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Conservation and Parks
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Ministère de l'Environnement, de la
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May 8, 2020

File: SI-LA-SC-660

MEMORANDUM:

To: Maisa Fumagalli
Abatement, Sarnia District Office

From: Hugh Geurts
Surface Water Evaluator, Southwest Regional Office

RE: Regional surface water review. Clean Harbors Canada. 2019 Annual Landfill Report Executive Summary Executive Report Prepared by Clean Harbors Canada Inc. – undated.

And;

2019 Annual Surface Water Quality Monitoring Report (Appendix H). Clean Harbors Lambton Facility. 4090 Telfer Road Corunna. Report Prepared by GHD Consulting - undated

I have reviewed the above noted report and I offer the following comments.

Section 3.4 of the Surface Water Quality Monitoring Report provides narrative with respect to the leachate seep that was identified at the south perimeter ditch in April/May 2019. Discussion includes, identification, containment, mitigation/repair, and subsequent monitoring to confirm that the leachate breakout did not ultimately impair water leaving through the Equalization Pond. As part of the mitigation, Clean Harbors submitted a plan on March 09, 2020 that provided further Leachate and surface water management to ensure similar leachate situations would not occur (attached).

Section 4 of the Surface Water Quality Monitoring Report notes minor exceedances of the PWQO for various metals and phenols within the stormwater ponds and equalization pond. The Consultant notes the values are comparable to background samples obtained at STN6 (Burton Creek) and the sources are likely background associated with the clay composition of the overburden at the site. Given the infrequency of the exceedances and that they were only slightly above the PWQO, I am willing to agree that is the likely source. I note a one time exceedance of Chromium VI for future reference of subsequent annual reviews. (0,001 mg/l in the East Pond on August 21, 2019). Required Microtox testing as identified in Section 4.2.2 of the report and in Table 7 indicated the water quality sampled was not toxic as per the toxicity evaluation procedure.

As per the attached “Surface Water Monitoring Program and Surface Water Characterization” submission, calendar year 2020 will for the final year of the proposed 5 year characterization study, Accordingly, Clean Harbors will be providing recommendations in the 2020 annual report with respect to modifications to the monitoring program.

Section 5.0 of the report does not propose any changes to the monitoring program but does suggest Clean Harbors redouble its efforts with respect to staff completing required monitoring.

It would be beneficial if Clean Harbors could please add a printed/submission date to the title pages of the reports for reference purposes.

Beyond the leachate breakout associated with the South Ditch in April/May 2019 (that appears to have been adequately addressed), I have no specific concern with surface water management at the facility for the monitoring year 2019.

Hugh Geurts
Surface Water Evaluator
Southwest Regional Office
Ontario Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs
733 Exeter Road, London
N6E 1L3
519-873-5039

Carabott, Erica Jo

From: Buhrow, James (MECP) <James.Buhrow@ontario.ca>
Sent: Thursday, July 23, 2020 1:32 PM
To: Carabott, Erica Jo
Subject: 2019 Annual Monitoring Report - Appendix G - Action Required.

Importance: High

Hi Erica,

As discussed there has been a number of issues identified after a review of Appendix G (Groundwater Monitoring Report), which forms a part of the 2019 Annual Monitoring Report. The review was conducted by ministry technical support staff. The following list needs to be addressed:

1. As part of the remedial response to the leachate seep, the southern berm was removed. Confirm the monitoring wells, that were removed as part of that work, were abandoned in accordance with Ontario Regulation 903 (Wells). **Provide the documentation required by Section 16.5.**
2. As recommended by GHD, **TW45-99D should be redeveloped to assess if the screen and sand-pack can be rehabilitated to improve well recharge.**
3. As recommended by GHD, **the leachate indicator parameters should be re-evaluated using samples collected from the leachate collection system in 2020.** That being said, the re-evaluation of the parameters should reflect both the new expansion area and previously filled areas where expansion activity has not yet occurred. In addition, leachate quality data previously collected at the site should be considered.
4. As recommended by GHD in Section 3.2, **start the collection and submission of leachate samples consisting of general indicators, major and minor ions semi-annually, total metals annually, and VOC biennial, starting in the spring of 2020.**
5. As outlined in Section 3.2.1.2, VOCs were detected at OW35-90S and TW45-99S. **These wells should be sampled for VOCs in 2020. Provide further discussion on why toluene was detected at the two wells.**
6. As identified by GHD in Section 4.1, *"the water levels and hydraulic gradients measured in the HCL in 2019 indicate that the remedial system is not operating as intended to maintain an upward gradient"*. **The following items are to be addressed:**
 - Provide all data logger information relating to the HCL monitoring and extraction wells (since the monitoring program began in 2015).
 - As recommended by GHD, perform an investigation on the Sub-Cell 3 groundwater extraction system to assess the functionality of the HCL extraction wells.
 - As recommended by GHD, establish groundwater elevation trigger levels and response actions to help assess the performance of the Sub-Cell 3 groundwater extraction system as monitoring data is collected throughout the year.

