Appendix A

Terms of Reference & Correspondence

A1. Submitted TOR (March 7, 2023)
A2. Agency Comments (City & NPCA)

A1. Submitted TOR (March 7, 2023)

74 Berkeley Street, Toronto, ON M5A 2W7
Tel: 647-795-8153 | www.pecg.ca

March 7, 2023

Amy Shanks, Senior Planner, Secondary Plans
Adam Boudens, Senior Environmental Planner/Ecologist
Planning and Development Services, Niagara Region
1815 Sir Isaac Brock Way
Thorold, ON, L2V 4T7

David Deluce, Senior Manager, Environmental Planning & Policy
Theresa Bukovics, Planning Ecologist, Planning & Regulations
Niagara Peninsula Conservation Authority
250 Thorold Road West
Welland, ON, L3C 3W2

David Schulz, Senior Planner
City of Port Colborne
66 Charlotte Street
Port Colborne, ON, L3K 3C8

Dear All:

Re: Proposed Terms of Reference for the Lens Wignell Subwatershed Study, City of Port Colborne, Niagara Region - Second Submission

1. Introduction

Palmer and The Odan/Detech Group Inc. (Odan/Detech) are pleased to provide the following Terms of Reference (TOR) for the completion of a Subwatershed Study (SWS) within the City of Port Colborne, Niagara Region. A SWS has been requested by the Region in response to the proposed residential development of multiple properties, owned by Elite Development located: primarily north of Killaly Street East; between Elizabeth Street and Lorraine Road; and primarily south of Main St. East (**Figure 1** showing subwatersheds and **Field Map** showing more accurate watercourse mapping). Additionally, the City of Port Colborne stated in a Pre-Consultation Agreement, dated February 25, 2021, that '*To address Provincial Policy, a Subwatershed Study/Plan should be undertaken to inform the Secondary Plan*.'

Both Palmer and Odan/Detech are working on ongoing studies for this development. This TOR document provides an outline of what we believe is an appropriate scope for the necessary studies required to complete the SWS. Niagara Region (Cara Lampman in communication to Drago Samardzic, Odan/Detech August 20, 2021) general Terms of Reference were suggested:

a) *Identification, maintenance, restoration and wherever feasible the enhancement of natural heritage features, groundwater features, surface water features and ecological functions which are required for the ecological and hydrological integrity of the watershed*

b) *Identification, maintenance, enhancement and wherever feasible restoration of linkages among natural heritage features, ground water features and surface water features*

c) *Identification of lands that demonstrate opportunities to maintain, enhance or where feasible, restore sensitive and vulnerable surface water and groundwater features and their hydrologic functions and floodplains*

d) *Protection of the quality, quantity, distribution and direction of flow of existing surface and groundwater processes*

e) *Identification of a stormwater management strategy which maintains or enhances the quality, quantity and distribution of stormwater including infiltration measures and minimizes stormwater volumes and contaminate loads*

f) *Development of a monitoring plan which defines roles and responsibilities for pre, during and post-construction monitoring to determine the impact of development and site alteration of the natural heritage system, as well as on surface and groundwater resources.*

The above text is a citation from the email referenced above, thus we have not explained 'feasible', but our workplan below explains our approach for the Subwatershed Study.

This second version of the terms of reference are a revision of the first terms of reference. The changes are based on agency comments dated June 21, 2022 and a meeting between Palmer NPCA and the Region (November 10, 2022).

1.1 Study Goals and Objectives

The overall goal for the Wignell SWS is to identify and assess opportunities and constraints to development, as well as identify the existing and potential natural heritage features within the study area. It is also to provide an overall strategic management framework for natural heritage and water resources within the SWS study area. The management framework will outline the parameters for future monitoring and site specific studies where appropriate.

To meet these goals, the SWS study requires technical input from a variety of specialized environmental, ecological, and engineering disciplines to establish baseline conditions of the following:

• Groundwater quality and quantity; • Water budget; • Hydrology and hydraulics; • Surface water quality and quantity;	• Fluvial geomorphology • Terrestrial ecology • Aquatic ecology • Environmental policy review

We have identified what we believe to be an appropriate scope or work for each of the above listed disciplines.

This SWS is intended to provide sufficient detail on the natural heritage features and their form and function to support the completion of a future Secondary Plan(s) and associated studies. It is expected that future neighbourhood-level and site-specific stormwater and environmental studies/plan will be consistent with the recommended strategic direction of the Wignell SWS.

2. Proposed Study Area

Based on the Niagara Peninsula Conservation Authority (NPCA) mapping, the proposed Elite development is primarily in the Lens Wignell Drain subwatershed. However, a portion is within the CWR Welland Canal South. **Figure 1** indicates the area that Palmer and Odan/Detech propose will entail the geographic scope of the SWS study. That is, within the CWR Welland Canal South SWS, the study area includes all of the Elite Development properties as well as the area in between Main St. East, Wellington St., Killaly St. East and Elizabeth St. (residential properties along those streets). We believe this to be appropriate since the west side is bordered by currently developed urban areas and to the north by quarried lands.

3. Scope of Work

The items listed below present the more refined scope of work proposed to be completed for the SWS and to achieve the goals listed by the Region and the NPCA.

3.1 Consultation

In addition to consultation with the City of Port Colborne, the NPCA and Niagara Region, Palmer will consult with others to ensure that the input and scope is thorough. This will include contacting the relevant indigenous communities as well as nature clubs such as the Peninsula Field Naturalists and the Niagara Falls Nature Club.

3.2 Access to Lands

Apart from Elite-owned lands (which are a about a seventh of the subwatershed), some road allowances, and Lockview Park, Palmer and Odan/Detech have no access to the subwatershed lands beyond the roadside. Thus, for field investigations, in order to increase the understanding of the watershed, Palmer will attempt to access other lands primarily through City consultation. This access may take the form of one or more of:

- Access along drain allowances;
- Through an opt-in program in response to City-delivered letters for selected properties; and/or
- Permission to enter any City-owned lands.

3.3 Surface Water and Fluvial Geomorphology

The Study Area contains an extensive drainage network, primarily composed of artificial municipal drains for agricultural purposes. The drainage features are further impacted by practices at the Port Colborne Quarries and the storm surge gate structure located at Lakeshore Road. An understanding of reach-scale morphological characteristics, trends and site-specific erosional processes is a necessary basis for assessing existing channel stability as well as informing and evaluating future development of the

subwatershed. Due to the heavily altered nature of the features, it is critical that the fluvial geomorphological assessment involves close collaboration with water resource engineers to inform an inter-disciplinary understanding of existing drainage feature conditions.

3.3.1 Drainage Feature Desktop Review

Pertinent information regarding the channels and the catchment will be obtained and reviewed, including surficial geology, drainage network and soils mapping, topographic data (e.g. LiDAR), previous studies completed for the Study Area including recent Municipal Drain Reports (2022, 2020, 2018), and historical aerial photographs. Reaches will be delineated based on similar characteristics with respect to parameters such as channel form, valley shape, land use, vegetation cover, and historical alterations. The desktop review will include preliminary screening of headwater drainage features to distinguish those features that may be considered 'intermittent' or 'ephemeral' based on drainage area, stream order, previous studies, and observed characteristics (based on aerial photography analysis). The preliminary screening will be refined and confirmed through field investigations.

3.3.2 Field Investigations

The field investigation will fulfill two objectives: first, identifying/confirming headwater drainage features and, second, documenting existing channel conditions for permanently flowing watercourses. Field investigations will 'ground truth' aerial photograph interpretations and collect detailed channel information (bankfull geometry, bed and bank materials, indicators of instability or erosion) at representative locations within the Study Area. Detailed channel information will be used for the erosion threshold analysis appropriately requested by NVCA.

3.3.3 Headwater Drainage Feature Characterization

High-level characterization of the presence of headwater drainage features will be completed to guide future development planning and indicate where additional data collection is required at subsequent planning phases. The characterization will identify potential headwater drainage features and preliminary future management recommendations (e.g. retain, potential removal, enhance). Recommendations will be determined in collaboration with aquatic/terrestrial ecologists and water resources engineers to ensure a holistic multi-disciplinary approach. Any recommendations would be preliminary and require additional study to confirm at subsequent planning phases.

3.3.4 Meander Belt Corridor Delineation

Channel configurations in georeferenced, historical and recent aerial photographs will be delineated within the study area as a basis for identifying trends in channel form and adjustment (trajectories and rates of erosion) and for establishing the erosion hazard limits and the meander belt boundaries along watercourses in accordance to accepted procedures (e.g. "Belt Width Delineation Procedures", TRCA, 2004). Empirical estimates of meander belt width are likely required for at least some reaches given the long history of disturbance and the unnatural character of existing channels (drains).

3.3.5 Erosion Threshold Analysis

Erosion thresholds will be determined, as appropriate for permanently flowing watercourses, based on TRCA/CVC guidelines. The thresholds will be estimated based on accepted empirical formula from applicable literature, with field observations and measurements as the necessary inputs. Fluvial geomorphologists will work with water resource engineers to develop erosion control criteria for use in hydrological modelling of pre- and post-development conditions in the Study Area.

3.4 Ecology

3.4.1.1 Ecology Background Review

The first stage of the ecological component will consist of a detailed background review and the identification and delineation of Natural Heritage Features (e.g., desktop ELC for woodlands, wetlands and other communities, aquatic habitats, and watercourses). The purpose of the first stage of the study will be to confirm the limits of the environmental features found in the Study Area that represent potential environmental constraints and/or sensitive features.

Natural heritage feature mapping and associated environmental policies at the provincial, regional and local levels will be identified and interpreted. Palmer will also consult with the NPCA, City of Port Colborne, Niagara Region and provincial agencies regarding any other ecological and hydrogeological information that may be available pertaining to the study area.

Existing documents, mapping, and contacts that will referenced and reviewed will include:

- Google Earth mapping (covering approximately the last 20 years, as well as 1934)
- Lands Information Ontario base mapping and associated Ministry of Natural Resources and Forestry *Make a Map: Natural Heritage Areas*
- Elite Developments Port Colborne EIS materials (Palmer in progress, 2021)
- *Natural Areas Inventory* 2006 - 2009, Volume 1 and 2 (NPCA, 2010)
- *Lake Erie North Shore Watershed Plan* (NPCA, 2010)
- *Nature for Niagara's Future* (NPCA 2010-2011)
- Online citizen science databases (e.g., eBird, iNaturalist, etc.),
- Department of Fisheries and Oceans Canada (DFO) *Aquatic Species at Risk (SAR) Map*(2020)
- Natural Heritage Information Center database for tracked species, plant communities and wildlife concentration areas
- *Lower Welland River Characterization Report* (2011)
- MNDMNRF fisheries data from Fisheries Database Sites and from MNDMNRF at Vineland
- MNRF Ontario Wetland Evaluations.

Additionally, the following specific land use planning documents and associated legislation and regulations relating to natural heritage and natural hazard constraints will be reviewed and summarized:

- *Federal Fisheries Act* (1985)
- *Provincial Endangered Species Act and Regulation* (2007)

- *Fish and Wildlife Conservation Act* (1997)
- *Provincial Policy Statement* (2020)
- *Provincial Growth Plan* (2020)
- *Niagara Region Official Plan* (2014 Consolidation, or later version if available)
- *City of Port Colborne Official Plan* (2013)
- *Policies for the Administration of Ontario Regulation 155/06 and the Planning Act* (Niagara Peninsula Conservation Authority, 2020)

3.4.1.2 Ecology Field Investigations

The second stage will be to complete ecological studies to field check the existing background mapping. The field check surveys will be based on a mix of within-property and targeted road-side reconnaissance in order to further refine the mapping and identify the ecological features and potential development areas. Degree of non-roadside work will depend on access as discussed in Section 3.2. .

Ecological characterization reporting will focus on the following aspects, Ecological Land Classification be as specific as possible, but will generally be at a high level based on aerial photo interpretation and road-side field checks except where we have site-specific information or access. Some further information is given below for come categories.

- Aquatic Assessments
- Ecological Land Classification
- Floral Inventory
- Amphibian Surveys
- Breeding Bird Surveys
- Species at Risk (SAR) Subwatershed Assessment
- Significant Wildlife Habitat (SWH) Subwatershed Assessment
- Landscape Connectivity Analysis
- Incidental Observations

Aquatic Assessment
As an important component to determining overall ecosystem health, water quality will be completed at various key locations within the Wignell Drain subwatershed area. Parameters to be sampled are consistent with other watershed studies completed for the area and will focus on the nutrient (phosphorus and nitrogen), metals (copper, zinc, chloride, and nickel) and physical characteristics (total suspended solids) across the watershed. Grab samples are intended to provide a 'snapshot' of water quality conditions during different seasons and following certain weather events. To help provide context to long-term water quality conditions, it is also proposed that grab samples be completed in conjunction with benthic invertebrate monitoring at key locations within the subwatershed area.

During water quality sampling events, general aquatic habitat conditions are to be noted to identify potential land use influences on the subwatershed (eg. sedimentation from adjacent fields), as well as opportunities or potential impacts to aquatic and semi-aquatic wildlife.

Fish community sampling is proposed at key locations within the Wignell Drain subwatershed to supplement existing background information. Fish collection permits will be obtained from the MNRF, and sampling will be completed in accordance with permit requirements.

Ecological Land Classification and Floral Inventory

A floral inventory will be produced which will be based on the Elite lands floral inventory and will be supplemented from observations made incidentally at all other times of the year when Palmer staff are in the watershed.

Breeding Birds

Breeding bird field survey data will consist of:

- Data from Elite properties (two surveys in one year);
- Data from lands where access is allowed (one survey in one year); plus
- Incidental observations

The understanding of breeding birds will be enhanced by eBird data, background information. Particular note will be taken of any rare or Species at Risk birds records.

SAR and SWH

SAR and SWH assessments are described as 'Subwatershed Assessments' because they are anticipated to take the form of annotated lists of SAR or SWH habitats which do or might occur in the subwatershed, because mapping of SAR and SWH is for the most part not anticipated to be possible due to the high-level approach of a subwatershed study, lack of precise data, and lack of access to lands.

Landscape Connectivity

A landscape connectivity analysis will be conducted using the principles of landscape ecology. That is, each natural feature will be examined in terms of size, shape, proximity to other features, general position in the landscape, as well as the location of human created barriers and areas and how these do or might affect natural connectivity. A conceptual series of connections between natural features will be proposed based on these factors.

Incidental and Roadside Mortality Observations

Species observations of groups that are not directly targeted (mainly reptiles and mammals) will be noted and tabulated in an appropriate manner (depending on the number and importance of the observation). Observations will include any road-killed wildlife and location.

Length of Study

Ecological field surveys are proposed to occur in 2022 and 2023 and to be supplemented with more detailed data gathered in both 2021 and 2022 on the Elite properties. The results of the ecological field

investigations completed for the SWS will need to be augmented through site level studies as other individual landowner's proceed with proposed development approval process.

The Ministry of the Environment Conservation and Parks (MECP) can be contacted to ensure that no field work proposed will damage will occur to SAR or their habitat.

3.5 Hydrogeology

Background Review

Palmer will complete a background review of data and information from multiple sources, including but not limited to, Ontario Geological Survey database (physiography, geology and boreholes), MECP database (well record, natural heritage, hydrology, source protection and environmental instruments) and database from municipalities and conservation authorities, to characterize physical and environmental settings of the subwatershed. The physical and environmental setting will direct further studies, help data interpretation and inform impact assessment.

Delineation of Groundwater Features

Palmer will conduct delineation of groundwater features through remote sensing interpretation and terrain analysis, and ground-truthing as required. Groundwater features include groundwater discharge features (springs, wet zones, seepage zones, sapping zones, hydrophytic vegetation etc.), groundwater recharge features (topographical gradient, hummocky or closed landforms, surficial porous areas) and pathways, as well as anthropogenic groundwater features (quarry and associated groundwater control system and etc.)

SWS Water Balance

A pre-development water balance will be prepared to establish groundwater recharge targets for the overall study area and for each sub-watershed. This will be completed using a GIS-based water balance model that takes into consideration soil type, land use, topography, and annual water surplus to determine pre-development recharge and runoff conditions.

The results of the hydrogeology study and water balance will be documented as part of the overall SWS. The results will be integrated with the stormwater management and LID recommendations to ensure that these mitigations are placed in the appropriate locations. Infiltration targets for future development will be established and integrated with the overall stormwater management plan for the study area.

Delineation of Groundwater Flow System, Quantity and Quality

Groundwater flow system will be delineated through groundwater table, groundwater flow and gradient, which will be characterized based on the regional setting and available site conditions. Groundwater quantity and quality will be discussed based on information about the groundwater flow system, aquifer volume and distribution, and groundwater quality information from MECP well records and other sources.

Hydrogeological Characterization and Assessment

Based on the information collected as part of the background reviews, groundwater feature delineation and water balance assessment, Palmer will prepare a detailed characterization of the existing hydrogeological conditions for the study area. Based on the characterization, hydrogeological development constraints will be assessed, the potential impact of development to groundwater resources will be assessed, and mitigation methods will be discussed. In addition, the quarry groundwater control system will be assessed for the impact of pumping cease to the groundwater system and the proposed development. The climate change projection will be factored into the assessment.

Recommendations on Groundwater Monitoring Program

A comprehensive groundwater monitoring program will be recommended based on the subwatershed hydrogeological characterization and the proposed developments, and may consist of monitoring points such as monitoring wells, baseflow station or synoptic flow stations, and surveillance stations. Adaptive Environmental Monitoring (AEMP) methodology will be employed when designing and implementing the groundwater monitoring program.

3.6 Stormwater Management Recommendations

Provide recommendations for the responsible storm water management Plan on a sub watershed level including the following:

- Protect and manage quantity and quality of surface water and groundwater resources;
- Investigation and assessment of Wignell Drain existing conditions.
- Examination of land use scenarios and impacts with regard to stormwater aspect.
- Evaluation of alternative plans to establish preferred stormwater management strategy to achieve the goals/objectives of the SWS
- With respect to Stormwater Management, there will be a focus on Low Impact Development techniques, where feasible. Note, shallow bedrock is a big factor.
- Suggest SWM facilities locations and preliminary sizing and justification for the type;
- Mitigate or minimize the risk of flooding and erosion in the Sub watershed;
- Preserve natural hydrological and hydrogeological systems. Keep the pre and post flow regimes more or less the same;

- Identify the aquatic, wetland and terrestrial resources that should be protected or enhanced by the SWM methods;

- Produce an implementation plan for Development of the Sub watershed Study area;

- Provide recommendations for flood control and the effects of fluctuating Lake Levels on a sub watershed level;

Develop an adaptive management guide for future activities in the sub watershed

3.7 Subwatershed Study Reporting

A Subwatershed Study Report will be prepared to apply watershed-based management strategies, environmental policies, objectives and constraints to the study area in order to develop management techniques and strategies for specific use in the identification of Secondary Planning Area(s).

The environmental policies applicable to the *Provincial Policy Statement*, Niagara Region, City of Port Colborne and Niagara Peninsula Conservation Authority, and provincial *Endangered Species Act* (*ESA*) will be summarized and considered as part of the scope of the SWS. Confirming the locations, potential linkages, enhancement opportunities as well as ecological and hydrological functions of the natural heritage features within the Study Area will form the basis for potential environmental constraints and opportunities.

The constraints and opportunities assessment will be an important part of the SWS and will be used as part of the natural heritage planning for development within the watershed. Constraints will include natural hazards as mapped by NPCA. NPCA Regulated lands will also be mapped, although they may or may not form constraints. This information can also be used to provide guidance to the development of preliminary site plan options and understanding policy implications and considerations (e.g., buffer widths, features of moderate or high constraint).

The following components are to be addressed as part of Subwatershed Study report.

- Baseline characterization of the existing ecological/biological/hydrological/hydrogeological conditions and associated features, forms, functions and relationships; this will be based on:
    - Pre-existing reports, mapping, and data;
    - Detailed field investigations specific to Elite Development lands only; and
    - Air photo interpretation and reconnaissance level road-side field investigations for the remainder of the Wignell SWS (as noted above).
- Opportunities and Constraints Assessment
    - Establish SWS objectives through a proposed framework that identifies potential targets, thresholds, and monitoring;
    - Review opportunities for ecological linkage areas and enhancement opportunities for natural heritage planning; and
    - Preliminary water balance to allocate scenario modeling of level of impervious areas.

- Consideration to be given to climate change and how it may affect the subwatershed function (including reference to TRCA, 2022, *Climate Projections for Niagara Region*)

- Subwatershed Management Recommendations, Monitoring and Mitigation
  - Provide management approaches including methods to meet environmental objectives and adaptive management for applicable technical disciplines;
  - Provide Impact Analysis and Management Requirements Proposed Framework (targets, thresholds and monitoring
  - Evaluation of build out scenarios to assess potential for no negative effects and mitigation opportunities;
  - Identify areas of restoration opportunities and enhancement (e.g., potentially enhancement for riparian corridors and/or improvement of existing natural areas);
  - Identify and further study recommendations required in subsequent development stage and provide outline for terms of reference for such studies;
  - Provide an Implementation Strategy for the Subwatershed Management Recommendations, including monitoring and mitigation requirements for the establishment of the long term enhancement and protection of the subwatershed;
  - The Environmental Monitoring portion of the SWS will use the following:
    - Performance measures
    - Criteria for evaluating the protection of quality and quantity of runoff..
  - Provide a series of recommendations regarding ongoing action items for stakeholders to improve and enhance the subwatershed post-development.

3.7.1 Report Content

A Subwatershed Study Report will be prepared that integrates the servicing, stormwater management, hydraulic structures, watercourse systems, and characterization and mapping of natural heritage features together into a comprehensive plan. This report will include:

(a) Identification of the existing environmental and baseline conditions for the Subwatershed Study Area.
(b) Documentation and mapping of the natural heritage features for the SWS area.
(c) Based on the SWS-level identification, characterization and mapping of the natural heritage features and function, provide a constraints and opportunities analysis that addresses the requirements and objectives of the Provincial, Regional and Local municipal and NPCA environmental policies to be incorporated as part of the development of the future Secondary Plan (s) that also informs the principle of “net gain”.
(d) Documentation of Water Quality/Quantity control requirements for flood and erosion control and stormwater quality management.
(e) Screening and evaluation of various stormwater and environmental management approaches.
(f) Groundwater management plan integrating baseline characterization stormwater management, aquatic and terrestrial needs, and general subsurface infrastructure design.
(g) Water balance requirements and consistency with Source Water Protection Area policies.
(h) Location for proposed stormwater management infrastructure.
(i) Local monitoring requirements.

(j) Hydraulic analyses of proposed regulated watercourse systems, including hydraulic structure. Analyses must include consideration of sizing and configuration to ensure safe passage of wildlife and provision of Regional Storm flood control as appropriate.

4. Closing

We trust that this TOR document as provided meets the requirements of the Niagara Region, NPCA and City of Port Colborne for the preparation of the SWS. Please feel free to contact Rosalind at 647-927-0519 or rosalind.chaundy@pecg.ca should you have any questions regarding this letter.

Yours truly,

Palmer

Rosalind Chaundy, M.Sc.F.
Senior Ecologist

Dirk Janas, B.Sc.
Principal Ecologist

Jason Cole, M.Sc., P.Geo.
Vice President, Principal Hydrogeologist

A2. Agency Comments (City & NPCA)

Palmer | PART OF SLR

Jesse Snider <jesse.snider@pecg.ca>

RE: Port Colborne Killaly - Wignell SWS REVISED ToR

David Schulz <David.Schulz@portcolborne.ca> Thu, May 18, 2023 at 10:41 AM
To: "rosalind.chaundy@pecg.ca" <rosalind.chaundy@pecg.ca>
Cc: Jesse Snider <jesse.snider@pecg.ca>

Hi Rosalind,

A couple things:

1. I have revised the letter to be a joint letter between the two of us. I used most of your verbiage, but please let me know if you have any final changes.
2. Regarding the map attached, would it be possible to highlight Elite's land holdings? I think the map should give people an idea of the Elite lands referred to in the letter.
3. The Region has responded to the SWS ToR as follows:

> Regional staff have reviewed the revised proposed Terms of Reference for the Lens Wignell Subwatershed Study, City of Port Colborne, prepared by Palmer (dated March 7, 2023) and are satisfied that the majority of the previous Regional comments have been sufficiently addressed. That said, staff note that as it relates to breeding bird studies specifically, only one survey is proposed on lands where access is allowed. Staff request that survey protocols be followed where additional access is provided for lands outside of the applicant-owned lands. Otherwise, no revisions/updates are requested.

Regards,

David

PORT COLBORNE

www.portcolborne.ca

David Schulz BURPI, MCIP, RPP
Senior Planner
City of Port Colborne

66 Charlotte Street
Port Colborne, ON L3K 3C8
Phone 905-835-2900 x202
Email David.Schulz@portcolborne.ca

"To provide an exceptional small-town experience in a big way"

From: rosalind.chaundy@pecg.ca <rosalind.chaundy@pecg.ca>
Sent: Wednesday, May 10, 2023 2:30 PM
To: David Schulz <David.Schulz@portcolborne.ca>
Cc: 'Jesse Snider' <jesse.snider@pecg.ca>
Subject: RE: Port Colborne Killaly - Wignell SWS REVISED ToR

Hi David,

I appreciate it – I know you've been away. Look forward to hearing from the agencies.

I'll send a different email regarding the landowner letters.

Cheers

Rosalind

From: David Schulz <David.Schulz@portcolborne.ca>
Sent: Wednesday, May 10, 2023 9:40 AM
To: rosalind.chaundy@pecg.ca
Subject: RE: Port Colborne Killaly - Wignell SWS REVISED ToR

Hi Rosalind,

My apologies for the delay. I'm still getting through all of my emails from being away on vacation.

1. I still have yet to hear back from the Region or NPCA. I will follow up to see where they are at.

2. I will respond to your other email regarding this point.

David

From: rosalind.chaundy@pecg.ca <rosalind.chaundy@pecg.ca>
Sent: April 28, 2023 12:15 PM
To: David Schulz <David.Schulz@portcolborne.ca>
Subject: RE: Port Colborne Killaly - Wignell SWS REVISED ToR

Hi David,

I hope you're well. I have a couple of questions for you.

1. Do you have any sense of when the Region and NPCA will be sending you comments regarding the Wignell Subwatershed Study revised Terms of Reference? Also, I'm wondering if the NPCA will be taking a smaller role or something along those lines, owing to Bill 23. I did recently leave a message with Theresa Bukovics, at NPCA to ask about that aspect.

2. You may remember that we talked about sending out letters to some landowners to access their lands. I am thinking that this would involve at most 10 landowners, so it is not a major undertaking. I believe you said that you would do that. I have started a letter than I am still working on, and which I would sending to you very soon along with a map of properties that we'd like to access. I was wondering if it was acceptable to you that the letter is signed by both myself and you, but that we have landowners contact you to respond or to accept access their property?

Let me know,

Thanks so much,

Rosalind

Rosalind Chaundy, **M.Sc.F.**

Senior Ecologist

| c (647) 927 0519 **| e** rosalind.chaundy@pecg.ca

From: David Schulz <David.Schulz@portcolborne.ca>
Sent: Monday, March 13, 2023 12:59 PM
To: rosalind.chaundy@pecg.ca
Subject: RE: Port Colborne Killaly - Wignell SWS REVISED ToR

Thank you Rosalind,

Received. I see the Region has confirmed as well and will be beginning their review. I will confirm with the NPCA as well.

Thanks,

David

PORT COLBORNE

David Schulz BURPI, MCIP, RPP
Senior Planner
City of Port Colborne

66 Charlotte Street
Port Colborne, ON L3K 3C8
Phone 905-835-2900 x202
Email David.Schulz@portcolborne.ca

www.portcolborne.ca

"To provide an exceptional small-town experience in a big way"

From: rosalind.chaundy@pecg.ca <rosalind.chaundy@pecg.ca>
Sent: March 10, 2023 10:57 AM
To: David Schulz <David.Schulz@portcolborne.ca>
Cc: Denise Landry <Denise.Landry@portcolborne.ca>; 'Shanks, Amy' <Amy.Shanks@niagararegion.ca>; 'D Deluce' <ddeluce@npca.ca>; 'Lampman, Cara' <Cara.Lampman@niagararegion.ca>; 'Boudens, Adam' <Adam.Boudens@niagararegion.ca>; 'Theresa Bukovics' <tbukovics@npca.ca>; jkrpan@odandetech.com; jason.cole@pecg.ca; 'Robin McKillop' <robin.mckillop@pecg.ca>; 'Frank Liu' <frank.liu@pecg.ca>; joel.davey@pecg.ca; 'Dirk Janas' <dirk.janas@pecg.ca>; jesse.snider@pecg.ca
Subject: RE: Port Colborne Killaly - Wignell SWS REVISED ToR

Hello David and All,

Please find attached our Revised Terms of Reference for the Wignell Subwatershed Study situated east of Port Colborne. We have taken into account the comments you send in June 2022 (also attached) as well as the discussion that some of us had on Nov 10, 2022 regarding these Terms of Reference.

Let me know if you have questions, and please (City, Niagara Region and NPCA) confirm that you have received it, as it is a large file.

Thank you and all the best,

Rosalind

Rosalind Chaundy, M.Sc.F.

Senior Ecologist

| c (647) 927 0519 **| e** rosalind.chaundy@pecg.ca

From: David Schulz <David.Schulz@portcolborne.ca>
Sent: June 21, 2022 10:59 AM
To: rosalind.chaundy@pecg.ca
Cc: Denise Landry <Denise.Landry@portcolborne.ca>; Shanks, Amy <Amy.Shanks@niagararegion.ca>; D Deluce <ddeluce@npca.ca>
Subject: Port Colborne Killaly - Wignell SWS ToR Comments

Good morning Rosalind,

Please find a letter attached outlining the comments from the Region and NPCA on the SWS ToR.

Should you have any questions please feel free to contact me.

Regards,

David

PORT COLBORNE

David Schulz, BURPI, MCIP, RPP
Senior Planner
City of Port Colborne

66 Charlotte Street
Port Colborne, ON L3K 3C8
Phone 905-835-2900 x202
Email David.Schulz@portcolborne.ca

www.portcolborne.ca

"To provide an exceptional small-town experience in a big way"

2 attachments

Letter for Landowner access - Wignell SWS.docx
672K

2007708-1-1-Wignell Subwatershed Study Area-compressed.pdf
3122K

rosalind.chaundy@pecg.ca

From: David Schulz <David.Schulz@portcolborne.ca>
Sent: June 2, 2023 2:59 PM
To: rosalind.chaundy@pecg.ca
Subject: Wignell SWS NPCA comments on ToR

Flag Status: Flagged

Hi Rosalind,

Hope you are well.

Please find the NPCA comments on the ToR below:

Here's NPCA comments on the revised TOR:

1) (Hazard Comment) NPCA staff are unclear what protocols will be utilized to characterize HDFs and watercourses within the Study Area. NPCA staff request that these assessments utilize procedures established in the Ontario Stream Assessment Protocol (TRCA, 2017) https://s3-ca-central 1.amazonaws.com/trcaca/app/uploads/2019/06/05112225/osap-master-version-10-july1-accessibility-compliant_editfootnoteS1M4.pdf and/or Evaluation, Classification and Management of Headwater Drainage Features Guidelines (TRCA & CVC, 2014) http://www.trca.on.ca/dotAsset/180724.pdf. Please revise the ToR to reflect this.

2) (Non-hazard Comment) In continuation with comment 1, NPCA staff are unclear what protocols will be used to assess breeding birds and other targeted surveys to ensure baseline characterization of the Study Area (e.g. Anuran, ELC, etc.). Please revise the ToR to reflect this.

    a) (Non-hazard Comment) For guidance for general field survey requirements and timelines please see Appendix H in NPCA's Interim Environmental Impact Study Guidelines. This document can be found at the following link: https://getinvolved.npca.ca/planning-permitting-policy-review.

    b) (Non-hazard Comment) To note, where access is able to be obtained within the subwatershed study area, NPCA staff will require the applicant to be in conformance with all appropriate protocols and their survey timing windows.

Regards,

PORT COLBORNE

www.portcolborne.ca

David Schulz BURPl, MCIP, RPP
Senior Planner
City of Port Colborne

66 Charlotte Street
Port Colborne, ON L3K 3C8
Phone 905-835-2900 x202
Email David.Schulz@portcolborne.ca

"To provide an exceptional small-town experience in a big way"

Appendix B

Natural Areas Inventory (NPCA)

A1. Dann Dunes (2010)
A2. Nickel Beach Woods (2010)

A1. Dann Dunes (2010)

Study Site PC-16

Dann Dunes

Municipality City of Port Colborne
Formerly N/A
Approximate Area 38 hectares
Watershed This study site drains via Wignell Drain to Lake Erie
Ownership Private

General Summary

Study Site PC-16 is located between Highway 3 and Lake Erie between Lorraine Road to the west and Weaver Road to the east.

Physical Description

This natural area is situated on the Onondaga Formation limestone plain characteristic of the Lake Erie shoreline. Silty, clay soils of the Haldimand Clay Plain are found in the northern section, with beach sand deposits associated with the Sand Plain found closer to the water's edge.

Soils

Soils	Percentage of Study Site
BROOKE - SHALLOW PHASE	0.19
FARMINGTON	27.53
FARMINGTON - VERY SHALLOW PHASE	11.80
WELLAND	1.50
WELLAND - PEATY PHASE	47.45
WATER	0.92
NOT MAPPED	10.62
Total %	100.00

Ecological Land Classification

Summary

This natural area supports an excellent example of forested sand dunes with numerous old growth trees and old growth forest characteristics. The Deciduous Forests recorded were dominated by Sugar Maple *(Acer saccharum ssp. saccharum)*, Red Oak *(Quercus rubra)*, and some Eastern Hemlock *(Tsuga canadensis)*.

A large Deciduous Swamp characterized by Red Maple *(Acer rubrum)*, Green Ash *(Fraxinus pennsylvanica)*, and Yellow Birch *(Betula alleghaniensis)* was also noted for this study site.

The herbaceous layer was a mix of Spinulose Wood Fern *(Dryopteris carthusiana)*, Sensitive Fern *(Onoclea sensibilis)*, and Cinnamon Fern *(Osmunda cinnamomea)*.

The Thicket Swamp and Meadow Marsh communities were situated on mineral or deep organic soils in a backdune muck basin. The Thicket Swamp was dominated by Bebb's Willow *(Salix bebbiana)*, with Silky Dogwood *(Cornus amomum ssp. obliqua),* and Narrow-leaved Meadowsweet *(Spirea alba).*

The Meadow Marsh was largely Reed Canary Grass *(Phalaris arundinacea).*

Along the Lake Erie shoreline, active dunes persist amongst a cottage community interspersed with manicured lawns and parkland. This natural area is noteworthy for its many old growth trees and for being one of the best examples of forested dune communities along the Lake Erie shoreline.

Vegetation Communities
There are a total of 160 recorded taxa (unique plant records) for this study site.

Community Series
Coniferous Forest (FOC)
Deciduous Forest (FOD)
Deciduous Swamp (SWD)
Meadow Marsh (MAM)
Open Sand Barren and Dune (SBO)
Submerged Shallow Aquatic (SAS)
Thicket Swamp (SWT)
Treed Sand Barren and Dune (SBT)

Vegetation Type
Bebb's Willow Mineral Deciduous Thicket Swamp Type (SWTM3-2)
Cottonwood Treed Sand Dune Type (SBTD1-1)
Dry – Fresh Sugar Maple Deciduous Forest Type (FODM5-1)
Fresh-Moist Hemlock Coniferous Forest Type (FOCM3-1)
Fresh-Moist Oak-Maple Deciduous Forest Type (FODM9-2)
Green Ash Mineral Deciduous Swamp Type (SWDM2-2)
Pondweed Submerged Shallow Aquatic Type (SAS_1-1)
Red Maple Organic Deciduous Swamp Type (SWDO2-1)
Red Maple Mineral Deciduous Swamp Type (SWDM3-1)
Green Ash Mineral Deciduous Swamp Type (SWDM2-2)
Reed-canary Grass Graminoid Mineral Meadow Marsh Type (MAMM1-3)

Significant Flora
Species at Risk
Juglans cinerea (Butternut) (NPCA, 2006-2009) - Endangered

Provincially Rare Species
Carex oligocarpa (Few-fruited Sedge) (NPCA, 2006-2009) – S3

Points of Interest
Old growth species include Sugar Maple, Red Oak, Eastern Hemlock, Yellow Birch and White Elm with diameters approaching one meter at breast height.

Eastern Milk Snake was also recorded for this site.

Faunal Records:
3- Reptiles & Amphibians
2- Mammals
1-Bird
1-Moth & Butterfly

Recommendations
Difficulty in classifying the unique plant communities found on the limestone outcroppings into Lake Erie suggest that more research is required in these areas. It is also suggested that where willing landowners exist, an effort should be made to preserve the unique shoreline and dune related communities.

Site Visits
May 30, 2007
A. Garofalo, K. White

June 1, 5, 2007
A. Garofalo, K. White

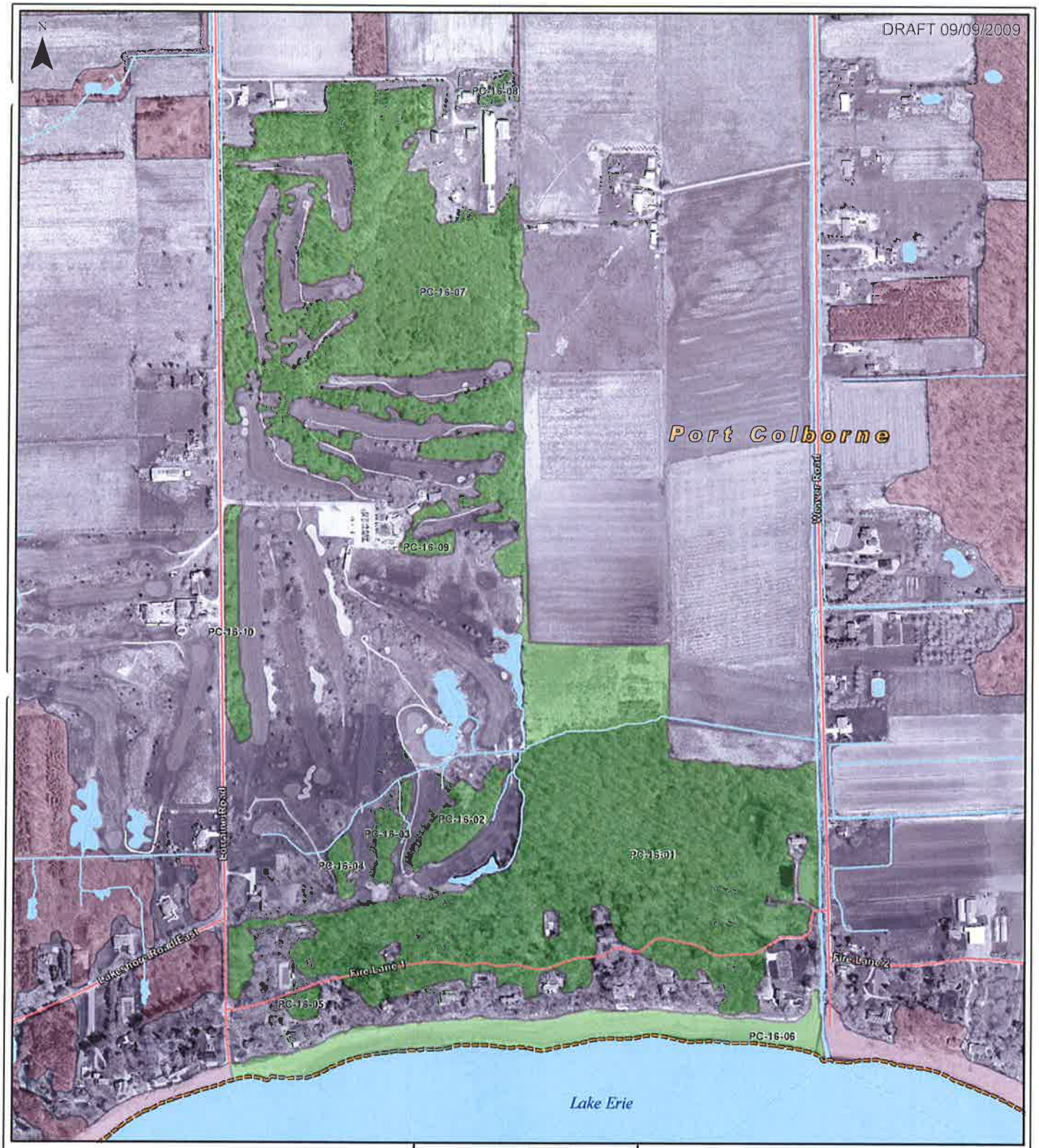
% of site visited
49.14% of this study site was visited by NAI teams.

References Cited
Government of Ontario, Ministry of Natural Resources. 2009. Deciduous Forest. Species at Risk in Ontario. Retrieved 11/05, 2009, from http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/276504.html

Natural Heritage Areas Inventory 2006-2009. Unpublished database, Niagara Peninsula Conservation Authority, Welland, Ontario.

Oldham, M. J., & Brinker, S. R. 2009. *Rare Vascular Plants of Ontario (Fourth Edition ed.)*. Peterborough, Ontario: Natural Heritage Information Centre, Ontario Ministry of Natural Resources.

Ontario Ministry of Agriculture and Food. 1989. *The Soils of The Regional Municipality of Niagara*, Report No. 60 of the Ontario Institute of Pedology, Guelph, Ontario.



Legend

- Major Highways
- Regional Highways
- Roads
- Watercourses
- Waterbodies
- Municipal Boundaries
- Study Sites
- Study Site PC-16

Natural Areas Inventory

Study Site PC-16

1:7,000

0 50 100 200 300 400 Meters

All Frames: North American Datum 1983, Universal Transverse Mercator 6° Projection, Zone 17N, Central Meridian 81° West

NIAGARA PENINSULA CONSERVATION AUTHORITY

There are a total of 160 recorded taxa (unique plant records) for this study site.
Community Series:
Deciduous Forest (FOD)
Deciduous Swamp (SWD)
Meadow Marsh (MAM)
Open Sand Barren and Dune (SBO)
Thicket Swamp (SWT)

A2. Nickel Beach Woods (2010)

Study Site PC-04

Nickel Beach Woods

Municipality City of Port Colborne
Formerly Nickel Beach Woodlot (Brady et al, 1980)
Approximate Area 197 hectares
Watershed This study site drains via Wignell Drain to Lake Erie
Ownership Mostly private

General Summary

Study Site PC-04 is located east of the Welland Canal in the municipality of Port Colborne on the north shore of Lake Erie. The Nickel Beach Woods begins just west of Lake Road, and on the east is bordered by Weaver Road. It extends north to Killaly Street East and the southern boundary is Lake Erie.

Physical Description

This natural area is situated on the Onondaga Formation limestone plain characteristic of the Lake Erie shoreline. Silty, clay soils of the Haldimand Clay Plain are found in the northern section, with beach sand deposits associated with the Sand Plain found closer to the water's edge.

Soils

Soil Type	Percentage of Study Site
ALLUVIUM	0.55
BROOKE - SHALLOW PHASE	3.90
CHINGUACOUSY - RED PHASE	1.55
FARMINGTON	0.47
FARMINGTON - SHALLOW PHASE	1.68
FARMINGTON - VERY SHALLOW PHASE	0.20
JEDDO - RED PHASE	3.24
NIAGARA	0.64
QUARRY	56.87
SMITHVILLE	0.55
WELLAND	4.39
WELLAND - PEATY PHASE	3.09
WATER	5.95
NOT MAPPED	16.94
Total %	100.00

Ecological Land Classification

Summary

This study site includes a very rich active dune community. It is the third largest extant of dune ecosystem in the entire NPCA watershed jurisdiction.

The active dunes were dominated by Beach Grass *(Ammophila breviligulata)*, with Switch Grass *(Panicum virgatum)*, Sagewort Wormwood *(Artemisia campestris ssp. caudata)*, and a rare form of Western Poison-ivy *(Rhus radicans ssp. rydbergii)* forming a thicket with stems up to 30-60cm tall.

The backdunes are a mix of Deciduous Forest characterized by Red Oak *(Quercus rubra)*, and Hop Hornbeam *(Ostrya virginiana)* in the rich mature areas and naturalized Scots Pine *(Pinus sylvestris)* or Red Pine *(Pinus resinosa*) plantations.

A very rich Sugar Maple *(Acer saccharum ssp. saccharum)*, Hemlock *(Tsuga canadensis)* forest covered cool, north facing slopes in parts of the study area. Also noted here were scattered old growth (balding bark) Bitternut Hickory *(Carya cordiformis)* trees with Bladdernut (*Staphylea trifolia)* in understory layer.

Occasional large diameter (in sheltered interdune valleys) or tortured, wind swept (on dune ridges) old growth individual trees were recorded. Several large diameter, but short, wind swept Red Oaks (1m+ dbh) in the mature, rich section were documented as well.

Vegetation Communities

A total of 154 recorded taxa (unique plant records) were collected for this study site.

Community Series

Coniferous Forest (FOC)
Deciduous Forest (FOD)
Deciduous Swamp (SWD)
Mixed Forest (FOM)
Open Sand Barren and Dune (SBO)

Vegetation Type

Dry-Fresh Red Oak Deciduous Forest Type (FODM1-1)
Dry-Fresh Scotch Pine Naturalized Coniferous Plantation Type (FOCM6-3)
Dry-Fresh Sugar Maple-Hemlock Mixed Forest Type (FOMM3-2)
Fresh-Moist Oak-Maple Deciduous Forest Type (FODM9-2)
Fresh-Moist Sugar Maple-Hemlock Mixed Forest Type (FOMM6-1)
Green Ash Mineral Deciduous Swamp Type (SWDM2-2)
Little Bluestem Switchgrass Beachgrass Open Graminoid Sand Dune Type (SBOD1-1)

Significant Flora

Species at Risk

Juglans cinerea (Butternut) (NPCA, 2006-2009) - Endangered
Ptelea trifoliate (Common Hop tree) (NPCA, 2006-2009) - Threatened

Provincially Rare Species- None noted.

Points of Interest

Very old and stunted Hop Hornbeam (Ostrya virginiana) individuals were noted on dune ridges and throughout the understory layer.

The provincially threatened Fowler's Toad was also recorded for this study site.

Faunal Records:

8 - Moths & Butterflies
4 - Mammals
3 - Birds
1 - Reptile & Amphibian

The Volunteer Crew recorded the following fungi:
Turkeytail
Pear-shaped Puffball

Recommendations

Difficulty in classifying the unique plant communities found on the limestone outcroppings into Lake Erie suggest that more research is required in these areas.

Site Visits

September 1, 1980
Brady et al.

Oct. 6, 2006
J. Sankey, J. Kellam, D. Young, F. Fohr, J. Grassie, R. Young

June 5, 2007
A. Garofalo, K. White

July 20, 2007
Wildlife Survey: B. Curry

Nov. 5, 2007
A. Garofalo

% of site visited

1.77% of the total study site was visited by NAI teams.

References Cited

Brady, R., et al. 1980. *Environmentally Sensitive Areas*. Regional Municipality of Niagara, Brock University, Department of Geography, St. Catharines, Ontario.

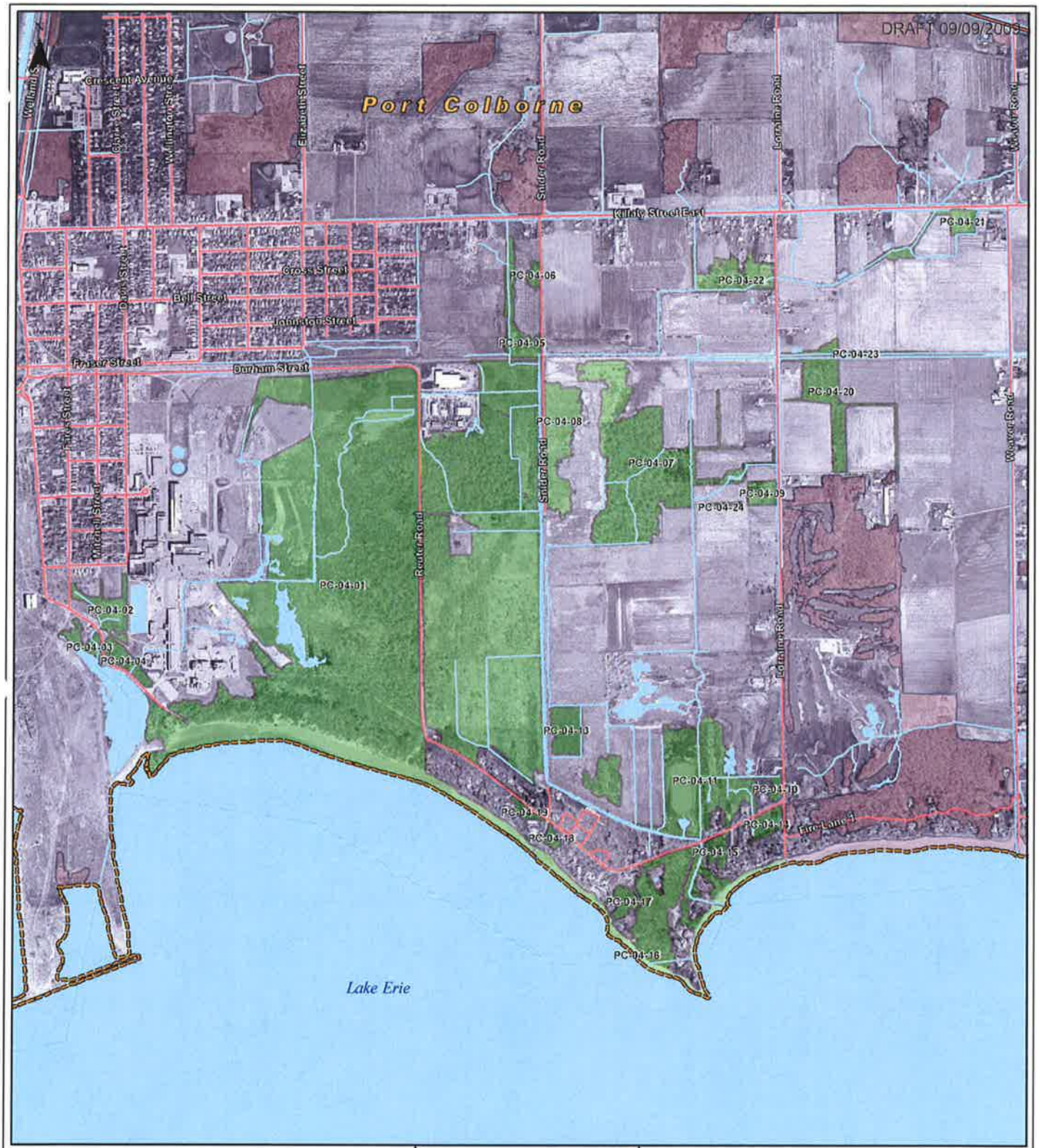
Government of Ontario, Ministry of Natural Resources. 2009. Deciduous Forest. Species at Risk in Ontario. Retrieved 11/05, 2009, from

http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/276504.html

Natural Heritage Areas Inventory 2006-2009. Unpublished database, Niagara Peninsula Conservation Authority, Welland, Ontario.

Oldham, M. J., & Brinker, S. R. 2009. *Rare Vascular Plants of Ontario (Fourth Edition ed.)*. Peterborough, Ontario: Natural Heritage Information Centre, Ontario Ministry of Natural Resources.

Ontario Ministry of Agriculture and Food. 1989. *The Soils of The Regional Municipality of Niagara*, Report No. 60 of the Ontario Institute of Pedology, Guelph, Ontario.



Legend

- Major Highways
- Regional Highways
- Roads
- Watercourses
- Waterbodies
- Municipal Boundaries
- Study Sites
- Study Site PC-04

Natural Areas Inventory

Study Site PC-04

1:18,000

0 125 250 500 750 1,000 Meters

Produced by the Niagara Peninsula Conservation Authority, 2009.
Portions of this map produced under license with the Ontario Ministry of Natural Resources Queen's printer for Ontario, 2009. Reproduced with permission.
All Frames: North American Datum 1983, Universal Transverse Mercator 6° Projection, Zone 17N, Central Meridian 81° West

NIAGARA PENINSULA CONSERVATION AUTHORITY

There are a total 154 recorded taxa (unique plant records) for this study site.
Community Series:
Coniferous Forest (FOC)
Deciduous Forest (FOD)
Deciduous Swamp (SWD)
Mixed Forest (FOM)
Open Sand Barren and Dune (SBO)

Appendix C

Elite Lands (Port Colborne) ELC

Appendix C

Ecological Land Classification from Elite Lands (Port Colborne) EIS

Forest Communities

Fresh – Moist Oak – Maple – Hickory Deciduous Forest (Oak Dominant) (FOD9a)

A4 Woodland

This small forest community was located in the southeastern portion of the Subject Lands on the 896 Killaly Street property (**Photo 1**). This community was noted to be somewhat disturbed as there were small trails that intersected the forest (used by the resident in the property). The canopy and subcanopy provided 75% cover and were comprised of frequent Bur Oak (*Quercus macrocarpa*), Red Oak (*Quercus rubra*), and Pin Oak (*Quercus palustris*), with occasional Basswood (*Tilia americana*), and Trembling Aspen (*Populus tremuloides*). At least one of the oaks was over a metre in diameter at breast height. The 30% cover of understory and included frequent hawthorn (*Craetegus* sp.) and Blue-beech (*Carpinus caroliniana*), along with occasional Green Ash (*Fraxinus pennsylvanica*) and Bitternut Hickory (*Carya cordiformis*). The groundcover varied in species composition though frequent May-apple (*Podophyllum peltatum*), Yellow Trout-lily (*Erythronium americanum*), Woodland Strawberry (*Fragaria vesca*), and goldenrod (*Solidago* sp.) were noted throughout the community.

The soils in this oak woodland consisted of a 20 cm loamy A layer, followed by a clay/silty clay dark brown layer becoming mid brown to at least 42 cm. No mottles were observed in the soil sample and no water table was reached. The moisture regime was thus at most a 4 (moderately moist) or was likely drier.

Photo 1. A4 Fresh – Moist Oak – Maple – Hickory Deciduous Forest (FOD9a) (August 30, 2022)

(A1 and B1 Woodlands)

These communities were located in in the northwestern portion of the Subject Lands (**Photo 2**). These moist forests were noted to have similar species composition as the adjacent wetlands (Silver Maple Mineral Deciduous Swamp (SWD3-2)) though they were noted to be drier and were excluded from the MNRF's LIO wetland delineation (Non-Provincially Significant Wetland). The canopies similarly contained Silver Maple (*Acer saccharinum*), with occasional Shagbark Hickory, White Oak (*Quercus alba*), Swamp White Oak (*Quercus bicolor*), Red Oak Blue Beech (*Carpinus caroliniana*) and ash.

Photo 2. A1/B1 Fresh – Moist Oak – Maple – Hickory Deciduous Forest (FOD9) (July 5, 2021)

Dry-Fresh Deciduous Forest (FOD4)(B2 Woodland)

This community was located within the central portion of the Subject Lands west of Snider Road (**Photo 3**). The tree canopy cover was patchy and was dominated by Black Walnut (*Juglans cinerea*), however other species were present including Bitternut Hickory, and White Mulberry (*Morus alba*). The open understory (20% cover) included abundant Green Ash and occasional hawthorn. Bladdernut (*Staphylea trifolia*) was also present. The groundcover varied in species composition, including frequent avens, Garlic Mustard (*Alliaria petiolata*), Hairy Bittercress (*Cardamine hirsuta*), and goldenrod. Finally, a stand of Honey Locusts (*Gleditsia triacanthos*) was noted in the southern edge of the woodland (**Photo 4**).

CUW1b was adjacent to the CUW1a but was separated mapped as it had a lower tree cover and was excluded from the staked woodland.

Based on two samples, the soils in this woodland consisted of a 15 to 20 cm brown A layer, followed by a loamy silt B layer to 30 to 40 cm, at which point the augering was stopped as bedrock was reached. At third auger attempt hit bedrock at 15 cm. No mottles nor water table was reached. The moisture regime was assessed to be 1 (moderately fresh).

Photo 3. B2 Dry-Fresh Deciduous Forest (FOD4) dominated by Black Walnut (October 19, 2021)

Photo 4. Honey Locust Stand noted within the FOD4 community (April 27, 2022)

Dry – Fresh Oak – Maple – Hickory Deciduous Forest (FOD2) (A3)

This community was located in the northeastern portion of the Subject Lands (**Photo 5**). The canopy and subcanopy provided 75% cover and were dominated by Red Oak, with frequent Black Cherry (*Prunus serotina*), and occasional Sugar Maple (*Acer saccharum*). Some trees were mature, while others were young. The understory provided 45% cover and included Black Cherry saplings, with occasional Honeysuckle (*Lonicera* sp.) and Green Ash saplings. The groundcover included Woodland Strawberry, Red Raspberry (*Rubus idaeus*), and avens (*Geum* sp.)

The soils in this woodland consisted of a 20 cm dark brown A layer, followed by a heavy clay/silty clay warm brown layer to 50 cm, at which point the auger would not drill lower (due to bedrock, heavy clay or root). No mottles were observed in the soil sample and no water table was reached. The moisture regime was thought to be a 4 (moderately moist) or 3 (very fresh), if bedrock was > 120 cm depth or 1 (moderately fresh) if bedrock was at 50 cm.

Photo 5. A3 Dry – Fresh Oak – Maple – Hickory Deciduous Forest (FOD2) (October 19, 2021)

Wetland Communities

Silver Maple Mineral Deciduous Swamp (SWD3-2) and SWD3-2 Gray Dogwood Mineral Thicket Swamp (SWT2-9) (A1 and B1 wetlands)

Two natural features classified as an SWD3-2 community and a SWD3-2/SWT2-9 were observed in the northwestern portion of the Subject Lands (**Photo 6 and 7**). These wetlands are evaluated non-provincially significant wetlands. The canopy provided 70% cover and was dominated by Silver Maple (*Acer saccharinum*), with occasional Shagbark Hickory, White Oak (*Quercus alba*), Swamp White Oak (*Quercus bicolor*), Red Oak and ash. The understory provided 40% cover and included abundant Green Ash saplings with occasional Swamp White Oak saplings and European Buckthorn (*Rhamnus cathartica*). The groundcover was composed of abundant goldenrod, asters (*Aster* sp.), with frequent Poison Ivy (*Toxicodendron radicans*) and occasional Bladder Sedge (*Carex intumescens*).

A1 had an overall lower tree canopy, was noted to contain swamp thicket inclusions, and had more dead Green Ash trees in the canopy. The swamp thicket portions were dominated by Gray Dogwood (*Cornus racemosa*) along with abundant Green Ash saplings and occasional Red-osier Dogwood. The groundcover included by Reed-canary Grass (*Phalaris arundinacea*). A1 also contained numerous Northern Spicebush (*Lindera benzoin*) shrubs.

The differences between the A1/B1 wetlands and A1/B1woodlands were subtle in terms of both terrain and vegetation. The division has been made based on the evaluated wetland mapping and with the agreement of NPCA.

The soils in B1 swamp consisted of a 14 cm A layer, followed by a clay/silty clay B layer to 18 cm, at which point the auger would not drill lower (due to bedrock, heavy clay or root). Distinct mottles were observed in the B layer (i.e. approximately 16 cm) but no water table was reached. The moisture regime was assessed to be 6 (very moist), but theoretically could have been 0 (moderately dry) if the bedrock was at 18 cm depth. Lee et al note that 'a very small difference in soil depth within very shallow soils results in a large difference in the moisture retained for plant growth'. Based on the plants found in A1 and B1 we suspect that there may be fluctuating differences in soils and moistures in these communities due to fluctuating depth to bedrock.

The soils in A1 swamp consisted of a 5 cm dark brown A layer, followed by a very heavy clay B layer to 45 cm, at which point the augering was stopped as a moisture regime was determined. Distinct mottles were observed at approximately 25 cm depth, but no water table was reached. The moisture regime was assessed to be 6 (very moist).

Photo 6. Silver Maple Mineral Deciduous Swamp (SWD3-2) located on the northwestern portions of the Subject Lands (October 19, 2021)

Photo 7. SWD3-2/Gray Dogwood Mineral Thicket Swamp (SWT2-9) located in the northwestern portion of the Subject Lands (October 19, 2021)

Poplar Deciduous Swamp SWD (Part B3)

This community was located northwest of the Killaly St. East and Snider Road junction (**Photo 8**). The canopy provided 50% cover and was dominated by Trembling Aspen (*Populus tremuloides*), with occasional Bur and Pin Oak, Manitoba Maple (*Acer negundo*), and Norway Maple (*Acer platanoides*) as well as other woody species. Based on vegetation, the southern end of the swamp is wetter as there are a few large willow trees as well as a cluster of willow shrubs. The understory provided 20-40% cover and included abundant Manitoba Maple and Trembling Aspen saplings, as well as frequent Red Raspberry, and Blackberry (*Rubus occidentalis*). The groundcover included goldenrod, Poison Ivy and Reed Canary Grass and numerous other species found in disturbed semi-open areas.

Four soil samples were undertaken in the B3 area to determine whether this community was primarily a wetland or an upland, since the species present tended to be those that could be found in either community type or were a mix of upland and wetland species. Of the four soil samples taken, three resulted in a moisture regime of 6 (Lee et al., 1998), and another was indeterminate (probable gleys found high in the soil profile) and therefore it has been classed as a poplar wetland swamp. Soil samples found soils that had little litter, a short organic A layer, and were generally heavy clays or silty clays, with distinct mottles starting at 5 to 18 cm. A water table was not reached in any soil sample, however the soil samplings were not dug deep (25 to 40 cm) since a moisture regimes could usually be determined without sampling deeper, and soils were difficult to dig.

Photo 8. Mineral Deciduous Swamp – Trembling Aspen (SWD) (October 19, 2021)

Southern Arrow-wood Mineral Thicket Swamp (SWT2-11) (A2)

This thicket community was located in the northern portion of the Subject Property (**Photo 9**). The small swamp thicket community was dominated by Southern Arrowood (*Viburnum recognitum*) with abundant Red-osier Dogwood and occasional European Buckhorn, Silver Maple and Green Ash saplings.

The soils in this thicket swamp consisted of a 20 cm dark brown clay-loam A layer, followed by a heavy clay/silty clay B layer to 45 cm, at which point the augering was stopped as a moisture regime was determined. Distinct mottles were observed at approximately 25 cm depth, but no water table nor bedrock was reached. The moisture regime was assessed to be 6 (very moist).

Photo 9. Southern Arrow-wood Mineral Thicket Swamp (SWT2-11) located in the northern portion of the Subject Lands (October 19, 2021)

Mineral Thicket Swamp (SWT2) (A4 Wetland)

This community was located in the southeastern portion of the Subject Lands and was found within the 896 Killaly Street property, directly south of woodland A4 (**Photo 10**). A small dug pond, that was staked with NPCA was noted within this community (**Photo 11**). The swamp thicket community was composed of frequent willow shrubs, Spicebush (*Lindera benzoin*), and Green Ash saplings. The groundcover varied in species composition and included abundant Reed Canary Grass, with numerous other ground cover species including Red Raspberry (*Rubus ideaus*), Wild Carrot (*Daucus carota*), Tufted Vetch (*Vicia cracca*). Surrounding the pond, cattails (*Typha* sp.), Common Reed (*Phragmites* australis), bulrush (*Scirpus* sp.), Purple Loosestrife (*Lythrum salicaria*), and Curled Dock (*Rumex crispus*), were noted. Both upland and wetland species were observed in this community.

Two soil samples were conducted in this community – one in the middle and one at the edge. The soils in this thicket swamp consisted of a 18 to 25 cm deep rich brown loamy layer, followed by clay/silty clay layer to 40 to 50 cm, at which point the augering was stopped. No distinct mottles were observed in one sample, and mottles were observed in the other at approximately 20 cm depth. No water table nor bedrock was reached in either sample. The moisture regime was assessed to be 6 (very moist) in the soil sample with the mottles, but could be drier if bedrock closer to the surface than 120 cm. It is possible that the soils here are disturbed and variable due to past human activity.

Photo 10. Mineral Thicket Swamp (SWT2) located in the southwestern portion of the Subject Property, within the 896 Killaly Street property (August 30, 2022)

Photo 11. Dug Pond located within the Mineral Thicket Swamp (SWT2) community (August 30, 2022)

Thicket Swamp / Meadow Marsh (SWT/MAM) (B2 Wetland)

This small community was located within a large Cultural Woodland. It contained standing water in late March 2022 and mid September 2022 and is thought to contain water for most of the summer. Portions of the wetland contained wetland grasses, while the borders were primarily Red-osier Dogwood. It is thought that bedrock is close to the surface in this community.

Reed Canary Grass Mineral Meadow Marsh (MAM2-2a) (between B1 and A1)

This small linear community was located in the northwestern portion of the Subject Lands within a hydro corridor and between areas B1 and A1 (**Photo 12**). The meadow marsh was dominated by Reed-canary Grass with occasional Pussy Willow (*Salix discolor*) and Bitter Wintercress (*Barbarea vulgaris*).

Photo 12. Reed Canary Grass Mineral Meadow Marsh (MAM2-2) associated with a hydro corridor in the northwestern portion of the Subject Lands (October 19, 2021)

Reed Canary Grass Mineral Meadow Marsh (MAM2-2b) (Part B3)

This community was located in the southern portion of the Subject Lands and was associated with the Wignell Drain West Tributary (adjacent to Polygon 3) (**Photo 13**). The meadow marsh was dominated by Reed-canary Grass with occasional Stinging Nettle (*Urtica dioica*), Grass-leaved Goldenrod (*Euthamia graminifolia*), and cattails.

Photo 13. Reed Canary Grass Mineral Meadow Marsh (MAM2-2b) associated with the Wignell Drain West Tributary (October 19, 2021)

Cultural Communities

Dry-Fresh Deciduous Woodland (CUW1)

The more open edge of the Black Walnut forest was considered a Cultural Woodland (CUW1)

Mineral Cultural Thicket (CUT1a through CUT1d)

Four cultural thickets (CUT) were recorded on the Subject Lands; each had different vegetation characteristics.

CUT1a was adjacent to the Mineral Cultural Woodland (B2). This thicket community was a dense hawthorn and European Buckthorn thicket.

CUT1b was directly south of the FOD2 (A3) community (**Photo 14**). This community contained numerous well-maintained trails (mowed vegetation) intersecting the area. The thicket community consisted of about 80% shrub cover and contained Grey Dogwood, non-native Rosa sp. along with frequent Green Ash saplings and Staghorn Sumac, as well as occasional apple (*Malus* sp.), European Buckthorn, and Riverbank Grape (*Vitis riparia*).

Photo 12. Mineral Cultural Thicket (CUT1b) located in the northeastern portion of the Subject Lands (October 19, 2021)

The relatively deep upper layer of soil in this Cultural Thicket 1b changed gradually through the first 50 cm with some dark brown organics nearer the top, then changing to a clay/silty clay. At 50 cm fairly distinct mottles appeared and at 60 cm a water was present. At 60 cm the soils changed colour to a grey-beige, and below that to a mid-beige brown at 75 cm (still clay/silty clay with a few angular pebbles). Given the location of the mottles, the moisture regime was determined to be 4 (moderately moist).

CUT1c was associated with area B3 (**Photo 15**). The thicket community provided variable levels of shrub cover and contained abundant European Buckthorn, along with frequent dogwood (*Cornus* sp.).

Photo 13. Mineral Cultural Thicket (CUT1c) (October 19, 2021)

CUT1d was located within the 896 Killaly Street property and was the drier edge of A4 (**Photo 16**). The thicket community varied in species composition, but included scattered trees, Shagbark Hickory and Green Ash saplings, willow shrubs, Red Raspberry, Red-osier Dogwood, European Buckthorn, and abundant herbaceous cover.

Photo 14. Mineral Cultural Thicket (CUT1d) located in the southeastern portion of the Subject Lands (March 1, 2022)

Dry-Moist Old Field Meadow (CUM1-1)

Small patches of mineral cultural meadows were noted throughout the Subject Lands (**Photo 17**). Species noted within these communities included Common Milkweed, goldenrod, Common Teasel (*Dipsacus fullonum*), Common Lamb's-quarters (*Chenopodium album*), Butter-and-eggs (*Linaria vulgaris*), and barnyard grass (*Echinochloa* sp.).

Photo 15. Dry-Moist Old Field Meadow (CUM1-1) noted in small areas throughout the Subject Lands (August 30, 2022)

Agricultural (AG) and Hedgerow (HR)

Most of the Subject Lands (approximately 112 ha) are composed of agricultural lands (**Photo 18**). At the time of the 2021/2022 field investigations, these lands had been mostly plowed but not planted.

Several hedgerows were present in the Subject Lands. Species present were those found elsewhere on the property and often contained deciduous shrubs or tree species. Along the south portion of Snider Road, mature oaks lined both sides of the road allowance ; some of these trees were included in the B3 woodland feature.

Photo 16. Agricultural lands (AG) covering most of the Subject Lands (October 19, 2021)

Anthropogenic (ANTH)

Three areas of land were classed as anthropogenic: a) a group of abandoned farm buildings and associated planted trees, in the southwest part of the Subject Lands b) the paved remnants of a removed building on the north side of Killaly St. E., and c) a group of active farm buildings and associated garden in the southeast part of the Subject Lands.

Soil Characterization from Elite Lands (Port Colborne) EIS

Variation between the soil samples collected in the Subject Lands was relatively low, with most containing clay or silty clay as the main soil type. A water table was reached in only one sample and no Of, Om or Oh (organic) soils were observed. Soil results were consistent with those characterized in the EXP Geotechnical Investigation Report (2021).

The soil characteristics for the following ELC communities are as follows:
Fresh – Moist Oak – Maple – Hickory Deciduous Forest (Oak Dominant) (FOD9a) (A4 Woodland)

The soils in this oak woodland consisted of a 20 cm loamy A layer, followed by a clay/silty clay dark brown layer becoming mid brown to at least 42 cm. No mottles were observed in the soil sample and no water table was reached. As such, the moisture regime was a 4 (moderately moist) at most, but likely drier.

Dry – Fresh Oak – Maple – Hickory Deciduous Forest (FOD2) (A3)

The soils in this woodland consisted of a 20 cm dark brown A layer, followed by a heavy clay/silty clay warm brown layer to 50 cm, at which point the auger would not drill lower (due to bedrock, heavy clay, or root). No mottles were observed in the soil sample and no water table was reached. The moisture regime was thought to be a 4 (moderately moist) or 3 (very fresh), if bedrock was > 120 cm depth or 1 (moderately fresh) if bedrock was at 50 cm.

Silver Maple Mineral Deciduous Swamp (SWD3-2) and SWD3-2 Gray Dogwood Mineral Thicket Swamp (SWT2-9) (A1 and B1 wetlands)

The soils in A1 swamp consisted of a 5 cm dark brown A layer, followed by a very heavy clay B layer to 45 cm, at which point the auger was no longer used as a moisture regime was determined. Distinct mottles were observed at approximately 25 cm depth, but no water table was reached. The moisture regime was assessed to be 6 (very moist).

Poplar Deciduous Swamp SWD (Part B3)

Four soil samples were undertaken in the B3 area to determine whether this community was primarily a wetland or an upland community, since the species present tended to be those that could be found in either community type or were a mix of upland and wetland species. Of the four soil samples taken, three resulted in a moisture regime of 6 (Lee et al., 1998), and another was indeterminate (probable gleys found high in the soil profile) and therefore it has been classed as a poplar wetland swamp. Soil samples found soils that had little litter, a short organic A layer, and were generally heavy clays or silty clays, with distinct mottles starting at 5 to 18 cm. A water table was not reached in any soil samples; however, the soil samplings were

not dug deep (25 to 40 cm) since a moisture regime could usually be determined without sampling deeper, and soils were difficult to dig.

Southern Arrow-wood Mineral Thicket Swamp (SWT2-11) (A2)

The soils in this thicket swamp consisted of a 20 cm dark brown clay-loam A layer, followed by a heavy clay/silty clay B layer to 45 cm, at which point the auger was no longer used as a moisture regime was determined. Distinct mottles were observed at approximately 25 cm depth, but no water table or bedrock was reached. The moisture regime was assessed to be 6 (very moist).

Mineral Thicket Swamp (SWT2) (A4 Wetland)

Two soil samples were conducted in this community – one in the middle and one at the edge. The soils in this thicket swamp consisted of an 18 to 25 cm deep rich brown loamy layer, followed by a clay/silty clay layer to 40 to 50 cm, at which point the auger was no longer used. No distinct mottles were observed in one of the samples, and mottles were observed in the other at approximately 20 cm in depth. No water table or bedrock was reached in either sample. The moisture regime was assessed to be 6 (very moist) in the soil sample with the mottles, but could be drier if bedrock is closer to the surface than 120 cm. It is possible that the soils here are disturbed and variable due to past human activity.

Mineral Cultural Woodland – Black Walnut (CUW1a) (B2)

Based on two soil samples collected, the soils in this woodland consisted of a 15 to 20 cm brown A layer, followed by a loamy silt B layer to 30 to 40 cm, at which point the auger was no longer used as bedrock was reached. A third auger attempt hit bedrock at 15 cm. No mottles were observed, and no water table was reached. The moisture regime was assessed to be 1 (moderately fresh).

Mineral Cultural Thicket (CUT1b)

The relatively deep upper layer of soil in Cultural Thicket 1b changed gradually through the first 50 cm, with some dark brown organics near the top, which then changed to a clay/silty clay. At 50 cm distinct mottles appeared and at 60 cm water was present. At 60 cm the soils changed colour to a grey-beige, and below that to a mid-beige brown at 75 cm (still clay/silty clay with a few angular pebbles). Given the location of the mottles, the moisture regime was determined to be 4 (moderately moist).

Should development be proposed for lands within the Study Area, but outside the Subject Lands, soil sampling and characterization is recommended.

Appendix D

Flora List

Appendix D

Flora List

Family	Scientific Name	Common Name	S Rank	COSEWIC Status	SARO Status	Exotic Status	Coefficient of Conservatism	Coefficient of Wetness	Niagara Region
Aceraceae	*Acer negundo*	Manitoba Maple	S5				0	0	
Aceraceae	*Acer platanoides*	Norway Maple	SNA			SE5		5	
Aceraceae	*Acer rubrum*	Red Maple	S5				4	0	
Aceraceae	*Acer saccharinum*	Silver Maple	S5				5	-3	
Aceraceae	*Acer saccharum*	Sugar Maple	S5				4	3	
Aceraceae	*Acer* x *freemanii*	Freeman's Maple - (Acer rubrum X Acer saccharinum)	SNA				6	-5	
Alismataceae	*Alisma triviale*	Northern Water-plantain	S5				1	-5	
Anacardiaceae	*Rhus typhina*	Staghorn Sumac	S5				1	3	
Anacardiaceae	*Toxicodendron radicans*	Poison Ivy	S5				2	0	
Apiaceae	*Daucus carota*	Wild Carrot	SNA			SE5		5	
Apocynaceae	*Asclepias syriaca*	Common Milkweed	S5				0	5	
Asteraceae	*Achillea* sp.	Yarrow Species							
Asteraceae	*Aster* sp.	Aster Species							
Asteraceae	*Bidens frondosa*	Devil's Beggarticks	S5				3	-3	
Asteraceae	*Cichorium intybus*	Wild Chicory	SNA			SE5		5	

Asteraceae	*Cirsium vulgare*	Bull Thistle	SNA			SE5		3	
Asteraceae	*Erigeron* sp.	Fleabane Species							
Asteraceae	*Eupatorium perfoliatum*	Common Boneset	S5				2	-3	
Asteraceae	*Euthamia graminifolia*	Grass-leaved Goldenrod	S5				2	0	
Asteraceae	*Hieracium* sp.	Hawkweed Species							
Asteraceae	*Matricaria discoidea*	Pineappleweed	SNA			SE5		3	
Asteraceae	*Solidago* sp.	Goldenrod Species							
Asteraceae	*Sonchus* sp.	Sowthistle Species							
Asteraceae	*Taraxacum officinale*	Common Dandelion	SNA			SE5		3	
Balsaminaceae	*Impatiens capensis*	Spotted Jewelweed	S5				4	-3	
Balsaminaceae	*Impatiens* sp.	Jewel-weed Species							
Berberidaceae	*Podophyllum peltatum*	May-apple	S5				5	3	
Betulaceae	*Carpinus caroliniana*	Blue-beech	S5				6	0	
Brassicaceae	*Alliaria petiolata*	Garlic Mustard	SNA			SE5		0	
Brassicaceae	*Barbarea vulgaris*	Bitter Wintercress	SNA			SE5		0	
Brassicaceae	*Cardamine douglassii*	Limestone Bittercress	S4				7	-3	
Brassicaceae	*Cardamine hirsuta*	Hairy Bittercress	SNA			SE4		3	
Butomaceae	*Butomus umbellatus*	Flowering-rush	SNA			SE5		-5	
Caprifoliaceae	*Diervilla lonicera*	Northern Bush-honeysuckle	S5				5	5	
Caprifoliaceae	*Lonicera* sp.	Honeysuckle Species							
Caprifoliaceae	*Lonicera tatarica*	Tatarian Honeysuckle	SNA			SE5		3	
Caprifoliaceae	*Viburnum recognitum*	Smooth Arrowwood	S4				7	0	
Caryophyllaceae	*Dianthus armeria*	Deptford Pink	SNA			SE5		5	
Chenopodiaceae	*Chenopodium album*	Common Lamb's-quarters	SNA			SE5		3	
Cornaceae	*Cornus racemosa*	Grey Dogwood	S5				2	0	

Cornaceae	*Cornus sericea*	Red-osier Dogwood	S5				2	-3	
Cornaceae	*Cornus* sp.	Dogwood Species							
Cupressaceae	*Juniperus communis*	Common Juniper	S5				4	3	
Cupressaceae	*Juniperus virginiana*	Eastern Red Cedar	S5				4	3	
Cupressaceae	*Thuja occidentalis*	Eastern White Cedar	S5				4	-3	
Cyperaceae	*Carex bebbii*	Bebb's Sedge	S5				3	-5	
Cyperaceae	*Carex* sp.	Sedge Species							
Cyperaceae	*Carex vulpinoidea*	Fox Sedge	S5				3	-5	
Cyperaceae	*Scirpus* sp.	Bulrush Species							
Dipsacaceae	*Dipsacus fullonum*	Common Teasel	SNA			SE5		3	
Fabaceae	*Gleditsia triacanthos*	Honey Locust	S2?				8	0	
Fabaceae	*Melilotus albus*	White Sweet-clover	SNA			SE5		3	
Fabaceae	*Trifolium repens*	White Clover	SNA			SE5		3	
Fabaceae	*Trifolium* sp.	Clover Species							
Fabaceae	*Vicia cracca*	Tufted Vetch	SNA			SE5		5	
Fagaceae	*Fagus grandifolia*	American Beech	S4				6	3	
Fagaceae	*Quercus alba*	White Oak	S5				6	3	
Fagaceae	*Quercus bicolor*	Swamp White Oak	S4				8	-3	
Fagaceae	*Quercus macrocarpa*	Bur Oak	S5				5	3	
Fagaceae	*Quercus palustris*	Swamp Pin Oak	S4				9	-3	
Fagaceae	*Quercus rubra*	Northern Red Oak	S5				6	3	
Fagaceae	*Quercus velutina*	Black Oak	S4				8	5	
Geraniaceae	*Geranium maculatum*	Spotted Geranium	S5				6	3	
Geraniaceae	*Geranium* sp.	Crane's-bill Species							
Juglandaceae	*Carya cordiformis*	Bitternut Hickory	S5				6	0	
Juglandaceae	*Carya ovata*	Shagbark Hickory	S5				6	3	
Juglandaceae	*Juglans nigra*	Black Walnut	S4?				5	3	
Juncaceae	*Juncus* sp.	Rush Species							
Lauraceae	*Lindera benzoin*	Northern Spicebush	S4				6	-3	

Lemnaceae	*Lemna* sp.	Duckweed Species							
Liliaceae	*Erythronium americanum*	Yellow Trout-lily	S5				5	5	
Lythraceae	*Lythrum salicaria*	Purple Loosestrife	SNA			SE5		-5	
Malvaceae	*Abutilon theophrasti*	Velvetleaf	SNA			SE5		3	
Oleaceae	*Fraxinus americana*	White Ash	S4				4	3	
Oleaceae	*Fraxinus pennsylvanica*	Red Ash	S4				3	-3	
Oleaceae	*Ligustrum vulgare*	European Privet	SNA			SE5		3	
Oleaceae	*Syringa vulgaris*	Common Lilac	SNA			SE5		5	
Onagraceae	*Epilobium* sp.	Willow-herb Species							
Oxalidaceae	*Oxalis* sp.	Wood Sorrel Species							
Papaveraceae	*Sanguinaria canadensis*	Bloodroot	S5				5	3	
Pinaceae	*Picea abies*	Norway Spruce	SNA			SE3		5	
Pinaceae	*Pinus sylvestris*	Scots Pine	SNA			SE5		3	
Pinaceae	*Tsuga canadensis*	Eastern Hemlock	S5				7	3	
Plantaginaceae	*Plantago lanceolata*	English Plantain	SNA			SE5		3	
Plantaginaceae	*Plantago major*	Common Plantain	SNA			SE5		3	
Poaceae	*Bromus inermis*	Smooth Brome	SNA			SE5		5	
Poaceae	*Echinochloa* sp.	Barnyard Grass Species							
Poaceae	*Leersia oryzoides*	Rice Cutgrass	S5				3	-5	
Poaceae	*Panicum* sp.	Panic Grass Species							
Poaceae	*Phalaris arundinacea*	Reed Canarygrass	S5				0	-3	
Poaceae	*Phragmites australis*	Common Reed	S4?				0	-3	
Poaceae	*Poa pratensis*	Kentucky Bluegrass	S5				0	3	
Poaceae	*Setaria faberi*	Giant Foxtail	SNA			SE4		3	
Poaceae	*Setaria pumila*	Yellow Foxtail	SNA			SE5		0	
Polygonaceae	*Reynoutria japonica*	Japanese Knotweed	SNA			SE5		3	
Polygonaceae	*Rumex crispus*	Curled Dock	SNA			SE5		0	
Primulaceae	*Lysimachia nummularia*	Creeping Yellow Loosestrife	SNA			SE5		-3	

Rhamnaceae	*Rhamnus cathartica*	European Buckthorn	SNA			SE5		0	
Rosaceae	*Crataegus* sp.	Hawthorn Species							
Rosaceae	*Fragaria vesca*	Woodland Strawberry	S5				4	3	
Rosaceae	*Fragaria virginiana*	Wild Strawberry	S5				2	3	
Rosaceae	*Geum canadense*	Canada Avens	S5				3	0	
Rosaceae	*Geum* sp.	Avens Species							
Rosaceae	*Malus* sp.	Apple Species							
Rosaceae	*Prunus serotina*	Black Cherry	S5				3	3	
Rosaceae	*Prunus virginiana*	Chokecherry	S5				2	3	
Rosaceae	*Rosa* sp.	Rose Species							
Rosaceae	*Rubus idaeus*	Red Raspberry	S5				2	3	
Rosaceae	*Rubus occidentalis*	Black Raspberry	S5				2	5	
Rosaceae	*Spiraea* sp.	Meadow-sweet Species							
Rubiaceae	*Galium aparine*	Common Bedstraw	S5				4	3	
Rubiaceae	*Galium circaezans*	Licorice Bedstraw	S5				7	3	
Rutaceae	*Zanthoxylum americanum*	Common Prickly-ash	S5				3	3	
Salicaceae	*Populus deltoides*	Eastern Cottonwood	S5				4	0	
Salicaceae	*Populus* sp.	Poplar Species							
Salicaceae	*Populus tremuloides*	Trembling Aspen	S5				2	0	
Salicaceae	*Salix discolor*	Pussy Willow	S5				3	-3	
Salicaceae	*Salix* sp.	Willow Species							
Scrophulariaceae	*Verbascum thapsus*	Common Mullein	SNA			SE5		5	
Staphyleaceae	*Staphylea trifolia*	American Bladdernut	S4				7	0	
Tiliaceae	*Tilia americana*	Basswood	S5				4	3	
Typhaceae	*Typha latifolia*	Broad-leaved Cattail	S5				1	-5	
Typhaceae	*Typha x glauca*	(Typha angustifolia X Typha latifolia)	SNA					-5	
Typhaceae	*Typha* sp.	Cattail Species							

Ulmaceae	*Ulmus americana*	White Elm	S5				3	-3	
Urticaceae	*Urtica dioica*	Stinging Nettle	S5				2	0	
Verbenaceae	*Verbena urticifolia*	White Vervain	S5				4	0	
Vitaceae	*Parthenocissus vitacea*	Thicket Creeper	S5				4	3	
Vitaceae	*Vitis riparia*	Riverbank Grape	S5				0	0	

LEGEND	
SRANK	**Provincial Status:** Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These ranks are not legal generally uncommon to common in the province. Species ranked S1-S3 are considered to be rare in Ontario. designations. S4 and S5 species are generally uncommon to common in the province. Species ranked S1-S3 are considered to be rare in Ontario.
S1 Critically Imperiled	Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2 Imperiled	Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3 Vulnerable	Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4 Apparently Secure	Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5 Secure	Common, widespread, and abundant in the nation or state/province.
SU Unrankable	Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA Unranked	A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
SX Presumed Extirpated	Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
SH Possibly Extirpated (Historica	Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered.
SE# Exotic Status	
S#? Rank Uncertain	

Ontario Ministry of Natural Resources (OMNR). 2018. Natural Heritage Information Centre Species Lists. Last updated January 30, 2018. https://www.ontario.ca/page/get-natural-heritage-information

COSSARO	
END Endangered	A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA.
THR Threatened	A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.
SC Special Concern	A species with characteristics that make it sensitive to human activities or natural events.
DD Data Deficient	
EXP Extirpated	A species that no longer exists in the wild in Ontario but still occurs elsewhere.

Ontario Ministry of Natural Resources and Forestry (2018). Species Risk in Ontario. Last updated UNE 28, 2018. https://www.ontario.ca/environment-and-energy/species-risk-type

COSEWIC	
END Endangered	A wildlife species facing imminent extirpation or extinction.
THR Threatened	A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
SC Special Concern	A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
VUL Vulenerable	
NAR Not at Risk	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
DD Data Deficient	A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
NA Non-active	
XT Extirpated	A wildlife species that no longer exists in the wild in Canada, but exists elsewhere.

Committee for the Status on Endangered Wildlife in Canada (COSEWIC). 2018. Canadian Wildlife Species at Risk. Last updated February 22, 2018. http://www.sararegistry.gc.ca/sar/index/default_e.cfm

Coefficient of Conservation

'Higher values of the coefficients of conservatism, on the scale of 1–10, indicate species that are more "conservative" (or ecologically sensitive), including those least associated with anthropogenic disturbance, least aggressive, least able to spread, and most confined to particular natural habitat' (Catling

Catling, Paul M. 2013. Using Coefficients of Conservatism and the Floristic Quality Index to assess the potential for serious and irreversible damage to plant communities. Canadian Field-Naturalist 127(3): 285–288.

Coefficient of Wetness

5 - Almost always occur on upland; 3 - Usually occur on uplands; 0 - Found on uplands and in wetlands; -3 Usually occur in wetlands; -5 Almost always occur in wetlands

Floristic Assessment System for Southern Ontario (Oldham et al, 1995).

