TOWNSHIP OF SOUTH GLENGARRY
REGULAR MEETING OF COUNCIL
AGENDA

Tuesday, September 20, 2022, 12:00 PM

Electronic Meeting

		Pages
1.	CALL TO ORDER	
2.	O CANADA	
3.	DISCLOSURE OF PECUNIARY INTEREST	
4.	APPROVAL OF AGENDA Additions, Deletions or Amendments All matters listed under For Information Only, are considered to be routine and will be enacted by one motion. Should a Council member wish an alternative action from the proposed recommendation, the Council member shall request that this matter be moved to the appropriate section at this time.	
5.	APPROVAL OF MINUTES	
5.a.	Previous Meeting Minutes - September 6, 2022	3
5.b.	Public Meeting Minutes - September 6, 2022	10
6.	PRESENTATIONS AND DELEGATIONS	
7.	ACTION REQUESTS	
7.a.	Reallocation of Funds – Signage Program (K. Campeau)	12
7.b.	Reallocation of Project Expenses from Glen Walter Water and Wastewater Reserve (K. MacDonald)	14
7.c.	Williamstown Fire Station – Septic System Update (D. Robertson)	17
7.d.	Tender 25-2022 - Peanut Line Bridge – CR19 (S. Servage)	24
7.e.	North Lancaster Landfill Annual Report (S. McDonald)	30
7.f.	Request for Use of Green Road - 18803 County Road 18 (S. McDonald)	615
8.	BY-LAWS	
8.a.	Federation of Canadian Municipalities Grant Agreement (S. Mcdonald)	623
9.	ITEMS FOR CONSIDERATION	
9.a.	CLRC Arena Floor Project Update (S. Servage)	657
9.b.	National Day for Truth and Reconciliation (T. Mills)	658

TOWNSHIP OF SOUTH GLENGARRY

REGULAR MEETING MINUTES

September 6, 2022, 7:00 p.m.
Tartan Hall - Char-Lan Recreation Centre
19740 John Street, Williamstown

PRESENT:	Mayor Lyle Warden, Deputy Mayor Stephanie Jaworski, Councillor Martin Lang, Councillor Sam McDonell and Councillor Rebecca Luck
STAFF PRESENT:	CAO Tim Mills, GM Corporate Services/Clerk Kelli Campeau, GM Finance/Treasurer Michael Hudson, GM Infrastructure Services Sarah McDonald, GM Planning, Building & Enforcement Joanne Haley, GM Parks, Recreation & Culture Sherry-Lynn Servage, Fire Chief Dave Robertson, Deputy Clerk Crystal LeBrun and Executive Assistant/Communications Coordinator Michelle O’Shaughnessy.

1. CALL TO ORDER

Resolution No. 276-2022

Moved by Deputy Mayor Jaworski
Seconded by Councillor Lang

BE IT RESOLVED THAT the September 6, 2022 Regular Council Meeting of the Township of South Glengarry now be opened at 7:00 pm

CARRIED

2. O CANADA

3. DISCLOSURE OF PECUNIARY INTEREST

4. APPROVAL OF AGENDA

Resolution No. 277-2022

Moved by Councillor Lang
Seconded by Councillor McDonell

BE IT RESOLVED THAT the Council of the Township of South Glengarry approve the agenda as circulated.

CARRIED

5. APPROVAL OF MINUTES

5.1 Special Meeting Minutes - August 2, 2022

Resolution No. 278-2022

Moved by Councillor McDonell
Seconded by Councillor Luck

BE IT RESOLVED THAT the Minutes of the August 2, 2022 Special Council Meeting, including the Closed Session Minutes, be adopted as circulated.

CARRIED

5.2 Previous Meeting Minutes - August 2, 2022

Resolution No. 279-2022

Moved by Councillor Luck
Seconded by Deputy Mayor Jaworski

BE IT RESOLVED THAT the Minutes of the August 2, 2022 Regular Council Meeting, including the Closed Session Minutes, be adopted as circulated.

CARRIED

6. PRESENTATIONS AND DELEGATIONS

6.1 OPP Update - Detachment Commander Marc Hemmerick

Cdr. Marc Hemmerick; Presented updated crime statistics to South Glengarry Council in regards to policing in the community.

6.2 Westley's Point Petition - Daniel Quenneville

Mr. Quenneville; requested a 10% tax reduction for residents of Westley's Point. Council directed staff to contact presenter and assist with obtaining MPAC information.

7. ACTION REQUESTS

7.1 Disposal of Used Building Equipment – Former Roads Garage (D. Robertson)

Resolution No. 280-2022

Moved by Deputy Mayor Jaworski
Seconded by Councillor Lang

BE IT RESOLVED THAT Staff Report 130-2022 be received and that the Council of the Township of South Glengarry deem the following equipment as surplus to the needs of the Corporation and that they be advertised for sale in accordance with the provisions of By-law 36-07, being the disposal of assets by-law.

Items to be disposed of:

- Ceiling mounted natural gas radiant tube heaters
- Four overhead doors and openers
- Chain hoist I-beam

CARRIED

7.2 Reallocation – Bray St Pumping Station Upgrades and Watermain Looping (M. Hudson)

Resolution No. 281-22022

Moved by Councillor Lang
Seconded by Councillor McDonell

BE IT RESOLVED THAT Staff Report 131-2022 be received and that the Council of the Township of South Glengarry allocate $380,433.51 from the General Reserve account for the Glen Walter Bray Street Pumping Station Upgrades and Extension of the Water Wastewater Mains.

POSTPONED

7.3 Roads Budget Reallocation – Guide Rail to Brushing (S. McDonald)

Resolution No. 282-2022

Moved by Councillor McDonell
Seconded by Councillor Luck

BE IT RESOLVED THAT Staff Report 133-2022 be received and that the Treasurer be directed to reallocate $50,000 from the 2022 Guide Rail account to the 2022 Roadside Brushing account.

CARRIED

7.4 RFP 21-2022 - 1st Line Road Culvert-Bridge (S. McDonald)

Resolution No. 283-2022

Moved by Councillor Luck
Seconded by Deputy Mayor Jaworski

BE IT RESOLVED THAT Staff Report 134-2022 be received and that the Council of the Township of South Glengarry award Procurement 22-2022 for the 1st Line Road Culvert-Bridge to Fidelity Engineering & Construction Inc. as per their submission of $284,350.30 plus HST and furthermore, that the Mayor and the Clerk be authorized to sign all relevant documents.

CARRIED

7.5 1st Line Road – Pipe Arch Funding (S. McDonald)

Resolution No. 284-2022

Moved by Deputy Mayor Jaworski
Seconded by Councillor Lang

BE IT RESOLVED THAT Staff Report 135-2022 be received and that Council directs Administration to fund the purchase of the pipe arch authorized by resolution 198-2022 in the following amounts:

$__70 000_____ from the General Reserve account

$____30 000___ from the Roads, Bridges and Structures Reserve account

CARRIED

7.6 Procurement 21-2022 Supply of Stone Dust (S. McDonald)

Resolution No. 285-2022

Moved by Councillor Lang
Seconded by Councillor McDonell

BE IT RESOLVED THAT Staff Report 136-2022 be received and that the Council of the Township of South Glengarry award Procurement 21-2022 for the Supply of Stone Dust to Cornwall Gravel Company Limited in accordance with their submission in the amount of $43,575.00 excluding HST for 3,500 tonnes of stone dust at the unit cost of $12.45 per tonne; and furthermore, that the Mayor and Clerk be authorized to sign all appropriate documents.

CARRIED

7.7 RFQ 24-2022 - Supply of Tree and Stump Removal Services (S. Servage)

Resolution No. 286-2022

Moved by Councillor McDonell
Seconded by Councillor Luck

BE IT RESOLVED THAT Staff Report 137-2022 be received, and that RFQ 24-2022 for the Supply of Tree and Stump Removal Services be awarded to Glengarry Tree Service Inc. per their submission of $38,900 +HST and furthermore that the Mayor and Clerk be authorized to sign all relevant documents.

CARRIED

8. BY-LAWS

8.1 Appointment of Marriage Licence Issuers (K. Campeau)

Resolution No. 287-2022

Moved by Councillor Luck
Seconded by Deputy Mayor Jaworski

BE IT RESOLVED THAT Staff Report 139-2022 be received and that By-law 57-2022, being a by-law to authorize the civil marriage solemnization and issuance of marriage licences in the Township of South Glengarry be read a first, second and third time, passed signed and sealed in open council this 6th day of September 2022.

CARRIED

8.2 Final Reading – McNairn Drain Engineer's Report (K. Campeau)

Resolution No. 288-2022

Moved by Deputy Mayor Jaworski
Seconded by Councillor Lang

BE IT RESOLVED THAT Staff Report 140-2022 be received and that By-law 41-2022, being a by-law to provide for updates to the McNairn Drain be read a third and final time, passed, signed and sealed in open council this 6th day of September 2022.

CARRIED

8.3 Video Surveillance Policy (K. Campeau)

Resolution No. 289-2022

Moved by Councillor Lang
Seconded by Councillor McDonell

BE IT RESOLVED THAT Staff Report 141-2022 be received and that By-law 58-2022, being a by-law to adopt a Video Surveillance Policy for the Township of South Glengarry be read a first, second and third time, passed, signed and sealed in open Council this 6th day of September 2022.

CARRIED

8.4 Zoning By-law Amendment - Benson Removal of Holding (J. Haley)

Resolution No. 290-2022

Moved by Councillor McDonell
Seconded by Deputy Mayor Jaworski

BE IT RESOLVED THAT Staff Report 142-2022 be received and that By-law 59-2022, being a by-law to amend By-law 37-18 for the property legally described as Part of Lot 8, Concession 1 B.F., I.L., PIN 671290641, being Part 1 on Reference Plan 14R-3507, in the former Township of Charlottenburgh, now in the Township of South Glengarry, County of Glengarry to remove the holding symbol to permit the development of a single detached dwelling, be read a first, second and third time, passed, signed and sealed in open council this 6th day of September 2022.

CARRIED

8.5 Knight Zoning By-law Amendment (J. Haley)

Resolution No. 291-2022

Moved by Deputy Mayor Jaworski
Seconded by Councillor Lang

BE IT RESOLVED THAT Staff Report 143-2022 be received and that By-law 61-2022, being a by-law to amend By-law 38-09, the Comprehensive Zoning By-law for the Township of South Glengarry for the property legally described as East Part of Lot 24, Concession 1 Front, in the geographic Township of Charlottenburg, now in the Township of South Glengarry, County of Glengarry, also known as 18645 Prevost Point Road to rezone the subject property from Limited Services Residential, Exception Four (LSR-4) which permits an existing single detached dwelling with an apartment unit to Limited Services Residential, Exception Four (LSR-4) to permit an existing detached dwelling with an apartment unit and a minimum lot frontage of 24 meters, be read a first, second and third time, passed, signed and sealed in open council this 6th day of September 2022. The Council of the Township of South Glengarry confirms that no comments from the public were received on this application therefore there was no effect on the decision.

CARRIED

9. CONSENT AGENDA

Resolution No. 292-2022

Moved by Councillor Lang
Seconded by Councillor Luck

BE IT RESOLVED THAT the Council of the Township of South Glengarry hereby accepts the Consent Agenda.

CARRIED

9.1 Environment Committee Minutes - March 1, 2022

9.2 Environment Committee Minutes - June 17, 2022

9.3 Glen Walter EA Steering Committee Minutes - July 25, 2022

9.4 Glen Walter EA Steering Committee Minutes - June 27, 2022

9.5 SDG County Council Draft Minutes - August 22, 2022

9.6 MTO Notification of Construction

9.7 Letter - Holy Trinity Secondary School

9.8 Letter - Ontario Sheep Farmers

9.9 Letter - Strong Mayors Building Homes Act (Town of Wasaga Beach)

10. ITEMS FOR CONSIDERATION

10.1 Play Structure Inspections - North Lancaster Optimist Park and Empey Poirier Park (S. Servage)

10.2 Fire Reserves Update (D. Robertson)

10.3 Williamstown Fire Station - September Construction Update (D. Robertson)

11. CLOSED SESSION

Resolution No. 293-2022

Moved by Councillor Luck
Seconded by Councillor McDonell

BE IT RESOLVED THAT Council convene to Closed Session at 9:09 pm to discuss the following items under Section 239(2) of the Municipal Act S.O. 2001;

(2) a meeting or part of a meeting may be closed to the public if the subject matter being considered is;

(d) labour relations or employee negotiations

Specifically: Staffing Matter

(k) a position, plan, procedure, criteria or instruction to be applied to any negotiations;

Specifically: Position to be applied to negotiations

CARRIED

Resolution No. 294-2022

Moved by Councillor McDonell
Seconded by Deputy Mayor Jaworski

BE IT RESOLVED THAT Council rise and reconvene at 9:44 pm into open session without reporting.

CARRIED

Resolution No. 295-2022

Moved by Deputy Mayor Jaworski
Seconded by Councillor Lang

BE IT RESOLVED THAT Council direct Administration to carry out all actions as specified in the Closed Session Minutes.

CARRIED

12. CONFIRMING BY-LAW

12.1 Confirming By-law 60-2022

Resolution No. 296-2022

Moved by Councillor Lang
Seconded by Councillor McDonell

BE IT RESOLVED THAT By-law 60-2022, being a by-law to adopt, confirm and ratify matters dealt with by resolution be read a first, second and third time, passed, signed and sealed in open council this 6th day of September 2022.

CARRIED

13. ADJOURNMENT

Resolution No. 297-2022

Moved by Councillor McDonell
Seconded by Councillor Luck

BE IT RESOLVED THAT the Council of the Township of South Glengarry adjourn to the call of the chair at 9:45 pm.

CARRIED

Mayor

Clerk

TOWNSHIP OF SOUTH GLENGARRY

REGULAR MEETING MINUTES

September 6, 2022, 6:30 p.m.
Tartan Hall - Char-Lan Recreation Centre
19740 John Street, Williamstown

PRESENT:	Mayor Lyle Warden, Deputy Mayor Stephanie Jaworski, Councillor Martin Lang, Councillor Sam McDonell and Councillor Rebecca Luck
STAFF PRESENT:	CAO Tim Mills, GM Corporate Services/Clerk Kelli Campeau, GM Planning, Building & Enforcement Joanne Haley, Deputy Clerk Crystal LeBrun and Executive Assistant/Communications Coordinator Michelle O'Shaughnessy.

1. CALL TO ORDER

Moved by: Councillor McDonell

Seconded by: Deputy Mayor Jaworski

That the meeting be opened.

CARRIED

2. APPROVAL OF AGENDA

3. DECLARATION OF PECUNIARY INTEREST

4. NEW BUSINESS

4.1 Zoning Amendment - Newbrabant Farms

Ms. Haley advised that the purpose of the Public Meeting is to rezone the property legally described as Part of Lot 26, Concession 4, in the geographic Township of Lancaster, now in the Township of South Glengarry, County of Glengarry from Agricultural (AG) to Agricultural - Exception Thirty-Two (AG-32) to reduce the minimum lot area from 20 hectares to 11.06 hectares and to prohibit residential construction.

No members of the public attended the meeting and there were no comments on the application.

5. ADJOURNMENT

Moved by: Deputy Mayor Jaworski

Seconded by: Councillor McDonell

That the meeting be adjourned.

CARRIED

Mayor

Clerk

STAFF REPORT S.R. No. 144-2022

PREPARED BY: Kelli Campeau, GM Corporate Services/Clerk

PREPARED FOR: Council of the Township of South Glengarry

COUNCIL DATE: September 20, 2022

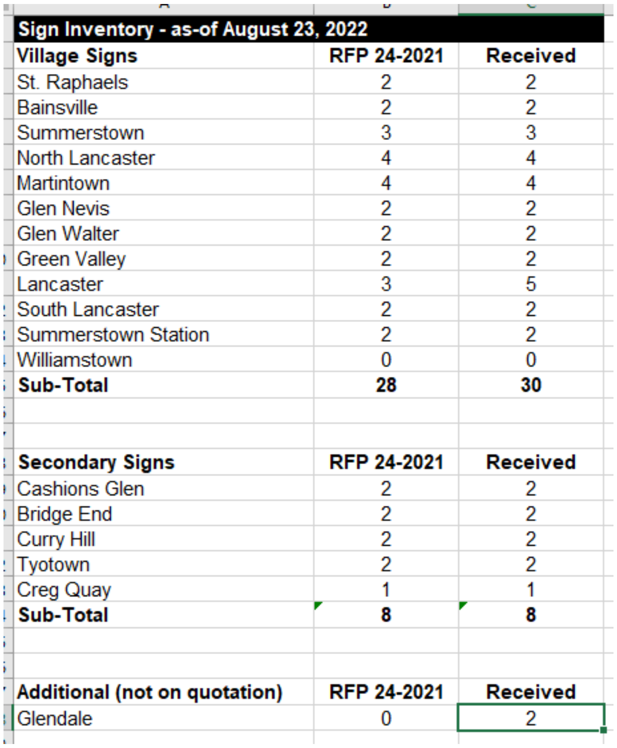
SUBJECT: Reallocation of Funds – Signage Program

BACKGROUND:

1. In October 2021, Council awarded RFP 24-2021 for the Production of South Glengarry Road Signs to Shane Signs for a total of $46,047.50 plus HST.

2. Council's direction at that time was to proceed with the production of all signs as opposed to a phased in approach.

3. Once the designs for the signs were completed, the signage was ordered from Shane Signs in accordance with the RFP, with 4 additional signs ordered that were not included in the RFP (2 for Lancaster and 2 for Glendale)



Sign Inventory - as-of August 23, 2022		
Village Signs	**RFP 24-2021**	**Received**
St. Raphaels	2	2
Bainsville	2	2
Summerstown	3	3
North Lancaster	4	4
Martintown	4	4
Glen Nevis	2	2
Glen Walter	2	2
Green Valley	2	2
Lancaster	3	5
South Lancaster	2	2
Summerstown Station	2	2
Williamstown	0	0
Sub-Total	**28**	**30**
Secondary Signs	**RFP 24-2021**	**Received**
Cashions Glen	2	2
Bridge End	2	2
Curry Hill	2	2
Tyotown	2	2
Creg Quay	1	1
Sub-Total	**8**	**8**
Additional (not on quotation)	**RFP 24-2021**	**Received**
Glendale	0	2

4. The cost for the project was included in the 2021 budget. The final cost for the production of the signs was $22,696.05. A deposit of $15,951.81 was paid in the 2021 budget year.

ANALYSIS:

5. There were delays in the production of the signs due to availability of materials, resulting in the project carrying into 2022.

6. Due to the project unexpectedly carrying into 2022, the funds for the remaining balance of $6,744.24 were not accounted for the in the 2022 Economic Development Budget.

7. Administration is therefore requesting that the remaining funds be transferred to the Economic Development Projects account from General Reserves.

8. All signs have now been received and Administration is presently coordinating and planning for the installation of the signs.

IMPACT ON 2022 BUDGET:

9. This will result in the transfer of $6,744.24 from General Reserves to the Economic Development Projects account.

ALIGNMENT WITH STRATEGIC PLAN:

N/A

RECOMMENDATION:

BE IT RESOLVED THAT Staff Report 144-2022 be received and that $6,744.24 be transferred from General Reserves to the Economic Development Projects account for the remaining balance of the hamlet signage project.

Recommended to Council for
Consideration by:
CAO – TIM MILLS

STAFF REPORT S.R. No. 145-2022

PREPARED BY: Kaylyn MacDonald, Deputy Treasurer

PREPARED FOR: Council of the Township of South Glengarry

COUNCIL DATE: September 20, 2022

SUBJECT: Reallocation of Project Expenses from Glen Walter Water and Wastewater Reserve

BACKGROUND:

1. On September 6, 2022, Council received Staff Report 131-2022 (attached), an action request to reallocate some of the expenses incurred for the 2020-2021 Bray St. Pumping Station and Watermain looping project. Costs identified for reallocation by the Deputy Treasurer were limited to those that the GM of Infrastructure considered related to the costs of the road work involved in the project.

2. As the project has been determined to provide a benefit beyond the users of the Glen Walter and Wastewater system, Council requested Administration further review the project costs to isolate the project costs for the Bray Street Pumping Station and identify the remainder to possibly be reallocated to the General Reserve.

ANALYSIS:

3. The cost of the watermain looping and associated excavation and road work for this project totaled $768K and was approximately half of the total invoiced by the contractor. The total amount invoiced by EVB related to this project totals $136K (approximately $80,000 of this amount was invoiced as contract administration for the project).

4. Administration also identified an expense of $14,420.00 for fire hydrants within the project that Council may choose to reallocate to the Fire Reserve.

5. In his presentation to Council on the project on September 21, 2020, former GM of Infrastructure Ewen MacDonald noted that the watermain looping both benefited users on the system by improving the operation of the water system and also provides an opportunity for the Township to create serviced lots in the future if the Township declares nearby land surplus to the needs of the municipality. Given that the benefit was also to existing users on the system, Council may opt to lower the amount to be reallocated to General Reserves.

6. Council has discussed that revenue expected from the sale of lots in Glen Walter may be used towards Glen Walter Water and Wastewater Infrastructure. It should be noted that any development of these lots as serviced lots in the near future is unlikely. As noted by the GM of Planning, Building & Enforcement:

> “*The Township of South Glengarry has vacant land in Glen Walter where lots can be created and sold by the Township subject to Council’s approval. Currently there is no available water and wastewater capacity in Glen Walter. According to a staff report in the January 2022 Council meeting agenda, the Township has over committed 4 water connections and 16 wastewater connections.*
>
> *The Township is currently completing the necessary studies to explore options to expand the plant in the future, in the meantime there are no immediate solutions to offer capacity to newly created lots. Lot creation can only occur once the Glen Walter Water and Wastewater Plant has been expanded which could take several years to complete the studies, determine the location, design the plant, construct the plant and allow connections.*
>
> *Once the new plant is in operation, allocation of capacity will occur based on the Water and Wastewater Capacity By-Law which prioritizes capacity to developers and infill lot*s.”

7. Council may also choose to transfer all or a percentage of the Pumping Station costs from General Reserves. If it is Council’s will to transfer the costs not related to the Pumping Station, Administration also recommends transferring a percentage of EVB costs billed for the project.

	100%	75%	50%	25%
Looping & Roads Related Costs	$ 768,000.00	$ 576,000.00	$ 460,800.00	$ 192,000.00
EVB Full Project Cost	$ 136,000.00	$ 102,000.00	$ 81,600.00	$ 34,000.00
Total:	$ 904,000.00	$ 678,000.00	$ 542,400.00	$ 226,000.00

IMPACT ON 2022 BUDGET:

N/A

ALIGNMENT WITH STRATEGIC PLAN:

Goal 2: Invest in infrastructure and its sustainability

RECOMMENDATION:

BE IT RESOLVED THAT Staff Report 145-2022 be received and that the Council of the Township of South Glengarry directs Administration to reallocate $14,420.00 from Fire Reserves and $__________ from the General Reserve account for the Glen Walter Bray Street Pumping Station Upgrades and Extension of the Water Wastewater Mains.

Recommended to Council for Consideration by:
CAO – TIM MILLS

STAFF REPORT S.R. No. 146-2022

PREPARED BY: Dave Robertson, Fire Chief

PREPARED FOR: Council of the Township of South Glengarry

COUNCIL DATE: September 20, 2022

SUBJECT: Williamstown Fire Station – Septic System Update

BACKGROUND:

1. The former Roads Maintenance Garage at 19686 William St. is presently under renovation to house a new location for the Williamstown Fire Station.

2. In order to move the Fire Station to this building, a Change of Use permit is required pursuant to Section 10 (1) of the Ontario Building Code Act (OBCA).

3. Section 10 (1) of the OBCA states, “Even though no construction is proposed, no person shall change the use of a building or part of a building or permit the use to be changed if the change would result in an increase in hazard, as determined in accordance with the building code, unless a permit has been issued by the chief building official.”

4. The Change of Use with this facility is from Group F, Division 2 to a Post Disaster rating and this facility type always triggers a change of use.

5. The Ontario Building Code (O. Reg. 332/12) further establishes requirements related to Change of Use, which includes the review of health requirements/washrooms.

6. Once the washroom requirements are determined, Part 8 (Sewage Systems) of the Ontario Building Code (OBC) is reviewed to ensure it can support the number of washrooms and use of the building.

7. A septic system report from a qualified person determines if the existing system is acceptable or if a new system is required. A Septic System Report for the building was completed by Goulet Septic on July 28th, 2022. The review is attached to this Staff Report.

ANALYSIS:

8. The septic system report states that while it appears to be functioning, the system has areas that are failing and has reached the end of its life expectancy. The report determines that:
    - the septic tank has a deteriorating center wall and cover,
    - the distribution box has deterioration concrete parts,
    - the field bed is compacted and upon inspection, it appears that it is not draining properly.

9. As the septic inspection report confirmed that the system is insufficient, Administration directed Goulet Septic to develop a new septic system plan. The plan was received on August 29th. It was subsequently forwarded to the Building Department for review.

10. The new septic system plan and permit was received on September 12th. The plan calls for a 4 Tertiary Dispersal Eljen GSF system consisting of a 7,000L concrete septic tank, an on-demand pump and a 33.6 sq m field bed consisting of 28 Eljen modules. This system will take up considerably less space than a traditional field bed style.

11. In order to proceed, a request for quotes should be issued to determine the cost for the new system, to be approved by Council at a later date.

12. It is anticipated that this project will be completed by early December. In order to receive an occupancy permit, the septic system replacement will need to be completed within that timeline.

IMPACT ON 2022 BUDGET:

13. The renovation project has been directed to be funded from Fire Reserves. Any additional costs required for a new septic system would also be funded from Fire Reserves, of which there are sufficient funds to complete the system.

14. There would be no direct impact on the 2022 budget.

ALIGNMENT WITH STRATEGIC PLAN:

Goal 2: Invest in infrastructure and its sustainability.

RECOMMENDATION:

BE IT RESOLVED THAT Staff Report 146-2022 be received and that the Council of the Township of South Glengarry directs Administration to proceed with a Request for Quotations for the replacement of the Septic System at 19686 William St. in accordance with the Septic System Evaluation Report completed by Goulet Septic dated July 28, 2022.

Recommended to Council for
Consideration by:
CAO – TIM MILLS

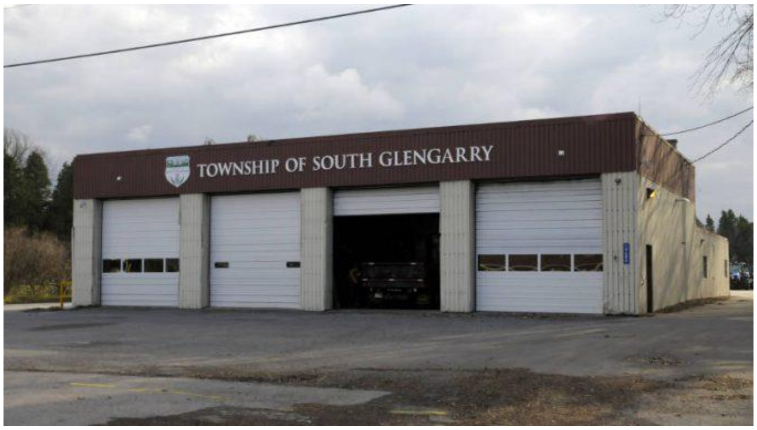
GOULET SEPTIC
Pumping & Design

20772 CONCESSIONS 8, GREEN VALLEY, ONTARIO, K0C 1L0.
TEL/FAX: 613 525 3759/ 1 888 678 8810 rgstp@hotmail.com

July 28, 2022

Septic System Evaluation
For the Old Township Garage in Williamstown

Requested by**; Dave Roberston for South Glengarry Township**
Email Address:
Phone Number **613 577 9663**



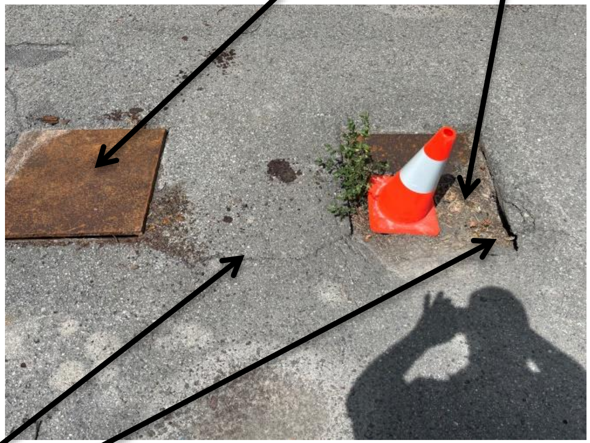
The septic system evaluation included the evaluation of the septic tank and the digging of the existing septic bed.
The Township backhoe was used to dig and evaluate the septic bed as my small excavator was just not strong enough to dig in the packed parking lot, which is where the existing septic bed is.

- How many people possibly working in this Fire Hall? **Unknown at this time.**
- Is this an Approved Septic System? **Probably originally but no paper work on it at this time.**
- Is tank pumped for the Evaluation? **No**
- Septic System bed is on the **South West side of property under part of the parking lot.**
- How many covers? **2 compartment cement tank approx. 3600 gallons (both covers are deteriorated and first cover is broken and hanging inside the tank.**
- Condition of Tank**? Poor – deteriorating center wall & deteriorated and crumbling wall all around upper edge. Inlet cover is broken and hanging on the inside of the tank.**
- Is there more than 1 tank? **No**

- Is Inlet Baffle in place? **Could not see as did not want to open first cover as cover is broken and hanging down.**
- Is water leaking in from the garage end? **Could not see.**
- Condition of Inlet pipe? **Could not see.**
- Is Outlet Baffle in place? **Yes**
- Condition of Outlet pipe? **Seems to be No Corrode and old.**
- Is there Back Flow from the septic bed? **No- but tank water level is halfway into the outlet pipe showing a high water mark. Very few people have been using the system since the new garage has been built. Therefore this garage is empty at this time.**
- Is there more than 1 septic system on this property? **No**
- Is there a grey water system? **No**
- Is there a pumping chamber tank? **No**
- Are all fixtures going to Septic Tank? **I am told Yes**
- Type of bed - **Conventional Pipe and Gravel with a distribution box and 2 lines of NO Corrode pipes.**
- How is drainage in the surroundings? **Fair**
- Trees & shrubs, Gardens? **No**
- Wet and or Surface Discharge, Odors? **No**
- Ditches or Creeks close to the area? **No**
- Is grass cut on top of septic bed? **No the septic system is under and in the parking lot.**
- Are there holes or depressions in the ground around the septic bed or around tank area? **No**

Summary

This system is in poor condition. Upon lifting the second compartment cement cover I saw the tank is 2-compartment cement tank approx. 3600L. The inlet cover is hanging inside the tank about to fall in. I could not see the inlet baffle as I didn't open the first broken cover.



This tank needs to be replaced as soon as possible, as it has a deteriorated center wall and all around the top edge of the wall is crumbling. The first cover is broken and hanging inside the tank. Even the asphalt around that cover is caving in.

We found a distribution box which has a broken cover and the box itself is badly deteriorating. There is a high water mark in the distribution box which shows problems with the bed not being able to absorb as it should.

The bed is also under a parking lot that is very well packed. It is surprising that this bed has worked this well in these types of conditions. This is probably why when we get heavy rain and or during the spring thaw, the bed has a hard time absorb.

From the distribution box we dug and found 2 existing weeping lines only. I drilled a hole in the weeper and found that the pipes are approximate 20M each for a total of 40M of weeping pipe.

This is a very small bed compared to today's Building Code. The 2 lines are of **no corrode pipe** half full of sludge and effluent is not draining properly. The garage has been empty for a few months and only used by a few people working around.

The system was installed in the original soil which is mixture of sandy silt and clayish soil.

In the spring the bed would be under water because of the high water table in the soils.

By Code a conventional pipe and gravel septic system has to be a minimum of 3 feet above the high water table.

We fixed the broken pipe with PVC pipe and MJ clamps.

We blocked the drilled hole, of which we used to find out what was inside the pipe and to measure the length of the weeping line.

We used an old sign to cover the distribution box until new cover is made.

This septic system appears to be functioning a little but has major problems that should be attended to very soon. The tank is in dangerous condition to collapse at any time. This septic system is at the end of its life and needs to be replaced

Hope this explains the condition of this septic system as it is in bad condition and will be causing problems soon.

Thank you and if you have any questions or concerns please don’t hesitate to call

Evaluation completed by

Rene Goulet

STAFF REPORT S.R. No. 147-2022

PREPARED BY: Sherry-Lynn Servage, GM of Parks, Recreation and Culture

PREPARED FOR: Council of the Township of South Glengarry

COUNCIL DATE: September 20, 2022

SUBJECT: Tender 25-2022 - Peanut Line Bridge – CR19

BACKGROUND:

1. The Peanut Line Bridge located south of County Road 19 is in need of rehabilitation. Some minor repairs have been completed internally; however larger repairs are required by designated contractors.

2. Proponents were invited to apply for the Peanut Line Bridge rehabilitation project through Tender No. 25-2022. The Tender documents for this project were completed through EVB Engineering.

3. The following is a general description of the work to be completed through this tender:

    a. Rehabilitation of the existing steel bridge structure including removal of the existing timber deck structure and replacement with a new steel beam and grating deck structure.
    b. New concrete approach at abutment walls.
    c. New vehicle and pedestrian guard rail.
    d. New load posting signage.
    e. Two provisional items were included in the Tender document. Provisional Item 1 (P1) included the additional cost for the installation of steel beam and wood post guide rail. Provisional Item 2 (P2) included the additional cost for extension of steel guard at abutments. Only one of the provisional items would be included in the project; if P1 is executed, P2 is not required.

4. Tender No. 25-2022 was published on August 17, 2022 and closed on August 31 with a non-mandatory site visit on August 24, 2022.

ANALYSIS:

5. The Township received four (4) submissions for Tender No. 25-2022. They are (HST not included in amounts below):

Company	Submission Amount	Provisional Item (P1)	Provisional Item (P2)
Glengarry Millwrights	$385,000.00	$25,000	$10,000
Facca Incorporated	$1,010,000.00	$25,000	$10,000
Fidelity Engineering and Construction Inc.	$1,156,812.00	$21,500	$125,000
Beton	$617,369.00	$6,000	$3,000

6. The original timeline for this project, outlined in Tender No. 25-2022, was to have the project completed by December 2, 2022. The work would be completed within a maximum of seven (7) weeks of consecutive bridge closure.

7. All submissions met the required criteria of the Tender.

8. Due to budget constraints and supply issues, it is recommended by EVB Engineering and Administration that the Township delays construction until 2023. However, there are items that need to be addressed in a timely manner due to safety concerns of the bridge.

9. Attached to this report is an inspection letter that EVB Engineering has compiled to give the Township direction on this project. Due to the condition of the bridge, there are repairs that need to take place in the interim (2022). The remainder of the project will be delayed until 2023.

10. It is recommended that the Township award Tender No. 25-2022 to the lowest submission, move forward with the minimum remediation work addressed in the attached Inspection letter and delay the remainder of the construction until 2023 once supply is available and a portion of the 2023 budget can be used for this project.

IMPACT ON 2022 BUDGET:

11. The 2022 budget included $130,000 for the County Road 19 Peanut Line Bridge Rehabilitation project.

12. Engineering costs for this project is approximately $19,000.

13. There is currently $223,000 in the Peanut Line reserve account.

14. The 2021 County Road 17 Peanut Line Bridge Rehabilitation Project carried over into 2022, therefore $19,755 of this 2021 project was charged to the 2022 budget outlined above.

15. If all Peanut Line reserves were used towards this project, approximately $71,000 will be required from general reserves to fund this project. This does not include provisional items.

ALIGNMENT WITH STRATEGIC PLAN:

Goal 2: Invest in infrastructure and its sustainability.

RECOMMENDATION:

BE IT RESOLVED THAT Staff Report 147-2022 be received, and that Tender No. 25-2022 for the Peanut Line Bridge Rehabilitation be awarded to Glengarry Millwrights per their submission of $385,000.00 plus HST and furthermore that the Mayor and Clerk be authorized to sign all relevant documents.

Recommended to Council for
Consideration by:
CAO – TIM MILLS

Township of South Glengarry
Sherry-Lynn Servage
General Manager of Parks, Recreation and Culture
Williamstown, Ontario
K0C 2J0

September 12th, 2022

Subject: **Peanut Line Bridge CR19**
Inspection Letter

Dear Sherry-Lynn,

This letter was prepared by EVB Engineering following your request to provide an evaluation of the Peanut Line Bridge over the Raisin River off CR19 west of Williamstown. On Sept 12th 2022, EVB Engineering visited the site to complete the investigative work

Rehabilitation work on the bridge was scheduled for this Fall (2022). Included with the rehabilitation work was the replacement of the existing timber deck with a new steel deck as well as the installation of a new steel guard. However, due to material supply issues and budget restraints, it may be necessary to delay construction until 2023. The purpose of this letter was to evaluate the current bridge condition and confirm the acceptability to delay the work and identify if any remediation work should be completed in the interim (prior to 2023).

The bridge is framed with two large steel girders approximately 9'-0" o.c. spanning between the concrete abutments on each shore. The girders support 10"x16" wood timbers at 16"o.c. with 2x4 wood sleepers running perpendicular to the timbers. Wood deck boards (2x10) span between the sleepers. A steel guard runs along each side of the bridge.

The following observations are presented below:

- ➢ Numerous deck boards are split or rotten (Photo 1)
- ➢ Several locations of the wood sleepers are split or rotten (Photo 2)
- ➢ The perimeter steel guard is loose and detached at some locations (Photos 3 and 4)
- ➢ The main 10x16 timbers appear in fair condition.
- ➢ The main steel girders appear in fair condition
- ➢ The concrete abutments are in fair condition with areas of concrete spalling

Based on the above observations it is our recommendations that the following minimum remediation work be completed in the interim (2022) until such time as the full bridge rehabilitation can be completed:

- ➢ Remove existing deck boards as required and replace wood sleepers where damaged
- ➢ Inspect existing wood timbers below when exposed
- ➢ Reinstate the existing deck and replace with new where required (approximately 50% of the existing deck boards require replacement)
- ➢ Repair the existing steel guard and re-anchor in place

Photo 1

Photo 2

Photo 3

Photo 4

We trust this letter meets your requirements. Please contact the undersigned should you have any questions.

Regards

Greg Esdale, P.Eng.
Structural Engineer

LICENSED PROFESSIONAL ENGINEER
G. C. ESDALE
100008875
2022-09-13
PROVINCE OF ONTARIO

STAFF REPORT S.R. No. 148-2022

PREPARED BY: Sarah McDonald, P. Eng., GM Infrastructure Services

PREPARED FOR: Council of the Township of South Glengarry

COUNCIL DATE: September 20, 2022

SUBJECT: North Lancaster Landfill Annual Report (2021)

BACKGROUND:

1. The North Lancaster Landfill 2021 Annual Report summarizes the results of the Township's annual monitoring and reporting requirements in accordance with the Environmental Compliance Approval (ECA) NO. A481403.

2. The monitoring and reporting were completed by WSP Canada Inc. on behalf of the Township of South Glengarry.

ANALYSIS:

3. The current estimate of the North Lancaster Landfill's lifespan is seven (7) years – or to 2028.

4. The above estimate was determined through a topographic survey completed in 2021, which was compared to recent fill rate trends, and the approved mound contour.

5. It is estimated that approximately 38% of the volume placed in the waste mound is interim cover. The report estimates that the lifespan of the landfill could be extended by additional two-years with reduced use of interim cover material.

6. Ground water monitoring laboratory results indicated that there is no impact associated with the North Lancaster Landfill to the surface water quality in the Beaudette River.

7. At the time of the report completion, an ECA amendment was in the process of being submitted to include the additional buffer to the east land of the waste disposal site.

8. The Annual Report contains eight recommendations (page 51 of the report) which include continued monitoring and annual topographical survey; further

investigation of a surface water location; improvement in placement of interim cover; improved record keeping; and consideration of equipment improvements.

IMPACT ON 2022 BUDGET:

N/A

ALIGNMENT WITH STRATEGIC PLAN:

N/A

RECOMMENDATION:

BE IT RESOLVED THAT Council receive Staff Report 148-2022 and the North Lancaster Landfill Annual Report for 2021 for information purposes..

Recommended to Council for
Consideration by:
CAO – TIM MILLS

TOWNSHIP OF SOUTH GLENGARRY

NORTH LANCASTER WASTE DISPOSAL SITE

2021 ANNUAL MONITORING REPORT

April 27, 2022

NORTH LANCASTER WASTE DISPOSAL SITE

2021 ANNUAL MONITORING REPORT

TOWNSHIP OF SOUTH GLENGARRY

PROJECT NO.: 111-55592-08
DATE: APRIL 27, 2022

WSP
1345 ROSEMOUNT AVENUE
CORNWALL, ON
CANADA K6J 3E5

T: +1 613 933-5602
F: +1 613 936-0335
WSP.COM

April 27, 2022

Ministry of the Environment, Conservation and Parks
113 Amelia Street, 1st Floor
Cornwall, Ontario
K6H 3P1

Attention: Candice McKay, Senior Environmental Officer

Subject: 2021 Annual Monitoring Report
North Lancaster Waste Disposal Site
Township of South Glengarry, Ontario

Dear Ms. McKay,

On behalf of the Corporation of the Township of South Glengarry, we are pleased to submit herein an electronic copy of the 2021 Annual Report for the North Lancaster Waste Disposal Site. As per previous arrangements, it is anticipated that you will forward a copy to the Ottawa District Office. Should you require a hard copy, one can be provided upon request.

This Report format reflects the guidance document *Monitoring and Reporting for Waste Disposal Sites, Groundwater and Surface Water Technical Guidance Document* (November 2010) produced by the Ministry of Environment and Climate Change.

Should you require further information concerning this Report, please do not hesitate to contact the undersigned.

Yours sincerely,

JBrown-Han

Jennifer Brown-Hawn
Team Lead, Environment

JBH/jbh

cc: Sarah McDonald, Township of South Glengarry

WSP ref.: 111-55592-08

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wsp.com

WSP Canada Inc.

REVISION HISTORY

FIRST ISSUE

March 28, 2021	Draft submitted to client	
Prepared by	Reviewed by	Approved By
Jennifer Brown-Hawn Team Lead, Environment	Andrew Harwood, M.Eng., P.Eng. Environmental Engineer	Andrew Harwood, M.Eng., P.Eng. Environmental Engineer
REVISION 1		
April 27, 2022	Final	
Prepared by	Reviewed by	Approved By
Jennifer Brown-Hawn Team Lead, Environment	Andrew Harwood, M.Eng., P.Eng. Environmental Engineer	Andrew Harwood, M.Eng., P.Eng. Environmental Engineer

SIGNATURES

PREPARED BY

JBrown-Ha

Jennifer Brown-Hawn
Team Leader, Environment

April 27, 2022
Date

REVIEWED[1] BY

A M Harwood

Andrew Harwood, M.Eng., P.Eng.
Environmental Engineer

April 27, 2022
Date

WSP Canada Inc. prepared this report solely for the use of the intended recipient, TOWNSHIP OF SOUTH GLENGARRY, in accordance with the professional services agreement. The intended recipient is solely responsible for the disclosure of any information contained in this report. The content and opinions contained in the present report are based on the observations and/or information available to WSP at the time of preparation. If a third party makes use of, relies on, or makes decisions in accordance with this report, said third party is solely responsible for such use, reliance or decisions. WSP does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken by said third party based on this report. This limitations statement is considered an integral part of this report.

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1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by the Township of South Glengarry (Township) to undertake the annual monitoring and reporting requirements for the North Lancaster Waste Disposal Site (WDS) in accordance with the Environmental Compliance Approval (ECA) No. A481403 included in **Appendix H-1**. This document is formatted in accordance with the Ontario Ministry of the Environment Conservation and Parks (MECP) document *Monitoring and Reporting for Waste Disposal Sites, Groundwater and Surface Water: Technical Guidance Document*, dated November 2010.

1.1 LOCATION

The Corporation of the Township of South Glengarry is the operating authority for the former Township of Lancaster Waste Disposal Site (known as the North Lancaster Landfill) situated on the eastern half of Lot 25, Concession 6, Lancaster Township in the United Counties of Stormont, Dundas and Glengarry as shown in **Figure 1-1** below. The waste disposal site (WDS) is located about two (2) kilometres north of the hamlet of North Lancaster and is accessed via the Concession 6/7 road allowance at 4580 2nd Line Road. The WDS is remotely located and surrounded by mature vegetation, recently cleared lands and agricultural lands. The site is approved to accept only non-hazardous, solid municipal, commercial, industrial and institutional waste generated within the Township of South Glengarry. The WDS is situated within the Beaudette River area catchment, which eventually discharges into the St. Lawrence River near the Ontario-Québec border.

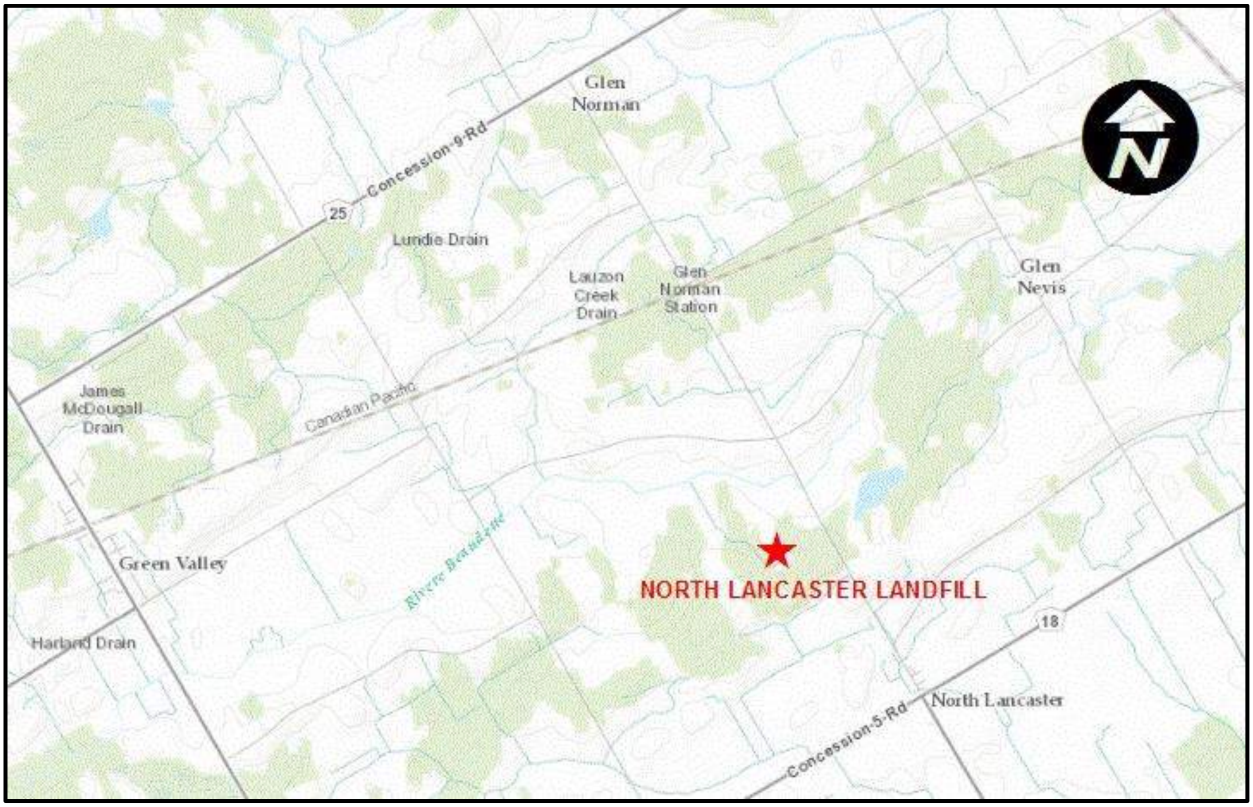

Figure 1-1 - Key Plan

Site Name: North Lancaster WDS
Site Municipality: Township of South Glengarry
Street Name: Concession 6/7 Road allowance
Lot/Concession: East half of Lot 25, Concession 6, (geographic) Township of South Glengarry

Coordinate System	Easting	Northing	Zone	NAD	Accuracy (m)	Method
UTM	537853	5011859	18	1983	+/- 10	Land-based Survey

1.2 OWNERSHIP AND KEY PERSONNEL

Site Owner:	Township of South Glengarry	Competent Environmental Practitioner (Groundwater/ Surface Water)	Andrew Harwood, M.Eng., P.Eng. Environmental Engineer WSP
Site Operator:	Sarah McDonald General Manager of Infrastructure Services		
Address:	6 Oak Street Lancaster, Ontario K0C 1N0		1931 Robertson Road Ottawa, Ontario K2H 5B7
Phone:	613-347-1166		613-592-9600
Fax:	613-347-3411		613-936-0335
Email:	info@southglengarry.ca smcdonald@southglengarry.com		Andrew.Harwood@wsp.com

1.3 DESCRIPTION AND DEVELOPMENT OF THE WDS

ECA #:	A481403	Status of Site:	Open
Site Opened:	1977	Projected Life of WDS:	Year 2028
Site Operated from:	1977-present	Approved Footprint Area:	3.8 ha
Site Closed:	N/A	Area of WDS:	47.3 ha

The Township of South Glengarry is the most easterly township in Ontario, forming part of the upper-tier municipality of the United Counties of Stormont, Dundas and Glengarry. The population of the Township of South Glengarry in 2016 was 13,150. The municipality covers an area of about 605 square kilometers (km^2), with a population density of about 22 persons per km^2.

Certificate of Approval (CofA) No. A481403 was issued originally on June 24, 1980, and amended on February 13, 1995, to allow the location and operation of a recycling transfer station on the site. The CofA was registered on title as Instrument No. 48616 on August 24, 1980. The site is legally described as Part 1, Reference Plan No. 14R-1039.

The Township received approval for an Individual Environmental Assessment (EA) for this site (and the Beaver Brook Road WDS) on June 18, 2003. Pre-Consultation took place with the MECP regarding conditions of the EA approval, which were to be satisfied before proceeding to the EPA application and subsequent EPA Part V approval (see EA Approval 2003 – Thompson Rosemount Group (TRG), 2002). The conditions included additional buffer land acquisition and further hydrogeological characterization.

The Township satisfied those conditions and proceeded to obtain an ECA for Waste Disposal Site (No. A481403, **Appendix H-1**) in March 2010 under EPA Section 27 for Landfill Design and Expansion. Subsequent discussions with the local MECP Area Office (Cornwall) were undertaken addressing matters associated with waste diversion, contaminant attenuation zone (CAZ) requirements, site operations and site development plan. These discussions resulted in an application for ECA amendment being filed in February 2011, for which amendment to the ECA was granted on December 13, 2011.

The estimated waste quantity for the North Lancaster WDS expansion was approximately 64,000 tonnes (about 128,000 m^3) (excluding interim cover), providing for a total approved site capacity of 242,000 m^3 (existing and expanded). The additional waste mound capacity was required to accommodate the waste stream generated by the anticipated population growth over a 40-year period (from the year 2000), which took into account waste diversion initiatives.

In 2009, it was determined that waste was placed beyond the approved footprint along the east and west sides of the landfill mound towards the south end of the mound, which encroached on the 30m buffer to the east. In discussion with MECP, it was decided that the Township would acquire sufficient lands to the east to maintain the 30m buffer area. The acquisition was finalized in 2016 and an ECA amendment will be submitted to the MECP in 2022 to incorporate the additional CAZ into the ECA.

The Township completed a Waste Recycling Strategy (WRS) to identify opportunities to increase waste diversion, particularly the blue box program. The recommended strategies to improve diversion are reviewed and implemented by the Township as appropriate. Diversion activities are further discussed in **Section 1.3.3**.

Township officials indicated that a salt/sand storage facility was located on the northern part of the site between 1978 and 1989. The approximate location of the salt storage area (no containment structure) is shown in **Figure 2.1**. Although the precise location of the salt storage is not known, a geophysical survey of the area (included in **Appendix H-2**) showed an area that is thought to be the location of the salt storage based on the observed groundwater contaminant plume.

1.3.1 WASTE DISPOSAL SITE MANAGEMENT AND OPERATIONS

The Township has consolidated all WDS operations on a seasonal basis to one (1) of its two (2) operational sites. Waste is managed at the North Lancaster Waste Disposal Site during the summer months from June 1st to September 30th and at the Beaver Brook Road Waste Disposal Site during the remainder of the year. Accordingly, the North Lancaster WDS did not receive waste from January 1 to May 31, 2020, and from October 1 to December 31, 2021.

The total area of the site, including the newly acquired buffer area and the groundwater rights area, is 59.6 ha. According to the site development plan, the current waste mound footprint is divided into four (4) areas (Area 10, Area 20, Area 30 and Area 40) (**Figure 1.2**). The area fill method was utilized in 2021 within the central portion of Area 10 of the development plan (**Figure 1.2**). Waste is deposited by packer trucks at the waste front. Private users are directed to a segregation area where waste is segregated into recyclable materials, tree/brush & clear wood, white goods, tires, metals, and inert construction materials. This has resulted in improved management of the tipping face and provided an additional waste diversion opportunity.

In 2021, the amount of waste transported to the site via packer trucks from curbside collection is estimated based on a three-week period when the packer trucks were weighed prior to and following disposal at the site. The average tonnage of waste during this period was estimated to be 58 tonnes/week. Based on this estimate and the fact that the site accepts waste for an 18-week period, the total estimated waste received from packer trucks is 1,027 tonnes in 2021. Based on WDS records, approximately 1,225 tonnes of waste (excluding brush) was received at the North Lancaster WDS via residential (curbside collection and residential delivered) and commercial users in 2021. **Table 1.1** below details the waste received in 2021.

Table 1.1: Waste Received in 2021

Month	Residential Delivered (tonnes)	Curbside Packer Trucks (tonnes)	Commercial, Municipal and Industrial (tonnes)	Brush (tonnes)
June	18.12	273.81	70.07	2.40
July	10.58	273.81	65.81	4.38
August	7.36	205.36	34.97	2.94
September	10.21	205.36	49.45	3.48
Total	46.28	958.34	220.30	13.20

The Township reported that approximately 1,500 cubic metres (m^3) of fill was imported to the site in 2021 as cover material. The Township has calculated this value based on the hours in which cover was being applied at the waste mound and two (2) packer trucks per hour that contain an estimated 10 m^3 of material. Cover material is hauled weekly from an onsite borrow pit and used as cover as required. The Township does not stockpile cover material. Township staff place, compact, and cover waste on a weekly basis. The equipment used at the site during this reporting period included a sheepsfoot compactor, a bulldozer, an excavator and two dump trucks. The excavator is used to load the waste into the dump trucks to transport waste from the separation area to the tipping face. The bulldozer is used to spread waste as well as apply daily cover material on the waste mound. The sheepsfoot compactor compacts landfilled waste materials. The site operations are overseen by the Director of Roads and Waste Management.

Security at the site is provided by a post and wire fence along the north and east property lines and a lockable gate at the entrance to the site. Capital Security and Investigations (Cornwall, ON) provides security for the site during operating hours and directs the public to the appropriate disposal area. The site attendant maintains a logbook at the WDS attendant’s building, which details the date, vehicle description and waste type brought to the site.

Waste disposal site visits are 82% residential vehicles and 18% curbside packer trucks and institutional, commercial and industrial (ICI) sources.

1.3.2 SITE CAPACITY

The North Lancaster Landfill Design Brief (TRG, 2008) indicated that there was sufficient capacity at this site to accommodate landfilling activities until approximately 2040. The total approved waste mound capacity is 242,000 m^3 of waste (including historic fill volume and expansion volume, excluding final cover), of which the total volume of the 40-year expansion area, including waste and 15% interim cover, is 147,000 m^3. Accounting for a total of 22,050 m^3 of daily/interim cover, approximately 124,950 m^3 was available for waste (excluding final cover). The waste mound footprint was reconfigured to incorporate the Fill Beyond Allowable Limit (FBAL) discovered in 2009, discussed in **Section 1.3.4**. The new footprint does not change the approved volume of the waste mound (**Figure 1.2** and **Figure 2.1**).

A topographic survey of the landfill footprint was completed in 2021 and compared to the proposed final landfill grade, which estimated that 26,633 m^3 of waste volume remained available at the site. This was compared to the remaining waste volume identified in the 2019 topographic survey of the landfill footprint (34,286 m^3). Based on the remaining landfill volume estimated in 2019 and 2021, the average annual waste mound fill rate (including waste and cover) was estimated to be approximately 3,826 m^3/year (4-month operating period). Based on the 2021 survey, this equates to an approximate remaining waste mound lifespan of seven (7) years (2028).

The Township waste logs (**Appendix H-3**) indicate that approximately 2,450 m^3 of waste was imported to the WDS, and 1,500 m^3 of interim cover was applied. This equates to an estimated remaining site life of 6.7 years. Based on the waste logs reported, in 2021, interim cover comprised approximately 38% of the volume landfilled. The waste mound lifespan could likely be extended approximately two (2) years (to 2030) with the appropriate use of interim cover material (i.e. improving the waste to cover ratio and removing daily/interim cover before adding the next waste lift). The Township reported that the compactor was not operating during the 2020 operating year, and therefore no compaction took place at the North Lancaster WDS. In 2021, the Township purchased a replacement compactor. To improve landfill operations, in the future, when the compactor is inoperable, the Township should consider retaining a contractor to complete compaction, or acquiring a rental unit.

Table 1.2 provides the annual estimated quantities of waste and cover since 2011 when the Township started seasonally operating the waste disposal site. Increased waste diversion (including recycling), better compaction and judicious use of interim cover should reduce the annual rate of fill as outlined in the report, Waste Recycling Strategy (Genivar, 2012).

Table 1.2: Estimated Refuse and Interim Cover Quantities

Year	Calculated based on:	Refuse (metric tonnes)	Refuse (m^3)	Daily/Interim Cover (m^3)	Ratio waste:cover (4:1)
2012	Twp Records	1,044	2,088	1,440	1.5:1
2013	Twp Records	1,044	2,088	1,500	1.4:1
2014	Twp Records	1,044	2,088	1,500	1.4:1
2015	Twp Records	1,470	2,940	1,500	2.0:1
2016	Twp Records	1,255	2,510	1,500	1.7:1
2017	Twp Records	1,178	2,357	1,500	1.6:1
2018	Twp Records	1,254	2,509	1,500	1.7:1
2019	Topographic Survey	2,254	4,507	1,500	3.0:1
2020	Twp. Records	1,249	2,498	1,500	1.7:1
2021	Topographic Survey	1,913	3,826	1,500	2.6:1

Township records report refuse in metric tonnes; therefore, a conversion factor must be applied to estimate the corresponding volume of waste. Based on an estimated conversion factor of 1,000 kg/t and compaction density of 500 kg/m^3 (provided by the compactor), the data was converted from mass to volume (i.e., tonnes to m^3).

Excessive use of cover material, although not deleterious to the environment, will diminish the waste mound lifespan via the accelerated use of the approved airspace. Management and placement of interim daily cover should be reviewed and could include:

- Reduction of the active working face;
- Ensuring adequate compaction of waste; and
- Removing and stockpiling the daily cover from the working face prior to the commencement of waste application on a daily basis, followed by the reapplication of the daily cover at the end of the day; and
- The use of alternative daily cover which would otherwise have been landfilled (i.e. contaminated soil, shredded material, etc.) or the use of removable tarps.

These efforts would be anticipated to reduce the amount of daily interim cover utilized and therefore increase the airspace available for waste.

1.3.3 DIVERSION INITIATIVES

The Township of South Glengarry provides curbside municipal waste and blue box material collection services throughout the municipality. Municipal waste collection was operated by HGC Management from January 1 to November 26, 2021, when the contract ended and E360S was contracted. Coco Group operated the blue box material collection services from January 1 to November 26, 2021, when the contract ended and E360S was contracted for the remainder of the year. These contracts are typically re-evaluated every three (3) years.

In 2011, the Township initiated a Waste Recycling Strategy (WRS) to address additional waste diversion opportunities. As part of the strategy, a plan to increase the efficiency and effectiveness of its recycling program, including maximizing the amount of blue box material diverted from disposal, was developed

(GENIVAR, 2012). This project recommended several initiatives. **Table 1.3** details the recommended initiatives, current and proposed implementation dates:

Table 1.3: Diversion Initiative Implementation Schedule

Implemented Initiatives	Date Implemented	Comments	Estimated Diverted Volume (metric tonnes/yr)
Regional goals, targets and inter-municipal committee	2012-ongoing	In 2015, the Townships within the Counties of Stormont, Dundas and Glengarry developed the SDG Waste Management Group to discuss options for efficiencies within the various waste management programs.	NA
Training of key staff		Key staff attend Continuous Improvement fund (CIF) Training Workshops annually.	NA
Promotion and education plan		Postings on the Township website, monthly newspaper advertisements and a collection calendar which is mailed to all residents within the Township.	95
Providing free/subsidized blue box and/or composters		Blue boxes and composters are provided at cost.	169
Clear bags for recyclables	2013-ongoing	Clear bags are accepted at the roadside collection.	348
Expand the list of eligible blue box recyclables		This is dependent on the Municipal Recycling Facility (MRF) capabilities.	41
Enhancing the recycling depot at the Township's WDS		A recycling depot is located at each WDS site, which includes e-waste collection containers.	118
Enhancing the Township's public space recycling program		A recycling program is implemented during the Williamstown Fair and at minor sports program events within the Township. Recycling stations are set up at all Community Centres within the Township.	NA
Recycling tag system providing information to properly recycle/dispose of an item.	2014-ongoing		NA
Following generally accepted principles for procurement and contract management.		The garbage, recycling and MRF contracts have been aligned.	NA
Curbside collection for residents on private roads.	2019	Garbage and Recycling are collected from private roads.	20
Implement curbside bag/container limits for garbage.		Implemented an 8-bag limit	36
Switching to weekly blue box collection	2021		297
Future Initiatives	**Proposed Schedule**	**Comments**	**Estimated Diverted Volume (metric tonnes/yr)**
Full user-pay for garbage	Future		392
Enacting WDS and curbside material bans			73
Further investigate bale wrap recycling options			NA
Enhance the curbside yard waste collection program			61

The operation of a curbside blue box program included collection from approximately 385 km of municipal roadway and 190 km of United Counties of Stormont Dundas and Glengarry (SDG) roadways. The Township switched from bi-weekly collection to weekly collection on November 29, 2021. The program recovered approximately 748 tonnes of Schedule 1 blue box materials in 2021. The municipality conducts other waste reduction programs including:

- Advertisement and sale of household composters.
- Segregation of tires, white goods, metals, ozone-depleting substances (ODS), and uncontaminated wood products at the site.
- Annual Household Hazardous Waste (HHW) day.
- Agreement with the City of Cornwall for the collection of hazardous waste and electronic waste at their Cornwall Centre Road WDS.
- Electronic waste is collected at each of the Township-owned WDS.
- Collection of leaf and yard waste.
- Collection of Christmas trees during the month of January.
- Segregated area at the WDS for blue box items, electronics and propane canisters.
- Initiation of Food Cycler Pilot project for at home composting in the community.

At this time, the Township intends to reduce the bag limit to two (2) by the end of 2022 and increase recycle collection to weekly effective November 28, 2021.

Ozone Depleting Substances (ODS) equipment is stored onsite temporarily within a designated area. Gator Metal Recycling is contracted to remove the ODS equipment. Gator Metal Recycling transports the ODS equipment to their facility in Alexandria, Ontario and removes the freon from the ODS equipment prior to disposal. No ODS equipment was removed from the site in 2021. Scrap metal was removed by Gator Metal Recycling in spring 2021.

Household Hazardous Waste (HHW) is collected once a year at a designated location in the Township. Additionally, the Township has an agreement with the City of Cornwall enabling Township residents to dispose of hazardous waste at the City's hazardous waste depot on Cornwall Centre Road. In 2021, approximately 24.8 tonnes of HHW was collected at the HHW day collection.

Starting in 2017, e-waste is collected at both WDS in segregated bins as part of the Ontario Electronic Stewardship program. Additionally, tires are collected in designated areas at each WDS as part of the Resource Productivity and Recovery Authority program. Although diverted to a segregated bin, no e-waste was removed from the site in 2021. The Township has an agreement with the City of Cornwall enabling Township residents to dispose of was e-waste at the City's collection depot on Cornwall Centre Road. In 2021, 0.38 tonnes of e-waste delivered to the City of Cornwall site by Township residents. There were approximately 2000 tires removed from the North Lancaster site in 2021 and 500 tires remained on site at the end of 2021.

The Township sold 41 blue boxes and no composters in 2021. It should be noted that generic versions of these boxes are also sold in local stores, but sales are not reported to the Township.

Based on the blue box material collected since the WRS was developed in 2012, recycling of blue box materials has fluctuated between 706 tonnes and 764 tonnes. Currently, it appears that blue box recycling is increasing since the 706 tonnes observed in 2019, as represented in **Table 1.4**. The change to weekly blue box collection should further improve the blue box recycling collection rates. **Table 1.4** details the type and amount of material diverted from the WDS since 2012.

Table 1.4: Waste Diverted

Type					Mass (Metric Tonnes)					
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Entire Township of South Glengarry										
Blue Box Materials	753	764	743	733.87	763.84	758.7	740.94	706.57	731.39	748.00
Brewers Retail[1]	72.48	72.40	72.69	70.66	73.55	72.46	72.37	72.37	72.37	72.37
Back Yard Composting[1]	0.89	0.96	0.83	0.87	0.91	0.80	0.88	0.88	0.88	0.88
Household Hazardous Waste										
Vehicles Attending Day	307	398	433	420	400	410[2]	N/A	N/A	N/A	N/A
Event total (tonnes)	19.78[2]	25.64[2]	27.90[2]	24.92	27.81	26.37[2]	18.07	7.90	4.92	24.79
Cornwall HHW Depot total	N/A	3.86	2.33	1.44	N/A	N/A	N/A	2.47	2.35	3.59
Vehicles Attending Cornwall HHW Depot	N/A	N/A	N/A	N/A	N/A	N/A	80	84	67	85
North Lancaster WDS										
Electronic Waste					2.33	1.2	1.7	4.7	6.6	0.38
Clean Wood/Brush	N/A	N/A	N/A	2.34	3.66	4.74	6.96	7.44	7.20	13.2
Tires: Recycled	0	325	0	250	0	0	0	0	0	2,000
Onsite	375	50	500	275	375	1,400	450	1,200	2,000	500

[1] Estimated based on average percent recycled in 2012 to 2017 GAP Data Call

[2] Estimated based on number of vehicles and average tonnes from 2015 to 2016

The Township is committed to improving record-keeping pertaining to diversion initiatives by keeping logs of the quantities of ODS equipment, scrap metal, and leaf and yard waste diverted from the waste stream.

The General Manager – Infrastructure attends the SD&G Regional Waste Management meetings. Additionally, Township staff complete annual general health and safety training.

1.3.4 BUFFERS

In 2009, it was determined through the topographical survey that fill had been spread and compacted beyond the approved footprint limit toward the southwest (and some of the southeast) part of the site. Instead of uncovering and moving this compacted waste back within the footprint, amending the existing approval to reconfigure the waste mound footprint to encompass this area was discussed with the MECP. A Fill Beyond Approved Limit (FBAL) request was submitted to the MECP on January 31, 2011 (**Appendix B**) and an ECA amendment application requesting incorporation of an additional CAZ as part of the landfill property will be submitted in 2022.

The area which was beyond the footprint to the west encroached about 25 m on the stipulated 30 m property buffer limit; however, the Township owns the property west of the WDS, which forms part of the CAZ for the site. There are twelve (12) monitoring wells located in the CAZ property to the west, which will delineate the extent of impact the WDS may have to the west (**Figure 1.0**).

The fill area to the east had encroached about 15 m on to the 30 m property buffer limit; however, the Township completed the acquisition of the adjacent land (1.2 ha) to the east of the WDS as an additional buffer (**Figure 2.1**). To further reduce potential impacts, final cover was applied to the area of the waste mound that was beyond the current footprint to the east as per the Development and Operations Plan (**Figure 1.2**).

1.3.5 COMPLAINTS, INCIDENTS, AND INSPECTIONS

The Township reported that there were no incidents or complaints received associated with the site in 2021. The Township's Environment Committee is provided with updates of ongoing and planned activities at the site. This committee is intended to provide feedback with respect to the community's perception of management and operations at the facility. The committee met on February 2, March 2, April 27, June 1, July 6, September 21, and November 23, 2021, to discuss Township diversion initiatives and waste management issues. Minutes of the meetings can be found in **Appendix B**. The committee intends to meet every 6 to 8 weeks in 2022.

A Solid Non-Hazardous Waste Disposal Site Inspection was completed on January 26, 2021, by the MECP for the North Lancaster waste disposal site (**Appendix B**). The inspection cited the following action items:

1 By no later than March 31, 2021, provide a workplan to the Ministry that addresses the review recommendations made by the Ministry's (MECP) Technical Support Section (TSS). The Ministry will review this workplan and confirm whether or not it is sufficient to address the non-compliance.

2 By no later than March 31, 2021, submit an application to amend the ECA to include the newly acquired CAZ and groundwater rights.

3 By no later than March 31, 2021, confirm with the Ministry that flags have been installed to mark the approved landfill footprint for waste deposition.

4 WSP recommended that the deep bedrock monitoring wells 99-2dBR, 00-2dBR, 00-4dBR, 06-2dBR, 06-1dBR and 06-4dBR should be removed from the monitoring program. The Ministry's TSS agrees with this, and therefore, they can be decommissioned as per Regulation 903, as amended.

MECP Groundwater Technical Support Section review comments were provided in regards to the 2019 Annual Report (dated January 22, 2021, **Appendix B**). The groundwater review cited the following:

- The site is not in compliance with Reasonable Use Guideline B-7 (RUG) as there are exceedances of the RUG limits at monitoring well nest 99-7, located at the western property boundary. The Township should address the non-compliance issues.
- The deep bedrock monitoring wells 99-2dBR, 00-2dBR, 00-4dBR, 06-2dBR, 06-1dBR and 06-4dBR should be removed from the monitoring program. The deep bedrock monitoring wells can be decommissioned as per Regulation 903 as amended.
- Monitoring of groundwater should continue semi-annually as per the monitoring program outlined in the ECA.
- The domestic wells should continue to be sampled annually.

MECP Surface Water Technical Support Section review comments were received for the 2019 Annual Monitoring Report (dated January 25, 2021, **Appendix B**). The surface water review cited the following:

- The North Lancaster WDS does not appear to be resulting in significant, negative impacts to downgradient surface water at this time. As recommended by WSP, all WDS perimeter ditches should be inspected for possible leachate seeps and erosion of ditch banks, particularly as the application rates for interim cover are adjusted to optimize landfill capacity.

The Township provided a response to the action items and workplan to address RUG non-compliance under separate correspondence dated both May 12, 2021 (**Appendix B**). The deep bedrock monitoring wells (99-2dBR, 00-2dBR, 00-4dBR, 06-2dBR, 06-1dBR and 06-4dBR) were decommissioned as per Ontario Regulation (O.Reg.) 903 on April 20, 2021, and the WDS perimeter ditches will be inspected for possible leachate seeps and erosion of ditch banks, particularly as the application rates for interim cover are adjusted to optimize landfill capacity. Monitoring continues as per the site's ECA.

1.3.6 ENVIRONMENTAL COMPLIANCE APPROVAL (ECA) REQUIREMENTS

Specific requirements and action items of the ECA covering the activities at the WDS are summarized below. Much of the information provided here, including the progress of action items and any deviations from the monitoring program as described in the relevant control documents are discussed in detail elsewhere in the appropriate section of the report.

Section 73: *All monitoring wells that are no longer required as part of the groundwater monitoring program and have been approved by the Director for abandonment, shall be decommissioned in accordance with good standard practice that will prevent contamination through the abandoned well and in accordance with Ontario Regulation 903. A report on the decommissioning shall be provided in the annual monitoring report for the period during which the well was decommissioned.*

Action: Monitoring wells 99-2dBR, 00-2dBR, 00-4dBR, 06-1dBR, 06-2dBR, and 06-4dBR were determined to be instrumented into formation water (saline) zones and were recommended to be removed from the monitoring program. In correspondence (dated January 22, 2021) from Mr. Thomas Guo, Groundwater Technical Support Section of the MECP, these monitoring wells were approved for decommissioning. The monitors were decommissioned as per the requirements of O.Reg. 903 on April 20, 2021 by a licensed well technician.

Section 74: *Any new or replacement well that is installed on Site shall be added to the groundwater monitoring program immediately.*

Action: Should any new or replacement wells be installed on Site, they will immediately be added to the groundwater monitoring program. No monitoring wells were added in 2021.

Section 76: *Monitoring programs shall be carried out for groundwater and surface water in accordance with Schedules “B”, “C”, and “D”, attached to the ECA.*

Action: The surface water and groundwater monitoring program is being completed as per Schedule “B”, “C”, and “D” of the ECA. Any changes to the monitoring program have been made in consultation with and approval from the MECP.

Section 77: *No alterations to the groundwater or surface water monitoring programs shall be implemented prior to receiving written agreement from the District Manager or written approval from the Director.*

Action: Changes to the monitoring program will be made in consultation with and approval from the MECP.

Section 78: *The owner shall follow the trigger mechanisms for groundwater and surface water as detailed in Item 12 of Schedule “A”.*

Action: The Reasonable Use Policy B-7 (RUP B7) is used as the groundwater trigger. The surface water trigger mechanism have been developed in consultation with the MECP and are followed.

Section 79: *In the event a result of a monitoring test carried out under a monitoring program does not comply with the standards set out in the above condition, the Owner shall:*

- Notify the District Manager immediately upon receipt of the result;
- Conduct confirmatory sampling within 30 days of the trigger event date;
- Conduct an investigation into the cause of the adverse result and submit a report to the District Manager that includes an assessment of whether contingency measures need to be carried out;
- If contingency measures are needed, submit detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures, and a schedule as to when these measures will be implemented, to the Director and notify District Manager; and
- Implement the required contingency measures upon approval by the Director.

Action: If an exceedance of a trigger occurs, which is confirmed to be waste disposal site-related, the District Manager will be notified immediately. Confirmatory sampling will occur within 30 days and a report will be produced that includes an assessment of the need for contingency measures.

Section 106(5): *Evaluation of the performance of the alternative final cover material shall be included in the annual report.*

Action: If an alternative cover is intended to be used at the site, the performance of the alternative final cover (once applied) will be evaluated and included in the subsequent annual report.

1.4 MONITORING AND REPORTING OBJECTIVES

As per Section 99 of ECA A481403, an annual report summarizing the activities associated with the development, operation and monitoring of the site is required to be submitted to the MECP District Manager on an annual basis. These items include, but are not limited to, an interpretive analysis of the results of monitoring programs, evaluation of the performance of procedures and engineered facilities, as well as the progress of final and intermediate cover applications.

1.5 ASSUMPTIONS AND LIMITATIONS

This document provides an overview of the recent conditions at the WDS based on field investigations and information provided by WDS officials. The information herein reflects WSP’s best judgment incorporating information reasonably available at the time of field investigations.

The assessment relies in part on information from subcontractors and other individuals as necessary (accredited laboratories, consultants, surveyors, etc.) as referenced within the report, some of which cannot be independently verified by WSP. This report has been prepared relying on information understood to be factual and correct obtained by investigative effort typical of this magnitude of project conducted by a reasonable and prudent environmental practitioner. WSP shall not be responsible for conditions arising from information or facts that were not disclosed to WSP. The conclusions presented herein are based on information obtained up to December 31, 2021. Any site activities or procedures that may have changed since December 31, 2021, may render the conclusions invalid.

Despite any conclusions in this report, given the limited nature of observations made during the field investigations, WSP does not purport to guarantee that latent or undiscovered conditions do not exist or otherwise may or may not become evident in the future. Any conclusions regarding environmental conditions presented in this report are based on an investigative scope of work authorized by the WDS operator (Corporation of the Township of South Glengarry). It is important to note that no investigation can wholly identify all contaminants or environmental conditions on a subject property (above and below ground).

2 PHYSICAL SETTING

The land use in the vicinity of the WDS is representative of a rural-agricultural setting typical of small WDS in eastern Ontario. Most of the surrounding land is agricultural land used for hay, pasture, and row crops. Non-improved lands consist of woodlots, recently cleared land and wet, low-lying areas. Local access roads and sparse housing comprise the remaining regional land use.

2.1 LOCAL TOPOGRAPHY AND SURFACE DRAINAGE

Local topographic conditions are dominated by an east-west trending ridge, which is located at the southern end of the site, having a maximum elevation of approximately 81 m above sea level (masl) (**Figure 2.1**). North of the ridge, the topography of the site area slopes down from southeast to northwest to the Beaudette River. North of the Beaudette River, the land rises to similar elevations as on its southern shore.

The western and eastern buffer properties are imperfectly-drained and contain mixed stands of coniferous and deciduous trees. The buffer areas between the WDS and the Beaudette River are gently-rolling, well-drained and used for hay, pasture, and row crops.

Locally, surface drainage flows northerly, but flows are seasonally intermittent. A ditch conveying water north is located about 100 m west of the current waste footprint and drains into the Beaudette River. This ditch is dry year-round except for brief periods following heavy rain events and during the spring freshet. As noted in the hydrogeological interpretation, the shallow overburden groundwater flow contributes to flow in this ditch from the east (i.e. waste disposal area), resulting in a potential for impacts on the ditch. Surface water monitoring station S-2 is intended to monitor potential downstream (derived) impacts.

Site surface drainage is conveyed via a ditch south of the waste footprint and drains west and then north along the site boundary into the Beaudette River. This ditch has intermittent flow. Drainage south of the ridge on the south edge of the waste mound footprint is southerly. A ditch exists south of the site that has east and west trending branches, which drain the ridge. These branches converge to a ditch that flows in a southerly direction. The southerly-trending drain meets another east/west-trending drain northwest of the village of North Lancaster.

Drainage improvements have been made along the site’s access road to convey runoff in a northerly direction (**Figure 2.1**). Ditching on Concession 6 and 7 road allowances convey seasonal runoff approximately 500 m further east to the Beaudette River.

In 2021, it was noted that forest clearing activities are occurring west of the site where surface water station S-2 is located. These activities may impact surface water flow and sample results at this location. Confirmation of the drain alignment may be required.

Regionally, surface drainage is dominated by the Beaudette River valley. The Beaudette River flows easterly and then southerly and is a tributary to the St. Lawrence River. The Beaudette River baseflow is composed partially of seasonal contribution by the local overburden groundwater system from the north and south. As is typical of other Eastern Ontario river basins, the hydrological regime of the Beaudette River is mixed nival/pluvial (Watelet and Johnson 1999). That is, it is characterized by a spring snowmelt peak followed by a summer low-flow period where groundwater recharge comprises the baseflow followed by a secondary late-season peak associated with fall precipitation and lower evaporation.

2.2 GEOLOGY AND HYDROGEOLOGY

The WDS is situated on the Glengarry Till Plain, which is characterized by low relief. The surface is undulating to rolling, with long morainic ridges and a few drumlins interspersed with clay flats and swamps. The till plain forms the drainage divide between the St. Lawrence River and the Ottawa River.

2.2.1 SURFICIAL GEOLOGY

The North Lancaster waste disposal site area geology is typical of the Glengarry Till Plain. The most recent glacial episode has left a veneer of glacial till, which is characterized as a very compact moraine with glaciomarine beach deposits comprised of sand and gravel, which exist as a result of the till being reworked by marine action. Some of these deposits were later developed as sand and gravel pits.

The surficial deposits consist of two (2) distinct tills, a brown till inferred as the Fort Covington till and a grey till inferred as the Malone till. On the southeast corner of the site and along the west side of the site, near monitoring wells 96-1 and 97-3 (**Figure 1.0**), post-glacial marine deposits, designated as marl, were observed at the surface.

The Fort Covington till is characterized as a poorly-sorted, compact, silty-sand and clay matrix with sub-rounded gravel (Terasme et. al. 1962). The gravel includes cobbles, as was encountered. The Malone till is present at a depth varying from 2.5 m below ground surface (b.g.s.) at the south end of the site to 4.5 m b.g.s. along the west side of the site. This till is characterized as a compact, grey, silty-clay matrix with sand and gravel seams. Boulders were encountered at the Fort Covington Till/Malone Till contact.

At the monitoring wells installed in 2000, the till was encountered only at monitoring well location 00-1 to the northeast and monitoring well 00-5 to the northwest. Between these flanks, the overburden is characterized by a valley containing marine deposits – shallow clay overlying marine outwash (coarse to medium rounded gravel with some sand) near the bedrock contact. These deposits comprise the apparent preferred leachate and salt plume pathway.

In 2006, tri-level (shallow and deep overburden, and deep bedrock) monitoring wells were installed downgradient (northeast and northwest) of the waste mound, as well as bi-level (deep overburden and deep bedrock), monitoring wells installed east of the waste mound. An additional deep bedrock monitoring well was installed proximate to the leachate monitoring wells (06-3dBR). All locations depicted a sandy clay layer which ranged from about 3.7 m to 6.5 m b.g.s. Below the sandy clay, at the northeast and northwest locations (monitoring wells 06-1 and 06-2), a 1.5 m to 2.5 m seam of gravel was encountered, which overlies the limestone bedrock.

2.2.2 BEDROCK GEOLOGY

Underlying the surficial deposits is limestone of the Bobcaygeon Formation. The rocks of this group are predominantly limestone, shaley limestone, and dolomitic limestone, with chert present in some beds (Williams et. al. 1985). They range from medium to thick-bedded and vary from grey to black. The limestone ranges from microcrystalline to crystalline in grain size. The maximum thickness of the limestone in the Ottawa area is about 213 m (700 ft). The thickness of the Ottawa Formation in this region/local is unknown as no deep wells exist in the area; however, older limestones, shales and sandstones are thought to underlie the Ottawa Formation based on the regional geology.

The top of the bedrock appears to be distinct from the underlying bedrock due to the decreased density of fractures observed with depth. The MECP well records indicate a fractured zone within approximately the top 5 m of bedrock, which coincides with the field observations made at the bedrock drilling locations at the site.

The site's monitoring wells, which are designated "sBR" (sBR denotes shallow bedrock), penetrate the top of the shallow bedrock 1.5 m to 6.1 m. Some of these well logs indicate a fractured bedrock zone, but others show limestone with clay layers or limestone with shale layers. Evidence suggesting fractured rock or boulders are recorded in monitoring well logs 99-1sBR, 99-2sBR, 99-3sBR, 99-5sBR, 99-6sBR, 99-7sBR, 99-8sBR, and 99-9sBR.

Fracturing of the bedrock varies both laterally and vertically and becomes less fractured with depth. Fractures are interpreted to be moderately interconnected based on groundwater level measurements, but some fractures may be disconnected from the larger hydrogeological system. Most fractures are coincident with bedding planes with a fewer number of interconnecting vertical fractures.

2.2.3 HYDROGEOLOGY

The localized flow system is governed by the geologic materials observed during the borehole and monitoring well installations. The conceptualized flow system based on the surficial and bedrock units observed consists of a four-component system where the individual flow and transport properties are distinct within each of the water-bearing zones:

- Shallow overburden semi-confined aquifer
- Deep overburden confined aquifer (bedrock contact zone)
- Shallow bedrock aquifer
- Deep bedrock aquifer

The till apparently thins out to the north as it extends to the Beaudette River, contacting the marine clay/gravel channel and bedrock formations. This valley of coarse deposits (gravel) apparently acts as a conduit for the migration of leachate from the south (**Figure 2.2**). The apparent preferential groundwater flow of this unit explains the change in potentiometric contours (i.e. inferred groundwater flow direction) from northwest to north toward the Beaudette River north of the site, as discussed later. The overburden layers north of the waste disposal area in the Beaudette River valley act as an effective aquitard and are interpreted to influence the flow of groundwater in the bedrock.

Underlying the overburden formations is a surface of stratified limestone containing some clay/shale beds, which are fractured and covered with gravel in some locations which become more uniform and massive with depth. The deeper bedrock has a very low intrinsic hydraulic conductivity (Eastern Ontario Water Resources Management Strategy, 2001) and is isolated from the atmospheric system.

Single well response tests were conducted in 1997 and 1999 on the deep overburden monitoring wells surrounding the waste mound (monitoring wells 96-3d, 97-4d, 99-1d), which were subsequently analyzed (**Appendix H-6**) to evaluate the hydraulic conductivity of the till. The hydraulic conductivity (K) was estimated to range from about 10^{-6} to 10^{-8} m/s. The approximate horizontal average groundwater flow velocity in the deep overburden ranges from 0.1 to 5 m/yr.

Single well response tests were conducted on a number of deep bedrock wells surrounding the waste mound in 1999 and immediately downgradient of the waste mound (monitoring wells 99-2, 99-4, 99-6, 99-7), which were subsequently analyzed (**Appendix H-6**) to assess the hydraulic conductivity of the bedrock unit. The pumping test conducted on monitoring well 99-6dBR estimated the hydraulic conductivity of this zone to be about 1×10^{-7} m/s. The most relatively permeable area of the tested deep bedrock was observed at monitoring well 99-6dBR; whereas, the downgradient monitoring wells to the northwest (99-2dBR, 99-4dBR, 99-7dBR) exhibit hydraulic conductivities of one to two orders of magnitude lower (2×10^{-8} to 2×10^{-9} m/s), which is consistent with the interpretation that the deep bedrock system is more isolated (i.e. it is poorly connected hydraulically).

3 MONITORING PROGRAM

The site has been characterized through the assessment of topographic surveys, surface drainage mapping and monitoring, a series of borehole and subsequent groundwater monitoring well installations, and groundwater and surface water monitoring. The monitoring well and surface water monitoring network have been established through consultation with the MECP. Monitoring locations are depicted in **Figure 1.0** and detailed in **Table 3.0A and Table 3.0B** in **Appendix C**.

3.1 GROUNDWATER MONITORING

The groundwater monitoring wells were installed to provide impacted and un-impacted groundwater quality in the overburden and bedrock strata. The compliance monitoring wells include thirty-nine (39) groundwater monitoring wells located upgradient and downgradient of the site and within the buffer area. Sampling of the monitoring wells occurs annually (spring) at twelve (12) locations and semi-annually (spring and fall) at twenty-seven (27) locations in accordance with the approved monitoring program (**Table 3.1**). Deep bedrock monitors 99-2dBR, 00-2dBR, 00-4dBr, 06-1dBR, 06-2dBR, and 06-4dBR were decommissioned on April 20, 2021 following MECP approval.

Table 3.1: Groundwater Monitoring Well Sampling Frequency

Location	Monitoring Well
Annual Monitoring (Spring)	
Background	96-1s, 96-1d, 99-1sBR
Downgradient	99-3sBR, 99-7s, 99-7sBR, 99-7dBR, 97-1s, 99-5sBR, 00-4s, 06-2s, 06-2d
Semi-Annual Monitoring (Spring and Fall)	
Leachate	96-3s, 96-3d, 06-3dBR, 97-4d
Downgradient	99-4sBR, 99-4dBR, 97-3d, 99-9s, 99-9sBR, 99-8s, 99-8sBR, 96-2d, 99-2sBR, 97-2s, 99-6sBR, 99-6dBR, 06-4d, 00-1s, 00-1dBR, 00-2s, 00-2sBR, 06-1s, 06-1d, 00-3s, 00-4sBR, 00-5sBR, 00-5dBR.

dBR – Deep Bedrock; sBR – Shallow Bedrock; dOVB – Deep Overburden; sOVB – Shallow Overburden

WSP measured groundwater levels and purged the monitoring wells a minimum of three (3) well volumes or until dry on May 25 and 26, and on October 4, 2021. Purging is completed at all monitoring wells prior to the sampling event to allow sufficient recharge of the monitoring wells prior to sample collection. Purging is done with the use of a Waterra™ inertial pump or by bailer at low yield monitoring wells.

Following purging, representative groundwater samples were collected. Samples collected for metals analysis were field-filtered with disposable in-line 0.45 µm filters. All sample bottles were filled to the shoulder or neck of the bottle unless otherwise instructed by the laboratory. The samples were collected in appropriate laboratory-prepared sample bottles and packaged in a cooler with ice packs, and shipped via courier to Caduceon Environmental Laboratories (Ottawa, ON), a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory, on the same day of sampling. Field water quality measurements (pH, conductivity, temperature, oxygen-reduction potential (ORP)) were recorded at the monitoring well at the time of sampling.

The groundwater field measurements and laboratory analysis parameters are listed in **Table 3.2**. The selection of parameters for analysis are in accordance with ECA A481403 and any other applicable control instruments.

Table 3.2: Groundwater and Private Well Field and Laboratory Analysis Parameters

Field Measurements	Laboratory Analysis
pH Conductivity Temperature ORP	Major cations/anions and general chemistry (pH, conductivity, alkalinity, hardness, TDS, calcium, magnesium, sodium, potassium, sulphate, chloride, phenol), Metals (iron, manganese, barium, boron), Nutrients and Biological (nitrite, nitrate, total ammonia, TKN, COD, BOD_5, DOC, organic nitrogen)

The results of the chemical analysis are compared to the *Ontario Drinking Water Standards, Objectives and Guidelines* (ODWS/OG) as well as the Reasonable Use Policy (MECP Guidelines B-7). It should be noted that the Guideline B-9 criteria have also been included since there are contaminant sources (historical salt storage, agriculture) other than those for which approval has been granted (leachate) for which Policy B-7 does not apply.

3.1.1 SUPPLEMENTAL GROUNDWATER MONITORING – DOMESTIC WELLS

There are three (3) private wells within one (1) km radius of the WDS (**Figure 1.0**). These private wells are located about 600, 610, and 950 m, respectively, north of the northern boundary of the WDS. Two (2) of the three (3) wells supply farm residences (PW3 and PW1), whereas PW2 supplies a farm shed that is apparently used infrequently. MECP well records (**Appendix H-6**) indicate that these wells range in depth from 28 m (92') at private well PW2 and private well PW3 to 92 m (303') at private well PW1.

Two (2) of the homeowners have agreed to participate in this monitoring program. Sampling of the raw supply water has occurred annually at private well PW1 since June 2004 and at private well PW3 since 2010. Several unsuccessful attempts have been made to contact the owner of private well PW2; consequently, private well PW2, is not included as part of the monitoring program.

Prior to sample collection, the fixtures were disinfected, and the water was run for a period of approximately ten (10) minutes. The samples were collected in appropriate laboratory-prepared sample bottles and packaged in a cooler with ice packs and shipped via courier to a CALA-accredited laboratory on the same day of sampling.

A sample was collected at private well PW1 and PW3 in May 2021. Results of the chemical analysis are summarized in **Table 5.5** (**Appendix E**).

With homeowner concurrence, these domestic wells will continue to be sampled annually.

3.1.2 LEACHATE MONITORING

The leachate management strategy implemented at the site (low-permeability interim and final cover) is intended to control the volume and rate of leachate production. Monitoring wells 96-3s, 96-3d, 97-4d, and 06-3dBR provide a means of characterizing leachate. The compliance monitoring program includes semi-annual (spring and fall) analysis at these monitoring wells. The parameter analysis is outlined in **Table 3.3** below.

Table 3.3: Leachate Monitoring Well Field and Laboratory Analysis Parameters

Field Measurements	Laboratory Analysis
pH Conductivity Temperature ORP	Major cations/anions and general chemistry (pH, conductivity, alkalinity, hardness, TDS, calcium, magnesium, sodium, potassium, sulphate, chloride, phenol), Metals (iron, manganese, barium, boron), Nutrients and Biological (nitrite, nitrate, total ammonia, TKN, COD, BOD_5, DOC, organic nitrogen)

3.2 SURFACE WATER MONITORING

Surface water samples are collected on a tri-annual basis (spring, summer (heavy rainfall event), and fall) at eight (8) sampling stations as part of the annual surface water monitoring program outlined in the ECA. A typical heavy rainfall or high precipitation event is characterized by a single rain event with total precipitation in excess of 15 mm.

The surface water stations are depicted in **Figure 1.0** and described as follows:

- Surface water station S-1a is in a drain south of the WDS;
- Surface water station S-2 is in the ditch west of the WDS;
- Four (4) locations on the Beaudette River (S-3, S-4, S-5, S-6). Surface water station S-3 is upstream from the (S-2) ditch's confluence with the Beaudette River, while surface water stations S-4, S-5, and S-6 are downstream of the confluence; and
- Two (2) surface water stations in the ditch along the north side of the Concession 6/7 road allowance (S-7 and S-8).

Surface water samples were collected on May 26, July 14, and October 4, 2021, following two-day total precipitation events consisting of 0 mm, 29.0 mm, and 24.0 mm, respectively.

Samples were analyzed by an accredited laboratory for a suite of parameters related to possible leachate impacts and are compared to the *Provincial Water Quality Objectives* (PWQOs).

Surface water samples were collected at the appropriate locations by slowly submerging a laboratory-prepared, non-preserved sample bottle into the watercourse and then decanting into the appropriately preserved sample bottles. This procedure was repeated until each of the required sample bottles was filled. Samples that required field-filtering (mercury) were collected in a sterile, dedicated syringe and pushed through a 0.45 µm filter into the appropriately preserved sample bottle. Once samples were collected, they were packaged in a cooler with ice packs and shipped via courier to a CALA-accredited laboratory on the same day of sampling. Surface water analytical results are compared to PWQO in **Tables 4.7b** and **4.7c** (**Appendix F**). Surface water trigger mechanisms have been developed and are discussed further in **Section 5.2**.

Field measurements (pH, conductivity, temperature, dissolved oxygen (D.O.), and ORP) were made directly in the surface watercourse at the time of sampling. The depth, width and velocity of the watercourse are also recorded in order to estimate the flow rate. The floating object method was used for slow, narrow surface water locations where the velocity probe (Global Flow Probe) was ineffective. Velocity was measured by placing a measuring tape along the shoreline, parallel to the channel, and measuring the time for a semi-submerged object to travel a predetermined distance. Flows at all sampling stations were established by integrating velocity and wetted cross-sectional stream area. There are, however, currently no staff gauges or other stage measurement instruments installed at the surface water monitoring locations, and rating curves have not been established for these areas. The surface water characteristics are summarized in **Table 3.4**.

Table 3.4: 2021 Surface Water Location and Characteristics

Surface Water Station	Location	Characteristics	Average Water Depth (m)	Flow Regime[1]
S-1A	Background	Ephemeral	0.04	Lentic
S-2	Offsite	Ephemeral	Dry	Lentic
S-3	Offsite	Permanent	1.0	Lotic
S-4	Offsite	Permanent	1.0	Lotic
S-5	Offsite	Permanent	1.1	Lotic
S-6	Offsite	Permanent	0.7	Lotic
S-7	Onsite	Ephemeral	Dry	Lentic
S-8	Onsite	Ephemeral	Dry	Lentic

[1] Categorization as required by MECP Technical Guidance Document (Nov. 2010)

The surface water field measurements and laboratory analysis parameters are listed in **Table 3.5**. The selection of parameters for analysis are in accordance with ECA A481403 and any other applicable control instruments.

Table 3.5: Surface Water Field and Laboratory Analysis Parameters

Field Measurements	Laboratory Analysis
pH Conductivity Temperature ORP D.O. Flow Measurements (depth, width, velocity)	Major cations/anions (pH, conductivity, turbidity, colour, alkalinity, hardness, TDS, TSS, calcium, magnesium, sodium, potassium, sulphate, chloride, phenol) Metals (iron, manganese, arsenic, barium, boron, cadmium, chromium, copper, lead, mercury, nickel, zinc) Nutrients and Biological (nitrite, nitrate, total ammonia, TKN, total phosphorus, COD, BOD_5)

3.3 LANDFILL GAS MONITORING

Methane gas is produced by the bacteriological decomposition of organic matter (carbon source) under reducing conditions. These conditions exist in a waste mound, and methane gas production can continue long after the waste mound has closed or been capped as long as the substrate is available. Although methane is an asphyxiant, its greatest potential hazard is that it forms an explosive mixture in the air between 5 % and 15 % by volume (v/v). Methane can enter buildings constructed on a WDS and form hazardous (explosive) mixtures.

Methane gas migrates through unsaturated zones and can rise unless a barrier impedes its ability to do so. Barriers to methane gas migration include saturated groundwater conditions or low-permeability layers (i.e. clay, frozen soils, etc.). The ‘sandwich’ nature of the waste mound produces alternating bands of substrate (waste), permeable and impermeable layers which can affect methane migration patterns. The distance that methane gas may migrate horizontally is estimated to be 10 times the effective thickness of the refuse (which is the depth of the refuse below native soil). At this WDS, the horizontal distance is estimated to be about 45 m. The risk associated with horizontal migration of methane at this site appears to be limited since there are no residential buildings within 700 m of the waste mound. Minimal risk is interpreted to be associated with the site attendant’s building as the structure does not have a basement or foundation in which methane gas could accumulate. The attendant’s building is supported by blocks.

The waste mound has a capacity of less than 1,500,000 m³, and as such, is not required to have a landfill gas collection system; however, a gravel trench and venting system similar to that illustrated in item (c), Figure 4.11 of the MOE Landfill Guidance Manual, shown in **Figure 3-1,** below can be installed to relieve undercap gas pressure upon closure. The results of the 2021 methane gas monitoring program can be found in **Section 5.4**.