- As recommended by GHD, develop an operational and maintenance procedure and an inspection checklist to be completed in tandem with groundwater monitoring events.
7. As identified by GHD in Section 5.1, *“However, during most of 2019 an inward gradient was not maintained from the property boundary to the LCS. Clean Harbors is working to re-establish the LCS to normal operation”*. **The following items need to be addressed:**
- As recommend by GHD, investigate the condition of the LCS standpipes and assess potential causes for the failure of transducer direct read cables.
 - Develop and implement a procedure for reviewing the water level data in a timely manner and promptly taking actions necessary to ensure the proper operation of the LCS.
8. With the changes to the surface water management system, an updated groundwater monitoring program will need to be submitted. The updated monitoring plan must demonstrate inwards gradients are maintained. **Provide a timeline on the updated monitoring plan submission.**

I understand that the current surface water system changes being made at the site will address some of the items; however, details need to be provided to show exactly how the issues will be resolved.

Please respond and provide the requested information by no later than **August 23, 2020**.

Let me know if you need any clarification.

Regards,

James Buhrow

Senior Environmental Officer
Ministry of the Environment, Conservation and Parks
Sarnia District Office
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james.buhrow@ontario.ca



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August 21, 2020

Reference No. 044985-42

Ms. Erica Carabott
Facility Compliance Manager
Clean Harbors Canada Inc.
Lambton Facility Landfill
4090 Telfer Sideroad
Corunna, Ontario
N0N 1G0

Dear Ms. Carabott:

**Re: Response to MECP Comments
2019 Annual Report – Appendix G – Groundwater Monitoring Report
Clean Harbors Canada, Inc. Lambton Facility Landfill**

This letter prepared by GHD technical staff responds to the Ministry of the Environment, Conservation and Parks (MECP) technical staff comments related to the Appendix G – Groundwater Monitoring Report, of the 2019 Annual Monitoring Report for the Clean Harbors Lambton Facility. The MECP comments were provided to Clean Harbors on Thursday July 23, 2020 in an email from Mr. James Buhrow.

The MECP comments are provided followed by the GHD response. The response to the comments will be included within the 2020 annual groundwater report as appropriate.

Comment #1:

As part of the remedial response to the leachate seep, the southern berm was removed. Confirm the monitoring wells, that were removed as part of that work, were abandoned in accordance with Ontario Regulation 903 (Wells). Provide the documentation required by Section 16.5.

GHD Response #1

The 6 monitoring wells (TW50-02A, TW50-02B, TW51-02A, TW51-02B, TW52-02A, TW52-02B) located in the southern berm were removed as part of the remedial work conducted in 2019. These wells were scheduled for abandonment as part of the installation of the southern storm water pond (Pond B) approved by MECP in September of 2019. The base of the surface water ponds is 196 m AMSL and the bottom of the screened interval for each of the 6 wells was 195.6 m AMSL. As such, well abandonment was accomplished by fully excavating the well materials as part of pond construction. In accordance with Section 21.1 Subsection (8) of Ontario Regulation 903 (Wells), practices related to sealing the annular space or removal of well materials, etc. do not apply in cases where the well is abandoned by "excavation of the entire well in the course of work carried out for another purpose."

No well tags were located on the noted wells. A letter that provides the abandonment method and the related well logs will be prepared and submitted to MECP by August 31, 2020.



Comment #2:

As recommended by GHD, TW45-99D should be redeveloped to assess if the screen and sand-pack can be rehabilitated to improve well recharge.

GHD Response #2

TW45-99D is located along Telfer Road and south of the main entrance and the bottom of the screen is about 40 metres below the ground surface. A work program to address the redevelopment of the monitoring well is being developed and will be submitted to Clean Harbors for review and approval. The well will be redeveloped by a licensed well driller once funding is approved.

Comment #3:

As recommended by GHD, the leachate indicator parameters should be re-evaluated using samples collected from the leachate collection system in 2020. That being said, the re-evaluation of the parameters should reflect both the new expansion area and previously filled areas where expansion activity has not yet occurred. In addition, leachate quality data previously collected at the site should be considered.