Appendix E

iNaturalist & eBird Atlases

A1. iNaturalist Observations

id	observed_on_string	observed_on	time_observed_at	user_name	created_at	updated_at	quality_grade	url	image_url	description	num_identification_agreements	num_identification_disagreements	captive_cultivated	oauth_application_id	place_guess	latitude	longitude	positional_accuracy	private_place_guess	private_latitude	private_longitude	public_positional_accuracy	geoprivacy	taxon_geoprivacy	coordinates_obscured	positioning_method	positioning_device	species_guess	scientific_name	common_name	iconic_taxon_name	taxon_id
13914986	Fri Jun 08 2018 09:02:35 GMT-0400 (EDT)	43259	2018-06-08 13:02:35 UTC	Colleen Mills	2018-06-30 15:51:42 UTC	2022-10-12 19:43:21 UTC	research	https://www.inaturalist.org/observations/13914986	https://static.inaturalist.org/photos/20556586/medium.jpg		2	0	FALSE	3	Port Colborne, Port Colborne, ON, CA	42.8776542	-79.227329446	2811				2811			FALSE			Io Moth	Automeris io	Io Moth	Insecta	82279
13915026	Fri Jun 08 2018 09:02:22 GMT-0400 (EDT)	43259	2018-06-08 13:02:22 UTC	Colleen Mills	2018-06-30 15:52:39 UTC	2022-10-12 04:06:34 UTC	research	https://www.inaturalist.org/observations/13915026	https://static.inaturalist.org/photos/20556623/medium.jpg		2	0	FALSE	3	Port Colborne, Port Colborne, ON, CA	42.87839297	-79.227311192	2666				2666			FALSE			Cecropia Moth	Hyalophora cecropia	Cecropia Moth	Insecta	81582
13915134	Tue May 15 2018 18:38:02 GMT-0400 (EDT)	43235	2018-05-15 22:38:02 UTC	Colleen Mills	2018-06-30 15:57:23 UTC	2018-06-30 21:13:30 UTC	research	https://www.inaturalist.org/observations/13915134	https://static.inaturalist.org/photos/20556803/medium.jpg		2	0	FALSE	3	8664€"1066 Snider Rd, Port Colborne, ON, CA	42.88989167	-79.22532	2865				2865			FALSE			Midland Painted Turtle	Chrysemys picta marginata	Midland Painted Turtle	Reptilia	39772
27741208	2019-06-26 3:38:43 PM EDT	43642	2019-06-26 19:38:43 UTC	Jeff Hollick	2019-06-27 05:00:08 UTC	2020-02-17 16:22:56 UTC	research	https://www.inaturalist.org/observations/27741208	https://static.inaturalist.org/photos/43195037/medium.jpeg		1	0	FALSE	2	Sherkston, ON L0S 1R0, Canada	42.88700531	-79.22866096	16				16			FALSE			Polyphemus Moth	Antheraea polyphemus	Polyphemus Moth	Insecta	47919
27749878	Thu Jun 27 2019 08:13:14 GMT-0400 (EDT)	43643	2019-06-27 12:13:14 UTC		2019-06-27 12:13:18 UTC	2019-07-14 15:25:21 UTC	research	https://www.inaturalist.org/observations/27749878	https://static.inaturalist.org/photos/43209405/medium.jpg		3	0	FALSE		Port Colborne, Port Colborne, ON, CA	42.88738132	-79.22575202	5				5	open		FALSE			Common Snapping Turtle	Chelydra serpentina	Common Snapping Turtle	Reptilia	39682
29182953	Sat Jul 20 2019 11:52:55 GMT-0400 (EDT)	43666	2019-07-20 15:52:55 UTC		2019-07-20 17:07:21 UTC	2021-11-09 16:39:23 UTC	research	https://www.inaturalist.org/observations/29182953	https://inaturalist-open-data.s3.amazonaws.com/photos/45533714/medium.jpg		3	0	FALSE	3	444 Lorraine Rd, Port Colborne, ON, CA	42.871455	-79.21452167	20				20	open		FALSE			Monarch	Danaus plexippus	Monarch	Insecta	48662
51646304	2020/07/01 12:54 PM EDT	44013	2020-07-01 16:54:00 UTC	Wendy Robins	2020-07-02 00:36:40 UTC	2021-02-02 18:47:52 UTC	needs_id	https://www.inaturalist.org/observations/51646304	https://static.inaturalist.org/photos/82064088/medium.jpeg		1	0	FALSE		Port Colborne, On, Canada	42.87452073	-79.22850566	153				153			FALSE			Giant Mayflies	Hexagenia	Giant Mayflies	Insecta	51112
51646315	2020/07/01 12:56 PM EDT	44013	2020-07-01 16:56:00 UTC	Wendy Robins	2020-07-02 00:36:45 UTC	2022-07-18 02:48:42 UTC	research	https://www.inaturalist.org/observations/51646315	https://static.inaturalist.org/photos/82064166/medium.jpeg		1	0	FALSE		Port Colborne, On, Canada	42.8746377	-79.22850566	72				72			FALSE			Banded Tussock Moth	Halysidota tessellaris	Banded Tussock Moth	Insecta	120217
51646316	2020/07/01 12:56 PM EDT	44013	2020-07-01 16:56:00 UTC	Wendy Robins	2020-07-02 00:36:45 UTC	2022-07-18 02:48:42 UTC	research	https://www.inaturalist.org/observations/51646316	https://static.inaturalist.org/photos/82064200/medium.jpeg		1	0	FALSE		Port Colborne, On, Canada	42.87466129	-79.22854857	57				57			FALSE			Lesser Maple Spanworm Moth	Macaria pustularia	Lesser Maple Spanworm Moth	Insecta	736797
51646334	2020/07/01 1:05 PM EDT	44013	2020-07-01 17:05:00 UTC	Wendy Robins	2020-07-02 00:36:53 UTC	2020-07-02 03:52:56 UTC	research	https://www.inaturalist.org/observations/51646334	https://static.inaturalist.org/photos/82064607/medium.jpeg		1	0	FALSE		Port Colborne, On, Canada	42.87458267	-79.22841983	72				72	open		FALSE			American Toad	Anaxyrus americanus	American Toad	Amphibia	64968
51646338	2020/07/01 1:06 PM EDT	44013	2020-07-01 17:06:00 UTC	Wendy Robins	2020-07-02 00:36:53 UTC	2022-07-18 02:48:43 UTC	research	https://www.inaturalist.org/observations/51646338	https://static.inaturalist.org/photos/82064794/medium.jpeg		1	0	FALSE		Port Colborne, On, Canada	42.87461412	-79.22847347	63				63			FALSE			Gypsy Moth	Lymantria dispar	Spongy Moth	Insecta	47802
51646349	2020/07/01 1:10 PM EDT	44013	2020-07-01 17:10:00 UTC	Wendy Robins	2020-07-02 00:36:57 UTC	2020-08-24 11:33:17 UTC	research	https://www.inaturalist.org/observations/51646349	https://static.inaturalist.org/photos/82065011/medium.jpeg		2	0	FALSE		Port Colborne, On, Canada	42.87465343	-79.22850566	77				77			FALSE			Seven-spotted Lady Beetle	Coccinella septempunctata	Seven-spotted Lady Beetle	Insecta	51702
51646351	2020/07/01 1:13 PM EDT	44013	2020-07-01 17:13:00 UTC	Wendy Robins	2020-07-02 00:36:57 UTC	2021-11-06 10:13:38 UTC	research	https://www.inaturalist.org/observations/51646351	https://static.inaturalist.org/photos/82065100/medium.jpeg		1	0	FALSE		Port Colborne, On, Canada	42.87469274	-79.22847347	84				84			FALSE			Scharfer Mauerpfeffer	Sedum acre	Biting Stonecrop	Plantae	55734
51646353	2020/07/01 1:19 PM EDT	44013	2020-07-01 17:19:00 UTC	Wendy Robins	2020-07-02 00:36:57 UTC	2022-03-17 23:02:18 UTC	research	https://www.inaturalist.org/observations/51646353	https://static.inaturalist.org/photos/82065229/medium.jpeg		1	0	FALSE		Port Colborne, On, Canada	42.87468488	-79.2284842	64	open		FALSE			Black Firefly	Lucidota atra	Black Firefly	Insecta	224157
51646358	2020/07/01 1:19 PM EDT	44013	2020-07-01 17:19:00 UTC	Wendy Robins	2020-07-02 00:37:00 UTC	2022-07-18 02:48:44 UTC	research	https://www.inaturalist.org/observations/51646358	https://static.inaturalist.org/photos/82065277/medium.jpeg		2	0	FALSE		Port Colborne, On, Canada	42.87464557	-79.22847347	77				77			FALSE			Ectropis crepuscularia	Small Engrailed	Insecta	143009
53046720	Wed Apr 01 2020 18:59:50 GMT-0400 (EDT)	43922	2020-04-01 22:59:50 UTC		2020-07-14 13:48:09 UTC	2023-12-08 14:42:23 UTC	research	https://www.inaturalist.org/observations/53046720	https://inaturalist-open-data.s3.amazonaws.com/photos/84354969/medium.jpg		2	0	FALSE	3	Lorraine Rd, Port Colborne, ON, CA	42.8902922	-79.21492925	5				5			FALSE			ribwort plantain	Plantago lanceolata	ribwort plantain	Plantae	53178
56873054	2020-08-15 9:13:16 AM EDT	44058	2020-08-15 13:13:16 UTC	Dan Andrews	2020-08-18 20:26:27 UTC	2021-03-11 14:00:51 UTC	research	https://www.inaturalist.org/observations/56873054	https://inaturalist-open-data.s3.amazonaws.com/photos/90666360/medium.jpg		1	0	FALSE	3	Lakeshore Rd E, Port Colborne, ON, CA	42.87194722	-79.21450278	5				5	gps	gps	FALSE			smooth carrionflower	Smilax herbacea	smooth carrionflower	Plantae	154524
85279101	Thu Jul 01 2021 15:13:02 GMT-0400 (EDT)	44378	2021-07-01 19:13:02 UTC		2021-07-01 23:55:59 UTC	2021-07-02 14:06:42 UTC	research	https://www.inaturalist.org/observations/85279101	https://inaturalist-open-data.s3.amazonaws.com/photos/140286113/medium.jpg		1	0	FALSE	3	Lakeshore Rd E, Port Colborne, ON, CA	42.87192167	-79.218645	4				4			FALSE			purple-flowered raspberry	Rubus odoratus	purple-flowered raspberry	Plantae	62377
85279585	Thu Jul 01 2021 15:12:44 GMT-0400 (EDT)	44378	2021-07-01 19:12:44 UTC		2021-07-02 00:00:14 UTC	2021-07-04 08:12:05 UTC	research	https://www.inaturalist.org/observations/85279585	https://inaturalist-open-data.s3.amazonaws.com/photos/140286899/medium.jpg		2	0	FALSE	3	Lakeshore Rd E, Port Colborne, ON, CA	42.87191333	-79.2186775	4				4	open		FALSE			Common Eastern Bumble Bee	Bombus impatiens	Common Eastern Bumble Bee	Insecta	118970
85279713	Thu Jul 01 2021 15:14:12 GMT-0400 (EDT)	44378	2021-07-01 19:14:12 UTC		2021-07-02 00:01:40 UTC	2021-08-18 06:36:53 UTC	research	https://www.inaturalist.org/observations/85279713	https://inaturalist-open-data.s3.amazonaws.com/photos/140287219/medium.jpg		1	0	FALSE	3	Lakeshore Rd E, Port Colborne, ON, CA	42.87194667	-79.21862833	5				5			FALSE			Echinocystis lobata	wild cucumber	Plantae	48618
85280050	Thu Jul 01 2021 15:16:06 GMT-0400 (EDT)	44378	2021-07-01 19:16:06 UTC		2021-07-02 00:04:35 UTC	2021-07-02 10:02:34 UTC	research	https://www.inaturalist.org/observations/85280050	https://inaturalist-open-data.s3.amazonaws.com/photos/140287724/medium.jpg		2	0	FALSE	3	Lakeshore Rd E, Port Colborne, ON, CA	42.871945	-79.218605	4				4			FALSE			star-flowered lily-of-the-valley	Maianthemum stellatum	star-flowered lily-of-the-valley	Plantae	53268
85280838	Thu Jul 01 2021 15:19:22 GMT-0400 (EDT)	44378	2021-07-01 19:19:22 UTC		2021-07-02 00:13:04 UTC	2021-11-12 15:10:15 UTC	research	https://www.inaturalist.org/observations/85280838	https://inaturalist-open-data.s3.amazonaws.com/photos/140289398/medium.jpg		1	0	FALSE	3	Lakeshore Rd E, Port Colborne, ON, CA	42.87193667	-79.21869667	8				8	open		FALSE			common jewelweed	Impatiens capensis	common jewelweed	Plantae	47888
89526064	Sun Aug 01 2021 15:06:55 GMT-0400 (EDT)	44409	2021-08-01 19:06:55 UTC	Amanda Dervaitis	2021-08-01 19:08:38 UTC	2022-01-02 15:48:38 UTC	research	https://www.inaturalist.org/observations/89526064	https://inaturalist-open-data.s3.amazonaws.com/photos/147650110/medium.jpg		1	0	FALSE	3	Lakeshore Rd E, Port Colborne, ON, CA	42.87464641	-79.22655441	6				6	open		FALSE			Eupatorium perfoliatum	common boneset	Eupatorium perfoliatum	Plantae	119045
97918608	Tue Jul 20 2021 13:13:22 GMT-0400 (EDT)	44397	2021-07-20 17:13:22 UTC		2021-10-11 18:14:04 UTC	2021-11-26 15:06:49 UTC	needs_id	https://www.inaturalist.org/observations/97918608	https://inaturalist-open-data.s3.amazonaws.com/photos/162927703/medium.jpg		1	0	FALSE	3	Great Lakes Waterfront Trail, Port Colborne, ON, CA	42.88705365	-79.22507624	2411338				2411338			FALSE			Snowberry Clearwing	Hemaris diffinis	Snowberry Clearwing	Insecta	358549
133518408	2022-09-03 16:41:38-04:00	44807	2022-09-03 20:41:38 UTC	Corey Hockings	2022-09-03 20:42:00 UTC	2023-10-31 01:18:48 UTC	needs_id	https://www.inaturalist.org/observations/133518408	https://static.inaturalist.org/photos/234855277/medium.jpg		1	0	FALSE	3	Killaly St E, Port Colborne, ON, CA	42.89108705	-79.2214528	5				5	open		FALSE			cypress family	Cupressaceae	cypress family	Plantae	47374
166180466	Wednesday, June 7, 2023	45084	2023-06-07 18:40:45 UTC	Conor Koval	2023-06-08 02:42:29 UTC	2023-06-08 02:46:28 UTC	research	https://www.inaturalist.org/observations/166180466	https://inaturalist-open-data.s3.amazonaws.com/photos/237748851/medium.jpg		1	0	FALSE	3	Port Colborne, ON L3K 5V3, Canada	42.87964985	-79.21962965	42				42	open	gps	gps	Great Blue Heron	Ardea herodias	Great Blue Heron	Aves	4958
168713008	Sunday, June 18, 2023	45095	2023-06-18 10:42:33 UTC	Conor Koval	2023-06-21 20:09:16 UTC	2023-06-21 20:45:01 UTC	research	https://www.inaturalist.org/observations/168713008	https://inaturalist-open-data.s3.amazonaws.com/photos/239423288/medium.jpeg		1	0	FALSE	2	Port Colborne, ON, Canada	42.88182106	-79.21436716	54				54	open		FALSE	gps	gps	Wild Turkey	Meleagris gallopavo	Wild Turkey	Aves	906
180016197	Thursday, August 24, 2023	45162	2023-08-24 18:03:02 UTC	Conor Koval	2023-08-24 19:31:07 UTC	2023-09-12 14:16:16 UTC	research	https://www.inaturalist.org/observations/180016197	https://inaturalist-open-data.s3.amazonaws.com/photos/213498241/medium.jpeg		2	0	FALSE	2	Port Colborne, ON L3K 5V3, Canada	42.87690685	-79.21546184	15				15	open		FALSE	gps	gps	Groundhog	Marmota monax	Groundhog	Mammalia	46095
181271344	Sunday, August 27, 2023	45165	2023-08-27 18:19:57 UTC	Tiana McDaniel	2023-09-01 22:39:23 UTC	2023-09-02 11:45:38 UTC	research	https://www.inaturalist.org/observations/181271344	https://inaturalist-open-data.s3.amazonaws.com/photos/215899173/medium.jpg	Dead on tra	1	0	FALSE	2	Port Colborne, ON L3K 5V3, Canada	42.8874002	-79.2254737	1				1	open		FALSE	gps	gps	American Toad	Anaxyrus americanus	American Toad	Amphibia	64968
182937314	Monday, September 11, 2023	45180	2023-09-11 18:24:56 UTC	Conor Koval	2023-09-12 12:58:27 UTC	2023-09-12 14:15:26 UTC	research	https://www.inaturalist.org/observations/182937314	https://inaturalist-open-data.s3.amazonaws.com/photos/219065227/medium.jpeg		2	0	FALSE	2	Port Colborne, ON L3K 5V3, Canada	42.87636164	-79.22146294	16				16	open		FALSE	gps	gps	Double-crested Cormorant	Nannopterum auritum	Double-crested Cormorant	Aves	1E+06
183134403	Wednesday, September 13, 2023	45182	2023-09-13 19:59:10 UTC	Conor Koval	2023-09-13 21:18:49 UTC	2023-09-14 21:49:24 UTC	research	https://www.inaturalist.org/observations/183134403	https://inaturalist-open-data.s3.amazonaws.com/photos/219448169/medium.jpeg		1	0	FALSE	2	Port Colborne, ON L3K 5V3, Canada	42.87704272	-79.22076188	13				13	open		FALSE	gps	gps	Wood Duck	Aix sponsa	Wood Duck	Aves	7107
183833812	Sunday, September 17, 2023	45186	2023-09-17 20:25:56 UTC	Conor Koval	2023-09-18 12:32:52 UTC	2023-09-18 12:46:08 UTC	research	https://www.inaturalist.org/observations/183833812	https://inaturalist-open-data.s3.amazonaws.com/photos/220782242/medium.jpeg		1	0	FALSE	2	Port Colborne, ON L3K 5V3, Canada	42.87724247	-79.22019191	20				20	open		FALSE	gps	gps	American Red Squirrel	Tamiasciurus hudsonicus	American Red Squirrel	Mammalia	46260
192675687	2023-09-11 18:45:47-04:00	45180	2023-09-11 22:45:47 UTC	Scott	2023-11-30 23:01:39 UTC	2023-12-01 14:26:21 UTC	research	https://www.inaturalist.org/observations/192675687	https://inaturalist-open-data.s3.amazonaws.com/photos/238294371/medium.jpg		1	0	FALSE	3	Great Lakes Waterfront Tr, Port Colborne, ON, CA	42.88723	-79.223275	20				20			FALSE			Two-striped Grasshopper	Melanoplus bivittatus	Two-striped Grasshopper	Insecta	129385
124867532	Tuesday, June 28, 2022	44740	2022-06-28 20:24:26 UTC	Gabe Perras	2022-07-05 11:32:15 UTC	2022-07-24 15:14:52 UTC	research	https://www.inaturalist.org/observations/124867532	https://static.inaturalist.org/photos/211695409/medium.jpg		2	0	FALSE	2	Port Colborne, ON L3K 5V3, Canada	42.88727091	-79.20869529	140				140	open		FALSE			Commas	Polygonia interrogationis	Question Mark	Insecta	58579
132851261	Tuesday, August 16, 2022	44789	2022-08-16 18:39:13 UTC	Conor Koval	2022-08-29 18:31:00 UTC	2022-09-05 12:57:39 UTC	research	https://www.inaturalist.org/observations/132851261	https://inaturalist-open-data.s3.amazonaws.com/photos/226199698/medium.jpeg		2	0	FALSE	2	Port Colborne, ON L3K 5V3, Canada	42.87814932	-79.21379182	130				130	open		FALSE			Canada Goose	Branta canadensis	Canada Goose	Aves	7089
165902330	Tuesday, June 6, 2023	45083	2023-06-06 10:44:56 UTC	Conor Koval	2023-06-06 14:27:10 UTC	2023-06-06 14:31:47 UTC	research	https://www.inaturalist.org/observations/165902330	https://inaturalist-open-data.s3.amazonaws.com/photos/237234386/medium.jpg		1	0	FALSE	2	Port Colborne, On, Canada	42.87950822	-79.213131	82				82	open		FALSE	gps	gps	Wild Turkey	Meleagris gallopavo	Wild Turkey	Aves	906
165902568	Tuesday, June 6, 2023	45083	2023-06-06 12:52:32 UTC	Conor Koval	2023-06-06 14:28:52 UTC	2023-06-06 14:52:05 UTC	research	https://www.inaturalist.org/observations/165902568	https://inaturalist-open-data.s3.amazonaws.com/photos/237234829/medium.jpeg		1	0	FALSE	2	Port Colborne, On, Canada	42.8788854	-79.21094164	55				55	open		FALSE	gps	gps	Northern Flicker	Colaptes auratus	Northern Flicker	Aves	18236
165902837	Tuesday, June 6, 2023	45083	2023-06-06 12:35:08 UTC	Conor Koval	2023-06-06 14:30:40 UTC	2023-06-06 16:03:02 UTC	research	https://www.inaturalist.org/observations/165902837	https://inaturalist-open-data.s3.amazonaws.com/photos/237235359/medium.jpeg		2	0	FALSE	2	Port Colborne, On, Canada	42.88110098	-79.21349544	47				47	open		FALSE			Red-headed Woodpecker	Melanerpes erythrocephalus	Red-headed Woodpecker	Aves	18204
168712626	Sunday, June 18, 2023	45095	2023-06-18 10:49:37 UTC	Conor Koval	2023-06-21 20:07:11 UTC	2023-06-21 20:22:57 UTC	research	https://www.inaturalist.org/observations/168712626	https://inaturalist-open-data.s3.amazonaws.com/photos/239242660/medium.jpeg		1	0	FALSE	2	Port Colborne, On, Canada	42.88256448	-79.21337307	22				22	open		FALSE	gps	gps	Northern Flicker	Colaptes auratus	Northern Flicker	Aves	18236
168713008	Sunday, June 18, 2023	45095	2023-06-18 10:42:33 UTC	Conor Koval	2023-06-21 20:09:16 UTC	2023-06-21 20:45:01 UTC	research	https://www.inaturalist.org/observations/168713008	https://inaturalist-open-data.s3.amazonaws.com/photos/239423288/medium.jpeg		1	0	FALSE	2	Port Colborne, On, Canada	42.88182106	-79.21436716	54				54	open		FALSE	gps	gps	Wild Turkey	Meleagris gallopavo	Wild Turkey	Aves	906
173614674	Friday, June 30, 2023	45107	2023-06-30 12:30:44 UTC	Conor Koval	2023-07-18 16:19:33 UTC	2023-07-18 19:11:10 UTC	research	https://www.inaturalist.org/observations/173614674	https://inaturalist-open-data.s3.amazonaws.com/photos/201519167/medium.jpeg		1	0	FALSE	2	Port Colborne, On, Canada	42.88186872	-79.21352199	18				18	open		FALSE	gps	gps	American Toad	Anaxyrus americanus	American Toad	Amphibia	64968
185431648	Tuesday, September 26, 2023	45195	2023-09-26 15:19:02:50 UTC	Conor Koval	2023-09-29 15:11:13 UTC	2023-10-08 19:46:54 UTC	research	https://www.inaturalist.org/observations/185431648	https://inaturalist-open-data.s3.amazonaws.com/photos/223850834/medium.jpg		1	0	FALSE	2	Port Colborne, ON L3K 5V3, Canada	42.87766506	-79.21284501	19				19	open		FALSE			Turkey Vulture	Cathartes aura	Turkey Vulture	Aves	4756
3917056	Fri Aug 16 2019 10:11:58 GMT-0400 (EDT)	42601	2016-08-19 14:11:58 UTC		2016-08-19 14:34:42 UTC	2016-08-19 16:10:16 UTC	research	http://inaturalist.ca/observations/3917056	https://inaturalist-open-data.s3.amazonaws.com/photos/4607555/medium.jpg	Picked him	1	0	FALSE	3	896 Killaly St E, Port Colborne, ON, CA	42.89350216	-79.21708511	823				823			FALSE			American Toad	Anaxyrus americanus	American Toad	Amphibia	64968
4582308	Sat Jul 07 2012 17:27:35 GMT-0400 (EDT)	41097	2012-07-07 21:27:35 UTC		2016-11-16 14:53:22 UTC	2022-08-15 15:45:06 UTC	research	http://inaturalist.ca/observations/4582308	https://inaturalist-open-data.s3.amazonaws.com/photos/5535095/medium.jpg	Photos are	2	0	FALSE	3	1751 Main St E, Port Colborne, ON, CA	42.8941428	-79.19926998	861				861			FALSE			White-marked Tussock Moth	Orgyia leucostigma	White-marked Tussock Moth	Insecta	81665
29179326	2019-07-19 10:28:48 AM EDT	43665	2019-07-19 14:28:48 UTC	Bernal Arce	2019-07-20 16:08:38 UTC	2019-07-20 17:50:11 UTC	research	https://www.inaturalist.org/observations/29179326	https://inaturalist-open-data.s3.amazonaws.com/photos/45527951/medium.jpeg		1	0	FALSE	2	Humberstone Speedway, Port Colborne, ON L3K 5V3, Canad	42.89777756	-79.20083618	1				1	gps	gps	FALSE			Red Admiral	Vanessa atalanta	Red Admiral	Insecta	49133
177016470	2023-08-06 12:22:35-04:00	45144	2023-08-06 16:22:35 UTC	Wendy Robins	2023-08-06 18:31:55 UTC	2023-08-06 19:06:09 UTC	research	https://www.inaturalist.org/observations/177016470	https://static.inaturalist.org/photos/307818595/medium.jpg		1	0	FALSE	3	Thomas A. Lannan Sports Complex, Port Colborne, ON, CA	42.8965333	-79.23771967	5				5			FALSE			Giant Mayflies	Hexagenia	Giant Mayflies	Insecta	51112
8166779	Tue Sep 19 2017 06:51:01 GMT-0400 (EDT)	42997	2017-09-19 10:51:01 UTC	Nicole Jany	2017-09-29 10:44:09 UTC	2019-02-03 19:31:01 UTC	research	https://www.inaturalist.org/observations/8166779	https://inaturalist-open-data.s3.amazonaws.com/photos/11641552/medium.jpg		2	0	FALSE	3	13048€"1692 Miller Rd, Port Colborne, ON, CA	42.90428511	-79.1940713	10				10			FALSE			Hickory Tussock Moth	Lophocampa caryae	Hickory Tussock Moth	Insecta	82225
54879594	Thu Jul 30 2020 15:21:51 GMT-0400 (EDT)	44042	2020-07-30 19:21:51 UTC		2020-07-30 21:25:27 UTC	2022-03-19 16:01:02 UTC	needs_id	https://www.inaturalist.org/observations/54879594	https://inaturalist-open-data.s3.amazonaws.com/photos/87348778/medium.jpg		1	0	FALSE	3	Port Colborne, ON, CA	42.91256333	-79.23175833	10				10			FALSE			Tabaninae	Horse Flies	Insecta	322389
86945292	Tue Jul 13 2021 14:33:22 GMT-0400 (EDT)	44390	2021-07-13 18:13:22 UTC	Josh Vandermeulen	2021-07-14 03:59:53 UTC	2021-07-15 11:06:44 UTC	research	https://www.inaturalist.org/observations/86945292	https://inaturalist-open-data.s3.amazonaws.com/photos/143321457/medium.jpeg		2	0	FALSE	3	Gasline, Port Colborne, ON, CA	42.90696667	-79.20091167	5				5			FALSE			Acadian Hairstreak	Satyrium acadica	Acadian Hairstreak	Insecta	198805
89001224	Wed Jul 28 2021 15:42:26 GMT-0400 (EDT)	44405	2021-07-28 19:42:26 UTC		2021-07-28 23:29:47 UTC	2021-07-29 12:11:33 UTC	research	https://www.inaturalist.org/observations/89001224	https://inaturalist-open-data.s3.amazonaws.com/photos/146920560/medium.jpg		1	0	FALSE	3	Chippawa Rd, Port Colborne, ON, CA	42.91250333	-79.23201167	10				10	open		FALSE			Dekay's Brownsnake	Storeria dekayi	DeKay's Brownsnake	Reptilia	28562
154361286	2023-04-06 17:50:50-04:00	45022	2023-04-06 21:50:32 UTC		2023-04-11 01:15:05 UTC	2023-04-11 01:17:29 UTC	research	https://www.inaturalist.org/observations/154361286	https://inaturalist-open-data.s3.amazonaws.com/photos/266710012/medium.jpg		1	0	FALSE	3	Concession Rd 2, Port Colborne, ON, CA	42.91122577	-79.20514541	93				93	open		FALSE			sarcelle-à-ailes bleues	Spatula discors	Blue-winged Teal	Aves	558433
154361600	2023-04-06 17:50:50-04:00	45022	2023-04-06 21:50:32 UTC		2023-04-11 01:17:32 UTC	2023-04-11 01:19:43 UTC	research	https://www.inaturalist.org/observations/154361600	https://inaturalist-open-data.s3.amazonaws.com/photos/266710522/medium.jpg		1	0	FALSE	3	Carl Rd, Port Colborne, ON, CA	42.91131683	-79.20494205	81				81	open		FALSE			canard noir	Anas rubripes	American Black Duck	Aves	6924
177747910	Thursday, May 12, 2022	44693	2022-05-12 15:46:09 UTC		2022-05-19 16:40:41 UTC	2023-04-18 16:31:23 UTC	research	https://www.inaturalist.org/observations/177747910	https://inaturalist-open-data.s3.amazonaws.com/photos/198886559/medium.jpeg		2	0	FALSE	2	Niagara, CA-ON, CA	42.91888889	-79.20305556	1				1			FALSE			Purple Cress	Cardamine douglassii	Purple Cress	Plantae	125902
154361286	2023-04-06 17:50:32-04:00	45022	2023-04-06 21:50:32 UTC		2023-04-11 01:15:05 UTC	2023-04-11 01:17:29 UTC	research	https://www.inaturalist.org/observations/154361286	https://inaturalist-open-data.s3.amazonaws.com/photos/266710012/medium.jpg		1	0	FALSE	3	Concession Rd 2, Port Colborne, ON, CA	42.91122577	-79.20514541	93				93	open		FALSE			sarcelle-à-ailes bleues	Spatula discors	Blue-winged Teal	Aves	558433
154361600	2023-04-06 17:50:50-04:00	45022	2023-04-06 21:50:50 UTC		2023-04-11 01:17:32 UTC	2023-04-11 01:19:43 UTC	research	https://www.inaturalist.org/observations/154361600	https://inaturalist-open-data.s3.amazonaws.com/photos/266710522/medium.jpg		1	0	FALSE	3	Carl Rd, Port Colborne, ON, CA	42.91131683	-79.20494205	81				81	open		FALSE			canard noir	Anas rubripes	American Black Duck	Aves	6924

A2. eBird Observations

Port Colborne--Lorraine Rd.

- Niagara County
- Ontario
- CA

Map
Directions

Hotspot navigation

- **Overview**
- **Illustrated Checklist**

Hotspot stats

- **58**
  Species observed
- **18**
  Complete checklists

Sightings

Updated 3 sec ago.

Last seenFirst seenHigh counts

Show all details

Observations - Last seen - Sorted by Date descending

SORT BY TAXONOMIC ORDER SPECIES NAME
SORT BY COUNTCOUNT
SORT BY DATEDATE
OBSERVER

species1.

Canada Goose
Count 150
27 Nov 2022
angelique mori
Show Details

species2.

Mallard
Count 13
27 Nov 2022
angelique mori

species3.

American Kestrel
Count 1
27 Nov 2022
angelique mori

species4.

Blue Jay
Count 1
27 Nov 2022

angelique mori

species5.

Black-capped Chickadee
Count 2
27 Nov 2022
angelique mori

species6.

House Sparrow
Exotic: Naturalized
Count 15
27 Nov 2022
angelique mori
Show Details

species7.

Pileated Woodpecker
Count 1
25 Apr 2022
Brad Reinhardt
Show Details

species8.

Northern Flicker
Count 1
25 Apr 2022
Brad Reinhardt

species9.

European Starling
Exotic: Naturalized
Count 2
25 Apr 2022
Brad Reinhardt

species10.

Mourning Dove
Count 1
24 Apr 2022
Marcie Jacklin

species11.

Double-crested Cormorant
Count 1
24 Apr 2022
Marcie Jacklin

species12.

American Robin
Count 4
24 Apr 2022
Marcie Jacklin

species13.

Chipping Sparrow
Count 1
24 Apr 2022
Marcie Jacklin

species14.

Northern Cardinal
Count 1
24 Apr 2022

Marcie Jacklin

species15.

Red-winged Blackbird
Count 3
23 Apr 2022
Diana Werezak

species16.

Redhead
Count 250
4 Jan 2022
Eric Orosz
Show Details

species17.

Bufflehead
Count 250
4 Jan 2022
Eric Orosz

species18.

Common Goldeneye
Count 50
4 Jan 2022
Eric Orosz

species19.

Northern Harrier
Count 1
4 Jan 2022
Eric Orosz

species20.

Red-tailed Hawk
Count 1
4 Jan 2022
Eric Orosz

species21.

Red-bellied Woodpecker
Count 2
4 Jan 2022
Eric Orosz

species22.

Downy Woodpecker
Count 6
4 Jan 2022
Eric Orosz

species23.

Tufted Titmouse
Count 3
4 Jan 2022
Eric Orosz

species24.

White-breasted Nuthatch
Count 3
4 Jan 2022
Eric Orosz

species25.

Carolina Wren

Count 1
4 Jan 2022
Eric Orosz

species26.

Eastern Bluebird
Count 1
4 Jan 2022
Eric Orosz

species27.

House Finch
Exotic: Naturalized
Count 1
4 Jan 2022
Eric Orosz

species28.

American Goldfinch
Count 2
4 Jan 2022
Eric Orosz

species29.

American Tree Sparrow
Count 4
4 Jan 2022
Eric Orosz

species30.

Dark-eyed Junco
Count 22
4 Jan 2022
Eric Orosz

species31.

Song Sparrow
Count 4
4 Jan 2022
Eric Orosz
Show Details

species32.

Greater Scaup
Count 450
1 Jan 2022
Jean Farnan
Show Details

species33.

Common Merganser
Count 6
1 Jan 2022
Jean Farnan

species34.

Red-breasted Merganser
Count 1
1 Jan 2022
Jean Farnan

species35.

Red-headed Woodpecker
Count 1

26 Jun 2021
Jennifer Mater
Show Details

species36.

Ring-necked Duck
Count 5
21 Mar 2021
Lisa Bacon

species37.

Killdeer
Count 1
21 Mar 2021
Lisa Bacon

species38.

Ring-billed Gull
Count 3
21 Mar 2021
Lisa Bacon

species39.

Turkey Vulture
Count 2
21 Mar 2021
Lisa Bacon

species40.

Bald Eagle
Count 1
21 Mar 2021
Lisa Bacon

species41.

Brown Creeper
Count 1
21 Mar 2021
Lisa Bacon

species42.

Common Grackle
Count 1
4 May 2019
Brady Wood

species43.

Greater White-fronted Goose
Count 19
11 Feb 2018
Bob Highcock
Show Details

species44.

White-crowned Sparrow
Count 1
16 Jan 2017
Marcie Jacklin

species45.

Hairy Woodpecker
Count 1
29 May 2013
Laurie Dann

species46.

Great Blue Heron
Count 3
31 Mar 2012
Trevor Jones

species47.

Gadwall
Count 55
24 Oct 2011
Gavin Platt

species48.

American Black Duck
Count 8
24 Oct 2011
Gavin Platt

species49.

Herring Gull
Count X
24 Oct 2011
Gavin Platt

species50.

American Wigeon
Count X
3 Jan 2011
Marcie Jacklin

species51.

Hooded Merganser
Count X
3 Jan 2011
Marcie Jacklin

species52.

Long-eared Owl
Count 2
5 Dec 1987
Richard Knapton
Show Details

species53.

American Crow
Count 3
29 Nov 1987
Richard Knapton

species54.

Northern Mockingbird
Count 1
29 Nov 1987
Richard Knapton

species55.

Pine Siskin
Count 1
29 Nov 1987
Richard Knapton

species56.

Snow Bunting
Count 15

29 Nov 1987
Richard Knapton

species57.

Northern Saw-whet Owl
Count 1
20 Oct 1987
Richard Knapton
Show Details

species58.

Golden-crowned Kinglet
Count 6
20 Oct 1987
Richard Knapton

ADDITIONAL TAXA

Aythya sp.
Count 200
4 Jan 2022
Eric Orosz
gull sp.
Count 1
4 Jan 2022
Eric Orosz
Trumpeter/Tundra Swan
Count 3
4 Mar 2021
Brian Smith
passerine sp.
Count 1
4 Mar 2021
Brian Smith
woodpecker sp.
Count 2
29 May 2013
Laurie Dann

Appendix F

Breeding Bird List

Breeding Birds of Wignell Subwatershed, Niagara Region

Common Name	Scientific Name	Status						
		National Species at Risk COSEWIC [a]	Species at Risk in Ontario Listing [a]	Provincial breeding season SRANK [b]	Regional Status [d]	Area-sensitive (OMNR) [c]	Observed in Subwatershed Lands (Excepting Elite Subject Lands) e	Total Oberved on Elite Subject Lands (Number of Pairs/Territories)
Great Blue Heron	*Ardea herodias*			S4	Un		# F	
Green Heron	*Butorides virescens*			S4	Un		#	
Canada Goose	*Branta canadensis*			S5	VC		#	
Wood Duck	*Aix sponsa*			S5	Un		#	
Green-winged Teal	*Anas crecca*			S4	O		# F?	
Mallard	*Anas platyrhynchos*			S5	C		#	
Turkey Vulture	*Cathartes aura*			S5	Un		# F	2 F
Red-tailed Hawk	*Buteo jamaicensis*			S5	Un			1
Wild Turkey	*Meleagris gallopavo*			S5	U*		#	
Canada Goose	*Branta canadensis*			S5	VC		# F	2 F
Killdeer	*Charadrius vociferus*			S5	C		#	4
Spotted Sandpiper	*Actitis macularia*			S5	C		#	
American Woodcock	*Scolopax minor*			S4	Un			2
Rock Pigeon	*Columba livia*			SE	VC		#	
Mourning Dove	*Zenaida macroura*			S5	VC		#	2
Chimney Swift	*Chaetura pelagica*	THR	THR	S4	Un		# F	5 F
Ruby-throated Hummingbird	*Archilochus colubris*			S5	Un			1
Belted Kingfisher	*Ceryle alcyon*			S4	Un		# F?	
Red-bellied Woodpecker	*Melanerpes carolinus*			S4	Un		#	1
Downy Woodpecker	*Picoides pubescens*			S5	C		#	3
Northern Flicker	*Colaptes auratus*			S4	C		#	4
Eastern Wood-Pewee	*Contopus virens*	SC	SC	S4	C		##	1
Willow Flycatcher	*Empidonax traillii*			S5	Un		##	2
Great Crested Flycatcher	*Myiarchus crinitus*			S4	C		#	1
Eastern Kingbird	*Tyrannus tyrannus*			S4	C			1
Horned Lark	*Eremophila alpestris*			S5	C		#	3
Tree Swallow	*Tachycineta bicolor*			S4	VC		#	1
N. Rough-winged Swallow	*Stelgidopteryx serripennis*			S4	Un		# F	
Barn Swallow	*Hirundo rustica*	SC	SC	S4	VC		##	3, 8F
Blue Jay	*Cyanocitta cristata*			S5	VC		##	4, 1F
American Crow	*Corvus brachyrhynchos*			S5	C		#	1 F
Common Raven	*Corvus corax*			S5	*		#	
Black-capped Chickadee	*Poecile atricapillus*			S5	C		#	4
White-breasted Nuthatch	*Sitta carolinensis*			S5	Un	A		1
Tufted Titmouse	*Baeolophus bicolor*			S4	R	A	#	

House Wren	*Troglodytes aedon*			S5	C		##	4
Carolina Wren	*Thryothorus ludovicianus*			S4	Un		#	3
Marsh Wren	*Cistothorus palustris*			S4	Un		#	
Blue-gray Gnatcatcher	*Polioptila caerulea*			S4	Un	A	#	
American Robin	*Turdus migratorius*			S5	VC		###	23
Gray Catbird	*Dumetella carolinensis*			S4	C		##	12
Brown Thrasher	*Toxostoma rufum*			S4	Un			1
Cedar Waxwing	*Bombycilla cedrorum*			S5	C		##	4
European Starling	*Sturnus vulgaris*			SE	VC		###	10, 12F
Warbling Vireo	*Vireo gilvus*			S5	C		##	1
Red-eyed Vireo	*Vireo olivaceus*			S5	C		#	1
Yellow Warbler	*Setophaga petechia*			S5	C		###	12
American Redstart	*Setophaga ruticilla*			S5	Un	A		1
Common Yellowthroat	*Geothlypis trichas*			S5	C		##	3
Northern Cardinal	*Cardinalis cardinalis*			S5	C		##	12
Rose-breasted Grosbeak	*Pheucticus ludovicianus*			S4	C		#	
Indigo Bunting	*Passerina cyanea*			S4	C		##	11
Chipping Sparrow	*Spizella passerina*			S5	C		#	1
Field Sparrow	*Spizella pusilla*			S4	Un			3
Vesper Sparrow	*Pooecetes gramineus*			S4	Un			1
Savannah Sparrow	*Passerculus sandwichensis*			S4	VC	A	##	21
Song Sparrow	*Melospiza melodia*			S5	VC		###	56
Swamp Sparrow	*Melospiza georgiana*			S5	Un		##	
Bobolink	*Dolichonyx oryzivorus*	THR	THR	S4	Un	A	#	1
Red-winged Blackbird	*Agelaius phoeniceus*			S4	VC		###	38
Common Grackle	*Quiscalus quiscula*			S5	VC		##	3, 1F
Brown-headed Cowbird	*Molothrus ater*			S5	VC		##	7
Orchard Oriole	*Icterus spurius*			S4	Un		#	
Baltimore Oriole	*Icterus galbula*			S4	C		##	6
American Goldfinch	*Cardeulis tristis*			S5	C		##	18
House Sparrow	*Passer domesticus*			SE	VC		##	1F

F = Foraging only, not breeding

Field Work Conducted On:	**Date**	**Temp (°C)**	**Wind Speed (km/h)**	**Cloud Cover (%)**	**Start time**	**End time**
Site visit 1 (most Elite properties)	June 17 2021	9	0	0	5:45 am	10:00 am
Site visit 2 (most Elite properties)	July 5 2021	20	0	100	6:30 am	9:30 am
Site visit 3 (705 Main St E and 896 Killaly St.)	May 31 2022	20	11	10	7:40 am	9:40 am
Site visit 4 (705 Main St E and 896 Killaly St.)	June 22 2022	21	16	40	8:35 am	10:15 am

Visit 5 - Roadside and path surveys elsewhere in subwatershed	June 9, 2023	11	0	85	6:00 am	11:00 am

Number of Breeding Season Species: 66
Number of (provincial and national) Species at Risk: 4 (3 nesting Eastern Wood-pewee, Barn Swallow, Bobolink; 1 Chimney Swift foraging only)
Number of S1 to S3 (provincially rare) Species: 0
Number of Regionally Rare Species (R, O and ER species, as below): 2 (Green-winged Teal and Tufted Titmouse)
Number of Forest Area-sensitive Species: 4 (White-breasted Nuthatch, Tufted Titmouse, Blue-gray Gnatcatcher, and American Redstart)
Number of Open Land/Grassland Area-Sensitive Species: 2 (Savannah Sparrow and Bobolink)

KEY
a COSEWIC = Committee on the Status of Endangered Wildlife in Canada
a Species at Risk in Ontario List (as applies to ESA) as designated by COSSARO (Committee on the Status of Species at Risk in Ontario)
END = Endangered, THR = Threatened, SC = Special Concern

b SRANK (from Natural Heritage Information Centre) for breeding status if:
S1 (Critically Imperiled), S2 (Imperiled),S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure)
SZB (breeding migrants or vagrants) and SR (reported as breeding, but no persuasive documentation) .
SE (exotic, i.e. non-native)

c Ontario Ministry of Natural Resources (OMNR). 2000. Significant Wildlife Habitat Technical Guide (Appendix G). 151 p plus appendices.

d Niagara Region Status - J.Black and K.Roy, Birds of the Niagara Region, in Natural Areas Inventory (2006-2009) Vol. 2, Niagara Peninsula Conservation Authority
Summer status for those that change status through seasons
Very Common (VC) - observed annually on most days at many locations, often in large numbers.
Common (C) - observed annually on most days at many locations in small numbers.
Uncommon (Un) - observed annually on many days at a few locations in small numbers.
Rare (R)- observed annually or almost annually at a few locations in very small numbers, often on only a few days, and with difficulty unless at a known location.
Occasional (O) - not observed annually though always anticipated; often only a single individual observed.
Extremely rare (ER)- an extraordinary observation with five or fewer Niagara records; the probability of recurrence very low.
Extirpated - formerly resident in Niagara; no longer observed.
Extinct - formerly observed in Niagara; no longer exists anywhere
* Since the mid 2000s when this list was compiled, Wild Turkey has increased in abundance and Common Raven has expanded its range greatly southward into Ontario
Raven was considered an Extremely Rare Visitor but this status is now outdated

e In 2023, approximate magnitute of Palmer observations in the subwatershed: # = Infrequently observed (1-4); ## Frequently (5-14); ### Abundant (15+)

Appendix G

Breeding Amphibians

Appendix G

Breeding Amphibian Surveys

Breeding Amphibian Station	April 12, 2022	May 18, 2022	June 23, 2022
Weather Conditions/ Location of Amphibians	11°C, 30% cloud cover, Beaufort Wind Scale No.0	11°C, light rain, Beaufort Wind Scale No. 2	25°C, 0% cloud cover, Beaufort Wind Scale No. 1
North of Killaly St E.			
B3 (within Subject Lands)	American Toad, Code: *1-1; Western Chorus Frog, Code: 1-1. Spring Peeper, Code: 3	No calls heard.	Not surveyed.
B2 (within Subject Lands)	Spring Peeper, Code: 2-3 Western Chorus Frog, Code: 2-5	No calls heard.	Not surveyed.
A4 (within Subject Lands)	Spring Peeper, Code: 2-5 American Toad, Code: 2-3	American Toad, Code: 1-1	No calls heard.
B1 (within Subject Lands)	Western Chorus Frog, Code: 2-5	No calls heard.	Not surveyed.
A1 (within Subject Lands)	No calls heard.	No calls heard.	Not surveyed.
A2 (within Subject Lands)	Spring Peeper, Code: 2-3 American Toad, Code: 1-2 Western Chorus Frog, Code: 2-4	No calls heard.	Not surveyed.
J	Spring Peeper, Code: 3 Western Chorus Frog, Code: 2-4	Spring Peeper, Code: 3	Not surveyed.
L	No calls heard.	No calls heard.	Not surveyed.
North of Main St.			
F	American Toad, Code: 3 Western Chorus Frog, Code: 1-2	No calls heard.	Not surveyed.
G	Spring Peeper, Code: 3 American Toad, Code: 1-1 Western Chorus Frog, Code: 3	No calls heard.	Not surveyed.
H	Spring Peeper, Code: 3	No calls heard.	Not surveyed.
Pond 5	Spring Peeper, Code: 3 American Toad, Code: 1-1 Western Chorus Frog, Code: 2-2	No calls heard.	Not surveyed.
WD-2	No calls heard.	No calls heard.	Not surveyed.
North of Friendship Trail			
E	Spring Peeper, Code: 3 American Toad, Code: 1-1	No calls heard.	Not surveyed.
Pond 4	Spring Peeper, Code: 3	No calls heard.	Not surveyed.
K	American Toad, Code: 1-1 Western Chorus Frog, Code: 1-2	No calls heard.	No calls heard.

	Spring Peeper, Code: 3		
North of Lakeshore Rd E.			
A	Spring Peeper, Code: 3 Northern Leopard Frog, Code: 1-1 Western Chorus Frog, Code: 1-2	Spring Peeper, Code: 1-1 Western Chorus Frog, Code: 1-1	Not surveyed.
B	Spring Peeper, Code: 3 Western Chorus Frog, Code: 1-2	No calls heard.	Not surveyed.
C	Spring Peeper, Code: 3	No calls heard.	Not surveyed.
D	Spring Peeper, Code: 3 Western Chorus Frog, Code: 1-1	No calls heard.	Not surveyed.
I	Spring Peeper, Code: 3 American Toad, Code: 1-1 Western Chorus Frog, Code: 1-1	Spring Peeper, Code: 3	Not surveyed.
Pond 1	Spring Peeper, Code: 3	No calls heard.	Not surveyed.
Pond 2	Spring Peeper, Code: 3 Northern Leopard Frog, Code: 1-1 American Toad, Code: 1-2	No calls heard.	Not surveyed.
Pond 3	American Toad, Code: 1-1 Western Chorus Frog, Code: 2-2	No calls heard.	Not surveyed.

* First number = Code (1 non-overlapping calls; 2 overlapping calls; 3 chorus); Second number = approximate number heard

Appendix H

Surface Water Quality

	Exceedence Value	WD-1						
2023 Sampling Date		14-Jun	06-Jul	31-Jul	16-Aug	31-Aug	27-Sep	24-Oct
Sampling Event (1-7)		1	2	3	4	5	6	7
Temp		15.9	19.4	18.9	19.1	15.92	15.6	10.7
DO (%L)		53.6	69.3	27.4	49	73.9	3.4	45.1
DO (mg/L)		4.91	6.15	2.69	4.27	6.51	0.32	4.84
SPC (ms/cm)		4.528	3.87	2.46	2.39	2.18	1.966	2.13
C (us/cm)		3750	3458	2168	2100	1800	1615	1547
pH	6.5 - 8.5	7.87	8.45	7.17	7.33	7.73	7.3	7.5
ORP (mV)		66.7	11.1	163.4	25.1	16.7	33.9	-97.1
ALS pH		8.22	8.55	8.06	7.83	8.23	8.40	8.36
TSS		2490	68.5	5.1	193	55.6	144	<3.0
TDS		2490	1990	1100	1020	1280	1280	1330
Chloride Content		1340	1020	431	368	491	478	494
Nitrite		<0.100	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrate		1.34	0.53	0.107	<0.100	0.13	0.132	0.126
Ammonia		0.205	0.176	0.0729	0.09	0.193	0.169	0.152
TKN		1.32	1.2	0.847	0.985	0.779	0.896	0.680
Total P		0.154	0.18	0.175	0.224	0.182	0.171	0.114
BOD		<3.0	<3.0	<3.0	<3.0	<3.0	18.6	<3.0
Hardness		307	255	204	206	227	214	230
Aluminum, total		0.634	0.397	0.66	0.38	0.125	0.290	0.0881
Antimony, total		<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Arsenic, total	0.1	0.00132	0.00115	0.00105	0.00114	<0.00100	<0.00100	<0.00100
Barium, total		0.0851	0.0702	0.0513	0.0476	0.0498	0.0461	0.0483
Beryllium, total	0.011	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200
Bismuth, total		<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Boron, total		<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Cadmium, total	0.0002	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
Calcium, total		83.7	70.4	56.7	57.2	64.5	59.5	64.2
Cesium, total		0.000117	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Chromium, total		<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500

Cobalt, total		<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Copper, total	0.005	0.00646	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Iron, total	0.3	0.903	0.98	1.03	0.945	0.875	1.04	0.495
Lead, total	0.025	0.00135	0.000946	0.000772	0.000702	<0.000500	0.000925	<0.000500
Lithium, total		<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
Magnesium, total		23.8	19.2	15.2	15.4	16	15.8	17.0
Manganese, total		0.102	0.24	0.168	0.27	0.201	0.0647	0.0992
Molybdenum, total		0.00752	0.0073	0.00454	0.00398	0.00398	0.00476	0.00476
Nickel, total	0.025	0.00707	0.00738	0.00691	0.00725	<0.00500	0.00504	<0.00500
Phosphorus, total		<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Potassium, total		3.15	2.74	2.52	2.64	2.1	2.22	2.50
Rubidium, total		0.00232	<0.00200	0.00214	<0.00200	<0.00200	<0.00200	<0.00200
Selenium, total	0.1	<0.000500	<0.000500	0.000607	0.00059	<0.000500	<0.000500	<0.000500
Silicon, total		3.45	4.53	5.75	5.57	4.75	4.97	3.60
Silver, total	0.0001	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Sodium, total		938	777	382	353	430	450	456
Strontium, total		3.17	2.81	1.85	1.98	2.17	2.13	2.45
Sulfur, total		66.4	56.5	30.6	24.5	34	38.0	55.6
Tellurium, total		<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200
Thallium, total		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Thorium, total		<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Tin, total		<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Titanium, total		0.0116	<0.00900	0.0173	<0.0200	0.00345	<0.00700	<0.00300
Tungsten, total		0.00121	0.001	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Uranium, total		0.00229	0.00224	0.00161	0.00131	0.00151	0.00197	0.00211
Vanadium, total		<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Zinc, total	0.03	0.13	0.104	0.0724	0.0654	0.0777	0.0982	0.0626
Zirconium, total		<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200

Values highlighted in orange exceed the Ontario PWQO (Provinicial Water Quality Objectives) limit (PWQO, 1994)

	Exceedence Value	WD-2						
2023 Sampling Date		14-Jun	06-Jul	31-Jul	16-Aug	31-Aug	27-Sep	24-Oct
Sampling Event (1-7)		1	2	3	4	5	5	7
Temp		20.2	25.8	21.5	20.6	17.22	17.6	12
DO (%L)		99.8	95.3	77.5	98.7	152.3	68.2	98.1
DO (mg/L)		8.69	7.52	6.7	8.5	13.65	6.36	10.11
SPC (ms/cm)		2.066	2.77	1.61	1.98	2.105	1.288	2.76
C (us/cm)		1085	2806	1498	1814	1788	1105	2073
pH	6.5 - 8.5	7.82	7.54	7.49	7.7	7.13	7.05	7.85
ORP (mV)		91.8	5.6	230	43.6	159	148.6	134.8
ALS pH		8.24	8.21	7.94	8.08	8.07	7.89	8.02
TSS		16.0	<3.0	4.1	33.1	6.4	100	145
TDS		1850	1770	1160	1490	1940	799	2230
Chloride Content		145	130	73.7	97.6	113	56.5	190
Nitrite		0.075	0.087	0.103	0.106	<0.050	<0.050	<0.050
Nitrate		0.663	0.468	0.856	1.21	0.455	0.121	0.601
Ammonia		0.764	0.812	0.69	0.0381	0.863	0.139	1.45
TKN		0.939	1.16	0.918	0.463	1.12	1.94	1.70
Total P		0.0108	0.0121	0.0066	0.0277	0.0136	0.198	0.0903
BOD		<3.0	<3.0	<3.0	<3.0	<3.0	6.0	<3.0
Hardness		1230	1240	795	1050	1250	621	1600
Aluminum, total		0.118	0.0648	0.0716	0.603	0.112	3.22	1.90
Antimony, total		<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	0.00110
Arsenic, total	0.1	0.00193	0.002	0.00133	0.00154	0.00144	0.00289	0.00316
Barium, total		0.0411	0.0416	0.0376	0.0404	0.0367	0.0735	0.0423
Beryllium, total	0.011	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200
Bismuth, total		<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Boron, total		2.05	2.16	1.38	1.89	2.26	1.07	2.82
Cadmium, total	0.0002	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
Calcium, total		364	361	229	305	369	148	462
Cesium, total		0.000109	0.00012	<0.000100	0.000166	<0.000100	0.000517	0.000695
Chromium, total		<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500

Cobalt, total		<0.00100	<0.00100	<0.00100	0.00135	<0.00100	0.00405	0.00416
Copper, total	0.005	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	0.0058	<0.00500
Iron, total	0.3	0.131	<0.100	<0.100	0.849	0.158	4.94	2.8
Lead, total	0.025	<0.000500	<0.000500	<0.000500	0.000591	<0.000500	0.00293	0.00337
Lithium, total		0.214	0.203	0.126	0.156	0.203	0.0865	0.298
Magnesium, total		77.2	81.1	54.3	70.9	78.9	61.0	108
Manganese, total		0.00783	0.00792	0.00358	0.0427	0.00944	0.125	0.0547
Molybdenum, total		0.0116	0.0128	0.0124	0.012	0.00844	0.00624	0.0101
Nickel, total	0.025	<0.00500	<0.00500	<0.00500	0.00634	<0.00500	0.0125	0.0171
Phosphorus, total		<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Potassium, total		13.7	14.6	10.8	12.1	13.7	8.59	17.9
Rubidium, total		0.0111	0.0128	0.00981	0.00966	0.0117	0.00824	0.0196
Selenium, total	0.1	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Silicon, total		2.70	3.48	2.73	4.63	3.92	6.19	7.01
Silver, total	0.0001	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Sodium, total		69.9	72.5	45.2	58.2	69.1	33.4	107
Strontium, total		9.48	9.24	6.31	7.59	8.58	5.11	10.6
Sulfur, total		370	368	224	296	352	155	444
Tellurium, total		<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200
Thallium, total		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Thorium, total		<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Tin, total		<0.00100	0.00115	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Titanium, total		0.00883	<0.00300	<0.00300	0.0142	<0.00300	0.0677	0.0544
Tungsten, total		<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Uranium, total		0.00499	0.0045	0.00318	0.00388	0.00357	0.00225	0.00631
Vanadium, total		<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	0.00679	0.00796
Zinc, total	0.03	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
Zirconium, total		<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	0.00266

Values highlighted in orange exceed the Ontario PWQO (Provinicial Water Quality Objectives) limit (PWQO, 1994)

	Exceedence Value	WD-3						
2023 Sampling Date		14-Jun	06-Jul	31-Jul	16-Aug	31-Aug	27-Sep	24-Oct
Sampling Event (1-7)		1	2	3	4	5	6	7
Temp		15.4	20.1	19.6	19.3	15.9	14	11.3
DO (%L)		56.6	25.2	54.7	53.1	68	49.4	57.2
DO (mg/L)		5.36	2.02	4.91	4.73	6.58	4.88	5.49
SPC (ms/cm)		2.825	1.18	0.312	0.25	0.546	1.224	0.92
C (us/cm)		2308	1069	279.9	195.1	451	985	680
pH	6.5 - 8.5	7.64	7.53	6.83	6.68	7.58	6.79	7.04
ORP (mV)		76.4	-47.3	251.3	75.9	90	182	54.3
ALS pH		8.49	8.51	7.88	7.74	7.94	8.10	8.18
TSS		15.2	57	7.5	31.3	127	184	48.6
TDS		1680	590	204	200	373	669	474
Chloride Content		783	155	21.7	10.6	31.2	189	80.2
Nitrite		<0.050	<0.050	<0.010	<0.010	<0.010	<0.050	<0.010
Nitrate		0.227	<0.100	<0.020	0.021	0.025	<0.100	<0.020
Ammonia		0.458	0.0983	0.0419	0.0247	0.119	2.14	0.114
TKN		1.40	1.6	1.21	1.58	1.79	3.86	1.26
Total P		0.185	0.254	0.32	0.528	0.552	0.510	0.313
BOD		<3.0	<3.0	<3.0	<3.0	<3.0	3.4	<3.0
Hardness		403	350	134	103	271	414	341
Aluminum, total		1.16	1.76	1.16	4.61	3.3	4.85	1.82
Antimony, total		<0.00100	0.00026	<0.00100	<0.00100	0.00019	0.00024	<0.00100
Arsenic, total	0.1	0.00306	0.00391	0.0032	0.00297	0.00543	0.0115	0.00228
Barium, total		0.120	0.075	0.0312	0.0486	0.0536	0.127	0.0672
Beryllium, total	0.011	<0.000200	0.000088	<0.000200	<0.000200	0.000181	0.000262	<0.000200
Bismuth, total		<0.000500	<0.000050	<0.000500	<0.000500	<0.000050	0.000056	<0.000500
Boron, total		<0.100	0.062	<0.100	<0.100	0.033	0.051	<0.100
Cadmium, total	0.0002	0.0000662	0.0000774	<0.0000500	0.0000913	0.0000984	0.000122	<0.0000500
Calcium, total		110	90.6	35.1	25.7	68.9	104	89.3
Cesium, total		0.000116	0.000186	0.00011	0.000367	0.000303	0.000364	0.000191
Chromium, total		<0.00500	0.0026	<0.00500	0.00541	0.00462	0.00721	<0.00500

Cobalt, total		0.00120	0.00141	<0.00100	0.00168	0.0029	0.00453	0.00130
Copper, total	0.005	0.0123	0.00871	0.0107	0.0106	0.00958	0.0149	0.00881
Iron, total	0.3	1.81	2.62	1.21	4.88	7	7.78	2.81
Lead, total	0.025	0.00171	0.00225	0.000928	0.00315	0.00437	0.00724	0.00221
Lithium, total		<0.0100	0.0036	<0.0100	<0.0100	0.0061	0.0113	<0.0100
Magnesium, total		31.1	30.1	11.4	9.41	24.1	37.4	28.7
Manganese, total		0.401	0.2	0.0367	0.0558	0.722	1.19	0.280
Molybdenum, total		0.00716	0.00299	0.00198	0.000799	0.00138	0.00492	0.00151
Nickel, total	0.025	0.0128	0.0243	0.0212	0.0305	0.0341	0.0293	0.0176
Phosphorus, total		<0.500	0.27	<0.500	0.534	0.676	0.528	<0.500
Potassium, total		4.45	4.48	5.58	5.81	4.2	6.09	6.46
Rubidium, total		0.00233	0.00326	0.00288	0.00866	0.00552	0.00583	0.00364
Selenium, total	0.1	0.000513	0.000507	<0.000500	<0.000500	0.000512	0.000698	<0.000500
Silicon, total		5.94	8.29	6.96	11	12.1	18.1	7.94
Silver, total	0.0001	<0.000100	0.000022	<0.000100	<0.000100	0.000028	0.000048	<0.000100
Sodium, total		502	95.1	13.8	4.9	24.9	129	48.1
Strontium, total		4.70	2.14	0.549	0.36	1.15	3.44	2.21
Sulfur, total		54.7	21.7	<5.00	<5.00	1.08	5.46	20.3
Tellurium, total		<0.00200	0.0002	<0.00200	<0.00200	<0.00020	0.00045	<0.00200
Thallium, total		<0.000100	0.000023	<0.000100	<0.000100	0.000037	0.000047	<0.000100
Thorium, total		<0.00100	0.00022	<0.00100	<0.00100	0.00035	0.00058	<0.00100
Tin, total		<0.00100	<0.00010	<0.00100	<0.00100	0.00014	0.00023	<0.00100
Titanium, total		0.0251	0.0369	0.0304	0.0731	0.0572	0.0859	0.0418
Tungsten, total		<0.00100	<0.00010	<0.00100	<0.00100	<0.00010	0.00014	<0.00100
Uranium, total		0.00255	0.00199	0.000419	0.00032	0.00066	0.00186	0.00200
Vanadium, total		<0.00500	0.00463	<0.00500	0.00811	0.0073	0.0105	<0.00500
Zinc, total	0.03	<0.0300	0.0262	<0.0300	<0.0300	0.0286	0.0552	<0.0300
Zirconium, total		<0.00200	0.00097	<0.00200	<0.00200	0.00131	0.00260	<0.00200

Values highlighted in orange exceed the Ontario PWQO (Provinicial Water Quality Objectives) limit (PWQO, 1994)

	Exceedence Value	WD-4						
2023 Sampling Date		14-Jun	06-Jul	31-Jul	16-Aug	31-Aug	27-Sep	24-Oct
Sampling Event (1-7)		1	2	3	4	5	6	7
Temp		17.5	24.7	21	20.5	17.01	16.4	10.8
DO (%L)		96.6	75.9	69.6	79.6	106.2	50.7	128.4
DO (mg/L)		8.86	6.13	6.03	6.99	10.02	4.83	11.54
SPC (ms/cm)		2.037	2.13	1.63	1.81	2.044	1.195	2.62
C (us/cm)		1746	2120	1508	1658	1728	1000	1911
pH	6.5 - 8.5	7.72	0.28	7.33	7.44	7.72	6.48	6.87
ORP (mV)		99.7	370.1	269.9	169.2	119.1	255.6	134.3
ALS pH		8.28	8.34	7.88	7.94	8.06	7.98	8.13
TSS		21.0	25.6	9.7	16.7	33.8	12.8	207
TDS		1730	1640	1110	1300	1770	876	2000
Chloride Content		137	123	81	100	109	58.0	166
Nitrite		0.093	0.101	0.218	0.217	0.051	<0.050	<0.050
Nitrate		0.514	0.574	1.09	0.976	0.474	0.157	0.363
Ammonia		0.731	0.244	0.431	0.215	0.558	0.309	0.330
TKN		1.20	0.83	0.755	0.739	1.04	1.14	1.35
Total P		0.0617	0.0534	0.0297	0.0644	0.043	0.0445	0.182
BOD		<3.0	<3.0	<3.0	<3.0	<3.0	4.5	5.0
Hardness		1180	1160	796	899	1220	625	1400
Aluminum, total		0.615	0.776	0.217	1.58	0.983	0.556	5.06
Antimony, total		<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Arsenic, total	0.1	0.00209	0.0021	0.00117	0.00169	0.00164	0.00188	0.00239
Barium, total		0.0448	0.0666	0.0475	0.0477	0.0602	0.0553	0.0990
Beryllium, total	0.011	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	0.000240
Bismuth, total		<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Boron, total		1.83	1.95	1.41	1.64	2.1	1.12	2.30
Cadmium, total	0.0002	<0.0000500	<0.0000500	0.000116	<0.0000500	<0.0000500	<0.0000500	0.0000787
Calcium, total		354	331	230	262	360	156	407
Cesium, total		<0.000100	0.000104	<0.000100	0.000168	0.000128	<0.000100	0.000546
Chromium, total		<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	0.00635

Cobalt, total		0.00123	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	0.00412
Copper, total	0.005	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	0.00911
Iron, total	0.3	0.688	0.896	0.187	1.43	1.14	0.602	6.1
Lead, total	0.025	0.00061	0.000583	<0.000500	0.00083	0.000718	<0.000500	0.00362
Lithium, total		0.192	0.184	0.124	0.133	0.192	0.0845	0.238
Magnesium, total		71.6	81.6	53.8	59.5	78.8	57.3	94.0
Manganese, total		0.0445	0.0345	0.0122	0.0271	0.0302	0.135	0.271
Molybdenum, total		0.0106	0.0117	0.0129	0.00946	0.00813	0.00597	0.00724
Nickel, total	0.025	0.012	0.00946	<0.00500	0.0224	0.00877	0.00957	0.0355
Phosphorus, total		<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Potassium, total		11.7	13.8	10.8	11.3	13.2	8.39	15.0
Rubidium, total		0.0101	0.0107	0.00984	0.0106	0.0124	0.00454	0.0144
Selenium, total	0.1	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Silicon, total		3.90	4.73	3.07	6.31	5.26	2.30	11.1
Silver, total	0.0001	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Sodium, total		64.8	68.6	47.1	64.9	65.7	36.8	96.1
Strontium, total		8.85	9.19	6.28	6.5	8.36	5.32	10.1
Sulfur, total		344	346	227	249	336	162	392
Tellurium, total		<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200
Thallium, total		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Thorium, total		<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Tin, total		<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Titanium, total		0.0122	0.0165	<0.00500	0.0316	0.019	0.0129	0.0933
Tungsten, total		<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Uranium, total		0.00423	0.00435	0.00358	0.0034	0.00381	0.00259	0.00547
Vanadium, total		<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	0.00906
Zinc, total	0.03	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300	<0.0300
Zirconium, total		<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200

Values highlighted in orange exceed the Ontario PWQO (Provinicial Water Quality Objectives) limit (PWQO, 1994)

	Exceedence Value	WD-5						
2023 Sampling Date		14-Jun	06-Jul	31-Jul	16-Aug	31-Aug	27-Sep	24-Oct
Sampling Event (1-7)		1	2	3	4	5	6	7
Temp		17.5	26.7	19.7	19.9	17.92	16.2	9.4
DO (%L)		118.7	68.2	24.9	49	98.3	26	66.8
DO (mg/L)		10.83	5.32	2.36	4.28	8.66	2.63	7.4
SPC (ms/cm)		1.225	1.27	0.35	0.54	0.804	1.466	1.68
C (us/cm)		1051	1315	312.2	490	694	1220	1182
pH	6.5 - 8.5	7.45	7.72	6.8	7.03	7.52	6.76	6.88
ORP (mV)		132.2	-22.6	211.8	98.2	81.4	232.5	241.1
ALS pH		8.04	8.24	7.77	7.76	7.7	7.88	8.25
TSS		4.8	17.2	29.1	14.3	5.6	14.5	12.6
TDS		853	938	204	338	741	1070	848
Chloride Content		138	83.2	23.2	35.7	54.2	82.5	94.6
Nitrite		0.173	<0.050	<0.010	0.012	<0.050	<0.050	<0.050
Nitrate		2.41	<0.100	0.19	0.14	0.18	0.236	0.361
Ammonia		0.149	0.059	0.0575	0.0362	0.128	0.210	0.144
TKN		1.34	1.11	1.21	1.57	1.91	1.04	1.24
Total P		0.102	0.0914	0.337	0.484	0.588	0.0802	0.137
BOD		<3.0	<3.0	<3.0	<3.0	<3.0	4.9	<3.0
Hardness		558	653	129	196	396	749	522
Aluminum, total		0.568	0.985	1.18	2.46	0.635	0.442	1.02
Antimony, total		0.00033	<0.00100	0.00019	0.0002	0.00023	<0.00100	0.00032
Arsenic, total	0.1	0.00181	0.00295	0.00289	0.0038	0.00312	0.00171	0.00158
Barium, total		0.0473	0.0528	0.0279	0.0363	0.0368	0.0730	0.0484
Beryllium, total	0.011	0.000031	<0.000200	0.000054	0.000106	0.000037	<0.000200	0.000037
Bismuth, total		<0.000050	<0.000500	<0.000050	<0.000050	<0.000050	<0.000500	<0.000050
Boron, total		0.674	1.06	0.042	0.097	0.538	1.26	0.536
Cadmium, total	0.0002	0.0000269	<0.0000500	0.0000428	0.0000715	0.0000482	<0.0000500	0.0000235
Calcium, total		155	164	34.7	53.6	115	203	148
Cesium, total		0.000057	<0.000100	0.00012	0.000226	0.000064	<0.000100	0.000102
Chromium, total		0.00079	<0.00500	0.00169	0.00294	0.00103	<0.00500	0.00134

Cobalt, total		0.00060	<0.00100	0.00068	0.00112	0.00137	<0.00100	0.00052
Copper, total	0.005	0.00372	<0.00500	0.00902	0.0119	0.00398	<0.00500	0.00365
Iron, total	0.3	0.692	1.19	1.43	2.52	2.08	0.594	0.997
Lead, total	0.025	0.000479	0.000868	0.00109	0.00184	0.000691	<0.000500	0.000699
Lithium, total		0.0504	0.0887	0.0019	0.0074	0.0425	0.102	0.0500
Magnesium, total		41.5	59.2	10.2	15.1	26.4	58.8	37.1
Manganese, total		0.0908	0.0665	0.023	0.0282	0.0917	0.122	0.0526
Molybdenum, total		0.00562	0.00551	0.00124	0.0019	0.00275	0.00496	0.00308
Nickel, total	0.025	0.0207	0.0149	0.0274	0.046	0.0235	0.0139	0.0162
Phosphorus, total		0.118	<0.500	0.367	0.514	0.71	<0.500	0.149
Potassium, total		4.84	9.12	5.19	5.79	6.04	9.53	8.92
Rubidium, total		0.00359	0.00632	0.00299	0.00563	0.00489	0.00447	0.00476
Selenium, total	0.1	0.000426	<0.000500	0.000422	0.000581	0.000341	<0.000500	0.000294
Silicon, total		4.16	4.56	5.81	9.1	6.05	2.63	6.27
Silver, total	0.0001	0.00001	<0.000100	0.00003	0.000049	0.000013	<0.000100	0.000014
Sodium, total		72.9	50.7	14.1	25.7	29.5	53.2	56.4
Strontium, total		3.28	5.64	0.453	0.779	2.42	5.54	2.69
Sulfur, total		120	173	4.07	11.1	73.2	192	104
Tellurium, total		0.00045	<0.00200	<0.00020	<0.00020	<0.00020	<0.00200	0.00037
Thallium, total		0.000012	<0.000100	0.000013	0.000027	0.000014	<0.000100	0.000016
Thorium, total		<0.00010	<0.00100	0.00012	0.00015	0.0001	<0.00100	0.00014
Tin, total		<0.00010	<0.00100	<0.00010	0.00011	<0.00010	<0.00100	<0.00010
Titanium, total		0.0185	<0.0300	0.0263	0.0461	0.0136	0.00977	0.0392
Tungsten, total		<0.00010	<0.00100	<0.00010	<0.00010	<0.00010	<0.00100	<0.00010
Uranium, total		0.00207	0.00204	0.000415	0.000811	0.00141	0.00268	0.00217
Vanadium, total		0.00189	<0.00500	0.00327	0.00554	0.00202	<0.00500	0.00257
Zinc, total	0.03	0.0037	<0.0300	0.01	0.0127	0.0048	<0.0300	0.0057
Zirconium, total		<0.00200	<0.00200	0.00063	0.00053	0.00046	<0.00200	0.00076

Values highlighted in orange exceed the Ontario PWQO (Provinicial Water Quality Objectives) limit (PWQO, 1994)

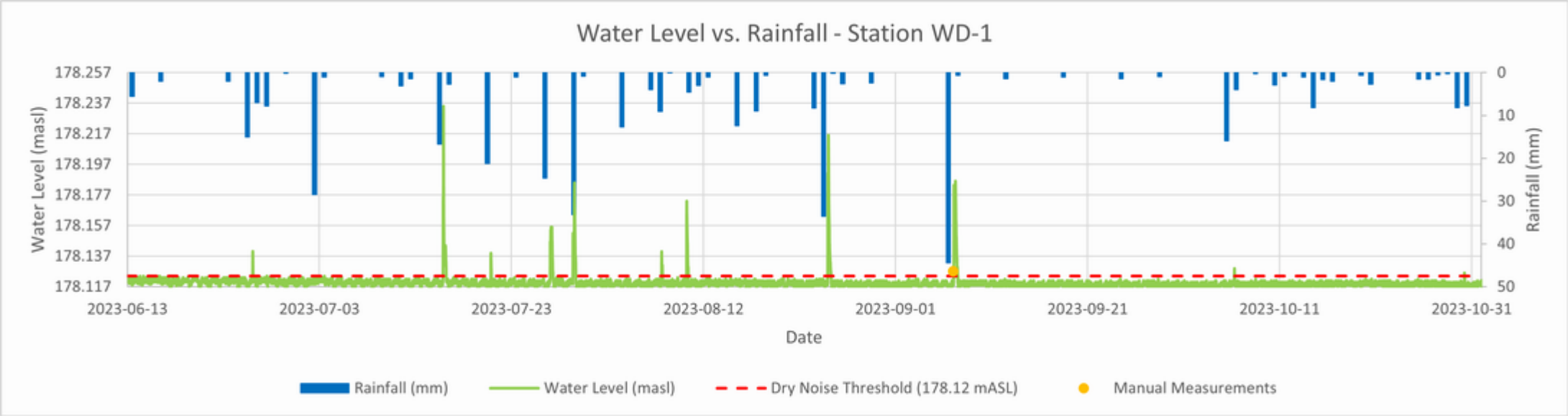
	Exceedence Value	WD-6						
2023 Sampling Date		14-Jun	06-Jul	31-Jul	16-Aug	31-Aug	27-Sep	24-Oct
Sampling Event (1-7)		1	2	3	4	5	6	7
Temp		17.2	26.6	21	20.7	19.98	16.5	12
DO (%L)		85.6	75.4	31	36.2	75.1	0.76	106.3
DO (mg/L)		7.88	5.77	2.62	3.08	6.7	0.6	11.36
SPC (ms/cm)		1.958	1.39	0.63	0.84	0.611	1.83	1.65
C (us/cm)		1667	1437	576	766	553	1525	1273
pH	6.5 - 8.5	7.19	7.12	6.43	6.65	7.25	6.54	6.99
ORP (mV)		121.9	-33.9	293.1	153.3	103.9	165.7	74.9
ALS pH		8.28	8.26	7.68	7.58	7.46	7.53	8.14
TSS		<3.0	5.2	3.9	<3.0	3.6	4.3	9.0
TDS		1240	999	387	540	426	1270	1070
Chloride Content		122	93.3	33.4	41.9	30.2	97.2	120
Nitrite		<0.050	<0.050	0.017	<0.010	<0.010	<0.050	<0.050
Nitrate		<0.100	<0.100	0.091	0.031	0.051	<0.100	0.384
Ammonia		0.0389	0.0803	0.0458	0.0429	0.0495	0.155	0.247
TKN		0.689	1.56	1.06	1.62	1.95	0.952	1.32
Total P		0.0963	0.117	0.302	0.387	0.621	0.114	0.138
BOD		<3.0	<3.0	<3.0	<3.0	<3.0	4.0	<3.0
Hardness		836	664	246	361	284	876	758
Aluminum, total		0.104	0.1	0.618	0.177	0.196	0.116	0.399
Antimony, total		<0.00100	<0.00100	0.00024	0.00027	0.0002	<0.00100	0.00039
Arsenic, total	0.1	0.00159	0.00238	0.0026	0.00373	0.0036	0.00214	0.00176
Barium, total		0.0565	0.0482	0.0368	0.03	0.0287	0.0662	0.0504
Beryllium, total	0.011	<0.000200	<0.000200	0.000025	0.000024	<0.000020	<0.000200	0.000022
Bismuth, total		<0.000500	<0.000500	<0.000050	<0.000050	<0.000050	<0.000500	<0.000050
Boron, total		1.26	1.02	0.309	0.491	0.354	1.70	1.21
Cadmium, total	0.0002	<0.0000500	<0.0000500	0.0000232	0.0000165	0.0000227	<0.0000500	0.0000119
Calcium, total		243	189	69.6	102	78.1	239	220
Cesium, total		<0.000100	<0.000100	0.000056	0.000014	0.000016	<0.000100	0.000041
Chromium, total		<0.00500	<0.00500	0.00103	0.00057	0.00058	<0.00500	0.00077

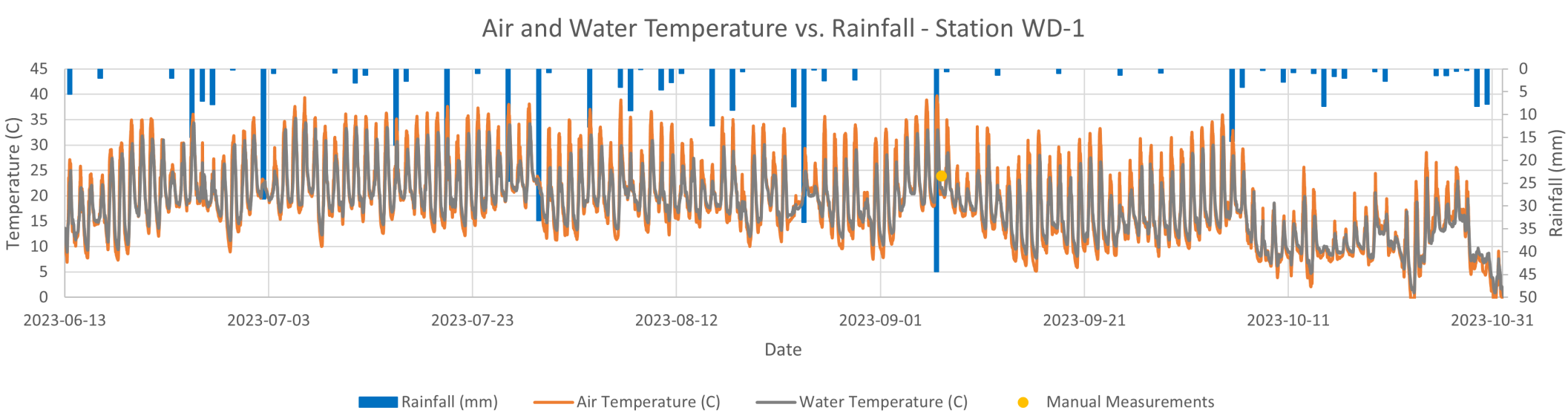
Cobalt, total		0.00172	<0.00100	0.00046	0.0007	0.00055	<0.00100	0.00097
Copper, total	0.005	<0.00500	<0.00500	0.00644	0.00363	0.00349	<0.00500	0.00172
Iron, total	0.3	0.703	0.289	0.852	1.23	1.45	0.976	1.37
Lead, total	0.025	<0.000500	<0.000500	0.00046	0.00027	0.00032	<0.000500	0.000259
Lithium, total		0.114	0.0861	0.022	0.0328	0.0237	0.134	0.0967
Magnesium, total		55.6	46.6	17.6	25.8	21.6	67.9	50.8
Manganese, total		0.235	0.0483	0.0259	0.0682	0.0586	0.208	0.143
Molybdenum, total		0.00390	0.0064	0.00366	0.00326	0.0023	0.00608	0.00533
Nickel, total	0.025	0.0275	0.0255	0.0288	0.0443	0.0393	0.0186	0.0172
Phosphorus, total		<0.500	<0.500	0.33	0.451	0.647	<0.500	0.143
Potassium, total		6.64	6.47	6.05	5.67	5.23	11.6	14.1
Rubidium, total		0.00408	0.00438	0.00324	0.00371	0.0031	0.00670	0.00660
Selenium, total	0.1	<0.000500	<0.000500	0.00039	0.000405	0.000415	<0.000500	0.000234
Silicon, total		3.13	1.96	4.75	5.11	4.64	2.65	4.64
Silver, total	0.0001	<0.000100	<0.000100	0.000022	0.000011	0.000011	<0.000100	<0.000010
Sodium, total		71.5	53.1	19.9	28.2	19.9	64.1	70.2
Strontium, total		5.44	4.65	1.56	2.34	1.83	6.53	4.46
Sulfur, total		219	168	48.6	62.1	40.9	241	187
Tellurium, total		<0.00200	<0.00200	<0.00020	<0.00020	<0.00020	<0.00200	0.00055
Thallium, total		<0.000100	<0.000100	<0.000010	<0.000010	<0.000010	<0.000100	<0.000010
Thorium, total		<0.00100	<0.00100	<0.00010	<0.00010	<0.00010	<0.00100	<0.00010
Tin, total		<0.00100	<0.00100	<0.00010	<0.00010	<0.00010	<0.00100	<0.00010
Titanium, total		0.00383	0.00351	0.0166	0.00719	0.00629	0.00375	0.0148
Tungsten, total		<0.00100	<0.00100	<0.00010	<0.00010	<0.00010	<0.00100	<0.00010
Uranium, total		0.00176	0.00202	0.000613	0.00112	0.000924	0.00209	0.00311
Vanadium, total		<0.00500	<0.00500	0.00197	0.00153	0.00135	<0.00500	0.00173
Zinc, total	0.03	<0.0300	<0.0300	0.0046	<0.0030	<0.0030	<0.0300	<0.0030
Zirconium, total		<0.00200	<0.00200	0.00056	0.00047	0.00052	<0.00200	0.00044

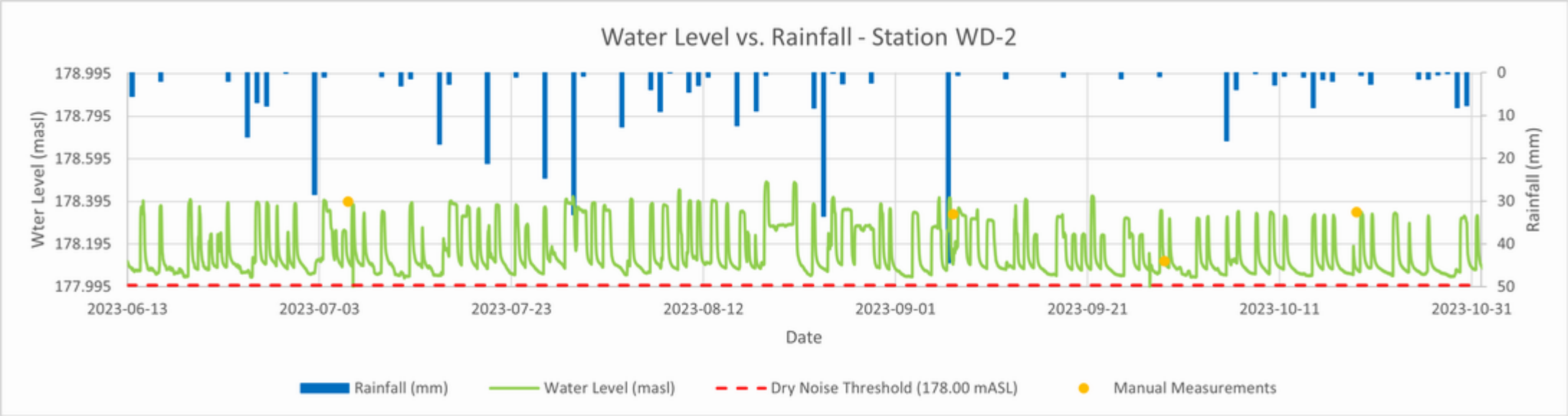
Values highlighted in orange exceed the Ontario PWQO (Provinicial Water Quality Objectives) limit (PWQO, 1994)

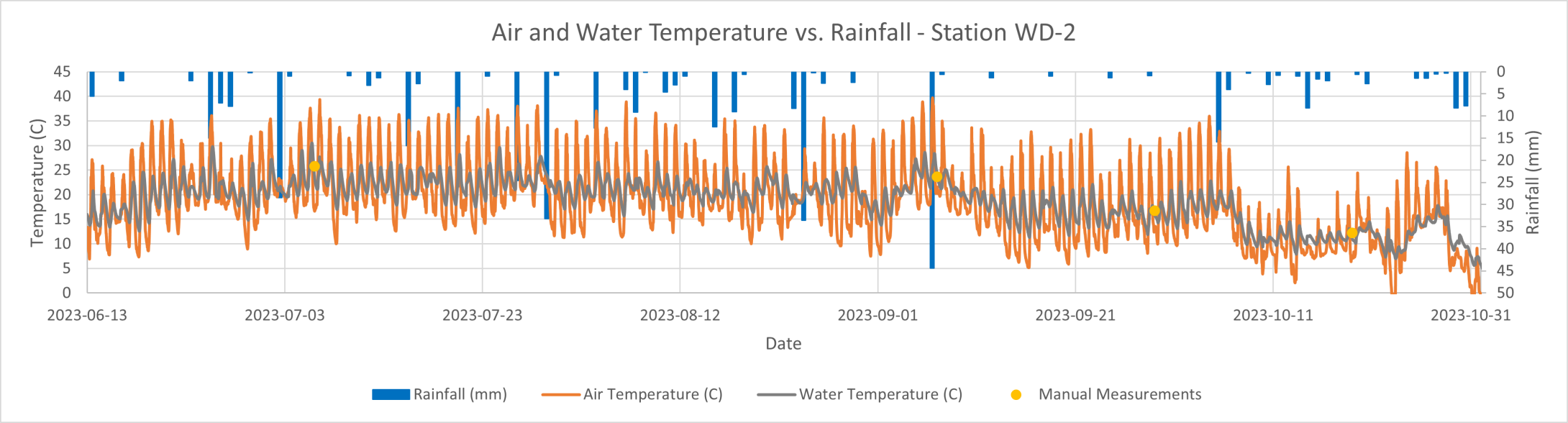
Appendix I

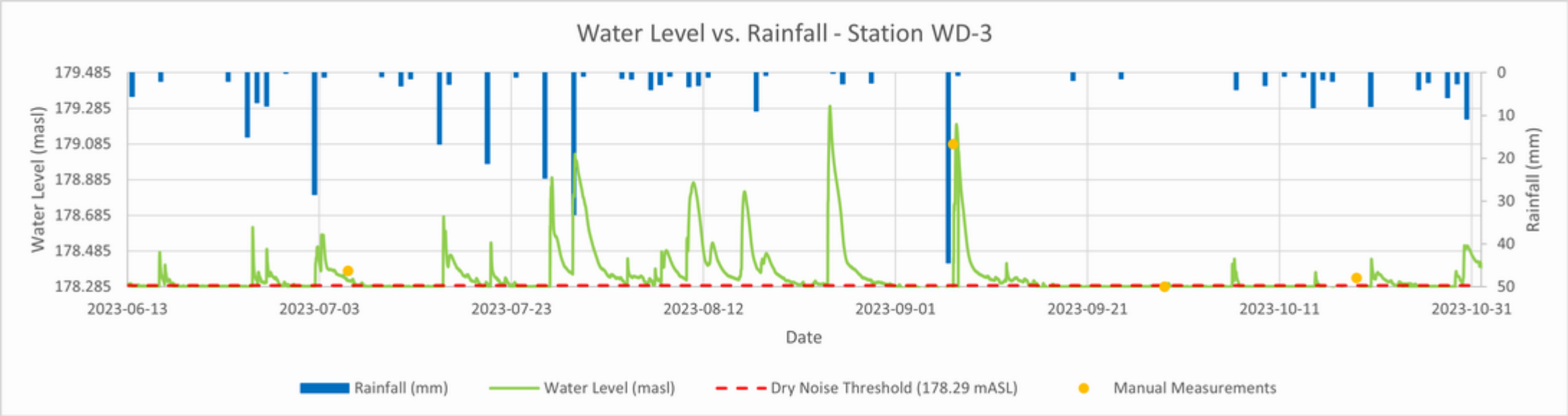
Water Level and Temperature

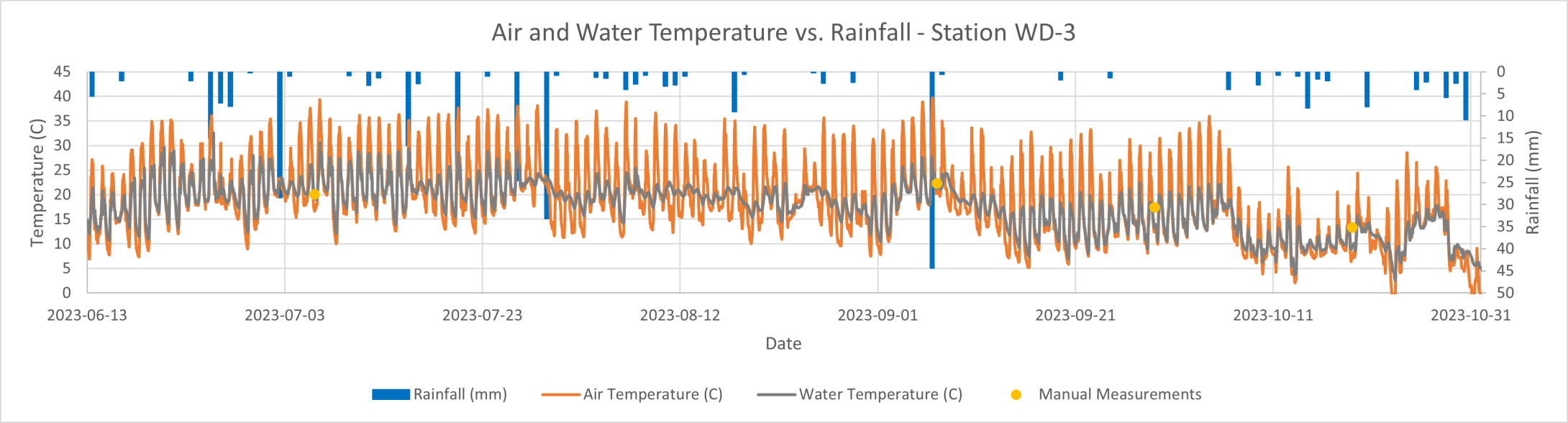

Water Level vs. Rainfall - Station WD-1
Water Level (masl)
178.257
178.237
178.217
178.197
178.177
178.157
178.137
178.117
Rainfall (mm)
0
10
20
30
40
50
2023-06-13
2023-07-03
2023-07-23
2023-08-12
2023-09-01
2023-09-21
2023-10-11
2023-10-31
Date
Rainfall (mm)
Water Level (masl)
Dry Noise Threshold (178.12 mASL)
Manual Measurements

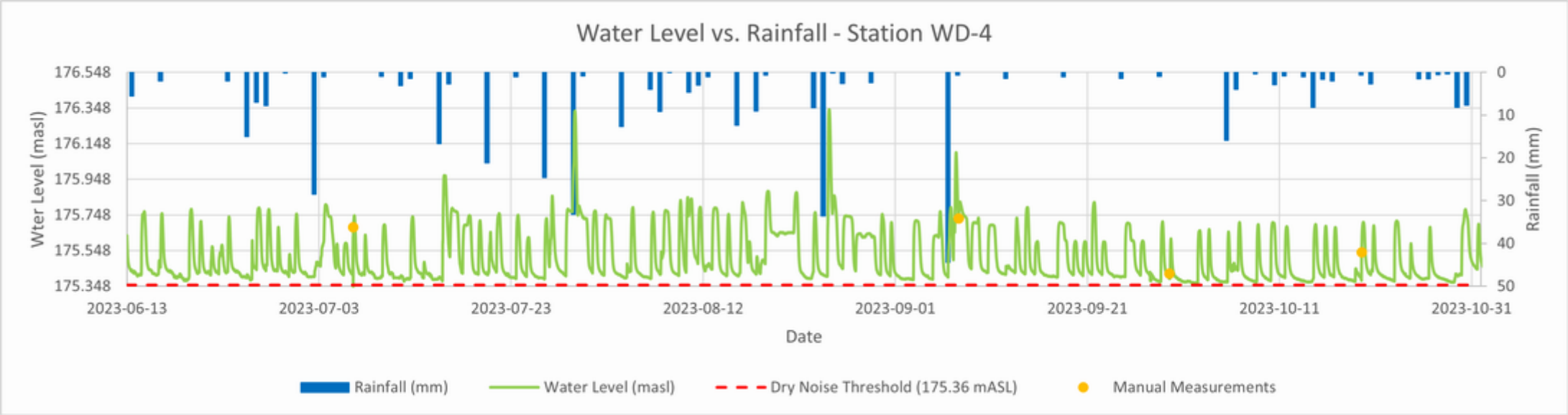

Air and Water Temperature vs. Rainfall - Station WD-1
Temperature (C)
Rainfall (mm)
45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
30
35
40
45
50
2023-06-13
2023-07-03
2023-07-23
2023-08-12
2023-09-01
2023-09-21
2023-10-11
2023-10-31
Date
Rainfall (mm)
Air Temperature (C)
Water Temperature (C)
Manual Measurements

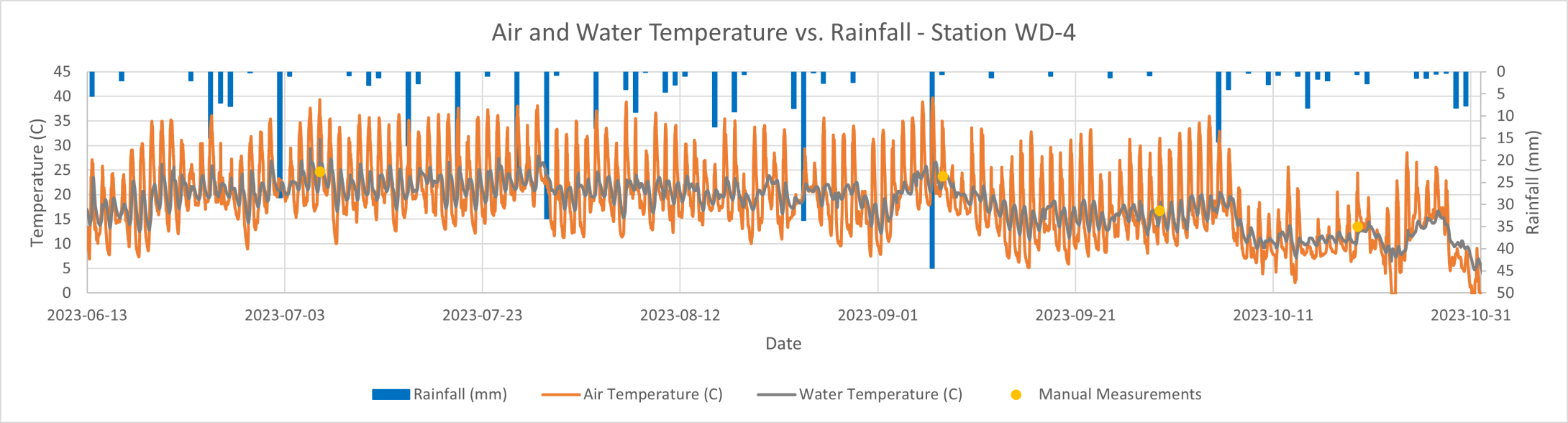

Water Level vs. Rainfall - Station WD-2
Wter Level (masl)
178.995
178.795
178.595
178.395
178.195
177.995
Rainfall (mm)
0
10
20
30
40
50
2023-06-13
2023-07-03
2023-07-23
2023-08-12
2023-09-01
2023-09-21
2023-10-11
2023-10-31
Date
Rainfall (mm)
Water Level (masl)
Dry Noise Threshold (178.00 mASL)
Manual Measurements

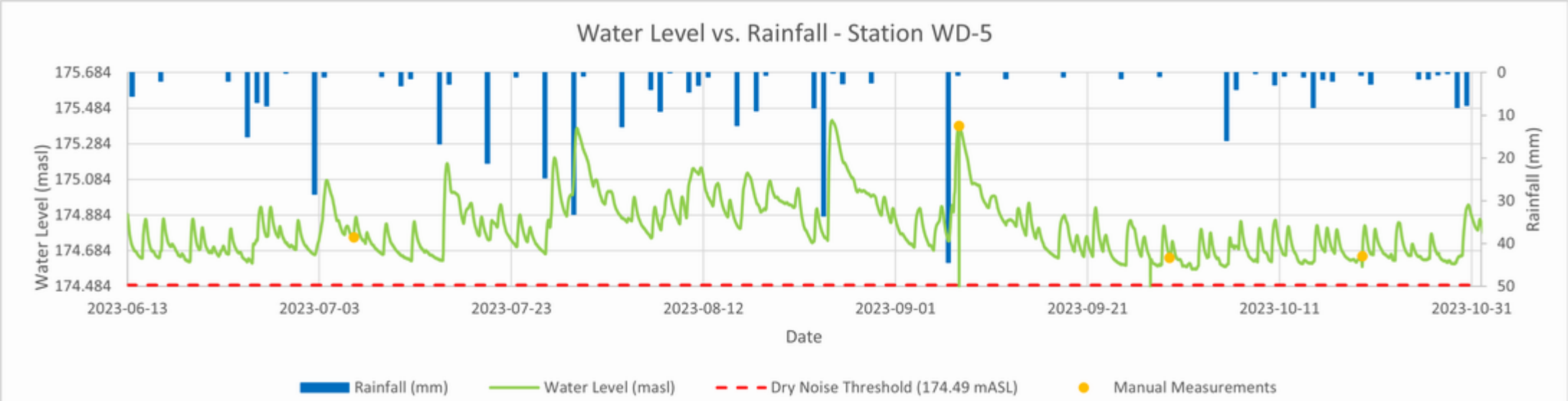

Air and Water Temperature vs. Rainfall - Station WD-2
Temperature (C)
Rainfall (mm)
45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
30
35
40
45
50
2023-06-13
2023-07-03
2023-07-23
2023-08-12
2023-09-01
2023-09-21
2023-10-11
2023-10-31
Date
Rainfall (mm)
Air Temperature (C)
Water Temperature (C)
Manual Measurements

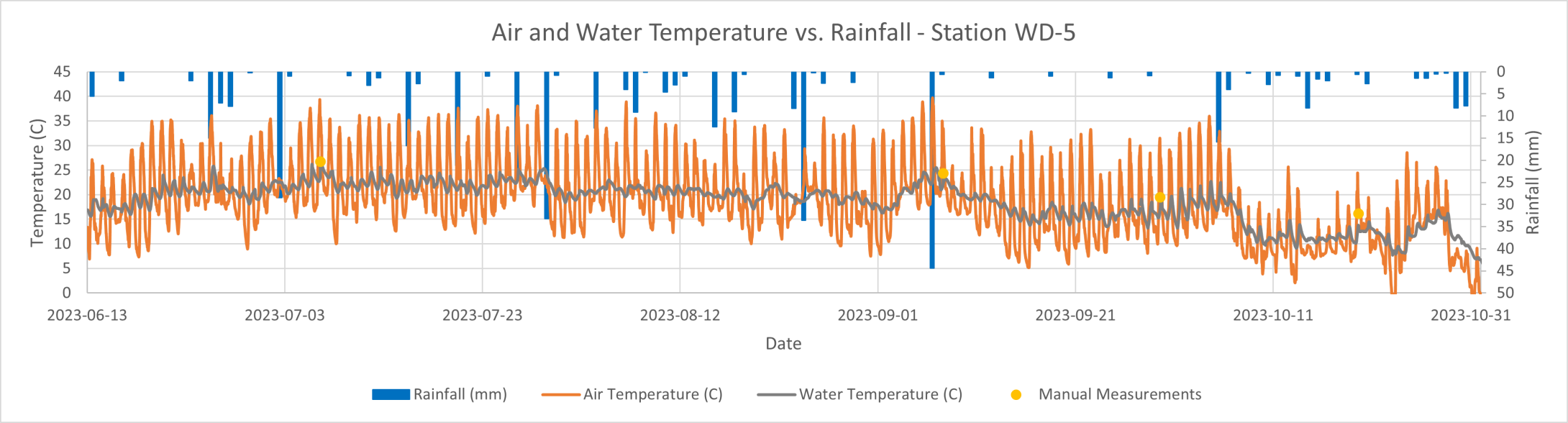

Water Level vs. Rainfall - Station WD-3
Water Level (masl)
179.485
179.285
179.085
178.885
178.685
178.485
178.285
Rainfall (mm)
0
10
20
30
40
50
2023-06-13
2023-07-03
2023-07-23
2023-08-12
2023-09-01
2023-09-21
2023-10-11
2023-10-31
Date
Rainfall (mm)
Water Level (masl)
Dry Noise Threshold (178.29 mASL)
Manual Measurements

