Englobe
Soils Materials Environment

Submitted to Planmac Engineering Inc.
80 North Queen Street, Suite 302, Toronto, Ontario M8Z 2C9
For the Ontario Ministry of Transportation

Bridge Rehabilitation
Highway 11
Orillia Road Concession No. 8 – Structure
Site No 30-476
GWP 2295-17-00

FINAL FOUNDATION INVESTIGATION REPORT

Date: February 20, 2018
Ref. №: P-0014012-0-00-100-01-F4

Geocres No. 31D-689

Englobe

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Final Foundation Investigation Report

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2018-02-20

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Property and Confidentiality

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1 INTRODUCTION

Englobe Corp. (Englobe), has been retained by Planmac Engineering Inc. (Planmac), on behalf of the Ministry of Transportation of Ontario (MTO), to carry out a foundation investigation at an existing bridge site. The site has been described as Orillia Road Concession No. 8 - Structure – Site No. 30-476, and crosses over Highway 11 in the Township of Oro-Medonte, Ontario (see Drawing No. 1, Appendix 1).

The foundation investigation location was specified by the MTO in the Terms of Reference for work under Assignment No. 2017-E-0004: GWP Nos. 2087-15-00, 2003-16-00 and its Clarification 3. The terms of reference for the scope of work are outlined in Englobe's Proposal 2017-P152-084, dated May 30, 2017. The purpose of this investigation was to determine the subsurface conditions in the areas of the bridge approaches to provide factual information at the bridge site for the Detailed Design for bridge rehabilitation. Englobe investigated the foundation area by the drilling of boreholes, carrying out in-situ tests, and performing laboratory testing on select samples.

2 SITE DESCRIPTION

The existing bridge underpass is located approximately between Stations 0+022 and 0+066.5 on Orillia Road Concession No. 8 - Structure and crosses over Highway 11 in the Township of Oro-Medonte. The existing embankment of Orillia Road Concession No. 8 currently supports two undivided lanes, locally running in a south-north direction. A visual review of the roadway to the north and the south of the bridge approaches indicates that, in general, the approaches are in fair to good condition (see Photo Essay in Appendix 4).

The existing underpass approaches have been constructed on an embankment fill containing sands and silty sands. At the bridge location, the existing highway centerline is at Elevation 269.6 m at the north expansion joint and Elevation 269.0 m at the south expansion joint of the bridge.

Infrastructure at the underpass bridge location consists of overhead utility wires running perpendicular to (i.e. crossing over) Orillia Road Concession No. 8 at the north approach.

2.1 SITE PHYSIOGRAPHY AND SURFICIAL GEOLOGY

The topography in the area of this site is generally flat to slightly rolling. Layers of earth overlay bedrock. Within the project area, the native overburden consists primarily of sands.

Bedrock in the area, based on Ontario Geologic Survey (OGS) Map MRD-126, consists of limestone, dolostone, shale, arkose, and/or sandstone.

3 INVESTIGATION PROCEDURES

The fieldwork for this investigation was carried out on September 19, 2017, during which time two (2) sampled boreholes were advanced. One (1) borehole was advanced at the north approach and one (1) borehole was advanced at the south approach.

The field investigation was carried out using a truck mounted CME drilling rig equipped with hollow stem augers, standard augers, casing equipment and routine geotechnical sampling equipment. Soil samples were obtained at the borehole locations at regular intervals of depth using the standard 50 mm O.D. split spoon sampler advanced in accordance with the Standard Penetration Test (SPT) procedures (ASTM D-1586). The SPT method involves advancing a 50 mm O.D. split spoon sampler with the force of a 63.5 kg hammer freely dropping 760 mm. All samples taken during this investigation were stored in labeled containers for transport to our North Bay laboratory for visual examination and select laboratory testing.

Groundwater conditions in the open boreholes were observed during the advancement of, and immediately following, completion of the individual boreholes. A 19 mm diameter standpipe was installed in Borehole No. 1 prior to backfilling to allow for further monitoring of the shallow groundwater levels. The remaining open borehole was backfilled upon completion with compacted auger cuttings in the general order they were removed, and where necessary, bentonite pellet backfill was added to the boreholes to bring them up to grade in accordance with requirements of Ontario Regulation 903. At the boreholes through the embankment, the upper portion of the hole, where necessary, was backfilled with an asphalt cold patch to seal the existing asphalt surface.

The fieldwork for this investigation was under the full time direction of a senior member of the Englobe engineering staff (Ed Sullivan), who was responsible for locating the boreholes, clearing the borehole locations of underground services, in-situ sampling and testing operations, logging of the boreholes, labeling and preparation of samples for transport to our North Bay laboratory, plus overall drill supervision. All samples received a visual confirmatory inspection in our laboratory. Laboratory testing of select samples included routine geotechnical testing for natural moisture content determination and particle size analyses. The results of the laboratory testing are presented on the individual Record of Borehole Sheets (Appendix 2), with a summary of testing results presented on the laboratory sheets in Appendix 3 (Figures Nos. L-1 to L-4 and Table No. L-5).

The location of the individual boreholes was determined in the field based on the existing underpass bridge approaches and offsets relative to highway centreline. The MTO co-ordinates, northing and easting, were then established for the boring locations using coordinates from MTM Zone 10, NAD 83 CSRS. The borehole elevations are based on coordinating the borehole locations with the highway survey carried out by IBW Surveyors. Elevations contained in this report are referenced to geodetic datum.

4 SUBSURFACE CONDITIONS

Details of the subsurface conditions revealed by the investigation program are presented on the enclosed Records of Borehole Logs (Enclosure Nos. 2 and 3, Appendix 2) and on Drawing No. 2 (Appendix 3). Please note that stratigraphic delineation presented on the borehole logs and soil strata plot are the results of non-continuous sampling, response to drilling progress, the results of SPT, plus field observations. Typically such boundaries represent transitions from one zone to another and are not an exact demarcation of specific geological unit. Additional consideration should be given to the fact that subsurface conditions may vary markedly between adjacent boreholes and beyond any specific boring location, and are shown on the drawings for illustration purposes only.

4.1 ORILLIA ROAD CONCESSION NO. 8 - STRUCTURE

A plan and profile illustrating the borehole locations and stratigraphic sequences is shown on Drawing No. 2, Appendix 3. During the course of the exploration program, two (2) sampled boreholes were put down at this site, with Borehole No. 1 advanced through the south approach and Borehole No. 2 was advanced through the north approach. At the time of the subsurface investigation, the ground surface elevations at Borehole Nos. 1 and 2 were recorded at Elevations 268.9 and 269.6 m, respectively.

4.1.1 Pavement Structure

Borehole No. 1 was advanced through the embankment where a pavement structure consisting of 70 to 80 mm of asphalt was penetrated, underlain by a layer of concrete approach slab approximately 240 to 250 mm in thickness. The concrete approach slab was underlain by a layer of crushed gravel, 150 to 180 mm in thickness.

4.1.2 Embankment Fill

4.1.2.1 *Upper Sand Fill*

Underlying the pavement structure at Borehole Nos. 1 and 2, a layer of embankment fill described as sand, some gravel, some silt was penetrated. A rock fragment of cobble size was encountered within this layer at a depth of 1.5 m below grade at Borehole No. 1. The natural moisture content measured on samples of this layer was in the order of 3 to 9%. Gradation (sieve) analyses were carried out on two (2) samples of this layer, and the testing results indicated 17 to 18% gravel size particles, 71 to 72% sand size particles, and 11% silt and clay size particles (Figure No. L-1, Appendix 3). Based on SPT 'N' values of 2 to 31 blows per 300 mm penetration, compactness of this layer was described as very loose to dense, generally compact on average. This layer was encountered to depths of 3.5 and 4.0, m below grade at Borehole Nos. 1 and 2, respectively (Elevations 265.4 and 265.6 m, respectively).