GHD Response #3

As part of the leachate indicator parameter assessment, a leachate quality database will be developed based on the historic leachate analysis that have been conducted at the Site for the last 10 years and the leachate quality data from the perimeter leachate collection system (LCS). It should be noted that samples collected from the LCS are representative of leachate from the newer cells, as well as portions of the older cells. Accordingly LCS samples are considered to be the best representation of bulk leachate quality and are appropriate for evaluating suitable Site-specific leachate indicator parameters.

Comment #4:

As recommend by GHD in Section 3.2, start the collection and submission of leachate samples consisting of general indicators, major and minor ions semi-annually, total metals annually, and VOC biennial, starting in the spring of 2020.

GHD Response #4

The LCS was operating in manual mode for approximately 1 year. The LCS operation was returned to normal operation mode in late spring of 2020. A sample of leachate was not collected in the spring, but is scheduled to commence in the fall of 2020. The intent of monitoring the LCS leachate quality is to determine if changes in the leachate quality are occurring. GHD concurs with the leachate monitoring parameters and frequency described above, however after 3 years, the frequency of leachate quality monitoring should be re-assessed.



Comment #5:

As outlined in Section 3.2.1.2, VOCs were detected at OW35-90S and TW45-99S. These wells should be sampled for VOCs in 2020. Provide further discussion on why toluene was detected at the two wells.

GHD Response #5

Toluene was reported at a concentration of 0.39 µg/L at TW34-99S in the sample collected in June 2019. The source of this low level detection is not known and toluene has not historically been reported at this monitoring well. As monitoring wells TW62-13S and TW63-13S are both located near TW45-99S, but closer to the landfilled waste, this detection of toluene is suspected to be anomalous. TW45-99S will be re-sampled for VOCs during the fall 2020 monitoring event to investigate whether or not this detection was anomalous.

Toluene was reported at OW35-90S at a concentration of 0.43 µg/L in the sample collected in June 2019. Toluene had not previously been reported at this monitoring well. The source of this detection is unknown, however OW35-90S will be re-sampled for VOCs during the fall 2020 monitoring event to investigate whether or not this detection was anomalous.

Comment #6:

As identified by GHD in Section 4.1, "the water levels and hydraulic gradients measured in the HCL in 2019 indicate that the remedial system is not operating as intended to maintain an upward gradient". The following items are to be addressed:

- Provide all data logger information relating to the HCL monitoring and extraction wells (since the monitoring program began in 2015).
- As recommended by GHD, perform an investigation on the Sub-Cell 3 groundwater extraction system to assess the functionality of the HCL extraction wells.
- As recommended by GHD, establish groundwater elevation trigger levels and response actions to help assess the performance of the Sub-Cell 3 groundwater extraction system as monitoring data is collected throughout the year.
- As recommended by GHD, develop an operational and maintenance procedure and an inspection checklist to be completed in tandem with groundwater monitoring events.

GHD Response #6

The Sub-Cell 3 groundwater extraction system is currently undergoing a maintenance assessment and the Sub-Cell 1, 2 and 3 area will have significant topography changes over the next 18 months. The Sub-Cell 3 is currently prone to flooding and the pumping system is prone to failure during winter conditions due to freezing of the air supply lines. The proposed changes are as follows:

- Increase the surface topography to be approximately 3 metres higher to ensure drainage from the Sub-Cell 1, 2, and 3 area. This was proposed in the surface water amendment that will allow surface



water to drain by gravity throughout the site and minimize the reliance on mechanical systems to move water. The filling operation commenced this summer and the surface in the vicinity of the extraction and monitoring wells has been raised by about 0.75 m and will be graded to temporary drain water to the north. In the spring of 2021, the focus of the fill operation in the area will be focused in the area of the Sub-Cell 3 extraction area.

- Installation of an air dryer on the air compressor system to provide dry air and minimize potential for compressed air lines freezing during the winter period. This has been ordered by Clean Harbors and will be installed prior to winter
- Once the Sub-Cell 3 grades have been revised to the new design grades, move the compressor building and related infrastructure to the purge well area and install weather protected air lines and water discharge lines. This is tentatively scheduled for late 2021 or in 2022.

