

May 27, 2013

Mr. Leonard Avery, P.Eng.

Heritage Gas

200-238 Brownlow Avenue

Dartmouth, NS B3B 1Y2

Dear Mr. Avery,

**Re: Geotechnical Investigation, Phase 3 – New Glasgow Pipeline
Pictou County, Nova Scotia**

This is our report on the Phase 3 Geotechnical Investigation conducted for the proposed Natural Gas Pipeline in Pictou County, Nova Scotia. The field program consisted of nine boreholes (BH3.2 to BH3.11, excluding BH3.10), seven test pits (TP1 to TP10, excluding TP2, TP3, and TP4), and wetland probes for eight locations (P1 to P8), completed from April 26 to May 16, 2013.

The subsurface conditions in the boreholes consisted of rootmat over compact to dense till then bedrock (mudstone, conglomerate, and sandstone/siltstone). Bedrock was encountered at each borehole. Bedrock consists of a weak mudstone (easily cored), conglomerate, or medium strong sandstone. Compressive strength analysis of the bedrock for 17 samples tested ranged from 3.0 MPa, to 137.4 MPa, with an average of 46.8 MPa.

Wetland depths were probed to refusal. Wetland depths were generally shallow (< 1.0 m). Begg Brook had a silty bottom. Refusal was encountered from 0.3 m to 0.7 m within the silt layer. Middle River has a rocky bottom with no apparent silt layer.

Hydrocarbon analysis along the abandoned rail bed was below RBCA Tier 1 Guidelines. Hydrocarbons were not detected in TP7, except a very low detectible concentration at a 1 m depth. Hydrocarbons were not detected in TP8. Analysis for metals from samples obtained from TP7 and TP8 were below CCME guidelines

Table A: Summary of Borehole Findings

Borehole	Thickness of Rootmat/Topsoil (m)	Thickness of Till (m)	Bedrock Depth (m)	RQD Min/Max	Compressive Strength (MPa)
BH 3.2	0.2	7.1	7.3	73% / 88%	12.8 (7.9 m) 52.9 (9.4 m)
BH 3.3	0.2	8.1	8.3	67% / 97%	26.7 (9.7 m) 35.1 (10.7 m)
BH 3.4	0.2	3.5	3.7	0% / 98%	137.4 (6.7 m) 19.9 (16.7 m)
BH 3.5	0.1	10.7	10.8	0% / 85%	70.3 (12.8)
BH 3.6	0.2	10.0	10.1	10% / 82%	28.5 (17.2 m) 59.5 (18.3 m)
BH 3.7	0.3	3.8	5.3	0% / 95%	84.4 (7.6 m) 42.6 (12.2 m)
BH 3.8	0.3	2.6	3.8	11% / 93%	62.0 (6.7 m) 50.7 (12.2 m)
BH 3.9	0.3	4.0	4.3	0% / 97%	54.5 (11.8 m) 35.6 (12.8 m)
BH 3.11	-	1.1	4.3	22% / 73%	19.2 (7.2 m) 3.0 (9.1 m)

Table B: Summary of Test Pit Findings

Test Pit	Thickness of Rootmat/Topsoil and Fill (m)	Thickness of Till (m)	Bedrock Depth (m)	Groundwater Depth
TP1	0.4	2.0	2.4	moderate seepage at 1.4 m
TP5	0.3	> 3.7	-	moderate seepage at 2.1 m
TP6	0.4	> 3.2	-	slight seepage at 1.4 m
TP7	1.6	1.9	3.5	heavy seepage at 1.2 m
TP8	1.2	> 1.4	-	heavy seepage at 1.2 m
TP9	0.4	> 3.6	-	slight seepage at 1.0 m
TP10	0.4	3.6	-	no groundwater seepage observed

Table C: Summary of Wetland Findings

Wetland	Depth to Refusal Min/Max (m)
P1	0.15m / 0.5 m
P2	0.2 m / 0.4 m
P3 (Middle River)	1.8 m / 2.4 m (from top of water)
P4	0 m / 1.0 m
P5	0 m / 0.3 m
P6	0.15 m / 0.5 m
P7 (Begg Brook)	0.4 m / 1.0 m (from top of water) 0.3 m to 0.7 m of silt
P8	0.2 m / 0.6 m

Please contact us if you require additional information.

Thank you,



Glenn Graham, P.Eng.
Geotechnical Engineer
ggraham@conquest-eng.com
Project No. 533-003

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1.0 INTRODUCTION

We have conducted Phase 3 of the Geotechnical Investigation for the proposed natural gas pipeline in Pictou County, NS at the request of Heritage Gas. The purpose of this investigation was to evaluate the subsurface conditions on the site, and to provide a factual report of our findings.

2.0 SITE DESCRIPTION AND GEOLOGY

Boreholes 3.2 and 3.3 are located along the power transmission line right of way near West River East Side Road in Alma, NS. Borehole 3.4 is located along Middle River. Boreholes 3.5 to 3.8 and 3.11 are located along secondary highways in Alma (Grant Road, Mt. William Road) and along an abandoned rail line. Borehole 3.9 is located off the TransCanada 106 right of way.

The borehole locations along the power transmission line right of way (BH3.2 to TP5) are predominantly cleared with some overgrown brush (alders) present. The borehole locations in Alma and along TransCanada 106 were predominantly wooded (alders/small trees).

Geological mapping shows the principal soil type as glacial till. Geological mapping shows the bedrock as fluvial sandstone or conglomerate which is part of the Pictou Group, Cumberland Group, and Mabou Group.

3.0 SUBSURFACE CONDITIONS

The field program consisted of nine boreholes (BH3.2 to BH3.11, excluding BH3.10), seven test pits (TP1 to TP10, excluding TP2, TP3, and TP4), and wetland probes for eight locations (P1 to P8), completed from April 26 to May 16, 2013. A complete location plan of the test locations is shown in Drawing 1 in the appendix.

The boreholes were drilled using a track mounted drill rig. The test pits were dug using an excavator or backhoe. Representative samples were taken during the field work and the conditions at the boreholes were logged in detail. The soil and groundwater conditions encountered at the site are described in detail on the appended Borehole Records and summarized in the following paragraphs and Table A and Table B.

Wetland depths were probed to refusal. The summary of wetland probe depths is shown in Table C. Begg Brook had a silty bottom. Refusal was encountered from 0.3 m to 0.7 m within the silt layer. Middle River has a rocky bottom with no apparent silt layer.

The subsurface conditions in the boreholes and test pits consisted of rootmat over typically compact to dense till then bedrock (mudstone, conglomerate, and sandstone/siltstone). Bedrock was encountered at each borehole. Test Pits (TP7 and TP8) and boreholes (BH11) along the abandoned rail line show fill over till then bedrock. The subsurface conditions at the location of TP7 and TP8 were wet and loose, with the sides of TP8 caving in.

Bedrock consists of a weak mudstone (easily cored), conglomerate, or medium strong sandstone. Compressive strength analysis of the bedrock for seventeen samples tested ranged from 3.0 MPa, to 137.4 MPa, with an average of 46.8 MPa.

Grainsize analysis was completed on four borehole samples with percentages of gravel ranging from 14% to 45%, sand ranged from 19% to 43%, and silty/clay ranged from 23% to 67%. Grainsize analysis was completed on two test pit samples with percentages of gravel ranging from 11% to 32%, sand ranged from 25% to 32%, and silt/clay ranged from 43% to 57%. Atterburg Limits was completed on the four borehole samples and showed the fines portion to generally be silty clay.

Hydrocarbon analysis along the abandoned rail bed was below RBCA Tier 1 Guidelines. Hydrocarbons were not detected in TP7, except a very low detectable concentration at a 1 m depth. Hydrocarbons were not detected in TP8. Analysis for metals from samples obtained from TP7 and TP8 were below CCME guidelines, except a slightly elevated level of Arsenic in TP7 at a depth of 4.0 m. Table D shows the results of hydrocarbon analysis. Table E shows the results of analysis for metals.

Table A: Summary of Borehole Findings

Borehole	Thickness of Rootmat/Topsoil (m)	Thickness of Till (m)	Bedrock Depth (m)	RQD Min/Max	Compressive Strength MPa (Depth)
BH 3.2	0.2	7.1	7.3	73% / 88%	12.8 (7.9 m) 52.9 (9.4 m)
BH 3.3	0.2	8.1	8.3	67% / 97%	26.7 (9.7 m) 35.1 (10.7 m)
BH 3.4	0.2	3.5	3.7	0% / 98%	137.4 (6.7 m) 19.9 (16.7 m)
BH 3.5	0.1	10.7	10.8	0% / 85%	70.3 (12.8)
BH 3.6	0.2	10.0	10.1	10% / 82%	28.5 (17.2 m) 59.5 (18.3 m)
BH 3.7	0.3	3.8	5.3	0% / 95%	84.4 (7.6 m) 42.6 (12.2 m)
BH 3.8	0.3	2.6	3.8	11% / 93%	62.0 (6.7 m) 50.7 (12.2 m)
BH 3.9	0.3	4.0	4.3	0% / 97%	54.5 (11.8 m) 35.6 (12.8 m)
BH 3.11	-	1.1	4.3	22% / 73%	19.2 (7.2 m) 3.0 (9.1 m)

Table B: Summary of Test Pit Findings

Test Pit	Thickness of Rootmat/Topsoil and Fill (m)	Thickness of Till (m)	Bedrock Depth (m)	Groundwater Depth
TP1	0.4	2.0	2.4	moderate seepage at 1.4 m
TP5	0.3	> 3.7	-	moderate seepage at 2.1 m
TP6	0.4	> 3.2	-	slight seepage at 1.4 m
TP7	1.6	1.9	3.5	heavy seepage at 1.2 m
TP8	1.2	> 1.4	-	heavy seepage at 1.2 m
TP9	0.4	> 3.6	-	slight seepage at 1.0 m
TP10	0.4	3.6	-	no groundwater seepage observed

Table C: Summary of Wetland Findings

Wetland	Depth to Refusal Min/Max (m)
P1	0.15m / 0.5 m
P2	0.2 m / 0.4 m
P3 (Middle River)	1.8 m / 2.4 m (from top of water)
P4	0 m / 1.0 m
P5	0 m / 0.3 m
P6	0.15 m / 0.5 m
P7 (Begg Brook)	0.4 m / 1.0 m (from top of water) 0.3 m to 0.7 m of silt
P8	0.2 m / 0.6 m

4.0 ENVIRONMENTAL SUMMARY

Samples were obtained from TP7 and TP8 for environmental testing for hydrocarbons and metals. Table D summarizes the results.

