Osmington Gerofsky Development Corporation
141 Adelaide St. W
Toronto, ON M5H 3L5

File No. 22-024 (Rev2)
October 6, 2023

Attention: Laurie Payne

**RE: HYDROGEOLOGICAL REVIEW REPORT**
**33 Davisville Avenue / 60 Balliol Street, Toronto, Ontario**

Grounded Engineering Inc. ("Grounded") is pleased to provide you with this Hydrogeological Review for the site known as 33 Davisville Avenue / 60 Balliol Street, in Toronto, Ontario.

The following documents are provided as part of this package:

- Foundation Drainage Summary Form and Technical Brief
- City of Toronto Hydrogeological Review Summary Form
- Hydrogeological Review Report

As part of the development applications process, the City of Toronto requires that both documents are submitted together for review.

We trust that the information contained with this report is adequate for your present requirements. If we can be of further assistance, please do not hesitate to contact us.

Matthew Garcia, BASc, EIT
Project Manager

Matthew Bielaski, P.Eng., $QP_{ESA-RA}$
Principal

# FOUNDATION DRAINAGE SUMMARY FORM

TORONTO

| General Information |
|---|
| **Applicant Name:** Osmington Gerofsky Developmen Corp |
| **Development Address:** 33 Davisville Avenue & 60 Balliol Street |
| **Development Application #:** 22 162080 STE 12 SA |
| **Available Sewer Servicing:** ■ Storm Sewers ■ Combined Sewers □ Sanitary Sewers |
| **Groundwater Level Assessment** |
| **GW Monitoring Approach:** □ 1. Flexible Year-Round ■ 2. Peak Season □ 3. Alternate (Attach Justification) |
| **Monitoring Length [weeks]:** 12± |
| **Monitoring Months:** □ Jan □ Feb □ Mar ■ Apr ■ May ■ Jun □ Jul □ Aug □ Sept □ Oct □ Nov □ Dec |
| **# of Measurements:** 6+ |
| **Peak Observed GWL [masl]:** 144.4 |
| **Estimated Maximum Anticipated GWL [masl]:** 145.2 |
| **Lowest Elevation of Proposed Structure [masl]:** 140.6 |
| **Proposed Condition and Measures** *(Complete all)* |
| **On-site Management Provided?** ■ Yes (Describe) □ No (Provide Rationale) |
| **Infrastructure Required for Future Emergency Repair?** ■ Yes □ No |
| **Foundation Drainage Expected to Contain Only Infiltrated Stormwater?** □ Yes ■ No |
| **Site Condition:** ■ Non-Brownfield with no RSC □ Brownfield with RSC + Risk Management □ Other (Describe) |
| **Proposed Foundation Drainage Management** *(Select one)* |
| □ **On-site Management** (no long-term discharge to sewers) |
| ■ **On-site Management with Infrastructure for Future Emergency Repair** (in accordance with *Policy 4.4*) |
| □ **Long-term Discharge to Storm or Combined Sewers** (in accordance with *Policy Statement 4.3*) |
| □ Request for Exemption of Policy to apply for Long-Term Discharge Agreement (in accordance with *Policy Sec 5.0*) |
| **Description/Attachments in Foundation Drainage Technical Brief** *(Select all that apply)* |
| ■ On-site Management Description/Rationale for Technological Infeasibility |
| □ GWL Monitoring Well Plan, including Monitoring Methodology and Justification (where alternate is proposed) |
| □ GWL Monitoring and Peak Flow Estimation Results, Analysis & Interpretation |
| □ Building Elevation Plan |
| □ Site Condition Supporting Documentation (e.g., Brownfield/RSC Status, Soil Quality) |
| □ Exemption Rationale and Documentation for Technical Infeasibility and/or Extenuating Circumstances.<br><br>Describe physical and design constraints to substantiate that a technical solution was not feasible; include documentation to substantiate that there are extenuating circumstances (e.g., application submission timeline and milestones) that may warrant an exemption, where applicable. |
| □ Other Documentation; *Specify* - |
| **Qualified Professional Sign-Off** |
| Name: Matthew Bielaski — Designation: P.Eng., QP(RA-ESA) |
| Signature: — Date: 2023-10-06 |

Form to accompany *Foundation Drainage Technical Brief* document prepared in accordance with the *Foundation Drainage Policy* and *Guidelines*.

November 1, 2021

Osmington Gerofsky Development Corp.
141 Adelaide St. W
Toronto, ON M5H 3L5

File No. 22-024 (Rev2)
October 6, 2023

Attention: Laurie Payne

**Subject: Foundation Drainage Summary Form Technical Brief**
**33 Davisville Avenue / 60 Balliol Street, Toronto, Ontario**

Grounded Engineering Inc. ("Grounded") is pleased to provide you with this Foundation Drainage Summary Form Technical Brief for the site known as 33 Davisville Avenue / 60 Balliol Street, in Toronto, Ontario.

The proposed project includes constructing a 40-storey residential tower with three levels of underground (P3). The lowest elevation of the proposed structure (Elev. 140.6 m) is below the Maximum Anticipated Groundwater Level (MAGWL) (Elev. 145.2 m). The proposed development will be watertight.

We trust that the information contained in this letter is sufficient for your present requirements. If we can be of any further assistance, please do not hesitate to contact us.

For and on behalf of our team,

Matthew Bielaski, P.Eng., $QP_{RA\text{-}ESA}$
Principal

TORONTO

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# HYDROLOGICAL REVIEW SUMMARY

The form is to be completed by the Professional that prepared the Hydrological Review.
Use of the form by the City of Toronto is not to be construed as verification of engineering/hydrological content.

Refer to the Terms of Reference, Hydrological Review:
Link to Terms of Reference Hydrological Review

| For City Staff Use Only: | |
|---|---|
| **Name of ECS Case Manager (Please print)** | |
| **Date Review Summary provided to to TW, EM&P** | |

**IF ANY OF THE REQUIREMENTS LISTED BELOW HAVE NOT BEEN INLCUDED IN THE HYDROLOGICAL REVIEW, THE REVIEW WILL BE CONSIDERED INCOMPLETE.**
**THE GREY SHADED BOXES WILL REQUIRE A CONSISTANCY CHECK BY THE ECS CASE MANAGER.**

**Summary of Key Information:**

| SITE INFORMATION | | Page # & Section # of Review | Review Includes this Information City Staff (Check) |
|---|---|---|---|
| Site Address | 33 Davisville Avenue / 60 Balliol Street, Toronto, Ontario | Title, i (Exec Sum), 1 (Sec 1) | |
| Postal Code | M4S 2Y9 | 1 (Sec 1) | |
| Property Owner (on request for comments memo) | 3414493 CANADA INC. | Title, i (Exec Sum), 1 (Sec 1) | |
| Proposed description of the project (if applicable)<br>(point towers, number of podiums) | Construction of 40-storey residential tower with three underground parking levels. | i (Exec Sum), 1-2 (Sec 1) | |
| Land Use (ex. commercial, residential, mixed, institutional, industrial) | Current: Residential<br>Proposed: Residential | i (Exec Sum), 1-2 (Sec 1) | |
| Number of below grade levels for the proposed structure | Three (3) | i (Exec Sum), 2 (Sec 1) | |
| **HYDROLOGICAL REVIEW INFORMATION** | | | |
| Date Hydrological Review was prepared: | 2023-10-06 | Title | |
| Who Performed the Hydrological Review<br>(Consulting Firm) | Grounded Engineering Inc. | Title, i (Exec Sum), 2 (Sec 1) | |
| Name of Author of Hydrological Review | Matthew Bielaski, P.Eng., $QP_{ESA-RA}$ | 2 (Sec 1), 14 (Sec 14) | |

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# HYDROLOGICAL REVIEW SUMMARY

| SITE INFORMATION | | Page # & Section # of Review | Review Includes this Information City Staff (Check) |
|---|---|---|---|
| Check the directories on the website for Professional Geoscientists and/or Professional Engineers of Ontario been checked to ensure that the Hydrological Report has been prepared by a qualified person who is a licensed Professional Geoscientist as set out in the Professional Geoscientist Act of Ontario or a Professional Engineer?<br>PEO: Professional Engineers of Ontario<br>APGO:<br>Association of Professional Geoscientists of Ontario | ✓ Yes | N/A | |
| Has the Hydrological Review been prepared in accordance with all the following:<br>• Ontario Water Resources Act<br>• Ontario Regulation 387/04<br>• Toronto Municipal Code Chapter 681-Sewers | ✓ Yes | 2-3 (Sec 1) | |
| Total Volume (L/day) Short Term Discharge of groundwater (construction dewatering) **with safety factor included** | Groundwater Seepage = 180,000 L/day<br>Design Rainfall = 57,000 L/day<br>Total = 237,000 L/day<br>What safety factor was used?<br>2.5 for groundwater seepage. | ii (Exec Sum),<br>10 (Sec 10) | |

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## HYDROLOGICAL REVIEW SUMMARY

| SITE INFORMATION | | Page # & Section # of Review | Review Includes this Information City Staff (Check) |
|---|---|---|---|
| Total Volume (L/day) Short Term Discharge of groundwater (construction dewatering) **without safety factor included** | Groundwater Seepage = 70,618 L/day<br>Design Rainfall = 67,000 L/day<br>Total = 137,618 L/day | Appendix G | |
| Total Volume (L/day) Long Term drainage of groundwater (from foundation drainage, weeping tiles, sub slab drainage) **with safety factor included**<br><br>If the development is part of a multiple tower complex, include total volume for each separate tower | Groundwater Seepage = 0*<br>Design Rainfall = 0*<br>Total = 0*<br>*assuming structure is made watertight<br><br>What safety factor was used?<br>2.5 for groundwater seepage when applicable. | ii (Exec Sum),<br>10 (Sec 10) | |
| List the nearest surface water (river, creek, lake) | The nearest waterbody is Yellow Creek, located approximately 900 m South of the Property. | 4 (Sec 3) | |
| Lowest basement elevation | 140.6± masl – base of excavation<br>142.6± masl – finish floor elevation | i (Exec Sum), Appendix F | |
| Foundation elevation | 140.6± masl – base of raft | i (Exec Sum) | |
| Ground elevation | 155.0± masl | Appendix F | |

# HYDROLOGICAL REVIEW SUMMARY

| SITE INFORMATION | | Page # & Section # of Review | Review Includes this Information City Staff (Check) |
|---|---|---|---|
| **STUDY AREA MAP** | | | **Review Includes this Information City Staff (Check)** |
| Study area map(s) have been included in the report. | ✓ Yes | Figures 1 & 2 | N/A |
| Study area map(s) been prepared according to the Hydrological Review Terms of Reference. | ✓ Yes | Figures 1 & 2<br>3 (Sec 2) | N/A |
| **WATER LEVEL AND WELLS** | | **Page # & Section # of every occurrence in the Review** | **Review Includes this Information (City Staff Initial)** |
| The groundwater level has been monitored using all wells located on site (within property boundary). | ✓ Yes | 4-5 (Sec 4 and 5), Figures 2 & 3 | |
| The static water level measurements have been monitored at all monitoring wells for a minimum of 3 months with samples taken every 2 weeks for a minimum of 6 samples.<br>The intent is for the qualified professional to use professional judgement to estimate the seasonally high groundwater level. | ✓ Yes | 4-5 (Sec 4 and 5), Appendix A | |

## HYDROLOGICAL REVIEW SUMMARY

| SITE INFORMATION | | Page # & Section # of Review | Review Includes this Information City Staff (Check) |
|---|---|---|---|
| All water levels in the wells have been measured with respect to masl. | ✓ Yes | 5 (Sec 4), Appendix A | |
| A table of geology/soil stratigraphy for the property has been included. | ✓ Yes | i (Exec Sum), 4 (Sec 3) | |
| **GEOLOGY AND PHYSICAL HYDROLOGY** | | **Page # & Section # of every occurrence in the Review** | **Review Includes this Information (City Staff Initial)** |
| The review has made reference to the soil materials including thickness, composition and texture, and bedrock environments. | ✓ Yes | 4 (Sec 3) | |
| Key aquifers and the site's proximity to nearby surface water has been identified. | ✓ Yes | 4 (Sec 3) | N/A |
| **PUMP TEST/SLUG TEST/DRAWDOWN ANALYSIS** | | **Page # & Section # of every occurrence in the Review** | **Review Includes this Information City Staff (Check)** |
| A summary of the pumping test data and analysis is included in the review. | ☒ No<br>A pumping test was not conducted. | 6 (Sec 5.1) | |
| The pump test been carried out for at least 24 hours if possible. If not, has a slug test been conducted? | ✓ Yes<br>A pump test was not conducted. Slug tests were conducted. | 6 (Sec 5.2) | |

## HYDROLOGICAL REVIEW SUMMARY

| SITE INFORMATION | | Page # & Section # of Review | Review Includes this Information City Staff (Check) |
|---|---|---|---|
| Have the monitoring well(s) have been monitored using digital devices? If yes how frequently? | ✓ Yes<br>Yes, water level measurements have been taken using a digital water level meter.<br>The frequency of the measurements is once every two weeks over the course of a 3-month period. | 5 (Sec 4) | |
| If a slug or pump test has been conducted has the static groundwater level been monitored at all monitoring well(s) multiple times to measure recovery?<br>-prior to the slug or pumping test(s)?<br>-post slug or pumping test(s)? | ✓ Yes<br>✓ Yes<br>✓ Yes | 5 (Sec 4),<br>6 (Sec 5.2) | N/A |
| The above noted slug or pump tests have been included in the report. | ✓ Yes | 6 (Sec 5.2),<br>Appendix B | |
| **WATER QUALITY** | | **Page # & Section # of every occurrence in the Review** | **Review Includes this Information City Staff (Check)** |
| The report includes baseline water quality samples from a laboratory. The water quality must be analyzed for all parameters listed in Tables 1 and 2 of Chapter 681 Sewers of the Toronto Municipal Code (found in Appendix A) and the samples must have to be taken unfiltered within 9 months of the date of submission. | ✓ Yes | 7-8 (Sec 7),<br>Appendix E | |

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# HYDROLOGICAL REVIEW SUMMARY

| SITE INFORMATION | | Page # & Section # of Review | Review Includes this Information City Staff (Check) |
|---|---|---|---|
| The water quality data templates in Appendix A have been completed for each sample taken for both sanitary/combined and storm sewer limits. | For sanitary discharge- See the sanitary/combined sewer parameter limit template<br><br>For storm discharge- See the storm sewer parameter limit template | Pg. 11-14 of Hydrological Review Summary | |
| Qualified professional to list all sample parameters that have violated the Bylaw limits for each sample taken for the sanitary/combined Bylaw limits<br>**If there are any sample parameter Exceedances the groundwater can't be discharged as is.** | Sanitary Combined Sewer:<br>• All parameters tested met the Sanitary/Combined Sewer Bylaw Limits | 7-8 (Sec 7) | |
| Qualified professional to list all sample parameters that have violated the Bylaw limits for each sample taken for the storm Bylaw limits.<br><br>**If there are any sample parameter exceedances the groundwater can't be discharged as is.** | Storm Sewer:<br>• Total Suspended Solids (Result 1790 mg/L; Limit 15 mg/L; RDL 3.0 mg/L)<br>• Total Manganese (Result 0.0737 mg/L; Limit 0.05 mg/L; RDL 0.00050) | 7-8 (Sec 7) | |
| The water quality samples have been analyzed by a Canadian laboratory accredited and licensed by Standards Council of Canada and/or Canadian Association for Laboratory Accreditation.<br><br>List of Canadian accredited laboratories:<br>Standards Council of Canada | ✓ Yes | Appendix E | N/A |
| A chain of custody record for the samples is included with the report. | ✓ Yes | Appendix E | |
| Has the chain of custody reference any filtered sample? If yes, the report has to be amended and re-submitted to include only non-filtered samples. | ☒ No | Appendix E | |

## HYDROLOGICAL REVIEW SUMMARY

| SITE INFORMATION | | Page # & Section # of Review | Review Includes this Information City Staff (Check) |
|---|---|---|---|
| List any of the sample parameters that exceed the Bylaw limits with the reporting detection limit (RDL) included. | Storm Sewer:<br>• Total Suspended Solids (Result 1790 mg/L; Limit 15 mg/L; RDL 3.0 mg/L)<br>• Total Manganese (Result 0.0737 mg/L; Limit 0.05 mg/L; RDL 0.00050) | 7-8 (Sec 7),<br>Appendix E | |
| A true copy of the Certificate of Analysis report, is included with the report. | ✓ Yes | Appendix E | |
| **EVALUATION OF IMPACT** | | **Page # & Section # of every occurrence in the Review** | **Review Includes this Information City Staff (Check)** |
| Does the report recommend a back-up system or relief safety valve(s)?<br><br>Does the associated Geotechnical report recommend a back-up system or relief safety valve(s)? | ☒ No (for watertight underground structure)<br><br>☒ No (if underground structure is watertight) | 9 (Sec 9)<br><br>15 (Sec 3.5) of Geotech Report | |
| The taking and discharging of groundwater on site has been analyzed to ensure that no negative impacts will occur to: the City sewage works in terms of quality and quantity (including existing infrastructure), the natural environment, and settlement issues. | ✓ Yes | 11-12 (Sec 11) | N/A |
| Has it been determined that there will be a negative impact to the natural environment, City sewage works, or surrounding properties has the study identified the following: the extent of the negative impact, the detail of the precondition state of all the infrastructure, City sewage works, and natural environment within the effected zone and the proposed remediation and monitoring plan? | ☒ No<br><br>**If yes, identify impact:** | 11-13 (Sec 11-12) | N/A |

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## HYDROLOGICAL REVIEW SUMMARY

Summary of Additional Information and Key Items (if applicable):

# Appendix A:

**SANITARY/COMBINED** **Sample Location: BH1**

| Inorganics | | Sample Result (mg/L) | Sample Result with upper RDL included (mg/L) | |
|---|---|---|---|---|
| Parameter | mg/L | | | ug/L |
| BOD | 300 | 4.8 | 4.8 (2) | 300,000 |
| Fluoride | 10 | 0.265 | 0.265 (0.1) | 10,000 |
| TKN | 100 | 1.48 | 1.48 (0.05) | 100,000 |
| pH | 6.0 - 11.5 | 0.284 | 0.284 (0.1) | 6.0 - 11.5 |
| Phenolics 4AAP | 1 | <0.001 | <0.001 (0.001) | 1,000 |
| TSS | 350 | 134 | 134 (3) | 350,000 |
| Total Cyanide | 2 | <0.0020 | <0.0020 (0.002) | 2,000 |
| **Metals** | | | | |
| Chromium Hexavalent | 2 | 0.00077 | 0.00077 (0.0005) | 2,000 |
| Mercury | 0.01 | <0.000005 | <0.000005 (0.000005) | 10 |
| Total Aluminum | 50 | 0.154 | 0.154 (0.01) | 50,000 |
| Total Antimony | 5 | 0.00052 | 0.00052 (0.0001) | 5,000 |
| Total Arsenic | 1 | 0.00155 | 0.00155 (0.0001) | 1,000 |
| Total Cadmium | 0.7 | 0.00001 | 0.00001 (0.00001) | 700 |
| Total Chromium | 4 | 0.00077 | 0.00077 (0.0005) | 4,000 |
| Total Cobalt | 5 | 0.0005 | 0.0005 (0.0001) | 5,000 |
| Total Copper | 2 | 0.0074 | 0.0074 (0.001) | 2,000 |
| Total Lead | 1 | <0.0001 | <0.0001 (0.0001) | 1,000 |
| Total Manganese | 5 | 0.0737 | 0.0737 (0.0005) | 5,000 |
| Total Molybdenum | 5 | 0.0121 | 0.0121 (0.00005) | 5,000 |
| Total Nickel | 2 | 0.00237 | 0.00237 (0.0005) | 2,000 |
| Total Phosphorus | 10 | 0.284 | 0.284 (0.003) | 10,000 |
| Total Selenium | 1 | 0.000356 | 0.000356 (0.00005) | 1,000 |
| Total Silver | 5 | <0.00005 | <0.00005 (0.00005) | 5,000 |
| Total Tin | 5 | 0.00191 | 0.00191 (0.0001) | 5,000 |
| Total Titanium | 5 | 0.00689 | 0.00689 (0.0003) | 5,000 |
| Total Zinc | 2 | <0.003 | <0.003 (0.003) | 2,000 |
| **Petroleum Hydrocarbons** | | | | |
| Animal/Vegetable Oil & Grease | 150 | <5 | <5 (5) | 150,000 |
| Mineral/Synthetic Oil & Grease | 15 | <2.5 | <2.5 (2.5) | 15,000 |

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| Volatile Organics | | Sample Result (mg/L) | Sample Result with upper RDL included (mg/L) | |
|---|---|---|---|---|
| Parameter | mg/L | | | ug/L |
| Benzene | 0.01 | <0.0005 | <0.0005 (0.0005) | 10 |
| Chloroform | 0.04 | <0.001 | <0.001 (0.001) | 40 |
| 1,2-Dichlorobenzene | 0.05 | <0.0005 | <0.0005 (0.0005) | 50 |
| 1,4-Dichlorobenzene | 0.08 | <0.0005 | <0.0005 (0.0005) | 80 |
| Cis-1,2-Dichloroethylene | 4 | <0.0005 | <0.0005 (0.0005) | 4,000 |
| Trans-1,3-Dichloropropylene | 0.14 | <0.0005 | <0.0005 (0.0005) | 140 |
| Ethyl Benzene | 0.16 | <0.0005 | <0.0005 (0.0005) | 160 |
| Methylene Chloride | 2 | <0.002 | <0.002 (0.002) | 2,000 |
| 1,1,2,2-Tetrachloroethane | 1.4 | <0.0005 | <0.0005 (0.0005) | 1,400 |
| Tetrachloroethylene | 1 | <0.0005 | <0.0005 (0.0005) | 1,000 |
| Toluene | 0.016 | <0.0005 | <0.0005 (0.0005) | 16 |
| Trichloroethylene | 0.4 | <0.0005 | <0.0005 (0.0005) | 400 |
| Total Xylenes | 1.4 | <0.0011 | <0.0011 (0.0011) | 1,400 |
| Semi-Volatile **Organics** | | | | |
| Di-n-butyl Phthalate | 0.08 | <0.001 | <0.001 (0.001) | 80 |
| Bis (2-ethylhexyl) Phthalate | 0.012 | <0.002 | <0.002 (0.002) | 12 |
| 3,3'-Dichlorobenzidine | 0.002 | <0.0004 | <0.0004 (0.0004) | 2 |
| Pentachlorophenol | 0.005 | <0.0005 | <0.0005 (0.0005) | 5 |
| Total PAHs | 0.005 | <0.0017 | <0.0017 (0.0017) | 5 |
| Misc **Parameters** | | | | |
| Nonylphenols | 0.02 | <0.001 | <0.001 (0.001) | 20 |
| Nonylphenol Ethoxylates | 0.2 | <0.0001 | <0.0001 (0.0001) | 200 |

Sample Collected: April 4, 2022

Temperature: 9.0 °C

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# HYDROLOGICAL REVIEW SUMMARY

**STORM** **Sample Location: BH1**

| Inorganics | | Sample Result (mg/L) | Sample Result with upper RDL included (mg/L) | |
|---|---|---|---|---|
| Parameter | mg/L | | | ug/L |
| pH | 6.0 - 9.5 | 0.284 | 0.284 (0.1) | |
| BOD | 15 | 4.8 | 4.8 (2) | 15,000 |
| Phenolics 4AAP | 0.008 | <0.001 | <0.001 (0.001) | 8 |
| TSS | 15 | 134 | 134 (3) | 15,000 |
| Total Cyanide | 0.02 | <0.0020 | <0.0020 (0.002) | 20 |
| **Metals** | | | | |
| Total Arsenic | 0.02 | 0.00155 | 0.00155 (0.0001) | 20 |
| Total Cadmium | 0.008 | 0.00001 | 0.00001 (0.00001) | 8 |
| Total Chromium | 0.08 | 0.00077 | 0.00077 (0.0005) | 80 |
| Chromium Hexavalent | 0.04 | 0.00077 | 0.00077 (0.0005) | 40 |
| Total Copper | 0.04 | 0.0074 | 0.0074 (0.001) | 40 |
| Total Lead | 0.12 | <0.0001 | <0.0001 (0.0001) | 120 |
| Total Manganese | 0.05 | 0.0737 | 0.0737 (0.0005) | 50 |
| Total Mercury | 0.0004 | <0.000005 | <0.000005 (0.000005) | 0.4 |
| Total Nickel | 0.08 | 0.00237 | 0.00237 (0.0005) | 80 |
| Total Phosphorus | 0.4 | 0.284 | 0.284 (0.003) | 400 |
| Total Selenium | 0.02 | 0.000356 | 0.000356 (0.00005) | 20 |
| Total Silver | 0.12 | <0.00005 | <0.00005 (0.00005) | 120 |
| Total Zinc | 0.04 | <0.003 | <0.003 (0.003) | 40 |
| **Microbiology** | | | | |
| E.coli | 200 | <2 | <2 (2) | 200,000 |
| **Volatile Organics** | | | | |
| Parameter | mg/L | | | ug/L |
| Benzene | 0.002 | <0.0005 | <0.0005 (0.0005) | 2 |
| Chloroform | 0.002 | <0.001 | <0.001 (0.001) | 2 |
| 1,2-Dichlorobenzene | 0.0056 | <0.0005 | <0.0005 (0.0005) | 6 |
| 1,4-Dichlorobenzene | 0.0068 | <0.0005 | <0.0005 (0.0005) | 7 |
| Cis-1,2-Dichloroethylene | 0.0056 | <0.0005 | <0.0005 (0.0005) | 6 |
| Trans-1,3-Dichloropropylene | 0.0056 | <0.0005 | <0.0005 (0.0005) | 6 |
| Ethyl Benzene | 0.002 | <0.0005 | <0.0005 (0.0005) | 2 |
| Methylene Chloride | 0.0052 | <0.002 | <0.002 (0.002) | 5 |
| 1,1,2,2-Tetrachloroethane | 0.017 | <0.0005 | <0.0005 (0.0005) | 17 |
| Tetrachloroethylene | 0.0044 | <0.0005 | <0.0005 (0.0005) | 4 |
| Toluene | 0.002 | <0.0005 | <0.0005 (0.0005) | 2 |
| Trichloroethylene | 0.0076 | <0.0005 | <0.0005 (0.0005) | 8 |
| Total Xylenes | 0.0044 | <0.0011 | <0.0011 (0.0011) | 4 |

## HYDROLOGICAL REVIEW SUMMARY

| Semi-Volatile Organics | | Sample Result (mg/L) | Sample Result with upper RDL included (mg/L) | |
|---|---|---|---|---|
| Di-n-butyl Phthalate | 0.015 | <0.001 | <0.001 (0.001) | 5 |
| Bis (2-ethylhexyl) Phthalate | 0.0088 | <0.002 | <0.002 (0.002) | 8.8 |
| 3,3'-Dichlorobenzidine | 0.0008 | <0.0004 | <0.0004 (0.0004) | 0.8 |
| Pentachlorophenol | 0.002 | <0.0005 | <0.0005 (0.0005) | 2 |
| Total PAHs | 0.002 | <0.0017 | <0.0017 (0.0017) | 2 |
| PCBs | 0.0004 | <0.004 | <0.004 (0.00004) | 0.4 |
| **Misc Parameters** | | | | |
| Nonylphenols | 0.001 | <0.001 | <0.001 (0.001) | 1 |
| Nonylphenol Ethoxylates | 0.01 | <0.0001 | <0.0001 (0.0001) | 10 |

Sample Collected: April 4, 2022

Temperature: 9.0 °C

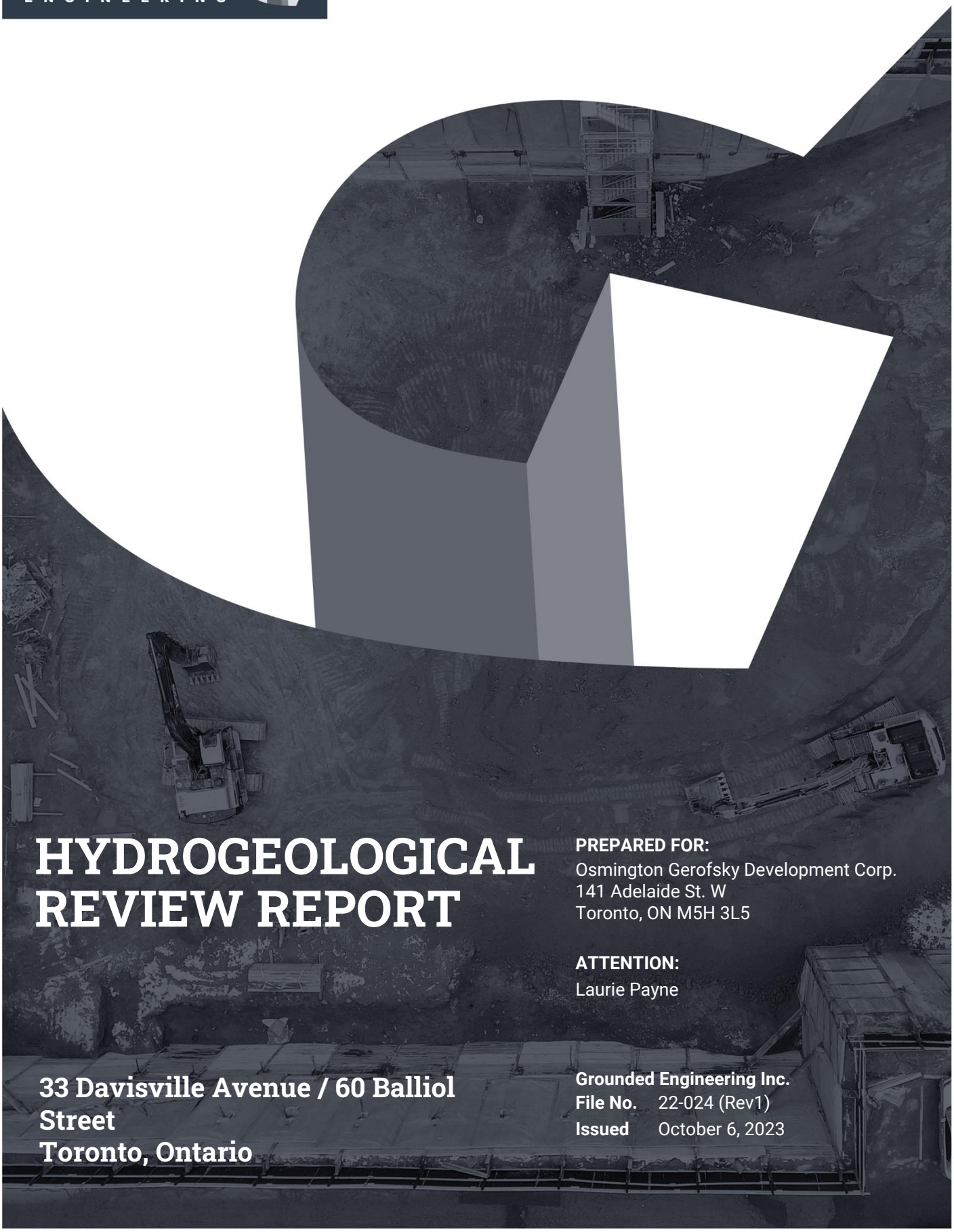
Consulting Firm that prepared Hydrological Report: Grounded Engineering Inc.