4.1.2.2 *Silty Sand Fill*

Underlying the upper sand fill at Borehole Nos. 1 and 2, a layer of embankment fill described as silty sand, trace to some gravel, trace to some clay was penetrated. The natural moisture content measured on samples of this layer was in the order of 4 to 16%. A gradation (hydrometer) analysis was carried out on one (1) sample of this layer, and the testing results indicated 12% gravel size particles, 42% sand size particles, and 30% silt size particles, and 16% clay size particles (Figure No. L-2, Appendix 3). Atterberg Limits testing was completed on one (1) sample of this fill layer, and the testing results indicated a Liquid Limit in the order of 15% and a Plastic Limit of 11%, indicating a low plastic silty sand material (poorly graded sand-silt mixtures) (Figure No. L-4, Appendix 3). Based on SPT 'N' values of 2 to 30 blows per 300 mm penetration, compactness of this layer was described as very loose to dense, generally loose on average. A SPT 'N' value of 27 blows per 300 mm was encountered within this fill layer at BH No. 1, however, was likely a result of the asphalt layer encountered within the fills and is not representative of the compactness of the fill layer. This layer was encountered to depths of 5.6 and 6.4, m below grade at Borehole Nos. 1 and 2, respectively (Elevations 263.3 and 263.2 m, respectively).

4.1.2.3 *Lower Sand Fill*

Underlying the silty sand fill at Borehole Nos. 1 and 2, a layer of embankment fill described as sand, some to with gravel, trace to some silt was penetrated. The natural moisture content measured on samples of this deposit was in the order of 8 to 11%. Based on SPT 'N' values of 14 to 21 blows per 300 mm penetration, compactness of this layer was described as compact. This layer was encountered to depths of 7.0 and 7.9, m below grade at Borehole Nos. 1 and 2, respectively (Elevations 261.9 and 261.7 m, respectively).

4.1.3 Upper Sand

Underlying the lower sand fill at Borehole Nos. 1 and 2, a deposit of sand trace to with gravel, trace silt, trace clay was penetrated. The natural moisture content measured on samples of this deposit was in the order of 5 to 7%. A gradation (hydrometer) analysis was carried out one (1) samples of this deposit, and the testing results indicated 30% gravel size particles, 58% sand size particles, 9% silt size particles, and 3% clay size particles (Figure No. L-3, Appendix 3). Based on SPT 'N' values of 17 to 21 blows per 300 mm to 25 blows per 0 mm penetration, compactness of this deposit was described as compact to very dense. This deposit was encountered to a depth of 8.7 m below grade at Borehole No. 1 (Elevation 260.2 m). Sampling was terminated within this deposit at a depth of 9.9 m below grade at Borehole No. 2 (Elevation 259.7 m).

4.1.4 Clayey Silt

Underlying the upper sand deposit at Borehole No. 1, a deposit of brown silty clay was penetrated. The natural moisture content measured on one (1) sample of this deposit was in the

order of 3%. This deposit was encountered to a depth of 9.5 m below grade at Borehole No. 1 (Elevation 259.4 m).

4.1.5 Lower Sand

Underlying the clayey silty deposit at Borehole No. 1, a deposit of lower sand, with gravel, with silt, some clay was penetrated. The natural moisture content measured on samples of this deposit was in the order of 3 to 6%. A gradation (hydrometer) analysis was carried out one (1) sample of this deposit, and the testing results indicated 26% gravel size particles, 41% sand size particles, 21% silt size particles, and 12% clay size particles (Figure No. L-3, Appendix 3). Atterberg Limits testing was completed on one (1) sample of this deposit, and the testing results indicated a Liquid Limit in the order of 14% and a Plastic Limit of 10%, indicating a low plastic sand with silt material (poorly graded sand-silt mixtures) (Figure No. L-4, Appendix 3). Based on SPT 'N' values of 34 to 35 blows per 300 mm penetration, compactness of this deposit was described as dense. Sampling was terminated within this deposit at a depth of 12.8 m below grade at Borehole No. 1 (Elevation 256.1 m).

4.2 GROUNDWATER DATA

Measurements of the groundwater table and cave-in levels were undertaken, where possible, in the open boreholes during the advance of the individual borings and upon completion. A 19 mm diameter standpipe piezometer was installed in Borehole No. 1 to obtain post borehole completion water level. These levels are recorded on the individual Record of Borehole Log Sheets (Appendix 2).

Borehole Nos. 1 and 2 were dry at the time of site investigation.

The groundwater and surface water levels will fluctuate seasonally/yearly.

4.3 CHEMICAL TESTING

One (1) soil sample recovered at Borehole No. 2 during the foundation investigation was submitted to AGAT analytical laboratory and tested for corrosivity potential to determine the potential for degradation of concrete in the presence of soluble sulphates used in foundations and buried infrastructure. The results of chemical testing (including PH, water soluble sulphate, chloride, resistivity and electrical conductivity analyses) are tabulated below and included in Appendix 3.

SAMPLE LOCATION	SAMPLE NO.	DEPTH BELOW GRADE (m)	pH	Soluble Sulphate (ppm)	Chloride (ppm)	Resistivity (Ohm.cm)	Electrical Conductivity (mS/cm)
BH 2	**2**	**0.8**	**9.14**	**7**	**17**	**7300**	**0.137**

5 MISCELLANEOUS

The field investigation was carried out using a truck mounted CME drilling rig owned by Chrisdanat Management Inc. and operated by Englobe Corp. Laboratory testing of select soil samples was undertaken at the North Bay Englobe Laboratory. The fieldwork for this investigation was under the full time supervision of Ed Sullivan, a senior member of the Englobe engineering staff. The report was written by Alexander Tepylo, P.Eng., and reviewed by Sen Hu, P.Eng.

6 STATEMENT OF LIMITATIONS

Proper subgrade preparation, groundwater control, compaction, etc. are all critical aspects of the bearing capacity of native soils. It must be noted that different aspects of the geotechnical design are based on the assumption that Englobe will be retained during site preparation and construction of the proposed works to ensure that both the geotechnical site characteristics and the construction operations/techniques are consistent with our recommendations. Should Englobe not be involved during the full construction phase, our liability is strictly limited to the factual information contained herein only.

The comments in this report are intended solely for the guidance of the design engineer and address the geotechnical conditions only. The number of boreholes required to determine the localized conditions between boreholes directly affecting construction costs, equipment, scheduling, etc. would in fact be greater than what has been carried out for design purposes. Therefore, contractors bidding on this project or undertaking this work should make their own interpretations of the factual borehole results and carry out further work as they deem necessary to assess the scope of the project.

If, during construction, conditions in the field vary from those assumed at the design stage, an engineer from this office must be notified immediately.

Appendix 1 Key Plan

Drawing No. 1 Key Plan

KEY PLAN

Drawing No. 1

NOT TO SCALE

FINAL FOUNDATION INVESTIGATION REPORT

GWP 2295-17-00

Highway 11

Orillia Road Concession No. 8 - Structure

Reference No: P-0014012-0-00-100-01-F4

January 2018

Englobe

Appendix 2 Subsurface Data

Enclosure No. 1	List of Abbreviations and Symbols
Enclosure Nos. 2 and 3	Record of Borehole Sheet

LIST OF ABBREVIATIONS & DESCRIPTION OF TERMS

The abbreviations and terms, used to describe retrieved samples and commonly employed on the borehole logs, on the figures and in the report are as follows:

1. ABBREVIATIONS

AS Auger Sample
CS Chunk Sample
DS Denison type sample
FS Foil Sample
NFP No Further Progress
PH Sampler advanced by hydraulic pressure
PM Sampler advanced by manual pressure
RC Rock core with size & percentage of recovery
SS Split Spoon
ST Slotted Tube
TO Thin-walled, open
TP Thin-walled, piston
WS Wash Sample
WH Sampler advanced by static weight of hammer and/or rods
Rec % recovery from individual run of rock core
RQD Rock quality designation (%)

2. PENETRATION RESISTANCE/"N"

Dynamic Cone Penetration Test (DCPT):

A continuous profile showing the number of blows for each 300 mm of penetration of a 50 mm diameter 60° cone attached to AW rod driven by a 63 kg hammer falling 760 mm.