Table D: Summary of Hydrocarbon Analysis

Sample ID	Unit	Benzene	Toluene	Ethyl benzene	Xylene	C6-C10 (less BTEX)	<C10-C16 Hydrocarbons	<C16-C21 Hydrocarbons	<C21-<C32 Hydrocarbons	Modified TPH (Tier 1)
TP7-SA1 (0.3 m)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP7-SA2 (1.0 m)	mg/kg	ND	ND	ND	ND	ND	ND	ND	28	28
TP7-SA3 (2.0 m)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP7-SA4 (3.0 m)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP7-SA5 (4.0 m)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP8-SA1 (0.3 m)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
TP8-SA2 (1.0 m)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND
RBCA Tier 1 Guidelines (Commercial - Potable)	mg/kg	33	0.094	0.74	0.13	22	1,900	4,700	10,000	

Table E: Summary of Metals Analysis

Metal	Units	TP7-SA1 (0.3 m)	TP7-SA2 (1.0 m)	TP7-SA3 (2.0 m)	TP7-SA4 (3.0 m)	TP7-SA5 (4.0 m)	TP8-SA1 (0.3 m)	TP8-SA2 (1.0 m)	CCME Guidelines
Aluminum	mg/kg	15000	16000	6100	8200	15000	14000	6800	-
Antimony	mg/kg	ND	ND	ND	ND	ND	ND	ND	40
Arsenic	mg/kg	11	9.7	ND	3.2	17	7.6	3.6	12
Barium	mg/kg	36	460	99	130	60	79	220	2000
Beryllium	mg/kg	ND	ND	ND	ND	ND	ND	ND	8
Bismuth	mg/kg	ND	ND	ND	ND	ND	ND	ND	-
Boron	mg/kg	ND	ND	ND	ND	ND	ND	ND	-
Cadmium	mg/kg	ND	0.51	ND	ND	0.60	ND	0.35	22
Chromium	mg/kg	28	25	14	18	27	22	17	87
Cobalt	mg/kg	16	12	6.0	9.8	15	12	10	300
Copper	mg/kg	20	19	13	20	30	21	16	91
Iron	mg/kg	34000	22000	11000	23000	34000	26000	21000	-
Lead	mg/kg	200	69	22	31	180	56	26	260
Lithium	mg/kg	26	34	16	20	28	26	21	-
Manganese	mg/kg	760	1400	120	770	730	920	530	-
Mercury	mg/kg	ND	0.12	ND	ND	ND	ND	ND	-
Molybdenum	mg/kg	ND	ND	ND	ND	ND	ND	ND	40
Nickel	mg/kg	42	35	17	34	41	24	25	50
Rubidium	mg/kg	5.3	13	5.8	7.7	7.2	8.9	6.7	-
Selenium	mg/kg	ND	ND	ND	ND	ND	ND	ND	2.9
Silver	mg/kg	ND	ND	ND	ND	ND	ND	ND	40
Strontium	mg/kg	ND	15	10	19	ND	ND	22	-
Thallium	mg/kg	ND	0.16	ND	ND	ND	0.11	ND	1
Tin	mg/kg	ND	ND	ND	ND	ND	ND	ND	300
Uranium	mg/kg	0.65	2.1	3.8	1.4	0.93	0.59	1.0	33
Vanadium	mg/kg	16	22	13	17	17	20	16	130
Zinc	mg/kg	110	130	52	89	170	92	88	360

5.0 CLOSURE

If there are changes to the proposed work we require that we be notified to allow for review of our recommendations.

A field investigation is a limited sampling of a site. Some variation between sampling locations should be expected. If the conditions encountered are significantly different than described in this report, we request that we be notified immediately.

This report was completed for the sole benefit of Heritage Gas. Any other person or entity may not rely on this report without the express written consent of Conquest Engineering Ltd. This report was written by Glenn Graham, P.Eng. and reviewed by Bruce MacNeil, P.Eng.



Glenn Graham, P.Eng
Geotechnical Engineer
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R. Bruce MacNeil, P.Eng
Senior Geotechnical Engineer
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BOREHOLE RECORD

Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

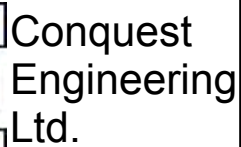
Borehole No.: 3.2

Page: 1 of 2

Date Drilled: May 7, 2013

Datum: -

Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%) Wp ---O--- WL 5 15 25 35 45	SPT (N) Blows/300mm 5 15 25 35 45
0		SS	1	350	3		ROOTMAT/TOPSOIL: TILL: Loose reddish brown silty clayey sand with gravel			
1		SS	2	300	9		TILL: Compact reddish brown sandy silty clay			
2		SS	3	350	24					
3	▼	SS	4	300	9					
4		SS	5	NR	19					
5										
6		SS	6	NR	19					
7										
8		SS	7	25	50-50mm		BEDROCK: Reddish brown fine grained sandstone - sound to fractured			
9		NQ	8	1520	88%					
10		NQ	9	1520	73%		- Conglomerate from 9.6 m to 10.4 m			



Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

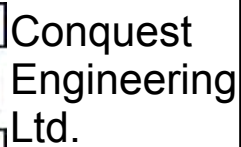
Borehole No.: 3.2

Page: 2 of 2

Date Drilled: May 7, 2013

Datum: -

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Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

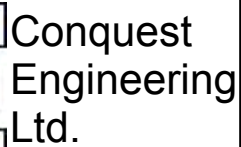
Borehole No.: 3.3

Page: 1 of 2

Date Drilled: April 27, 2013

Datum: -

Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%)					
									○	Wp	---○---	WL	○	
									5	15	25	35	45	
									SPT (N)					
									■	Blows/300mm			■	
									5	15	25	35	45	
0	▼	SS	1	100	2		ROOTMAT/TOPSOIL: TILL: Loose to dense reddish brown sandy silty clay							
1														
2		SS	2	175	4									
3														
4														
5		SS	3	350	14									
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8		SS	4	225	17									
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10		SS	5	375	43		- cobbles							
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Project Name: Propsoed Natural Gas Pipeline - Phase 3
Project No.: 533-003
Client: Heritage Gas
Location: Pictou County
Water Level Date: -

Datum: -

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BOREHOLE RECORD

Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

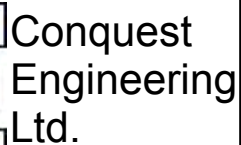
Borehole No.: 3.4

Page: 1 of 2

Date Drilled: May 8, 2013

Datum: -

Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%) Wp ---O--- WL 5 15 25 35 45	SPT (N) Blows/300mm 5 15 25 35 45
0		SS	1	350	2		ROOTMAT/TOPSOIL: TILL: Loose reddish brown sandy silty clay			
1		SS	2	300	21		TILL: Compact to dense brown to reddish brown silty clayey sand with gravel			
2		SS	3	350	47		- grey sandstone cobbles			
3		SS	4	400	31					
		SS	5	450	41					
4		NQ	6	125	0%		BEDROCK: Reddish brown sandstone - highly fractured to very sound			
5		NQ	7	1520	13%		- reddish brown conglomerate poorly consolidated			
6										
7		NQ	8	1520	45%					
8		NQ	9	1370	33%					
9										
10		NQ	10	1140	28%					



Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

Borehole No.: 3.4

Page: 2 of 2

Date Drilled: May 8, 2013

Datum: -

Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%)				
									○	Wp	---O---	WL	○
									5	15	25	35	45
									SPT (N)				
									■	Blows/300mm			■
									5	15	25	35	45
11 													



**Conquest
Engineering
Ltd.**

BOREHOLE RECORD

Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

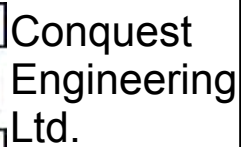
Borehole No.: 3.5

Page: 1 of 2

Date Drilled: May 9, 2013

Datum: -

Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%) Wp ---O--- WL 5 15 25 35 45	SPT (N) Blows/300mm 5 15 25 35 45
0		SS	1	200	6		ROOTMAT/TOPSOIL: TILL: Loose to compact light brown to reddish brown silty gravel			
1		SS	2	225	20					
2		SS	3	350	33		TILL: Compact to dense reddish brown sandy silty clay with gravel			
3		SS	4	125	53		- cobbles			
4		SS	5	375	20					
5		SS	6	325	27					
6		SS	7	500	22					
7		NQ	8	150	0%					
8		NQ	9	350	0%		- cobbles			
9		SS	10	525	46					
10		SS	11	525	36					



Datum: -

[illegible]



BOREHOLE RECORD

Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

Borehole No.: 3.6

Page: 1 of 2

Date Drilled: May 8, 2013

Datum: -

Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%) Wp ---O--- WL	SPT (N) Blows/300mm
0		SS	1	425	4		ROOTMAT/TOPSOIL:			
1							TILL: Loose to compact reddish brown silty clayey sand with gravel			
2		SS	2	400	18					
3		SS	3	450	15					
4										
5		SS	4	350	14					
6										
7		SS	5	375	26					
8										
9		SS	6	475	55		TILL: Dense grey silty gravel			
10		SS	7	50	50-50mm					



BOREHOLE RECORD

Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

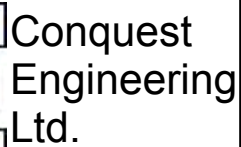
Borehole No.: 3.7

Page: 1 of 2

Date Drilled: May 10, 2013

Datum: -

Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%) Wp ---O--- WL	SPT (N) Blows/300mm
0							ROOTMAT/TOPSOIL:			
		SS	1	425	3		FILL: Loose dark brown sandy silty clay - some organics			
1		SS	2	250	1					
2							TILL: Loose to dense reddish brown sandy silty clay			
		SS	3	200	90-430mm		- light brown weathered sandstone			
3										
4		SS	4	200	14					
							- grey weathered sandstone			
5		SS	5	425	68					
		NQ	6	425	0%		BEDROCK: Reddish brown sandstone - very severely fractured to very sound			
6										
7		NQ	7	1520	68%					
8										
		NQ	8	1520	88%					
9										
10		NQ	9	1520	63%					



Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

Borehole No.: 3.7

Page: 2 of 2

Date Drilled: May 10, 2013

Datum: -

Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%)					
									○	Wp	---○---	WL	○	
									5	15	25	35	45	
									SPT (N)					
									■	Blows/300mm			■	
									5	15	25	35	45	
11							- reddish brown with grey sandstone							
		NQ	10	1520	88%									
12							- greyish brown sandstone with trace fossils							
		NQ	11	1520	95%									
13														
14							END OF BOREHOLE AT 13.7 m							
15														
16														
17														
18														
19														
20														



BOREHOLE RECORD

Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

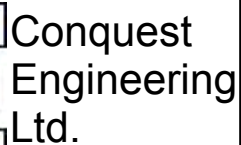
Borehole No.: 3.8

Page: 1 of 2

Date Drilled: May 14, 2013

Datum: -

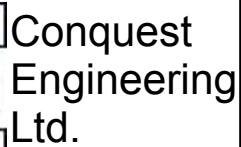
Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%) Wp ---O--- WL	SPT (N) Blows/300mm
0		SS	1	500	6		ROOTMAT/TOPSOIL:		5 15 25 35 45	5 15 25 35 45
1							FILL: Loose reddish brown silty clayey sand with gravel			
2		SS	2	300	37		TILL: Compact to dense reddish brown sandy silty clay with gravel			
3		SS	3	425	63					
4		SS	4	375	92					
5		NQ	5	835	11%		BEDROCK: Reddish brown conglomerate and siltstone - very severely fractured to very sound			
6		NQ	6	1520	50%					
7		NQ	7	1270	47%					
8		NQ	8	1520	52%					
9										
10		NQ	9	1520	73%					



Project Name: Propsoed Natural Gas Pipeline - Phase 3
Project No.: 533-003
Client: Heritage Gas
Location: Pictou County
Water Level Date: -