With regard to the points noted in the comment the following is provided:

- a) The data logger information will be consolidated and provided to MECP in digital format. GHD is currently reviewing the data that is available in digital format. GHD will provide 5 years of data or if 5 years is not available, all of the digital data that GHD has. This data will be provided no later than September 30, 2020.
- b) With regard to the latter three items, GHD and Clean Harbors are preparing a work plan to address the assessment of the system, the development of trigger levels, and an operational and maintenance procedure. This work will be conducted in association with the system upgrades that are proposed over the next 2 years.

Comment #7:

As identified by GHD in Section 5.1, "However, during most of 2019 an inward gradient was not maintained from the property boundary to the LCS. Clean Harbors is working to re-establish the LCS to normal operation". The following items need to be addressed:

- As recommend by GHD, investigate the condition of the LCS standpipes and assess potential causes for the failure of transducer direct read cables.
- Develop and implement a procedure for reviewing the water level data in a timely manner and promptly taking actions necessary to ensure the proper operation of the LCS.

GHD Response #7

With regard to the direct read cables, GHD and Clean Harbors are working on this item to determine the cause and potential solutions that would minimize the potential for failure of the transducer direct read cables.

With the new surface water ponds, the surface water pond level is required to be compared to the LCS level and warnings be sent to the system operator via the SCADA system so the operator can respond to conditions prior to a loss of inward hydraulic gradients. Once the surface water pond level indicator is



installed and connected to the LCS monitoring system, programming will occur that will allow the trigger and warnings to be installed as per the surface water amendment document/approval requirements. The system will commence operation once the surface water ponds construction work is complete and the ponds commence routine operations.

Comment #8:

With the changes to the surface water management system, an updated groundwater monitoring program will need to be submitted. The updated monitoring plan must demonstrate inwards gradients are maintained. Provide a timeline on the updated monitoring plan submission.

GHD Response #8

The intent is to develop a monitoring program that incorporates the groundwater, Sub-Cell 3, the LCS, and the surface water into a single program. The monitoring program will be designed to provide comprehensive monitoring of water quality and gradients at critical locations while removing unnecessary monitoring or redundancies. Decisions concerning modifications to the existing program will be made in light of recent changes to the Site surface water management system, LCS and the observed evolution of water quality within the zones monitored. The intent is to provide a draft of this updated monitoring program to the MECP in the spring of 2021 for review and discussion/comment. Prior to the development of the updated monitoring program, GHD and Clean Harbors are open to discussing the program in general terms with MECP.

Should you have any questions regarding the information provided in this letter, do not hesitate to let us know.

Sincerely,

GHD

A handwritten signature in black ink that reads 'James R. Yardley'. The signature is fluid and cursive, with a long horizontal stroke at the end.

James R. Yardley, P.Eng
Associate

JRY/mg/27

cc: Michael Parker, Clean Harbors
Ben Kempel, GHD



August 31, 2020

Reference No. 044985-42

Ms. Erica Carabott
Facility Compliance Manager
Clean Harbors Canada Inc.
Lambton Facility Landfill
4090 Telfer Sideroad
Corunna, Ontario
N0N 1G0

Dear Ms. Carabott:

**Re: Abandonment of South Berm Chloride Monitoring Wells
Clean Harbors Canada, Inc. Lambton Facility Landfill**

This letter provides a record of the excavation of the South Berm monitoring wells that were installed to assess chloride impacts prior to the installation of a leachate collection system.

Six (6) monitoring wells (TW50-02A, TW50-02B, TW51-02A, TW51-02B, TW52-02A, TW52-02B) were installed as part of the installation of the South Berm at the Clean Harbors Lambton facility. The location of the 6 monitoring wells and the stratigraphic logs for the monitoring wells are provided in Attachment A.

The monitoring wells were installed in 2002 to monitor the performance of the berm with regard to controlling chloride impacts in the upper groundwater system during the assessment of the need for a leachate collection. The assessment and approval of vertical expansion of the landfill required the installation of a leachate collection system and control of the shallow of the groundwater in the vicinity of the landfill footprint. The leachate collection and pumping system adjacent to the South Berm was installed in 2016. As such the South Berm monitoring wells were determined to no longer be required.

In 2019, the Ministry of the Environment, Conservation and Parks (MECP) approved a remedial action plan with regard to leachate seep control and remediation (June), as well as the revised storm water management plan (September). The storm water management plan included the removal of the South Berm and the remediation program required the partial removal of the South Berm as part of the remedial work and equipment access.

The 6 monitoring wells were located within the footprint of the storm water pond and the base of the monitoring wells was similar to the base of the storm water pond (+/- 0.3 m). As such, it was determined that the monitoring wells would be fully excavated as part of the storm water pond construction.

