Englobe
Soils Materials Environment

Johnston Bros. (Bothwell) Ltd.

Part of Lot 16 Concession 4, NTR Geographic Township of North Dorchester, Municipality of Thames Centre, Middlesex County

Aggregate Assessment Report

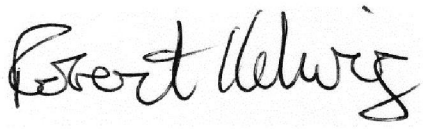
Date: October 25, 2017
Ref. N°: 160-B-0017881-1-GE-R-0001-00

Johnston Bros. (Bothwell) Ltd.

Part of Lot 16, Concession 4, NTR Geographic Township of North Dorchester, Municipality of Thames Centre, Middlesex County, Ontario

Aggregate Assessment Report | 160-B-0017881-1-GE-R-0001-00

Prepared by:



Robert J. Helwig, B.Sc., P.Geo.
Manager, London Operations

TABLE OF CONTENTS

Appendices

Property and Confidentiality

Johnston Bros. (Bothwell) Ltd.
PO Box 220
Bothwell, Ontario N0P 1C0

Attention: Mr. Lloyd Johnston

REVISION AND PUBLICATION REGISTER		
Revision N°	**Date**	**Modification And/Or Publication Details**
00	2017-10-25	Final Report Issued

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INTRODUCTION

We have completed this project in accordance with your instruction and authorization. This report contains a record of our findings and presents our conclusions with respect to the possible use of aggregate requiring a below water license from the subject property located as shown on Drawing 1 in Appendix 1.

1 FIELDWORK

The fieldwork, consisting of eight (8) sampled test pits, was carried out on August 16, 2017, at the locations shown on Drawing 2 in Appendix 1. The test pits were dug with a track-mounted excavator to the sampling depths.

Bulk samples were retrieved from the test pits and the samples were then transferred to our laboratory for grain size analyses. The fieldwork was supervised by a geologist, who also related strata changes to the ground surface (pit floor) at each test pit location.

2 SUBSURFACE CONDITIONS

Detailed descriptions of the strata, which were encountered at each location, are given on the test pit summary comprising Appendix 2. The following notes are intended only to amplify this data.

The test pits encountered an extensive granular deposit ranging in gradation from fine sand to too sand and gravel which extends beyond the lower limit of test pits 4 to 8 at depths ranging from 3.0 to 4.0 metres. Test pits 1, 2, 3 encountered grey clayey silt till at depths ranging from 2.9 2 to 4.7 metres, and were terminated in the till at depths ranging from 3.5 to 4.7 metres.

3 GRAIN SIZE ANALYSES

Grain size analyses were performed on representative samples of the granular material to obtain an indication of the grading, and the results are plotted on the grain size distribution curves comprising Figures 1 to 2 in Appendix 3.

4 GROUNDWATER CONDITIONS

Stabilized groundwater levels were measured in the open test pits and are shown on the test pit summary in Appendix 2. Groundwater was measured at depths ranging from 0.8 to 1.6 metres in the open excavations.

5 DISCUSSION AND RECOMMENDATIONS

The investigation has revealed that the property contains significant quantities of aggregate of commercial value. The granular deposit has an estimated minimum average thickness of 3.6 metres and covers the entire extraction area of 8.85 hectares. This equates to a minimum of 318,600 cubic metres cubic metres of granular material or approximately 637,000 metric tonnes by weight.

The sand and gravel could be manufactured into Granular 'A' and Granular 'B' which are classifications of the Provincial Ministries for road base and sub-base material. The sandier materials could be blended into the sand and gravel to produce Granular "B'. The sand could also be used to manufacture winter sand and Granular 'C'.

The entire deposit will require a below water extraction license.

The estimated quantities in the report are based on the results of the test pits and boreholes. Developers of the property should form their own opinions with regard to the potential net value of subsoil excavated for commercial purposes.

6 CONCLUSIONS

The investigation has revealed that a minimum of 637,000 metric tonnes of granular material of commercial value could be extracted from the property. The estimated quantities in the report are based on the results of the test pits and the proposed extraction area. Developers of the property should form their own opinions with regard to the potential net value of subsoil excavated for commercial purposes.

