

April 23, 2009

Project No. 04-1111-052

Mr. Mike Delsey, P. Eng.
AECOM
300 Water Street
Whitby, Ontario
L1N 9J2

**SITE RECONNAISSANCE FOR PROPOSED NEW NORTH OAKVILLE TRANSPORTATION CORRIDOR
ENVIRONMENTAL ASSESSMENT
NEW BURNHAMTHORPE ROAD OVER SIXTEEN MILE CREEK
OAKVILLE, ONTARIO**

Dear Sir:

This letter presents the revised results of a site reconnaissance carried out on December 5, 2008 as part of the Class Environmental Assessment for the proposed New North Oakville Transportation Corridor over the Sixteen Mile Creek within Oakville, Ontario. This additional work was undertaken in response to your email dated October 9, 2008, which included a request by Halton Region to carry out a site reconnaissance to verify, based on visual observations, the soil conditions inferred from the available information as described in our letter dated May 27, 2008. The site reconnaissance was completed on December 5, 2008 after receiving your written authorization to proceed on November 26, 2008 for the work as outlined in our proposal dated October 27, 2008. A letter providing the results of site reconnaissance was submitted to AECOM on March 18, 2009.

Halton Region provided comments on our March 18, 2008 letter; these were received on March 30, 2009. In addition, the review comments made by Conservation Halton were received on March 30, 2009. Their comments included the request for a site reconnaissance as noted above as well as the statement that "...the geotechnical assessment should account for potential slope stability impacts resulting from loss of vegetation arising from the crossing's construction. Geotechnical input should also be provided with respect to the proposed construction access including remediation requirements." It is understood that AECOM will address the second request with respect to the proposed construction access in their submission.

Accordingly, this letter replaces our letter dated March 18, 2009 to incorporate the comments received from both Halton Region and Conservation Halton as described above. This letter should be read in conjunction with our previous letter dated May 27, 2008.

The study area is located in north Oakville and is bounded by Bronte Road, Highway 407, Dundas Street and 9th Line. Several potential routes for the New North Oakville Transportation Corridor had been considered within the study area. As requested by AECOM, Golder undertook the site reconnaissance of the area where the new alignment (the preferred Alternative W6) crosses Sixteen Mile Creek. A review of the available aerial photos and maps of the area prior to visiting the site indicated that the banks of the creek in the area of the crossing are generally densely vegetated and that the only available access to the site was from Lions Valley Park Road South which connects to the trail within the Lions Valley Park to the northwest of Dundas Street West, Oakville.



REGIONAL GEOLOGY

Physiographically, the study area is located within the geological domain known as the “South Slope” of the Oak Ridges Moraine including a strip south of the Peel Plain – predominantly a moraine till plain – known as the Halton Ground Moraine till plain which is characterized by the surficial clayey silt till. This plain is transected by the Trafalgar End Moraine till ridge which is generally represented by the topographic high area in the north part of the study area. The Trafalgar Moraine mainly consists of clayey silt till overlying shale bedrock of the Queenston Formation which consists of red-brown shale containing limestone/siltstone interbeds.

SUBSURFACE CONDITIONS ALONG CREEK VALLEY

The approximate boundary of site reconnaissance completed on December 5, 2008 is shown on Figure 1. Both side slopes of the Sixteen Mile Creek valley are generally densely vegetated in the Lions Valley Park. Based on the available overburden in the valley generally consists of unsorted, unstratified heterogeneous mixtures of clayey silts, sands and gravels of glacial till origin. The overburden varies in thickness at different areas but is typically less than a few metres.

As shown on Photo 1, there is an approximately 260 m long stretch of the east/north creek valley slope within the Lions Valley Park, to the east of the proposed alignment, where the red-brown shale containing limestone/siltstone interbeds of the Queenston Formation is exposed. In the upper portion of the slope, surficial topsoil and shallow overburden overlies the shale bedrock. The lower 3 m to 5 m of the exposed bedrock slope is standing almost vertical; there are significant erosion channels formed on the slope surface.