Plotted as —•—•—•—•

Standard Penetration Test (SPT) or "N" Values

The number of blows of a 63 kg hammer falling 760 mm required to advance a 50 mm O.D. drive open sampler 300 mm.

3. SOIL DESCRIPTION

a) *Cohesionless Soils:*

"N" (blows/0.3 m)	*Compactness Condition*
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
over 50	very dense

b) *Cohesive Soils:*

Undrained Shear Strength (kPa)	*Consistency*
Less than 12	very soft
12 to 25	soft
25 to 50	firm
50 to 100	stiff
100 to 200	very stiff
over 200	hard

3. SOIL DESCRIPTION (Cont'd)

c) Bedrock:

RQD (%)	*Classification*
Less than 25	Very poor quality
25 to 50	Poor quality
50 to 75	Fair quality
75 to 90	Good quality
90 to 100	Excellent quality

d) *Method of Determination of Undrained Shear Strength of Cohesive Soils:*

+ 3.2 - Field Vane test in borehole. The number denotes the sensitivity to remoulding.

D - Laboratory Vane Test

¨ - Compression test in laboratory

For a saturated cohesive soil the undrained shear strength is taken as one-half of the undrained compressive strength.

e) *Soil Moisture:*

Moisture	*Described as*
Dry	Below optimum moisture content
Moist	Near optimum moisture content
Wet	Above optimum moisture content

4. TERMINOLOGY

Terminology used for describing soil strata is based on the proportion of individual particle sizes present in the samples (please note that, with the exception of those samples subject to a grain-size analysis, all samples were classified visually and the accuracy of visual examination is not sufficient to determine exact grain sizing):

Trace, or occasional	Less than 10%
Some	10 to 20%
With	20 to 30%
Adjective (i.e. silty or sandy)	30 to 40%
And (i.e. sand and gravel)	40 to 60%

Terminology for cobbles and boulders is based on auger response and field observations:

Occasional	Obstructions encountered in borehole, however advance is not impeded
Numerous	Obstructions are essentially continuous over drilled length

SAMPLE DESCRIPTION NOTES:

1. **FILL:** The term fill is used to designate all man-made deposits of natural soil and/or waste materials. The reader is cautioned that fill materials can be very heterogeneous in nature and variable in depth, density and degree of compaction. Fill materials can be expected to contain organics, waste materials, construction materials, shot rock, rip-rap, and/or larger obstructions such as boulders, concrete foundations, slabs, abandoned tanks, etc.; none of which may have been encountered in the borehole. The description of the material penetrated in the borehole therefore may not be applicable as a general description of the fill material on the site as boreholes cannot accurately define the nature of fill material. During the boring and sampling process, retrieved samples may have certain characteristics that identify them as 'fill'. Fill materials (or possible fill materials) will be designated on the Borehole Logs. If fill material is identified on the site, it is highly recommended that testpits be put down to delineate the nature of the fill material. However, even through the use of testpits defining the true nature and composition of the fill material cannot be guaranteed. Fill deposits often contain pockets or seams of organics, organically contaminated soils or other deleterious material that can cause settlement or result in the production of methane gas. It should be noted that the origins and history of fill material is frequently very vague or non-existent. Often fill material may be contaminated beyond environmental guidelines and the material will have to be disposed of at a designated site (i.e. registered landfill). Unless requested or stated otherwise in this report, fill material on this site has not been tested for contaminants however, environmental testing of the fill material can be carried out at your request. Detection of underground storage tanks cannot be determined with conventional geotechnical procedures.

2. **TILL:** The term till indicates a material that is an unstratified, glacial deposit, heterogeneous in nature and, as such, may consist of mixtures and pockets of clay, silt, sand, gravel, cobbles and/or boulders. These heterogeneous deposits originate from a geological process associated with glaciation. It must be noted that due to the highly heterogeneous nature of till deposits, the description of the deposit on the borehole log may only be applicable to a very limited area and therefore, caution must be exercised when dealing with a till deposit. When excavating in till, contractors may encounter cobbles/boulders or possibly bedrock even if they are not indicated on the borehole logs. It must be appreciated that conventional geotechnical sampling equipment does not identify the nature or size of any obstruction.

3. **BEDROCK:** Auger refusal may be due to the presence of bedrock, but possibly could also be due to the presence of very dense underlying deposits, boulders or other large obstructions. Auger refusal is defined as the point at which an auger can no longer be practically advanced. It must be appreciated that conventional geotechnical sampling equipment does not differentiate between nature and size of obstructions that prevent further penetration of the boring below grade. Bedrock indicated on the borehole logs will be labeled 'possibly' or 'probable' etc. based on the response of the boring and sampling equipment, surrounding topography, etc. Bedrock can be proven at individual borehole locations, at your request, by diamond core drilling operations or, possibly, by testpits. It must also be appreciated that bedrock surfaces can be, and most times are, very erratic in nature (i.e. sheer drops, isolated rock knobs, etc.) and caution must be used when interpreting subsurface conditions between boreholes. A bedrock profile can be more accurately estimated, at the clients' request, through a series of closely positioned unsampled auger probes combined with core drilling.

4. **GROUNDWATER:** Although the groundwater table may have been encountered during this investigation and the elevation noted in the report and/or on the record of boreholes, it must be appreciated that the elevation of the groundwater table will fluctuate based upon seasonal conditions, localized changes, erratic changes in the underlying soil profile between boreholes, underlying soil layers with highly variable permeabilities, etc. These conditions may affect the design and type and nature of dewatering procedures. Cave-in levels recorded in borings give a general indication of the groundwater level in cohesionless soils however, it must be noted that cave-in levels may also be due to the relative density of the deposit, drilling operations etc.

ENCLOSURE NO.: 2 (Pg. 1 of 2)

METRIC

RECORD OF BOREHOLE NO. 1

Englobe

REFERENCE P-0014012-0-00-100-01-F4 DATUM Geodetic | LOCATION N 4947671.6 E 311851.5, Twp. of Oro-Medonte | ORIGINATED BY ELS

PROJECT GWP 2295-17-00, Orillia Road Concession #8 - Structure | BOREHOLE TYPE Truck Mounted CME 45 - Hollow Stem Augers | COMPILED BY DM

CLIENT Planmac Engineering Inc. | DATE (Started) 19 September 2017 TIME (Completed) | CHECKED BY AT

DATE (Completed) 19 September 2017

ELEV / DEPTH	DESCRIPTION (see Enclosure No. 1)	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS
268.9	Ground Surface					
0.0	70 mm asphalt 250 mm concrete 180 mm crushed gravel					
	EMBANKMENT FILL - sand, some gravel, some silt		1A 1B	SS	22	
	(dense/loose)		2	SS	17	
	cobble encountered at a depth of 1.5 m					
			3	SS	21	
			4	SS	31	
265.4			5A 5B	SS	7	
3.5	EMBANKMENT FILL - silty sand, some gravel, some clay					
	grey					
	(compact/loose)		6A 6B	SS	24	
	poorly graded sand-silt mixtures		7A 7B	SS	4	
263.3			8A 8B	SS	27/180 mm	
5.6	possible asphalt					
	EMBANKMENT FILL - sand, some to with gravel, trace silt					
	(compact)		9	SS	14	
261.9						
7.0	SAND - trace gravel, trace silt					
	(compact)		10	SS	17	
260.2						
8.7	CLAYEY SILT					
	brown					
259.4			11A 11B	SS	5	
9.5	SAND - with gravel, with silt, some clay					
	brown to grey Continued Next Page					

ELEVATION SCALE: 268, 267, 266, 265, 264, 263, 262, 261, 260, 259

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH kPa (20 40 60 80 100)
○ UNCONFINED + FIELD VANE
● QUICK TRIAXIAL × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%) (20 40 60)

UNIT WEIGHT γ kN/m³

REMARKS & GRAIN SIZE DISTRIBUTION (%)	GR	SA	(SI	CL)
	17	72	(11)	
	12	42	30	16

COMMENTS

The stratification lines represent approximate boundaries. The transition may be gradual.