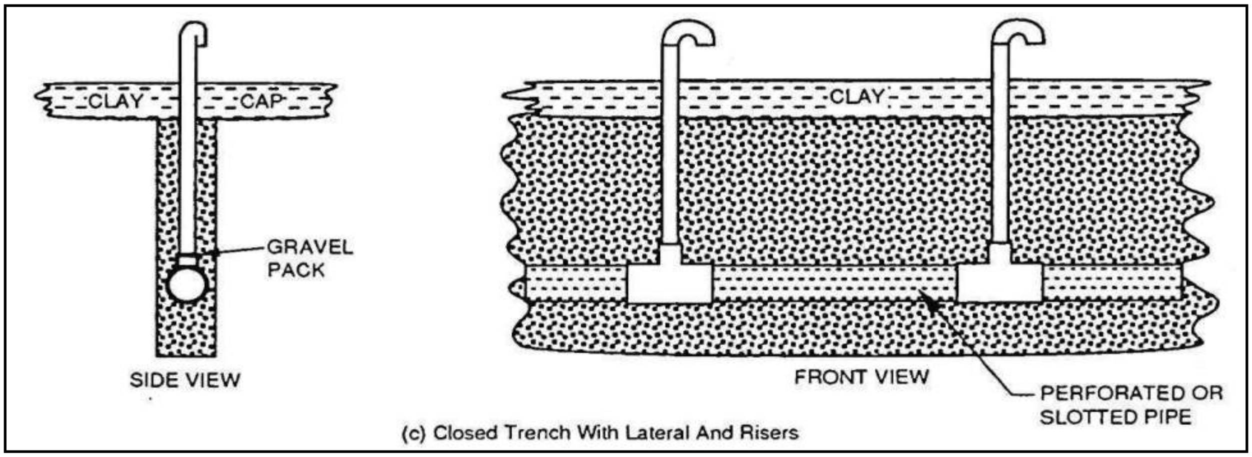

Figure 3-1- Typical Configuration of Trench Vents (Schematic view)

A portable Landtec GEM5000 gas detector calibrated to methane is used to collect combustible gas measurements from monitoring wells 96-3s, 96-3d and 06-3dBR on an annual basis (Calibration certificate in **Appendix H-8**).

The GEM5000 probe was inserted into the monitoring well, and the opening was blocked to exclude ambient air. The stabilized measured gas concentrations were recorded. Percent methane, carbon dioxide, oxygen and percent of the lower explosive limit for methane were recorded and are presented in **Section 4.6**.

3.4 QUALITY ASSURANCE/QUALITY CONTROL

3.4.1 STANDARD OPERATING PROCEDURES

Standard Operating Procedures are followed as per WSP's Standard Operating Procedures Manual included in **Appendix H-4**. Any deviations from the sample collection protocol or discrepancies in results are reviewed and documented in accordance with the provisions of the ECA.

3.4.2 QUALITY ASSURANCE

All observations collected onsite are recorded in logbooks and transferred to WSP's standard Field Record Forms immediately following the site visits. The forms are retained in a logbook as well as electronically and record monitoring well condition, surface water observations, landfill gas monitoring, and requirements for equipment. The forms are reviewed prior to the next site visit. Field Record Forms for 2021 are included in **Appendix G**.

As part of the quality assurance for field sampling, WSP used disposable, powder-free nitrile gloves, which were changed between each sample. Sample bottles were handled such that the inside of the bottle and cap do not come in contact with the surrounding environment or the sampling equipment. If contact does occur, the sample bottle or cap are thoroughly rinsed with sample water or the bottle is discarded. If the bottle contains preservative, then the bottle is discarded. Sample bottles were labelled (on the bottle label as well as the cap) with the monitoring well number, which is identified using a site map. Duplicate samples were collected for each sampling program (groundwater and surface water).

The laboratory certificates of analyses indicate the following quality control issues:

- Surface water samples collected on July 14 from S-4 and S-5 ion balance ratio was outside acceptable criteria of 10% (13.0 and 18.6%, respectively);
- As part of the ion balance calculation, the cations were run from an unpreserved bottle for the May 26 samples collected at monitoring wells 99-1s.

Additionally, the laboratory certificates of analyses indicate that all limits for holding time were met and do not indicate any substantial quality control issues that would materially affect the conclusions of this report.

The methods used to complete the required analysis and the laboratory QA/QC checks were detailed on the certificates of analysis (attached on CD in **Appendix H-8**). As indicated above, Caduceon is a CALA member and participates in the proficiency testing program. Caduceon complies with the requirements of ISO/IEC Guide 17025.

A data QA/QC protocol is undertaken by WSP, which ensures a second associate review all laboratory data transcribed for reporting purposes to confirm accurate transcription as well as identify any exceedance of a compliance criteria.

3.4.3 DATA QUALITY EVALUATION

WSP's sampling protocols follow those recommended in the MECP document *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario* (1996). Field instruments were calibrated prior to use in the field. Groundwater field data were measured using a groundwater sample collected in a separate unpreserved sample bottle, which was later discarded, while surface water field data were measured by placing the field instrument directly in the surface watercourse whenever possible.

Duplicate samples are collected during each sampling program (groundwater and surface water). Analytical results from the duplicate sample are compared to the analytical results from the original sample Relative percent difference (RPD) indicates the variation between the original and field duplicate analytical results and is defined by the following equation:

$$Duplicate\ Relative\ Percent\ Difference = \left[\frac{(Sample\ Result - Duplicate\ Result)}{\frac{(Sample\ Result + Duplicate\ Result)}{2}}\right] \times 100$$

RPD can be calculated for a parameter when both measured concentrations for the same analyte (the original sample and the duplicate) are greater than five times the laboratory reportable detection limit. The MECP document titled *Protocol for Analytical Methods Used in Assessment of Properties under Part XV.1 of the Environmental Protection Act* indicates that the quality control performance criteria for most parameters studied in groundwater and surface water at WDS should have calculated RPDs not exceeding 20%. Those parameters which were not detected were excluded from data quality evaluation via analysis of RPD.

Groundwater RPD was calculated based on one groundwater duplicate sample collected at monitoring well 99-7dbr in May and October 2021. Eighty four percent of the parameters valid for comparison had RPD less than 20% in the May duplicate and 89% in the October 2021 duplicate. The average absolute RPD for valid groundwater parameters was approximately 7.6% in May and 6.3% in October 2021.

Surface water RPD was calculated based on one surface water duplicate sample collected at station S-1A in May, July and October 2021. In 2021, 100% of the parameters valid for comparison had RPD less than 20% in the May duplicate, 86% for the July duplicate, and 82% for the October duplicate. The average absolute RPD for valid surface water parameters was approximately 2.6% in May, 8.2% in July and 17.4% in October 2021. The elevated average absolute RPD value for October is skewed by elevated values for iron and manganese. These values may be influenced by the increased turbidity in the original sample.

3.5 OPERATIONAL MONITORING

The Director of Roads and Waste Management oversees the management, planning and operations of the WDS. A snow fence was erected in the winter of the 2018-2019 season, which reduced the wind-blown debris. Litter is collected in the spring and summer by the site attendant. When dust is observed, dust suppression materials (e.g. calcium chloride) were utilized to minimize dust emissions.

No leachate seeps were observed in 2021.

3.6 CONTROL SYSTEM MONITORING

No engineered leachate/landfill gas control systems are utilized at this site.

4 MONITORING RESULTS

4.1 HISTORICAL DATA

Historical data are included in **Appendix D** (groundwater) and **Appendix F** (surface water) as well as on the attached digital file, included in **Appendix H-7**. The groundwater and surface water tables show the historical sample locations, the number of samples per year per station, the date that sampling occurred and the range of data for key parameters. Groundwater data have been collected at this site since 1996, while surface water data have been collected since 1998. Methane gas monitoring commenced in 2010.

4.2 GROUNDWATER ELEVATIONS

Table 5.0a (**Appendix C**) depicts the 2021 measured and calculated groundwater elevations of the compliance monitoring wells. The historical data are presented in **Appendix H-7**. The spring 2021 interpreted groundwater piezometric contours have been plotted for each aquifer on **Figures 4.3A to D**. The inferred groundwater flow directions have been interpreted from this data, as discussed in **Section 5**.

4.3 GROUNDWATER QUALITY

All groundwater monitoring wells were installed at the site to provide impacted and un-impacted groundwater quality data. It is noted that the interpretation is challenging since there are multiple competing sources of groundwater impacts: leachate, historical salt storage, agricultural sources as well as deep formation water contributions.

It is important to highlight the May 2009 geophysical survey results (**Appendix H-2**), which had shown that there are several sources of elevated conductivity concentrations north of the waste mound, namely the former salt storage area and the groundwater leachate plume. The leachate plume, in contrast to the salt plume, has a relatively weak conductivity signature (**Figure 5.0A** and **5.0B**, attached).

The results of the groundwater monitoring were also tabulated for each monitoring well and sampling event for trend analysis. The results were compared to the applicable Ontario Drinking Water Standards, Objectives and Guidelines (ODWS/OG), as well as to the Reasonable Use Policy (Guideline B-7) criteria and Guideline B-9.

Groundwater samples were collected from the monitoring wells to characterize the groundwater chemistry upgradient, within, and downgradient of the WDS. The groundwater analytical results have been organized with respect to hydrostratigraphic unit and apparent source of impact(s) in **Table 4.1**.

Table 4.1: Groundwater Monitoring Well Characteristics

Impact Type	Background	Leachate	Downgradient		CAZ	
Waste Disposal Site Leachate	96-1s	96-3s	west	97-3d, 99-3sBR, 99-4sBR, 99-4dBR, 99-9s, 99-9sBR	northeast north northwest	00-1s, 00-2s, 00-2sBR, 06-1s, 06-1d, 06-4d 00-3s 00-4s, 00-4sBR, 00-5sBR, 06-2s, 06-2d
	99-1d	96-3d	northwest	99-7s, 99-7sBR, 99-7dBR, 99-8s, 99-8sBR		
	99-1sBR	97-4d	north	96-2d, 99-2sBR		
			northeast	97-2s		
			east	97-1s		
Salt Storage	00-5dBR					
Leachate/Salt Storage		06-3dBR	north	99-6sBR, 99-6dBR		
			east	99-5sBR		
Agricultural						
Saline Formation					northeast	00-1dBR

The results of the analysis have been compiled, and exceedances shaded in **Tables 5.3a - e** and **Table 5.4** are included in **Appendix D**. A photographic inventory of each groundwater monitoring station is included on the CD in **Appendix H-5**.

4.3.1 LEACHATE CHARACTERIZATION

The leachate was characterized by analyzing the groundwater analytical results from groundwater samples collected from monitoring wells 96-3s, 96-3d, 97-4d, and 06-3dBR (locations are shown in **Figure 1.0**). Leachate quality is compared to ODWS/OG and is tabulated in **Table 5.4** in **Appendix D**. The 2021 leachate data was also compared to typical leachate concentration data in **Table 4.2** below (MOE Landfill Compliance Manual, 1993). A comparison of the results shows that, with the exception of measured nitrate concentrations in groundwater samples from each leachate monitoring well, measured sulphate concentration in groundwater sample collected from monitoring well 97-4d, and measured chloride concentration in groundwater sample collected from monitoring well 06-3dBR, the leachate quality at the North Lancaster WDS is in the low range of typical leachate concentrations, as would be expected for a small rural WDS. It should be noted that monitoring well 06-3dBR is located in the former salt storage area, which likely explains the higher dissolved chloride analytical result as well as the elevated sodium and TDS concentrations. Although other parameters may contribute to the site's leachate signature, apparent leachate indicators were assessed to be chloride, sodium, total ammonia, TKN, boron, and COD. These analytes were utilized to assess leachate impacts.

Table 4.2: Leachate Characterization (May 2021)

Parameter	Units	Typical Range[1]	Monitoring Well			
			96-3s	96-3d	97-4d	06-3dBR
Alkalinity	mg/L	300 – 2,000	461	420	550	171
Conductivity (25°C)	µmho/cm	---	2,000	1,810	1,480	8,350
pH	pH units	6 - 7	7.60	7.64	7.70	7.81
Chloride	mg/L	20 – 2,500	349	333	17.4	2,760
Nitrate	mg/L	<0.1 – 0.5	4.22	0.97	10.1	0.72
Nitrite	mg/L	---	0.94	0.89	0.36	<1.3
Sulphate	mg/L	<1 – 300	62	42	227	<10
Sodium	mg/L	---	145	129	64.9	1,700
Potassium	mg/L	---	26.4	25.2	16.7	24.4
Boron	mg/L	'---	0.353	0.282	0.625	1.24
Iron	mg/L	---	<0.005	2.19	0.010	0.435
Manganese	mg/L	---	0.001	0.533	0.199	0.040
Total Ammonia	mg/L	5 – 100	0.03	0.02	3.49	2.08
TKN	mg/L	1 – 100	0.4	0.4	3.8	2.3
BOD	mg/L	---	<3	7	12	14
COD	mg/L	150 – 6,000	15	9	12	331
TDS	mg/L	---	1,091	988	931	4,653

[1] *Guidance Manual for Landfill Sites Receiving Municipal Waste; Table 1 (MOE, 1993)*

The leachate generation rate was estimated based on the annual precipitation (P) and evapotranspiration (ET) for 2021 (Thornewaite and Mather) and a conservative runoff coefficient (c). The moisture content of the waste was not factored into this estimate. The 2021 climate data were measured at Cornwall (Environment Canada Station ID 6101874). The leachate production is estimated as:

Annual Precipitation (P) = 765.5 mm

Annual Evapotranspiration (ET) = 631.3 mm

Runoff Coefficient (c) = 0.7

Active Waste Mound (A) = 38,250 m^2

Volumetric Leachate Production = [(P– ET) x (1 - c)]/1000 x A

= [(765.5 mm – 631.3 mm) x (1 – 0.7)]/1000 x 38,250 m^2

= (134.2 mm/yr x 0.3)/1000 x 38,250 m^2

~ 1,540 m^3

The leachate receiver is the underlying till, having an average saturated thickness of 4.5 m based on the borehole logs and a hydraulic conductivity (K) of about $1x10^{-6}$ m/s. Applying Darcy's Law, the annual groundwater flow was estimated as:

Groundwater Flow = kiA

Where: k = 1 x 10^{-6} m/s

i = 0.024 m/m (horizontal hydraulic gradient of leachate receiver)

A = depth of waste below grade x width of waste footprint perpendicular to the groundwater flow

Groundwater Flow = ($1x10^{-6}$ m/s) x (0.024 m/m) x (4.5 m x 190 m)

= 2.03 x 10^{-5} m^3/s

Annual Groundwater Flow **~ 640 m^3/yr**

4.3.2 SUPPLEMENTAL GROUNDWATER MONITORING – DOMESTIC WELLS

These private wells (PW1 and PW3) are developed into bedrock, and it is expected that the groundwater flow to these wells is from the north (i.e. travelling south toward the Beaudette River) with horizontal gradients of similar magnitude to those on the south side of the river. As such, these wells are not expected to be impacted by current or historical activities at the WDS.

The background quality of the groundwater in the area of the site is poor, exceeding ODWS/OG. The contact zone supply aquifer is characterized by elevated concentrations of hardness, some iron, and possible hydrogen sulfide in its groundwater, depending upon the degree of confinement of the aquifer and the proximity of recharge zones.

The results of the private well monitoring program are compiled and compared to the ODWS/OG in **Table 5.5** included in **Appendix E**. Both private wells PW1 and PW3 indicated ODWS/OG exceedances for hardness and iron.

4.4 SURFACE WATER MONITORING

The surface water flows calculated for the various surface water sampling stations in 2021 ranged from no observed flow to about 600 L/s. They are summarized in **Table 4.3.** Historical flow rates are summarized in **Table 4.6,** included in **Appendix F**. It is noted that dry conditions were observed at surface water stations S-2, S-7 and S-8 in during each sampling attempt in 2021. Stagnant (no flow) conditions were observed at surface water stations S-5 in July 2021. It should be noted that the dry conditions at S-2 could be the result of clearing, which is occurring in the vicinity of this surface water monitoring location. The clearing works could have disrupted the flow of this drain. Further investigation will need to be completed to confirm the viability of this location as a monitoring location.

Table 4.3: 2021 Surface Water Flow Data (m^3/s)

Location	Date and Flow Estimate (m^3/s) May 26	July 14	November 16
S-1A (background)	0.001	Trace	0.001
S-2 (downstream)	Dry	Dry	Dry
S-3 (upstream)	0.23	0.23	Trace
S-4 (Beaudette R.)	0.23	0.23	0.18
S-5 (Beaudette R.)	0.60	No flow	Trace
S-6 (Beaudette R.)	0.27	0.16	0.04
S-7 (CAZ ditch)	Dry	Dry	Dry
S-8 (CAZ ditch)	Dry	Dry	Dry

4.5 SURFACE WATER QUALITY

Surface water monitoring analytical results have been compiled in **Table 4.7a and b** (**Appendix F**) and compared to the PWQO with exceedances highlighted.

As per the MECP Technical Support surface water review, the results from sampling monitoring wells north of the site to the Beaudette River have been compiled and compared to PWQO (**Tables 4.7c - 4.7f**, **Appendix F**).

The surface water trigger parameters were selected based on ODWS/OG parameters and leachate indicators. The leachate indicators with prescribed ODWS/OG criteria are sodium and chloride.

Table 4.8A, **Appendix F**, represents typical WDS parameters of concern where the criteria concentrations represent the lowest chronic adverse effects and exceedances are highlighted. Surface water quality data are compared to the established criteria prescribed by the MECP document *Monitoring and Reporting for Waste Disposal Sites, Groundwater and Surface Water Technical Guidance Document* (November 2010).

Table 4.8B, **Appendix F**, summarizes the results highlighting exceedances of alternative review criteria, specifically the Canadian Water Quality Guideline (CWQG). These results do not necessarily suggest that leachate impact has occurred, as discussed in this report (**Section 5.3**).

A photographic inventory of each surface water monitoring station is included on the CD in **Appendix H-5**.

4.6 LANDFILL GAS

In May 2021, the combustible gas concentrations measured from the wellheads of monitoring wells 96-3s, 96-3d, and 06-3dBR were measured utilizing a portable Landtec GEM5000 gas detector calibrated to methane. The results of methane gas monitoring are detailed in **Table 4.4** below. The methane concentration is displayed in percent (0-100%) of the Lower Explosive Limit (LEL).

Table 4.4: Leachate Monitoring Well Methane (%LEL)

Monitoring well ID	Methane Gas Reading (% LEL)
Location	May 12, 2021
96-3s	0
96-3d	0
99-3sBR	0

5 ASSESSMENT, INTERPRETATION AND DISCUSSION

5.1 GROUNDWATER FLOW INTERPRETATION

A review of the measured groundwater depths at the various monitoring wells and calculated hydraulic gradients was undertaken to evaluate the conceptual horizontal groundwater movement as well as recharge/discharge conditions in the shallow and deep overburden strata, as well as the shallow and deep bedrock.

5.1.1 SHALLOW OVERBURDEN

The shallow overburden aquifer is predominantly located in the brown Fort Covington till formation. **Figure 4.3A** presents the interpreted shallow overburden groundwater contours. The average horizontal hydraulic gradient in the area of the waste mound was approximately 0.022 m/m during the May 2021 monitoring event, generally in a northwesterly direction.

South (upgradient) of the site, little or no vertical hydraulic gradient is observed; however, the leachate monitoring wells (96-3) indicate a strong vertical downward gradient (recharge) (**Table 5.0b**, **Appendix C**).

Single well response tests were conducted on the shallow overburden wells surrounding the WDS and in the CAZ (97-1s, 97-2s, 99-7s, 00-4s). Based on the analysis of these wells (**Appendix H-6**), the hydraulic conductivity (K) of the Fort Covington till at the site ranges from 10^{-6} to 10^{-8} m/s.

Based on the observed hydraulic gradient and hydraulic conductivities assessed through slug tests (previously completed in 1999), the horizontal travel time in the shallow overburden is interpreted to range from 1.5 to 21.5 m/yr, and the vertical travel time is interpreted to be less than 1 m/yr. As suggested by these gradients, the groundwater flux is downward (recharge) in the waste disposal area and then lateral to the north of the WDS. Upward flux (discharge) toward the surface is observed approaching the river valley.

5.1.2 DEEP OVERBURDEN

The deeper overburden Malone till morainic deposit is composed of very compact silty clay containing seams of sand and gravel. These seams are the possible pathways for horizontal groundwater flow within the deep overburden. The deep overburden groundwater flow direction in the vicinity of the waste mound was towards the north, with an average horizontal gradient of approximately 0.029 m/m during the May 2021 monitoring event (**Figure 4.3B**). Similar to the shallow overburden aquifer, the interpreted groundwater flow direction is towards the north at the deep overburden geologic boundary.

Strong recharge (downward) vertical hydraulic gradients are evident north of the site as well as in the immediate vicinity of the landfilling area (**Table 5.0b**, **Appendix C**). Groundwater depths measured in monitoring wells located in the upgradient areas of the site indicate a recharge gradient (vertical downward, approximately 0.2 m/m) at the time of the May 2021 monitoring event between the deep overburden and shallow bedrock system.

5.1.3 SHALLOW BEDROCK

The shallow bedrock/overburden contact zone aquifer is composed of fractured limestone with shale and clay bedding planes. The shallow bedrock groundwater flow direction in the vicinity of the waste mound is interpreted to generally be towards the northwest with an average horizontal gradient of approximately 0.036 m/m in the vicinity of the waste disposal area during the May 2021 monitoring event (**Figure 4.3C**). Similar to the overburden aquifers, the flow direction changes slightly towards the north at the inferred deep overburden geologic boundary. The horizontal gradient decreases in the CAZ as the topography is more subdued in the river plain area.

The vertical hydraulic gradient in the vicinity of the site suggests recharge (downward) vertical hydraulic gradients, while a neutral gradient is observed immediately north of the landfilling area (**Table 5.0b, Appendix C**). Progressing north from the site towards the Beaudette River, the vertical hydraulic gradients between the shallow bedrock and deep bedrock demonstrate discharge gradients.

Single well response tests were conducted on a number of shallow bedrock monitoring wells surrounding the waste mound and immediately downgradient of the waste mound (monitoring wells 99-1, 99-2, 99-4, 99-5, 99-6, 99-7, 99-9) which were subsequently analyzed (**Appendix H-6**) to assess the hydraulic conductivity of the shallow bedrock aquifer. Additionally, a pumping test was conducted from monitoring well 99-5sBR and analyzed. The hydraulic conductivity of this zone was assessed to range from 10^{-5} to 10^{-8} m/s. The area with the greatest hydraulic conductivity was observed in the downgradient area, towards the northwest of the WDS.

The horizontal travel time in the shallow bedrock is interpreted to range from about 10 to 450 m/yr (based on single well response test completed in 1999, **Appendix H-6**). As indicated by the large variation in hydraulic conductivity, the predominant driving force downgradient of the WDS is horizontally within the shallow bedrock. The horizontal gradient decreases as the groundwater flow approaches the river.

5.1.4 DEEP BEDROCK

The deep bedrock aquifer is composed of thickly bedded limestone characterized by apparently disconnected fractures. The deep bedrock groundwater flow direction has been interpreted using the deep bedrock monitoring wells, which demonstrate interconnectivity. Consequently, groundwater flow direction in the deep bedrock is interpreted to be generally towards the west (**Figure 4.3D**).

5.2 GROUNDWATER QUALITY

5.2.1 LEACHATE CHARACTERIZATION

The leachate was characterized by analyzing the groundwater analytical results from groundwater samples collected from monitoring wells 96-3s, 96-3d, 97-4d, and 06-3dBR. It should be noted that monitoring well 06-3dBR is located in the former salt storage area, which likely explains the elevated chloride analytical results from the groundwater sample collected at that location.

Given the complexity of the presence of various contaminant sources (agricultural, saline formation, salt storage, landfill leachate), the analysis of the groundwater analytical data was first undertaken using a Piper plot to group areas and possible contaminant sources. The groundwater analytical data from each monitoring well in 2021 was plotted, and water groups were analyzed, as shown in **Figure 5-1**.

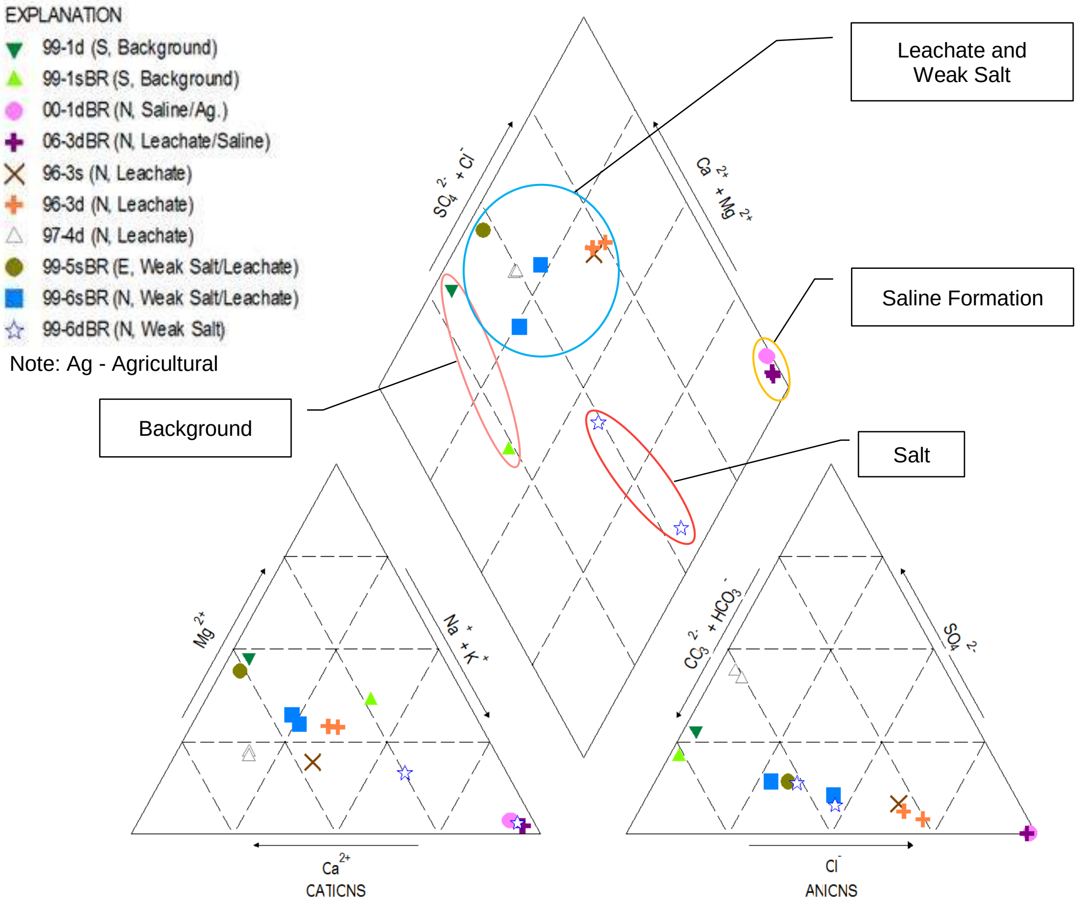

Figure 5-1 - Bedrock and Leachate 2021 Piper Plot

The interpretation of the Piper plot highlights several water groups:

- Background (monitoring wells 99-1d and 99-1sBR)
  - The groundwater samples collected from these wells show dominant bicarbonate (HCO_3), calcium and magnesium signals which are typical of a background and recharge zone. The mixing line evolves toward proportionately higher sodium (Na^+) and Potassium (K^+) toward the deeper aquifer (99-1sBR).
- Leachate/weak salt (monitoring wells 96-3s, 96-3d, 97-4d, 99-6sBR, 99-5sBR (to a lesser extent)
  - It is also diagnostic of the natural water quality mixing from upper to lower aquifer units. This mixing line evolves from bicarbonate toward chloride (anion plot) and the increasing chloride (Cl) and Sulphate (SO_4) ("Leachate and Weak Salt") on the diamond plot. The downgradient wells (99-6sBR) show increasing salt signals relative to leachate. This is shown as "Salt" in the plot.
- Formation Saline (monitoring wells 06-3dBR and 00-1dBR)
  - The strong salt signature is very prominent to the right apex of the anion plot (chloride), the cation plot (sodium and potassium), as well as the upper right section of the diamond plot and is identified as "Formation Saline". These groups of water are suspected of being formation (saline) water and are not attributable to the historical salt storage on the WDS property. There is no evidence of such a large salt signal path to this bedrock depth (20 to 24 m into the bedrock formation).
  - Offset from the saline formation water, a different group of water is the weaker salt and a potassium-signal labelled as "Salt". These waters are apparently diagnostic of the residual salt from the historical salt storage as well as some mixing with agricultural impacts.

The geochemical data for the major ions were also plotted graphically using Schoeller's method to compare and contrast various areas of the WDS (**Figure 5-2** to **Figure 5-3**). **Figure 5-2** shows the contrast of the leachate, salt and agricultural influences from the background (**Figure 5-3**). The inference from the Schoeller diagrams is that the leachate and salt signal are very different in composition from the background signal with the saline signal being most elevated for sodium and chloride. There are distinct influences from both historical salt storage (99-6sBR and 99-5dBR) and saline bedrock (00-1dBR and 06-3dBR) units.

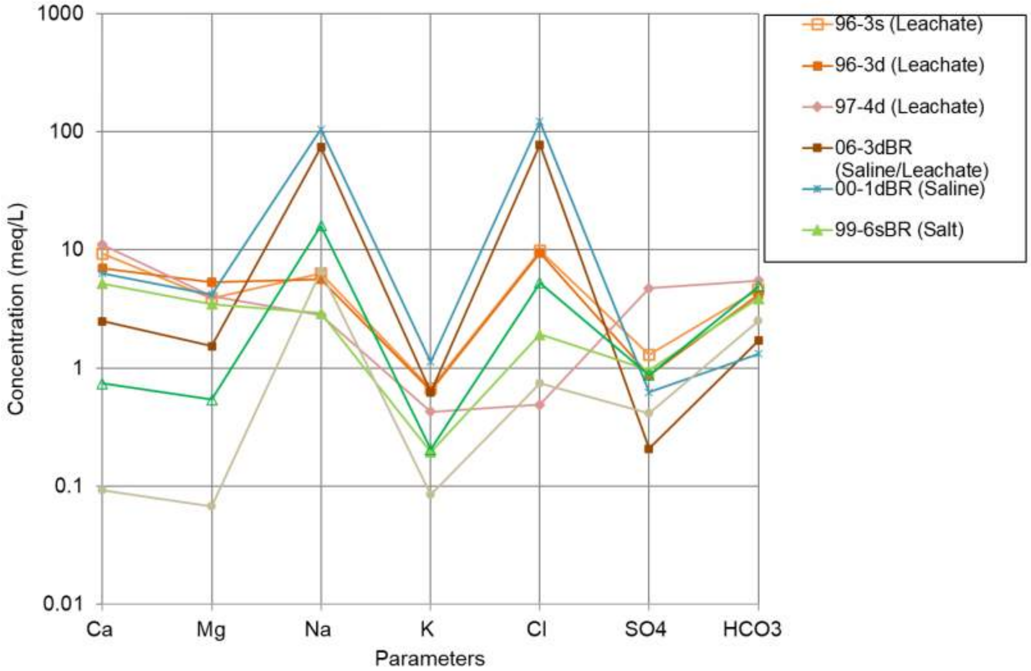

Figure 5-2 - Schoeller Plot Salt and Leachate Impacts May 2021

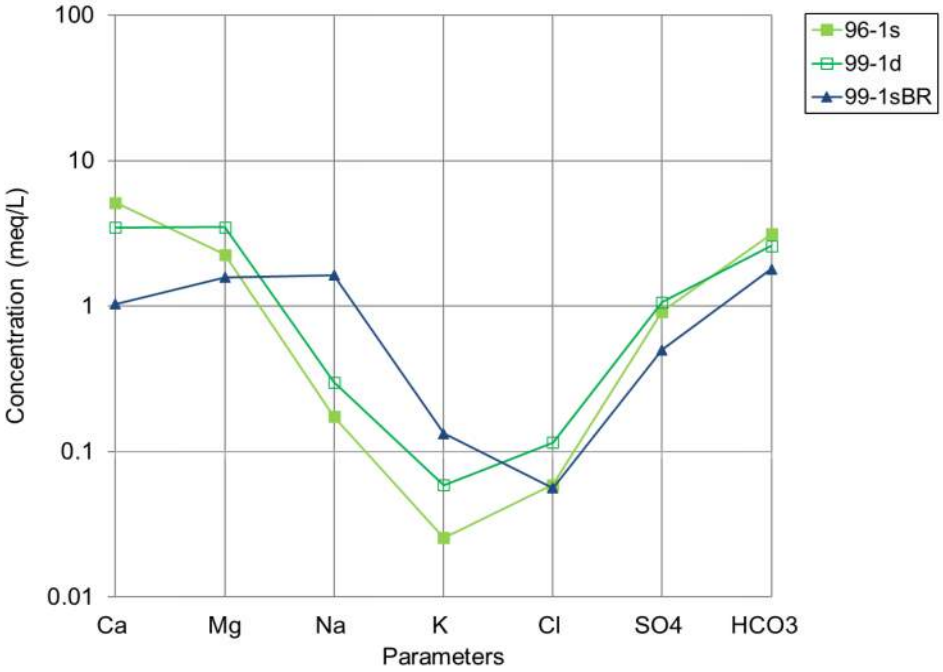

Figure 5-3 - Schoeller Plot Background May 2021

The implication of these two plots is that the site's compliance with the Reasonable Use Policy (Guideline B-7) must occur at the downgradient buffer zone boundary (effectively the Beaudette River), which is further discussed in **Section 5.2.6**. The conceptual groundwater characterization (which was confirmed by previous modelling, WHI 2000) identifies the Beaudette River as a downgradient groundwater discharge boundary for the overburden and shallow bedrock system. The deep bedrock system appears isolated, which is consistent with the presence of saline groundwater.

5.2.1.1 *LEACHATE GEOCHEMISTRY – SHALLOW OVERBURDEN*

The shallow overburden leachate monitoring well, 96-3s, is located immediately downgradient of the waste mound footprint. The depth of the well screen is 1.56 to 2.78 m b.g.s. No sample was collected from this location in the fall of 2021 as the monitor was dry. Groundwater samples collected in the spring monitoring event from that well show concentrations exceeding the ODWS/OG for hardness, chloride, organic nitrogen and TDS. **Figure 5-4** indicates a generally declining trend in conductivity, sodium, chloride and TDS in groundwater at monitoring well 96-3s with some seasonal influences until about October 2018, when dissolved concentrations of the parameters listed above began increasing. The dissolved sodium and chloride concentrations measured in the 2021 monitoring events are higher than historic values. Concentrations of COD, potassium, ammonia and nitrate remain stable with seasonal influences.

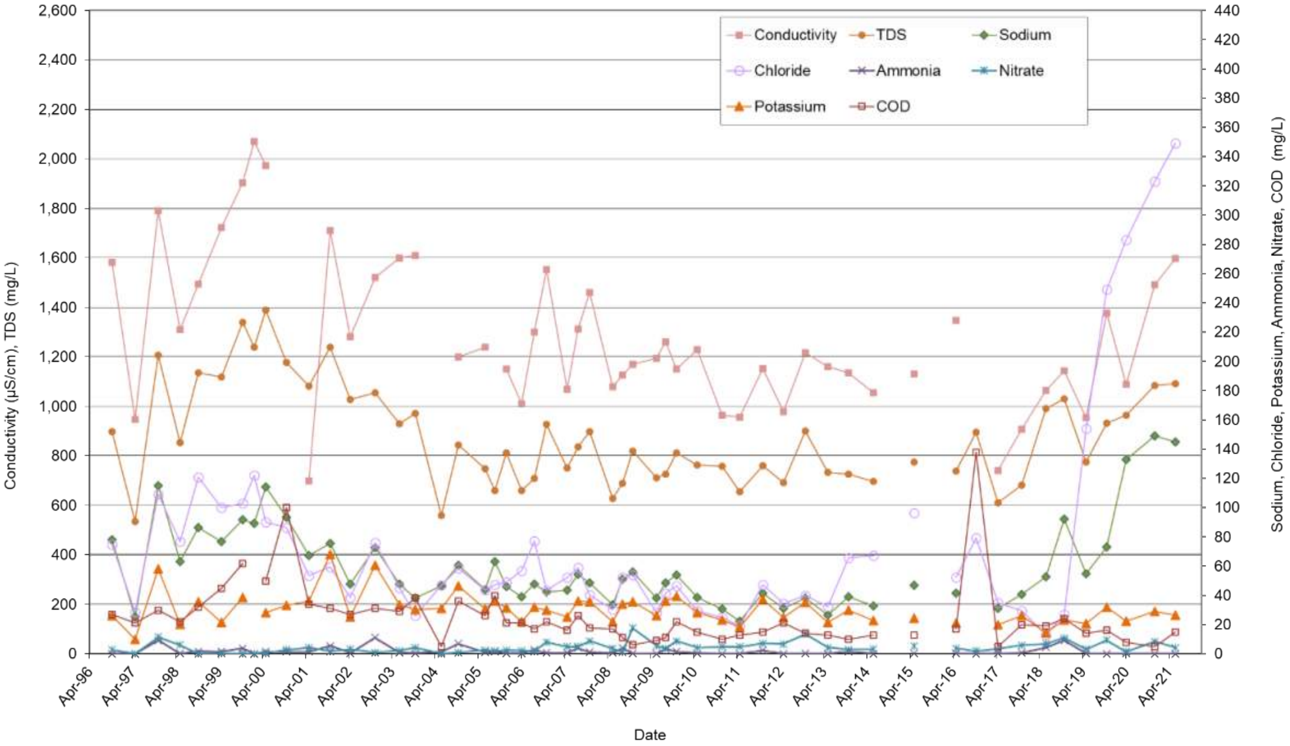

Figure 5-4 - Monitoring Well 96-3s Leachate Quality Trend

5.2.1.2 *LEACHATE GEOCHEMISTRY – DEEP OVERBURDEN*

The deep overburden leachate monitoring well, 96-3d, is located immediately downgradient of the waste mound footprint (**Figure 1.0**) and screened from about 5.94 m to 7.43 m b.g.s. The geochemical signature of the groundwater collected from this location in the deep overburden at monitoring well 97-4d appears to have been impacted by the WDS operations, with this location exhibiting a similar groundwater quality signature to the deep overburden leachate monitor, 96-3d (**Figure 5-5** and **Figure 5-6**). Groundwater samples collected from monitoring wells 96-3d and 97-4d both exhibit concentrations of hardness, manganese, organic nitrogen and TDS above ODWS/OG. Additionally, chloride and iron concentrations are above ODWS/OG at leachate monitoring well 96-3d, and alkalinity and nitrate concentrations are above ODWS/OG at monitoring well 97-4d.

These deep overburden monitoring wells are hydraulically upgradient of the areas where historical salt storage and handling has occurred. This, in conjunction with a similar pattern of water quality trends to other leachate-indicator parameters, suggests that the reported dissolved sodium and chloride concentrations at these locations are likely attributable to the influence of landfill leachate. The elevated concentrations of potassium, boron, TKN and nitrogen content, as well as the location (proximate to the waste mound and downgradient), also indicate that monitoring well 97-4d could also be considered a leachate monitor. The leachate monitoring well (96-3d) and deep overburden cross-gradient monitoring well (97-4d) are interpreted to be influenced by the WDS operations as the TKN concentration is elevated and routinely comprised almost entirely of ammonia (average of 87% and 78%, respectively). The nitrate signal also indicates nitrification of ammonia in the leachate plume.

Figure 5-5 and **Figure 5-6** depict the leachate characteristics at monitoring wells 96-3d and 97-4d and suggest that:

- COD and ammonia groundwater concentrations appear to be stabilizing at monitoring well 96-3d and stable with slight seasonal fluctuations at the location of monitoring well 97-4d;
- Dissolved potassium concentrations appear to be stable at monitoring wells 96-3d and 97-4d;
- Nitrate is at/near non-detectable levels in groundwater samples collected from monitoring well 96-3d and appears stable at monitoring well 97-4d;
- Conductivity, TDS, sodium and chloride concentrations at monitoring well 96-3d depict an increasing trend since 2017; and
- Conductivity, TDS, and sodium concentrations demonstrate an increasing trend since 2020 at the location of monitoring well 97-4d, but remain lower in concentration than historical values. Chloride concentrations at monitoring 97-4d remain less than 40 mg/L.

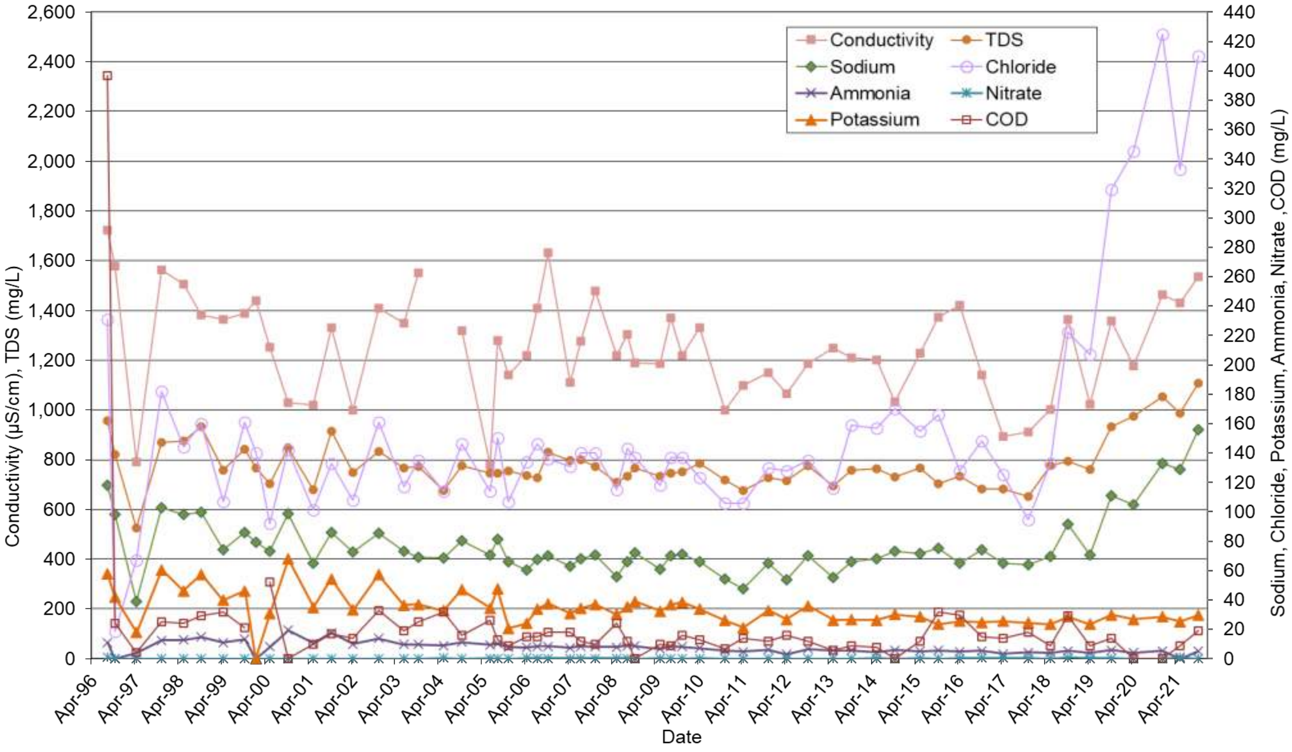

Figure 5-5 - Monitoring Well 96-3d Leachate Quality Trend

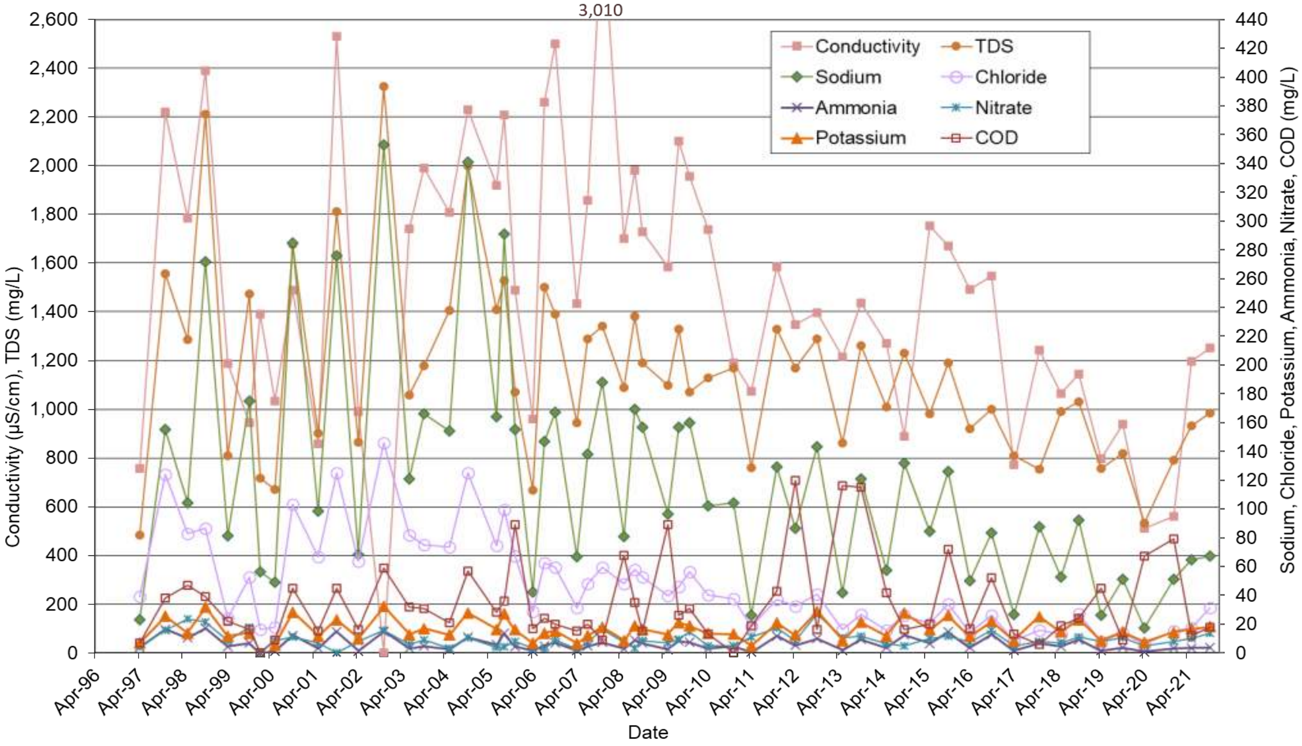

Figure 5-6 - Monitoring Well 97-4d Leachate Quality Trend

5.2.1.3 *LEACHATE GEOCHEMISTRY – DEEP BEDROCK*

The deep bedrock leachate monitoring well, 06-3dBR, is located immediately downgradient of the waste mound footprint (**Figure 1.0**). Groundwater samples from this monitoring well show elevated concentrations of hardness, chloride, sodium, iron, organic nitrogen, and TDS above ODWS/OG. The slightly elevated nitrogen species may be attributed to the waste mound proximity and is consistent with the concentrations observed in the overburden leachate monitoring wells. It is postulated that this monitoring well may reflect significant deeper bedrock connate (formation water) mixing as well.

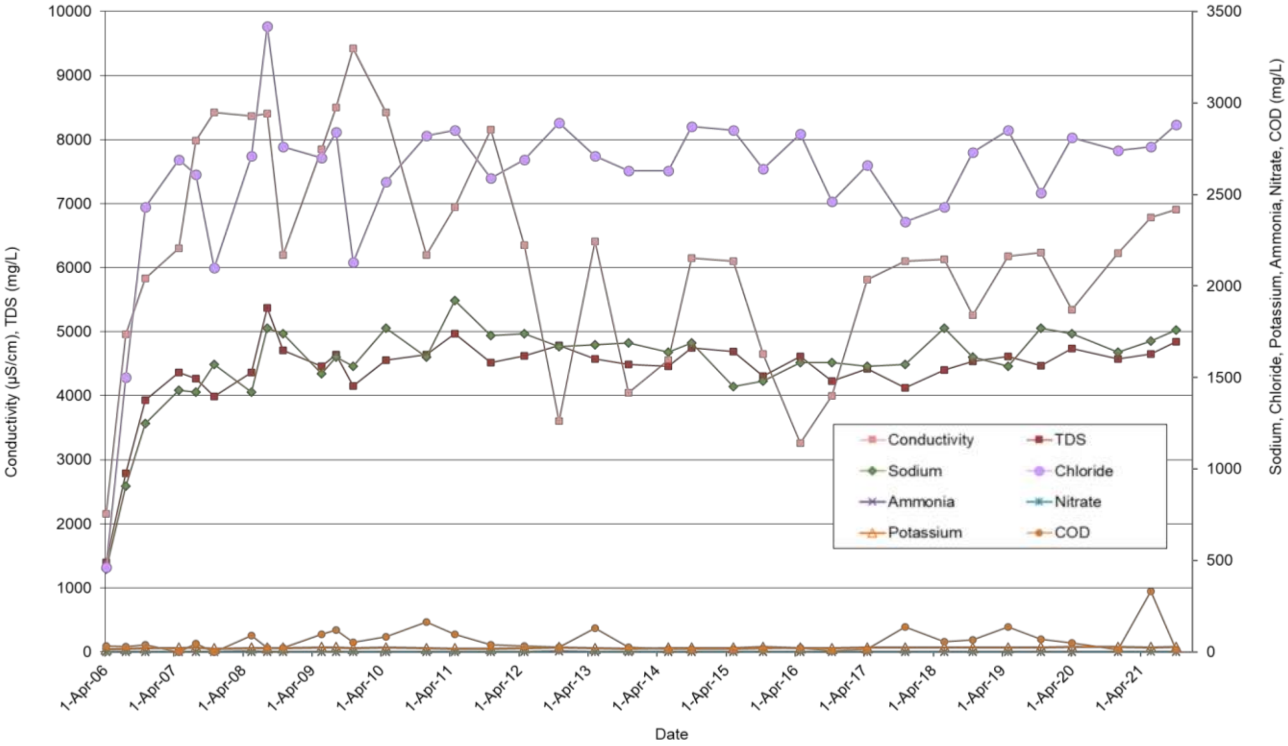

Figure 5-7 - Monitoring Well 06-3dBR Leachate Quality Trend

Dissolved sodium and chloride concentrations at 06-3dBR appear to be disproportionately elevated compared to the other leachate indicators, as shown in **Figure 5-2** and Error! Reference source not found.**,** as well as in **Table 5.4** included in **Appendix D**. The sodium concentration is approximately 12 times higher than the deep overburden concentration while the chloride concentration is approximately 8 times higher than the deep overburden concentration. However, the potassium concentration is not proportionately elevated to the sodium and chloride concentrations but rather is comparable in concentration compared to the deep overburden leachate monitoring well in 2021. This is evidence of salt contributions which may be associated with formation water zone mixing or the former salt storage area.

5.2.2 SHALLOW OVERBURDEN GROUNDWATER QUALITY

The shallow overburden wells comprise of:

- Background monitoring well: 96-1s
- Downgradient monitoring wells: 97-1s, 97-2s
- CAZ monitoring wells: 99-7s, 99-8s, 99-9s, 00-1s, 00-2s, 00-3s, 00-4s, 06-1s, 06-2s

Of the above-listed monitoring wells, the shallow overburden monitoring well 96-1s is located to characterize background groundwater conditions (upgradient from the WDS). Since 1998, dissolved chloride (a conservative tracer of leachate) concentration has not been reported exceeding 5.2 mg/L at monitoring well 96-1s. Other possible leachate indicators (sodium, ammonia, TKN, boron, COD) have been in the lower range of the spectrum, or non-detectable, which is consistent with the adequacy of monitoring well 96-1s as a background monitor.

The shallow overburden groundwater results are compiled in **Table 5.3a** and **Table 5.3b, Appendix D**, and compared to the ODWS/OG. Historically, shallow overburden water quality monitoring has shown concentrations of hardness, iron, manganese, organic nitrogen, sodium, chloride, TDS, and pH exceeding the ODWS/OG. In 2021, exceedances of ODWS/OG occurred for hardness and organic nitrogen at the background, and for hardness, organic nitrogen, iron (monitoring well 99-8s, 99-9s and 00-2s only), manganese (monitoring well 99-

8s and 99-9s only), and TDS (monitoring wells 97-2s, 99-8s and 00-1s only) at the downgradient/cross-gradient monitoring wells.

The groundwater analytical results from monitoring well 97-1s (located along the east side of the waste mound) further demonstrate that the leachate plume from the waste mound first moves north and then west since leachate parameter concentrations (chloride, TKN, and COD) are consistently in the low range at monitoring well 97-1s. The geochemical signature of groundwater quality at monitoring well 97-1s is similar to the shallow overburden background water quality (**Figure 5-8 and Table 5.3b**).

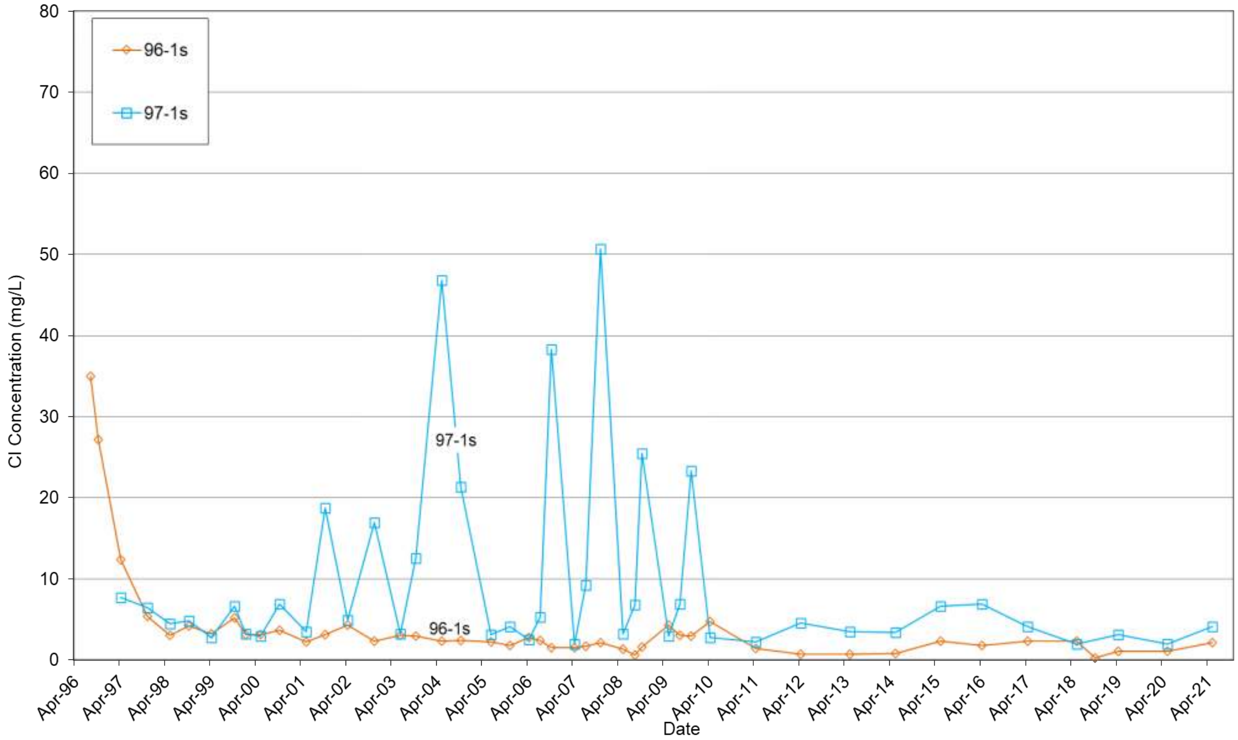

Figure 5-8 - Shallow Overburden Chloride Trends, East

Figure 5-9 illustrates a plot of the measured dissolved chloride concentration versus time at monitoring well locations installed in the shallow overburden to the north and northeast of the waste disposal area. Visual analysis of the chloride concentrations shown in **Figure 5-9** suggests that chloride concentrations at 97-2s, 00-2s and 06-1s are decreasing with time. This provides additional evidence that the elevated dissolved sodium chloride (NaCl) concentrations are associated with historical salt storage rather than from landfill leachate. The WDS continues to receive waste, and leachate influences would be expected to result in increasing, or otherwise stable, dissolved chloride concentrations downgradient of the site.

The sodium and chloride signatures associated with the former salt storage area also contribute to the dissolved salt concentrations observed to the north of the waste disposal area and shown in **Figure 2.1**. Groundwater samples collected from the shallow monitoring well (97-2s), located downgradient of the former salt storage area, show elevated dissolved sodium and chloride concentrations that vary significantly by season (**Figure 5-9**). Evidence of impacts are also apparent at monitoring well location 00-1s depicting similar trends as at monitoring well location 97-2s.

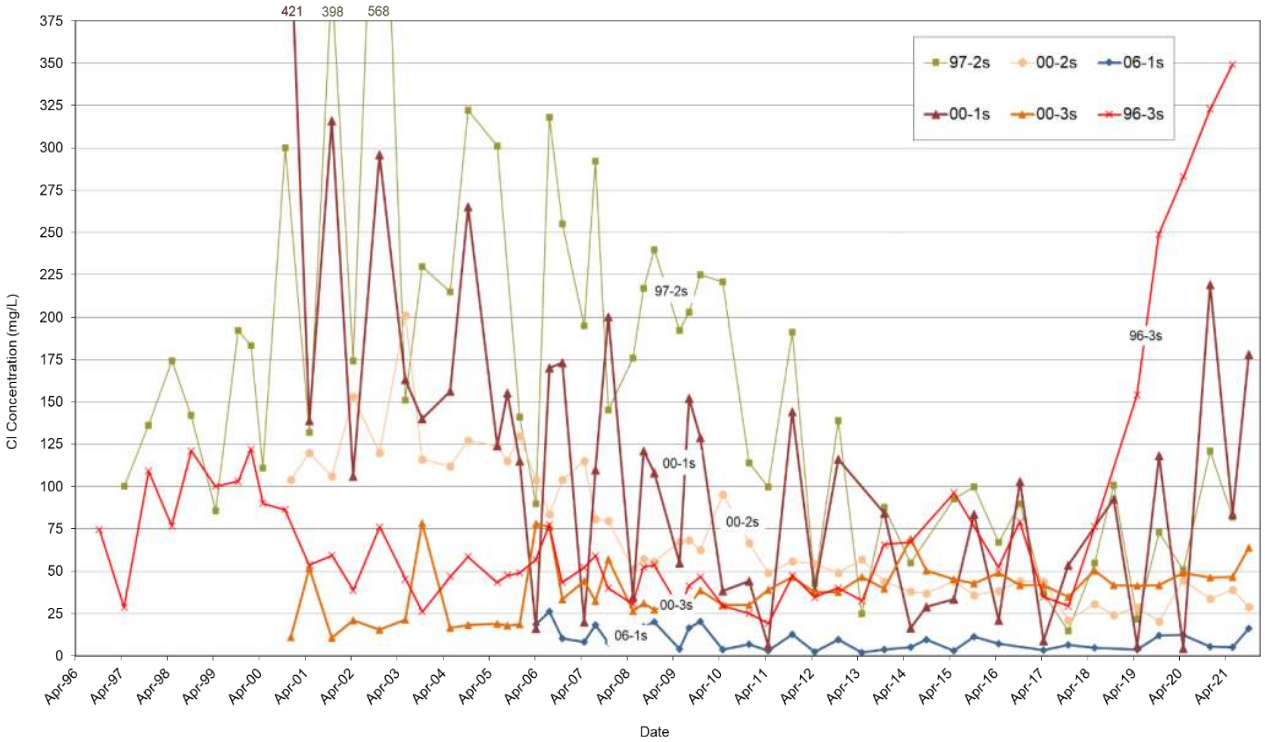

Figure 5-9 - Shallow Overburden Chloride Trends Northeast

Groundwater samples collected from the downgradient monitoring wells located to the northwest (99-7s and 99-8s) indicate a similar geochemical signal to the shallow overburden background groundwater samples collected from monitoring well (96-1s). These groundwater samples show similar concentrations for sulphate, potassium, manganese, ammonia, TKN, nitrite and nitrate concentrations. Groundwater sampled from monitoring well 99-9s located west of the site exhibit the majority of parameters having concentrations similar to, or less than, that of the concentrations of the background location with the exception of TKN and COD. Based on **Figure 5-10**, it appears that the monitoring wells 99-8s and 99-7s are marginally impacted by the upgradient landfilling operations. The chloride concentrations measured from groundwater samples collected at these wells are decreasing with time and are affected by seasonal recharge. Some of this may be biased by active exchange (sodium removal and enrichment).

Based on the estimated average horizontal groundwater velocity and a distance of 180 m to 320 m (average of 250 m), the travel time between the waste disposal area and monitoring wells 99-7s and 99-8s is estimated to be about 25 years (v = 10 m/year {average of 1.5 – 21.5 m/year}).

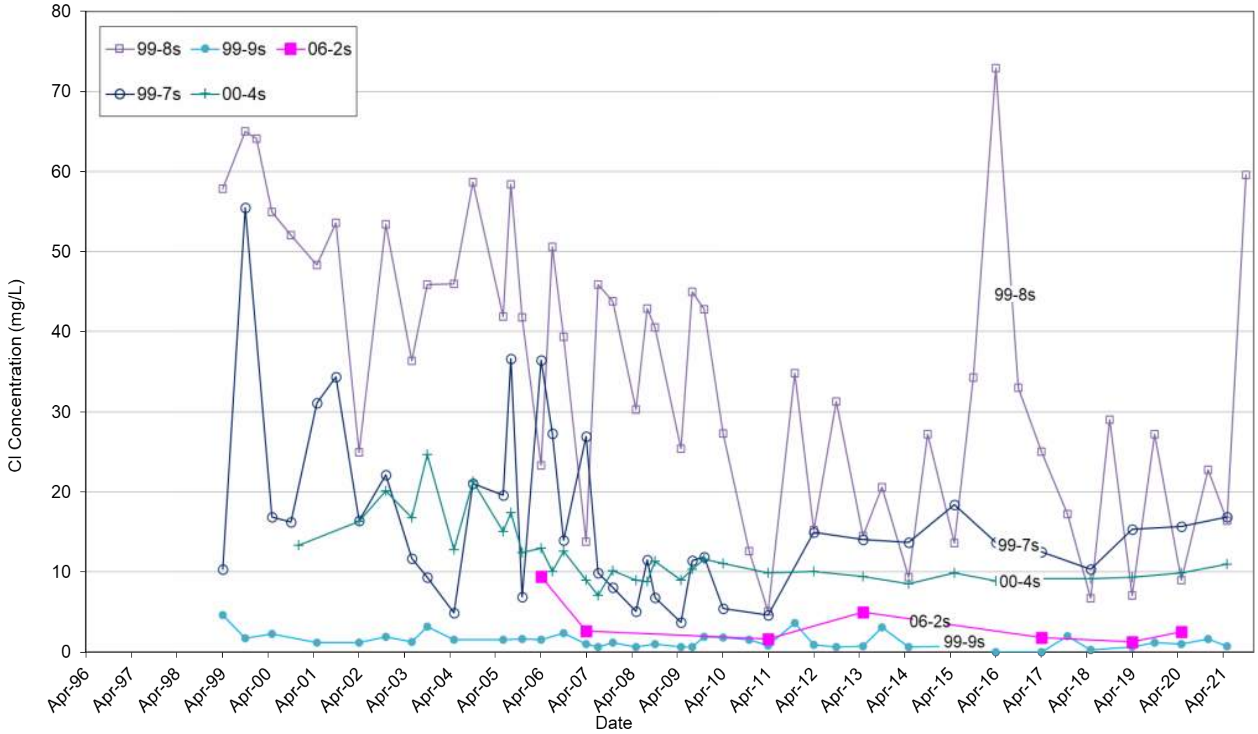

Figure 5-10 - Shallow Overburden Chloride Trends West, Northwest

Most of the measured concentrations of analytes in the groundwater of the shallow overburden CAZ wells are generally similar to the concentrations of the same analytes measured from groundwater samples collected from the background wells, with the exception of the sodium and chloride concentration measured in groundwater from monitoring wells 99-7s, 99-8s, 00-1s, 00-2s and 00-3s which are slightly elevated compared to background concentrations. The CAZ groundwater geochemistry does not appear to be impacted by the upgradient operations as none of the leachate parameters (TKN, COD, total ammonia) appear to be elevated compared to background levels. Although dissolved chloride and sodium concentrations are elevated at some monitoring well locations, the geochemical signature of the CAZ groundwater in the shallow overburden follows that of the background shallow overburden well.

It should also be noted that the sodium to chloride mass ratios calculated from groundwater analytical of samples collected at monitoring wells 00-1s, 00-3s and 00-4s are typically less than 1 (chloride enriched), whereas monitoring wells 00-2s and 06-1s indicate ratios of close to 1 or greater in 2021 (except for the fall event at 06-1s). Monitoring well 06-2s (NW of the landfilling area and furthest from the anticipated plume pathway) has been intermittently sampled since April 2006 due to dry conditions or inadequate water volume within the well. Dissolved sodium to chloride (Na:Cl) ratios in groundwater samples collected from this monitoring well have remained greater than 1 (sodium enriched). Dissolved sodium to chloride (Na:Cl) ratios in groundwater samples collected from monitoring well 97-2s fluctuate; however, are typically slightly elevated (close to or above 1) and are thought to be associated with the historical salt storage. The magnitude of dissolved chloride concentration variation at monitoring well 97-2s is likely associated with recharge (i.e. seasonal). Given the monitoring wells' proximity to the former salt storage area, the chloride concentration is likely indicative of the salt still bound in the soil, which leaches seasonally with recharge flux.

The dissolved salt components (sodium and chloride) measured in groundwater samples collected from monitoring wells cannot be attributed to any single direct surface activity at these locations. These elevated concentrations are likely remnants of the WDS activities as well as historical salt storage and/or agricultural contributions.

Figure 5.0A depicts the spring 2021 chloride concentration for the groundwater in the shallow overburden system, with peak measured concentrations in downgradient monitoring well 96-3s. The dissolved chloride concentrations in groundwater appear to have a northeast trajectory towards the Beaudette River.

5.2.3 DEEP OVERBURDEN GROUNDWATER QUALITY

The deep overburden monitoring wells comprise of:

- Background monitoring well: 99-1d,
- Downgradient monitoring wells: 97-3d, and
- CAZ monitoring wells: 96-2d, 06-1d, 06-2d, 06-4d.

The deep overburden monitoring well 99-1d is appropriately located to characterize background (upgradient from the waste mound) conditions. Since 2000, the chloride concentration has not exceeded 5 mg/L at this location. The higher chloride values prior to 2000 are associated with inadequate development shortly after well installation. Iron has shown three (3) ODWS/OG exceedances (one in March 2020) since 1999, with all other levels being near or below detection levels. This confirms that monitoring well 99-1d is an appropriate background monitor.

The deep overburden groundwater results are compiled and compared to the ODWS/OG in **Table 5.3a** and **Table 5.3c,** included in **Appendix D**. Groundwater quality monitoring historically has shown concentrations of hardness, alkalinity, iron, manganese, organic nitrogen, TDS, and pH exceeding the ODWS/OG, while sulphate, sodium, chloride, and nitrate have also exceeded the ODWS/OG in the leachate wells 96-3d and 97-4d. In 2021, the deep overburden monitoring wells exhibited ODWS/OG exceedances for hardness, organic nitrogen, alkalinity (96-2d only), iron (96-2d, 97-3d, 06-1d), manganese (96-2d and 97-3d), and TDS (96-2d), and for hardness, manganese, organic nitrogen and TDS in the deep overburden leachate monitoring wells as well as alkalinity and nitrate at 97-4d and iron and chloride at leachate monitoring well 96-3d.

Most of the geochemical parameter concentrations for the CAZ monitoring wells are similar to the background geochemistry. Predominantly, the CAZ geochemistry in the deep overburden does not appear to be impacted by the upgradient WDS operations as none of the leachate parameters (sodium, chloride, ammonia, TKN and COD) appear to be regularly elevated above background levels.

The geochemical interpretation of the deep overburden groundwater chemistry data is consistent with the groundwater flow interpretation. In a downgradient direction (northwest), WDS leachate impacts are evident with the highest chloride concentrations at leachate monitoring well 96-3d, which has demonstrated an increasing trend since 2017 (**Figure 5-11**). The chemistry at monitoring well 97-4d and, to a lesser extent, at monitoring well 06-4d depict a seasonally variable yet diminishing chloride trend (**Figure 5-11**). Also indicated in **Figure 5-11** is the decreasing trend in concentration with downgradient distance from the WDS (monitoring well 96-3d) to the downgradient periphery, monitoring wells 06-1d and 06-2d. As previously indicated in **Section 5.2.1.2**, the sample results from leachate monitoring well 96-3d show that the chloride concentrations have been steadily increasing since 2017. It is noted that chloride concentrations at monitoring well 96-2d, located downgradient to the northwest, increased from 2014 until 2016, returned to historical concentrations in 2017 and increased again in the fall 2018, 2019 and 2021 monitoring events. This may be indicative of a leachate influence as sodium, ammonia, and TKN concentrations have also increased during these time periods.

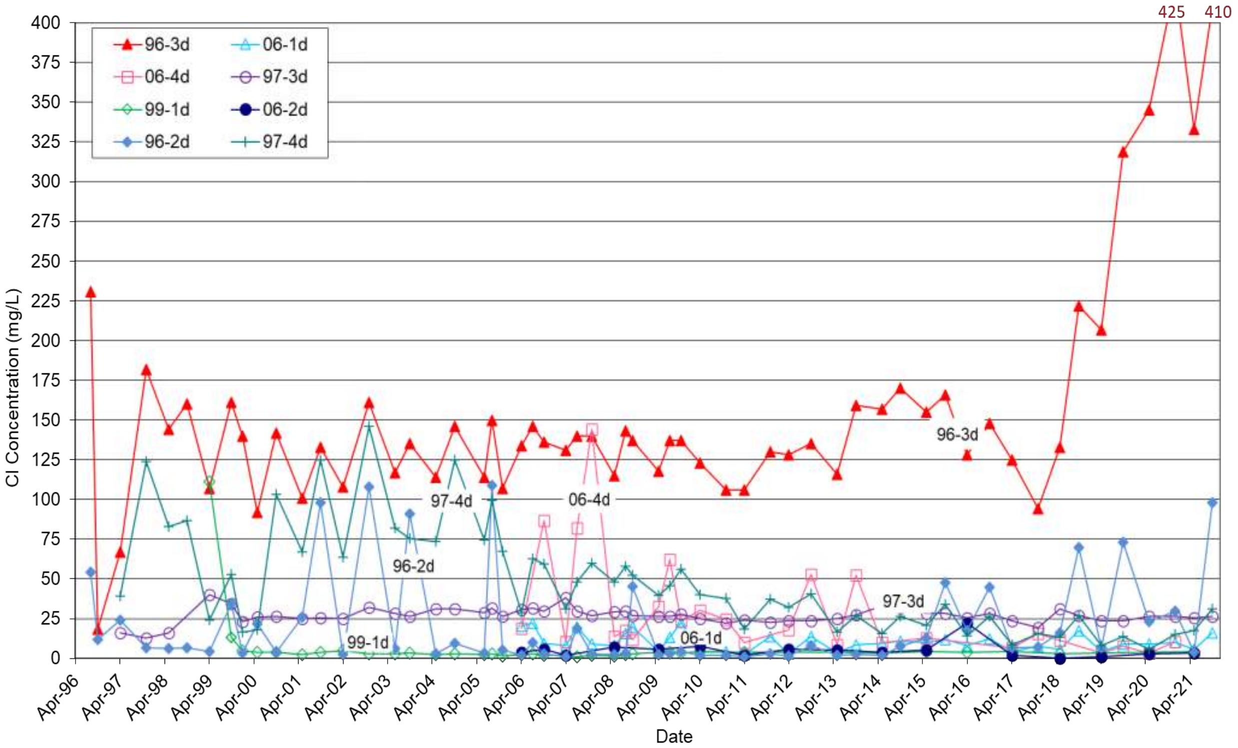

Figure 5-11 - Deep Overburden Chloride Trends

Figure 5.0A presents the spatial distribution of the chloride concentrations for spring 2021 (deep overburden) data set. The chloride peak at the leachate monitoring well (96-3d) further supports the observation that monitoring well 97-4d represents a predominate leachate signal un-impacted by the salt storage. Additionally, this location, 97-4d, is located downgradient of the landfill and is not downgradient of the former salt storage area. The chloride concentration appears to dissipate radially from its peak at monitoring well 96-3d without any major downgradient signal (i.e. monitoring wells 06-2d and 06-1d do not exhibit any considerable chloride signal in the deep overburden). This provides evidence that chloride moves into the deep overburden and shallow bedrock system as it progresses downgradient towards the north and northeast.

5.2.4 SHALLOW BEDROCK GROUNDWATER QUALITY

The shallow bedrock wells comprise of:

- background monitoring well: 99-1sBR,
- downgradient monitoring wells: west 99-3sBR, 99-4sBR; north 99-6sBR; east 99-5sBR,
- CAZ monitoring wells: northeast 00-2sBR; north 99-2sBR; northwest 99-7sBR, 99-8sBR, 00-4sBR, 00-5sBR, west 99-9sBR.

The shallow bedrock monitoring well 99-1sBR is located adjacent to the overburden background monitoring wells (96-1s and 99-1d) (**Figure 1.0**). Since October 1999, chloride has not been reported exceeding 8.0 mg/L, with hardness, pH, iron and organic nitrogen being the only parameters that have ever exceeded ODWS/OG at that location. With the exception of hardness, these exceedances are infrequent. As such, this location and the water-bearing zone is representative of the shallowest depth of the potential potable water supply. It should be noted that the drinking water supply wells in the vicinity of the WDS are reported to be developed into the deeper bedrock aquifer(s).

The shallow bedrock groundwater results are compiled and compared to the ODWS/OG in **Tables 5.3a** and **5.3d included in Appendix D**. With respect to the ODWS/OG, historical exceedances have been observed for hardness, alkalinity, pH, chloride, sodium, barium, iron, manganese, TDS and organic nitrogen in the groundwater from the shallow bedrock. Exceedances of chloride and sodium have historically been observed in downgradient monitoring wells (monitoring wells 99-6sBR and 99-4sBR) in close proximity to the landfilling and historical salt storage areas. In 2021, hardness, iron (monitoring wells 99-2sBR, 99-3sBR, 99-6sBR, 99-7sBR, 99-8sBR and 99-9sBR), manganese (monitoring wells 99-2sBR, 99-3sBR, 99-6sBR, 99-7sBR, and 99-8sBR), organic nitrogen (except for monitoring wells 99-5sBR, 99-6sBR and 00-4sBR), and TDS (monitoring wells 99-2sBR, 99-3sBR, 99-4SBR, 99-6sBR, 99-8sBR and 00-2sBR) exceedances were observed in the shallow bedrock.

The geochemical signal directly north of the waste mound, at monitoring well 99-6sBR, appears to be impacted predominantly by the historical salt storage activities, though there is evidence of some WDS influence. As with monitoring well 97-2s in the shallow overburden, monitoring well 99-6sBR in the shallow bedrock also shows evidence of fluctuating sodium and chloride that varies by event. **Figure 5-12** demonstrates the seasonal chloride fluctuations, with overall decreasing concentrations at monitoring well 99-6sBR.

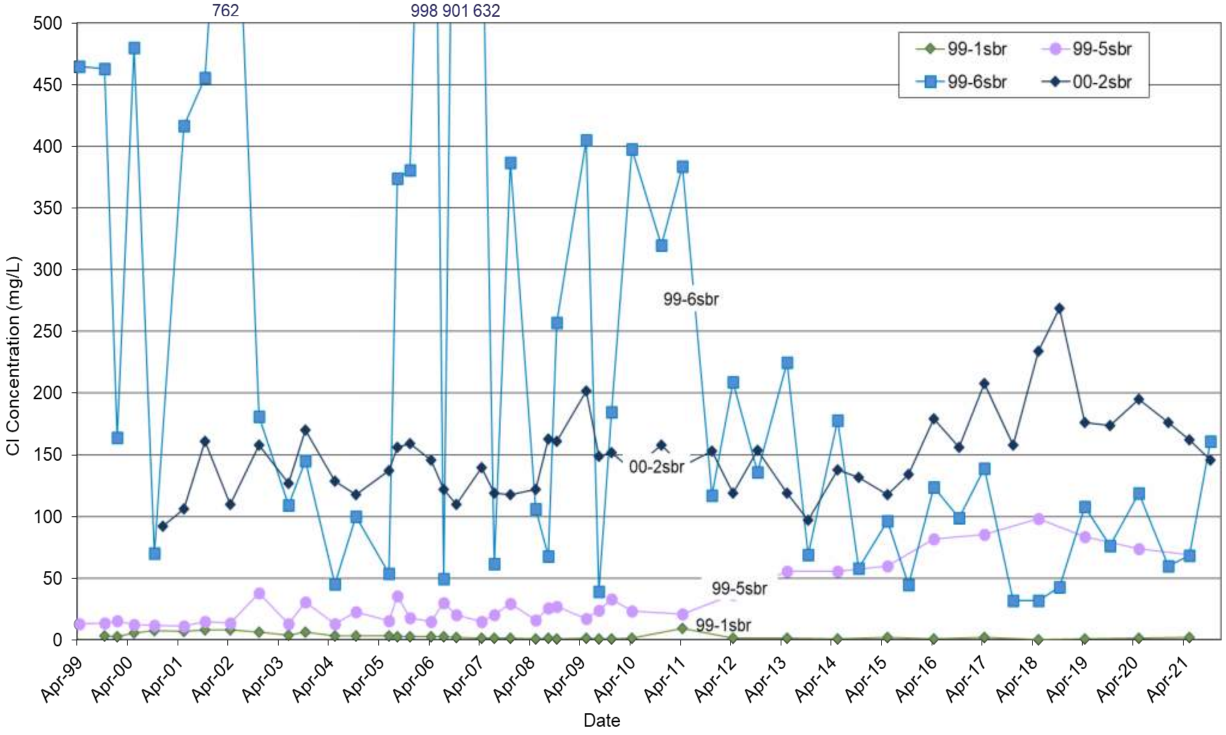

Figure 5-12 - Shallow Bedrock Chloride Trends East/Northeast

Although the iron and manganese concentrations are typically elevated in the downgradient shallow bedrock monitoring well (99-6sBR), the COD concentrations are similar to background concentrations. The observation is that north of the WDS, the predominant signal is chloride, which is disproportionately elevated compared to the other leachate indicators, whereas, hydrogeologically downgradient there is a more proportional geochemical balance (from mixing and attenuation) which is consistent with the inferred flow and transport directions. It is therefore unlikely that the sodium and chloride concentrations observed at 99-6sBR are solely derived from leachate migration but are more likely associated with substantial contributions from the historical salt storage activities.

The geochemical signal directly east of the waste mound at monitoring well 99-5sBR appears to be only minimally impacted by the WDS or salt storage operations as this is located on the flank of the plume though concentrations of chloride have increased marginally since 2011. The interpreted piezometric elevation contours (**Figure 4.3C**) indicate that monitoring well 99-5sBR is likely cross-gradient of the landfilling area in the shallow bedrock. Concentrations of other leachate indicators (sodium, TKN, ammonia, boron, COD) do not show an increasing trend and are either less than or equal to that of the background monitor, which suggests that the chloride increase may be related to the historical salt storage.

There is geochemical variability in the area proximate to the Beaudette River. Monitoring well 00-2sBR, adjacent to the river, exhibit elevated alkalinity, conductivity, magnesium, sodium, chloride, organic nitrogen, barium, manganese, COD and TDS concentrations but with all other parameters similar to background concentrations. These, however, could also be as a result of contributions from local agricultural activities.

Chloride concentrations, as observed in **Figure 5-12** and **Figure 5-13,** remain low and relatively stable at monitoring wells 99-1sBR and 00-5sBR, which lie outside of the anticipated contaminant plume. Low and stabilizing trends are also noted at monitoring wells 00-4sBR, 99-7sBR and 99-8sBR (since 2018). Chloride concentrations at monitoring wells 99-5sBR and 99-9sBR also remain low but have increased marginally since 2011 and 2014, respectively. Chloride at monitoring well 99-3sBR demonstrate an overall slight increasing trend; however, since June 2005 has remained between 50 and 113 mg/L. Stabilizing trends are noted at monitoring well 99-4sBR since April 2016 at about 113 mg/L. The concentrations at monitoring wells 99-3sBR and 99-4sBR may be related to WDS effects. Monitoring well 00-2sBR has demonstrated an increasing trend since fall 2015. Monitoring wells 99-2sBR had been depicting a decreasing trend until October 2018, when an increasing trend emerged. Monitoring well 99-6sBR demonstrates decreasing trends in chloride and has remained between 32 mg/L and 160 mg/L since October 2014. All shallow bedrock monitoring wells, with the exception of monitoring well 00-2sBR, which depicted a chloride ODWS/OG exceedance in October 2018, have remained below ODWS/OG limits for chloride since fall 2011.

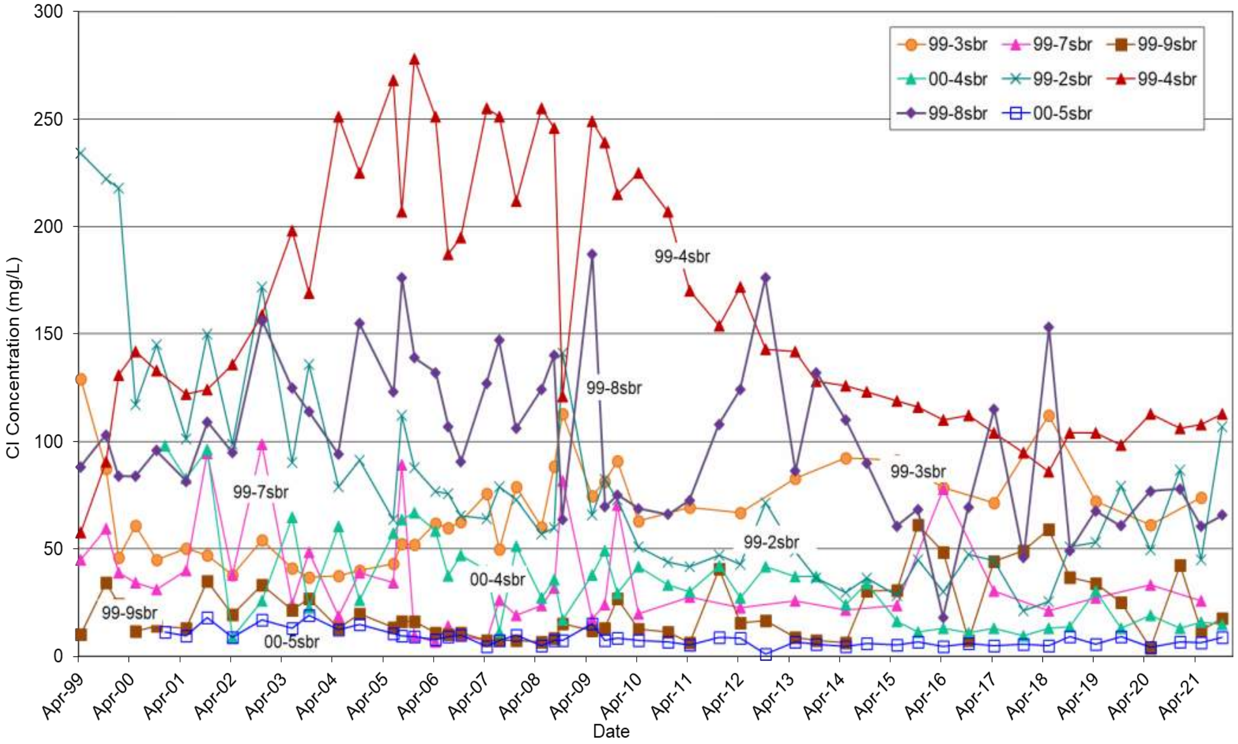

Figure 5-13 - Shallow Bedrock Chloride Trends West/Northwest

The chloride isopleth (**Figure 5.0A**) indicates peak concentrations surrounding monitoring well 99-4sBR (108 mg/L) adjacent to the waste mound and monitoring well 00-2sBR (162 mg/L) adjacent to the Beaudette River. The isopleths suggest a low-level chloride influence from the WDS to the northwest, while to the north, as groundwater migrates deeper, it picks up the former salt storage chloride signal and travels north to northeast. As this plume moves further north, the chloride concentration decreases downgradient of the former salt storage area toward the Beaudette River; however, chloride concentrations are higher to the northeast by the Beaudette River at monitoring well 00-2sBr (162 mg/L). This is further evidence that there is another distinct chloride source adjacent to the Beaudette River near monitoring well 00-2sBR.

Contrasting the pattern of exceedances observed at the other shallow bedrock monitoring wells (hardness, iron, manganese, organic nitrogen, and TDS) is the data from monitoring well 99-5sBR with exceedances for hardness in 2021. Monitoring well 99-5sBR is located along the east side of the WDS, which is consistent with the interpretation that the leachate plume movement in the shallow bedrock is generally northwesterly, as there have not been any obvious WDS source impacts observed at this location. These results support the physical hydrogeological findings that groundwater flow proximate to the site travels northwest and that WDS leachate impacts occur northwest of the waste mound, whereas the salt storage impacts are observed to the north/northeast since this latter source originated north of the landfilling area.

The geochemical interpretation of the shallow bedrock chemistry data is consistent with the interpreted groundwater flow interpretation. The leachate plume appears to preferentially flow down into the shallow bedrock system northwest of the WDS, which then flows north and northeast to the river; however, based on the geochemical data downgradient of the WDS, there would appear to be three sources of groundwater contamination impacts:

- Leachate pattern concentration which dissipates northwest of the WDS.
- Historical salt storage, which confuses the downgradient interpretation, but appears to have travelled directly north/west of the storage location, as highlighted by the geophysical survey as well.
- Agricultural fertilizer applications, which provide a source/signal of nitrogen (nitrate and ammonia) and potassium (K).

5.2.5 DEEP BEDROCK GROUNDWATER QUALITY

The deep bedrock wells comprise of:

- downgradient monitoring wells:
    - west 99-4dBR
    - north 99-6dBR
- CAZ monitoring wells:
    - northeast 00-1dBR
    - northwest 00-5dBR, 99-7dBR

The deep bedrock groundwater results are compiled and compared to the ODWS/OG in **Table 5.3e,** included in **Appendix D**. Groundwater quality monitoring historically has shown concentrations of hardness, alkalinity, pH, chloride, sulphate, sodium, iron, manganese, organic nitrogen, barium, nitrate, nitrate and TDS exceeding the ODWS/OG. In 2021, hardness, pH (monitoring wells 99-6dBR, 00-5dBR), iron (monitoring wells 99-6dBR, 00-1dBR,99-7dBR), manganese (monitoring wells 99-7dBR, 00-1dBR), organic nitrogen (monitoring well 99-4dBR, 99-7dBR), TDS (except for monitoring wells 00-5dB), sodium monitoring wells 99-6dBR, 00-1dBR) and chloride (monitoring wells 00-1dBR) were the most notable exceedances in the deep bedrock.

The April 2021 data was used to develop bedrock chloride isopleth figure (**Figure 5.0B**). **Figure 5.0B** highlights the significant increase in dissolved chloride concentration downgradient of the WDS associated with contact with the historical salt storage area.

Groundwater analytical results from monitoring well 99-4dBR indicate that there is little sodium or chloride impact on the deep bedrock aquifer adjacent to the western flank of the waste mound. As previously discussed, this location may be considered representative of leachate before any significant dilution has taken place and without any apparent influence from other site activities. The contaminant plume emanating from the WDS appears to be attenuated with distance and depth in the downgradient direction from the WDS.

As noted in the physical hydrogeological interpretation (**Section 2.2.3**), the deep bedrock units do not appear to be well-connected to the upper geological units. The most obvious geochemical concentrations in the deep bedrock system are the sodium and chloride concentrations. The chloride trend for the deep bedrock monitoring wells has been plotted in **Figure 5-14**.

Review of **Figure 5-14** demonstrates that chloride concentrations at monitoring well 00-5dBR increased marginally from 9 mg/L in 2003 to a peak at 41.3 mg/L in 2015; however, the chloride concentrations decreased in 2016 and have remained between 18.9 mg/L and 39.4 mg/L since. Monitoring well 99-4dBR depicts an overall decreasing trend since 2012, from a peak of 139 mg/L to 43.9 mg/L in 2021. Additionally, monitoring well 99-6dBR continues to depict a decreasing trend since 2008 (peak value of 647 mg/L) with concentrations of 187 and 104 mg/L in May and October 2021, respectively. Since January 2000, monitoring well 99-7dbr has fluctuated between 16.8 mg/L and 139 mg/L. The remaining monitoring wells demonstrate stable but elevated trends (monitoring wells 00-1dBR, 06-3dBR). These wells may be influenced by the former road salt storage or saline formation water.

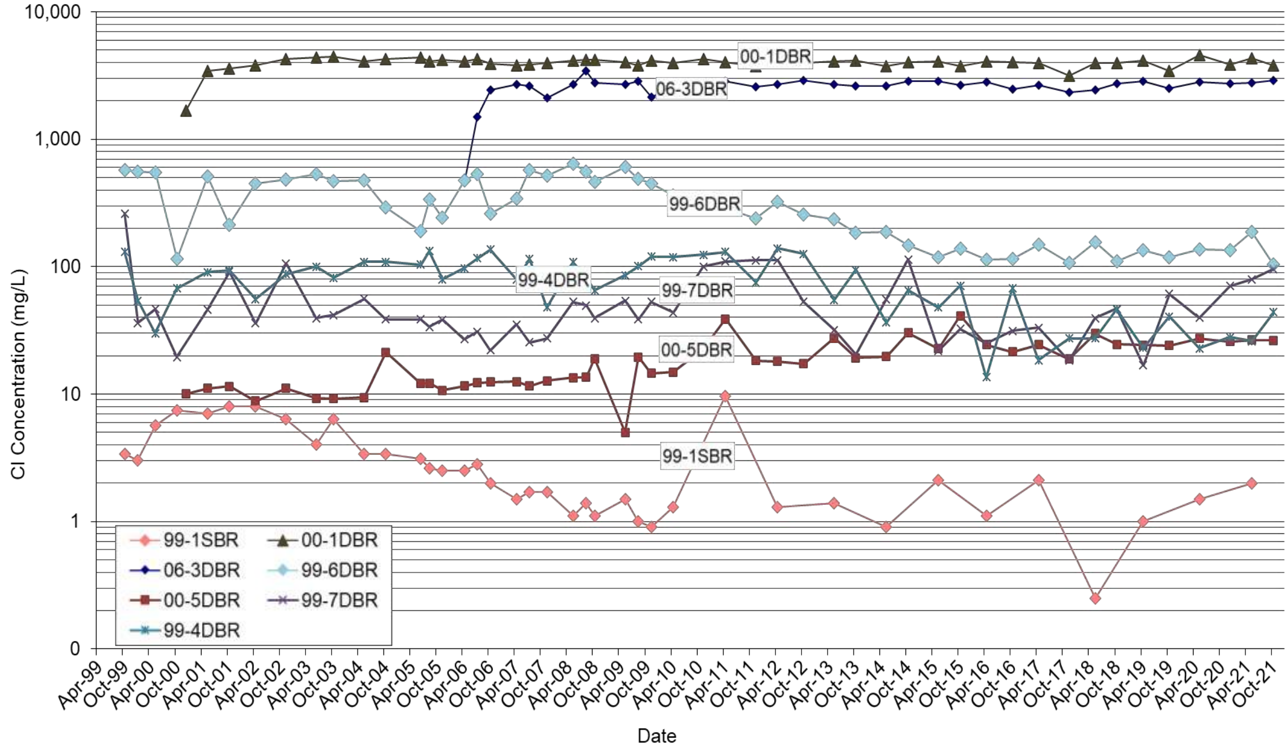

Figure 5-14 - Deep Bedrock Chloride Trends

5.2.5.1 *HISTORICAL SALT STORAGE*

Information from former Township staff indicated that road salt was stored on the northern part of the site's approved footprint (**Figure 1.0**). The exact extent and footprint are not known, although results of a geophysical survey showed its general vicinity and (near-surface – about 6 m depth below grade) groundwater flow direction of impact (**Appendix H-2**). The salt was stored as part of the Township's road salting operations. The amount and duration of the storage are not known, and it is not known if the stockpiled salt was mixed or blended with other components. No other waste deposition has been reported to have occurred in this area.

As noted in **Table 5.3e** (**Appendix D**), the monitoring wells which are downgradient of the former salt storage area show (in relation to the upgradient leachate monitoring wells) a chloride and proportional sodium signal (based on mass). This signal is shown in **Figure 5-2** in **Section 5.2.1** and appears distinct from leachate and background characteristics shown in **Figure 5-2 and Figure 5-3**.

Figure 5.0B illustrates the interpreted chloride concentration contours of the deep bedrock aquifer. The data suggest that there is a chloride contribution to the deep bedrock from shallower bedrock and overburden units associated with landfilling and/or historical salt storage. The location of the peak chloride concentrations, particularly in the shallow bedrock, suggests that the deep bedrock chloride plume shown in **Figure 5.0B**, which is evident at monitoring wells 06-3dBR and 00-1dBR, is more likely attributed to historical salt storage activities rather than WDS leachate. The chloride concentrations at monitoring well 00-1dBR are higher than those observed at the waste mound and salt storage areas (monitoring wells 06-3dBR and 99-6dBR) and are likely associated with influences from deep saline formation waters (**Figure 5.0B**), particularly since chloride concentrations at these monitoring wells has not exceeded 3,500 mg/L and 650 mg/L, respectively since these monitoring wells were installed.

5.2.6 REASONABLE USE POLICY (B-7)

MECP Reasonable Use Policy (RUP) Guideline B-7 analysis was used to evaluate the acceptable concentration of contaminant(s) at the site boundary given that the reasonable use of the groundwater is potentially used to recharge deeper aquifers for drinking water supply, thus the comparison with the ODWS/OG. From a regulatory perspective, there are three (3) known sources of groundwater contamination that need to be considered:

- WDS leachate
- Historical salt storage area (north of waste mound footprint - **Figure 1.0**)
- Agricultural operations which have a characteristic groundwater signature.

Additionally, saline water associated with formation water is noted in the isolated deep bedrock system.

The maximum allowable concentration at the site boundary is determined by the “Reasonable Use” Criteria. The method involves determining the acceptable concentrations for various parameters based upon their respective background (un-impacted) concentrations according to the following formula:

Cm = Cb + x(Cr – Cb)

where Cm = maximum allowable concentration;

Cb = background concentration;

x = 0.5 for non-health related parameters or 0.25 for health-related parameters;

Cr = the ODWS/OG criteria

The RUP limit was calculated for each event (spring and fall) in 2021. The median values of all historic sampling events at the background monitoring wells (96-1, 99-1d, and 99-1sBR) were used to determine the RUP assessment limits for the respective groundwater zones for the leachate-influenced plume. The observed results at the boundary monitoring wells for each event were then compared to the Maximum Allowable Concentrations (Cm) for the shallow and deep overburden, as well as shallow bedrock monitoring wells at each location.

The parameters chosen for the analysis include those parameters which have ODWS/OG prescribed limits: iron, manganese, chloride, sodium, TDS, organic nitrogen and nitrate. The site RUP assessment is shown in **Table 5.1,** and the results are also compared to Groundwater Resolution Policy (B-9) trigger, as shown in **Table 5.2**.

Table 5.1 highlights the Policy B-7 exceedances in the overburden and bedrock boundary monitoring wells. Iron exceedances were noted at monitoring wells 99-7s, 99-7sBR, 99-7dBR (fall only), 99-9s and 99-9sBR (fall only). The limit for manganese was exceeded at the locations of monitoring wells 99-7sBR, 99-7dBR and 99-9s. Sodium exceeded RUP B7 in the fall at monitoring well 99-7dBR, and total dissolved solids (TDS) RUP limit was exceeded at monitoring well 99-7dBR. Organic nitrogen exceedances occurred during each monitoring event at each location except for monitoring wells 00-4s in the spring and 99-7dBR in the fall. Nitrate exceeded RUP B-7 limits in the fall at monitoring wells 06-1s and 06-1d.

Although exceedances of RUP limit are evident at the location of monitoring wells 99-7dBR and 99-7sBR, leachate indicator parameters have depicted a minimal change in concentration. Total ammonia has remained near to, or less than, background concentrations at both locations. At monitoring well 99-7sBR, sodium is stable and less than the background, COD is typically between 5 mg/L and 40 mg/L, and TDS has remained between 398 mg/L and 487 mg/L since 2013. Spikes in concentrations of COD and TKN were noted in April 2019, but these returned to historic levels in 2020 and are currently comparable to background concentrations. At monitoring well 99-7dBR, COD has remained less than 33 mg/L and is typically less than 20 mg/L, concentrations of TKN remain similar to background concentrations, and sodium concentrations continue to fluctuate and was 99.9 mg/L in May and 165 mg/L in October 2021. Chloride concentrations have depicted a slight increase at monitoring well 99-7dBR since 2017 but have remained between 16.8 mg/L and 139 mg/L since 2000. It is postulated that this may be influenced by activities occurring to the west and north of these monitoring wells (clearing of trees, increased farming activities). Further monitoring will confirm these trends.

