



**RETURN BIDS TO:**

**RETOURNER LES SOUMISSIONS À:**

Public Works and Government Services Canada  
Canada Place/Place du Canada  
10th Floor/10e étage  
9700 Jasper Ave/9700 ave Jasper  
Edmonton  
Alberta  
T5J 4C3  
Bid Fax: (780) 497-3510

**SOLICITATION AMENDMENT  
MODIFICATION DE L'INVITATION**

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

**Comments - Commentaires**

**Vendor/Firm Name and Address**  
**Raison sociale et adresse du**  
**fournisseur/de l'entrepreneur**

**Issuing Office - Bureau de distribution**  
Public Works and Government Services Canada  
Canada Place / Place du Canada  
10th Floor / 10e étage  
9700 Jasper Ave / 9700 ave Jasper  
Edmonton  
Alberta  
T5J 4C3

<b>Title - Sujet</b> Wharf Repair - Hay River	
<b>Solicitation No. - N° de l'invitation</b> EW038-202022/A	<b>Amendment No. - N° modif.</b> 002
<b>Client Reference No. - N° de référence du client</b> DFO-EW038-202022	<b>Date</b> 2020-01-15
<b>GETS Reference No. - N° de référence de SEAG</b> PW-SPWU-201-11761	
<b>File No. - N° de dossier</b> PWU-9-42185 (201)	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2020-01-24</b>	<b>Time Zone</b> <b>Fuseau horaire</b> Mountain Standard Time MST
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Ho (RPC), Hector	<b>Buyer Id - Id de l'acheteur</b> pwu201
<b>Telephone No. - N° de téléphone</b> (780) 901-0989 ( )	<b>FAX No. - N° de FAX</b> (780) 497-3510
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b>	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

<b>Delivery Required - Livraison exigée</b>	<b>Delivery Offered - Livraison proposée</b>
<b>Vendor/Firm Name and Address</b> <b>Raison sociale et adresse du fournisseur/de l'entrepreneur</b>	
<b>Telephone No. - N° de téléphone</b> <b>Facsimile No. - N° de télécopieur</b>	
<b>Name and title of person authorized to sign on behalf of Vendor/Firm</b> <b>(type or print)</b> <b>Nom et titre de la personne autorisée à signer au nom du fournisseur/</b> <b>de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>

Solicitation No. - N° de l'invitation  
EW038-202022/A

Amd. No. - N° de la modif.  
002

Buyer ID - Id de l'acheteur  
pwu201

Client Ref. No. - N° de réf. du client  
DFO-EW038-202022

File No. - N° du dossier  
PWU-9-42185

CCC No./N° CCC - FMS No./N° VME

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**La présente vise à modifier la demande de soumission EW038-202022/A comme suit:**

À la page 1 de 132, à la section L'invitation prend fin :

**SUPPRIMER :**

2020-01-22

**INSÉRER :**

2020-01-24

**QUESTION :**

- 1) Dans la section 1.8.1, on peut lire que de l'information géotechnique est disponible. Est-ce que vous pourriez fournir cette information pour nous aider à bien préparer notre proposition?

**RÉPONSE :**

Vous trouverez ci-joint toute l'information géotechnique dont dispose le MPO pour le site.

**QUESTION :**

- 2) Afin de présenter une proposition précise et exacte, nous devons bien étudier toutes les options en matière de réparation et de remplacement du mur vertical en palplanches d'acier qui pourraient s'appliquer. Est-ce qu'il a de plus amples renseignements ou d'autres dessins disponibles sur l'état actuel du mur?

**RÉPONSE :**

Non, il n'y a pas de dessins supplémentaires qui décrivent l'état actuel du mur vertical en palplanches d'acier. Vous trouverez ci-joint une photographie prise du mur vertical en palplanches d'acier en juin 2019.

Solicitation No. - N° de l'invitation  
EW038-202022/A

Amd. No. - N° de la modif.  
002

Buyer ID - Id de l'acheteur  
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Client Ref. No. - N° de réf. du client  
DFO-EW038-202022

File No. - N° du dossier  
PWU-9-42185

CCC No./N° CCC - FMS No./N° VME

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**QUESTION :**

- 3) Nous notons que la construction devrait avoir lieu en hiver : y a-t-il des contraintes d'échéancier particulières qui font que cela est nécessaire?