Datum: -

Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%)						
									○	Wp ---O--- WL			○		
									5	15	25	35	45		
									SPT (N)						
									■	Blows/300mm			■		
									5	15	25	35	45		
10 11 12 13 14 15 16 17 18			9		73%										
		NQ	10	1520	73%										
		NQ	11	1520	80%										
		NQ	12	1520	93%										
		NQ	13	1520	90%										
		NQ	14	1520	93%										
19							END OF BOREHOLE AT 18.4 m								
20															



Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

Borehole No.: 3.9

Page: 1 of 3

Date Drilled: May 15, 2013

Datum: -

[illegible]



BOREHOLE RECORD

Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

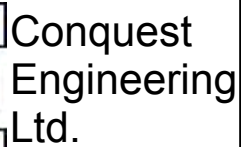
Borehole No.: 3.9

Page: 2 of 3

Date Drilled: May 15, 2013

Datum: -

Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%) Wp ---O--- WL	SPT (N) Blows/300mm
									5 15 25 35 45	5 15 25 35 45
11		NQ	9	1520	13%		- clay seam			
12		NQ	10	1520	63%		- reddish brown mudstone			
13							- reddish brown sandstone			
14		NQ	11	1520	70%					
15		NQ	12	1520	45%		- clay seam			
16							- reddish brown siltstone			
17		NQ	13	1520	93%		- reddish brown coarse sandstone			
18							- reddish brown fine sandstone			
19							- reddish brown sandstone			
20		NQ	15	1520	97%					



Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

Borehole No.: 3.9

Page: 3 of 3

Date Drilled: May 15, 2013

Datum: -

Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%)									
									○	Wp	○	WL	○					
									5	15	25	35	45					
									SPT (N)									
									■	Blows/300mm			■					
									5	15	25	35	45					
																		
							END OF BOREHOLE AT 18.4 m											
21																		
22																		
23																		
24																		
25																		
26																		
27																		
28																		
29																		
30																		



BOREHOLE RECORD

Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

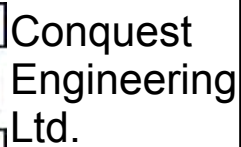
Borehole No.: 3.11

Page: 1 of 2

Date Drilled: May 15, 2013

Datum: -

Depth (m)	Water Level (m)	Sample Type	Sample Number	Recovery (mm)	N Value or RQD %	Symbols	SOIL AND/OR ROCK DESCRIPTION	Elevation (m)	Moisture Content (%) Wp ---O--- WL 5 15 25 35 45	SPT (N) Blows/300mm 5 15 25 35 45
0		SS	1	350	7		FILL: Loose to compact black to brown silty clayey sand with gravel			
1		SS	2	150	2					
		SS	3	200	4					
2										
		SS	4	50	24		- some cobbles			
3		SS	5	300	36		TILL: Dense reddish brown silty clayey sand with gravel - some cobbles			
4										
5		NQ	6	1370	22%		BEDROCK: Reddish brown conglomerate - very severely fractured to fractured			
6		NQ	7	1520	73%					
7										
		NQ	8	1520	60%					
8										
9		NQ	9	1520	73%					
10							END OF BOREHOLE AT 9.9 m			



Project Name: Propsoed Natural Gas Pipeline - Phase 3

Project No.: 533-003

Client: Heritage Gas

Location: Pictou County

Water Level Date: -

Borehole No.: 3.11

Page: 2 of 2

Date Drilled: May 15, 2013

Datum: -

[illegible]



TEST PIT RECORD

Project Name: Proposed Natural Gas Pipeline - Phase 3

Location: Pictou County

Project No.: 533-003

Client: Heritage Gas

Water Level: May 9, 2013

Test Pit: 1

Sheet: 1 of 1

Date: May 9, 2013

Datum: -

SUBSURFACE PROFILE

SAMPLE

Depth (m)	Symbol	Soil and/or Rock Description	Water Level (m)	Type	Number	Comments
0		Ground Surface				
		ROOTMAT/TOPSOIL:				
1		TILL: Compact reddish brown silty clayey sand with gravel				
2				BS	1	
3		END OF TEST PIT Excavator refusal on inferred bedrock Moderate seepage at 1.4 m				
4						
5						
6						
7						
8						
9						
10						



TEST PIT RECORD

Project Name: Proposed Natural Gas Pipeline - Phase 3

Location: Pictou County

Project No.: 533-003

Client: Heritage Gas

Water Level: May 9, 2013

Test Pit: 5

Sheet: 1 of 1

Date: May 9, 2013

Datum: -

SUBSURFACE PROFILE			SAMPLE			Comments
Depth (m)	Symbol	Soil and/or Rock Description	Water Level (m)	Type	Number	
0		Ground Surface				
		ROOTMAT/TOPSOIL:				
		TILL: Compact reddish brown sandy silty clay with gravel				
1						
2			▼	BS	1	
3						
4				BS	1	
		END OF TEST PIT Moderate seepage at 2.1 m				
5						
6						
7						
8						
9						
10						



TEST PIT RECORD

Project Name: Proposed Natural Gas Pipeline - Phase 3

Location: Pictou County

Project No.: 533-003

Client: Heritage Gas

Water Level: May 9, 2013

Test Pit: 6

Sheet: 1 of 1

Date: May 9, 2013

Datum: -

SUBSURFACE PROFILE			SAMPLE			Comments
Depth (m)	Symbol	Soil and/or Rock Description	Water Level (m)	Type	Number	
0		Ground Surface				
		ROOTMAT/TOPSOIL:				
1		TILL: Compact to dense reddish brown sandy silty clay with gravel		BS	1	
2		- some cobbles - trace boulders (nominal size 0.3 m)				
3				BS	1	
4		END OF TEST PIT Slight seepage at 1.4 m				
5						
6						
7						
8						
9						
10						



TEST PIT RECORD

Project Name: Proposed Natural Gas Pipeline - Phase 3

Location: Pictou County

Project No.: 533-003

Client: Heritage Gas

Water Level: May 9, 2013

Test Pit: 7

Sheet: 1 of 1

Date: May 9, 2013

Datum: -

SUBSURFACE PROFILE			SAMPLE			Comments
Depth (m)	Symbol	Soil and/or Rock Description	Water Level (m)	Type	Number	
0		Ground Surface				
		FILL: Loose dark brown with black sand with gravel				
1		FILL: Loose to compact dark brown silty clayey sand with gravel - organics (tree limbs, roots)	▼			
2		TILL: Compact to dense reddish brown silty clayey sand with gravel - some cobbles - trace boulders (nominal size 0.3 m)		BS	1	
3						
4		END OF TEST PIT Excavator refusal on inferred bedrock at 3.5 m Heavy seepage at 1.2 m				
5						
6						
7						
8						
9						
10						



TEST PIT RECORD

Project Name: Proposed Natural Gas Pipeline - Phase 3

Location: Pictou County

Project No.: 533-003

Client: Heritage Gas

Water Level: May 9, 2013

Test Pit: 8

Sheet: 1 of 1

Date: May 9, 2013

Datum: -

SUBSURFACE PROFILE			SAMPLE			Comments
Depth (m)	Symbol	Soil and/or Rock Description	Water Level (m)	Type	Number	
0		Ground Surface				
0		FILL: Loose reddish brown silty clayey sand with gravel				
1		- organics (tree limbs, roots)				
1		TILL: Very loose reddish brown silty clayey sand with gravel	▼			
2						
3		END OF TEST PIT Sides of the excavation caving in Heavy seepage at 1.2 m				
4						
5						
6						
7						
8						
9						
10						



TEST PIT RECORD

Project Name: Proposed Natural Gas Pipeline - Phase 3

Location: Pictou County

Project No.: 533-003

Client: Heritage Gas

Water Level: May 9, 2013

Test Pit: 9

Sheet: 1 of 1

Date: May 9, 2013

Datum: -

SUBSURFACE PROFILE			SAMPLE			Comments
Depth (m)	Symbol	Soil and/or Rock Description	Water Level (m)	Type	Number	
0		Ground Surface				
		ROOTMAT/TOPSOIL				
		TILL: Loose to compact reddish brown silty clayey sand with gravel				
1		TILL: Stiff reddish brown sandy clay				
2						
3						
4		END OF TEST PIT Slight seepage at 1.0 m		BS	1	
5						
6						
7						
8						
9						
10						



TEST PIT RECORD

Project Name: Proposed Natural Gas Pipeline - Phase 3

Location: Pictou County

Project No.: 533-003

Client: Heritage Gas

Water Level: May 9, 2013

Test Pit: 10

Sheet: 1 of 1

Date: May 9, 2013

Datum: -

SUBSURFACE PROFILE			SAMPLE			Comments
Depth (m)	Symbol	Soil and/or Rock Description	Water Level (m)	Type	Number	
0		Ground Surface				
		ROOTMAT/TOPSOIL				
1		TILL: Stiff reddish brown sandy clay - trace boulders (nominal size 0.3m)				
2						
3						
4		END OF TEST PIT No groundwater seepage observed		BS	1	
5						
6						
7						
8						
9						
10						



Photograph 1: Test Pit 1. May 9, 2013.



Photograph 2: Test Pit 5. May 9, 2013.



Photograph 3: Test Pit 6. May 9, 2013



Photograph 4: Test Pit 7. May 9, 2013



Photograph 5: Test Pit 9. May 9, 2013.



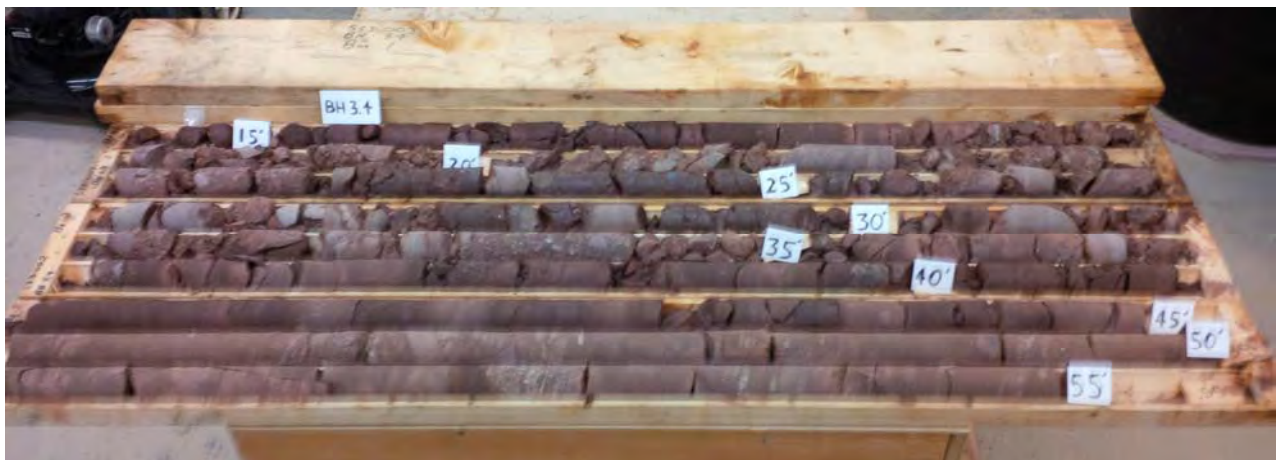
Photograph 6: Test Pit 10. May 9, 2013.