7 STATEMENT OF LIMITATIONS

The geotechnical recommendations provided in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known at the time of report preparation, we recommend that we be retained during the final design stage to verify that the geotechnical recommendations have been correctly interpreted in the design. Also, if any further clarification and/or elaboration are needed concerning the geotechnical aspects of the project, EnGlobe should be contacted. We recommend that we be retained during construction to confirm that the subsurface conditions do not deviate materially from those encountered in the test holes and to ensure that our recommendations are properly understood. Quality assurance testing and inspection services during construction are a necessary part of the evaluation of the subsurface conditions.

The geotechnical recommendations provided in this report are intended for the use of the Client or its agent and may not be used by a Third Party without the expressed written consent of Englobe and the Client. They are not intended as specifications or instructions to contractors. Any use which a contractor makes of this report, or decisions made based on it, are the responsibility of the contractor. The contractor must also accept the responsibility for means and methods of construction, seek additional information if required, and draw their own

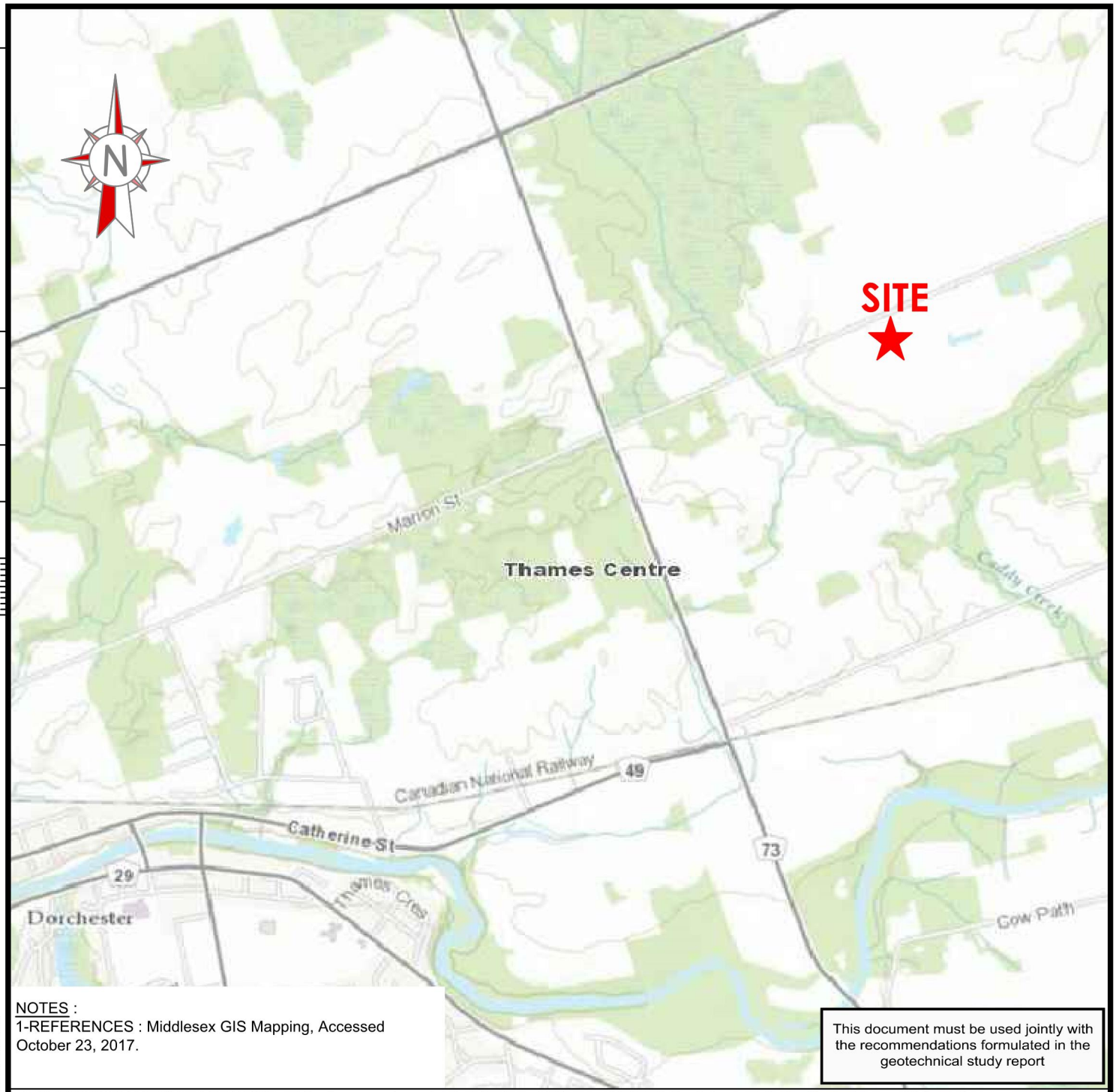
conclusions as to how the subsurface conditions may affect their work. Englobe accepts no responsibility and denies any liability whatsoever for any damages arising from improper or unauthorized use of the report or parts thereof.