**RÉPONSE :**

Le MPO a indiqué que si la période de construction hivernale devait affecter la qualité globale des travaux exécutés (c.-à-d. compactage des sols à des températures inférieures à zéro), il est disposé à repousser la période de construction pour permettre des conditions météorologiques plus favorables.

**QUESTION :**

- 4) Nous notons que la demande de propositions précise qu'il faut soumettre une proposition sur papier. Pouvez-vous confirmer si une proposition électronique serait également acceptable?

**RÉPONSE :**

Veuillez consulter la section EPEP 2, Exigences de la proposition, elle comprend les détails sur la présentation des propositions.



182 McDougal Road  
Fort Smith, NT X0E 0P0  
Telephone 867.872-2812  
Facsimile 867.872-2813  
mitch.heron@maskwaengineering.ca

March 13, 2016

Felipe Salgado  
Project Manager  
Public Works and Government Services / Government of Canada

**RE: Geotechnical Investigation at Hay River Coast Guard Base**

Dear Felipe Salgado,

Maskwa Engineering Ltd. (Maskwa) as part of their contract with Public Works and Government Services Canada (PW&GSC) conducted a drilling program at the Hay River Coast Guard Site. As requested, this field report documents the methodology and the relevant information of this site investigation.

### **PROJECT INFORMATION**

PW&GSC awarded a contract to design a new water and sewer system for the Hay River Coast Guard Base. The existing water and sewer system was installed in 1962 when the base was opened. The existing water mains are approximately 3.5m below the existing ground.

### **METHODOLOGY**

The site investigation was conducted on March 2, 2016 by Maskwa's field representative, Mitchel Heron

A track mounted geotechnical drill rig, CME850, operated by ProCore Drilling Ltd. of Hay River, NT, was used to drill two boreholes at the project site. Borehole locations were selected in the field by Maskwa's representative, considering the general features of the project site. The relative location of these two boreholes drilled can be identified in the attached photo appendix. To reduce damages on the existing road pavement, boreholes were located outside of the paved area. BH-01 was located near the entrance to site by the coast guard sign. The second was located close to the second valve chamber approximately 5m from the road shoulder. Photographs taken during the site investigation are presented in Appendix A.

Borehole 1 was advanced to a depth of 6.0 m below the existing road surface and Borehole 2 was advanced to refusal at 6.0m. SPTs were undertaken at regular intervals (1.5 m, if possible based on the ground conditions) to obtain soil consistency information and disturbed samples. Additional disturbed soil samples were obtained from auger flights. Both types of samples were retained for visual soil description and laboratory testing. Both boreholes were logged, based on observations of soil samples and drilling behaviors. Ground ice condition or temperature was checked from the disturbed soil samples, and recorded in the borehole logs.

Standpipes were installed during this drilling investigation at both holes in order to determine ground water levels later in the season. Groundwater level was also observed about 1 hour after drilling to insure a stabilized water level was identified.

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Borehole logs that indicate the field observations and laboratory testing results are presented in Appendix B.

### **CLIMATE**

Environment Canada maintains a weather station in Hay River with complete records available from 1943 to the present. (Environment Canada, 2012)

The mean annual air temperatures recorded varied between -5.2°C (1966) and -0.5°C (2010). Linear interpolation was used to analyze temperature trends, indicating a warming trend of about 0.053 °C per year, over the period of record. The average of mean freezing index over the past ten years was approximately 2900 Celsius degree-day, with a warming trend of 9 Celsius degree-day per year.

### **OBSERVATIONS AND RECOMENDATIONS**

The existing soil is mostly silty clay with some traces of organic material. The ground water table is approximately 4.6-5.0m below the existing ground. Wells were installed in order to determine the water level during the spring, summer and fall.

The existing pipe depth is adequate for frost protection. Generally the frost penetrates approximately 1.0-2.0m depending on mean temperature, the location and snow cover. It is recommended that the pipe is bedded with a clean sand or gravel free of frost susceptible material. The depth should be a minimum of 300mm on each side of the pipe. The existing trench material can be used for backfill as long as it is free of organic material. The top 450mm when under the road should be a crushed aggregate and compacted in lifts no greater than 150mm.

### **LABORATORY TESTING**

Laboratory testing included determination of natural moisture contents, Atterberg Limits test, grain size analyses by hydrometer, and soluble sulphate content. The test results are presented with the borehole logs in Appendix C.

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## CLOSURE

This investigation was carried out in accordance with generally accepted practice of Geotechnical Engineering.

We trust that the above meets your present requirements. If you have any questions or require additional details, please contact the undersigned.