Photograph 7: Borehole 3.2



Photograph 8: Borehole 3.3



Photograph 9: Borehole 3.4



Photograph 10: Borehole 3.5



Photograph 11: Borehole 3.3



Photograph 12: Borehole 3.7



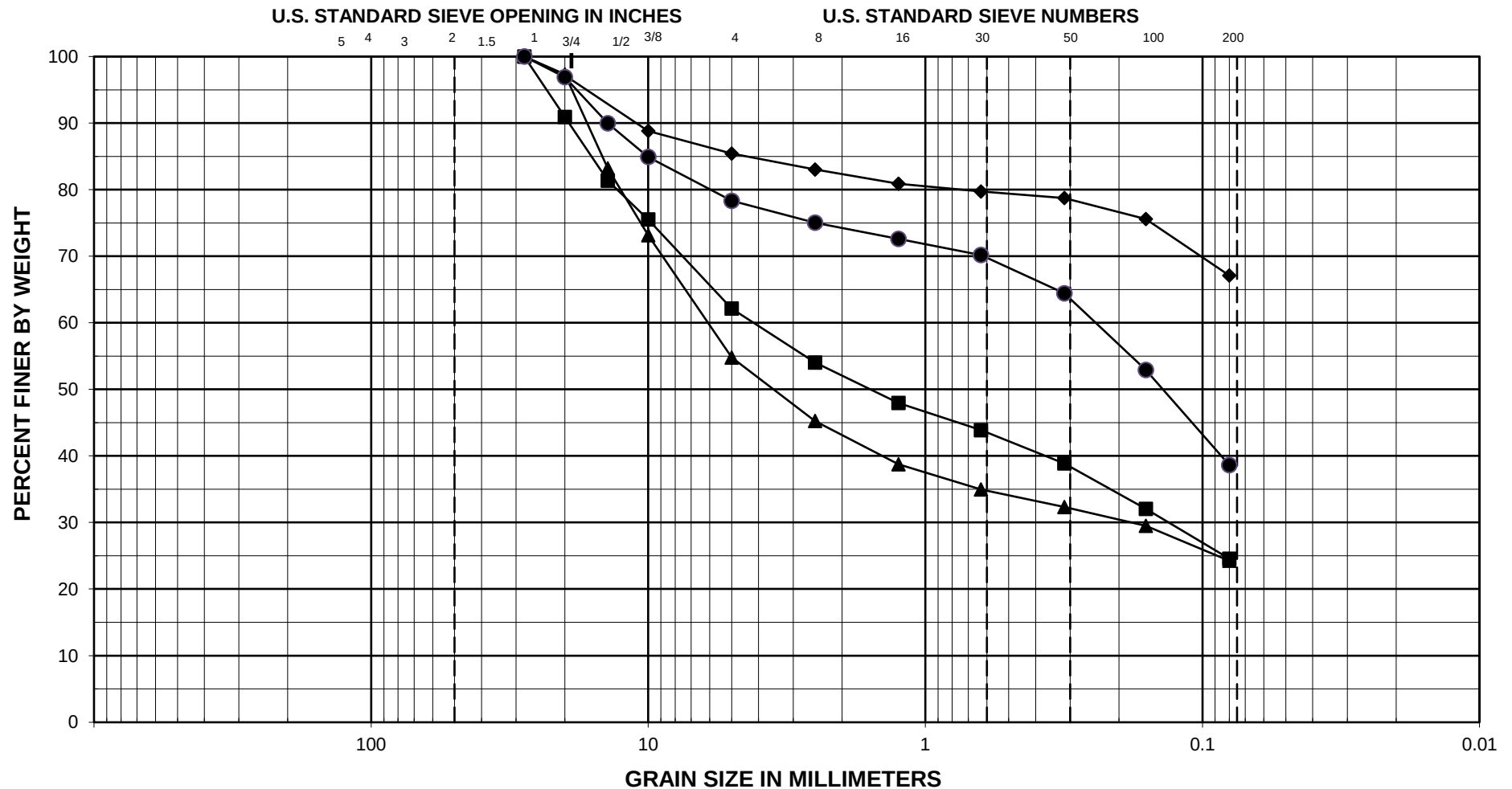
Photograph 13: Borehole 3.8



Photograph 14: Borehole 3.9



Photograph 15: Borehole 3.11



	Sample No.	Depth	Classification	w%	Cu	Cc	% Gravel	% Sand	% Silt and Clay
◆	BH-3.3, Sa.3	3.0 m	Sandy silty CLAY (CL-ML)	23%	NA	NA	14.6	18.7	66.7%
■	BH-3.4 Sa.3	1.0 m	Silty clayey SAND with gravel (SC-SM)	9%	NA	NA	37.9	38.5	23.6%
▲	BH 3.8 Sa. 4	3.2 m	Silty clayey GRAVEL with sand (GC-GM)	11%	NA	NA	45.2	31.4	23.4%
●	BH 3.9, Sa4	3.6 m	Silty clayey SAND with gravel (SC-SM)	13%	NA	NA	21.7	42.9	35.4%
○									



Project: Pipeline Phase 3 New Glasgow N.S.

Job No.: 533-001

Location: Borehole Locations

Date: 27-May-13

Notes:

SIEVE ANALYSIS



CONQUEST ENGINEERING LTD.