As such, well abandonment was accomplished by fully excavating the well materials prior to pond construction. In accordance with Section 21.1 Subsection (8) of Ontario Regulation 903 (Wells), practices related to sealing the annular space or removal of well materials, etc. do not apply in cases where the well is abandoned by "excavation of the entire well in the course of work carried out for another purpose."

No well tags were located on the noted wells.



Should you have any questions regarding the information provided in this letter, do not hesitate to let us know.

Sincerely,

GHD

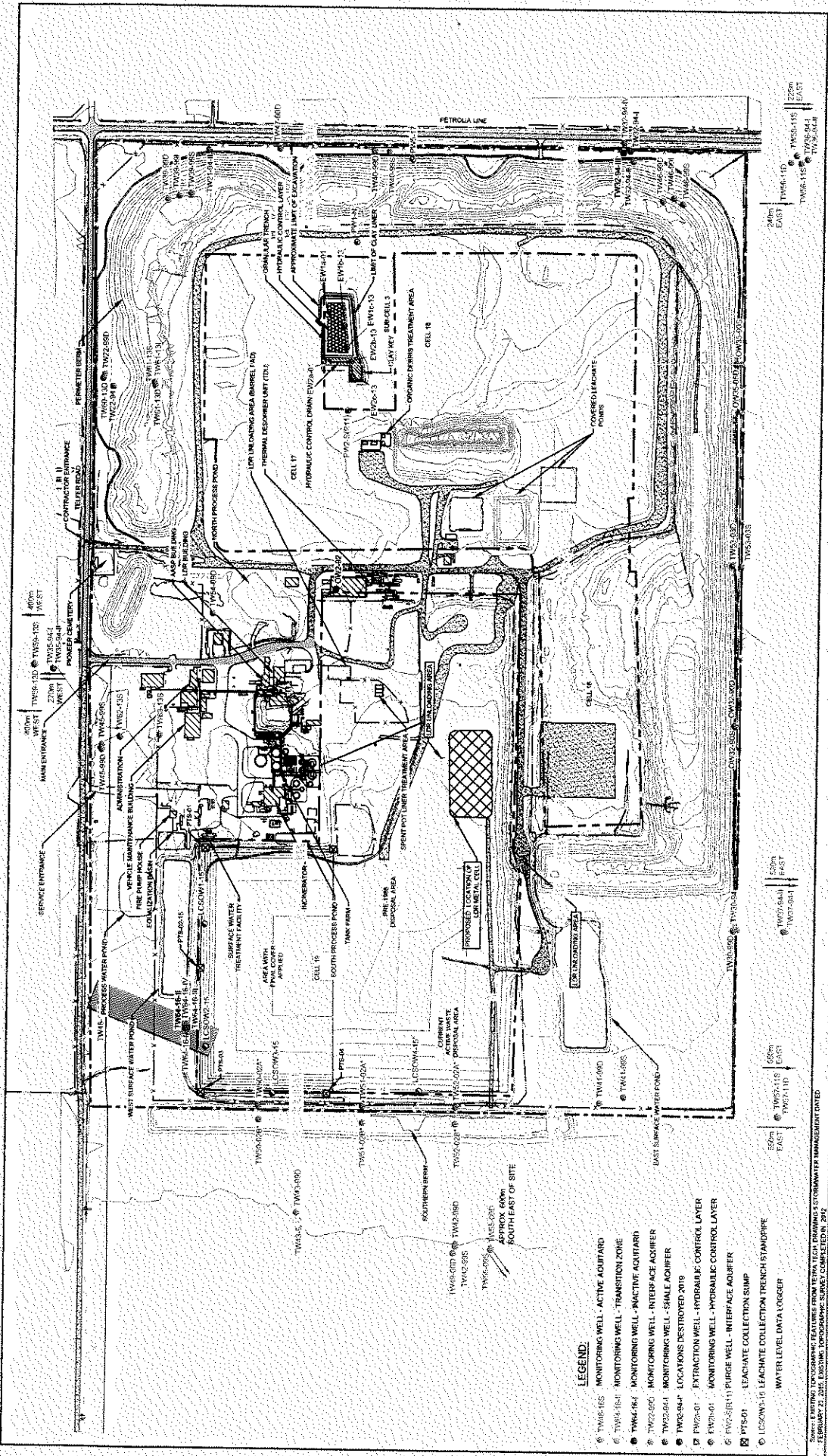
A handwritten signature in black ink, appearing to read 'James R. Yardley'. The signature is fluid and cursive, with a long horizontal stroke extending to the right.