Qualified Professional who completed the report summary: Matt Bielaski, P.Eng.

Print Name

Qualified Professional who completed the report summary:


Signature Date & Stamp



# HYDROGEOLOGICAL REVIEW REPORT

**PREPARED FOR:**
Osmington Gerofsky Development Corp.
141 Adelaide St. W
Toronto, ON M5H 3L5

**ATTENTION:**
Laurie Payne

## 33 Davisville Avenue / 60 Balliol Street
## Toronto, Ontario

**Grounded Engineering Inc.**
**File No.** 22-024 (Rev1)
**Issued** October 6, 2023

1 Banigan Drive, Toronto ON M4H 1G3 | (647) 264-7909 | groundedeng.ca | Grounded Engineering

# Executive Summary

Grounded Engineering Inc. (Grounded) was retained by Osmington Gerofsky Development Corp. to conduct a Hydrogeological Review for the proposed redevelopment of 33 Davisville Avenue / 60 Balliol Street in Toronto, Ontario (site). The conclusions of the investigation are summarized as follows:

## Development Information

**Current Development**

| Development Phase | Above Grade Levels | Below Grade Levels | | | |
|---|---|---|---|---|---|
| | | Level # | Lowest Finished Floor | | Approximate Base of Footings (masl) |
| | | | Depth (m) | Elevation (masl) | |
| 33 Davisville Ave | 21 | 3 | 8.5± | 146.5± | 145.5± |

**Proposed Development**

| Development Phase | Above Grade Levels | Below Grade Levels | | | |
|---|---|---|---|---|---|
| | | Level # | Lowest Finished Floor | | Approximate Base of Raft (masl) |
| | | | Depth (m) | Elevation (masl) | |
| Additional Tower Structure | 40 | 3 | 12.4± | 142.6± | 140.6± |

## Site Conditions

**Site Stratigraphy**

| Stratum/Formation | Aquifer or Aquitard | Depth Range (mbgs) | Elevation Range (masl) | Hydraulic Conductivity (m/s) |
|---|---|---|---|---|
| Fill | Aquifer | 0.1 to 5.5 | 155.7 to 150.3 | $1.0 \times 10^{-6}$ |
| Sandy Silt Till | Aquifer | 0.2 to 10.7 | 153.6 to 144.2 | $1.0 \times 10^{-7}$ |
| Sands | Aquifer | 0.9 to 16.8 | 145.3 to 137.7 | $5.0 \times 10^{-6}$ |
| Clay and Silt | Aquitard | 7.6 to 29.0 | 140.0 to 126.1 | $4.0 \times 10^{8}$ |
| Lower Sands | Aquifer | 16.8 to 30.8 | 130.0 to 124.3 | $5.0 \times 10^{-5}$ |

*Indicates conductivity was calculated by Slug Test
**Indicates conductivity was estimated using grain size analysis
***Indicates conductivity was estimated using typical published values from Freeze and Cherry (1979)

| Groundwater Elevation | |
|---|---|
| **Design Groundwater Elevation (masl)** | 144.4 |
| **MAGWL Assessment Option** | Option 2 |
| **Seasonal Fluctuation (m)** | 0.8 |
| **Maximum Anticipated Groundwater Level (MAGWL)** | 145.2 |

| Groundwater Quality | | | | |
|---|---|---|---|---|
| **Sample ID** | **Sample Date** | **Sample Expiry Date** | **City of Toronto Storm Sewer Limits** | **City of Toronto Sanitary and Combined Sewer Limits** |
| SW-UF-BH1 | April 4, 2022 | Dec. 4, 2022 | Exceeds | Meets |

## Groundwater Control

| Stored Groundwater (pre-excavation/dewatering) | | | | | |
|---|---|---|---|---|---|
| **Volume of Excavation ($m^3$)** | **Volume of Excavation Below Water Table ($m^3$)** | **Volume of Stored Groundwater** | | **Volume of Available Groundwater** | |
| | | **($m^3$)** | **(L)** | **($m^3$)** | **(L)** |
| 32,200 | 8,450 | 2,600 | 2,600,000 | 2,300 | 2,300,000 |

| Short Term (Construction) Groundwater Quantity – Safety Factor of 2.5 Used | | | | | |
|---|---|---|---|---|---|
| **Groundwater Seepage** | | **Design Rainfall Event (25mm)** | | **Total Daily Water Takings** | |
| **L/day** | **L/min** | **L/day** | **L/min** | **L/day** | **L/min** |
| 180,000 | 125.0 | 57,000 | 39.6 | 237,000 | 164.6 |

| Long Term (Permanent) Groundwater Quantity – Safety Factor of 2.5 Used | | | | | |
|---|---|---|---|---|---|
| **Groundwater Seepage** | | **Infiltration Design Rainfall Event (25mm)** | | **Total Daily Water Takings** | |
| **L/day** | **L/min** | **L/day** | **L/min** | **L/day** | **L/min** |
| 0 | 0 | 0 | 0 | 0 | 0 |

| Zone of Influence | |
|---|---|
| **Zone of Influence (m)** | **Maximum Potential Settlement (mm)** |
| 30 | 2 |

| Regulatory Requirements | |
|---|---|
| Environmental Activity and Sector Registry (EASR) Posting | Required |
| Short Term Permit to Take Water (PTTW) | Not Required |
| Long Term Permit to Take Water (PTTW) | Not Required |
| Short Term Discharge Agreement City of Toronto | Required |
| Long Term Discharge Agreement City of Toronto | Not Required |

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# FIGURES

Figure 1 – Study Area Map
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# APPENDICES

Appendix A – Borehole Logs
Appendix B – Aquifer Response Tests
Appendix C – Grain Size Analysis
Appendix D – HydrogeoSieveXL Data
Appendix E – Laboratory Certificate of Analysis
Appendix F – Finite Element Model
Appendix G – Dewatering Calculations

# 1 Introduction

Osmington Gerofsky Development Corporation has retained Grounded Engineering Inc. ("Grounded") to provide hydrogeological engineering design advice for their proposed development at 33 Davisville Avenue / 60 Balliol Street, in Toronto, Ontario. This revision includes updated engineering for updated site plans.

This Hydrogeological Review has been prepared in support of an Official Plan Amendment (OPA), Zoning By-law Amendment (ZBA) and a Site Plan Approval (SPA) application submitted by Osmington Gerofsky Development Corporation, the applicant, for the site municipally known as 33 Davisville Avenue and 60 Balliol Street (the "Subject Lands"). The Subject Lands are located between Davisville Avenue and Balliol Street, approximately 85 metres east of Yonge Street, and represents a total area of 5,638 square metres (0.56 hectares). The property is managed by Real Property Management Services ("RPMS").

The Subject Lands consists of a 21-storey, 266-unit rental apartment building located on the northern portion of the site fronting Davisville Avenue (33 Davisville Avenue). The southern portion of the site is currently used as a privately-owned open space (60 Balliol Street). The requested OPA, ZBA and SPA applications would permit infill intensification on the lands known as 60 Balliol Street (the "Development Site") with a 40-storey residential building comprised of a 5-storey base building and 35 storey tower element on a developable site area of 2,879 square metres (0.28 ha). The existing 21-storey building currently on site at 33 Davisville Avenue will be retained.

The proposed building will include approximately 526 new dwelling units (in a mix of studio, one-bedroom, two-bedroom, and three-bedroom units) across 30,786 square metres of residential gross floor area.

| **Property Information** | |
|---|---|
| Location of Property | 33 Davisville Avenue / 60 Balliol Street, Toronto, Ontario, M4S 2Y9 |
| Ownership of Property | 3414493 CANADA INC. |
| Property Dimensions (m) | 70± x 80± (equivalent rectangular dimensions) |
| Property Area ($m^2$) | 5,600± |

| **Existing Development** | |
|---|---|
| Number of Building Structures | One (1) |
| Number of Above Grade Levels | Twenty-one (21) |

| | |
|---|---|
| Number of Underground Levels | Three (3) |
| Sub-Grade Depth of Development (m) | 8.5± |
| Sub-Grade Area ($m^2$) | 3,200± |
| Land Use Classification | Residential |

| **Proposed Development** | |
|---|---|
| Number of Building Structures | One (1) additional tower structure (including replacement of existing section of underground parking structure) |
| Number of Above Grade Levels | Forty (40) |
| Number of Underground Levels | Three (3) |
| Sub-Grade Depth of Development (m) | 12.4± |
| Sub-Grade Area ($m^2$) | 2,240± |
| Land Use Classification | Residential |

| **Qualified Person and Hydrogeological Review Information** | |
|---|---|
| Qualified Person | Matthew Bielaski, P.Eng., $QP_{ESA-RA}$ |
| Consulting Firm | Grounded Engineering Inc. |
| Date of Hydrogeological Review | October 6, 2023 |
| Scope of Work | ▪ Review of MECP Water Well Records for the area<br>▪ Review of geological information for the area<br>▪ Review of topographic information for the area<br>▪ Advancement of 6 boreholes to a maximum depth of 31 m, with installation of 6 monitoring wells<br>▪ Completion of a 24-hour pump test (if feasible)<br>▪ Completion of slug tests in all available monitoring wells<br>▪ Groundwater elevation monitoring for three (3) months<br>▪ Groundwater sampling and analysis to the City of Toronto Sewer Use Limits<br>▪ Assessment of groundwater controls and potential impacts<br>▪ Report preparation in accordance with Ontario Water Resources Act, Ontario Regulation 387/04 and Toronto Municipal Code Chapter 681 |

| General Hydrogeological Characterization | |
|---|---|
| Property Topography | The site has an approximate ground surface elevation of 155.0± masl. |
| Local Physiographic Features | The site is composed of sandy silt till, sand, and clay and silt till deposits.<br>The site is part of the physiographic landform known as the till plains. The till plains are large, generally flat or gently-sloping, areas of glacial till which consists of material from clay to large glacial erratics. |
| Regional Physiographic Features | The site is within the physiographic region known as the South Slope of the Oak Ridges Moraine. The South Slope extends from the Niagara Escarpment to the Trent River, covering approximately 940 square miles. It consists of till material related to underlying rock which varies between limestones of the Verulam and Lindsay Formations, grey shale of the Georgian Bay Formation, and reddish shales of the Queenston Formation. The till material is generally more sandy in the east and clayey in the west. |
| Watershed | The site is located within the Don River Watershed. Locally, groundwater is anticipated to flow south towards a tributary of the Don River. |
| Surface Drainage | Surface water is expected to flow towards municipal catch basins located on or adjacent to the site, via Balliol Street to the South. |

# 2 Study Area Map

A map has been enclosed which shows the following information:

- All monitoring wells identified on site
- All monitoring wells identified off site within the study area
- All boreholes identified on site
- All buildings identified on site and within the study area
- The property boundaries of the site
- Any watercourses and drainage features within the study area.

# 3 Geology and Physical Hydrogeology

The site stratigraphy, including soil materials, composition and texture are presented in detail on the borehole logs in Appendix A. A summary of stratigraphic units that were encountered at the site are as follows:

| Site Stratigraphy | | | | |
|---|---|---|---|---|
| **Stratum/Formation** | **Depth Range (mbgs)** | **Elevation Range (masl)** | **Hydraulic Conductivity (m/s)** | **Method of Determination** |
| Fill | 0.1 to 5.5 | 155.7 to 150.3 | $1.0 \times 10^{-6}$ | Literature[1] |
| Sandy Silt Till | 0.2 to 10.7 | 153.6 to 144.2 | $1.0 \times 10^{-7}$ | Literature[1] |
| Sands | 0.9 to 16.8 | 145.3 to 137.7 | $5.0 \times 10^{-6}$ | Grain Size |
| Clay and Silt | 7.6 to 29.0 | 140.0 to 126.1 | $4.0 \times 10^{-8}$ | Slug test |
| Lower Sands | 16.8 to 30.8 | 130.0 to 124.3 | $1.0 \times 10^{-8}$ | Literature[1] |

| Surface Water | | | |
|---|---|---|---|
| **Surface Water Body** | **Distance from site (m)** | **Direction from Site** | **Hydraulically Connected to Property (yes/no)** |
| Yellow Creek | 900 | South | No |

# 4 Groundwater Elevations

## 4.1 Monitoring Well Information

| Well ID | Well Diameter (mm) | Ground Surface (masl) | Top of Screen (masl) | Bottom of Screen (masl) | Screened Geological Unit |
|---|---|---|---|---|---|
| BH1 | 50 | 155.2 | 133.8 | 130.8 | Clay and Silt |
| BH2 | 50 | 155.8 | 134.5 | 131.4 | Clay and Silt |
| BH3 | 50 | 155.1 | 127.7 | 124.6 | Clay and Silt / Lower Sands |
| BH4 | 50 | 146.1 | 136.9 | 133.9 | Clay and Silt |
| BH5 | 50 | 146.5 | 140.4 | 137.4 | Sands / Clay and Silt |
| BH6 | 50 | 146.8 | 131.6 | 128.5 | Clay and Silt / Lower Sands |

[1] Freeze and Cherry (1979)

## 4.2 Groundwater Elevations

| Well ID | Groundwater Elevation (masl) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | April 4, 2022 | April 5, 2022 | April 11, 2022 | April 14, 2022 | April 29, 2022 | May 13, 2022 | May 27, 2022 | June 10, 2022 | June 24, 2022 |
| **BH1** | - | 132.2 | - | 133.6 | 135.7 | 135.9 | 136.0 | 136.0 | 136.0 |
| **BH2** | 133.3 | - | - | 133.5 | 135.0 | 135.5 | 135.6 | 135.6 | 135.7 |
| **BH3** | - | 129.3 | - | 126.3 | 125.5 | 125.0 | 124.8 | 125.1 | - |
| **BH4** | - | - | 144.1 | 144.3 | 144.3 | 144.2 | 144.3 | 144.3 | 144.2 |
| **BH5** | - | - | - | 144.4 | 144.4 | 144.1 | 144.4 | 144.4 | 144.4 |
| **BH6** | - | 129.0 | - | 129.0 | - | - | - | 129.0 | 129.7 |

Note: - refers to a well not measured or not installed yet.

For design purposes, the groundwater table is at Elev. 144.4± m, in the sands deposit. This unit will yield free-flowing water when penetrated. The lower clay and silt has a very low permeability and will yield only minor seepage in the long term.

Groundwater levels fluctuate with time depending on the amount of precipitation and surface runoff and may be influenced by known or unknown dewatering activities at nearby sites.

## 4.3 Maximum Anticipated Groundwater Level (MAGWL)

Per the City of Toronto, Toronto Water Infrastructure Management's Foundation Drainage Policy (November 1, 2021), long term connection to and discharge of foundation drainage to the City's sanitary sewer system will not be permitted. A connection to the City's storm sewer system **may** be granted if all conditions of Section 4.2 and 4.3 of the policy are satisfied, including that the lowest elevation of any proposed structure is higher than the Maximum Anticipated Groundwater Level at the site. A temporary, emergency foundation drainage connection to the City's sewer systems **may** be granted if on-site management is being proposed.

The MAGWL is determined based on the following equation:

*Maximum Anticipated GWL = Peak Static GWL Observed + Fluctuation Allowance*

| Groundwater Elevation | |
|---|---|
| **Design Groundwater Elevation (masl)** | 144.4 |
| **MAGWL Assessment Option** | Option 2 |
| **Seasonal Fluctuation (m)** | 0.8 |
| **Maximum Anticipated Groundwater Level (MAGWL)** | 145.2 |
| **Base of Subfloor Drainage Layer (masl)** | 142.0± |

| Groundwater Elevation | |
|---|---|
| **Higher or lower than MAGWL** | Higher |

As the proposed structure (taken as the base of subfloor drainage layer) extends below the determined MAGWL, long term discharge of groundwater to the City's sewer systems is unlikely to be permitted. Either the on-site management of groundwater, or a fully waterproofed basement, is implied.

# 5 Aquifer Testing

## 5.1 Pump Test

A pumping test was not completed at the site. Due to the nature of the soil materials present and slow ground recharge of the aquifer it was not feasible to complete a 24-hour pumping test. Please note however that in-situ single well response tests were completed on each of the monitoring wells installed at the site.

## 5.2 Single Well Response Test (Slug Test)

The hydraulic conductivities from the monitoring wells were determined based on slug tests (single-well response tests). These tests involve rapid removal of water or addition of a "slug" which displaces a known volume of water from a single well, and then monitoring the water level in the well until it recovers. The results of the slug tests were analyzed using the Bouwer and Rice method (1976).

The hydraulic properties of the strata applicable to the site are as follows:

| Well ID | Well Screen Elevation (masl) | Screened Geological Unit | Hydraulic Conductivity (m/s) |
|---|---|---|---|
| BH1 | 133.8 - 130.8 | Clay and Silt | $1.1 \times 10^{-8}$ |
| BH2 | 134.5 - 131.4 | Clay and Silt | $1.1 \times 10^{-8}$ |
| BH3 | 127.7 - 124.6 | Clay and Silt / Lower Sands | $5.5 \times 10^{-9}$ |
| BH4 | 136.9 - 133.9 | Clay and Silt | $7.1 \times 10^{-7}$ |
| BH5 | 140.4 - 137.4 | Sands / Clay and Silt | $2.5 \times 10^{-7}$ |

## 5.3 Soil Grain Size Distribution

The hydraulic conductivities of various soil types can also be estimated from grain size analyses. An assessment of the grain sizes was conducted using the excel-based tool, HydrogeoSieve XL

(*HydrogeoSieve XL ver.2.2, J.F. Devlin, University of Kansas, 2015*). HydrogeoSieve XL compares the results of the grain size analyses against fifteen (15) different analytical methods.

Given our experience in the area as well as published literature, some of the geometric means provided for the soil were biased low by one or more methods. In these instances, the values determined by these methods were excluded from the mean. The table below illustrates the hydraulic conductivity values estimated from the mean of the analytical methods where the soil met the applicable analysis criteria.

| Sample ID | Soil Description | Applicable Analysis Methods | Hydraulic Conductivity (m/s) |
|---|---|---|---|
| BH1 SS7 | Sandy silt, some clay, some gravel | Alyamani and Sen, Barr, Sauerbrei | $1.8 \times 10^{-8}$ |
| BH1 SS10 | Silty sand, some gravel, trace clay | Alyamani and Sen, Barr, Krumbein and Monk, Sauerbrei | $1.4 \times 10^{-6}$ |
| BH1 SS16 | Silty clay, trace sand, trace gravel | Alyamani and Sen, Barr, Sauerbrei | $5.9 \times 10^{-11}$ |
| BH1 SS18 | Clay and silt, some sand, trace gravel | Alyamani and Sen, Barr, Sauerbrei | $2.9 \times 10^{-10}$ |
| BH2 SS15 | Sand, some silt, trace clay, trace gravel | Alyamani and Sen, Barr, Krumbein and Monk, Sauerbrei | $1.0 \times 10^{-6}$ |
| BH4 SS5A | Clay and silt, trace sand, trace gravel | Alyamani and Sen, Barr, Krumbein and Monk, Sauerbrei | $4.1 \times 10^{-6}$ |

The results of the analyses are presented in Appendix D.

## 5.4 Literature

According to Freeze and Cherry (1979), the typical hydraulic conductivity of the strata investigated at the site are:

| Stratum/Formation | Hydraulic Conductivity (m/s) |
|---|---|
| Earth Fill | $10^{-2}$ to $10^{-6}$ |
| Sands | $10^{-2}$ to $10^{-7}$ |
| Silts | $10^{-5}$ to $10^{-9}$ |
| Glacial Tills | $10^{-6}$ to $10^{-12}$ |
| Clays | $10^{-9}$ to $10^{-12}$ |

# 6 Sump Monitoring

A new basement structure is proposed for the site. The monitoring of the existing sumps (where present) is excluded from the present scope.

# 7 Water Quality

One (1) unfiltered groundwater sample was collected and analyzed by a Canadian laboratory accredited and licensed by Standards Council of Canada and or Canadian Association for Laboratory Accreditation.

The sample was collected directly from monitoring well BH1 on April 4, 2022. The sample was analyzed for the following parameters:

- City of Toronto Municipal Code Chapter 681 Table 1 – Limits for Sanitary and Combined Sewers Discharge
- City of Toronto Municipal Code Chapter 681 Table 2 – Limits for Storm Sewer Discharge

The groundwater sample **exceeded** the **Limits for Storm Sewer Discharge** for the following parameters:

- Total Suspended Solids (Limit 15 mg/L, Result 134 mg/L)
- Total Manganese (Limit 0.05 mg/L, Result 0.0737 mg/L)

The groundwater sample **met** the **Limits for Sanitary and Combined Sewer Discharge** for all parameters analyzed.

A true copy of the analysis report, Certificate of Analysis and a chain of custody record for the sample are enclosed.

# 8 Proposed Construction Method

The proposed shoring methodology at the site is currently undetermined. For the purposes of this report, numerical analyses were conducted employing conventional soldier piling and lagging in order to determine a “worst-case scenario” with respect to dewatering volumes and groundwater seepage at the site.

For design purposes, the stabilized groundwater table is at about Elev. 144.4± m. The water table is present in the native sands unit. The lowest (P3) FFE is at about Elev. 142.0± m. Therefore,

- Bulk excavation will extend down to the elevation of the prevailing groundwater table;
- Foundation excavations will extend below the prevailing groundwater table; and
- Foundation excavations will penetrate the silty sand unit, which will yield free-flowing water.

Prior to excavation, positive dewatering to lower the groundwater table will be required to facilitate construction as well as to maintain the integrity of the subgrade for foundation and slab-on-grade support. The water level must be kept at least 1.2 m below the lowest excavation elevation during construction. Failure to dewater prior to excavation will result in unrecoverable disturbance of the subgrade, which will render advice provided for undisturbed subgrade conditions inapplicable.

Dewatering will take some time to accomplish prior to the start of excavation. Stored water within the excavation will need to be considered prior to excavation/dewatering.

It is recommended that a professional dewatering contractor be consulted to review the subsurface conditions and to design a site-specific dewatering system. It is the dewatering contractor's responsibility to assess the factual data and to provide recommendations on dewatering system requirements.

The proposed underground structure will need to be fully waterproofed at this site, per the discussion in Sections 5 and 10.

# 9 Private Water Drainage System (PWDS)

As the proposed development is to be designed as a leak tight structure, a private water drainage system will not be required. However, the structure must then be designed to resist hydrostatic pressure and uplift forces. A connection to the City's sewer for emergency repair services is recommended.

# 10 Groundwater Extraction and Discharge

Numerical analyses were conducted for the short term scenario. The modeling was conducted using computer software, which deploys the finite element modelling method. The Finite Element Model (FEM) for groundwater seepage indicates the short term (construction) dewatering requirements as provided below. The finite element model results are presented in Appendix E.

As the proposed structures are to be made watertight, there will be no requirement for long term (permanent) dewatering as provided below.

The groundwater seepage estimates, which have been provided, represent the steady state groundwater seepage. There will be an initial drawdown of the groundwater before a steady state condition is reached. The rate of the initial drawdown, and therefore discharge, is dependent on the dewatering contractor and how the groundwater is being dealt with at the site. An estimated initial volume of stored groundwater which will require removal before steady state is reached has been provided below.

Please note that if excavation is exposed to the elements, storm water will have to be managed. The short term control of groundwater should consider stormwater management from rainfall events. A dewatering system should be designed to consider the removal of rainfall from excavation. A design storm of 25 mm has been used in the quantity estimates.

As required by Ontario Regulation 63/16, a plan for discharge must consider the conveyance of storm water from a 100-year storm. The additional volume that will be generated in the occurrence of a 100-year storm event is approximately 211,000 L.

| Stored Groundwater (pre-excavation/dewatering) | | | | | |
|---|---|---|---|---|---|
| Volume of Excavation ($m^3$) | Volume of Excavation Below Water Table ($m^3$) | Volume of Stored Groundwater | | Volume of Available Groundwater | |
| | | ($m^3$) | (L) | ($m^3$) | (L) |
| 32,200 | 8,450 | 2,600 | 2,600,000 | 2,300 | 2,300,000 |

| Short Term (Construction) Groundwater Quantity – Safety Factor of 2.5 Used | | | | | |
|---|---|---|---|---|---|
| Groundwater Seepage | | Design Rainfall Event (25mm) | | Total Daily Water Takings | |
| L/day | L/min | L/day | L/min | L/day | L/min |
| 180,000 | 125.0 | 57,000 | 39.6 | 237,000 | 164.6 |

| Long Term (Permanent) Groundwater Quantity – Safety Factor of 2.5 Used | | | | | |
|---|---|---|---|---|---|
| Groundwater Seepage | | Infiltration Design Rainfall Event (25mm) | | Total Daily Water Takings | |
| L/day | L/min | L/day | L/min | L/day | L/min |
| 0 | 0 | 0 | 0 | 0 | 0 |

| Regulatory Requirements | |
|---|---|
| Environmental Activity and Sector Registry (EASR) Posting | Required |
| Short Term Permit to Take Water (PTTW) | Not Required |
| Long Term Permit to Take Water (PTTW) | Not Required |
| Short Term Discharge Agreement City of Toronto | Required |
| Long Term Discharge Agreement City of Toronto | Not Required |

The lowest elevation of the proposed structure (taken as the base of subfloor drainage layer) at the site will be below the determined MAGWL. A fully waterproofed underground structure will be required at this site.

The City of Toronto will require Discharge Agreements in the short term, if any water is to be discharged to the storm or sanitary sewers.

Please note:

- The proposed pump schedule for short term construction dewatering has not been completed. As such, the actual peak short term discharge rate is not available at the time of writing this report. The pump schedule must be specified by either the dewatering contractor retained or the mechanical consultant.
- If an emergency repair connection is proposed, the pump schedule for this connection has not been completed. The actual emergency discharge rate is not available at the time writing of this report. The pump schedule must be specified by the mechanical consultant.
- On-site containment (infiltration gallery/dry well etc.) has not been considered as part of the proposed development at this time. If this option is considered, additional work will have to be conducted (i.e. infiltration testing).

# 11 Evaluation of Impact

## 11.1 Zone of Influence (ZOI)

The Zone of Influence (ZOI) with respect to groundwater was calculated based on the estimated groundwater taking rate and the hydraulic conductivity of the unit which water will be taken at the Property.

