



THURBER ENGINEERING LTD.



CONSTRUCTION MEMORANDUM NO.18

To: Tim Stevens, McElhanney
Tim Blackburn, Urban Systems Ltd.

Date: June 5, 2017

From: Warren Wunderlick, B.A.Sc., P.Eng

File: 17-610-211

Review: Stephen Bean, M.Eng, P.Eng.

Cc: Udo Sommer, BCMoTI
Mike Dinney, BCMoTI
Crystal Lacher, BCMoTI

ADMIRALS – MCKENZIE INTERCHANGE BEDROCK PROBING RESULTS

Since the bedrock surface is known to be highly variable in this area, the project team decided to conduct a bedrock probing investigation along the proposed retaining wall locations to be constructed in contract 2. The hole locations were drilled on an approximate 20 m spacing to assist in reducing the uncertainty in the retaining wall design.

The test holes were drilled by Western Grater Contracting Ltd. as a subcontractor to Jacob Brothers Construction (the Prime Contractor in Contract 1). The drill was a blasting type drill and details of the investigation relating to the hole diameter, drill fluid, etc. have not been provided to us. The drilling was supervised by David Arnott of the BCMoTI field services team.

Thurber Engineering Ltd. did not provide drilling supervision, interpretation or verification of the results. We have been requested to present the bedrock elevation table that has been provided to us for use as reference information for Contract 2 proponents. The results table is attached.

Closure

If you have any questions regarding this memorandum, please contact us.

Attachments

Statement of Limitations and Conditions
Bedrock Probing Table

Admiral's - McKenzie
Proposed 2017 Probe Hole Locations

Base drawing for proposed probe hole plan used McElhanney_C2 Retaining Wall Drawing - drawing in millimeters

ft to m = 0.305

| Description | Probe Hole No. | Northing | Easting | Ground Elev.(m) | Drill Depth (m) | Rock Elev (m) | Comments |
|--|----------------|-----------|----------|-----------------|-----------------|---------------|-----------------------------|
| Grass area between TCH 1 & Portage - Accessable from Portage | 1 | 369822.13 | 69707.91 | 17.52 | 6.71 | 10.81 | |
| | 2 | 369810.26 | 69723.67 | 17.44 | 7.93 | 9.51 | |
| | 3 | 369800.49 | 69736.94 | 17.42 | 8.24 | 9.18 | |
| | 4 | 369791.24 | 69749.38 | 17.70 | 7.32 | 10.38 | |
| | 5 | 369782.47 | 69761.06 | 18.00 | 3.05 | 14.95 | |
| | 6 | 369774.34 | 69771.85 | 18.57 | 3.05 | 15.52 | |
| | 7 | 369766.19 | 69782.65 | 18.94 | 2.14 | 16.80 | |
| | 8 | 369758.04 | 69793.42 | 19.11 | 4.27 | 14.84 | |
| | 9 | 369749.77 | 69804.36 | 19.20 | 7.32 | 11.88 | |
| | 10 | 369739.53 | 69817.94 | 19.29 | 7.02 | 12.27 | |
| | 11 | 369733.64 | 69825.97 | 19.37 | 7.02 | 12.36 | |
| | 12 | 369726.12 | 69836.47 | 19.60 | 8.54 | 11.06 | |
| Same as above | 13 | 369633.37 | 69985.82 | 18.42 | 3.97 | 14.46 | |
| | 14 | 369628.56 | 69997.61 | 18.16 | 4.88 | 13.28 | |
| Bridge Pile | 15 | 369621.06 | 70015.21 | 17.41 | 3.00 | 14.41 | from bridge pile install |
| Move from under ramp | 16 | 369617.71 | 70029.32 | 17.59 | | | Eliminated |
| Ramp Pile | 17 | 369606.33 | 70041.21 | 17.93 | 3.00 | 14.93 | from ramp pile install |
| | 18 | 369599.65 | 70065.85 | 18.14 | 2.14 | 16.00 | Moved |
| | 19 | 369598.70 | 70054.06 | 17.97 | | | Eliminated |
| | 20 | 369593.90 | 70071.08 | 18.16 | 1.83 | 16.33 | Moved |
| | 21 | 369590.95 | 70065.22 | | | | Eliminated |
| Either side of oak tree | 22 | 369577.55 | 70086.15 | 17.90 | 5.19 | 12.72 | |
| | 23 | 369566.42 | 70096.62 | 17.43 | 4.88 | 12.55 | Moved |
| Black berries | 24 | 369561.29 | 70102.73 | 17.10 | 7.32 | 9.78 | |
| Old Portage | 25 | 369549.91 | 70111.80 | 15.99 | 2.50 | 13.49 | Estimated from exposed rock |
| Old Portage | 26 | 369540.94 | 70118.93 | 15.39 | 3.36 | 12.03 | |



STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

- a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.
- b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.
- c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.
- d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.