Table 5.1: Guideline B-7 Reasonable Use Policy Assessment

May 2021 Data

	Background Concentrations			ODWS/ OG	RUP B-7 Allowable Concentrations			Reported Concentrations										
								Northwest					West		North	Northeast		East
Parameter	96-1s	99-1d	99-1sBR		Shallow Overburden	Deep Overburden	Bedrock	06-2s	06-2d	99-7s	99-7sBR	99-7dBR	99-9s	99-9sBR	00-4s	06-1s	06-1d	06-4d
Iron	0.020	0.011	0.029	0.30	0.160	0.156	0.165	Not Sampled	0.054	0.166 ▨	1.02 ▨	0.064	0.408 ▨	0.13	<0.005	0.019	0.033	Not Sampled
Manganese	0.006	0.006	0.006	0.050	0.028	0.028	0.028		0.004	0.023	0.223 ▨	0.029 ▨	0.083 ▨	0.021	0.008	0.009	0.019	
Chloride	2.3	3.35	2.0	250	126	127	126		3.4	16.9	25.8	79.5	0.7	11.9	9.9	5	5.7	
Sodium	7	8.75	37.5	200	104	104	119		5.7	14.0	23.0	99.9	3.8	9.9	7.3	8.1	8.3	
TDS	427	357	238	500	464	429	369		420	313	366	437 ▨	89	319	344	347	352	
Organic-N	0.20	0.14	0.06	0.15	0.18	0.15	0.11		0.67 ▨	0.19 ▨	0.20 ▨	0.33 ▨	4.12 ▨	3.69 ▨	0.18	3.06 ▨	0.27 ▨	
Nitrate	0.2	0.1	0.1	10	2.65	2.58	2.58		1.43	0.08	0.11	0.16	0.21	<0.05	0.30	0.19	0.14	
Potassium	1.05	1.9	5.3	---	---	---	---		0.8	1.0	1.4	3.1	0.3	2.8	1.1	1.2	1.2	

October 2021 Data

	Background Concentrations			ODWS/ OG	RUP B-7 Allowable Concentrations			Reported Concentrations										
								Northwest					West		North	Northeast		East
Parameter	96-1s	99-1d	99-1sBR		Shallow Overburden	Deep Overburden	Bedrock	06-2s	06-2d	99-7s	99-7sBR	99-7dBR	99-9s	99-9sBR	00-4s	06-1s	06-1d	06-4d
Iron	0.020	0.011	0.029	0.30	0.160	0.156	0.165	Not sampled				0.471 ▨	Not Sampled	0.523 ▨	0.047	0.087	0.517 ▨	Not Sampled
Manganese	0.006	0.006	0.006	0.050	0.028	0.028	0.028					0.072 ▨		0.027	0.004	0.006	0.02	
Chloride	2.3	3.35	2.0	250	126	127	126					96.1		17.6	11	16	15.9	
Sodium	7	8.75	37.5	200	104	104	119					165 ▨		11.5	6.6	8.8	8.7	
TDS	427	357	238	500	464	429	369					513 ▨		355	330	379	370	
Organic-N	0.20	0.14	0.065	0.15	0.18	0.15	0.11					0.01		0.81 ▨	0.29 ▨	1.17 ▨	0.89 ▨	
Nitrate	0.2	0.1	0.1	10	2.65	2.58	2.58					<0.05		<0.05	1.47	5.34 ▨	5.88 ▨	
Potassium	1.05	1.9	5.25	---	---	---	---					4.8		3.2	1.1	1.1	1.0	

Background values are determined using the median value of all historical results

▨ Indicates Reasonable Use Policy exceedance

Note - No criteria for agricultural influences (i.e. potassium)

Policy B-7 applies to identifiable WDS leachate impacts and Policy B-9 applies to other impact(s)

Sovb - Shallow Overburden Dovb - Deep Overburden SBR - Shallow Bedrock DBR - Deep Bedrock

When the RUP value is less than the background value for any given parameter, the background value is used as the RUP limit.

With respect to MECP Policy B-9, application of this definition to the North Lancaster Waste Disposal Site would define the WDS, salt storage area and agricultural fields as possible sources and the various downgradient water-bearing zones as the ‘environment of consideration’.

Policy B-9 criteria were applied to monitoring wells 00-4sBR, 00-2s, and 00-2sBR rather than B-7 since the source is interpreted to be largely due to the historical salt storage activities (**Table 5.2**).

Policy B-9 exceedances occurred for TDS and organic nitrogen at monitoring wells 00-2s and 00-2sBR in the spring event and for TDS in the fall event at 00-2sBR. Concentrations of iron exceeded Policy B-9 criteria in the fall at monitoring well 00-2s (**Table 5.2**). These results are consistent with historical observations.

Table 5.2: Reasonable Use Policy (B-9) Assessment

May 2021 Data

	Background Concentrations			ODWS/OG	Observed		
					North	Northeast	
Parameter	96-1s	99-1d	99-1sBR	(B-9)	00-4sBR	00-2s	00-2sBR
Iron	0.02	0.011	0.029	0.3	0.03	0.3	0.005
Manganese	0.006	0.006	0.006	0.05	0.005	0.026	0.007
Chloride	2.3	3.35	2.0	250	16	39.1	162
Sodium	7	8.75	37.5	200	44.2	46.7	157
TDS	427	357	238	500	338	413	598
Org-N	0.2	0.14	0.06	0.15	0.11	0.17	0.50
Nitrate	0.2	0.1	0.1	10	2.03	<0.05	<0.05
Potassium	1.05	1.9	5.3	---	4.0	1.8	10.6

October 2021 Data

	Background Concentrations			ODWS/ OG	Observed		
					North	Northeast	
Parameter	96-1s	99-1d	99-1sBR	(B-9)	00-4sBR	00-2s	00-2sBR
Iron	0.02	0.011	0.029	0.3	0.017	0.371	<0.005
Manganese	0.006	0.006	0.006	0.05	0.004	0.037	0.007
Chloride	2.3	3.35	2.0	250	14.8	28.8	146
Sodium	7	8.75	37.5	200	27	38.6	153
TDS	427	357	238	500	372	411	579
Org-N	0.2	0.14	0.06	0.15	0.05	0.09	0.06
Nitrate	0.2	0.1	0.1	10	0.81	<0.05	<0.05
Potassium	1.05	1.9	5.3	---	3.5	2.0	10.7

Background values are determined using the median value of all historical results

🟦 Indicates Policy B-9 exceedance

Policy B-7 applies to WDS leachate impacts and Policy B-9 applies to the salt storage impact

5.3 SURFACE WATER QUALITY

Historical surface water quality data are summarized and compared to PWQO in **Table 4.7a** and **Table 4.7b** (**Appendix F**). PWQO exceedances have been historically reported upstream and downstream of the WDS for iron, pH, un-ionized ammonia, phenol, total phosphorus, boron, cadmium, copper, lead, vanadium, zinc, aluminum and nickel. Surface water stations S-2, S-7 and S-8 remained dry during each sample event in 2021. In 2021, PWQO exceedances occurred for iron and total phosphorous at all locations sampled in the spring, summer, and fall. The PWQO limit was exceeded for zinc at surface water stations S-4 and S-5 in the spring event, at surface water stations S-1A and S3 in the summer event, and at S-1A, S-3, S-4 and S-5 in the fall event. Results exceeding the PWQO occur at multiple sampling stations with no discernible correlation to the WDS. Previous reports indicate that exceedances of these criteria are common to eastern Ontario streams.

Surface water station S-2 is a key monitoring location as it represents a potential leachate impact discharge (for leachate that may have discharged to surface water proximate to the WDS) upstream of the Beaudette River; however, since the clearing of trees in the vicinity of this sample location, a sample has not been able to be collected. An alternate location may have to be determined.

As shown in **Table 4.8A, Appendix F**, exceedances of the MECP Table A *Assessment Criteria* occurred for iron at surface water station S-3 in summer and fall, at S-5 in the spring and summer, and for lead at surface water station S-5 in the summer. No other exceedances to the MECP Table A Assessment Criteria were noted.

Comparison to the MECP Table B *Alternative Review Criteria for Waste Disposal Sites* (**Table 4.8B, Appendix F**) depicts exceedances of CWQG for nitrite in the spring at surface water stations S-1A, S-3, S-4, S-5 and S-6, nitrate in the spring and fall at S-1A, and in the summer at S-3 and S-4.

In terms of groundwater discharge to the Beaudette River, surface water stations S-5 and S-6 do not show any adverse impacts attributable to leachate. Continued in-stream and tributary monitoring are recommended.

Surface water data for 2021 were compared to monitoring wells 06-3dBR (saline) and 96-3d (leachate) in **Figure 5-15**. This shows the saline deposit in sharp contrast (as expected) to the surface waters. The leachate is distinct, as is the background surface water (S-1A). The nearest downstream surface water location to the WDS is S-2, which was dry during each monitoring event in 2022. Historically, the results of S-2 compare closely to the background surface water signal based on the Piper Plot, and no leachate impacts have previously been noted at this location. Surface water stations that were monitored in 2021 are comparable to the background surface water stations (S-1A) results. The monitoring wells furthest downgradient and proximate to the Beaudette River (monitoring wells 00-4sBR, 00-2sBR and 00-4s) were also plotted to compare and contrast with surface water and leachate.

The groundwater analytical results from samples collected from monitoring wells located between the north side of the WDS and the Beaudette River have also been compared to PWQO in **Tables 4.7c - f** included in **Appendix F**. In summary, the following exceedances of the PWQO were observed in the 2021 groundwater monitoring well sampling results:

- Boron during both events at monitoring wells 00-2sBR, 99-6dBR, 00-1dBR and 00-5dBR;
- Boron during the October sampling event at monitoring wells 96-2d and 99-6sBR;
- Iron during both events at monitoring wells 99-2sBR, 99-6sBR and 00-1dBR;
- Iron during the October sampling event at monitoring wells 00-2s, 96-2d, 06-1d and 99-6dBR;
- Phenol at monitoring well 00-2sBR in October;
- Laboratory pH and field pH at monitoring well 00-5dBR during both sampling events;
- Laboratory pH at monitoring well 99-6dBR in May.

These exceedances are consistent with historical observations.

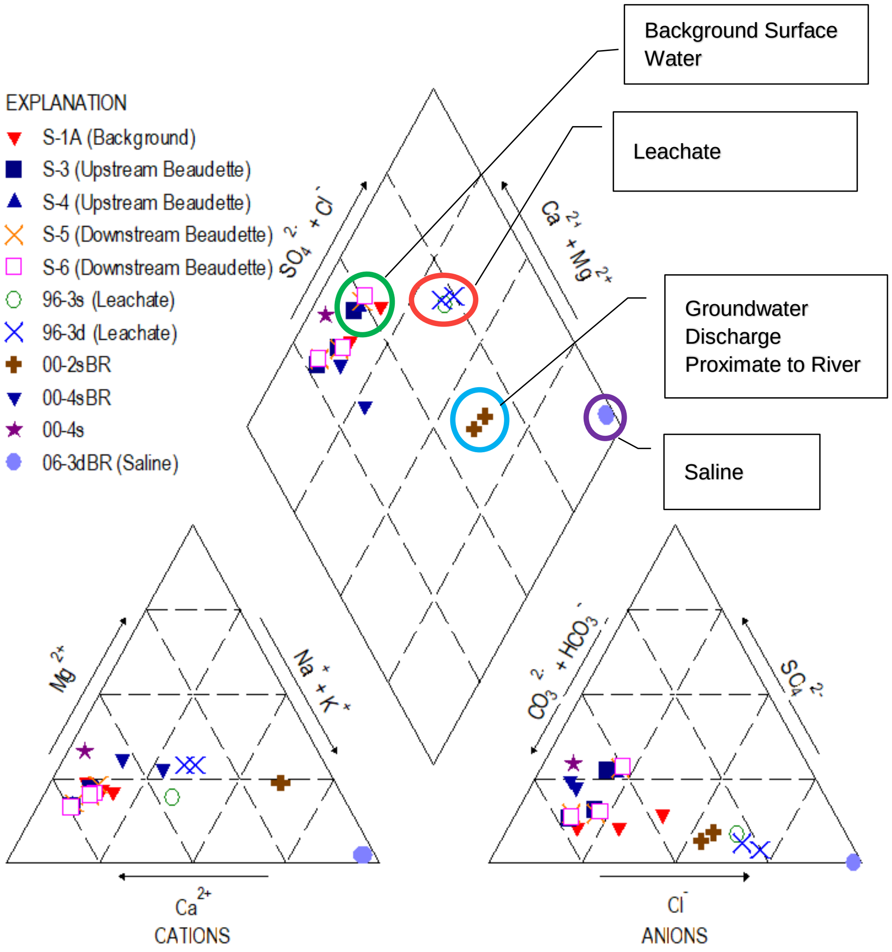

Figure 5-15 – Piper Plot of 2021 Surface Water

5.3.1 SURFACE WATER TRIGGERS

The surface water trigger parameters were selected based on ODWS/OG parameters and leachate indicators and applied to the surface water monitoring stations. The leachate indicators that have ODWS/OG criteria are sodium and chloride.

The groundwater Reasonable Use Policy B-7, in combination with the surface water triggers, provide timely warning of a possible excessive leachate advance toward surface water (Beaudette River). Based on the on-going monitoring (both groundwater and surface water), the Beaudette River has not been impacted by the operations from the WDS. Surface water trigger mechanism exceedances would initiate remedial action.

A trigger mechanism was developed to implement contingency measures should a verifiable surface water impact become evident. The trigger parameters found in **Table 4.7g** (**Appendix F**) are sodium, potassium, calcium, sulphate, chloride, nitrate + nitrite, and ammonia. The trigger limit is two times the baseline concentrations determined using the 1998-2007 sampling results, where all results have first been statistically evaluated using a control limit approach ($\mu \pm 3\sigma$) to identify outliers for normally distributed data. Triggers for surface water sampling location S-7 have been developed based on data collected between 2010 and 2015 (5 sample events). Implementation of the surface water contingency plan occurs if the baseline concentrations of any four of the seven selected inorganic parameters at any of the seven surface water sampling locations are doubled in three consecutive sampling events. The trigger limits for each surface water station are detailed in **Table 4.7g**.

No parameter exceedances were reported during 2021 at surface water stations S-2, S-6, S-7, and S-8. Exceedances of the trigger limits were noted as follow:

- Nitrate + nitrite at S-1A during all three (3) monitoring events in 2021.
- Ammonia at S-5 in May and July and at S-1A, S-3 and S-4 in October.
- Potassium at S-4 and S-5 in July and at S-3 and S-5 in October.
- Sodium and chloride exceeded in October at S-1A.

The data demonstrate that no detectable WDS impact on the surface water quality in the Beaudette River was evident in 2021; therefore, the implementation of contingency measures is not considered to be required.

5.4 LANDFILL GAS

The results of the combustible gas levels in the monitoring wells measured were 0% of the LEL (**Table 4.4**, **Section 4.6**). These results do not indicate the need to implement contingency measures.

5.5 ADEQUACY OF THE MONITORING PROGRAM

The compliance monitoring program (with the exception of the deep bedrock monitoring wells, which were decommissioned in April 2021) is considered adequate to assess the potential WDS impacts on the groundwater and surface water. Compliance monitoring wells are placed to provide impacted and unimpacted data as well as downgradient site boundary quality data. Sufficient monitoring wells are located between the leachate monitoring well and the site boundary to provide an early detection of offsite migration of contaminants. The Township has acquired additional buffer area to the east (Lot 24, Concession 6) to improve compliance monitoring analysis.

5.6 CONTINGENCY MEASURES

No trigger exceedances associated with the waste disposal site occurred in the groundwater or surface water monitoring programs; therefore, the implementation of contingency measures is not required.

5.6.1 LEACHATE CONTINGENCY PLAN ASSESSMENT

The leachate contingency plan in place at this site involves several stages of action:

1. Additional confirmatory monitoring (to augment that required by the ECA);
2. Additional waste mound capping (if necessary);
3. Procurement of additional CAZ down-gradient of the WDS; and
4. Installation of an interceptor trench along the down-gradient (northern) perimeter of the waste mound.

The need for a leachate collection system was also evaluated during the design of the expansion of this site. Based on the groundwater modelling (WHI, 2000), it was determined that natural leachate attenuation is acceptable from a natural environmental impact perspective, provided that an additional downgradient buffer (CAZ) was acquired. The Township acquired the additional downgradient buffer (Conc. VI, Lot 24), as shown in **Figure 1.0**.

If future groundwater monitoring demonstrates unacceptable impact and trigger exceedances (e.g. RUP B-7 exceeded), the source would be confirmed by additional sampling, if necessary, and the leachate contingency plan evaluated.

If required, a leachate interceptor trench could be installed along the toe of the west and north waste slope. The configuration of the trench includes a perforated subdrain located at an appropriate depth to intercept the leachate as it migrates to the north. Flow in the drainpipe would be conveyed to the north and east to a holding tank located near the access road. The leachate would be hauled for offsite treatment at one of the municipal sewage treatment plants.

If leachate seeps are detected along the face of the waste mound, their source and extent will be verified by the Director of Roads and Waste Management, who in turn, will provide additional cap material and continue to monitor the area.

Stormwater will be contained within the areas that it is generated by employing the waste cell containment berms. This would seep into the subsurface as leachate. In the event that stormwater treatment is required (i.e. surface water triggers exceeded), an exfiltration pond could be employed such that runoff to the adjacent land and waterways is not permitted. The pond would be located no closer than 30 m from the buffer. An approval under the Ontario Water Resources Act would first be sought as part of a detailed design.

5.6.2 METHANE CONTINGENCY PLAN

The primary concern with respect to methane management is the rupture of the final waste pile cap and elevated concentrations of methane near to or exceeding the lower explosive limit (LEL). If routine inspection of the site identifies ruptures of the outer layers or elevated levels of methane, installation of passive gas vents may be required. Minimal risk is interpreted to be associated with horizontal migration since the estimated distance that methane gas may migrate horizontally is estimated to be about 45 m, and the attendant’s onsite building is based on blocks. There are no residential buildings within 700 m.

6 CONCLUSIONS

- The EPA Part V application for expansion and the ECA were approved in 2010. The expansion plan was to provide additional capacity at this site to a total of 242,000m^3 (including historic fill volume).
- The area fill method was utilized in 2021 within the central portion of Area 10 of the development plan. Approximately 1,500 m^3 of fill was reported to have been used as cover for the site, and according to Township waste logs, approximately 2,450 m^3 (1,225 tonnes) of waste was received in 2021.
- A topographic survey was completed in 2021 and was compared to the final landfill grade, which determined that 26,711 m^3 of waste volume capacity remained at the site. This volume was compared to the remaining waste volume identified in the 2019 topographic survey of the landfill footprint (34,286 m^3). Based on the remaining landfill volume in 2019 and 2021, the annual waste mound fill rate (including waste and cover) was calculated to be approximately 3,778 m^3/year (4-month operating period). Based on the 2021 survey, this equates to an approximate remaining waste mound lifespan of seven (7) years (2028).
- Based on the waste logs, in 2021, interim cover comprised approximately 38% of the volume placed into the waste mound. The waste mound lifespan could be extended approximately two (2) years (2030) with more careful (reduced) use of interim cover material (15%) and improved diversion initiatives.
- Approximately 748 tonnes of Schedule 1 blue box material were diverted from being landfilled at the WDS in 2021.
- In 2021, no ODS equipment was removed from site.
- In 2021, scrap metal was removed from the site.
- In 2021, approximately 24.79 tonnes of HHW was collected on the annual collection day, and 3.59 tonnes were delivered by Township residents to the City of Cornwall HHW facility in 2021.
- E-waste was collected at the site in 2021; however, was not removed from site. Township residents delivered 0.38 tonnes of e-waste to the City of Cornwall depot in 2021.
- 2000 tires were removed from the North Lancaster site in 2021. 500 tires remain on site.
- As per correspondence received from Thomas Guo, MECP Groundwater Technical Support (correspondence January 22, 2021), deep bedrock monitoring wells 99-2dBR, 00-2dBR, 00-4dBR, 06-2dBR, 06-1dBR and 06-4dBR were decommissioned as per Regulation 903 in 2021 under the supervision of WSP staff.
- Groundwater monitoring and sampling was completed in May and October 2021.
- The groundwater flow direction in the shallow overburden is interpreted to be to the northwest in the vicinity of the WDS. The deep overburden and shallow bedrock groundwater flow direction is to the north, and the deep bedrock flow direction is westerly.
- Information from Township staff indicated that from approximately 1978 to 1989, road salt was stored at the north end of the site's approved footprint. The monitoring wells downgradient of the former salt storage pile demonstrate that a salt plume has resulted in chloride and sodium impacts to groundwater, which is distinct from leachate and background characteristics.
- Based on the geochemical data downgradient of the WDS, there would appear to be three sources of groundwater contamination: leachate, salt storage and agricultural. Deep bedrock formation water is naturally saline.
- Boundary monitoring well data was compiled and compared to Reasonable Use Policy B-7. Policy B-7 exceedances were observed in the overburden northwest, west, northeast and north of the WDS for organic nitrogen and in the overburden wells northwest and west for iron. The shallow bedrock depicts exceedances of Policy B-7 to the northwest and west for iron, and organic nitrogen. Additionally, manganese exceeded to the northwest in the shallow bedrock. The deep bedrock depicts Policy B-7 exceedances for iron, manganese, sodium, TDS and organic-nitrogen. Although exceedances of RUP limit are evident at monitoring wells 99-7dBR and 99-7sBR, leachate indicator parameters have depicted minimal change in concentration with the exception of chloride, which shows a slight

increasing trend at both boundary bedrock monitoring wells since 2017; however, land clearing and a change in land use (converting to agriculture) has taken place proximate to these wells since 2017 which may impart an influence on these locations.

- The 2021 B-9 assessment indicates concentrations in excess of B-9 criteria at the shallow bedrock compliance monitoring well northeast of the WDS for TDS and organic nitrogen. B-9 exceedances were noted at the shallow overburden to the northeast for TDS and organic nitrogen in the spring only and for iron in the fall only.
- Two (2) homeowners have consented to participate in the monitoring program. In 2021, the sample results from both private wells PW1 and PW3 indicated that the local drinking water aquifer is characterized by hardness and iron in excess of the ODWS/OG. These wells are not expected to be impacted by current or historical activities at the WDS, and the above exceedances are interpreted to be naturally occurring.
- Surface water monitoring and sampling was completed on May 26, July 14 and October 4, 2021.
- The laboratory results from the monitoring wells located between the WDS and Beaudette River were compared to PWQO. Occasional exceedances of PWQO in 2021 occurred for boron, iron, phenol and pH. This is consistent with historical results and does not show any significant influence from the waste disposal site.
- No impact associated with the WDS on the surface water quality in the Beaudette River is apparent since the trigger limit was not exceeded on three (3) consecutive events for four (4) of the seven (7) parameters.
- No surface water impacts can be clearly linked to waste disposal site activities.
- The risk associated with horizontal migration of methane at this site is limited since the calculated distance that methane gas may migrate horizontally is estimated to be about 45 m. The results of the combustible gas levels in the monitoring wells measured were 0% of the LEL. These results do not indicate the need to implement contingency measures. Additionally, there are no residential buildings within 700 m of the WDS, and minimal risk is interpreted to be associated with the site attendant’s building as there is no foundation for the gas to accumulate.
- An ECA amendment application is in the process of being submitted to the MECP to include the additional buffer to the east of the WDS.

7 RECOMMENDATIONS

1 Monitoring of groundwater should continue semi-annually as per the monitoring program outlined in the ECA. With the concurrence of the homeowners, the domestic wells should continue to be sampled annually. Surface water monitoring should be undertaken in the spring, summer, and fall of each year as per the monitoring program outlined in the ECA.

2 All WDS perimeter ditches should be inspected to identify possible leachate seep(s) and erosion of ditch banks.

3 Further investigation is needed to confirm the viability of S-2 as a downstream surface water location due to the clearing works taking place proximate to this surface water monitoring station. An alternate location may have to be identified.

4 The waste mound lifespan could likely be extended approximately two (2) years (to 2030) with the appropriate use of interim cover material (i.e. ensuring adequate compaction of the waste, improving the waste to cover ratio, removing daily/interim cover before adding the next lift of waste).

5 Placement of interim cover should be limited to the required quantity.

6 Annual topographic surveys of the waste footprint should be conducted to confirm the fill rate and ensure filling occurs within the footprint boundary. The waste mound and surrounding area should be surveyed using a suitable method in late fall.

7 Record keeping should be improved to include staff visits/purpose, onsite inspections, maintenance and litter clean-up logs, and improved cover placement/quantity logs. Additionally, improved record-keeping should be implemented for materials segregated from landfilling as part of diversion initiatives.

8 When the compactor is inoperable, the Township should consider retaining a contractor to complete compaction or acquiring a rental unit.

BIBLIOGRAPHY

- GENIVAR, 2012. Township of South Glengarry, Waste Recycling Strategy. 2012
- Ministry of the Environment. 1993. Guidance Manual for Landfill Sites Receiving Municipal Waste, MOE 1993
- Ministry of the Environment. 1994. Guideline B-9 Resolution of Groundwater Interference Problems. April 1994.
- Ministry of the Environment. 2003. Stormwater Management Planning and Design Manual. March 2003.
- Ministry of the Environment. 2003. Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines. June 2003.
- Ministry of the Environment. 2010. Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document. November 2010.
- Ministry of the Environment. 2012. Landfill Standards: A Guideline on the Regulatory and Approval Requirements for New or Expanding Landfilling Sites. January 2012.
- Ministry of the Environment and Energy. 1994. Guideline B-7 Incorporation of Reasonable Use Concept into MOEE Groundwater Management Activities. 1994.
- Ministry of the Environment and Energy. 1994. Water Management, Policies, Guidelines, Provincial Water Quality Objectives. 1994.
- Ministry of the Environment and Energy. 1996. Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario. 1996.
- NOTRA Inc. 2009. Summary of the Geophysical Surveys Conducted North Lancaster Landfill Twp. Of South Glengarry, Ontario. June 2009.
- Ontario Geological Survey, 1991. Bedrock Geology of Ontario, Southern Sheet; Ontario Geological Survey, Map 2544, scale 1:1,000,000.
- Terasmae, J. 1962. *Surficial Geology of the Cornwall and St. Lawrence Seaway Project Areas*. Geological Survey of Canada. Department of Mines and Technical Surveys. Bulletin 121.
- Thompson Rosemount Group, 2008, Township of South Glengarry, North Lancaster Landfill Design Brief. 2008.
- Watelet and Johnson, 1999. Hydrology and Water Quality of the Raisin River: Overview of Impacts of Recent Land and Channel Changes in Eastern Ontario, Water Quality Research Journal of Canada. August 1999
- Waterloo Hydrogeologic Inc. 2000. Groundwater Flow and Transport Modelling to Evaluate the Lancaster WDS Expansion Scenarios, Lancaster Waste Disposal Site, Township of South Glengarry United Counties of Stormont Dundas and Glengarry. December 2000.
- Williams, D.A., Wolf, R.R., and Carson, D.M. 1985. Paleozoic geology of the Cornwall-Huntingdon area, southern Ontario; Ontario Geological Survey, Preliminary Map P.2720, scale 1:50 000.
- WSP, 2018. Township of South Glengarry, North Lancaster Landfill 2017 Annual Report, March 2018.
- WSP, 2019. Township of South Glengarry, North Lancaster Landfill 2018 Annual Report, April 2019.
- WSP, 2020. Township of South Glengarry, North Lancaster Landfill 2019 Annual Report, March 2020.
- WSP, 2021. Township of South Glengarry, North Lancaster Landfill 2020 Annual Report, April 2021.

FIGURES

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WWW.WSP.COM

CLIENT:

TOWNSHIP OF SOUTH GLENGARRY

PROJECT:

NORTH LANCASTER WASTE DISPOSAL SITE

LEGEND

99-7s ⊕ MONITORING WELLS
00-3dbr ⊕ DECOMMISSIONED MONITORING WELL
◉ PRIVATE WELL
SW-2 ▲ SURFACE WATER STATIONS
→ SURFACE WATER AND FLOW DIRECTION
🟥 AMENDED LANDFILL FOOTPRINT (2011)
☐ PROPERTY BOUNDARY
▨ CAZ PROPERTY
▨ WATER RIGHTS ACQUISITION

Data Source: Base mapping information licensed under the Open Gouverment Licence - Ontario

PROJECT NUMBER:	111-55592-00	DATE:	SEPTEMBER 2021
DRAWN BY:	AF		
CHECKED BY:	JBH		
SCALE:	1:7,500		

Meters
0 50 100 200 300 400

TITLE

GROUNDWATER AND SURFACE WATER MONITORING LOCATIONS

SHEET NUMBER:

FIGURE 1.0

Path: M:\2011\111-55592-01DOC\GIS\2021\111-55592-00_Site Plan.mxd

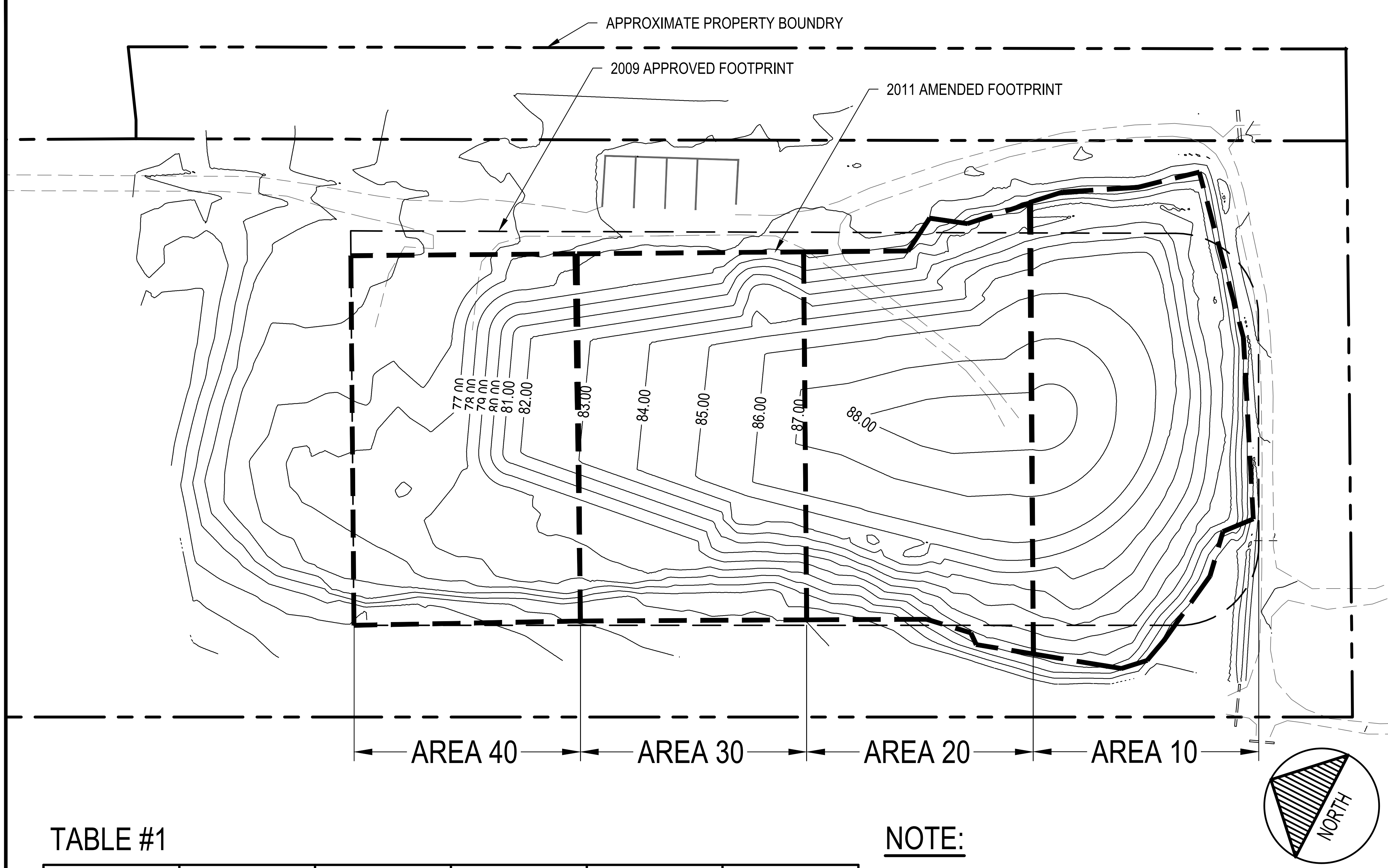

TABLE #1

	AREA 10	AREA 20	AREA 30	AREA 40	TOTAL APPROVED FOOTPRINT
AREA (m²)	10075	9839	9142	9121	38177
REMAINING CAPACITY (m³)	(-2262)	7817	14128	6950	26633

NOTE:

1. TABLE #1 IS A BREAKDOWN OF AREA FOR EACH REGION AND THE RESPECTIVE REMAINING CAPACITY FOR WASTE. THE PURPOSE OF THIS FIGURE IS TO PROVIDE A HIGH-LEVEL OVERVIEW. THE FINAL CONTOURS OF THE LANDFILL SHALL BE IN ACCORDANCE WITH FIGURE 1.3 - LANDFILL CROSS-SECTIONS (DATED JANUARY 30, 2022).
2. TOPOGRAPHIC SURVEY COMPLETED ON OCTOBER 26, 2021. REFER TO WSP SURVEY REPORT DATED JANUARY 30, 2022 FOR DETAILS RELATED TO SURVEY.

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CLIENT:
TOWNSHIP OF SOUTH GLENGARRY

CLIENT REF. #:

PROJECT:
NORTH LANCASTER LANDFILL

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
1		2022/01/30	ISSUED FOR FINAL REPORT

PROJECT NO: 111-55592-04
DATE: 01/30/2022
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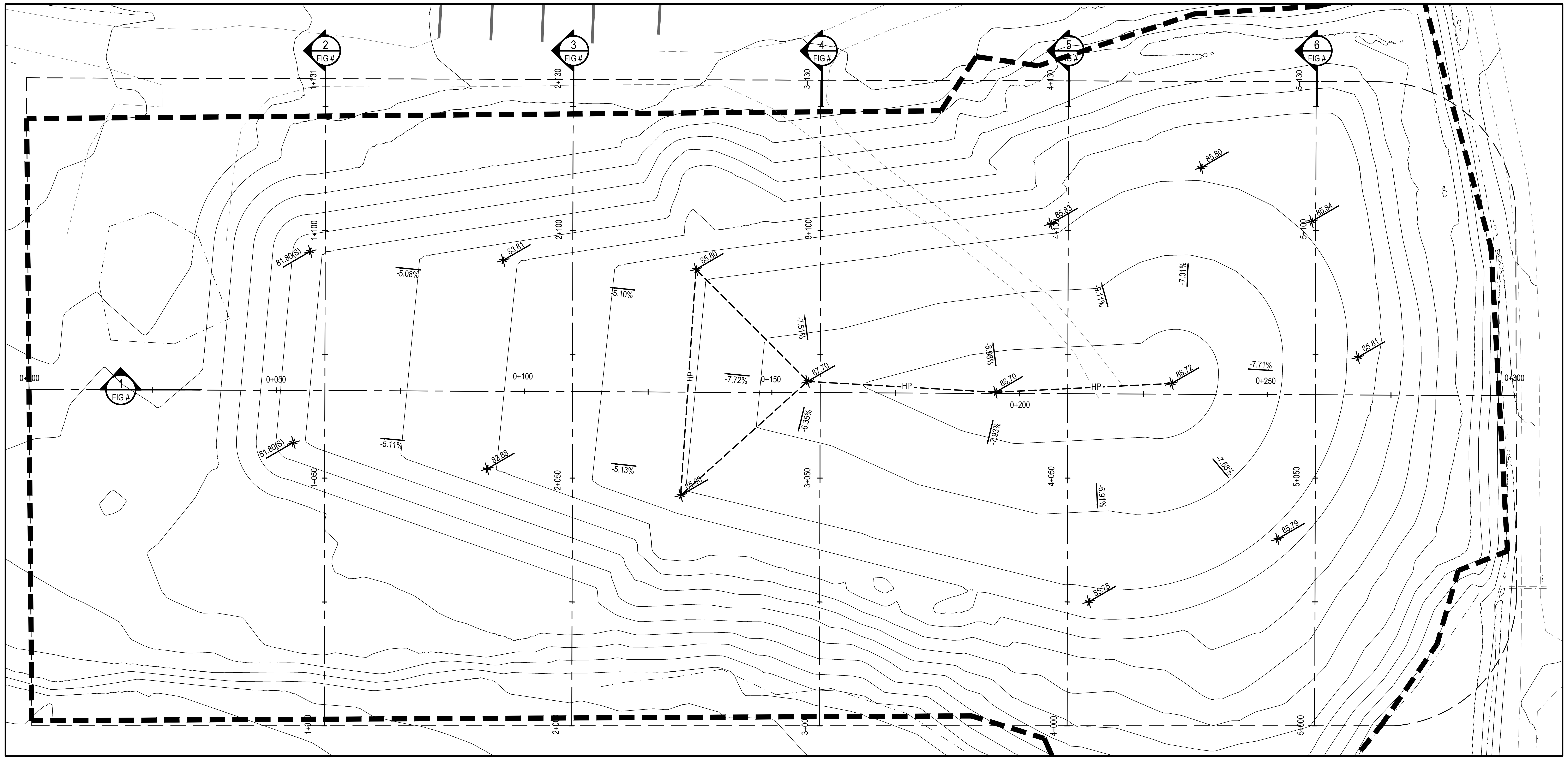
25mm
DESIGNED BY: DS
DRAWN BY: T.C.
CHECKED BY: SJT
DISCIPLINE: ENVIRONMENTAL

TITLE:
APPROVED LANDFILL FOOTPRINT - FILL AREAS

SHEET NUMBER: FIG-1.2
SHEET #: OF
ISSUE: ISSUED FOR FINAL REPORT
REV #: 0
DATE OF: 2022/01/30

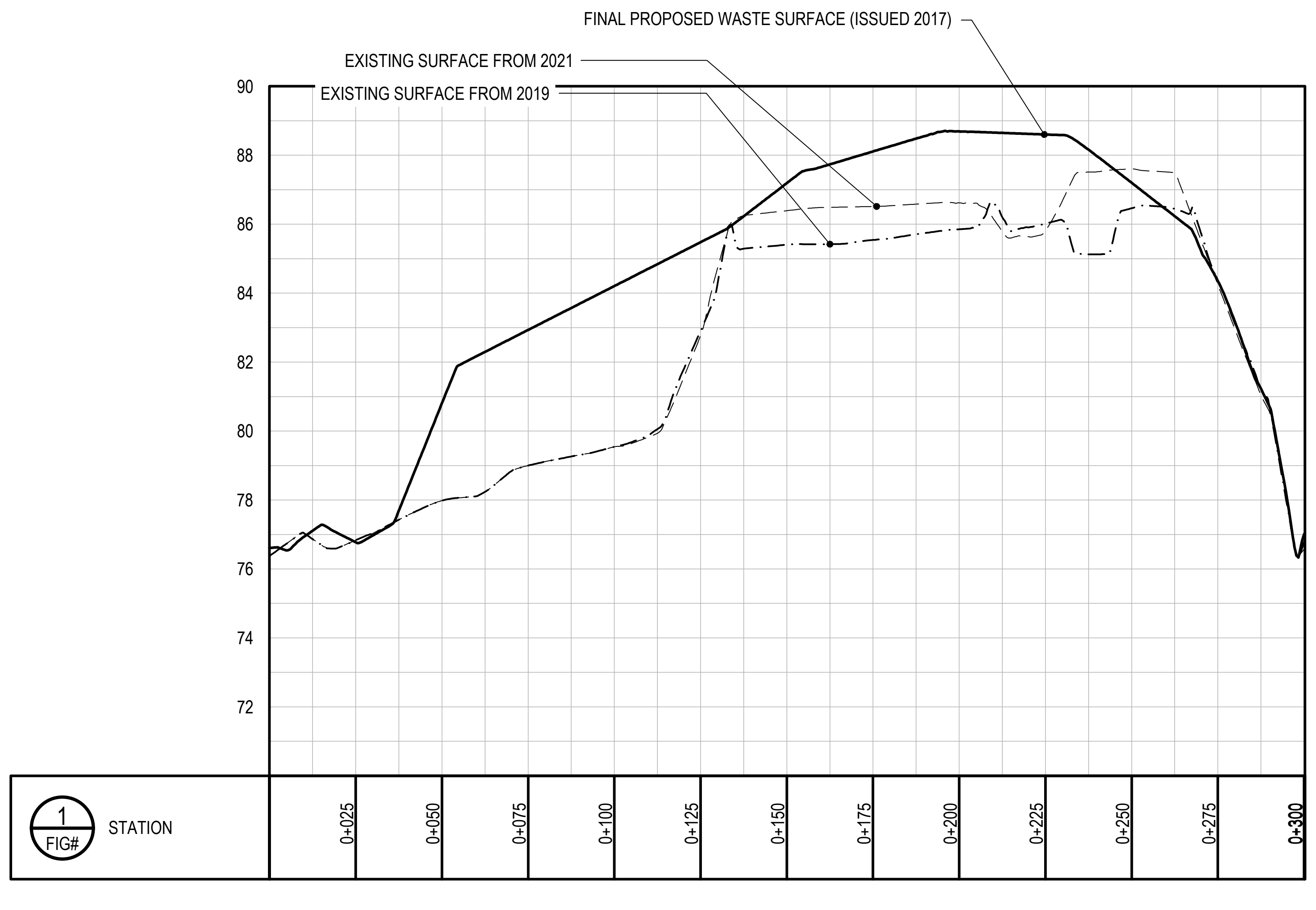
C:\Users\catc073812\Desktop\Temporary\Cornwall\2022.1.28 - North Lancaster 2021\Volume Calc 2021\111-55592-06 - FIG 3.4.dwg Mar 29, 2022-5:49pm BY:(CATC073812)

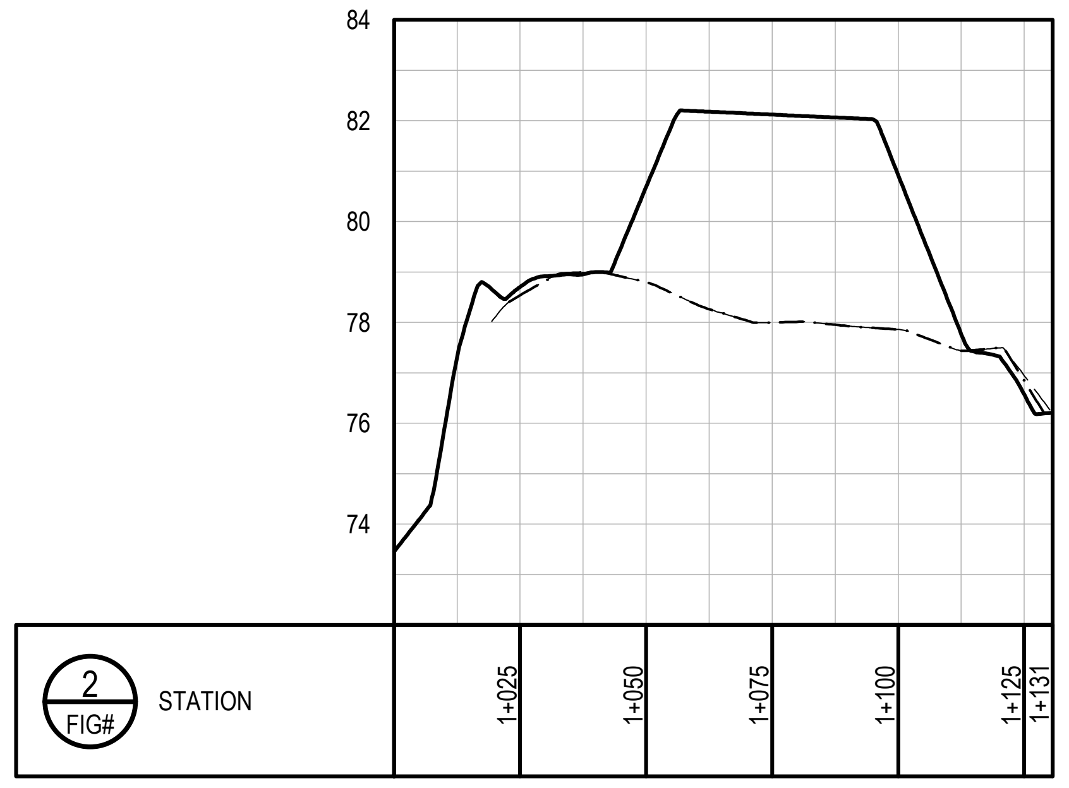


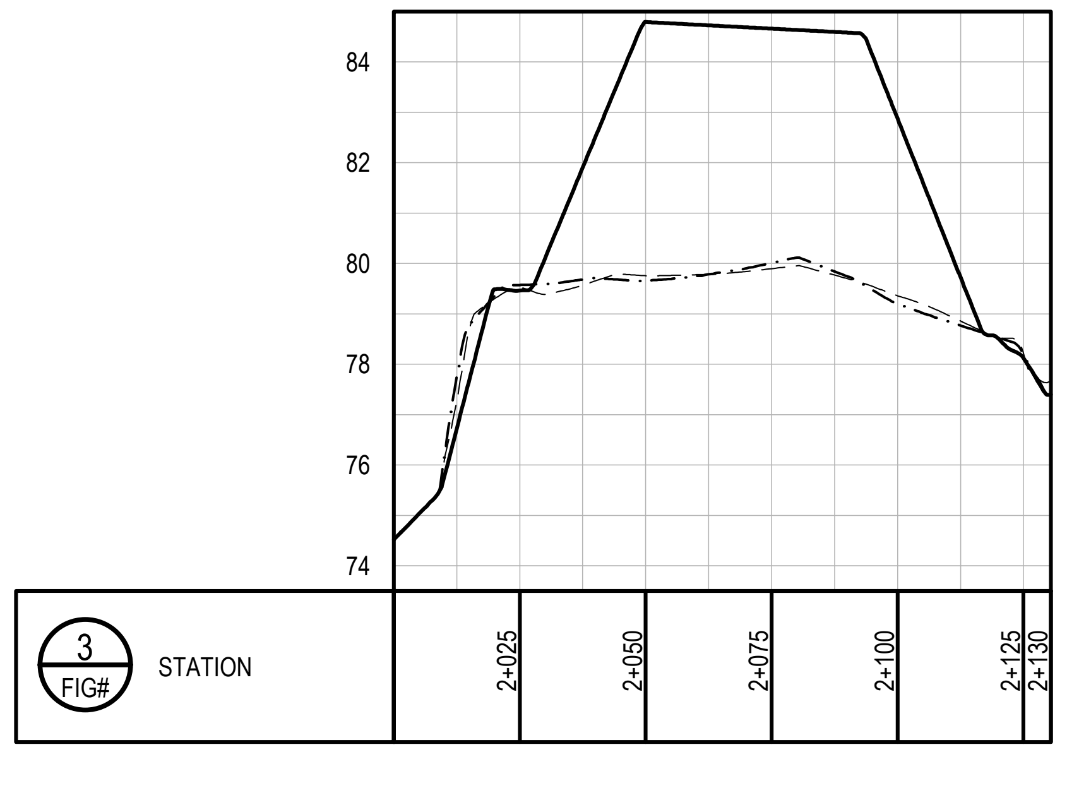
FINAL GRADING PLAN

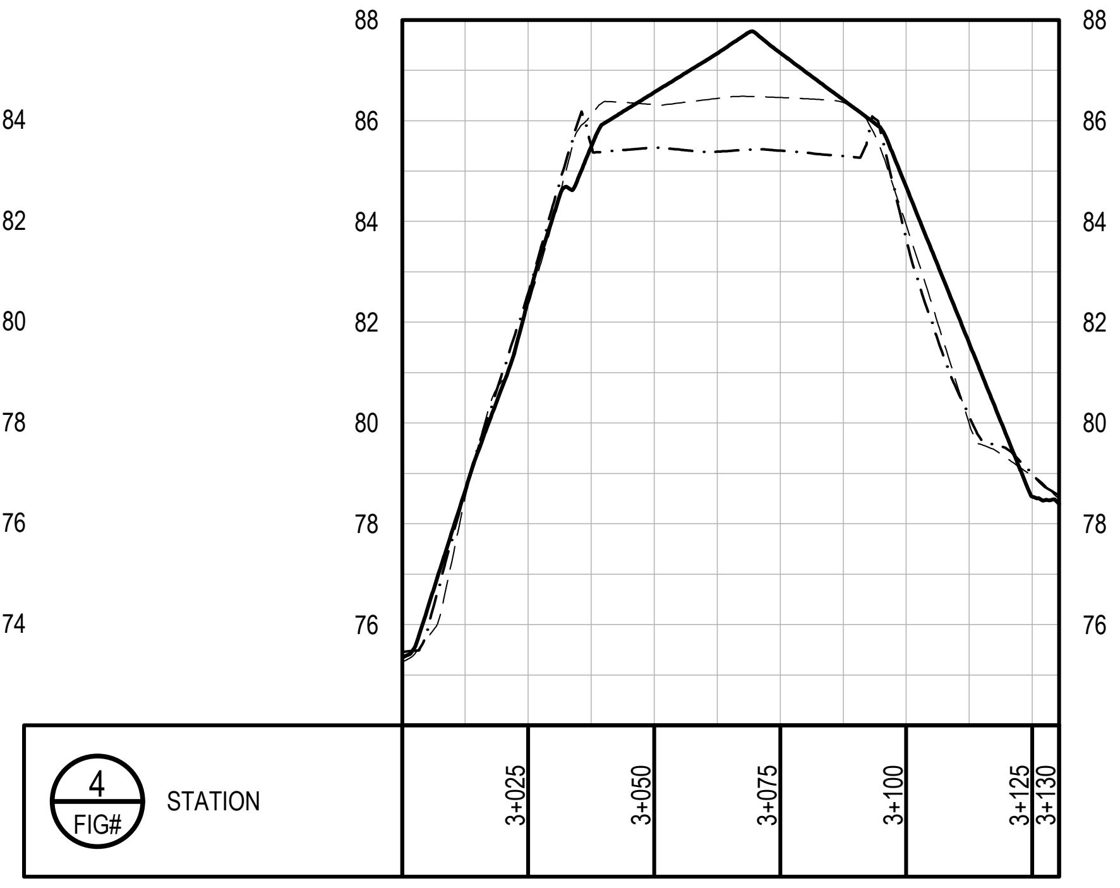
A
FIG#

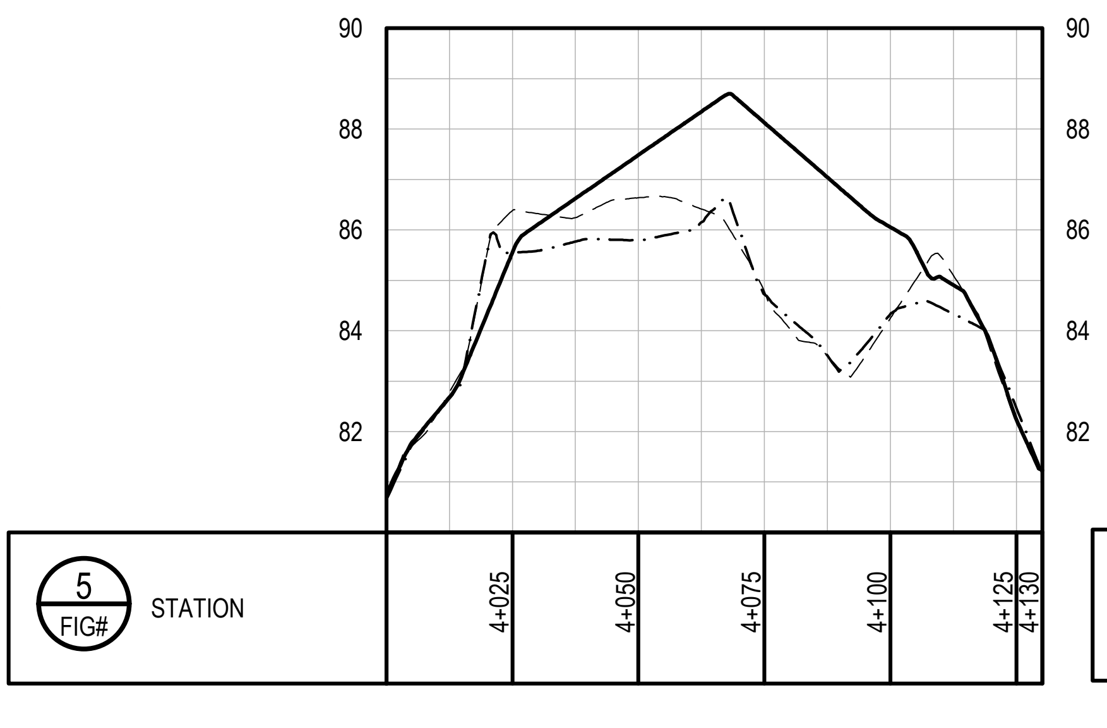
SCALE: 1:500

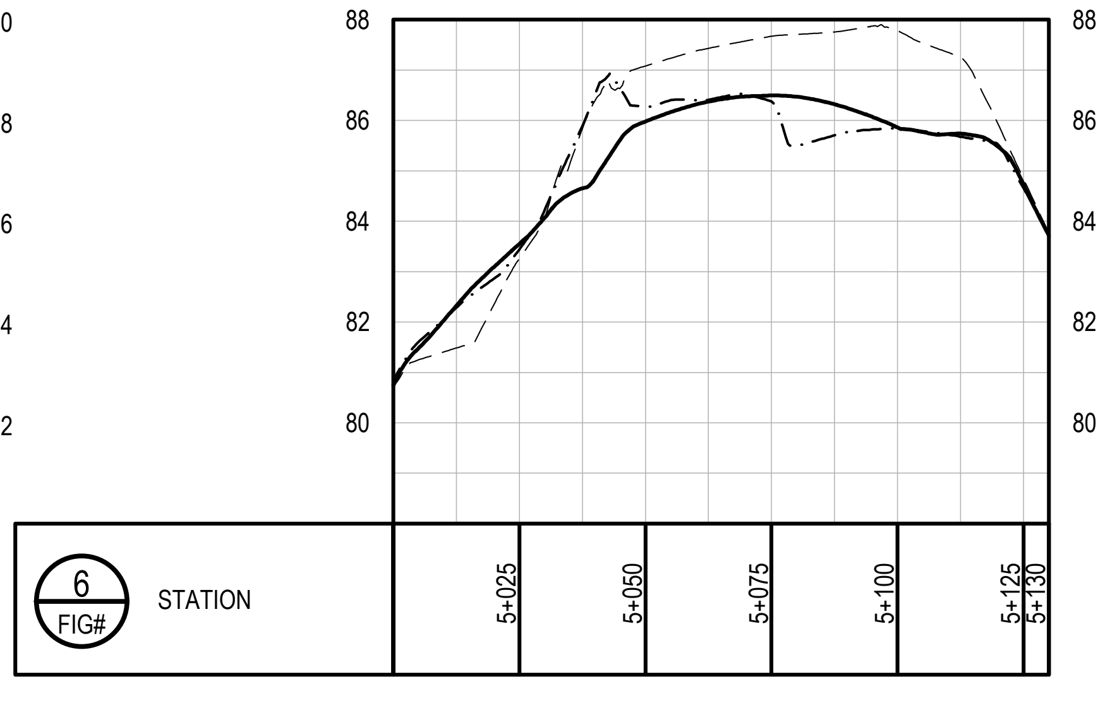












NOTES:

1. ELEVATIONS SHOWN HEREIN ARE GEODETIC, AND ARE CREATED USING REAL TIME COORDINATES. GEODETIC BENCHMARK ESTABLISHED USING CANNET SYSTEM CREATED BY WSP IN MAY OF 2021.
2. THE HORIZONTAL COORDINATE SYSTEM IS ZONE 18 - UTM NAD83 CSRS (GRID) - EPOCH 2010.
3. LEGAL BOUNDARY SHOWN IS APPROXIMATE AND IS FOR ILLUSTRATIVE PURPOSES ONLY. LOCATION OF SITE BOUNDARY MUST BE CONFIRMED BY A LICENSED ONTARIO LAND SURVEYOR (OLS).
4. TOPOGRAPHIC SURVEY COMPLETED OCTOBER 26TH, 2021.. REFER TO WSP SURVEY REPORT DATED JANUARY 28TH, 2022 FOR DETAILS RELATED TO SURVEY.

LEGEND:

— — — —	SITE PROPERTY LINE
- - - - -	EXISTING EDGE OF GRAVEL
—·—·—	EXISTING DITCH
—··—··—	EXISTING BOTTOM OF SLOPE
—— — · ——	EXISTING TOP OF SLOPE
▬ ▬ ▬ ▬	2011 AMENDED LANDFILL FOOTPRINT
67.50 ×	WASTE AND INTERIM COVER ELEVATION
5.00% →	PROPOSED SLOPE

TEMPORARY BENCH MARKS

T.B.M. #	ELEVATION (m)	DESCRIPTION
BM1	76.03	TOP OF 1" REBAR NORTH OF SEGREGATION AREA

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1345 ROSEMOUNT AVENUE
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WWW.WSPGROUP.COM

CONSULTANT:

SEAL:

NORTH

CLIENT:

TOWNSHIP OF SOUTH
GLENGARRY

CLIENT REF. #: --

PROJECT:

NORTH LANCASTER
LANDFILL

KEY PLAN:

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
1		2018/4/30	ISSUE FOR FINAL REPORT

PROJECT NO: 111-55592-04
DATE: 2017/04/30
ORIGINAL SCALE: AS SHOWN / PROFILE: H = 1:1500, V=150
DESIGNED BY: D.S.
DRAWN BY: T.C.
CHECKED BY: S.T.
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm
DISCIPLINE: ENVIRONMENTAL
TITLE:

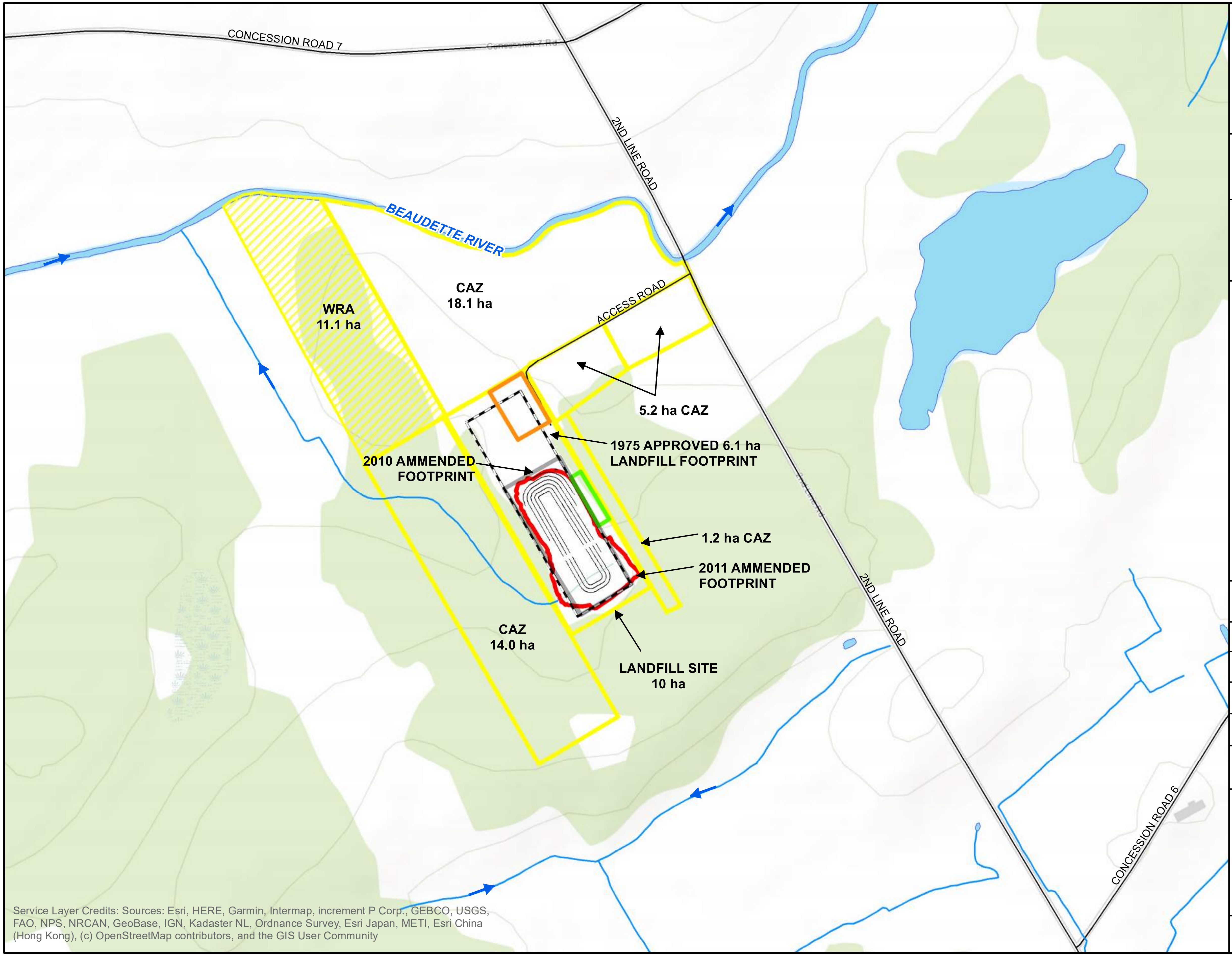
LANDFILL CROSS-SECTIONS

SHEET NUMBER:

FIGURE 1-3

SHEET #: OF
ISSUE: ISSUE FOR FINAL REPORT
REV # 0
DATE OF: 2017/4/30

C:\Users\catc073812\Desktop\Temporary\Cornwall\North Lancaster\Volume Calc 2021\111-55592-06 - FIG 3.5.dwg Jan 28, 2022-9:28am BY:(CATC073812)



Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

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CLIENT: TOWNSHIP OF SOUTH GLENGARRY

PROJECT: NORTH LANCASTER LANDFILL

LEGEND

- 1975 APPROVED FOOTPRINT
- 2010 APPROVED FOOTPRINT
- 2011 AMENDED FOOTPRINT
- CONTAMINANT ATTENUATION ZONE (CAZ)
- WATER RIGHTS ACQUIRED (WRA)
- PROPOSED FINAL CONTOURS
- SURFACE WATER AND FLOW DIRECTION
- RECYCLING RECLAMATION AREA
- FORMER SALT STORAGE AREA
- 70 APPROXIMATE GROUND CONTOURS (mASL)

Data Source: Base mapping information licensed under the Open Gouverment Licence - Ontario

PROJECT NUMBER:	111-55592-00	DATE:	SEPTEMBER 2021
DRAWN BY:	GR		
CHECKED BY:	JBH		
SCALE:	1:8,000		

N

0 60 120 240 360 480 Meters

TITLE

SITE PLAN AND BUFFER PROPERTY

SHEET NUMBER: FIGURE 2.1

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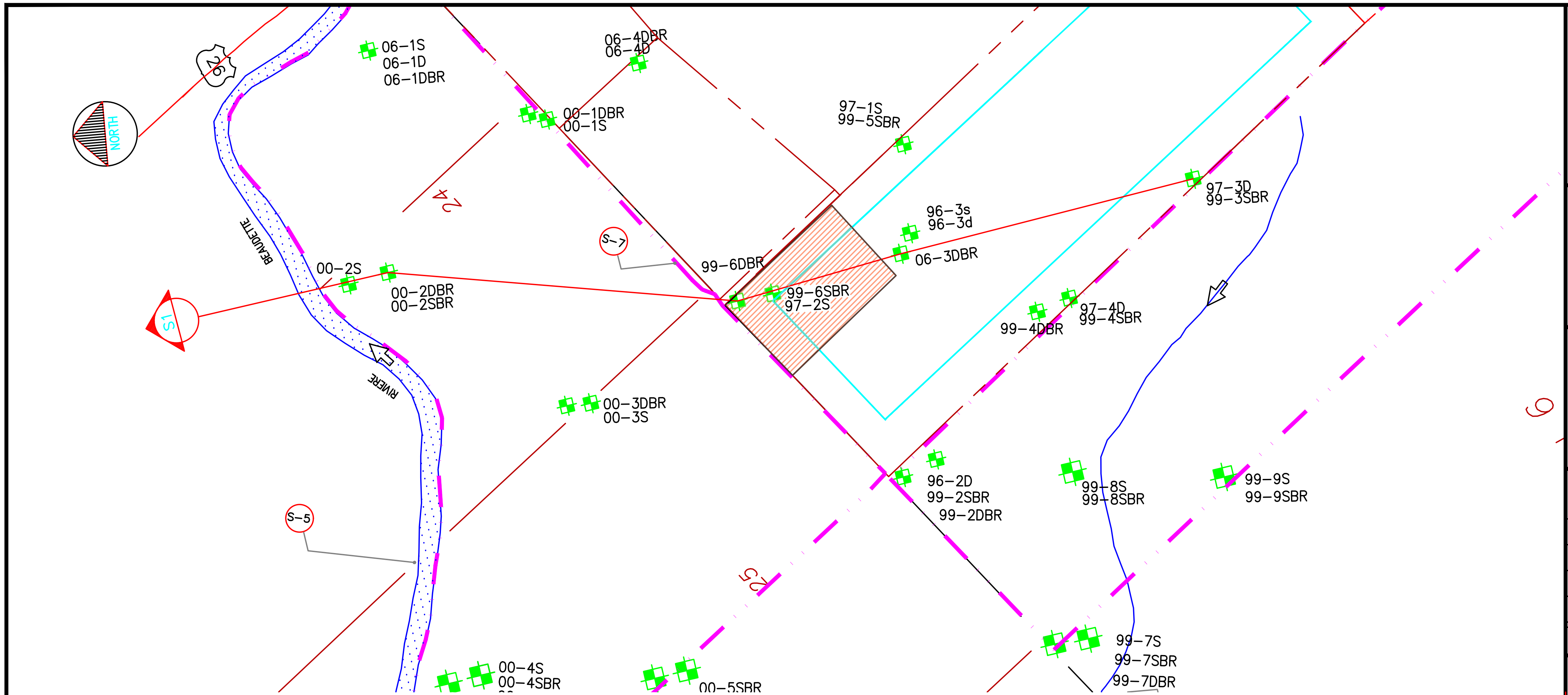

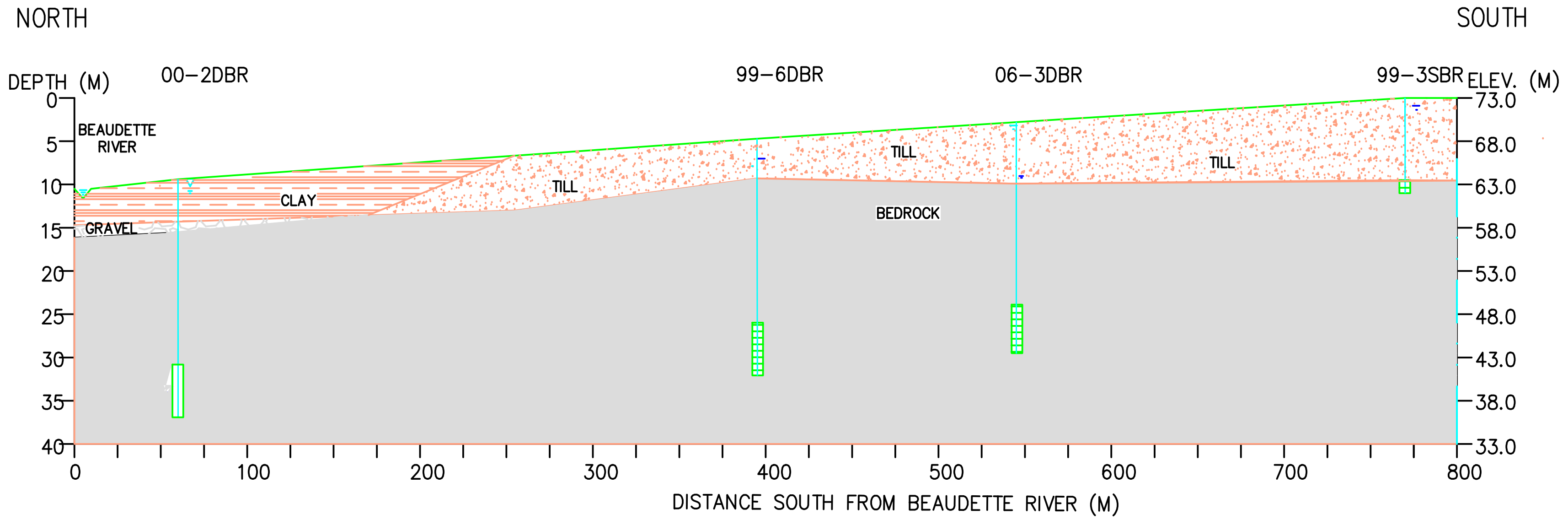

LEGEND

- ▥ MONITORING WELL SCREEN
- ▤ CLAY
- ▨ TILL
- ▧ GRAVEL
- ▩ BEDROCK
- ▨ APPROXIMATE FORMER SALT STORAGE AREA

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CLIENT:
TOWNSHIP OF SOUTH GLENGARRY
CLIENT REF. #:

PROJECT:
NORTH LANCASTER LANDFILL

ISSUED FOR – REVISION:

IS	RE	DATE	DESCRIPTION

PROJECT NO: 111-55592-00
DATE: MARCH 2020
ORIGINAL SCALE: AS SHOWN
DESIGNED BY: JSTM
DRAWN BY: JBH/GR
CHECKED BY: JBH

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm

DISCIPLINE: ENVIRONMENTAL

TITLE:
NORTH – SOUTH
SITE CROSS-SECTION

SHEET NUMBER: FIGURE 2.2
SHEET #: -- OF --
ISSUE: --
DATE OF: --
REV # 0

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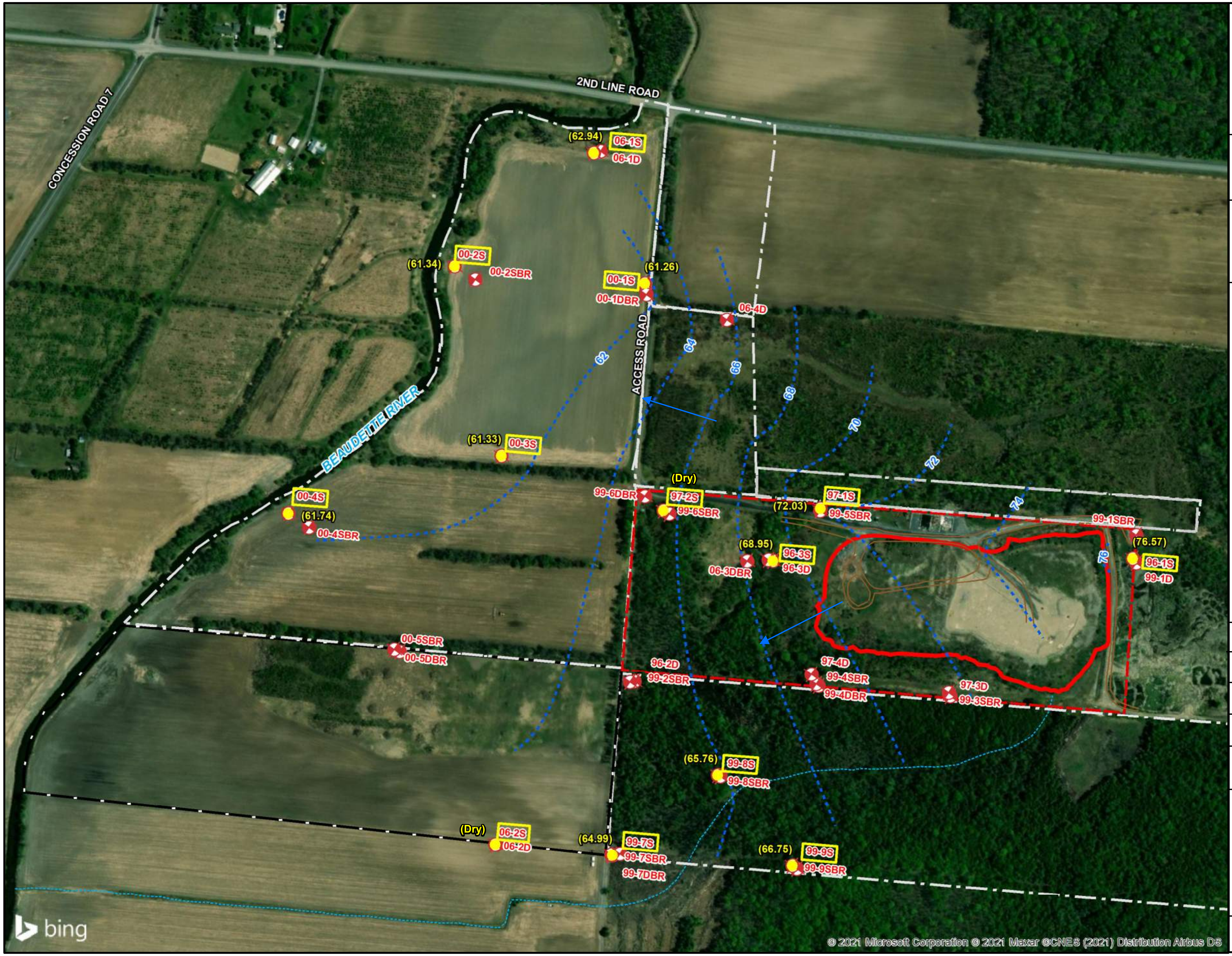

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CLIENT:

TOWNSHIP OF SOUTH GLENGARRY

PROJECT:

NORTH LANCASTER WASTE DISPOSAL SITE

LEGEND

06-1D ⊕	MONITORING WELL
06-1S ⊕ 75.09 m	SHALLOW OVERBURDEN MONITOR WITH RESPECTIVE WATER LEVEL (METERS)
— 68 —	INTERPRETED GROUNDWATER ELEVATION CONTOUR (METERS)
→	INFERRED GROUNDWATER FLOW DIRECTION
-·-·-	STREAM
▭	AMENDED LANDFILL FOOTPRINT (2011)
⊏⊐	PROPERTY BOUNDARY
⊏⊐	CAZ PROPERTY
⊏⊐	WATER RIGHTS ACQUISITION

Data Source: Base mapping information licensed under the Open Government Licence – Ontario

PROJECT NUMBER: 111-55592-00

DATE: SEPTEMBER 2021

DRAWN BY: AF

CHECKED BY: JBH

SCALE: 1:4,000

Meters
0 25 50 100 150 200

TITLE

INTERPRETED SHALLOW OVERBURDEN GROUNDWATER ELEVATION CONTOURS - MAY 2021

SHEET NUMBER:

FIGURE 4.3 A

Path: M:\2011\111-55592-01\DOC\GIS\2021\Fig 4_3a 55592 SOB_March2021.mxd

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CLIENT:
TOWNSHIP OF SOUTH GLENGARRY

PROJECT:
NORTH LANCASTER WASTE DISPOSAL SITE

LEGEND

06-1D ⊕	MONITORING WELL
06-1S ⊕ 75.09 m	DEEP OVERBURDEN MONITOR WITH RESPECTIVE WATER LEVEL (METERS)
— 68 —	INTERPRETED GROUNDWATER ELEVATION CONTOUR (METERS)
→	INFERRED GROUNDWATER FLOW DIRECTION
-·-·-	STREAM
▭	AMENDED LANDFILL FOOTPRINT (2011)
▭	PROPERTY BOUNDARY
▭	CAZ PROPERTY
▭	WATER RIGHTS ACQUISITION

Data Source: Base mapping information licensed under the Open Government Licence – Ontario

PROJECT NUMBER: 111-55592-00
DATE: SEPTEMBER 2021
DRAWN BY: AF
CHECKED BY: JBH
SCALE: 1:4,000

Meters
0 25 50 100 150 200

TITLE

INTERPRETED DEEP OVERBURDEN GROUNDWATER ELEVATION CONTOURS - MAY 2021

SHEET NUMBER:
FIGURE 4.3 B

Path: M:\2011\111-55592-01\DOC\GIS\2021\Fig 4_3b 55592 DOB_March2021.mxd

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CLIENT:
TOWNSHIP OF SOUTH GLENGARRY

PROJECT:
NORTH LANCASTER WASTE DISPOSAL SITE

LEGEND

06-1D ⊕	MONITORING WELL
99-1SBR ● 75.09 m	SHALLOW BEDROCK MONITOR WITH RESPECTIVE WATER LEVEL (METERS)
— 68 —	INTERPRETED GROUNDWATER ELEVATION CONTOUR (METERS)
→	INFERRED GROUNDWATER FLOW DIRECTION
········	STREAM
🟥	AMENDED LANDFILL FOOTPRINT (2011)
▭	PROPERTY BOUNDARY
▭	CAZ PROPERTY
▭	WATER RIGHTS ACQUISITION

Data Source: Base mapping information licensed under the Open Government Licence – Ontario

PROJECT NUMBER:	111-55592-00
DATE:	SEPTEMBER 2021
DRAWN BY:	AF
CHECKED BY:	JBH
SCALE:	1:4,000

0 25 50 100 150 200 Meters

TITLE
INTERPRETED SHALLOW BEDROCK GROUNDWATER ELEVATION CONTOURS - MAY 2021

SHEET NUMBER:
FIGURE 4.3 C

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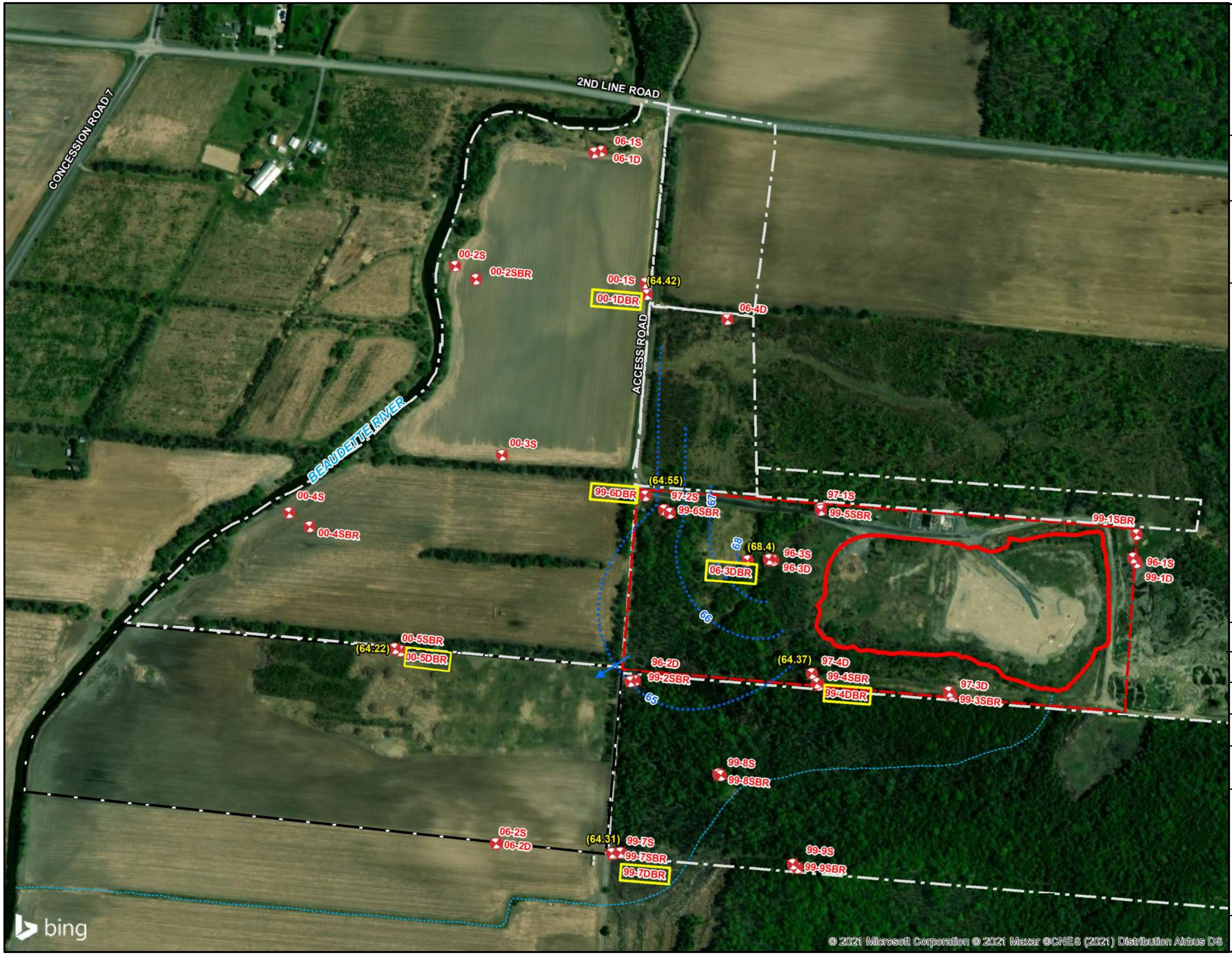

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CLIENT:

TOWNSHIP OF SOUTH GLENGARRY

PROJECT:

NORTH LANCASTER WASTE DISPOSAL SITE

LEGEND

06-1D MONITORING WELL

99-1DBR 75.09 m DEEP BEDROCK MONITOR WITH RESPECTIVE WATER LEVEL (METERS)

— 68 — INTERPRETED GROUNDWATER ELEVATION CONTOUR (METERS)

→ INFERRED GROUNDWATER FLOW DIRECTION

STREAM

AMENDED LANDFILL FOOTPRINT (2011)

PROPERTY BOUNDARY

CAZ PROPERTY

WATER RIGHTS ACQUISITION

Data Source: Base mapping information licensed under the Open Government Licence – Ontario

PROJECT NUMBER:	111-55592-00	DATE:	SEPTEMBER 2021
DRAWN BY:	AF		
CHECKED BY:	JBH		
SCALE:	1:4,000		

0 25 50 100 150 200 Meters

TITLE

INTERPRETED DEEP BEDROCK GROUNDWATER ELEVATION CONTOURS - MAY 2021

SHEET NUMBER: FIGURE 4.3 D

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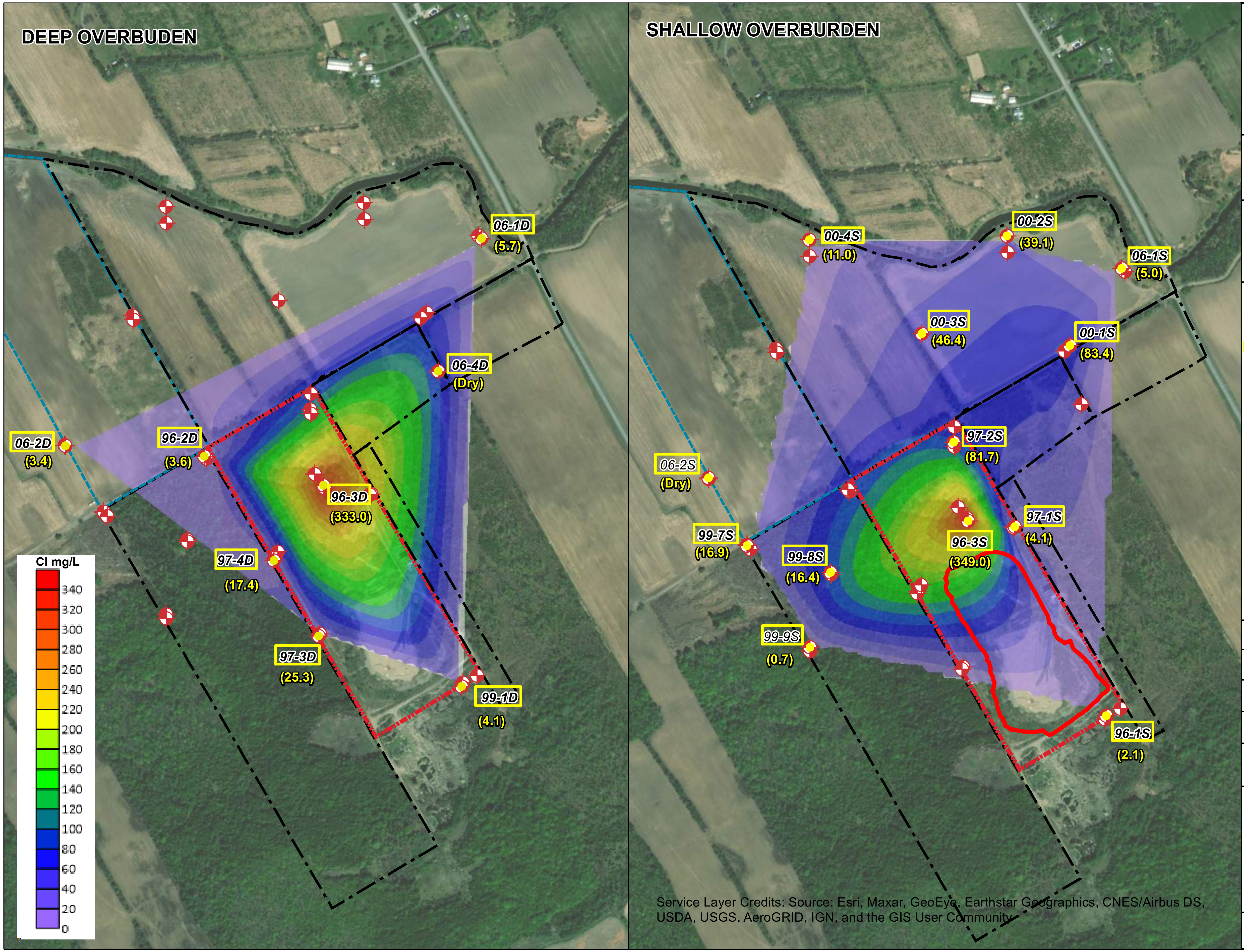

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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CLIENT: TOWNSHIP OF SOUTH GLENGARRY

PROJECT: NORTH LANCASTER WASTE DISPOSAL SITE

LEGEND

⊕ MONITORING WELLS

00-1DBR (4320) MONITORING WELLS USED FOR ISOPLETHS WITH RESPECTIVE CHLORIDE CONCENTRATIONS (mg/L)

▭ AMENDED LANDFILL FOOTPRINT (2011)

▭ PROPERTY BOUNDARY

- - - SURFACE WATER

▭ PROPERTY BOUNDARY

▭ CAZ PROPERTY

▭ WATER RIGHTS ACQUISITION

Data Source: Base mapping information licensed under the Open Gouverment Licence - Ontario

PROJECT NUMBER:	111-55592-00	DATE:	SEPTEMBER 2021
DRAWN BY:	SD		
CHECKED BY:	JBH		
SCALE:	1:6,000		

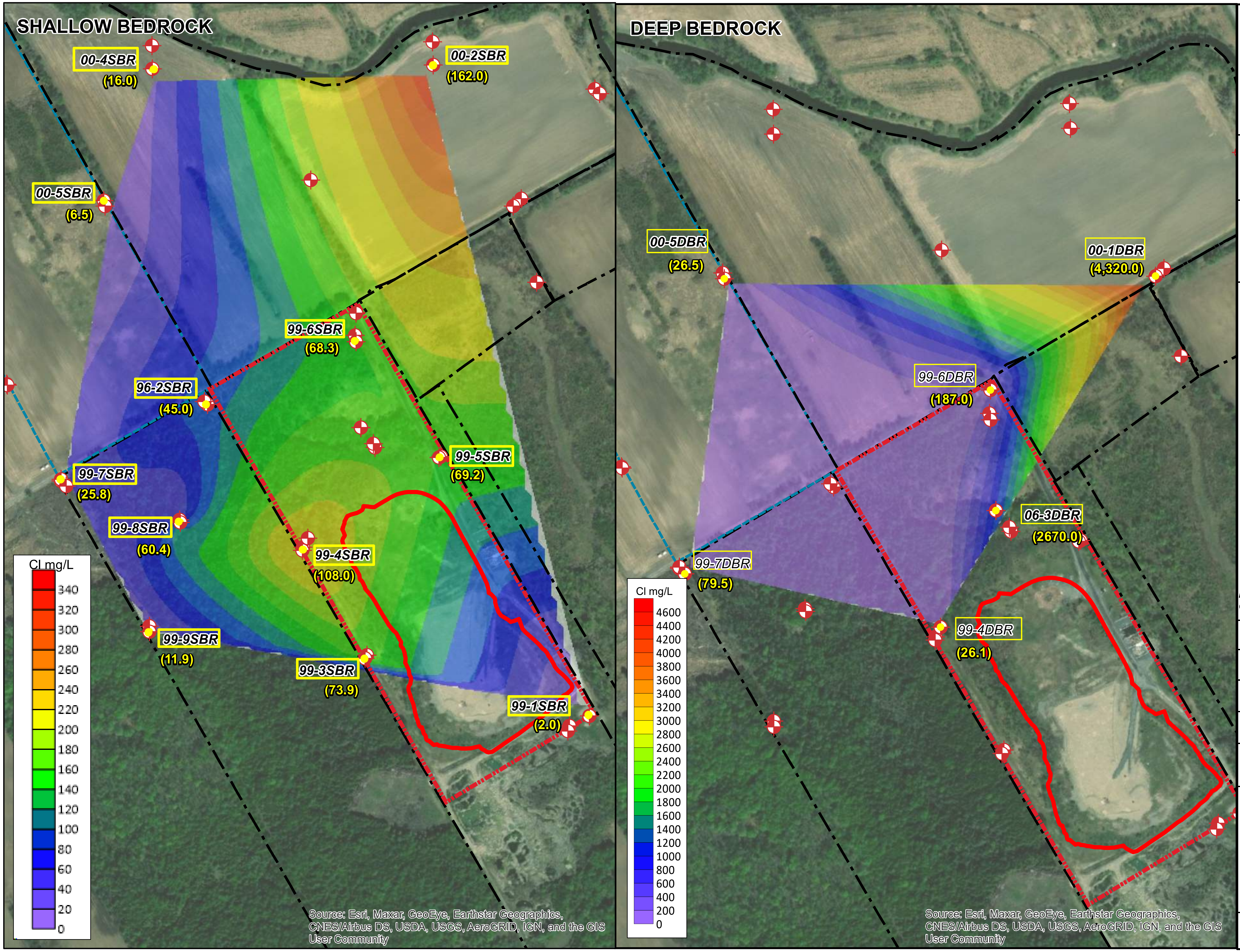
0 40 80 160 240 320 Meters

TITLE

INTERPRETED OVERBURDEN, CHLORIDE ISOPLETHS MAY 2021

SHEET NUMBER: FIGURE 5.0 A

Path: \\corp.pbwan.net\ca\env_gis\PROJECTS\ON\2011\111-55592-08 ; North Lancaster Waste Disposal Site\MXD\Fig 5_0a 55592 Cl_OB_SBR_Apr2020.mxd



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

1345 ROSEMOUNT AVENUE
CORNWALL, ONTARIO
CANADA K6J 3E5
PHONE: 613-933-5602 FAX: 613-936-0335
WWW.WSP.COM

CLIENT:
TOWNSHIP OF SOUTH GLENGARRY

PROJECT:
NORTH LANCASTER WASTE DISPOSAL SITE

LEGEND

- ⊕ MONITORING WELLS
- 00-1DBR (4320.0) MONITORING WELLS USED FOR ISOPLETH WITH RESPECTIVE CHLORIDE CONCENTRATIONS (mg/L)
- ▭ AMENDED LANDFILL FOOTPRINT (2011)
- ⬚ PROPERTY BOUNDARY
- ┄ SURFACE WATER
- ⬚ PROPERTY BOUNDARY
- ⬚ CAZ PROPERTY
- ⬚ WATER RIGHTS ACQUISITION

Data Source: Base mapping information licensed under the Open Goverment Licence - Ontario

PROJECT NUMBER:	111-55592-00	DATE:	SEPTEMBER 2021
DRAWN BY:	SD		
CHECKED BY:	JBH		
SCALE:	1:4,000		

0 25 50 100 150 200 Meters

TITLE
INTERPRETED BEDROCK
CHLORIDE ISOPLETHS
MAY 2021

SHEET NUMBER:
FIGURE 5.0 B

Path: \\corp.pbwan.net\ca\env_gis\PROJECTS\ON\2011\111-55592-08 ; North Lancaster Waste Disposal Site\MXD\Fig 5_0b 55592 Cl_DBR exc saline_Apr2020.mxd

APPENDIX

A

MONITORING AND SCREENING CHECKLIST

Appendix D-Monitoring and Screening Checklist
General Information and Instructions

General Information: The checklist is to be completed, and submitted with the Monitoring Report.
Instructions: A complete checklist consists of:
(a) a completed and signed checklist, including any additional pages of information which can be attached as needed to provide further details where indicated.
(b) completed contact information for the Competent Environmental Practitioner (CEP)
(c) self-declaration that CEP(s) meet(s) the qualifications as set out below and in Section 1.2 of the Technical Guidance Document.

Definition of Groundwater CEP:
For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:
(a) the person holds a licence, limited licence or temporary licence under the *Professional Engineers Act*; or
(b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary, member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..
Definition of Surface water CEP:
A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

The type of scientific work that a CEP performs must be consistent with that person's education and experience. If an individual has appropriate training and credentials in both groundwater and surface water and is responsible for both areas of expertise, the CEP may then complete and validate both sections of the checklist.

Monitoring Report and Site Information

Waste Disposal Site (WDS) Name	North Lancaster WDS
Location (e.g. street address, lot, concession)	2nd Line Road, East half of Lot 25, Part 1, Concession 6
GPS Location (taken within the property boundary at front gate/ front entry)	E537853 N5011859 (Zone 18)
Municipality	Township of South Glengarry
Client and/or Site Owner	Corporation of the Township of South Glengarry
Monitoring Period (Year)	2021
This Monitoring Report is being submitted under the following:	
Environmental Compliance Approval (ECA) Number (formerly "Certificate of Approval" (C of A)) :	A481403
Director's Order No.:	Type Here
Provincial Officer's Order No.:	Type Here

Other:	Type Here		
Report Submission Frequency	● **Annual** ○ **Other**	Specify (Type Here):	
The site is: **(Operation Status)**	● **Open** ○ **Inactive** ○ **Closed**		
Is there an active waste transfer station at the site?	○ **Yes** ● **No**		
Does this WDS have a Closure Plan?	○ **Not yet submitted** ○ **Submitted and under review** ● **Submitted and approved**		
Total Approved Capacity	242000	*Units*	Cubic Metres
Maximum Approved Fill Rate	100.0	*Units*	Tonnes per Day
Total Waste Received within Monitoring Period (Year)	1,913	*Units*	Tonnes
Total Waste Received within Monitoring Period (Year) *Describe the methodology used to determine this quantity*	Calculated from topographical survey		
Estimated Remaining Capacity	26,633	*Units*	Cubic Metres
Estimated Remaining Capacity *Describe the methodology used to determine this quantity*	Estimation based on calculation and 2021 topographical survey		
Estimated Remaining Capacity *Date Last Determined*	2022-03-30		
Non-Hazardous Approved Waste Types	☒ Domestic ☒ Industrial, Commercial & Institutional (IC&I) ☐ Source Separated Organics (Green Bin) ☒ Tires	☐ Contaminated Soil ☒ Wood Waste ☒ Blue Box Material ☐ Processed Organics ☒ Leaf and Yard Waste	☐ Food Processing/Preparation Operations Waste ☐ Hauled Sewage Other:
Subject Waste Approved Waste Classes: Hazardous & Liquid Industrial *(separate waste classes by comma)*	None		

Year Site Opened *(enter the Calendar Year only)*	1977	**Current ECA Issue Date**	March 30, 2010

Is your Site required to submit Financial Assurance?	○ **Yes** ● **No**
Describe how your WDS is designed.	● Natural Attenuation only ○ Fully engineered Facility ○ Partially engineered Facility
Does your Site have an approved Contaminant Attenuation Zone?	● **Yes** ○ **No**
If closed, specify ECA, control or authorizing document closure date:	Select Date
Has the nature of the operations at the site changed during this monitoring period?	● **Yes** ○ **No**
If yes, provide details:	Waste is managed at the North Lancaster site during the summer months from June 1st to September 30th and at the Beaver Brook Road Landfill during remainder of the year. Accordingly, the North Lancaster Landfill did not receive waste from January 1 to May 31, 2021 and from October 1 to December 31, 2021.

Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i.e. exceeded the LEL for methane)	○ Yes ● No

Groundwater WDS Verification:

Based on all available information about the site and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:	● **Yes** ○ **No**	
2) All groundwater, leachate and landfill gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by ECA or other relevant authorizing/ control document(s):	○ **Yes** ● **No** ○ **Not Applicable**	If no, list exceptions below or attach information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
06-2s 06-4d	No or low volume water to sample. No sample collected.	25-May-2021
06-4d	Low water volume. No sample collected	21-Oct-2021

3) a) Some or all groundwater, leachate and landfill gas sampling and monitoring requirements have been established or defined outside of a ministry ECA, authorizing, or control document.	○ **Yes** ● **No** ○ **Not Applicable**	
b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:	○ **Yes** ○ **No** ● **Not Applicable**	If no, list exceptions below or attach additional information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**

4) All field work for groundwater investigations was done in accordance with Standard Operating Procedures (SOP) as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	● **Yes** ○ **No**	If no, specify (Type Here):
Sampling and Monitoring Program Results/WDS Conditions and Assessment:		
5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/ or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.	● **Yes** ○ **No**	
6) The site meets compliance and assessment criteria.	○ **Yes** ● **No**	Exceedances of Policy B-7 for iron, manganese, TDS, organic-nitrogen, and sodium, and Policy B-9 for iron, TDS, and organic-N occurred at select wells. The data demonstrates that no detectable WDS impact occurred in the groundwater monitors.
7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.	● **Yes** ○ **No**	If no, list exceptions and explain reason for increase/change (Type Here):

1) Is one or more of the following risk reduction practices in place at the site: ***(a)* There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/ treatment; or** ***(b)* There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or** ***(c)* The site meets the following two conditions (typically achieved after 15 years or longer of site operation):** ***i.*The site has developed stable leachate mound(s) and stable leachate plume geometry/ concentrations; and** ***ii.*Seasonal and annual water levels and water quality fluctuations are well understood.**	● **Yes** ○ **No**	**Note which practice(s):**	☐ **(a)** ☐ **(b)** ☒ **(c)**
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	○ **Yes** ● **No** ○ **Not Applicable**	If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here):	

Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Environmental Compliance Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

● **No changes to the monitoring program are recommended** ○ **The following change(s) to the monitoring program is/are recommended:**	
● **No Changes to site design and operation are recommended** ○ **The following change(s) to the site design and operation is/are recommended:**	
Name:	Andrew Harwood, M.Eng., P.Eng.
Seal:	Add Image LICENSED PROFESSIONAL ENGINEER A.M. Harwood A.M. HARWOOD 29/03/2022 PROVINCE OF ONTARIO

Signature:	A M Harwood	**Date:**	2022-03-29
CEP Contact Information:	Andrew Harwood, M.Eng., P.Eng.		
Company:	WSP Golder		
Address:	1931 Robertson Road Ottawa, ON K2H 5B7		
Telephone No.:	613-592-9600	Fax No. :	
E-mail Address:	Andrew.Harwood@wsp.com		
Co-signers for additional expertise provided:			
Signature:		**Date:**	Select Date
Signature:		**Date:**	Select Date

Surface Water WDS Verification:

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):

Name (s)	Beaudette River

Distance(s)	250 m north of the licensed landfill limit and 440 m north of the approved fill area.