The ZOI was calculated using the Sichardt equation below.

Equation: $R_0 = 3000*dH*K^{0.5}$

Where:

dH is the dewatering thickness (m)

K is the hydraulic conductivity (m/s)

Calculation:

The ZOI with respect to groundwater seepage at the site is summarized as follows.

| **Zone of Influence (ZOI)** | | |
|---|---|---|
| | **Short Term (Construction), m** | **Long Term (Permanent), m** |
| **Maximum Zone of Influence (m)** | 30 | 0* |

*assuming watertight structure

## 11.2 Land Stability

The impacts to land stability on adjacent structures due to the proposed short and long term dewatering at the site are summarized as follows:

| Land Stability | | |
|---|---|---|
| | **Short Term (Construction)** | **Long Term (Permanent)** |
| **Dewatering Thickness (m)** | 4.5± | 0 |
| **Increase in Effective Stress (kPa)** | 44 | 0 |
| **Maximum Theoretical Settlement due to Dewatering (mm)** | 2 | 0 |
| **Public Realm Theoretical Settlement due to Dewatering (mm)** | <2 | 0 |

The maximum induced settlement (estimated) occurs directly adjacent to the proposed excavation and decreases in a nonlinear fashion with distance away from the excavation.

On this basis, the impact of the proposed dewatering on the existing adjacent structures is considered by Grounded to be within acceptable limits.

## 11.3 City's Sewage Works

Negative impacts to City's sewage works may occur in terms of the quantity or quality of the groundwater discharged. This report provided the estimated quantity of the water discharge. However, this report does not speak to the sewer capacities. The sewer capacity analysis is provided under a separate cover by the civil consultant.

The quality of the proposed groundwater discharge is provided in Section 7. As noted in that section, the groundwater sample exceeded the Limits for Storm Sewer Discharge and met the Limits for Sanitary and Combined Sewer Discharge.

As such, additional treatment will be required before the water can be discharged to the Storm Sewer to avoid impacts to the City's sewage works caused by groundwater quality. Additional treatment will not be required before the water can be discharged to the Sanitary and Combined Sewer.

## 11.4 Natural Environment

There are no natural waterbodies within the ZOI that will be affected by the proposed construction dewatering or permanent drainage. Any groundwater which will be taken from the site will be discharged (if required) into the City's sewer systems and not into any natural water body. As such, there will be no impact to the natural environment caused by the water takings at the site.

## 11.5 Local Drinking Water Wells

The site is located within the municipal boundaries of the City of Toronto. The site and surrounding area are provided with municipal piped water and sewer supply. There is no use of

the groundwater for water supply in this area of Toronto. As such, there will be no impact to drinking water wells.

### 11.6 Contamination Source

The site and immediately surrounding area currently consist mostly of residential and commercial areas. These land uses are not anticipated to be a source of potential contamination and are not expected to provide an Area of Potential Environmental Concern for the site. As such, the pumping of groundwater at the site is not anticipated to facilitate the movement of potential contaminants onto the site. Evaluation of the environmental condition of the site will be completed under a separate cover.

## 12 Proposed Mitigation Measures and Monitoring Plan

The extent of the negative impact identified in previous sections will be limited to the ZOI caused by the groundwater taking at the site.

As a result of dewatering and draining the soil, changes in groundwater level have the potential to cause settlement based on the change in the effective stresses within the ZOI.

If adjacent buildings or municipal infrastructure are within the ZOI and will undergo settlement that may be considered unacceptable as identified the Land Stability Section, consideration should be given to implement a monitoring and mitigation program during dewatering activities.

Both the temporary construction dewatering system and the permanent building drainage system must be properly installed and screened to ensure sediments and fines will not be removed, which is typically a primary cause of dewatering related settlement.

## 13 Limitations

Natural occurrences, the passage of time, local construction, and other human activity all have the potential to directly or indirectly alter the subsurface conditions at or near the project site. Contractual obligations related to groundwater or stormwater control must be considered with attention and care as they relate this potential site alteration.

The hydrogeological engineering advice provided in this report is based on the factual observations made from the site investigations as reported. It is intended for use by the owner and their retained design team. If there are changes to the features of the development or to the scope, the interpreted subsurface information, geotechnical engineering design parameters, advice, and discussion on construction considerations may not be relevant or complete for the project. Grounded should be retained to review the implications of such changes with respect to the contents of this report.

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# 14 Closure

If there are any questions regarding the discussion and advice provided, please do not hesitate to contact our office. We trust that this report meets your requirements at present.

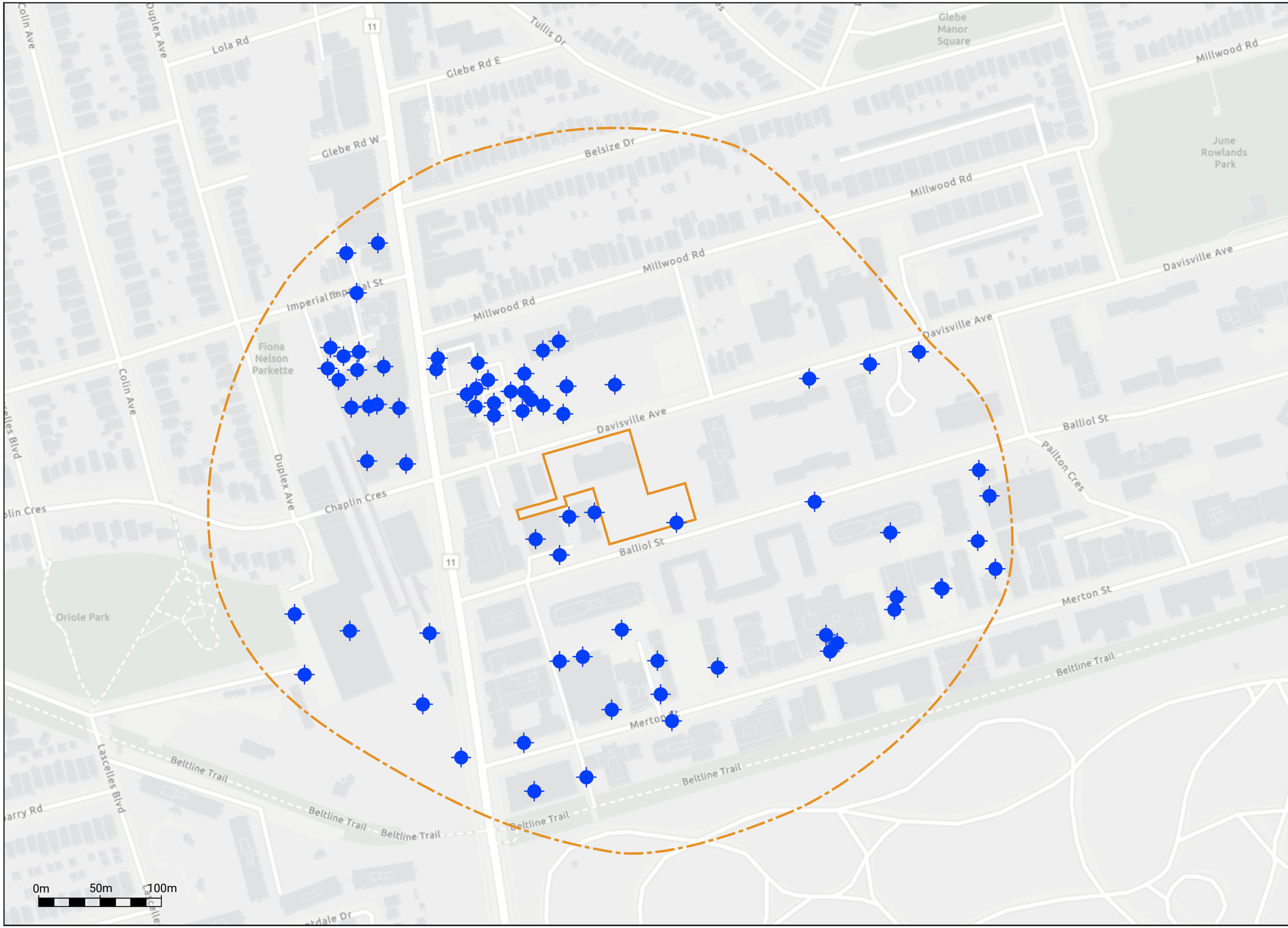
For and on behalf of our team,

GROUNDED ENGINEERING


Matthew Garcia, BASc, EIT
Project Manager

Matthew Bielaski, P.Eng., $QP_{RA\text{-}ESA}$
Principal

# FIGURES

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www.groundedeng.ca

**LEGEND**

- APPROXIMATE PROPERTY BOUNDARY
- STUDY AREA (250 m RADIUS)
- MECP WELL LOCATION

Note

Reference

ArcGIS 2022.

Project

**33 DAVISVILLE AVENUE / 60 BALLIOL STREET, TORONTO, ONTARIO**

Figure Title

**SITE LOCATION PLAN**

North

TRUE
PROJECT

Date

OCTOBER 2023

Scale

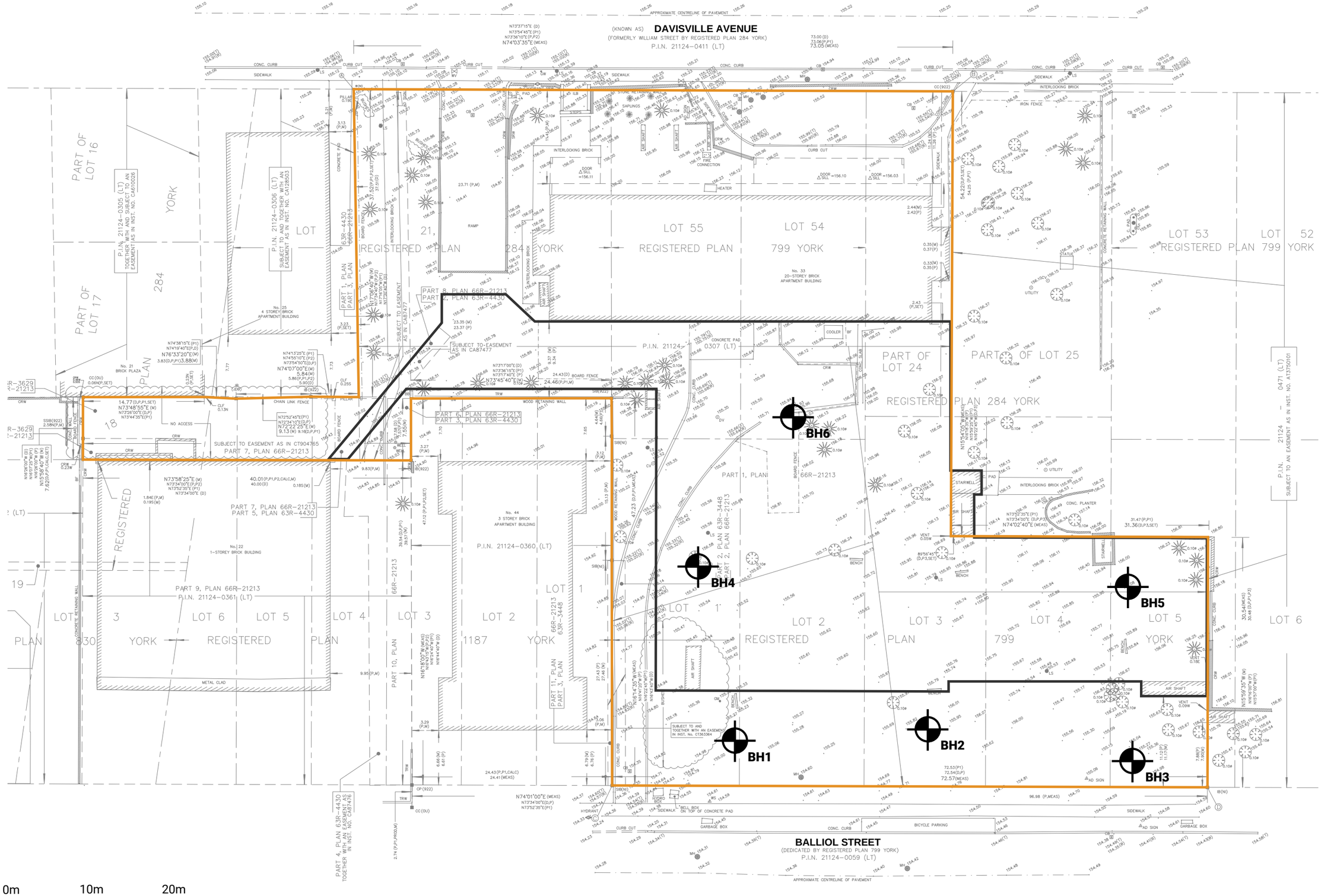
AS INDICATED

Job No

22-024

Figure No

**FIGURE 1**





GROUNDED ENGINEERING

1 BANIGAN DRIVE, TORONTO, ONT., M4H 1G3
www.groundedeng.ca


**LEGEND**

- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE EXTENT OF EXISTING UNDERGROUND PARKING
- MONITORING WELL/BOREHOLE BY GROUNDED

Note

Reference
Survey Project No.: 3424-1. Completion date: October 28, 2020 (Updated February 23, 2022). Prepared by R. Avis Surveying Inc..

Project
**33 DAVISVILLE AVENUE / 60 BALLIOL STREET, TORONTO, ONTARIO**

Figure Title
**BOREHOLE LOCATION PLAN**

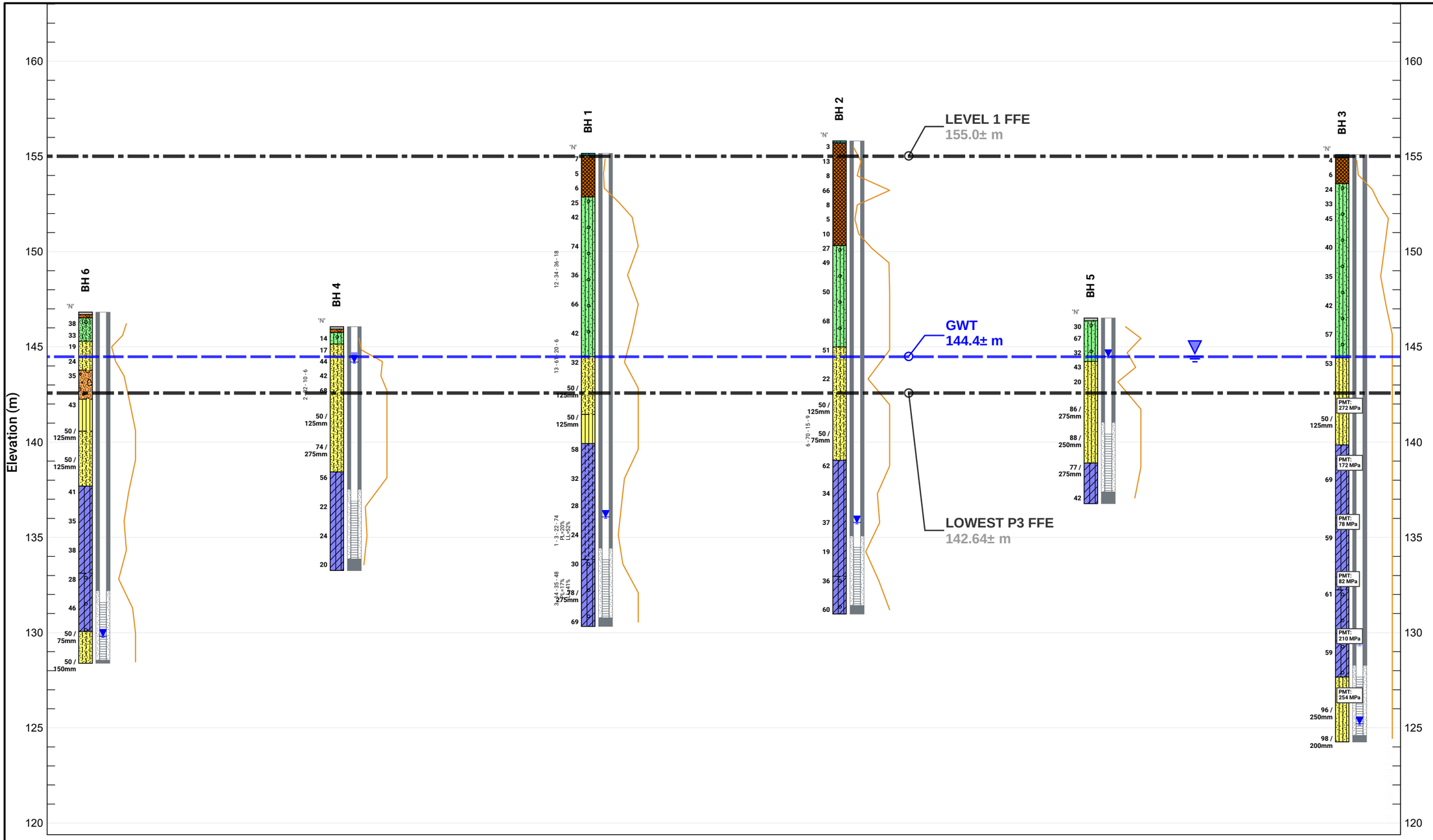
North

Date
OCTOBER 2023

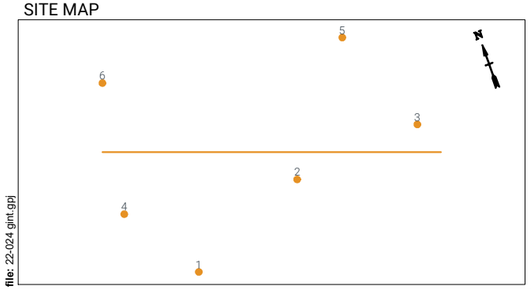
Scale
AS INDICATED

Job No
22-024

Figure No
**FIGURE 2**




SITE MAP




file: 22-024 gint.gpj

***Boreholes Equally Spaced***

**BOREHOLE STRATIGRAPHY LEGEND**

| | | | |
|---|---|---|---|
| Topsoil | Silt | Sand and Silt | Silty Sand Till |
| Fill | Silty Clay | Sandy Silt | Sandy Gravel |
| Sandy Silt Till | Clay and Silt Till | Concrete | |
| Silty Sand | Clay and Silt | Aggregate | |

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LEGEND

- FILL
- GRAVELS (gravel to gravelly sand)
- SILT TO SAND (not till)
- COHESIONLESS TILLS
- COHESIVE SOILS (clayey silt to clay, incl. tills)
- DISTURBED/REWORKED/ORGANIC

- water level, unstabilized
- water level, stabilized (latest)
- water level, stabilized (highest)

Project
**33 DAVISVILLE AVE / 60 BALLIOL ST TORONTO**

Figure Title
**SUBSURFACE PROFILE**

Date
OCTOBER 2023

Scale
AS INDICATED

Job No
22-024

Figure No
**FIGURE 3**

# APPENDIX A

# BOREHOLE LOG TERMINOLOGY

GROUNDED ENGINEERING

## SAMPLING/TESTING METHODS

SS: split spoon sample

AS: auger sample

GS: grab sample

FV: shear vane

DP: direct push

PMT: pressuremeter test

ST: shelby tube

CORE: soil coring

RUN: rock coring

## SYMBOLS & ABBREVIATIONS

MC: moisture content

LL: liquid limit

PL: plastic limit

PI: plasticity index

γ: soil unit weight (bulk)

$G_s$: specific gravity

$S_u$: undrained shear strength

▽ unstabilized water level

▼ 1st water level measurement

▼ 2nd water level measurement most recent

▼ water level measurement

## ENVIRONMENTAL SAMPLES

M&I: metals and inorganic parameters

PAH: polycyclic aromatic hydrocarbon

PCB: polychlorinated biphenyl

VOC: volatile organic compound

PHC: petroleum hydrocarbon

BTEX: benzene, toluene, ethylbenzene and xylene

PPM: parts per million

## FIELD MOISTURE (based on tactile inspection)

**DRY:** no observable pore water

**MOIST:** inferred pore water, not observable (i.e. grey, cool, etc.)

**WET:** visible pore water

## COHESIONLESS

| Relative Density | N-Value |
|---|---|
| Very Loose | <4 |
| Loose | 4 - 10 |
| Compact | 10 - 30 |
| Dense | 30 - 50 |
| Very Dense | >50 |

## COHESIVE

| Consistency | N-Value | Su (kPa) |
|---|---|---|
| Very Soft | <2 | <12 |
| Soft | 2 - 4 | 12 - 25 |
| Firm | 4 - 8 | 25 - 50 |
| Stiff | 8 - 15 | 50 - 100 |
| Very Stiff | 15 - 30 | 100 - 200 |
| Hard | >30 | >200 |

## COMPOSITION

| Term | % by weight |
|---|---|
| ***trace*** silt | <10 |
| ***some*** silt | 10 - 20 |
| silt***y*** | 20 - 35 |
| sand ***and*** silt | >35 |

## ASTM STANDARDS

**ASTM D1586 Standard Penetration Test (SPT)**
Driving a 51 mm O.D. split-barrel sampler ("split spoon") into soil with a 63.5 kg weight free falling 760 mm. The blows required to drive the split spoon 300 mm ("bpf") after an initial penetration of 150 mm is referred to as the N-Value.

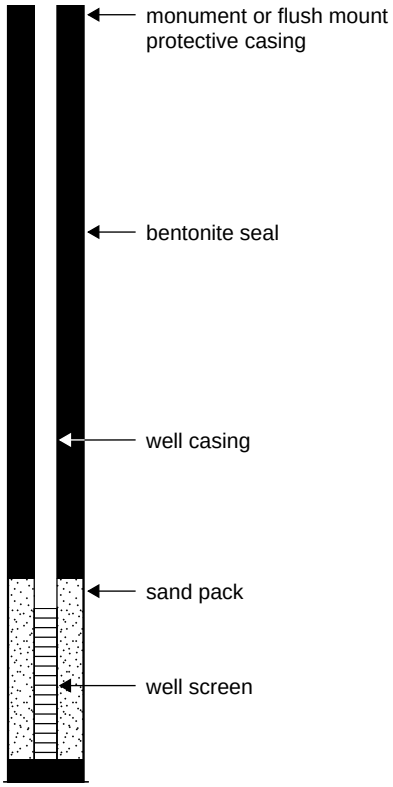
**ASTM D3441 Cone Penetration Test (CPT)**
Pushing an internal still rod with a outer hollow rod ("sleeve") tipped with a cone with an apex angle of 60° and a cross-sectional area of 1000 $mm^2$ into soil. The resistance is measured in the sleeve and at the tip to determine the skin friction and the tip resistance.

**ASTM D2573 Field Vane Test (FVT)**
Pushing a four blade vane into soil and rotating it from the surface to determine the torque required to shear a cylindrical surface with the vane. The torque is converted to the shear strength of the soil using a limit equilibrium analysis.

**ASTM D1587 Shelby Tubes (ST)**
Pushing a thin-walled metal tube into the in-situ soil at the bottom of a borehole, removing the tube and sealing the ends to prevent soil movement or changes in moisture content for the purposes of extracting a relatively undisturbed sample.

**ASTM D4719 Pressuremeter Test (PMT)**
Place an inflatable cylindrical probe into a pre-drilled hole and expanding it while measuring the change in volume and pressure in the probe. It is inflated under either equal pressure increments or equal volume increments. This provides the stress-strain response of the soil.

## WELL LEGEND



GROUNDED ENGINEERING

**Date Started** : Mar 24, 2022
**Position** : E: 629355, N: 4839570 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 1

**File No.** : 22-024 **Project** : 33 Davisville Ave / 60 Balliol St, Toronto **Client** : Osmington Gerofsky Development Corporation

drill method : *Truck-mounted rig*

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **155.2** | **GROUND SURFACE** | | | | |
| | 100mm **TOPSOIL** | | 1 | SS | 7 |
| | **FILL**, silty sand, trace clay, trace gravel, trace brick fragments, trace rootlets, loose, brown, moist | | 2 | SS | 5 |
| | ...at 1.5 m, some clay, brown with orange | | 3 | SS | 6 |
| 152.9 | | | | | |
| 2.3 | **SANDY SILT**, clayey, trace gravel, compact, brown with mottled orange, moist (GLACIAL TILL) | | 4 | SS | 25 |
| | ...at 3.0 m, dense to very dense | | 5 | SS | 42 |
| | ...at 4.6 m, trace rock fragments, grey | | 6 | SS | 74 |
| | ...at 6.1 m, some clay, some gravel | | 7 | SS | 36 |
| | ...at 7.6 m, trace clay, trace gravel | | 8 | SS | 66 |
| | | | 9 | SS | 42 |
| 144.5 | | | | | |
| 10.7 | **SILTY SAND**, some gravel, trace clay, dense to very dense | | 10 | SS | 32 |
| | | | 11 | SS | 50 / 125mm |
| 141.5 | | | | | |
| 13.7 | **SILT**, some sand, trace clay, trace gravel, very dense, grey, moist | | 12 | SS | 50 / 125mm |
| 140.0 | | | | | |
| 15.2 | **SILTY CLAY**, trace sand, trace gravel, very stiff to hard, grey, moist | | 13 | SS | 58 |

hollow stem augers (med) OD=175 mm

mud rotary small OD=100 mm

depth scale (m): 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

well details

elevation (m): 155 154 153 152 151 150 149 148 147 146 145 144 143 142 141 140 139

**undrained shear strength (kPa)**
○ unconfined + field vane
● pocket penetrometer ■ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene
⊠ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level

**lab data and comments**

grain size distribution (%) (MIT)
GR SA SI CL

SS2: H-Ms, Metals, ORPs

SS3: BTEX, PAHs, PCBs, PHCs, VOCs

SS4: Corrosivity

SS6: PAHs

12 34 36 18
SS7: BTEX, H-Ms, Metals, ORPs, PCBs, PHCs, VOCs

SS9: Corrosivity

13 61 20 6
SS10: H-Ms, Metals, ORPs, PAHs

SS11: BTEX, PHCs, VOCs

SS13: H-Ms, Metals, ORPs, PAHs

file: 22-024 gint.gpj



**Tech** : KS | **PM** : MG | **Rev** : MD

*(continued next page)*

GROUNDED ENGINEERING

**Date Started** : Mar 24, 2022
**Position** : E: 629355, N: 4839570 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 1

**File No.** : 22-024 **Project** : 33 Davisville Ave / 60 Balliol St, Toronto **Client** : Osmington Gerofsky Development Corporation

drill method : *Truck-mounted rig*
mud rotary small OD=100 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| | *(continued)* | | | | |
| | **SILTY CLAY**, trace sand, trace gravel, very stiff to hard, grey, moist *(continued)* | | | | |
| | | | 14 | SS | 32 |
| | | | 15 | SS | 28 |
| | ...at 19.8 m, silty clay | | 16 | SS | 24 |
| 133.9 / 21.3 | | | | | |
| | **CLAY AND SILT**, some sand, trace gravel, hard, grey, moist (GLACIAL TILL) | | 17 | SS | 30 |
| | | | 18 | SS | 78 / 275mm |
| | | | 19 | SS | 69 |
| 130.4 / 24.8 | | | | | |

depth scale (m): 17, 18, 19, 20, 21, 22, 23, 24
elevation (m): 138, 137, 136, 135, 134, 133, 132, 131

**undrained shear strength (kPa)**
○ unconfined + field vane
● pocket penetrometer ■ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene
⊠ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS14: BTEX, PHCs, VOCs

LL=52
1 3 22 74

LL=41.2
3 14 35 48

**END OF BOREHOLE**

Contained drill water upon completion of drilling. Unstabilized water level not measured. Borehole was open.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Apr 5, 2022 | 23.0 | 132.2 |
| Apr 14, 2022 | 21.6 | 133.6 |
| Apr 29, 2022 | 19.5 | 135.7 |
| May 13, 2022 | 19.3 | 135.9 |
| May 27, 2022 | 19.2 | 136.0 |
| Jun 10, 2022 | 19.2 | 136.0 |
| Jun 24, 2022 | 19.2 | 136.0 |

**file:** 22-024 gint.gpj



**Tech** : KS | **PM** : MG | **Rev** : MD

**GROUNDED ENGINEERING**

**Date Started** : Mar 23, 2022
**Position** : E: 629379, N: 4839580 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 2