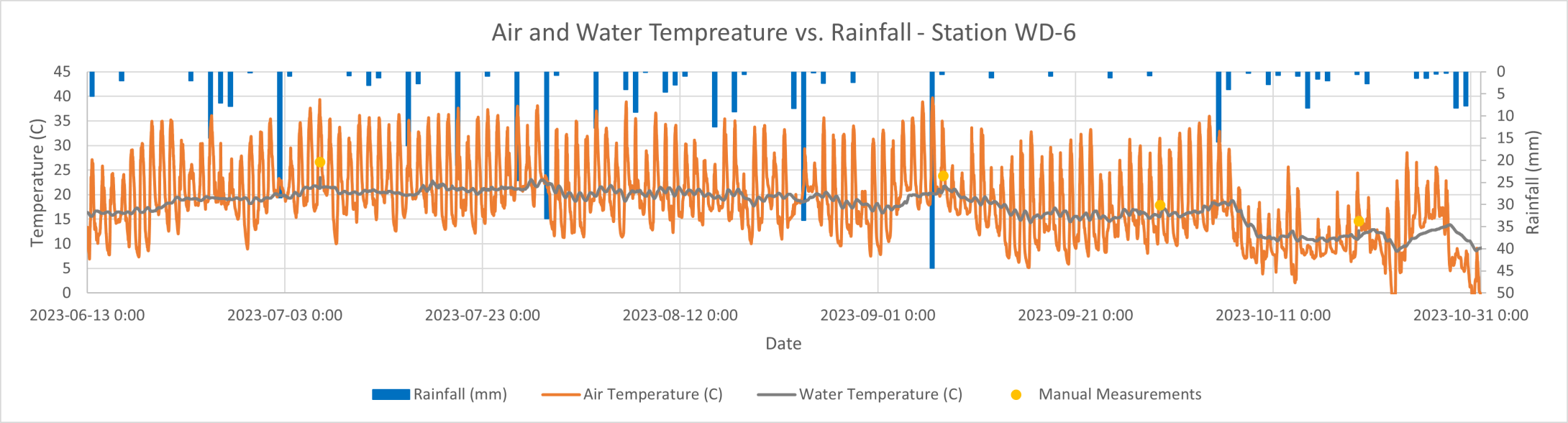

Air and Water Temperature vs. Rainfall - Station WD-3
Temperature (C)
Rainfall (mm)
45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
30
35
40
45
50
2023-06-13
2023-07-03
2023-07-23
2023-08-12
2023-09-01
2023-09-21
2023-10-11
2023-10-31
Date
Rainfall (mm)
Air Temperature (C)
Water Temperature (C)
Manual Measurements

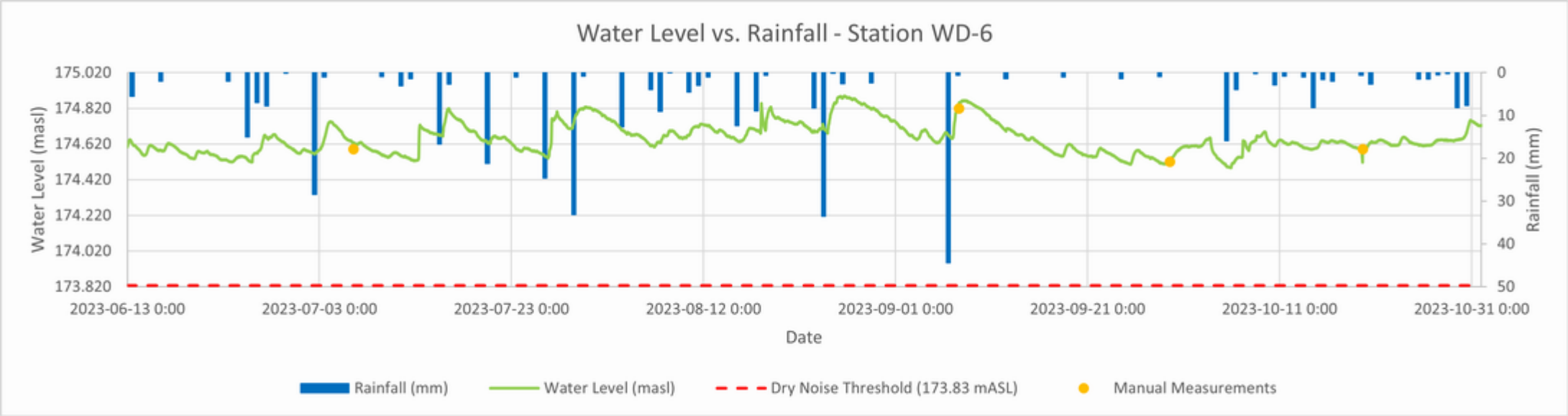

Water Level vs. Rainfall - Station WD-4
Wter Level (masl)
176.548
176.348
176.148
175.948
175.748
175.548
175.348
Rainfall (mm)
0
10
20
30
40
50
2023-06-13
2023-07-03
2023-07-23
2023-08-12
2023-09-01
2023-09-21
2023-10-11
2023-10-31
Date
Rainfall (mm)
Water Level (masl)
Dry Noise Threshold (175.36 mASL)
Manual Measurements


Air and Water Temperature vs. Rainfall - Station WD-4
Temperature (C)
Rainfall (mm)
45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
30
35
40
45
50
2023-06-13
2023-07-03
2023-07-23
2023-08-12
2023-09-01
2023-09-21
2023-10-11
2023-10-31
Date
Rainfall (mm)
Air Temperature (C)
Water Temperature (C)
Manual Measurements


Water Level vs. Rainfall - Station WD-5
175.684
175.484
175.284
175.084
174.884
174.684
174.484
Water Level (masl)
0
10
20
30
40
50
Rainfall (mm)
2023-06-13
2023-07-03
2023-07-23
2023-08-12
2023-09-01
2023-09-21
2023-10-11
2023-10-31
Date
Rainfall (mm)
Water Level (masl)
Dry Noise Threshold (174.49 mASL)
Manual Measurements


Air and Water Temperature vs. Rainfall - Station WD-5
Temperature (C)
Rainfall (mm)
45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
30
35
40
45
50
2023-06-13
2023-07-03
2023-07-23
2023-08-12
2023-09-01
2023-09-21
2023-10-11
2023-10-31
Date
Rainfall (mm)
Air Temperature (C)
Water Temperature (C)
Manual Measurements


Air and Water Tempreature vs. Rainfall - Station WD-6
Temperature (C)
Rainfall (mm)
45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
30
35
40
45
50
2023-06-13 0:00
2023-07-03 0:00
2023-07-23 0:00
2023-08-12 0:00
2023-09-01 0:00
2023-09-21 0:00
2023-10-11 0:00
2023-10-31 0:00
Date
Rainfall (mm)
Air Temperature (C)
Water Temperature (C)
Manual Measurements


Water Level vs. Rainfall - Station WD-6
Water Level (masl)
175.020
174.820
174.620
174.420
174.220
174.020
173.820
Rainfall (mm)
0
10
20
30
40
50
2023-06-13 0:00
2023-07-03 0:00
2023-07-23 0:00
2023-08-12 0:00
2023-09-01 0:00
2023-09-21 0:00
2023-10-11 0:00
2023-10-31 0:00
Date
Rainfall (mm)
Water Level (masl)
Dry Noise Threshold (173.83 mASL)
Manual Measurements

Appendix J

Benthics

A1. Fall Season

WD-2

Simpson Diversity Index

SS1

Organism	Common Name	# collected	pi	pi^2
Oligochaeta	Aquatic earthworms	6	0.060606061	0.003673095
Nemata	Roundworm			
Turbellaria	Flatworms	10	0.101010101	0.010203041
Isopoda	Sow Bugs	74	0.747474747	0.558718498
Pelecypoda	Clams	1	0.01010101	0.00010203
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites	1	0.01010101	0.00010203
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds	7	0.070707071	0.00499949
Hirundinea	Leeches			
Decapoda	Crayfish			

Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**99**	**1**	**0.577798184**
	Richness	**6**		
	Simpson Diversity Index (1-D)	**0.422201816**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.730708105**		

SS2

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	5	0.03649635	0.001331984
Nemata	Roundworm			
Turbellaria	Flatworms	37	0.270072993	0.072939421
Isopoda	Sow Bugs	89	0.649635036	0.422025681
Pelecypoda	Clams			
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds	6	0.04379562	0.001918056

Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**137**	**1**	**0.498215142**
	Richness	**4**		
	Simpson Diversity Index (1-D)	**0.501784858**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**2.007165009**		**[D = ∑(pi)^2]**

SS3

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	3	0.027522936	0.000757512
Nemata	Roundworm			
Turbellaria	Flatworms	13	0.119266055	0.014224392
Isopoda	Sow Bugs	74	0.678899083	0.460903964
Pelecypoda	Clams	7	0.064220183	0.004124232
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			

Chironomidae	Midges			
Amphipoda	Scuds	9	0.082568807	0.006817608
Hirundinea	Leeches	3	0.027522936	0.000757512
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**109**	**1**	**0.48758522**
	Richness	**6**		
	Simpson Diversity Index (1-D)	**0.51241478**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**2.050923528**		**[D = ∑(pi)^2]**

Pooled

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	14	0.04057971	0.001646713
Nemata	Roundworm			
Turbellaria	Flatworms	60	0.173913043	0.030245747
Isopoda	Sow Bugs	237	0.686956522	0.471909263
Pelecypoda	Clams	8	0.023188406	0.000537702
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites	1	0.002898551	8.4016E-06

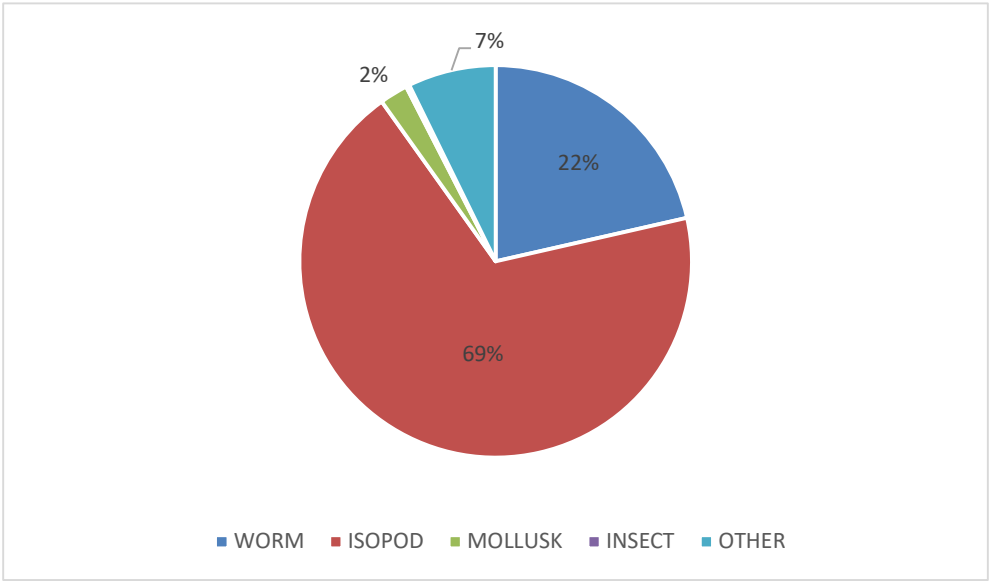
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds	22	0.063768116	0.004066373
Hirundinea	Leeches	3	0.008695652	7.56144E-05
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**345**	**1**	**0.508489813**
	Richness	**7**		
	Simpson Diversity Index (1-D)	**0.491510187**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.966607736**		**[D = ∑(pi)^2]**

Abundance and Percent of Organisms in each taxa

Abundance

Family /Order	SS1	SS2	SS3	Reach	Percent in Reach
WORM	**16**	**42**	**16**	**74**	**21.45**
Oligochaeta (Qquatic worms)	6	5	3	14	4.06
Nemata (Nematode)				0	0.00
Tubullaria (Flatworm)	10	37	13	60	17.39
ISOPOD	**74**	**89**	**74**	**237**	**68.70**
Sow Bugs	74	89	74	237	68.70
MOLLUSK	**1**	**0**	**7**	**8**	**2.32**
Pelecypoda (Clams)	1		7	8	2.32
Gastropoda (Snails, limpets)				0	0.00
INSECT	**1**	**0**	**0**	**1**	**0.29**
Misc. True Flies				0	0.00
Coleptera (Beetle)				0	0.00
Hemiptera (True Bugs)				0	0.00
Ephemeroptera (Mayfly)				0	0.00
Zygoptera (Damselfly)				0	0.00
Anisoptera (Dragonfly)				0	0.00
Plecoptera (Stonefly)				0	0.00
Megaloptera				0	0.00
Tipulidae				0	0.00
Tipulidae (Cranefly)				0	0.00
Culicidae (Mosquito)				0	0.00
Lepidoptera (Aquatic Moths)				0	0.00
Hydrachnidia (Mites)	1			1	0.29
Trichoptera (Caddisfly)				0	0.00
Tabanidae (Horsefly)				0	0.00
OTHER	**7**	**6**	**12**	**25**	**7.25**
Chironomidae (midges)				0	0.00

Amphipoda (Scuds)	7	6	9	22	6.38
Hirudinea (Leeches)			3	3	0.87
Decapoda (Crayfish)				0	0.00
Colelenterata (Hydra)				0	0.00
Ceratopogonidae (No-see-um)				0	0.00
TOTAL ABUNDANCE	**99**	**137**	**109**	**345**	



EPT Index

SS	# of Ephermoptera	# of Plecoptera	# of Trichoptera	EPT Index
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
Overall	0	0	0	**0**

HBI										
Organism	Common Name	Average OBBN Family Tolerance* **	SS1 species abundance	SS2 species abundance	SS3 species abundance	OVERALL species abundance	SS1 - Species abundance x tolerance	SS2 - Species abundance x tolerance	SS3 - Species abundance x tolerance	OVERALL - Species abundance x tolerance
Oligochaeta	Aquatic earthworms	10	6	5	3	14	60	50	30	140
Nemata	Roundworm	6	0	0	0	0	0	0	0	0
Turbellaria	Flatworms	4.5	10	37	13	60	45	166.5	58.5	270
Isopoda	Sow Bugs	8	74	89	74	237	592	712	592	1896
Pelecypoda	Clams	6	1	0	7	8	6	0	42	48
Gastropoda	Snails, limpets	6.75	0	0	0	0	0	0	0	0
Diptera	Misc True Flies	6.5	0	0	0	0	0	0	0	0
Coleptera	Beetles	4.85714286	0	0	0	0	0	0	0	0
Hemiptera	True Bugs	5	0	0	0	0	0	0	0	0
Ephemeroptera	Mayflies	3.72727273	0	0	0	0	0	0	0	0
Zygoptera	Damselflies	7	0	0	0	0	0	0	0	0
Anisoptera	Dragonflies	4.75	0	0	0	0	0	0	0	0
Plecoptera	Stoneflies	2	0	0	0	0	0	0	0	0
Megaloptera	Fishflies/Alderflies	4	0	0	0	0	0	0	0	0
Tipulidae	Craneflies	4	0	0	0	0	0	0	0	0
Simuliidae	Blackflies	6	0	0	0	0	0	0	0	0
Culicidae	Mosquitos	8	0	0	0	0	0	0	0	0
Lepidoptera	Aquatic Moths	5	0	0	0	0	0	0	0	0

Hydrachnidia	Mites	5	1	0	0	1	5	0	0	5
Trichoptera	Caddisflies	5.94117647	0	0	0	0	0	0	0	0
Tabanidae	Horseflies	5	0	0	0	0	0	0	0	0
Chironomidae	Midges	6	0	0	0	0	0	0	0	0
Amphipoda	Scuds	6.75	7	6	9	22	47.25	40.5	60.75	148.5
Hirundinea	Leeches	8	0	0	3	3	0	0	24	24
Decapoda	Crayfish	6	0	0	0	0	0	0	0	0
Colelenterata	Hydra	6	0	0	0	0	0	0	0	0
Ceratopogonidae	No-see-ums	6	0	0	0	0	0	0	0	0
Total		-	**99**	**137**	**109**	**345**	**755.25**	**969**	**807.25**	**2531.5**

SS	**HDI**	
1	7.62878788	
2	7.0729927	
3	7.4059633	
Overall	**7.33768116**	Very Poor

HBI Interpretation *:**	
0 -3.75: Excellent	Organic pollution unlkely
3.76-4.25 = Very Good	Possible slight organic pollution
4.25-5: Good	Some organic pollution probable
5.01-5.75: Fair	Fairly substantial polluiton likely
5.76-6.5: Fairly Poor	Substantial pollution likely
6.51-7.25: Poor	Very substantial polluiton likely
7.26-10: Very Poor	Severe organc pollution likely

References

* Toronto and Region Conservation Authority. 2011. Regional Watershed Monitoring Program: Benthic Macroinvertebate Summary 2001-2008. https://trcaca.s3.ca-central-

** The Watershed Institute. N.d. Pollution Tolerance Values of Aquatic Macroinvertebrate Families.

*** McGauley et al. 2018. Coarse taxonomy (tolerance value averaging) biases Hilsenhoff's family level biotic index. Environ Monit Assess. 190:446

WD-4

Simpson Diversity Index

SS1

Organism	Common Name	# collected	pi	pi^2
Oligochaeta	Aquatic earthworms	12	0.101694915	0.010341856
Nemata	Roundworm			
Turbellaria	Flatworms	19	0.161016949	0.025926458
Isopoda	Sow Bugs	46	0.389830508	0.151967825
Pelecypoda	Clams	26	0.220338983	0.048549267
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds	15	0.127118644	0.01615915
Hirundinea	Leeches			
Decapoda	Crayfish			

Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**118**	**1**	**0.252944556**
	Richness	**5**		
	Simpson Diversity Index (1-D)	**0.747055444**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**3.953435548**		**[D = ∑(pi)^2]**

SS2

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	5	0.039370079	0.001550003
Nemata	Roundworm			
Turbellaria	Flatworms	28	0.220472441	0.048608097
Isopoda	Sow Bugs	40	0.31496063	0.099200198
Pelecypoda	Clams	34	0.267716535	0.071672143
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds	20	0.157480315	0.02480005

Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**127**	**1**	**0.245830492**
	Richness	**5**		
	Simpson Diversity Index (1-D)	**0.754169508**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**4.067843632**		**[D = ∑(pi)^2]**

SS3

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	6	0.048	0.002304
Nemata	Roundworm			
Turbellaria	Flatworms	15	0.12	0.0144
Isopoda	Sow Bugs	50	0.4	0.16
Pelecypoda	Clams	30	0.24	0.0576
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			

Chironomidae	Midges			
Amphipoda	Scuds	24	0.192	0.036864
Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**125**	**1**	**0.271168**
	Richness	**5**		
	Simpson Diversity Index (1-D)	**0.728832**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**3.687750767**		**[D = ∑(pi)^2]**

Pooled

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	23	0.060526316	0.003663435
Nemata	Roundworm			
Turbellaria	Flatworms	62	0.163157895	0.026620499
Isopoda	Sow Bugs	136	0.357894737	0.128088643
Pelecypoda	Clams	90	0.236842105	0.056094183
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			

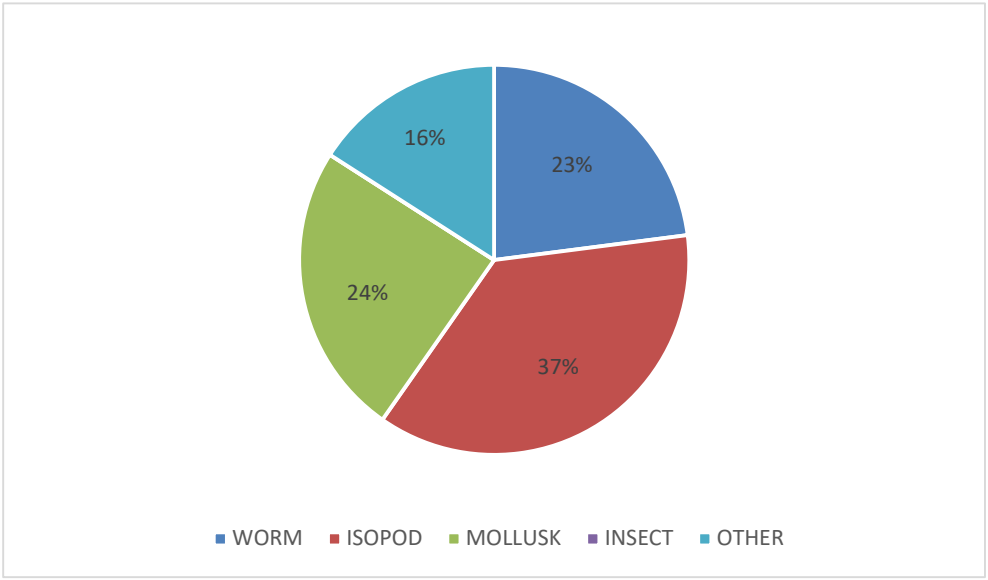
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds	69	0.181578947	0.032970914
Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**380**	**1**	**0.247437673**
	Richness	**5**		
	Simpson Diversity Index (1-D)	**0.752562327**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**4.041421774**		**[D = ∑(pi)^2]**

Abundance and Percent of Organisms in each taxa

Abundance

Family /Order	SS1	SS2	SS3	Reach	Percent in Reach
WORM	**31**	**33**	**21**	**85**	**30.36**
Oligochaeta (Qquatic worms)	12	5	6	23	8.21
Nemata (Nematode)				0	0.00
Tubullaria (Flatworm)	19	28	15	62	22.14
ISOPOD	**46**	**40**	**50**	**136**	**48.57**
Sow Bugs	46	40	50	136	48.57
MOLLUSK	**26**	**34**	**30**	**90**	**32.14**
Pelecypoda (Clams)	26	34	30	90	32.14
Gastropoda (Snails, limpets)				0	0.00
INSECT	**0**	**0**	**0**	**0**	**0.00**
Misc. True Flies				0	0.00
Coleptera (Beetle)				0	0.00
Hemiptera (True Bugs)				0	0.00
Ephemeroptera (Mayfly)				0	0.00
Zygoptera (Damselfly)				0	0.00
Anisoptera (Dragonfly)				0	0.00
Plecoptera (Stonefly)				0	0.00
Megaloptera				0	0.00
Tipulidae				0	0.00
Tipulidae (Cranefly)				0	0.00
Culicidae (Mosquito)				0	0.00
Lepidoptera (Aquatic Moths)				0	0.00
Hydrachnidia (Mites)				0	0.00
Trichoptera (Caddisfly)				0	0.00
Tabanidae (Horsefly)				0	0.00
OTHER	**15**	**20**	**24**	**59**	**21.07**
Chironomidae (midges)				0	0.00

Amphipoda (Scuds)	15	20	24	59	21.07
Hirudinea (Leeches)				0	0.00
Decapoda (Crayfish)				0	0.00
Colelenterata (Hydra)				0	0.00
Ceratopogonidae (No-see-um)				0	0.00
TOTAL ABUNDANCE	**118**	**127**	**125**	**280**	



EPT Index

SS	# of Ephermoptera	# of Plecoptera	# of Trichoptera	EPT Index
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
Overall	0	0	0	**0**

HBI										
Organism	Common Name	Average OBBN Family Tolerance* **	SS1 species abundance	SS2 species abundance	SS3 species abundance	OVERALL species abundance	SS1 - Species abundance x tolerance	SS2 - Species abundance x tolerance	SS3 - Species abundance x tolerance	OVERALL - Species abundance x tolerance
Oligochaeta	Aquatic earthworms	10	12	5	6	23	120	50	60	230
Nemata	Roundworm	6	0	0	0	0	0	0	0	0
Turbellaria	Flatworms	4.5	19	28	15	62	85.5	126	67.5	279
Isopoda	Sow Bugs	8	46	40	50	136	368	320	400	1088
Pelecypoda	Clams	6	26	34	30	90	156	204	180	540
Gastropoda	Snails, limpets	6.75	0	0	0	0	0	0	0	0
Diptera	Misc True Flies	6.5	0	0	0	0	0	0	0	0
Coleptera	Beetles	4.85714286	0	0	0	0	0	0	0	0
Hemiptera	True Bugs	5	0	0	0	0	0	0	0	0
Ephemeroptera	Mayflies	3.72727273	0	0	0	0	0	0	0	0
Zygoptera	Damselflies	7	0	0	0	0	0	0	0	0
Anisoptera	Dragonflies	4.75	0	0	0	0	0	0	0	0
Plecoptera	Stoneflies	2	0	0	0	0	0	0	0	0
Megaloptera	Fishflies/Alderflies	4	0	0	0	0	0	0	0	0
Tipulidae	Craneflies	4	0	0	0	0	0	0	0	0
Simuliidae	Blackflies	6	0	0	0	0	0	0	0	0
Culicidae	Mosquitos	8	0	0	0	0	0	0	0	0
Lepidoptera	Aquatic Moths	5	0	0	0	0	0	0	0	0

Hydrachnidia	Mites	5	0	0	0	0	0	0	0	0
Trichoptera	Caddisflies	5.94117647	0	0	0	0	0	0	0	0
Tabanidae	Horseflies	5	0	0	0	0	0	0	0	0
Chironomidae	Midges	6	0	0	0	0	0	0	0	0
Amphipoda	Scuds	6.75	15	20	24	69	101.25	135	162	465.75
Hirundinea	Leeches	8	0	0	0	0	0	0	0	0
Decapoda	Crayfish	6	0	0	0	0	0	0	0	0
Colelenterata	Hydra	6	0	0	0	0	0	0	0	0
Ceratopogonidae	No-see-ums	6	0	0	0	0	0	0	0	0
Total		-	**118**	**127**	**125**	**380**	**830.75**	**835**	**869.5**	**2602.75**

SS	**HDI**	
1	7.04025424	
2	6.57480315	
3	6.956	
Overall	**6.84934211**	Very Poor

HBI Interpretation *:**	
0 -3.75: Excellent	Organic pollution unlkely
3.76-4.25 = Very Good	Possible slight organic pollution
4.25-5: Good	Some organic pollution probable
5.01-5.75: Fair	Fairly substantial polluiton likely
5.76-6.5: Fairly Poor	Substantial pollution likely
6.51-7.25: Poor	Very substantial polluiton likely
7.26-10: Very Poor	Severe organc pollution likely

References

* Toronto and Region Conservation Authority. 2011. Regional Watershed Monitoring Program: Benthic Macroinvertebate Summary 2001-2008. https://trcaca.s3.ca-central-

** The Watershed Institute. N.d. Pollution Tolerance Values of Aquatic Macroinvertebrate Families.

*** McGauley et al. 2018. Coarse taxonomy (tolerance value averaging) biases Hilsenhoff's family level biotic index. Environ Monit Assess. 190:446

WD-5

Simpson Diversity Index

SS1

Organism	Common Name	# collected	pi	pi^2
Oligochaeta	Aquatic earthworms	5	0.046728972	0.002183597
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs	2	0.018691589	0.000349375
Pelecypoda	Clams			
Gastropoda	Snails, limpets	7	0.065420561	0.00427985
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies	24	0.224299065	0.050310071
Zygoptera	Damselflies	23	0.214953271	0.046204909
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges	2	0.018691589	0.000349375
Amphipoda	Scuds	44	0.411214953	0.169097738
Hirundinea	Leeches			
Decapoda	Crayfish			

Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**107**	**1**	**0.272774915**
	Richness	**7**		
	Simpson Diversity Index (1-D)	**0.727225085**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**3.666026257**		**[D = ∑(pi)^2]**

SS2

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	2	0.02	0.0004
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs			
Pelecypoda	Clams			
Gastropoda	Snails, limpets	8	0.08	0.0064
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies	14	0.14	0.0196
Zygoptera	Damselflies	31	0.31	0.0961
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges	2	0.02	0.0004
Amphipoda	Scuds	43	0.43	0.1849

Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**100**	**1**	**0.3078**
	Richness	**6**		
	Simpson Diversity Index (1-D)	**0.6922**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**3.248862898**		**[D = ∑(pi)^2]**

SS3

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	5	0.042372881	0.001795461
Nemata	Roundworm			
Turbellaria	Flatworms	1	0.008474576	7.18184E-05
Isopoda	Sow Bugs			
Pelecypoda	Clams			
Gastropoda	Snails, limpets	2	0.016949153	0.000287274
Diptera	Misc True Flies			
Coleptera	Beetles	5	0.042372881	0.001795461
Hemiptera	True Bugs			
Ephemeroptera	Mayflies	24	0.203389831	0.041367423
Zygoptera	Damselflies	20	0.169491525	0.028727377
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites	1	0.008474576	7.18184E-05
Trichoptera	Caddisflies			
Tabanidae	Horseflies			

Chironomidae	Midges	6	0.050847458	0.002585464
Amphipoda	Scuds	54	0.457627119	0.20942258
Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**118**	**1**	**0.286124677**
	Richness	**9**		
	Simpson Diversity Index (1-D)	**0.713875323**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**3.49497992**		**[D = ∑(pi)^2]**

Pooled

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	12	0.036923077	0.001363314
Nemata	Roundworm			
Turbellaria	Flatworms	1	0.003076923	9.46746E-06
Isopoda	Sow Bugs	2	0.006153846	3.78698E-05
Pelecypoda	Clams			
Gastropoda	Snails, limpets	17	0.052307692	0.002736095
Diptera	Misc True Flies			
Coleptera	Beetles	5	0.015384615	0.000236686
Hemiptera	True Bugs			
Ephemeroptera	Mayflies	62	0.190769231	0.036392899
Zygoptera	Damselflies	74	0.227692308	0.051843787
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites	1	0.003076923	9.46746E-06

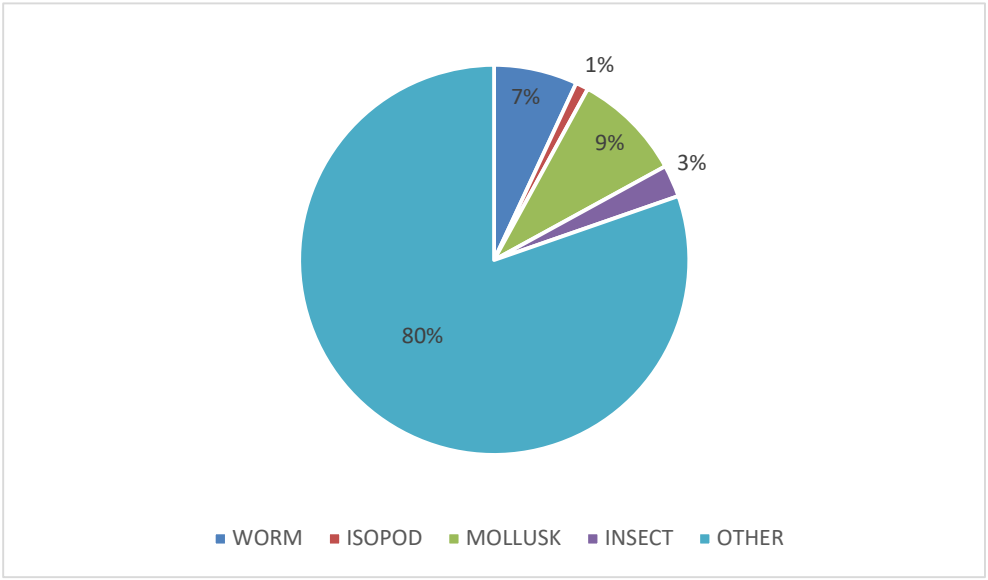
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges	10	0.030769231	0.000946746
Amphipoda	Scuds	141	0.433846154	0.188222485
Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**325**	**1**	**0.281798817**
	Richness	**10**		
	Simpson Diversity Index (1-D)	**0.718201183**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**3.548630942**		**[D = ∑(pi)^2]**

Abundance and Percent of Organisms in each taxa

Abundance

Family /Order	SS1	SS2	SS3	Reach	Percent in Reach
WORM	**5**	**2**	**6**	**13**	**7.60**
Oligochaeta (Qquatic worms)	5	2	5	12	7.02
Nemata (Nematode)				0	0.00
Tubullaria (Flatworm)			1	1	0.58
ISOPOD	**2**	**0**	**0**	**2**	**1.17**
Sow Bugs	2			2	1.17
MOLLUSK	**7**	**8**	**2**	**17**	**9.94**
Pelecypoda (Clams)				0	0.00
Gastropoda (Snails, limpets)	7	8	2	17	9.94
INSECT	**47**	**45**	**50**	**5**	2.92
Misc. True Flies				0	0.00
Coleptera (Beetle)			5	5	2.92
Hemiptera (True Bugs)				0	0.00
Ephemeroptera (Mayfly)	24	14	24	62	36.26
Zygoptera (Damselfly)	23	31	20	74	43.27
Anisoptera (Dragonfly)				0	0.00
Plecoptera (Stonefly)				0	0.00
Megaloptera				0	0.00
Tipulidae				0	0.00
Tipulidae (Cranefly)				0	0.00
Culicidae (Mosquito)				0	0.00
Lepidoptera (Aquatic Moths)				0	0.00
Hydrachnidia (Mites)			1	1	0.58
Trichoptera (Caddisfly)				0	0.00
Tabanidae (Horsefly)				0	0.00
OTHER	**46**	**45**	**60**	**151**	**88.30**
Chironomidae (midges)	2	2	6	10	5.85

Amphipoda (Scuds)	44	43	54	141	82.46
Hirudinea (Leeches)				0	0.00
Decapoda (Crayfish)				0	0.00
Colelenterata (Hydra)				0	0.00
Ceratopogonidae (No-see-um)				0	0.00
TOTAL ABUNDANCE	**107**	**100**	**118**	**171**	



EPT Index

SS	# of Ephermoptera	# of Plecoptera	# of Trichoptera	EPT Index
1	24	0	0	0.224299065
2	14	0	0	0.14
3	24	0	0	0.203389831
Overall	62	0	0	**0.362573099**

HBI										
Organism	Common Name	Average OBBN Family Tolerance* **	SS1 species abundance	SS2 species abundance	SS3 species abundance	OVERALL species abundance	SS1 - Species abundance x tolerance	SS2 - Species abundance x tolerance	SS3 - Species abundance x tolerance	OVERALL - Species abundance x tolerance
Oligochaeta	Aquatic earthworms	10	5	2	5	12	50	20	50	120
Nemata	Roundworm	6	0	0	0	0	0	0	0	0
Turbellaria	Flatworms	4.5	0	0	1	1	0	0	4.5	4.5
Isopoda	Sow Bugs	8	2	0	0	2	16	0	0	16
Pelecypoda	Clams	6	0	0	0	0	0	0	0	0
Gastropoda	Snails, limpets	6.75	7	8	2	17	47.25	54	13.5	114.75
Diptera	Misc True Flies	6.5	0	0	0	0	0	0	0	0
Coleptera	Beetles	4.85714286	0	0	5	5	0	0	24.2857143	24.2857143
Hemiptera	True Bugs	5	0	0	0	0	0	0	0	0
Ephemeroptera	Mayflies	3.72727273	24	14	24	62	89.4545455	52.1818182	89.4545455	231.090909
Zygoptera	Damselflies	7	23	31	20	74	161	217	140	518
Anisoptera	Dragonflies	4.75	0	0	0	0	0	0	0	0
Plecoptera	Stoneflies	2	0	0	0	0	0	0	0	0
Megaloptera	Fishflies/Alderflies	4	0	0	0	0	0	0	0	0
Tipulidae	Craneflies	4	0	0	0	0	0	0	0	0
Simuliidae	Blackflies	6	0	0	0	0	0	0	0	0
Culicidae	Mosquitos	8	0	0	0	0	0	0	0	0
Lepidoptera	Aquatic Moths	5	0	0	0	0	0	0	0	0

Hydrachnidia	Mites	5	0	0	1	1	0	0	5	5
Trichoptera	Caddisflies	5.94117647	0	0	0	0	0	0	0	0
Tabanidae	Horseflies	5	0	0	0	0	0	0	0	0
Chironomidae	Midges	6	2	2	6	10	12	12	36	60
Amphipoda	Scuds	6.75	44	43	54	141	297	290.25	364.5	951.75
Hirundinea	Leeches	8	0	0	0	0	0	0	0	0
Decapoda	Crayfish	6	0	0	0	0	0	0	0	0
Colelenterata	Hydra	6	0	0	0	0	0	0	0	0
Ceratopogonidae	No-see-ums	6	0	0	0	0	0	0	0	0
Total		-	**107**	**100**	**118**	**325**	**672.704545**	**645.431818**	**727.24026**	**2045.37662**

SS	**HDI**	
1	6.28695837	
2	6.45431818	
3	6.16305305	
Overall	**6.29346653**	Fairly Poor

HBI Interpretation *:**	
0 -3.75: Excellent	Organic pollution unlkely
3.76-4.25 = Very Good	Possible slight organic pollution
4.25-5: Good	Some organic pollution probable
5.01-5.75: Fair	Fairly substantial polluiton likely
5.76-6.5: Fairly Poor	Substantial pollution likely
6.51-7.25: Poor	Very substantial polluiton likely
7.26-10: Very Poor	Severe organc pollution likely

References

* Toronto and Region Conservation Authority. 2011. Regional Watershed Monitoring Program: Benthic Macroinvertebate Summary 2001-2008. https://trcaca.s3.ca-central-

** The Watershed Institute. N.d. Pollution Tolerance Values of Aquatic Macroinvertebrate Families.

*** McGauley et al. 2018. Coarse taxonomy (tolerance value averaging) biases Hilsenhoff's family level biotic index. Environ Monit Assess. 190:446

WD-6

Simpson Diversity Index

SS1

Organism	Common Name	# collected	pi	pi^2
Oligochaeta	Aquatic earthworms	2	0.04	0.0016
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs	1	0.02	0.0004
Pelecypoda	Clams			
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies	1	0.02	0.0004
Zygoptera	Damselflies	3	0.06	0.0036
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges	42	0.84	0.7056
Amphipoda	Scuds			
Hirundinea	Leeches			
Decapoda	Crayfish			

Colelenterata	Hydra			
Ceratopogonidae	No-see-ums	1	0.02	0.0004
	Total	**50**	**1**	**0.712**
	Richness	**6**		
	Simpson Diversity Index (1-D)	**0.288**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.404494382**		**[D = ∑(pi)^2]**

SS2

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms			
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs	1	0.076923077	0.00591716
Pelecypoda	Clams			
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies	2	0.153846154	0.023668639
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges	9	0.692307692	0.479289941
Amphipoda	Scuds	1	0.076923077	0.00591716

Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**13**	**1**	**0.514792899**
	Richness	**4**		
	Simpson Diversity Index (1-D)	**0.485207101**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.942528736**		**[D = ∑(pi)^2]**

SS3

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	1	0.03125	0.000976563
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs	3	0.09375	0.008789063
Pelecypoda	Clams			
Gastropoda	Snails, limpets			
Diptera	Misc True Flies	1	0.03125	0.000976563
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies	5	0.15625	0.024414063
Zygoptera	Damselflies	1	0.03125	0.000976563
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			

Chironomidae	Midges	8	0.25	0.0625
Amphipoda	Scuds	12	0.375	0.140625
Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums	1	0.03125	0.000976563
	Total	**32**	**1**	**0.240234375**
	Richness	**8**		
	Simpson Diversity Index (1-D)	**0.759765625**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**4.162601626**		**[D = ∑(pi)^2]**

Pooled

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	3	0.031578947	0.00099723
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs	5	0.052631579	0.002770083
Pelecypoda	Clams			
Gastropoda	Snails, limpets			
Diptera	Misc True Flies	1	0.010526316	0.000110803
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies	6	0.063157895	0.00398892
Zygoptera	Damselflies	6	0.063157895	0.00398892
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			

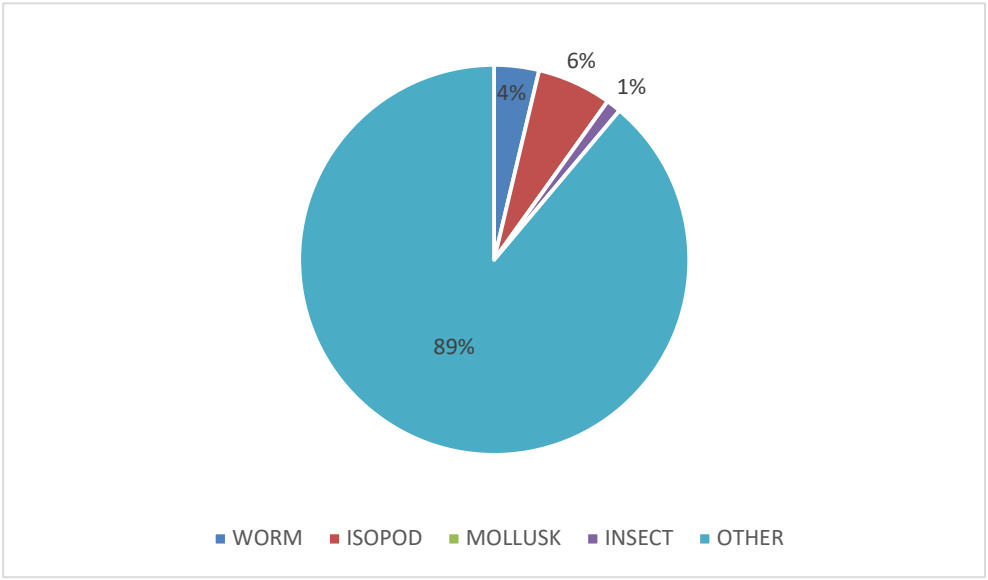
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges	59	0.621052632	0.385706371
Amphipoda	Scuds	13	0.136842105	0.018725762
Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums	2	0.021052632	0.000443213
	Total	**95**	**1**	**0.416731302**
	Richness	**8**		
	Simpson Diversity Index (1-D)	**0.583268698**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**2.399627759**		**[D = ∑(pi)^2]**

Abundance and Percent of Organisms in each taxa

Abundance

Family /Order	SS1	SS2	SS3	Reach	Percent in Reach
WORM	**2**	**0**	**1**	**3**	**3.70**
Oligochaeta (Qquatic worms)	2		1	3	3.70
Nemata (Nematode)				0	0.00
Tubullaria (Flatworm)				0	0.00
ISOPOD	**1**	**1**	**3**	**5**	**6.17**
Sow Bugs	1	1	3	5	6.17
MOLLUSK	**0**	**0**	**0**	**0**	**0.00**
Pelecypoda (Clams)				0	0.00
Gastropoda (Snails, limpets)				0	0.00
INSECT	**4**	**2**	**7**	**1**	**1.23**
Misc. True Flies			1	1	1.23
Coleptera (Beetle)				0	0.00
Hemiptera (True Bugs)				0	0.00
Ephemeroptera (Mayfly)	1		5	6	7.41
Zygoptera (Damselfly)	3	2	1	6	7.41
Anisoptera (Dragonfly)				0	0.00
Plecoptera (Stonefly)				0	0.00
Megaloptera				0	0.00
Tipulidae				0	0.00
Tipulidae (Cranefly)				0	0.00
Culicidae (Mosquito)				0	0.00
Lepidoptera (Aquatic Moths)				0	0.00
Hydrachnidia (Mites)				0	0.00
Trichoptera (Caddisfly)				0	0.00
Tabanidae (Horsefly)				0	0.00
OTHER	**43**	**10**	**21**	**72**	**88.89**
Chironomidae (midges)	42	9	8	59	72.84

Amphipoda (Scuds)		1	12	13	16.05
Hirudinea (Leeches)				0	0.00
Decapoda (Crayfish)				0	0.00
Colelenterata (Hydra)				0	0.00
Ceratopogonidae (No-see-um)	1		1	2	2.47
TOTAL ABUNDANCE	**50**	**13**	**32**	**81**	



EPT Index

SS	# of Ephermoptera	# of Plecoptera	# of Trichoptera	EPT Index
1	1	0	0	0.02
2	0	0	0	0
3	5	0	0	0.15625
Overall	6	0	0	**0.074074074**

HBI										
Organism	Common Name	Average OBBN Family Tolerance* **	SS1 species abundance	SS2 species abundance	SS3 species abundance	OVERALL species abundance	SS1 - Species abundance x tolerance	SS2 - Species abundance x tolerance	SS3 - Species abundance x tolerance	OVERALL - Species abundance x tolerance
Oligochaeta	Aquatic earthworms	10	2	0	1	3	20	0	10	30
Nemata	Roundworm	6	0	0	0	0	0	0	0	0
Turbellaria	Flatworms	4.5	0	0	0	0	0	0	0	0
Isopoda	Sow Bugs	8	1	1	3	5	8	8	24	40
Pelecypoda	Clams	6	0	0	0	0	0	0	0	0
Gastropoda	Snails, limpets	6.75	0	0	0	0	0	0	0	0
Diptera	Misc True Flies	6.5	0	0	1	1	0	0	6.5	6.5
Coleptera	Beetles	4.85714286	0	0	0	0	0	0	0	0
Hemiptera	True Bugs	5	0	0	0	0	0	0	0	0
Ephemeroptera	Mayflies	3.72727273	1	0	5	6	3.72727273	0	18.6363636	22.3636364
Zygoptera	Damselflies	7	3	2	1	6	21	14	7	42
Anisoptera	Dragonflies	4.75	0	0	0	0	0	0	0	0
Plecoptera	Stoneflies	2	0	0	0	0	0	0	0	0
Megaloptera	Fishflies/Alderflies	4	0	0	0	0	0	0	0	0
Tipulidae	Craneflies	4	0	0	0	0	0	0	0	0
Simuliidae	Blackflies	6	0	0	0	0	0	0	0	0
Culicidae	Mosquitos	8	0	0	0	0	0	0	0	0
Lepidoptera	Aquatic Moths	5	0	0	0	0	0	0	0	0

Hydrachnidia	Mites	5	0	0	0	0	0	0	0	0
Trichoptera	Caddisflies	5.94117647	0	0	0	0	0	0	0	0
Tabanidae	Horseflies	5	0	0	0	0	0	0	0	0
Chironomidae	Midges	6	42	9	8	59	252	54	48	354
Amphipoda	Scuds	6.75	0	1	12	13	0	6.75	81	87.75
Hirundinea	Leeches	8	0	0	0	0	0	0	0	0
Decapoda	Crayfish	6	0	0	0	0	0	0	0	0
Colelenterata	Hydra	6	0	0	0	0	0	0	0	0
Ceratopogonidae	No-see-ums	6	1	0	1	2	6	0	6	12
Total		-	**50**	**13**	**32**	**95**	**310.727273**	**82.75**	**201.136364**	**594.613636**

SS	**HDI**	
1	6.21454545	
2	6.36538462	
3	6.28551136	
Overall	**6.25909091**	Poor

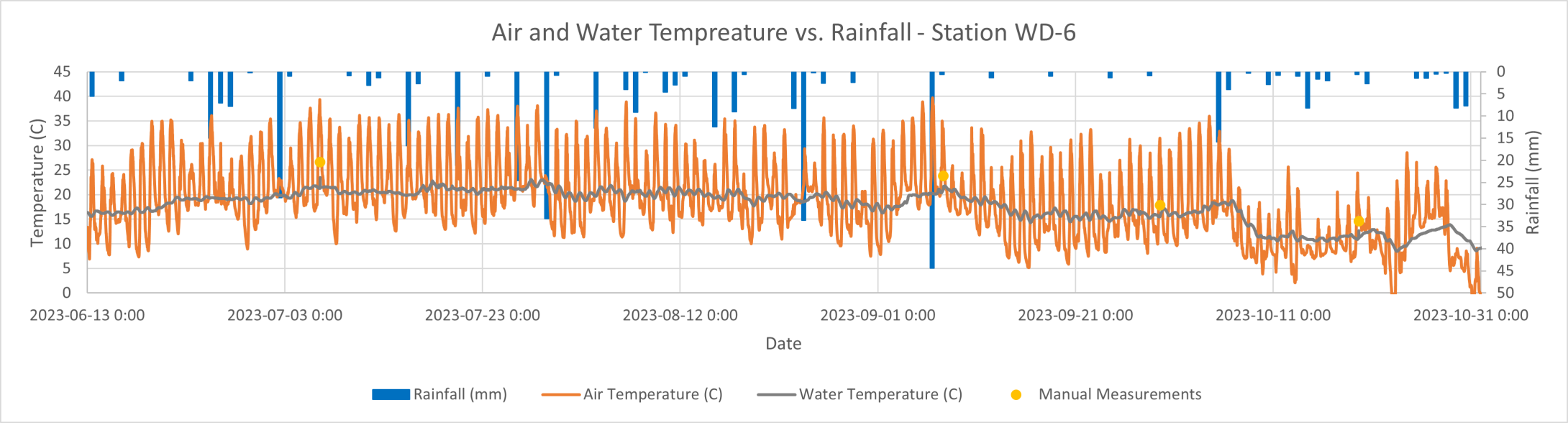
HBI Interpretation *:**	
0 -3.75: Excellent	Organic pollution unlkely
3.76-4.25 = Very Good	Possible slight organic pollution
4.25-5: Good	Some organic pollution probable
5.01-5.75: Fair	Fairly substantial polluiton likely
5.76-6.5: Fairly Poor	Substantial pollution likely
6.51-7.25: Poor	Very substantial polluiton likely
7.26-10: Very Poor	Severe organc pollution likely

References

* Toronto and Region Conservation Authority. 2011. Regional Watershed Monitoring Program: Benthic Macroinvertebate Summary 2001-2008. https://trcaca.s3.ca-central-

** The Watershed Institute. N.d. Pollution Tolerance Values of Aquatic Macroinvertebrate Families.

*** McGauley et al. 2018. Coarse taxonomy (tolerance value averaging) biases Hilsenhoff's family level biotic index. Environ Monit Assess. 190:446


Air and Water Tempreature vs. Rainfall - Station WD-6
Temperature (C)
Rainfall (mm)
45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
30
35
40
45
50
2023-06-13 0:00
2023-07-03 0:00
2023-07-23 0:00
2023-08-12 0:00
2023-09-01 0:00
2023-09-21 0:00
2023-10-11 0:00
2023-10-31 0:00
Date
Rainfall (mm)
Air Temperature (C)
Water Temperature (C)
Manual Measurements

A2. Spring Season

WD-2

Simpson Diversity Index

SS1

Organism	Common Name	# collected	pi	pi^2
Oligochaeta	Aquatic earthworms	1	0.00310559	9.64469E-06
Nemata	Roundworm			
Turbellaria	Flatworms	8	0.02484472	0.00061726
Isopoda	Sow Bugs	306	0.950310559	0.903090159
Pelecypoda	Clams	1	0.00310559	9.64469E-06
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges	5	0.01552795	0.000241117
Amphipoda	Scuds	1	0.00310559	9.64469E-06
Hirundinea	Leeches			
Decapoda	Crayfish			

Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**322**	**1**	**0.90397747**
	Richness	**6**		
	Simpson Diversity Index (1-D)	**0.09602253**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.10622226**		**[D = ∑(pi)^2]**

SS2

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	4	0.010204082	0.000104123
Nemata	Roundworm			
Turbellaria	Flatworms	43	0.109693878	0.012032747
Isopoda	Sow Bugs	336	0.857142857	0.734693878
Pelecypoda	Clams	5	0.012755102	0.000162693
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles	1	0.00255102	6.50771E-06
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds	3	0.007653061	5.85693E-05

Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**392**	**1**	**0.747058517**
	Richness	**6**		
	Simpson Diversity Index (1-D)	**0.252941483**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.338583226**		**[D = ∑(pi)^2]**

SS3

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	2	0.012987013	0.000168663
Nemata	Roundworm	1	0.006493506	4.21656E-05
Turbellaria	Flatworms	23	0.149350649	0.022305616
Isopoda	Sow Bugs	127	0.824675325	0.680089391
Pelecypoda	Clams			
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			

Chironomidae	Midges			
Amphipoda	Scuds	1	0.006493506	4.21656E-05
Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**154**	**1**	**0.702648001**
	Richness	**5**		
	Simpson Diversity Index (1-D)	**0.297351999**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.42318771**		**[D = ∑(pi)^2]**

Pooled

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	7	0.008064516	6.50364E-05
Nemata	Roundworm	1	0.001152074	1.32727E-06
Turbellaria	Flatworms	74	0.085253456	0.007268152
Isopoda	Sow Bugs	769	0.8859447	0.784898012
Pelecypoda	Clams	6	0.006912442	4.77819E-05
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles	1	0.001152074	1.32727E-06
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			

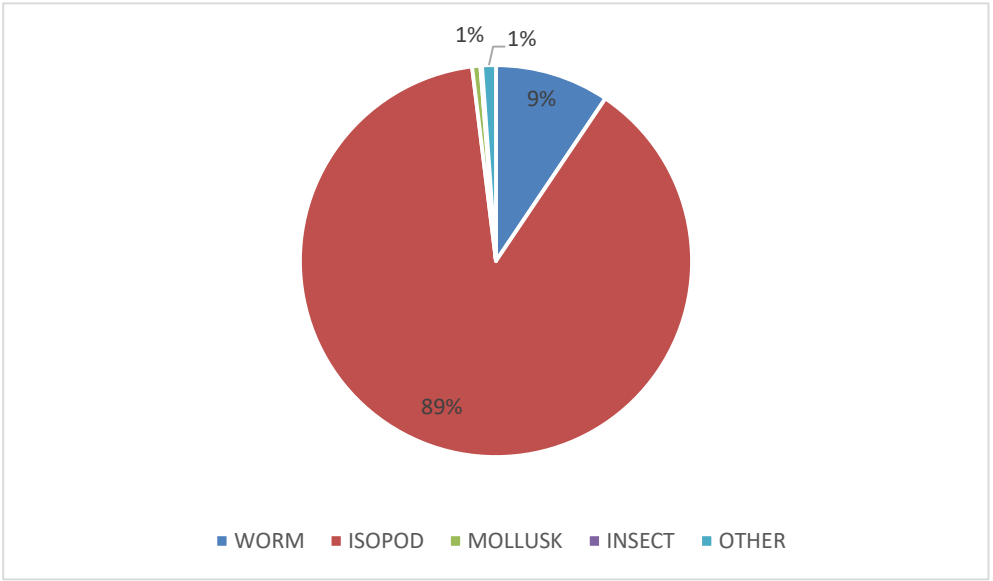
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges	5	0.005760369	3.31818E-05
Amphipoda	Scuds	5	0.005760369	3.31818E-05
Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**868**	**1**	**0.792348001**
	Richness	**8**		
	Simpson Diversity Index (1-D)	**0.207651999**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.262071715**		**[D = ∑(pi)^2]**

Abundance and Percent of Organisms in each taxa

Abundance

Family /Order	SS1	SS2	SS3	Reach	Percent in Reach
WORM	**9**	**47**	**26**	**82**	**9.45**
Oligochaeta (Qquatic worms)	1	4	2	7	0.81
Nemata (Nematode)			1	1	0.12
Tubullaria (Flatworm)	8	43	23	74	8.53
ISOPOD	**306**	**336**	**127**	**769**	**88.59**
Sow Bugs	306	336	127	769	88.59
MOLLUSK	**1**	**5**	**0**	**6**	**0.69**
Pelecypoda (Clams)	1	5		6	0.69
Gastropoda (Snails, limpets)				0	0.00
INSECT	**0**	**1**	**0**	**1**	**0.12**
Misc. True Flies				0	0.00
Coleptera (Beetle)		1		1	0.12
Hemiptera (True Bugs)				0	0.00
Ephemeroptera (Mayfly)				0	0.00
Zygoptera (Damselfly)				0	0.00
Anisoptera (Dragonfly)				0	0.00
Plecoptera (Stonefly)				0	0.00
Megaloptera				0	0.00
Tipulidae				0	0.00
Tipulidae (Cranefly)				0	0.00
Culicidae (Mosquito)				0	0.00
Lepidoptera (Aquatic Moths)				0	0.00
Hydrachnidia (Mites)				0	0.00
Trichoptera (Caddisfly)				0	0.00
Tabanidae (Horsefly)				0	0.00
OTHER	**6**	**3**	**1**	**10**	**1.15**
Chironomidae (midges)	5			5	0.58

Amphipoda (Scuds)	1	3	1	5	0.58
Hirudinea (Leeches)				0	0.00
Decapoda (Crayfish)				0	0.00
Colelenterata (Hydra)				0	0.00
Ceratopogonidae (No-see-um)				0	0.00
TOTAL ABUNDANCE	**322**	**392**	**154**	**868**	



EPT Index

SS	# of Ephermoptera	# of Plecoptera	# of Trichoptera	EPT Index
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
Overall	0	0	0	**0**

HBI										
Organism	Common Name	Average OBBN Family Tolerance* **	SS1 species abundance	SS2 species abundance	SS3 species abundance	OVERALL species abundance	SS1 - Species abundance x tolerance	SS2 - Species abundance x tolerance	SS3 - Species abundance x tolerance	OVERALL - Species abundance x tolerance
Oligochaeta	Aquatic earthworms	10	1	4	2	7	10	40	20	70
Nemata	Roundworm	6	0	0	1	1	0	0	6	6
Turbellaria	Flatworms	4.5	8	43	23	74	36	193.5	103.5	333
Isopoda	Sow Bugs	8	306	336	127	769	2448	2688	1016	6152
Pelecypoda	Clams	6	1	5	0	6	6	30	0	36
Gastropoda	Snails, limpets	6.75	0	0	0	0	0	0	0	0
Diptera	Misc True Flies	6.5	0	0	0	0	0	0	0	0
Coleptera	Beetles	4.85714286	0	1	0	1	0	4.85714286	0	4.85714286
Hemiptera	True Bugs	5	0	0	0	0	0	0	0	0
Ephemeroptera	Mayflies	3.72727273	0	0	0	0	0	0	0	0
Zygoptera	Damselflies	7	0	0	0	0	0	0	0	0
Anisoptera	Dragonflies	4.75	0	0	0	0	0	0	0	0
Plecoptera	Stoneflies	2	0	0	0	0	0	0	0	0
Megaloptera	Fishflies/Alderflies	4	0	0	0	0	0	0	0	0
Tipulidae	Craneflies	4	0	0	0	0	0	0	0	0
Simuliidae	Blackflies	6	0	0	0	0	0	0	0	0
Culicidae	Mosquitos	8	0	0	0	0	0	0	0	0
Lepidoptera	Aquatic Moths	5	0	0	0	0	0	0	0	0

Hydrachnidia	Mites	5	0	0	0	0	0	0	0	0
Trichoptera	Caddisflies	5.94117647	0	0	0	0	0	0	0	0
Tabanidae	Horseflies	5	0	0	0	0	0	0	0	0
Chironomidae	Midges	6	5	0	0	5	30	0	0	30
Amphipoda	Scuds	6.75	1	3	1	5	6.75	20.25	6.75	33.75
Hirundinea	Leeches	8	0	0	0	0	0	0	0	0
Decapoda	Crayfish	6	0	0	0	0	0	0	0	0
Colelenterata	Hydra	6	0	0	0	0	0	0	0	0
Ceratopogonidae	No-see-ums	6	0	0	0	0	0	0	0	0
Total		-	**322**	**392**	**154**	**868**	**2536.75**	**2976.60714**	**1152.25**	**6665.60714**

SS	**HDI**	
1	7.87810559	
2	7.59338557	
3	7.48214286	
Overall	**7.6792709**	Very Poor

HBI Interpretation *:**	
0 -3.75: Excellent	Organic pollution unlkely
3.76-4.25 = Very Good	Possible slight organic pollution
4.25-5: Good	Some organic pollution probable
5.01-5.75: Fair	Fairly substantial polluiton likely
5.76-6.5: Fairly Poor	Substantial pollution likely
6.51-7.25: Poor	Very substantial polluiton likely
7.26-10: Very Poor	Severe organc pollution likely

References

* Toronto and Region Conservation Authority. 2011. Regional Watershed Monitoring Program: Benthic Macroinvertebate Summary 2001-2008. https://trcaca.s3.ca-central-

** The Watershed Institute. N.d. Pollution Tolerance Values of Aquatic Macroinvertebrate Families.

*** McGauley et al. 2018. Coarse taxonomy (tolerance value averaging) biases Hilsenhoff's family level biotic index. Environ Monit Assess. 190:446

WD-3

Simpson Diversity Index

SS1

Organism	Common Name	# collected	pi	pi^2
Oligochaeta	Aquatic earthworms	10	0.026385224	0.00069618
Nemata	Roundworm			
Turbellaria	Flatworms	1	0.002638522	6.9618E-06
Isopoda	Sow Bugs	344	0.907651715	0.823831636
Pelecypoda	Clams			
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles	20	0.052770449	0.00278472
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds	4	0.01055409	0.000111389
Hirundinea	Leeches			
Decapoda	Crayfish			

Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**379**	**1**	**0.827430887**
	Richness	**5**		
	Simpson Diversity Index (1-D)	**0.172569113**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.208560154**		**[D = ∑(pi)^2]**

SS2

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	8	0.034482759	0.001189061
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs	220	0.948275862	0.899227111
Pelecypoda	Clams			
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles	4	0.017241379	0.000297265
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds			

Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**232**	**1**	**0.900713436**
	Richness	**3**		
	Simpson Diversity Index (1-D)	**0.099286564**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.110231023**		**[D = ∑(pi)^2]**

SS3

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	9	0.018480493	0.000341529
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs	465	0.954825462	0.911691663
Pelecypoda	Clams			
Gastropoda	Snails, limpets	2	0.004106776	1.68656E-05
Diptera	Misc True Flies			
Coleptera	Beetles	3	0.006160164	3.79476E-05
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			

Chironomidae	Midges			
Amphipoda	Scuds	6	0.012320329	0.00015179
Hirundinea	Leeches	1	0.002053388	4.2164E-06
Decapoda	Crayfish	1	0.002053388	4.2164E-06
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**487**	**1**	**0.912248228**
	Richness	**7**		
	Simpson Diversity Index (1-D)	**0.087751772**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.096192866**		**[D = ∑(pi)^2]**

Pooled

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	27	0.024590164	0.000604676
Nemata	Roundworm			
Turbellaria	Flatworms	1	0.000910747	8.2946E-07
Isopoda	Sow Bugs	1029	0.93715847	0.878265998
Pelecypoda	Clams			
Gastropoda	Snails, limpets	2	0.001821494	3.31784E-06
Diptera	Misc True Flies			
Coleptera	Beetles	27	0.024590164	0.000604676
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			

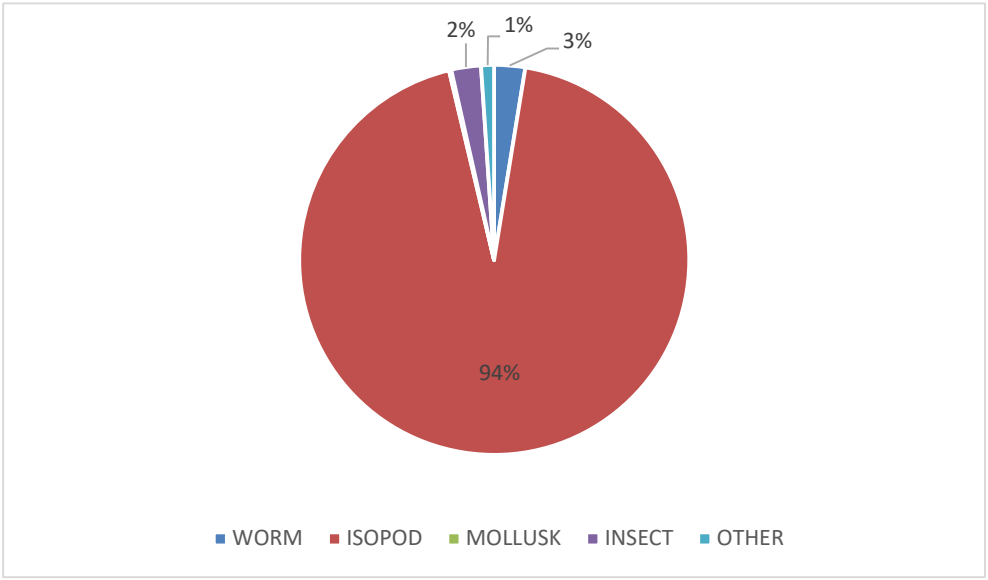
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds	10	0.009107468	8.2946E-05
Hirundinea	Leeches	1	0.000910747	8.2946E-07
Decapoda	Crayfish	1	0.000910747	8.2946E-07
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**1098**	**1**	**0.879564102**
	Richness	**8**		
	Simpson Diversity Index (1-D)	**0.120435898**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.1369268**		**[D = ∑(pi)^2]**

Abundance and Percent of Organisms in each taxa

Abundance

Family /Order	SS1	SS2	SS3	Reach	Percent in Reach
WORM	**11**	**8**	**9**	**28**	**2.55**
Oligochaeta (Qquatic worms)	10	8	9	27	2.46
Nemata (Nematode)				0	0.00
Tubullaria (Flatworm)	1			1	0.09
ISOPOD	**344**	**220**	**465**	**1029**	**93.72**
Sow Bugs	344	220	465	1029	93.72
MOLLUSK	**0**	**0**	**2**	**2**	**0.18**
Pelecypoda (Clams)				0	0.00
Gastropoda (Snails, limpets)			2	2	0.18
INSECT	**20**	**4**	**3**	**27**	**2.46**
Misc. True Flies				0	0.00
Coleptera (Beetle)	20	4	3	27	2.46
Hemiptera (True Bugs)				0	0.00
Ephemeroptera (Mayfly)				0	0.00
Zygoptera (Damselfly)				0	0.00
Anisoptera (Dragonfly)				0	0.00
Plecoptera (Stonefly)				0	0.00
Megaloptera				0	0.00
Tipulidae				0	0.00
Tipulidae (Cranefly)				0	0.00
Culicidae (Mosquito)				0	0.00
Lepidoptera (Aquatic Moths)				0	0.00
Hydrachnidia (Mites)				0	0.00
Trichoptera (Caddisfly)				0	0.00
Tabanidae (Horsefly)				0	0.00
OTHER	**4**	**0**	**8**	**12**	**1.09**
Chironomidae (midges)				0	0.00

Amphipoda (Scuds)	4		6	10	0.91
Hirudinea (Leeches)			1	1	0.09
Decapoda (Crayfish)			1	1	0.09
Colelenterata (Hydra)				0	0.00
Ceratopogonidae (No-see-um)				0	0.00
TOTAL ABUNDANCE	**379**	**232**	**487**	**1098**	



EPT Index

SS	# of Ephermoptera	# of Plecoptera	# of Trichoptera	EPT Index
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
Overall	0	0	0	**0**

HBI										
Organism	Common Name	Average OBBN Family Tolerance* **	SS1 species abundance	SS2 species abundance	SS3 species abundance	OVERALL species abundance	SS1 - Species abundance x tolerance	SS2 - Species abundance x tolerance	SS3 - Species abundance x tolerance	OVERALL - Species abundance x tolerance
Oligochaeta	Aquatic earthworms	10	10	8	9	27	100	80	90	270
Nemata	Roundworm	6	0	0	0	0	0	0	0	0
Turbellaria	Flatworms	4.5	1	0	0	1	4.5	0	0	4.5
Isopoda	Sow Bugs	8	344	220	465	1029	2752	1760	3720	8232
Pelecypoda	Clams	6	0	0	0	0	0	0	0	0
Gastropoda	Snails, limpets	6.75	0	0	2	2	0	0	13.5	13.5
Diptera	Misc True Flies	6.5	0	0	0	0	0	0	0	0
Coleptera	Beetles	4.85714286	20	4	3	27	97.1428571	19.4285714	14.5714286	131.142857
Hemiptera	True Bugs	5	0	0	0	0	0	0	0	0
Ephemeroptera	Mayflies	3.72727273	0	0	0	0	0	0	0	0
Zygoptera	Damselflies	7	0	0	0	0	0	0	0	0
Anisoptera	Dragonflies	4.75	0	0	0	0	0	0	0	0
Plecoptera	Stoneflies	2	0	0	0	0	0	0	0	0
Megaloptera	Fishflies/Alderflies	4	0	0	0	0	0	0	0	0
Tipulidae	Craneflies	4	0	0	0	0	0	0	0	0
Simuliidae	Blackflies	6	0	0	0	0	0	0	0	0
Culicidae	Mosquitos	8	0	0	0	0	0	0	0	0
Lepidoptera	Aquatic Moths	5	0	0	0	0	0	0	0	0

Hydrachnidia	Mites	5	0	0	0	0	0	0	0	0
Trichoptera	Caddisflies	5.94117647	0	0	0	0	0	0	0	0
Tabanidae	Horseflies	5	0	0	0	0	0	0	0	0
Chironomidae	Midges	6	0	0	0	0	0	0	0	0
Amphipoda	Scuds	6.75	4	0	6	10	27	0	40.5	67.5
Hirundinea	Leeches	8	0	0	1	1	0	0	8	8
Decapoda	Crayfish	6	0	0	1	1	0	0	6	6
Colelenterata	Hydra	6	0	0	0	0	0	0	0	0
Ceratopogonidae	No-see-ums	6	0	0	0	0	0	0	0	0
Total		-	**379**	**232**	**487**	**1098**	**2980.64286**	**1859.42857**	**3892.57143**	**8732.64286**

SS	**HDI**	
1	7.86449303	
2	8.01477833	
3	7.99295981	
Overall	**7.95322665**	Very Poor

HBI Interpretation *:**	
0 -3.75: Excellent	Organic pollution unlkely
3.76-4.25 = Very Good	Possible slight organic pollution
4.25-5: Good	Some organic pollution probable
5.01-5.75: Fair	Fairly substantial polluiton likely
5.76-6.5: Fairly Poor	Substantial pollution likely
6.51-7.25: Poor	Very substantial polluiton likely
7.26-10: Very Poor	Severe organc pollution likely

References

* Toronto and Region Conservation Authority. 2011. Regional Watershed Monitoring Program: Benthic Macroinvertebate Summary 2001-2008. https://trcaca.s3.ca-central-

** The Watershed Institute. N.d. Pollution Tolerance Values of Aquatic Macroinvertebrate Families.

*** McGauley et al. 2018. Coarse taxonomy (tolerance value averaging) biases Hilsenhoff's family level biotic index. Environ Monit Assess. 190:446

WD-4

Simpson Diversity Index

SS1

Organism	Common Name	# collected	pi	pi^2
Oligochaeta	Aquatic earthworms	3	0.02970297	0.000882266
Nemata	Roundworm			
Turbellaria	Flatworms	1	0.00990099	9.80296E-05
Isopoda	Sow Bugs	43	0.425742574	0.18125674
Pelecypoda	Clams	29	0.287128713	0.082442898
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds	25	0.247524752	0.061268503
Hirundinea	Leeches			
Decapoda	Crayfish			

Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**101**	**1**	**0.325948436**
	Richness	**5**		
	Simpson Diversity Index (1-D)	**0.674051564**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**3.067969925**		**[D = ∑(pi)^2]**

SS2

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	1	0.005128205	2.62985E-05
Nemata	Roundworm			
Turbellaria	Flatworms	2	0.01025641	0.000105194
Isopoda	Sow Bugs	116	0.594871795	0.353872452
Pelecypoda	Clams	41	0.21025641	0.044207758
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles	1	0.005128205	2.62985E-05
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds	34	0.174358974	0.030401052

Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**195**	**1**	**0.428639053**
	Richness	**6**		
	Simpson Diversity Index (1-D)	**0.571360947**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**2.332965213**		**[D = ∑(pi)^2]**

SS3

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	1	0.019607843	0.000384468
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs	33	0.647058824	0.418685121
Pelecypoda	Clams	1	0.019607843	0.000384468
Gastropoda	Snails, limpets	6	0.117647059	0.01384083
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			

Chironomidae	Midges			
Amphipoda	Scuds	10	0.196078431	0.038446751
Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**51**	**1**	**0.471741638**
	Richness	**5**		
	Simpson Diversity Index (1-D)	**0.528258362**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**2.119804401**		**[D = ∑(pi)^2]**

Pooled

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	5	0.014409222	0.000207626
Nemata	Roundworm			
Turbellaria	Flatworms	3	0.008645533	7.47452E-05
Isopoda	Sow Bugs	192	0.553314121	0.306156517
Pelecypoda	Clams	71	0.204610951	0.041865641
Gastropoda	Snails, limpets	6	0.017291066	0.000298981
Diptera	Misc True Flies			
Coleptera	Beetles	1	0.002881844	8.30503E-06
Hemiptera	True Bugs			
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			

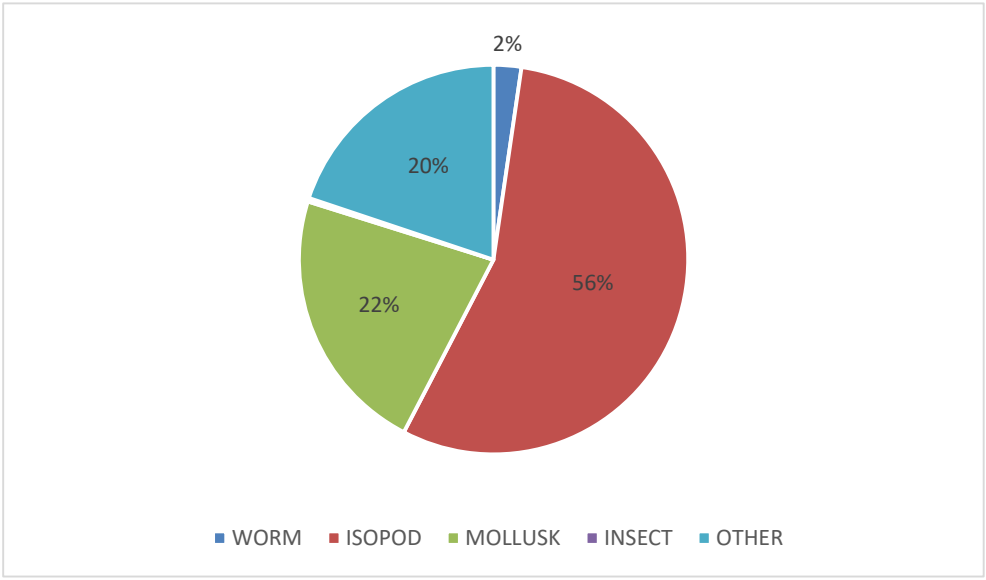
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds	69	0.198847262	0.039540234
Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**347**	**1**	**0.388152048**
	Richness	**7**		
	Simpson Diversity Index (1-D)	**0.611847952**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**2.57630999**		**[D = ∑(pi)^2]**

Abundance and Percent of Organisms in each taxa

Abundance

Family /Order	SS1	SS2	SS3	Reach	Percent in Reach
WORM	**4**	**3**	**1**	**8**	**2.31**
Oligochaeta (Qquatic worms)	3	1	1	5	1.44
Nemata (Nematode)				0	0.00
Tubullaria (Flatworm)	1	2		3	0.86
ISOPOD	**43**	**116**	**33**	**192**	**55.33**
Sow Bugs	43	116	33	192	55.33
MOLLUSK	**29**	**41**	**7**	**77**	**22.19**
Pelecypoda (Clams)	29	41	1	71	20.46
Gastropoda (Snails, limpets)			6	6	1.73
INSECT	**0**	**1**	**0**	**1**	**0.29**
Misc. True Flies				0	0.00
Coleptera (Beetle)		1		1	0.29
Hemiptera (True Bugs)				0	0.00
Ephemeroptera (Mayfly)				0	0.00
Zygoptera (Damselfly)				0	0.00
Anisoptera (Dragonfly)				0	0.00
Plecoptera (Stonefly)				0	0.00
Megaloptera				0	0.00
Tipulidae				0	0.00
Tipulidae (Cranefly)				0	0.00
Culicidae (Mosquito)				0	0.00
Lepidoptera (Aquatic Moths)				0	0.00
Hydrachnidia (Mites)				0	0.00
Trichoptera (Caddisfly)				0	0.00
Tabanidae (Horsefly)				0	0.00
OTHER	**25**	**34**	**10**	**69**	**19.88**
Chironomidae (midges)				0	0.00

Amphipoda (Scuds)	25	34	10	69	19.88
Hirudinea (Leeches)				0	0.00
Decapoda (Crayfish)				0	0.00
Colelenterata (Hydra)				0	0.00
Ceratopogonidae (No-see-um)				0	0.00
TOTAL ABUNDANCE	**101**	**195**	**51**	**347**	



EPT Index

SS	# of Ephermoptera	# of Plecoptera	# of Trichoptera	EPT Index
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
Overall	0	0	0	**0**

HBI										
Organism	Common Name	Average OBBN Family Tolerance* **	SS1 species abundance	SS2 species abundance	SS3 species abundance	OVERALL species abundance	SS1 - Species abundance x tolerance	SS2 - Species abundance x tolerance	SS3 - Species abundance x tolerance	OVERALL - Species abundance x tolerance
Oligochaeta	Aquatic earthworms	10	3	1	1	5	30	10	10	50
Nemata	Roundworm	6	0	0	0	0	0	0	0	0
Turbellaria	Flatworms	4.5	1	2	0	3	4.5	9	0	13.5
Isopoda	Sow Bugs	8	43	116	33	192	344	928	264	1536
Pelecypoda	Clams	6	29	41	1	71	174	246	6	426
Gastropoda	Snails, limpets	6.75	0	0	6	6	0	0	40.5	40.5
Diptera	Misc True Flies	6.5	0	0	0	0	0	0	0	0
Coleptera	Beetles	4.85714286	0	1	0	1	0	4.85714286	0	4.85714286
Hemiptera	True Bugs	5	0	0	0	0	0	0	0	0
Ephemeroptera	Mayflies	3.72727273	0	0	0	0	0	0	0	0
Zygoptera	Damselflies	7	0	0	0	0	0	0	0	0
Anisoptera	Dragonflies	4.75	0	0	0	0	0	0	0	0
Plecoptera	Stoneflies	2	0	0	0	0	0	0	0	0
Megaloptera	Fishflies/Alderflies	4	0	0	0	0	0	0	0	0
Tipulidae	Craneflies	4	0	0	0	0	0	0	0	0
Simuliidae	Blackflies	6	0	0	0	0	0	0	0	0
Culicidae	Mosquitos	8	0	0	0	0	0	0	0	0
Lepidoptera	Aquatic Moths	5	0	0	0	0	0	0	0	0

Hydrachnidia	Mites	5	0	0	0	0	0	0	0	0
Trichoptera	Caddisflies	5.94117647	0	0	0	0	0	0	0	0
Tabanidae	Horseflies	5	0	0	0	0	0	0	0	0
Chironomidae	Midges	6	0	0	0	0	0	0	0	0
Amphipoda	Scuds	6.75	25	34	10	69	168.75	229.5	67.5	465.75
Hirundinea	Leeches	8	0	0	0	0	0	0	0	0
Decapoda	Crayfish	6	0	0	0	0	0	0	0	0
Colelenterata	Hydra	6	0	0	0	0	0	0	0	0
Ceratopogonidae	No-see-ums	6	0	0	0	0	0	0	0	0
Total		-	**101**	**195**	**51**	**347**	**721.25**	**1427.35714**	**388**	**2536.60714**

SS	**HDI**	
1	7.14108911	
2	7.31978022	
3	7.60784314	
Overall	**7.31010704**	Very Poor

HBI Interpretation *:**	
0 -3.75: Excellent	Organic pollution unlkely
3.76-4.25 = Very Good	Possible slight organic pollution
4.25-5: Good	Some organic pollution probable
5.01-5.75: Fair	Fairly substantial polluiton likely
5.76-6.5: Fairly Poor	Substantial pollution likely
6.51-7.25: Poor	Very substantial polluiton likely
7.26-10: Very Poor	Severe organc pollution likely

References

* Toronto and Region Conservation Authority. 2011. Regional Watershed Monitoring Program: Benthic Macroinvertebate Summary 2001-2008. https://trcaca.s3.ca-central-

** The Watershed Institute. N.d. Pollution Tolerance Values of Aquatic Macroinvertebrate Families.

*** McGauley et al. 2018. Coarse taxonomy (tolerance value averaging) biases Hilsenhoff's family level biotic index. Environ Monit Assess. 190:446

WD-5

Simpson Diversity Index

SS1

Organism	Common Name	# collected	pi	pi^2
Oligochaeta	Aquatic earthworms			
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs	25	0.183823529	0.03379109
Pelecypoda	Clams	1	0.007352941	5.40657E-05
Gastropoda	Snails, limpets	8	0.058823529	0.003460208
Diptera	Misc True Flies			
Coleptera	Beetles	2	0.014705882	0.000216263
Hemiptera	True Bugs	3	0.022058824	0.000486592
Ephemeroptera	Mayflies	1	0.007352941	5.40657E-05
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges			
Amphipoda	Scuds	95	0.698529412	0.487943339
Hirundinea	Leeches			
Decapoda	Crayfish	1	0.007352941	5.40657E-05

Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**136**	**1**	**0.526059689**
	Richness	**8**		
	Simpson Diversity Index (1-D)	**0.473940311**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.900924974**		**[D = ∑(pi)^2]**

SS2

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms			
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs	24	0.406779661	0.165469693
Pelecypoda	Clams			
Gastropoda	Snails, limpets			
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs	2	0.033898305	0.001149095
Ephemeroptera	Mayflies			
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites	1	0.016949153	0.000287274
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges	19	0.322033898	0.103705832
Amphipoda	Scuds	11	0.186440678	0.034760126

Hirundinea	Leeches	1	0.016949153	0.000287274
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums	1	0.016949153	0.000287274
	Total	**59**	**1**	**0.305946567**
	Richness	**7**		
	Simpson Diversity Index (1-D)	**0.694053433**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**3.268544601**		**[D = ∑(pi)^2]**

SS3

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	1	0.017857143	0.000318878
Nemata	Roundworm			
Turbellaria	Flatworms	2	0.035714286	0.00127551
Isopoda	Sow Bugs	6	0.107142857	0.011479592
Pelecypoda	Clams			
Gastropoda	Snails, limpets	9	0.160714286	0.025829082
Diptera	Misc True Flies			
Coleptera	Beetles	5	0.089285714	0.007971939
Hemiptera	True Bugs	4	0.071428571	0.005102041
Ephemeroptera	Mayflies	1	0.017857143	0.000318878
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites	1	0.017857143	0.000318878
Trichoptera	Caddisflies			
Tabanidae	Horseflies			

Chironomidae	Midges	8	0.142857143	0.020408163
Amphipoda	Scuds	19	0.339285714	0.115114796
Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**56**	**1**	**0.188137755**
	Richness	**10**		
	Simpson Diversity Index (1-D)	**0.811862245**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**5.315254237**		**[D = ∑(pi)^2]**

Pooled

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	1	0.003984064	1.58728E-05
Nemata	Roundworm			
Turbellaria	Flatworms	2	0.007968127	6.34911E-05
Isopoda	Sow Bugs	55	0.219123506	0.048015111
Pelecypoda	Clams	1	0.003984064	1.58728E-05
Gastropoda	Snails, limpets	17	0.067729084	0.004587229
Diptera	Misc True Flies			
Coleptera	Beetles	7	0.027888446	0.000777765
Hemiptera	True Bugs	9	0.035856574	0.001285694
Ephemeroptera	Mayflies	2	0.007968127	6.34911E-05
Zygoptera	Damselflies			
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites	2	0.007968127	6.34911E-05

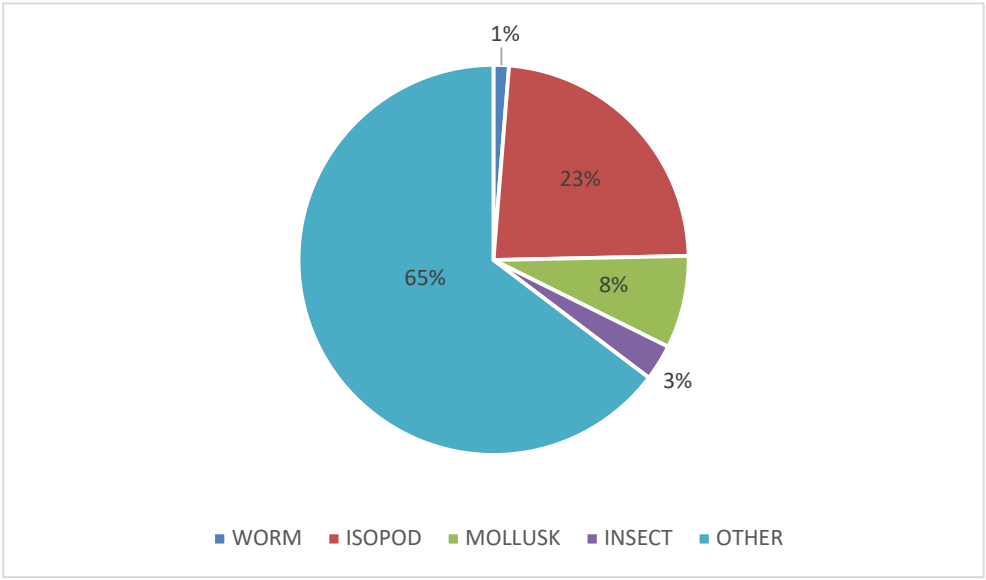
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges	27	0.107569721	0.011571245
Amphipoda	Scuds	125	0.498007968	0.248011936
Hirundinea	Leeches	1	0.003984064	1.58728E-05
Decapoda	Crayfish	1	0.003984064	1.58728E-05
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums	1	0.003984064	1.58728E-05
	Total	**251**	**1**	**0.314518817**
	Richness	**14**		
	Simpson Diversity Index (1-D)	**0.685481183**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**3.179460005**		**[D = ∑(pi)^2]**

Abundance and Percent of Organisms in each taxa

Abundance

Family /Order	SS1	SS2	SS3	Reach	Percent in Reach
WORM	**0**	**0**	**3**	**3**	**1.38**
Oligochaeta (Qquatic worms)			1	1	0.46
Nemata (Nematode)				0	0.00
Tubullaria (Flatworm)			2	2	0.92
ISOPOD	**25**	**24**	**6**	**55**	**25.35**
Sow Bugs	25	24	6	55	25.35
MOLLUSK	**9**	**0**	**9**	**18**	**8.29**
Pelecypoda (Clams)	1			1	0.46
Gastropoda (Snails, limpets)	8		9	17	7.83
INSECT	**6**	**3**	**11**	**7**	3.23
Misc. True Flies				0	0.00
Coleptera (Beetle)	2		5	7	3.23
Hemiptera (True Bugs)	3	2	4	9	4.15
Ephemeroptera (Mayfly)	1		1	2	0.92
Zygoptera (Damselfly)				0	0.00
Anisoptera (Dragonfly)				0	0.00
Plecoptera (Stonefly)				0	0.00
Megaloptera				0	0.00
Tipulidae				0	0.00
Tipulidae (Cranefly)				0	0.00
Culicidae (Mosquito)				0	0.00
Lepidoptera (Aquatic Moths)				0	0.00
Hydrachnidia (Mites)		1	1	2	0.92
Trichoptera (Caddisfly)				0	0.00
Tabanidae (Horsefly)				0	0.00
OTHER	**96**	**32**	**27**	**152**	**70.05**
Chironomidae (midges)		19	8	27	12.44

Amphipoda (Scuds)	95	11	19	125	57.60
Hirudinea (Leeches)		1		1	0.46
Decapoda (Crayfish)	1			1	0.46
Colelenterata (Hydra)				0	0.00
Ceratopogonidae (No-see-um)		1		1	0.46
TOTAL ABUNDANCE	**136**	**59**	**56**	**217**	



EPT Index

SS	# of Ephermoptera	# of Plecoptera	# of Trichoptera	EPT Index
1	1	0	0	0.007352941
2	0	0	0	0
3	1	0	0	0.017857143
Overall	2	0	0	**0.00921659**

HBI										
Organism	Common Name	Average OBBN Family Tolerance* **	SS1 species abundance	SS2 species abundance	SS3 species abundance	OVERALL species abundance	SS1 - Species abundance x tolerance	SS2 - Species abundance x tolerance	SS3 - Species abundance x tolerance	OVERALL - Species abundance x tolerance
Oligochaeta	Aquatic earthworms	10	0	0	1	1	0	0	10	10
Nemata	Roundworm	6	0	0	0	0	0	0	0	0
Turbellaria	Flatworms	4.5	0	0	2	2	0	0	9	9
Isopoda	Sow Bugs	8	25	24	6	55	200	192	48	440
Pelecypoda	Clams	6	1	0	0	1	6	0	0	6
Gastropoda	Snails, limpets	6.75	8	0	9	17	54	0	60.75	114.75
Diptera	Misc True Flies	6.5	0	0	0	0	0	0	0	0
Coleptera	Beetles	4.85714286	2	0	5	7	9.71428571	0	24.2857143	34
Hemiptera	True Bugs	5	3	2	4	9	15	10	20	45
Ephemeroptera	Mayflies	3.72727273	1	0	1	2	3.72727273	0	3.72727273	7.45454545
Zygoptera	Damselflies	7	0	0	0	0	0	0	0	0
Anisoptera	Dragonflies	4.75	0	0	0	0	0	0	0	0
Plecoptera	Stoneflies	2	0	0	0	0	0	0	0	0
Megaloptera	Fishflies/Alderflies	4	0	0	0	0	0	0	0	0
Tipulidae	Craneflies	4	0	0	0	0	0	0	0	0
Simuliidae	Blackflies	6	0	0	0	0	0	0	0	0
Culicidae	Mosquitos	8	0	0	0	0	0	0	0	0
Lepidoptera	Aquatic Moths	5	0	0	0	0	0	0	0	0

Hydrachnidia	Mites	5	0	1	1	2	0	5	5	10
Trichoptera	Caddisflies	5.94117647	0	0	0	0	0	0	0	0
Tabanidae	Horseflies	5	0	0	0	0	0	0	0	0
Chironomidae	Midges	6	0	19	8	27	0	114	48	162
Amphipoda	Scuds	6.75	95	11	19	125	641.25	74.25	128.25	843.75
Hirundinea	Leeches	8	0	1	0	1	0	8	0	8
Decapoda	Crayfish	6	1	0	0	1	6	0	0	6
Colelenterata	Hydra	6	0	0	0	0	0	0	0	0
Ceratopogonidae	No-see-ums	6	0	1	0	1	0	6	0	6
Total		-	**136**	**59**	**56**	**251**	**935.691558**	**409.25**	**357.012987**	**1701.95455**

SS	**HDI**	
1	6.88008499	
2	6.93644068	
3	6.37523191	
Overall	**6.7806954**	Fairly Poor

HBI Interpretation *:**	
0 -3.75: Excellent	Organic pollution unlkely
3.76-4.25 = Very Good	Possible slight organic pollution
4.25-5: Good	Some organic pollution probable
5.01-5.75: Fair	Fairly substantial polluiton likely
5.76-6.5: Fairly Poor	Substantial pollution likely
6.51-7.25: Poor	Very substantial polluiton likely
7.26-10: Very Poor	Severe organc pollution likely

References

* Toronto and Region Conservation Authority. 2011. Regional Watershed Monitoring Program: Benthic Macroinvertebate Summary 2001-2008. https://trcaca.s3.ca-central-

** The Watershed Institute. N.d. Pollution Tolerance Values of Aquatic Macroinvertebrate Families.

*** McGauley et al. 2018. Coarse taxonomy (tolerance value averaging) biases Hilsenhoff's family level biotic index. Environ Monit Assess. 190:446

WD-6

Simpson Diversity Index

SS1

Organism	Common Name	# collected	pi	pi^2
Oligochaeta	Aquatic earthworms			
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs	6	0.047619048	0.002267574
Pelecypoda	Clams			
Gastropoda	Snails, limpets	26	0.206349206	0.042579995
Diptera	Misc True Flies			
Coleptera	Beetles	3	0.023809524	0.000566893
Hemiptera	True Bugs			
Ephemeroptera	Mayflies	1	0.007936508	6.29882E-05
Zygoptera	Damselflies	4	0.031746032	0.001007811
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites			
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges	19	0.150793651	0.022738725
Amphipoda	Scuds	67	0.531746032	0.282753842
Hirundinea	Leeches			
Decapoda	Crayfish			

Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**126**	**1**	**0.351977828**
	Richness	**7**		
	Simpson Diversity Index (1-D)	**0.648022172**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**2.841088046**		**[D = ∑(pi)^2]**

SS2

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms			
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs			
Pelecypoda	Clams			
Gastropoda	Snails, limpets	14	0.049295775	0.002430073
Diptera	Misc True Flies			
Coleptera	Beetles	3	0.01056338	0.000111585
Hemiptera	True Bugs	1	0.003521127	1.23983E-05
Ephemeroptera	Mayflies	1	0.003521127	1.23983E-05
Zygoptera	Damselflies	15	0.052816901	0.002789625
Anisoptera	Dragonflies			
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites	1	0.003521127	1.23983E-05
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges	15	0.052816901	0.002789625
Amphipoda	Scuds	234	0.823943662	0.678883158

Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**284**	**1**	**0.687041262**
	Richness	**8**		
	Simpson Diversity Index (1-D)	**0.312958738**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.455516656**		**[D = ∑(pi)^2]**

SS3

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	2	0.01980198	0.000392118
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs			
Pelecypoda	Clams			
Gastropoda	Snails, limpets	12	0.118811881	0.014116263
Diptera	Misc True Flies			
Coleptera	Beetles			
Hemiptera	True Bugs			
Ephemeroptera	Mayflies	1	0.00990099	9.80296E-05
Zygoptera	Damselflies	2	0.01980198	0.000392118
Anisoptera	Dragonflies	1	0.00990099	9.80296E-05
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites	1	0.00990099	9.80296E-05
Trichoptera	Caddisflies			
Tabanidae	Horseflies			

Chironomidae	Midges	31	0.306930693	0.09420645
Amphipoda	Scuds	51	0.504950495	0.254975002
Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**101**	**1**	**0.364376042**
	Richness	**8**		
	Simpson Diversity Index (1-D)	**0.635623958**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**2.744417541**		**[D = ∑(pi)^2]**

Pooled

Organism	**Common Name**	**# collected**	**pi**	**pi^2**
Oligochaeta	Aquatic earthworms	2	0.003913894	1.53186E-05
Nemata	Roundworm			
Turbellaria	Flatworms			
Isopoda	Sow Bugs	6	0.011741683	0.000137867
Pelecypoda	Clams			
Gastropoda	Snails, limpets	52	0.101761252	0.010355352
Diptera	Misc True Flies			
Coleptera	Beetles	6	0.011741683	0.000137867
Hemiptera	True Bugs	1	0.001956947	3.82964E-06
Ephemeroptera	Mayflies	3	0.005870841	3.44668E-05
Zygoptera	Damselflies	21	0.04109589	0.001688872
Anisoptera	Dragonflies	1	0.001956947	3.82964E-06
Plecoptera	Stoneflies			
Megaloptera	Fishflies/Alderflies			
Tipulidae	Craneflies			
Simuliidae	Blackflies			
Culicidae	Mosquitos			
Lepidoptera	Aquatic Moths			
Hydrachnidia	Mites	2	0.003913894	1.53186E-05

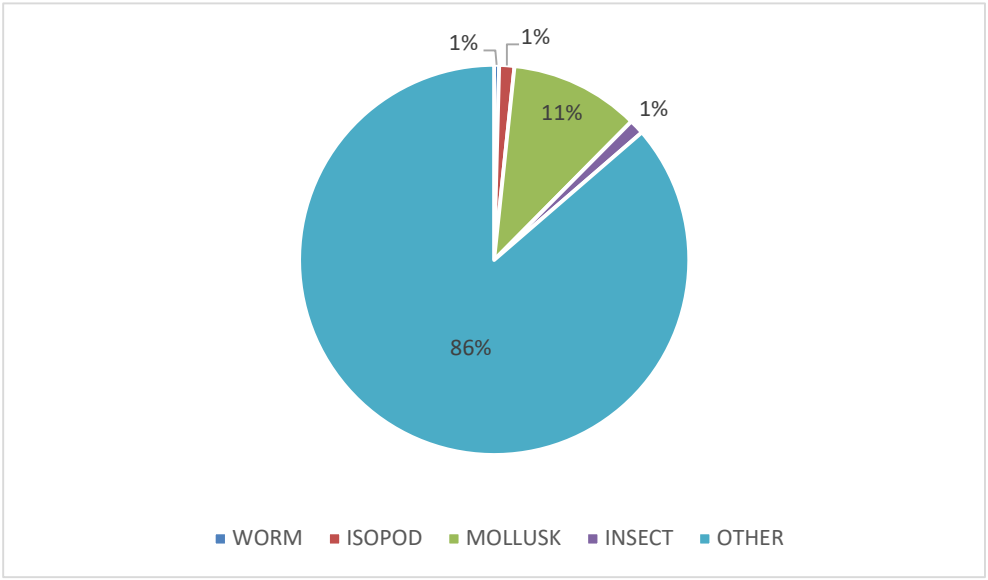
Trichoptera	Caddisflies			
Tabanidae	Horseflies			
Chironomidae	Midges	65	0.127201566	0.016180238
Amphipoda	Scuds	352	0.688845401	0.474507987
Hirundinea	Leeches			
Decapoda	Crayfish			
Colelenterata	Hydra			
Ceratopogonidae	No-see-ums			
	Total	**511**	**1**	**0.503080947**
	Richness	**11**		
	Simpson Diversity Index (1-D)	**0.496919053**		**[D = ∑(pi)^2]**
	Reciprocal (1/D)	**1.987751684**		**[D = ∑(pi)^2]**

Abundance and Percent of Organisms in each taxa

Abundance

Family /Order	SS1	SS2	SS3	Reach	Percent in Reach
WORM	**0**	**0**	**2**	**2**	**0.46**
Oligochaeta (Qquatic worms)			2	2	0.46
Nemata (Nematode)				0	0.00
Tubullaria (Flatworm)				0	0.00
ISOPOD	**6**	**0**	**0**	**6**	**1.39**
Sow Bugs	6			6	1.39
MOLLUSK	**26**	**14**	**12**	**52**	**12.06**
Pelecypoda (Clams)				0	0.00
Gastropoda (Snails, limpets)	26	14	12	52	12.06
INSECT	**8**	**21**	**5**	**6**	**1.39**
Misc. True Flies				0	0.00
Coleptera (Beetle)	3	3		6	1.39
Hemiptera (True Bugs)		1		1	0.23
Ephemeroptera (Mayfly)	1	1	1	3	0.70
Zygoptera (Damselfly)	4	15	2	21	4.87
Anisoptera (Dragonfly)			1	1	0.23
Plecoptera (Stonefly)				0	0.00
Megaloptera				0	0.00
Tipulidae				0	0.00
Tipulidae (Cranefly)				0	0.00
Culicidae (Mosquito)				0	0.00
Lepidoptera (Aquatic Moths)				0	0.00
Hydrachnidia (Mites)		1	1	2	0.46
Trichoptera (Caddisfly)				0	0.00
Tabanidae (Horsefly)				0	0.00
OTHER	**86**	**249**	**82**	**417**	**96.75**
Chironomidae (midges)	19	15	31	65	15.08

Amphipoda (Scuds)	67	234	51	352	81.67
Hirudinea (Leeches)				0	0.00
Decapoda (Crayfish)				0	0.00
Colelenterata (Hydra)				0	0.00
Ceratopogonidae (No-see-um)				0	0.00
TOTAL ABUNDANCE	**126**	**284**	**101**	**431**	



EPT Index

SS	# of Ephermoptera	# of Plecoptera	# of Trichoptera	EPT Index
1	1	0	0	0.007936508
2	1	0	0	0.003521127
3	1	0	0	0.00990099
Overall	3	0	0	**0.006960557**

HBI										
Organism	Common Name	Average OBBN Family Tolerance* **	SS1 species abundance	SS2 species abundance	SS3 species abundance	OVERALL species abundance	SS1 - Species abundance x tolerance	SS2 - Species abundance x tolerance	SS3 - Species abundance x tolerance	OVERALL - Species abundance x tolerance
Oligochaeta	Aquatic earthworms	10	0	0	2	2	0	0	20	20
Nemata	Roundworm	6	0	0	0	0	0	0	0	0
Turbellaria	Flatworms	4.5	0	0	0	0	0	0	0	0
Isopoda	Sow Bugs	8	6	0	0	6	48	0	0	48
Pelecypoda	Clams	6	0	0	0	0	0	0	0	0
Gastropoda	Snails, limpets	6.75	26	14	12	52	175.5	94.5	81	351
Diptera	Misc True Flies	6.5	0	0	0	0	0	0	0	0
Coleptera	Beetles	4.85714286	3	3	0	6	14.5714286	14.5714286	0	29.1428571
Hemiptera	True Bugs	5	0	1	0	1	0	5	0	5
Ephemeroptera	Mayflies	3.72727273	1	1	1	3	3.72727273	3.72727273	3.72727273	11.1818182
Zygoptera	Damselflies	7	4	15	2	21	28	105	14	147
Anisoptera	Dragonflies	4.75	0	0	1	1	0	0	4.75	4.75
Plecoptera	Stoneflies	2	0	0	0	0	0	0	0	0
Megaloptera	Fishflies/Alderflies	4	0	0	0	0	0	0	0	0
Tipulidae	Craneflies	4	0	0	0	0	0	0	0	0
Simuliidae	Blackflies	6	0	0	0	0	0	0	0	0
Culicidae	Mosquitos	8	0	0	0	0	0	0	0	0
Lepidoptera	Aquatic Moths	5	0	0	0	0	0	0	0	0

Hydrachnidia	Mites	5	0	1	1	2	0	5	5	10
Trichoptera	Caddisflies	5.94117647	0	0	0	0	0	0	0	0
Tabanidae	Horseflies	5	0	0	0	0	0	0	0	0
Chironomidae	Midges	6	19	15	31	65	114	90	186	390
Amphipoda	Scuds	6.75	67	234	51	352	452.25	1579.5	344.25	2376
Hirundinea	Leeches	8	0	0	0	0	0	0	0	0
Decapoda	Crayfish	6	0	0	0	0	0	0	0	0
Colelenterata	Hydra	6	0	0	0	0	0	0	0	0
Ceratopogonidae	No-see-ums	6	0	0	0	0	0	0	0	0
Total		-	**126**	**284**	**101**	**511**	**836.048701**	**1897.2987**	**658.727273**	**3392.07468**

SS	**HDI**	
1	6.63530715	
2	6.68062923	
3	6.52205221	
Overall	**6.63811091**	Poor

HBI Interpretation *:**	
0 -3.75: Excellent	Organic pollution unlkely
3.76-4.25 = Very Good	Possible slight organic pollution
4.25-5: Good	Some organic pollution probable
5.01-5.75: Fair	Fairly substantial polluiton likely
5.76-6.5: Fairly Poor	Substantial pollution likely
6.51-7.25: Poor	Very substantial polluiton likely
7.26-10: Very Poor	Severe organc pollution likely

References

* Toronto and Region Conservation Authority. 2011. Regional Watershed Monitoring Program: Benthic Macroinvertebate Summary 2001-2008. https://trcaca.s3.ca-central-

** The Watershed Institute. N.d. Pollution Tolerance Values of Aquatic Macroinvertebrate Families.

*** McGauley et al. 2018. Coarse taxonomy (tolerance value averaging) biases Hilsenhoff's family level biotic index. Environ Monit Assess. 190:446

Appendix K

Species at Risk Assessment

Species at Risk Assessment

NAME	SARA STATUS	SARO	COSEWIC	SCHEDULE	S-RANK	HABITAT REQUIREMENTS	SOURCE OF RECORD	POTENTIAL HABITAT PRESENT (Y/P/N)	RATIONALE
AVIFAUNA									
Acadian Fly Catcher (*Empidonax virescens*)	END	END	END	1	S2S3B	The Acadian Flycatcher is typically found in mature, shady forests with ravines, or in forested swamps with lots of maple and beech trees. In Canada, the Acadian Flycatcher nests only in southwestern Ontario, near the shore of Lake Erie, in large forests and forested ravines. This species is found primarily southern Ontario's Carolinian forests, and requires large, undisturbed forests, often more than 40 hectares in size. This species is relatively rare in Ontario, with 25 to 75 breeding pairs recorded in 2010 (Ministry of Natural Resources and Forestry, 2017). The main threat to the Acadian flycatcher is habitat loss due to urban and agricultural development.	OBBA	P	Breeding individuals may exist in treed areas along the Lake Erie shoreline however, it is unlikely due to the degree of disturbance in the Study Area.
Bank Swallow (*Riparia riparia*)	THR	THR	THR	1	S4B	The Bank Swallow is threatened by loss of breeding and foraging habitat, destruction of nesting habitat and widespread pesticide use. Bank swallows are small songbirds with brown upperparts, white underparts and a distinctive dark breast band. It averages 12 cm long and weighs between 10 and 18 grams. The swallow can be distinguished in flight from other swallows by its quick, erratic wing beats and its almost constant buzzy, chattering vocalizations. They nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposit, including banks of rivers and lakes, 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 (Ministry of Natural Resources and Forestry, 2014).	OBBA	P	Potential habitat may be present along the Lake Erie shoreline within the Study Area.
Barn Owl (*Tyto alba*)	END	END	END (Ontario population)	1	S1	Barn Owls require open foraging habitat with an abundance of small mammal prey, and nearby protected cavity sites for nesting. Primary foraging habitats include old agricultural fields, rough pasture, hayfields, grassy roadsides, margins of row crop fields, marine foreshore and marshes. Old fields and grassland set-asides that are 2-4 years old are among the most productive habitats for Microtus voles in Delta, British Columbia (M. Merkens pers. comm. 2008; Hindmarch 2010), a favourite prey item. Barn Owls roost in dense conifers, buildings, hollow trees, nest boxes and occasionally on the ground in fields of tall grass (Andrusiak 1994; Marti et al. 2005). A wide variety of natural and artificial nest structures has been used by Barn Owls in Canada, including cavities in live and dead trees, chimneys, elevated platforms in barn lofts, silos, hangars, water towers, bridges/overpasses, attics, crevices between stacked hay bales, and behind insulation in buildings (Campbell and Campbell 1983; Peck and James 1983; Andrusiak 1994).	OBBA	P	Potential habitat does exist in the Study Area (i.e., barn structures), however unlikely to be present due to extreme rarity in province.
Barn Swallow (*Hirundo rustica*)	THR	SC	SC	1	S4B	The Barn Swallow is a threatened species, is found throughout southern Ontario, and can range into the north as long as suitable nesting locations can be found. These birds prefer to nest within human made structures such as barns, bridges, and culverts. Barn Swallow nests are cup-shaped and made of mud; they are typically attached to horizontal beams or vertical walls underneath an overhang. A significant decline in populations of this species has been documented since the mid-1980s, which is thought to be related to a decline in prey. Since the Barn Swallow is an aerial insectivore, this species relies on the presence of flying insects at specific times during the year. Changes in building practices and materials may also be having an impact on this species (Ministry of Natural Resources and Forestry, 2015).	OBBA	Y	Three active nests were observed within the EIS Subject Lands. Potential breeding habitat may be present within the Study Area.
Bobolink (*Dolichonyx oryzivorus*)	THR	THR	THR	1	S4B	The Bobolink is found in grasslands and hayfields, and feeds and nests on the ground. This species is widely distributed across most of Ontario; however, are designated at risk because of rapid population decline over the last 50 years (Ministry of Natural Resources and Forestry, 2014). The historical habitat of the bobolink was tallgrass prairie and other natural open meadow communities; however, as a result of the clearing of native prairies and the post-colonial increase in agriculture, bobolinks are now widely found in hayfields. Due to their reproductive cycle, nesting habits, and use of agricultural areas, bobolink nests and young are particularly vulnerable to loss as a result of common agricultural practices (i.e. first cut hay).	OBBA, NHIC	Y	One Bobolink territory recorded within the EIS Subject Lands. Potential breeding habitat is likely present within the Study Area.

