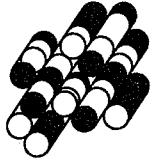


Appendix D

Laboratory Soils Test Results



Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

May 25, 2012

Ref: 8-10-5013
Stoney Creek Office

AECOM

300 - 300 Town Centre Boulevard
Markham, ON
L3R 5Z6

Attention: **Mr. Brian Dermody**

**RE: LABORATORY TEST RESULTS
NEWALTA LANDFILL
STONEY CREEK, ONTARIO**

Dear Sir,

This report presents the results of laboratory testing carried out on two samples of material delivered to our laboratory by a representative of your office on May 18th, 2012 and entered into our log on May 18th, 2012. As per your instructions, the testing was to consist of a hydrometer analysis, Atterburg Limits and standard Proctor compaction testing.

The samples received were labeled by your office as follows:

N12-CL-001
N12-CL-002

The attached table (Table 1) provides a summary of the test results.

We trust that this letter and the enclosed are satisfactory for your present requirements. If there is any point requiring further clarification, please contact this office.

Yours Truly,
Terraprobe Inc.

Adam Cummings C. Tech
Technical Services Co-ordinator

Terraprobe Inc.

Greater Toronto
11 Indell Lane
Brampton, Ontario L6T 3Y3
(905) 796-2650 Fax 796-2250
brampton@terraprobe.ca

Hamilton - Niagara
903 Barton Street, Unit 22
Stoney Creek, Ontario L8E 5P5
(905) 643-7560 Fax 643-7559
stoneycreek@terraprobe.ca

Central Ontario
220 Bayview Drive, Unit 25
Barrie, Ontario L4N 4Y8
(705) 739-8355 Fax 739-8369
barrie@terraprobe.ca

Northern Ontario
1012 Kelly Lake Rd.
Sudbury, Ontario P3E 5P4
(705) 670-0460 Fax 670-0558
sudbury@terraprobe.ca

www.terraprobe.ca

**TABLE 1
SUMMARY OF LABORATORY TESTING**

Terraprobe SAMPLE ID	S656	S657
AECOM SAMPLE ID	N12-CL-001	N12-CL-002
Plastic Limit (%)	18.5%	18.9%
Liquid Limit (%)	34.0%	34.7%
Plasticity Index	15.5%	15.8%
Maximum Dry Density	1.785 T/m ³	1.780 T/m ³
Optimum Moisture Content	18.2%	18.5%

* Table to be read with accompanying letter. All percent values rounded to 0.1%.



Terraprobe

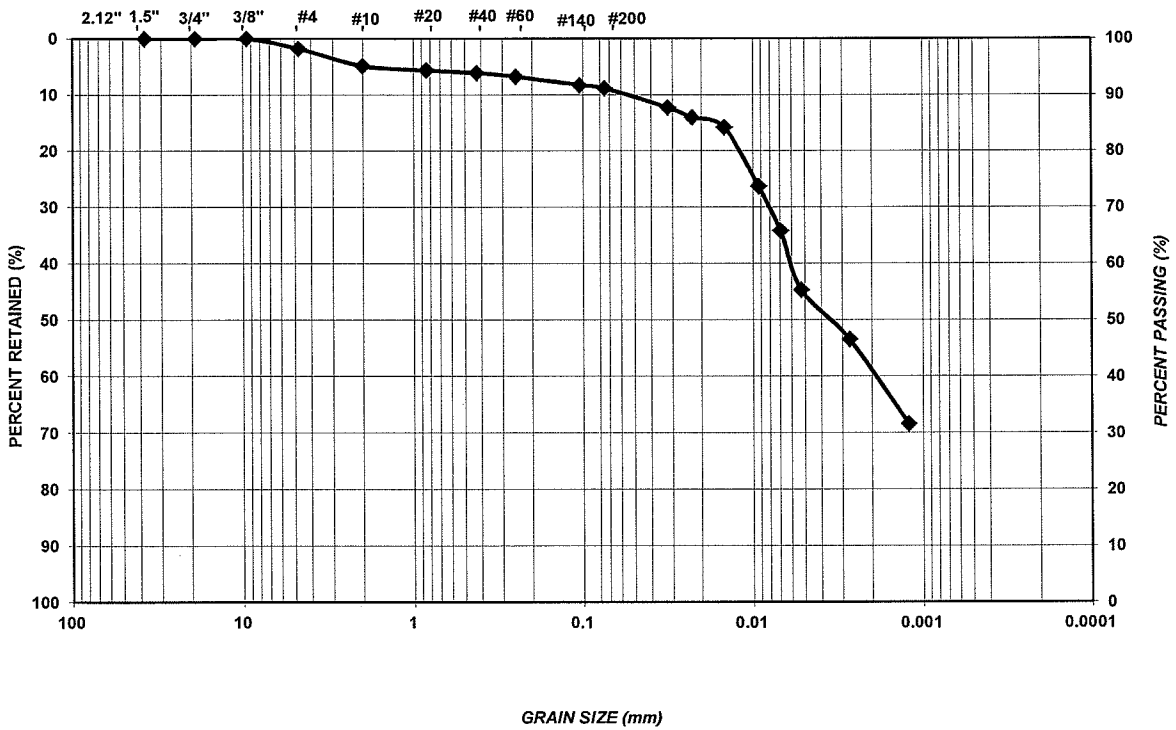
SIEVE AND HYDROMETER ANALYSIS

PROJECT: Newalta Landfill
 LOCATION: Stoney Creek, ON
 CLIENT: AECOM
 BOREHOLE: N/A
 SAMPLE NUMBER: Offsite (N12-CL-001)
 SAMPLE DESCRIPTION: Silty Clay, trace sand, trace gravel

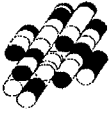
FILE NO.: 72-10-5013
 LAB NO.: S656
 SAMPLE DATE: May 18, 2012
 SAMPLED BY: Client
 PLASTIC LIMIT: 18.5%
 LIQUID LIMIT: 34.0%
 PLASTICITY INDEX: 15.5%

GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
	GRAVEL			SAND				



Terraprobe

**ATTERBURG LIMIT
TEST FORM**

PROJECT : **Newalta Landfill**
LOCATION : **Stoney Creek, ON**
CLIENT : **AECOM**

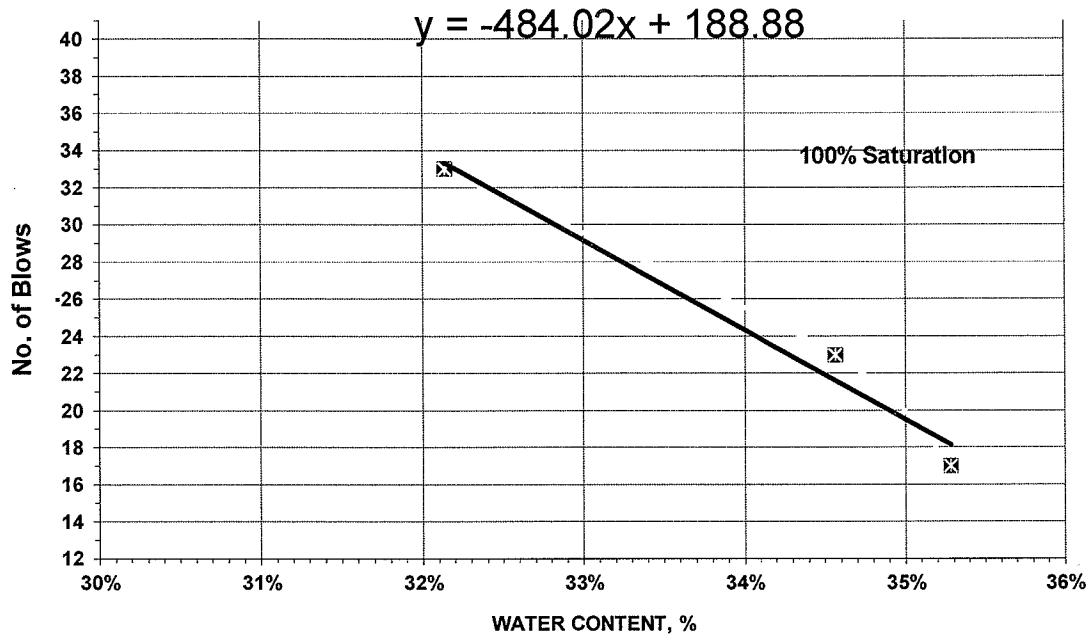
FILE No.: **72-10-5013**
LAB No.: **S656**

SAMPLE DESCRIPTION : **Silty Clay - Offsite (N12-CL-001)**
SAMPLE LOCATION :
SAMPLE SUPPLIER :

SAMPLE DATE: **May 18, 2012**
SAMPLED BY : **Client**

Liquid Limit:	34.00
Plastic Limit:	18.52
Platicity Index	15.48

STANDARD ATTERBURG GRAPH





Terraprobe

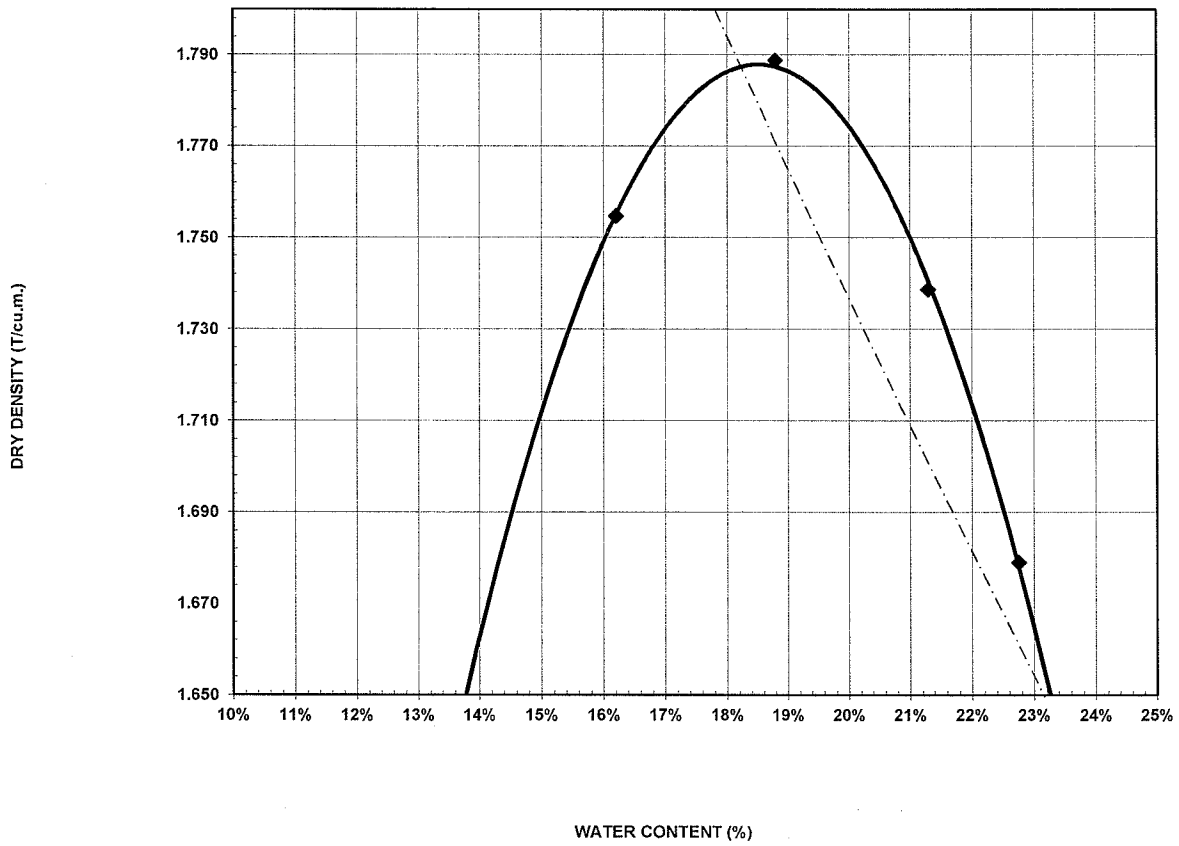
PROCTOR COMPACTION

PROJECT: Newalta Landfill
LOCATION: Stoney Creek, ON
CLIENT: AECOM
SAMPLE DESCRIPTION: Silty Clay, trace sand, trace gravel
SAMPLE LOCATION: Offsite (N12-CL-001)
SAMPLE SUPPLIER: Offsite

FILE No.: 72-10-5013
LAB No.: S656
SAMPLE DATE: May 18, 2012
SAMPLED BY: Client

MAXIMUM DRY DENSITY (t/m^3):	1.785
CORRECTED DRY DENSITY (t/m^3):	1.785
OPTIMUM WATER CONTENT (%):	18.2

STANDARD PROCTOR COMPACTION

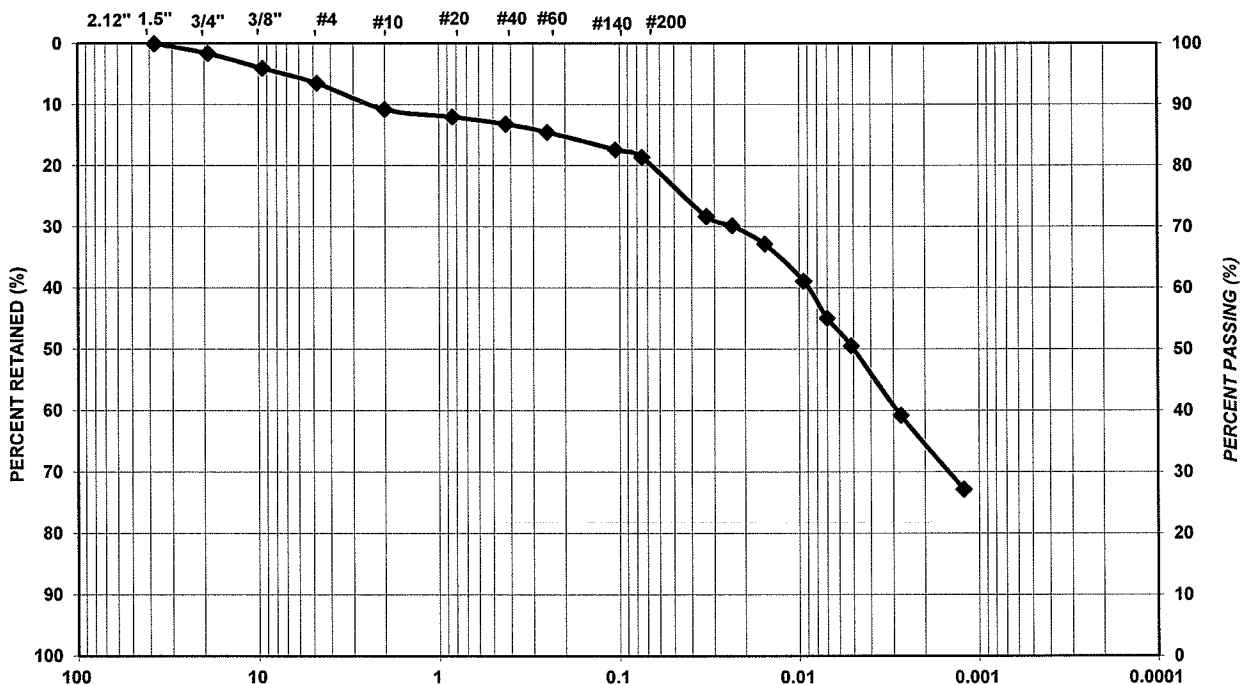




PROJECT: **Newalta Landfill**
 LOCATION: **Stoney Creek, ON**
 CLIENT: **AECOM**
 BOREHOLE: **N/A**
 SAMPLE NUMBER: **Offsite (N12-CL-002)**
 SAMPLE DESCRIPTION: **Silty Clay trace sand, trace gravel**

FILE NO.: **72-10-5013**
 LAB NO.: **S657**
 SAMPLE DATE: **May 18, 2012**
 SAMPLED BY: **Client**
 PLASTIC LIMIT: **18.9%**
 LIQUID LIMIT: **34.7%**
 PLASTICITY INDEX: **15.8%**

GRAIN SIZE DISTRIBUTION
 U.S. STANDARD SIEVE SIZES



GRAIN SIZE (mm)

MIT SYSTEM	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
	GRAVEL			SAND				



Terraprobe

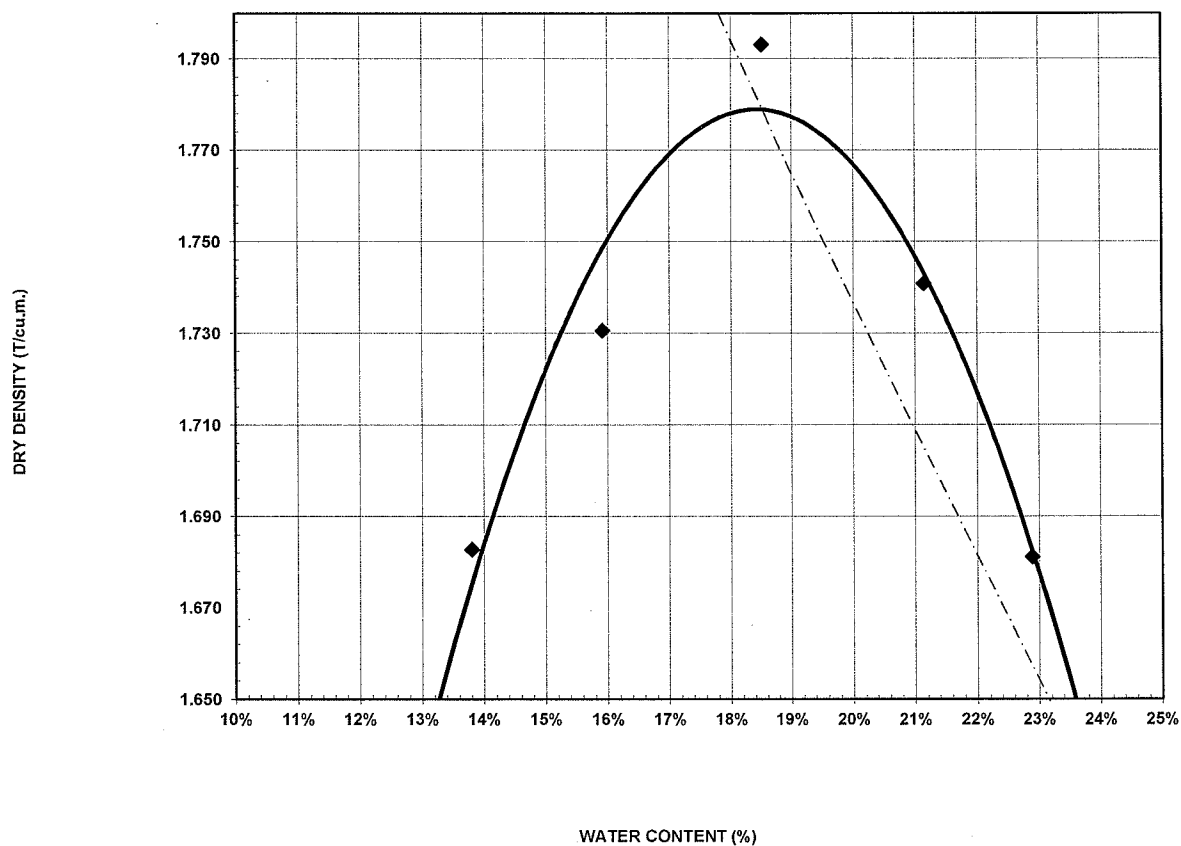
PROCTOR COMPACTION

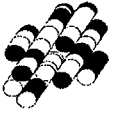
PROJECT: **Newalta Landfill**
LOCATION: **Stoney Creek, ON**
CLIENT: **AECOM**
SAMPLE DESCRIPTION: **Silty Clay, trace sand, trace gravel**
SAMPLE LOCATION: **Offsite (N12-CL-002)**
SAMPLE SUPPLIER: **Offsite**

FILE No.: **72-10-5013**
LAB No.: **S657**
SAMPLE DATE: **May 18, 2012**
SAMPLED BY: **Client**

MAXIMUM DRY DENSITY (t/m^3):	1.780
CORRECTED DRY DENSITY (t/m^3):	1.780
OPTIMUM WATER CONTENT (%):	18.5

STANDARD PROCTOR COMPACTION





Terraprobe

**ATTERBURG LIMIT
TEST FORM**

PROJECT : **Newalta Landfill**
LOCATION : **Stoney Creek, ON**
CLIENT : **AECOM**

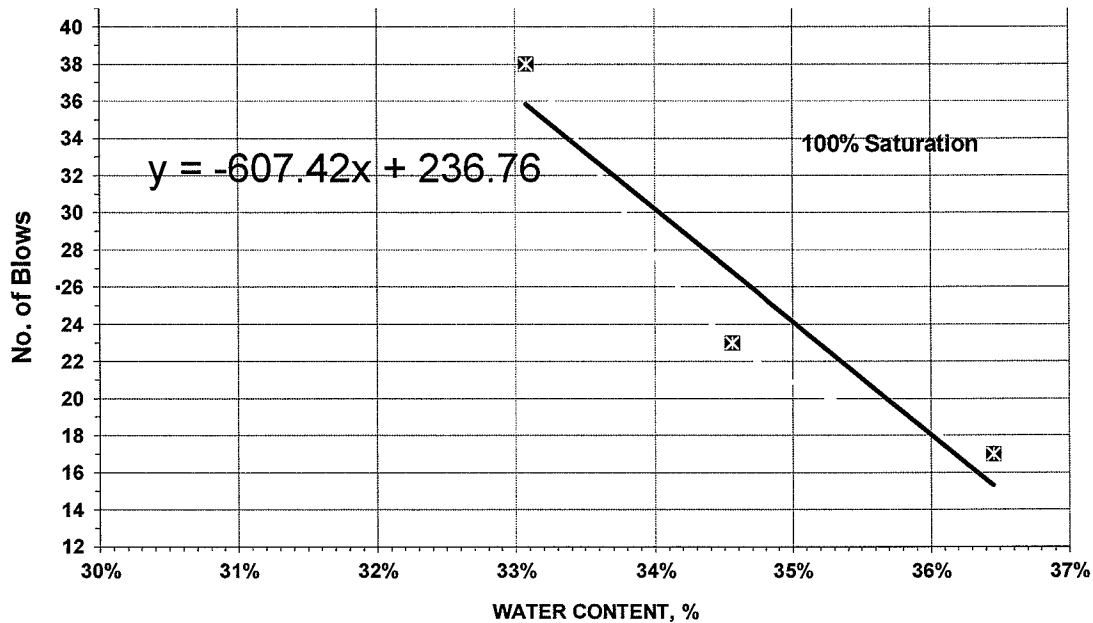
FILE No.: **72-10-5013**
LAB No.: **S657**

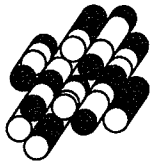
SAMPLE DESCRIPTION : **Silty Clay - Offsite (N12-CL-002)**
SAMPLE LOCATION :
SAMPLE SUPPLIER :

SAMPLE DATE: **May 18, 2012**
SAMPLED BY : **Client**

Liquid Limit:	34.70
Plastic Limit:	18.90
Platicity Index	15.80

STANDARD ATTERBURG GRAPH





Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

July 10, 2012

Ref: 72-10-5013

Formerly (8-10-5013)
Stoney Creek Office

AECOM

300 - 300 Town Centre Boulevard
Markham, ON
L3R 5Z6

Attention: **Mr. Brian Dermody**

**RE: LABORATORY TEST RESULTS
NEWALTA LANDFILL
STONEY CREEK, ONTARIO**

Dear Sir,

This report presents the results of laboratory testing carried out a sample of material delivered to our laboratory by a representative of your office on June 27th, 2012 and entered into our log on June 27th, 2012. As per your instructions, the testing was to consist of a hydrometer analysis, Atterburg Limits, moisture content and standard Proctor compaction testing.

The samples received were labeled by your office as follows:

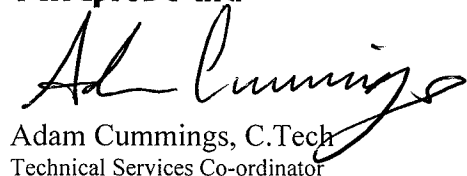
N12-CL-003

The attached table (Table 1) provides a summary of the test results.

We trust that this letter and the enclosed are satisfactory for your present requirements. If there is any point requiring further clarification, please contact this office.

Yours Truly,

Terraprobe Inc.



Adam Cummings, C.Tech
Technical Services Co-ordinator

Terraprobe Inc.

Greater Toronto
11 Indell Lane
Brampton, Ontario L6T 3Y3
(905) 796-2650 Fax 796-2250
brampton@terraprobe.ca

Hamilton - Niagara
903 Barton Street, Unit 22
Stoney Creek, Ontario L8E 5P5
(905) 643-7560 Fax 643-7559
stoneycreek@terraprobe.ca

Central Ontario
220 Bayview Drive, Unit 25
Barrie, Ontario L4N 4Y8
(705) 739-8355 Fax 739-8369
barrie@terraprobe.ca

Northern Ontario
1012 Kelly Lake Rd.
Sudbury, Ontario P3E 5P4
(705) 670-0460 Fax 670-0558
sudbury@terraprobe.ca

www.terraprobe.ca

**TABLE 1
SUMMARY OF LABORATORY TESTING**

Terraprobe SAMPLE ID	S699
AECOM SAMPLE ID	N12-CL-003
As Received Moisture Content	23.0%
Plastic Limit (%)	14.0%
Liquid Limit (%)	35.0%
Plasticity Index	21.1%
Maximum Dry Density	1.735 T/m ³
Optimum Moisture Content	17.5%

* Table to be read with accompanying letter. All percent values rounded to 0.1%.