Based on all available information and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:	● **Yes** ○ **No**	If no, identify issues (Type Here):
2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the ECA or relevant authorizing/control document(s) (if applicable):	○ **Yes** ● **No** ○ **Not applicable**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
S-2, S-7, S-8	Surface water stations were dry	26-May-2021
S-2, S-7, S-8	Surface water stations were dry	14-Jul-2021
S-2, S-7, S-8	Surface water stations were dry	4-Oct-2021
Type Here	Type Here	Select Date

3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry ECA or authorizing/control document.	○ **Yes** ● **No** ○ **Not Applicable**	
b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:	○ **Yes** ○ **No** ● **Not Applicable**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

4) All field work for surface water investigations was done in accordance with SOP, including internal/external QA/QC requirements, as established/outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	● **Yes** ○ **No**	If no, specify (Type Here):

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation, regulations, Water Management Policies, Guidelines and Provincial Water Quality Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or Table B in the Technical Guidance Document (Section 4.6):	○ **Yes** ● **No**

If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table on the following page or provide details in an attachment:

Parameter	**Compliance or Assessment Criteria or Background**	**Amount by which Compliance or Assessment Criteria or Background Exceeded**
e.g. Nickel	e.g. ECA limit, PWQO, background	e.g. X% above PWQO
S-3, Fe S-5, Fe S-5 Pb S-3, S-4, S-5 NO2 S-6 NO2	Table A MECP Assessment Criteria (MOE Guidance, 2010) Table B MECP Assessment Criteria (MOE Guidance, 2010)	63%, 27% above in July and October 161%, 1000% above in May and July 119% above in July each 17% above in May 33% above in May
S-3 Zn S-5 Zn S-3 Fe S-4 Fe S-5 Fe S-6 Fe	Table B MECP Assessment Criteria (MOE Guidance, 2010) PWQO	23% above in July 1867% above in July 44%, 443%, 323 above in May, July and October 70% , 116%, 46% above in May, July and October 770%, 3,567% , 20% above in May, July and October 107%, 42% above in May and October
S-3 TP S-4 TP S-5 TP S-6 TP	PWQO	267%, 467%, 4933% above in May, July and October 233%, 1,067%, 100% above in May, July and October 1,033%, 4,733%, 100% above in May, July and October 233%, 67%, 67% above in May, July and October
S-3 Zn S-4 Zn S-5 Zn S-5 Cu	PWQO	85%, 25% above in July and October 50%, 30% above in July and October 5%, 195% above in May and July 222% above in July
6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	● **Yes** ○ **No**	PWQO exceedances occurred in 2021 for iron, total phosphorus at all locations monitored, including the upstream location. The PWQO limit was exceeded for un-ionized ammonia at background station S-1a in October but was within limits in the duplicate sample at this location. Zinc at surface water station station S-1a, and S-3 exceeded the PWQO limit in July and October while S-4 and S-5 exceeded the limit in the May and July sampling events. The PWQO limit for copper was exceeded at S-5 in July. Results exceeding the PWQO occur at multiple sampling stations with no discernible correlation to the WDS. Previous reports indicate that exceedances of these criteria are common to Eastern Ontario streams and small drains. Other local sources including area roads, road salt application, former salt storage, and agricultural land use are likely contributing to surface water quality in the vicinity of the WDS

7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.	○ **Yes** ● **No**	Results are variable, but are not interpreted to be leachate-related.
8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g. , PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):	● Yes ○ No ○ Not Known ○ Not Applicable	Monitoring wells are located between the landfill and the Beaudette River whose sampling results are compared to the PWQO. Occasional exceedances of PWQO were observed in 2021 for B, Fe, Phenol and pH in the groundwater quality. Although seasonal connectivity between the groundwater and Beaudette River is evident, upstream vs. downstream effects are not observed in the surface water.
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	○ **Yes** ● **No** ○ **Not Applicable**	Exceedances of trigger limits were noted for nitrate + nitrite at surface water station S-1a during each monitoring event, and for sodium and chloride in October. The trigger limit for potassium was exceeded in July at S-4 and S-5 and in October at S-3 and S-5. Stations S-1a, S-3, S-4 and S-5 each demonstrated exceedances of the trigger limit for ammonia during 2021. The data demonstrates that no detectable WDS impact on the surface water quality in the Beaudette River was evident in 2021.

Surface Water CEP Declaration:

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.

I have examined the applicable Environmental Compliance Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended) and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

● **No Changes to the monitoring program are recommended** ○ **The following change(s) to the monitoring program is/are recommended:**	Type Here
● **No changes to the site design and operation are recommended** ○ **The following change(s) to the site design and operation is/ are recommended:**	

CEP Signature	A M Harwood	
Relevant Discipline	Environmental Engineer	
Date:	2022-03-29	
CEP Contact Information:	Andrew Harwood, M.Eng., P.Eng.	
Company:	WSP Golder	
Address:	1931 Robertson Road Ottawa, Ontario K2H 5B7	
Telephone No.:	613-592-9600	
Fax No. :		
E-mail Address:	Andrew.Harwood@wsp.com	
Save As		**Print Form**

APPENDIX

B CORRESPONDENCE

GENIVAR

Ministry of the Environment
Environmental Assessment and Approvals Branch
2 St. Clair Avenue W, Floor 12A
Toronto, Ontario
M4V 1L5

January 31, 2011

Attn: Director, Waste Management Branch

Re: North Lancaster Landfill
Certificate of Approval No. A481403 Amendment

Dear Sir/Madame:

Further to our meeting of November 15, 2010 regarding the North Lancaster Landfill, GENIVAR is corresponding on behalf of the Township of South Glengarry to request an amendment to the North Lancaster Landfill Certificate of Approval (CofA No. A481403). Each item is detailed below.

Certificate of Approval

The landfill footprint in the CofA should state

> "…*a 3.8 ha landfill footprint within a total site area of 58.4 ha (including buffer areas)*".

Section 14 – Acquisition of Groundwater Rights

> The groundwater rights contract (attached) has been renewed with the landowner for West Part Lot 25 in the Township of South Glengarry, County of Glengarry, lying south of the Beaudette River.

Section 15 – Certificate of Prohibition

> The Certificate of Prohibition has been completed (attached) and is awaiting the signature of the Director prior to the registration on title with the land registry office.

Section 25 and 26 – Landfill Base and Final Contour drawings

> We noted to the MOE at the meeting, and on-site, that the area fill is occurring on top of previously filled waste trenches. The landfill operation, until recently, occurred via trench and fill methodology per the previous CofA. We have enclosed the revised site development plans that show the waste filling evolution above these former trenches. The landfill base grades and water table elevation of the shallow overburden aquifer is also shown (Figure 1).

Section 27 – Geotechnical Assessment

> A geotechnical assessment was undertaken by St. Lawrence Testing (SLT), under the supervision of GENIVAR, on July 12, 2010. Five test pits were excavated at the site proximate to the landfill footprint (see attached SLT report). SLT indicated that a clean glacial till or landfill material overlies a brown, moist, compact to dense silty sand till with some clay, gravel, cobbles and boulders. The bearing capacity was determined by SLT to be 200 KPa in the range of 1.2 to 1.5 m below grade and 300 KPa in the range of 1.7 to 2.1 m below grade.

Section 28 – Waste Type

In the CofA it states that only non-hazardous, solid municipal waste shall be accepted at this site. The waste stream should be amended to include commercial, industrial, and institutional non-hazardous, solid waste.

Section 32 – Service Area

The Township requests that the service area be amended to state:

Only waste that is generated in the Township of South Glengarry shall be accepted at the Site.

There is no definition for the former Township of Lancaster since amalgamation in 1998. The Township would like to enable residence to utilize either of the South Glengarry operated landfills (North Lancaster and Beaver Brook Road). The ability for the Township to have all Township waste be deposited at either of their landfills enables the Township flexibility in its operations (i.e. waste contract procurement, possible temporary winter closure of one site, etc.).

Section 52 – Operations Manual

The Development and Operations Plan has been completed and provided to MOE Cornwall on December 22, 2010. The Development and Operation Plan details the operation of the site, emergency procedures and contingency plans as well as the required records that will be kept.

Section 54 – Landfill Limits

It was determined through topographical survey that fill had been spread and compacted just beyond the approved footprint limit toward the south end of the landfill. In lieu of uncovering and moving this compacted waste back within the footprint it was discussed with the MOE regarding the Township amending the CofA and reconfiguring the landfill footprint to encompass this area (however, the same waste capacity limit would be achieved).

The attached drawings depict the proposed waste footprint and final contours (Figure 1). We have calculated the waste beyond footprint volume to be 13,000 m^3 (combined at the southeast and southwest parts of the site). As noted, we have deducted the fill beyond footprint volume (13,000 m^3) from the approved fill envelope (242,000 m^3) and re-configured the final waste contours. The new shape now incorporates a 0.5% longitudinal slope across the entire north-south profile to reduce the volume accordingly. Note the final waste elevation will be about 1 m lower than the original approved contour at the north end. The south end is about the same elevation as the original approval.

The area which is beyond the current footprint to the west encroaches about 25 m on the stipulated 30 m property buffer limit, however; the Township owns the property west of the landfill which forms part of the CAZ for the landfill. There are 12 monitoring wells located in the CAZ property to the west which will delineate the extent of any impact the landfill may have to the west (Figure 3.12).

The area to the east encroaches about 20 m on the 30 m property buffer limit. The Township is in the process of acquiring the adjacent land or groundwater rights (up to 8.0 ha) of the property to the east of the landfill as buffer (Figure 3.12). It may be necessary to install tri-level monitoring wells (into shallow and deep overburden and bedrock aquifers) at the edge of the site boundary to characterize possible impacts and confirm the buffer dimensions. To further reduce impacts, the area of the landfill that is beyond the current footprint to the east will have final cover applied as per the Development and Operations Plan (Figure 1).

Section 56 – Landfill Cover

The last sentence of the third bullet point should state: *"…Fill areas will be progressively completed and have final cover and topsoil applied once final contour is reached".*

Section 58 – Hours of Operation

This should be amended to say:

"*Public access to the Site for waste deposition shall only be accepted during the following time periods:…"*

Section 65 – Employees and Training

Records will be kept of employee training. The Township is investigating its options for a trained landfill attendant.

Additional Information

Alternative Final Cover

It is anticipated that once the new footprint is approved, that the southern portion of the approved waste limit, including the waste beyond limits portion, may be near final contour elevation and thereby require final cover application.

The Township is seeking approval to utilize materials removed from the Township-owned sewage lagoon at Green Valley as an alternative final cover. The Township recently de-sludged one of these lagoons and anticipates de-sludging the second lagoon in 2011.

GENIVAR reviewed the potential use of this material as a soil conditioner. The stockpiled lagoon material was sampled on September 27, 2010 and sent to Caduceon Laboratory for quality testing. Samples were analyzed for pH, total solids, nutrients and metals. The results of the analysis are attached. The biosolids contain 7 mg/L of plant available nitrogen (i.e., ammonium plus nitrate) and 3,770 mg/L of TKN which will mineralize to plant available forms over time encouraging vegetative growth which will control erosion. The nutrient value was very poor and it is primarily inorganic clay. Accordingly, its best application is as landfill cap material. Since the nutrient value was low, the sample was submitted for geotechnical evaluation as discussed in the following section.

GENIVAR sampled the Green Valley east lagoon material on November 18, 2010 and sent the samples to the Paterson Group for a grain size analysis and standard proctor test (SPT). The results indicated that the material consists of 74% clay, 24% silt and 1 % sand. The moisture content was measured to be 88%. This material could satisfy the permeability requirements for final capping material at the landfill.

Diversion Initiatives

In addition to the current diversion initiatives (i.e. blue/black box program, HHW days, tire, metal/white goods, clean wood segregation) the Township would like to add an on-site recycle/reclamation area. This area would have various locations designated for re-usable waste, traditional recyclables (i.e. PET, cans, boxboard, cardboard, glass), electronics, and propane canisters. The re-use/recycle area will be located next to the operators building (Figure 3.12). The site attendant will direct the public on disposal locations for the recyclable waste. Public will be able to obtain any items from the reclamation/re-use area. The CofA should be amended to include this provision.

Landfill Equipment

Compaction equipment for the landfill is shared between the two Township owned landfills. The equipment is brought to the site on a weekly basis to undertake compaction of the landfill. The Township is reviewing the type of compaction equipment and interim cover methodology to ensure that optimal compaction and volume use is occurring (target 500 kg/m^3).

Surface Water at Southwest Corner of Landfill

Correspondence from the Township of South Glengarry (dated December 21, 2010) indicated that the surface water pooling at the southwest corner of the landfilling area was removed by David Brown Environmental Services for off-site treatment and disposal. The area was re-graded to promote positive drainage thereby eliminating standing water in this area.

Should you have any questions or comments please contact the undersigned.

Regards,

GENIVAR Inc.

John St. Marseille

John St. Marseille, M.Sc., P.Eng., P.Geo.
Manager, Environmental Engineering

JSTM/jbh

cc. Lisa Chalmers, MOE Cornwall
Ewen MacDonald, Township of South Glengarry

Attached. Groundwater Rights Agreement
Certificate of Prohibition
Figure 1
Figure 3.12

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

Solid Non-Hazardous Waste Disposal Site Inspection Report

Client:	The Corporation of the Township of South Glengarry Mailing Address: 6 Oak St, Post Office Box, 220, South Glengarry, Ontario, Canada, K0C 1N0 Physical Address: 6 Oak St, South Glengarry, Township, United Counties of Stormont, Dundas and Glengarry, Ontario, Canada, K0C 1N0 Telephone: (613)347-1166, email: emacdonald@southglengarry.com Client #: 0708-4FUM6X, Client Type: Municipal Government, NAICS: 913910		
Inspection Site Address:	North Lancaster Landfill Address: Lot: Pt. Lot 25, Concession: 6 and 7, Geographic Township: CHARLOTTENBURGH, South Glengarry, Township, United Counties of Stormont Dundas and Glengarry District Office: Cornwall LIO GeoReference: Zone: , UTM Easting: , UTM Northing: , Latitude: 45.1849, Longitude: -74.6751 Site #: 6439-5PVH99		
Contact Name:	Ewen MacDonald	**Title:**	General Manager, Infrastructure Services
Contact Telephone:	(613) 347-1166 **ext**228	**Contact Fax:**	(613) 347-3411
Last Inspection Date:	2019/07/17		
Inspection Start Date:	2021/01/26	**Inspection Finish Date:**	2021/01/26
Region:	Eastern		

1.0 INTRODUCTION

The purpose of the Ministry of the Environment, Conservation and Parks' (MECP or the Ministry) compliance inspection program for solid non-hazardous waste disposal sites is to ensure that these sites are in conformance with MECP legislation, control documents, and waste-related policies and guidelines. This includes, but may not necessarily be limited to, compliance and/or conformance with the following:

- The Environmental Protection Act (the EPA);
- The Ontario Water Resources Act (the OWRA);
- Ontario Regulation 347: General - Waste Management (O. Reg. 347);
- Environmental Compliance Approval No. A481403 (the ECA);
- Provincial Officer Order (P.O.O) and / or Director's Order (as they may apply);
- Ministry Guideline B-7: Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities; and
- Ministry Guideline C-5 Registration on Title of Certificates of Approval for Waste Disposal Sites.

The Ministry conducts monitoring and enforcement functions by responding to pollution incident reports, conducting field inspections of waste disposal sites, and by reviewing monitoring reports submitted by each landfill operator.

A desktop inspection was conducted of the North Lancaster Waste Disposal Site (the Site and/or WDS), owned and operated by the Township of South Glengarry (the Township) during January 2021. The focus of this inspection report is the groundwater and surface water impacts, as discussed in recent annual monitoring

reports and Ministry Technical Support Section (TSS) review and recommendations.

A physical inspection was conducted by the Ministry in 2019 and did not observe any significant non-compliance. These findings are documented under Inspection Report Reference No. 6357-B9XP34.

The following appendices are included with this inspection report:
- MECP TSS Groundwater memorandum, dated January 22, 2021, authored by Thomas Guo, M/ Eng., P. Geo.
- MECP TSS Surface Water memorandum, dated January 25, 2021, authored by Lauren Forrester, M.Sc.

2.0 INSPECTION OBSERVATIONS

Certificate of Approval Number(s):

Please note that as of 2011, the Ministry term "Certificate of Approval" has been replaced with "Environmental Compliance Approval" or "ECA".

The WDS originally began operation under Certificate of Approval No. A481403, issued around 1971 and was annually re-issued until 1979. This Certificate of Approval is no longer active.

In June 1980, Certificate of Approval No. A481403 was issued to the Township which allowed for the disposal of domestic, commerical and non-hazardous solid industrial waste at the Site. In 1988, as a result of a Solid Waste Management Project, an Environmental Assessment (EA) was conducted to subsequently receive approval to expand the Site, which was provided to the Ministry February 2003.

In 1995, a Notice amending the Certificate of Approval was issued for roll-off recycling containers and in 1998, by request of the Ministry, the Township provided an updated Design and Operations Report.

In June 2008, the Ministry received an application to amend Certificate of Approval No. A481403, which resulted in the revocation and replacement of the conditions of the Certificate of Approval with new conditions. On March 30, 2010, the revised Certificate of Approval was issued to the Township.

An application to amend this Certificate was received by the Ministry which resulted in the issuance of Notice No. 1 in December 2011.

2.1 FINANCIAL ASSURANCE:

Specifics:

Financial Assurance (FA) is authorized under Part XII of the EPA and allows Directors to require, as a condition of an order, approval or by regulation, the provision of financial security by regulated parties. FA can be required either to ensure compliance with environmental objectives, ensure that requirements are achieved by a specified deadline, or to ensure that funds are available for future clean-up and remediation of landfills and other contaminated sites. As the Site is owned and operated by the Township of South Glengarry, **FA is not required**.

2.2 APPROVED AREA OF THE SITE:

Specifics:

ECA No. A481403 states that the approved total area of the Site is 47.3 hectares and the approved landfilling area (footprint) is 3.8 hectares.

2.3 APPROVED CAPACITY:

Specifics:

2.4 ACCESS CONTROL:

Specifics:

2.5 COVER MATERIAL:

Specifics:

2.6 WASTE BURNING:

Specifics:

2.7 GROUNDWATER/SURFACEWATER IMPACT:

Specifics:

Groundwater Impact

Ministry Guideline B-7, "Reasonable Use Guidance" (RUG) establishes the basis for determining the 'reasonable use' of groundwater on property adjacent to sources of contaminants and for determining the levels of contaminant discharges considered acceptable by the Ministry.

The hydrogeologically pertinent sections of the 2019 Annual Monitoring Report for the North Lancaster Waste Disposal Site was reviewed by the Ministry's Technical Support Section (TSS). The review found that the Site is not in compliance with the RUG as there are exceedances of the RUG limits at monitoring well nest 99-7, located at the western property boundary.

To address the non-compliance issues, the Township of South Glengarry has acquired several additional lands and Land Use Right in the vicinity of the Site. Even with the inclusion of these lands as a contaminant attenuation zone (CAZ) on the ECA, the Site may not be in compliance with the RUG in the overburden and shallow bedrock aquifers. **Please refer to Section 5.0 of this report.**

The hydrogeological conceptual model is migration of leachate to the northwest changing to the north-northeast and ultimately discharging into the Beaudette River. Therefore, there is potential for surface water impacts to the Beaudette River.

Surface Water Impact

Provincial Water Quality Objectives (PWQO) were created by the Ministry to ensure that water quality is satisfactory for aquatic life and recreation and that water uses which require more stringent water quality may be protected on a site-specific basis.

Phosphorus and iron were found to exceed the PWQO at all surface water stations (except S-1A). Zinc also exceeded the PWQO in the Beaudette River (S-4) in October (stagnant conditions were noted). The Township's consultant, WSP, conclude that these exceedances reflect background conditions and/or local sources (roads, road salt application, salt storage, agricultural use). WSP concludes that no significant leachate-related trends are evident. Ministry TSS agrees with this.

Based on the available surface water data, the Site does not appear to be resulting in significant negative impacts to downgradient surface water at this time. As recommended by WSP, all Site perimeter ditches should be inspected for possible leachate seeps and erosion of ditch banks, particularly as the application rates for interim cover are adjusted to optimize landfill capacity. **Please refer to Section 5.0 of this report.**

2.8 LEACHATE CONTROL SYSTEM:

Specifics:

2.9 METHANE GAS CONTROL SYSTEM:

Specifics:

2.10 OTHER WASTES:

Specifics:

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

The non-compliance of the RUG has been identified in previous inspection reports and discussed with the Township and their consultant. As mentioned in Section 2.7 of this report, to address the non-compliance issues, the Township has acquired several additional lands and Land Use Rights (LUR) in the vicinity of the Site. However, even with the inclusion of these lands as CAZ on the ECA, the Site may not be in compliance with the RUG in the overburden and shallow bedrock aquifers, as stated in Appendix A of this report.

The 2019 inspection conducted at the Site found that flags were not in place to mark the landfill footprint. **This has not been addressed by the Township.**

4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?

No

Specifics:

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?

Yes

Specifics:

- The Site is not in compliance with the Reasonable Use Guideline B-7 as there are exceedances of the RUG limits at monitoring well nest 99-7, located at the western property boundary.
- Perimeter ditches should be inspected for possible leachate seeps and erosion of ditch banks.
- The Landfill footprint has not been flagged to ensure waste is deposited within the approved area.

Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ?

No

Specifics:

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?

No

Specifics:

Was there any indication of minor administrative non-compliance?

Yes

Specifics:

- The newly acquired 1.2 ha CAZ and 11.1 ha of groundwater rights are not included in the ECA.
- Future reports should include figures showing the locations of monitoring stations relative to the landfill to support the review and interpretation. While the figures were listed within the Table of Contents for the 2019 Annual Report, they were not included in the electronic file.

5.0 ACTION(S) REQUIRED

Upon review of Appendices A and B of this report, the Township shall:

1. By no later than March 31, 2021, provide a workplan to the Ministry that addresses the review recommendations made by the Ministry's Technical Support Section. The Ministry will review this workplan and confirm whether or not it is sufficient to address the non-compliance.
2. By no later than March 31, 2021, submit an application to amend the ECA to include the newly acquired CAZ and groundwater rights.
3. By no later than May 31, 2021, confirm with the Ministry that flags have been installed to mark the approved landfill footprint for waste deposition.

6.0 OTHER INSPECTION FINDINGS

WSP recommends that the deep bedrock monitors 99-2dBR; 00-4dBR; 06-1dBR and 06-4dBR should be removed from the monitoring program. The Ministry's TSS agrees with this and therefore they can be decommissioned as per Regulation 903, as amended. This is detailed in Appendix A of this report.

7.0 INCIDENT REPORT

Applicable
3204-BEDJ8Q

8.0 ATTACHMENTS

Appendix A.pdf; Appendix B.pdf

PREPARED BY:
Environmental Officer:
Name: **Erin Legue**
District Office: **Ottawa District Office**
Date: **2021/02/01**
Signature

REVIEWED BY:
District Supervisor:
Name: **Michael Seguin**
District Office: **Cornwall Area Office**
Date: **2021/02/04**

Signature:

File Storage Number: SI GL SG

Note:
"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements"

We want to hear from you. Please tell us about the quality of your interaction with our staff. You can provide feedback at 1-888-745-8888.

Appendix A: MECP TSS Groundwater Memorandum

Ministry of the Environment, Conservation and Parks
Eastern Region
1259 Gardiners Road, Unit 3
Kingston ON K7P 3J6
Phone: 613.549.4000
or 1.800.267.0974

Ministère de l'Environnement, de la Protection de la nature et des Parcs
Région de l'Est
1259, rue Gardiners, unité 3
Kingston (Ontario) K7P 3J6
Tél: 613 549-4000
ou 1 800 267-0974

Ontario

MEMORANDUM

January 22, 2021

TO: Erin Legue
Senior Environmental Officer
Cornwall Area Office
Eastern Region

FROM: Thomas Guo
Hydrogeologist
Technical Support Section
Eastern Region

RE: 2019 Annual Report
North Lancaster Waste Disposal Site
Part Lot 25, Concession 6, Geographic Region of Lancaster
Township of South Glengarry
United Counties of Stormont, Dundas and Glengarry

Environmental Compliance Approval (ECA): A481403

I have reviewed the hydrogeologically pertinent sections of the document entitled “North Lancaster Waste Disposal Site, 2019 Annual Monitoring Report”, prepared by WSP Canada Inc. (WSP) and dated March 25, 2020. The report was provided on behalf of the Township of South Glengarry to document the 2019 monitoring results in the site. I offer the following comments for your consideration.

Summary

- Reasonable Use Guideline B-7 (RUG) applies to operating waste disposal sites and sites that closed post 1986. The North Lancaster waste disposal site (WDS) is an active site, thus the RUG applies to the site;
- The site is not in compliance with RUG as there are exceedances of the RUG limits at monitoring well nest 99-7, located at the western property boundary;
- To address the non-compliance issues, the Township has acquired several additional lands and Land Use Right (LUR) in the vicinity of the landfill site. Even with the inclusion of these lands as contaminant attenuation zone (CAZ) on the ECA, the site may not be in compliance with the RUG in the overburden and shallow bedrock aquifers. The township should addess the non-compliance;
- It is my understanding that the newly acquired 1.2 ha CAZ and 11.1 groundwater right are not registred in the ECA. The township should ammend the ECA to include the the newly acquired CAZ and groundwater right;
- The hydrogeological conceptual model is migration of leachate to the northwest changing to the north-northeast and ultimately discharging to the Beaudette River. Therefore there is a potential for surface water impacts to the Beaudette River;

- Two (2) domestic wells located north of the site across the Beaudette River were sampled.). The monitoring results indicate that these two domestic wells are not impacted by the landfill leachate or the salt storage; and

- I concur with consultant's following recommendations:
  - The deep bedrock monitors 99-2dBR; 00-2dBR; 00-4dBR; 06-2dBR; 06-1dBR; and 06-4dBR should be removed from the monitoring program;
  - Monitoring of groundwater should continue semi-annually as per the monitoring program outlined in the ECA; and
  - The domestic wells should continue to be sampled annually.

Environmental Compliance Approval (ECA)

The North Lancaster WDS is situated on the east half of Lot 25, Concession 6, Lancaster Township. The Site has been in operation since 1977 and has a projected operating life to the year 2040. The approved footprint is 3.8 ha within a 47.3 ha area. Under the existing ECA A481403, the site is approved to accept only non-hazardous solid municipal, commercial, industrial and institutional waste generated within the Township of South Glengarry. Waste is currently disposed using the area fill method within Area 10 of the Site development plan. The North Lancaster WDS functions as a natural attenuation landfill.

The site was issued originally ECA No. A481403 on June 24, 1980 and amended on February 13, 1995 to allow the location and operation of a recycling transfer station on the site. On December 13, 2011, an amendment to the ECA was granted for waste disposal site.

It was determined that waste fill had been spread and compacted beyond the approved footprint limit towards the southeast (and some of the southeast) part of the Site. A Fill Beyond Approved Limit (FBAL) request was submitted by the landfill site owner on January 31, 2011.

It was also noted by the landfill site owner that there had been a salt/sand stockpile located on-site at the north end of the landfill from about 1978 to 1989.

Site Settings

The WDS is located approximately two (2) kilometres north of the hamlet of North Lancaster.

Locally, surface drainage flows northerly, but flows are seasonally intermittent. A ditch conveying water north is located about 100 m west of the current waste footprint and drains into the Beaudette River. This ditch is dry year-round except for brief periods following heavy rain events and during the spring freshet. As noted in the hydrogeological interpretation, the shallow overburden groundwater flow contributes to flow in this ditch from the east (i.e. waste disposal area), resulting in a potential for impacts on the ditch. Station S-2 is intended to monitor potential downstream (derived) impactsis. The Beaudette River area catchment eventually discharges into the St. Lawrence River near the Ontario-Quebec border.

The site is remotely located and surrounded by mature vegetation and agricultural lands. Most of the surrounding land is undeveloped, featuring mature forests.

Geology

WSP determined the geology to be:

- Brown silty sand till (Fort Covington);

- Grey sandy silt till (Malone);
- Marine deposits of shallow clay overlying marine outwash (granular deposit) to the north of the waste disposal site;
- Limestone and shale bedrock (Ottawa Formation) 5- 7 metres below ground surface with the upper 5 metres of bedrock being weathered and fractured and underlying bedrock being more competent.

Hydrogeology

The consultants determined the physical hydrogeological characteristics to be:

Shallow Overburden (Fort Covington Till)

- The average horizontal hydraulic gradient in the area of the waste mound is approximately 0.024 m/m, generally in a northwesterly direction;
- The vertical gradient are predominantly downwards (recharge conditions) changing to upwards in the vicinity of the Beaudette River (discharge conditions);
- The estimated hydraulic conductivity ranges from 10 x10^{-6} to 10 x 10^{-8} m/s;
- The main migration pathway for contamination in this unit is vertical (downwards).

Deeper Overburden (Malone Till)

- The deep overburden groundwater flow direction in the vicinity of the waste mound is towards the north with an average gradient of approximately 0.024 m/m;
- The vertical gradient are predominantly downwards (recharge conditions) changing to upwards in the vicinity of the Beaudette River (discharge conditions);
- The main migration pathway for contamination in this unit is vertical (downwards).

Shallow Bedrock

- The shallow bedrock groundwater flow direction in the vicinity of the waste mound is generally towards the northwest with an average horizontal gradient of approximately 0.036 m/m in the vicinity of the waste disposal area;
- The vertical gradient are predominantly downwards (recharge conditions) changing to upwards in the vicinity of the Beaudette River (discharge conditions);
- The estimated hydraulic conductivity ranges from 10 x 10^{-5} to 10 x 10^{-8} m/s;
- The main migration pathway for contamination in this unit is horizontal.

Deep Bedrock

- Groundwater flow direction in the deep bedrock is interpreted to be towards the north;
- The vertical gradient are predominantly downwards (recharge conditions);
- The deep bedrock wells are not hydraulically connected, or very poorly connected, to the deep bedrock aquife; and
- The main migration pathway for contamination in this unit is horizontal.

Hydrogeological Conceptual Model

Leachate will migrate predominately vertically in the overburden unit to the underlying shallow bedrock unit where it will migrate predominately horizontal to the northwest changing to the north-northeast. The shallow bedrock unit is currently interpreted to be the primary pathway for leachate migration.

Groundwater Monitoring

The compliance monitoring wells include 46 groundwater monitors located upgradient and downgradient of the site, and within the buffer area. Sampling of the monitors occurs annually (spring) at 12 locations and semi-annually (spring and fall) at 34 locations per the approved monitoring program.

In 2019, the spring sampling event took place on April 29, 30 and May 1; the fall sampling event occurred on October 1 and 2.

Background Groundwater Quality

Monitoring wells 96-1 and 99-1 are located to the south of the site, hydraulically upgradient of the waste.

Monitoring Well 96-1 is completed in the shallow overburden unit. The water quality in this well is representative of background water quality in the shallow overburden unit. In 2019, hardness, manganese and organic nitrogen were detected to exceed Ontario Drinking Water Quality Standards (ODWQS) at 96-1

Monitoring Well 99-1d is completed in the deeper overburden unit. The water quality in this well is representative of background water quality in the deeper overburden unit. In 2019, only hardness was detected to exceed the ODWQS at 99-1d.

Monitoring Well 99-1sBR is completed in the shallow bedrock unit. The water quality in this monitoring well is representative of background water quality in the shallow bedrock unit. In 2019, only hardness was detected to exceed the ODWQS at 99-1sBR.

Leachate

The consultant uses monitoring wells 96-3s, 96-3d, 97-4d and 06-3dBR as the leachate monitoring wells.

Monitoring Well 96-3s is located hydraulically downgradient of the waste. This monitoring well is completed in the shallow overburden unit. The water quality in this monitoring well is representative of leachate as numerous typical leachate parameters show elevated concentrations in comparison to background water quality.

Monitoring Well 96-3d is located hydraulically downgradient of the waste. This monitoring well is completed in the deeper overburden unit. The water quality in this monitoring well is representative of leachate as numerous typical leachate parameters show elevated concentrations in comparison to background water quality.

Monitoring Well 06-3dBR is located hydraulically downgradient of the waste. This monitoring well is completed in the deeper bedrock unit. Monitoring well t 06-3dBR is located in the former salt storage area, which may explain the elevated chloride results.

With the exception of nitrate at 96-3s, and 97-4d, sulphate at 97-4d, and chloride at 06- 3dBR, the leachate quality at the North Lancaster WDS is in the low range of typical leachate concentrations, as would be expected for a small rural WDS. Although other parameters may contribute to the site's leachate signature, apparent leachate indicators were determined to be chloride, sodium, ammonia, TKN (Total Kjeldahl Nitrogen) and COD (chemical oxygen demand). These parameters were utilized to assess leachate impacts.

The leachate indicator parameters are more elevated in the deeper overburden monitoring well (96-3d) than in the shallow overburden monitoring well (96-3s).

Downgradient Water Quality

The consultant used chloride and conductivity as the primary leachate indicator parameters. They are conservative leachate indicator parameters and can be used a tracer of the leachate; however the historical storage of salt on the property also impacts these parameters.

Leachate impacts are evident in the shallow overburden monitoring wells in proximity to the waste (97-2s, 99-7s, 99-8s, 00-1s,00-2s and 00-3s).

Leachate impacts are evident in the deeper overburden monitoring wells in proximity to the waste (96-2d, 97-3d).

Leachate impacts are evident in the shallow bedrock monitoring wells in proximity to the waste (99-2sBR, 99-3sBR, 99-4sBR, 99-6sBR and 99-8sBR).

Leachate impacts have not been determined yet in the deep bedrock monitoring wells since some of these wells seem to be impacted by salt storage or be mineralized.

Impacts of Historical Salt Storage

Information from former Township staff indicated that the salt was stored in the north part of the site's approved footprint. The exact extent and footprint is not known.

In the deep overburden, the salt impacts appear to be localized around monitoring well 96-3d, south of the place where the salt was stored.

In the sallow bedrock, the consultant states that the salt impacts still exist at monitoring wells 99-6SsBR (the salt was stored) and 99-4sBR (south of monitoring well 96-3d), and that the elevated chloride and sodium at monitoring well 00-2sBR are likely attributed to another source (Figure 5.0A).

In the deep bedrock, the consultant states that the very high concentrations of chloride and sodium at monitoring wells 00-2dBR, 00-4dBR and 06-1dBR are attributed to the deep saline formation, and accordingly that the salt impacts extend to monitoring wells 00-1dBR, and 00-5dBR (Figure 5.0 C).

Groundwater Surface Water Interaction

The hydrogeological conceptual model is leachate migration to the northwest changing to the north-northeast and ultimately discharging to the Beaudette River. Therefore there is a potential for surface water impacts to the Beaudette River. During high water table conditions, the shallow groundwater discharges to the drainage ditch to the west/northwest of the waste. Therefore there is a potential for surface water impacts to the drainage ditch.

Guideline B-7

Reasonable Use Guideline B-7 (RUG) applies to operating waste disposal sites and sites that closed post 1986. The site is an active site, thus the RUG applies to the site.

Exceedances of the RUG limit for iron were noted at 99-7s, 99-7sBR, and 99-7dBR (fall only). The limit for manganese was exceeded at 99-7s, 99-7sBR, 99-7dBR and 00-4s. the RUG limit of total dissolved solids (TDS) was exceeded at 99-7sBR, and 99-7dBR. Organic nitrogen exceedances occurred during each monitoring event at each location except for 00-4s, 06-1s, 06-1d and 06-4d in the fall. Sodium also exceeded the RUG limit in the fall at 99-7dBR.

The site is not in compliance with the RUG as there are exceedances of the RUG limits at the licensed property boundary.

To address the non-compliance issues, the Township has acquired following additional lands in the vicinity of the landfill site (Figure 2.1):

- 14.0 ha to the west of the site;
- 18.1 ha to the north-northeast of the site;
- 5.2 ha to the east-northeast of the site; and
- 1.2 ha to the east of the site.

In addition, the municipality has acquired the “groundwater rights” on an additional 11.1 ha of land to the northwest of the site. The municipality has proposed to acquire 8.0 ha of lands to the east of the site. As monitoring well nest 99-7 is located in the western property boundary, the site may not be in compliance with the RUG in the overburden and shallow bedrock aquiferss even with the inclusion of these lands as buffer zone and CAZ on the ECA. The township should addess the non-compliance.

It is my understanding that the newly acquired 1.2 ha CAZ and 11.1 groundwater right are not registred in the ECA. The township should ammend the ECA to include the the newly acquired CAZ and groundwater right.

Domestic Wells

There are three (3) private wells within one (1) km radius of the WDS (Figure 1.0). These wells are about 600, 610, and 950 m, respectively, north of the northern boundary of the WDS. Two of the three wells supply farm residences (PW-3 and PW-1), whereas PW-2 supplies a farm shed that is apparently used infrequently.

MECP well records indicate that these wells range in depth from 28 m (92’) at PW-2 and PW-3 to 92 m (303’) at PW-1. Two of the homeowners have agreed to participate in the monitoring program. Sampling of the raw supply water have occurred annually at PW-1 since June 2004 and at PW-3 since 2010. Several unsuccessful attempts have been made to contact the owner of PW-2, consequently, Well PW-2 is not included as part of the monitoring program.

Samples were collected at PW1 and PW3 in April 2019. PW1 indicated ODWS/OG exceedances for hardness and PW3 concentration was less than the lower limit for hardness. This low hardness is likely due to the softening treatment system. The monitoring results indicate that these two domestic wells are not impacted by the landfill leachate and the salt storage.

Groundwater Monitoring Program

WSP recommends that:

- The deep bedrock monitors 99-2dBR; 00-2dBR; 00-4dBR; 06-2dBR; 06-1dBR; and 06-4dBR should be removed from the monitoring program;
- Monitoring of groundwater should continue semi-annually as per the monitoring program outlined in the ECA; and
- The domestic wells should continue to be sampled annually.

I concur with these recommendations. The deep bedrock monitoring wells can be decommissioned as per Regulation 903 as amended.

Thomas Guo, M. Eng, P. Geo.
TG/

cc: Lauren Forrester, Surface Water Specialist
File No. GW ST SG 01 02 (North Lancaster WDS - A481403)
TG/IDS# 6112-BC5NMA

ec: Victor Castro, Water Resources Supervisor

Appendix B: MECP TSS Surface Water Memorandum

Ministry of the
Environment,
Conservation and Parks
Eastern Region
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Ministère de l'Environnement,
de la Protection de la nature
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Région de l'Est
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ou 1 800 267-0974

Ontario

MEMORANDUM

January 25, 2021

TO: Candice McKay
Senior Environmental Officer
Cornwall Area Office
Eastern Region

FROM: Lauren Forrester
Surface Water Specialist
Technical Support Section
Eastern Region

RE: 2019 Annual Monitoring Report
North Lancaster Waste Disposal Site
Lot 25, Concession 6, Lancaster Township
Township of South Glengarry
ECA No. No A481403

As requested, I have reviewed the subject report, prepared by WSP and dated March 2020. I offer the following comments in relation to surface water matters only.

Background

The North Lancaster Waste Disposal Site (WDS) has been in operation since 1977 and is operated as a natural attenuation landfill under Environmental Compliance Approval No. (ECA) A481403. The site operates only on a seasonal basis (during summer months). The ECA is approved for the disposal of non-hazardous solid municipal, commercial, industrial and institutional waste generated within the township of South Glengarry. The total approve site capacity is 242,000 cubic metres within a total site area of 59.4 ha. WSP interprets the remaining site capacity to be 33,878 m^3 following a 2019 topographic survey, equating to approximately 5.5 years (noting apparent over-application of interim cover), or up to 8.3 years (to 2031) with judicious use of interim cover material.

Leachate indicator parameters are identified as chloride, sodium, ammonia, Total Kjeldahl Nitrogen (TKN), and chemical oxygen demand (COD). A salt storage facility was previously located on the northern part of the property (up to 1989).

Leachate migration is interpreted to be to the northwest, then northeast in the shallow bedrock aquifer. There is potential for leachate migration to the Beaudette River via groundwater, as well as through interception of overburden groundwater in the ditch, under high water table conditions. The primary pathway for leachate migration is interpreted by the groundwater reviewer to be in bedrock.

Surface Water Regime

On-site surface water drainage is generally to the north. An intermittent ditch, about 100 metres west of the current waste footprint, drains water to the north towards the Beaudette River, which ultimately drains to the St. Lawrence River. It is noted that the ditch is typically dry and carries flow only following heavy rain and/or spring freshet. Shallow overburden groundwater has been interpreted to flow to the ditch, with potential for leachate impacts to the ditch (monitored as Station S-2). Drainage south of the ridge on the south edge of the waste mound is to the south. Another ditch is noted south of the site that has east-west trending branches draining the ridge and flowing in a southerly direction to another east-west trending drain northwest of the Village of Lancaster.

Surface water monitoring is undertaken at 8 locations:

- Beaudette River background (SW-3)
- Beaudette River downstream of the West Drainage Ditch outlet (S-4)
- Beaudette River downgradient, adjacent to the landfill site (S-5)
- Beaudette River downgradient of East Drainage Ditch outlet (S-6)
- West Drainage Ditch downstream of the landfill waste mound (S-2)
- East Drainage Ditch downstream of the landfill waste mound (in CAZ) (S-7, S-8)
- South Drainage Course background south of the landfill (S-1A).

Results and discussion

Spring sampling was completed at all stations, except S-7 (dry). Stations S-3, S-4 and S5, and S-6 were stagnant or trace flow in October 2019, while S1A, S2, S7, and S8 were dry.

Phosphorus and iron were found to exceed Provincial Water Quality Objectives (PWQO) at all surface water stations (except S-1A). Zn also exceed the PWQO in the Beaudette River (S-4) in October (stagnant conditions are noted). WSP conclude that these exceedances reflect background conditions and/or local sources (roads, road salt application, salt storage, agricultural use). WSP concludes that no significant leachate-related trends are evident. Based on my review of the surface water data provided, I agree.

Historically, chloride concentrations have occasionally been elevated at some monitoring stations, particularly S-7. No samples were obtained at S-7 in 2019. Chloride was elevated slightly above the CWQG at S-7 in April 2017, but not in 2018. Concentrations in other surface water monitoring locations were generally consistent both among stations and with historical trends.

Groundwater results from monitoring wells between the WDS and Beaudette River were compared to surface water criteria. Occasional exceedances of water quality criteria are noted for B, Mn, Fe, phenol and pH in groundwater. This is consistent with historical results and does not appear to be causing impacts to surface water at this time.

Trigger evaluation

Trigger parameters are Na, K, Ca, SO4, Cl, NO3/NO2, and NH3, with a limit of two-times baseline (from 1998-2007 results). The contingency measures are to be implemented if any four of these parameters exceed the trigger limit in three consecutive monitoring events at any surface water station.

Trigger limits were exceeded for ammonia at S-4, S-5, S-6 in April, nitrate/nitrite at S-8 in April, and potassium at S-3, S-4, S-5, S-6 in October. WSP concludes that there is no detectable WDS impact to the Beaudette River in 2019 as the trigger limit was not exceeded on three consecutive events for four of the seven parameters. Based on my review of the water quality data I agree; however, trends should be carefully monitored moving forward.

Recommendations

Based on the available surface water data, the North Lancaster WDS does not appear to be resulting in significant negative impacts to downgradient surface water at this time. As recommended by WSP, all WDS perimeter ditches should be inspected for possible leachate seeps and erosion of ditch banks, particularly as the application rates for interim cover are adjusted to optimize landfill capacity.

Future reports should include figures showing the locations of monitoring stations relative to the landfill to support the review and interpretation. While the figures are listed within the Table of Contents for the 2019 Annual Report, they were not included in the electronic file.

If you have any questions about these comments, I would be happy to discuss them with you.

Lauren Forrester

Lauren Forrester, M.Sc.
LF

ec: Michael Seguin, Cornwall Area Supervisor
Victor Castro, Water Resources Unit Supervisor
Thomas Guo, Regional Hydrogeologist

c: File SW ST SG 03 07 C6 - North Lancaster WDS
SW 12 01 07 02 BE – Beaudette River, St. Lawrence River Basin
LF/IDS No. 3450-BC5NVU

May 12, 2021

Candice McKay
Ministry of the Environment, Conservation and Parks
113 Amelia Street, 1st Floor
Cornwall, Ontario
K6H 3P1

Subject: North Lancaster Waste Disposal Site- MECP Site Inspection Report
(MECP Ref No.:6439-5PVH99)

Dear Ms. McKay:

WSP is responding on behalf of the Township of South Glengarry (Township) regarding a Site Inspection Report dated January 26, 2021 for the North Lancaster Waste Disposal Site.

The Ministry of the Environment, Conservation and Parks (MECP) identified items of concern in Section 5.0 Actions Required and Section 6.0 which requires the Township of South Glengarry to address items of concerns bulleted in the inspection report, as follows:

5.0 Actions Required

1 By no later than March 31, 2021, provide a workplan to the Ministry that address the review recommendations made by the Ministry's Technical Support Section. The Ministry will review this workplan and confirm whether or not it is sufficient to address the non-compliance. It should be noted that this was deadline was extended to May 19, 2021 in correspondence from Candice Mckay of the MECP.

The MECP Groundwater Technical Support:

- *The site is not in compliance with RUG as there are exceedances of the RUG limits at monitoring well nest 99-7, located at the western property boundary…The Township should address the non-compliance issues.*

  Response: A workplan will be developed to address the possible non-compliance issues noted along the western property boundary.

- *The deep bedrock monitors 99-2dBR, 00-2dBR, 00-4dBR, 06-2dBR, 06-1dBR and 06-4dBR should be removed from the monitoring program. The deep bedrock monitoring wells can be decommissioned as per Regulation 903, as amended.*

  Response: The deep bedrock monitoring wells that have been approved for removal from the monitoring program were decommissioned on April 20, 2021 as per the requirements of Regulation 903, as amended.

- *Monitoring of groundwater should continue semi-annually as per the monitoring program outlined in the ECA.*

  Response: Monitoring of groundwater will continue semi-annually as per the monitoring program outlined in the site's ECA.

- *The domestic wells should continue to be sampled annually.*

  Response: The domestic wells will continue to be sampled annually with homeowner concurrence.

The MECP Surface Water Technical Support:

- *…the North Lancaster WDS does not appear to be resulting in significant negative impacts to downgradient surface water at this time. As recommended by WSP, all WDS perimeter ditches should be inspected for possible leachate seeps and erosion of ditch banks, particularly as the application rates for interim cover are adjusted to optimize landfill capacity.*

  Response: The WDS perimeter ditches will be inspected for possible leachate seeps and erosion of ditch banks, particularity as the application rates for interim cover are adjusted to optimize landfill capacity.

2 By no later than March 31, 2021, submit an application to amend the ECA to include the newly acquired CAZ and groundwater rights. It should be noted that this was extended to May 19, 2021 in correspondence from Candice Mckay of the MECP.

Response: An application to amend the ECA to include the newly acquired CAZ and groundwater rights will be submitted to MECP by May 31, 2021.

3 By no later than May 31, 2021, confirm with the Ministry that flags have been installed to mark the approved landfill footprint for waste deposition.

Response: T-rail posts were installed to mark the approved landfill footprint for waste deposition on May 4, 2021.

6.0 Other Inspection Findings

- *WSP recommended that the deep bedrock monitors 99-22dBR; 00-4dBR; 06-1dBR and 06-4dBR should be removed from the monitoring program. The Ministry's TSS agrees with this and therefore they can be decommissioned as per Regulation 903, as amended.*

Response: The deep bedrock monitoring wells that have been approved for removal (monitoring wells: 99-2dBR, 00-2dBR, 00-4dBR, 06-2dBR, 06-1dBR and 06-4dBR) from the monitoring program were decommissioned as per the requirements of Regulation 903, as amended on April 20, 2021.

Should you have any further questions or comments please contact the undersigned.

Yours sincerely,

JBrown-Hawn

Jennifer Brown-Hawn
Team Leader, Environment

JBH/af

cc: Chris Leblanc, Township of South Glengarry
Gino Dalla Coletta, WSP

WSP ref.: 111-55592

May 12, 2021

Candice McKay, Senior Environmental Officer
Ministry of the Environment, Conservation and Parks
113 Amelia Street, 1st Floor
Cornwall, Ontario
K6H 3P1

Subject: North Lancaster Waste Disposal Site- Reasonable Use Guideline Exceedance Workplan (MECP Ref No.:6439-5PVH99)

Dear Ms. McKay:

WSP is responding on behalf of the Township of South Glengarry (Township) regarding a Site Inspection Report action item number 1 dated January 26, 2021 for the North Lancaster Waste Disposal Site. The Ministry of the Environment, Conservation and Parks (MECP) identified items of concern in Section 5.0 Actions Required including actions in regards to Reasonable Use Guideline exceedances which requires the Township of South Glengarry to address. Specifically, the Action item stated:

1 *By no later than March 31, 2021, provide a workplan to the Ministry that address the review recommendations made by the Ministry's Technical Support Section. The Ministry will review this workplan and confirm whether or not it is sufficient to address the non-compliance.*

The MECP Groundwater Technical Support Comment (January 22, 2021):

- *The site is not in compliance with RUG as there are exceedances of the RUG limits at monitoring well nest 99-7, located at the western property boundary…The Township should address the non-compliance issues.*

Township Response:

Exceedances of RUG limits are evident at the location of bedrock monitoring wells 99-7dBR and 99-7sBR; however, with the exception of a spike in measured dissolved concentrations in the shallow bedrock result at monitoring well 99-7sBR in April 2019 for organic nitrogen, TKN, and COD, concentrations of RUG parameters have remained within historical ranges at both the shallow and deep bedrock monitoring wells at location 99-7.

Leachate indicator parameters (chloride, sodium, ammonia, TKN and COD) have depicted minimal change in measured dissolved concentration at both bedrock monitoring well locations, 99-7sBR and 99-7dBR. The leachate indicator parameters (LIP) were graphed (attached) and demonstrate total ammonia has remained near to, or less than, background concentrations at both locations. At monitoring well 99-7sBR, sodium is stable and less than background; COD is typically between 5 mg/L and 40 mg/L; and, TDS has remained between 398 mg/L and 487 mg/L since 2013. Spikes in concentrations of COD and TKN were noted in April 2019 but these returned to historic levels in 2020.

At monitoring well 99-7dBR, COD has remained less than 33 mg/L and is typically less than 20 mg/L. Concentrations of TKN remain similar to background concentrations and sodium concentrations continues to fluctuate (103 mg/L in April and 151 mg/L in December 2020). Chloride concentrations have depicted a slight increase at monitoring well 99-7dBR since 2017; however, has historically exhibited more elevated concentrations.

1345 Rosemount Avenue
Cornwall, ON, Canada K6J 3E5

It is postulated that these monitoring well locations may be influenced by activities occurring to the west and north of these monitoring wells (clearing of trees, increased farming activities). Figure 1 attached shows the change in land use proximate to these monitoring wells between 2013 and 2021.

It is suggested that further groundwater quality monitoring is required to assess the evolution of these trends. If an increasing trend in measured dissolved leachate indicator parameters (chloride, sodium, ammonia, TKN and COD) are observed in groundwater samples, contingency options will be explored.

Should you have any further questions or comments please contact the undersigned.

Yours sincerely,

JBrown-Ha

Jennifer Brown-Hawn
Team Leader, Environment

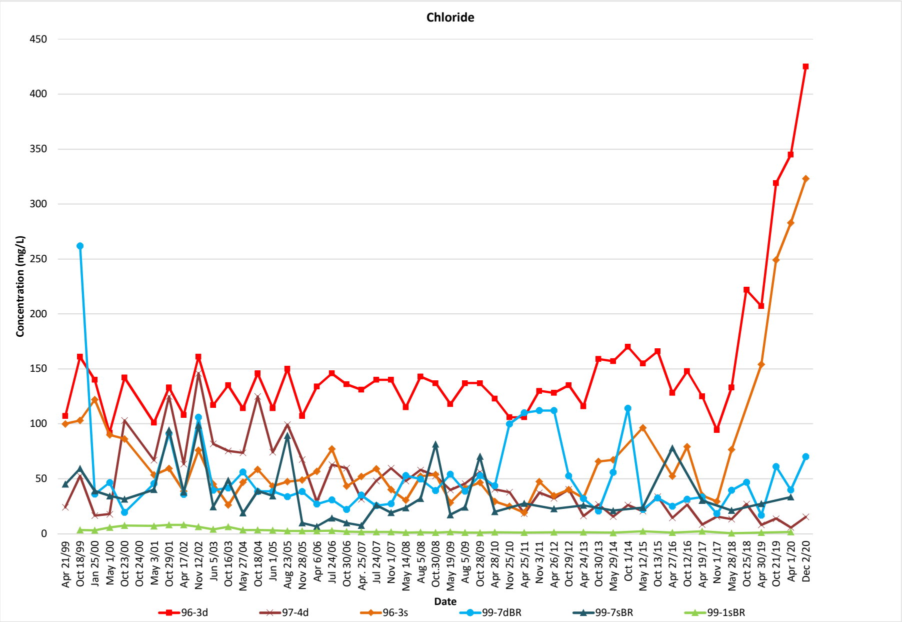
JBH/jbh

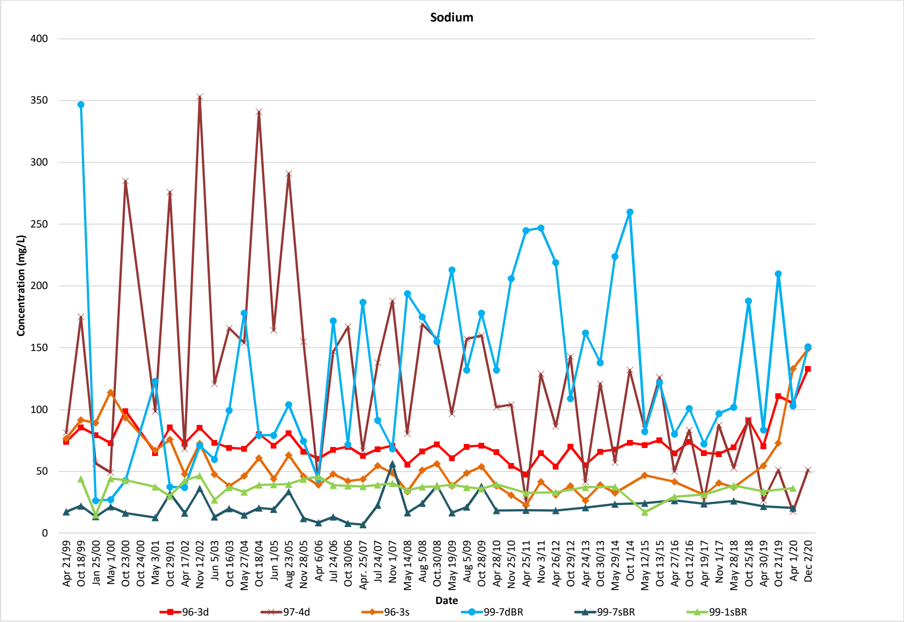
cc: Chris Leblanc, Township of South Glengarry
Gino Dalla Coletta, WSP

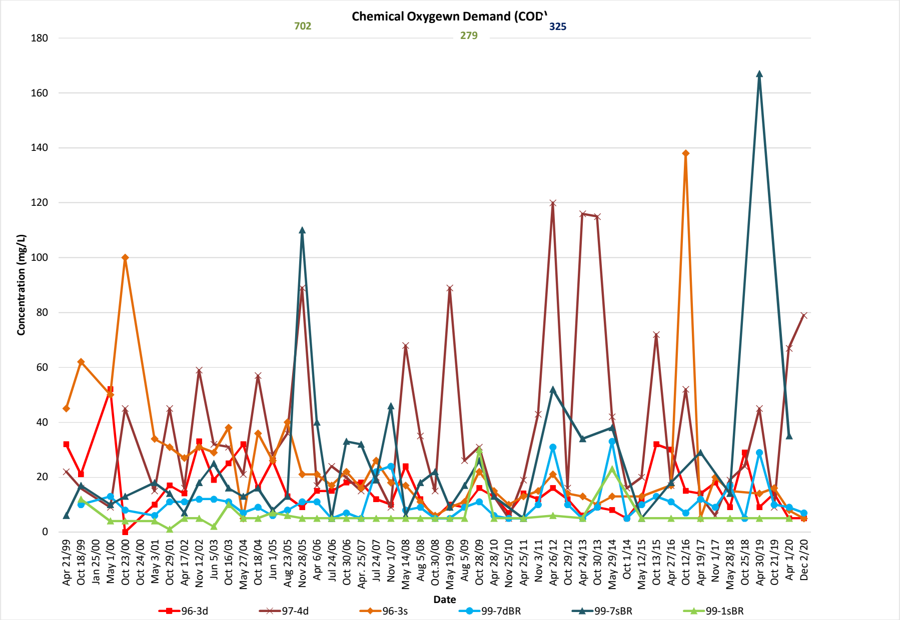
Enclosed: Leachate indicator parameters figures
Land use figure

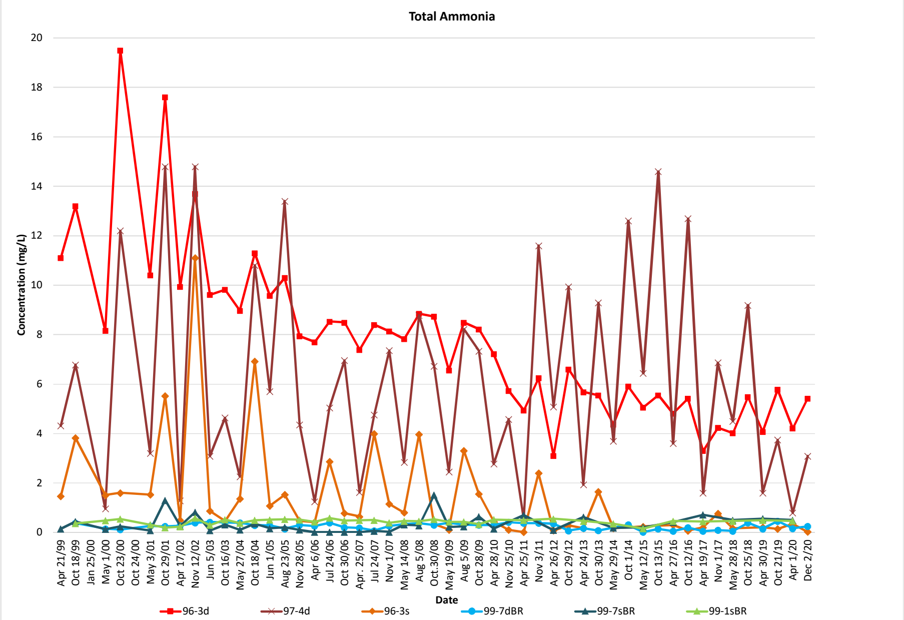
WSP ref.: 111-55592

Trends in Leachate Indicator Parameter
North Lancasater WDS

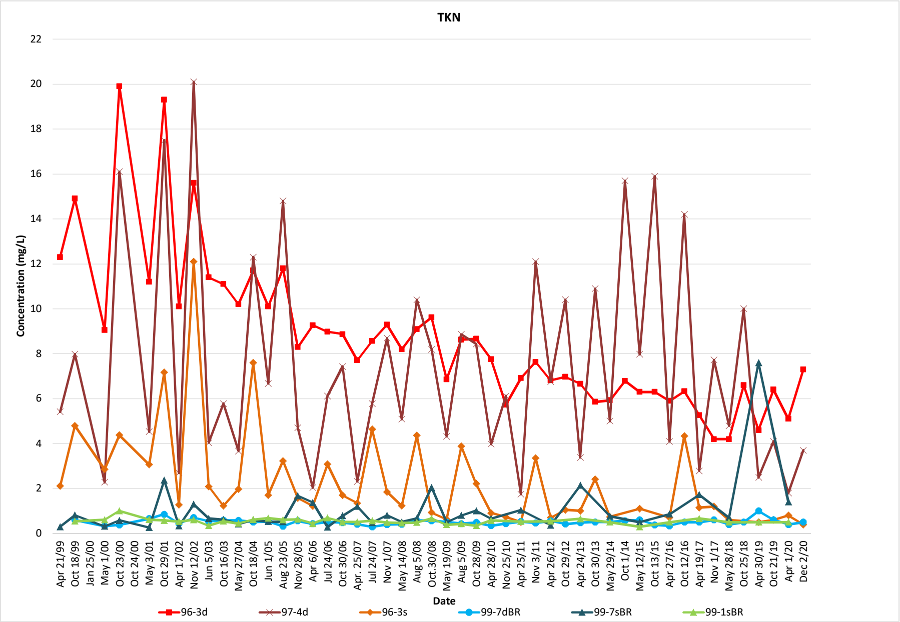


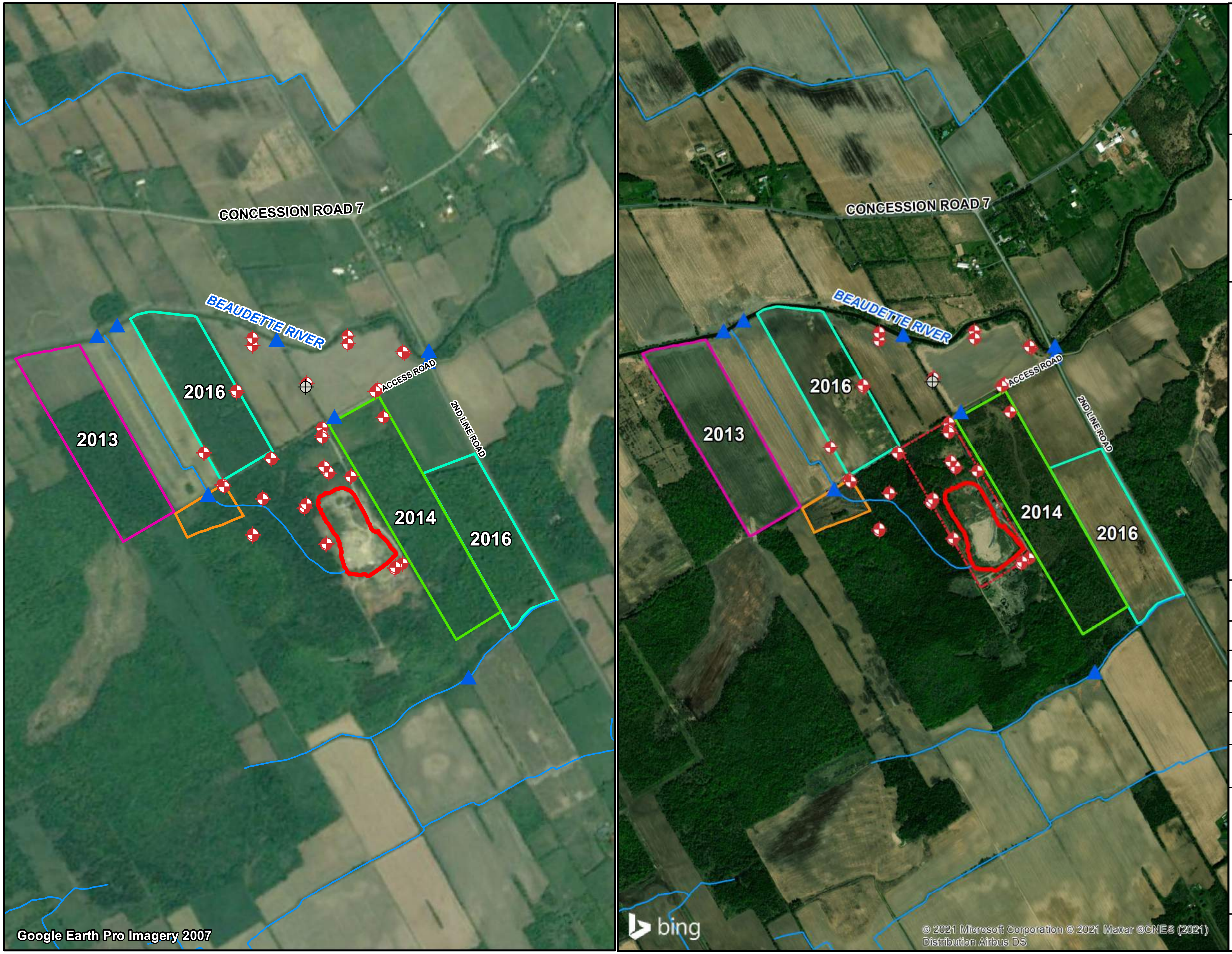






Trends in Leachate Indicator Parameter
North Lancasater WDS





wsp
1345 ROSEMOUNT AVENUE
CORNWALL, ONTARIO
CANADA K6J 3E5
PHONE: 613-933-5602 FAX: 613-936-0335
WWW.WSP.COM

CLIENT:
TOWNSHIP OF SOUTH GLENGARRY

PROJECT:
NORTH LANCASTER WDS

LEGEND

⊕	MONITORING WELLS
▲	SURFACE WATER STATIONS
—	SURFACE WATER
▭	AMENDED LANDFILL FOOTPRINT (2011)
▭	PROPERTY BOUNDARY

AGRICULTURAL CLEARING, YEAR

▭	2013
▭	2014
▭	2016
▭	2020

Data Source: Base mapping information licensed under the Open Gouvernment Licence - Ontario

PROJECT NUMBER:	111-55592-00	DATE:	APRIL 2021
DRAWN BY:	AF		
CHECKED BY:	JBH		
SCALE:	1:12,500		

Meters
0 90 180 360 540 720

TITLE
CHANGE OF LAND USE

SHEET NUMBER:
FIGURE 1

Path: M:\2011\111-55592-01\DOC\GIS\111-55592-00_ClearingFields_210413.mxd

Township of South Glengarry
6 Oak Street, P.O. Box 220, Lancaster,
ON, K0C 1N0T: (613) 347-
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Environment Committee Minutes

February 2, 2021

7:06 PM

Attendance
Stephanie Jaworski, Chair
Mike Madden
Angie Parker, Vice Chair
Colleen Bissonnette
Aodin MacDonell

Resource Members:
Ewen MacDonald – GM Infrastructure Services
Jennifer Brown Hawn- WSP
Crystal LeBrun- Executive Assistant
Chris Leblanc- Director of Roads and Waste Management

1. Welcome

The chair opened the meeting and welcomed committee members and anyone watching online.

2. Approval of Agenda

Items added to New Business: Updated Acceptable Materials List
Items added to Business Arising from Minutes- Bag Limits
Moved to approve the agenda as Amended

It was:
MOVED BY: Aodin MacDonell
SECONDED BY: Colleen Bissonnette **CARRIED**

3. Approval of Minutes from December 11, 2020

Committee members reviewed the minutes and moved to approve as circulated.

It was:
MOVED BY: Mike Madden
SECONDED BY: Angie Parker **CARRIED**

4. **Business Arising from the Minutes**
   a. **FoodCycler Program-** Environment Committee Recommends that Alex Hayman from Food Cylcer make a presentation to Council.
   b. **Bag Limits** A. Parker requested an update on Bag limits. No movement from Council
   c. E. MacDonald confirmed that the Waste Composition Study is not complete, and they are on the second week of winter collection. Report should be completed by mid-March

5. **Update on Regional Waste Management Project- Ewen**
   - Just received the updated Regional Waste Management Program for all municipalities from SD&G. Environment Committee can take the next month, provide feedback to consultant from EC, and a presentation will go to all respective Council's in SD&G. E. MacDonald recommended that the EC should focus on specific sections such as potential impact to South Glengarry if we were to go to a Regional model. Consider life cycle of landfill sites and the benefits of going to a Regional Model. Deadline to provide feedback at least 1 month, consultant will be taking feedback for 6-8 weeks.

6. **New Business**
   a. Updated Acceptable Materials List
      - City of Cornwall have upgraded their equipment and expanded their list of acceptable materials to include shopping bags, saran wrap, etc. Administration will communicate to residents with the updated list of recycling material.

   b. Environment Committee suggested administration and Council to look into Recycle Coach App or similar communication platforms for residents.

7. **Next Meeting –** March 2, 2021 at 5:30PM

8. **Adjournment** 7:58PM.

It was:
MOVED BY: Mike Madden
SECONDED BY: Angie Parker **CARRIED**

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Environment Committee Minutes

March 2, 2021

5:38 PM

Attendance
Stephanie Jaworski, Chair
Mike Madden, Vice Chair
Angie Parker
Colleen Bissonnette
Aodin MacDonell

Resource Members:
Chris Leblanc- Director of Roads and Waste Management
Jennifer Brown Hawn- WSP
Crystal LeBrun- Executive Assistant
Tim Mills, CAO
Kelli Campeau, Clerk

1. Welcome

The chair opened the meeting and welcomed committee members and anyone watching online.

2. Approval of Agenda

Moved to approve the agenda as presented.

It was:
MOVED BY: Mike Madden
SECONDED BY: Colleen Bissonnette **CARRIED**

3. Approval of Minutes from February 2, 2020

Committee members reviewed the minutes and moved as amended.

It was:
MOVED BY: Aodin MacDonell
SECONDED BY: Mike Madden **CARRIED**

4. **Business Arising from the Minutes**
    a. **FoodCycler Program** Glengarry Staff that Alex Hayman from FoodCylcer would be presenting at the March 15th Council meeting.
    b. **Bag Limits**- No update from staff. Waiting for Waste Composition Study
    c. **Waste Composition Study-** Fall/ Winter Round has been completed and information should be provided to us by end of March.
    d. **Recycle Coach/ Access E11 –** Staff will be attending a demonstration by both platforms and intends on bringing a report to Council with recommendations.

Committee has asked that staff improve communication and information to the public.

5. **Update on Regional Waste Management Project**
    - Special meeting of County Council will occur sometime near the end of March to review the draft report. No decisions will be made and hosted for information purposes only.

6. **New Business**
    - None to report

7. **Next Meeting –** April 21, 2021 at 5:00PM

8. **Adjournment** 6:58PM.

It was:
MOVED BY: Mike Madden
SECONDED BY: Angie Parker **CARRIED**

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Environment Committee Minutes

April 27, 2021

5:12 PM

Attendance
Stephanie Jaworski, Chair
Mike Madden, Vice Chair
Angie Parker
Colleen Bissonnette
Aodin MacDonell

Resource Members:
Chris Leblanc- Director of Roads and Waste Management
Jennifer Brown Hawn- WSP
Crystal LeBrun- Executive Assistant
Tim Mills, CAO
Kelli Campeau, Clerk

Guest:
Derek Ali: DFA Infrastructure International Inc

1. Welcome

The chair opened the meeting and welcomed committee members and anyone watching online.

2. Approval of Agenda

Moved to approve the agenda as presented.

It was:
MOVED BY: Colleen Bissonnette
SECONDED BY: Michael Madden **CARRIED**

3. Approval of Minutes from March 2, 2020

Committee members reviewed the minutes and moved as amended.

It was:
MOVED BY: Michael Madden
SECONDED BY: Colleen Bissonnette **CARRIED**

4. Business Arising from the Minutes

Committee requested a follow up with Waste Composition Study. Administration would bring an update at next meeting.

5. **Update on Regional Waste Management Project**

- Presenter Derek Ali DFA Infrastructure International Inc.

Mr. Ali went through key slides on the Regional Waste Management Project. The committee discussed possible expansion of the North Lancaster site, however more investigation and analysis would need to occure. Mr. Ali indicated that he has a better understanding of the needs of other Municipalities after a recent CAO meeting. Committee would like to see more collboration between neighbouring Municipalities. The Commiittee members were directed to send any additional comments to Crystal LeBrun by May 4th and we would provide any additional feedback to Mr. Ali.

6. **Communication Plan**

Kelli Campeau presented a South Glengarry Waste Management Communications plan (attached). The committee members were happy with the plan and suggested including Instagram to our communication platform to target younger audiences. The Committee also recommended newspaper adds to highlight waste diversion and management.

7. **New Business**

Lee Theodore to present at next meeting on Future Climate Leaders

8. **Next Meeting – June 1 @ 5PM**

9. **Adjournment** 7:00PM.

It was:
MOVED BY: Mike Madden
SECONDED BY: Angie Parker **CARRIED**

SOUTH GLENGARRY
Ontario's Celtic Heartland

Township of South Glengarry
6 Oak Street, P.O. Box 220, Lancaster,
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Environment Committee Minutes

June 1, 2021

5:10 PM

Attendance
Stephanie Jaworski, Chair
Angie Parker
Colleen Bissonnette
Aodin MacDonell
Mike Madden, Vice Chair- joined at 5:31PM

Regrets: Carl Goodwin, Division Manager of Environment at the City of Cornwall

Resource Members:
Chris Leblanc- Director of Roads and Waste Management
Jennifer Brown Hawn- WSP
Tim Mills, CAO
Kelli Campeau, Clerk
Crystal LeBrun- Deputy Clerk

Guest:
Lee Theodore, Project Coordinator with the River Institute

1. Welcome

The chair opened the meeting and welcomed committee members and anyone watching online.

2. Approval of Agenda

Moved to approve the agenda as presented.

It was:
MOVED BY: Aodin MacDonell
SECONDED BY: Colleen Bissonnette **CARRIED**

3. Approval of Minutes from April 27, 2021

Committee members reviewed the minutes and moved as amended.

It was:
MOVED BY: Aodin MacDonell

SECONDED BY: Colleen Bissonnette CARRIED

4. Business Arising from the Minutes

- None

5. Presentations

a. Presenter Lee Theodore, Project Coordinator with the River Institute
    a. As per appended presentation. Next Townhall is June 15th with Abraham Benedict 7PM.
b. Carl Goodwin, Division Manager of Environment at the City of Cornwall
    i. Mr. Goodwin did not attend the meeting.

6. Ongoing Projects Update

- Crystal gave a detailed update on various projects to the Environment Committee. (see attached)

7. New Business

- EC requested a follow up to the bio-digestor presentation. Staff would follow up to coordinate a presentation to the committee.

8. Next Meeting – July 6th @ 5PM

9. Adjournment 6:01PM

It was:
MOVED BY: Angie Parker
SECONDED BY: Aodin MacDonell CARRIED

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Environment Committee Minutes

September 21, 2021

5:00 PM

Attendance
Stephanie Jaworski, Chair
Mike Madden, Vice Chair
Angie Parker
Colleen Bissonnette
Aodin MacDonell

Resource Members
Chris Leblanc- Director of Roads and Waste Management
Jennifer Brown Hawn- WSP
Crystal LeBrun- Deputy Clerk

Guest: Lee Theodore

1. **Welcome**
   The chair opened the meeting and welcomed committee members and anyone watching online.

2. **Approval of Agenda**
   Moved to approve the agenda as presented.

   It was:
   MOVED BY: Mike Madden
   SECONDED BY: Aodin MacDonell **CARRIED**

3. **Approval of Minutes from July 6th, 2021**

4. **Business Arising from the Minutes**
   - **None**

5. **Presentations**
   - **David Kuhn City of Cornwall will present at next meeting.**

6. **Project Update**

Garbage Bag Limit Exemptions Feedback

- Implement Application Process/ Simple Standard form for Exemption
- Agri Business (would encourage Council to formally reach out to GFA for input)
- Consider Special Medical Needs
- Special Events/Group Home already arrange waste Pickup so we should not change that.
- Come committee members would prefer if we didn't make too many exemptions.
- Exemptions should be at a minimum, and as requested.

Bag Tag Discussion

- Pay per use.
- Exemptions can be provided more bag tags.
- At roll out, Township could provide all residents with extra tags (10) at the beginning of rollout. Include extra tags with tax bills. $2 or $2.25 per extra tag.
- Tag revenue can go towards sustainability funds, or reserves. Fee to cover service.
- Sold at different locations: Make sure they are available at several areas for accessibility and if people can't get there during operating hours.
- Container Size – 50lbs more acceptable than 60lbs. Not so prescriptive.
- Make it easy for people to use our landfill bridge Program- Drop off location for garbage. Encourage people to make the right choices.

Innovative Waste Diversion Ideas

- Organic/Yard Waste Diversion –
- Consider Composting area at landfill.
- Look into backyard composters
- Recycle Coach
- Agreement with City of Cornwall
- Consider "free depot" or "Free Store"
- Recycling Depot
- Communication Roll: social media, Mail Outs, ASAP, Repeated!

LANDFILL VISIT PLANNING (2022)

- Committee would like to visit our landfills in 2022

7. **New Business**
    - None

8. **Next Meeting – November 2, 2021**

9. **Adjournment** 6:41 PM.

It was:
MOVED BY: Michael Madden
SECONDED BY: Aodin MacDonell **CARRIED**

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Environment Committee Minutes

November 23, 2021

5:05 PM

Attendance

Stephanie Jaworski, Chair
Mike Madden, Vice Chair (5:15PM)
Angie Parker
Colleen Bissonnette
Aodin MacDonell

Resource Members

Chris Leblanc- Director of Roads and Waste Management
Jennifer Brown Hawn- WSP
Crystal LeBrun- Deputy Clerk
Sarah McDonald – GM of Infrastructure

Guest:

David Kuhn, City of Cornwall
Lee Theodore- Project Coordinator – Future Climate Leaders

1. **Welcome**
   The chair opened the meeting and welcomed committee members and anyone watching online.

2. **Approval of Agenda**
   Moved to approve the agenda as presented.

   It was:
   MOVED BY: Aodin MacDonell
   SECONDED BY: Colleen Bissonnette **CARRIED**

3. **Approval of Minutes from September 21, 2021 as amended.**

   - Make it easy for people to use our landfill program and education on drop off locations for garbage. Encourage people to make the right choices.

4. **Business Arising from the Minutes**
   - **None**

5. Staffing Update

- Intro to General Manager of Infrastructure (Sarah McDonald)
    - Tours of MRF and Landfills in 2022

6. Presentations

- David Kuhn City of Cornwall
    - See attached presentation
    - Free store would require monitoring by staff/personnel
    - What can we do in Cornwall?
        - Hazardous Waste/ Electronics
        - Blue Box Recycling – MRF plant directly

7. Project Update

- As per the information report attached

8. New Business

- Look at last Council meeting for presentation for Contract
- Town Hall Future Climate Leaders @ 7PM Nov 23

9. Next Meeting – January 18, 2022

10. Adjournment 6:41 PM.

It was:
MOVED BY: Michael Madden
SECONDED BY: Aodin MacDonell **CARRIED**

APPENDIX

C

POTENTIOMETRIC ELEVATIONS AND VERTICAL HYDRAULIC GRADIENTS

Table 3.0A - Groundwater Monitoring Locations
North Lancaster Waste Disposal Site

Zone	Accuracy	Location Method	Instrument	Personnel
18	3 m	Land-Based Survey	Total Station	Ontario Land Surveyor

Groundwater Monitoring Locations

Station	Easting	Northing	Date of survey	Station	Easting (m)	Northing (m)	Date of survey
06-1dBR	538033	5012241	Apr 14, 2006	99-7s	537442	5011810	Apr 8, 1999
06-1D	538040	5012244		99-7sBR	537442	5011812	
06-1S	538034	5012249		99-7dBR	537448	5011805	
00-2s	537853	5012300	Nov 30, 2000	99-9sBR	537541	5011644	
00-2sBR	537854	5012274		99-9s	537541	5011650	
00-2dBR	537855	5012273		99-8s	537574	5011768	
00-1s	537953	5012127	Dec 6, 2000	99-8sBR	537575	5011765	
00-1dBR	537944	5012118		99-2dBR	537598	5011880	
06-4d	537971	5012034	Apr 14, 2006	99-2sBR	537605	5011896	
06-4dBR	537975	5012033		96-2d	537601	5011899	Aug 25, 1996
99-6dBR	537770	5011998	Apr 8, 1999	97-1s	537865	5011840	Apr 29, 1997
99-6sBR	537770	5011967		99-5sBR	537863	5011839	Apr 8, 1999
97-2s	537769	5011974	Apr 29, 1997	96-3s	537792	5011849	Aug 25, 1996
00-3s	537718	5012146	Nov 30, 2000	96-3d	537790	5011854	
00-3dBR	537716	5012133		06-3dBR	537776	5011872	Apr 14, 2006
00-4sBR	537541	5012268	Dec 6, 2000	99-1sBR	538032	5011553	Apr 8, 1999
00-4dBR	537544	5012272		99-1d	538008	5011536	
00-4S	537541	5012294		96-1	538010	5011542	Aug 25, 1996
00-5dBR	537489	5012116	Nov 30, 2000	97-3d	537782	5011615	Apr 8, 1999
00-5sBR	537488	5012122		99-3sBR	537784	5011619	
06-2dBR	537384	5011919	Apr 14, 2006	97-4d	537712	5011735	Apr 19, 1997
06-2d	537382	5011916		99-4sBR	537712	5011738	Apr 8, 1999
06-2s	537381	5011917		99-4dBR	537717	5011748	

Table 3.0B - Surface Water Monitoring Locations
North Lancaster Waste Disposal Site

Zone	Accuracy (m)	Location Method	Instrument	Personnel
18	3	Land-Based Survey	Total Station	Ontario Land Surveyor

Surface Water Monitoring Locations							
Station	Easting (m)	Northing (m)	Date of survey	Station	Easting (m)	Northing (m)	Date of survey
SW-1A	538249	5011181	April 2011	SW-5	537620	5012289	April 2011
SW-2	537394	5011781		SW-6	538119	5012252	
SW-3	537031	5012301		SW-7	537810	5012035	
SW-4	537096	5012336		SW-8	538117	5012217	

Table 5.0a - Potentiometric Elevations
North Lancaster Waste Disposal Site

Monitor I.D.	Top of Piez. (m)	Base of Screen (m)	Ground Elev. (m)	Aug 12/96	Oct 3/96	Oct 8/96	Apr 24/97	Nov. 4/97	May 7/98	Oct 7/98	Apr 8/99	Apr 21/99	May 5/99	Oct 12/99	Oct 18/99	Nov 22/99	Jan 25/00	Apr 26/00
96-1s	78.93	74.55	78.23	76.82	76.47	76.53	77.95	76.28	77.97	77.59	78.17	77.82	77.58	74.81	76.77	75.45	77.47	77.93
99-1d	79.16	67.27	78.25	---	---	---	---	---	---	---	77.99	77.66	77.36	74.05	74.51	75.49	77.25	77.78
99-1sBR	79.11	51.03	78.46	---	---	---	---	---	---	---	---	---	---	70.26	70.54	71.30	72.86	73.77
96-2d	68.19	62.88	67.45	66.04	66.46	66.41	67.23	66.11	66.89	66.82	67.24	66.85	66.51	65.20	65.89	65.92	66.05	66.00
99-2sBR	68.25	57.73	67.40	---	---	---	---	---	---	---	66.43	65.96	65.74	64.39	65.04	64.27	65.49	66.23
99-2dBR	68.26	40.21	67.64	---	---	---	---	---	---	---	---	---	---	65.07	64.89	65.53	66.03	65.64
96-3s	71.06	67.52	70.34	68.06	68.47	68.35	69.83	68.25	69.39	68.99	70.07	69.37	68.85	67.81	68.69	68.11	68.68	69.85
96-3d	71.02	62.75	70.18	67.62	67.84	67.78	69.15	67.11	68.97	68.66	69.51	69.00	68.62	67.33	67.99	67.80	68.37	69.37
06-3dBR	70.60	41.60	69.94	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
97-1s	74.86	70.16	73.96	---	---	---	72.77	70.54	73.08	71.76	73.71	73.21	72.46	70.64	70.89	71.05	72.14	73.52
99-5sBR	74.92	65.04	74.06	---	---	---	---	---	---	---	73.12	72.66	72.11	70.37	70.69	70.77	71.78	72.89
97-2s	69.38	63.48	68.38	---	---	---	66.82	64.58	65.85	65.24	67.17	66.07	65.23	64.30	64.71	64.70	64.99	66.84
99-6sBR	69.47	60.50	68.49	---	---	---	---	---	---	---	67.16	66.07	65.27	67.18	64.74	64.82	65.10	66.16
99-6dBR	68.98	40.88	68.31	---	---	---	---	---	---	---	---	---	---	60.83	53.98	51.74	58.62	66.34
97-3d	73.93	66.81	72.91	---	---	---	72.22	70.09	72.69	72.72	73.12	72.72	72.40	71.16	71.97	72.07	72.38	72.91
99-3sBR	73.19	62.03	73.00	---	---	---	---	---	---	---	71.27	70.99	70.69	69.61	70.14	70.29	70.81	70.83
97-4d	70.84	64.99	69.89	---	---	---	68.60	67.22	68.25	68.25	69.66	68.56	68.13	67.33	67.67	67.65	68.06	68.98
99-4sBR	70.83	60.34	69.97	---	---	---	---	---	---	---	66.40	66.40	65.73	64.60	65.12	65.38	65.64	66.49
99-4dBR	70.86	42.78	70.21	---	---	---	---	---	---	---	---	---	---	62.66	62.69	64.82	65.11	65.53
99-7s	67.03	63.00	66.05	---	---	---	---	---	---	---	66.06	65.92	65.39	64.18	64.33	65.33	65.97	65.97
99-7sBR	67.01	57.98	66.05	---	---	---	---	---	---	---	66.09	65.83	65.29	64.19	64.31	64.26	65.45	65.98
99-7dBR	66.85	38.75	66.18	---	---	---	---	---	---	---	---	---	---	63.95	64.39	64.81	65.31	65.51
99-8s	67.80	64.22	66.96	---	---	---	---	---	---	---	---	66.79	66.51	65.51	66.26	66.24	66.38	66.67
99-8sBR	67.76	59.33	66.96	---	---	---	---	---	---	---	---	66.02	65.85	64.54	65.19	65.43	65.76	66.21
99-9s	68.60	66.33	67.85	---	---	---	---	---	---	---	---	67.57	67.20	67.61	67.28	66.95	67.68	67.70
99-9sBR	68.54	60.23	67.85	---	---	---	---	---	---	---	---	65.84	65.61	64.84	64.94	65.22	65.50	66.04
00-1s	64.42	59.54	63.80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-1dBR	64.42	36.38	63.81	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-2s	64.17	57.78	63.56	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-2sBR	64.28	54.73	63.57	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-2dBR	64.28	36.14	63.57	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-3s	64.94	59.02	64.20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-3dBR	64.93	36.61	64.04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-4s	63.52	56.13	62.38	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-4sBR	63.72	55.12	62.74	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-4dBR	63.67	35.31	62.74	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-5sBR	74.04	59.90	73.62	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-5dBR	74.01	46.19	73.62	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-1s	66.04	62.47	65.53	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-1d	66.04	61.41	65.53	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-1dBR	66.26	36.56	65.54	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-2s	67.37	64.47	66.82	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-2d	67.46	63.21	66.82	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-2dBR	67.52	39.82	66.86	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-4d	64.56	59.82	63.74	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-4dBR	64.47	36.57	63.74	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SW-2	66.80			---	---	---	---	---	---	---	65.62	65.48	65.47	DRY	DRY	DRY	DRY	---
SW at Bridge	66.35			---	---	---	---	---	---	---	---	---	---	---	---	61.55	61.54	---

Note: 99-3sBR was damaged in fall 2020 and repaired.

1 - 99-9sBR was observed to be damaged in fall 2012 and was subsequently repaired.
note: negative (-) value indicates discharge gradient (upward flux)

Table 5.0a - Potentiometric Elevations
North Lancaster Waste Disposal Site

Monitor I.D.	Top of Piez. (m)	Base of Screen (m)	Ground Elev. (m)	Oct 23/00	Nov 30/00	May 1/01	Oct 23/01	Apr 17/02	Nov 4/02	Jun 2/03	Oct 8/03	May 20/04	Oct 5/04	May 30/05	Aug 23/05	Nov 21/05	Apr 5/06	Jul 19/06	Oct 26/06
96-1s	78.93	74.55	78.23	74.92	---	77.74	74.63	77.96	Dry	77.82	Dry	77.71	76.07	77.56	74.88	77.89	78.01	77.01	77.56
99-1d	79.16	67.27	78.25	75.03	---	77.58	73.99	77.88	74.13	77.69	74.63	77.57	75.57	77.44	74.93	77.72	77.92	76.69	77.26
99-1sBR	79.11	51.03	78.46	71.27	---	73.58	70.28	73.01	70.34	73.54	70.48	73.21	71.29	72.92	70.75	74.06	74.24	72.40	72.95
96-2d	68.19	62.88	67.45	65.59	---	66.70	65.13	67.06	64.98	66.82	64.90	66.47	65.69	66.35	64.57	66.91	67.08	65.87	66.63
99-2sBR	68.25	57.73	67.40	64.89	---	65.75	64.32	65.81	64.10	65.51	64.25	65.36	64.76	65.13	63.98	65.57	65.83	64.83	65.43
99-2dBR	68.26	40.21	67.64	65.44	---	66.64	63.73	65.52	63.78	65.23	65.46	65.09	65.28	65.66	50.43	63.50	65.45	63.80	62.85
96-3s	71.06	67.52	70.34	67.99	---	69.47	68.36	69.80	68.48	69.77	68.26	69.25	68.43	69.03	68.06	69.79	70.05	68.70	69.80
96-3d	71.02	62.75	70.18	67.32	---	69.15	67.41	69.50	67.58	69.43	67.25	69.00	68.02	68.78	67.23	69.48	69.48	68.45	69.28
06-3dBR	70.60	41.60	69.94	---	---	---	---	---	---	---	---	---	---	---	---	---	69.35	67.80	66.88
97-1s	74.86	70.16	73.96	70.95	---	73.15	71.01	73.54	71.04	73.36	71.01	72.77	71.05	72.32	70.76	73.37	73.59	71.61	72.11
99-5sBR	74.92	65.04	74.06	70.74	---	72.49	70.72	72.97	70.73	72.75	70.73	72.34	70.91	72.04	70.71	72.88	73.07	71.50	71.80
97-2s	69.38	63.48	68.38	64.07	---	65.65	63.99	66.30	64.02	65.56	63.86	64.86	64.24	64.62	63.85	65.84	66.33	64.27	65.45
99-6sBR	69.47	60.50	68.49	64.50	---	65.50	64.17	65.99	63.04	65.45	64.20	65.16	64.59	64.89	63.96	65.64	65.94	64.66	65.27
99-6dBR	68.98	40.88	68.31	65.77	---	65.27	63.89	66.40	65.62	65.95	64.54	65.89	64.69	65.02	63.80	65.47	66.24	64.57	65.23
97-3d	73.93	66.81	72.91	71.54	---	72.68	70.97	72.99	70.95	72.80	70.54	72.66	71.62	72.30	70.53	72.97	73.01	72.00	72.80
99-3sBR	73.19	62.03	73.00	70.13	---	71.37	69.89	71.75	69.81	70.97	69.78	71.39	70.54	71.26	69.58	71.69	71.76	70.67	71.52
97-4d	70.84	64.99	69.89	67.46	---	68.44	67.51	69.18	67.47	68.64	67.34	68.34	67.72	68.15	67.06	68.97	69.43	67.88	68.51
99-4sBR	70.83	60.34	69.97	65.16	---	65.87	64.57	66.07	64.45	65.85	64.61	65.74	65.08	65.50	64.33	65.96	66.33	65.26	65.71
99-4dBR	70.86	42.78	70.21	64.82	---	65.35	67.30	65.78	63.92	65.25	64.06	65.16	64.58	64.94	63.78	65.41	65.52	64.64	65.02
99-7s	67.03	63.00	66.05	64.98	---	65.80	64.24	65.90	64.17	65.84	64.41	65.66	64.89	65.49	63.81	65.86	65.70	64.93	65.60
99-7sBR	67.01	57.98	66.05	64.99	---	65.80	64.29	65.89	64.23	65.65	64.29	65.61	64.95	65.40	63.95	65.78	65.91	65.00	65.60
99-7dBR	66.85	38.75	66.18	64.61	---	65.41	64.02	65.54	63.98	65.25	64.05	65.11	64.57	64.99	63.81	65.29	65.49	64.65	64.97
99-8s	67.80	64.22	66.96	66.07	---	66.54	65.75	66.70	65.59	66.65	65.22	66.48	65.79	66.36	64.54	66.56	66.66	65.85	66.42
99-8sBR	67.76	59.33	66.96	65.41	---	65.95	64.63	66.37	64.60	66.31	64.62	66.19	65.18	65.73	64.00	66.04	66.27	65.33	65.58
99-9s	68.60	66.33	67.85	66.53	---	67.41	Dry	67.71	Dry	67.61	Dry	67.39	66.48	67.05	DRY	DRY	67.85	66.72	67.62
99-9sBR	68.54	60.23	67.85	65.00	---	65.76	64.37	65.94	64.27	65.71	64.45	65.60	65.02	65.41	64.16	65.76	65.98	65.07	65.58
00-1s	64.42	59.54	63.80	---	62.14	61.90	61.42	62.97	61.34	62.27	61.41	62.30	61.52	61.60	61.24	62.64	63.51	61.48	62.63
00-1dBR	64.42	36.38	63.81	---	49.29	64.21	64.12	64.42	64.04	64.40	64.22	64.42	---	64.39	49.67	63.83	64.42	64.42	64.42
00-2s	64.17	57.78	63.56	---	61.98	61.76	61.33	62.63	61.25	62.08	61.35	62.21	61.47	61.56	61.19	62.41	63.09	61.43	62.40
00-2sBR	64.28	54.73	63.57	---	61.98	61.81	61.38	63.66	61.27	62.10	61.38	62.24	61.46	61.55	61.21	62.42	63.11	61.46	62.46
00-2dBR	64.28	36.14	63.57	---	62.03	61.88	52.24	54.23	49.13	52.34	51.52	44.39	44.79	43.66	40.68	43.07	41.48	38.93	39.33
00-3s	64.94	59.02	64.20	---	62.04	60.82	61.35	62.76	61.26	62.21	61.38	62.22	61.46	61.57	61.19	62.49	63.20	62.46	62.08
00-3dBR	64.93	36.61	64.04	---	52.94	51.78	39.63	40.57	38.21	38.85	37.64	40.30	36.99	43.04	37.24	37.43	37.18	37.13	37.34
00-4s	63.52	56.13	62.38	---	62.18	---	---	62.60	61.58	62.33	62.69	62.44	61.87	Submerged	61.50	62.50	Submerged	62.50	62.25
00-4sBR	63.72	55.12	62.74	---	62.27	63.08	61.84	62.85	60.76	62.46	61.88	62.57	62.05	62.18	61.66	62.73	61.43	62.05	62.35
00-4dBR	63.67	35.31	62.74	---	61.76	62.26	41.81	38.28	39.38	47.53	43.78	37.83	37.36	37.67	36.28	36.07	35.79	35.84	35.77
00-5sBR	74.04	59.90	73.62	---	63.14	64.21	62.27	65.11	62.24	64.05	62.33	63.56	62.71	63.28	62.25	64.37	65.40	62.97	63.45
00-5dBR	74.01	46.19	73.62	---	64.62	65.33	63.96	65.47	63.78	65.15	63.99	65.10	64.94	64.92	63.75	65.65	65.55	64.60	65.00
06-1s	66.04	62.47	65.53	---	---	---	---	---	---	---	---	---	---	---	---	---	64.67	62.92	64.16
06-1d	66.04	61.41	65.53	---	---	---	---	---	---	---	---	---	---	---	---	---	64.67	63.02	64.16
06-1dBR	66.26	36.56	65.54	---	---	---	---	---	---	---	---	---	---	---	---	---	66.26	49.85	41.76
06-2s	67.37	64.47	66.82	---	---	---	---	---	---	---	---	---	---	---	---	---	66.20	63.27	64.53
06-2d	67.46	63.21	66.82	---	---	---	---	---	---	---	---	---	---	---	---	---	66.21	64.66	63.74
06-2dBR	67.52	39.82	66.86	---	---	---	---	---	---	---	---	---	---	---	---	---	57.84	55.50	50.64
06-4d	64.56	59.82	63.74	---	---	---	---	---	---	---	---	---	---	---	---	---	62.09	59.99	60.59
06-4dBR	64.47	36.57	63.74	---	---	---	---	---	---	---	---	---	---	---	---	---	59.89	63.38	62.98
SW-2	66.80			DRY	---	65.62	65.58	65.63	65.63	65.84	65.59	65.74	---	---	---	---	---	---	---
SW at Bridge	66.35			---	---	---	61.75	62.22	61.35	62.30	---	61.76	---	63.30	---	---	62.57	61.82	---

Note: 99-3sBR was damaged in fall 2020 and repaired.