Canada Warbler (*Cardellina canadensis*)	THR	SC	SC	1	S4B	The Canada Warbler is found in a variety of forest types, but is most abundant in moist, mixed forests with a well-developed, dense shrub layer. This species can also be locally abundant in regenerating forests following natural or anthropogenic disturbances. Nests are usually located on or near the ground on mossy logs, and along stream banks. In Canada, habitat loss due to conversion of swamp forests, agricultural activities and road development have contributed to the species' significant long-term decline, and its special concern designation. A reduction in forests with a well-developed shrub-layer has also likely impacted Canada warblers throughout their breeding range in Ontario (Committee on the Status of Endangered Wildlife in Canada, 2008).	OBBA	P	Potential habitat within the larger treed communities of the Study Area.
Chimney Swift (*Chaetura pelagica*)	THR	THR	THR	1	S4B,S4N	The Chimney Swift is a threatened species which breeds in Ontario and winters in northwestern South America. It is found mostly near urban areas where the presence of chimneys or other manmade structures provide nesting and roosting habitat. Prior to settlement, the Chimney Swift would mainly nest in cave walls and hollow tress. The Chimney Swift initially benefitted from human settlement; however, recent declines in flying insects and the modernization of chimneys are factors attributed to their current population declines. As a threatened species, the Chimney Swift receives protection for both species and habitat under the ESA (Ministry of Natural Resources and Forestry, 2014).	OBBA, NHIC	Y	Foraging individuals were observed in the EIS Subject Lands. Potential breeding habitat exists within the Study Area (i.e., chimneys, man-made structures).
Common Nighthawk (*Chordeiles minor*)	SC	SC	SC	1	S4B	The Common Nighthawk is an extremely well camouflaged bird that inhabits gravel beaches, rock outcrops and burned woodlands, that have little to no ground vegetation. This species can also be found in highly disturbed locations such as clear cuts, mine tailings areas, cultivated fields, urban parks, gravel roads, and orchards. As an insectivore, the primary threat to this species is the widespread application of pesticides (Ministry of Natural Resources and Forestry, 2015). Special concern species do not receive habitat protection under the ESA.	OBBA	P	Potential habitat does exist in the Study Area (i.e., fields, parks).
Eastern Meadowlark (*Sturnella magna*)	THR	THR	THR	1	S4B	The Eastern Meadowlark is a bird that prefers pastures and hayfields, but is also found to breed in orchards, shrubby fields and human use areas such as airports and roadsides. Eastern meadowlarks can nest from early May to mid-August, in nests that are built on the ground and well-camouflaged with a roof woven from grasses. The decline in population of these species is thought to be at least partially related to habitat destruction and agricultural practices (Ministry of Natural Resources and Forestry, 2014).	OBBA, NHIC	P	No habitat was observed within the EIS Subject Lands. Potential habitat may be present within the Study Area.
Eastern Whip-poor-will (*Antrostomus vociferus*)	THR	THR	THR	1	S4B	Once widespread throughout the central Great Lakes region, distribution of the Eastern Whip-poor-will in this area is now fragmented. Although there is uncertainty about the causes of the population decline, the main threat is likely habitat loss and fragmentation. Additional threats may include car mortality and food supply changes related to pesticides and climate change. The Eastern Whip-poor-will is usually found in areas with a mix of open and forested areas, such as patchy forests with clearings, forests that are regenerating after major disturbances, savannahs, open woodlands or openings in more mature forests. Breeding habitat is dependent on forest structure rather than composition, although common tree associations are pine and oak, and it nests directly on the forest floor. Its distinctive call can be heard at dusk or dawn during the breeding season, and whip-poor-wills heard singing between mid-May and mid-July are likely local breeders (Committee on the Status of Endangered Wildlife in Canada, 2009).	OBBA	P	No habitat was observed within the EIS Subject Lands. Potential habitat may be present within the Study Area.
Eastern Wood-Pewee (*Contopus virens*)	SC	SC	SC	1	S4B	The Eastern Wood-pewee is classified as a species of special concern by COSSARO. Their population has been gradually declining since the mid-1960's (The Cornell Lab of Ornithology, 2015). The Eastern Wood-pewee is a "flycatcher", a bird that eats flying insects, that lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It prefers intermediate-age forest stands with little understory vegetation. Threats to the population are largely unknown; however, causes may include loss of habitat due to urban development and decreases in the availability of flying insect prey (Ministry of Natural Resources and Forestry, 2014).	OBBA, NHIC	Y	One individual was observed within the EIS Subject Lands. Several individuals observed from roadside in Study Area
Grasshopper Sparrow (*Ammodramus savannarum*)	SC	SC	SC	No Schedule	S4B	Grasshopper Sparrow are specialized to open relatively short grassland habitat, preferably grasslands with relatively sparse cover such as those in areas of poor soils, including alvars, moraines, and sand plains and generally does not favour tall grass moist meadows. It will also breed in manmade hayfields and occasionally in cereals such as Rye (*Secale cereale*).	OBBA, NHIC	P	No individuals were observed within the EIS Subject Lands. Potential habitat may be present within the Study Area.

Henslow's Sparrow (*Ammodramus henslowii*)	END	END	END	1	SHB	Henslow's Sparrow is found in large fields with tall grass, a dense litter layer, and standing dead vegetation. Continuous patches of grassland of at least 30 hectares are likely required to support Henslow's sparrow populations, which nest and probably feed on the ground. This species is extremely rare in Ontario, and there have been no confirmed breeding occurrences in the province in many years. Habitat management programs have been undertaken in Ontario to increase the area of grassland through shrub removal and mowing. Due to their reproductive cycle, nest habits, and specialized habitat requirements, Henslow's sparrow nests and young are particularly vulnerable to the loss and degradation of moist, grassy habitats (Committee on the Status of Species at Risk in Ontario (COSSARO), 2011).	OBBA	N	No known large moist fields in Study Area
Least Bittern (*Ixobrychus exilis*)	THR	THR	THR	1	S4B	The Least Bittern prefers marshes and swamps dominated by emergent vegetation, preferably cattails, interspersed with patches of woody vegetation and open water. The smallest member of the heron family, least bitterns nest in marshes south of the Precambrian Shield in Ontario. Due to the location of the nests close to the water surface, least bittern nests are susceptible to damage as a result of wakes cast by recreational boats (Government of Canada, 2015).	OBBA, NHIC	P	Potential habitat may be present within the marsh communities within the Study Area south of Friendship Trail.
Peregrine Falcon (*Falco peregrinus*)	SC	SC	Not at Risk	1	S3B	The Peregrine Falcon is a species of Special Concern in Ontario because of habitat loss and destruction, disturbance and persecution by people, and environmental contaminants. Peregrine falcons are medium sized birds of prey, with a blue back, cream-coloured chest covered in dark markings and bright yellow legs and feet. It can be found nesting on tall, steep cliff ledges close to large bodies of water. The majority of Ontario's breeding population is found around Lake Superior in northwestern Ontario (Ministry of Natural Resources and Forestry, 2014).	OBBA	P	Potential habitat is found along the Lake Erie shoreline.
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	END	END	END	1	S4B	The Red-headed Woodpecker is a medium-sized bird, with black and white colouring and a bright red head, neck, and breast. Adults often return to the same nesting site year after year. Between May and June, adults often return to the same nesting site and females lay from three to seven eggs. Habitat for the birds includes open woodland and woodland edges, often near man-made landscapes such as parks, golf courses and cemeteries. The red-headed woodpecker is widespread across southern Ontario but rare (Ministry of Natural Resource and Forestry, 2014).	OBBA, NHIC	Y	Potential habitat may be present in cultural woodland and similar communites within the Study Area. Ebird record of one near Lorraine Roadand Lake Erie from June 26, 2021. iNaturalist record from Whisky Run Golf Club from June , 2023.
Wood Thrush (*Hylocichla mustelina*)	THR	SC	THR	1	S4B	The Wood Thrush is a species of Special Concern because of habitat degradation or destruction by anthropogenic development. The Wood Thrush is a medium-sized songbird, generally rusty-brown on the upper parts with white under parts and large blackish spots on the breast and sides, and about 20 cm long. The Wood Thrush forages for food in leaf litter or on semi-bare ground, including larval and adult insects as well as plant material. They seek moist stands of trees with well-developed undergrowth in large mature deciduous and mixed (conifer-deciduous) forests. The Wood Thrush flies south to Mexico and Central America for the winter (Ministry of Natural Resources and Forestry, 2014).	OBBA, NHIC	P	No individuals were observed within the EIS Subject Lands. Potential habitat may be present within the larger woodlands of the Study Area.
HERPTILES									
Massasauga Rattlesnake (Carolinian population) (*Sistrurus catenatus*)	THR	END	THR	1	S3	Massasaugas live in different types of habitats throughout Ontario, including tall grass prairie, bogs, marshes, shorelines, forests and alvars. Within all of these habitats, Massasaugas require open areas to warm themselves in the sun. Pregnant females are most often found in open, dry habitats such as rock barrens or forest clearings where they can more easily maintain the body temperature required for the development of their offspring. Non-pregnant females and males forage and mate in lowland habitats such as grasslands, wetlands, bogs and the shorelines of lakes and rivers. Massasaugas hibernate underground in crevices in bedrock, sphagnum swamps, tree root cavities and animal burrows where they can get below the frost line but stay above the water table.	ORAA	P	Potential habitat may exist within the Study Area but none were observed during field investigations and not expected to be present.

Snapping Turtle (*Chelydra serpentina*)	SC	SC	SC	1	S3	The snapping turtle is a species of special concern in Ontario due to the potential for the species to become threatened or endangered as a result of biological factors or other identified threats. While not presently protected by law, the snapping turtle has been recognized as a species of special concern by COSSARO. Snapping turtles spend the majority of their lives in water and travel slightly upland to gravel or sandy embankments or beaches to lay their eggs (Ontario Ministry of Natural Resources and Forestry, 2014).	ORAA	P	Potential habitat may exist within the Study Area but none were observed during field investigations.
Fowler's Toad (*Anaxyrus fowleri*)	THR	END	END	1	S2	In Ontario, Fowler's Toads inhabit open beaches, dunes, sandy shorelines, rocky pools, creek and stream mouths, backshore wetlands, and marshes along the northern shore of Lake Erie.	ORAA, NHIC	P	Potential habitat exists along the shoreline of Lake Erie.
VASCULAR PLANTS									
American Chestnut (*Castanea dentata*)	END	END	END	1	S2	The American Chestnut prefers dryer upland deciduous forests with sandy, acidic to neutral soils. In Ontario, it is only found in the Carolinian Zone between Lake Erie and Lake Huron. The species grows alongside Red Oak, Black Cherry, Sugar Maple, American Beech and other deciduous tree species.	NHIC	P	Not expected, but could occur in the Study Area.
Butternut (*Juglans cinerea*)	END	END	END	1	S2?	The butternut is designated as endangered by COSSARO and is tracked by the NHIC as a species at risk. The tree is federally regulated by the Species at Risk Act (2002). Butternut belongs to the walnut family and produces edible nuts which are a preferred food source for wildlife. The range of butternut trees is south of the Canadian Shield on soils derived from calcium rich limestone bedrock. Butternut trees, which at one time were much more common to the south extending to the northern aspect of zone 6E, have been declining due to factors including forest loss and disease. Butternut trees suffer from a highly transmissible fungal disease called butternut canker. Butternut canker is causing very rapid decline in this tree species across its native range. The fungal disease is easily transmitted by wind and is very difficult to prevent. Trees often die within a few years of infection by butternut canker (Ministry of Natural Resource and Forestry, 2014).	NHIC	P	Not observed in the Subject Lands, but species may exist within the Study Area although none were observed during field investigations.
Common Hop Tree (*Ptelea trifoliata*)	SC	SC	SC	1	S3	The Lake Erie shoreline, where most of Canada's Common Hoptrees occur, is characterized by a long growing season and a moderated climate (Crins et al. 2009). On the Point Pelee and Fish Point sandspits it is common on the windward west shore but rare on the leeward side and inland. Common Hoptree is often found in areas of high natural disturbance where it forms the outer edge of shoreline woody vegetation. It usually grows on nutrient-poor sand, but occasionally occurs on other droughty substrates such as thin soil over limestone. This species shows little tolerance for deep shade.	NHIC	P	Not observed during field investigations. Potential habitat may be found along the Lake Erie shoreline.
Shumard oak (*Quercus shumardii*)	No Status	SC	SC	No Schedule	S3	In Ontario, shumard oak occurs in mature deciduous woods on clay soil, silty loam and in swampy areas. This species is usually well spaced and never occurs in pure stands (Donley et al. 2013). It typically grows in southwestern Ontario.	NHIC	P	Not observed during field investigations. Potential habitat may be found throughout the Study Area.
MAMMALS									
Tri-colored Bat (Eastern Pipistrelle) (*Perimyotis subflavus*)	END	END	END	1	S3?	The eastern pipistrelle is a small bat that is widely distributed in eastern North America and whose range extends north to southern Ontario. The eastern pipistrelle is rare in this region of Ontario which is at the northernmost limit of the natural range for the species. These bats prefer to nest in foliage, tree cavities and woodpecker holes, and are occasionally found in buildings; though this is not their preferred habitat. Winter hibernation takes place in caves, mines and deep crevices. Eastern pipistrelles feed primarily on small insects and prefer an open forest habitat type in proximity to water (University of Michigan Museum of Zoology, 2004).	Professional Experience	P	No observations made however, potential habitat may present within treed areas of the Study Area.
Eastern Small-footed Myotis (*Myotis leibii*)	No Status	END	No Status	No Schedule	S2S3	The eastern small-footed myotis, a bat, are an endangered species threatened by a disease known as white nose syndrome, caused by a fungus from Europe. Eastern small-footed bat's fur has black roots and shiny light brown tips, giving it a yellowish-brown appearance. Its face mask, ears and wings are black, and its underside is grayish-brown, about 8 cm long in size and weighs 4-5 grams. 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. They change their roosting locations daily and hunt at night for insects to eat, including beetles, mosquitos, moths, and flies. They hibernate in winter, often in caves and abandoned mines. They can be found from south of Georgian Bay to Lake Erie and east to the Pembroke area, and choose colder and drier sites (Ministry of Natural Resources and Forestry, 2014).	Professional Experience	P	No observations made however, potential habitat may present within treed areas of the Study Area.

Little Brown Myotis (*Myotis lucifugus*)	END	END	END	1	S4	Little brown myotis, a bat, are an endangered species threatened by a disease known as white nose syndrome, caused by a fungus from Europe. Little brown bats have glossy brown fur and usually weigh between four and 11 grams. 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 – an ideal environment for the fungus to grow and flourish. The syndrome affects bats by disrupting their hibernation cycle, so that they use up body fat supplies before the spring when they can once again find food sources (Ministry of Natural Resources and Forestry, 2014).	Professional Experience	P	No observations made however, potential habitat may present within treed areas of the Study Area.
Northern Myotis (*Myotis septentrionalis*)	END	END	END	1	S3	The northern long-eared myotis, a bat, are an endangered species threatened by a disease known as white nose syndrome, caused by a fungus from Europe. Northern long-eared bats have dull yellow-brown fur with pale grey bellies. They are approximately eight cm long, with a wingspan of about 25 cm, and usually weigh six to nine grams. Northern long-eared bats can be found in boreal forests, roosting 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 (Ministry of Natural Resources and Forestry, 2014).	Professional Experience	P	No observations made however, potential habitat may present within treed areas of the Study Area.
Aquatics									
Silver Chub (*Macrhybopsis storeriana*)	END	THR	END	1	S2	Throughout most of its North American range, Silver chub prefers medium to large rivers with substantial current and silt, sand or gravel bottoms, but in Ontario it is only found in the Great Lakes. It is usually found in depths between seven and 12 metres, and is believed to spawn in May and June in open water areas. It feeds on aquatic insect larvae, crustaceans and molluscs, including Zebra mussels.	DFO	N	Habitat exists within the Great Lakes, immediately adjacent to the Study Area. No known occurrences within the Study Area.
Silver Lamprey (Great Lakes - Upper St. Lawrence River population) (*Ichthyomyzon unicuspis*)	SC	SC	SC	1	S3	The Silver Lamprey requires clear water to allow the parasitic phase to locate fish hosts, relatively clean stream substrate composed of sand and organic debris for ammocoete habitat, and unrestricted migration routes for spawners (Trautman 1981). They have several requirements for spawning, including gravel and sand to build their nests (Trautman 1981; Scott and Crossman 1998). They prefer habitats with swift-flowing, unidirectional water current over intermediate-sized gravel and sand substrate (Carpenter et al. 1987; Manion and Hanson 1980). They require water velocities of 0.5-1.5 m/s and a small amount of silt-free sand or some other fine material to which the eggs can adhere (Manion and Hanson 1980).	DFO	N	Habitat exists within the Great Lakes, immediately adjacent to the Study Area. No known occurrences within the Study Area.
Spotted Sucker (*Minytrema melanops*)	SC	SC	SC	1	S2	The Spotted sucker usually inhabits clear creeks and small to moderate sized rivers with sand, gravel or hard-clay bottoms, usually free of silt. However, in Ontario it has frequently been found in turbid habitats. In late spring and early summer, Spotted suckers move to rocky riffle areas of streams to breed.	DFO	N	Habitat exists within the Great Lakes, immediately adjacent to the Study Area. No known occurrences within the Study Area.
OTHER									
Monarch Butterfly (*Danaus plexippus*)	SC	SC	END	1	S2N,S4B	The monarch is an orange and black butterfly with small white spots and is classified as a species of special concern by COSSARO. The monarch relies on milkweed plants as a food source for growing caterpillars, but the adult butterflies forage in diverse habitats for nectar from wildflowers. The greatest threat to the monarch is loss of overwintering habitat in Mexico. Other threats include use of pesticides and herbicides throughout its range (Ministry of Natural Resources and Forestry, 2014).	OBA	Y	No individuals observed during field investigations by Palmer however, potential habitat does exist within the Study Area. At least one iNaturalist record from area.

Notes:
SC - Special Concern
THR - Threatened
END - Endangered
S1 - Extremely rare in Ontario
S2 - Very rare in Ontario
S3 - Rare to uncommon in Ontario
S4 - Considered to be common in Ontario
S5 - Species is widespread in Ontario
SH - Possibly extirpated
S#S# - Indicates insufficient information exists to assign a single rank.

S#? - Indicates some uncertainty with the classification due to insufficient data.
S#N - Nonbreeding
S#B - Breeding
Y= Yes, P = Potential, N = No

Appendix L

Significant Wildlife Habitat Assessment

SWH Type	Associated Species	Associated ELC Ecosites	Habitat Criteria	Presence (Y/P/N)	Additional Notes and Species Observations
Seasonal Concentration Areas of Animals					
Waterfowl Stopover and Staging Areas (Terrestrial)	Duck-like species, Tundra Swan	CUM + CUT ecosites	Fields with sheet-water flooding mid-March to May. Specific areas for Tundra Swan	P	Potential habitat may be present in fields. Not mapped.
Waterfowl Stopover and Staging Area (Aquatic)	Ducks, Geese	Ponds, Lakes, Inlets, Marshes, bays, coastal inlets, watercourse used in migration, Swamps, Shallow Water Ecosites	Sewage & SWM ponds **not** SWH. Reservoir managed as a large wetland or pond/lake qualifies. Abundant food supply (inverts, shallow water veg)	N	None known, no larger waterbodies or open water present in the subwatershed. Quarry ponding not considered SWH.
Shorebird Migratory Stopover Area	Shorebirds	Beaches, Dunes, Meadow Marshes	Shorelines. Great Lakes Shores, including rocky ones. Sewage treatment ponds and storm water ponds **not** SWH.	N	No known suitable habitat. Beach along Lake Erie, at Wignell Drain outlet, not considered high quality shorebird habitat.
Raptor Wintering Area	Eagles, Hawks, Owls	**Hawks/Owls:** Combination of both Forest and Cultural Ecosites **Bald Eagle:** Forest or swamp near open water (hunting ground)	**Raptors:** >20ha, with a combo of forest and upland. Meadow (>15ha) with adjacent woodlands. **Eagles:** open water, large trees & snags for roosting.	P	Potential habitat may be present in the south part of the Study Area, where there are treed areas and large open areas (Buteos), additionally there are treed areas close to Lake Erie (Eagle). Not mapped.
Bat Hibernacula	Big Brown Bat, Tri-coloured Bat	Caves, Crevices, mines, karsts	Buildings and active mine sites **not** SWH.	N	Habitat is not present.
Bat Maternity Colonies	Big Brown Bat, Silver-haired Bat	Decidious or mixed forests and swamps.	Mature deciduous and mixed forests with >10/ha cavity trees >25 cm DBH.	P	Potential habitat may be present within the treed areas of the Study Area. Not mapped
Turtle Wintering Area	**Turtles** (Midland, N. Map, Snapping)	SW, MA, OA, SA, FEO, BOO (requires open waters)	**Free water beneath ice.** Soft mud substrate. Permanent water bodies, large wetlands, bogs, fens with adequate DO. Man-made is not SWH.	P	Potential habitat present, particularly along Wignell Drain south of Friendship Trail. Not mapped.
Reptile Hibernaculum	Snakes	**Snakes:** Any ecosite (esp. w/ rocky areas), other than very wet ones. Talus, Rock Barren, Crevice, Cave, Alvar esp.	**Access below frost line:** burrows; **rock** crevices, piles or slopes, **stone** fences or foundations. Conifer/shrubby swamps/swales, poor fens, depressions in bedrock w/ accumulations of sphagnum moss or sedge hummock ground cover.	N	No potential habitat, using this criteria, has been observed. No snakes observed within the Elite Lands by Palmer. Hibernacula persumed to not be present.
Colonially-nesting Bird Breeding Habitat (Bank and Cliff)	Cliff Swallow, N. Rough-winged Swallow	Habitat includes: banks, sandy hills/piles, pits, slopes, cliff faces, bridge abutments, silos, barns.	Exposed soil banks, does **not** a licensed/permitted aggregate area or new man-made features (2 yrs), nor bridges or buildings.	N	Habitat not known to be present; banks and cliffs not typical of this subwatershed. No Cliff Swallows and only a few N. Rough-winged Swallows were observed during breeding bird surveys.
Colonially-nesting Bird Breeding Habitat (Tree/Shrubs)	Great Blue Heron, Black-crowned NightHeron, Great Egret, Green Heron	SWM2, SWM3, SWM5, SWM6, SWD1 to SWD7, FET1	Nests in live or dead standing trees in wetlands, lakes, islands and peninsulas. Shrubs and emergents may be used. Nests in trees are 11 - 15 m from ground, near tree tops.	P	Habitat may be present within deciduous swamps and thickets of the Study Area, however if any colonies of the first three species were present, they would be expected to have been seen. Only a few Great Blue Herons were observed foraging and one Green Heron was observed.
Colonially-nesting Bird Breeding Habitat (Ground)	Herring Gull, Great Black-backed Gull, Little Gull, Ring-billed Gull, Common Tern, Caspian Tern, Brewer's Blackbird	**Gulls/Terns:** Rocky island or peninsula in lake or river. **Brewer's Blackbird:** close to watercourses in open fields or pastures with scattered trees or shrubs.	**Gulls/Terns:** islands or peninsulas with open water or marshy areas. **Brewers Blackbird colonies:** on the ground in low bushes close to streams and irrigation ditches.	N	No habitat present for Gulls/Terns. Study Area out of range for Bewer's Blackbird.
Migratory Butterfly Stopover Area	Painted Lady, Red Admiral, **Special Concern:** Monarch	Combination of open (CU) and forested (FO) ecosites (need one from each).	≥10 ha, located within 5 km of Lake Ontario or Lake Erie. Undisturbed sites, with preferred nectar species.	P	Although the subwatershed is within 5 km of Lake Erie, there are very few old field habitat areas. Not mapped.
Landbird Migratory Stopover Areas	All migratory songbirds. All migrant raptor species.	Forest (FO) and Swamp (SW) ecosites	Woodlots >5 ha within 5 km of L. Ontario & L. Erie (2-5 ha if rare in area). If multiple woodlands are along the shoreline, those <2 km from L. Ontario are more significant.	P	In-depth studies would be required to determine which are the best areas in the subwatershed for migratory land birds. Palmer has considered A1/B1, B2, B3, A3 and A4 woodlands within the Subject Lands as potential SWH given their relative proximity (about 2 to 3 km) to Lake Erie. Other woodlands within the subwatershed could also be potential SWH, especially those situcated closer to Lake Eire. Not mapped
Deer Winter Congregation Areas	White-tailed Deer	Mixed or Conifer ecosites	Determined by MNRF - no studies	P	Following Palmer's review of MNRF mapping, It is Palmer's understanding that mapped congregation areas are based on outdated aerial imagery and therefore, should not be relied upon to confirm SWH designation. Potential habitat may be present within the Study Area however, it is unlikely given none of the woodlands meet the provided size criteria (> 50 ha).
Rare Vegetation Communities					
Cliffs and Talus Slopes		TAO, TAS, CLO, CLS, TAT, CLT e.g., Niagara Escarpment (contact NEC)	**Cliff:** near vertical bedrock >3m **Talus Slope:** coarse rock rubble at the base of a cliff	N	Habitat is not present.
Sand Barren		SBO1, SBS1, SBT1	Sand Barrens >0.5 ha. Vegetation can vary from patchy and barren to tree covered, but <60%. <50% vegetation cover are exotic species.	N	Habitat is not present.

SWH Type	Associated Species	Associated ELC Ecosites	Habitat Criteria	Presence (Y/P/N)	Additional Notes and Species Observations
Alvar	*Carex crawei, Panicum philadelphicum, Eleocharis compressa, Scutellaria parvula, Trichostema brachiatum*	ALO1, ALS1, ALT1, FOC1, FOC2, CUM2, CUS2, CUT2-1, CUW2	Alvar >0.5 ha. **Need 4 of the 5 Alvar Inidcator Spp**. <50% vegetation cover are exotic species.	N	Habitat is not present.
Old Growth Forest	Trees >140 yrs; heavy mortaily = gaps. Multi-layer canopy, lots of snags and downed logs	FOD, FOC, FOM, SWD, SWC, SWM	Woodland areas 0.5 ha. No evidence of logging.	N	Habitat not known to be present.
Savannah	Prairie Grasses w/ trees	TPS1, TPS2, TPW1, TPW2, CUS2	No min. size.A Savannah is a tallgrass prairie habitat that has tree cover of 25 – 60%. <50% cover of exotic species.	N	Habitat is not present.
Tallgrass Prairie	Prairies Grasses dominate	TPO1, TPO2	No min. size. An open Tallgrass Prairie habitat has < 25% tree cover. Less than 50% cover of exotic species.	N	Habitat is not present.
Other Rare Vegetation Communities		Provincially Rare S1 - S3 veg. comm. are listed in Appendix M of SWHTG.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	Y	Rare vegetation communities (i.e., Southern Arrow-wood Mineral Thicket Swamp) were identified within the EIS Subject Lands and are not known, but may be, present within the Study Area. Mapped.
Specialized Habitat for Wildlife					
Waterfowl Nesting Area	Ducks	Upland habitats adjacent to: MAS1 to MAS3, SAS1, SAM1, SAF1, MAM1 to MAM6, SWT1, SWT2, SWD1 to SWD4 (>0.5 ha open water wetlands, alone or collectively).	Extends 120 m from a wetland or wetland complex. Upland areas should be at least 120 m wide. Wood Ducks and Hooded Mergansers use cavity trees (>40 cm dbh).	P	Potential habitat may be present south of Friendship Trail however, breeding bird data suggests that insufficient nesting waterfowl are present. Not mapped.
Bald Eagle & Osprey Nesting, Foraging and Perching Habitat	Osprey, Bald Eagle	FOD, FOM, FOC, SWD, SWM, SWC directly adjacent to riparian areas	Nesting areas are associated with waterbodies along forested shorelines, islands, or on structures over water. Not man-made structures.	P	Potential habitat may be present within treed habitats close to Lake Erie however, observations of nests nor of either species were made by Palmer. One record of a Bald Eagle was made in March 2021 (eBird). Not mapped.
Woodland Raptor Nesting Habitat	Barred Owl. **Hawks:** N. Goshawk, Cooper's, Sharp-shinned, Red-shouldered, Broad-winged.	Forests (FO), swamps (SW), and conifer plantations (CUP3)	>30 ha with > 4 ha interior habitat (200 m buffer)	P	No habitat present using the Candidate criteria and no observations of any listed species during breeding bird surveys however, Sharp-shinned and Cooper's Hawk may be present. Not mapped.
Turtle Nesting Areas	Midland Painted Turtle **Special Concern:** Snapping Turtle, Northern Map Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100m) or within: MAS1 to MAS3, SAS1, SAM1, SAF1, BOO1, FEO1	Nest sites within open sunny areas with soil suitable for digging. Sand and gravel beaches.	P	Habitat may be present between Lakeshore Road and the south edge of the subwatershed (i.e., within the historical sand dune). Not mapped.
Seeps and Springs	Wild Turkey, Ruffed Grouse, Spruce Grouse, White-tailed Deer, Salamander spp.	Seeps/Springs are areas where ground water comes to the surface.	Any forested area within the headwaters of a stream/river system. (2 or more seeps/springs confirms SWH type).	N	No seeps or springs observed within the Study Area; geological terrain is not conducive for these conditions.
Amphibian Breeding Habitat (Woodland)	Woodland Frogs and Salamanders, E. Newt	FOC, FOM, FOD, SWC, SWM, SWD	Open water wetlands, pond or woodland pool of >500 m^2 within or adjacent to wooded areas. Permanent ponds or holding water until mid-July preferred.	Y	One location meets the criteria. Chorus of both Spring Peeper and Western Chorus Frog recorded in April 2022 in the SWD3 community south of Carl Rd and 2nd Concession Rd. Mapped.
Amphibian Breeding Habitat (Wetlands)	Toads, Frogs, and Salamanders, E. Newt	SW, MA, FE, BO, OA and SA. Typically isolated (>120m) from woodland ecosites, however larger wetlands may be adjacent to woodlands.	Open water wetland ecosites >500m^2 isolated from woodland ecosites with high species diversity. Permanent water with abundant vegetation for bullfrogs.	P	Apart from Western Chorus Frog, only a few Green Frogs recorded (of criteria species). Currently no known locations fit the criteria, however a few locations may fit this criteria (i.e., Wignell Drain south of Friendship Trail; golf course pond)
Woodland Area-Sensitive Bird Breeding Habitat	Birds (area-sensitive species)	FOC, FOM, FOD, SWC, SWM, SWD	Large mature (>60 years) forest stands/woodlots >30 ha. Interior forest habitat >200m from forest edge.	N	Very few forest area-sensitive birds recorded. Despite lack of access, woodland size and configuration strongly suggests that the conditions for this category would not be met.
Habitat of Species of Conservation Concern					
Marsh Bird Breeding Habitat	Wetland Birds	MAM1 to MAM6, SAS1, SAM1, SAF1, FEO1, BOO1 **Green Heron**: SW, MA and CUM1	Wetlands with shallow water and emergent vegetation. Gr. Heron @ edges of these types w/ woody cover.	P	Habitat may be present however, no large cattail marshes are known to be present in the Study Area, and none of the listed Criteria species were observed, except for Green Heron (in the wetland area south of Friendship Trail).
Open Country Bird Breeding Habitat	Upland Sandpiper, Grasshopper Sparrow, Vesper Sparrow, N. Harrier, Savannah Sparrow, **Short-eared Owl (SC)**	CUM1, CUM2	Grassland/meadow >30 ha. Not being actively used for farming. Habitat established for 5 years or more.	N	No suitable habitat is present in the Study Area, areas of meadow are generally very small.
Shrub/Early Successional Bird Breeding Habitat	**Brown Thrasher + Clay-coloured Sparrow (indicators);** Field Sparrow, Black-billed Cuckoo, E. Towhee, Willow Flycatcher, Yellow-breasted Chat, Golden-winged Warbler	CUT1, CUT2, CUS1, CUS2, CUW1, CUW2	Large field areas succeeding to shrub and thicket habitats > 10 ha. Areas not actively used for farming in the last 5 years.	P	Suitable habitat may be present in the Study Area. Small numbers of Willow Flycatcher and Field Sparrow were recorded however, no high quality areas for shrubland birds are known to date. Not mapped.

SWH Type	Associated Species	Associated ELC Ecosites	Habitat Criteria	Presence (Y/P/N)	Additional Notes and Species Observations
Terrestrial Crayfish	Chimney or Digger Crayfish; Devil Crayfish or Meadow Crayfish	MAM1 to MAM6, MAS1 to MAS3, SWD, SWT, SWM. CUM1 sites with inclusions of the aforementioned.	Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish (typc. protected by wetland setbacks).	P	Potential habitat may exist within the marshes and swamps of the Study Area. However, no chimneys have been observed to date. Not mapped.
Special Concern and Rare Wildlife Species	Any species of concern or rare wildlife species	Any ELC code.	Presence of species of concern or rare wildlife species.	Y	Two Special Concern avian species were recorded; Eastern Wood-Pewee and Barn Swallow. Three Barn Swallow nests were observed in two buildings in the active farm area at 896 Killlaly St. E. This is the only area where three or more Barn Swallow nests were observed and thus, is the only SWH for Barn Swallow (mapped). All records of Eastern Wood-Pewee are of single territories in a treed area. Single territories are not considered SWH based on professional experience. One record of Green-winged Teal (Occasional), with uncertain breeding status, and a single breeding record of Tufted Titmouse (Rare) are not considered SWH due to low numbers. Other SWH under this category have the potential to occur.
Animal Movement Corridors					
Amphibians	Amphibians	all ecosites assoc. w/ water	Movement corridors between breeding habitat and summer habitat.	N	None known. The Criteria Schedule says: "Animal Movement Corridors should only be identified as SWH where: where a Confirmed or Candidate SWH has been identified by MNRF or the planning authority based on documented evidence of a habitat identified within these Criterion Schedules or the Significant Wildlife Habitat Technical Guide".
Exceptions for Ecoregion 7E					
Bat Migratory Stopover: 7E-2	Hoary Bat, Eastern Red Bat, Silver-haired Bat	No Specific ELC	Long Point (42°35' N, 80°30'E to 42°33' N, 80°,03'E) - Silver-haired. Additional stopover areas currently unknown.	N	Habitat not known to be present within the Study Area at this time.

Appendix M

Fluvial Photo Log

Photograph 1. ***Reach PC-2 Photo taken at Babion Road box culvert. Deep pool at culvert approximately 0.50-1.0m deep. (Dec 12, 2022)***

Photograph 2. ***Reach PC-3 Photo taken at Main St. E. culvert facing downstream. (May 24, 2022)***

Photograph 3. ***Reach PC-4 Photo taken at Matin St. E. facing westward. Note large stone placed in channel. (May 24, 2022)***

Photograph 4. ***Reach PC-5 Photo taken facing northward, flow is from right to left in photo (Oct 19, 2023)***

Photograph 5. ***Reach PC-6 Cross-section photo from detailed fieldwork facing downstream. (Jul 18, 2023)***

Photograph 6. ***Reach PC-7 Shallow wide cross-section, photo taken facing northward (Oct 19, 2023).***

Photograph 7. ***Reach PC-7 Photo taken facing upstream cross-section widens approaching Friendship Trail (Oct 19, 2023).***

Photograph 8. ***Reach PC-7 Photo taken facing southward, Friendship Trail crossing visible (Oct 19, 2023).***

Photograph 9. ***Reach WD-2 Photo taken at Main St. E. culvert facing south (Dec 12, 2022).***

Photograph 10. ***Reach WD-4 Photo taken at Killaly St. E. culvert facing south (Dec 12, 2022).***

Photograph 11. ***Reach WD-4 Photo taken at Lorraine Road culvert facing north (Dec 12, 2022).***

Photograph 12. ***Reach WD-4 Photo taken north of Friendship Trail before confluence with Reach PC-7 (Dec 12, 2022).***

Photograph 13. ***Confluence of PC-7 and WD-4 downstream of Friendship Trail, photo taken facing south (Dec 12, 2022).***

Photograph 14. ***Reach WD-5 at Lakeshore Road, photo taken facing north (Dec 12, 2022).***

Appendix N

Hydrogeology

A1. Well Records

A2. Regional Well Logs

A2. Borehole and Well logs

A2. Groundwater – Chemical Analysis

WELL_ID	COMPLETED	DEPTH	DP_BEDROCK	STATIC_LEV	WELL_USE	WATER	SCREEN	CASING_DIA	PUMP_TEST	FORMATION
6600870	1967-06-27	15.20	3.00	0.00	DO	FR 0012 SU 0032 SU 0047			/45/2/0:15	BRWN CLAY 0010 SHLE GRVL 0014 LMSN 0050
6600871	1967-11-30	17.40	7.30	0.30	DO	SU 0057			1/50/2/2:0	BRWN CLAY 0024 LMSN 0057
6600874	1953-06-06	7.60	2.70	1.80	DO	SU 0025			6///:	BLCK LOAM CLAY 0009 GREY SHLE 0025
6600876	1957-09-14	14.60	5.50	3.70	DO	FR 0048			12/12/10/0:30	MSND 0010 BLUE CLAY 0018 LMSN 0048
6600877	1962-12-01	14.60	4.30	1.80	DO	FR 0048			6/46/1/2:0	BLUE CLAY 0014 LMSN 0048
6600878	1967-09-06	7.30	2.10	3.00	DO	FR 0024			10/12/15/1:0	CLAY 0007 LMSN 0024
6600879	1947-09-12	18.00	17.10	0.00	DO	FR 0040			//3/1:0	MSND 0050 GRVL 0056 LMSN 0059
6600880	1957-05-15	7.60	4.60	0.60	DO	SU 0022			2/20/1/1:0	CLAY 0015 LMSN 0025
6600881	1960-09-23	4.90	1.80	1.50	DO	FR 0015			5/8/20/0:30	LOAM 0001 BRWN CLAY 0006 BRWN LMSN 0016
6600882	1964-04-24	14.30	10.40	7.60	DO	FR 0047			25/30/10/1:30	MSND 0025 BLUE CLAY 0034 LMSN 0047
6600883	1965-08-19	7.30	2.10	2.40	DO	SU 0024			8/15/6/1:30	CLAY 0007 GREY LMSN 0024
6600884	1952-01-14	7.90	0.90	2.40	DO	SU 0026			8/8/4/0:30	CLAY 0003 LMSN 0026
6600885	1951-10-22	6.10	3.00	1.20	DO	FR 0020			4/4/4/0:30	CLAY 0010 BLCK SHLE 0020
6600886	1952-09-24	5.80	2.10	1.80	DO	FR 0019			6/6/3/0:30	LOAM CLAY 0007 LMSN 0019
6600887	1953-04-15	8.50	3.70	1.50	DO	FR 0028			5/5/3/0:30	RED CLAY 0012 GREY LMSN 0028
6600888	1957-06-03	5.80	3.00	1.80	DO	FR 0019			6/6/10/0:30	RED CLAY 0010 LMSN 0019
6600889	1959-04-08	4.30	1.50	1.80	DO	FR 0014			6/9/10/0:30	LOAM 0005 LMSN 0014
6600890	1961-07-11	6.10	1.80	1.80	DO	FR 0020			6/18/7/1:30	CLAY 0006 LMSN 0020
6600891	1961-07-13	7.00	3.70	1.80	DO	FR 0023			6/20/3/1:30	CLAY 0012 LMSN 0023
6600892	1962-06-28	6.70	3.70	1.20	DO	FR 0022			4/4/15/1:0	CLAY 0012 LMSN 0022
6600893	1962-10-10	7.30	1.80	3.00	ST DO	FR 0024			10/10/7/1:0	CLAY 0006 LMSN 0024
6600894	1963-03-14	6.70	4.30	1.20	DO	SU 0022			4/4/10/1:0	CLAY 0014 LMSN 0022
6600895	1963-07-25	9.10	2.70	3.00	DO	FR 0030			10/28/2/1:30	CLAY 0009 LMSN 0030
6600896	1966-09-15	6.70	1.80	2.40	DO	FR 0014			8/22/2/1:0	GREY CLAY 0006 LMSN 0022
6600897	1950-10-28	11.30	7.90	3.00	DO	FR 0037			10/10/4/0:30	MSND 0026 LMSN 0037
6600898	1951-06-11	8.20	1.50	1.20	DO	MN 0027			4///:	CLAY 0005 LMSN 0027
6600899	1952-09-17	4.90	0.00	2.70	DO	FR 0016		6	9/9/4/0:30	BLCK MUCK 0012 GRVL 0016
6600900	1962-02-06	8.80	2.70	2.40	DO	FR 0029			8/8/10/1:0	CLAY 0009 GREY LMSN 0029
6600901	1967-09-25	7.60	1.20	3.00	DO	FR 0025			10/14/15/1:30	CLAY 0004 GREY LMSN 0025
6600902	1954-10-14	8.20	2.70	2.10	DO	SU 0027			7/7/4/0:30	CLAY 0009 SHLE 0027
6600903	1963-04-18	8.20	2.70	4.30	DO	SU 0027			14/14/12/1:30	BRWN CLAY 0009 LMSN 0027
6600904	1948-08-17	7.90	1.50	2.40	CO	FR 0023			8/18/9/0:30	LOAM GRVL 0005 LMSN 0026
6600956	1954-08-09	10.10	1.20	5.80	DO	FR 0033			19/19/8/0:10	CLAY 0004 BRWN LMSN 0033
6600958	1959-07-31	8.80	3.70	3.70	DO	SU 0029			12/14/5/1:0	CLAY 0012 LMSN 0029
6600959	1964-04-11	15.20	8.20	4.90	DO	FR 0050			16/40/5/1:30	RED CLAY 0027 SHLE 0050
6600965	1956-06-06	6.70	2.40	1.50	DO	FR 0022			5/10/50/1:0	CLAY 0008 LMSN 0022
6600966	1965-05-20	8.50	3.70	0.60	DO	SU 0028			2/2/20/1:0	CLAY 0012 LMSN 0028
6600967	1966-11-09	9.10	4.60	1.80	DO	SU 0030			6/12/10/1:30	CLAY 0015 LMSN 0030
6600968	1949-08-28	13.70	9.10	7.60	DO	FR 0043			25///:	CLAY GRVL 0010 CLAY 0030 LMSN 0045
6600969	1954-05-21	9.40	7.60	2.40	DO	FR 0027			8/8/15/1:0	LOAM CLAY 0018 QSND 0025 LMSN 0031
6600970	1963-10-23	16.80	13.70	10.70	DO	FR 0055			35/42/10/1:30	LOAM MSND 0045 LMSN 0055
6600971	1948-07-29	8.80	2.70	0.60	DO	SU 0026			2/27/2/1:0	RED CLAY 0009 LMSN 0029
6600972	1952-03-21	9.10	5.80	2.40	DO	SU 0027			8/8//:	CLAY 0017 CLAY GRVL 0019 LMSN 0030
6600973	1954-08-14	7.30	6.40	3.00	DO	FR 0024			10/10/10/1:0	LOAM 0002 CLAY 0021 LMSN 0024
6600974	1958-05-27	12.20	7.90	2.40	IR DO	FR 0040			8/8/15/0:30	RED CLAY 0015 BLUE CLAY 0026 LMSN 0040
6600975	1949-09-25	9.10	0.90	3.70	DO	FR 0028			12/20/4/0:30	LOAM 0003 LMSN 0030
6600976	1951-07-12	9.10	0.90	2.40	DO	FR 0028			8///:	CLAY 0003 LMSN 0030
6600977	1951-11-20	19.20	1.80	5.20	ST DO	FR 0063			17/17/4/0:30	CLAY 0006 BRWN SHLE 0063
6600978	1957-07-01	6.40	2.40	2.10	DO	FR 0021			7/7/10/0:30	RED CLAY 0008 LMSN 0021
6600979	1959-01-12	6.40	2.10	1.80	DO	FR 0021			6/8/50/1:0	CLAY 0007 LMSN 0021

6600980	1961-06-19	6.10	0.60	0.90	DO	FR 0020			3/3/15/1:0	LOAM CLAY 0002 LMSN 0020
6600981	1947-12-27	4.00	3.00	0.30	DO	FR 0013			1///:	CLAY 0010 LMSN 0013
6600982	1947-12-31	7.90	4.60	0.30	DO	FR 0026			1///:	CLAY 0015 LMSN 0026
6600983	1952-05-13	4.60	2.40	0.60	DO	SU 0015			2/2//:	CLAY 0008 LMSN 0015
6600984	1952-07-26	6.40	3.00	1.20	DO	SU 0021			4/4//:	RED CLAY 0010 LMSN 0021
6600985	1953-07-18	11.90	3.40	8.20	DO	SU 0039			27/30/4/2:0	CLAY MSND STNS 0011 GREY SHLE 0039
6600986	1953-07-20	4.90	1.80	0.30	DO	SU 0016			1/3/2/2:0	CLAY MSND STNS 0006 GREY SHLE 0016
6600987	1952-05-09	7.60	1.50	2.10	DO	SU 0025			7/7//:	CLAY 0005 LMSN 0025
6600988	1967-03-25	7.90	3.70	0.60	DO	SU 0026			2/2/15/1:0	CLAY 0012 LMSN 0026
6600989	1948-07-29	8.80	4.30	2.40	DO	FR 0028			8/25/5/0:30	CLAY GRVL 0014 LMSN 0029
6600990	1950-03-20	9.40	0.60	1.20	DO	FR 0029			4/31//:	LOAM 0002 LMSN 0031
6600991	1953-04-07	4.90	0.90	1.20	DO	FR 0016			4//5/:	CLAY MSND STNS 0003 GREY SHLE 0016
6600992	1953-10-14	7.30	2.70	1.20	DO	SU 0024			4/24/4/0:30	CLAY 0009 LMSN 0024
6600993	1956-03-17	4.30	1.50	1.50	DO	FR 0014			5/5/4/0:30	RED CLAY 0005 SHLE 0014
6600994	1959-09-17	5.80	0.60	1.50	DO	FR 0019			5/8/4/1:0	LOAM STNS 0002 LMSN 0019
6600995	1962-03-29	9.80	0.00	4.60	DO	FR 0032			15/20/10/1:0	LMSN 0032
6600996	1948-12-14	4.90	2.40	0.90	DO	FR 0016			3///:	LOAM CLAY 0008 LMSN 0016
6600997	1952-03-03	6.70	2.40	3.40	DO	SU 0021			11/11/4/0:30	LOAM CLAY 0008 BLCK SHLE 0022
6600998	1957-08-01	4.30	2.40	1.80	DO	FR 0014			6/9/3/0:30	CLAY 0008 LMSN 0014
6600999	1958-05-14	7.60	1.80	1.20	DO	SU 0025			4/25/2/0:30	RED CLAY 0006 SHLE 0025
6601000	1959-07-18	10.70	1.80	3.70	DO	SU 0035			12///1:30	CLAY 0006 GREY LMSN 0035
6601001	1959-05-03	7.90	1.80	3.70	DO	SU 0022			12/20/5/1:0	CLAY 0006 LMSN 0026
6601002	1959-05-25	3.70	1.80	1.50	DO	FR 0010			5/7/2/1:0	CLAY 0006 LMSN 0012
6601003	1954-04-26	6.70	3.40	4.60	DO	FR 0022			15/15/10/1:0	CLAY 0011 LMSN 0022
6601004	1957-11-04	9.10	1.20	4.90	DO	FR 0030			16/16/10/0:30	RED CLAY 0004 GREY LMSN 0030
6601005	1958-08-20	24.40	1.20	11.30	DO	FR 0080			37/80/4/0:30	LOAM CLAY 0004 LMSN 0080
6601006	1948-07-22	7.30	2.10	0.60	DO	FR 0022			2/22/5/0:30	LOAM CLAY 0007 LMSN 0024
6601007	1952-09-15	12.20	0.60	4.30	DO	MN 0022 MN 0040			14/14/4/0:30	CLAY 0002 BRWN SHLE 0040
6601008	1952-11-08	20.10	1.20	16.80	DO	FR 0066			55/66/3/0:30	LOAM MSND 0004 SHLE 0066
6601009	1958-08-01	22.30	0.00	11.30	IN	FR 0073			37/37/20/0:30	GREY LMSN 0073
6601010	1954-05-14	5.80	0.90	2.40	DO	FR 0019			8/8/6/0:30	LOAM CLAY 0003 LMSN 0019
6601011	1959-09-08	27.70	0.00	3.70	IN	FR 0065 SU 0090		6	12/30/17/1:0	LMSN 0071 BLUE SHLE 0091
6601012	1946-08-27	14.00	1.80	0.00	DO	FR 0031				LOAM CLAY 0006 LMSN 0046
6601013	1946-08-30	11.90	1.20	0.00		FR 0020				LOAM CLAY 0004 LMSN 0039
6601014	1948-03-27	11.90	0.30	7.60	DO	FR 0025		6	25///:	LOAM 0001 LMSN 0039
6601015	1948-08-12	7.60	1.50	1.50	DO	FR 0023			5/15/10/0:30	CLAY GRVL 0005 LMSN 0025
6601016	1949-02-09	11.60	1.20	6.10		FR 0038			20//10/0:30	CLAY 0004 GREY LMSN 0038
6601017	1949-10-06	12.20	1.50	6.10	DO	FR 0040			20//10/0:30	CLAY 0005 GREY LMSN 0040
6601018	1949-10-15	11.30	1.50	5.20	DO	FR 0037			17//10/:	CLAY 0005 GREY LMSN 0037
6601019	1949-10-25	12.20	1.20	6.10	DO	SU 0040			20//10/0:30	CLAY 0004 GREY LMSN 0040
6601020	1949-11-02	12.20	0.90	6.10	DO	SU 0040			20//10/0:30	CLAY 0003 GREY LMSN 0040
6601021	1949-11-10	11.90	1.20	5.50		FR 0039			18//10/0:30	CLAY 0004 GREY LMSN 0039
6601022	1949-12-13	12.80	1.20	6.10	DO	FR 0042			20//10/0:30	CLAY 0004 GREY LMSN 0042
6601023	1950-02-21	10.70	0.90	0.00	DO	FR 0034			0///:	CLAY 0003 LMSN 0035
6601024	1950-09-12	12.80	1.20	6.10	DO	MN 0042			20///:	CLAY 0004 GREY LMSN 0042
6601025	1951-06-26	12.80	1.50	6.10	DO	FR 0042			20///:	CLAY 0005 GREY LMSN 0042
6601026	1949-06-01	12.80	0.90	6.10	DO	FR 0020			20//10/0:30	CLAY 0003 GREY LMSN 0042
6601027	1951-07-02	12.80	2.10	7.60	DO	FR 0042			25///:	CLAY 0007 GREY LMSN 0042
6601028	1951-10-19	13.40	0.60	7.60	DO	FR 0044			25//10/:	CLAY 0002 GREY LMSN 0044
6601029	1951-11-10	7.60	0.60	2.70	DO	FR 0024			9/25/4/0:30	CLAY 0002 LMSN 0025
6601030	1951-11-14	13.10	2.40	7.60	DO	FR 0043			25///:	CLAY 0008 GREY LMSN 0043

6601031	1951-11-26	12.50	2.40	7.60	DO	FR 0041			25///:	CLAY 0008 GREY LMSN 0041
6601032	1952-12-05	11.60	0.90	5.20	ST DO	SU 0017			17//5/:	CLAY STNS 0003 GREY SHLE 0038
6601033	1953-04-04	7.90	0.00	2.40	PS	FR 0026			8//3/0:30	BRWN SHLE 0005 LMSN 0026
6601034	1953-09-08	14.30	0.00	4.90	DO	FR 0047			16//4/0:30	LMSN 0004 BRWN SHLE 0047
6601035	1954-07-03	14.00	0.60	7.90	DO	FR 0046			26/26/35/0:20	LOAM MSND 0002 GREY LMSN 0046
6601036	1954-07-09	20.40	0.60	14.30	DO	FR 0067			47/50/50/0:15	LOAM MSND 0002 GREY LMSN 0067
6601037	1955-07-24	20.10	0.00	5.50	DO	FR 0066			18/18/4/0:30	SHLE 0012 GREY LMSN 0066
6601038	1947-07-19	12.80	0.00	7.30	DO	FR 0042			24///:	LMSN 0042
6601039	1959-02-17	11.90	4.90	6.40	CO	FR 0039			21/21/10/0:30	RED CLAY 0016 GREY LMSN 0039
6601044	1952-07-03	7.30	2.40	3.70	DO	FR 0024			12///:	CLAY HPAN 0008 SHLE 0024
6601089	1954-01-26	7.30	4.00	4.00	DO	FR 0024			13/13/4/0:30	RED CLAY 0013 SHLE 0024
6601090	1953-02-10	7.90	1.80	3.40	DO	FR 0026			11/11/3/0:30	LOAM CLAY 0006 BRWN SHLE 0026
6601091	1958-05-29	7.90	3.70	2.40	DO	FR 0026			8/8/15/0:30	RED CLAY 0012 SHLE 0026
6601092	1965-11-13	12.80	8.80	6.10	CO	FR 0042			20/20/15/1:30	BLUE CLAY 0026 GRVL 0029 SHLE 0042
6601093	1966-10-06	12.50	8.20	6.70	ST DO	FR 0041			22/27/20/1:30	CLAY 0022 GRVL MSND 0027 LMSN 0041
6601094	1947-08-06	8.50	4.30	8.50	DO	FR 0028			28///:	LOAM MSND 0014 LMSN 0028
6601095	1948-04-15	9.40	0.00	8.50	DO	FR 0031			28///:	CLAY LMSN 0026 LMSN 0031
6601096	1953-06-20	9.10	5.20	6.10	DO	FR 0030			20/20/10/1:0	CLAY MSND STNS 0017 GREY SHLE 0030
6601097	1954-05-28	7.30	4.30	3.00	DO	FR 0017			10/10/10/1:0	LOAM MSND GRVL 0014 LMSN 0024
6601098	1957-04-29	22.90	4.30	3.40	DO	FR 0075			11/50/3/0:30	RED CLAY 0014 SHLE 0075
6601099	1959-03-06	9.40	5.20	3.00	DO	FR 0031			10/10/10/0:30	RED CLAY 0017 GREY LMSN 0031
6601100	1959-03-11	10.10	5.80	3.70	DO	FR 0033			12/12/10/0:30	RED CLAY 0019 GREY LMSN 0033
6601101	1959-09-17	13.40	4.60	11.90	DO	FR 0044			39/39/5/0:30	CLAY GRVL 0015 LMSN 0044
6601102	1961-07-08	8.80	4.90	2.40	DO	FR 0029			8/15/7/1:0	CLAY 0016 LMSN 0029
6601103	1962-04-04	8.20	3.70	1.20	DO	FR 0027			4/12/10/1:0	BRWN CLAY 0012 LMSN 0027
6601104	1965-09-04	9.40	2.40	3.70	DO	FR 0031			12/20/7/1:30	CLAY 0008 SHLE 0022 LMSN 0031
6601105	1947-04-23	14.60	1.80	0.00	DO	FR 0048				CLAY 0006 LMSN 0048
6601106	1949-06-12	23.20	3.70	13.40	DO	FR 0070			44///:	CLAY MSND STNS 0012 LMSN SHLE 0076
6601107	1949-06-30	12.80	0.00	10.40	DO	FR 0038			34///:	LMSN 0042
6601108	1951-01-20	13.10	0.90	11.90	DO	FR 0043			39/39/4/0:30	LOAM MSND 0003 BLCK SHLE 0043
6601109	1954-07-27	15.50	1.20	8.80	PS	FR 0051			29/29/4/0:30	CLAY 0004 SHLE 0051
6601110	1965-09-11	14.30	0.90	11.90	DO	FR 0047			39/39/15/1:30	LOAM CLAY 0003 SHLE 0030 LMSN 0047
6601111	1967-02-18	29.90	0.90	13.10	PS	FR 0098			43/83/12/1:30	BRWN CLAY 0003 SHLE 0098
6601112	1946-09-02	14.00	3.00	0.00	DO	FR 0036				CLAY 0010 LMSN 0046
6601113	1949-06-01	12.80	0.90	9.10	DO	FR 0036			30///:	CLAY 0003 LMSN 0042
6601114	1954-10-05	22.90	3.00	10.10	DO	FR 0075			33/33/4/0:30	CLAY 0008 MSND GRVL 0010 SHLE 0075
6601115	1955-06-17	16.80	0.90	9.80	PS	FR 0055			32/32/20/0:30	LOAM 0003 LMSN 0055
6601116	1957-05-29	13.40	0.90	8.80	DO	FR 0044			29/29/10/0:30	LOAM CLAY 0003 SHLE 0025 GREY LMSN 0044
6601117	1957-08-24	14.30	0.90	11.30	DO	FR 0047			37/37/10/0:30	LOAM CLAY 0003 SHLE 0047
6601118	1958-08-11	23.50	3.40	10.70	DO	FR 0077			35/35/20/0:30	RED CLAY 0011 BRWN SHLE 0030 LMSN 0077
6601119	1958-09-25	16.80	0.00	3.70	PS	FR 0055			12/14/8/1:0	SHLE 0004 LMSN 0055
6601120	1963-11-12	14.30	0.00	11.30	DO	FR 0047			37/37/10/1:30	SHLE 0023 LMSN 0047
6601121	1947-04-10	15.20	3.40	0.00	DO	FR 0050				CLAY 0011 LMSN 0050
6601122	1953-04-04	7.90	1.20	1.50	DO	FR 0026			5/5/5/:	LOAM MSND 0004 GREY SHLE 0026
6601123	1953-11-12	11.00	4.30	4.30	DO	FR 0036			14/14/2/4:0	CLAY MSND STNS 0014 GREY SHLE 0036
6601124	1954-08-10	7.90	0.90	5.50	ST	FR 0026			18/18/5/1:0	LOAM 0003 LMSN 0026
6601125	1957-06-27	11.90	0.90	2.70	DO	FR 0039			9/9/10/0:30	LOAM CLAY 0003 SHLE 0010 LMSN 0039
6601126	1958-06-28	15.80	8.50	5.20	DO	FR 0052			17/52/4/0:30	RED CLAY 0028 GREY LMSN 0052
6601127	1950-02-08	9.10	1.80	2.10	DO	FR 0028			7/9/12/1:0	CLAY 0006 LMSN 0030
6601129	1954-08-01	9.80	1.80	6.70	DO	FR 0032			22/22/1/1:0	LOAM 0001 CLAY 0006 LMSN 0032
6601130	1954-08-10	10.10	5.50	5.80	DO	SU 0033			19/20/5/1:0	LOAM 0001 CLAY 0018 LMSN 0033
6601131	1962-11-10	18.90	1.50	6.70	ST DO	FR 0062			22/22/15/1:0	CLAY 0005 SHLE 0030 LMSN 0062
6601132	1949-03-25	12.20	2.10	7.60		SU 0040		6	25//4/:	CLAY STNS 0007 LMSN 0040

6601135	1953-05-04	9.40	2.10	4.30	DO	FR 0031			14///:	LOAM MSND 0002 RED CLAY 0007 GREY SHLE 0031
6601136	1954-11-01	7.90	3.70	5.50	DO	FR 0026			18/20/2/1:0	CLAY 0012 LMSN 0026
6601137	1954-11-15	10.70	2.40	7.60	DO	SU 0035			25/26/2/1:0	LOAM 0002 CLAY 0008 LMSN 0035
6601138	1955-05-07	10.10	3.70	5.50	DO	FR 0033			18/20/2/1:0	CLAY 0012 LMSN 0033
6601139	1955-05-20	14.00	1.80	1.80	DO	FR 0046			6/40/1/1:0	CLAY 0006 LMSN 0046
6601140	1955-05-13	11.30	0.90	6.10	DO	FR 0037			20/20/3/1:0	CLAY 0003 LMSN 0037
6601142	1952-05-02	15.20	0.60	11.90	DO	FR 0050			39/50//:	LOAM 0002 LMSN 0050
6601143	1952-05-15	14.60	12.20	4.60	CO	FR 0048			15/15/4/0:30	CLAY 0040 SHLE 0048
6601144	1955-05-27	20.40	0.60	11.00	DO	FR 0067			36/36/4/0:30	LOAM 0002 SHLE 0067
6601145	1955-06-22	9.10	0.90	4.00	DO	FR 0030			13/14/10/1:0	LOAM 0003 LMSN 0030
6601146	1955-07-20	9.10	0.60	4.60	DO	FR 0027			15/20/4/1:0	LOAM 0002 LMSN 0030
6601147	1955-11-25	14.00	0.30	9.10	DO	FR 0046			30/45/5/2:0	LOAM 0001 LMSN 0046
6601148	1957-03-21	20.70	0.60	7.60	DO	FR 0068			25/25/4/0:30	LOAM MSND 0002 SHLE 0017 GREY LMSN 0068
6601149	1947-10-25	11.90	1.50	2.70	DO	FR 0039			9///:	LOAM CLAY 0005 LMSN 0039
6601150	1947-11-06	19.50	0.30	0.00	DO	FR 0026				LOAM 0001 LMSN 0064
6601151	1949-04-15	8.20	1.50	4.60	DO	FR 0025			15///:	CLAY MSND STNS 0005 LMSN 0027
6601152	1952-04-10	10.10	6.10	2.70	DO	FR 0027			9/9//:	LOAM 0006 CLAY 0020 LMSN 0033
6601180	1954-06-24	9.40	3.70	6.40	DO	FR 0031			21/21/4/0:30	LOAM MSND 0012 SHLE 0031
6601181	1961-03-20	9.80	6.10	6.10	DO	FR 0032			20/20/10/1:0	CLAY 0020 LMSN 0032
6601182	1951-05-18	13.70	0.90	11.90	DO	FR 0045			39/39/4/0:30	LOAM MSND 0003 BRWN SHLE 0045
6601183	1954-07-13	14.30	1.50	12.20	DO	FR 0047			40/40/4/0:30	LOAM MSND 0005 SHLE 0047
6601184	1959-08-17	8.20	0.00	6.70	DO	FR 0027		5	22/24/5/1:0	LMSN 0027
6601185	1960-07-09	6.70	4.30	3.40	DO	FR 0022			11/11/20/0:30	RED CLAY 0014 LMSN 0022
6601186	1961-03-29	16.20	0.00	12.50	DO	FR 0053			41/41/10/1:0	LMSN 0053
6601188	1963-09-18	13.70	1.80	11.00	DO	FR 0045			36/36/10/1:0	FILL 0006 SHLE 0030 LMSN 0045
6601191	1952-07-23	15.20	0.00	6.10	DO	FR 0048		6	20/48/4/0:30	CLAY 0047 GRVL MSND 0050
6601223	1946-11-09	12.20	2.40	0.00	DO	FR				LOAM 0001 CLAY 0008 LMSN 0040
6601604	1947-07-19	12.20	0.60	7.60	DO	FR 0025			25///:	CLAY 0002 LMSN 0040
6601605	1947-07-31	14.00	0.30	8.50	DO	FR 0028			28///:	CLAY 0001 LMSN 0046
6601613	1955-08-26	11.90	7.90	4.60	DO	SU 0039			15/15/4/0:30	MSND 0026 LMSN 0039
6601616	1965-04-07	12.20	10.70	3.00	CO	FR 0040			10/15/15/1:30	BLUE CLAY 0035 LMSN 0040
6601618	1966-08-13	7.30	1.80	3.40	DO	FR 0024			11/15/50/1:30	GREY CLAY 0006 LMSN 0024
6602375	1968-08-29	9.10	2.70	1.50	DO	SU 0030			5/15/8/1:30	CLAY 0009 LMSN 0030
6602407	1969-02-21	15.50	8.50	7.90	DO	FR 0051			26/26/15/1:30	MSND GRVL 0028 LMSN 0051
6602536	1970-07-23	8.20	2.10	3.00	DO	FR 0027		6	10/10/25/1:0	BRWN CLAY 0007 LMSN 0027
6602557	1970-10-29	11.30	11.00	2.40	DO	UK 0037		6	8/15/30/1:0	LOAM 0002 BRWN CLAY 0014 BRWN CLAY GRVL 0036 GREY SHLE 0037
6602558	1970-10-28	13.70	5.80	2.40	DO	FR 0035		6	8/40/10/1:0	RED CLAY STNS 0019 LMSN 0045
6602559	1970-10-26	15.80	2.40	6.10	DO	SU 0050		6	20/48/4/1:0	BRWN CLAY 0008 LMSN 0052
6602568	1970-11-21	16.50	7.90	6.70	DO	FR 0054			22/48/8/1:0	LOAM MSND 0015 MSND 0023 GRVL 0026 LMSN 0054
6602574	1971-01-08	24.40	1.20	14.60	DO	FR 0050		6	48/50/10/2:0	BRWN CLAY 0004 GREY ROCK 0080
6602629	1971-08-10	15.20	8.50	5.80	ST	FR 0040			19/30/12/1:0	BRWN CLAY 0023 GREY CLAY 0028 GREY SHLE 0030 GREY LMSN 0050
6602667	1972-05-27	13.70	6.40	2.10	DO	FR 0044			7/13/8/1:0	BRWN CLAY 0021 GREY LMSN 0045
6602668	1972-06-13	16.20	0.90	11.00	DO	FR 0048			36/41/12/1:0	BRWN FSND 0003 GREY LMSN 0053
6602672	1972-07-10	8.50	1.20	2.40	ST DO	FR 0026		6	8/10/15/2:0	BRWN CLAY STNS 0004 GREY LMSN 0028
6602704	1972-10-03	18.60	1.20	12.20	DO	FR 0059			40/42/10/1:0	BRWN CLAY 0004 GREY LMSN 0061
6602706	1972-09-19	7.00	2.10	2.40	DO	SU 0022			8/10/8/1:0	BRWN CLAY 0007 GREY LMSN 0023
6602709	1972-12-30	10.40	2.40	0.90	DO	SU 0033			3/20/12/1:0	BRWN CLAY 0008 GREY LMSN 0034
6602710	1972-12-15	6.70	0.30	2.40	ST	FR 0020			8/9/12/1:0	BRWN LOAM STNS 0001 BRWN SHLE 0002 GREY LMSN 0022

6602711	1972-12-17	10.70	3.00	0.60	DO	FR 0033			2/15/12/1:0	BRWN CLAY 0010 GREY LMSN 0035
6602756	1973-06-21	18.30	1.50	13.10	DO	FR 0050			43/45/12/1:0	BRWN CLAY 0005 GREY LMSN 0060
6602761	1973-06-03	7.90	2.10	1.50	DO	SU 0025			5/9/12/1:0	BRWN CLAY 0007 GREY LMSN 0026
6602785	1973-09-18	18.30	4.00	3.00		SU 0015 SU 0035 SU 0058		6	10/60/1/1:0	BRWN CLAY 0013 GREY SHLE LMSN 0015 GREY LMSN 0060
6602786	1973-10-13	10.10	4.30	1.20	DO	FR 0014			4/33/4/1:0	BRWN CLAY 0013 GREY GRVL 0014 GREY SHLE 0015 GREY LMSN 0033
6602787	1973-10-10	7.30	0.60	1.50	DO	FR 0023			5/7/14/1:0	BRWN LOAM 0002 GREY LMSN 0024
6602789	1973-10-20	11.60	3.40	4.90	DO	SU 0037			16/20/14/1:0	BRWN CLAY 0011 GREY LMSN 0038
6602790	1973-10-17	16.20	8.50	4.00	DO	FR 0045			13/53/4/1:15	BRWN CLAY 0020 BRWN FSND 0025 BRWN STNS 0028 GREY SHLE 0030 GREY LMSN 0053
6602928	1974-02-20	21.90	18.90	15.80	DO	FR 0071			52/54/12/1:15	BRWN SAND 0050 BRWN CLAY GRVL 0051 BRWN BLDR SAND 0062 GREY LMSN 0072
6602929	1974-02-25	8.20	2.10	1.20	DO	SU 0025			4/10/12/1:0	BRWN CLAY 0007 GREY LMSN 0027
6602930	1974-02-28	7.60	2.40	1.20	DO	SU 0023			4/14/12/1:0	BRWN CLAY 0008 GREY LMSN 0025
6602953	1974-06-08	11.60	4.90	0.00	IR DO	FR 0037			0/0/16/1:0	BLCK LOAM 0002 GREY CLAY 0010 BRWN CLAY 0016 GREY LMSN 0038
6602977	1974-08-07	12.20	2.10	0.00	DO	FR 0037			0/30/8/1:0	BRWN CLAY 0007 GREY LMSN 0040
6602978	1974-08-10	12.20	2.10	0.00	DO	SU 0037			0/28/8/:	BRWN CLAY 0007 GREY LMSN 0040
6602990	1974-09-05	12.20	8.20	4.90	DO	FR 0038		6	16/20/15/1:0	BRWN LOAM 0018 BRWN CLAY 0027 GREY LMSN 0040
6603021	1974-12-30	7.60	0.90	1.80	DO	FR 0023			6//1:0	BRWN CLAY 0003 GREY LMSN 0025
6603052	1975-02-03	16.50	12.20	9.10	ST	FR 0053			30/33/15/1:15	BRWN LOAM 0002 BRWN SAND GRVL 0040 GREY LMSN 0054
6603087	1975-06-16	22.60	10.70	6.70	CO	FR 0035		6	22/38/25/3:0	BRWN CLAY 0005 GREY CLAY 0035 ROCK 0074
6603090	1975-08-07	9.10	2.40	1.80	DO	FR 0026			6/27/5/1:0	BLCK LOAM 0001 BRWN CLAY 0008 GREY LMSN 0030
6603143	1976-07-30	12.50	0.00	8.50	DO	FR 0041		6	28/28/10/2:0	SAND GRVL 0041
6603165	1976-08-18	4.00	0.00	0.90	DO	FR 0012		6	3/6/8/1:0	BLCK MUCK 0004 BRWN CLAY 0010 GRVL SAND 0013
6603175	1976-10-07	11.90	5.20	0.00	ST DO	SU 0039			0/0/20/1:0	BLCK MUCK LOOS 0006 GREY CLAY SOFT 0013 BRWN CLAY DNSE 0017 GREY LMSN LYRD 0039
6603186	1974-11-08	12.20	0.60	7.00	DO	FR 0040			23/40/5/1:0	BRWN CLAY PCKD 0002 BRWN SHLE LOOS 0004 GREY LMSN LYRD 0040
6603188	1976-12-14	6.10	2.10	0.90	DO	SU 0012			3/10/8/1:0	BRWN CLAY PCKD 0007 GREY LMSN FLNT LYRD 0020
6603189	1976-12-15	7.60	3.40	1.20	DO	FR 0013 FR 0020			4/10/16/1:0	BRWN CLAY PCKD 0007 BRWN CLAY GRVL PCKD 0011 GREY LMSN LYRD 0025
6603234	1977-10-05	7.60	2.40	0.60	DO	SU 0020			2/24/2/1:0	BRWN LOAM SOFT 0001 BRWN CLAY PCKD 0008 BRWN SHLE LYRD 0010 GREY LMSN LYRD 0025
6603237	1977-09-15	9.80	1.80	3.00	DO	SU 0030		6	10/15/30/1:0	BRWN CLAY SNDY 0006 GREY FLNT 0032
6603301	1978-05-11	17.40	9.80	6.70	ST DO	SU 0034		7	22/32/20/2:30	BRWN CLAY 0008 GREY CLAY 0022 CLAY GRVL 0032 ROCK 0057
6603379	1979-09-26	16.80	0.00	8.50	ST	FR 0030		7	28/40/10/:	CLAY LOAM 0003 GREY CLAY 0015 GREY CLAY GRVL 0028 UNKN 0055
6603380	1979-10-04	21.90	0.00	17.10	DO	FR 0069		7	56/65/10/2:0	BRWN CLAY 0004 GREY CLAY 0007 BLCK STNS 0072
6603409	1979-09-27	7.60	7.30	2.70	PS	FR 0024			9/9/45/24:30	GREY CLAY GRVL 0024 BLUE GRVL CLAY DRTY 0024 BLUE LMSN DKCL 0025
6603492		24.40	11.90	10.70	DO ST	FR 0049		7	35/50/20/2:0	BRWN GRVL SNDY 0015 GREY CLAY GRVL 0039 GREY ROCK LMSN 0080
6603494	1981-07-23	30.80	7.30	7.00	DO ST	FR 0026		8	23/65/25/2:0	BRWN CLAY LOAM 0008 CLAY 0024 GREY LMSN 0050 GREY LMSN 0101

6603495	1982-01-22	24.40	11.90	10.70	DO ST	FR 0050		6	35/60/20/2:0	BRWN SAND 0006 GRVL SNDY 0015 RED CLAY GRVL 0039 ROCK 0080
6603552	1982-03-20	21.30	0.00	13.70	DO	FR 0070		6	45/51/20/1:30	BLUE SAND 0051 BLCK LOAM 0054 GREY CLAY 0058 UNKN 0070
6603653	1985-07-09	6.10	4.00	2.70	DO	FR 0013			9/12/15/1:0	BRWN CLAY DNSE 0013 GREY SHLE 0015 GREY LMSN SHLE LYRD 0020
6603670	1985-10-17	19.50	0.00	8.20	DO	MN 0040 UK 0063			27/50/8/1:0	GREY LMSN LYRD 0064
6603697	1986-09-10	8.80	3.70	4.00	DO	FR 0018 FR 0029			13/25/7/1:30	BRWN MSND SOFT 0012 GREY LMSN FLNT LYRD 0029
6603707	1986-11-27	14.00	11.30	7.30	DO	GS 0045			24/25/14/2:0	BRWN SAND LOOS 0022 YLLW SAND LOOS 0024 BLCK MUCK DNSE 0026 BRWN CLAY GRVL PCKD 0037 GREY LMSN LYRD 0046
6603740	1987-04-15	12.20	0.90	8.20	DO	FR 0033			27/13/18/2:0	BRWN CLAY LOOS 0003 WHIT SHLE LOOS 0007 GREY SHLE DNSE 0015 UNKN DRY 0015 GREY SHLE DNSE 0020 GREY SHLE LOOS 0025 GREY SHLE LYRD 0040
6603741	1987-04-03	9.80	2.10	1.80		FR 0032			6/28/4/1:30	RED CLAY DNSE 0007 GREY LMSN FLNT LYRD 0032
6603757	1987-06-30	9.40	4.00	4.30	DO	FR 0017 FR 0031			14/19/8/1:0	STNS SAND LOOS 0003 BRWN FSND 0013 GREY LMSN LYRD 0031
6603779	1987-10-02	9.10	0.30	9.40	DO	FR 0036			31/31/17/1:15	STNS LOOS 0001 GREY SHLE CLAY LOOS 0007 GREY SHLE LOOS 0011 GREY SHLE LYRD 0028 GREY SHLE LOOS 0030
6603793	1988-01-25	10.70	5.80	0.90	DO	SU 0033			3/5/21/3:0	BLUE CLAY STNS PCKD 0003 BRWN CLAY PCKD 0019 GREY FLNT LYRD 0027 GREY LMSN LYRD 0035
6603811	1988-04-18	5.50	2.70	2.40	DO	FR 0010 FR 0017			8/8/6/2:0	BRWN CLAY PCKD 0009 GREY LMSN LYRD 0018
6603826	1988-08-11	9.10	3.40	0.00						BRWN CLAY PCKD 0009 GREY FGVL CLAY PCKD 0011 GREY FLNT LMSN LYRD 0018 GREY LMSN FLNT 0030
6603843	1988-07-18	59.40	3.40	4.60	CO	SU 0075		8	15//25/3:0	BRWN CLAY 0007 GREY CLAY SAND 0010 GREY GRVL 0011 GREY ROCK 0185 GREY LMSN 0195
6603877	1989-07-19	10.70	6.10	6.40	DO	FR 0021 FR 0033			21/24/21/1:30	BRWN FSND 0011 GREY CGVL 0014 BRWN SAND FGVL 0020 GREY LMSN LYRD 0035
6603896	1989-05-31	22.90	0.90	3.70	DO	FR 0050		6	12/75/10/1:0	BRWN CLAY STNS 0003 LMSN 0075
6603897	1989-06-26	13.70	9.10	5.20	DO	FR 0040		6	17/45/10/2:0	BRWN SAND 0010 BRWN CLAY 0014 GREY CLAY 0030 LMSN 0045
6603957	1990-07-26	9.10	3.70	4.30	DO	FR 0030			14/16/21/2:0	BRWN FSND 0011 BRWN SAND CLAY PCKD 0012 GREY LMSN LYRD 0030
6603969	1990-11-10	9.10	5.20	3.00	DO	FR 0029			10/12/28/2:0	BRWN SAND 0004 BRWN CLAY 0009 BRWN CLAY CGVL 0012 GREY CGVL 0014 GREY FGVL 0017 GREY LMSN LYRD 0030
6604003	1991-04-29	8.80	1.50	2.10	DO	FR 0029			7/22/12/1:30	BLCK LOAM LOOS 0004 BRWN CLAY PCKD 0005 BRWN SHLE LOOS 0006 GREY LMSN LYRD 0029
6604006	1991-07-10	6.40	1.20	0.00	MN	UK 0018		2		BRWN LOAM PCKD 0001 BRWN CLAY PCKD 0004 GREY SHLE LYRD 0005 GREY LMSN LYRD 0008 UNKN DRY 0009 GREY LMSN LYRD 0021
6604007	1991-07-09	7.90	1.80	0.00	MO	UK 0026		2		BRWN LOAM LOOS 0002 BRWN CLAY PCKD 0006 GREY SHLE LYRD 0007 GREY LMSN LYRD 0022 GREY SHLE LYRD 0024 GREY LMSN LYRD 0026

6604008	1991-07-08	7.00	0.00	0.00	MO	UK 0023		2		BRWN UNKN LOOS 0003 BRWN UNKN PCKD 0006 GREY UNKN LYRD 0008 GREY UNKN LYRD 0023
6604018	1991-08-13	9.80	0.30	4.60	DO	FR 0019			15/9/9/2:15	BRWN LOAM PCKD 0001 GREY SHLE LYRD 0009 GREY LMSN LYRD 0032
6604028	1991-09-23	10.70	0.90	2.40	DO	SU 0018			8/9/21/2:30	BRWN CLAY PCKD 0003 GREY LMSN LYRD 0035
6604046	1991-06-05	16.80	0.90	7.90	CO	FR 0033 FR 0042 FR 0053		6	26/50/25/1:0	BRWN SAND 0003 LMSN 0055
6604059	1992-01-04	13.40	11.30	4.90	DO ST	FR 0043		6	16/43/12/1:0	BRWN CLAY 0004 GREY CLAY 0015 RED CLAY GRVL 0037 ROCK 0044
6604078	1992-08-21	90.80	14.00	12.80	IN	FR 0050 SU 0155 SU 0163 SU 0197 SU 0230		6	42/40/35/2:0	BRWN CLAY 0003 BRWN SAND 0020 BRWN SAND STNS 0046 ROCK 0298
6604079	1992-08-24	90.80	10.10	0.00	IN	SU 0154		6	//2/:	BRWN CLAY 0004 BRWN SAND 0015 BRWN SAND GRVL 0026 BRWN SAND BLDR 0033 ROCK
6604129	1992-12-07	14.90	1.50	4.00	DO	SU 0029 SU 0049			13/45/5/1:30	BRWN CLAY PCKD 0005 GREY LMSN LYRD 0049
6604132	1993-04-28	6.10	4.60	1.20	DO	FR 0016			4/6/28/:	BLCK LOAM LOOS 0002 BRWN CLAY CGVL PCKD 0008 GREY FGVL 0015 GREY LMSN LYRD 0020
6604134	1983-04-17	11.90	0.90	8.20	DO	FR 0038			27/35/6/2:0	BRWN CLAY STNS PCKD 0003 GREY SHLE LYRD 0006 GREY LMSN LYRD 0039
6604149	1993-07-22	64.00	0.60	24.40	IR	SU 0160		6	80/210/25/1:0	BRWN CLAY 0002 ROCK LMSN 0210
6604150	1993-08-04	13.70	5.50	0.00	DO	FR 0042		6	/45/12/1:0	BRWN CLAY 0003 GREY CLAY STNS LOOS 0018 ROCK LMSN 0045
6604166	1993-06-11	12.20	5.80	4.00	DO	FR 0038			13/23/28/:	BLCK LOAM PCKD 0002 BRWN SAND DNSE 0018 BRWN CLAY STNS PCKD 0019 GREY LMSN LYRD 0040
6604205	1990-08-09	8.50	2.40	2.70	DO	FR 0011 FR 0028			9/9/21/2:0	BLCK LOAM PCKD 0001 BRWN SAND STNS PCKD 0008 GREY LMSN LYRD 0028
6604207	1995-06-28	7.60	2.40	3.40	DO	FR 0012 FR 0015			11/23/6/2:30	BLCK LOAM PCKD 0001 BRWN CLAY PCKD 0008 GREY LMSN LYRD 0025
6604260	1997-02-26	13.70	9.80	3.00	DO	FR 0042		6	10//10/1:0	BRWN CLAY 0003 GREY CLAY 0021 GREY CLAY BLDR 0032 ROCK LMSN 0045
6604269	1997-07-08	11.90	5.80	3.40	DO	FR 0037			11/11/21/2:0	BLCK LOAM PCKD 0001 BRWN SAND PCKD 0010 BLUE CLAY SAND PCKD 0019 GREY LMSN LYRD 0039
6604278	1997-11-05	15.50	0.90	8.80	DO	UK 0051			29/30/1/2:0	BLCK LOAM FGVL PCKD 0003 GREY LMSN LYRD 0051
6604279	1997-09-30	20.70	18.00	15.20	DO	FR 0067			50/56/14/0:0	GREY STNS PCKD 0000 BRWN SAND LOOS 0003 BRWN CLAY CGVL PCKD 0059 GREY LMSN LYRD 0068
6604291	1998-04-09	9.10	6.10	4.60	DO	FR 0029			15/16/21/2:0	BRWN CLAY PCKD 0004 BRWN CLAY FGVL PCKD 0020 GREY SHLE 0030
6604292	1998-05-26	14.00	2.40	3.70	DO	FR 0044			12/16/28/1:30	BLCK LOAM PCKD 0001 BRWN CLAY PCKD 0008 GREY SHLE LYRD 0010 GREY LMSN LYRD 0046
6604293	1998-05-12	23.50	17.70	14.90	DO	FR 0075			49/70/8/1:30	BRWN SAND PCKD 0045 BRWN CLAY FGVL PCKD 0058 GREY LMSN LYRD 0077
6604294	1998-04-15	18.30	0.60	10.40	DO	FR 0056			34/36/21/2:0	BRWN CLAY PCKD 0002 GREY SHLE LYRD 0060
6604324	1998-08-22	14.60	1.20	6.10	DO	FR 0047			20/20/20/2:30	BLCK LOAM PCKD 0001 BRWN CLAY FGVL PCKD 0004 GREY LMSN LYRD 0048
6604331	1999-05-15	12.80	4.90	3.40	DO	FR 0040			11/13/21/2:0	BLCK LOAM PCKD 0001 BRWN SAND PCKD 0016 GREY LMSN LYRD 0042