**File No.** : 22-024 **Project** : 33 Davisville Ave / 60 Balliol St, Toronto **Client** : Osmington Gerofsky Development Corporation

drill method : *Truck-mounted rig*

| elev depth (m) | description | graphic log | number | type | SPT N-value | lab data and comments |
|---|---|---|---|---|---|---|
| **155.8** | **GROUND SURFACE** | | | | | |
| | 100mm **TOPSOIL** | | 1 | SS | 3 | |
| | **FILL**, silty sand, trace clay, trace gravel, trace brick fragments, trace rootlets, very loose, brown, moist<br>...at 0.8 m, loose to compact | | 2 | SS | 13 | SS2: H-Ms, Metals, ORPs, PAHs |
| | ...at 1.5 m, some silt | | 3 | SS | 8 | SS3: BTEX, PCBs, PHCs, VOCs |
| | ...at 2.3 m, some concrete fragments, grey | | 4 | SS | 66 | **2.4m:** 6" of concrete |
| | ...at 3.0 m, clayey silt, some sand, stiff, brown | | 5 | SS | 8 | SS5: Corrosivity |
| | ...at 3.8 m, sand, some silt, trace clay, loose to compact, wet | | 6 | SS | 5 | |
| | | | 7 | SS | 10 | SS7: H-Ms, Metals, ORPs, PAHs |
| 150.3 | | | 8A | SS | 27 | |
| 5.5 | **SANDY SILT**, clayey, trace gravel, compact, grey with orange, moist<br>(GLACIAL TILL)<br>...at 6.1 m, dense to very dense, grey | | 8B | | | 8B: BTEX, PHCs, VOCs |
| | | | 9 | SS | 49 | |
| | | | 10 | SS | 50 | |
| | | | 11 | SS | 68 | SS11: Corrosivity |
| 145.0 | | | 12A | SS | 51 | |
| 10.8 | **SILTY SAND**, trace gravel, very dense, grey, wet | | 12B | | | 12B: H-Ms, Metals, ORPs, PAHs |
| | ...at 12.2 m, sand and silt, some clay, compact | | 13 | SS | 22 | SS13: BTEX, PHCs, VOCs |
| | ...at 13.7 m, trace clay, very dense, moist | | 14 | SS | 50 / 125mm | |
| | ...at 15.2 m, some silt, wet | | 15 | SS | 50 / 75mm | 6 70 15 9<br>SS15: H-Ms, Metals, ORPs |

hollow stem augers OD=215 mm

mud rotary small OD=100 mm

depth scale (m): 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

well details

elevation (m): 155 154 153 152 151 150 149 148 147 146 145 144 143 142 141 140

**undrained shear strength (kPa)**
○ unconfined + field vane
● pocket penetrometer ■ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene
⊠ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level

grain size distribution (%) (MIT)
GR SA SI CL

file: 22-024 gint.gpj



**Tech** : KS | **PM** : MG | **Rev** : MD

*(continued next page)*

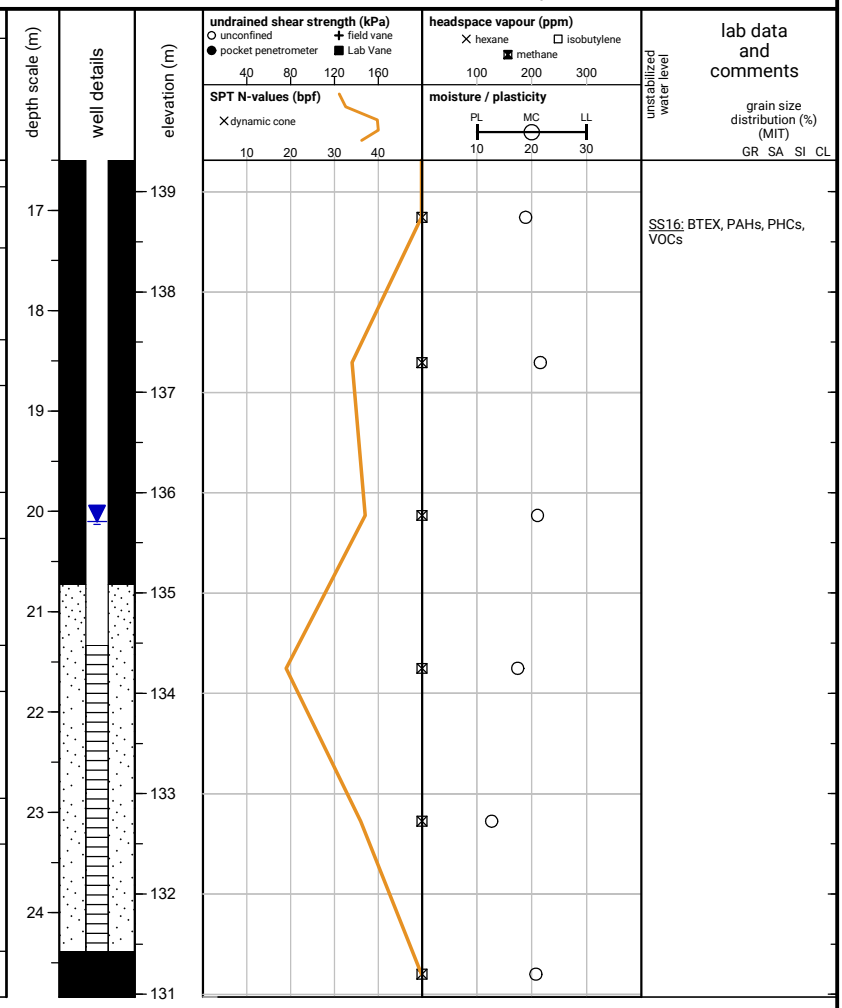
# BOREHOLE LOG 2

**Date Started** : Mar 23, 2022
**Position** : E: 629379, N: 4839580 (UTM 17T)
**Elev. Datum** : Geodetic

**File No.** : 22-024 **Project** : 33 Davisville Ave / 60 Balliol St, Toronto **Client** : Osmington Gerofsky Development Corporation

drill method : *Truck-mounted rig*
mud rotary small OD=100 mm

| elev depth (m) | description (*continued*) | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| 139.0 | | | | | |
| 16.8 | **CLAY AND SILT**, trace sand, trace gravel, very stiff to hard, grey, moist | | 16 | SS | 62 |
| | | | 17 | SS | 34 |
| | | | 18 | SS | 37 |
| | | | 19 | SS | 19 |
| 132.9 | | | | | |
| 22.9 | **CLAY AND SILT**, trace sand, trace gravel, hard, grey, moist (GLACIAL TILL) | | 20 | SS | 36 |
| | | | 21 | SS | 60 |
| 131.0 | | | | | |
| 24.8 | **END OF BOREHOLE** | | | | |




Contained drill water upon completion of drilling. Unstabilized water level not measured. Borehole was open.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Apr 4, 2022 | 22.5 | 133.3 |
| Apr 14, 2022 | 22.3 | 133.5 |
| Apr 29, 2022 | 20.8 | 135.0 |
| May 13, 2022 | 20.3 | 135.5 |
| May 27, 2022 | 20.2 | 135.6 |
| Jun 10, 2022 | 20.2 | 135.6 |
| Jun 24, 2022 | 20.1 | 135.7 |

**file:** 22-024 gint.gpj



**Tech** : KS | **PM** : MG | **Rev** : MD

GROUNDED ENGINEERING

**Date Started** : Mar 24, 2022
**Position** : E: 629404, N: 4839583 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 3

**File No.** : 22-024 **Project** : 33 Davisville Ave / 60 Balliol St, Toronto **Client** : Osmington Gerofsky Development Corporation

drill method : *Truck-mounted rig*

hollow stem augers (med) OD=175 mm

mud rotary small OD=100 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| **155.1** | **GROUND SURFACE** | | | | |
| | 150mm **TOPSOIL** | | 1 | SS | 4 |
| | **FILL**, silt, some clay, some sand, trace gravel, trace organics, loose, brown, moist | | | | |
| | ...at 0.8 m, silty sand, trace brick fragments | | 2 | SS | 6 |
| 153.6 / 1.5 | **SANDY SILT**, clayey, trace gravel, compact to dense, brown with mottled orange, moist (GLACIAL TILL) | | 3 | SS | 24 |
| | | | 4 | SS | 33 |
| | | | 5 | SS | 45 |
| | ...at 4.6 m, grey | | 6 | SS | 40 |
| | | | 7 | SS | 35 |
| | | | 8 | SS | 42 |
| | ...at 9.1 m, very dense | | 9 | SS | 57 |
| 144.4 / 10.7 | **SAND AND SILT**, trace rock fragments, very dense, grey, wet | | 10 | SS | 53 |
| | | | 1 | PMT | |
| | | | 11 | SS | 50 / 125mm |
| 139.9 / 15.2 | **CLAY AND SILT**, trace sand, trace gravel, hard, grey, moist | | 2 | PMT | |

depth scale (m) 0–16 | well details | elevation (m) 155–139

**undrained shear strength (kPa)** — unconfined, field vane, pocket penetrometer, Lab Vane; 40 80 120 160

**SPT N-values (bpf)** — dynamic cone; 10 20 30 40

**headspace vapour (ppm)** — hexane, isobutylene, methane; 100 200 300

**moisture / plasticity** — PL MC LL; 10 20 30

**PMT**@142.1 m: 272 MPa

**PMT**@139.1 m: 172 MPa

unstabilized water level

lab data and comments

grain size distribution (%) (MIT) GR SA SI CL

SS2: H-Ms, Metals, ORPs

SS3: BTEX, PAHs, PCBs, PHCs, VOCs

SS6: H-Ms, Metals, ORPs, PAHs

SS7: BTEX, PHCs, VOCs

SS9: H-Ms, Metals, ORPs, PAHs

SS10: BTEX, PHCs, VOCs

SS11: H-Ms, Metals, ORPs

file: 22-024 gint.gpj



**Tech** : RR | **PM** : MG | **Rev** : MD

*(continued next page)*

# BOREHOLE LOG 3

**Date Started** : Mar 24, 2022
**Position** : E: 629404, N: 4839583 (UTM 17T)
**Elev. Datum** : Geodetic

**File No.** : 22-024 **Project** : 33 Davisville Ave / 60 Balliol St, Toronto **Client** : Osmington Gerofsky Development Corporation

drill method : *Truck-mounted rig*

mud rotary small OD=100 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| | *(continued)* | | | | |
| | **CLAY AND SILT**, trace sand, trace gravel, hard, grey, moist *(continued)* | | 2 | PMT | |
| | | | 12 | SS | 69 |
| | | | 3 | PMT | |
| | | | 13 | SS | 59 |
| | | | 4 | PMT | |
| 132.2 22.9 | **CLAY AND SILT**, trace sand, trace gravel, hard, grey, moist (GLACIAL TILL) | | 14 | SS | 61 |
| | | | 5 | PMT | |
| | | | 15 | SS | 59 |
| 127.7 27.4 | **SANDY SILT**, trace gravel, with seams of clayey silt, very dense, grey, moist | | 6 | PMT | |
| | | | 16 | SS | 96 / 250mm |
| | ...at 30.5 m, wet | | 17 | SS | 98 / 200mm |
| 124.3 30.8 | **END OF BOREHOLE** | | | | |

depth scale (m): 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30

well details

elevation (m): 138, 137, 136, 135, 134, 133, 132, 131, 130, 129, 128, 127, 126, 125

undrained shear strength (kPa): unconfined, field vane, pocket penetrometer, Lab Vane; 40, 80, 120, 160
SPT N-values (bpf): dynamic cone; 10, 20, 30, 40

headspace vapour (ppm): hexane, isobutylene, methane; 100, 200, 300
moisture / plasticity: PL, MC, LL; 10, 20, 30

unstabilized water level

lab data and comments
grain size distribution (%) (MIT)
GR SA SI CL

PMT@136.0 m: 78 MPa
PMT@133.0 m: 82 MPa
PMT@130.0 m: 210 MPa
PMT@126.9 m: 254 MPa

SS12: BTEX, PAHs, PHCs, VOCs

Contained drill water upon completion of drilling. Unstabilized water level not measured. Borehole was open.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Apr 5, 2022 | 25.8 | 129.3 |
| Apr 14, 2022 | 28.8 | 126.3 |
| Apr 29, 2022 | 29.6 | 125.5 |
| May 13, 2022 | 30.1 | 125.0 |
| May 27, 2022 | 30.3 | 124.8 |
| Jun 10, 2022 | 30.0 | 125.1 |

file: 22-024 gint.gpj



**Tech** : RR | **PM** : MG | **Rev** : MD

# BOREHOLE LOG 4

**Date Started** : Mar 25, 2022
**Position** : E: 629345, N: 4839585 (UTM 17T)
**Elev. Datum** : Geodetic

**File No.** : 22-024 **Project** : 33 Davisville Ave / 60 Balliol St, Toronto **Client** : Osmington Gerofsky Development Corporation

drill method : *Hilti DD350*

mud rotary small OD=100 mm

| elev depth (m) | description | graphic log | sample number | sample type | SPT N-value |
|---|---|---|---|---|---|
| **146.1** | **TOP OF SLAB** | | | | |
| 145.8 | 125mm **CONCRETE** | | | | |
| 0.3 | 175mm **AGGREGATE** | | 1A | SS | 14 |
| | | | 1B | | |
| 145.2 | **SANDY SILT**, some clay, trace gravel, compact, grey, moist (GLACIAL TILL) | | 2 | SS | 17 |
| 0.9 | ...at 0.6 m, some sand, wet, dilatent | | | | |
| | **SILTY SAND**, trace gravel, compact to dense, grey, wet | | 3 | SS | 44 |
| | ...at 1.5 m, some silt | | 4 | SS | 42 |
| | ...at 3.0 m, trace silt, very dense | | 5A | SS | 68 |
| | ...at 3.4 m, clayey silt seam | | 5B 5C | | |
| | ...at 4.6 m, sandy silt, some clay | | 6 | SS | 50 / 125mm |
| | | | 7 | SS | 74 / 275mm |
| 138.5 | | | | | |
| 7.6 | **CLAY AND SILT**, trace sand, trace gravel, very stiff to hard, grey, moist | | 8 | SS | 56 |
| | | | 9 | SS | 22 |
| | | | 10 | SS | 24 |
| | | | 11 | SS | 20 |
| 133.3 | | | | | |
| 12.8 | **END OF BOREHOLE** | | | | |

depth scale (m): 0 1 2 3 4 5 6 7 8 9 10 11 12

well details

elevation (m): 146 145 144 143 142 141 140 139 138 137 136 135 134

**undrained shear strength (kPa)**
○ unconfined + field vane
● pocket penetrometer ■ Lab Vane
40 80 120 160

**SPT N-values (bpf)**
× dynamic cone
10 20 30 40

**headspace vapour (ppm)**
× hexane □ isobutylene
▣ methane
100 200 300

**moisture / plasticity**
PL MC LL
10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT)
GR SA SI CL

SS2: H-Ms, Metals, ORPs

SS3: BTEX, PAHs, PHCs, VOCs

2 82 10 6

SS6: BTEX, H-Ms, Metals, ORPs, PAHs, PHCs, VOCs

Contained drill water upon completion of drilling. Unstabilized water level not measured. Borehole was open.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Apr 11, 2022 | 2.0 | 144.1 |
| Apr 14, 2022 | 1.8 | 144.3 |
| Apr 29, 2022 | 1.8 | 144.3 |
| May 13, 2022 | 1.9 | 144.2 |
| May 27, 2022 | 1.8 | 144.3 |
| Jun 10, 2022 | 1.8 | 144.3 |
| Jun 24, 2022 | 1.9 | 144.2 |

**file:** 22-024 gint.gpj



**Tech** : LB | **PM** : MG | **Rev** : MD

# BOREHOLE LOG 5

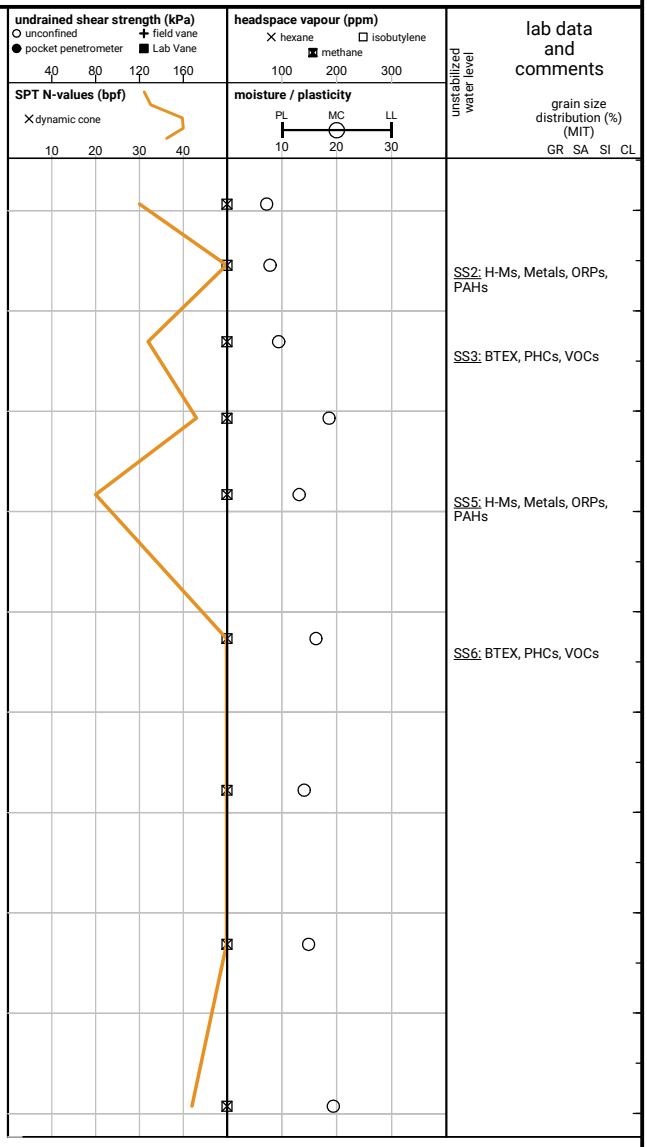
**Date Started** : Mar 31, 2022
**Position** : E: 629396, N: 4839603 (UTM 17T)
**Elev. Datum** : Geodetic

**File No.** : 22-024 **Project** : 33 Davisville Ave / 60 Balliol St, Toronto **Client** : Osmington Gerofsky Development Corporation

drill method : Hilti DD350

mud rotary small OD=100 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| 146.5 | **TOP OF SLAB** | | | | |
| | 150mm **CONCRETE** | | | | |
| | **SANDY SILT**, trace to some clay, trace gravel, dense to very dense, grey, moist (GLACIAL TILL) | | 1 | SS | 30 |
| | | | 2 | SS | 67 |
| | | | 3 | SS | 32 |
| 144.2 | | | | | |
| 2.3 | **SAND AND SILT**, trace gravel, dense, grey, wet | | 4 | SS | 43 |
| | ...at 3.0 m, with clay seams, compact | | 5 | SS | 20 |
| | ...at 4.6 m, very dense | | 6 | SS | 86 / 275mm |
| | | | 7 | SS | 88 / 250mm |
| 138.9 | | | | | |
| 7.6 | **CLAY AND SILT**, trace sand, trace gravel, hard, grey, moist | | 8 | SS | 77 / 275mm |
| | | | 9 | SS | 42 |
| 136.7 | | | | | |
| 9.8 | **END OF BOREHOLE** | | | | |




Contained drill water upon completion of drilling. Unstabilized water level not measured. Borehole was open.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Apr 14, 2022 | 2.1 | 144.4 |
| Apr 29, 2022 | 2.1 | 144.4 |
| May 13, 2022 | 2.4 | 144.1 |
| May 27, 2022 | 2.1 | 144.4 |
| Jun 10, 2022 | 2.1 | 144.4 |
| Jun 24, 2022 | 2.1 | 144.4 |

file: 22-024 gint.gpj



**Tech** : RR/LB | **PM** : MG | **Rev** : MD

**GROUNDED ENGINEERING**

**Date Started** : Mar 21, 2022
**Position** : E: 629350, N: 4839611 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 6

**File No.** : 22-024 **Project** : 33 Davisville Ave / 60 Balliol St, Toronto **Client** : Osmington Gerofsky Development Corporation

drill method : *Hilti DD350*

mud rotary small OD=100 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| 146.8 | **TOP OF SLAB** | | | | |
| 146.5 / 0.3 | 125mm **CONCRETE** / 175mm **AGGREGATE** | | 1 | SS | 38 |
| | **SILTY SAND**, trace clay, trace gravel, compact to dense, grey with brown, moist (GLACIAL TILL) | | 2 | SS | 33 |
| 145.3 / 1.5 | ...at 0.9 m, sandy silt, grey<br>**SILTY SAND**, trace gravel, trace rock fragments, compact, grey, wet | | 3 | SS | 19 |
| | | | 4 | SS | 24 |
| 143.8 / 3.0 | **SANDY GRAVEL**, trace rock fragments, dense, grey, wet | | 5 | SS | 35 |
| 142.2 / 4.6 | **SILT**, some sand, trace gravel, dense, moist | | 6 | SS | 43 |
| 140.6 / 6.2 | **SILTY SAND**, trace gravel, very dense, grey, wet | | 7A / 7B | SS | 50 / 125mm |
| | ...at 7.6 m, sand and silt, moist | | 8 | SS | 50 / 125mm |
| 137.7 / 9.1 | **CLAY AND SILT**, trace sand, trace gravel, very stiff to hard, grey, moist | | 9 | SS | 41 |
| | | | 10 | SS | 35 |
| | | | 11 | SS | 38 |
| 133.1 / 13.7 | **CLAY AND SILT**, some sand, trace gravel, hard, grey, moist (GLACIAL TILL) | | 12 | SS | 28 |
| | | | 13 | SS | 46 |

depth scale (m) 0–16; elevation (m) 146–131

well details

undrained shear strength (kPa): unconfined, field vane, pocket penetrometer, Lab Vane; 40 80 120 160

SPT N-values (bpf): dynamic cone; 10 20 30 40

headspace vapour (ppm): hexane, isobutylene, methane; 100 200 300

moisture / plasticity: PL MC LL; 10 20 30

unstabilized water level

lab data and comments

grain size distribution (%) (MIT) GR SA SI CL

SS2: H-Ms, Metals, ORPs

SS3: BTEX, PAHs, PHCs, VOCs

SS5: H-Ms, Metals, ORPs, PAHs

SS6: BTEX, PHCs, VOCs

file: 22-024 gint.gpj



**Tech** : LB | **PM** : MG | **Rev** : MD

*(continued next page)*

GROUNDED ENGINEERING

**Date Started** : Mar 21, 2022
**Position** : E: 629350, N: 4839611 (UTM 17T)
**Elev. Datum** : Geodetic

# BOREHOLE LOG 6

**File No.** : 22-024 **Project** : 33 Davisville Ave / 60 Balliol St, Toronto **Client** : Osmington Gerofsky Development Corporation

drill method : *Hilti DD350*
mud rotary small OD=100 mm

| elev depth (m) | description | graphic log | number | type | SPT N-value |
|---|---|---|---|---|---|
| | *(continued)* | | | | |
| 130.0 | | | | | |
| 16.8 | **SILTY SAND**, trace clay, trace gravel, very dense, grey, moist | | 14 | SS | 50 / 75mm |
| 128.4 | ...at 18.3 m, some silt, wet | | 15 | SS | 50 / 150mm |
| 18.4 | | | | | |

depth scale (m): 17, 18
well details
elevation (m): 130, 129

undrained shear strength (kPa): unconfined, field vane, pocket penetrometer, Lab Vane; 40 80 120 160
SPT N-values (bpf): dynamic cone; 10 20 30 40
headspace vapour (ppm): hexane, isobutylene, methane; 100 200 300
moisture / plasticity: PL MC LL; 10 20 30
unstabilized water level
lab data and comments
grain size distribution (%) (MIT): GR SA SI CL

**END OF BOREHOLE**

Contained drill water upon completion of drilling. Unstabilized water level not measured. Borehole was open.

50 mm dia. monitoring well installed.
No. 10 screen

**GROUNDWATER LEVELS**

| date | depth (m) | elevation (m) |
|---|---|---|
| Apr 5, 2022 | 17.8 | 129.0 |
| Apr 14, 2022 | 17.8 | 129.0 |
| Jun 24, 2022 | 17.1 | 129.7 |

**file:** 22-024 gint.gpj

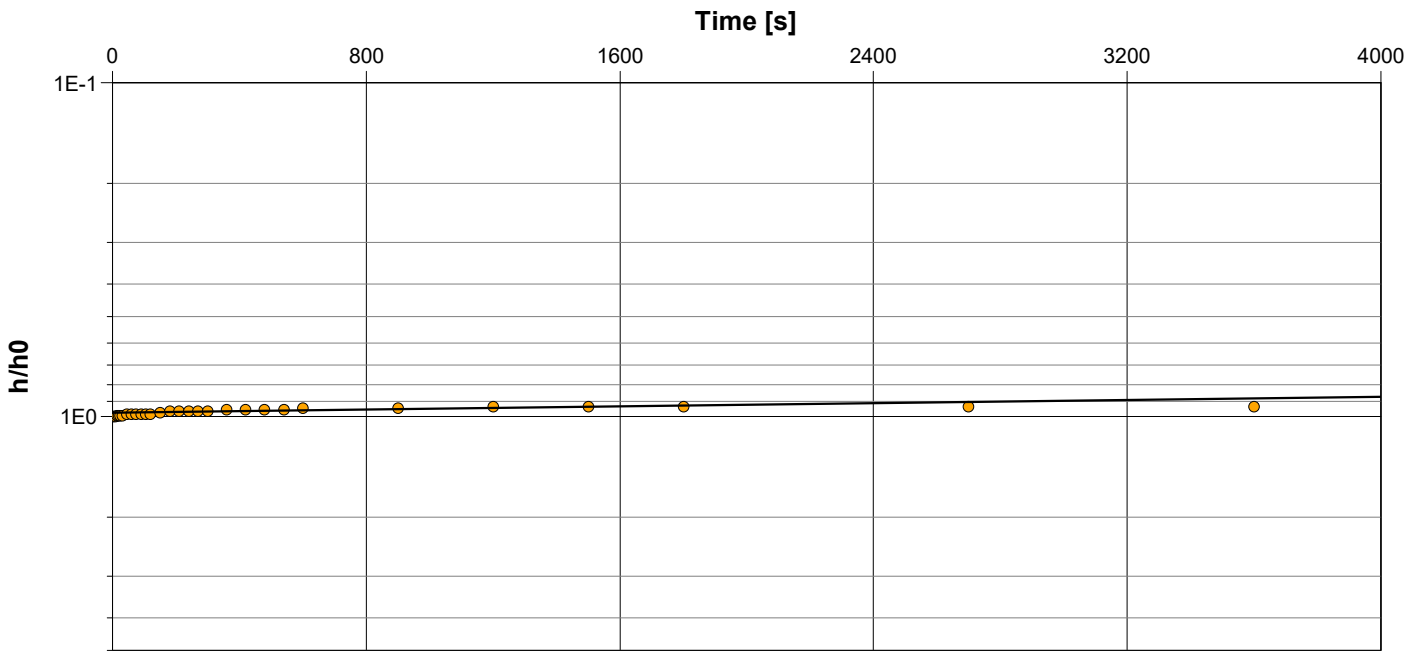


**Tech** : LB | **PM** : MG | **Rev** : MD

# APPENDIX B

| | |
|---|---|
| GROUNDED ENGINEERING | **Slug Test Analysis Report** |
| | Project: 33 Davisville Avenue / 60 Balliol Avenue |
| | Number: 22-024 |
| | Client: Osmington Gerofsky Development Corporation |

| | | |
|---|---|---|
| Location: Toronto, Ontario | Slug Test: RHT BH1 | Test Well: BH1 |
| Test Conducted by: RR | | Test Date: 2022-04-05 |
| Analysis Performed by: MG | | Analysis Date: 2022-04-19 |
| Aquifer Thickness: 24.40 m | | |