1 - 99-9sBR was observed to be damaged in fall 2012 and was subsequently repaired.
note: negative (-) value indicates discharge gradient (upward flux)

Table 5.0a - Potentiometric Elevations
North Lancaster Waste Disposal Site

Monitor I.D.	Top of Piez. (m)	Base of Screen (m)	Ground Elev. (m)	Apr 24/07	July 18/07	Oct 29/07	May 5/08	Jul 30/08	Oct 20/08	Oct 30/08	May 11/09	July 28/09	Oct 21/09	Apr 21/10	Nov 22/10	Apr 19/11	Oct 31/11	Apr 18/12
96-1s	78.93	74.55	78.23	77.59	76.19	77.47	77.51	75.96	Dry	76.76	76.76	76.17	75.08	77.08	77.02	77.18	76.52	76.66
99-1d	79.16	67.27	78.25	77.54	76.02	76.60	77.43	75.82	74.38	74.79	74.79	76.05	75.05	77.04	77.01	77.22	75.55	76.69
99-1sBR	79.11	51.03	78.46	74.00	71.59	71.77	73.73	71.77	70.12	70.39	70.39	72.37	70.66	73.81	73.84	74.21	71.32	73.14
96-2d	68.19	62.88	67.45	66.96	65.58	66.45	66.86	65.57	64.40	65.38	65.38	65.87	65.07	66.83	66.89	67.13	66.04	66.42
99-2sBR	68.25	57.73	67.40	65.69	64.63	65.28	65.60	64.57	63.65	65.63	65.63	64.78	64.05	65.53	65.56	65.87	64.86	65.11
99-2dBR	68.26	40.21	67.64	64.00	63.69	63.84	57.39	43.59	41.31	40.56	40.56	50.46	52.61	57.13	56.79	56.32	53.92	57.12
96-3s	71.06	67.52	70.34	69.81	68.28	69.15	69.72	68.23	67.84	68.90	68.90	68.57	68.02	69.80	69.82	69.41	68.69	69.30
96-3d	71.02	62.75	70.18	69.41	67.87	69.66	69.40	67.81	66.47	67.10	67.10	69.00	66.96	69.37	69.32	69.39	68.03	68.71
06-3dBR	70.60	41.60	69.94	68.97	65.06	65.18	64.95	65.01	64.63	64.64	64.64	64.85	64.65	64.71	64.74	64.73	64.61	64.70
97-1s	74.86	70.16	73.96	73.42	71.40	71.83	73.32	71.16	70.33	70.95	70.95	71.52	70.84	73.43	73.43	73.67	71.46	72.47
99-5sBR	74.92	65.04	74.06	72.90	71.21	71.50	72.79	71.05	70.09	70.75	70.75	71.35	70.58	72.83	72.92	73.18	71.16	72.14
97-2s	69.38	63.48	68.38	66.18	64.11	65.30	65.54	64.02	63.86	64.20	64.20	64.29	63.93	65.45	65.61	66.58	64.56	64.70
99-6sBR	69.47	60.50	68.49	65.65	64.79	65.16	65.43	64.48	63.65	64.44	64.44	64.60	63.97	65.34	65.43	65.89	64.72	64.97
99-6dBR	68.98	40.88	68.31	65.95	63.99	64.99	65.34	64.32	63.63	55.75	55.75	64.60	63.85	65.47	65.40	66.27	64.49	64.94
97-3d	73.93	66.81	72.91	72.93	72.21	72.87	72.83	71.87	70.36	71.83	71.83	72.27	71.55	72.87	73.11	73.16	72.57	72.58
99-3sBR	73.19	62.03	73.00	71.73	70.86	71.40	71.60	70.67	69.56	70.59	70.59	70.98	70.36	71.63	71.75	72.02	71.10	71.33
97-4d	70.84	64.99	69.89	69.12	67.83	68.43	68.85	67.70	67.01	67.69	67.69	67.83	67.47	68.82	69.00	69.66	68.04	68.44
99-4sBR	70.83	60.34	69.97	66.00	64.95	65.54	65.82	64.98	63.98	64.82	64.82	65.11	64.38	65.83	65.88	66.16	65.22	65.48
99-4dBR	70.86	42.78	70.21	65.34	64.32	64.90	65.20	64.36	63.40	63.93	63.93	64.43	63.62	65.06	65.09	65.26	64.35	64.63
99-7s	67.03	63.00	66.05	65.61	64.63	65.55	65.61	64.69	63.34	64.67	64.67	64.76	63.80	65.57	65.58	65.50	65.05	65.43
99-7sBR	67.01	57.98	66.05	65.81	64.73	65.41	65.70	64.69	63.56	64.68	64.68	64.93	64.01	65.55	65.63	65.85	64.99	65.28
99-7dBR	66.85	38.75	66.18	65.28	64.33	64.73	65.17	64.33	63.43	63.86	63.86	64.37	63.60	64.95	64.94	65.19	64.27	64.56
99-8s	67.80	64.22	66.96	66.53	65.51	66.31	66.53	65.50	64.52	65.61	65.61	65.78	65.44	66.51	66.53	66.58	65.86	66.30
99-8sBR	67.76	59.33	66.96	65.88	64.87	65.50	65.94	64.82	63.64	n/a	---	65.38	64.40	65.72	65.53	65.70	64.96	65.14
99-9s	68.60	66.33	67.85	67.63	Dry	67.65	67.60	66.51	Dry	67.41	67.41	66.68	Dry	67.69	67.70	65.92	67.03	67.39
99-9sBR	68.54	60.23	67.85	65.82	64.85	65.37	65.71	64.78	63.71	63.69	63.87	64.87	64.14	65.61	65.68	67.87	65.07	65.35
00-1s	64.42	59.54	63.80	62.63	61.26	64.20	62.05	61.34	61.03	61.78	61.78	61.58	61.08	62.27	62.22	63.51	61.38	Damaged
00-1dBR	64.42	36.38	63.81	64.42	64.42	62.12	64.42	64.42	63.31	---	---	62.29	62.80	64.41	64.41	63.27	61.72	64.33
00-2s	64.17	57.78	63.56	61.98	61.21	61.95	61.79	61.30	61.01	61.71	61.71	61.52	61.06	62.04	62.02	62.99	61.36	61.36
00-2sBR	64.28	54.73	63.57	62.00	61.22	61.96	61.81	61.32	61.04	61.73	61.73	61.56	61.07	62.06	62.05	63.01	61.38	61.37
00-2dBR	64.28	36.14	63.57	41.41	41.58	39.87	46.60	39.62	37.61	36.62	36.62	39.26	38.12	38.24	39.06	38.85	38.26	48.91
00-3s	64.94	59.02	64.20	62.39	61.30	62.02	61.92	61.30	60.99	61.72	61.72	61.53	61.05	62.13	62.09	63.25	61.38	61.39
00-3dBR	64.93	36.61	64.04	38.27	37.93	38.16	38.72	38.56	37.39	36.99	36.99	37.42	36.96	37.29	37.49	37.97	37.54	37.46
00-4s	63.52	56.13	62.38	62.42	61.55	62.16	62.07	61.66	61.26	61.89	61.89	61.90	61.36	62.15	62.26	63.15	61.75	61.74
00-4sBR	63.72	55.12	62.74	62.64	61.72	62.28	62.36	61.84	61.40	62.13	62.13	62.08	61.51	62.39	62.46	63.32	61.90	61.97
00-4dBR	63.67	35.31	62.74	35.85	35.73	35.75	49.42	38.04	36.23	---	---	35.93	35.82	35.57	35.77	36.41	35.96	35.51
00-5sBR	74.04	59.90	73.62	64.91	62.58	63.21	64.74	62.61	61.86	46.38	46.38	62.81	62.07	64.16	64.27	65.56	62.73	63.34
00-5dBR	74.01	46.19	73.62	65.32	64.27	64.81	65.18	64.31	63.32	63.91	63.91	64.41	63.60	64.98	65.01	65.27	64.32	64.58
06-1s	66.04	62.47	65.53	63.75	62.82	63.58	63.41	62.90	62.58	63.31	63.31	63.13	62.66	63.45	63.68	64.68	62.96	62.97
06-1d	66.04	61.41	65.53	63.74	62.82	63.58	63.41	62.92	62.59	63.31	63.31	63.13	62.67	63.45	63.68	64.68	62.96	62.96
06-1dBR	66.26	36.56	65.54	38.89	37.19	37.24	37.35	36.99	37.13	36.75	36.75	36.91	36.99	37.23	37.36	37.32	37.32	37.26
06-2s	67.37	64.47	66.82	65.83	Dry	67.11	65.29	64.49	Dry	Dry	Dry	Dry	64.51	64.82	65.01	66.31	Dry	Dry
06-2d	67.46	63.21	66.82	65.83	63.18	Dry	65.48	63.18	Dry	Dry	---	63.21	63.13	64.81	65.01	66.32	63.18	63.88
06-2dBR	67.52	39.82	66.86	47.98	48.46	48.28	45.93	41.57	40.65	39.52	39.52	41.46	40.50	42.37	42.33	41.57	41.27	41.03
06-4d	64.56	59.82	63.74	61.35	59.91	60.68	60.66	60.00	Dry	60.29	60.29	60.09	59.90	60.69	60.81	62.38	59.92	59.97
06-4dBR	64.47	36.57	63.74	63.13	63.04	62.58	63.10	62.88	61.91	54.97	54.97	62.84	62.42	62.58	62.68	62.94	62.13	62.63
SW-2	66.80			---	---	---	---	---	66.80	66.80								66.22
SW at Bridge	66.35			---	62.02	---	---	---	66.35	66.35								61.39

Note: 99-3sBR was damaged in fall 2020 and repaired.

1 - 99-9sBR was observed to be damaged in fall 2012 and was subsequently repaired.
note: negative (-) value indicates discharge gradient (upward flux)

Table 5.0a - Potentiometric Elevations
North Lancaster Waste Disposal Site

Monitor I.D.	Top of Piez. (m)	Base of Screen (m)	Ground Elev. (m)	Oct 23/12	Apr 18/13	Oct 23/13	May 27/14	Sep 30/14	May 6/15	Oct 8/15	Apr 26/16	Oct 11/16	Apr 17/17	Nov 1/17	May 24/18	Oct 25/18	Apr 11/19	Oct 21/19
96-1s	78.93	74.55	78.23	---	77.18	---	76.86	76.01	76.80	---	76.85	---	77.19	---	76.63	---	77.13	---
99-1d	79.16	67.27	78.25	---	77.16	---	76.93	75.99	76.85	---	76.97	---	77.19	---	76.72	---	77.16	---
99-1sBR	79.11	51.03	78.46	---	74.35	---	73.69	72.41	73.50	---	73.64	---	74.17	---	73.15	---	74.16	---
96-2d	68.19	62.88	67.45	66.03	67.22	66.36	66.83	65.55	66.71	65.60	66.87	65.17	67.06	66.79	66.54	65.10	67.00	65.56
99-2sBR	68.25	57.73	67.40	64.90	65.90	65.06	65.33	64.99	65.22	64.28	65.36	63.97	65.67	65.29	65.14	64.03	65.60	64.49
99-2dBR	68.26	40.21	67.64	57.63	55.36	52.75	51.87	45.90	56.76	52.70	48.14	45.66	44.96	44.65	44.08	43.39	42.35	42.49
96-3s	71.06	67.52	70.34	69.59	69.96	68.86	69.69	68.03	69.61	67.85	69.65	67.95	69.85	69.46	69.23	67.84	70.00	68.14
96-3d	71.02	62.75	70.18	68.51	69.24	68.29	68.91	67.21	67.13	66.57	68.88	66.68	69.11	68.69	68.48	66.57	69.20	66.85
06-3dBR	70.60	41.60	69.94	64.60	64.44	64.64	64.73	64.68	63.77	64.74	64.70	64.50	64.60	64.69	64.78	64.62	64.56	64.31
97-1s	74.86	70.16	73.96	---	73.55	---	73.20	71.04	72.96	---	73.30	---	73.55	---	72.23	---	73.46	---
99-5sBR	74.92	65.04	74.06	---	73.11	---	72.77	70.95	72.56	---	72.77	---	73.34	---	71.99	---	72.97	---
97-2s	69.38	63.48	68.38	64.76	66.55	64.56	65.33	64.00	65.07	63.93	65.30	63.91	66.07	65.10	64.82	63.86	65.96	63.96
99-6sBR	69.47	60.50	68.49	64.81	65.99	64.85	65.22	64.22	65.00	64.21	65.20	63.93	65.58	65.08	64.95	63.95	65.59	64.29
99-6dBR	68.98	40.88	68.31	64.39	66.01	64.57	65.87	64.28	65.21	64.41	65.39	64.35	65.78	64.86	65.29	63.88	65.89	64.24
97-3d	73.93	66.81	72.91	72.86	73.20	72.72	72.65	71.67	72.82	71.14	72.85	71.31	73.07	72.98	72.48	71.33	73.01	72.00
99-3sBR	73.19	62.03	73.00	---	72.05	---	71.76	70.54	70.70	---	71.62	---	71.70	---	71.24	---	72.21	---
97-4d	70.84	64.99	69.89	68.38	69.55	68.34	69.03	67.71	68.61	67.51	69.00	67.43	69.39	68.73	68.45	67.53	69.29	68.01
99-4sBR	70.83	60.34	69.97	65.23	66.19	65.36	65.65	64.70	65.50	64.63	65.64	64.29	65.88	65.41	65.38	64.36	65.90	64.78
99-4dBR	70.86	42.78	70.21	64.30	65.28	64.52	64.83	63.86	64.65	63.56	64.79	63.38	65.09	64.48	64.49	63.54	65.11	63.86
99-7s	67.03	63.00	66.05	---	65.69	65.45	65.32	64.37	65.38	---	65.42	---	65.42	---	65.10	---	65.39	---
99-7sBR	67.01	57.98	66.05	---	65.94	65.32	65.52	64.51	65.38	---	65.56	---	65.83	---	65.28	---	65.87	---
99-7dBR	66.85	38.75	66.18	64.19	65.13	64.40	64.81	63.78	64.59	63.63	64.77	63.26	65.02	64.42	64.45	63.52	64.95	62.80
99-8s	67.80	64.22	66.96	66.18	66.52	66.25	66.36	65.52	66.20	65.32	66.32	64.97	66.42	66.26	66.02	65.32	66.36	65.59
99-8sBR	67.76	59.33	66.96	64.95	65.76	64.96	65.20	64.29	65.11	64.33	65.20	63.80	65.34	65.02	64.93	63.95	65.30	64.15
99-9s	68.60	66.33	67.85	67.33	67.81	67.40	67.65	66.44	67.34	66.43	67.51	---	67.00	67.51	67.11	66.43	67.47	67.29
99-9sBR	68.54	60.23	67.85	Damaged	66.33	65.41	65.81	64.67	65.45	64.54	65.67	64.14	65.89	65.37	65.42	64.32	67.01	65.50
00-1s	64.42	59.54	63.80	---	---	---	---	---	---	---	---	---	---	---	Damaged	---	---	---
00-1dBR	64.42	36.38	63.81	63.99	64.42	62.50	64.42	62.75	64.40	63.97	64.40	63.92	64.42	64.30	64.39	63.25	64.25	63.83
00-2s	64.17	57.78	63.56	62.13	63.02	61.51	61.66	61.03	59.59	61.10	61.67	60.98	62.42	62.17	61.31	61.10	62.26	61.58
00-2sBR	64.28	54.73	63.57	62.14	63.04	61.52	61.66	61.03	61.53	61.11	61.69	60.14	62.45	62.20	61.34	61.12	62.28	61.60
00-2dBR	64.28	36.14	63.57	39.10	38.91	39.61	40.36	40.12	40.37	41.08	40.94	41.54	40.93	41.42	41.91	41.07	39.94	40.60
00-3s	64.94	59.02	64.20	62.13	63.13	61.52	61.70	61.01	61.53	60.87	61.69	60.96	62.58	62.19	61.30	61.07	61.47	61.55
00-3dBR	64.93	36.61	64.04	37.63	38.36	38.47	38.13	38.07	38.87	39.23	39.24	40.53	39.84	Decommissioned			---	---
00-4s	63.52	56.13	62.38	---	62.97	---	61.92	61.30	60.77	---	---	---	---	---	61.73	---	62.49	---
00-4sBR	63.72	55.12	62.74	62.33	63.25	62.04	62.25	61.58	61.45	61.73	62.26	61.55	---	63.51	61.99	61.62	62.87	62.08
00-4dBR	63.67	35.31	62.74	35.47	35.44	35.41	---	38.54	37.55	36.54	36.59	36.41	---	38.71	39.04	38.13	37.94	37.60
00-5sBR	74.04	59.90	73.62	62.84	65.92	62.91	64.15	62.36	63.82	62.96	64.26	62.28	65.29	63.74	63.58	62.27	65.23	62.94
00-5dBR	74.01	46.19	73.62	64.27	65.24	64.50	64.84	63.85	64.58	63.66	64.82	63.33	65.07	64.45	64.48	63.53	65.08	63.92
06-1s	66.04	62.47	65.53	63.74	64.72	63.10	63.30	62.59	63.11	62.67	63.23	62.57	64.12	63.81	62.90	62.71	63.98	63.22
06-1d	66.04	61.41	65.53	63.75	64.70	63.10	63.28	62.60	63.12	62.67	63.23	62.57	64.12	63.81	62.91	62.70	63.98	63.22
06-1dBR	66.26	36.56	65.54	37.28	37.30	37.31	37.42	37.16	37.53	37.31	37.51	37.75	38.06	37.72	38.26	38.26	38.10	38.30
06-2s	67.37	64.47	66.82	Dry	66.79	Dry	64.73	---	---	---	---	---	---	---	dry	---	65.88	---
06-2d	67.46	63.21	66.82	---	66.80	63.32	64.74	63.19	64.39	---	64.96	---	65.99	---	64.15	---	65.88	---
06-2dBR	67.52	39.82	66.86	41.35	41.48	41.17	41.22	40.34	41.02	40.44	40.78	40.47	41.43	41.54	41.49	41.72	40.75	41.08
06-4d	64.56	59.82	63.74	60.75	62.42	60.09	60.39	59.90	60.07	59.89	60.36	59.88	61.40	60.96	59.95	59.89	63.28	60.19
06-4dBR	64.47	36.57	63.74	62.13	62.62	61.68	62.25	61.88	62.21	61.83	62.75	61.98	62.78	63.44	62.96	61.70	62.56	62.17
SW-2	66.80			66.19														
SW at Bridge	66.35			61.43	63.00	61.42												

Note: 99-3sBR was damaged in fall 2020 and repaired.

1 - 99-9sBR was observed to be damaged in fall 2012 and was subsequently repaired.
note: negative (-) value indicates discharge gradient (upward flux)

Table 5.0a - Potentiometric Elevations
North Lancaster Waste Disposal Site

Monitor I.D.	Top of Piez. (m)	Base of Screen (m)	Ground Elev. (m)	Mar 31/20	Dec 2/20	May 25/21	Oct 4/21
96-1s	78.93	74.55	78.23	77.32	---	76.57	---
99-1d	79.16	67.27	78.25	77.23	---	76.61	---
99-1sBR	79.11	51.03	78.46	74.47	---	72.85	---
96-2d	68.19	62.88	67.45	67.29	66.63	66.19	64.87
99-2sBR	68.25	57.73	67.40	66.02	65.04	64.75	63.93
99-2dBR	68.26	40.21	67.64	43.49	42.07	Decommissioned	
96-3s	71.06	67.52	70.34	70.14	68.75	68.95	Dry
96-3d	71.02	62.75	70.18	69.33	67.89	68.18	66.40
06-3dBR	70.60	41.60	69.94	64.57	64.65	68.40	64.30
97-1s	74.86	70.16	73.96	73.78	---	72.03	---
99-5sBR	74.92	65.04	74.06	73.32	---	71.79	---
97-2s	69.38	63.48	68.38	66.50	---	---	---
99-6sBR	69.47	60.50	68.49	66.19	64.83	64.56	63.97
99-6dBR	68.98	40.88	68.31	66.41	64.78	64.55	64.13
97-3d	73.93	66.81	72.91	73.22	72.78	72.20	70.73
99-3sBR	73.19	62.03	73.00	72.15	71.48	71.75	---
97-4d	70.84	64.99	69.89	69.76	68.52	68.06	67.54
99-4sBR	70.83	60.34	69.97	66.23	65.30	65.05	64.25
99-4dBR	70.86	42.78	70.21	65.40	64.43	64.37	62.49
99-7s	67.03	63.00	66.05	65.90	---	64.99	---
99-7sBR	67.01	57.98	66.05	65.94	---	64.89	---
99-7dBR	66.85	38.75	66.18	65.11	64.36	64.31	63.43
99-8s	67.80	64.22	66.96	66.46	66.29	65.76	64.88
99-8sBR	67.76	59.33	66.96	65.50	64.80	65.48	63.66
99-9s	68.60	66.33	67.85	67.78	67.62	66.75	Dry
99-9sBR	68.54	60.23	67.85	66.93	64.98	66.10	64.41
00-1s	64.42	59.54	63.80	64.22	62.36	61.26	61.02
00-1dBR	64.42	36.38	63.81	64.42	64.05	64.42	63.86
00-2s	64.17	57.78	63.56	63.60	62.25	61.34	61.13
00-2sBR	64.28	54.73	63.57	63.63	62.26	61.36	61.15
00-2dBR	64.28	36.14	63.57	39.38	41.71	Decommissioned	
00-3s	64.94	59.02	64.20	63.69	62.30	61.33	61.06
00-3dBR	64.93	36.61	64.04	---	---	---	---
00-4s	63.52	56.13	62.38	62.79	---	61.74	---
00-4sBR	63.72	55.12	62.74	63.00	62.62	62.01	61.63
00-4dBR	63.67	35.31	62.74	---	---	Decommissioned	
00-5sBR	74.04	59.90	73.62	65.29	64.05	63.12	62.13
00-5dBR	74.01	46.19	73.62	64.87	64.41	64.32	63.43
06-1s	66.04	62.47	65.53	65.22	63.92	62.94	62.72
06-1d	66.04	61.41	65.53	65.23	63.92	62.94	62.72
06-1dBR	66.26	36.56	65.54	38.19	38.41	Decommissioned	
06-2s	67.37	64.47	66.82	66.52	---	Dry	---
06-2d	67.46	63.21	66.82	66.53	---	63.57	---
06-2dBR	67.52	39.82	66.86	40.63	41.65	Decommissioned	
06-4d	64.56	59.82	63.74	63.11	61.06	59.94	59.90
06-4dBR	64.47	36.57	63.74	62.73	62.68	Decommissioned	
SW-2	66.80						
SW at Bridge	66.35						

Note: 99-3sBR was damaged in fall 2020 and repaired.

1 - 99-9sBR was observed to be damaged in fall 2012 and was subsequently repaired.
note: negative (-) value indicates discharge gradient (upward flux)

Table 5.0b - Vertical Hydraulic Gradients
North Lancaster Waste Disposal Site

Monitor I.D.	Top of Piez. (m)	Base of Screen (m)	Ground Elev. (m)	Aug 12/96	Oct 3/96	Oct 8/96	Apr 24/97	Nov. 4/97	May 7/98	Oct 7/98	Apr 8/99	Apr 21/99	May 5/99	Oct 12/99	Oct 18/99	Nov 22/99	Jan 25/00	Apr 26/00
96-1s	78.93	74.55	78.23	---	---	---	---	---	---	---	0.02	0.02	0.03	0.10	0.31	-0.01	0.03	0.02
99-1d	79.16	67.27	78.25	---	---	---	---	---	---	---	---	---	---	0.23	0.24	0.26	0.27	0.25
99-1sBR	79.11	51.03	78.46															
96-2d	68.19	62.88	67.45	---	---	---	---	---	---	---	0.16	0.17	0.15	0.16	0.17	0.32	0.11	-0.04
99-2sBR	68.25	57.73	67.40	---	---	---	---	---	---	---	---	---	---	-0.04	0.01	-0.07	-0.03	0.03
99-2dBR	68.26	40.21	67.64															
96-3s	71.06	67.52	70.34	0.09	0.13	0.12	0.14	0.24	0.09	0.07	0.12	0.08	0.05	0.10	0.15	0.06	0.06	0.10
96-3d	71.02	62.75	70.18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-3dBR	70.60	41.60	69.94															
97-1s	74.86	70.16	73.96	---	---	---	---	---	---	---	0.12	0.11	0.07	0.05	0.04	0.05	0.07	0.12
99-5sBR	74.92	65.04	74.06															
97-2s	69.38	63.48	68.38	---	---	---	---	---	---	---	---	---	---	-0.97	-0.01	-0.04	-0.04	0.23
99-6sBR	69.47	60.50	68.49	---	---	---	---	---	---	---	---	---	---	0.32	0.55	0.67	0.33	-0.01
99-6dBR	68.98	40.88	68.31															
97-3d	73.93	66.81	72.91	---	---	---	---	---	---	---	0.39	0.36	0.36	0.32	0.38	0.37	0.33	0.44
99-3sBR	73.50	62.03	73.00															
97-4d	70.84	64.99	69.89	---	---	---	---	---	---	---	0.70	0.46	0.52	0.59	0.55	0.49	0.52	0.54
99-4sBR	70.83	60.34	69.97	---	---	---	---	---	---	---	---	---	---	0.11	0.14	0.03	0.03	0.05
99-4dBR	70.86	42.78	70.21															
99-7s	67.03	63.00	66.05	---	---	---	---	---	---	---	-0.01	0.02	0.02	0.00	0.00	0.21	0.10	0.00
99-7sBR	67.01	57.98	66.05	---	---	---	---	---	---	---	---	---	---	0.01	0.00	-0.03	0.01	0.02
99-7dBR	66.85	38.75	66.18															
99-8s	67.80	64.22	66.96	---	---	---	---	---	---	---	---	0.16	0.13	0.20	0.22	0.17	0.13	0.09
99-8sBR	67.76	59.33	66.96															
99-9s	68.60	66.33	67.85	---	---	---	---	---	---	---	---	0.28	0.26	0.45	0.38	0.28	0.36	0.27
99-9sBR	68.64	60.23	67.85															
00-1s	64.42	59.54	63.80	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-1dBR	64.42	36.38	63.81															
00-2s	64.17	57.78	63.56															
00-2sBR	64.28	54.73	63.57	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-2dBR	64.28	36.14	63.57															
00-3s	64.94	59.02	64.20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-3dBR	64.93	36.61	64.04															
00-4s	63.47	56.13	62.38	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-4sBR	63.72	55.12	62.74	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-4dBR	63.67	35.31	62.74															
00-5sBR	74.04	59.90	73.62	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
00-5dBR	74.01	46.19	73.62															
06-1s	66.04	62.47	65.53	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-1d	66.04	61.41	65.53	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-1dBR	66.26	36.56	65.54															
06-2s	67.37	64.47	66.82	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-2d	67.46	63.21	66.82	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-2dBR	67.52	39.82	66.86															
06-4d	64.56	59.82	63.74	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
06-4dBR	64.47	36.57	63.74															

note: negative (-) value indicates discharge gradient (upward flux)

1 - 99-9sBR was observed to be damaged in fall 2012 and was subsequently repaired.
note: negative (-) value indicates discharge gradient (upward flux)

Table 5.0b - Vertical Hydraulic Gradients
North Lancaster Waste Disposal Site

Monitor I.D.	Top of Piez. (m)	Base of Screen (m)	Ground Elev. (m)	Oct 23/00	Nov 30/00	May 1/01	Oct 23/01	Apr 17/02	Nov 4/02	Jun 2/03	Oct 8/03	May 20/04	Oct 5/04	May 30/05	Aug 23/05	Nov 21/05	Apr 5/06	Jul 19/06	Oct 26/06
96-1s	78.93	74.55	78.23	-0.02	---	0.02	0.09	0.01	---	0.02	---	0.02	0.07	0.02	-0.01	0.02	0.01	0.04	0.04
99-1d	79.16	67.27	78.25	0.23	---	0.25	0.23	0.30	0.23	0.26	0.26	0.27	0.26	0.28	0.26	0.23	0.23	0.26	0.27
99-1sBR	79.11	51.03	78.46																
96-2d	68.19	62.88	67.45	0.14	---	0.18	0.16	0.24	0.17	0.25	0.13	0.22	0.18	0.24	0.11	0.26	0.24	0.20	0.23
99-2sBR	68.25	57.73	67.40	-0.03	---	-0.05	0.03	0.02	0.02	0.02	-0.07	0.02	-0.03	-0.03	0.77	0.12	0.02	0.06	0.15
99-2dBR	68.26	40.21	67.64																
96-3s	71.06	67.52	70.34	0.14	---	0.07	0.20	0.06	0.19	0.07	0.21	0.05	0.09	0.05	0.17	0.06	0.12	0.05	0.11
96-3d	71.02	62.75	70.18	---	---	---	---	---	---	---	---	---	---	---	---	---	0.01	0.03	0.11
06-3dBR	70.60	41.60	69.94																
97-1s	74.86	70.16	73.96	0.04	---	0.13	0.06	0.11	0.06	0.12	0.05	0.08	0.03	0.05	0.01	0.10	0.10	0.02	0.06
99-5sBR	74.92	65.04	74.06																
97-2s	69.38	63.48	68.38	-0.14	---	0.05	-0.06	0.10	0.33	0.04	-0.11	-0.10	-0.12	-0.09	-0.04	0.07	0.13	-0.13	0.06
99-6sBR	69.47	60.50	68.49	-0.06	---	0.01	0.01	-0.02	-0.13	-0.03	-0.02	-0.04	-0.01	-0.01	0.01	0.01	-0.02	0.00	0.00
99-6dBR	68.98	40.88	68.31																
97-3d	73.93	66.81	72.91	0.29	---	0.27	0.23	0.26	0.24	0.38	0.16	0.27	0.23	0.22	0.20	0.27	0.26	0.28	0.27
99-3sBR	73.50	62.03	73.00																
97-4d	70.84	64.99	69.89	0.49	---	0.55	0.63	0.67	0.65	0.60	0.59	0.56	0.57	0.57	0.59	0.65	0.67	0.56	0.60
99-4sBR	70.83	60.34	69.97	0.02	---	0.03	-0.16	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.04	0.04
99-4dBR	70.86	42.78	70.21																
99-7s	67.03	63.00	66.05	0.00	---	0.00	-0.01	0.00	-0.01	0.04	0.02	0.01	-0.01	0.02	-0.03	0.02	-0.04	-0.01	0.00
99-7sBR	67.01	57.98	66.05	0.02	---	0.02	0.01	0.02	0.01	0.02	0.01	0.03	0.02	0.02	0.01	0.03	0.02	0.02	0.03
99-7dBR	66.85	38.75	66.18																
99-8s	67.80	64.22	66.96	0.13	---	0.12	0.23	0.07	0.20	0.07	0.12	0.06	0.12	0.13	0.11	0.11	0.08	0.11	0.17
99-8sBR	67.76	59.33	66.96																
99-9s	68.60	66.33	67.85	0.25	---	0.27	---	0.29	---	0.31	---	0.29	0.24	0.27	---	---	0.31	0.27	0.33
99-9sBR	68.64	60.23	67.85																
00-1s	64.42	59.54	63.80	---	0.55	-0.10	-0.12	-0.06	-0.12	-0.09	-0.12	-0.09	---	-0.12	0.50	-0.05	-0.04	-0.13	-0.08
00-1dBR	64.42	36.38	63.81																
00-2s	64.17	57.78	63.56					-0.34	-0.01	-0.01	-0.01	-0.01	0.00	0.00	-0.01	0.00	-0.01	-0.01	-0.02
00-2sBR	64.28	54.73	63.57	---	-0.003	-0.004	0.492	0.51	0.65	0.53	0.53	0.96	0.90	0.96	1.10	1.04	1.16	1.21	1.24
00-2dBR	64.28	36.14	63.57																
00-3s	64.94	59.02	64.20	---	0.406	0.403	0.969	0.99	1.03	1.04	1.06	0.98	1.09	0.83	1.07	1.12	1.16	1.13	1.10
00-3dBR	64.93	36.61	64.04																
00-4s	63.47	56.13	62.38	---	-0.089	---	---	-0.25	0.81	-0.13	0.80	-0.13	-0.18	---	-0.16	-0.23	---	0.45	-0.10
00-4sBR	63.72	55.12	62.74	---	0.03	0.04	1.01	1.24	1.08	0.75	0.91	1.25	1.25	1.24	1.28	1.35	1.29	1.32	1.34
00-4dBR	63.67	35.31	62.74																
00-5sBR	74.04	59.90	73.62	---	-0.11	-0.08	-0.12	-0.03	-0.11	-0.08	-0.12	-0.11	-0.16	-0.12	-0.11	-0.09	-0.01	-0.12	-0.11
00-5dBR	74.01	46.19	73.62																
06-1s	66.04	62.47	65.53	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	-0.09	0.00
06-1d	66.04	61.41	65.53	---	---	---	---	---	---	---	---	---	---	---	---	---	-0.06	0.53	0.90
06-1dBR	66.26	36.56	65.54																
06-2s	67.37	64.47	66.82	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	-1.09	0.63
06-2d	67.46	63.21	66.82	---	---	---	---	---	---	---	---	---	---	---	---	---	0.36	0.39	0.56
06-2dBR	67.52	39.82	66.86																
06-4d	64.56	59.82	63.74	---	---	---	---	---	---	---	---	---	---	---	---	---	0.09	-0.15	-0.10
06-4dBR	64.47	36.57	63.74																

note: negative (-) value indicates discharge gradient (upward fl

1 - 99-9sBR was observed to be damaged in fall 2012 and was subsequently repaired.
note: negative (-) value indicates discharge gradient (upward flux)

Table 5.0b - Vertical Hydraulic Gradients
North Lancaster Waste Disposal Site

Monitor I.D.	Top of Piez. (m)	Base of Screen (m)	Ground Elev. (m)	Apr 24/07	July 18/07	Oct 29/07	May 5/08	Jul 30/08	Oct 20/08	Oct 30/08	May 11/09	Jul 28/09	Oct 21/09	Apr 21/10	Nov 22/10	Apr 19/11	Oct 31/11	Apr 18/12
96-1s	78.93	74.55	78.23	0.01	0.02	0.12	0.01	0.02	Dry	0.27	0.27	0.02	0.00	0.01	0.00	-0.01	0.13	0.00
99-1d	79.16	67.27	78.25	0.22	0.27	0.30	0.23	0.25	0.26	0.27	0.27	0.23	0.27	0.20	0.20	0.19	0.26	0.22
99-1sBR	79.11	51.03	78.46															
96-2d	68.19	62.88	67.45	0.25	0.18	0.23	0.24	0.19	0.15	-0.05	-0.05	0.21	0.20	0.25	0.26	0.24	0.23	0.25
99-2sBR	68.25	57.73	67.40	0.10	0.05	0.08	0.47	1.20	1.28	1.43	1.43	0.82	0.65	0.48	0.50	0.55	0.62	0.46
99-2dBR	68.26	40.21	67.64															
96-3s	71.06	67.52	70.34	0.08	0.09	-0.11	0.07	0.09	0.29	0.38	0.38	-0.09	0.22	0.09	0.10	0.00	0.14	0.12
96-3d	71.02	62.75	70.18	0.02	0.13	0.21	0.21	0.13	0.09	0.12	0.12	0.20	0.11	0.22	0.22	0.22	0.16	0.19
06-3dBR	70.60	41.60	69.94															
97-1s	74.86	70.16	73.96	0.10	0.04	0.06	0.10	0.02	0.05	0.04	0.04	0.03	0.05	0.12	0.10	0.10	0.06	0.06
99-5sBR	74.92	65.04	74.06															
97-2s	69.38	63.48	68.38	0.18	-0.23	0.05	0.04	-0.15	0.07	-0.08	-0.08	-0.10	-0.01	0.04	0.06	0.23	-0.05	-0.09
99-6sBR	69.47	60.50	68.49	-0.02	0.04	0.01	0.00	0.01	0.00	0.44	0.44	0.00	0.01	-0.01	0.00	-0.02	0.01	0.00
99-6dBR	68.98	40.88	68.31															
97-3d	73.93	66.81	72.91	0.25	0.28	0.31	0.26	0.25	0.17	0.26	0.26	0.27	0.25	0.26	0.28	0.24	0.31	0.26
99-3sBR	73.50	62.03	73.00															
97-4d	70.84	64.99	69.89	0.67	0.62	0.62	0.65	0.58	0.65	0.62	0.62	0.58	0.66	0.64	0.67	0.75	0.61	0.64
99-4sBR	70.83	60.34	69.97	0.04	0.04	0.04	0.04	0.04	0.03	0.05	0.05	0.04	0.04	0.04	0.04	0.05	0.05	0.05
99-4dBR	70.86	42.78	70.21															
99-7s	67.03	63.00	66.05	-0.04	-0.02	0.03	-0.02	0.00	-0.04	0.00	0.00	-0.03	-0.04	0.00	-0.01	-0.07	0.01	0.03
99-7sBR	67.01	57.98	66.05	0.03	0.02	0.04	0.03	0.02	0.01	0.04	0.04	0.03	0.02	0.03	0.04	0.03	0.04	0.04
99-7dBR	66.85	38.75	66.18															
99-8s	67.80	64.22	66.96	0.13	0.13	0.17	0.12	0.14	0.18	n/a	---	0.08	0.21	0.16	0.20	0.18	0.18	0.24
99-8sBR	67.76	59.33	66.96															
99-9s	68.60	66.33	67.85	0.30	---	0.37	0.31	0.28	Dry	0.61	0.58	0.30	---	0.34	0.33	-0.32	0.32	0.33
99-9sBR	68.64	60.23	67.85															
00-1s	64.42	59.54	63.80	-0.08	-0.14	0.09	-0.10	-0.13	-0.10	0.52	0.52	-0.03	-0.07	-0.09	-0.09	0.01	-0.01	damaged
00-1dBR	64.42	36.38	63.81															
00-2s	64.17	57.78	63.56	-0.01	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	-0.01	-0.01	-0.01	-0.01	0.00
00-2sBR	64.28	54.73	63.57	1.11	1.06	1.19	0.82	1.17	1.26	1.35	1.35	1.20	1.23	1.28	1.24	1.30	1.24	0.67
00-2dBR	64.28	36.14	63.57															
00-3s	64.94	59.02	64.20	1.08	1.04	1.06	1.04	1.01	1.05	1.10	1.10	1.08	1.08	1.11	1.10	1.13	1.06	1.07
00-3dBR	64.93	36.61	64.04															
00-4s	63.47	56.13	62.38	-0.22	-0.17	-0.12	-0.29	-0.18	-0.14	-0.24	-0.24	-0.18	-0.15	-0.24	-0.20	-0.17	-0.15	-0.23
00-4sBR	63.72	55.12	62.74	1.35	1.31	1.34	0.65	1.20	1.27	-0.08	-0.08	1.32	1.30	1.35	1.35	1.36	1.31	1.34
00-4dBR	63.67	35.31	62.74															
00-5sBR	74.04	59.90	73.62	-0.03	-0.12	-0.12	-0.03	-0.12	-0.11	-1.28	-1.28	-0.12	-0.11	-0.06	-0.05	0.02	-0.12	-0.09
00-5dBR	74.01	46.19	73.62															
06-1s	66.04	62.47	65.53	0.01	0.00	0.00	0.00	-0.02	-0.01	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.01
06-1d	66.04	61.41	65.53	1.00	1.03	1.06	1.05	1.04	1.02	1.07	1.07	1.06	1.03	1.06	1.06	1.10	1.03	1.03
06-1dBR	66.26	36.56	65.54															
06-2s	67.37	64.47	66.82	0.01	---	---	-0.14	1.04	Dry	Dry	---	---	1.09	0.01	0.01	0.00	---	---
06-2d	67.46	63.21	66.82	0.76	0.63	---	0.84	0.92	Dry	Dry	---	0.93	0.97	0.96	0.97	1.06	0.94	0.98
06-2dBR	67.52	39.82	66.86															
06-4d	64.56	59.82	63.74	-0.08	-0.13	-0.08	-0.10	-0.12	Dry	0.23	0.23	-0.12	-0.11	-0.08	-0.08	-0.02	-0.09	-0.11
06-4dBR	64.47	36.57	63.74															

note: negative (-) value indicates discharge gradient (upward fl

1 - 99-9sBR was observed to be damaged in fall 2012 and was subsequently repaired.
note: negative (-) value indicates discharge gradient (upward flux)

Table 5.0b - Vertical Hydraulic Gradients
North Lancaster Waste Disposal Site

Monitor I.D.	Top of Piez. (m)	Base of Screen (m)	Ground Elev. (m)	Oct 23/12	Apr 18/13	Oct 23/13	May 27/14	Sep 30/14	May 6/15	Oct 8/15	Apr 26/16	Oct 11/16	Apr 17/17	Nov 1/17	May 24/18	Oct 25/18	April29/19	Oct 21/19
96-1s	78.93	74.55	78.23	---	0.00	---	-0.01	0.00	-0.01	---	-0.02	---	0.00	---	-0.01	---	0.00	---
99-1d	79.16	67.27	78.25	---	0.17	---	0.20	0.22	0.21	---	0.21	---	0.19	---	0.22	---	0.18	---
99-1sBR	79.11	51.03	78.46															
96-2d	68.19	62.88	67.45	0.22	0.26	0.25	0.29	0.11	0.29	0.26	0.29	0.23	0.27	0.29	0.27	0.21	0.27	0.21
99-2sBR	68.25	57.73	67.40	0.41	0.60	0.70	0.77	1.09	0.48	0.66	0.98	1.05	1.18	1.18	1.20	1.18	1.33	1.26
99-2dBR	68.26	40.21	67.64															
96-3s	71.06	67.52	70.34	0.23	0.15	0.12	0.16	0.17	0.52	0.27	0.16	0.27	0.16	0.16	0.16	0.27	0.17	0.27
96-3d	71.02	62.75	70.18	0.18	0.23	0.17	0.20	0.12	0.16	0.09	0.20	0.10	0.21	0.19	0.17	0.09	0.22	0.12
06-3dBR	70.60	41.60	69.94															
97-1s	74.86	70.16	73.96	---	---	---	---	---	0.08	---	0.10	---	0.04	---	0.05	---	0.10	---
99-5sBR	74.92	65.04	74.06															
97-2s	69.38	63.48	68.38	-0.02	0.19	-0.10	0.04	-0.07	0.02	-0.09	0.03	-0.01	0.16	0.01	-0.04	-0.03	0.12	-0.11
99-6sBR	69.47	60.50	68.49	0.02	0.00	0.01	-0.03	0.00	-0.01	-0.01	-0.01	-0.02	-0.01	0.01	-0.02	0.00	-0.02	0.00
99-6dBR	68.98	40.88	68.31															
97-3d	73.93	66.81	72.91	---	0.24	---	0.19	0.24	0.44	---	0.26	---	0.29	---	0.26	---	0.17	---
99-3sBR	73.50	62.03	73.00															
97-4d	70.84	64.99	69.89	0.68	0.72	0.64	0.73	0.65	0.67	0.62	0.72	0.68	0.75	0.71	0.66	0.68	0.73	0.69
99-4sBR	70.83	60.34	69.97	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.04	0.05	0.05	0.05	0.04	0.05
99-4dBR	70.86	42.78	70.21															
99-7s	67.03	63.00	66.05	---	-0.05	0.03	-0.04	-0.03	0.00	---	-0.03	---	-0.08	---	-0.04	---	-0.10	---
99-7sBR	67.01	57.98	66.05	---	0.04	0.05	0.04	0.04	0.04	---	0.04	---	0.04	---	0.04	---	0.05	---
99-7dBR	66.85	38.75	66.18															
99-8s	67.80	64.22	66.96	0.25	0.16	0.26	0.24	0.25	0.22	0.20	0.23	0.24	0.22	0.25	0.22	0.28	0.22	0.29
99-8sBR	67.76	59.33	66.96															
99-9s	68.60	66.33	67.85	---	0.24	0.33	0.30	0.29	0.31	0.31	0.30	---	0.18	0.35	0.28	0.35	0.08	0.29
99-9sBR	68.64	60.23	67.85															
00-1s	64.42	59.54	63.80															
00-1dBR	64.42	36.38	63.81															
00-2s	64.17	57.78	63.56	0.00	-0.01	0.00	0.00	0.00	-0.64	0.00	-0.01	0.28	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
00-2sBR	64.28	54.73	63.57	1.24	1.30	1.18	1.15	1.12	1.14	1.08	1.12	1.00	1.16	1.12	1.05	1.08	1.20	1.13
00-2dBR	64.28	36.14	63.57															
00-3s	64.94	59.02	64.20	1.09	1.11	1.03	1.05	1.02	1.01	0.97	1.00	0.91	1.01					
00-3dBR	64.93	36.61	64.04												Decommissioned			
00-4s	63.47	56.13	62.38	---	-0.28	---	-0.33	-0.28	-0.67	---	---	---	---	---	-0.26	---	-0.38	---
00-4sBR	63.72	55.12	62.74	1.36	1.40	1.34	---	1.16	1.21	1.27	1.30	1.27	---	1.25	1.16	1.19	1.26	1.24
00-4dBR	63.67	35.31	62.74		---	---	---	---	---	---								
00-5sBR	74.04	59.90	73.62	-0.10	0.05	-0.12	-0.05	-0.11	-0.06	-0.05	-0.04	-0.08	0.02	-0.05	-0.07	-0.09	0.01	-0.07
00-5dBR	74.01	46.19	73.62		---	---	---	---	---	---								
06-1s	66.04	62.47	65.53	-0.01	0.02	0.00	0.02	-0.01	-0.01	0.00	0.00	0.00	0.00	0.00	-0.01	0.01	0.00	0.00
06-1d	66.04	61.41	65.53	1.07	1.10	1.04	1.04	1.02	1.03	1.02	1.04	1.00	1.05	1.05	0.99	0.98	1.04	1.00
06-1dBR	66.26	36.56	65.54		---	---	---	---	---	---	---	---	---	---				
06-2s	67.37	64.47	66.82	---	0.00	---	0.00	---	---	---	---	---	---	---	---	---	1.37	---
06-2d	67.46	63.21	66.82	---	1.08	0.95	1.01	0.98	1.00	---	1.03	---	1.05	---	0.97	---	1.07	---
06-2dBR	67.52	39.82	66.86		---	---	---	---	---	---								
06-4d	64.56	59.82	63.74	-0.06	-0.01	-0.07	-0.08	-0.09	-0.09	-0.08	-0.10	-0.09	-0.06	-0.11	-0.13	-0.08	0.03	-0.09
06-4dBR	64.47	36.57	63.74		---	---	---	---	---	---	---	---	---	---				

note: negative (-) value indicates discharge gradient (upward fl

1 - 99-9sBR was observed to be damaged in fall 2012 and was subsequently repaired.
note: negative (-) value indicates discharge gradient (upward flux)

Table 5.0b - Vertical Hydraulic Gradients
North Lancaster Waste Disposal Site

Monitor I.D.	Top of Piez. (m)	Base of Screen (m)	Ground Elev. (m)	Mar 31/20	Dec 2/20	May 25/21	Oct 4/21
96-1s	78.93	74.55	78.23	0.01	---	-0.01	---
99-1d	79.16	67.27	78.25	0.17	---	0.23	---
99-1sBR	79.11	51.03	78.46				
96-2d	68.19	62.88	67.45	0.25	0.31	0.28	0.18
99-2sBR	68.25	57.73	67.40	1.29	1.31	---	---
99-2dBR	68.26	40.21	67.64				
96-3s	71.06	67.52	70.34	0.17	0.18	0.16	---
96-3d	71.02	62.75	70.18	0.23	0.15	-0.01	0.10
06-3dBR	70.60	41.60	69.94				
97-1s	74.86	70.16	73.96	0.09	---	0.05	---
99-5sBR	74.92	65.04	74.06				
97-2s	69.38	63.48	68.38	0.10	---	---	---
99-6sBR	69.47	60.50	68.49	-0.01	0.00	0.00	-0.01
99-6dBR	68.98	40.88	68.31				
97-3d	73.93	66.81	72.91	0.22	0.27	0.09	---
99-3sBR	73.50	62.03	73.00				
97-4d	70.84	64.99	69.89	0.76	0.69	0.65	0.71
99-4sBR	70.83	60.34	69.97	0.05	0.05	0.04	0.10
99-4dBR	70.86	42.78	70.21				
99-7s	67.03	63.00	66.05	-0.01	---	0.02	---
99-7sBR	67.01	57.98	66.05	0.04	---	0.03	---
99-7dBR	66.85	38.75	66.18				
99-8s	67.80	64.22	66.96	0.20	0.30	0.06	0.25
99-8sBR	67.76	59.33	66.96				
99-9s	68.60	66.33	67.85	0.14	0.43	0.11	---
99-9sBR	68.64	60.23	67.85				
00-1s	64.42	59.54	63.80				
00-1dBR	64.42	36.38	63.81				
00-2s	64.17	57.78	63.56	-0.01	0.00	-0.01	-0.01
00-2sBR	64.28	54.73	63.57	1.30	1.11	---	---
00-2dBR	64.28	36.14	63.57				
00-3s	64.94	59.02	64.20				
00-3dBR	64.93	36.61	64.04				
00-4s	63.47	56.13	62.38	-0.21	---	-0.27	---
00-4sBR	63.72	55.12	62.74	---	---	---	---
00-4dBR	63.67	35.31	62.74				
00-5sBR	74.04	59.90	73.62	0.03	-0.03	-0.09	-0.09
00-5dBR	74.01	46.19	73.62				
06-1s	66.04	62.47	65.53	-0.01	0.00	0.00	0.00
06-1d	66.04	61.41	65.53	1.09	1.03	---	---
06-1dBR	66.26	36.56	65.54				
06-2s	67.37	64.47	66.82	0.51	---	---	---
06-2d	67.46	63.21	66.82	1.11	---	---	---
06-2dBR	67.52	39.82	66.86				
06-4d	64.56	59.82	63.74	0.02	-0.07	---	---
06-4dBR	64.47	36.57	63.74				

note: negative (-) value indicates discharge gradient (upward fl

1 - 99-9sBR was observed to be damaged in fall 2012 and was subsequently repaired.
note: negative (-) value indicates discharge gradient (upward flux)

Groundwater Monitor Details and Sampling Frequencies

Monitor	Location	Unit	Geology	Top of Casing Elev.	Ground Elev.	Total Depth From Ground Surface		Screened Interval	
				(m asl)	(m asl)	(m)	(m asl)	(m below ground)	(m asl)
Annual Monitoring									
96-1s	Background	sOVB	Till	78.93	78.23	3.68	74.55	1.68-3.68	76.55-74.55
99-1d		dOVB	Boulders	79.16	78.25	10.98	67.27	9.45-10.98	68.80-67.27
99-1sBR		sBR	Limestone w/ shale seams	79.11	78.46	27.43	51.03	22.86-27.43	55.60-51.03
99-3sBR	Downgradient West	sBR	Limestone w/clay seams	73.50	73.00	10.97	62.03	9.50-10.97	63.50-62.03
99-7s	CAZ Downgradient Northwest	sOVB	Till	67.03	66.05	3.05	63.00	1.55-3.05	64.50-63.00
99-7sBR		sBR	Limestone w/clay seams	67.01	66.05	8.07	57.98	6.55-8.07	59.50-57.98
99-7dBR		dBR	Limestone w/shale seams	66.85	66.18	27.43	38.75	21.34-27.43	44.84-38.75
97-1s	Downgradient East	sOVB	Brown Till	74.86	73.96	3.80	70.16	2.30-3.80	71.66-70.16
99-5sBR		sBR	Limestone w/clay seams	74.92	74.06	9.02	65.04	7.46-9.02	66.60-65.04
00-4s	CAZ Northwest	sOVB	Boulders	63.52	62.38	6.25	56.13	4.48-6.25	57.90-56.37
06-2s		sOVB	Sandy Clay	67.37	66.82	2.35	64.47	1.92-2.35	64.90-64.47
06-2d		dOVB	Gravel	67.46	66.82	6.10	60.72	3.76-6.10	63.10-60.72
Semi-Annual Monitoring									
96-3s	Leachate	sOVB	Brown Till	71.06	70.34	2.82	67.52	1.99-2.82	68.35-67.52
96-3d		dOVB	Grey Till	71.02	70.18	7.43	62.75	5.94-7.43	64.24-62.75
06-3dBR		dBR	Limestone	70.60	69.94	28.34	41.60	20.54-28.34	49.40-41.60
97-4d		dOVB	Grey Till	70.84	69.89	4.90	64.99	3.40-4.90	66.49-64.99
99-4sBR	Downgradient West	sBR	Limestone w/clay seams	70.83	69.97	9.63	60.34	8.07-9.63	61.90-60.34
99-4dBR		dBR	Limestone w/shale seams	70.86	70.21	27.43	42.78	21.34-27.43	48.87-42.78
97-3d		dOVB	Grey Till	73.98	72.91	6.10	66.81	4.61-6.10	68.30-66.81
99-9s	CAZ Downgradient West	sOVB	Clay	68.60	67.85	1.52	66.33	0.75-1.52	67.10-66.33
99-9sBR		sBR	Limestone	68.64	67.85	7.62	60.23	6.05-7.62	61.80-60.23
99-8s	CAZ Downgradient Northwest	sOVB	Till	67.80	66.96	2.74	64.22	1.26-2.74	65.70-64.22
99-8sBR		sBR	Limestone	67.76	66.96	7.63	59.33	6.06-7.63	60.90-59.33
96-2d	CAZ Downgradient North	dOVB	Grey Till	68.19	67.45	4.57	62.88	3.05-4.57	64.40-62.88
99-2sBR		sBR	Limestone w/clay seams	68.25	67.40	9.67	57.73	8.20-9.67	59.20-57.73
97-2s	Downgradient Northeast	sOVB	Brown Till	69.38	68.38	4.90	63.48	3.40-4.90	64.98-63.48
99-6sBR		sBR	Limestone w/ clay seams	69.47	68.49	7.99	60.50	6.49-7.99	62.00-60.50
99-6dBR		dBR	Limestone w/shale seams	68.98	68.31	27.43	40.88	21.34-27.43	46.97-40.88
06-4d	CAZ East	dOVB	Sandy Clay	64.56	63.74	3.92	59.82	3.00-3.92	60.74-59.82
00-1s	CAZ Northeast	sOVB	Till	64.42	63.80	4.26	59.54	2.73-4.26	61.07-59.54
00-1dBR*		dBR	Limestone	64.42	63.81	27.43	36.38	24.38-27.43	39.43-36.38
00-2s		sOVB	Marine Outwash	64.17	63.56	5.98	57.78	4.26-5.98	59.30-57.78
00-2sBR		sBR	Shale	64.28	63.57	8.84	54.73	7.32-8.84	56.25-54.73
06-1s		sOVB	Clay	66.04	65.53	3.06	62.47	1.03-3.06	64.50-62.47
06-1d		dOVB	Gravel	66.04	65.53	4.12	61.41	3.28-4.12	62.25-61.41
00-3s	CAZ North	sOVB	Marine Clay	64.94	64.20	5.18	59.02	3.74-5.18	60.46-59.02
00-4sBR	CAZ Northwest	sBR	Shale	63.72	62.74	7.62	55.12	6.22-7.62	56.52-55.12
00-5sBR		sBR	Shale	74.04	73.62	13.72	59.90	12.19-13.72	61.43-59.90
00-5dBR		dBR	Shale	74.01	73.62	27.43	46.19	21.34-27.43	52.28-46.19

dBR – Deep Bedrock; sBR – Shallow Bedrock; dOVB – Deep Overburden; sOVB – Shallow Overburden

**This well exhibits slow recovery and the geochemistry data indicates that this may represent formation water and be saline.*

These wells exhibited very low static water elevations and extremely slow recovery. The geochemistry data corroborated that these may represent formation water and are saline and, further to MECP approval, were decommissioned.

Monitor	Location	Unit	Geology	Top of Casing Elev.	Ground Elev.	Total Depth From Ground Surface		Screened Interval	
				(m asl)	(m asl)	(m)	(m asl)	(m below ground)	(m asl)
Decommissioned Monitoring Wells									
99-2dBR	CAZ Downgradient North	dBR	Limestone with shale seams	68.26	67.64	27.43	40.21	21.34-27.43	46.30-40.21
06-4dBR	CAZ East	dBR	Limestone	64.47	63.74	27.17	36.57	21.25-27.17	42.49-36.57
00-2dBR	CAZ Northeast	dBR	Shale	64.28	63.57	27.43	36.14	21.23-27.43	42.23-36.14
06-1dBR		dBR	Limestone w/shale seams	66.26	65.54	29.98	35.56	22.34-29.98	43.20-35.56
00-3dBR	CAZ North	dBR	Limestone	64.93	64.04	27.73	36.61	24.71-27.43	39.33-36.61
00-4dBR	CAZ Northwest	dBR	Shale	63.67	62.74	27.43	35.31	24.50-27.43	38.24-35.31
06-2dBR		dBR	Limestone	67.52	66.86	27.04	39.82	21.86-27.04	45.00-39.82

APPENDIX

D

GROUNDWATER CHEMISTRY DATA

Table 5.3a: Background Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field		250	500			200		1.0	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
96-1s																															
Aug 12/96	365	325	730	760	---	8.20	---	21.7	35.0	38.0	80.2	40.1	46.2	5.2	0.01	---	0.01	0.302	1.97	0.20	0.74	0.54	ND	0.5	ND	38	308	---	103	442	1.05
Oct 8/96	333	344	775	803	---	7.69	---	---	27.2	48.0	70.7	38.1	52.7	3.0	---	---	ND	0.067	0.16	0.01	0.22	0.21	ND	ND	ND	4	11	---	4.0	446	1.26
Apr 24/97	263	324	813	778	7.65	7.56	---	---	12.4	60.2	52.4	32.2	47.6	1.9	0.10	0.07	0.20	0.403	0.12	0.01	0.14	0.13	ND	ND	ND	ND	4	---	8.0	402	1.28
Nov. 4/97	521	375	1,045	981	7.12	7.63	---	---	5.4	204	123	52.0	55.3	2.9	0.07	0.04	0.02	ND	0.55	ND	0.14	0.14	ND	0.2	ND	1	3	---	4.0	669	1.05
May 7/98	298	287	613	579	7.33	7.84	---	7.7	3.0	43.3	80.9	23.2	28.7	1.0	---	---	0.27	0.010	1.10	ND	0.06	0.06	ND	ND	ND	2	17	---	8.0	353	0.720
Oct 8/98	361	342	749	626	7.22	7.45	---	13.6	4.2	36.0	102	25.8	26.8	1.7	---	---	0.01	0.053	0.70	ND	0.12	0.12	ND	ND	ND	2	ND	---	6.0	402	0.610
Apr 21/99	317	303	656	642	---	6.82	---	7.1	3.2	33.0	85.6	25.1	23.3	2.8	---	---	ND	0.014	0.37	ND	0.24	0.24	ND	ND	ND	ND	23	---	1.0	355	0.570
Oct 18/99	351	300	657	615	7.25	7.44	---	11.7	5.2	54.4	96.0	27.0	18.7	ND	---	---	0.20	0.023	0.71	ND	0.06	0.06	ND	0.3	ND	ND	ND	---	3.0	383	0.430
Jan 25/00	---	---	655	652	---	---	---	3.6	3.1	---	---	---	17.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	368	---
May 1/00	329	285	597	556	7.11	7.90	---	6.0	3.1	35.5	92.7	23.7	13.8	ND	0.81	0.12	0.06	0.006	0.64	ND	0.11	0.11	ND	ND	ND	6	5.0	---	4.0	340	0.330
Oct 23/00	377	388	898	---	7.58	---	---	---	3.7	116	87.3	38.6	23.1	2.05	---	---	0.02	0.011	---	ND	---	---	ND	ND	---	ND	---	---	---	528	0.520
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.93	0.17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	261	238	524	290	---	8.20	---	10.0	2.2	33.2	74.8	18.1	8.3	ND	---	---	0.32	0.009	1.02	0.04	0.29	0.25	ND	ND	ND	ND	18	---	1.0	280	0.220
Oct 29/01	393	342	749	700	7.46	7.90	---	11.2	3.1	81.6	113	27.0	8.2	1.4	0.06	0.05	0.01	ND	0.78	ND	0.19	0.19	ND	ND	ND	ND	ND	---	5.0	440	0.180
Apr 17/02	315	265	585	460	7.14	6.60	---	7.2	4.3	39.9	90.2	21.7	6.5	ND	---	---	0.01	ND	---	ND	0.07	0.07	ND	0.8	ND	ND	1	---	2.0	325	0.160
Nov 12/02	551	348	778	910	7.88	7.50	---	10.9	2.3	246	158	38.0	9.8	2.8	---	---	0.03	ND	---	ND	0.10	0.10	ND	0.2	ND	1	16	---	1.8	667	0.180
Jun 5/03	296	267	492	520	7.86	8.10	---	9.2	3.0	44	81.2	22.6	5.9	0.8	---	---	0.03	ND	---	ND	0.19	0.19	ND	0.2	ND	ND	10	---	2.3	319	0.150
Oct 16/03	322	245	576	670	7.78	7.60	---	9.4	2.9	66	93.2	21.6	7.0	1.2	---	---	0.523	0.005	---	ND	0.15	0.15	ND	0.5	ND	ND	13	---	8.0	340	0.170
May 27/04	358	288	587	570	7.69	7.51	---	10.3	2.3	32	105	23.4	4.8	0.8	---	---	ND	ND	---	ND	0.31	0.31	ND	0.4	ND	ND	ND	---	2.3	342	0.110
Oct 14/04	409	369	773	680	7.55	6.88	---	11.5	2.4	65	118	27.6	11.2	1.2	---	---	ND	ND	---	ND	0.37	0.32	ND	0.1	ND	1	13	---	1.9	447	0.241
Jun 1/05	340	304	625	580	---	7.42	---	13.5	2.2	33	98.0	23.0	4.9	0.6	---	---	ND	ND	---	0.02	0.46	0.44	ND	0.1	0.001	ND	32	---	3.0	344	0.116
Aug 23/05	Not sampled - Not enough to sample																														
Nov 28/05	424	352	744	530	---	7.63	---	7.6	1.8	38	124	27.6	7.4	1.2	---	---	ND	0.004	---	ND	0.31	0.31	ND	ND	ND	ND	7	---	4.2	410	0.156
Apr 6/06	352	312	527	460	7.63	7.46	---	5.8	2.8	25	103	23.2	7.2	0.8	---	---	ND	ND	---	ND	0.16	0.16	ND	0.5	ND	ND	ND	---	2.0	350	0.167
Jul 20/06	429	432	775	720	7.40	7.66	---	14.7	2.4	26	124	28.9	5.1	0.9	---	---	ND	0.025	---	ND	0.24	0.24	ND	0.2	ND	ND	ND	---	4.6	447	0.108
Oct 30/06	354	342	599	707	7.45	7.44	---	9.4	1.5	32	106	21.6	4.7	0.7	---	---	ND	ND	---	ND	0.35	0.35	ND	0.1	ND	ND	ND	---	3.1	372	0.108
Apr 25/07	296	296	590	440	7.55	7.73	---	8.0	1.5	24	87.1	19.0	6.9	0.6	---	---	ND	ND	---	ND	0.08	0.08	ND	ND	ND	ND	31	---	3.2	317	0.174
Jul 24/07	374	362	642	651	7.16	7.13	---	15.8	1.7	32	109	24.5	10.6	1.0	---	---	0.048	0.006	---	ND	0.21	0.21	ND	0.2	ND	ND	ND	---	1.4	397	0.239
Nov 1/07	377	348	691	420	7.55	7.88	---	11.2	2.1	23	111	24.1	6.4	1.0	---	---	0.069	0.006	---	ND	0.25	0.25	ND	0.2	ND	ND	ND	---	2.5	377	0.143
May 14/08	265	290	471	560	7.44	7.68	---	9.4	1.3	16	76.9	17.7	6.5	0.7	---	---	0.160	0.003	---	ND	0.14	0.14	ND	0.2	ND	ND	70	---	1.7	291	0.174
Aug 6/08	382	411	662	726	7.45	7.46	---	13.2	0.6	31	111	25.7	10.6	1.3	---	---	0.106	0.006	---	ND	0.10	0.10	ND	0.1	ND	ND	ND	---	1.3	427	0.236
Oct. 30/08	377	360	713	1,170	7.59	7.06	---	9.4	1.6	58	112	23.8	8.0	1.1	---	---	ND	0.015	---	ND	0.31	0.31	ND	1.1	ND	ND	ND	---	1.3	425	0.180
May 19/09	566	496	973	890	7.33	7.70	---	10.6	4.3	58	166	36.6	7.0	1.1	0.144	0.035	0.044	0.020	---	ND	1.22	1.22	ND	1.7	ND	ND	26	1.3	1.3	578	0.128
Aug 5/09	458	450	872	940	7.41	6.77	---	14.7	3.0	60	129	33.0	10.5	1.3	0.102	0.043	0.077	0.002	---	ND	0.14	0.14	ND	0.8	ND	ND	ND	1.4	1.4	510	0.213
Nov 3/09	586	422	1,000	905	7.35	6.88	---	11.2	2.9	149	170	39.2	8.5	1.8	0.146	0.048	0.219	0.006	---	ND	0.09	0.09	ND	0.1	ND	ND	18	1.8	1.8	625	0.152
Apr 28/10	675	469	1,110	1,093	7.45	7.28	---	7.2	4.7	145	191	44.0	6.5	1.1	0.152	0.034	0.021	0.002	---	ND	0.22	0.22	ND	5.4	ND	ND	ND	1.5	---	697	0.109
Nov 23/10	---	---	---	850	---	7.01	---	11.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Apr 25/11	473	376	861	830	7.50	6.96	---	6.4	1.4	78	140	29.8	5.6	1.1	0.102	0.033	0.089	0.004	---	ND	0.21	0.21	ND	1.8	ND	ND	7	1.3	---	490	0.113
Nov 2/11	NS																														
Apr 26/12	461	364	1,060	787	7.93	7.36	32	8.2	0.7	132	133	31.5	5.8	1.1	0.078	0.021	0.016	ND	---	ND	0.05	0.05	ND	0.2	ND	ND	ND	2.0	---	524	0.118
May 8/13	405	347	752	725	7.81	7.47	-92	10.0	0.7	71	121	24.9	4.1	0.8	0.074	0.031	0.060	0.002	---	ND	0.11	0.11	ND	0.2	ND	ND	13	2.2	---	432	0.0877
May 29/14	487	374	789	739	7.91	7.61	40	12.1	0.8	48	144	30.8	5.1	1.1	0.085	0.044	0.008	0.003	---	ND	0.18	0.18	ND	0.3	ND	ND	24	7.4	---	455	0.101
May 7/15	558	425	808	850	7.78	7.38	148	9.2	2.3	61	164	36.1	5.8	1.1	0.100	0.043	0.033	0.031	---	ND	0.60	0.60	ND	0.4	ND	ND	29	1.3	---	527	0.106
Apr 27/16	492	426	858	954	7.96	7.18	-42	5.9	1.8	94	146	31.1	4.3	0.8	0.085	0.007	ND	ND	---	0.04	0.40	0.36	ND	0.3	ND	ND	39	2.2	---	534	0.084
Apr 19/17	479	394	823	803	7.89	7.67	10.9	3.9	2.3	69	141	30.8	3.9	0.8	0.077	0.035	0.006	0.036	---	ND	0.56	0.56	0.3	1.2	ND	ND	31	4.3	---	490	0.0781
May 28/18	513	392	819	584	8.11	7.18	76.7	9.3	<0.5	55	149	34.2	5.0	0.9	0.091	0.032	0.005	0.086	---	0.02	0.30	0.28	ND	ND	ND	ND	9	4.0	---	480	0.0957
May 1/19	445	406	904	478	7.61	7.23	76.3	5.4	1.1	66	132	27.9	4.1	0.7	0.067	0.032	0.028	0.104	---	0.04	0.20	0.16	<0.05	<0.05	<0.002	<3	9	2.9	---	476	0.0840
Apr 1/20	507	393	820	523	7.72	6.88	100.1	6.0	1.1	48	148	33.4	4.7	1.0	0.078	0.036	0.068	0.049	---	<0.01	0.20	0.20	<0.05	0.09	<0.002	<3	<5	3.8	---	472	0.0912
May 26/21	371	313	666	595	7.78	7.88	28.6	9.3	2.1	44	103	27.6	4.0	1.0	0.074	0.030	<0.005	<0.001	---	0.04	0.50	0.46	<0.05	0.05	<0.001	<3	5	3.0	---	369	0.0896

🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
All values are given in mg/L, except ORP (mV) conductivity (μS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3a: Background Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-1d																															
Apr 21/99	339	234	910	916	---	6.98	---	9.1	111	72.3	62.8	44.3	61.8	4.3	---	---	0.05	0.024	0.21	0.02	0.19	0.17	ND	ND	ND	65	124	---	22.0	497	1.46
Oct 18/99	280	233	563	500	7.36	7.74	---	9.8	13.0	67.4	43.3	41.7	27.9	2.1	---	---	0.18	0.017	0.03	ND	0.06	0.06	ND	ND	ND	4	ND	---	9.0	335	0.730
Jan 25/00	---	---	607	575	---	---	---	4.7	4.9	---	---	---	18.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---		334	---
May 1/00	310	274	604	558	7.42	7.90	---	7.0	3.7	39.4	47.4	46.5	18.0	1.8	0.77	0.10	0.06	0.014	0.51	ND	0.13	0.13	ND	ND	ND	11	10	---	2.0	321	0.440
Oct 23/00	328	301	641	370	7.51	7.90	---	12.2	4.0	51.0	50.1	49.3	18.1	3.55	---	---	ND	ND	0.19	0.03	0.16	0.13	ND	ND	ND	1	4	---	3.0	357	0.430
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.17	0.04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	290	293	680	400	---	8.20	---	12.7	2.5	62.1	69.6	28.3	16.2	1.8	---	---	0.20	0.028	7.75	0.03	0.26	0.23	ND	ND	ND	4	130	---	6.0	357	0.410
Oct 29/01	276	269	582	440	7.63	7.60	---	10.5	3.7	47.9	55.5	33.5	8.8	2.6	0.11	0.03	0.05	ND	0.23	0.05	0.16	0.11	ND	ND	ND	ND	ND	---	2.0	314	0.230
Apr 17/02	305	271	567	430	7.11	7.00	---	7.0	4.8	33.4	88.0	20.6	6.1	1.1	---	---	0.01	ND	---	ND	0.13	0.13	ND	0.9	ND	ND	9	---	2.0	321	0.150
Nov 12/02	356	276	493	540	8.18	7.60	---	9.5	2.9	55	81.4	37.0	9.8	2.6	---	---	0.56	0.040	---	0.07	0.11	0.04	0.1	0.1	ND	ND	4	---	1.5	355	0.230
Jun 5/03	338	300	528	590	7.91	8.30	---	9.4	2.9	42	93.1	25.6	8.9	1.5	---	---	0.16	ND	---	0.04	0.25	0.21	ND	0.1	ND	ND	12	---	3.0	355	0.210
Oct 16/03	332	276	541	600	7.85	7.50	---	7.9	3.3	56	87.9	27.2	8.7	1.7	---	---	0.128	0.006	---	ND	0.14	0.14	ND	0.2	ND	1	16	---	7.0	350	0.210
May 27/04	375	318	617	530	7.77	7.14	---	9.4	2.4	32	111	23.6	5.4	1.0	---	---	ND	ND	---	ND	0.33	0.33	ND	0.2	ND	ND	11	---	2.3	366	0.120
Oct 14/04	367	351	706	620	7.57	6.95	---	10.6	2.7	52	95.7	31.2	11.5	1.8	---	---	ND	ND	---	0.10	0.36	0.26	ND	ND	ND	ND	26	---	1.7	403	0.260
Jun 1/05	341	302	628	590	---	7.59	---	11.9	2.4	32	98.9	22.7	5.9	0.8	---	---	ND	ND	---	ND	0.18	0.18	ND	0.6	ND.00	ND	12	---	2.3	345	0.139
Aug 23/05	375	311	647	600	7.49	---	---	11.0	2.9	49	92.8	34.7	11.4	11.4	---	---	1.61	0.035	---	ND	0.17	0.17	ND	ND	ND	ND	14	---	5.1	379	0.257
Nov 28/05	373	344	680	490	---	7.62	---	7.0	1.6	26	109	24.2	6.5	1.1	---	---	ND	ND	---	ND	0.31	0.31	ND	ND	ND	ND	10	---	4.5	374	0.146
Apr 6/06	358	314	588	500	7.75	7.33	---	5.7	2.4	23	106	22.8	6.7	0.9	---	---	ND	ND	---	0.02	0.53	0.51	ND	0.8	ND	ND	ND	---	0.5	353	0.154
Jul 20/06	411	441	771	730	7.46	7.53	---	13.4	3.1	27	120	27.2	6.4	1.0	---	---	ND	0.001	---	ND	0.14	0.14	ND	0.1	ND	ND	9	---	2.4	448	0.136
Oct 30/06	375	350	646	742	7.34	7.14	---	7.7	2.0	38	113	22.4	5.0	0.7	---	---	ND	ND	---	ND	0.14	0.14	ND	0.5	ND	ND	ND	---	3.0	394	0.111
Apr 25/07	336	338	653	520	7.54	7.57	---	8.2	2.0	45	96.0	23.4	7.4	1.2	---	---	0.011	ND	---	ND	0.17	0.17	ND	0.4	ND	ND	6	---	3.1	380	0.176
Jul 24/07	373	372	600	647	7.13	7.04	---	13.6	1.2	21	113	22.2	8.8	1.0	---	---	0.005	ND	---	ND	0.08	0.08	ND	0.1	ND	ND	60	---	1.3	390	0.198
Nov 1/07	351	370	673	654	7.35	7.21	---	10.3	1.7	31	103	23.0	9.4	1.0	---	---	0.017	0.002	---	ND	ND	ND	ND	0.2	ND	ND	ND	---	2.1	388	0.218
May14/08	242	272	465	493	7.46	7.69	---	11.5	1.3	26	70.3	16.2	4.5	1.1	---	---	0.006	0.002	---	ND	0.06	0.06	ND	ND	ND	ND	16	---	1.8	282	0.125
Aug 6/08	348	327	628	647	7.52	7.67	---	9.9	2.3	40	91.9	28.8	9.4	2.0	---	---	0.075	0.013	---	ND	0.18	0.18	ND	0.1	ND	ND	ND	---	1.2	371	0.219
Oct. 30/08	336	330	640	655	7.71	7.70	---	7.5	2.7	43	86.1	29.5	9.2	2.2	---	---	ND	0.022	---	ND	0.36	0.36	ND	ND	ND	ND	ND	---	1.2	368	0.218
May 19/09	337	298	628	561	7.69	8.17	---	9.6	3.7	53	81.4	32.5	9.6	2.4	0.097	0.030	0.040	0.037	---	ND	ND	ND	ND	0.1	ND	ND	17	0.8	0.8	362	0.228
Aug 5/09	321	294	601	640	7.68	7.12	---	11.5	3.6	57	75.3	32.3	8.5	2.2	0.090	0.028	0.013	0.045	---	ND	ND	ND	ND	ND	ND	ND	ND	1.1	1.1	355	0.207
Nov 3/09	357	301	655	619	7.70	7.20	---	9.9	3.5	55	89.3	32.6	10.0	2.1	0.105	0.030	0.014	0.009	---	ND	0.06	0.06	ND	0.1	ND	ND	<30	1.3	1.4	374	0.231
Apr 28/10	343	286	623	618	7.74	7.50	---	8.3	4.3	58	81.9	33.7	8.9	2.3	0.107	0.031	0.006	0.020	---	0.02	0.09	0.07	ND	0.1	ND	ND	ND	0.8	---	361	0.210
Nov 23/10	---	---	---	549	---	7.50	---	9.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Apr 25/11	285	276	595	584	8.09	7.24	---	8.4	3.7	58	65.5	29.4	19.1	2.1	0.087	0.053	0.028	0.011	---	ND	ND	0.05	ND	0.1	ND	ND	6	1.1	---	344	0.492
Nov 2/11	NS																														
Apr 26/12	307	270	630	605	8.16	7.49	30	9.2	3.6	58	68.8	32.7	7.4	2.2	0.084	0.019	ND	0.008	---	ND	ND	ND	ND	ND	ND	ND	5	1.2	---	335	0.185
Apr 24/13	316	274	599	600	8.05	7.28	-3	9.9	4.0	59	72.4	33.0	7.9	2.0	0.100	0.031	ND	0.016	---	ND	0.09	0.09	ND	0.1	ND	ND	ND	2.2	---	343	0.193
May 29/14	365	281	621	628	8.23	8.01	44	9.9	3.2	58	88.3	35.1	7.9	1.8	0.096	0.028	ND	0.004	---	ND	0.15	0.15	ND	0.2	ND	ND	21	6.4	---	363	0.180
May 7/15	345	263	544	580	7.90	6.74	135	11.1	4.2	56	75.4	38.2	8.8	2.3	0.096	0.035	0.020	0.010	---	ND	0.10	0.10	ND	0.1	ND	ND	ND	1.1	---	343	0.206
Apr 27/16	342	298	606	457	8.04	7.42	91	7.4	4.0	54	74.3	37.9	7.1	2.0	0.098	ND	0.051	0.016	---	0.07	0.30	0.23	ND	ND	ND	4	31	1.5	---	359	0.167
Apr 19/17	346	298	603	434.0	8.09	7.81	39.9	5.9	4.2	51	77.8	36.8	6.8	1.9	0.099	0.029	ND	0.005	---	ND	0.26	0.26	0.2	0.3	ND	ND	ND	4.2	---	359	0.159
May 28/18	378	285	614	423.1	8.25	7.49	31.1	10.0	3.1	53	83.5	41.1	7.9	1.9	0.106	0.024	ND	0.007	---	0.03	0.2	0.17	ND	0.06	ND	ND	7	18.0	---	362	0.177
May 1/19	331	282	645	365.8	7.89	7.51	21.8	6.5	3.4	50	71.6	37.0	6.4	1.9	0.095	0.029	<0.005	0.001	---	0.05	<0.1	0.05	<0.05	0.06	<0.002	<3	<5	1.8	---	340	0.154
Apr 1/20	349	263	596	391.7	7.91	7.38	67.4	8.4	3.9	51	73.5	40.2	6.7	2.3	0.101	0.034	0.322	0.032	---	<0.01	0.10	0.10	<0.05	0.13	<0.002	<3	<5	5.2	---	336	0.157
May 26/21	349	260	579	515.0	8.17	8.30	72.7	10.8	4.1	51	69.6	42.5	6.9	2.3	0.1	0.032	0.011	0.006	---	0.05	0.50	0.45	<0.05	0.09	<0.001	<3	8	3.2	---	332	0.161

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3a: Background Shallow Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-1sBR																															
Oct 18/99	152	193	418	379	7.80	8.22	---	9.0	3.4	35.4	24.0	22.4	44.0	4.8	---	---	1.87	0.029	2.26	0.36	0.55	0.19	ND	ND	ND	3	12	---	9.0	250	1.55
Jan 25/00	---	---	564	558	---	---	---	6.5	3.0	---	---	---	14.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	344	---
May 1/00	159	208	457	430	7.60	8.20	---	8.8	5.7	26.9	24.0	24.0	44.2	5.2	0.53	0.47	0.09	0.008	0.14	0.48	0.61	0.13	ND	ND	ND	5	4	---	5.0	256	1.53
Oct 23/00	158	219	422	290	7.95	7.80	---	12.5	7.5	26.7	24.8	23.4	42.8	6.0	---	---	0.02	0.010	0.24	0.54	1.01	0.47	ND	ND	ND	ND	4	---	4.0	263	1.48
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.97	0.53	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	168	219	497	390	---	8.20	---	13.7	7.0	28.5	29.5	23.0	37.4	4.8	---	---	0.27	0.010	0.10	0.31	0.62	0.31	ND	0.7	ND	4	4	---	ND	265	1.25
Oct 29/01	190	234	524	370	7.73	7.80	---	10.7	8.0	37.2	34.9	25.1	29.9	4.3	0.13	0.33	0.03	0.006	0.19	0.19	0.58	0.39	0.7	ND	ND	ND	1	---	1.0	283	0.94
Apr 17/02	193	237	527	420	7.35	7.00	---	7.8	8.0	35.8	35.1	25.5	42.6	5.3	---	---	0.18	0.010	---	0.23	0.53	0.30	ND	0.9	ND	4	5	---	1.0	299	1.34
Nov 12/02	175	237	512	440	8.38	7.60	---	9.9	6.4	39	30.5	24.0	46.5	6.3	---	---	0.09	ND	---	0.58	0.61	0.03	ND	0.4	ND	ND	ND	---	ND	297	1.53
Jun 5/03	238	270	504	510	8.01	8.20	---	11.0	4.0	33	59.0	22.1	26.9	3.4	---	---	ND	ND	---	0.30	0.35	0.05	ND	0.3	ND	ND	2	---	1.9	312	0.76
Oct 16/03	181	224	492	520	8.31	7.60	---	8.1	6.4	35	32.1	24.4	37.1	5.3	---	---	0.045	0.006	---	0.52	0.55	0.03	0.2	0.1	ND	ND	10	---	7.0	271	1.20
May 27/04	227	246	526	430	8.00	7.66	---	10.4	3.4	34	50.2	24.6	33.4	5.0	---	---	0.100	0.011	---	0.38	0.45	0.07	0.2	0.3	ND	ND	ND	---	0.6	296	0.97
Oct 14/04	143	220	486	340	8.04	7.64	---	9.6	3.4	31	23.4	20.6	39.1	5.5	---	---	0.013	0.004	---	0.49	0.62	0.13	ND	0.1	ND	2	ND	---	ND	252	1.42
Jun 1/05	150	204	444	400	---	8.40	---	11.8	3.1	27	23.9	21.9	39.3	5.8	---	---	0.006	0.007	---	0.51	0.68	0.17	ND	0.1	ND	ND	7	---	0.6	239	1.40
Aug 23/05	148	205	440	400	7.99	---	---	13.2	2.6	26	23.7	21.6	39.7	7.1	---	---	1.12	0.017	---	0.53	0.61	0.08	ND	ND	ND	ND	6	---	3.1	239	1.42
Nov 28/05	158	216	465	370	---	8.35	---	6.8	2.5	25	25.5	22.9	43.7	6.4	---	---	0.045	0.006	---	0.51	0.63	0.12	ND	ND	ND	ND	ND	---	0.5	250	1.51
Apr 6/06	151	212	446	330	8.39	8.03	---	7.4	2.5	25	24.1	22.1	45.7	6.1	---	---	ND	0.005	---	0.43	0.44	0.01	ND	ND	ND	ND	ND	---	ND	247	1.62
Jul 20/06	131	210	441	380	8.24	8.32	---	14.8	2.8	24	20.5	19.5	38.7	5.4	---	---	ND	0.004	---	0.58	0.69	0.11	ND	0.1	ND	ND	ND	---	1.6	231	1.47
Oct 30/06	126	208	400	497	7.85	7.97	---	7.2	2.0	24	19.5	18.8	38.3	5.5	---	---	0.006	0.002	---	0.48	0.51	0.03	ND	ND	ND	ND	ND	---	0.7	234	1.48
Apr 25/07	126	226	452	430	7.87	8.14	---	10.2	1.5	25	19.5	18.8	37.7	5.2	---	---	0.009	0.002	---	0.49	0.51	0.02	ND	0.1	ND	ND	ND	---	2.2	245	1.46
Jul 24/07	132	222	450	428	7.51	7.88	---	14.3	1.7	24	21.4	19.1	39.0	5.3	---	---	0.036	0.005	---	0.50	0.57	0.07	0.1	0.5	ND	ND	ND	---	0.8	247	1.47
Nov 1/07	133	190	400	544	7.55	7.27	---	11.1	1.7	23	21.5	19.2	40.3	5.4	---	---	0.021	0.007	---	0.39	0.49	0.10	0.1	0.2	ND	ND	ND	---	1.6	229	1.52
May 14/08	115	206	435	410	7.64	8.21	---	11.0	1.1	23	19.0	16.5	34.6	4.8	---	---	0.019	0.003	---	0.46	0.47	0.01	0.1	0.1	ND	ND	5	---	<0.5	224	1.40
Aug 6/08	119	190	379	395	7.88	8.82	---	11.1	1.4	22	20.0	16.9	37.4	4.9	---	---	0.067	0.020	---	0.45	0.49	0.04	ND	0.3	ND	ND	ND	---	0.5	216	1.49
Oct 30/08	123	210	394	390	7.94	8.32	---	8.2	1.1	23	19.5	18.0	37.7	5.3	---	---	0.067	0.006	---	0.53	0.67	0.14	ND	ND	ND	ND	ND	---	0.4	230	1.48
May 19/09	136	205	444	444	7.98	7.64	---	10.1	1.5	26	21.4	20.1	39.4	5.7	0.086	0.342	0.038	0.007	---	0.43	0.39	-0.04	ND	0.1	ND	ND	5	0.3	0.3	238	1.47
Aug 5/09	125	200	422	450	7.51	7.73	---	12.0	1.0	23	19.8	18.5	37.1	5.3	0.092	0.319	0.007	0.016	---	0.43	0.43	0.00	ND	0.1	ND	ND	ND	0.6	0.6	226	1.44
Nov 3/09	133	207	423	385	8.29	7.84	---	10.0	0.9	24	22.2	18.9	35.9	5.4	0.110	0.323	0.028	0.004	---	0.33	0.35	0.02	ND	0.2	ND	ND	<30	0.8	0.8	232	1.35
Apr 28/10	133	203	422	415	8.04	8.10	---	8.5	1.3	25	21.7	19.3	39.5	5.5	0.117	0.357	0.034	0.015	---	0.52	0.58	0.06	ND	0.1	0.003	ND	ND	0.2	---	235	1.49
Nov 23/10	---	---	---	409	---	8.05	---	9.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Apr 25/11	122	196	400	396	7.89	7.89	---	9.6	1.0	23	21.6	16.6	32.5	4.4	0.104	0.293	0.055	0.008	---	0.49	0.53	0.04	ND	ND	ND	ND	ND	0.6	---	218	1.28
Nov 2/11	NS																														
Apr 26/12	121	201	453	432	8.31	8.18	27	9.8	1.3	28	18.8	17.9	33.2	5.1	0.098	0.287	0.025	0.002	---	0.55	0.55	0.00	ND	ND	ND	ND	6	3.0	---	226	1.31
Apr 24/13	126	202	429	457	8.17	8.10	-32	11.6	1.4	29	20.5	18.2	37.1	5.1	0.110	0.353	0.082	0.009	---	0.46	0.65	0.19	ND	ND	ND	ND	ND	1.6	---	233	1.44
May 29/14	125	181	386	488	8.36	8.26	49	12.9	0.9	24	20.0	18.3	37.4	5.1	0.109	0.353	0.007	0.005	---	0.35	0.50	0.15	ND	ND	ND	ND	23	2.1	---	214	1.45
May 7/15	256	228	449	570	7.96	7.39	115	11.9	2.1	35	51.0	31.4	17.0	3.4	0.121	0.180	0.023	0.012	---	0.16	0.30	0.14	ND	0.1	ND	ND	ND	1.3	---	278	0.463
Apr 27/16	147	202	397	455	8.12	7.76	-87	7.8	1.1	24	25.8	20.0	29.4	4.4	0.100	0.271	0.005	0.003	---	0.46	0.50	0.04	ND	ND	ND	11	ND	1.3	---	226	1.06
Apr 19/17	148	192	455	277.6	8.16	8.01	-129.9	6.9	2.1	22	27.0	19.7	31.2	4.7	0.125	0.302	0.036	0.006	---	0.44	0.67	0.23	0.2	0.3	ND	ND	ND	3.0	---	224	1.11
May 28/18	142	187	398	292.6	8.33	8.01	-63.9	10.1	<0.5	25	24.0	20.1	38.6	5.2	0.122	0.319	0.044	0.004	---	0.46	0.50	0.04	ND	ND	ND	ND	ND	1.8	---	226	1.41
May 1/19	125	174	397	260.7	8.17	8.04	-116.7	8.5	1.0	24	20.8	17.7	33.9	4.8	0.103	0.309	0.009	0.003	---	0.49	0.50	0.01	<0.05	<0.05	0.002	<3	<5	1.1	---	207	1.32
Apr 1/20	132	172	385	269.5	8.02	7.81	29.3	9.2	1.5	23	22.2	18.7	36.4	5.3	0.110	0.370	0.011	0.005	---	0.47	0.50	0.03	<0.05	0.09	<0.002	<3	<5	1.1	---	211	1.38
May 26/21	131	180	387	321.6	8.48	8.28	-8.4	10.8	2.0	24	20.7	19.3	37.5	5.2	0.107	0.373	0.017	0.003	---	0.51	0.50	-0.01	<0.05	<0.05	<0.001	<3	<5	2.9	---	218	1.42

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (μS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3b: Shallow Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.0	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
97-1s																															
Apr 24/97	313	298	644	607	7.44	7.58	---	---	7.7	23.8	80.1	27.4	4.7	2.1	0.08	0.02	0.15	0.026	1.52	ND	0.15	0.15	ND	ND	ND	3	26	---	16.0	325	0.120
Nov. 4/97	363	306	628	611	7.38	8.06	---	---	6.4	26.9	92.1	32.2	5.1	1.6	0.08	0.02	0.01	0.022	1.84	ND	0.20	0.20	ND	ND	ND	5	24	---	5.0	348	0.120
May 7/98	323	275	557	546	7.30	7.75	---	7.7	4.5	15.8	95.5	20.4	2.5	ND	---	---	0.02	ND	1.04	ND	0.06	0.06	ND	ND	ND	2	26	---	27.0	304	0.060
Oct 8/98	323	279	614	511	7.21	7.37	---	13.7	4.8	20.2	96.0	20.3	4.0	ND	---	---	0.01	0.040	1.09	ND	0.08	0.08	ND	ND	ND	1	18	---	3.0	313	0.100
Apr 21/99	293	261	562	530	---	6.74	---	7.5	2.8	15.9	90.2	16.4	2.1	ND	---	---	ND	ND	1.14	ND	0.10	0.10	ND	ND	ND	ND	49	---	2.0	284	0.050
Oct 18/99	366	317	636	579	7.35	7.57	---	11.2	6.6	27.7	104	25.8	5.7	1.6	---	---	ND	ND	0.75	ND	5.46	5.46	ND	0.3	ND	ND	44	---	18.0	363	0.130
Jan 25/00	---	---	572	564	---	---	---	5.8	3.2	---	---	---	2.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	300	---
May 1/00	257	244	519	494	7.17	7.40	---	7.5	2.9	13.8	70.2	19.8	2.3	ND	0.60	0.06	ND	ND	0.61	ND	0.08	0.08	ND	ND	ND	4	9	---	12.0	255	0.060
Oct 23/00	339	287	627	400	7.47	7.70	---	11.8	6.9	20.6	101	21.1	3.0	ND	---	---	ND	0.011	1.63	0.02	0.17	0.15	ND	1.0	ND	ND	12	---	4.0	329	0.070
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.83	0.12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	259	244	542	370	---	8.40	---	10.9	3.5	17.1	77.3	15.9	2.3	ND	---	---	1.04	0.061	0.46	0.04	0.36	0.32	ND	ND	ND	ND	ND	---	1.0	264	0.060
Oct 24/01	366	327	731	590	7.47	7.40	---	12.2	18.7	27.7	103	26.4	3.9	ND	0.12	ND	1.34	0.147	0.28	ND	0.12	0.12	ND	0.8	ND	ND	ND	---	2.0	381	0.090
Apr 17/02	307	271	547	390	7.17	6.80	---	6.9	4.9	19.4	93.9	17.7	2.4	ND	---	---	ND	ND	---	ND	0.02	0.02	ND	ND	ND	ND	10	---	2.0	301	0.060
Nov 11/02	457	369	690	670	7.81	8.00	---	12.2	16.9	35	137	27.8	5.2	ND	---	---	ND	ND	---	ND	0.04	0.04	ND	0.3	ND	1	8	---	1.5	445	0.110
Jun 10/03	297	238	518	440	7.66	8.20	---	10.2	3.2	14	92.7	15.8	2.7	ND	---	---	0.17	ND	---	0.14	0.24	0.10	ND	0.2	ND	ND	14	---	1.9	272	0.070
Oct 16/03	361	309	711	680	7.54	7.40	---	7.7	12.5	31	101	26.5	5.2	0.9	---	---	0.210	0.002	---	0.02	0.19	0.17	ND	0.2	ND	ND	3	---	5.0	364	0.120
May 27/04	333	276	503	---	7.60	8.03	---	13.1	46.8	93	189	35.4	46.4	31.2	---	---	ND	0.108	---	1.36	1.98	0.62	0.8	3.1	ND	ND	15	---	4.1	770	0.810
Oct 14/04	405	339	709	650	7.52	6.80	---	11.8	21.3	29	119	26.3	4.5	0.40	---	---	0.008	ND	---	0.02	0.25	0.23	ND	0.2	ND	ND	6	---	1.9	404	0.096
Jun 1/05	329	306	600	510	---	7.47	---	12.7	3.1	19	97.5	20.7	2.6	0.3	---	---	ND	ND	---	ND	0.15	0.15	ND	0.2	ND	ND	7	---	1.7	327	0.062
Aug 23/05	DRY																														
Nov 28/05	413	356	721	540	---	7.82	---	7.0	4.1	20	122	26.0	6.0	0.4	---	---	0.008	0.001	---	ND	0.17	0.17	ND	ND	ND	ND	ND	---	1.7	392	0.129
Apr 5/06	330	306	544	500	7.73	7.53	---	4.3	2.5	11	99.6	19.6	4.1	0.3	---	---	ND	ND	---	ND	0.10	0.10	ND	ND	ND	ND	10	---	6.2	320	0.098
Jul 24/06	344	356	657	650	7.10	7.78	---	12.7	5.3	16	104	20.6	2.8	0.6	---	---	ND	0.005	---	0.06	0.21	0.15	ND	0.1	ND	ND	ND	---	2.3	362	0.066
Oct 30/06	418	406	782	942	7.29	7.13	---	9.6	38.3	27	121	27.9	5.0	0.2	---	---	ND	ND	---	ND	0.30	0.30	ND	0.2	ND	ND	ND	---	3.2	464	0.107
Apr 25/07	310	324	561	560	7.50	7.66	---	8.4	2.0	11	95.6	17.4	2.6	0.2	---	---	0.012	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	---	2.2	323	0.064
Jul 24/07	421	399	639	720	7.12	7.13	---	15.1	9.2	22	124	26.8	4.0	0.3	---	---	ND	0.004	---	ND	0.31	0.31	ND	0.2	ND	ND	10	---	0.9	427	0.084
Nov 1/07	523	417	980	767	7.56	7.27	---	10.9	50.7	50	146	38.6	7.7	0.4	---	---	0.026	0.007	---	ND	0.30	0.30	ND	0.2	ND	ND	9	---	3.5	544	0.147
May 14/08	268	310	487	550	7.48	7.70	---	8.8	3.2	13	80.7	16.2	2.2	0.1	---	---	0.019	0.002	---	ND	0.07	0.07	ND	0.2	ND	ND	15	---	1.5	302	0.058
Aug 5/08	357	345	604	640	7.70	7.51	---	11.8	6.8	18	104	23.7	3.8	0.8	---	---	0.006	0.007	---	ND	0.18	0.18	ND	0.1	ND	ND	7	---	1.1	364	0.088
Oct.30/08	437	375	658	750	7.45	6.56	---	7.8	25.5	26	126	29.8	7.0	0.5	---	---	0.038	0.010	---	0.01	0.23	0.22	ND	0.2	ND	ND	ND	---	1.2	440	0.146
May 19/09	209	220	451	552	7.95	7.56	---	9.6	2.9	12	55.4	17.2	8.7	0.3	0.042	0.008	0.022	0.005	---	ND	ND	ND	ND	0.2	ND	ND	24	1.0	1.0	229	0.261
Aug 5/09	374	382	699	730	7.20	6.92	---	11.1	6.9	17	109	24.6	3.4	0.2	0.056	ND	0.015	0.020	---	ND	0.10	0.10	ND	ND	ND	ND	ND	1.3	1.4	391	0.076
Oct 28/09	443	357	820	759	7.26	6.96	---	9.9	23.3	30	130	28.8	5.0	0.4	0.088	0.009	0.013	0.002	---	ND	0.65	0.65	ND	0.1	ND	ND	22	1.1	1.2	432	0.104
Apr 28/10	331	299	561	555	7.57	7.42	---	6.5	2.8	12	101	19.4	2.3	0.1	0.045	ND	0.057	0.004	---	ND	ND	ND	ND	ND	ND	ND	ND	1.2	---	317	0.056
Nov 23/10	---	---	---	605	---	7.22	---	9.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Apr 25/11	300	303	598	558	7.52	7.07	---	6.6	2.2	8	91.4	17.3	2.2	0.6	0.045	0.008	0.047	0.003	---	ND	0.11	0.11	ND	ND	ND	ND	6	1.1	---	304	0.056
Nov 2/11	NS																														
Apr 26/12	321	309	623	577	8.05	7.36	-61	8.1	4.6	13	93.9	20.9	2.9	0.2	0.044	ND	0.021	0.001	---	ND	ND	ND	ND	ND	ND	ND	7	3.6	---	321	0.070
Apr 24/13	327	312	579	600	7.96	7.37	-19	6.6	3.5	12	97.0	20.6	2.8	ND	0.048	ND	0.008	0.007	---	ND	0.30	0.30	ND	ND	ND	ND	ND	2.3	---	323	0.0673
May 28/14	355	323	637	625	7.96	7.43	90	9.1	3.4	13	104	23.1	3.6	ND	0.057	0.006	ND	0.001	---	ND	0.21	0.21	ND	0.1	ND	ND	ND	3.0	---	342	0.0827
May 7/15	364	320	570	680	7.77	7.18	82	7.4	6.6	19	107	23.5	7.8	0.2	0.069	0.008	0.060	0.009	---	ND	0.30	0.30	ND	0.1	ND	ND	ND	4.3	---	357	0.178
Apr 27/16	305	298	550	621	8.01	7.28	121	4.7	6.9	14	89.6	19.8	6.2	ND	0.043	ND	ND	ND	---	0.08	0.20	0.12	ND	ND	ND	ND	ND	2.3	---	315	0.154
Apr 19/17	317	293	574	351	8.02	7.77	6	3.4	4.1	9	93.4	20.3	6.6	0.1	0.045	0.008	0.005	0.116	---	ND	0.26	0.26	0.2	ND	ND	ND	ND	10.3	---	310	0.160
May 28/18	362	319	607	600	8.15	7.59	103	10.2	2.0	13	106	23.7	4.4	<0.1	0.062	ND	0.007	0.004	---	0.03	0.30	0.27	ND	ND	ND	ND	8	8.6	---	341	0.100
May 1/19	290	272	551	318	7.82	7.36	65	5.3	3.1	7	86.9	17.7	7.6	0.2	0.055	<0.005	<0.005	0.029	---	0.05	<0.1	0.05	<0.05	<0.05	<0.002	<3	<5	2.8	---	285	0.194
Apr 1/20	259	236	471	288	7.87	7.45	48	6.2	2.0	6	78.7	15.2	8.9	0.2	0.048	0.005	0.079	0.090	---	<0.01	0.20	0.20	<0.05	0.11	<0.002	<3	<5	2.9	---	253	0.240
May 26/21	326	262	521	478	8.06	8.40	100	10.1	4.1	11	94.8	21.6	5.7	0.3	0.07	0.008	0.138	0.034	---	0.02	0.60	0.58	<0.05	0.08	<0.001	<3	6	5.3	---	295	0.137

🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3b: Shallow Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field		250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
97-2s																															
Apr 24/97	267	251	1,017	875	7.59	6.96	---	---	100	85.3	75.6	19.0	96.7	4.0	0.06	0.04	0.10	0.261	0.78	ND	0.23	0.23	ND	0.2	0.010	2	8	---	8.0	532	2.57
Nov. 4/97	496	360	1,975	1,787	7.26	7.71	---	---	136	439	154	27.1	281	3.8	0.11	0.05	0.12	0.016	0.77	ND	0.28	0.28	ND	1.0	ND	1	18	---	7.0	1,261	5.49
May 7/98	423	343	1,501	1,463	7.12	7.51	---	8.2	174	172	135	20.7	189	1.9	---	---	0.11	ND	0.36	ND	0.10	0.10	ND	0.3	ND	ND	4	---	11.0	900	4.00
Oct 8/98	378	354	1,391	1,096	7.03	7.30	---	13.0	142	141	119	19.7	157	2.5	---	---	0.01	0.011	0.47	ND	0.17	0.17	ND	0.3	ND	ND	8	---	3.0	795	3.51
Apr 21/99	339	321	939	842	---	7.36	---	8.3	85.7	57.1	101	21.0	70.0	1.9	---	---	ND	ND	0.47	ND	0.10	0.10	ND	0.4	ND	ND	4	---	ND	531	1.65
Oct 18/99	392	358	1,490	1,474	7.26	7.42	---	11.6	192	152	107	30.3	193	4.8	---	---	ND	ND	0.36	ND	0.16	0.16	ND	0.8	ND	2	9	---	5.0	897	4.24
Jan 25/00	---	---	1,411	1,370	---	---	---	0.2	183	---	---	---	143	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	768	---
May 1/00	405	315	1,089	1,021	7.12	7.60	---	7.3	111	66.4	124	23.0	79.1	2.0	0.77	0.12	2.15	0.083	1.65	ND	0.19	0.19	ND	1.1	ND	4	18	---	5.0	602	1.71
Oct 23/00	446	400	2,030		7.45	---	---	---	300	103	128	30.7	214	2.8	---	---	0.02	0.019	3.56	ND	0.41	0.41	ND	ND	ND	8	37	---	15.0	1,019	4.41
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.78	0.16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	305	294	1,189	740	---	8.20	---	10.8	132	44.8	84.1	23.0	100	1.6	---	---	2.31	0.129	0.91	0.03	0.17	0.14	ND	0.7	ND	ND	2	---	4.0	568	2.49
Oct 24/01	328	377	2,200	1,400	7.55	7.70	---	10.6	398	106	80.6	30.7	304	3.9	0.29	0.08	3.77	1.340	2.02	ND	0.29	0.29	ND	0.7	ND	ND	56	---	ND	1,161	7.31
Apr 17/02	287	341	1,362	950	7.11	6.60	---	7.0	174	53.4	82.9	19.3	134	1.5	---	---	ND	ND	---	ND	0.06	0.06	ND	0.8	ND	ND	7	---	3.0	673	3.44
Nov 11/02	549	384	2,520	> 1,990	7.75	7.50	---	12.6	568	115	161	35.6	287	1.0	---	---	0.02	ND	---	0.01	0.15	0.14	ND	0.3	ND	2	30	---	2.4	1,399	5.33
Jun 10/03	310	277	1,150	1,240	7.58	7.80	---	9.9	151	45	91.1	19.9	148	1.8	---	---	0.13	ND	---	0.09	0.35	0.26	ND	0.3	ND	ND	14	---	1.7	625	3.66
Oct 16/03	328	291	1,570	1,230	7.59	8.20	---	11.5	230	79	98.1	20.1	187	3.5	---	---	0.210	0.009	---	0.02	0.32	0.30	ND	0.8	ND	ND	9	---	7.0	796	4.49
May 27/04	411	330	1,290	---	7.67	7.58	---	10.3	215	51	123	25.2	152	1.9	---	---	0.005	ND	---	ND	0.29	0.29	ND	0.3	ND	ND	7	---	1.6	764	3.26
Oct 14/04	444	387	1,800	1,520	7.71	7.15	---	11.7	322	69	130	28.9	231	2.8	---	---	0.019	ND	---	0.08	0.33	0.25	ND	0.3	ND	ND	17	---	1.7	1,010	4.76
Jun 1/05	444	380	1,590	1,550	---	7.02	---	12.2	301	61	134	26.5	152	2.2	---	---	0.006	ND	---	ND	0.30	0.30	ND	ND	ND	ND	11	---	3.6	902	3.13
Aug 23/05	DRY																														
Nov 28/05	361	390	1,100	920	---	7.60	---	7.2	141	39	109	21.5	80.8	1.7	---	---	ND	ND	---	ND	0.15	0.15	ND	0.3	ND	ND	ND	---	2.8	626	1.85
Apr 5/06	329	300	853	700	7.80	7.37	---	6.3	89.9	25	101	18.9	85.8	1.6	---	---	0.010	ND	---	ND	0.07	0.07	ND	0.3	ND	ND	ND	---	2.7	501	2.06
Jul 24/06	425	426	1,810	1,830	7.10	7.83	---	12.3	318	57	128	25.3	194	2.8	---	---	ND	ND	---	0.06	0.39	0.33	ND	0.3	ND	ND	16	---	9.7	979	4.10
Oct 30/06	389	432	1,590	2,130	7.19	9.94	---	9.0	255	56	118	22.8	141	3.8	---	---	ND	0.012	---	0.24	0.56	0.32	ND	0.5	ND	ND	6	---	2.4	859	3.11
Apr 25/07	353	411	1,250	1,380	7.33	7.51	---	8.6	195	36	106	21.5	136	3.7	---	---	0.037	0.014	---	0.07	0.29	0.22	ND	0.5	ND	ND	5	---	2.1	747	3.15
Jul 18/07	503	498	1,680	1,802	7.42	7.25	---	14.3	292	91	144	34.7	239	6.5	---	---	0.032	0.114	---	0.34	0.88	0.54	0.6	2.8	ND	ND	15	---	3.6	1,120	4.64
Nov 1/07	364	423	1,220	1,297	7.56	7.03	---	10.1	145	43	107	23.7	117	4.7	---	---	0.026	0.011	---	0.07	0.39	0.32	ND	0.7	ND	ND	ND	---	3.3	696	2.66
May 14/08	336	358	1,220	713	7.56	7.86	---	8.3	176	36	99.1	21.3	146	4.4	---	---	0.055	0.011	---	0.17	0.51	0.34	ND	0.4	ND	3	31	---	1.2	700	3.47
Aug 5/08	446	430	1,440	1,550	7.65	7.98	---	15.7	217	83	125	32.3	178	6.4	---	---	0.058	0.008	---	ND	0.38	0.38	ND	1.2	ND	ND	11	---	1.3	903	3.67
Oct 30/08	479	504	1,680	1,600	7.52	6.59	---	8.8	240	92	140	31.3	224	7.9	---	---	0.009	0.009	---	0.06	0.60	0.54	ND	2.5	ND	ND	6	---	1.5	1,050	4.46
May 19/09	440	409	1,500	1,257	7.62	7.35	---	10.8	192	49	127	29.4	200	6.1	0.139	0.097	0.043	0.031	---	0.02	0.25	0.23	ND	0.5	ND	ND	26	0.7	0.7	852	4.16
Aug 5/09	427	476	1,590	1,630	7.29	6.79	---	13.3	203	85	118	31.7	197	7.2	0.133	0.150	0.012	0.042	---	0.30	0.59	0.29	ND	0.6	ND	ND	7	1.8	1.8	931	4.15
Oct 28/09	---	471	1,930	---	7.34	---	---	---	225	119	---	---	---	---	---	---	---	---	---	ND	1.24	1.24	ND	1.8	ND	<3	33	---	---	---	---
Apr 28/10	459	471	1,620	1,606	7.32	7.01	---	7.1	221	58	129	29.4	191	6.9	0.161	0.106	0.082	0.059	---	0.35	0.70	0.35	ND	0.4	ND	ND	7	0.9	---	921	3.95
Nov 25/10	407	479	1,240	990	7.42	7.02	---	8.3	114	42	119	26.9	119	5.0	0.141	0.099	0.062	0.099	---	0.41	0.61	0.20	ND	0.4	ND	3	ND	1.7	---	715	2.57
Apr 25/11	316	282	1,040	1,046	7.73	6.98	---	6.3	99.9	30	91.6	21.1	41.3	1.4	0.096	0.020	0.021	0.005	---	ND	0.17	0.17	ND	0.6	ND	ND	7	1.4	---	458	1.01
Nov 3/11	446	550	1,630	1,352	7.70	6.84	46	10.6	191	79	161	43.8	191	9.3	0.205	0.264	0.018	ND	---	0.31	0.80	0.49	ND	1.0	ND	5	30	1.8	---	1,010	3.45
Apr 25/12	333	378	872	761	7.79	7.26	99	6.0	42.8	26	97.5	21.7	35.0	1.7	0.102	0.025	0.042	0.028	---	ND	0.14	0.14	ND	0.4	ND	5	25	1.7	---	453	0.834
Oct 29/12	518	533	1,400	1,269	7.64	6.60	-103	11.2	139	65	136	43.1	131	9.7	0.211	0.207	0.151	0.024	---	0.36	0.64	0.28	ND	1.4	ND	ND	7	2.3	---	850	2.50
Apr 23/13	331	300	707	710	7.84	7.48	65	6.5	24.7	16	101	19.3	29.3	1.5	0.121	0.034	0.089	0.009	---	ND	0.24	0.24	ND	0.3	ND	4	ND	2.5	---	373	0.702
Oct 29/13	467	473	1,130	1,120	7.64	6.84	58	9.5	87.8	60	126	36.6	79.8	7.2	0.169	0.148	0.206	0.252	---	0.44	0.84	0.24	ND	0.1	ND	ND	8	5.6	---	683	1.61
May 28/14	364	392	938	913	7.90	7.20	-54	8.3	55.0	26	109	22.3	52.3	2.9	0.141	0.056	0.014	0.006	---	ND	0.52	0.52	ND	0.5	ND	3	ND	5.8	---	504	1.19
Oct 1/14	DRY - Not Sampled																														
May 7/15	458	454	1,060	1,050	7.73	6.58	62	9.6	92.4	43	133	30.4	103	6.5	0.180	0.134	ND	0.006	---	0.19	0.60	0.41	ND	0.5	ND	ND	6	4.2	---	684	2.10
Oct 8/15	290	467	1,250	---	8.03	---	---	---	99.8	74	59.1	34.6	134	10.8	0.082	0.226	0.051	0.001	---	ND	---	---	ND	1.7	---	---	---	1.2	---	701	3.43
Apr 26/16	377	410	960	1,140	7.94	7.21	128	6.3	66.9	33	111	24.6	66.4	4.0	0.129	0.067	ND	ND	---	0.03	0.34	0.31	ND	0.9	ND	ND	5	2.1	---	555	1.49
Oct 11/16	421	440	1,250	---	7.98	---	---	---	89.7	66	122	28.2	80.6	4.7	0.158	0.096	0.013	0.034	---	ND	0.29	0.29	ND	1.6	ND	6	12	2.2	---	662	1.71
Apr 18/17	384	377	851	889	7.83	7.19	143	6.5	36.7	23	119	21.1	22.6	1.7	0.147	0.056	<0.005	0.001		0.02	0.50	0.48	ND	0.9	ND	5	<5	4.7		454	0.502
Nov 2/17	415	373	795	659	8.03	7.09	-122	11	14.8	17	125	25.0	16.3	1.4	0.157	0.032	0.006	0.002	---	ND	0.50	0.5	ND	0.7	ND	<3	38	5.4	---	427	0.348
May 23/18	383	401	953	663	8.06	7.15	55.6	7.6	54.8	32	112	25.0	86.9	4.5	0.153	0.076	<0.005	0.008	---	0.46	0.6	0.14	ND	0.57	ND	<3	11	2.8	---	556	1.93
Oct 25/18	---	489	1,300	---	8.04	---	---	---	101	58	---	---	---	---	---	---	---	---	---	0.04	0.5	0.46	<0.05	0.53	---	---	---	---	---	---	---
Apr 30/19	349	338	746	388.5	7.91	7.04	94.6	5.7	21.5	13	112	16.7	7.2	0.6	0.099	0.010	<0.005	0.001	---	0.22	0.4	0.18	<0.05	0.47	<0.002	<3	9	0.9	---	374	0.168
Oct 21/19	278	392	1,030	---	7.91	---	---	---	72.9	32	62.0	30.0	72.5	4.9	0.105	0.086	<0.005	<0.001	---	---	---	---	<0.05	3.40	---	<3	---	4.1	---	510	1.89
Mar 31/20	421	336	847	529	7.76	7.25	49.2	5.6	50.6	23	126.0	25.7	29.7	2.4	0.126	0.046	0.012	0.001	---	0.01	0.1	0.09	<0.05	1.02	<0.002	<3	<5	3.3	---	459	0.63
Dec 2/20	561	455	1,390	1026	7.52	6.49	31.9	8.9	121	47	151.0	44.6	113	7.2	0.214	0.162	0.046	0.007	---	0.17	0.6	0.43	0.07	5.05	<0.002	<3	<5	3.8	---	758	2.08
May 25/21	417	424	1,120	899	8.06	7.06	6.8	9.2	81.7	43	111.0	34.0	77	6.1	0.152	0.119	0.051	0.028	---	1.27	1.5	0.23	0.25	0.96	<0.002	6	11	2.1	---	608	1.64

🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3b: Shallow Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.0	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-7s																															
Apr 21/99	305	250	570	525	---	7.26	---	6.5	10.3	34.7	95.7	15.9	5.4	1.8	---	---	0.09	0.062	0.02	0.01	0.23	0.22	ND	ND	ND	8	678	---	10.0	314	0.130
Oct 18/99	397	328	839	603	7.10	7.35	---	11.3	55.5	55.1	122	22.3	10.8	1.9	---	---	0.04	0.011	1.71	0.28	0.38	0.10	ND	ND	ND	ND	56	---	9.0	465	0.240
Jan 25/00	Not sampled - Not enough to sample																														
May 1/00	278	202	516	473	7.20	7.70	---	6.2	16.9	41.3	83.2	17.0	8.7	ND	---	---	0.27	0.031	2.05	ND	0.21	0.21	ND	3.8	ND	3	67	---	6.0	305	0.230
Oct 23/00	317	260	590	460	7.11	7.40	---	11.8	16.2	42.8	96.8	18.3	8.1	1.99	---	---	0.34	0.045	2.01	0.06	0.46	0.40	ND	ND	ND	1	57	---	10.0	341	0.200
May 3/01	271	200	598	310	---	8.40	---	7.8	31.1	54.3	82.3	15.8	8.3	ND	---	---	0.13	0.035	2.72	0.03	0.30	0.27	ND	ND	ND	6	53	---	6.0	312	572
Oct 29/01	336	278	730	640	7.35	7.90	---	10.1	34.4	64.1	102	19.6	13.9	1.2	---	---	0.09	0.039	2.97	0.02	0.33	0.31	ND	ND	ND	ND	54	---	3.0	402	0.330
Apr 17/02	221	183	503	260	7.13	6.90	---	7.3	16.4	49.5	67.2	12.9	8.1	ND	---	---	0.14	0.025	---	0.02	0.20	0.18	ND	ND	ND	ND	86	---	6.0	264	0.240
Nov 11/02	305	249	616	490	8.30	7.40	---	12.0	22.1	60	93.4	17.3	9.1	ND	---	---	ND	ND	---	ND	0.13	0.13	ND	0.2	ND	1	42	---	3.0	352	0.230
Jun 3/03	244	199	495	390	7.23	7.80	---	12.7	11.7	38	76.6	12.7	8.0	0.9	---	---	0.17	0.030	---	0.09	2.72	2.63	ND	0.1	ND	2	125	---	6.2	268	0.220
Oct 16/03	188	131	417	360	7.63	7.50	---	12.9	9.3	53	60.1	9.2	6.8	1.4	---	---	0.150	0.001	---	0.03	0.45	0.42	ND	0.1	ND	1	34	---	10.0	219	0.220
May 27/04	220	198	423	---	7.70	7.22	---	11.9	4.9	14	68.1	12.1	7.0	0.8	---	---	0.261	0.030	---	0.02	0.65	0.63	ND	ND	ND	3	73	---	7.9	225	0.210
Oct 14/04	297	260	593	520	7.32	6.70	---	12.7	21.0	52	91.6	16.6	13.8	1.1	---	---	0.039	0.008	---	0.03	0.52	0.49	ND	ND	ND	2	71	---	4.2	349	0.347
Jun 1/05	258	228	546	500	---	6.89	---	12.5	19.6	32	79.0	14.8	13.7	0.8	---	---	0.057	0.013	---	ND	0.50	0.50	ND	0.1	0.001	ND	43	---	9.4	296	0.370
Aug 23/05	384	292	757	740	7.35	---	---	13.7	36.6	65	117	22.1	22.0	2.9	---	---	1.53	0.016	---	ND	0.99	0.99	ND	0.3	ND	ND	46	---	8.4	441	0.488
Nov 28/05	145	170	352	260	---	7.69	---	1.9	6.9	20	42.9	9.15	12.4	1.1	---	---	0.226	0.003	---	ND	0.78	0.78	ND	0.1	ND	ND	39	---	10.7	192	0.448
Apr 6/06	393	310	725	620	7.99	7.29	---	5.5	36.5	44	112	27.7	22.5	1.8	---	---	0.159	0.636	---	0.63	5.68	5.05	ND	0.1	ND	5	53	---	26.2	430	0.495
Jul 20/06	328	310	676	680	7.84	7.43	---	15.0	27.3	49	97.8	20.3	21.7	1.3	---	---	1.01	0.245	---	0.15	0.54	0.39	ND	0.1	ND	ND	6	---	5.9	404	0.521
Oct 30/06	236	193	459	534	7.26	7.40	---	9.7	14.0	42	73.5	12.7	13.5	1.0	---	---	0.085	0.037	---	ND	0.64	0.64	ND	0.1	ND	4	23	---	7.1	274	0.381
Apr 25/07	330	292	675	660	7.46	7.58	---	8.2	26.9	51	97.4	21.0	18.2	1.4	---	---	1.01	0.495	---	0.19	1.18	0.99	ND	ND	ND	6	12	---	3.9	393	0.435
Jul 18/07	252	210	475	492	7.36	6.86	---	14.8	9.9	33	77.6	14.1	11.4	1.0	---	---	0.314	0.041	---	ND	0.91	0.91	ND	0.2	ND	ND	34	---	3.2	274	0.312
Oct 31/07	163	150	412	430	7.55	6.97	---	12.5	8.1	35	43.9	13.1	8.0	0.9	---	---	0.183	0.113	---	ND	0.27	0.27	ND	0.1	ND	ND	52	---	7.3	202	0.272
May 14/08	133	150	344	320	7.74	7.22	---	7.6	5.1	14	40.5	7.73	5.4	0.5	---	---	0.066	0.018	---	ND	1.22	1.22	ND	0.1	ND	ND	32	---	4.6	166	0.204
Aug 5/08	229	210	489	500	7.51	7.19	---	13.2	11.5	34	71.1	12.5	9.2	1.3	---	---	0.108	0.025	---	ND	0.28	0.28	ND	0.3	ND	ND	15	---	3.2	268	0.265
Oct. 30/08	170	140	367	370	8.12	6.99	---	9.0	6.8	43	52.3	9.67	5.6	1.1	---	---	0.051	0.007	---	0.01	0.86	0.85	ND	0.2	ND	ND	29	---	4.9	204	0.188
May 14/09	156	148	338	284	6.27	6.32	---	10.7	3.7	13	47.2	9.15	5.7	0.7	0.021	0.006	0.084	0.018	---	ND	0.97	0.97	ND	0.2	ND	ND	52	5.9	5.9	169	0.199
Aug 4/09	211	200	473	560	7.13	6.85	---	13.1	11.4	45	63.8	12.5	8.1	0.9	0.033	0.009	0.248	0.040	---	ND	0.51	0.51	ND	ND	0.003	ND	19	3.4	3.5	260	0.243
Oct 26/09	236	210	562	471	8.01	6.51	---	10.3	11.9	55	71.6	14.0	7.9	1.0	0.075	0.005	0.017	0.003	---	ND	0.33	0.33	ND	0.2	ND	ND	24	3.2	3.5	290	0.224
Apr 26/10	169	149	333	580	7.29	7.28	---	7.3	5.4	18	51.8	9.55	6.1	0.6	0.026	0.006	0.211	0.017	---	0.02	0.60	0.58	ND	0.1	ND	ND	33	4.9	---	181	0.205
Nov 22/10	---	---	---	424	---	6.88	---	7.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Apr 25/11	179	174	350	371	7.85	6.77	---	6.0	4.6	15	54.3	10.4	8.0	0.8	0.032	0.008	1.47	0.043	---	ND	0.44	0.44	ND	ND	ND	ND	11	3.2	---	199	0.261
Nov 1/11	NS																														
Apr 26/12	218	197	471	455	7.52	9.22	146	6.3	15.0	21	66.8	12.3	12.4	0.7	0.027	ND	0.301	0.020	---	0.02	0.30	0.28	ND	ND	ND	ND	45	4.4	---	247	0.366
Apr 23/13	262	245	549	570	7.76	7.20	-121	5.8	14.1	36	80.2	14.9	10.7	0.9	0.107	0.012	2.67	0.237	---	ND	1.32	1.32	ND	ND	ND	ND	32	5.1	---	307	0.288
May 28/14	309	280	629	593	7.80	6.83	89	11.0	13.7	26	96.3	16.6	18.9	0.9	0.052	0.014	0.071	0.043	---	ND	0.80	0.80	ND	0.1	ND	ND	69	5.6	---	341	0.467
May 7/15	310	257	557	550	7.64	7.02	35	7.1	18.4	32	94.8	17.9	14.7	0.9	0.049	0.013	0.198	0.040	---	ND	2.20	2.20	ND	0.1	ND	ND	64	2.9	---	333	0.362
Apr 26/16	265	225	492	652	7.70	7.08	-11	4.8	13.7	30	81.3	14.9	13.5	0.8	0.037	ND	0.229	0.040	---	ND	0.29	0.29	ND	ND	ND	ND	17	5.2	---	290	0.360
Apr 17/17	280	247	542	591	7.79	7.11	15	4.7	12.5	26	86.8	15.4	11.3	0.6	0.045	0.016	0.457	0.044	---	0.03	1.64	1.61	<0.1	<0.1	<0.001	<3	70	8.6	---	301	0.294
May 22/18	243	289	587	419	7.72	6.79	-42	9.1	10.3	20	75.0	13.6	11.7	0.6	0.043	0.009	0.688	0.062	---	0.10	2.70	2.60	<0.05	<0.05	<0.001	<3	93	5.9	---	305	0.326
Apr 29/19	295	239	584	376	7.71	6.90	-18	5.1	15.3	35	89.4	17.5	11.4	0.7	0.043	0.007	0.191	0.034	---	0.07	1.30	1.23	<0.05	<0.05	<0.002	<3	43	4.2	---	313	0.289
Mar 31/20	300	238	571	352	7.59	7.41	27	4.2	15.7	35	91.9	17.2	11.6	0.7	0.048	0.012	0.138	0.022	---	<0.01	0.30	0.30	<0.05	0.05	<0.002	<3	7	6.5	---	315	0.291
May 25/21	271	241	576	457	8.15	7.20	-6	8.8	16.9	39	80.1	17.1	14.0	1.0	0.047	0.015	0.166	0.023	---	0.01	0.20	0.19	0.07	0.08	<0.002	<3	9	6.6	---	313	0.370

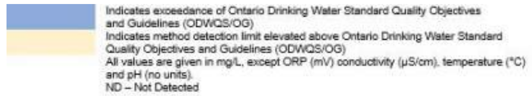
🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3b: Shallow Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-8s																															
Apr 21/99	466	303	881	812	---	6.50	---	6.9	57.9	77.2	121	39.7	13.7	2.4	---	---	ND	0.021	0.01	ND	0.14	0.14	ND	ND	ND	3	326	---	5.0	494	0.280
Oct 18/99	479	319	915	832	7.28	7.29	---	11.6	65.0	95.8	122	42.4	21.8	ND	---	---	ND	ND	0.15	ND	0.08	0.08	ND	ND	ND	ND	5	---	2.0	538	0.430
Jan 25/00	---	---	911	921	---	---	---	2.5	64.1	---	---	---	27.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	562	---
May 1/00	422	293	923	870	7.07	7.60	---	6.9	55.0	96.1	106	38.3	38.9	3.0	0.81	0.07	ND	ND	0.51	ND	0.10	0.10	ND	ND	ND	5	9	---	4.0	513	0.820
Oct 23/00	409	279	846	720	7.30	8.20	---	11.5	52.1	95.2	110	32.5	24.1	1.42	---	---	0.01	0.029	1.13	0.02	0.33	0.31	ND	ND	ND	3	25	---	7.0	483	0.520
Oct 24/00	---	---	---	---	---	---	---	---		---	---	---	---	---	0.85	0.12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	434	301	898	560	---	8.60	---	9.1	48.3	81.0	113	36.8	17.0	ND	---	---	0.02	0.033	0.49	0.02	0.23	0.21	ND	ND	ND	ND	19	---	2.0	477	0.360
Oct 29/01	393	305	877	1,110	7.45	7.30	---	10.3	53.6	91.7	106	31.2	20.7	ND	0.13	0.01	ND	ND	2.17	0.02	0.24	0.22	ND	ND	ND	ND	19	---	ND	486	0.450
Apr 17/02	384	306	784	300	7.24	7.10	---	9.0	24.9	75.6	101	32.1	21.8	ND	---	---	0.02	ND	---	0.01	0.08	0.07	ND	ND	ND	ND	12	---	4.0	439	0.480
Nov 11/02	424	273	715	710	7.86	7.50	---	11.5	53.4	107	117	32.0	25.5	ND	---	---	ND	ND	---	ND	0.11	0.11	ND	0.1	ND	2	27	---	3.2	499	0.540
Jun 3/03	408	303	808	770	7.41	7.80	---	10.8	36.4	98	111	31.7	30.4	0.7	---	---	0.18	ND	---	0.09	0.65	0.56	ND	0.1	ND	ND	15	---	1.9	491	0.660
Oct 16/03	404	249	792	790	7.62	7.60	---	11.6	45.9	94	109	32.0	20.6	0.9	---	---	0.118	0.002	---	0.01	0.18	0.17	ND	ND	ND	ND	7	---	6.0	452	0.450
May 27/04	457	336	864	---	7.79	7.68	---	9.8	46.0	110	122	37.3	33.0	0.8	---	---	0.007	ND	---	ND	0.66	0.66	ND	ND	ND	ND	10	---	1.7	549	0.670
Oct 14/04	420	290	873	780	7.52	6.83	---	11.2	58.7	115	116	31.3	26.3	0.9	---	---	0.054	0.005	---	0.02	0.32	0.30	ND	ND	ND	1	12	---	3.0	524	0.558
Jun 1/05	437	322	886	920	---	6.99	---	10.0	41.9	91	114	37.0	24.6	1.6	---	---	ND	0.006	---	ND	0.13	0.13	ND	ND	ND	ND	ND	---	2.5	501	0.512
Aug 23/05	453	275	861	920	7.33	---	---	12.6	58.4	107	129	32.0	28.3	3.1	---	---	3.19	0.023	---	ND	0.39	0.39	ND	0.3	ND	ND	21	---	9.4	524	0.578
Nov 28/05	515	386	1,050	820	---	7.06	---	6.7	41.8	111	139	40.6	44.4	1.2	---	---	0.006	ND	---	ND	0.29	0.29	ND	ND	ND	ND	17	---	6.9	608	0.852
Apr 6/06	438	356	786	720	7.53	7.27	---	5.3	23.3	76	119	34.1	28.7	0.7	---	---	ND	0.037	---	ND	0.17	0.17	ND	ND	ND	ND	ND	---	2.4	495	0.598
Jul 20/06	412	322	859	830	7.48	7.65	---	15.3	50.6	100	111	32.4	23.9	0.8	---	---	ND	0.004	---	ND	0.33	0.33	ND	0.1	ND	ND	ND	---	3.9	512	0.513
Oct 30/06	460	392	874	1,021	7.37	7.33	---	9.0	39.4	93	126	35.5	28.0	0.9	---	---	ND	ND	---	ND	0.14	0.14	ND	0.1	ND	ND	7	---	2.6	558	0.569
Apr 25/07	333	316	632	633	7.48	7.26	---	5.9	13.8	47	90.2	26.1	16.2	0.7	---	---	ND	0.007	---	ND	0.14	0.14	ND	ND	ND	ND	5	---	2.3	384	0.387
Jul 24/07	446	342	781	847	7.24	7.18	---	15.8	45.9	99	123	34.1	26.6	0.9	---	---	0.010	0.006	---	ND	0.13	0.13	ND	0.2	ND	ND	9	---	1.3	535	0.547
Nov 1/07	466	330	939	719	7.56	7.42	---	9.9	43.8	101	125	37.6	25.4	0.9	---	---	0.035	0.004	---	ND	0.20	0.20	ND	ND	ND	ND	ND	---	3.9	532	0.512
May 6/08	420	345	813	805	7.84	7.27	---	8.9	30.3	81	114	32.7	24.3	0.7	---	---	0.028	0.010	---	ND	0.09	0.09	ND	0.1	ND	ND	26	---	1.9	491	0.515
Aug 5/08	440	339	912	860	7.61	7.48	---	12.4	42.9	96	121	33.1	27.2	1.3	---	---	0.059	0.013	---	ND	0.32	0.32	ND	ND	ND	ND	9	---	2.2	526	0.565
Oct. 30/08	448	363	912	914	7.65	7.49	---	8.4	40.5	99	128	31.4	31.2	1.1	---	---	ND	0.006	---	0.02	0.23	0.21	ND	0.1	ND	ND	6	---	2.9	549	0.641
May 14/09	379	318	635	777	7.46	8.06	---	7.5	25.4	82	101	30.6	31.4	0.8	0.068	0.010	0.016	0.006	---	ND	0.09	0.09	ND	0.1	ND	ND	ND	0.01	2.0	463	0.701
Aug 4/09	426	341	894	910	7.61	7.25	---	12.6	45.0	108	114	34.6	26.6	1.0	0.136	0.027	0.012	0.009	---	ND	ND	ND	ND	2.3	ND	ND	6	1.2	1.2	543	0.561
Oct 26/09	436	333	947	850	7.38	7.00	---	9.1	42.8	111	118	34.2	28.5	1.0	0.163	0.035	0.033	0.006	---	ND	0.23	0.23	ND	ND	ND	ND	9	2.3	2.5	536	0.593
Apr 26/10	447	361	867	830	7.31	7.11	---	8.0	27.3	86	120	35.9	31.9	0.7	0.095	0.012	0.027	0.010	---	ND	ND	ND	ND	ND	ND	ND	ND	1.9	---	518	0.658
Nov 29/10	349	342	737	755	7.46	7.01	---	7.9	12.6	42	93.8	27.8	20.0	0.6	0.069	ND	0.024	0.007	---	ND	0.07	0.07	ND	0.1	ND	ND	ND	3.8	---	403	0.465
Apr 25/11	267	281	551	547	7.93	7.10	---	6.0	5.1	25	74.7	19.6	11.3	0.7	0.053	0.010	0.146	0.030	---	ND	0.15	0.15	ND	ND	ND	ND	8	3.1	---	305	0.300
Nov 1/11	415	351	880	930	7.75	7.19	-43	10.9	34.8	97	110	34.2	22.6	0.9	0.139	0.027	ND	0.012	---	ND	0.11	0.11	ND	ND	ND	ND	8	2.2	---	510	0.482
Apr 25/12	361	341	798	712	7.75	7.41	201	6.5	15.2	68	96.7	28.9	29.8	0.7	0.074	ND	0.007	0.007	---	ND	ND	ND	ND	ND	ND	3	28	2.3	---	443	0.683
Oct 30/12	489	353	862	849	7.98	7.36	-41	12.3	31.3	100	129	40.3	32.9	1.2	0.155	0.025	0.034	0.002	---	ND	0.08	0.08	ND	ND	ND	ND	11	3.2	---	547	0.648
Apr 23/13	334	321	728	773	7.93	7.19	156	7.4	14.5	64	91.0	26.0	24.8	0.5	0.067	0.009	0.018	0.014	---	ND	0.11	0.11	ND	ND	ND	ND	6	3.1	---	413	0.590
Oct 29/13	430	356	747	934	7.76	7.01	183	9.0	20.6	69	113	35.8	22.1	0.9	0.136	ND	0.021	0.002	---	ND	0.15	0.15	ND	0.1	ND	ND	5	4.7	---	475	0.464
May 29/14	380	308	706	533	8.03	7.25	-43	10.0	9.3	41	103	29.7	21.4	0.5	0.076	0.007	0.015	0.150	---	ND	0.19	0.19	ND	ND	ND	ND	34	6.3	---	390	0.478
Oct 1/14	403	318	790	753	8.01	7.22	-86	12.7	27.2	81	106	33.5	22.2	0.8	0.191	0.031	0.010	0.010	---	ND	0.17	0.17	ND	ND	ND	ND	ND	8.5	---	462	0.482
May 7/15	389	341	692	774	7.80	7.07	180	11.9	13.6	48	102	32.6	21.2	0.5	0.075	0.007	0.068	0.103	---	ND	0.20	0.20	ND	ND	ND	ND	6	2.1	---	423	0.468
Oct 8/15	410	368	833	960	7.87	7.25	137	12.6	34.3	83	105	36.1	33.7	1.5	0.153	0.050	0.038	0.008	---	ND	0.76	0.76	ND	ND	ND	ND	ND	2.6	---	514	0.725
Apr 26/16	387	350	707	972	7.88	7.68	160	5.6	72.9	10	102	32.1	23.6	0.5	0.081	0.006	0.076	0.084	---	ND	0.13	0.13	ND	0.3	ND	ND	ND	4.9	---	453	0.522
Oct 11/16	403	367	833	820	7.82	7.30	136	12.6	33.0	93	105	34.0	25.7	0.6	0.128	0.009	ND	0.004	---	ND	0.15	0.15	ND	0.1	ND	ND	ND	4.9	---	512	0.557
Apr 17/17	479	409	878	918	7.90	7.20	30	6.2	25.0	73	128	38.8	27.7	0.5	0.110	0.023	0.484	0.201	---	<0.01	0.37	0.37	ND	ND	ND	ND	5	3.7	---	539	0.550
Nov 1/17	424	344	790	282.9	8.11	7.22	43	11.6	17.2	50	106	38.8	22.9	0.8	0.132	0.028	0.433	0.039	---	<0.01	0.30	0.30	<0.1	0.1	<0.001	<3	<5	15.8	---	443	0.484
May 22/18	289	325	641	437.3	8.03	7.29	-45.3	7.8	6.7	28	78.3	22.8	16.6	0.3	0.059	<0.005	0.075	0.342	---	0.03	0.90	0.87	<0.05	<0.05	<0.001	<3	39	10.1	---	348	0.425
Oct 25/18	453	347	882	579	7.97	7.30	54.6	10.3	29.0	92	121	36.7	28.8	0.9	0.164	0.056	0.487	0.030	---	0.04	0.50	0.46	<0.05	<0.05	<0.002	<3	7	17.9	---	517	0.589
Apr/29/19	266	278	634	417.4	7.96	7.23	-39.6	5.8	7.1	38	71.2	21.5	19.6	0.3	0.049	<0.005	0.437	0.175	---	0.02	0.30	0.28	<0.05	<0.05	<0.002	<3	7	4.7	---	325	0.523
Oct 21/19	447	338	887	709	7.99	7.09	112	10.9	27.2	104	116	38.2	26.3	0.8	0.151	0.043	0.009	0.004	---	0.03	0.10	0.07	<0.05	<0.05	<0.002	<3	<5	4.3	---	515	0.541
Mar 31/20	344	291	667	416.6	7.7	7.49	67.4	3.7	9.0	50	94.3	26.3	21.1	0.3	0.064	0.005	0.011	0.016	---	<0.01	0.20	0.20	<0.05	0.11	<0.002	<3	<5	4.5	---	375	0.495
Dec 1/20	430	330	865	642	7.69	7.61	78.8	8.2	22.8	90	112	36.4	28.3	0.4	0.118	0.022	0.046	0.013	---	0.02	0.40	0.38	<0.05	<0.05	<0.002	<3	<5	3.6	---	488	0.594
May 25/21	373	301	725	567	8.15	7.57	27.4	8.2	16.4	65	94.9	33.0	23.7	0.5	0.076	0.016	0.339	0.327	---	0.03	0.40	0.37	0.08	0.12	<0.002	<3	12	3.9	---	415	0.534
Oct 4/21	422	292	919	773	7.70	7.24	20.9	12.4	59.6	105	112	34.6	27.9	0.9	0.140	0.058	0.008	0.001	---	0.13	0.30	0.17	<0.05	<0.05	<0.002	<3	10	6.8	---	515	0.590

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3b: Shallow Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-9s																															
Apr 21/99	302	281	662	640	---	6.49	---	7.5	4.6	70.0	92.5	17.1	27.0	1.3	---	---	ND	0.009	5.94	ND	0.40	0.40	ND	ND	ND	10	596	---	12.0	381	0.680
Oct 18/99	124	136	329	292	7.61	7.99	---	11.7	1.7	32.9	38.7	6.70	16.0	ND	---	---	0.05	0.008	0.98	ND	0.16	0.16	ND	ND	ND	1	36	---	5.0	178	0.620
Jan 25/00	Not Sampled																														
May 1/00	266	236	579	539	7.03	7.80	---	7.1	2.3	77.1	82.9	14.4	38.1	1.1	0.56	0.07	0.63	0.093	0.19	ND	0.14	0.14	ND	ND	ND	7	20	---	3.0	358	1.02
Oct 23/00	---	---	---	---	---	---	---	---	---	---	87.8	16.8	31.8	1.77	---	---	0.67	0.071	2.52	---	3.46	---	---	---	ND	8	129	---	---	---	---
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.23	0.23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	266	248	639	460	---	8.90	---	8.8	1.2	76.4	80.4	15.7	32.5	ND	---	---	ND	ND	0.75	0.01	0.26	0.25	ND	ND	ND	ND	31	---	3.0	355	0.870
Oct 24/01	Not Sampled																														
Apr 17/02	124	153	341	180	7.46	7.10	---	9.5	1.2	25.1	39.4	6.20	23.1	ND	---	---	0.02	ND	---	0.01	0.17	0.16	ND	ND	ND	ND	47	---	4.0	187	0.900
Nov 11/02	171	177	419	340	8.24	7.40	---	11.2	1.9	30	55.3	8.06	30.7	ND	---	---	ND	ND	---	ND	0.19	0.19	ND	0.1	ND	2	75	---	5.5	233	1.02
Jun 3/03	130	108	361	260	7.45	8.10	---	11.8	1.3	27	32.3	6.14	21.3	ND	---	---	0.05	ND	---	0.03	2.01	1.98	ND	0.1	ND	ND	79	---	5.5	153	0.900
Oct 16/03	42	70	219	200	7.95	7.70	---	12.3	3.2	20	13.2	2.23	21.9	0.7	---	---	0.582	0.005	---	0.03	0.46	0.43	ND	0.2	ND	2	83	---	11.0	105	1.47
May 27/04	225	225	462	---	7.99	7.55	---	11.3	1.5	21	70.1	12.0	22.3	0.4	---	---	0.026	0.035	---	ND	0.69	0.69	ND	ND	ND	ND	68	---	4.0	262	0.650
Oct 14/04	Not sampled - Not enough to sample																														
Jun 1/05	234	248	535	540	---	7.58	---	14.1	1.5	30	72.7	12.6	31.4	0.4	---	---	ND	ND	---	ND	0.35	0.35	ND	0.1	ND	ND	18	---	9.8	298	0.895
Aug 23/05	DRY																														
Nov 28/05	175	228	474	390	---	6.68	---	7.3	1.6	23	54.8	9.14	40.3	0.5	---	---	0.017	0.004	---	ND	0.51	0.51	ND	0.1	ND	8	32	---	11.3	266	1.33
Apr 6/06	256	288	526	400	8.02	7.30	---	4.9	1.5	17	79.5	14.0	24.9	0.5	---	---	0.007	0.034	---	0.02	0.53	0.51	ND	0.1	ND	ND	ND	---	6.5	310	0.678
Jul 20/06	260	---	---	---	---	---	---	---	---	---	81.0	14.1	29.7	0.5	---	---	0.050	0.21	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct 30/06	257	314	521	633	7.41	7.47	---	8.7	2.4	19	80.7	13.3	22.9	0.4	---	---	0.012	ND	---	ND	0.29	0.29	ND	0.1	ND	ND	9	---	4.4	328	0.623
Apr 25/07	285	320	553	534	7.48	7.43	---	7.9	1.0	15	85.4	17.4	20.0	0.4	---	---	ND	0.006	---	ND	2.18	2.18	ND	ND	ND	ND	5	---	1.5	332	0.515
Jul 24/07	160	210	416	388	7.26	7.05	---	16.4	0.6	15	50.8	7.94	31.1	0.7	---	---	0.248	0.008	---	ND	1.68	1.68	ND	0.3	ND	ND	5	---	2.7	234	1.07
Nov 1/07	99	150	325	340	7.76	7.17	---	9.7	1.2	15	30.9	5.36	25.6	0.4	---	---	0.254	0.008	---	ND	1.04	1.04	ND	0.1	ND	ND	ND	---	7.4	167	1.12
May 6/08	186	220	402	401	8.10	7.63	---	8.4	0.6	9	59.3	9.26	18.2	0.3	---	---	0.063	0.037	---	0.03	2.41	2.38	0.2	0.2	ND	ND	39	---	2.2	229	0.580
Aug 5/08	Not sampled - Not enough to sample																														
Oct. 30/08	41	54	147	137	8.19	7.97	---	7.2	1.0	17	12.8	2.09	11.1	0.4	---	---	0.477	0.015	---	0.03	1.62	1.59	ND	0.1	ND	ND	35	---	8.7	78	0.760
May 14/09	129	144	311	190	7.66	8.15	---	10.7	0.6	9	41.4	6.10	25.6	1.4	0.056	0.021	1.78	0.030	---	ND	1.87	1.87	ND	0.2	ND	ND	64	3.1	3.1	173	0.983
Aug 4/09	233	271	488	530	7.07	7.16	---	13.4	0.6	11	74.9	11.1	17.2	0.4	0.024	ND	0.034	0.013	---	0.02	0.45	0.43	ND	ND	ND	ND	ND	2.8	2.9	278	0.490
Oct 26/09	59	63	170	110	7.50	7.13	---	8.0	1.9	14	16.5	4.33	13.3	0.4	0.025	ND	0.384	0.013	---	0.03	1.35	1.32	ND	0.1	ND	ND	50	9.8	10	89.6	0.752
Apr 26/10	93	110	221	220	7.33	6.75	---	8.3	1.8	5	29.7	4.67	7.7	0.3	0.022	ND	0.429	0.013	---	0.05	1.07	1.02	ND	0.1	ND	ND	25	3.8	---	116	0.348
Nov 25/10	120	149	290	285	7.27	7.25	---	5.0	1.5	3	38.3	6.03	8.5	0.3	0.020	ND	0.239	0.003	---	ND	1.07	1.07	ND	0.2	ND	ND	8	4.4	---	148	0.337
Apr 25/11	213	247	459	938	7.50	6.89	---	7.4	0.8	8	68.1	10.4	10.8	0.7	0.030	0.006	0.467	0.029	---	ND	0.48	0.48	ND	ND	ND	ND	ND	2.3	---	248	0.323
Nov 1/11	118	117	274	250	7.46	6.99	-2	10.8	3.6	12	37.8	5.73	10.1	0.9	0.012	ND	0.029	0.001	---	ND	0.81	0.81	ND	0.1	ND	ND	21	4.0	---	140	0.405
Apr 26/12	79	98	203	161	7.47	6.58	236	7.3	0.9	7	24.6	4.18	7.5	0.4	0.027	ND	0.534	0.012	---	0.05	0.25	0.20	ND	0.1	ND	ND	103	3.5	---	104	0.368
Oct 30/12	147	144	279	1,540	7.70	7.58	-26	12.9	0.6	11	46.5	7.38	11.5	0.8	0.050	ND	0.558	0.050	---	ND	0.69	0.69	0.1	0.3	ND	ND	28	5.7	---	166	0.413
Apr 23/13	202	194	379	380	7.91	7.42	-106	6.7	0.7	8	65.8	9.06	9.5	0.3	0.028	ND	0.179	0.011	---	0.17	1.57	1.40	ND	0.2	ND	ND	26	7.0	---	211	0.290
Oct 29/13	119	130	256	366	7.54	7.86	-5	8.4	3.1	7	38.0	5.83	11.4	0.5	0.024	ND	0.191	0.016	---	ND	2.49	2.49	ND	0.1	ND	6	26	2.7	---	145	0.455
May 29/14	156	151	291	388	7.89	7.00	10	14.2	0.6	3	50.3	7.41	9.9	0.4	0.022	ND	0.056	0.013	---	ND	1.43	1.43	ND	ND	ND	ND	53	8.6	---	163	0.345
Oct 1/14	DRY - Not Sampled																														
May 7/15	214	227	424	535	7.94	7.37	114	10.8	0.7	7	69.0	10.1	11.1	0.4	0.028	ND	0.152	0.012	---	ND	1.40	1.40	ND	ND	ND	ND	33	2.3	---	235	0.331
Oct 8/15	DRY																														
Apr 12/16	109	148	264	333	7.79	7.01	201	5.6	ND	5	34.1	5.90	6.7	0.7	0.010	ND	0.010	0.005	---	ND	1.04	1.04	0.1	ND	ND	ND	31	2.9	---	142	0.279
Oct 11/16	DRY																														
Apr 17/17	147	147	281	330	7.91	7.27	36	4.6	ND	3	48.0	6.46	4.4	0.1	0.014	ND	0.049	0.062	---	ND	1.49	1.49	ND	ND	ND	ND	38	5.3	---	150	0.159
Nov 1/17	152	153	299	207.8	7.90	7.07	29	10.8	2	5	49	7.23	8.2	0.3	0.017	0.012	1.870	0.160	---	0.04	2.5	2.46	0.1	0.1	<0.001	<3	52	9.8		166	0.289
May 22/18	108	143	270	239.5	7.95	7.52	12.1	10.3	<0.5	3	34.6	5.21	6.4	0.2	0.017	<0.005	0.068	0.110	---	0.08	4.4	4.32	<0.05	0.10	<0.001	<3	97	3.8	---	136	0.268
Oct 25/18	Dry																														
Apr 29/19	90	108	229	187.4	7.71	7.33	89.5	10.0	0.6	3	28.6	4.50	4.5	0.2	0.007	<0.005	0.020	<0.001	---	0.05	2.3	2.25	<0.05	<0.05	<0.002	<3	49	3.0	---	107	0.206
Oct 21/19	45	46	111	92.6	7.28	7.57	112.7	10.3	1.2	5	14.4	2.10	3.8	0.2	0.006	<0.005	0.035	0.001	---	0.08	0.4	0.32	<0.05	0.06	<0.002	<3	35	6.5	---	55	0.248
Mar 31/20	107	113	233	172.9	7.31	7.27	144.7	3.1	1.0	3	33.5	5.72	4.9	0.2	0.009	<0.005	0.029	<0.001	---	0.02	0.8	0.78	<0.05	<0.05	<0.002	<3	17	2.0	---	116	0.205
Dec 1/20	42	39	98	84.8	7.09	7.37	102.1	7.2	1.6	5	13.2	2.25	2.5	<0.1	0.005	<0.005	0.034	0.001	---	0.05	0.4	0.35	<0.05	<0.05	<0.002	<3	77	4.7	---	48	0.165
May 25/21	71	91	190	---	8.06	---	---	---	0.7	3	22.3	3.83	3.8	0.3	0.019	0.005	0.408	0.083	---	0.18	4.3	4.12	0.07	0.21	<0.002	<3	105	4.3	---	89	0.197
Oct 4/21	Dry																														

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3b: Shallow Overburden Groundwater Chemical Analysis

North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
00-1s																															
Dec 6/00	515	354	2,350	>1990	7.90	7.90	---	6.4	421	111	148	35.4	225	3.9	---	---	0.01	0.050	0.34	ND	0.44	0.44	ND	0.7	ND	2	13	---	ND	1,160	4.31
May 3/01	336	250	1,106	610	---	8.40	---	9.8	139	43.8	98.0	22.2	80.1	1.7	---	---	ND	0.244	0.39	ND	0.27	0.27	ND	0.6	ND	ND	9	---	1.0	538	1.90
Oct 24/01	---	---	---	---	---	---	---	---		---	---	---	---	---	0.15	0.05	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct 30/01	457	352	1,892	1,780	7.28	8.00	---	9.6	316	86.2	130	32.0	190	3.4	---	---	ND	ND	0.50	ND	0.19	0.19	ND	0.5	ND	ND	13	---	4.0	971	3.87
Apr 17/02	323	270	917	450	7.49	7.20	---	9.7	106	36.1	95.0	20.8	53.3	1.4	---	---	0.01	ND	---	0.02	0.05	0.03	ND	0.6	ND	ND	4	---	3.0	477	1.29
Nov 12/02	529	360	1,550	1,440	7.79	7.70	---	11.5	296	105	154	35.0	194	2.6	---	---	ND	ND	---	ND	0.17	0.17	ND	0.2	ND	ND	13	---	1.6	1,004	3.67
Jun 10/03	358	300	1,150	1,323	7.76	8.10	---	10.7	163	56	107	22.0	117	1.7	---	---	0.22	ND	---	0.02	0.15	0.13	ND	0.4	ND	ND	7	---	1.8	649	2.69
Oct 16/03	337	246	1,010	960	7.60	7.80	---	12.6	140	56	97.5	22.6	85.6	2.4	---	---	0.234	0.003	---	0.04	0.16	0.17	ND	0.6	ND	1	3	---	6.0	555	2.03
May 27/04	380	297	1,110	---	8.07	7.70	---	11.6	156	58	112	24.6	100	1.6	---	---	0.006	ND	---	ND	0.14	0.14	ND	0.3	ND	ND	ND	---	0.5	630	2.24
Oct 14/04	471	375	1,710	1,380	7.56	6.98	---	12.4	265	92	134	33.0	170	2.4	---	---	ND	ND	---	ND	0.16	0.11	ND	0.7	ND	ND	7	---	0.6	922	3.41
2-Jun-05	346	320	1,010	650	7.51	7.33	---	13.5	124	51	101	22.7	83.9	1.6	---	---	ND	ND	---	ND	0.23	0.23	ND	0.3	ND	ND	8	---	1.4	576	1.96
Aug 23/05	405	345	1,180	1,080	7.39	---	---	14.7	155	61	119	26.3	112	2.8	---	---	0.822	0.009	---	ND	0.27	0.27	ND	0.2	ND	ND	ND	---	6.4	681	2.42
Nov 28/05	363	357	1,070	1,460	---	7.95	---	10.6	115	49	106	23.9	95.2	2.5	---	---	ND	0.003	---	ND	0.45	0.45	ND	0.4	ND	ND	ND	---	2.5	605	2.17
Apr 6/06	276	240	538	450	8.16	7.46	---	8.3	16.1	24	81.0	17.8	17.3	1.0	---	---	ND	ND	---	ND	0.05	0.05	ND	0.3	ND	ND	ND	---	1.3	302	0.452
Jul 24/06	390	375	1,260	1,730	7.28	7.64	---	14.2	170	61	113	26.2	100	2.9	---	---	ND	ND	---	ND	0.13	0.13	ND	0.2	ND	ND	ND	---	4.5	696	2.21
Oct 31/06	384	402	1,260	1,437	7.65	8.61	---	8.4	173	58	109	27.1	112	2.0	---	---	ND	0.004	---	ND	0.14	0.14	ND	0.4	ND	ND	ND	---	1.5	724	2.48
Apr 25/07	275	278	572	540	7.74	7.72	---	9.0	19.8	22	81.2	17.5	18.5	1.3	---	---	ND	ND	---	ND	0.09	0.09	ND	0.3	ND	ND	5	---	1.4	328	0.485
Jul 19/07	371	376	1,000	3,710	7.71	7.18	---	13.5	110	53	108	24.5	83.4	1.8	---	---	0.027	0.012	---	ND	0.17	0.17	ND	0.4	ND	ND	41	---	1.1	608	1.88
Oct 31/07	469	426	1,310	1,610	7.76	7.28	---	11.8	200	71	137	30.6	108	1.7	---	---	0.061	0.004	---	ND	0.14	0.14	ND	0.7	ND	ND	32	---	4.3	808	2.18
May 14/08	270	280	589	643	8.06	7.99	---	9.1	34.7	26	80.9	16.5	27.5	0.9	---	---	ND	0.007	---	ND	ND	ND	ND	0.3	ND	ND	ND	---	0.9	356	0.729
Aug 5/08	388	390	1,070	1,080	7.80	7.78	---	11.2	121	53	114	25.2	74.3	2.1	---	---	0.007	0.003	---	ND	0.09	0.09	ND	0.3	ND	ND	ND	---	0.8	625	1.64
Oct. 30/08	337	318	921	919	7.91	7.72	---	9.0	108	56	99.2	21.7	58.6	2.2	---	---	ND	0.002	---	ND	0.12	0.11	ND	0.9	ND	ND	ND	---	1.0	541	1.39
May 19/09	347	308	819	753	7.60	7.05	---	7.4	54.7	36	102	22.6	45.8	1.2	0.043	0.022	0.095	0.011	---	ND	0.26	0.26	ND	0.3	ND	ND	34	0.8	1.0	448	1.07
Aug 5/09	415	405	1,270	1,350	7.52	6.90	---	11.7	152	62	119	28.8	114	2.0	0.066	0.041	0.020	0.007	---	ND	0.08	0.08	ND	0.4	ND	ND	5	1.1	1.1	722	2.44
Nov 3 /09	468	392	1,240	1,040	7.57	6.96	---	10.5	129	68	138	29.9	100	2.1	0.078	0.046	0.057	0.009	---	ND	0.37	0.37	ND	0.4	ND	ND	<5	1.0	1.1	704	2.02
Apr 28/10	345	321	769	742	7.93	6.93	---	8.4	38.2	34	101	22.6	39.8	1.4	0.051	0.024	0.031	0.014	---	ND	0.15	0.15	ND	0.3	ND	ND	11	ND	---	430	0.934
Nov 29/10	349	369	868	878	7.62	7.33	---	8.0	44.0	32	101	23.5	47.1	1.6	0.054	0.029	0.039	ND	---	ND	ND	ND	ND	0.3	ND	ND	ND	1.4	---	472	1.10
Apr 26/11	230	235	486	485	7.98	7.24	---	6.6	6.0	16	68.3	14.5	7.0	1.5	0.031	ND	0.035	0.005	---	ND	0.18	0.18	ND	0.2	ND	ND	13	1.2	---	255	0.201
Nov 3/11	404	445	1,360	1,400	7.78	7.07	-66	11.5	144	66	151	36.6	125	2.3	0.105	0.077	0.028	ND	---	ND	0.23	0.23	ND	0.5	ND	ND	40	1.0	---	793	2.36
Apr 26/12	353	329	858	1,043	8.09	7.66	32	8.3	39.1	44	101	24.4	32.6	1.6	0.046	0.013	ND	ND	---	ND	0.07	0.07	ND	0.3	ND	ND	ND	1.6	---	442	0.756
Oct 29/12	532	427	1,200	1,174	7.77	6.76	-112	11.7	116	66	153	36.4	99.7	3.0	0.102	0.056	0.011	0.003	---	ND	0.18	0.18	ND	0.6	ND	ND	ND	0.8	---	733	1.88
Apr 23/13	Damaged																														
Oct 30/13	456	429	1,090	1,085	7.39	7.24	189	9.1	84.1	59	132	30.5	78.2	1.9	0.086	0.062	ND	0.002	---	ND	0.13	0.13	ND	0.4	ND	ND	ND	4.0	---	644	1.59
May 29/14	330	285	627	621	8.21	7.30	89	9.2	16.5	22	97.7	20.9	17.5	0.9	0.041	0.014	ND	ND	---	ND	ND	ND	ND	0.2	ND	ND	24	3.1	---	347	0.419
Duplicate	316	288	624	---	8.19	---	---	---	16.2	21	93.2	20.1	16.8	0.9	0.039	0.014	ND	0.002	---	ND	ND	ND	ND	0.2	ND	ND	22	2.6	---	343	0.412
Oct 1/14	400	345	796	853	7.69	7.00	134	15.0	29.0	33	118	25.8	30.6	1.5	0.060	0.036	ND	ND	---	ND	0.08	0.08	ND	0.2	ND	ND	ND	3.2	---	445	0.666
Jun 8/15	390	346	795	976	7.95	6.87	104	11.3	33.5	33	110	27.7	32.2	1.3	0.053	0.026	ND	ND	---	ND	0.23	0.23	ND	0.8	ND	ND	5	2.8	---	449	0.710
Oct 8/15	412	393	1,000	1,116	7.74	7.37	68	13.9	83.6	51	117	29.3	48.3	1.6	0.068	0.039	ND	ND	---	ND	ND	ND	ND	0.6	ND	ND	5	1.5	---	569	1.04
Apr 27/16	307	285	605	970	8.00	7.49	-19	5.9	20.8	23	89.1	20.5	14.9	0.9	0.037	ND	ND	ND	---	ND	ND	ND	ND	0.4	ND	6	ND	2.7	---	342	0.369
Oct 12/16	443	376	1,090	982	8.06	7.67	54	12.8	103	59	123	32.9	53.6	1.7	0.074	0.035	ND	0.002	---	ND	ND	ND	ND	0.6	ND	ND	ND	3.3	---	602	1.11
Apr 19/17	285	252	581	4,870	8.07	7.55	130	8.3	9.0	18	85.1	17.6	8.1	0.8	0.035	0.010	ND	0.001	---	ND	0.25	0.25	0.2	0.4	ND	ND	ND	1.5	---	292	0.21
Nov 1/17	448	395	1,010	714	8.09	7.18	-40	10.1	53.6	34	126	32.3	51.7	1.7	0.081	0.049	ND	ND	---	ND	0.10	0.10	ND	0.3	ND	ND	ND	11.1	---	538	1.06
May 22/18	Damaged																														
Oct 25/18	478	348	1,020	681	8.11	7.15	179.7	10.7	92.7	59	136	33.5	47.3	1.8	0.087	0.033	0.005	0.001	---	<0.01	0.1	0.1	<0.05	0.17	<0.002	<3	<5	4.1	---	579	0.942
May 1/19	275	245	531	202	7.82	7.62	155	6.0	5.6	16	82.7	16.5	5.3	0.6	0.033	0.009	<0.005	0.002	---	0.06	<0.1	0.06	<0.05	0.09	<0.002	<3	<5	3.4	---	274	0.139
Oct 21/19	486	289	1,130	790	7.88	6.98	102.5	12.1	118	102	135	36.2	53.7	1.9	0.087	0.026	<0.005	0.001	---	0.09	0.2	0.1	<0.05	0.30	<0.002	<3	7	4.4	---	620	1.06
Mar 31/20	292	238	517	421	7.7	7.5	35.6	6.5	4.4	21	87.6	17.8	5.9	0.6	0.037	0.012	0.012	0.009	---	<0.01	<0.1	<0.1	<0.05	0.22	<0.002	<3	<5	2.7	---	281	0.15
Dec 2/20	666	366	1,550	1,237	7.55	7.33	95.2	7.5	219	94	176	55	98.3	3.9	0.125	0.037	0.038	0.003	---	0.02	0.1	0.08	<0.05	0.24	<0.002	<3	<5	1.7	---	867	1.66
May 26/21	456	307	904	838	8.11	6.98	18	13.9	83.4	50	125	34.8	38.2	1.8	0.064	0.023	0.012	<0.001	---	<0.01	0.2	0.20	<0.05	0.09	<0.001	<3	<5	2	---	517	0.779
Oct 4/21	689	351	1,450	1,223	7.55	6.99	19.9	12.1	178	131	187	54.2	71.3	3.1	0.115	0.035	0.056	0.001	---	0.03	<0.1	0.03	<0.05	<0.05	<0.002	<3	11	2	---	834	1.18

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3b: Shallow Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
00-2s																															
Dec 6/00	357	352	1,150	1,280	7.00	7.90	---	5.4	104	58.0	100	26.1	77.2	2.6	---	---	ND	0.209	0.39	0.01	0.33	0.32	ND	ND	ND	ND	9	---	1.0	579	1.78
May 3/01	357	305	1,186	570	---	8.20	---	10.6	120	57.1	102	24.9	99.0	1.8	---	---	0.10	0.158	0.15	0.01	0.20	0.19	ND	ND	ND	ND	5	---	2.0	588	2.28
Oct 24/01	---	---	---	---	---	---	---	---		---	---	---	---	---	0.17	0.05	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct 30/01	347	333	1,097	1,000	7.37	7.60	---	8.0	106	48.0	97.8	24.9	64.1	1.7	---	---	0.15	0.789	0.12	0.02	0.21	0.19	ND	ND	ND	ND	4	---	6.0	543	1.50
Apr 17/02	369	291	1,246	730	7.39	7.10	---	10.2	153	68.4	104	26.5	107	2.0	---	---	0.01	0.256	---	0.02	0.08	0.06	ND	ND	ND	ND	2	---	7.0	636	2.42
Nov 12/02	348	291	923	920	8.13	7.60	---	10.5	120	77	99.2	24.4	82.3	ND	---	---	0.03	0.660	---	0.01	0.18	0.17	ND	ND	ND	ND	31	---	0.9	578	1.92
Jun 10/03	369	291	1,230	1,170	7.88	8.10	---	11.0	201	78	107	24.8	119	2.1	---	---	0.47	0.390	---	0.08	0.17	0.09	ND	0.1	ND	ND	5	---	1.0	708	2.69
Oct 23/03	334	297	955	1,020	8.08	7.80	---	7.9	116	71	95.0	23.5	84.0	1.8	---	---	0.583	0.145	---	0.04	0.07	0.03	ND	0.1	ND	ND	3	---	4.0	569	2.00
May 27/04	285	285	965	---	8.00	7.93	---	14.1	112	64	77.0	22.5	113	2.1	---	---	0.051	0.196	---	0.04	0.20	0.16	ND	ND	ND	ND	5	---	ND	559	2.90
Oct 14/04	277	306	1,020	800	7.92	7.24	---	11.3	127	62	74.8	21.9	112	2.1	---	---	0.077	0.200	---	0.02	0.20	0.18	ND	0.1	ND	2	11	---	0.8	582	2.93
Jun 2/05	308	310	1,020	>19,990	7.56	6.22	---	13.8	124	64	83.4	24.3	96.5	2.5	---	---	0.065	0.224	---	0.01	0.08	0.07	ND	0.2	ND	ND	ND	---	1.1	579	2.39
Aug 23/05	351	304	978	1,190	7.46	---	---	11.7	115	56	98.8	25.2	81.8	2.0	---	---	1.06	0.215	---	ND	0.10	0.10	ND	ND	ND	ND	6	---	3.7	561	1.90
Nov 28/05	213	290	1,020	1,400	---	8.08	---	12.8	130	60	53.2	19.5	137	2.9	---	---	0.310	0.193	---	ND	0.25	0.25	ND	ND	ND	ND	ND	---	1.0	577	4.09
Apr 13/06	196	328	966	850	7.34	7.43	---	9.4	104	50	48.1	18.4	119	2.1	---	---	0.150	0.500	---	0.03	0.18	0.15	ND	0.1	ND	ND	ND	---	1.0	538	3.70
Jul 24/06	264	308	866	930	7.32	7.91	---	14.5	83.6	45	73.8	19.3	72.8	2.2	---	---	0.578	0.212	---	0.04	0.11	0.07	ND	ND	ND	ND	5	---	4.3	480	1.95
Oct31/06	325	344	936	>19,990	7.96	6.58	---	9.0	104	50	90.4	24.2	74.7	1.8	---	---	0.802	0.136	---	ND	0.12	0.12	ND	ND	ND	ND	ND	---	1.4	552	1.80
Apr 26/07	243	346	896	1,810	7.46	8.93	---	9.8	115	54	68.0	17.7	105	1.7	---	---	0.331	0.126	---	ND	0.15	0.15	ND	ND	ND	ND	6	---	2.4	569	2.92
Jul 23/07	268	274	804	737	8.11	7.92	---	16.8	80.9	42	75.5	19.2	87.1	2.0	---	---	0.431	0.091	---	ND	0.13	0.13	ND	0.2	ND	ND	17	---	0.7	472	2.32
Nov 1/07	326	304	815	712	7.63	7.41	---	9.4	79.8	45	92.5	23.1	75.4	1.9	---	---	0.586	0.108	---	ND	0.21	0.21	ND	0.1	ND	ND	ND	---	3.1	501	1.82
May 14/08	254	304	675	720	7.98	7.85	---	10.1	51.1	40	72.6	17.6	51.6	1.6	---	---	0.492	0.165	---	ND	0.30	0.30	ND	ND	ND	ND	6	---	0.9	418	1.41
Aug 5/08	194	290	694	767	7.76	7.51	---	11.8	57.4	33	54.0	14.3	71.8	1.6	---	---	0.361	0.162	---	ND	0.38	0.38	ND	0.1	ND	ND	9	---	1.0	406	2.25
Oct.30/08	274	290	741	969	8.25	8.03	---	7.3	55.5	33	78.0	19.3	63.4	2.2	---	---	0.436	0.173	---	0.05	0.13	0.08	ND	0.2	ND	ND	ND	---	1.0	423	1.67
May 19/09	298	302	852	490	7.59	8.12	---	9.2	67.4	49	84.9	20.9	70.5	1.8	0.097	0.041	0.389	0.079	---	ND	0.15	0.15	ND	ND	ND	ND	ND	0.7	0.7	476	1.78
Aug 5/09	266	284	783	850	7.65	7.19	---	11.5	68.4	45	74.0	19.6	67.2	1.8	0.090	0.053	0.467	0.101	---	ND	ND	ND	ND	ND	ND	ND	ND	1.2	1.2	447	1.80
Nov 3/09	293	296	809	720	8.01	7.72	---	9.7	62.3	45	83.9	20.3	67.6	2.0	0.099	0.059	0.444	0.073	---	ND	0.09	0.09	ND	ND	ND	ND	<5	1.0	1.0	459	1.72
Apr 28/10	352	312	978	925	7.02	7.17	---	9.9	95.2	63	100	24.6	86.1	2.1	0.147	0.074	0.519	0.065	---	ND	0.18	0.18	ND	0.1	ND	ND	17	0.6	---	560	2.00
Nov 29/10	245	321	917	942	7.71	7.84	---	9.1	66.5	55	68.5	18.0	89.9	1.9	0.103	0.061	0.291	0.092	---	ND	0.09	0.09	ND	0.2	ND	ND	ND	1.0	---	493	2.50
Apr 26/11	134	293	825	743	8.30	7.36	---	7.5	48.9	33	31.6	13.3	96.8	2.5	0.061	0.042	0.019	0.190	---	ND	0.32	0.32	ND	ND	ND	ND	ND	1.1	---	402	3.64
Nov 3/11	253	293	807	738	7.89	7.31	-67	10.6	55.9	52	93.7	23.9	66.2	2.0	0.135	0.073	0.548	0.057	---	ND	0.17	0.17	ND	ND	ND	ND	23	0.8	---	470	1.58
Apr 26/12	336	311	905	812	8.16	7.04	180	9.0	54.2	42	94.9	24.0	61.3	2.1	0.128	0.051	0.405	0.059	---	0.01	0.08	0.07	ND	ND	ND	ND	5	0.7	---	466	1.46
Oct 29/12	351	316	782	930	7.84	7.23	-137	10.0	49.0	44	100	24.5	68.9	2.7	0.149	0.062	0.553	0.096	---	ND	0.06	0.06	ND	ND	ND	ND	ND	0.6	---	480	1.60
Apr 24/13	307	328	888	866	8.05	7.20	-25	9.4	57.0	47	87.1	21.8	61.8	1.9	0.137	0.058	0.642	0.071	---	ND	0.24	0.24	ND	ND	ND	ND	ND	0.8	---	474	1.53
Oct 29/13	237	308	798	898	7.88	7.48	-55	8.6	43.7	42	66.4	17.3	76.4	2.4	0.115	0.055	0.380	0.095	---	ND	0.65	0.65	ND	ND	ND	ND	ND	2.9	---	433	2.16
May 29/14	319	303	715	561	8.13	7.11	17	10.2	38.0	46	88.9	23.5	54.2	1.8	0.124	0.044	0.339	0.151	---	ND	0.31	0.31	ND	ND	ND	ND	26	2.4	---	435	1.32
Oct 2/14	322	302	772	879	7.99	7.14	-13	10.4	36.9	46	92	22.5	47.1	1.9	0.165	0.047	0.500	0.054	---	ND	2.16	2.16	ND	ND	0.005	11	37	1.8	---	428	1.14
May 6/15	366	342	812	947	7.97	7.11	-18	12.6	44.1	50	103	26.3	55.0	2.0	0.137	0.055	0.316	0.059	---	ND	0.60	0.60	ND	ND	ND	ND	ND	3.2	---	486	1.25
Oct 13/15	276	327	764	989	7.95	7.57	18	10.0	35.8	49	75.1	21.6	84.5	4.9	0.100	0.041	0.332	0.043	---	ND	0.10	0.10	ND	ND	ND	ND	ND	0.5	---	467	2.21
Apr 26/16	345	326	744	576	7.99	7.68	-142	7.2	38.3	43	97.2	24.9	40.4	1.8	0.117	0.035	0.210	0.035	---	ND	0.07	0.07	ND	ND	ND	ND	ND	2.4	---	441	0.945
Oct 12/16	282	314	844	899	8.04	7.45	-75	10.5	44.2	50	76.8	22.0	41.5	1.5	0.096	0.030	0.228	0.040	---	ND	0.19	0.19	ND	ND	ND	ND	ND	0.9	---	425	1.08
Apr 19/17	347	320	807	550	7.93	7.04	-80.1	6.2	43.7	48	97.5	25.2	46.1	1.8	0.128	0.044	0.517	0.053	---	ND	0.25	0.25	ND	ND	ND	ND	ND	3.2	---	455	1.08
Nov 1/17	311	283	709	707	8.02	7.36	119.0	9.4	20.9	49	86.3	23.1	39.5	1.8	0.122	0.041	0.215	0.045	---	ND	0.2	0.20	ND	ND	ND	ND	ND	15.3	---	390	0.975
May 24/18	311	303	769	680	8.06	7.32	-69.0	10.2	30.6	53	87.6	22.4	46.4	1.7	0.118	0.032	0.120	0.035	---	0.10	0.2	0.10	<0.05	<0.05	<0.001	<3	12	8.0	---	424	1.14
Oct 25/18	321	289	724	749	8.00	7.77	-13.6	8.8	23.9	57	92.3	22.0	35.8	1.6	0.117	0.029	0.253	0.034	---	0.03	0.1	0.07	<0.05	<0.05	<0.002	<3	<5	3.4	---	406	0.869
May 1/19	313	261	645	456.7	7.90	7.17	-109.4	8	28.5	28	89.0	22.1	32.5	1.5	0.112	0.037	0.202	0.021	---	0.05	0.2	0.15	<0.05	<0.05	0.012	<3	<5	2.3	---	358	0.799
Oct 22/19	284	274	679	541	7.98	7.20	11.7	10.1	20.1	42	77.6	22.0	33.0	1.6	0.096	0.017	<0.005	0.006	---	0.16	0.2	0.04	<0.05	0.05	0.001	<3	<5	2.7	---	361	0.851
Apr 1/20	366	306	801	466.4	7.81	7.17	110.7	7.9	44.3	46	105	25.2	43.0	1.8	0.130	0.047	0.283	0.032	---	<0.01	<0.1	ND	<0.05	0.07	0.003	<3	<5	2.6	---	450	0.978
Dec 1/20	315	272	700	555	7.71	7.18	-83.9	9.1	33.8	41	88	23.2	38.4	1.6	0.108	0.043	0.325	0.033	---	0.1	0.20	0.1	<0.05	<0.05	<0.002	<3	<5	0.8	---	389	0.941
May 26/21	320	276	717	582	8.26	7.22	-141.4	9.7	39.1	47	88	24.2	46.7	1.8	0.117	0.04	0.300	0.026	---	0.03	0.20	0.17	<0.05	<0.05	<0.001	<3	<5	1.7	---	413	1.14
Oct 4/21	336	287	728	609	7.72	7.15	-13.7	10.3	28.8	50	93	25.3	38.6	2	0.122	0.039	0.371	0.037	---	0.09	<0.1	0.09	<0.05	<0.05	<0.002	<3	6	3.1	---	411	0.916

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3b: Shallow Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
00-3s																															
Dec 6/00	256	286	590	700	7.69	8.70	---	5.4	10.8	7.0	50.3	31.6	18.3	4.5	---	---	0.14	0.037	1.77	0.07	0.35	0.28	ND	ND	ND	ND	ND	---	ND	294	0.500
May 3/01	321	271	747	450	---	8.10	---	11.7	51.9	26.3	61.6	40.7	29.0	5.5	---	---	0.43	0.088	2.08	0.02	0.25	0.23	ND	0.5	ND	3	20	---	2.0	380	0.700
Oct 24/01	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.08	0.15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct 30/01	265	301	592	550	7.89	7.80	---	8.1	10.5	13.8	50.0	34.0	15.4	5.4	---	---	ND	0.113	0.67	0.05	0.33	0.28	ND	0.6	ND	3	4	---	1.0	313	0.410
Apr 17/02	304	280	647	360	7.31	6.90	---	10.0	21.0	19.9	58.1	38.7	18.6	5.3	---	---	ND	0.035	---	ND	0.08	0.08	ND	ND	ND	ND	ND	---	1.0	330	0.460
Nov 12/02	301	297	608	580	8.59	8.00	---	10.7	15.5	13	60.0	36.7	18.5	6.0	---	---	ND	0.010	---	0.01	0.32	0.31	ND	0.3	ND	1	5	---	1.2	329	0.460
Jun 5/03	293	297	580	530	8.26	8.30	---	9.8	21.2	16	59.0	35.3	20.6	5.5	---	---	0.210	0.030	---	0.24	0.34	0.10	ND	0.2	ND	ND	4	---	1.6	337	0.520
Oct 16/03	340	288	700	1,180	8.26	7.90	---	9.6	78.3	25	66.0	42.5	32.2	6.3	---	---	0.189	0.110	---	0.10	0.15	0.05	ND	0.2	ND	ND	10	---	14.0	418	0.760
May 27/04	299	276	597	---	8.30	8.24	---	13.1	16.5	15	58.7	37.1	19.1	5.8	---	---	ND	0.012	---	0.03	0.19	0.16	ND	0.3	ND	ND	4	---	0.7	313	0.480
Oct 18/04	292	306	592	510	7.92	7.71	---	8.8	18.2	13	58.1	35.8	18.1	5.6	---	---	ND	0.074	---	0.11	0.28	0.17	ND	0.3	ND	2	8	---	1.3	328	0.460
Jun 2/05	300	312	636	---	7.88	---	---	---	18.9	13	57.9	37.8	20.5	6.0	---	---	ND	0.007	---	0.01	0.22	0.21	ND	0.3	ND	ND	6	---	1.6	337	0.515
Aug 23/05	307	290	610	570	8.09	---	---	14.0	18.0	12	59.7	38.5	19.5	9.3	---	---	3.83	0.090	---	0.09	0.48	0.39	ND	0.2	ND	ND	22	---	7.3	327	0.483
Nov 28/05	296	315	640	990	---	8.71	---	10.9	18.4	11	57.3	37.2	24.6	6.9	---	---	0.009	0.003	---	0.03	0.71	0.68	ND	0.2	ND	ND	ND	---	2.7	339	0.622
Apr 6/06	335	324	838	770	7.92	7.56	---	6.2	78.0	34	66.7	40.9	29.8	5.9	---	---	ND	0.006	---	ND	0.44	0.44	ND	0.2	ND	ND	ND	---	4.2	445	0.709
Jul 20/06	351	330	799	770	7.84	8.06	---	14.4	76.2	35	71.6	41.9	35.3	5.8	---	---	ND	0.016	---	ND	0.19	0.19	ND	0.4	ND	ND	6	---	4.1	460	0.821
Oct31/06	300	328	641	757	8.04	8.10	---	7.4	33.4	19	58.8	37.2	21.4	5.7	---	---	ND	0.005	---	ND	0.12	0.12	ND	0.3	ND	ND	ND	---	3.2	374	0.537
Apr 26/07	319	314	699	550	7.43	7.93	---	9.9	44.1	22	63.6	39.0	26.4	6.4	---	---	ND	0.004	--	ND	0.14	0.14	ND	0.3	ND	ND	ND	---	1.8	391	0.642
Jul 23/07	312	308	625	1,170	7.99	8.20	---	13.9	32.2	19	62.1	38.0	23.3	5.8	---	---	0.018	0.002	---	ND	0.09	0.09	ND	0.4	ND	ND	17	---	0.6	367	0.573
Oct 31/07	146	280	700	798	7.85	7.80	---	12.1	56.9	29	32.6	15.6	102	6.4	---	---	0.035	0.006	---	ND	ND	ND	ND	0.4	ND	ND	30	---	2.1	412	3.67
May 14/08	268	322	633	626	7.38	8.24	---	10.0	26.5	14	52.9	33.1	18.3	5.1	---	---	0.006	0.003	---	ND	0.13	0.13	ND	0.3	ND	ND	12	---	1.2	345	0.487
Aug 5/08	303	300	607	658	7.95	8.09	---	13.0	30.9	16	61.0	36.6	21.0	6.1	---	---	0.012	0.003	---	ND	0.09	0.09	ND	0.3	ND	ND	8	---	1.0	353	0.524
Oct.30/08	302	306	630	666	7.94	8.15	---	8.0	27.3	16	61.2	36.2	20.1	5.7	---	---	ND	0.019	---	0.04	0.15	0.11	ND	0.3	ND	ND	ND	---	1.3	351	0.503
May 19/09	320	299	689	639	7.78	8.45	---	9.1	31.5	17	62.6	39.7	21.8	5.9	0.087	0.137	0.021	0.002	---	ND	ND	ND	ND	0.2	ND	ND	12	0.9	0.9	359	0.531
Aug 4/09	307	303	648	710	7.55	7.19	---	11.7	29.9	17	59.1	38.7	18.9	5.6	0.081	0.129	0.011	0.014	---	ND	ND	ND	ND	0.3	ND	ND	ND	1.1	1.1	352	0.469
Oct 26/09	304	290	715	640	7.94	7.78	---	8.9	38.5	21	58.7	38.2	21.7	6.0	0.099	0.132	ND	0.013	---	ND	ND	ND	ND	0.3	ND	ND	5	1.0	1.0	358	0.542
Apr 26/10	328	312	660	650	8.23	7.74	---	9.8	30.0	14	64.5	40.6	20.0	5.9	0.103	0.147	0.006	0.011	---	0.02	ND	ND	ND	0.2	ND	4	ND	0.9	---	363	0.480
Nov 29/10	269	310	682	671	8.19	8.09	---	9.1	30.1	13	50.5	34.6	16.0	4.9	0.076	0.145	0.037	0.030	---	ND	0.05	0.05	ND	0.3	ND	3	ND	1.2	---	336	0.424
Apr 25/11	313	306	688	635	8.32	7.70	---	10.1	38.8	19	61.1	39.1	21.8	5.0	0.094	0.142	0.015	0.006	---	ND	0.11	0.11	ND	0.2	ND	ND	ND	2.2	---	370	0.536
Nov 3/11	291	305	757	727	7.98	7.71	43	9.0	46.4	21	69.5	43.6	27.3	6.2	0.127	0.177	0.024	0.013	---	ND	0.12	0.12	ND	0.4	ND	ND	16	1.0	---	399	0.632
Apr 25/12	316	301	699	655	8.15	8.02	88	8.2	37.5	17	61.4	39.6	20.6	5.6	0.094	0.120	ND	0.002	----	ND	ND	ND	ND	0.3	ND	ND	22	1.1	---	364	0.503
Oct 30/12	359	306	663	698	8.18	7.89	---	11.9	37.6	15	70.5	44.5	22.1	6.6	0.121	0.162	ND	0.018	---	ND	ND	ND	ND	0.3	ND	ND	ND	1.5	---	381	0.508
Apr 23/13	343	315	732	823	8.14	7.63	18	10.3	46.5	20	68.3	42.0	27.0	5.4	0.124	0.158	0.086	0.032	---	ND	0.15	0.15	ND	0.2	ND	ND	ND	2.2	---	399	0.634
Oct 29/13	335	308	650	826	8.12	7.45	85	8.3	39.5	15	67.9	40.3	23.4	5.8	0.119	0.135	ND	0.014	---	ND	0.11	0.11	ND	0.3	ND	ND	ND	3.5	---	378	0.557
May 29/14	380	308	822	617	8.30	8.22	-12	10.5	69.0	33	80.9	43.2	42.2	5.6	0.144	0.126	ND	0.004	---	ND	0.09	0.09	ND	0.3	ND	ND	20	3.4	---	460	0.943
Oct 1/14	347	288	738	584	8.02	7.69	74	12.0	50.4	25	70.0	41.9	30.2	5.9	0.129	0.150	ND	0.021	---	ND	0.08	0.08	ND	0.3	ND	ND	ND	2.6	---	397	0.705
May 6/15	334	295	740	948	8.19	7.60	106	11.8	45.3	20	63.5	42.6	22.3	5.8	0.106	0.152	0.012	0.002	---	ND	0.20	0.20	ND	0.1	ND	ND	ND	3.1	---	377	0.531
Oct 8/15	319	302	678	919	7.96	8.03	163	10.1	42.9	20	61.8	40.1	21.7	5.4	0.104	0.153	ND	0.019	---	0.07	0.16	0.09	ND	ND	ND	ND	ND	2.7	---	373	0.528
Apr 26/16	358	326	705	953	8.16	7.59	-56	7.0	48.8	23	70.2	44.4	27.1	6.0	0.117	0.152	ND	0.005	---	0.02	0.11	0.09	ND	ND	ND	ND	ND	2.8	---	415	0.622
Oct 11/16	304	307	668	642	8.19	7.93	-1	11.3	41.6	16	58.5	38.5	23.2	5.1	0.097	0.109	ND	0.046	---	ND	0.17	0.17	ND	0.2	ND	ND	ND	1.6	---	367	0.577
Apr 18/17	355	294	742	486.7	8.18	7.65	122.9	6.8	41.6	20	71.4	42.9	21.8	5.7	0.131	0.175	<0.005	0.006	---	<0.01	0.35	0.35	<0.1	0.3	<0.001	<3	7	4.0	---	380	0.503
Nov 1/17	340	301	677	519	8.27	7.74	-57	9.8	34.9	13	63.6	44.1	22.7	6.2	0.113	0.161	<0.005	0.073	---	0.02	0.3	0.28	<0.1	0.3	<0.001	<3	<5	12.2	---	366	0.535
May 24/18	348	290	696	670	8.30	7.76	15	10.1	50.4	17	68.3	43.1	29.8	5.9	0.118	0.148	<0.005	0.008	---	0.03	0.2	0.17	<0.05	0.12	<0.001	<3	10	2.2	---	388	0.695
Oct 25/18	328	281	689	418.2	8.08	7.97	128.5	8.3	41.6	15	63.0	41.4	21.7	5.9	0.119	0.161	<0.005	0.037	---	0.14	0.2	0.06	<0.05	<0.05	<0.002	<3	<5	3.2	---	358	0.522
Apr 29/19	333	271	696	490.9	8.23	7.78	62	8	41.4	17	63.2	42.6	21.7	5.6	0.102	0.152	<0.005	0.002	---	0.01	0.2	0.19	<0.05	0.07	<0.002	<3	<5	2.2	---	355	0.517
Oct 22/19	352	270	677	699	8.17	8.17	-0.7	10.5	41.8	15	65.2	45.9	23.5	6.7	0.118	0.176	<0.005	0.056	---	0.23	0.3	0.07	<0.05	0.20	<0.001	<3	<5	2.2	---	361	0.545
Mar 31/20	343	275	702	474.9	8.07	8.27	97	6.2	48.8	21	68.1	42.1	21.2	5.6	0.113	0.15	0.009	0.001	---	0.07	0.2	0.13	<0.05	0.19	<0.002	<3	5	2.5	---	371	0.498
Dec 2/20	356	263	690	512	8.14	7.18	17.8	8	46.1	16	66.8	46.1	24.2	6.4	0.122	0.165	0.018	0.031	---	0.12	0.3	0.18	<0.05	0.14	<0.002	<3	<5	2.4	---	364	0.558
May 25/21	328	281	686	578	8.46	8.16	88.1	10.3	46.4	17	61.6	42.4	22.2	5.8	0.106	0.145	0.035	0.037	---	0.05	1.6	1.55	0.10	0.23	<0.002	<3	24	2.0	---	364	0.533
Oct 4/21	357	322	856	583	7.97	7.92	70.6	10.7	63.9	36	69.1	45.0	25.7	6.4	0.133	0.159	<0.005	0.023	---	0.05	0.3	0.25	<0.05	<0.05	<0.002	<3	7	2.4	---	440	0.592

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3b: Shallow Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
00-4s																															
Dec 6/00	307	276	630	830	7.44	8.30	---	6.0	13.3	44.1	79.8	26.1	8.5	1.3	---	---	ND	0.033	0.02	ND	0.15	0.15	ND	ND	ND	ND	129	---	ND	339	0.210
May 3/01	Damaged																														
Apr 17/02	346	268	656	340	7.59	7.00	---	10.1	16.3	55.5	90.2	29.2	10.3	1.5	---	---	ND	0.014	---	ND	0.05	0.05	ND	0.7	ND	ND	21	---	1.0	367	0.240
Nov 12/02	372	255	552	570	7.95	7.90	---	11.1	20.1	56	100	29.7	9.7	1.5	---	---	0.48	0.040	---	ND	0.05	0.05	ND	0.3	ND	ND	57	---	0.8	372	0.220
Jun 5/03	335	267	563	620	7.90	8.00	---	10.5	16.8	64	90.4	26.5	10.4	1.5	---	---	0.16	0.010	---	0.15	0.15	0.00	ND	0.3	ND	ND	4	---	1.4	372	0.250
Oct 16/03	355	276	651	800	8.07	7.90	---	7.0	24.7	61	94.2	29.0	10.6	1.5	---	---	0.026	0.014	---	0.02	0.07	0.05	ND	0.4	ND	ND	8	---	13.0	387	0.240
May 27/04	349	240	624	---	8.01	7.72	---	11.6	12.8	68	92.8	28.3	7.4	1.4	---	---	ND	0.011	---	ND	1.62	1.62	ND	0.5	ND	ND	4	---	0.9	356	0.170
Oct 18/04	356	260	656	670	7.54	7.21	---	9.4	21.3	68	96.1	28.2	8.4	1.3	---	---	ND	0.011	---	ND	0.06	0.01	ND	0.5	ND	2	2	---	0.5	383	0.193
Jun 2/05	341	258	644	---	7.27	---	---	---	15.1	69	90.3	28.1	7.2	1.2	---	---	ND	0.010	---	ND	0.09	0.09	ND	1.2	ND	ND	ND	---	0.8	370	0.170
Aug 24/05	369	268	657	610	7.30	7.47	---	14.9	17.4	73	99.8	29.2	9.8	2.1	---	---	0.012	0.013	---	ND	0.07	0.07	ND	1.1	ND	ND	ND	---	2.3	394	0.220
Nov 28/05	358	270	682	820	---	7.84	---	9.9	12.4	66	95.3	29.0	9.1	1.7	---	---	0.008	0.010	---	ND	0.07	0.07	ND	0.7	ND	ND	ND	---	0.9	377	0.210
Apr 13/06	316	262	631	520	7.55	7.54	---	10.1	13.0	65	83.0	26.4	11.4	1.4	---	---	0.055	0.010	---	ND	0.06	0.06	ND	0.6	ND	ND	ND	---	1.1	359	0.278
Aug 4/06	326	218	446	600	7.50	7.83	---	13.3	10.1	69	90.6	24.2	6.2	1.2	---	---	ND	ND	---	0.01	ND	0.01	ND	0.6	ND	ND	5	---	4.9	334	0.148
Oct31/06	335	274	617	732	7.78	7.70	---	7.9	12.6	66	88.7	27.5	7.8	1.2	---	---	ND	0.012	---	ND	0.13	0.13	ND	0.3	ND	ND	ND	---	2.1	370	0.186
Apr 25/07	329	280	579	580	7.53	7.51	---	10.7	9.0	62	87.7	26.6	6.6	1.3	---	---	ND	0.027	---	ND	0.19	0.19	ND	0.4	ND	ND	5	---	0.9	363	0.159
Jul 23/07	351	270	600	578	7.75	7.31	---	17.7	7.1	64	96.2	27.0	5.7	1.3	---	---	ND	0.014	---	ND	ND	ND	ND	0.8	ND	ND	16	---	<0.5	366	0.132
Oct 31/07	10	260	547	660	8.01	7.64	---	11.6	10.2	64	2.63	0.86	142	3.2	---	---	0.105	0.178	---	ND	ND	ND	ND	0.2	ND	ND	26	---	2.0	380	19.5
May 14/08	273	264	523	572	7.41	7.50	---	11.5	9.0	55	72.9	22.2	5.8	1.0	---	---	ND	0.009	---	ND	0.07	0.07	ND	0.8	ND	ND	ND	---	0.8	328	0.153
Aug 5/08	314	260	619	570	7.67	7.79	---	11.1	8.8	53	85.3	24.5	5.2	1.4	---	---	ND	0.014	---	ND	ND	ND	ND	0.3	ND	ND	5	---	0.7	333	0.127
Oct.30/08	339	280	619	601	7.79	7.83	---	9.0	11.3	56	93.1	25.9	5.0	1.1	---	---	ND	0.024	---	0.02	0.31	0.29	ND	0.2	ND	ND	ND	---	0.9	359	0.118
May 14/09	319	237	631	596	7.69	8.18	---	9.5	9.0	54	84.4	26.2	6.4	1.2	0.095	0.026	0.016	0.019	---	ND	ND	ND	ND	0.6	ND	ND	ND	0.6	0.6	327	0.156
Aug 4/09	318	265	593	660	7.42	7.44	---	10.7	10.3	63	84.1	26.1	6.0	1.1	0.090	0.024	0.022	0.035	---	ND	0.07	0.07	ND	0.5	ND	ND	ND	0.8	0.8	351	0.147
Oct 28/09	334	240	660	610	7.51	7.02	---	9.6	11.6	65	90.4	26.1	4.9	1.1	0.103	0.013	0.009	0.016	---	ND	ND	ND	ND	0.3	ND	ND	ND	0.6	0.6	346	0.116
Apr 26/10	348	269	632	600	7.80	7.40	---	9.8	11.1	57	93.2	27.9	7.7	1.3	0.120	0.031	<0.005	0.021	---	ND	ND	ND	ND	0.8	ND	ND	ND	0.5	---	364	0.180
Nov 22/10	---	---	---	569	---	7.44	---	8.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Apr 25/11	282	263	606	575	7.93	7.28		9.5	9.9	55	75.4	22.7	9.6	1.2	0.096	0.04	0.034	0.019	---	ND	0.37	0.37	ND	1.3	ND	ND	6	0.7	---	338	0.248
Nov 2/11	NS																														
Apr 25/12	325	269	629	596	7.91	7.88	102	10.0	10.1	55	86.7	26.4	5.5	1.1	0.095	0.010	ND	0.006	---	ND	ND	ND	ND	1.1	ND	ND	29	0.5	---	351	0.133
Oct 29/12	NS																														
Apr 23/13	346	270	619	682	7.95	7.48	-39	14.2	9.4	57	92.6	27.9	6.9	1.2	0.126	0.035	0.237	0.037	---	ND	0.11	0.11	ND	1.3	ND	ND	ND	2.0	---	363	0.161
May 29/14	327	237	582	615	8.13	7.43	130	10.1	8.5	58	88.5	25.9	6.5	1.2	0.109	0.026	ND	0.007	---	ND	0.24	0.24	ND	2.3	ND	ND	28	6.2	---	341	0.155
May 6/15	357	257	583	590	8.02	7.24	165	13.4	9.9	59	95.2	29.0	7.6	1.3	0.115	0.032	0.026	0.005	---	ND	0.40	0.40	ND	1.6	ND	ND	ND	4.2	---	363	0.174
Apr 27/16	339	270	595	847	8.00	7.42	214	11.0	8.9	53	90.9	27.2	6.4	1.2	0.107	ND	ND	0.002	---	0.01	0.10	0.09	ND	1.9	ND	ND	8	1.2	---	358	0.152
Apr 17/17	332	269	613	395	8.07	7.45	97.2	6.4	9.2	53	89.6	26.2	14.5	0.9	0.122	0.033	ND	0.013	---	ND	0.29	0.29	ND	0.8	ND	ND	5	8.1	---	357	0.346
May 22/18	284	267	607	443	8.21	7.54	82.7	10.1	9.2	51	72.0	25.3	45.0	0.9	0.089	0.032	0.021	0.011	---	0.15	0.40	0.25	ND	1.13	ND	ND	18	5.9	---	364	1.160
Apr 29/19	332	264	616	452	8.09	7.27	75.3	10.3	9.3	50	87.9	27.4	9.7	1.2	0.097	0.032	<0.005	0.029	---	0.06	0.20	0.14	<0.05	0.44	<0.002	<3	9	3.9	---	344	0.232
Apr 7/20	340	259	620	456	7.98	7.24	36.9	10.6	9.9	53	90.1	27.9	7.3	1.1	0.111	0.027	<0.005	0.008	---	0.02	0.20	0.18	<0.05	0.30	<0.002	<3	17	6.0	---	344	0.172
May 26/21	342	232	576	500	8.14	7.19	-29.5	10.6	11.0	53	89.6	28.8	6.6	1.1	0.103	0.021	0.047	0.004	---	0.01	0.30	0.29	<0.05	1.47	0.001	<3	<5	2.1	---	330	0.155