6604332	1999-04-09	8.80	3.40	1.80	DO	FR 0027			6/8/28/1:30	BLCK LOAM PCKD 0002 BLCK CLAY FGVL PCKD 0011 GREY LMSN LYRD 0029
6604333	1999-04-07	9.10	2.10	1.80	DO	FR 0028			6/7/28/1:30	BLCK LOAM PCKD 0002 BRWN CLAY FGVL PCKD 0007 GREY SHLE LYRD 0009 GREY LMSN LYRD 0030
6604334	1999-04-05	8.50	2.70	1.20		FR 0026			4/6/28/1:45	BLCK LOAM PCKD 0002 BRWN CLAY PCKD 0006 GREY CGVL PCKD 0009 GREY SHLE LYRD 0011 GREY LMSN LYRD 0028
6604339	1999-03-01	6.70	2.40	0.90	DO	FR 0017			3/20/11/1:30	BLCK LOAM PCKD 0001 RED CLAY PCKD 0008 GREY LMSN LYRD 0022
6604348	1999-07-09	22.90	9.10	5.80	DO	SU 0052 SU 0068 SU 0072			19/71/11/1:45	BRWN SAND CLAY LOOS 0025 BRWN CLAY PCKD 0030 GREY LMSN LYRD 0075
6604449	2000-06-28	16.50	7.90	7.90	DO	FR 0052			26/28/21/3:	BRWN SAND PCKD 0026 GREY SHLE LYRD 0028 GREY LMSN LYRD 0054
6604453	2000-07-05	8.20	0.90	0.00		FR 0018	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604454	2000-08-15	11.30	0.90	0.00		UK 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604455	2000-07-05	8.20	0.90	0.00		FR 0018	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604456	2000-07-04	8.20	0.90	0.00		FR 0019	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN 0027
6604457	2000-07-04	8.20	0.90	0.00		FR 0018	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604458	2000-07-04	8.20	0.90	0.00		FR 0020	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604459	2000-07-04	8.20	0.90	0.00		FR 0019	0017 10	4		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604460	2000-07-04	8.20	0.90	0.00		FR 0019	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604461	2000-07-04	8.20	0.90	0.00		FR 0019	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604462	2000-07-04	8.20	0.90	0.00		FR 0018	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604463	2000-07-04	7.90	0.90	0.00		FR 0020	0021 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0026
6604464	2000-07-04	8.20	0.90	0.00		FR 0019	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604465	2000-07-04	8.20	0.90	0.00		FR 0019		2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604466	2000-08-02	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604467	2000-07-19	8.20	0.90	0.00		FR 0019	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604468	2000-08-15	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604469	2000-08-15	11.30	0.90	0.00		FR 0023	0017 2	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604470	2000-08-02	11.00	0.90	0.00		FR 0023	0036 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0036
6604471	2000-07-19	8.20	0.90	0.00		FR 0020	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604472	2000-07-05	8.20	0.90	0.00		FR 0018	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604473	2000-08-15	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604474	2000-07-05	8.20	0.90	0.00		FR 0018 FR	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604475	2000-07-19	8.20	0.90	0.00		FR 0019	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604476	2000-07-05	8.20	0.90	0.00		UK 0019	0017 10	2		BRWN LOAM LOOS 0003 GREN LMSN LYRD 0027
6604477	2000-07-05	8.20	0.90	0.00		FR 0017	0017 10	7		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604478	2000-08-15	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604479	2000-07-19	8.20	0.90	0.00		FR 0014	0007 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604480	2000-08-02	10.70	0.90	0.00		FR 0023	0025 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0035
6604481	2000-07-19	8.20	0.90	0.00		FR 0019	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604482	2000-07-19	9.40	0.90	0.00		FR 0023	0021 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0031
6604483	2000-07-19	8.20	0.90	0.00		FR 0019	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604484	2000-08-02	11.00	0.90	0.00		FR 0023	0026 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0036
6604485	2000-07-19	8.20	0.90	0.00		FR 0018	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604486	2000-08-15	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604487	2000-07-05	8.20	0.90	0.00		FR 0015	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604488	2000-08-02	11.00	0.90	0.00		FR 0023 MN	0027 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0036
6604489	2000-07-04	8.80	0.90	0.00		FR 0020	0009 20	4		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0029
6604490	2000-07-05	8.20	0.90	0.00		FR 0018	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604491	2000-07-05	8.20	0.90	0.00		FR 0020	0017 10			BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027

6604496	2000-07-25	8.50	8.50	6.70	DO	FR			22/22/14/1:30	BRWN CLAY FGVL PCKD 0019 HPAN PCKD 0028 GREY SHLE 0028
6604497	2000-08-15	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604498	2000-08-15	11.30	0.90	0.00		FR 0023 GS	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604499	2000-08-15	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604521	2000-09-09	14.30	0.90	0.00		FR 0029	0027 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0047
6604522	2000-09-07	12.80	0.90	0.00		FR 0027	0022 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0042
6604523	2000-09-07	11.00	0.90	0.00		FR 0023	0015 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0036
6604524	2000-09-07	11.00	0.90	0.00		FR 0023	0016 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0036
6604525	2000-09-07	11.30	0.90	0.00	NU	FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604526	2000-09-07	10.40	0.90	0.00		FR 0022	0014 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0034
6604527	2000-11-13	11.30	1.50	0.00	NU	FR 0022	0017 20	2		BRWN LOAM 0003 GREY CLAY SILT DNSE 0005 GREY LMSN LYRD 0037
6604528	2000-11-23	5.20	1.50	0.00		FR 0013	0007 10	2		BRWN LOAM 0003 GREY CLAY SILT DNSE 0005 GREY LMSN LYRD 0017
6604529	2000-11-23	11.30	1.20	0.00		FR 0023	0017 20	2		BRWN LOAM 0003 GREY CLAY SILT DNSE 0004 GREY LMSN LYRD 0037
6604531	2001-01-30	11.60	0.90	0.00		FR 0023	0018 20	2		BRWN LOAM 0003 GREY LMSN LYRD 0038
6604540	2000-12-14	22.60	15.80	13.70	DO	FR 0072			45/47/21/1:30	BLCK LOAM PCKD 0001 BRWN SAND PCKD 0045 BRWN SAND FGVL PCKD 0049 GREY CGVL SAND PCKD 0052 GREY LMSN LYRD 0074
6604552	2001-06-21	11.30	3.00	5.50	DO	FR 0035			18/25/21/3:	BLCK LOAM PCKD 0001 BRWN CLAY PCKD 0010 GREY LMSN LYRD 0037
6604579	2001-08-28	8.20	0.90	0.00		FR 0019				BRWN LOAM 0003 GREY LMSN LYRD 0027
6604580	2001-08-28	8.20	0.90	0.00		FR 0019				BRWN LOAM 0003 GREY LMSN 0027
6604581	2001-08-28	7.90	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0026
6604582	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604583	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604584	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604585	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604586	2001-08-28	8.20	0.90	0.00		FR 0019				BRWN LOAM 0003 GREY LMSN 0027
6604587	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604588	2001-08-27	8.20	0.90	0.00		FR 0020				BRWN LOAM 0003 GREY LMSN LYRD 0027
6604589	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604590	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604591	2001-08-27	8.20	0.00	0.00						BRWN UNKN 0003 GREY LMSN 0027
6604592	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604594	2001-08-21	0.00	0.00	0.00		FR 0026				
6604595	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604596	2001-08-28	8.80	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0029
6604597	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604598	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604599	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604600	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604602	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604603	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604604	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN 0027
6604605	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604606	2001-08-29	11.00	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0036
6604607	2001-08-29	9.40	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0031
6604608	2001-10-25	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604609	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604610	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037

6604611	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN 0037
6604612	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604613	2001-08-29	11.00	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0036
6604614	2001-08-29	11.00	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0036
6604615	2001-08-29	11.00	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0036
6604616	2001-08-29	14.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0047
6604617	2001-08-29	12.80	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0042
6604618	2001-08-29	11.00	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0036
6604619	2001-08-29	11.00	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0036
6604620	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604621	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604622	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604623	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604625	2001-08-29	10.40	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0034
6604626	2001-08-29	5.20	1.50	0.00						BRWN LOAM 0003 GREY CLAY SILT DNSE 0005 GREY LMSN LYRD 0017
6604627	2001-08-29	11.30	1.50	0.00						BRWN LOAM 0003 GREY CLAY SILT DNSE 0005 GREY LMSN LYRD 0037
6604655	2002-04-03	9.40	2.10	0.00	DO	SU 0029			0/21/12/1:15	BLCK LOAM LOOS 0002 BRWN CLAY PCKD 0006 GREY CGVL PCKD 0007 GREY LMSN LYRD 0031
6604662	2002-06-09	10.10	3.00	0.60	DO	FR 0026			2/30/10/1:30	BLCK LOAM PCKD 0002 BRWN CLAY PCKD 0010 GREY LMSN LYRD 0033
6604694	2002-06-25	0.00	0.00	0.00	NU					
6604695	2002-06-25	0.00	0.00	0.00	NU					
6604712	2003-05-01	16.20	3.00	2.40	DO	FR 0052			8/10/20/2:0	BLCK LOAM LOOS 0004 BRWN CLAY PCKD 0010 GREY LMSN LYRD 0053
6604731	2003-07-28	7.60	2.40	3.00	DO	FR 0017			10/11/20/2:0	BRWN SAND LOOS 0007 GREY FGVL LOOS 0008 GREY SHLE LYRD 0009 GREY LMSN LYRD 0025
6604812	2004-09-30	18.20	6.10	2.70	DO	FR 0054		5.9	9/34/3/1:0	BLUE LOAM 0020 GREY LMSN STNS 0041 GREY LMSN 0060
6604826	2004-09-23	8.50	3.40	0.00			0024 5	2		BLCK PEAT 0005 GREY CLAY 0011 GREY LMSN 0028
6604903	2005-10-06	6.80	0.00	0.00		FR 0013	0006 16	1.76		GREY PGVL LOAM LOOS 0004 BRWN CLAY SILT SOFT 0022
6604914	2003-12-15	4.70	0.00	0.00		FR 0008	0007 8	1.97		BRWN GRVL FILL 0003 BRWN SAND FILL 0006 GREN 0008 BLCK GRVL SAND FILL 0015
6604959	2006-06-02	5.50	5.20	0.00			0008 10	2		0000 GREY GRVL 0002 BRWN SAND GRVL 0006 BRWN SAND SILT 0012 GREY SILT SAND 0017 ROCK 0018
7040857	2006-08-22	32.30	1.20	0.00				5.11		GREY CLAY 0004 LMSN DLMT 0106
7041805	2007-02-02	6.70	1.50	0.00			0012 10	2		RED CLAY SILT 0005 GREY LMSN 0022
7044668	2007-05-18	0.00	0.00	0.00						
7103742	2008-03-03	10.60	0.00	0.00	MO	FR 0004	0030 5	2.04		BRWN PEAT 0004 GREY CLAY 0012 GREY LMSN ROCK 0035
7103742	2008-02-25	0.00	0.00	0.00	MO	FR 0004	0030 5	2.04		BRWN PEAT 0004 GREY CLAY 0012 GREY LMSN ROCK 0035
7103742	2008-02-19	0.00	0.00	0.00	MO	FR 0004	0030 5	2.04		BRWN PEAT 0004 GREY CLAY 0012 GREY LMSN ROCK 0035
7103742	2008-03-03	0.00	0.00	0.00	MO	FR 0004	0030 5	2.04		BRWN PEAT 0004 GREY CLAY 0012 GREY LMSN ROCK 0035
7103742	2008-02-12	0.00	0.00	0.00	MO	FR 0004	0030 5	2.04		BRWN PEAT 0004 GREY CLAY 0012 GREY LMSN ROCK 0035
7117151		3.80	0.00	0.00	MO		0007 5			BRWN FILL LOOS 0005 GREY DLMT HARD 0012

7117152		5.00	0.00	0.00	MO		0006 10			BRWN FILL LOOS 0005 GREY DLMT CHRT HARD 0016
7117153		5.80	0.00	0.00	MO		0009 10			BRWN FILL LOOS 0008 GREY DLMT CHRT HARD 0019
7135563	2009-11-03	4.60	0.00	0.00	TH		0005 10			BRWN LOAM GRVL LOOS 0005 GREY CLAY 0015
7137138	2009-12-14	25.30	0.00	7.30	DO	FR 0060		6	24/78/10/1:0	BRWN SAND 0012 RED CLAY 0024 GREY LMSN ROCK 0083
7137139	2009-12-15	0.00	0.00	0.00	OT					
7141993	2009-05-20	3.90	0.00	0.00	TH					BRWN CLAY SILT 0003 GREY CLAY SILT 0012 ROCK 0013
7141993	2009-05-20	0.00	0.00	0.00	TH					BRWN CLAY SILT 0003 GREY CLAY SILT 0012 ROCK 0013
7141993	2009-05-20	0.00	0.00	0.00	TH					BRWN CLAY SILT 0003 GREY CLAY SILT 0012 ROCK 0013
7141993	2009-05-20	0.00	0.00	0.00	TH					BRWN CLAY SILT 0003 GREY CLAY SILT 0012 ROCK 0013
7146536	2010-05-01	13.70	0.00	2.20	DO	FR 0030			7/38/4/1:	BRWN LOAM STNS 0002 GREY LMSN 0045
7146537	2010-05-01	0.00	0.00	0.00	DO					
7153957	2010-10-20	3.00	0.00	0.00	MT		0005 5	1.5		BRWN SAND GRVL DNSE 0003 BLCK LOOS 0004 RED CLAY SILT LOOS 0010
7153958	2010-10-20	5.50	0.00	0.00	MT		0008 10	1.5		BRWN GRVL SAND DNSE 0003 BLCK SAND LOOS 0004 RED CLAY SILT LOOS 0018
7153959	2010-10-20	4.60	0.00	0.00	MT		0005 10	1.5		BRWN GRVL SAND DNSE 0003 BLCK SAND LOOS 0004 RED CLAY SILT LOOS 0015
7153960	2010-10-20	3.00	0.00	0.00	MT		0005 5	1.5		BRWN GRVL SAND DNSE 0003 BLCK SAND LOOS 0004 RED CLAY SILT LOOS 0010
7159645	2011-01-31	0.00	0.00	0.00						
7161328	2011-03-18	3.30	0.00	0.00	MT		0003 8	1.36		BRWN LOAM SAND SOFT 0002 GREY ROCK HARD 0011
7161805	2011-01-25	0.00	0.00	0.00						
7164728	2011-05-28	0.00	0.00	0.00						
7165599	2011-06-14	0.00	0.00	0.00	OT	0008				
7173376	2011-11-15	18.00	0.00	3.50	DO	SU		6	11//10/11:	BRWN SAND 0007 GREY LMSN 0059
7173377		0.00	0.00	0.00		SU			//2/1:0	
7175527	2012-01-12	0.00	0.00	0.00	OT					
7175528	2012-01-12	12.80	0.00	2.40	DO	FR 0038		8	8/20/12/1:	BRWN SAND 0008 GREY LMSN ROCK 0042
7180676	2012-03-06	7.60	0.00	0.00	MT		0015 10	1.59		GREY GRVL FILL STNS 0004 BRWN CLAY SOFT 0012 GREY SHLE SOFT FCRD 0018 BLCK SHLE SOFT FCRD 0025
7180677	2012-03-06	7.60	0.00	0.00	MT		0015 10	1.59		GREY GRVL FILL STNS 0004 BRWN CLAY SOFT 0012 GREY SHLE SOFT FCRD 0018 BLCK SHLE SOFT FCRD 0025
7180678	2012-03-06	7.60	0.00	0.00	MT		0015 10	1.59		GREY GRVL FILL STNS 0004 BRWN CLAY SOFT 0012 GREY SHLE SOFT FCRD 0018 GREY SHLE SOFT FCRD 0025
7184673	2012-07-04	0.00	0.00	7.60	OT				25///1:	
7185577	2012-05-12	6.70	0.00	0.00	MO		0005 17	1.79		GREY ROCK STNS FCRD 0003 GREY LMSN HARD 0022
7185636	2012-07-15	18.90	0.00	3.00	DO	SU 0056			10/37/4/1:	BRWN LOAM 0002 BRWN CLAY GRVL 0023 GREY LMSN 0062
7185637	2012-07-20	0.00	0.00	0.00	DO					
7188654	2012-01-19	0.00	0.00	0.00						

7196455	2012-12-14	4.60	0.00	0.00	MO		0005 10	1.12		BRWN LMSN CLAY FILL 0005 GREY LMSN ROCK 0015
7202691	2013-05-27	13.40	0.00	3.40	DO	FR 0042			11/14/18/3:30	BRWN SAND PCKD 0006 BLCK MUCK CLAY PCKD 0008 BRWN CLAY PCKD 0013 GREY LMSN LYRD 0044
7206946	2013-06-19	9.10	0.00	0.00	MO		0020 10	2		GREY CLAY CLAY 0030
7211607	2013-02-22	6.10	0.00	0.00	MO		0010 10	1.79		BRWN FILL LOOS 0001 BRWN CLAY 0020
7222108	2014-05-13	9.10	0.00	2.60	DO	FR 0028		6.11	9/10/21/4:30	BLCK MUCK FSND PCKD 0005 BRWN CLAY FSND PCKD 0008 GREY LMSN LYRD 0030
7225195	2014-07-11	6.40	0.00	2.10	DO	FR 0010			7/7/28/5:	BLCK LOAM LOOS 0001 BRWN CLAY PCKD 0006 GREY LMSN LYRD 0021
7232290	2014-09-03	9.10	0.00	0.00	MO		0025 5	0.75		GREY LMSN GRVL GRVL 0001 BRWN CLAY STNS 0008 BRWN CLAY SILT SOFT 0030
7232367	2014-10-02	3.00	0.00	0.00	MO		0004 6	1.79		BRWN CLAY 0005 GREY CLAY DRY 0010
7239321	2014-04-21	5.80	0.00	0.00	MT		0010 10	2		BRWN LOAM 0001 GREY ---- 0015 BRWN PEAT 0019
7248425	2015-06-13	14.30	0.00	7.60	DO	UT 0045		6	25/45/10/1:	BRWN CLAY 0006 BRWN SAND 0027 BRWN SAND BLDR 0036 GREY LMSN 0047
7262474	2015-11-25	3.00	0.00	0.00	MO		0005 5	1.97		SAND FILL 0010
7265731	2016-06-14	18.90	0.00	3.40	DO	UT 0049		6	11/53/10/1:0	BRWN CLAY 0007 GREY LMSN 0062
7269706	2016-08-05	18.90	0.00	5.20	DO	FR 0018 FR 0054 FR 0061			17/55/15/4:	BRWN CLAY PCKD 0007 GREY LMSN LYRD 0062
7272871	2016-07-21	6.10	0.00	0.00	MO	UT	0013 7	2		BRWN CLAY SILT SOFT 0013 GREY LMSN 0020
7281304	2016-11-08	6.40	0.00	0.00	TH	UT 0018	0011 10	2		BRWN SILT CLAY SOFT 0006 GREY LMSN 0021
7281305	2016-11-08	11.20	0.00	0.00	TH	UT 0028	0027 12	2		BRWN CLAY SILT SOFT 0005 GREY LMSN 0037
7281306	2016-11-08	11.20	0.00	0.00	TH	UT 0028	0027 10	2		BRWN CLAY SILT LOOS 0002 GREY LMSN 0037
7281338	2016-11-08	10.60	0.00	0.00	TH	UT 0029	0020 15	2		BRWN CLAY SILT SOFT 0004 GREY LMSN 0035
7281339	2016-11-08	11.20	0.00	0.00	TH	UT 0028	0027 12	2		BRWN SAND CLAY SOFT 0004 GREY LMSN 0037
7301226	2017-01-03	0.00	0.00	0.00						
7306395	2018-01-26	0.00	0.00	0.00						
7319653	2018-07-27	0.00	0.00	0.00	OT					
7333353	2019-04-28	9.10	0.00	2.10	DO	0021			7/11/8/1:	BRWN LOAM 0002 BLCK CLAY GRVL 0012 GREY LMSN 0030
7335422	2019-03-04	4.90	0.00	0.00	MO		0011 5	2		BRWN FILL LOOS 0005 BRWN SAND FILL LOOS 0010 GREY SHLE HARD 0016
7337327	2019-06-26	0.00	0.00	0.00						
7339748	2019-06-14	6.10	0.00	0.00	MO		0010 10	2		BRWN CLAY SILT 0010 GREY CLAY SILT SOFT 0020
7339749	2019-06-13	6.10	0.00	0.00	MO		0010 10	2		BRWN CLAY SILT 0010 GREY CLAY SILT SOFT 0020
7339750	2019-06-14	6.10	0.00	0.00	MO		0010 10	2		BRWN CLAY SILT 0010 GREY CLAY SILT SOFT 0020
7339751	2019-06-17	3.80	0.00	0.00	MO		0003 10	2		BRWN CLAY SILT 0012
7340495	2019-02-20	6.10	0.00	0.00	MO		0010 10	1.97		FILL 0005 GREY CLAY DNSE 0010 GREY CLAY SOFT 0015 RED CLAY GRVL WBRG 0020
7340496	2019-02-20	6.10	0.00	0.00	MO		0010 10	1.97		FILL 0005 GREY CLAY DNSE 0010 GREY CLAY SOFT 0015 RED CLAY GRVL WBRG 0020
7340497	2019-02-20	6.10	0.00	0.00	MO		0010 10	1.97		FILL 0005 GREY CLAY DNSE 0010 GREY CLAY SOFT 0015 RED CLAY GRVL WBRG 0020
7341011	2019-07-11	0.00	0.00	0.00						
7346667	2019-10-12	18.30	0.00	7.30	DO	UT 0058			24/51/10/1:0	BRWN SAND ---- 0038 BLCK ROCK FCRD 0060
7346668	2019-10-12	0.00	0.00	0.00						

7355650	2020-03-02	4.60	0.00	0.00	TH		0005 10	2		BRWN LOAM 0001 BRWN GRVL STNS BLDR 0006 GREY SILT CLAY 0015
7355651	2020-03-05	8.20	0.00	0.00	TH		0010 17	2		GREY STNS CMTD 0017 BLCK LOAM 0018 BRWN CLAY 0024 GREY CLAY 0027
7355652	2020-03-05	5.20	0.00	0.00	TH		0007 10	2		BLCK LOAM 0001 BRWN CLAY 0005 GREY CLAY 0014 GREY CLAY SILT 0017
7355653	2020-03-02	5.20	0.00	0.00	TH		0007 10	2		BRWN SILT CLAY STNS 0004 BRWN CLAY 0006 GREY CLAY 0017
7368378	2020-07-21	0.00	0.00	0.00						
7368478	2020-09-01	25.60	0.00	0.00	MO		0055 29	2		BRWN SAND GRVL FILL 0012 GREY LMSN ROCK 0084
7368495	2020-08-27	10.70	0.00	0.00	MO		0025 10	2		BRWN SAND GRVL FILL 0007 GREY LMSN ROCK 0035
7371272	2020-08-06	0.00	0.00	0.00						
7377287	2021-01-05	0.00	0.00	0.00	MO			2		
7377288	2021-01-05	0.00	0.00	0.00	MO			2		
7377289	2021-01-05	0.00	0.00	0.00	MO			2		
7377290	2021-01-05	0.00	0.00	0.00	MO			2		
7377291	2021-01-05	0.00	0.00	0.00	NU MO			2		
7377292	2021-01-05	0.00	0.00	0.00	MO			2		
7377293	2021-01-05	0.00	0.00	0.00	MO			2		
7377294	2021-01-05	0.00	0.00	0.00	MO			2		
7388535	2021-04-20	6.10	0.00	0.00						
7388536	2021-04-20	6.10	0.00	0.00						
7388537	2021-04-20	6.10	0.00	0.00						
7388549	2021-04-20	6.10	0.00	0.00						
7388550	2021-04-20	6.10	0.00	0.00						
7388551	2021-04-20	6.10	0.00	0.00						
7388552	2021-04-20	6.70	0.00	0.00						

Note:

CASING DIA: Casing diameter in inches

PUMP TEST: Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour:Minutes

SCREEN: Screen Depth and Length in feet

Abbreviation:

DO	Domestic	FR	Fresh	OT	Other
ST	Livestock	SA	Salty	TH	Test Hole
IR	Irrigation	SU	Sulphur	DE	Dewatering
IN	Industrial	MN	Minerial	MO	Monitoring
CO	Commercial	UK	Not Stated	MT	Monitoring and Test Hole
MN	Municipal	GS	Gas		
PS	Public	IR	Iron		
AC	Cooling And AC	UT	Untested		
NU	Not Used	OT	Other		

PGMN ID: W0000289

Ontario — Ministry of the Environment

Measurements recorded in: ☑ Metric ☐ Imperial

Well T... (below) **A 077606**

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	NIAGARA PENINSULA CONSERVATION AUTHORITY		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
250 THOROLD ROAD WEST, 3RD FLOOR	WELLAND	ONTARIO	L3C 3W2	905 788 3135

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
HOLLOWAY BAY ROAD	FORT ERIE		

County/District/Municipality	City/Town/Village	Province	Postal Code
	NIAGARA	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	653833	4751561		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	TOPSOIL			0	0.1
RED-BROWN	SILTY CLAY			0.1	2.0
GREY-BROWN	LIMESTONE BEDROCK			2.0	4.9M

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	2.3M	BENTONITE	
2.3M	4.9M	SILICA SAND	

Method of Construction

☐ Cable Tool ☑ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☑ Other, specify AUGER

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PLASTIC	SCH 40	0	3.4M

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2"	PLASTIC	0.010	3.4	4.9M

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify	Hole Diameter Depth From	Depth To	Diameter (cm/in)
		0	2.0M	27cm
		2.0M	4.9M	10cm

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.

SEE ATTACHED

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
LANTECH DRILLING SERVICES INC.	6810

Business Address (Street Number/Name)	Municipality
3661 MOUNT ALBERT ROAD	SHARON

Province	Postal Code	Business E-mail Address
ONTARIO	L0G 1V0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905 478 2243	MIKE SOKOLOW

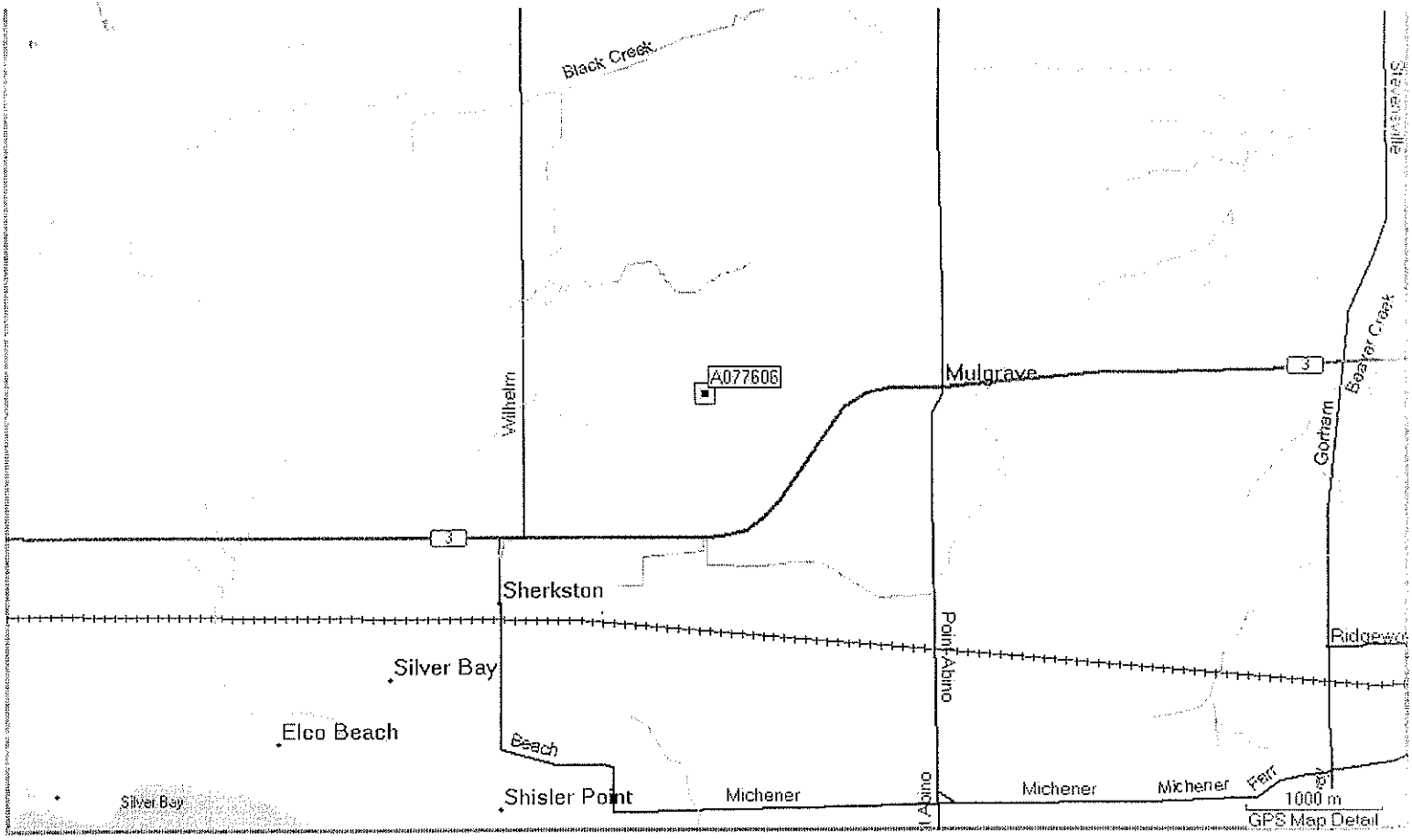
Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
2381		2009/10/09

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☑ No		2003/02/03

Ministry Use Only

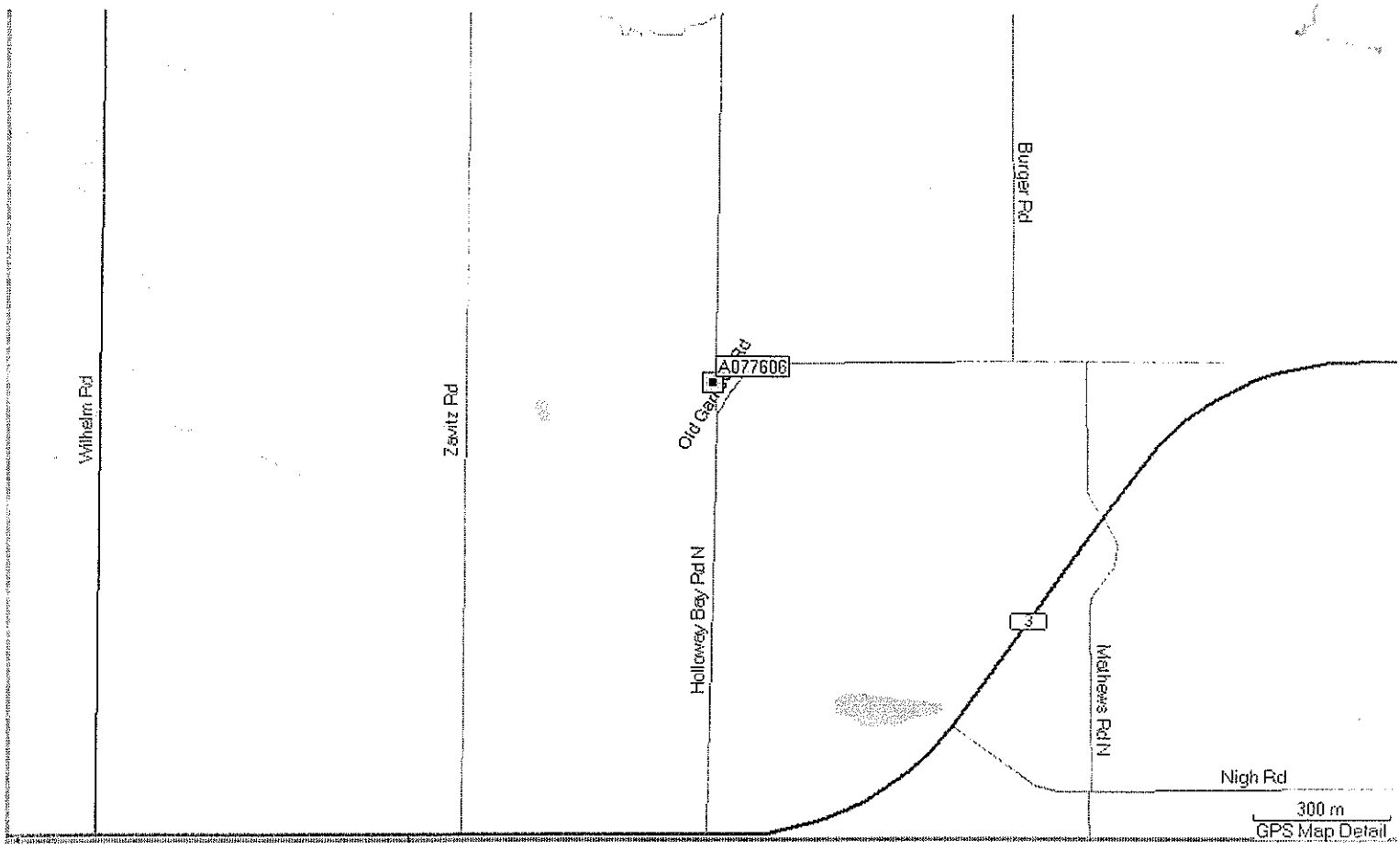
Audit No. Z 096715

Received MAR 01 2010



C-6809
2096715

MAR 0 1 2010



E-6809
2096715

MAR 0 1 2010

Buchner Well

13-0168-01 #

Ontario — Ministry of the Environment

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*: A165167

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	The Corporation of The City of Welland		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
60 East Main St.	Welland	ON	L3B3X4	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
BUCHNER RD.	Crowland		

County/District/Municipality	City/Town/Village	Province	Postal Code
Welland	WELLAND	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	645985	4760622		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	CLAY	SILT	SILTY CLAY	0	15'
RED/GREY	CLAY	SILT/SAND/STONE	DIAMICTON	15'	65'
RED/GREY	CLAY	SILT	CLAY & SILT LAYERS	65'	130'
GREY/RED	SAND	GRAVEL/CLAY	SAND + GRAVEL & CLAY	130'	131'
GREY	LIMESTONE		BEDROCK	131'	141'

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	128'	BENTONITE	

Method of Construction

☐ Cable Tool ☒ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☒ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify*

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☒ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify*

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2.5"	PVC	Sch 40	+3	131'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2.5"	PVC	10	131'	141'

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☒ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Water Details

Water found at Depth (m/ft)	Kind of Water	Gas	Other, specify
	☐ Fresh ☐ Untested	☐	
	☐ Fresh ☐ Untested	☐	
	☐ Fresh ☐ Untested	☐	

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	8	8"
8	141	5"

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify*

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping ____ hrs + ____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

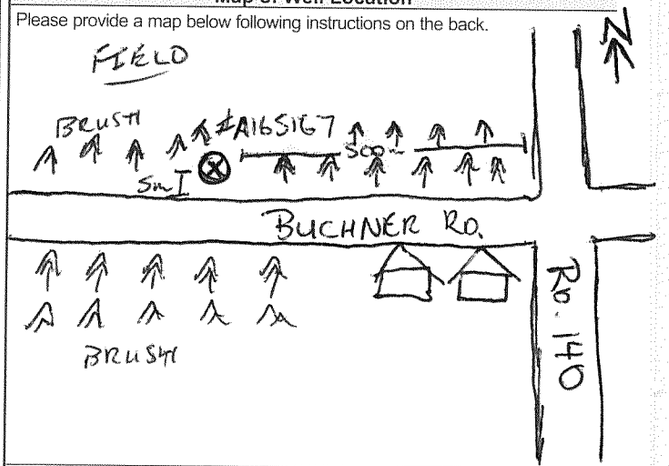
Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Aardvark Drilling Inc.	7238

Business Address (Street Number/Name)	Municipality
5-C Lewis Road	Guelph

Province	Postal Code	Business E-mail Address
ON	N1H1E9	www.aardvarkdrillinginc.com

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
1982693 40	LAVERS, CRAIG

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3559		2014 08 08

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2014 08 09

Ministry Use Only

Audit No Z188671

AUG 29 2014

Ministry's Copy

Well ID

Townline Well

Well ID Number: 7226391
Well Audit Number: *Z188670*
Well Tag Number: *A165164*

This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location	TOWNLINE ROAD
Township	WAINFLEET TOWNSHIP
Lot	
Concession	
County/District/Municipality	NIAGARA (WELLAND)
City/Town/Village	WELLAND
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 640191.00 Northing: 4756683.00
Municipal Plan and Sublot Number	
Other	

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To
GREY	CLAY	SILT	SILT	0 ft	25 ft
RED	CLAY	SILT	CLAY	25 ft	53 ft
RED	SAND	SILT	FSND	53 ft	95 ft
GREY	SAND	SILT	MSND	95 ft	100 ft
RED	SILT	SAND		100 ft	130 ft
GREY	LMSN			130 ft	139.42 ft

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant Used (Material and Type)	Volume Placed
0 ft	112 ft	BENTONITE	

Method of Construction & Well Use

Method of Construction	Well Use

Diamond

Monitoring

Status of Well

Observation Wells

Construction Record - Casing

Inside Diameter	Open Hole or material	Depth From	Depth To
2.5 inch	PLASTIC	3 ft	115 ft
2.5 inch	PLASTIC	130 ft	139.42 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
2.5 inch	PLASTIC	115 ft	130 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 7238

Results of Well Yield Testing

After test of well yield, water was
If pumping discontinued, give reason
Pump intake set at
Pumping Rate
Duration of Pumping
Final water level
If flowing give rate
Recommended pump depth
Recommended pump rate
Well Production
Disinfected?

Draw Down & Recovery

Draw Down Time(min)	Draw Down Water level	Recovery Time(min)	Recovery Water level
SWL			
1		1	

2	2
3	3
4	4
5	5
10	10
15	15
20	20
25	25
30	30
40	40
45	45
50	50
60	60

Water Details

Water Found at Depth Kind

Hole Diameter

Depth From	Depth To	Diameter
0 ft	8 ft	8 inch
8 ft	139.42 ft	5 inch

Audit Number: Z188670

Date Well Completed: July 29, 2014

Date Well Record Received by MOE: August 29, 2014

Log of Borehole BH/MW-01

Project No. HAM-21000726-C0 Drawing No. 3

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

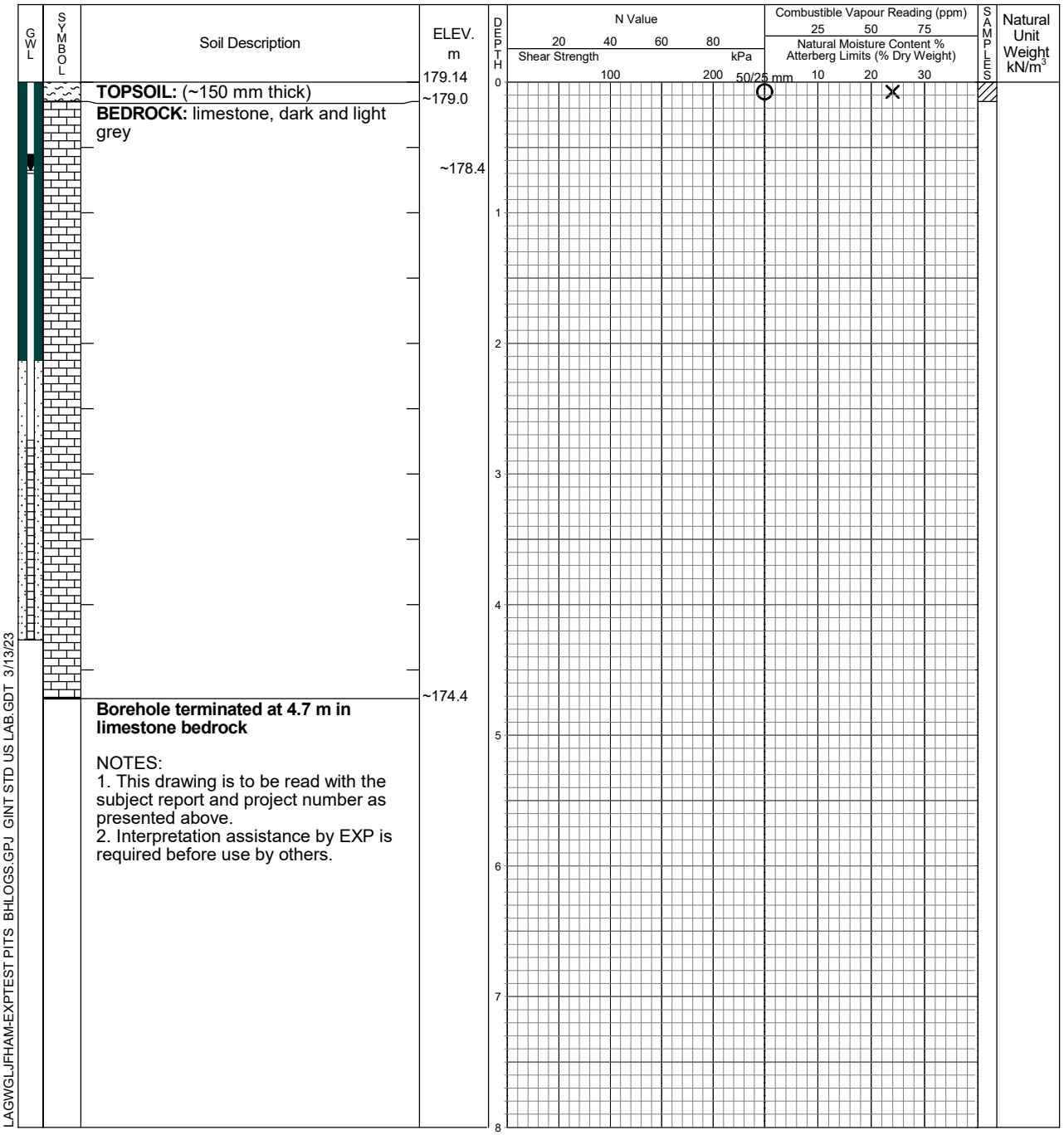
Date Drilled: June 3 to June 4, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	4.3
August 3, 2021	1.2	
August 30, 2021	1.2	
March 6, 2023	0.7	

Log of Borehole BH/MW-02

Project No. HAM-21000726-C0 | Drawing No. 4

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

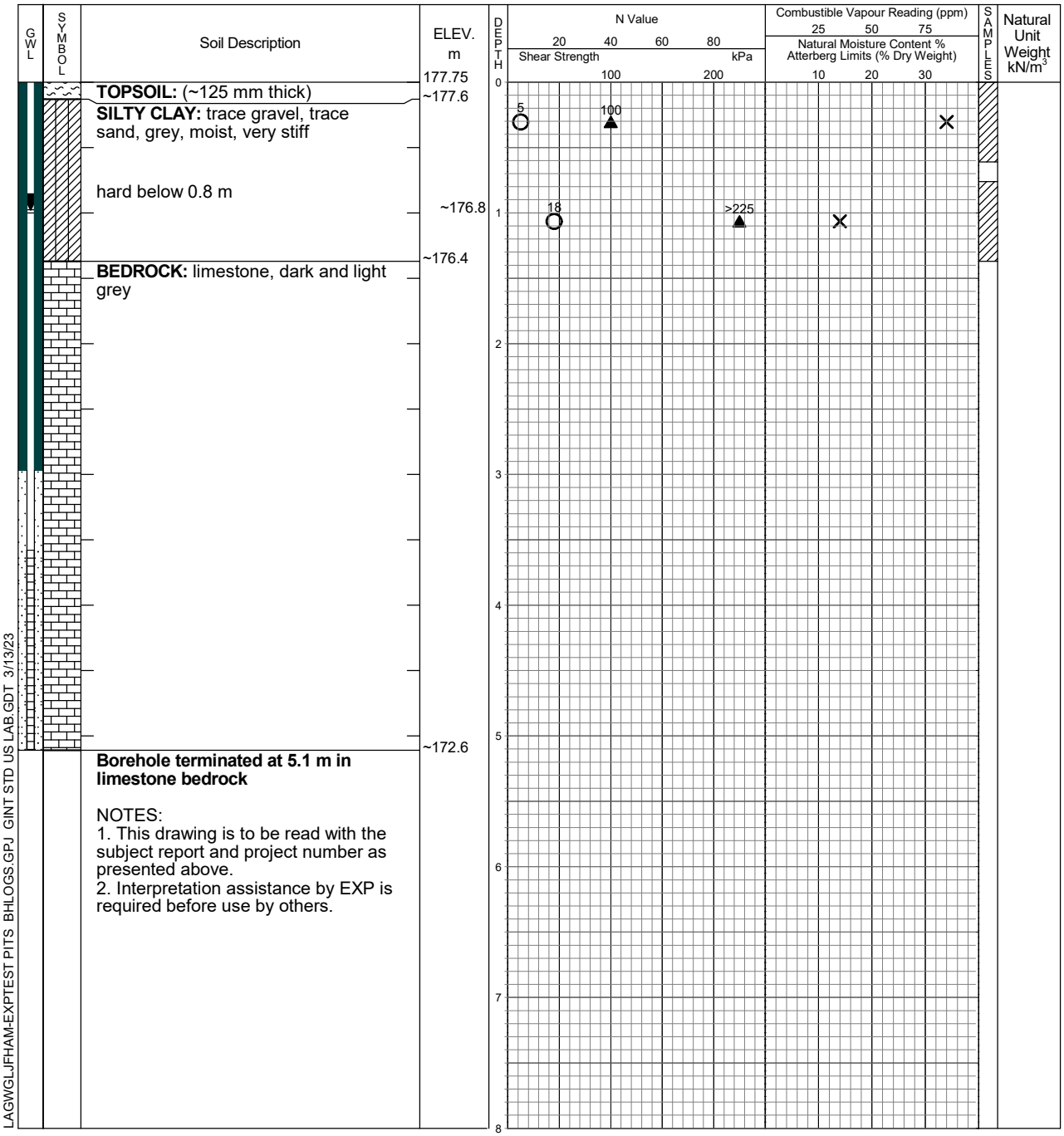
Date Drilled: June 3, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	5.1
August 3, 2021	1.0	
August 30, 2021	1.0	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH-03

Project No. HAM-21000726-C0 | Drawing No. 5

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

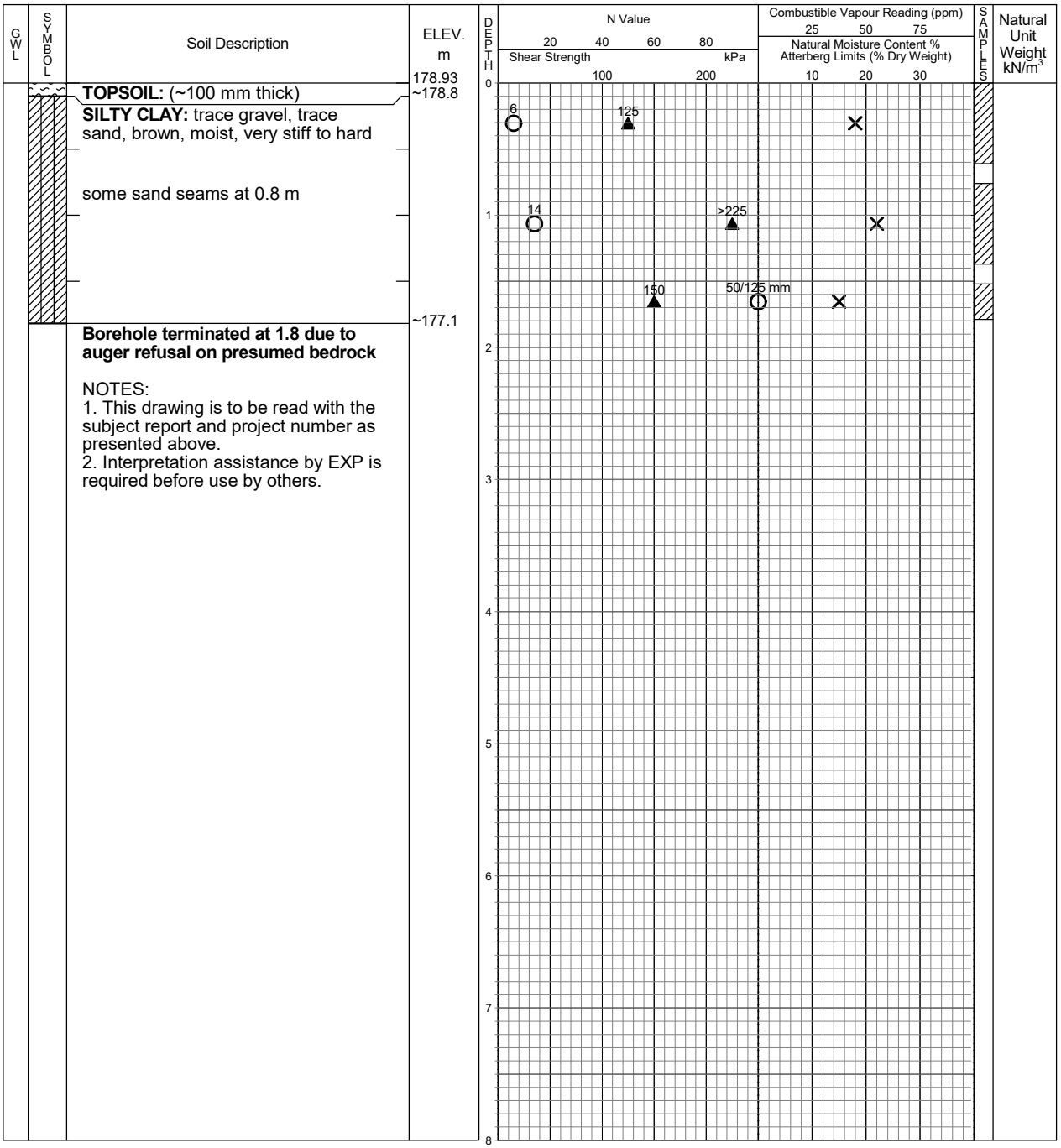
Date Drilled: June 3, 2021

Drill Type: D-70 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample | SPT (N) Value | Dynamic Cone Test | Shelby Tube | Field Vane Test (S)

Combustible Vapour Reading | Natural Moisture | Plastic and Liquid Limit | Undrained Triaxial at % Strain at Failure | Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	1.8

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-04

Project No. HAM-21000726-C0 | Drawing No. 6

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

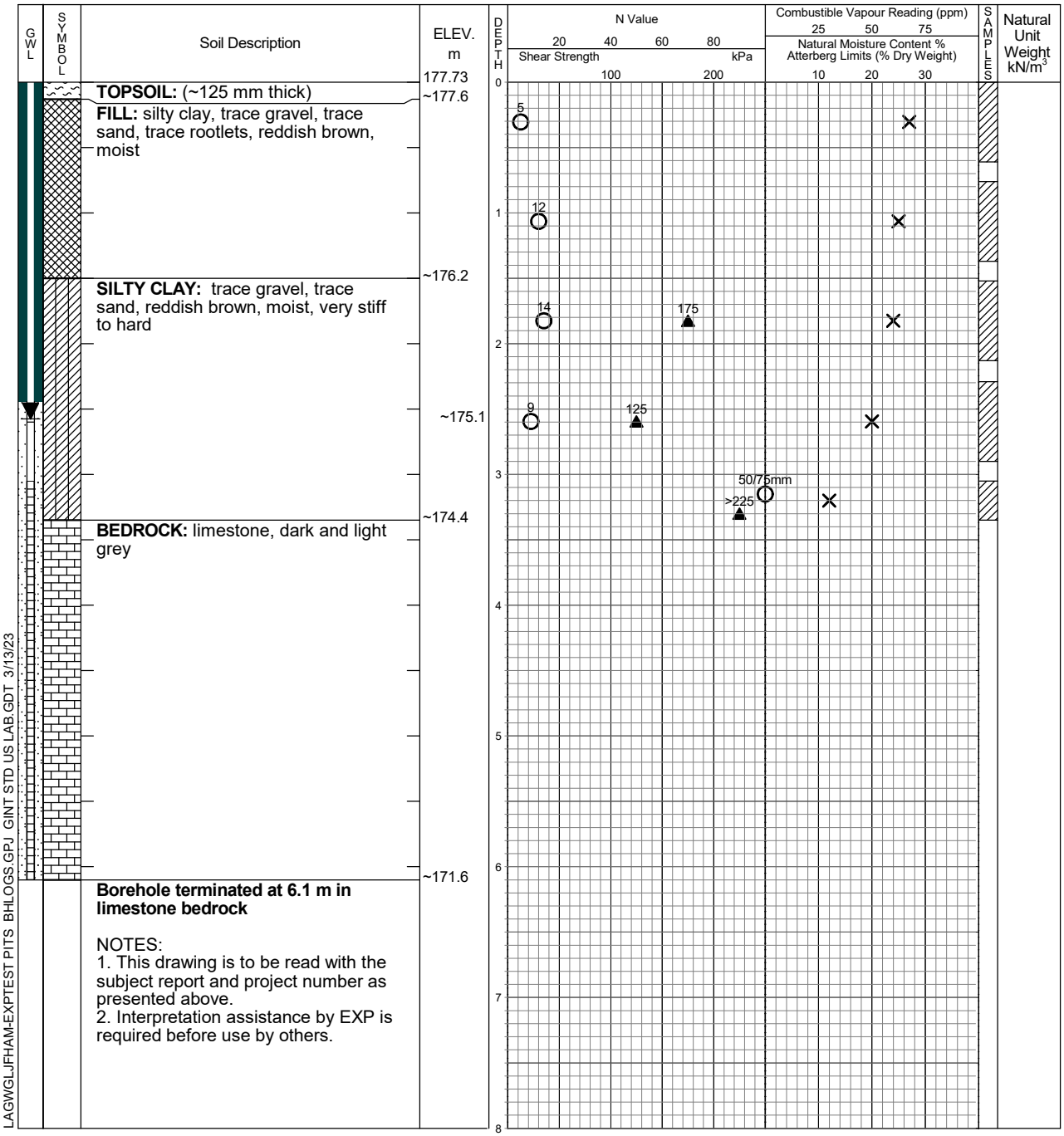
Date Drilled: June 1, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	6.1
August 3, 2021	0.8	
August 30, 2021	2.6	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-05

Project No. HAM-21000726-C0 | Drawing No. 7

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

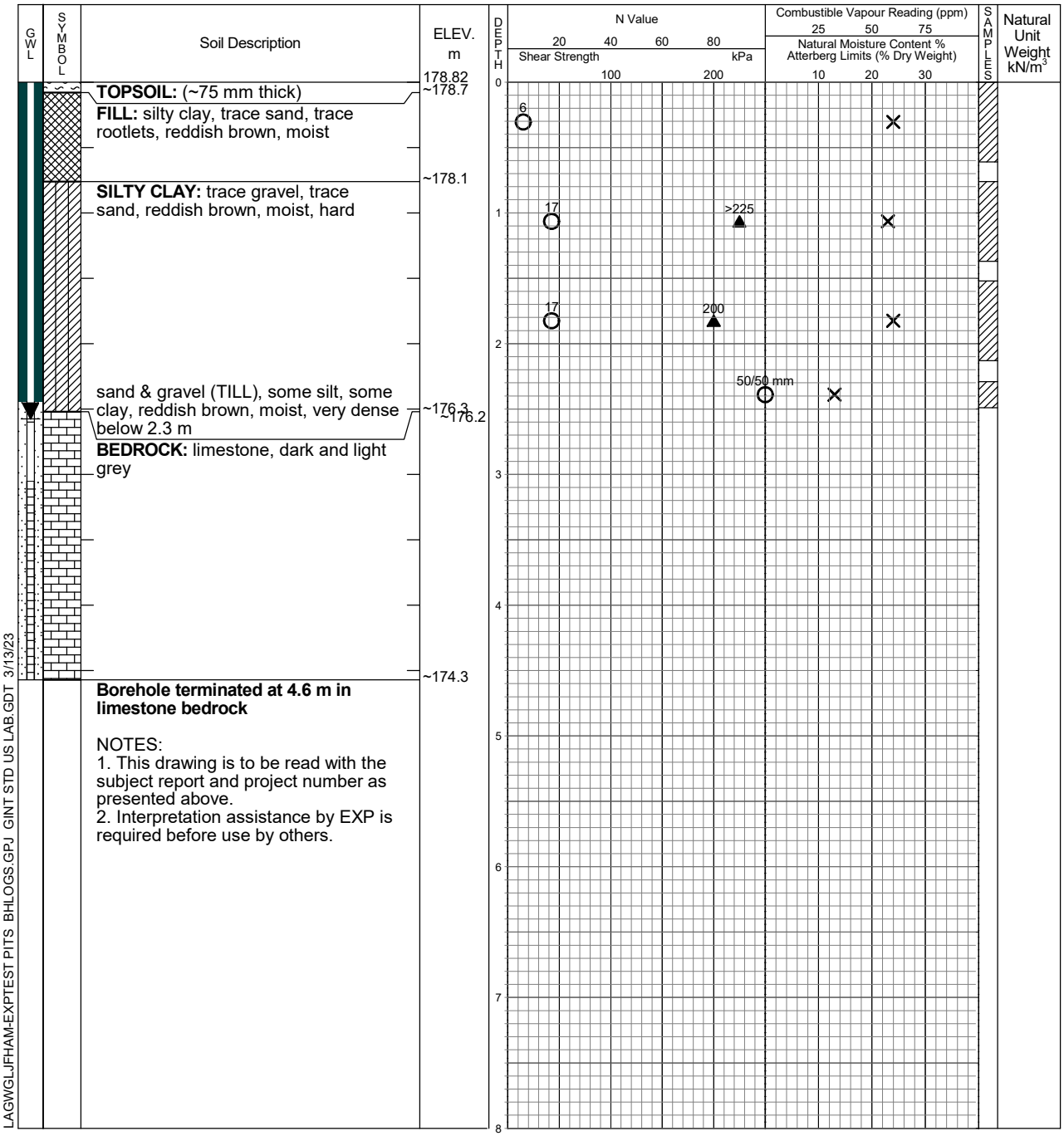
Date Drilled: June 2, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	4.6
August 3, 2021	1.9	
August 30, 2021	2.6	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-06

Project No. HAM-21000726-C0 | Drawing No. 8

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: June 2, 2021

Drill Type: D-70 Track Mount, Hollow Stem

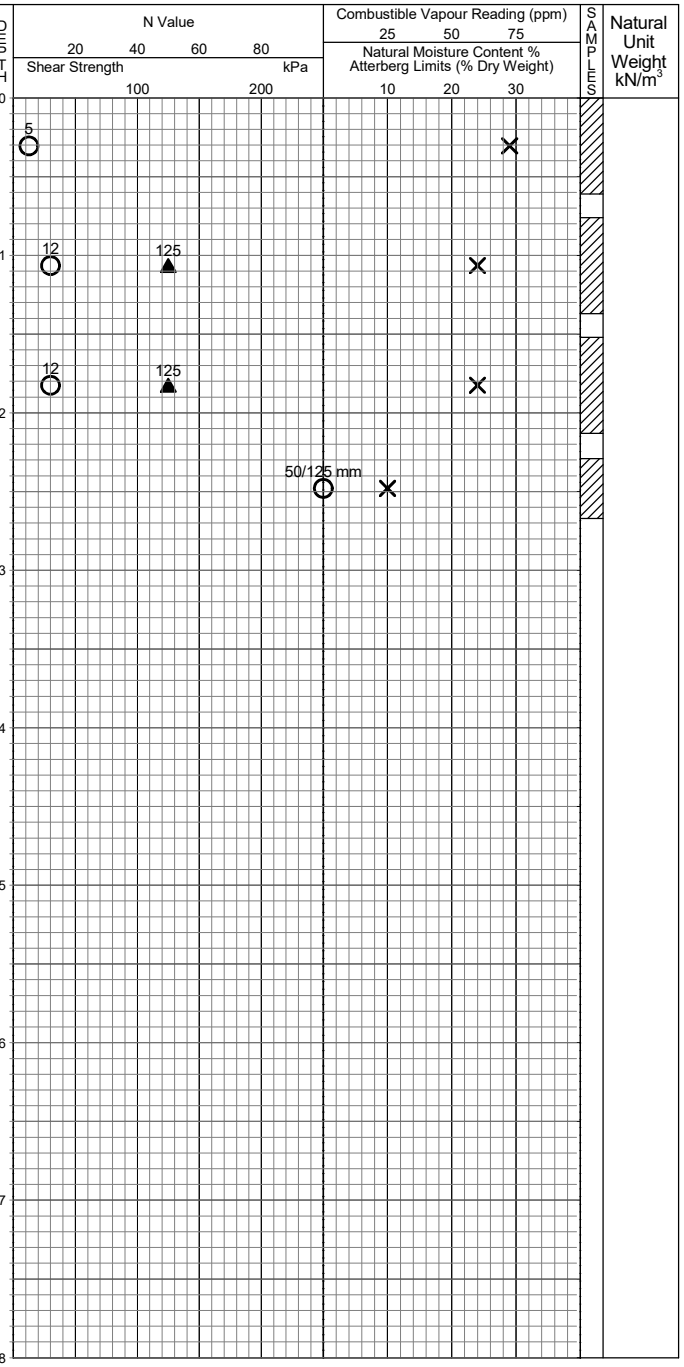
Datum: Geodetic

Auger Sample | SPT (N) Value | Dynamic Cone Test | Shelby Tube | Field Vane Test (S)

Combustible Vapour Reading | Natural Moisture | Plastic and Liquid Limit | Undrained Triaxial at % Strain at Failure | Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
			177.89
		TOPSOIL: (~125 mm thick)	~177.8
		FILL: silty clay, trace gravel, trace sand, trace rootlets, reddish brown, moist	~176.8
		SILTY CLAY: trace gravel, trace sand, trace rootlets, reddish brown, moist, very stiff	~176.2
		some sand and gravel below 2.2 m	~175.3
		BEDROCK: limestone, dark and light grey	~173.3
		Borehole terminated at 4.5 m in limestone bedrock	

NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.



Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	4.6
August 3, 2021	1.4	
August 30, 2021	1.7	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-07

Project No. HAM-21000726-C0 | Drawing No. 9

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

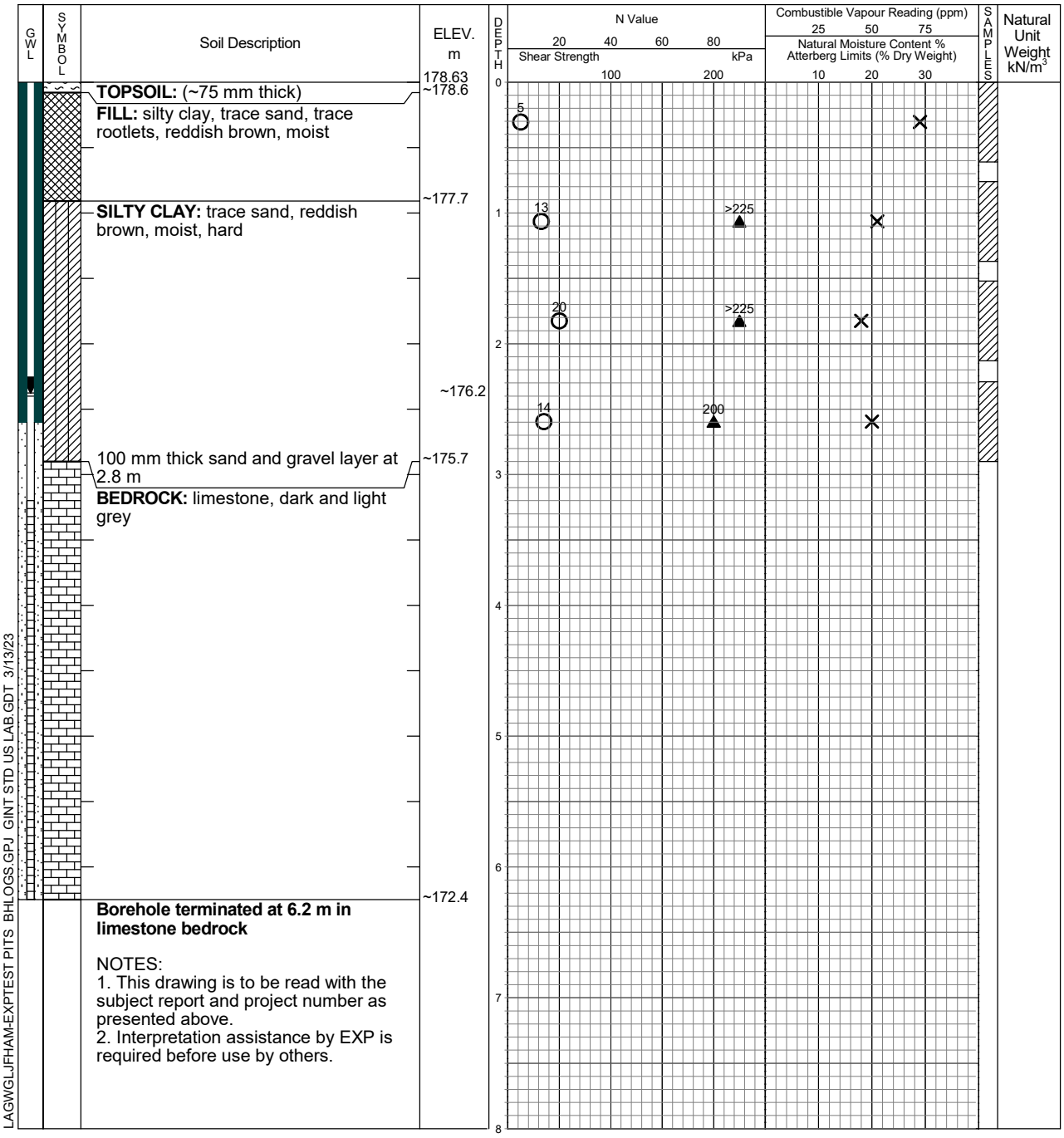
Date Drilled: June 2, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	6.2
August 3, 2021	2.0	
August 30, 2021	2.4	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH-08

Project No. HAM-21000726-C0 | Drawing No. 10

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

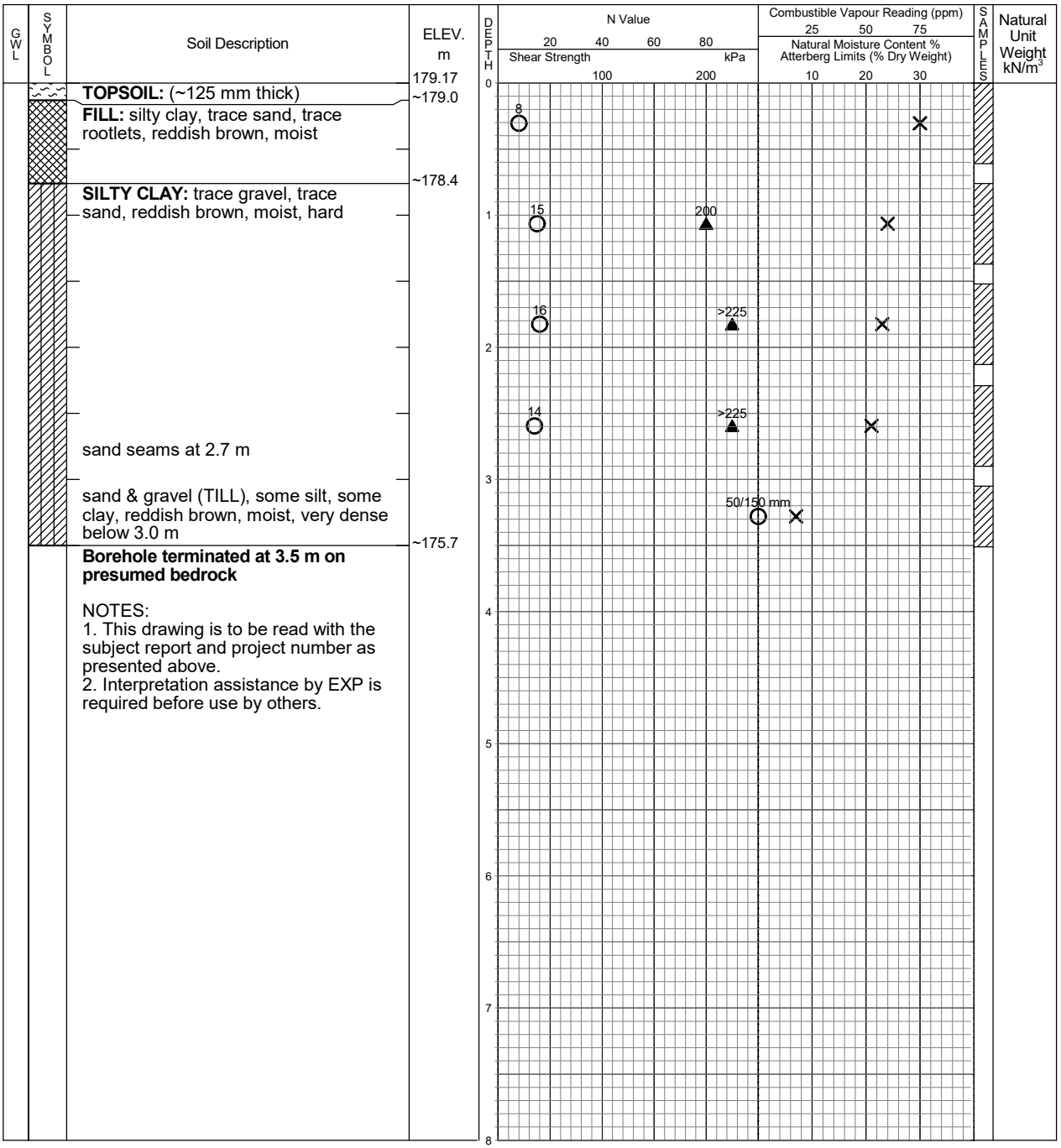
Date Drilled: June 1, 2021

Drill Type: D-70 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample | SPT (N) Value | Dynamic Cone Test | Shelby Tube | Field Vane Test (S)

Combustible Vapour Reading | Natural Moisture | Plastic and Liquid Limit | Undrained Triaxial at % Strain at Failure | Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	3.5

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-09

Project No. HAM-21000726-C0 Drawing No. 11

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

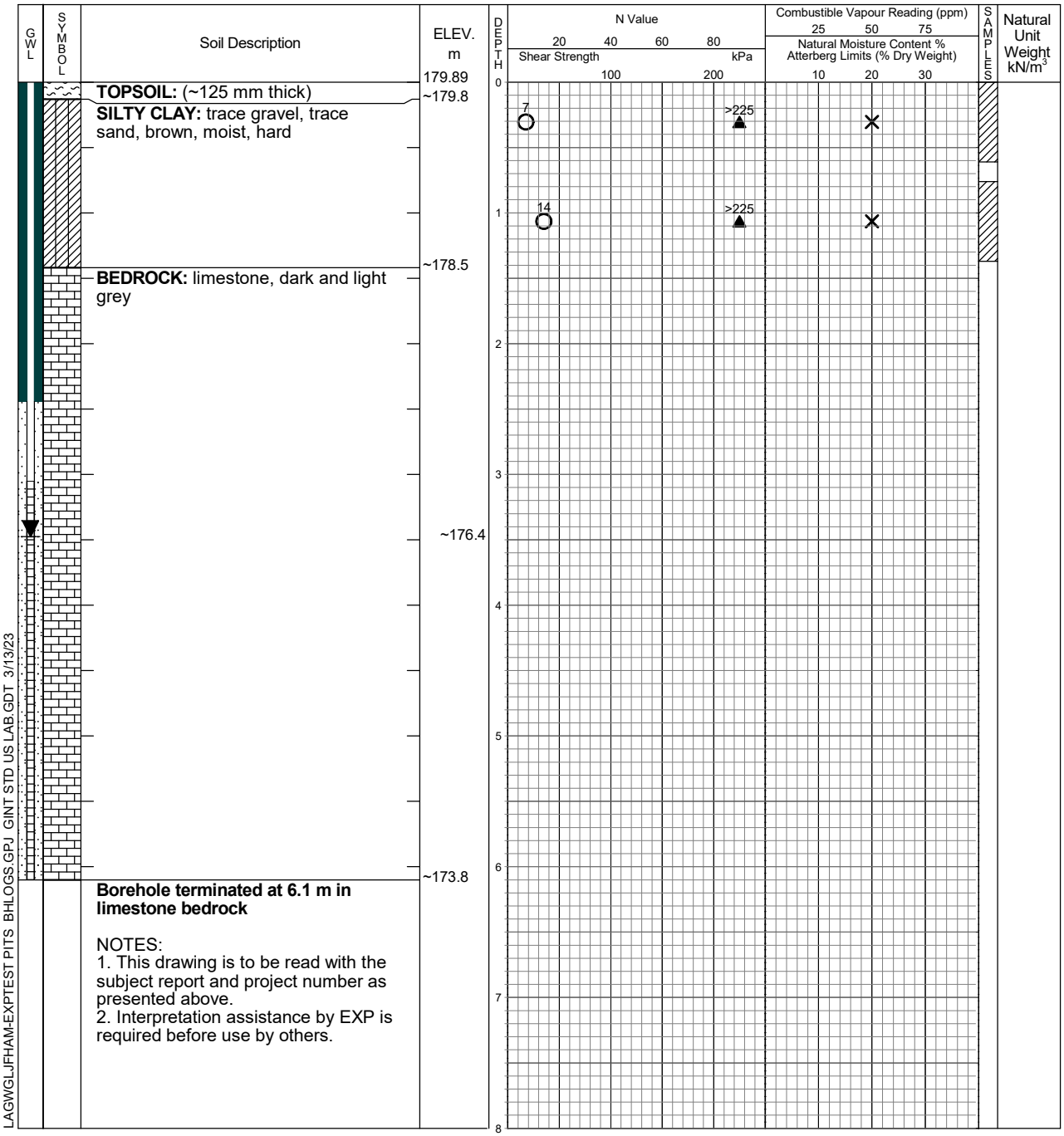
Date Drilled: June 7, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	6.1
August 3, 2021	3.5	
August 30, 2021	3.5	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH-10

Project No. HAM-21000726-C0 | Drawing No. 12

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: June 4, 2021

Drill Type: D-70 Track Mount, Solid Stem

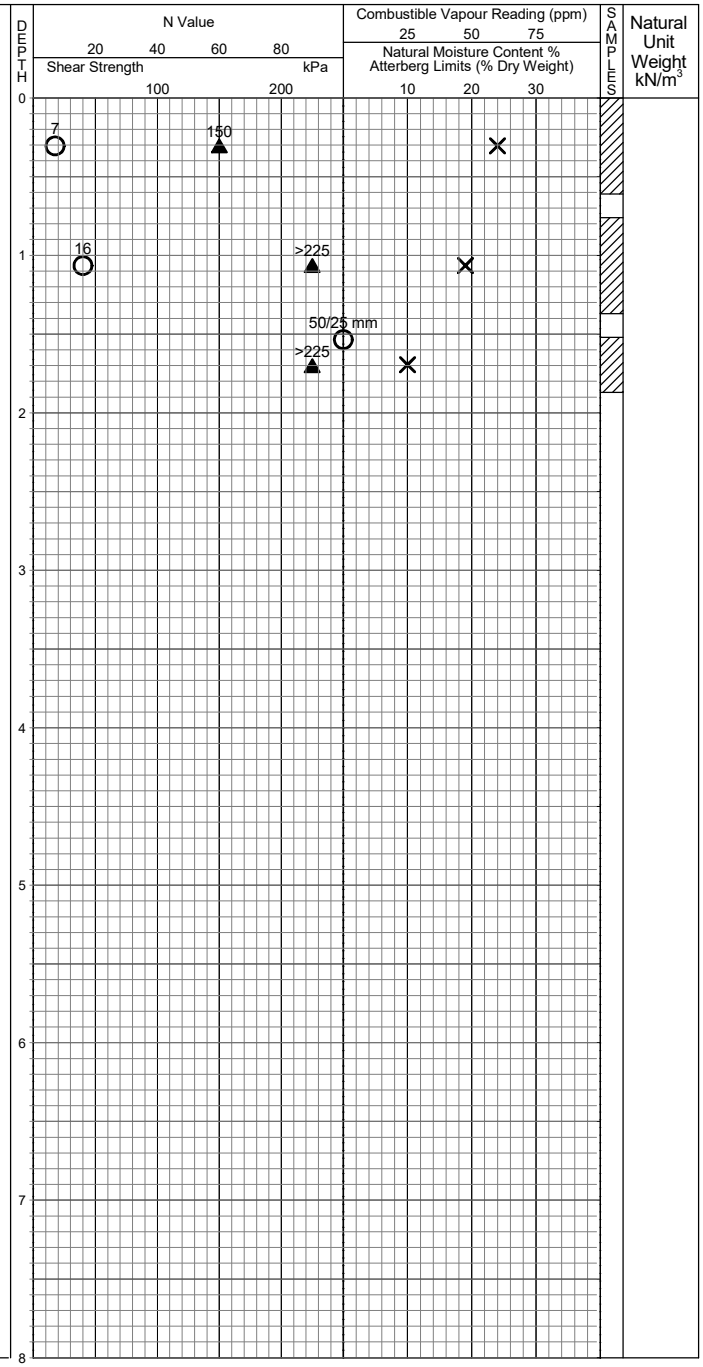
Datum: Geodetic

Auger Sample | SPT (N) Value | Dynamic Cone Test | Shelby Tube | Field Vane Test (S)

Combustible Vapour Reading | Natural Moisture | Plastic and Liquid Limit | Undrained Triaxial at % Strain at Failure | Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
			179.35
		TOPSOIL: (~75 mm thick)	~179.3
		SILTY CLAY: trace sand, brown, moist, very stiff	
		trace gravel, hard below 0.8 m	
			~177.5
		Borehole terminated at 1.9 m due to auger refusal on presumed bedrock	

NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.



Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	1.9

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-11

Project No. HAM-21000726-C0 | Drawing No. 13

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: May 31, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL: (~125 mm thick)	177.07	0
		FILL: silty clay, trace sand, trace rootlets, trace black organic stains, dark brown, moist	~176.9	
		SILTY CLAY: trace sand, brown, moist, hard	~176.3	1
		BEDROCK: limestone, slightly weathered to fresh, dark and light grey	~175.3	2
		RUN 1 (1.73 - 3.48 m): recovery 85%, RQD 55% (fair)	~175.2	3
		RUN 2 (3.48 - 5.12 m): recovery 97%, RQD 75% (good)		4
		Borehole terminated at 5.1 m in limestone bedrock	~171.9	5
		NOTES: 1. This drawing is to be read with the subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by others.		6
				7
				8

N Value: 20 40 60 80
Shear Strength kPa: 100 200
Combustible Vapour Reading (ppm): 25 50 75
Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30

7
12
>225
50/50 mm
>225

SAMPLES

Natural Unit Weight kN/m³

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	5.1
August 3, 2021	1.6	
August 30, 2021	1.9	

Log of Borehole BH-12

Project No. HAM-21000726-C0 | Drawing No. 14

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: May 31, 2021

Drill Type: D-70 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL: (~125 mm thick)	177.77 ~177.6	0
		FILL: silty clay, some sand, trace gravel, reddish brown, moist		
			~177.0	1
		SILTY CLAY: trace gravel, trace sand, reddish brown, moist, hard	~176.8	
		Borehole terminated at 1.0 m due to auger refusal on presumed bedrock		
		NOTES: 1. This drawing is to be read with the subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by others.		2 3 4 5 6 7 8

N Value (20 40 60 80)
Shear Strength (100 200 kPa)
Combustible Vapour Reading (ppm) (25 50 75)
Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)
SAMPLES
Natural Unit Weight kN/m³

8
12
>225

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	1.1

Log of Borehole BH-13

Project No. HAM-21000726-C0 | Drawing No. 15

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: May 27, 2021

Drill Type: D-70 Track Mount, Solid Stem

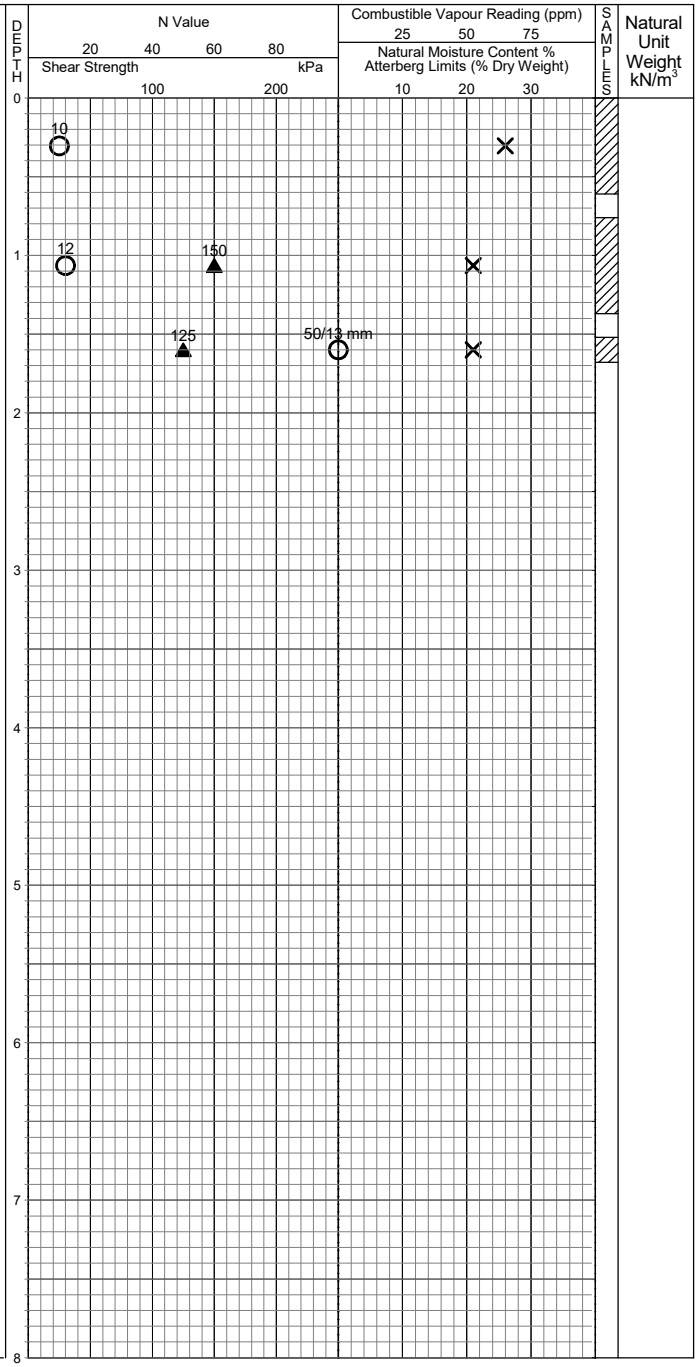
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
			178.42
		TOPSOIL: (~75 mm thick)	~178.3
		FILL: sand and gravel, some silt, trace clay, trace rootlets, grey, damp	~178.2
		FILL: silty clay, trace sand, brown, moist	~177.7
		SILTY CLAY: trace sand, reddish brown, moist, very stiff	
		some gravel below 1.5 m	~176.8
		Borehole terminated at 1.6 m due to auger refusal on presumed bedrock	

NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.



LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	1.7

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-14

Project No. HAM-21000726-C0 | Drawing No. 16

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: June 14, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL: (~100 mm thick)	178.82 ~178.7	0
		FILL: silty clay, some sand, trace rootlets, reddish brown, moist	~178.2	
		SILTY CLAY: trace sand, reddish brown, moist, very stiff	~178.1	1
		BEDROCK: limestone, dark and light grey	~177.6	
		Borehole terminated at 6.1 m in limestone bedrock	~172.7	6

NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

N Value: 20 40 60 80
Shear Strength kPa: 100 200
Combustible Vapour Reading (ppm): 25 50 75
Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30

12
125
50/50 mm

SAMPLES

Natural Unit Weight kN/m³

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	6.1
August 3, 2021	2.2	
August 30, 2021	2.3	
March 6, 2023	0.6	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-15

Project No. HAM-21000726-C0 | Drawing No. 17

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

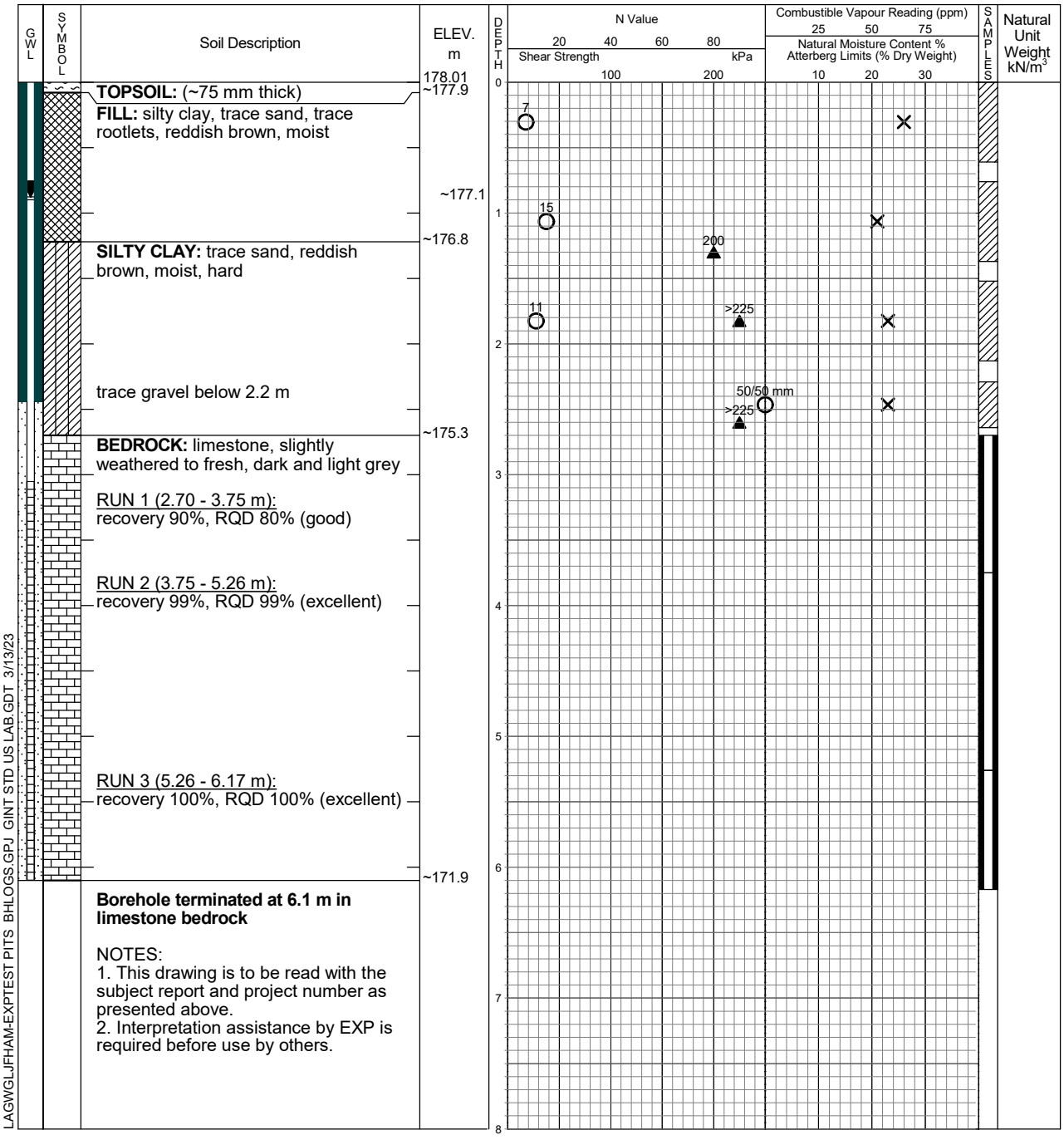
Date Drilled: May 27, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample | SPT (N) Value | Dynamic Cone Test | Shelby Tube | Field Vane Test (S)

Combustible Vapour Reading | Natural Moisture | Plastic and Liquid Limit | Undrained Triaxial at % Strain at Failure | Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	6.1
August 3, 2021	1.6	
August 30, 2021	2.6	
March 6, 2023	0.9	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-16

Project No. HAM-21000726-C0 Drawing No. 18

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

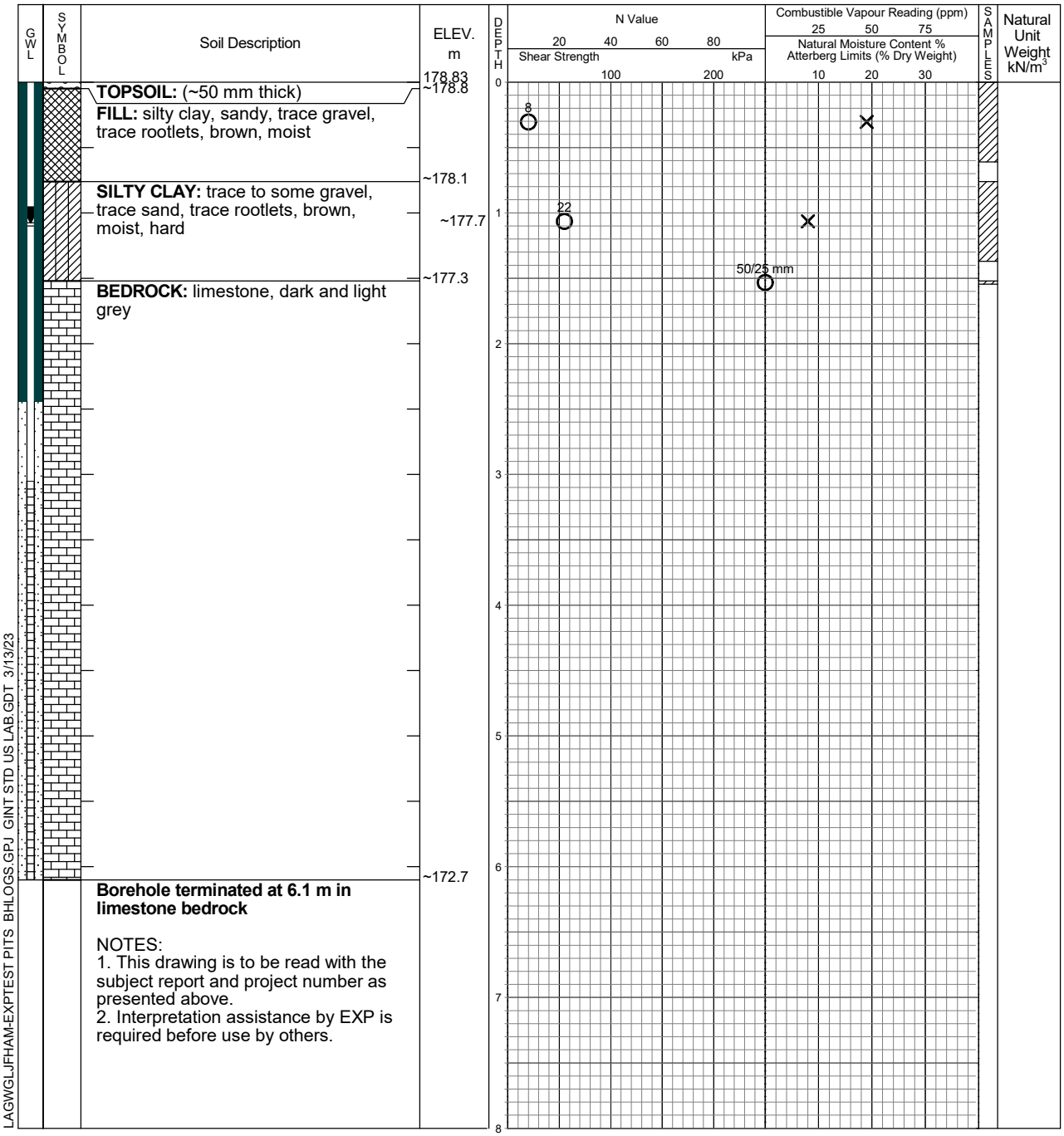
Date Drilled: May 27, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	4.87	6.1
August 3, 2021	2.1	
August 30, 2021	3.1	
March 6, 2023	1.1	

Log of Borehole BH-17

Project No. HAM-21000726-C0 Drawing No. 19

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: June 14, 2021

Drill Type: D-70 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL: (~100 mm thick)	179.71	0
		FILL: silty clay, trace sand, trace rootlets, reddish brown, moist	~179.6	
			~178.5	1
		Borehole terminated at 1.2 m due to auger refusal on presumed bedrock		
		NOTES: 1. This drawing is to be read with the subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by others.		2
				3
				4
				5
				6
				7
				8

N Value: 20 40 60 80
Shear Strength: 100 200 kPa
Combustible Vapour Reading (ppm): 25 50 75
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30
SAMPLES
Natural Unit Weight kN/m³

10
50/75 mm

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	1.2

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-18

Project No. HAM-21000726-C0 Drawing No. 20

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

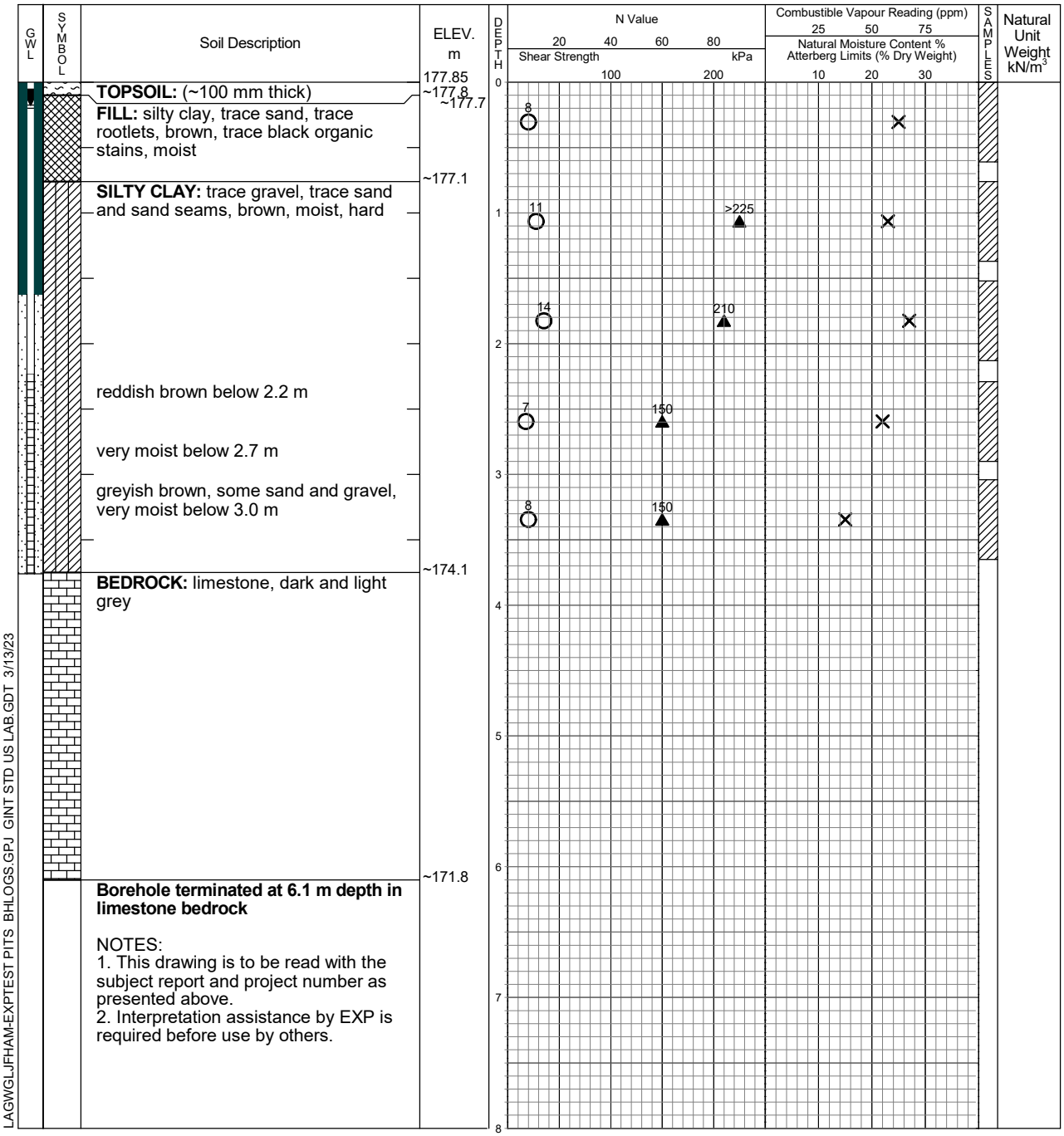
Date Drilled: May 31, 2021

Drill Type: D-70 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	3.8
August 3, 2021	1.5	
August 30, 2021	2.5	
March 6, 2023	0.2	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-19

Project No. HAM-21000726-C0 Drawing No. 21

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: June 7, 2021

Drill Type: D-70 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		TOPSOIL: (~60 mm thick)	180.55
			~180.4
		BEDROCK: limestone, dark and light grey	~180.3
			~177.5
		Borehole terminated at 3.0 m in limestone bedrock	

NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

DEPTH 0 1 2 3 4 5 6 7 8

N Value 20 40 60 80
Shear Strength kPa 100 200
50/50 mm

Combustible Vapour Reading (ppm) 25 50 75
Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30

SAMPLES

Natural Unit Weight kN/m³

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	2.6	3.1
August 3, 2021	0.4	
August 30, 2021	0.9	
March 6, 2023	0.3	

Log of Borehole BH/MW-20

Project No. HAM-21000726-C0 Drawing No. 22

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

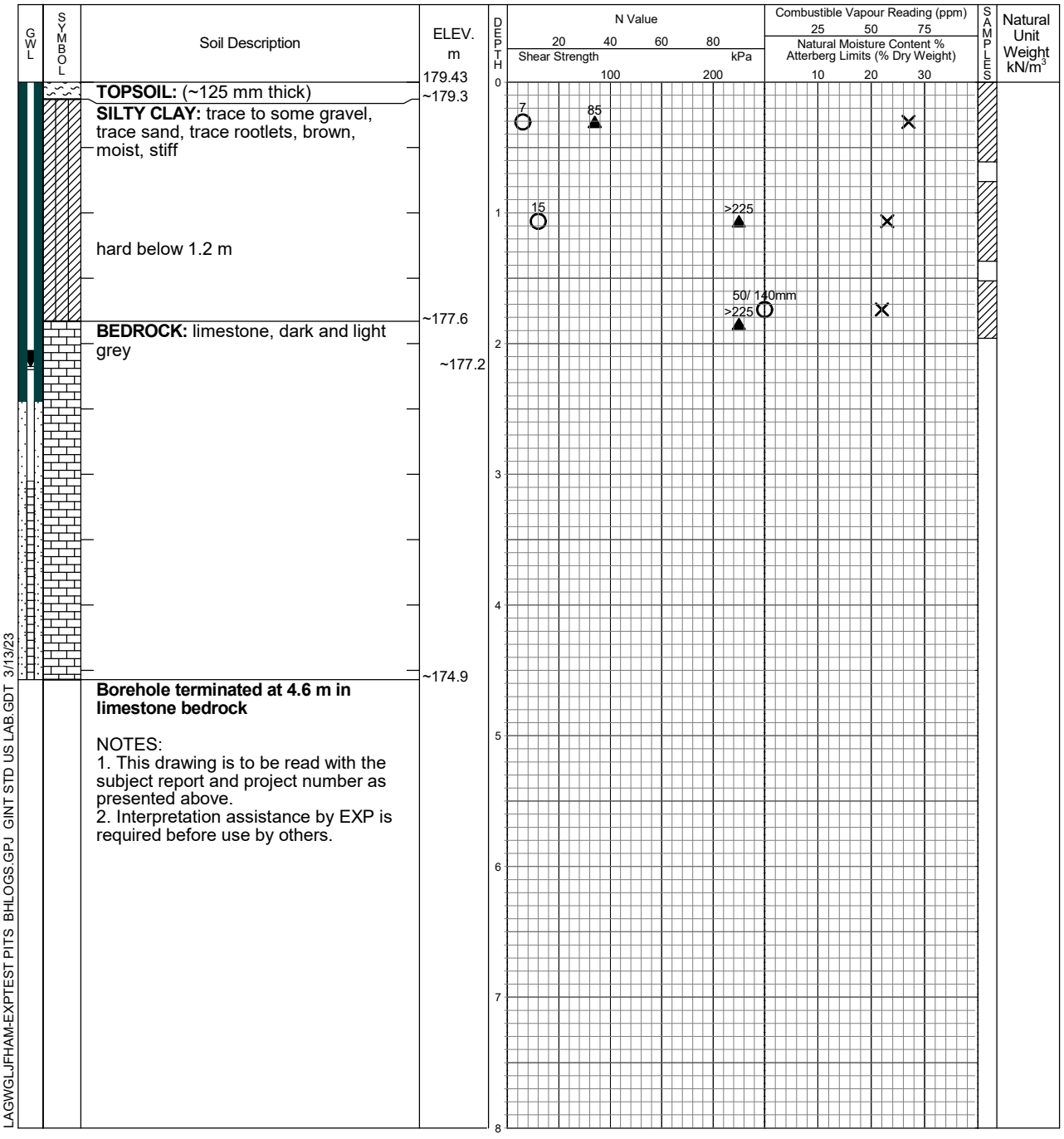
Date Drilled: June 7, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	3.81	4.6
August 3, 2021	1.7	
August 30, 2021	2.2	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-21

Project No. HAM-21000726-C0 Drawing No. 23

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: February 16, 2023

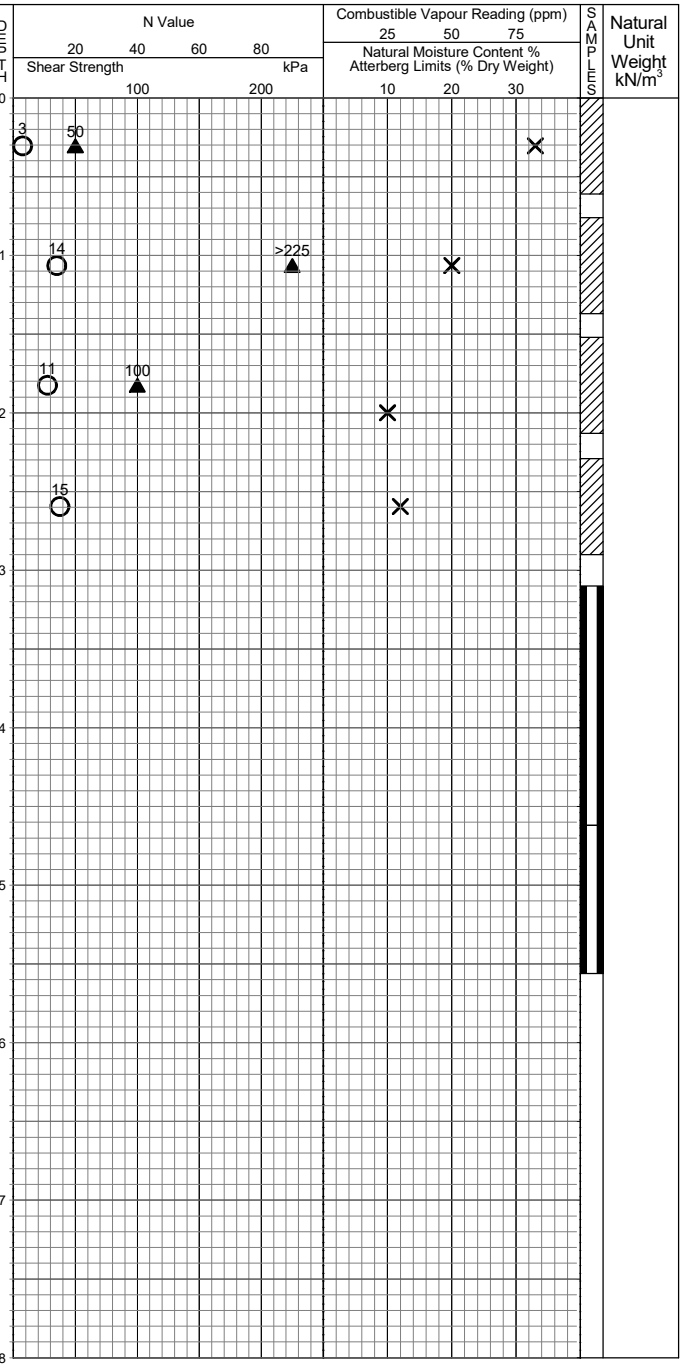
Drill Type: D-50 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
			178.74
		TOPSOIL: (~200 mm thick)	~178.5
		SILTY CLAY: trace gravel, trace sand, brown, very moist, stiff	~178.2
		moist, hard below 0.8 m	
		very stiff below 1.5 m	
		sandy silt (TILL), trace gravel, trace clay, brown, moist, compact below 2.0 m	~175.6
		BEDROCK: limestone, slightly weathered to fresh, dark and light grey	
		RUN 1 (3.10 - 4.62 m): recovery 100%, RQD 88% (good)	
		RUN 2 (4.62 - 5.56 m): recovery 100%, RQD 93% (excellent)	~173.2
		Borehole terminated at 5.6 m in limestone bedrock	
		NOTES: 1. This drawing is to be read with the subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by others.	



LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	5.6
March 6, 2023	0.5	

Log of Borehole BH/MW-22

Project No. HAM-21000726-C0 Drawing No. 24

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

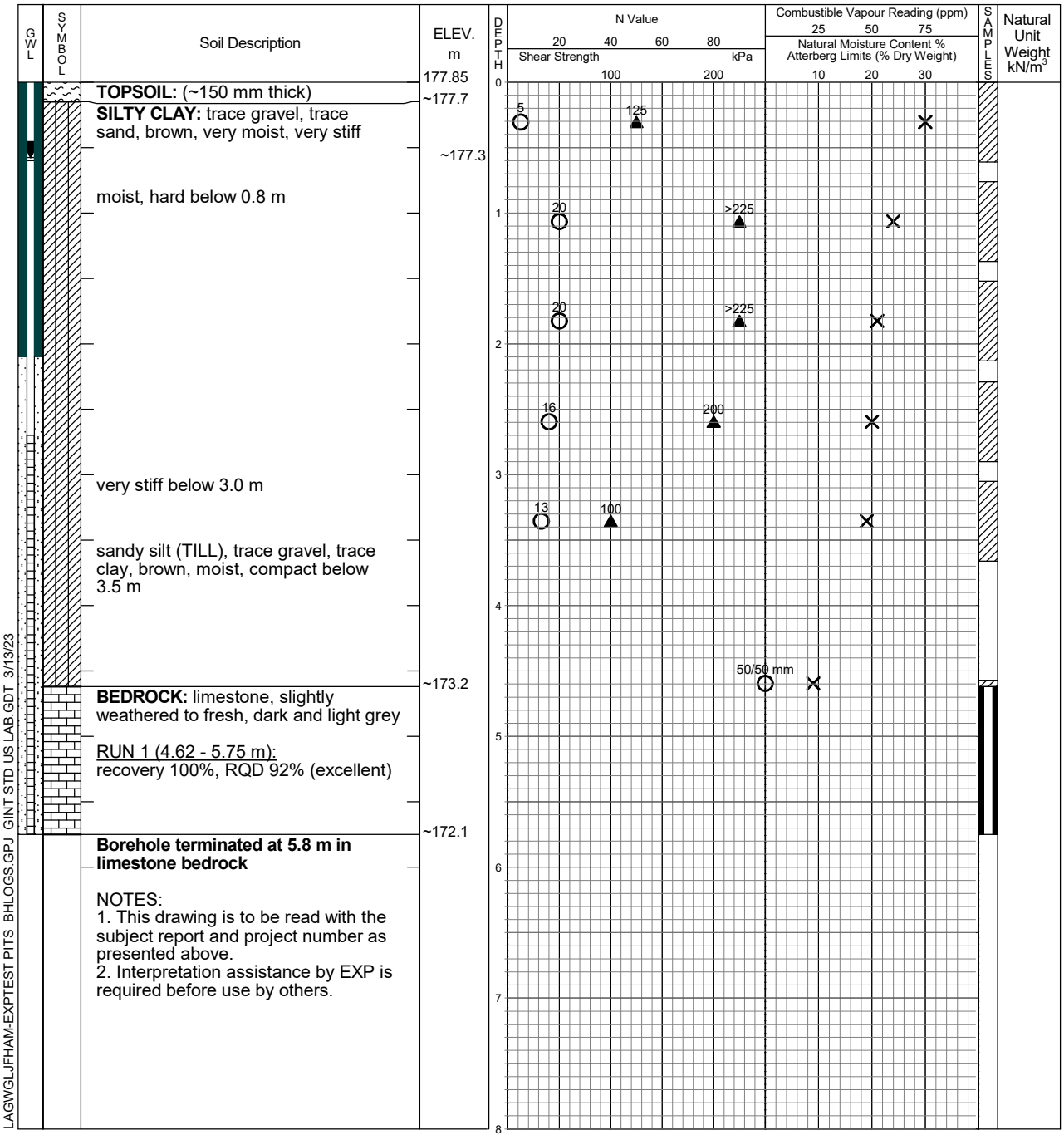
Date Drilled: February 16, 2023

Drill Type: D-50 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	5.8
March 6, 2023	0.6	

Your P.O. #: ENV-BRM
Your Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your C.O.C. #: 839058-02-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2021/08/10
Report #: R6758759
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1L7721
Received: 2021/08/03, 18:16

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2021/08/09	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2021/08/10	CAM SOP-00102	APHA 4500-CO2 D
Biochemical Oxygen Demand (BOD)	1	2021/08/05	2021/08/10	CAM SOP-00427	SM 23 5210B m
Chloride by Automated Colourimetry	1	N/A	2021/08/06	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	1	N/A	2021/08/10	CAM SOP-00414	SM 23 2510 m
Total Cyanide	1	2021/08/05	2021/08/05	CAM SOP-00457	OMOE E3015 5 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2021/08/06	CAM SOP-00446	SM 23 5310 B m
Fluoride	1	2021/08/07	2021/08/10	CAM SOP-00449	SM 23 4500-F C m
Hardness (calculated as CaCO3)	1	N/A	2021/08/06	CAM SOP 00102/00408/00447	SM 2340 B
Mercury in Water by CVAA	1	2021/08/06	2021/08/09	CAM SOP-00453	EPA 7470A m
Lab Filtered Metals by ICPMS	1	2021/08/05	2021/08/06	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	1	N/A	2021/08/09	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2021/08/10		
Anion and Cation Sum	1	N/A	2021/08/10		
Total Ammonia-N	1	N/A	2021/08/09	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	1	N/A	2021/08/06	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Animal and Vegetable Oil and Grease	1	N/A	2021/08/07	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2021/08/06	2021/08/07	CAM SOP-00326	EPA1664B m,SM5520B m
pH	1	2021/08/07	2021/08/09	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2021/08/05	CAM SOP-00444	OMOE E3179 m
Orthophosphate	1	N/A	2021/08/06	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	1	N/A	2021/08/10		Auto Calc
Sat. pH and Langelier Index (@ 4C)	1	N/A	2021/08/10		Auto Calc
Sulphate by Automated Colourimetry	1	N/A	2021/08/06	CAM SOP-00464	EPA 375.4 m
Sulphide	1	N/A	2021/08/04	CAM SOP-00455	SM 23 4500-S G m
Total Dissolved Solids (TDS calc)	1	N/A	2021/08/10		Auto Calc
Total Kjeldahl Nitrogen in Water	1	2021/08/06	2021/08/09	CAM SOP-00938	OMOE E3516 m
Mineral/Synthetic O & G (TPH Heavy Oil) (3)	1	2021/08/06	2021/08/07	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2021/08/06	2021/08/09	CAM SOP-00428	SM 23 2540D m
Volatile Organic Compounds in Water	1	N/A	2021/08/06	CAM SOP-00228	EPA 8260C m

Your P.O. #: ENV-BRM
Your Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your C.O.C. #: 839058-02-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2021/08/10
Report #: R6758759
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1L7721
Received: 2021/08/03, 18:16

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(3) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
10 Aug 2021 17:23:11

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

NIAGARA SANITARY & COMB. SEWER (27-2014)

BV Labs ID				QGU659			QGU659		
Sampling Date				2021/08/03 12:00			2021/08/03 12:00		
	UNITS	Criteria	Criteria-2	BH/MW2	RDL	QC Batch	BH/MW2 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Total Animal/Vegetable Oil and Grease	mg/L	-	150	ND	0.50	7499802			
Inorganics									
Total BOD	mg/L	-	300	ND	2	7501894			
Fluoride (F-)	mg/L	-	10	0.50	0.10	7506974	0.49	0.10	7506974
Total Kjeldahl Nitrogen (TKN)	mg/L	-	100	0.25	0.10	7505710	0.25	0.10	7505710
pH	pH	6.5:8.5	6.0:11	7.92		7506977	7.97		7506977
Phenols-4AAP	mg/L	0.001	1	ND	0.0010	7501635			
Total Suspended Solids	mg/L	-	350	ND	10	7502168			
Dissolved Sulphate (SO4)	mg/L	-	1500	120	1.0	7503817			
Sulphide	mg/L	0.002	1	**0.037**	0.020	7501311	**0.034**	0.020	7501311
Total Cyanide (CN)	mg/L	-	1	ND	0.0050	7502269			
Petroleum Hydrocarbons									
Total Oil & Grease	mg/L	-	-	ND	0.50	7505878			
Total Oil & Grease Mineral/Synthetic	mg/L	0.5	15	ND	0.50	7505881			
Metals									
Mercury (Hg)	mg/L	0.0002	0.01	ND	0.00010	7505695			
Total Antimony (Sb)	ug/L	20	5000	ND	0.50	7504807			
Total Arsenic (As)	ug/L	100	1000	ND	1.0	7504807			
Total Cadmium (Cd)	ug/L	0.2	700	ND	0.090	7504807			
Total Chromium (Cr)	ug/L	-	3000	ND	5.0	7504807			
Total Cobalt (Co)	ug/L	0.9	5000	**2.3**	0.50	7504807			
Total Copper (Cu)	ug/L	5	3000	1.7	0.90	7504807			
Total Lead (Pb)	ug/L	5	1000	ND	0.50	7504807			
Total Molybdenum (Mo)	ug/L	40	5000	2.9	0.50	7504807			
Total Nickel (Ni)	ug/L	25	2000	9.2	1.0	7504807			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
Criteria-2: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara BY-LAW No. 27-2014
ND = Not detected

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

NIAGARA SANITARY & COMB. SEWER (27-2014)

BV Labs ID				QGU659			QGU659		
Sampling Date				2021/08/03 12:00			2021/08/03 12:00		
	UNITS	Criteria	Criteria-2	BH/MW2	RDL	QC Batch	BH/MW2 Lab-Dup	RDL	QC Batch
Total Phosphorus (P)	ug/L	10	-	**ND (1)**	100	7504807			
Total Selenium (Se)	ug/L	100	1000	ND	2.0	7504807			
Total Silver (Ag)	ug/L	0.1	5000	ND	0.090	7504807			
Total Tin (Sn)	ug/L	-	5000	ND	1.0	7504807			
Total Zinc (Zn)	ug/L	30	3000	ND	5.0	7504807			
Volatile Organics									
Benzene	ug/L	100	10	ND	0.40	7501818			
Chloroform	ug/L	-	40	ND	0.40	7501818			
1,2-Dichlorobenzene	ug/L	2.5	50	ND	0.80	7501818			
1,4-Dichlorobenzene	ug/L	4	80	ND	0.80	7501818			
Ethylbenzene	ug/L	8	160	ND	0.40	7501818			
Methylene Chloride(Dichloromethane)	ug/L	100	210	ND	4.0	7501818			
1,1,2,2-Tetrachloroethane	ug/L	70	40	ND	0.80	7501818			
Tetrachloroethylene	ug/L	50	50	ND	0.40	7501818			
Toluene	ug/L	0.8	200	ND	0.40	7501818			
Trichloroethylene	ug/L	20	50	ND	0.40	7501818			
p+m-Xylene	ug/L	2	-	ND	0.40	7501818			
o-Xylene	ug/L	40	520	ND	0.40	7501818			
Total Xylenes	ug/L	-	-	ND	0.40	7501818			
Surrogate Recovery (%)									
4-Bromofluorobenzene	%	-	-	97		7501818			
D4-1,2-Dichloroethane	%	-	-	103		7501818			
D8-Toluene	%	-	-	97		7501818			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
Criteria-2: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara BY-LAW No. 27-2014
ND = Not detected
(1) RDL exceeds criteria

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

RCAP - COMPREHENSIVE (LAB FILTERED)

BV Labs ID				QGU659			QGU659		
Sampling Date				2021/08/03 12:00			2021/08/03 12:00		
	UNITS	Criteria	Criteria-2	BH/MW2	RDL	QC Batch	BH/MW2 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	-	-	9.25	N/A	7499842			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	280	1.0	7499948			
Calculated TDS	mg/L	-	-	480	1.0	7499953			
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	2.2	1.0	7499948			
Cation Sum	me/L	-	-	8.33	N/A	7499842			
Hardness (CaCO3)	mg/L	-	-	390	1.0	7500554			
Ion Balance (% Difference)	%	-	-	5.18	N/A	7499949			
Langelier Index (@ 20C)	N/A	-	-	0.846		7499951			
Langelier Index (@ 4C)	N/A	-	-	0.598		7499952			
Saturation pH (@ 20C)	N/A	-	-	7.07		7499951			
Saturation pH (@ 4C)	N/A	-	-	7.32		7499952			
Inorganics									
Total Ammonia-N	mg/L	-	-	0.053	0.050	7505829			
Conductivity	umho/cm	-	-	780	1.0	7506979	780	1.0	7506979
Dissolved Organic Carbon	mg/L	-	-	2.2	0.40	7505746			
Orthophosphate (P)	mg/L	-	-	0.012	0.010	7503825			
Alkalinity (Total as CaCO3)	mg/L	-	-	280	1.0	7506976	280	1.0	7506976
Dissolved Chloride (Cl-)	mg/L	-	-	36	1.0	7503823			
Nitrite (N)	mg/L	-	-	ND	0.010	7503189	ND	0.010	7503189
Nitrate (N)	mg/L	-	-	ND	0.10	7503189	ND	0.10	7503189
Nitrate + Nitrite (N)	mg/L	-	-	ND	0.10	7503189	ND	0.10	7503189
Metals									
Dissolved Aluminum (Al)	ug/L	-	-	ND	4.9	7503495	ND	4.9	7503495
Dissolved Antimony (Sb)	ug/L	20	5000	ND	0.50	7503495	ND	0.50	7503495

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
Criteria-2: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara BY-LAW No. 27-2014
N/A = Not Applicable
ND = Not detected

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

RCAP - COMPREHENSIVE (LAB FILTERED)

BV Labs ID				QGU659			QGU659		
Sampling Date				2021/08/03 12:00			2021/08/03 12:00		
	UNITS	Criteria	Criteria-2	BH/MW2	RDL	QC Batch	BH/MW2 Lab-Dup	RDL	QC Batch
Dissolved Arsenic (As)	ug/L	100	1000	ND	1.0	7503495	ND	1.0	7503495
Dissolved Barium (Ba)	ug/L	-	-	42	2.0	7503495	42	2.0	7503495
Dissolved Beryllium (Be)	ug/L	11	-	ND	0.40	7503495	ND	0.40	7503495
Dissolved Boron (B)	ug/L	200	-	58	10	7503495	59	10	7503495
Dissolved Cadmium (Cd)	ug/L	0.2	700	ND	0.090	7503495	ND	0.090	7503495
Dissolved Calcium (Ca)	ug/L	-	-	87000	200	7503495	89000	200	7503495
Dissolved Chromium (Cr)	ug/L	-	3000	ND	5.0	7503495	ND	5.0	7503495
Dissolved Cobalt (Co)	ug/L	0.9	5000	**2.3**	0.50	7503495	**2.3**	0.50	7503495
Dissolved Copper (Cu)	ug/L	5	3000	ND	0.90	7503495	ND	0.90	7503495
Dissolved Iron (Fe)	ug/L	300	-	ND	100	7503495	ND	100	7503495
Dissolved Lead (Pb)	ug/L	5	1000	ND	0.50	7503495	ND	0.50	7503495
Dissolved Magnesium (Mg)	ug/L	-	-	41000	50	7503495	40000	50	7503495
Dissolved Manganese (Mn)	ug/L	-	-	37	2.0	7503495	37	2.0	7503495
Dissolved Molybdenum (Mo)	ug/L	40	5000	3.1	0.50	7503495	3.1	0.50	7503495
Dissolved Nickel (Ni)	ug/L	25	2000	8.6	1.0	7503495	8.4	1.0	7503495
Dissolved Phosphorus (P)	ug/L	-	-	ND	100	7503495	ND	100	7503495
Dissolved Potassium (K)	ug/L	-	-	1200	200	7503495	1200	200	7503495
Dissolved Selenium (Se)	ug/L	100	1000	ND	2.0	7503495	ND	2.0	7503495
Dissolved Silicon (Si)	ug/L	-	-	3900	50	7503495	4000	50	7503495
Dissolved Silver (Ag)	ug/L	0.1	5000	ND	0.090	7503495	ND	0.090	7503495
Dissolved Sodium (Na)	ug/L	-	-	14000	100	7503495	14000	100	7503495
Dissolved Strontium (Sr)	ug/L	-	-	350	1.0	7503495	350	1.0	7503495
Dissolved Thallium (Tl)	ug/L	0.3	-	ND	0.050	7503495	ND	0.050	7503495
Dissolved Titanium (Ti)	ug/L	-	-	ND	5.0	7503495	ND	5.0	7503495
Dissolved Uranium (U)	ug/L	5	-	2.3	0.10	7503495	2.3	0.10	7503495
Dissolved Vanadium (V)	ug/L	6	-	ND	0.50	7503495	ND	0.50	7503495

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
Criteria-2: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara BY-LAW No. 27-2014
ND = Not detected

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

RCAP - COMPREHENSIVE (LAB FILTERED)

BV Labs ID				QGU659			QGU659		
Sampling Date				2021/08/03 12:00			2021/08/03 12:00		
	UNITS	Criteria	Criteria-2	BH/MW2	RDL	QC Batch	BH/MW2 Lab-Dup	RDL	QC Batch
Dissolved Zinc (Zn)	ug/L	30	3000	ND	5.0	7503495	ND	5.0	7503495

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
Criteria-2: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara BY-LAW No. 27-2014
ND = Not detected

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

TEST SUMMARY

BV Labs ID: QGU659
Sample ID: BH/MW2
Matrix: Water

Collected: 2021/08/03
Shipped:
Received: 2021/08/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7506976	N/A	2021/08/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7499948	N/A	2021/08/10	Automated Statchk
Biochemical Oxygen Demand (BOD)	DO	7501894	2021/08/05	2021/08/10	Nusrat Naz
Chloride by Automated Colourimetry	KONE	7503823	N/A	2021/08/06	Alina Dobreanu
Conductivity	AT	7506979	N/A	2021/08/10	Surinder Rai
Total Cyanide	SKAL/CN	7502269	2021/08/05	2021/08/05	Aditiben Patel
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7505746	N/A	2021/08/06	Nimarta Singh
Fluoride	ISE	7506974	2021/08/07	2021/08/10	Surinder Rai
Hardness (calculated as CaCO3)		7500554	N/A	2021/08/06	Automated Statchk
Mercury in Water by CVAA	CV/AA	7505695	2021/08/06	2021/08/09	Meghaben Patel
Lab Filtered Metals by ICPMS	ICP/MS	7503495	2021/08/05	2021/08/06	Nan Raykha
Total Metals Analysis by ICPMS	ICP/MS	7504807	N/A	2021/08/09	Nan Raykha
Ion Balance (% Difference)	CALC	7499949	N/A	2021/08/10	Automated Statchk
Anion and Cation Sum	CALC	7499842	N/A	2021/08/10	Automated Statchk
Total Ammonia-N	LACH/NH4	7505829	N/A	2021/08/09	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7503189	N/A	2021/08/06	Chandra Nandlal
Animal and Vegetable Oil and Grease	BAL	7499802	N/A	2021/08/07	Automated Statchk
Total Oil and Grease	BAL	7505878	2021/08/06	2021/08/07	Saumya Modh
pH	AT	7506977	2021/08/07	2021/08/09	Surinder Rai
Phenols (4AAP)	TECH/PHEN	7501635	N/A	2021/08/05	Deonarine Ramnarine
Orthophosphate	KONE	7503825	N/A	2021/08/06	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7499951	N/A	2021/08/10	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7499952	N/A	2021/08/10	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7503817	N/A	2021/08/06	Avneet Kour Sudan
Sulphide	ISE/S	7501311	N/A	2021/08/04	Neil Dassanayake
Total Dissolved Solids (TDS calc)	CALC	7499953	N/A	2021/08/10	Automated Statchk
Total Kjeldahl Nitrogen in Water	SKAL	7505710	2021/08/06	2021/08/09	Rajni Tyagi
Mineral/Synthetic O & G (TPH Heavy Oil)	BAL	7505881	2021/08/06	2021/08/07	Saumya Modh
Total Suspended Solids	BAL	7502168	2021/08/06	2021/08/09	Sandeep Kaur
Volatile Organic Compounds in Water	GC/MS	7501818	N/A	2021/08/06	Ancheol Jeong

BV Labs ID: QGU659 Dup
Sample ID: BH/MW2
Matrix: Water

Collected: 2021/08/03
Shipped:
Received: 2021/08/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7506976	N/A	2021/08/09	Surinder Rai
Conductivity	AT	7506979	N/A	2021/08/10	Surinder Rai
Fluoride	ISE	7506974	2021/08/07	2021/08/10	Surinder Rai
Lab Filtered Metals by ICPMS	ICP/MS	7503495	2021/08/05	2021/08/06	Nan Raykha
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7503189	N/A	2021/08/06	Chandra Nandlal
pH	AT	7506977	2021/08/07	2021/08/09	Surinder Rai
Sulphide	ISE/S	7501311	N/A	2021/08/04	Neil Dassanayake

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

TEST SUMMARY

BV Labs ID: QGU659 Dup
Sample ID: BH/MW2
Matrix: Water

Collected: 2021/08/03
Shipped:
Received: 2021/08/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Kjeldahl Nitrogen in Water	SKAL	7505710	2021/08/06	2021/08/09	Rajni Tyagi

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	16.7°C

Sample QGU659 [BH/MW2] : VOC Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7501818	4-Bromofluorobenzene	2021/08/06	99	70 - 130	99	70 - 130	98	%				
7501818	D4-1,2-Dichloroethane	2021/08/06	103	70 - 130	98	70 - 130	100	%				
7501818	D8-Toluene	2021/08/06	99	70 - 130	100	70 - 130	98	%				
7501311	Sulphide	2021/08/04	97	80 - 120	95	80 - 120	ND, RDL=0.020	mg/L	10	20		
7501635	Phenols-4AAP	2021/08/05	105	80 - 120	104	80 - 120	ND, RDL=0.0010	mg/L	NC	20		
7501818	1,1,2,2-Tetrachloroethane	2021/08/06	100	70 - 130	94	70 - 130	ND, RDL=0.40	ug/L	NC	30		
7501818	1,2-Dichlorobenzene	2021/08/06	93	70 - 130	95	70 - 130	ND, RDL=0.40	ug/L	NC	30		
7501818	1,4-Dichlorobenzene	2021/08/06	108	70 - 130	112	70 - 130	ND, RDL=0.40	ug/L	NC	30		
7501818	Benzene	2021/08/06	90	70 - 130	89	70 - 130	ND, RDL=0.20	ug/L	3.1	30		
7501818	Chloroform	2021/08/06	97	70 - 130	95	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7501818	Ethylbenzene	2021/08/06	88	70 - 130	90	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7501818	Methylene Chloride(Dichloromethane)	2021/08/06	111	70 - 130	106	70 - 130	ND, RDL=2.0	ug/L	NC	30		
7501818	o-Xylene	2021/08/06	88	70 - 130	91	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7501818	p+m-Xylene	2021/08/06	90	70 - 130	93	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7501818	Tetrachloroethylene	2021/08/06	89	70 - 130	91	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7501818	Toluene	2021/08/06	91	70 - 130	93	70 - 130	ND, RDL=0.20	ug/L	0.69	30		
7501818	Total Xylenes	2021/08/06					ND, RDL=0.20	ug/L	NC	30		
7501818	Trichloroethylene	2021/08/06	98	70 - 130	99	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7501894	Total BOD	2021/08/10					ND,RDL=2	mg/L	8.0	30	91	80 - 120
7502168	Total Suspended Solids	2021/08/09					ND, RDL=10	mg/L	9.1	25	98	85 - 115
7502269	Total Cyanide (CN)	2021/08/05	99	80 - 120	97	80 - 120	ND, RDL=0.0050	mg/L	NC	20		
7503189	Nitrate (N)	2021/08/06	95	80 - 120	100	80 - 120	ND, RDL=0.10	mg/L	NC	20		
7503189	Nitrite (N)	2021/08/06	105	80 - 120	107	80 - 120	ND, RDL=0.010	mg/L	NC	20		
7503495	Dissolved Aluminum (Al)	2021/08/06	92	80 - 120	92	80 - 120	ND, RDL=4.9	ug/L	NC	20		
7503495	Dissolved Antimony (Sb)	2021/08/06	106	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	NC	20		
7503495	Dissolved Arsenic (As)	2021/08/06	100	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L	NC	20		
7503495	Dissolved Barium (Ba)	2021/08/06	102	80 - 120	101	80 - 120	ND, RDL=2.0	ug/L	0.93	20		

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7503495	Dissolved Beryllium (Be)	2021/08/06	105	80 - 120	100	80 - 120	ND, RDL=0.40	ug/L	NC	20		
7503495	Dissolved Boron (B)	2021/08/06	97	80 - 120	94	80 - 120	ND, RDL=10	ug/L	0.42	20		
7503495	Dissolved Cadmium (Cd)	2021/08/06	102	80 - 120	99	80 - 120	ND, RDL=0.090	ug/L	NC	20		
7503495	Dissolved Calcium (Ca)	2021/08/06	NC	80 - 120	94	80 - 120	ND, RDL=200	ug/L	1.7	20		
7503495	Dissolved Chromium (Cr)	2021/08/06	95	80 - 120	94	80 - 120	ND, RDL=5.0	ug/L	NC	20		
7503495	Dissolved Cobalt (Co)	2021/08/06	94	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L	0.26	20		
7503495	Dissolved Copper (Cu)	2021/08/06	97	80 - 120	96	80 - 120	ND, RDL=0.90	ug/L	NC	20		
7503495	Dissolved Iron (Fe)	2021/08/06	95	80 - 120	95	80 - 120	ND, RDL=100	ug/L	NC	20		
7503495	Dissolved Lead (Pb)	2021/08/06	96	80 - 120	98	80 - 120	ND, RDL=0.50	ug/L	NC	20		
7503495	Dissolved Magnesium (Mg)	2021/08/06	NC	80 - 120	95	80 - 120	ND, RDL=50	ug/L	1.1	20		
7503495	Dissolved Manganese (Mn)	2021/08/06	96	80 - 120	96	80 - 120	ND, RDL=2.0	ug/L	0.56	20		
7503495	Dissolved Molybdenum (Mo)	2021/08/06	106	80 - 120	100	80 - 120	ND, RDL=0.50	ug/L	0.72	20		
7503495	Dissolved Nickel (Ni)	2021/08/06	94	80 - 120	95	80 - 120	ND, RDL=1.0	ug/L	2.6	20		
7503495	Dissolved Phosphorus (P)	2021/08/06	105	80 - 120	107	80 - 120	ND, RDL=100	ug/L	NC	20		
7503495	Dissolved Potassium (K)	2021/08/06	95	80 - 120	94	80 - 120	ND, RDL=200	ug/L	0.054	20		
7503495	Dissolved Selenium (Se)	2021/08/06	98	80 - 120	98	80 - 120	ND, RDL=2.0	ug/L	NC	20		
7503495	Dissolved Silicon (Si)	2021/08/06	93	80 - 120	93	80 - 120	ND, RDL=50	ug/L	1.6	20		
7503495	Dissolved Silver (Ag)	2021/08/06	102	80 - 120	100	80 - 120	ND, RDL=0.090	ug/L	NC	20		
7503495	Dissolved Sodium (Na)	2021/08/06	91	80 - 120	93	80 - 120	ND, RDL=100	ug/L	2.0	20		
7503495	Dissolved Strontium (Sr)	2021/08/06	98	80 - 120	96	80 - 120	ND, RDL=1.0	ug/L	0.22	20		
7503495	Dissolved Thallium (Tl)	2021/08/06	99	80 - 120	99	80 - 120	ND, RDL=0.050	ug/L	NC	20		
7503495	Dissolved Titanium (Ti)	2021/08/06	90	80 - 120	89	80 - 120	ND, RDL=5.0	ug/L	NC	20		
7503495	Dissolved Uranium (U)	2021/08/06	96	80 - 120	97	80 - 120	ND, RDL=0.10	ug/L	0.65	20		
7503495	Dissolved Vanadium (V)	2021/08/06	97	80 - 120	96	80 - 120	ND, RDL=0.50	ug/L	NC	20		
7503495	Dissolved Zinc (Zn)	2021/08/06	95	80 - 120	96	80 - 120	ND, RDL=5.0	ug/L	NC	20		
7503817	Dissolved Sulphate (SO4)	2021/08/06	NC	75 - 125	105	80 - 120	ND, RDL=1.0	mg/L	0.93	20		
7503823	Dissolved Chloride (Cl-)	2021/08/06	NC	80 - 120	105	80 - 120	ND, RDL=1.0	mg/L	1.6	20		

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7503825	Orthophosphate (P)	2021/08/06	NC	75 - 125	99	80 - 120	ND, RDL=0.010	mg/L	0.45	25		
7504807	Total Antimony (Sb)	2021/08/09	108	80 - 120	104	80 - 120	ND, RDL=0.50	ug/L	6.0	20		
7504807	Total Arsenic (As)	2021/08/09	104	80 - 120	102	80 - 120	ND, RDL=1.0	ug/L	2.9	20		
7504807	Total Cadmium (Cd)	2021/08/09	105	80 - 120	103	80 - 120	ND, RDL=0.090	ug/L	NC	20		
7504807	Total Chromium (Cr)	2021/08/09	98	80 - 120	96	80 - 120	ND, RDL=5.0	ug/L	NC	20		
7504807	Total Cobalt (Co)	2021/08/09	101	80 - 120	95	80 - 120	ND, RDL=0.50	ug/L	NC	20		
7504807	Total Copper (Cu)	2021/08/09	101	80 - 120	97	80 - 120	ND, RDL=0.90	ug/L	0.69	20		
7504807	Total Lead (Pb)	2021/08/09	103	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	1.5	20		
7504807	Total Molybdenum (Mo)	2021/08/09	110	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	2.4	20		
7504807	Total Nickel (Ni)	2021/08/09	98	80 - 120	96	80 - 120	ND, RDL=1.0	ug/L	1.6	20		
7504807	Total Phosphorus (P)	2021/08/09	101	80 - 120	98	80 - 120	ND, RDL=100	ug/L	1.2	20		
7504807	Total Selenium (Se)	2021/08/09	101	80 - 120	104	80 - 120	ND, RDL=2.0	ug/L	NC	20		
7504807	Total Silver (Ag)	2021/08/09	105	80 - 120	102	80 - 120	ND, RDL=0.090	ug/L	NC	20		
7504807	Total Tin (Sn)	2021/08/09	105	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L	NC	20		
7504807	Total Zinc (Zn)	2021/08/09	102	80 - 120	102	80 - 120	ND, RDL=5.0	ug/L	9.9	20		
7505695	Mercury (Hg)	2021/08/09	96	75 - 125	99	80 - 120	ND, RDL=0.00010	mg/L	NC	20		
7505710	Total Kjeldahl Nitrogen (TKN)	2021/08/09	106	N/A	104	80 - 120	ND, RDL=0.10	mg/L	1.6	20	97	80 - 120
7505746	Dissolved Organic Carbon	2021/08/06	NC	80 - 120	98	80 - 120	ND, RDL=0.40	mg/L	0.83	20		
7505829	Total Ammonia-N	2021/08/09	NC	75 - 125	100	80 - 120	ND, RDL=0.050	mg/L	0.26	20		
7505878	Total Oil & Grease	2021/08/07			100	85 - 115	ND, RDL=0.50	mg/L	3.1	25		
7505881	Total Oil & Grease Mineral/Synthetic	2021/08/07			96	85 - 115	ND, RDL=0.50	mg/L	4.3	25		
7506974	Fluoride (F-)	2021/08/10	85	80 - 120	99	80 - 120	ND, RDL=0.10	mg/L	0.95	20		
7506976	Alkalinity (Total as CaCO3)	2021/08/09			96	85 - 115	ND, RDL=1.0	mg/L	0.31	20		
7506977	pH	2021/08/09			102	98 - 103			0.67	N/A		

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7506979	Conductivity	2021/08/10			103	85 - 115	ND, RDL=1.0	umho/cm	0.78	25		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

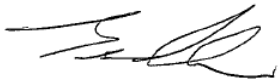
Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas Laboratories
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel (905) 817-5700 Toll-free 800-563-6266 Fax (905) 817-5777 www.bvlabs.com

Page 1 of 1

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#30554 exp Services Inc	Company Name:	EXP Services	Quotation #:	B91717	BV Labs Job #:	Bottle Order #:
Attention:	Central Services	Attention:	Francois Chartier Thabiso Modise	P.O. #:	ENV-BRM		839058
Address:	1595 Clark Blvd Brampton ON L6T 4V1	Address:	1595 Clark Blvd Brampton ON L6T 4V1	Project:	BRM-21000726-A0	COC #:	Project Manager:
Tel:	(905) 793-9800 Fax: (905) 793-0641	Tel:	(905) 793-9800 Ext: 2523 Fax:	Project Name:		C#839058-01-01	Patricia Legette
Email:	AP@exp.com; Karen.Burke@exp.com	Email:	Francois.Chartier@exp.com Thabiso.Modise@exp	Site #:	Killaly, Port Colborne		
				Sampled By:	Thabiso Modise		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- ☐ Table 1 ☐ Res/Park ☐ Medium/Fine
- ☐ Table 2 ☐ Ind/Comm ☐ Coarse
- ☐ Table 3 ☐ Agri/Other ☐ For RSC
- ☐ Table ___

Other Regulations
- ☐ CCME ☑ Sanitary Sewer Bylaw
- ☐ Reg 558 ☑ Storm Sewer Bylaw
- ☐ MISA Municipality ___
- ☑ PWQO ☐ Reg 406 Table ___
- ☐ Other ___

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ___

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT:
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___
Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Niagara Sanitary & Comb. Sewer (27-2014)	RCAP	# of Bottles	Comments
1		BH/MW 2		12:00	GW		✓	✓	17	PLEASE FILTER METALS
2										FROM THE RCAP COMPREHENSIVE
3										PACKAGE
4										
5										
6										
7										
8										
9										
10										

03-Aug-21 18:16
Patricia Legette
C1L7721
SYK ENV-567

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
[illegible]	21/08/03	13:05	KAVITHA SELVAN	2021/08/03	18:16	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	17/17/16	Present	✓	✓
		Intact		

On ICE

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

White: BV Labs Yellow: Client

Bureau Veritas Canada (2019) Inc.

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

Exceedance Summary Table – Prov. Water Quality Obj.

Result Exceedances

Sample ID	BV Labs ID	Parameter	Criteria	Result	DL	UNITS
BH/MW2	QGU659-07	Total Cobalt (Co)	0.9	2.3	0.50	ug/L
BH/MW2	QGU659-03	Dissolved Cobalt (Co)	0.9	2.3	0.50	ug/L
BH/MW2	QGU659-03-Lab Dup	Dissolved Cobalt (Co)	0.9	2.3	0.50	ug/L
BH/MW2	QGU659-09-Lab Dup	Sulphide	0.002	0.034	0.020	mg/L
BH/MW2	QGU659-09	Sulphide	0.002	0.037	0.020	mg/L

Detection Limit Exceedances

Sample ID	BV Labs ID	Parameter	Criteria	Result	DL	UNITS
BH/MW2	QGU659-07	Total Phosphorus (P)	10	<100	100	ug/L

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Exceedance Summary Table – Niagara Combined Sewer

Result Exceedances

Sample ID	BV Labs ID	Parameter	Criteria	Result	DL	UNITS
No Exceedances						

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Your P.O. #: ENV-BRM
Your Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your C.O.C. #: 922971-01-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2023/03/14
Report #: R7545379
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C366543
Received: 2023/03/08, 16:59

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dissolved Metals by ICPMS	1	N/A	2023/03/13	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your P.O. #: ENV-BRM
Your Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your C.O.C. #: 922971-01-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2023/03/14
Report #: R7545379
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C366543
Received: 2023/03/08, 16:59

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
14 Mar 2023 10:24:51

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366543
Report Date: 2023/03/14

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		VFW621		
Sampling Date		2023/03/08 12:00		
COC Number		922971-01-01		
	UNITS	BH 21	RDL	QC Batch
Metals				
Dissolved Aluminum (Al)	ug/L	6.1	4.9	8546228
Dissolved Antimony (Sb)	ug/L	ND	0.50	8546228
Dissolved Arsenic (As)	ug/L	ND	1.0	8546228
Dissolved Barium (Ba)	ug/L	62	2.0	8546228
Dissolved Beryllium (Be)	ug/L	ND	0.40	8546228
Dissolved Bismuth (Bi)	ug/L	ND	1.0	8546228
Dissolved Boron (B)	ug/L	490	10	8546228
Dissolved Cadmium (Cd)	ug/L	ND	0.090	8546228
Dissolved Calcium (Ca)	ug/L	190000	400	8546228
Dissolved Chromium (Cr)	ug/L	ND	5.0	8546228
Dissolved Cobalt (Co)	ug/L	ND	0.50	8546228
Dissolved Copper (Cu)	ug/L	ND	0.90	8546228
Dissolved Iron (Fe)	ug/L	170	100	8546228
Dissolved Lead (Pb)	ug/L	ND	0.50	8546228
Dissolved Lithium (Li)	ug/L	100	5.0	8546228
Dissolved Magnesium (Mg)	ug/L	150000	50	8546228
Dissolved Manganese (Mn)	ug/L	190	2.0	8546228
Dissolved Molybdenum (Mo	ug/L	7.4	0.50	8546228
Dissolved Nickel (Ni)	ug/L	5.0	1.0	8546228
Dissolved Phosphorus (P)	ug/L	ND	100	8546228
Dissolved Potassium (K)	ug/L	5400	200	8546228
Dissolved Selenium (Se)	ug/L	ND	2.0	8546228
Dissolved Silicon (Si)	ug/L	7400	50	8546228
Dissolved Silver (Ag)	ug/L	ND	0.090	8546228
Dissolved Sodium (Na)	ug/L	65000	100	8546228
Dissolved Strontium (Sr)	ug/L	9600	1.0	8546228
Dissolved Tellurium (Te)	ug/L	ND	1.0	8546228
Dissolved Thallium (Tl)	ug/L	ND	0.050	8546228

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366543
Report Date: 2023/03/14

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		VFW621		
Sampling Date		2023/03/08 12:00		
COC Number		922971-01-01		
	UNITS	BH 21	RDL	QC Batch
Dissolved Tin (Sn)	ug/L	ND	1.0	8546228
Dissolved Titanium (Ti)	ug/L	ND	5.0	8546228
Dissolved Tungsten (W)	ug/L	51	1.0	8546228
Dissolved Uranium (U)	ug/L	5.5	0.10	8546228
Dissolved Vanadium (V)	ug/L	ND	0.50	8546228
Dissolved Zinc (Zn)	ug/L	5.2	5.0	8546228
Dissolved Zirconium (Zr)	ug/L	1.6	1.0	8546228

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366543
Report Date: 2023/03/14

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

TEST SUMMARY

Bureau Veritas ID: VFW621
Sample ID: BH 21
Matrix: Water

Collected: 2023/03/08
Shipped:
Received: 2023/03/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	8546228	N/A	2023/03/13	Rupinder Gill

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.3°C

Results relate only to the items tested.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8546228	Dissolved Aluminum (Al)	2023/03/13	NC	80 - 120	109	80 - 120	ND, RDL=4.9	ug/L		
8546228	Dissolved Antimony (Sb)	2023/03/13	113	80 - 120	104	80 - 120	ND, RDL=0.50	ug/L	6.1	20
8546228	Dissolved Arsenic (As)	2023/03/13	107	80 - 120	99	80 - 120	ND, RDL=1.0	ug/L	NC	20
8546228	Dissolved Barium (Ba)	2023/03/13	109	80 - 120	102	80 - 120	ND, RDL=2.0	ug/L	8.5	20
8546228	Dissolved Beryllium (Be)	2023/03/13	107	80 - 120	99	80 - 120	ND, RDL=0.40	ug/L	NC	20
8546228	Dissolved Bismuth (Bi)	2023/03/13	99	80 - 120	99	80 - 120	ND, RDL=1.0	ug/L		
8546228	Dissolved Boron (B)	2023/03/13	104	80 - 120	97	80 - 120	ND, RDL=10	ug/L	9.0	20
8546228	Dissolved Cadmium (Cd)	2023/03/13	108	80 - 120	101	80 - 120	ND, RDL=0.090	ug/L	NC	20
8546228	Dissolved Calcium (Ca)	2023/03/13	113	80 - 120	106	80 - 120	ND, RDL=200	ug/L		
8546228	Dissolved Chromium (Cr)	2023/03/13	101	80 - 120	97	80 - 120	ND, RDL=5.0	ug/L	8.0	20
8546228	Dissolved Cobalt (Co)	2023/03/13	105	80 - 120	100	80 - 120	ND, RDL=0.50	ug/L	NC	20
8546228	Dissolved Copper (Cu)	2023/03/13	115	80 - 120	106	80 - 120	ND, RDL=0.90	ug/L	8.9	20
8546228	Dissolved Iron (Fe)	2023/03/13	108	80 - 120	104	80 - 120	ND, RDL=100	ug/L		
8546228	Dissolved Lead (Pb)	2023/03/13	103	80 - 120	98	80 - 120	ND, RDL=0.50	ug/L	NC	20
8546228	Dissolved Lithium (Li)	2023/03/13	113	80 - 120	105	80 - 120	ND, RDL=5.0	ug/L		
8546228	Dissolved Magnesium (Mg)	2023/03/13	111	80 - 120	105	80 - 120	ND, RDL=50	ug/L		
8546228	Dissolved Manganese (Mn)	2023/03/13	106	80 - 120	99	80 - 120	ND, RDL=2.0	ug/L		
8546228	Dissolved Molybdenum (Mo)	2023/03/13	112	80 - 120	104	80 - 120	ND, RDL=0.50	ug/L	7.0	20
8546228	Dissolved Nickel (Ni)	2023/03/13	102	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L	NC	20
8546228	Dissolved Phosphorus (P)	2023/03/13	118	80 - 120	118	80 - 120	ND, RDL=100	ug/L		
8546228	Dissolved Potassium (K)	2023/03/13	NC	80 - 120	105	80 - 120	ND, RDL=200	ug/L		
8546228	Dissolved Selenium (Se)	2023/03/13	108	80 - 120	100	80 - 120	ND, RDL=2.0	ug/L	NC	20
8546228	Dissolved Silicon (Si)	2023/03/13	111	80 - 120	105	80 - 120	ND, RDL=50	ug/L		
8546228	Dissolved Silver (Ag)	2023/03/13	100	80 - 120	96	80 - 120	ND, RDL=0.090	ug/L	NC	20
8546228	Dissolved Sodium (Na)	2023/03/13	NC	80 - 120	105	80 - 120	ND, RDL=100	ug/L	8.2	20
8546228	Dissolved Strontium (Sr)	2023/03/13	104	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L		
8546228	Dissolved Tellurium (Te)	2023/03/13	112	80 - 120	104	80 - 120	ND, RDL=1.0	ug/L		
8546228	Dissolved Thallium (Tl)	2023/03/13	102	80 - 120	102	80 - 120	ND, RDL=0.050	ug/L	NC	20
8546228	Dissolved Tin (Sn)	2023/03/13	111	80 - 120	102	80 - 120	ND, RDL=1.0	ug/L		
8546228	Dissolved Titanium (Ti)	2023/03/13	111	80 - 120	102	80 - 120	ND, RDL=5.0	ug/L		

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8546228	Dissolved Tungsten (W)	2023/03/13	109	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L		
8546228	Dissolved Uranium (U)	2023/03/13	105	80 - 120	97	80 - 120	ND, RDL=0.10	ug/L	9.5	20
8546228	Dissolved Vanadium (V)	2023/03/13	104	80 - 120	98	80 - 120	ND, RDL=0.50	ug/L	5.0	20
8546228	Dissolved Zinc (Zn)	2023/03/13	105	80 - 120	99	80 - 120	ND, RDL=5.0	ug/L	NC	20
8546228	Dissolved Zirconium (Zr)	2023/03/13	116	80 - 120	108	80 - 120	ND, RDL=1.0	ug/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366543
Report Date: 2023/03/14

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere

Cristina Carriere, Senior Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvna.com

08-Mar-23 16:59
Patricia Legette
C366543

ENV-1474

Only:

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:			
Company Name:	#30554 exp Services Inc	Company Name:	EXP Services Inc	Quotation #:	C20374	Bottle Order #:	922971
Attention:	Accounts Payable	Attention:	Francois Chartier	P.O. #:	ENV-BRM		
Address:	1595 Clark Blvd Brampton ON L6T 4V1	Address:	Yogirajsinh.Rang@exp.com Thabiso.Modise@exp.com	Project:	HAM-21000726-C0	Project Manager:	
Tel:	(905) 793-9800 Fax: (905) 793-0641	Tel:	(905) 793-9800 Ext: 2523 Fax:	Project Name:		COC #:	C#922971-01-01
Email:	AP@exp.com; Karen.Burke@exp.com	Email:	Francois.Chartier@exp.com, nicolas.sabo@exp.com	Site #:	705 Main Street E, Port Colborne		Patricia Legette
				Sampled By:	Thabiso Modise		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- ☐ Table 1 ☐ Res/Park ☐ Medium/Fine
- ☐ Table 2 ☐ Ind/Comm ☐ Coarse
- ☐ Table 3 ☐ Agri/Other ☐ For RSC
- ☐ Table ___

Other Regulations
- ☐ CCME ☐ Sanitary Sewer Bylaw
- ☐ Reg 558 ☐ Storm Sewer Bylaw
- ☐ MISA Municipality ____
- ☐ PWQO ☐ Reg 406 Table ____
- ☐ Other ____

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ____

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☑
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ____ Time Required: ____ ☐
Rush Confirmation Number: ____ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): (Metals / Hg / Cr VI)	PWQO Metals and Inorganics	Dissolved Metals	# of Bottles	Comments
1		BH 21	8/Mar/2023	12:00	GW	Yes		✓	1	
2										
3										
4										
5										
6										
7										
8										
9										
10										

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Thabiso Modise	23/03/03	17:05	BH GWA Sukhdeva	23/03/08	16:59	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	4 4 5	Present		
		Intact		✓

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

Bureau Veritas Canada (2019) Inc.

Your P.O. #: ENV-BRM
Your Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your C.O.C. #: 922969-01-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2023/03/15
Report #: R7547073
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C366552
Received: 2023/03/08, 16:59

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Biochemical Oxygen Demand (BOD)	1	2023/03/10	2023/03/15	CAM SOP-00427	SM 23 5210B m
Total Cyanide	1	2023/03/09	2023/03/09	CAM SOP-00457	OMOE E3015 5 m
Fluoride	1	2023/03/10	2023/03/10	CAM SOP-00449	SM 23 4500-F C m
Mercury in Water by CVAA	1	2023/03/10	2023/03/10	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	1	2023/03/13	2023/03/13	CAM SOP-00447	EPA 6020B m
Animal and Vegetable Oil and Grease	1	N/A	2023/03/13	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2023/03/13	2023/03/13	CAM SOP-00326	EPA1664B m,SM5520B m
pH	1	2023/03/10	2023/03/10	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2023/03/10	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Turbidimetry	1	N/A	2023/03/10	CAM SOP-00464	SM 23 4500-SO42- E m
Sulphide	1	N/A	2023/03/14	CAM SOP-00455	SM 23 4500-S G m
Total Kjeldahl Nitrogen in Water	1	2023/03/09	2023/03/13	CAM SOP-00938	OMOE E3516 m
Mineral/Synthetic O & G (TPH Heavy Oil) (1)	1	2023/03/13	2023/03/13	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2023/03/13	2023/03/14	CAM SOP-00428	SM 23 2540D m
Volatile Organic Compounds in Water	1	N/A	2023/03/10	CAM SOP-00228	EPA 8260D

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope

Your P.O. #: ENV-BRM
Your Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your C.O.C. #: 922969-01-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2023/03/15
Report #: R7547073
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C366552
Received: 2023/03/08, 16:59

dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
15 Mar 2023 14:55:21

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366552
Report Date: 2023/03/15

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

NIAGARA SANITARY & COMB. SEWER (27-2014)

Bureau Veritas ID			VFW701		
Sampling Date			2023/03/08 12:00		
COC Number			922969-01-01		
	UNITS	Criteria	BH 21	RDL	QC Batch
Calculated Parameters					
Total Animal/Vegetable Oil and Greas	mg/L	150	0.80	0.50	8542330
Inorganics					
Total BOD	mg/L	300	ND	2	8545057
Fluoride (F-)	mg/L	10	0.96	0.10	8546112
Total Kjeldahl Nitrogen (TKN)	mg/L	100	0.93	0.50	8543754
pH	pH	6.0:11	7.70		8546119
Phenols-4AAP	mg/L	1	ND	0.0010	8545971
Total Suspended Solids	mg/L	350	81	10	8548438
Dissolved Sulphate (SO4)	mg/L	1500	360	1.0	8544535
Sulphide	mg/L	1	0.33	0.020	8545850
Total Cyanide (CN)	mg/L	1	ND	0.0050	8542788
Petroleum Hydrocarbons					
Total Oil & Grease	mg/L	-	0.80	0.50	8548318
Total Oil & Grease Mineral/Synthetic	mg/L	15	ND	0.50	8548320
Metals					
Mercury (Hg)	mg/L	0.01	ND	0.00010	8545466
Total Antimony (Sb)	ug/L	5000	ND	0.50	8548577
Total Arsenic (As)	ug/L	1000	1.3	1.0	8548577
Total Cadmium (Cd)	ug/L	700	ND	0.090	8548577
Total Chromium (Cr)	ug/L	3000	ND	5.0	8548577
Total Cobalt (Co)	ug/L	5000	1.6	0.50	8548577
Total Copper (Cu)	ug/L	3000	3.8	0.90	8548577
Total Lead (Pb)	ug/L	1000	0.99	0.50	8548577
Total Molybdenum (Mo)	ug/L	5000	9.2	0.50	8548577
Total Nickel (Ni)	ug/L	2000	7.3	1.0	8548577

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara
BY-LAW No. 27-2014
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366552
Report Date: 2023/03/15

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

NIAGARA SANITARY & COMB. SEWER (27-2014)

Bureau Veritas ID			VFW701		
Sampling Date			2023/03/08 12:00		
COC Number			922969-01-01		
	UNITS	Criteria	BH 21	RDL	QC Batch
Total Phosphorus (P)	ug/L	-	ND	100	8548577
Total Selenium (Se)	ug/L	1000	ND	2.0	8548577
Total Silver (Ag)	ug/L	5000	0.59	0.090	8548577
Total Tin (Sn)	ug/L	5000	ND	1.0	8548577
Total Zinc (Zn)	ug/L	3000	7.8	5.0	8548577
Volatile Organics					
Benzene	ug/L	10	ND	0.40	8543520
Chloroform	ug/L	40	ND	0.40	8543520
1,2-Dichlorobenzene	ug/L	50	ND	0.80	8543520
1,4-Dichlorobenzene	ug/L	80	ND	0.80	8543520
Ethylbenzene	ug/L	160	ND	0.40	8543520
Methylene Chloride(Dichloromethane	ug/L	210	ND	4.0	8543520
1,1,2,2-Tetrachloroethane	ug/L	40	ND	0.80	8543520
Tetrachloroethylene	ug/L	50	ND	0.40	8543520
Toluene	ug/L	200	ND	0.40	8543520
Trichloroethylene	ug/L	50	ND	0.40	8543520
p+m-Xylene	ug/L	-	ND	0.40	8543520
o-Xylene	ug/L	520	ND	0.40	8543520
Total Xylenes	ug/L	-	ND	0.40	8543520
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	-	90		8543520
D4-1,2-Dichloroethane	%	-	111		8543520
D8-Toluene	%	-	96		8543520

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara
BY-LAW No. 27-2014
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366552
Report Date: 2023/03/15

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

TEST SUMMARY

Bureau Veritas ID: VFW701
Sample ID: BH 21
Matrix: Water

Collected: 2023/03/08
Shipped:
Received: 2023/03/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Biochemical Oxygen Demand (BOD)	DO	8545057	2023/03/10	2023/03/15	Gurjot Kaur
Total Cyanide	SKAL/CN	8542788	2023/03/09	2023/03/09	Kruti Jitesh Patel
Fluoride	ISE	8546112	2023/03/10	2023/03/10	Kien Tran
Mercury in Water by CVAA	CV/AA	8545466	2023/03/10	2023/03/10	Japneet Gill
Total Metals Analysis by ICPMS	ICP/MS	8548577	2023/03/13	2023/03/13	Rupinder Gill
Animal and Vegetable Oil and Grease	BAL	8542330	N/A	2023/03/13	Automated Statchk
Total Oil and Grease	BAL	8548318	2023/03/13	2023/03/13	Navneet Singh
pH	AT	8546119	2023/03/10	2023/03/10	Kien Tran
Phenols (4AAP)	TECH/PHEN	8545971	N/A	2023/03/10	Mandeep Kaur
Sulphate by Automated Turbidimetry	KONE	8544535	N/A	2023/03/10	Massarat Jan
Sulphide	ISE/S	8545850	N/A	2023/03/14	Taslima Aktar
Total Kjeldahl Nitrogen in Water	SKAL	8543754	2023/03/09	2023/03/13	Jency Sara Johnson
Mineral/Synthetic O & G (TPH Heavy Oil)	BAL	8548320	2023/03/13	2023/03/13	Navneet Singh
Total Suspended Solids	BAL	8548438	2023/03/13	2023/03/14	Shaneil Hall
Volatile Organic Compounds in Water	GC/MS	8543520	N/A	2023/03/10	Skylar Canning

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366552
Report Date: 2023/03/15

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.3°C

Sample VFW701 [BH 21] : VOC Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366552
Report Date: 2023/03/15

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8543520	4-Bromofluorobenzene	2023/03/10	95	70 - 130	95	70 - 130	93	%				
8543520	D4-1,2-Dichloroethane	2023/03/10	108	70 - 130	108	70 - 130	108	%				
8543520	D8-Toluene	2023/03/10	103	70 - 130	104	70 - 130	100	%				
8542788	Total Cyanide (CN)	2023/03/09	101	80 - 120	101	80 - 120	ND, RDL=0.0050	mg/L	NC	20		
8543520	1,1,2,2-Tetrachloroethane	2023/03/10	102	70 - 130	102	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8543520	1,2-Dichlorobenzene	2023/03/10	93	70 - 130	93	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8543520	1,4-Dichlorobenzene	2023/03/10	102	70 - 130	104	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8543520	Benzene	2023/03/10	82	70 - 130	82	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	Chloroform	2023/03/10	88	70 - 130	88	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	Ethylbenzene	2023/03/10	83	70 - 130	84	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	Methylene Chloride(Dichloromethane)	2023/03/10	90	70 - 130	89	70 - 130	ND, RDL=2.0	ug/L	NC	30		
8543520	o-Xylene	2023/03/10	83	70 - 130	85	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	p+m-Xylene	2023/03/10	86	70 - 130	87	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	Tetrachloroethylene	2023/03/10	80	70 - 130	80	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	Toluene	2023/03/10	87	70 - 130	88	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	Total Xylenes	2023/03/10					ND, RDL=0.20	ug/L	NC	30		
8543520	Trichloroethylene	2023/03/10	87	70 - 130	87	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543754	Total Kjeldahl Nitrogen (TKN)	2023/03/13	NC	80 - 120	105	80 - 120	ND, RDL=0.10	mg/L	12	20	100	80 - 120
8544535	Dissolved Sulphate (SO4)	2023/03/10	129 (1)	75 - 125	96	80 - 120	ND, RDL=1.0	mg/L	NC	20		
8545057	Total BOD	2023/03/15					ND,RDL=2	mg/L	NC	30	93	80 - 120
8545466	Mercury (Hg)	2023/03/10	105	75 - 125	107	80 - 120	ND, RDL=0.00010	mg/L	18	20		
8545850	Sulphide	2023/03/14	103	80 - 120	96	80 - 120	ND, RDL=0.020	mg/L	NC	20		
8545971	Phenols-4AAP	2023/03/10	100	80 - 120	101	80 - 120	ND, RDL=0.0010	mg/L	NC	20		
8546112	Fluoride (F-)	2023/03/13	95	80 - 120	96	80 - 120	ND, RDL=0.10	mg/L	NC	20		
8546119	pH	2023/03/13			101	98 - 103			1.6	N/A		
8548318	Total Oil & Grease	2023/03/13			99	85 - 115	ND, RDL=0.50	mg/L	0.51	25		
8548320	Total Oil & Grease Mineral/Synthetic	2023/03/13			96	85 - 115	ND, RDL=0.50	mg/L	0.52	25		

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8548438	Total Suspended Solids	2023/03/14					ND, RDL=10	mg/L	12	20	100	85 - 115
8548577	Total Antimony (Sb)	2023/03/13	112	80 - 120	109	80 - 120	ND, RDL=0.50	ug/L	NC	20		
8548577	Total Arsenic (As)	2023/03/13	104	80 - 120	105	80 - 120	ND, RDL=1.0	ug/L	0.88	20		
8548577	Total Cadmium (Cd)	2023/03/13	104	80 - 120	104	80 - 120	ND, RDL=0.090	ug/L	NC	20		
8548577	Total Chromium (Cr)	2023/03/13	96	80 - 120	98	80 - 120	ND, RDL=5.0	ug/L	NC	20		
8548577	Total Cobalt (Co)	2023/03/13	98	80 - 120	101	80 - 120	ND, RDL=0.50	ug/L	3.6	20		
8548577	Total Copper (Cu)	2023/03/13	103	80 - 120	105	80 - 120	ND, RDL=0.90	ug/L	11	20		
8548577	Total Lead (Pb)	2023/03/13	98	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	2.7	20		
8548577	Total Molybdenum (Mo)	2023/03/13	104	80 - 120	103	80 - 120	ND, RDL=0.50	ug/L	0.52	20		
8548577	Total Nickel (Ni)	2023/03/13	96	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L	1.4	20		
8548577	Total Phosphorus (P)	2023/03/13	109	80 - 120	110	80 - 120	ND, RDL=100	ug/L	17	20		
8548577	Total Selenium (Se)	2023/03/13	107	80 - 120	107	80 - 120	ND, RDL=2.0	ug/L	NC	20		
8548577	Total Silver (Ag)	2023/03/13	97	80 - 120	97	80 - 120	ND, RDL=0.090	ug/L	NC	20		
8548577	Total Tin (Sn)	2023/03/13	106	80 - 120	103	80 - 120	ND, RDL=1.0	ug/L	4.0	20		
8548577	Total Zinc (Zn)	2023/03/13	99	80 - 120	106	80 - 120	ND, RDL=5.0	ug/L	NC	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366552
Report Date: 2023/03/15

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

08-Mar-23 16:59
Patricia Legette
C366552
AVI ENV-1474

Presence of Visible Particulate/Sediment

Maxxam Analytics
CAM FCD-01013/5
Page 1 of 1

When there is >1cm of visible particulate/sediment, the amount will be recorded in the field below

Bottle Types

	Sample ID	All	Inorganics					Organics										Hydrocarbons							Volatiles				Other
			CrVI	CN	General	Hg	Metals (Diss.)	Organic 1 of 2	Organic 2 of 2	PCB 1 of 2	PCB 2 of 2	Pest/ Herb 1 of 2	Pest/ Herb 2 of 2	SVOC/ ABN 1 of 2	SVOC/ ABN 2 of 2	PAH 1 of 2	PAH 2 of 2	Dioxin /Furan	F1 Vial 1	F1 Vial 2	F1 Vial 3	F1 Vial 4	F2-F4 1 of 2	F2-F4 2 of 2	F4G	VOC Vial 1	VOC Vial 2	VOC Vial 3	VOC Vial 4	
1	BH21																								B	TS			
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													

Comments:

Legend:	
P	Suspended Particulate
TS	Trace Settled Sediment (just covers bottom of container or less)
S	Sediment greater than (>) Trace, but less than (<) 1 cm

Recorded By: (signature/print) ANMOL

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvna.com

Page 1 of 1

08-Mar-23 16:59
Patricia Legette
C366552

INVOICE TO:

Company Name: #30554 exp Services Inc
Attention: Accounts Payable
Address: 1595 Clark Blvd, Brampton ON L6T 4V1
Tel: (905) 793-9800 Fax: (905) 793-0641
Email: AP@exp.com; Karen.Burke@exp.com

REPORT TO:

Company Name: EXP Services Inc
Attention: Francois Chartier
Address: Yogirajsinh.Rana@exp.com; Thabiso.Modise@exp.com
Tel: (905) 793-9800 Ext: 2523 Fax:
Email: Francois.Chartier@exp.com, nicolas.sabo@exp.com

PROJECT INFORMATION:

Quotation #: C20374
P.O. #: ENV-BRM
Project: HAM-21000726-C0 VI ENV-1474
Project Name:
Site #: 705 Main Street E, Port Colborne
Sampled By: Thabiso Modise

Lab Use Only:

Bottle Order #: 922969
Project Manager: Patricia Legette
C#922969-01-01

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)

- [ ] Table 1 [ ] Res/Park [ ] Medium/Fine
- [ ] Table 2 [ ] Ind/Comm [ ] Coarse
- [ ] Table 3 [ ] Agri/Other [ ] For RSC
- [ ] Table ___

Other Regulations

- [ ] CCME
- [x] Sanitary Sewer Bylaw
- [x] Storm Sewer Bylaw
- [ ] MISA Municipality Niagara
- [ ] PWQO [ ] Reg 406 Table
- [ ] Other

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? Y

Field Filtered (please circle): Metals / Hg / Cr VI

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Niagara Sanitary & Comb. Sewer (27-2014)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ✓
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: Time Required:
Rush Confirmation Number: *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered	Niagara Sanitary & Comb. Sewer (27-2014)	# of Bottles	Comments
1		BH 21	8/Mar/2023	12:00	GW	NO	✓	12	
2									
3									
4									
5									
6									
7									
8									
9									
10									

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Thabiso Modise	23/03/08	17:05	Ashlie Sukumar ASHLIE SUKUMAR	2023/03/08	16:59	

Laboratory Use Only

Time Sensitive | Temperature (°C) on Recei: 4/4/5 | Custody Seal Present ✓ | Intact ✓ | Yes | No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

Bureau Veritas Canada (2019) Inc.

Appendix N

Hydrogeology

A1. Well Records

WELL_ID	COMPLETED	DEPTH	DP_BEDROCK	STATIC_LEV	WELL_USE	WATER	SCREEN	CASING_DIA	PUMP_TEST	FORMATION
6600870	1967-06-27	15.20	3.00	0.00	DO	FR 0012 SU 0032 SU 0047			/45/2/0:15	BRWN CLAY 0010 SHLE GRVL 0014 LMSN 0050
6600871	1967-11-30	17.40	7.30	0.30	DO	SU 0057			1/50/2/2:0	BRWN CLAY 0024 LMSN 0057
6600874	1953-06-06	7.60	2.70	1.80	DO	SU 0025			6///:	BLCK LOAM CLAY 0009 GREY SHLE 0025
6600876	1957-09-14	14.60	5.50	3.70	DO	FR 0048			12/12/10/0:30	MSND 0010 BLUE CLAY 0018 LMSN 0048
6600877	1962-12-01	14.60	4.30	1.80	DO	FR 0048			6/46/1/2:0	BLUE CLAY 0014 LMSN 0048
6600878	1967-09-06	7.30	2.10	3.00	DO	FR 0024			10/12/15/1:0	CLAY 0007 LMSN 0024
6600879	1947-09-12	18.00	17.10	0.00	DO	FR 0040			//3/1:0	MSND 0050 GRVL 0056 LMSN 0059
6600880	1957-05-15	7.60	4.60	0.60	DO	SU 0022			2/20/1/1:0	CLAY 0015 LMSN 0025
6600881	1960-09-23	4.90	1.80	1.50	DO	FR 0015			5/8/20/0:30	LOAM 0001 BRWN CLAY 0006 BRWN LMSN 0016
6600882	1964-04-24	14.30	10.40	7.60	DO	FR 0047			25/30/10/1:30	MSND 0025 BLUE CLAY 0034 LMSN 0047
6600883	1965-08-19	7.30	2.10	2.40	DO	SU 0024			8/15/6/1:30	CLAY 0007 GREY LMSN 0024
6600884	1952-01-14	7.90	0.90	2.40	DO	SU 0026			8/8/4/0:30	CLAY 0003 LMSN 0026
6600885	1951-10-22	6.10	3.00	1.20	DO	FR 0020			4/4/4/0:30	CLAY 0010 BLCK SHLE 0020
6600886	1952-09-24	5.80	2.10	1.80	DO	FR 0019			6/6/3/0:30	LOAM CLAY 0007 LMSN 0019
6600887	1953-04-15	8.50	3.70	1.50	DO	FR 0028			5/5/3/0:30	RED CLAY 0012 GREY LMSN 0028
6600888	1957-06-03	5.80	3.00	1.80	DO	FR 0019			6/6/10/0:30	RED CLAY 0010 LMSN 0019
6600889	1959-04-08	4.30	1.50	1.80	DO	FR 0014			6/9/10/0:30	LOAM 0005 LMSN 0014
6600890	1961-07-11	6.10	1.80	1.80	DO	FR 0020			6/18/7/1:30	CLAY 0006 LMSN 0020
6600891	1961-07-13	7.00	3.70	1.80	DO	FR 0023			6/20/3/1:30	CLAY 0012 LMSN 0023
6600892	1962-06-28	6.70	3.70	1.20	DO	FR 0022			4/4/15/1:0	CLAY 0012 LMSN 0022
6600893	1962-10-10	7.30	1.80	3.00	ST DO	FR 0024			10/10/7/1:0	CLAY 0006 LMSN 0024
6600894	1963-03-14	6.70	4.30	1.20	DO	SU 0022			4/4/10/1:0	CLAY 0014 LMSN 0022
6600895	1963-07-25	9.10	2.70	3.00	DO	FR 0030			10/28/2/1:30	CLAY 0009 LMSN 0030
6600896	1966-09-15	6.70	1.80	2.40	DO	FR 0014			8/22/2/1:0	GREY CLAY 0006 LMSN 0022
6600897	1950-10-28	11.30	7.90	3.00	DO	FR 0037			10/10/4/0:30	MSND 0026 LMSN 0037
6600898	1951-06-11	8.20	1.50	1.20	DO	MN 0027			4///:	CLAY 0005 LMSN 0027
6600899	1952-09-17	4.90	0.00	2.70	DO	FR 0016		6	9/9/4/0:30	BLCK MUCK 0012 GRVL 0016
6600900	1962-02-06	8.80	2.70	2.40	DO	FR 0029			8/8/10/1:0	CLAY 0009 GREY LMSN 0029
6600901	1967-09-25	7.60	1.20	3.00	DO	FR 0025			10/14/15/1:30	CLAY 0004 GREY LMSN 0025
6600902	1954-10-14	8.20	2.70	2.10	DO	SU 0027			7/7/4/0:30	CLAY 0009 SHLE 0027
6600903	1963-04-18	8.20	2.70	4.30	DO	SU 0027			14/14/12/1:30	BRWN CLAY 0009 LMSN 0027
6600904	1948-08-17	7.90	1.50	2.40	CO	FR 0023			8/18/9/0:30	LOAM GRVL 0005 LMSN 0026
6600956	1954-08-09	10.10	1.20	5.80	DO	FR 0033			19/19/8/0:10	CLAY 0004 BRWN LMSN 0033
6600958	1959-07-31	8.80	3.70	3.70	DO	SU 0029			12/14/5/1:0	CLAY 0012 LMSN 0029
6600959	1964-04-11	15.20	8.20	4.90	DO	FR 0050			16/40/5/1:30	RED CLAY 0027 SHLE 0050
6600965	1956-06-06	6.70	2.40	1.50	DO	FR 0022			5/10/50/1:0	CLAY 0008 LMSN 0022
6600966	1965-05-20	8.50	3.70	0.60	DO	SU 0028			2/2/20/1:0	CLAY 0012 LMSN 0028
6600967	1966-11-09	9.10	4.60	1.80	DO	SU 0030			6/12/10/1:30	CLAY 0015 LMSN 0030
6600968	1949-08-28	13.70	9.10	7.60	DO	FR 0043			25///:	CLAY GRVL 0010 CLAY 0030 LMSN 0045
6600969	1954-05-21	9.40	7.60	2.40	DO	FR 0027			8/8/15/1:0	LOAM CLAY 0018 QSND 0025 LMSN 0031
6600970	1963-10-23	16.80	13.70	10.70	DO	FR 0055			35/42/10/1:30	LOAM MSND 0045 LMSN 0055
6600971	1948-07-29	8.80	2.70	0.60	DO	SU 0026			2/27/2/1:0	RED CLAY 0009 LMSN 0029
6600972	1952-03-21	9.10	5.80	2.40	DO	SU 0027			8/8//:	CLAY 0017 CLAY GRVL 0019 LMSN 0030
6600973	1954-08-14	7.30	6.40	3.00	DO	FR 0024			10/10/10/1:0	LOAM 0002 CLAY 0021 LMSN 0024
6600974	1958-05-27	12.20	7.90	2.40	IR DO	FR 0040			8/8/15/0:30	RED CLAY 0015 BLUE CLAY 0026 LMSN 0040
6600975	1949-09-25	9.10	0.90	3.70	DO	FR 0028			12/20/4/0:30	LOAM 0003 LMSN 0030
6600976	1951-07-12	9.10	0.90	2.40	DO	FR 0028			8///:	CLAY 0003 LMSN 0030
6600977	1951-11-20	19.20	1.80	5.20	ST DO	FR 0063			17/17/4/0:30	CLAY 0006 BRWN SHLE 0063
6600978	1957-07-01	6.40	2.40	2.10	DO	FR 0021			7/7/10/0:30	RED CLAY 0008 LMSN 0021
6600979	1959-01-12	6.40	2.10	1.80	DO	FR 0021			6/8/50/1:0	CLAY 0007 LMSN 0021

6600980	1961-06-19	6.10	0.60	0.90	DO	FR 0020			3/3/15/1:0	LOAM CLAY 0002 LMSN 0020
6600981	1947-12-27	4.00	3.00	0.30	DO	FR 0013			1///:	CLAY 0010 LMSN 0013
6600982	1947-12-31	7.90	4.60	0.30	DO	FR 0026			1///:	CLAY 0015 LMSN 0026
6600983	1952-05-13	4.60	2.40	0.60	DO	SU 0015			2/2//:	CLAY 0008 LMSN 0015
6600984	1952-07-26	6.40	3.00	1.20	DO	SU 0021			4/4//:	RED CLAY 0010 LMSN 0021
6600985	1953-07-18	11.90	3.40	8.20	DO	SU 0039			27/30/4/2:0	CLAY MSND STNS 0011 GREY SHLE 0039
6600986	1953-07-20	4.90	1.80	0.30	DO	SU 0016			1/3/2/2:0	CLAY MSND STNS 0006 GREY SHLE 0016
6600987	1952-05-09	7.60	1.50	2.10	DO	SU 0025			7/7//:	CLAY 0005 LMSN 0025
6600988	1967-03-25	7.90	3.70	0.60	DO	SU 0026			2/2/15/1:0	CLAY 0012 LMSN 0026
6600989	1948-07-29	8.80	4.30	2.40	DO	FR 0028			8/25/5/0:30	CLAY GRVL 0014 LMSN 0029
6600990	1950-03-20	9.40	0.60	1.20	DO	FR 0029			4/31//:	LOAM 0002 LMSN 0031
6600991	1953-04-07	4.90	0.90	1.20	DO	FR 0016			4//5/:	CLAY MSND STNS 0003 GREY SHLE 0016
6600992	1953-10-14	7.30	2.70	1.20	DO	SU 0024			4/24/4/0:30	CLAY 0009 LMSN 0024
6600993	1956-03-17	4.30	1.50	1.50	DO	FR 0014			5/5/4/0:30	RED CLAY 0005 SHLE 0014
6600994	1959-09-17	5.80	0.60	1.50	DO	FR 0019			5/8/4/1:0	LOAM STNS 0002 LMSN 0019
6600995	1962-03-29	9.80	0.00	4.60	DO	FR 0032			15/20/10/1:0	LMSN 0032
6600996	1948-12-14	4.90	2.40	0.90	DO	FR 0016			3///:	LOAM CLAY 0008 LMSN 0016
6600997	1952-03-03	6.70	2.40	3.40	DO	SU 0021			11/11/4/0:30	LOAM CLAY 0008 BLCK SHLE 0022
6600998	1957-08-01	4.30	2.40	1.80	DO	FR 0014			6/9/3/0:30	CLAY 0008 LMSN 0014
6600999	1958-05-14	7.60	1.80	1.20	DO	SU 0025			4/25/2/0:30	RED CLAY 0006 SHLE 0025
6601000	1959-07-18	10.70	1.80	3.70	DO	SU 0035			12///1:30	CLAY 0006 GREY LMSN 0035
6601001	1959-05-03	7.90	1.80	3.70	DO	SU 0022			12/20/5/1:0	CLAY 0006 LMSN 0026
6601002	1959-05-25	3.70	1.80	1.50	DO	FR 0010			5/7/2/1:0	CLAY 0006 LMSN 0012
6601003	1954-04-26	6.70	3.40	4.60	DO	FR 0022			15/15/10/1:0	CLAY 0011 LMSN 0022
6601004	1957-11-04	9.10	1.20	4.90	DO	FR 0030			16/16/10/0:30	RED CLAY 0004 GREY LMSN 0030
6601005	1958-08-20	24.40	1.20	11.30	DO	FR 0080			37/80/4/0:30	LOAM CLAY 0004 LMSN 0080
6601006	1948-07-22	7.30	2.10	0.60	DO	FR 0022			2/22/5/0:30	LOAM CLAY 0007 LMSN 0024
6601007	1952-09-15	12.20	0.60	4.30	DO	MN 0022 MN 0040			14/14/4/0:30	CLAY 0002 BRWN SHLE 0040
6601008	1952-11-08	20.10	1.20	16.80	DO	FR 0066			55/66/3/0:30	LOAM MSND 0004 SHLE 0066
6601009	1958-08-01	22.30	0.00	11.30	IN	FR 0073			37/37/20/0:30	GREY LMSN 0073
6601010	1954-05-14	5.80	0.90	2.40	DO	FR 0019			8/8/6/0:30	LOAM CLAY 0003 LMSN 0019
6601011	1959-09-08	27.70	0.00	3.70	IN	FR 0065 SU 0090		6	12/30/17/1:0	LMSN 0071 BLUE SHLE 0091
6601012	1946-08-27	14.00	1.80	0.00	DO	FR 0031				LOAM CLAY 0006 LMSN 0046
6601013	1946-08-30	11.90	1.20	0.00		FR 0020				LOAM CLAY 0004 LMSN 0039
6601014	1948-03-27	11.90	0.30	7.60	DO	FR 0025		6	25///:	LOAM 0001 LMSN 0039
6601015	1948-08-12	7.60	1.50	1.50	DO	FR 0023			5/15/10/0:30	CLAY GRVL 0005 LMSN 0025
6601016	1949-02-09	11.60	1.20	6.10		FR 0038			20//10/0:30	CLAY 0004 GREY LMSN 0038
6601017	1949-10-06	12.20	1.50	6.10	DO	FR 0040			20//10/0:30	CLAY 0005 GREY LMSN 0040
6601018	1949-10-15	11.30	1.50	5.20	DO	FR 0037			17//10/:	CLAY 0005 GREY LMSN 0037
6601019	1949-10-25	12.20	1.20	6.10	DO	SU 0040			20//10/0:30	CLAY 0004 GREY LMSN 0040
6601020	1949-11-02	12.20	0.90	6.10	DO	SU 0040			20//10/0:30	CLAY 0003 GREY LMSN 0040
6601021	1949-11-10	11.90	1.20	5.50		FR 0039			18//10/0:30	CLAY 0004 GREY LMSN 0039
6601022	1949-12-13	12.80	1.20	6.10	DO	FR 0042			20//10/0:30	CLAY 0004 GREY LMSN 0042
6601023	1950-02-21	10.70	0.90	0.00	DO	FR 0034			0///:	CLAY 0003 LMSN 0035
6601024	1950-09-12	12.80	1.20	6.10	DO	MN 0042			20///:	CLAY 0004 GREY LMSN 0042
6601025	1951-06-26	12.80	1.50	6.10	DO	FR 0042			20///:	CLAY 0005 GREY LMSN 0042
6601026	1949-06-01	12.80	0.90	6.10	DO	FR 0020			20//10/0:30	CLAY 0003 GREY LMSN 0042
6601027	1951-07-02	12.80	2.10	7.60	DO	FR 0042			25///:	CLAY 0007 GREY LMSN 0042
6601028	1951-10-19	13.40	0.60	7.60	DO	FR 0044			25//10/:	CLAY 0002 GREY LMSN 0044
6601029	1951-11-10	7.60	0.60	2.70	DO	FR 0024			9/25/4/0:30	CLAY 0002 LMSN 0025
6601030	1951-11-14	13.10	2.40	7.60	DO	FR 0043			25///:	CLAY 0008 GREY LMSN 0043

6601031	1951-11-26	12.50	2.40	7.60	DO	FR 0041			25///:	CLAY 0008 GREY LMSN 0041
6601032	1952-12-05	11.60	0.90	5.20	ST DO	SU 0017			17//5/:	CLAY STNS 0003 GREY SHLE 0038
6601033	1953-04-04	7.90	0.00	2.40	PS	FR 0026			8//3/0:30	BRWN SHLE 0005 LMSN 0026
6601034	1953-09-08	14.30	0.00	4.90	DO	FR 0047			16//4/0:30	LMSN 0004 BRWN SHLE 0047
6601035	1954-07-03	14.00	0.60	7.90	DO	FR 0046			26/26/35/0:20	LOAM MSND 0002 GREY LMSN 0046
6601036	1954-07-09	20.40	0.60	14.30	DO	FR 0067			47/50/50/0:15	LOAM MSND 0002 GREY LMSN 0067
6601037	1955-07-24	20.10	0.00	5.50	DO	FR 0066			18/18/4/0:30	SHLE 0012 GREY LMSN 0066
6601038	1947-07-19	12.80	0.00	7.30	DO	FR 0042			24///:	LMSN 0042
6601039	1959-02-17	11.90	4.90	6.40	CO	FR 0039			21/21/10/0:30	RED CLAY 0016 GREY LMSN 0039
6601044	1952-07-03	7.30	2.40	3.70	DO	FR 0024			12///:	CLAY HPAN 0008 SHLE 0024
6601089	1954-01-26	7.30	4.00	4.00	DO	FR 0024			13/13/4/0:30	RED CLAY 0013 SHLE 0024
6601090	1953-02-10	7.90	1.80	3.40	DO	FR 0026			11/11/3/0:30	LOAM CLAY 0006 BRWN SHLE 0026
6601091	1958-05-29	7.90	3.70	2.40	DO	FR 0026			8/8/15/0:30	RED CLAY 0012 SHLE 0026
6601092	1965-11-13	12.80	8.80	6.10	CO	FR 0042			20/20/15/1:30	BLUE CLAY 0026 GRVL 0029 SHLE 0042
6601093	1966-10-06	12.50	8.20	6.70	ST DO	FR 0041			22/27/20/1:30	CLAY 0022 GRVL MSND 0027 LMSN 0041
6601094	1947-08-06	8.50	4.30	8.50	DO	FR 0028			28///:	LOAM MSND 0014 LMSN 0028
6601095	1948-04-15	9.40	0.00	8.50	DO	FR 0031			28///:	CLAY LMSN 0026 LMSN 0031
6601096	1953-06-20	9.10	5.20	6.10	DO	FR 0030			20/20/10/1:0	CLAY MSND STNS 0017 GREY SHLE 0030
6601097	1954-05-28	7.30	4.30	3.00	DO	FR 0017			10/10/10/1:0	LOAM MSND GRVL 0014 LMSN 0024
6601098	1957-04-29	22.90	4.30	3.40	DO	FR 0075			11/50/3/0:30	RED CLAY 0014 SHLE 0075
6601099	1959-03-06	9.40	5.20	3.00	DO	FR 0031			10/10/10/0:30	RED CLAY 0017 GREY LMSN 0031
6601100	1959-03-11	10.10	5.80	3.70	DO	FR 0033			12/12/10/0:30	RED CLAY 0019 GREY LMSN 0033
6601101	1959-09-17	13.40	4.60	11.90	DO	FR 0044			39/39/5/0:30	CLAY GRVL 0015 LMSN 0044
6601102	1961-07-08	8.80	4.90	2.40	DO	FR 0029			8/15/7/1:0	CLAY 0016 LMSN 0029
6601103	1962-04-04	8.20	3.70	1.20	DO	FR 0027			4/12/10/1:0	BRWN CLAY 0012 LMSN 0027
6601104	1965-09-04	9.40	2.40	3.70	DO	FR 0031			12/20/7/1:30	CLAY 0008 SHLE 0022 LMSN 0031
6601105	1947-04-23	14.60	1.80	0.00	DO	FR 0048				CLAY 0006 LMSN 0048
6601106	1949-06-12	23.20	3.70	13.40	DO	FR 0070			44///:	CLAY MSND STNS 0012 LMSN SHLE 0076
6601107	1949-06-30	12.80	0.00	10.40	DO	FR 0038			34///:	LMSN 0042
6601108	1951-01-20	13.10	0.90	11.90	DO	FR 0043			39/39/4/0:30	LOAM MSND 0003 BLCK SHLE 0043
6601109	1954-07-27	15.50	1.20	8.80	PS	FR 0051			29/29/4/0:30	CLAY 0004 SHLE 0051
6601110	1965-09-11	14.30	0.90	11.90	DO	FR 0047			39/39/15/1:30	LOAM CLAY 0003 SHLE 0030 LMSN 0047
6601111	1967-02-18	29.90	0.90	13.10	PS	FR 0098			43/83/12/1:30	BRWN CLAY 0003 SHLE 0098
6601112	1946-09-02	14.00	3.00	0.00	DO	FR 0036				CLAY 0010 LMSN 0046
6601113	1949-06-01	12.80	0.90	9.10	DO	FR 0036			30///:	CLAY 0003 LMSN 0042
6601114	1954-10-05	22.90	3.00	10.10	DO	FR 0075			33/33/4/0:30	CLAY 0008 MSND GRVL 0010 SHLE 0075
6601115	1955-06-17	16.80	0.90	9.80	PS	FR 0055			32/32/20/0:30	LOAM 0003 LMSN 0055
6601116	1957-05-29	13.40	0.90	8.80	DO	FR 0044			29/29/10/0:30	LOAM CLAY 0003 SHLE 0025 GREY LMSN 0044
6601117	1957-08-24	14.30	0.90	11.30	DO	FR 0047			37/37/10/0:30	LOAM CLAY 0003 SHLE 0047
6601118	1958-08-11	23.50	3.40	10.70	DO	FR 0077			35/35/20/0:30	RED CLAY 0011 BRWN SHLE 0030 LMSN 0077
6601119	1958-09-25	16.80	0.00	3.70	PS	FR 0055			12/14/8/1:0	SHLE 0004 LMSN 0055
6601120	1963-11-12	14.30	0.00	11.30	DO	FR 0047			37/37/10/1:30	SHLE 0023 LMSN 0047
6601121	1947-04-10	15.20	3.40	0.00	DO	FR 0050				CLAY 0011 LMSN 0050
6601122	1953-04-04	7.90	1.20	1.50	DO	FR 0026			5/5/5/:	LOAM MSND 0004 GREY SHLE 0026
6601123	1953-11-12	11.00	4.30	4.30	DO	FR 0036			14/14/2/4:0	CLAY MSND STNS 0014 GREY SHLE 0036
6601124	1954-08-10	7.90	0.90	5.50	ST	FR 0026			18/18/5/1:0	LOAM 0003 LMSN 0026
6601125	1957-06-27	11.90	0.90	2.70	DO	FR 0039			9/9/10/0:30	LOAM CLAY 0003 SHLE 0010 LMSN 0039
6601126	1958-06-28	15.80	8.50	5.20	DO	FR 0052			17/52/4/0:30	RED CLAY 0028 GREY LMSN 0052
6601127	1950-02-08	9.10	1.80	2.10	DO	FR 0028			7/9/12/1:0	CLAY 0006 LMSN 0030
6601129	1954-08-01	9.80	1.80	6.70	DO	FR 0032			22/22/1/1:0	LOAM 0001 CLAY 0006 LMSN 0032
6601130	1954-08-10	10.10	5.50	5.80	DO	SU 0033			19/20/5/1:0	LOAM 0001 CLAY 0018 LMSN 0033
6601131	1962-11-10	18.90	1.50	6.70	ST DO	FR 0062			22/22/15/1:0	CLAY 0005 SHLE 0030 LMSN 0062
6601132	1949-03-25	12.20	2.10	7.60		SU 0040		6	25//4/:	CLAY STNS 0007 LMSN 0040