MASKWA ENGINEERING LTD.  
NAPEGG PERMIT TO PRACTICE: P 347

Prepared By:

Mitchel Heron, CET

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PROJECT: Geotechnical Investigation		CLIENT: Public Works Canada		PROJECT No.: 15-070	
ADDRESS: Coast Guard Base Hay River		DRILL: Track Mounted CME850		BOREHOLE No.: BH-01	
LOCATION: Hay River, NT		STATION: 6746045mN 567578mE		DATUM NAD 83 ZONE 11	
SAMPLE TYPE <input checked="" type="checkbox"/> DISTURBED <input type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> SPT <input type="checkbox"/> A-CASING <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> CORE					
BACKFILL TYPE <input type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> DRILL CUTTING <input type="checkbox"/> SAND					

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE No.	SPT (N)	<div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: black; margin-right: 5px;"></div> STANDARD PENETRATION (N) </div> <div style="text-align: center;"> 20   40   60   80 </div> </div> <div> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: black; margin-right: 5px;"></div> POCKET PEN (kPa) </div> <div style="text-align: center;"> 100   200   300   400 </div> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: black; margin-right: 5px;"></div> WATER CONTENT (%) </div> <div style="text-align: center;"> 10   20   30   40 </div> </div> <div> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: black; margin-right: 5px;"></div> W </div> </div> </div>	GROUND ICE DESCRIPTION	Depth (ft)
0	TOP SOIL -fine grained, damp, loose					0	
0.5	GRAVEL -fine to medium, angular, loose to compact, damp	<input checked="" type="checkbox"/>	S1			0.5	
1.5	CLAY -sandy, silty damp medium plasticity, trace organics	<input checked="" type="checkbox"/>	S2			1.5	
3.5		<input checked="" type="checkbox"/>	S3	7		3.5	
4.5		<input checked="" type="checkbox"/>	S4			4.5	
5.5		<input checked="" type="checkbox"/>	S5			5.5	
6.0	END OF HOLE AT 6.0m, DESIRED DEPTH INSTALLED GROUND WATER MONITORING WELL					6.0	
7.0						7.0	
8.0						8.0	
9.0						9.0	
10.0						10.0	
11.0						11.0	
12.0						12.0	
13.0						13.0	
14.0						14.0	
15.0						15.0	
16.0						16.0	
17.0						17.0	
18.0						18.0	

<div style="display: flex; justify-content: space-between;"> <div> <p>182 McDougal Road Fort Smith, NT X0E 0P0</p> </div> <div> LOGGED BY: MH  REVIEWED BY:  DRAWING No.: BH1 </div> </div>	<div style="display: flex; justify-content: space-between;"> <div> COMPLETION DEPTH: 6.0m  COMPLETE: March 2, 2016  PAGE: </div> </div>
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PROJECT: Geotechnical Investigation		CLIENT: Public Works Canada		PROJECT No.: 15-070	
ADDRESS: Coast Guard Base Hay River		DRILL: Track Mounted CME850		BOREHOLE No.: BH-02	
LOCATION: Hay River, NT		STATION: 6746033mN 567640mE		DATUM NAD 83 ZONE 11	
SAMPLE TYPE <input checked="" type="checkbox"/> DISTURBED <input type="checkbox"/> NO RECOVERY <input checked="" type="checkbox"/> SPT <input type="checkbox"/> A-CASING <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> CORE					
BACKFILL TYPE <input type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> DRILL CUTTING <input type="checkbox"/> SAND					

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE No.	SPT (N)	<div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: black; margin-right: 5px;"></div> STANDARD PENETRATION (N) </div> <div style="text-align: center;"> 20   40   60   80 </div> </div> <div> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: black; margin-right: 5px;"></div> POCKET PEN (kPa) </div> <div style="text-align: center;"> 100   200   300   400 </div> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: black; margin-right: 5px;"></div> WATER CONTENT (%) </div> <div style="text-align: center;"> 10   20   30   40 </div> </div> <div> <div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: black; margin-right: 5px;"></div> Wp </div> <div style="text-align: center;"> 10   20   30   40 </div> </div> </div>	GROUND ICE DESCRIPTION	Depth (ft)
0	TOP SOIL -fine grained, damp, loose					0	
0.5	SAND -fine, loose, damp, trace organics, trace clay	<input checked="" type="checkbox"/>	S1			0.5	
1.5		<input checked="" type="checkbox"/>	S2	9		1.5	
2.0	CLAY -sandy, silty damp medium plasticity, trace organics	<input checked="" type="checkbox"/>	S3			2.0	
3.5		<input checked="" type="checkbox"/>	S4	11		3.5	
4.0		<input checked="" type="checkbox"/>	S5			4.0	
4.6	-water table at 4.6m -silty, very wet, soft low plasticity	<input checked="" type="checkbox"/>	S6			4.6	
6.0	END OF HOLE AT 6.0m, DESIRED DEPTH INSTALLED GROUND WATER MONITORING WELL					6.0	
7.0						7.0	
8.0						8.0	
9.0						9.0	
10.0						10.0	
11.0						11.0	
12.0						12.0	
13.0						13.0	
14.0						14.0	
15.0						15.0	
16.0						16.0	
17.0						17.0	
18.0						18.0	

