05	1.48 / 241.29	1.29 / 241.48	1.22 / 241.55	1.26 / 241.51
BH/MW 17D	3.0 to 4.6	241.7 to 240.1	Clay & Silt Glacial Till	0.06 / 244.67	3.21 / 241.52	1.16 / 243.57	0.06 / 244.67	0.12 / 244.61	0.85 / 243.88	1.45 / 243.28	2.03 / 242.7	2.11 / 242.62	1.22 / 243.51	0.56 / 244.17	0.49 / 244.24	0.26 / 244.47	0.9 / 243.83
BH/MW 17S	1.5 to 3.0	243.1 to 241.6	Clay & Silt Glacial Till	0.2 / 244.51	2.75 / 241.96	1.83 / 242.88	0.57 / 244.14	0.61 / 244.1	0.77 / 243.94	1.38 / 243.33	1.71 / 243	1.71 / 243	1.2 / 243.51	0.48 / 244.23	0.36 / 244.35	0.2 / 244.51	0.77 / 243.94
BH/MW 18D	5.2 to 6.7	235.3 to 233.8	Clay & Silt Glacial Till	0.79 / 239.74	1.63 / 238.9	0.9 / 239.63	0.81 / 239.72	0.79 / 239.74	1.15 / 239.38	1.55 / 238.98	2.04 / 238.49	2.29 / 238.24	2.42 / 238.11	2.2 / 238.33	1.94 / 238.59	1.58 / 238.95	1.32 / 239.21
BH/MW 18S	1.5 to 3.0	239.0 to 237.5	Clay & Silt Glacial Till	1.09 / 239.44	2.8 / 237.73	2.1 / 238.43	1.4 / 239.13	1.11 / 239.42	1.09 / 239.44	1.29 / 239.24	1.64 / 238.89	1.82 / 238.71	2.09 / 238.44	2.17 / 238.36	2.04 / 238.49	1.31 / 239.22	1.26 / 239.27
BH/MW 19	4.6 to 6.1	234.7 to 233.2	Clay & Silt Glacial Till	0.37 / 238.95	0.31 / 239.01	0.6 / 238.7	0.5 / 238.82	0.37 / 238.95	0.39 / 238.93	0.57 / 238.75	0.92 / 238.4	1.09 / 238.23	0.81 / 238.51	0.73 / 238.59	0.66 / 238.66	0.58 / 238.74	0.66 / 238.67
BH/MW 22D	3.0 to 4.6	230.5 to 228.9	Clay & Silt Glacial Till	0.37 / 233.24	0.53 / 233.08	0.59 / 233.02	0.46 / 233.15	0.37 / 233.24	0.85 / 232.76	-	1.45 / 232.16	1.6 / 232.01	0.67 / 232.94	0.49 / 233.12	0.54 / 233.07	0.38 / 233.23	0.76 / 232.85
BH/MW 22S	1.5 to 3.0	232.0 to 230.5	Clay & Silt Glacial Till	0.28 / 233.32	Dry	2.43 / 231.17	1.67 / 231.93	0.6 / 233	1.09 / 232.51	-	1.44 / 232.16	1.69 / 231.91	0.46 / 233.14	0.31 / 233.29	0.39 / 233.21	0.28 / 233.32	0.85 / 232.75
BH/MW 23	2.3 to 3.8	236.3 to 234.8	Clay & Silt Glacial Till	0.6 / 238.1	3.79 / 234.91	3.04 / 235.66	1.96 / 236.74	0.92 / 237.78	1.12 / 237.58	1.56 / 237.14	2.04 / 236.66	2.22 / 236.48	1.21 / 237.49	0.6 / 238.1	0.42 / 238.28	0.35 / 238.35	1.05 / 237.65

Table 3.12: Groundwater Monitoring Summary

Monitoring Wells	Well Screen Location		Strata Screened	Groundwater Level Depth / Elev. (m)													
	Depth (m)	Elev. (m)		Highest Ground water Level	May 15/23	Jun. 6/23	Jul. 11/23	Aug. 8/23	Sept. 14/23	Oct. 19/23	Nov. 29/23	Dec. 20/23	Jan. 29/24	Feb. 27/24	Mar. 3/24	May 3/24	Aug. 20/24
BH/MW 24	6.1 to 7.6	229.8 to 228.3	Silt and Sand Glacial Till	1.22 / 234.71	1.23 / 234.7	1.54 / 234.39	1.91 / 234.02	1.53 / 234.4	1.74 / 234.19	1.94 / 233.99	2.26 / 233.67	2.13 / 233.8	1.5 / 234.43	1.42 / 234.51	1.27 / 234.66	1.22 / 234.71	1.58 / 234.35
BH/MW 26D	4.6 to 6.1	223.5 to 222.0	Silt Glacial Till	0.51 / 227.66	0.7 / 227.47	1.13 / 227.04	1.35 / 226.82	0.94 / 227.23	1.77 / 226.4	2.58 / 225.59	3.09 / 225.08	1.65 / 226.52	1.05 / 227.12	0.68/ 227.49	0.62 / 227.55	0.51 / 227.66	1.88 / 226.30
BH/MW 26S	1.5 to 3.0	226.6 to 225.1	Clay & Silt Glacial Till	0.27 / 227.93	2.79 / 225.41	2.35 / 225.85	1.9 / 226.3	1.47 / 226.73	0.97 / 227.23	1.07 / 227.13	1.33 / 226.87	1.37 / 226.83	0.5 / 227.7	0.41 / 227.79	0.31 / 227.89	0.27 / 227.93	0.67 / 227.53
BH/MW 27	4.6 to 6.1	221.7 to 220.2	Clay & Silt Glacial Till; Sandy Silt Glacial Till	2.88 / 223.48	3.1 / 223.26	3.77 / 222.59	3.73 / 222.63	3.73 / 222.63	5.45 / 220.91	5.83 / 220.53	-	-	3.92 / 222.44	3.69 / 222.67	3.21 / 223.15	2.88 / 223.48	4.99 / 221.37
BH/MW 28D	3.0 to 4.6	223.3 to 221.7	Clay & Silt Glacial Till; Bedrock	Above 226.4	Above 226.4	Above 226.4	Above 226.4	Above 226.4	Above 226.4	Above 226.4	0.15/ 226.25	0.36 / 226.04	Above 226.4	Above 226.4	Above 226.4	Above 226.4	Above 226.4
BH/MW 28S	1.5 to 3.0	224.8 to 223.3	Clay & Silt Glacial Till	Above 226.34	1.82 / 224.52	Above 226.34	Above 226.34	Above 226.34	0.16 / 226.18	0.48 / 225.86	0.65 / 225.69	0.62 / 225.72	0.16 / 226.18	0.05 / 226.29	0.05 / 226.29	Above 226.34	0.48 / 225.86
BH/MW 29	4.6 to 6.1	226.0 to 224.5	Bedrock	1.27 / 229.38	1.35 / 229.3	1.72 / 228.93	1.71 / 228.94	1.49 / 229.16	2.23 / 228.42	2.51 / 228.14	2.78 / 227.87	2.85 / 227.8	1.6 / 229.05	1.55 / 229.1	1.51 / 229.14	1.27 / 229.38	-
BH/MW 30D	3.0 to 4.6	226.7 to 225.1	Clay & Silt Glacial Till	0.36 / 229.41	3.94 / 225.83	3.16 / 226.61	1.33 / 228.44	0.45 / 229.32	0.89 / 228.88	1.2 / 228.57	1.14 / 228.63	0.97 / 228.8	0.51 / 229.26	0.36 / 229.41	0.41 / 229.36	0.37 / 229.4	0.97 / 228.8
BH/MW 30S	1.5 to 3.0	228.2 to 226.7	Clay & Silt Glacial Till	0.09 / 229.74	2.51 / 227.32	1.8 / 228.03	0.64 / 229.19	0.43 / 229.4	1.07 / 228.76	1.38 / 228.45	0.81 / 229.02	2.42 / 227.41	0.09 / 229.74	0.27 / 229.56	0.21 / 229.62	2.31 / 227.52	0.85 / 228.98
BH/MW 32D	3.4 to 4.9	229.1 to 227.6	Clay & Silt Glacial Till	0.34 / 232.24	4.1 / 228.48	3.42 / 229.16	2.74 / 229.84	1.4 / 231.18	1.04 / 231.54	1.56 / 231.02	1.93 / 230.65	2.21 / 230.37	0.87 / 231.71	0.52 / 232.06	0.39 / 232.19	0.34 / 232.24	0.83 / 231.75
BH/MW 32S	2.1 to 3.0	230.4 to 229.5	Clay & Silt Glacial Till	0.26 / 232.32	2.8 / 229.78	2.53 / 230.05	2.29 / 230.29	1.27 / 231.31	1.08 / 231.5	1.69 / 230.89	2.17 / 230.41	2.2 / 230.38	0.58 / 232	0.32 / 232.26	0.31 / 232.27	0.26 / 232.32	0.84 / 231.74
BH/MW 33D	5.0 to 6.6	226.2 to 224.6	Clay & Silt Glacial Till	2.29 / 228.96	4.95 / 226.3	4.6 / 226.65	2.76 / 228.49	2.39 / 228.86	2.44 / 228.81	2.76 / 228.49	3.25 / 228	3.54 / 227.71	3.11 / 228.14	2.82 / 228.43	2.62 / 228.63	2.29 / 228.96	2.38 / 228.87

Table 3.12: Groundwater Monitoring Summary

Monitoring Wells	Well Screen Location		Strata Screened	Groundwater Level Depth / Elev. (m)													
	Depth (m)	Elev. (m)		Highest Ground water Level	May 15/23	Jun. 6/23	Jul. 11/23	Aug. 8/23	Sept. 14/23	Oct. 19/23	Nov. 29/23	Dec. 20/23	Jan. 29/24	Feb. 27/24	Mar. 3/24	May 3/24	Aug. 20/24
BH/MW 33S	1.5 to 3.0	229.6 to 228.1	Clay & Silt Glacial Till	0.31 / 230.85	2.47 / 228.69	2.01 / 229.15	1.51 / 229.65	0.88 / 230.28	1.65 / 229.51	1.55 / 229.61	2 / 229.16	2.09 / 229.07	1.22 / 229.94	0.61 / 230.55	0.45 / 230.71	0.31 / 230.85	1.5 / 229.66
BH/MW 36	4.6 to 6.1	220.5 to 219.0	Sandy Silt Glacial Till	0.72 / 224.45	1.12 / 224.05	1.13 / 224.04	1.53 / 223.64	0.81 / 224.36	1.29 / 223.88	1.56 / 223.61	1.99 / 223.18	2.32 / 222.85	1.34 / 223.83	1.07 / 224.1	0.98 / 224.19	0.72 / 224.45	1.3 / 223.87
BH/MW 38D	4.9 to 6.4	216.4 to 214.9	Sandy Silt Glacial Till	0.32 / 220.98	0.48 / 220.82	0.82 / 220.48	0.64 / 220.66	0.72 / 220.58	-	2.92 / 218.38	1.72 / 219.58	1.24 / 220.06	0.38 / 220.92	0.32 / 220.98	0.48 / 220.82	0.38 / 220.92	1.2 / 220.1
BH/MW 38S	2.1 to 3.7	219.2 to 217.6	Sandy Silt Glacial Till	0.29 / 221.01	0.47 / 220.83	0.82 / 220.48	0.64 / 220.66	0.7 / 220.6	-	1.72 / 219.58	1.55 / 219.75	1.05 / 220.25	0.33 / 220.97	0.29 / 221.01	0.48 / 220.82	0.34 / 220.96	1.21 / 220.09
BH/MW 39D	5.2 to 6.7	216.3 to 214.8	Sandy Silt; Sand and Silt Till	0.41 / 221.19	0.5 / 221.1	0.7 / 220.9	0.49 / 221.11	0.56 / 221.04	1.37 / 220.23	1.74 / 219.86	2.26 / 219.34	2.41 / 219.19	0.55 / 221.05	0.44 / 221.16	0.54 / 221.06	0.41 / 221.19	1.48 / 220.12
BH/MW 39S	1.5 to 3.0	220.1 to 218.6	Clay & Silt Glacial Till	0.25 / 221.4	2.09 / 219.56	1.18 / 220.47	0.4 / 221.25	0.48 / 221.17	1.36 / 220.29	1.63 / 220.02	1.91 / 219.74	2.04 / 219.61	0.33 / 221.32	0.28 / 221.37	0.43 / 221.22	0.25 / 221.4	1.61 / 220.04
BH/MW 40	3.0 to 6.1	222.7 to 219.6	Clay & Silt Glacial Till	0.3 / 225.44	4.64 / 221.1	2.88 / 222.86	0.63 / 225.11	0.45 / 225.29	1.18 / 224.56	1.61 / 224.13	1.95 / 223.79	1.93 / 223.81	0.74 / 225	0.43 / 225.31	0.35 / 225.39	0.3 / 225.44	1.32 / 224.43
BH/MW 41D	3.0 to 4.6	224.8 to 223.2	Clay & Silt Glacial Till	0.68 / 227.15	4.13 / 223.7	3.35 / 224.48	1.19 / 226.64	0.76 / 227.07	1.22 / 226.61	-	1.84 / 225.99	2.15 / 225.68	1.51 / 226.32	1.21 / 226.62	1.01 / 226.82	0.68 / 227.15	1.35 / 226.48
BH/MW 41S	1.5 to 3.0	226.3 to 224.8	Clay & Silt Glacial Till	0.53 / 227.38	1.25 / 226.66	1.03 / 226.88	0.97 / 226.94	0.69 / 227.22	1.53 / 226.38	-	2.24 / 225.67	2.47 / 225.44	1.18 / 226.73	0.53 / 227.38	0.56 / 227.35	0.32 / 227.59	-
BH/MW 101	3.0 to 6.1	237.2 to 234.1	Clay & Silt Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	6.26 / 238.42
BH/MW 102	3.0 to 6.1	236.4 to 233.3	Clay & Silt Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	6.36 / 234.58
BH/MW 103	3.0 to 6.1	232.0 to 228.9	Clay & Silt Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	6.08 / 233.38
BH/MW 104D	3.0 to 6.1	234.5 to 231.4	Clay & Silt Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	6.10 / 232.10

Table 3.12: Groundwater Monitoring Summary

Monitoring Wells	Well Screen Location		Strata Screened	Groundwater Level Depth / Elev. (m)													
	Depth (m)	Elev. (m)		Highest Ground water Level	May 15/23	Jun. 6/23	Jul. 11/23	Aug. 8/23	Sept. 14/23	Oct. 19/23	Nov. 29/23	Dec. 20/23	Jan. 29/24	Feb. 27/24	Mar. 3/24	May 3/24	Aug. 20/24
BH/MW 104S	0.8 to 2.3	236.7 to 235.2	Clay & Silt Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
BH/MW 105	3.0 to 6.1	231.9 to 228.8	Clay & Silt Glacial Till	-	-	-	-	-	-	-	-	-	-	-	-	-	6.29 / 231.1

Table 3.13: Summary of Groundwater and Surface Water Data / Interaction

Staff Gauge (SG)	Monitoring Well / Piezometer	Ecological Community / Headwater Drainage Feature	Groundwater Elevation Range	Surface Water Elevation Range	Vertical Hydraulic Gradient	Surface / Groundwater Connection
SG1	MW38D / MW38S	MAM2-10 (Ford Mineral Meadow Marsh)	221.1 - 218.4 m asl	220.7 - 220.1 m asl	***Spring and summer:*** neutral to downward flow ***Fall and winter:*** negative	Surface water fed
SG2	MW39D / MW39S	Dist (Disturbed)	221.3 - 219.1 m asl	220.4 - 219.7 m asl	***Spring and summer:*** upward flow to downward flow ***Fall and winter:*** downward flow	Surface water fed
SG3	MW41D / MW41S	Reed Canary Grass Mineral Meadow Marsh (MAM2-2)	223.7 - 227.8 m asl	227.7 - 227.6 m asl	***Spring and summer:*** downward flow ***Fall and winter:*** upward flow to downward flow	Surface water fed
SG4	MW32D / MW32S	Reed Canary Grass Mineral Meadow Marsh (MAM2-2)	232.5 - 228.4 m asl	232.5 - 232.4 m asl	***Spring and Summer:*** downward flow ***Fall and Winter:*** upward flow	Surface water fed
SG5	MW30D / MW30S	Silver Maple Mineral Deciduous Swamp (SWD3-2)	229.6 - 225.8 m asl	231.8 - 231.4 m asl	***Spring and Summer:*** downward flow ***Fall and winter:*** downward flow to upward flow	Surface water fed
SG6	MW28D / MW28S	H3S1A/H5S4	226.3 – 224.5 m asl	225.8 - 225.6 m asl	***Spring and summer:*** neutral ***Fall and winter:*** upward flow	Groundwater fed
SG7	MW26D / MW26S	H4S2	227.7 - 225.3 m asl	228.1 - 227.8 m asl	***Spring and summer:*** upward flow ***Fall and winter:*** downward flow	Surface water fed
SG8	MW22D / MW22S	H4S3	233.6 - 231.2 m asl	233.0 - 232.9 m asl	***Spring, summer and fall:*** upward flow ***Winter:*** neutral to downward flow	Surface water fed
SG9	MW14D / MW14S	-	234.6 - 230.8 m asl	235.0 - 234.9 m asl	***Spring and summer:*** downward flow to upward flow ***Fall and winter:*** downward flow to upward flow	Surface water fed
SG10	MW17D / MW17S	Reed Canary Grass Mineral Meadow Marsh (MAM2-2)	244.6 - 241.5 m asl	246.3 - 245.9 m asl	***Spring to summer:*** upward flow ***Fall to winter:*** downward flow to neutral	Surface water fed

Table 3.13: Summary of Groundwater and Surface Water Data / Interaction

Staff Gauge (SG)	**Monitoring Well / Piezometer**	**Ecological Community / Headwater Drainage Feature**	**Groundwater Elevation Range**	**Surface Water Elevation Range**	**Vertical Hydraulic Gradient**	**Surface / Groundwater Connection**
SG11	MW11D / MW11S	H1S1	240.3 - 235.0 m asl	242.5 - 242.3 m asl	***Spring to summer:*** downward flow to neutral ***Fall to winter:*** downward flow to upward flow	Surface water fed
SG12	MW12D / MW12S	Cattail Mineral Shallow Marsh Mowed (MAS2-1)	246.5 - 242.9 m asl	248.5 - 248.0 m asl	***Spring to summer:*** downward flow to neutral ***Fall and winter:*** neutral	Groundwater fed
SG13	MW13D / MW13S	-	239.5 - 235.8 m asl	239.4 - 239.1 m asl	***Spring to summer:*** downward flow to neutral ***Fall to winter:*** downward flow to upward flow	Surface water fed
SG14	MW1D / MW1S	Reed Canary Grass Mineral Meadow Marsh (MAM2-2)	242.0 - 239.9 m asl	241.8 - 241.4 m asl	***Spring to summer:*** upward flow to neutral ***Fall to winter:*** neutral to upward flow	Surface water fed
SG15	MW3D / MW3S	Cattail Mineral Shallow Marsh (MAS2-1)	247.7 - 245.8 m asl	249.2 - 248.8 m asl	***Spring to summer:*** upward flow to downward flow ***Fall to winter:*** downward flow	Groundwater fed
SG16	MW4D / MW4S	Swamp Maple Mineral Deciduous Swamp (SWD3-3)	247.3 - 244.1 m asl	248.3 - 247.6 m asl	***Spring to summer:*** downward flow ***Fall to winter:*** downward flow	Surface water fed

Table 3.14: Summary of Hydraulic Conductivity Testing

Monitoring Wells	Well Screen Location		Strata Screened	Hydraulic Conductivity (K) (m/s)
	Depth (m)	Elev. (m)		
BH/MW 5	6.1 to 7.6	235.7 to 234.2	Silty Sand Glacial Till	4.3×10^{-7}
BH/MW 16	4.6 to 6.1	238.1 to 236.6	Clay and Silt Glacial Till	2.2×10^{-7}
BH/MW 18D	4.6 to 6.1	235.9 to 234.4	Clay and Silt Glacial Till	7.4×10^{-8}
BH/MW 19	4.6 to 6.1	234.7 to 227.1	Silty Clay Glacial Till	4.0×10^{-8}
BH/MW 26D	4.6 to 6.1	223.5 to 222	Silt Glacial Till	4.7×10^{-7}
BH/MW 27	4.6 to 6.1	221.7 to 220.2	Sandy Silt Glacial Till	3.9×10^{-7}
BH/MW 33D	5.0 to 6.6	226.2 to 224.6	Clay and Silt Glacial Till	2.6×10^{-7}
BH/MW 36D	4.6 to 6.1	220.5 to 219	Sandy Silt Glacial Till	3.6×10^{-7}
BH/MW 38D	4.9 to 6.4	216.4 to 214.9	Sandy Silt Glacial Till	2.6×10^{-5}
BH/MW101	3.1 to 6.1	237.1 to 234.1	Clay and Silt Glacial Till	8.2×10^{-9}
BH/MW103	3.1 to 6.1	232.7 to 229.7	Clay and Silt Glacial Till	2.6×10^{-8}
MW4 (Pinchin)	3.0 to 6.0	240.4 to 237.4	Silty Clay	4.8×10^{-7}
MW8 (Pinchin)	3.0 to 6.0	234.8 to 231.8	Silty Clay	2.5×10^{-9}

Table 3.15: Estimated Hydraulic Conductivity from Grain Size Distributions

Borehole	Sample			Soil Type	Estimated Hydraulic Conductivity (K) (m/s)
	Number	Depth (m)	Elev. (m)		
BH1	SS6	4.6 to 5.0	237.7 to 237.3	Clay and Silt Till	1.9×10^{-8}
BH3	SS3	1.5 to 2.0	246.3 to 245.8	Clay and Silt Till	7.4×10^{-9}
BH4	SS6	4.6 to 5.0	241.7 to 241.3	Silty Sand Till	3.4×10^{-6}
BH6	SS7	6.1 to 6.6	234.1 to 233.6	Silt and Clay Till	1.7×10^{-8}
BH11	SS3	1.5 to 2.0	239.3 to 238.8	Clay and Silt Till	9.5×10^{-9}
BH17	SS5	3.0 to 3.5	241.7 to 241.2	Clay and Silt Till	5.7×10^{-9}
BH18	SS3	1.5 to 2.0	239 to 238.5	Clay and Silt Till	5.7×10^{-9}
BH19	SS6	4.6 to 5.0	234.7 to 234.3	Clay and Silt Till	9.9×10^{-9}
BH23	SS4	2.3 to 2.7	236.3 to 235.9	Clay and Silt Till	5.3×10^{-9}
BH26	SS6	4.6 to 5.0	223.5 to 223.1	Silt Till	2.6×10^{-7}
BH30	SS2	0.8 to 1.2	228.9 to 228.5	Clay and Silt Till	1.1×10^{-8}
BH33	SS7	6.1 to 6.6	225.1 to 224.6	Clay and Silt Till	1.1×10^{-8}

Borehole	Sample			Soil Type	Estimated Hydraulic Conductivity (K) (m/s)
	Number	Depth (m)	Elev. (m)		
BH39	SS7	6.1 to 6.6	215.4 to 214.9	Sand and Silt Till	2.6×10^{-6}
BH41	SS5	3.0 to 3.5	224.8 to 224.3	Clay and Silt Till	8.8×10^{-8}
BH/MW101	SS5	3.0 to 3.5	237.2 to 236.7	Clay and Silt Till	7.4×10^{-9}
BH/MW103	SS2	0.8 to 1.2	235.0 to 234.6	Clay and Silt Till	8.4×10^{-9}
BH/MW105	SS4	2.3 to 2.7	232.6 to 232.2	Clay and Silt Till	6.8×10^{-9}

*The geometric mean was taken from Hazen, Slichter, Terzaghi, Beyer, Sauerbrei, Vukovic and Soro, Kruger, Kozeny-Carmen, Zunker, Zamarin, USBR, Barr, Alyamni and Sen, Chapuis, Krumbein and Monk and Shepherd equations to determine the hydraulic conductivities based on the grain size distribution.

APPENDIX C4

BOREHOLE LOGS

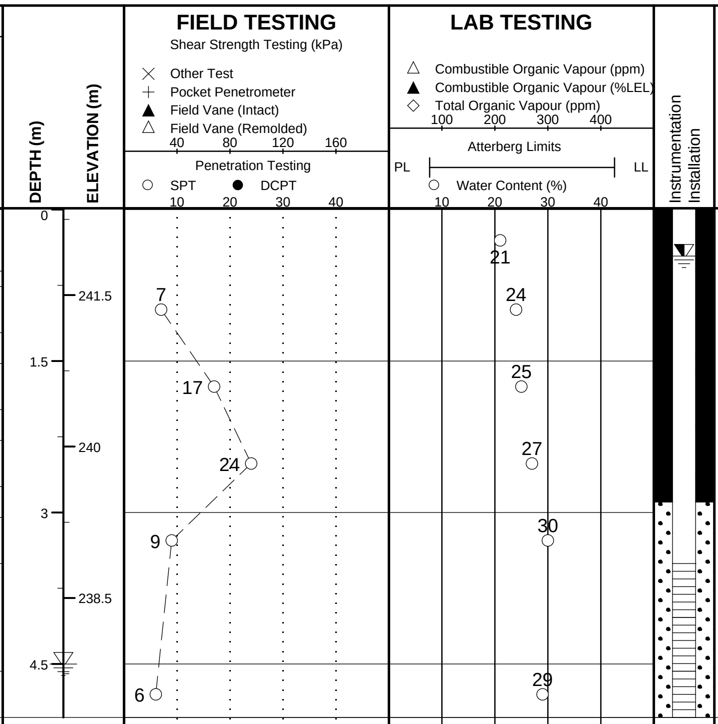
RECORD OF BOREHOLE No. 1-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Reviewed By: **RW**
Northing: **4853404**
Easting: **599878.7**
Date Started: **May 4/23**
Date Completed: **May 4/23**

Depth (m) / Elevation (m)	LITHOLOGY PROFILE – DESCRIPTION (Geodetic)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
0.0 / 242.3 – 0.6 / 241.7	TOPSOIL: 610 mm	AS	1			21				
0.6 / 241.7 – 1.5 / 240.8	WEATHERED/DISTURBED Some organics, firm, brown to dark brown, moist	SS	2	100	7	24				
1.5 / 240.8 – 5.0 / 237.3	CLAY AND SILT GLACIAL TILL: Some sand, inferred cobbles and boulders, very stiff, grey, moist to wet	SS	3	100	17	25				
		SS	4	45	24	27				
	- - - Stiff - - -	SS	5	100	9	30				
	- - - Firm - - -	SS	6	100	6	29	0	12	46	42

Borehole Terminated at 5.0 m



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: 4.5 m.
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.46 m.
Groundwater Elevation: 241.9 m

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 1-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Northing: **4853404**
Date Started: **May 4/23**
Reviewed By: **RW**
Easting: **599879.3**
Date Completed: **May 4/23**

GEI Consultants

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION Geodetic 0.0 242.3	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Shear Strength Testing (kPa) × Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded) 40 80 120 160 Penetration Testing ○ SPT ● DCPT 10 20 30 40	△ Combustible Organic Vapour (ppm) ▲ Combustible Organic Vapour (%LEL) ◇ Total Organic Vapour (ppm) 100 200 300 400 Atterberg Limits PL ├──┤ LL ○ Water Content (%) 10 20 30 40	Instrumentation Installation	GR	SA	SI	CL
	TOPSOIL: 610 mm 0.6 241.7					0								
	WEATHERED/DISTURBED Some organics, firm, brown to dark brown, moist moist 1.5 240.8						241.5							
	CLAY AND SILT GLACIAL TILL: Some sand, inferred cobbles and boulders, very stiff, grey, moist to wet 3.0 239.3					1.5 3	240							
	Borehole Terminated at 3.0 m													

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling:
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.57 m.
Groundwater Elevation: 241.7 m

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

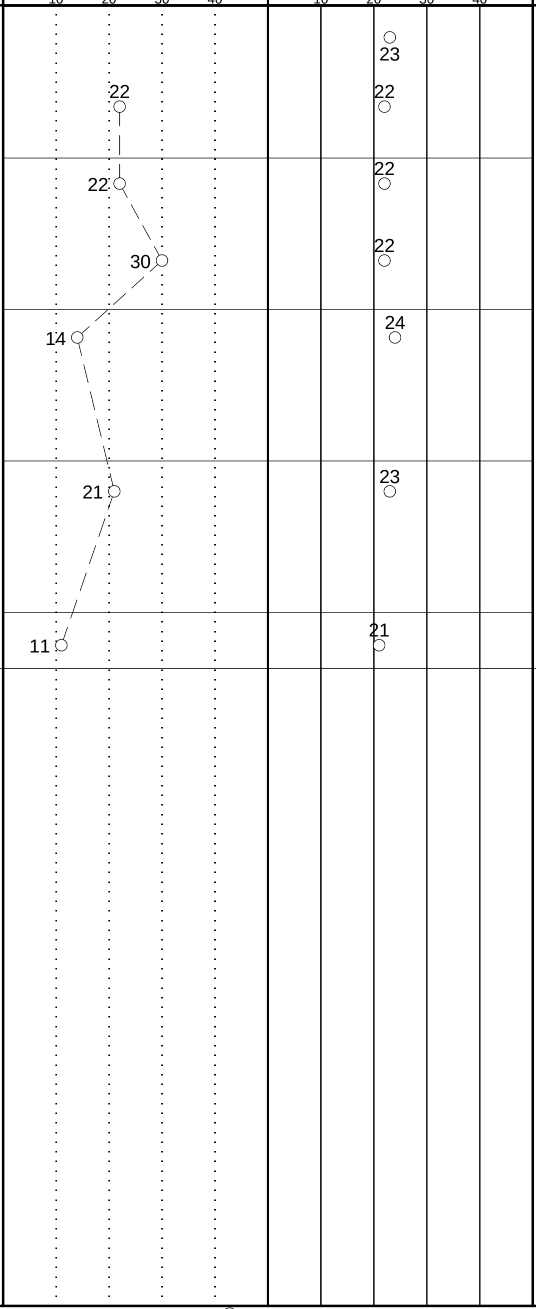
Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 2

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Northing: **4853574**
Date Started: **May 4/23**
Reviewed By: **RW**
Easting: **600090.9**
Date Completed: **May 4/23**

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)
Depth (m) / Elevation (m)	DESCRIPTION (Geodetic)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	SPT	Water Content (%)	Instrumentation Installation	GR / SA / SI / CL
0.0 / 249.1						0	249				
0.1 / 249.0	TOPSOIL: 130 mm										
	WEATHERED/DISTURBED Trace organics, brown, moist	AS	1						23		
0.8 / 248.4	CLAY AND SILT GLACIAL TILL: Some sand trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	2	100	22			22	22		
		SS	3	100	22	1.5	247.5	22	22		
		SS	4	100	30			30	22		
	- - - Stiff - - -	SS	5	100	14	3	246	14	24		
	- - - Very stiff - - -	SS	6	100	21	4.5	244.5	21	23		
6.6 / 242.6	- - - Stiff - - -	SS	7	100	11	6	243	11	21		
	Borehole Terminated at 6.6 m										



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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

Scale: **1 :75**
Page: **1 of 1**

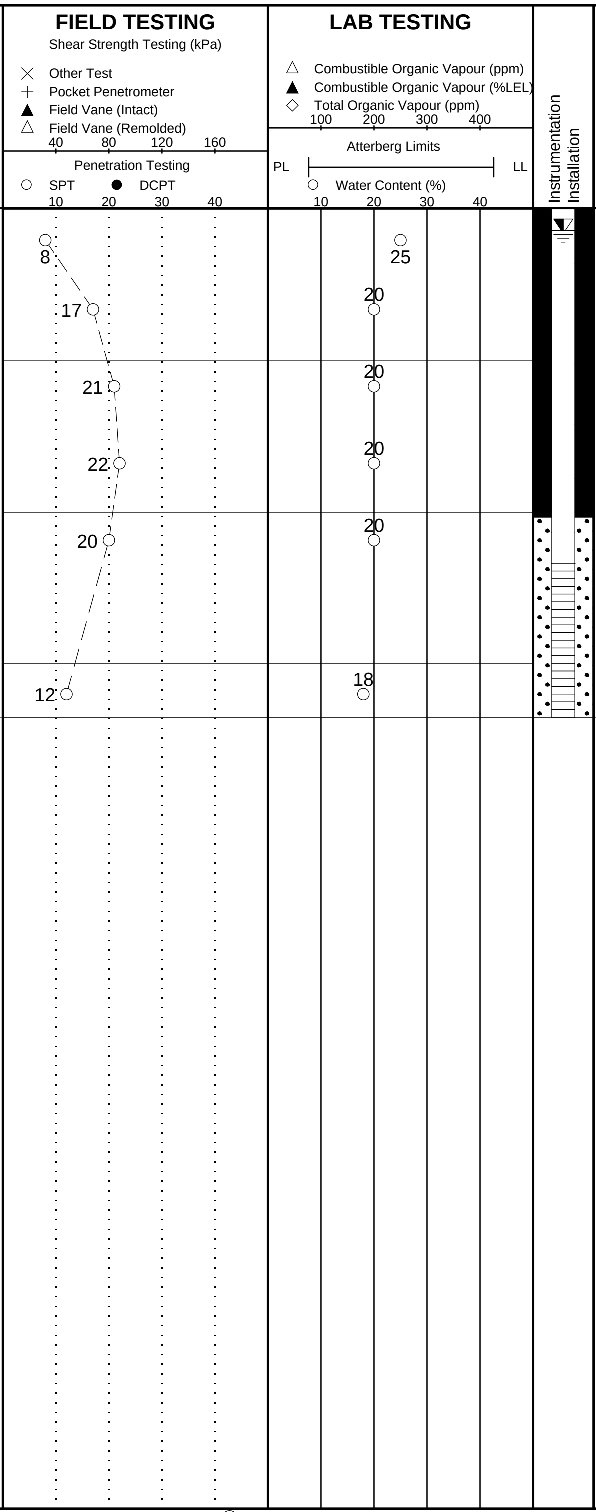
RECORD OF BOREHOLE No. 3-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853765**
Easting: **600186.9**
Date Started: **May 3/23**
Date Completed: **May 3/23**

LITHOLOGY PROFILE			SOIL SAMPLING					
Depth (m)	DESCRIPTION (Geodetic)	Elevation (m)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR / SA / SI / CL	
0.0		247.8						
0.2	TOPSOIL: 150 mm	247.7	SS	1	50	8		
0.6	WEATHERED/DISTURBED Stiff, brown, moist	247.2						
	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist		SS	2	100	17		
			SS	3	100	21	0 / 3 / 41 / 56	
			SS	4	100	22		
	- - - Grey/brown/orange - - -		SS	5	100	20		
	- - - Stiff, grey, moist to wet - - -		SS	6	65	12		
5.0		242.8						

Borehole Terminated at 5.0 m



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.21 m.
Groundwater Elevation: 247.6 m

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

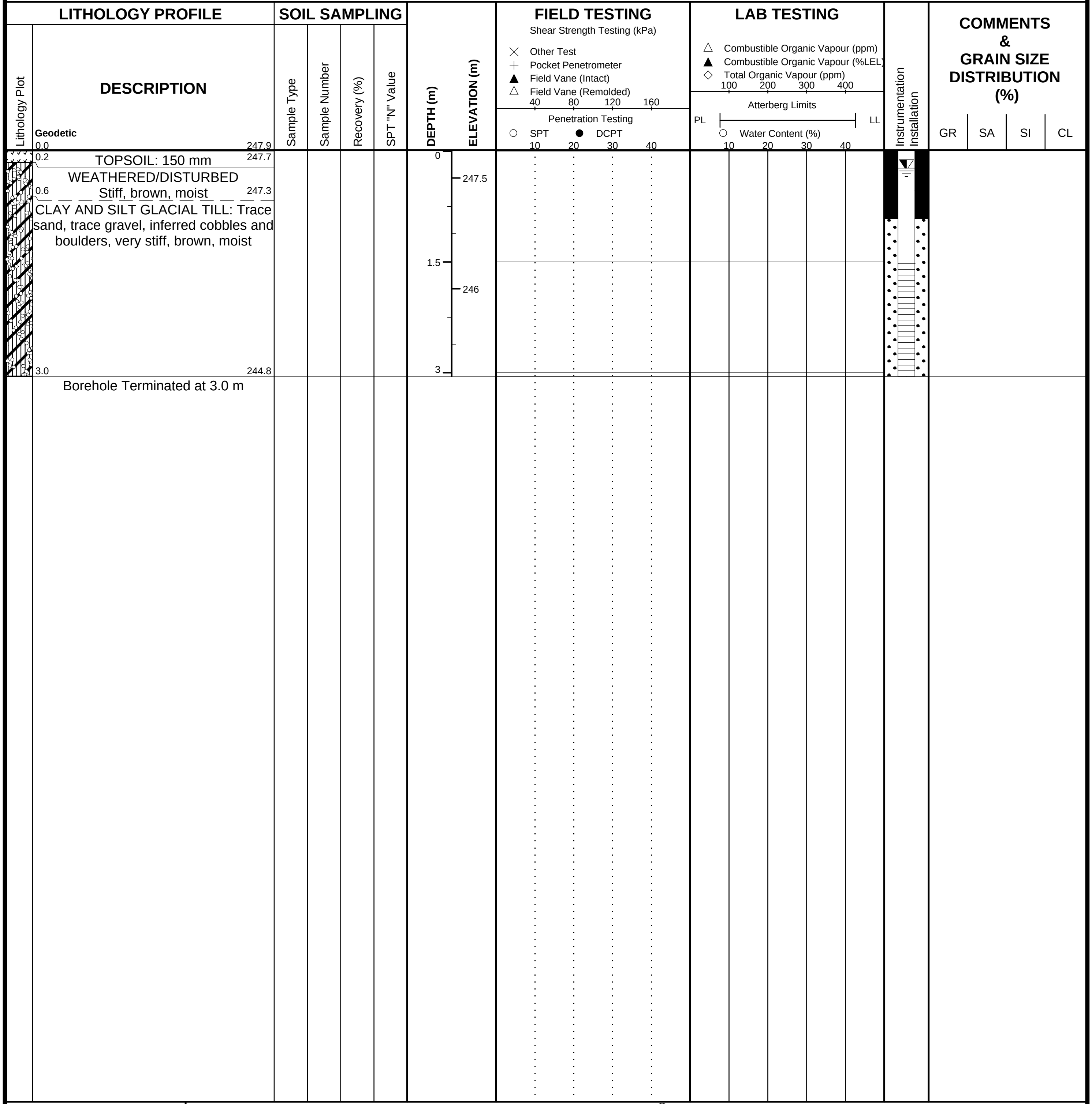
Scale: **1 :75**

Page: **1 of 1**

RECORD OF BOREHOLE No. 3-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4863764**
Easting: **600186.9**
Date Started: **May 3/23**
Date Completed: **May 3/23**



Depth (m)	Elevation (m)	Description
0.0	247.9	Geodetic
0.2	247.7	TOPSOIL: 150 mm
0.6	247.3	WEATHERED/DISTURBED Stiff, brown, moist
3.0	244.8	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist

Borehole Terminated at 3.0 m

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry

Cave depth after auger removal: Open

Groundwater depth observed on: Jul 11/23 at depth of: 0.23 m.

Groundwater Elevation: 247.6 m

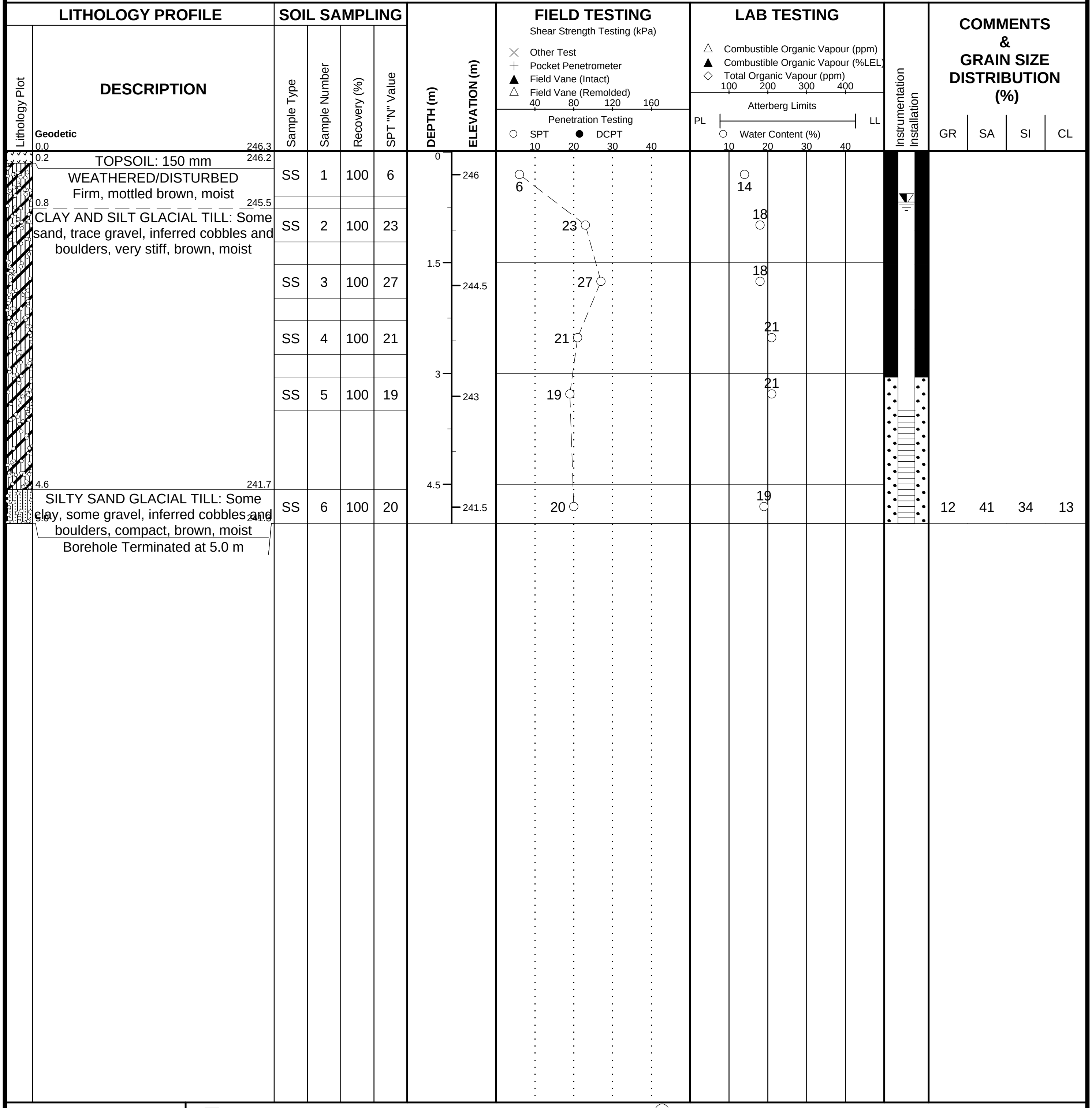
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and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

Scale: **1 :75**

RECORD OF BOREHOLE No. 4-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4854033**
Easting: **600270.7**
Date Started: **May 3/23**
Date Completed: **May 3/23**



Depth (m)	Elevation (m)	DESCRIPTION
0.0	246.3	**Geodetic**
0.2	246.2	TOPSOIL: 150 mm
		WEATHERED/DISTURBED Firm, mottled brown, moist
0.8	245.5	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist
4.6	241.7	SILTY SAND GLACIAL TILL: Some clay, some gravel, inferred cobbles and boulders, compact, brown, moist
5.0	241.3	Borehole Terminated at 5.0 m

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
SS	1	100	6	14				
SS	2	100	23	18				
SS	3	100	27	18				
SS	4	100	21	21				
SS	5	100	19	21				
SS	6	100	20	19	12	41	34	13

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry

Cave depth after auger removal: Open

Groundwater depth observed on: Jul 11/23 at depth of: 0.68 m.

Groundwater Elevation: 245.6 m

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

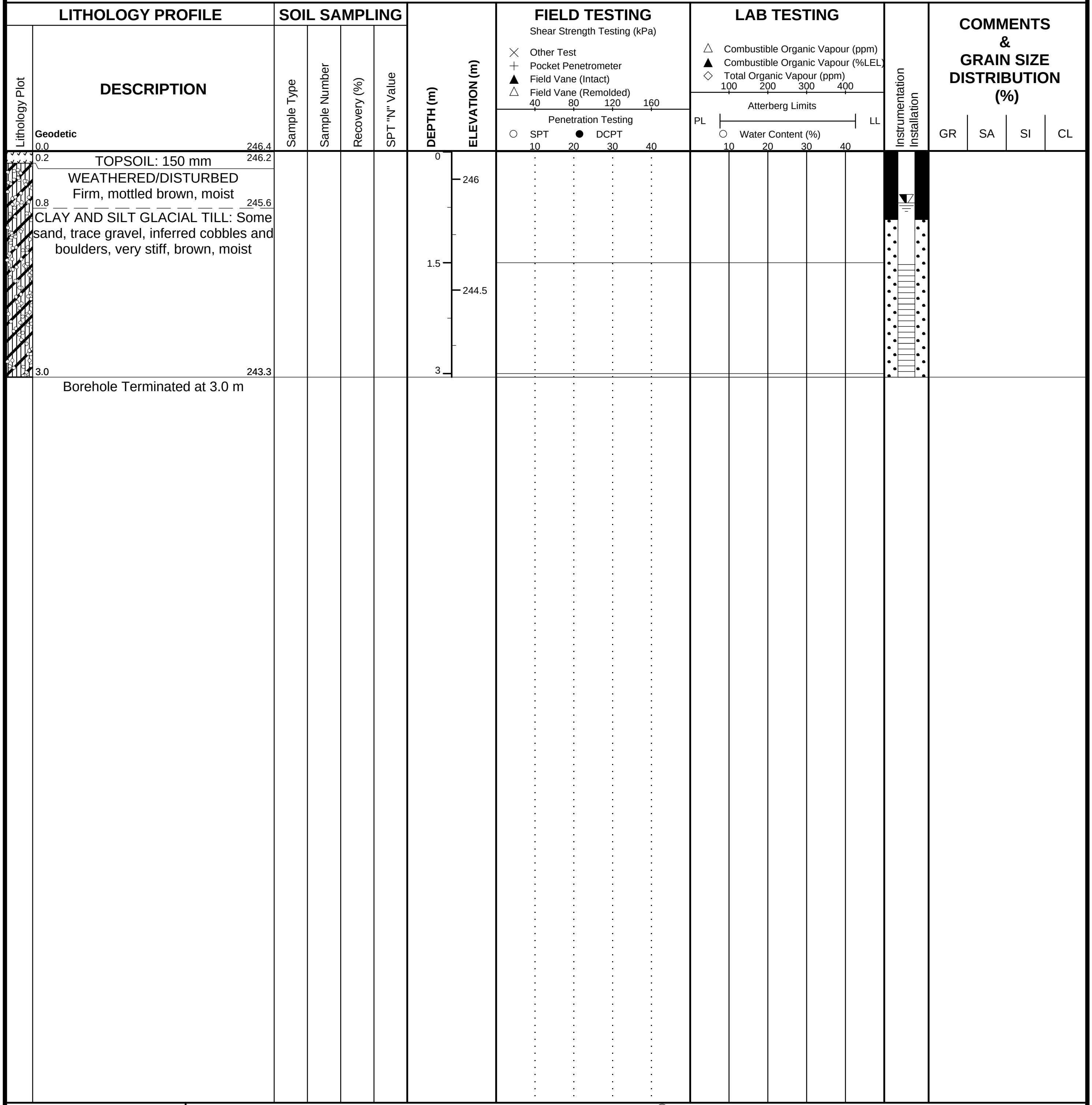
Scale: **1 :75**

Page: **1 of 1**

RECORD OF BOREHOLE No. 4-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4854033**
Easting: **600270**
Date Started: **May 3/23**
Date Completed: **May 3/23**



TOPSOIL: 150 mm

WEATHERED/DISTURBED
Firm, mottled brown, moist

CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist

Borehole Terminated at 3.0 m

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry

Cave depth after auger removal: Open

Groundwater depth observed on: Jul 11/23 at depth of: 0.69 m.

Groundwater Elevation: 245.7 m

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

Scale: **1 :75**

RECORD OF BOREHOLE No. 5

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

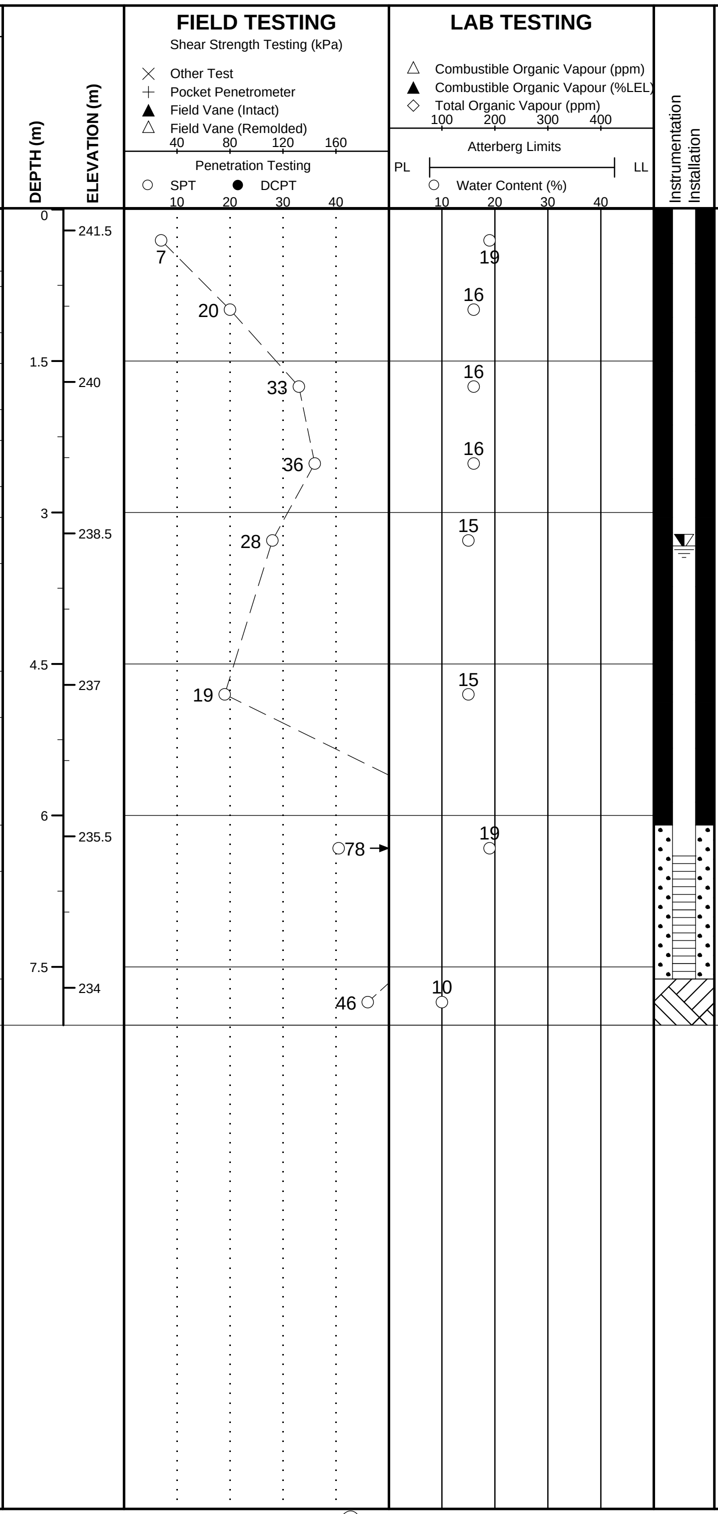
Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4854286**
Easting: **600502.1**
Date Started: **May 3/23**
Date Completed: **May 3/23**

LITHOLOGY PROFILE

Depth (m)	Elevation (m)	DESCRIPTION
0.0	241.7	Geodetic
0.2	241.6	TOPSOIL: 150 mm
		WEATHERED/DISTURBED Trace organics, firm, brown, moist
0.8	240.9	CLAY AND SILT GLACIAL TILL: Some sand trace gravel, inferred cobbles and boulders, very stiff to hard, brown, moist
		- - - Grey - - -
6.1	235.6	SILTY SAND GLACIAL TILL: Trace gravel, inferred cobbles and boulders, hard, brown, wet
		- - - Grey - - -
8.1	233.6	Borehole Terminated at 8.1 m

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
SS	1	100	7	19
SS	2	100	20	16
SS	3	100	33	16
SS	4	100	36	16
SS	5	100	28	15
SS	6	100	19	15
SS	7	100	78	19
SS	8	100	46	10



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 3.33 m.
Groundwater Elevation: 238.4 m

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 6

GEI Consultants

Project Number: **2100463**

Project Client: **Wildfield Village Landowners Group Inc.**

Project Name: **Wildfield Village**

Project Location: **Town of Caledon, ON**

Drilling Location: **See Borehole Location Plan**

Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**

Drilling Machine: **Track Mount**

Logged By: **FH**

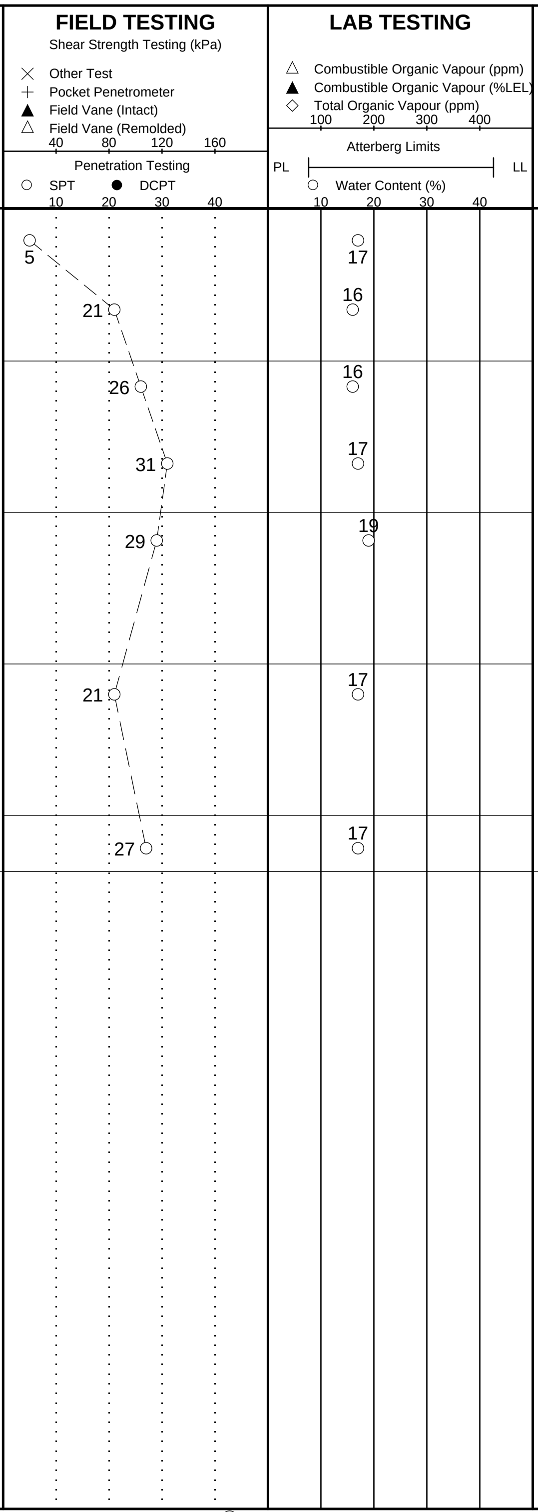
Reviewed By: **RW**

Northing: **4854174**

Easting: **600721.2**

Date Started: **May 3/23**

Date Completed: **May 3/23**



Depth (m)	Elevation (m)	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
0.0	240.2	Geodetic									
0.3	239.9	TOPSOIL: 305 mm									
0.8	239.4	WEATHERED/DISTURBED Trace organics, firm, brown, moist	SS	1	100	5	17				
		CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff to hard, brown with grey, moist	SS	2	100	21	16				
			SS	3	100	26	16				
			SS	4	100	31	17				
		- - - Grey/brown - - -	SS	5	100	29	19				
		- - - Grey - - -	SS	6	100	21	17				
6.6	233.6		SS	7	100	27	17	2	14	43	41
		Borehole Terminated at 6.6 m									

Depth (m): 0, 1.5, 3, 4.5, 6
Elevation (m): 240, 238.5, 237, 235.5, 234

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry

Cave depth after auger removal: Open

Groundwater depth observed on:

Groundwater Elevation:

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

Scale: **1 :75**

Page: **1 of 1**

RECORD OF BOREHOLE No. 7

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853981**
Easting: **600519.4**
Date Started: **May 2/23**
Date Completed: **May 2/23**

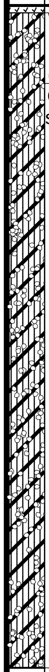
LITHOLOGY PROFILE

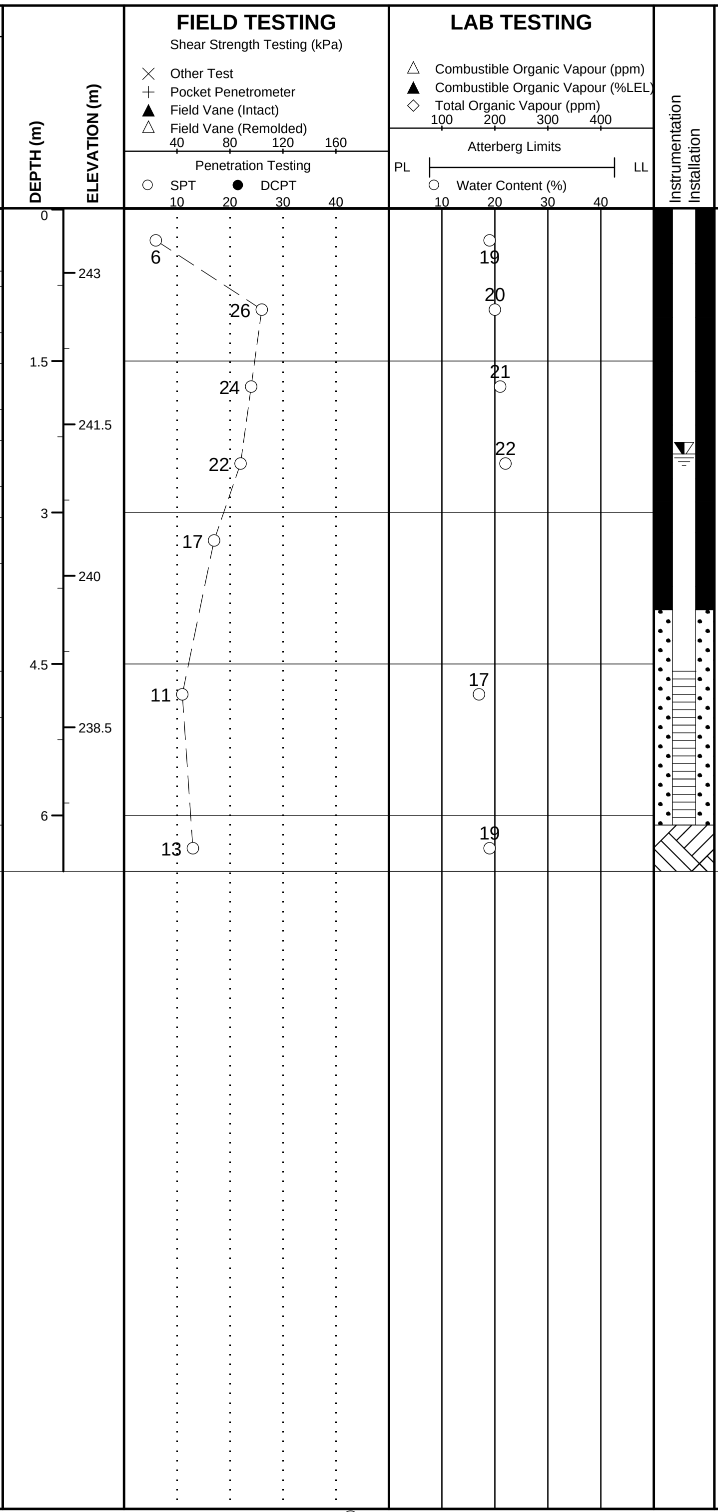
Geodetic

Depth (m)	Elevation (m)	DESCRIPTION
0.0 0.1	243.6 243.6	TOPSOIL: 75 mm
		WEATHERED/DISTURBED Firm, mottled brown, moist
0.8	242.9	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist - - - Brown/grey - - - - - - Grey - - - - - - Stiff - - -
6.6	237.1	Borehole Terminated at 6.6 m

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
SS	1	100	6	19
SS	2	100	26	20
SS	3	100	24	21
SS	4	100	22	22
SS	5	100	17	
SS	6	100	11	17
SS	7	100	13	19





COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 2.42 m.
Groundwater Elevation: 241.2 m

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

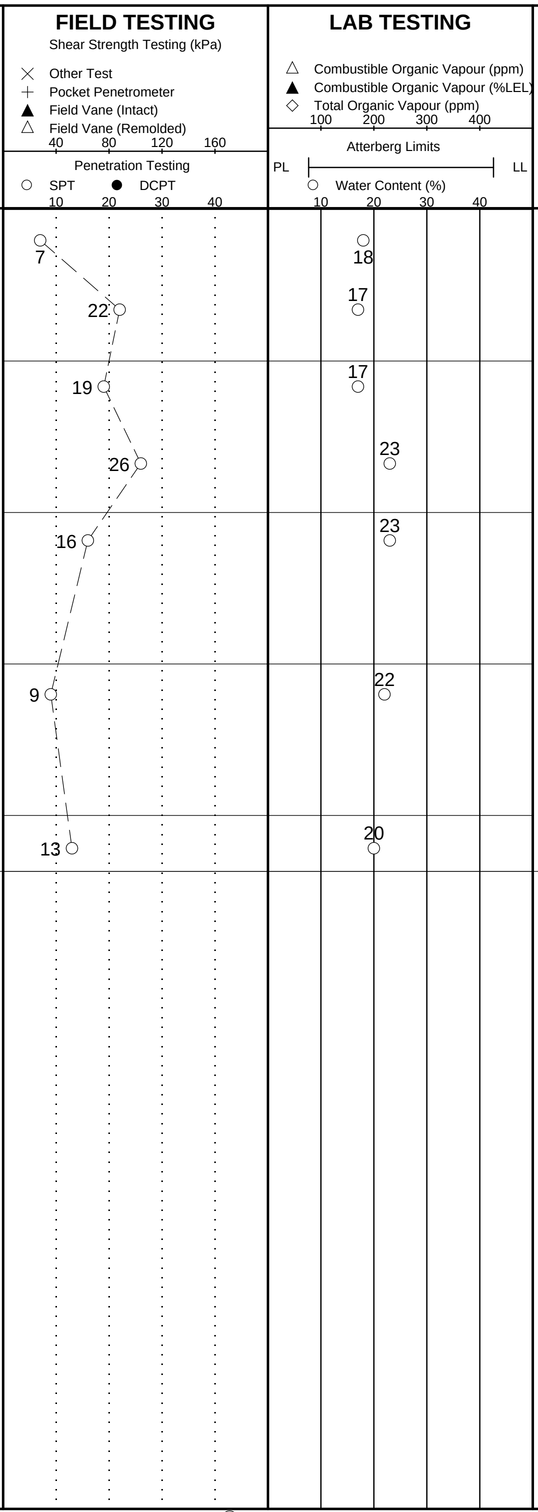
Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 8

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853630**
Easting: **600390.2**
Date Started: **May 3/23**
Date Completed: **May 3/23**

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)
Depth (m)	DESCRIPTION (Geodetic)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: SPT	Water Content (%)	Instrumentation Installation	GR / SA / SI / CL
0.0	244.5					0	244.5				
0.3	TOPSOIL: 305 mm — 244.2										
	WEATHERED/DISTURBED Firm, mottled brown, moist	SS	1	100	7			7	18		
0.8	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist — 243.8	SS	2	100	22			22	17		
	- - - Brown/grey - - -	SS	3	100	19	1.5	243	19	17		
		SS	4	100	26			26	23		
	- - - Grey - - -	SS	5	65	16	3	241.5	16	23		
	- - - Stiff - - -	SS	6	100	9	4.5	240	9	22		
		SS	7	100	13	6	238.5	13	20		
6.6	238.0										
	Borehole Terminated at 6.6 m										



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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

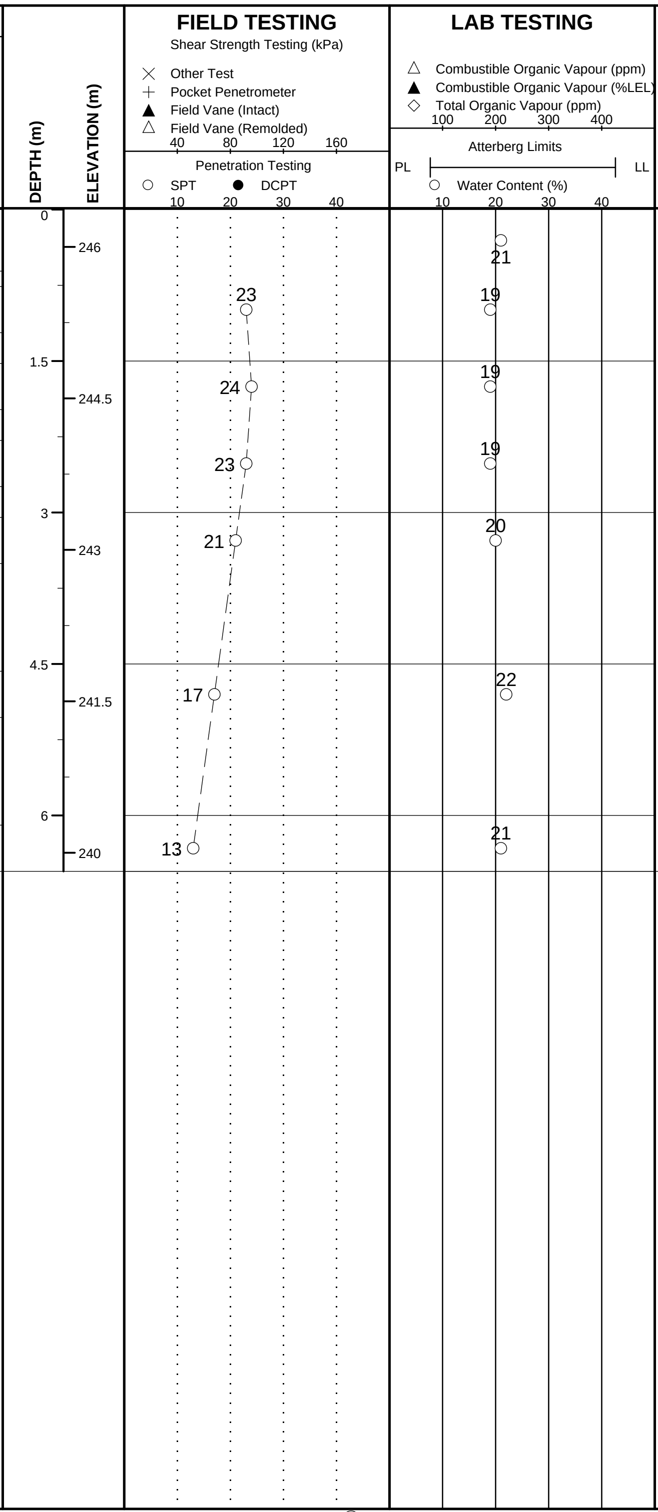
Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 9

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Reviewed By: **RW**
Northing: **4853378**
Easting: **600167.6**
Date Started: **May 4/23**
Date Completed: **May 4/23**

Depth (m)	Elevation (m)	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
0.0	246.4	**Geodetic**					
0.2	246.2	TOPSOIL: 150 mm					
		WEATHER/DISTURBED Brown, moist	AS	1			21
0.8	245.6	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	2	100	23	19
			SS	3	30	24	19
			SS	4	100	23	19
			SS	5	100	21	20
			SS	6	100	17	22
		- - - Stiff - - -	SS	7	100	13	21
6.6	239.8	Borehole Terminated at 6.6 m					



Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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

Scale: **1 :75**

RECORD OF BOREHOLE No. 10

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

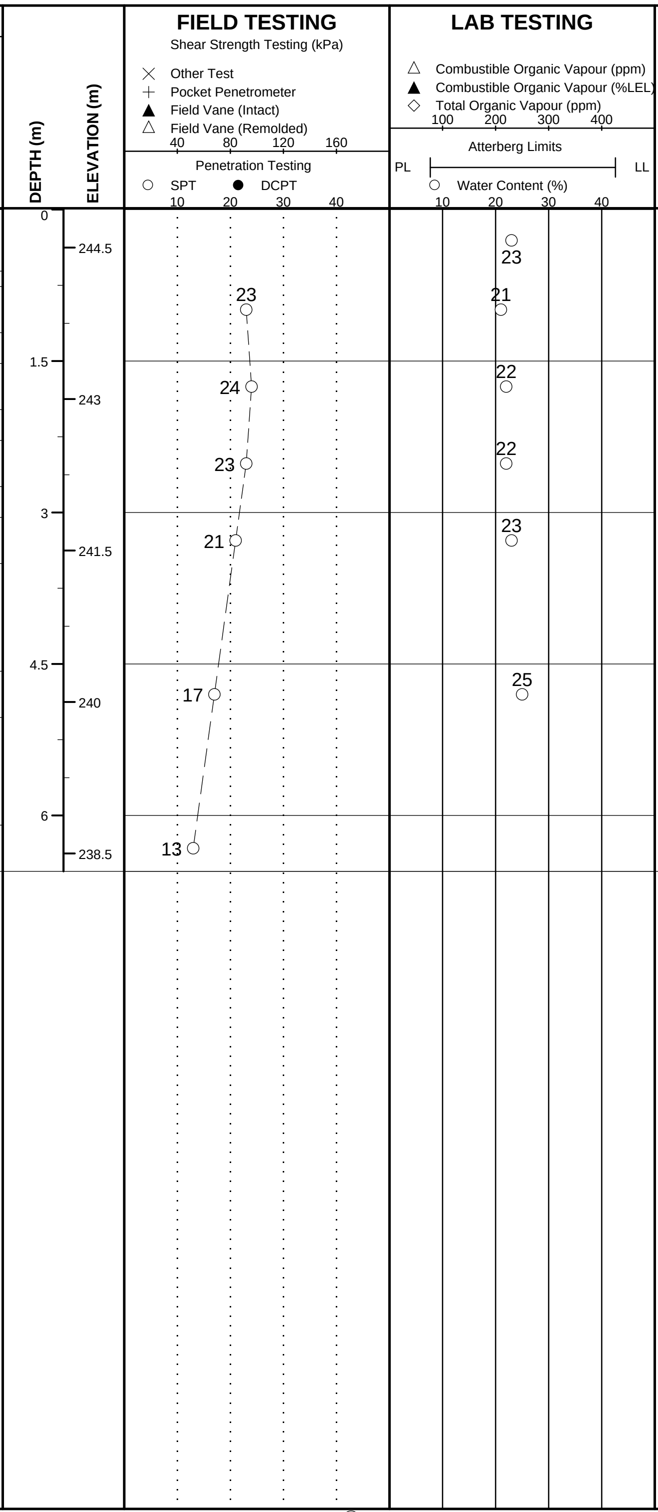
Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Reviewed By: **RW**
Northing: **4853146**
Easting: **599933.4**
Date Started: **May 4/23**
Date Completed: **May 4/23**

LITHOLOGY PROFILE

Depth (m)	Elevation (m)	DESCRIPTION
0.0	244.9	**Geodetic**
0.2	244.7	TOPSOIL: 150 mm
0.8	244.1	WEATHERED/DISTURBED Mottled brown, moist
		CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist
		- - - Stiff, grey - - -
6.6	238.3	Borehole Terminated at 6.6 m

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
AS	1			23
SS	2	100	23	21
SS	3	100	24	22
SS	4	100	23	22
SS	5	100	21	23
SS	6	100	17	25
SS	7	100	13	



Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

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

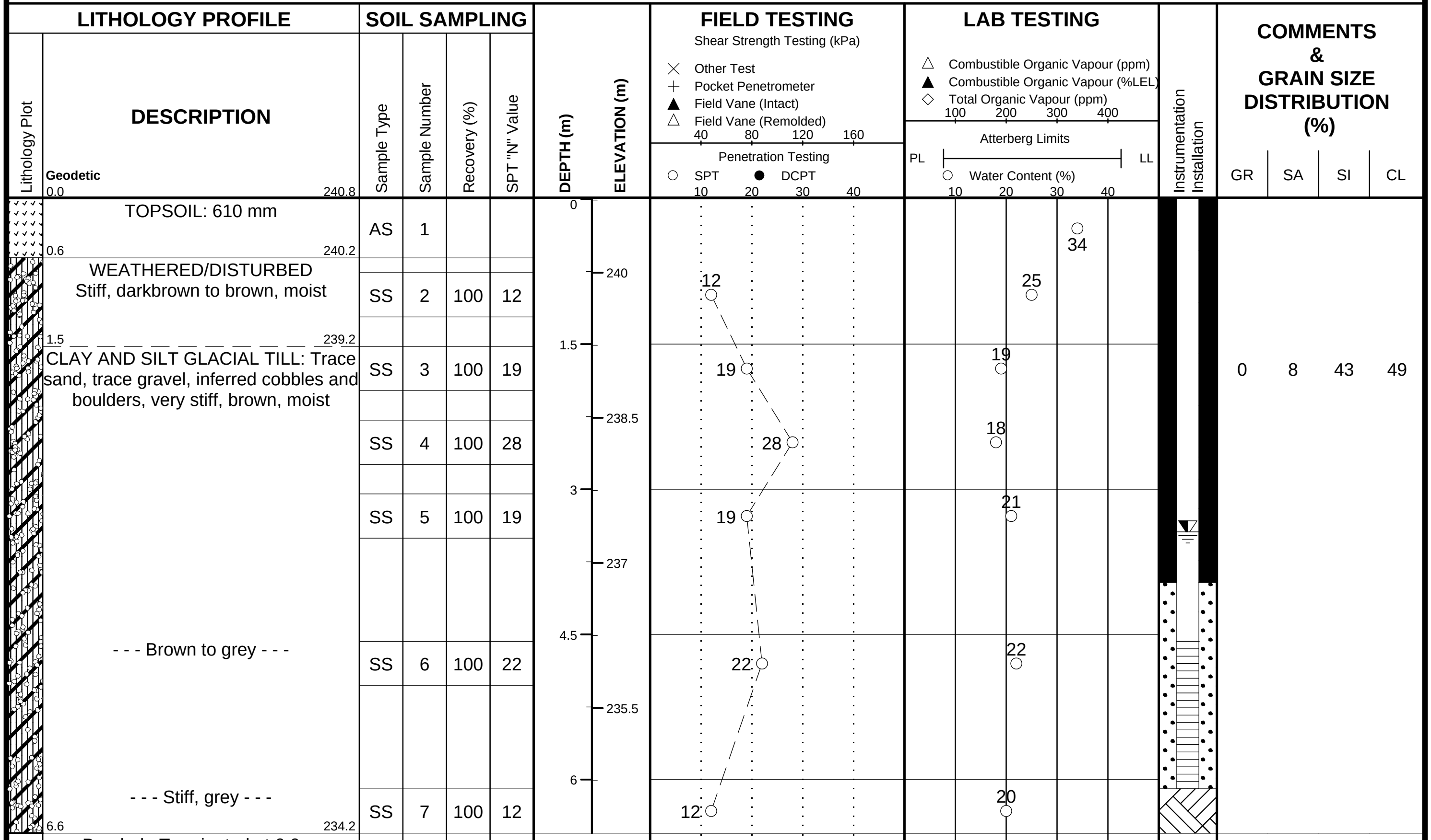
Scale: **1 :75**

RECORD OF BOREHOLE No. 11-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Reviewed By: **RW**
Northing: **4853264**
Easting: **600032.8**
Date Started: **May 4/23**
Date Completed: **May 4/23**

Depth (m)	Elevation (m)	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
0.0	240.8	**Geodetic**									
		TOPSOIL: 610 mm	AS	1			34				
0.6	240.2	WEATHERED/DISTURBED Stiff, darkbrown to brown, moist	SS	2	100	12	25				
1.5	239.2	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	3	100	19	19	0	8	43	49
			SS	4	100	28	18				
			SS	5	100	19	21				
		- - - Brown to grey - - -	SS	6	100	22	22				
		- - - Stiff, grey - - -	SS	7	100	12	20				
6.6	234.2	Borehole Terminated at 6.6 m									



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 3.44 m.
Groundwater Elevation: 237.3 m

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 11-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

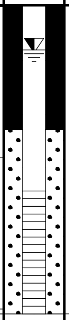
Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Reviewed By: **RW**
Northing: **4853265**
Easting: **600032.8**
Date Started: **May 4/23**
Date Completed: **May 4/23**

LITHOLOGY PROFILE | **SOIL SAMPLING** | **FIELD TESTING** | **LAB TESTING** | **COMMENTS & GRAIN SIZE DISTRIBUTION (%)**

Field Testing – Shear Strength Testing (kPa): × Other Test; + Pocket Penetrometer; ▲ Field Vane (Intact); △ Field Vane (Remolded); 40 80 120 160
Penetration Testing: ○ SPT ● DCPT; 10 20 30 40

Lab Testing: △ Combustible Organic Vapour (ppm); ▲ Combustible Organic Vapour (%LEL); ◇ Total Organic Vapour (ppm); 100 200 300 400
Atterberg Limits: PL ├──┤ LL; ○ Water Content (%); 10 20 30 40

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Instrumentation Installation	GR	SA	SI	CL
	Geodetic 0.0 240.7					0						
	TOPSOIL: 610 mm											
	0.6 240.1 WEATHERED/DISTURBED Stiff, dark brown to brown, moist						240					
	1.5 239.2 CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist					1.5	238.5					
	3.0 237.7 Borehole Terminated at 3.0 m					3						



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.43 m.
Groundwater Elevation: 240.3 m

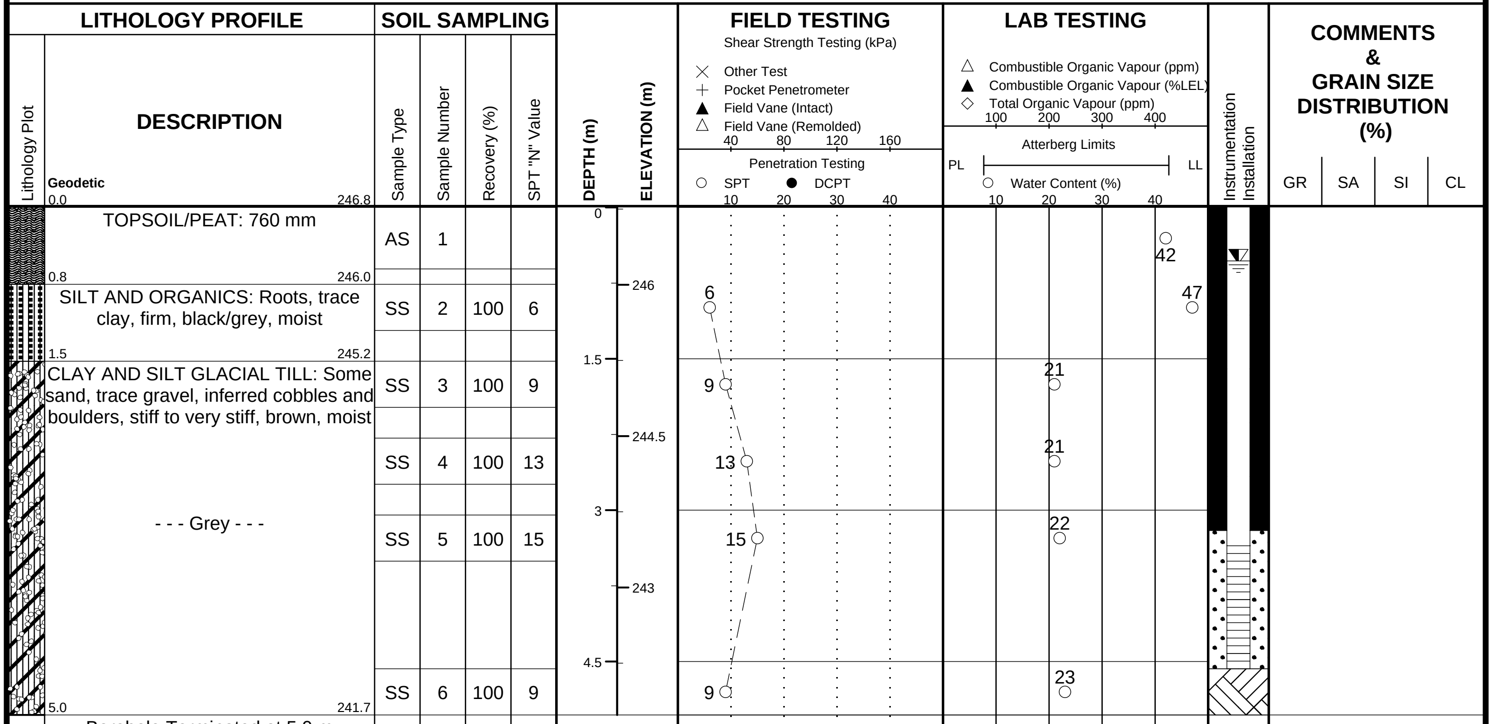
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 12-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Reviewed By: **RW**
Northing: **4853356**
Easting: **600278.6**
Date Started: **May 4/23**
Date Completed: **May 4/23**



Depth (m)	Elevation (m)	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value
0.0	246.8	Geodetic				
		TOPSOIL/PEAT: 760 mm	AS	1		
0.8	246.0	SILT AND ORGANICS: Roots, trace clay, firm, black/grey, moist	SS	2	100	6
1.5	245.2	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, stiff to very stiff, brown, moist	SS	3	100	9
			SS	4	100	13
		- - - Grey - - -	SS	5	100	15
5.0	241.7		SS	6	100	9
		Borehole Terminated at 5.0 m				

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.53 m.
Groundwater Elevation: 246.2 m

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 12-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Northing: **4853356**
Date Started: **May 4/23**
Reviewed By: **RW**
Easting: **600278.4**
Date Completed: **May 4/23**

LITHOLOGY PROFILE | **SOIL SAMPLING** | **FIELD TESTING** | **LAB TESTING** | **COMMENTS & GRAIN SIZE DISTRIBUTION (%)**

FIELD TESTING – Shear Strength Testing (kPa): × Other Test; + Pocket Penetrometer; ▲ Field Vane (Intact); △ Field Vane (Remolded); 40 80 120 160. Penetration Testing: ○ SPT ● DCPT; 10 20 30 40

LAB TESTING: △ Combustible Organic Vapour (ppm); ▲ Combustible Organic Vapour (%LEL); ◇ Total Organic Vapour (ppm); 100 200 300 400. Atterberg Limits: PL ├──┤ LL; ○ Water Content (%); 10 20 30 40

Depth (m)	Description (Geodetic)	Elevation (m)
0.0	TOPSOIL/PEAT: 760 mm	246.8
0.8	SILT AND ORGANICS: Roots, trace clay, firm, black/grey, moist	246.1
1.5	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, stiff to very stiff, brown, moist	245.3
3.0	Borehole Terminated at 3.0 m	243.8

Depth scale: 0, 1.5, 3. Elevation scale: 246, 244.5.