6601135	1953-05-04	9.40	2.10	4.30	DO	FR 0031			14///:	LOAM MSND 0002 RED CLAY 0007 GREY SHLE 0031
6601136	1954-11-01	7.90	3.70	5.50	DO	FR 0026			18/20/2/1:0	CLAY 0012 LMSN 0026
6601137	1954-11-15	10.70	2.40	7.60	DO	SU 0035			25/26/2/1:0	LOAM 0002 CLAY 0008 LMSN 0035
6601138	1955-05-07	10.10	3.70	5.50	DO	FR 0033			18/20/2/1:0	CLAY 0012 LMSN 0033
6601139	1955-05-20	14.00	1.80	1.80	DO	FR 0046			6/40/1/1:0	CLAY 0006 LMSN 0046
6601140	1955-05-13	11.30	0.90	6.10	DO	FR 0037			20/20/3/1:0	CLAY 0003 LMSN 0037
6601142	1952-05-02	15.20	0.60	11.90	DO	FR 0050			39/50//:	LOAM 0002 LMSN 0050
6601143	1952-05-15	14.60	12.20	4.60	CO	FR 0048			15/15/4/0:30	CLAY 0040 SHLE 0048
6601144	1955-05-27	20.40	0.60	11.00	DO	FR 0067			36/36/4/0:30	LOAM 0002 SHLE 0067
6601145	1955-06-22	9.10	0.90	4.00	DO	FR 0030			13/14/10/1:0	LOAM 0003 LMSN 0030
6601146	1955-07-20	9.10	0.60	4.60	DO	FR 0027			15/20/4/1:0	LOAM 0002 LMSN 0030
6601147	1955-11-25	14.00	0.30	9.10	DO	FR 0046			30/45/5/2:0	LOAM 0001 LMSN 0046
6601148	1957-03-21	20.70	0.60	7.60	DO	FR 0068			25/25/4/0:30	LOAM MSND 0002 SHLE 0017 GREY LMSN 0068
6601149	1947-10-25	11.90	1.50	2.70	DO	FR 0039			9///:	LOAM CLAY 0005 LMSN 0039
6601150	1947-11-06	19.50	0.30	0.00	DO	FR 0026				LOAM 0001 LMSN 0064
6601151	1949-04-15	8.20	1.50	4.60	DO	FR 0025			15///:	CLAY MSND STNS 0005 LMSN 0027
6601152	1952-04-10	10.10	6.10	2.70	DO	FR 0027			9/9//:	LOAM 0006 CLAY 0020 LMSN 0033
6601180	1954-06-24	9.40	3.70	6.40	DO	FR 0031			21/21/4/0:30	LOAM MSND 0012 SHLE 0031
6601181	1961-03-20	9.80	6.10	6.10	DO	FR 0032			20/20/10/1:0	CLAY 0020 LMSN 0032
6601182	1951-05-18	13.70	0.90	11.90	DO	FR 0045			39/39/4/0:30	LOAM MSND 0003 BRWN SHLE 0045
6601183	1954-07-13	14.30	1.50	12.20	DO	FR 0047			40/40/4/0:30	LOAM MSND 0005 SHLE 0047
6601184	1959-08-17	8.20	0.00	6.70	DO	FR 0027		5	22/24/5/1:0	LMSN 0027
6601185	1960-07-09	6.70	4.30	3.40	DO	FR 0022			11/11/20/0:30	RED CLAY 0014 LMSN 0022
6601186	1961-03-29	16.20	0.00	12.50	DO	FR 0053			41/41/10/1:0	LMSN 0053
6601188	1963-09-18	13.70	1.80	11.00	DO	FR 0045			36/36/10/1:0	FILL 0006 SHLE 0030 LMSN 0045
6601191	1952-07-23	15.20	0.00	6.10	DO	FR 0048		6	20/48/4/0:30	CLAY 0047 GRVL MSND 0050
6601223	1946-11-09	12.20	2.40	0.00	DO	FR				LOAM 0001 CLAY 0008 LMSN 0040
6601604	1947-07-19	12.20	0.60	7.60	DO	FR 0025			25///:	CLAY 0002 LMSN 0040
6601605	1947-07-31	14.00	0.30	8.50	DO	FR 0028			28///:	CLAY 0001 LMSN 0046
6601613	1955-08-26	11.90	7.90	4.60	DO	SU 0039			15/15/4/0:30	MSND 0026 LMSN 0039
6601616	1965-04-07	12.20	10.70	3.00	CO	FR 0040			10/15/15/1:30	BLUE CLAY 0035 LMSN 0040
6601618	1966-08-13	7.30	1.80	3.40	DO	FR 0024			11/15/50/1:30	GREY CLAY 0006 LMSN 0024
6602375	1968-08-29	9.10	2.70	1.50	DO	SU 0030			5/15/8/1:30	CLAY 0009 LMSN 0030
6602407	1969-02-21	15.50	8.50	7.90	DO	FR 0051			26/26/15/1:30	MSND GRVL 0028 LMSN 0051
6602536	1970-07-23	8.20	2.10	3.00	DO	FR 0027		6	10/10/25/1:0	BRWN CLAY 0007 LMSN 0027
6602557	1970-10-29	11.30	11.00	2.40	DO	UK 0037		6	8/15/30/1:0	LOAM 0002 BRWN CLAY 0014 BRWN CLAY GRVL 0036 GREY SHLE 0037
6602558	1970-10-28	13.70	5.80	2.40	DO	FR 0035		6	8/40/10/1:0	RED CLAY STNS 0019 LMSN 0045
6602559	1970-10-26	15.80	2.40	6.10	DO	SU 0050		6	20/48/4/1:0	BRWN CLAY 0008 LMSN 0052
6602568	1970-11-21	16.50	7.90	6.70	DO	FR 0054			22/48/8/1:0	LOAM MSND 0015 MSND 0023 GRVL 0026 LMSN 0054
6602574	1971-01-08	24.40	1.20	14.60	DO	FR 0050		6	48/50/10/2:0	BRWN CLAY 0004 GREY ROCK 0080
6602629	1971-08-10	15.20	8.50	5.80	ST	FR 0040			19/30/12/1:0	BRWN CLAY 0023 GREY CLAY 0028 GREY SHLE 0030 GREY LMSN 0050
6602667	1972-05-27	13.70	6.40	2.10	DO	FR 0044			7/13/8/1:0	BRWN CLAY 0021 GREY LMSN 0045
6602668	1972-06-13	16.20	0.90	11.00	DO	FR 0048			36/41/12/1:0	BRWN FSND 0003 GREY LMSN 0053
6602672	1972-07-10	8.50	1.20	2.40	ST DO	FR 0026		6	8/10/15/2:0	BRWN CLAY STNS 0004 GREY LMSN 0028
6602704	1972-10-03	18.60	1.20	12.20	DO	FR 0059			40/42/10/1:0	BRWN CLAY 0004 GREY LMSN 0061
6602706	1972-09-19	7.00	2.10	2.40	DO	SU 0022			8/10/8/1:0	BRWN CLAY 0007 GREY LMSN 0023
6602709	1972-12-30	10.40	2.40	0.90	DO	SU 0033			3/20/12/1:0	BRWN CLAY 0008 GREY LMSN 0034
6602710	1972-12-15	6.70	0.30	2.40	ST	FR 0020			8/9/12/1:0	BRWN LOAM STNS 0001 BRWN SHLE 0002 GREY LMSN 0022

6602711	1972-12-17	10.70	3.00	0.60	DO	FR 0033			2/15/12/1:0	BRWN CLAY 0010 GREY LMSN 0035
6602756	1973-06-21	18.30	1.50	13.10	DO	FR 0050			43/45/12/1:0	BRWN CLAY 0005 GREY LMSN 0060
6602761	1973-06-03	7.90	2.10	1.50	DO	SU 0025			5/9/12/1:0	BRWN CLAY 0007 GREY LMSN 0026
6602785	1973-09-18	18.30	4.00	3.00		SU 0015 SU 0035 SU 0058		6	10/60/1/1:0	BRWN CLAY 0013 GREY SHLE LMSN 0015 GREY LMSN 0060
6602786	1973-10-13	10.10	4.30	1.20	DO	FR 0014			4/33/4/1:0	BRWN CLAY 0013 GREY GRVL 0014 GREY SHLE 0015 GREY LMSN 0033
6602787	1973-10-10	7.30	0.60	1.50	DO	FR 0023			5/7/14/1:0	BRWN LOAM 0002 GREY LMSN 0024
6602789	1973-10-20	11.60	3.40	4.90	DO	SU 0037			16/20/14/1:0	BRWN CLAY 0011 GREY LMSN 0038
6602790	1973-10-17	16.20	8.50	4.00	DO	FR 0045			13/53/4/1:15	BRWN CLAY 0020 BRWN FSND 0025 BRWN STNS 0028 GREY SHLE 0030 GREY LMSN 0053
6602928	1974-02-20	21.90	18.90	15.80	DO	FR 0071			52/54/12/1:15	BRWN SAND 0050 BRWN CLAY GRVL 0051 BRWN BLDR SAND 0062 GREY LMSN 0072
6602929	1974-02-25	8.20	2.10	1.20	DO	SU 0025			4/10/12/1:0	BRWN CLAY 0007 GREY LMSN 0027
6602930	1974-02-28	7.60	2.40	1.20	DO	SU 0023			4/14/12/1:0	BRWN CLAY 0008 GREY LMSN 0025
6602953	1974-06-08	11.60	4.90	0.00	IR DO	FR 0037			0/0/16/1:0	BLCK LOAM 0002 GREY CLAY 0010 BRWN CLAY 0016 GREY LMSN 0038
6602977	1974-08-07	12.20	2.10	0.00	DO	FR 0037			0/30/8/1:0	BRWN CLAY 0007 GREY LMSN 0040
6602978	1974-08-10	12.20	2.10	0.00	DO	SU 0037			0/28/8/:	BRWN CLAY 0007 GREY LMSN 0040
6602990	1974-09-05	12.20	8.20	4.90	DO	FR 0038		6	16/20/15/1:0	BRWN LOAM 0018 BRWN CLAY 0027 GREY LMSN 0040
6603021	1974-12-30	7.60	0.90	1.80	DO	FR 0023			6//1:0	BRWN CLAY 0003 GREY LMSN 0025
6603052	1975-02-03	16.50	12.20	9.10	ST	FR 0053			30/33/15/1:15	BRWN LOAM 0002 BRWN SAND GRVL 0040 GREY LMSN 0054
6603087	1975-06-16	22.60	10.70	6.70	CO	FR 0035		6	22/38/25/3:0	BRWN CLAY 0005 GREY CLAY 0035 ROCK 0074
6603090	1975-08-07	9.10	2.40	1.80	DO	FR 0026			6/27/5/1:0	BLCK LOAM 0001 BRWN CLAY 0008 GREY LMSN 0030
6603143	1976-07-30	12.50	0.00	8.50	DO	FR 0041		6	28/28/10/2:0	SAND GRVL 0041
6603165	1976-08-18	4.00	0.00	0.90	DO	FR 0012		6	3/6/8/1:0	BLCK MUCK 0004 BRWN CLAY 0010 GRVL SAND 0013
6603175	1976-10-07	11.90	5.20	0.00	ST DO	SU 0039			0/0/20/1:0	BLCK MUCK LOOS 0006 GREY CLAY SOFT 0013 BRWN CLAY DNSE 0017 GREY LMSN LYRD 0039
6603186	1974-11-08	12.20	0.60	7.00	DO	FR 0040			23/40/5/1:0	BRWN CLAY PCKD 0002 BRWN SHLE LOOS 0004 GREY LMSN LYRD 0040
6603188	1976-12-14	6.10	2.10	0.90	DO	SU 0012			3/10/8/1:0	BRWN CLAY PCKD 0007 GREY LMSN FLNT LYRD 0020
6603189	1976-12-15	7.60	3.40	1.20	DO	FR 0013 FR 0020			4/10/16/1:0	BRWN CLAY PCKD 0007 BRWN CLAY GRVL PCKD 0011 GREY LMSN LYRD 0025
6603234	1977-10-05	7.60	2.40	0.60	DO	SU 0020			2/24/2/1:0	BRWN LOAM SOFT 0001 BRWN CLAY PCKD 0008 BRWN SHLE LYRD 0010 GREY LMSN LYRD 0025
6603237	1977-09-15	9.80	1.80	3.00	DO	SU 0030		6	10/15/30/1:0	BRWN CLAY SNDY 0006 GREY FLNT 0032
6603301	1978-05-11	17.40	9.80	6.70	ST DO	SU 0034		7	22/32/20/2:30	BRWN CLAY 0008 GREY CLAY 0022 CLAY GRVL 0032 ROCK 0057
6603379	1979-09-26	16.80	0.00	8.50	ST	FR 0030		7	28/40/10/:	CLAY LOAM 0003 GREY CLAY 0015 GREY CLAY GRVL 0028 UNKN 0055
6603380	1979-10-04	21.90	0.00	17.10	DO	FR 0069		7	56/65/10/2:0	BRWN CLAY 0004 GREY CLAY 0007 BLCK STNS 0072
6603409	1979-09-27	7.60	7.30	2.70	PS	FR 0024			9/9/45/24:30	GREY CLAY GRVL 0024 BLUE GRVL CLAY DRTY 0024 BLUE LMSN DKCL 0025
6603492		24.40	11.90	10.70	DO ST	FR 0049		7	35/50/20/2:0	BRWN GRVL SNDY 0015 GREY CLAY GRVL 0039 GREY ROCK LMSN 0080
6603494	1981-07-23	30.80	7.30	7.00	DO ST	FR 0026		8	23/65/25/2:0	BRWN CLAY LOAM 0008 CLAY 0024 GREY LMSN 0050 GREY LMSN 0101

6603495	1982-01-22	24.40	11.90	10.70	DO ST	FR 0050		6	35/60/20/2:0	BRWN SAND 0006 GRVL SNDY 0015 RED CLAY GRVL 0039 ROCK 0080
6603552	1982-03-20	21.30	0.00	13.70	DO	FR 0070		6	45/51/20/1:30	BLUE SAND 0051 BLCK LOAM 0054 GREY CLAY 0058 UNKN 0070
6603653	1985-07-09	6.10	4.00	2.70	DO	FR 0013			9/12/15/1:0	BRWN CLAY DNSE 0013 GREY SHLE 0015 GREY LMSN SHLE LYRD 0020
6603670	1985-10-17	19.50	0.00	8.20	DO	MN 0040 UK 0063			27/50/8/1:0	GREY LMSN LYRD 0064
6603697	1986-09-10	8.80	3.70	4.00	DO	FR 0018 FR 0029			13/25/7/1:30	BRWN MSND SOFT 0012 GREY LMSN FLNT LYRD 0029
6603707	1986-11-27	14.00	11.30	7.30	DO	GS 0045			24/25/14/2:0	BRWN SAND LOOS 0022 YLLW SAND LOOS 0024 BLCK MUCK DNSE 0026 BRWN CLAY GRVL PCKD 0037 GREY LMSN LYRD 0046
6603740	1987-04-15	12.20	0.90	8.20	DO	FR 0033			27/13/18/2:0	BRWN CLAY LOOS 0003 WHIT SHLE LOOS 0007 GREY SHLE DNSE 0015 UNKN DRY 0015 GREY SHLE DNSE 0020 GREY SHLE LOOS 0025 GREY SHLE LYRD 0040
6603741	1987-04-03	9.80	2.10	1.80		FR 0032			6/28/4/1:30	RED CLAY DNSE 0007 GREY LMSN FLNT LYRD 0032
6603757	1987-06-30	9.40	4.00	4.30	DO	FR 0017 FR 0031			14/19/8/1:0	STNS SAND LOOS 0003 BRWN FSND 0013 GREY LMSN LYRD 0031
6603779	1987-10-02	9.10	0.30	9.40	DO	FR 0036			31/31/17/1:15	STNS LOOS 0001 GREY SHLE CLAY LOOS 0007 GREY SHLE LOOS 0011 GREY SHLE LYRD 0028 GREY SHLE LOOS 0030
6603793	1988-01-25	10.70	5.80	0.90	DO	SU 0033			3/5/21/3:0	BLUE CLAY STNS PCKD 0003 BRWN CLAY PCKD 0019 GREY FLNT LYRD 0027 GREY LMSN LYRD 0035
6603811	1988-04-18	5.50	2.70	2.40	DO	FR 0010 FR 0017			8/8/6/2:0	BRWN CLAY PCKD 0009 GREY LMSN LYRD 0018
6603826	1988-08-11	9.10	3.40	0.00						BRWN CLAY PCKD 0009 GREY FGVL CLAY PCKD 0011 GREY FLNT LMSN LYRD 0018 GREY LMSN FLNT 0030
6603843	1988-07-18	59.40	3.40	4.60	CO	SU 0075		8	15//25/3:0	BRWN CLAY 0007 GREY CLAY SAND 0010 GREY GRVL 0011 GREY ROCK 0185 GREY LMSN 0195
6603877	1989-07-19	10.70	6.10	6.40	DO	FR 0021 FR 0033			21/24/21/1:30	BRWN FSND 0011 GREY CGVL 0014 BRWN SAND FGVL 0020 GREY LMSN LYRD 0035
6603896	1989-05-31	22.90	0.90	3.70	DO	FR 0050		6	12/75/10/1:0	BRWN CLAY STNS 0003 LMSN 0075
6603897	1989-06-26	13.70	9.10	5.20	DO	FR 0040		6	17/45/10/2:0	BRWN SAND 0010 BRWN CLAY 0014 GREY CLAY 0030 LMSN 0045
6603957	1990-07-26	9.10	3.70	4.30	DO	FR 0030			14/16/21/2:0	BRWN FSND 0011 BRWN SAND CLAY PCKD 0012 GREY LMSN LYRD 0030
6603969	1990-11-10	9.10	5.20	3.00	DO	FR 0029			10/12/28/2:0	BRWN SAND 0004 BRWN CLAY 0009 BRWN CLAY CGVL 0012 GREY CGVL 0014 GREY FGVL 0017 GREY LMSN LYRD 0030
6604003	1991-04-29	8.80	1.50	2.10	DO	FR 0029			7/22/12/1:30	BLCK LOAM LOOS 0004 BRWN CLAY PCKD 0005 BRWN SHLE LOOS 0006 GREY LMSN LYRD 0029
6604006	1991-07-10	6.40	1.20	0.00	MN	UK 0018		2		BRWN LOAM PCKD 0001 BRWN CLAY PCKD 0004 GREY SHLE LYRD 0005 GREY LMSN LYRD 0008 UNKN DRY 0009 GREY LMSN LYRD 0021
6604007	1991-07-09	7.90	1.80	0.00	MO	UK 0026		2		BRWN LOAM LOOS 0002 BRWN CLAY PCKD 0006 GREY SHLE LYRD 0007 GREY LMSN LYRD 0022 GREY SHLE LYRD 0024 GREY LMSN LYRD 0026

6604008	1991-07-08	7.00	0.00	0.00	MO	UK 0023		2		BRWN UNKN LOOS 0003 BRWN UNKN PCKD 0006 GREY UNKN LYRD 0008 GREY UNKN LYRD 0023
6604018	1991-08-13	9.80	0.30	4.60	DO	FR 0019			15/9/9/2:15	BRWN LOAM PCKD 0001 GREY SHLE LYRD 0009 GREY LMSN LYRD 0032
6604028	1991-09-23	10.70	0.90	2.40	DO	SU 0018			8/9/21/2:30	BRWN CLAY PCKD 0003 GREY LMSN LYRD 0035
6604046	1991-06-05	16.80	0.90	7.90	CO	FR 0033 FR 0042 FR 0053		6	26/50/25/1:0	BRWN SAND 0003 LMSN 0055
6604059	1992-01-04	13.40	11.30	4.90	DO ST	FR 0043		6	16/43/12/1:0	BRWN CLAY 0004 GREY CLAY 0015 RED CLAY GRVL 0037 ROCK 0044
6604078	1992-08-21	90.80	14.00	12.80	IN	FR 0050 SU 0155 SU 0163 SU 0197 SU 0230		6	42/40/35/2:0	BRWN CLAY 0003 BRWN SAND 0020 BRWN SAND STNS 0046 ROCK 0298
6604079	1992-08-24	90.80	10.10	0.00	IN	SU 0154		6	//2/:	BRWN CLAY 0004 BRWN SAND 0015 BRWN SAND GRVL 0026 BRWN SAND BLDR 0033 ROCK
6604129	1992-12-07	14.90	1.50	4.00	DO	SU 0029 SU 0049			13/45/5/1:30	BRWN CLAY PCKD 0005 GREY LMSN LYRD 0049
6604132	1993-04-28	6.10	4.60	1.20	DO	FR 0016			4/6/28/:	BLCK LOAM LOOS 0002 BRWN CLAY CGVL PCKD 0008 GREY FGVL 0015 GREY LMSN LYRD 0020
6604134	1983-04-17	11.90	0.90	8.20	DO	FR 0038			27/35/6/2:0	BRWN CLAY STNS PCKD 0003 GREY SHLE LYRD 0006 GREY LMSN LYRD 0039
6604149	1993-07-22	64.00	0.60	24.40	IR	SU 0160		6	80/210/25/1:0	BRWN CLAY 0002 ROCK LMSN 0210
6604150	1993-08-04	13.70	5.50	0.00	DO	FR 0042		6	/45/12/1:0	BRWN CLAY 0003 GREY CLAY STNS LOOS 0018 ROCK LMSN 0045
6604166	1993-06-11	12.20	5.80	4.00	DO	FR 0038			13/23/28/:	BLCK LOAM PCKD 0002 BRWN SAND DNSE 0018 BRWN CLAY STNS PCKD 0019 GREY LMSN LYRD 0040
6604205	1990-08-09	8.50	2.40	2.70	DO	FR 0011 FR 0028			9/9/21/2:0	BLCK LOAM PCKD 0001 BRWN SAND STNS PCKD 0008 GREY LMSN LYRD 0028
6604207	1995-06-28	7.60	2.40	3.40	DO	FR 0012 FR 0015			11/23/6/2:30	BLCK LOAM PCKD 0001 BRWN CLAY PCKD 0008 GREY LMSN LYRD 0025
6604260	1997-02-26	13.70	9.80	3.00	DO	FR 0042		6	10//10/1:0	BRWN CLAY 0003 GREY CLAY 0021 GREY CLAY BLDR 0032 ROCK LMSN 0045
6604269	1997-07-08	11.90	5.80	3.40	DO	FR 0037			11/11/21/2:0	BLCK LOAM PCKD 0001 BRWN SAND PCKD 0010 BLUE CLAY SAND PCKD 0019 GREY LMSN LYRD 0039
6604278	1997-11-05	15.50	0.90	8.80	DO	UK 0051			29/30/1/2:0	BLCK LOAM FGVL PCKD 0003 GREY LMSN LYRD 0051
6604279	1997-09-30	20.70	18.00	15.20	DO	FR 0067			50/56/14/0:0	GREY STNS PCKD 0000 BRWN SAND LOOS 0003 BRWN CLAY CGVL PCKD 0059 GREY LMSN LYRD 0068
6604291	1998-04-09	9.10	6.10	4.60	DO	FR 0029			15/16/21/2:0	BRWN CLAY PCKD 0004 BRWN CLAY FGVL PCKD 0020 GREY SHLE 0030
6604292	1998-05-26	14.00	2.40	3.70	DO	FR 0044			12/16/28/1:30	BLCK LOAM PCKD 0001 BRWN CLAY PCKD 0008 GREY SHLE LYRD 0010 GREY LMSN LYRD 0046
6604293	1998-05-12	23.50	17.70	14.90	DO	FR 0075			49/70/8/1:30	BRWN SAND PCKD 0045 BRWN CLAY FGVL PCKD 0058 GREY LMSN LYRD 0077
6604294	1998-04-15	18.30	0.60	10.40	DO	FR 0056			34/36/21/2:0	BRWN CLAY PCKD 0002 GREY SHLE LYRD 0060
6604324	1998-08-22	14.60	1.20	6.10	DO	FR 0047			20/20/20/2:30	BLCK LOAM PCKD 0001 BRWN CLAY FGVL PCKD 0004 GREY LMSN LYRD 0048
6604331	1999-05-15	12.80	4.90	3.40	DO	FR 0040			11/13/21/2:0	BLCK LOAM PCKD 0001 BRWN SAND PCKD 0016 GREY LMSN LYRD 0042

6604332	1999-04-09	8.80	3.40	1.80	DO	FR 0027			6/8/28/1:30	BLCK LOAM PCKD 0002 BLCK CLAY FGVL PCKD 0011 GREY LMSN LYRD 0029
6604333	1999-04-07	9.10	2.10	1.80	DO	FR 0028			6/7/28/1:30	BLCK LOAM PCKD 0002 BRWN CLAY FGVL PCKD 0007 GREY SHLE LYRD 0009 GREY LMSN LYRD 0030
6604334	1999-04-05	8.50	2.70	1.20		FR 0026			4/6/28/1:45	BLCK LOAM PCKD 0002 BRWN CLAY PCKD 0006 GREY CGVL PCKD 0009 GREY SHLE LYRD 0011 GREY LMSN LYRD 0028
6604339	1999-03-01	6.70	2.40	0.90	DO	FR 0017			3/20/11/1:30	BLCK LOAM PCKD 0001 RED CLAY PCKD 0008 GREY LMSN LYRD 0022
6604348	1999-07-09	22.90	9.10	5.80	DO	SU 0052 SU 0068 SU 0072			19/71/11/1:45	BRWN SAND CLAY LOOS 0025 BRWN CLAY PCKD 0030 GREY LMSN LYRD 0075
6604449	2000-06-28	16.50	7.90	7.90	DO	FR 0052			26/28/21/3:	BRWN SAND PCKD 0026 GREY SHLE LYRD 0028 GREY LMSN LYRD 0054
6604453	2000-07-05	8.20	0.90	0.00		FR 0018	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604454	2000-08-15	11.30	0.90	0.00		UK 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604455	2000-07-05	8.20	0.90	0.00		FR 0018	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604456	2000-07-04	8.20	0.90	0.00		FR 0019	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN 0027
6604457	2000-07-04	8.20	0.90	0.00		FR 0018	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604458	2000-07-04	8.20	0.90	0.00		FR 0020	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604459	2000-07-04	8.20	0.90	0.00		FR 0019	0017 10	4		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604460	2000-07-04	8.20	0.90	0.00		FR 0019	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604461	2000-07-04	8.20	0.90	0.00		FR 0019	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604462	2000-07-04	8.20	0.90	0.00		FR 0018	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604463	2000-07-04	7.90	0.90	0.00		FR 0020	0021 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0026
6604464	2000-07-04	8.20	0.90	0.00		FR 0019	0022 5	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604465	2000-07-04	8.20	0.90	0.00		FR 0019		2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604466	2000-08-02	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604467	2000-07-19	8.20	0.90	0.00		FR 0019	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604468	2000-08-15	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604469	2000-08-15	11.30	0.90	0.00		FR 0023	0017 2	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604470	2000-08-02	11.00	0.90	0.00		FR 0023	0036 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0036
6604471	2000-07-19	8.20	0.90	0.00		FR 0020	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604472	2000-07-05	8.20	0.90	0.00		FR 0018	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604473	2000-08-15	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604474	2000-07-05	8.20	0.90	0.00		FR 0018 FR	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604475	2000-07-19	8.20	0.90	0.00		FR 0019	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604476	2000-07-05	8.20	0.90	0.00		UK 0019	0017 10	2		BRWN LOAM LOOS 0003 GREN LMSN LYRD 0027
6604477	2000-07-05	8.20	0.90	0.00		FR 0017	0017 10	7		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604478	2000-08-15	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604479	2000-07-19	8.20	0.90	0.00		FR 0014	0007 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604480	2000-08-02	10.70	0.90	0.00		FR 0023	0025 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0035
6604481	2000-07-19	8.20	0.90	0.00		FR 0019	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604482	2000-07-19	9.40	0.90	0.00		FR 0023	0021 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0031
6604483	2000-07-19	8.20	0.90	0.00		FR 0019	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604484	2000-08-02	11.00	0.90	0.00		FR 0023	0026 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0036
6604485	2000-07-19	8.20	0.90	0.00		FR 0018	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604486	2000-08-15	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604487	2000-07-05	8.20	0.90	0.00		FR 0015	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604488	2000-08-02	11.00	0.90	0.00		FR 0023 MN	0027 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0036
6604489	2000-07-04	8.80	0.90	0.00		FR 0020	0009 20	4		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0029
6604490	2000-07-05	8.20	0.90	0.00		FR 0018	0017 10	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027
6604491	2000-07-05	8.20	0.90	0.00		FR 0020	0017 10			BRWN LOAM LOOS 0003 GREY LMSN LYRD 0027

6604496	2000-07-25	8.50	8.50	6.70	DO	FR			22/22/14/1:30	BRWN CLAY FGVL PCKD 0019 HPAN PCKD 0028 GREY SHLE 0028
6604497	2000-08-15	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604498	2000-08-15	11.30	0.90	0.00		FR 0023 GS	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604499	2000-08-15	11.30	0.90	0.00		FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604521	2000-09-09	14.30	0.90	0.00		FR 0029	0027 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0047
6604522	2000-09-07	12.80	0.90	0.00		FR 0027	0022 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0042
6604523	2000-09-07	11.00	0.90	0.00		FR 0023	0015 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0036
6604524	2000-09-07	11.00	0.90	0.00		FR 0023	0016 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0036
6604525	2000-09-07	11.30	0.90	0.00	NU	FR 0023	0017 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0037
6604526	2000-09-07	10.40	0.90	0.00		FR 0022	0014 20	2		BRWN LOAM LOOS 0003 GREY LMSN LYRD 0034
6604527	2000-11-13	11.30	1.50	0.00	NU	FR 0022	0017 20	2		BRWN LOAM 0003 GREY CLAY SILT DNSE 0005 GREY LMSN LYRD 0037
6604528	2000-11-23	5.20	1.50	0.00		FR 0013	0007 10	2		BRWN LOAM 0003 GREY CLAY SILT DNSE 0005 GREY LMSN LYRD 0017
6604529	2000-11-23	11.30	1.20	0.00		FR 0023	0017 20	2		BRWN LOAM 0003 GREY CLAY SILT DNSE 0004 GREY LMSN LYRD 0037
6604531	2001-01-30	11.60	0.90	0.00		FR 0023	0018 20	2		BRWN LOAM 0003 GREY LMSN LYRD 0038
6604540	2000-12-14	22.60	15.80	13.70	DO	FR 0072			45/47/21/1:30	BLCK LOAM PCKD 0001 BRWN SAND PCKD 0045 BRWN SAND FGVL PCKD 0049 GREY CGVL SAND PCKD 0052 GREY LMSN LYRD 0074
6604552	2001-06-21	11.30	3.00	5.50	DO	FR 0035			18/25/21/3:	BLCK LOAM PCKD 0001 BRWN CLAY PCKD 0010 GREY LMSN LYRD 0037
6604579	2001-08-28	8.20	0.90	0.00		FR 0019				BRWN LOAM 0003 GREY LMSN LYRD 0027
6604580	2001-08-28	8.20	0.90	0.00		FR 0019				BRWN LOAM 0003 GREY LMSN 0027
6604581	2001-08-28	7.90	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0026
6604582	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604583	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604584	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604585	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604586	2001-08-28	8.20	0.90	0.00		FR 0019				BRWN LOAM 0003 GREY LMSN 0027
6604587	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604588	2001-08-27	8.20	0.90	0.00		FR 0020				BRWN LOAM 0003 GREY LMSN LYRD 0027
6604589	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604590	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604591	2001-08-27	8.20	0.00	0.00						BRWN UNKN 0003 GREY LMSN 0027
6604592	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604594	2001-08-21	0.00	0.00	0.00		FR 0026				
6604595	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604596	2001-08-28	8.80	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0029
6604597	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604598	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604599	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604600	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604602	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604603	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604604	2001-08-28	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN 0027
6604605	2001-08-27	8.20	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0027
6604606	2001-08-29	11.00	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0036
6604607	2001-08-29	9.40	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0031
6604608	2001-10-25	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604609	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604610	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037

6604611	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN 0037
6604612	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604613	2001-08-29	11.00	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0036
6604614	2001-08-29	11.00	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0036
6604615	2001-08-29	11.00	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0036
6604616	2001-08-29	14.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0047
6604617	2001-08-29	12.80	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0042
6604618	2001-08-29	11.00	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0036
6604619	2001-08-29	11.00	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0036
6604620	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604621	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604622	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604623	2001-08-29	11.30	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0037
6604625	2001-08-29	10.40	0.90	0.00						BRWN LOAM 0003 GREY LMSN LYRD 0034
6604626	2001-08-29	5.20	1.50	0.00						BRWN LOAM 0003 GREY CLAY SILT DNSE 0005 GREY LMSN LYRD 0017
6604627	2001-08-29	11.30	1.50	0.00						BRWN LOAM 0003 GREY CLAY SILT DNSE 0005 GREY LMSN LYRD 0037
6604655	2002-04-03	9.40	2.10	0.00	DO	SU 0029			0/21/12/1:15	BLCK LOAM LOOS 0002 BRWN CLAY PCKD 0006 GREY CGVL PCKD 0007 GREY LMSN LYRD 0031
6604662	2002-06-09	10.10	3.00	0.60	DO	FR 0026			2/30/10/1:30	BLCK LOAM PCKD 0002 BRWN CLAY PCKD 0010 GREY LMSN LYRD 0033
6604694	2002-06-25	0.00	0.00	0.00	NU					
6604695	2002-06-25	0.00	0.00	0.00	NU					
6604712	2003-05-01	16.20	3.00	2.40	DO	FR 0052			8/10/20/2:0	BLCK LOAM LOOS 0004 BRWN CLAY PCKD 0010 GREY LMSN LYRD 0053
6604731	2003-07-28	7.60	2.40	3.00	DO	FR 0017			10/11/20/2:0	BRWN SAND LOOS 0007 GREY FGVL LOOS 0008 GREY SHLE LYRD 0009 GREY LMSN LYRD 0025
6604812	2004-09-30	18.20	6.10	2.70	DO	FR 0054		5.9	9/34/3/1:0	BLUE LOAM 0020 GREY LMSN STNS 0041 GREY LMSN 0060
6604826	2004-09-23	8.50	3.40	0.00			0024 5	2		BLCK PEAT 0005 GREY CLAY 0011 GREY LMSN 0028
6604903	2005-10-06	6.80	0.00	0.00		FR 0013	0006 16	1.76		GREY PGVL LOAM LOOS 0004 BRWN CLAY SILT SOFT 0022
6604914	2003-12-15	4.70	0.00	0.00		FR 0008	0007 8	1.97		BRWN GRVL FILL 0003 BRWN SAND FILL 0006 GREN 0008 BLCK GRVL SAND FILL 0015
6604959	2006-06-02	5.50	5.20	0.00			0008 10	2		0000 GREY GRVL 0002 BRWN SAND GRVL 0006 BRWN SAND SILT 0012 GREY SILT SAND 0017 ROCK 0018
7040857	2006-08-22	32.30	1.20	0.00				5.11		GREY CLAY 0004 LMSN DLMT 0106
7041805	2007-02-02	6.70	1.50	0.00			0012 10	2		RED CLAY SILT 0005 GREY LMSN 0022
7044668	2007-05-18	0.00	0.00	0.00						
7103742	2008-03-03	10.60	0.00	0.00	MO	FR 0004	0030 5	2.04		BRWN PEAT 0004 GREY CLAY 0012 GREY LMSN ROCK 0035
7103742	2008-02-25	0.00	0.00	0.00	MO	FR 0004	0030 5	2.04		BRWN PEAT 0004 GREY CLAY 0012 GREY LMSN ROCK 0035
7103742	2008-02-19	0.00	0.00	0.00	MO	FR 0004	0030 5	2.04		BRWN PEAT 0004 GREY CLAY 0012 GREY LMSN ROCK 0035
7103742	2008-03-03	0.00	0.00	0.00	MO	FR 0004	0030 5	2.04		BRWN PEAT 0004 GREY CLAY 0012 GREY LMSN ROCK 0035
7103742	2008-02-12	0.00	0.00	0.00	MO	FR 0004	0030 5	2.04		BRWN PEAT 0004 GREY CLAY 0012 GREY LMSN ROCK 0035
7117151		3.80	0.00	0.00	MO		0007 5			BRWN FILL LOOS 0005 GREY DLMT HARD 0012

7117152		5.00	0.00	0.00	MO		0006 10			BRWN FILL LOOS 0005 GREY DLMT CHRT HARD 0016
7117153		5.80	0.00	0.00	MO		0009 10			BRWN FILL LOOS 0008 GREY DLMT CHRT HARD 0019
7135563	2009-11-03	4.60	0.00	0.00	TH		0005 10			BRWN LOAM GRVL LOOS 0005 GREY CLAY 0015
7137138	2009-12-14	25.30	0.00	7.30	DO	FR 0060		6	24/78/10/1:0	BRWN SAND 0012 RED CLAY 0024 GREY LMSN ROCK 0083
7137139	2009-12-15	0.00	0.00	0.00	OT					
7141993	2009-05-20	3.90	0.00	0.00	TH					BRWN CLAY SILT 0003 GREY CLAY SILT 0012 ROCK 0013
7141993	2009-05-20	0.00	0.00	0.00	TH					BRWN CLAY SILT 0003 GREY CLAY SILT 0012 ROCK 0013
7141993	2009-05-20	0.00	0.00	0.00	TH					BRWN CLAY SILT 0003 GREY CLAY SILT 0012 ROCK 0013
7141993	2009-05-20	0.00	0.00	0.00	TH					BRWN CLAY SILT 0003 GREY CLAY SILT 0012 ROCK 0013
7146536	2010-05-01	13.70	0.00	2.20	DO	FR 0030			7/38/4/1:	BRWN LOAM STNS 0002 GREY LMSN 0045
7146537	2010-05-01	0.00	0.00	0.00	DO					
7153957	2010-10-20	3.00	0.00	0.00	MT		0005 5	1.5		BRWN SAND GRVL DNSE 0003 BLCK LOOS 0004 RED CLAY SILT LOOS 0010
7153958	2010-10-20	5.50	0.00	0.00	MT		0008 10	1.5		BRWN GRVL SAND DNSE 0003 BLCK SAND LOOS 0004 RED CLAY SILT LOOS 0018
7153959	2010-10-20	4.60	0.00	0.00	MT		0005 10	1.5		BRWN GRVL SAND DNSE 0003 BLCK SAND LOOS 0004 RED CLAY SILT LOOS 0015
7153960	2010-10-20	3.00	0.00	0.00	MT		0005 5	1.5		BRWN GRVL SAND DNSE 0003 BLCK SAND LOOS 0004 RED CLAY SILT LOOS 0010
7159645	2011-01-31	0.00	0.00	0.00						
7161328	2011-03-18	3.30	0.00	0.00	MT		0003 8	1.36		BRWN LOAM SAND SOFT 0002 GREY ROCK HARD 0011
7161805	2011-01-25	0.00	0.00	0.00						
7164728	2011-05-28	0.00	0.00	0.00						
7165599	2011-06-14	0.00	0.00	0.00	OT	0008				
7173376	2011-11-15	18.00	0.00	3.50	DO	SU		6	11//10/11:	BRWN SAND 0007 GREY LMSN 0059
7173377		0.00	0.00	0.00		SU			//2/1:0	
7175527	2012-01-12	0.00	0.00	0.00	OT					
7175528	2012-01-12	12.80	0.00	2.40	DO	FR 0038		8	8/20/12/1:	BRWN SAND 0008 GREY LMSN ROCK 0042
7180676	2012-03-06	7.60	0.00	0.00	MT		0015 10	1.59		GREY GRVL FILL STNS 0004 BRWN CLAY SOFT 0012 GREY SHLE SOFT FCRD 0018 BLCK SHLE SOFT FCRD 0025
7180677	2012-03-06	7.60	0.00	0.00	MT		0015 10	1.59		GREY GRVL FILL STNS 0004 BRWN CLAY SOFT 0012 GREY SHLE SOFT FCRD 0018 BLCK SHLE SOFT FCRD 0025
7180678	2012-03-06	7.60	0.00	0.00	MT		0015 10	1.59		GREY GRVL FILL STNS 0004 BRWN CLAY SOFT 0012 GREY SHLE SOFT FCRD 0018 GREY SHLE SOFT FCRD 0025
7184673	2012-07-04	0.00	0.00	7.60	OT				25///1:	
7185577	2012-05-12	6.70	0.00	0.00	MO		0005 17	1.79		GREY ROCK STNS FCRD 0003 GREY LMSN HARD 0022
7185636	2012-07-15	18.90	0.00	3.00	DO	SU 0056			10/37/4/1:	BRWN LOAM 0002 BRWN CLAY GRVL 0023 GREY LMSN 0062
7185637	2012-07-20	0.00	0.00	0.00	DO					
7188654	2012-01-19	0.00	0.00	0.00						

7196455	2012-12-14	4.60	0.00	0.00	MO		0005 10	1.12		BRWN LMSN CLAY FILL 0005 GREY LMSN ROCK 0015
7202691	2013-05-27	13.40	0.00	3.40	DO	FR 0042			11/14/18/3:30	BRWN SAND PCKD 0006 BLCK MUCK CLAY PCKD 0008 BRWN CLAY PCKD 0013 GREY LMSN LYRD 0044
7206946	2013-06-19	9.10	0.00	0.00	MO		0020 10	2		GREY CLAY CLAY 0030
7211607	2013-02-22	6.10	0.00	0.00	MO		0010 10	1.79		BRWN FILL LOOS 0001 BRWN CLAY 0020
7222108	2014-05-13	9.10	0.00	2.60	DO	FR 0028		6.11	9/10/21/4:30	BLCK MUCK FSND PCKD 0005 BRWN CLAY FSND PCKD 0008 GREY LMSN LYRD 0030
7225195	2014-07-11	6.40	0.00	2.10	DO	FR 0010			7/7/28/5:	BLCK LOAM LOOS 0001 BRWN CLAY PCKD 0006 GREY LMSN LYRD 0021
7232290	2014-09-03	9.10	0.00	0.00	MO		0025 5	0.75		GREY LMSN GRVL GRVL 0001 BRWN CLAY STNS 0008 BRWN CLAY SILT SOFT 0030
7232367	2014-10-02	3.00	0.00	0.00	MO		0004 6	1.79		BRWN CLAY 0005 GREY CLAY DRY 0010
7239321	2014-04-21	5.80	0.00	0.00	MT		0010 10	2		BRWN LOAM 0001 GREY ---- 0015 BRWN PEAT 0019
7248425	2015-06-13	14.30	0.00	7.60	DO	UT 0045		6	25/45/10/1:	BRWN CLAY 0006 BRWN SAND 0027 BRWN SAND BLDR 0036 GREY LMSN 0047
7262474	2015-11-25	3.00	0.00	0.00	MO		0005 5	1.97		SAND FILL 0010
7265731	2016-06-14	18.90	0.00	3.40	DO	UT 0049		6	11/53/10/1:0	BRWN CLAY 0007 GREY LMSN 0062
7269706	2016-08-05	18.90	0.00	5.20	DO	FR 0018 FR 0054 FR 0061			17/55/15/4:	BRWN CLAY PCKD 0007 GREY LMSN LYRD 0062
7272871	2016-07-21	6.10	0.00	0.00	MO	UT	0013 7	2		BRWN CLAY SILT SOFT 0013 GREY LMSN 0020
7281304	2016-11-08	6.40	0.00	0.00	TH	UT 0018	0011 10	2		BRWN SILT CLAY SOFT 0006 GREY LMSN 0021
7281305	2016-11-08	11.20	0.00	0.00	TH	UT 0028	0027 12	2		BRWN CLAY SILT SOFT 0005 GREY LMSN 0037
7281306	2016-11-08	11.20	0.00	0.00	TH	UT 0028	0027 10	2		BRWN CLAY SILT LOOS 0002 GREY LMSN 0037
7281338	2016-11-08	10.60	0.00	0.00	TH	UT 0029	0020 15	2		BRWN CLAY SILT SOFT 0004 GREY LMSN 0035
7281339	2016-11-08	11.20	0.00	0.00	TH	UT 0028	0027 12	2		BRWN SAND CLAY SOFT 0004 GREY LMSN 0037
7301226	2017-01-03	0.00	0.00	0.00						
7306395	2018-01-26	0.00	0.00	0.00						
7319653	2018-07-27	0.00	0.00	0.00	OT					
7333353	2019-04-28	9.10	0.00	2.10	DO	0021			7/11/8/1:	BRWN LOAM 0002 BLCK CLAY GRVL 0012 GREY LMSN 0030
7335422	2019-03-04	4.90	0.00	0.00	MO		0011 5	2		BRWN FILL LOOS 0005 BRWN SAND FILL LOOS 0010 GREY SHLE HARD 0016
7337327	2019-06-26	0.00	0.00	0.00						
7339748	2019-06-14	6.10	0.00	0.00	MO		0010 10	2		BRWN CLAY SILT 0010 GREY CLAY SILT SOFT 0020
7339749	2019-06-13	6.10	0.00	0.00	MO		0010 10	2		BRWN CLAY SILT 0010 GREY CLAY SILT SOFT 0020
7339750	2019-06-14	6.10	0.00	0.00	MO		0010 10	2		BRWN CLAY SILT 0010 GREY CLAY SILT SOFT 0020
7339751	2019-06-17	3.80	0.00	0.00	MO		0003 10	2		BRWN CLAY SILT 0012
7340495	2019-02-20	6.10	0.00	0.00	MO		0010 10	1.97		FILL 0005 GREY CLAY DNSE 0010 GREY CLAY SOFT 0015 RED CLAY GRVL WBRG 0020
7340496	2019-02-20	6.10	0.00	0.00	MO		0010 10	1.97		FILL 0005 GREY CLAY DNSE 0010 GREY CLAY SOFT 0015 RED CLAY GRVL WBRG 0020
7340497	2019-02-20	6.10	0.00	0.00	MO		0010 10	1.97		FILL 0005 GREY CLAY DNSE 0010 GREY CLAY SOFT 0015 RED CLAY GRVL WBRG 0020
7341011	2019-07-11	0.00	0.00	0.00						
7346667	2019-10-12	18.30	0.00	7.30	DO	UT 0058			24/51/10/1:0	BRWN SAND ---- 0038 BLCK ROCK FCRD 0060
7346668	2019-10-12	0.00	0.00	0.00						

7355650	2020-03-02	4.60	0.00	0.00	TH		0005 10	2		BRWN LOAM 0001 BRWN GRVL STNS BLDR 0006 GREY SILT CLAY 0015
7355651	2020-03-05	8.20	0.00	0.00	TH		0010 17	2		GREY STNS CMTD 0017 BLCK LOAM 0018 BRWN CLAY 0024 GREY CLAY 0027
7355652	2020-03-05	5.20	0.00	0.00	TH		0007 10	2		BLCK LOAM 0001 BRWN CLAY 0005 GREY CLAY 0014 GREY CLAY SILT 0017
7355653	2020-03-02	5.20	0.00	0.00	TH		0007 10	2		BRWN SILT CLAY STNS 0004 BRWN CLAY 0006 GREY CLAY 0017
7368378	2020-07-21	0.00	0.00	0.00						
7368478	2020-09-01	25.60	0.00	0.00	MO		0055 29	2		BRWN SAND GRVL FILL 0012 GREY LMSN ROCK 0084
7368495	2020-08-27	10.70	0.00	0.00	MO		0025 10	2		BRWN SAND GRVL FILL 0007 GREY LMSN ROCK 0035
7371272	2020-08-06	0.00	0.00	0.00						
7377287	2021-01-05	0.00	0.00	0.00	MO			2		
7377288	2021-01-05	0.00	0.00	0.00	MO			2		
7377289	2021-01-05	0.00	0.00	0.00	MO			2		
7377290	2021-01-05	0.00	0.00	0.00	MO			2		
7377291	2021-01-05	0.00	0.00	0.00	NU MO			2		
7377292	2021-01-05	0.00	0.00	0.00	MO			2		
7377293	2021-01-05	0.00	0.00	0.00	MO			2		
7377294	2021-01-05	0.00	0.00	0.00	MO			2		
7388535	2021-04-20	6.10	0.00	0.00						
7388536	2021-04-20	6.10	0.00	0.00						
7388537	2021-04-20	6.10	0.00	0.00						
7388549	2021-04-20	6.10	0.00	0.00						
7388550	2021-04-20	6.10	0.00	0.00						
7388551	2021-04-20	6.10	0.00	0.00						
7388552	2021-04-20	6.70	0.00	0.00						

Note:

CASING DIA: Casing diameter in inches

PUMP TEST: Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour:Minutes

SCREEN: Screen Depth and Length in feet

Abbreviation:

DO	Domestic	FR	Fresh	OT	Other
ST	Livestock	SA	Salty	TH	Test Hole
IR	Irrigation	SU	Sulphur	DE	Dewatering
IN	Industrial	MN	Minerial	MO	Monitoring
CO	Commercial	UK	Not Stated	MT	Monitoring and Test Hole
MN	Municipal	GS	Gas		
PS	Public	IR	Iron		
AC	Cooling And AC	UT	Untested		
NU	Not Used	OT	Other		

A2. Regional Well Logs

PGMN ID: W0000289

Ontario — Ministry of the Environment

Measurements recorded in: ☑ Metric ☐ Imperial

Well T... (below) **A 077606**

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	NIAGARA PENINSULA CONSERVATION AUTHORITY		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
250 THOROLD ROAD WEST, 3RD FLOOR	WELLAND	ONTARIO	L3C 3W2	905 788 3135

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
HOLLOWAY BAY ROAD	FORT ERIE		

County/District/Municipality	City/Town/Village	Province	Postal Code
	NIAGARA	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	653833	4751561		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	TOPSOIL			0	0.1
RED-BROWN	SILTY CLAY			0.1	2.0
GREY-BROWN	LIMESTONE BEDROCK			2.0	4.9M

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	2.3M	BENTONITE	
2.3M	4.9M	SILICA SAND	

Method of Construction

☐ Cable Tool ☑ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☑ Other, specify AUGER

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PLASTIC	SCH 40	0	3.4M

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2"	PLASTIC	0.010	3.4	4.9M

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify	Hole Diameter Depth From	Depth To	Diameter (cm/in)
		0	2.0M	27cm
		2.0M	4.9M	10cm

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.

SEE ATTACHED

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
LANTECH DRILLING SERVICES INC.	6810

Business Address (Street Number/Name)	Municipality
3661 MOUNT ALBERT ROAD	SHARON

Province	Postal Code	Business E-mail Address
ONTARIO	L0G 1V0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905 478 2243	MIKE SOKOLOW

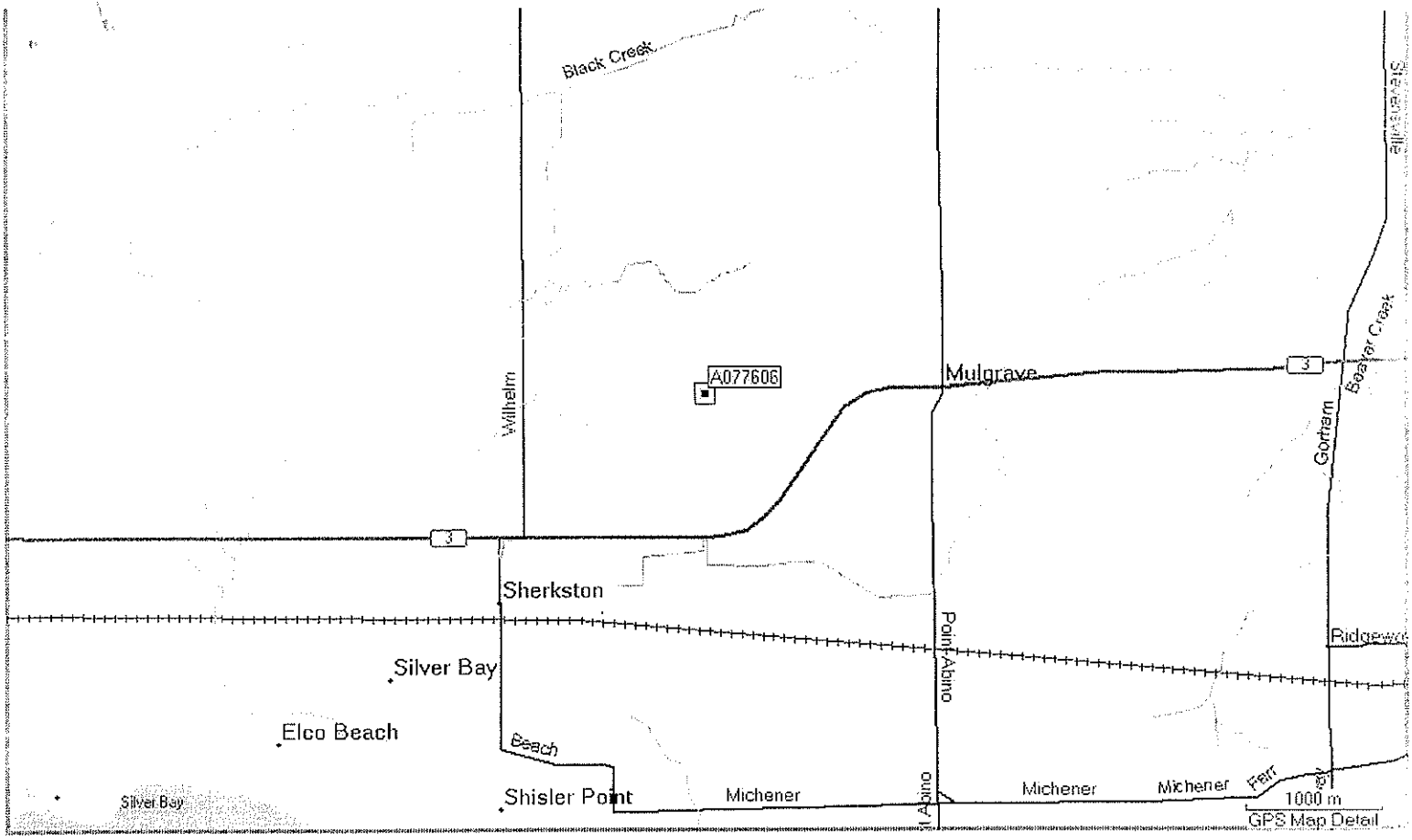
Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
2381		2009/10/09

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☑ No		2003/02/03

Ministry Use Only

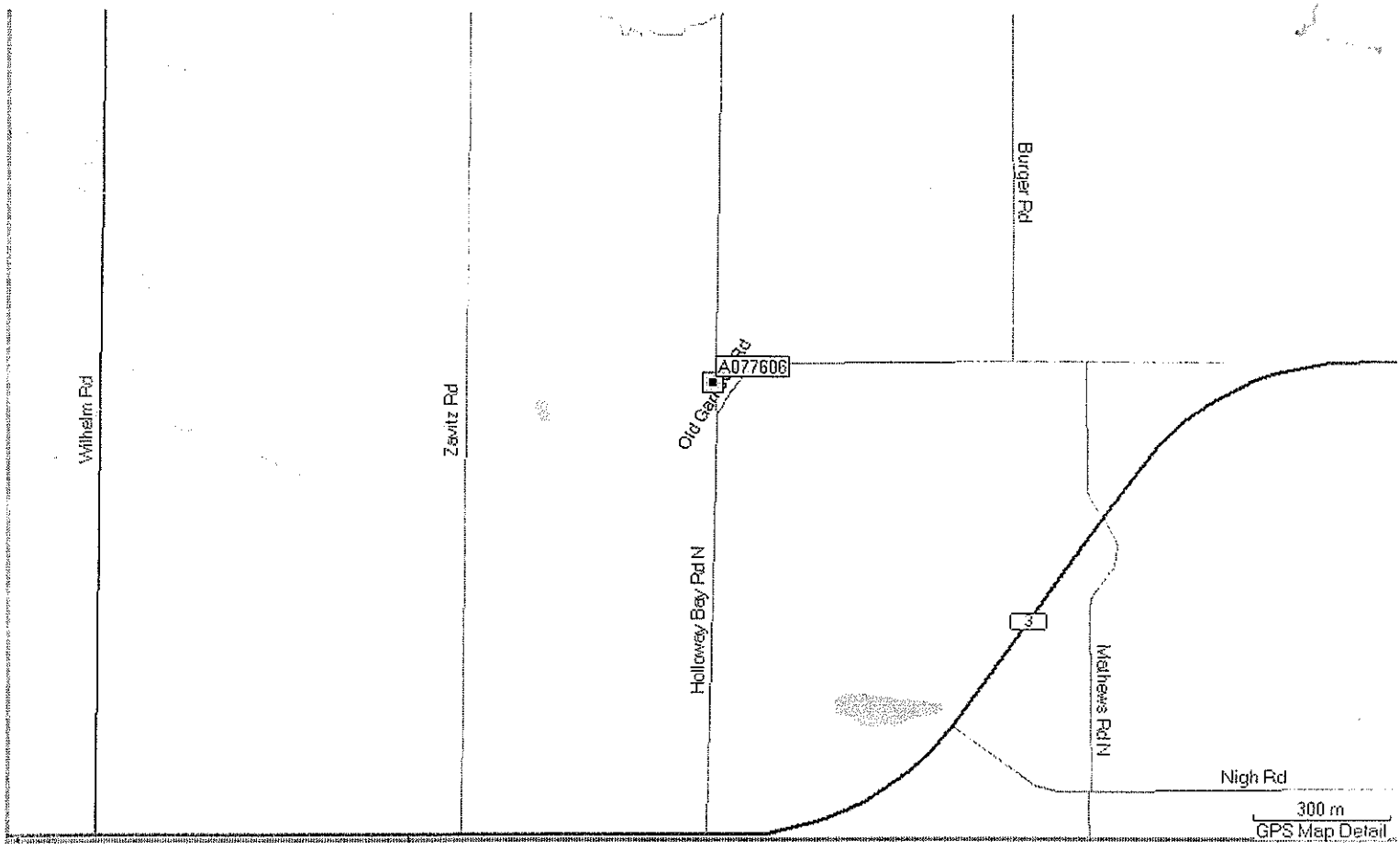
Audit No. Z 096715

Received MAR 01 2010



C-6809
2096715

MAR 0 1 2010



E-6809
2096715

MAR 0 1 2010

Buchner Well

13-0168-01 #

Ontario — Ministry of the Environment

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*: A165167

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	The Corporation of The City of Welland		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
60 East Main St.	Welland	ON	L3B3X4	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
BUCHNER RD.	Crowland		

County/District/Municipality	City/Town/Village	Province	Postal Code
Welland	WELLAND	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	645985	4760622		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	CLAY	SILT	SILTY CLAY	0	15'
RED/GREY	CLAY	SILT/SAND/STONE	DIAMICTON	15'	65'
RED/GREY	CLAY	SILT	CLAY & SILT LAYERS	65'	130'
GREY/RED	SAND	GRAVEL/CLAY	SAND + GRAVEL & CLAY	130'	131'
GREY	LIMESTONE		BEDROCK	131'	141'

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	128'	BENTONITE	

Method of Construction

☐ Cable Tool ☒ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☒ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify*

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☒ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify*

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2.5"	PVC	Sch 40	+3	131'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2.5"	PVC	10	131'	141'

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☒ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Water Details

Water found at Depth (m/ft)	Kind of Water	Gas	Other, specify
	☐ Fresh ☐ Untested	☐	
	☐ Fresh ☐ Untested	☐	
	☐ Fresh ☐ Untested	☐	

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	8	8"
8	141	5"

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify*

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping ____ hrs + ____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

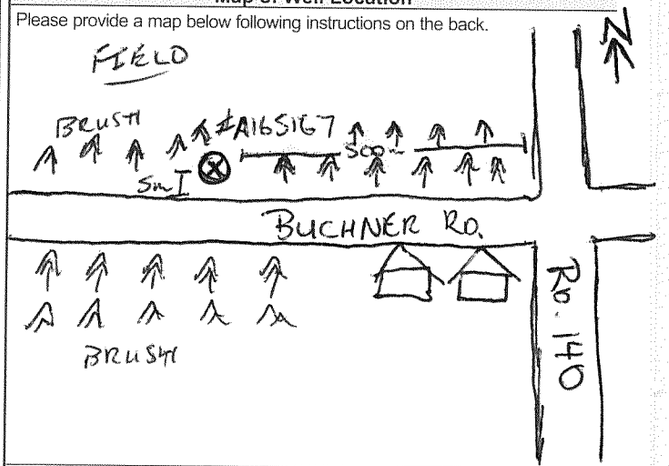
Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Aardvark Drilling Inc.	7238

Business Address (Street Number/Name)	Municipality
5-C Lewis Road	Guelph

Province	Postal Code	Business E-mail Address
ON	N1H1E9	www.aardvarkdrillinginc.com

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
1982693 40	LAVERS, CRAIG

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3559		2014 08 08

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2014 08 09

Ministry Use Only

Audit No Z188671

AUG 29 2014

Ministry's Copy

Well ID

Townline Well

Well ID Number: 7226391
Well Audit Number: *Z188670*
Well Tag Number: *A165164*

This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location	TOWNLINE ROAD
Township	WAINFLEET TOWNSHIP
Lot	
Concession	
County/District/Municipality	NIAGARA (WELLAND)
City/Town/Village	WELLAND
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 640191.00 Northing: 4756683.00
Municipal Plan and Sublot Number	
Other	

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To
GREY	CLAY	SILT	SILT	0 ft	25 ft
RED	CLAY	SILT	CLAY	25 ft	53 ft
RED	SAND	SILT	FSND	53 ft	95 ft
GREY	SAND	SILT	MSND	95 ft	100 ft
RED	SILT	SAND		100 ft	130 ft
GREY	LMSN			130 ft	139.42 ft

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant Used (Material and Type)	Volume Placed
0 ft	112 ft	BENTONITE	

Method of Construction & Well Use

Method of Construction	Well Use

Diamond

Monitoring

Status of Well

Observation Wells

Construction Record - Casing

Inside Diameter	Open Hole or material	Depth From	Depth To
2.5 inch	PLASTIC	3 ft	115 ft
2.5 inch	PLASTIC	130 ft	139.42 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
2.5 inch	PLASTIC	115 ft	130 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 7238

Results of Well Yield Testing

After test of well yield, water was
If pumping discontinued, give reason
Pump intake set at
Pumping Rate
Duration of Pumping
Final water level
If flowing give rate
Recommended pump depth
Recommended pump rate
Well Production
Disinfected?

Draw Down & Recovery

Draw Down Time(min)	Draw Down Water level	Recovery Time(min)	Recovery Water level
SWL			
1		1	

2	2
3	3
4	4
5	5
10	10
15	15
20	20
25	25
30	30
40	40
45	45
50	50
60	60

Water Details

Water Found at Depth Kind

Hole Diameter

Depth From	Depth To	Diameter
0 ft	8 ft	8 inch
8 ft	139.42 ft	5 inch

Audit Number: Z188670

Date Well Completed: July 29, 2014

Date Well Record Received by MOE: August 29, 2014

A2. Borehole and Well logs

Log of Borehole BH/MW-01

Project No. HAM-21000726-C0 Drawing No. 3

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

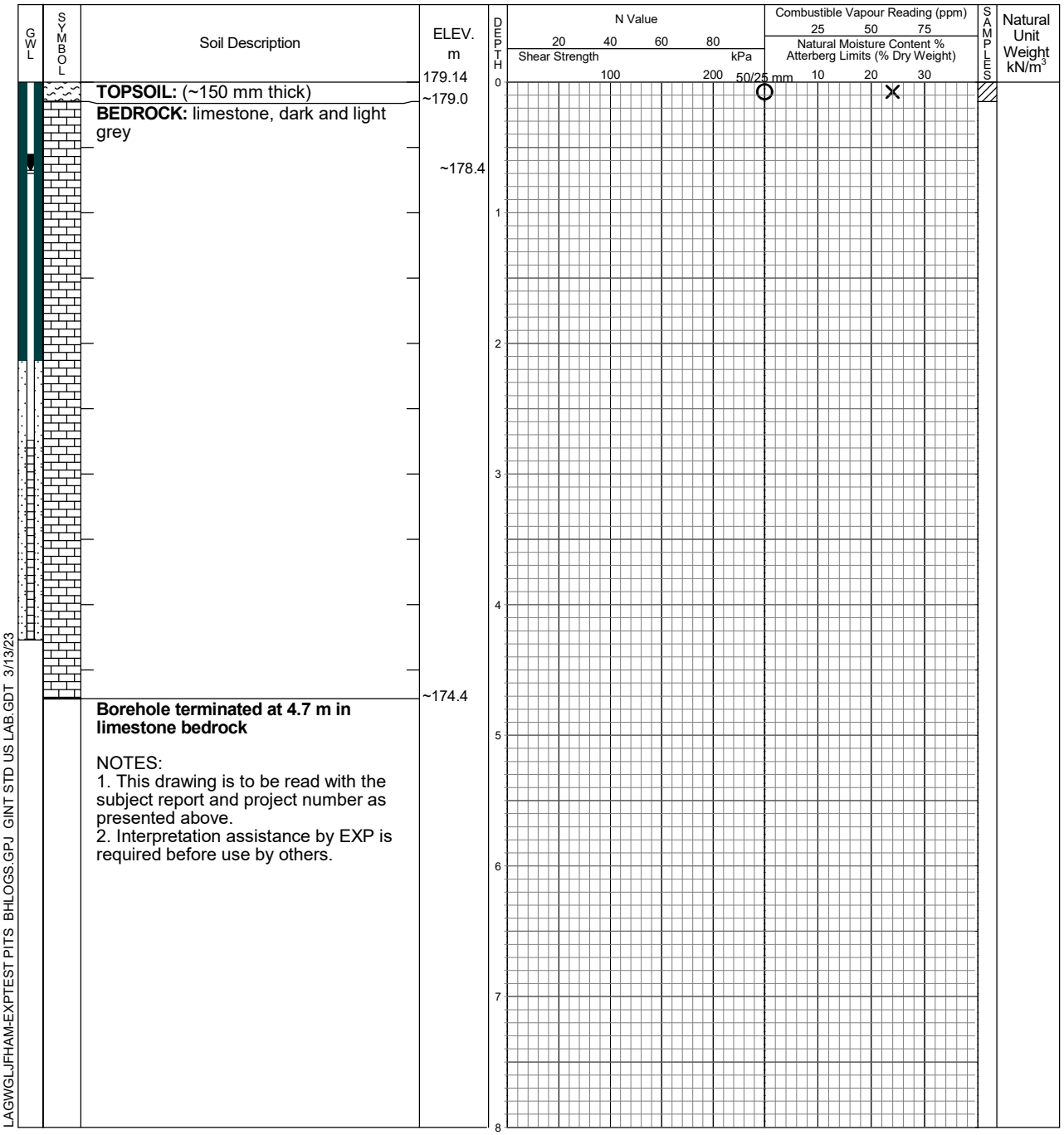
Date Drilled: June 3 to June 4, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	4.3
August 3, 2021	1.2	
August 30, 2021	1.2	
March 6, 2023	0.7	

Log of Borehole BH/MW-02

Project No. HAM-21000726-C0 | Drawing No. 4

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

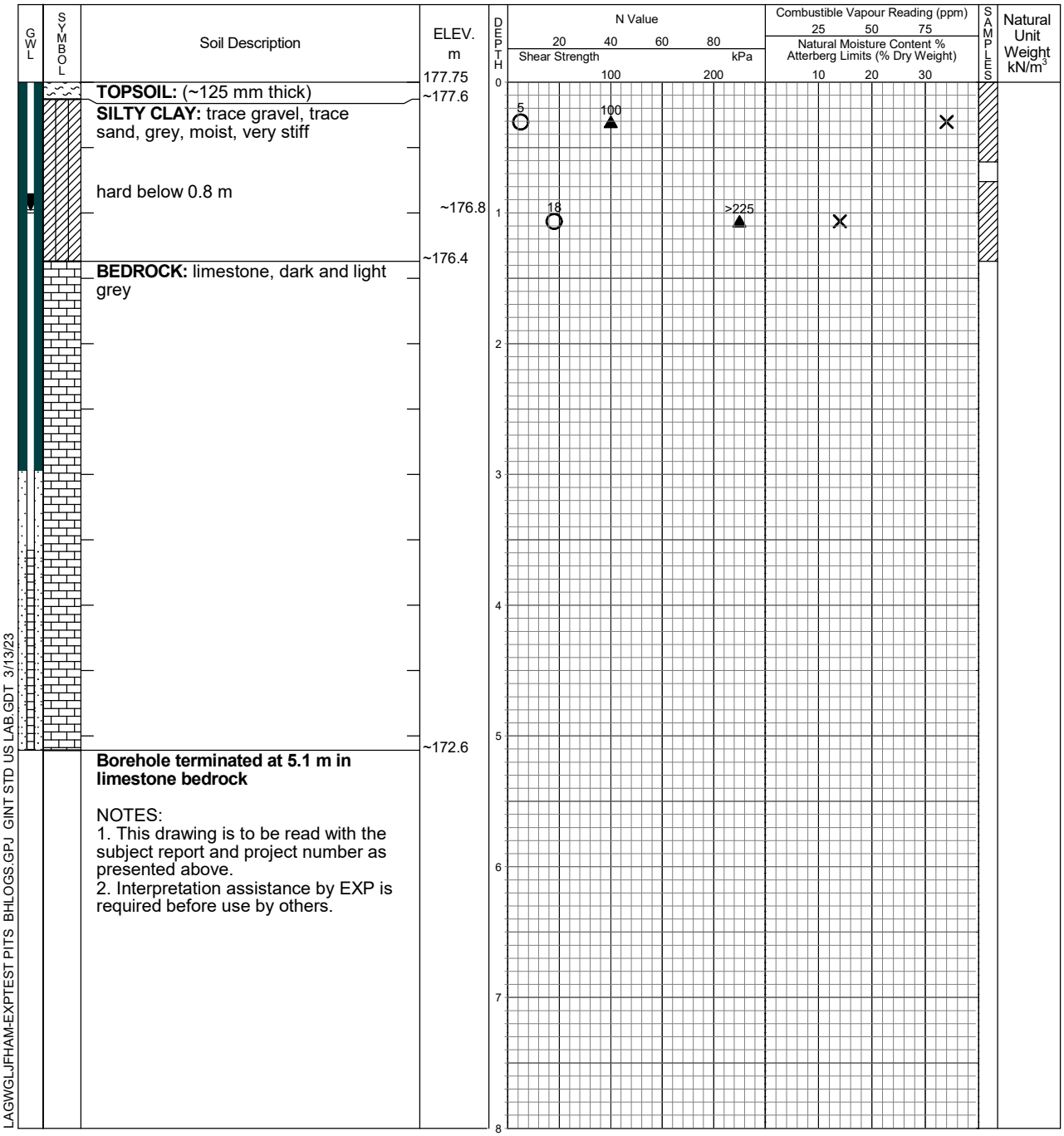
Date Drilled: June 3, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	5.1
August 3, 2021	1.0	
August 30, 2021	1.0	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH-03

Project No. HAM-21000726-C0 | Drawing No. 5

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

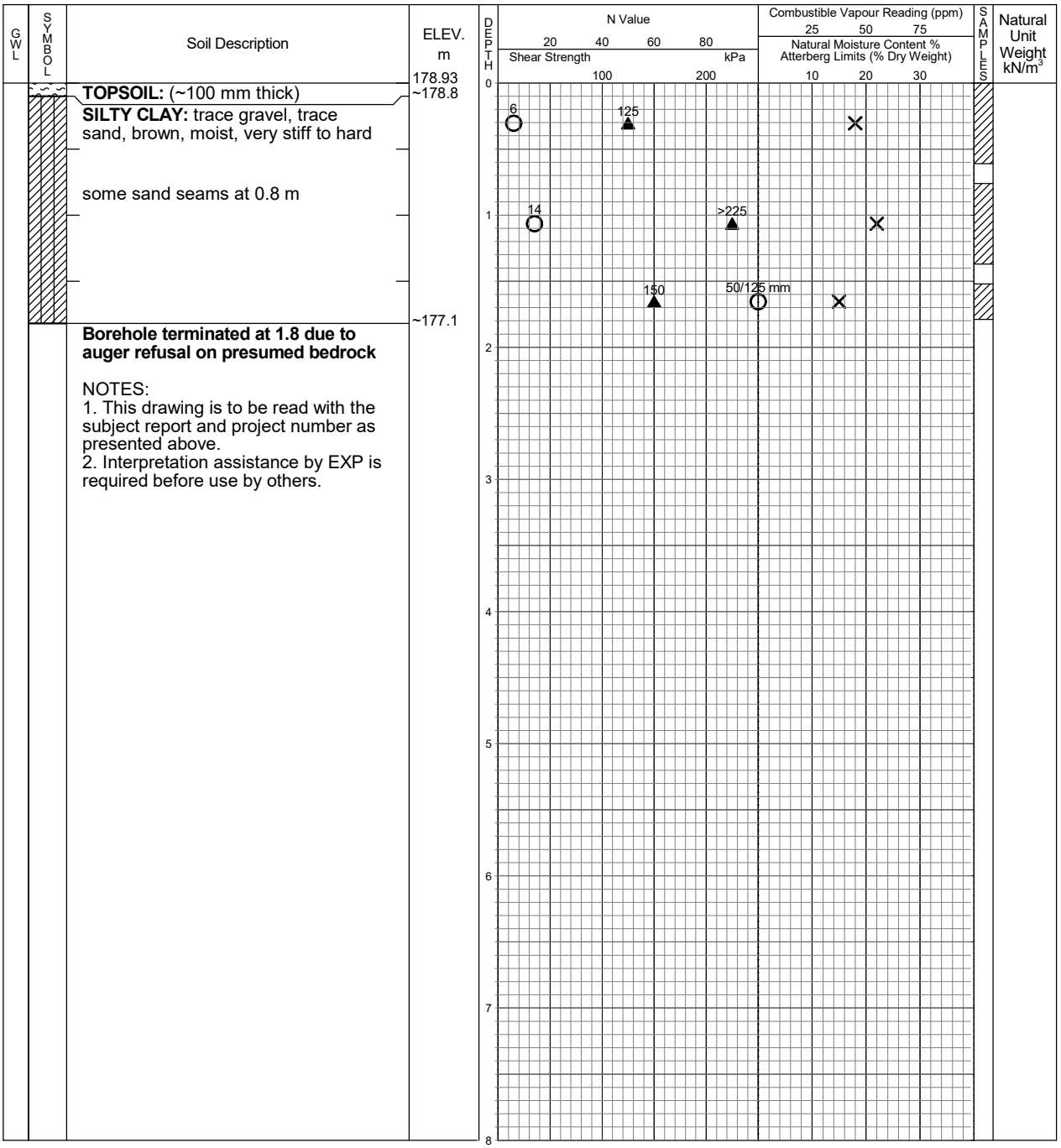
Date Drilled: June 3, 2021

Drill Type: D-70 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample | SPT (N) Value | Dynamic Cone Test | Shelby Tube | Field Vane Test (S)

Combustible Vapour Reading | Natural Moisture | Plastic and Liquid Limit | Undrained Triaxial at % Strain at Failure | Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	1.8

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-04

Project No. HAM-21000726-C0 | Drawing No. 6

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

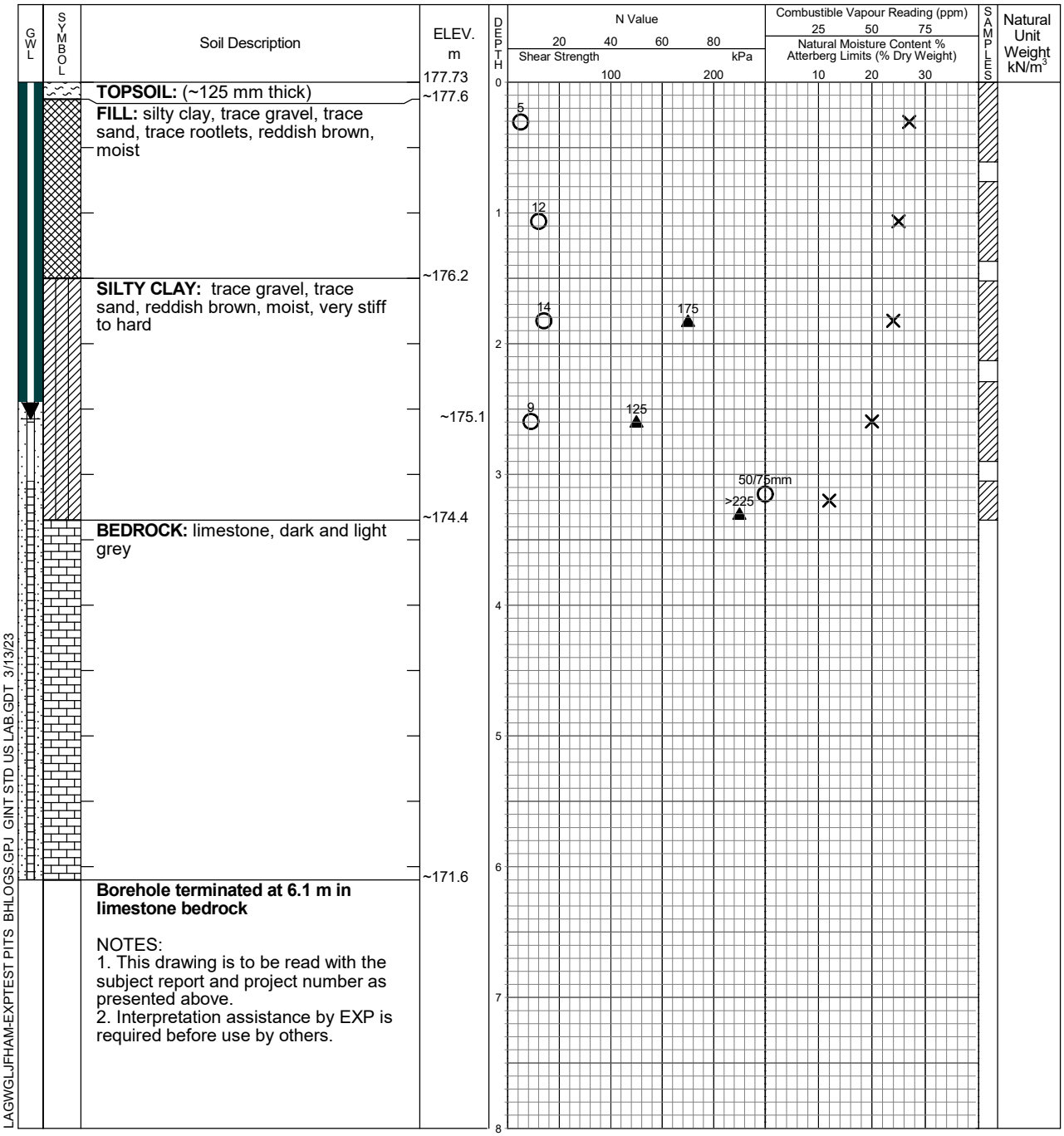
Date Drilled: June 1, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	6.1
August 3, 2021	0.8	
August 30, 2021	2.6	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-05

Project No. HAM-21000726-C0 | Drawing No. 7

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

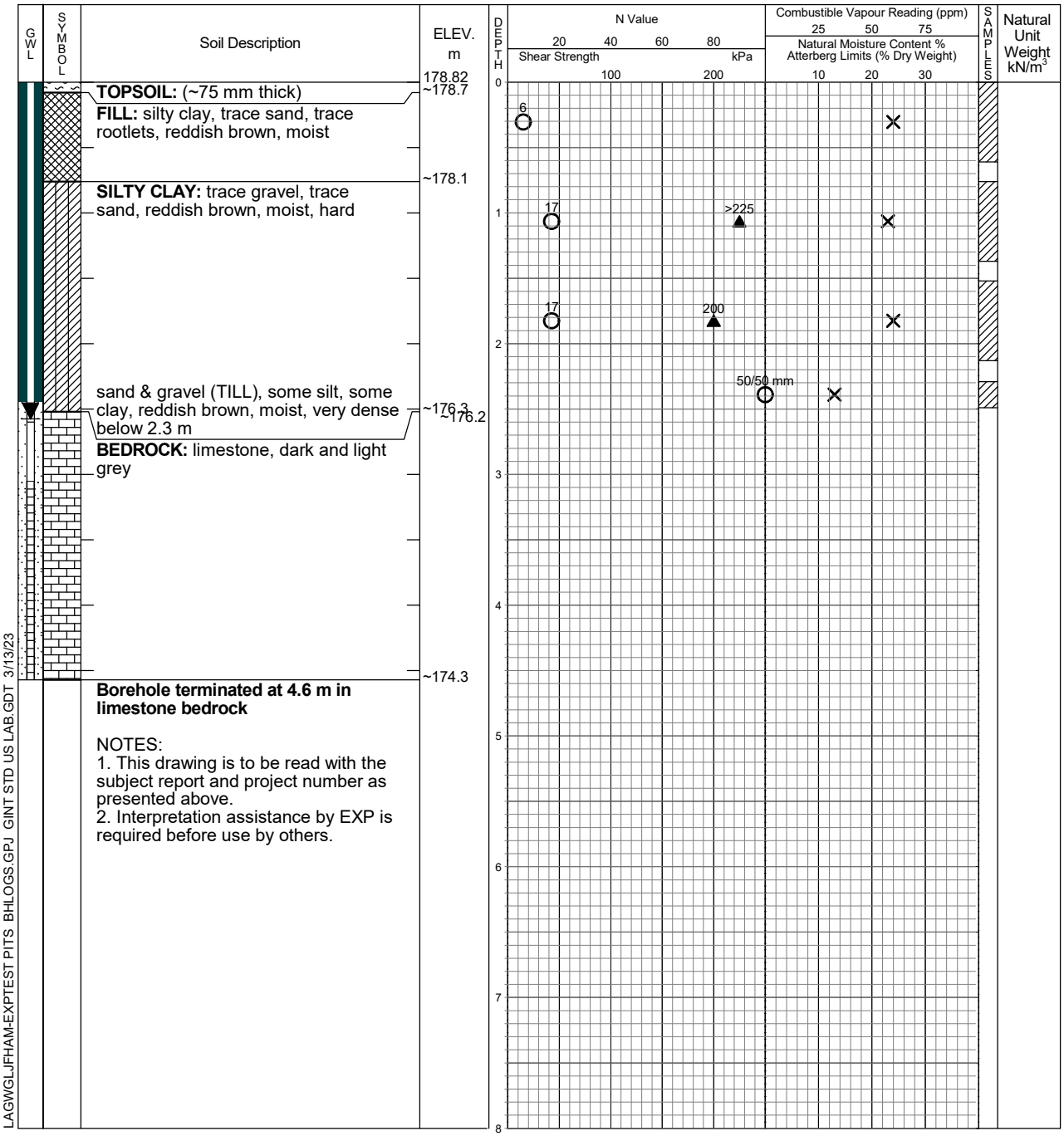
Date Drilled: June 2, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	4.6
August 3, 2021	1.9	
August 30, 2021	2.6	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-06

Project No. HAM-21000726-C0 | Drawing No. 8

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: June 2, 2021

Drill Type: D-70 Track Mount, Hollow Stem

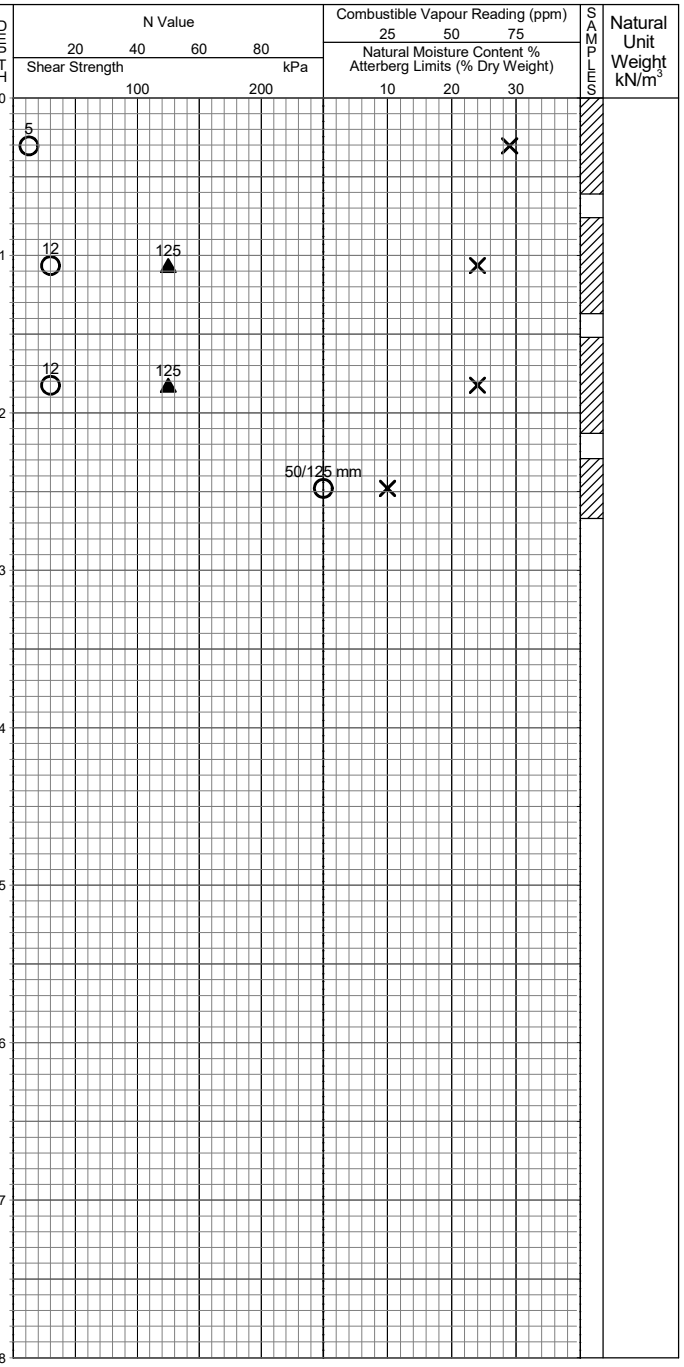
Datum: Geodetic

Auger Sample | SPT (N) Value | Dynamic Cone Test | Shelby Tube | Field Vane Test (S)

Combustible Vapour Reading | Natural Moisture | Plastic and Liquid Limit | Undrained Triaxial at % Strain at Failure | Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
			177.89
		TOPSOIL: (~125 mm thick)	~177.8
		FILL: silty clay, trace gravel, trace sand, trace rootlets, reddish brown, moist	~176.8
		SILTY CLAY: trace gravel, trace sand, trace rootlets, reddish brown, moist, very stiff	~176.2
		some sand and gravel below 2.2 m	~175.3
		BEDROCK: limestone, dark and light grey	~173.3
		Borehole terminated at 4.5 m in limestone bedrock	

NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.



Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	4.6
August 3, 2021	1.4	
August 30, 2021	1.7	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-07

Project No. HAM-21000726-C0 | Drawing No. 9

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

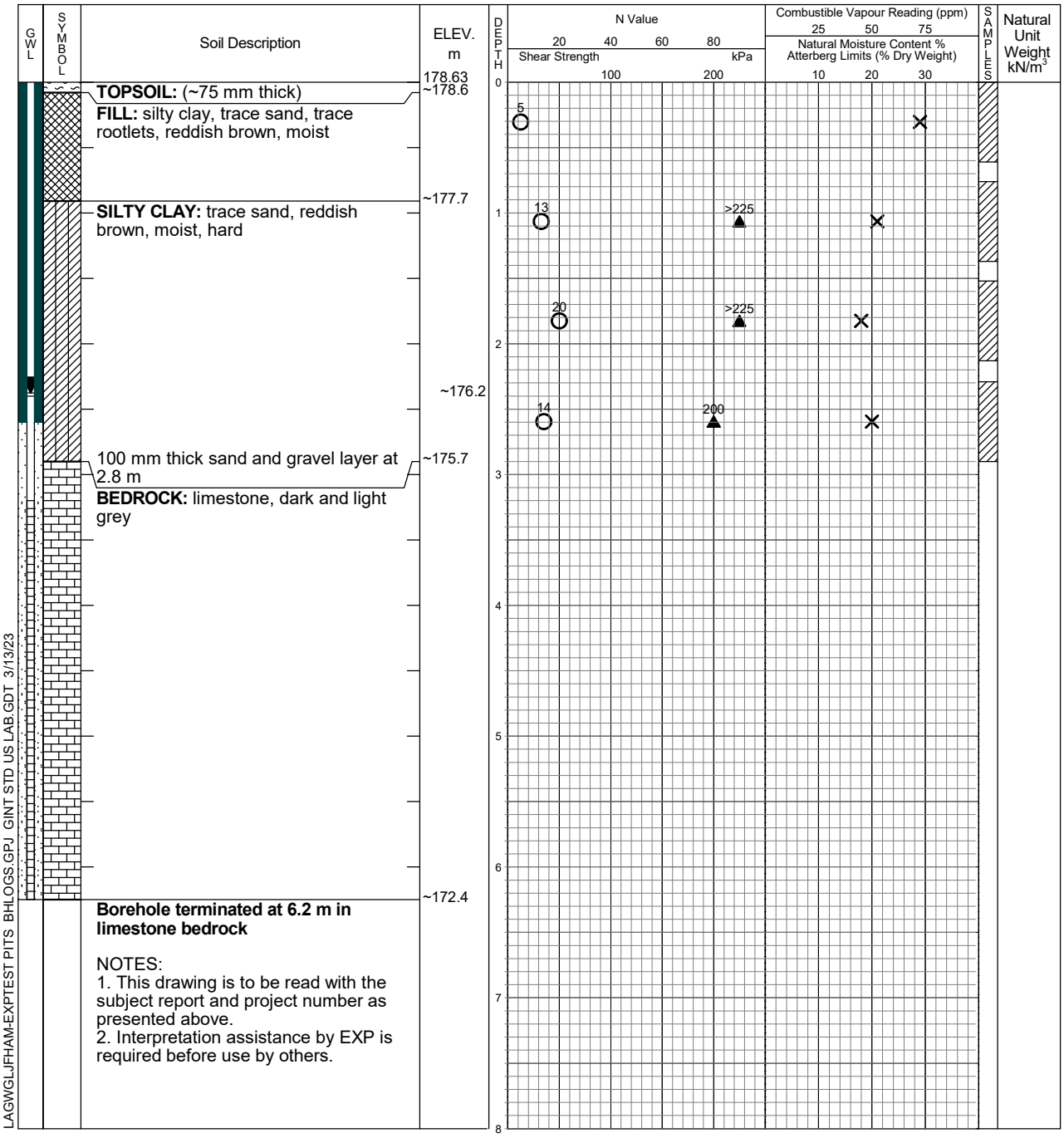
Date Drilled: June 2, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	6.2
August 3, 2021	2.0	
August 30, 2021	2.4	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH-08

Project No. HAM-21000726-C0 | Drawing No. 10

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

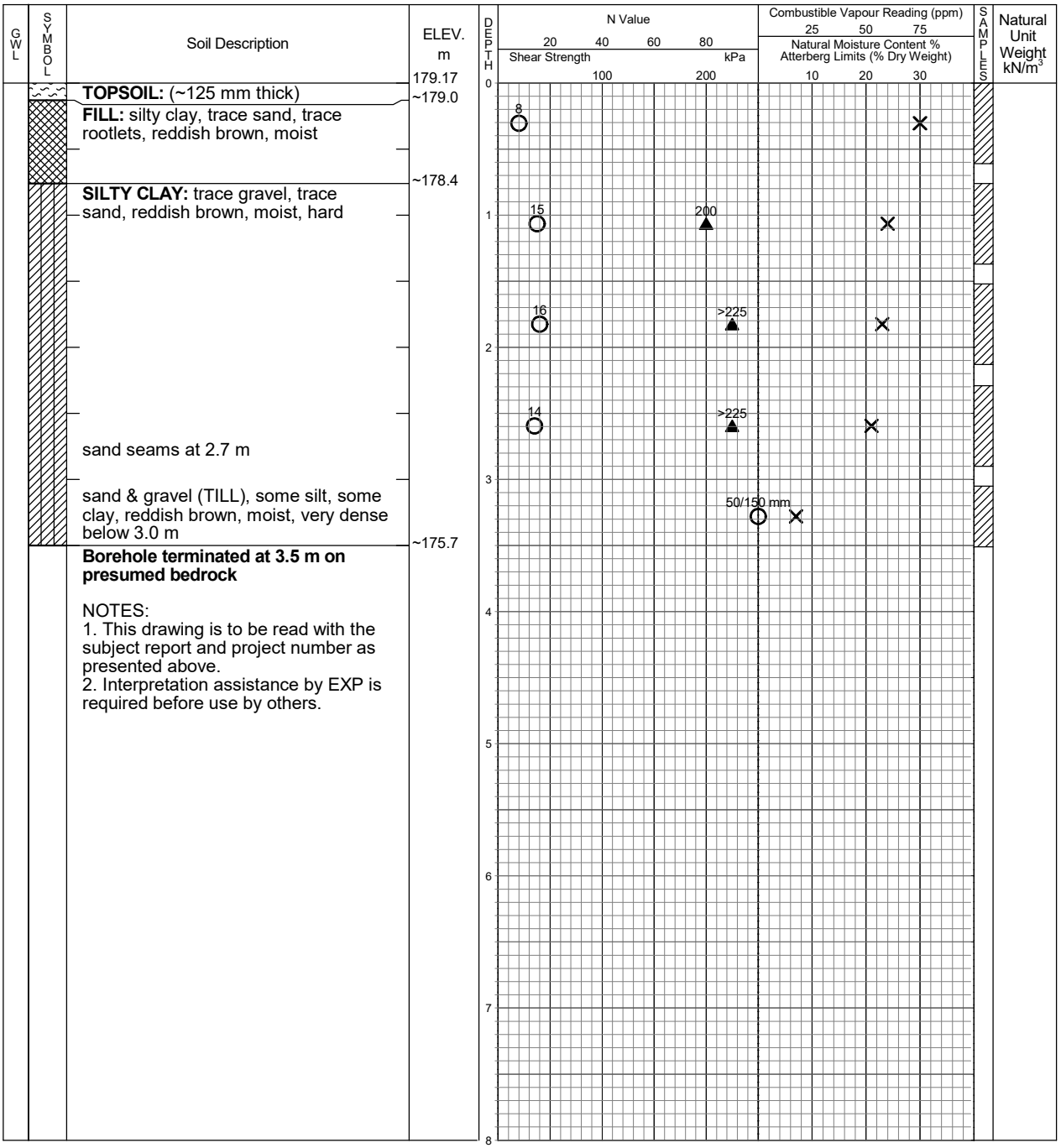
Date Drilled: June 1, 2021

Drill Type: D-70 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample | SPT (N) Value | Dynamic Cone Test | Shelby Tube | Field Vane Test (S)

Combustible Vapour Reading | Natural Moisture | Plastic and Liquid Limit | Undrained Triaxial at % Strain at Failure | Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	3.5

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-09

Project No. HAM-21000726-C0 Drawing No. 11

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

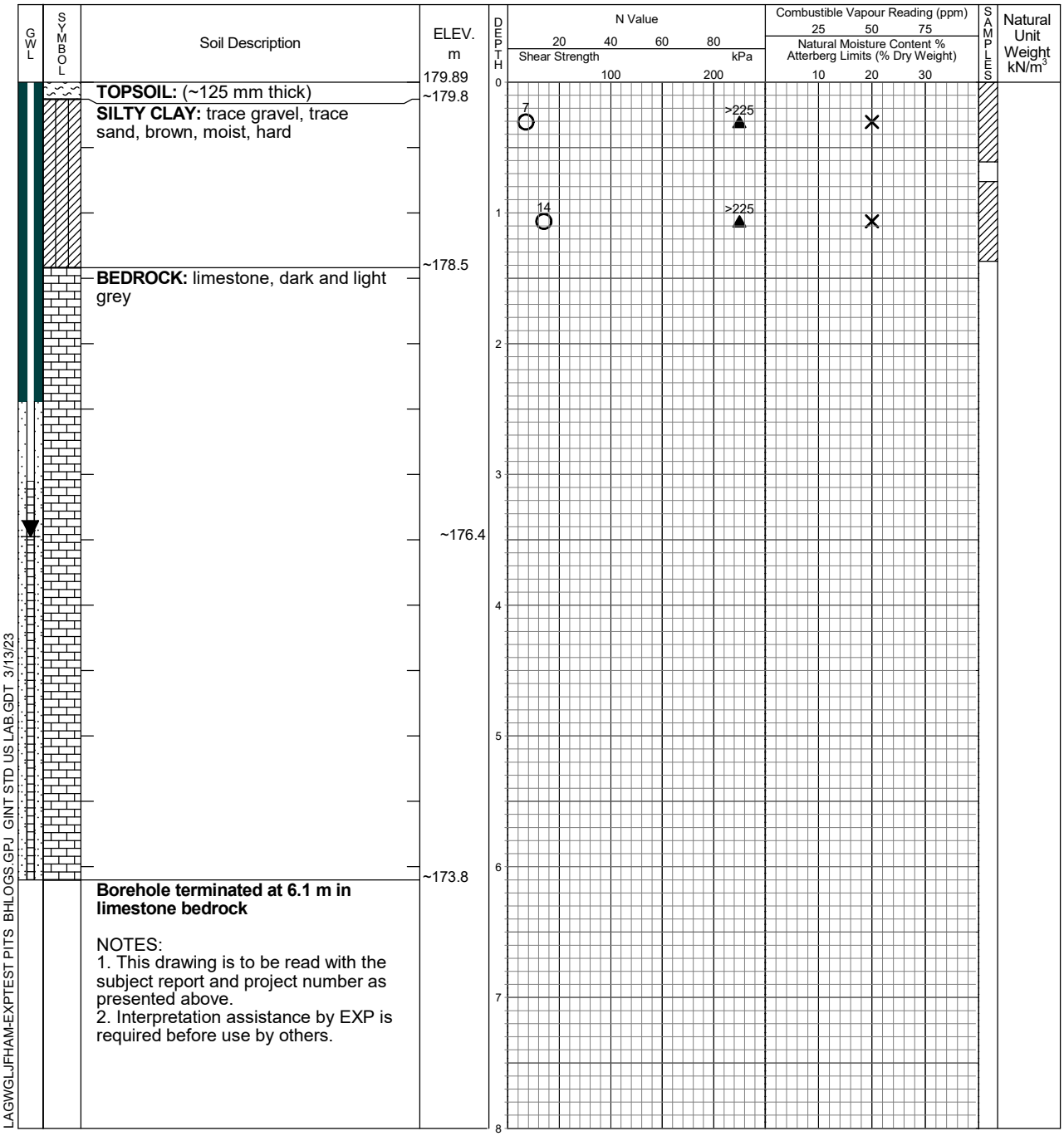
Date Drilled: June 7, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	6.1
August 3, 2021	3.5	
August 30, 2021	3.5	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH-10

Project No. HAM-21000726-C0 | Drawing No. 12

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: June 4, 2021

Drill Type: D-70 Track Mount, Solid Stem

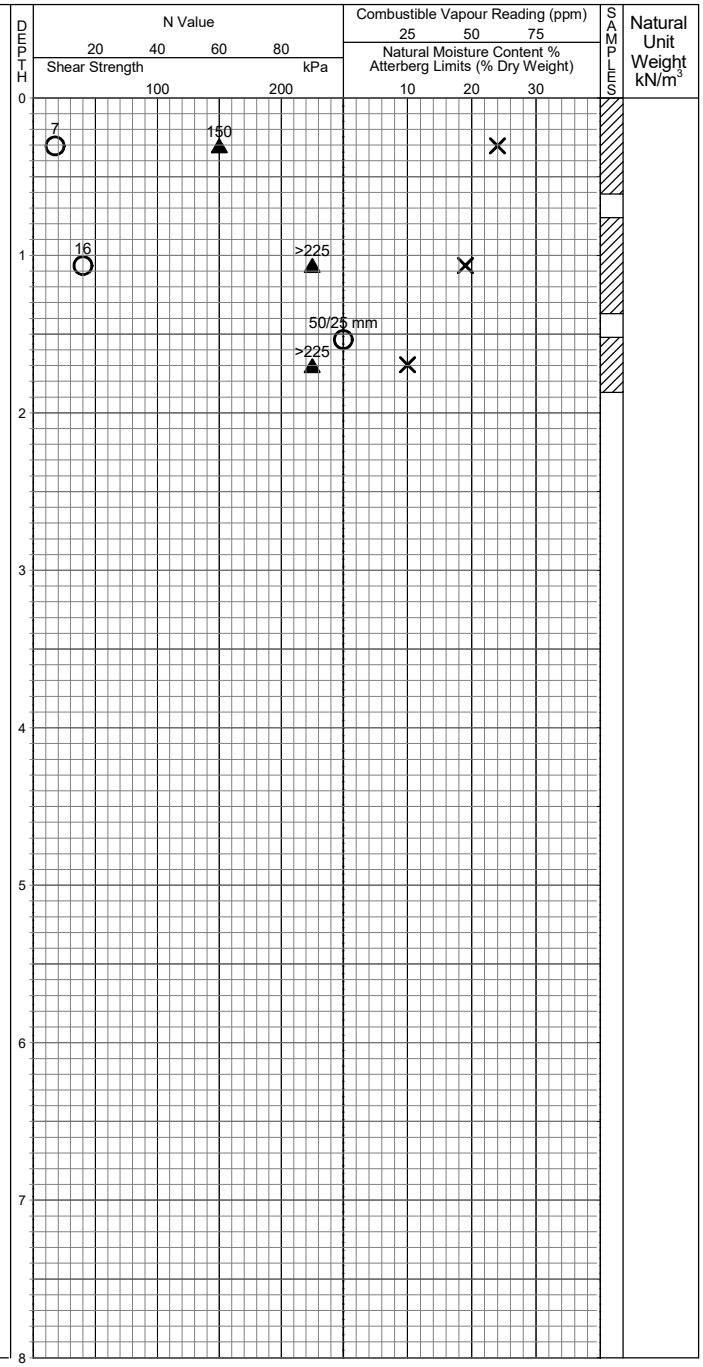
Datum: Geodetic

Auger Sample | SPT (N) Value | Dynamic Cone Test | Shelby Tube | Field Vane Test (S)

Combustible Vapour Reading | Natural Moisture | Plastic and Liquid Limit | Undrained Triaxial at % Strain at Failure | Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
			179.35
		TOPSOIL: (~75 mm thick)	~179.3
		SILTY CLAY: trace sand, brown, moist, very stiff	
		trace gravel, hard below 0.8 m	
			~177.5
		Borehole terminated at 1.9 m due to auger refusal on presumed bedrock	

NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.



Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	1.9

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-11

Project No. HAM-21000726-C0 | Drawing No. 13

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: May 31, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL: (~125 mm thick)	177.07	0
		FILL: silty clay, trace sand, trace rootlets, trace black organic stains, dark brown, moist	~176.9	
		SILTY CLAY: trace sand, brown, moist, hard	~176.3	1
		BEDROCK: limestone, slightly weathered to fresh, dark and light grey	~175.3	2
		RUN 1 (1.73 - 3.48 m): recovery 85%, RQD 55% (fair)	~175.2	3
		RUN 2 (3.48 - 5.12 m): recovery 97%, RQD 75% (good)		4
		Borehole terminated at 5.1 m in limestone bedrock	~171.9	5
		NOTES: 1. This drawing is to be read with the subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by others.		6
				7
				8

N Value: 20 40 60 80
Shear Strength kPa: 100 200
Combustible Vapour Reading (ppm): 25 50 75
Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30

7
12
>225
50/50 mm
>225

SAMPLES

Natural Unit Weight kN/m³

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	5.1
August 3, 2021	1.6	
August 30, 2021	1.9	

Log of Borehole BH-12

Project No. HAM-21000726-C0 | Drawing No. 14

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: May 31, 2021

Drill Type: D-70 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL: (~125 mm thick)	177.77 ~177.6	0
		FILL: silty clay, some sand, trace gravel, reddish brown, moist		
			~177.0	1
		SILTY CLAY: trace gravel, trace sand, reddish brown, moist, hard	~176.8	
		Borehole terminated at 1.0 m due to auger refusal on presumed bedrock		
		NOTES: 1. This drawing is to be read with the subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by others.		2 3 4 5 6 7 8

N Value (20 40 60 80)
Shear Strength (100 200 kPa)
Combustible Vapour Reading (ppm) (25 50 75)
Natural Moisture Content % Atterberg Limits (% Dry Weight) (10 20 30)
SAMPLES
Natural Unit Weight kN/m³

8
12
>225

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	1.1

Log of Borehole BH-13

Project No. HAM-21000726-C0 | Drawing No. 15

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: May 27, 2021

Drill Type: D-70 Track Mount, Solid Stem

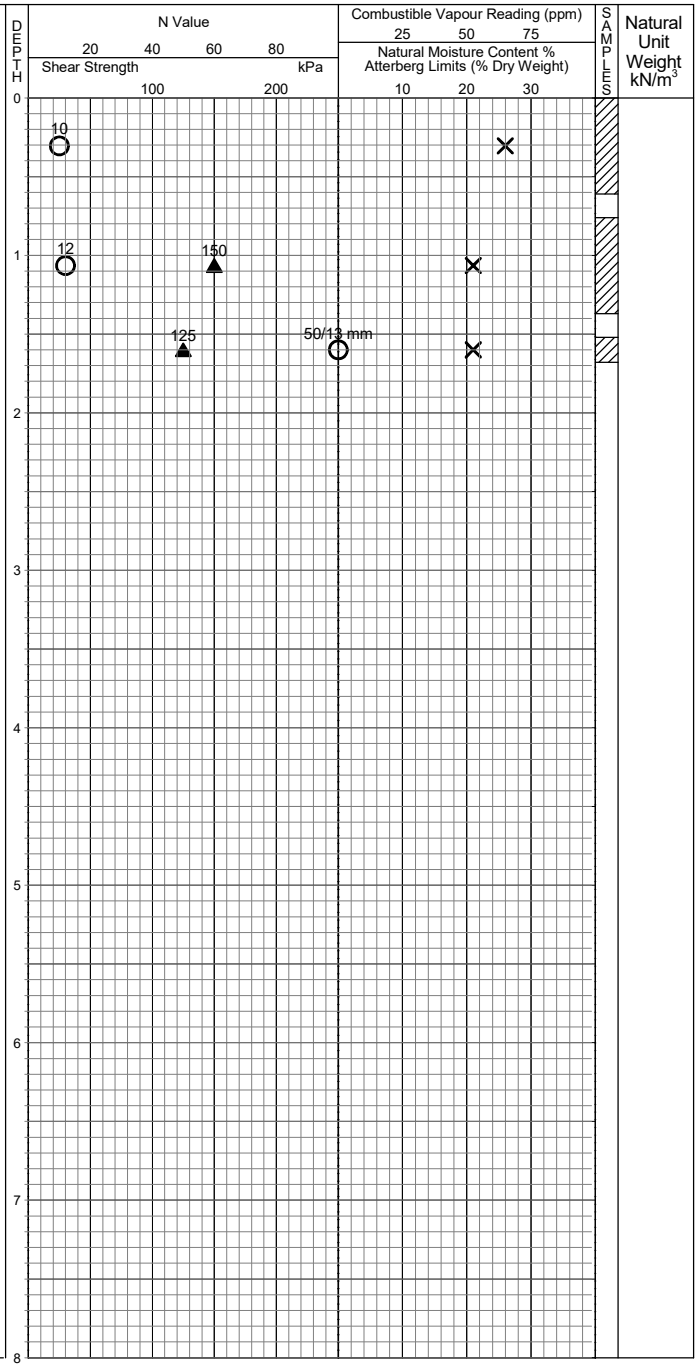
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
			178.42
		TOPSOIL: (~75 mm thick)	~178.3
		FILL: sand and gravel, some silt, trace clay, trace rootlets, grey, damp	~178.2
		FILL: silty clay, trace sand, brown, moist	~177.7
		SILTY CLAY: trace sand, reddish brown, moist, very stiff	
		some gravel below 1.5 m	~176.8
		Borehole terminated at 1.6 m due to auger refusal on presumed bedrock	

NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.



LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	1.7

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-14

Project No. HAM-21000726-C0 | Drawing No. 16

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: June 14, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL: (~100 mm thick)	178.82 ~178.7	0
		FILL: silty clay, some sand, trace rootlets, reddish brown, moist	~178.2	
		SILTY CLAY: trace sand, reddish brown, moist, very stiff	~178.1	1
		BEDROCK: limestone, dark and light grey	~177.6	
		Borehole terminated at 6.1 m in limestone bedrock	~172.7	6

NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

N Value: 20 40 60 80
Shear Strength kPa: 100 200
Combustible Vapour Reading (ppm): 25 50 75
Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30

12
125
50/50 mm

SAMPLES

Natural Unit Weight kN/m³

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	6.1
August 3, 2021	2.2	
August 30, 2021	2.3	
March 6, 2023	0.6	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-15

Project No. HAM-21000726-C0 | Drawing No. 17

Project: Geotechnical Investigation | Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

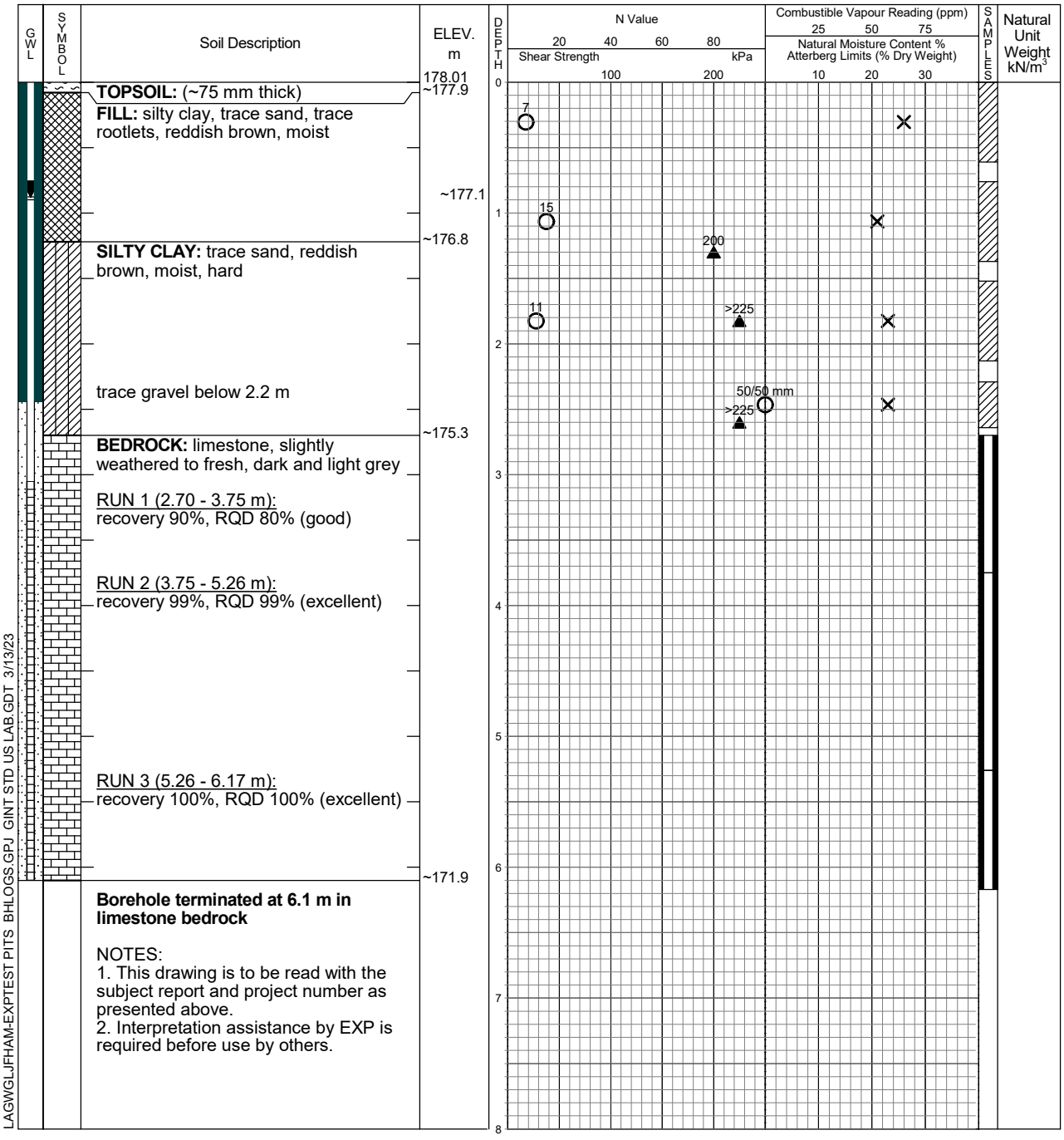
Date Drilled: May 27, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample | SPT (N) Value | Dynamic Cone Test | Shelby Tube | Field Vane Test (S)

Combustible Vapour Reading | Natural Moisture | Plastic and Liquid Limit | Undrained Triaxial at % Strain at Failure | Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	6.1
August 3, 2021	1.6	
August 30, 2021	2.6	
March 6, 2023	0.9	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-16

Project No. HAM-21000726-C0 Drawing No. 18

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

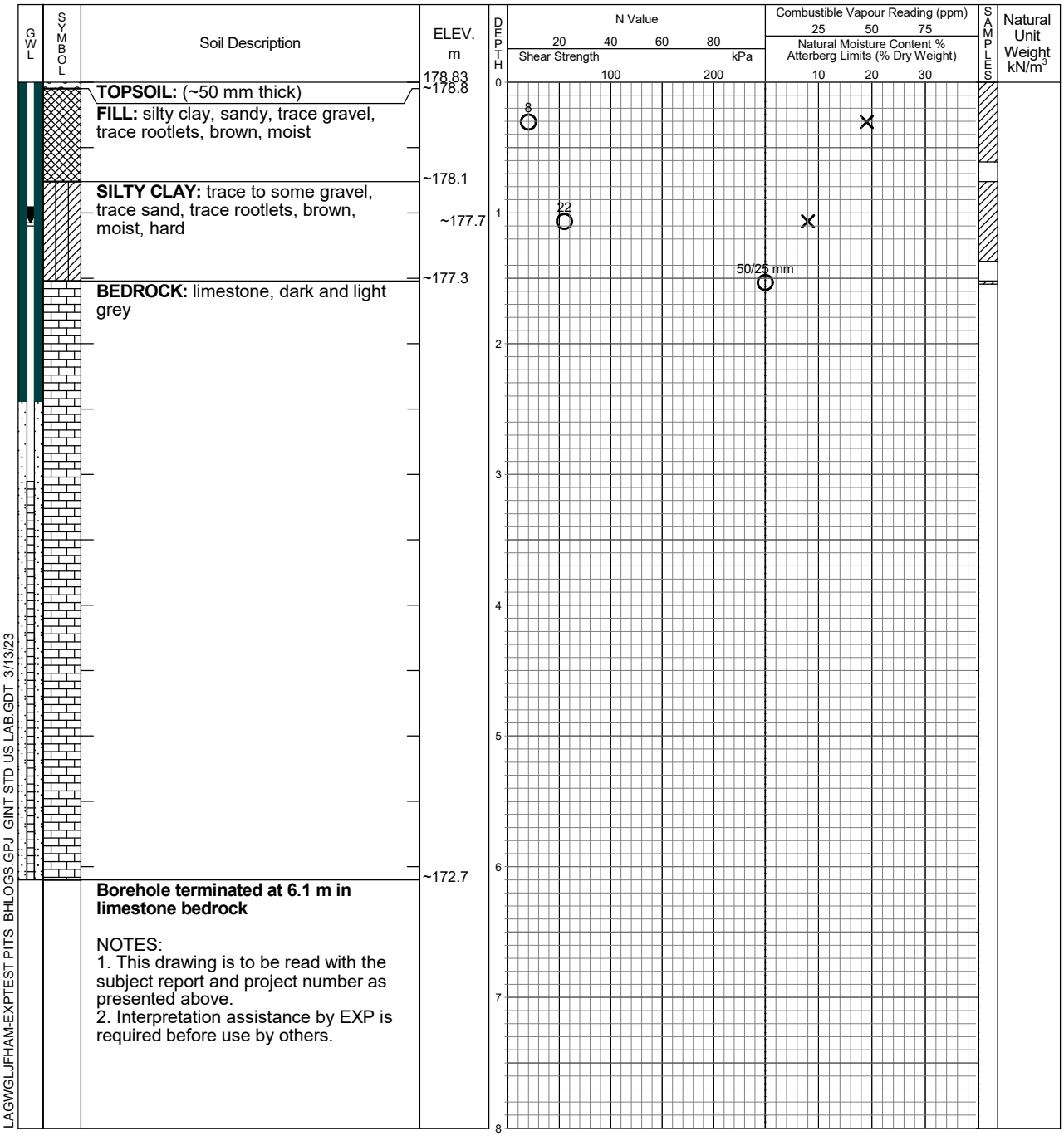
Date Drilled: May 27, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	4.87	6.1
August 3, 2021	2.1	
August 30, 2021	3.1	
March 6, 2023	1.1	

Log of Borehole BH-17

Project No. HAM-21000726-C0 Drawing No. 19

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: June 14, 2021

Drill Type: D-70 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		TOPSOIL: (~100 mm thick)	179.71	0
		FILL: silty clay, trace sand, trace rootlets, reddish brown, moist	~179.6	
			~178.5	1
		Borehole terminated at 1.2 m due to auger refusal on presumed bedrock		
		NOTES: 1. This drawing is to be read with the subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by others.		2
				3
				4
				5
				6
				7
				8

N Value: 20 40 60 80
Shear Strength: 100 200 kPa
Combustible Vapour Reading (ppm): 25 50 75
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30
SAMPLES
Natural Unit Weight kN/m³

10
50/75 mm

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	1.2

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-18

Project No. HAM-21000726-C0 Drawing No. 20

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

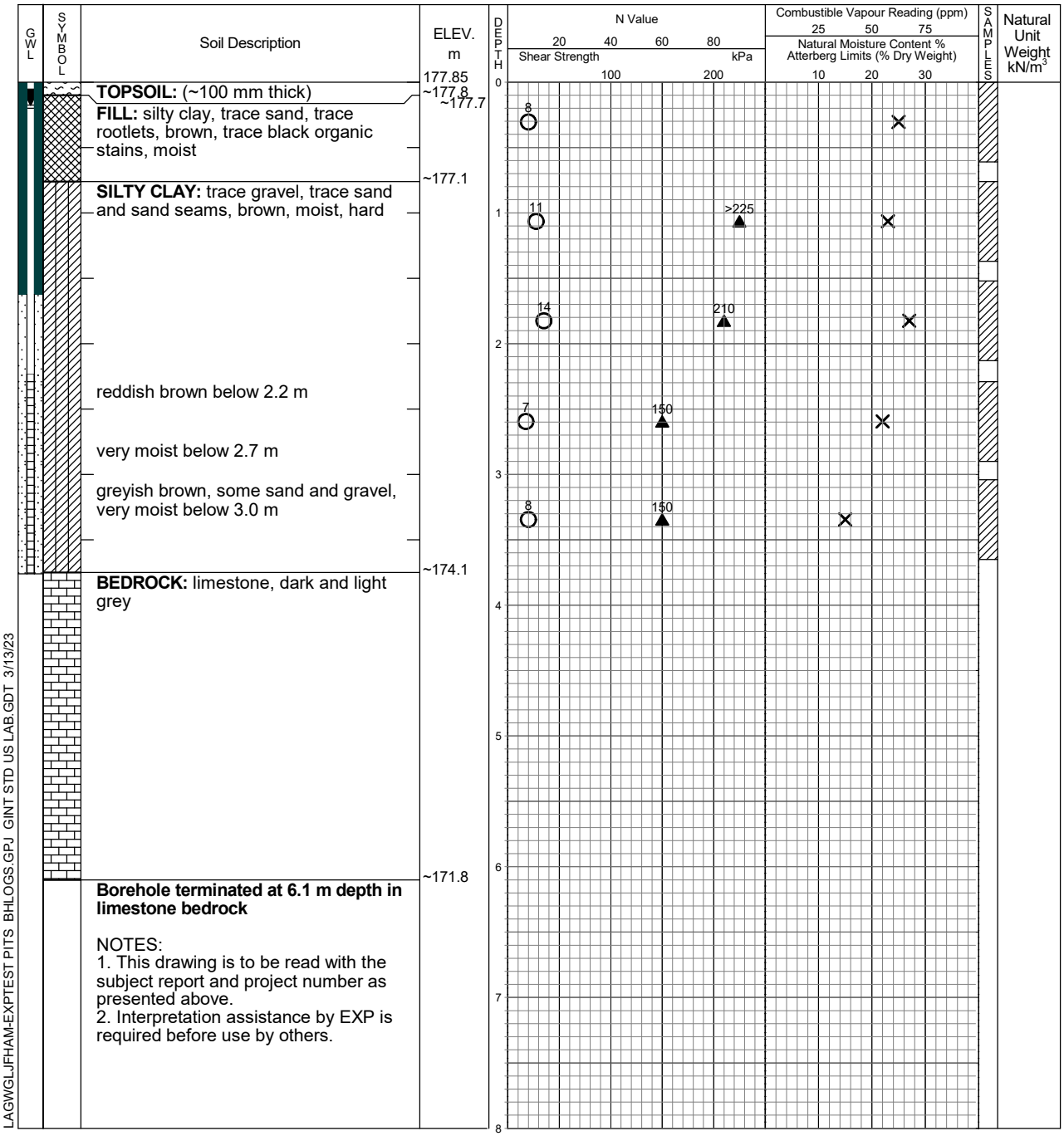
Date Drilled: May 31, 2021

Drill Type: D-70 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	3.8
August 3, 2021	1.5	
August 30, 2021	2.5	
March 6, 2023	0.2	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-19

Project No. HAM-21000726-C0 Drawing No. 21

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: June 7, 2021

Drill Type: D-70 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		TOPSOIL: (~60 mm thick)	180.55
			~180.4
		BEDROCK: limestone, dark and light grey	~180.3
			~177.5
		Borehole terminated at 3.0 m in limestone bedrock	

NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

DEPTH 0 1 2 3 4 5 6 7 8

N Value 20 40 60 80
Shear Strength kPa 100 200
50/50 mm

Combustible Vapour Reading (ppm) 25 50 75
Natural Moisture Content % Atterberg Limits (% Dry Weight) 10 20 30

SAMPLES

Natural Unit Weight kN/m³

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	2.6	3.1
August 3, 2021	0.4	
August 30, 2021	0.9	
March 6, 2023	0.3	

Log of Borehole BH/MW-20

Project No. HAM-21000726-C0 Drawing No. 22

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

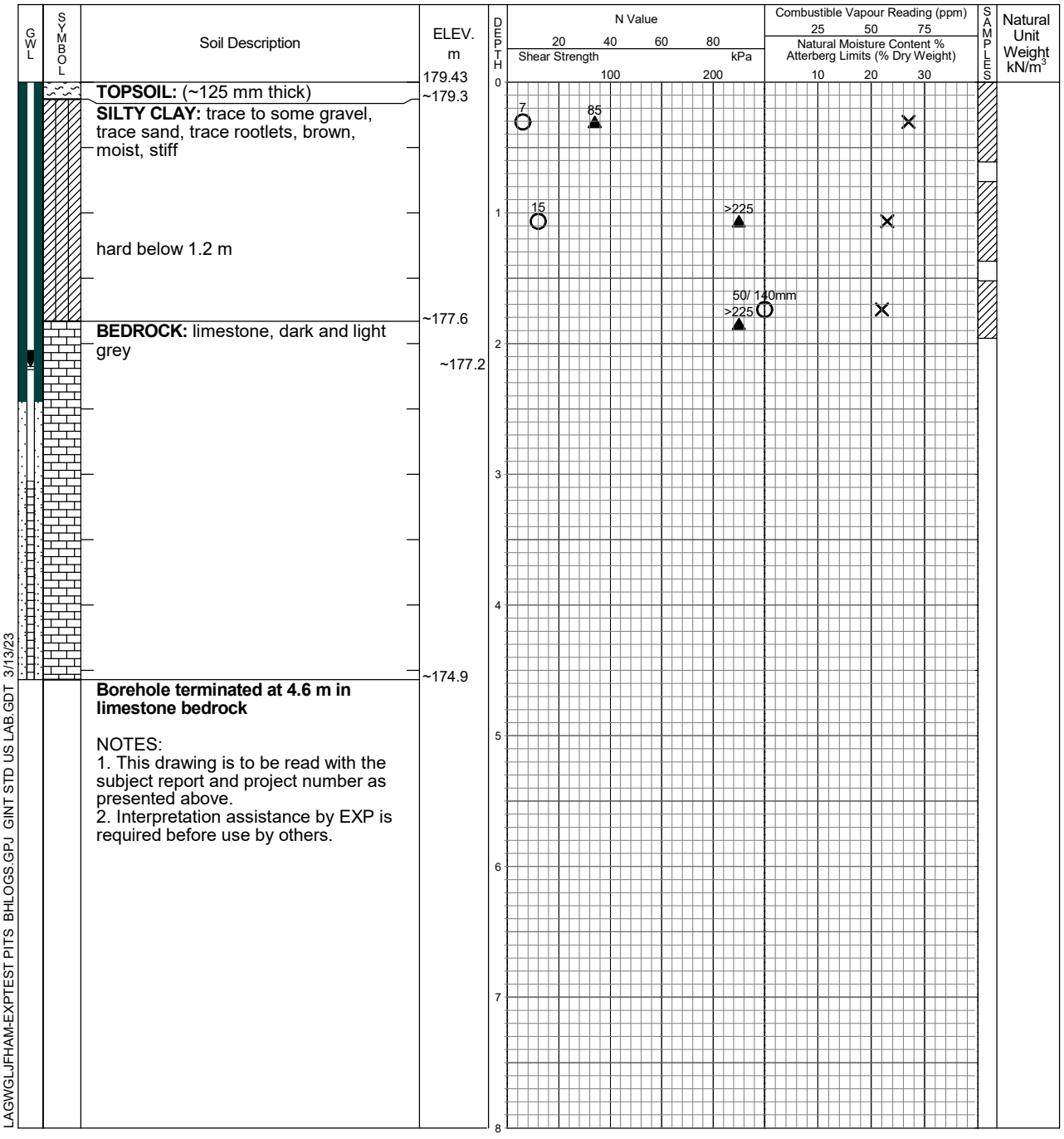
Date Drilled: June 7, 2021

Drill Type: D-70 Track Mount, Hollow Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

Time	Water Level (m)	Depth to Cave (m)
on completion	3.81	4.6
August 3, 2021	1.7	
August 30, 2021	2.2	

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Log of Borehole BH/MW-21

Project No. HAM-21000726-C0 Drawing No. 23

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

Date Drilled: February 16, 2023

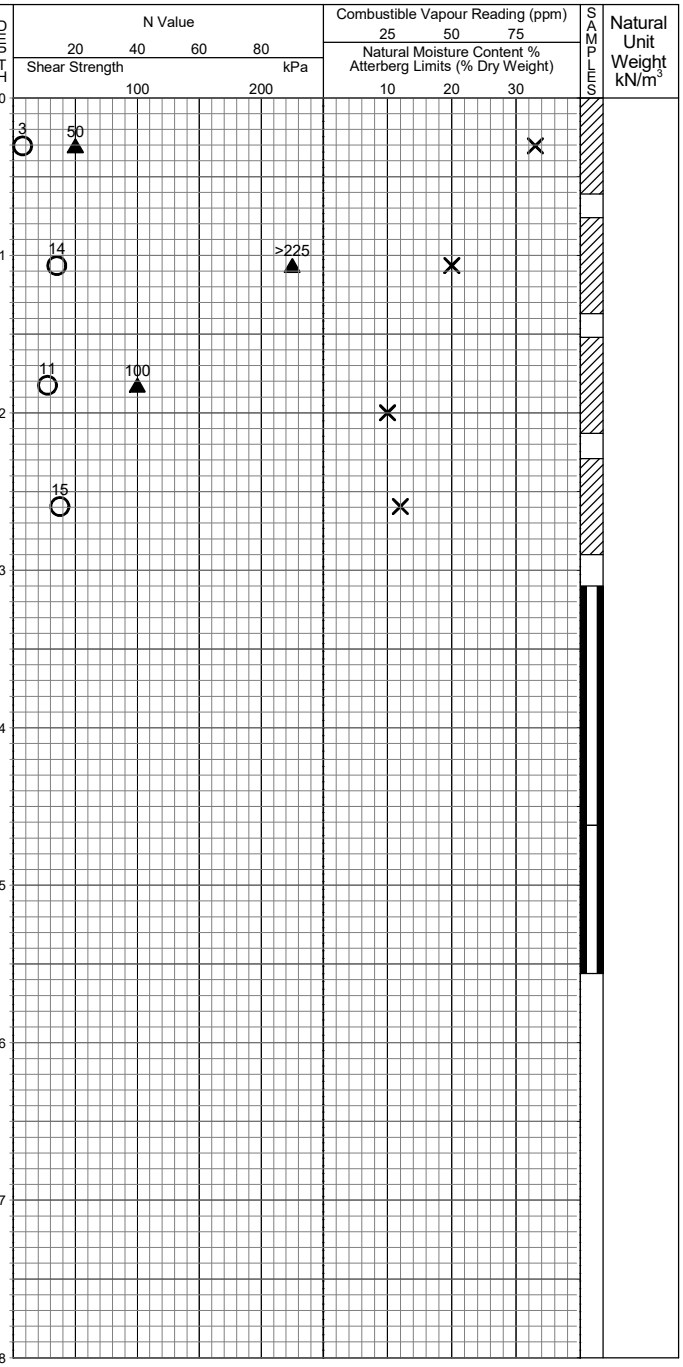
Drill Type: D-50 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
			178.74
		TOPSOIL: (~200 mm thick)	~178.5
		SILTY CLAY: trace gravel, trace sand, brown, very moist, stiff	~178.2
		moist, hard below 0.8 m	
		very stiff below 1.5 m	
		sandy silt (TILL), trace gravel, trace clay, brown, moist, compact below 2.0 m	~175.6
		BEDROCK: limestone, slightly weathered to fresh, dark and light grey	
		RUN 1 (3.10 - 4.62 m): recovery 100%, RQD 88% (good)	
		RUN 2 (4.62 - 5.56 m): recovery 100%, RQD 93% (excellent)	~173.2
		Borehole terminated at 5.6 m in limestone bedrock	
		NOTES: 1. This drawing is to be read with the subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by others.	



LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	5.6
March 6, 2023	0.5	

Log of Borehole BH/MW-22

Project No. HAM-21000726-C0 Drawing No. 24

Project: Geotechnical Investigation Sheet No. 1 of 1

Location: Killaly Street East, Port Colborne, ON

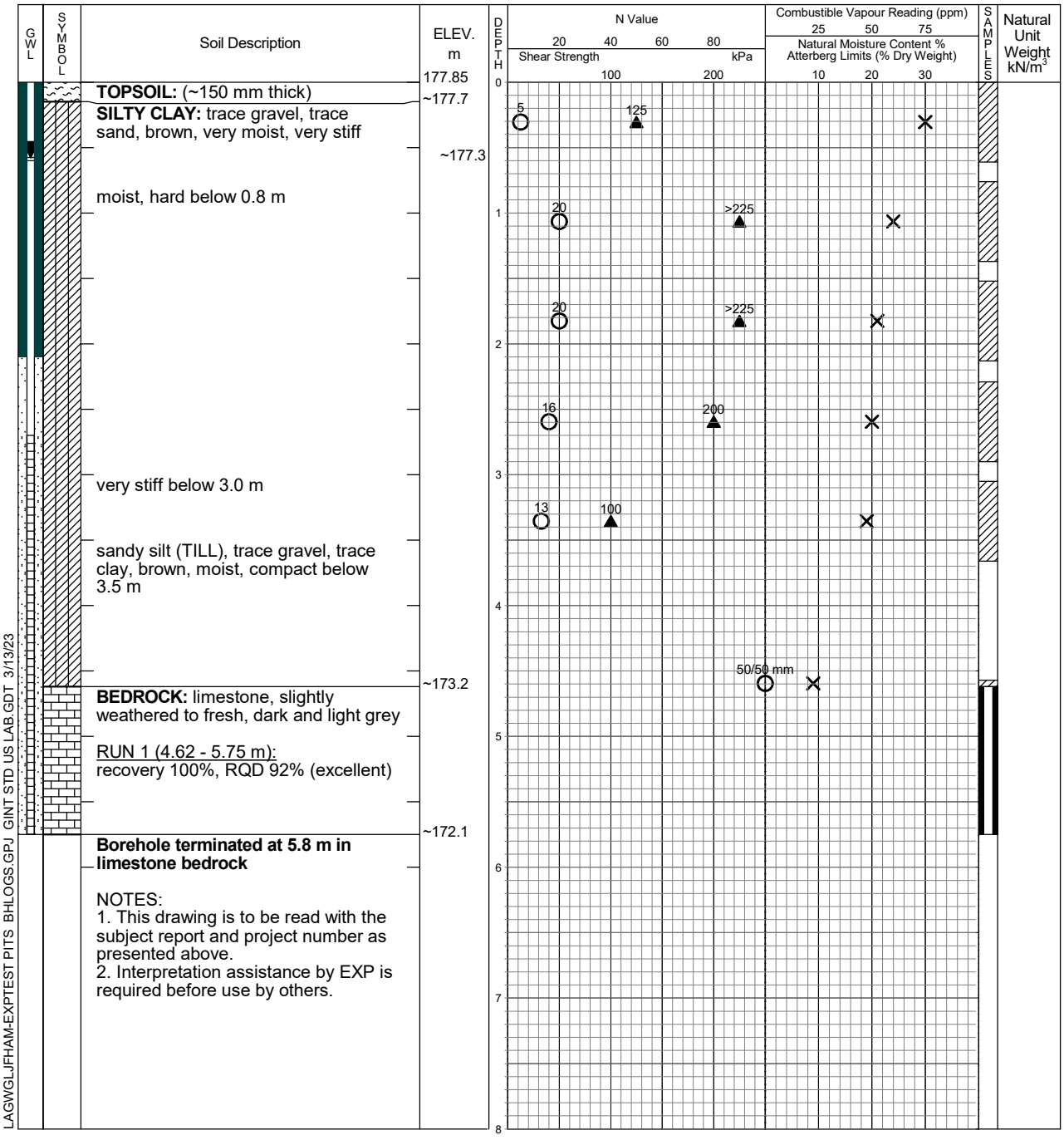
Date Drilled: February 16, 2023

Drill Type: D-50 Track Mount, Solid Stem

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

LAGWGLJFHAM-EXPTEST PITS BHLOGS.GPJ GINT STD US LAB.GDT 3/13/23

EXP Services Inc.
Hamilton, ON
Telephone: 905.573.4000
Facsimile: 905.573.9693

Time	Water Level (m)	Depth to Cave (m)
on completion	no free water	5.8
March 6, 2023	0.6	

A2. Groundwater – Chemical Analysis

Your P.O. #: ENV-BRM
Your Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your C.O.C. #: 839058-02-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2021/08/10
Report #: R6758759
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1L7721
Received: 2021/08/03, 18:16

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2021/08/09	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2021/08/10	CAM SOP-00102	APHA 4500-CO2 D
Biochemical Oxygen Demand (BOD)	1	2021/08/05	2021/08/10	CAM SOP-00427	SM 23 5210B m
Chloride by Automated Colourimetry	1	N/A	2021/08/06	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	1	N/A	2021/08/10	CAM SOP-00414	SM 23 2510 m
Total Cyanide	1	2021/08/05	2021/08/05	CAM SOP-00457	OMOE E3015 5 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2021/08/06	CAM SOP-00446	SM 23 5310 B m
Fluoride	1	2021/08/07	2021/08/10	CAM SOP-00449	SM 23 4500-F C m
Hardness (calculated as CaCO3)	1	N/A	2021/08/06	CAM SOP 00102/00408/00447	SM 2340 B
Mercury in Water by CVAA	1	2021/08/06	2021/08/09	CAM SOP-00453	EPA 7470A m
Lab Filtered Metals by ICPMS	1	2021/08/05	2021/08/06	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	1	N/A	2021/08/09	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2021/08/10		
Anion and Cation Sum	1	N/A	2021/08/10		
Total Ammonia-N	1	N/A	2021/08/09	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	1	N/A	2021/08/06	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Animal and Vegetable Oil and Grease	1	N/A	2021/08/07	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2021/08/06	2021/08/07	CAM SOP-00326	EPA1664B m,SM5520B m
pH	1	2021/08/07	2021/08/09	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2021/08/05	CAM SOP-00444	OMOE E3179 m
Orthophosphate	1	N/A	2021/08/06	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	1	N/A	2021/08/10		Auto Calc
Sat. pH and Langelier Index (@ 4C)	1	N/A	2021/08/10		Auto Calc
Sulphate by Automated Colourimetry	1	N/A	2021/08/06	CAM SOP-00464	EPA 375.4 m
Sulphide	1	N/A	2021/08/04	CAM SOP-00455	SM 23 4500-S G m
Total Dissolved Solids (TDS calc)	1	N/A	2021/08/10		Auto Calc
Total Kjeldahl Nitrogen in Water	1	2021/08/06	2021/08/09	CAM SOP-00938	OMOE E3516 m
Mineral/Synthetic O & G (TPH Heavy Oil) (3)	1	2021/08/06	2021/08/07	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2021/08/06	2021/08/09	CAM SOP-00428	SM 23 2540D m
Volatile Organic Compounds in Water	1	N/A	2021/08/06	CAM SOP-00228	EPA 8260C m

Your P.O. #: ENV-BRM
Your Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your C.O.C. #: 839058-02-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2021/08/10
Report #: R6758759
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1L7721
Received: 2021/08/03, 18:16

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(3) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
10 Aug 2021 17:23:11

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

NIAGARA SANITARY & COMB. SEWER (27-2014)

BV Labs ID				QGU659			QGU659		
Sampling Date				2021/08/03 12:00			2021/08/03 12:00		
	UNITS	Criteria	Criteria-2	BH/MW2	RDL	QC Batch	BH/MW2 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Total Animal/Vegetable Oil and Grease	mg/L	-	150	ND	0.50	7499802			
Inorganics									
Total BOD	mg/L	-	300	ND	2	7501894			
Fluoride (F-)	mg/L	-	10	0.50	0.10	7506974	0.49	0.10	7506974
Total Kjeldahl Nitrogen (TKN)	mg/L	-	100	0.25	0.10	7505710	0.25	0.10	7505710
pH	pH	6.5:8.5	6.0:11	7.92		7506977	7.97		7506977
Phenols-4AAP	mg/L	0.001	1	ND	0.0010	7501635			
Total Suspended Solids	mg/L	-	350	ND	10	7502168			
Dissolved Sulphate (SO4)	mg/L	-	1500	120	1.0	7503817			
Sulphide	mg/L	0.002	1	**0.037**	0.020	7501311	**0.034**	0.020	7501311
Total Cyanide (CN)	mg/L	-	1	ND	0.0050	7502269			
Petroleum Hydrocarbons									
Total Oil & Grease	mg/L	-	-	ND	0.50	7505878			
Total Oil & Grease Mineral/Synthetic	mg/L	0.5	15	ND	0.50	7505881			
Metals									
Mercury (Hg)	mg/L	0.0002	0.01	ND	0.00010	7505695			
Total Antimony (Sb)	ug/L	20	5000	ND	0.50	7504807			
Total Arsenic (As)	ug/L	100	1000	ND	1.0	7504807			
Total Cadmium (Cd)	ug/L	0.2	700	ND	0.090	7504807			
Total Chromium (Cr)	ug/L	-	3000	ND	5.0	7504807			
Total Cobalt (Co)	ug/L	0.9	5000	**2.3**	0.50	7504807			
Total Copper (Cu)	ug/L	5	3000	1.7	0.90	7504807			
Total Lead (Pb)	ug/L	5	1000	ND	0.50	7504807			
Total Molybdenum (Mo)	ug/L	40	5000	2.9	0.50	7504807			
Total Nickel (Ni)	ug/L	25	2000	9.2	1.0	7504807			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
Criteria-2: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara BY-LAW No. 27-2014
ND = Not detected

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

NIAGARA SANITARY & COMB. SEWER (27-2014)

BV Labs ID				QGU659			QGU659		
Sampling Date				2021/08/03 12:00			2021/08/03 12:00		
	UNITS	Criteria	Criteria-2	BH/MW2	RDL	QC Batch	BH/MW2 Lab-Dup	RDL	QC Batch
Total Phosphorus (P)	ug/L	10	-	**ND (1)**	100	7504807			
Total Selenium (Se)	ug/L	100	1000	ND	2.0	7504807			
Total Silver (Ag)	ug/L	0.1	5000	ND	0.090	7504807			
Total Tin (Sn)	ug/L	-	5000	ND	1.0	7504807			
Total Zinc (Zn)	ug/L	30	3000	ND	5.0	7504807			
Volatile Organics									
Benzene	ug/L	100	10	ND	0.40	7501818			
Chloroform	ug/L	-	40	ND	0.40	7501818			
1,2-Dichlorobenzene	ug/L	2.5	50	ND	0.80	7501818			
1,4-Dichlorobenzene	ug/L	4	80	ND	0.80	7501818			
Ethylbenzene	ug/L	8	160	ND	0.40	7501818			
Methylene Chloride(Dichloromethane)	ug/L	100	210	ND	4.0	7501818			
1,1,2,2-Tetrachloroethane	ug/L	70	40	ND	0.80	7501818			
Tetrachloroethylene	ug/L	50	50	ND	0.40	7501818			
Toluene	ug/L	0.8	200	ND	0.40	7501818			
Trichloroethylene	ug/L	20	50	ND	0.40	7501818			
p+m-Xylene	ug/L	2	-	ND	0.40	7501818			
o-Xylene	ug/L	40	520	ND	0.40	7501818			
Total Xylenes	ug/L	-	-	ND	0.40	7501818			
Surrogate Recovery (%)									
4-Bromofluorobenzene	%	-	-	97		7501818			
D4-1,2-Dichloroethane	%	-	-	103		7501818			
D8-Toluene	%	-	-	97		7501818			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
Criteria-2: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara BY-LAW No. 27-2014
ND = Not detected
(1) RDL exceeds criteria

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

RCAP - COMPREHENSIVE (LAB FILTERED)

BV Labs ID				QGU659			QGU659		
Sampling Date				2021/08/03 12:00			2021/08/03 12:00		
	UNITS	Criteria	Criteria-2	BH/MW2	RDL	QC Batch	BH/MW2 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	-	-	9.25	N/A	7499842			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	280	1.0	7499948			
Calculated TDS	mg/L	-	-	480	1.0	7499953			
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	2.2	1.0	7499948			
Cation Sum	me/L	-	-	8.33	N/A	7499842			
Hardness (CaCO3)	mg/L	-	-	390	1.0	7500554			
Ion Balance (% Difference)	%	-	-	5.18	N/A	7499949			
Langelier Index (@ 20C)	N/A	-	-	0.846		7499951			
Langelier Index (@ 4C)	N/A	-	-	0.598		7499952			
Saturation pH (@ 20C)	N/A	-	-	7.07		7499951			
Saturation pH (@ 4C)	N/A	-	-	7.32		7499952			
Inorganics									
Total Ammonia-N	mg/L	-	-	0.053	0.050	7505829			
Conductivity	umho/cm	-	-	780	1.0	7506979	780	1.0	7506979
Dissolved Organic Carbon	mg/L	-	-	2.2	0.40	7505746			
Orthophosphate (P)	mg/L	-	-	0.012	0.010	7503825			
Alkalinity (Total as CaCO3)	mg/L	-	-	280	1.0	7506976	280	1.0	7506976
Dissolved Chloride (Cl-)	mg/L	-	-	36	1.0	7503823			
Nitrite (N)	mg/L	-	-	ND	0.010	7503189	ND	0.010	7503189
Nitrate (N)	mg/L	-	-	ND	0.10	7503189	ND	0.10	7503189
Nitrate + Nitrite (N)	mg/L	-	-	ND	0.10	7503189	ND	0.10	7503189
Metals									
Dissolved Aluminum (Al)	ug/L	-	-	ND	4.9	7503495	ND	4.9	7503495
Dissolved Antimony (Sb)	ug/L	20	5000	ND	0.50	7503495	ND	0.50	7503495

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
Criteria-2: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara BY-LAW No. 27-2014
N/A = Not Applicable
ND = Not detected

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

RCAP - COMPREHENSIVE (LAB FILTERED)

BV Labs ID				QGU659			QGU659		
Sampling Date				2021/08/03 12:00			2021/08/03 12:00		
	UNITS	Criteria	Criteria-2	BH/MW2	RDL	QC Batch	BH/MW2 Lab-Dup	RDL	QC Batch
Dissolved Arsenic (As)	ug/L	100	1000	ND	1.0	7503495	ND	1.0	7503495
Dissolved Barium (Ba)	ug/L	-	-	42	2.0	7503495	42	2.0	7503495
Dissolved Beryllium (Be)	ug/L	11	-	ND	0.40	7503495	ND	0.40	7503495
Dissolved Boron (B)	ug/L	200	-	58	10	7503495	59	10	7503495
Dissolved Cadmium (Cd)	ug/L	0.2	700	ND	0.090	7503495	ND	0.090	7503495
Dissolved Calcium (Ca)	ug/L	-	-	87000	200	7503495	89000	200	7503495
Dissolved Chromium (Cr)	ug/L	-	3000	ND	5.0	7503495	ND	5.0	7503495
Dissolved Cobalt (Co)	ug/L	0.9	5000	**2.3**	0.50	7503495	**2.3**	0.50	7503495
Dissolved Copper (Cu)	ug/L	5	3000	ND	0.90	7503495	ND	0.90	7503495
Dissolved Iron (Fe)	ug/L	300	-	ND	100	7503495	ND	100	7503495
Dissolved Lead (Pb)	ug/L	5	1000	ND	0.50	7503495	ND	0.50	7503495
Dissolved Magnesium (Mg)	ug/L	-	-	41000	50	7503495	40000	50	7503495
Dissolved Manganese (Mn)	ug/L	-	-	37	2.0	7503495	37	2.0	7503495
Dissolved Molybdenum (Mo)	ug/L	40	5000	3.1	0.50	7503495	3.1	0.50	7503495
Dissolved Nickel (Ni)	ug/L	25	2000	8.6	1.0	7503495	8.4	1.0	7503495
Dissolved Phosphorus (P)	ug/L	-	-	ND	100	7503495	ND	100	7503495
Dissolved Potassium (K)	ug/L	-	-	1200	200	7503495	1200	200	7503495
Dissolved Selenium (Se)	ug/L	100	1000	ND	2.0	7503495	ND	2.0	7503495
Dissolved Silicon (Si)	ug/L	-	-	3900	50	7503495	4000	50	7503495
Dissolved Silver (Ag)	ug/L	0.1	5000	ND	0.090	7503495	ND	0.090	7503495
Dissolved Sodium (Na)	ug/L	-	-	14000	100	7503495	14000	100	7503495
Dissolved Strontium (Sr)	ug/L	-	-	350	1.0	7503495	350	1.0	7503495
Dissolved Thallium (Tl)	ug/L	0.3	-	ND	0.050	7503495	ND	0.050	7503495
Dissolved Titanium (Ti)	ug/L	-	-	ND	5.0	7503495	ND	5.0	7503495
Dissolved Uranium (U)	ug/L	5	-	2.3	0.10	7503495	2.3	0.10	7503495
Dissolved Vanadium (V)	ug/L	6	-	ND	0.50	7503495	ND	0.50	7503495

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
Criteria-2: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara BY-LAW No. 27-2014
ND = Not detected

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

RCAP - COMPREHENSIVE (LAB FILTERED)

BV Labs ID				QGU659			QGU659		
Sampling Date				2021/08/03 12:00			2021/08/03 12:00		
	UNITS	Criteria	Criteria-2	BH/MW2	RDL	QC Batch	BH/MW2 Lab-Dup	RDL	QC Batch
Dissolved Zinc (Zn)	ug/L	30	3000	ND	5.0	7503495	ND	5.0	7503495

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
Criteria-2: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara BY-LAW No. 27-2014
ND = Not detected

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

TEST SUMMARY

BV Labs ID: QGU659
Sample ID: BH/MW2
Matrix: Water

Collected: 2021/08/03
Shipped:
Received: 2021/08/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7506976	N/A	2021/08/09	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7499948	N/A	2021/08/10	Automated Statchk
Biochemical Oxygen Demand (BOD)	DO	7501894	2021/08/05	2021/08/10	Nusrat Naz
Chloride by Automated Colourimetry	KONE	7503823	N/A	2021/08/06	Alina Dobreanu
Conductivity	AT	7506979	N/A	2021/08/10	Surinder Rai
Total Cyanide	SKAL/CN	7502269	2021/08/05	2021/08/05	Aditiben Patel
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7505746	N/A	2021/08/06	Nimarta Singh
Fluoride	ISE	7506974	2021/08/07	2021/08/10	Surinder Rai
Hardness (calculated as CaCO3)		7500554	N/A	2021/08/06	Automated Statchk
Mercury in Water by CVAA	CV/AA	7505695	2021/08/06	2021/08/09	Meghaben Patel
Lab Filtered Metals by ICPMS	ICP/MS	7503495	2021/08/05	2021/08/06	Nan Raykha
Total Metals Analysis by ICPMS	ICP/MS	7504807	N/A	2021/08/09	Nan Raykha
Ion Balance (% Difference)	CALC	7499949	N/A	2021/08/10	Automated Statchk
Anion and Cation Sum	CALC	7499842	N/A	2021/08/10	Automated Statchk
Total Ammonia-N	LACH/NH4	7505829	N/A	2021/08/09	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7503189	N/A	2021/08/06	Chandra Nandlal
Animal and Vegetable Oil and Grease	BAL	7499802	N/A	2021/08/07	Automated Statchk
Total Oil and Grease	BAL	7505878	2021/08/06	2021/08/07	Saumya Modh
pH	AT	7506977	2021/08/07	2021/08/09	Surinder Rai
Phenols (4AAP)	TECH/PHEN	7501635	N/A	2021/08/05	Deonarine Ramnarine
Orthophosphate	KONE	7503825	N/A	2021/08/06	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7499951	N/A	2021/08/10	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7499952	N/A	2021/08/10	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7503817	N/A	2021/08/06	Avneet Kour Sudan
Sulphide	ISE/S	7501311	N/A	2021/08/04	Neil Dassanayake
Total Dissolved Solids (TDS calc)	CALC	7499953	N/A	2021/08/10	Automated Statchk
Total Kjeldahl Nitrogen in Water	SKAL	7505710	2021/08/06	2021/08/09	Rajni Tyagi
Mineral/Synthetic O & G (TPH Heavy Oil)	BAL	7505881	2021/08/06	2021/08/07	Saumya Modh
Total Suspended Solids	BAL	7502168	2021/08/06	2021/08/09	Sandeep Kaur
Volatile Organic Compounds in Water	GC/MS	7501818	N/A	2021/08/06	Ancheol Jeong

BV Labs ID: QGU659 Dup
Sample ID: BH/MW2
Matrix: Water

Collected: 2021/08/03
Shipped:
Received: 2021/08/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7506976	N/A	2021/08/09	Surinder Rai
Conductivity	AT	7506979	N/A	2021/08/10	Surinder Rai
Fluoride	ISE	7506974	2021/08/07	2021/08/10	Surinder Rai
Lab Filtered Metals by ICPMS	ICP/MS	7503495	2021/08/05	2021/08/06	Nan Raykha
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7503189	N/A	2021/08/06	Chandra Nandlal
pH	AT	7506977	2021/08/07	2021/08/09	Surinder Rai
Sulphide	ISE/S	7501311	N/A	2021/08/04	Neil Dassanayake

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

TEST SUMMARY

BV Labs ID: QGU659 Dup
Sample ID: BH/MW2
Matrix: Water

Collected: 2021/08/03
Shipped:
Received: 2021/08/03

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Kjeldahl Nitrogen in Water	SKAL	7505710	2021/08/06	2021/08/09	Rajni Tyagi

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	16.7°C

Sample QGU659 [BH/MW2] : VOC Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7501818	4-Bromofluorobenzene	2021/08/06	99	70 - 130	99	70 - 130	98	%				
7501818	D4-1,2-Dichloroethane	2021/08/06	103	70 - 130	98	70 - 130	100	%				
7501818	D8-Toluene	2021/08/06	99	70 - 130	100	70 - 130	98	%				
7501311	Sulphide	2021/08/04	97	80 - 120	95	80 - 120	ND, RDL=0.020	mg/L	10	20		
7501635	Phenols-4AAP	2021/08/05	105	80 - 120	104	80 - 120	ND, RDL=0.0010	mg/L	NC	20		
7501818	1,1,2,2-Tetrachloroethane	2021/08/06	100	70 - 130	94	70 - 130	ND, RDL=0.40	ug/L	NC	30		
7501818	1,2-Dichlorobenzene	2021/08/06	93	70 - 130	95	70 - 130	ND, RDL=0.40	ug/L	NC	30		
7501818	1,4-Dichlorobenzene	2021/08/06	108	70 - 130	112	70 - 130	ND, RDL=0.40	ug/L	NC	30		
7501818	Benzene	2021/08/06	90	70 - 130	89	70 - 130	ND, RDL=0.20	ug/L	3.1	30		
7501818	Chloroform	2021/08/06	97	70 - 130	95	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7501818	Ethylbenzene	2021/08/06	88	70 - 130	90	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7501818	Methylene Chloride(Dichloromethane)	2021/08/06	111	70 - 130	106	70 - 130	ND, RDL=2.0	ug/L	NC	30		
7501818	o-Xylene	2021/08/06	88	70 - 130	91	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7501818	p+m-Xylene	2021/08/06	90	70 - 130	93	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7501818	Tetrachloroethylene	2021/08/06	89	70 - 130	91	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7501818	Toluene	2021/08/06	91	70 - 130	93	70 - 130	ND, RDL=0.20	ug/L	0.69	30		
7501818	Total Xylenes	2021/08/06					ND, RDL=0.20	ug/L	NC	30		
7501818	Trichloroethylene	2021/08/06	98	70 - 130	99	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7501894	Total BOD	2021/08/10					ND,RDL=2	mg/L	8.0	30	91	80 - 120
7502168	Total Suspended Solids	2021/08/09					ND, RDL=10	mg/L	9.1	25	98	85 - 115
7502269	Total Cyanide (CN)	2021/08/05	99	80 - 120	97	80 - 120	ND, RDL=0.0050	mg/L	NC	20		
7503189	Nitrate (N)	2021/08/06	95	80 - 120	100	80 - 120	ND, RDL=0.10	mg/L	NC	20		
7503189	Nitrite (N)	2021/08/06	105	80 - 120	107	80 - 120	ND, RDL=0.010	mg/L	NC	20		
7503495	Dissolved Aluminum (Al)	2021/08/06	92	80 - 120	92	80 - 120	ND, RDL=4.9	ug/L	NC	20		
7503495	Dissolved Antimony (Sb)	2021/08/06	106	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	NC	20		
7503495	Dissolved Arsenic (As)	2021/08/06	100	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L	NC	20		
7503495	Dissolved Barium (Ba)	2021/08/06	102	80 - 120	101	80 - 120	ND, RDL=2.0	ug/L	0.93	20		

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7503495	Dissolved Beryllium (Be)	2021/08/06	105	80 - 120	100	80 - 120	ND, RDL=0.40	ug/L	NC	20		
7503495	Dissolved Boron (B)	2021/08/06	97	80 - 120	94	80 - 120	ND, RDL=10	ug/L	0.42	20		
7503495	Dissolved Cadmium (Cd)	2021/08/06	102	80 - 120	99	80 - 120	ND, RDL=0.090	ug/L	NC	20		
7503495	Dissolved Calcium (Ca)	2021/08/06	NC	80 - 120	94	80 - 120	ND, RDL=200	ug/L	1.7	20		
7503495	Dissolved Chromium (Cr)	2021/08/06	95	80 - 120	94	80 - 120	ND, RDL=5.0	ug/L	NC	20		
7503495	Dissolved Cobalt (Co)	2021/08/06	94	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L	0.26	20		
7503495	Dissolved Copper (Cu)	2021/08/06	97	80 - 120	96	80 - 120	ND, RDL=0.90	ug/L	NC	20		
7503495	Dissolved Iron (Fe)	2021/08/06	95	80 - 120	95	80 - 120	ND, RDL=100	ug/L	NC	20		
7503495	Dissolved Lead (Pb)	2021/08/06	96	80 - 120	98	80 - 120	ND, RDL=0.50	ug/L	NC	20		
7503495	Dissolved Magnesium (Mg)	2021/08/06	NC	80 - 120	95	80 - 120	ND, RDL=50	ug/L	1.1	20		
7503495	Dissolved Manganese (Mn)	2021/08/06	96	80 - 120	96	80 - 120	ND, RDL=2.0	ug/L	0.56	20		
7503495	Dissolved Molybdenum (Mo)	2021/08/06	106	80 - 120	100	80 - 120	ND, RDL=0.50	ug/L	0.72	20		
7503495	Dissolved Nickel (Ni)	2021/08/06	94	80 - 120	95	80 - 120	ND, RDL=1.0	ug/L	2.6	20		
7503495	Dissolved Phosphorus (P)	2021/08/06	105	80 - 120	107	80 - 120	ND, RDL=100	ug/L	NC	20		
7503495	Dissolved Potassium (K)	2021/08/06	95	80 - 120	94	80 - 120	ND, RDL=200	ug/L	0.054	20		
7503495	Dissolved Selenium (Se)	2021/08/06	98	80 - 120	98	80 - 120	ND, RDL=2.0	ug/L	NC	20		
7503495	Dissolved Silicon (Si)	2021/08/06	93	80 - 120	93	80 - 120	ND, RDL=50	ug/L	1.6	20		
7503495	Dissolved Silver (Ag)	2021/08/06	102	80 - 120	100	80 - 120	ND, RDL=0.090	ug/L	NC	20		
7503495	Dissolved Sodium (Na)	2021/08/06	91	80 - 120	93	80 - 120	ND, RDL=100	ug/L	2.0	20		
7503495	Dissolved Strontium (Sr)	2021/08/06	98	80 - 120	96	80 - 120	ND, RDL=1.0	ug/L	0.22	20		
7503495	Dissolved Thallium (Tl)	2021/08/06	99	80 - 120	99	80 - 120	ND, RDL=0.050	ug/L	NC	20		
7503495	Dissolved Titanium (Ti)	2021/08/06	90	80 - 120	89	80 - 120	ND, RDL=5.0	ug/L	NC	20		
7503495	Dissolved Uranium (U)	2021/08/06	96	80 - 120	97	80 - 120	ND, RDL=0.10	ug/L	0.65	20		
7503495	Dissolved Vanadium (V)	2021/08/06	97	80 - 120	96	80 - 120	ND, RDL=0.50	ug/L	NC	20		
7503495	Dissolved Zinc (Zn)	2021/08/06	95	80 - 120	96	80 - 120	ND, RDL=5.0	ug/L	NC	20		
7503817	Dissolved Sulphate (SO4)	2021/08/06	NC	75 - 125	105	80 - 120	ND, RDL=1.0	mg/L	0.93	20		
7503823	Dissolved Chloride (Cl-)	2021/08/06	NC	80 - 120	105	80 - 120	ND, RDL=1.0	mg/L	1.6	20		

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7503825	Orthophosphate (P)	2021/08/06	NC	75 - 125	99	80 - 120	ND, RDL=0.010	mg/L	0.45	25		
7504807	Total Antimony (Sb)	2021/08/09	108	80 - 120	104	80 - 120	ND, RDL=0.50	ug/L	6.0	20		
7504807	Total Arsenic (As)	2021/08/09	104	80 - 120	102	80 - 120	ND, RDL=1.0	ug/L	2.9	20		
7504807	Total Cadmium (Cd)	2021/08/09	105	80 - 120	103	80 - 120	ND, RDL=0.090	ug/L	NC	20		
7504807	Total Chromium (Cr)	2021/08/09	98	80 - 120	96	80 - 120	ND, RDL=5.0	ug/L	NC	20		
7504807	Total Cobalt (Co)	2021/08/09	101	80 - 120	95	80 - 120	ND, RDL=0.50	ug/L	NC	20		
7504807	Total Copper (Cu)	2021/08/09	101	80 - 120	97	80 - 120	ND, RDL=0.90	ug/L	0.69	20		
7504807	Total Lead (Pb)	2021/08/09	103	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	1.5	20		
7504807	Total Molybdenum (Mo)	2021/08/09	110	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	2.4	20		
7504807	Total Nickel (Ni)	2021/08/09	98	80 - 120	96	80 - 120	ND, RDL=1.0	ug/L	1.6	20		
7504807	Total Phosphorus (P)	2021/08/09	101	80 - 120	98	80 - 120	ND, RDL=100	ug/L	1.2	20		
7504807	Total Selenium (Se)	2021/08/09	101	80 - 120	104	80 - 120	ND, RDL=2.0	ug/L	NC	20		
7504807	Total Silver (Ag)	2021/08/09	105	80 - 120	102	80 - 120	ND, RDL=0.090	ug/L	NC	20		
7504807	Total Tin (Sn)	2021/08/09	105	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L	NC	20		
7504807	Total Zinc (Zn)	2021/08/09	102	80 - 120	102	80 - 120	ND, RDL=5.0	ug/L	9.9	20		
7505695	Mercury (Hg)	2021/08/09	96	75 - 125	99	80 - 120	ND, RDL=0.00010	mg/L	NC	20		
7505710	Total Kjeldahl Nitrogen (TKN)	2021/08/09	106	N/A	104	80 - 120	ND, RDL=0.10	mg/L	1.6	20	97	80 - 120
7505746	Dissolved Organic Carbon	2021/08/06	NC	80 - 120	98	80 - 120	ND, RDL=0.40	mg/L	0.83	20		
7505829	Total Ammonia-N	2021/08/09	NC	75 - 125	100	80 - 120	ND, RDL=0.050	mg/L	0.26	20		
7505878	Total Oil & Grease	2021/08/07			100	85 - 115	ND, RDL=0.50	mg/L	3.1	25		
7505881	Total Oil & Grease Mineral/Synthetic	2021/08/07			96	85 - 115	ND, RDL=0.50	mg/L	4.3	25		
7506974	Fluoride (F-)	2021/08/10	85	80 - 120	99	80 - 120	ND, RDL=0.10	mg/L	0.95	20		
7506976	Alkalinity (Total as CaCO3)	2021/08/09			96	85 - 115	ND, RDL=1.0	mg/L	0.31	20		
7506977	pH	2021/08/09			102	98 - 103			0.67	N/A		

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7506979	Conductivity	2021/08/10			103	85 - 115	ND, RDL=1.0	umho/cm	0.78	25		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

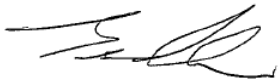
Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas Laboratories
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel (905) 817-5700 Toll-free 800-563-6266 Fax (905) 817-5777 www.bvlabs.com

Page 1 of 1

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#30554 exp Services Inc	Company Name:	EXP Services	Quotation #:	B91717	BV Labs Job #:	Bottle Order #:
Attention:	Central Services	Attention:	Francois Chartier Thabiso Modise	P.O. #:	ENV-BRM		839058
Address:	1595 Clark Blvd Brampton ON L6T 4V1	Address:	1595 Clark Blvd Brampton ON L6T 4V1	Project:	BRM-21000726-A0	COC #:	Project Manager:
Tel:	(905) 793-9800 Fax: (905) 793-0641	Tel:	(905) 793-9800 Ext: 2523 Fax:	Project Name:		C#839058-01-01	Patricia Legette
Email:	AP@exp.com; Karen.Burke@exp.com	Email:	Francois.Chartier@exp.com Thabiso.Modise@exp	Site #:	Killaly, Port Colborne		
				Sampled By:	Thabiso Modise		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- ☐ Table 1 ☐ Res/Park ☐ Medium/Fine
- ☐ Table 2 ☐ Ind/Comm ☐ Coarse
- ☐ Table 3 ☐ Agri/Other ☐ For RSC
- ☐ Table ___

Other Regulations
- ☐ CCME ☑ Sanitary Sewer Bylaw
- ☐ Reg 558 ☑ Storm Sewer Bylaw
- ☐ MISA Municipality ___
- ☑ PWQO ☐ Reg 406 Table ___
- ☐ Other ___

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ___

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT:
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___
Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Niagara Sanitary & Comb. Sewer (27-2014)	RCAP	# of Bottles	Comments
1		BH/MW 2		12:00	GW		✓	✓	17	PLEASE FILTER METALS
2										FROM THE RCAP COMPREHENSIVE
3										PACKAGE
4										
5										
6										
7										
8										
9										
10										

03-Aug-21 18:16
Patricia Legette
C1L7721
SYK ENV-567

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
[illegible]	21/08/03	13:05	KAVITHA SELVAN	2021/08/03	18:16	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	17/17/16	Present	✓	✓
		Intact		

On ICE

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

White: BV Labs Yellow: Client

Bureau Veritas Canada (2019) Inc.

BV Labs Job #: C1L7721
Report Date: 2021/08/10

exp Services Inc
Client Project #: BRM-21000726-A0
Site Location: Killaly, Port Colborne
Your P.O. #: ENV-BRM
Sampler Initials: TM

Exceedance Summary Table – Prov. Water Quality Obj.

Result Exceedances

Sample ID	BV Labs ID	Parameter	Criteria	Result	DL	UNITS
BH/MW2	QGU659-07	Total Cobalt (Co)	0.9	2.3	0.50	ug/L
BH/MW2	QGU659-03	Dissolved Cobalt (Co)	0.9	2.3	0.50	ug/L
BH/MW2	QGU659-03-Lab Dup	Dissolved Cobalt (Co)	0.9	2.3	0.50	ug/L
BH/MW2	QGU659-09-Lab Dup	Sulphide	0.002	0.034	0.020	mg/L
BH/MW2	QGU659-09	Sulphide	0.002	0.037	0.020	mg/L

Detection Limit Exceedances

Sample ID	BV Labs ID	Parameter	Criteria	Result	DL	UNITS
BH/MW2	QGU659-07	Total Phosphorus (P)	10	<100	100	ug/L

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Exceedance Summary Table – Niagara Combined Sewer

Result Exceedances

Sample ID	BV Labs ID	Parameter	Criteria	Result	DL	UNITS
No Exceedances						

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Your P.O. #: ENV-BRM
Your Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your C.O.C. #: 922971-01-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2023/03/14
Report #: R7545379
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C366543
Received: 2023/03/08, 16:59

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dissolved Metals by ICPMS	1	N/A	2023/03/13	CAM SOP-00447	EPA 6020B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your P.O. #: ENV-BRM
Your Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your C.O.C. #: 922971-01-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2023/03/14
Report #: R7545379
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C366543
Received: 2023/03/08, 16:59

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
14 Mar 2023 10:24:51

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366543
Report Date: 2023/03/14

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		VFW621		
Sampling Date		2023/03/08 12:00		
COC Number		922971-01-01		
	UNITS	BH 21	RDL	QC Batch
Metals				
Dissolved Aluminum (Al)	ug/L	6.1	4.9	8546228
Dissolved Antimony (Sb)	ug/L	ND	0.50	8546228
Dissolved Arsenic (As)	ug/L	ND	1.0	8546228
Dissolved Barium (Ba)	ug/L	62	2.0	8546228
Dissolved Beryllium (Be)	ug/L	ND	0.40	8546228
Dissolved Bismuth (Bi)	ug/L	ND	1.0	8546228
Dissolved Boron (B)	ug/L	490	10	8546228
Dissolved Cadmium (Cd)	ug/L	ND	0.090	8546228
Dissolved Calcium (Ca)	ug/L	190000	400	8546228
Dissolved Chromium (Cr)	ug/L	ND	5.0	8546228
Dissolved Cobalt (Co)	ug/L	ND	0.50	8546228
Dissolved Copper (Cu)	ug/L	ND	0.90	8546228
Dissolved Iron (Fe)	ug/L	170	100	8546228
Dissolved Lead (Pb)	ug/L	ND	0.50	8546228
Dissolved Lithium (Li)	ug/L	100	5.0	8546228
Dissolved Magnesium (Mg)	ug/L	150000	50	8546228
Dissolved Manganese (Mn)	ug/L	190	2.0	8546228
Dissolved Molybdenum (Mo	ug/L	7.4	0.50	8546228
Dissolved Nickel (Ni)	ug/L	5.0	1.0	8546228
Dissolved Phosphorus (P)	ug/L	ND	100	8546228
Dissolved Potassium (K)	ug/L	5400	200	8546228
Dissolved Selenium (Se)	ug/L	ND	2.0	8546228
Dissolved Silicon (Si)	ug/L	7400	50	8546228
Dissolved Silver (Ag)	ug/L	ND	0.090	8546228
Dissolved Sodium (Na)	ug/L	65000	100	8546228
Dissolved Strontium (Sr)	ug/L	9600	1.0	8546228
Dissolved Tellurium (Te)	ug/L	ND	1.0	8546228
Dissolved Thallium (Tl)	ug/L	ND	0.050	8546228

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366543
Report Date: 2023/03/14

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		VFW621		
Sampling Date		2023/03/08 12:00		
COC Number		922971-01-01		
	UNITS	BH 21	RDL	QC Batch
Dissolved Tin (Sn)	ug/L	ND	1.0	8546228
Dissolved Titanium (Ti)	ug/L	ND	5.0	8546228
Dissolved Tungsten (W)	ug/L	51	1.0	8546228
Dissolved Uranium (U)	ug/L	5.5	0.10	8546228
Dissolved Vanadium (V)	ug/L	ND	0.50	8546228
Dissolved Zinc (Zn)	ug/L	5.2	5.0	8546228
Dissolved Zirconium (Zr)	ug/L	1.6	1.0	8546228

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366543
Report Date: 2023/03/14

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

TEST SUMMARY

Bureau Veritas ID: VFW621
Sample ID: BH 21
Matrix: Water

Collected: 2023/03/08
Shipped:
Received: 2023/03/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Metals by ICPMS	ICP/MS	8546228	N/A	2023/03/13	Rupinder Gill

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.3°C

Results relate only to the items tested.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8546228	Dissolved Aluminum (Al)	2023/03/13	NC	80 - 120	109	80 - 120	ND, RDL=4.9	ug/L		
8546228	Dissolved Antimony (Sb)	2023/03/13	113	80 - 120	104	80 - 120	ND, RDL=0.50	ug/L	6.1	20
8546228	Dissolved Arsenic (As)	2023/03/13	107	80 - 120	99	80 - 120	ND, RDL=1.0	ug/L	NC	20
8546228	Dissolved Barium (Ba)	2023/03/13	109	80 - 120	102	80 - 120	ND, RDL=2.0	ug/L	8.5	20
8546228	Dissolved Beryllium (Be)	2023/03/13	107	80 - 120	99	80 - 120	ND, RDL=0.40	ug/L	NC	20
8546228	Dissolved Bismuth (Bi)	2023/03/13	99	80 - 120	99	80 - 120	ND, RDL=1.0	ug/L		
8546228	Dissolved Boron (B)	2023/03/13	104	80 - 120	97	80 - 120	ND, RDL=10	ug/L	9.0	20
8546228	Dissolved Cadmium (Cd)	2023/03/13	108	80 - 120	101	80 - 120	ND, RDL=0.090	ug/L	NC	20
8546228	Dissolved Calcium (Ca)	2023/03/13	113	80 - 120	106	80 - 120	ND, RDL=200	ug/L		
8546228	Dissolved Chromium (Cr)	2023/03/13	101	80 - 120	97	80 - 120	ND, RDL=5.0	ug/L	8.0	20
8546228	Dissolved Cobalt (Co)	2023/03/13	105	80 - 120	100	80 - 120	ND, RDL=0.50	ug/L	NC	20
8546228	Dissolved Copper (Cu)	2023/03/13	115	80 - 120	106	80 - 120	ND, RDL=0.90	ug/L	8.9	20
8546228	Dissolved Iron (Fe)	2023/03/13	108	80 - 120	104	80 - 120	ND, RDL=100	ug/L		
8546228	Dissolved Lead (Pb)	2023/03/13	103	80 - 120	98	80 - 120	ND, RDL=0.50	ug/L	NC	20
8546228	Dissolved Lithium (Li)	2023/03/13	113	80 - 120	105	80 - 120	ND, RDL=5.0	ug/L		
8546228	Dissolved Magnesium (Mg)	2023/03/13	111	80 - 120	105	80 - 120	ND, RDL=50	ug/L		
8546228	Dissolved Manganese (Mn)	2023/03/13	106	80 - 120	99	80 - 120	ND, RDL=2.0	ug/L		
8546228	Dissolved Molybdenum (Mo)	2023/03/13	112	80 - 120	104	80 - 120	ND, RDL=0.50	ug/L	7.0	20
8546228	Dissolved Nickel (Ni)	2023/03/13	102	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L	NC	20
8546228	Dissolved Phosphorus (P)	2023/03/13	118	80 - 120	118	80 - 120	ND, RDL=100	ug/L		
8546228	Dissolved Potassium (K)	2023/03/13	NC	80 - 120	105	80 - 120	ND, RDL=200	ug/L		
8546228	Dissolved Selenium (Se)	2023/03/13	108	80 - 120	100	80 - 120	ND, RDL=2.0	ug/L	NC	20
8546228	Dissolved Silicon (Si)	2023/03/13	111	80 - 120	105	80 - 120	ND, RDL=50	ug/L		
8546228	Dissolved Silver (Ag)	2023/03/13	100	80 - 120	96	80 - 120	ND, RDL=0.090	ug/L	NC	20
8546228	Dissolved Sodium (Na)	2023/03/13	NC	80 - 120	105	80 - 120	ND, RDL=100	ug/L	8.2	20
8546228	Dissolved Strontium (Sr)	2023/03/13	104	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L		
8546228	Dissolved Tellurium (Te)	2023/03/13	112	80 - 120	104	80 - 120	ND, RDL=1.0	ug/L		
8546228	Dissolved Thallium (Tl)	2023/03/13	102	80 - 120	102	80 - 120	ND, RDL=0.050	ug/L	NC	20
8546228	Dissolved Tin (Sn)	2023/03/13	111	80 - 120	102	80 - 120	ND, RDL=1.0	ug/L		
8546228	Dissolved Titanium (Ti)	2023/03/13	111	80 - 120	102	80 - 120	ND, RDL=5.0	ug/L		

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8546228	Dissolved Tungsten (W)	2023/03/13	109	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L		
8546228	Dissolved Uranium (U)	2023/03/13	105	80 - 120	97	80 - 120	ND, RDL=0.10	ug/L	9.5	20
8546228	Dissolved Vanadium (V)	2023/03/13	104	80 - 120	98	80 - 120	ND, RDL=0.50	ug/L	5.0	20
8546228	Dissolved Zinc (Zn)	2023/03/13	105	80 - 120	99	80 - 120	ND, RDL=5.0	ug/L	NC	20
8546228	Dissolved Zirconium (Zr)	2023/03/13	116	80 - 120	108	80 - 120	ND, RDL=1.0	ug/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366543
Report Date: 2023/03/14

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere

Cristina Carriere, Senior Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvna.com

08-Mar-23 16:59
Patricia Legette
C366543

ENV-1474

Only:

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:			
Company Name:	#30554 exp Services Inc	Company Name:	EXP Services Inc	Quotation #:	C20374	Bottle Order #:	922971
Attention:	Accounts Payable	Attention:	Francois Chartier	P.O. #:	ENV-BRM		
Address:	1595 Clark Blvd Brampton ON L6T 4V1	Address:	Yogirajsinh.Rang@exp.com Thabiso.Modise@exp.com	Project:	HAM-21000726-C0	Project Manager:	
Tel:	(905) 793-9800 Fax: (905) 793-0641	Tel:	(905) 793-9800 Ext: 2523 Fax:	Project Name:		COC #:	C#922971-01-01
Email:	AP@exp.com; Karen.Burke@exp.com	Email:	Francois.Chartier@exp.com, nicolas.sabo@exp.com	Site #:	705 Main Street E, Port Colborne		Patricia Legette
				Sampled By:	Thabiso Modise		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- ☐ Table 1 ☐ Res/Park ☐ Medium/Fine
- ☐ Table 2 ☐ Ind/Comm ☐ Coarse
- ☐ Table 3 ☐ Agri/Other ☐ For RSC
- ☐ Table ___

Other Regulations
- ☐ CCME ☐ Sanitary Sewer Bylaw
- ☐ Reg 558 ☐ Storm Sewer Bylaw
- ☐ MISA Municipality ____
- ☐ PWQO ☐ Reg 406 Table ____
- ☐ Other ____

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ____

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☑
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ____ Time Required: ____ ☐
Rush Confirmation Number: ____ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): (Metals / Hg / Cr VI)	PWQO Metals and Inorganics	Dissolved Metals	# of Bottles	Comments
1		BH 21	8/Mar/2023	12:00	GW	Yes		✓	1	
2										
3										
4										
5										
6										
7										
8										
9										
10										

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Thabiso Modise	23/03/03	17:05	BH GWA Sukhdeva	23/03/08	16:59	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	4 4 5	Present		
		Intact		✓

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

Bureau Veritas Canada (2019) Inc.

Your P.O. #: ENV-BRM
Your Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your C.O.C. #: 922969-01-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2023/03/15
Report #: R7547073
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C366552
Received: 2023/03/08, 16:59

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Biochemical Oxygen Demand (BOD)	1	2023/03/10	2023/03/15	CAM SOP-00427	SM 23 5210B m
Total Cyanide	1	2023/03/09	2023/03/09	CAM SOP-00457	OMOE E3015 5 m
Fluoride	1	2023/03/10	2023/03/10	CAM SOP-00449	SM 23 4500-F C m
Mercury in Water by CVAA	1	2023/03/10	2023/03/10	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	1	2023/03/13	2023/03/13	CAM SOP-00447	EPA 6020B m
Animal and Vegetable Oil and Grease	1	N/A	2023/03/13	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2023/03/13	2023/03/13	CAM SOP-00326	EPA1664B m,SM5520B m
pH	1	2023/03/10	2023/03/10	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2023/03/10	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Turbidimetry	1	N/A	2023/03/10	CAM SOP-00464	SM 23 4500-SO42- E m
Sulphide	1	N/A	2023/03/14	CAM SOP-00455	SM 23 4500-S G m
Total Kjeldahl Nitrogen in Water	1	2023/03/09	2023/03/13	CAM SOP-00938	OMOE E3516 m
Mineral/Synthetic O & G (TPH Heavy Oil) (1)	1	2023/03/13	2023/03/13	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2023/03/13	2023/03/14	CAM SOP-00428	SM 23 2540D m
Volatile Organic Compounds in Water	1	N/A	2023/03/10	CAM SOP-00228	EPA 8260D

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope

Your P.O. #: ENV-BRM
Your Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your C.O.C. #: 922969-01-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2023/03/15
Report #: R7547073
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C366552
Received: 2023/03/08, 16:59

dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
15 Mar 2023 14:55:21

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366552
Report Date: 2023/03/15

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

NIAGARA SANITARY & COMB. SEWER (27-2014)

Bureau Veritas ID			VFW701		
Sampling Date			2023/03/08 12:00		
COC Number			922969-01-01		
	UNITS	Criteria	BH 21	RDL	QC Batch
Calculated Parameters					
Total Animal/Vegetable Oil and Greas	mg/L	150	0.80	0.50	8542330
Inorganics					
Total BOD	mg/L	300	ND	2	8545057
Fluoride (F-)	mg/L	10	0.96	0.10	8546112
Total Kjeldahl Nitrogen (TKN)	mg/L	100	0.93	0.50	8543754
pH	pH	6.0:11	7.70		8546119
Phenols-4AAP	mg/L	1	ND	0.0010	8545971
Total Suspended Solids	mg/L	350	81	10	8548438
Dissolved Sulphate (SO4)	mg/L	1500	360	1.0	8544535
Sulphide	mg/L	1	0.33	0.020	8545850
Total Cyanide (CN)	mg/L	1	ND	0.0050	8542788
Petroleum Hydrocarbons					
Total Oil & Grease	mg/L	-	0.80	0.50	8548318
Total Oil & Grease Mineral/Synthetic	mg/L	15	ND	0.50	8548320
Metals					
Mercury (Hg)	mg/L	0.01	ND	0.00010	8545466
Total Antimony (Sb)	ug/L	5000	ND	0.50	8548577
Total Arsenic (As)	ug/L	1000	1.3	1.0	8548577
Total Cadmium (Cd)	ug/L	700	ND	0.090	8548577
Total Chromium (Cr)	ug/L	3000	ND	5.0	8548577
Total Cobalt (Co)	ug/L	5000	1.6	0.50	8548577
Total Copper (Cu)	ug/L	3000	3.8	0.90	8548577
Total Lead (Pb)	ug/L	1000	0.99	0.50	8548577
Total Molybdenum (Mo)	ug/L	5000	9.2	0.50	8548577
Total Nickel (Ni)	ug/L	2000	7.3	1.0	8548577

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara
BY-LAW No. 27-2014
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366552
Report Date: 2023/03/15

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

NIAGARA SANITARY & COMB. SEWER (27-2014)

Bureau Veritas ID			VFW701		
Sampling Date			2023/03/08 12:00		
COC Number			922969-01-01		
	UNITS	Criteria	BH 21	RDL	QC Batch
Total Phosphorus (P)	ug/L	-	ND	100	8548577
Total Selenium (Se)	ug/L	1000	ND	2.0	8548577
Total Silver (Ag)	ug/L	5000	0.59	0.090	8548577
Total Tin (Sn)	ug/L	5000	ND	1.0	8548577
Total Zinc (Zn)	ug/L	3000	7.8	5.0	8548577
Volatile Organics					
Benzene	ug/L	10	ND	0.40	8543520
Chloroform	ug/L	40	ND	0.40	8543520
1,2-Dichlorobenzene	ug/L	50	ND	0.80	8543520
1,4-Dichlorobenzene	ug/L	80	ND	0.80	8543520
Ethylbenzene	ug/L	160	ND	0.40	8543520
Methylene Chloride(Dichloromethane	ug/L	210	ND	4.0	8543520
1,1,2,2-Tetrachloroethane	ug/L	40	ND	0.80	8543520
Tetrachloroethylene	ug/L	50	ND	0.40	8543520
Toluene	ug/L	200	ND	0.40	8543520
Trichloroethylene	ug/L	50	ND	0.40	8543520
p+m-Xylene	ug/L	-	ND	0.40	8543520
o-Xylene	ug/L	520	ND	0.40	8543520
Total Xylenes	ug/L	-	ND	0.40	8543520
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	-	90		8543520
D4-1,2-Dichloroethane	%	-	111		8543520
D8-Toluene	%	-	96		8543520

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: By-Law To Regulate Discharges To The Sanitary And Storm Sewer Systems Of The Regional Municipality Of Niagara
BY-LAW No. 27-2014
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366552
Report Date: 2023/03/15

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

TEST SUMMARY

Bureau Veritas ID: VFW701
Sample ID: BH 21
Matrix: Water

Collected: 2023/03/08
Shipped:
Received: 2023/03/08

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Biochemical Oxygen Demand (BOD)	DO	8545057	2023/03/10	2023/03/15	Gurjot Kaur
Total Cyanide	SKAL/CN	8542788	2023/03/09	2023/03/09	Kruti Jitesh Patel
Fluoride	ISE	8546112	2023/03/10	2023/03/10	Kien Tran
Mercury in Water by CVAA	CV/AA	8545466	2023/03/10	2023/03/10	Japneet Gill
Total Metals Analysis by ICPMS	ICP/MS	8548577	2023/03/13	2023/03/13	Rupinder Gill
Animal and Vegetable Oil and Grease	BAL	8542330	N/A	2023/03/13	Automated Statchk
Total Oil and Grease	BAL	8548318	2023/03/13	2023/03/13	Navneet Singh
pH	AT	8546119	2023/03/10	2023/03/10	Kien Tran
Phenols (4AAP)	TECH/PHEN	8545971	N/A	2023/03/10	Mandeep Kaur
Sulphate by Automated Turbidimetry	KONE	8544535	N/A	2023/03/10	Massarat Jan
Sulphide	ISE/S	8545850	N/A	2023/03/14	Taslima Aktar
Total Kjeldahl Nitrogen in Water	SKAL	8543754	2023/03/09	2023/03/13	Jency Sara Johnson
Mineral/Synthetic O & G (TPH Heavy Oil)	BAL	8548320	2023/03/13	2023/03/13	Navneet Singh
Total Suspended Solids	BAL	8548438	2023/03/13	2023/03/14	Shaneil Hall
Volatile Organic Compounds in Water	GC/MS	8543520	N/A	2023/03/10	Skylar Canning

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366552
Report Date: 2023/03/15

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.3°C

Sample VFW701 [BH 21] : VOC Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366552
Report Date: 2023/03/15

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8543520	4-Bromofluorobenzene	2023/03/10	95	70 - 130	95	70 - 130	93	%				
8543520	D4-1,2-Dichloroethane	2023/03/10	108	70 - 130	108	70 - 130	108	%				
8543520	D8-Toluene	2023/03/10	103	70 - 130	104	70 - 130	100	%				
8542788	Total Cyanide (CN)	2023/03/09	101	80 - 120	101	80 - 120	ND, RDL=0.0050	mg/L	NC	20		
8543520	1,1,2,2-Tetrachloroethane	2023/03/10	102	70 - 130	102	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8543520	1,2-Dichlorobenzene	2023/03/10	93	70 - 130	93	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8543520	1,4-Dichlorobenzene	2023/03/10	102	70 - 130	104	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8543520	Benzene	2023/03/10	82	70 - 130	82	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	Chloroform	2023/03/10	88	70 - 130	88	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	Ethylbenzene	2023/03/10	83	70 - 130	84	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	Methylene Chloride(Dichloromethane)	2023/03/10	90	70 - 130	89	70 - 130	ND, RDL=2.0	ug/L	NC	30		
8543520	o-Xylene	2023/03/10	83	70 - 130	85	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	p+m-Xylene	2023/03/10	86	70 - 130	87	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	Tetrachloroethylene	2023/03/10	80	70 - 130	80	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	Toluene	2023/03/10	87	70 - 130	88	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543520	Total Xylenes	2023/03/10					ND, RDL=0.20	ug/L	NC	30		
8543520	Trichloroethylene	2023/03/10	87	70 - 130	87	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8543754	Total Kjeldahl Nitrogen (TKN)	2023/03/13	NC	80 - 120	105	80 - 120	ND, RDL=0.10	mg/L	12	20	100	80 - 120
8544535	Dissolved Sulphate (SO4)	2023/03/10	129 (1)	75 - 125	96	80 - 120	ND, RDL=1.0	mg/L	NC	20		
8545057	Total BOD	2023/03/15					ND,RDL=2	mg/L	NC	30	93	80 - 120
8545466	Mercury (Hg)	2023/03/10	105	75 - 125	107	80 - 120	ND, RDL=0.00010	mg/L	18	20		
8545850	Sulphide	2023/03/14	103	80 - 120	96	80 - 120	ND, RDL=0.020	mg/L	NC	20		
8545971	Phenols-4AAP	2023/03/10	100	80 - 120	101	80 - 120	ND, RDL=0.0010	mg/L	NC	20		
8546112	Fluoride (F-)	2023/03/13	95	80 - 120	96	80 - 120	ND, RDL=0.10	mg/L	NC	20		
8546119	pH	2023/03/13			101	98 - 103			1.6	N/A		
8548318	Total Oil & Grease	2023/03/13			99	85 - 115	ND, RDL=0.50	mg/L	0.51	25		
8548320	Total Oil & Grease Mineral/Synthetic	2023/03/13			96	85 - 115	ND, RDL=0.50	mg/L	0.52	25		

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8548438	Total Suspended Solids	2023/03/14					ND, RDL=10	mg/L	12	20	100	85 - 115
8548577	Total Antimony (Sb)	2023/03/13	112	80 - 120	109	80 - 120	ND, RDL=0.50	ug/L	NC	20		
8548577	Total Arsenic (As)	2023/03/13	104	80 - 120	105	80 - 120	ND, RDL=1.0	ug/L	0.88	20		
8548577	Total Cadmium (Cd)	2023/03/13	104	80 - 120	104	80 - 120	ND, RDL=0.090	ug/L	NC	20		
8548577	Total Chromium (Cr)	2023/03/13	96	80 - 120	98	80 - 120	ND, RDL=5.0	ug/L	NC	20		
8548577	Total Cobalt (Co)	2023/03/13	98	80 - 120	101	80 - 120	ND, RDL=0.50	ug/L	3.6	20		
8548577	Total Copper (Cu)	2023/03/13	103	80 - 120	105	80 - 120	ND, RDL=0.90	ug/L	11	20		
8548577	Total Lead (Pb)	2023/03/13	98	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	2.7	20		
8548577	Total Molybdenum (Mo)	2023/03/13	104	80 - 120	103	80 - 120	ND, RDL=0.50	ug/L	0.52	20		
8548577	Total Nickel (Ni)	2023/03/13	96	80 - 120	100	80 - 120	ND, RDL=1.0	ug/L	1.4	20		
8548577	Total Phosphorus (P)	2023/03/13	109	80 - 120	110	80 - 120	ND, RDL=100	ug/L	17	20		
8548577	Total Selenium (Se)	2023/03/13	107	80 - 120	107	80 - 120	ND, RDL=2.0	ug/L	NC	20		
8548577	Total Silver (Ag)	2023/03/13	97	80 - 120	97	80 - 120	ND, RDL=0.090	ug/L	NC	20		
8548577	Total Tin (Sn)	2023/03/13	106	80 - 120	103	80 - 120	ND, RDL=1.0	ug/L	4.0	20		
8548577	Total Zinc (Zn)	2023/03/13	99	80 - 120	106	80 - 120	ND, RDL=5.0	ug/L	NC	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C366552
Report Date: 2023/03/15

exp Services Inc
Client Project #: HAM-21000726-C0
Site Location: 705 MAIN STREET E, PORT COLBORNE, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

08-Mar-23 16:59
Patricia Legette
C366552
AVI ENV-1474

Presence of Visible Particulate/Sediment

Maxxam Analytics
CAM FCD-01013/5
Page 1 of 1

When there is >1cm of visible particulate/sediment, the amount will be recorded in the field below

Bottle Types

	Sample ID	All	Inorganics					Organics										Hydrocarbons							Volatiles				Other
			CrVI	CN	General	Hg	Metals (Diss.)	Organic 1 of 2	Organic 2 of 2	PCB 1 of 2	PCB 2 of 2	Pest/ Herb 1 of 2	Pest/ Herb 2 of 2	SVOC/ ABN 1 of 2	SVOC/ ABN 2 of 2	PAH 1 of 2	PAH 2 of 2	Dioxin /Furan	F1 Vial 1	F1 Vial 2	F1 Vial 3	F1 Vial 4	F2-F4 1 of 2	F2-F4 2 of 2	F4G	VOC Vial 1	VOC Vial 2	VOC Vial 3	VOC Vial 4	
1	BH21																								B	TS			
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													

Comments:

Legend:	
P	Suspended Particulate
TS	Trace Settled Sediment (just covers bottom of container or less)
S	Sediment greater than (>) Trace, but less than (<) 1 cm

Recorded By: (signature/print) ANMOL

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvna.com

Page 1 of 1

08-Mar-23 16:59
Patricia Legette
C366552

INVOICE TO:

Company Name: #30554 exp Services Inc
Attention: Accounts Payable
Address: 1595 Clark Blvd, Brampton ON L6T 4V1
Tel: (905) 793-9800 Fax: (905) 793-0641
Email: AP@exp.com; Karen.Burke@exp.com

REPORT TO:

Company Name: EXP Services Inc
Attention: Francois Chartier
Address: Yogirajsinh.Rana@exp.com; Thabiso.Modise@exp.com
Tel: (905) 793-9800 Ext: 2523 Fax:
Email: Francois.Chartier@exp.com, nicolas.sabo@exp.com

PROJECT INFORMATION:

Quotation #: C20374
P.O. #: ENV-BRM
Project: HAM-21000726-C0 VI ENV-1474
Project Name:
Site #: 705 Main Street E, Port Colborne
Sampled By: Thabiso Modise

Lab Use Only:

Bottle Order #: 922969
Project Manager: Patricia Legette
C#922969-01-01

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)

- [ ] Table 1 [ ] Res/Park [ ] Medium/Fine
- [ ] Table 2 [ ] Ind/Comm [ ] Coarse
- [ ] Table 3 [ ] Agri/Other [ ] For RSC
- [ ] Table ___

Other Regulations

- [ ] CCME
- [x] Sanitary Sewer Bylaw
- [x] Storm Sewer Bylaw
- [ ] MISA Municipality Niagara
- [ ] PWQO [ ] Reg 406 Table
- [ ] Other

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? Y

Field Filtered (please circle): Metals / Hg / Cr VI

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Niagara Sanitary & Comb. Sewer (27-2014)

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ✓
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: Time Required:
Rush Confirmation Number: *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered	Niagara Sanitary & Comb. Sewer (27-2014)	# of Bottles	Comments
1		BH 21	8/Mar/2023	12:00	GW	NO	✓	12	
2									
3									
4									
5									
6									
7									
8									
9									
10									

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Thabiso Modise	23/03/08	17:05	Ashlie Sukumar ASHLIE SUKUMAR	2023/03/08	16:59	

Laboratory Use Only

Time Sensitive | Temperature (°C) on Recei: 4/4/5 | Custody Seal Present ✓ | Intact ✓ | Yes | No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

Bureau Veritas Canada (2019) Inc.