<b>MASKWA ENGINEERING LTD</b> 182 McDougal Road Fort Smith, NT X0E 0P0	LOGGED BY: MH                      COMPLETION DEPTH: 6.0m REVIEWED BY:                      COMPLETE: March 2, 2016 DRAWING No.: BH1                      PAGE:
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# Water Content of Soil and Rock

## ASTM D2216-05



### SOIL MOISTURE CONTENT AND SAMPLE INFORMATION SHEET

PROJECT NUMBER	15-070	PROJECT	Water Line Replacement
DATE	5-Mar-2016	LOCATION	Coast Guard Hay River
CLIENT	Coast Guard	SAMPLED BY	Mitchel Heron

#### MOISTURE CONTENT

BOREHOLE #	BH1	BH1	BH1	BH1	BH2	BH2
DEPTH (m)	0-1.5m	1.5-3.0m	3.0-4.5m	4.5-6.0m	0-1.5m	1.5-3.0m
SAMPLE #	1	2	3	4	5	6
MASS OF MOIST SAMPLE + PAN (g)	1285.80	63.55	61.92	60.21	64.16	62.37
MASS OF DRY SAMPLE + PAN (g)	1162.9	55.4	53.0	50.6	52.4	53.6
MASS OF WATER (g)	122.9	8.1	8.9	9.6	11.8	8.8
MASS OF PAN (g)	396.10	20.64	20.76	20.74	20.98	20.83
MASS OF DRY SAMPLE (g)	766.8	34.8	32.3	29.9	31.4	32.8
MOISTURE CONTENT (%)	16.0	23.4	27.6	32.1	37.6	26.7

BOREHOLE #	BH2	BH2				
DEPTH (m)	3.0-4.5m	4.5-6.0m				
SAMPLE #	7	8				
MASS OF MOIST SAMPLE + PAN (g)	61.63	60.72				
MASS OF DRY SAMPLE + PAN (g)	53.3	51.0				
MASS OF WATER (g)	8.4	9.7				
MASS OF PAN (g)	20.75	20.99				
MASS OF DRY SAMPLE (g)	32.5	30.0				
MOISTURE CONTENT (%)	25.8	32.3				

BOREHOLE #						
DEPTH (m)						
SAMPLE #						
MASS OF MOIST SAMPLE + PAN (g)						
MASS OF DRY SAMPLE + PAN (g)						
MASS OF WATER (g)						
MASS OF PAN (g)						
MASS OF DRY SAMPLE (g)						
MOISTURE CONTENT (%)						

The testing services reported herein have been performed in accordance with the indicated recognized standard, or in accordance with local industry practice. This report is for the sole use of the designated client. This report constitutes a testing service only and does not represent any results interpretation or opinion regarding specification compliance or material suitability. Engineering interpretation can be provided by Maskwa Engineering Ltd. upon request.