Columns: Lithology Plot; Description; Sample Type; Sample Number; Recovery (%); SPT "N" Value; DEPTH (m); ELEVATION (m); Instrumentation Installation; GR; SA; SI; CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.53 m.
Groundwater Elevation: 246.3 m

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 13-D

GEI Consultants

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853809**
Easting: **600648.2**
Date Started: **May 2/23**
Date Completed: **May 2/23**

LITHOLOGY PROFILE

Depth (m)	DESCRIPTION	Elevation (m)
0.0	**Geodetic**	240.1
0.2	TOPSOIL: 205 mm	239.9
0.8	WEATHERED/DISTURBED Firm, mottled brown, moist	239.4
5.0	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist - - - Grey/brown to brown - - -	235.1

Borehole Terminated at 5.0 m

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT "N" Value
SS	1	100	5
SS	2	100	23
SS	3	100	26
SS	4	100	27
SS	5	100	28
SS	6	100	30

FIELD TESTING

Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
40 80 120 160
Penetration Testing
○ SPT ● DCPT
10 20 30 40

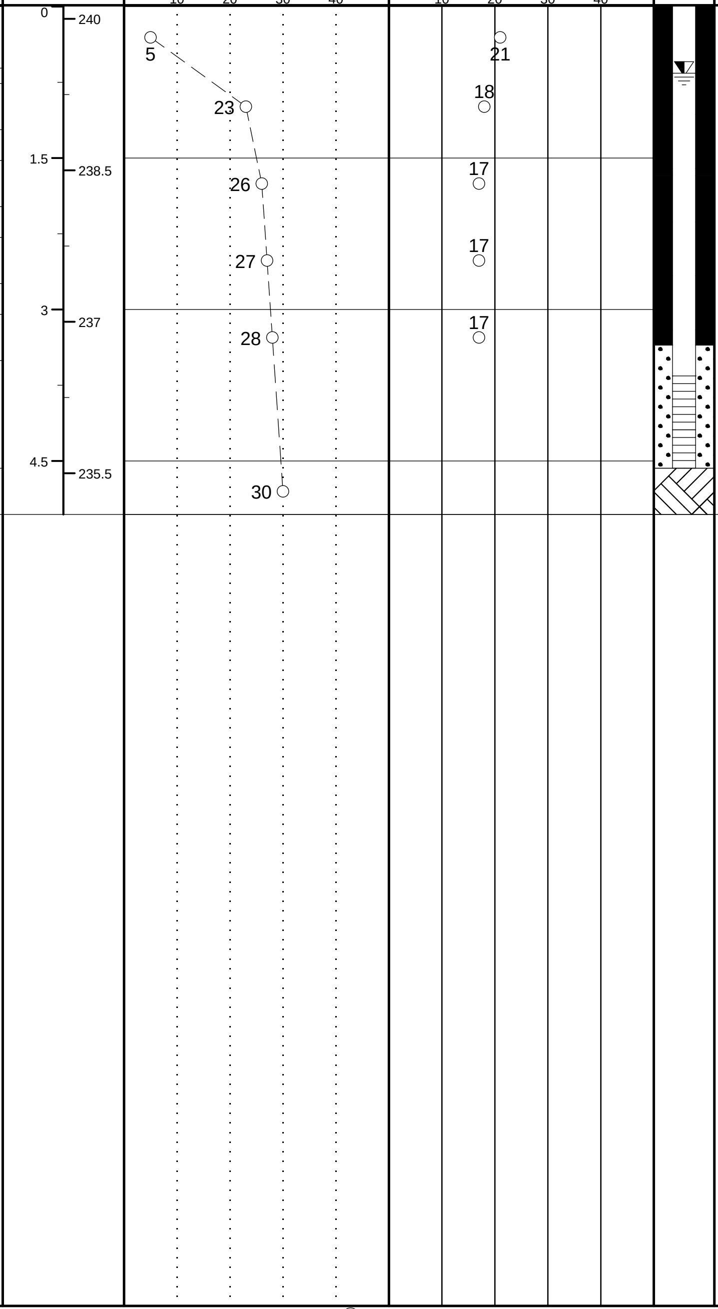
LAB TESTING

△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL LL
○ Water Content (%)
10 20 30 40

Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.66 m.
Groundwater Elevation: 239.5 m

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 13-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853809**
Easting: **600647.6**
Date Started: **May 2/23**
Date Completed: **May 2/23**

LITHOLOGY PROFILE | SOIL SAMPLING | FIELD TESTING | LAB TESTING | COMMENTS & GRAIN SIZE DISTRIBUTION (%)

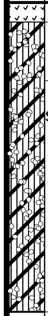
Lithology Plot | DESCRIPTION | Sample Type | Sample Number | Recovery (%) | SPT "N" Value | DEPTH (m) | ELEVATION (m) | Instrumentation Installation | GR | SA | SI | CL

FIELD TESTING: Shear Strength Testing (kPa)
- × Other Test
- + Pocket Penetrometer
- ▲ Field Vane (Intact)
- △ Field Vane (Remolded)
- 40 80 120 160

Penetration Testing
- ○ SPT ● DCPT
- 10 20 30 40

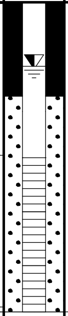
LAB TESTING:
- △ Combustible Organic Vapour (ppm)
- ▲ Combustible Organic Vapour (%LEL)
- ◇ Total Organic Vapour (ppm)
- 100 200 300 400

Atterberg Limits: PL |———| LL
- ○ Water Content (%)
- 10 20 30 40



Depth (m)	Elevation (m)	Description
0.0	240.1	**Geodetic**
0.2	239.9	TOPSOIL: 205 mm
0.8	239.4	WEATHERED/DISTURBED Firm, mottled brown, moist
3.0	237.1	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist - - - Grey/brown to brown - - -
		Borehole Terminated at 3.0 m

Depth scale: 0, 1.5, 3
Elevation scale: 240, 238.5



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.62 m.
Groundwater Elevation: 239.5 m

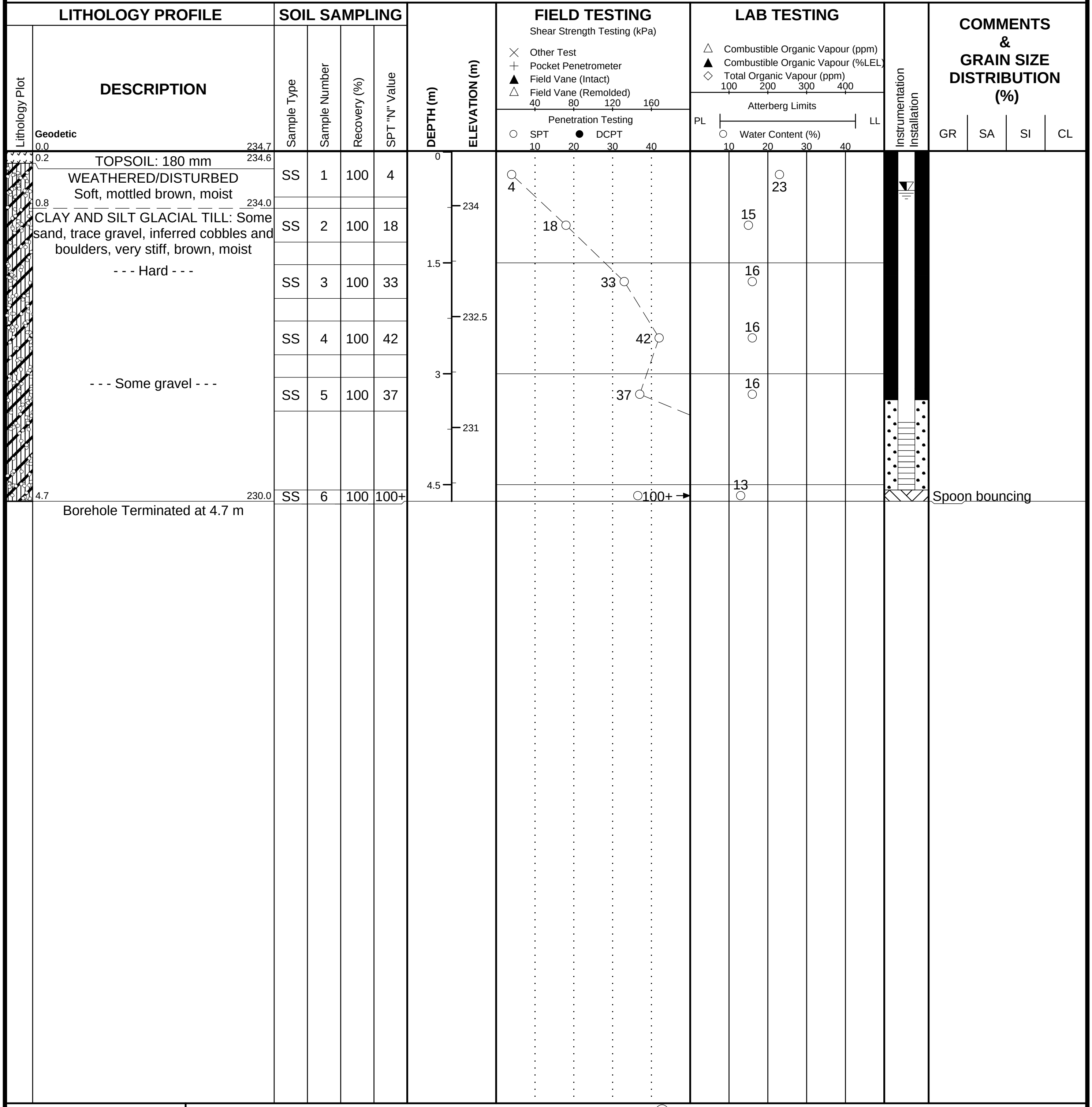
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 14-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853898**
Easting: **601014**
Date Started: **May 2/23**
Date Completed: **May 2/23**



Depth (m)	Elevation (m)	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	Comments
0.0	234.7	Geodetic						
0.2	234.6	TOPSOIL: 180 mm						
		WEATHERED/DISTURBED Soft, mottled brown, moist	SS	1	100	4	23	
0.8	234.0	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	2	100	18	15	
		- - - Hard - - -	SS	3	100	33	16	
			SS	4	100	42	16	
		- - - Some gravel - - -	SS	5	100	37	16	
4.7	230.0		SS	6	100	100+	13	Spoon bouncing
		Borehole Terminated at 4.7 m						

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.52 m.
Groundwater Elevation: 234.2 m

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

Scale: **1 :75**

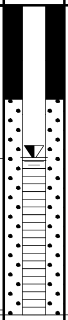
Page: **1 of 1**

RECORD OF BOREHOLE No. 14-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Northing: **4853899**
Date Started: **May 2/23**
Reviewed By: **RW**
Easting: **601014.4**
Date Completed: **May 2/23**

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)
Lithology Plot	DESCRIPTION Geodetic	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Shear Strength Testing (kPa) ╳ Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded) 40 80 120 160 Penetration Testing ○ SPT ● DCPT 10 20 30 40	△ Combustible Organic Vapour (ppm) ▲ Combustible Organic Vapour (%LEL) ◇ Total Organic Vapour (ppm) 100 200 300 400 Atterberg Limits PL ├──┤ LL ○ Water Content (%) 10 20 30 40	Instrumentation Installation	GR SA SI CL
	0.0 — 234.8					0					
	0.2 — 234.6 TOPSOIL: 180 mm										
	WEATHERED/DISTURBED Soft, mottled brown, moist stiff, grey/brown/white, moist						234				
	0.8 — 234.0 CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist - - - Hard - - -					1.5	232.5				
	3.0 — 231.7					3					
	Borehole Terminated at 3.0 m - - - Some gravel - - -										



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 1.49 m.
Groundwater Elevation: 233.3 m

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 15

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Reviewed By: **RW**
Northing: **4853612**
Easting: **600658.4**
Date Started: **May 3/23**
Date Completed: **May 3/23**

LITHOLOGY PROFILE

Depth (m)	DESCRIPTION	Elevation (m)
0.0	**Geodetic**	241.9
0.3	TOPSOIL: 305 mm	241.6
0.8	WEATHERED/DISTURBED Firm, mottled brown, moist	241.1
	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist - - - Light grey - - - - - - Firm, grey - - -	
6.6		235.3
	Borehole Terminated at 6.6 m	

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
SS	1	100	6	21
SS	2	100	26	19
SS	3	100	23	18
SS	4	100	23	20
SS	5	100	20	21
SS	6	5	6	20
SS	7	100	7	18

FIELD TESTING

Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
40 80 120 160
Penetration Testing
○ SPT ● DCPT
10 20 30 40

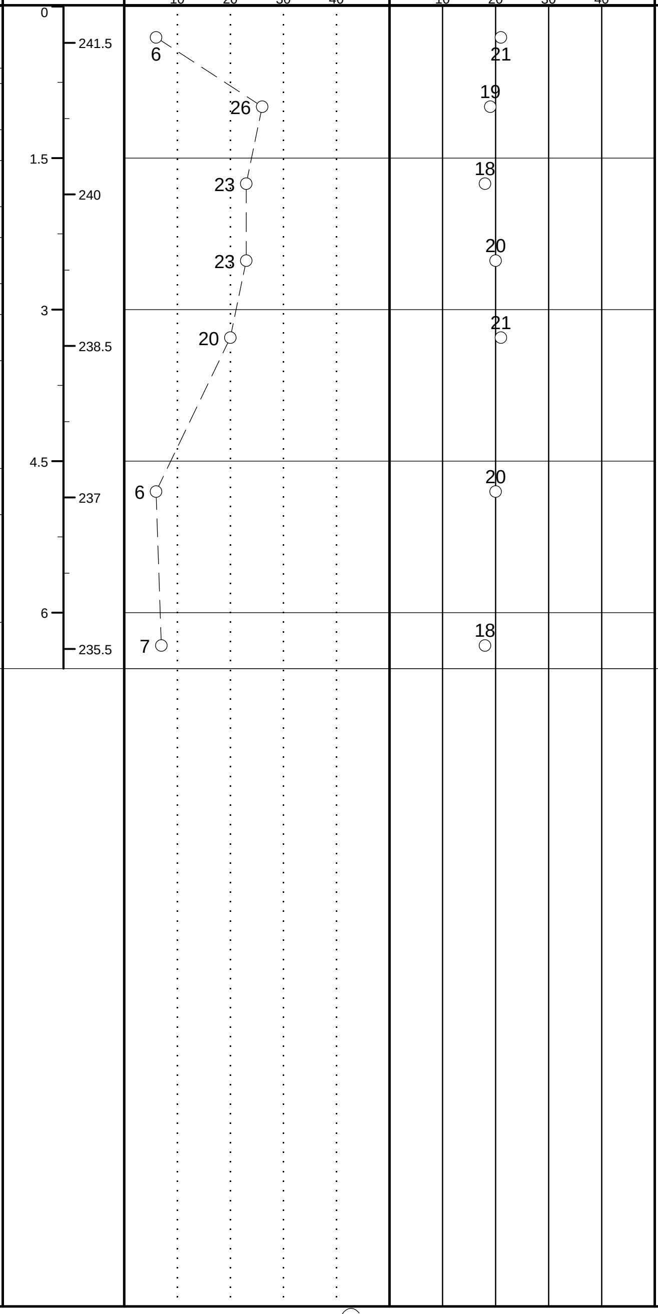
LAB TESTING

△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL ├──┤ LL
○ Water Content (%)
10 20 30 40

Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 16

GEI Consultants

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

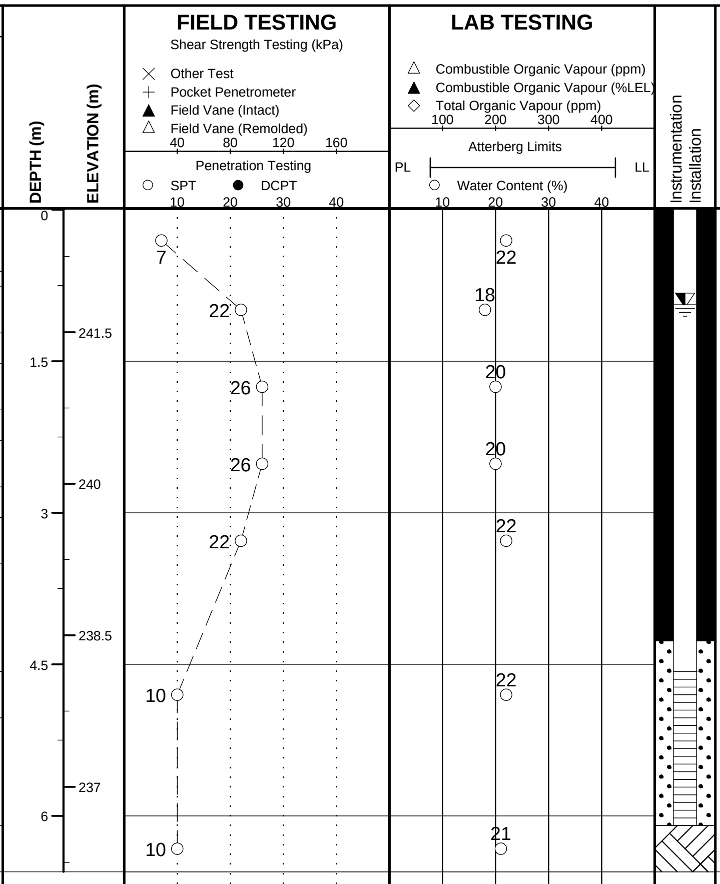
Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853438**
Easting: **600534.7**
Date Started: **May 3/23**
Date Completed: **May 3/23**

LITHOLOGY PROFILE

Depth (m)	Elevation (m)	DESCRIPTION
0.0	242.7	Geodetic
0.3	242.4	TOPSOIL: 305 mm
0.8	242.0	WEATHERED/DISTURBED Firm, brown, moist
		CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist - - - Brown to grey - - - - - - Stiff, grey - - -
6.6	236.2	Borehole Terminated at 6.6 m

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
SS	1	50	7	22
SS	2	100	22	18
SS	3	100	26	20
SS	4	100	26	20
SS	5	100	22	22
SS	6	100	10	22
SS	7	35	10	21



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.94 m.
Groundwater Elevation: 241.8 m

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

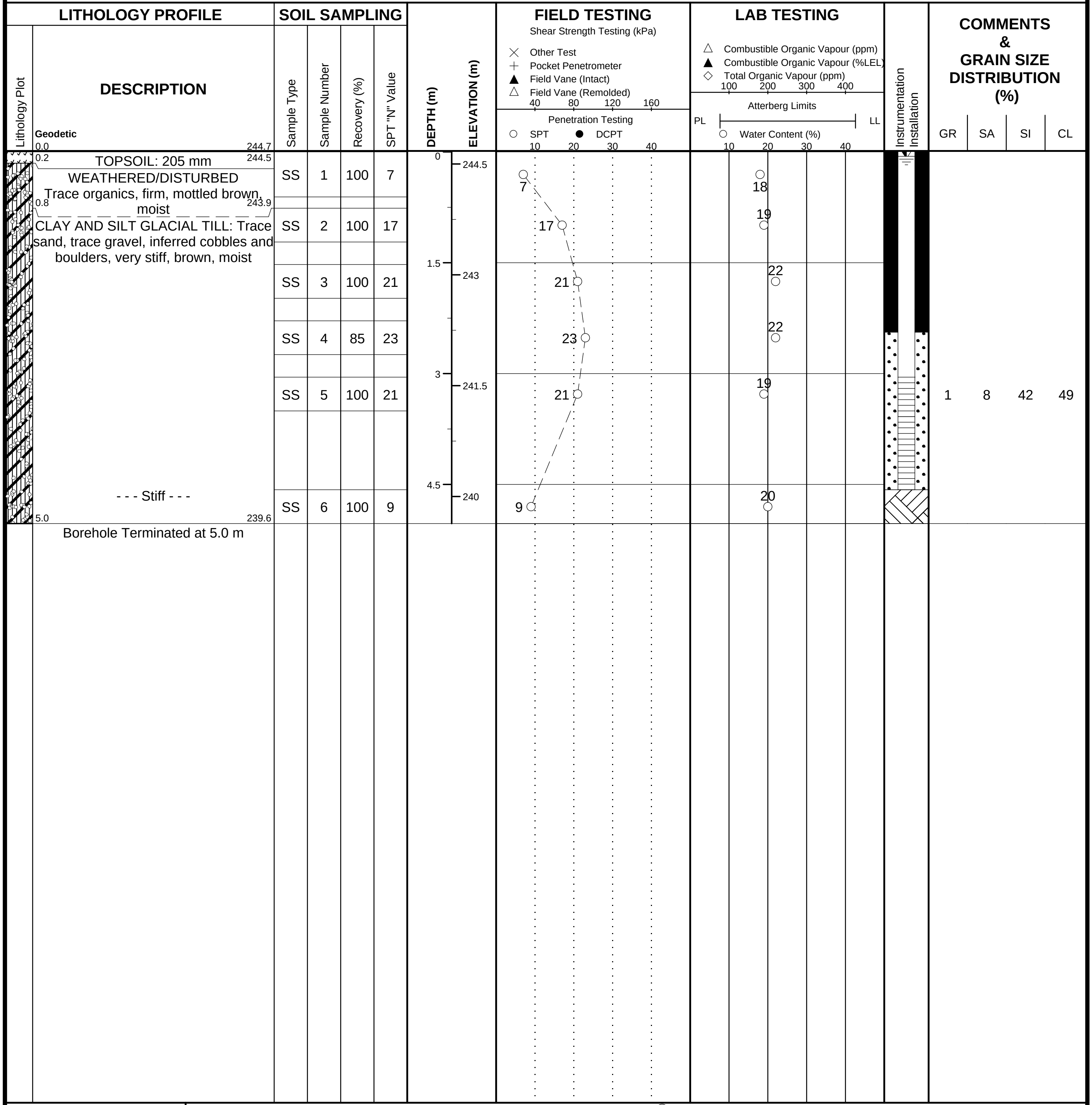
Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 17-D

GEI Consultants

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853199**
Easting: **600316.6**
Date Started: **May 3/23**
Date Completed: **May 3/23**



Depth (m)	Elevation (m)	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
0.0	244.7	Geodetic									
0.2	244.5	TOPSOIL: 205 mm									
0.8	243.9	WEATHERED/DISTURBED Trace organics, firm, mottled brown, moist	SS	1	100	7	18				
		CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	2	100	17	19				
			SS	3	100	21	22				
			SS	4	85	23	22				
			SS	5	100	21	19	1	8	42	49
5.0	239.6	- - - Stiff - - -	SS	6	100	9	20				
		Borehole Terminated at 5.0 m									

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.06 m.
Groundwater Elevation: 244.6 m

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

Scale: **1 :75**
Page: **1 of 1**

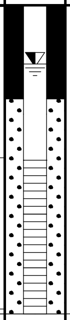
RECORD OF BOREHOLE No. 17-S

GEI Consultants

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853198**
Easting: **600316.4**
Date Started: **May 3/23**
Date Completed: **May 3/23**

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION Geodetic	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Shear Strength Testing (kPa) × Other Test + Pocket Penetrometer ▲ Field Vane (Intact) △ Field Vane (Remolded) 40 80 120 160 Penetration Testing ○ SPT ● DCPT 10 20 30 40	△ Combustible Organic Vapour (ppm) ▲ Combustible Organic Vapour (%LEL) ◇ Total Organic Vapour (ppm) 100 200 300 400 Atterberg Limits PL LL ○ Water Content (%) 10 20 30 40	Instrumentation Installation	GR	SA	SI	CL
	0.0 244.6					0	244.5							
	0.2 TOPSOIL: 205 mm 244.5													
	WEATHERED/DISTURBED Trace organics, firm, mottled brown, moist 0.8 243.9													
	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist					1.5	243							
	3.0 241.6					3								
	Borehole Terminated at 3.0 m													



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.57 m.
Groundwater Elevation: 244.1 m

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

Scale: **1 :75**

RECORD OF BOREHOLE No. 18-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Reviewed By: **RW**
Northing: **4852979**
Easting: **600135.1**
Date Started: **May 4/23**
Date Completed: **May 4/23**

Depth (m)	Elevation (m)	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
0.0	240.5	Geodetic									
0.1	240.4	TOPSOIL: 100 mm									
		WEATHERED/DISTURBED Brown, moist	AS	1			22				
0.8	239.7	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	2	100	18	21				
			SS	3	100	19	21	0	4	39	57
			SS	4	100	18					
3.0	237.4	SANDY SILT GLACIAL TILL: Trace clay, trace gravel, inferred cobbles and boulders, compact, brown, moist	SS	5	100	16	20				
4.6	235.9	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	6	100	17	27				
		- - - Grey - - -	SS	7	100	20	17				
6.6	233.9	Borehole Terminated at 6.6 m									

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.81 m.
Groundwater Elevation: 239.6 m

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 18-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

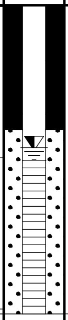
Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Reviewed By: **RW**
Northing: **4852978**
Easting: **600135.1**
Date Started: **May 4/23**
Date Completed: **May 4/23**

Depth (m)	Elevation (m)	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Comments & Grain Size Distribution (%)
0.0	240.5	Geodetic					
0.1	240.4	TOPSOIL: 100 mm					
		WEATHERED/DISTURBED Brown, moist					
0.8	239.7	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist					
3.0	237.4	Borehole Terminated at 3.0 m					

Field Testing: Shear Strength Testing (kPa) — × Other Test; + Pocket Penetrometer; ▲ Field Vane (Intact); △ Field Vane (Remolded); 40 80 120 160. Penetration Testing — ○ SPT ● DCPT; 10 20 30 40

Lab Testing: △ Combustible Organic Vapour (ppm); ▲ Combustible Organic Vapour (%LEL); ◇ Total Organic Vapour (ppm); 100 200 300 400. Atterberg Limits PL ⊢⊣ LL; ○ Water Content (%) 10 20 30 40

Comments & Grain Size Distribution (%): GR SA SI CL



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 1.4 m.
Groundwater Elevation: 239.1 m

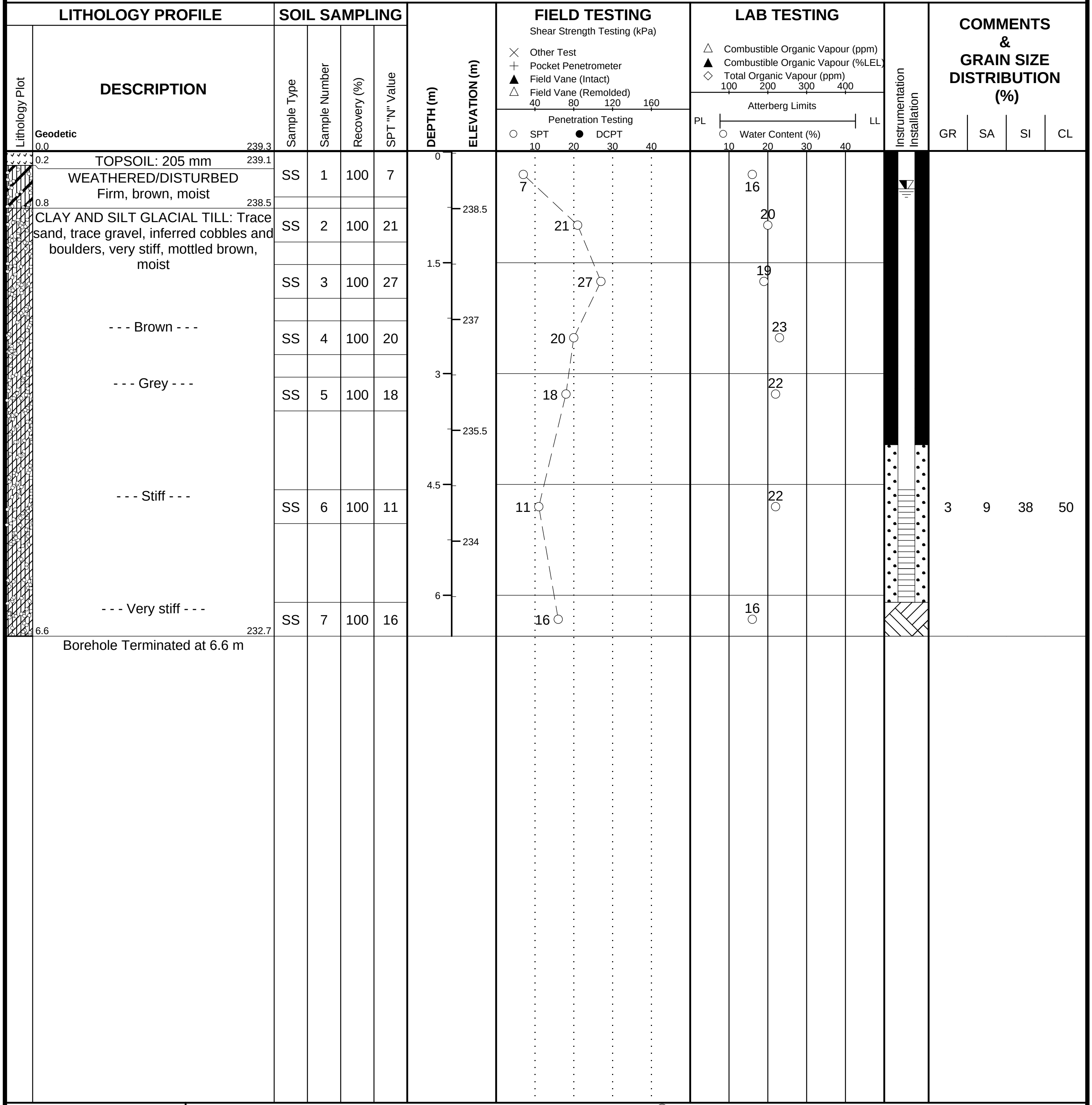
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 19

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853274**
Easting: **600763.7**
Date Started: **May 2/23**
Date Completed: **May 2/23**



Depth (m)	Elevation (m)	Description
0.0	239.3	Geodetic
0.2	239.1	TOPSOIL: 205 mm
0.8	238.5	WEATHERED/DISTURBED Firm, brown, moist
6.6	232.7	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, mottled brown, moist - - - Brown - - - - - - Grey - - - - - - Stiff - - - - - - Very stiff - - -

Borehole Terminated at 6.6 m

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
SS	1	100	7	16				
SS	2	100	21	20				
SS	3	100	27	19				
SS	4	100	20	23				
SS	5	100	18	22				
SS	6	100	11	22	3	9	38	50
SS	7	100	16	16				

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry

Cave depth after auger removal: Open

Groundwater depth observed on: Jul 11/23 at depth of: 0.5 m.

Groundwater Elevation: 238.8 m

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

Scale: **1 :75**

Page: **1 of 1**

RECORD OF BOREHOLE No. 20

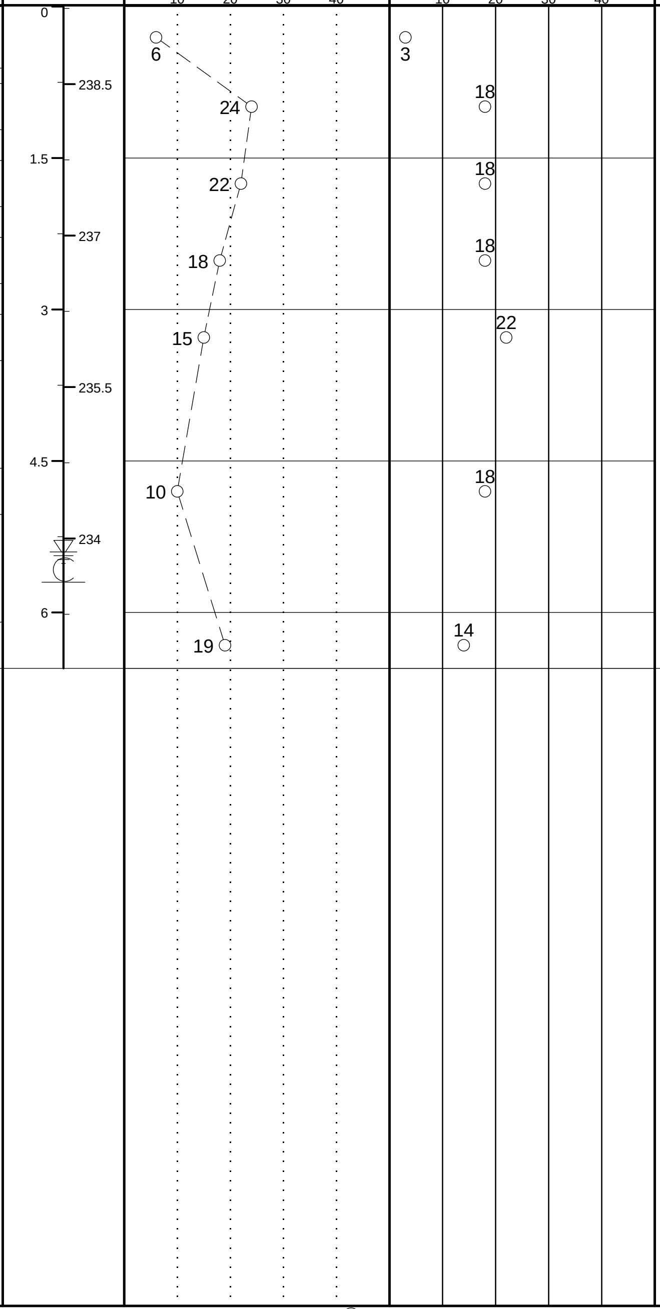
Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853581**
Easting: **600910.8**
Date Started: **May 2/23**
Date Completed: **May 2/23**

Depth (m)	Elevation (m) Geodetic	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
0.0	239.3										
0.1	239.1	TOPSOIL: 150 mm									
		WEATHERED/DISTURBED Firm, brown, moist	SS	1	100	6	3				
0.8	238.5	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	2	100	24	18				
			SS	3	100	22	18	3	10	39	48
			SS	4	100	18	18				
			SS	5	100	15	22				
		- - - Stiff - - -	SS	6	100	10	18				
6.4	232.9	- - - Very stiff - - -	SS	7	100	19	14				
6.6	232.7	SAND: Trace gravel, compact, brown, wet									
		Borehole Terminated at 6.6 m									

FIELD TESTING
Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
Penetration Testing
○ SPT ● DCPT

LAB TESTING
△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
Atterberg Limits
PL LL
○ Water Content (%)



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: 5.4 m.
Cave depth after auger removal: 5.7 m.
Groundwater depth observed on:
Groundwater Elevation:

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 21

Project Number: **2100463**

Project Client: **Wildfield Village Landowners Group Inc.**

Project Name: **Wildfield Village**

Project Location: **Town of Caledon, ON**

Drilling Location: **See Borehole Location Plan**

Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**

Drilling Machine: **Track Mount**

Logged By: **FH**

Reviewed By: **RW**

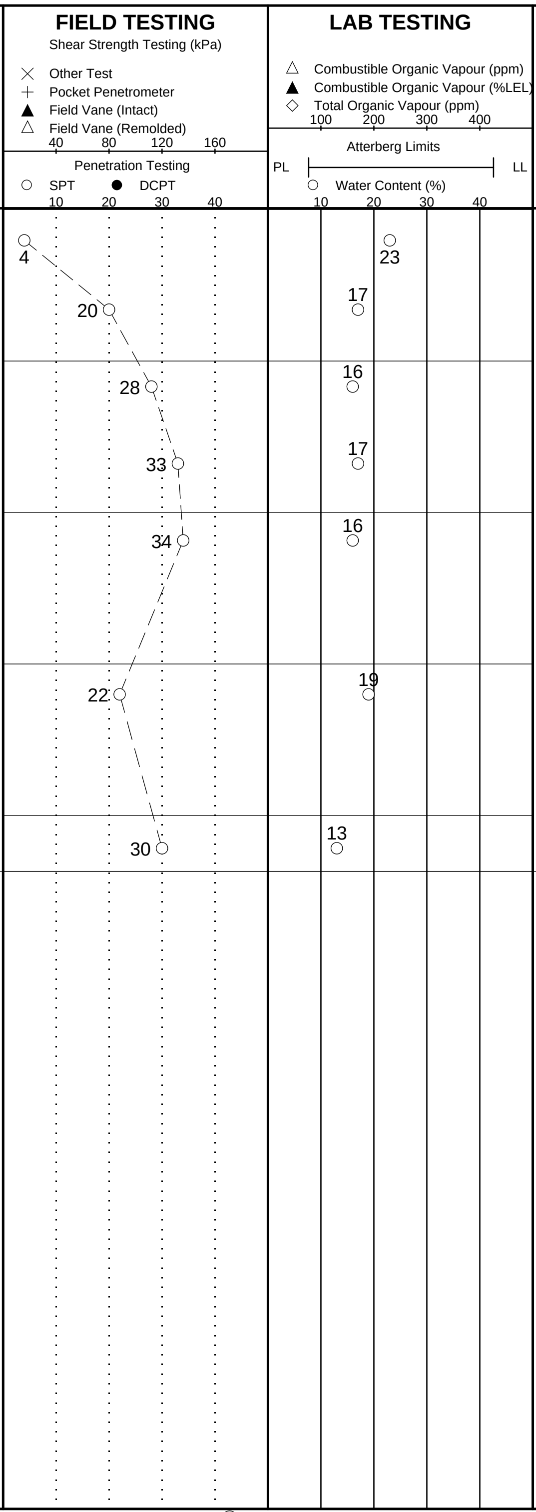
Northing: **4853596**

Easting: **601200.5**

Date Started: **May 2/23**

Date Completed: **May 2/23**

LITHOLOGY PROFILE		SOIL SAMPLING							
Depth / Elevation	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Instrumentation Installation	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
Geodetic 0.0 / 233.3						0			
0.3 / 233.0	TOPSOIL: 305 mm								
0.8 / 232.5	WEATHERED/DISTURBED Trace organics, soft, brown, moist	SS	1	100	4		232.5		
	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	2	100	20	1.5			
	- - - Hard - - -	SS	3	100	28		231		
		SS	4	100	33	3			
		SS	5	100	34		229.5		
	- - - Very stiff, grey - - -	SS	6	100	22	4.5	228		
6.4 / 226.8		SS	7	100	30	6			
	SILT GLACIAL TILL: Some clay, trace gravel, trace sand, inferred cobbles and boulders, dense, grey, moist								
	Borehole Terminated at 6.6 m								



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry

Cave depth after auger removal: Open

Groundwater depth observed on:

Groundwater Elevation:

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

Scale: **1 :75**

Page: **1 of 1**

RECORD OF BOREHOLE No. 22-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853330**
Easting: **601177.5**
Date Started: **May 2/23**
Date Completed: **May 2/23**

LITHOLOGY PROFILE

Geodetic 0.0 233.5

0.2 233.4 TOPSOIL: 205 mm

WEATHERED/DISTURBED Soft, mottled brown, moist

0.8 232.8 CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist

- - - Brown/grey - - -

- - - Grey - - -

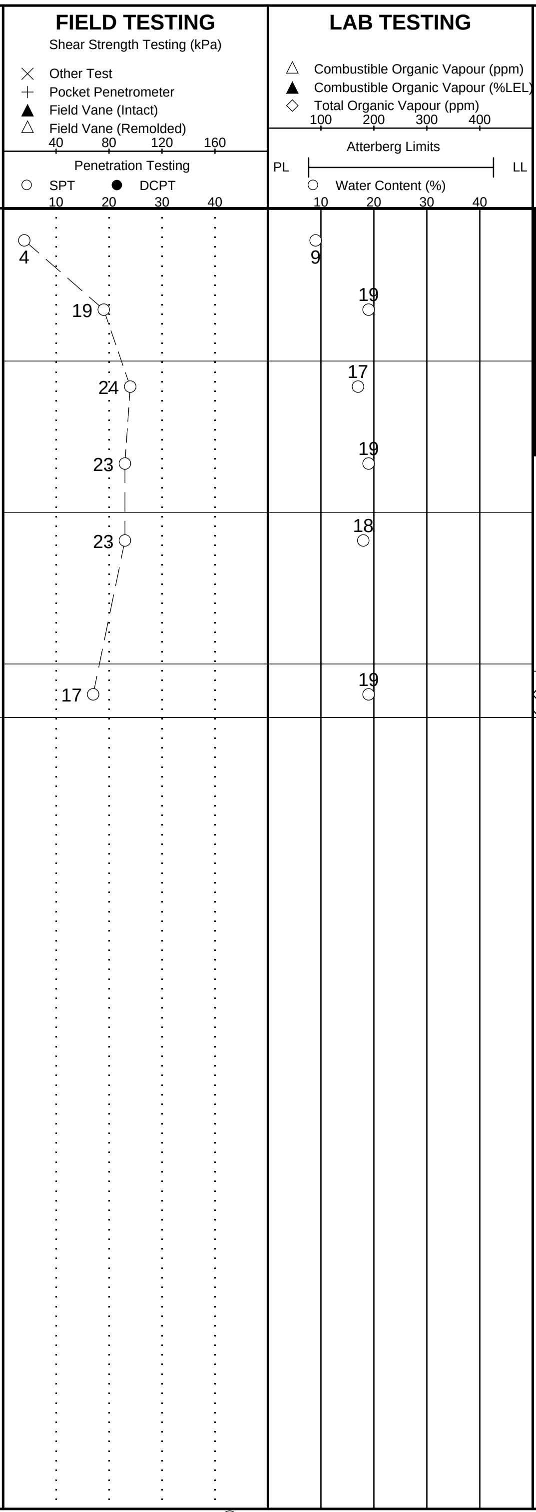
5.0 228.5

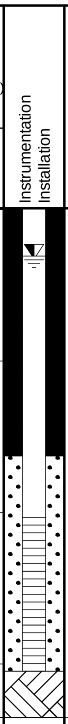
Borehole Terminated at 5.0 m

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT "N" Value
SS	1	100	4
SS	2	100	19
SS	3	100	24
SS	4	100	23
SS	5	100	23
SS	6	100	17

DEPTH (m): 0, 1.5, 3, 4.5
ELEVATION (m): 232.5, 231, 229.5





COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.46 m.
Groundwater Elevation: 233.1 m

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

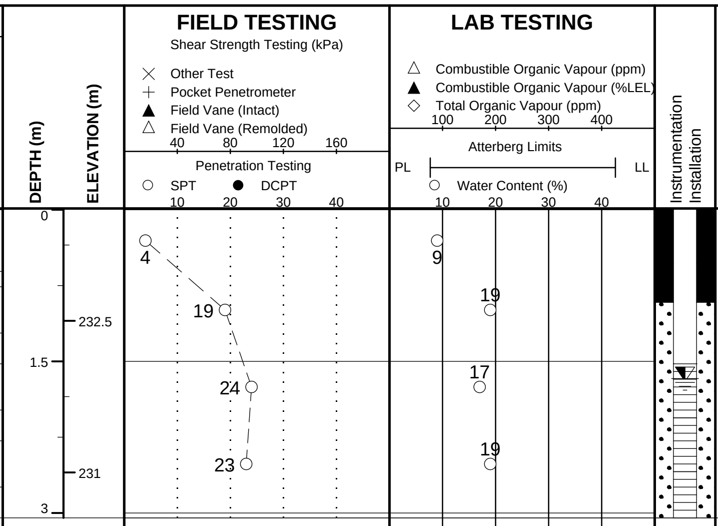
Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 22-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853330**
Easting: **601177**
Date Started: **May 2/23**
Date Completed: **May 2/23**

Depth (m)	Elevation (m)	DESCRIPTION (Geodetic)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value
0.0	233.6					
0.2	233.4	TOPSOIL: 205 mm				
		WEATHERED/DISTURBED Soft, mottled brown, moist	SS	1	100	4
0.8	232.8	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	2	100	19
			SS	3	100	24
		- - - Brown/grey - - -	SS	4	100	23
3.0	230.6	Borehole Terminated at 3.0 m				



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 1.67 m.
Groundwater Elevation: 231.9 m

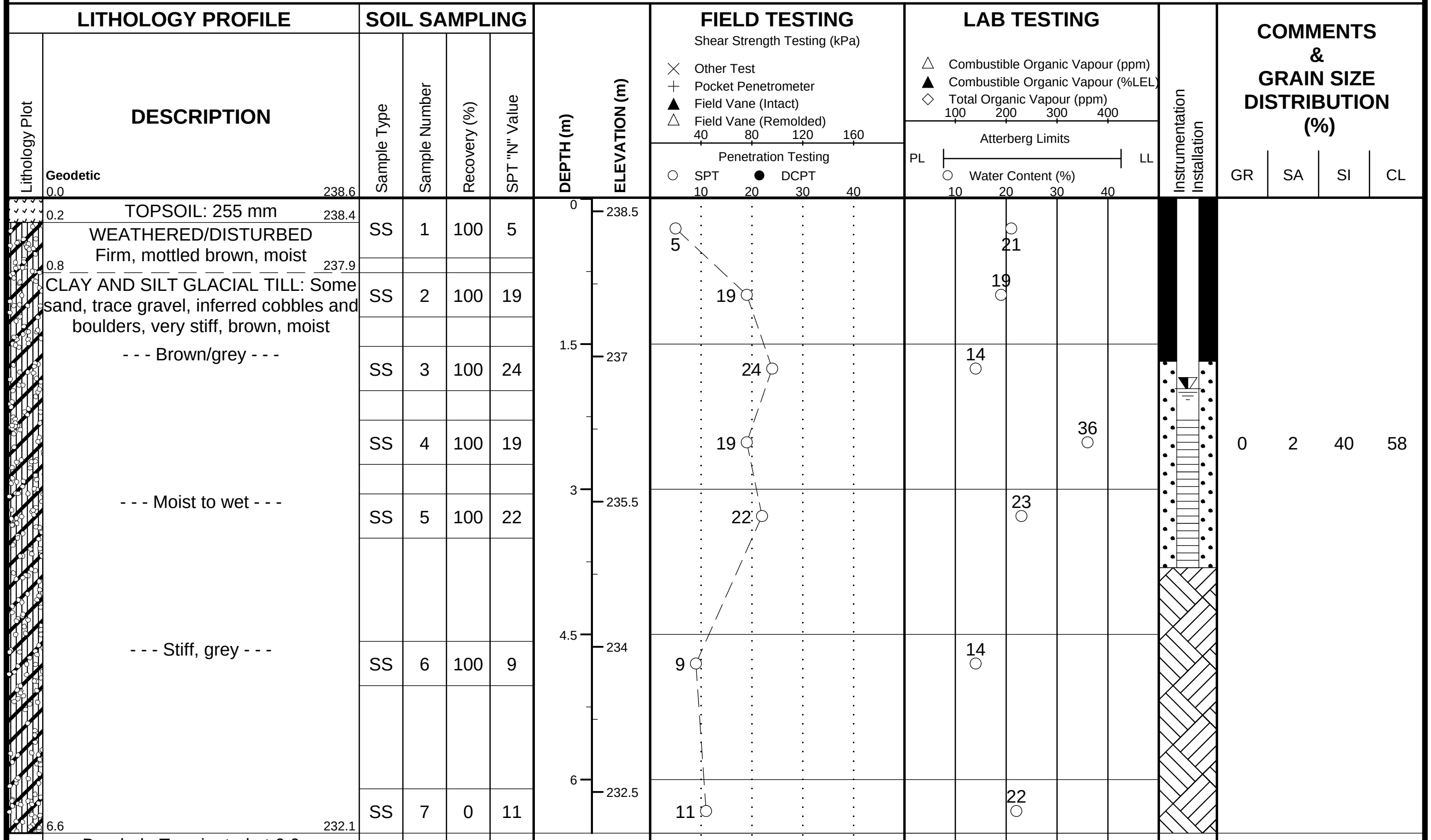
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and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

Scale: **1 :75**

RECORD OF BOREHOLE No. 23

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853057**
Easting: **600985.6**
Date Started: **May 2/23**
Date Completed: **May 2/23**



Depth (m)	Elevation (m)	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
0.0	238.6	Geodetic									
0.2	238.4	TOPSOIL: 255 mm									
0.8	237.9	WEATHERED/DISTURBED Firm, mottled brown, moist	SS	1	100	5	21				
		CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	2	100	19	19				
		- - - Brown/grey - - -	SS	3	100	24	14				
			SS	4	100	19	36	0	2	40	58
		- - - Moist to wet - - -	SS	5	100	22	23				
		- - - Stiff, grey - - -	SS	6	100	9	14				
6.6	232.1		SS	7	0	11	22				

Borehole Terminated at 6.6 m

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 1.96 m.
Groundwater Elevation: 236.7 m

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

Scale: **1 :75**

RECORD OF BOREHOLE No. 24

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

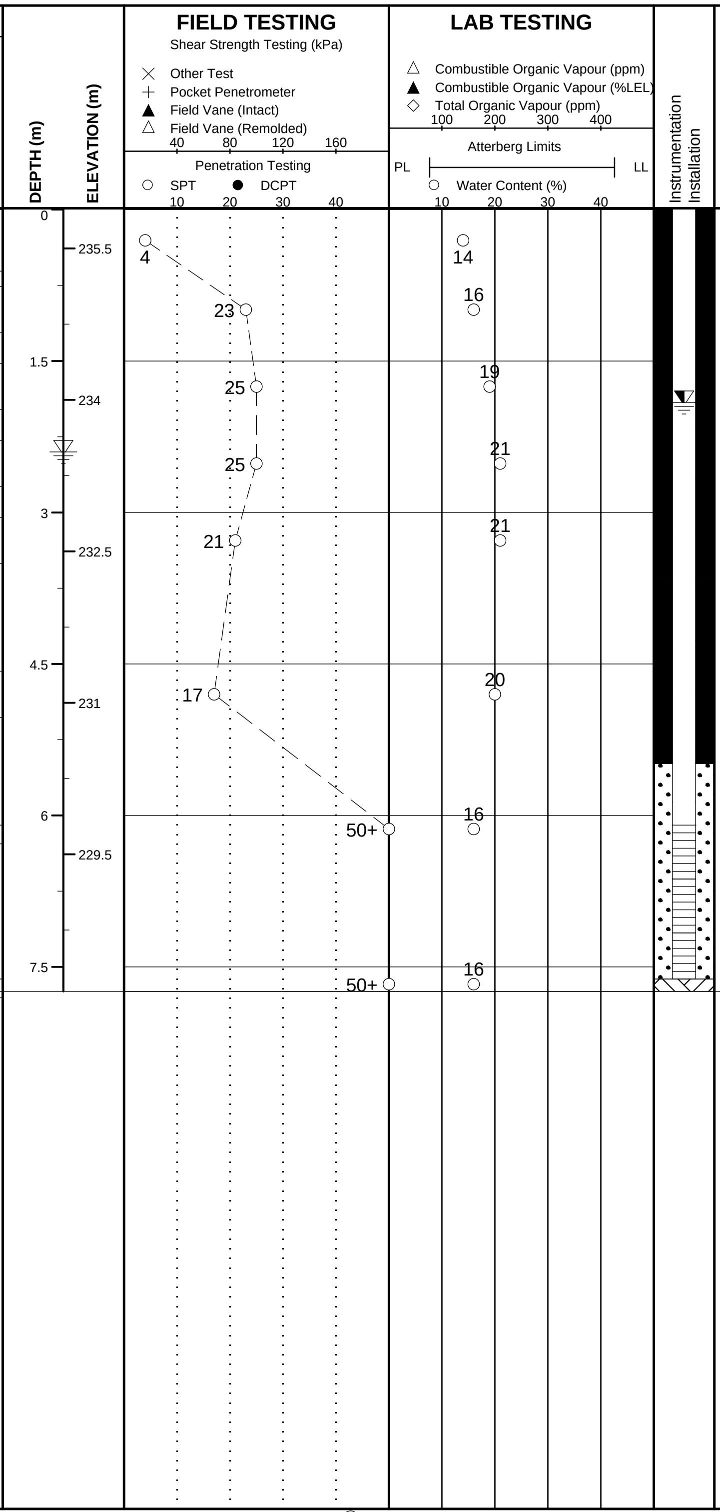
Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853876**
Easting: **601208.1**
Date Started: **May 123**
Date Completed: **May 1/23**

LITHOLOGY PROFILE

Depth (m)	Elevation (m)	DESCRIPTION
0.0	235.9	**Geodetic**
0.2	235.7	TOPSOIL: 205 mm
		WEATHERED/DISTURBED Soft, mottled brown, moist
0.8	235.1	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist
6.1	229.8	SILT AND SAND GLACIAL TILL: Trace clay, trace gravel, cobbles and boulders, very dense, grey, moist
7.6	228.3	INFERRED BEDROCK: Shale, highly weathered, grey
7.7	228.1	Borehole Terminated at 7.7 m

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
SS	1	100	4	14
SS	2	100	23	16
SS	3	100	25	19
SS	4	100	25	21
SS	5	100	21	21
SS	6	100	17	20
SS	7	100	50+	16
SS	8	0	50+	16



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: 2.4 m.
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 1.91 m.
Groundwater Elevation: 234.0 m

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

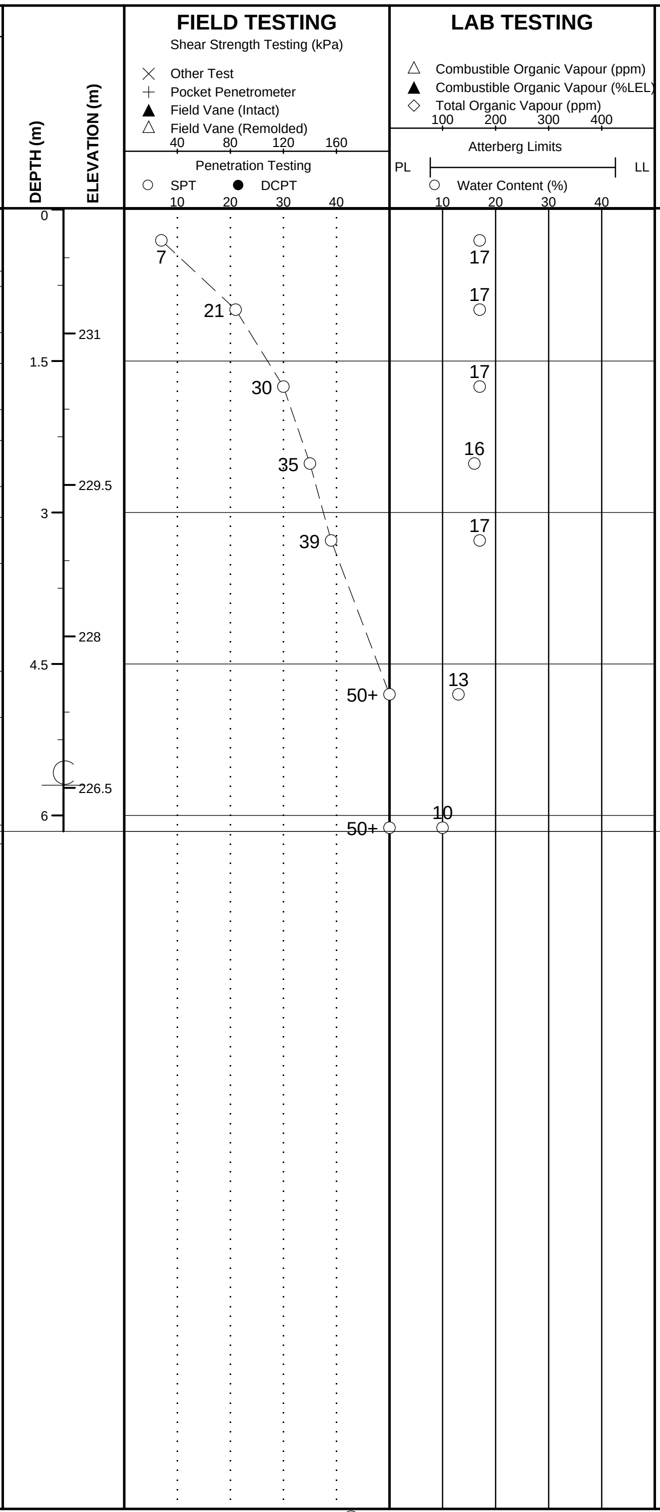
Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 25

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853099**
Easting: **601372.7**
Date Started: **May 1/23**
Date Completed: **May 1/23**

Depth (m)	Elevation (m)	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
0.0	232.2	Geodetic					
0.2	232.0	TOPSOIL: 205 mm					
		WEATHERED/DISTURBED Firm, mottled brown, moist	SS	1	100	7	17
0.8	231.5	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	2	100	21	17
			SS	3	100	30	17
		- - - Hard, grey/brown - - -	SS	4	100	35	16
			SS	5	100	39	17
		- - - Grey - - -	SS	6	100	50+	13
5.0	227.3	SAND AND SILT GLACIAL TILL: Trace clay, trace gravel, very dense, grey, moist	SS	7	100	50+	10
		Borehole Terminated at 6.2 m					



Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: 5.7 m.
Groundwater depth observed on:
Groundwater Elevation:

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

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

Scale: **1 :75**
Page: **1 of 1**

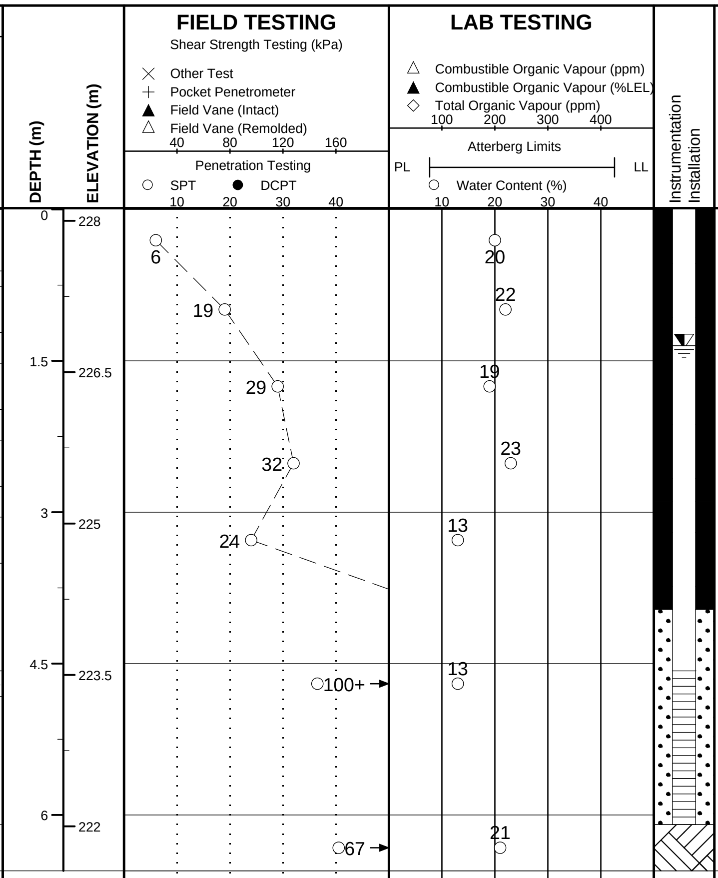
RECORD OF BOREHOLE No. 26-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853265**
Easting: **601490.2**
Date Started: **May 1/23**
Date Completed: **May 1/23**

Depth (m)	Elevation (m)	Description	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
0.0	228.1	Geodetic									
0.3	227.8	TOPSOIL: 305 mm	SS	1	100	6	20				
0.6	227.4	WEATHERED/DISTURBED Trace organics, firm, dark brown, moist									
		CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, mottled brown, moist	SS	2	100	19	22				
			SS	3	100	29	19				
		- - - Hard - - -	SS	4	100	32	23				
		- - - Very stiff - - -	SS	5	100	24	13				
4.6	223.5										
		SILT GLACIAL TILL: Some sand, some gravel, some clay, inferred cobbles and boulders, very dense, grey, moist	SS	6	100	100+	13	13	18	58	11
6.1	222.0										
6.6	221.6	SILT: Some sand, very dense, grey, moist	SS	7	100	67	21				

Borehole Terminated at 6.6 m



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry

Cave depth after auger removal: Open

Groundwater depth observed on: Jul 11/23 at depth of: 1.35 m.

Groundwater Elevation: 226.8 m

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

Scale: **1 :75**

Page: **1 of 1**

RECORD OF BOREHOLE No. 26-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4853264**
Easting: **601489.9**
Date Started: **May 1/23**
Date Completed: **May 1/23**

LITHOLOGY PROFILE

Lithology Plot | DESCRIPTION

SOIL SAMPLING

Sample Type | Sample Number | Recovery (%) | SPT "N" Value

DEPTH (m) | ELEVATION (m)

FIELD TESTING

Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
40 80 120 160
Penetration Testing
○ SPT ● DCPT
10 20 30 40

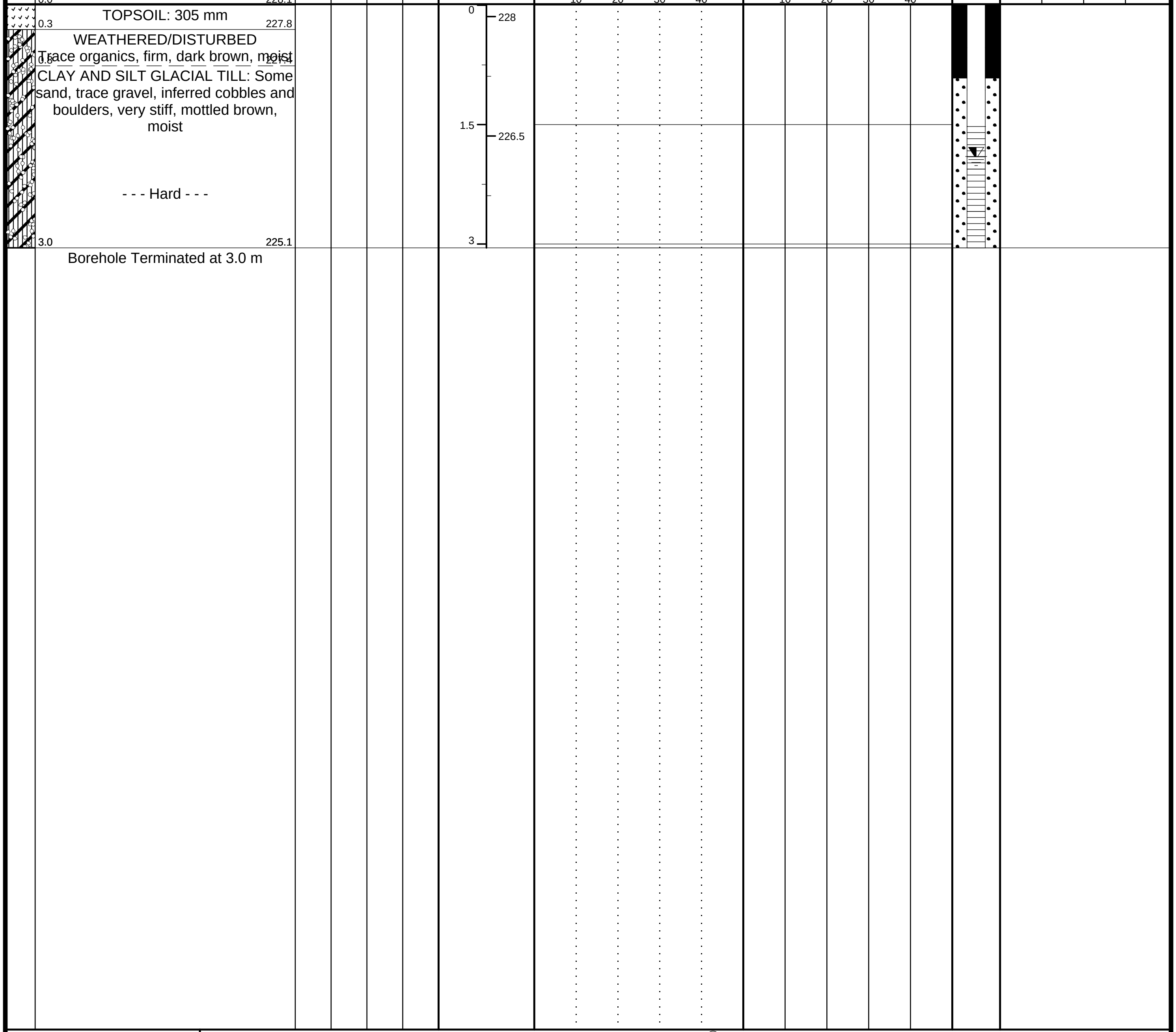
LAB TESTING

△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL |———| LL
○ Water Content (%)
10 20 30 40

Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR | SA | SI | CL



Geodetic
0.0 228.1

TOPSOIL: 305 mm
0.3 227.8

WEATHERED/DISTURBED
Trace organics, firm, dark brown, moist
0.8 227.4

CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, mottled brown, moist

- - - Hard - - -

3.0 225.1

Borehole Terminated at 3.0 m

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 1.9 m.
Groundwater Elevation: 226.2 m

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

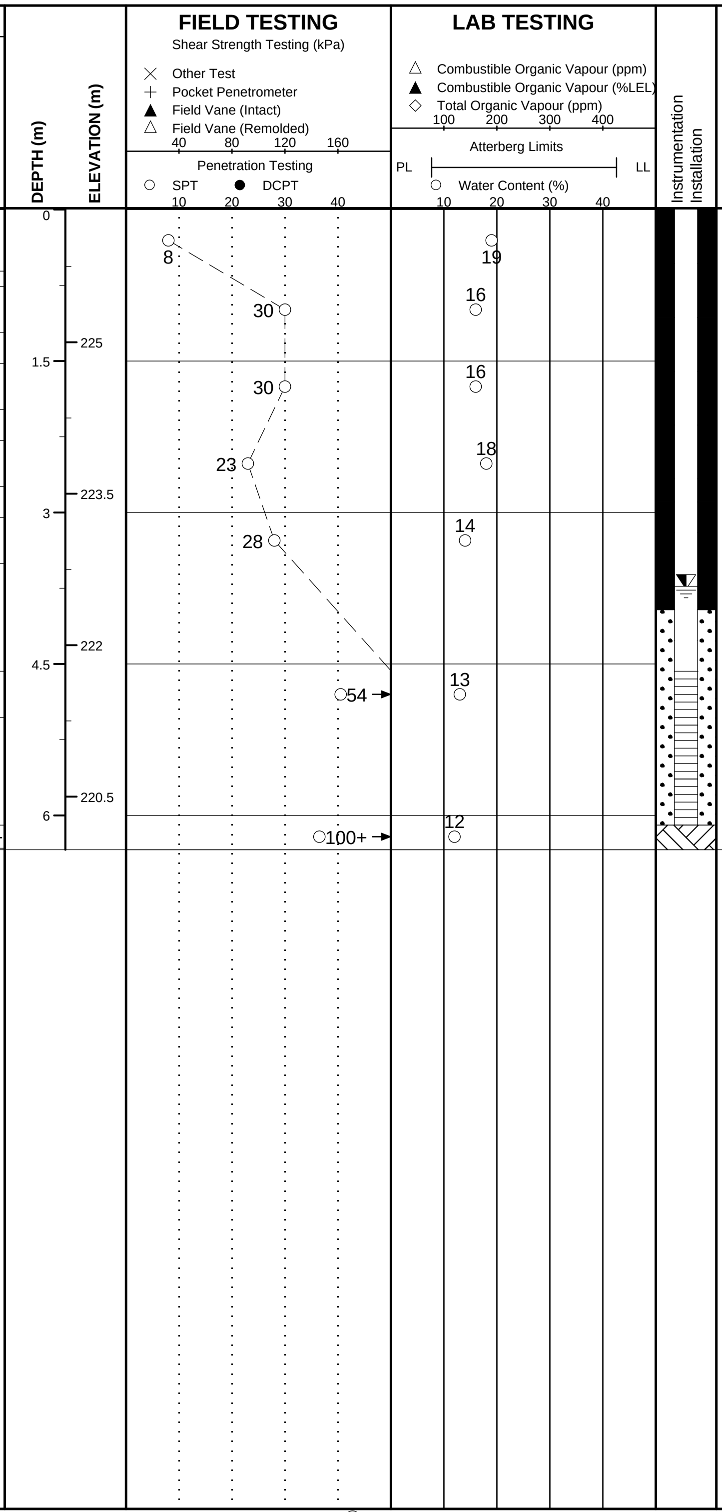
Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 27

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Northing: **4853049**
Date Started: **May 1/23**
Reviewed By: **RW**
Easting: **601870.8**
Date Completed: **May 1/23**

Depth (m)	Elevation (m)	DESCRIPTION (Geodetic)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value
0.0	226.3					
0.2	226.1	TOPSOIL: 205 mm				
		WEATHERED/DISTURBED Stiff, mottled brown, moist	SS	1	100	8
0.8	225.6	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	2	100	30
			SS	3	100	30
			SS	4	100	23
			SS	5	100	28
4.6	221.7	SANDY SILT GLACIAL TILL: Some gravel, trace clay, inferred cobbles and boulders, very dense, grey, moist	SS	6	100	54
6.3	220.0		SS	7	100	100+
		Borehole Terminated at 6.3 m				



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

Groundwater depth encountered on completion of drilling: Dry

Cave depth after auger removal: Open

Groundwater depth observed on: Jul 11/23 at depth of: 3.73 m.

Groundwater Elevation: 222.6 m

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

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

Scale: **1 :75**

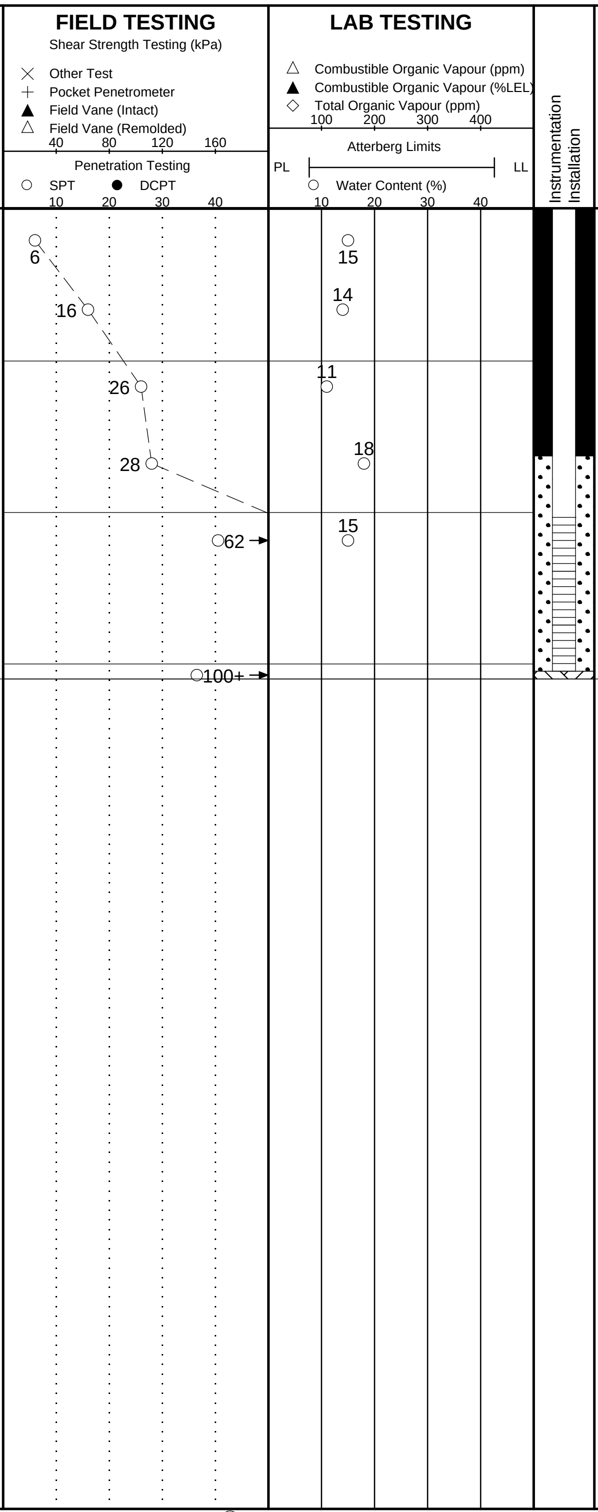
RECORD OF BOREHOLE No. 28-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852786**
Easting: **601695**
Date Started: **Apr 28/23**
Date Completed: **Apr 28/23**

LITHOLOGY PROFILE / SOIL SAMPLING

Depth (m)	Elevation (m)	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
0.0	226.3	Geodetic					
0.3	226.0	TOPSOIL: 305 mm					
0.8	225.6	WEATHERED/DISTURBED Firm, mottled brown to dark brown, moist	SS	1	100	6	15
		CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown to dark brown, moist	SS	2	100	16	14
			SS	3	100	26	11
		- - - Grey - - -	SS	4	100	28	18
3.4	223.0	INFERRED BREDROCK: Weathered shale, grey	SS	5	100	62	15
4.6	221.7	Borehole Terminated at 4.6 m	AS	6	0	100+	



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: -0.6 m.
Groundwater Elevation: 226.9 m

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

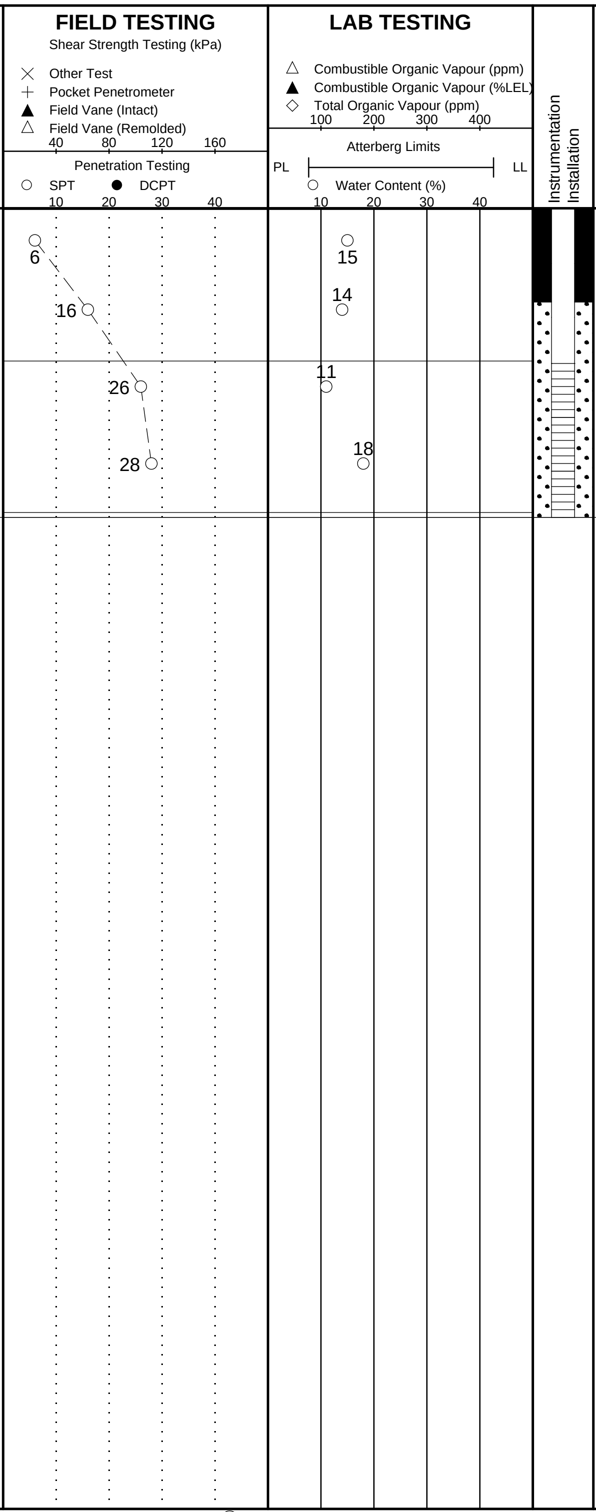
Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 28-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852785**
Easting: **601694.2**
Date Started: **Apr 28/23**
Date Completed: **Apr 28/23**

LITHOLOGY PROFILE			SOIL SAMPLING					
Depth (m)	DESCRIPTION	Elevation (Geodetic)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)
0.0		226.3					0	
0.3	TOPSOIL: 305 mm	226.0	SS	1	100	6		
0.8	WEATHERED/DISTURBED Firm, mottled brown to dark brown, moist	225.5	SS	2	100	16		225
	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist		SS	3	100	26	1.5	
	- - - Grey - - -		SS	4	100	28		223.5
3.0		223.2					3	
	Borehole Terminated at 3.0 m							



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: -0.17 m.
Groundwater Elevation: 226.5 m

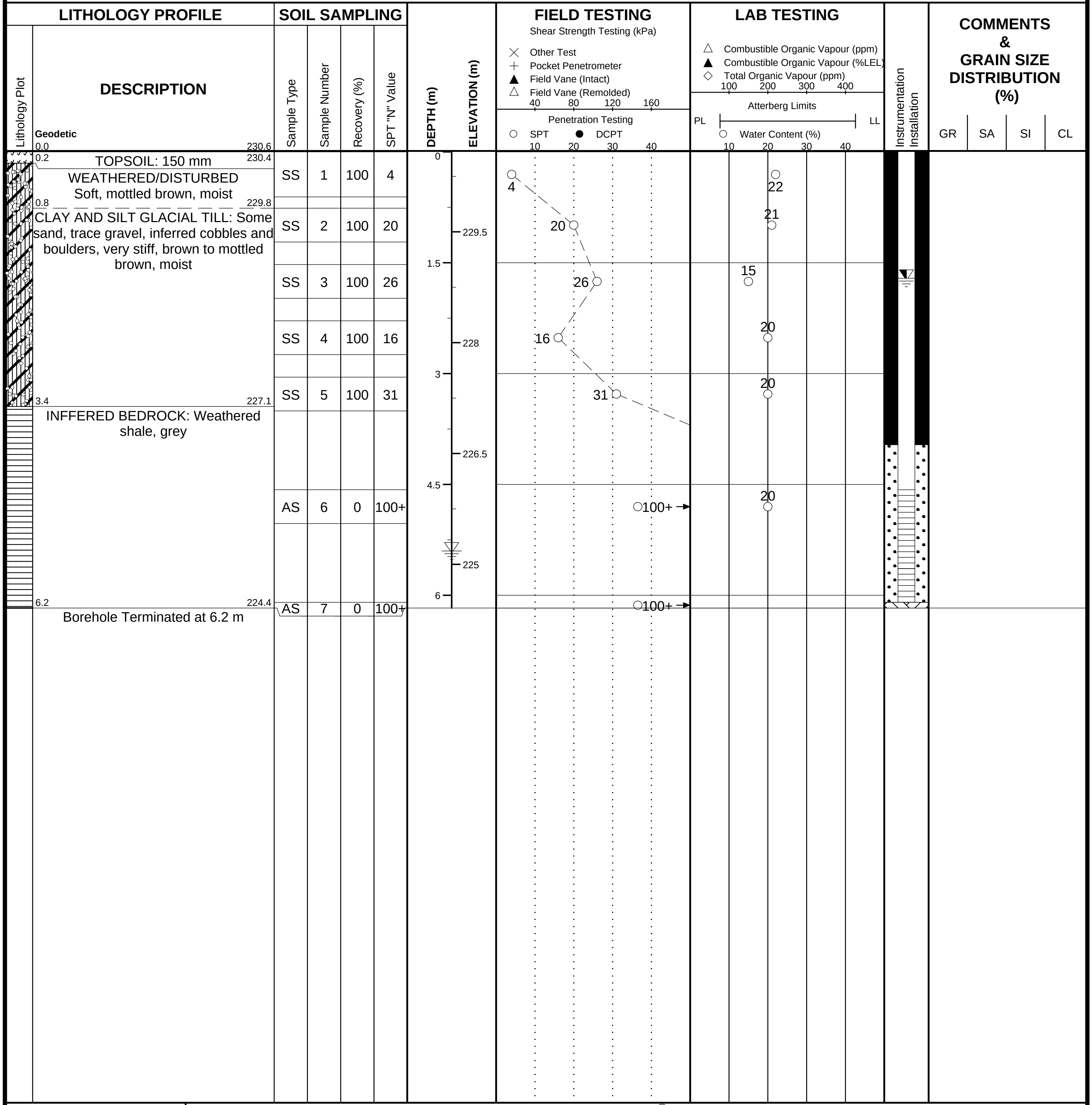
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 29

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852609**
Easting: **601513.8**
Date Started: **Apr 28/23**
Date Completed: **Apr 28/23**



Depth (m)	Elevation (m)	Description
0.0	230.6	Geodetic
0.2	230.4	TOPSOIL: 150 mm
0.8	229.8	WEATHERED/DISTURBED Soft, mottled brown, moist
3.4	227.1	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown to mottled brown, moist
6.2	224.4	INFFERED BEDROCK: Weathered shale, grey
		Borehole Terminated at 6.2 m

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
SS	1	100	4	22
SS	2	100	20	21
SS	3	100	26	15
SS	4	100	16	20
SS	5	100	31	20
AS	6	0	100+	20
AS	7	0	100+	

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: 5.4 m.
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 1.71 m.
Groundwater Elevation: 228.9 m

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

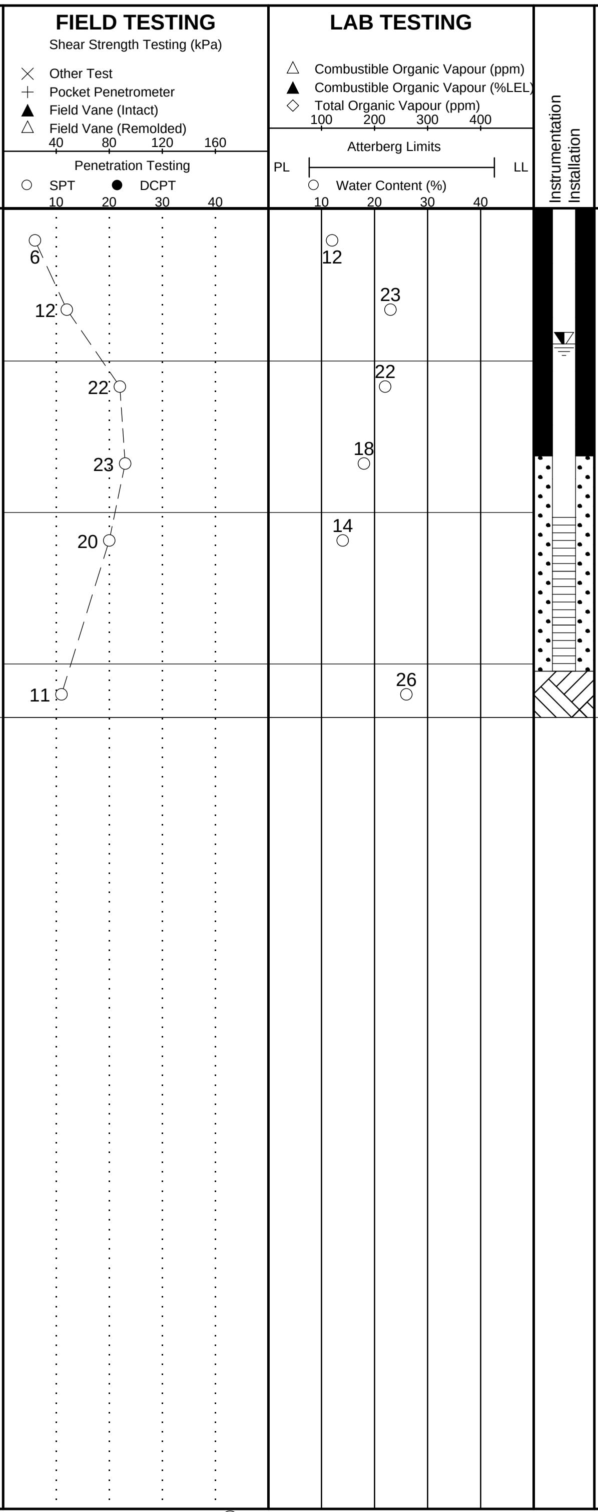
Scale: **1 :75**

RECORD OF BOREHOLE No. 30-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852437**
Easting: **601630.1**
Date Started: **Apr 28/23**
Date Completed: **Apr 28/23**

Depth (m)	Elevation (m)	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
0.0	229.7	Geodetic									
0.2	229.5	TOPSOIL: 180 mm									
		WEATHERED/DISTURBED Firm, brown, moist	SS	1	100	6	12				
0.8	228.9	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, stiff, brown, moist	SS	2	100	12	23	0	11	42	47
		- - - Trace gravel, very stiff, grey/dark brown - - -	SS	3	100	22	22				
			SS	4	100	23	18				
			SS	5	100	20	14				
		- - - Stiff, greyish-brown - - -	SS	6	0	11	26				
5.0	224.7	Borehole Terminated at 5.0 m									



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 1.33 m.
Groundwater Elevation: 228.4 m

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 30-S

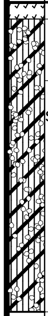
Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Northing: **4852437**
Date Started: **Apr 28/23**
Reviewed By: **RW**
Easting: **601629.7**
Date Completed: **Apr 28/23**

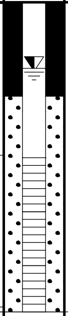
LITHOLOGY PROFILE | **SOIL SAMPLING** | **FIELD TESTING** | **LAB TESTING** | **COMMENTS & GRAIN SIZE DISTRIBUTION (%)**

FIELD TESTING – Shear Strength Testing (kPa): × Other Test; + Pocket Penetrometer; ▲ Field Vane (Intact); △ Field Vane (Remolded); 40 80 120 160
Penetration Testing: ○ SPT ● DCPT; 10 20 30 40

LAB TESTING: △ Combustible Organic Vapour (ppm); ▲ Combustible Organic Vapour (%LEL); ◇ Total Organic Vapour (ppm); 100 200 300 400
Atterberg Limits: PL ├──┤ LL
○ Water Content (%); 10 20 30 40



Lithology Plot	DESCRIPTION Geodetic	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Instrumentation Installation	GR	SA	SI	CL
	0.2 TOPSOIL: 180 mm 229.6					0	229.5					
	WEATHERED/DISTURBED Firm, brown, moist											
	0.8 229.0 CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, stiff, brown, moist											
	- - - Trace gravel, very stiff, grey/dark brown - - -					1.5	228					
	3.0 226.7					3						
	Borehole Terminated at 3.0 m											



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

▽ Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
▼ Groundwater depth observed on: Jul 11/23 at depth of: 0.64 m.
Groundwater Elevation: 229.1 m

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 31

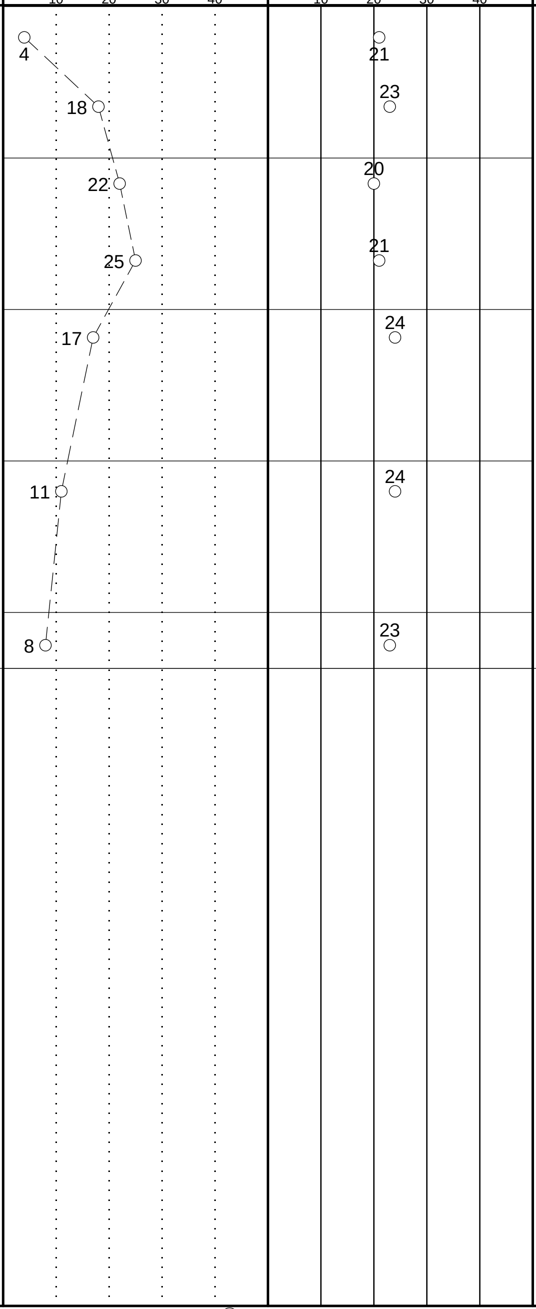
Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852269**
Easting: **601406**
Date Started: **Apr 27/23**
Date Completed: **Apr 27/23**

LITHOLOGY PROFILE		SOIL SAMPLING					
Depth (m) / Elevation (m)	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)
Geodetic 0.0 / 232.0						0	
0.2 / 231.8	TOPSOIL: 150 mm	SS	1	100	4		
0.8 / 231.2	WEATHERED/DISTURBED Soft, mottled brown, moist						
	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	2	100	18		231
		SS	3	100	22	1.5	
		SS	4	100	25		229.5
		SS	5	100	17	3	
							228
	- - - Stiff - - -	SS	6	100	11	4.5	
							226.5
6.6 / 225.4	- - - Grey - - -	SS	7	100	8	6	
	Borehole Terminated at 6.6 m						

FIELD TESTING
Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
40 80 120 160
Penetration Testing
○ SPT ● DCPT
10 20 30 40

LAB TESTING
△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL ├──┤ LL
○ Water Content (%)
10 20 30 40



Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 32-D

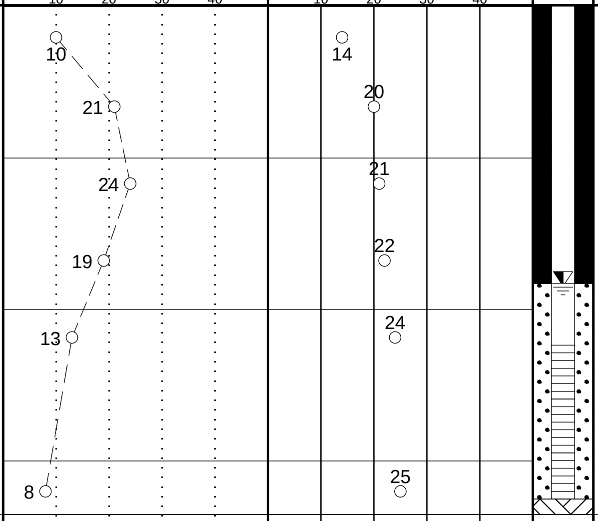
Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852065**
Easting: **601229.9**
Date Started: **Apr 27/23**
Date Completed: **Apr 27/23**

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)
Lithology Plot	DESCRIPTION Geodetic	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: SPT	Water Content (%)	Instrumentation Installation	GR / SA / SI / CL
	0.0 — 232.5					0	232.5				
	0.2 — 232.4 TOPSOIL: 150 mm										
	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, stiff to very stiff, brown/grey, moist	SS	1	100	10			10	14		
		SS	2	100	21			21	20		
		SS	3	100	24	1.5	231	24	21		
	- - - Brown - - -	SS	4	100	19			19	22		
		SS	5	100	13	3	229.5	13	24		
	- - - Grey - - -	SS	6	100	8	4.5	228	8	25		
	5.0 — 227.5										
	Borehole Terminated at 5.0 m										

FIELD TESTING
Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
40 80 120 160
Penetration Testing
○ SPT ● DCPT
10 20 30 40

LAB TESTING
△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400
Atterberg Limits
PL LL
○ Water Content (%)
10 20 30 40



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: 4.8 m.
Groundwater depth observed on: Jul 11/23 at depth of: 2.74 m.
Groundwater Elevation: 229.8 m

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 32-S

GEI Consultants

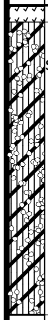
Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852064**
Easting: **601229.9**
Date Started: **Apr 27/23**
Date Completed: **Apr 27/23**

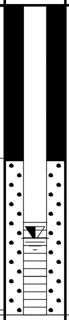
LITHOLOGY PROFILE | **SOIL SAMPLING** | **FIELD TESTING** | **LAB TESTING** | **COMMENTS & GRAIN SIZE DISTRIBUTION (%)**

Field Testing – Shear Strength Testing (kPa): × Other Test; + Pocket Penetrometer; ▲ Field Vane (Intact); △ Field Vane (Remolded); scale 40, 80, 120, 160
Penetration Testing: ○ SPT ● DCPT; scale 10, 20, 30, 40

Lab Testing: △ Combustible Organic Vapour (ppm); ▲ Combustible Organic Vapour (%LEL); ◇ Total Organic Vapour (ppm); scale 100, 200, 300, 400
Atterberg Limits: PL ├──┤ LL; ○ Water Content (%); scale 10, 20, 30, 40



Lithology Plot	DESCRIPTION (Geodetic)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Instrumentation Installation	GR	SA	SI	CL
	0.2 TOPSOIL: 150 mm 232.4					0	232.5					
	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, stiff to very stiff, brown/grey, moist											
						1.5	231					
	- - - Brown - - -											
	3.0 229.5					3	229.5					
	Borehole Terminated at 3.0 m											



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry

Groundwater depth observed on: Jul 11/23 at depth of: 2.29 m. Groundwater Elevation: 230.2 m