PROJECT: **Newalta Landfill**
 LOCATION: **Stoney Creek, ON**
 CLIENT: **AECOM**

FILE NO.: **72-10-5013**
 LAB NO.: **S699**
 SAMPLE DATE: **June 27, 2012**

BOREHOLE: **N/A**

SAMPLED BY: **Client**

SAMPLE NUMBER: **Offsite (N12-CL-003)**

PLASTIC LIMIT: **14.0%**

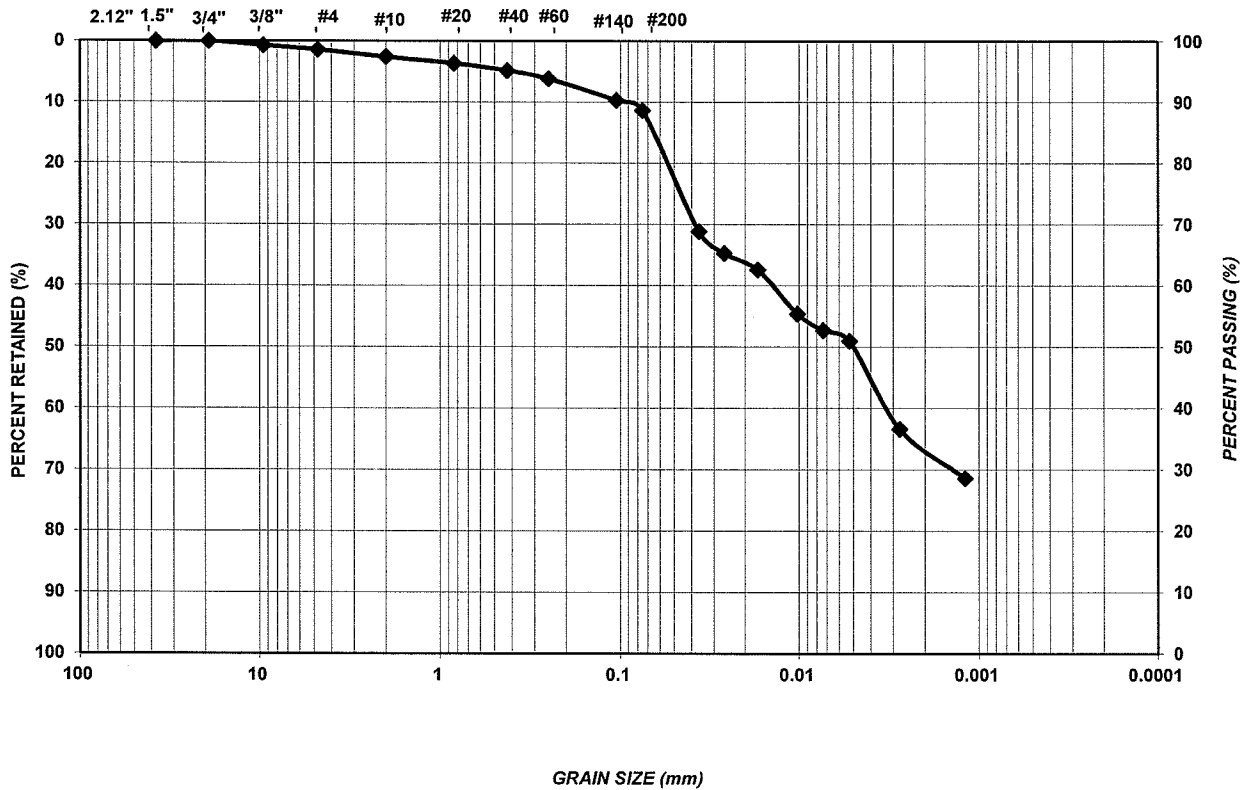
SAMPLE DESCRIPTION: **Brown Silty Clay, trace to some sand, occasional gravel**

LIQUID LIMIT: **35.0%**

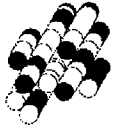
PLASTICITY INDEX: **21.1%**

GRAIN SIZE DISTRIBUTION

U.S. STANDARD SIEVE SIZES



MIT SYSTEM	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
	GRAVEL			SAND				



Terraprobe

**ATTERBURG LIMIT
TEST FORM**

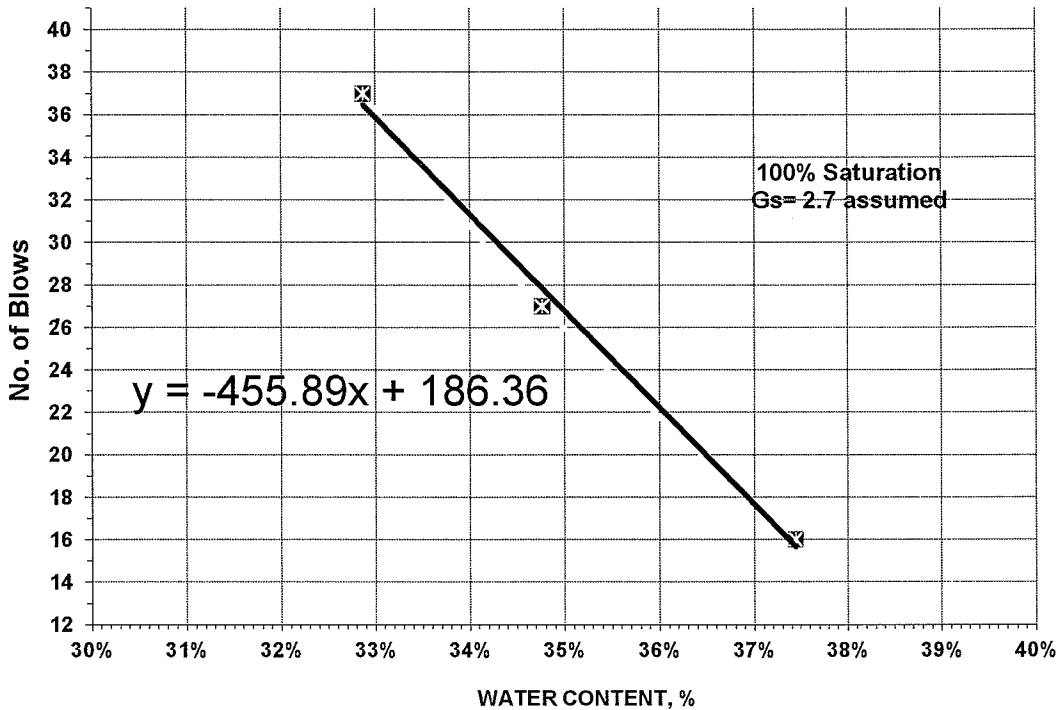
PROJECT : **Newalta Landfill**
LOCATION : **Stoney Creek, ON**
CLIENT : **AECOM**

FILE No.: **72-10-5013**
LAB No.: **S699**

SAMPLE DESCRIPTION : **Brown Silty Clay - Offsite (N12-CL-003** SAMPLE DATE: **June 27, 2012**
SAMPLED BY : **Client**

Liquid Limit:	35.03
Plastic Limit:	13.97
Platicity Inde	21.06

STANDARD ATTERBURG GRAPH



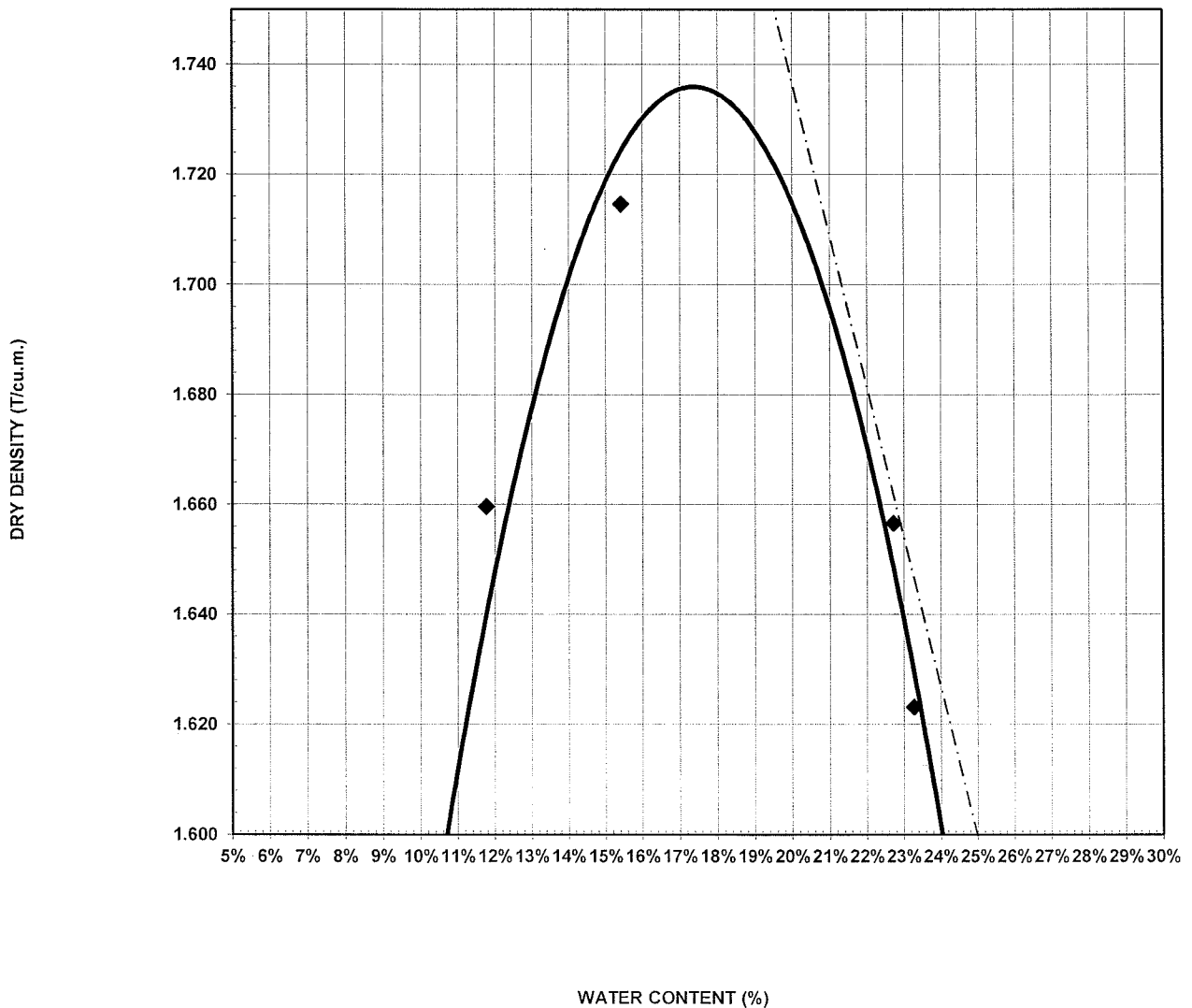


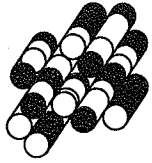
PROJECT: Newalta Landfill
LOCATION: Stoney Creek, ON
CLIENT: AECOM
SAMPLE DESCRIPTION: Brown Silty Clay, trace to some sand, occasional gravel
SAMPLE LOCATION: (N12-CL-003) Detention Pond Area
SAMPLE SUPPLIER:

FILE No.: 72-10-5013
LAB No.: S699
SAMPLE DATE: June 27, 2012
SAMPLED BY: Client

MAXIMUM DRY DENSITY (t/m^3):	1.735
CORRECTED DRY DENSITY (t/m^3):	1.735
OPTIMUM WATER CONTENT (%):	17.5

STANDARD PROCTOR COMPACTION





Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

August 1, 2012

Ref: 72-10-5013

Formerly (8-10-5013)
Stoney Creek Office

AECOM

300 - 300 Town Centre Boulevard
Markham, ON
L3R 5Z6

Attention: **Mr. Brian Dermody**

**RE: LABORATORY TEST RESULTS
NEWALTA LANDFILL
STONEY CREEK, ONTARIO**

Dear Sir,

This report presents the results of laboratory testing carried out on a sample of material delivered to our laboratory by a representative of your office on July 24th, 2012 and entered into our log on July 24th, 2012. As per your instructions, the testing was to consist of a hydrometer analysis, Atterburg Limits, moisture content and standard Proctor compaction testing.

The sample received was labeled by your office as follows:


N12-CL-006 - East Borrow

The attached table (Table 1) provides a summary of the test results.

We trust that this letter and the enclosed are satisfactory for your present requirements. If there is any point requiring further clarification, please contact this office.

Yours Truly,

Terraprobe Inc.



Adam Cummings, C.Tech
Technical Services Co-ordinator

Terraprobe Inc.

Greater Toronto
11 Indell Lane
Brampton, Ontario L6T 3Y3
(905) 796-2650 Fax 796-2250
brampton@terraprobe.ca

Hamilton - Niagara
903 Barton Street, Unit 22
Stoney Creek, Ontario L8E 5P5
(905) 643-7560 Fax 643-7559
stoneycreek@terraprobe.ca

Central Ontario
220 Bayview Drive, Unit 25
Barrie, Ontario L4N 4Y8
(705) 739-8355 Fax 739-8369
barrie@terraprobe.ca

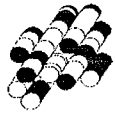
Northern Ontario
1012 Kelly Lake Rd.
Sudbury, Ontario P3E 5P4
(705) 670-0460 Fax 670-0558
sudbury@terraprobe.ca

www.terraprobe.ca

**TABLE 1
SUMMARY OF LABORATORY TESTING**

	Terraprobe SAMPLE ID	S714
	AECOM SAMPLE ID	N12-CL-006
As Received Moisture Content		28.4%
Plastic Limit (%)		17.3%
Liquid Limit (%)		41.2%
Plasticity Index		23.9%
Maximum Dry Density		1.675T/m ³
Optimum Moisture Content		20.0%

* Table to be read with accompanying letter. All percent values rounded to 0.1%.



Terraprobe

**ATTERBURG LIMIT
TEST FORM**

PROJECT : Newalta Landfill
LOCATION : Stoney Creek, ON
CLIENT : AECOM

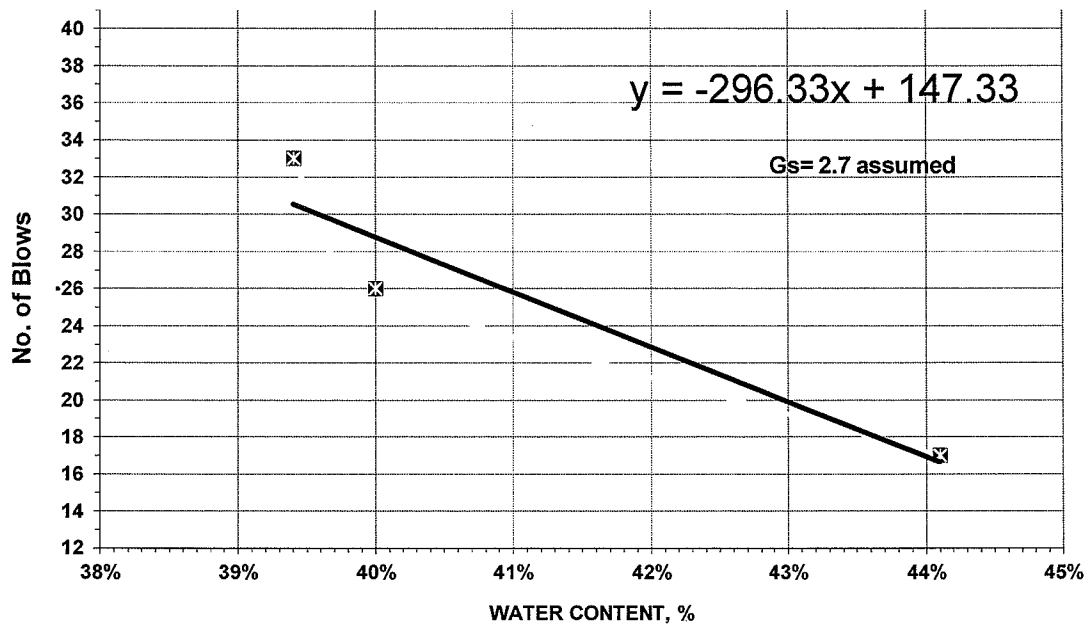
FILE No.: 72-10-5013
LAB No.: S714

SAMPLE DESCRIPTION : Brown Silty Clay - (N12-CL-006)
East Borrow

SAMPLE DATE: July 24, 2012
SAMPLED BY : Client

Liquid Limit:	41.17
Plastic Limit:	17.25
Platicity Index	23.92

STANDARD ATTERBURG GRAPH



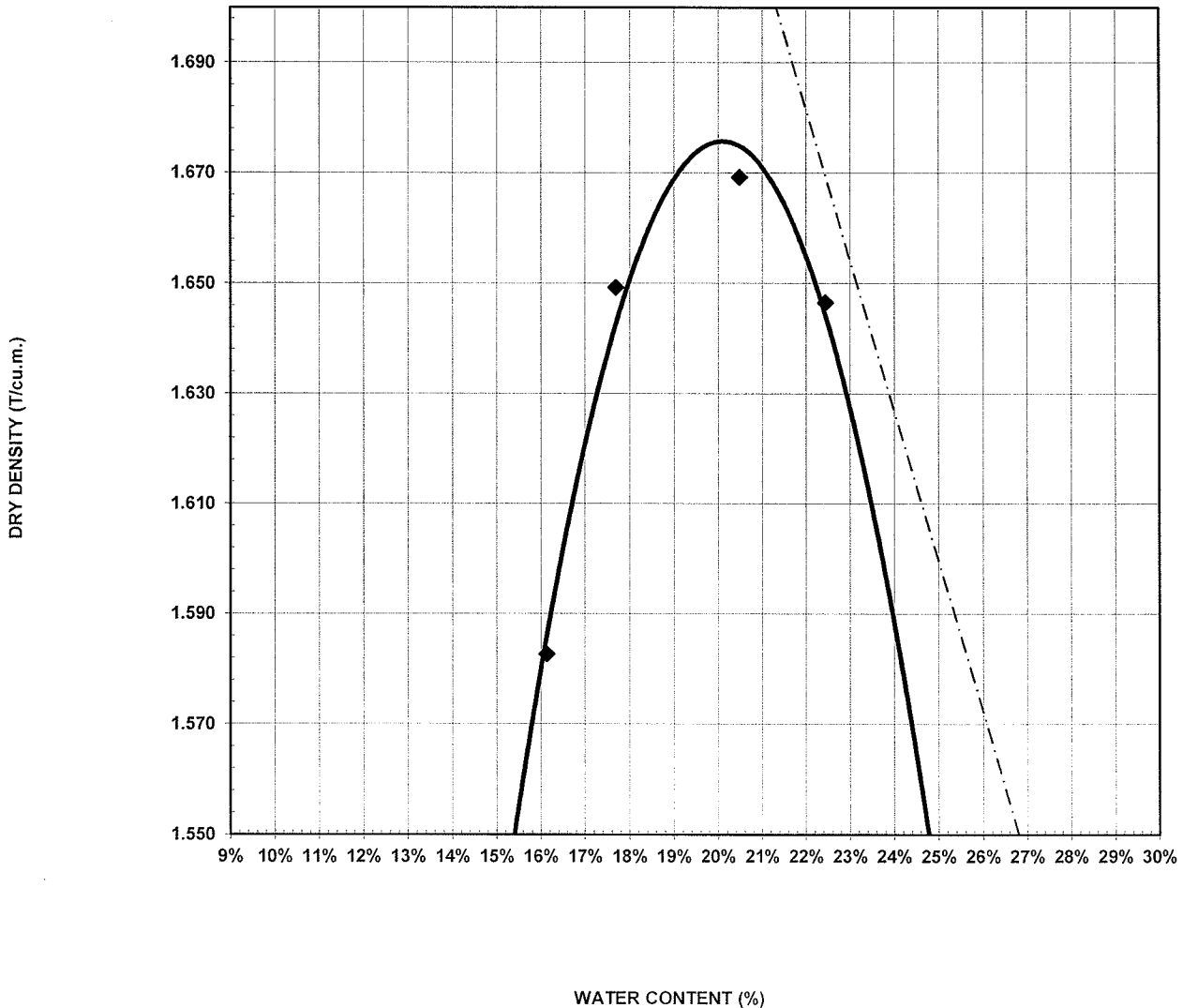


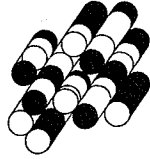
PROJECT: **Newalta Landfill**
LOCATION: **Stoney Creek, ON**
CLIENT: **AECOM**
SAMPLE DESCRIPTION: **Brown Silty Clay, trace sand**
SAMPLE LOCATION: **(N12-CL-006) East Borrow**
SAMPLE SUPPLIER:

FILE No.: **72-10-5013**
LAB No.: **S714**
SAMPLE DATE: **July 24, 2012**
SAMPLED BY: **Client**

MAXIMUM DRY DENSITY (t/m^3):	1.675
CORRECTED DRY DENSITY (t/m^3):	1.675
OPTIMUM WATER CONTENT (%):	20.0

STANDARD PROCTOR COMPACTION





Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

September 24, 2012

Ref: 72-10-5013
Stoney Creek Office

AECOM

300 - 300 Town Centre Boulevard
Markham, ON
L3R 5Z6

Attention: **Mr. Brian Dermody**

**RE: LABORATORY TEST RESULTS
NEWALTA LANDFILL
STONEY CREEK, ONTARIO**

Dear Sir,

This report presents the results of laboratory testing carried out on two samples delivered to our laboratory by a representative of your office on September 18th, 2012. As per your instructions, the testing was to consist of a sieve gradation analysis on a granular sample and a standard Proctor test, moisture content, and sieve hydrometer analysis on a soil sample. The samples received were labeled by your office as follows:

N12-LC-002 - Cayuga - 19mm Clear Stone
N12-EF-001 - North Buffer - Engineered Fill

The attached table (Table 1) provides a summary of the test results for N12-EF-001 (S759). The sieve hydrometer for (S759) and sieve gradation analysis (S760) is also attached.

We trust that this letter and the enclosed are satisfactory for your present requirements. If there is any point requiring further clarification, please contact this office.

Yours Truly,

Terraprobe Inc.



Adam Cummings, C.Tech
Technical Services Coordinator

Terraprobe Inc.

Greater Toronto
10 Bram Court
Brampton, Ontario L6W 3R6
(905) 796-2650 Fax 796-2250
brampton@terraprobe.ca

Hamilton - Niagara
903 Barton Street, Unit 22
Stoney Creek, Ontario L8E 5P5
(905) 643-7560 Fax 643-7559
stoneycreek@terraprobe.ca

Central Ontario
220 Bayview Drive, Unit 25
Barrie, Ontario L4N 4Y8
(705) 739-8355 Fax 739-8369
barrie@terraprobe.ca

Northern Ontario
1012 Kelly Lake Rd.
Sudbury, Ontario P3E 5P4
(705) 670-0460 Fax 670-0558
sudbury@terraprobe.ca

www.terraprobe.ca

**TABLE 1
SUMMARY OF LABORATORY TESTING**

Terraprobe SAMPLE ID	S759
AECOM SAMPLE ID	N12-EF-001 - North Buffer - Engineered Fill
As Received Moisture Content	14.4%
Maximum Dry Density	1.925T/m ³
Optimum Moisture Content	14.0%

* Table to be read with accompanying letter.