+ 3, × 3 : Numbers on right refer to Sensitivity
Numbers on left refer to values greater than 100 kPa

○ 3% STRAIN AT FAILURE

WATER LEVEL RECORDS

Date (dd/mm/yy)/Time	Water Depth (m)	Cave In (m)
1) 19/9/17 12:20:00 PM	DRY	-
2)	-	-
3)	-	-

MEL-GEO P-0014012 - BOREHOLE LOGS - F4.GPJ MEL-GEO.GDT 15/2/18

Englobe Corp.
120 Progress Court, North Bay, On P1A 0C2 Phone: (705)476-2550 Fax: (705)476-8882 Email: northbay@englobecorp.com

METRIC

RECORD OF BOREHOLE NO. 1

REFERENCE P-0014012-0-00-100-01-F4 DATUM Geodetic
LOCATION N 4947671.6 E 311851.5, Twp. of Oro-Medonte
ORIGINATED BY ELS
PROJECT GWP 2295-17-00, Orillia Road Concession #8 - Structure
BOREHOLE TYPE Truck Mounted CME 45 - Hollow Stem Augers
COMPILED BY DM
CLIENT Planmac Engineering Inc.
DATE (Started) 19 September 2017
DATE (Completed) 19 September 2017
TIME (Completed)
CHECKED BY AT

ELEV / DEPTH	DESCRIPTION (see Enclosure No. 1)	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA (SI CL)
	Continued from Previous Page										
	(loose/dense)										
	poorly graded sand-silt mixtures		12	SS	34		258				26 41 21 12
							257				
256.1			13	SS	35						
12.8	End of Sampling End of Borehole										

MEL-GEO P-0014012 - BOREHOLE LOGS - F4.GPJ MEL-GEO.GDT 15/2/18

Englobe Corp.
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ENCLOSURE NO.: 3 (Pg. 1 of 2)

METRIC

RECORD OF BOREHOLE NO. 2

Englobe

REFERENCE P-0014012-0-00-100-01-F4 DATUM Geodetic | LOCATION N 4947693.4 E 311801.6, Twp. of Oro-Medonte | ORIGINATED BY ELS

PROJECT GWP 2295-17-00, Orillia Road Concession #8 - Structure | BOREHOLE TYPE Truck Mounted CME 45 - Hollow Stem Augers | COMPILED BY DM

CLIENT Planmac Engineering Inc. | DATE (Started) 19 September 2017 | TIME (Completed) | CHECKED BY AT

DATE (Completed) 19 September 2017

ELEV / DEPTH	DESCRIPTION (see Enclosure No. 1)	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA (SI CL)
269.6	Ground Surface										
0.0	80 mm asphalt 240 mm concrete 150 mm crushed gravel										
	EMBANKMENT FILL - sand, some gravel, some silt (dense/very loose)		1	SS	31		269				
			2	SS	30						
			3	SS	9		268				18 71 (11)
			4	SS	19		267				
			5	SS	13						
265.6							266				
4.0	EMBANKMENT FILL - silty sand, trace gravel, trace clay brown to grey (very loose/dense)		6A 6B	SS	2						
			7A 7B	SS	9		265				
			8	SS	8		264				
263.2											
6.4	EMBANKMENT FILL - sand, with gravel, some silt brown (compact)		9A 9B	SS	30		263				
261.7							262				
7.9	SAND - with gravel, trace silt, trace clay (compact/very dense)		10A 10B	SS	21						30 58 9 3
			11	SS	25/0 mm		261				
	silty sand, trace gravel at tip of spoon										
259.7	Continued Next Page						260				

COMMENTS

The stratification lines represent approximate boundaries. The transition may be gradual.

$+^3$, $\times^3$: Numbers on right refer to Sensitivity
Numbers on left refer to values greater than 100 kPa

○ 3% STRAIN AT FAILURE

WATER LEVEL RECORDS

Date (dd/mm/yy)/Time	Water Depth (m)	Cave In (m)
1) 19/9/17 5:38:00 PM	DRY	7.7
2)	-	-
3)	-	-

MEL-GEO P-0014012 - BOREHOLE LOGS - F4.GPJ MEL-GEO.GDT 15/2/18

Englobe Corp.
120 Progress Court, North Bay, On P1A 0C2 Phone: (705)476-2550 Fax: (705)476-8882 Email: northbay@englobecorp.com

METRIC

RECORD OF BOREHOLE NO. 2

REFERENCE P-0014012-0-00-100-01-F4 DATUM Geodetic
LOCATION N 4947693.4 E 311801.6, Twp. of Oro-Medonte
ORIGINATED BY ELS
PROJECT GWP 2295-17-00, Orillia Road Concession #8 - Structure
BOREHOLE TYPE Truck Mounted CME 45 - Hollow Stem Augers
COMPILED BY DM
CLIENT Planmac Engineering Inc.
DATE (Started) 19 September 2017
DATE (Completed) 19 September 2017
TIME (Completed)
CHECKED BY AT

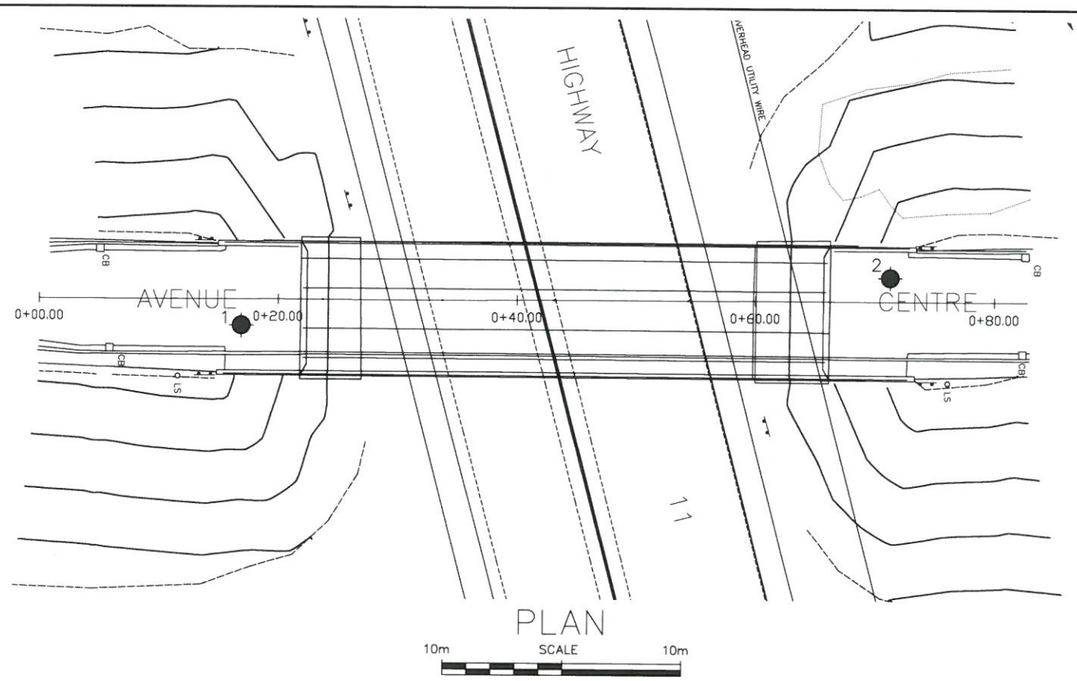
SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA (SI CL)
ELEV / DEPTH	DESCRIPTION (see Enclosure No. 1)	STRATA PLOT	NUMBER	TYPE	"N" VALUES						
	Continued from Previous Page										
9.9	End of Sampling End of Borehole										

MEL-GEO P-0014012 - BOREHOLE LOGS - F4.GPJ MEL-GEO.GDT 15/2/18

Englobe Corp.
120 Progress Court, North Bay, On P1A 0C2 Phone: (705)476-2550 Fax: (705)476-8882 Email: northbay@englobecorp.com