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

Scale: **1 :75**

Page: **1 of 1**

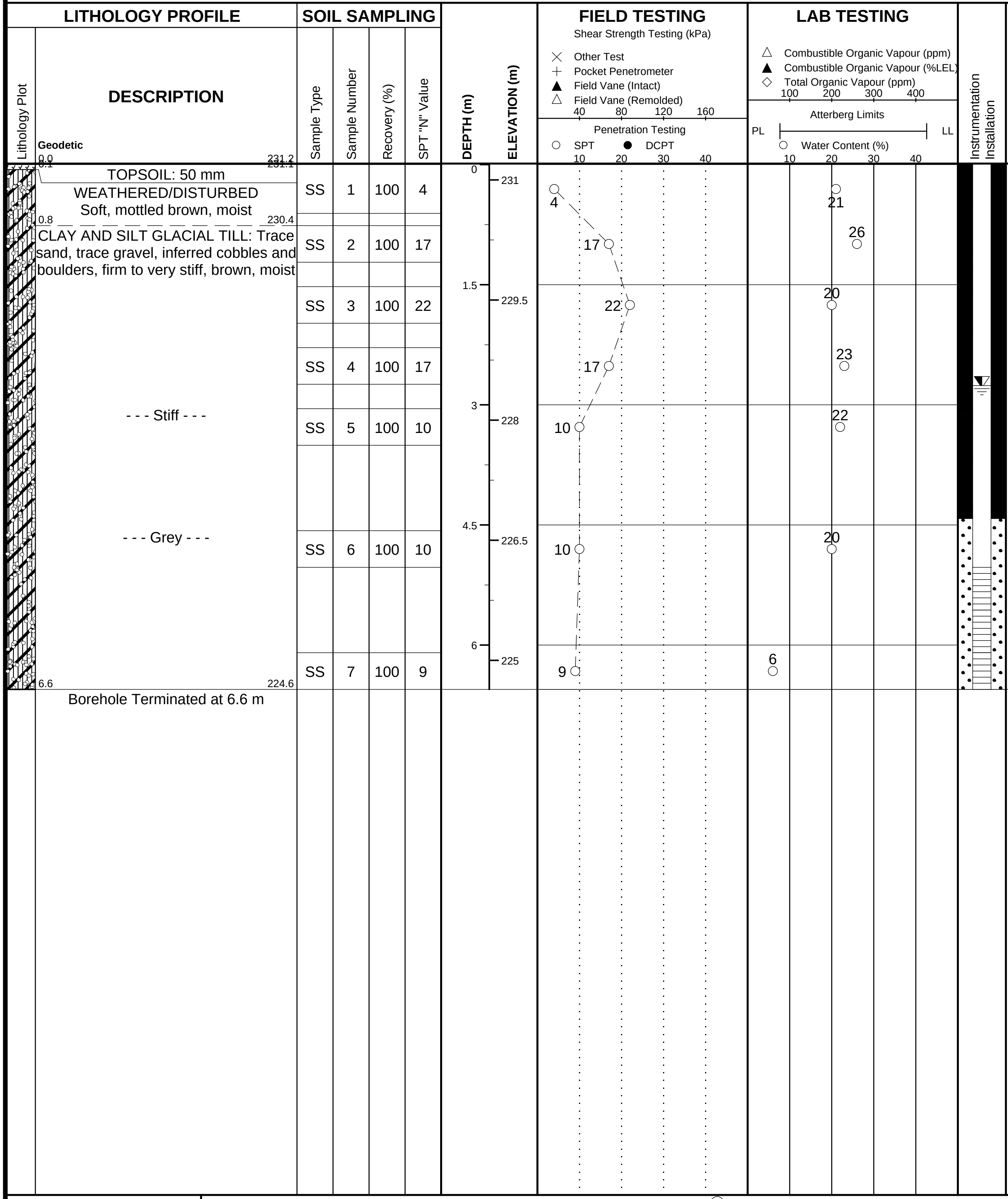
RECORD OF BOREHOLE No. 33-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4851893**
Easting: **601298.2**
Date Started: **Apr 27/23**
Date Completed: **Apr 27/23**

Depth (m)	Elevation (m)	Description (Geodetic)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
0.0 0.1	231.2 231.1	TOPSOIL: 50 mm WEATHERED/DISTURBED Soft, mottled brown, moist	SS	1	100	4	21				
0.8	230.4	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, firm to very stiff, brown, moist	SS	2	100	17	26				
			SS	3	100	22	20				
			SS	4	100	17	23				
		- - - Stiff - - -	SS	5	100	10	22				
		- - - Grey - - -	SS	6	100	10	20				
6.6	224.6		SS	7	100	9	6	1	14	38	47

Borehole Terminated at 6.6 m



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 2.76 m.
Groundwater Elevation: 228.4 m

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

Scale: **1 :75**
Page: **1 of 1**

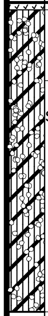
RECORD OF BOREHOLE No. 33-S

GEI Consultants

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4851892**
Easting: **601298**
Date Started: **Apr 27/23**
Date Completed: **Apr 27/23**

LITHOLOGY PROFILE



Depth (m)	DESCRIPTION (Geodetic)	Elevation (m)
0.0		231.1
0.1	TOPSOIL: 50 mm	231.0
	WEATHERED/DISTURBED Soft, mottled brown, moist	
0.8	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	230.3
3.0		228.1

Borehole Terminated at 3.0 m

SOIL SAMPLING

Sample Type | Sample Number | Recovery (%) | SPT "N" Value

DEPTH (m): 0, 1.5, 3
ELEVATION (m): 231, 229.5

FIELD TESTING

Shear Strength Testing (kPa)
× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)
40 80 120 160

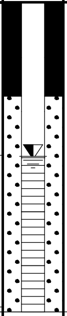
Penetration Testing
○ SPT ● DCPT
10 20 30 40

LAB TESTING

△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)
100 200 300 400

Atterberg Limits
PL ├──┤ LL
○ Water Content (%)
10 20 30 40

Instrumentation Installation



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR | SA | SI | CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 1.51 m.
Groundwater Elevation: 229.6 m

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

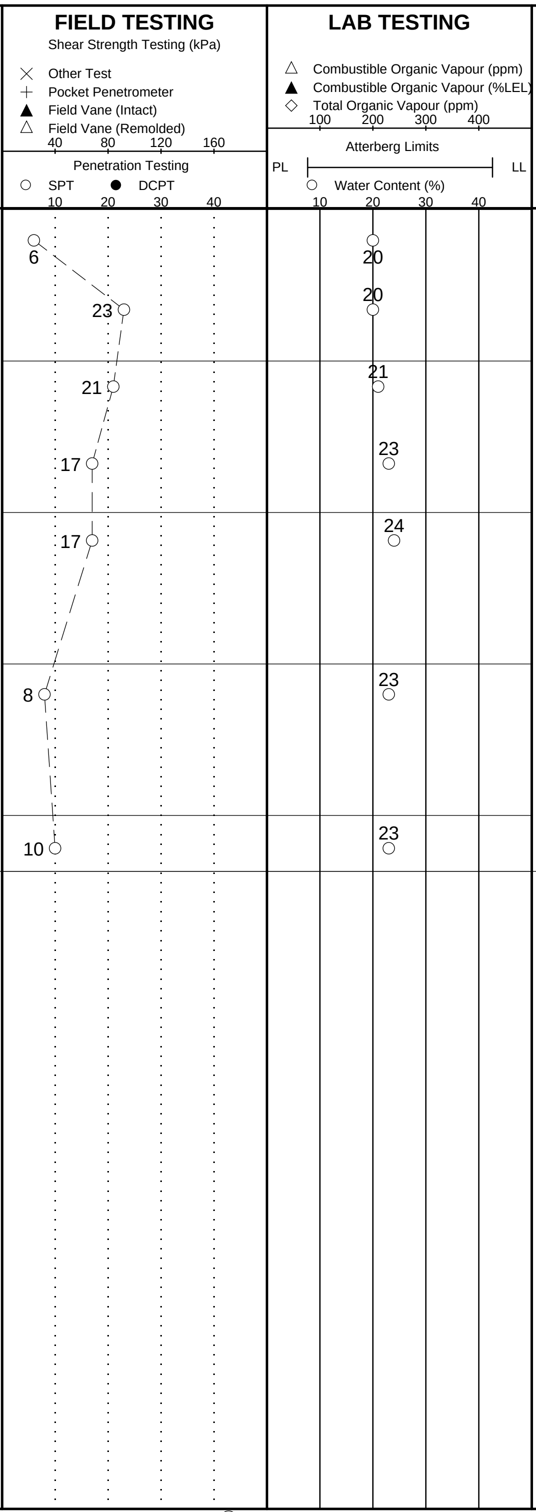
Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 34

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852183**
Easting: **601612.6**
Date Started: **Apr 27/23**
Date Completed: **Apr 27.23**

Depth (m)	Elevation (m)	Description (Geodetic)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value
0.0	229.7					
0.2	229.5	TOPSOIL: 150 mm				
		WEATHERED/DISTURBED Firm, brown, moist	SS	1	100	6
0.8	228.9	CLAY AND SILT GLACIAL TILL: Some sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	SS	2	100	23
			SS	3	100	21
			SS	4	100	17
			SS	5	100	17
		- - - Stiff, grey - - -	SS	6	0	8
6.6	223.1		SS	7	100	10
		Borehole Terminated at 6.6 m				



Depth (m): 0, 1.5, 3, 4.5, 6
Elevation (m): 229.5, 228, 226.5, 225, 223.5

Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

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

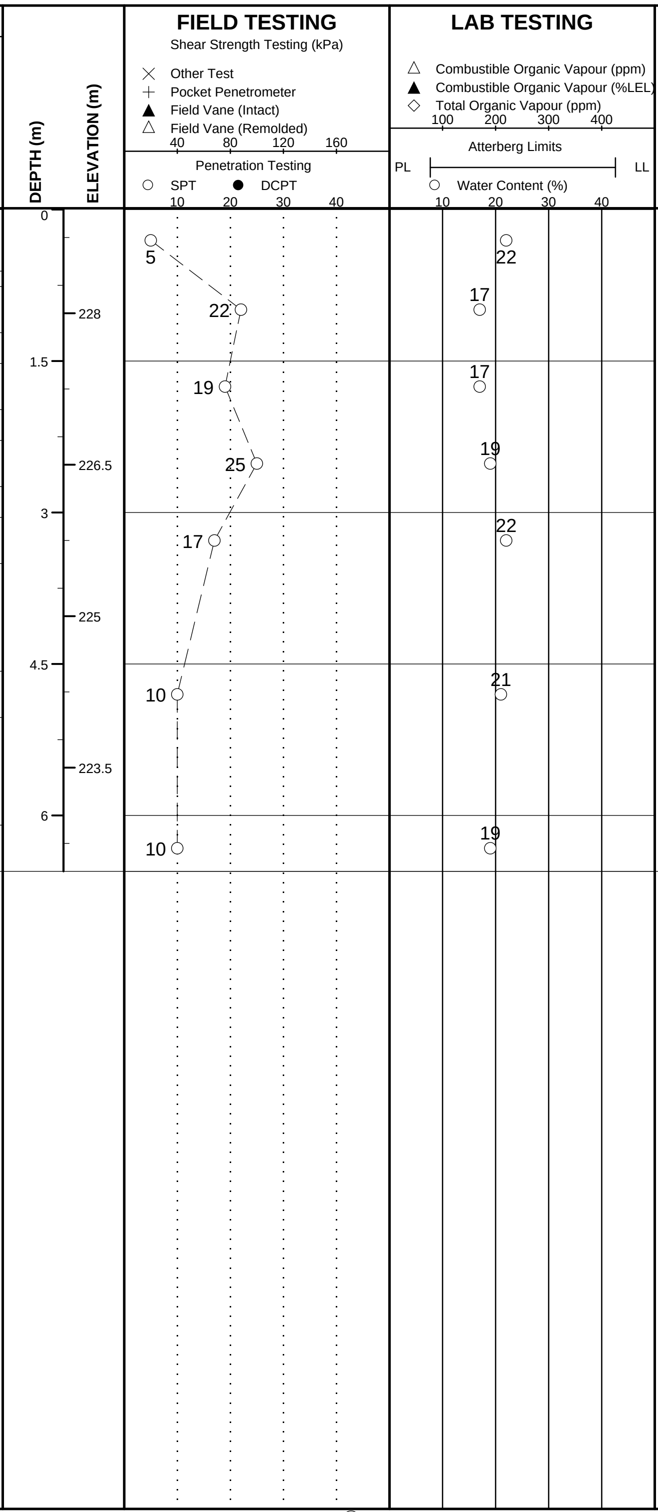
Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 35

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852399**
Easting: **601759.2**
Date Started: **Apr 27/23**
Date Completed: **Apr 27/23**

LITHOLOGY PROFILE		SOIL SAMPLING					
Depth (m)	DESCRIPTION (Geodetic)	Elevation (m)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
0.0		229.0					
0.2	TOPSOIL: 230 mm	228.9					
	WEATHERED/DISTURBED Firm, brown, moist		SS	1	100	5	22
0.8	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	228.3	SS	2	100	22	17
			SS	3	100	19	17
			SS	4	100	25	19
	- - - Grey - - -		SS	5	100	17	22
	- - - Stiff - - -		AS	6	0	10	21
6.6		222.5	SS	7	100	10	19
	Borehole Terminated at 6.6 m						



Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)
GR | SA | SI | CL

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

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

Scale: **1 :75**

RECORD OF BOREHOLE No. 36

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

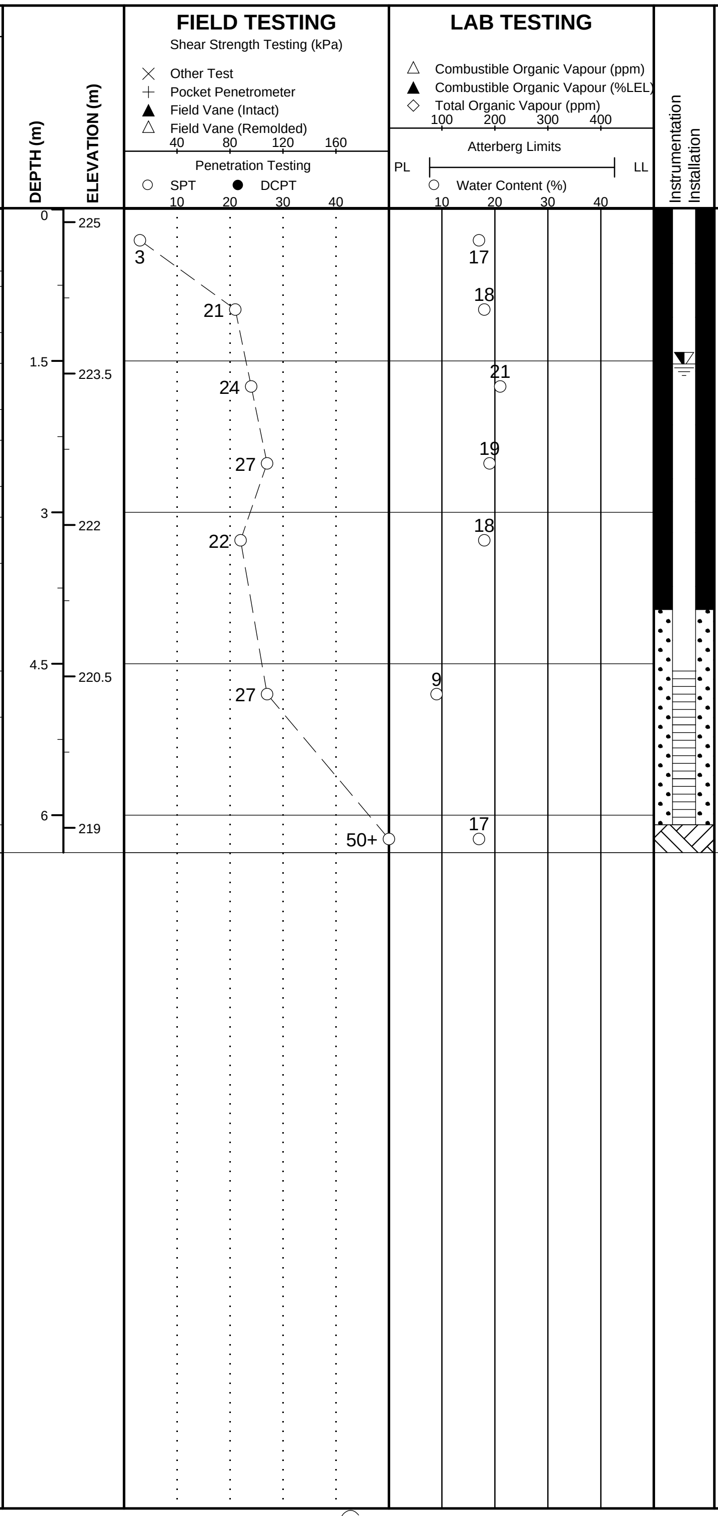
Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852605**
Easting: **601914.3**
Date Started: **Apr 28/23**
Date Completed: **Apr 28/23**

LITHOLOGY PROFILE

Depth (m)	DESCRIPTION	Elevation (m)
0.0	**Geodetic**	225.1
0.2	TOPSOIL: 255 mm	224.9
	WEATHERED/DISTURBED Soft, mottled brown, moist	
0.8	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, mottled brown, moist - - - Some gravel, dark brown - - -	224.4
4.9	SANDY SILT GLACIAL TILL: Some gravel, inferred cobbles and boulders, compact, grey, moist	220.2
6.2		218.9
6.4	INFERRED BEDROCK: Highly weathered shale, grey Borehole Terminated at 6.4 m	218.8

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
SS	1	100	3	17
SS	2	100	21	18
SS	3	100	24	21
SS	4	100	27	19
SS	5	100	22	18
SS	6	100	27	9
SS	7	100	50+	17



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 1.53 m.
Groundwater Elevation: 223.6 m

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

Scale: **1 :75**
Page: **1 of 1**

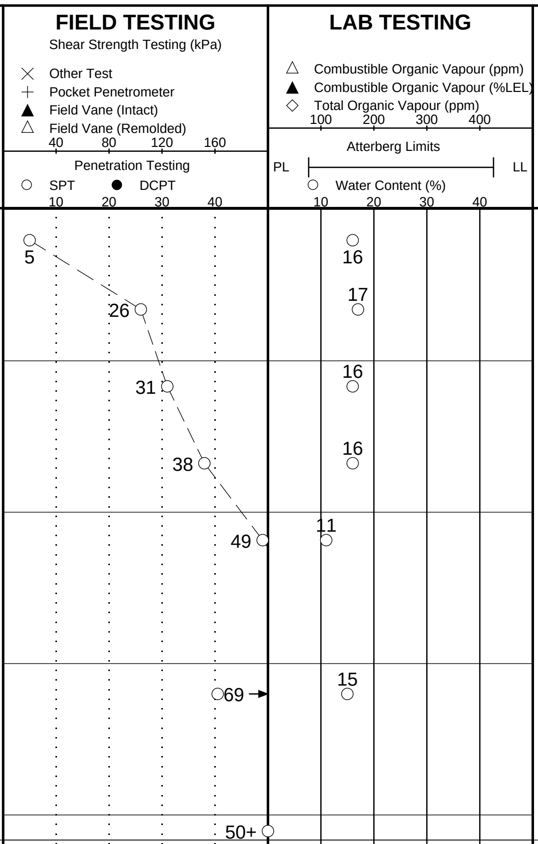
RECORD OF BOREHOLE No. 37

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852828**
Easting: **602076.5**
Date Started: **May 1/23**
Date Completed: **May 1/23**

Depth (m)	Elevation (m)	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value
0.0	223.8	Geodetic				
0.3	223.5	TOPSOIL: 305 mm	SS	1	100	5
0.8	223.1	WEATHERED/DISTURBED Firm, mottled brown, moist				
		CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff to hard, brown, moist	SS	2	100	26
			SS	3	100	31
			SS	4	100	38
3.0	220.8	SANDY SILT GLACIAL TILL: Trace gravel, trace clay, inferred cobbles and boulders, dense, brown, moist	SS	5	100	49
		- - - Very dense, grey - - -	SS	6	100	69
6.2	217.6		SS	7	100	50+

Borehole Terminated at 6.2 m



Instrumentation Installation

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on:
Groundwater Elevation:

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

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

Scale: **1 :75**

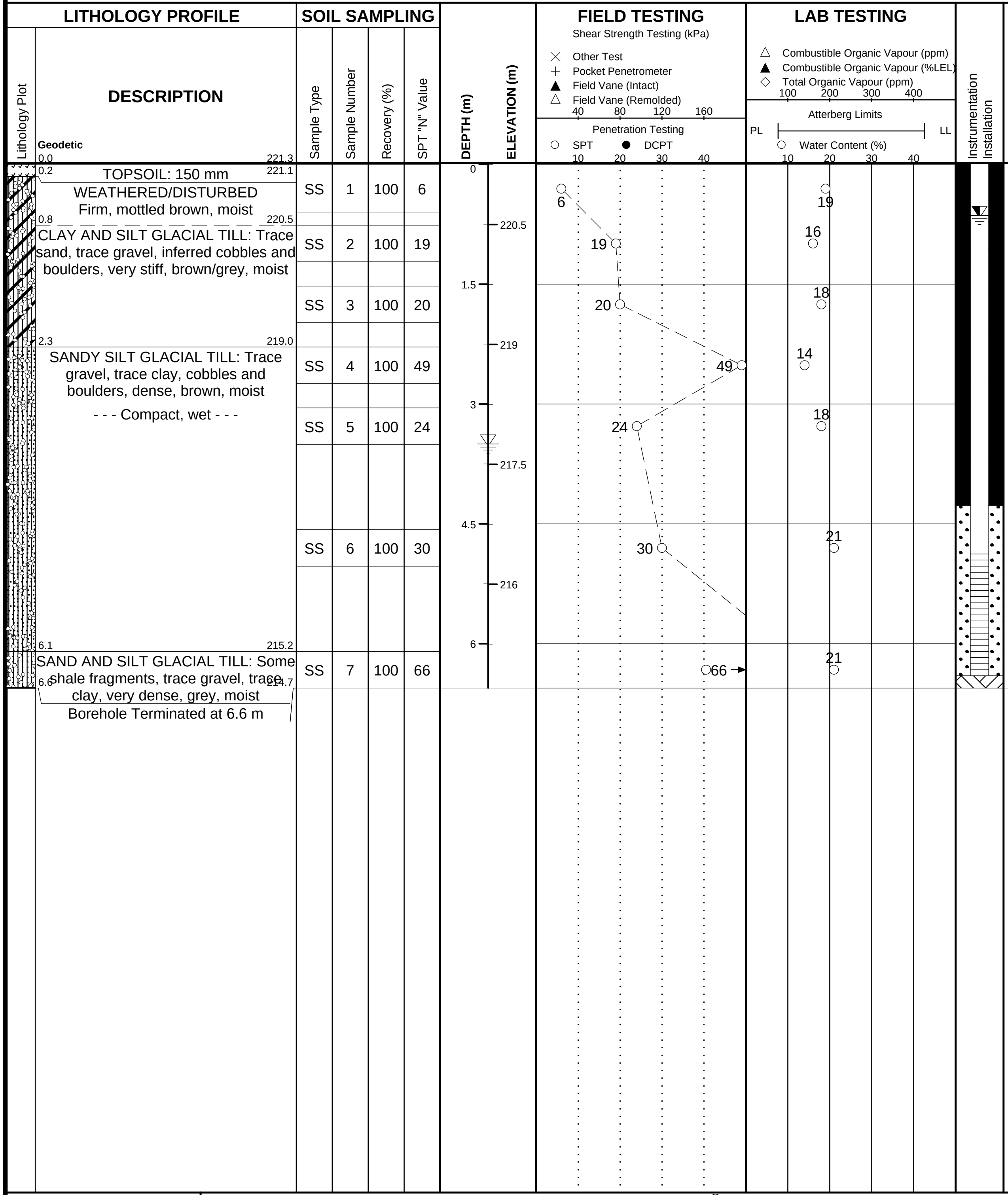
RECORD OF BOREHOLE No. 38-D

GEI Consultants

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Northing: **4852629**
Date Started: **Apr 28/23**
Reviewed By: **RW**
Easting: **602168.9**
Date Completed: **Apr 28/23**

Depth (m)	Elevation (m)	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
0.0	221.3	Geodetic						
0.2	221.1	TOPSOIL: 150 mm						
		WEATHERED/DISTURBED Firm, mottled brown, moist	SS	1	100	6	19	
0.8	220.5	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown/grey, moist	SS	2	100	19	16	
			SS	3	100	20	18	
2.3	219.0	SANDY SILT GLACIAL TILL: Trace gravel, trace clay, cobbles and boulders, dense, brown, moist	SS	4	100	49	14	
		- - - Compact, wet - - -	SS	5	100	24	18	First Water Strike SS5
			SS	6	100	30	21	
6.1	215.2	SAND AND SILT GLACIAL TILL: Some shale fragments, trace gravel, trace clay, very dense, grey, moist	SS	7	100	66	21	
6.6	214.7	Borehole Terminated at 6.6 m						



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: 3.5 m.

Cave depth after auger removal: Open

Groundwater depth observed on: Jul 11/23 at depth of: 0.64 m.

Groundwater Elevation: 220.6 m

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

Scale: **1 :75**

Page: **1 of 1**

RECORD OF BOREHOLE No. 38-S

GEI Consultants

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852629**
Easting: **602168.5**
Date Started: **Apr 28/23**
Date Completed: **Apr 28/23**

LITHOLOGY PROFILE			SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Depth (m)	DESCRIPTION	Elevation (Geodetic)	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)			Instrumentation Installation	GR	SA	SI	CL
0.0		221.3					0								
0.2	TOPSOIL: 150 mm	221.1													
0.8	WEATHERED/DISTURBED Firm, mottled brown, moist	220.5						220.5							
2.3	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown/grey, moist	219.0					1.5	219							
3.7	SANDY SILT GLACIAL TILL: Trace gravel, trace clay, inferred cobbles and boulders, dense, brown, moist	217.6					3								
	Borehole Terminated at 3.7 m														

FIELD TESTING

Shear Strength Testing (kPa)

× Other Test
+ Pocket Penetrometer
▲ Field Vane (Intact)
△ Field Vane (Remolded)

40 80 120 160

Penetration Testing

○ SPT ● DCPT

10 20 30 40

LAB TESTING

△ Combustible Organic Vapour (ppm)
▲ Combustible Organic Vapour (%LEL)
◇ Total Organic Vapour (ppm)

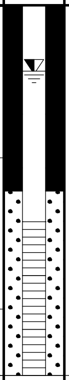
100 200 300 400

Atterberg Limits

PL ├──┤ LL

○ Water Content (%)

10 20 30 40



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: 3.5 m.
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.64 m.
Groundwater Elevation: 220.6 m

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 39-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

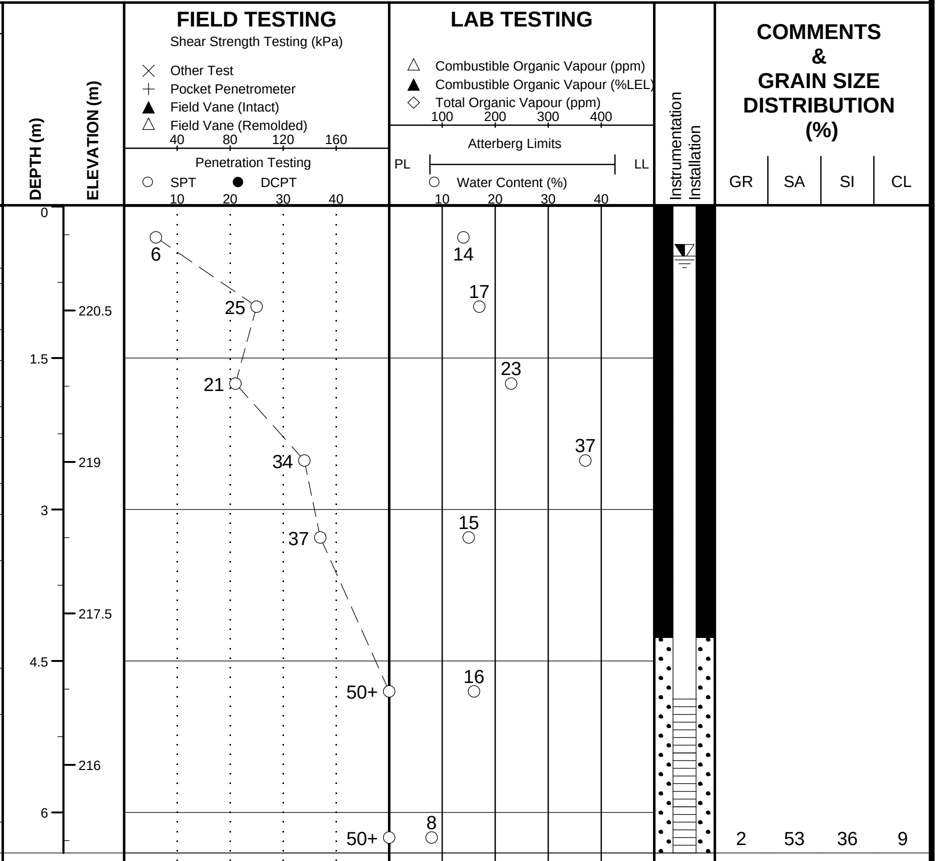
Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Northing: **4852542**
Date Started: **Apr 28/23**
Reviewed By: **RW**
Easting: **602171.6**
Date Completed: **Apr 28/23**

LITHOLOGY PROFILE

Depth (m)	Elevation (m)	DESCRIPTION
0.0	221.5	Geodetic
0.2	221.4	TOPSOIL: 150 mm
0.8	220.8	WEATHERED/DISTURBED Firm, mottled brown, moist
		CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist - - - Hard - - - - - - Grey - - -
4.6	217.0	SANDY SILT: Trace clay, very dense, grey, moist
6.1	215.4	SAND AND SILT GLACIAL TILL: Trace clay, trace gravel, inferred cobbles and boulders, very dense, grey, moist
6.4	215.1	Borehole Terminated at 6.4 m

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
SS	1	100	6	14				
SS	2	100	25	17				
SS	3	100	21	23				
SS	4	100	34	37				
SS	5	100	37	15				
SS	6	100	50+	16				
SS	7	100	50+	8	2	53	36	9



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry

Cave depth after auger removal: Open

Groundwater depth observed on: Jul 11/23 at depth of: 0.49 m.

Groundwater Elevation: 221.0 m

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

Scale: **1 :75**

RECORD OF BOREHOLE No. 39-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852543**
Easting: **602172.1**
Date Started: **Apr 28/23**
Date Completed: **Apr 28/23**

LITHOLOGY PROFILE | SOIL SAMPLING | FIELD TESTING | LAB TESTING | COMMENTS & GRAIN SIZE DISTRIBUTION (%)

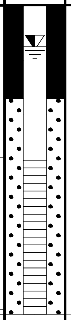
FIELD TESTING — Shear Strength Testing (kPa): × Other Test; + Pocket Penetrometer; ▲ Field Vane (Intact); △ Field Vane (Remolded); 40 80 120 160
Penetration Testing: ○ SPT ● DCPT; 10 20 30 40

LAB TESTING — △ Combustible Organic Vapour (ppm); ▲ Combustible Organic Vapour (%LEL); ◇ Total Organic Vapour (ppm); 100 200 300 400
Atterberg Limits: PL ├──┤ LL; ○ Water Content (%); 10 20 30 40

Columns: Lithology Plot | DESCRIPTION | Sample Type | Sample Number | Recovery (%) | SPT "N" Value | DEPTH (m) | ELEVATION (m) | Instrumentation Installation | GR | SA | SI | CL

Depth (m)	Elevation (m)	DESCRIPTION
0.0	221.6	Geodetic
0.2	221.4	TOPSOIL: 150 mm
0.8	220.8	WEATHERED/DISTURBED Firm, mottled brown, moist
		CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist - - - Hard - - -
3.0	218.5	Borehole Terminated at 3.0 m

DEPTH (m) scale: 0, 1.5, 3
ELEVATION (m) scale: 220.5, 219



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.4 m.
Groundwater Elevation: 221.2 m

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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 40

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

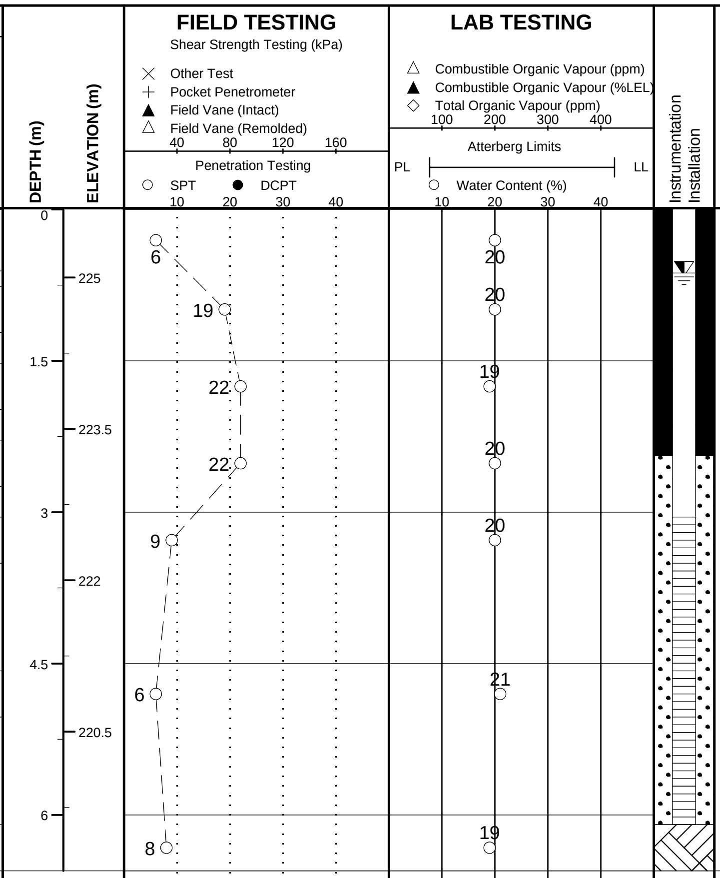
Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852203**
Easting: **601919.2**
Date Started: **Apr 28/23**
Date Completed: **Apr 28/23**

LITHOLOGY PROFILE

Depth (m)	DESCRIPTION	Elevation (m) Geodetic
0.0		225.7
0.2	TOPSOIL: 150 mm	225.5
	WEATHERED/DISTURBED Firm, mottled brown, moist	
0.8	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown, moist	224.9
	- - - Stiff - - -	
	- - - Firm - - -	
6.6		219.1
	Borehole Terminated at 6.6 m	

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT "N" Value
SS	1	100	6
SS	2	100	19
SS	3	100	22
SS	4	100	22
SS	5	100	9
SS	6	100	6
SS	7	100	8



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry

Cave depth after auger removal: Open

Groundwater depth observed on: Jul 11/23 at depth of: 0.63 m.

Groundwater Elevation: 225.0 m

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

Scale: **1 :75**

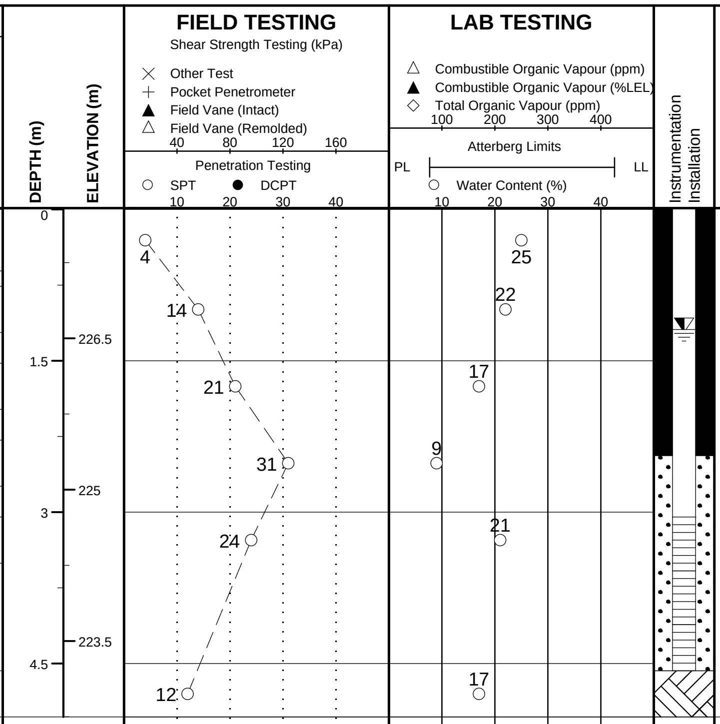
Page: **1 of 1**

RECORD OF BOREHOLE No. 41-D

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852021**
Easting: **601764.8**
Date Started: **Apr 27/23**
Date Completed: **Apr 27/23**

Depth / Elevation (m)	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
Geodetic 0.0 / 227.8	WEATHERED/DISTURBED Soft to stiff, brown/red/grey, moist	SS	1	100	4	25				
		SS	2	100	14	22				
1.5 / 226.3	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff to hard, brown, moist	SS	3	100	21	17				
		SS	4	100	31	9				
	- - - Trace sand - - -	SS	5	100	24	21	1	6	38	55
5.0 / 222.7	- - - Stiff, grey - - -	SS	6	100	12	17				
	Borehole Terminated at 5.0 m									



GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 1.19 m.
Groundwater Elevation: 226.6 m

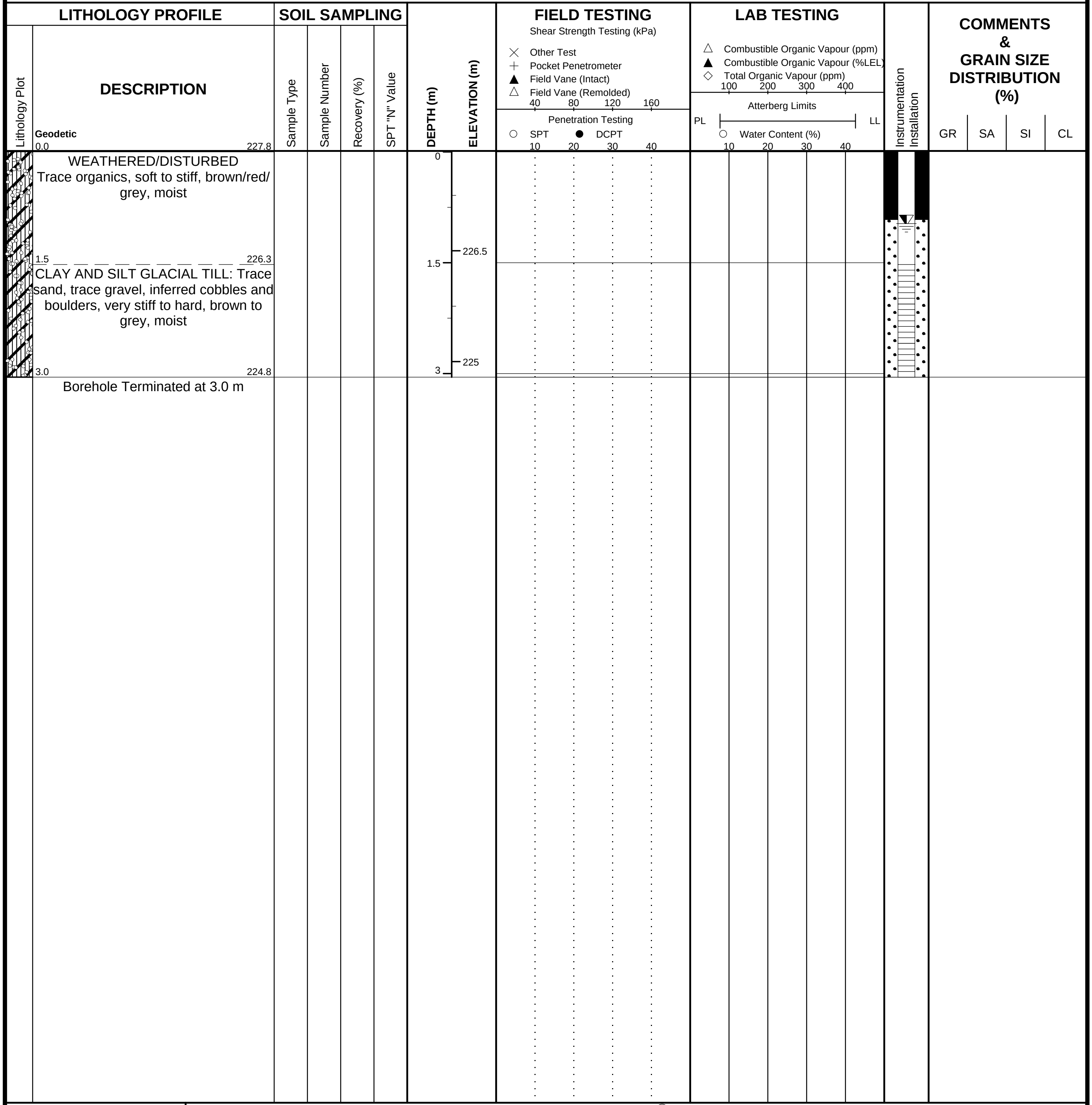
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and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

Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 41-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **FH**
Reviewed By: **RW**
Northing: **4852022**
Easting: **601764.2**
Date Started: **Apr 27/23**
Date Completed: **Apr 27/23**



Depth (m)	Elevation (m)	Description
0.0	227.8	WEATHERED/DISTURBED Trace organics, soft to stiff, brown/red/grey, moist
1.5	226.3	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff to hard, brown to grey, moist
3.0	224.8	Borehole Terminated at 3.0 m

GEI CONSULTANTS
647 Welham Road, Unit 14
Barrie, Ontario L4N 0B7
T : (705) 719-7994
www.geiconsultants.com

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Jul 11/23 at depth of: 0.97 m.
Groundwater Elevation: 226.9 m

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

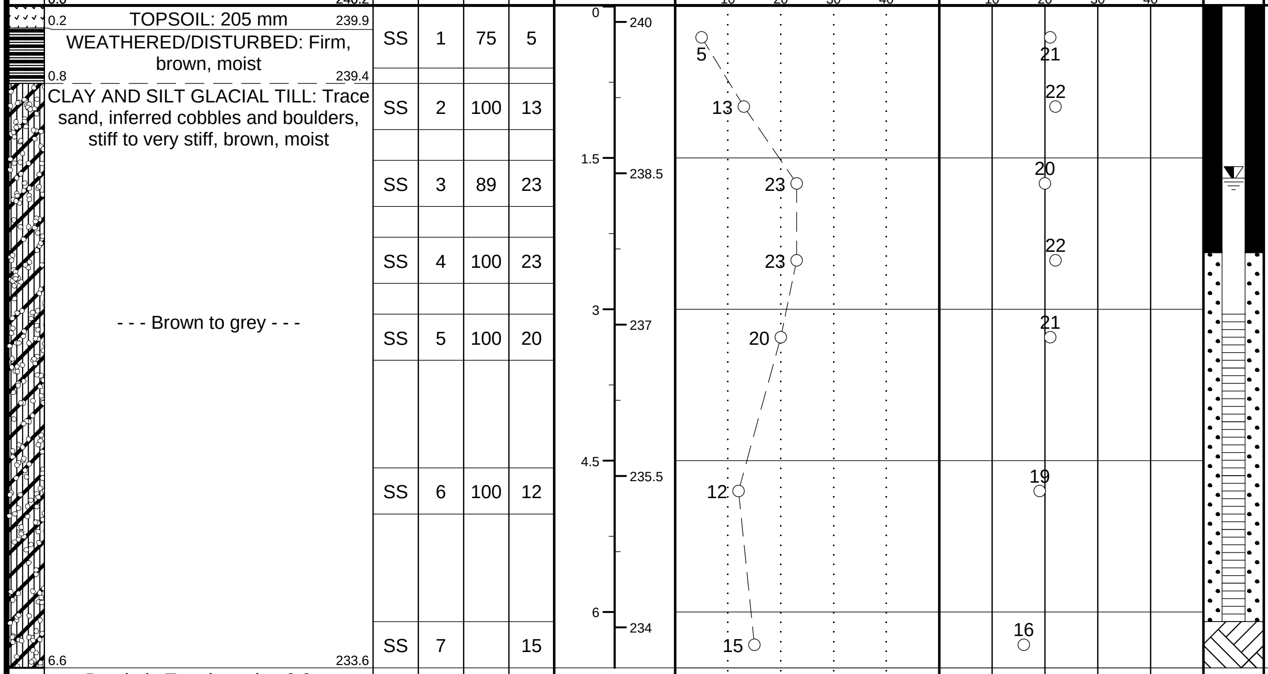
Scale: **1 :75**
Page: **1 of 1**

RECORD OF BOREHOLE No. 101

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Reviewed By: **RW/AB**
Northing: **4852692**
Easting: **600400**
Date Started: **Jul 16/24**
Date Completed: **Jul 16/24**

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING	COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
DESCRIPTION	Depth / Elevation	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Penetration Testing (SPT)	Water Content (%)	GR	SA	SI	CL
Geodetic	0.0 / 240.2					0	240						
TOPSOIL: 205 mm	0.2 / 239.9												
WEATHERED/DISTURBED: Firm, brown, moist		SS	1	75	5			5	21				
CLAY AND SILT GLACIAL TILL: Trace sand, inferred cobbles and boulders, stiff to very stiff, brown, moist	0.8 / 239.4	SS	2	100	13			13	22				
		SS	3	89	23	1.5	238.5	23	20				
		SS	4	100	23			23	22				
- - - Brown to grey - - -		SS	5	100	20	3	237	20	21	1	6	41	52
		SS	6	100	12	4.5	235.5	12	19				
	6.6 / 233.6	SS	7		15	6	234	15	16				
Borehole Terminated at 6.6 m													



Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Aug 23/24 at depth of: 1.7 m.
Groundwater Elevation: 238.5 m

GEI CONSULTANTS
Canada Ltd.
www.geiconsultants.com

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

Scale: **1 :75**

RECORD OF BOREHOLE No. 102

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

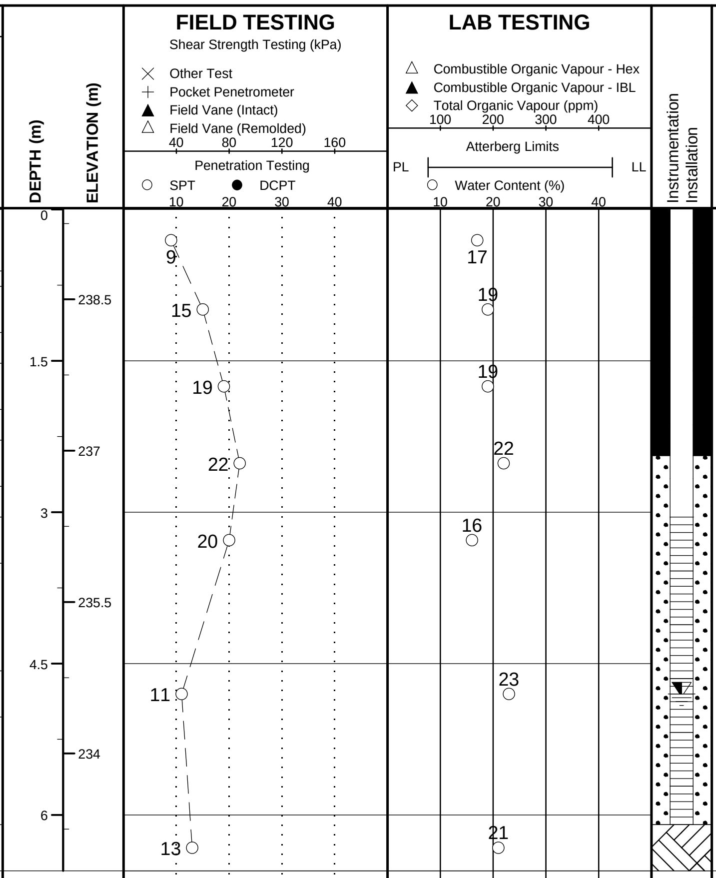
Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH**
Reviewed By: **RW/AB**
Northing: **4852541**
Easting: **600685**
Date Started: **Jul 16/24**
Date Completed: **Jul 16/24**

LITHOLOGY PROFILE

Depth (m)	Elevation (m)	DESCRIPTION
0.0	239.4	Geodetic
0.2	239.2	TOPSOIL: 180 mm
		WEATHERED/DISTURBED: Stiff, brown, moist
0.8	238.6	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, stiff to very stiff, brown, moist
		- - - Brown to grey - - -
6.6	232.8	Borehole Terminated at 6.6 m

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
SS	1		9	17
SS	2	100	15	19
SS	3	100	19	19
SS	4	100	22	22
SS	5	100	20	16
SS	6	100	11	23
SS	7	100	13	21



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Aug 23/24 at depth of: 4.8 m.
Groundwater Elevation: 234.6 m

GEI CONSULTANTS
Canada Ltd.
www.geiconsultants.com

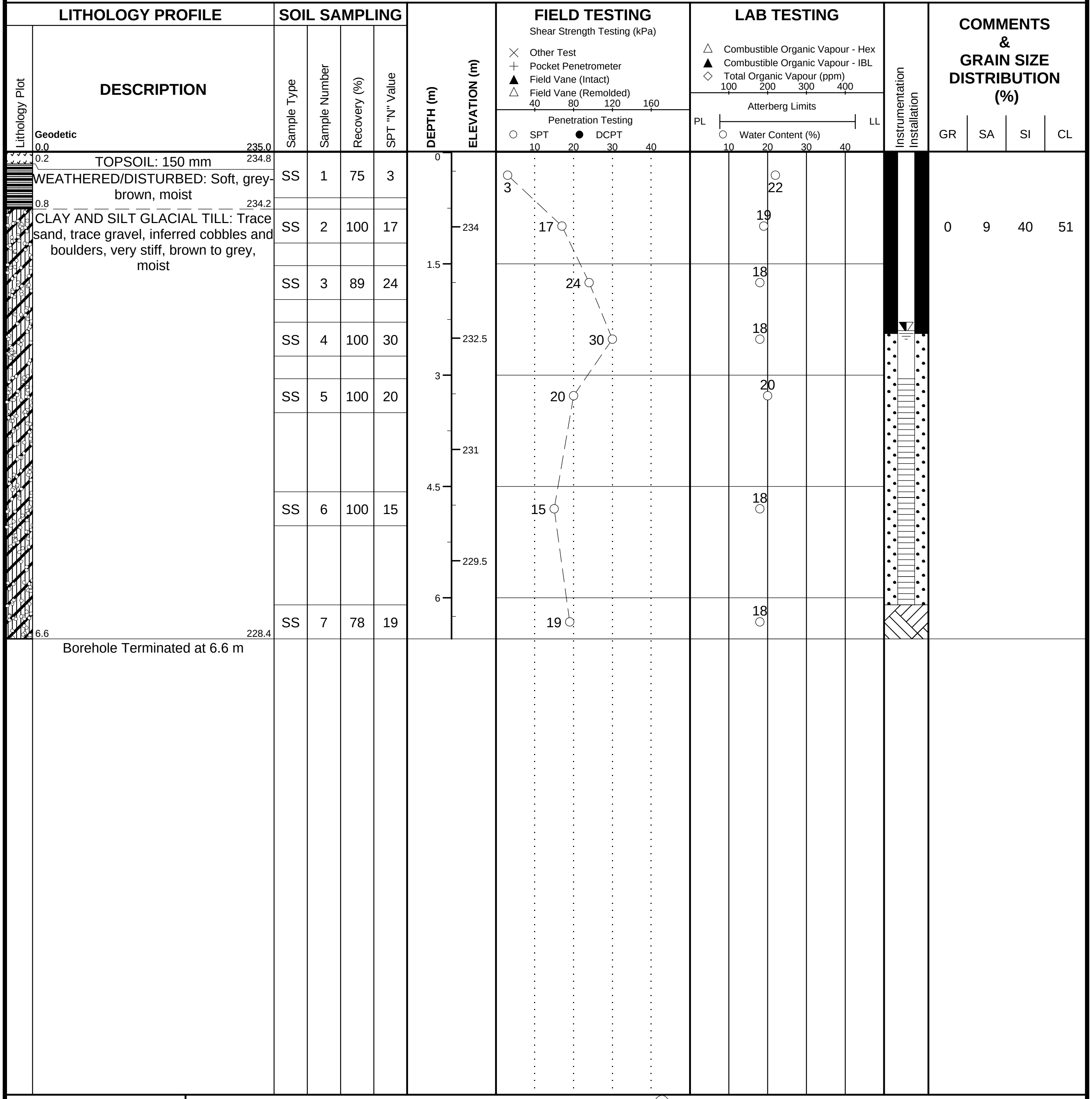
Borehole details presented do not constitute a thorough understanding of all potential conditions present and require interpretative assistance from a qualified geotechnical engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and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

Scale: **1 :75**

RECORD OF BOREHOLE No. 103

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Auger**
Drilling Machine: **Track Mount**
Logged By: **BH/AB**
Reviewed By: **RW/AB**
Northing: **4852231**
Easting: **600846**
Date Started: **Jul 16/24**
Date Completed: **Jul 16/24**



Depth (m)	Elevation (m)	Description (Geodetic)
0.0	235.0	
0.2	234.8	TOPSOIL: 150 mm
		WEATHERED/DISTURBED: Soft, grey-brown, moist
0.8	234.2	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, very stiff, brown to grey, moist
6.6	228.4	Borehole Terminated at 6.6 m

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
SS	1	75	3	22				
SS	2	100	17	19	0	9	40	51
SS	3	89	24	18				
SS	4	100	30	18				
SS	5	100	20	20				
SS	6	100	15	18				
SS	7	78	19	18				

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Aug 23/24 at depth of: 2.4 m.
Groundwater Elevation: 232.6 m

GEI CONSULTANTS
Canada Ltd.
www.geiconsultants.com

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

Scale: **1 :75**

RECORD OF BOREHOLE No. 104-D

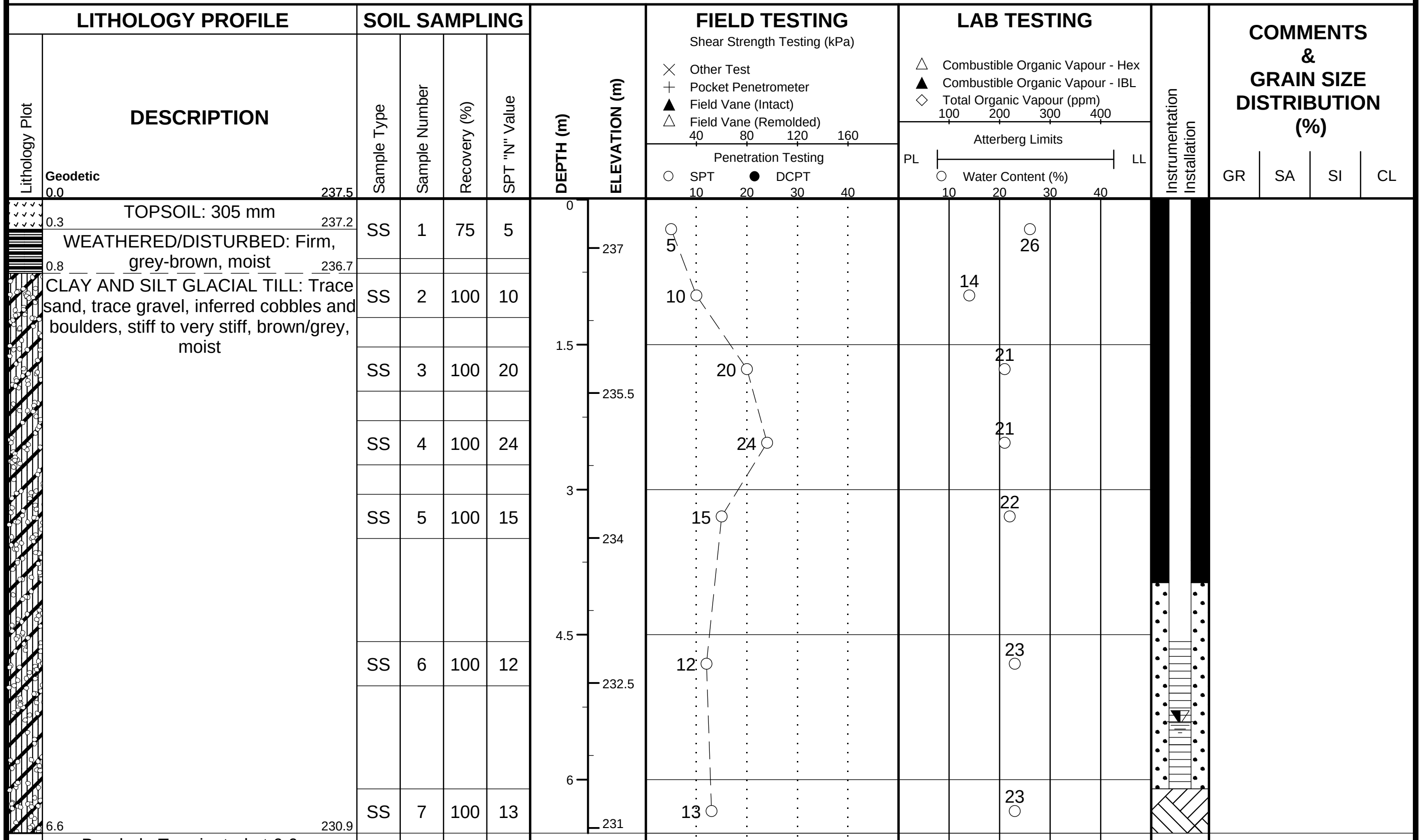
GEI Consultants

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH/AB**
Reviewed By: **RW/AB**
Northing: **4852592**
Easting: **600940**
Date Started: **Jul 16/24**
Date Completed: **Jul 16/24**

Depth (m)	Elevation (m)	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)
0.0	237.5	Geodetic					
0.3	237.2	TOPSOIL: 305 mm	SS	1	75	5	26
0.8	236.7	WEATHERED/DISTURBED: Firm, grey-brown, moist					
6.6	230.9	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, stiff to very stiff, brown/grey, moist	SS	2	100	10	14
			SS	3	100	20	21
			SS	4	100	24	21
			SS	5	100	15	22
			SS	6	100	12	23
			SS	7	100	13	23

Borehole Terminated at 6.6 m



Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Aug 23/24 at depth of: 5.4 m.
Groundwater Elevation: 232.1 m

GEI CONSULTANTS
Canada Ltd.
www.geiconsultants.com

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

Scale: **1 :75**

Page: **1 of 1**

RECORD OF BOREHOLE No. 104-S

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH/AB**
Reviewed By: **RW/AB**
Northing: **4852561**
Easting: **600940**
Date Started: **Jul 16/24**
Date Completed: **Jul 16/24**

LITHOLOGY PROFILE			SOIL SAMPLING						LAB TESTING	COMMENTS & GRAIN SIZE DISTRIBUTION (%)
Depth (m)	DESCRIPTION	Elevation (m) Geodetic	Sample Type	Sample Number	Recovery (%)	SPT "N" Value	DEPTH (m)	ELEVATION (m)	Water Content (%)	GR / SA / SI / CL
0.0		237.5					0			
0.3	TOPSOIL: 305 mm	237.2	SS	1	75	5		237	26	
0.8	WEATHERED/DISTURBED: Firm, grey-brown, moist	236.7	SS	2	100	10			14	
	CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, stiff to very stiff, brown/grey, moist		SS	3	100	20	1.5	235.5	21	
2.7		234.8	SS	4	100	24			21	

Borehole Terminated at 2.7 m

FIELD TESTING

Shear Strength Testing (kPa)

- × Other Test
- + Pocket Penetrometer
- ▲ Field Vane (Intact)
- △ Field Vane (Remolded)

40 80 120 160

Penetration Testing

○ SPT ● DCPT

10 20 30 40

LAB TESTING

- △ Combustible Organic Vapour - Hex
- ▲ Combustible Organic Vapour - IBL
- ◇ Total Organic Vapour (ppm)

100 200 300 400

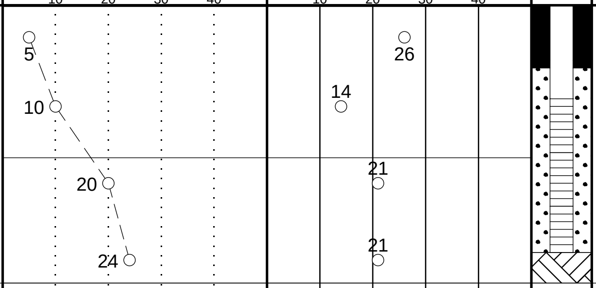
Atterberg Limits

PL ├──┤ LL

○ Water Content (%)

10 20 30 40

Instrumentation Installation



▽ Groundwater depth encountered on completion of drilling: Dry

▼ Groundwater depth observed on: Aug 23/24 at depth of: Dry

Cave depth after auger removal: Open

Groundwater Elevation:

GEI CONSULTANTS
Canada Ltd.
www.geiconsultants.com

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

Scale: **1 :75**

Page: **1 of 1**

RECORD OF BOREHOLE No. 105

Project Number: **2100463**
Project Client: **Wildfield Village Landowners Group Inc.**
Project Name: **Wildfield Village**
Project Location: **Town of Caledon, ON**
Drilling Location: **See Borehole Location Plan**
Local Benchmark: **Geodetic**

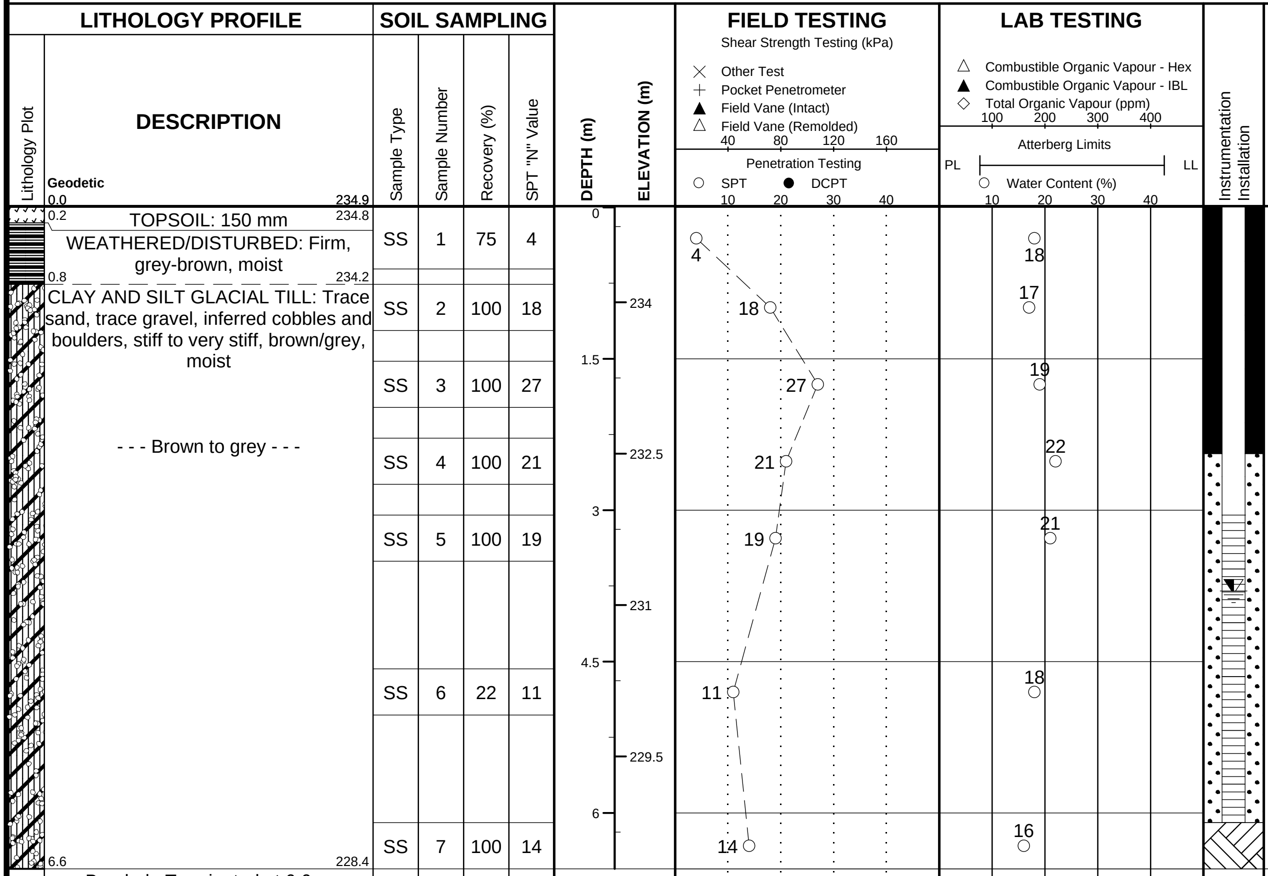
Drilling Method: **Solid Stem Augers**
Drilling Machine: **Track Mount**
Logged By: **BH/AB**
Reviewed By: **RW/AB**
Northing: **4852708**
Easting: **601218**
Date Started: **Jul 16/24**
Date Completed: **Jul 16/24**

LITHOLOGY PROFILE

Depth (m)	Elevation (m)	DESCRIPTION
0.0	234.9	Geodetic
0.2	234.8	TOPSOIL: 150 mm
0.8	234.2	WEATHERED/DISTURBED: Firm, grey-brown, moist
		CLAY AND SILT GLACIAL TILL: Trace sand, trace gravel, inferred cobbles and boulders, stiff to very stiff, brown/grey, moist - - - Brown to grey - - -
6.6	228.4	Borehole Terminated at 6.6 m

SOIL SAMPLING

Sample Type	Sample Number	Recovery (%)	SPT "N" Value	Water Content (%)	GR	SA	SI	CL
SS	1	75	4	18				
SS	2	100	18	17				
SS	3	100	27	19				
SS	4	100	21	22	0	6	41	53
SS	5	100	19	21				
SS	6	22	11	18				
SS	7	100	14	16				



COMMENTS & GRAIN SIZE DISTRIBUTION (%)

Groundwater depth encountered on completion of drilling: Dry
Cave depth after auger removal: Open
Groundwater depth observed on: Aug 23/24 at depth of: 3.8 m.
Groundwater Elevation: 231.1 m

GEI CONSULTANTS
Canada Ltd.
www.geiconsultants.com

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

Scale: **1 :75**

Log of Borehole: MW1

Project #: 325252.002 **Logged By:** CG

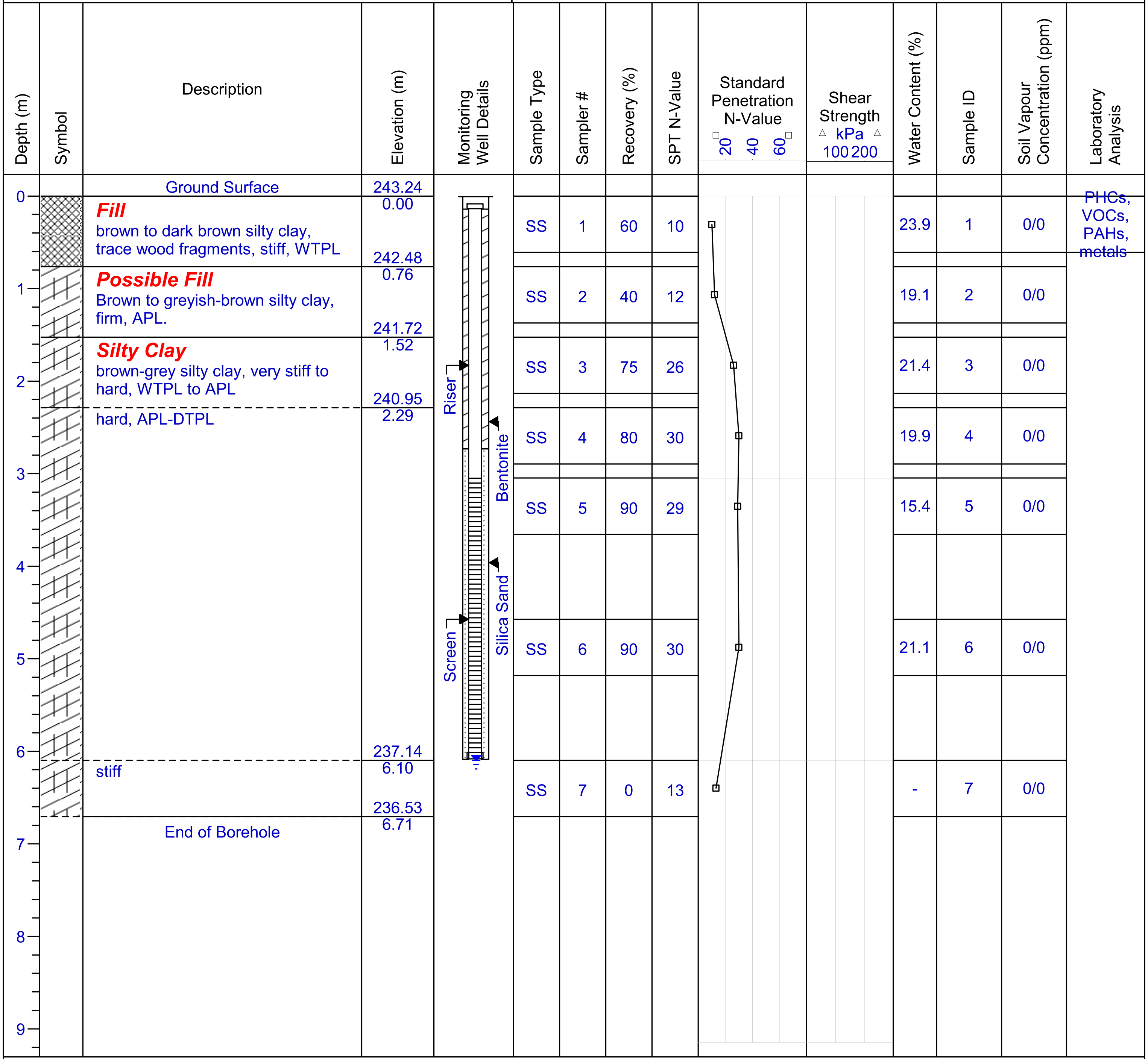
Project: Geotechnical Investigation

Client: Paul and Gail Piercey

Location: 12561 Centreville Creek Road, Caledon, Ontario

Drill Date: July 31, 2023 **Project Manager:** EN

SUBSURFACE PROFILE | **SAMPLE**



Description	Elevation (m)	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis
Ground Surface	243.24 0.00								
Fill brown to dark brown silty clay, trace wood fragments, stiff, WTPL	242.48 0.76	SS	1	60	10	23.9	1	0/0	PHCs, VOCs, PAHs, metals
Possible Fill Brown to greyish-brown silty clay, firm, APL.	241.72 1.52	SS	2	40	12	19.1	2	0/0	
Silty Clay brown-grey silty clay, very stiff to hard, WTPL to APL	240.95 2.29	SS	3	75	26	21.4	3	0/0	
hard, APL-DTPL		SS	4	80	30	19.9	4	0/0	
		SS	5	90	29	15.4	5	0/0	
	237.14 6.10	SS	6	90	30	21.1	6	0/0	
stiff	236.53 6.71	SS	7	0	13	-	7	0/0	
End of Borehole									

Contractor: Tec Geological Drilling Inc. **Grade Elevation:** 243.24 masl

Drilling Method: Split Spoon/Solid Stem Auger **Top of Casing Elevation:** 244.12 masl

Well Casing Size: 5.1 cm **Sheet:** 1 of 1

Log of Borehole: BH2

Project #: 325252.002 **Logged By:** CG

Project: Geotechnical Investigation

Client: Paul and Gail Piercey

Location: 12561 Centreville Creek Road, Caledon, Ontario

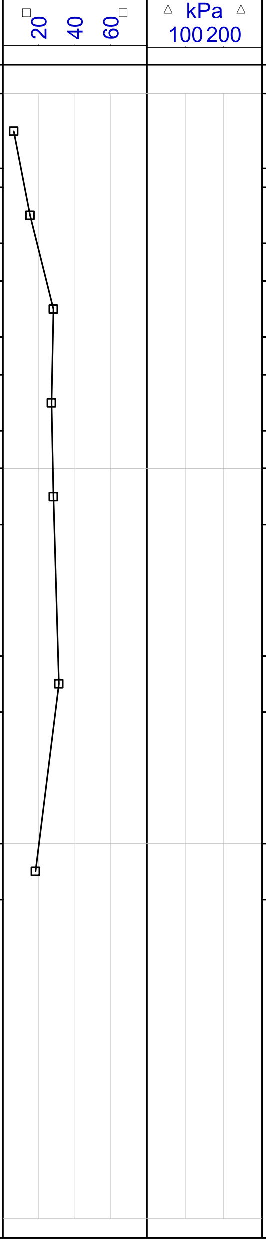
Drill Date: July 31, 2023 **Project Manager:** EN

SUBSURFACE PROFILE

Depth (m)	Description	Elevation (m)	Monitoring Well Details
	Ground Surface	242.47	
0	**Fill** brown silty clay, trace sand, trace gravel, trace organics, firm, WTPL	0.00	No Monitoring Well Installed
	Silty Clay brown silty clay, trace sand, grey seams, APL, very stiff	241.71 0.76	
	some sand, DTPL-APL	239.42 3.05	
	some gravel, hard	237.59 4.88	
	very stiff	236.38 6.10	
	End of Borehole	235.77 6.71	

SAMPLE

Sample Type	Sampler #	Recovery (%)	SPT N-Value	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis
SS	1	60	6	24.1	1	0/0	
SS	2	60	15	22.6	2	0/0	
SS	3	90	28	20.5	3	0/0	
SS	4	90	27	19.5	4	0/0	
SS	5	90	28	15.1	5	0/0	
SS	6	90	31	19.6	6	0/0	
SS	7	90	18	16.5	7	0/0	



Contractor: Tec Geological Drilling Inc. **Grade Elevation:** 242.47 masl

Drilling Method: Split Spoon/Solid Stem Auger **Top of Casing Elevation:** NM

Well Casing Size: NA **Sheet:** 1 of 1

Log of Borehole: MW3

Project #: 325252.002 **Logged By:** CG

Project: Geotechnical Investigation

Client: Paul and Gail Piercey

Location: 12561 Centreville Creek Road, Caledon, Ontario

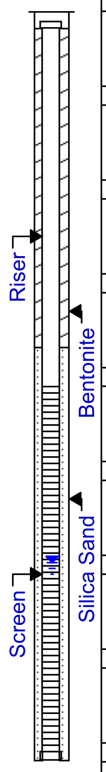
Drill Date: July 31, 2023 **Project Manager:** EN

SUBSURFACE PROFILE

Description	Elevation (m)
Ground Surface	242.68 0.00
Fill sandy silt, some gravel and brick fragments, trace clay, compact, moist.	241.92 0.76
Silty Clay Brown to dark brown silty clay, trace sand, organic staining, stiff, APL-DTPL.	240.39 2.29
Silt Brown silt, trace clay, trace sand and gravel, compact, very moist	239.63 3.05
Silty Clay Grey silty clay, trace gravel, hard, APL	238.87 3.81
very stiff, WTPL	237.34 5.33
occasional saturated grey seams, very stiff to stiff	235.97 6.71
End of Borehole	

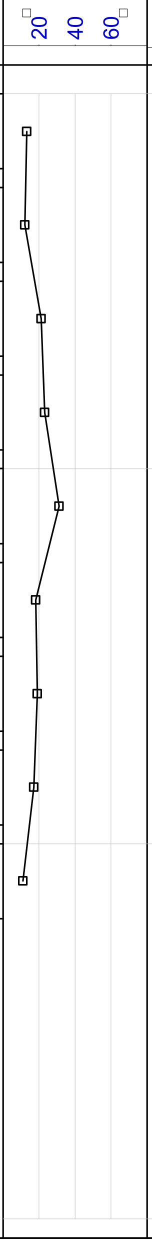
Depth (m): 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Monitoring Well Details



SAMPLE

Standard Penetration N-Value



Shear Strength △ kPa △ 100 200

Sample Type	Sampler #	Recovery (%)	SPT N-Value	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis
SS	1	35	13	11.6	1	0/0	
SS	2	25	12	19.4	2	0/0	
SS	3	80	21	13.6	3	0/0	
SS	4	75	23	20.4	4	0/0	
SS	5	90	31	21.5	5	0/0	
SS	6	90	18	23.7	6	0/0	PHCs, VOCs, PAHs, metals
SS	7	90	19	22.8	7	0/0	
SS	8	75	17	22.8	8	0/0	
SS	9	90	11	21	9	0/0	

Contractor: Tec Geological Drilling Inc. **Grade Elevation:** 242.68 masl

Drilling Method: Split Spoon/Solid Stem Auger **Top of Casing Elevation:** 243.66 masl

Well Casing Size: 5.1 cm **Sheet:** 1 of 1

Log of Borehole: MW4

Project #: 325252.002 **Logged By:** CG

Project: Geotechnical Investigation

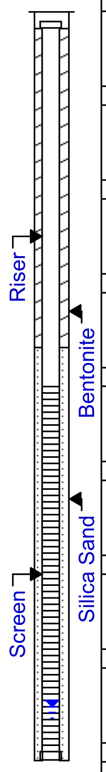
Client: Paul and Gail Piercey

Location: 12561 Centreville Creek Road, Caledon, Ontario

Drill Date: August 1, 2023 **Project Manager:** EN

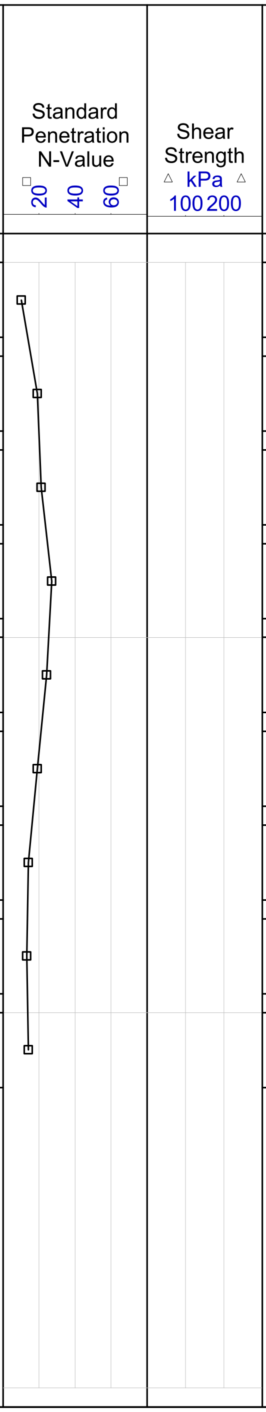
SUBSURFACE PROFILE

Depth (m)	Description	Elevation (m)
	Ground Surface	243.41
0.00	**Silt** Brown Silt, some clay, trace sand and gravel, compact, very moist	
1.52	**Silty Clay** Brown and grey silty clay, trace sand, trace gravel, very stiff, APL-WTPL.	241.89
2.29	oxidation staining	241.12
3.81	grey, very stiff to stiff	239.60
6.71	End of Borehole	236.70



SAMPLE

Sample Type	Sampler #	Recovery (%)	SPT N-Value	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis
SS	1	40	10	13	1	0/0	PHCs, VOCs, PAHs, metals, OCPs
SS	2	75	19	15.1	2	0/0	
SS	3	75	21	18.8	3	0/0	
SS	4	75	27	21	4	0/0	
SS	5	75	24	21.4	5	0/0	
SS	6	85	19	22.3	6	0/0	
SS	7	90	14	21.9	7	0/0	
SS	8	90	13	21.6	8	0/0	
SS	9	90	14	22	9	0/0	



Contractor: Tec Geological Drilling Inc. **Grade Elevation:** 243.41 masl

Drilling Method: Split Spoon/Solid Stem Auger **Top of Casing Elevation:** 244.36 masl

Well Casing Size: 5.1 cm **Sheet:** 1 of 1

Log of Borehole: BH5

Project #: 325252.002 **Logged By:** CG

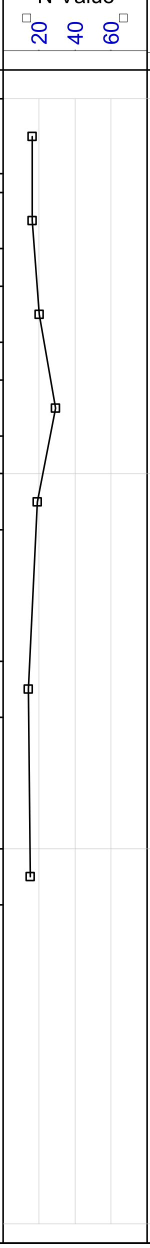
Project: Geotechnical Investigation

Client: Paul and Gail Piercey

Location: 12561 Centreville Creek Road, Caledon, Ontario

Drill Date: August 1, 2023 **Project Manager:** EN

SUBSURFACE PROFILE					SAMPLE									
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value	Shear Strength kPa	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis
		Ground Surface	240.69											
0		**TopSoil**	0.00	No Monitoring Well Installed										
		Silty Clay Brown and grey, trace to some sand and gravel, very stiff, APL.			SS	1	60	16			18.6	1	0/0	
1					SS	2	50	16			21.9	2	0/0	
2					SS	3	60	20			21.2	3	0/0	
		Silt Till Brown-grey sandy silt, some clay, some gravel, compact, wet	238.40 2.29		SS	4	70	29			19.7	4	0/0	
3		**Silty Clay** Greyish-brown, trace gravel, grey seams, very stiff, APL.	237.64 3.05		SS	5	75	19			20.1	5	0/0	
4														
5		Grey, stiff	236.11 4.57		SS	6	80	14			19.1	6	0/0	
6		DTPL	234.59 6.10		SS	7	90	15			11.1	7	0/0	
7		End of Borehole	234.13 6.55											
8														
9														



Contractor: Tec Geological Drilling Inc. **Grade Elevation:** 240.69 masl

Drilling Method: Split Spoon/Solid Stem Auger **Top of Casing Elevation:** NM

Well Casing Size: NA **Sheet:** 1 of 1

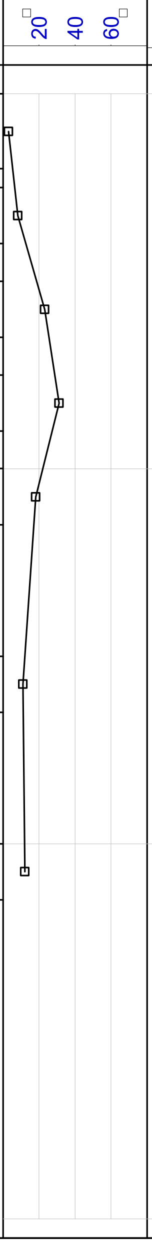
Log of Borehole: BH6

Project #: 325252.002
Logged By: CG
Project: Geotechnical Investigation
Client: Paul and Gail Piercey
Location: 12561 Centreville Creek Road, Caledon, Ontario
Drill Date: August 1, 2023
Project Manager: EN

SUBSURFACE PROFILE		
Description	Elevation (m)	Monitoring Well Details
Ground Surface	240.75 0.00	No Monitoring Well Installed
TopSoil		
Silty Clay Brown and grey, trace sand, soft, WTPL.	239.99 0.76	
Trace gravel, firm to very stiff, APL.	238.46 2.29	
grey, trace rock fragments, hard	237.70 3.05	
very stiff	236.48 4.27	
stiff	234.20 6.55	
End of Borehole		

SAMPLE								
Sample Type	Sampler #	Recovery (%)	SPT N-Value	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis	Shear Strength kPa
SS	1	40	3	28.5	1	0/0		
SS	2	70	8	17.9	2	0/0		
SS	3	60	23	19.7	3	0/0		
SS	4	50	31	20.8	4	0/0		
SS	5	60	18	19.9	5	0/0		
SS	6	70	11	19.1	6	0/0		
SS	7	60	12	16.1	7	0/0		

Standard Penetration N-Value



Shear Strength
△ kPa △
100 200

Depth (m): 0 1 2 3 4 5 6 7 8 9

Contractor: Tec Geological Drilling Inc.
Grade Elevation: 240.75 masl
Drilling Method: Split Spoon/Solid Stem Auger
Top of Casing Elevation: NM
Well Casing Size: NA
Sheet: 1 of 1

Log of Borehole: BH7

Project #: 325252.002 **Logged By:** CG

Project: Geotechnical Investigation

Client: Paul and Gail Piercey

Location: 12561 Centreville Creek Road, Caledon, Ontario

Drill Date: August 1, 2023 **Project Manager:** EN

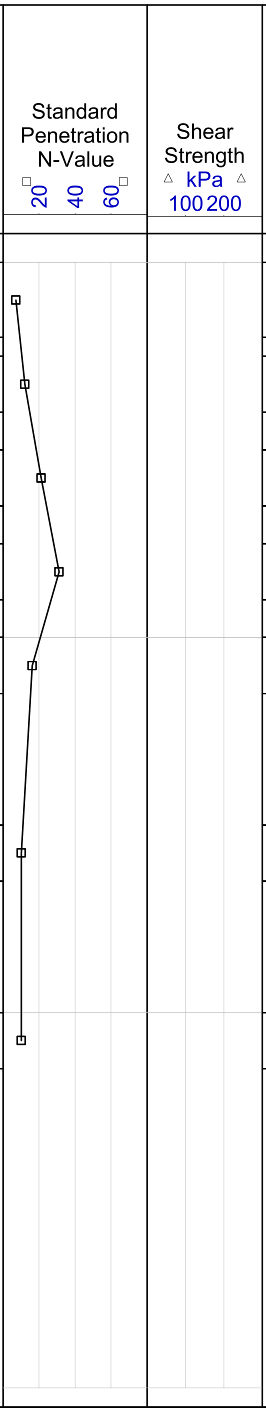
SUBSURFACE PROFILE

Description	Elevation (m)
Ground Surface	239.59
TopSoil	0.00
Silty Clay Brown and grey silty clay, trace sand and gravel, trace rootlets, firm, WTPL	
Some grey seams, stiff	238.83 0.76
very stiff, APL	238.07 1.52
hard	237.31 2.29
grey, some sand, very stiff to stiff	236.55 3.05
End of Borehole	233.04 6.55

Monitoring Well Details: No Monitoring Well Installed

SAMPLE

Sample Type	Sampler #	Recovery (%)	SPT N-Value	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis
SS	1	50	7	24.1	1	0/0	
SS	2	60	12	22.3	2	0/0	
SS	3	70	21	20.8	3	0/0	
SS	4	70	31	21.1	4	0/0	
SS	5	60	16	20.4	5	0/0	
SS	6	70	10	22.3	6	0/0	
SS	7	80	10	20.8	7	0/0	



Contractor: Tec Geological Drilling Inc. **Grade Elevation:** 239.60 masl

Drilling Method: Split Spoon/Solid Stem Auger **Top of Casing Elevation:** NM

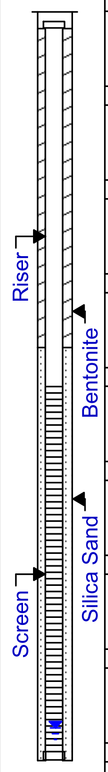
Well Casing Size: NA **Sheet:** 1 of 1

Log of Borehole: MW8

Project #: 325252.002
Logged By: CG
Project: Geotechnical Investigation
Client: Paul and Gail Piercey
Location: 12561 Centreville Creek Road, Caledon, Ontario
Drill Date: August 3, 2023
Project Manager: EN

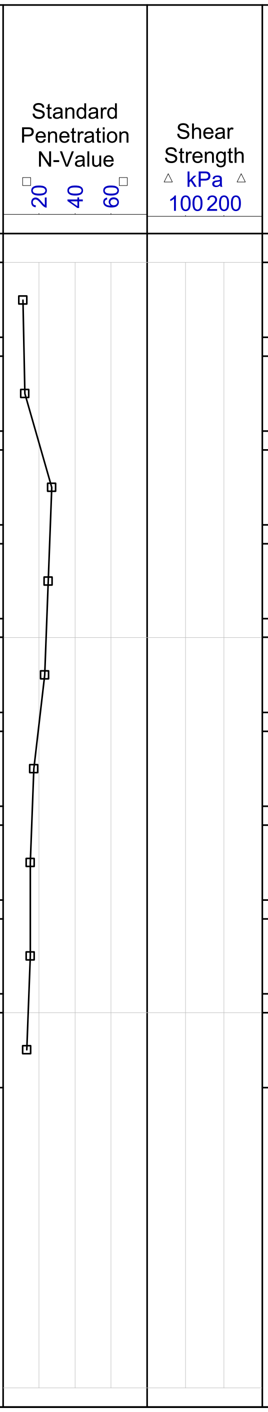
SUBSURFACE PROFILE

Depth (m)	Symbol	Description	Elevation (m)
		Ground Surface	237.78
0.00		**TopSoil**	0.00
		Silty Clay Orange-grey, trace sand and gravel, mottled, oxidation staining, stiff, WTPL to APL.	
1.52		some gravel, very stiff	236.25 1.52
3.05		grey, some sand	234.73 3.05
6.10		stiff	231.68 6.10
6.71		End of Borehole	231.07 6.71



SAMPLE

Sample Type	Sampler #	Recovery (%)	SPT N-Value	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis
SS	1	60	11	30.3	1	0/0	Metals, OCPs, pH
SS	2	40	12	21.8	2	0/0	
SS	3	70	27	20.1	3	0/0	pH and Grain Size
SS	4	60	25	19.6	4	0/0	
SS	5	50	23	20.8	5	0/0	
SS	6	40	17	21.7	6	0/0	
SS	7	60	15	18.8	7	0/0	
SS	8	40	15	21.1	8	0/0	
SS	9	60	13	19.2	9	0/0	



Contractor: Tec Geological Drilling Inc.
Grade Elevation: 237.78 masl
Drilling Method: Split Spoon/Solid Stem Auger
Top of Casing Elevation: 238.75 masl
Well Casing Size: 5.1 cm
Sheet: 1 of 1

Log of Borehole: BH9

Project #: 325252.002 **Logged By:** CG

Project: Geotechnical Investigation

Client: Paul and Gail Piercey

Location: 12561 Centreville Creek Road, Caledon, Ontario

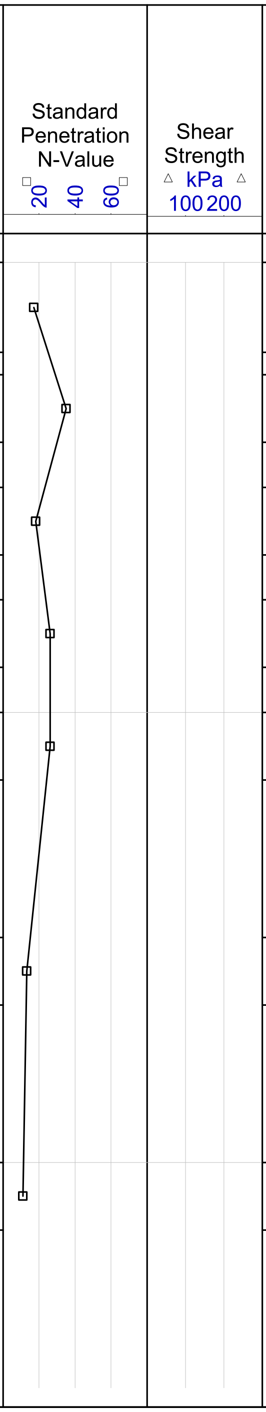
Drill Date: August 3, 2023 **Project Manager:** EN

SUBSURFACE PROFILE

Description	Elevation (m)	Monitoring Well Details
Ground Surface	239.01 0.00	No Monitoring Well Installed
TopSoil		
Silty Clay Dark brown silty clay, trace sand and gravel, trace organics, very stiff to hard, APL.		
Silt Brown silt, some clay, compact, wet	237.49 1.52	
Silty Clay brown-grey silty clay, some gravel, very stiff	236.73 2.29	
very stiff to stiff, DTPL	235.96 3.05	
APL	233.83 5.18	
End of Borehole	232.46 6.55	

SAMPLE

Sample Type	Sampler #	Recovery (%)	SPT N-Value	Water Content (%)	Sample ID	Soil Vapour Concentration (ppm)	Laboratory Analysis
SS	1	50	17	22	1	0/0	
SS	2	10	35	18.8	2	0/0	
SS	3	70	18	21.7	3	0/0	
SS	4	80	26	20.8	4	0/0	
SS	5	80	26	17.2	5	0/0	
SS	6	75	13	19.6	6	0/0	
SS	7	100	11	20.2	7	0/0	



Contractor: Tec Geological Drilling Inc. **Grade Elevation:** 239.01 masl

Drilling Method: Split Spoon/Solid Stem Auger **Top of Casing Elevation:** NM

Well Casing Size: NA **Sheet:** 1 of 1

JOB NO.: 2311-S127

LOG OF BOREHOLE: 1

FIGURE NO.: 1

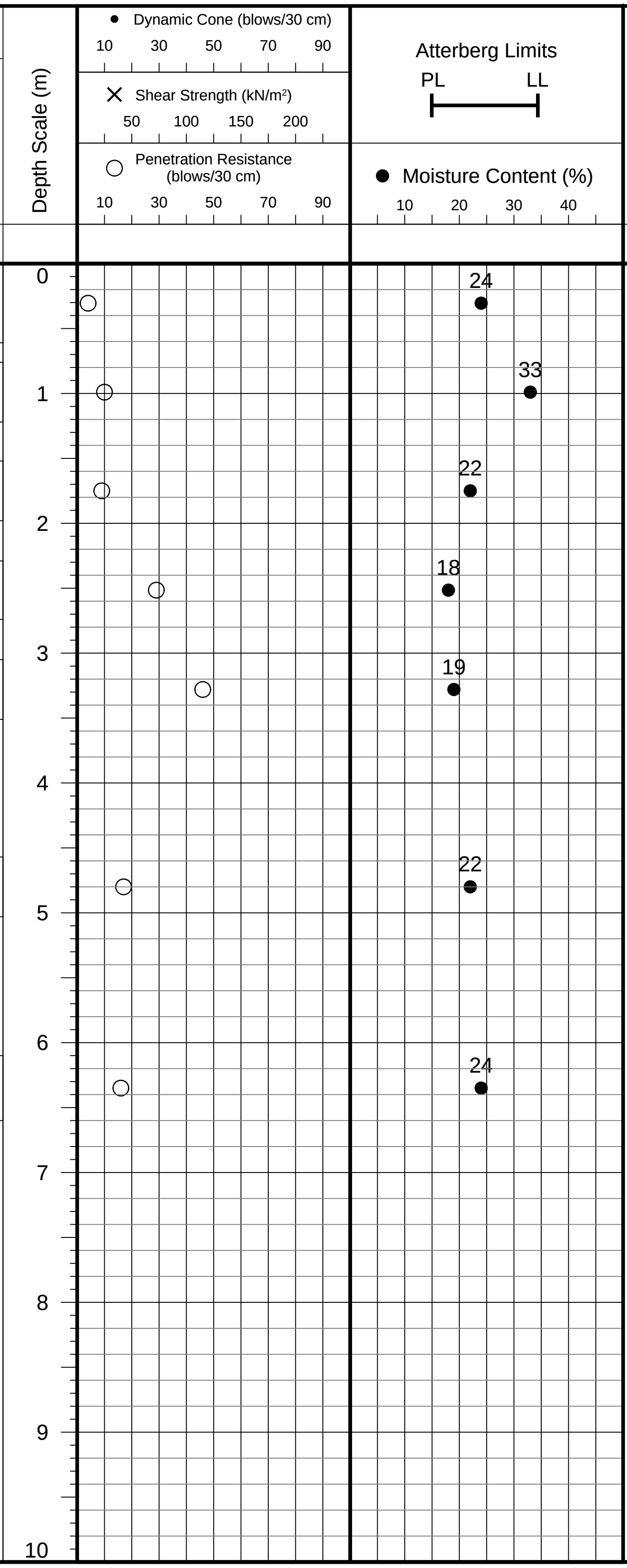
PROJECT DESCRIPTION: Due Diligence for Property Acquisition

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 12319 Centreville Creek Road, Town of Caledon

DRILLING DATE: December 1, 2023

El. (m) Depth (m)	SOIL DESCRIPTION	SAMPLES Number	SAMPLES Type	SAMPLES N-Value	Moisture Content (%)	WATER LEVEL
235.9	Ground Surface					
0.0	Dark brown/brown **EARTH FILL** silty clay with topsoil inclusions and layers	1	DO	4	24	Dry on completion
		2	DO	10	33	
234.9 1.0	Stiff to hard	3	DO	9	22	
	weathered	4	DO	29	18	
	SILTY CLAY TILL	5	DO	46	19	
	a trace to some sand, a trace of gravel occ. cobbles and boulders	6	DO	17	22	
	brown grey	7	DO	16	24	
229.3 6.6	**END OF BOREHOLE**					



Soil Engineers Ltd.