Terraprobe

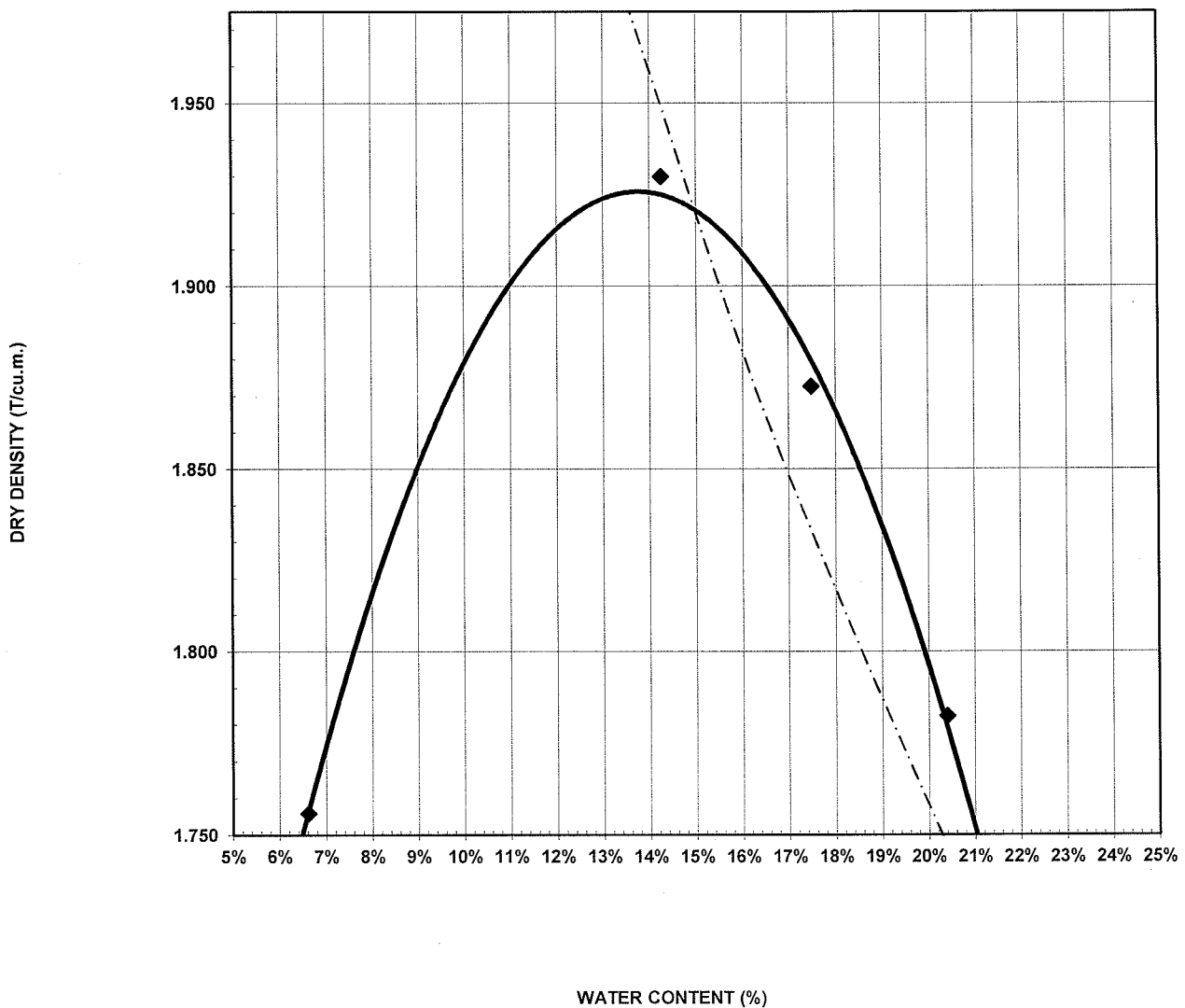
PROCTOR COMPACTION

PROJECT: **Newalta Landfill**
LOCATION: **Stoney Creek, ON**
CLIENT: **AECOM**
SAMPLE DESCRIPTION: **Brown Clayey Silt with sand and gravel**
SAMPLE LOCATION: **North Buffer - Engineered Fill (N12-EF-001)**
SAMPLE SUPPLIER: **N/A**

FILE No.: **72-10-5013**
LAB No.: **S759**
SAMPLE DATE: **September 18, 2012**
SAMPLED BY: **Client**

MAXIMUM DRY DENSITY (t/m^3):	1.925
CORRECTED DRY DENSITY (t/m^3):	1.925
OPTIMUM WATER CONTENT (%):	14.0

STANDARD PROCTOR COMPACTION





Terraprobe

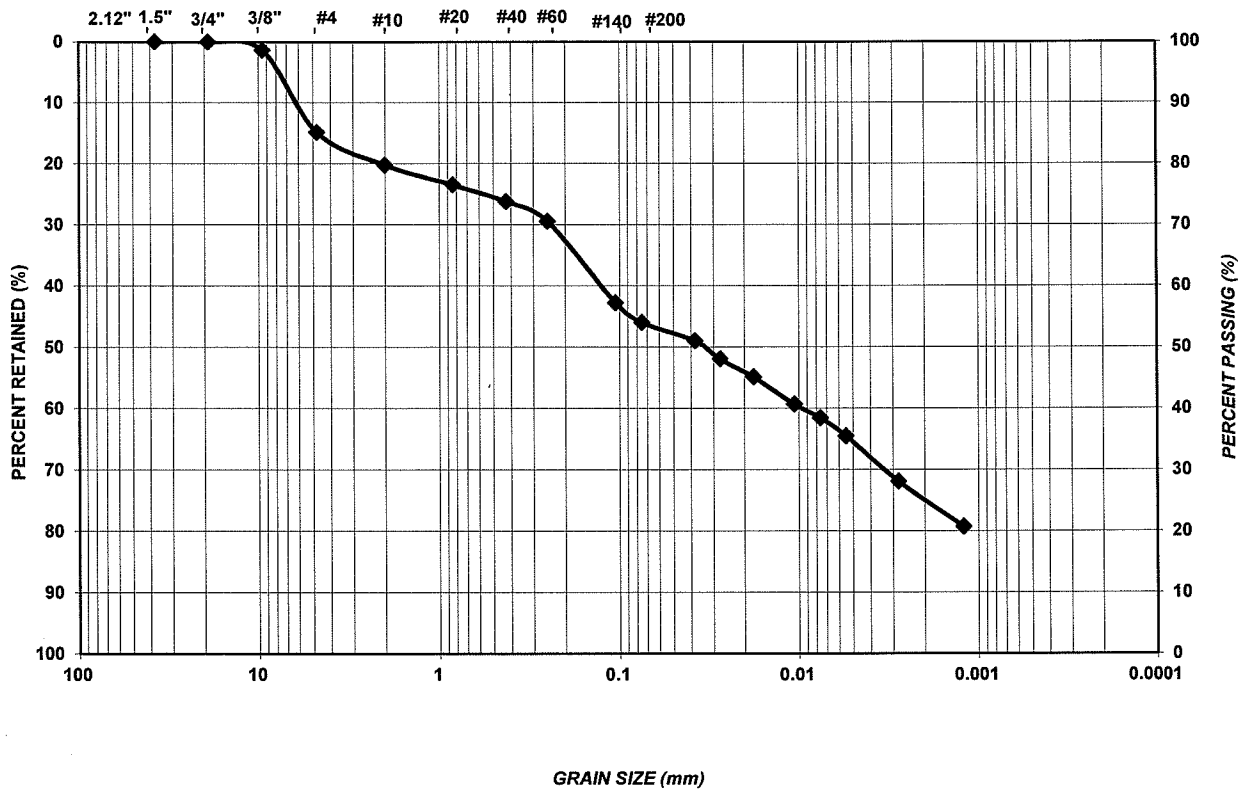
SIEVE AND HYDROMETER ANALYSIS

PROJECT: **Newalta Landfill**
 LOCATION: **Stoney Creek, ON**
 CLIENT: **AECOM**
 BOREHOLE: **N/A**

FILE NO.: **72-10-5013**
 LAB NO.: **S759**
 SAMPLE DATE: **September 18, 2012**
 SAMPLED BY: **Client**

SAMPLE NUMBER: **(N12-EF-001) North Buffer - Engineered Fill**
 SAMPLE DESCRIPTION: **Brown Clayey Silt with sand and gravel**

GRAIN SIZE DISTRIBUTION
 U.S. STANDARD SIEVE SIZES



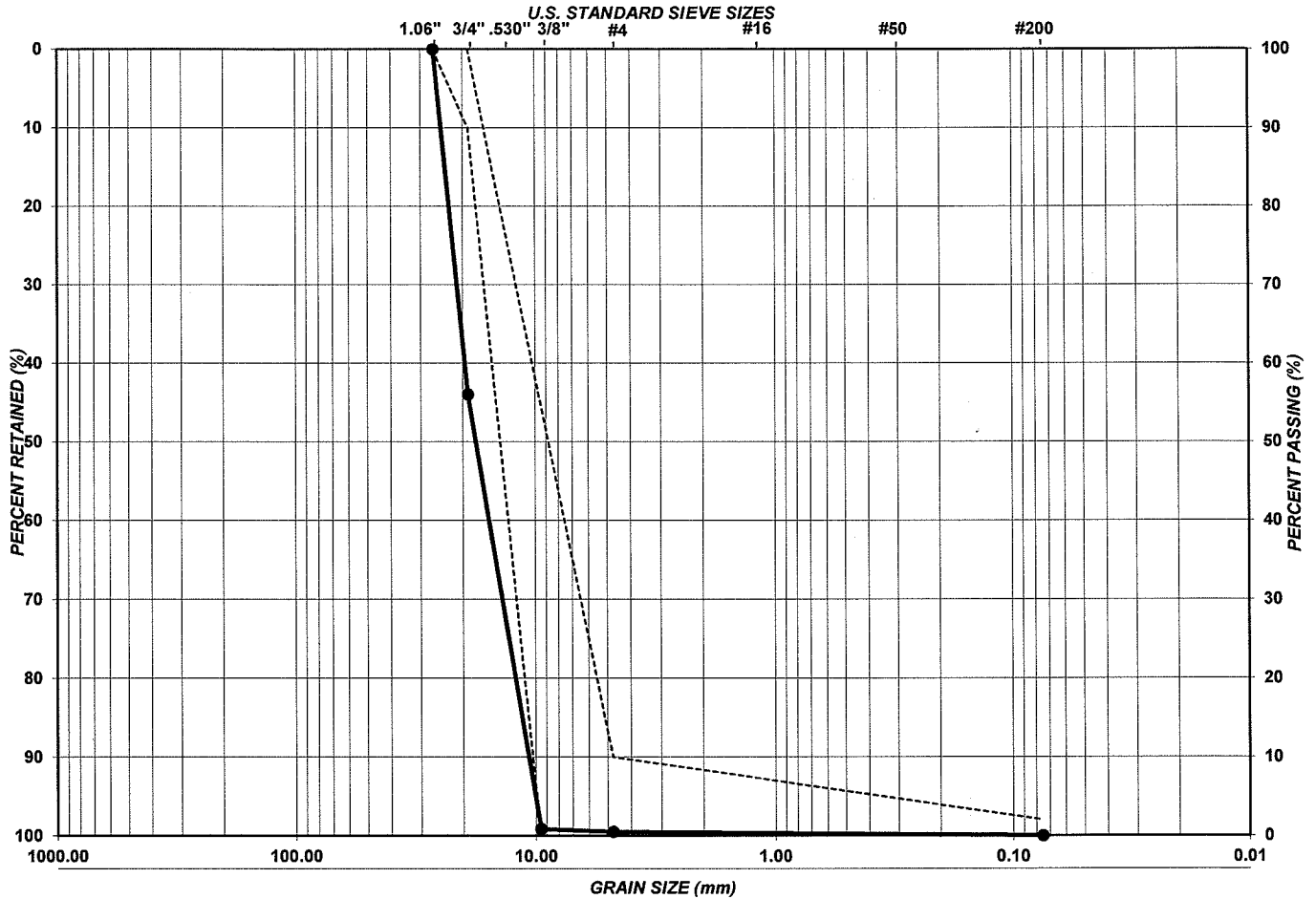
MIT SYSTEM	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
	GRAVEL			SAND				



PROJECT: **Newalta**
 LOCATION: **Stoney Creek, Ontario**
 CLIENT: **AECOM**
 MATERIAL DESCRIPTION: **Cayuga 19mm Clear Stone - N12-LC-002**
 SAMPLE LOCATION: **N/A**
 SAMPLE SUPPLIER: **N/A**

FILE NO.: **72-10-5013**
 LAB NO.: **S760**
 SAMPLE DATE: **September 18, 2012**
 SAMPLED BY: **Client**

GRAIN SIZE DISTRIBUTION



MIT SYSTEM	GRAVEL			COARSE	MEDIUM	FINE	SILT
				SAND			
UNIFIED SYSTEM			COARSE	FINE	COARSE	MEDIUM	FINE
			GRAVEL		SAND		
SIEVE SIZE		PERCENT PASSING			19mm CLEARSTONE		
Standard	(mm)	SPECIFIED MIN.	SPECIFIED MAX.	SAMPLE	OPSS 1004		
1.06"	26.5	100	100	100.0			
3/4"	19.0	90	100	56.0			
3/8"	9.5	0	55	0.8			
No. 4	4.75	0	10	0.5			
No. 200	0.075	0	2	0.0			
Note: Shading denotes not meeting specifications							



Terraprobe

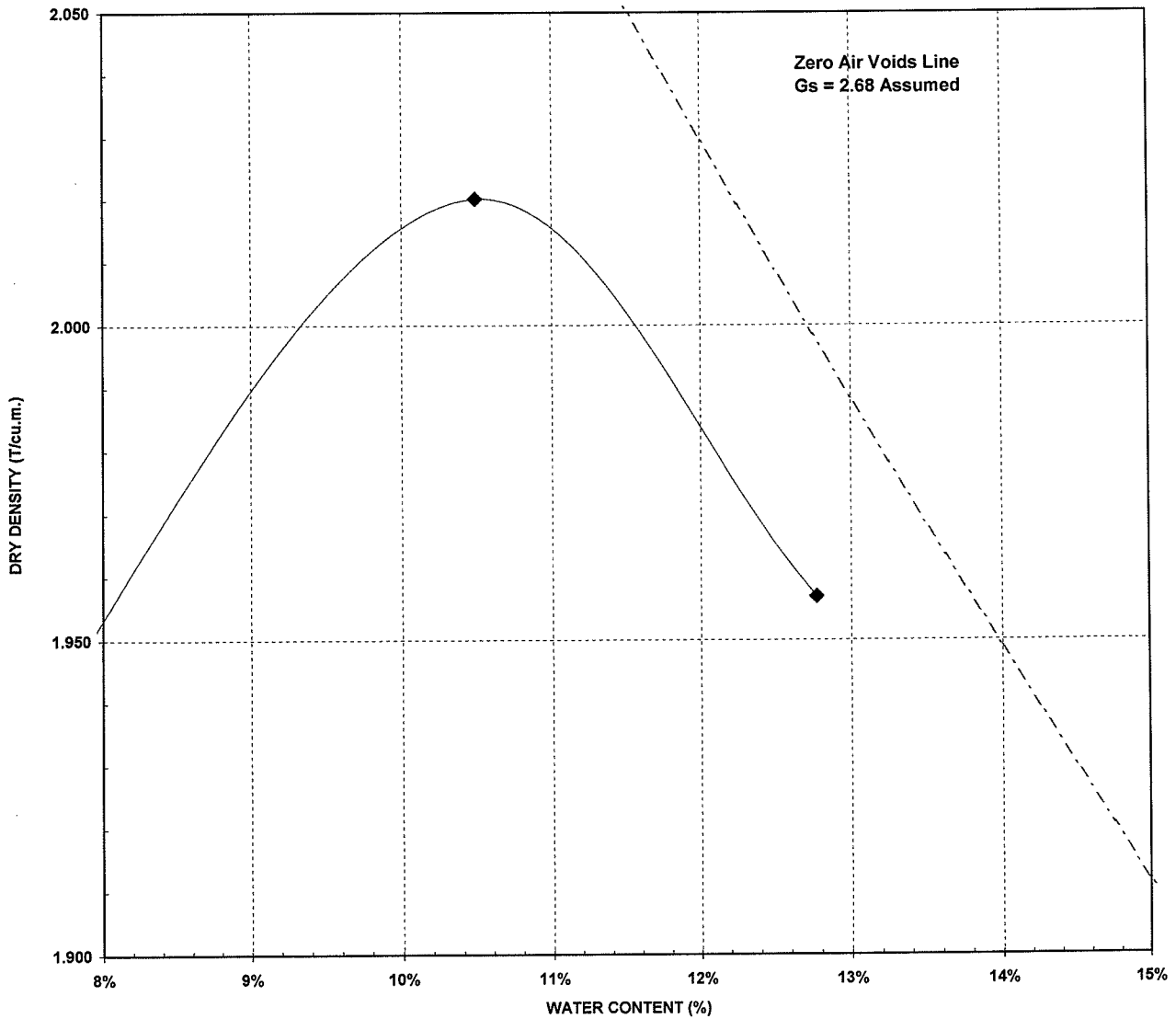
PROCTOR COMPACTION TEST REPORT

PROJECT: **Newalta Landfill**
LOCATION: **Hamilton**
CLIENT: **Gartner Lee Ltd.**
SAMPLE DESCRIPTION: **Sandy Silt**
SAMPLE LOCATION: **Stockpile Sa2**
SAMPLE SUPPLIER:

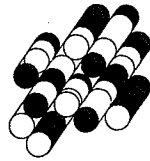
FILE No.: **8-07-2022**
LAB No.: **072051**
SAMPLE DATE: **May 17 2007**
SAMPLED BY: **Client**

MAXIMUM DRY DENSITY (t/m^3):	2.020
OPTIMUM WATER CONTENT (%):	10.5

STANDARD PROCTOR COMPACTION



In Situ Water Content = 11.1%



Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

June 18, 2010

Ref: 8-10-5013
Stoney Creek Office

AECOM

300 - 300 Town Centre Boulevard
Markham, ON
L3R 5Z6

Attention: **Mr. Brian Dermody**

**RE: LABORATORY TEST RESULTS
NEWALTA LANDFILL
STONE CREEK, ONTARIO**

Dear Sir,

This report presents the results of laboratory testing carried out on a sample of material delivered to our laboratory by a representative of your office on June 8, 2010. As per your instructions, the testing was to consist of a hydrometer analysis, Atterburg Limits, and standard Proctor compaction testing of the sample. The sample received was labelled by your office as follows:

Newalta, Phase 5B, Sample #3
Clay, Highway 20 South Borrow.

The attached table (Table 1) provides a summary of the test results. The hydrometer analysis is also attached.

We trust that this letter and the enclosed are satisfactory for your present requirements. If there is any point requiring further clarification, please contact this office.

Yours Truly,

Terraprobe Inc.

T. Kyle MacDonald, B.Sc.
Technical Services Coordinator

Terraprobe Inc.

Greater Toronto
10 Bram Court
Brampton, Ontario L6W 3R6
(905) 796-2650 Fax 796-2250
brampton@terraprobe.ca

Hamilton - Niagara
903 Barton Street, Unit 22
Stoney Creek, Ontario L8E 5P5
(905) 643-7560 Fax 643-7559
stoneycreek@terraprobe.ca

Central Ontario
220 Bayview Drive, Unit 25
Barrie, Ontario L4N 4Y8
(705) 739-8355 Fax 739-8369
barrie@terraprobe.ca
www.terraprobe.ca

Northern Ontario
1012 Kelly Lake Rd.
Sudbury, Ontario P3E 5P4
(705) 670-0460 Fax 670-0558
sudbury@terraprobe.ca

**TABLE 1
SUMMARY OF LABORATORY TESTING**

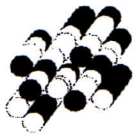
Terraprobe SAMPLE ID	S062
AECOM SAMPLE ID	Phase 5, Sample #3, Clay, Hwy. 20 South Borrow
Terraprobe Sample Description	Brown Silty CLAY, trace sand
Plastic Limit (%)	19.8
Liquid Limit (%)	42.4
Plasticity Index	22.6
Maximum Dry Density	1.658 T/m ³
Optimum Moisture Content	22.5%

* Table to be read with accompanying letter.

**TABLE 1
SUMMARY OF LABORATORY TESTING**

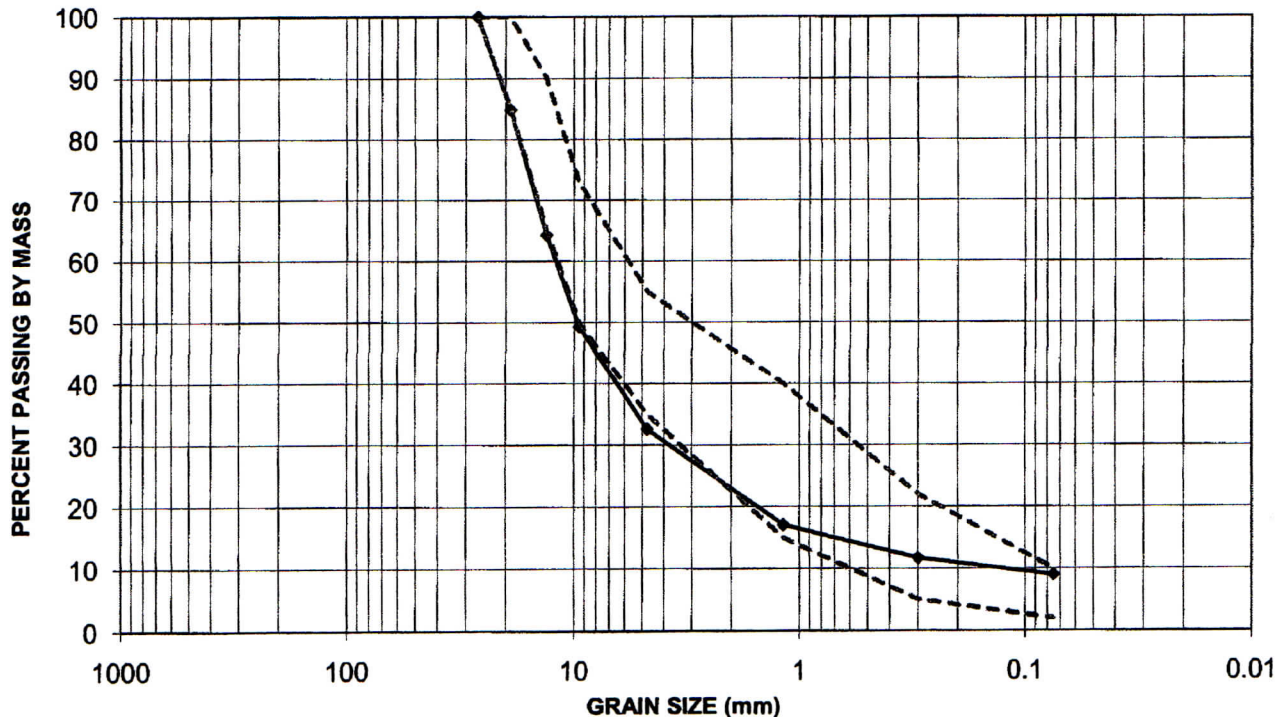
Terraprobe SAMPLE ID	S027	S028	S029	S030	S031
AECOM SAMPLE ID	Granular A limestone	Berm Stockpile South, Sample #2	Berm Stockpile North, Sample #1	Engineered Fill Stockpile, East	Engineered Fill Stockpile, West
Terraprobe Sample Description	Grey 26.5mm down crushed limestone, trace clay	Brown Silty CLAY with Grey SILT, trace sand, trace gravel	Brown Silty CLAY, trace gravel, trace topsoil	Brown Silty SAND, some gravel	Brown Silty SAND, some topsoil, trace to some gravel
SIEVE SIZE					
150mm	100.0	100.0	100.0	100.0	100.0
26.5mm	100.0			96.2	94.5
19.0mm	84.8	99.6	93.4	90.7	93.2
13.2mm	64.3			85.5	91.1
9.5mm	49.3	98.2	92.9	79.9	89.8
4.75mm	32.6	96.1	92.3	70.8	84.6
1.18mm	17.1			58.5	79.6
0.300mm	11.7			49.6	69.1
0.075mm	9.0	87.4	85.8	36.2	36.3
Plastic Limit		15.0%	18.6%		
Liquid Limit		29.3%	35.1%		
Plasticity Index		14.3	16.5		
Maximum Dry Density	2.120 T/m ³	1.765 T/m ³	1.725 T/m ³	2.008 T/m ³	1.968 T/m ³
Optimum Moisture Content	7.4%	16.6%	19.2%	11.2%	10.2%

* Table to be read with accompanying letter.



PROJECT: Newalta Landfill
LOCATION: unknown
CLIENT: AECOM
SAMPLE SUPPLIER: Client
SAMPLE LOCATION: unknown
MATERIAL DESCRIPTION: Grey 26.5mm down crushed limestone, trace clay

FILE NO.: 8-10-5013
LAB NO.: S027
SAMPLE DATE: May 4, 2010
SAMPLED BY: Client



MIT SYSTEM	COBBLE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT
		GRAVEL			SAND			

SIEVE SIZE (mm)	PERCENT PASSING BY MASS	
	Tolerance Ranges	SAMPLE
150		
37.5		
26.5	100	100.0
19.0	85 - 100	84.3
13.2	65 - 90	64.3
9.5	50 - 73	49
4.75	35 - 55	32.6
1.18	15 - 40	17.1
0.300	5 - 22	11.7
0.150		
0.075	2 - 10	9.0

GRANULAR 'A'
OPSS FORM 1010

Note:
 The sample does not meet the tolerance specifications for the percent passing four sieve sizes.