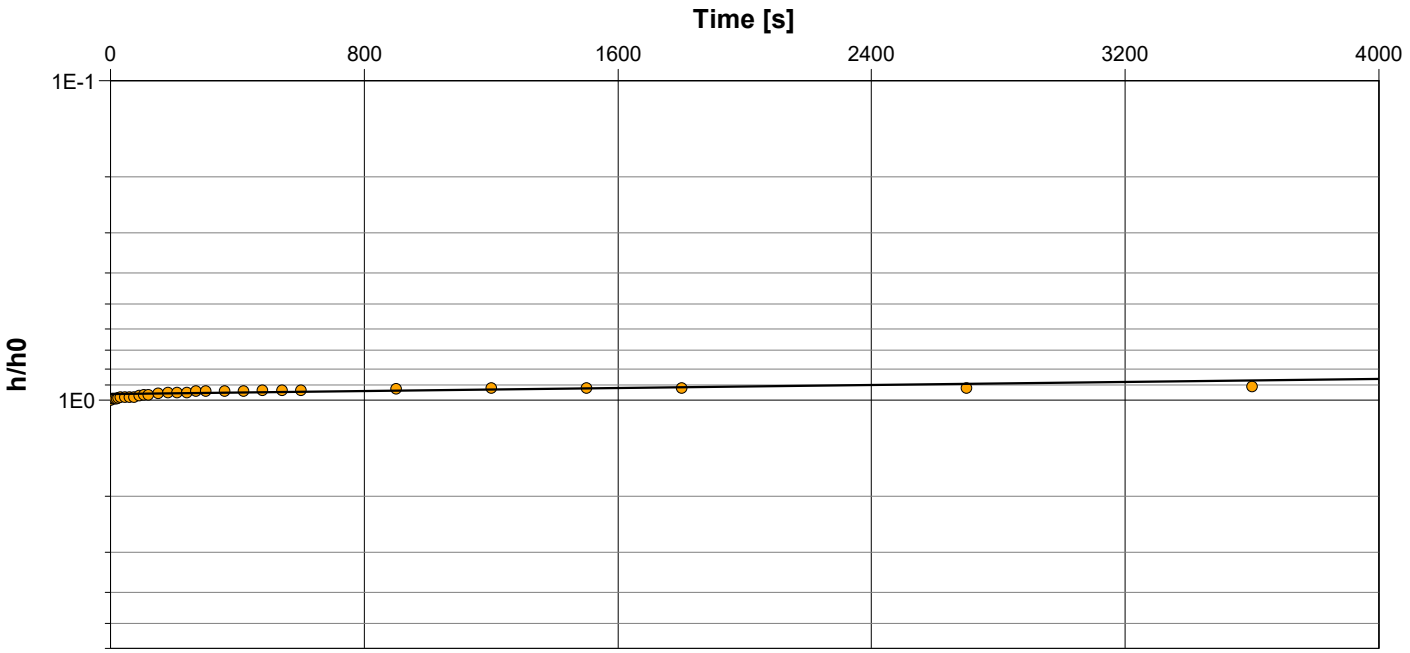



Calculation using Bouwer & Rice

| Observation Well | Hydraulic Conductivity [m/s] | |
|---|---|---|
| BH1 | $1.05 \times 10^{-8}$ | |

| | |
|---|---|
| GROUNDED ENGINEERING | **Slug Test Analysis Report** |
| | Project: 33 Davisville Avenue / 60 Balliol Avenue |
| | Number: 22-024 |
| | Client: Osmington Gerofsky Development Corporation |

| | | |
|---|---|---|
| Location: Toronto, Ontario | Slug Test: RHT BH2 | Test Well: BH2 |
| Test Conducted by: RR | | Test Date: 2022-04-04 |
| Analysis Performed by: MG | New analysis 1 | Analysis Date: 2022-04-19 |
| Aquifer Thickness: 24.40 m | | |




Calculation using Bouwer & Rice

| Observation Well | Hydraulic Conductivity [m/s] | |
|---|---|---|
| BH2 | $1.05 \times 10^{-8}$ | |

GROUNDED ENGINEERING

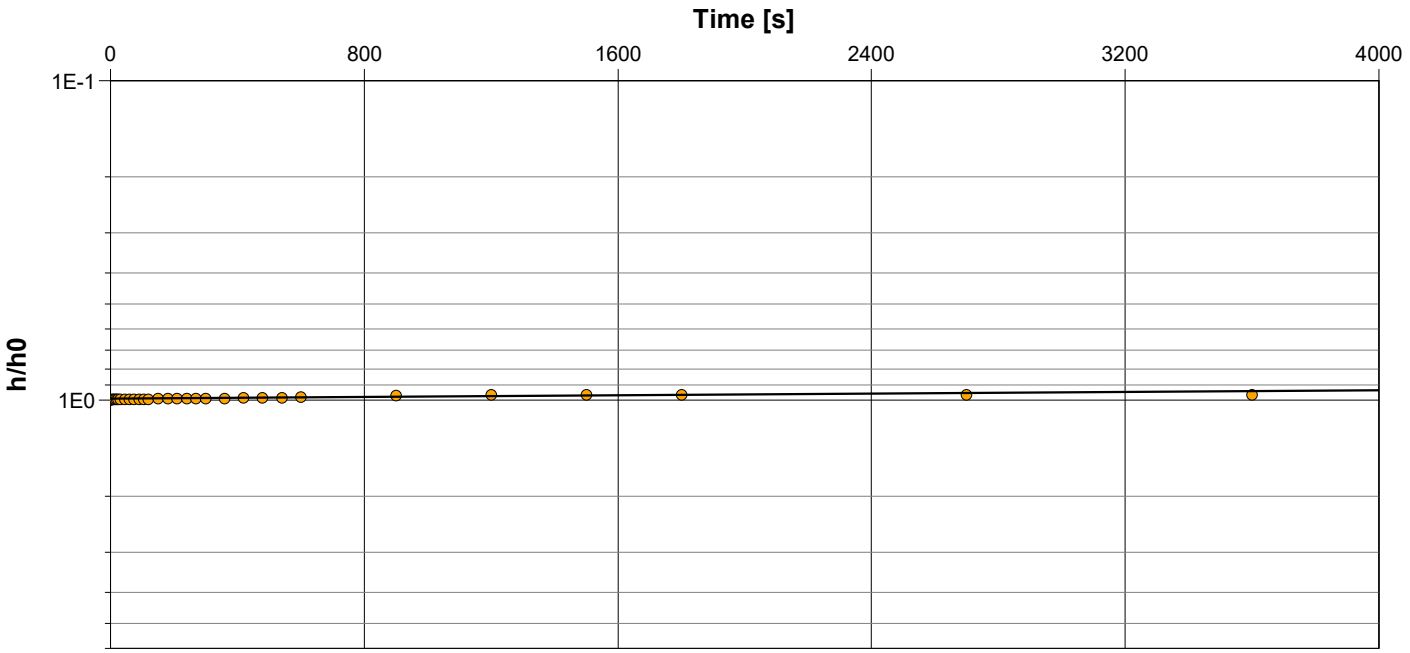
**Slug Test Analysis Report**

Project: 33 Davisville Avenue / 60 Balliol Avenue

Number: 22-024

Client: Osmington Gerofsky Development Corporation

| | | |
|---|---|---|
| Location: Toronto, Ontario | Slug Test: RHT BH3 | Test Well: BH3 |
| Test Conducted by: RR | | Test Date: 2022-04-05 |
| Analysis Performed by: MG | | Analysis Date: 2022-04-19 |
| Aquifer Thickness: 30.50 m | | |

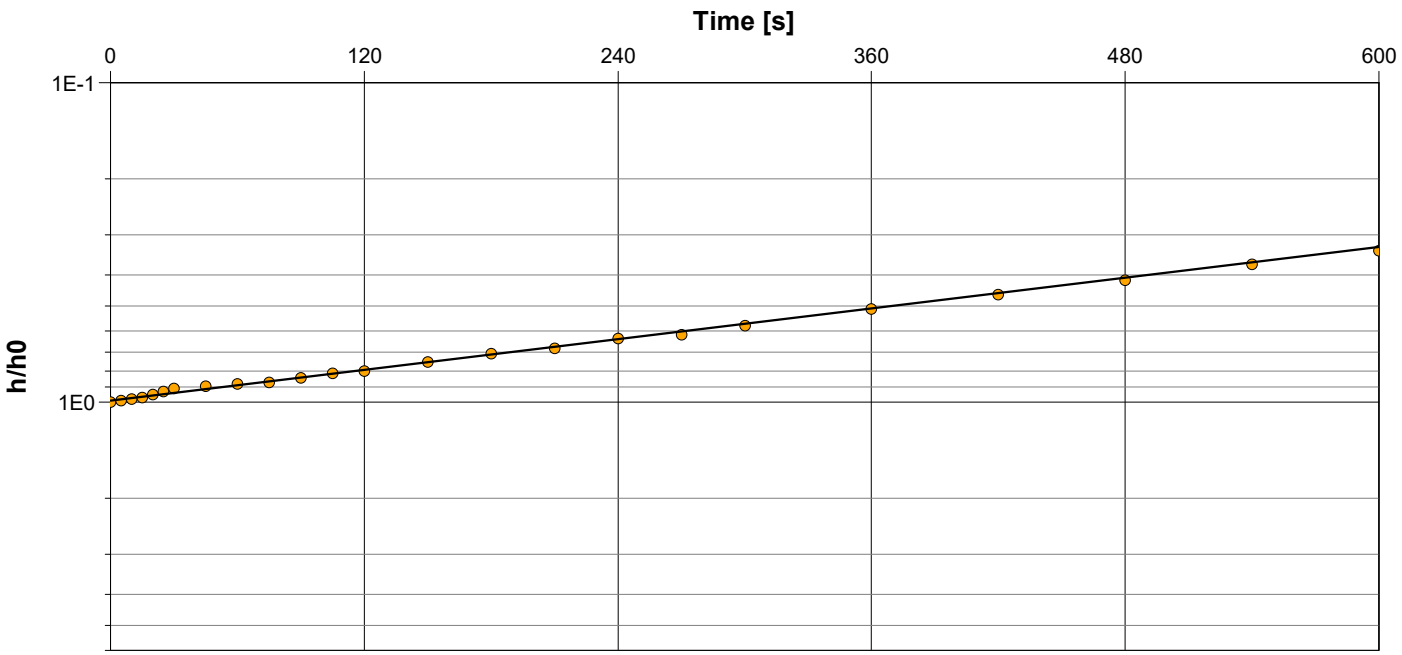



Calculation using Bouwer & Rice

| Observation Well | Hydraulic Conductivity [m/s] | |
|---|---|---|
| BH3 | $5.52 \times 10^{-9}$ | |

| | |
|---|---|
| GROUNDED ENGINEERING | **Slug Test Analysis Report** |
| | Project: 33 Davisville Avenue / 60 Balliol Avenue |
| | Number: 22-024 |
| | Client: Osmington Gerofsky Development Corporation |

| | | |
|---|---|---|
| Location: Toronto, Ontario | Slug Test: RHT BH4 | Test Well: BH4 |
| Test Conducted by: LB | | Test Date: 2022-04-11 |
| Analysis Performed by: MG | | Analysis Date: 2022-04-19 |
| Aquifer Thickness: 12.20 m | | |




Calculation using Bouwer & Rice

| Observation Well | Hydraulic Conductivity [m/s] | |
|---|---|---|
| BH4 | $7.09 \times 10^{-7}$ | |

GROUNDED ENGINEERING

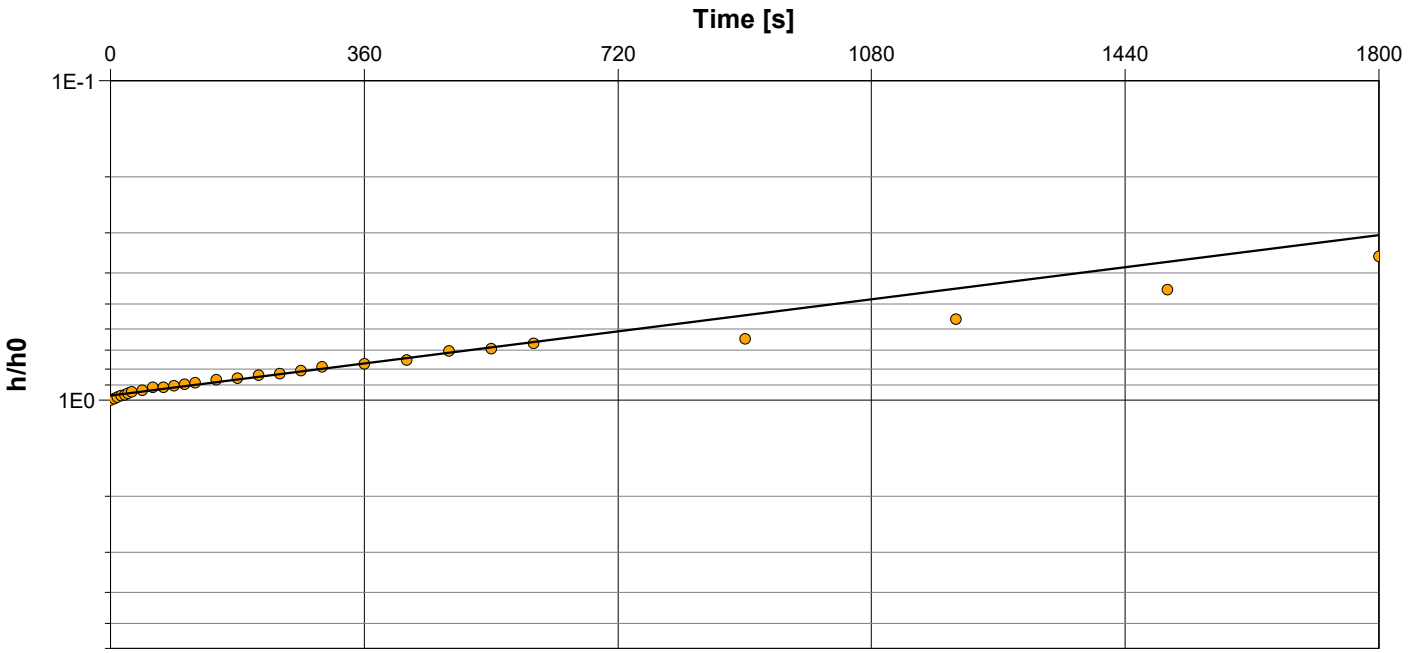
**Slug Test Analysis Report**

Project: 33 Davisville Avenue / 60 Balliol Avenue

Number: 22-024

Client: Osmington Gerofsky Development Corporation

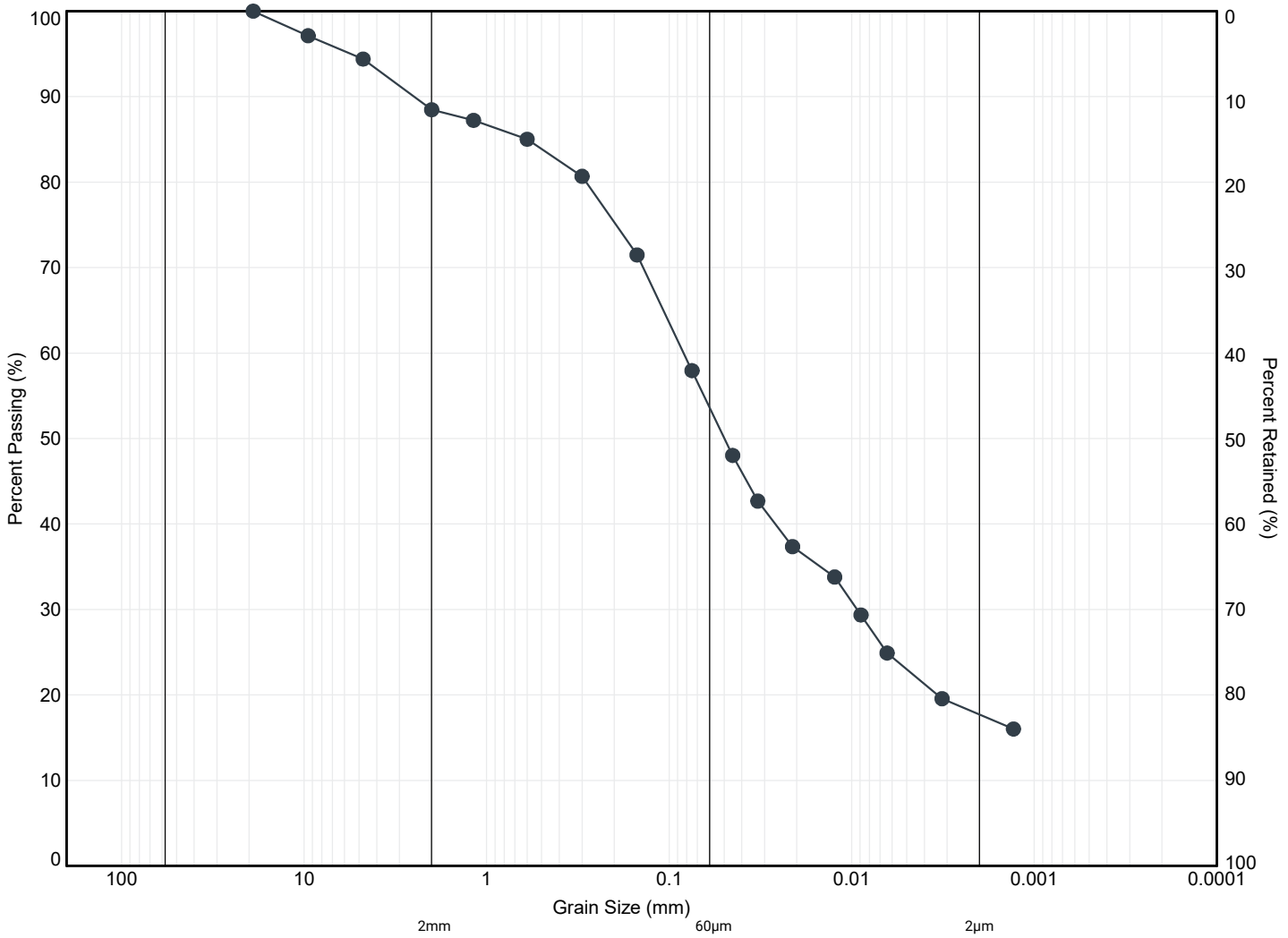
| | | |
|---|---|---|
| Location: Toronto, Ontario | Slug Test: RHT BH5 | Test Well: BH5 |
| Test Conducted by: RR | | Test Date: 2022-04-04 |
| Analysis Performed by: MG | | Analysis Date: 2022-04-19 |
| Aquifer Thickness: 9.20 m | | |




Calculation using Bouwer & Rice

| Observation Well | Hydraulic Conductivity [m/s] | |
|---|---|---|
| BH5 | $2.46 \times 10^{-7}$ | |

# APPENDIX C




| MIT SYSTEM | COBBLES | GRAVEL | | | SAND | | | SILT | CLAY |
|---|---|---|---|---|---|---|---|---|---|
| | | COARSE | MEDIUM | FINE | COARSE | MEDIUM | FINE | | |

MIT SYSTEM

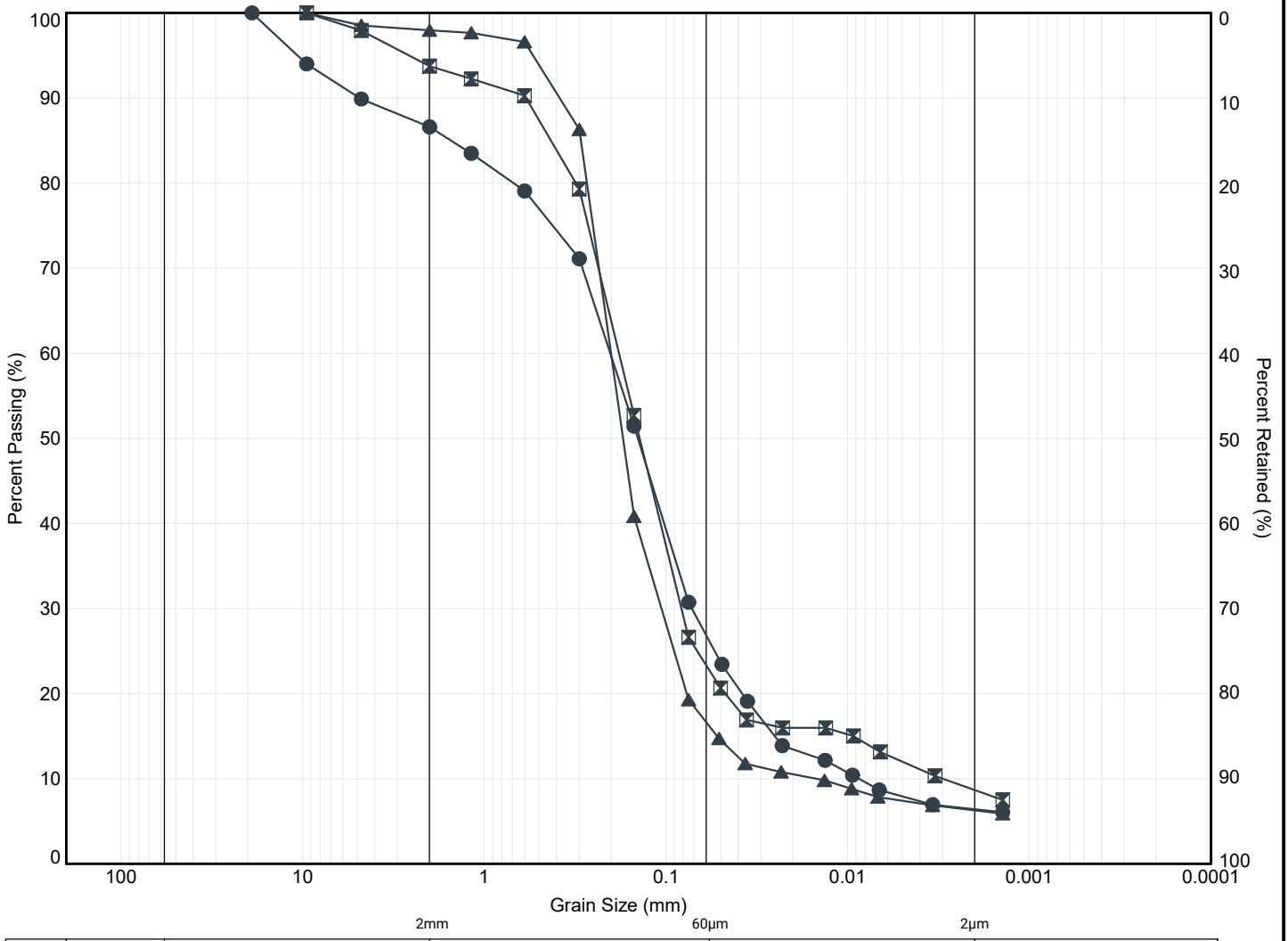
| | Borehole | Sample | Depth (m) | Elev. (m) | Gravel (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|---|---|---|
| ● | **1** | SS7 | 6.4 | 148.8 | 12 | 34 | 36 | 18 |

GROUNDED ENGINEERING

Title: **GRAIN SIZE DISTRIBUTION**
**SANDY SILT TILL**

File No.: **22-024**

file: 22-024 gint.gpj




| MIT SYSTEM | COBBLES | GRAVEL | | | SAND | | | SILT | CLAY |
|---|---|---|---|---|---|---|---|---|---|
| | | COARSE | MEDIUM | FINE | COARSE | MEDIUM | FINE | | |

MIT SYSTEM

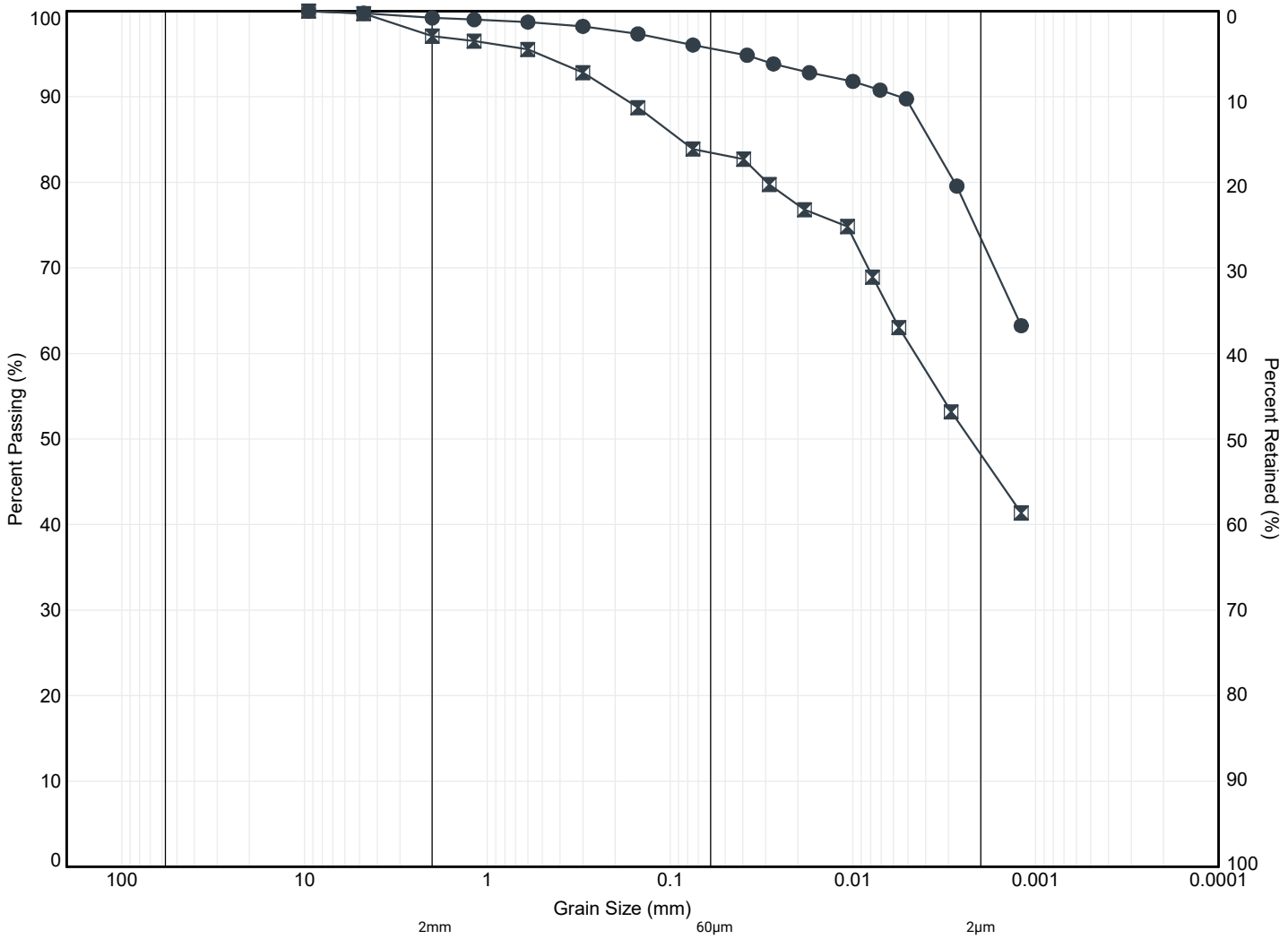
| | Borehole | Sample | Depth (m) | Elev. (m) | Gravel (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|---|---|---|
| ● | **1** | SS10 | 11.0 | 144.2 | 13 | 61 | 20 | 6 |
| ⊠ | **2** | SS15 | 15.4 | 140.5 | 6 | 70 | 15 | 9 |
| ▲ | **4** | 5A | 3.2 | 142.9 | 2 | 82 | 10 | 6 |

GROUNDED ENGINEERING

Title: **GRAIN SIZE DISTRIBUTION SILTY SAND**

File No.: **22-024**

file: 22-024.gint.gpj




| MIT SYSTEM | COBBLES | GRAVEL | | | SAND | | | SILT | CLAY |
|---|---|---|---|---|---|---|---|---|---|
| | | COARSE | MEDIUM | FINE | COARSE | MEDIUM | FINE | | |

MIT SYSTEM

| | Borehole | Sample | Depth (m) | Elev. (m) | Gravel (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|---|---|---|
| ● | **1** | SS16 | 20.0 | 135.1 | 1 | 3 | 22 | 74 |
| ⊠ | **1** | SS18 | 23.1 | 132.1 | 3 | 14 | 35 | 48 |