# ATTERBERG LIMITS

## LABORATORY REPORT

ASTM D4318



**Project:** Coast Guard Water & Sewer  
Hay River Site  
**Project Number:** 15-070  
**Sample Descrip.:** clayey SILT

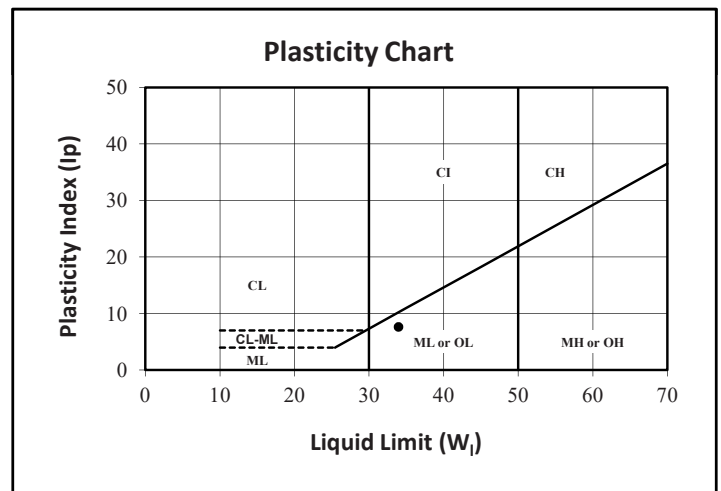
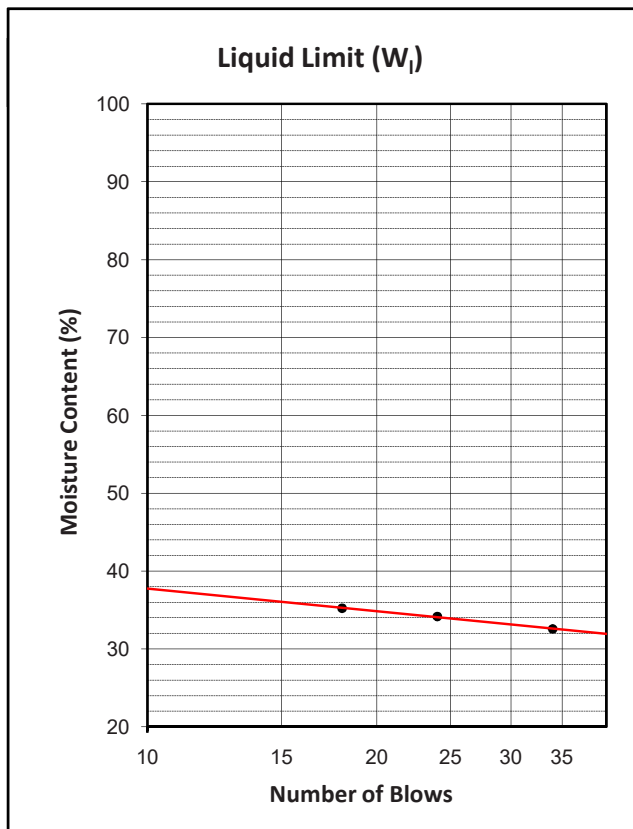
**Borehole Number:** BH01#4  
**Sample Location:** Entrance to yard  
**Depth:** 1.5-3.0  
**Date Sampled:** 1-Mar-16 **Sampled By:** MH  
**Date Tested:** 13-Mar-16 **Tested By:** MH

### Plastic Limit Test

Trial Number	1	2	Natural Moisture
Tare Number	41	11	18
Wt. Wet Soil + Tare	22.32	27.84	28.88
Wt. Dry Soil + Tare	20.48	24.89	25.66
Wt. of Tare	13.58	13.48	13.60
Wt. of Water	1.84	2.95	3.2
Wt. of Dry Soil	6.90	11.41	12.1
Moisture Content (%)	26.7	25.9	26.7

### Liquid Limit Test

Trial Number	1	2	3
No. of Blows	18	24	34
Tare Number	56	72	42
Wt. Wet Soil + Tare	30.95	31.78	30.72
Wt. Dry Soil + Tare	26.41	27.11	26.48
Wt. of Tare	13.53	13.45	13.47
Wt. of Water	4.54	4.67	4.24
Wt. of Dry Soil	12.88	13.66	13.01
Moisture Content (%)	35.2	34.2	32.6