LOG OF BOREHOLE: 2

JOB NO.: 2311-S127

FIGURE NO.: 2

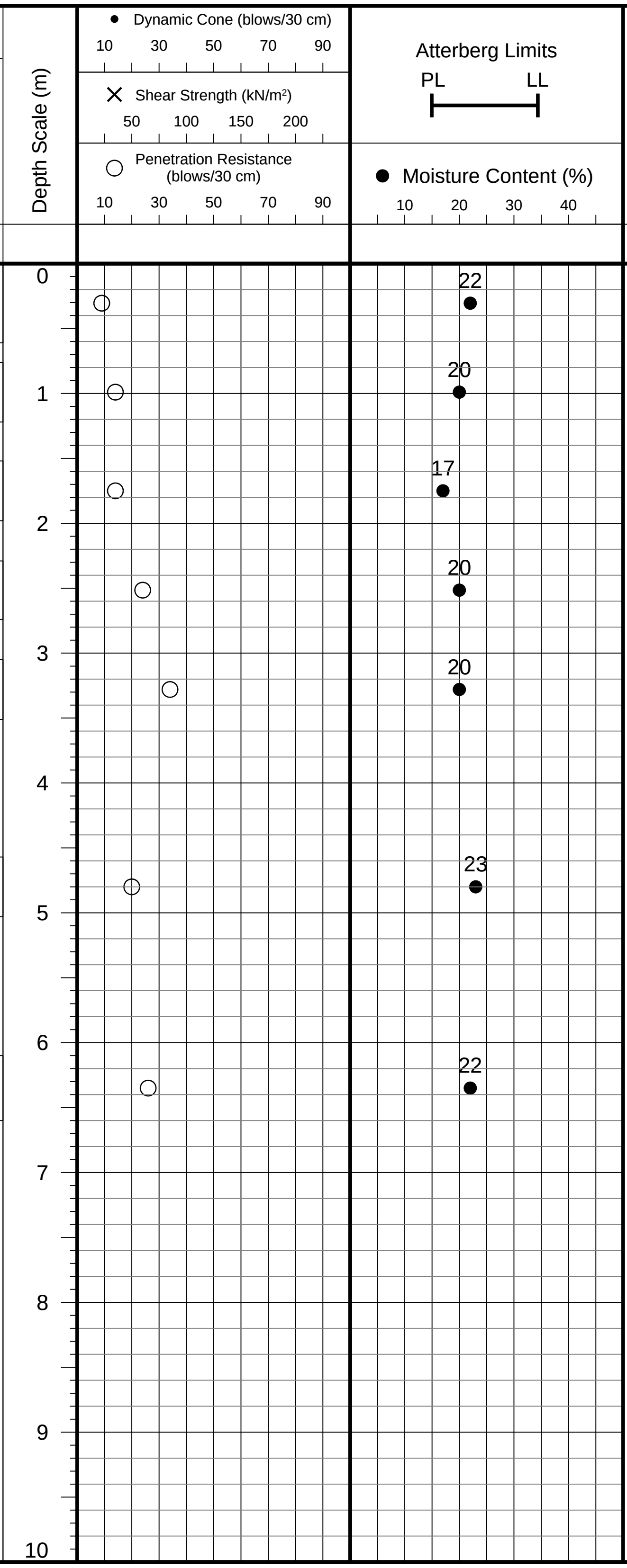
PROJECT DESCRIPTION: Due Diligence for Property Acquisition

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 12319 Centreville Creek Road, Town of Caledon

DRILLING DATE: December 1, 2023

El. (m) Depth (m)	SOIL DESCRIPTION	SAMPLES Number	SAMPLES Type	SAMPLES N-Value
237.2 0.0	Ground Surface **28 cm TOPSOIL**			
	Brown, firm to hard	1	DO	9
	weathered	2	DO	14
	SILTY CLAY TILL	3	DO	14
		4	DO	24
	a trace to some sand, a trace of gravel occ. cobbles and boulders	5	DO	34
232.6 4.6	Brown, very stiff	6	DO	20
	SILTY CLAY a trace of sand occ. silt seams and layers			
231.1 6.1	Grey, very stiff **SILTY CLAY TILL** a trace to some sand, a trace of gravel occ. rock fragments	7	DO	26
230.6 6.6	**END OF BOREHOLE**			



WATER LEVEL

W.L. @ El. 231.3 m on completion

∇

JOB NO.: 2311-S127

LOG OF BOREHOLE: 3

FIGURE NO.: 3

PROJECT DESCRIPTION: Due Diligence for Property Acquisition

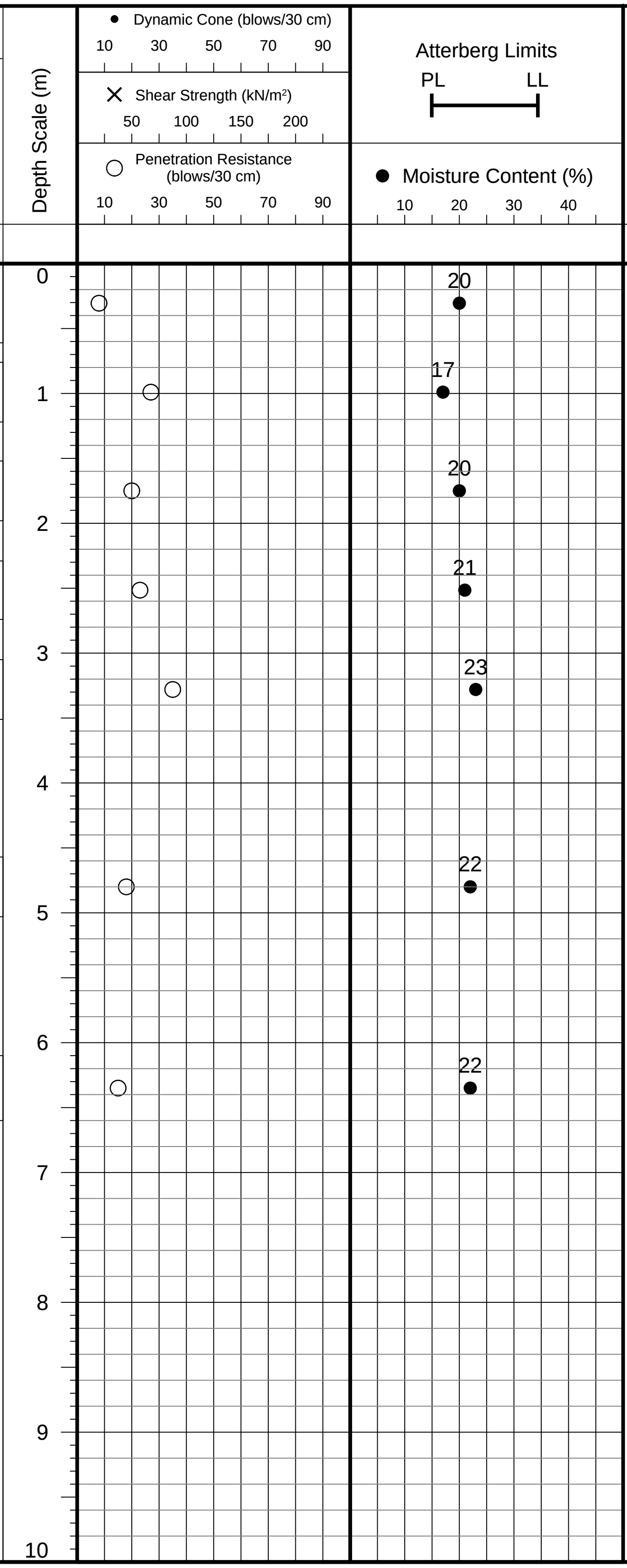
METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 12319 Centreville Creek Road, Town of Caledon

DRILLING DATE: December 1, 2023

El. (m) Depth (m)	SOIL DESCRIPTION
236.4	Ground Surface
0.0	**23 cm TOPSOIL**
	Stiff to very stiff **SILTY CLAY TILL** a trace to some sand, a trace of gravel occ. cobbles and boulders weathered
234.9 1.5	Brown, very stiff **SILTY CLAY** a trace of sand occ. silt seams and layers
234.1 2.3	Very stiff to hard **SILTY CLAY TILL** brown grey a trace to some sand, a trace of gravel occ. cobbles and boulders
229.8 6.6	**END OF BOREHOLE**

SAMPLES		
Number	Type	N-Value
1	DO	8
2	DO	27
3	DO	20
4	DO	23
5	DO	35
6	DO	18
7	DO	15



WATER LEVEL

Dry on completion

Soil Engineers Ltd.

JOB NO.: 2311-S127

LOG OF BOREHOLE: 4

FIGURE NO.: 4

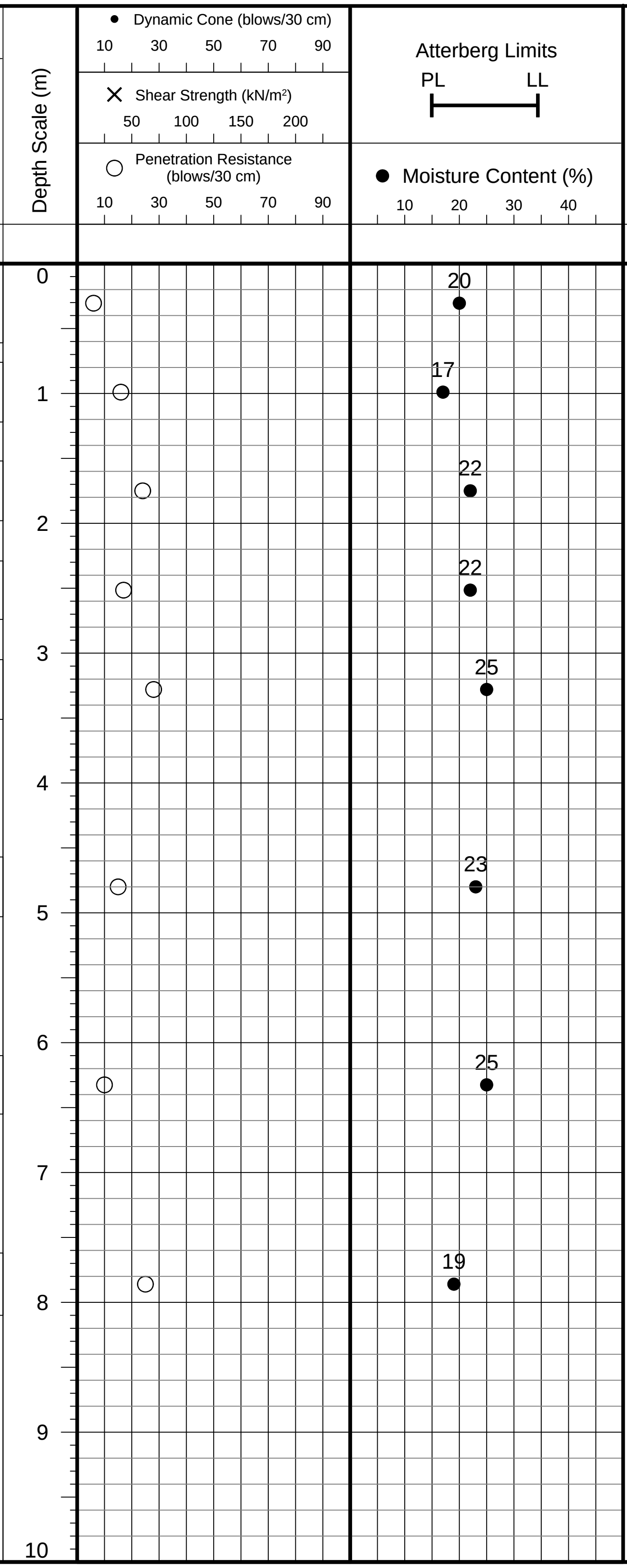
PROJECT DESCRIPTION: Due Diligence for Property Acquisition

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 12319 Centreville Creek Road, Town of Caledon

DRILLING DATE: December 1, 2023

El. (m) Depth (m)	SOIL DESCRIPTION	SAMPLES Number	SAMPLES Type	SAMPLES N-Value	WATER LEVEL
236.9	Ground Surface				
0.0	**18 cm TOPSOIL**				
	Brown, firm to very stiff	1	DO	6	Dry on completion
	weathered	2	DO	16	
	SILTY CLAY TILL	3	DO	24	
		4	AS	17	
	a trace to some sand, a trace of gravel occ. cobbles and boulders	5	DO	28	
232.3 4.6	Grey, stiff	6	DO	15	
	SILTY CLAY				
	a trace of sand occ. silt seams and layers seepage at 6.0 m	7	DO	10	
229.3 7.6	Grey, very stiff **SILTY CLAY TILL** a trace to some sand, a trace of gravel	8	DO	25	
228.8 8.1	**END OF BOREHOLE**				



Soil Engineers Ltd.

JOB NO.: 2311-S127

LOG OF BOREHOLE: 5

FIGURE NO.: 5

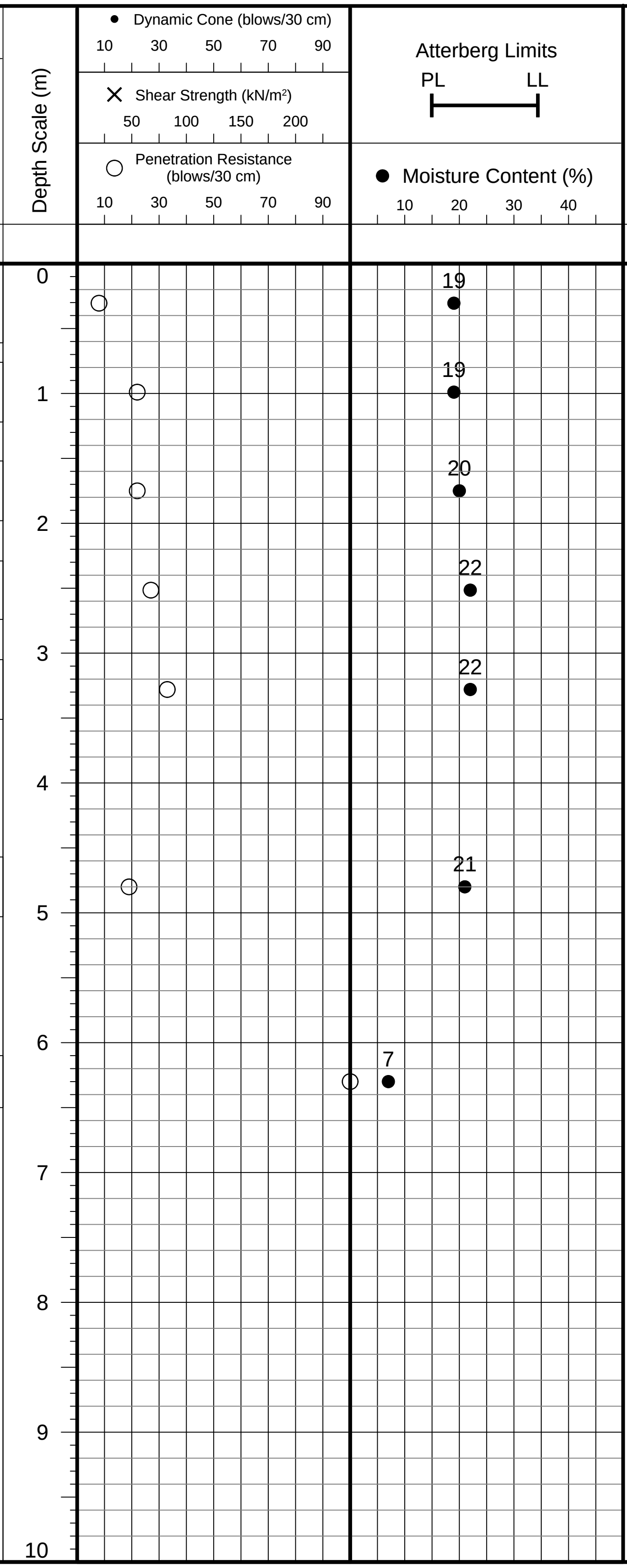
PROJECT DESCRIPTION: Due Diligence for Property Acquisition

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 12319 Centreville Creek Road, Town of Caledon

DRILLING DATE: December 1, 2023

El. (m) Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
234.6	Ground Surface			
0.0	**15 cm TOPSOIL** Brown, stiff to hard	1	DO	8
	weathered	2	DO	22
	SILTY CLAY TILL	3	DO	22
		4	DO	27
	a trace to some sand, a trace of gravel occ. cobbles and boulders	5	DO	33
230.0 4.6	Grey, very stiff **SILTY CLAY** a trace of sand occ. silt seams and layers	6	DO	19
228.6 4.6	Grey, hard **SILTY CLAY TILL** a trace to some sand, a trace of gravel platy with shale fragments below 6.0 m	7	DO	76/23
228.1 6.5	**END OF BOREHOLE**			

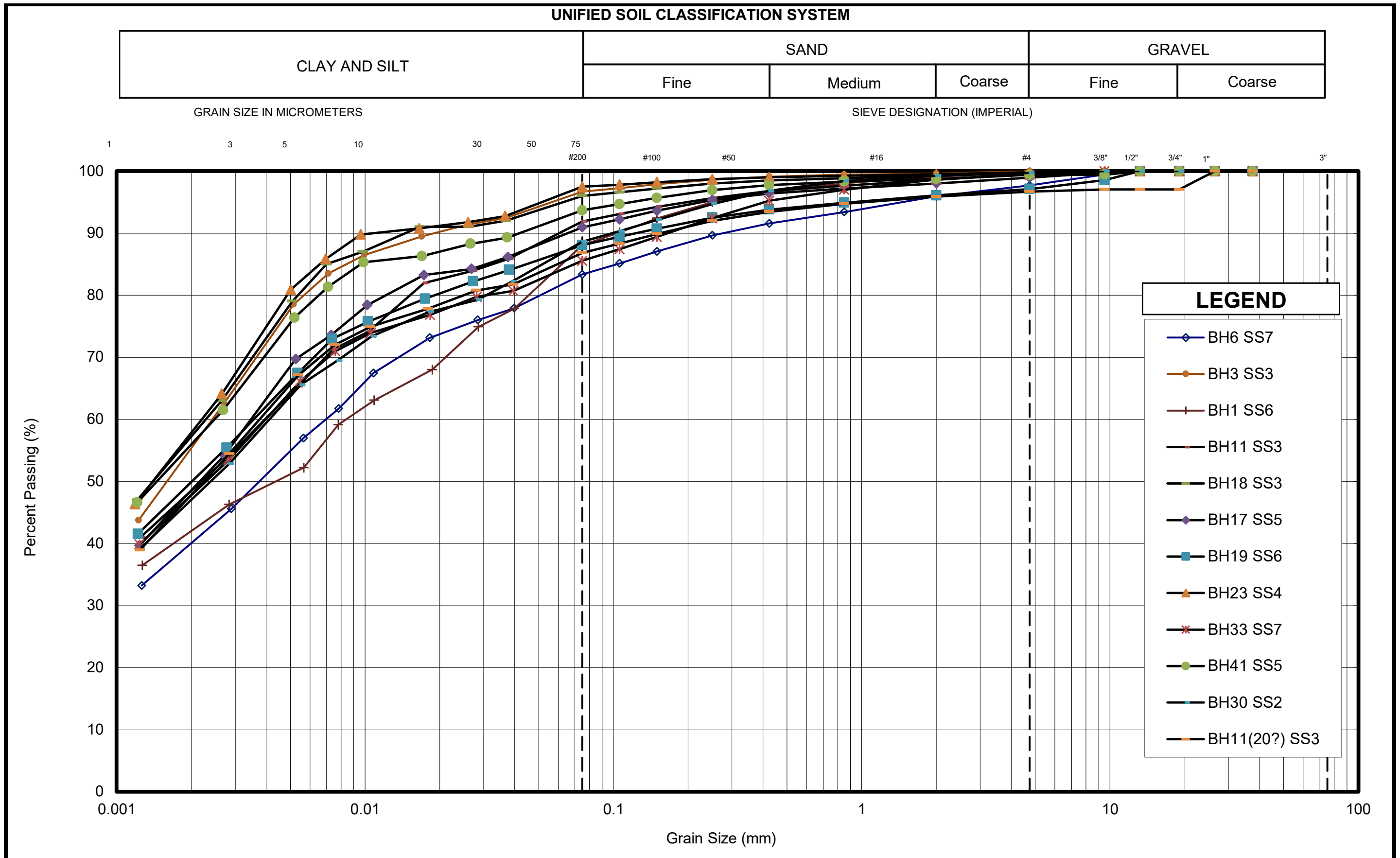


WATER LEVEL: Dry on completion

Soil Engineers Ltd.

APPENDIX C5

GEOTECHNICAL LABORATORY TESTING

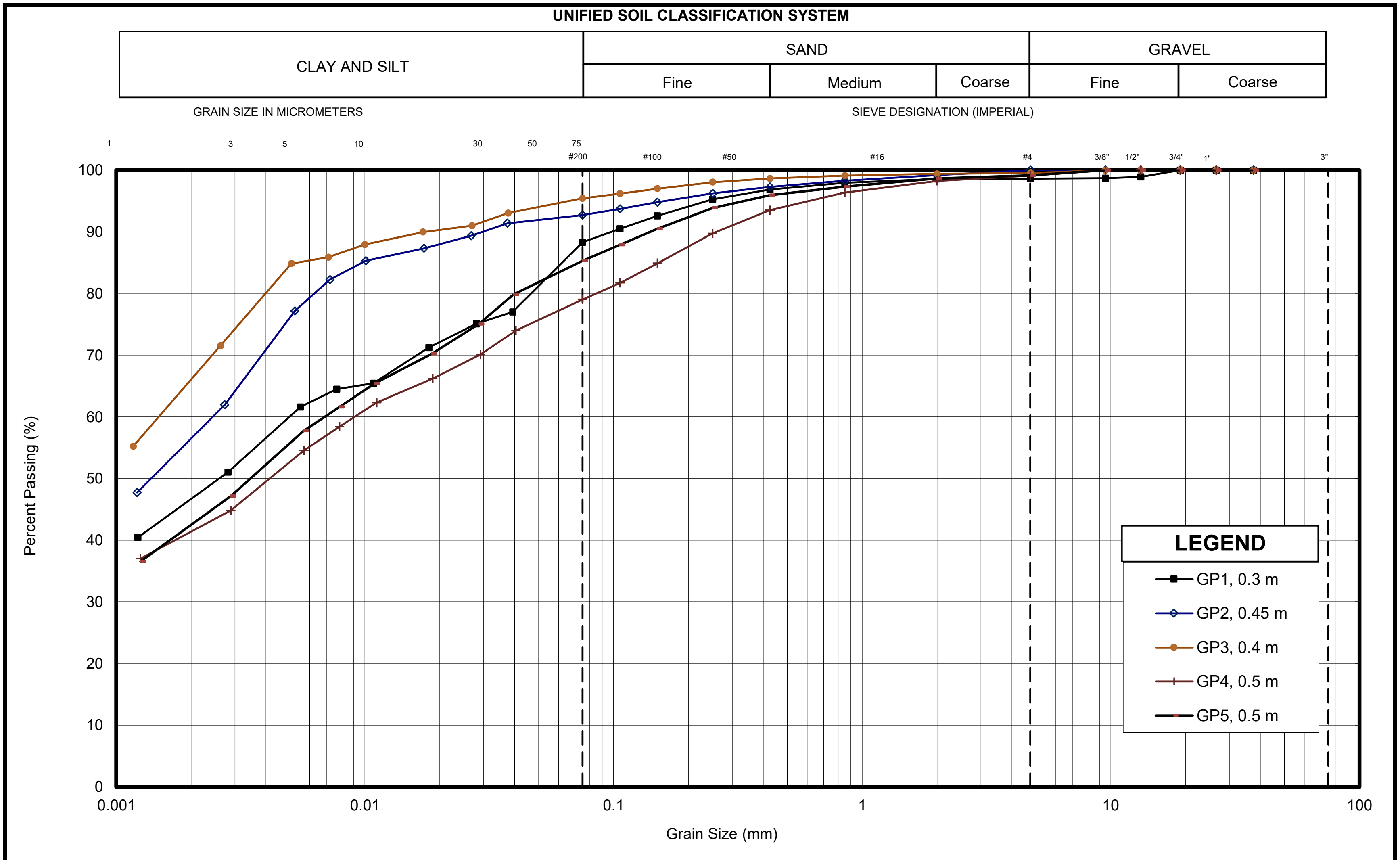


Sample	Description	Gr.	Sa.	Si.	Cl.	D_{10}	D_{30}	D_{60}	C_u	C_c
BH6 SS7	SILT AND CLAY, Some Sand, Trace Gravel	2	14	43	40	-	-	0.007	-	-
BH3 SS3	CLAY AND SILT, Trace Sand	0	3	41	56	-	-	0.002	-	-
BH1 SS6	SILT AND CLAY, Some Sand	0	12	46	42	-	-	0.008	-	-
BH11 SS3	CLAY AND SILT, Trace Sand	0	8	43	49	-	-	0.004	-	-
BH18 SS3	CLAY AND SILT, Trace Sand	0	4	39	57	-	-	0.002	-	-
BH17 SS5	CLAY AND SILT, Trace Sand, Trace Gravel	1	8	42	49	-	-	0.003	-	-
BH19 SS6	CLAY AND SILT, Trace Sand, Trace Gravel	3	9	38	50	-	-	0.004	-	-
BH23 SS4	CLAY AND SILT, Trace Sand	0	2	40	58	-	-	0.002	-	-
BH33 SS7	CLAY AND SILT, Some Sand, Trace Gravel	1	14	38	47	-	-	0.004	-	-
BH41 SS5	CLAY AND SILT, Trace Sand, Trace Gravel	1	6	38	55	-	-	0.002	-	-
BH30 SS2	CLAY AND SILT, Some Sand	0	11	42	47	-	-	0.004	-	-
BH20 SS3	CLAY AND SILT, Some Sand, Trace Gravel	3	10	39	48	-	-	0.004	-	-

GRAIN SIZE DISTRIBUTION - Wildfield Village

COHESIVE GLACIAL TILL

FIGURE No. -
REF. No. 2100463
DATE August 2024



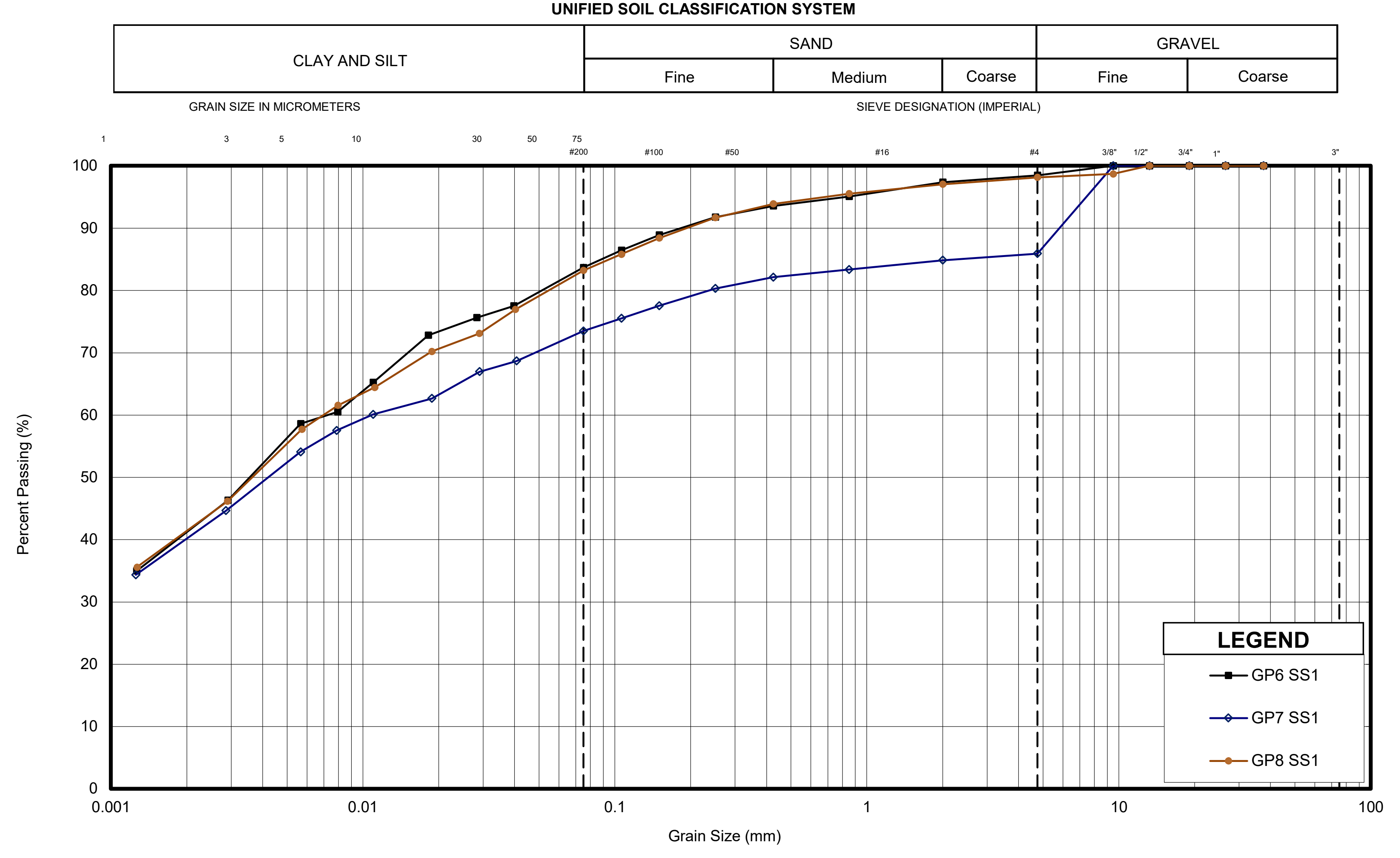
Sample	Description	Gr.	Sa.	Si.	Cl.	D_{10}	D_{30}	D_{60}	C_u	C_c
GP1	SILT AND CLAY, Some Sand, Trace Gravel	1	10	42	47	-	-	0.005	-	-
GP2	SILT AND CLAY, Trace Sand	-	7	36	57	-	-	0.002	-	-
GP3	SILTY CLAY, Trace Sand	-	4	29	67	-	-	0.001	-	-
GP4	SANDY SILT AND CLAY, Trace Gravel	1	20	38	41	-	-	0.009	-	-
GP5	SILT AND CLAY, Some Sand, Trace Gravel	1	14	43	42	-	-	0.007	-	-

GEI Consultants

GRAIN SIZE DISTRIBUTION - Wildfield Village

COHESIVE GLACIAL TILL

REF. No. 2100463
DATE August 2024



Sample	Description	Gr.	Sa.	Si.	Cl.	D_{10}	D_{30}	D_{60}	C_u	C_c
GP6 SS1	SILT AND CLAY, Some Sand Trace Gravel	2	15	42	41	-	-	0.007	-	-
GP7 SS1	SILTY CLAY, Some Grave, Some Sand	14	12	33	41	-	-	0.011	-	-
GP8 SS1	SILT AND CLAY, Some Sand Trace Gravel	2	15	42	41	-	-	0.007	-	-

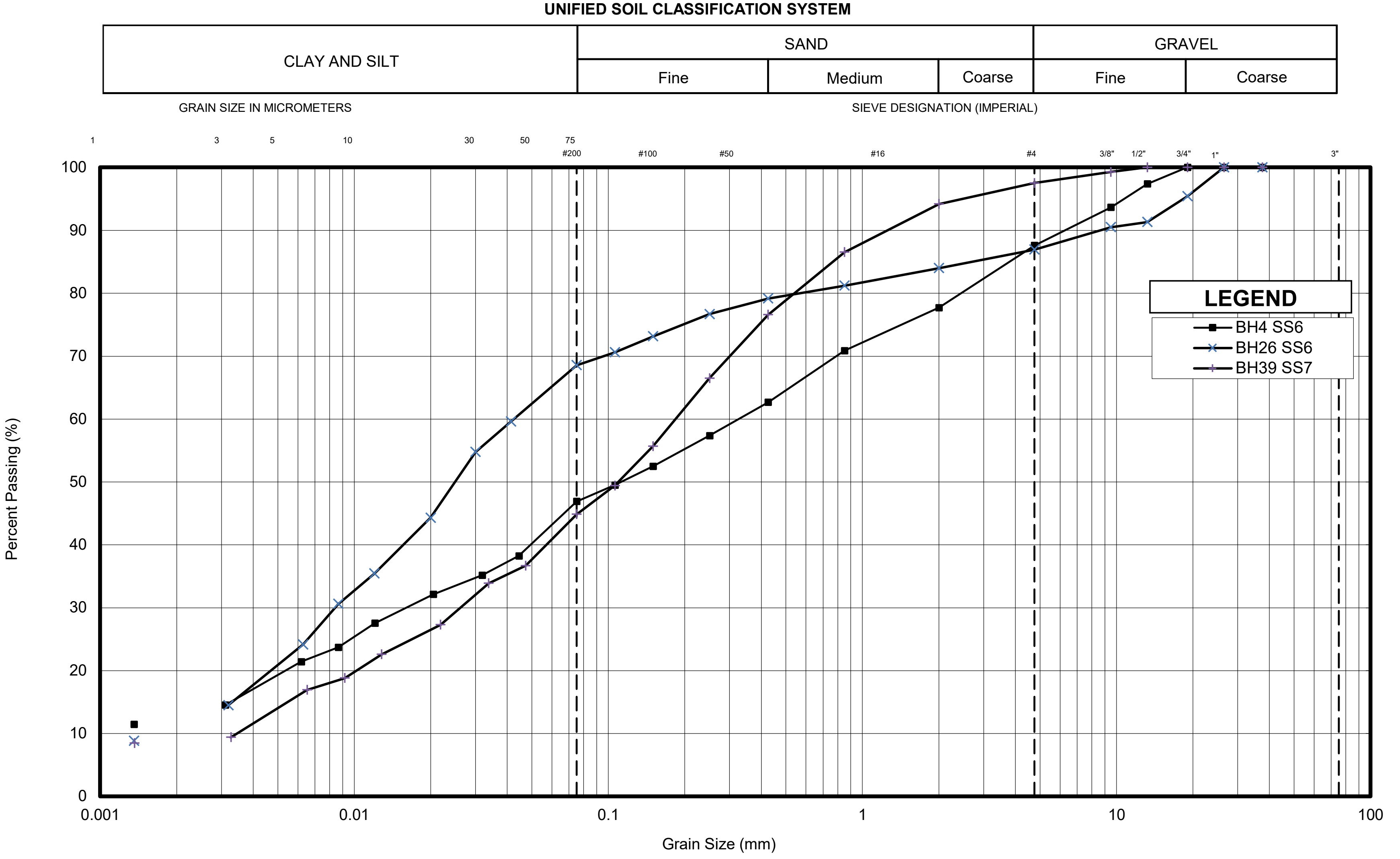
GEI Consultants

GRAIN SIZE DISTRIBUTION - Wildfield Village

COHESIVE GLACIAL TILL

REF. No. 2100463

DATE August 2024



Sample	Description	Gr.	Sa.	Si.	Cl.	D_{10}	D_{30}	D_{60}	C_u	C_c
BH39 SS7	SAND AND SILT, Trace Clay, Trace Gravel	2	53	36	9	0.003	0.026	0.184	53.3	1.1
BH26 SS6	SILT, Some Sand, Some Gravel, Some Clay	13	18	58	11	0.002	0.008	0.042	26.3	1.0
BH4 SS6	SILTY SAND, Some Clay, Some Gravel	12	41	34	13	-	0.016	0.326	-	-

GRAIN SIZE DISTRIBUTION - Wildfield Village

COHESIONLESS GLACIAL TILL

FIGURE No. -

REF. No. 2100463

DATE August 2024

APPENDIX C6

SEEPAGE METER PHOTOGRAPHS

SCS consulting group ltd

GEI Consultants

PHOTOGRAPH 1

(GEI 2023)

Description:

Rivulet emplaced seepage meter (1A) downstream of DP1 and SG1

PHOTOGRAPH 2

(GEI 2023)

Description:

Wetland emplaced seepage meter (12A), DP12 in foreground

PHOTOGRAPH 2
(GEI 2023)
Description:
Wetland emplaced seepage meter (12A), DP12

PHOTOGRAPH 3
(GEI 2023)
Description:
Wetland emplaced seepage meter (12A), DP12

PHOTOGRAPH 4

(GEI 2023)

Description:

Wetland emplaced seepage meters (12B, 12B2), SG 12

APPENDIX C7

GUELPH PERMEAMETER INFILTRATION TESTING RESULTS

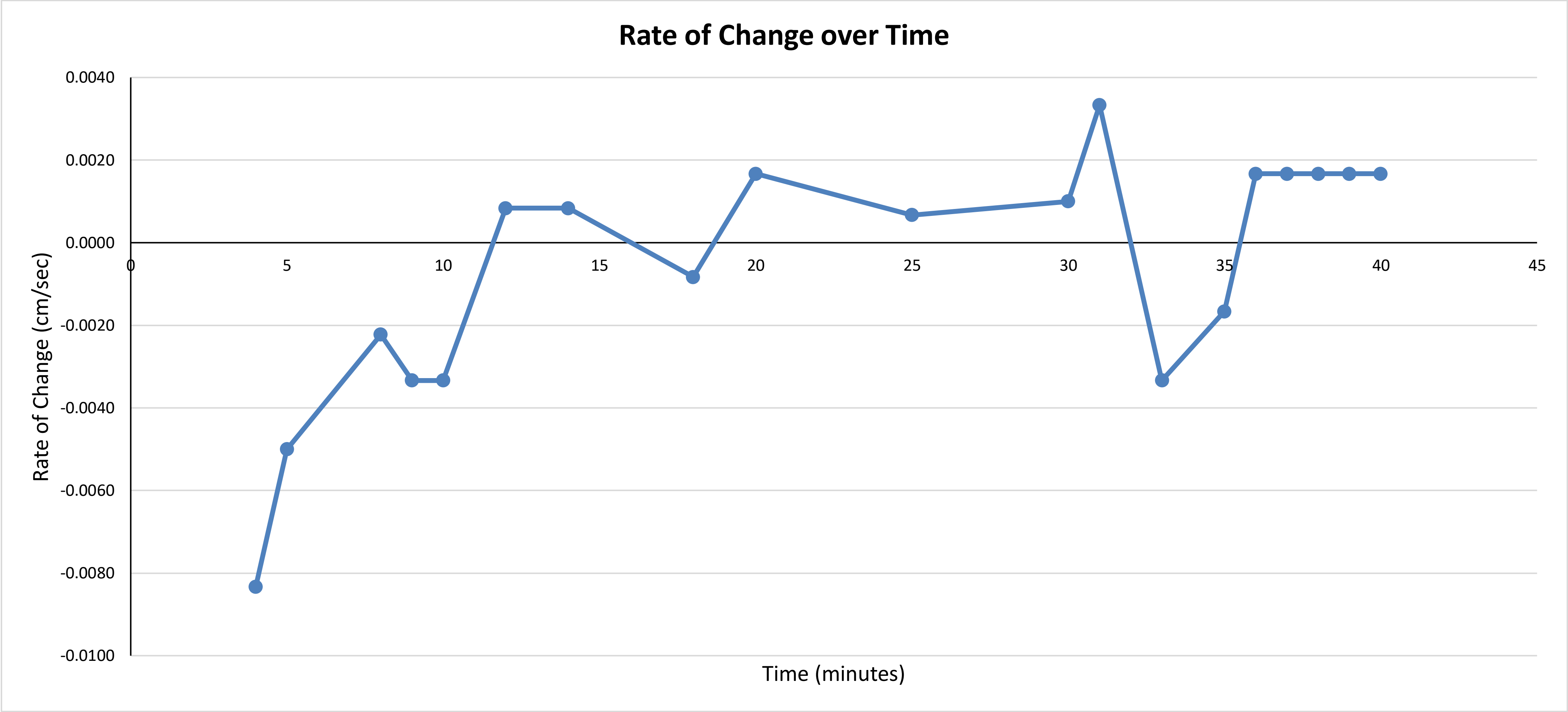
SCS consulting group ltd

GEI Consultants

Guelph Permeameter
Infiltration Rate Determination

GEI Consultants

Test Location: GP 1



INPUT PARAMETERS

α* =	0.12	cm^{-1}
H =	5	cm
a =	3	cm
X =	2.16	cm^2
R =	0.0017	cm/sec

SHAPE FACTOR

Shape Factor (1, 2 or 3) =	1
Shape Factor Value (cm^{-1}) =	0.803

CALCULATED PARAMETERS

H_a =	1.67	unitless
Q_1 =	0.003672	cm^3/sec

CALCULATED DESIGN VALUES

k_{fs}=	6.68E-06	cm/sec
Φ_m=	5.57E-05	cm^2/s
Infiltration:	22.42	mm/hr
FOS:	2.50	unitless
Design Infiltration:	8.97	mm/hr

Variable Glossary

α*	**1)** is the ratio of gravity to capillarity forces during infiltration or drainage **2)** determined from table 1 on page 47 of the manual (or the adjacent table)
H	**1)** is the water head in the BH **2)** determined by the height that the inner tube is pulled up during field operation
a	**1)** is the radius of the borehole **2)** determine by the size of the auger
X	**1)** is the resevoir constant **2)** determined by the reservoir knob at the top of the unit • if the knob is up X = 35.22 (outer and inner reservoir) • if the knob is down X = 2.16 (inner reservoir)
R	**1)** is the steady state rate of flow per minute **2)** is determined by timing the drop of water in the Guelph Permeameter

Equation Glossary

Ha	is the ratio of head to borehole radius
Q1	is the flow rate
$C_{(1, 2 \text{ or } 3)}$	is the shape factor which accounts for the saturated area of the soil • Select C_1 if α* is ≥ 0.12 cm^{-1} • Select C_2 if α* = 0.04 cm^{-1} • Select C_3 if α* = 0.01 cm^{-1}
k_{fs}	is the field saturated hydraulic conductivity of the soil
Φ_m	is an indicator of the capillary pull exerted by the unsaturated soil on the water

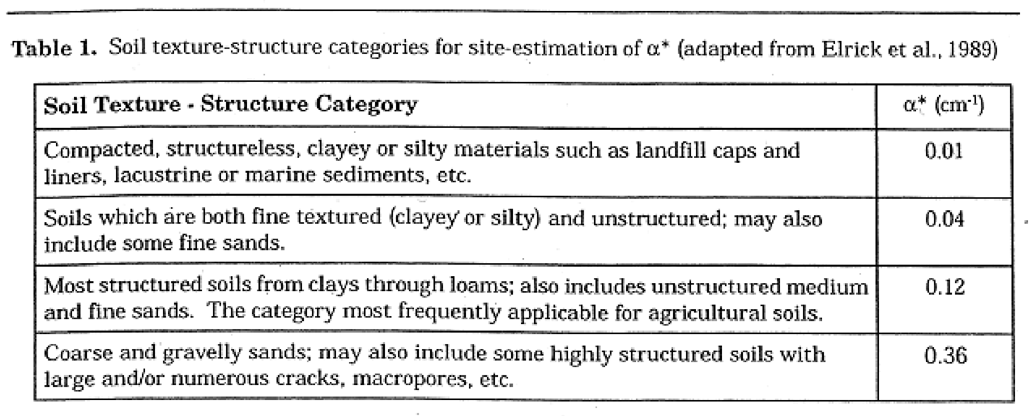


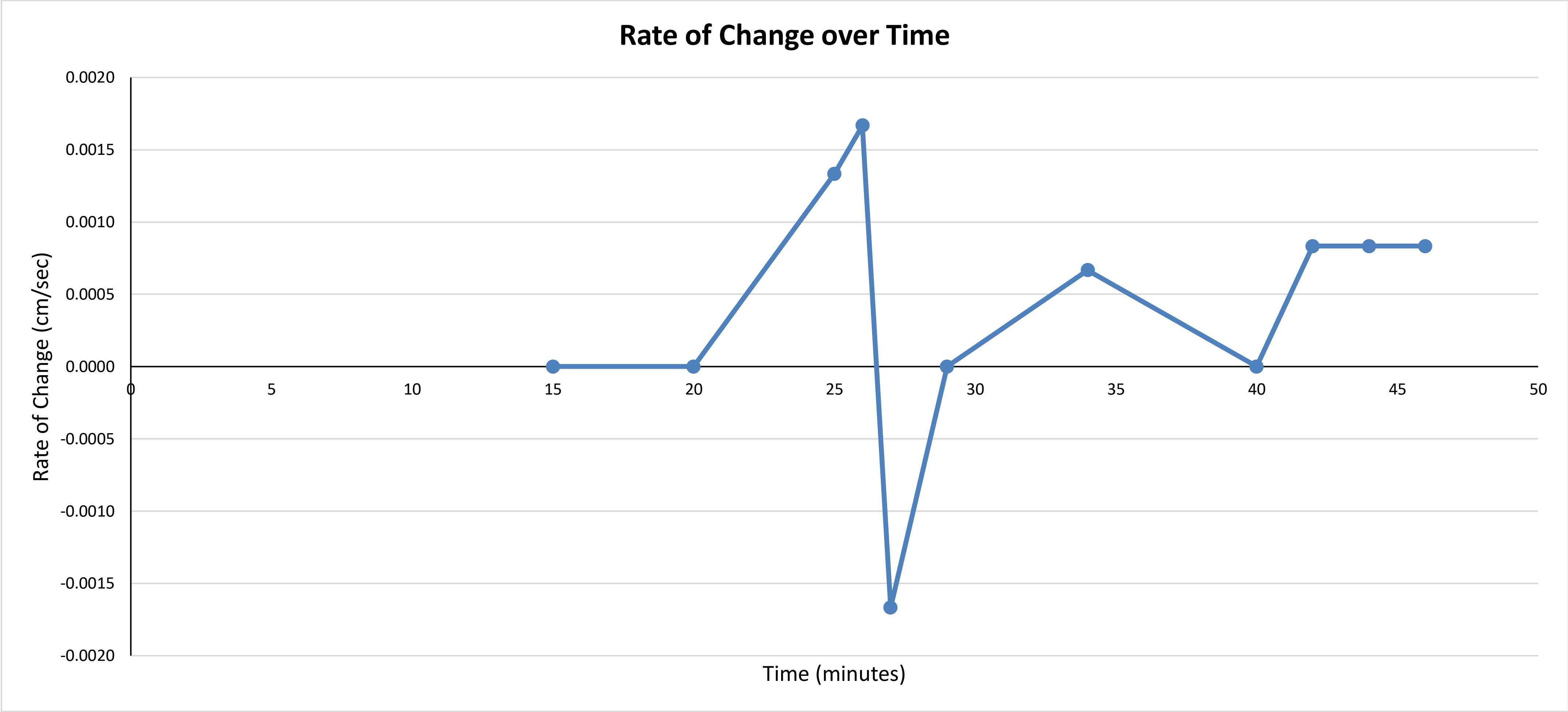
Table 1. Soil texture-structure categories for site-estimation of α* (adapted from Elrick et al., 1989)

Soil Texture - Structure Category	α* (cm^{-1})
Compacted, structureless, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36

Guelph Permeameter
Infiltration Rate Determination

GEI Consultants

Test Location: GP 2



INPUT PARAMETERS

α^* = 0.12 cm^{-1}

H = 5 cm

a = 3 cm

X = 2.16 cm^2

R = 0.0008 cm/sec

SHAPE FACTOR

Shape Factor (1, 2 or 3) = 1

Shape Factor Value (cm^{-1}) = 0.803

CALCULATED PARAMETERS

H_a = 1.67 unitless

Q_1 = 0.001728 cm^3/sec

CALCULATED DESIGN VALUES

k_{fs}= 3.14E-06 cm/sec

Φ_m= 2.62E-05 cm^2/s

Infiltration: 18.33 mm/hr

FOS: 2.50 unitless

Design Infiltration: 7.33 mm/hr

Variable Glossary

α*	**1)** is the ratio of gravity to capillarity forces during infiltration or drainage **2)** determined from table 1 on page 47 of the manual (or the adjacent table)
H	**1)** is the water head in the BH **2)** determined by the height that the inner tube is pulled up during field operation
a	**1)** is the radius of the borehole **2)** determine by the size of the auger
X	**1)** is the resevoir constant **2)** determined by the reservoir knob at the top of the unit • if the knob is up X = 35.22 (outer and inner reservoir) • if the knob is down X = 2.16 (inner reservoir)
R	**1)** is the steady state rate of flow per minute **2)** is determined by timing the drop of water in the Guelph Permeameter

Equation Glossary

Ha	is the ratio of head to borehole radius
Q1	is the flow rate
$C_{(1, 2 \text{ or } 3)}$	is the shape factor which accounts for the saturated area of the soil • Select C_1 if α* is ≥ 0.12 cm^{-1} • Select C_2 if α* = 0.04 cm^{-1} • Select C_3 if α* = 0.01 cm^{-1}
k_{fs}	is the field saturated hydraulic conductivity of the soil
Φ_m	is an indicator of the capillary pull exerted by the unsaturated soil on the water

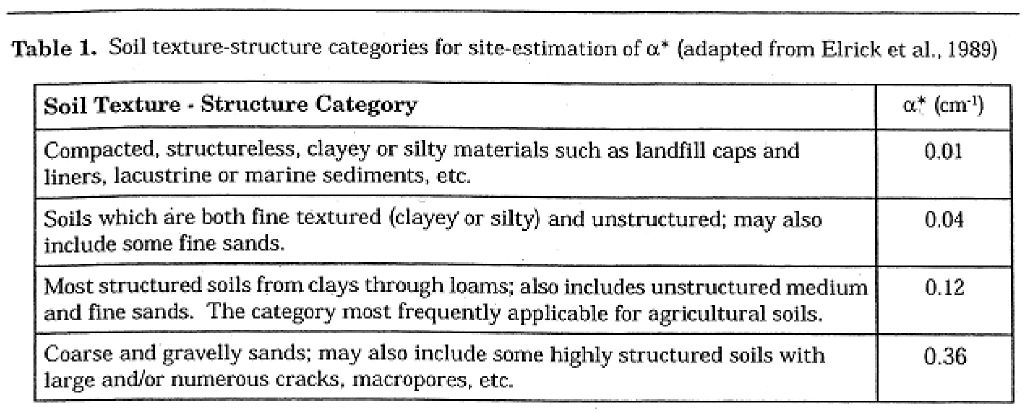


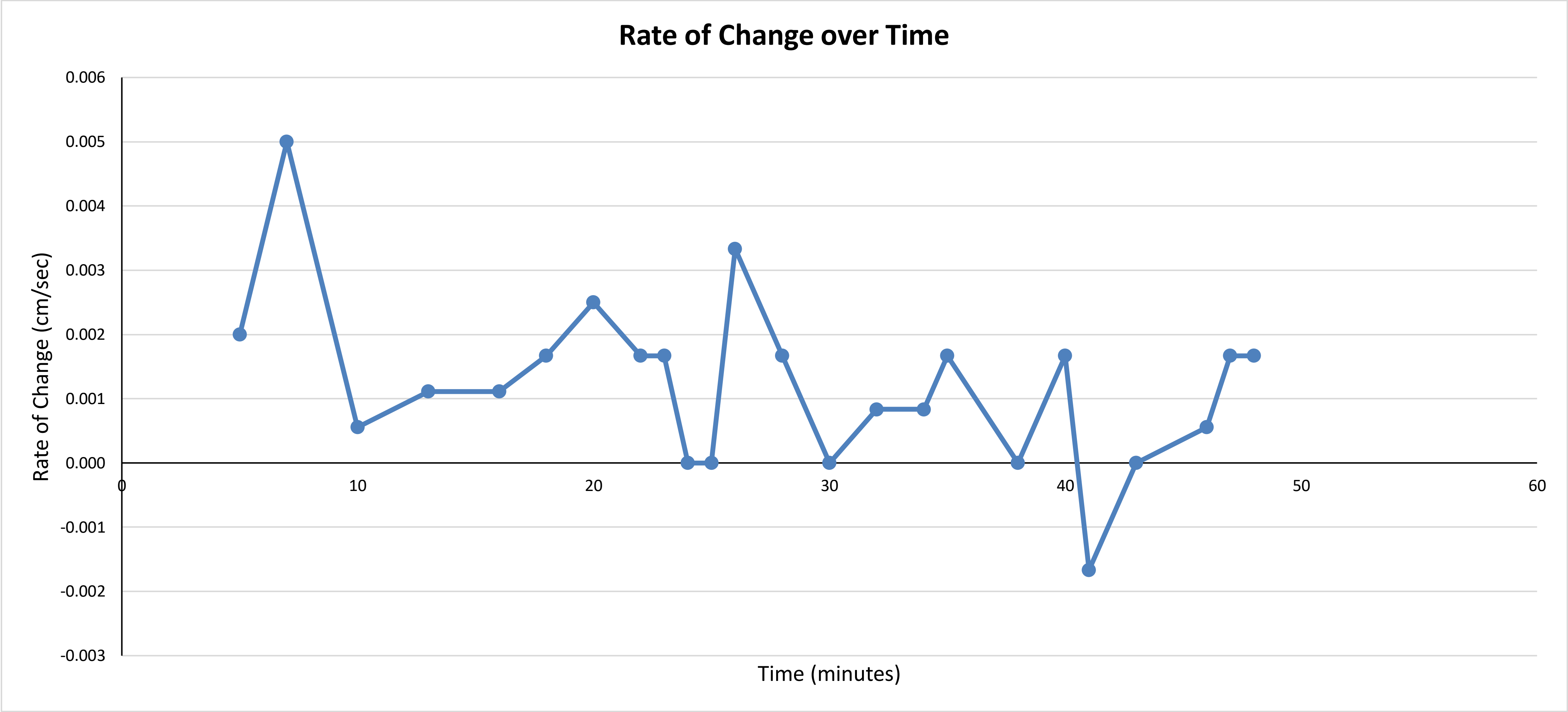
Table 1. Soil texture-structure categories for site-estimation of α* (adapted from Elrick et al., 1989)

Soil Texture - Structure Category	α* (cm^{-1})
Compacted, structureless, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36

Guelph Permeameter
Infiltration Rate Determination

GEI Consultants

Test Location: GP 3



INPUT PARAMETERS

α* =	0.12	cm^{-1}
H =	5	cm
a =	3	cm
X =	2.16	cm^2
R =		cm/sec

SHAPE FACTOR

Shape Factor (1, 2 or 3) =	1
Shape Factor Value (cm^{-1}) =	0.803

CALCULATED PARAMETERS

H_a =	1.67	unitless
Q_1 =	0	cm^3/sec

CALCULATED DESIGN VALUES

k_{fs}=	0.00E+00	cm/sec
Φ_m=	0.00E+00	cm^2/s
Infiltration:	0.00	mm/hr
FOS:	2.50	unitless
Design Infiltration:	0.00	mm/hr

Variable Glossary

α*	**1)** is the ratio of gravity to capillarity forces during infiltration or drainage **2)** determined from table 1 on page 47 of the manual (or the adjacent table)
H	**1)** is the water head in the BH **2)** determined by the height that the inner tube is pulled up during field operation
a	**1)** is the radius of the borehole **2)** determine by the size of the auger
X	**1)** is the resevoir constant **2)** determined by the reservoir knob at the top of the unit • if the knob is up X = 35.22 (outer and inner reservoir) • if the knob is down X = 2.16 (inner reservoir)
R	**1)** is the steady state rate of flow per minute **2)** is determined by timing the drop of water in the Guelph Permeameter

Equation Glossary

Ha	is the ratio of head to borehole radius
Q1	is the flow rate
$C_{(1, 2 \text{ or } 3)}$	is the shape factor which accounts for the saturated area of the soil • Select C_1 if α* is ≥ 0.12 cm^{-1} • Select C_2 if α* = 0.04 cm^{-1} • Select C_3 if α* = 0.01 cm^{-1}
k_{fs}	is the field saturated hydraulic conductivity of the soil
Φ_m	is an indicator of the capillary pull exerted by the unsaturated soil on the water

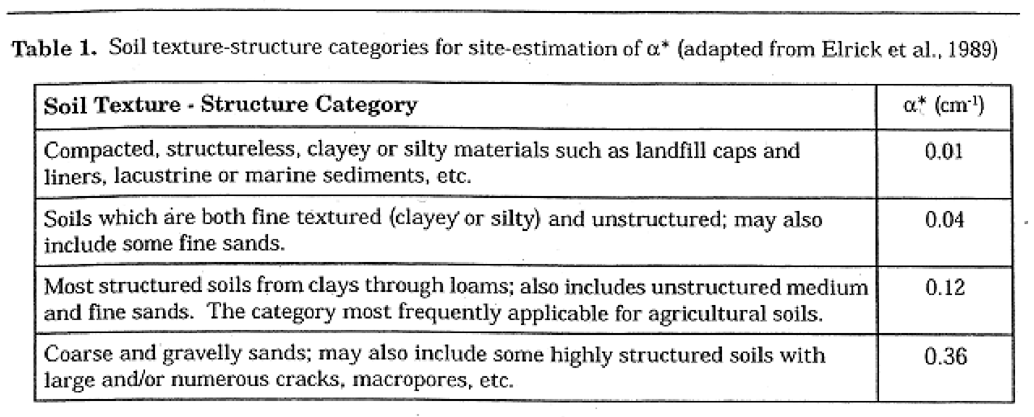


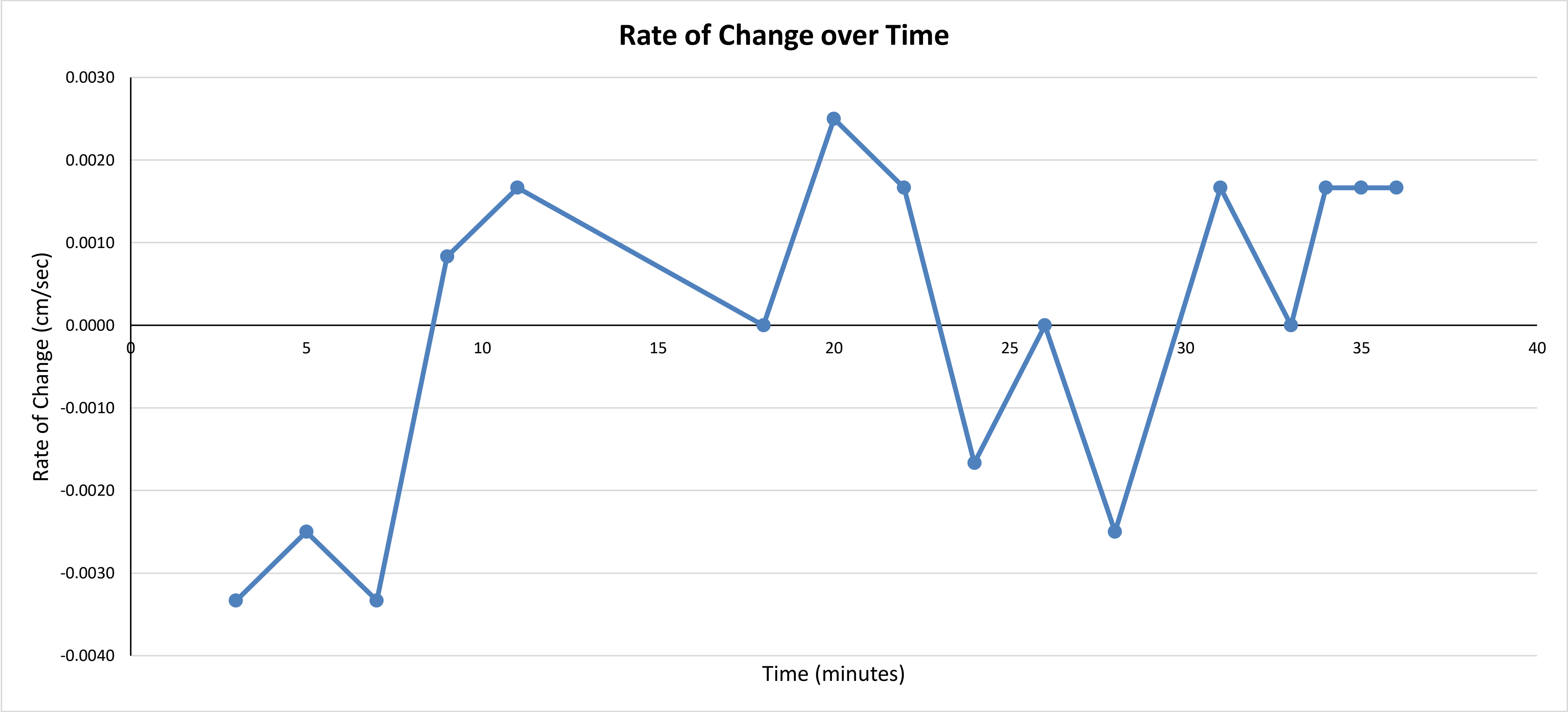
Table 1. Soil texture-structure categories for site-estimation of α* (adapted from Elrick et al., 1989)

Soil Texture - Structure Category	α* (cm^{-1})
Compacted, structureless, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36

Guelph Permeameter
Infiltration Rate Determination

GEI Consultants

Test Location: GP 4



INPUT PARAMETERS

α* = 0.12 cm^{-1}
H = 5 cm
a = 3 cm
X = 2.16 cm^2
R = 0.0017 cm/sec

SHAPE FACTOR

Shape Factor (1, 2 or 3) = 1
Shape Factor Value (cm^{-1}) = 0.803

CALCULATED PARAMETERS

H_a = 1.67 unitless
Q_1 = 0.003672 cm^3/sec

CALCULATED DESIGN VALUES

k_{fs}= 6.68E-06 cm/sec
Φ_m= 5.57E-05 cm^2/s
Infiltration: 22.42 mm/hr
FOS: 2.50 unitless
Design Infiltration: 8.97 mm/hr

Variable Glossary

α*	**1)** is the ratio of gravity to capillarity forces during infiltration or drainage **2)** determined from table 1 on page 47 of the manual (or the adjacent table)
H	**1)** is the water head in the BH **2)** determined by the height that the inner tube is pulled up during field operation
a	**1)** is the radius of the borehole **2)** determine by the size of the auger
X	**1)** is the resevoir constant **2)** determined by the reservoir knob at the top of the unit • if the knob is up X = 35.22 (outer and inner reservoir) • if the knob is down X = 2.16 (inner reservoir)
R	**1)** is the steady state rate of flow per minute **2)** is determined by timing the drop of water in the Guelph Permeameter

Equation Glossary

Ha	is the ratio of head to borehole radius
Q1	is the flow rate
$C_{(1, 2 \text{ or } 3)}$	is the shape factor which accounts for the saturated area of the soil • Select C_1 if α* is ≥ 0.12 cm^{-1} • Select C_2 if α* = 0.04 cm^{-1} • Select C_3 if α* = 0.01 cm^{-1}
k_{fs}	is the field saturated hydraulic conductivity of the soil
Φ_m	is an indicator of the capillary pull exerted by the unsaturated soil on the water

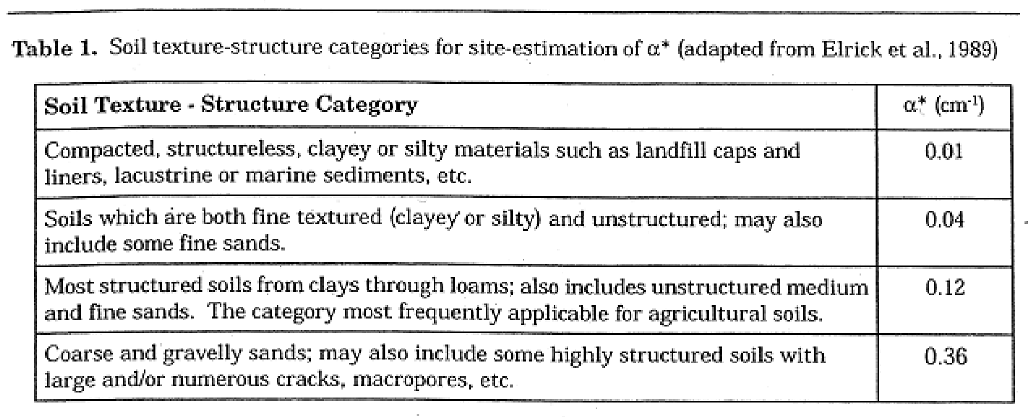
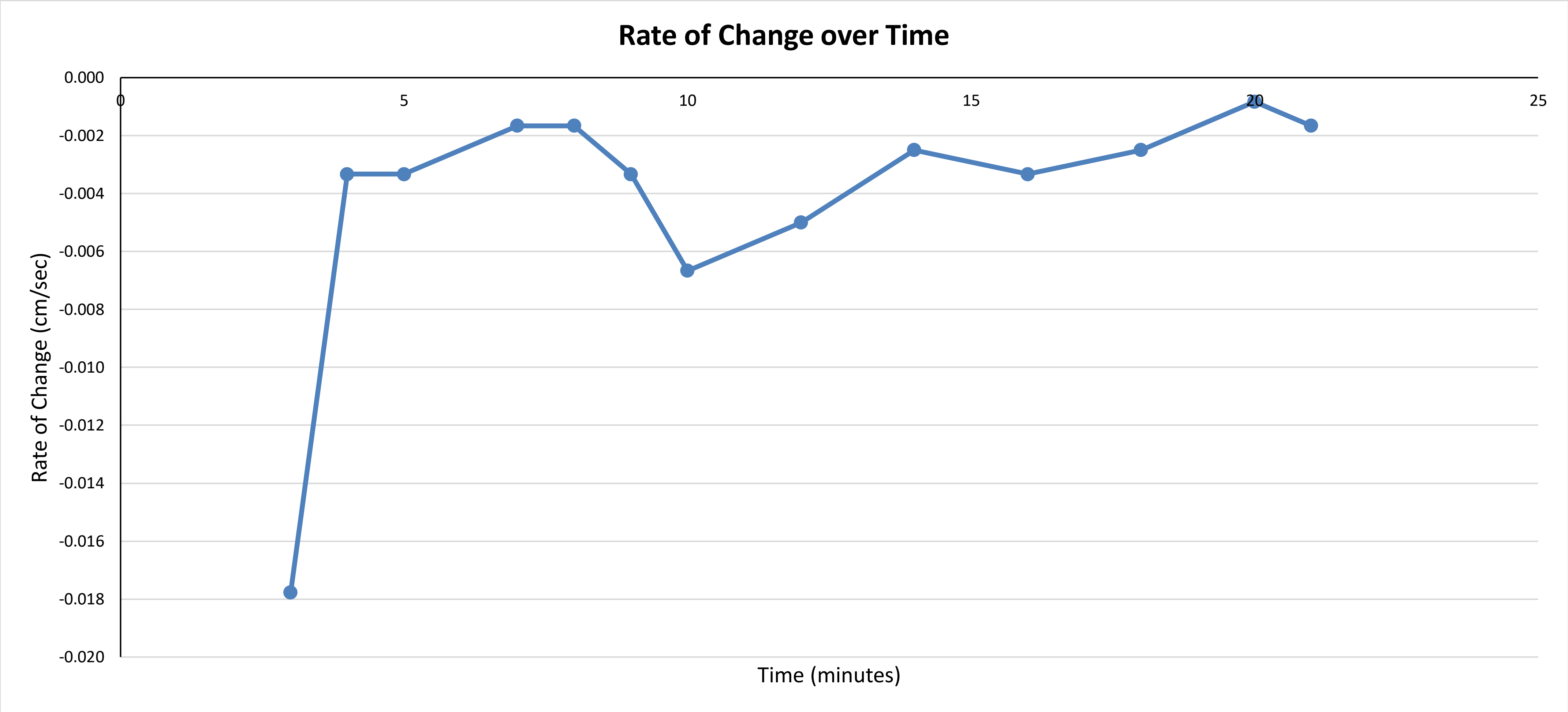


Table 1. Soil texture-structure categories for site-estimation of α* (adapted from Elrick et al., 1989)

Soil Texture - Structure Category	α* (cm^{-1})
Compacted, structureless, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36

Guelph Permeameter
Infiltration Rate Determination

Test Location: GP 5



INPUT PARAMETERS

α^* = 0.12 cm^{-1}
H = 5 cm
a = 3 cm
X = 2.16 cm^2
R = cm/sec

SHAPE FACTOR

Shape Factor (1, 2 or 3) = 1
Shape Factor Value (cm^{-1}) = 0.803

CALCULATED PARAMETERS

H_a = 1.67 unitless
Q_1 = 0 cm^3/sec

CALCULATED DESIGN VALUES

k_{fs}= 0.00E+00 cm/sec
Φ_m= 0.00E+00 cm^2/s
Infiltration: 0.00 mm/hr
FOS: 2.50 unitless
Design Infiltration: 0.00 mm/hr

Variable Glossary

α^*	**1)** is the ratio of gravity to capillarity forces during infiltration or drainage **2)** determined from table 1 on page 47 of the manual (or the adjacent table)
H	**1)** is the water head in the BH **2)** determined by the height that the inner tube is pulled up during field operation
a	**1)** is the radius of the borehole **2)** determine by the size of the auger
X	**1)** is the resevoir constant **2)** determined by the reservoir knob at the top of the unit • if the knob is up X = 35.22 (outer and inner reservoir) • if the knob is down X = 2.16 (inner reservoir)
R	**1)** is the steady state rate of flow per minute **2)** is determined by timing the drop of water in the Guelph Permeameter

Equation Glossary

Ha	is the ratio of head to borehole radius
Q1	is the flow rate
$C_{(1, 2 \text{ or } 3)}$	is the shape factor which accounts for the saturated area of the soil • Select C_1 if α^* is ≥ 0.12 cm^{-1} • Select C_2 if α^* = 0.04 cm^{-1} • Select C_3 if α^* = 0.01 cm^{-1}
k_{fs}	is the field saturated hydraulic conductivity of the soil
Φ_m	is an indicator of the capillary pull exerted by the unsaturated soil on the water

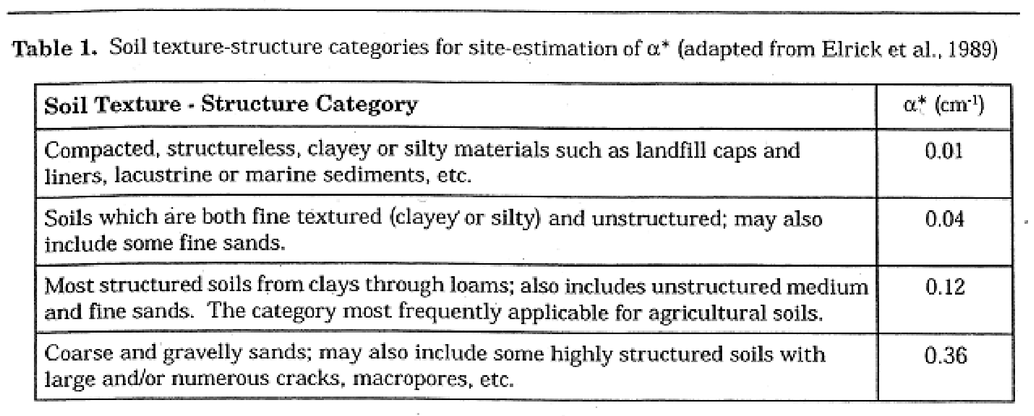


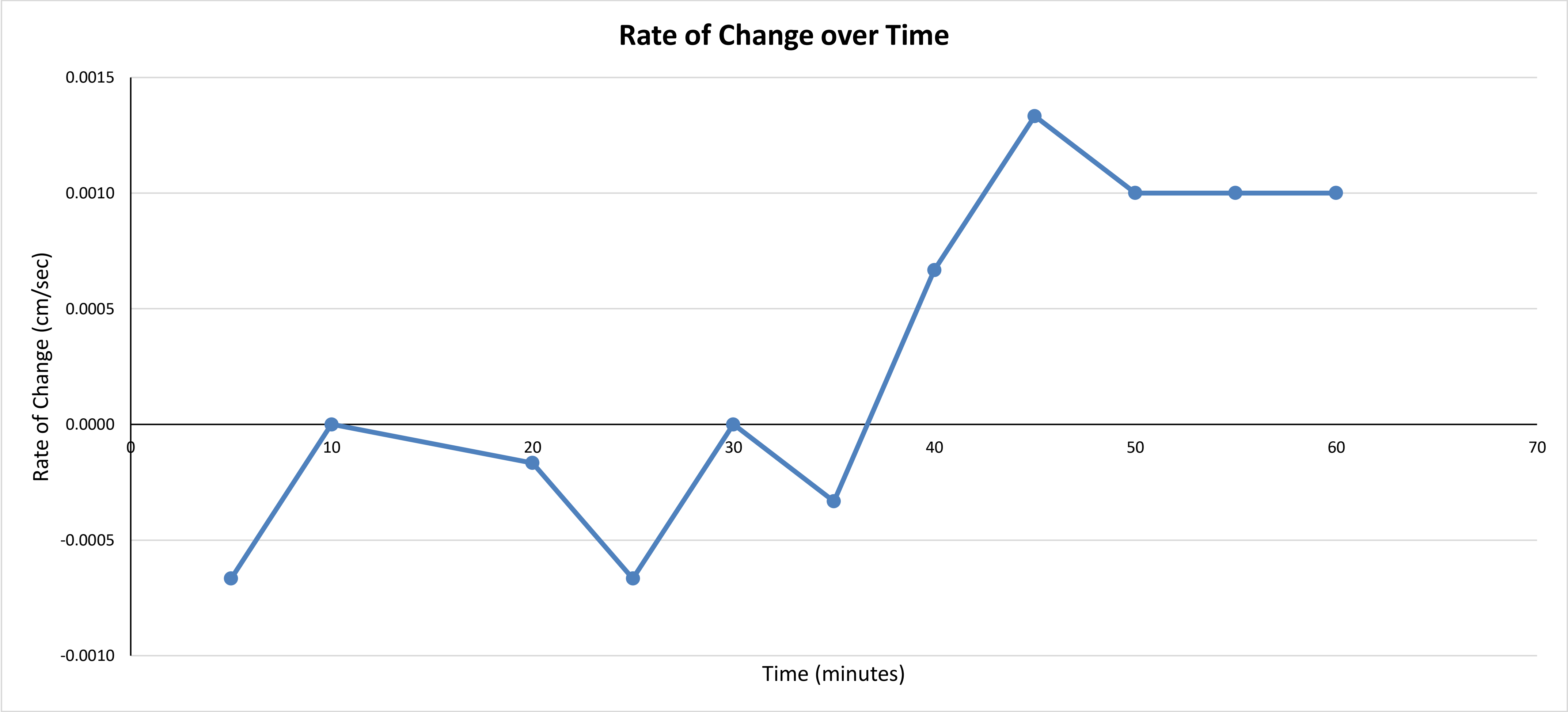
Table 1. Soil texture-structure categories for site-estimation of α^* (adapted from Elrick et al., 1989)

Soil Texture - Structure Category	α^* (cm^{-1})
Compacted, structureless, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36

Guelph Permeameter
Infiltration Rate Determination

GEI Consultants

Test Location: GP 6



INPUT PARAMETERS

α* =	0.12	cm^{-1}
H =	5	cm
a =	3	cm
X =	2.16	cm^2
R =	0.001	cm/sec

SHAPE FACTOR

Shape Factor (1, 2 or 3) =	1
Shape Factor Value (cm^{-1}) =	0.803

CALCULATED PARAMETERS

H_a =	1.67	unitless
Q_1 =	0.00216	cm^3/sec

CALCULATED DESIGN VALUES

k_{fs}=	3.93E-06	cm/sec
Φ_m=	3.27E-05	cm^2/s
Infiltration:	19.45	mm/hr
FOS:	2.50	unitless
Design Infiltration:	7.78	mm/hr

Variable Glossary

α*	**1)** is the ratio of gravity to capillarity forces during infiltration or drainage **2)** determined from table 1 on page 47 of the manual (or the adjacent table)
H	**1)** is the water head in the BH **2)** determined by the height that the inner tube is pulled up during field operation
a	**1)** is the radius of the borehole **2)** determine by the size of the auger
X	**1)** is the resevoir constant **2)** determined by the reservoir knob at the top of the unit • if the knob is up X = 35.22 (outer and inner reservoir) • if the knob is down X = 2.16 (inner reservoir)
R	**1)** is the steady state rate of flow per minute **2)** is determined by timing the drop of water in the Guelph Permeameter

Equation Glossary

Ha	is the ratio of head to borehole radius
Q1	is the flow rate
$C_{(1, 2 \text{ or } 3)}$	is the shape factor which accounts for the saturated area of the soil • Select C_1 if α* is ≥ 0.12 cm^{-1} • Select C_2 if α* = 0.04 cm^{-1} • Select C_3 if α* = 0.01 cm^{-1}
k_{fs}	is the field saturated hydraulic conductivity of the soil
Φ_m	is an indicator of the capillary pull exerted by the unsaturated soil on the water

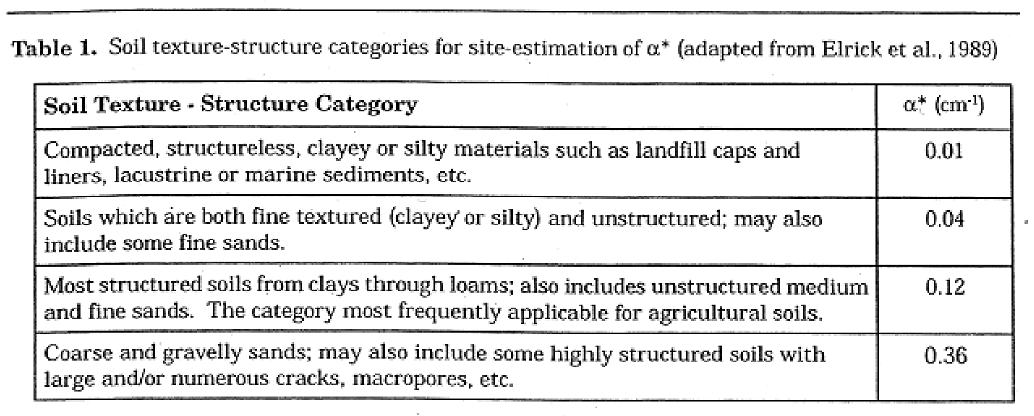
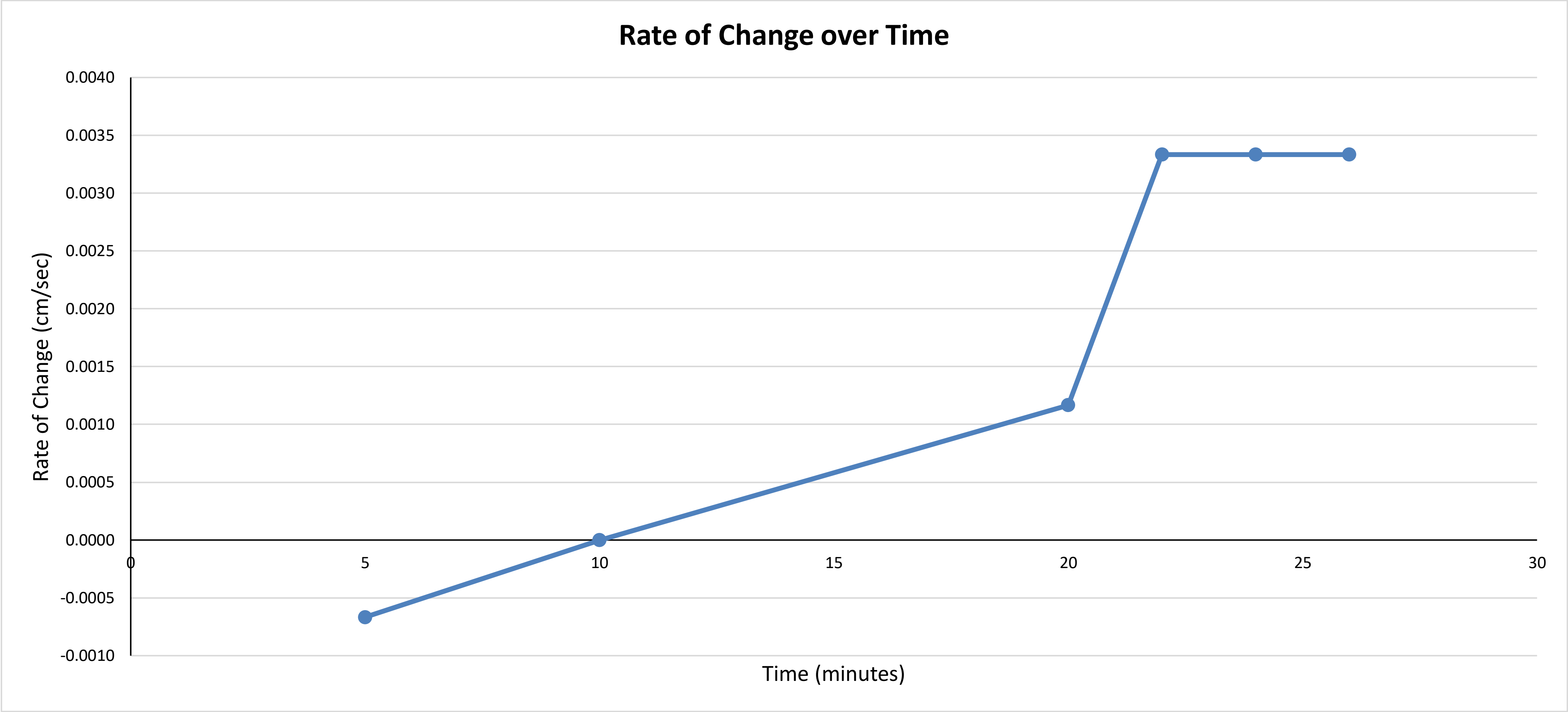