GROUNDED ENGINEERING

Title: **GRAIN SIZE DISTRIBUTION CLAY AND SILT TILL**

File No.: **22-024**

file: 22-024 gint.gpj

# APPENDIX D

*K* from Grain Size Analysis Report

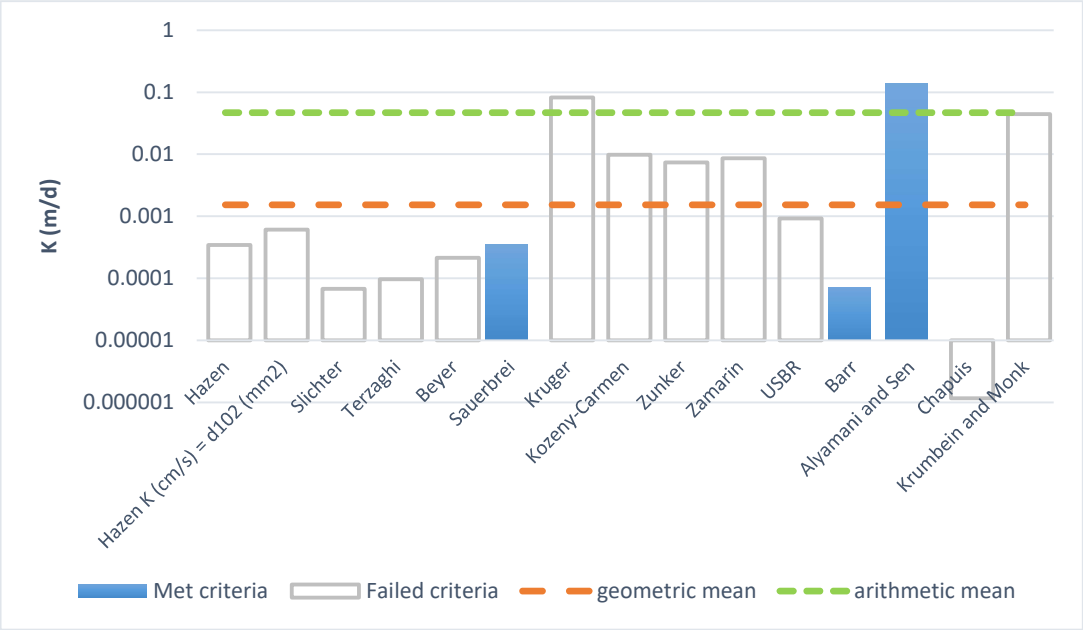
Date: 25-Apr-22

Sample Name: BH1 SS7

Mass Sample (g): 100

T (oC) 20

## Poorly sorted sandy gravelly silt with fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 4.0E-07 | 4.0E-09 | 0.00 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 7.0E-07 | 7.0E-09 | 0.00 | |
| Slichter | 7.8E-08 | 7.8E-10 | 0.00 | |
| Terzaghi | 1.1E-07 | 1.1E-09 | 0.00 | |
| Beyer | 2.5E-07 | 2.5E-09 | 0.00 | |
| Sauerbrei | 4.1E-07 | 4.1E-09 | 0.00 | |
| Kruger | 9.6E-05 | 9.6E-07 | 0.08 | |
| Kozeny-Carmen | 1.1E-05 | 1.1E-07 | 0.01 | |
| Zunker | 8.6E-06 | 8.6E-08 | 0.01 | |
| Zamarin | 1.0E-05 | 1.0E-07 | 0.01 | |
| USBR | 1.1E-06 | 1.1E-08 | 0.00 | |
| Barr | 8.4E-08 | 8.4E-10 | 0.00 | |
| Alyamani and Sen | 1.6E-04 | 1.6E-06 | 0.14 | |
| Chapuis | 1.3E-09 | 1.3E-11 | 0.00 | |
| Krumbein and Monk | 5.1E-05 | 5.1E-07 | 0.04 | |
| geometric mean | 1.8E-06 | 1.8E-08 | 0.00 | |
| arithmetic mean | 5.5E-05 | 5.5E-07 | 0.05 | |

*K* from Grain Size Analysis Report

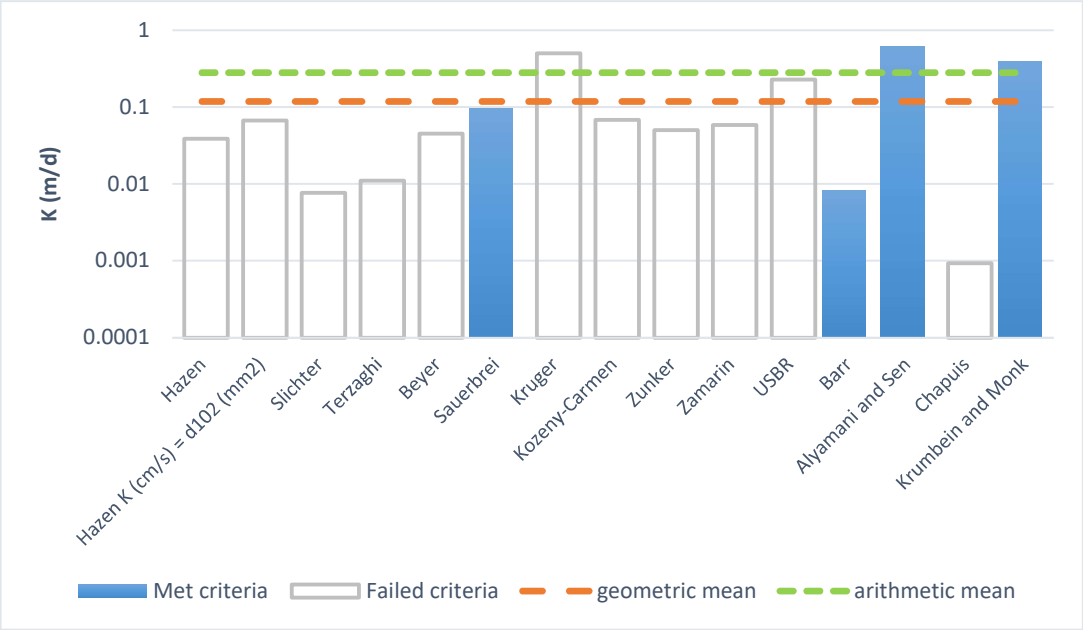
Date: 25-Apr-22

Sample Name: BH1 SS10

Mass Sample (g): 100

T (oC) 20

## Poorly sorted gravelly sand low in fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 4.5E-05 | 4.5E-07 | 0.04 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 7.7E-05 | 7.7E-07 | 0.07 | |
| Slichter | 8.9E-06 | 8.9E-08 | 0.01 | |
| Terzaghi | 1.3E-05 | 1.3E-07 | 0.01 | |
| Beyer | 5.2E-05 | 5.2E-07 | 0.05 | |
| Sauerbrei | 1.1E-04 | 1.1E-06 | 0.10 | |
| Kruger | 5.8E-04 | 5.8E-06 | 0.50 | |
| Kozeny-Carmen | 7.9E-05 | 7.9E-07 | 0.07 | |
| Zunker | 5.8E-05 | 5.8E-07 | 0.05 | |
| Zamarin | 6.8E-05 | 6.8E-07 | 0.06 | |
| USBR | 2.6E-04 | 2.6E-06 | 0.23 | |
| Barr | 9.6E-06 | 9.6E-08 | 0.01 | |
| Alyamani and Sen | 7.2E-04 | 7.2E-06 | 0.62 | |
| Chapuis | 1.1E-06 | 1.1E-08 | 0.00 | |
| Krumbein and Monk | 4.6E-04 | 4.6E-06 | 0.40 | |
| geometric mean | 1.4E-04 | 1.4E-06 | 0.12 | |
| arithmetic mean | 3.3E-04 | 3.3E-06 | 0.28 | |

*K* from Grain Size Analysis Report

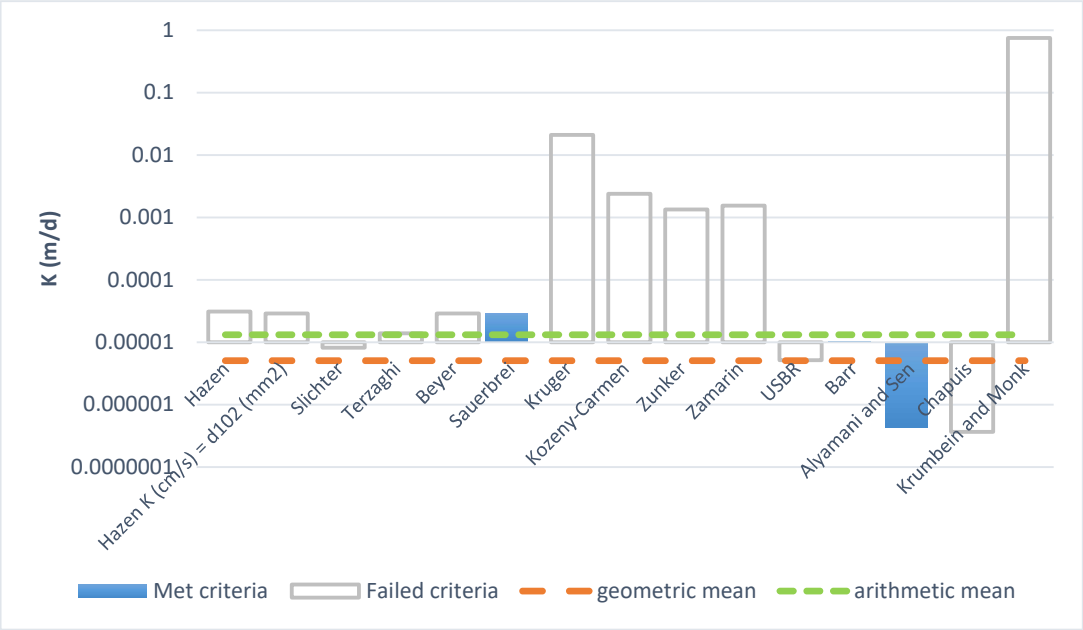
Date: 25-Apr-22

Sample Name: BH1 SS16

Mass Sample (g): 100

T (oC) 20

## Poorly sorted clay with fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 3.6E-08 | 3.6E-10 | 0.00 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 3.3E-08 | 3.3E-10 | 0.00 | |
| Slichter | 9.4E-09 | 9.4E-11 | 0.00 | |
| Terzaghi | 1.6E-08 | 1.6E-10 | 0.00 | |
| Beyer | 3.3E-08 | 3.3E-10 | 0.00 | |
| Sauerbrei | 3.4E-08 | 3.4E-10 | 0.00 | |
| Kruger | 2.4E-05 | 2.4E-07 | 0.02 | |
| Kozeny-Carmen | 2.8E-06 | 2.8E-08 | 0.00 | |
| Zunker | 1.6E-06 | 1.6E-08 | 0.00 | |
| Zamarin | 1.8E-06 | 1.8E-08 | 0.00 | |
| USBR | 5.9E-09 | 5.9E-11 | 0.00 | |
| Barr | 1.2E-08 | 1.2E-10 | 0.00 | |
| Alyamani and Sen | 5.0E-10 | 5.0E-12 | 0.00 | |
| Chapuis | 4.2E-10 | 4.2E-12 | 0.00 | |
| Krumbein and Monk | 8.7E-04 | 8.7E-06 | 0.75 | |
| geometric mean | 5.9E-09 | 5.9E-11 | 0.00 | |
| arithmetic mean | 1.5E-08 | 1.5E-10 | 0.00 | |

*K* from Grain Size Analysis Report

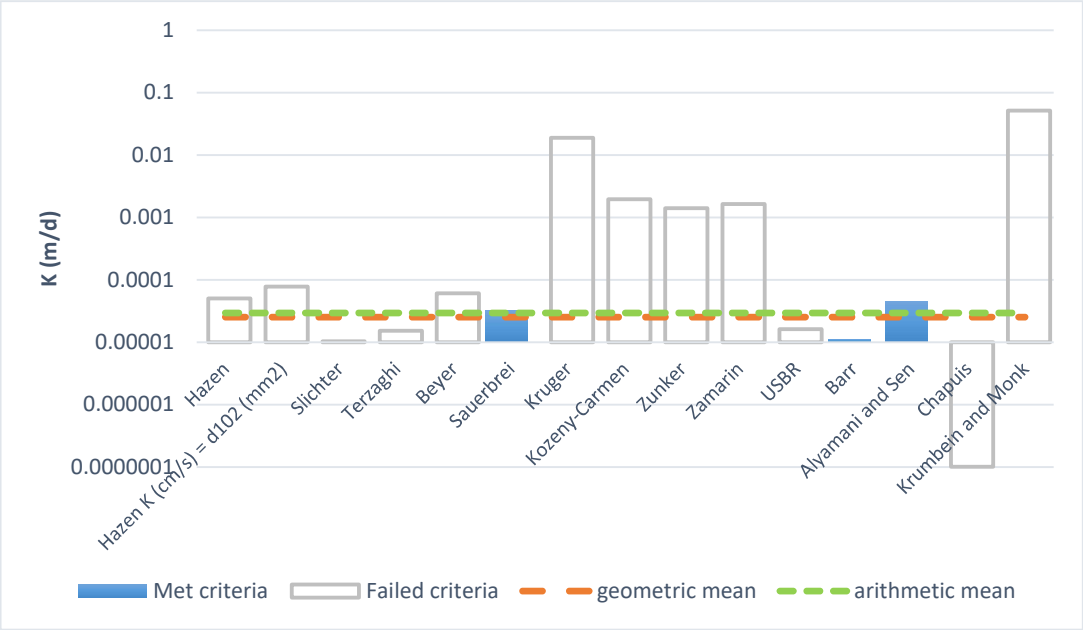
Date: 25-Apr-22

Sample Name: BH1 SS18

Mass Sample (g): 100

T (oC) 20

## Poorly sorted clay with fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 5.8E-08 | 5.8E-10 | 0.00 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 9.0E-08 | 9.0E-10 | 0.00 | |
| Slichter | 1.2E-08 | 1.2E-10 | 0.00 | |
| Terzaghi | 1.8E-08 | 1.8E-10 | 0.00 | |
| Beyer | 7.0E-08 | 7.0E-10 | 0.00 | |
| Sauerbrei | 3.7E-08 | 3.7E-10 | 0.00 | |
| Kruger | 2.2E-05 | 2.2E-07 | 0.02 | |
| Kozeny-Carmen | 2.3E-06 | 2.3E-08 | 0.00 | |
| Zunker | 1.6E-06 | 1.6E-08 | 0.00 | |
| Zamarin | 1.9E-06 | 1.9E-08 | 0.00 | |
| USBR | 1.9E-08 | 1.9E-10 | 0.00 | |
| Barr | 1.3E-08 | 1.3E-10 | 0.00 | |
| Alyamani and Sen | 5.3E-08 | 5.3E-10 | 0.00 | |
| Chapuis | 1.2E-10 | 1.2E-12 | 0.00 | |
| Krumbein and Monk | 6.0E-05 | 6.0E-07 | 0.05 | |
| geometric mean | 2.9E-08 | 2.9E-10 | 0.00 | |
| arithmetic mean | 3.4E-08 | 3.4E-10 | 0.00 | |

*K* from Grain Size Analysis Report

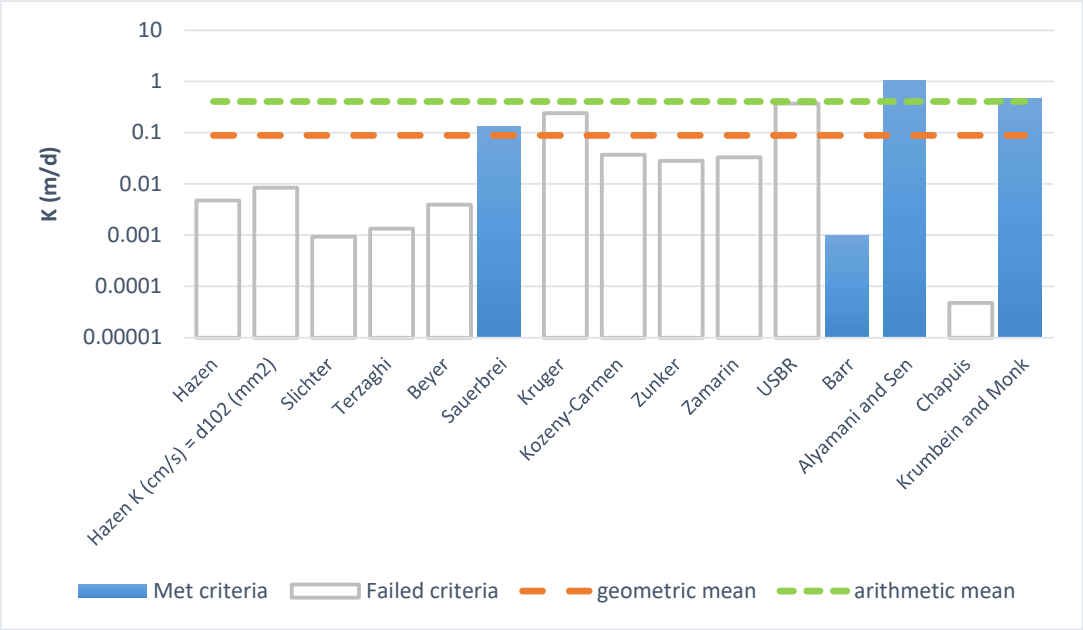
Date: 25-Apr-22

Sample Name: BH2 SS15

Mass Sample (g): 100

T (oC) 20

## Poorly sorted sand with fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 5.5E-06 | 5.5E-08 | 0.00 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 9.7E-06 | 9.7E-08 | 0.01 | |
| Slichter | 1.1E-06 | 1.1E-08 | 0.00 | |
| Terzaghi | 1.5E-06 | 1.5E-08 | 0.00 | |
| Beyer | 4.6E-06 | 4.6E-08 | 0.00 | |
| Sauerbrei | 1.5E-04 | 1.5E-06 | 0.13 | |
| Kruger | 2.8E-04 | 2.8E-06 | 0.24 | |
| Kozeny-Carmen | 4.3E-05 | 4.3E-07 | 0.04 | |
| Zunker | 3.3E-05 | 3.3E-07 | 0.03 | |
| Zamarin | 3.8E-05 | 3.8E-07 | 0.03 | |
| USBR | 4.3E-04 | 4.3E-06 | 0.37 | |
| Barr | 1.2E-06 | 1.2E-08 | 0.00 | |
| Alyamani and Sen | 1.2E-03 | 1.2E-05 | 1.03 | |
| Chapuis | 5.5E-08 | 5.5E-10 | 0.00 | |
| Krumbein and Monk | 5.4E-04 | 5.4E-06 | 0.47 | |
| geometric mean | 1.0E-04 | 1.0E-06 | 0.09 | |
| arithmetic mean | 4.7E-04 | 4.7E-06 | 0.41 | |

*K* from Grain Size Analysis Report

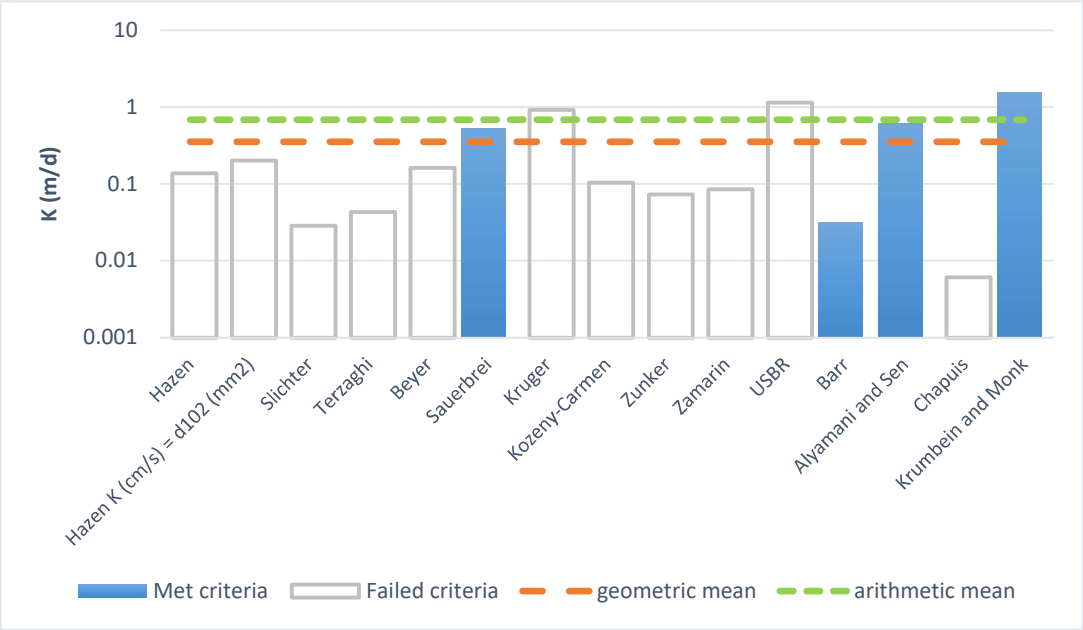
Date: 25-Apr-22

Sample Name: BH4 SS5A

Mass Sample (g): 100

T (oC) 20

## Poorly sorted sand low in fines




| Estimation of Hydraulic Conductivity | cm/s | m/s | m/d | de |
|---|---|---|---|---|
| Hazen | 1.6E-04 | 1.6E-06 | 0.14 | |
| Hazen K (cm/s) = $d_{10}$ (mm) | 2.3E-04 | 2.3E-06 | 0.20 | |
| Slichter | 3.3E-05 | 3.3E-07 | 0.03 | |
| Terzaghi | 5.0E-05 | 5.0E-07 | 0.04 | |
| Beyer | 1.9E-04 | 1.9E-06 | 0.16 | |
| Sauerbrei | 6.1E-04 | 6.1E-06 | 0.52 | |
| Kruger | 1.1E-03 | 1.1E-05 | 0.92 | |
| Kozeny-Carmen | 1.2E-04 | 1.2E-06 | 0.10 | |
| Zunker | 8.4E-05 | 8.4E-07 | 0.07 | |
| Zamarin | 9.8E-05 | 9.8E-07 | 0.08 | |
| USBR | 1.3E-03 | 1.3E-05 | 1.15 | |
| Barr | 3.6E-05 | 3.6E-07 | 0.03 | |
| Alyamani and Sen | 7.2E-04 | 7.2E-06 | 0.62 | |
| Chapuis | 7.0E-06 | 7.0E-08 | 0.01 | |
| Krumbein and Monk | 1.8E-03 | 1.8E-05 | 1.58 | |
| geometric mean | 4.1E-04 | 4.1E-06 | 0.36 | |
| arithmetic mean | 8.0E-04 | 8.0E-06 | 0.69 | |

# APPENDIX E

Grounded Engineering Inc
ATTN: MATTHEW GARCIA
1 BANIGAN DRIVE
TORONTO ON M4H 1G3

Date Received: 05-APR-22
Report Date: 12-APR-22 10:35 (MT)
Version: FINAL

Client Phone: 647-264-7928

# Certificate of Analysis

## Lab Work Order #: L2696874

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 20-893909
Legal Site Desc:

Amanda Overholster
Account Manager

# ANALYTICAL REPORT

## Summary of Guideline Exceedances

| Guideline ALS ID | Client ID | Grouping | Analyte | Result | Guideline Limit | Unit |
|---|---|---|---|---|---|---|
| **Ontario Toronto Sanitary Discharge Sewer By-Law 100-2016 (FEB 4,2016) - Ontario Toronto Sanitary Discharge Sewer By-Law** | | | | | | |
| (No parameter exceedances) | | | | | | |
| **Ontario Toronto Sanitary Discharge Sewer By-Law 100-2016 (FEB 4,2016) - Ontario Toronto Storm Sewer By-Law** | | | | | | |
| L2696874-1 | SW-UF-BH1 | Physical Tests | Total Suspended Solids | 134 | 15 | mg/L |
| | | Total Metals | Manganese (Mn)-Total | 0.0737 | 0.05 | mg/L |

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

# ANALYTICAL REPORT

## Physical Tests - WATER

| Analyte | Unit | Guide Limits #1 | Guide Limits #2 | Lab ID: L2696874-1<br>Sample Date: 04-APR-22<br>Sample ID: SW-UF-BH1 |
|---|---|---|---|---|
| pH | pH units | 6.00-11.5 | 6.0-9.5 | 8.13 |
| Total Suspended Solids | mg/L | 350 | 15 | 134 |

**Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law**
**Guide Limit #2: Ontario Toronto Storm Sewer By-Law**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

# ANALYTICAL REPORT

## Anions and Nutrients - WATER

| Analyte | Unit | Guide Limits #1 | Guide Limits #2 | Lab ID: L2696874-1<br>Sample Date: 04-APR-22<br>Sample ID: SW-UF-BH1 |
|---|---|---|---|---|
| Fluoride (F) | mg/L | 10 | - | 0.265 |
| Total Kjeldahl Nitrogen | mg/L | 100 | - | 1.48 DLM |
| Phosphorus, Total | mg/L | 10 | 0.4 | 0.284 |

**Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law**
**Guide Limit #2: Ontario Toronto Storm Sewer By-Law**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

# ANALYTICAL REPORT

## Cyanides - WATER

| | | Guide Limits | | |
|---|---|---|---|---|
| **Analyte** | **Unit** | **#1** | **#2** | |
| **Lab ID** | | | | L2696874-1 |
| **Sample Date** | | | | 04-APR-22 |
| **Sample ID** | | | | SW-UF-BH1 |
| Cyanide, Total | mg/L | 2 | 0.02 | <0.0020 |

**Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law**
**Guide Limit #2: Ontario Toronto Storm Sewer By-Law**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

# ANALYTICAL REPORT

## Bacteriological Tests - WATER

| | | Guide Limits | | | |
|---|---|---|---|---|---|
| | | | | Lab ID | L2696874-1 |
| | | | | Sample Date | 04-APR-22 |
| | | | | Sample ID | SW-UF-BH1 |
| **Analyte** | **Unit** | **#1** | **#2** | | |
| E. Coli | CFU/100mL | - | 200 | <2 DLM | |

**Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law**
**Guide Limit #2: Ontario Toronto Storm Sewer By-Law**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

# ANALYTICAL REPORT

## Total Metals - WATER

| | | | | |
|---|---|---|---|---|
| | | | **Lab ID** | L2696874-1 |
| | | | **Sample Date** | 04-APR-22 |
| | | | **Sample ID** | SW-UF-BH1 |
| **Analyte** | **Unit** | **Guide Limits #1** | **#2** | |
| Aluminum (Al)-Total | mg/L | 50 | - | 0.154 |
| Antimony (Sb)-Total | mg/L | 5 | - | 0.00052 |
| Arsenic (As)-Total | mg/L | 1 | 0.02 | 0.00155 |
| Cadmium (Cd)-Total | mg/L | 0.7 | 0.008 | 0.000010 |
| Chromium (Cr)-Total | mg/L | 4 | 0.08 | 0.00077 |
| Cobalt (Co)-Total | mg/L | 5 | - | 0.00050 |
| Copper (Cu)-Total | mg/L | 2 | 0.04 | 0.0074 |
| Lead (Pb)-Total | mg/L | 1 | 0.12 | <0.00010 |
| Manganese (Mn)-Total | mg/L | 5 | 0.05 | 0.0737 |
| Mercury (Hg)-Total | mg/L | 0.01 | 0.0004 | <0.0000050 |
| Molybdenum (Mo)-Total | mg/L | 5 | - | 0.0121 |
| Nickel (Ni)-Total | mg/L | 2 | 0.08 | 0.00237 |
| Selenium (Se)-Total | mg/L | 1 | 0.02 | 0.000356 |
| Silver (Ag)-Total | mg/L | 5 | 0.12 | <0.000050 |
| Tin (Sn)-Total | mg/L | 5 | - | 0.00191 |
| Titanium (Ti)-Total | mg/L | 5 | - | 0.00689 |
| Zinc (Zn)-Total | mg/L | 2 | 0.04 | <0.0030 |

**Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law**
**Guide Limit #2: Ontario Toronto Storm Sewer By-Law**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

# ANALYTICAL REPORT

## Speciated Metals - WATER

| | | Lab ID | Sample Date | Sample ID |
|---|---|---|---|---|
| | | L2696874-1 | 04-APR-22 | SW-UF-BH1 |
| Analyte | Unit | Guide Limits #1 | Guide Limits #2 | |
| Chromium, Hexavalent | mg/L | 2 | 0.04 | <0.00050 |

**Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law**
**Guide Limit #2: Ontario Toronto Storm Sewer By-Law**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

# ANALYTICAL REPORT

## Aggregate Organics - WATER

| | | | | |
|---|---|---|---|---|
| | | | **Lab ID** | L2696874-1 |
| | | | **Sample Date** | 04-APR-22 |
| | | | **Sample ID** | SW-UF-BH1 |
| | | **Guide Limits** | | |
| **Analyte** | **Unit** | **#1** | **#2** | |
| BOD | mg/L | 300 | 15 | 4.8 |
| Oil and Grease, Total | mg/L | - | - | <5.0 |
| Animal/Veg Oil & Grease | mg/L | 150 | - | <5.0 |
| Mineral Oil and Grease | mg/L | 15 | - | <2.5 |
| Phenols (4AAP) | mg/L | 1.0 | 0.008 | <0.0010 |

**Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law**
**Guide Limit #2: Ontario Toronto Storm Sewer By-Law**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

# ANALYTICAL REPORT

## Volatile Organic Compounds - WATER

| | | | | |
|---|---|---|---|---|
| | | | **Lab ID** | L2696874-1 |
| | | | **Sample Date** | 04-APR-22 |
| | | | **Sample ID** | SW-UF-BH1 |
| | | **Guide Limits** | | |
| **Analyte** | **Unit** | **#1** | **#2** | |
| Benzene | ug/L | 10 | 2 | <0.50 OWP |
| Chloroform | ug/L | 40 | 2 | <1.0 OWP |
| 1,2-Dichlorobenzene | ug/L | 50 | 5.6 | <0.50 OWP |
| 1,4-Dichlorobenzene | ug/L | 80 | 6.8 | <0.50 OWP |
| cis-1,2-Dichloroethylene | ug/L | 4000 | 5.6 | <0.50 OWP |
| Dichloromethane | ug/L | 2000 | 5.2 | <2.0 OWP |
| trans-1,3-Dichloropropene | ug/L | 140 | - | <0.50 OWP |
| Ethylbenzene | ug/L | 160 | 2 | <0.50 OWP |
| 1,1,2,2-Tetrachloroethane | ug/L | 1400 | 17 | <0.50 OWP |
| Tetrachloroethylene | ug/L | 1000 | 4.4 | <0.50 OWP |
| Toluene | ug/L | 16 | 2 | <0.50 OWP |
| Trichloroethylene | ug/L | 400 | 7.6 | <0.50 OWP |
| o-Xylene | ug/L | - | - | <0.50 OWP |
| m+p-Xylenes | ug/L | - | - | <1.0 OWP |
| Xylenes (Total) | ug/L | 1400 | 4.4 | <1.1 |
| Surrogate: 4-Bromofluorobenzene | % | - | - | 111.4 |
| Surrogate: 1,4-Difluorobenzene | % | - | - | 88.5 |

**Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law**
**Guide Limit #2: Ontario Toronto Storm Sewer By-Law**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

# ANALYTICAL REPORT

## Polycyclic Aromatic Hydrocarbons - WATER

| | | | | |
|---|---|---|---|---|
| | | | **Lab ID** | L2696874-1 |
| | | | **Sample Date** | 04-APR-22 |
| | | | **Sample ID** | SW-UF-BH1 |
| | | **Guide Limits** | | |
| **Analyte** | **Unit** | **#1** | **#2** | |
| Acenaphthene | ug/L | - | - | <0.010 |
| Anthracene | ug/L | - | - | <0.010 |
| Benzo(a)anthracene | ug/L | - | - | <0.010 |
| Benzo(a)pyrene | ug/L | - | - | <0.010 |
| Benzo(b&j)fluoranthene | ug/L | - | - | <0.010 |
| Benzo(e)pyrene | ug/L | - | - | <0.050 |
| Benzo(ghi)perylene | ug/L | - | - | <0.010 |
| Benzo(k)fluoranthene | ug/L | - | - | <0.010 |
| Chrysene | ug/L | - | - | 0.018 AI |
| Dibenz(a,h)acridine | ug/L | - | - | <0.050 |
| Dibenz(a,j)acridine | ug/L | - | - | <0.050 |
| Dibenz(a,h)anthracene | ug/L | - | - | <0.010 |
| Dibenzo(a,i)pyrene | ug/L | - | - | <0.050 |
| 7H-Dibenzo(c,g)carbazole | ug/L | - | - | <0.050 |
| 1,3-Dinitropyrene | ug/L | - | - | <1.0 |
| 1,6-Dinitropyrene | ug/L | - | - | <1.0 |
| 1,8-Dinitropyrene | ug/L | - | - | <1.0 |
| Fluoranthene | ug/L | - | - | <0.020 DLB |
| Fluorene | ug/L | - | - | <0.010 |
| Indeno(1,2,3-cd)pyrene | ug/L | - | - | <0.010 |
| Naphthalene | ug/L | - | - | <0.040 DLB |
| Perylene | ug/L | - | - | 0.042 |
| Phenanthrene | ug/L | - | - | <0.030 DLB |
| Pyrene | ug/L | - | - | 0.019 |
| Surrogate: 2-Fluorobiphenyl | % | - | - | 66.8 |
| Surrogate: D14-Terphenyl | % | - | - | 71.0 |
| Surrogate: d14-Terphenyl | % | - | - | 80.4 |
| Total PAHs | ug/L | 5 | 2 | <1.7 |

**Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law**
**Guide Limit #2: Ontario Toronto Storm Sewer By-Law**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

# ANALYTICAL REPORT

## Semi-Volatile Organics - WATER

| Analyte | Unit | Guide Limits #1 | Guide Limits #2 | Lab ID: L2696874-1<br>Sample Date: 04-APR-22<br>Sample ID: SW-UF-BH1 |
|---|---|---|---|---|
| 3,3-Dichlorobenzidine | ug/L | 2 | 0.8 | <0.40 |
| Di-n-butylphthalate | ug/L | 80 | 15 | <1.0 |
| Bis(2-ethylhexyl)phthalate | ug/L | 12 | 8.8 | <2.0 |
| Pentachlorophenol | ug/L | 5 | 2 | <0.50 |
| Surrogate: 2-Fluorobiphenyl | % | - | - | 72.7 |
| Surrogate: p-Terphenyl d14 | % | - | - | 68.2 |
| Surrogate: 2,4,6-Tribromophenol | % | - | - | 109.9 |

**Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law**
**Guide Limit #2: Ontario Toronto Storm Sewer By-Law**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

# ANALYTICAL REPORT

## Polychlorinated Biphenyls - WATER

| | | | | |
|---|---|---|---|---|
| | | | Lab ID | L2696874-1 |
| | | | Sample Date | 04-APR-22 |
| | | | Sample ID | SW-UF-BH1 |
| | | Guide Limits | | |
| Analyte | Unit | #1 | #2 | |
| Aroclor 1242 | ug/L | - | - | <0.020 |
| Aroclor 1248 | ug/L | - | - | <0.020 |
| Aroclor 1254 | ug/L | - | - | <0.020 |
| Aroclor 1260 | ug/L | - | - | <0.020 |
| Surrogate: Decachlorobiphenyl | % | - | - | 69.5 |
| Total PCBs | ug/L | 1 | 0.4 | <0.040 |
| Surrogate: Tetrachloro-m-xylene | % | - | - | 100.1 |

**Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law**
**Guide Limit #2: Ontario Toronto Storm Sewer By-Law**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

# ANALYTICAL REPORT

## Organic Parameters - WATER

| | | | | |
|---|---|---|---|---|
| | | | **Lab ID** | L2696874-1 |
| | | | **Sample Date** | 04-APR-22 |
| | | | **Sample ID** | SW-UF-BH1 |
| | | **Guide Limits** | | |
| **Analyte** | **Unit** | **#1** | **#2** | |
| Nonylphenol | ug/L | 20 | 1 | <1.0 |
| Nonylphenol Diethoxylates | ug/L | - | - | <0.10 |
| Total Nonylphenol Ethoxylates | ug/L | 200 | 10 | <2.0 |
| Nonylphenol Monoethoxylates | ug/L | - | - | <2.0 |

**Guide Limit #1: Ontario Toronto Sanitary Discharge Sewer By-Law**
**Guide Limit #2: Ontario Toronto Storm Sewer By-Law**

Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
Analytical result for this parameter exceeds Guide Limits listed. See Summary of Guideline Exceedances.

* Please refer to the Reference Information section for an explanation of any qualifiers noted.

# Reference Information

**Qualifiers for Individual Parameters Listed:**

| Qualifier | Description |
|---|---|
| DLB | Detection Limit Raised. Analyte detected at comparable level in Method Blank. |
| AI | Analytical interferences may be present. Result may be biased high. |
| DLM | Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity). |
| OWP | Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of |

sediment.

**Methods Listed (if applicable):**

| ALS Test Code | Matrix | Test Description | Method Reference** |
|---|---|---|---|
| **625-PAH-LOW-WT** | Water | EPA 8270 PAH (Low Level) | SW846 8270 |

Aqueous samples are extracted and extracts are analyzed on GC/MSD. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

| | | | |
|---|---|---|---|
| **625-SAN-WT** | Water | Ontario Sanitary Sewer SVOC Target List | SW-846 8270 |

Samples are extracted with solvent and then analyzed by GC/MS.

| | | | |
|---|---|---|---|
| **BOD-WT** | Water | BOD | APHA 5210 B |

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

| | | | |
|---|---|---|---|
| **CN-TOT-WT** | Water | Cyanide, Total | ISO 14403-2 |

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

| | | | |
|---|---|---|---|
| **CR-CR6-IC-WT** | Water | Chromium +6 | EPA 7199 |

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

| | | | |
|---|---|---|---|
| **EC-SCREEN-WT** | Water | Conductivity Screen (Internal Use Only) | APHA 2510 |

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

| | | | |
|---|---|---|---|
| **EC-WW-MF-WT** | Water | E. Coli | SM 9222D |

A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 °C for 24 – 2 h. Method ID: WT-TM-1200

| | | | |
|---|---|---|---|
| **F-IC-N-WT** | Water | Fluoride in Water by IC | EPA 300.1 (mod) |

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

| | | | |
|---|---|---|---|
| **HG-T-CVAA-WT** | Water | Total Mercury in Water by CVAAS | EPA 1631E (mod) |

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

| | | | |
|---|---|---|---|
| **MET-T-CCMS-WT** | Water | Total Metals in Water by CRC ICPMS | EPA 200.2/6020A (mod) |

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

# Reference Information

**Methods Listed (if applicable):**

| ALS Test Code | Matrix | Test Description | Method Reference** |
|---|---|---|---|

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

| | | | |
|---|---|---|---|
| **NP,NPE-LCMS-WT** | Water | Nonylphenols and Ethoxylates by LC/MS-MS | J. Chrom A849 (1999) p.467-482 |

Water samples are filtered and analyzed on LCMS/MS by direct injection.

| | | | |
|---|---|---|---|
| **OGG-SPEC-CALC-WT** | Water | Speciated Oil and Grease A/V Calc | CALCULATION |

Sample is extracted with hexane, sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

| | | | |
|---|---|---|---|
| **OGG-SPEC-WT** | Water | Speciated Oil and Grease-Gravimetric | APHA 5520 B |

The procedure involves an extraction of the entire water sample with hexane. Sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

| | | | |
|---|---|---|---|
| **P-T-COL-WT** | Water | Total P in Water by Colour | APHA 4500-P PHOSPHORUS |

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

| | | | |
|---|---|---|---|
| **PAH-EXTRA-WT** | Water | Sanitary Sewer Use By-Law Additional PAH | SW 846 8270 |
| **PAH-SUM-CALC-WT** | Water | TOTAL PAH's | CALCULATION |

Total PAH represents the sum of all PAH analytes reported for a given sample. Note that regulatory agencies and criteria differ in their definitions of Total PAH in terms of the individual PAH analytes to be included.

| | | | |
|---|---|---|---|
| **PCB-WT** | Water | Polychlorinated Biphenyls | EPA 8082 |

PCBs are extracted from an aqueous sample at neutral pH with aliquots of dichloromethane using a modified separatory funnel technique. The extracts are analyzed by GC/MSD.

| | | | |
|---|---|---|---|
| **PH-WT** | Water | pH | APHA 4500 H-Electrode |

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

| | | | |
|---|---|---|---|
| **PHENOLS-4AAP-WT** | Water | Phenol (4AAP) | EPA 9066 |

An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.

| | | | |
|---|---|---|---|
| **SOLIDS-TSS-WT** | Water | Suspended solids | APHA 2540 D-Gravimetric |

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.

| | | | |
|---|---|---|---|
| **TKN-F-WT** | Water | TKN in Water by Fluorescence | J. ENVIRON. MONIT., 2005,7,37-42,RSC |

Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection

# Reference Information

**Methods Listed (if applicable):**

| ALS Test Code | Matrix | Test Description | Method Reference** |
|---|---|---|---|
| **VOC-ROU-HS-WT** | Water | Volatile Organic Compounds | SW846 8260 |
| Aqueous samples are analyzed by headspace-GC/MS. | | | |
| **XYLENES-SUM-CALC-WT** | Water | Sum of Xylene Isomer Concentrations | CALCULATION |
| Total xylenes represents the sum of o-xylene and m&p-xylene. | | | |

**ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

20-893909

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

| Laboratory Definition Code | Laboratory Location |
|---|---|
| WT | ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA |

**GLOSSARY OF REPORT TERMS**

*Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.*
*mg/kg - milligrams per kilogram based on dry weight of sample*
*mg/kg wwt - milligrams per kilogram based on wet weight of sample*
*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight*
*mg/L - unit of concentration based on volume, parts per million.*
*< - Less than.*
*D.L. - The reporting limit.*
*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*
*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*
*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*

*Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.*

# Quality Control Report



Client: Grounded Engineering Inc
1 BANIGAN DRIVE
TORONTO ON M4H 1G3
Contact: MATTHEW GARCIA

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|---|---|---|---|---|---|---|---|---|
| **625-PAH-LOW-WT** | **Water** | | | | | | | |
| **Batch R5756402** | | | | | | | | |
| **WG3713905-2 LCS** | | | | | | | | |
| Acenaphthene | | | 88.8 | | % | | 50-130 | 06-APR-22 |
| Anthracene | | | 95.4 | | % | | 60-130 | 06-APR-22 |
| Benzo(a)anthracene | | | 97.9 | | % | | 60-140 | 06-APR-22 |
| Benzo(a)pyrene | | | 90.4 | | % | | 60-130 | 06-APR-22 |
| Benzo(b&j)fluoranthene | | | 91.9 | | % | | 60-130 | 06-APR-22 |
| Benzo(ghi)perylene | | | 82.7 | | % | | 50-140 | 06-APR-22 |
| Benzo(k)fluoranthene | | | 92.3 | | % | | 60-130 | 06-APR-22 |
| Chrysene | | | 94.3 | | % | | 60-140 | 06-APR-22 |
| Dibenz(a,h)anthracene | | | 86.5 | | % | | 60-130 | 06-APR-22 |
| Fluoranthene | | | 96.4 | | % | | 60-130 | 06-APR-22 |
| Fluorene | | | 93.7 | | % | | 60-130 | 06-APR-22 |
| Indeno(1,2,3-cd)pyrene | | | 94.3 | | % | | 60-140 | 06-APR-22 |
| Naphthalene | | | 87.4 | | % | | 50-130 | 06-APR-22 |
| Perylene | | | 87.9 | | % | | 60-130 | 06-APR-22 |
| Phenanthrene | | | 91.8 | | % | | 60-130 | 06-APR-22 |
| Pyrene | | | 97.4 | | % | | 60-130 | 06-APR-22 |
| **WG3713905-1 MB** | | | | | | | | |
| Acenaphthene | | | <0.010 | | ug/L | | 0.01 | 06-APR-22 |
| Anthracene | | | <0.010 | | ug/L | | 0.01 | 06-APR-22 |
| Benzo(a)anthracene | | | <0.010 | | ug/L | | 0.01 | 06-APR-22 |
| Benzo(a)pyrene | | | <0.010 | | ug/L | | 0.01 | 06-APR-22 |
| Benzo(b&j)fluoranthene | | | <0.010 | | ug/L | | 0.01 | 06-APR-22 |
| Benzo(ghi)perylene | | | <0.010 | | ug/L | | 0.01 | 06-APR-22 |
| Benzo(k)fluoranthene | | | <0.010 | | ug/L | | 0.01 | 06-APR-22 |
| Chrysene | | | <0.010 | | ug/L | | 0.01 | 06-APR-22 |
| Dibenz(a,h)anthracene | | | <0.010 | | ug/L | | 0.01 | 06-APR-22 |
| Fluoranthene | | | 0.011 | MB-LOR | ug/L | | 0.01 | 06-APR-22 |
| Fluorene | | | <0.010 | | ug/L | | 0.01 | 06-APR-22 |
| Indeno(1,2,3-cd)pyrene | | | <0.010 | | ug/L | | 0.01 | 06-APR-22 |
| Naphthalene | | | 0.012 | MB-LOR | ug/L | | 0.01 | 06-APR-22 |
| Perylene | | | <0.010 | | ug/L | | 0.01 | 06-APR-22 |
| Phenanthrene | | | 0.022 | MB-LOR | ug/L | | 0.01 | 06-APR-22 |
| Pyrene | | | <0.010 | | ug/L | | 0.01 | 06-APR-22 |
| Surrogate: 2-Fluorobiphenyl | | | 81.4 | | % | | 40-130 | 06-APR-22 |

# Quality Control Report



Client: Grounded Engineering Inc
1 BANIGAN DRIVE
TORONTO ON M4H 1G3
Contact: MATTHEW GARCIA

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|---|---|---|---|---|---|---|---|---|
| **625-PAH-LOW-WT** | **Water** | | | | | | | |
| **Batch R5756402** | | | | | | | | |
| **WG3713905-1 MB** | | | | | | | | |
| Surrogate: D14-Terphenyl | | | 92.9 | | % | | 40-130 | 06-APR-22 |
| **625-SAN-WT** | **Water** | | | | | | | |
| **Batch R5757137** | | | | | | | | |
| **WG3713905-2 LCS** | | | | | | | | |
| 3,3-Dichlorobenzidine | | | 13.1 | RRQC | % | | 50-140 | 06-APR-22 |
| Bis(2-ethylhexyl)phthalate | | | 115.7 | | % | | 50-140 | 06-APR-22 |
| Di-n-butylphthalate | | | 104.3 | | % | | 50-140 | 06-APR-22 |
| Pentachlorophenol | | | 149.5 | LCS-H | % | | 50-140 | 06-APR-22 |
| COMMENTS: RRQC: Recovery is outside ALS control limits. Associated sample results have not been affected. | | | | | | | | |
| **WG3713905-1 MB** | | | | | | | | |
| 3,3-Dichlorobenzidine | | | <0.40 | | ug/L | | 0.4 | 06-APR-22 |
| Bis(2-ethylhexyl)phthalate | | | <2.0 | | ug/L | | 2 | 06-APR-22 |
| Di-n-butylphthalate | | | <1.0 | | ug/L | | 1 | 06-APR-22 |
| Pentachlorophenol | | | <0.50 | | ug/L | | 0.5 | 06-APR-22 |
| Surrogate: 2-Fluorobiphenyl | | | 84.5 | | % | | 40-130 | 06-APR-22 |
| Surrogate: 2,4,6-Tribromophenol | | | 100.1 | | % | | 40-130 | 06-APR-22 |
| Surrogate: p-Terphenyl d14 | | | 102.2 | | % | | 40-130 | 06-APR-22 |
| **BOD-WT** | **Water** | | | | | | | |
| **Batch R5761533** | | | | | | | | |
| **WG3714409-2 DUP** | | **L2696874-1** | | | | | | |
| BOD | | 4.8 | 4.9 | | mg/L | 2.5 | 30 | 06-APR-22 |
| **WG3714409-3 LCS** | | | | | | | | |
| BOD | | | 98.0 | | % | | 85-115 | 06-APR-22 |
| **WG3714409-1 MB** | | | | | | | | |
| BOD | | | <2.0 | | mg/L | | 2 | 06-APR-22 |
| **CN-TOT-WT** | **Water** | | | | | | | |
| **Batch R5756820** | | | | | | | | |
| **WG3714266-3 DUP** | | **WG3714266-5** | | | | | | |
| Cyanide, Total | | 0.0194 | 0.0190 | | mg/L | 2.0 | 20 | 06-APR-22 |
| **WG3714266-2 LCS** | | | | | | | | |
| Cyanide, Total | | | 109.0 | | % | | 80-120 | 06-APR-22 |
| **WG3714266-1 MB** | | | | | | | | |
| Cyanide, Total | | | <0.0020 | | mg/L | | 0.002 | 06-APR-22 |
| **WG3714266-4 MS** | | **WG3714266-5** | | | | | | |
| Cyanide, Total | | | 96.8 | | % | | 70-130 | 06-APR-22 |

# Quality Control Report



Client: Grounded Engineering Inc
1 BANIGAN DRIVE
TORONTO ON M4H 1G3
Contact: MATTHEW GARCIA

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|---|---|---|---|---|---|---|---|---|
| **CR-CR6-IC-WT** | **Water** | | | | | | | |
| **Batch R5758038** | | | | | | | | |
| **WG3714351-4 DUP** | | **WG3714351-3** | | | | | | |
| Chromium, Hexavalent | | <0.00050 | <0.00050 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| **WG3714351-2 LCS** | | | | | | | | |
| Chromium, Hexavalent | | | 97.0 | | % | | 80-120 | 06-APR-22 |
| **WG3714351-1 MB** | | | | | | | | |
| Chromium, Hexavalent | | | <0.00050 | | mg/L | | 0.0005 | 06-APR-22 |
| **WG3714351-5 MS** | | **WG3714351-3** | | | | | | |
| Chromium, Hexavalent | | | 93.6 | | % | | 70-130 | 06-APR-22 |
| **EC-WW-MF-WT** | **Water** | | | | | | | |
| **Batch R5757864** | | | | | | | | |
| **WG3714346-3 DUP** | | **L2697130-2** | | | | | | |
| E. Coli | | 0 | 0 | | CFU/100mL | 0.0 | 65 | 06-APR-22 |
| **WG3714346-1 MB** | | | | | | | | |
| E. Coli | | | 0 | | CFU/100mL | | 1 | 06-APR-22 |
| **F-IC-N-WT** | **Water** | | | | | | | |
| **Batch R5757798** | | | | | | | | |
| **WG3714309-10 DUP** | | **WG3714309-8** | | | | | | |
| Fluoride (F) | | 0.095 | 0.097 | | mg/L | 1.9 | 20 | 06-APR-22 |
| **WG3714309-7 LCS** | | | | | | | | |
| Fluoride (F) | | | 102.0 | | % | | 90-110 | 06-APR-22 |
| **WG3714309-6 MB** | | | | | | | | |
| Fluoride (F) | | | <0.020 | | mg/L | | 0.02 | 06-APR-22 |
| **WG3714309-9 MS** | | **WG3714309-8** | | | | | | |
| Fluoride (F) | | | 104.3 | | % | | 75-125 | 06-APR-22 |
| **HG-T-CVAA-WT** | **Water** | | | | | | | |
| **Batch R5756464** | | | | | | | | |
| **WG3714155-4 DUP** | | **WG3714155-3** | | | | | | |
| Mercury (Hg)-Total | | <0.0000050 | <0.000005( | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| **WG3714155-2 LCS** | | | | | | | | |
| Mercury (Hg)-Total | | | 102.0 | | % | | 80-120 | 06-APR-22 |
| **WG3714155-1 MB** | | | | | | | | |
| Mercury (Hg)-Total | | | <0.000005( | | mg/L | | 0.000005 | 06-APR-22 |
| **WG3714155-6 MS** | | **WG3714155-5** | | | | | | |
| Mercury (Hg)-Total | | | 99.4 | | % | | 70-130 | 06-APR-22 |
| **MET-T-CCMS-WT** | **Water** | | | | | | | |

# Quality Control Report



Client: Grounded Engineering Inc
1 BANIGAN DRIVE
TORONTO ON M4H 1G3
Contact: MATTHEW GARCIA

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|---|---|---|---|---|---|---|---|---|
| **MET-T-CCMS-WT** | **Water** | | | | | | | |
| **Batch R5756387** | | | | | | | | |
| **WG3714048-4 DUP** | | **WG3714048-3** | | | | | | |
| Aluminum (Al)-Total | | <0.050 | <0.050 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Antimony (Sb)-Total | | <0.0010 | <0.0010 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Arsenic (As)-Total | | <0.0010 | <0.0010 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Cadmium (Cd)-Total | | <0.000050 | <0.000050 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Chromium (Cr)-Total | | <0.0050 | <0.0050 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Cobalt (Co)-Total | | <0.0010 | <0.0010 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Copper (Cu)-Total | | <0.0050 | <0.0050 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Lead (Pb)-Total | | <0.00050 | <0.00050 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Manganese (Mn)-Total | | 0.0128 | 0.0116 | | mg/L | 9.7 | 20 | 06-APR-22 |
| Molybdenum (Mo)-Total | | <0.00050 | <0.00050 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Nickel (Ni)-Total | | <0.0050 | <0.0050 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Selenium (Se)-Total | | <0.00050 | <0.00050 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Silver (Ag)-Total | | <0.00050 | <0.00050 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Tin (Sn)-Total | | <0.0010 | <0.0010 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Titanium (Ti)-Total | | <0.0030 | <0.0030 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| Zinc (Zn)-Total | | <0.030 | <0.030 | RPD-NA | mg/L | N/A | 20 | 06-APR-22 |
| **WG3714048-2 LCS** | | | | | | | | |
| Aluminum (Al)-Total | | | 103.7 | | % | | 80-120 | 06-APR-22 |
| Antimony (Sb)-Total | | | 102.3 | | % | | 80-120 | 06-APR-22 |
| Arsenic (As)-Total | | | 101.0 | | % | | 80-120 | 06-APR-22 |
| Cadmium (Cd)-Total | | | 99.2 | | % | | 80-120 | 06-APR-22 |
| Chromium (Cr)-Total | | | 99.5 | | % | | 80-120 | 06-APR-22 |
| Cobalt (Co)-Total | | | 95.2 | | % | | 80-120 | 06-APR-22 |
| Copper (Cu)-Total | | | 98.7 | | % | | 80-120 | 06-APR-22 |
| Lead (Pb)-Total | | | 97.2 | | % | | 80-120 | 06-APR-22 |
| Manganese (Mn)-Total | | | 99.7 | | % | | 80-120 | 06-APR-22 |
| Molybdenum (Mo)-Total | | | 96.1 | | % | | 80-120 | 06-APR-22 |
| Nickel (Ni)-Total | | | 98.3 | | % | | 80-120 | 06-APR-22 |
| Selenium (Se)-Total | | | 100.3 | | % | | 80-120 | 06-APR-22 |
| Silver (Ag)-Total | | | 91.4 | | % | | 80-120 | 06-APR-22 |
| Tin (Sn)-Total | | | 97.6 | | % | | 80-120 | 06-APR-22 |
| Titanium (Ti)-Total | | | 98.0 | | % | | 80-120 | 06-APR-22 |
| Zinc (Zn)-Total | | | 101.5 | | % | | 80-120 | 06-APR-22 |

# Quality Control Report



Client: Grounded Engineering Inc
1 BANIGAN DRIVE
TORONTO ON M4H 1G3
Contact: MATTHEW GARCIA

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|---|---|---|---|---|---|---|---|---|
| **MET-T-CCMS-WT** | **Water** | | | | | | | |
| **Batch R5756387** | | | | | | | | |
| **WG3714048-1 MB** | | | | | | | | |
| Aluminum (Al)-Total | | | <0.0050 | | mg/L | | 0.005 | 06-APR-22 |
| Antimony (Sb)-Total | | | <0.00010 | | mg/L | | 0.0001 | 06-APR-22 |
| Arsenic (As)-Total | | | <0.00010 | | mg/L | | 0.0001 | 06-APR-22 |
| Cadmium (Cd)-Total | | | <0.000005C | | mg/L | | 0.000005 | 06-APR-22 |
| Chromium (Cr)-Total | | | <0.00050 | | mg/L | | 0.0005 | 06-APR-22 |
| Cobalt (Co)-Total | | | <0.00010 | | mg/L | | 0.0001 | 06-APR-22 |
| Copper (Cu)-Total | | | <0.00050 | | mg/L | | 0.0005 | 06-APR-22 |
| Lead (Pb)-Total | | | <0.000050 | | mg/L | | 0.00005 | 06-APR-22 |
| Manganese (Mn)-Total | | | <0.00050 | | mg/L | | 0.0005 | 06-APR-22 |
| Molybdenum (Mo)-Total | | | <0.000050 | | mg/L | | 0.00005 | 06-APR-22 |
| Nickel (Ni)-Total | | | <0.00050 | | mg/L | | 0.0005 | 06-APR-22 |
| Selenium (Se)-Total | | | <0.000050 | | mg/L | | 0.00005 | 06-APR-22 |
| Silver (Ag)-Total | | | <0.000050 | | mg/L | | 0.00005 | 06-APR-22 |
| Tin (Sn)-Total | | | <0.00010 | | mg/L | | 0.0001 | 06-APR-22 |
| Titanium (Ti)-Total | | | <0.00030 | | mg/L | | 0.0003 | 06-APR-22 |
| Zinc (Zn)-Total | | | <0.0030 | | mg/L | | 0.003 | 06-APR-22 |
| **WG3714048-5 MS** | | **WG3714048-6** | | | | | | |
| Aluminum (Al)-Total | | | 101.1 | | % | | 70-130 | 06-APR-22 |
| Antimony (Sb)-Total | | | 97.1 | | % | | 70-130 | 06-APR-22 |
| Arsenic (As)-Total | | | 93.6 | | % | | 70-130 | 06-APR-22 |
| Cadmium (Cd)-Total | | | 98.2 | | % | | 70-130 | 06-APR-22 |
| Chromium (Cr)-Total | | | 95.4 | | % | | 70-130 | 06-APR-22 |
| Cobalt (Co)-Total | | | 89.4 | | % | | 70-130 | 06-APR-22 |
| Copper (Cu)-Total | | | 93.4 | | % | | 70-130 | 06-APR-22 |
| Lead (Pb)-Total | | | 93.5 | | % | | 70-130 | 06-APR-22 |
| Manganese (Mn)-Total | | | 88.8 | | % | | 70-130 | 06-APR-22 |
| Molybdenum (Mo)-Total | | | 99.8 | | % | | 70-130 | 06-APR-22 |
| Nickel (Ni)-Total | | | 90.2 | | % | | 70-130 | 06-APR-22 |
| Selenium (Se)-Total | | | 102.3 | | % | | 70-130 | 06-APR-22 |
| Silver (Ag)-Total | | | 90.7 | | % | | 70-130 | 06-APR-22 |
| Tin (Sn)-Total | | | 97.8 | | % | | 70-130 | 06-APR-22 |
| Titanium (Ti)-Total | | | 90.4 | | % | | 70-130 | 06-APR-22 |
| Zinc (Zn)-Total | | | 94.8 | | % | | 70-130 | 06-APR-22 |
| **NP,NPE-LCMS-WT** | **Water** | | | | | | | |