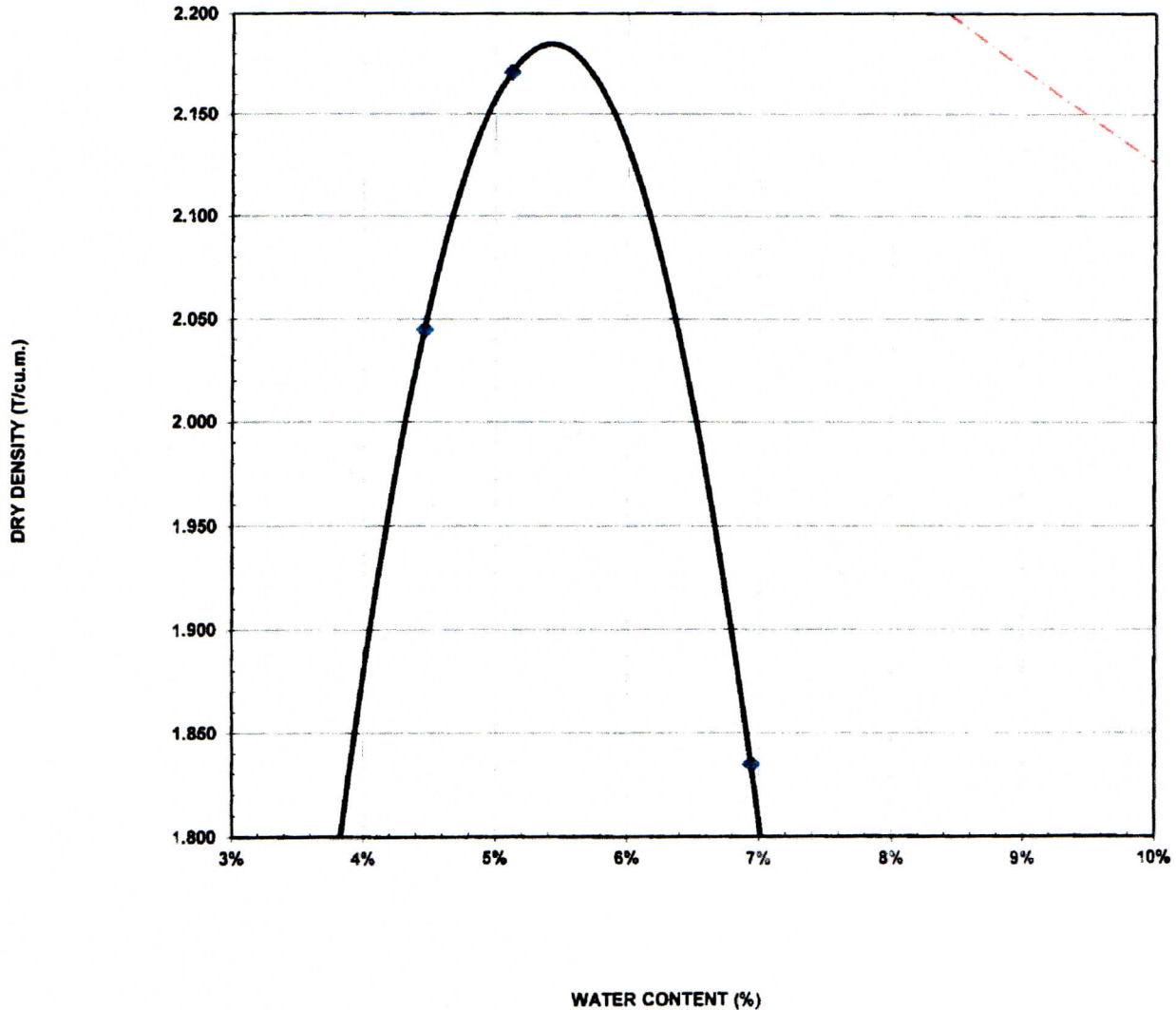


PROJECT: Newalta Landfill
LOCATION: Hamilton, Ontario
CLIENT: AECOM
SAMPLE DESCRIPTION: Granular A - N11-GA-001
SAMPLE LOCATION: N/A
SAMPLE SUPPLIER: N/A

FILE No.: 8-10-5013
LAB No.: S507
SAMPLE DATE: Novemebr 1, 2011
SAMPLED BY: Client

MAXIMUM DRY DENSITY (t/m^3):	2.185
CORRECTED DRY DENSITY (t/m^3):	2.185
OPTIMUM WATER CONTENT (%):	5.4

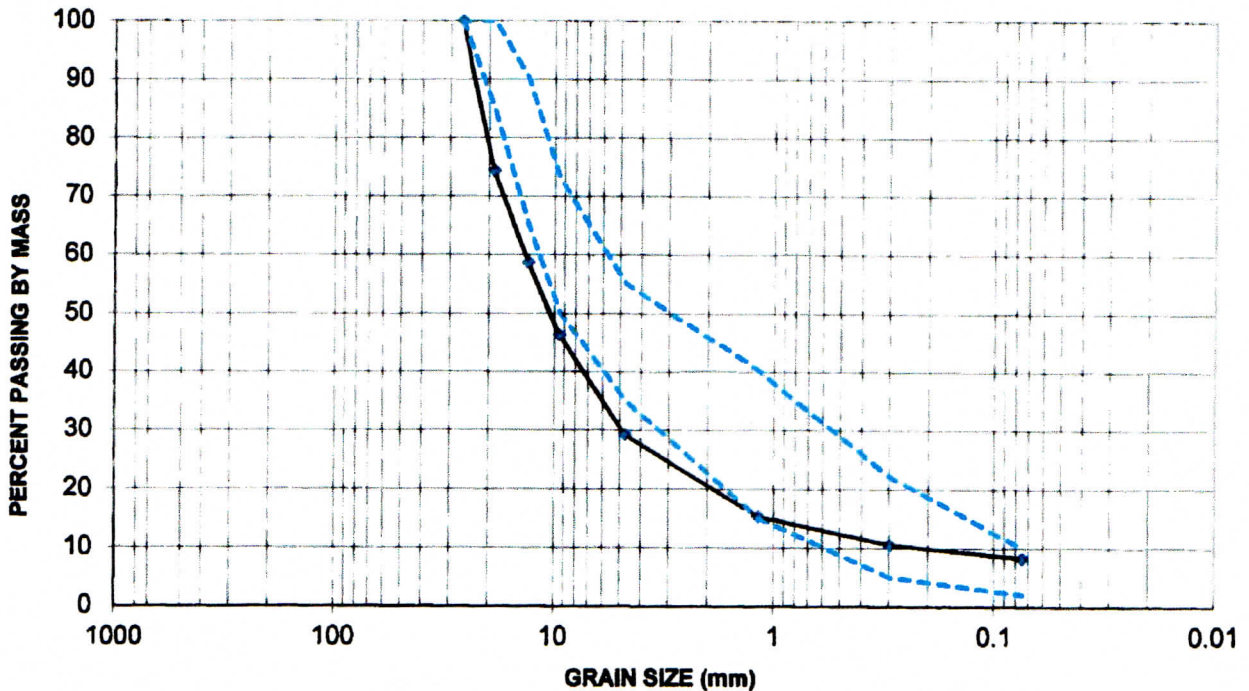
STANDARD PROCTOR COMPACTION





PROJECT: Newalta Landfill
LOCATION: Hamilton, Ont.
CLIENT: AECON
SAMPLE SUPPLIER: N/A
SAMPLE LOCATION: N/A
MATERIAL DESCRIPTION: Gran A - N11-GA-001

FILE NO.: 8-10-5013
LAB NO.: S507
SAMPLE DATE: Nov. 1, 2011
SAMPLED BY: Client



MIT	COBBLE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT
		GRAVEL			SAND			

SIEVE SIZE	PERCENT PASSING BY MASS		GRANULAR 'A' OPSS FORM 1010
(mm)	Tolerance Ranges	SAMPLE	
150			Note:
37.5			
26.5	100	100.0	
19.0	85 - 100	74.3	
13.2	65 - 90	58.7	
9.5	50 - 73	46.3	
4.75	35 - 55	29.2	
1.18	15 - 40	15.3	
0.300	5 - 22	10.6	
0.150			
0.075	2 - 10	8.3	



Terraprobe

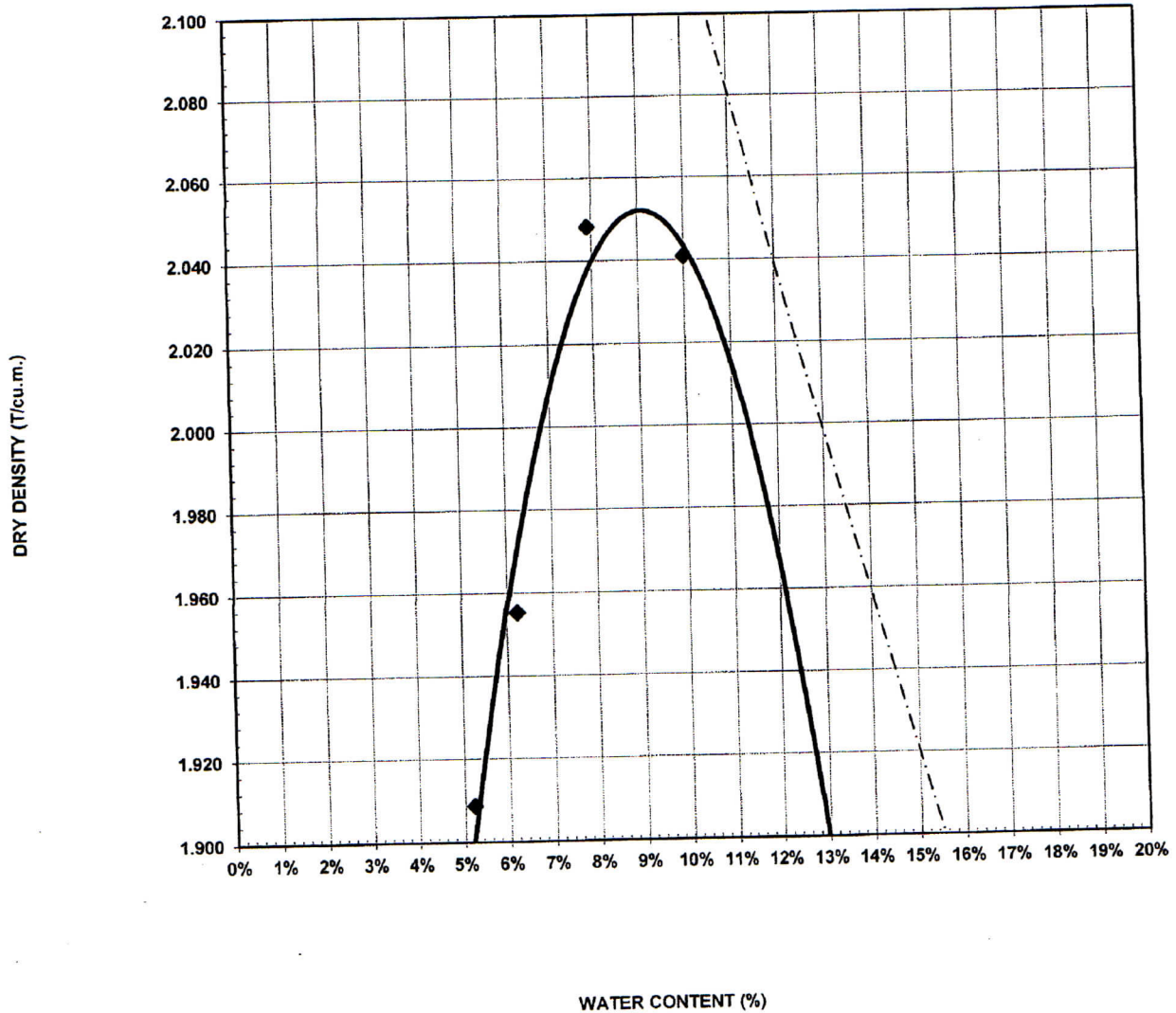
PROCTOR COMPACTION

PROJECT: Newalta Landfill
LOCATION: Stoney Creek, ON
CLIENT: AECOM
SAMPLE DESCRIPTION: CY - Granular A
SAMPLE LOCATION: (N12-BGL-001)
SAMPLE SUPPLIER:

FILE No.: 72-10-5013
LAB No.: S727
SAMPLE DATE: August 8, 2012
SAMPLED BY: Client

MAXIMUM DRY DENSITY (t/m^3):	2.050
CORRECTED DRY DENSITY (t/m^3):	2.050
OPTIMUM WATER CONTENT (%):	9.0

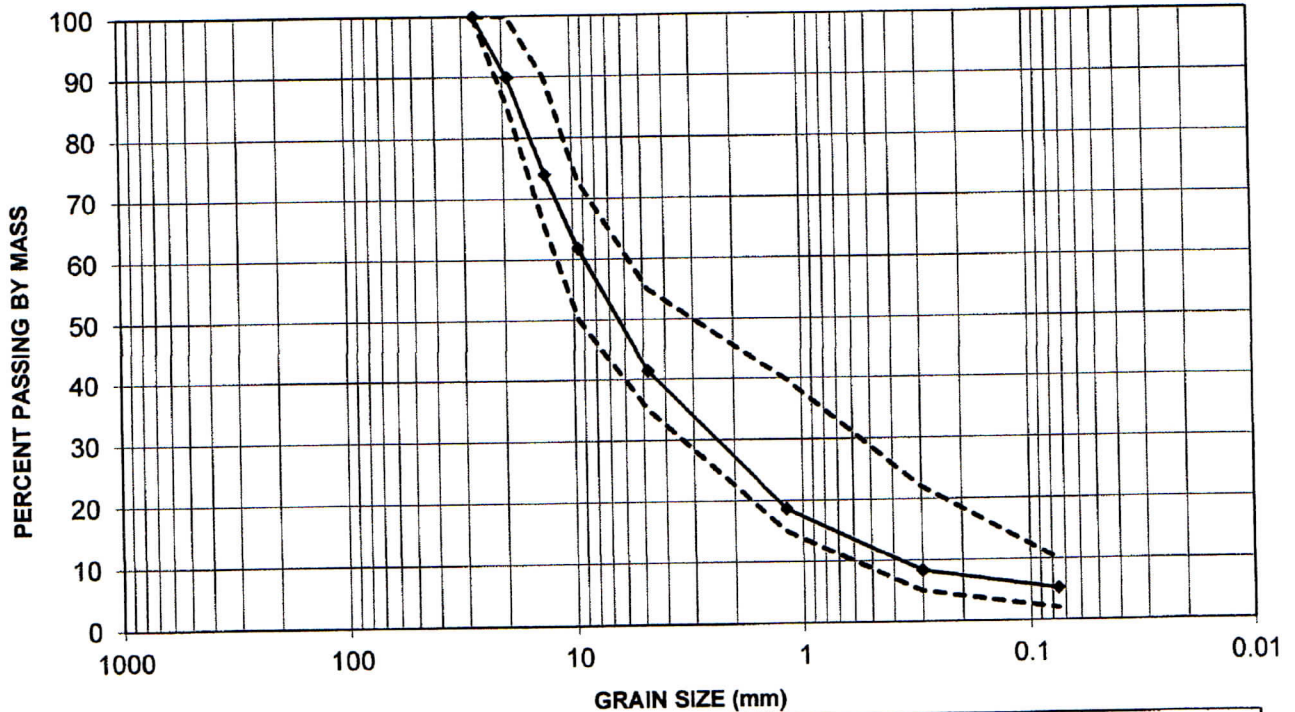
STANDARD PROCTOR COMPACTION





PROJECT: Newalta - Landfill
 LOCATION: Stoney Creek, On
 CLIENT: AECOM
 SAMPLE SUPPLIER: N/A
 SAMPLE LOCATION: N/A
 MATERIAL DESCRIPTION: N12-BGL-001 - CY Granular A

FILE NO.: 72-10-5013
 LAB NO.: S727
 SAMPLE DATE: August 8, 2012
 SAMPLED BY: Client



MIT SYSTEM	COBBLE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT
		GRAVEL			SAND			

SIEVE SIZE (mm)	PERCENT PASSING BY MASS	
	Tolerance Ranges	SAMPLE
150		
37.5		
26.5	100	100.0
19.0	85 - 100	89.9
13.2	65 - 90	74.0
9.5	50 - 73	61.8
4.75	35 - 55	41.5
1.18	15 - 40	18.6
0.300	5 - 22	8.3
0.150		
0.075	2 - 10	5.2

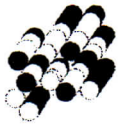
GRANULAR 'A'
 OPSS FORM 1010

Note:

**TABLE 1
SUMMARY OF LABORATORY TESTING**

Terraprobe SAMPLE ID	S027	S028	S029	S030	S031
AECOM SAMPLE ID	Granular A limestone	Berm Stockpile South, Sample #2	Berm Stockpile North, Sample #1	Engineered Fill Stockpile, East	Engineered Fill Stockpile, West
Terraprobe Sample Description	Grey 26.5mm down crushed limestone, trace clay	Brown Silty CLAY with Grey SILT, trace sand, trace gravel	Brown Silty CLAY, trace gravel, trace topsoil	Brown Silty SAND, some gravel	Brown Silty SAND, some topsoil, trace to some gravel
SIEVE SIZE					
150mm	100.0	100.0	100.0	100.0	100.0
26.5mm	100.0			96.2	94.5
19.0mm	84.8	99.6	93.4	90.7	93.2
13.2mm	64.3			85.5	91.1
9.5mm	49.3	98.2	92.9	79.9	89.8
4.75mm	32.6	96.1	92.3	70.8	84.6
1.18mm	17.1			58.5	79.6
0.300mm	11.7			49.6	69.1
0.075mm	9.0	87.4	85.8	36.2	36.3
Plastic Limit		15.0%	18.6%		
Liquid Limit		29.3%	35.1%		
Plasticity Index		14.3	16.5		
Maximum Dry Density	2.120 T/m ³	1.765 T/m ³	1.725 T/m ³	2.008 T/m ³	1.968 T/m ³
Optimum Moisture Content	7.4%	16.6%	19.2%	11.2%	10.2%

* Table to be read with accompanying letter.

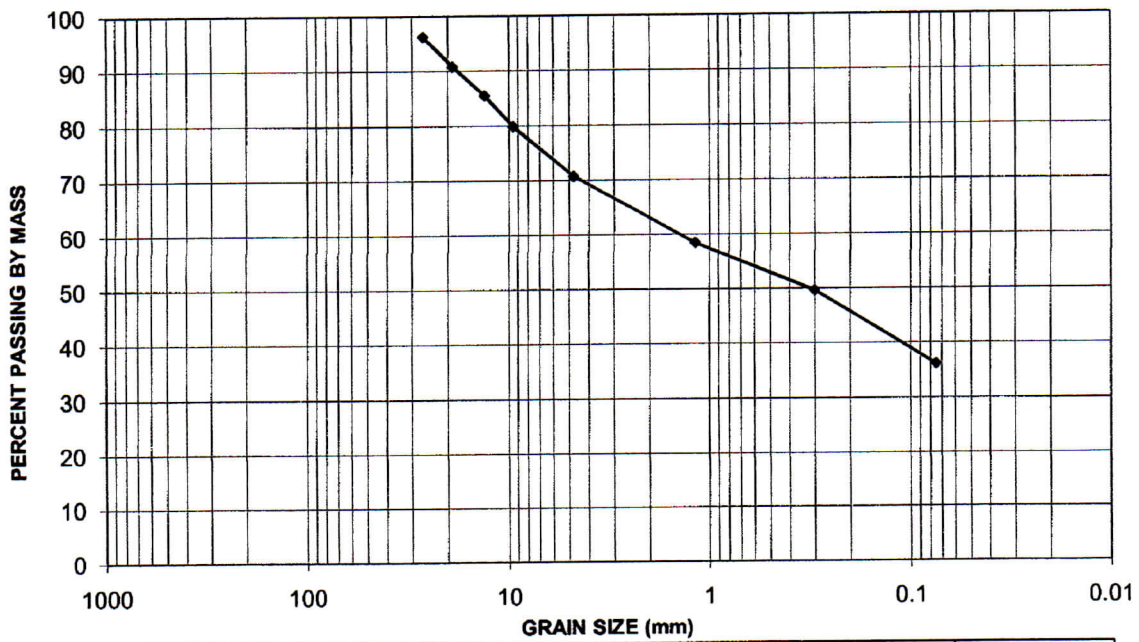


Terraprobe

GRAIN SIZE ANALYSIS

PROJECT: **Newalta Landfill**
 LOCATION: **unknown**
 CLIENT: **AECOM**
 SAMPLE SUPPLIER: **Client**
 SAMPLE LOCATION: **Engineered Fill (Stockpile, East)**
 MATERIAL DESCRIPTION: **Brown Silty SAND, some gravel**

FILE NO.: **8-10-5013**
 LAB NO.: **S030**
 SAMPLE DATE: **May 4, 2010**
 SAMPLED BY: **Client**



MIT SYSTEM	COBBLE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT
		GRAVEL			SAND			

SIEVE SIZE (mm)	PERCENT PASSING BY MASS	
	Tolerance Ranges	SAMPLE
150		100.0
37.5		
26.5		96.2
19.0		90.7
13.2		85.5
9.5		79.9
4.75		70.8
1.18		58.5
0.300		49.6
0.150		
0.075		36.2

Note:

Appendix E

In situ Moisture Contents



Newalta Stormwater Ponds
 Stoney Creek, ON
 Moisture Content

Project No.: 60265424
 Tested by: Mike Stocker
 Reviewed by: Marco Coscarella

Sample No.: 1

Date: 7/11/2012
 Location: Ponds
 Description: Low Perm Soil (Troxler % Moisture = 24.0)

Moisture Content	
Tare Number	4
Wet wt. plus Tare	701.9
Tare plus dry soil	608.4
Moisture	93.5
Tare	190.3
Dry Soil	418.1
% Moisture	22.4

Sample No.:2

Date: 7/11/2012
 Location: Ponds
 Description: Low Perm Soil (Troxler % Moisture = 24.3)

Moisture Content	
Tare Number	8
Wet wt. plus Tare	789.3
Tare plus dry soil	672.5
Moisture	116.8
Tare	190.2
Dry Soil	482.3
% Moisture	24.2

Sample No.: 1

Date: 7/12/2012
 Location: Ponds
 Description: Low Perm Soil (Troxler % Moisture = 24.4)

Moisture Content	
Tare Number	8
Wet wt. plus Tare	670.5
Tare plus dry soil	584.5
Moisture	86.0
Tare	190.1
Dry Soil	394.4
% Moisture	21.8

Sample No.: 2

Date: 7/13/2012
 Location: Ponds
 Description: Low Perm Soil (Troxler % Moisture = 23.6)

Moisture Content	
Tare Number	4
Wet wt. plus Tare	647.2
Tare plus dry soil	563.2
Moisture	84.0
Tare	190.3
Dry Soil	372.9
% Moisture	22.5

Sample No.: 1

Date: 10/16/2012
 Location: Ponds
 Description: Low Perm Soil (Troxler % Moisture = 18.5)

Moisture Content	
Tare Number	4
Wet wt. plus Tare	606.5
Tare plus dry soil	539.1
Moisture	67.4
Tare	190.4
Dry Soil	348.7
% Moisture	19.3

Sample No.: 1

Date: 10/17/2012
 Location: Ponds
 Description: Low Perm Soil (Troxler % Moisture =21.2)

Moisture Content	
Tare Number	4
Wet wt. plus Tare	662.1
Tare plus dry soil	582.5
Moisture	79.6
Tare	190.3
Dry Soil	392.2
% Moisture	20.3

Appendix F

Field Testing Reports for the
Forebay and Detention Pond
(Clay)

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Forebay

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 7/11/2012

NO	ELEVATION	LOCATION OF TEST	BY PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC. YES/NO	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY DENSITY	MOISTURE CONTENT	DRY DENSITY			
					MOISTURE						
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
1	1ST LIFT	1618N 1028E	S	98.0	22.5	1658	24.0	1628	98.2%	YES	Gr. Br. Clayey Silt
2	1ST LIFT	1593N 1045E	S	98.0	22.5	1658	24.3	1628	98.2%	YES	Gr. Br. Clayey Silt*
1	"	N1196 E1552	S	98.0	21.2	1650	23.6	1620	98.2%	YES	Gr. Br. Clayey Silt
2	"	N1222 E1560	S	98.0	19.2	1725	20.2	1740	100.9%	YES	Gr. Br. Clayey Silt
3	"	N1199 E1557	S	98.0	18.6	1707	21.0	1670	97.8%	YES	Gr. Br. Clayey Silt*
4	"	N1236 E1589	S	98.0	18.6	1707	20.7	1680	98.4%	YES	Gr. Br. Clayey Silt
5	"	N1255 E1587	S	98.0	18.6	1707	20.3	1670	97.8%	YES	Gr. Br. Clayey Silt*

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * 3 MORE PASSES WITH COMPACTION EQUIPMENT AFTER TEST WAS CONDUCTED

AREA ACCEPTED ON A VISUAL BASIS

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Forebay

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 7/12/2012

NO	ELEVATION	LOCATION OF TEST	PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC. YES/NO	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY DENSITY	MOISTURE CONTENT	DRY DENSITY			
					MOISTURE						
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
3	2ND LIFT	1604N 1029E	S	98.0	22.5	1658	24.4	1626	98.1%	YES	Gr. Br. Clayey Silt
4	2ND LIFT	1590N 1033E	S	98.0	22.5	1658	24.0	1642	99.0%	YES	Gr. Br. Clayey Silt
1	"	N1196 E1552	S	98.0	21.2	1650	23.6	1620	98.2%	YES	Gr. Br. Clayey Silt
2	"	N1222 E1560	S	98.0	19.2	1725	20.2	1740	100.9%	YES	Gr. Br. Clayey Silt
3	"	N1199 E1557	S	98.0	18.6	1707	21.0	1670	97.8%	YES	Gr. Br. Clayey Silt*
4	"	N1236 E1589	S	98.0	18.6	1707	20.7	1680	98.4%	YES	Gr. Br. Clayey Silt
5	"	N1255 E1587	S	98.0	18.6	1707	20.3	1670	97.8%	YES	Gr. Br. Clayey Silt*

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * 3 MORE PASSES WITH COMPACTION EQUIPMENT AFTER TEST WAS CONDUCTED
AREA ACCEPTED ON A VISUAL BASIS

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Forebay

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 7/13/2012

NO	ELEVATION	LOCATION OF TEST	PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC.	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY DENSITY	MOISTURE CONTENT	DRY DENSITY			
					MOISTURE						
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
5	3RD LIFT	1608N 1041E	S	98.0	22.5	1658	23.5	1635	98.6%	YES	Gr. Br. Clayey Silt
6	3RD LIFT	1587N 1043E	S	98.0	22.5	1658	23.6	1623	97.9%	YES	Gr. Br. Clayey Silt*

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * 3 MORE PASSES WITH COMPACTION EQUIPMENT AFTER TEST WAS CONDUCTED

AREA ACCEPTED ON A VISUAL BASIS

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Detention

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 10/16/2012

NO	ELEVATION	LOCATION OF TEST	PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC.	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY DENSITY	MOISTURE CONTENT	DRY DENSITY			
					MOISTURE						
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
7	1ST LIFT	2	S	98.0	17.5	1735	18.5	1721	99.2%	YES	Gr. Br. Clayey Silt
8	1ST LIFT	1	S	98.0	18.6	1693	19.7	1666	98.4%	YES	Gr. Br. Clayey Silt
9	1ST LIFT	3	S	98.0	17.5	1735	19.2	1716	98.9%	YES	Gr. Br. Clayey Silt

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * 3 MORE PASSES WITH COMPACTION EQUIPMENT AFTER TEST WAS CONDUCTED
 AREA ACCEPTED ON A VISUAL BASIS

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Detention

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 10/17/2012

NO	ELEVATION	LOCATION OF TEST	BY PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC.	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY DENSITY	MOISTURE CONTENT	DRY DENSITY			
					MOISTURE						
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
10	2ND LIFT	4	S	98.0	20.0	1675	21.2	1653	98.7%	YES	Gr. Br. Clayey Silt
11	2ND LIFT	5	S	98.0	16.6	1765	18.1	1768	100.2%	YES	Gr. Br. Clayey Silt*
12	2ND LIFT	6	S	98.0	17.5	1735	18.5	1700	98.0%	YES	Gr. Br. Clayey Silt
13	3RD LIFT	7	S	98.0	17.5	1735	18.6	1713	98.7%	YES	Gr. Br. Clayey Silt
14	3RD LIFT	8	S	98.0	17.5	1735	18.9	1718	99.0%	YES	Gr. Br. Clayey Silt
15	3RD LIFT	9	S	98.0	16.6	1765	18.6	1742	98.7%	YES	Gr. Br. Clayey Silt

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * 3 MORE PASSES WITH COMPACTION EQUIPMENT AFTER TEST WAS CONDUCTED

AREA ACCEPTED ON A VISUAL BASIS

Appendix G

Field Testing Reports for the
Forebay and Detention Pond
(Engineered Fill)