Table 1. Soil texture-structure categories for site-estimation of α* (adapted from Elrick et al., 1989)

Soil Texture - Structure Category	α* (cm^{-1})
Compacted, structureless, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36

Guelph Permeameter
Infiltration Rate Determination

Test Location: GP 7



INPUT PARAMETERS

α^* =	0.12	cm^{-1}
H =	5	cm
a =	3	cm
X =	2.16	cm^2
R =	0.003	cm/sec

SHAPE FACTOR

Shape Factor (1, 2 or 3) =	1
Shape Factor Value (cm^{-1}) =	0.803

CALCULATED PARAMETERS

H_a =	1.67	unitless
Q_1 =	0.00648	cm^3/sec

CALCULATED DESIGN VALUES

k_{fs}=	1.18E-05	cm/sec
Φ_m=	9.82E-05	cm^2/s
Infiltration:	26.10	mm/hr
FOS:	2.50	unitless
Design Infiltration:	10.44	mm/hr

Variable Glossary

α^*	**1)** is the ratio of gravity to capillarity forces during infiltration or drainage **2)** determined from table 1 on page 47 of the manual (or the adjacent table)
H	**1)** is the water head in the BH **2)** determined by the height that the inner tube is pulled up during field operation
a	**1)** is the radius of the borehole **2)** determine by the size of the auger
X	**1)** is the resevoir constant **2)** determined by the reservoir knob at the top of the unit • if the knob is up X = 35.22 (outer and inner reservoir) • if the knob is down X = 2.16 (inner reservoir)
R	**1)** is the steady state rate of flow per minute **2)** is determined by timing the drop of water in the Guelph Permeameter

Equation Glossary

Ha	is the ratio of head to borehole radius
Q1	is the flow rate
$C_{(1, 2 \text{ or } 3)}$	is the shape factor which accounts for the saturated area of the soil • Select C_1 if α^* is ≥ 0.12 cm^{-1} • Select C_2 if α^* = 0.04 cm^{-1} • Select C_3 if α^* = 0.01 cm^{-1}
k_{fs}	is the field saturated hydraulic conductivity of the soil
Φ_m	is an indicator of the capillary pull exerted by the unsaturated soil on the water

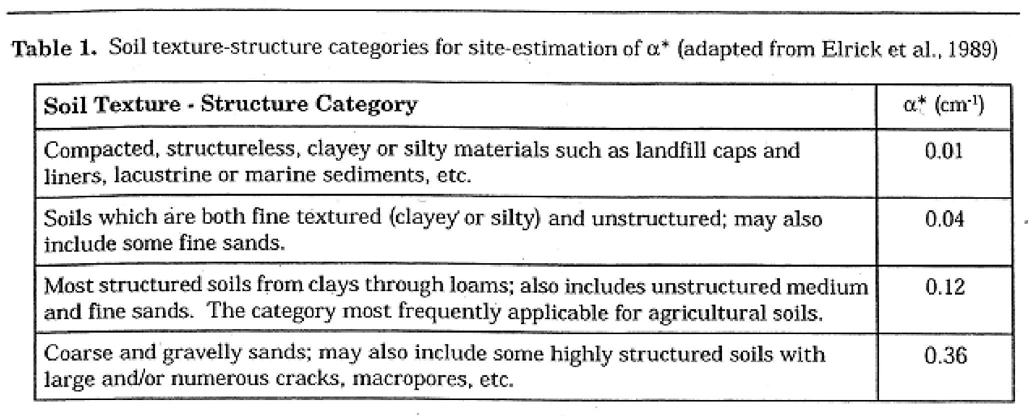


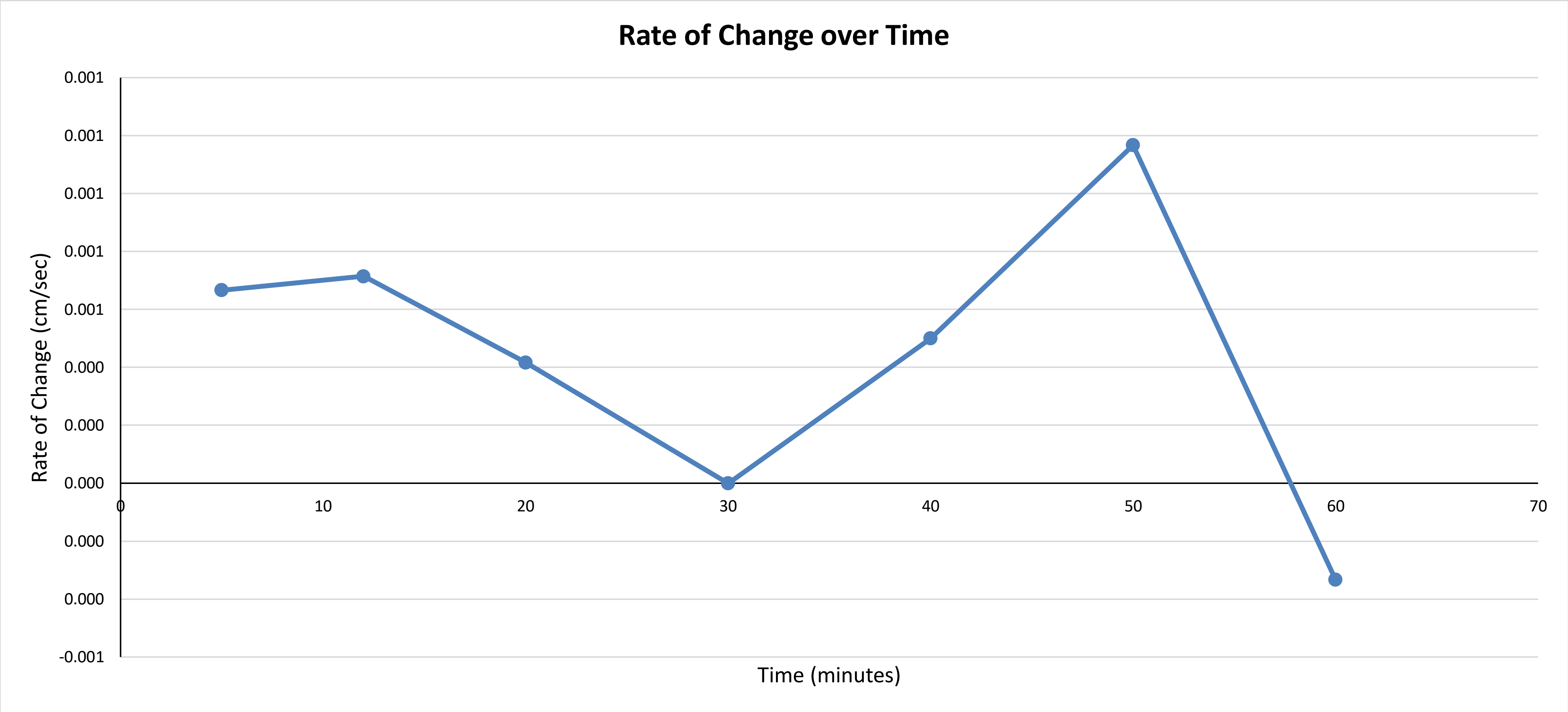
Table 1. Soil texture-structure categories for site-estimation of α^* (adapted from Elrick et al., 1989)

Soil Texture - Structure Category	α^* (cm^{-1})
Compacted, structureless, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36

Guelph Permeameter
Infiltration Rate Determination

GEI Consultants

Test Location: GP 8



INPUT PARAMETERS

α* =	0.12	cm^{-1}
H =	5	cm
a =	3	cm
X =	2.16	cm^2
R =		cm/sec

SHAPE FACTOR

Shape Factor (1, 2 or 3) =	1
Shape Factor Value (cm^{-1}) =	0.803

CALCULATED PARAMETERS

H_a =	1.67	unitless
Q_1 =	0	cm^3/sec

CALCULATED DESIGN VALUES

k_{fs}=	0.00E+00	cm/sec
Φ_m=	0.00E+00	cm^2/s
Infiltration:	0.00	mm/hr
FOS:	2.50	unitless
Design Infiltration:	0.00	mm/hr

Variable Glossary

α*	**1)** is the ratio of gravity to capillarity forces during infiltration or drainage **2)** determined from table 1 on page 47 of the manual (or the adjacent table)
H	**1)** is the water head in the BH **2)** determined by the height that the inner tube is pulled up during field operation
a	**1)** is the radius of the borehole **2)** determine by the size of the auger
X	**1)** is the resevoir constant **2)** determined by the reservoir knob at the top of the unit • if the knob is up X = 35.22 (outer and inner reservoir) • if the knob is down X = 2.16 (inner reservoir)
R	**1)** is the steady state rate of flow per minute **2)** is determined by timing the drop of water in the Guelph Permeameter

Equation Glossary

Ha	is the ratio of head to borehole radius
Q1	is the flow rate
$C_{(1, 2 \text{ or } 3)}$	is the shape factor which accounts for the saturated area of the soil • Select C_1 if α* is ≥ 0.12 cm^{-1} • Select C_2 if α* = 0.04 cm^{-1} • Select C_3 if α* = 0.01 cm^{-1}
k_{fs}	is the field saturated hydraulic conductivity of the soil
Φ_m	is an indicator of the capillary pull exerted by the unsaturated soil on the water

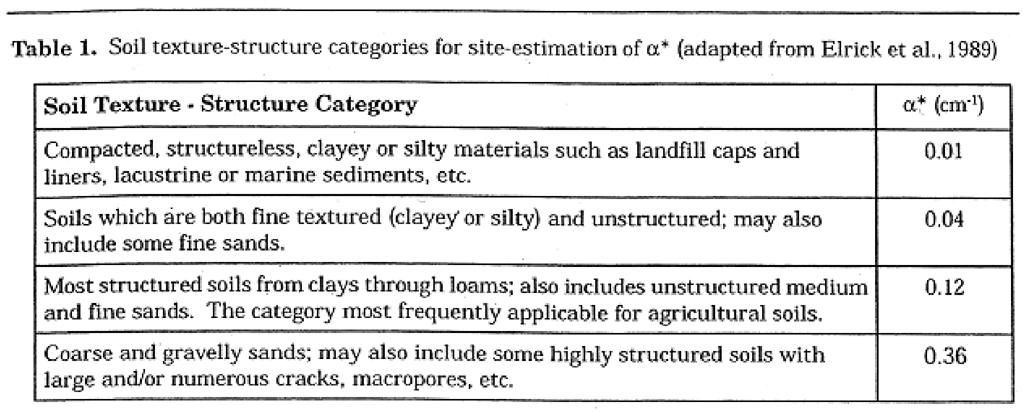


Table 1. Soil texture-structure categories for site-estimation of α* (adapted from Elrick et al., 1989)

Soil Texture - Structure Category	α* (cm^{-1})
Compacted, structureless, clayey or silty materials such as landfill caps and liners, lacustrine or marine sediments, etc.	0.01
Soils which are both fine textured (clayey or silty) and unstructured; may also include some fine sands.	0.04
Most structured soils from clays through loams; also includes unstructured medium and fine sands. The category most frequently applicable for agricultural soils.	0.12
Coarse and gravelly sands; may also include some highly structured soils with large and/or numerous cracks, macropores, etc.	0.36

APPENDIX C8

WATER BALANCE CALCULATIONS

Water Balance Analysis
Wildfield Village, Healey Road and The Gore Road, Caledon, ON
Project No.: 2100463

Wildfield Village, Healey Road and The Gore Road, Caledon, ON

MONTHLY AND YEARLY WATER BALANCE COMPONENTS

			JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Potential Evapotranspiration Calculation		Average Temperature: T (°C)	-6.60	-4.80	-0.40	6.60	12.90	18.10	20.80	19.60	15.40	9.00	3.10	-2.80	7.60
		Heat Index: $i=(T/5)^{1.514}$	0.00	0.00	0.00	1.52	4.20	7.01	8.66	7.91	5.49	2.43	0.48	0.00	37.7
		Unadjusted Potential Evapotranspiration: U (mm)	0.0	0.0	0.0	29.5	61.5	89.1	103.7	97.2	74.7	41.5	12.9	0.0	510.1
		Adjusting Factor for U (Latitude 44°)	0.81	0.81	1.02	1.13	1.27	1.28	1.30	1.20	1.04	0.94	0.80	0.76	-
		Adjusted Potential Evapotranspiration - PET (mm)	0.0	0.0	0.0	33.4	78.1	114.0	134.9	116.7	77.6	39.0	10.3	0.0	604.0
Pervious Components		Precipitation: P (mm)	50.30	44.20	49.20	63.30	79.10	76.30	70.40	80.40	84.60	66.50	78.30	57.40	799.80
		Adjusted Potential Evapotranspiration: PET (mm)	0.0	0.0	0.0	33.4	78.1	114.0	134.9	116.7	77.6	39.0	10.3	0.0	604.0
		P - PET	50.3	44.2	49.2	29.9	1.0	-37.7	-64.5	-36.3	7.0	27.5	68.0	57.4	196.0
		Change in Soil Moisture Storage (mm)	0.0	0.0	0.0	0.0	0.0	-37.7	-64.5	-36.3	7.0	27.5	0.0	0.0	-
		Water Holding Capacity Agri. (max. 75 mm)	75.0	75.0	75.0	75.0	75.0	37.3	0.0	0.0	7.0	34.5	75.0	75.0	-
		Water Holding Capacity Treed (max. 350 mm)	350.0	350.0	350.0	350.0	350.0	312.3	247.8	211.5	218.5	246.0	314.0	350.0	-
		Water Surplus Available for Infiltration or Runoff Agri.	50.3	44.2	49.2	29.9	1.0	0.0	0.0	0.0	0.0	0.0	27.5	57.4	259.5
		Water Surplus Available for Infiltration or Runoff Treed.	50.3	44.2	49.2	29.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0	21.4	196.0
	Agr	Potential Infiltration based on MECP Infiltration Factor (mm)	17.6	15.5	17.2	10.5	0.4	0.0	0.0	0.0	0.0	0.0	9.6	20.1	90.8
		Potential Surface Water Runoff (mm)	32.7	28.7	32.0	19.5	0.7	0.0	0.0	0.0	0.0	0.0	17.8	37.3	168.7
	Treed	Potential Infiltration based on MECP Infiltration Factor (mm)	20.1	17.7	19.7	12.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	8.6	78.4
		Potential Surface Water Runoff (mm)	30.2	26.5	29.5	18.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	12.8	117.6
Impervious Components		Potential Evaporation: PE (mm), Assume 15%	-												120.0
		Potential Surface Water Runoff: P - PE (mm)	-												679.8

PRE- AND POST-DEVELOPMENT WATER BALANCE (NO LOW IMPACT DEVELOPMENT MEASURES IN PLACE)

		Total Land Area (m^2)	Impervious Factor	Impervious Area (m^2)	Pervious Area (m2)	Runoff (m^3/annum)	Infiltration (m^3/annum)	**Runoff Increase Pre to Post**
Existing Land Use (Pre-Development)	Agricultural	3,401,760	5%	170088.00	3231672.0	660722.4	293510.8	See Page 2
	Treed	179,040	0%	0.00	179040.0	21058.8	14039.2	**Infiltration Decrease Pre to Post**
	TOTAL	3,580,800	5%	170,088	3,410,712	681,781	307,550	See Page 2
Proposed Land Use (Post-Development)	To be completed in the Phase 2 Report.							**Infiltration Required to Meet Pre-Development Conditions (m^3)**
								To be completed in Phase 2 Report

307,550

Notes

1. Both potential infiltration and surface water runoff are independent of temperature
2. Assumption is in January maximum soil moisture storage value is present (75 to 300mm)
3. Water Holding Capacity & Infiltration Factors taken from Table 3.1 of MOE SWMPDM, 2003
4. Average Temp. and Precip. taken from Environment Canada station "Woodbridge" between 1981 and 2010

	Site Description		**Infiltration Factor**	
Infiltration Criteria	**Agricultural**	**Treed**	**Agricultural**	**Treed**
Topography	Steeply Rolling Land - Ave	Steeply Rolling Land - Ave	0.15	0.15
Soils	Tight Impervious Clay	Tight Impervious Clay	0.1	0.1
Cover	Cultivated Land/AGR/ANT	Wetland/Meadow/MAS/N	0.1	0.15
		Sum of Infiltration Factors	**0.35**	**0.4**

APPENDIX C9

SUMMARY OF PRIVATE WELL SURVEY

Adress	Dropped off/Did not drop of
7040 Mayfield Road	Dropped off.
7212 Mayfield Road	Dropped off.
7236 Mayfield Road	Dropped off.
7421 Mayfield Road	Dropped off.
7435 Mayfield Road	Gated/no visible mailbox outside
7481 Mayfield Road	Dropped off.
12031 The Gore Road	Dropped off.
12056 The Gore Road	Dropped off.
12049 The Gore Road	Dropped off.
12071 The Gore Road	Dropped off.
12081 The Gore Road	Dropped off.
12109 The Gore Road	Dropped off.
12119 The Gore Road	Dropped off.
12125 The Gore Road	Dropped off.
12131 The Gore Road	Dropped off.
12161 The Gore Road	Dropped off.
12177 The Gore Road	Dropped off.
12185 The Gore Road	Dropped off.
12204 The Gore Road	Dropped off.
12220 The Gore Road	Dropped off.
12272 The Gore Road	Dropped off.
12286 The Gore Road	Dropped off.
12300 The Gore Road	Dropped off.
12348 The Gore Road	Dropped off.
12421 The Gore Road	Dropped off.
12538 The Gore Road	Dropped off.
12560 The Gore Road	Dropped off.
12568 The Gore Road	Dropped off.
12610 The Gore Road	Dropped off.
12621 The Gore Road	Dropped off.
12630 The Gore Road	Dropped off.
12650 The Gore Road	Dropped off.
12660 The Gore Road	Dropped off.
12621 The Gore Road	Dropped off.
12723 The Gore Road	Dropped off.
12723 The Gore Road	Dropped off.
7171 Healey Road	Gated/abandoned (?)
6984 Healey Road	Dropped off.

Adress	Dropped off/Did not drop of
12850 Centreville Creek Road	Dropped off.
12833 Centreville Creek Road	Dropped off.
12805 Centreville Creek Road	Dropped off.
12825 Centreville Creek Road	Dropped off.
12797 Centreville Creek Road	Dropped off.
12767 Centreville Creek Road	Dropped off.
12777 Centreville Creek Road	Dropped off.
12753 Centreville Creek Road	Dropped off.
12435 Centreville Creek Road	Dropped off.
12402 Centreville Creek Road	Dropped off.
12419 Centreville Creek Road	Dropped off.
12398 Centreville Creek Road	Dropped off.
12389 Centreville Creek Road	Dropped off.
12378 Centreville Creek Road	Dropped off.
12204 Centreville Creek Road	Dropped off.
12113 Centreville Creek Road	Dropped off.
12110 Centreville Creek Road	Dropped off.
12113 Centreville Creek Road	Dropped off.
12078 Centreville Creek Road	Dropped off.
12047 Centreville Creek Road	Dropped off.
12048 Centreville Creek Road	Dropped off.
12037 Centreville Creek Road	Dropped off.
6960 Mayfield Road	Dropped off.

GEI Consultants

Private Water Well Survey Form

Name:____ Date:____________________________

Address : ____

Telephone Number:___________________________ Email:___________________________________

Do you have a well? **Yes** ☐ **No** ☐

Well location on property: ____

Type (see definitions at bottom of page): Dug ☐ Drilled ☐ Bored ☐

Diameter of well: ___________ Depth of well: ________ Approximate age of well: ________________

Is your well accessible? Yes ☐ No ☐ Details: ____

Any problems with water quantity in the past? Yes ☐ No ☐ Comments: _______________________

Any problems with water quality in the past (i.e. sulfur, bacteria, etc)? Yes ☐ No ☐ Comments: ____

Are any treatment systems in place (i.e. UV Filter, Reverse Osmosis, Softener etc): _________________

Has your well ever gone dry? Yes ☐ No ☐ Comments: ___________________________________

Do you have a septic system? **Yes** ☐ **No** ☐

Septic system location on property: ____

Are you generally available during working hours (8:00 am to 5:00 pm)? **Yes** ☐ **No** ☐

If not, when is the best time to contact you? ____

Would you be willing to participate in a monitoring program including the manual measurement of the ground water level in your water well? **Yes** ☐ **No** ☐

We thank you for your co-operation.

Please email completed survey to abelfrage@geiconsultants.com.

Definitions

Bored Well: A well usually 12 inches or more in diameter and seldom deeper than 100 feet.
Drilled Well: A well usually 10 inches or less in diameter and cased with steel or plastic pipe. Drilled wells can be of varying depth.
Dug Well: Large diameter wells often constructed by hand, usually old and often cased by concrete or hand-laid bricks.

APPENDIX C10

GROUNDWATER QUALITY TESTING CERTIFICATES OF ANALYSIS

SCS consulting group ltd

GEI Consultants

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7	Report Number:	1997225
		Date Submitted:	2023-05-18
		Date Reported:	2023-05-26
		Project:	2100463
		COC #:	222055
Attention:	M. Aiden Belfrage		
PO#:			
Invoice to:	GEI Consultants Inc.		

Dear Aiden Belfrage:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: ______________________________

Raheleh Zafari, Environmental Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: https://directory.cala.ca/.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997225
Date Submitted: 2023-05-18
Date Reported: 2023-05-26
Project: 2100463
COC #: 222055

				Lab I.D.	1687732	1687733	1687734	1687735
				Sample Matrix	SURF W	SURF W	SURF W	SURF W
				Sample Type				
				Sampling Date	2023-05-18	2023-05-18	2023-05-18	2023-05-18
				Sample I.D.	BH5	BH18	BH26	BH33
Group	**Analyte**	**MRL**	**Units**	**Guideline**				
General Chemistry	Total Suspended Solids	2	mg/L		13	319	49	158
Metals	Ag	0.0001	mg/L	PWQO 0.0001	<0.0001		<0.0001	<0.0001
		0.0002	mg/L	PWQO 0.0001		<0.0002*		
	Al	0.01	mg/L		0.04		0.04	0.31
		0.02	mg/L			0.14		
	As	0.001	mg/L	PWQO 0.100	<0.001		<0.001	<0.001
		0.002	mg/L	PWQO 0.100		<0.002		
	B	0.01	mg/L	IPWQO 0.200	0.09		0.04	0.35*
		0.02	mg/L	IPWQO 0.200		0.55*		
	Ba	0.01	mg/L		0.06		0.13	0.06
		0.02	mg/L			0.03		
	Be	0.0005	mg/L	PWQO 0.011	<0.0005		<0.0005	<0.0005
		0.001	mg/L	PWQO 0.011		<0.001		
	Cd	0.0001	mg/L	PWQO 0.0002	<0.0001		<0.0001	<0.0001
		0.0002	mg/L	PWQO 0.0002		<0.0002		
	Co	0.0002	mg/L	PWQO 0.0009	0.0016*		0.0015*	0.0063*
		0.0004	mg/L	PWQO 0.0009		0.0068*		
	Cr	0.001	mg/L		<0.001		<0.001	0.001
		0.002	mg/L			<0.002		
	Cu	0.001	mg/L	PWQO 0.005	<0.001		<0.001	0.002
		0.002	mg/L	PWQO 0.005		<0.002		
	Fe	0.03	mg/L	PWQO 0.30	0.06		0.09	0.19
		0.06	mg/L	PWQO 0.30		0.17		
	Hg	0.0001	mg/L	PWQO 0.0002	<0.0001	<0.0001	<0.0001	<0.0001
	Mo	0.005	mg/L	IPWQO 0.040	<0.005		<0.005	<0.005

Guideline = PWQO - Ontario

*** = Guideline Exceedence**

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

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

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7
Attention:	M. Aiden Belfrage
PO#:	
Invoice to:	GEI Consultants Inc.

Report Number:	1997225
Date Submitted:	2023-05-18
Date Reported:	2023-05-26
Project:	2100463
COC #:	222055

				Lab I.D.	1687732	1687733	1687734	1687735
				Sample Matrix	SURF W	SURF W	SURF W	SURF W
				Sample Type				
				Sampling Date	2023-05-18	2023-05-18	2023-05-18	2023-05-18
				Sample I.D.	BH5	BH18	BH26	BH33
Group	**Analyte**	**MRL**	**Units**	**Guideline**				
Metals	Mo	0.01	mg/L	IPWQO 0.040		<0.01		
	Ni	0.005	mg/L	PWQO 0.025	<0.005		<0.005	0.010
		0.01	mg/L	PWQO 0.025		<0.01		
	Pb	0.001	mg/L	PWQO 0.005	<0.001		<0.001	<0.001
		0.002	mg/L	PWQO 0.005		<0.002		
	Sb	0.0005	mg/L	IPWQO 0.020	<0.0005		<0.0005	<0.0005
		0.001	mg/L	IPWQO 0.020		<0.001		
	Se	0.001	mg/L	PWQO 0.100	0.002		<0.001	0.002
		0.002	mg/L	PWQO 0.100		<0.002		
	Tl	0.0001	mg/L	IPWQO 0.0003	<0.0001		<0.0001	<0.0001
		0.0002	mg/L	IPWQO 0.0003		<0.0002		
	U	0.001	mg/L	IPWQO 0.005	0.010*		0.004	0.012*
		0.002	mg/L	IPWQO 0.005		0.035*		
	V	0.001	mg/L	IPWQO 0.006	<0.001		0.001	0.002
		0.002	mg/L	IPWQO 0.006		<0.002		
	W	0.002	mg/L	IPWQO 0.030	<0.002		<0.002	<0.002
		0.004	mg/L	IPWQO 0.030		<0.004		
	Zn	0.01	mg/L	PWQO 0.030	<0.01		<0.01	<0.01
		0.02	mg/L	PWQO 0.030		<0.02		
	Zr	0.002	mg/L	IPWQO 0.004	<0.002		<0.002	<0.002
		0.004	mg/L	IPWQO 0.004		<0.004		

Guideline = PWQO - Ontario

*** = Guideline Exceedence**

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

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

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7
Attention:	M. Aiden Belfrage
PO#:	
Invoice to:	GEI Consultants Inc.

Report Number:	1997225
Date Submitted:	2023-05-18
Date Reported:	2023-05-26
Project:	2100463
COC #:	222055

				Lab I.D.	1687736	1687737	1687738	1687739
				Sample Matrix	SURF W	SURF W	SURF W	SURF W
				Sample Type				
				Sampling Date	2023-05-18	2023-05-18	2023-05-18	2023-05-18
				Sample I.D.	BH38	BH5 - F	BH18 - F	BH26 - F
Group	**Analyte**	**MRL**	**Units**	**Guideline**				
General Chemistry	Total Suspended Solids	2	mg/L		103	<2	4	<2
Metals	Ag	0.0001	mg/L	PWQO 0.0001	<0.0001	<0.0001		<0.0001
		0.0002	mg/L	PWQO 0.0001			<0.0002*	
	Al	0.01	mg/L		0.44	<0.01		<0.01
		0.02	mg/L				0.09	
	As	0.001	mg/L	PWQO 0.100	0.001	<0.001		<0.001
		0.002	mg/L	PWQO 0.100			<0.002	
	B	0.01	mg/L	IPWQO 0.200	0.20	0.09		0.04
		0.02	mg/L	IPWQO 0.200			0.51*	
	Ba	0.01	mg/L		0.06	0.05		0.12
		0.02	mg/L				0.03	
	Be	0.0005	mg/L	PWQO 0.011	<0.0005	<0.0005		<0.0005
		0.001	mg/L	PWQO 0.011			<0.001	
	Cd	0.0001	mg/L	PWQO 0.0002	<0.0001	<0.0001		<0.0001
		0.0002	mg/L	PWQO 0.0002			<0.0002	
	Co	0.0002	mg/L	PWQO 0.0009	0.0011*	0.0018*		0.0014*
		0.0004	mg/L	PWQO 0.0009			0.0061*	
	Cr	0.001	mg/L		0.001	<0.001		<0.001
		0.002	mg/L				<0.002	
	Cu	0.001	mg/L	PWQO 0.005	0.001	<0.001		<0.001
		0.002	mg/L	PWQO 0.005			<0.002	
	Fe	0.03	mg/L	PWQO 0.30	0.99*	<0.03		<0.03
		0.06	mg/L	PWQO 0.30			0.07	
	Hg	0.0001	mg/L	PWQO 0.0002	<0.0001	<0.0001	<0.0001	<0.0001
	Mo	0.005	mg/L	IPWQO 0.040	<0.005	<0.005		<0.005

Guideline = PWQO - Ontario

*** = Guideline Exceedence**

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

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

eurofins | Environment Testing

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7	Report Number:	1997225
Attention:	M. Aiden Belfrage	Date Submitted:	2023-05-18
PO#:		Date Reported:	2023-05-26
Invoice to:	GEI Consultants Inc.	Project:	2100463
		COC #:	222055

				Lab I.D.	1687736	1687737	1687738	1687739
				Sample Matrix	SURF W	SURF W	SURF W	SURF W
				Sample Type				
				Sampling Date	2023-05-18	2023-05-18	2023-05-18	2023-05-18
				Sample I.D.	BH38	BH5 - F	BH18 - F	BH26 - F
Group	**Analyte**	**MRL**	**Units**	**Guideline**				
Metals	Mo	0.01	mg/L	IPWQO 0.040			<0.01	
	Ni	0.005	mg/L	PWQO 0.025	<0.005	<0.005		<0.005
		0.01	mg/L	PWQO 0.025			<0.01	
	Pb	0.001	mg/L	PWQO 0.005	<0.001	<0.001		<0.001
		0.002	mg/L	PWQO 0.005			<0.002	
	Sb	0.0005	mg/L	IPWQO 0.020	<0.0005	<0.0005		<0.0005
		0.001	mg/L	IPWQO 0.020			<0.001	
	Se	0.001	mg/L	PWQO 0.100	<0.001	0.001		<0.001
		0.002	mg/L	PWQO 0.100			<0.002	
	Tl	0.0001	mg/L	IPWQO 0.0003	<0.0001	<0.0001		<0.0001
		0.0002	mg/L	IPWQO 0.0003			<0.0002	
	U	0.001	mg/L	IPWQO 0.005	0.002	0.011*		0.004
		0.002	mg/L	IPWQO 0.005			0.033*	
	V	0.001	mg/L	IPWQO 0.006	0.002	<0.001		<0.001
		0.002	mg/L	IPWQO 0.006			<0.002	
	W	0.002	mg/L	IPWQO 0.030	<0.002	<0.002		<0.002
		0.004	mg/L	IPWQO 0.030			<0.004	
	Zn	0.01	mg/L	PWQO 0.030	<0.01	<0.01		<0.01
		0.02	mg/L	PWQO 0.030			<0.02	
	Zr	0.002	mg/L	IPWQO 0.004	<0.002	<0.002		<0.002
		0.004	mg/L	IPWQO 0.004			<0.004	

Guideline = PWQO - Ontario

*** = Guideline Exceedence**

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

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

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997225
Date Submitted: 2023-05-18
Date Reported: 2023-05-26
Project: 2100463
COC #: 222055

				Lab I.D.	1687740	1687741
				Sample Matrix	SURF W	SURF W
				Sample Type		
				Sampling Date	2023-05-18	2023-05-18
				Sample I.D.	BH33 - F	BH38 - F
Group	**Analyte**	**MRL**	**Units**	**Guideline**		
General Chemistry	Total Suspended Solids	2	mg/L		3	<2
Metals	Ag	0.0001	mg/L	PWQO 0.0001	<0.0001	<0.0001
	Al	0.01	mg/L		<0.01	<0.01
	As	0.001	mg/L	PWQO 0.100	<0.001	<0.001
	B	0.01	mg/L	IPWQO 0.200	0.35*	0.20
	Ba	0.01	mg/L		0.05	0.06
	Be	0.0005	mg/L	PWQO 0.011	<0.0005	<0.0005
	Cd	0.0001	mg/L	PWQO 0.0002	<0.0001	<0.0001
	Co	0.0002	mg/L	PWQO 0.0009	0.0061*	0.0006
	Cr	0.001	mg/L		0.003	<0.001
	Cu	0.001	mg/L	PWQO 0.005	0.001	<0.001
	Fe	0.03	mg/L	PWQO 0.30	<0.03	<0.03
	Hg	0.0001	mg/L	PWQO 0.0002	<0.0001	<0.0001
	Mo	0.005	mg/L	IPWQO 0.040	<0.005	<0.005
	Ni	0.005	mg/L	PWQO 0.025	0.010	<0.005
	Pb	0.001	mg/L	PWQO 0.005	<0.001	<0.001
	Sb	0.0005	mg/L	IPWQO 0.020	<0.0005	<0.0005
	Se	0.001	mg/L	PWQO 0.100	0.002	<0.001
	Tl	0.0001	mg/L	IPWQO 0.0003	<0.0001	<0.0001
	U	0.001	mg/L	IPWQO 0.005	0.012*	0.002
	V	0.001	mg/L	IPWQO 0.006	0.001	<0.001
	W	0.002	mg/L	IPWQO 0.030	<0.002	<0.002
	Zn	0.01	mg/L	PWQO 0.030	<0.01	<0.01
	Zr	0.002	mg/L	IPWQO 0.004	<0.002	<0.002

Guideline = PWQO - Ontario *** = Guideline Exceedence**

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

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

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 442139 **Analysis/Extraction Date** 2023-05-24 **Analyst** SKH **Method** C SM2540			
Total Suspended Solids	<2 mg/L	98	90-110
Run No 442182 **Analysis/Extraction Date** 2023-05-23 **Analyst** SD **Method** EPA 200.8			
Aluminum	<0.01 mg/L	97	80-120
Arsenic	<0.001 mg/L	88	80-120
Boron (total)	<0.01 mg/L	105	80-120
Barium	<0.01 mg/L	95	80-120
Beryllium	<0.0005 mg/L	105	80-120
Cadmium	<0.0001 mg/L	101	80-120
Cobalt	<0.0002 mg/L	103	80-120
Chromium Total	<0.001 mg/L	107	80-120
Copper	<0.001 mg/L	101	80-120
Iron	<0.03 mg/L	84	80-120
Molybdenum	<0.005 mg/L	78	80-120
Nickel	<0.005 mg/L	103	80-120
Lead	<0.001 mg/L	94	80-120

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Antimony	<0.0005 mg/L	99	80-120
Selenium	<0.001 mg/L	98	80-120
Thallium	<0.0001 mg/L	90	80-120
Uranium	<0.001 mg/L	86	80-120
Vanadium	<0.001 mg/L	111	80-120
W	<0.002 mg/L	106	80-120
Zinc	<0.01 mg/L	105	80-120
Zr	<0.002 mg/L	97	80-120
Run No 442321 **Analysis/Extraction Date** 2023-05-23 **Analyst** SD **Method** EPA 200.8			
Mercury	<0.0001 mg/L	119	80-120
Run No 442322 **Analysis/Extraction Date** 2023-05-23 **Analyst** SD **Method** EPA 200.8			
Silver	<0.0001 mg/L	101	80-120
Run No 442334 **Analysis/Extraction Date** 2023-05-26 **Analyst** SD **Method** EPA 200.8			
Silver	<0.0002 mg/L	105	80-120
Aluminum	<0.02 mg/L	97	80-120
Arsenic	<0.002 mg/L	87	80-120

Guideline = PWQO - Ontario *** = Guideline Exceedence**

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

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

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7
Attention:	M. Aiden Belfrage
PO#:	
Invoice to:	GEI Consultants Inc.

Report Number:	1997225
Date Submitted:	2023-05-18
Date Reported:	2023-05-26
Project:	2100463
COC #:	222055

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Boron (total)	<0.02 mg/L	98	80-120
Barium	<0.02 mg/L	92	80-120
Beryllium	<0.001 mg/L	100	80-120
Cadmium	<0.0002 mg/L	101	80-120
Cobalt	<0.0004 mg/L	99	80-120
Chromium Total	<0.002 mg/L	108	80-120
Copper	<0.002 mg/L	98	80-120
Iron	<0.06 mg/L	103	80-120
Molybdenum	<0.01 mg/L	85	80-120
Nickel	<0.01 mg/L	99	80-120
Lead	<0.002 mg/L	97	80-120
Antimony	<0.001 mg/L	79	80-120
Selenium	<0.002 mg/L	93	80-120
Thallium	<0.0002 mg/L	93	80-120
Uranium	<0.002 mg/L	90	80-120
Vanadium	<0.002 mg/L	110	80-120
W	<0.004 mg/L	92	80-120
Zinc	<0.02 mg/L	100	80-120

Guideline = PWQO - Ontario *** = Guideline Exceedence**

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

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

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7
Attention:	M. Aiden Belfrage
PO#:	
Invoice to:	GEI Consultants Inc.

Report Number:	1997225
Date Submitted:	2023-05-18
Date Reported:	2023-05-26
Project:	2100463
COC #:	222055

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Zr	<0.004 mg/L	87	80-120

Guideline = PWQO - Ontario *** = Guideline Exceedence**

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

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

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7
Attention:	M. Aiden Belfrage
PO#:	
Invoice to:	GEI Consultants Inc.

Report Number:	1997225
Date Submitted:	2023-05-18
Date Reported:	2023-05-26
Project:	2100463
COC #:	222055

Sample Comment Summary

Sample ID: 1687733	BH18	Metals MRLs raised because of matrix interference, sample was diluted.
Sample ID: 1687738	BH18 - F	Metals MRLs raised because of matrix interference, sample was diluted.

Guideline = PWQO - Ontario *** = Guideline Exceedence**

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

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

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7	Report Number:	1997224
		Date Submitted:	2023-05-18
		Date Reported:	2023-05-26
		Project:	2100463
Attention:	M. Aiden Belfrage	COC #:	222055
Invoice to:	GEI Consultants Inc.	Temperature (C):	9
PO#:		Custody Seal:	

Dear Aiden Belfrage:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

Raheleh Zafari, Environmental Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise stated
.

Eurofins Environment Testing Canada Inc. is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at https://directory.cala.ca/

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline or regulatory limits listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official guideline or regulation as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997224
Date Submitted: 2023-05-18
Date Reported: 2023-05-26
Project: 2100463
COC #: 222055

Exceedence Summary

Sample I.D.	Analyte	Result	Units	Criteria

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

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

Certificate of Analysis

Environment Testing

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7	Report Number:	1997224
Attention:	M. Aiden Belfrage	Date Submitted:	2023-05-18
PO#:		Date Reported:	2023-05-26
Invoice to:	GEI Consultants Inc.	Project:	2100463
		COC #:	222055

Guideline = O.Reg 153-T1-Groundwater

Hydrocarbons

				Lab I.D.	1687727	1687728	1687729	1687730	1687731
				Sample Matrix	GW153	GW153	GW153	GW153	GW153
				Sample Type					
				Sample Date	2023-05-18	2023-05-18	2023-05-18	2023-05-18	2023-05-18
				Sampling Time	13:05	11:00	14:00	09:45	15:00
				Sample I.D.	BH5	BH18	BH26	BH33	BH38
Analyte	**Batch No**	**MRL**	**Units**	**Guideline**					
PHC's F1	442316	20	ug/L	STD 420				<20	
	442376	20	ug/L	STD 420	<20	<20	<20		<20
PHC's F1-BTEX	442330	20	ug/L					<20	
	442384	20	ug/L		<20	<20	<20		<20
PHC's F2	442301	20	ug/L	STD 150	<20	<20		<20	<20
	442378	20	ug/L	STD 150			<20		
PHC's F3	442301	50	ug/L	STD 500	<50	<50		<50	<50
	442378	50	ug/L	STD 500			<50		
PHC's F4	442301	50	ug/L	STD 500	<50	<50		<50	<50
	442378	50	ug/L	STD 500			<50		

Volatiles

				Lab I.D.	1687727	1687728	1687729	1687730	1687731
				Sample Matrix	GW153	GW153	GW153	GW153	GW153
				Sample Type					
				Sample Date	2023-05-18	2023-05-18	2023-05-18	2023-05-18	2023-05-18
				Sampling Time	13:05	11:00	14:00	09:45	15:00
				Sample I.D.	BH5	BH18	BH26	BH33	BH38
Analyte	**Batch No**	**MRL**	**Units**	**Guideline**					
Acetone	442316	30	ug/L	STD 2700				<30	
	442376	30	ug/L	STD 2700	<30	<30	<30		<30
Benzene	442316	0.5	ug/L	STD 0.5				<0.5	
	442376	0.5	ug/L	STD 0.5	<0.5	<0.5	<0.5		<0.5
Bromodichloromethane	442316	0.3	ug/L	STD 2				<0.3	
	442376	0.3	ug/L	STD 2	<0.3	<0.3	<0.3		<0.3
Bromoform	442316	0.4	ug/L	STD 5				<0.4	
	442376	0.4	ug/L	STD 5	<0.4	<0.4	<0.4		<0.4
Bromomethane	442316	0.5	ug/L	STD 0.89				<0.5	

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

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

Certificate of Analysis

eurofins | Environment Testing

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997224
Date Submitted: 2023-05-18
Date Reported: 2023-05-26
Project: 2100463
COC #: 222055

Guideline = O.Reg 153-T1-Groundwater

Volatiles

				Lab I.D.	1687727	1687728	1687729	1687730	1687731
				Sample Matrix	GW153	GW153	GW153	GW153	GW153
				Sample Type					
				Sample Date	2023-05-18	2023-05-18	2023-05-18	2023-05-18	2023-05-18
				Sampling Time	13:05	11:00	14:00	09:45	15:00
				Sample I.D.	BH5	BH18	BH26	BH33	BH38
Analyte	Batch No	MRL	Units	Guideline					
Bromomethane	442376	0.5	ug/L	STD 0.89	<0.5	<0.5	<0.5		<0.5
Carbon Tetrachloride	442316	0.2	ug/L	STD 0.2				<0.2	
	442376	0.2	ug/L	STD 0.2	<0.2	<0.2	<0.2		<0.2
Chlorobenzene	442316	0.5	ug/L	STD 0.5				<0.5	
	442376	0.5	ug/L	STD 0.5	<0.5	<0.5	<0.5		<0.5
Chloroform	442316	0.5	ug/L	STD 2				<0.5	
	442376	0.5	ug/L	STD 2	<0.5	<0.5	<0.5		<0.5
Dibromochloromethane	442316	0.3	ug/L	STD 2				<0.3	
	442376	0.3	ug/L	STD 2	<0.3	<0.3	<0.3		<0.3
Dichlorobenzene, 1,2-	442316	0.4	ug/L	STD 0.5				<0.4	
	442376	0.4	ug/L	STD 0.5	<0.4	<0.4	<0.4		<0.4
Dichlorobenzene, 1,3-	442316	0.4	ug/L	STD 0.5				<0.4	
	442376	0.4	ug/L	STD 0.5	<0.4	<0.4	<0.4		<0.4
Dichlorobenzene, 1,4-	442316	0.4	ug/L	STD 0.5				<0.4	
	442376	0.4	ug/L	STD 0.5	<0.4	<0.4	<0.4		<0.4
Dichlorodifluoromethane	442316	0.5	ug/L	STD 590				<0.5	
	442376	0.5	ug/L	STD 590	<0.5	<0.5	<0.5		<0.5
Dichloroethane, 1,1-	442316	0.4	ug/L	STD 0.5				<0.4	
	442376	0.4	ug/L	STD 0.5	<0.4	<0.4	<0.4		<0.4
Dichloroethane, 1,2-	442316	0.5	ug/L	STD 0.5				<0.5	
	442376	0.5	ug/L	STD 0.5	<0.5	<0.5	<0.5		<0.5
Dichloroethylene, 1,1-	442316	0.5	ug/L	STD 0.5				<0.5	
	442376	0.5	ug/L	STD 0.5	<0.5	<0.5	<0.5		<0.5

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

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

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997224
Date Submitted: 2023-05-18
Date Reported: 2023-05-26
Project: 2100463
COC #: 222055

Guideline = O.Reg 153-T1-Groundwater

Volatiles

				Lab I.D.	1687727	1687728	1687729	1687730	1687731
				Sample Matrix	GW153	GW153	GW153	GW153	GW153
				Sample Type					
				Sample Date	2023-05-18	2023-05-18	2023-05-18	2023-05-18	2023-05-18
				Sampling Time	13:05	11:00	14:00	09:45	15:00
				Sample I.D.	BH5	BH18	BH26	BH33	BH38
Analyte	**Batch No**	**MRL**	**Units**	**Guideline**					
Dichloroethylene, 1,2-cis-	442316	0.4	ug/L	STD 1.6				<0.4	
	442376	0.4	ug/L	STD 1.6	<0.4	<0.4	<0.4		<0.4
Dichloroethylene, 1,2-trans-	442316	0.4	ug/L	STD 1.6				<0.4	
	442376	0.4	ug/L	STD 1.6	<0.4	<0.4	<0.4		<0.4
Dichloropropane, 1,2-	442316	0.5	ug/L	STD 0.5				<0.5	
	442376	0.5	ug/L	STD 0.5	<0.5	<0.5	<0.5		<0.5
Dichloropropene,1,3-	442316	0.5	ug/L	STD 0.5				<0.5	
	442376	0.5	ug/L	STD 0.5	<0.5	<0.5	<0.5		<0.5
Dichloropropene,1,3-cis-	442316	0.5	ug/L					<0.5	
	442376	0.5	ug/L		<0.5	<0.5	<0.5		<0.5
Dichloropropene,1,3-trans-	442316	0.5	ug/L					<0.5	
	442376	0.5	ug/L		<0.5	<0.5	<0.5		<0.5
Ethylbenzene	442316	0.5	ug/L	STD 0.5				<0.5	
	442376	0.5	ug/L	STD 0.5	<0.5	<0.5	<0.5		<0.5
Ethylene dibromide	442316	0.2	ug/L	STD 0.2				<0.2	
	442376	0.2	ug/L	STD 0.2	<0.2	<0.2	<0.2		<0.2
Hexane (n)	442316	5	ug/L	STD 5				<5	
	442376	5	ug/L	STD 5	<5	<5	<5		<5
Methyl Ethyl Ketone	442316	2	ug/L	STD 400				<2	
	442376	2	ug/L	STD 400	<2	<2	<2		<2
Methyl Isobutyl Ketone	442316	10	ug/L	STD 640				<10	
	442376	10	ug/L	STD 640	<10	<10	<10		<10
Methyl tert-Butyl Ether (MTBE)	442316	2	ug/L	STD 15				<2	

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

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

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997224
Date Submitted: 2023-05-18
Date Reported: 2023-05-26
Project: 2100463
COC #: 222055

Guideline = O.Reg 153-T1-Groundwater

Volatiles

				Lab I.D.	1687727	1687728	1687729	1687730	1687731
				Sample Matrix	GW153	GW153	GW153	GW153	GW153
				Sample Type					
				Sample Date	2023-05-18	2023-05-18	2023-05-18	2023-05-18	2023-05-18
				Sampling Time	13:05	11:00	14:00	09:45	15:00
				Sample I.D.	BH5	BH18	BH26	BH33	BH38
Analyte	**Batch No**	**MRL**	**Units**	**Guideline**					
Methyl tert-Butyl Ether (MTBE)	442376	2	ug/L	STD 15	<2	<2	<2		<2
Methylene Chloride	442316	4.0	ug/L	STD 5				<4.0	
	442376	4.0	ug/L	STD 5	<4.0	<4.0	<4.0		<4.0
Styrene	442316	0.5	ug/L	STD 0.5				<0.5	
	442376	0.5	ug/L	STD 0.5	<0.5	<0.5	<0.5		<0.5
Tetrachloroethane, 1,1,1,2-	442316	0.5	ug/L	STD 1.1				<0.5	
	442376	0.5	ug/L	STD 1.1	<0.5	<0.5	<0.5		<0.5
Tetrachloroethane, 1,1,2,2-	442316	0.5	ug/L	STD 0.5				<0.5	
	442376	0.5	ug/L	STD 0.5	<0.5	<0.5	<0.5		<0.5
Tetrachloroethylene	442316	0.3	ug/L	STD 0.5				<0.3	
	442376	0.3	ug/L	STD 0.5	<0.3	<0.3	<0.3		<0.3
Toluene	442316	0.4	ug/L	STD 0.8				<0.4	
	442376	0.4	ug/L	STD 0.8	<0.4	<0.4	0.4		<0.4
Trichloroethane, 1,1,1-	442316	0.4	ug/L	STD 0.5				<0.4	
	442376	0.4	ug/L	STD 0.5	<0.4	<0.4	<0.4		<0.4
Trichloroethane, 1,1,2-	442316	0.4	ug/L	STD 0.5				<0.4	
	442376	0.4	ug/L	STD 0.5	<0.4	<0.4	<0.4		<0.4
Trichloroethylene	442316	0.3	ug/L	STD 0.5				<0.3	
	442376	0.3	ug/L	STD 0.5	<0.3	<0.3	<0.3		<0.3
Trichlorofluoromethane	442316	0.5	ug/L	STD 150				<0.5	
	442376	0.5	ug/L	STD 150	<0.5	<0.5	<0.5		<0.5
Vinyl Chloride	442316	0.2	ug/L	STD 0.5				<0.2	
	442376	0.2	ug/L	STD 0.5	<0.2	<0.2	<0.2		<0.2

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

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

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7	Report Number:	1997224
Attention:	M. Aiden Belfrage	Date Submitted:	2023-05-18
PO#:		Date Reported:	2023-05-26
Invoice to:	GEI Consultants Inc.	Project:	2100463
		COC #:	222055

Guideline = O.Reg 153-T1-Groundwater

Volatiles

Analyte	Batch No	MRL	Units	Guideline					
				Lab I.D.	1687727	1687728	1687729	1687730	1687731
				Sample Matrix	GW153	GW153	GW153	GW153	GW153
				Sample Type					
				Sample Date	2023-05-18	2023-05-18	2023-05-18	2023-05-18	2023-05-18
				Sampling Time	13:05	11:00	14:00	09:45	15:00
				Sample I.D.	BH5	BH18	BH26	BH33	BH38
Xylene Mixture	442329	0.5	ug/L	STD 72				<0.5	
	442383	0.5	ug/L	STD 72	<0.5	<0.5	<0.5		<0.5
Xylene, m/p-	442316	0.4	ug/L					<0.4	
	442376	0.4	ug/L		<0.4	<0.4	<0.4		<0.4
Xylene, o-	442316	0.4	ug/L					<0.4	
	442376	0.4	ug/L		<0.4	<0.4	<0.4		<0.4

PHC Surrogate

Analyte	Batch No	MRL	Units	Guideline					
				Lab I.D.	1687727	1687728	1687729	1687730	1687731
				Sample Matrix	GW153	GW153	GW153	GW153	GW153
				Sample Type					
				Sample Date	2023-05-18	2023-05-18	2023-05-18	2023-05-18	2023-05-18
				Sampling Time	13:05	11:00	14:00	09:45	15:00
				Sample I.D.	BH5	BH18	BH26	BH33	BH38
Alpha-androstrane	442301	0	%		110	112		81	103
	442378	0	%				85		

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

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

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997224
Date Submitted: 2023-05-18
Date Reported: 2023-05-26
Project: 2100463
COC #: 222055

Guideline = O.Reg 153-T1-Groundwater

VOCs Surrogates

Analyte	Batch No	MRL	Units	Guideline	1687727	1687728	1687729	1687730	1687731
Lab I.D.					1687727	1687728	1687729	1687730	1687731
Sample Matrix					GW153	GW153	GW153	GW153	GW153
Sample Type									
Sample Date					2023-05-18	2023-05-18	2023-05-18	2023-05-18	2023-05-18
Sampling Time					13:05	11:00	14:00	09:45	15:00
Sample I.D.					BH5	BH18	BH26	BH33	BH38
1,2-dichloroethane-d4	442316	0	%					107	
	442376	0	%		92	95	94		94
4-bromofluorobenzene	442316	0	%					80	
	442376	0	%		80	78	77		80
Toluene-d8	442316	0	%					98	
	442376	0	%		94	93	94		92

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

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

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997224
Date Submitted: 2023-05-18
Date Reported: 2023-05-26
Project: 2100463
COC #: 222055

Quality Assurance Summary

Batch No	Analyte	Blank	QC % Rec	QC Limits	Spike % Rec	Spike Limits	Dup % RPD	Duplicate Limits
442301	PHC's F2	<20 ug/L	96	60-140		60-140		0-30
442301	PHC's F3	<50 ug/L	96	60-140		60-140		0-30
442301	PHC's F4	<50 ug/L	96	60-140		60-140		0-30
442316	Tetrachloroethane, 1,1,1,2-	<0.5 ug/L	88	60-130	109	50-140	0	0-30
442316	Trichloroethane, 1,1,1-	<0.4 ug/L	81	60-130	113	50-140	0	0-30
442316	Tetrachloroethane, 1,1,2,2-	<0.5 ug/L	109	60-130	110	50-140	0	0-30
442316	Trichloroethane, 1,1,2-	<0.4 ug/L	87	60-130	107	50-140	0	0-30
442316	Dichloroethane, 1,1-	<0.4 ug/L	102	60-130	119	50-140	0	0-30
442316	Dichloroethylene, 1,1-	<0.5 ug/L	91	60-130	112	50-140	0	0-30
442316	Dichlorobenzene, 1,2-	<0.4 ug/L	104	60-130	102	50-140	0	0-30
442316	Dichloroethane, 1,2-	<0.5 ug/L	82	60-130	124	50-140	0	0-30
442316	Dichloropropane, 1,2-	<0.5 ug/L	82	60-130	120	50-140	0	0-30
442316	Dichlorobenzene, 1,3-	<0.4 ug/L	100	60-130	101	50-140	0	0-30
442316	Dichloropropene,1,3-							
442316	Dichlorobenzene, 1,4-	<0.4 ug/L	100	60-130	101	50-140	0	0-30
442316	Acetone	<30 ug/L		60-130	71	50-140	0	0-30
442316	Benzene	<0.5 ug/L	84	60-130	120	50-140	0	0-30
442316	Bromodichloromethane	<0.3 ug/L	102	60-130	121	50-140	0	0-30
442316	Bromoform	<0.4 ug/L	84	60-130	101	50-140	0	0-30
442316	Bromomethane	<0.5 ug/L	101	60-130	112	50-140	0	0-30
442316	Dichloroethylene, 1,2-cis-	<0.4 ug/L	110	60-130	119	50-140	0	0-30
442316	Dichloropropene,1,3-cis-	<0.5 ug/L	102	60-130	112	50-140	0	0-30
442316	Carbon Tetrachloride	<0.2 ug/L	83	60-130	113	50-140	0	0-30
442316	Chloroform	<0.5 ug/L	103	60-130	119	50-140	0	0-30
442316	Dibromochloromethane	<0.3 ug/L	83	60-130	103	50-140	0	0-30
442316	Dichlorodifluoromethane	<0.5 ug/L	92	60-130	101	50-140	0	0-30
442316	Methylene Chloride	<4.0 ug/L	107	60-130	103	50-140	0	0-30
442316	Ethylbenzene	<0.5 ug/L	80	60-130	112	50-140	0	0-30
442316	Ethylene dibromide	<0.2 ug/L	89	60-130	100	50-140	0	0-30
442316	PHC's F1	<20 ug/L	96	60-140	100	60-140	0	0-30
442316	Hexane (n)	<5 ug/L	100	60-130	107	50-140	0	0-30
442316	Xylene, m/p-	<0.4 ug/L	102	60-130	112	50-140	0	0-30

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

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

Quality Assurance Summary

Batch No	Analyte	Blank	QC % Rec	QC Limits	Spike % Rec	Spike Limits	Dup % RPD	Duplicate Limits
442316	Methyl Ethyl Ketone	<2 ug/L	120	60-130	121	50-140	0	0-30
442316	Methyl Isobutyl Ketone	<10 ug/L	100	60-130	107	50-140	0	0-30
442316	Methyl tert-Butyl Ether (MTBE)	<2 ug/L	100	60-130	114	50-140	0	0-30
442316	Chlorobenzene	<0.5 ug/L	83	60-130	109	50-140	0	0-30
442316	Xylene, o-	<0.4 ug/L	102	60-130	113	50-140	0	0-30
442316	Styrene	<0.5 ug/L	99	60-130	111	50-140	0	0-30
442316	Dichloroethylene, 1,2-trans-	<0.4 ug/L	103	60-130	118	50-140	0	0-30
442316	Dichloropropene,1,3-trans-	<0.5 ug/L	96	60-130	111	50-140	0	0-30
442316	Tetrachloroethylene	<0.3 ug/L	110	60-130	112	50-140	0	0-30
442316	Toluene	<0.4 ug/L	108	60-130	125	50-140	0	0-30
442316	Trichloroethylene	<0.3 ug/L	99	60-130	112	50-140	0	0-30
442316	Trichlorofluoromethane	<0.5 ug/L	110	60-130	105	50-140	0	0-30
442316	Vinyl Chloride	<0.2 ug/L	99	60-130	111	50-140	0	0-30
442329	Xylene Mixture							
442330	PHC's F1-BTEX							
442376	Tetrachloroethane, 1,1,1,2-	<0.5 ug/L	88	60-130	109	50-140	0	0-30
442376	Trichloroethane, 1,1,1-	<0.4 ug/L	81	60-130	113	50-140	0	0-30
442376	Tetrachloroethane, 1,1,2,2-	<0.5 ug/L	109	60-130	110	50-140	0	0-30
442376	Trichloroethane, 1,1,2-	<0.4 ug/L	87	60-130	107	50-140	0	0-30
442376	Dichloroethane, 1,1-	<0.4 ug/L	102	60-130	119	50-140	0	0-30
442376	Dichloroethylene, 1,1-	<0.5 ug/L	91	60-130	112	50-140	0	0-30
442376	Dichlorobenzene, 1,2-	<0.4 ug/L	104	60-130	102	50-140	0	0-30
442376	Dichloroethane, 1,2-	<0.5 ug/L	82	60-130	124	50-140	0	0-30
442376	Dichloropropane, 1,2-	<0.5 ug/L	82	60-130	120	50-140	0	0-30
442376	Dichlorobenzene, 1,3-	<0.4 ug/L	100	60-130	101	50-140	0	0-30
442376	Dichloropropene,1,3-							
442376	Dichlorobenzene, 1,4-	<0.4 ug/L	100	60-130	101	50-140	0	0-30
442376	Acetone	<30 ug/L		60-130	71	50-140	0	0-30
442376	Benzene	<0.5 ug/L	84	60-130	120	50-140	0	0-30
442376	Bromodichloromethane	<0.3 ug/L	102	60-130	121	50-140	0	0-30
442376	Bromoform	<0.4 ug/L	84	60-130	101	50-140	0	0-30
442376	Bromomethane	<0.5 ug/L	101	60-130	112	50-140	0	0-30
442376	Dichloroethylene, 1,2-cis-	<0.4 ug/L	110	60-130	119	50-140	0	0-30

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

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

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7	Report Number:	1997224
		Date Submitted:	2023-05-18
		Date Reported:	2023-05-26
		Project:	2100463
		COC #:	222055
Attention:	M. Aiden Belfrage		
PO#:			
Invoice to:	GEI Consultants Inc.		

Quality Assurance Summary

Batch No	Analyte	Blank	QC % Rec	QC Limits	Spike % Rec	Spike Limits	Dup % RPD	Duplicate Limits
442376	Dichloropropene,1,3-cis-	<0.5 ug/L	102	60-130	112	50-140	0	0-30
442376	Carbon Tetrachloride	<0.2 ug/L	83	60-130	113	50-140	0	0-30
442376	Chloroform	<0.5 ug/L	103	60-130	119	50-140	0	0-30
442376	Dibromochloromethane	<0.3 ug/L	83	60-130	103	50-140	0	0-30
442376	Dichlorodifluoromethane	<0.5 ug/L	92	60-130	101	50-140	0	0-30
442376	Methylene Chloride	<4.0 ug/L	107	60-130	103	50-140	0	0-30
442376	Ethylbenzene	<0.5 ug/L	80	60-130	112	50-140	0	0-30
442376	Ethylene dibromide	<0.2 ug/L	89	60-130	100	50-140	0	0-30
442376	PHC's F1	<20 ug/L	94	60-140	87	60-140	0	0-30
442376	Hexane (n)	<5 ug/L	100	60-130	107	50-140	0	0-30
442376	Xylene, m/p-	<0.4 ug/L	102	60-130	112	50-140	0	0-30
442376	Methyl Ethyl Ketone	<2 ug/L	120	60-130	121	50-140	0	0-30
442376	Methyl Isobutyl Ketone	<10 ug/L	100	60-130	107	50-140	0	0-30
442376	Methyl tert-Butyl Ether (MTBE)	<2 ug/L	100	60-130	114	50-140	0	0-30
442376	Chlorobenzene	<0.5 ug/L	83	60-130	109	50-140	0	0-30
442376	Xylene, o-	<0.4 ug/L	102	60-130	113	50-140	0	0-30
442376	Styrene	<0.5 ug/L	99	60-130	111	50-140	0	0-30
442376	Dichloroethylene, 1,2-trans-	<0.4 ug/L	103	60-130	118	50-140	0	0-30
442376	Dichloropropene,1,3-trans-	<0.5 ug/L	96	60-130	111	50-140	0	0-30
442376	Tetrachloroethylene	<0.3 ug/L	110	60-130	112	50-140	0	0-30
442376	Toluene	<0.4 ug/L	108	60-130	125	50-140	0	0-30
442376	Trichloroethylene	<0.3 ug/L	99	60-130	112	50-140	0	0-30
442376	Trichlorofluoromethane	<0.5 ug/L	110	60-130	105	50-140	0	0-30
442376	Vinyl Chloride	<0.2 ug/L	99	60-130	111	50-140	0	0-30
442378	PHC's F2	<20 ug/L	100	60-140		60-140		0-30
442378	PHC's F3	<50 ug/L	100	60-140		60-140		0-30
442378	PHC's F4	<50 ug/L	100	60-140		60-140		0-30
442383	Xylene Mixture							
442384	PHC's F1-BTEX							

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

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

Test Summary

Batch No	Analyte	Instrument	Prep aration Date	Analysis Date	Analyst	Method
442301	PHC's F2	GC/FID	2023-05-25	2023-05-25	SS	CCME O.Reg 153/04
442301	PHC's F3	GC/FID	2023-05-25	2023-05-25	SS	CCME O.Reg 153/04
442301	PHC's F4	GC/FID	2023-05-25	2023-05-25	SS	CCME O.Reg 153/04
442316	Tetrachloroethane, 1,1,1,2-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Trichloroethane, 1,1,1-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Tetrachloroethane, 1,1,2,2-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Trichloroethane, 1,1,2-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dichloroethane, 1,1-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dichloroethylene, 1,1-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dichlorobenzene, 1,2-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dichloroethane, 1,2-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dichloropropane, 1,2-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dichlorobenzene, 1,3-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dichloropropene,1,3-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dichlorobenzene, 1,4-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Acetone	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Benzene	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Bromodichloromethane	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Bromoform	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Bromomethane	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dichloroethylene, 1,2-cis-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dichloropropene,1,3-cis-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Carbon Tetrachloride	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Chloroform	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dibromochloromethane	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dichlorodifluoromethane	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Methylene Chloride	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Ethylbenzene	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Ethylene dibromide	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	PHC's F1	GC/FID	2023-05-24	2023-05-24	PJ	CCME O.Reg 153/04
442316	Hexane (n)	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Xylene, m/p-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7
Attention:	M. Aiden Belfrage
PO#:	
Invoice to:	GEI Consultants Inc.

Report Number:	1997224
Date Submitted:	2023-05-18
Date Reported:	2023-05-26
Project:	2100463
COC #:	222055

Test Summary

Batch No	Analyte	Instrument	Prep aration Date	Analysis Date	Analyst	Method
442316	Methyl Ethyl Ketone	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Methyl Isobutyl Ketone	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Methyl tert-Butyl Ether (MTBE)	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Chlorobenzene	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Xylene, o-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Styrene	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dichloroethylene, 1,2-trans-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Dichloropropene,1,3-trans-	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Tetrachloroethylene	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Toluene	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Trichloroethylene	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Trichlorofluoromethane	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442316	Vinyl Chloride	GC-MS	2023-05-24	2023-05-24	PJ	EPA 8260
442329	Xylene Mixture	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442330	PHC's F1-BTEX	GC/FID	2023-05-25	2023-05-25	PJ	CCME O.Reg 153/04
442376	Tetrachloroethane, 1,1,1,2-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Trichloroethane, 1,1,1-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Tetrachloroethane, 1,1,2,2-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Trichloroethane, 1,1,2-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichloroethane, 1,1-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichloroethylene, 1,1-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichlorobenzene, 1,2-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichloroethane, 1,2-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichloropropane, 1,2-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichlorobenzene, 1,3-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichloropropene,1,3-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichlorobenzene, 1,4-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Acetone	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Benzene	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Bromodichloromethane	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Bromoform	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Bromomethane	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichloroethylene, 1,2-cis-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997224
Date Submitted: 2023-05-18
Date Reported: 2023-05-26
Project: 2100463
COC #: 222055

Test Summary

Batch No	Analyte	Instrument	Prep aration Date	Analysis Date	Analyst	Method
442376	Dichloropropene,1,3-cis-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Carbon Tetrachloride	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Chloroform	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dibromochloromethane	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichlorodifluoromethane	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Methylene Chloride	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Ethylbenzene	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Ethylene dibromide	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	PHC's F1	GC/FID	2023-05-25	2023-05-25	PJ	CCME O.Reg 153/04
442376	Hexane (n)	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Xylene, m/p-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Methyl Ethyl Ketone	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Methyl Isobutyl Ketone	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Methyl tert-Butyl Ether (MTBE)	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Chlorobenzene	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Xylene, o-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Styrene	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichloroethylene, 1,2-trans-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichloropropene,1,3-trans-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Tetrachloroethylene	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Toluene	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Trichloroethylene	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Trichlorofluoromethane	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Vinyl Chloride	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442378	PHC's F2	GC/FID	2023-05-26	2023-05-26	SS	CCME O.Reg 153/04
442378	PHC's F3	GC/FID	2023-05-26	2023-05-26	SS	CCME O.Reg 153/04
442378	PHC's F4	GC/FID	2023-05-26	2023-05-26	SS	CCME O.Reg 153/04
442383	Xylene Mixture	GC-MS	2023-05-26	2023-05-26	PJ	EPA 8260
442384	PHC's F1-BTEX	GC/FID	2023-05-26	2023-05-26	PJ	CCME O.Reg 153/04

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

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

---

CWS for Petroleum Hydrocarbons in Soil - Tier 1

Notes:

1. The laboratory method complies with CCME Tier 1 reference method for PHC in soil. It is validated for laboratory use.
2. Where the F1 fraction (C6 to C10) and BTEX are both measured, F1-BTEX is reported.
3. Where the F2 fraction (C10 to C16) and naphthalene are both measured, F2-naphthalene is reported.
4. Where the F3 fraction (C16 to C34) and PAHs* are both measured, F3-PAH is reported.
5. F4G is analyzed if the chromatogram does not descend to baseline before C50. Where F4 (C34 to C50) and F4G are both reported, the higher result is compared to the standard.
6. Unless otherwise stated in the sample comments, the following criteria have been met where applicable:

   - nC6 and nC10 response factors within 30% of response factor for toluene;
   - nC10, nC16, and nC34 response factors within 10% of each other;
   - C50 response factors within 70% of nC10 + nC16 + nC34 average; and,
   - Linearity is within 15%.

7. Unless otherwise stated in the sample comments, sampling requirements and analytical holding times have been met.
8. Gravimetric heavy hydrocarbons (F4G) cannot be added to the C6 and C50 hydrocarbons.
9. *PAHs = phenanthrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene and pyrene.

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

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7	Report Number:	1997226
		Date Submitted:	2023-05-18
		Date Reported:	2023-06-08
		Project:	2100463
		COC #:	222055
Attention:	M. Aiden Belfrage		
PO#:			
Invoice to:	GEI Consultants Inc.		

Dear Aiden Belfrage:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: ______________________________

Raheleh Zafari, Environmental Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: https://directory.cala.ca/.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997226
Date Submitted: 2023-05-18
Date Reported: 2023-06-08
Project: 2100463
COC #: 222055

				Lab I.D.	1687742	1687743
				Sample Matrix	STRM W	STRM W
				Sample Type		
				Sampling Date	2023-05-18	2023-05-18
				Sample I.D.	BH5	BH26
Group	**Analyte**	**MRL**	**Units**	**Guideline**		
Anions	F	0.10	mg/L		0.18	0.11
	SO4	1	mg/L		256	105
General Chemistry	BOD5	1	mg/L	MAC 15	1	1
	Cyanide (total)	0.005	mg/L	MAC 0.02	<0.005	<0.005
	pH	1.00		6.0-9.0	7.79	7.82
	Phenols	0.002	mg/L	MAC 0.008	<0.002	<0.002
	Total Suspended Solids	2	mg/L	MAC 15	36*	8
Metals	Ag	0.0001	mg/L	MAC 0.12	<0.0001	<0.0001
	Al	0.01	mg/L		0.06	0.03
	As	0.001	mg/L	MAC 0.02	<0.001	<0.001
	Cd	0.0001	mg/L	MAC 0.008	<0.0001	<0.0001
	Co	0.0002	mg/L		0.0016	0.0014
	Cr	0.001	mg/L	MAC 0.08	<0.001	<0.001
	Cu	0.001	mg/L	MAC 0.05	<0.001	<0.001
	Hg	0.0001	mg/L	MAC 0.0004	<0.0001	<0.0001
	Mn	0.01	mg/L	MAC 0.05	0.16*	0.11*
	Mo	0.005	mg/L		<0.005	<0.005
	Ni	0.005	mg/L	MAC 0.08	<0.005	<0.005
	Pb	0.001	mg/L	MAC 0.12	<0.001	<0.001
	Sb	0.0005	mg/L		<0.0005	<0.0005
	Se	0.001	mg/L	MAC 0.02	0.001	<0.001
	Sn	0.01	mg/L		<0.01	<0.01
	Ti	0.01	mg/L		<0.01	<0.01
	Zn	0.01	mg/L	MAC 0.04	<0.01	<0.01
Microbiology	Escherichia Coli	0	ct/100mL	MAC 200	0	0

Guideline = Storm Sewer - Peel

*** = Guideline Exceedence**

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

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

eurofins | Environment Testing

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997226
Date Submitted: 2023-05-18
Date Reported: 2023-06-08
Project: 2100463
COC #: 222055

				Lab I.D.	1687742	1687743
				Sample Matrix	STRM W	STRM W
				Sample Type		
				Sampling Date	2023-05-18	2023-05-18
				Sample I.D.	BH5	BH26
Group	**Analyte**	**MRL**	**Units**	**Guideline**		
Nutrients	Total Kjeldahl Nitrogen	0.100	mg/L	MAC 1	0.285	0.192
	Total P	0.020	mg/L	MAC 0.4	<0.020	<0.020
Oil and Grease	Oil & Grease - Mineral	1	mg/L		<1	<1
	Oil & Grease - Non-mineral	1	mg/L		<1	<1
	Oil & Grease - Total	1	mg/L		<1	<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L	MAC 0.4	<0.1	<0.1
Semi-Volatiles	1,2-dichlorobenzene	0.2	ug/L	MAC 5.6	<0.2	<0.2
	1,4-dichlorobenzene	0.4	ug/L	MAC 6.8	<0.4	<0.4
	Bis(2-ethylhexyl)phthalate	0.4	ug/L	MAC 8.8	<0.4	<0.4
	Di-n-butylphthalate	1.3	ug/L	MAC 15.0	<1.3	<1.3
Subcontract	Nonylphenol Ethoxalate (Total)	10	ug/L		<10	<10
	Nonylphenols (Total)	1	ug/L		<1	<1
VOCs Surrogates	1,2-dichloroethane-d4	0	%		96	93
	4-bromofluorobenzene	0	%		78	78
	Toluene-d8	0	%		92	92
Volatiles	1,1,2,2-tetrachloroethane	0.5	ug/L	MAC 17	<0.5	<0.5
	Benzene	0.5	ug/L	MAC 2.0	<0.5	<0.5
	c-1,2-Dichloroethylene	0.4	ug/L	MAC 5.6	<0.4	<0.4
	Chloroform	0.5	ug/L	MAC 2.0	<0.5	<0.5
	Dichloromethane	4.0	ug/L	MAC 5.2	<4.0	<4.0
	Ethylbenzene	0.5	ug/L	MAC 2.0	<0.5	<0.5
	m/p-xylene	0.4	ug/L		<0.4	<0.4
	Methyl Ethyl Ketone (MEK)	2	ug/L		<2	<2
	o-xylene	0.4	ug/L		<0.4	<0.4
	Styrene	0.5	ug/L		<0.5	<0.5

Guideline = Storm Sewer - Peel

*** = Guideline Exceedence**

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

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

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7	Report Number:	1997226
Attention:	M. Aiden Belfrage	Date Submitted:	2023-05-18
PO#:		Date Reported:	2023-06-08
Invoice to:	GEI Consultants Inc.	Project:	2100463
		COC #:	222055

				Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1687742 STRM W 2023-05-18 BH5	1687743 STRM W 2023-05-18 BH26
Group	**Analyte**	**MRL**	**Units**	**Guideline**		
Volatiles	t-1,3-Dichloropropylene	0.5	ug/L	MAC 5.6	<0.5	<0.5
	Tetrachloroethylene	0.3	ug/L	MAC 4.4	<0.3	<0.3
	Toluene	0.4	ug/L	MAC 2.0	<0.4	0.4
	Trichloroethylene	0.3	ug/L	MAC 8.0	<0.3	<0.3
	Xylene; total	0.5	ug/L	MAC 4.4	<0.5	<0.5

Guideline = Storm Sewer - Peel

*** = Guideline Exceedence**

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

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

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 439934 **Analysis/Extraction Date** 2023-05-23 **Analyst** C M **Method** B 625/P 8270			
Dichlorobenzene, 1,2-	<0.2 ug/L	74	20-140
Dichlorobenzene, 1,4-	<0.4 ug/L	68	20-140
Bis(2-ethylhexyl)phthalate	<0.4 ug/L	84	20-140
Di-n-butylphthalate	<1.3 ug/L	96	20-140
Run No 442126 **Analysis/Extraction Date** 2023-05-24 **Analyst** M E **Method** SM 5210B			
BOD5	<1 mg/L	98	75-125
Run No 442139 **Analysis/Extraction Date** 2023-05-24 **Analyst** SKH **Method** C SM2540			
Total Suspended Solids	<2 mg/L	98	90-110
Run No 442169 **Analysis/Extraction Date** 2023-05-23 **Analyst** R G **Method** EPA 8081B			
Polychlorinated Biphenyls	<0.1 ug/L	91	60-140
Run No 442182 **Analysis/Extraction Date** 2023-05-23 **Analyst** SD **Method** EPA 200.8			
Aluminum	<0.01 mg/L	97	80-120
Arsenic	<0.001 mg/L	88	80-120

Guideline = Storm Sewer - Peel

*** = Guideline Exceedence**

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

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

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7		Report Number:	1997226
Attention:	M. Aiden Belfrage		Date Submitted:	2023-05-18
PO#:			Date Reported:	2023-06-08
Invoice to:	GEI Consultants Inc.		Project:	2100463
			COC #:	222055

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Cadmium	<0.0001 mg/L	101	80-120
Cobalt	<0.0002 mg/L	103	80-120
Chromium Total	<0.001 mg/L	107	80-120
Copper	<0.001 mg/L	101	80-120
Manganese	<0.01 mg/L	105	80-120
Molybdenum	<0.005 mg/L	78	80-120
Nickel	<0.005 mg/L	103	80-120
Lead	<0.001 mg/L	94	80-120
Antimony	<0.0005 mg/L	99	80-120
Selenium	<0.001 mg/L	98	80-120
Sn	<0.01 mg/L	85	80-120
Titanium	<0.01 mg/L	87	80-120
Zinc	<0.01 mg/L	105	80-120
Run No 442201 **Analysis/Extraction Date** 2023-05-24 **Analyst** SKH **Method** EPA 351.2			
Total Kjeldahl Nitrogen	<0.100 mg/L	112	70-130
Run No 442269 **Analysis/Extraction Date** 2023-05-24 **Analyst** Z S **Method** SM4500-CNC/MOE E3015			

Guideline = Storm Sewer - Peel

*** = Guideline Exceedence**

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

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

Certificate of Analysis

eurofins | Environment Testing

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997226
Date Submitted: 2023-05-18
Date Reported: 2023-06-08
Project: 2100463
COC #: 222055

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Cyanide (total)	<0.005 mg/L	82	61-139
Run No 442283 **Analysis/Extraction Date** 2023-05-24 **Analyst** AsA			
Method SM2320,2510,4500H/F			
F	<0.10 mg/L	101	90-110
pH		100	90-110
Run No 442294 **Analysis/Extraction Date** 2023-05-25 **Analyst** R G			
Method SM 5520B/F			
Oil & Grease - Mineral	<1 mg/L	120	70-130
Oil & Grease - Non-mineral	<1 mg/L		70-130
Oil & Grease - Total	<1 mg/L	115	70-130
Run No 442321 **Analysis/Extraction Date** 2023-05-23 **Analyst** SD			
Method EPA 200.8			
Mercury	<0.0001 mg/L	119	80-120
Run No 442322 **Analysis/Extraction Date** 2023-05-23 **Analyst** SD			
Method EPA 200.8			
Silver	<0.0001 mg/L	101	80-120
Run No 442324 **Analysis/Extraction Date** 2023-05-25 **Analyst** IP			
Method SM5530D/EPA420.2			
Phenols	<0.002 mg/L	105	50-120

Guideline = Storm Sewer - Peel

*** = Guideline Exceedence**

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

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

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997226
Date Submitted: 2023-05-18
Date Reported: 2023-06-08
Project: 2100463
COC #: 222055

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 442331 **Analysis/Extraction Date** 2023-05-25 **Method** EPA 365.1	**Analyst** SKH		
Total P	<0.020 mg/L	106	80-120
Run No 442376 **Analysis/Extraction Date** 2023-05-25 **Method** EPA 8260	**Analyst** PJ		
Tetrachloroethane, 1,1,2,2-	<0.5 ug/L	109	60-130
Benzene	<0.5 ug/L	84	60-130
Dichloroethylene, 1,2-cis-	<0.4 ug/L	110	60-130
Chloroform	<0.5 ug/L	103	60-130
Methylene Chloride	<4.0 ug/L	107	60-130
Ethylbenzene	<0.5 ug/L	80	60-130
m/p-xylene	<0.4 ug/L	102	60-130
Methyl Ethyl Ketone	<2 ug/L	120	60-130
o-xylene	<0.4 ug/L	102	60-130
Styrene	<0.5 ug/L	99	60-130
Dichloropropene,1,3-trans-	<0.5 ug/L	96	60-130
Tetrachloroethylene	<0.3 ug/L	110	60-130
Toluene	<0.4 ug/L	108	60-130

Guideline = Storm Sewer - Peel

*** = Guideline Exceedence**

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

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

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997226
Date Submitted: 2023-05-18
Date Reported: 2023-06-08
Project: 2100463
COC #: 222055

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Trichloroethylene	<0.3 ug/L	99	60-130
Run No 442383 **Analysis/Extraction Date** 2023-05-26 **Analyst** PJ **Method** EPA 8260			
Xylene Mixture			
Run No 442400 **Analysis/Extraction Date** 2023-05-26 **Analyst** AaN **Method** SM 4110			
SO4	<1 mg/L	100	90-110
Run No 442809 **Analysis/Extraction Date** 2023-06-02 **Analyst** QL **Method** SUBCONTRACT-SGS			
Nonylphenol Ethoxalate (Total)	<10 ug/L		
Nonylphenols (Total)	<1 ug/L		
Run No 442992 **Analysis/Extraction Date** 2023-06-08 **Analyst** DRA **Method** AMBCOLM1			
Escherichia Coli			

Guideline = Storm Sewer - Peel

*** = Guideline Exceedence**

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

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

Sample Comment Summary

Sample ID: 1687742	BH5	Bacteria sample was taken on June 6th at 13:30hs
Sample ID: 1687743	BH26	Bacteria sample was taken on June 6th at 14:40hs

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7	Report Number:	1997226
		Date Submitted:	2023-05-18
		Date Reported:	2023-06-08
		Project:	2100463
Attention:	M. Aiden Belfrage	COC #:	222055
Invoice to:	GEI Consultants Inc.	Temperature (C):	9
PO#:		Custody Seal:	

Dear Aiden Belfrage:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Sample Comment Summary

Sample ID: 1687742	BH5	Bacteria sample was taken on June 6th at 13:30hs
Sample ID: 1687743	BH26	Bacteria sample was taken on June 6th at 14:40hs

Report Comments:

Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise stated
.

Eurofins Environment Testing Canada Inc. is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at https://directory.cala.ca/

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline or regulatory limits listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official guideline or regulation as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7	Report Number:	1997226
Attention:	M. Aiden Belfrage	Date Submitted:	2023-05-18
PO#:		Date Reported:	2023-06-08
Invoice to:	GEI Consultants Inc.	Project:	2100463
		COC #:	222055

Exceedence Summary

Sample I.D.	Analyte	Result	Units	Criteria

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

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

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997226
Date Submitted: 2023-05-18
Date Reported: 2023-06-08
Project: 2100463
COC #: 222055

Guideline = Sanitary Sewer - Peel

Metals

				Lab I.D.	1687742	1687743
				Sample Matrix	STRM W	STRM W
				Sample Type		
				Sample Date	2023-05-18	2023-05-18
				Sampling Time	13:05	14:00
				Sample I.D.	BH5	BH26
Analyte	**Batch No**	**MRL**	**Units**	**Guideline**		
Aluminum	442182	0.01	mg/L	MAC 50	0.06	0.03
Antimony	442182	0.0005	mg/L	MAC 5	<0.0005	<0.0005
Arsenic	442182	0.001	mg/L	MAC 1	<0.001	<0.001
Cadmium	442182	0.0001	mg/L	MAC 0.7	<0.0001	<0.0001
Chromium Total	442182	0.001	mg/L	MAC 5	<0.001	<0.001
Cobalt	442182	0.0002	mg/L	MAC 5	0.0016	0.0014
Copper	442182	0.001	mg/L	MAC 3	<0.001	<0.001
Lead	442182	0.001	mg/L	MAC 3	<0.001	<0.001
Manganese	442182	0.01	mg/L	MAC 5	0.16	0.11
Mercury	442321	0.0001	mg/L	MAC 0.01	<0.0001	<0.0001
Molybdenum	442182	0.005	mg/L	MAC 5	<0.005	<0.005
Nickel	442182	0.005	mg/L	MAC 3	<0.005	<0.005
Selenium	442182	0.001	mg/L	MAC 1	0.001	<0.001
Silver	442322	0.0001	mg/L	MAC 5	<0.0001	<0.0001
Tin	442182	0.01	mg/L	MAC 5	<0.01	<0.01
Titanium	442182	0.01	mg/L	MAC 5	<0.01	<0.01
Zinc	442182	0.01	mg/L	MAC 3	<0.01	<0.01

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

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

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997226
Date Submitted: 2023-05-18
Date Reported: 2023-06-08
Project: 2100463
COC #: 222055

Guideline = Sanitary Sewer - Peel

Microbiology

Analyte	Batch No	MRL	Units	Guideline	1687742	1687743
Lab I.D.					1687742	1687743
Sample Matrix					STRM W	STRM W
Sample Type						
Sample Date					2023-05-18	2023-05-18
Sampling Time					13:05	14:00
Sample I.D.					BH5	BH26
Escherichia Coli	442992	0	ct/100mL		0	0

Oil and Grease

Analyte	Batch No	MRL	Units	Guideline	1687742	1687743
Lab I.D.					1687742	1687743
Sample Matrix					STRM W	STRM W
Sample Type						
Sample Date					2023-05-18	2023-05-18
Sampling Time					13:05	14:00
Sample I.D.					BH5	BH26
Oil & Grease - Mineral	442294	1	mg/L	MAC 15	<1	<1
Oil & Grease - Non-mineral	442294	1	mg/L	MAC 150	<1	<1
Oil & Grease - Total	442294	1	mg/L		<1	<1

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

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

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997226
Date Submitted: 2023-05-18
Date Reported: 2023-06-08
Project: 2100463
COC #: 222055

Guideline = Sanitary Sewer - Peel

Others

Analyte	Batch No	MRL	Units	Guideline	1687742	1687743
Sample Matrix					STRM W	STRM W
Sample Type						
Sample Date					2023-05-18	2023-05-18
Sampling Time					13:05	14:00
Sample I.D.					BH5	BH26
Total Kjeldahl Nitrogen	442201	0.100	mg/L	MAC 100	0.285	0.192
Total P	442331	0.020	mg/L	MAC 10	<0.020	<0.020

Subcontract

Analyte	Batch No	MRL	Units	Guideline	1687742	1687743
Sample Matrix					STRM W	STRM W
Sample Type						
Sample Date					2023-05-18	2023-05-18
Sampling Time					13:05	14:00
Sample I.D.					BH5	BH26
Nonylphenol Ethoxalate (Total)	442809	10	ug/L	MAC 200	<10	<10
Nonylphenols (Total)	442809	1	ug/L	MAC 20	<1	<1

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

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

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997226
Date Submitted: 2023-05-18
Date Reported: 2023-06-08
Project: 2100463
COC #: 222055

Guideline = Sanitary Sewer - Peel

Volatiles

Analyte	Batch No	MRL	Units	Guideline	1687742	1687743
Lab I.D.					1687742	1687743
Sample Matrix					STRM W	STRM W
Sample Type						
Sample Date					2023-05-18	2023-05-18
Sampling Time					13:05	14:00
Sample I.D.					BH5	BH26
Benzene	442376	0.5	ug/L	MAC 10	<0.5	<0.5
Chloroform	442376	0.5	ug/L	MAC 40	<0.5	<0.5
Dichloroethylene, 1,2-cis-	442376	0.4	ug/L	MAC 4000	<0.4	<0.4
Dichloropropene,1,3-trans-	442376	0.5	ug/L	MAC 140	<0.5	<0.5
Ethylbenzene	442376	0.5	ug/L	MAC 160	<0.5	<0.5
Methyl Ethyl Ketone	442376	2	ug/L	MAC 8000	<2	<2
Methylene Chloride	442376	4.0	ug/L	MAC 2000	<4.0	<4.0
Styrene	442376	0.5	ug/L	MAC 200	<0.5	<0.5
Tetrachloroethane, 1,1,2,2-	442376	0.5	ug/L	MAC 1400	<0.5	<0.5
Tetrachloroethylene	442376	0.3	ug/L	MAC 1000	<0.3	<0.3
Toluene	442376	0.4	ug/L	MAC 270	<0.4	0.4
Trichloroethylene	442376	0.3	ug/L	MAC 400	<0.3	<0.3
Xylene Mixture	442383	0.5	ug/L	MAC 1400	<0.5	<0.5
Xylene, m/p-	442376	0.4	ug/L		<0.4	<0.4
Xylene, o-	442376	0.4	ug/L		<0.4	<0.4

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

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

eurofins | Environment Testing

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7
Attention:	M. Aiden Belfrage
PO#:	
Invoice to:	GEI Consultants Inc.