348 Bluewater Road, Bedford, NS, B4B 1J6 Phone: (902) 835-7313 Fax: (902) 835-1260

Client Name: Heritage Gas

Project Name: New Glasgow Pipeline Phase 3

Material Tested: BH-3.3, Sa.3

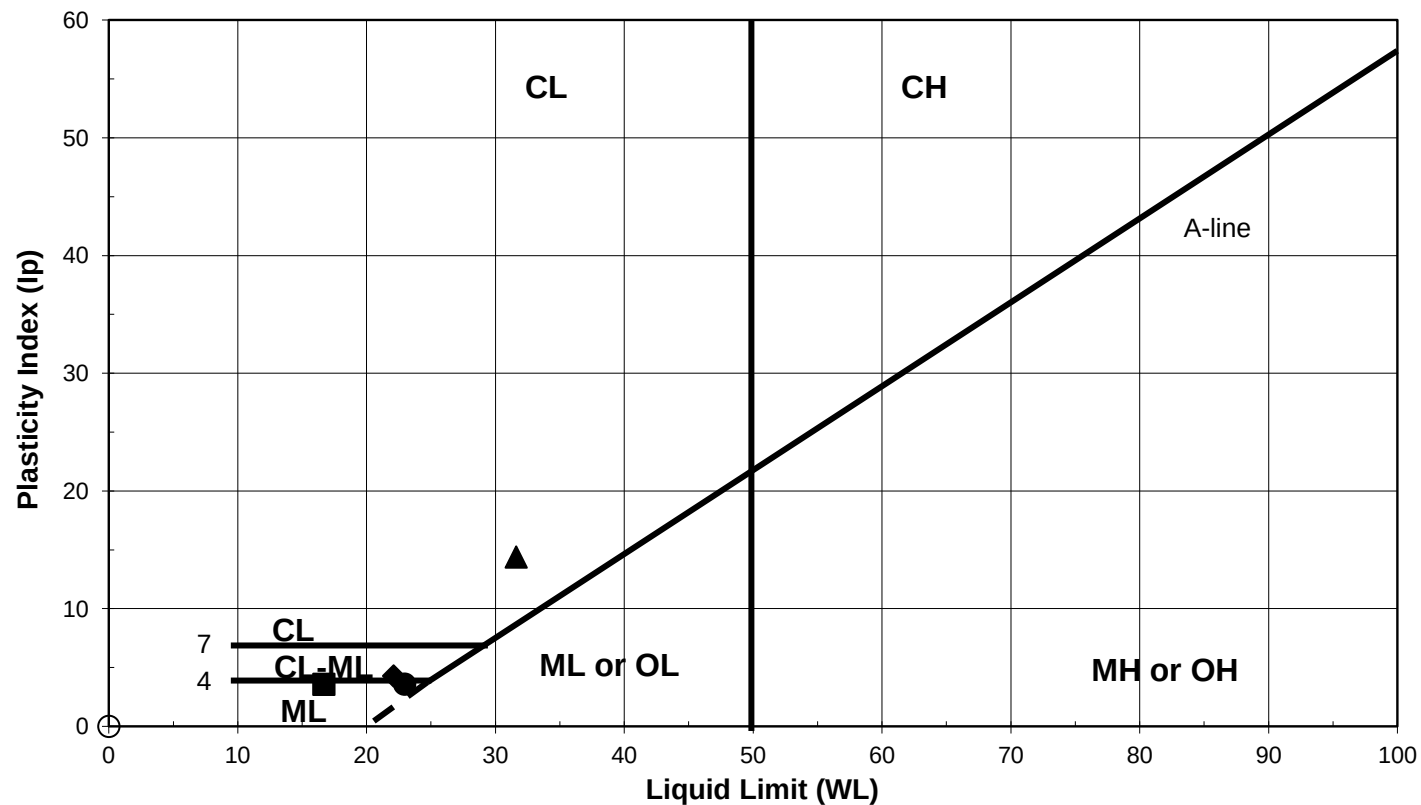
Site Sampled: Proposed Pipeline Route

Job No.: 533-002

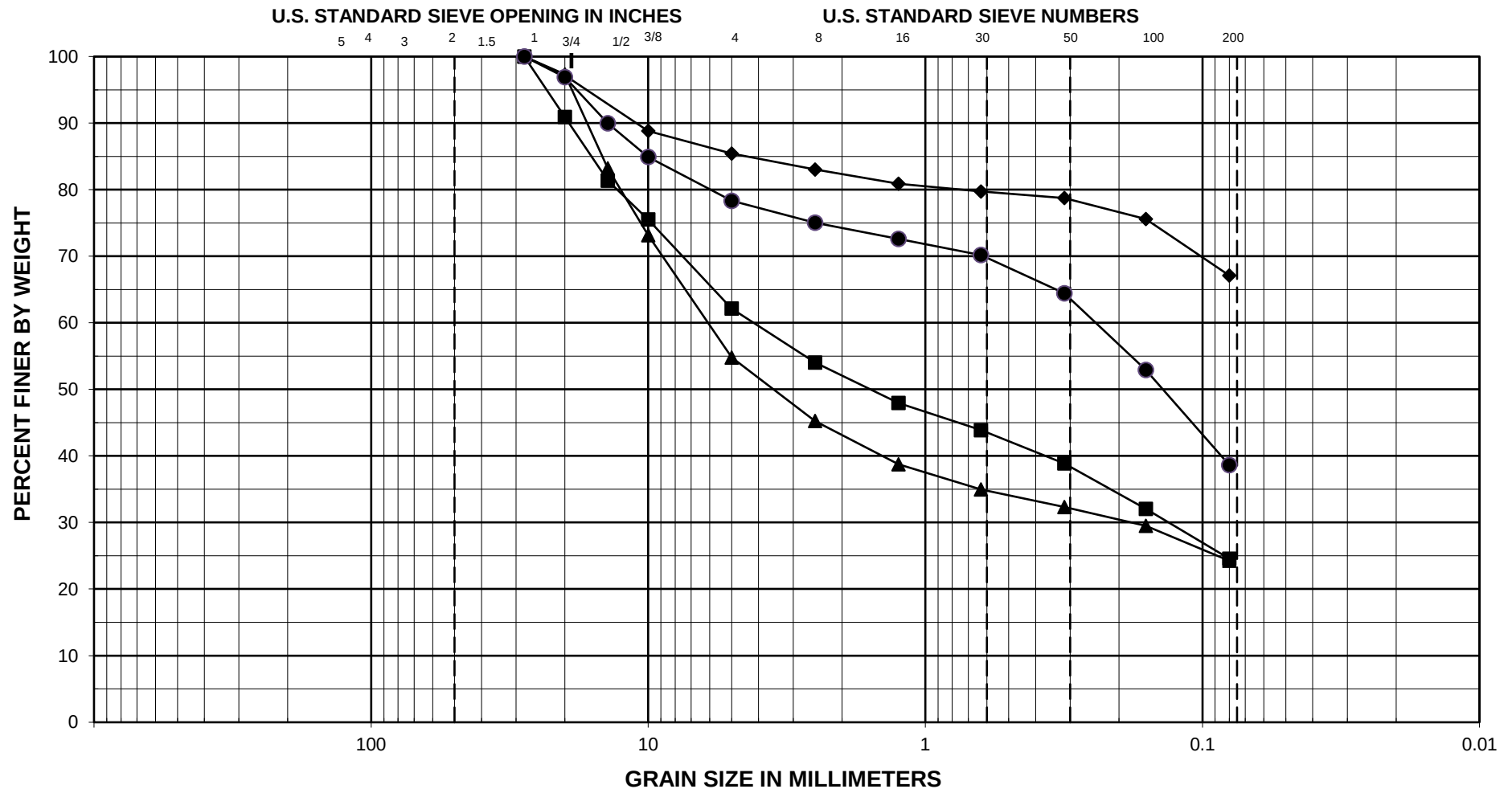
Date: 27-May-13

Tested by: AGG

Plasticity Chart



	Borehole	Depth	Classification	USCS Symbol	Liquid Limit	Plasticity Index
◆	BH3.3-Sa3	3.0 m	Silty CLAY	CL-ML	22.1	4.3
■	BH3.4-Sa3	1.0 m	Silty CLAY	CL-ML	16.7	3.6
▲	BH3.9-Sa4	3.2 m	Lean CLAY	CL	31.6	14.4
●	BH3.8-Sa4	3.6 m	Silty CLAY	CL-ML	23.0	3.6
○						



	Sample No.	Depth	Classification	w%	Cu	Cc	% Gravel	% Sand	% Silt and Clay
◆	BH-3.3, Sa.3	3.0 m	Sandy silty CLAY (CL-ML)	23%	NA	NA	14.6	18.7	66.7%
■	BH-3.4 Sa.3	1.0 m	Silty clayey SAND with gravel (SC-SM)	9%	NA	NA	37.9	38.5	23.6%
▲	BH 3.8 Sa. 4	3.2 m	Silty clayey GRAVEL with sand (GC-GM)	11%	NA	NA	45.2	31.4	23.4%
●	BH 3.9, Sa4	3.6 m	Silty clayey SAND with gravel (SC-SM)	13%	NA	NA	21.7	42.9	35.4%
○									



Project: Pipeline Phase 3 New Glasgow N.S.

Job No.: 533-001

Location: Borehole Locations

Date: 27-May-13

Notes:

SIEVE ANALYSIS

Your Project #: 533-003
Site Location: HERITAGE GAS
Your C.O.C. #: n/a

Attention: Glenn Graham
Conquest Engineering Ltd
348 Bluewater Road
Bedford, NS
CANADA B4B1J6

Report Date: 2013/05/14

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B371076
Received: 2013/05/10, 13:49

Sample Matrix: Soil
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
TEH in Soil (PIRI) (1)	7	2013/05/10	2013/05/11	ATL SOP 00111	Based on Atl. PIRI
Metals Solids Acid Extr. ICPMS	7	2013/05/13	2013/05/14	ATL SOP 00059	Based on EPA6020A
Moisture	7	N/A	2013/05/13	ATL SOP 00001	MOE Handbook 1983
PAH Compounds by GCMS (SIM) (1)	6	2013/05/10	2013/05/10	ATL SOP 00102	Based on EPA8270C
PAH Compounds by GCMS (SIM) (1)	1	2013/05/10	2013/05/13	ATL SOP 00102	Based on EPA8270C
VPH in Soil (PIRI)	7	2013/05/10	2013/05/11	ATL SOP 00119	Based on Atl. PIRI
ModTPH (T1) Calc. for Soil	7	2013/05/10	2013/05/13		Based on Atl. PIRI

Remarks:

Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Mari Kenny, Project Manager
Email: MKenny@maxxam.ca
Phone# (902) 420-0203 Ext:291

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

Maxxam Job #: B371076
Report Date: 2013/05/14

Conquest Engineering Ltd
Client Project #: 533-003
Site Location: HERITAGE GAS
Sampler Initials: WS

ATLANTIC MUST IN SOIL (SOIL)

Maxxam ID		RL8859	RL8860	RL8861	RL8862	RL8863	RL8864		
Sampling Date		2013/05/09	2013/05/09	2013/05/09	2013/05/09	2013/05/09	2013/05/09		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	Units	TP7 SA1	TP7 SA2	TP7 SA3	TP7 SA4	TP8 SA1	TP8 SA2	RDL	QC Batch

Inorganics									
Moisture	%	8	14	16	14	9	14	1	3208561
Petroleum Hydrocarbons									
Benzene	mg/kg	ND	ND	ND	ND	ND	ND	0.025	3210075
Toluene	mg/kg	ND	ND	ND	ND	ND	ND	0.025	3210075
Ethylbenzene	mg/kg	ND	ND	ND	ND	ND	ND	0.025	3210075
Xylene (Total)	mg/kg	ND	ND	ND	ND	ND	ND	0.050	3210075
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	ND	ND	ND	2.5	3210075
>C10-C16 Hydrocarbons	mg/kg	ND	ND	ND	ND	ND	ND	10	3209188
>C16-C21 Hydrocarbons	mg/kg	ND	ND	ND	ND	ND	ND	10	3209188
>C21-<C32 Hydrocarbons	mg/kg	ND	28	ND	ND	ND	ND	15	3209188
Modified TPH (Tier1)	mg/kg	ND	28	ND	ND	ND	ND	15	3208775
Reached Baseline at C32	mg/kg	NA	Yes	NA	NA	NA	NA	N/A	3209188
Hydrocarbon Resemblance	mg/kg	NA	COMMENT (1)	NA	NA	NA	NA	N/A	3209188
Surrogate Recovery (%)									
Isobutylbenzene - Extractable	%	86	92	87	85	86	87		3209188
n-Dotriacontane - Extractable	%	87	90	88	91	88 (2)	89		3209188
Isobutylbenzene - Volatile	%	105	103	109	106	109	110		3210075

ND = Not detected
N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Lube oil fraction.
(2) TEH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

Maxxam Job #: B371076
Report Date: 2013/05/14

Conquest Engineering Ltd
Client Project #: 533-003
Site Location: HERITAGE GAS
Sampler Initials: WS

ATLANTIC MUST IN SOIL (SOIL)

Maxxam ID		RL8865		
Sampling Date		2013/05/09		
COC Number		n/a		
	Units	TP7 SA5	RDL	QC Batch

Inorganics				
Moisture	%	11	1	3208561
Petroleum Hydrocarbons				
Benzene	mg/kg	ND	0.025	3210075
Toluene	mg/kg	ND	0.025	3210075
Ethylbenzene	mg/kg	ND	0.025	3210075
Xylene (Total)	mg/kg	ND	0.050	3210075
C6 - C10 (less BTEX)	mg/kg	ND	2.5	3210075
>C10-C16 Hydrocarbons	mg/kg	ND	10	3209188
>C16-C21 Hydrocarbons	mg/kg	ND	10	3209188
>C21-<C32 Hydrocarbons	mg/kg	ND	15	3209188
Modified TPH (Tier1)	mg/kg	ND	15	3208775
Reached Baseline at C32	mg/kg	NA	N/A	3209188
Hydrocarbon Resemblance	mg/kg	NA	N/A	3209188
Surrogate Recovery (%)				
Isobutylbenzene - Extractable	%	92		3209188
n-Dotriacontane - Extractable	%	90		3209188
Isobutylbenzene - Volatile	%	108		3210075

ND = Not detected
N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B371076
Report Date: 2013/05/14

Conquest Engineering Ltd
Client Project #: 533-003
Site Location: HERITAGE GAS
Sampler Initials: WS

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		RL8859	RL8860	RL8861	RL8862	RL8863		
Sampling Date		2013/05/09	2013/05/09	2013/05/09	2013/05/09	2013/05/09		
COC Number		n/a	n/a	n/a	n/a	n/a		
	Units	TP7 SA1	TP7 SA2	TP7 SA3	TP7 SA4	TP8 SA1	RDL	QC Batch

Metals								
Acid Extractable Aluminum (Al)	mg/kg	15000	16000	6100	8200	15000	10	3210669
Acid Extractable Antimony (Sb)	mg/kg	ND	ND	ND	ND	ND	2.0	3210669
Acid Extractable Arsenic (As)	mg/kg	11	9.7	ND	3.2	17	2.0	3210669
Acid Extractable Barium (Ba)	mg/kg	36	460	99	130	60	5.0	3210669
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	ND	ND	2.0	3210669
Acid Extractable Bismuth (Bi)	mg/kg	ND	ND	ND	ND	ND	2.0	3210669
Acid Extractable Boron (B)	mg/kg	ND	ND	ND	ND	ND	50	3210669
Acid Extractable Cadmium (Cd)	mg/kg	ND	0.51	ND	ND	0.60	0.30	3210669
Acid Extractable Chromium (Cr)	mg/kg	28	25	14	18	27	2.0	3210669
Acid Extractable Cobalt (Co)	mg/kg	16	12	6.0	9.8	15	1.0	3210669
Acid Extractable Copper (Cu)	mg/kg	20	19	13	20	30	2.0	3210669
Acid Extractable Iron (Fe)	mg/kg	34000	22000	11000	23000	34000	50	3210669
Acid Extractable Lead (Pb)	mg/kg	200	69	22	31	180	0.50	3210669
Acid Extractable Lithium (Li)	mg/kg	26	34	16	20	28	2.0	3210669
Acid Extractable Manganese (Mn)	mg/kg	760	1400	120	770	730	2.0	3210669
Acid Extractable Mercury (Hg)	mg/kg	ND	0.12	ND	ND	ND	0.10	3210669
Acid Extractable Molybdenum (Mo)	mg/kg	ND	ND	ND	ND	ND	2.0	3210669
Acid Extractable Nickel (Ni)	mg/kg	42	25	17	24	41	2.0	3210669
Acid Extractable Rubidium (Rb)	mg/kg	5.3	13	5.8	7.7	7.2	2.0	3210669
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	ND	ND	1.0	3210669
Acid Extractable Silver (Ag)	mg/kg	ND	ND	ND	ND	ND	0.50	3210669
Acid Extractable Strontium (Sr)	mg/kg	ND	15	10	19	ND	5.0	3210669
Acid Extractable Thallium (Tl)	mg/kg	ND	0.16	ND	ND	ND	0.10	3210669
Acid Extractable Tin (Sn)	mg/kg	ND	ND	ND	ND	ND	2.0	3210669
Acid Extractable Uranium (U)	mg/kg	0.65	2.1	3.8	1.4	0.93	0.10	3210669
Acid Extractable Vanadium (V)	mg/kg	16	22	13	17	17	2.0	3210669
Acid Extractable Zinc (Zn)	mg/kg	110	130	52	89	170	5.0	3210669