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Forebay

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 6/29/2012

NO	ELEVATION	LOCATION OF TEST	LABORATORY PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC.	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY DENSITY	MOISTURE CONTENT	DRY DENSITY			
					MOISTURE						
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
1	193.0	1613N 1025E	S	95.0	12.4	1900	14.7	1887	99.3%	YES	Gr. Br. Clayey Silt
2	193.4	1609N 1033E	S	95.0	12.4	1900	14.4	1906	100.3%	YES	Gr. Br. Clayey Silt*
3	194.0	1583N 1039E	S	95.0	12.4	1900	14.2	1851	97.4%	YES	Gr. Br. Clayey Silt
4	195.0	1591N 1018E	S	95.0	11.2	2008	11.7	1976	98.4%	YES	Gr. Br. Clayey Silt
5	194.0	1617N 1039E	S	95.0	12.4	1900	14.9	1879	98.9%	YES	Gr. Br. Clayey Silt

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * Rocky

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Forebay

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 7/3/2012

NO	ELEVATION	LOCATION OF TEST	LABORATORY PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC.	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY	MOISTURE	DRY			
					MOISTURE	DENSITY	CONTENT	DENSITY			
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
6	193.5	1587N 1021E	S	95.0	11.2	2008	12.6	1963	97.8%	YES	Gr. Br. Clayey Silt
7	194.1	1595N 1020E	S	95.0	12.4	1900	13.4	1893	99.6%	YES	Gr. Br. Clayey Silt
8	195.2	1620N 1021E	S	95.0	12.4	1900	14.4	1845	97.1%	YES	Gr. Br. Clayey Silt
9	194.3	1603N 1033E	S	95.0	11.2	2008	12.1	2010	100.1%	YES	Gr. Br. Clayey Silt*
10	193.7	1609N 1024E	S	95.0	11.2	2008	8.9	2040	101.6%	YES	Gr. Br. Clayey Silt*
11	195.1	1585N 1038E	S	95.0	12.4	1900	14.1	1860	97.9%	YES	Gr. Br. Clayey Silt

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * Rocky

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Forebay

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 7/4/2012

NO	ELEVATION	LOCATION OF TEST	LABORATORY PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC.	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY	MOISTURE	DRY			
					MOISTURE	DENSITY	CONTENT	DENSITY			
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
12	194.5	1602N 1025E	S	95.0	12.4	1900	10.6	1915	100.8%	YES	Gr. Br. Clayey Silt*
13	195.4	1615N 1040E	S	95.0	11.2	2008	11.5	2072	103.2%	YES	Gr. Br. Clayey Silt*
14	196.2	1620N 1021E	S	95.0	12.4	1900	11.5	1845	97.1%	YES	Gr. Br. Clayey Silt
15	195.9	1630N 1025E	S	95.0	11.2	2008	11.6	2064	102.8%	YES	Gr. Br. Clayey Silt*
16	194.8	1617N 1042E	S	95.0	12.4	1900	13.2	1849	97.3%	YES	Gr. Br. Clayey Silt
17	195.6	1616N 1038E	S	95.0	12.4	1900	13.4	1911	100.6%	YES	Gr. Br. Clayey Silt*
18	196.3	1615N 1040E	S	95.0	12.4	1900	13.2	1860	97.9%	YES	Gr. Br. Clayey Silt

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * Rocky

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Forebay

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 7/5/2012

NO	ELEVATION	LOCATION OF TEST	LABORATORY PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC.	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY DENSITY	MOISTURE CONTENT	DRY DENSITY			
					MOISTURE						
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
19	197.6	1609N 1050E	S	95.0	12.4	1900	12.7	1921	101.1%	YES	Gr. Br. Clayey Silt*
20	196.9	1580N 1030E	S	95.0	11.2	2008	10.0	2033	101.2%	YES	Gr. Br. Clayey Silt*
21	197.2	1582N 1045E	S	95.0	11.2	2008	9.0	2029	101.0%	YES	Gr. Br. Clayey Silt*
22	196.7	1615N 1047E	S	95.0	12.4	1900	12.1	1847	97.2%	YES	Gr. Br. Clayey Silt

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * Rocky

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Forebay

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 7/6/2012

NO	ELEVATION	LOCATION OF TEST	LABORATORY PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC.	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY	MOISTURE	DRY			
					MOISTURE	DENSITY	CONTENT	DENSITY			
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
23	198.3	1596N 1062E	S	95.0	14.2	1900	12.2	1843	97.0%	YES	Gr. Br. Clayey Silt

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * Rocky

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Detention

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 9/25/2012

NO	ELEVATION	LOCATION OF TEST	LABORATORY PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC.	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY DENSITY	MOISTURE CONTENT	DRY DENSITY			
					MOISTURE						
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
24	203.0	1647N 1113E	S	95.0	12.4	1900	11.7	1870	98.4%	YES	Gr. Br. Clayey Silt
25	201.0	1669N 1103E	S	95.0	22.6	1658	23.7	1578	95.2%	YES	Gr. Br. Clayey Silt
26	203.0	1653N 1155E	S	95.0	17.5	1735	19.6	1668	96.1%	YES	Gr. Br. Clayey Silt

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * Rocky

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Detention

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 9/26/2012

NO	ELEVATION	LOCATION OF TEST	LABORATORY PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC.	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY	MOISTURE	DRY			
					MOISTURE	DENSITY	CONTENT	DENSITY			
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
27	186.0	1644N 1113E	S	95.0	20.8	1680	22.6	1686	100.4%	YES	Gr. Br. Clayey Silt*
28	185.0	1638N 1128E	S	95.0	20.5	1715	22.0	1666	97.1%	YES	Gr. Br. Clayey Silt
29	184.0	1677N 1109E	S	95.0	22.6	1658	24.3	1610	97.1%	YES	Gr. Br. Clayey Silt
30	187.0	1653N 1111E	S	95.0	22.6	1658	23.0	1615	97.4%	YES	Gr. Br. Clayey Silt
31	199.0	1645N 1150E	S	95.0	11.2	2008	14.2	2013	100.2%	YES	Gr. Br. Clayey Silt*
32	198.0	1632N 1137E	S	95.0	20.5	1715	22.3	1704	99.4%	YES	Gr. Br. Clayey Silt

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * Rocky

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Detention

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 9/27/2012

NO	ELEVATION	LOCATION OF TEST	LABORATORY PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC.	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY	MOISTURE	DRY			
					MOISTURE	DENSITY	CONTENT	DENSITY			
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
33	202.0	1646N 1158E	S	95.0	22.5	1658	24.3	1647	99.3%	YES	Gr. Br. Clayey Silt*
34	203.0	1631N 1133E	S	95.0	12.4	1900	12.3	1828	96.2%	YES	Gr. Br. Clayey Silt

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * Rocky

FIELD COMPACTION TEST RESULTS

CLIENT: Newalta.

JOB NUMBER: 60265424

LOCATION: Detention

STORMWATER PONDS

JOB NAME: Newalta Stoney Creek Landfill

TEST METHOD: Nuclear Density Metre

GENERAL CONTRACTOR: Dufferin Construction Ltd.

TECHNICIAN: M Stocker

EARTHWORK CONTRACTOR:

DATE TESTED: 9/28/2012

NO	ELEVATION	LOCATION OF TEST	LABORATORY PROCTOR RESULTS			FIELD RESULTS			% COMP. OBTAINED	TEST RESULTS AS SPEC.	MATERIAL TESTED
			STD OR MOD.	SPEC.	OPTIMUM	MAX. DRY	MOISTURE	DRY			
					MOISTURE	DENSITY	CONTENT	DENSITY			
		START FIRST LIFT	S/M	%	%	KG/M ³	%	KG/M ³	%	YES/NO	
35	201.0	1660N 1118E	S	95.0	12.4	1900	13.5	1844	97.1%	YES	Gr. Br. Clayey Silt
36	202.0	1677N 1109E	S	95.0	12.4	1900	12.7	1900	100.0%	YES	Gr. Br. Clayey Silt*
37	202.0	1654N 1165E	S	95.0	16.6	1765	15.9	1775	100.6%	YES	Gr. Br. Clayey Silt*

COMPACTION METHOD: 1 BOMAG BW213 PDH-40 VIBRATORY SHEEPS- FOOT ROLLER

REMARKS: * Rocky

Newalta Corporation

Stormwater Contingency and Remedial Action Plan
Stage I Stormwater Management Facility
Newalta Stoney Creek Landfill

Prepared by:

AECOM

300 – 300 Town Centre Boulevard 905 477 8400 tel
Markham, ON, Canada L3R 5Z6 905 477 1456 fax
www.aecom.com

Project Number:

60265424

Date:

May, 2013

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("Consultant") for the benefit of the client ("Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to Consultant which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

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This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

May 2, 2013

Mr. Lorenzo Alfano
District Manager – Hamilton Operations
Newalta Corporation
65 Green Mountain Road
Stoney Creek, ON L8J 1X5

Dear Mr. Alfano:

Project No: 60265424

Regarding: Stormwater Contingency and Remedial Action Plan

We are pleased to provide you with our report outlining contingency and remedial action measures associated with the stormwater management facility at the Newalta Stoney Creek Landfill. We understand that this report will be used to satisfy Condition 6 (1) of Environmental Compliance Approval No.5400-7DSSHU for Industrial Sewage Works issued by the Ministry of the Environment for the site.

Thank you for the opportunity to provide our expertise and professional services. Please do not hesitate to contact us with any questions or comments.

Sincerely,
AECOM Canada Ltd.



Brian Dermody, P. Eng.
Senior Environmental Engineer, Environment
Brian.Dermody@aecom.com

BMD
Encl.
cc: Mr. Geoffrey Knapper, MOE

Distribution List

# of Hard Copies	PDF Required	Association / Company Name
2	2	Newalta Corporation
1	0	Ministry of the Environment, Hamilton District Office

AECOM Signatures

Report Prepared By:



Brian Dermody, P. Eng.
Senior Environmental Engineer, Environment

Report Reviewed By:



Joseph Puopolo, P. Eng., PMP
Senior Environmental Engineer, Environment

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Letter of Transmittal

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Appendices

Appendix A Environmental Compliance Approval

1. Introduction

1.1 Background

Newalta Corporation operates the Newalta Hamilton (Stoney Creek) Landfill in Stoney Creek, Ontario. The site has been operating since December 1996 under Environmental Compliance Approval (ECA) No. A181008 issued by the Ministry of the Environment (MOE).

Stage I of the site's Stormwater Management Facility (SMF) was approved by the MOE under ECA No. 5400-7DSSHU for Industrial Sewage Works, issued May 1, 2008. Construction of the Stormwater Management Pond (SWM Pond) was completed in April, 2013. The quality assurance work undertaken during SWM Pond construction will be submitted under separate cover. An overview of the site layout, indicating the location of the SMF and completed SWM Pond is shown in Figure 1. A copy of the ECA is included in Appendix A.

This report is being submitted in compliance with Condition 6 (1) of the ECA for the SMF, which states:

Condition 6 (1):

*Before the commencement of operation of the **Works (SWM Pond)**, the Owner shall prepare a "Stormwater Contingency and Remedial Action Plan" for the Works (**SWM Pond**) and provide a copy to the District Manager.*

1.2 Scope of Report

The remainder of this report is organized as follows:

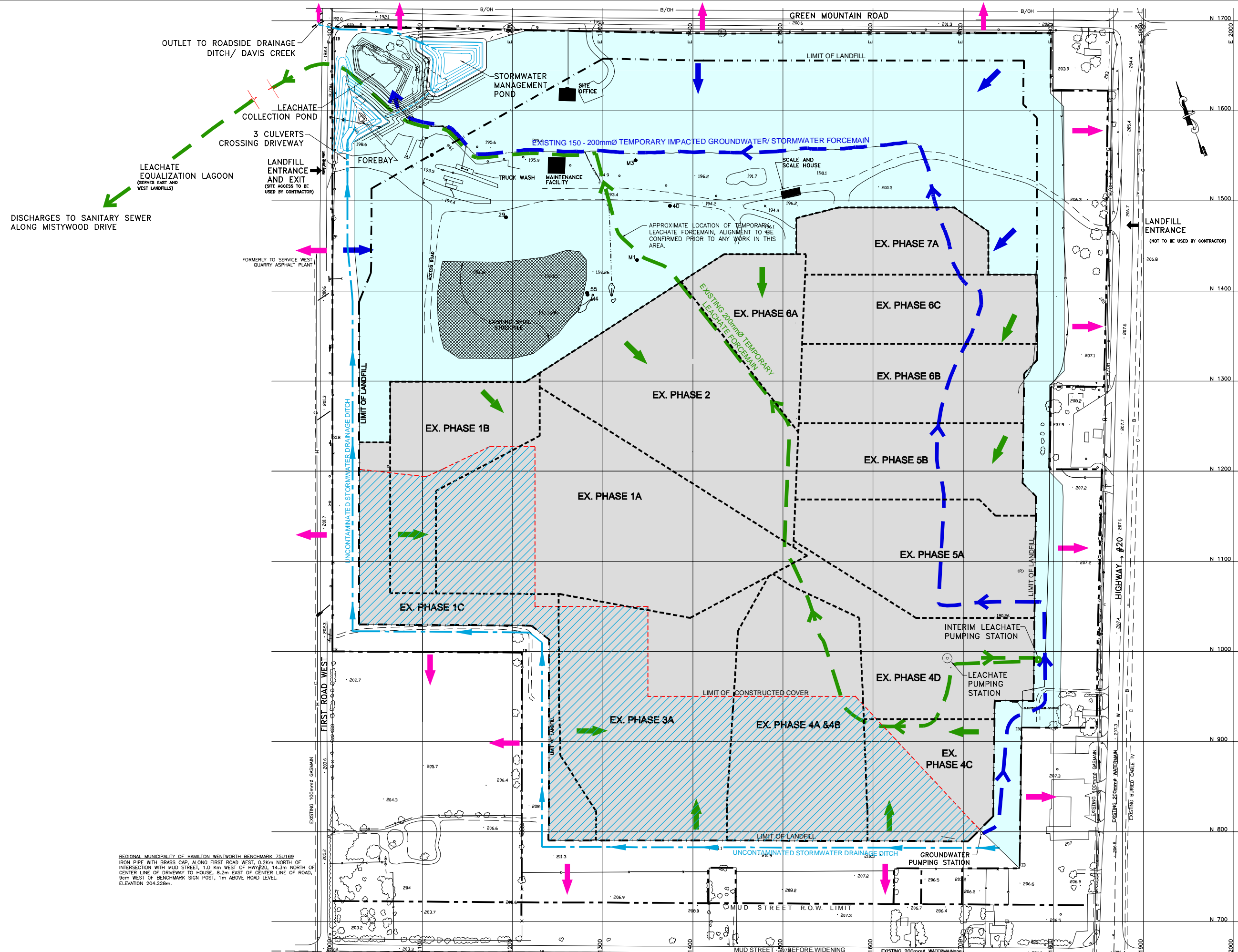
- a) Section 2 presents a brief overview of the Stormwater Management Facility;
- b) Section 3 summarizes the monitoring and recording requirements;
- c) Section 4 presents the contingency actions; and
- d) Section 5 presents the remedial actions that have been developed.

2. Stormwater Management Facility

The Stage I Stormwater Management Facility receives uncontaminated stormwater runoff from approximately 34 hectares of the south and west portions of the landfill site where the 0.75 metre thick final cover is in place. The SMF generally functions as follows:

1. Uncontaminated stormwater runoff is shed from the final cover, and conveyed to the northeast corner of the site through a perimeter drainage ditch approximately 1,450 metres in length running along the south and west sides of the landfill. The ditch has a minimum depth of 1.0 m, a bottom width of 1.0 m, side slopes of 3H:1V, and is designed to handle stormwater runoff from a 100-year storm event.

Filename: N:\2010\60681\2007\WORK\INPROGRESS\DATA\INTERPRETATION\NEWALTA SWM - FIGURE 1-R.DWG
 Last saved by: LEFEBVREJ
 Last Plotted: 2013-05-02
 Project Management Initials: Designer: J.G.L. Checked: B.D. Approved: M.A.S. ANS I D 864mm x 599mm



REGIONAL MUNICIPALITY OF HAMILTON WENTWORTH BENCHMARK 751169
 IRON PIPE WITH BRASS CAP, ALONG FIRST ROAD WEST, 0.2km NORTH OF
 INTERSECTION WITH MUD STREET, 1.0 km WEST OF HWY#20, 14.3m NORTH OF
 CENTER LINE OF DRIVEWAY TO HOUSE, 8.2m EAST OF CENTER LINE OF ROAD,
 9cm WEST OF BENCHMARK SIGN POST, 1m ABOVE ROAD LEVEL.
 ELEVATION 204.228m.



PROJECT
Stormwater Management Facility Layout

Newalta Stoney Creek Landfill
 65 Green Mountain Road
 Stoney Creek, Ontario L8J 1X5

CLIENT
Newalta Corporation

1100 Burloak Drive, 5th Floor
 Burlington, Ontario L7L 6B2
 800 263 8602 tel

CONSULTANT
 AECOM
 300 - 300 Town Centre Blvd.
 Markham, ON L3R 5Z 6
 905 477 8400 tel 905 477 1456 fax
 www.aecom.com

LEGEND:

- SITE BUILDINGS
- PROPERTY BOUNDARY
- LIMIT OF LANDFILL
- LIMIT OF CONSTRUCTED PHASES
- LIMIT OF CONSTRUCTED FINAL COVER
- LOWER EXCAVATION AREA (CLAY PLUG)
- AREA OF LANDFILL WITH NO BASE LINER CONSTRUCTED (LANDFILL OPERATING AREA)
- AREA OF LANDFILL WITH CONSTRUCTED BASE LINER
- AREA OF LANDFILL WITH CONSTRUCTED FINAL COVER (UNCONTAMINATED STORMWATER)
- FLOW PATH FOR IMPACTED GROUNDWATER/ STORMWATER
- FLOW PATH FOR LEACHATE
- FLOW PATH FOR UNCONTAMINATED STORMWATER OFF FINAL COVER
- DIRECTION OF IMPACTED GROUNDWATER/ STORMWATER FLOW IN OPERATING LANDFILL AREA
- DIRECTION OF IMPACTED LEACHATE IN CONSTRUCTED LANDFILL AREA
- DIRECTION OF STORMWATER FLOW OUTSIDE OF LANDFILL LIMIT

REGISTRATION

ISSUE/REVISION

NO.	DATE	DESCRIPTION
B	2013-05-02	Issued for M.O.E. Submission
A	2012-06-27	Issued for Client Review
I/R		

PROJECT NUMBER
 60265424

DRAWING TITLE
 STORMWATER MANAGEMENT FACILITY LAYOUT

FIGURE NUMBER
 1

2. Stormwater is discharged from the ditch through three (3) 675 mm diameter concrete culverts underneath the existing landfill entrance/exit to the SWM Pond forebay.
3. The forebay includes a 600 mm thick bottom clay liner and a permanent pool depth of 1.5 metres. Water flows around a 2.0 m wide by 8.5 m long gabion wall, through a 900 mm diameter HDPE pipe to the main (wet) cell of the SWM Pond.
4. The main cell includes a 600 mm thick bottom clay liner, and provides 2,060 m³ of permanent storage capacity (including forebay) and 4,265 m³ of extended detention storage capacity (including forebay). Stormwater flows around a 2.0 m wide by 30.0 m long gabion wall to the outlet structure.
5. The outlet structure consists of a 1500 mm diameter precast concrete catchbasin inlet; a reverse slope 300 mm diameter pipe, with a 125 mm diameter orifice plate; a gate valve (**normally open**); a 750 mm diameter HDPE discharge pipe, outletting through a 760 mm diameter CSP; and roadside ditches to Davis Creek.
6. The SWM Pond also includes an emergency overflow structure consisting of a 15.0 m wide, 200 mm deep overflow weir constructed with geotextile, a geoweb cellular system, and granular stone infill discharging to the existing leachate collection pond.

In addition to the SMF, the site also includes a collection system to handle leachate impacted groundwater and stormwater, which will generally function as follows:

1. Leachate impacted groundwater and stormwater runoff from the southeast corner of the site is conveyed to a leachate collection pond in the northwest corner of the site by a 18.9 L/sec capacity pumping station and forcemain approximately 1,600 m long and 150 to 200 mm in diameter to
2. Leachate impacted groundwater is also collected via the existing truck wash pad, and discharged via a sewer approximately 130 m long and 450 mm in diameter to the leachate collection pond.
3. The leachate collection pond is approximately 2.0 m deep, and provides a total of 4,600 m³ storage capacity, and is equipped with a 18.0 L/sec pump to dispose of collected leachate impacted stormwater runoff and groundwater to a leachate equalization lagoon.
4. The leachate equalization lagoon is located north of the closed Taro West Landfill Site, and has a storage capacity of approximately 7,000 m³.
5. The leachate equalization lagoon is equipped with a gate valve and flow meter, and discharges via a gravity sewer approximately 460 m long and 250 mm in diameter to a manhole at Mistywood Drive, City of Hamilton, and ultimately to the City of Hamilton sanitary sewage collection system for treatment at the Woodward Avenue Sewage Treatment Plant.

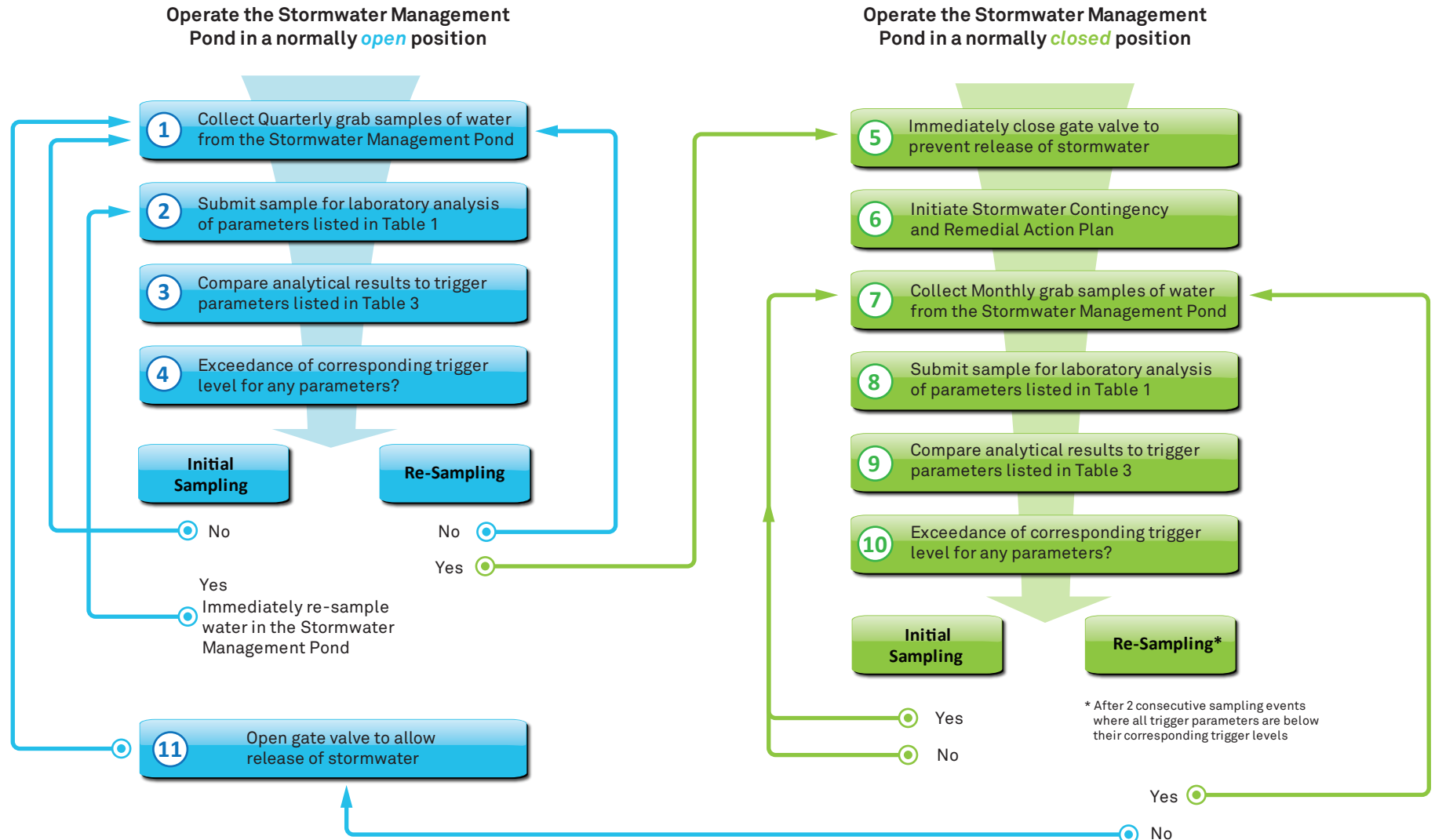
3. Monitoring and Operation

Upon commencement of operation of the SMF, a monitoring and recording program will be implemented for stormwater and leachate. An overview of the monitoring program is outlined in the process flow diagram shown in Figure 2.

Figure 2

Newalta Stoney Creek Landfill - Stormwater Management Facility Monitoring Program - Process Flow Diagram

Based on MOE Environmental Compliance Approval No. 5400-7DSSHU for Industrial Sewage Works, Issued May 1, 2008



Grab samples of stormwater will be collected from the SWM Pond at a quarterly frequency and analyzed for the parameters listed in Table 1.

Table 1. Stormwater Management Monitoring – Sampling Location: SWM Pond

General Parameters	Metals	Field Parameters
Alkalinity	Arsenic	Conductivity
Hardness	Aluminum	Dissolved Oxygen
pH	Boron	pH
Chloride	Beryllium	Temperature
Sulphate	Cadmium	
Sodium	Chromium	
Calcium	Cobalt	
Potassium	Copper	
Magnesium	Iron	
Nitrate as Nitrogen	Lead	
Nitrite as Nitrogen	Manganese	
Total Ammonia	Mercury	
Un-ionized Ammonia	Molybdenum	
Total Suspended Solids (TSS)	Nickel	
Total Organic Carbon (TOC)	Silver	
Total Phosphorus	Selenium	
Total Kjeldahl Nitrogen (TKN)	Vanadium	
Biochemical Oxygen Demand (CBOD5)	Zinc	
Total Phenols (4AAP)		

Grab samples of leachate will also be collected from the Leachate Pumping Station on a quarterly basis and analyzed for the parameters listed in Table 2.