James R. Yardley, P.Eng
Associate

JRY/mg/28

cc: Michael Parker, Clean Harbors
Ben Kempel, GHD

Attachment A



44085-43
Feb 6 2020

MONITORING WELL NETWORK

LEGEND:

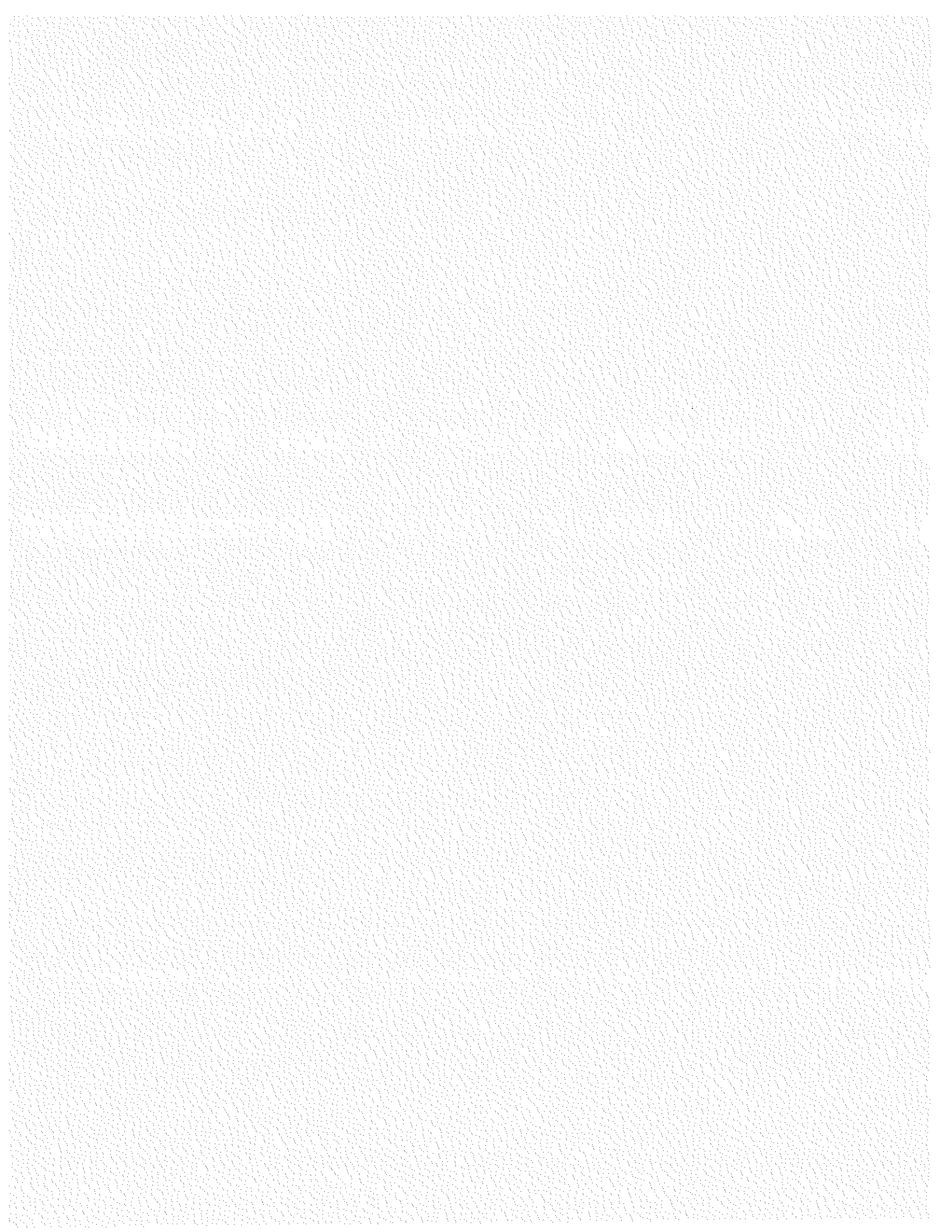
- TW46-165 MONITORING WELL - ACTIVE AQUIFARD
- TW46-164 MONITORING WELL - TRANSITION ZONE
- TW46-164 MONITORING WELL - INACTIVE AQUIFARD
- TW42-290 MONITORING WELL - INTERFACE AQUIFER
- TW23-264 MONITORING WELL - INTERFACE AQUIFER
- TW23-264 MONITORING WELL - SHALE AQUIFER
- TW23-264 LOCATIONS DESTROYED, 2019
- FW23-01 MONITORING WELL - HYDRAULIC CONTROL LAYER
- FW23-01 MONITORING WELL - HYDRAULIC CONTROL LAYER
- FW23-01 PURGE WELL - INTERFACE AQUIFER
- PWS-01 LEACHATE COLLECTION SUMP
- LCCSW-15 LEACHATE COLLECTION TRENCH STAMPONE
- WATER LEVEL DATA LOGGER