It is important to note that the geotechnical assessment involves a limited sampling of the site gathered at specific test hole locations and the conclusions in this report are based on this information gathered and in accordance with normally accepted practices. The subsurface geotechnical, hydrogeological, environmental and geologic conditions between and beyond the test holes will differ from those encountered at the test holes. Also such conditions are not uniform and can vary over time. Should subsurface conditions be encountered which differ materially from those indicated at the test holes, we request that we be notified in order to assess the additional information and determine whether or not changes should be made as a result of the conditions. Englobe will not be responsible to any party for damages incurred as a result of failing to notify Englobe that differing site or subsurface conditions are present upon becoming aware of such conditions.

The professional services provided for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise stated specifically in the report. The recommendations and opinions given in this report are based on our professional judgment and are for the guidance of the Client or its Agent in the design of the specific project. No other warranties or guarantees, expressed or implied, are made.

Appendix 1 Drawings

Drawing 1: Site Location Plan
Drawing 2: Test Pit Location Plan



NOTES :
1-REFERENCES : Middlesex GIS Mapping, Accessed October 23, 2017.

This document must be used jointly with the recommendations formulated in the geotechnical study report

Client

Project

Aggregate Assessment Report

Part of Lot 16 Concession 4, NTR Geographic Township of North Dorchester, Municipality of Thames Centre, Middlesex County

Title

Site Location Plan

Englobe Corp.

60 Meg Drive, Unit 12
London, Ontario
N6E 3T6
519-685-6400

Discipline: Geotechnical		Prepared by: J. Bree	Verified by: R. Helwig
Scale: No Scale		Drawned by: J. Bree	Approved by: R. Helwig
Date: 23/10/2017		Figure n°: 01 of 02	
Page setup: Site location plan	Paper Format: ANSI full bleed A (8.50 x 11.00 Inches)	Register n°:	

Resp.	Project	Wbs	Project/ Disc	Phase/ Type	Elec. ref. / Drawing n°	Rev.
161	B-0017881-1		GE		01	00

10 cm 0 1 2 3 4 5

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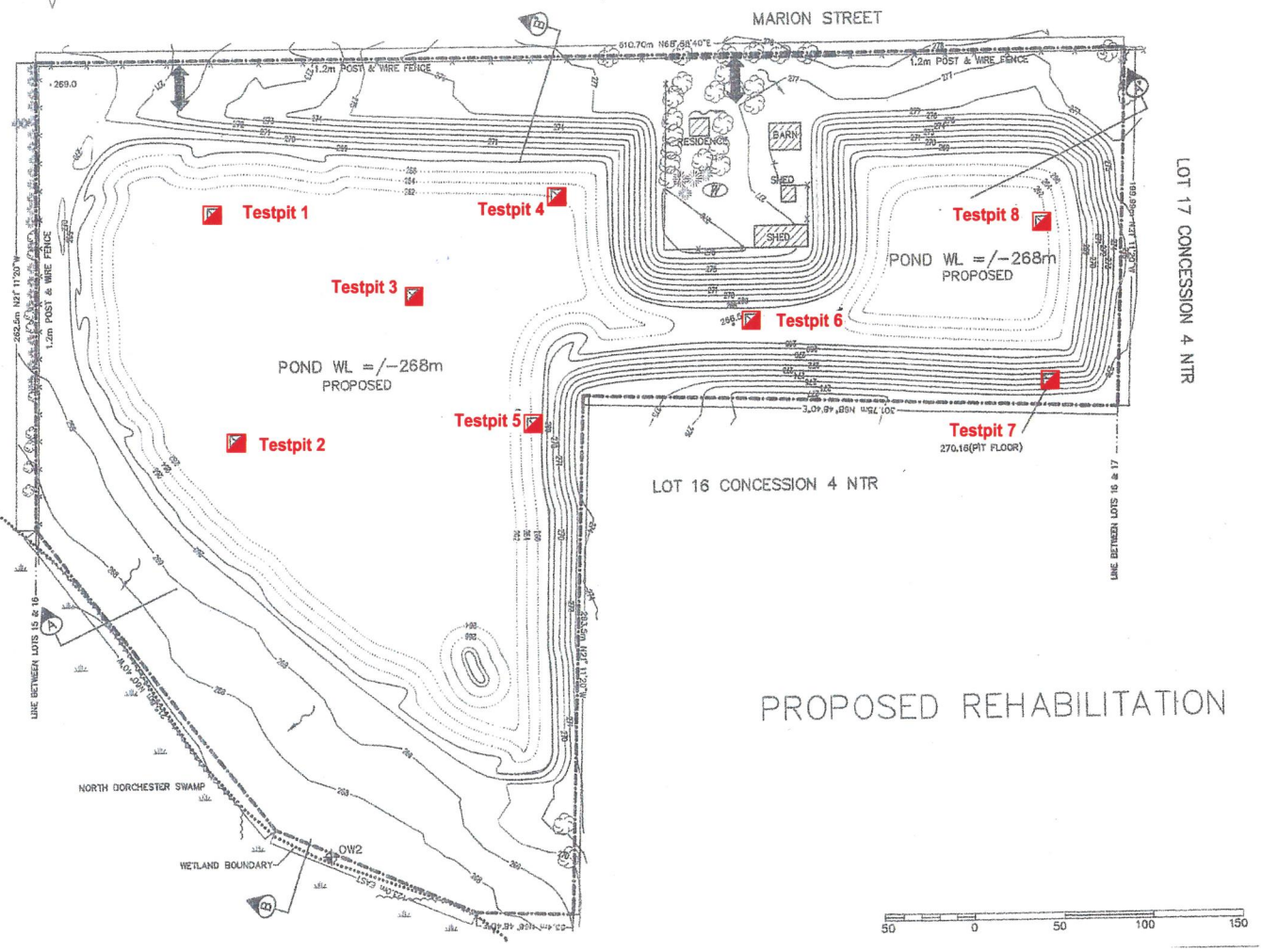

