



THURBER ENGINEERING LTD.



MEMORANDUM NO. 1

To: Michael George, P.Eng.
BC Ministry of Transportation and
Infrastructure

Date: May 26, 2017

From: Andrew Chand, P.Eng.
Review: Steven Coulter, P.Eng.

File: 19066

Cc: Marcus Barber, McElhanney
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CHERRY CREEK SITES FLOOD REPAIR – RODEO DRIVE RESPONSE (MOTI PROJECT NO. 24210) TEMPORARY BRIDGE INSTALLATION - GEOTECHNICAL RECOMMENDATIONS

Introduction

We understand that MoTI is planning to install a pre-fabricated bridge supported on concrete lock-blocks to provide temporary access across Cherry Creek where Rodeo Drive was washed out. We understand that a permanent replacement crossing will likely not be installed until at least the spring of 2018. This memo summarizes our observations and provides geotechnical recommendations for foundations for the proposed temporary bridge.

It is a condition of this memo that Thurber's performance of its professional services will be subject to the attached Statement of Limitations and Conditions.

Observations

The subsurface conditions generally comprise cemented silt and sand underlain by uncemented sand. On the east side of the creek, the soil exposed on the creek bank slope consists of silt with some roots extending to a depth of approximately 1.0 m below the original road grade. Below this there was dry silt extending to a depth of approximately 1.3 m. These silt deposits are underlain by dry, mottled reddish-brown to brown, fine silty sand to sandy silt to at least 2.2 m depth. The silt and sand deposits below a depth of 1.0 m were observed to be cemented with visible pores. Uncemented sand was not observed in this slope.

On the west side of the creek, the soil exposed on the creek bank slope consists of silt with some gravel and some sand (possibly fill) extending to a depth of approximately 1.0 m below the original road grade. Below this there was moist, mottled reddish-brown to brown silt with some fine sand extending to a depth of approximately 2.3 m. This native silt deposit is weakly to moderately cemented and contains visible pores. Soils adjacent to the toe of the slope consist of wet sand with some fine gravel and trace to some silt; this sand deposit is uncemented and did not contain any visible pores.

Discussion and Recommendations

Foundation Preparation

Based on our experience with similar deposits in the region, the cemented silt and sand observed within the creek banks is potentially collapsible. The temporary bridge abutments will be constructed from lock-blocks and should not be founded on the cemented silt and sand due to the potential for collapse settlement if these soils become wet or saturated. The cemented silt and sand should be sub-excavated beneath the proposed abutments to expose uncemented, wet sand. Based on our observations of the exposed soils within the creek banks, the depth of sub-excavation required is approximately 2.3 m beneath the original pavement surface on the west side of the creek, and more than 2.2 m beneath the original pavement surface on the east side of the creek.

It is noted that lab testing to estimate collapse settlement (i.e. double oedometer tests) is not considered feasible as MoTI must install the temporary bridge within the next several days.

Any backfill required beneath the lock-blocks (i.e. levelling course) should consist of well compacted, 19 mm minus, crushed gravel.

Provided that the bearing surface is prepared as outlined above, a design bearing resistance of 100 kPa (ULS) can be used for the temporary bridge.

Abutment Construction

The excavated cemented silt and sand can be used as backfill behind the abutments provided that it is well compacted to break down the cemented structure, and is not too wet at the time of placement.

If the height of the abutment is greater than or equal to 3.0 m (i.e. four blocks), the lower row of blocks should be oriented with the long dimension placed parallel to the direction of the bridge.

Closure

Please contact us if you have any questions regarding these recommendations.

Thurber Engineering Ltd.
Steven Coulter, M.Sc., P.Eng.
Review Engineer



Andrew Chand, M.Eng., P.Eng.
Geotechnical Engineer



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.

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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.

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