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Maxxam Job #: B371076
Report Date: 2013/05/14

Conquest Engineering Ltd
Client Project #: 533-003
Site Location: HERITAGE GAS
Sampler Initials: WS

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		RL8864	RL8865		
Sampling Date		2013/05/09	2013/05/09		
COC Number		n/a	n/a		
	Units	TP8 SA2	TP7 SA5	RDL	QC Batch

Metals					
Acid Extractable Aluminum (Al)	mg/kg	14000	6800	10	3210669
Acid Extractable Antimony (Sb)	mg/kg	ND	ND	2.0	3210669
Acid Extractable Arsenic (As)	mg/kg	7.6	3.6	2.0	3210669
Acid Extractable Barium (Ba)	mg/kg	79	220	5.0	3210669
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	2.0	3210669
Acid Extractable Bismuth (Bi)	mg/kg	ND	ND	2.0	3210669
Acid Extractable Boron (B)	mg/kg	ND	ND	50	3210669
Acid Extractable Cadmium (Cd)	mg/kg	ND	0.35	0.30	3210669
Acid Extractable Chromium (Cr)	mg/kg	22	17	2.0	3210669
Acid Extractable Cobalt (Co)	mg/kg	12	10	1.0	3210669
Acid Extractable Copper (Cu)	mg/kg	21	16	2.0	3210669
Acid Extractable Iron (Fe)	mg/kg	26000	21000	50	3210669
Acid Extractable Lead (Pb)	mg/kg	56	26	0.50	3210669
Acid Extractable Lithium (Li)	mg/kg	26	21	2.0	3210669
Acid Extractable Manganese (Mn)	mg/kg	920	530	2.0	3210669
Acid Extractable Mercury (Hg)	mg/kg	ND	ND	0.10	3210669
Acid Extractable Molybdenum (Mo)	mg/kg	ND	ND	2.0	3210669
Acid Extractable Nickel (Ni)	mg/kg	24	25	2.0	3210669
Acid Extractable Rubidium (Rb)	mg/kg	8.9	6.7	2.0	3210669
Acid Extractable Selenium (Se)	mg/kg	ND	ND	1.0	3210669
Acid Extractable Silver (Ag)	mg/kg	ND	ND	0.50	3210669
Acid Extractable Strontium (Sr)	mg/kg	ND	22	5.0	3210669
Acid Extractable Thallium (Tl)	mg/kg	0.11	ND	0.10	3210669
Acid Extractable Tin (Sn)	mg/kg	ND	ND	2.0	3210669
Acid Extractable Uranium (U)	mg/kg	0.59	1.0	0.10	3210669
Acid Extractable Vanadium (V)	mg/kg	20	16	2.0	3210669
Acid Extractable Zinc (Zn)	mg/kg	92	88	5.0	3210669

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Maxxam Job #: B371076
Report Date: 2013/05/14

Conquest Engineering Ltd
Client Project #: 533-003
Site Location: HERITAGE GAS
Sampler Initials: WS

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		RL8859	RL8860	RL8861	RL8862	RL8863	RL8864		
Sampling Date		2013/05/09	2013/05/09	2013/05/09	2013/05/09	2013/05/09	2013/05/09		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	Units	TP7 SA1	TP7 SA2	TP7 SA3	TP7 SA4	TP8 SA1	TP8 SA2	RDL	QC Batch

Polyaromatic Hydrocarbons									
1-Methylnaphthalene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
2-Methylnaphthalene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Acenaphthene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Acenaphthylene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Anthracene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Benzo(a)anthracene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Benzo(a)pyrene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Benzo(b)fluoranthene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Benzo(g,h,i)perylene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Benzo(j)fluoranthene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Chrysene	mg/kg	0.011	ND	ND	ND	0.012	ND	0.010	3209226
Dibenz(a,h)anthracene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Fluoranthene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Fluorene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Naphthalene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Perylene	mg/kg	ND	0.020	ND	ND	ND	ND	0.010	3209226
Phenanthrene	mg/kg	0.023	0.028	ND	ND	0.018	0.012	0.010	3209226
Pyrene	mg/kg	ND	ND	ND	ND	ND	ND	0.010	3209226
Surrogate Recovery (%)									
D10-Anthracene	%	96	92	102	90	101	107		3209226
D14-Terphenyl (FS)	%	102	98	103	91	103	111		3209226
D8-Acenaphthylene	%	99	93	99	89	98	104		3209226

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Maxxam Job #: B371076
Report Date: 2013/05/14

Conquest Engineering Ltd
Client Project #: 533-003
Site Location: HERITAGE GAS
Sampler Initials: WS

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		RL8865		
Sampling Date		2013/05/09		
COC Number		n/a		
	Units	TP7 SA5	RDL	QC Batch

Polyaromatic Hydrocarbons				
1-Methylnaphthalene	mg/kg	ND	0.010	3209226
2-Methylnaphthalene	mg/kg	ND	0.010	3209226
Acenaphthene	mg/kg	ND	0.010	3209226
Acenaphthylene	mg/kg	ND	0.010	3209226
Anthracene	mg/kg	ND	0.010	3209226
Benzo(a)anthracene	mg/kg	ND	0.010	3209226
Benzo(a)pyrene	mg/kg	ND	0.010	3209226
Benzo(b)fluoranthene	mg/kg	ND	0.010	3209226
Benzo(g,h,i)perylene	mg/kg	ND	0.010	3209226
Benzo(j)fluoranthene	mg/kg	ND	0.010	3209226
Benzo(k)fluoranthene	mg/kg	ND	0.010	3209226
Chrysene	mg/kg	ND	0.010	3209226
Dibenz(a,h)anthracene	mg/kg	ND	0.010	3209226
Fluoranthene	mg/kg	ND	0.010	3209226
Fluorene	mg/kg	ND	0.010	3209226
Indeno(1,2,3-cd)pyrene	mg/kg	ND	0.010	3209226
Naphthalene	mg/kg	ND	0.010	3209226
Perylene	mg/kg	ND	0.010	3209226
Phenanthrene	mg/kg	ND	0.010	3209226
Pyrene	mg/kg	ND	0.010	3209226
Surrogate Recovery (%)				
D10-Anthracene	%	101		3209226
D14-Terphenyl (FS)	%	102		3209226
D8-Acenaphthylene	%	94		3209226

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Maxxam Job #: B371076
Report Date: 2013/05/14

Conquest Engineering Ltd
Client Project #: 533-003
Site Location: HERITAGE GAS
Sampler Initials: WS

Package 1	8.7°C
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Each temperature is the average of up to three cooler temperatures taken at receipt

GENERAL COMMENTS

Results relate only to the items tested.

Conquest Engineering Ltd
Attention: Glenn Graham
Client Project #: 533-003
P.O. #:
Site Location: HERITAGE GAS

Quality Assurance Report
Maxxam Job Number: DB371076

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3209188 AJS	Matrix Spike	Isobutylbenzene - Extractable	2013/05/11		88	%	30 - 130
		n-Dotriacontane - Extractable	2013/05/11		87	%	30 - 130
		>C10-C16 Hydrocarbons	2013/05/11		75	%	30 - 130
		>C16-C21 Hydrocarbons	2013/05/11		86	%	30 - 130
		>C21-<C32 Hydrocarbons	2013/05/11		87	%	30 - 130
	Spiked Blank	Isobutylbenzene - Extractable	2013/05/11		93	%	30 - 130
		n-Dotriacontane - Extractable	2013/05/11		87	%	30 - 130
		>C10-C16 Hydrocarbons	2013/05/11		77	%	30 - 130
		>C16-C21 Hydrocarbons	2013/05/11		86	%	30 - 130
		>C21-<C32 Hydrocarbons	2013/05/11		90	%	30 - 130
	Method Blank	Isobutylbenzene - Extractable	2013/05/11		92	%	30 - 130
		n-Dotriacontane - Extractable	2013/05/11		88	%	30 - 130
		>C10-C16 Hydrocarbons	2013/05/11	ND, RDL=10		mg/kg	
		>C16-C21 Hydrocarbons	2013/05/11	ND, RDL=10		mg/kg	
		>C21-<C32 Hydrocarbons	2013/05/11	ND, RDL=15		mg/kg	
	RPD	>C10-C16 Hydrocarbons	2013/05/11	NC		%	50
		>C16-C21 Hydrocarbons	2013/05/11	NC		%	50
		>C21-<C32 Hydrocarbons	2013/05/11	NC		%	50
3209226 GTH	Matrix Spike	D10-Anthracene	2013/05/13		97	%	30 - 130
		D14-Terphenyl (FS)	2013/05/13		96 (1)	%	30 - 130
		D8-Acenaphthylene	2013/05/13		100	%	30 - 130
		1-Methylnaphthalene	2013/05/13		81	%	30 - 130
		2-Methylnaphthalene	2013/05/13		92	%	30 - 130
		Acenaphthene	2013/05/13		104	%	30 - 130
		Acenaphthylene	2013/05/13		97	%	30 - 130
		Anthracene	2013/05/13		91	%	30 - 130
		Benzo(a)anthracene	2013/05/13		90	%	30 - 130
		Benzo(a)pyrene	2013/05/13		95	%	30 - 130
		Benzo(b)fluoranthene	2013/05/13		99	%	30 - 130
		Benzo(g,h,i)perylene	2013/05/13		89	%	30 - 130
		Benzo(j)fluoranthene	2013/05/13		99	%	30 - 130
		Benzo(k)fluoranthene	2013/05/13		98	%	30 - 130
		Chrysene	2013/05/13		86	%	30 - 130
		Dibenz(a,h)anthracene	2013/05/13		93	%	30 - 130
		Fluoranthene	2013/05/13		64	%	30 - 130
		Fluorene	2013/05/13		95	%	30 - 130
		Indeno(1,2,3-cd)pyrene	2013/05/13		93	%	30 - 130
		Naphthalene	2013/05/13		90	%	30 - 130
	Spiked Blank	Perylene	2013/05/13		95	%	30 - 130
		Phenanthrene	2013/05/13		88	%	30 - 130
		Pyrene	2013/05/13		77	%	30 - 130
		D10-Anthracene	2013/05/10		96	%	30 - 130
		D14-Terphenyl (FS)	2013/05/10		100	%	30 - 130
		D8-Acenaphthylene	2013/05/10		98	%	30 - 130
		1-Methylnaphthalene	2013/05/10		91	%	30 - 130
		2-Methylnaphthalene	2013/05/10		100	%	30 - 130
		Acenaphthene	2013/05/10		104	%	30 - 130
		Acenaphthylene	2013/05/10		99	%	30 - 130
		Anthracene	2013/05/10		96	%	30 - 130
		Benzo(a)anthracene	2013/05/10		98	%	30 - 130
		Benzo(a)pyrene	2013/05/10		104	%	30 - 130
		Benzo(b)fluoranthene	2013/05/10		107	%	30 - 130
		Benzo(g,h,i)perylene	2013/05/10		107	%	30 - 130
		Benzo(j)fluoranthene	2013/05/10		106	%	30 - 130
		Benzo(k)fluoranthene	2013/05/10		103	%	30 - 130