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3b: Shallow Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
06-1s																															
Apr 13/06	219	248	530	830	7.65	7.62	---	7.9	18.6	31	67.9	12.1	22.7	1.1	---	---	ND	0.033	---	ND	8.24	8.24	ND	0.1	ND	11	334	---	34.3	302	0.666
Jul 24/06	414	392	937	1,010	7.13	7.88	---	13.7	26.0	121	112	32.5	37.7	2.3	---	---	ND	0.036		0.03	3.66	3.63	ND	0.3	ND	9	323	---	36.0	566	0.805
Oct 31/06	379	374	725	861	7.45	7.43	---	9.7	10.4	57	116	21.9	18.3	0.7	---	---	0.007	0.013	---	0.03	1.65	1.62	ND	ND	ND	ND	63	---	20.0	449	0.410
Apr 26/07	370	340	732	617	7.41	7.48	---	9.8	8.0	45	115	20.3	12.8	0.8	---	---	0.015	0.003	---	ND	0.78	0.78	ND	0.2	ND	ND	ND	---	33.0	406	0.289
Jul 19/07	431	370	856	836	7.64	7.12	---	12.0	18.1	87	120	32.0	21.6	2.1	---	---	0.242	0.041	---	ND	1.63	1.63	ND	0.3	ND	ND	58	---	1.3	504	0.452
Nov 1/07	407	357	784	761	7.47	7.50	---	9.1	7.7	69	125	23.2	14.1	0.7	---	---	0.077	0.006	---	ND	0.26	0.26	ND	0.2	ND	ND	ND	---	3.1	455	0.304
May 14/08	352	298	661	700	7.82	7.71	---	8.6	12.7	68	100	24.5	16.8	1.3	---	---	0.035	0.011	---	ND	0.42	0.42	ND	0.2	ND	ND	38	---	1.1	404	0.389
Aug 5/08	466	426	940	888	7.70	7.34	---	10.4	17.0	97	125	37.1	23.1	2.0	---	---	0.007	0.027	---	ND	0.21	0.21	ND	0.1	ND	ND	ND	---	1.2	558	0.466
Oct 30/08	332	318	682	698	8.07	7.86	---	8.3	20.0	47	93.6	23.9	23.6	1.8	---	---	ND	0.010	---	ND	0.34	0.33	ND	0.5	ND	ND	14	---	1.1	402	0.564
May 19/09	305	251	560	524	7.52	7.88	---	7.8	4.0	32	93.3	17.4	7.9	0.5	0.036	0.005	0.040	0.016	---	0.01	0.35	0.34	ND	0.1	ND	ND	166	1.1	1.1	306	0.196
Aug 5/09	489	424	924	1,000	7.45	6.95	---	10.0	16.4	99	127	41.9	16.2	2.2	0.178	0.021	0.195	0.068	---	ND	ND	ND	ND	0.1	ND	ND	ND	1.4	1.4	558	0.319
Nov 3/09	510	412	986	820	7.69	7.44	---	9.8	20.2	96	140	38.8	25.9	2.3	0.135	0.021	0.023	0.026	---	ND	0.18	0.18	ND	0.1	ND	ND	9	1.0	1.0	571	0.499
Apr 28/10	353	311	633	638	7.73	7.33	---	7.9	3.5	36	108	20.0	8.8	0.3	0.049	ND	0.021	0.012	---	ND	0.22	0.22	ND	0.1	ND	ND	9	1.4	---	365	0.203
Nov 29/10	387	419	789	817	7.55	7.10	---	9.4	6.7	49	114	24.8	9.3	0.8	0.059	0.007	0.063	0.004	---	ND	0.12	0.12	ND	0.2	ND	3	ND	1.3	---	458	0.206
Ap 26/11	259	291	568	571	7.73	7.31	---	5.6	2.8	17	79.4	14.7	5.8	0.3	0.038	ND	0.093	0.007	---	ND	0.29	0.29	ND	ND	ND	ND	17	1.4	---	295	0.157
Nov 3/11	300	371	821	767	8.09	7.07	30	11.6	12.5	63	111	35.7	11.9	1.6	0.089	0.025	0.130	ND	---	ND	0.22	0.22	ND	0.3	ND	ND	49	0.5	---	460	0.251
Apr 26/12	296	266	563	587	8.12	7.26	189	6.8	2.4	21	89.9	17.4	6.5	0.4	0.040	ND	0.022	ND	---	ND	0.10	0.10	ND	ND	ND	ND	6	1.8	---	297	0.165
Oct 29/12	376	341	692	1,061	7.72	7.40	-63	10.5	9.7	46	109	25.2	9.3	1.0	0.082	0.010	0.012	0.001	---	ND	0.16	0.16	ND	ND	ND	ND	ND	4.4	---	406	0.209
May 8/13	281	286	543	536	7.74	7.24	-122	10.9	1.8	15	84.5	17.0	6.1	0.5	0.046	ND	0.011	0.002	---	ND	ND	ND	ND	ND	ND	ND	15	1.5	---	297	0.158
Oct 29/13	413	441	691	944	7.40	7.55	-7	9.7	3.5	25	122	25.9	10.7	1.4	0.090	ND	0.015	ND	---	ND	0.14	0.14	ND	ND	ND	ND	ND	3.4	---	454	0.229
May 29/14	344	308	616	415	8.17	7.25	12	7.8	5.1	17	103	21.2	7.8	0.8	0.060	ND	ND	0.002	---	ND	0.12	0.12	ND	ND	ND	ND	25	3.1	---	339	0.182
Oct 1/14	476	377	780	1,168	7.93	7.41	105	14.5	9.5	60	129	37.4	24.6	2.2	0.126	0.027	ND	0.087	---	ND	0.70	0.70	ND	0.1	ND	ND	10	6.6	---	490	0.490
May 12/15	345	292	580	3,468	8.16	7.72	182	6.4	2.8	18	105	20.4	6.7	0.6	0.055	ND	0.012	ND	---	ND	0.50	0.50	ND	0.1	ND	ND	ND	0.8	---	328	0.157
Oct 13/15	468	355	700	839	7.82	7.48	194	12.3	11.1	48	125	37.9	13.4	2.0	0.121	0.023	0.031	0.017	---	ND	0.19	0.19	ND	0.2	ND	ND	14	2.7	---	451	0.270
Apr 27/16	316	312	607	853	7.95	7.48	61	10.4	7.0	27	91.1	21.4	6.9	0.7	0.052	ND	0.006	0.010	---	0.03	0.30	0.27	ND	1.1	ND	ND	20	1.5	---	346	0.169
Oct 12/16	Not enough to sample																					0.00									
Apr 19/17	278	260	524	654	7.91	7.42	26	6.9	3.2	14	84.4	16.4	5.9	0.4	0.047	0.006	ND	ND	---	ND	0.38	0.38	0.3	0.5	ND	ND	ND	4.9	---	283	0.153
Nov 1/17	384	335	693	491	7.94	7.20	43	10.3	6.6	22	114	24.2	8.2	0.8	0.082	0.009	0.007	0.004	---	ND	0.3	0.30	ND	1.3	ND	ND	14	11.2	---	383	0.183
May 28/18	361	365	640	299	7.73	7.66	135	11.2	4.6	27	102	25.7	8.1	0.8	0.074	ND	ND	ND	---	0.02	0.5	0.48	ND	0.25	ND	ND	6	29.0	---	388	0.186
Oct 24/18	Not enough to sample																														
May 1/19	214	206	505	676	7.94	7.77	39	5.9	3.8	10	65	12.5	5.6	0.4	0.031	0.005	<0.005	0.002	---	0.11	0.2	0.09	<0.05	0.99	<0.002	<3	6	1.0	---	221	0.167
Oct 21/19	347	298	644	515	7.94	7.26	71	11.0	11.9	32	102	22.3	7.5	0.6	0.068	0.008	<0.005	<0.001	---	0.02	0.2	0.18	<0.05	2.23	<0.002	<3	<5	4.8	---	355	0.175
Apr 1/20	255	214	502	350	7.96	7.66	47	6.5	12.3	16	75	16.1	5.5	0.6	0.038	0.007	<0.005	<0.001	---	0.01	0.5	0.49	0.37	4.97	0.004	<3	<5	1.2	---	254	0.15
Dec 2/20	397	312	685	1,168	7.88	6.75	18	8.1	5.5	26	117	25.5	8.5	0.8	0.074	0.006	0.005	0.001	---	0.02	0.2	0.18	<0.05	<0.05	<0.002	<3	<5	2.7	---	371	0.186
May 25/21	363	288	610	---	8.07	---	---	---	5.0	32	101	26.9	8.1	1.2	0.083	0.006	0.019	0.009	---	0.04	3.1	3.06	0.08	0.19	<0.002	<3	89	5.3	---	347	0.186
Oct 4/21	398	283	716	584	7.59	7.14	116	11.3	16.0	41	116	26.5	8.8	1.1	0.084	0.012	0.087	0.006	---	0.03	1.2	1.17	<0.05	5.34	<0.002	<3	25	3.4	---	379	0.193

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3b: Shallow Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
06-2s																															
Apr 6/06	305	248	589	540	7.75	7.66	---	5.6	9.4	69	81.3	24.8	31.1	2.5	---	---	0.018	0.031	---	0.06	1.18	1.12	ND	0.3	ND	5	63	---	20.1	367	0.775
Jul 20/06	260	---	---	---	---	---	---	---	---	30	81.0	14.1	---	0.5	---	---	0.050	0.210	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct 31/06	Not Sampled - Not enough to sample																														
Apr 25/07	213	195	512	486	7.64	7.69	---	8.7	2.6	88	57.8	16.7	23.7	1.3	---	---	0.007	0.006	---	ND	0.89	0.89	ND	ND	ND	ND	26	---	4.5	308	0.706
Jul 18/07	Dry																														
Oct 31/07	Not enough to sample																														
May 14/08	Not enough to sample																														
Aug 5/08	Dry																														
Oct.30/08	Dry																														
May 14/09	Not enough to sample																														
Aug 5/09	Dry																														
Oct 26/09	Dry																														
Apr 26/10	Dry																														
Nov 22/10	---	---	---	570	---	7.10	---	8.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Apr 25/11	190	195	404	439	8.06	7.00	---	5.8	1.6	34	53.5	13.7	14.9	0.8	0.022	0.008	0.257	0.011	---	ND	0.49	0.49	ND	0.10	ND	ND	19	5.3		236	0.471
Nov 1/11	NS																														
Apr 26/12	Dry																														
Apr 23/13	352	307	644	640	7.90	7.46	-106	7.8	5.0	55	97.0	26.7	16.1	0.5	0.033	0.013	0.029	0.023	---	ND	0.23	0.23	ND	0.20	ND	4	11	29.4	---	385	0.372
May 28/14	Not enough to sample																														
May 7/15	Dry																														
April 27/16	Dry																														
April 17/17	220	215	386	503	8.01	7.59	62	6.0	1.8	22	61.4	16.3	8.8	0.3	0.016	ND	ND	0.001	---	ND	0.88	0.88	ND	0.6	<0.001	ND	22	4.4	---	242	0.259
May 22/18	Dry																														
Apr 29/19	190	202	428	281	8.20	7.72	96	6.1	1.3	17	49.7	15.9	25.9	0.5	0.025	0.005	0.016	0.016	---	0.04	0.40	0.40	<0.05	<0.05	<0.002	<3	13	3.6	---	231	0.818
Mar 31/20	255	224	503	160	7.92	7.66	35	4.2	2.5	25	69.6	19.8	17.6	0.3	0.030	<0.005	0.005	<0.001	---	<0.01	0.30	0.30	<0.05	1.9	<0.002	<3	7	5.9	---	269	0.479
May 25/21	Dry																														

🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3c: Deep Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
96-2d																															
Aug 12/96	439	327	812	830	---	7.10	---	10.7	54.0	24.5	108	41.0	16.7	2.2	0.28	---	0.64	0.040	0.60	0.16	0.49	0.33	ND	ND	ND	25	394	---	131	443	0.350
Oct 8/96	323	272	620	619	---	7.77	---	---	12.0	17.7	90.3	23.7	7.1	ND	---	---	ND	0.015	2.60	0.01	0.32	0.31	ND	ND	ND	2	21	---	9.0	314	0.170
Apr 24/97	296	282	672	638	7.36	7.25	---	---	23.9	22.7	75.3	26.3	9.0	ND	0.16	0.02	0.16	0.037	2.61	0.01	0.25	0.24	ND	ND	ND	2	42	---	27.0	327	0.230
Nov. 4/97	299	277	574	585	7.40	7.91	---	---	6.5	23.6	88.0	19.3	10.3	ND	---	---	0.03	0.006	0.02	ND	0.13	0.13	ND	ND	ND	2	66	---	ND	314	0.260
May 7/98	283	259	531	489	7.24	7.54	---	8.2	6.0	17.5	85.6	16.8	7.2	ND	---	---	0.06	ND	0.97	ND	0.05	0.05	ND	ND	ND	4	20	---	10.0	289	0.190
Oct 8/98	299	268	590	450	7.20	7.34	---	13.3	6.6	15.3	90.1	18.0	5.7	ND	---	---	0.01	0.005	1.56	ND	0.08	0.08	ND	ND	ND	1	6	---	2.0	297	0.140
Apr 21/99	274	261	531	470	---	7.39	---	7.9	4.4	12.7	84.8	15.2	5.0	1.8	---	---	0.01	0.067	4.99	0.01	0.15	0.14	ND	ND	ND	3	93	---	38.0	281	0.130
Oct 18/99	390	344	761	682	7.28	7.53	---	11.3	34.6	37.7	107	29.9	12.6	1.7	---	---	ND	ND	1.15	0.40	0.45	0.05	ND	ND	ND	ND	17	---	5.0	430	0.280
Jan 25/00	---	---	593	569	---	---	---	5.2	3.4	---	---	---	4.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	354	---
May 1/00	314	298	688	671	7.13	7.50	---	7.3	21.9	28.3	73.6	31.6	10.4	1.2	0.05	---	ND	0.017	3.41	0.40	1.85	1.45	ND	ND	ND	4	39	---	---	346	0.260
Oct 23/00	324	314	595	480	7.45	7.70	---	11.0	3.8	18.1	95.7	20.7	4.9	ND	---	---	ND	0.048	0.24	0.01	0.46	0.45	ND	ND	ND	12	60	---	29.0	332	0.120
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	356	289	748	390	---	8.20	---	9.9	25.9	34.3	95.0	28.9	11.9	1.3	---	---	0.02	0.010	1.62	0.42	0.94	0.52	ND	0.7	ND	4	16	---	2.0	374	0.270
Oct 24/01	603	448	1,216	1,090	7.44	7.60	---	12.1	97.9	56.4	137	63.5	34.3	9.2	0.07	---	6.57	0.842	2.10	6.49	8.94	2.45	ND	0.7	ND	8	23	---	5.0	679	0.610
Apr 17/02	256	240	523	280	7.32	6.70	---	9.2	2.6	36.0	82.5	12.2	17.7	ND	---	---	ND	ND	---	ND	0.10	0.10	ND	ND	0.001	ND	12	---	1.0	295	0.480
Nov 11/02	599	447	1,020	1,030	7.82	7.40	---	11.6	108	74	136	62.9	41.4	7.9	---	---	2.56	0.050	---	7.76	8.13	0.37	ND	0.2	ND	2	18	---	6.3	712	0.740
Jun 3/03	301	272	585	500	7.47	7.70	---	10.5	6.0	36	98.0	13.6	11.7	0.6	---	---	0.09	ND	---	0.09	0.81	0.72	ND	0.3	ND	ND	19	---	2.3	330	0.290
Oct 16/03	547	408	1,160	1,050	7.44	7.20	---	11.2	90.7	81	128	55.2	38.4	7.5	---	---	0.152	0.063	---	6.39	9.93	3.54	ND	0.2	ND	1	16	---	13.0	655	0.710
May 27/04	302	258	526	---	7.77	7.37	---	11.3	2.8	23	98.0	14.0	6.9	0.4	---	---	ND	0.002	---	ND	0.31	0.31	ND	0.2	ND	ND	7	---	1.7	301	0.170
Oct 14/04	340	336	681	570	7.46	6.84	---	11.2	9.3	35	105	18.7	5.9	0.7	---	---	0.014	0.002	---	0.12	0.33	0.21	0.1	0.4	ND	ND	3	---	1.4	379	0.139
Jun 1/05	304	258	558	510	---	7.02	---	12.0	3.3	19	92.8	17.7	9.4	0.9	---	---	0.005	0.009	---	0.03	0.26	0.23	ND	0.2	ND	ND	ND	---	2.5	297	0.235
Aug 23/05	609	499	1,300	1,170	7.26	---	---	12.2	109	69	143	61.5	48.3	10.9	---	---	1.80	0.054	---	7.93	8.54	0.61	ND	0.2	ND	ND	24	---	13.7	743	0.852
Nov 28/05	337	288	631	450	---	7.51	---	7.1	5.4	30	105	18.1	11.0	1.2	---	---	ND	0.009	---	0.05	0.29	0.24	0.1	0.3	ND	ND	12	---	1.8	345	0.260
Apr 6/06	261	224	423	370	7.79	7.64	---	5.9	1.9	13	83.1	13.0	6.9	0.7	---	---	ND	ND	---	ND	0.12	0.12	ND	0.1	ND	ND	ND	---	1.3	253	0.185
Jul 20/06	328	340	650	630	7.46	7.46	---	13.8	9.7	20	103	17.3	6.1	0.7	---	---	0.014	0.007	---	0.35	0.53	0.18	0.1	0.2	ND	ND	6	---	5.2	361	0.146
Oct 31/06	310	302	547	655	7.60	7.42	---	8.2	2.7	23	98.7	15.4	5.5	0.5	---	---	ND	ND	---	ND	0.14	0.14	ND	0.1	ND	ND	26	---	1.9	328	0.136
Apr 25/07	262	256	453	390	7.21	7.62	---	9.0	1.2	11	84.3	12.3	4.2	0.5	---	---	ND	ND	---	ND	0.14	0.14	ND	ND	ND	ND	5	---	1.6	267	0.114
Jul 18/07	350	362	690	682	7.44	7.10	---	13.2	18.9	32	105	21.5	7.9	1.1	---	---	0.106	0.018	---	0.97	1.22	0.25	0.1	0.2	ND	ND	ND	---	2.2	406	0.183
Oct 31/07	290	298	564	620	7.82	7.39	---	11.5	3.0	21	73.0	26.1	5.5	5.7	---	---	0.393	0.058	---	ND	0.21	0.21	ND	0.1	ND	ND	32	---	1.6	314	0.140
May 14/08	223	246	457	470	7.09	7.58	---	8.0	2.4	13	70.7	11.3	3.9	0.3	---	---	0.02	0.002	---	0.1	0.18	0.08	ND	0.1	ND	ND	12	---	1.2	250	0.112
Aug 5/08	304	330	627	570	7.81	8.09	---	11.6	3.5	13	92.9	17.5	6.3	2.7	---	---	0.029	0.026	---	0.15	0.29	0.14	ND	0.4	ND	ND	ND	---	1.0	336	0.158
Oct.30/08	442	444	936	920	7.85	6.71	---	9.1	45.1	54	127.0	30.4	18.3	3.1	---	---	0.316	0.037	---	2.11	2.60	0.49	ND	1.4	ND	ND	9	---	2.8	553	0.379
May 19/09	253	244	482	427	7.75	7.25	---	10.1	2.2	12	81.5	12.1	4.8	0.5	0.029	---	0.016	0.003	---	ND	0.41	0.41	ND	0.1	ND	ND	8	1.4	1.4	260	0.132
Aug 4/09	311	317	583	1,150	7.17	7.03	---	10.6	2.7	13	97.5	16.3	4.2	0.6	0.042	ND	0.010	0.014	---	0.02	0.19	0.17	ND	0.1	ND	ND	ND	1.3	1.3	325	0.104
Oct 28/09	342	318	649	620	7.47	7.24	---	10.2	4.5	20	105	19.6	5.6	0.7	0.061	ND	0.026	0.004	---	0.07	0.2	0.13	ND	0.3	ND	ND	8	1.0	1.0	347	0.131
Apr 26/10	277	257	493	480	7.66	7.16	---	8.5	1.8	13	88.9	13.4	4.1	0.3	0.038	ND	0.023	0.005	---	0.02	0.05	0.03	ND	0.1	ND	ND	ND	1.2	---	277	0.106
Nov 25/10	322	317	612	547	7.43	7.19	---	8.6	2.1	13	103	15.9	4.1	0.4	0.042	ND	0.036	0.003	---	ND	ND	ND	ND	0.1	ND	ND	ND	1.4	---	328	0.0995
Apr 25/11	220	261	478	486	7.96	7.14	---	6.5	0.9	8	71.7	9.84	2.7	0.5	0.025	ND	0.042	0.004	---	ND	0.15	0.15	ND	ND	ND	ND	ND	1.3	---	250	0.0805
Nov 3/11	294	338	664	676	7.76	7.18	-33	11.2	3.0	13	111	21.5	5.2	0.7	0.071	0.031	0.026	ND	---	0.02	0.17	0.15	ND	0.2	ND	7	ND	1.0	---	358	0.119
Apr 25/12	271	264	531	532	7.80	8.57	76	8.7	1.5	13	86.1	13.6	3.9	0.3	0.034	ND	ND	ND	---	0.03	ND	ND	ND	0.2	ND	ND	28	1.3	---	277	0.102
Oct 30/12	389	336	650	697	7.74	7.44	---	12.4	8.1	21	116	23.9	9.8	1.4	0.089	0.009	0.023	0.005	---	0.06	0.24	0.18	0.2	0.7	ND	ND	14	1.4	---	386	0.217
Apr 23/13	241	228	429	492	7.89	6.86	43	7.9	2.0	10	78.5	11.0	3.6	0.2	0.033	ND	0.082	0.008	---	ND	0.11	0.11	ND	ND	ND	4	6	1.9	---	242	0.100
Oct 29/13	354	344	595	693	7.72	7.31	-2	10.5	2.5	13	112	18.0	5.7	0.6	0.059	ND	ND	0.002	---	ND	0.15	0.15	ND	0.1	ND	ND	ND	4.2	---	359	0.132
May 28/14	294	272	538	612	7.99	7.19	89	8.7	1.7	9	95.0	13.8	4.1	0.4	0.036	ND	ND	0.002	---	ND	0.18	0.18	ND	0.1	ND	ND	ND	2.7	---	287	0.105
Oct 1/14	339	336	666	652	7.97	7.21	-65	12.0	7.6	18	103	19.8	5.2	0.7	0.075	0.006	0.023	0.003	---	0.35	0.60	0.25	ND	ND	ND	ND	5	3.2	---	357	0.123
May 7/15	378	318	605	681	7.65	7.09	1	13.7	12.7	19	110	25.0	14.0	1.7	0.076	0.030	0.060	0.019	---	0.99	1.30	0.31	ND	0.1	ND	ND	7	1.7	---	375	0.313
Oct 8/15	491	474	1050	1,168	7.74	7.14	-56	-10.1	47.8	68	122	44.9	30.9	4.4	0.193	0.072	1.91	0.075	---	4.29	4.66	0.37	ND	ND	ND	ND	15	3.7	---	611	0.607
Apr 26/16	337	306	596	777	7.86	7.11	108	7.4	17.6	16	101	20.2	11.1	1.2	0.057	0.020	0.010	0.017	---	0.64	0.83	0.19	ND	ND	ND	ND	9	2.7	---	352	0.264
Oct 11/16	430	472	1,000	1,262	7.73	7.34	-65	8.8	45.0	61	110	37.5	25.9	3.4	0.167	0.036	1.14	0.074	---	4.50	5.02	0.52	ND	0.1	ND	ND	8	4.4	---	574	0.543
Apr 18/17	301	243	511	312.9	7.93	7.41	5.9	4.3	6.6	11	94.5	15.8	6.8	0.8	0.058	0.030	<0.005	0.010		0.20	0.66	0.46	0.3	0.3	<0.001	3	7	2.4		283	0.171
Nov 2/17	377	321	664	498.6	8.12	7.13	-109	11.5	7.1	13	113	22.9	10.6	1.2	0.073	0.025	0.008	0.027	---	0.41	0.7	0.29	0.3	0.1	<0.001	<3	8	6.3	---	362	0.238
May 24/18	335	362	704	537	7.99	7.05	19	11.8	16.1	18	101	20.0	11.0	1.0	0.057	0.023	0.036	0.076	---	1.23	1.4	0.17	<0.05	<0.05	<0.001	<3	14	24.7	---	386	0.262
Oct 25/18	610	527	1,340	1,170	7.80	6.95	-424	10.2	69.7	92	142	62.1	49.4	8.2	0.352	0.148	3.04	0.107	---	8.58	8.6	0.02	<0.05	<0.05	0.004	<3	10	7.7	---	753	0.870
May 1/19	282	259	553	352	7.90	7.20	-3.2	6.2	6.8	16	86.2	16.1	8.5	1.0	0.065	0.017	0.038	0.049	---	0.46	0.6	0.14	<0.05	0.12	<0.002	<3	6	4.0	---	290	0.221
Oct 21/19	591	519	1,340	1,041	7.78	6.77	-44.6	10.3	73.0	71	133	63.0	52.0	9.5	0.390	0.167	3.49	0.060	---	10.0	11.0	1.00	<0.05	0.15	<0.002	<3	14	10.4	---	729	0.930
Mar 31/20	375	311	719	480	7.73	7.12	68.7	6.4	23.0	26	109	24.9	14.9	2.0	0.095	0.041	0.066	0.047	---	2.1	2.3	0.19	<0.05	0.06	<0.002	<3	6	4.3	---	389	0.335
Dec 2/20	429	326	822	665	7.59	6.77	17.3	8.3	29.6	43	118	32.6	21.3	3.0	0.158	0.061	0.094	0.043	---	2.5	2.8	0.35	0.06	0.33	<0.002	<3	7	4.4	---	447	0.448
May 25/21	286	254	514	488	8.07	6.80	94.7	11.2	3.6	11	90.4	14.5	4.3	0.3	0.041	0.006	0.012	<0.001	---	0.0	0.2	0.16	0.07	0.23	<0.002	<3	<5	4.9	---	277	0.111
Oct 4/21	676	573	1,460	1,182	7.47	6.93	-23.7	11.6	97.9	67	148	74.5	63.7	11.9	0.497	0.232	4.4	0.099	---	12.8	13.2	0.40	<0.05	<0.05	<0.002	<3	25	7.8	---	827	1.070

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3c: Deep Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
97-3d																															
Apr 24/97	303	264	681	648	7.64	7.64	---	---	16.0	52.0	58.3	38.2	14.3	2.6	0.08	0.02	0.09	0.030	1.71	0.01	0.22	0.21	0.2	0.4	0.010	2	18	---	7.0	342	0.360
Nov. 4/97	347	285	667	646	7.55	7.94	---	---	12.6	52.2	66.0	44.4	16.4	4.8	0.09	0.03	0.04	0.069	9.87	0.02	0.33	0.31	ND	ND	ND	4	37	---	7.0	368	0.380
May 7/98	364	282	656	618	7.48	7.87	---	8.0	16.1	47.6	68.3	47.1	8.4	1.8	---	---	0.08	0.032	1.01	ND	0.09	0.09	ND	ND	ND	3	22	---	9.0	359	0.190
Oct 8/98	Damaged																														
Apr 21/99	396	333	832	805	---	7.46	---	7.5	40.2	63.6	80.7	47.2	38.1	1.6	---	---	0.01	0.129	1.82	ND	0.28	0.28	ND	ND	ND	7	312	---	28.0	471	0.830
Oct 18/99	414	344	835	756	7.38	7.53	---	11.7	34.6	68.9	87.3	47.7	9.7	2.2	---	---	ND	0.033	1.10	ND	1.13	1.13	ND	ND	ND	1	17	---	5.0	457	0.210
Jan 25/00	---	---	823	842	---	---	---	1.9	23.2	---	---	---	51.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	463	---
May 1/00	346	313	742	691	7.37	8.00	---	8.0	26.1	53.1	79.3	35.9	16.9	1.1	0.99	0.10	0.05	0.071	1.75	0.01	0.21	0.20	ND	ND	ND	6	53	---	6.0	400	0.400
Oct 23/00	360	335	805	470	7.51	7.80	---	11.6	26.4	60.4	69.0	45.6	49.0	2.89	---	---	ND	0.056	0.37	0.02	0.33	0.31	ND	ND	ND	2	12	---	6.0	454	1.12
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.74	0.10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	334	288	728	440	---	8.20	---	9.2	25.1	43.6	66.9	40.6	8.20	1.9	---	---	0.32	0.042	0.51	0.03	0.25	0.22	ND	ND	ND	ND	5	---	ND	360	0.200
Oct 29/01	311	318	745	620	7.61	7.60	---	11.1	25.7	50.2	59.2	39.6	24.9	2.4	0.05	0.03	0.85	0.077	0.68	0.02	0.24	0.22	ND	ND	ND	ND	9	---	3.0	394	0.610
Apr 17/02	383	309	741	390	7.32	7.10	---	10.0	25.1	46.9	73.6	48.4	17.9	2.3	---	---	0.08	0.093	---	ND	0.08	0.08	ND	ND	ND	ND	11	---	2.0	400	0.400
Nov 12/02	391	315	588	670	8.19	7.60	---	11.1	31.9	49	75.5	49.1	16.8	1.1	---	---	0.05	0.030	---	0.01	0.13	0.12	ND	ND	ND	ND	20	---	1.5	413	0.370
Jun 5/03	364	303	668	650	7.99	7.80	---	8.9	28.5	51	72.5	44.5	25.2	2.3	---	---	0.26	0.020	---	0.23	0.42	0.19	ND	ND	ND	ND	11	---	2.0	406	0.570
Oct 16/03	352	306	626	790	8.04	8.20	---	8.3	26.6	49	68.4	44.0	15.9	2.5	---	---	0.401	0.030	---	0.03	0.29	0.26	ND	0.1	ND	ND	23	---	5.0	388	0.370
May 27/04	393	297	710	670	7.98	7.49	---	9.3	31.3	48	77.8	48.4	12.6	2.1	---	---	0.042	0.057	---	0.01	0.15	0.14	ND	ND	ND	ND	ND	---	1.6	397	0.280
18-Oct-04	371	333	730	700	7.52	7.03	---	9.4	31.2	55	72.6	46.1	23.1	2.6	---	---	0.322	0.079	---	0.01	0.15	0.14	ND	0.1	ND	1	15	---	1.7	429	0.522
Jun 1/05	378	306	748	760	---	7.32	---	11.6	28.6	50	72.6	47.9	20.5	2.5	---	---	0.006	0.007	---	ND	0.29	0.29	ND	0.1	ND	ND	14	---	3.2	403	0.459
Aug 23/05	416	318	748	720	7.60	---	---	13.3	31.5	51	82.3	51.2	16.0	4.1	---	---	2.13	0.048	---	0.05	0.40	0.35	ND	0.1	ND	ND	12	---	8.3	426	0.340
Nov 28/05	423	334	800	610	---	7.91	---	7.7	26.6	48	83.1	52.4	20.0	2.9	---	---	ND	0.002	---	ND	0.40	0.40	ND	0.1	ND	ND	9	---	4.2	431	0.423
Apr 6/06	413	328	707	650	7.77	7.49	---	6.5	30.6	49	81.0	51.1	16.6	2.5	---	---	0.023	0.005	---	0.05	0.72	0.67	ND	ND	ND	ND	18	---	8.5	425	0.356
Jul 24/06	389	348	774	760	7.44	7.97	---	13.9	31.4	48	75.6	48.7	8.8	2.5	---	---	0.223	0.031	---	0.04	0.24	0.20	ND	0.1	ND	ND	6	---	6.1	423	0.194
Oct 30/06	384	344	716	847	7.61	7.41	---	8.2	29.8	49	76.0	47.2	13.1	2.5	---	---	0.047	0.030	---	ND	0.12	0.12	ND	0.2	ND	ND	ND	---	2.1	424	0.290
Apr 25/07	406	364	821	757	7.66	7.79	---	8.8	38.0	51	80.1	50.0	10.9	2.2	---	---	0.074	0.105	---	0.02	0.10	0.08	ND	0.1	ND	ND	ND	---	2.3	451	0.235
Jul 24/07	429	366	732	802	7.22	7.43	---	13.2	29.9	49	84.4	52.9	11.8	2.4	---	---	0.164	0.037	---	ND	0.16	0.16	ND	0.1	ND	ND	ND	---	1.0	450	0.248
Nov 1/07	410	333	709	610	7.68	7.57	---	10.5	26.8	48	81.0	50.4	11.1	2.5	---	---	0.230	0.027	---	ND	0.14	0.14	ND	0.1	ND	ND	ND	---	3.1	421	0.239
May 14/08	366	356	656	780	7.59	7.85	---	8.9	29.4	52	71.3	45.6	11.1	2.1	---	---	0.008	0.014	---	ND	0.28	0.28	ND	ND	ND	ND	693	---	1.6	425	0.253
Aug 5/08	418	375	740	770	7.69	7.43	---	11.7	29.6	51	83.3	51.1	12.8	2.5	---	---	ND	0.006	---	0.04	0.15	0.11	ND	0.2	ND	ND	ND	---	1.6	456	0.273
Oct.30/08	412	350	776	775	7.86	7.67	---	8.3	27.1	51	83.0	49.9	14.6	3.2	---	---	0.028	0.032	---	ND	0.18	0.18	ND	0.1	ND	ND	7	---	1.7	439	0.313
May 19/09	435	348	807	725	7.58	8.03	---	10.5	26.6	51	83.9	54.9	13.5	2.5	0.067	0.016	0.017	0.110	---	ND	0.19	0.19	ND	0.1	ND	ND	14	1.4	1.4	442	0.282
Aug 5/09	409	363	789	830	7.23	7.03	---	12.6	26.3	52	77.9	52.1	12.7	2.5	0.065	0.016	0.014	0.034	---	ND	0.16	0.16	ND	0.2	ND	ND	ND	1.6	1.6	442	0.274
Oct 28/09	393	363	838	775	7.45	7.35	---	9.5	27.7	63	76.4	49.2	17.1	2.8	0.079	0.017	0.044	0.036	---	0.02	0.17	0.15	ND	ND	ND	<3	5	1.7	1.7	454	0.374
Apr 28/10	433	309	788	779	7.82	7.50	---	6.9	24.8	52	84.5	54.0	12.7	2.5	0.078	0.016	0.045	0.095	---	0.06	0.16	0.10	ND	0.1	ND	ND	ND	2.1	---	416	0.266
Nov 25/10	407	356	789	660	7.64	7.00	---	8.6	22.3	51	79.1	50.9	12.3	2.3	0.082	0.017	0.022	0.068	---	ND	ND	ND	ND	0.1	ND	3	ND	1.6	---	432	0.265
Apr 25/11	389	367	787	732	7.85	7.23	---	9.0	23.9	51	76	48.4	12.5	2.2	0.079	0.023	0.068	0.083	---	ND	0.14	0.14	ND	0.1	ND	ND	6	1.6	---	435	0.275
Nov 3/11	387	364	827	771	7.84	7.08	140	9.6	22.7	50	85.5	56.3	12.3	2.8	0.098	0.056	0.050	0.045	---	ND	0.22	0.22	ND	ND	ND	ND	13	1.4	---	448	0.254
Apr 26/12	408	357	837	750	8.11	7.63	21	7.3	23.6	51	77.8	51.9	11.2	2.4	0.074	0.006	0.017	0.008	---	ND	0.07	0.07	ND	ND	ND	ND	ND	1.7	---	433	0.241
Oct 29/12	472	364	773	898	7.97	6.87	-75	11.7	23.8	53	91.0	59.4	18.1	3.5	0.097	0.017	0.079	0.012	---	ND	0.34	0.34	ND	ND	ND	ND	ND	0.9	---	467	0.362
Apr 24/13	450	362	788	838	7.99	7.64	72	8.3	25.0	52	89.9	54.7	13.2	2.4	0.097	0.018	0.028	0.067	---	ND	0.23	0.23	ND	ND	ND	ND	ND	2.3	---	454	0.270
Oct 30/13	456	374	811	850	7.63	7.57	141	10.2	27.2	50	89.9	56.3	14.1	2.7	0.103	0.026	0.102	0.022	---	ND	0.18	0.18	ND	0.1	ND	ND	ND	4.4	---	466	0.287
May 29/14	466	366	830	801	8.15	7.80	-19	10.4	33.0	51	91.4	57.8	14.5	2.5	0.096	0.016	0.041	0.032	---	ND	0.21	0.21	ND	ND	ND	ND	26	7.4	---	470	0.291
Oct 1/14	467	364	838	652	7.82	7.40	14	11.7	31.5	50	91.8	57.9	14.9	2.8	0.106	0.024	0.503	0.041	---	ND	0.19	0.19	ND	ND	ND	ND	ND	4.1	---	468	0.299
May 12/15	436	348	808	913	8.21	7.85	9.7	6.4	28.2	58	81.2	56.6	15.6	2.4	0.080	ND	0.100	0.037	---	ND	0.6	0.60	ND	0.1	ND	ND	16	1.6	---	451	0.325
Oct 13/15	353	363	790	880	7.98	7.46	87	12.5	28.4	58	63.2	47.4	31.1	3.3	0.074	0.020	0.334	0.031	---	0.02	0.14	0.12	ND	0.2	ND	ND	ND	1.5	---	450	0.721
Apr 27/16	436	408	795	902	8.06	7.36	15	6.7	25.3	54	83.7	55.1	15.3	2.4	0.079	ND	0.149	0.033	---	0.17	1.20	1.03	ND	ND	ND	10	65	2.0	---	481	0.318
Oct 12/16	432	369	845	879	8.04	7.50	-70	12.1	28.2	60	80.1	56.3	18.7	2.6	0.080	0.018	0.046	0.079	---	0.03	0.58	0.55	ND	0.1	ND	ND	26	1.8	---	468	0.392
Apr 19/17	434	367	820	520	8.04	7.40	46.5	4.8	23.6	50	84.2	54.5	15.2	2.5	0.080	0.026	0.007	0.005	---	0.03	0.62	0.59	ND	ND	ND	ND	50	5.1	---	451	0.317
Nov 2/17	427	356	804	588	8.20	7.31	-98.0	11.3	19.4	42	77.9	56.4	16.9	2.8	0.081	0.023	0.15	0.054	---	0.18	0.6	0.42	ND	0.2	ND	ND	38	8.3	---	430	0.356
May 28/18	453	370	836	589	8.20	7.58	104.0	10.6	31.0	55	79.7	61.8	17.3	2.8	0.090	0.016	0.015	0.029	---	0.08	0.9	0.82	ND	ND	ND	ND	48	7.3	---	470	0.354
Oct 25/18	438	366	837	547	8.05	7.62	-53.6	10.5	27.1	51	85.6	54.4	24.2	3.0	0.101	0.022	0.446	0.060	---	0.52	1.1	0.58	<0.05	<0.05	<0.01	12	66	10.5	---	466	0.503
Apr 30/19	423	337	788	543	8.09	7.33	7	7.4	23.7	52	80.8	53.8	15.1	2.5	0.081	0.019	0.086	0.048	---	0.15	0.6	0.45	<0.05	<0.05	<0.002	<3	37	2.3	---	430	0.319
Oct 21/19	409	335	806	649	8.06	7.42	-44.3	11.1	23.8	49	74.6	54.2	22.0	2.9	0.083	0.022	0.163	0.037	---	0.16	0.3	0.14	<0.05	0.10	<0.002	<3	34	3.6	---	428	0.473
Apr 1/20	442	336	790	492.1	7.9	7.25	116.2	5.2	26.5	55	86.3	55.1	17.0	2.6	0.088	0.021	0.097	0.028	---	0.04	0.5	0.46	<0.05	0.06	<0.002	<3	53	3.4	---	444	0.352
Dec 2/20	426	312	794	2943	7.98	7.74	8	8.5	26.5	55	78.7	55.8	28.8	3.0	0.087	0.026	0.143	0.025	---	0.08	0.8	0.72	<0.05	0.06	<0.002	<3	78	2.4	---	435	0.607
May 26/21	408	286	703	7.2	8.18	8.1	43.6	10.7	25.3	57	75.9	53.1	19.7	2.5	0.079	0.021	0.086	0.024	---	0.06	0.6	0.54	<0.05	<0.05	0.002	<3	12	2.6	---	406	0.424
Oct 4/21	410	340	789	685	7.85	7.36	-64.8	13	26.2	54	76.8	53.1	22.7	3.4	0.089	0.025	0.694	0.115	---	0.58	0.9	0.32	<0.05	<0.05	0.013	<3	20	3.4	---	442	0.488

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (μS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3c: Deep Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
06-1d																															
Apr 13/06	260	284	646	600	7.49	7.55	---	8.1	20.3	54	76.3	16.8	30.7	1.6	---	---	0.013	0.037	---	ND	5.84	5.84	ND	0.2	ND	7	367	---	27.5	369	0.828
Jul 24/06	402	366	859	930	7.11	7.82	---	13.6	22.4	107	114	28.5	21.3	2.6	---	---	0.005	0.028	---	ND	6.23	6.23	0.1	0.2	ND	11	474	---	78.0	515	0.462
Oct31/06	373	364	704	855	7.49	7.38	---	9.7	9.5	53	114	21.2	16.8	0.5	---	---	ND	0.008	---	0.11	1.05	6.23	ND	ND	ND	ND	37	---	12.0	433	0.378
Apr 26/07	367	352	735	950	7.41	7.51	---	9.9	8.0	39	114	19.8	12.9	0.9	---	---	0.015	0.002	---	ND	0.52	0.52	ND	0.2	ND	ND	31	---	11.0	406	0.292
Jul 19/07	451	402	885	892	7.75	7.11	---	12.1	19.9	97	122	35.3	26.6	2.1	---	---	0.034	0.070	---	ND	0.23	0.23	ND	0.2	ND	ND	48	---	1.5	546	0.546
Nov 1/07	406	360	742	987	7.48	7.40	---	9.2	9.1	87	120	25.7	18.5	0.9	---	---	4.20	0.830	---	0.06	0.48	0.42	ND	0.1	ND	ND	44	---	6.9	480	0.399
May 14/08	320	304	542	643	7.95	7.99	---	9.1	8.2	34	95.5	19.8	10.2	1.0	---	---	0.064	0.001	---	0.05	0.48	0.43	ND	ND	ND	ND	35	---	1.4	351	0.249
Aug 5/08	408	370	772	836	7.68	7.28	---	10.8	15.7	82	116	29.0	19.8	1.6	---	---	0.072	0.007	---	ND	0.46	0.46	ND	0.2	ND	ND	ND	---	1.1	483	0.425
Oct.30/08	324	324	707	713	8.13	7.54	---	6.9	19.9	55	91.5	23.3	21.5	1.9	---	---	ND	0.004	---	0.02	0.33	0.31	ND	0.6	ND	ND	6	---	1.1	410	0.520
May 19/09	288	276	582	490	7.99	8.12	---	7.8	4.2	28	89.1	15.9	8.1	0.6	0.032	ND	0.065	0.016	---	ND	0.11	0.11	ND	ND	ND	ND	12	0.5	0.5	312	0.208
Aug 5/09	410	389	882	880	7.70	6.96	---	11.4	13.3	75	112	31.4	19.1	1.7	0.075	0.014	0.025	0.016	---	ND	ND	ND	ND	0.4	ND	ND	ND	0.7	1.3	488	0.411
Nov 3/09	461	386	914	790	7.66	7.39	---	9.3	22.6	83	130	33.2	21.1	2.0	0.097	0.016	0.012	0.006	---	ND	0.27	0.27	ND	0.2	ND	ND	ND	1.3	1.5	524	0.427
Apr 28/10	372	324	658	597	7.88	7.48	---	8.2	3.6	39	113	21.9	8.9	0.6	0.055	ND	0.067	0.011	---	ND	0.30	0.30	ND	ND	ND	ND	30	1.4	---	381	0.201
Nov 29/10	368	409	800	777	7.51	7.07	---	9.2	4.1	30	111	22.2	8.8	0.6	0.054	ND	0.047	0.003	---	ND	0.28	0.28	ND	0.1	ND	3	ND	2.0	---	422	0.199
Apr 25/11	270	294	577	660	7.70	7.41	---	6.1	2.2	18	82.6	15.4	6.1	0.3	0.039	ND	0.057	0.005	---	ND	0.30	0.30	ND	ND	ND	ND	11	1.3	---	302	0.163
Nov 3/11	335	398	884	817	8.05	7.01	11	10.9	13.6	83	114	42.8	12.1	1.9	0.134	0.031	0.167	0.043	---	ND	0.09	0.09	ND	0.2	ND	ND	23	1.0	---	507	0.246
Apr 26/12	318	273	583	563	8.09	7.28	186	7.1	2.8	24	94.0	20.2	7.1	0.6	0.062	ND	0.073	0.001	---	ND	ND	ND	ND	ND	ND	ND	ND	1.4	---	313	0.172
Oct 29/12	413	335	735	880	7.72	7.20	-95	10.2	13.5	70	115	30.7	11.6	1.5	0.118	0.015	0.501	0.027	---	ND	0.12	0.12	ND	ND	ND	ND	ND	2.5	---	444	0.248
Apr 24/13	232	251	557	548	8.13	7.29	172	7.6	3.4	16	66.1	16.3	7.9	1.8	0.051	0.009	0.937	0.020	---	ND	0.24	0.24	ND	ND	ND	ND	30	2.2	---	263	0.227
Oct 29/13	453	417	822	900	7.67	6.93	211	8.9	8.7	64	129	31.5	13.4	1.8	0.107	ND	0.121	0.013	---	ND	0.15	0.15	ND	0.1	ND	ND	ND	4.3	---	500	0.273
May 29/14	382	331	705	546	8.12	7.22	23	8.1	9.5	43	114	23.8	9.3	1.0	0.072	0.006	0.119	0.044	---	ND	0.16	0.16	ND	ND	ND	ND	34	3.0	---	399	0.208
Oct 1/14	520	388	848	876	7.96	7.23	-113	13.1	10.9	81	141	41	14.3	2.1	0.250	0.024	0.562	0.142	---	ND	0.2	0.20	ND	ND	ND	ND	10	4.9	---	523	0.273
May 6/15	414	319	672	630	7.99	6.98	176	11.0	10.0	39	120	27.8	9.5	1.2	0.083	0.012	0.038	0.031	---	ND	0.20	0.20	ND	0.5	ND	ND	ND	3.9	---	401	0.203
Duplicate	418	324	676	630	7.96	6.98	176	11.0	9.8	39	121	28.0	9.6	1.2	0.086	0.012	0.049	0.033	---	ND	0.10	0.10	ND	0.5	ND	ND	ND	6.0	---	406	0.205
Oct 8/15	366	352	749	516	7.73	7.27	8.5	8.2	12.0	15	101	27.8	9.3	1.4	0.120	0.013	0.344	0.078	---	ND	0.12	0.12	ND	0.4	ND	ND	10	2.2	---	379	0.212
Apr 27/16	316	312	636	853	8.00	7.62	53	8.3	8.0	29	91.7	21.1	7.3	0.7	0.051	ND	0.137	0.036	---	ND	0.20	0.20	ND	1.3	ND	ND	9	1.0	---	351	0.179
Oct 12/16	329	332	764	809	7.99	7.35	85.0	11.5	12.5	39	92.0	24.2	9.3	0.9	0.075	0.007	ND	ND	---	ND	0.28	0.28	0.4	3.0	ND	ND	16	1.2	---	392	0.222
Apr 19/17	284	255	519	611	7.89	7.74	35.5	4.4	4.3	14	86.6	16.4	5.6	0.4	0.043	ND	ND	0.001	---	ND	0.49	0.49	0.2	1.4	ND	ND	ND	10.4	---	287	0.143
Nov 1/17	368	332	764	626	7.99	7.28	51.0	9.9	7.5	24	108	23.9	9.1	0.8	0.082	0.014	0.009	0.011	---	ND	0.7	0.7	ND	1.5	ND	ND	5	4.1	---	379	0.208
Duplicate	377	328	685	626	7.98	7.28	51.0	9.9	7.4	24	111	24.2	8.6	0.8	0.083	0.013	ND	0.013	---	<0.01	0.9	0.9	ND	1.7	ND	ND	6	6.4	---	380	0.193
May 28/18	403	354	703	710	8.23	7.66	60.0	9.1	5.9	35	116	27.6	9.1	0.9	0.081	ND	0.046	0.005	---	0.02	0.3	0.28	ND	0.25	ND	ND	21	28.9	---	406	0.198
Oct 25/18	358	284	697	710	8.00	6.53	-291	9.7	17.6	34	105	23.3	8.9	0.7	0.068	0.010	<0.005	<0.001	---	0.03	0.3	0.27	<0.05	3.21	<0.002	<3	<5	3.8	---	360	0.205
May 1/19	234	213	465	277.3	7.93	7.60	60.3	5.7	4.3	11	71.1	13.7	4.6	0.4	0.037	<0.005	<0.005	<0.001	---	0.05	0.2	0.15	<0.05	2.02	<0.002	<3	<5	3.9	---	233	0.132
Oct 21/19	345	281	645	763	7.94	7.41	55.2	10.4	9.2	34	101	22.4	7.8	0.7	0.062	0.008	<0.005	0.001	---	0.01	0.1	0.09	<0.05	1.21	<0.002	<3	5	3.5	---	344	0.182
Apr 1/20	284	218	506	333.7	7.92	7.66	71.6	7.3	9.1	15	86.3	16.7	5.3	0.6	0.048	0.007	0.005	<0.001	---	<0.01	0.4	0.4	<0.05	5.16	0.005	<3	<5	3.2	---	264	0.138
Dec 2/20	421	306	707	600	7.87	6.63	-2.5	8.1	9.8	38	120	29.4	9.6	1.3	0.093	0.008	0.019	0.002	---	0.02	0.3	0.28	<0.05	1.1	<0.002	<3	5	3.1	---	391	0.204
May 25/21	364	296	632	563	8.05	8.11	80.5	10.6	5.7	32	101	27.1	8.3	1.2	0.082	0.006	0.033	0.019	---	0.03	0.3	0.27	<0.05	0.14	<0.002	<3	7	3.5	---	352	0.189
Oct 4/21	393	274	716	576	7.68	7.09	113.4	10.5	15.9	40	113	26.7	8.7	1.0	0.083	0.009	0.517	0.02	---	0.01	0.9	0.89	<0.05	5.88	<0.002	<3	15	3.2	---	370	0.192

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🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3c: Deep Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
06-2d																															
Apr 6/06	209	210	454	310	7.57	7.69	---	7.1	3.7	28	63.7	12.0	10.0	0.9	---	---	0.012	0.046	---	0.08	7.11	7.03	0.1	0.3	ND	6	378	---	217.0	246	0.302
Jul 20/06	Dry																														
Oct31/06	479	302	905	1,066	7.66	7.33	---	9.2	5.5	250	132	36.5	14.8	0.7	---	---	ND	0.008	---	0.02	2.22	2.20	ND	0.3	ND	3	54	---	17.0	619	0.294
Apr 25/07	223	198	456	419	7.49	7.36	---	6.9	1.7	44	67.4	13.3	9.6	1.1	---	---	ND	0.005	---	ND	2.41	2.41	ND	ND	ND	ND	65	---	4.3	256	0.279
Jul 18/07	N/S																														
Oct 31/07	N/S			1,710		7.25	---	11.8							---	---															
May 14/08	393	312	748	697	7.60	7.56	---	9.0	7.0	140	109	29.4	18.5	0.7	---	---	0.038	0.02	---	ND	0.31	0.31	ND	0.3	ND	ND	14	---	2.9	492	0.405
Aug 5/08	Not enough to sample																														
Oct.30/08	Dry																														
May 14/09	519	330	942	810	7.52	8.11	---	8.5	5.6	195	130	47.2	7.9	0.8	0.03	ND	0.035	0.010	---	ND	0.44	0.44	ND	0.3	ND	ND	25	1.6	1.7	586	0.151
Aug 5/09	Not enough to sample																														
Oct 26/09	Dry																														
Apr 26/10	522	329	900	840	7.66	7.24	---	7.1	7.6	173	136	44.5	13.2	0.8	0.034	ND	0.125	0.012	---	ND	0.67	0.67	ND	0.3	ND	ND	22	2.1	---	574	0.251
Nov 22/10	---	---	---	707	---	7.01	---	9.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Apr 25/11	203	196	421	411	7.54	7.22	---	5.7	1.9	38	60.5	12.6	7.1	0.6	0.018	0.007	0.238	0.005	---	ND	0.59	0.59	ND	0.1	ND	ND	22	5.1	---	240	0.216
Nov 1/11	NS																														
Apr 25/12	399	281	800	731	7.79	7.32	71	6.7	5.9	154	102	34.9	10.1	0.6	0.027	ND	0.132	0.008	---	ND	0.12	0.12	ND	0.2	ND	ND	58	3.5	---	478	0.220
Apr 23/13	317	266	605	620	7.92	7.27	-84	6.0	5.4	58	87.0	24.1	9.3	0.6	0.024	0.011	0.036	0.010	---	ND	0.45	0.45	ND	0.2	ND	ND	14	4.6	---	346	0.228
May 28/14	367	291	755	816	8.05	7.24	240	8.8	3.7	122	102	27.2	16.0	0.5	0.029	0.007	0.020	0.005	---	ND	0.20	0.20	ND	0.3	ND	ND	8	4.5	---	447	0.364
May 7/15	550	312	835	830	7.72	6.25	233	7.4	5.1	191	140	48.3	9.2	0.8	0.032	ND	0.091	0.058	---	ND	0.20	0.20	ND	0.3	ND	ND	9	2.0	---	584	0.171
Apr 26/16	395	294	645	255	7.91	7.38	168	3.5	22.3	28	105	32.1	9.2	0.6	0.021	ND	ND	0.004	---	ND	0.78	0.78	ND	ND	ND	ND	28	3.7	---	373	0.201
Apr 17/17	211	188	390	483	7.93	7.42	146	6.6	2.0	20	59.6	15.0	5.7	0.3	0.014	0.005	ND	0.001	---	ND	0.89	0.89	ND	0.5	ND	ND	13	2.9	---	217	0.172
May 24/18	353	298	638	472	8.09	7.20	16	9.7	<0.5	56	93.7	28.9	7.9	0.4	0.021	0.005	0.011	0.004	---	0.03	1.40	1.37	<0.05	0.07	<0.001	<3	38	10.7	---	366	0.183
Apr 29/19	199	172	387	454	8.04	7.53	98	7.2	1.1	14	57.9	13.3	5.1	0.2	0.012	0.007	0.005	0.001	---	0.02	0.30	0.28	<0.05	0.07	<0.002	<3	16	4.7	---	195	0.157
Mar 31/20	281	217	505	336	7.80	8.08	13	5.3	2.8	35	76.7	21.6	5.2	0.3	0.018	<0.005	0.019	0.001	---	<0.01	0.60	0.60	<0.05	2.04	<0.002	<3	15	3.6	---	272	0.135
May 25/21	404	287	723	619	8.28	8.07	96	11.3	3.4	101	96.6	39.5	5.7	0.8	0.031	<0.005	0.054	0.004	---	0.03	0.70	0.67	0.07	1.43	<0.002	<3	15	3.7	---	420	0.123

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3c: Deep Overburden Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.0	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
06-4d																															
Apr 6/06	281	304	658	690	7.63	7.26	---	7.5	19.1	65	85.2	16.4	11.0	1.1	---	---	ND	0.009	---	0.01	1.19	1.18	ND	0.2	0.003	ND	22	---	9.9	380	0.287
Jul 24/06	Not enough to sample																														
Oct31/06	417	366	1020	1,227	7.58	7.30	---	9.1	86.5	113	121	27.9	63.7	1.3	---	---	ND	0.002	---	ND	0.27	0.27	ND	0.3	ND	ND	ND	---	3.1	634	1.36
Apr 25/07	292	272	596	631	7.62	7.69	---	10.8	10.5	49	87.4	17.9	9.9	1.1	---	---	0.012	0.014	---	ND	0.45	0.45	ND	0.3	ND	ND	10	---	1.8	340	0.252
Jul 24/07	442	342	939	992	7.13	7.18	---	14.4	81.8	97	131	27.8	45.3	1.2	---	---	0.041	0.009	---	ND	0.84	0.84	ND	0.3	ND	ND	16	---	1.7	591	0.938
Oct 31/07	433	396	1,100	1,306	8.07	7.22	---	11.3	144	82	129	26.8	103	1.3	---	---	ND	0.015	---	ND	0.29	0.29	ND	0.6	ND	ND	35	---	2.5	726	2.16
May 14/08	262	266	563	635	8.08	8.20	---	10.9	13.8	61	78.5	16.0	13.0	0.8	---	---	0.061	0.003	---	0.02	0.92	0.90	ND	0.3	ND	ND	134	---	1.2	344	0.348
Aug 5/08	345	300	625	779	7.90	7.57	---	12.7	17.5	44	101	22.7	15.3	2.1	---	---	0.309	0.108	---	0.13	2.14	2.01	ND	0.2	ND	ND	62	---	1.2	384	0.360
Oct.30/08	361	312	710	650	7.88	6.73	---	7.4	11.8	62	106	23.2	13.0	1.3	---	---	ND	0.014	---	ND	0.28	0.28	ND	0.4	ND	ND	ND	---	1.1	406	0.297
May 19/09	349	292	732	490	7.60	8.12	---	9.2	32.5	54	99.8	24.2	22.1	1.0	0.024	0.012	0.020	0.011	---	ND	0.11	0.11	ND	0.7	ND	ND	ND	1.0	1.0	412	0.516
Aug 5/09	364	344	881	940	7.16	6.76	---	11.6	62.4	44	104	25.0	48.7	1.3	0.049	0.028	0.019	0.006	---	ND	0.08	0.08	ND	0.4	ND	ND	ND	1.2	1.2	495	1.11
Nov 3/09	393	340	761	670	7.45	7.31	---	9.3	23.7	50	116	25.0	25.3	1.2	0.052	0.028	0.058	0.003	---	ND	0.16	0.16	ND	0.3	ND	ND	<5	1.4	1.3	446	0.555
Apr 28/10	401	277	782	703	7.96	7.47	---	6.9	30.1	95	119	25.3	15.1	1.0	0.037	0.009	0.052	0.010	---	0.01	0.69	0.68	ND	0.1	ND	ND	18	1.5	---	452	0.329
Nov 25/10	384	332	808	660	7.43	7.24	---	8.0	24.7	71	111	25.9	21.3	1.1	0.043	0.015	0.061	0.003	---	ND	ND	ND	ND	0.2	ND	ND	ND	1.3	---	455	0.473
Apr 26/11	246	248	604	536	8.32	7.76	---	6.4	9.7	32	73.2	15.2	7.6	1.6	0.027	ND	0.075	0.006	---	ND	0.45	0.45	ND	0.2	ND	ND	13	1.6	---	289	0.210
Nov 2/11	Not enough to sample			1,015		7.45	61	11.6																							
Apr 26/12	353	249	699	715	8.10	7.40	47	7.5	18.0	82	102	23.9	13.4	1.3	0.028	ND	0.051	ND	---	ND	0.11	0.11	ND	ND	ND	ND	10	2.2	---	389	0.309
Oct 29/12	503	385	938	1,092	7.77	6.85	-74	11.0	52.9	70	146	33.5	42.3	2.0	0.082	0.030	0.068	0.005	---	ND	0.17	0.17	ND	0.4	ND	ND	7	1.3	---	579	0.820
Apr 23/13	290	234	576	530	7.94	7.40	---	7.6	8.5	56	86.0	18.2	5.9	0.6	0.029	0.009	0.072	0.010	---	ND	0.17	0.17	ND	0.1	ND	ND	ND	2.6	---	316	0.151
Oct 29/13	400	388	880	1,126	7.66	6.83	85	7.2	52.3	44	116	26.5	46.1	1.4	0.077	0.027	0.033	0.002	---	ND	0.21	0.21	ND	0.4	ND	ND	ND	3.8	---	521	1.00
May 28/14	349	286	675	686	8.13	7.49	88	8.3	9.7	48	102	22.6	9.9	0.7	0.036	0.013	0.009	0.003	---	ND	0.11	0.11	ND	0.2	ND	ND	ND	2.1	---	366	0.231
May 12/15	348	295	686	850	8.15	8.17	94	8.4	12.7	51	99.8	24.1	10.4	0.8	0.038	ND	0.012	0.003	---	ND	0.40	0.4	ND	1.2	ND	ND	10	0.8	---	381	0.242
Oct 8/15	DRY																														
Apr 26/16	Not enough to sample																														
Oct 12/16	Not enough to sample																														
Apr 19/17	274	239	597	731	8.01	7.34	40	7.2	6.5	43	78.8	18.9	7.8	0.5	0.032	0.010	ND	0.001	---	ND	0.46	0.46	0.2	0.3	ND	ND	ND	2.3	---	301	0.204
Nov 2/17	384	330	862	651	8.19	7.28	-116	10.9	15.8	80	109	27.1	11.5	1.1	0.04	0.010	ND	0.001	---	ND	0.30	0.3	ND	0.2	ND	<3	10	3.9	---	443	0.255
May 23/18	364	291	681	485	8.17	7.64	-31	11.1	11.3	58	104	25.3	10.4	0.9	0.044	0.011	ND	0.001	---	0.06	1.1	1.04	ND	0.12	ND	<3	43	2.0	---	384	0.237
Oct 24/18	Not enough to sample																														
May 1/19	249	224	503	303	7.82	7.43	5	5.2	3.4	24	74.1	15.4	5.7	0.6	0.021	0.006	<0.005	<0.001	---	0.05	0.5	0.45	<0.05	0.05	<0.002	<3	9	2.9	---	257	0.157
Oct 21/19	394	291	708	507	7.87	7.32	185	10.6	7.5	56	113	27.2	10.0	1.0	0.050	0.017	<0.005	0.001	---	0.02	0.1	0.08	<0.05	1.02	<0.002	<3	<5	3.8	---	389	0.219
Mar 31/20	253	218	462	6,340	7.86	7.24	-7	7.4	3.3	14	77	14.6	3.0	0.5	0.027	0.007	0.024	<0.001	---	<0.01	0.2	0.2	<0.05	0.1	<0.002	<3	7	2.8	---	243	0.0822
Dec 2/20	326	236	633	495	7.73	6.72	21	8.4	10.6	68	99	19.2	13.9	0.8	0.033	0.007	0.014	<0.001	---	0.04	0.8	0.76	<0.05	<0.05	<0.002	<3	16	3.8	---	353	0.335
May 25/21	Dry																														
Oct 4/21	Not enough to sample																														

🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3d: Shallow Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200			5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-2sBR																															
Apr 21/99	580	323	1,448	1,345	---	7.15	---	8.8	234	74.9	149	50.5	73.8	6.0	---	---	0.02	0.030	0.84	0.11	0.40	0.29	ND	ND	ND	7	24	---	30.0	782	1.33
Oct 18/99	720	406	1,540	1,374	7.24	7.27	---	10.3	222	129	179	66.2	67.7	4.4	---	---	2.22	0.039	0.53	0.69	1.21	0.52	ND	ND	ND	6	15	---	6.0	915	1.10
Jan 25/00	---	---	1,610	1,570	---	---	---	---	218	---	---	---	82.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	942	---
May 1/00	523	315	1,166	1,120	7.18	7.60	---	8.3	117	88.5	144	39.6	38.6	3.3	0.37	0.04	ND	ND	0.02	0.65	0.98	0.33	ND	ND	ND	5	9	---	4.0	621	0.730
Oct 23/00	642	394	1,438	1,070	7.23	7.30	---	10.6	145	125	154	62.6	64.1	5.35	---	---	2.16	0.041	0.48	1.42	2.08	0.66	ND	ND	ND	ND	24	---	6.0	797	1.10
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.93	0.23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	511	331	1,157	600	---	7.90	---	10.4	101	95.5	128	46.4	34.4	3.1	---	---	1.04	0.036	0.15	1.04	1.34	0.30	ND	0.6	ND	ND	6	---	3.0	612	0.660
Oct 24/01	603	457	1,550	1,270	7.50	7.60	---	12.0	150	125	137	63.5	42.8	7.1	0.33	0.14	3.76	0.129	0.14	2.78	3.58	0.80	ND	ND	ND	ND	19	---	4.0	807	0.760
Apr 17/02	529	345	1,120	700	7.11	6.90	---	10.5	98.6	87.2	122	54.5	33.3	4.3	---	---	0.16	0.043	---	1.65	2.16	0.51	ND	0.5	ND	ND	18	---	2.0	611	0.630
Nov 11/02	767	477	1,360	1,320	7.81	7.50	---	11.1	172	157	183	75.4	76.8	2.3	---	---	3.06	0.050	---	3.57	4.09	0.52	ND	0.1	ND	2	16	---	5.3	961	1.21
Jun 3/03	598	378	1,070	1,080	7.44	7.70	---	11.1	90.2	95	121	49.9	41.3	5.8	---	---	0.840	0.040	---	2.94	3.53	0.59	ND	0.3	ND	1	25	---	4.5	636	0.800
Oct 16/03	694	438	1,430	1,200	7.74	7.40	---	10.2	136	156	165	68.4	66.1	6.3	---	---	0.430	0.040	---	4.24	4.78	0.54	ND	0.1	ND	1	18	---	8.0	867	1.09
May 27/04	544	380	1,090	---	7.76	7.44	---	11.2	78.8	121	132	52.4	39.3	5.4	---	---	0.159	0.033	---	2.49	3.02	0.53	ND	0.4	ND	ND	11	---	3.7	656	0.730
Oct 14/04	525	447	1,200	1,000	7.31	6.72	---	11.0	91.1	133	126	51.0	38.6	5.4	---	---	1.51	0.036	---	2.65	3.25	0.60	ND	0.2	ND	ND	15	---	3.8	714	0.732
Jun 1/05	483	360	1,020	970	---	7.02	---	12.2	63.8	92	117	46.5	33.1	5.0	---	---	1.18	0.033	---	1.62	2.14	0.52	ND	1.0	ND	ND	12	---	3.2	575	0.656
Aug 23/05	717	441	1,430	1,340	7.41	---	---	11.2	112	180	178	66.1	62.6	5.4	---	---	0.650	0.040	---	0.91	1.36	0.45	ND	0.2	ND	ND	12	---	7.9	866	1.02
Nov 28/05	535	460	1,210	960	---	7.27	---	7.6	87.8	130	131	50.7	38.5	6.5	---	---	0.009	0.043	---	2.87	3.29	0.42	ND	0.1	ND	ND	15	---	4.8	718	0.725
Apr 6/06	538	410	1,040	1,030	7.78	7.34	---	6.7	76.9	107	130	51.9	40.5	5.1	---	---	ND	0.058	---	2.38	3.06	0.68	ND	0.8	ND	ND	ND	---	3.8	659	0.760
Jul 20/06	481	428	1,000	1,070	7.52	7.74	---	15.1	75.6	108	115	47.3	36.0	5.0	---	---	1.14	0.033	---	2.66	2.96	0.30	ND	0.2	ND	3	7	---	3.7	644	0.714
Oct 31/06	549	420	1,100	1,186	7.65	7.23	---	9.1	65.3	96	130	54.9	47.9	5.6	---	---	1.93	0.041	---	2.61	3.30	0.69	ND	0.2	ND	ND	11	---	5.9	658	0.889
Apr 25/07	462	380	961	830	7.41	7.40	---	9.9	64.2	90	111	44.9	32.1	4.3	---	---	0.071	0.041	---	0.5	0.83	0.33	ND	1.2	ND	ND	5	---	3.1	581	0.650
Jul 18/07	542	432	1,140	1,121	7.34	6.98	---	11.9	78.9	114	133	51.3	43.4	5.2	---	---	1.18	0.042	---	2.62	3.14	0.52	0.2	0.3	ND	ND	46	---	3.3	691	0.811
Oct 31/07	325	380	966	1,210	7.72	7.16	---	11.2	72.8	114	120	5.97	43.7	11.1	---	---	0.338	0.028	---	3.16	3.75	0.59	ND	0.1	ND	3	32	---	3.7	598	1.06
May 14/08	429	375	897	951	6.87	7.31	---	10.0	57.0	91	106	39.8	30.1	3.8	---	---	ND	0.041	---	0.54	0.95	0.41	0.3	1.6	ND	5	15	---	2.5	561	0.633
Aug 5/08	487	417	1,060	1,020	7.62	7.35	---	10.1	59.7	103	121	44.8	34.1	4.5	---	---	0.771	0.053	---	2.36	2.79	0.43	0.3	0.2	ND	7	8	---	2.8	623	0.673
Oct.30/08	650	564	1,400	1,410	7.76	6.77	---	9.1	141	119	158	62.4	72.1	7.6	---	---	3.02	0.048	---	5.49	5.99	0.50	ND	ND	ND	ND	17	---	3.4	908	1.23
May 19/09	473	401	1,090	992	7.58	7.26	---	9.4	65.8	86	113	46.2	35.9	5.3	0.195	0.066	0.330	0.043	---	1.92	2.50	0.58	ND	0.8	ND	ND	17	2.4	2.4	599	0.718
Aug 4/09	488	447	1,180	600	7.11	7.23	---	11.7	82.4	119	117	47.5	35.3	5.0	0.202	0.067	2.24	0.057	---	2.43	3.40	0.97	ND	0.2	ND	ND	20	3.0	3.0	681	0.695
Oct 28/09	579	430	1,260	1,120	7.23	7.07	---	9.4	72.8	124	141	55.0	41.4	6.8	0.265	0.075	2.91	0.051	---	5.14	5.30	0.16	ND	0.1	ND	<3	12	3.8	3.8	709	0.749
Apr 26/10	478	380	993	900	7.66	7.21	---	8.8	50.8	94	116	45.6	32.7	4.8	0.200	0.056	0.018	0.052	---	0.60	0.95	0.35	0.3	1.6	ND	ND	8	2.6	---	581	0.651
Nov 25/10	451	380	962	770	7.49	7.25	---	7.6	43.7	88	109	43.1	29.3	3.3	0.181	0.047	0.602	0.036	---	1.39	1.54	0.15	ND	0.2	ND	5	ND	2.4	---	548	0.600
Apr 25/11	384	378	895	817	7.94	7.18	---	10.0	41.6	73	94.8	35.9	23.8	3.0	0.161	0.037	0.031	0.027	---	0.83	1.05	0.22	ND	0.5	ND	ND	5	2.3	---	502	0.528
Nov 2/11	403	408	1,040	1,050	7.68	6.92	-31	9.9	47.1	80	117	47.1	32.6	4.8	0.235	0.090	0.372	0.030	---	2.51	3.06	0.55	ND	0.1	ND	4	9	3.1	---	577	0.643
Apr 26/12	422	376	941	876	7.77	9.83	54	8.0	42.9	72	101	41.0	29.2	4.4	0.181	0.046	ND	0.019	---	0.46	1.10	0.64	0.3	1.1	ND	14	42	2.4	----	523	0.618
Oct 30/12	573	437	1,100	956	7.66	7.34	---	12.1	71.3	83	136	57.0	45.5	7.4	0.324	0.104	2.09	0.055	---	3.42	3.94	0.52	ND	ND	ND	4	19	4.0	---	668	0.826
Apr 23/13	478	406	984	998	7.77	6.89	58	7.9	48.8	78	114	47.2	36.6	5.4	0.252	0.091	0.357	0.075	---	2.05	2.80	0.75	ND	0.7	ND	14	11	3.8	---	579	0.728
Oct 29/13	448	412	880	956	7.69	7.31	-14	8.9	36.6	76	110	42.2	34.7	5.3	0.242	0.066	0.859	0.037	---	2.91	3.14	0.23	ND	0.1	ND	4	7	6.6	---	557	0.713
Duplicate	441	413	833	---	7.76	---	---	---	41.2	80	107	41.9	34.7	5.5	0.242	0.064	1.16	0.037	---	2.97	3.12	0.15	ND	0.1	ND	3	9	4.0	---	564	0.720
May 28/14	394	354	841	791	7.97	7.19	40	10.0	29.6	51	98.0	36.3	25.2	3.6	0.180	0.054	ND	0.037	---	1.07	2.01	0.94	ND	0.4	ND	3	8	4.2	---	459	0.552
Oct 1/14	418	367	883	935	7.93	7.27	-46	11.8	36.4	58	103.0	39.1	28.7	4.7	0.276	0.078	0.336	0.035	---	1.90	2.60	0.70	ND	ND	ND	ND	11	7.5	---	493	0.611
May 7/15	434	367	771	863	7.79	6.98	-42	11.5	28.3	48	108	39.8	27.5	3.8	0.192	0.057	1.13	0.035	---	1.50	1.70	0.20	ND	0.1	ND	ND	7	1.8	---	480	0.575
Oct 8/15	457	445	973	1,122	7.68	7.17	-53	9.1	45.0	62	112	43.2	32.9	4.9	0.231	0.084	1.68	0.046	---	2.55	2.80	0.25	ND	ND	ND	ND	9	3.8	---	572	0.670
Apr 26/16	445	385	810	962	7.83	7.17	-34	9.4	29.9	48	111	40.8	27.2	3.6	0.192	0.047	1.50	0.035	---	1.98	2.22	0.24	ND	0.1	ND	ND	ND	3.0	---	496	0.562
Oct 11/16	443	450	982	1,249	7.79	7.36	-51	7.5	47.3	68	106	43.3	34.6	4.9	0.229	0.069	1.69	0.043	---	3.20	3.73	0.53	ND	0.1	ND	ND	8	4.4	---	581	0.715
Apr 18/17	507	442	1,040	728	7.93	7.27	-34.0	6.1	44.7	71	128	45.4	29.5	4.2	0.274	0.082	2.20	0.046	---	2.09	3.15	1.06	<0.1	1.9	<0.001	6	53	5.7	---	598	0.57
Nov 2/17	446	412	891	623	8.15	7.07	-73.0	9.9	21.3	38	114	39.1	24.1	3.7	0.197	0.063	1.53	0.034	---	2.40	2.5	0.10	<0.1	<0.1	<0.001	<3	10	8.7	---	492	0.497
May 24/18	403	371	798	682	8.00	7.10	-58.6	9.4	25.4	35	105	34.3	23.2	3.3	0.197	0.053	1.13	0.031	---	2.01	2.2	0.19	<0.05	0.07	<0.001	<3	9	31.6	---	452	0.503
Oct 25/18	511	439	1,080	1,150	7.89	7.05	-397	9.5	51.0	67	123	49.4	42.4	6.2	0.281	0.136	1.80	0.052	---	3.66	3.8	0.14	<0.05	<0.05	<0.002	3	<5	4.8	---	608	0.816
May 1/19	455	410	1,090	634	7.50	7.00	-56.6	7.4	53.2	79	111	43.3	30.0	4.6	0.240	0.077	1.29	0.038	---	2.73	2.9	0.17	<0.05	0.15	<0.002	<3	<5	4.6	---	572	0.612
Oct 21/19	533	440	1,230	1,115	7.78	6.83	-46.7	9.4	79.2	79	128	51.9	52.1	6.6	0.258	0.186	2.22	0.049	---	3.69	3.8	0.11	<0.05	0.09	<0.002	4	6	3.7	---	667	0.982
Mar 31/20	471	389	981	689	7.69	7.14	-18.9	7.5	49.4	56	117	43.5	33.1	5.4	0.240	0.114	1.34	0.053	---	2.87	3.1	0.23	<0.05	0.41	<0.002	<3	11	5.7	---	543	0.663
Dec 1/20	469	426	1,240	793	7.47	7.30	-23.3	9.1	86.8	97	113	45.4	34.9	5.7	0.244	0.127	1.81	0.046	---	2.94	3.4	0.46	<0.05	0.05	<0.002	<3	5	4.2	---	644	0.701
May 25/21	417	368	921	719	8.23	6.77	16.2	8.8	45.0	61	98.4	41.5	33.4	5.5	0.214	0.106	1.15	0.042	---	2.28	2.3	0.02	0.10	0.39	<0.002	<3	16	4.7	---	509	0.712
Oct 4/21	570	416	1,230	1,389	7.55	7.05	-39.2	9.4	107	80	137	55.2	57.9	6.8	0.283	0.207	2.10	0.075	---	2.85	3.0	0.15	<0.05	<0.05	<0.002	<3	13	5.0	---	700	1.06

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3d: Shallow Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200			5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-3sBR																															
Apr 21/99	521	446	1,265	1,207	---	7.04	---	9.1	129	59.9	125	50.8	45.5	5.7	---	---	0.02	0.151	6.11	0.95	1.93	0.98	ND	ND	ND	3	141	---	22.0	685	0.870
Oct 18/99	569	482	1,210	1,058	7.08	7.14	---	10.6	87.4	59.2	119	66.0	49.2	5.3	---	---	0.09	0.097	1.31	2.42	2.44	0.02	ND	ND	ND	1	29	---	15.0	679	0.900
Jan 25/00	---	---	1,000	1,015	---	---	---	5.8	45.9	---	---	---	42.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	541	---
May 1/00	453	418	1,030	963	7.06	7.40	---	8.2	60.9	45.5	103	47.5	40.7	5.2	0.73	0.09	ND	0.077	0.41	1.06	1.44	0.38	ND	ND	ND	4	12	---	6.0	555	0.830
Oct 23/00	441	412	999	530	7.28	8.20	---	11.5	45.0	51.3	96.3	48.8	39.1	5.29	---	---	ND	0.071	0.12	0.95	0.95	ND	ND	1.1	ND	3	11	---	7.0	539	0.810
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.64	0.12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	427	367	978	590	---	8.20	---	10.7	50.2	43.8	106	39.5	29.6	4.3	---	---	0.18	0.133	0.27	1.02	1.67	0.65	ND	0.5	ND	ND	6	---	ND	497	0.620
Oct 29/01	473	412	967	920	7.45	7.40	---	9.7	47.1	46.8	100	54.2	35.7	7.7	0.37	0.09	0.08	0.159	0.14	1.60	2.72	1.12	0.5	ND	ND	6	9	---	6.0	543	0.710
Apr 17/02	433	377	904	510	7.03	6.60	---	9.2	37.9	41.1	94.0	48.2	23.7	3.8	---	---	0.12	0.110	---	0.69	0.87	0.18	ND	0.8	ND	5	4	---	4.0	476	0.500
Nov 12/02	487	423	757	840	8.63	7.60	---	9.8	54.0	56	111	51.0	34.6	5.8	---	---	0.03	0.170	---	1.71	2.25	0.54	0.1	0.4	ND	1	14	---	4.2	571	0.680
Jun 5/03	446	375	760	800	7.93	7.80	---	9.3	41.1	48	108	42.8	28.8	4.9	---	---	0.29	0.130	---	1.09	1.34	0.25	0.2	0.4	ND	ND	6	---	2.8	503	0.590
Oct 16/03	433	372	826	830	7.74	7.60	---	8.5	36.7	49	95.6	47.1	23.5	4.1	---	---	0.035	0.070	---	0.57	0.81	0.24	ND	0.2	ND	ND	16	---	5.0	477	0.490
May 27/04	445	336	798	710	7.80	7.30	---	9.4	37.4	47	108	42.7	24.0	4.4	---	---	0.020	0.105	---	0.66	0.91	0.25	ND	0.2	ND	ND	3	---	2.3	463	0.490
Oct 18/04	446	384	832	700	7.43	6.93	---	8.6	40.1	54	97.0	49.6	22.0	4.2	---	---	0.037	0.090	---	0.71	1.07	0.36	ND	0.3	ND	1	11	---	2.9	495	0.454
Jun 1/05	462	370	911	1,350	---	6.92	---	12.5	43.3	54	107	47.0	23.6	4.4	---	---	0.216	0.155	---	0.77	1.35	0.58	ND	0.5	0.001	ND	17	---	3.5	501	0.478
Aug 23/05	474	376	885	870	7.41	---	---	11.7	52.5	51	104	52.2	21.7	5.3	---	---	0.634	0.088	---	0.93	1.96	1.03	ND	0.3	ND	ND	21	---	11.4	510	0.433
Nov 28/05	495	382	961	720	---	7.60	---	7.8	52.1	52	113	52.0	25.1	4.6	---	---	ND	0.007	---	0.47	0.79	0.32	0.1	0.3	ND	ND	ND	---	3.2	525	0.490
Apr 6/06	548	376	957	900	7.67	7.37	---	7.2	61.8	78	131	53.8	33.3	4.6	---	---	ND	0.193	---	0.78	1.22	0.44	ND	0.3	ND	ND	ND	---	4.2	586	0.618
Jul 24/06	432	411	994	920	7.25	7.86	---	13.6	59.9	77	89.8	50.5	21.7	4.1	---	---	0.018	0.109	---	0.53	0.83	0.30	ND	0.2	ND	ND	ND	---	5.4	548	0.454
Oct 30/06	525	416	950	1,150	7.45	7.32	---	8.4	62.5	67	125	51.5	31.2	4.8	---	---	0.026	0.166	---	0.53	0.85	0.32	ND	0.2	ND	ND	7	---	3.0	594	0.593
Apr 25/07	511	436	1,060	890	7.30	7.43	---	10.2	75.8	76	118	52.8	32.3	3.9	---	---	0.098	0.173	---	0.46	0.83	0.37	ND	0.2	ND	ND	10	---	4.6	622	0.622
Jul 24/07	441	374	813	810	7.16	7.29	---	12.3	50.0	56	85.0	55.5	21.4	3.3	---	---	0.038	0.066	---	0.20	0.58	0.38	0.1	0.2	ND	ND	6	---	1.6	498	0.444
Nov 1/07	570	459	1,050	1,240	7.55	6.99	---	9.2	78.9	88	137	55.2	42.6	4.7	---	---	0.290	0.155	---	0.59	1.14	0.55	ND	0.3	ND	ND	8	---	4.2	683	0.778
May 14/08	426	386	932	996	7.45	7.44	---	9.3	60.0	81	91.1	48.3	28.6	3.5	---	---	0.035	0.099	---	0.38	0.96	0.58	ND	0.2	ND	ND	35	---	2.7	545	0.602
Aug 5/08	605	513	1,140	1,230	7.56	6.92	---	11.6	88.3	94	147	57.7	42.8	5.1	---	---	0.011	0.179	---	0.67	1.21	0.54	ND	0.2	ND	ND	10	---	3.4	745	0.757
Oct.30/08	732	606	1,410	1,420	7.41	7.16	---	8.1	113	107	184	66.0	60.4	5.4	---	---	0.240	0.184	---	0.61	1.10	0.49	ND	0.2	ND	ND	12	---	4.0	901	0.971
May 19/09	578	467	1,150	1,095	7.47	6.85	---	9.5	74.6	85	132	60.1	42.6	4.8	0.192	0.083	0.032	0.253	---	0.40	0.80	0.40	ND	0.3	ND	ND	19	2.7	2.7	682	0.772
Aug 5/09	570	496	1,210	1,270	7.30	6.65	---	10.4	81.4	95	132	58.5	44.5	4.7	0.195	0.088	ND	0.160	---	0.57	1.04	0.47	ND	0.3	ND	ND	17	3.6	3.6	715	0.811
Oct 28/09	671	525	1,350	1,130	7.12	7.11	---	8.6	90.9	106	167	61.9	53.8	5.0	0.231	0.117	0.014	0.025	---	0.53	1.41	0.88	ND	0.3	ND	<3	18	3.9	3.9	801	0.904
Apr 28/10	545	434	1,060	1,049	7.45	7.10	---	7.3	63.0	71	119	60.4	34.3	4.4	0.188	0.083	0.108	0.221	---	0.34	0.81	0.47	ND	0.2	ND	ND	11	2.6	---	614	0.639
Nov 23/10	---	---	---	638	---	7.59	---	8.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Apr 25/11	462	445	1,090	975	7.80	6.77	---	7.7	69.5	76	83.3	61.7	37.3	4.0	0.112	0.115	0.023	ND	---	0.37	0.70	0.33	ND	0.1	ND	ND	11	3.8	---	599	0.755
Nov 2/11	NS																														
Apr 26/12	480	420	1,100	989	8.03	7.21	-27	8.0	66.8	63	97.5	57.4	33.4	4.0	0.140	0.111	0.030	0.176	---	0.36	0.75	0.39	ND	0.2	ND	ND	9	3.7	---	576	0.664
Apr 24/13	591	489	1,190	1,159	7.98	6.40	-123	8.6	82.9	74	133	63.0	51.7	4.8	0.217	0.261	0.102	0.231	---	0.60	1.17	0.57	ND	0.3	ND	ND	6	4.2	---	705	0.925
May 29/14	668	561	1,350	1,169	8.01	7.26	-3	11.4	92.3	78	153	69.6	69.9	5.4	0.190	0.425	0.010	0.152	---	0.82	1.64	0.82	ND	0.2	ND	ND	44	9.3	---	805	1.18
May 12/15	611	630	1,490	1,433	7.87	7.60	-14	7.4	91.2	82	133	67.8	54.5	4.8	0.210	0.408	1.09	0.258	---	0.95	1.80	0.85	ND	0.2	ND	ND	19	7.7	---	815	0.959
Apr 27/16	652	698	1,370	1,476	7.68	6.78	-13	6.7	78.5	83	150	67.4	65.9	5.5	0.235	0.545	0.923	0.301	---	1.50	2.20	0.70	ND	ND	ND	12	56	7.8	---	872	1.12
Apr 19/17	602	614	1,410	615	7.77	7.38	43.7	5.1	71.4	76	133	65.6	51.6	5.7	0.222	0.428	0.538	0.293	---	1.69	1.88	0.19	ND	0.3	ND	ND	6	12.9	---	776	0.915
May 28/18	689	532	1,330	978	8.01	6.87	-19.5	11.0	112	65	141	81.8	71.6	11.6	0.204	0.538	1.42	0.037	---	1.22	1.6	0.38	ND	ND	ND	ND	21	25.6	---	805	1.19
Apr 30/19	667	598	1,390	978	7.88	6.78	8.4	8.8	72.0	69	153	69.2	60.3	6.8	0.255	0.571	0.430	0.323	---	2.06	2.6	0.54	<0.05	0.62	<0.002	<3	<5	7.1	---	792	1.02
Apr 1/20	493	478	1,160	663	7.59	6.83	127.7	7.3	61.3	59	93.4	63.1	29.1	4.7	0.154	0.203	0.017	0.136	---	2.53	3.2	0.67	<0.05	0.72	<0.002	<3	7	5.5	---	601	0.57
May 26/21	580	485	1,200	839	7.93	7.30	17.2	9.8	73.9	60	121	67.5	51.1	6.5	0.222	0.421	0.540	0.31	---	2.37	2.8	0.43	<0.05	0.97	<0.001	<3	19	5.9	---	675	0.923

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3d: Shallow Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-4sBR																															
Apr 21/99	342	290	790	758	---	7.43	---	8.5	57.6	41.4	66.3	42.9	19.7	7.0	---	---	0.34	0.007	2.07	0.45	0.74	0.29	ND	ND	ND	7	110	---	23.0	410	0.460
Oct 18/99	430	351	1,060	1,913	7.20	7.05	---	11.3	90.6	40.5	91.9	48.7	22.5	7.7	---	---	0.27	0.011	0.03	2.36	2.37	0.01	ND	ND	ND	2	7	---	2.0	516	0.470
Jan 25/00	---	---	1,165	1,164	---	---	---	6.4	131	---	---	---	46.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	681	---
May 1/00	524	348	1,190	1,112	7.16	7.60	---	8.2	142	58.5	116	56.9	56.0	13.3	0.74	0.34	0.69	ND	0.03	2.14	2.42	0.28	ND	ND	ND	5	8	---	4.0	655	1.07
Oct 23/00	510	326	1,206	710	7.33	7.80	---	10.5	133	47.0	104	60.9	47.9	12.7	---	---	0.38	0.032	0.17	2.74	4.02	1.28	ND	ND	ND	1	11	---	4.0	601	0.920
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.90	0.32	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	440	320	1,191	710	---	7.90	---	10.0	122	52.0	92.4	151	43.2	10.4	---	---	0.30	0.033	0.36	2.09	2.59	0.50	ND	ND	ND	ND	13	---	2.0	566	0.900
Oct 29/01	524	354	1,155	1,100	7.49	7.30	---	9.7	124	55.5	96.1	69.1	33.9	10.1	0.15	0.23	1.35	0.036	0.19	1.73	2.22	0.49	ND	ND	ND	ND	11	---	4.0	605	0.640
Apr 17/02	464	351	1,323	880	7.12	6.50	---	8.2	136	58.0	90.3	57.9	42.3	10.2	---	---	0.76	0.018	---	1.52	1.62	0.10	ND	ND	ND	4	2	---	2.0	608	0.850
Nov 12/02	549	360	1,030	1,060	8.13	7.60	---	9.7	159	70	110	66.6	53.8	11.0	---	---	1.08	0.030	---	1.40	1.83	0.43	ND	0.2	ND	ND	11	---	2.3	690	1.00
Jun 5/03	533	360	1,320	1,280	7.88	7.60	---	8.6	198	59	110	62.7	28.8	11.4	---	---	1.54	0.030	---	1.74	2.00	0.26	ND	0.2	ND	ND	9	---	2.3	726	1.21
Oct 16/03	528	366	1,170	1,300	7.84	7.90	---	8.1	169	71	106	63.9	54.2	10.4	---	---	0.066	0.023	---	1.52	1.91	0.39	ND	0.1	ND	ND	12	---	6.0	686	1.03
May 27/04	617	349	1,480	1,380	7.80	7.34	---	8.6	251	70	127	72.7	83.5	11.5	---	---	1.39	0.031	---	1.59	2.05	0.46	ND	0.2	ND	ND	6	---	2.0	818	1.46
18-Oct-04	623	375	1,420	1,300	7.32	6.84	---	8.4	225	79	126	74.9	79.7	11.1	---	---	1.34	0.031	---	1.44	1.83	0.39	ND	0.1	ND	2	11	---	2.6	813	1.39
Jun 1/05	640	392	1,600	1,570	---	6.97	---	10.7	268	76	131	75.9	87.9	11.1	---	---	0.194	0.035	---	1.70	2.04	0.34	ND	0.3	ND	ND	14	---	2.6	879	1.51
Aug 23/05	619	383	1,430	1,280	7.24	---	---	10.5	207	70	128	72.5	74.9	12.6	---	---	0.936	0.030	---	1.69	1.99	0.30	ND	0.2	ND	ND	9	---	1.4	786	1.31
Nov 28/05	680	410	1,680	1,430	---	7.39	---	7.5	278	71	143	78.4	103	13.1	---	---	1.82	0.037	---	2.24	2.31	0.07	ND	ND	ND	ND	ND	---	3.1	925	1.73
Apr 6/06	628	410	1,560	1,560	7.70	7.19	---	6.0	251	73	134	71.3	105	12.9	---	---	0.377	0.060	---	2.13	2.45	0.32	ND	0.1	ND	ND	11	---	4.5	884	1.82
Jul 24/06	543	456	1,480	1,390	7.16	7.67	---	11.6	187	93	119	59.7	71.3	9.6	---	---	0.927	0.037	---	1.70	1.96	0.26	ND	0.1	ND	ND	7	---	3.4	807	1.33
Oct 30/06	545	432	1,520	1,610	7.58	7.28	---	8.3	195	78	117	61.5	69.1	11.9	---	---	1.63	0.059	---	1.92	2.37	0.38	ND	0.1	ND	ND	ND	---	2.5	796	1.29
Apr. 25/07	586	428	1,450	1,539	7.24	7.22	---	7.7	255	87	127	65.4	95.4	11.6	---	---	1.69	0.062	---	1.83	2.63	0.80	ND	0.1	ND	ND	8	---	4.2	903	1.71
Jul 24/07	613	420	1,530	1,484	6.88	7.06	---	11.2	251	81	127	72.3	105	12.0	---	---	0.113	0.041	---	1.93	2.40	0.47	ND	0.2	ND	3	11	---	1.4	903	1.85
Nov 1/07	582	396	1,430	1,590	7.11	7.09	---	9.1	212	77	122	67.7	86.6	11.4	---	---	1.76	0.052	---	1.71	2.12	0.41	ND	0.2	ND	ND	6	---	5.2	816	1.56
May 14/08	521	396	1,540	1,622	7.42	7.31	---	9.2	255	80	105	62.9	91.1	9.1	---	---	1.03	0.031	---	1.68	2.02	0.34	ND	ND	ND	ND	21	---	1.1	843	1.74
Aug 5/08	533	405	1,520	1,627	7.39	7.46	---	10.6	246	77	110	62.7	70.1	10.4	---	---	1.31	0.038	---	1.61	1.91	0.30	ND	0.2	ND	ND	5	---	1.2	824	1.32
Oct.30/08	419	336	1,010	1,400	7.69	6.46	---	7.4	121	48	83.6	51.1	43.8	8.7	---	---	1.84	0.046	---	0.65	0.80	0.15	ND	ND	ND	ND	ND	---	1.0	561	0.931
May 19/09	633	387	1,650	1,595	7.48	7.58	---	8.6	249	75	131	74.3	100	11.7	0.115	0.272	1.71	0.047	---	1.53	1.82	0.29	ND	0.1	ND	ND	21	0.7	0.7	878	1.74
Aug 5/09	607	429	1,610	1,730	7.21	6.64	---	8.9	239	76	123	72.8	94.4	11.4	0.119	0.253	1.84	0.045	---	1.99	2.38	0.39	ND	ND	ND	ND	5	1.4	1.4	879	1.67
Oct 28/09	637	369	1,640	1,420	7.53	7.13	---	8.6	215	85	135	72.6	89.8	10.9	0.129	0.265	1.90	0.043	---	1.86	2.26	0.40	ND	ND	ND	<3	8	1.6	4.9	834	1.55
Apr 28/10	643	404	1,590	1,525	7.52	7.16	---	7.6	225	73	136	73.9	92.6	11.2	0.126	0.290	1.85	0.052	---	1.72	2.10	0.38	ND	ND	ND	ND	5	0.6	---	857	1.59
Nov 25/10	575	406	1,520	1,086	7.41	6.90	---	7.4	207	74	119	67.3	80.2	9.6	0.117	0.282	2.01	0.043	---	1.98	2.27	0.29	ND	ND	ND	8	ND	1.1	---	806	1.46
Apr 25/11	580	376	1,360	1,013	7.81	6.93	---	8.9	170	98	115	71.1	47.0	9.7	0.092	0.368	0.13	0.030	---	1.43	1.61	0.18	ND	0.2	ND	ND	5	1.3	---	740	0.849
Nov 3/11	512	442	1,400	1,173	7.68	6.91	-22	8.1	154	69	115	72	60.9	11.1	0.158	0.338	2.43	0.033	---	2.75	3.65	0.90	ND	ND	ND	ND	12	1.9	---	752	1.10
Apr 26/12	509	396	1,390	1,103	8.09	7.24	42	8.1	172	71	102	61.7	55.3	9.3	0.094	0.220	0.374	0.027	---	1.59	2.15	0.56	ND	ND	ND	ND	9	1.3	---	712	1.07
Oct 29/12	618	437	1,260	1,218	7.75	6.97	-136	9.8	143	66	125	74.3	64.5	11.6	0.149	0.298	2.25	0.039	---	2.17	2.68	0.51	ND	ND	ND	ND	9	2.4	---	752	1.13
Apr 24/13	486	384	1,170	1,120	7.96	7.19	-146	9.6	142	67	99.3	57.7	44.7	8.7	0.102	0.291	1.19	0.045	---	1.23	1.57	0.34	ND	ND	ND	ND	5	1.5	---	653	0.882
Oct 30/13	475	409	1,030	1,127	7.38	7.27	-62	9.4	128	67	90.1	60.8	26.6	8.8	0.094	0.453	0.319	0.011	---	0.96	1.91	0.95	ND	ND	<0.001	ND	7	4.9	---	629	0.532
May 29/14	509	354	1,110	1,024	8.11	7.11	-70	9.7	126	76	106	59.2	44.1	9.0	0.099	0.266	1.19	0.038	---	1.07	1.42	0.35	ND	ND	ND	ND	29	3.5	---	633	0.849
Oct 1/14	531	377	1,150	1,612	7.72	6.87	114	13.0	123	59	110	62.4	44.2	9.8	0.122	0.285	1.63	0.035	---	1.66	2.09	0.43	ND	ND	ND	ND	ND	3.8	---	638	0.834
May 12/15	518	415	1,200	1,304	8.02	7.56	-49	7.4	119	59	103	63.4	40.5	8.6	0.108	0.302	1.32	0.033	---	1.13	1.6	0.47	ND	ND	ND	ND	10	3.7	---	646	0.775
Oct 13/15	535	469	1,220	1,270	7.82	7.01	-95	10.7	116	68	102	68.0	51.2	9.1	0.120	0.341	1.66	0.037	---	1.36	1.81	0.45	ND	ND	ND	ND	ND	2.1	---	699	0.963
Apr 27/16	564	475	1,220	1,388	7.81	6.84	-88	7.1	110	76	117	65.9	47.2	9.2	0.122	0.323	0.890	0.032	---	1.18	1.5	0.32	ND	ND	ND	12	15	3.6	---	713	0.866
Oct 12/16	523	411	1,160	957	7.96	6.54	-71	9.1	112	61	105	63.2	41.6	9.1	0.116	0.297	1.42	0.030	---	1.31	1.63	0.32	ND	ND	ND	ND	ND	2.8	---	641	0.791
Apr 19/17	503	403	1,140	740	7.88	7.11	-39.9	6.3	104	65	105	58.4	34.0	9.2	0.111	0.328	1.02	0.029	---	1.04	1.41	0.37	ND	ND	ND	ND	ND	3.7	---	619	0.660
Nov 1/17	636	536	1,370	1,011	7.96	6.97	-80.0	9.7	94.9	53	124	79.2	66.7	11.5	0.178	0.526	1.11	0.035	---	1.34	1.7	0.36	ND	0.2	ND	ND	8	5.8	---	755	1.150
May 28/18	705	690	1,470	938	7.79	6.91	-63.8	10.0	85.8	76	160	74.2	67.3	7.1	0.286	0.510	0.832	0.359	---	2.32	2.8	0.36	ND	0.39	ND	ND	22	14.9	---	889	1.100
Oct 25/18	659	473	1260	903	7.93	6.98	-34.6	9.8	104	57	135	78.2	60.4	10.9	0.199	0.465	1.61	0.037	---	1.72	2.0	0.28	<0.05	<0.05	0.005	<3	13	8.2	---	732	1.02
Apr 30/19	582	481	1300	883	7.86	6.83	-34.7	8.3	104	65	120	68.5	48.8	10.0	0.158	0.412	0.993	0.031	---	1.24	1.6	0.36	<0.05	<0.05	<0.002	<3	13	5.6	---	708	0.880
Duplicate	577	474	1310	---	7.90	---	---	---	101	65	118	68.6	48.1	9.9	0.156	0.414	0.987	0.031	---	1.26	1.6	0.34	<0.05	<0.05	<0.002	<3	14	5.6	---	698	0.871
Oct 21/19	599	532	1410	125.5	7.91	7.12	-48.7	10.1	98.3	56	121	72.1	53.7	10.9	0.190	0.449	1.58	0.032	---	1.96	2.3	0.34	<0.05	0.09	<0.002	<3	13	8.6	---	735	0.955
Apr 1/20	672	551	1440	953	7.56	6.53	65.8	8.3	113	66	142	77.2	65.8	12.5	0.239	0.586	1.12	0.039	---	1.72	2.3	0.58	<0.05	0.05	<0.002	<3	6	8	---	810	1.1
Dec 2/20	689	542	1440	536	7.58	7.13	-75.5	8.7	106	51	141	81.8	77.7	14.1	0.281	0.585	1.68	0.043	---	2.33	3.8	1.47	<0.05	<0.05	<0.002	<3	22	9.1	---	801	1.29
Duplicate	709	538	1480	---	7.63	---	---	---	106	51	144	84.9	80.4	14.5	0.283	0.602	1.7	0.044	---	2.37	4.3	1.93	<0.05	<0.05	<0.002	<3	32	4.9	---	808	1.31
May 26/21	559	422	1170	9.3	8.07	7.6	-53.2	13.2	108	49	111	68.6	49.4	11.1	0.189	0.453	1.16	0.031	---	1.76	2.1	0.34	<0.05	0.07	<0.001	<3	14	3.9	---	653	0.909
Oct 4/21	567	406	1180	976	7.64	6.91	-55.3	9.7	113	48	111	70.4	42	10.8	0.184	0.377	1.97	0.032	---	2.27	2.9	0.63	<0.05	<0.05	<0.002	<3	14	3.6	---	644	0.767