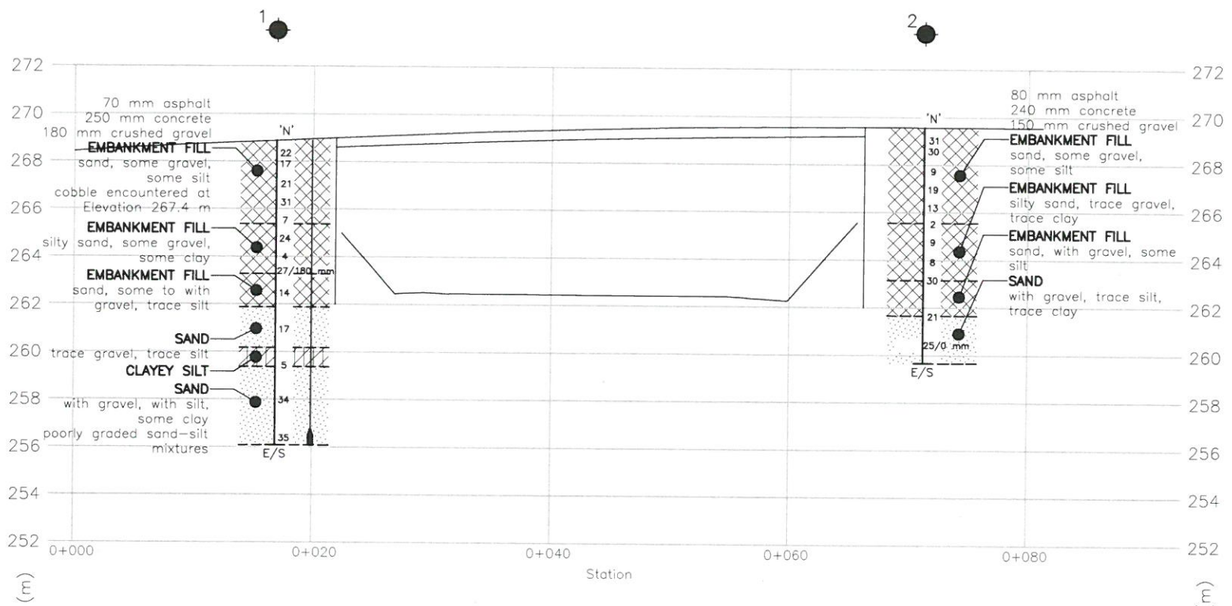
Appendix 3 Borehole Plan and Laboratory Data

Drawing No. 2:	Borehole Location and Soil Strata
Figure Nos. L-1 to L-3:	Grain Size Distribution Curves
Figure No. L-4	Atterberg Limits Test Results
Table No. L-5:	Lab Test Summary Sheet
	Analytical Test Results



PLAN

10m SCALE 10m



C/L PROFILE ORILLIA ROAD CONCESSION NO. 8

SCALE

HOR 10 5 0 10 20m

VERT 5 2.5 0 5 10m

This drawing is for subsurface information only. Surface details and features are for conceptual illustration. The proposed structure location is shown for illustration purposes only and may not be consistent with the final design configuration as shown elsewhere in the Contract Documents.

DISTRICT
CONT. No.
GWP No. 2295-17-00

HWY 11, ORILLIA ROAD
CONCESSION NO. 8 STRUCTURE
SITE NO. 30-476

BOREHOLE LOCATIONS
AND SOIL STRATIGRAPHY

SHEET 2

Englobe

KEY PLAN
N.T.S.

	Borehole w/ DCPT
	Borehole
N	Blows/0.3 m (Std Pen Test, 475 J/blow)
DCPT	Blows/0.3 m (60° Cone, 475 J/blow)
	Water Level at Time of Investigation
A/R	Auger Refusal at Elevation
E/S	End of Sampling
	Piezometer

BOREHOLE No.	ELEVATION	O/S	NORTHING	EASTING
1	268.9	2.2 Rt	4947671.6	311851.5
2	269.6	2.0 Lt	4947693.4	311801.6

NOTES:

The boundaries between soil strata have been established at the borehole locations only. The boundaries illustrated and stratigraphy between boreholes on this drawing are assumed based on borehole data and may vary. They are intended for design only.

Base plan and alignment provided in digital format by Planmac Engineering Inc. on December 21, 2017

Coordinates based on MTM Zone 10 NAD83 CSRS

GEOCRES No. 31D-689

LICENSED PROFESSIONAL ENGINEER
S. HU
90524232
Feb 20, 2018
PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER
M. H. MacKAY
PROVINCE OF ONTARIO

2018-02-20

REVISIONS			
JAN/18	DM	DRAFT	
FEB/18	DM	FINAL	
		DESCRIPTION	

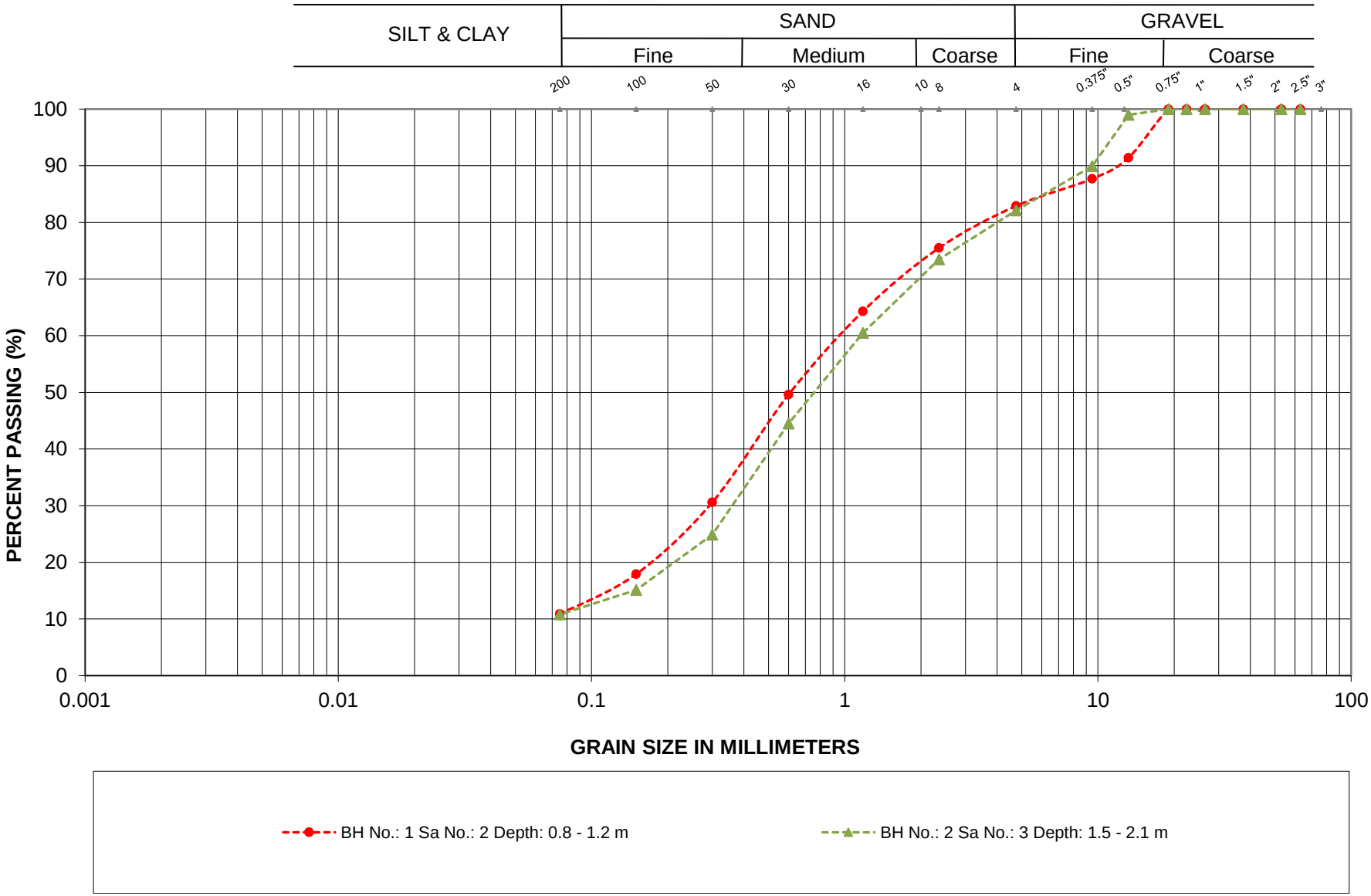
DESIGN	CHK	CODE	LOAD	DATE FEB/18
DRAWN DM	CHK AT	SITE 30-476	STRUCT	SCHEME DWG 2