SUBSURFACE CONDITIONS AT THE PROPOSED CREEK CROSSING

The proposed bridge crossing Sixteen Mile Creek is located between approximately Station 13+120 and 13+420 near the point where a tributary flows into the main creek channel. The total length of the proposed four-span bridge is 280 m. The slope on the north side of the creek at the proposed creek crossing is densely vegetated as shown on Photo 2.

The south creek valley slope at the proposed bridge crossing is also densely vegetated. The slopes are at inclinations generally ranging from 27 degrees to 32 degrees; however, there is a near vertical bedrock outcrop at the slope toe (see Figure 1 and Photo 3) where red-brown shale containing limestone/siltstone interbeds is exposed. The adjacent slopes are at inclinations of 50 degrees or steeper. Above the exposed bedrock, at heights ranging from 1.5 m to 2 m above the creek level, the overburden consist of clayey silt till underlying surficial topsoil; however, the thickness of the overburden is not known. Soils mixed with gravel, cobble, boulder and rock fragments are present at some locations in the creek bed; bedrock was not visible in the creek bed.

FOUNDATION CONSIDERATIONS FOR NEW BRIDGE

Based on the site observations with respect to subsurface conditions for the Sixteen Mile Creek valley slopes at the proposed bridge crossing as described above, spread footings placed on the shale bedrock and/or pile foundations extended into the bedrock as discussed in our previous letter dated May 27, 2008 would be suitable for the support of the proposed New North Oakville Transportation Corridor Structure over Sixteen Mile Creek.

Depending on the thickness of the overburden at the crest of the valley slopes at the abutment locations, spread footings could be feasible for the abutment support. For the pier footings, the choice of founding options will depend on the overburden thickness as well as the nature of the upper portions of the bedrock. It is noted that the configuration of the valley slope at the abutment locations should be reviewed and an assessment made with respect to where the abutment footings need to be located to maintain them beyond the geotechnical long term stable slope line. The assessment should include both stability and erosion components. In addition, there will be some extent of vegetation removal required on the slopes at/adjacent to the bridge to permit construction. The determination of the geotechnical long term stable slope line will have to take this into account. Provision should be made for revegetation of the slope as well as placement of suitable erosion protection measures for the slopes adjacent to the bridge to protect against surficial erosion.

It is noted that the comments provided are based on a site reconnaissance supporting the literature review as presented in our previous letter. A borehole drilling program will be required to provide site-specific subsurface information for further foundation design recommendations.

We trust that this letter is sufficient for your present requirements. If you have any questions please call us.

Yours truly,

GOLDER ASSOCIATES LTD.