LEGEND:

- EXISTING GROUND CONTOUR
- PROPERTY BOUNDARY
- - - LIMIT OF WASTE
- ▨ DRAINAGE SWALE
- FENCELINE
- ▭ PAVED ROADWAY
- ▭ GRAVEL ROADWAY
- ▭ BUILDING STRUCTURE
- ▭ CLEAN INTERNAL MAUL ROAD
- ▭ TRANSECT CELL 19-1

Scale: 1:5000
 Date: 2020-01-21
 Project: LAMBTON FACILITY
 Drawing: MONITORING WELL NETWORK
 Author: [Name]
 Date: 2020-01-21
 Project: LAMBTON FACILITY
 Drawing: MONITORING WELL NETWORK
 Author: [Name]

FIGURE 3



BOREHOLE LOG	PROJECT: 22-377	BOREHOLE: TW50-02A 1 of 1
Clean Harbors Canada - Lambton Facility Corruna, Ontario FOR: Clean Harbors Canada, Inc.	DATE: 26 August 2002 GEOLOGIST DJG/PJAM ELEVATION m ASL	

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						COMMENTS	
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC		% RQD
1.1		SILTY CLAY (FILL) Light brown silty clay fill mixed with some rootlets, occasional orange and light brown mottle, compact, dry to moist, topsoil odour.		1		CS			100		
2		CLAYEY SILT TILL (ST. JOSEPH TILL) Light brown clayey silt till, weathered, occasional orange and grey mottling, occasional rootlet within fractures, occasional orange and grey staining on fracture faces, trace disseminated subrounded to subangular gravel, massive, very stiff, DTPL.		2		CS			100		
		- Layer of greyish white crystalline material 0.05 m thick at 2.4 m depth.		3		CS			67		
3				4		CS			98		
4		- Becoming WTPL below 3.9 m depth.		5		CS			100		
4.9		Borehole terminated at 4.9 m depth in clayey silt till.									


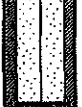



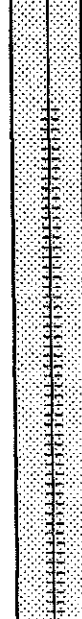
BOREHOLE LOG	PROJECT: 22-377	BOREHOLE: TW50-02B 1 of 1
Clean Harbors Canada - Lambton Facility Corruna, Ontario FOR: Clean Harbors Canada, Inc.		DATE: 27 August 2002 GEOLOGIST DJG/PJAM ELEVATION m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					COMMENTS	
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER		% REC
1		BERM FILL Greyish to light brown silt fill, occasional orange and light brown mottle, occasional orange staining on fracture faces, occasional fine to medium subrounded gravel, massive, very stiff, APL to DTPL.		1		CS			100	
2				2		CS			100	
2.7				3		CS			72	
3		CLAYERY SILT (FILL) Light brown silty clay fill mixed with some rootlets, occasional orange and light brown mottle, occasional orange staining on fracture faces, occasional fine to medium subrounded gravel, very stiff, DTPL.		3		CS			72	
4				4		CS			100	
4.3		CLAYEY SILT TILL (ST. JOSEPH TILL) Light brown clayey silt till, occasional orange and grey mottling, occasional orange and grey staining on fracture faces, trace disseminated subrounded to subangular gravel, massive, very stiff, DTPL. - Becoming greyish brown below 4.5 m depth.		4		CS			100	
5				5		CS			100	
6		- Grey and black staining on fracture faces below 5.8 m depth.		5		CS			100	
7				6		CS			100	
7.9		Borehole terminated at 7.9 m depth in clayey silt till.								