Report Number:	1997226
Date Submitted:	2023-05-18
Date Reported:	2023-06-08
Project:	2100463
COC #:	222055

Guideline = Sanitary Sewer - Peel

Inorganics

				Lab I.D.	1687742	1687743
				Sample Matrix	STRM W	STRM W
				Sample Type		
				Sample Date	2023-05-18	2023-05-18
				Sampling Time	13:05	14:00
				Sample I.D.	BH5	BH26
Analyte	**Batch No**	**MRL**	**Units**	**Guideline**		
BOD5	442126	1	mg/L	MAC 300	1	1
Cyanide (total)	442269	0.005	mg/L	MAC 2	<0.005	<0.005
F	442283	0.10	mg/L	MAC 10	0.18	0.11
pH	442283	1.00		MAC 5.5-10.0	7.79	7.82
Phenols	442324	0.002	mg/L	MAC 1.0	<0.002	<0.002
SO4	442400	1	mg/L	MAC 1500	256	105
Total Suspended Solids	442139	2	mg/L	MAC 350	36	8

PCBs

				Lab I.D.	1687742	1687743
				Sample Matrix	STRM W	STRM W
				Sample Type		
				Sample Date	2023-05-18	2023-05-18
				Sampling Time	13:05	14:00
				Sample I.D.	BH5	BH26
Analyte	**Batch No**	**MRL**	**Units**	**Guideline**		
Polychlorinated Biphenyls	442169	0.1	ug/L	MAC 1	<0.1	<0.1

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

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

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7	Report Number:	1997226
Attention:	M. Aiden Belfrage	Date Submitted:	2023-05-18
PO#:		Date Reported:	2023-06-08
Invoice to:	GEI Consultants Inc.	Project:	2100463
		COC #:	222055

Guideline = Sanitary Sewer - Peel

Semi-Volatiles

				Lab I.D.	1687742	1687743
				Sample Matrix	STRM W	STRM W
				Sample Type		
				Sample Date	2023-05-18	2023-05-18
				Sampling Time	13:05	14:00
				Sample I.D.	BH5	BH26
Analyte	**Batch No**	**MRL**	**Units**	**Guideline**		
Bis(2-ethylhexyl)phthalate	439934	0.4	ug/L	MAC 12	<0.4	<0.4
Dichlorobenzene, 1,2-	439934	0.2	ug/L	MAC 50	<0.2	<0.2
Dichlorobenzene, 1,4-	439934	0.4	ug/L	MAC 80	<0.4	<0.4
Di-n-butylphthalate	439934	1.3	ug/L	MAC 80	<1.3	<1.3

VOCs Surrogates

				Lab I.D.	1687742	1687743
				Sample Matrix	STRM W	STRM W
				Sample Type		
				Sample Date	2023-05-18	2023-05-18
				Sampling Time	13:05	14:00
				Sample I.D.	BH5	BH26
Analyte	**Batch No**	**MRL**	**Units**	**Guideline**		
1,2-dichloroethane-d4	442376	0	%		96	93
4-bromofluorobenzene	442376	0	%		78	78
Toluene-d8	442376	0	%		92	92

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

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

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997226
Date Submitted: 2023-05-18
Date Reported: 2023-06-08
Project: 2100463
COC #: 222055

Quality Assurance Summary

Batch No	Analyte	Blank	QC % Rec	QC Limits	Spike % Rec	Spike Limits	Dup % RPD	Duplicate Limits
439934	Dichlorobenzene, 1,2-	<0.2 ug/L	74	20-140				
439934	Dichlorobenzene, 1,4-	<0.4 ug/L	68	20-140				
439934	Bis(2-ethylhexyl)phthalate	<0.4 ug/L	84	20-140		50-140		0-40
439934	Di-n-butylphthalate	<1.3 ug/L	96	20-140				
442126	BOD5	<1 mg/L	98	75-125				0-30
442139	Total Suspended Solids	<2 mg/L	98	90-110			8	0-20
442169	Polychlorinated Biphenyls	<0.1 ug/L	91	60-140		60-140		0-30
442182	Aluminum	<0.01 mg/L	97	80-120		70-130	2	0-20
442182	Arsenic	<0.001 mg/L	88	80-120	58	70-130	0	0-20
442182	Cadmium	<0.0001	101	80-120	68	70-130	0	0-20
442182	Cobalt	<0.0002	103	80-120	52	70-130	3	0-20
442182	Chromium Total	<0.001 mg/L	107	80-120	61	70-130	4	0-20
442182	Copper	<0.001 mg/L	101	80-120	49	70-130	1	0-20
442182	Manganese	<0.01 mg/L	105	80-120	28	70-130	1	0-20
442182	Molybdenum	<0.005 mg/L	78	80-120	64	70-130	0	0-20
442182	Nickel	<0.005 mg/L	103	80-120	50	70-130	0	0-20
442182	Lead	<0.001 mg/L	94	80-120	65	70-130	0	0-20
442182	Antimony	<0.0005	99	80-120	59	70-130	0	0-20
442182	Selenium	<0.001 mg/L	98	80-120	61	70-130	0	0-20
442182	Tin	<0.01 mg/L	85	80-120	71	70-130	0	0-20
442182	Titanium	<0.01 mg/L	87	80-120	36	70-130	0	0-20
442182	Zinc	<0.01 mg/L	105	80-120	55	70-130	0	0-20
442201	Total Kjeldahl Nitrogen	<0.100 mg/L	112	70-130	110	70-130	0	0-20
442269	Cyanide (total)	<0.005 mg/L	82	61-139	102	80-120	0	0-20
442283	F	<0.10 mg/L	101	90-110			0	0-5
442283	pH		100	90-110			0	0-5
442294	Oil & Grease - Mineral	<1 mg/L	120	70-130				
442294	Oil & Grease - Non-mineral	<1 mg/L		70-130				
442294	Oil & Grease - Total	<1 mg/L	115	70-130				
442321	Mercury	<0.0001	119	80-120	74	70-130	0	0-20
442322	Silver	<0.0001	101	80-120	62	70-130	0	0-20
442324	Phenols	<0.002 mg/L	105	50-120	105	80-120	0	0-20

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

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

eurofins | Environment Testing

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997226
Date Submitted: 2023-05-18
Date Reported: 2023-06-08
Project: 2100463
COC #: 222055

Quality Assurance Summary

Batch No	Analyte	Blank	QC % Rec	QC Limits	Spike % Rec	Spike Limits	Dup % RPD	Duplicate Limits
442331	Total P	<0.020 mg/L	106	80-120	103	80-120	4	0-20
442376	Tetrachloroethane, 1,1,2,2-	<0.5 ug/L	109	60-130	110	50-140	0	0-30
442376	Benzene	<0.5 ug/L	84	60-130	120	50-140	0	0-30
442376	Dichloroethylene, 1,2-cis-	<0.4 ug/L	110	60-130	119	50-140	0	0-30
442376	Chloroform	<0.5 ug/L	103	60-130	119	50-140	0	0-30
442376	Methylene Chloride	<4.0 ug/L	107	60-130	103	50-140	0	0-30
442376	Ethylbenzene	<0.5 ug/L	80	60-130	112	50-140	0	0-30
442376	Xylene, m/p-	<0.4 ug/L	102	60-130	112	50-140	0	0-30
442376	Methyl Ethyl Ketone	<2 ug/L	120	60-130	121	50-140	0	0-30
442376	Xylene, o-	<0.4 ug/L	102	60-130	113	50-140	0	0-30
442376	Styrene	<0.5 ug/L	99	60-130	111	50-140	0	0-30
442376	Dichloropropene,1,3-trans-	<0.5 ug/L	96	60-130	111	50-140	0	0-30
442376	Tetrachloroethylene	<0.3 ug/L	110	60-130	112	50-140	0	0-30
442376	Toluene	<0.4 ug/L	108	60-130	125	50-140	0	0-30
442376	Trichloroethylene	<0.3 ug/L	99	60-130	112	50-140	0	0-30
442383	Xylene Mixture							
442400	SO4	<1 mg/L	100	90-110		80-120	0	0-25
442809	Nonylphenol Ethoxalate (Total)	<10 ug/L						
442809	Nonylphenols (Total)	<1 ug/L						
442992	Escherichia Coli							0-500

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

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

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7	Report Number:	1997226
Attention:	M. Aiden Belfrage	Date Submitted:	2023-05-18
PO#:		Date Reported:	2023-06-08
Invoice to:	GEI Consultants Inc.	Project:	2100463
		COC #:	222055

Test Summary

Batch No	Analyte	Instrument	Prep aration Date	Analysis Date	Analyst	Method
439934	Dichlorobenzene, 1,2-	GC/MS	2023-05-23	2023-05-23	C_M	B 625/P 8270
439934	Dichlorobenzene, 1,4-	GC/MS	2023-05-23	2023-05-23	C_M	B 625/P 8270
439934	Bis(2-ethylhexyl)phthalate	GC/MS	2023-05-23	2023-05-23	C_M	B 625/P 8270
439934	Di-n-butylphthalate	GC/MS	2023-05-23	2023-05-23	C_M	B 625/P 8270
442126	BOD5	Dissolved O2 Meter	2023-05-19	2023-05-24	M_E	SM 5210B
442139	Total Suspended Solids	Manual	2023-05-23	2023-05-24	SKH	C SM2540
442169	Polychlorinated Biphenyls	GC/ECD	2023-05-23	2023-05-23	R_G	EPA 8081B
442182	Aluminum	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Arsenic	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Cadmium	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Cobalt	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Chromium Total	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Copper	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Manganese	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Molybdenum	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Nickel	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Lead	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Antimony	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Selenium	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Tin	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Titanium	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442182	Zinc	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442201	Total Kjeldahl Nitrogen	AQ-400	2023-05-23	2023-05-24	SKH	EPA 351.2
442269	Cyanide (total)	Skalar CN Analyzer	2023-05-24	2023-05-24	Z_S	SM4500-CNC/MOE E3015
442283	F	Auto Titrator	2023-05-24	2023-05-24	AsA	SM2320,2510,4500H/F
442283	pH	Auto Titrator	2023-05-24	2023-05-24	AsA	SM2320,2510,4500H/F
442294	Oil & Grease - Mineral	Gravimetric	2023-05-23	2023-05-25	R_G	SM 5520B/F
442294	Oil & Grease - Non-mineral	Gravimetric	2023-05-23	2023-05-25	R_G	SM 5520B/F
442294	Oil & Grease - Total	Gravimetric	2023-05-23	2023-05-25	R_G	SM 5520B/F
442321	Mercury	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442322	Silver	ICAPQ-MS	2023-05-23	2023-05-23	SD	EPA 200.8
442324	Phenols	Technicon	2023-05-25	2023-05-25	IP	SM5530D/EPA420.2

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

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

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 1997226
Date Submitted: 2023-05-18
Date Reported: 2023-06-08
Project: 2100463
COC #: 222055

Test Summary

Batch No	Analyte	Instrument	Prep aration Date	Analysis Date	Analyst	Method
442331	Total P	AQ 400	2023-05-25	2023-05-25	SKH	EPA 365.1
442376	Tetrachloroethane, 1,1,2,2-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Benzene	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichloroethylene, 1,2-cis-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Chloroform	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Methylene Chloride	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Ethylbenzene	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Xylene, m/p-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Methyl Ethyl Ketone	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Xylene, o-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Styrene	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Dichloropropene,1,3-trans-	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Tetrachloroethylene	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Toluene	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442376	Trichloroethylene	GC-MS	2023-05-25	2023-05-25	PJ	EPA 8260
442383	Xylene Mixture	GC-MS	2023-05-26	2023-05-26	PJ	EPA 8260
442400	SO4	IC	2023-05-26	2023-05-26	AaN	SM 4110
442809	Nonylphenol Ethoxalate (Total)		2023-06-02	2023-06-02	QL	SUBCONTRACT-SGS
442809	Nonylphenols (Total)		2023-06-02	2023-06-02	QL	SUBCONTRACT-SGS
442992	Escherichia Coli	Manual	2023-06-07	2023-06-08	DRA	AMBCOLM1

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

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

CWS for Petroleum Hydrocarbons in Soil - Tier 1

Notes:

1. The laboratory method complies with CCME Tier 1 reference method for PHC in soil. It is validated for laboratory use.
2. Where the F1 fraction (C6 to C10) and BTEX are both measured, F1-BTEX is reported.
3. Where the F2 fraction (C10 to C16) and naphthalene are both measured, F2-naphthalene is reported.
4. Where the F3 fraction (C16 to C34) and PAHs* are both measured, F3-PAH is reported.
5. F4G is analyzed if the chromatogram does not descend to baseline before C50. Where F4 (C34 to C50) and F4G are both reported, the higher result is compared to the standard.
6. Unless otherwise stated in the sample comments, the following criteria have been met where applicable:

   - nC6 and nC10 response factors within 30% of response factor for toluene;
   - nC10, nC16, and nC34 response factors within 10% of each other;
   - C50 response factors within 70% of nC10 + nC16 + nC34 average; and,
   - Linearity is within 15%.

7. Unless otherwise stated in the sample comments, sampling requirements and analytical holding times have been met.
8. Gravimetric heavy hydrocarbons (F4G) cannot be added to the C6 and C50 hydrocarbons.
9. *PAHs = phenanthrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene and pyrene.

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 3010375
Date Submitted: 2024-08-22
Date Reported: 2024-08-29
Project: 2100463
COC #: 916051

Dear Aiden Belfrage:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: ______________________________
Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: https://directory.cala.ca/.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Certificate of Analysis

Client: GEI Consultants Inc.
647 Welham Rd Unit 14
Barrie, ON
L4N 0B7
Attention: M. Aiden Belfrage
PO#:
Invoice to: GEI Consultants Inc.

Report Number: 3010375
Date Submitted: 2024-08-22
Date Reported: 2024-08-29
Project: 2100463
COC #: 916051

				Lab I.D.	1740347	1740348
				Sample Matrix	SURF W	SURF W
				Sample Type		
				Sampling Date	2024-08-22	2024-08-22
				Sample I.D.	BH/MW/05	BH/MW/05-F
Group	**Analyte**	**MRL**	**Units**	**Guideline**		
General Chemistry	Total Suspended Solids	2	mg/L		92	8
Metals	Ag	0.0001	mg/L	PWQO 0.0001	<0.0001	<0.0001
	Al (dissolved)	0.01	mg/L	IPWQO 0.075	<0.01	<0.01
	As	0.001	mg/L	PWQO 0.100	0.003	<0.001
	B	0.01	mg/L	IPWQO 0.200	0.29*	0.29*
	Be	0.0005	mg/L	PWQO 0.011	0.0006	<0.0005
	Cd	0.0001	mg/L	PWQO 0.0002	0.0004*	0.0002
	Co	0.0002	mg/L	PWQO 0.0009	0.0411*	0.0295*
	Cr	0.001	mg/L		0.009	<0.001
	Cu	0.001	mg/L	PWQO 0.005	0.010*	0.001
	Fe	0.03	mg/L	PWQO 0.30	6.05*	0.04
	Filtration				Y	Y
	Hg Dissolved	0.0001	mg/L	PWQO 0.0002	<0.0001	<0.0001
	Mo	0.005	mg/L	IPWQO 0.040	<0.005	<0.005
	Ni	0.005	mg/L	PWQO 0.025	0.032*	0.022
	Pb	0.001	mg/L	PWQO 0.005	0.004	<0.001
	Sb	0.0005	mg/L	IPWQO 0.020	<0.0005	<0.0005
	Se	0.001	mg/L	PWQO 0.100	0.004	0.002
	Tl	0.0001	mg/L	IPWQO 0.0003	0.0001	<0.0001
	U	0.001	mg/L	IPWQO 0.005	0.015*	0.015*
	V	0.001	mg/L	IPWQO 0.006	0.012*	<0.001
	W	0.002	mg/L	IPWQO 0.030	<0.002	<0.002
	Zn	0.01	mg/L	PWQO 0.030	0.04*	0.01
	Zr	0.002	mg/L	IPWQO 0.004	0.005*	<0.002

Guideline = PWQO - Ontario

*** = Guideline Exceedence**

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

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

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7
Attention:	M. Aiden Belfrage
PO#:	
Invoice to:	GEI Consultants Inc.

Report Number:	3010375
Date Submitted:	2024-08-22
Date Reported:	2024-08-29
Project:	2100463
COC #:	916051

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 464919 **Analysis/Extraction Date** 2024-08-27 **Analyst** AaN **Method** EPA 200.8			
Silver	<0.0001 mg/L	117	80-120
Al (dissolved)	<0.01 mg/L	106	80-120
Arsenic	<0.001 mg/L	103	80-120
Boron (total)	<0.01 mg/L	102	80-120
Beryllium	<0.0005 mg/L	107	80-120
Cadmium	<0.0001 mg/L	101	80-120
Cobalt	<0.0002 mg/L	102	80-120
Chromium Total	<0.001 mg/L	104	80-120
Copper	<0.001 mg/L	105	80-120
Iron	<0.03 mg/L	98	80-120
Filtration			
Hg Dissolved	<0.0001 mg/L	100	
Molybdenum	<0.005 mg/L	91	80-120
Nickel	<0.005 mg/L	104	80-120
Lead	<0.001 mg/L	104	80-120
Antimony	<0.0005 mg/L	83	80-120

Guideline = PWQO - Ontario

*** = Guideline Exceedence**

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

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

Certificate of Analysis

Client:	GEI Consultants Inc. 647 Welham Rd Unit 14 Barrie, ON L4N 0B7
Attention:	M. Aiden Belfrage
PO#:	
Invoice to:	GEI Consultants Inc.

Report Number:	3010375
Date Submitted:	2024-08-22
Date Reported:	2024-08-29
Project:	2100463
COC #:	916051

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Selenium	<0.001 mg/L	104	80-120
Thallium	<0.0001 mg/L	101	80-120
Uranium	<0.001 mg/L	98	80-120
Vanadium	<0.001 mg/L	98	80-120
W	<0.002 mg/L	93	80-120
Zinc	<0.01 mg/L	106	80-120
Zr	<0.002 mg/L	92	80-120
Run No 464974 **Analysis/Extraction Date** 2024-08-28 **Analyst** MiV **Method** C SM2540			
Total Suspended Solids	<2 mg/L	97	90-110

Guideline = PWQO - Ontario

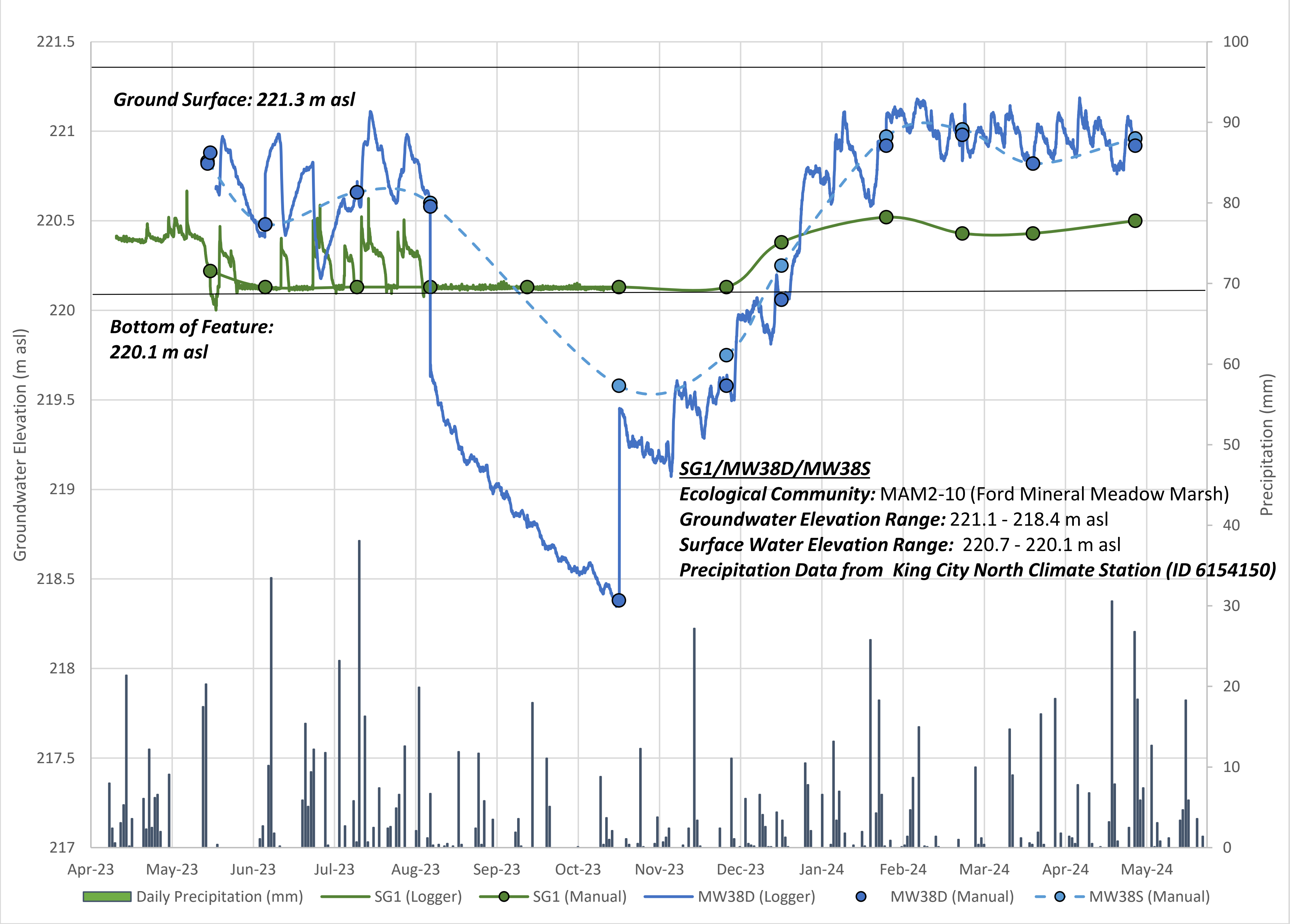
*** = Guideline Exceedence**

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

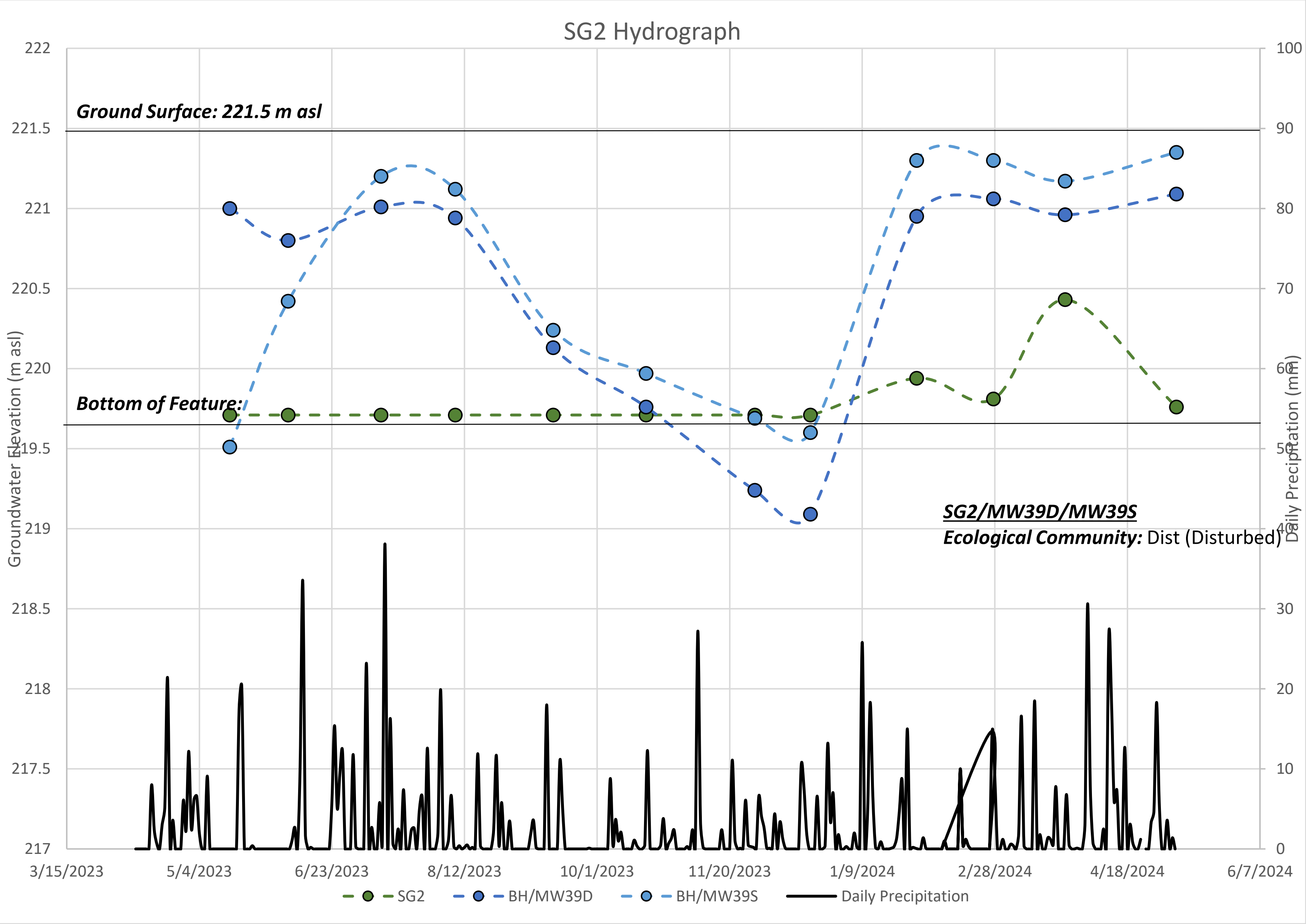
MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired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

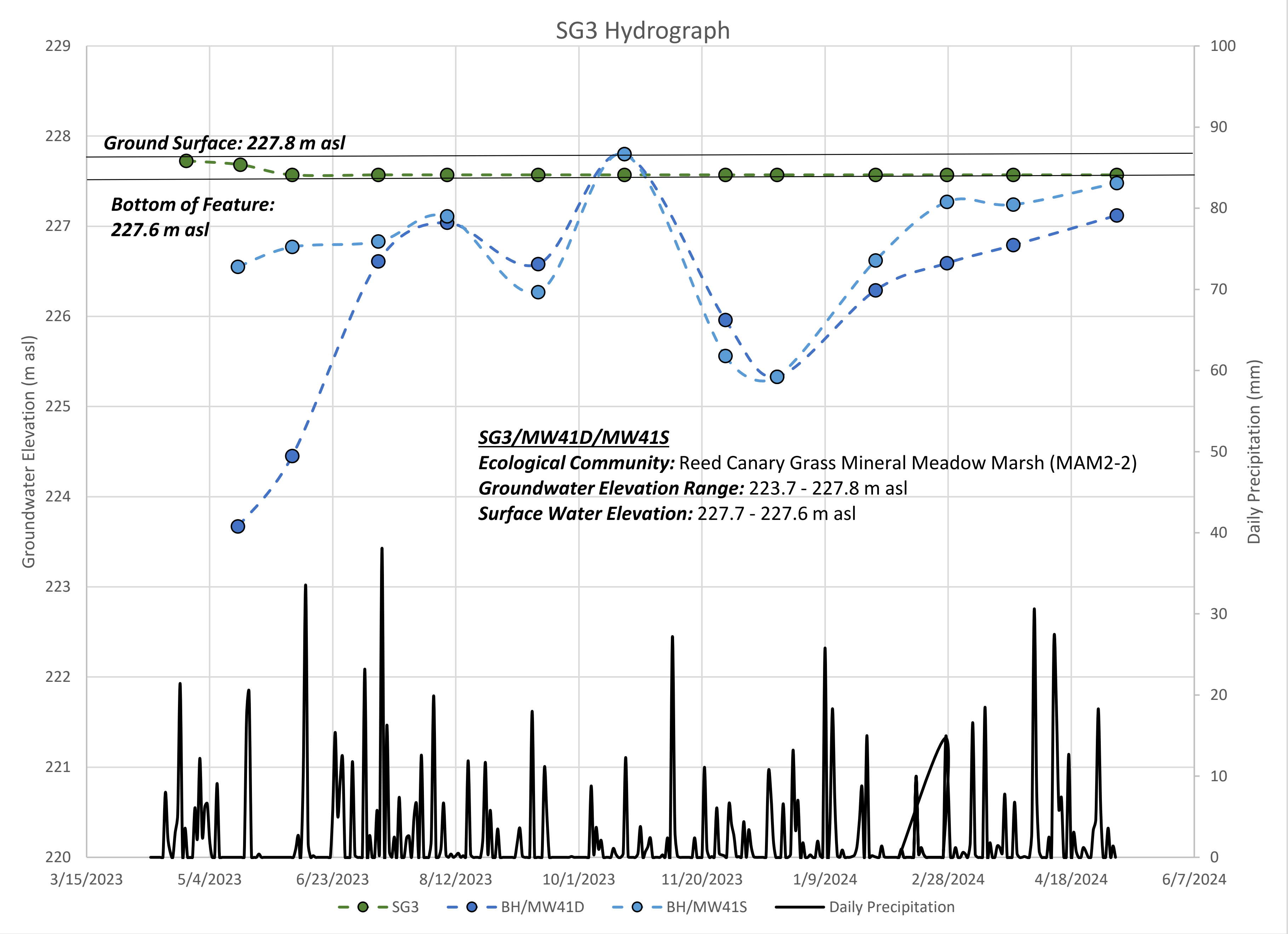
APPENDIX C11

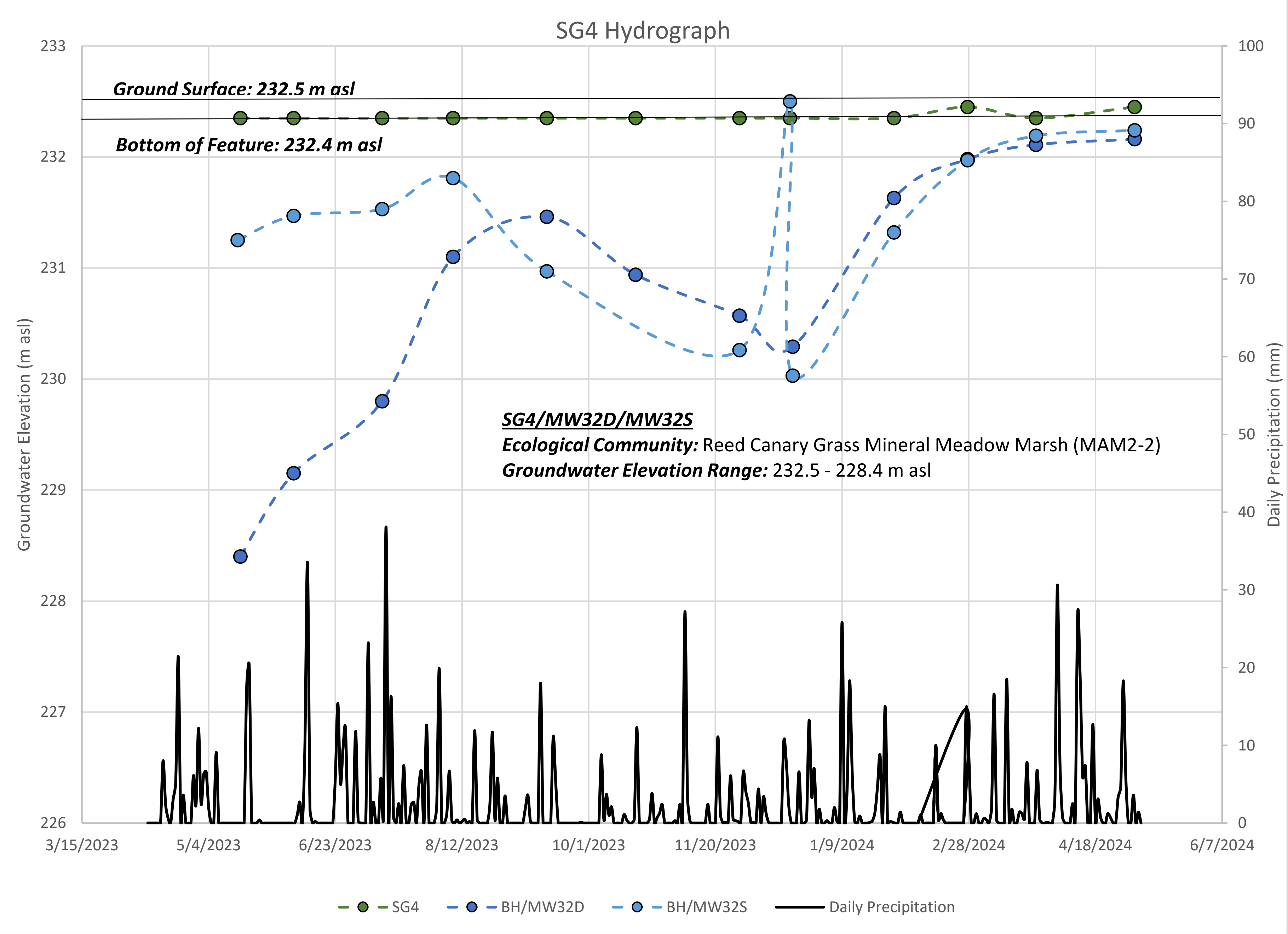
GROUNDWATER AND SURFACE WATER HYDROGRAPHS

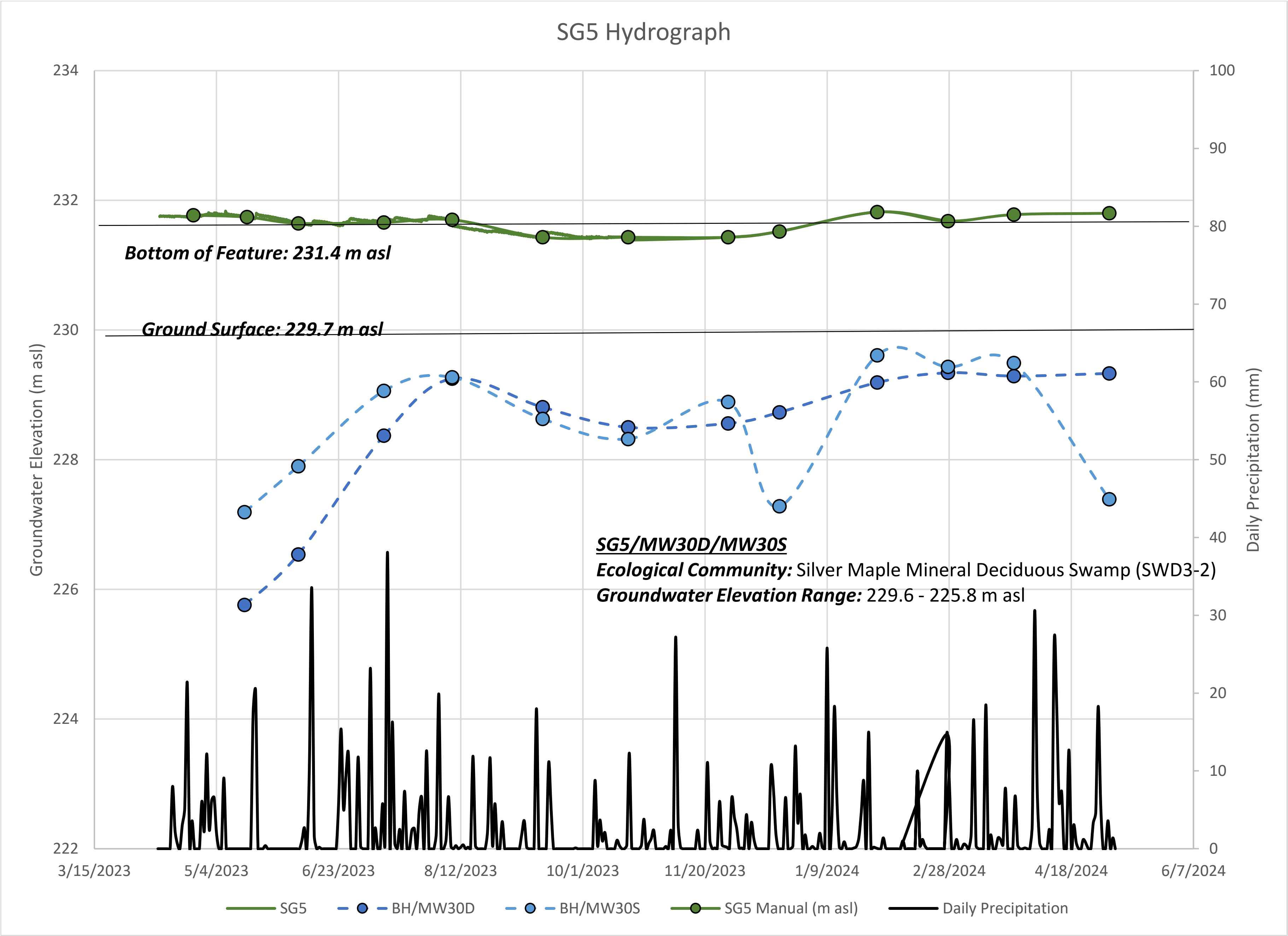


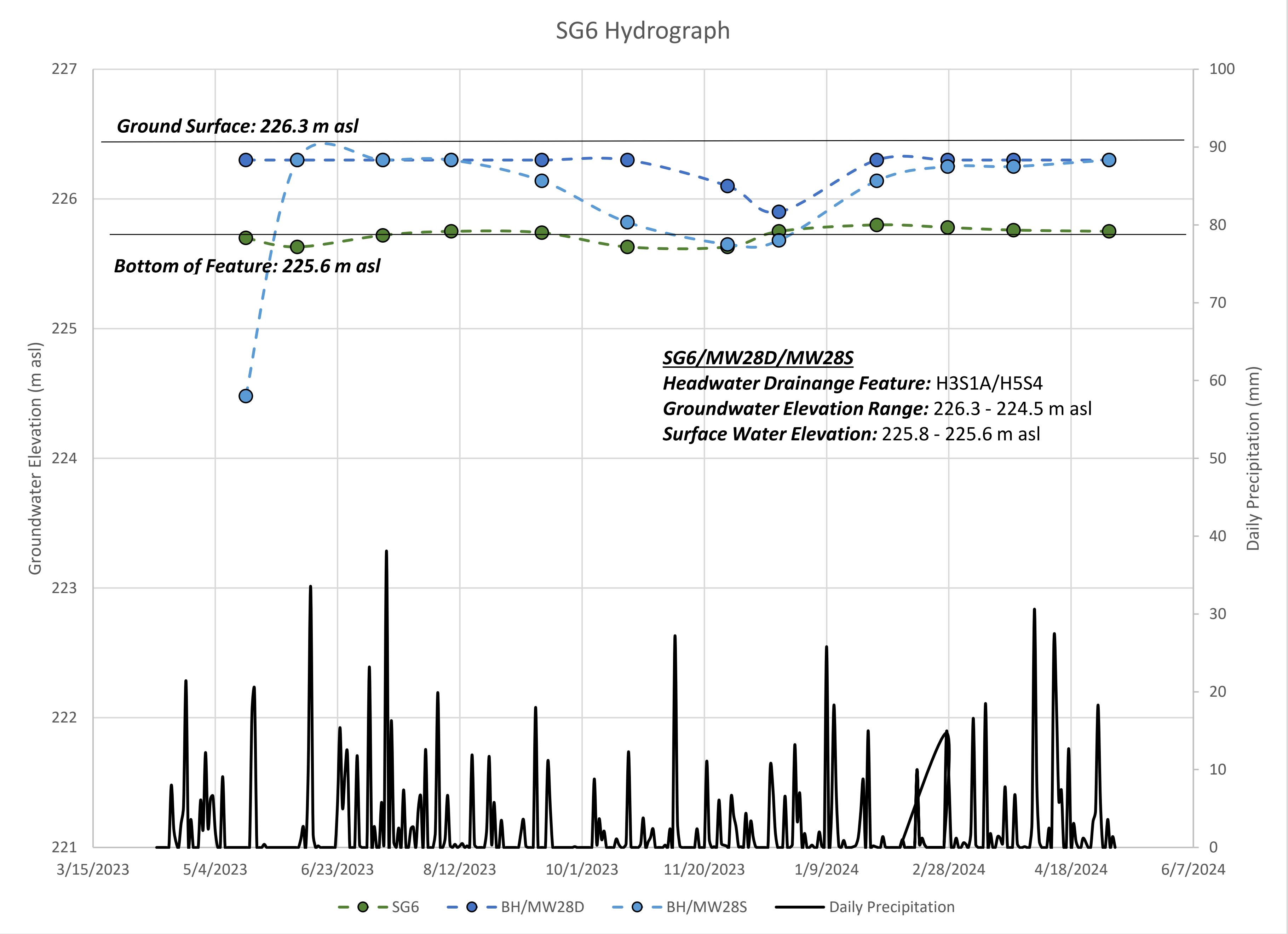
SG1 Hydrograph

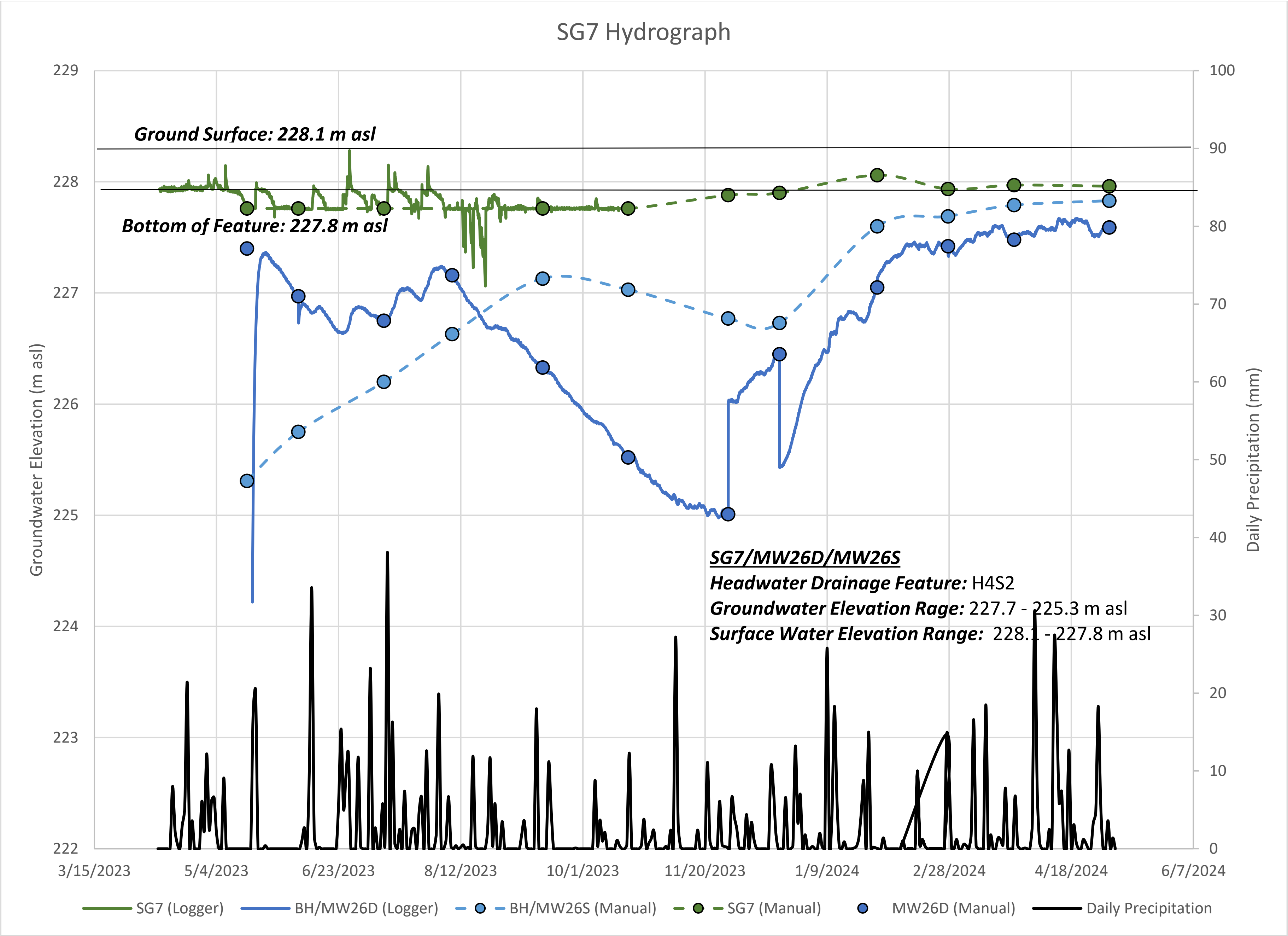

SG2 Hydrograph
Ground Surface: 221.5 m asl
Bottom of Feature:
SG2/MW39D/MW39S
Ecological Community: Dist (Disturbed)
Groundwater Elevation (m asl)
Daily Precipitation (mm)
222
221.5
221
220.5
220
219.5
219
218.5
218
217.5
217
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
SG2
BH/MW39D
BH/MW39S
Daily Precipitation

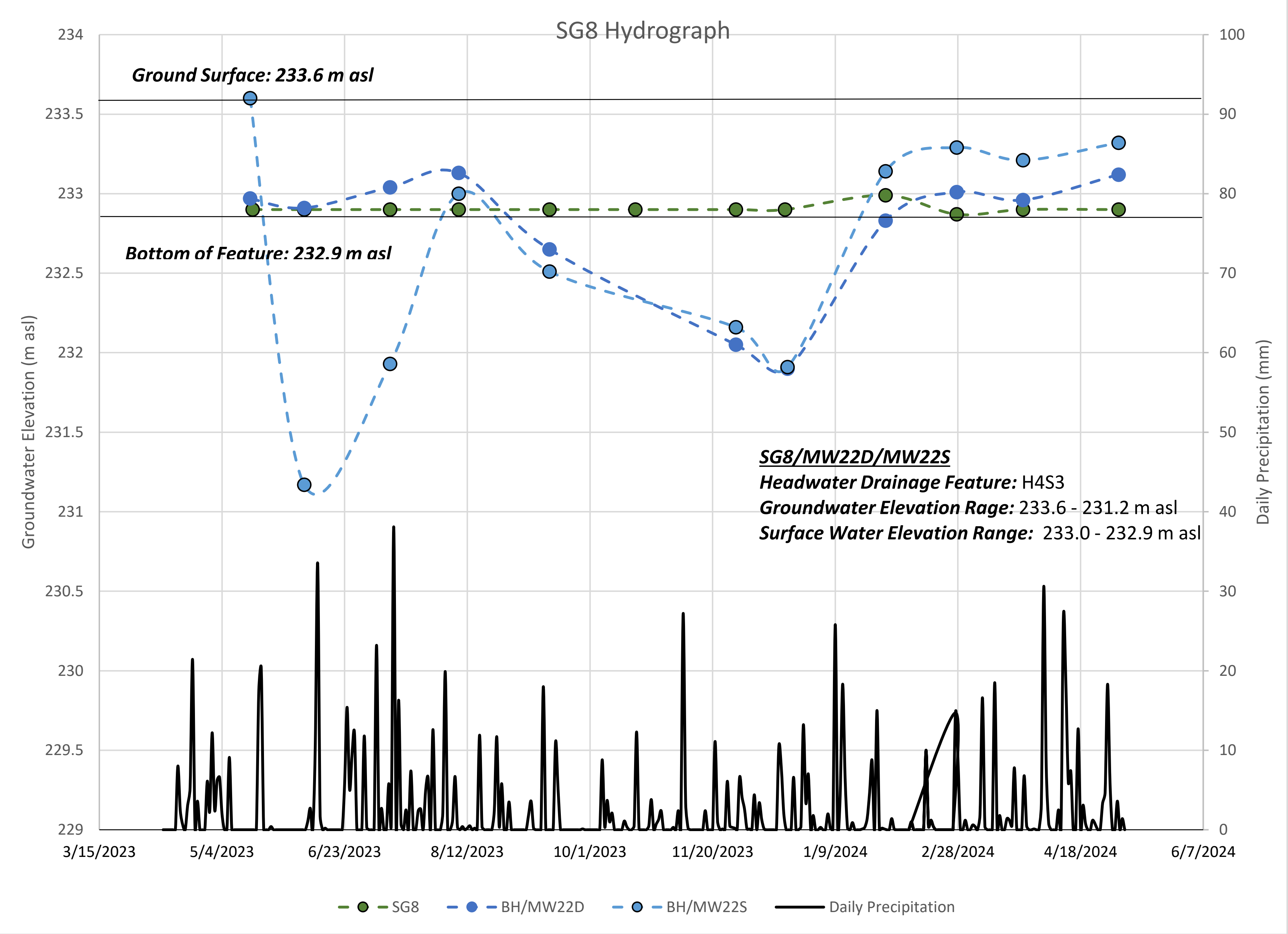

SG3 Hydrograph
Groundwater Elevation (m asl)
Daily Precipitation (mm)
229
228
227
226
225
224
223
222
221
220
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
Ground Surface: 227.8 m asl
Bottom of Feature:
227.6 m asl
SG3/MW41D/MW41S
Ecological Community: Reed Canary Grass Mineral Meadow Marsh (MAM2-2)
Groundwater Elevation Range: 223.7 - 227.8 m asl
Surface Water Elevation: 227.7 - 227.6 m asl
SG3
BH/MW41D
BH/MW41S
Daily Precipitation

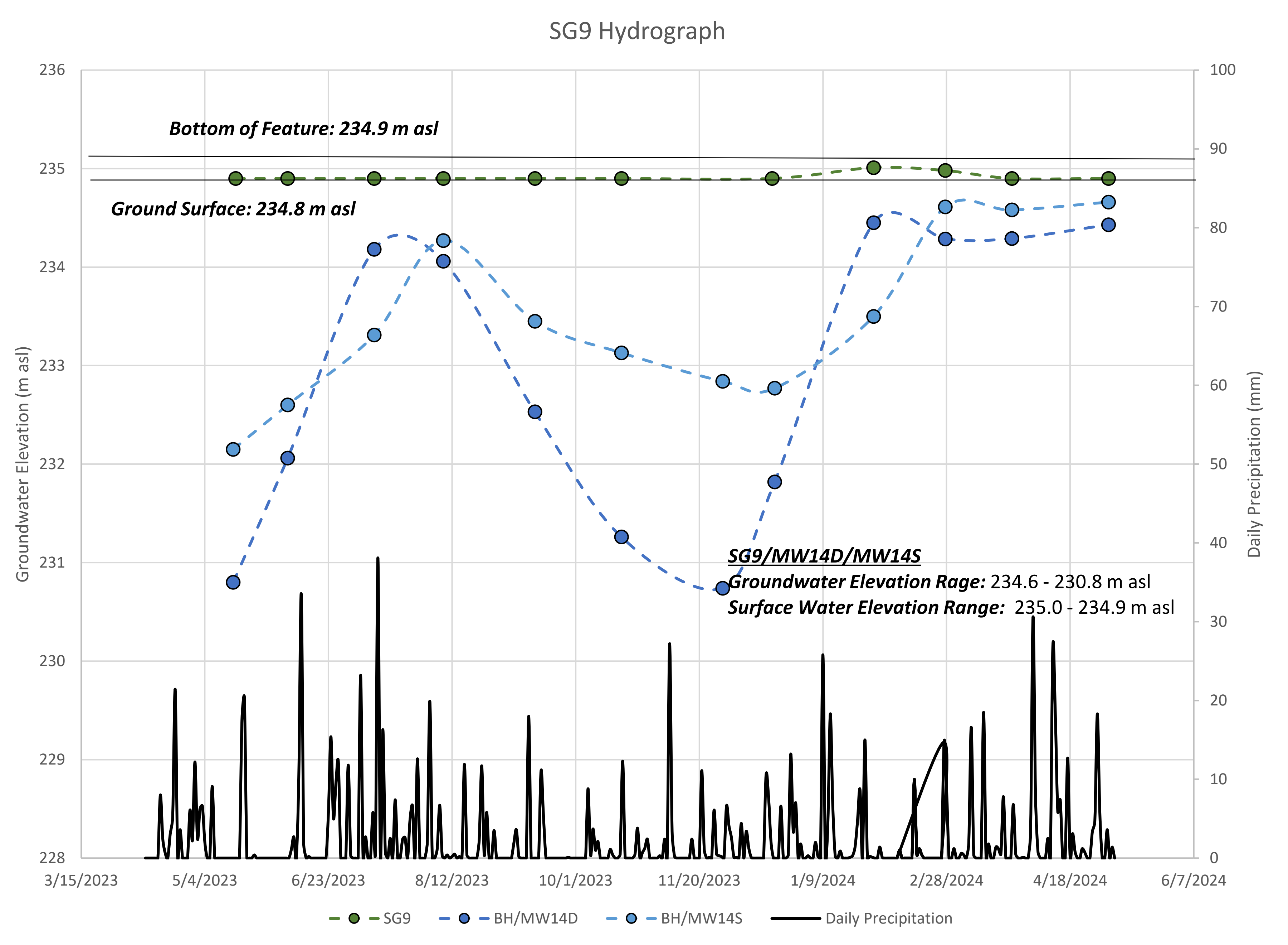

SG4 Hydrograph
Ground Surface: 232.5 m asl
Bottom of Feature: 232.4 m asl
SG4/MW32D/MW32S
Ecological Community: Reed Canary Grass Mineral Meadow Marsh (MAM2-2)
Groundwater Elevation Range: 232.5 - 228.4 m asl
Groundwater Elevation (m asl)
Daily Precipitation (mm)
233
232
231
230
229
228
227
226
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
SG4
BH/MW32D
BH/MW32S
Daily Precipitation

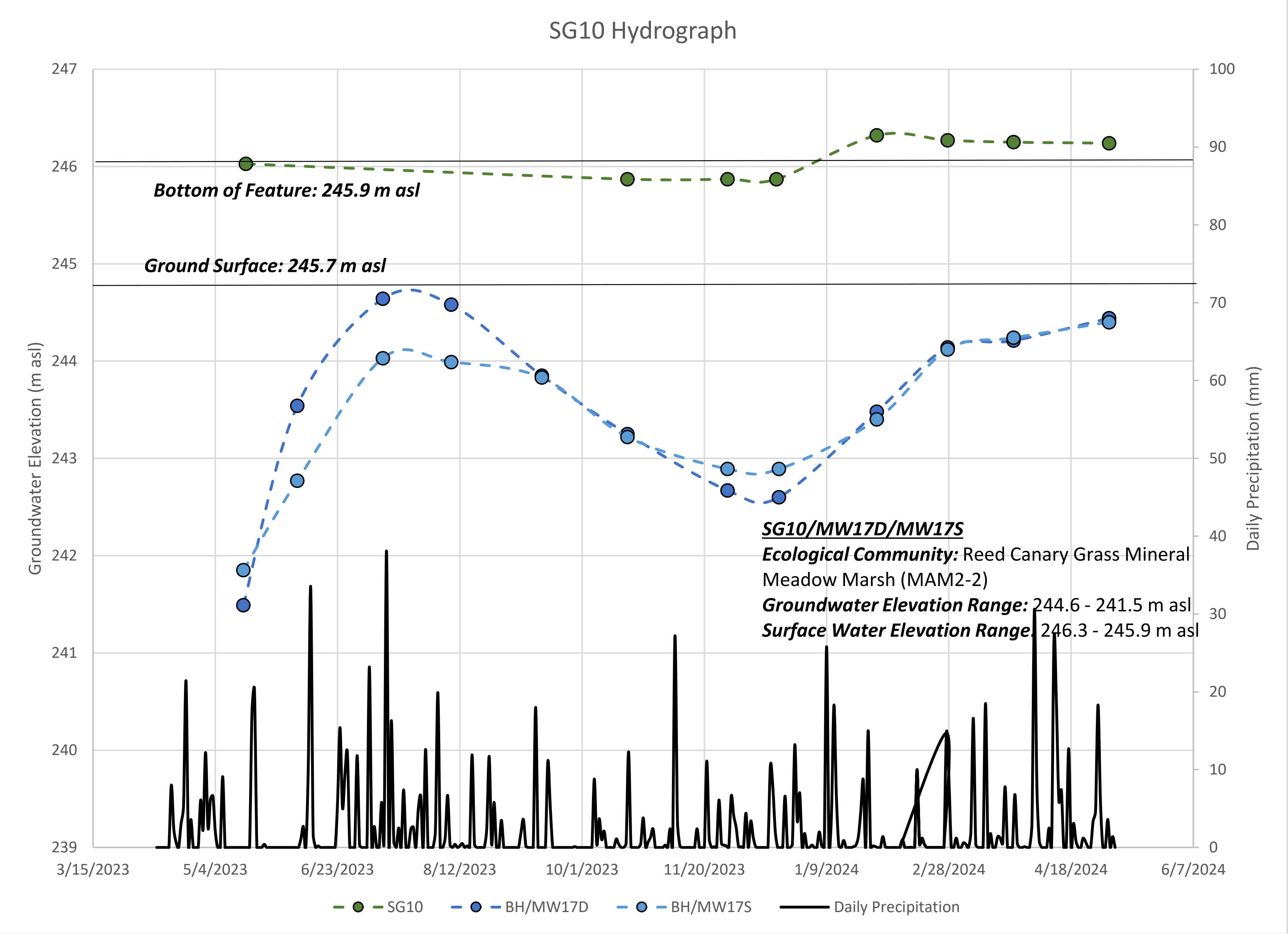

SG5 Hydrograph
Groundwater Elevation (m asl)
Daily Precipitation (mm)
234
232
230
228
226
224
222
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
Bottom of Feature: 231.4 m asl
Ground Surface: 229.7 m asl
SG5/MW30D/MW30S
Ecological Community: Silver Maple Mineral Deciduous Swamp (SWD3-2)
Groundwater Elevation Range: 229.6 - 225.8 m asl
SG5
BH/MW30D
BH/MW30S
SG5 Manual (m asl)
Daily Precipitation

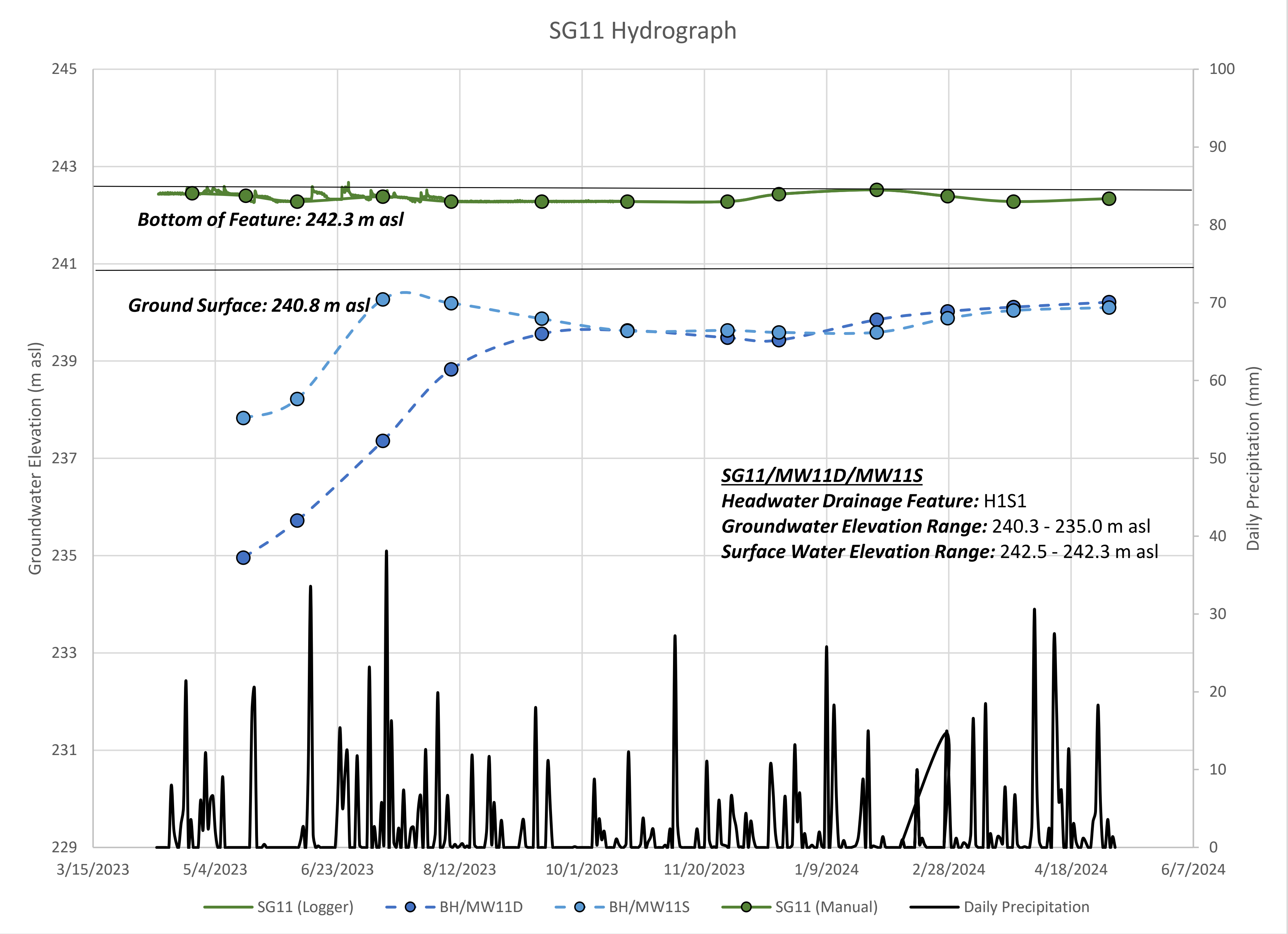

SG6 Hydrograph
Ground Surface: 226.3 m asl
Bottom of Feature: 225.6 m asl
SG6/MW28D/MW28S
Headwater Drainange Feature: H3S1A/H5S4
Groundwater Elevation Range: 226.3 - 224.5 m asl
Surface Water Elevation: 225.8 - 225.6 m asl
Groundwater Elevation (m asl)
227
226
225
224
223
222
221
Daily Precipitation (mm)
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
SG6
BH/MW28D
BH/MW28S
Daily Precipitation


SG7 Hydrograph
Groundwater Elevation (m asl)
229
228
227
226
225
224
223
222
Daily Precipitation (mm)
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
Ground Surface: 228.1 m asl
Bottom of Feature: 227.8 m asl
SG7/MW26D/MW26S
Headwater Drainage Feature: H4S2
Groundwater Elevation Rage: 227.7 - 225.3 m asl
Surface Water Elevation Range: 228.1 - 227.8 m asl
SG7 (Logger)
BH/MW26D (Logger)
BH/MW26S (Manual)
SG7 (Manual)
MW26D (Manual)
Daily Precipitation


SG8 Hydrograph
Ground Surface: 233.6 m asl
Bottom of Feature: 232.9 m asl
SG8/MW22D/MW22S
Headwater Drainage Feature: H4S3
Groundwater Elevation Rage: 233.6 - 231.2 m asl
Surface Water Elevation Range: 233.0 - 232.9 m asl
Groundwater Elevation (m asl)
Daily Precipitation (mm)
234
233.5
233
232.5
232
231.5
231
230.5
230
229.5
229
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
SG8
BH/MW22D
BH/MW22S
Daily Precipitation


SG9 Hydrograph
Bottom of Feature: 234.9 m asl
Ground Surface: 234.8 m asl
SG9/MW14D/MW14S
Groundwater Elevation Rage: 234.6 - 230.8 m asl
Surface Water Elevation Range: 235.0 - 234.9 m asl
Groundwater Elevation (m asl)
236
235
234
233
232
231
230
229
228
Daily Precipitation (mm)
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
SG9
BH/MW14D
BH/MW14S
Daily Precipitation

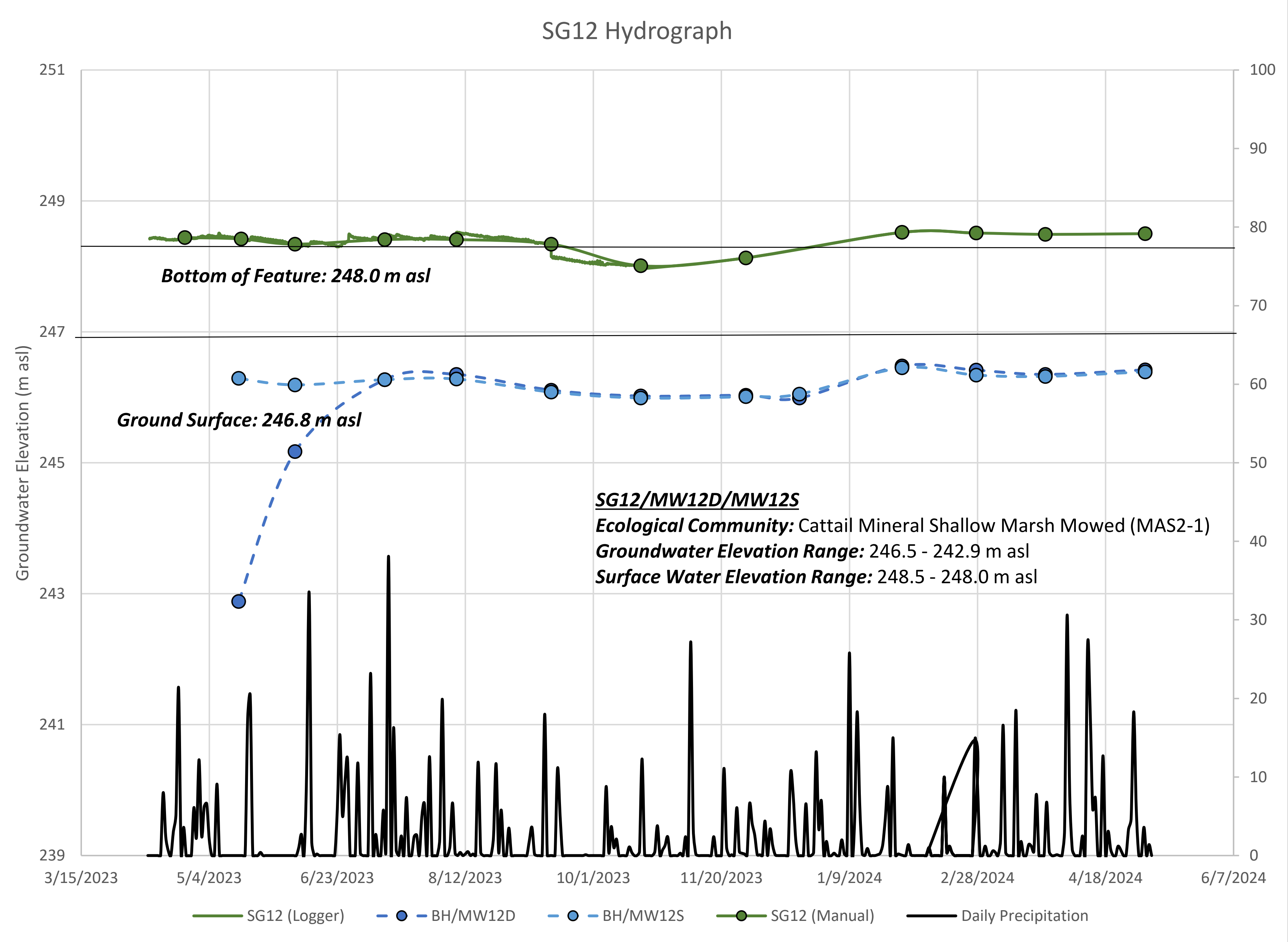

SG10 Hydrograph
Groundwater Elevation (m asl)
Daily Precipitation (mm)
247
246
245
244
243
242
241
240
239
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
Bottom of Feature: 245.9 m asl
Ground Surface: 245.7 m asl
SG10/MW17D/MW17S
Ecological Community: Reed Canary Grass Mineral Meadow Marsh (MAM2-2)
Groundwater Elevation Range: 244.6 - 241.5 m asl
Surface Water Elevation Range: 246.3 - 245.9 m asl
SG10
BH/MW17D
BH/MW17S
Daily Precipitation

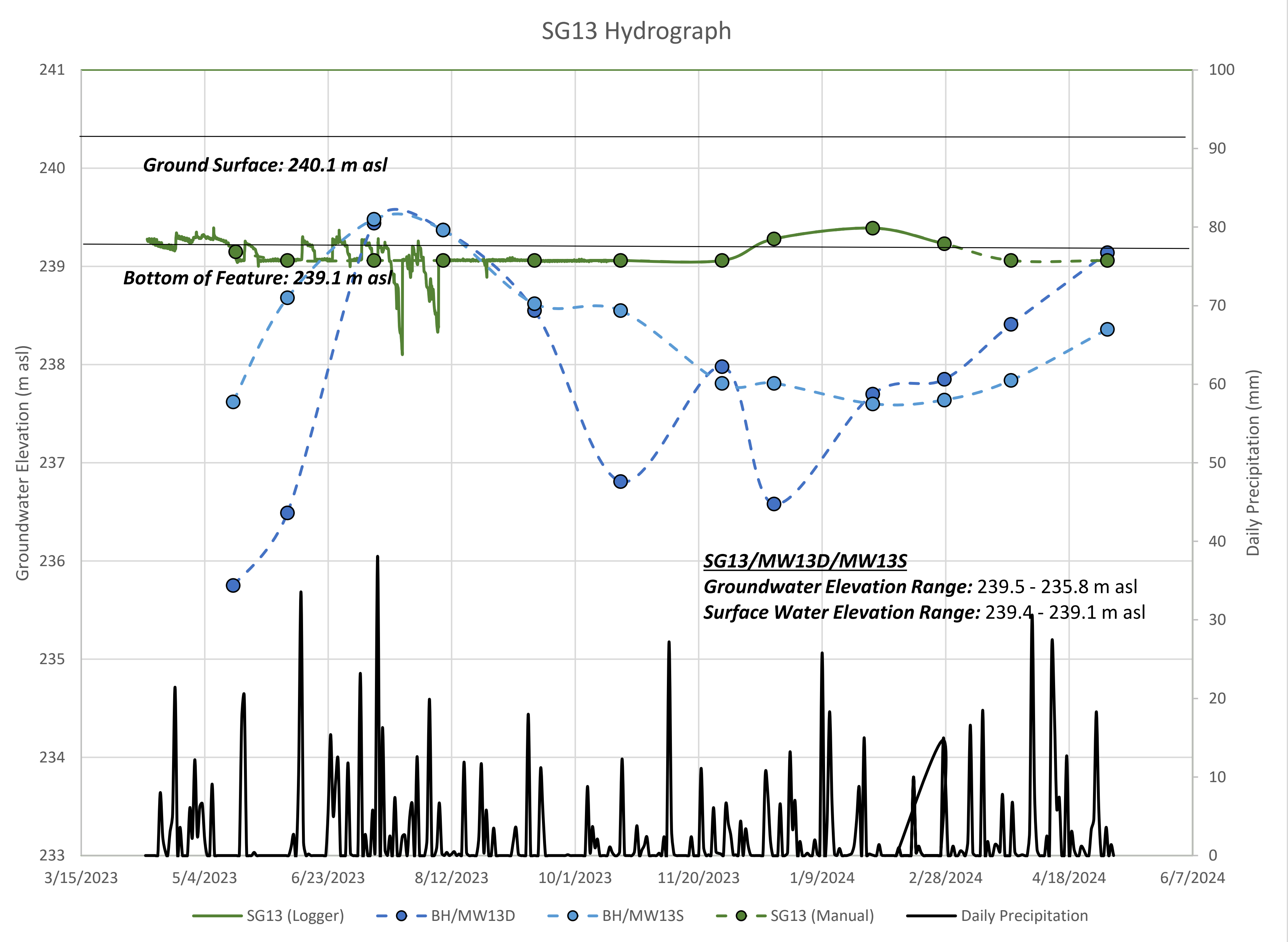

SG11 Hydrograph

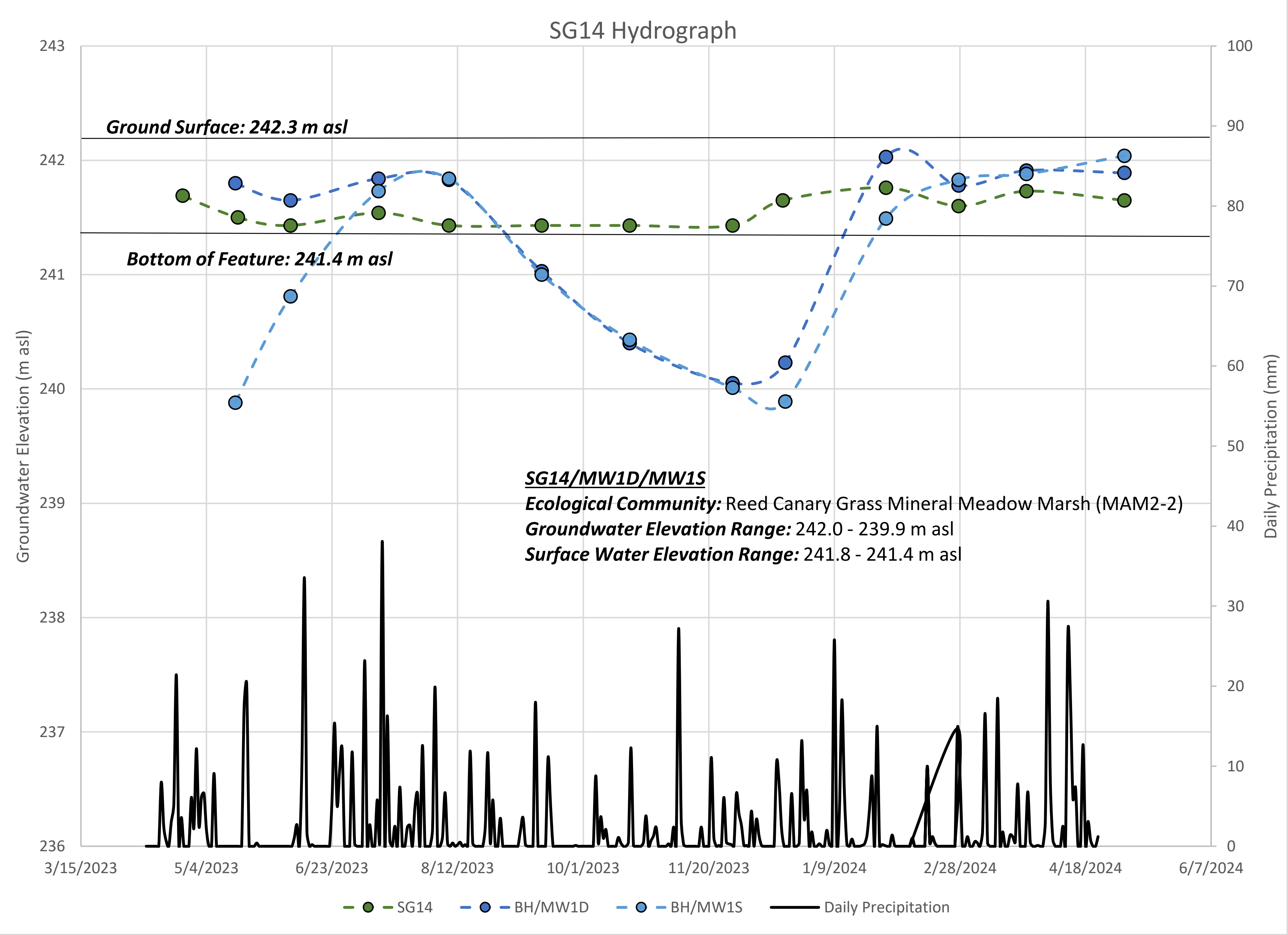
Bottom of Feature: 242.3 m asl

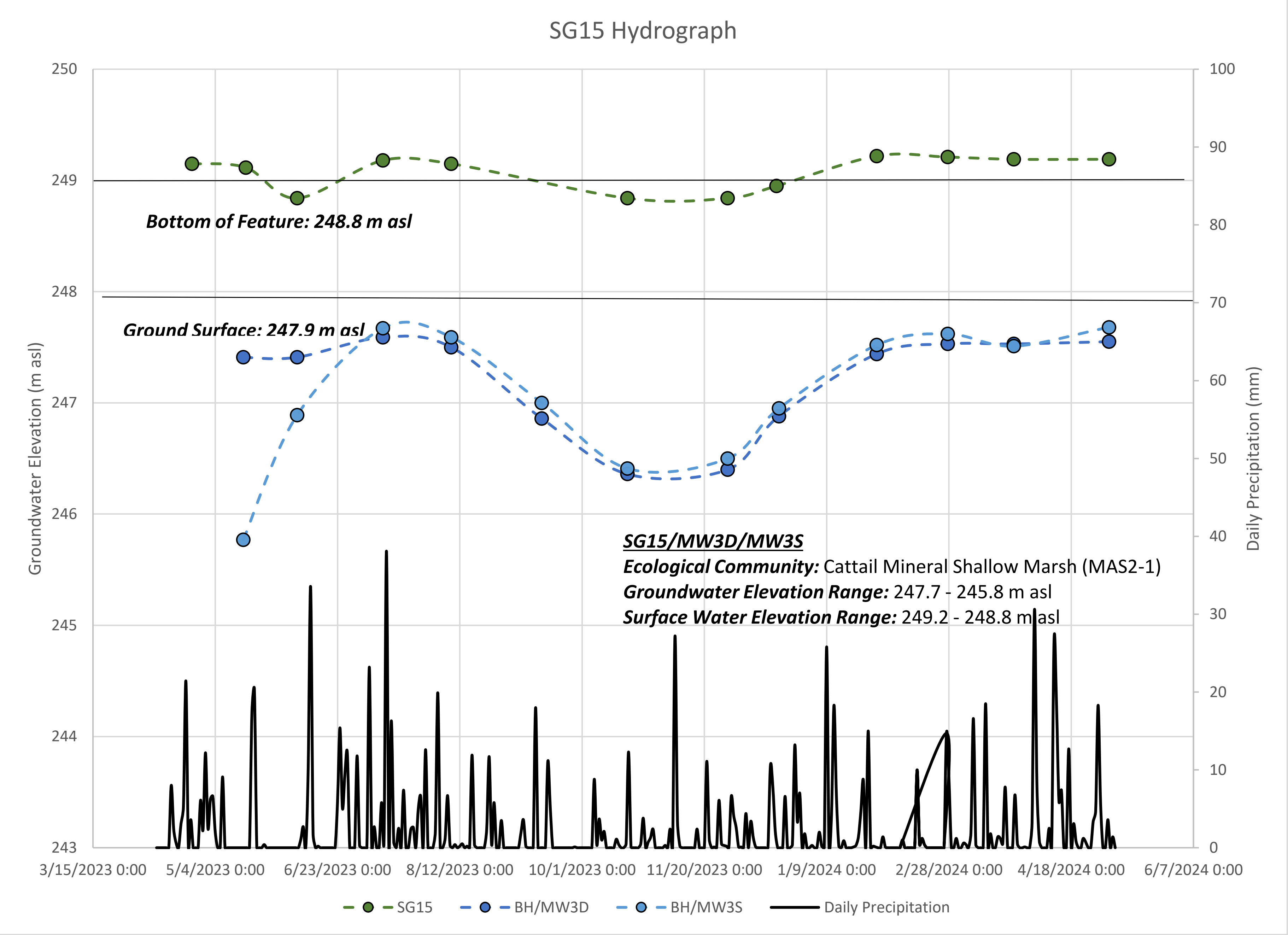
Ground Surface: 240.8 m asl

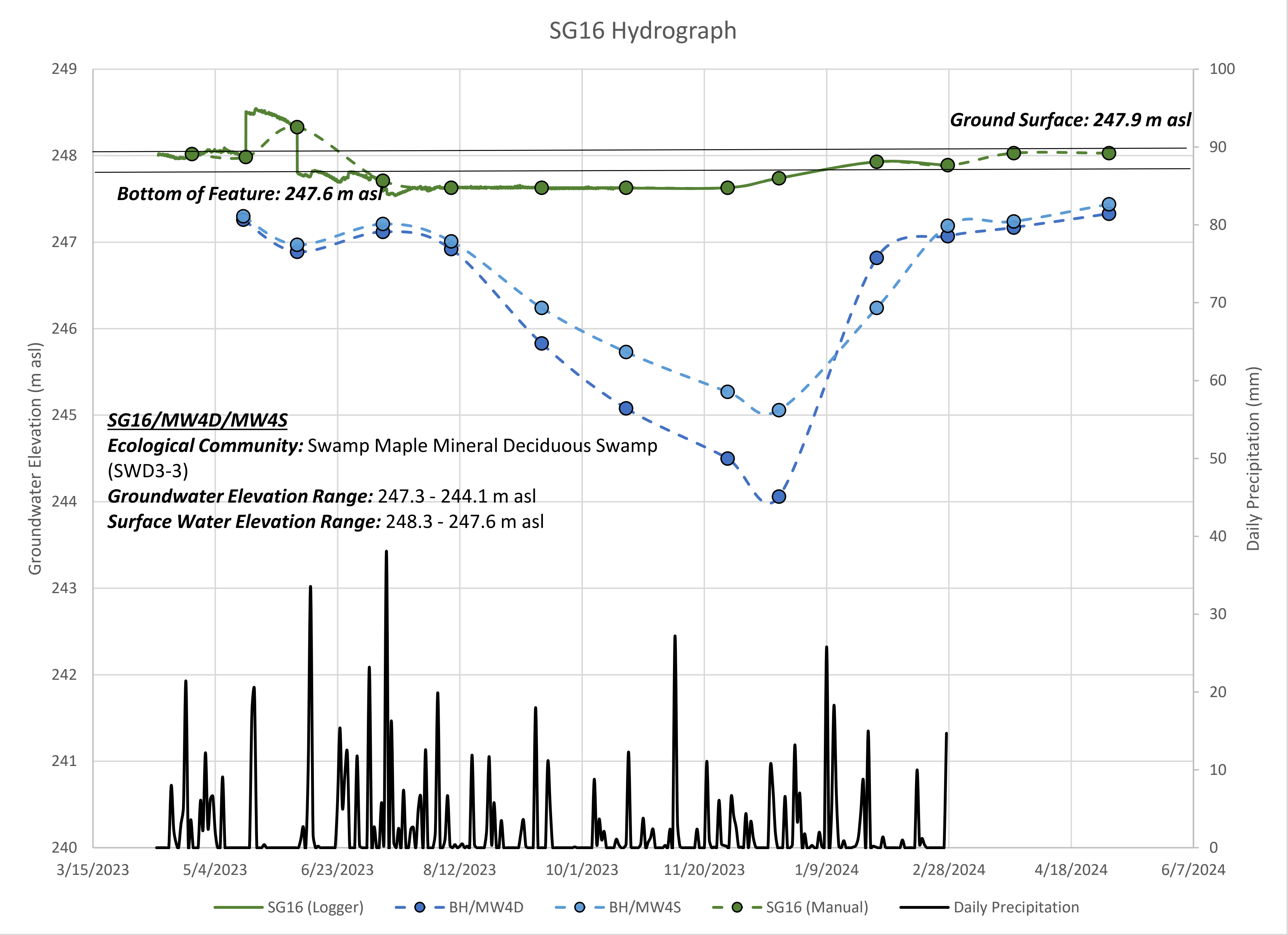
SG11/MW11D/MW11S
Headwater Drainage Feature: H1S1
Groundwater Elevation Range: 240.3 - 235.0 m asl
Surface Water Elevation Range: 242.5 - 242.3 m asl

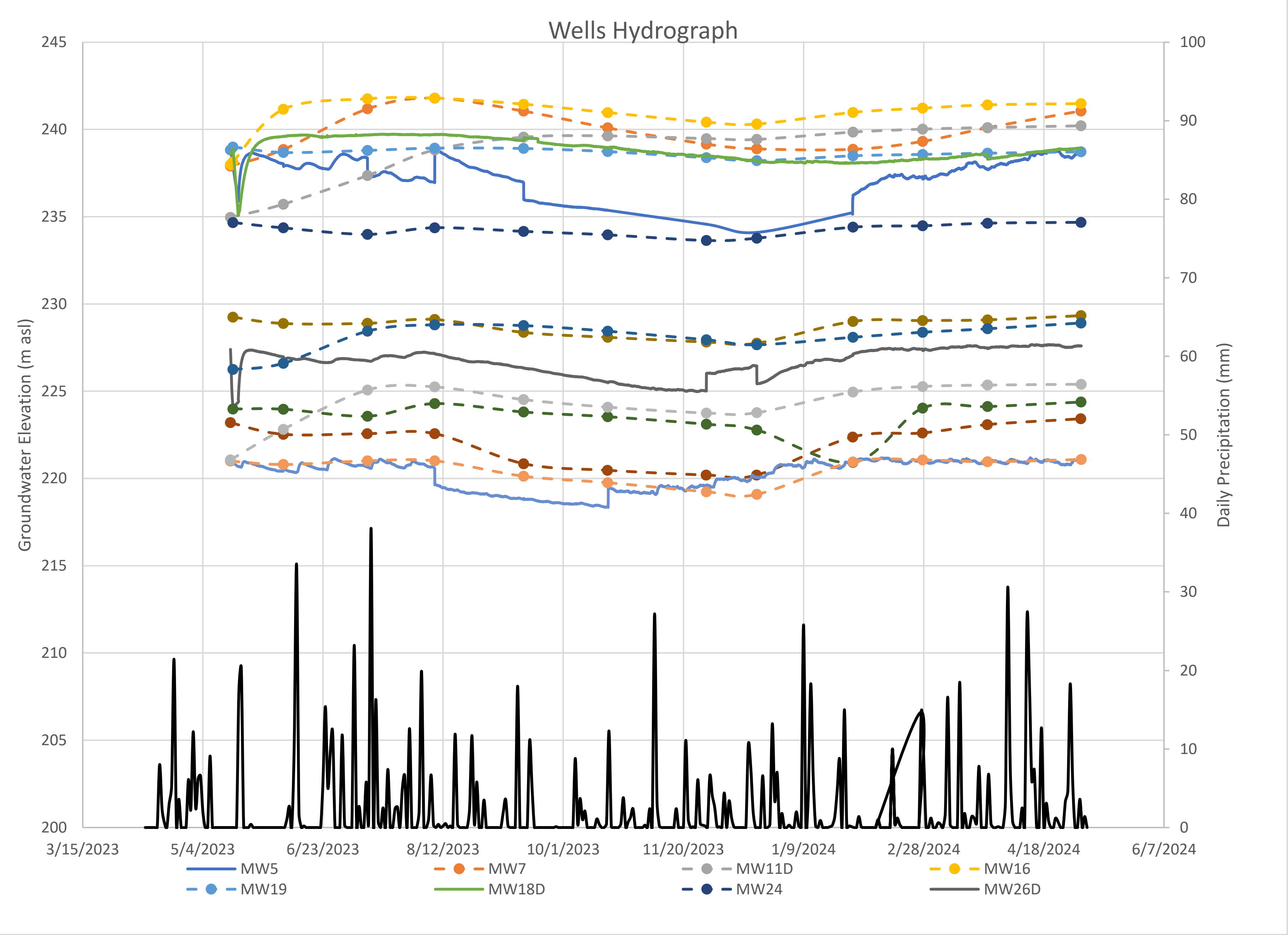

SG12 Hydrograph
Groundwater Elevation (m asl)
251
249
247
245
243
241
239
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
Bottom of Feature: 248.0 m asl
Ground Surface: 246.8 m asl
SG12/MW12D/MW12S
Ecological Community: Cattail Mineral Shallow Marsh Mowed (MAS2-1)
Groundwater Elevation Range: 246.5 - 242.9 m asl
Surface Water Elevation Range: 248.5 - 248.0 m asl
SG12 (Logger)
BH/MW12D
BH/MW12S
SG12 (Manual)
Daily Precipitation


SG13 Hydrograph
Ground Surface: 240.1 m asl
Bottom of Feature: 239.1 m asl
SG13/MW13D/MW13S
Groundwater Elevation Range: 239.5 - 235.8 m asl
Surface Water Elevation Range: 239.4 - 239.1 m asl
Groundwater Elevation (m asl)
Daily Precipitation (mm)
241
240
239
238
237
236
235
234
233
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
SG13 (Logger)
BH/MW13D
BH/MW13S
SG13 (Manual)
Daily Precipitation


SG14 Hydrograph
Ground Surface: 242.3 m asl
Bottom of Feature: 241.4 m asl
SG14/MW1D/MW1S
Ecological Community: Reed Canary Grass Mineral Meadow Marsh (MAM2-2)
Groundwater Elevation Range: 242.0 - 239.9 m asl
Surface Water Elevation Range: 241.8 - 241.4 m asl
Groundwater Elevation (m asl)
243
242
241
240
239
238
237
236
Daily Precipitation (mm)
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
SG14
BH/MW1D
BH/MW1S
Daily Precipitation