LEGEND:

Testpit 1 Approximate Testpit Location

This document must be used jointly with the recommendations formulated in the geotechnical study report

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Title

Test Pit Location Plan

Englobe Corp.

60 Meg Drive, Unit 12
London, Ontario
N6E 3T6
519-685-6400

Discipline: Geotechnical		Prepared by: J. Bree	Verified by: R. Helwig
Scale: 1:4 000		Drawned by: J. Bree	Approved by: R. Helwig
Date: 23/10/2017		Figure n°: 02 of 02	
Page setup: Test pit loc plan	Paper Format: ANSI full bleed A (8.50 x 11.00 Inches)	Register n°:	

Resp.	Project	Wbs	Project/ Disc	Phase/ Type	Elec. ref. / Drawing n°	Rev.
161	B-0017881-1		GE		02	00

10 cm 0 1 2 3 4 5

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Appendix 2 Test Pit Summary

Appendix 2

TEST PIT SUMMARY			
Test Pit	**Depth (metres)**	**Description**	**Remarks (water level)**
TP1-17	0 – 3.3	Fine sand, trace of silt	1.1 m
	3.3 – 3.5	Grey clayey silt till	
TP2-17	0 – 2.9	Fine to coarse sand, trace of gravel	1.0 m
	2.9 – 3.2	Grey clayey silt till	
TP3-17	0 – 4.5	Fine to medium sand, trace of gravel	1.6 m
	4.5 – 4.7	Grey clayey silt till	
TP4-17	0 – 4.0	Fine sand, trace of silt	1.1 m
TP5-17	0 – 4.0	Fine sand, trace of silt	1.2 m
TP6-17	0 – 4.0	Fine to medium sand, trace of gravel	1.4 m
TP7-17	0 – 3.0	Gravelly sand, trace of silt	0.9 m
TP8-17	0 – 3.0	Sand and gravel, trace of silt	0.8 m