Conquest Engineering Ltd
Attention: Glenn Graham
Client Project #: 533-003
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Site Location: HERITAGE GAS

Quality Assurance Report (Continued)

Maxxam Job Number: DB371076

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3209226 GTH	Spiked Blank	Chrysene	2013/05/10		100	%	30 - 130
		Dibenz(a,h)anthracene	2013/05/10		105	%	30 - 130
		Fluoranthene	2013/05/10		97	%	30 - 130
		Fluorene	2013/05/10		103	%	30 - 130
		Indeno(1,2,3-cd)pyrene	2013/05/10		106	%	30 - 130
		Naphthalene	2013/05/10		99	%	30 - 130
		Perylene	2013/05/10		107	%	30 - 130
		Phenanthrene	2013/05/10		98	%	30 - 130
		Pyrene	2013/05/10		101	%	30 - 130
		D10-Anthracene	2013/05/10		103	%	30 - 130
	Method Blank	D14-Terphenyl (FS)	2013/05/10		103	%	30 - 130
		D8-Acenaphthylene	2013/05/10		96	%	30 - 130
		1-Methylnaphthalene	2013/05/10	ND, RDL=0.010		mg/kg	
		2-Methylnaphthalene	2013/05/10	ND, RDL=0.010		mg/kg	
		Acenaphthene	2013/05/10	ND, RDL=0.010		mg/kg	
		Acenaphthylene	2013/05/10	ND, RDL=0.010		mg/kg	
		Anthracene	2013/05/10	ND, RDL=0.010		mg/kg	
		Benzo(a)anthracene	2013/05/10	ND, RDL=0.010		mg/kg	
		Benzo(a)pyrene	2013/05/10	ND, RDL=0.010		mg/kg	
		Benzo(b)fluoranthene	2013/05/10	ND, RDL=0.010		mg/kg	
	RPD	Benzo(g,h,i)perylene	2013/05/10	ND, RDL=0.010		mg/kg	
		Benzo(j)fluoranthene	2013/05/10	ND, RDL=0.010		mg/kg	
		Benzo(k)fluoranthene	2013/05/10	ND, RDL=0.010		mg/kg	
		Chrysene	2013/05/10	ND, RDL=0.010		mg/kg	
		Dibenz(a,h)anthracene	2013/05/10	ND, RDL=0.010		mg/kg	
		Fluoranthene	2013/05/10	ND, RDL=0.010		mg/kg	
		Fluorene	2013/05/10	ND, RDL=0.010		mg/kg	
		Indeno(1,2,3-cd)pyrene	2013/05/10	ND, RDL=0.010		mg/kg	
		Naphthalene	2013/05/10	ND, RDL=0.010		mg/kg	
		Perylene	2013/05/10	ND, RDL=0.010		mg/kg	
		Phenanthrene	2013/05/10	ND, RDL=0.010		mg/kg	
		Pyrene	2013/05/10	ND, RDL=0.010		mg/kg	
		1-Methylnaphthalene	2013/05/11	22.6		%	50
		2-Methylnaphthalene	2013/05/11	NC (2)		%	50
		Acenaphthene	2013/05/11	NC (2)		%	50
		Acenaphthylene	2013/05/11	NC (2)		%	50
		Anthracene	2013/05/11	NC (2)		%	50
		Benzo(a)anthracene	2013/05/11	25.7		%	50
		Benzo(a)pyrene	2013/05/11	7.9		%	50
		Benzo(b)fluoranthene	2013/05/11	4.8		%	50
		Benzo(g,h,i)perylene	2013/05/11	4.4		%	50
		Benzo(j)fluoranthene	2013/05/11	17.5		%	50
		Benzo(k)fluoranthene	2013/05/11	9.9		%	50
		Chrysene	2013/05/11	18.7		%	50
		Dibenz(a,h)anthracene	2013/05/11	NC		%	50
		Fluoranthene	2013/05/11	14.0		%	50
		Fluorene	2013/05/11	19.4		%	50
		Indeno(1,2,3-cd)pyrene	2013/05/11	2.2		%	50
		Naphthalene	2013/05/11	NC		%	50
		Perylene	2013/05/11	2.6		%	50
		Phenanthrene	2013/05/11	3.7		%	50
		Pyrene	2013/05/11	18.3		%	50
3210075 THL	Matrix Spike	Isobutylbenzene - Volatile	2013/05/11		93	%	60 - 140
		Benzene	2013/05/11		92	%	60 - 140
		Toluene	2013/05/11		116	%	60 - 140

Conquest Engineering Ltd
Attention: Glenn Graham
Client Project #: 533-003
P.O. #:
Site Location: HERITAGE GAS

Quality Assurance Report (Continued)

Maxxam Job Number: DB371076

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3210075 THL	Matrix Spike	Ethylbenzene	2013/05/11		112	%	60 - 140
		Xylene (Total)	2013/05/11		121	%	60 - 140
	Spiked Blank	Isobutylbenzene - Volatile	2013/05/11		102	%	60 - 140
		Benzene	2013/05/11		94	%	60 - 140
		Toluene	2013/05/11		98	%	60 - 140
		Ethylbenzene	2013/05/11		94	%	60 - 140
	Method Blank	Xylene (Total)	2013/05/11		97	%	60 - 140
		Isobutylbenzene - Volatile	2013/05/11		105	%	60 - 140
		Benzene	2013/05/11	ND, RDL=0.025		mg/kg	
		Toluene	2013/05/11	ND, RDL=0.025		mg/kg	
	RPD	Ethylbenzene	2013/05/11	ND, RDL=0.025		mg/kg	
		Xylene (Total)	2013/05/11	ND, RDL=0.050		mg/kg	
		C6 - C10 (less BTEX)	2013/05/11	ND, RDL=2.5		mg/kg	
		Benzene	2013/05/11	NC		%	50
		Toluene	2013/05/11	NC		%	50
		Ethylbenzene	2013/05/11	NC		%	50
		Xylene (Total)	2013/05/11	NC		%	50
		C6 - C10 (less BTEX)	2013/05/11	NC		%	50
3210669 DLB	Matrix Spike [RL8862-01]	Acid Extractable Antimony (Sb)	2013/05/14		99	%	75 - 125
		Acid Extractable Arsenic (As)	2013/05/14		104	%	75 - 125
		Acid Extractable Barium (Ba)	2013/05/14		NC	%	75 - 125
		Acid Extractable Beryllium (Be)	2013/05/14		108	%	75 - 125
		Acid Extractable Bismuth (Bi)	2013/05/14		103	%	75 - 125
		Acid Extractable Boron (B)	2013/05/14		90	%	75 - 125
		Acid Extractable Cadmium (Cd)	2013/05/14		100	%	75 - 125
		Acid Extractable Chromium (Cr)	2013/05/14		107	%	75 - 125
		Acid Extractable Cobalt (Co)	2013/05/14		106	%	75 - 125
		Acid Extractable Copper (Cu)	2013/05/14		153 (3)	%	75 - 125
		Acid Extractable Lead (Pb)	2013/05/14		NC	%	75 - 125
		Acid Extractable Lithium (Li)	2013/05/14		111	%	75 - 125
		Acid Extractable Manganese (Mn)	2013/05/14		NC	%	75 - 125
		Acid Extractable Mercury (Hg)	2013/05/14		93	%	75 - 125
		Acid Extractable Molybdenum (Mo)	2013/05/14		99	%	75 - 125
		Acid Extractable Nickel (Ni)	2013/05/14		104	%	75 - 125
		Acid Extractable Rubidium (Rb)	2013/05/14		95	%	75 - 125
		Acid Extractable Selenium (Se)	2013/05/14		102	%	75 - 125
		Acid Extractable Silver (Ag)	2013/05/14		106	%	75 - 125
		Acid Extractable Strontium (Sr)	2013/05/14		108	%	75 - 125
		Acid Extractable Thallium (Tl)	2013/05/14		100	%	75 - 125
		Acid Extractable Tin (Sn)	2013/05/14		99	%	75 - 125
		Acid Extractable Uranium (U)	2013/05/14		106	%	75 - 125
		Acid Extractable Vanadium (V)	2013/05/14		108	%	75 - 125
		Acid Extractable Zinc (Zn)	2013/05/14		NC	%	75 - 125
	Spiked Blank	Acid Extractable Antimony (Sb)	2013/05/14		107	%	75 - 125
		Acid Extractable Arsenic (As)	2013/05/14		106	%	75 - 125
		Acid Extractable Barium (Ba)	2013/05/14		108	%	75 - 125
		Acid Extractable Beryllium (Be)	2013/05/14		108	%	75 - 125
		Acid Extractable Bismuth (Bi)	2013/05/14		103	%	75 - 125
		Acid Extractable Boron (B)	2013/05/14		100	%	75 - 125
		Acid Extractable Cadmium (Cd)	2013/05/14		101	%	75 - 125
		Acid Extractable Chromium (Cr)	2013/05/14		106	%	75 - 125
		Acid Extractable Cobalt (Co)	2013/05/14		105	%	75 - 125
		Acid Extractable Copper (Cu)	2013/05/14		104	%	75 - 125
		Acid Extractable Lead (Pb)	2013/05/14		106	%	75 - 125

Conquest Engineering Ltd
Attention: Glenn Graham
Client Project #: 533-003
P.O. #:
Site Location: HERITAGE GAS

Quality Assurance Report (Continued)