SG15 Hydrograph
250
249
248
247
246
245
244
243
Groundwater Elevation (m asl)
100
90
80
70
60
50
40
30
20
10
0
Daily Precipitation (mm)
3/15/2023 0:00
5/4/2023 0:00
6/23/2023 0:00
8/12/2023 0:00
10/1/2023 0:00
11/20/2023 0:00
1/9/2024 0:00
2/28/2024 0:00
4/18/2024 0:00
6/7/2024 0:00
Bottom of Feature: 248.8 m asl
Ground Surface: 247.9 m asl
SG15/MW3D/MW3S
Ecological Community: Cattail Mineral Shallow Marsh (MAS2-1)
Groundwater Elevation Range: 247.7 - 245.8 m asl
Surface Water Elevation Range: 249.2 - 248.8 m asl
SG15
BH/MW3D
BH/MW3S
Daily Precipitation


SG16 Hydrograph
Groundwater Elevation (m asl)
Daily Precipitation (mm)
249
248
247
246
245
244
243
242
241
240
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
Ground Surface: 247.9 m asl
Bottom of Feature: 247.6 m asl
SG16/MW4D/MW4S
Ecological Community: Swamp Maple Mineral Deciduous Swamp (SWD3-3)
Groundwater Elevation Range: 247.3 - 244.1 m asl
Surface Water Elevation Range: 248.3 - 247.6 m asl
SG16 (Logger)
BH/MW4D
BH/MW4S
SG16 (Manual)
Daily Precipitation


Wells Hydrograph
Groundwater Elevation (m asl)
245
240
235
230
225
220
215
210
205
200
Daily Precipitation (mm)
100
90
80
70
60
50
40
30
20
10
0
3/15/2023
5/4/2023
6/23/2023
8/12/2023
10/1/2023
11/20/2023
1/9/2024
2/28/2024
4/18/2024
6/7/2024
MW5
MW7
MW11D
MW16
MW19
MW18D
MW24
MW26D

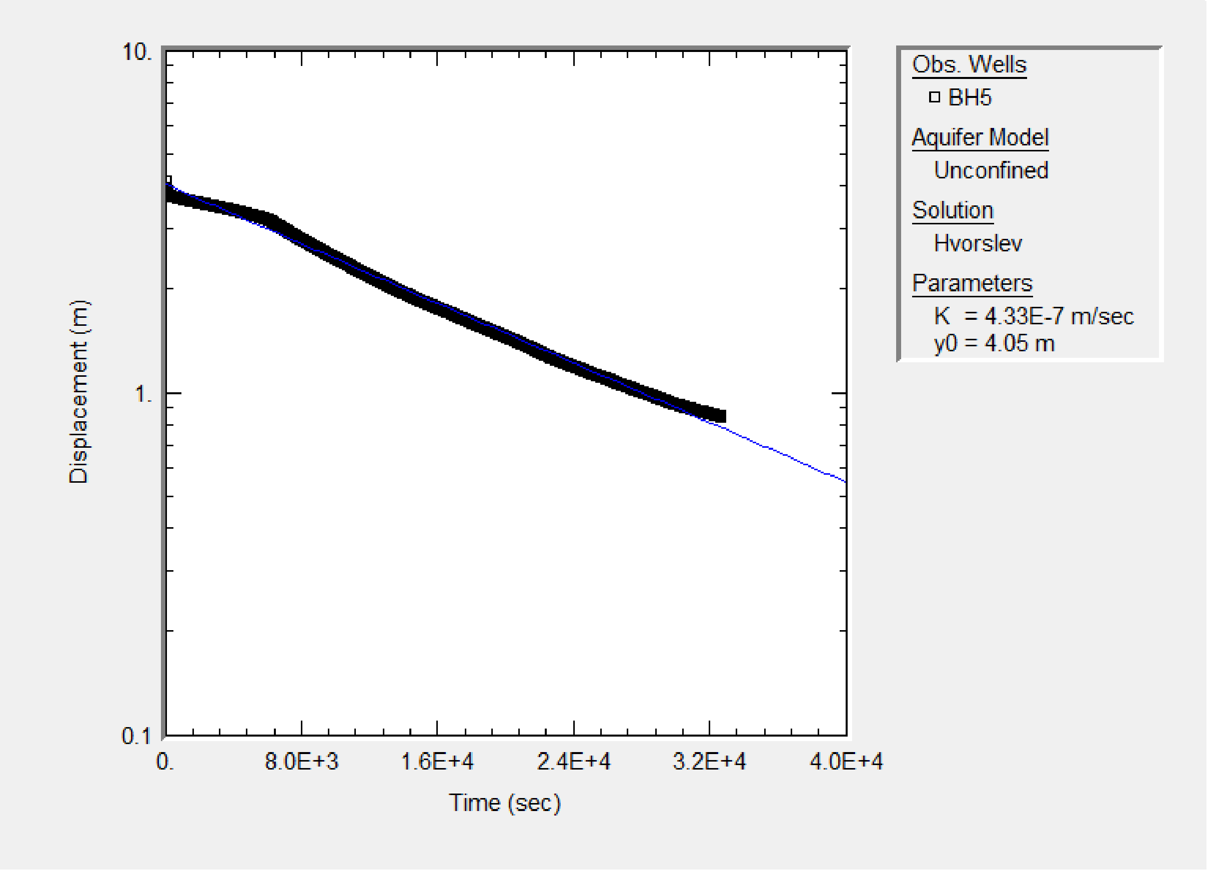
APPENDIX C12

RISING HEAD TEST RESULTS

Estimation of K by Slug Test, based on Horslev equation

Date:	May 16 to 18, 2023
Conducted by:	B.Hwang

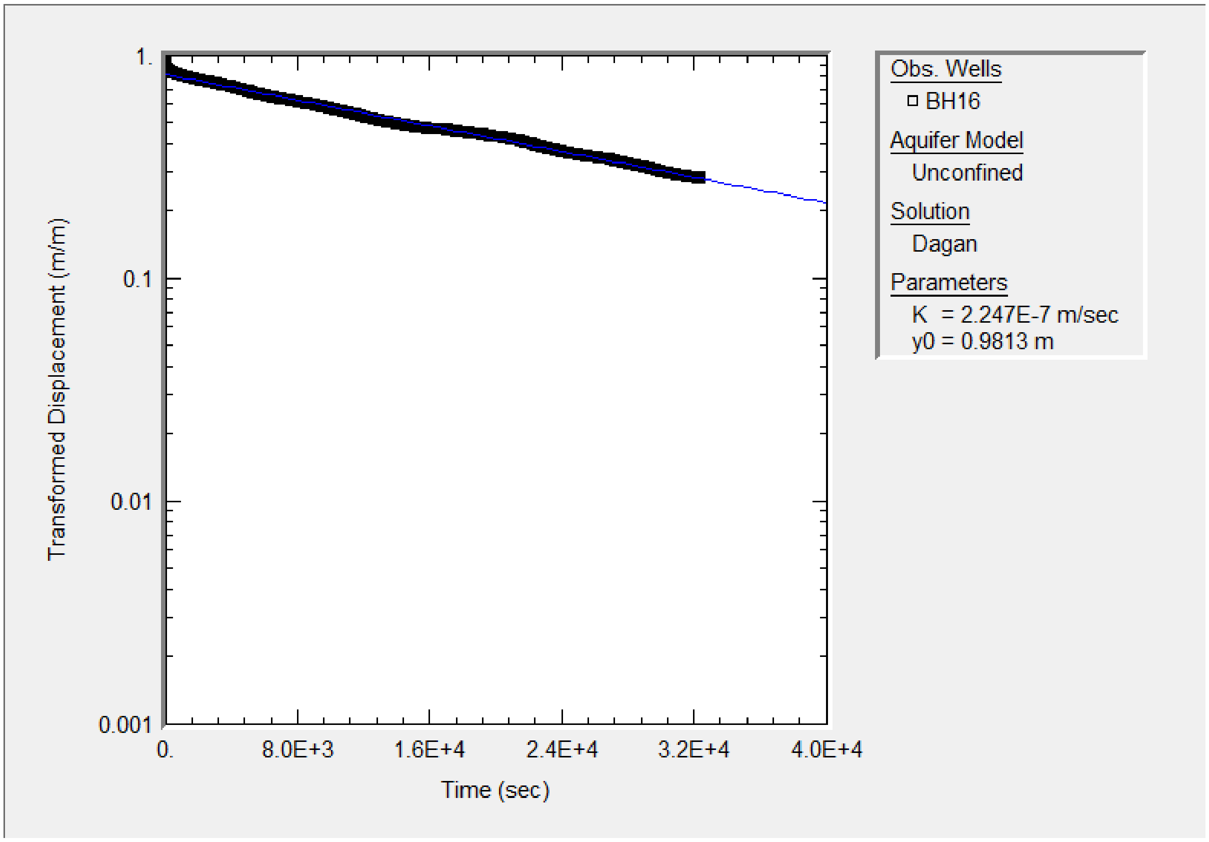
Well Number:	BH5	
Well Screen Bottom:	7.62	mbgs
Top of Pipe:	0.93	mbgs
Well Casing Diameter:	5.08	cm
Well Elevation:	241.8	mbgs
Static Water Level:	2.85	mbgs
$K = r^2\ln(L/R)/(2LTo)$ =	**$4.3\text{x}10^{-7}$**	m/s



Estimation of K by Slug Test, based on Horslev equation

Date:	May 16 to 18, 2023
Conducted by:	B.Hwang

Well Number:	BH16	
Well Screen Bottom:	6.10	mbgs
Top of Pipe:	0.76	mbgs
Well Casing Diameter:	5.08	cm
Well Elevation:	242.77	mbgs
Static Water Level:	4.60	mbgs
$K = r^2 \ln(L/R)/(2LTo) =$	**$2.2x10^{-7}$**	m/s

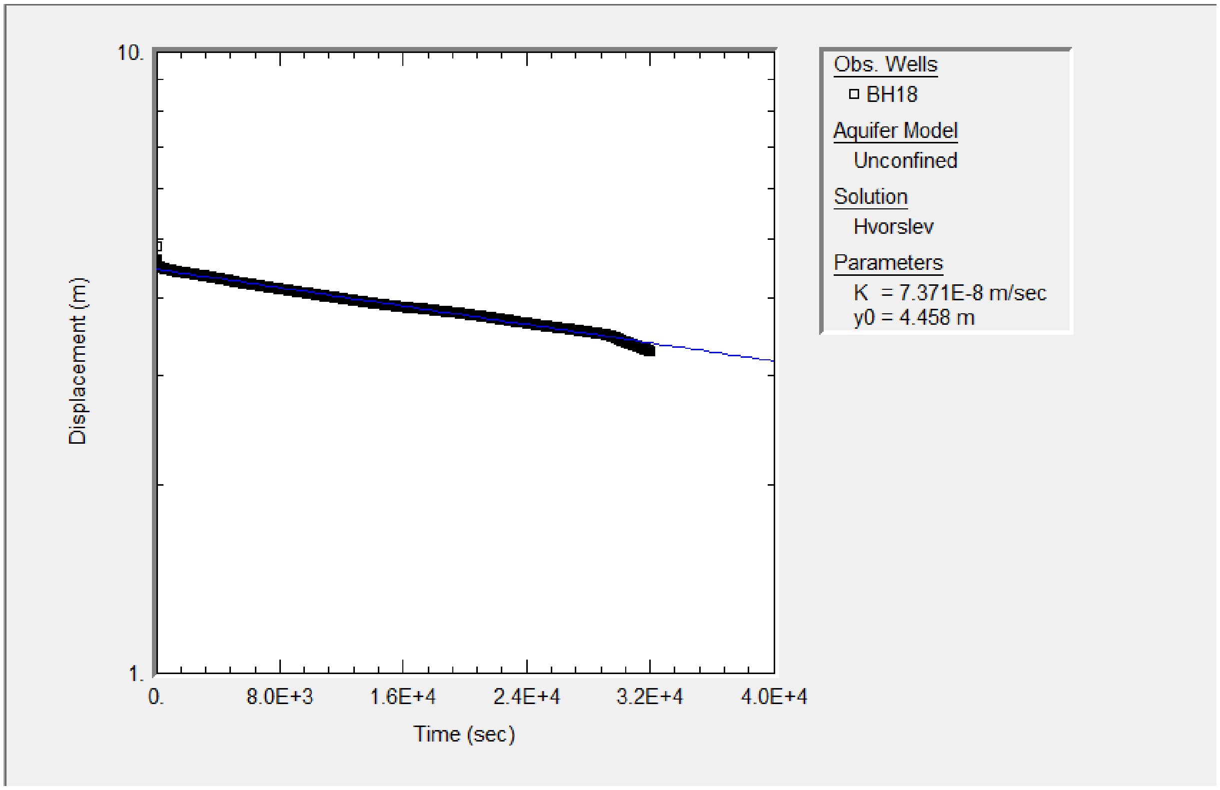


Obs. Wells
□ BH16
Aquifer Model
Unconfined
Solution
Dagan
Parameters
K = 2.247E-7 m/sec
y0 = 0.9813 m

Estimation of K by Slug Test, based on Horslev equation

Date:	May 16 to 18, 2023
Conducted by:	B.Hwang

Well Number:	BH18D	
Well Screen Bottom:	6.70	mbgs
Top of Pipe:	0.75	mags
Well Casing Diameter:	5.08	cm
Well Elevation:	240.53	mbgs
Static Water Level:	1.68	mbgs
$K = r^2 \ln(L/R)/(2LTo) =$	**7.4×10^{-8}**	m/s



Obs. Wells
□ BH18

Aquifer Model
Unconfined

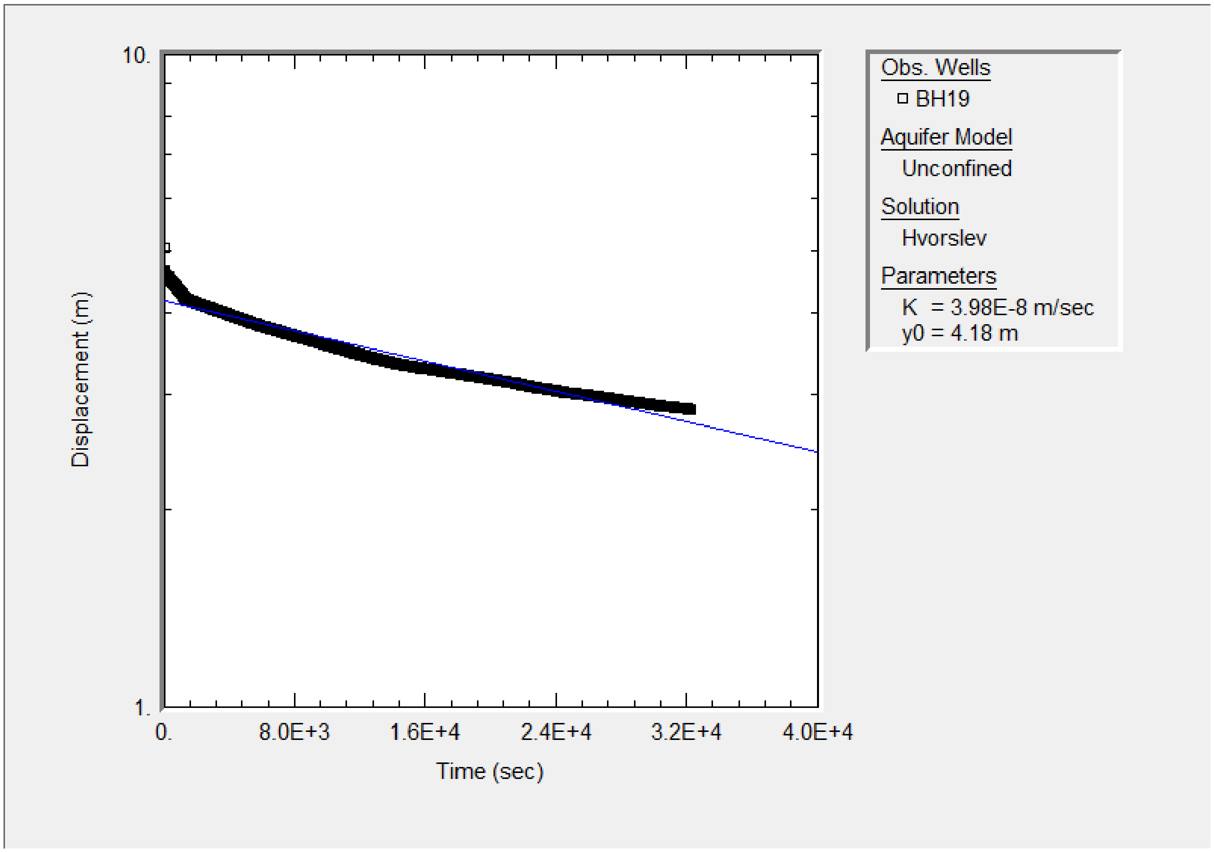
Solution
Hvorslev

Parameters
K = 7.371E-8 m/sec
y0 = 4.458 m

Estimation of K by Slug Test, based on Horslev equation

Date:	May 16 to 18, 2023
Conducted by:	B.Hwang

Well Number:	BH19	
Well Screen Bottom:	6.10	mbgs
Top of Pipe:	0.78	mags
Well Casing Diameter:	5.08	cm
Well Elevation:	239.32	mbgs
Static Water Level:	0.31	mbgs
$K = r^2\ln(L/R)/(2LTo) =$	**$4.0x10^{-8}$**	m/s

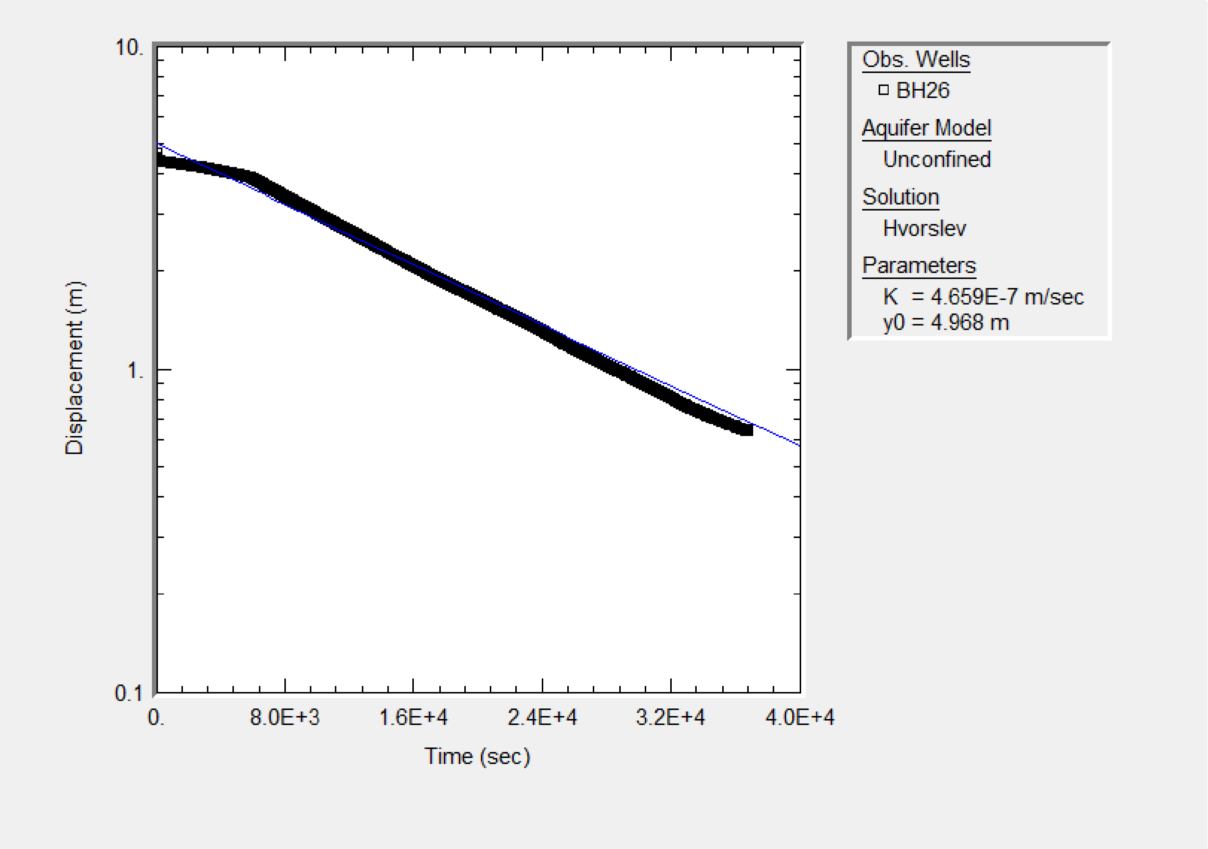


Obs. Wells
☐ BH19
Aquifer Model
Unconfined
Solution
Hvorslev
Parameters
K = 3.98E-8 m/sec
y0 = 4.18 m

Estimation of K by Slug Test, based on Horslev equation

Date:	May 16 to 18, 2023
Conducted by:	B.Hwang

Well Number:	BH26	
Well Screen Bottom:	6.10	mbgs
Top of Pipe:	0.78	mags
Well Casing Diameter:	5.08	cm
Well Elevation:	228.17	mbgs
Static Water Level:	0.73	mbgs
$K = r^2 \ln(L/R)/(2LTo) =$	**$4.7\text{x}10^{-7}$**	m/s

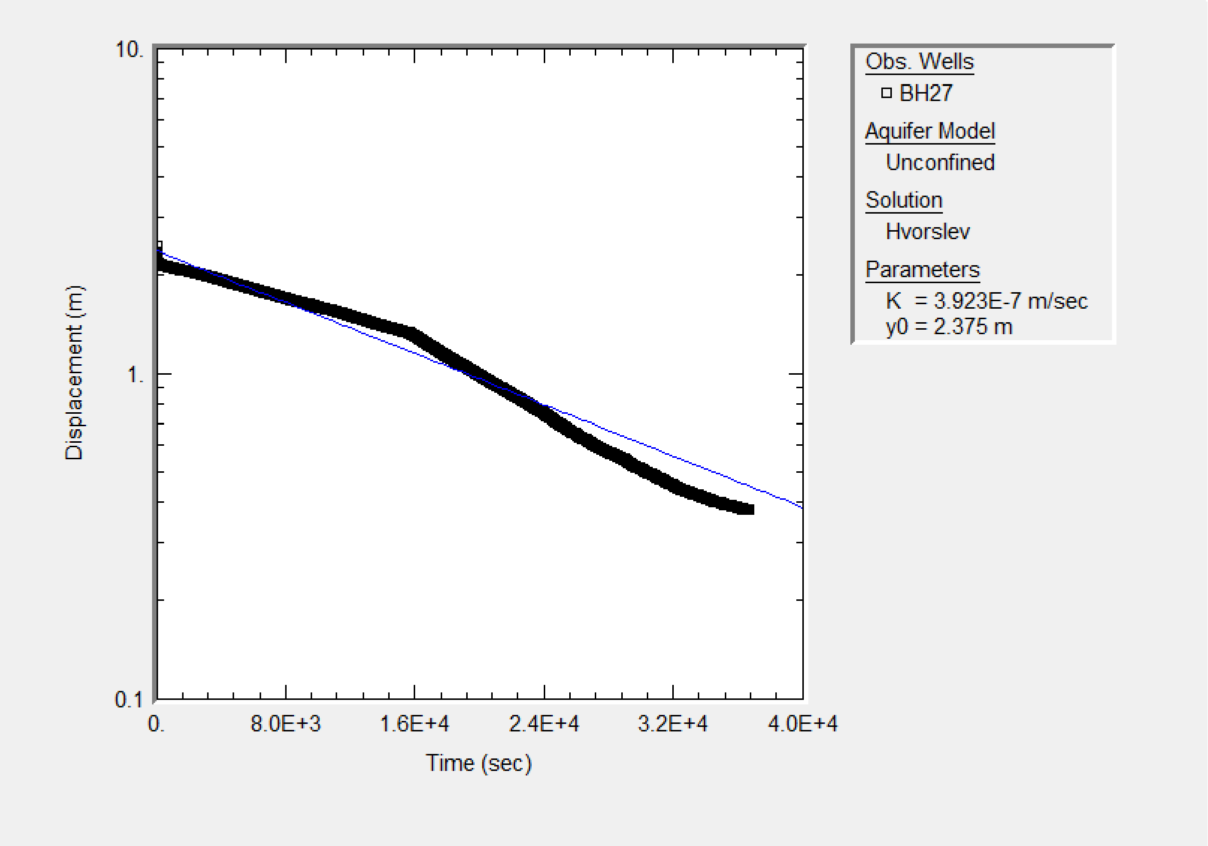


Obs. Wells
□ BH26
Aquifer Model
Unconfined
Solution
Hvorslev
Parameters
K = 4.659E-7 m/sec
y0 = 4.968 m

Estimation of K by Slug Test, based on Horslev equation

Date:	May 16 to 18, 2023
Conducted by:	B.Hwang

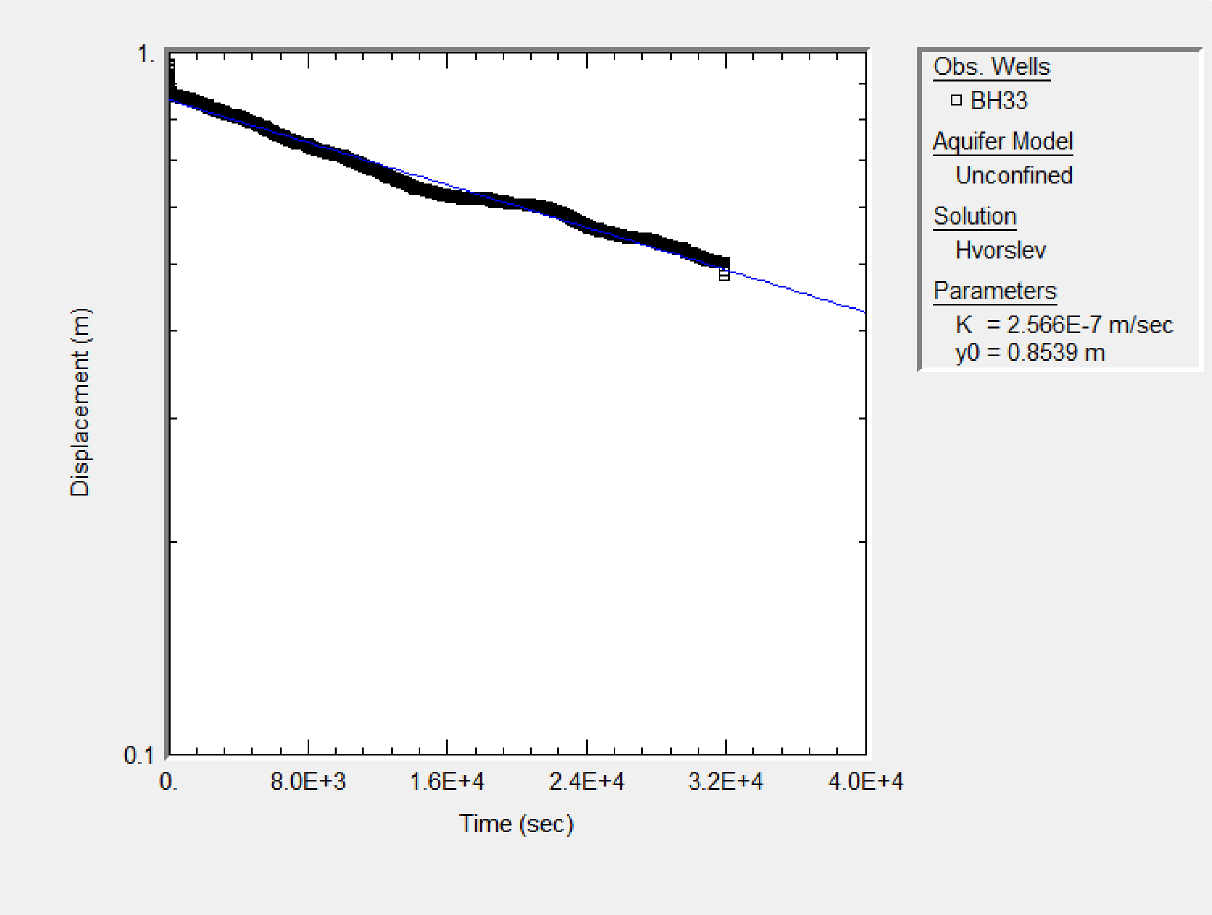
Well Number:	BH27	
Well Screen Bottom:	6.10	mbgs
Top of Pipe:	1.00	mags
Well Casing Diameter:	5.08	cm
Well Elevation:	226.36	mbgs
Static Water Level:	3.13	mbgs
$K = r^2 \ln(L/R)/(2LTo) =$	**$3.9x10^{-7}$**	m/s



Estimation of K by Slug Test, based on Horslev equation

Date:	May 16 to 18, 2023
Conducted by:	B.Hwang

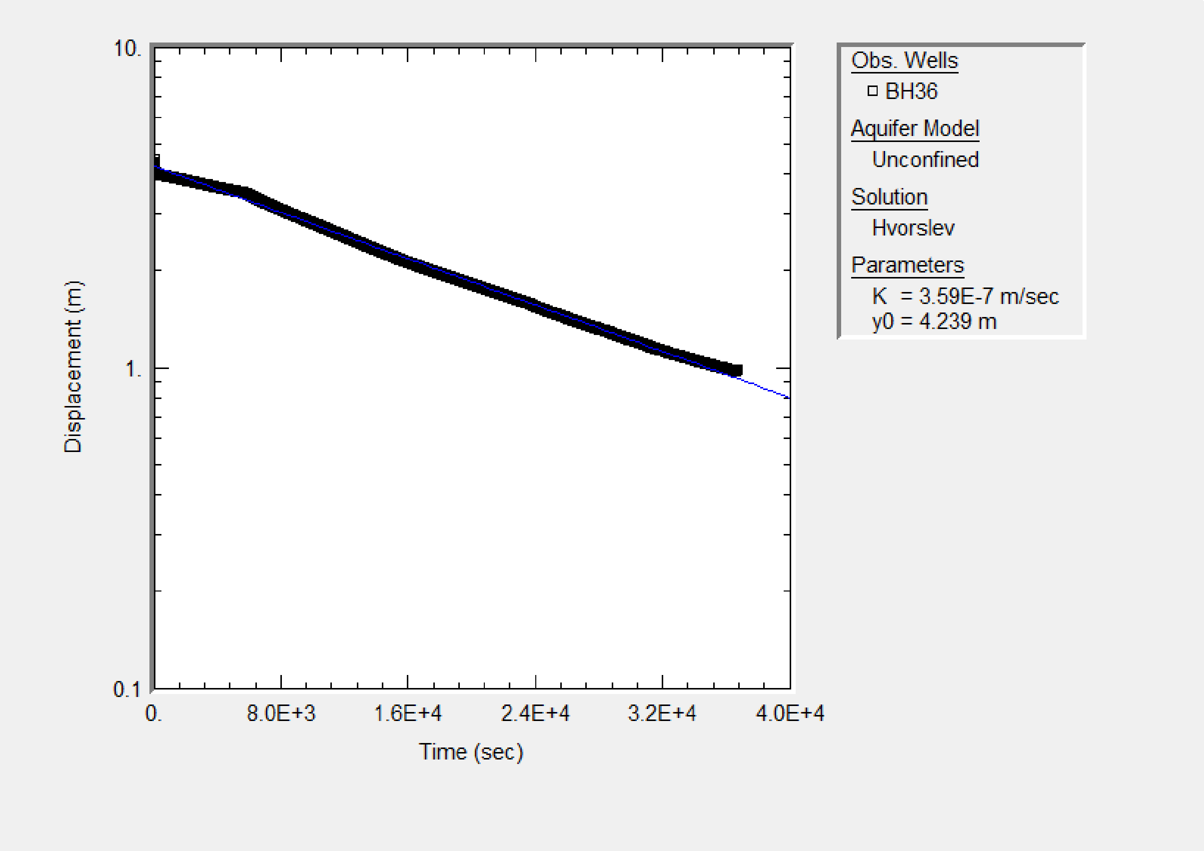
Well Number:	BH33	
Well Screen Bottom:	6.60	mbgs
Top of Pipe:	0.78	mags
Well Casing Diameter:	5.08	cm
Well Elevation:	231.25	mbgs
Static Water Level:	5.00	mbgs
$K = r^2 \ln(L/R)/(2LTo) =$	**2.6×10^{-7}**	m/s



Estimation of K by Slug Test, based on Horslev equation

Date:	May 16 to 18, 2023
Conducted by:	B.Hwang

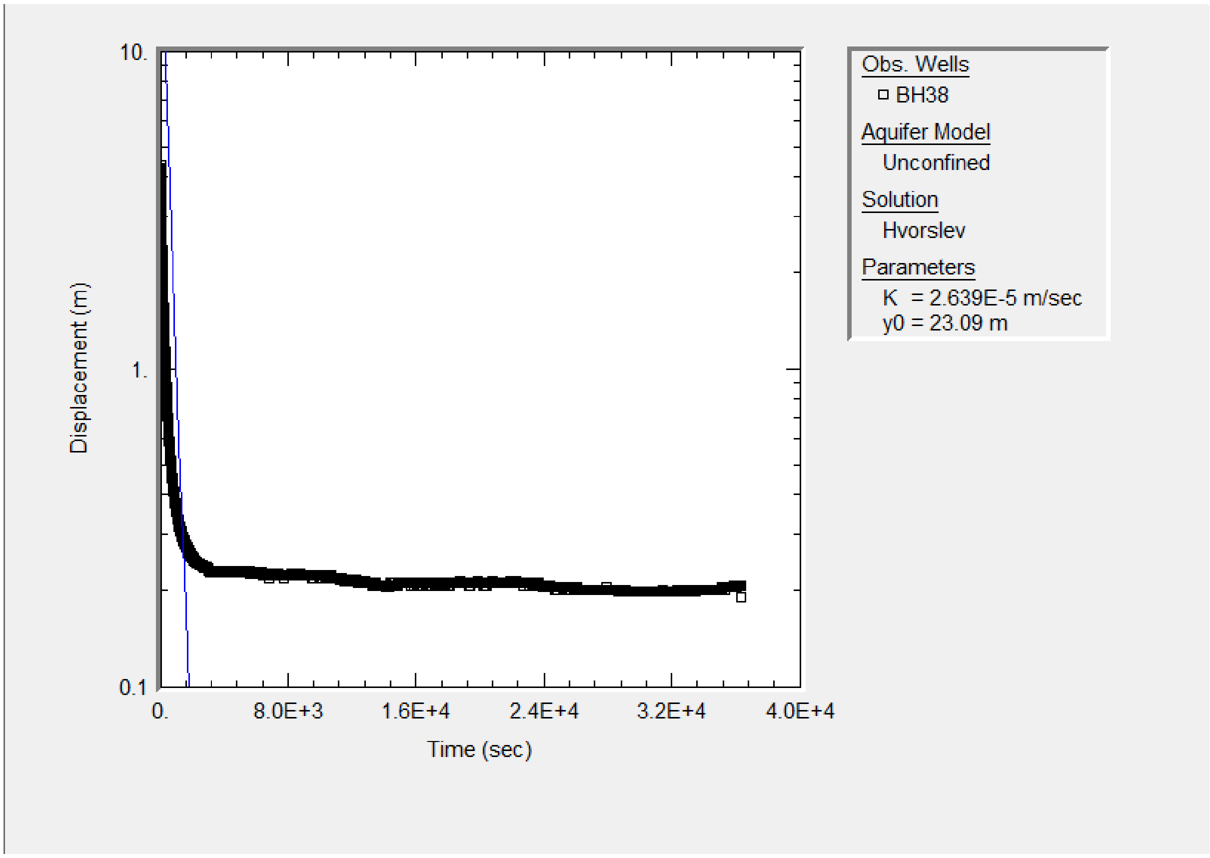
Well Number:	BH36	
Well Screen Bottom:	6.10	mbgs
Top of Pipe:	0.69	mags
Well Casing Diameter:	5.08	cm
Well Elevation:	225.17	mbgs
Static Water Level:	1.19	mbgs
$K = r^2\ln(L/R)/(2LTo) =$	**$3.6\text{x}10^{-7}$**	m/s



Estimation of K by Slug Test, based on Horslev equation

Date:	May 16 to 18, 2023
Conducted by:	B.Hwang

Well Number:	BH38	
Well Screen Bottom:	6.40	mbgs
Top of Pipe:	0.70	mags
Well Casing Diameter:	5.08	cm
Well Elevation:	221.30	mbgs
Static Water Level:	0.39	mbgs
$K = r^2\ln(L/R)/(2LTo) =$	**2.6×10^{-5}**	m/s

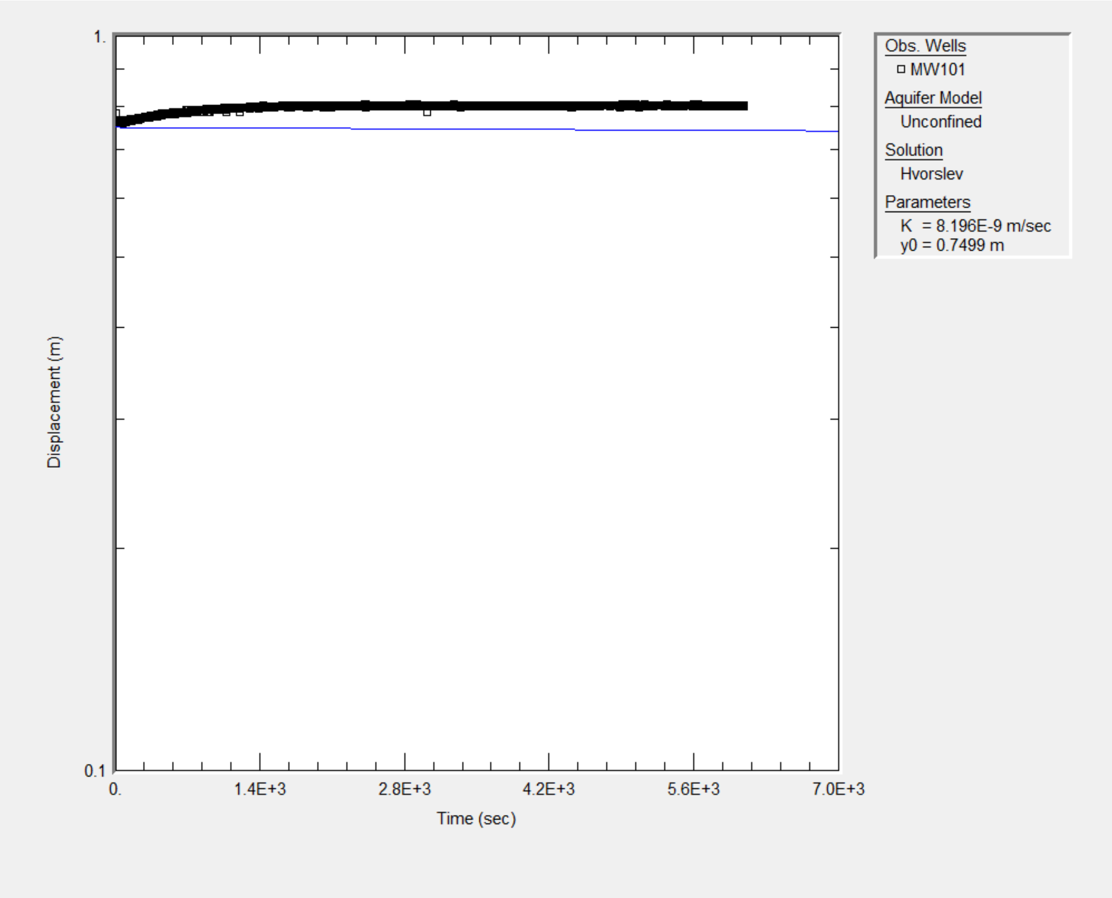


Obs. Wells
□ BH38
Aquifer Model
Unconfined
Solution
Hvorslev
Parameters
K = 2.639E-5 m/sec
y0 = 23.09 m

Estimation of K by Slug Test, based on Horslev equation

Date:	August 21 to 22, 2024
Conducted by:	T.Atikain

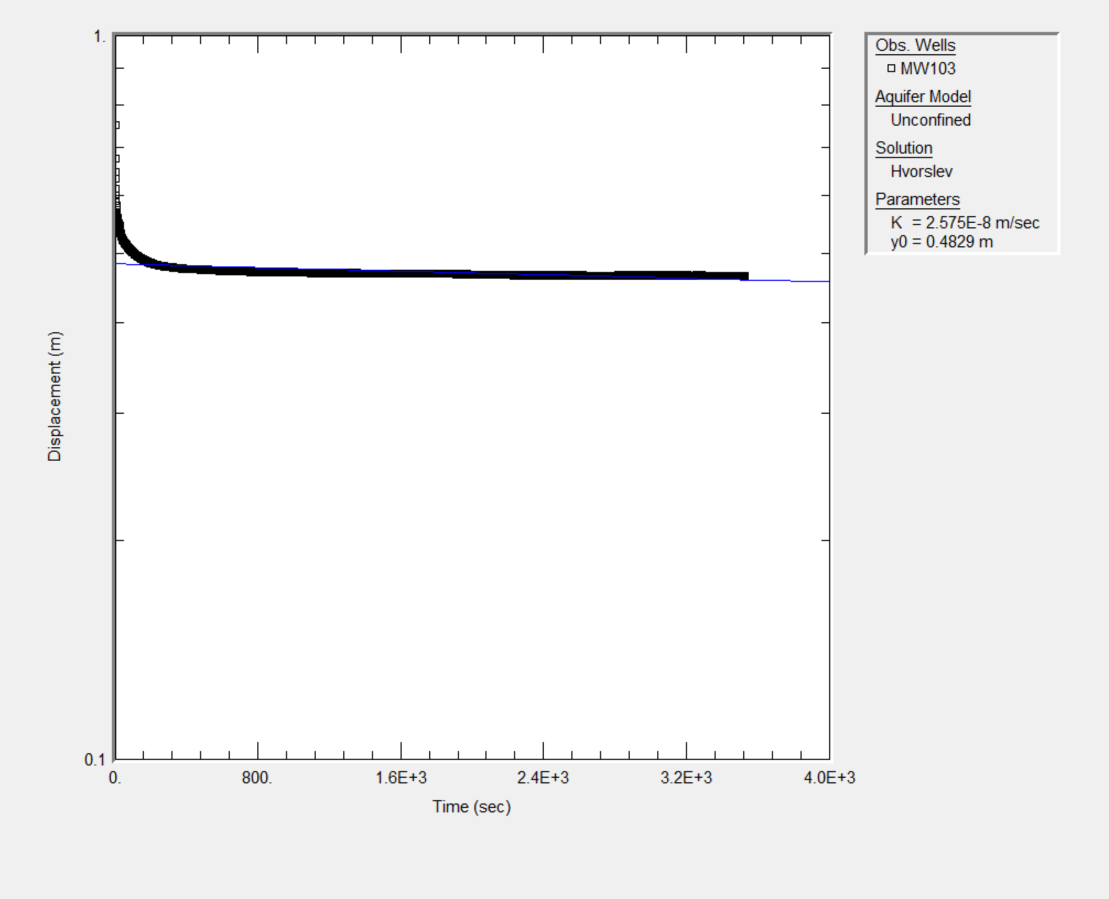
Well Number:	MW101	
Well Screen Bottom:	6.10	mbgs
Top of Pipe:	0.73	mags
Well Casing Diameter:	5.08	cm
Well Elevation:	240.16	mbgs
Static Water Level:	1.74	mbgs
$K = r^2 \ln(L/R)/(2LTo) =$	**8.2×10^{-9}**	m/s



Estimation of K by Slug Test, based on Horslev equation

Date:	August 21 to 22, 2024
Conducted by:	T.Atikain

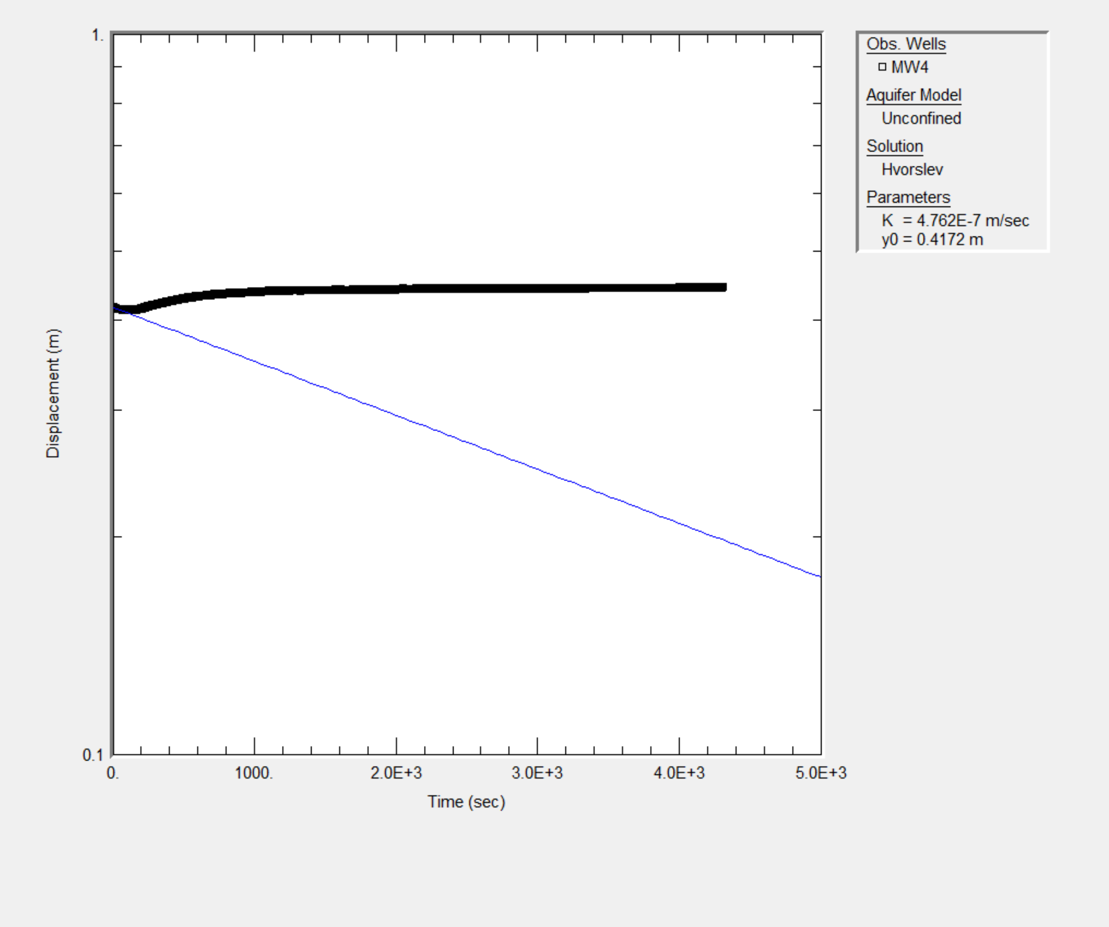
Well Number:	MW103	
Well Screen Bottom:	6.10	mbgs
Top of Pipe:	0.81	mags
Well Casing Diameter:	5.08	cm
Well Elevation:	235.81	mbgs
Static Water Level:	2.44	mbgs
$K = r^2 \ln(L/R)/(2LTo) =$	**2.6×10^{-8}**	m/s



Estimation of K by Slug Test, based on Horslev equation

Date:	August 21 to 22, 2024
Conducted by:	T.Atikain

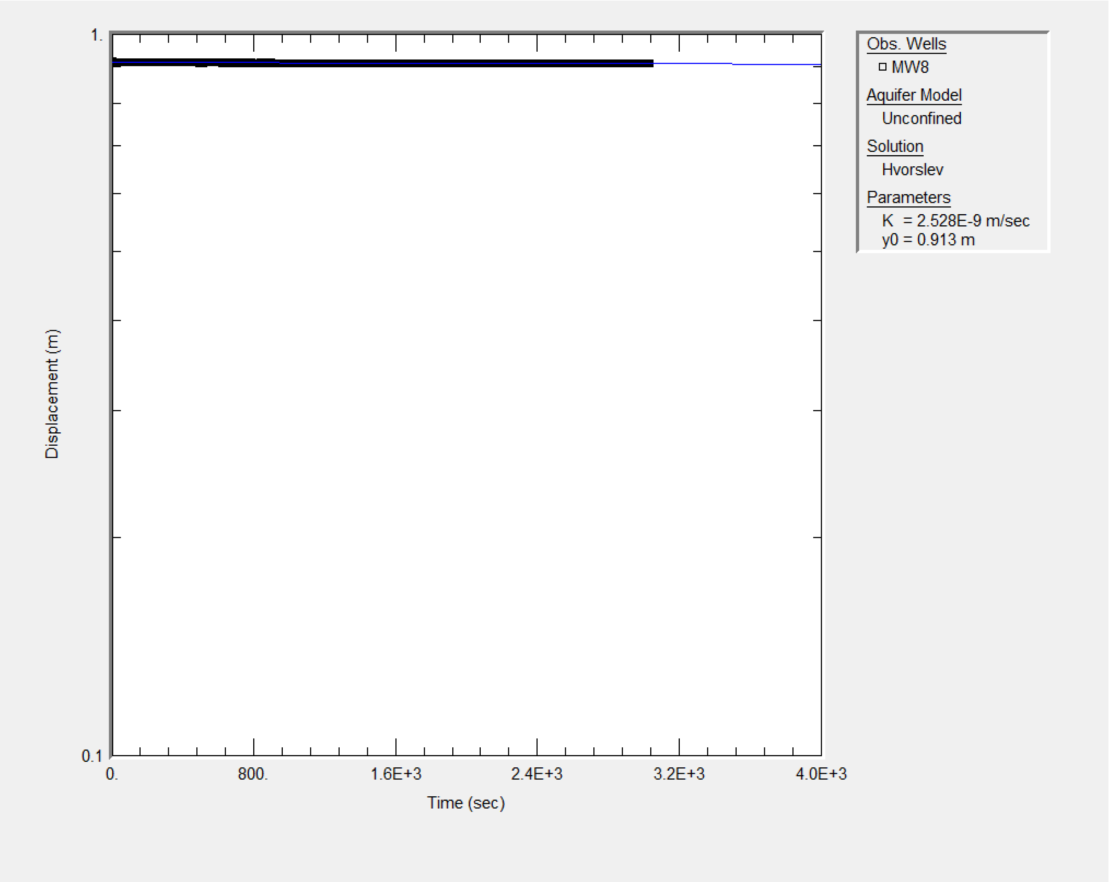
Well Number:	MW4 (Pinchin)	
Well Screen Bottom:	6.00	mbgs
Top of Pipe:	0.95	mags
Well Casing Diameter:	5.08	cm
Well Elevation:	243.41	mbgs
Static Water Level:	2.48	mbgs
$K = r^2 \ln(L/R)/(2LTo) =$	**$4.8x10^{-7}$**	m/s



Estimation of K by Slug Test, based on Horslev equation

Date:	August 21 to 22, 2024
Conducted by:	T.Atikain

Well Number:	MW8 (Pinchin)	
Well Screen Bottom:	6.00	mbgs
Top of Pipe:	0.97	mags
Well Casing Diameter:	5.08	cm
Well Elevation:	237.78	mbgs
Static Water Level:	2.40	mbgs
$K = r^2 \ln(L/R)/(2LTo) =$	**2.5×10^{-9}**	m/s



APPENDIX C13

SURFACE WATER QUALITY TESTING CERTIFICATES OF ANALYSIS

SCS consulting group ltd

GEI Consultants

GENERAL SAMPLE SUBMISSION FORM

CADUCEON
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured. Proudly Canadian.

SAMPLES SUBMITTED TO:

- Kingston ☐
- Ottawa ☐
- Richmond Hill ☒
- Barrie ☐
- Windsor ☐

TESTING REQUIREMENTS

- ☐ O'Reg 153/04 Table (1 - 9) ______
- ☐ O'Reg 406/19 Table (1 - 9.1) ______
- ☐ RPI ☐ ICC
- ☐ Coarse ☐ Medium/Fine
- ☐ MISA ☒ PWQO
- ☐ Other: ______
- Record of Site ______
- SPLP Table (1-9.1) ______
- ☐ Agricultural
- ☐ O'Reg 558 TCLP
- ☐ Landfill Monitoring

REPORT NUMBER (Lab Use)

24-013700

Are any samples to be submitted intended for Human Consumption under any Drinking Water Regulations? ☐ Yes ☒ No (If yes, submit all Drinking Water Samples on a Drinking Water Chain of Custody)

Organization: GEI CONSULTANTS CANADA LTD.
Contact: BETHANY GRUBER
Tel: 519 212 3092
Fax:
Email: BGRUBER@GEICONSULTANTS.COM
Additional Info (email, cell, etc):

Address:
1266 S SERVICE RD
UNIT C3-1
STONEY CREEK, ON
L8E 5R9

Quote #: Q3924 ~~Q 3924~~
P.O. #: ~~Q3754~~

Invoicing Address (if different):
Project Name or #: 2100463
Additional Info: Client quote is correct as

ANALYSES REQUESTED

TURNAROUND SERVICE REQUESTED (see back page)
*Must be arranged in advance

- ☐ Platinum* 200% Surcharge
- ☐ Gold* 100% Surcharge
- ☐ Silver 50% Surcharge
- ☐ Bronze 25% Surcharge
- ☒ Standard 5-7 days
- ☐ Specific Date: ______

* Sample Matrix Legend: WW=Waste Water, SW=Surface Water, GW=Groundwater, LS=Liquid Sludge, SS=Solid Sludge, S=Soil, Sed=Sediment, PC=Paint Chips, F=Filter, Oil = Oil

Lab No.	Sample Source and/or Sample Identification	S.P.L. (Watertrax)	Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected	GENERAL CHEM	~~BACTERIA~~ E.COLI	ICPMS TOTAL METALS	TP/TKN, AMMONIA, ~~BOD~~	RISS - PAH's	FECAL COLIFORMS	TOTAL COLIFORMS + BACKGROUND	PHOSPHATE-P, BOD-5	ANIONS - Cl, NO2-N, NO3-N	TS, TSS, TURBIDITY	ICP TOTAL METALS	OIL + GREASE TOTAL	Suspected Highly Contaminated X	Field pH	Field Temp.	# Bottles/ Sample	Field Filtered Y/N
1	SW-02		SW	24-05-13	20:00	X	X	X	X	X	X	X	X	X	X	X	X				8	N
2	SW-04		SW	24-05-13	20:30	X	X	X	X	X	X	X	X	X	X	X	X				8	N
3	SW-05		SW	24-05-13	20:30	X	X	X	X	X	X	X	X	X	X	X	X				8	N
4	SW-07 *		SW	24-05-13	21:00	X	X	X	X	X	X	X	X	X	X	X	X				8	N

K - bacti (fecal), gen chem, O&G, 1L amber, nutr
O - genchem, metals
~~B - bacti (e.coli)~~ M

*#4 - O&G ~2/3 full, PAH only half full. CS

SAMPLE SUBMISSION INFORMATION

	Sampled by:	Submitted by:
Print:	BETHANY GRUBER	BETHANY GRUBER
Sign:	Bethany Gruber	Bethany Gruber
Date (yy-mm-dd)/Time:	24-05-13 16:00	24-05-13 22:00

SHIPPING INFORMATION

- Courier (Client account) ☐
- Courier (Caduceon account) ☐
- Drop Off ☒
- Caduceon (Pick-up) ☐

Invoice
# of Pieces: 1

REPORTING / INVOICING

- Report by Fax ☐
- Report by Email ☒
- Invoice by Email ☒
- Invoice by Mail ☐

SAMPLE RECEIVING INFORMATION (LABORATORY USE ONLY)

Received By (print): Jam
Signature:
Date Received (yy-mm-dd): 24-05-14
Time Received: 8:00 (AH)
Laboratory Prepared Bottles: ☒ Yes ☐ No
Sample Temperature °C: 9.8
Labeled by:

Comments: GENERAL CHEM = ALKALINITY, CONDUCTIVITY, TDS, PH
ICP METALS = Al, B, Ba, Ca, Fe, Mg, Na, Mn, Sn, K, Si, Sr, W, Ti, Zn, Zr
ICPMS METALS = Sb, As, Be, Cd, Cr, Co, Cu, Pb, Mo, Ni, Se, Ag, Tl, U, V

Page 1 of 1

G 112666

CofC, Oct 2021 Revision No: 24

CADUCEON
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured. Canadian owned.

Notification of Sample Receipt

GEI Consultants
647 Welham Rd, Unit 14
Barrie ON L4N 0B7
CA

CADUCEON Environmental Laboratories
110 West Beaver Creek Rd
Unit #14
Richmond Hill ON L4B 1J9
CA

Submission Summary:

Project: 24-013700

Customer Project: 2100463

Project PO #:

Receipt Temperature: 9.8°C

Project Due Date:

Project Received Date: 2024-May-14

4 Samples Received at RICHMOND_HILL

Lab Sample ID	Client Sample ID	Date Sampled	Sample Due Date	Sample Type
24-013700-1	SW-02	2024-May-13	2024-May-21	Surface Water
24-013700-2	SW-04	2024-May-13	2024-May-21	Surface Water
24-013700-3	SW-05	2024-May-13	2024-May-21	Surface Water
24-013700-4	SW-07	2024-May-13	2024-May-21	Surface Water

Analysis Requested:

	Ammonia & o-Phosphate (Liquid)	Anions (Liquid)	BOD5 (Liquid)	Cond/pH/Alk Auto (Liquid)	E.Coli m-TECH Media (Liquid)	Fecal Coliforms (Liquid)	ICP/MS Total (Liquid)	ICP/OES Total (Liquid)	Oil & Grease (Liquid)	SVOC - Semi-Volatiles (Liquid)	Total Coliforms (m-Endo Media)	TP & TKN (Liquid)	TS (Liquid)	TSS (Liquid)	Turbidity (Liquid)
SW-02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SW-04	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SW-05	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SW-07	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

GENERAL SAMPLE SUBMISSION FORM

CADUCEON
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured. Proudly Canadian.

SAMPLES SUBMITTED TO:
Kingston ☐
Ottawa ☐
Richmond Hill ☒
Barrie ☐
Windsor ☐

TESTING REQUIREMENTS
☐ O'Reg 153/04 Table (1 - 9) ______
☐ O'Reg 406/19 Table (1 - 9.1) ______
☐ RPI ☐ ICC
☐ Coarse ☐ Medium/Fine
☐ MISA ☒ PWQO
☐ Other: ______
Record of Site ______
SPLP Table (1-9.1) ______
☐ Agricultural
☐ O'Reg 558 TCLP
☐ Landfill Monitoring

REPORT NUMBER (Lab Use)
24-013700

Are any samples to be submitted intended for Human Consumption under any Drinking Water Regulations? ☐ Yes ☒ No (If yes, submit all Drinking Water Samples on a Drinking Water Chain of Custody)

Organization: GEI CONSULTANTS CANADA LTD.
Contact: BETHANY GRUBER
Tel: 519 212 3092
Fax:
Email: BGRUBER@GEICONSULTANTS.COM
Additional Info (email, cell, etc):

Address:
1266 S SERVICE RD
UNIT C3-1
STONEY CREEK, ON
L8E 5R9

Quote #: Q3924 ~~Q 3924~~
P.O. #: ~~Q3754~~

Invoicing Address (if different):
Project Name or #: 2100463
Additional Info: Clutquote is correct as

ANALYSES REQUESTED

TURNAROUND SERVICE REQUESTED (see back page)
*Must be arranged in advance
☐ Platinum* 200% Surcharge
☐ Gold* 100% Surcharge
☐ Silver 50% Surcharge
☐ Bronze 25% Surcharge
☒ Standard 5-7 days
☐ Specific Date: ______

* Sample Matrix Legend: WW=Waste Water, SW=Surface Water, GW=Groundwater, LS=Liquid Sludge, SS=Solid Sludge, S=Soil, Sed=Sediment, PC=Paint Chips, F=Filter, Oil = Oil

Lab No.	Sample Source and/or Sample Identification	S.P.L. (Watertrax)	Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected	GENERAL CHEM	~~BACTERIA~~ E.COLI	ICPMS, TOTAL METALS	TP/TKN, AMMONIA, ~~BOD~~	RIS3 - PAH's	FECAL COLIFORMS	TOTAL COLIFORMS + BACKGROUND	PHOSPHATE-P, BOD-5	ANIONS - Cl, NO2-N, NO3-N	TS, TSS, TURBIDITY	ICP TOTAL METALS	OIL + GREASE TOTAL	Suspected Highly Contaminated X	Field pH	Field Temp.	# Bottles/ Sample	Field Filtered Y/N
1	SW-02		SW	24-05-13	20:00	X	X	X	X	X	X	X	X	X	X	X	X				8	N
2	SW-04		SW	24-05-13	20:30	X	X	X	X	X	X	X	X	X	X	X	X				8	N
3	SW-05		SW	24-05-13	20:30	X	X	X	X	X	X	X	X	X	X	X	X				8	N
4	SW-07 ✱		SW	24-05-13	21:00	X	X	X	X	X	X	X	X	X	X	X	X				8	N

K - bacti (fecal), gen chem, O&G, 1L amber, nutr
O - genchem, metals
~~B - bacti (e-coli)~~ M

✱#4 - O&G ~2/3 full, PAH only half full. CS

SAMPLE SUBMISSION INFORMATION

	Sampled by:	Submitted by:
Print:	BETHANY GRUBER	BETHANY GRUBER
Sign:	Bethany Gruber	Bethany Gruber
Date (yy-mm-dd)/Time:	24-05-13 16:00	24-05-13 22:00

SHIPPING INFORMATION
Courier (Client account) ☐
Courier (Caduceon account) ☐
Drop Off ☒
Caduceon (Pick-up) ☐
Invoice
# of Pieces: 1

REPORTING / INVOICING
Report by Fax ☐
Report by Email ☒
Invoice by Email ☒
Invoice by Mail ☐

SAMPLE RECEIVING INFORMATION (LABORATORY USE ONLY)
Received By (print): Jam
Signature:
Date Received (yy-mm-dd): 24-05-14
Time Received: 8:00 (AH)
Laboratory Prepared Bottles: ☒ Yes ☐ No
Sample Temperature °C: 9.8
Labeled by:

Comments: GENERAL CHEM = ALKALINITY, CONDUCTIVITY, TDS, PH
ICP METALS = Al, B, Ba, Ca, Fe, Mg, Na, Mn, Sn, K, Si, Sr, W, Ti, Zn, Zr
ICPMS METALS = Sb, As, Be, Cd, Cr, Co, Cu, Pb, Mo, Ni, Se, Ag, Tl, U, V

Page 1 of 1

G 112666

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G112666 **REPORT No: 24-013700 - Rev. 0**

Report To:
GEI Consultants
647 Welham Rd, Unit 14
Barrie, ON L4N 0B7

CADUCEON Environmental Laboratories
110 West Beaver Creek Rd
Unit #14
Richmond Hill, ON L4B 1J9

Attention: Bethany Gruber

DATE RECEIVED: 2024-May-14
DATE REPORTED: 2024-May-21
SAMPLE MATRIX: Surface Water

CUSTOMER PROJECT: 2100463
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	4	OTTAWA	LMACGREGOR	2024-May-16	A-IC-01	SM 4110B
BOD5 (Liquid)	4	KINGSTON	JWOLFE2	2024-May-16	BOD-001	SM 5210B
Cond/pH/Alk Auto (Liquid)	4	OTTAWA	SBOUDREAU	2024-May-16	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
E.Coli m-TECH Media (Liquid)	4	KINGSTON	BBURTCH	2024-May-15	EC-001	MECP E3371
Fecal Coliforms (Liquid)	4	KINGSTON	BBURTCH	2024-May-15	FC-001	SM 9222D
ICP/MS Total (Liquid)	4	OTTAWA	AOZKAYMAK	2024-May-16	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	4	OTTAWA	NHOGAN	2024-May-16	D-ICP-01	SM 3120B
Ammonia & o-Phosphate (Liquid)	4	KINGSTON	JYEARWOOD	2024-May-16	NH3-001	SM 4500NH3
Oil & Grease (Liquid)	4	KINGSTON	MLANE	2024-May-15	O&G-001	SM 5520
SVOC - Semi-Volatiles (Liquid)	4	KINGSTON	EASIEDU	2024-May-15	NAB-W-001	EPA 8270D
Total Coliforms (m-Endo Media)	4	KINGSTON	BBURTCH	2024-May-15	TC-001	SM 9222B
TP & TKN (Liquid)	4	KINGSTON	KDIBBITS	2024-May-16	TPTKN-001	MECP E3516.2
TS (Liquid)	4	KINGSTON	JMACINNES	2024-May-17	TS-001	SM 2540
TSS (Liquid)	4	KINGSTON	DCASSIDY	2024-May-16	TSS-001	SM 2540D
Turbidity (Liquid)	4	OTTAWA	PLUSSIER	2024-May-15	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

M. Dubien

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

				Client I.D.	SW-02	SW-04	SW-05	SW-07
				Sample I.D.	24-013700-1	24-013700-2	24-013700-3	24-013700-4
				Date Collected	2024-May-13	2024-May-13	2024-May-13	2024-May-13
Parameter	**Units**	**R.L.**	**Limits**		-	-	-	-
Total Coliform	CFU/100mL	1			2500	7400	5900	1100
Background	CFU/100mL	1			>20000	>20000	>20000	>20000
E coli	CFU/100mL	1	100	PWQO	**304**	25	75	84
Fecal Coliform	CFU/100mL	1			312	7000	121	144
Alkalinity(CaCO3) to pH4.5	mg/L	5			298	419	301	341
TDS (Calc. from Cond.)	mg/L	3			718	656	501	835
Conductivity @25°C	uS/cm	1			1320	1220	943	1530
pH @25°C	pH units	-	8.5	PWQO	7.95	8.10	8.11	8.10
Turbidity	NTU	0.1			41.4	7.5	45.9	111
Chloride	mg/L	0.5			193	125	83.2	273
Nitrate (N)	mg/L	0.05			0.73	0.45	0.58	0.06
Nitrite (N)	mg/L	0.05			<0.05	<0.05	<0.05	<0.05
BOD5	mg/L	3			<3	3	3	<3
Total Suspended Solids	mg/L	3			55	9	51	151
Total Solids	mg/L	30			3700	2720	2660	1440
Phosphorus (Total)	µg/L	10	10	INTERIM	**140**	**60**	**130**	**220**
Total Kjeldahl Nitrogen	mg/L	0.1			1.4	0.6	2.6	1.3
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05			0.14	0.10	2.22	0.15
o-Phosphate (P)	mg/L	0.002			0.064	0.027	0.050	0.086
Hardness (as CaCO3)	mg/L as CaCO3	-			365	351	343	374
Aluminum (Total)	µg/L	10			1600	130	900	2220

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

				Client I.D.	SW-02	SW-04	SW-05	SW-07
				Sample I.D.	24-013700-1	24-013700-2	24-013700-3	24-013700-4
				Date Collected	2024-May-13	2024-May-13	2024-May-13	2024-May-13
Parameter	**Units**	**R.L.**	**Limits**		-	-	-	-
Barium (Total)	µg/L	1			42	38	43	74
Boron (Total)	µg/L	5	200	INTERIM	50	58	65	45
Calcium (Total)	µg/L	20			96300	111000	87600	112000
Iron (Total)	µg/L	5	300	PWQO	**2230**	**456**	**1040**	**3390**
Magnesium (Total)	µg/L	20			30200	18000	30200	22800
Manganese (Total)	µg/L	1			214	372	187	423
Potassium (Total)	µg/L	100			5600	4100	8100	3700
Silicon (Total)	µg/L	10			3100	3500	1640	4820
Sodium (Total)	µg/L	200			115000	102000	56900	173000
Strontium (Total)	µg/L	1			389	350	401	468
Tin (Total)	µg/L	50			<50	<50	<50	<50
Titanium (Total)	µg/L	5			44	<5	36	65
Tungsten (Total)	µg/L	10	30	INTERIM	<10	<10	<10	<10
Zinc (Total)	µg/L	5	20, 30	INTERIM, PWQO	**27**	**125**	13	**25**
Zirconium (Total)	µg/L	3	4	INTERIM	<3	<3	<3	<3
Antimony (Total)	µg/L	0.1	20	INTERIM	0.4	0.3	0.4	0.4
Arsenic (Total)	µg/L	0.1	5, 5	INTERIM, PWQO	0.9	0.6	1.0	1.0
Beryllium (Total)	µg/L	0.1	11	PWQO	<0.1	<0.1	<0.1	0.1
Cadmium (Total)	µg/L	0.015	0.1, 0.2	INTERIM, PWQO	0.040	<0.015	0.034	0.063
Chromium (Total)	µg/L	1			2	<1	1	3
Cobalt (Total)	µg/L	0.1	0.9	INTERIM	**1.4**	0.6	0.9	**1.8**

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

				Client I.D.	SW-02	SW-04	SW-05	SW-07
				Sample I.D.	24-013700-1	24-013700-2	24-013700-3	24-013700-4
				Date Collected	2024-May-13	2024-May-13	2024-May-13	2024-May-13
Parameter	**Units**	**R.L.**	**Limits**		-	-	-	-
Copper (Total)	µg/L	0.1	5	INTERIM	**5.7**	3.3	3.8	**6.0**
Lead (Total)	µg/L	0.02	1, 5	INTERIM, PWQO	**1.16**	0.10	0.56	**1.95**
Molybdenum (Total)	µg/L	0.1	40	INTERIM	1.0	0.7	1.3	4.7
Nickel (Total)	µg/L	0.2	25	PWQO	4.6	2.5	3.4	5.6
Selenium (Total)	µg/L	1	100	PWQO	<1	<1	<1	<1
Silver (Total)	µg/L	0.1	0.1	PWQO	<0.1	<0.1	<0.1	<0.1
Thallium (Total)	µg/L	0.05	0.3, 0.3	INTERIM, PWQO	<0.05	<0.05	<0.05	<0.05
Uranium (Total)	µg/L	0.05	5	INTERIM	1.98	1.69	3.82	1.59
Vanadium (Total)	µg/L	0.1	6	INTERIM	3.1	0.7	2.0	4.0

				Client I.D.	SW-02	SW-04	SW-05	SW-07
				Sample I.D.	24-013700-1	24-013700-2	24-013700-3	24-013700-4
				Date Collected	2024-May-13	2024-May-13	2024-May-13	2024-May-13
Parameter	**Units**	**R.L.**	**Limits**		-	-	-	-
Oil & Grease (Total)	mg/L	1.0			3.0	3.5	2.9	3.9

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

				Client I.D.	SW-02	SW-04	SW-05	SW-07
				Sample I.D.	24-013700-1	24-013700-2	24-013700-3	24-013700-4
				Date Collected	2024-May-13	2024-May-13	2024-May-13	2024-May-13
Parameter	**Units**	**R.L.**	**Limits**		-	-	-	-
Acenaphthene	µg/L	0.05			<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/L	0.05			<0.05	<0.05	<0.05	<0.05
Anthracene	µg/L	0.05	0.0008	PWQO	**<0.05**	**<0.05**	**<0.05**	**<0.05**
Benzo[a]anthracene	µg/L	0.05	0.0004	INTERIM	**<0.05**	**<0.05**	**<0.05**	**<0.06 (15)**
Benzo(a)pyrene	µg/L	0.01			<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	µg/L	0.05			<0.05	<0.05	<0.05	<0.05
Benzo(b+k)fluoranthene	µg/L	0.1			<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	0.05	0.00002	INTERIM	**<0.05**	**<0.05**	**<0.05**	**<0.05**
Benzo(k)fluoranthene	µg/L	0.05			<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	0.05	0.0001	INTERIM	**<0.05**	**<0.05**	**<0.05**	**<0.05**
Dibenzo(a,h)anthracene	µg/L	0.05	0.002	INTERIM	**<0.05**	**<0.05**	**<0.05**	**<0.05**
Fluoranthene	µg/L	0.05	0.0008	INTERIM	**<0.05**	**<0.05**	**<0.05**	**<0.05**
Fluorene	µg/L	0.05	0.2	INTERIM	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3,-cd)Pyrene	µg/L	0.05			<0.05	<0.05	<0.05	<0.05
Methylnaphthalene,1-	µg/L	0.05	2	INTERIM	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene,2-(1-)	µg/L	1			<1	<1	<1	<1
Methylnaphthalene,2-	µg/L	0.05	2	INTERIM	<0.05	<0.05	<0.05	<0.05
Naphthalene	µg/L	0.05	7	INTERIM	<0.05	<0.05	<0.05	<0.06
Phenanthrene	µg/L	0.05	0.03	INTERIM	**<0.05**	**<0.05**	**<0.05**	**<0.05**
Pyrene	µg/L	0.05			<0.05	<0.05	<0.05	<0.05
Total PAH	µg/L	0.1			<0.1	<0.1	<0.1	<0.1

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

Comments:

15. Elevated RL due to low sample volume

: PWQO Limits
INTERIM: Interim PWQO
PWQO: PWQO

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

Summary of Exceedances

Interim PWQO

SW-02	Found Value	Limit
Phosphorus (Total)	140	10
Zinc (Total)	27	20
Cobalt (Total)	1.4	0.9
Copper (Total)	5.7	5
Lead (Total)	1.16	1
Benzo[a]anthracene	<0.05	0.0004
Benzo(g,h,i)perylene	<0.05	0.00002
Chrysene	<0.05	0.0001
Dibenzo(a,h)anthracene	<0.05	0.002
Fluoranthene	<0.05	0.0008
Phenanthrene	<0.05	0.03

SW-04	Found Value	Limit
Phosphorus (Total)	60	10
Zinc (Total)	125	20
Benzo[a]anthracene	<0.05	0.0004
Benzo(g,h,i)perylene	<0.05	0.00002
Chrysene	<0.05	0.0001
Dibenzo(a,h)anthracene	<0.05	0.002
Fluoranthene	<0.05	0.0008
Phenanthrene	<0.05	0.03

SW-05	Found Value	Limit
Phosphorus (Total)	130	10
Benzo[a]anthracene	<0.05	0.0004
Benzo(g,h,i)perylene	<0.05	0.00002
Chrysene	<0.05	0.0001
Dibenzo(a,h)anthracene	<0.05	0.002
Fluoranthene	<0.05	0.0008
Phenanthrene	<0.05	0.03

SW-07	Found Value	Limit
Phosphorus (Total)	220	10
Zinc (Total)	25	20
Cobalt (Total)	1.8	0.9
Copper (Total)	6.0	5
Lead (Total)	1.95	1
Benzo[a]anthracene	<0.06	0.0004

Michelle Dubien
Data Specialist

Benzo(g,h,i)perylene	<0.05	0.00002
Chrysene	<0.05	0.0001
Dibenzo(a,h)anthracene	<0.05	0.002
Fluoranthene	<0.05	0.0008
Phenanthrene	<0.05	0.03
PWQO		
SW-02	**Found Value**	**Limit**
E coli	304	100
Iron (Total)	2230	300
Anthracene	<0.05	0.0008
SW-04	**Found Value**	**Limit**
Iron (Total)	456	300
Zinc (Total)	125	30
Anthracene	<0.05	0.0008
SW-05	**Found Value**	**Limit**
Iron (Total)	1040	300
Anthracene	<0.05	0.0008
SW-07	**Found Value**	**Limit**
Iron (Total)	3390	300
Anthracene	<0.05	0.0008

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

GENERAL SAMPLE SUBMISSION FORM

CADUCEON™
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured. Proudly Canadian.

SAMPLES SUBMITTED TO:

Kingston ☐
Ottawa ☐
Richmond Hill ☑
Barrie ☐
Windsor ☐

TESTING REQUIREMENTS

☐ O'Reg 153/04	Table (1 - 9)		Record of Site		
☐ O'Reg 406/19	Table (1 - 9.1)		SPLP Table (1-9.1)		
☐ RPI	☐	ICC	☐	Agricultural	
☐ Coarse	☐	Medium/Fine	☐	O'Reg 558 TCLP	
☐ MISA	☑	PWQO	☐	Landfill Monitoring	
☐ Other:					

REPORT NUMBER (Lab Use)

24- 013860

Are any samples to be submitted intended for Human Consumption under any Drinking Water Regulations? ☐ Yes ☑ No (If yes, submit all Drinking Water Samples on a Drinking Water Chain of Custody)

Organization: GEI CONSULTANTS CANADA LTD
Contact: BETHANY GRUBER
Tel: 519 212 3092
Fax:
Email: BGRUBER@GEICONSULTANTS.COM
Additional Info (email, cell, etc):

Address:
1266 S SERVICE RD
UNIT C3-1
STONEY CREEK, ON
L8E 5R9
Quote #: 3924
P.O. #:

Invoicing Address (if different):
Project Name or #: 2100463
Additional Info:

ANALYSES REQUESTED

TURNAROUND SERVICE REQUESTED (see back page)
*Must be arranged in advance

☐	Platinum*	200% Surcharge
☐	Gold*	100% Surcharge
☐	Silver	50% Surcharge
☐	Bronze	25% Surcharge
☑	Standard	5-7 days
☐	Specific Date:	

* Sample Matrix Legend: WW=Waste Water, SW=Surface Water, GW=Groundwater, LS=Liquid Sludge, SS=Solid Sludge, S=Soil, Sed=Sediment, PC=Paint Chips, F=Filter, Oil = Oil

Lab No.	Sample Source and/or Sample Identification	S.P.L. (Watertrax)	Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected	R153-PAH'S	E.COLI, FECAL COLI TOTAL COLI + BACKGROUND	ALK., COND., TDS PH	AMMONIA PHOSPHATE ANIONS	BOD5	TOTAL SOLIDS	TSS	TP + TKN	TURBIDITY	ICP TOTAL METALS	ICPMS TOTAL METALS	OIL + GREASE TOTAL	Suspected Highly Contaminated X	Field pH	Field Temp.	# Bottles/ Sample	Field Filtered Y/N
1	SW-02		SW	24-05-14	17:00	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				8	N
2	SW-04 *		SW	24-05-14	17:00	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				8	N
3	SW-05		SW	24-05-14	17:30	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				8	N
4	SW-07		SW	24-05-14	18:00	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				8	N

~~B - bacti~~ JS
K - gen chem, O & G, 1L amber, nutr, bacti x2
O - gen chem, metals
* metals bottle arrived empty; will split from gen chem JS

SAMPLE SUBMISSION INFORMATION

	Sampled by:	Submitted by:
Print:	BETHANY GRUBER	BETHANY GRUBER
Sign:	Bethany Gruber	Bethany Gruber
Date (yy-mm-dd)/Time:	24-05-14 / 14:00	24-05-14 /

SHIPPING INFORMATION

Courier (Client account) ☐
Courier (Caduceon account) ☐
Drop Off ☑
Caduceon (Pick-up) ☐

Invoice
# of Pieces: 1

REPORTING / INVOICING

Report by Fax ☐
Report by Email ☑
Invoice by Email ☑
Invoice by Mail ☐

SAMPLE RECEIVING INFORMATION (LABORATORY USE ONLY)

Received By (print): Jam
Signature: JS
Date Received (yy-mm-dd): 24-05-15
Time Received: 800 (A-H)
Laboratory Prepared Bottles: ☒ Yes ☐ No
Sample Temperature °C: 12.1
Labeled by: JS

Comments:

Page 1 of 1

G 113770

Notification of Sample Receipt

GEI Consultants
647 Welham Rd, Unit 14
Barrie ON L4N 0B7
CA

CADUCEON Environmental Laboratories
110 West Beaver Creek Rd
Unit #14
Richmond Hill ON L4B 1J9
CA

Submission Summary:

Project: 24-013860

Project PO #:

Project Due Date:

Customer Project: 2100463

Receipt Temperature: 12.1°C

Project Received Date: 2024-May-15

4 Samples Received at RICHMOND_HILL

Lab Sample ID	Client Sample ID	Date Sampled	Sample Due Date	Sample Type
24-013860-1	SW-02	2024-May-14	2024-May-22	Surface Water
24-013860-2	SW-04	2024-May-14	2024-May-22	Surface Water
24-013860-3	SW-05	2024-May-14	2024-May-22	Surface Water
24-013860-4	SW-07	2024-May-14	2024-May-22	Surface Water

Analysis Requested:

	Ammonia & o-Phosphate (Liquid)	Anions (Liquid)	BOD5 (Liquid)	Cond/pH/Alk Auto (Liquid)	E.Coli m-TECH Media (Liquid)	Fecal Coliforms (Liquid)	ICP/MS Total (Liquid)	ICP/OES Total (Liquid)	Oil & Grease (Liquid)	SVOC - Semi-Volatiles (Liquid)	Total Coliforms (m-Endo Media)	TP & TKN (Liquid)	TS (Liquid)	TSS (Liquid)	Turbidity (Liquid)
SW-02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SW-04	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SW-05	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SW-07	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

CADUCEON
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured. Canadian owned.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: **G113770** | **REPORT No: 24-013860 - Rev. 0**

Report To:
GEI Consultants
647 Welham Rd, Unit 14
Barrie, ON L4N 0B7

CADUCEON Environmental Laboratories
110 West Beaver Creek Rd
Unit #14
Richmond Hill, ON L4B 1J9

Attention: Bethany Gruber

DATE RECEIVED: 2024-May-15
DATE REPORTED: 2024-May-24
SAMPLE MATRIX: Surface Water

CUSTOMER PROJECT: 2100463
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	4	OTTAWA	PCURIEL	2024-May-17	A-IC-01	SM 4110B
BOD5 (Liquid)	4	KINGSTON	JWOLFE2	2024-May-17	BOD-001	SM 5210B
Cond/pH/Alk Auto (Liquid)	4	OTTAWA	SBOUDREAU	2024-May-16	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
E.Coli m-TECH Media (Liquid)	4	KINGSTON	BBURTCH	2024-May-16	EC-001	MECP E3371
Fecal Coliforms (Liquid)	4	KINGSTON	BBURTCH	2024-May-16	FC-001	SM 9222D
ICP/MS Total (Liquid)	4	OTTAWA	TPRICE	2024-May-21	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	4	OTTAWA	APRUDYVUS	2024-May-17	D-ICP-01	SM 3120B
Ammonia & o-Phosphate (Liquid)	4	KINGSTON	JYEARWOOD	2024-May-16	NH3-001	SM 4500NH3
Oil & Grease (Liquid)	4	KINGSTON	MLANE	2024-May-16	O&G-001	SM 5520
SVOC - Semi-Volatiles (Liquid)	4	KINGSTON	EASIEDU	2024-May-18	NAB-W-001	EPA 8270D
Total Coliforms (m-Endo Media)	4	KINGSTON	BBURTCH	2024-May-16	TC-001	SM 9222B
TP & TKN (Liquid)	4	KINGSTON	KDIBBITS	2024-May-21	TPTKN-001	MECP E3516.2
TS (Liquid)	4	KINGSTON	JMACINNES	2024-May-23	TS-001	SM 2540
TSS (Liquid)	4	KINGSTON	DCASSIDY	2024-May-16	TSS-001	SM 2540D
Turbidity (Liquid)	4	OTTAWA	PLUSSIER	2024-May-17	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

				Client I.D.	SW-02	SW-04	SW-05	SW-07
				Sample I.D.	24-013860-1	24-013860-2	24-013860-3	24-013860-4
				Date Collected	2024-May-14	2024-May-14	2024-May-14	2024-May-14
Parameter	**Units**	**R.L.**	**Limits**		-	-	-	-
Total Coliform	CFU/100mL	1			980	74000	720	600
Background	CFU/100mL	1			>4000	>200000	>4000	>4000
E coli	CFU/100mL	1	100	PWQO	**146**	**400**	46	16
Fecal Coliform	CFU/100mL	1			167	4100	76	34
Alkalinity(CaCO3) to pH4.5	mg/L	5			261	411	288	354
TDS (Calc. from Cond.)	mg/L	3			824	730	479	864
Conductivity @25°C	uS/cm	1			1510	1350	903	1580
pH @25°C	pH units	-	8.5	PWQO	7.95	8.13	8.20	8.10
Turbidity	NTU	0.1			57.7	7.6	53.4	17.2
Chloride	mg/L	0.5			273	177	78.6	275
Nitrate (N)	mg/L	0.05			0.42	<0.05	0.45	<0.05
Nitrite (N)	mg/L	0.05			<0.05	<0.05	0.14	0.05
BOD5	mg/L	3			<3	<3	9	<3
Total Suspended Solids	mg/L	3			30	8	61	217
Total Solids	mg/L	30			1000	770	675	945
Phosphorus (Total)	µg/L	10	10	INTERIM	**140**	**80**	**130**	**60**
Total Kjeldahl Nitrogen	mg/L	0.1			2.0	1.1	3.4	1.2
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05			0.12	0.09	1.39	0.10
o-Phosphate (P)	mg/L	0.002			0.054	0.035	0.046	0.026
Hardness (as CaCO3)	mg/L as CaCO3	-			422	360	360	379
Aluminum (Total)	µg/L	10			1070	90	820	360

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

				Client I.D.	SW-02	SW-04	SW-05	SW-07
				Sample I.D.	24-013860-1	24-013860-2	24-013860-3	24-013860-4
				Date Collected	2024-May-14	2024-May-14	2024-May-14	2024-May-14
Parameter	**Units**	**R.L.**	**Limits**		-	-	-	-
Barium (Total)	µg/L	1			49	44	43	64
Boron (Total)	µg/L	5	200	INTERIM	60	57	72	46
Calcium (Total)	µg/L	20			111000	115000	92800	114000
Iron (Total)	µg/L	5	300	PWQO	**1440**	**499**	**1080**	**594**
Magnesium (Total)	µg/L	20			35200	18000	31100	22800
Manganese (Total)	µg/L	1			180	479	209	359
Potassium (Total)	µg/L	100			7100	4400	8500	3500
Silicon (Total)	µg/L	10			2440	4350	1550	3960
Sodium (Total)	µg/L	200			162000	160000	56300	184000
Strontium (Total)	µg/L	1			480	370	431	514
Tin (Total)	µg/L	50			<50	<50	<50	<50
Titanium (Total)	µg/L	5			25	<5	24	11
Tungsten (Total)	µg/L	10	30	INTERIM	<10	<10	<10	<10
Zinc (Total)	µg/L	5	20, 30	INTERIM, PWQO	8	**87**	<5	7
Zirconium (Total)	µg/L	3	4	INTERIM	<3	<3	<3	<3
Antimony (Total)	µg/L	0.1	20	INTERIM	0.3	0.5	0.5	0.5
Arsenic (Total)	µg/L	0.1	5, 5	INTERIM, PWQO	0.8	0.6	1.2	0.7
Beryllium (Total)	µg/L	0.1	11	PWQO	<0.1	<0.1	<0.1	<0.1
Cadmium (Total)	µg/L	0.015	0.1, 0.2	INTERIM, PWQO	0.034	<0.015	0.039	0.034
Chromium (Total)	µg/L	1			2	<1	1	<1
Cobalt (Total)	µg/L	0.1	0.9	INTERIM	**1.0**	0.4	**1.2**	0.7

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

				Client I.D.	SW-02	SW-04	SW-05	SW-07
				Sample I.D.	24-013860-1	24-013860-2	24-013860-3	24-013860-4
				Date Collected	2024-May-14	2024-May-14	2024-May-14	2024-May-14
Parameter	**Units**	**R.L.**	**Limits**		-	-	-	-
Copper (Total)	µg/L	0.1	5	INTERIM	3.0	2.1	3.6	2.6
Lead (Total)	µg/L	0.02	1, 5	INTERIM, PWQO	0.98	0.09	0.82	0.43
Molybdenum (Total)	µg/L	0.1	40	INTERIM	0.9	0.6	1.4	4.5
Nickel (Total)	µg/L	0.2	25	PWQO	2.9	1.2	2.9	2.1
Selenium (Total)	µg/L	1	100	PWQO	<1	<1	1	<1
Silver (Total)	µg/L	0.1	0.1	PWQO	<0.1	<0.1	<0.1	<0.1
Thallium (Total)	µg/L	0.05	0.3, 0.3	INTERIM, PWQO	<0.05	<0.05	<0.05	<0.05
Uranium (Total)	µg/L	0.05	5	INTERIM	1.99	1.44	4.36	1.53
Vanadium (Total)	µg/L	0.1	6	INTERIM	2.3	0.5	2.4	0.9

				Client I.D.	SW-02	SW-04	SW-05	SW-07
				Sample I.D.	24-013860-1	24-013860-2	24-013860-3	24-013860-4
				Date Collected	2024-May-14	2024-May-14	2024-May-14	2024-May-14
Parameter	**Units**	**R.L.**	**Limits**		-	-	-	-
Oil & Grease (Total)	mg/L	1.0			2.0	2.8	<1.0	3.1

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

				Client I.D.	SW-02	SW-04	SW-05	SW-07
				Sample I.D.	24-013860-1	24-013860-2	24-013860-3	24-013860-4
				Date Collected	2024-May-14	2024-May-14	2024-May-14	2024-May-14
Parameter	**Units**	**R.L.**	**Limits**		-	-	-	-
Acenaphthene	µg/L	0.05			<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/L	0.05			<0.05	<0.05	<0.05	<0.05
Anthracene	µg/L	0.05	0.0008	PWQO	**<0.05**	**<0.05**	**<0.05**	**<0.05**
Benzo[a]anthracene	µg/L	0.05	0.0004	INTERIM	**<0.05**	**<0.06 (14)**	**<0.05**	**<0.05**
Benzo(a)pyrene	µg/L	0.01			<0.01	<0.01	<0.01	0.02
Benzo(b)fluoranthene	µg/L	0.05			<0.05	<0.05	<0.05	<0.05
Benzo(b+k)fluoranthene	µg/L	0.1			<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	0.05	0.00002	INTERIM	**<0.05**	**<0.05**	**<0.05**	**<0.05**
Benzo(k)fluoranthene	µg/L	0.05			<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	0.05	0.0001	INTERIM	**<0.05**	**<0.05**	**<0.05**	**<0.05**
Dibenzo(a,h)anthracene	µg/L	0.05	0.002	INTERIM	**<0.05**	**<0.05**	**<0.05**	**<0.05**
Fluoranthene	µg/L	0.05	0.0008	INTERIM	**<0.05**	**<0.05**	**<0.05**	**<0.05**
Fluorene	µg/L	0.05	0.2	INTERIM	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3,-cd)Pyrene	µg/L	0.05			<0.05	<0.05	<0.05	<0.05
Methylnaphthalene,1-	µg/L	0.05	2	INTERIM	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene,2-(1-)	µg/L	1			<1	<1	<1	<1
Methylnaphthalene,2-	µg/L	0.05	2	INTERIM	<0.05	<0.05	<0.05	<0.05
Naphthalene	µg/L	0.05	7	INTERIM	<0.05	<0.06	<0.05	<0.05
Phenanthrene	µg/L	0.05	0.03	INTERIM	**<0.05**	**<0.05**	**<0.05**	**<0.05**
Pyrene	µg/L	0.05			<0.05	<0.05	<0.05	<0.05

Comments:

14. Elevated RL due to dilution

Michelle Dubien
Data Specialist

: PWQO Limits
INTERIM: Interim PWQO
PWQO: PWQO

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

Summary of Exceedances		
Interim PWQO		
SW-02	**Found Value**	**Limit**
Phosphorus (Total)	140	10
Cobalt (Total)	1.0	0.9
Benzo[a]anthracene	<0.05	0.0004
Benzo(g,h,i)perylene	<0.05	0.00002
Chrysene	<0.05	0.0001
Dibenzo(a,h)anthracene	<0.05	0.002
Fluoranthene	<0.05	0.0008
Phenanthrene	<0.05	0.03
SW-04	**Found Value**	**Limit**
Phosphorus (Total)	80	10
Zinc (Total)	87	20
Benzo[a]anthracene	<0.06	0.0004
Benzo(g,h,i)perylene	<0.05	0.00002
Chrysene	<0.05	0.0001
Dibenzo(a,h)anthracene	<0.05	0.002
Fluoranthene	<0.05	0.0008
Phenanthrene	<0.05	0.03
SW-05	**Found Value**	**Limit**
Phosphorus (Total)	130	10
Cobalt (Total)	1.2	0.9
Benzo[a]anthracene	<0.05	0.0004
Benzo(g,h,i)perylene	<0.05	0.00002
Chrysene	<0.05	0.0001
Dibenzo(a,h)anthracene	<0.05	0.002
Fluoranthene	<0.05	0.0008
Phenanthrene	<0.05	0.03
SW-07	**Found Value**	**Limit**
Phosphorus (Total)	60	10
Benzo[a]anthracene	<0.05	0.0004
Benzo(g,h,i)perylene	<0.05	0.00002
Chrysene	<0.05	0.0001
Dibenzo(a,h)anthracene	<0.05	0.002
Fluoranthene	<0.05	0.0008
Phenanthrene	<0.05	0.03
PWQO		

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

SW-02	**Found Value**	**Limit**
E coli	146	100
Iron (Total)	1440	300
Anthracene	<0.05	0.0008
SW-04	**Found Value**	**Limit**
E coli	400	100
Iron (Total)	499	300
Zinc (Total)	87	30
Anthracene	<0.05	0.0008
SW-05	**Found Value**	**Limit**
Iron (Total)	1080	300
Anthracene	<0.05	0.0008
SW-07	**Found Value**	**Limit**
Iron (Total)	594	300
Anthracene	<0.05	0.0008

Michelle Dubien
Data Specialist

GENERAL SAMPLE SUBMISSION FORM

CADUCEON
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured. Proudly Canadian

SAMPLES SUBMITTED TO:
Kingston ☐
Ottawa ☐
Richmond Hill ☒
Barrie ☐
Windsor ☐

TESTING REQUIREMENTS
☐ O'Reg 153/04 Table (1 - 9) ______
☐ O'Reg 406/19 Table (1 - 9.1) ______
☐ RPI ☐ ICC
☐ Coarse ☐ Medium/Fine
☐ MISA ☒ PWQO
☐ Other: ______
Record of Site ______
SPLP Table (1-9.1) ______
☐ Agricultural
☐ O'Reg 558 TCLP
☐ Landfill Monitoring

REPORT NUMBER (Lab Use)
24-014981

Are any samples to be submitted intended for Human Consumption under any Drinking Water Regulations? ☐ Yes ☑ No (If yes, submit all Drinking Water Samples on a Drinking Water Chain of Custody)

Organization: GEI Consultants
Contact: Bethany Gruber
Tel: 519 212 3092
Fax:
Email: BGruber@GEIConsultants.com
Additional Info (email, cell, etc): SLove@GEIConsultants.com
Address: 75 Tiverton Court, Markham ON
Quote #: Q3924
P.O. #:
Invoicing Address (if different):
Project Name or #: 2100463
Additional Info:

TURNAROUND SERVICE REQUESTED (see back page)
*Must be arranged in advance
☐ Platinum* 200% Surcharge
☐ Gold* 100% Surcharge
☐ Silver 50% Surcharge
☐ Bronze 25% Surcharge
☒ Standard 5-7 days
☐ Specific Date: ______

* Sample Matrix Legend: WW=Waste Water, SW=Surface Water, GW=Groundwater, LS=Liquid Sludge, SS=Solid Sludge, S=Soil, Sed=Sediment, PC=Paint Chips, F=Filter, Oil = Oil

ANALYSES REQUESTED – Indicate Test For Each Sample By Using A Check Mark In The Box Provided

Lab No.	Sample Source and/or Sample Identification	S.P.L. (Watertrax)	Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected	General Chem	E. Coli	ICPMS Total Metals	TP/TKN Ammonia	R153 PAHs	Fecal Coliforms	Total Coliforms + Background	Phosphorus-D BOD5	Anions - Cl-, NO2-N NO3-N	TS, TSS Turbidity	ICP Total Metals	Oil + Grease Total	Suspected Highly Contaminated	X	Field pH	Field Temp.	# Bottles/ Sample	Field Filtered Y/N
1	SW2		SW	24-05-24	1:20pm	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					8	N
2	SW4		SW	24-05-24	1:40pm	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					8	N
3	SW5		SW	24-05-24	2:00pm	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					8	N

K - bacti x 2, gen chem, nutr, O&G, 1L amber
O - gen chem, metals

SAMPLE SUBMISSION INFORMATION

	Sampled by:	Submitted by:
Print:	S.Love	S.Love
Sign:		
Date (yy-mm-dd)/Time:	24-05-24	4:00pm

SHIPPING INFORMATION
Courier (Client account) ☐
Courier (Caduceon account) ☐
Drop Off ☒
Caduceon (Pick-up) ☐
Invoice
# of Pieces: 1

REPORTING / INVOICING
Report by Fax ☐
Report by Email ☒
Invoice by Email ☒
Invoice by Mail ☐

SAMPLE RECEIVING INFORMATION (LABORATORY USE ONLY)
Received By (print): C. Bucci
Signature:
Date Received (yy-mm-dd): 24-05-24
Time Received: 15:55
Laboratory Prepared Bottles: ☒ Yes ☐ No
Sample Temperature °C: 11
Labeled by: JB

Comments: General Chem = Alkalinity, conductivity, TDS, pH (Liquid) 3 + Results
ICP Metals = Al, Ba, B, Ca, Fe, Mg, Na, Mn, Sn, K, Si, Sr, W, Ti, Zn Zr
ICPMS Metals = Sb, As, Be, Cd, Cr, Co, Cu, Pb, Mo, Ni, Se, Ag, Tl, U, V

Page 1 of 1
G 113854

CADUCEON™
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured. Canadian owned.