Table 2. Leachate Monitoring – Sampling Location: Leachate Pumping Station

Parameter	Parameter	Parameter
Conductivity	Arsenic	Volatile Organics
Alkalinity	Aluminum	Non-halogenated Volatiles
Hardness	Boron	Water Soluble Volatiles
pH	Beryllium	Base Neutral Extractables
Chloride	Cadmium	Acid Extractables
Sulphate	Chromium	Phenoxy Acid Herbicides
Sodium	Cobalt	Organochlorine Compounds
Calcium	Copper	Neutral Chlorinated Compounds
Potassium	Iron	Oil and Grease
Magnesium	Lead	Fatty and Resin Acids
Nitrate as Nitrogen	Manganese	PCBs
Nitrite as Nitrogen	Mercury	
Total Ammonia	Molybdenum	
Un-ionized Ammonia	Nickel	
Total Suspended Solids (TSS)	Silver	
Total Organic Carbon (TOC)	Selenium	
Total Phosphorus	Vanadium	
Total Kjeldahl Nitrogen (TKN)	Zinc	
Biochemical Oxygen Demand (CBOD5)		
Total Phenols (4AAP)		

The gate valve in the SWM Pond outlet structure will be operated in a normally open position, allowing clean stormwater runoff to discharge from the site. Monitoring results obtained from the SWM Pond will be compared with the trigger levels of the trigger parameters listed in Table 3.

Table 3. Trigger Parameters

Parameter	Unit	Trigger Levels
pH	-	6.5 – 8.5
Conductivity	uS	700
Ammonia (un-ionized)	mg/L	0.04
Phenols	mg/L	0.002
Total Phosphorus	mg/L	0.03

Provided quarterly monitoring results for the trigger parameters listed in Table 3 are below their corresponding trigger levels, the gate valve can continue to be operated in a normally open position. In the event that a monitoring result for any of the parameters listed in Table 3 exceeds its corresponding trigger level, an additional sample will be obtained immediately to confirm the concentration for that parameter.

If an exceedance is not confirmed after the second round of sampling, the gate valve can continue to be operated in a normally open position, and normal quarterly sampling can continue. However, if the presence of any parameter of concern is confirmed after the second round of sampling, the gate valve will be closed immediately and operated in a normally closed position.

Following the closure of the gate valve, the contingency and remedial actions noted in Sections 4 and 5 will be implemented to prevent the release of impacted water from the site and to investigate potential sources of contaminants. Monitoring of the trigger parameters will be conducted on a monthly frequency, and the gate valve will resume operating in a normally open position when monitoring results for all trigger parameters from 3 consecutive sampling events are less than their respective trigger levels.

4. Contingency Actions

In the event that SWM Pond monitoring confirms any trigger parameter has exceeded the corresponding trigger level, the following contingency actions shall be implemented:

- Ensure that the gate valve in the SWM Pond outlet structure is firmly closed.
- Verify that no flow from the SWM Pond is being discharged to the roadside ditches to Davis Creek.
- With the gate valve closed, impacted stormwater will flow by gravity from the SWM Pond via the emergency overflow structure, and discharge into the leachate collection pond.
- Confirm that the emergency overflow weir is functioning properly, and is the only discharge point for impacted stormwater.
- Pump the impacted water from the leachate collection pond to the leachate equalization pond as required.
- Confirm that the leachate equalization lagoon is functioning properly, and that impacted water is being discharged to the City of Hamilton sanitary sewer at Mistywood Drive.
- Manage water levels in the SWM Pond, Leachate Collection Pond, and Leachate Equalization Lagoon such that no impacted water escapes containment. Use additional pumps as required.
- Initiate appropriate remedial measures as soon as possible to limit the volume of impacted stormwater reaching the drainage system.

5. Remedial Actions

In the event that SWM Pond monitoring confirms any trigger parameters exceed their corresponding trigger levels, the following general remedial actions shall be undertaken:

1. Attempt to identify the source(s) of contamination, including:
 - Disturbed or eroded areas in the final cover.
 - Leachate seeps through the final cover.
 - Runoff from exposed waste within landfill entering the perimeter drainage ditch.
 - Runoff from site roads entering the perimeter drainage ditch.
 - Sediment, waste or other foreign materials in the drainage ditch, forebay, and SWM Pond.
2. Remediate any issues identified under Item 1):
 - Repair/re-establish final cover in any disturbed or exposed areas.
 - Repair any leachate seeps observed in the final cover.
 - Re-grade exposed waste areas to provide positive drainage away from drainage ditch.
 - Maintain clean road surfaces and/or divert runoff from roadways away from drainage ditch.
 - Remove any sediment, waste, or other foreign objects from ditches and ponds

Routine inspection of the SWF should be undertaken to avoid the need for contingency or remedial actions. Regular monitoring for the above noted issues, regardless of stormwater monitoring results, will benefit SWF operations by eliminating additional monitoring requirements and reducing the volume of stormwater discharged as leachate.

Appendix A

Environmental Compliance Approval

**CERTIFICATE OF APPROVAL
INDUSTRIAL SEWAGE WORKS**NUMBER 5400-7DSSHU
Issue Date: May 1, 2008

Newalta Industrial Services Inc.
65 Green Mountain Rd W
Stoney Creek, Ontario
L8J 1X5

Site Location: Newalta Stoney Creek Landfill
65 Green Mountain Rd
Hamilton City,
L8J 1X5

You have applied in accordance with Section 53 of the Ontario Water Resources Act for approval of:

stormwater management facility and leachate collection and disposal facility to service Newalta Stoney Creek Landfill (formerly known as Taro East Landfill) located in the City of Hamilton, consisting of the following:

STORMWATER MANAGEMENT FACILITY

constructing a stormwater management facility to service a total of 34 ha drainage area of Phase I of Newalta Stoney Creek Landfill designed to provide quantity and quality control of stormwater runoff from storm events with up to 1:100 year return frequency, consisting of the following:

Stormwater Management Pond (SWM Pond)

A stormwater management facility to service 34.0 ha drainage area of Phase 1 of the landfill consisting of the south and west portions of the total 74.0 ha landfill property consisting of the following:

- one (1) approximately 1,400 m long perimeter ditch running along the south and west side of the landfill site having a minimum depth of 1.0 m, bottom width of 1.0 m and side slopes of 3H:1V, designed to handle stormwater runoff from 1:100 year return frequency storm events, discharging through a 1,050 mm diameter HDPE culvert to a forebay described below;
- one (1) forebay with a 600 mm bottom clay line and a depth of 1.5 m connected through a

900 mm diameter HDPE pipe to a wet detention pond described below;

- one (1) 2.0 m deep extended wet detention pond (SWM Pond) with 600 mm bottom clay liner, providing 2,072 m³ of permanent storage capacity (including forebay) and 4,789 m³ of extended detention storage capacity (including forebay), equipped with an outlet structure consisting of one (1) 1200 x 1200 mm precast concrete catchbasin inlet, a reverse slope 300 mm diameter pipe with a 125 mm orifice plate, a gate valve (**normally open**), a 750 mm diameter HDPE discharge pipe, discharging through a 760 mm diameter CSP and side road ditches to Davis Creek;
- one (1) emergency overflow structure consisting of 15.0 m wide, 200 mm deep overflow weir constructed with granular stone infill and geotextile, discharging to leachate collection pond described below;
- including all controls and associated appurtenances.

LEACHATE IMPACTED GROUNDWATER AND STORMWATER COLLECTION SYSTEM

Leachate Collection Pond

- one (1) approximately 1,600 m long 150 to 200 mm diameter forcemain equipped with a 18.9 L/sec capacity pumping station conveying leachate impacted groundwater and stormwater runoff from the southeast corner of the landfill site to a leachate collection pond described below;
- one (1) approximately 130 m long 450 mm diameter sewer receiving leachate impacted stormwater runoff from the active parts of the landfill site and truck wash pad, discharging to a leachate collection pond described below;
- one (1) 2.0 m deep leachate collection pond, providing a total of 4,600 m³ storage capacity, equipped with a 18.0 L/sec capacity pump to dispose off collected leachate impacted stormwater runoff and groundwater to a leachate equalization lagoon described below;

Leachate Equalization Lagoon

- one (1) approximately 7,000 m³ storage capacity leachate equalization lagoon located north of the closed Taro West Landfill Site, discharging through a gravity sewer described below;
- one (1) approximately 460 m long 250 mm diameter gravity sewer, equipped with a gate valve and a flow meter, extending from the leachate equalization lagoon described above to a manhole at Mistywood Drive, City of Hamilton, discharging to the City of Hamilton sanitary sewage collection system for treatment at the Woodward Avenue STP; and
- including all controls and associated appurtenances.

all in accordance with the Application for Approval of Industrial Sewage Works submitted by Newalta Industrial Services Inc. dated July 9, 2007, all supporting design specifications and drawings prepared by Gartner Lee Limited, Markham, Ontario, and the following documents:

1. "Stormwater Management Design Report, Phase 1, Newalta Stoney Creek Landfill" dated June 2007, prepared by Gartner Lee Limited, Markham, Ontario.
2. "Newalta Industrial Services Inc., Stoney Creek Operating Landfill, 2006 Annual Report" (CD report) dated June 30, 2007, prepared by Jackman Geosciences Inc.
3. "Taro East Quarry Environmental Assessment - Design and Operations Report" dated January 1995, prepared by Garner Lee Limited.
4. Letter from Gartner Lee Limited dated March 24, 2008 providing response to an additional information request letter from Environmental Assessment and Approvals Branch, MOE dated February 14, 2008.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

"Act " means the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended;

"CBOD5 " means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;

"Certificate " means this entire certificate of approval document, issued in accordance with Section 53 of the Act , and includes any schedules;

"Director " means any *Ministry* employee appointed by the Minister pursuant to section 5 of the Act ;

"District Manager " means the District Manager of the Hamilton District Office of the Ministry;

"Ministry " means the Ontario Ministry of the Environment;

"Owner " means Newalta Industrial Services Inc. and includes its successors and assignees;

"Substantial Completion" has the same meaning as "substantial performance " in the Construction Lien Act; and

"Works " means the sewage works described in the Owner 's application, this Certificate and in the supporting documentation referred to herein, to the extent approved by this Certificate .

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

- (1) The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Works* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.
- (2) Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Certificate*, the application for approval of the works and the submitted supporting documents and plans and specifications as listed in this *Certificate*.
- (3) Where there is a conflict between a provision of any submitted document referred to in this *Certificate* and the Conditions of this *Certificate*, the Conditions in this *Certificate* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.
- (4) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.
- (5) The requirements of this *Certificate* are severable. If any requirement of this *Certificate*, or the application of any requirement of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this certificate shall not be affected thereby.

2. EXPIRY OF APPROVAL

The approval issued by this *Certificate* will cease to apply to those parts of the *Works* which have not been constructed within five (5) years of the date of this *Certificate*.

3. CHANGE OF OWNER

- (1) The *Owner* shall notify the *District Manager* and the *Director*, in writing, of any of the following changes within 30 days of the change occurring:
 - (a) change of *Owner* ;
 - (b) change of address of the *Owner* ;
 - (c) change of partners where the *Owner* is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, R.S.O. 1990, c.B17 shall be included in the notification to the *District Manager* ;
 - (d) change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act, R.S.O. 1990, c. C39 shall be included in the notification to the *District Manager* ;

- (2) In the event of any change in ownership of the *Works* , other than a change to a successor municipality, the *Owner* shall notify in writing the succeeding owner of the existence of this *Certificate* , and a copy of such notice shall be forwarded to the *District Manager* and the *Director* .

4. UPON THE SUBSTANTIAL COMPLETION OF THE WORKS

- (1) Within one (1) year of the *Substantial Completion* of the *Works* , a set of as-built drawings showing the works “as constructed” shall be prepared. These drawings shall be kept up to date through revisions undertaken from time to time and a copy shall be retained at the *Works* for the operational life of the *Works* .

5. MONITORING AND RECORDING

- (1) The *Owner* shall, upon commencement of operation of the **Works (SWM Pond)**, carry out the following monitoring program. Grab samples shall be collected from the designated sampling locations **at a quarterly frequency** and analysed for the following parameters listed in Table 1:

Table 1 Stormwater Management Monitoring Sampling Locations: SWM Pond		
General Parameters	Metals	Field Parameters
Alkalinity	Arsenic	Conductivity
Hardness	Aluminum	Dissolved Oxygen
pH	Boron	pH
Chloride	Beryllium	Temperature
Sulphate	Cadmium	
Sodium	Chromium	
Calcium	Cobalt	
Potassium	Copper	
Magnesium	Iron	
Nitrate as Nitrogen	Lead	
Nitrite as Nitrogen	Manganese	
Total Ammonia	Mercury	
Un-ionized Ammonia	Molybdenum	
Total Suspended Solids (TSS)	Nickel	
Total Organic Carbon (TOC)	Silver	
Total Phosphorus	Selenium	
Total Kjeldahl Nitrogen (TKN)	Vanadium	
Biochemical Oxygen Demand (CBOD5)	Zinc	
Total Phenols (4AAP)		

- (2) The Owner shall collect grab samples of leachate from a designated sampling location at a

quarterly frequency and analyze for the parameters listed in Table 2:

Table 2 - LEACHATE MONITORING		
Sampling Location: Leachate Pumping Station		
Parameter	Parameter	Parameter
Conductivity	Arsenic	Volatile Organics
Alkalinity	Aluminum	Non-halogenated Volatiles
Hardness	Boron	Water Soluble Volatiles
pH	Beryllium	Base Neutral Extractables
Chloride	Cadmium	Acid Extractables
Sulphate	Chromium	Phenoxy Acid Herbicides
Sodium	Cobalt	Organochlorine Compounds
Calcium	Copper	Neutral Chlorinated Compounds
Potassium	Iron	Oil and Grease
Magnesium	Lead	Fatty and Resin Acids
Nitrate as Nitrogen	Manganese	PCBs
Nitrite as Nitrogen	Mercury	
Total Ammonia	Molybdenum	
Un-ionized Ammonia	Nickel	
Total Suspended Solids (TSS)	Silver	
Total Organic Carbon (TOC)	Selenium	
Total Phosphorus	Vanadium	
Total Kjeldahl Nitrogen (TKN)	Zinc	
Biochemical Oxygen Demand (CBOD5)		
Total Phenols (4AAP)		

- (3) The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following:
- (a) the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended from time to time by more recently published editions;
 - (b) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (January 1999), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions;
 - (c) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition), as amended from time to time by more recently published editions;
- (4) The measurement frequencies and parameter list specified in subsection (1) are

minimum requirements which may, after 24 months of monitoring in accordance with this Condition, be modified by the *District Manager* in writing from time to time.

- (5) The *Owner* shall install and maintain a continuous flow measuring devices, to measure the flow rate of leachate from the *Works (Leachate Pumping Station)* with an accuracy to within plus or minus 15 per cent (+/- 15%) of the actual flow rate for the entire design range of the flow measuring device, and record the flow rate at a daily frequency.
- (6) The *Owner* shall retain for a minimum of three (3) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this *Certificate* .

6. OPERATION AND MAINTENANCE

- (1) Before the commencement of operation of the **Works (SWM Pond)**, the *Owner* shall prepare a "Stormwater Contingency and Remedial Action Plan" for the *Works (SWM Pond)* and provide a copy to the *District Manager* ;
- (2) The *Owner* shall operate the *Works (SWM Pond)* in a **normally open position**. The *Owner* shall compare monitoring results obtained from the **SWM Pond** under Condition 5 (1) with the trigger levels of the trigger parameters listed in Table 3 to identify any potential leachate impact to stormwater discharged from the site to the receiving surface water.

Table 3 - Trigger Parameters		
Parameter	Unit	Trigger Levels
pH	-	6.5 - 8.5
Conductivity	uS	700
Ammonia (un-ionized)	mg/L	0.04
Phenols	mg/L	0.002
Total Phosphorus	mg/L	0.03

- (3) In the event that a monitoring result for any of the parameters listed in Table 3 exceeds its corresponding trigger level, the *Owner* shall immediately re-sample to confirm the exceedence for that parameter.
- (4) In the event that the presence of the parameter(s) of concern is (are) not confirmed after the second round of sampling conducted under Condition 6 (3), then, normal stormwater monitoring shall be resumed;
- (5) In the event that the presence of any parameter of concern is confirmed after the second round of sampling conducted under Condition 6 (3), the *Owner* shall operate the *Works (SWM Pond)* in a **normally closed position** and dispose the contents of the **SWM Pond** to the leachate collection system while recording the date and volume of contaminated stormwater being disposed of to the leachate collection system;

- (6) The *Owner* shall implement the "Stormwater Contingency and Remedial Action Plan" prepared under Condition 6 (1) and collect a grab sample and analyze for the trigger parameters listed under Condition 6 (2) at a **monthly frequency** preferably after a storm event;
- (7) The *Owner* shall resume operating the *Works* (**SWM Pond**) in a **normally open position** if monitoring results for all trigger parameters from three (3) consecutive sampling events conducted under Condition 6 (6) are less than their respective trigger levels.
- (8) Discharge of contaminated stormwater from the *Works* to storm sewer/surface water is prohibited, except where it is necessary to avoid loss of life, personal injury, danger to public health or severe property damage;
- (9) The *Owner* shall prepare an operations manual within six (6) months of *Substantial Completion* of the *Works* , that includes, but not necessarily limited to, the following information:
 - (a) operating procedures for routine operation of the *Works* ;
 - (b) inspection programs, including frequency of inspection, for the *Works* and the methods or tests employed to detect when maintenance is necessary;
 - (c) repair and maintenance programs, including the frequency of repair and maintenance for the *Works* ;
 - (d) procedures for the inspection and calibration of monitoring equipment;
 - (e) procedures for receiving, responding and recording public complaints, including recording any follow up actions taken.
- (10) The *Owner* shall maintain the operations manual current and retain a copy at the location of the *Works* or operational office of the *Owner* for the operational life of the *Works* . Upon request, the *Owner* shall make the manual available to *Ministry* staff.
- (11) The *Owner* shall inspect the *Works* at least once a year and, if necessary, clean and maintain the *Works* to prevent the excessive build-up of sediments and/or vegetation.
- (12) The *Owner* shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall keep the logbook at the site operations office for inspection by the *Ministry* . The logbook shall include the following:
 - (a) the name of the *Works* ; and
 - (b) the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed.

7. REPORTING

- (1) In addition to the obligations under Part X of the Environmental Protection Act, the *Owner* shall, within 10 working days of the occurrence of any reportable spill as defined in Ontario Regulation 675/98, bypass or loss of any product, by-product, intermediate product, oil, solvent, waste material or any other polluting substance into the environment, submit a full written report of the occurrence to the *District Manager* describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.
- (2) The *Owner* shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to *Ministry* staff.
- (3) The *Owner* shall prepare, and submit to the *District Manager* upon request, a performance report, on an annual basis, before June 30th following the end of the period being reported upon. The first such report shall cover the first annual period following the commencement of operation of the *Works* and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:
 - (a) a description of any operating problems encountered and corrective actions taken;
 - (b) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the *Works* ;
 - (c) a summary of all stormwater and leachate monitoring results undertaken in the reporting period;
 - (d) a summary of the calibration and maintenance carried out on all monitoring equipment; and
 - (e) a summary of all *By-pass* , spill or abnormal discharge events.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Certificate* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review. The condition also advises the Owners their responsibility to notify any person they authorized to carry out work pursuant to this *Certificate* the existence of this *Certificate* .
2. Condition 2 is included to ensure that the *Works* are constructed in a timely manner so that

standards applicable at the time of Approval of the *Works* are still applicable at the time of construction, to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the *Ministry* records are kept accurate and current with respect to the approved works and to ensure that subsequent owners of the *Works* are made aware of the *Certificate* and continue to operate the *Works* in compliance with it.
4. Condition 4 is included to ensure that the *Works* are constructed in accordance with the approval and that record drawings of the *Works* "as constructed" are maintained for future references.
5. Condition 5 is included to enable the *Owner* to evaluate and demonstrate the performance of the *Works*, on a continual basis, so that the *Works* are properly operated and maintained at a level which is consistent with the design objectives and effluent limits specified in the *Certificate* and that the *Works* does not cause any impairment to the receiving watercourse.
6. Condition 6 is included to require that the *Works* be properly operated, maintained, funded, staffed and equipped such that the environment is protected and deterioration, loss, damage to property or injury to any person is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the owner and made available to the *Ministry*. Such a manual is an integral part of the operation of the *Works*. The manual will also act as a benchmark for *Ministry* staff when reviewing the *Owner's* operation of the work.
7. Condition 7 is included to provide a performance record for future references, to ensure that the *Ministry* is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this *Certificate*, so that the *Ministry* can work with the *Owner* in resolving any problems in a timely manner.

In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, Chapter 0.40, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the works are located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

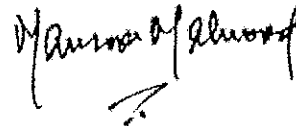
AND

The Director
Section 53, *Ontario Water Resources Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted sewage works are approved under Section 53 of the Ontario Water Resources Act.

DATED AT TORONTO this 1st day of May, 2008

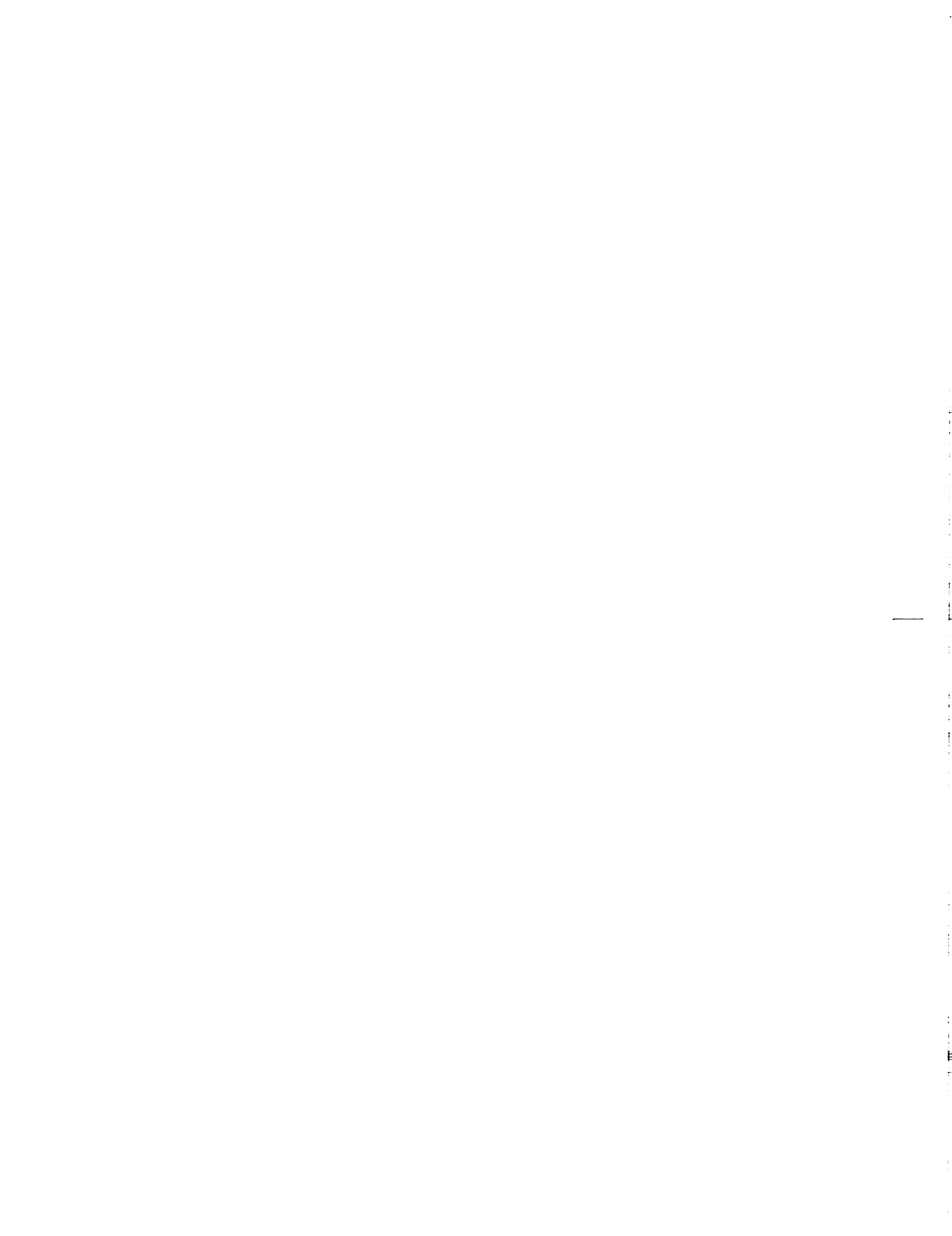


Mansoor Mahmood, P.Eng.
Director
Section 53, *Ontario Water Resources Act*

SH/

c: District Manager, MOE Hamilton - District
Edward San, Gartner Lee Limited

A1: Borehole Logs



GRAPHICS, SYMBOLS AND ABBREVIATIONS ON LOGS

SAMPLE TYPES and TESTS

▨	SS	Split Spoon Sample	
⊗	SN	Non-Standard Split Spoon Sample	
I	ST	Shelby Tube Sample :	
		(unconfined compression or	- ◆
		unconsolidated undrained test)	
▨	DS	Denision Type Sample	
□	PS	Piston Type Sample	
≡	CS	Continuous Sample	
∇	GS	Grab Sample	
▨	WS	Wash Sample	
▨	BQ	BQ Core Sample	
▨	HQ	HQ Core Sample	
▨	NQ	NQ Core Sample	
∇	DT	Dynamic Penetration Test	
■	VT	Field Vane Test (undisturbed)	- +
■	VT	Field Vane Test (remoulded)	- ⊕

PENETRATION RESISTANCES

Standard Penetration Resistance(N Value)

The number of blows by a 63.6 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) split spoon sampler for a distance of 300 mm (12 in.).