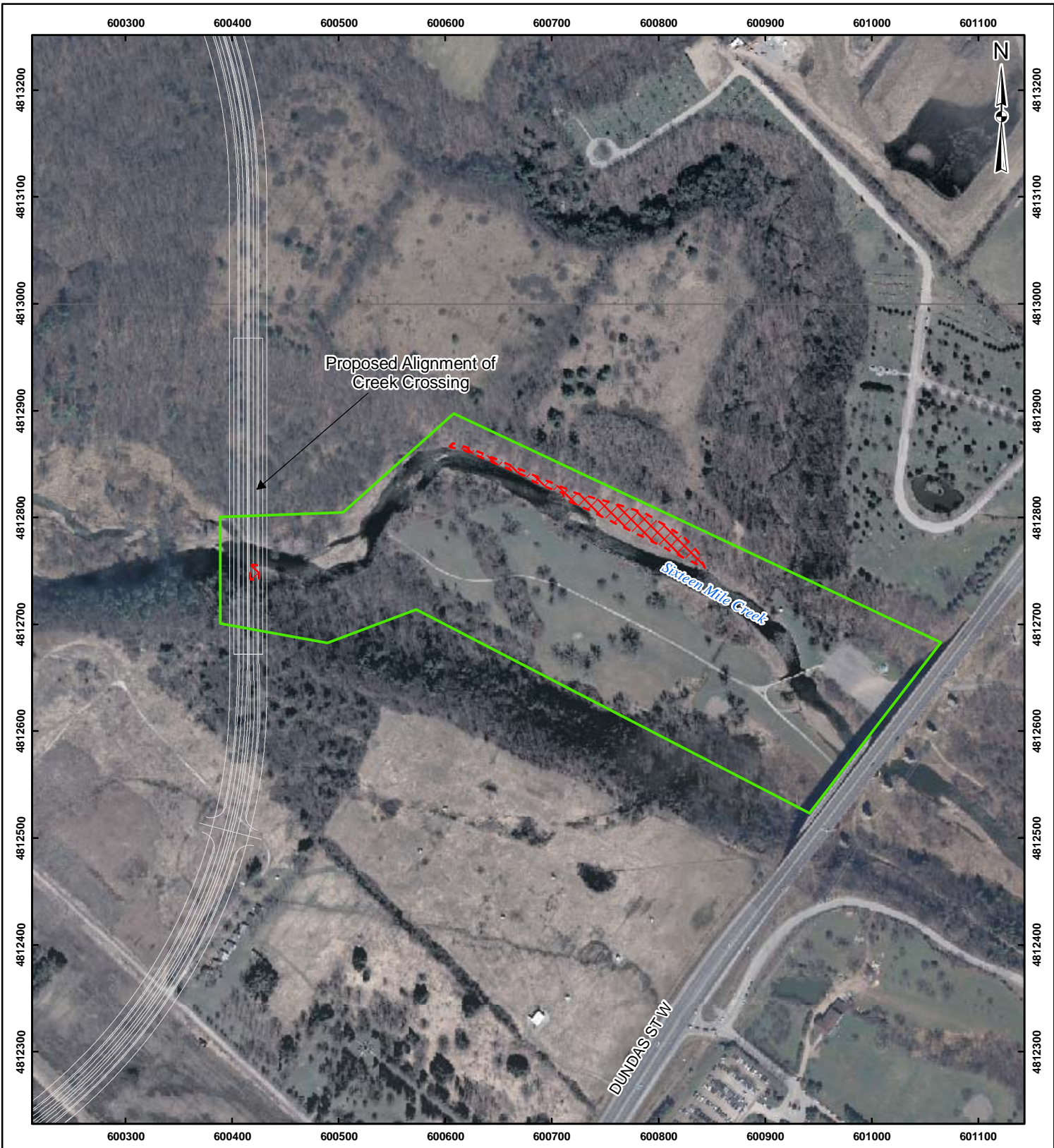
Sen Hu, EIT
Geotechnical Group






Anne S. Poschmann, P. Eng.
Principal

SH/AP/jl

Attachments: Figure 1 Area of Site Reconnaissance and Bedrock Outcrops
Photos 1 to 4



LEGEND

-  Alignment
-  Approximate Area of Bedrock Outcrop
-  Approximate Boundary of Site Reconnaissance on December 5, 2008



REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2006.4
 Produced by Golder Associates Ltd under licence from
 Ontario Ministry of Natural Resources, © Queens Printer 2008
 Projection: Transverse Mercator Datum: NAD ?? Coordinate System: UTM Zone ??



PROJECT NEW NORTH OAKVILLE TRANSPORTATION CORRIDOR & CROSSING OF THE SIXTEEN MILE CREEK CLASS ENVIRONMENTAL ASSESSMENT

TITLE AREA OF SITE RECONNAISSANCE AND BEDROCK OUTCROPS



PROJECT No.	04-1111-052	SCALE AS SHOWN	REV. 0.0
DESIGN	JO 15 Dec. 2008		
GIS	JO 15 Dec. 2008		
CHECK	XX 15 Dec. 2008		
REVIEW	XX 15 Dec. 2008		

FIGURE: 1



Photo 1 Bedrock Outcrop 1: North Valley Wall of Sixteen Mile Creek within the North Park



Photo 2 Dense Vegetation on North Side of Sixteen Mile Creek at the Proposed Bridge Crossing



Photo 3 Exposed Bedrock at the Toe of the South Valley Wall at the Proposed Creek Crossing



Photo 4 South Valley Wall at Proposed Creek Crossing