BOREHOLE LOG	PROJECT: 22-377	BOREHOLE: TW51-02A 1 of 1
Clean Harbors Canada - Lambton Facility Corruna, Ontario FOR: Clean Harbors Canada, Inc.	DATE: 26 August 2002 GEOLOGIST DJG/PJAM ELEVATION m ASL	

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					COMMENTS	
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER		% REC
1		SILTY CLAY (FILL) Light brown silty clay fill mixed with some rootlets, occasional orange and light brown mottle, orange staining on fracture face, topsoil odour, occasional subrounded gravel, massive, DTPL.		1		CS			100	
1.2		CLAYEY SILT TILL (ST. JOSEPH TILL) Light brown clayey silt till, occasional orange and grey mottling, occasional orange and grey staining on fracture faces, trace disseminated subrounded to subangular gravel, massive, very stiff, DTPL to APL.		2		CS			100	
2				3		CS			100	
3				4		CS			100	
4		- Becoming greyish brown clayey silt till below 3.7 m depth.		5		CS			100	
4.9		Borehole terminated at 4.9 m depth in clayey silt till.								

BOREHOLE LOG	PROJECT: 22-377	BOREHOLE: TW51-02B 1 of 1
Clean Harbors Canada - Lambton Facility Corruna, Ontario FOR: Clean Harbors Canada, Inc.		DATE: 27 August 2002 GEOLOGIST DJG/PJAM ELEVATION m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					COMMENTS			
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER		% REC	% FQD	
1		BERM FILL Greyish to light brown silty clay fill, occasional orange and light brown mottle, occasional orange staining on fracture faces, trace fine to medium subrounded gravel, massive, very stiff, DTPL to APL.		1		CS			100			
2		2			CS			100				
2.7			CLAYEY SILT (FILL) Light brown silty clay fill mixed with some rootlets, occasional orange and light brown mottle, occasional orange staining on fracture faces, occasional fine to medium subrounded gravel, very stiff, DTPL.		3		CS			100		
3			4			CS			100			
4.3			CLAYEY SILT TILL (ST. JOSEPH TILL) Light brown clayey silt till, occasional orange and grey mottling, occasional orange and grey staining on fracture faces, trace disseminated subrounded to subangular gravel, massive, very stiff, DTPL to APL. - Becoming greyish brown below 4.5 m depth.		4		CS			100		
5			5			CS			100			
6	6				CS			100				
7.9		Borehole terminated at 7.9 m depth in clayey silt till.										

BOREHOLE LOG	PROJECT: 22-377	BOREHOLE: TW52-02A 1 of 1
Clean Harbors Canada - Lambton Facility Corruna, Ontario FOR: Clean Harbors Canada, Inc.	DATE: 26 August 2002 GEOLOGIST DJG/PJAM ELEVATION m ASL	

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					COMMENTS		
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER		% REC	% RQD
1		SILTY CLAY (FILL) Light brown silty clay fill mixed with some rootlets, occasional orange and light brown mottle, orange staining on fracture face, weathered, trace subrounded gravel, massive, DTPL.		1		CS			100		
1.1		CLAYEY SILT TILL (ST. JOSEPH TILL) Light brown clayey silt till, weathered, occasional orange and grey mottling, occasional orange and grey staining on fracture faces, trace disseminated subrounded to subangular gravel, massive, very stiff, DTPL to APL.		2		CS			100		
2				3		CS			100		
3				4		CS			100		
4				5		CS			100		
4.9		Borehole terminated at 4.9 m depth in clayey silt till.									

BOREHOLE LOG	PROJECT: 22-377	BOREHOLE: TW52-02B 1 of 1
Clean Harbors Canada - Lambton Facility Corruna, Ontario FOR: Clean Harbors Canada, Inc.		DATE: 27 August 2002 GEOLOGIST DJG/PJAM ELEVATION m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					COMMENTS		
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER		% REC	% RQD
1		BERM FILL Light brown silty clay fill, occasional orange and light brown mottle, massive, stiff to very stiff, DTPL.		1		CS			96		
2				2		CS			100		
3.0				3		CS			100		
4				CLAYEY SILT (FILL) Light brown silty clay fill mixed with some rootlets, occasional orange and light brown mottle, occasional orange staining on fracture faces, occasional fine to medium subrounded gravel, very stiff, DTPL.							
4.3				CLAYEY SILT TILL (ST. JOSEPH TILL) Light brown clayey silt till, occasional orange and grey mottling, occasional orange and grey staining on fracture faces, trace disseminated subrounded to subangular gravel, massive, very stiff, DTPL to APL.							
5				- Becoming greyish brown below 5.8 m depth.							
6				4		CS			100		
7				5		CS			100		
8				6		CS			100		
8.1		Borehole terminated at 8.1 m depth in clayey silt till.									