ABBREVIATIONS

DTPL:	Drier Than Plastic Limit
APL:	About Plastic Limit
WTPL:	Wetter Than Plastic Limit
K:	Hydraulic Conductivity (m/s)
C_u :	Undrained Shear Strength (kPa)
% REC :	Percentage of Sample Recovered
% RQD :	Indirect Measure of the Number of Fractures and Soundness of Rock Mass
≡	Approximate Water Table

GRAIN SIZE CLASSIFICATION %

trace, "eg. trace sand"	1 - 10
some, "eg. some sand"	10 - 20
adjective, "eg. sandy"	20 - 35
and, "eg. and sand"	35 - 50
noun, "eg. sand"	>50

Note: Classification Divisions Based on Modified M.I.T. Grain Size Scale

SOIL DESCRIPTIONS

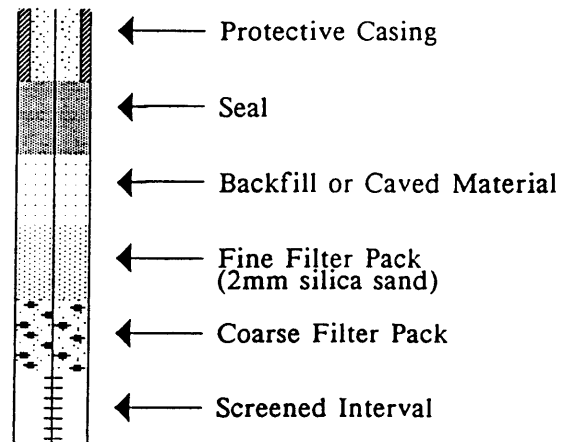
Cohesionless Soils

Relative Density	N Value
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	over 50

Cohesive Soils

Consistency	C_u (kPa)	N Value
Very soft	0 to 12	0 to 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	over 200	over 30

MONITOR DETAILS



BOREHOLE NO. 3 & 4

PROJECT NAME HYDROGEOLOGICAL ASSESSMENT - TARO QUARRY
 CLIENT TARO AGGREGATES
 BOREHOLE TYPE TARO QUARRY AIRTRACK, 7.6 cm BOREHOLE
 ELEVATION _____

PROJECT NO. 82-49
 DATE MARCH 18, 1980
 GEOLOGIST A.B.
 TECHNOLOGIST _____

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE				GROUND WATER	REMARKS
			TYPE	BLOW/0.3 m	ROD	% RECOVERY		
0.0		B.H.3, ELEVATION 193.4 m						
		VINEMOUNT SHALE Dark grey, aphanitic crystalline, medium to thick bedded shale.					▲	Airtrack hole - no samples
6.10		Borehole terminated at 6.10 m in shale.						
0.0		B.H.4, ELEVATION 194.1 m						
		VINEMOUNT SHALE Dark grey aphanitic crystalline, medium to thick bedded shale.					▲	Airtrack hole - no samples
6.10		GOAT ISLAND DOLOSTONE grey, aphanitic, medium to thick bedded dolostone.						
7.62		Borehole terminated at 7.62 m in dolostone.						

BOREHOLE LOG	PROJECT: 92-372	BOREHOLE: 5-I 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES - STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 17 March 1980 GEOLOGIST AB ELEVATION 192.1 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY (%)				RQD (%)						
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD										
											25	50	75	100	25	50	75	100		
0.5		TOPSOIL Dark brown to brown fine sandy silt, rootlets, some fine subangular gravel and clay, moist, compact.																		
1.3	1	CLAYEY SILT Brown clayey silt, reworked, trace fine sand, APL, stiff.																		
2.0	2	SANDY SILT Brown, slightly mottled light grey, fine sandy silt, trace clay, slightly laminated, moist, compact.																		
3.0	3	SANDY SILT TILL Brown fine sandy silt, trace to some fine subangular gravel to coarse sand, horizontal to vertical fracturing with black oxidation, occasional dolostone fragments, moist, very dense.																		
3.5		Till with weathered dolostone below about 3.4 m.																		
4.5		GOAT ISLAND DOLOSTONE																		
5.0		SHALE Dark brownish grey, aphanitic to very fine crystalline, thin bedded shale, some horizontal and vertical fracturing, locally interlaminated to thinly interbedded with dolostone.																		
6.0		GOAT ISLAND DOLOSTONE Brownish grey to grey, fine crystalline, thin to medium bedded dolostone, moderate shale content, occasional shale stringers, minor occurrences of sphalerite mineralization and small calcite infilled vugs locally.																		
7.0		-Locally interlaminated with shale below about 6.3 m.																		
8.0		-3 cm cavity lined with well formed calcite crystals at about 6.6 m.																		
9.0																				
10.0																				
10.7		Borehole terminated at 10.67 m in dolostone. Note: Borehole drilled in 1980 using Air Track, Stratigraphy revised using recent adjacent borehole 43-I.																		

BOREHOLE NO. 5 & 6

PROJECT NAME HYDROGEOLOGICAL ASSESSMENT - TARO QUARRY **PROJECT NO.** 82-49
CLIENT TARO AGGREGATES **DATE** MARCH 17, 1980
BOREHOLE TYPE TARO QUARRY AIRTRACK - 7.6 cm BOREHOLE **GEOLOGIST** A.B.
ELEVATION _____ **TECHNOLOGIST** _____

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE				GROUND WATER	REMARKS
			TYPE	BLOW/0.3 m	RQD	% RECOVERY		
0.0		B.H.5, ELEVATION 192.1 m						
		TOPSOIL						Airtrack hole - no samples
2.90		TILL: Medium brown sandy-silt till, wet.						
3.66		SAND & GRAVEL Medium brown sand and gravel, wet.						
		GOAT ISLAND DOLOSTONE						
9.76		ANCASTER DOLOSTONE Medium grey aphanitic, medium bedded cherty dolomite.						
10.67		Borehole terminated at 10.67 m in cherty dolostone.						
0.0		B.H. 6, ELEVATION 188.3 m						
0.15		TOPSOIL						Airtrack hole - no samples
2.90		TILL Medium brown sandy silt till, wet.						
		GOAT ISLAND DOLOSTONE Medium grey, aphanitic crystalline, medium to fine bedded dolostone.						
6.10		ANCASTER DOLOSTONE Medium grey, aphanitic crystalline, medium to fine bedded cherty dolostone.						
10.80		Borehole terminated at 10.80 m in cherty dolostone.						

BOREHOLE NO. 12 & 13

PROJECT NAME HYDROGEOLOGICAL ASSESSMENT - TARO QUARRY
 CLIENT TARO AGGREGATES
 BOREHOLE TYPE TARO QUARRY AIRTRACK - 7.6 cm BOREHOLE
 ELEVATION _____

PROJECT NO. 82-49
 DATE March 18, 1980
 GEOLOGIST A.B.
 TECHNOLOGIST _____

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE				GROUND WATER	REMARKS
			TYPE	BLOW/0.3 m	RQD	% RECOVERY		
0.0		B.H.12, ELEVATION 194.15 m						
		VINEMOUNT SHALE Dark grey, aphanitic crystalline, medium to thick bedded shale.					▲	Airtrack hole - no samples
6.10		Borehole terminated at 6.10 m in shale.						
0.0		B.H. 13, ELEVATION 202.4 m						
0.15		TOPSOIL					▲	Airtrack hole - no samples
		TILL Sandy silt till, wet.						
2.44		ERAMOSIA DOLOSTONE Medium grey aphanitic crystalline, medium to fine bedded dolostone.						
8.54		VINEMOUNT SHALE Dark grey, aphanitic crystalline thick bedded shale.						
12.20		Borehole terminated at 12.20 m in shale.						

BOREHOLE NO. 14 & 15

PROJECT NAME HYDROGEOLOGICAL ASSESSMENT - TARO QUARRY

PROJECT NO. 82-49

CLIENT TARO AGGREGATES

DATE March 17, 18, 1980

BOREHOLE TYPE TARO QUARRY AIRTRACK - 7.6 cm BOREHOLE

GEOLOGIST A.B.

ELEVATION _____

TECHNOLOGIST _____

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE				GROUND WATER	REMARKS
			TYPE	BLOW/0.3 m	RQD	% RECOVERY		
0.0		B.H. 14, ELEVATION 188.0 m						
0.18		TOPSOIL					Airtrack hole - no samples	
3.05		TILL Medium brown sandy silt till, wet.						
3.35		SAND & GRAVEL Medium brown, wet.						
6.40		GOAT ISLAND DOLOSTONE Medium grey, aphanitic medium to fine bedded dolostone.						
10.67		ANCASTER DOLOSTONE Medium grey, aphanitic, medium bedded cherty dolostone.				▲		
		Borehole terminated at 10.67 m in cherty dolostone.						
0.0		B.H. 15, ELEVATION 201.2 m						
0.15		TOPSOIL					Airtrack hole - no samples	
2.44		TILL Sandy silt till, wet.						
8.54		ERAMOSIA DOLOSTONE Medium brown grey, aphanitic crystalline, medium to thin bedded dolostone.						
11.74		VINEMOUNT SHALE Dark grey, aphanitic crystalline, thin bedded shale.				▲		
		Borehole terminated at 11.74 m in shale.						

● Piezometer Tip ▲ Standpipe Tip

BOREHOLE NO. 17

PROJECT NAME HYDROGEOLOGICAL STUDY - EAST QUARRY PROPERTY

PROJECT NO. 82-49

CLIENT TARO AGGREGATES

DATE June 24, 25, 1982

BOREHOLE TYPE 10.8 cm I.D. AUGERS, NV3 ROCK CORE, 7.6 cm AIR-

GEOLOGIST A.B.

ELEVATION 205.62 m

TRACK HOLE

TECHNOLOGIST _____

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE				GROUND WATER	REMARKS
			TYPE	BLOW/0.3 E	RQD	% RECOVERY		
0.16		TOPSOIL						
2.68		CLAYEY SILT Medium brown clayey silt, D.T.P.L. Fissures through-	SS	21				
		ERAMOSA DOLOSTONE Medium out. brown grey, fine crystalline, medium bedded dolcstone - weathered in upper portion - many shale partings	NV3		100	100		
					91	100		
			NV3		91	100		
			NV3		100	100		
14.81		VINEMOUNT SHALE Dark grey, aphanitic crystalline, thick bedded shale. - platy, some dolostone beds.	NV3		98	100		
			NV3		88	100		
19.81		GOAT ISLAND DOLOSTONE Medium grey, fine crystalline, medium to thick bedded dolostone - some shale partings - slightly fossiliferous	NV3		97	100		
			NV3		97	100		
27.30		ANCASTER CHERTY DOLOSTONE Medium grey, fine crystalline, medium to thick bedded cherty dolcstone.	NV3		100	100		
			NV3		51	100		
33.92		GASPORT DOLOSTONE Coarse grained. Crinoidal						
35.08		DECEW ROCHESTER DOLOSTONE-SHALE						
35.35		Borehole terminated at 35.35 m in Decew-Rochester dolostone-shale						

● Piezometer Tip ▲ Standpipe Tip

BOREHOLE NO. 18

PROJECT NAME HYDROGEOLOGICAL STUDY - EAST QUARRY PROPERTY
 CLIENT TARO AGGREGATES
 BOREHOLE TYPE 10.8 cm I.D. AUGERS, NX ROCK CORE 7.6 cm AIR-TRACK HOLE
 ELEVATION 202.06 m

PROJECT NO. 82-49
 DATE June 21, 1982
 GEOLOGIST A.B.
 TECHNOLOGIST _____

DEPTH (m)	STRATIGRAPHY	DESCRIPTION	SAMPLE				GROUND WATER	REMARKS
			TYPE	BLOW/0.3 m	RQD	% RECOVERY		
0.12		TOPSOIL						No water return during coring.
2.13		FILL Clayey silt fill stones, moist, fractured	SS	21				
		TILL Clayey silt till, wet fractured.	SS	7				
3.96		ERAMOSA DOLOSTONE Medium brown grey, fine crystalline, medium to thin bedded dolostone.	NX		45	100		
8.75		VINEMOUNT SHALE Dark grey, aphanitic crystalline, medium to thick bedded shale - platy.	NX		81	100		
			NX		100	100		
			NX		100	100		
16.40		GOAT ISLAND DOLOSTONE Medium grey, medium to fine crystalline medium to thick bedded dolostone	NX		91	100		
			NX		98	100		
22.86		ANCASTER CHERTY DOLOSTONE Medium grey, medium to fine crystalline, thick bedded cherty dolostone	NX		100	100		
27.28		GASPORT DOLOSTONE Coarse crystalline thick bedded.	NX		92	100		
28.38		DECEW-ROCHESTER DOLOSTONE						
29.56		DOLOSTONE SHALE COMPLEX: Dark grey aphanitic crystalline, thick bedded dolostone-shale complex						
		Borehole terminated at 29.56 m in dolostone-shale complex						

BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 28-1 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 27 February 1989 GEOLOGIST PW ELEVATION 192.5 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE				RECOVERY (%)				RQD (%)										
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD												
											25	50	75	100	25	50	75	100				
0.6		VINEMOUNT SHALE Dark grey, aphanitic to fine crystalline, thin to medium bedded shale. Occasional dolostone beds. Some gypsum infilling in fractures. -Dolostone bed from about 0.6 to 1.2 m.		1	HQ			100	58													
1.1				2	HQ			83	44													
2				3	HQ			100	88													
3				4	HQ			100	100													
4.6				GOAT ISLAND DOLOSTONE Medium grey, fine crystalline, medium to thick bedded dolostone. Numerous shale stringers, gypsum infilling.	5	HQ			100	93												
6.0					SHALE Dark brownish grey, medium bedded shale, interlaminated with dolostone, bioturbation at upper contact.	6	HQ			100	94											
6.7						7	HQ			100	100											
8						8	HQ			100	100											
10																						
11																						
11.4		Borehole terminated at 11.43 m in dolostone.																				











BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 28-II 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 14 March 1989 GEOLOGIST PW ELEVATION 192.5 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY (%)				RQD (%)							
				NUMBER	INTERVAL	TYPE	N	VALUE	% WATER	% REC	% RQD										
												25	50	75	100	25	50	75	100		
0.6	[Pattern]	VINEMOUNT SHALE Dark grey, aphanitic to fine crystalline, thin to medium bedded shale. Occasional dolostone beds. Some gypsum infilling in fractures. -Dolostone bed from about 0.6 to 1.2 m.	[Pattern]																		
1.1																					
2																					
3																					
4	[Pattern]	GOAT ISLAND DOLOSTONE Medium grey, fine crystalline, medium to thick bedded dolostone. Numerous shale stringers, gypsum infilling.	[Pattern]																		
4.6																					
5	[Pattern]	Borehole terminated at 5.83 m in dolostone. BOREHOLE DRILLED DIRECTLY BY AIRTRACK, STRATIGRAPHY INFERRED FROM 28-I AND DRILL CUTTINGS	[Pattern]																		
5.8																					









BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 28-IV 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 11 February 1992 GEOLOGIST SMA ELEVATION 192.5 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY (%)				RQD (%)							
				NUMBER	INTERVAL	TYPE	N	VALUE	% WATER	% REC	% RQD										
												25	50	75	100	25	50	75	100		
0.6	[Stratigraphic pattern]	VINEMOUNT SHALE Dark grey, aphanitic to fine crystalline, thin to medium bedded shale. Occasional dolostone beds. Some gypsum infilling in fractures. -Dolostone bed from about 0.6 to 1.2 m.	[Monitor pattern]																		
1.1																					
2																					
3																					
4.3		Borehole terminated at 4.30 m in shale. NOTE: Borehole drilled using an Air Track Percussion Drill. Stratigraphy inferred from adjacent borehole 28-1.																			

BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 29-II 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 14 March 1989 GEOLOGIST PW ELEVATION 194.2 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY (%)				RQD (%)						
				NUMBER	INTERVAL	TYPE	N	VALUE	% WATER	% REC	% RQD									
												25	50	75	100	25	50	75	100	
0.8		FILL Sand and gravel.																		
1.4		VINEMOUNT SHALE Dark grey, aphanitic to fine crystalline, thin to medium bedded shale. Numerous dolostone beds.																		
2.0		-Dolostone bed from about 1.4 to 2.0 m.																		
3.0																				
4.4																				
		Borehole terminated at 4.43 m in shale. BOREHOLE DRILLED DIRECTLY BY AIRTRACK, STRATIGRAPHY INFERRED FROM 29-I AND DRILL CUTTINGS																		

BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 29-III 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 12 February 1992 GEOLOGIST SMA ELEVATION 194.2 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY (%)				RQD (%)						
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD										
											25	50	75	100	25	50	75	100		
0.8		FILL Sand and gravel.																		
1.4		VINEMOUNT SHALE Dark grey, aphanitic to fine crystalline, thin to medium bedded shale. Numerous dolostone beds.																		
2.0		-Dolostone bed from about 1.4 to 2.0 m.																		
5.5		GOAT ISLAND DOLOSTONE Medium grey, fine crystalline, medium bedded dolostone, occasional shale stringers, some fossils.																		
7.0		Borehole terminated at 7.00 m in dolostone. NOTE: Borehole drilled using an Air Track Percussion Drill. Stratigraphy inferred from adjacent borehole 29-I.																		


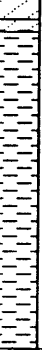

BOREHOLE LOG	PROJECT: 97-557 TARO	BOREHOLE: 29-IV 1 of 2
HYDROGEOLOGICAL INVESTIGATIONS Stoney Creek, Ontario FOR: TARO AGGREGATES LTD.		DATE: 6 June 1997 GEOLOGIST: TLC ELEVATION: 194.20 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					RECOVERY (%)				RQD (%)							
				NUMBER	INTERVAL	TYPE	N	VALVE	% WATER	% REC	% RQD									
												25	50	75	100	25	50	75	100	
1.0		<u>FILL</u> Sand and gravel.																		
1.7		<u>VINEMOUNT SHALE</u> Dark grey, aphanitic to fine crystalline, thin to medium bedded shale. Numerous dolostone beds.		1	HQ						100	18								
2.4		-Dolostone bed (VFZ) from about 1.7 to 2.4 m.		2	HQ						100	72								
3.0				2a	HQ						100	100								
3.5				3	HQ						100	92								
4.0				4	HQ						100	83								
5.8				5	HQ						100	100								
6.7		<u>GOAT ISLAND DOLOSTONE</u> Medium grey, fine crystalline, thick to massive bedded dolostone. Numerous shale stringers, occasional gypsum infilling, some fossils, trace clay seams.		6	HQ						100	85								
7.2		-Large gypsum nodule and gypsum seam (UFZ) observed between about 6.7 and 6.8 m.		7	HQ						100	91								
8.0		<u>SHALE</u> Dark brownish grey, medium bedded shale, interlaminated with dolostone, bioturbation at upper contact.		8	HQ						100	100								
9.4		-Thin to medium bedded from about 8.0 to 9.4 m. -Approximate lower extent of UMFZ at about 9.4 m.		9	HQ						100	95								
10.0				10	HQ						100	84								
11.0																				
12.0		-Becoming locally siliceous below about 12.2 m.																		
13.0																				
14.3		-Extent of LMFZ from about 14.2 to 14.4 m. <u>ANCASTER CHERT BEDS</u> Brownish grey to greyish brown aphanitic to fine																		


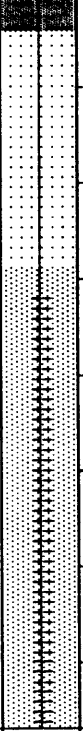
BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 30-I 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 9 March 1989 GEOLOGIST PW ELEVATION 201.7 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY (%)				RQD (%)								
				NUMBER	INTERVAL	TYPE	N	VALUE	% WATER	% REC	% RQD											
												25	50	75	100	25	50	75	100			
1	INDUSTRIAL FILL Black heterogeneous mix of sand, clay, silt, and gravel with industrial debris throughout. Moist to wet, compact.	NOTE: Soil sample details and locations shown on borehole log 30-II.																				
2																						
3																						
4																						
5																						
6																						
7																						
8.2				-Brown silty clay at assumed bedrock interface.																		
9.1	VINEMOUNT SHALE Dark grey, aphanitic to fine crystalline, thin to medium bedded shale. Occasional dolostone beds, trace fossils. -Very weathered to about 8.5 m. -Dolostone from about 8.5 to 9.1 m.		1	HQ				100	17													
10			2	HQ				100	86													
11			3	HQ				88	61													
12																						
12.4		Borehole terminated at 12.35 m in shale.																				




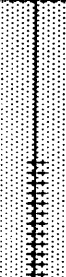
BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 31-I 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 10 March 1989 GEOLOGIST PW ELEVATION 201.2 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE				RECOVERY (%)				RQD (%)									
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD											
											25	50	75	100	25	50	75	100			
1	 <p>INDUSTRIAL FILL Black heterogeneous mix of sand, clayey silt, and gravel with industrial debris throughout. Moist to wet, compact to very dense.</p> <p>NOTE: Soil sample details and locations shown on borehole log 31-II.</p> <p>-Greenish-grey silty clay fill with brown sandy gravel below 6.0 m.</p> <p>-Saturated below 7.3 m.</p> <p>-Fill mixed in with rock fragments at bedrock interface.</p>																				
2																					
3																					
4																					
5																					
6																					
7																					
8																					
8.4																					
8.8	 <p>VINEMOUNT SHALE Dark grey, aphanitic to fine crystalline, thin bedded shale. Numerous dolostone beds. High dolomitic content throughout.</p> <p>-Dolostone from about 8.4 to 8.9 m.</p>	1	HQ				100	0													
9		2	HQ				100	53													
10		3	HQ				100	90													
11																					
12.1	 <p>GOAT ISLAND DOLOSTONE Medium grey, fine crystalline, medium bedded dolostone. Some gypsum infilled vugs, shale stringers, trace fossils.</p> <p>Borehole terminated at 13.15 m in dolostone.</p>	4	HQ				83	73													
13.2																					

BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 31-II 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 10 March 1989 GEOLOGIST PW ELEVATION 201.3 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE				N VALUE				WATER CONTENT (%)									
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	15	30	45	60	10	20	30	40			
1		INDUSTRIAL FILL Black heterogeneous mix of sand, clayey silt, and gravel with industrial debris throughout. compact to wet, loose to very dense.		1		SS	10	18.1													
2		NOTE: Split spoon sample intervals taken from borehole 31-I.		2		SS	40	19.2													
3				3		SS	45	16.4													
4																					
5																					
6																					
7																					
7.7		Borehole terminated at 7.69 m in fill. BOREHOLE AUGERED WITHOUT SAMPLING, STRATIGRAPHY INFERRED FROM 31-I AND AUGER CUTTINGS																			

BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 32-I 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 13 March 1989 GEOLOGIST PW ELEVATION 202.9 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY (%)				RQD (%)							
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	25	50	75	100	25	50	75	100			
1		INDUSTRIAL FILL Black to dark brown heterogeneous mix of sand, clay, silt, and gravel with industrial debris. Moist to wet, loose to very dense.																			
2																					
3		NOTE: Soil sample details and locations shown on borehole log 32-II.																			
4																					
5																					
6																					
7																					
8																					
9				-Mottled greenish-grey brown silty clay was found above the bedrock interface.																	
10.0																					
10.3		VINEMOUNT SHALE Dark grey, aphanitic to fine crystalline, thin bedded shale. Numerous dolostone beds, very broken up to about 10.9 m.		1	HQ						100	15									
10.9		-Dolostone bed from about 10.3 to 10.9 m.																			
11																					
12																					
13.0		Borehole terminated at 13.00 m in shale.																			


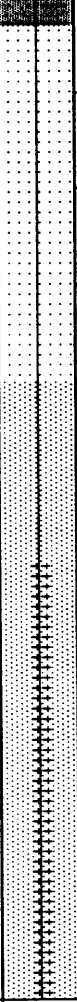
BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 32-II 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 13 March 1989 GEOLOGIST PW ELEVATION 202.9 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE				N VALUE				WATER CONTENT (%)						
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	15	30	45	60	10	20	30	40
				1		INDUSTRIAL FILL Black to dark brown heterogeneous mix of sand, clay, silt, and gravel with industrial debris. moist to wet, loose to very dense.		1	SS	3	29.2							
2		NOTE: Split spoon sample interval taken from borehole 32-II.		2	SS	38	17.7											
3				3	SS	8	18.5											
4				4	SS	12	13.5											
5				5	SS	50	13.2											
6																		
7																		
8																		
9.1		Borehole terminated at 9.14 m in fill. BOREHOLE AUGERED WITHOUT SAMPLING, STRATIGRAPHY INFERRED FROM 32-I AND AUGER CUTTINGS																

BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 33-I 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 6 March 1989 GEOLOGIST PW ELEVATION 203.3 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE				RECOVERY (%)				RQD (%)							
				NUMBER	INTERVAL	TYPE	N	U	A	L	E	R	C	Q	D	R	Q	D	R
1	INDUSTRIAL FILL Dark brown to black heterogeneous mix of sand, clay, silt, and gravel with industrial debris. Moist to wet, loose to dense.																		
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
10.7		-Brown silty clay till encountered at bedrock interface with rock and slag fragments.																	
11	VINEMOUNT SHALE	Dark grey, aphanitic to fine crystalline, thin to medium bedded shale. Occasional dolostone layers, trace fossils.																	
11.3																			
12		-Dolostone bed from about 10.7 to 11.3 m.																	
13			1	HQ						100	0								
			2	HQ						100	52								
14.1																			
14		Borehole terminated at 14.14 m in shale.																	

BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 33-II 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 6 March 1989 GEOLOGIST PW ELEVATION 203.3 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE				N VALUE				WATER CONTENT (%)							
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	15	30	45	60	10	20	30	40	
1		INDUSTRIAL FILL Dark brown to black heterogeneous mix of sand, clay, silt, and gravel with industrial debris. Moist to wet, loose to dense. NOTE: Split spoon sample intervals taken from borehole 33-I.		1		SS	26	14.6											
2				2		SS	9	27.3											
3				3		SS	40	9.7											
4				4		SS	13	12.4											
5				5		SS	16	14.0											
6				6		SS	14	18.7											
7																			
8																			
9																			
10																			
10.4		Borehole terminated at 10.44 m in fill. BOREHOLE AUGERED WITHOUT SAMPLING, STRATIGRAPHY INFERRED FROM 33-I AND AUGER CUTTINGS																	

BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 34-I 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 2 March 1989 GEOLOGIST PW ELEVATION 186.2 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					RECOVERY (%)				RQD (%)							
				NUMBER	INTERVAL	TYPE	N	VALUE	% WATER	% REC	% RQD									
												25	50	75	100	25	50	75	100	
1		SANDY CLAYEY SILT TILL Light brown sandy clayey silt till, trace gravel, moist to wet, loose to dense. Trace of topsoil surface.		1		SS	4	24.2												
2.4		GRAIN SIZE DISTRIBUTION Silt 41.1% Clay 30.0% Sand 25.4% Gravel 3.5%		2		SS	20	11.5												
				3		SS	42	13.7												
3		GOAT ISLAND DOLOSTONE Medium grey, fine crystalline, thin to medium bedded dolostone. Layers of brown dolostone throughout, few vugs with some having gypsum infilling, occasional clay seams and shale stringers.		1		HQ			100	21										
4				2		HQ			100	93										
5																				
5.6		-Calcite and gypsum infilled vugs and fractures present towards bottom of unit.		3		HQ			100	76										
6		ANCASTER CHERT BED Medium grey, fine crystalline, thin to medium bedded dolostone. Numerous chert nodules, some shale stringers and calcium and gypsum filled vugs.																		
7		-Chert nodules were vuggy with well formed calcite crystals within.		4		HQ			100	68										
7.4		Borehole terminated at 7.36 m in cherty dolostone.																		

BOREHOLE LOG	PROJECT: 97-557 TARO	BOREHOLE: 34-II	1 of 1
HYDROGEOLOGICAL INVESTIGATIONS Stoney Creek, Ontario FOR: TARO AGGREGATES LTD.		DATE: 15 December 1997	GEOLOGIST YS ELEVATION 186.78 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE				N VALUE				WATER CONTENT (%)								
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD										
											15	30	45	60	10	20	30	40		
0.6		<u>FILL</u> Brown sandy, clayey silt fill with trace gravel, moist.																		
1		<u>SANDY CLAYEY SILT TILL</u> Light brown sandy clayey silt till, trace gravel, moist to wet, loose to dense.																		
3.0		<u>GOAT ISLAND DOLOSTONE</u> Medium grey, fine crystalline, thin to medium bedded dolostone. Layers of brown dolostone throughout, few vugs with some having gypsum infilling, occasional clay seams and shale stringers.																		
5		-Calcite and gypsum infilled vugs and fractures present towards bottom of unit.																		
6.2		<u>ANCASTER CHERT BED</u> Medium grey, fine crystalline, thin to medium bedded siliceous dolostone. Numerous chert nodules, some shale stringers and calcium and gypsum filled vugs.																		
8		Trace shale stringer at about 8 m.		1	HQ				100	82										
9.3		Borehole terminated at 9.27 m in siliceous dolostone. NOTE: Original borehole 34-I monitor overdrilled and removed. Borehole deepened for this installation. Borehole stratigraphy to 7.9 m taken from borehole 34-I.																		

BOREHOLE LOG	PROJECT: 97-557 TARO	BOREHOLE: 34-III 1 of 1
HYDROGEOLOGICAL INVESTIGATIONS Stoney Creek, Ontario FOR: TARO AGGREGATES LTD.		DATE: 15 December 1997 GEOLOGIST: YS ELEVATION: 186.78 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					N VALUE				WATER CONTENT (%)						
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD									
											15	30	45	60	10	20	30	40	
0.6		FILL Light brown sandy, clayey silt fill with trace gravel, moist.																	
1		SANDY CLAYEY SILT TILL Light brown sandy clayey silt till, trace gravel, moist to wet, loose to dense.																	
2																			
3.0																			
3		GOAT ISLAND DOLOSTONE Medium grey, fine crystalline, thin to medium bedded dolostone. Layers of brown dolostone throughout, few vugs with some having gypsum infilling, occasional clay seams and shale stringers.		1	HQ				95	53									
4				2	HQ				100	72									
5		-Calcite and gypsum infilled vugs and fractures present towards bottom of unit.		3	HQ				100	92									
6.1		Borehole terminated at 6.12 m in siliceous dolostone. NOTE: Borehole stratigraphy inferred from adjacent borehole 34-I. Borehole logged to confirm contacts and for monitor placement.																	
6																			

BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 35-I 1 of 2
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 21 February 1989 GEOLOGIST TLC ELEVATION 200.4 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY (%)				RQD (%)					
				NUMBER	INTERVAL	TYPE	N	VALUE	% WATER	% REC	% RQD								
												25	50	75	100	25	50	75	100
0.5		TOPSOIL Dark brown sandy silt, rootlets, firm, frozen.		1		SS	8												
1		SANDY SILT TILL Medium brown sandy silt till with clay, trace gravel, dense to very dense, moist.		2		SS	25												
1.7		GRAIN SIZE DISTRIBUTION Silt 47.1% Sand 28.8% Clay 21.4% Gravel 2.7%		3		SS	50												
2				1		HQ	0.08m		100	0									
2				2		HQ			100	0									
3		ERAMOSA DOLOSTONE Medium brownish-grey, fine crystalline, thin to medium bedded dolostone. Vuggy, numerous shale stringers and gypsum infilled fractures and vugs. Trace fossils with some small fossiliferous zones observed. -Weathered to about 4.0 m.		3		HQ			91	60									
4				4		HQ			93	72									
5				5		HQ			100	80									
6				6		HQ			100	72									
7				7		HQ			91	89									
7.7				8		HQ			98	81									
8		VINEMOUNT SHALE Dark grey, aphanitic to fine crystalline, medium bedded shale. Numerous clay seams, trace fossils. -Dolostone bed from about 8.8 to 9.3 m, locally minor shale content.		6		HQ			100	72									
8.8				7		HQ			91	89									
9				8		HQ			98	81									
9.3				9		HQ			100	93									
10																			
11																			
12																			
12.6																			
13		GOAT ISLAND DOLOSTONE Medium grey, fine crystalline, thin to thick bedded dolostone. Vuggy, numerous shale stringers and gypsum infilling.																	
13.8																			
14		SHALE Dark brownish grey, medium bedded shale, interlaminated with dolostone, bioturbation at upper																	
14.4																			

BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 35-I 2 of 2
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 21 February 1989 GEOLOGIST TLC ELEVATION 200.4 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					RECOVERY (%)				RQD (%)						
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	25	50	75	100	25	50	75	100	
16		contact. GOAT ISLAND DOLOSTONE(continued)		10		HQ				100	90								
17				11		HQ				100	93								
17.8		Borehole terminated at 17.83 m in dolostone.																	

BOREHOLE LOG	PROJECT: 92377	BOREHOLE: 35-III 1 of 2
HYDRAULIC CONTROL INVESTIGATION TARO-WEST QUARRY FOR: TARO AGGREGATES LTD.		DATE: 29 September 1992 GEOLOGIST SMA ELEVATION 200.4 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY (%)				RQD (%)					
				NUMBER	INTERVAL	TYPE	N	VALUE	WATER	REC	RQD	25	50	75	100	25	50	75	100
1		SANDY SILT TILL Light brown sandy silt, some topsoil at surface, moist, loose to compact.		1	SS	8	21	50											
1.5				2	SS	23	13	60											
2		ERAMOSIA DOLOSTONE Greyish brown to brownish grey, fine crystalline, thin bedded dolostone, locally weathered and porous to about 3.0 m, minor shale content locally.		3	SS	>30	11	40	13										
2				1	HQ			100											
3		-6 cm cavity with well formed calcite at about 3.1 m.																	
4																			
5				2	HQ			100	65										
6																			
7																			
7.6		-Transitional below about 7.2 m.																	
8		VINEMOUNT SHALE Dark brownish grey, aphanitic to very fine crystalline, thin to medium bedded shale, locally interlaminated to thinly interbedded with dolostone, some fossils.																	
8.8																			
9.3		-Grey dolostone from about 8.8 to 9.3 m, locally minor shale content.		4	HQ			100	92										
10																			
11																			
12																			
12.7		-Transitional below about 12.4 m.		5	HQ			100	100										
13		GOAT ISLAND DOLOSTONE Brownish grey, fine crystalline, thin to thick bedded dolostone, occasional shale stringers, minor shale content locally.																	
13.8																			
14		-1 cm well formed gypsum seam at about 13.3 m.		6	HQ			100	97										
14.4		SHALE Dark brownish grey, medium bedded shale,																	

BOREHOLE LOG	PROJECT: 92377	BOREHOLE: 35-III 2 of 2
HYDRAULIC CONTROL INVESTIGATION TARO-WEST QUARRY FOR: TARO AGGREGATES LTD.		DATE: 29 September 1992 GEOLOGIST SMA ELEVATION 200.4 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE				RECOVERY (%)				RQD (%)								
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD										
											25	50	75	100	25	50	75	100		
16		interlaminated with dolostone, bioturbation at upper contact. GOAT ISLAND DOLOSTONE (continued) -Occasional gypsum seams and nodules observed from about 14.4 to 15.8 m. -Fractured zone from about 15.5 to 15.6 m.																		
17				7		HQ				100	97									
18																				
19		-Minor occurrence of chert nodules with sphalerite mineralization below about 19.2 m.																		
20				8		HQ				100	97									
20.5																				
21		ANCASTER CHERT BEDS Brownish grey to grey, very fine crystalline, thin to thick bedded siliceous dolostone with numerous chert nodules and layers.		9		HQ				100	97									
22																				
23				10		HQ				100	100									
24																				
24.7		Borehole terminated at 24.65 in siliceous dolostone.																		

BOREHOLE LOG	PROJECT: 92377	BOREHOLE: 35-IV 1 of 2
HYDRAULIC CONTROL INVESTIGATION TARO-WEST QUARRY FOR: TARO AGGREGATES LTD.		DATE: 30 September 1992 GEOLOGIST SMA ELEVATION 200.4 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY (%)				RQD (%)				
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	25	50	75	100	25	50	75	100
1		SANDY SILT TILL Light brown sandy silt, some topsoil at surface, moist, loose to compact.																
1.5																		
2		ERAMOSIA DOLOSTONE Greyish brown to brownish grey, fine crystalline, thin bedded dolostone, locally weathered and porous to about 3.0 m, minor shale content locally.																
3		-6 cm cavity with well formed calcite at about 3.1 m.																
4																		
5																		
6																		
7																		
7.6		-Transitional below about 7.2 m.																
8		VINEMOUNT SHALE Dark brownish grey, aphanitic to very fine crystalline, thin to medium bedded shale, locally interlaminated to thinly interbedded with dolostone, some fossils.																
8.8																		
9.3		-Grey dolostone from about 8.8 to 9.3 m, locally minor shale content.																
10																		
11																		
12																		
12.7		-Transitional below about 12.4 m.																
13		GOAT ISLAND DOLOSTONE Brownish grey, fine crystalline, thin to thick bedded dolostone, occasional shale stringers, minor shale content locally.																
13.8																		
14.1		-1 cm well formed gypsum seam at about 13.3 m.																
14		SHALE Borehole terminated at 14.12 m in shale.																

BOREHOLE LOG	PROJECT: 92377	BOREHOLE: 35-IV 2 of 2
HYDRAULIC CONTROL INVESTIGATION TARO-WEST QUARRY FOR: TARO AGGREGATES LTD.		DATE: 30 September 1992 GEOLOGIST SMA ELEVATION 200.4 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE							RECOVERY (%)				RQD (%)				
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	25	50	75	100	25	50	75	100	
		NOTE: Stratigraphy inferred from adjacent borehole 35-III. Borehole cored directly to 14.12 m, logged to confirm contacts and for monitor placement.																	

BOREHOLE LOG	PROJECT: 92377	BOREHOLE: 35-V 1 of 1
HYDRAULIC CONTROL INVESTIGATION TARO-WEST QUARRY FOR: TARO AGGREGATES LTD.		DATE: 29 September 1992 GEOLOGIST SMA ELEVATION 200.4 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE							RECOVERY				RQD					
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	RECOVERY (%)				RQD (%)					
											25	50	75	100	25	50	75	100		
1		SANDY SILT TILL Light brown sandy silt, some topsoil at surface, moist, loose to compact.																		
1.5																				
2		ERAMOSA DOLOSTONE Greyish brown to brownish grey, fine crystalline, thin bedded dolostone, locally weathered and porous to about 3.0 m, minor shale content locally.																		
3		-6 cm cavity with well formed calcite at about 3.1 m.																		
4																				
5																				
6																				
6.8		Borehole terminated at 6.77 m in dolostone. NOTE: Stratigraphy inferred from adjacent borehole 35-III. Borehole cored directly to 6.77 m, logged to confirm contacts and for monitor placement.																		

BOREHOLE LOG	PROJECT: TARO	BOREHOLE: 35-VI 1 of 2
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES - STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 13 January 1994 GEOLOGIST SMA/TLC ELEVATION 200.4 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE							RECOVERY (%)				RQD (%)				
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	25	50	75	100	25	50	75	100	
0.5		TOPSOIL Dark brown sandy silt, rootlets, firm.																	
1		SANDY SILT TILL Medium brown sandy silt with clay, trace gravel, dense to very dense, moist.																	
1.7																			
2		ERAMOSA DOLOSTONE Medium brownish-grey, fine crystalline, thin to medium bedded dolostone. Vuggy, numerous shale stringers and gypsum infilled fractures and vugs. Trace fossils with some small fossiliferous zones observed. -Weathered to about 4.0 m.																	
3																			
4																			
5																			
6																			
7																			
7.7																			
8		VINEMOUNT SHALE Dark grey, aphanitic to fine crystalline, medium bedded shale. Numerous clay seams, trace fossils.																	
8.8																			
9		-Dolostone bed from about 8.8 to 9.3 m, locally minor shale content.																	
9.3																			
10																			
11																			
12		-Dolomitic content within shale increases towards bottom of unit.																	
12.6																			
13		GOAT ISLAND DOLOSTONE Medium grey, fine crystalline, thin to thick bedded dolostone. Vuggy, numerous shale stringers and gypsum infilling.																	
13.8																			
14		SHALE																	
14.4		Dark brownish grey, medium bedded shale, interlaminated with dolostone, bioturbation at upper contact.																	

BOREHOLE LOG	PROJECT: TARO	BOREHOLE: 35-VII 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES - STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 18 January 1994 GEOLOGIST SMA ELEVATION 200.4 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE							RECOVERY (%)				RQD (%)				
				NUMBER	INTERVAL	TYPE	N	VALUE	% WATER	% REC	% RQD	25	50	75	100	25	50	75	100
0.5		TOPSOIL Dark brown sandy silt, rootlets, firm.																	
1		SANDY SILT TILL Medium brown sandy silt with clay, trace gravel, dense to very dense, moist.																	
1.7																			
2		ERAMOSA DOLOSTONE Medium brownish-grey, fine crystalline, thin to medium bedded dolostone. Vuggy, numerous shale stringers and gypsum infilled fractures and vugs. Trace fossils with some small fossiliferous zones observed. -Weathered to about 4.0 m.																	
3																			
4																			
5																			
6																			
7																			
7.7																			
8		VINEMOUNT SHALE Dark grey, aphanitic to fine crystalline, medium bedded shale. Numerous clay seams, trace fossils.																	
8.8																			
9		-Dolostone bed from about 8.8 to 9.3 m, locally minor shale content.																	
9.3																			
10																			
11																			
11.3																			
		Borehole terminated at 11.29 m in shale. NOTE: Borehole 35-II was overdrilled January, 1994. The bottom of the borehole was sealed and a new monitor was installed in borehole.																	

BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 36-1 1 of 2
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 23 February 1989 GEOLOGIST TLC ELEVATION 205.8 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE				RECOVERY (%)				RQD (%)							
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD									
											25	50	75	100	25	50	75	100	
1		SANDY SILT FILL Light to medium greyish-brown sandy silt fill, some clay, compact, moist.		1		SS	15												
2.1				2		SS	14												
3		CLAYEY SILT Light brownish-grey clayey silt, some sand, dense to very dense, moist. -Root channels with trace laminations to about 2.7 m, becoming laminated silt and clay (1-3 mm thick) with depth.		3		SS	16												
4				4		SS	23												
4.7				5		SS	47												
5		GRAIN SIZE DISTRIBUTION Silt 51.6% Clay 38.0% Sand 10.4% -Boulder encountered at about 4.1 m.		6		SS	50												
6		ERAMOSIA DOLOSTONE Medium brownish-grey, fine crystalline, thick bedded dolostone. Numerous shale stringers and vugs, slightly porous. -Weathered to about 6.0 m.		1	0.08m	HQ		42	27										
7				2		HQ		78	22										
8				3		HQ		100	65										
9				4		HQ		100	67										
10				5		HQ		100	90										
11		-Becomes vuggy below about 10.4 m, with numerous gypsum infilled fractures and vugs. Calcite present.		6		HQ		87	76										
12				7		HQ		100	88										
13		-Becomes less porous below about 12.0 m.		8		HQ		100	90										
14.1		VINEMOUNT SHALE Dark grey, aphanitic to fine crystalline, thick to massive bedded shale. Occasional dolostone layers,																	

BOREHOLE LOG	PROJECT: 88-197	BOREHOLE: 36-I 2 of 2
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES, STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 23 February 1989 GEOLOGIST TLC ELEVATION 205.8 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					RECOVERY (%)				RQD (%)					
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	25	50	75	100	25	50	75	100
15.2		trace fossils.		9		HQ				100	87							
15.7		-Dolostone bed from about 15.2 to 15.7 m, locally moderate shale content.																
16				10		HQ				100	100							
17																		
18				11		HQ				100	97							
19		-Transitional below about 18.3 m.																
19.5																		
20		GOAT ISLAND DOLOSTONE Medium brownish-grey, fine crystalline, massive bedded dolostone. Numerous shale stringers, some gypsum infilling, trace vugs.		12		HQ				100	100							
20.5																		
21.1		SHALE Dark brownish grey, medium bedded shale, interlaminated with dolostone, bioturbation at upper contact.		13		HQ				100	95							
22																		
23				14		HQ				100	100							
24.2		Borehole terminated at 24.18 m in dolostone.																

BOREHOLE LOG	PROJECT: 92377	BOREHOLE: 36-II 1 of 3
HYDRAULIC CONTROL INVESTIGATION TARO-WEST QUARRY FOR: TARO AGGREGATES LTD.		DATE: 23 September 1992 GEOLOGIST SMA ELEVATION 205.9 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY (%)				RQD (%)							
				NUMBER	INTERVAL	TYPE	N	VALUE	% WATER	% REC	% RQD										
												25	50	75	100	25	50	75	100		
1	FILL Light to medium greyish brown sandy silt, some clay, compact, moist.	-Changing to a light brownish grey clayey silt, hard, DTPL, below about 2.9 m.		1	SS	8	22	60													
2				2	SS	10	21	70													
3				3	SS	16	18	50													
4				4	SS	13	20	50													
4.8				5	5	SS	27	18	45												
5				6	6	SS	27	18	50												
6	ERAMOSA DOLOSTONE Brownish grey, fine crystalline, thin to medium bedded dolostone, occasional shale stringers and thin gypsum seams, locally porous, minor occurrences of vugs and sphalerite mineralization.	-Minor shale content locally below about 7.2 m.		1	SS	>30/	8	65	28												
7				2	HQ	0.08m		91													
8				3	HQ			100	50												
9				4	HQ			99	74												
10				5	HQ			100	85												
11				6	HQ			100	71												
12				7	HQ																
13	VINEMOUNT SHALE Dark brownish grey, aphanitic to very fine	-Becoming thinly interbedded with shale below about 13.3 m. -Transitional below about 13.8 m.		7	HQ			99	83												
14.3				14																	

BOREHOLE LOG	PROJECT: 94-428	BOREHOLE: 36-III 1 of 2
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES - STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 25 September 1992 GEOLOGIST SMA ELEVATION 205.7 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY				RQD									
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	RECOVERY (%)				RQD (%)								
											25	50	75	100	25	50	75	100					
1	[Cross-hatched pattern]	FILL Light to medium greyish brown sandy silt, some clay, compact, moist.	[Vertical shaded bar]																				
2																							
3		-Changing to a light brownish grey clayey silt, hard, DTPL, below about 2.9 m.																					
4																							
4.6																							
5	[Diagonal hatched pattern]	ERAMOSIA DOLOSTONE Brownish grey, fine crystalline, thin to medium bedded dolostone, occasional shale stringers and thin gypsum seams, locally porous, minor occurrences of vugs and sphalerite mineralization.																					
6																							
7		-Minor shale content locally below about 7.0 m.																					
8																							
9																							
10																							
11																							
12																							
13																							
14.1																							
14	[Vertical dashed pattern]	-Becoming thinly interbedded with shale below about 13.1 m.																					
14.1		-Transitional below about 13.8 m.																					
15.0		VINEMOUNT SHALE Dark brownish grey, aphanitic to very fine crystalline, thin to medium bedded shale,																					

BOREHOLE LOG	PROJECT: 94-428	BOREHOLE: 36-III 2 of 2
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES - STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 25 September 1992 GEOLOGIST SMA ELEVATION 205.7 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE							RECOVERY (%)				RQD (%)				
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	25	50	75	100	25	50	75	100	
15.5		interlaminated to locally interbedded with dolostone, dolostone beds usually associated with bioturbation at lower contact and fossils at upper contact.																	
16		-Grey dolostone from about 15.0 to 15.5 m, locally with moderate shale content.																	
17																			
18																			
19		-Transitional below about 18.4 m.																	
19.3																			
20		GOAT ISLAND DOLOSTONE Brownish grey, fine crystalline, thin to thick bedded dolostone, occasional gypsum seams, nodules and shale stringers to about 22.4 m, moderate shale content,																	
20.4		-1 cm gypsum seam, slightly weathered, observed at about 19.9 m.																	
20.6		SHALE Borehole terminated at 20.60 m in shale NOTE: Stratigraphy inferred from adjacent borehole 36-II. Borehole cored directly to 20.60 m, logged to confirm contacts and for monitor placement. Due to elevation change caused by the slope of the berm contacts are about 0.2 m higher.																	

BOREHOLE LOG

PROJECT: 94-428

BOREHOLE: 36-V 1 of 2

HYDROGEOLOGICAL INVESTIGATION
 FARO QUARRIES - STONEY CREEK
 FOR: TARO AGGREGATES LTD.

DATE: 18 October 1994
GEOLOGIST PW
ELEVATION m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY (%)				RQD (%)							
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	25	50	75	100	25	50	75	100			
1	[Cross-hatched pattern]	FILL Light to medium greyish brown sandy silt, some clay, compact, moist.																			
2																					
3		-Changing to a light brownish grey clayey silt, hard, DTPL, below about 2.9 m.																			
4.5				1	HQ			55	19												
5	[Diagonal hatched pattern]	ERAMOSIA DOLOSTONE Brownish grey, fine crystalline, thin to medium bedded dolostone, occasional shale stringers and thin gypsum seams, locally porous, minor occurrences of vugs and sphalerite mineralization.		2	HQ			100	30												
6			3	HQ			100	53													
				4	HQ			100	69												
7																					
8				5	HQ			100	81												
9																					
10				6	HQ			100	47												
				7	HQ			100	78												
11				8	HQ			100	82												
12																					
13																					
13.7		-Becoming thinly interbedded with shale below about 13.1 m.																			
14	[Horizontal hatched pattern]	VINEMOUNT SHALE Dark brownish grey, aphanitic to very fine crystalline, thin to medium bedded shale, -Grey dolostone below about 14.5 m, locally		9	HQ			100	97												
14.5				10	HQ			98	83												

BOREHOLE LOG	PROJECT: 94-428	BOREHOLE: 36-V 2 of 2
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES - STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 18 October 1994 GEOLOGIST PW ELEVATION m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY (%)				RQD (%)					
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD									
											25	50	75	100	25	50	75	100	
15.3		moderate shale content.																	
15.5		Borehole terminated at 15.54 m in shale.		11	HQ					89	69								

BOREHOLE LOG	PROJECT: 92-372	BOREHOLE: 37-I 1 of 1
HYDROGEOLOGICAL INVESTIGATION TARO QUARRIES - STONEY CREEK FOR: TARO AGGREGATES LTD.		DATE: 3 February 1992 GEOLOGIST TLC ELEVATION 192.8 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE				RECOVERY (%)				RQD (%)								
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD										
											25	50	75	100	25	50	75	100		
0.4		VINEMOUNT SHALE Dark brownish grey, aphanitic to very fine crystalline, thin to medium bedded shale, locally laminated with dolostone.																		
1.2		-Dolostone bed from about 0.4 to 1.2 m, moderate shale content locally.																		
2																				
3																				
4		-Dolostone content increasing below about 3.8 m.																		
4.9																				
5		GOAT ISLAND DOLOSTONE Brownish grey to grey, fine crystalline, thin to medium bedded dolostone, moderate shale content, occasional shale stringers and calcite nodules, gypsum infilled seams locally, trace fossils.																		
6.1																				
6.8		SHALE Dark brownish grey, aphanitic to very fine crystalline, thick bedded shale interlaminated with dolostone, bioturbation at upper contact.																		
7																				
8		-Becoming massive bedded below about 8 m.																		
9																				
10																				
11																				
11.4		Borehole terminated at 11.42 m in dolostone.																		