Appendix 3 Grain Size Distribution Analyses

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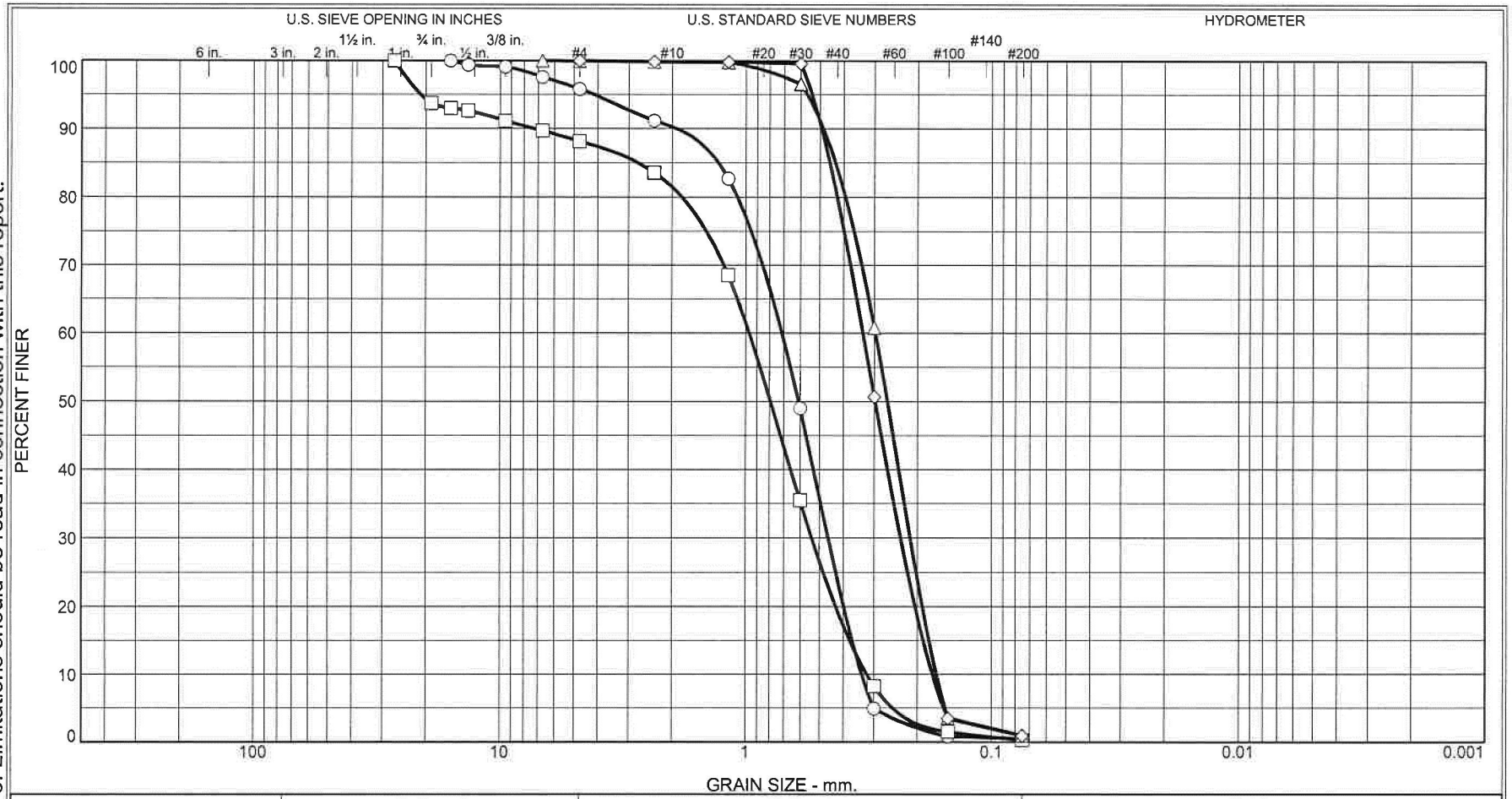


% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

	Location	Source	Sample #	Depth/Elev.	Sample Information
○	Test Pit 01		1	0 - 3.3 m	Fine sand, trace of silt
□	Test Pit 02		1	0 - 2.9 m	Fine to coarse sand, trace of gravel
△	Test Pit 03		1	0 - 4.5 m	Fine to medium sand, trace of gravel
◇	Test Pit 04		1	0 - 4.0 m	Fine sand, trace of silt