Maxxam Job Number: DB371076

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3210669 DLB	Spiked Blank	Acid Extractable Lithium (Li)	2013/05/14		112	%	75 - 125
		Acid Extractable Manganese (Mn)	2013/05/14		105	%	75 - 125
		Acid Extractable Mercury (Hg)	2013/05/14		100	%	75 - 125
		Acid Extractable Molybdenum (Mo)	2013/05/14		104	%	75 - 125
		Acid Extractable Nickel (Ni)	2013/05/14		103	%	75 - 125
		Acid Extractable Rubidium (Rb)	2013/05/14		100	%	75 - 125
		Acid Extractable Selenium (Se)	2013/05/14		103	%	75 - 125
		Acid Extractable Silver (Ag)	2013/05/14		104	%	75 - 125
		Acid Extractable Strontium (Sr)	2013/05/14		107	%	75 - 125
		Acid Extractable Thallium (Tl)	2013/05/14		104	%	75 - 125
		Acid Extractable Tin (Sn)	2013/05/14		105	%	75 - 125
		Acid Extractable Uranium (U)	2013/05/14		106	%	75 - 125
		Acid Extractable Vanadium (V)	2013/05/14		108	%	75 - 125
		Acid Extractable Zinc (Zn)	2013/05/14		107	%	75 - 125
	Method Blank	Acid Extractable Aluminum (Al)	2013/05/14	ND, RDL=10		mg/kg	
		Acid Extractable Antimony (Sb)	2013/05/14	ND, RDL=2.0		mg/kg	
		Acid Extractable Arsenic (As)	2013/05/14	ND, RDL=2.0		mg/kg	
		Acid Extractable Barium (Ba)	2013/05/14	ND, RDL=5.0		mg/kg	
		Acid Extractable Beryllium (Be)	2013/05/14	ND, RDL=2.0		mg/kg	
		Acid Extractable Bismuth (Bi)	2013/05/14	ND, RDL=2.0		mg/kg	
		Acid Extractable Boron (B)	2013/05/14	ND, RDL=50		mg/kg	
		Acid Extractable Cadmium (Cd)	2013/05/14	ND, RDL=0.30		mg/kg	
		Acid Extractable Chromium (Cr)	2013/05/14	ND, RDL=2.0		mg/kg	
		Acid Extractable Cobalt (Co)	2013/05/14	ND, RDL=1.0		mg/kg	
		Acid Extractable Copper (Cu)	2013/05/14	ND, RDL=2.0		mg/kg	
		Acid Extractable Iron (Fe)	2013/05/14	ND, RDL=50		mg/kg	
		Acid Extractable Lead (Pb)	2013/05/14	ND, RDL=0.50		mg/kg	
		Acid Extractable Lithium (Li)	2013/05/14	ND, RDL=2.0		mg/kg	
		Acid Extractable Manganese (Mn)	2013/05/14	ND, RDL=2.0		mg/kg	
		Acid Extractable Mercury (Hg)	2013/05/14	ND, RDL=0.10		mg/kg	
		Acid Extractable Molybdenum (Mo)	2013/05/14	ND, RDL=2.0		mg/kg	
		Acid Extractable Nickel (Ni)	2013/05/14	ND, RDL=2.0		mg/kg	
		Acid Extractable Rubidium (Rb)	2013/05/14	ND, RDL=2.0		mg/kg	
		Acid Extractable Selenium (Se)	2013/05/14	ND, RDL=1.0		mg/kg	
		Acid Extractable Silver (Ag)	2013/05/14	ND, RDL=0.50		mg/kg	
		Acid Extractable Strontium (Sr)	2013/05/14	ND, RDL=5.0		mg/kg	
		Acid Extractable Thallium (Tl)	2013/05/14	ND, RDL=0.10		mg/kg	
		Acid Extractable Tin (Sn)	2013/05/14	ND, RDL=2.0		mg/kg	
		Acid Extractable Uranium (U)	2013/05/14	ND, RDL=0.10		mg/kg	
		Acid Extractable Vanadium (V)	2013/05/14	ND, RDL=2.0		mg/kg	
		Acid Extractable Zinc (Zn)	2013/05/14	ND, RDL=5.0		mg/kg	
	RPD [RL8862-01]	Acid Extractable Aluminum (Al)	2013/05/14	1.2		%	35
		Acid Extractable Antimony (Sb)	2013/05/14	NC		%	35
		Acid Extractable Arsenic (As)	2013/05/14	NC		%	35
		Acid Extractable Barium (Ba)	2013/05/14	5.7		%	35
		Acid Extractable Beryllium (Be)	2013/05/14	NC		%	35
		Acid Extractable Bismuth (Bi)	2013/05/14	NC		%	35
		Acid Extractable Boron (B)	2013/05/14	NC		%	35
		Acid Extractable Cadmium (Cd)	2013/05/14	NC		%	35
		Acid Extractable Chromium (Cr)	2013/05/14	0.5		%	35
		Acid Extractable Cobalt (Co)	2013/05/14	1.9		%	35
		Acid Extractable Copper (Cu)	2013/05/14	4.1		%	35
		Acid Extractable Iron (Fe)	2013/05/14	0.7		%	35
		Acid Extractable Lead (Pb)	2013/05/14	3.5		%	35
		Acid Extractable Lithium (Li)	2013/05/14	0.1		%	35

Conquest Engineering Ltd
Attention: Glenn Graham
Client Project #: 533-003
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Quality Assurance Report (Continued)

Maxxam Job Number: DB371076

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3210669 DLB	RPD [RL8862-01]	Acid Extractable Manganese (Mn)	2013/05/14	1.8		%	35
		Acid Extractable Mercury (Hg)	2013/05/14	NC		%	35
		Acid Extractable Molybdenum (Mo)	2013/05/14	NC		%	35
		Acid Extractable Nickel (Ni)	2013/05/14	0.03		%	35
		Acid Extractable Rubidium (Rb)	2013/05/14	NC		%	35
		Acid Extractable Selenium (Se)	2013/05/14	NC		%	35
		Acid Extractable Silver (Ag)	2013/05/14	NC		%	35
		Acid Extractable Strontium (Sr)	2013/05/14	NC		%	35
		Acid Extractable Thallium (Tl)	2013/05/14	NC		%	35
		Acid Extractable Tin (Sn)	2013/05/14	NC		%	35
		Acid Extractable Uranium (U)	2013/05/14	0.6		%	35
		Acid Extractable Vanadium (V)	2013/05/14	0.6		%	35
		Acid Extractable Zinc (Zn)	2013/05/14	1.6		%	35

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.

NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

(1) Elevated PAH RDL(s) due to sample dilution.

(2) Elevated PAH RDL(s) due to matrix / co-extractive interference.

(3) Elevated recovery due to possible sample inhomogeneity.

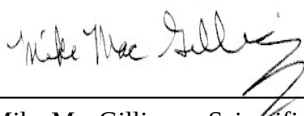
Validation Signature Page

Maxxam Job #: B371076

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Alan Stewart, Scientific Specialist (Organics)



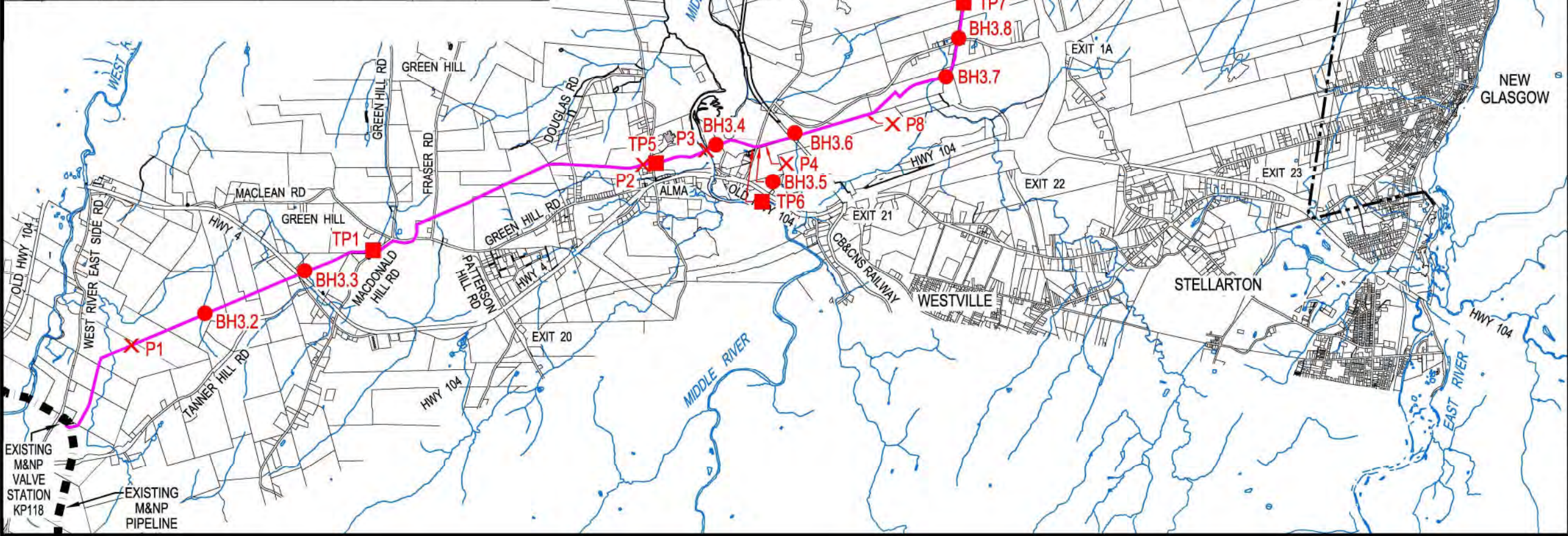
Mike MacGillivray, Scientific Specialist (Inorganics)

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Pictou Geotechnical Phase 3

Item	I.D	Crossing Name	Location Approx. STA.	Type of Sub Soil Investigation	Estimated Depth of Hole (m)	Approx. BH Drill Depth (m)
1	P 1	Wetland 1	1+120	Probe	na	45
2	BH 3.2	Trib to Miller Brook WC	2+010	Bore Hole	10	35
3	BH 3.3	Greenhill	3+200	Bore Hole	12	
4	TP 1	MacDonald Hill Rd	4+000	Test Pit	3	
5	P 2	Wetland 3	7+320	Probe	na	
6	TP 5	Alma Rd	7+440	Test Pit	4	
7	P 3	Middle River	8+080	Probe	na	
8	BH 3.4	Middle River	8+110	Bore Hole	14	-8
9	TP 6	Granton Rd	8+620	Test Pit	3	
10	BH 3.5	Granton Rd and Wetland 5	8+640	Bore Hole	8	20
11	P 4	Wetland 5	8+700	Probe	na	
12	BH 3.6	CB&CNS Railway	9+040	Bore Hole	8	16
13	BH 3.7	Trib to Bear Brook WC M1	10+890	Bore Hole	14	32
14	BH 3.8	Mt. William Rd	11+340	Bore Hole	6	50
15	TP 7	Abandoned Railway	11+740	Test Pit	3	
16	TP 8	Abandoned Railway	12+200	Test pit	3	
17	TP 9	Wetland M5	13+580	Test Pit	4	
18	P 5	Wetland M5	13+670	Probe	na	
19	P 6	Wetland M8	15+700	Probe	na	
20	TP 10	Wetland M8	15+740	Test Pit	4	
21	BH 3.9	Begg Brook 2	16+120	Bore Hole	20	-8
22	P 7	Begg Brook 2	16+170	Probe	na	
23	BH 3.10	Begg Brook 3	16+850	Bore Hole	16	
24	TP 11	Northern Pulp Property	18+000	Test Pit	4	
25	TP 12	Northern Pulp Property	18+505	Test Pit	4	
26	BH 3.11	Abandoned Railway	12+220	Bore Hole	na	
27	P 8	Wetland M1		Probe	na	



LEGEND

- EXISTING M&NP STEEL PIPELINE
- STEEL PIPELINE (PROPOSED 2013)
- BOREHOLE REQUIRED
- TESTPIT REQUIRED
- PROBE REQUIRED

1	TEST LOCATIONS	22/05/13	AGG	RBM
NO.	REVISIONS	DATE	DWN	APP

AREA: NEW GLASGOW PICTOU CO., N.S.

PROJECT: NATURAL GAS DISTRIBUTION SYSTEM PICTOU COUNTY PIPELINE

TITLE: PROPOSED PHASE 3 BOREHOLES, TESTPITS & PROBES

DWG NO: DRAWING 1

DESIGN:	DRAWN: AGG	SCALE: 0 500 1000m
		1:50,000