MINISTRY OF TRANSPORTATION, ONTARIO PR-0-707 88-05

CAD FILE LOCATION AND NAME:\1SP\P-0014012 - PAV & FDN, Hwy 11 Orillia (Planmac)\Foundation\4_CAD\F4\P-0014012-F4 - Borehole Location Plan.dwg
MODIFIED:2/15/2018 8:37:55 AM BY: MITCDU
DATE PLOTTED:2/15/2018 10:45:22 AM BY:

Reference No.: P-0014012-0-00-100-01-F4
Date: November, 2017

GRAIN SIZE ANALYSIS



EMBANKMENT FILL, sand

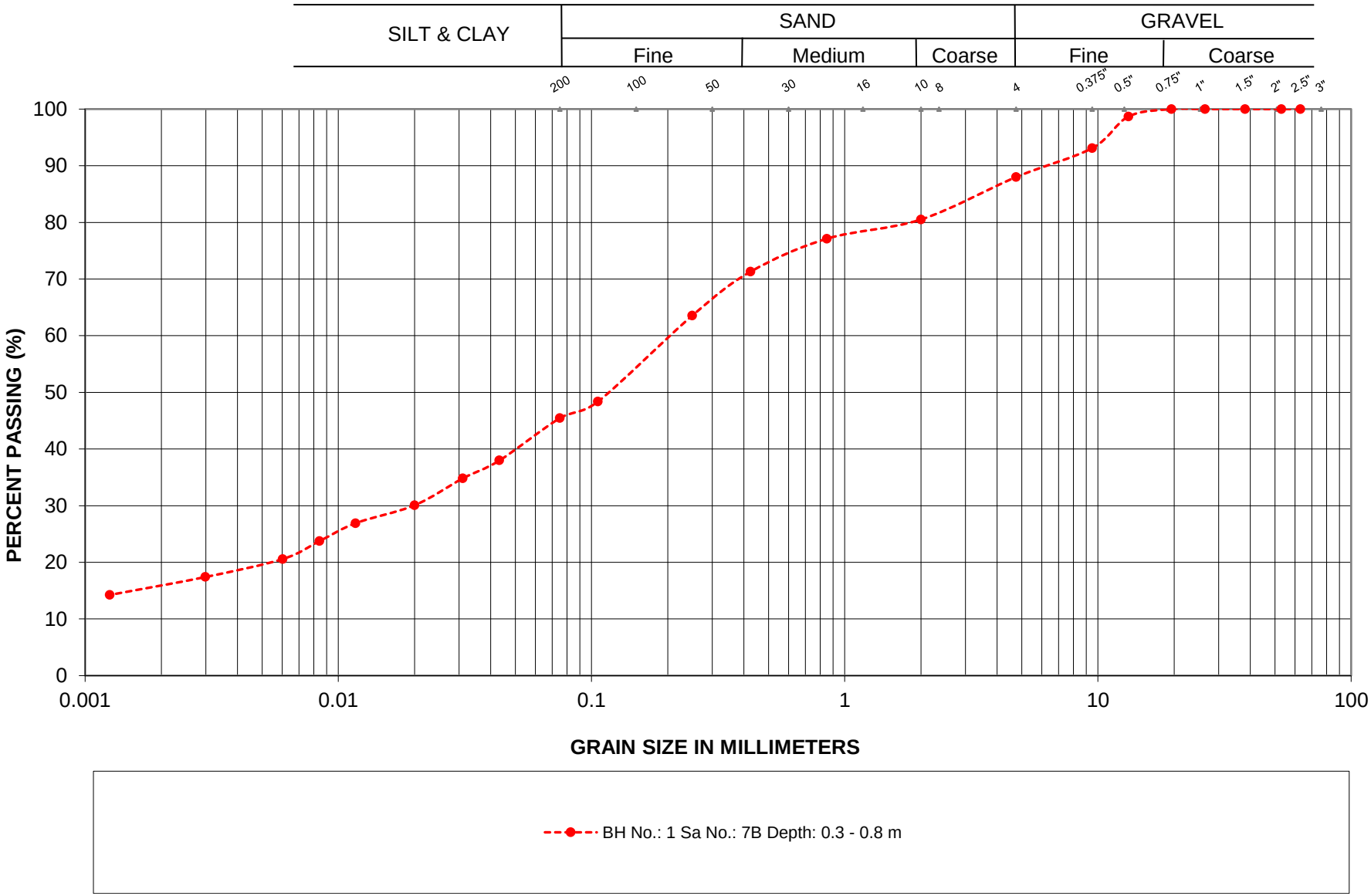
LOCATION: Hwy 11
Orillia Road Concession No. 8 - Structure

Englobe Corp.

FIGURE L-1

Reference No.: P-0014012-0-00-100-01-F4
Date: December, 2017

GRAIN SIZE ANALYSIS



EMBANKMENT FILL, silty sand, poorly graded sand-silt mixtures

LOCATION: Hwy 11
Orillia Road Concession No. 8 - Structure

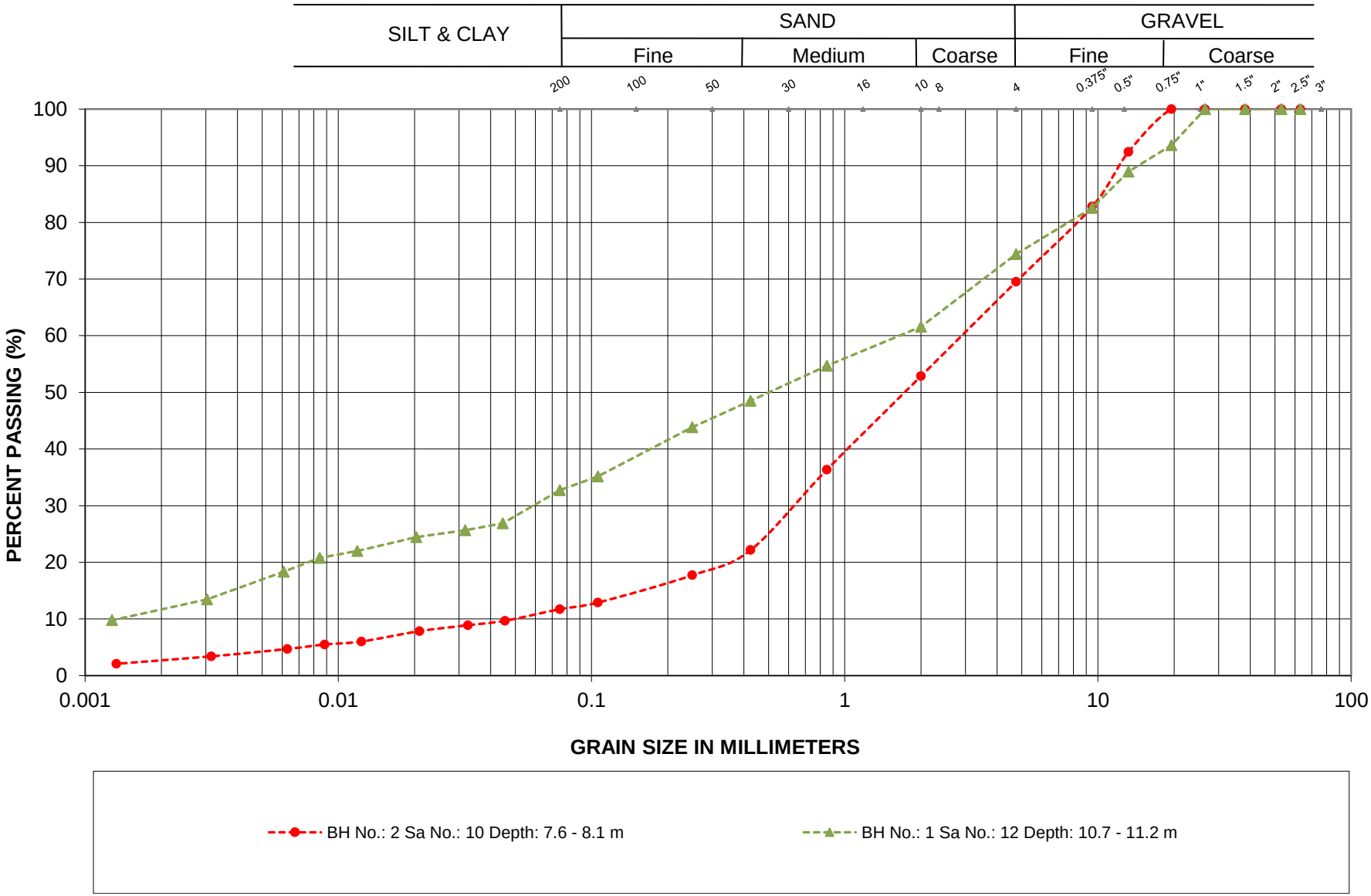
Englobe Corp.