Project No. B-0017881 **Client** Johnston Bros. (Bothwell) Ltd. **Figure 3** 1

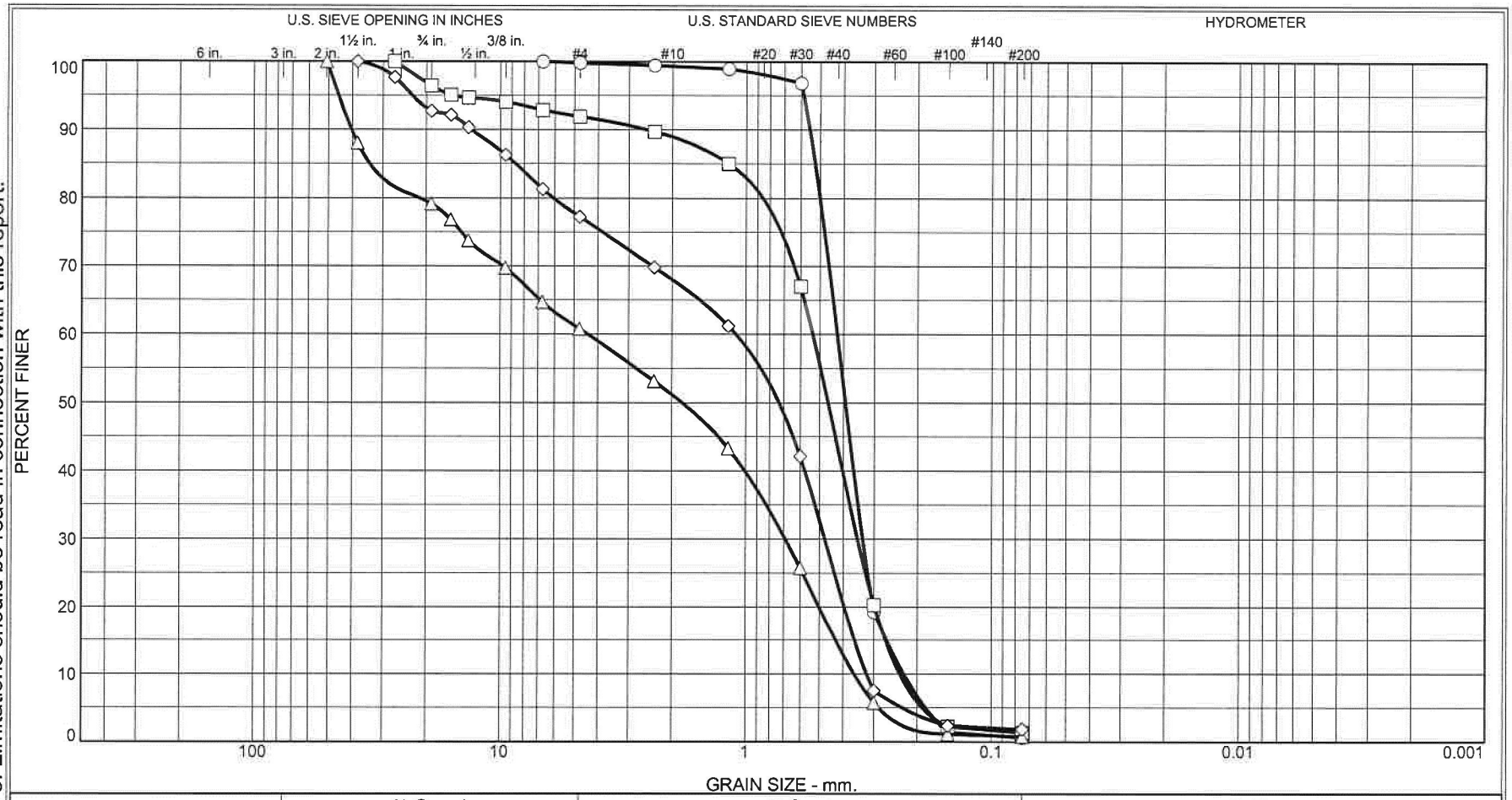
Grain Size Analysis

Aggregate Assessment, Marsh Pit, 6385 Marion Street, Middlesex County

EnGlobe

London, Ontario

Tested By: D.McBay **Checked By:** R.Helwig



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

	Location	Source	Sample #	Depth/Elev.	Sample Information
○	Test Pit 05		1	0 - 4.0 m	Fine sand, trace of silt
□	Test Pit 06		1	0 - 4.0 m	Fine to medium sand, trace of gravel
△	Test Pit 07		1	0 - 3.0 m	Gravelly sand, trace of silt
◇	Test Pit 08		1	0 - 3.0 m	Sand and gravel, trace of silt

Project No. B-0017881 **Client** Johnston Bros. (Bothwell) Ltd. **Figure 3** 2

Grain Size Analysis

Aggregate Assessment, Marsh Pit, 6385 Marion Street, Middlesex County

EnGlobe

London, Ontario

Tested By: D.McBay **Checked By:** R.Helwig