Date	Quote #
24/Feb/09	Q3924

Expire Date	PO Number
24/Dec/31	

Quoted to:

GEI Consultants

647 Welham Rd, Unit 14
Barrie ON L4N 0B7
CA

Attention: Bethany Gruber

HST Number	Currency	Terms
898699194	CAD	Net 30

#	Item Code	Description	Quantity	Unit Cost, $	Amount, $
1	R153_PAH	R153 - PAH's (Liquid)	1	$123.63	$123.63
2	EC_RGW	E.Coli (Liquid)	1	$17.12	$17.12
3	FC_RGW	Fecal Coliforms (Liquid)	1	$17.12	$17.12
4	TC_BG_RGW	Total Coliform & Background (Liquid)	1	$17.12	$17.12
5	COND_PH_ALK_GRP3	Alkalinity, Conductivity, TDS, pH (Liquid) 3+Results	1	$24.15	$24.15
6	NH3_OP_RPW_GRP2	Ammonia-N, Phosphate-P (Liquid) 2+ Results	1	$21.14	$21.14
7	ANIONS_RPW_GRP3	Anions (Liquid) 3+Results- Cl, NO2-N, NO3-N	1	$24.15	$24.15
8	BOD5_RGW	BOD5 (Liquid) Biochemical Oxygen Demand	1	$30.19	$30.19
9	TS_VS_RGW	Total Solids (Liquid)	1	$18.11	$18.11
10	TSS_VSS_RGW	Total Suspended Solids (Liquid)	1	$18.11	$18.11
11	TPTKN_RPW_GRP2	TP & TKN (Liquid) 2+ Results	1	$24.15	$24.15
12	TURBIDITY_RGW	Turbidity (Liquid)	1	$14.49	$14.49
13	METALS_ICPOES_RPT_GRP3	ICP Total Metals (Liquid) 6+ Metals - Hardness, Al, Ba, B, Ca, Fe, Mg, Na, Mn, Sn, K, Si, Sr, W, Ti, Zn, Zr	1	$24.15	$24.15
14	METALS_ICPMS_RPT_GRP3	ICPMS Total Metals (Liquid) 6+ Metals - Sb, As, Be, Cd, Cr, Co, Cu, Pb, Mo, Ni, Se, Ag, Tl, U, V	1	$27.17	$27.17
15	OIL_GREASE_RGW	Oil & Grease (Liquid) Total	1	$39.94	$39.94

Subtotal	**$440.74**
HST	$57.30
Total Cost	**$498.04**

Please note: All submissions must have a completed Chain of Custody form accompanying samples indicating report recipient name, address, invoicing information (if different from recipient), Purchase Order Number &/or Project Number or CADUCEON Quotation Number. **If any of PO Number/Order Number or CADUCEON quote is not provided, CADUCEON will default to GENERAL pricing for invoicing purposes.** The Chain of Custody form will also require the Item codes from CADUCEON quote listed, or have the analysis required listed clearly and concisely. CADUCEON is a member of the Canadian Association for Laboratory Accreditation (CALA) and participates in the proficiency testing program for a list of parameters registered with the association. The laboratory is accredited for specific tests by CALA and was found to comply with the requirements of ISO/IEC Guide 17025. See Scope of Accreditation for list of tests. This quote is intended for the addressee(s) shown on this form only, and may contain information which is confidential and privileged, any disclosure, copying, distribution or use of the contents of this quote without the consent of CADUCEON Environmental Laboratories is prohibited. Please note, due to current unpredictable laboratory supplies pricing and delivery, inflation, etc., prices may be subject to change. CADUCEON will endeavour to provide as much notice as possible should price increases be required.

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured. Canadian owned.

Notification of Sample Receipt

GEI Consultants
647 Welham Rd, Unit 14
Barrie ON L4N 0B7
CA

CADUCEON Environmental Laboratories
110 West Beaver Creek Rd
Unit #14
Richmond Hill ON L4B 1J9
CA

Submission Summary:

Project: 24-014981
Customer Project: 2100463
Project PO #:
Receipt Temperature: 11°C
Project Due Date:
Project Received Date: 2024-May-24

3 Samples Received at RICHMOND_HILL

Lab Sample ID	Client Sample ID	Date Sampled	Sample Due Date	Sample Type
24-014981-1	SW2	2024-May-24	2024-May-31	Surface Water
24-014981-2	SW4	2024-May-24	2024-May-31	Surface Water
24-014981-3	SW5	2024-May-24	2024-May-31	Surface Water

Analysis Requested:

	Ammonia & o-Phosphate (Liquid)	Anions (Liquid)	BOD5 (Liquid)	Cond/pH/Alk Auto (Liquid)	E.Coli m-TECH Media (Liquid)	Fecal Coliforms (Liquid)	ICP/MS Total (Liquid)	ICP/OES Total (Liquid)	Oil & Grease (Liquid)	SVOC - Semi-Volatiles (Liquid)	Total Coliforms (m-Endo Media)	TP & TKN (Liquid)	TS (Liquid)	TSS (Liquid)	Turbidity (Liquid)
SW2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SW4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SW5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: **G113854** **REPORT No: 24-014981 - Rev. 0**

Report To:
GEI Consultants
647 Welham Rd, Unit 14
Barrie, ON L4N 0B7

CADUCEON Environmental Laboratories
110 West Beaver Creek Rd
Unit #14
Richmond Hill, ON L4B 1J9

Attention: Bethany Gruber

DATE RECEIVED: 2024-May-24
DATE REPORTED: 2024-Jun-03
SAMPLE MATRIX: Surface Water

CUSTOMER PROJECT: 2100463
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	3	OTTAWA	ASCHNEIDER	2024-May-29	A-IC-01	SM 4110B
BOD5 (Liquid)	3	KINGSTON	DCASSIDY	2024-May-29	BOD-001	SM 5210B
Cond/pH/Alk Auto (Liquid)	3	OTTAWA	SBOUDREAU	2024-May-28	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
E.Coli m-TECH Media (Liquid)	3	KINGSTON	BBURTCH	2024-May-25	EC-001	MECP E3371
Fecal Coliforms (Liquid)	3	KINGSTON	BBURTCH	2024-May-25	FC-001	SM 9222D
ICP/MS Total (Liquid)	3	OTTAWA	AOZKAYMAK	2024-May-29	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	3	OTTAWA	NHOGAN	2024-May-29	D-ICP-01	SM 3120B
Ammonia & o-Phosphate (Liquid)	3	KINGSTON	JYEARWOOD	2024-May-29	NH3-001	SM 4500NH3
Oil & Grease (Liquid)	3	KINGSTON	MLANE	2024-May-29	O&G-001	SM 5520
SVOC - Semi-Volatiles (Liquid)	3	KINGSTON	EASIEDU	2024-May-28	NAB-W-001	EPA 8270D
Total Coliforms (m-Endo Media)	3	KINGSTON	BBURTCH	2024-May-25	TC-001	SM 9222B
TP & TKN (Liquid)	3	KINGSTON	KDIBBITS	2024-May-30	TPTKN-001	MECP E3516.2
TS (Liquid)	3	KINGSTON	JMACINNES	2024-May-29	TS-001	SM 2540
TSS (Liquid)	3	KINGSTON	MCLOSS	2024-May-28	TSS-001	SM 2540D
Turbidity (Liquid)	3	OTTAWA	PLUSSIER	2024-May-28	A-TURB-01	SM 2130B

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

				Client I.D.	SW2	SW4	SW5
				Sample I.D.	24-014981-1	24-014981-2	24-014981-3
				Date Collected	2024-May-24	2024-May-24	2024-May-24
Parameter	**Units**	**R.L.**	**Limits**		-	-	-
Total Coliform	CFU/100mL	1			NDOGT	NDOGT	NDOGT
Background	CFU/100mL	1			NDOGT	NDOGT	NDOGT
E coli	CFU/100mL	1	100	PWQO	**272**	**142**	33
Fecal Coliform	CFU/100mL	1			NDOGT	NDOGT	NDOGT
Alkalinity(CaCO3) to pH4.5	mg/L	5			287	495	427
TDS (Calc. from Cond.)	mg/L	3			1010	835	2020
Conductivity @25°C	uS/cm	1			1830	1530	3610
pH @25°C	pH units	-	8.5	PWQO	7.96	8.13	7.92
Turbidity	NTU	0.1			57.5	11.3	15.0
Chloride	mg/L	0.5			330	172	731
Nitrate (N)	mg/L	0.05			0.36	1.35	0.08
Nitrite (N)	mg/L	0.05			<0.05	<0.05	<0.05
BOD5	mg/L	3			<3	3	<3
Total Suspended Solids	mg/L	3			31	21	13
Total Solids	mg/L	30			215	465	1540
Phosphorus (Total)	µg/L	10	10	INTERIM	**190**	**100**	**100**
Total Kjeldahl Nitrogen	mg/L	0.1			2.5	1.3	2.0
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05			0.26	0.06	0.72
o-Phosphate (P)	mg/L	0.002			0.062	0.012	0.016
Hardness (as CaCO3)	mg/L as CaCO3	-			434	467	492
Aluminum (Total)	µg/L	10			1350	130	240

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

				Client I.D.	SW2	SW4	SW5
				Sample I.D.	24-014981-1	24-014981-2	24-014981-3
				Date Collected	2024-May-24	2024-May-24	2024-May-24
Parameter	**Units**	**R.L.**	**Limits**		-	-	-
Barium (Total)	µg/L	1			61	48	96
Boron (Total)	µg/L	5	200	INTERIM	64	75	71
Calcium (Total)	µg/L	20			119000	144000	154000
Iron (Total)	µg/L	5	300	PWQO	**1820**	**359**	**883**
Magnesium (Total)	µg/L	20			33300	26000	26100
Manganese (Total)	µg/L	1			467	517	3870
Potassium (Total)	µg/L	100			7000	4100	9200
Silicon (Total)	µg/L	10			4770	6660	3120
Sodium (Total)	µg/L	200			202000	161000	454000
Strontium (Total)	µg/L	1			484	491	544
Tin (Total)	µg/L	50			<50	<50	<50
Titanium (Total)	µg/L	5			46	<5	7
Tungsten (Total)	µg/L	10	30	INTERIM	<10	<10	<10
Zinc (Total)	µg/L	5	20, 30	INTERIM, PWQO	**63**	**91**	20
Zirconium (Total)	µg/L	3	4	INTERIM	<3	<3	<3
Antimony (Total)	µg/L	0.1	20	INTERIM	0.4	0.5	0.4
Arsenic (Total)	µg/L	0.1	5, 5	INTERIM, PWQO	1.1	0.5	1.0
Beryllium (Total)	µg/L	0.1	11	PWQO	<0.1	<0.1	<0.1
Cadmium (Total)	µg/L	0.015	0.1, 0.2	INTERIM, PWQO	0.035	<0.015	**0.136**
Chromium (Total)	µg/L	1			1	<1	<1
Cobalt (Total)	µg/L	0.1	0.9	INTERIM	**1.1**	0.5	**1.7**

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

				Client I.D.	SW2	SW4	SW5
				Sample I.D.	24-014981-1	24-014981-2	24-014981-3
				Date Collected	2024-May-24	2024-May-24	2024-May-24
Parameter	**Units**	**R.L.**	**Limits**		-	-	-
Copper (Total)	µg/L	0.1	5	INTERIM	**6.6**	3.1	4.9
Lead (Total)	µg/L	0.02	1, 5	INTERIM, PWQO	0.98	0.12	0.30
Molybdenum (Total)	µg/L	0.1	40	INTERIM	1.0	0.8	1.3
Nickel (Total)	µg/L	0.2	25	PWQO	3.6	1.9	3.3
Selenium (Total)	µg/L	1	100	PWQO	<1	<1	<1
Silver (Total)	µg/L	0.1	0.1	PWQO	**0.4**	<0.1	**0.2**
Thallium (Total)	µg/L	0.05	0.3, 0.3	INTERIM, PWQO	<0.05	<0.05	<0.05
Uranium (Total)	µg/L	0.05	5	INTERIM	1.47	1.55	2.54
Vanadium (Total)	µg/L	0.1	6	INTERIM	2.4	0.5	0.8

				Client I.D.	SW2	SW4	SW5
				Sample I.D.	24-014981-1	24-014981-2	24-014981-3
				Date Collected	2024-May-24	2024-May-24	2024-May-24
Parameter	**Units**	**R.L.**	**Limits**		-	-	-
Oil & Grease (Total)	mg/L	1.0			1.1	3.0	1.1

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

				Client I.D.	SW2	SW4	SW5
				Sample I.D.	24-014981-1	24-014981-2	24-014981-3
				Date Collected	2024-May-24	2024-May-24	2024-May-24
Parameter	**Units**	**R.L.**	**Limits**		-	-	-
Acenaphthene	µg/L	0.05			<0.05	<0.05	<0.05
Acenaphthylene	µg/L	0.05			<0.05	<0.05	<0.05
Anthracene	µg/L	0.05	0.0008	PWQO	**<0.05**	**<0.05**	**<0.05**
Benzo[a]anthracene	µg/L	0.05	0.0004	INTERIM	**<0.07 (14)**	**<0.06**	**<0.05**
Benzo(a)pyrene	µg/L	0.01			<0.01	<0.01	<0.01
Benzo(b)fluoranthene	µg/L	0.05			<0.05	<0.05	<0.05
Benzo(b+k)fluoranthene	µg/L	0.1			<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	0.05	0.00002	INTERIM	**<0.05**	**<0.05**	**<0.05**
Benzo(k)fluoranthene	µg/L	0.05			<0.05	<0.05	<0.05
Chrysene	µg/L	0.05	0.0001	INTERIM	**<0.05**	**<0.05**	**<0.05**
Dibenzo(a,h)anthracene	µg/L	0.05	0.002	INTERIM	**<0.05**	**<0.05**	**<0.05**
Fluoranthene	µg/L	0.05	0.0008	INTERIM	**<0.05**	**<0.05**	**<0.05**
Fluorene	µg/L	0.05	0.2	INTERIM	<0.05	<0.05	<0.05
Indeno(1,2,3,-cd)Pyrene	µg/L	0.05			<0.05	<0.05	<0.05
Methylnaphthalene,1-	µg/L	0.05	2	INTERIM	<0.05	<0.05	<0.05
Methylnaphthalene,2-(1-)	µg/L	1			<1	<1	<1
Methylnaphthalene,2-	µg/L	0.05	2	INTERIM	<0.05	<0.05	<0.05
Naphthalene	µg/L	0.05	7	INTERIM	<0.07	<0.06	<0.05
Phenanthrene	µg/L	0.05	0.03	INTERIM	**<0.05**	**<0.05**	**<0.05**
Pyrene	µg/L	0.05			<0.05	<0.05	<0.05
Total PAH	µg/L	0.1			<0.1	<0.1	<0.1

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

Comments:

14. Elevated RLs due to dilution

: PWQO Limits
INTERIM: Interim PWQO
PWQO: PWQO

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

Summary of Exceedances

Interim PWQO

SW2	Found Value	Limit
Phosphorus (Total)	190	10
Zinc (Total)	63	20
Cobalt (Total)	1.1	0.9
Copper (Total)	6.6	5
Benzo[a]anthracene	<0.07	0.0004
Benzo(g,h,i)perylene	<0.05	0.00002
Chrysene	<0.05	0.0001
Dibenzo(a,h)anthracene	<0.05	0.002
Fluoranthene	<0.05	0.0008
Phenanthrene	<0.05	0.03

SW4	Found Value	Limit
Phosphorus (Total)	100	10
Zinc (Total)	91	20
Benzo[a]anthracene	<0.06	0.0004
Benzo(g,h,i)perylene	<0.05	0.00002
Chrysene	<0.05	0.0001
Dibenzo(a,h)anthracene	<0.05	0.002
Fluoranthene	<0.05	0.0008
Phenanthrene	<0.05	0.03

SW5	Found Value	Limit
Phosphorus (Total)	100	10
Cadmium (Total)	0.136	0.1
Cobalt (Total)	1.7	0.9
Benzo[a]anthracene	<0.05	0.0004
Benzo(g,h,i)perylene	<0.05	0.00002
Chrysene	<0.05	0.0001
Dibenzo(a,h)anthracene	<0.05	0.002
Fluoranthene	<0.05	0.0008
Phenanthrene	<0.05	0.03

PWQO

SW2	Found Value	Limit
E coli	272	100
Iron (Total)	1820	300
Zinc (Total)	63	30
Silver (Total)	0.4	0.1

Michelle Dubien
Data Specialist

Anthracene	<0.05	0.0008
SW4	**Found Value**	**Limit**
E coli	142	100
Iron (Total)	359	300
Zinc (Total)	91	30
Anthracene	<0.05	0.0008
SW5	**Found Value**	**Limit**
Iron (Total)	883	300
Silver (Total)	0.2	0.1
Anthracene	<0.05	0.0008

Michelle Dubien
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

APPENDIX D

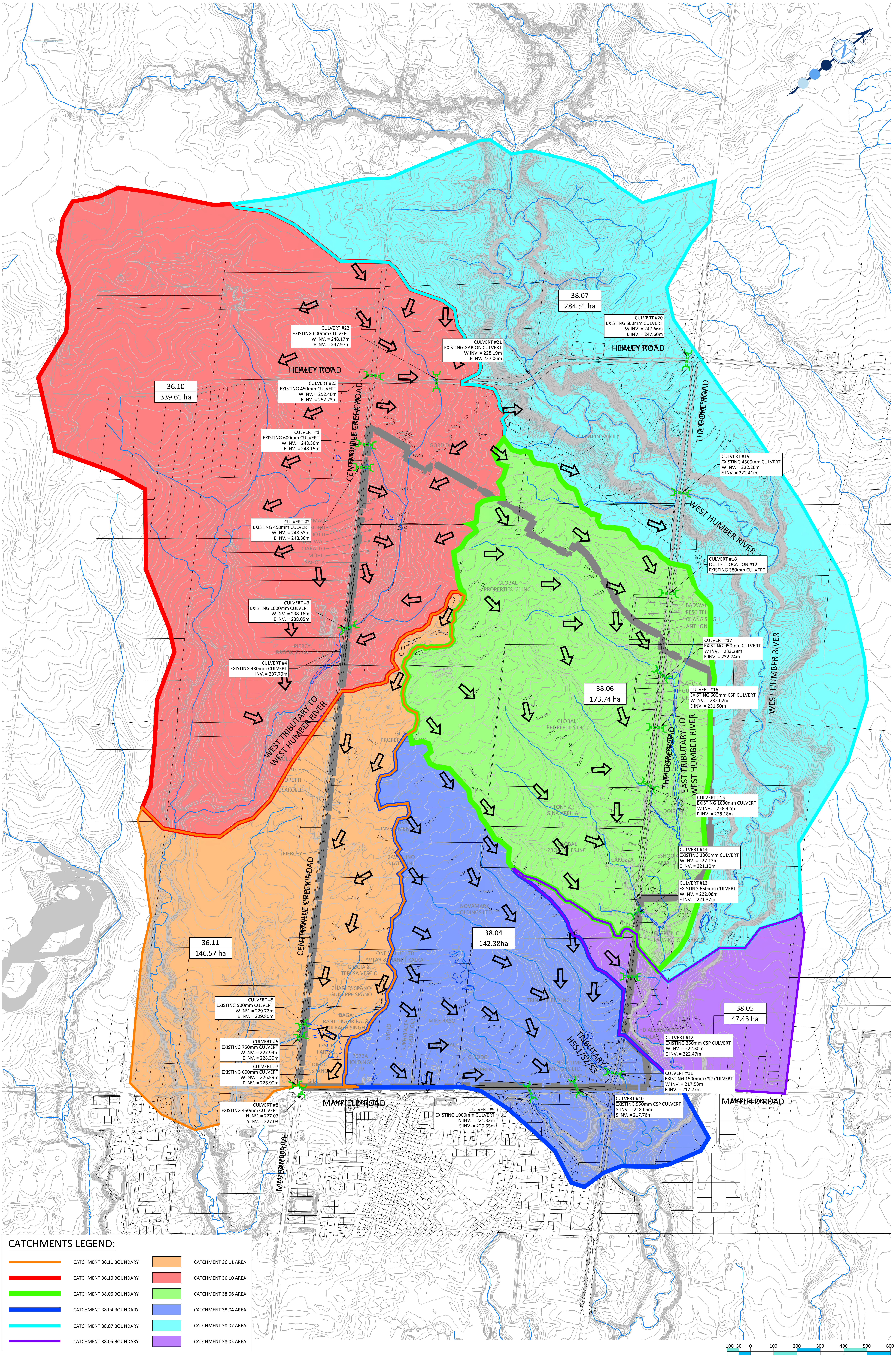
SECTION 4

APPENDIX D1

FIGURES

SCS consulting group ltd

GEI Consultants



CATCHMENTS LEGEND:

🟧	CATCHMENT 36.11 BOUNDARY	🟧	CATCHMENT 36.11 AREA
🟥	CATCHMENT 36.10 BOUNDARY	🟥	CATCHMENT 36.10 AREA
🟩	CATCHMENT 38.06 BOUNDARY	🟩	CATCHMENT 38.06 AREA
🟦	CATCHMENT 38.04 BOUNDARY	🟦	CATCHMENT 38.04 AREA
🟦	CATCHMENT 38.07 BOUNDARY	🟦	CATCHMENT 38.07 AREA
🟪	CATCHMENT 38.05 BOUNDARY	🟪	CATCHMENT 38.05 AREA

LEGEND:

▬ ▪ ▪ ▬	WILDFIELD VILLAGE SECONDARY PLAN (WVSP) AREA LIMITS
─	WATERCOURSE (TRCA, 2018)
]====[	EXISTING CULVERT
ID	HUMBER RIVER CATCHMENT ID (TRCA, 2018)
153.27 ha	CATCHMENT DRAINAGE AREA (HECTARES)
⇨	FLOW DIRECTION

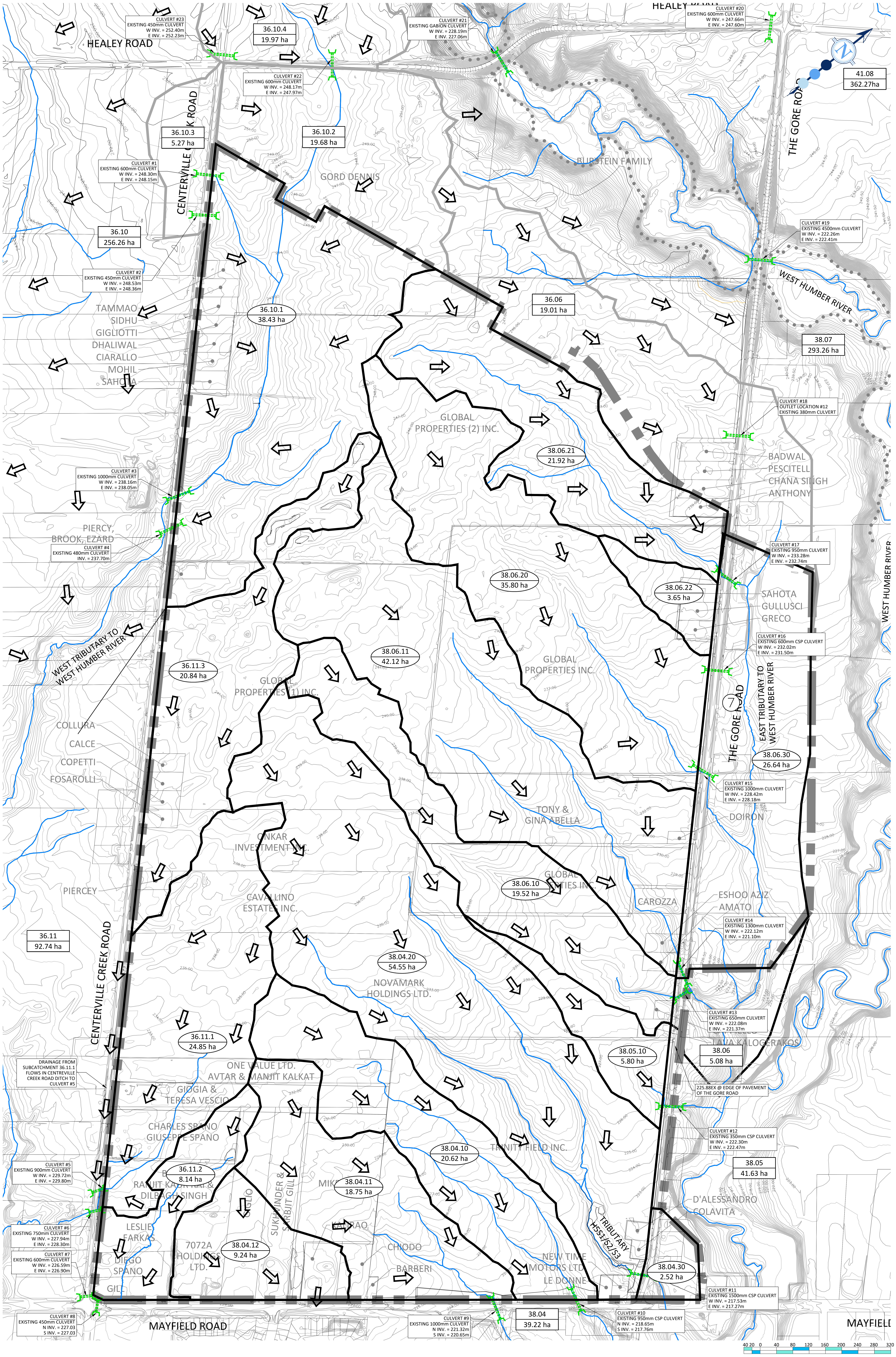
SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

WILDFIELD VILLAGE

EXISTING HUMBER RIVER CATCHMENTS

DESIGNED BY: R.R.B.
CHECKED BY: A.R.K.
SCALE: 1:7000
DATE: SEPTEMBER 2024
PROJECT No: 2630
FIGURE No: 4.1

File: P:\2630 Wildfield Village\Drawings\LSS\Fig\Report Figures\2630P-STRM-EXST-4.1.dwg – Revised by <JNELLAS> : Fri, Oct 04 2024 – 3:13pm



LEGEND:

- ▬ ▬ ▬ WILDFIELD VILLAGE SECONDARY PLAN (WVSP) AREA LIMITS
- ▬ SUBCATCHMENT BOUNDARY
- ▬ EXTERNAL CATCHMENT BOUNDARY
- ─ WATERCOURSE (TRCA, 2018)
- ⇨ FLOW DIRECTION
- 38.06.10 SUBCATCHMENT ID
- 19.52 ha DRAINAGE AREA (HECTARES)
- 38.06 EXTERNAL CATCHMENT ID
- 5.08 ha EXTERNAL DRAINAGE AREA (HECTARES)
-]======[EXISTING CULVERT

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

WILDFIELD VILLAGE

EXISTING HUMBER RIVER SUBCATCHMENTS

DESIGNED BY: R.R.B.
CHECKED BY: A.R.K.
SCALE: 1:4000
DATE: NOVEMBER 2024
PROJECT No: 2630
FIGURE No: 4.2

File: P:\2630 Wildfield Village\Drawings\LSS\Fig\Report Figures\2630P-STRM-EXST-4.2.dwg – Revised by <JNELLAS> : Fri, Oct 04 2024 – 3:07pm

APPENDIX D2

TOPOGRAPHIC INFORMATION (R-PE SURVEYING LTD.)

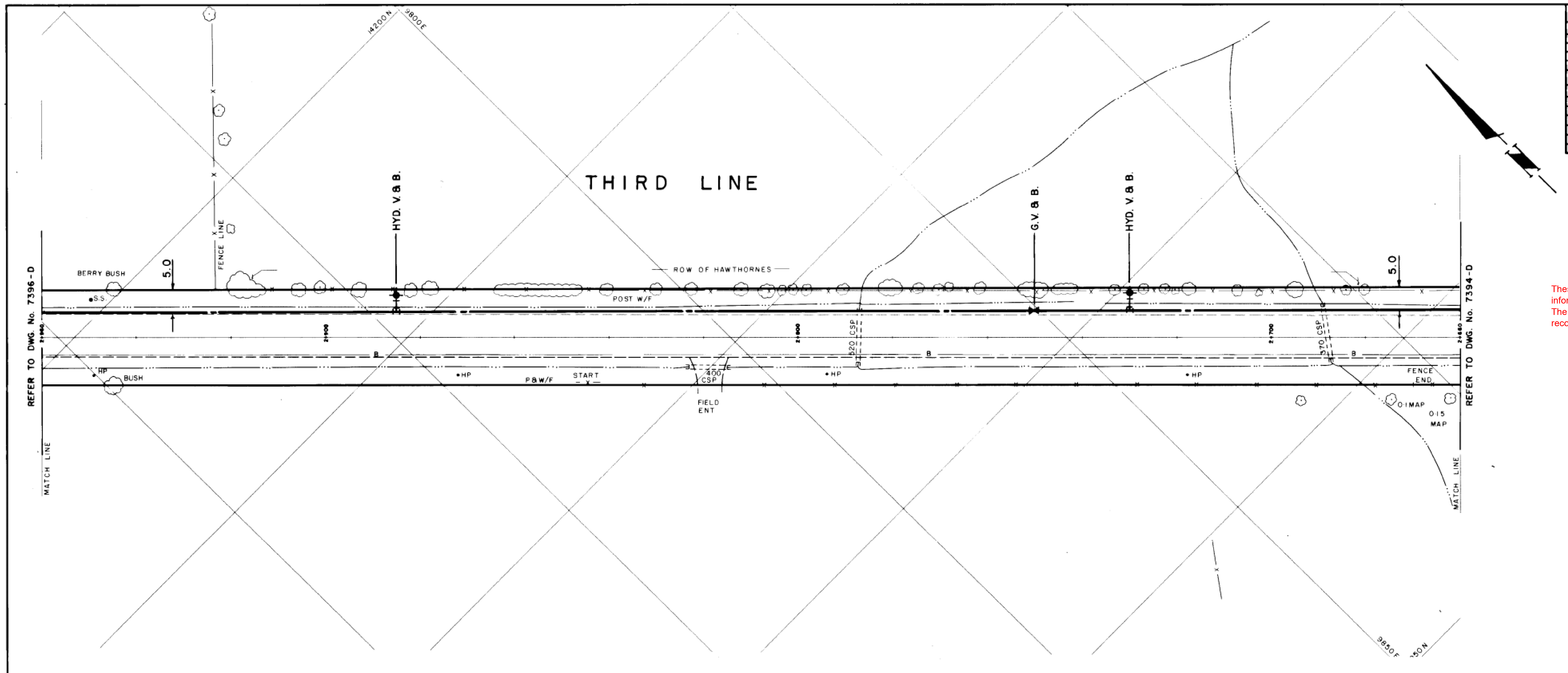
Appendix D2.1 Record Drawings

Fileshare Link: https://filesafecloud.scsconsultinggroup.com/url/cjjgwsjmwrrhh7kq

scs consulting group ltd

Appendix D2.2 Culvert Inspection Reports

Fileshare Link: https://filesafecloud.scsconsultinggroup.com/url/6umauvzhawmgqupf

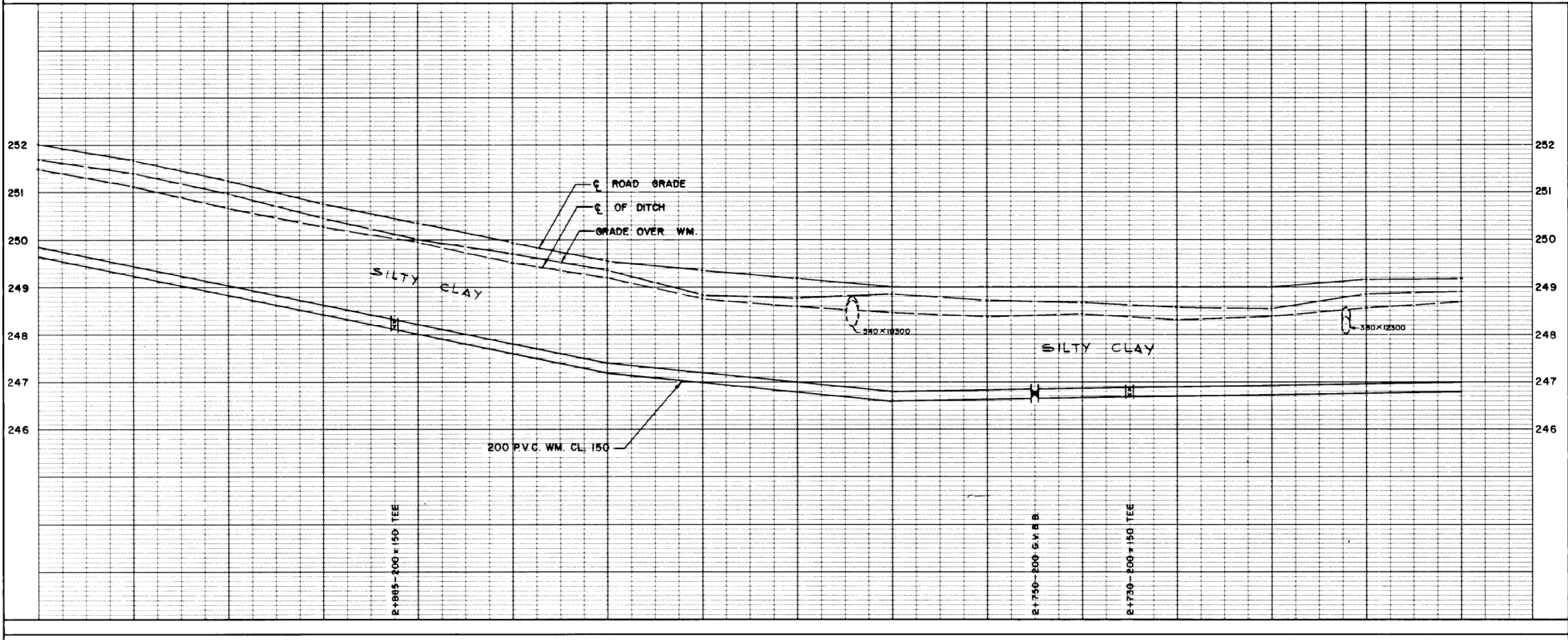


SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN. SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		

REVISIONS

DATE	DETAILS	INIT.
JULY 1986	AS CONSTRUCTED	A.S.

DISCLAIMER
These records are based upon available and unverified information and may prove inaccurate.
The Region of Peel disclaims any responsibility should these records be relied upon to the detriment of any person.



249.65	249.24	248.83	248.42	248.01	247.60	247.20	247.00	246.80	246.60	246.63	246.67	246.70	246.73	246.76	246.80	EL. BOT. OF WM.
2+960	2+940	2+920	2+900	2+880	2+860	2+840	2+820	2+800	2+780	2+760	2+740	2+720	2+700	2+680	2+660	℄ RD. CHAINAGE

General Notes

- – All Driveways Gravel Unless Otherwise Noted.
- – All Service Locations Are Approximate And Must Be Located Accurately In Field.

● Denotes Building – Not Located
▭ Denotes Building Located
Type 'B' Bedding Unless Otherwise Noted (SAN)

B.M. N° Elev.

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction Location of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

W. L. LISING
Aug 14, 1985
Designed by
chkd.

G. L. SAVAGE
Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. PORT CREDIT
HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION

Region of Peel

Department of Public Works

THIRD LINE (ALBION)

200mm WATERMAIN

Sta. 2+660 **To Sta.** 2+960

Lots 5 CON. 3	Area C – 3	Project No. 85–1080
Scale Hor. 1:500 Ver. 1:50	Drawn by Y.C./A.S.	Checked by
Date JUNE '85	Sheet 10 of 11	Plan No. 7395-D

7395-D

SKETCH SHOWING ELEVATIONS FOR ENGINEER'S USE

SCALE 1:2000

R–PE SURVEYING LTD., O.L.S.

METRIC

CAUTION

A) THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED EXCEPT FOR THE PURPOSE INDICATED IN THE TITLE BLOCK.

B) THIS SKETCH IS PROTECTED BY COPYRIGHT ©.

NOTES

THIS SKETCH IS AN ORIGINAL IF EMBOSSED BY THE SURVEYOR'S SEAL. BOUNDARIES ARE NOT CERTIFIED BY THIS PLAN, AND ARE SUBJECT TO CLARIFICATION UPON THE INCORPORATION OF ADDITIONAL DOCUMENTARY AND FIELD SURVEY EVIDENCE.

BENCHMARK NOTE

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO PEEL REGION VERTICAL BENCHMARK NUMBER 44 HAVING AN ORTHOMETRIC ELEVATION OF 227.660 METRES. ELEVATIONS ARE REFERENCED TO THE CANADIAN GEODETIC VERTICAL DATUM OF 1928, 1978 ADJUSTMENT (CGVD–1928:1978).

MONUMENT IS LOCATED ON THE SOUTH FACE AT THE WEST CORNER OF GARAGE OF A RED BRICK BUNGALOW LOCATED ON THE NORTH SIDE OF SEVENTEENTH SIDEROAD (REGION ROAD No. 14) APPROXIMATELY 0.64KM EAST OF McVEAN DRIVE (EIGHTH LINE EAST). No. 7236 MAYFIELD ROAD.

FIELD OBSERVATIONS

THE FIELD OBSERVATIONS REPRESENTED ON THIS PLAN WERE COMPLETED ON

THE 24th DAY OF OCTOBER, 2023

ADDITIONAL FIELD OBSERVATIONS WERE COMPLETED ON

THE 9th DAY OF NOVEMBER, 2023

ADDITIONAL FIELD OBSERVATIONS WERE COMPLETED ON

THE 21st DAY OF DECEMBER, 2023

ADDITIONAL FIELD OBSERVATIONS WERE COMPLETED ON

THE 1st DAY OF FEBRUARY, 2024

LEGEND

RW	DENOTES RETAINING WALL
MW	DENOTES MONITORING WELL
COL	DENOTES COLUMN
BXB	DENOTES BELL BOX
UTBX	DENOTES UTILITY BOX
CB	DENOTES CATCH BASIN
–W–	DENOTES OVERHEAD WIRE
–X–	DENOTES FENCE LINE
–GR–	DENOTES GUIDE RAIL
–OHGUY–	DENOTES OVERHEAD GUY WIRE
UP	DENOTES UTILITY POLE
LS	DENOTES LAMP STANDARD
TS	DENOTES TRAFFIC SIGNAL
INV.	DENOTES INVERT ELEVATION
OBV.	DENOTES OBVERT ELEVATION
ø	DENOTES DIAMETER
✿	DENOTES DECIDUOUS TREE
✷	DENOTES CONIFEROUS TREE
INT	DENOTES INTERLOCK
CONC.	DENOTES CONCRETE
CPAD	DENOTES CONCRETE PAD
P	DENOTES PORCH
MH	DENOTES MANHOLE
MHST	DENOTES MANHOLE STORM
WV	DENOTES WATER VALVE
UMC	DENOTES UNDERGROUND CABLE
⊕	DENOTES FIRE HYDRANT
⊥	DENOTES GUY WIRE ANCHOR
Ⓦ	DENOTES WELL
ST	DENOTES STAIRS
⚑	DENOTES GAS LOCATION MARKER
🟩	DENOTES CURB CUT
CLF	DENOTES CHAIN LINK FENCE
SW	DENOTES STONE WALL
UMW	DENOTES UNDERGROUND WATER MARKER
SH	DENOTES SINK HOLE
GLB	DENOTES GROUND LEVEL BOX
PDC	DENOTES PEDESTRIAN CROSSING
MBX	DENOTES MAILBOX
BXH	DENOTES ELECTRICAL BOX
○	DENOTES POST
COL	DENOTES COLUMN

R–PE SURVEYING LTD.
ONTARIO LAND SURVEYORS
643 Chrislea Road, Suite 7
Woodbridge, Ontario L4L 8A3
Tel.(416)635–5000 Fax (416)635–5001
Tel.(905)264–0881 Fax (905)264–2099
Website: www.r–pe.ca
DRAWN: A.Q./K.M.
JOB No. 23–157 CAD FILE No.23157tp01d

APPENDIX D3

TABLES

Table 4.1: Existing Conditions Drainage Area Summary

Catchment ID[1]	Sub-Catchment ID[2]	Description	Drainage Area (ha)	Outlet[3]
36.10	36.10.1	Agricultural and 8 Residential Lots fronting Centreville Creek Road	38.43	Culverts #3 and #4
	36.10.2	External Agricultural Lands (Future Highway 413 Corridor)	19.68	Catchment 36.10.1
	36.10.3	External Agricultural Lands West of Centreville Creek Road	5.27	Culverts #1 and #2
	36.10.4	External Agricultural Lands North of Healey Road	19.97	Culvert #22
36.11	36.11.1	Agricultural and 4 Estate Residential Lots fronting the east side of Centreville Creek Road	24.85	Culvert #5, Centreville Creek Road Ditch
	36.11.2	Agricultural and 3 Residential Lots fronting the east side of Centreville Creek Road	8.14	Culverts #6, #7, #8
	36.11.3	Agricultural and 5 Residential Lots fronting the east side of Centreville Creek Road	20.84	Centreville Creek Road Ditch and Culvert #5
38.04	38.04.10	Agricultural	20.62	Culvert #10
	38.04.11	Agricultural	18.75	Culvert #9
	38.04.12	Agricultural	9.24	Mayfield Road ditch and Culvert #9
	38.04.20	Agricultural	54.55	Culvert #11
38.05	38.05.10	Agricultural	5.80	Culvert #12
38.06	38.06.10	Agricultural	19.52	Culvert #13
	38.06.11	Agricultural and 4 Residential Lot fronting the west side of The Gore Road	42.12	Culvert #14
	38.06.20	Agricultural	35.80	Culvert #15

Catchment ID[1]	**Sub-Catchment ID**[2]	**Description**	**Drainage Area (ha)**	**Outlet**[3]
	38.06.21	Agricultural and 1 Residential Lot fronting the west side of The Gore Road	21.92	Culvert #17
	38.06.22	Agricultural and 3 Residential Lots fronting the west side of The Gore Road	3.65	The Gore Road Ditch and Culvert #16
	38.06.30	Agricultural east of The Gore Road	26.64	Tributary to West Humber River

[1] Refer to **Figure 4.1** for catchment locations.

[2] Refer to **Figure 4.2** for subcatchment locations.

[3] Refer to **Figure 4.2** for culvert locations.

Table 4.2: Stormwater Management Criteria

Criteria	Control Measure	
Quantity Controls	Regional Storm	Post- to pre- development controls are required for the Regional (Hurricane Hazel) Storm event where pre-development target peak flows are to be determined utilizing TRCA's most recent calibrated Humber River hydrologic model per the Scoped Subwatershed Study (Wood., 2022) and TRCA. Ensure no increases in peak flow at downstream nodes in existing FVAs.
	2 through 100 Year Storms	Post-development peaks flows are to be controlled to the target flow rates established using the target unit release rates generated by Equation F for Sub-Basin 36 of the West Humber River as per TRCA Stormwater Management Criteria (2012). Refer to **Appendix D4** for the unit rate equations.
Quality Control	An "Enhanced" level of quality control is required based on MOE Guidelines (2003) to provide 80% Total Suspended Solids (TSS) removal.	
Erosion Control	Using continuous simulation hydrologic modelling, complete an erosion exceedance analysis to compare pre- and post-development erosion impacts, and establish an appropriate erosion threshold and volume requirement for end-of-pipe SWM facilities. End-of-pipe SWM facilities must provide extended detention of the 25 mm rainfall event for a minimum 48 hours. Where conditions do not warrant an end-of-pipe SWM facility, a minimum of 5 mm of on-site retention is required.	

Table 4.3: Regional Storm Quantity Control Target Unit Rates

Catchment[1]	NHYD ID[2]	Total Catchment Area[2] (ha)	Regional Storm Total Catchment Peak Flow[2] (m^3/s)	Regional Storm Quantity Control Target Unit Rate[3] ($m^3/s/ha$)
36.10	560	339.61	23.674	0.070
36.11	561	146.57	10.904	0.074
38.04	577	142.38	10.896	0.077
38.05	578	47.43	5.139	0.108
38.06	579	173.74	12.867	0.074

[1] Refer to **Figure 4.1** for catchment locations.

[2] Per TRCA hydrologic model. Refer to **Appendix D3**.

[3] Target Unit Rate is calculated based on Total Catchment Peak Flow (TRCA model) divided by the Total Catchment Area.

Table 4.4 – Regional Storm Quantity Control Target Flow Rates

Catchment ID[1]	Subcatchment ID[2]	Pre-Development Drainage Area[2] (ha)	Regional Storm Quantity Control Target Flow Rate[3] (m^3/s)
36.10	36.10.1	38.43	2.679
36.11	36.11.1	24.85	1.849
	36.11.2	8.14	0.606
	36.11.3	20.84	1.550
38.04	38.04.10	20.62	1.578
	38.04.11	18.75	1.435
	38.04.12	9.24	0.707
	38.04.20	54.55	4.175
38.05	38.05.10	5.80	0.628
38.06	38.06.10	19.52	1.446
	38.06.11	42.12	3.119
	38.06.20	35.80	2.651
	38.06.21	23.68	1.754
	38.06.22	3.65	0.270
	38.06.30	26.64	1.973

[1] Refer to **Figure 4.1** for catchment locations.

[2] Refer to **Figure 4.2** for subcatchment locations and areas.

[3] Quantity Control Target Flow Rate is calculated based on the Target Unit Rate provided in **Table 4.3** multiplied by the subcatchment area within the WVSP area.

Table 4.5 – Existing Conditions Regional Storm Nodal Peak Flows

Node[1]	NHYD ID[1]	Location	Regional Storm Nodal Peak Flow[1] (m^3/s)
J7038.202	1939	Mayfield Road east of The Gore Road	178.62
J7038.112	1935	West Humber River at The Gore Road South of Countryside Drive	186.27
J42	1456	Confluence of Tributary and West Humber River	250.84
J5755.242	1776	Castlemore Road	367.59
J3477.822	1366	Upstream of Cottrelle Boulevard	369.28
J1291.942	869	Upstream of McVean Drive	369.04
O2HCO31	720	Upstream of Queen Street	708.15
J4045.633	1442	Downstream of Highway 407	954.53
J9359.973	2074	Finch Avenue and Highway 427	952.87
J7731.4112	1971	Highway 27	969.62
J18	1028	West of Islington Avenue and South of Albion Road	1013.55
J17	1005	South of Albion Road	1870.78
J16	975	Upstream of Eglington Avenue, East of Scarlett Road	1919.92
CJ807.6693_1	1000	Lake Ontario	2496.74

[1] Refer to **Appendix D3** for node locations, hydrologic model schematic, summary output for the nodes specified and a digital link to the hydrologic modelling files.

APPENDIX D4

HUMBER RIVER DESIGN STORM UNIT RELEASE RATES

Humber River Stormwater Management Quantity Control Release Rates

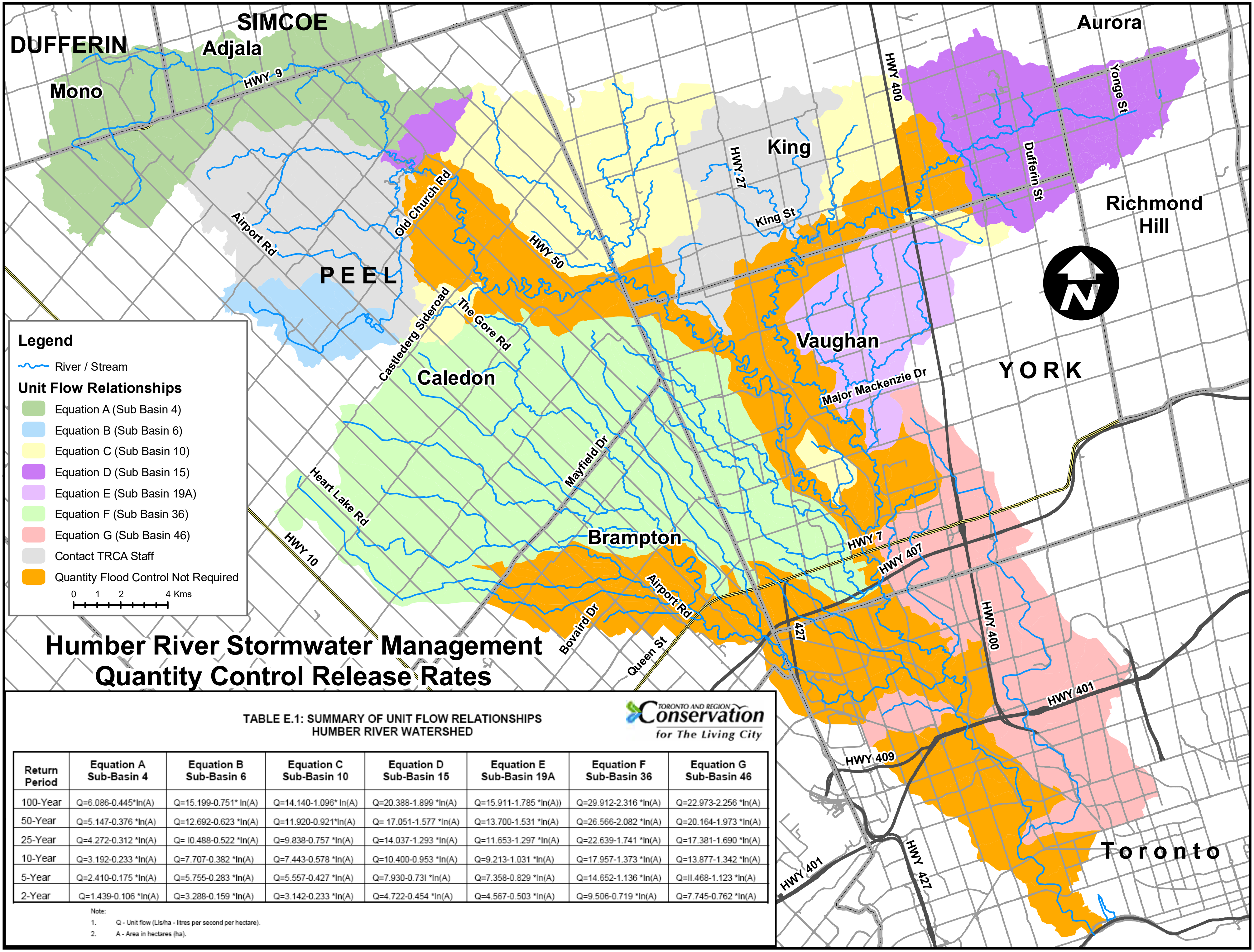


TABLE E.1: SUMMARY OF UNIT FLOW RELATIONSHIPS
HUMBER RIVER WATERSHED

Toronto and Region Conservation for The Living City

Return Period	Equation A Sub-Basin 4	Equation B Sub-Basin 6	Equation C Sub-Basin 10	Equation D Sub-Basin 15	Equation E Sub-Basin 19A	Equation F Sub-Basin 36	Equation G Sub-Basin 46
100-Year	Q=6.086-0.445*In(A)	Q=15.199-0.751* In(A)	Q=14.140-1.096* In(A)	Q=20.388-1.899 *In(A)	Q=15.911-1.785 *In(A))	Q=29.912-2.316 *In(A)	Q=22.973-2.256 *In(A)
50-Year	Q=5.147-0.376 *In(A)	Q=12.692-0.623 *In(A)	Q=11.920-0.921*In(A)	Q= 17.051-1.577 *In(A)	Q=13.700-1.531 *In(A)	Q=26.566-2.082 *In(A)	Q=20.164-1.973 *In(A)
25-Year	Q=4.272-0.312 *In(A)	Q= I0.488-0.522 *In(A)	Q=9.838-0.757 *In(A)	Q=14.037-1.293 *In(A)	Q=11.653-1.297 *In(A)	Q=22.639-1.741 *In(A)	Q=17.381-1.690 *In(A)
10-Year	Q=3.192-0.233 *In(A)	Q=7.707-0.382 *In(A)	Q=7.443-0.578 *In(A)	Q=10.400-0.953 *In(A)	Q=9.213-1.031 *In(A)	Q=17.957-1.373 *In(A)	Q=13.877-1.342 *In(A)
5-Year	Q=2.410-0.175 *In(A)	Q=5.755-0.283 *In(A)	Q=5.557-0.427 *In(A)	Q=7.930-0.73I *In(A)	Q=7.358-0.829 *In(A)	Q=14.652-1.136 *In(A)	Q=II.468-1.123 *In(A)
2-Year	Q=1.439-0.106 *In(A)	Q=3.288-0.159 *In(A)	Q=3.142-0.233 *In(A)	Q=4.722-0.454 *In(A)	Q=4.567-0.503 *In(A)	Q=9.506-0.719 *In(A)	Q=7.745-0.762 *In(A)

Note:

1. Q - Unit flow (Ll/s/ha - litres per second per hectare).
2. A - Area in hectares (ha).

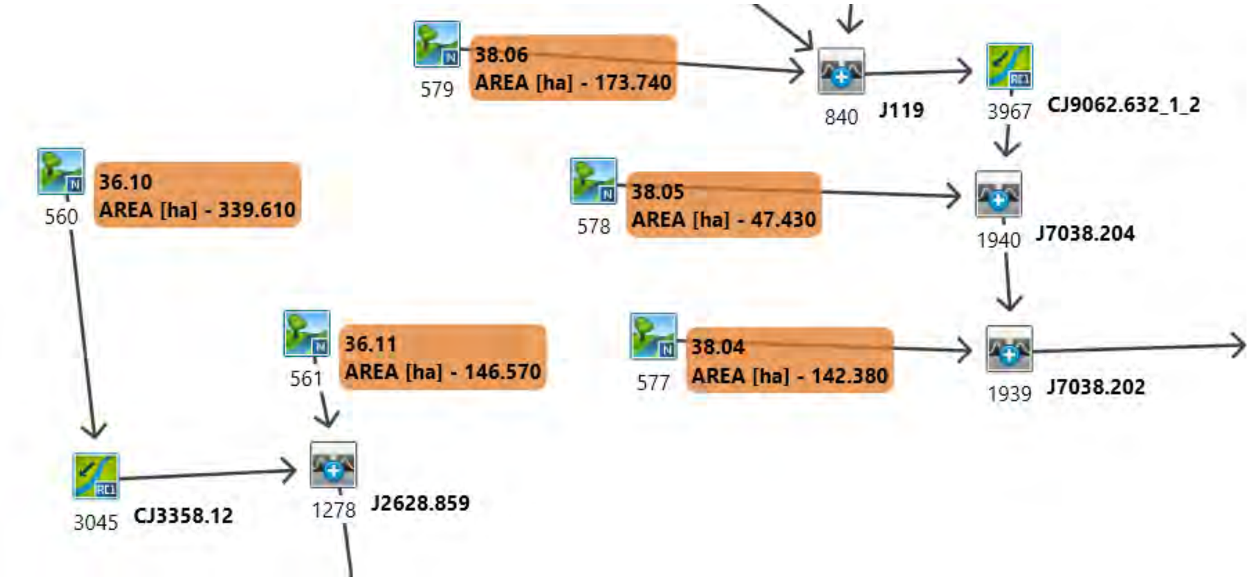
APPENDIX D5

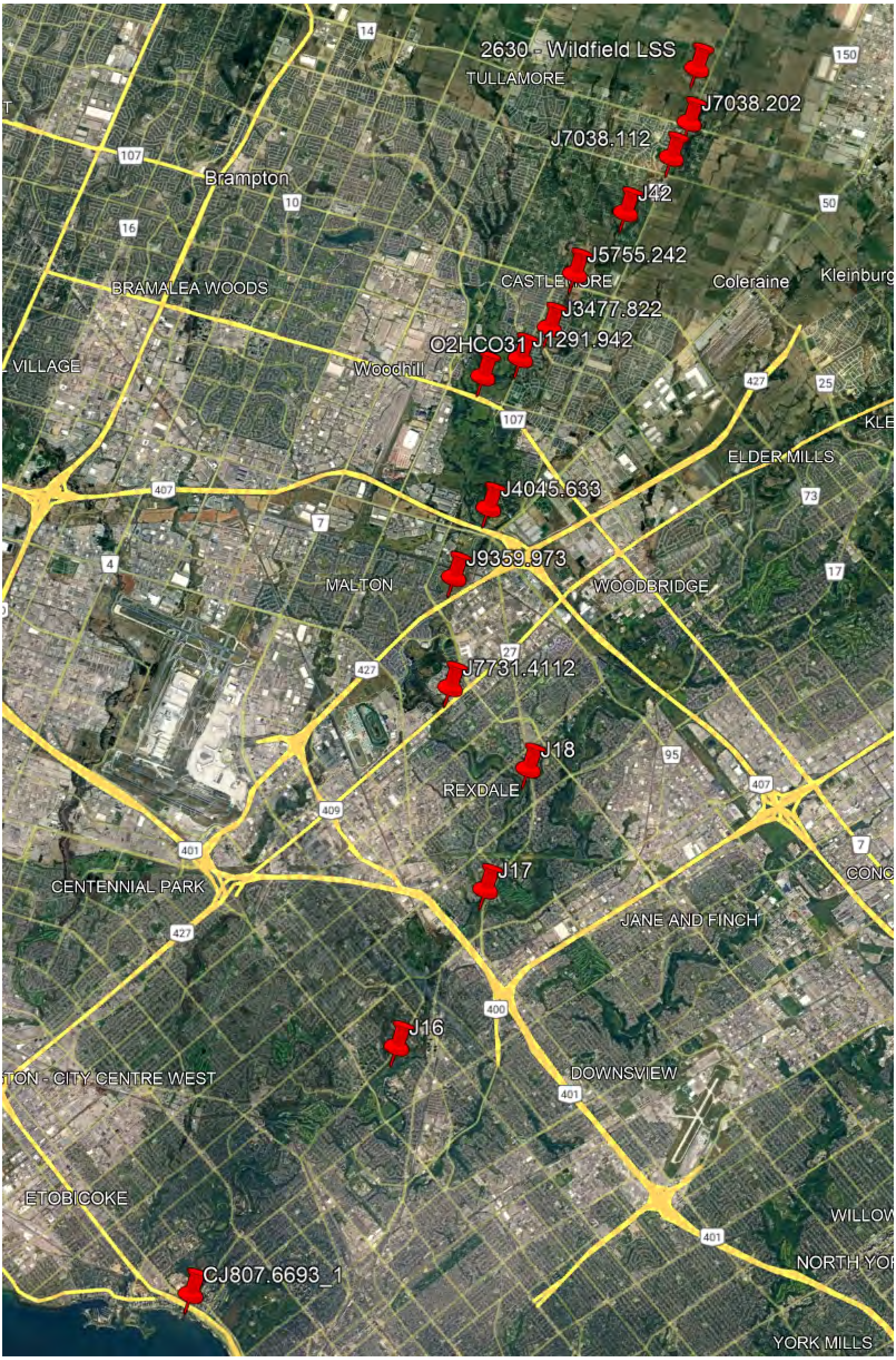
EXISTING CONDITIONS HYDROLOGIC MODELLING (TRCA)

SCS consulting group ltd

GEI Consultants

Existing Hydrologic Modelling Schematic – Total Areas (TRCA 2018)





LEGEND:

WILDFIELD VILLAGE

FLOW NODE LOCATIONS

SCS consulting group ltd

30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

DESIGNED BY: R.B.

CHECKED BY: A.K.

SCALE: N.T.S.

DATE: SEPTEMBER 2024

PROJECT No: 2630

FIGURE No: D3

File: Document1.pdf – Revised By <jrideout> : Oct 18 2023 – 1:35:28 PM

```
********************************
** SIMULATION:Hazel1000       **
********************************
--------------------
| CALIB            |
| NASHYD   (  0560)|   Area    (ha)= 339.61   Curve Number   (CN)= 95.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  10.00   # of Linear Res.(N)= 2.50
--------------------   U.H. Tp(hrs)=   2.38

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                               ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
                0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
                0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
                0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
                0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
                0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
                0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
                0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
                0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
                0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
                0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
                1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
                1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
                1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
                1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
                1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
                1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
                1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
                1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
                1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
                1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
                1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
                1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
                2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
                2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
                2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
                2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
                2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
                2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
                2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
                2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
                2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
                2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
                2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
                2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
                3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   4.657

     PEAK FLOW       (cms)=  23.674 (i)
     TIME TO PEAK    (hrs)=  12.250
     RUNOFF VOLUME    (mm)= 189.460
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.894

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0561)|   Area    (ha)= 146.57   Curve Number   (CN)= 95.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  10.00   # of Linear Res.(N)= 2.50
--------------------   U.H. Tp(hrs)=   2.09

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                               ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
                0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
                0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
                0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
                0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
                0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
                0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
                0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
                0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
```

```
                 0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
                 0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
                 1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
                 1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
                 1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
                 1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
                 1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
                 1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
                 1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
                 1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
                 1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
                 1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
                 1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
                 1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
                 2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
                 2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
                 2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
                 2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
                 2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
                 2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
                 2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
                 2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
                 2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
                 2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
                 2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
                 2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
                 3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   2.289

     PEAK FLOW       (cms)=  10.904 (i)
     TIME TO PEAK    (hrs)=  12.000
     RUNOFF VOLUME    (mm)= 189.459
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.894

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0579)|   Area    (ha)= 173.74   Curve Number   (CN)= 95.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  10.00   # of Linear Res.(N)= 2.50
--------------------   U.H. Tp(hrs)=   2.11

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                  ---- TRANSFORMED HYETOGRAPH ----
                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                 0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
                 0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
                 0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
                 0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
                 0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
                 0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
                 0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
                 0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
                 0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
                 0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
                 0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
                 1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
                 1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
                 1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
                 1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
                 1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
                 1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
                 1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
                 1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
                 1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
                 1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
                 1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
                 1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
                 2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
                 2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
                 2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
                 2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
                 2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
                 2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
                 2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
                 2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
                 2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
                 2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
```

```
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   2.687

     PEAK FLOW       (cms)=  12.867 (i)
     TIME TO PEAK    (hrs)=  12.083
     RUNOFF VOLUME    (mm)= 189.459
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.894

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0578)|   Area    (ha)=  47.43   Curve Number   (CN)= 96.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  10.00   # of Linear Res.(N)= 2.50
--------------------   U.H. Tp(hrs)=   0.82

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   1.888

     PEAK FLOW       (cms)=   5.139 (i)
     TIME TO PEAK    (hrs)=  11.000
     RUNOFF VOLUME    (mm)= 191.909
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.905

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0577)|   Area    (ha)= 142.38   Curve Number   (CN)= 96.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  10.00   # of Linear Res.(N)= 2.50
--------------------   U.H. Tp(hrs)=   1.99

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

```
                               ---- TRANSFORMED HYETOGRAPH ----
                 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
                0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
                0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
                0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
                0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
                0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
                0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
                0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
                0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
                0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
                0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
                1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
                1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
                1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
                1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
                1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
                1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
                1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
                1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
                1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
                1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
                1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
                1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
                2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
                2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
                2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
                2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
                2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
                2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
                2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
                2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
                2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
                2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
                2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
                2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
                3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   2.335

     PEAK FLOW       (cms)=  10.896 (i)
     TIME TO PEAK    (hrs)=  11.917
     RUNOFF VOLUME    (mm)= 191.940
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.905

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
```

SCS consulting group ltd

Hydrologic Modelling Files

https://filesafecloud.scsconsultinggroup.com/url/4zgdgqceisa3skkn

APPENDIX E

SECTION 5

SCS consulting group ltd

GEI Consultants

APPENDIX E1

WASTEWATER DEVELOPMENT CHARGES (REGION OF PEEL)

Wastewater Development Charges 2024

Wastewater Servicing Infrastructure
Treatment and Trunk Sewer System
2024-2041 Development Charges

Draft – Not Approved by Council

Humber

New Sewage Pumping Station **24-2984**	C-2024 (56676) P-2024 (56677) C-2026 (56678)

McLaughlin

New Sewage Pumping Station **24-2985**	D-2024 (57359) C-2026 (57360)

McVean

Sewage Pumping Station Expansion **18-2976**	C-2024 (55680) C-2024 (56671)

Church Street

New Facility **29-2960**	D-2029 (35358) P-2029 (35223) C-2030 (34286)

Streetsville

New Facility **29-2960**	D-2029 (35364) P-2029 (35221) C-2030 (34285)

Various Dosing Stations

New Dosing Stations **25-2960**	D-2029 (35383) P-2029 (35224) C-2030 (34287)

Clarkson Wastewater Treatment Plant

Facility **20-2951**	C-2024 (56232)
Automation Consolidation **19-2934**	C-2024 (56108) C-2025 (56109)
Treatment Expansion **22-2950**	D-2025 (51956) C-2024 (51958) C-2025 (51959) C-2026 (53368)
Standby Power Expansion	D-2029 (52214) C-2031 (52215)
Biosolids Expansion **29-2999** **23-2952**	D-2024(56234) D-2025(56235) C-2026(54572) C-2028(56236) C2026(56237)
New Operations Building	C-2026(56884) D-2028(56885)
Treatment Expansion **26-2959** **25-2564**	EA-2025(57068)

Jack Darling 3 Sewer Pumping Station

New Pumping Station **24-2980**	D-2024 (53565) C-2026 (53012)

Sanitary Pumping Stations

Decommissioning **26-2978**	D-2026 (52841) C-2028 (52842)

Beach Street Sanitary Pumping Station

Upgrades **24-2971**	D-2024 (52754) C-2026 (52755)

Lakeview Village

New Sewage Pumping Station **25-2982**	D-2025 (27417) C-2027 (27418)

G.E. Booth Wastewater Treatment Plant

Automation Consolidation **19-2924**	C-2024 (56106) C-2025 (56107)
Odour Control Improvements **20-2961**	C-2024 (38871)
Plant 2 Blower Replacement **22-2923**	C-2024 (53410)
New Outfall **22-2944**	D-2025 (56297) C-2027 (51949)
Ash Management Facility **24-2942**	D-2024 (52833) C-2026 (52834)
Administration Building **26-2943**	D-2026 (51946) C-2028 (51947)
Treatment Expansion **25-2945**	D-2025 (38620) D-2027 (38621) C-2027 (51944) C-2028 (51945) C-2029 (52838)
Biosolids Expansion **29-2599** **29-2999**	EA-2029 (38619) D-2032 (51950) D-2032 (51952) D-2036 (51951)
Standby Power Expansion **28-2999**	D-2028 (52214) C-2030 (52215)
Ash Management Facility **28-2999**	C-2032 (37812) C-2034 (37813)
Biosolids Expansion **29-2999**	C-2034 (51953) C-2036 (35964)
Ash Berm Relocation **29-2947**	D-2024 (56879) C-2025 (56880)
Capacity Restoration **19-2940**	D-2024 (56890) C-2024 (56891)
Digesters and Beneficial Gas Reuse **25-2941**	D-2025 (56886) C-2028 (56887)
Ultaviolet Disinfection **25-2949**	D-2025 (56888) C-2028 (56889)
Treatment Expansion **25-2563** **29-2999**	EA-2025 (57067) D-2033 (38620) D-2033 (38621) C-2036 (51944) C-2036 (51945) C-2036 (52838)

Approved Infrastructure 2024

- ▲ Sewer Pumping Station
- ⬢ Odour Control Facility
- ⬟ Wastewater Treatment Plant
- - - - Approved Local Wastewater Main 2024
- - - - Approved Primary Wastewater Main 2024

Proposed Infrastructure 2025-2041

- ▲ Sewer Pumping Station
- ⬢ Odour Control Facility
- ⬟ Wastewater Treatment Plant
- — Proposed Local Wastewater Main > 2024
- — Proposed Primary Wastewater Main > 2024
- — Proposed Force Main

Existing Wastewater Infrastructure

- ▲ Sanitary Pumping Station
- — Existing Wastewater Main
- ▨ Highway 413
- — Watercourse
- 🟩 Greenbelt Boundary
- ▢ Urban Boundary
- ▢ Municipal Boundary
- ▢ Ward Boundary

Label Legend

2031 - Construction Year
30713 - Component Number
25-2199 - Project Number

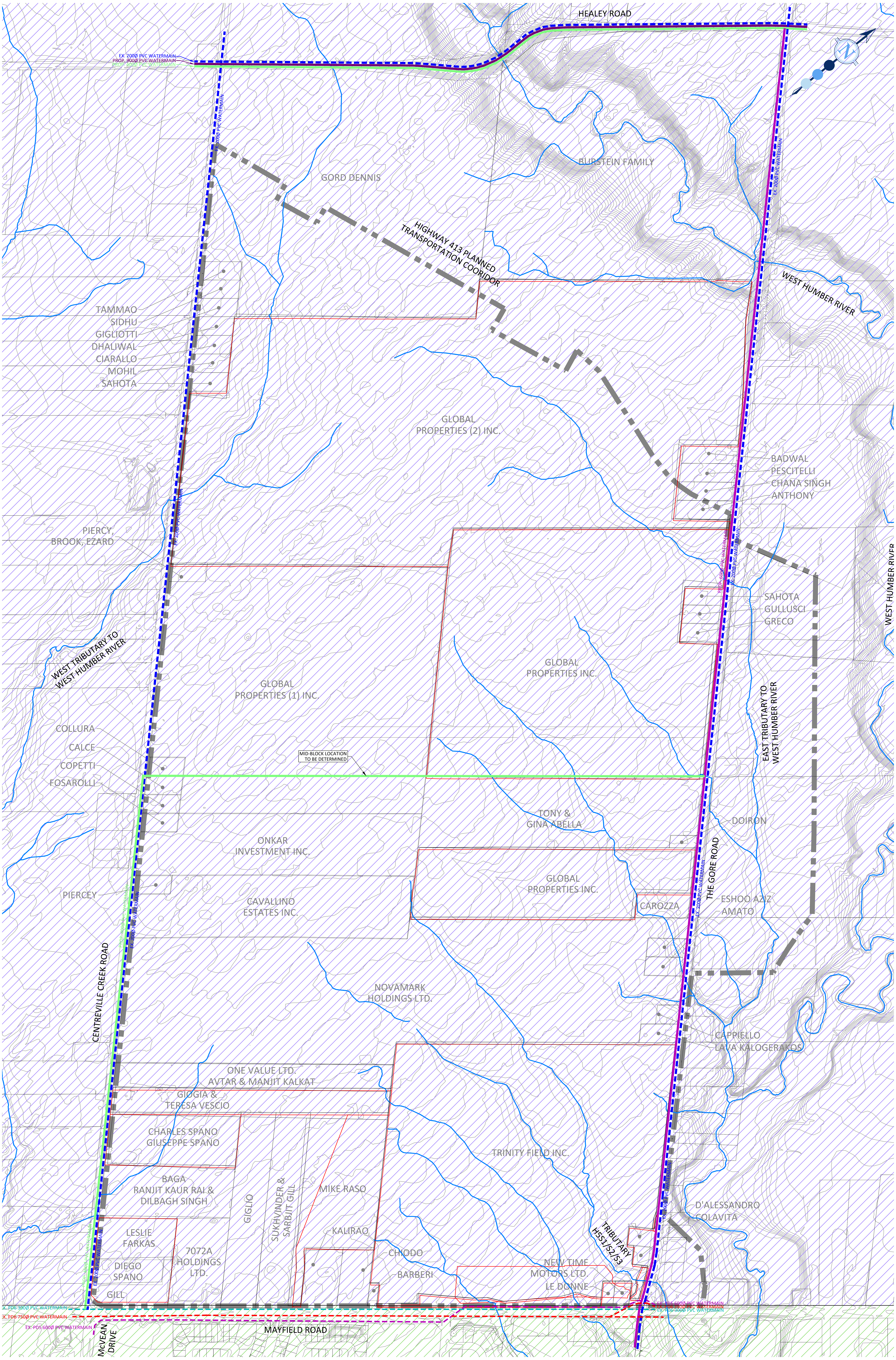
Region of Peel
working with you

October 2023
Water & Wastewater Planning, Public Works
Map ID: 3871-WW-DC Wastewater Map 2024
Data Source: Region of Peel
Scale: 1:68,000 | NAD83 UTM zone 17N

DISCLAIMER
The proposed capital projects shown on this map are subject to annual review and approval by Regional Council. As such, project schedules and project scopes are subject to change.

APPENDIX E2

FIGURES



LEGEND:

▬ ▪ ▪ ▬	WILDFIELD VILLAGE SECONDARY PLAN (WVSP) AREA LIMITS
―	WATERCOURSE (TRCA, 2018)
―	400Ø PROPOSED DISTRIBUTION WATERMAIN
―	600Ø PROPOSED DISTRIBUTION WATERMAIN
―	900Ø PROPOSED TRANSMISSION WATERMAIN
- - -	200Ø EXISTING WATERMAIN
- - -	300Ø EXISTING WATERMAIN
- - -	600Ø EXISTING WATERMAIN
- - -	750Ø EXISTING WATERMAIN
▨	APPROXIMATE EXTENT OF PRESSURE ZONE 5 (182.4 - 236.2m)
▨	APPROXIMATE EXTENT OF PRESSURE ZONE 6E (214.5 - 259.1m)

SCS consulting group ltd

30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

WILDFIELD VILLAGE

EXISTING AND PLANNED WATER SERVICING INFRASTRUCTURE

DESIGNED BY: R.R.B.
CHECKED BY: A.R.K.
SCALE: 1:4000
DATE: SEPTEMBER 2024
PROJECT No: 2630
FIGURE No: 5.1

File: P:\2630 Wildfield Village\Drawings\LSS\Fig\Report Figures\2630P-WTRM-5.1.dwg – Revised by <JNELLAS> : Fri, Oct 04 2024 – 3:02pm

APPENDIX E3

WATER DEVELOPMENT CHARGES (REGION OF PEEL)

Water Development Charges 2024

Water Servicing Infrastructure
Water Production, Transmission Systems
and Distribution Systems
2024-2041 Development Charges

Draft – Not Approved by Council

Palgrave
New Groundwater Well — C-2024 (52304)
22-1832 — C-2025 (57301)

Caledon East
New Groundwater Well
23-1830 — C-2026 (52300)

Inglewood
New Groundwater Well — D-2025 (52801)
22-1831 — C-2027 (52302)

South Albion
New Reservoir and Pumping Station — EA-2029 (22574), D-2031 (35752), P-2031 (35753), C-2033 (35754), C-2033 (35755)
29-1599
29-1999
New Elevated Tank — EA-2033 (38092), D-2035 (35756), P-2035 (35757), C-2037 (35758)
29-1599
29-1999

Macville
New Elevate Tank — EA-2028 (22514), D-2030 (30682), P-2030 (32702), C-2032 (32010)
28-1583
29-1999

Castlederg
New Elevated Tank — EA-2031 (22677), D-2033 (35614), P-2033 (35615), C-2035 (35616)
25-1599
29-1999

North Bolton
Booster Pumping Station — D-2024 (30686), P-2024 (32574), C-2026 (32573)
24-1969

Victoria
New Pumping Station — EA-2026 (22350), D-2028 (23447), C-2030 (23448)
26-1580
28-1963

Sandhill
New Reservoir and Pumping Station — EA-2027 (35850), D-2029 (38087), P-2029 (38088), C-2031 (38089), C-2031 (38090)
27-1582
29-1999

West Caledon
New Elevated Tank — D-2024 (20692)
23-1941 — C-2026 (20685)

Heritage Road
New Elevated Tank — EA-2031 (34474), D-2033 (32972), P-2033 (32973), C-2035 (32974)
29-1599
29-1999

Tullamore
Pumping Station Expansion
27-1964 — D-2027 (56932), C-2029 (56933)

Snelgrove
Decommissioning Elevated Tank — C-2024 (32270)
21-1951
New Elevated Tank — EA-2028 (22428), D-2030 (37130), P-2030 (37131), C-2032 (37132)
28-1581
29-1999

West Brampton
Reservoir Expansion — D-2031 (25259)
28-1999 — C-2033 (26196)
Pumping Station Expansion — D-2026 (23391)
26-1962 — C-2027 (23392)
Pumping Station Expansion — D-2029 (34485)
28-1999 — C-2030 (16350)
Pumping Station Expansion — D-2034 (23389)
28-1999 — C-2035 (23390)

North Brampton
Transient Protection Expansion — D-2024 (54336), C-2026 (54337)
22-1987

East Brampton
Reservoir Improvements and Upgrades — C-2026 (32269)
26-1954
Transients Protection Expansion — D-2024 (54302), C-2026 (54303)
24-1985

Airport Road
Transient Protection Expansion — C-2026 (54339)
22-1988
Transient Protection Expansion — D-2028 (54294), C-2030 (54295)
28-1995
Pumping Station Expansion — D-2027 (56934), C-2029 (56937), D-2027 (56938), C-2029 (56939)
27-1965

Beckett Sproule
Pumping Station Expansion — C-2024 (33336)
21-1974
Improvements and Upgrades — C-2024 (54248)
21-1978
Transient Protection Expansion — D-2028 (54296), C-2030 (54297)
28-1995
Training and Logistics Facility — D-2024 (54083), C-2024 (54084)
24-1980
Pumping Station Expansion — D-2029 (52045), C-2030 (52046)
29-1999

Meadowvale North
Transient Protection Expansion — C-2026 (54335)
22-1986
Transient Protection Expansion — D-2028 (54300), C-2030 (54301)
28-1995

Hanlan
Transient Protection Expansion — D-2028 (54298), C-2030 (54299)
28-1995
Pumping Station Expansion — D-2031 (23582), C-2033 (23585)
29-1999

Hanlan West
New Pumping Station
22-1992 — C-2025 (54315)
New Reservoir — EA-2031 (22673), D-2033 (35617), C-2035 (35618)
29-1599
29-1999

Silverthorn
Transient Protection Expansion — C-2023 (54397)
23-1994
Reservoir Expansion — D-2026 (54120), C-2027 (54121)
26-1941

Arthur P. Kennedy
Reservoir Expansion — D-2024 (23395), C-2026 (23396)
21-1923
Lake Ontario Monitoring System — C-2024 (54097)
22-1924
Standby Power Expansion — D-2027 (53560), C-2028 (53561), C-2029 (53562)
27-1982
Waste Building Expansion — D-2031 (23404), C-2033 (23405)
29-1997
New Intake — EA-2029 (23451), D-2037 (23452), C-2039 (23453)
29-1995
29-1997
Treatment Expansion — EA-2025 (50380), D-2028 (32975), P-2028 (32976), C-2030 (32977)
25-1575
28-1925

Lorne Park
Lake Ontario Monitoring System — C-2024 (54099)
22-1934
Transient Protection Expansion — C-2039 (54396)
24-1540
Transients/Protection Expansion — D-2028 (54304), C-2030 (54305)
28-1995
Treatment Expansion — EA-2025 (51085), D-2032 (32978), P-2032 (32979), C-2034 (32980)
25-1575
29-1997

Approved Infrastructure 2024
- ▲ Pumping Station
- ■ Reservoir
- ● Elevated Tank
- ● Well
- ⬟ Water Treatment Plant
- - - - Approved Distribution Feeder Main 2024
- - - - Approved Transmission Main 2024

Proposed Infrastructure 2025-2041
- ▲ Pumping Station
- ■ Reservoir
- ● Elevated Tank
- ● Well
- ⬟ Water Treatment Plant
- — Proposed Distribution Feeder Main Post 2024
- — Proposed Transmission Main Post 2024

Existing Water Infrastructure
- □ Reservoir
- ○ Elevated Tank
- ◇ Standpipe
- ○ Well
- △ Water Pumping Station
- — Water Main
- — Watercourse
- ▨ Highway 413
- 🟩 Greenbelt Boundary
- □ Urban Boundary
- □ Municipal Boundary
- □ Ward Boundary

Label Legend
2031 - Construction Year
30713 - Component Number
25-2199 - Project Number

DISCLAIMER
The proposed capital projects shown on this map are subject to annual review and approval by Regional Council. As such, project schedules and project scopes are subject to change.

0 2 4 8 Kilometres

Region of Peel
working with you

October 2023
Water & Wastewater Planning, Public Works
Map ID: 3870-W-DC Water Map 2024_2
Data Source: Region of Peel
Scale: 1:68,000 | NAD83 UTM zone 17N