FIGURE L-2

Reference No.: P-0014012-0-00-100-01-F4
Date: December, 2017

Englobe

GRAIN SIZE ANALYSIS



SAND, with gravel

LOCATION: Hwy 11
Orillia Road Concession No. 8 - Structure

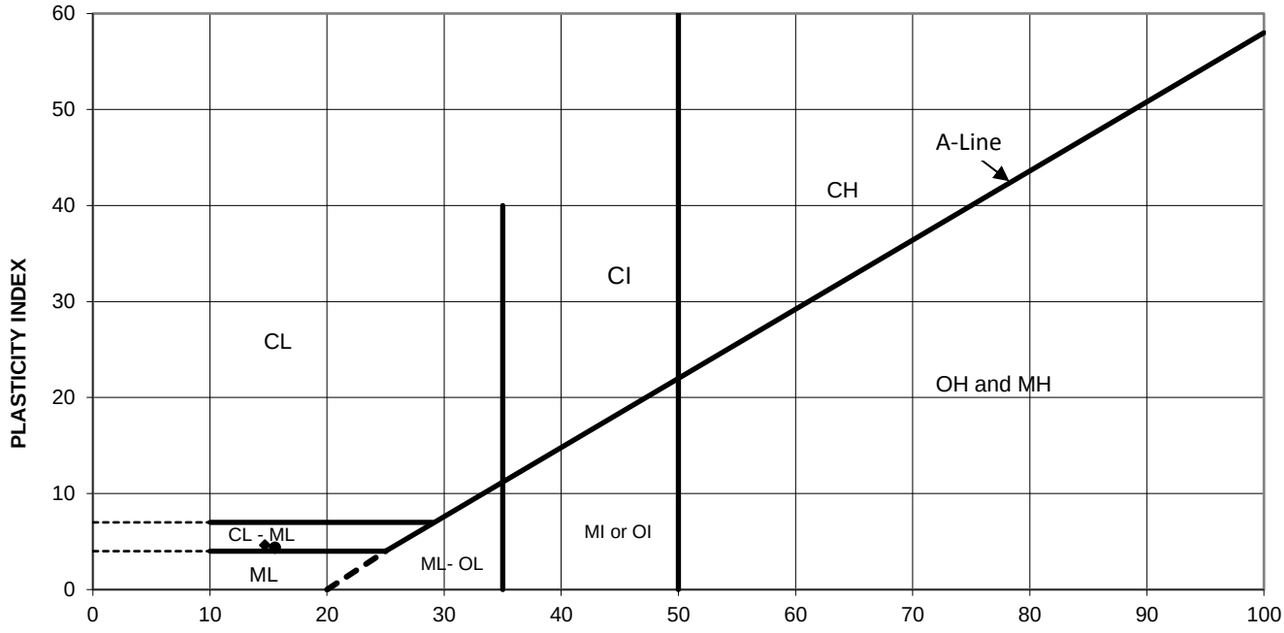
Englobe Corp.

FIGURE L-3

ATTERBERG LIMITS TEST RESULTS

FIGURE L-4

ATTERBERG INDICES



SYMBOL	BH	Sa. No.	Depth(m)	Elev.(m)	Liquid Limit	Plastic Limit	Plasticity Index	NMC %
●	1	7B	5.0	263.9	15.6	11.2	4.4	10.5
◆	1	12	10.9	258.0	14.7	10.1	4.6	5.9

Date: Nov-17
Project: Hwy 11
Location: Orillia Road Concession No. 8 - Structure

Prep'd: DM
Chkd: AT
Ref. No.: P-0014012-0-00-100-01-F4

Englobe Corp.

Laboratory Tests - Summary Sheet

Englobe

Borehole No.	Sample No.	Depth	Grain Size Analysis				NMC	Atterberg Limits			SPT 'N'	USCS	Unit Weight (kN/m3)	Remarks
			Gravel Size (%)	Sand Size (%)	Silt Size (%)	Clay Size (%)		LL (%)	PL (%)	IP (%)				
1	1a	0.3					6.8				22			
	1b	0.6					2.9							
	2	0.8	17	72	11		4.7				17			
	3	1.5					4.2				21			
	4	2.3					4.7				31			
	5a	3.0					4.9				7			
	5b	3.3					5.3							
	6a	3.8					8.5				24			
	6b	4.1					16.3							
	7a	4.6					9.3				4			
	7b	4.9	12	42	30	16	10.5	15.6	11.2	4.4				
	8a	5.3					4.3				27/180 mm			
	8b	5.5					10.3							
	9	6.1					8.1				14			
	10	7.6					7.0				17			
	11a	9.1					2.9				5			
	11b	9.4					3.3							
	12	10.7	26	41	21	12	5.9	14.7	10.1	4.6	34			
	13	12.2					6.0				35			
2	1	0.3					6.9				31			
	2	0.8					5.8				30			
	3	1.5	18	71	11		4.2				9			
	4	2.3					8.5				19			
	5	3.1					7.4				13			
	6a	3.8					8.4				2			
	6b	4.1					6.9							
	7a	4.6					6.5				9			
	7b	4.9					15.1							
	8	5.3					12.1				8			

Laboratory Tests - Summary Sheet

Englobe

Borehole No.	Sample No.	Depth	Grain Size Analysis				NMC	Atterberg Limits			SPT 'N'	USCS	Unit Weight (kN/m3)	Remarks
			Gravel Size (%)	Sand Size (%)	Silt Size (%)	Clay Size (%)		LL (%)	PL (%)	IP (%)				
2	9a	6.1					10.7				13			
	9b	6.4					11.3							
	10	7.6	30	58	9	3	5.1				21			
	11	9.1					6.2				25/0 mm			

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: ENGLOBE CORP
120 PROGRESS CRT.
NORTH BAY , ON P1A0C2
(705) 476-2550

ATTENTION TO: Victoria Steuernol

PROJECT: P-0014012-0-00-100-01

AGAT WORK ORDER: 17T286462

SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Nov 30, 2017

PAGES (INCLUDING COVER): 6

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 17T286462

PROJECT: P-0014012-0-00-100-01

CLIENT NAME: ENGLOBE CORP

ATTENTION TO: Victoria Steuernol

SAMPLING SITE:

SAMPLED BY:

Corrosivity Package

DATE RECEIVED: 2017-11-21

DATE REPORTED: 2017-11-30

		SAMPLE DESCRIPTION:		F1-BH1-Sa2	F2-BH2-Sa2	F3-BH1-Sa3	F4-BH2-Sa2	F5-BH2-Sa3	F6-BH1-Sa2	F7-BH1-Sa8	F8-BH1-Sa3
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:									
Parameter	Unit	G / S	RDL	8924749	8924752	8924753	8924754	8924755	8924756	8924757	8924758
Sulfide (S2-)	%		0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	0.08
Chloride (2:1)	µg/g		2	8	55	190	17	25	12	5	345
Sulphate (2:1)	µg/g		2	4	21	21	7	4	10	7	44
pH (2:1)	pH Units		NA	9.81	9.06	9.80	9.14	8.87	8.91	9.05	9.44
Electrical Conductivity (2:1)	mS/cm		0.005	0.218	0.263	0.557	0.137	0.118	0.104	0.066	0.710
Resistivity (2:1)	ohm.cm		1	4590	3800	1800	7300	8470	9620	15200	1410
Redox Potential (2:1)	mV		5	143	156	118	148	156	158	151	127

		SAMPLE DESCRIPTION:		F9-BH1-Sa2		F10-BH1-Sa5		F11-BH1-Sa3	F12-BH1-Sa4
		SAMPLE TYPE:		Soil		Soil		Soil	Soil
		DATE SAMPLED:							
Parameter	Unit	G / S	RDL	8924759	RDL	8924760	RDL	8924761	8924762
Sulfide (S2-)	%		0.05	<0.05	0.05	0.09	0.05	<0.05	<0.05
Chloride (2:1)	µg/g		2	166	4	1210	2	175	334
Sulphate (2:1)	µg/g		2	14	4	19	2	66	30
pH (2:1)	pH Units		NA	9.62	NA	8.95	NA	9.22	9.33
Electrical Conductivity (2:1)	mS/cm		0.005	0.435	0.005	1.79	0.005	0.622	0.773
Resistivity (2:1)	ohm.cm		1	2300	1	559	1	1610	1290
Redox Potential (2:1)	mV		5	121	5	138	5	123	117

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

8924749-8924759 EC/Resistivity, pH, Chloride, Sulphate and Redox Potential were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil).
*Sulphide analyzed at AGAT 5623 McAdam
Sampling dates were not mentioned on COC.

8924760 EC/Resistivity, pH, Chloride, Sulphate and Redox Potential were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil).
*Sulphide analyzed at AGAT 5623 McAdam
Sampling date was not mentioned on COC.
Elevated RDL indicates the degree of sample dilution prior to the analysis for Anions in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

8924761-8924762 EC/Resistivity, pH, Chloride, Sulphate and Redox Potential were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil).
*Sulphide analyzed at AGAT 5623 McAdam
Sampling dates were not mentioned on COC.

Certified By: Amanjot Bhela

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: ENGLOBE CORP
AGAT WORK ORDER: 17T286462
PROJECT: P-0014012-0-00-100-01
ATTENTION TO: Victoria Steuernol
SAMPLING SITE:
SAMPLED BY:

Soil Analysis

RPT Date:			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Corrosivity Package															
Sulfide (S2-)	8924749	8924749	< 0.05	< 0.05	NA	< 0.05	98%	80%	120%						
Chloride (2:1)	8924749	8924749	8	8	NA	< 2	108%	80%	120%	106%	80%	120%	104%	70%	130%
Sulphate (2:1)	8924749	8924749	4	4	NA	< 2	95%	80%	120%	99%	80%	120%	103%	70%	130%
pH (2:1)	8924749	8924749	9.81	9.79	0.2%	NA	101%	90%	110%	NA			NA		
Electrical Conductivity (2:1)	8924749	8924749	0.218	0.209	4.2%	< 0.005	98%	90%	110%	NA			NA		
Redox Potential (2:1)	8924749	8924749	143	143	0.0%	< 5	104%	70%	130%	NA			NA		
Corrosivity Package															
Sulfide (S2-)	8924753	8924753	< 0.05	< 0.05	NA	< 0.05	99%	80%	120%						

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By: Amanjot Bhela

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: ENGLOBE CORP

AGAT WORK ORDER: 17T286462

PROJECT: P-0014012-0-00-100-01

ATTENTION TO: Victoria Steuernol

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Sulfide (S2-)	MIN-200-12025	ASTM E1915-09	GRAVIMETRIC
Chloride (2:1)	INOR-93-6004	McKeague 4.12 & SM 4110 B	ION CHROMATOGRAPH
Sulphate (2:1)	INOR-93-6004	McKeague 4.12 & SM 4110 B	ION CHROMATOGRAPH
pH (2:1)	INOR 93-6031	MSA part 3 & SM 4500-H+ B	PH METER
Electrical Conductivity (2:1)	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Resistivity (2:1)	INOR-93-6036	McKeague 4.12, SM 2510 B,SSA #5 Part 3	CALCULATION
Redox Potential (2:1)		McKeague 4.12 & SM 2510 B	REDOX POTENTIAL ELECTRODE

1 large bleed

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only
Work Order #: 17T286462
Cooler Quantity:
Arrival Temperatures: 9.8 | 9.2 | 9.4
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Report Information:
Company: Englobe Corp
Contact: Victoria Steuernol
Address: 2-120 Progress Court
North Bay, Ontario
Phone: 705 476 2550 Fax: 705 476 8882
Reports to be sent to:
1. Email: alexander.tepylo@englobecorp.com
2. Email: victoria.steuernol@englobecorp.com

Regulatory Requirements: ☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region (Indicate One) ☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Turnaround Time (TAT) Required:
Regular TAT ☑ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day
OR Date Required (Rush Surcharges May Apply):
Require analysis of first 4 samples by 27th
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*
For 'Same Day' analysis, please contact your AGAT CPM

Project Information:
Project: P-0014012-0-00-100-OR
Site Location:
Sampled By:
AGAT Quote #: PO: A12736
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:
Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend
B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☑ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	O. Reg 153: ORPs (☐ B-HWS ☐ Cl ☐ CN ☐ Cr6+ ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR)	Full Metals Scan	Regulation/Custom Metals	Nutrients (☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2)	Volatiles (☐ VOC ☐ BTEX ☐ THM)	PHCs F1 - F4	ABNs	PAHs	PCBs (☐ Total ☐ Aroclors)	Organochlorine Pesticides	TCLP (☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs)	Sewer Use	Corrosivity Package
F1-BH1-Sa2			1	S	Corrosivity Package Test for all:														☑
F2-BH2-Sa2			1	S	pH, water soluable sulphate,														☑
F3-BH1-Sa3			1	S	sulphide, chloride, resistivity and														☑
F4-BH2-Sa2			1	S	electrical conductivity														☑
F5-BH2-Sa3			1	S															☑
F6-BH1-Sa2			1	S															☑
F7-BH1-Sa8			1	S															☑
F8-BH1-Sa3			1	S															☑
F9-BH1-Sa2			1	S															☑
F10-BH1-Sa5			1	S															☑
F11-BH1-Sa3			1	S															☑

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Sonya Clelland SC	NOV 20/17	7:00	Procelin Patel	21/11/17	8:33

Page 1 of 2
N°:

Pink Copy - Client | Yellow Copy - AGAT | White Copy- AGAT Date Issued: February 22, 2017

AGAT Laboratories
5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: Englobe Corp
Contact: Victoria Steuernol
Address: 2-120 Progress Court
North Bay, Ontario
Phone: 705 476 2550 Fax: 705 476 8882
Reports to be sent to:
1. Email: see first page
2. Email:

Project Information:

Project: See first pate
Site Location:
Sampled By:
AGAT Quote #: PO:
Please note: if quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☑ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary ☐ Storm
Region (Indicate One) ☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Laboratory Use Only

Work Order #:
Cooler Quantity:
Arrival Temperatures:
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☐ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI (Y/N)	O. Reg 153: Metals and Inorganics (☐ All Metals ☑ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	O. Reg 153: ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN⁻ ☐ C^{2+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	Corrosivity Package Tet					
F12-BH1-Sa4			1	S																		☑					

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
			Priscilla Pudd	21/11/17	8:33
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

Date Issued: February 22, 2017

Appendix 4 Photo Essay

Enclosure No. 4: Photo Essay

Existing Bridge – Looking South	Photo: 1

Project: GWP 2295-17-00 - Hwy 11 – Orillia Road Concession No. 8 - Structure	Photos Provided By: Englobe Date: September 2017