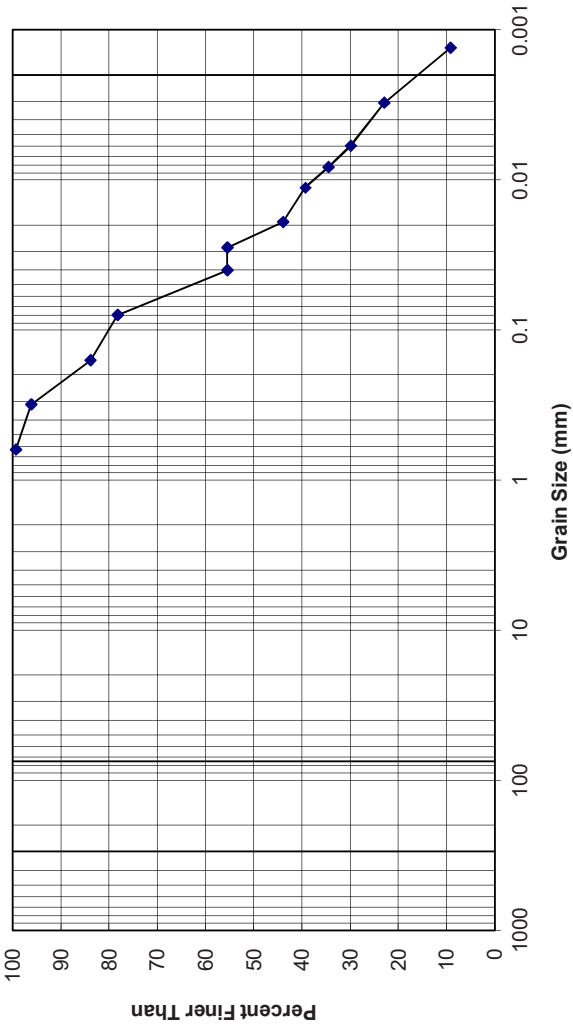
Natural Moisture (%) 26.70  
Liquid Limit (%) 33.92  
Plastic Limit (%) 26.26  
PLASTICITY INDEX (%) 7.7

**Soil Description:** Medium Plasticity

**USCS Symbol:** CI

### Remarks:

NOTE: Data presented hereon is for the sole use of the stipulated client. Maskwa is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of Maskwa. The testing services reported herein have been performed by a Maskwa technician to recognized industry standards, unless otherwise noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability.

<div><div><div><div>Grain Size Analysis</div><div>(Mechanical &amp; Hydrometer)</div><div>ASTM D422</div></div></div></div> <div><div>Project : 15-070</div><div>Sample No. 04</div></div>		<div><div>Depth 1.5-3.0</div><div>Source: BH02</div><div>Description of Sample: Clayey SILT</div><div>Date Sampled: March 2, 2015</div></div>	<div><div>Grain Size Analysis Results:</div><table><thead><tr><th>Opening (mm)</th><th>Percent Passing (%)</th></tr></thead><tbody><tr><td>2.00</td><td>100.0</td></tr><tr><td>1.25</td><td>99.9</td></tr><tr><td>0.63</td><td>99.4</td></tr><tr><td>0.315</td><td>96.2</td></tr><tr><td>0.160</td><td>83.9</td></tr><tr><td>0.080</td><td>78.3</td></tr><tr><td>0.040</td><td>55.5</td></tr><tr><td>0.028</td><td>55.5</td></tr><tr><td>0.019</td><td>43.9</td></tr><tr><td>0.011</td><td>39.3</td></tr><tr><td>0.008</td><td>34.5</td></tr><tr><td>0.006</td><td>29.9</td></tr><tr><td>0.003</td><td>23.0</td></tr><tr><td>0.001</td><td>9.2</td></tr></tbody></table></div>	Opening (mm)	Percent Passing (%)	2.00	100.0	1.25	99.9	0.63	99.4	0.315	96.2	0.160	83.9	0.080	78.3	0.040	55.5	0.028	55.5	0.019	43.9	0.011	39.3	0.008	34.5	0.006	29.9	0.003	23.0	0.001	9.2
Opening (mm)	Percent Passing (%)																																
2.00	100.0																																
1.25	99.9																																
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<div><div>Grain Size Analysis</div><table><thead><tr><th colspan="2">GRAVEL</th><th colspan="2">SAND</th><th colspan="2">SILT</th><th>CLAY</th></tr><tr><th>Coarse</th><th>Fine</th><th>Coarse</th><th>Medium</th><th>Fine</th><th></th><th></th></tr></thead><tbody><tr><td colspan="2">% Gravel</td><td colspan="2">% Sand</td><td colspan="2">% Silt</td><td>% Clay</td></tr><tr><td colspan="2"></td><td colspan="2">25.2</td><td colspan="2">60.4</td><td>14.5</td></tr></tbody></table></div>			GRAVEL		SAND		SILT		CLAY	Coarse	Fine	Coarse	Medium	Fine			% Gravel		% Sand		% Silt		% Clay			25.2		60.4		14.5	<div>Comments:</div>		
GRAVEL		SAND		SILT		CLAY																											
Coarse	Fine	Coarse	Medium	Fine																													
% Gravel		% Sand		% Silt		% Clay																											
		25.2		60.4		14.5																											
Natural water content 26.8																																	
Reviewed by:																																	