# Quality Control Report



Client: Grounded Engineering Inc
1 BANIGAN DRIVE
TORONTO ON M4H 1G3
Contact: MATTHEW GARCIA

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|---|---|---|---|---|---|---|---|---|
| **NP,NPE-LCMS-WT** | **Water** | | | | | | | |
| **Batch R5759697** | | | | | | | | |
| **WG3714758-3 DUP** | | **L2696874-1** | | | | | | |
| Nonylphenol | | <1.0 | <1.0 | RPD-NA | ug/L | N/A | 30 | 08-APR-22 |
| Nonylphenol Monoethoxylates | | <2.0 | <2.0 | RPD-NA | ug/L | N/A | 30 | 08-APR-22 |
| Nonylphenol Diethoxylates | | <0.10 | <0.10 | RPD-NA | ug/L | N/A | 30 | 08-APR-22 |
| **WG3714758-2 LCS** | | | | | | | | |
| Nonylphenol | | | 89.4 | | % | | 75-125 | 08-APR-22 |
| Nonylphenol Monoethoxylates | | | 101.0 | | % | | 75-125 | 08-APR-22 |
| Nonylphenol Diethoxylates | | | 97.5 | | % | | 75-125 | 08-APR-22 |
| **WG3714758-1 MB** | | | | | | | | |
| Nonylphenol | | | <1.0 | | ug/L | | 1 | 08-APR-22 |
| Nonylphenol Monoethoxylates | | | <2.0 | | ug/L | | 2 | 08-APR-22 |
| Nonylphenol Diethoxylates | | | <0.10 | | ug/L | | 0.1 | 08-APR-22 |
| **WG3714758-4 MS** | | **L2696874-1** | | | | | | |
| Nonylphenol | | | 109.7 | | % | | 60-140 | 08-APR-22 |
| Nonylphenol Monoethoxylates | | | 162.7 | K | % | | 60-140 | 08-APR-22 |
| Nonylphenol Diethoxylates | | | 117.6 | | % | | 60-140 | 08-APR-22 |
| **OGG-SPEC-WT** | **Water** | | | | | | | |
| **Batch R5758559** | | | | | | | | |
| **WG3714108-2 LCS** | | | | | | | | |
| Oil and Grease, Total | | | 90.7 | | % | | 70-130 | 06-APR-22 |
| Mineral Oil and Grease | | | 85.3 | | % | | 70-130 | 06-APR-22 |
| **WG3714108-1 MB** | | | | | | | | |
| Oil and Grease, Total | | | <5.0 | | mg/L | | 5 | 06-APR-22 |
| Mineral Oil and Grease | | | <2.5 | | mg/L | | 2.5 | 06-APR-22 |
| **P-T-COL-WT** | **Water** | | | | | | | |
| **Batch R5758999** | | | | | | | | |
| **WG3714746-3 DUP** | | **L2696752-4** | | | | | | |
| Phosphorus, Total | | 0.0098 | 0.0076 | J | mg/L | 0.0022 | 0.006 | 08-APR-22 |
| **WG3714746-2 LCS** | | | | | | | | |
| Phosphorus, Total | | | 97.0 | | % | | 80-120 | 08-APR-22 |
| **WG3714746-1 MB** | | | | | | | | |
| Phosphorus, Total | | | <0.0030 | | mg/L | | 0.003 | 08-APR-22 |
| **WG3714746-4 MS** | | **L2696752-4** | | | | | | |
| Phosphorus, Total | | | 89.0 | | % | | 70-130 | 08-APR-22 |
| **PAH-EXTRA-WT** | **Water** | | | | | | | |

# Quality Control Report



Client: Grounded Engineering Inc
1 BANIGAN DRIVE
TORONTO ON M4H 1G3
Contact: MATTHEW GARCIA

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|---|---|---|---|---|---|---|---|---|
| **PAH-EXTRA-WT** | **Water** | | | | | | | |
| **Batch R5756425** | | | | | | | | |
| **WG3713905-2 LCS** | | | | | | | | |
| Benzo(e)pyrene | | | 101.4 | | % | | 60-130 | 06-APR-22 |
| 1,3-Dinitropyrene | | | 135.6 | LCS-H | % | | 60-130 | 06-APR-22 |
| 1,6-Dinitropyrene | | | 121.9 | | % | | 60-130 | 06-APR-22 |
| Dibenz(a,h)acridine | | | 101.4 | | % | | 60-130 | 06-APR-22 |
| 1,8-Dinitropyrene | | | 133.6 | LCS-H | % | | 60-130 | 06-APR-22 |
| Dibenz(a,j)acridine | | | 107.4 | | % | | 60-130 | 06-APR-22 |
| 7H-Dibenzo(c,g)carbazole | | | 108.9 | | % | | 60-130 | 06-APR-22 |
| Dibenzo(a,i)pyrene | | | 85.2 | | % | | 60-130 | 06-APR-22 |
| **WG3713905-1 MB** | | | | | | | | |
| Benzo(e)pyrene | | | <0.050 | | ug/L | | 0.05 | 06-APR-22 |
| 1,3-Dinitropyrene | | | <1.0 | | ug/L | | 1 | 06-APR-22 |
| 1,6-Dinitropyrene | | | <1.0 | | ug/L | | 1 | 06-APR-22 |
| Dibenz(a,h)acridine | | | <0.050 | | ug/L | | 0.05 | 06-APR-22 |
| 1,8-Dinitropyrene | | | <1.0 | | ug/L | | 1 | 06-APR-22 |
| Dibenz(a,j)acridine | | | <0.050 | | ug/L | | 0.05 | 06-APR-22 |
| 7H-Dibenzo(c,g)carbazole | | | <0.050 | | ug/L | | 0.05 | 06-APR-22 |
| Dibenzo(a,i)pyrene | | | <0.050 | | ug/L | | 0.05 | 06-APR-22 |
| Surrogate: d14-Terphenyl | | | 99.0 | | % | | 40-130 | 06-APR-22 |
| **PCB-WT** | **Water** | | | | | | | |
| **Batch R5757740** | | | | | | | | |
| **WG3714559-2 LCS** | | | | | | | | |
| Aroclor 1242 | | | 99.9 | | % | | 65-130 | 07-APR-22 |
| Aroclor 1248 | | | 99.0 | | % | | 65-130 | 07-APR-22 |
| Aroclor 1254 | | | 89.0 | | % | | 65-130 | 07-APR-22 |
| Aroclor 1260 | | | 90.4 | | % | | 65-130 | 07-APR-22 |
| **WG3714559-1 MB** | | | | | | | | |
| Aroclor 1242 | | | <0.020 | | ug/L | | 0.02 | 07-APR-22 |
| Aroclor 1248 | | | <0.020 | | ug/L | | 0.02 | 07-APR-22 |
| Aroclor 1254 | | | <0.020 | | ug/L | | 0.02 | 07-APR-22 |
| Aroclor 1260 | | | <0.020 | | ug/L | | 0.02 | 07-APR-22 |
| Surrogate: Decachlorobiphenyl | | | 99.3 | | % | | 50-150 | 07-APR-22 |
| Surrogate: Tetrachloro-m-xylene | | | 97.1 | | % | | 50-150 | 07-APR-22 |
| **PH-WT** | **Water** | | | | | | | |

# Quality Control Report



Client: Grounded Engineering Inc
1 BANIGAN DRIVE
TORONTO ON M4H 1G3
Contact: MATTHEW GARCIA

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|---|---|---|---|---|---|---|---|---|
| **PH-WT** | **Water** | | | | | | | |
| **Batch R5757527** | | | | | | | | |
| **WG3714244-4 DUP** | | **WG3714244-3** | | | | | | |
| pH | | 7.74 | 7.74 | J | pH units | 0.00 | 0.2 | 06-APR-22 |
| **WG3714244-2 LCS** | | | | | | | | |
| pH | | | 7.03 | | pH units | | 6.9-7.1 | 06-APR-22 |
| **PHENOLS-4AAP-WT** | **Water** | | | | | | | |
| **Batch R5757862** | | | | | | | | |
| **WG3714005-3 DUP** | | **L2696467-1** | | | | | | |
| Phenols (4AAP) | | 0.0440 | 0.0443 | | mg/L | 0.7 | 20 | 06-APR-22 |
| **WG3714005-2 LCS** | | | | | | | | |
| Phenols (4AAP) | | | 99.1 | | % | | 85-115 | 06-APR-22 |
| **WG3714005-1 MB** | | | | | | | | |
| Phenols (4AAP) | | | <0.0010 | | mg/L | | 0.001 | 06-APR-22 |
| **WG3714005-4 MS** | | **L2696467-1** | | | | | | |
| Phenols (4AAP) | | | N/A | MS-B | % | | - | 06-APR-22 |
| **SOLIDS-TSS-WT** | **Water** | | | | | | | |
| **Batch R5759993** | | | | | | | | |
| **WG3714685-3 DUP** | | **L2697144-2** | | | | | | |
| Total Suspended Solids | | 16.5 | 18.7 | | mg/L | 13 | 20 | 10-APR-22 |
| **WG3714685-2 LCS** | | | | | | | | |
| Total Suspended Solids | | | 94.3 | | % | | 85-115 | 10-APR-22 |
| **WG3714685-1 MB** | | | | | | | | |
| Total Suspended Solids | | | <3.0 | | mg/L | | 3 | 10-APR-22 |
| **TKN-F-WT** | **Water** | | | | | | | |
| **Batch R5760441** | | | | | | | | |
| **WG3714807-3 DUP** | | **L2697014-1** | | | | | | |
| Total Kjeldahl Nitrogen | | 0.498 | 0.528 | | mg/L | 5.8 | 20 | 08-APR-22 |
| **WG3714807-2 LCS** | | | | | | | | |
| Total Kjeldahl Nitrogen | | | 104.6 | | % | | 75-125 | 08-APR-22 |
| **WG3714807-1 MB** | | | | | | | | |
| Total Kjeldahl Nitrogen | | | <0.050 | | mg/L | | 0.05 | 08-APR-22 |
| **WG3714807-4 MS** | | **L2697014-1** | | | | | | |
| Total Kjeldahl Nitrogen | | | 110.2 | | % | | 70-130 | 08-APR-22 |
| **VOC-ROU-HS-WT** | **Water** | | | | | | | |
| **Batch R5757297** | | | | | | | | |
| **WG3714103-4 DUP** | | **WG3714103-3** | | | | | | |
| 1,1,2,2-Tetrachloroethane | | <0.50 | <0.50 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |
| 1,2-Dichlorobenzene | | <0.50 | <0.50 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |

# Quality Control Report



Client: Grounded Engineering Inc
1 BANIGAN DRIVE
TORONTO ON M4H 1G3
Contact: MATTHEW GARCIA

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|---|---|---|---|---|---|---|---|---|
| **VOC-ROU-HS-WT** | **Water** | | | | | | | |
| **Batch R5757297** | | | | | | | | |
| **WG3714103-4 DUP** | | **WG3714103-3** | | | | | | |
| 1,4-Dichlorobenzene | | <0.50 | <0.50 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |
| Benzene | | <0.50 | <0.50 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |
| Chloroform | | <1.0 | <1.0 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |
| cis-1,2-Dichloroethylene | | <0.50 | <0.50 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |
| Dichloromethane | | <2.0 | <2.0 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |
| Ethylbenzene | | <0.50 | <0.50 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |
| m+p-Xylenes | | <1.0 | <0.40 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |
| o-Xylene | | <0.50 | <0.30 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |
| Tetrachloroethylene | | <0.50 | <0.50 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |
| Toluene | | <0.50 | <0.40 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |
| trans-1,3-Dichloropropene | | <0.50 | <0.30 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |
| Trichloroethylene | | <0.50 | <0.50 | RPD-NA | ug/L | N/A | 30 | 07-APR-22 |
| **WG3714103-1 LCS** | | | | | | | | |
| 1,1,2,2-Tetrachloroethane | | | 92.3 | | % | | 70-130 | 07-APR-22 |
| 1,2-Dichlorobenzene | | | 99.8 | | % | | 70-130 | 07-APR-22 |
| 1,4-Dichlorobenzene | | | 99.3 | | % | | 70-130 | 07-APR-22 |
| Benzene | | | 93.0 | | % | | 70-130 | 07-APR-22 |
| Chloroform | | | 95.6 | | % | | 70-130 | 07-APR-22 |
| cis-1,2-Dichloroethylene | | | 93.9 | | % | | 70-130 | 07-APR-22 |
| Dichloromethane | | | 93.6 | | % | | 70-130 | 07-APR-22 |
| Ethylbenzene | | | 106.7 | | % | | 70-130 | 07-APR-22 |
| m+p-Xylenes | | | 105.1 | | % | | 70-130 | 07-APR-22 |
| o-Xylene | | | 108.9 | | % | | 70-130 | 07-APR-22 |
| Tetrachloroethylene | | | 109.2 | | % | | 70-130 | 07-APR-22 |
| Toluene | | | 103.0 | | % | | 70-130 | 07-APR-22 |
| trans-1,3-Dichloropropene | | | 97.9 | | % | | 70-130 | 07-APR-22 |
| Trichloroethylene | | | 86.7 | | % | | 70-130 | 07-APR-22 |
| **WG3714103-2 MB** | | | | | | | | |
| 1,1,2,2-Tetrachloroethane | | | <0.50 | | ug/L | | 0.5 | 07-APR-22 |
| 1,2-Dichlorobenzene | | | <0.50 | | ug/L | | 0.5 | 07-APR-22 |
| 1,4-Dichlorobenzene | | | <0.50 | | ug/L | | 0.5 | 07-APR-22 |
| Benzene | | | <0.50 | | ug/L | | 0.5 | 07-APR-22 |
| Chloroform | | | <1.0 | | ug/L | | 1 | 07-APR-22 |
| cis-1,2-Dichloroethylene | | | <0.50 | | | | 0.5 | |

# Quality Control Report



Client: Grounded Engineering Inc
1 BANIGAN DRIVE
TORONTO ON M4H 1G3
Contact: MATTHEW GARCIA

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|---|---|---|---|---|---|---|---|---|
| **VOC-ROU-HS-WT** | **Water** | | | | | | | |
| **Batch R5757297** | | | | | | | | |
| **WG3714103-2 MB** | | | | | | | | |
| cis-1,2-Dichloroethylene | | | <0.50 | | ug/L | | 0.5 | 07-APR-22 |
| Dichloromethane | | | <2.0 | | ug/L | | 2 | 07-APR-22 |
| Ethylbenzene | | | <0.50 | | ug/L | | 0.5 | 07-APR-22 |
| m+p-Xylenes | | | <0.40 | | ug/L | | 0.4 | 07-APR-22 |
| o-Xylene | | | <0.30 | | ug/L | | 0.3 | 07-APR-22 |
| Tetrachloroethylene | | | <0.50 | | ug/L | | 0.5 | 07-APR-22 |
| Toluene | | | <0.40 | | ug/L | | 0.4 | 07-APR-22 |
| trans-1,3-Dichloropropene | | | <0.30 | | ug/L | | 0.3 | 07-APR-22 |
| Trichloroethylene | | | <0.50 | | ug/L | | 0.5 | 07-APR-22 |
| Surrogate: 1,4-Difluorobenzene | | | 89.3 | | % | | 70-130 | 07-APR-22 |
| Surrogate: 4-Bromofluorobenzene | | | 110.2 | | % | | 70-130 | 07-APR-22 |
| **WG3714103-5 MS** | | **WG3714103-3** | | | | | | |
| 1,1,2,2-Tetrachloroethane | | | 91.1 | | % | | 50-150 | 07-APR-22 |
| 1,2-Dichlorobenzene | | | 91.1 | | % | | 50-150 | 07-APR-22 |
| 1,4-Dichlorobenzene | | | 90.3 | | % | | 50-150 | 07-APR-22 |
| Benzene | | | 85.6 | | % | | 50-150 | 07-APR-22 |
| Chloroform | | | 89.7 | | % | | 50-150 | 07-APR-22 |
| cis-1,2-Dichloroethylene | | | 88.4 | | % | | 50-150 | 07-APR-22 |
| Dichloromethane | | | 88.6 | | % | | 50-150 | 07-APR-22 |
| Ethylbenzene | | | 99.5 | | % | | 50-150 | 07-APR-22 |
| m+p-Xylenes | | | 96.6 | | % | | 50-150 | 07-APR-22 |
| o-Xylene | | | 102.6 | | % | | 50-150 | 07-APR-22 |
| Tetrachloroethylene | | | 100.6 | | % | | 50-150 | 07-APR-22 |
| Toluene | | | 96.0 | | % | | 50-150 | 07-APR-22 |
| trans-1,3-Dichloropropene | | | 91.4 | | % | | 50-150 | 07-APR-22 |
| Trichloroethylene | | | 78.4 | | % | | 50-150 | 07-APR-22 |

# Quality Control Report

Workorder: L2696874 Report Date: 12-APR-22

Client: Grounded Engineering Inc
1 BANIGAN DRIVE
TORONTO ON M4H 1G3
Contact: MATTHEW GARCIA



**Legend:**

| | |
|---|---|
| Limit | ALS Control Limit (Data Quality Objectives) |
| DUP | Duplicate |
| RPD | Relative Percent Difference |
| N/A | Not Available |
| LCS | Laboratory Control Sample |
| SRM | Standard Reference Material |
| MS | Matrix Spike |
| MSD | Matrix Spike Duplicate |
| ADE | Average Desorption Efficiency |
| MB | Method Blank |
| IRM | Internal Reference Material |
| CRM | Certified Reference Material |
| CCV | Continuing Calibration Verification |
| CVS | Calibration Verification Standard |
| LCSD | Laboratory Control Sample Duplicate |

**Sample Parameter Qualifier Definitions:**

| Qualifier | Description |
|---|---|
| J | Duplicate results and limits are expressed in terms of absolute difference. |
| K | Matrix Spike recovery outside ALS DQO due to sample matrix effects. |
| LCS-H | Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified. |
| MB-LOR | Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level. |
| MS-B | Matrix Spike recovery could not be accurately calculated due to high analyte background in sample. |
| RPD-NA | Relative Percent Difference Not Available due to result(s) being less than detection limit. |
| RRQC | Refer to report remarks for information regarding this QC result. |

**Hold Time Exceedances:**

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

www.alsglobal.com

L2696874-COFC

Form

COC Number: 20 - 893909

Page of

| Report To | Contact and company name below will appear on the final report |
|---|---|
| Company: | Grounded Engineering |
| Contact: | Matthew Garcia |
| Phone: | 416 839 3580 |
| | Company address below will appear on the final report |
| Street: | 1 Banigan Dr |
| City/Province: | Toronto ON |
| Postal Code: | M4H 1G3 |
| Invoice To | Same as Report To ☒ YES ☐ NO |
| | Copy of Invoice with Report ☐ YES ☐ NO |
| Company: | |
| Contact: | mgarcia@groundedeng.ca |

| Report Format / Distribution | |
|---|---|
| Select Report Format: | ☒ PDF ☐ EXCEL ☐ EDD (DIGITAL) |
| Merge QC/QCI Reports with COA | ☐ YES ☐ NO ☐ N/A |
| ☒ Compare Results to Criteria on Report - provide details below if box checked | |
| Select Distribution: | ☒ EMAIL ☐ MAIL ☐ FAX |
| Email 1 or Fax | mgarcia@Groundedeng.ca |
| Email 2 | |
| Email 3 | |

| Invoice Recipients | |
|---|---|
| Select Invoice Distribution: | ☒ EMAIL ☐ MAIL ☐ FAX |
| Email 1 or Fax | |
| Email 2 | |

| Project Information | |
|---|---|
| ALS Account # / Quote #: | |
| Job #: | |
| PO / AFE: | |
| LSD: | |

| Oil and Gas Required Fields (client use) | |
|---|---|
| AFE/Cost Center: | PO#: |
| Major/Minor Code: | Routing Code: |
| Requisitioner: | |
| Location: | |

ALS Lab Work Order # (ALS use only): L2696874 JP

ALS Contact: Sampler: LB

**Turnaround Time (TAT) Requested**

- ☒ Routine [R] If received by 3pm M-F - no surcharges apply
- ☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
- ☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
- ☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
- ☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
- ☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

**Analysis Request**

| ALS Sample # (ALS use only) | Sample Identification and/or Coordinates (This description will appear on the report) | Date (dd-mmm-yy) | Time (hh:mm) | Sample Type | NUMBER OF CONTAINERS | Toronto San - Storm | SAMPLES ON HOLD | EXTENDED STORAGE REQUIRED | SUSPECTED HAZARD (see notes) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SW-4F-BH1 | 04/Apr/22 | 3:30pm | GW | 20 | X | | | |

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

| Drinking Water (DW) Samples[1] (client use) | Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only) |
|---|---|
| Are samples taken from a Regulated DW System? ☐ YES ☐ NO | Toronto Sanitary and Storm + Combined |
| Are samples for human consumption/ use? ☐ YES ☐ NO | |

**SAMPLE RECEIPT DETAILS (ALS use only)**

Cooling Method: ☐ NONE ☐ ICE ☒ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

| INITIAL COOLER TEMPERATURES °C | | | | FINAL COOLER TEMPERATURES °C | | | |
|---|---|---|---|---|---|---|---|
| | | | | 9.0 | | | |

| SHIPMENT RELEASE (client use) | | | INITIAL SHIPMENT RECEPTION (ALS use only) | | | FINAL SHIPMENT RECEPTION (ALS use only) | | |
|---|---|---|---|---|---|---|---|---|
| Released by: Laurence | Date: April 4/22 | Time: 5:30 | Received by: | Date: | Time: | Received by: JP | Date: 5 APR 22 | Time: 10:30 |

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

ALS 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

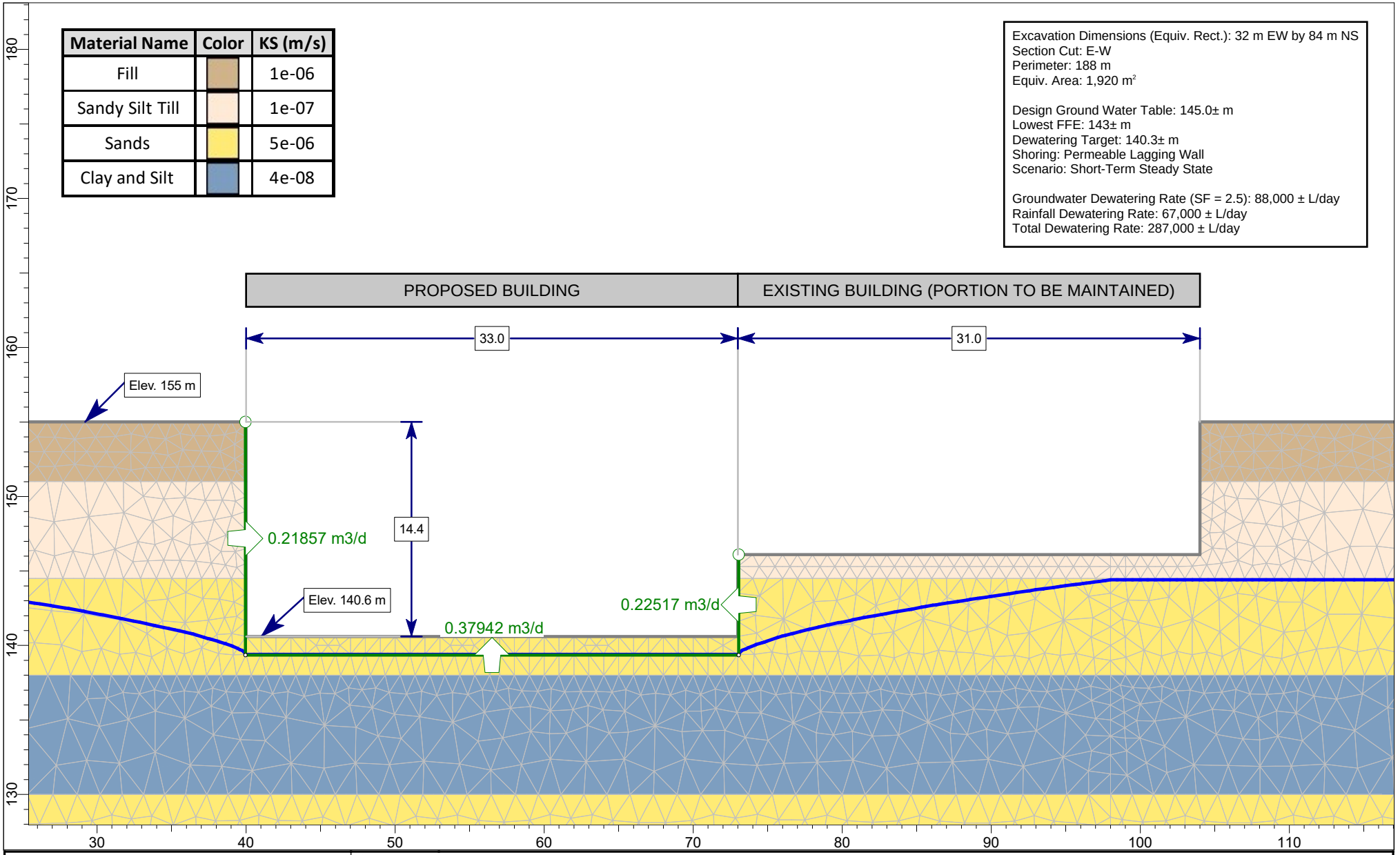
# APPENDIX F

| Material Name | Color | KS (m/s) |
|---|---|---|
| Fill | | 1e-06 |
| Sandy Silt Till | | 1e-07 |
| Sands | | 5e-06 |
| Clay and Silt | | 4e-08 |

Excavation Dimensions (Equiv. Rect.): 32 m EW by 84 m NS
Section Cut: E-W
Perimeter: 188 m
Equiv. Area: 1,920 $m^2$

Design Ground Water Table: 145.0± m
Lowest FFE: 143± m
Dewatering Target: 140.3± m
Shoring: Permeable Lagging Wall
Scenario: Short-Term Steady State

Groundwater Dewatering Rate (SF = 2.5): 88,000 ± L/day
Rainfall Dewatering Rate: 67,000 ± L/day
Total Dewatering Rate: 287,000 ± L/day




GROUNDED ENGINEERING

| | | | |
|---|---|---|---|
| File | 22-024 \| 33 Davisville Avenue, Toronto, Ontario | | |
| Analysis | Dewatering: P3 Raft, Permeable Shoring - Short-Term | | |
| Ref. | | | |
| RS2 File | 22-024 FEM.slmd | Scale 1:350 | Eng MG |

SLIDEINTERPRET 9.027

# APPENDIX G

## SHORT TERM - P3 Soldier Pile and Lagging (Permeable Shoring)

| Excavation Dimensions [m] | |
|---|---|
| N-S | 33 |
| E-W | 68 |
| Area (m2) | 2244 |
| Perimeter (m) | 202 |

| Rainfall Data | | |
|---|---|---|
| Year | 2 | 100 |
| Hour | 3 | 12 |
| Depth (mm) | 25 | 94 |
| Depth (m) | 0.025 | 0.094 |

| Section | | Flow [m3/day] | Length [m] | Volume [L/day] |
|---|---|---|---|---|
| Base | | 0.37942 | 68 | 25,801 |
| Sides | | 0.22187 | 202 | 44,818 |
| Total | | | | 70,618 |
| Factor of Safety | 2.5 | | | 176,546 |

| Storm Events | |
|---|---|
| 2 Year [L/day] | 100 Year [L/day] |
| 56,100 | 211,000 |

| Summary | L/day | L/min |
|---|---|---|
| Groundwater | 180,000 | 125.0 |
| Rainfall | 57,000 | 39.6 |
| Total | 237,000 | 164.6 |

## LONG TERM - P3 Raft

| Excavation Dimensions [m] | |
|---|---|
| N-S | 33 |
| E-W | 68 |
| Area (m2) | 2244 |
| Perimeter (m) | 202 |

| Rainfall Data | | |
|---|---|---|
| Year | 2 | 100 |
| Hour | 3 | 12 |
| Depth (mm) | 25 | 94 |
| Depth (m) | 0.025 | 0.094 |

| Section | | Flow [m3/day] | Length [m] | Volume [L/day] |
|---|---|---|---|---|
| Base | | 0 | 68 | - |
| Sides | | 0 | 202 | - |
| Total | | | | - |
| Factor of Safety | 2.5 | | | - |

| Infiltration [L/day] |
|---|
| 0 |

| Summary | L/day | L/min |
|---|---|---|
| Groundwater | - | - |
| Infiltration | - | - |
| Total | - | - |