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3d: Shallow Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-5sBR																															
Apr 21/99	320	271	636	608	---	6.84	---	8.8	13.2	39.1	66.3	37.5	7.2	1.2	---	---	0.61	0.017	0.98	ND	0.19	0.19	ND	ND	ND	2	56	---	ND	328	0.180
Oct 18/99	376	308	654	592	7.41	7.81	---	9.8	13.6	42.2	76.0	45.3	5.3	1.6	---	---	0.23	0.014	0.73	ND	ND	ND	ND	ND	ND	ND	14	---	ND	369	0.120
Jan 25/00	---	---	655	652	---	---	---	8.5	15.4	---	---	---	4.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	351	---
May 1/00	410	323	641	606	7.23	7.80	---	9.0	12.6	37.8	84.4	48.5	13.9	ND	0.77	0.16	0.17	0.015	0.50	ND	0.07	0.07	ND	ND	ND	15	41	---	7.0	368	0.120
Oct 23/00	385	304	685	420	7.49	7.90	---	11.1	11.8	39.5	84.0	42.5	6.11	1.42	---	---	0.02	0.022	0.08	0.01	0.10	0.09	ND	ND	ND	ND	2	---	2.0	368	0.140
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.69	0.12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	317	259	668	460	---	8.60	---	11.3	11.2	36.6	71.9	33.5	4.8	ND	---	---	0.22	0.017	0.28	0.03	2.35	2.32	ND	ND	ND	ND	3	---	1.0	314	0.120
Oct 24/01	377	331	708	510	7.60	7.90	---	11.2	14.6	38.5	79.1	43.7	5.8	ND	0.15	0.02	2.65	0.069	0.61	ND	0.12	0.12	ND	ND	ND	ND	6	---	ND	383	0.130
Apr 17/02	362	320	684	550	7.21	6.50	---	7.3	13.6	38.0	78.8	40.2	6.4	ND	---	---	0.01	0.007	---	ND	ND	ND	ND	ND	ND	ND	7	---	1.0	369	0.150
Nov 11/02	405	345	738	630	7.86	7.60	---	11.6	38.1	46	87.6	45.2	8.8	ND	---	---	0.07	0.010	---	ND	ND	ND	ND	0.1	ND	1	11	---	0.8	433	0.190
Jun 10/03	370	327	671	680	7.76	7.80	---	9.9	13.3	38	82.8	39.6	7.1	0.7	---	---	0.27	0.010	---	0.05	0.05	0.00	ND	0.1	ND	ND	6	---	0.9	379	0.160
Oct 16/03	428	333	774	730	7.66	7.90	---	10.3	31.0	44	94.1	46.9	8.1	1.1	---	---	0.020	0.015	---	0.08	0.12	0.04	ND	0.1	ND	ND	4	---	5.0	426	0.170
May 27/04	394	315	631	---	7.82	7.68	---	12.8	12.9	40	87.0	42.9	6.3	0.9	---	---	0.081	0.008	---	ND	0.05	0.05	ND	ND	ND	ND	2	---	ND	379	0.140
Oct 14/04	469	369	767	630	7.53	6.94	---	11.8	22.9	48	103	51.2	8.6	0.9	---	---	ND	ND	---	ND	0.13	0.08	ND	0.1	ND	ND	17	---	1.0	456	0.174
Jun 1/05	417	332	749	780	---	7.33	---	10.0	15.4	41	90.5	46.3	8.6	0.9	---	---	ND	0.003	---	ND	0.08	0.08	ND	1.0	ND	ND	8	---	1.1	406	0.184
Aug 23/05	513	386	865	810	7.34	---	---	13.1	35.5	48	114	55.3	11.0	1.7	---	---	0.904	0.058	---	ND	0.06	0.06	ND	0.1	ND	ND	8	---	14.4	497	0.212
Nov 28/05	460	344	796	600	---	7.82	---	6.8	17.7	40	102	49.9	9.1	1.2	---	---	0.013	ND	---	ND	0.09	0.09	ND	ND	ND	ND	5	---	1.1	425	0.184
Apr 5/06	404	338	712	660	7.86	7.33	---	5.4	14.9	39	88.7	44.2	8.2	1.0	---	---	0.007	0.011	---	ND	0.11	0.11	ND	0.1	ND	ND	11	---	4.9	399	0.177
Jul 24/06	417	266	840	790	7.27	7.83	---	11.5	30.2	45	91.3	45.9	7.4	0.8	---	---	0.452	0.046	---	ND	0.16	0.16	ND	0.1	ND	ND	8	---	3.4	381	0.157
Oct 30/06	403	366	770	845	7.31	7.24	---	9.5	20.1	41	89.7	43.5	7.3	0.8	---	---	0.076	0.011	---	ND	0.05	0.05	ND	0.1	ND	ND	21	---	1.3	422	0.157
Apr 25/07	381	362	743	820	7.41	7.55	---	10.1	14.8	39	84.9	41.0	6.6	0.8	---	---	0.046	0.015	---	ND	ND	ND	ND	0.1	ND	ND	ND	---	2.1	405	0.147
Jul 24/07	417	372	720	661	7.18	7.24	---	13.8	20.3	40	92.1	45.3	7.7	0.8	---	---	0.043	0.009	---	ND	0.11	0.11	ND	0.1	ND	ND	8	---	0.6	430	0.165
Nov 1/07	448	372	759	661	7.63	7.40	---	10.1	29.4	44	98.8	49.0	8.3	1.0	---	---	0.015	0.015	---	ND	0.38	0.38	ND	ND	ND	ND	19	---	5.4	454	0.171
May 14/08	341	360	609	714	7.38	7.73	---	9.6	15.8	41	75.0	37.3	6.3	0.7	---	---	ND	0.006	---	ND	0.07	0.07	ND	0.1	ND	ND	10	---	0.9	393	0.148
Aug 5/08	410	372	724	690	7.61	7.83	---	11.3	25.9	41	90.3	44.8	7.7	1.2	---	---	ND	0.010	---	ND	ND	ND	ND	ND	ND	ND	ND	---	0.8	434	0.165
Oct.30/08	425	381	744	730	7.47	6.60	---	8.1	27.0	40	95.4	45.4	8.2	1.0	---	---	ND	0.006	---	ND	0.10	0.10	ND	ND	ND	ND	ND	---	0.8	446	0.174
May 19/09	424	352	760	695	7.83	7.57	---	8.1	17.5	35	93.2	46.4	8.2	0.9	0.111	0.011	0.028	0.028	---	ND	ND	ND	ND	ND	ND	3	ND	0.5	0.5	412	0.163
Aug 5/09	430	384	816	850	7.31	6.87	---	9.3	24.3	41	93.1	48.1	8.0	0.9	0.117	0.012	ND	0.020	---	ND	ND	ND	ND	ND	ND	ND	10	0.9	0.9	446	0.168
Oct 28/09	456	387	879	820	7.30	7.27	---	8.1	33.3	44	102	48.9	9.2	0.9	0.139	0.011	0.053	0.029	---	ND	ND	ND	ND	ND	ND	ND	ND	0.9	0.8	471	0.186
Apr 28/10	445	341	784	769	7.58	7.33	---	8.0	23.7	38	99.7	47.7	8.0	0.9	0.135	0.012	0.027	0.009	---	0.01	ND	ND	ND	0.1	ND	ND	ND	0.7	---	423	0.165
Nov 23/10	---	---	---	660	---	7.28	---	10.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Apr 25/11	389	352	747	714	7.82	7.04	---	9.2	21.1	35	86.2	42.1	55.5	1.5	0.119	0.056	0.069	0.013	---	ND	0.06	0.06	ND	0.1	ND	ND	ND	0.7	---	453	1.22
Nov 2/11	NS																														
Apr 26/12	425	337	838	773	8.02	7.42	-55	8.4	36.6	35	93.1	46.6	8.2	1.0	0.121	ND	0.013	0.006	---	ND	ND	ND	ND	ND	ND	ND	ND	1.2	---	423	0.172
Apr 24/13	453	365	859	873	7.97	7.38	64	8.5	55.8	39	101	48.8	9.4	0.8	0.150	0.017	0.028	0.026	---	ND	0.15	0.15	ND	ND	ND	ND	ND	1.9	---	474	0.192
May 28/14	465	350	878	738	8.02	8.33	68	9.6	55.6	38	103	50.4	9.1	0.9	0.145	0.016	ND	0.013	---	ND	ND	ND	ND	0.1	ND	ND	ND	3.1	---	467	0.183
May 7/15	515	363	831	902	7.82	7.25	49	10.4	59.7	39	111	57.7	10.3	1.1	0.156	0.019	0.177	0.019	---	ND	ND	ND	ND	ND	ND	ND	ND	1.2	---	497	0.197
Apr 27/16	503	379	931	1,050	7.94	7.09	-4	6.4	81.9	39	109	55.9	10.3	0.9	0.148	ND	0.242	0.016	---	0.04	0.2	0.16	ND	ND	ND	ND	5	1.6	---	525	0.200
Apr 19/17	527	363	983	640	7.90	7.64	24.0	5.1	85.3	37	118	56.4	10.1	0.9	0.162	0.025	0.298	0.025	---	ND	0.35	0.35	ND	ND	ND	ND	7	2.8	---	527	0.191
May 28/18	567	361	995	870	8.12	7.39	9.8	10.6	98.3	40	122	63.8	11.8	0.9	0.178	0.016	0.179	0.017	---	ND	0.1	0.10	ND	ND	ND	ND	ND	2.9	---	553	0.216
May 1/19	502	336	961	583	7.92	7.17	18.1	7.6	83.4	39	111	54.7	9.7	0.9	0.153	0.021	0.149	0.018	---	0.03	<0.1	0.03	<0.05	<0.05	<0.002	<3	<5	2.1	---	500	0.188
Apr 1/20	493	340	917	611	7.81	7.45	37.4	7.3	73.8	39	111	52.5	9.4	0.9	0.144	0.024	0.091	0.021	---	<0.01	0.1	0.10	<0.05	0.06	<0.002	<3	<5	4	---	491	0.184
May 26/21	501	317	865	693	8.03	7.81	97.5	9.3	69.2	40	108	56.3	10.3	0.9	0.141	0.025	0.145	0.016	---	0.01	<0.1	0.01	<0.05	<0.05	<0.001	<3	<5	2.1	---	475	0.200

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3d: Shallow Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-6sBR																															
Apr 21/99	504	430	2,360	2,150	---	7.00	---	9.3	465	119	145	34.4	275	6.3	---	---	3.12	0.388	0.02	0.10	0.38	0.28	ND	ND	ND	6	103	---	43.0	1,306	5.33
Oct 18/99	528	432	2,270	2,570	7.18	7.09	---	10.5	463	100	139	43.9	280	6.3	---	---	3.92	1.01	0.03	0.32	0.64	0.32	ND	ND	ND	1	19	---	8.0	1,297	5.30
Jan 25/00	---	---	1,356	2,150	---	---	---	5.3	164	---	---	---	80.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	717	---
May 1/00	616	411	2,460	2,410	6.99	7.40	---	8.2	480	110	187	36.1	266	5.6	0.62	0.15	0.39	0.454	0.03	0.16	0.46	0.30	ND	ND	ND	12	13	---	7.0	1,332	4.66
Oct 23/00	484	336	971	690	7.36	7.60	---	11.5	70.4	50.4	110	50.8	26.3	5.76	---	---	ND	0.041	0.07	0.26	0.73	0.47	ND	0.8	ND	ND	14	---	5.0	519	0.520
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.80	0.23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	520	366	2,310	1,190	---	7.80	---	10.7	417	86.3	140	41.4	226	5.8	---	---	0.14	0.329	0.10	0.31	0.74	0.43	ND	ND	ND	ND	12	---	3.0	1,137	4.31
Oct 24/01	494	430	2,370	2,370	7.59	7.60	---	10.7	456	83.9	122	45.9	289	6.1	0.21	0.19	7.91	0.674	0.12	0.45	0.93	0.48	ND	ND	ND	ND	21	---	7.0	1,270	5.66
Apr 17/02	573	439	3,400	3,170	6.94	6.70	---	8.2	762	115	158	43.4	43.6	6.4	---	---	3.27	0.674	---	0.26	0.61	0.35	ND	ND	ND	ND	21	---	4.0	1,789	7.92
Nov 11/02	557	366	2,520	1,130	7.82	7.50	---	11.6	181	56	127	58.3	73.3	4.1	---	---	1.21	0.090	---	0.43	0.74	0.31	ND	0.1	ND	2	30	---	4.5	722	1.35
Jun 3/03	474	291	1,070	1,090	7.62	7.60	---	10.2	109	73	111	47.8	45.9	5.8	---	---	0.82	0.030	---	0.40	0.72	0.32	ND	0.1	ND	2	14	---	3.7	569	0.920
Oct 16/03	552	351	1,160	920	7.59	7.50	---	10.0	145	53	126	57.6	35.9	6.2	---	---	0.409	0.020	---	0.35	0.66	0.31	ND	ND	ND	ND	8	---	6.0	635	0.660
May 27/04	367	285	743	---	7.86	7.60	---	11.2	45.6	61	84.7	37.9	25.4	5.2	---	---	0.327	0.017	---	0.28	0.68	0.40	ND	0.1	ND	ND	8	---	3.0	427	0.580
Oct 14/04	473	375	1,040	890	7.53	6.86	---	11.1	100	63	109	48.7	26.3	5.6	---	---	0.211	0.010	---	0.28	0.59	0.31	ND	0.1	ND	ND	16	---	2.9	574	0.526
Jun 1/05	372	302	830	800	---	7.05	---	15.4	54.1	65	85.8	38.3	31.4	4.9	---	---	0.393	0.020	---	0.25	0.56	0.31	ND	0.1	ND	ND	16	---	2.8	457	0.709
Aug 23/05	732	371	1,920	1,590	7.30	---	---	12.6	374	64	167	76.6	128	8.7	---	---	0.494	0.023	---	0.30	0.59	0.29	ND	0.1	ND	ND	13	---	6.8	1,030	2.06
Nov 28/05	251	394	1,830	>1999	---	6.32	---	7.4	381	79	3.94	58.6	273	8.2	---	---	0.877	0.062	---	0.35	1.05	0.70	ND	0.1	ND	ND	20	---	6.5	1,030	7.50
Apr 5/06	670	410	3,810	3,560	7.58	6.92	---	6.6	998	101	181	53.0	568	7.6	---	---	1.10	0.048	---	0.28	0.57	0.29	<3	0.2	ND	ND	17	---	9.5	2,150	9.55
Jul 24/06	370	340	807	1,020	7.33	7.82	---	12.2	49.5	50	85.6	38.0	26.0	5.2	---	---	0.325	0.014	---	0.28	0.58	0.30	ND	0.1	ND	ND	5	---	6.1	451	0.588
Oct 30/06	711	591	3,440	4,132	7.28	7.71	---	9.7	901	128	203	49.6	524	12.5	---	---	2.59	0.620	---	1.25	1.89	0.64	ND	0.1	ND	ND	12	---	7.6	2,180	8.56
Apr 25/07	593	306	2,720	2,510	7.21	7.24	---	10.0	632	89	162	45.6	455	9.9	---	---	0.395	0.492	---	1.41	2.08	0.67	ND	ND	ND	ND	5	---	3.9	1,580	8.13
Jul 18/07	444	382	792	926	7.55	7.14	---	11.9	62.0	59	104	44.6	32.4	5.9	---	---	0.622	0.034	---	0.25	0.60	0.35	0.2	0.2	ND	ND	35	---	2.5	540	0.669
Nov 1/07	482	460	1,790	1,295	7.48	7.21	---	9.4	387	95	122	43.1	198	13.9	---	---	3.27	0.836	---	1.52	2.22	0.70	ND	0.1	ND	ND	7	---	6.0	1,140	3.92
May 14/08	369	352	1,010	1,252	7.56	7.41	---	8.4	106	62	90.2	34.9	98.6	5.9	---	---	0.93	0.113	---	0.45	1.16	0.71	ND	0.1	ND	ND	44	---	2.1	611	2.23
Aug 5/08	405	369	863	880	7.74	7.57	---	12.4	68.1	53	95.8	40.3	31.6	5.9	---	---	0.304	0.027	---	0.24	0.49	0.25	ND	0.6	ND	ND	9	---	2.1	520	0.682
Oct.30/08	584	471	1,480	1,460	7.78	6.90	---	7.3	257	73	134.0	60.4	110	8.3	---	---	0.524	0.058	---	0.50	0.77	0.27	ND	ND	ND	ND	7	---	1.3	926	1.98
May 19/09	331	480	2,280	3,080	7.49	7.03	---	8.6	405	98	78.9	32.6	302	10.1	0.067	0.378	0.188	0.050	---	0.45	1.24	0.79	ND	0.1	ND	ND	24	0.7	0.7	1,220	7.23
Aug 5/09	352	410	782	810	7.68	6.85	---	9.6	39.3	53	81.8	35.8	30.0	5.6	0.147	0.079	0.508	0.050	---	0.33	0.57	0.24	ND	0.1	ND	ND	ND	2.5	2.5	493	0.696
Oct 28/09	578	405	1,420	1,318	7.24	6.94	---	8.2	185	69	137	57.5	62.2	7.6	0.296	0.152	0.785	0.056	---	0.44	0.88	0.44	ND	ND	ND	ND	14	1.5	1.5	763	1.13
Apr 28/10	573	480	2,320	OR	6.89	6.93	---	7.2	398	96	153	43.3	374	9.3	0.139	0.194	2.65	0.312	---	1.13	2.08	0.95	ND	0.1	ND	ND	16	1.8	---	1,360	6.88
Nov 25/10	501	545	2,140	1,280	7.38	7.07	---	7.4	320	83	139	37.1	312	9.2	0.141	0.222	3.21	0.600	---	1.61	2.25	0.64	ND	ND	ND	4	ND	1.6	---	1,230	6.07
Apr 25/11	405	539	2,210	1,797	7.60	6.94	---	7.8	384	83	115	28.6	271	7.1	0.11	0.135	1.30	0.447	---	1.34	1.75	0.41	ND	ND	ND	ND	12	1.6	---	1,220	5.85
Nov 3/11	450	409	1,200	1,034	7.91	6.98	-21	9.9	117	55	130	58.9	42.7	7.5	0.303	0.138	0.864	0.044	---	0.44	0.78	0.34	ND	ND	ND	ND	10	2.0	---	658	0.780
Apr 25/12	434	524	1,730	1,440	7.68	7.05	108	7.3	209	88	112	37.5	165	8.0	0.158	0.147	1.37	0.243	---	1.11	1.87	0.76	ND	ND	ND	6	46	1.9	---	944	3.58
Oct 29/12	607	432	1,230	1,158	7.75	6.71	-120	10.4	136	59	140	62.6	65.1	9.1	0.328	0.177	0.868	0.080	---	0.56	0.82	0.26	ND	ND	ND	ND	58	1.9	---	732	1.15
Apr 23/13	436	497	1,800	1,630	7.90	7.17	38	7.5	225	70	120	32.8	232	9.1	0.154	0.200	1.28	0.493	---	1.68	2.52	0.84	ND	0.2	ND	7	11	5.0	---	991	4.83
Oct 29/13	467	420	974	1,008	7.71	7.31	-21	8.6	68.9	52	111	46.1	41.0	6.6	0.266	0.104	0.644	0.046	---	0.48	0.98	0.50	ND	ND	ND	ND	9	6.2	---	579	0.825
May 28/14	418	493	1,570	1,309	7.90	7.10	-26	8.5	178	67	115	31.9	188	8.7	0.141	0.166	0.952	0.422	---	1.37	1.91	0.54	ND	0.1	ND	5	22	5.5	---	888	4.01
Oct 1/14	437	391	956	904	7.96	7.78	-25	10.3	58.3	45	105	42.6	44	6.6	0.320	0.134	1.67	0.059	---	0.47	0.97	0.50	ND	ND	ND	3	6	3.8	---	539	0.923
May 7/15	448	493	1,210	1,120	7.72	6.90	46	11.4	96.4	53	113	39.9	101	8.5	0.192	0.169	0.806	0.202	---	1.18	1.20	0.02	ND	0.1	ND	ND	8	1.3	---	712	2.09
Oct 8/15	427	411	896	1,122	7.78	7.51	-35	9.5	44.5	40	103	40.9	44.2	7.2	0.228	0.154	0.932	0.158	---	0.62	1.14	0.52	ND	ND	ND	ND	14	2.9	---	529	0.931
Apr 26/16	427	482	1,270	1,310	7.94	7.62	3	7.8	124	59	108	38.2	109	7.9	0.155	0.145	0.943	0.219	---	1.46	1.77	0.31	ND	0.1	ND	ND	9	2.5	---	738	2.29
Oct 11/16	447	471	1,170	1,074	7.93	7.10	58	10.4	98.8	57	107	43.5	62.7	7.4	0.229	0.168	0.977	0.207	---	1.33	1.78	0.45	ND	ND	ND	ND	ND	2.8	---	662	1.29
Apr 18/17	453	513	1,390	1,323	7.82	7.10	134	8.2	139	56	125	34.2	139	7.8	0.187	0.190	0.932	0.381	---	1.86	2.52	0.66	ND	0.2	ND	4	9	7.2		811	2.84
Nov 2/17	417	386	927	625	8.13	7.16	-115	9.6	32.1	35	101	40.0	47.9	7.2	0.217	0.155	0.964	0.143	---	0.97	1.2	0.23	ND	ND	ND	<3	11	7.6	---	497	1.02
May 23/18	376	350	818	578	8.03	7.09	-45	8.9	32.2	41	91.1	36.0	44.0	6.4	0.196	0.110	0.455	0.089	---	0.76	1.0	0.24	ND	0.12	ND	<3	17	3.0	---	462	0.988
Oct 25/18	412	383	916	1,040	7.83	7.02	-354	9.8	42.7	40	95.4	42.1	39.2	7.2	0.219	0.133	0.012	<0.001	---	0.62	0.7	0.08	<0.05	<0.05	0.004	6	<5	5.5	---	497	0.841
Apr 30/19	382	438	1,260	828	7.88	6.97	9.5	7.6	108	44	106	28.5	128	6.2	0.119	0.133	0.125	0.278	---	1.51	1.8	0.29	<0.05	<0.05	<0.002	<3	9	2.8	---	686	2.85
Oct 21/19	482	396	1,110	838	7.79	7.06	-25	10.0	76.5	45	111	49.7	51.1	7.9	0.279	0.183	0.771	0.061	---	0.86	1.1	0.24	<0.05	0.06	<0.002	<3	<5	5.0	---	580	1.01
Mar 31/20	433	428	1,250	828	7.73	7.15	14.8	7.2	119	49	116	34.8	110	6.5	0.168	0.134	0.708	0.231	---	1.32	1.5	0.18	<0.05	0.06	<0.002	<3	<5	4.1	---	695	2.30
Dec 2/20	475	366	991	714	7.8	6.72	34.1	7.7	60.2	48	111	48.1	42.2	7.6	0.284	0.144	0.816	0.043	---	0.82	1.1	0.28	<0.05	<0.05	<0.002	<3	<5	5.3	---	539	0.842
May 25/21	435	387	1,000	448	8.2	6.98	-21.9	8.2	68.3	46	104	42.6	66.9	7.6	0.236	0.145	1.19	0.122	---	1.54	1.6	0.06	0.12	0.11	<0.002	<3	10	3.8	---	571	1.40
Oct 4/21	595	434	1,380	1,114	7.65	7.16	-41	9.5	161	50	139	60.3	77.7	9.4	0.367	0.257	1.77	0.180	---	1.89	2.0	0.11	<0.05	<0.05	<0.002	<3	13	3.9	---	762	1.39

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3d: Shallow Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200			5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-7sBR																															
Apr 21/99	356	275	734	736	---	7.39	---	8.8	45.1	39.8	107	21.5	17.3	4.3	---	---	0.09	0.095	0.03	0.14	0.30	0.16	ND	ND	ND	ND	6	---	7.0	400	0.400
Oct 18/99	451	335	866	788	7.30	7.29	---	10.8	59.3	57.0	111	42.2	22.1	3.6	---	---	0.20	0.115	1.20	0.44	0.82	0.38	ND	ND	ND	ND	17	---	6.0	497	0.450
Jan 25/00	---	---	---	764	6.68	---	---	4.8	39.0	---	---	---	13.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	407	---
May 1/00	347	263	708	667	7.22	7.60	---	6.9	34.4	53.9	100	23.7	21.4	1.5	0.71	0.03	0.20	0.300	0.03	0.13	0.32	0.19	ND	ND	ND	4	10	---	3.0	393	0.500
Oct 23/00	370	297	724	570	7.20	7.60	---	11.1	31.3	41.4	108	24.3	16.2	2.76	---	---	0.77	0.096	0.26	0.24	0.58	0.34	ND	ND	ND	ND	13	---	6.0	403	0.370
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.86	0.13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	332	241	694	360	---	8.40	---	8.9	40.0	52.2	97.8	21.4	12.7	ND	---	---	0.51	0.140	0.49	0.08	0.26	0.18	ND	ND	ND	ND	18	---	2.0	369	0.300
Oct 29/01	485	375	1,072	910	7.31	7.20	---	8.6	94.4	64.2	121	44.4	32.0	5.2	0.10	ND	0.99	0.098	0.08	1.30	2.37	1.07	ND	ND	ND	ND	14	---	2.0	589	0.630
Apr 17/02	358	264	750	410	7.13	6.70	---	9.0	37.8	54.4	101	25.6	16.3	1.7	---	---	0.45	0.225	---	0.26	0.34	0.08	ND	ND	ND	ND	7	---	2.0	396	0.380
Nov 11/02	532	354	911	1,020	8.11	7.20	---	10.7	98.7	64	140	44.3	36.3	2.5	---	---	1.91	0.150	---	0.82	1.30	0.48	ND	0.1	ND	1	18	---	5.2	600	0.680
Jun 3/03	265	228	547	510	7.36	7.80	---	10.6	24.5	54	96.5	18.0	13.2	1.1	---	---	1.17	0.080	---	0.08	0.67	0.59	ND	0.1	ND	ND	25	---	5.2	346	0.320
Oct 16/03	366	251	747	660	7.60	7.90	---	10.8	48.6	70	105	25.3	19.9	2.0	---	---	0.154	0.035	---	0.31	0.62	0.31	ND	0.1	ND	ND	16	---	8.0	422	0.450
May 27/04	318	240	573	---	8.04	7.45	---	11.3	18.7	36	96.4	18.9	14.7	1.1	---	---	2.02	0.128		0.10	0.42	0.32	ND	ND	ND	ND	13	---	3.9	331	0.360
Oct 14/04	350	306	757	650	7.44	6.81	---	11.2	38.8	61	105	21.1	20.5	1.4	---	---	0.957	0.134	---	0.35	0.60	0.25	ND	0.1	ND	1	16	---	4.1	432	0.476
Jun 1/05	351	268	722	710	---	6.94	---	10.0	34.4	55	105	21.6	19.3	1.1	---	---	0.513	0.187	---	0.16	0.53	0.37	ND	0.1	ND	ND	8	---	4.1	398	0.448
Aug 23/05	498	374	1,010	930	7.30	---	---	11.4	89.3	62	143	34.3	33.6	1.8	---	---	0.768	0.160	---	0.21	0.52	0.31	ND	0.1	ND	ND	13	---	9.9	588	0.655
Nov 28/05	182	190	405	360	---	7.61	---	3.3	9.7	15	55.9	10.3	12.0	1.4	---	---	10.2	0.048	---	0.10	1.68	1.58	ND	0.2	ND	11	110	---	35.9	230	0.387
Apr 13/06	157	166	361	220	7.12	7.34	---	6.1	6.7	14	47.4	9.45	8.4	0.7	---	---	0.261	0.011	---	ND	1.38	1.38	ND	0.1	ND	ND	40	---	6.0	186	0.292
Jul 20/06	254	254	562	500	7.94	7.36	---	16.8	14.3	39	78.4	14.0	13.1	1.1	---	---	0.172	0.001	---	ND	0.28	0.28	ND	0.1	ND	ND	ND	---	6.4	312	0.358
Oct 30/06	192	188	435	869	7.14	7.85	---	9.4	9.7	43	59.0	10.9	8.0	0.8	---	---	0.130	0.016	---	ND	0.79	0.79	ND	0.1	ND	ND	33	---	7.6	244	0.250
Apr 26/07	175	188	412	540	7.58	7.36	---	10.3	7.5	22	53.4	10.2	6.9	0.7	---	---	0.108	0.016	--	ND	1.20	1.20	ND	ND	ND	ND	32	---	3.4	213	0.227
Jul 18/07	347	298	728	702	7.41	7.14	---	11.4	26.1	53	105	20.8	22.7	1.3	---	---	1.61	0.215	---	0.06	0.48	0.42	0.1	0.2	ND	ND	19	---	2.4	411	0.530
Oct 31/07	178	232	608	640	7.63	7.31	---	10.4	19.1	56	49.1	13.4	56.3	4.9	---	---	ND	0.002	---	0.02	0.81	0.79	ND	0.1	ND	3	46	---	5.9	339	1.84
May 14/08	260	278	633	650	7.72	7.32	---	7.9	23.6	43	75.9	17.0	16.5	1.1	---	---	1.08	0.259	---	0.31	0.51	0.20	ND	ND	ND	ND	6	---	3.0	345	0.446
Aug 5/08	351	309	700	740	7.75	7.31	---	12.4	32.0	45	102	23.5	24.2	2.1	---	---	2.58	0.258	---	0.28	0.67	0.39	ND	0.3	ND	ND	18	---	3.4	418	0.562
Oct.30/08	445	432	984	1020	7.92	6.56	---	8.6	81.6	64	121	34.7	38.4	4.4	---	---	2.02	0.248	---	1.52	2.05	0.53	ND	ND	ND	ND	22	---	3	607	0.792
May 14/09	280	223	599	470	7.51	6.80	---	10.7	17.2	39	83.9	17.1	16.5	1.1	0.094	0.014	0.179	0.257	---	0.22	0.50	0.28	ND	0.1	ND	ND	9	3.7	3.7	310	0.430
Aug 4/09	317	277	669	730	7.16	7.07	---	11.3	24.1	58	94.2	19.8	21.2	1.4	0.11	0.021	4.66	0.233	---	0.24	0.80	0.56	ND	ND	ND	ND	17	2.9	2.9	390	0.520
Oct 26/09	465	381	1050	791	7.93	7.63	---	9.1	70.3	79	126	36.6	38.1	3.0	0.249	0.062	5.24	0.283	---	0.64	1.01	0.37	ND	ND	ND	ND	26	3.2	3.3	588	0.768
Apr 26/10	303	253	600	530	7.25	7.34	---	7.1	19.9	42	91.2	18.3	18.4	1.2	0.113	0.016	0.373	0.325	---	0.15	0.66	0.51	ND	0.1	ND	ND	13	3.5	---	344	0.461
Nov 22/10	---	---	---	600	---	7.08	---	8.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Apr 25/11	348	339	742	728	8.03	6.85	---	7.0	27.6	40	96.3	26	18.5	1.8	0.188	0.036	1.99	0.500	---	0.70	1.04	0.34	ND	ND	ND	ND	ND	2.5	---	417	0.432
Nov 1/11	NS																														
Apr 25/12	310	260	641	596	7.76	9.13	160	6.6	22.6	37	92.4	19.1	18.3	1.1	0.118	0.006	0.554	0.160	---	0.09	0.37	0.28	ND	ND	ND	ND	52	3.3	---	347	0.453
Apr 23/13	378	338	763	805	7.80	7.33	6	7.5	25.9	54	104	28.5	20.6	1.8	0.228	0.045	1.88	0.547	---	0.62	2.14	1.52	ND	ND	ND	5	34	3.0	---	441	0.462
May 28/14	354	312	720	808	7.97	6.98	127	8.5	21.0	36	104	22.7	23.4	1.5	0.169	0.031	0.023	0.431	---	0.18	0.77	0.59	ND	0.1	ND	3	38	4.5	---	398	0.541
May 7/15	383	327	692	700	7.66	7.00	-3	8.3	23.7	41	114	24.0	24.3	1.4	0.172	0.027	0.783	0.272	---	0.21	0.50	0.29	ND	0.1	ND	ND	ND	2.1	---	426	0.541
Apr 26/16	375	327	707	977	7.90	7.14	2	6.3	77.9	48	109	24.9	26.5	1.7	0.194	0.033	1.38	0.421	---	0.41	0.86	0.45	ND	ND	ND	3	18	6.7	---	487	0.596
Apr 17/17	407	348	792	863	7.84	7.22	51	7.0	30.3	42	114	29.7	23.8	2.0	0.260	0.073	1.31	0.509	---	0.71	1.73	1.02	<0.1	<0.1	<0.001	<3	29	5.0	---	454	0.513
May 24/18	352	339	717	496	7.94	6.99	-52.5	7.9	21.1	33	103	22.9	26.1	1.5	0.180	0.040	0.99	0.295	---	0.50	0.70	0.20	<0.05	<0.05	<0.001	<3	14	15.5	---	413	0.606
Apr 29/19	374	306	776	522	7.78	7.02	-72.3	6.3	27.3	50	104	27.8	21.6	1.9	0.196	0.051	1.34	0.400	---	0.56	7.60	7.04	<0.05	<0.05	0.002	13	167	4.3	---	419	0.486
Mar 31/20	392	315	774	545	7.67	7.33	-14.9	6.5	33.4	41	110	28.5	20.5	1.8	0.202	0.052	2.94	0.449	---	0.50	1.40	0.90	<0.05	0.06	<0.002	6	35	4.2	---	428	0.450
Duplicate	395	319	785	---	7.76	---	---	---	32.6	41	111	28.6	20.5	1.8	0.221	0.054	1.51	0.396	---	0.50	1.20	0.70	<0.05	0.07	<0.002	5	85	4.2	---	429	0.449
May 25/21	307	268	657	542	8.34	7.34	-31.9	9.2	25.8	44	88.9	20.6	23.0	1.4	0.147	0.042	1.02	0.223	---	0.40	0.60	0.20	0.09	0.11	<0.002	<3	9	5.8	---	366	0.571

🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3d: Shallow Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200			5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-8sBR																															
Apr 21/99	474	373	1,044	953	---	6.42	---	8.4	88.1	42.4	126	38.6	29.9	8.0	---	---	0.61	0.357	0.90	4.31	4.69	0.38	ND	ND	ND	ND	29	---	5.0	563	0.600
Oct 18/99	470	410	1,180	1,057	7.18	7.23	---	10.3	103	73.2	113	45.7	35.2	6.8	---	---	1.31	0.435	0.07	7.45	7.55	0.10	ND	ND	ND	1	14	---	7.0	634	0.710
Jan 25/00	---	---	1,041	1,021	---	---	---	7.8	83.9	---	---	---	30.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	598	---
May 1/00	462	352	1,039	984	7.07	7.30	---	6.9	83.7	49.9	122	38.2	36.6	6.7	0.89	0.11	1.47	0.205	0.25	3.65	3.91	0.26	ND	ND	ND	7	24	---	8.0	555	0.740
Oct 23/00	472	405	1,113	880	7.45	8.00	---	11.9	95.7	58.1	108	49.1	34.4	6.94	---	---	0.64	0.315	0.41	4.67	5.28	0.61	ND	1.8	ND	3	14	---	10.0	610	0.690
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.01	0.17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	438	336	1,027	570	---	8.20	---	10.5	81.5	49.2	112	38.4	27.8	4.9	---	---	0.89	0.221	0.27	2.82	3.73	0.91	ND	ND	ND	ND	11	---	6.0	520	0.580
Oct 29/01	539	402	1,197	770	7.37	8.00	---	9.6	109	63.5	117	59.9	32.3	6.9	0.39	0.09	2.44	0.296	0.13	6.34	6.43	0.09	ND	ND	ND	ND	16	---	4.0	641	0.610
Apr 17/02	516	396	1,113	640	7.16	6.90	---	8.7	94.7	48.8	116	54.9	35.0	6.6	---	---	0.87	0.200	---	3.89	4.32	0.43	ND	0.8	ND	ND	17	---	4.0	603	0.670
Nov 11/02	580	366	1,110	1,090	7.90	7.30	---	11.2	156	72	134	59.7	47.7	5.6	---	---	2.80	0.210	---	4.66	5.59	0.93	0.2	0.3	ND	2	8	---	4.6	706	0.860
Jun 3/03	511	399	1,150	1,150	7.16	7.60	---	10.8	125	56	127	54.4	41.0	6.4	---	---	1.43	0.160	---	3.23	5.31	2.08	0.3	0.5	ND	ND	46	---	5.9	659	0.770
Oct 16/03	527	381	1,170	1,140	7.73	7.50	---	10.4	114	69	126	51.6	43.8	7.5	---	---	0.369	0.248	---	5.21	9.02	3.81	ND	0.1	ND	ND	14	---	14.0	648	0.830
May 27/04	519	381	1,030	---	7.67	7.39	---	10.1	94.1	60	123	51.6	33.7	5.5	---	---	1.38	0.189	---	2.39	3.08	0.69	0.8	1.2	ND	2	26	---	5.2	603	0.640
Oct 14/04	570	471	1,330	1,150	7.29	6.72	---	10.1	155	59	126	61.9	55.2	8.6	---	---	3.90	0.138	---	4.00	4.71	0.71	ND	0.2	ND	2	17	---	4.8	750	1.01
Jun 1/05	578	436	1,250	1,250	---	6.83	---	10.5	123	56	128	63.1	49.5	8.5	---	---	3.49	0.107	---	4.55	5.64	1.09	ND	0.1	ND	13	64	---	9.1	690	0.896
Aug 23/05	641	475	1,440	1,320	7.11	---	---	12.6	176	55	143	69.1	68.2	11.8	---	---	2.43	0.092	---	5.50	5.85	0.35	ND	0.2	ND	7	22	---	13.3	807	1.17
Nov 28/05	550	482	1,270	900	---	7.03	---	5.3	139	55	131	54.4	43.3	6.7	---	---	0.007	0.082	---	2.91	3.34	0.43	ND	0.2	ND	14	23	---	7.2	716	0.803
Apr 6/06	582	460	1,200	1,110	7.35	7.04	---	5.7	132	55	135	59.3	50.2	6.6	---	---	0.062	0.506	---	2.72	26.9	24.18	0.4	1.6	ND	27	704	---	206	720	0.905
Jul 20/06	463	404	1,010	1,150	7.52	7.46	---	13.7	107	64	113	44.0	41.8	4.8	---	---	1.25	0.262	---	3.00	3.93	0.93	0.1	0.1	ND	3	18	---	6.5	619	0.846
Oct 30/06	430	412	1,020	1,299	7.24	7.01	---	9.0	90.6	56	101	43.3	38.7	5.1	---	---	ND	0.146	---	2.47	3.26	0.79	ND	0.2	ND	ND	13	---	4.9	586	0.812
Apr 25/07	525	444	1,130	1,168	7.35	7.15	---	6.9	127	64	121	54.1	48.3	6.4	---	---	6.47	0.194	---	2.92	6.59	3.67	ND	ND	ND	9	120	---	4.2	699	0.917
Jul 24/07	605	438	1,190	1,379	7.05	7.12	---	12.8	147	73	136	64.4	70.9	8.0	---	---	10.2	0.231	---	4.35	5.92	1.57	0.2	0.7	ND	11	77	---	5.6	783	1.25
Nov 1/07	498	414	1,260	937	7.49	7.26	---	9.8	106	66	123	46.6	46.8	5.4	---	---	3.09	0.417	---	2.39	3.16	0.77	ND	0.2	ND	10	15	---	7.3	646	0.912
May 06/08	551	411	1,190	1,117	7.49	7.10	---	8.1	124	59	126	57.6	53.6	6.5	---	---	3.43	0.757	---	2.59	1.58	-1.01	0.5	0.9	ND	22	40	---	2.5	686	0.994
Aug 5/08	506	429	1,160	1,300	7.47	7.29	---	10.4	140	59	121	49.5	54.3	7.1	---	---	5.68	0.259	---	2.92	3.12	0.20	ND	0.3	ND	12	16	---	2.4	699	1.05
Oct.30/08	451	381	982	984	7.66	7.40	---	8.0	63.7	88	119	37.0	39.3	4.7	---	---	1.37	0.463	---	2.96	3.73	0.77	ND	0.2	ND	ND	9	---	3.4	587	0.806
May 14/09	595	453	1,580	1,434	7.35	7.57	---	9.4	187	58	131	65.3	73.8	8.0	0.306	0.099	3.44	0.235	---	3.42	4.31	0.89	ND	1.1	ND	18	35	1.7	1.8	807	1.320
Aug 4/09	467	396	1,020	970	7.20	7.14	---	10.3	69.6	70	114	44.0	37.8	5.2	0.283	0.067	3.60	0.400	---	2.70	4.39	1.69	ND	0.3	ND	14	22	3.4	3.5	587	0.762
Oct 26/09	472	363	1,080	930	7.43	7.32	---	8.7	75.1	81	117	43.5	43.5	5.6	0.317	0.074	4.81	0.668	---	1.96	4.76	2.80	1.8	ND	ND	10	279	3.2	3.2	600	0.872
Apr 26/10	489	417	1,030	970	7.28	7.17	---	7.2	68.8	58	121	45.2	31.6	4.1	0.293	0.055	3.18	0.796	---	2.13	5.92	3.79	0.4	1.2	ND	15	84	2.7	---	592	0.662
Nov 29/10	446	436	1,080	1,060	7.35	6.97	---	8.5	66.0	47	110	41.7	36.5	5.0	0.255	0.077	2.18	0.406	---	3.33	4.35	1.02	ND	0.1	ND	7	12	3.5	---	575	0.752
Apr 25/11	429	431	1,050	989	7.89	6.92	---	8.0	72.6	52	107	39.3	35.3	4.2	0.204	0.071	3.10	0.425	---	3.76	4.63	0.87	ND	0.2	ND	ND	20	3.6	---	579	0.742
Nov 1/11	465	408	1,180	1,180	7.62	7.09	-60	10.5	108	69	111	45.6	48.7	5.1	0.257	0.099	3.95	0.623	---	2.97	4.90	1.93	ND	0.3	ND	15	40	3.1	---	641	0.982
Apr 25/12	544	484	1,300	1,108	7.61	7.14	254	7.2	124	60	120	59.6	62.5	7.7	0.266	0.097	3.77	0.641	---	3.33	5.92	2.59	ND	0.1	ND	41	50	2.7	---	734	1.16
Oct 30/12	663	452	1,460	1,072	7.65	7.22	-114	13.0	176	75	147	71.9	106	9.7	0.391	0.167	11.4	0.190	---	3.99	5.19	1.20	ND	ND	ND	5	26	3.1	---	873	1.78
Apr 23/13	478	434	1,110	1,111	7.81	7.24	90	6.8	86.3	57	114	46.9	41.2	4.8	0.275	0.094	2.76	0.398	---	2.64	4.97	2.33	ND	0.4	ND	21	63	3.4	---	619	0.819
Oct 29/13	487	456	1,210	1,083	7.59	7.02	-17	8.9	132	61	121	44.8	53.6	6.1	0.307	0.101	3.33	0.430	---	3.94	5.16	1.22	ND	ND	ND	3	17	6.9	---	701	1.06
May 29/14	528	419	1,180	918	8.12	7.12	-183	9.6	110	55	120	55.1	68.8	6.7	0.222	0.106	0.035	0.316	---	2.12	4.91	2.79	ND	0.2	ND	8	29	5.1	---	669	1.30
Oct 1/14	465	376	1,030	1,035	7.87	7.08	-128	10.7	89.8	50	112	44.8	53.8	5.7	0.410	0.126	10.5	0.418	---	2.40	5.02	2.62	ND	0.3	ND	8	51	5.2	---	597	1.09
May 7/15	466	397	908	961	7.73	7.38	-32	11.5	60.5	43	116	42.8	40.3	4.8	0.256	0.095	3.08	0.503	---	2.95	4.00	1.05	ND	0.3	ND	10	15	1.9	---	554	0.812
Oct 8/15	424	413	993	757	7.67	7.09	-36	9.3	68.3	67	109	36.9	43.0	4.2	0.248	0.114	3.21	0.413	---	2.56	3.91	1.35	ND	0.2	ND	ND	55	2.4	---	584	0.909
Apr 26/16	477	432	1,020	1,238	7.85	7.16	155	5.4	18.2	62	118	44.2	43.1	5.2	0.255	0.102	3.07	0.472	---	3.62	4.35	0.73	ND	ND	ND	ND	14	7.5	---	559	0.858
Oct 11/16	410	438	985	1,806	7.78	7.19	-137	10.9	69.5	62	104	36.3	43.7	4.2	0.242	0.090	2.36	0.384	---	3.14	3.65	0.51	ND	0.2	ND	ND	11	5.0	---	590	0.940
Apr 17/17	507	442	1,240	1,338	7.83	7.17	4	7.1	115	58	126	46.6	43.9	5.0	0.303	0.115	3.19	0.391	---	3.29	3.68	0.39	ND	ND	ND	ND	9	6.0	---	668	0.849
Nov 1/17	439	418	955	613	8.05	7.11	4	10.6	46	34	107	41.8	42.5	5.3	0.264	0.128	2.83	0.434	---	3.31	3.50	0.19	<0.1	0.1	<0.001	<3	<5	9.7	---	535	0.882
May 24/18	486	454	1,350	685	7.88	7.05	-86	8.0	153	63	115	48.3	62.0	6.5	0.301	0.145	6.80	0.406	---	4.49	6.50	2.01	<0.05	<0.05	<0.001	<3	29	5.8	---	733	1.220
Oct 25/18	455	406	971	636	7.88	7.11	-456	9.8	49.3	69	120	37.7	41.8	4.8	0.302	0.138	2.66	0.429	---	3.27	3.3	0.03	<0.05	0.07	<0.002	<3	7	10.1	---	574	0.853
Apr 29/19	476	428	1,070	719	7.80	6.93	-47.3	6.5	67.6	50	117	44.7	42.5	4.9	0.258	0.114	2.66	0.372	---	3.35	4.6	1.25	<0.05	0.11	<0.002	7	25	4.9	---	590	0.847
Oct 21/19	429	356	1,010	756	7.91	6.91	-45.4	10.2	60.8	60	109	38.1	43.0	5.3	0.277	0.140	2.81	0.346	---	3.49	3.6	0.11	<0.05	0.19	<0.002	5	9	6.6	---	538	0.903
Mar 31/20	491	398	1,060	735	7.64	7.23	21.4	6.2	76.9	50	121	45.8	43.1	5.3	0.275	0.123	2.6	0.319	---	3.71	4.5	0.79	<0.05	0.12	<0.002	<3	61	5.4	---	589	0.847
Dec 1/20	496	380	1,050	779	7.49	7.44	-26.2	9.3	77.9	53	116	50.1	60.4	6.6	0.36	0.194	13.3	0.264	---	3.79	4.7	0.91	<0.05	<0.05	<0.002	<3	13	5.8	---	597	1.18
May 25/21	415	376	946	735	8.29	7.55	84.1	9.3	60.4	42	99.1	40.8	41.8	5.4	0.235	0.127	2.91	0.29	---	2.68	2.5	0.18	0.1	0.16	<0.002	<3	14	4.1	---	522	0.892
Oct 4/21	482	386	1,040	852	7.66	7.18	-33.8	11	65.8	60	121	43.3	47.1	5.8	0.323	0.153	3.66	0.360	---	3.52	4.0	0.48	<0.05	<0.05	<0.002	<3	16	5.4	---	583	0.934

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3d: Shallow Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.0	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-9sBR																															
Apr 21/99	313	277	620	603	---	6.70	---	9.5	10.3	24.9	92.0	20.2	10.4	4.1	---	---	ND	0.027	1.26	0.04	0.25	0.21	ND	ND	ND	12	102	---	5.0	328	0.260
Oct 18/99	388	304	709	613	7.33	7.55	---	10.3	34.3	26.1	94.8	36.8	9.3	2.4	---	---	ND	0.125	ND	0.10	0.18	0.08	ND	ND	ND	ND	2	---	4.0	386	0.210
Jan 25/00	---	---	659	670	---	---	---	4.9	24.4	---	---	---	8.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	359	---
May 1/00	314	275	579	545	7.26	7.60	---	8.7	11.8	21.5	75.8	30.2	10.8	1.6	0.82	0.10	0.04	0.059	0.03	0.04	0.18	0.14	ND	ND	ND	6	6	---	---	317	0.270
Oct 23/00	337	314	629	480	7.40	8.00	---	10.4	14.2	17.4	84.2	30.9	8.89	3.32	---	---	0.19	0.138	0.03	0.20	0.53	0.33	ND	ND	ND	1	11	---	5.0	348	0.210
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.98	0.18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	315	274	614	500	---	8.50	---	12.4	13.1	21.2	74.0	31.7	8.1	2.3	---	---	0.13	0.082	0.02	0.08	0.24	0.16	ND	ND	ND	ND	2	---	1.0	315	0.200
Oct 29/01	355	335	759	660	7.54	7.50	---	9.5	35.1	28.0	85.0	34.6	10.6	3.1	0.27	0.06	0.45	0.021	0.05	0.14	0.68	0.54	ND	ND	ND	ND	8	---	2.0	398	0.240
Apr 17/02	327	306	676	410	7.30	6.70	---	8.5	19.3	25.0	78.8	31.6	11.9	3.0	---	---	0.08	0.011	---	0.07	0.25	0.18	ND	ND	ND	ND	3	---	ND	353	0.290
Nov 11/02	397	315	602	640	8.06	7.40	---	11.0	33.3	30	99.1	36.4	14.5	0.6	---	---	0.39	0.010	---	0.17	0.33	0.16	ND	0.1	ND	1	5	---	3.3	404	0.320
Jun 3/03	349	297	646	570	7.59	7.90	---	11.8	21.7	28	87.6	31.7	13.8	3.1	---	---	0.47	0.010	---	0.16	0.48	0.32	0.1	0.2	ND	ND	17	---	2.1	366	0.320
Oct 16/03	363	306	695	660	7.64	7.90	---	10.8	26.8	28	90.8	33.2	14.3	3.3	---	---	0.260	0.007	---	0.17	0.29	0.12	ND	0.1	ND	1	6	---	6.0	381	0.330
May 27/04	318	276	583	---	8.13	7.67	---	10.4	13.0	24	77.3	30.4	10.2	3.4	---	---	0.301	0.007	---	0.12	0.31	0.19	ND	0.2	ND	ND	3	---	0.8	322	0.250
Oct 14/04	325	312	657	540	7.65	7.02	---	10.5	19.7	26	80.1	30.3	11.4	3.0	---	---	0.274	0.007	---	0.11	0.29	0.18	ND	0.1	ND	ND	3	---	1.8	356	0.276
Jun 1/05	311	268	596	580	---	7.04	---	12.1	13.5	24	74.8	30.0	10.6	2.7	---	---	0.162	0.018	---	0.08	0.27	0.19	ND	0.2	ND	4	9	---	3.1	315	0.262
Aug 23/05	334	293	625	750	7.49	---	---	13.3	16.4	23	81.4	31.7	11.5	3.6	---	---	0.576	0.006	---	0.12	0.34	0.22	ND	0.1	ND	ND	ND	---	4.1	341	0.275
Nov 28/05	360	316	689	610	---	6.62	---	9.5	16.4	26	87.9	34.2	14.1	3.7	---	---	0.020	0.006	---	0.14	0.36	0.22	ND	ND	ND	ND	ND	---	1.7	368	0.324
Apr 6/06	329	300	558	500	7.75	7.38	---	6.7	10.9	23	79.9	31.4	11.6	3.2	---	---	0.149	0.015	---	0.08	0.35	0.27	0.1	0.1	ND	ND	ND	---	1.1	338	0.279
Jul 20/06	295	306	526	510	7.69	7.72	---	13.1	10.3	22	71.2	28.4	8.6	2.7	---	---	0.176	0.006	---	0.12	0.16	0.04	ND	0.1	ND	ND	ND	---	1.8	325	0.217
Oct 30/06	295	310	570	651	7.46	7.55	---	8.8	10.9	21	72.5	27.6	8.3	2.9	---	---	0.172	0.005	---	0.02	0.19	0.17	ND	ND	ND	ND	6	---	1.1	329	0.211
Apr25/07	295	298	531	565	7.54	7.56	---	8.9	7.4	20	72.2	27.9	8.8	3.0	---	---	0.028	0.009	---	0.03	0.34	0.31	ND	ND	ND	ND	5	---	1.1	319	0.223
Jul 24/07	296	292	523	545	7.34	7.38	---	18.2	7.4	19	73.2	27.6	8.4	2.7	---	---	0.381	0.007	---	0.02	0.20	0.18	ND	0.2	ND	3	ND	---	0.7	315	0.211
Nov 1/07	310	290	534	640	7.57	7.32	---	9.2	7.6	20	76.5	28.8	9.0	2.9	---	---	0.253	0.009	---	0.05	0.25	0.20	ND	0.1	ND	ND	7	---	3.1	317	0.221
May 6/08	298	290	577	544	7.97	7.50	---	10.3	6.8	20	73.9	27.6	8.2	2.7	---	---	0.037	0.016	---	0.07	0.37	0.30	ND	0.2	ND	4	21	---	0.9	312	0.207
Aug 5/08	292	290	526	558	7.85	7.46	---	10.3	8.5	19	73.2	26.6	8.4	2.8	---	---	0.440	0.009	---	0.10	0.27	0.17	<0.1	0.1	ND	ND	39	---	1.0	313	0.214
Oct.30/08	322	312	582	661	7.83	7.75	---	7.2	15.3	20	81.7	28.7	10.0	2.9	---	---	0.217	0.013	---	0.12	0.21	0.09	ND	ND	ND	ND	ND	---	1.5	346	0.242
May 14/09	323	290	620	547	7.51	7.87	---	8.4	12.1	21	78.2	31.1	10.2	3.0	0.176	0.064	0.015	0.011	---	0.04	0.17	0.13	ND	0.2	ND	ND	ND	1.0	1.0	329	0.247
Aug 4/09	307	288	593	620	7.34	6.86	---	9.6	13.2	24	74.2	29.4	9.1	2.8	0.181	0.059	0.029	0.010	---	0.14	0.17	0.03	ND	0.1	ND	ND	ND	1.2	1.3	326	0.227
Oct 26/09	398	306	733	660	7.55	7.64	---	8.0	26.8	25	95.9	38.5	14.7	3.5	0.280	0.087	0.366	0.023	---	0.10	0.26	0.16	ND	0.2	ND	ND	14	1.6	2.2	390	0.321
Apr 26/10	331	299	616	580	7.40	7.12	---	9.5	12.6	21	82.0	30.8	10.3	2.9	0.224	0.069	0.157	0.023	---	0.11	0.20	0.09	ND	0.1	ND	ND	ND	1.0	---	340	0.246
Nov 25/10	305	296	607	540	7.57	7.55	---	7.7	11.2	20	74.5	29.0	8.7	2.6	0.197	0.069	0.267	0.011	---	0.07	0.20	0.13	ND	ND	ND	ND	ND	1.2	---	324	0.216
Apr 25/11	274	280	557	551	7.94	7.27	---	7.6	6.4	19	67.9	25.3	7.3	2.4	0.172	0.056	0.093	0.012	---	ND	0.33	0.33	ND	0.1	ND	ND	ND	1.0	---	297	0.191
Nov 1/11	422	323	757	700	7.65	7.27	-21	9.6	40.6	25	95.4	44.8	16.7	3.8	0.302	0.134	0.533	0.017	---	0.11	0.17	0.06	ND	0.1	ND	ND	ND	1.5	---	421	0.354
Apr 25/12	310	294	647	597	7.87	7.34	245	7.5	15.7	22	77.2	28.6	8.9	2.8	0.284	0.121	0.317	0.018	---	ND	0.14	0.14	ND	0.1	ND	4	28	1.6	---	332	0.221
Oct 30/12	362	325	680	689	7.67	7.37	-113	11.8	16.8	20	92.8	31.6	12.0	4.2	0.279	0.065	2.64	0.100	---	10.5	12.7	2.20	ND	ND	0.039	48	325	17.4	---	389	0.275
Apr 23/13	317	302	585	580	7.88	7.43	-155	8.5	8.9	20	79.7	28.5	9.0	2.4	0.209	0.067	0.294	0.021	---	0.64	3.91	3.27	ND	ND	0.025	4	53	2.6	---	330	0.219
Oct 29/13	312	296	540	701	7.88	7.66	-49	8.4	7.6	19	79.9	27.3	9.1	2.8	0.167	0.046	2.01	0.105	---	0.64	2.74	2.10	ND	ND	ND	6	26	3.7	---	326	0.225
May 29/14	304	256	538	388	8.20	7.43	-117	9.9	6.3	19	77.2	27.1	7.5	2.4	0.186	0.054	0.158	0.007	---	ND	0.63	0.63	ND	ND	ND	ND	29	4.9	---	293	0.188
Oct 1/14	307	294	678	708	8.03	7.34	-74	10.7	30.4	24	75.3	28.9	9.0	2.6	0.266	0.077	0.019	0.004	---	0.5	1.85	1.35	ND	ND	ND	ND	58	4.3	---	348	0.224
May 7/15	406	340	723	811	7.94	7.33	-24	9.7	30.8	30	95.2	40.9	21.4	4.0	0.289	0.142	0.332	0.017	---	0.15	0.6	0.45	ND	ND	ND	ND	ND	0.9	---	427	0.462
Oct 8/15	421	388	895	1,093	7.76	7.28	82	9.5	61.1	37	96.8	43.7	26.5	4.2	0.326	0.161	0.507	0.013	---	0.26	0.51	0.25	ND	ND	ND	ND	13	3.3	---	503	0.563
Apr 26/16	449	375	818	971	7.84	7.00	37	6.2	48.5	37	104	45.9	27.6	4.8	0.335	0.157	0.469	0.013	---	0.22	0.53	0.31	ND	ND	ND	ND	10	3.3	---	493	0.566
Oct 11/16	277	292	538	790	7.92	7.15	-23	9.8	7.6	18	69.8	24.9	7.8	2.0	0.171	0.022	0.212	0.004	---	ND	0.35	0.35	ND	0.2	ND	ND	ND	2.2	---	306	0.203
Apr 17/17	451	346	813	888	7.93	7.21	46	7.3	44.4	32	107	44.7	25.1	4.8	0.403	0.187	0.482	0.014	---	0.09	0.61	0.52	ND	ND	ND	ND	ND	5.0	---	466	0.514
Nov 1/17	454	388	929	66	8.08	7.18	30	9.4	49.0	31	101	49.0	31.5	5.7	0.382	0.219	0.468	0.013	---	0.38	0.60	0.22	<0.1	<0.1	<0.001	<3	<5	14.0	---	501	0.643
May 24/18	458	361	881	614	8.12	7.09	-43	8.1	59.1	37	105	47.6	32.1	5.5	0.396	0.203	0.513	0.014	---	0.37	0.70	0.33	<0.05	0.06	<0.001	<3	<5	3.8	---	503	0.652
Oct 25/18	338	324	752	491.7	7.98	7.45	-60.9	8.8	36.7	24	86.4	29.6	10.2	2.8	0.226	0.070	0.749	0.011	---	0.26	1.0	0.74	<0.05	<0.05	<0.002	8	<5	3.1	---	385	0.242
Apr 29/19	328	277	691	555	7.89	7.15	6.2	7.5	34.1	25	75.9	33.7	18.8	4.0	0.193	0.139	<0.005	0.001	---	0.07	2.3	2.23	<0.05	0.14	<0.002	6	70	4.3	---	358	0.451
Oct 21/119	327	297	695	387.1	7.88	7.07	21.7	9.8	25.2	17	79.7	31.1	16.6	3.7	0.266	0.104	0.050	0.016	---	0.24	0.4	0.16	<0.05	0.07	<0.002	18	<5	5.9	---	352	0.399
Mar 31/20	163	165	356	183.9	7.69	7.43	136.3	4.4	3.9	8	52.5	7.66	2.5	0.8	0.056	0.015	0.009	0.01	---	0.16	0.7	0.54	<0.05	0.09	<0.002	<3	42	3.2	---	175	0.087
Dec 1/20	396	328	808	594	7.77	7.42	66.3	8.6	42.5	25	96.6	37.5	21.1	3.4	0.28	0.140	0.244	0.019	---	0.20	0.4	0.2	<0.05	<0.05	<0.002	<3	<5	5	---	423	0.462
May 26/21	316	281	589	540	8.3	7.17	-26	9.7	11.9	18	78.7	28.9	9.9	2.8	0.162	0.070	0.130	0.021	---	0.21	3.9	3.69	<0.05	<0.05	<0.001	5	106	3.5	---	319	0.243
Oct 4/21	361	303	680	543	7.76	7.42	-31.3	9.7	17.6	17	91.1	32.4	11.5	3.2	0.23	0.077	0.523	0.027	---	0.19	1.0	0.81	<0.05	<0.05	<0.002	<3	37	5.3	---	355	0.264

🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3d: Shallow Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.0	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
00-2sBR																															
Dec 6/00	202	311	1,036	1,190	8.06	9.00	---	5.9	92.4	112	61.3	11.8	173	7.35	---	---	3.67	0.710	4.44	0.33	0.79	0.46	ND	ND	ND	6	59	---	ND	649	5.30
May 3/01	117	280	981	520	---	8.40	---	11.2	106	54.7	19.0	17.0	163	7.9	---	---	0.37	0.433	2.27	0.32	0.77	0.45	ND	ND	0.006	11	43	---	ND	537	6.54
Oct 24/01	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.77	1.05	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct 30/01	104	280	1,034	980	7.87	7.70	---	7.4	161	34.4	17.4	14.8	200	8.7	---	---	1.43	1.15	1.20	0.37	0.67	0.30	ND	ND	ND	7	20	---	1.0	607	8.52
Apr 17/02	74	266	952	500	8.14	7.40	---	9.3	110	28.5	13.0	10.2	174	6.7	---	---	0.02	0.496	---	0.32	0.47	0.15	ND	ND	ND	12	18	---	6.0	503	8.77
Nov 12/02	92	291	1,140	960	8.56	7.80	---	10.0	158	47	17.1	12.0	194	7.2	---	---	ND	0.340	---	0.51	0.70	0.19	ND	ND	ND	10	31	---	2.2	611	8.80
Jun 10/03	55	291	1,010	1,370	7.87	9.00	---	10.5	127	5	9.73	7.56	184	6.7	---	---	0.050	0.080	---	0.62	0.69	0.07	ND	0.1	ND	15	29	---	1.2	516	10.8
Oct 23/03	121	282	1,030	1,060	8.41	8.60	---	6.6	170	33	21.9	16.1	181	7.9	---	---	0.008	0.050	---	0.55	0.67	0.12	ND	ND	ND	19	32	---	4.0	592	7.16
May 27/04	86	273	1,020	---	8.14	7.36	---	13.8	129	59	14.3	12.3	185	8.0	---	---	0.031	0.072	---	0.52	0.66	0.14	ND	ND	ND	18	31	---	ND	564	8.63
Oct 14/04	112	303	982	840	8.62	8.82	---	10.4	118	40	18.8	15.8	168	8.1	---	---	0.007	0.104	---	0.51	0.69	0.18	ND	0.1	0.019	19	32	---	0.8	543	6.89
Jun 2/05	88	286	984	1,010	8.32	7.94	---	17.7	137	29	14.7	12.4	162	8.3	---	---	0.007	0.074	---	0.48	0.75	0.27	ND	0.5	ND	6	27	---	4.7	529	7.50
Aug 23/05	99	268	1,020	2,690	8.50	---	---	12.8	156	24	15.7	14.5	186	8.8	---	---	0.590	0.050	---	0.56	0.81	0.25	ND	ND	<0.007	9	30	---	3.8	558	8.12
Nov 28/05	103	290	1,070	650	---	8.73	---	9.2	159	19	16.7	14.8	201	8.4	---	---	0.006	0.042	---	0.47	0.73	0.26	ND	ND	0.005	7	22	---	1.2	583	8.65
Apr 13/06	72	280	1,010	870	7.80	8.18	---	9.0	146	38	12.4	10.1	185	6.9	---	---	0.007	0.031	---	ND	0.67	0.67	ND	0.1	0.008	8	24	---	1.5	560	9.43
Jul 24/06	72	318	994	1,170	8.33	8.48	---	15.1	122	14	11.8	10.4	177	7.2	---	---	ND	0.021	---	0.47	0.54	0.07	ND	ND	0.012	13	10	---	0.8	527	9.06
Oct31/06	86	342	935	1,134	8.05	8.51	---	9.7	110	50	13.9	12.3	165	7.0	---	---	ND	0.041	---	0.51	0.72	0.21	ND	ND	0.014	16	39	---	0.5	564	7.77
Apr 26/07	77	304	1,020	1,810	8.24	8.93	---	9.8	140	40	12.9	11.0	195	7.7	---	---	ND	0.027	---	0.46	0.66	0.20	ND	ND	0.005	16	30	---	2.1	589	9.62
Jul 23/07	77	328	992	923	8.57	8.15	---	15.6	119	58	12.9	10.9	194	7.8	---	---	0.010	0.032	---	0.48	0.59	0.11	0.1	0.1	0.012	16	37	---	0.7	602	9.63
Nov 1/07	84	280	1,060	1,040	7.89	8.45	---	9.2	118	28	14.0	11.9	187	7.2	---	---	0.026	0.029	---	0.48	0.64	0.16	ND	ND	0.009	14	31	---	2.0	535	8.88
May 14/08	67	314	995	OR	8.18	8.99	---	9.9	122	38	11.1	9.58	165	6.5	---	---	0.025	0.026	---	0.4	0.66	0.26	ND	ND	0.004	7	21	---	0.6	541	8.77
Aug 5/08	83	300	1,060	1,092	7.98	7.91	---	14.6	163	25	13.8	11.7	195	8.2	---	---	0.022	0.019	---	0.50	0.70	0.20	ND	0.1	ND	13	27	---	0.3	598	9.32
Oct.30/08	92	309	1,150	1,254	8.40	6.72	---	8.1	161	17	15.3	13.2	196	8.2	---	---	ND	0.026	---	0.54	0.76	0.22	ND	ND	0.004	15	13	---	0.5	597	8.86
May 19/09	134	293	1,270	1,179	7.78	8.05	---	9.2	202	33	21.2	19.7	220	9.7	0.475	0.545	0.023	0.021	---	0.54	0.73	0.19	ND	ND	0.031	13	35	0.3	0.3	682	8.26
Aug 5/09	129	305	1,070	1,180	8.16	7.71	---	10.1	149	23	20.2	19	180	8.8	0.416	0.474	0.033	0.033	---	0.60	0.62	0.02	ND	ND	0.009	21	32	0.3	0.3	583	6.89
Nov 3/09	166	320	1,150	1,080	8.54	8.24	---	9.4	152	39	27.6	23.6	167	9.1	0.492	0.459	0.144	0.031	---	0.61	1.15	0.54	ND	ND	0.010	18	55	0.6	0.7	611	5.63
Apr 28/10	123	331	1,120	1,046	8.64	8.00	---	8.7	138	25	20.4	17.6	185	8.8	0.452	0.564	0.046	0.032	---	0.50	0.86	0.36	ND	ND	0.009	14	27	0.4	---	593	7.24
Nov 29/10	120	323	1,110	1,059	7.81	8.22	---	8.7	158	5	19.4	17.3	209	8.1	0.434	0.586	0.183	0.018	---	0.54	0.64	0.10	ND	0.3	0.012	15	14	2.4	---	612	8.33
Apr 26/11	94	316	1,080	968	8.40	8.12	---	7.4	141	12	15.4	13.5	170	7.5	0.381	0.509	0.020	0.021	---	0.42	0.82	0.40	ND	ND	ND	10	48	0.8	---	549	7.61
Nov 3/11	87	318	1,150	1,035	8.29	7.92	-210	11.0	153	10	20.3	20.2	209	8.8	0.499	0.673	0.050	0.020	---	0.41	0.74	0.33	ND	ND	0.011	17	20	0.4	---	612	7.85
Apr 26/12	82	308	1,060	963	8.36	8.14	174	8.6	119	36	12.4	12.5	180	8.4	0.225	0.526	ND	0.012	---	0.43	0.67	0.24	ND	0.1	0.014	19	22	0.7	---	554	8.61
Oct 29/12	152	328	1,120	1,479	8.32	7.87	-195	10.0	154	33	24.8	21.9	220	10.7	0.573	0.626	ND	0.035	---	0.54	0.76	0.22	ND	ND	0.009	28	26	0.5	---	662	7.75
Apr 24/13	117	307	990	991	8.03	7.39	-205	9.5	119	29	19.2	16.7	159	7.4	0.456	0.551	0.022	0.023	---	0.41	0.8	0.39	ND	ND	ND	7	<5	0.9	---	535	6.39
Oct 29/13	164	331	886	1,001	8.28	8.19	-180	8.2	97	26	26.9	23.6	136	8.8	0.607	0.498	0.006	0.024	---	0.49	0.79	0.30	ND	ND	0.005	7	27	2.3	---	517	4.62
May 29/14	135	296	1,090	1,003	8.40	8.25	-154	11.4	138	32	22.1	19.4	174	8.5	0.487	0.589	ND	0.011	---	0.45	0.70	0.25	ND	ND	0.008	13	30	3.7	---	572	6.50
Oct 1/14	136	297	1,020	1,069	8.24	7.89	-233	10.0	132	44	23.5	18.9	189	8.7	0.572	0.619	0.057	0.055	---	0.43	0.71	0.28	ND	ND	0.003	14	24	2.1	---	595	7.03
May 6/15	171	317	946	1,106	8.37	7.86	-210	12.0	118	31	27.5	24.8	154	9.2	0.530	0.563	0.017	0.020	---	0.48	1.00	0.52	ND	ND	0.003	14	26	2.2	---	555	5.12
Oct 13/15	156	304	1,010	1,083	7.93	7.90	-159	10.2	134	21	24.6	23.0	149	8.2	0.548	0.505	ND	0.009	---	0.50	0.91	0.41	ND	ND	0.009	12	ND	0.3	---	544	5.20
Apr 26/16	189	315	1160	1,136	8.19	8.07	-238	6.8	179	38	30.1	27.7	154	9.6	0.601	0.552	ND	0.008	---	0.55	0.79	0.24	ND	ND	ND	6	21	1.3	---	629	4.88
Oct 12/16	179	331	1,100	1,110	8.16	7.90	-247	10.0	156	33	27.4	26.9	138	8.5	0.564	0.477	ND	0.017	---	0.56	0.82	0.26	ND	ND	0.009	5	13	0.9	---	589	4.48
Apr 19/17	191	318	1,310	695	8.20	7.36	-218.3	7.1	208	38	31.7	27.2	176	10.5	0.585	0.560	0.009	0.101	---	0.61	1.42	0.81	ND	ND	0.002	13	24	3.0	---	684	5.54
Nov 1/17	201	306	1,190	959	8.29	7.73	-48	9.2	158	44	30.4	30.3	134	9.8	0.653	0.503	ND	0.007	---	0.63	0.9	0.27	ND	ND	0.010	8	10	1.3	---	591	4.12
May 24/18	211	277	1,300	1,060	8.14	7.83	-159	11.4	234	49	32.6	31.5	172	10.4	0.735	0.497	0.005	0.007	---	0.69	1.1	0.41	<0.05	<0.05	0.013	<3	22	4.8	---	697	5.15
Oct 25/18	211	297	1500	932	8.12	8.08	-216	8.8	269	53	34.9	30.1	232	11.9	0.550	0.553	<0.005	0.161	---	0.92	1.4	0.48	0.13	<0.05	<0.002	9	45	2.0	---	811	6.95
May 1/19	186	286	1180	721	8.14	7.69	-210.7	8.6	176	36	30.1	27.0	152	9.4	0.652	0.492	<0.005	0.007	---	0.70	0.8	0.10	<0.05	<0.05	<0.002	11	33	1.4	---	603	4.85
Oct 22/19	243	308	1210	1172	8.31	7.72	-247.7	9.4	174	43	37.6	36.2	175	12.0	0.802	0.566	0.005	0.013	---	0.84	0.9	0.06	<0.05	<0.05	0.009	5	18	0.9	---	664	4.89
Apr 1/20	211	293	1200	992	8.21	7.99	-229.6	8.5	195	17	34.5	30.3	161	10.7	0.735	0.560	0.008	0.006	---	0.68	0.9	0.22	<0.05	<0.05	0.022	10	16	1.7	---	626	4.82
Dec 1/20	207	273	1160	889	8.04	7.69	31.5	9.0	176	47	32.8	30.5	155	9.7	0.694	0.517	0.007	0.014	---	0.71	0.9	0.19	<0.05	<0.05	0.012	5	15	1.3	---	616	4.68
May 26/21	216	279	1090	943	8.49	7.65	-225.8	10.9	162	35	33.0	32.4	157	10.6	0.710	0.530	0.005	0.007	---	0.70	1.2	0.50	<0.05	<0.05	<0.001	7	20	1.4	---	598	4.65
Oct 4/21	219	298	1060	849	8.18	7.64	-214.2	9.3	146	23	34.4	32.4	153	10.7	0.764	0.525	<0.005	0.007	---	0.74	0.8	0.06	<0.05	<0.05	0.014	<3	27	1.4	---	579	4.49

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
	All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
	ND – Not Detected

Table 5.3d: Shallow Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.0	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
00-4sBR																															
Dec 6/00	240	270	966	1,130	7.53	8.80	---	3.8	97.9	36.6	63.1	19.9	77.6	6.7	---	---	0.02	0.053	0.07	0.27	0.47	0.20	ND	1.0	ND	ND	ND	---	1.0	469	2.18
May 3/01	170	261	804	400	---	8.30	---	11.1	82.7	24.5	36.6	19.2	88.7	5.5	---	---	0.31	1.51	0.69	0.46	1.08	0.62	ND	0.7	ND	3	5	---	2.0	419	2.96
Oct 24/01	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.19	0.41	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct 30/01	149	287	877	730	7.70	7.80	---	9.8	96.1	29.0	30.5	17.8	117	6.5	---	---	ND	0.037	1.11	0.26	0.49	0.23	ND	ND	ND	10	22	---	ND	470	4.16
Apr 17/02	130	274	824	430	7.42	6.90	---	11.0	8.8	30.7	27.9	14.6	104	5.5	---	---	0.03	0.025	---	0.24	0.36	0.12	ND	ND	ND	8	15	---	1.0	356	3.97
Nov 12/02	263	273	579	610	8.11	8.00	---	11.0	25.9	52	64.5	24.8	48.7	4.4	---	---	0.28	0.050	---	0.19	0.26	0.07	ND	0.2	ND	ND	8	---	0.7	392	1.31
Jun 5/03	114	273	776	690	8.40	8.20	---	10.4	64.7	33	24.5	12.9	125	6.6	---	---	0.08	ND	---	0.47	0.47	0.00	ND	ND	ND	4	23	---	1.9	431	5.09
Oct 16/03	353	285	666	680	8.14	7.90	---	8.4	22.6	58	91.9	30.1	10.7	2.5	---	---	ND	0.070	---	0.11	0.17	0.06	ND	0.9	ND	ND	9	---	11.0	389	0.250
May 27/04	111	261	701	---	8.26	8.23	---	12.1	60.4	32	22.6	13.2	123	7.0	---	---	0.010	0.003	---	0.37	0.73	0.36	ND	ND	ND	4	22	---	0.9	409	5.10
Oct 18/04	276	290	660	590	7.66	7.22	---	9.8	26.2	60	68.1	25.8	40.6	4.7	---	---	0.059	0.017	---	0.19	0.30	0.11	ND	0.3	ND	1	3	---	0.6	393	1.06
Jun 2/05	106	298	731	810	7.87	7.72	---	15.5	57.3	18	21.7	12.5	115	7.4	---	---	0.009	0.007	---	14.8	14.9	0.10	ND	ND	ND	4	3,270	---	5.0	422	4.87
Aug 23/05	108	277	740	720	8.18	---	---	14.6	63.8	18	22.0	12.9	122	7.4	---	---	0.410	0.004	---	0.26	0.48	0.22	ND	0.2	ND	4	12	---	3.5	406	5.09
Nov 28/05	284	300	739	870	---	8.00	---	8.9	66.8	9	72.6	24.9	41.4	4.0	---	---	0.034	0.001	---	0.42	0.65	0.23	0.2	0.2	ND	6	18	---	0.8	395	1.07
Apr 6/06	298	300	762	600	8.31	7.77	---	7.1	58.4	15	76.9	25.6	32.0	3.4	---	---	0.195	0.013	---	0.22	0.31	0.09	ND	0.1	ND	8	ND	---	0.6	389	0.806
Jul 24/06	108	290	678	1,040	7.95	8.16	---	14.3	37.5	15	22.5	12.6	98.9	6.5	---	---	0.006	0.002	---	0.34	0.39	0.05	ND	0.1	ND	4	22	---	1.3	362	4.14
Oct31/06	121	306	675	947	8.11	8.16	---	7.8	46.9	19	25.1	14.3	108	7.3	---	---	ND	0.006	---	0.36	0.43	0.07	ND	ND	0.004	5	14	---	0.8	405	4.27
Apr 25/07	112	312	693	663	7.91	8.04	---	9.6	40.1	22	23.1	13.3	112	7.1	---	---	ND	0.001	---	0.34	0.56	0.22	ND	ND	0.012	6	17	---	0.8	406	4.61
Jul 23/07	250	274	560	---	7.82	---	---	---	11.4	52	60.0	24.2	38.0	5.4	---	---	0.116	0.011	---	0.25	0.27	0.02	ND	0.1	ND	ND	15	---	0.6	357	1.05
Oct 31/07	343	276	717	719	8.62	7.72	---	11.9	51.3	23	89.5	29.1	5.9	1.2	---	---	0.084	0.041	---	0.36	0.44	0.08	ND	ND	ND	9	41	---	2.4	367	0.139
May 14/08	97	284	676	623	6.17	8.33	---	10.8	27.4	40	19.9	11.5	96.4	6.3	---	---	0.020	0.004	---	0.40	0.63	0.23	ND	ND	0.008	8	33	---	0.7	373	4.26
Aug 5/08	118	270	618	620	7.82	8.34	---	12.0	35.8	17	24.3	14.0	92.0	7.0	---	---	ND	0.006	---	0.38	0.43	0.05	ND	0.1	ND	ND	17	---	0.7	355	3.68
Oct.30/08	208	280	594	645	7.88	8.07	---	9.0	16.9	47	48.3	21.2	58.3	6.3	---	---	0.037	0.010	---	0.27	0.37	0.10	ND	0.1	ND	ND	ND	---	0.9	368	1.76
May 14/09	104	260	715	651	8.08	8.60	---	9.1	37.8	28	20.3	13.0	117	7.4	0.095	0.429	0.017	0.005	---	0.34	0.47	0.13	ND	0.2	0.006	8	27	0.5	0.5	381	4.98
Aug 4/09	109	293	719	770	7.73	7.96	---	13.1	49.2	24	21.5	13.3	113	7.2	0.110	0.429	0.022	0.023	---	0.34	0.48	0.14	ND	0.1	0.006	6	9	0.7	0.7	406	4.71
Oct 28/09	229	250	717	660	7.86	7.51	---	9.3	29.2	54	55.2	22.1	50.1	5.2	0.165	0.184	0.102	0.008	---	0.29	0.58	0.29	ND	ND	ND	4	32	0.6	0.6	366	1.44
Apr 26/10	107	299	708	680	8.23	7.77	---	9.6	41.8	26	21.8	12.7	125	7.5	0.135	0.490	0.037	0.012	---	0.36	0.44	0.08	ND	ND	0.004	8	24	0.6	---	415	5.28
Nov 29/10	109	295	745	698	8.16	8.02	---	9.1	33.1	13	22.7	12.8	122	6.9	0.122	0.461	0.053	0.009	---	0.35	0.43	0.08	ND	0.1	0.006	11	16	0.6	---	388	5.06
Apr 25/11	102	286	642	645	7.88	7.84	---	9.4	30.0	15	21.0	11.9	97.6	5.8	0.117	0.424	0.031	0.005	---	0.28	0.56	0.28	ND	0.1	0.006	5	12	0.8	---	354	4.21
Nov 2/11	105	284	719	696	7.96	7.89	-168	9.7	42.1	16	26.1	15.0	114	7.6	0.150	0.527	0.033	ND	---	0.23	0.68	0.45	ND	ND	0.005	8	35	0.5	---	391	4.40
Apr 25/12	162	282	676	697	8.14	7.96	-241	9.9	27.4	32	35.8	17.5	77.6	6.4	0.146	0.303	0.018	0.004	---	0.32	0.37	0.05	ND	ND	ND	4	21	0.6	---	366	2.66
Oct 30/12	168	293	676	686	8.13	7.84	---	12.3	41.9	26	38.8	17.4	103	7.0	0.150	0.438	0.150	0.008	---	0.38	0.43	0.05	ND	ND	0.003	8	5	1.9	---	411	3.45
Apr 23/13	103	296	684	731	8.31	7.70	-136	13.6	37.1	22	20.7	12.4	113	6.4	0.137	0.536	0.020	0.005	---	0.33	0.60	0.27	ND	ND	0.007	16	26	7.0	---	390	4.87
Oct 29/13	117	290	637	732	8.23	8.17	-121	9.2	37.2	10	24.2	13.7	103	7.0	0.146	0.474	0.010	0.005	---	0.30	0.51	0.21	ND	0.1	0.004	6	ND	2.7	---	370	4.15
May 29/14	105	254	620	645	8.26	7.89	-188	11.9	24.0	44	21.1	12.6	103	6.6	0.128	0.493	0.006	0.005	---	0.20	0.72	0.52	ND	ND	0.002	10	35	7.4	---	364	4.37
Oct 1/14	120	270	668	508	8.32	8.26	-205	11.2	34.0	29	25.1	14.0	107	6.9	0.136	0.469	ND	0.003	---	0.26	0.49	0.23	ND	ND	ND	12	ND	1.5	---	378	4.23
May 6/15	284	261	609	610	8.12	7.26	-207	9.4	16.2	38	72.5	25.0	35.2	4.1	0.170	0.144	0.033	0.009	---	0.16	0.40	0.24	ND	3.4	ND	ND	ND	6.2	---	363	0.91
Oct 8/15	330	299	632	462	7.81	7.58	-168	9.0	11.2	50	87.0	27.4	17.7	2.6	0.153	0.073	0.030	0.009	---	0.08	0.14	0.06	ND	0.7	ND	ND	5	1.0	---	379	0.424
Apr 26/16	255	269	590	772	8.10	7.60	-171	7.6	13.0	35	65.0	22.5	42.6	4.4	0.159	0.182	0.020	0.006	---	0.15	0.26	0.11	ND	2.9	ND	ND	ND	1.9	---	357	1.16
Oct 11/16	288	281	612	660	7.98	7.56	-8	11.3	11.0	53	74.6	24.6	16.8	2.4	0.141	0.042	0.006	0.005	---	0.04	0.12	0.08	ND	1.0	ND	3	31	2.0	---	356	0.432
Apr 17/17	280	263	592	701	8.07	7.50	-90	8.1	13.1	32	73.2	23.5	28.7	3.5	0.179	0.135	0.024	0.008	---	0.12	0.44	0.32	ND	2.4	ND	ND	ND	2.8	---	343	0.747
Nov 1/17	318	264	616	465	8.14	7.45	-98	10.1	9.4	36	80.5	28.4	15.2	3.2	0.174	0.080	0.041	0.006	---	0.12	0.3	0.18	ND	1.1	ND	ND	ND	7.6	---	337	0.371
May 24/18	245	263	570	600	8.13	7.91	-120	9.3	13.0	35	61.3	22.4	45.0	4.9	0.182	0.209	0.015	0.007	---	0.23	0.3	0.07	<0.05	1.35	<0.001	<3	51	7.3	---	340	1.250
Oct 25/18	321	278	643	479.2	8.02	7.77	-68.9	9.7	13.7	44	83.5	27.3	19.6	3.5	0.178	0.101	0.026	0.005	---	0.17	0.2	0.03	<0.05	0.45	<0.002	<3	<5	14.6	---	359	0.476
Apr 29/19	124	278	703	527	8.27	8.13	-256.3	9.2	30.6	30	26.0	14.4	105	6.7	0.129	0.441	<0.005	0.022	---	0.35	0.6	0.25	<0.05	0.14	0.011	<3	17	2.7	---	380	4.10
Oct 22/19	350	265	635	510	8.11	7.32	-32.5	10.6	13.2	52	88.4	31.4	14.5	3.3	0.171	0.066	0.027	0.007	---	0.13	0.2	0.07	<0.05	0.58	<0.001	<3	<5	2.9	---	362	0.337
Apr 7/20	266	268	642	471.2	7.89	7.50	-136.7	9.2	19.1	34	66.4	24.4	44.3	4.2	0.163	0.185	0.027	0.005	---	0.22	0.3	0.08	<0.05	0.77	<0.002	<3	6	2.3	---	353	1.180
Dec 1/20	331	265	651	247.7	7.87	7.39	-171.3	9.5	13.1	48	85.2	28.8	16.9	2.6	0.148	0.079	0.024	0.004	---	0.21	0.4	0.19	<0.05	1.35	<0.002	<3	10	2.3	---	354	0.404
May 26/21	261	241	596	539	8.24	7.71	-162.4	10.9	16.0	40	64.5	24.3	44.2	4	0.147	0.192	0.03	0.005	---	0.19	0.3	0.11	0.09	2.03	<0.001	<3	5	2.4	---	338	1.190
Oct 4/21	330	273	667	528	7.89	7.57	-123.2	10.1	14.8	49	84.0	29.1	27	3.5	0.174	0.119	0.017	0.004	---	0.15	0.2	0.05	<0.05	0.81	<0.002	<3	10	4.6	---	372	0.646

🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3d: Shallow Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.0	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
00-5sBR																															
Dec 6/00	271	291	759	840	7.33	8.60	---	5.6	11.3	79.6	65.6	26.1	42.8	1.1	---	---	0.01	0.050	0.38	ND	0.20	0.20	ND	0.9	ND	ND	ND	---	ND	405	1.13
May 3/01	329	262	654	410	---	8.20	---	11.9	9.7	38.4	80.8	30.8	8.7	1.4	---	---	0.15	0.104	0.40	ND	0.14	0.14	ND	0.8	ND	ND	1	---	1.0	331	0.210
Oct 24/01	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.09	0.03	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct 30/01	364	300	701	690	7.60	8.00	---	8.1	17.9	50.6	97.3	29.4	8.2	1.4	---	---	ND	0.092	0.35	0.02	0.10	0.08	ND	0.5	ND	ND	ND	---	1.0	387	0.190
Apr 17/02	349	297	667	400	7.41	7.10	---	10.0	8.9	43.4	86.1	32.6	8.0	1.3	---	---	ND	0.039	---	ND	0.03	0.03	ND	1.0	ND	ND	2	---	1.0	363	0.190
Nov 12/02	343	282	508	590	8.11	7.60	---	9.4	17.0	46	85.7	31.3	9.1	1.0	---	---	ND	0.040	---	ND	0.02	0.02	ND	0.5	ND	ND	ND	---	0.9	362	0.210
Jun 5/03	319	300	568	580	7.89	8.50	---	10.3	13.1	57	77.4	30.6	19.6	1.8	---	---	0.57	ND	---	0.10	0.20	0.10	ND	0.9	ND	ND	2	---	0.7	384	0.480
Oct 16/03	361	285	612	720	7.81	7.90	---	8.5	19.1	50	90.7	32.6	11.8	2.0	---	---	0.132	0.049	---	0.05	0.14	0.09	ND	0.5	ND	ND	19	---	20.0	378	0.270
May 27/04	353	270	625	---	7.82	7.68	---	12.8	12.4	55	89.4	31.4	4.5	1.0	---	---	ND	ND	---	ND	0.12	0.12	ND	0.8	ND	1	5	---	1.0	358	0.110
Oct 18/04	356	290	635	640	7.42	6.97	---	9.4	14.9	57	91.0	31.1	5.4	1.0	---	---	ND	0.006	---	ND	0.09	0.04	ND	1.3	ND	1	5	---	0.8	382	0.125
Jun 2/05	343	296	639	610	7.46	7.34	---	14.3	10.6	52	85.7	31.3	6.6	1.3	---	---	ND	0.001	---	ND	0.14	0.14	ND	1.3	ND	ND	10	---	1.6	369	0.154
Aug 23/05	364	270	630	580	7.76	---	---	14.5	9.7	48	92.5	32.3	6.1	2.1	---	---	1.16	0.013	---	ND	0.07	0.07	ND	1.7	ND	ND	6	---	2.3	359	0.140
Nov 28/05	367	300	678	730	---	7.62	---	9.3	9.1	48	92.8	32.7	6.0	1.4	---	---	0.005	ND	---	ND	0.06	0.06	ND	1.4	ND	ND	ND	---	1.3	373	0.136
Apr 6/06	354	302	608	510	7.70	7.41	---	7.7	7.7	49	90.8	31.0	7.5	1.1	---	---	ND	0.017	---	0.06	0.83	0.77	ND	0.9	ND	ND	ND	---	6.5	371	0.173
Jul 20/06	332	288	612	540	7.60	7.85	---	15.1	9.1	50	84.4	29.5	5.0	1.0	---	---	ND	0.003	---	ND	0.13	0.13	0.1	1.0	ND	ND	ND	---	5.2	356	0.120
Oct31/06	337	292	611	713	7.80	7.65	---	7.2	9.8	47	86.2	29.6	6.9	1.3	---	---	ND	0.050	---	ND	0.33	0.33	ND	2.4	ND	ND	6	---	2.0	367	0.164
Apr 25/07	334	302	592	570	7.49	7.61	---	11.3	4.7	44	86	29	4.1	1.1	---	---	ND	0.021	---	ND	0.11	0.11	ND	0.9	ND	ND	ND	---	12.0	354	0.097
Jul 23/07	349	292	609	574	7.61	7.38	---	15.5	7.4	55	90.7	29.8	5.0	1.2	---	---	0.033	0.006	---	ND	0.17	0.17	ND	0.7	ND	ND	ND	---	0.7	368	0.116
Oct 31/07	364	276	660	634	7.89	7.27	---	11.1	9.8	52	68.8	46.6	5.8	5.2	---	---	1.40	0.041	---	ND	0.06	0.06	ND	0.9	ND	ND	26	---	2.1	359	0.133
May 14/08	288	278	517	580	7.67	7.95	---	10.8	5.0	44	73.6	25.3	3.6	1.0	---	---	0.064	0.039	---	ND	ND	0.05	ND	0.7	ND	ND	18	---	0.7	322	0.093
Aug 5/08	333	280	617	604	7.73	7.49	---	11.4	7.5	46	85.8	29.0	6.4	1.6	---	---	0.021	0.042	---	ND	0.18	0.18	ND	0.6	ND	ND	6	---	0.8	346	0.153
Oct.30/08	337	300	572	610	8.00	6.70	---	7.3	7.6	46	87.9	28.6	4.5	1.2	---	---	ND	0.002	---	0.01	0.10	0.09	ND	0.4	ND	ND	ND	---	0.9	358	0.106
May 14/09	338	276	625	585	8.41	8.12	---	11.0	15.2	19	85.0	30.6	3.6	1.0	0.066	0.012	0.029	0.007	---	ND	0.23	0.23	ND	0.1	ND	ND	18	0.6	0.7	321	0.085
Aug 4/09	331	290	611	680	7.27	7.43	---	11.4	7.3	60	83.2	29.8	5.4	1.2	0.073	0.025	0.032	0.049	---	ND	0.17	0.17	ND	0.8	ND	ND	5	0.7	0.7	364	0.13
Oct 28/09	338	270	708	670	7.49	7.57	---	7.7	8.4	77	86.2	29.7	4.8	1.1	0.088	0.013	0.059	0.003	---	ND	ND	ND	ND	0.4	ND	<3	28	0.7	0.7	369	0.113
Apr 26/10	353	297	645	610	7.66	7.25	---	8.4	7.4	55	88.2	32.3	9.2	1.6	0.072	0.045	0.130	0.143	---	0.01	ND	ND	ND	0.6	ND	ND	ND	0.6	---	375	0.213
Nov 29/10	339	295	639	669	8.02	7.45	---	7.9	6.6	44	85.7	30.4	7.5	1.4	0.078	0.036	0.069	0.084	---	0.05	ND	ND	ND	0.9	ND	ND	ND	0.8	---	357	0.177
Apr 25/11	303	278	590	591	7.91	7.36	---	10.0	5.4	43	77.6	26.5	5.4	1.2	0.083	0.024	0.035	0.034	---	ND	0.07	0.07	ND	1.2	ND	ND	ND	0.8	---	331	0.134
Nov 3/11	291	278	656	623	7.87	7.28	14	10.4	9.0	46	96.6	32.4	5.6	1.4	0.102	0.048	0.031	0.032	---	ND	ND	ND	ND	1.5	ND	ND	13	0.5	---	365	0.125
Apr 25/12	344	292	657	677	7.96	7.42	103	9.0	8.6	50	86.0	31.3	14.3	2.1	0.060	0.044	0.029	0.263	---	0.03	ND	ND	ND	0.7	ND	ND	28	0.9	---	371	0.335
Oct 30/12	386	291	630	688	7.99	7.58	---	10.3	1.1	57	98.8	33.8	7.1	1.7	0.106	0.033	0.045	0.010	---	ND	0.07	0.07	ND	0.7	ND	ND	10	1.5	---	377	0.157
Apr 23/13	346	290	632	610	7.91	7.57	-67	9.1	6.9	57	88.1	30.7	14.2	1.6	0.062	0.055	0.122	0.475	---	ND	0.70	0.70	ND	1.1	ND	ND	58	1.9	---	378	0.332
Oct 29/13	340	278	567	670	7.93	7.81	-7	7.8	5.8	39	88.7	28.8	4.1	1.1	0.096	ND	0.034	0.010	---	ND	0.22	0.22	ND	2.2	ND	ND	ND	3.2	---	344	0.0958
May 29/14	333	261	572	600	8.14	7.37	178	10.4	4.5	40	85.9	28.8	6.3	1.4	0.073	0.030	0.016	0.129	---	0.12	0.33	0.21	ND	1.7	ND	ND	31	1.6	---	331	0.150
Oct 1/14	338	265	609	662	7.91	7.66	31	9.8	6.1	41	87	29.4	4.3	1.2	0.091	0.019	ND	0.007	---	ND	0.1	0.10	ND	1.9	ND	ND	ND	1.9	---	336	0.103
May 6/15	348	269	558	590	8.03	7.15	145	111.5	5.2	41	88.2	31.0	3.5	1.1	0.090	0.015	ND	0.005	---	ND	0.10	0.10	ND	1.8	ND	ND	ND	3.2	---	339	0.0823
Oct 8/15	372	333	653	895	7.77	7.26	158	10.5	6.8	41	95.6	32.3	6.9	1.1	0.102	0.017	ND	0.021	---	ND	0.08	0.08	ND	0.2	ND	ND	7	1.6	---	385	0.157
Apr 26/16	359	305	601	844	7.99	7.68	55	8.2	4.7	41	91.9	31.6	3.3	1.0	0.091	ND	ND	0.003	---	ND	0.13	0.13	ND	1.1	ND	ND	12	1.2	---	362	0.0758
Oct 11/16	316	298	596	620	7.97	7.58	-42	9.8	6.1	41	80.5	27.8	4.9	0.7	0.086	ND	ND	ND	---	ND	ND	ND	ND	1.4	ND	ND	ND	2.4	---	346	0.119
Apr 17/17	357	285	608	394.1	8.00	7.64	18.4	6.2	5.1	41	94.2	29.5	2.7	0.8	0.106	0.014	ND	0.002	---	ND	0.15	0.15	ND	1.0	ND	ND	ND	4.0	---	349	0.0629
Nov 1/17	352	292	629	454.3	8.13	7.33	117.0	9.0	5.8	30	88.2	32.1	5.5	1.0	0.100	0.018	ND	0.002	---	ND	0.3	0.30	0.2	0.9	ND	ND	ND	8.5	---	343	0.127
May 24/18	323	315	592	580	8.06	7.43	-80.0	9.9	4.9	37	82.1	28.7	4.4	1.0	0.090	0.017	<0.005	0.006	---	0.03	0.2	0.17	<0.05	0.79	<0.001	<3	<5	12.1	---	347	0.107
Oct 25/18	369	309	675	410.3	7.98	7.59	124.3	8.2	9.2	41	95.2	31.9	7.3	1.1	0.110	0.021	<0.005	0.001	---	0.04	0.1	0.06	<0.05	0.31	<0.002	<3	<5	3.3	---	371	0.165
Apr 29/19	337	304	644	465	8.04	7.32	-26.6	10.4	5.5	50	86.4	29.4	3.6	0.9	0.080	0.015	0.155	0.062	---	0.03	0.2	0.17	<0.05	0.56	<0.002	<3	27	1.7	---	359	0.0851
Oct 22/19	379	291	701	581	7.99	7.62	70.6	10.1	9.1	71	95.2	34.3	8.8	1.2	0.109	0.026	0.005	0.010	---	0.06	0.1	0.04	<0.05	0.13	<0.001	<3	<5	2.6	---	394	0.196
Mar 31/20	328	261	563	417.4	7.84	7.61	78.2	7.7	4.4	25	87.7	26.5	4.6	0.9	0.093	0.016	0.009	0.006	---	<0.01	0.1	0.10	<0.05	1.36	<0.002	<3	<5	1.9	---	306	0.11
Dec 1/20	381	299	673	264.3	7.84	7.07	48.1	8.6	6.6	37	99	32.4	6.6	1.0	0.110	0.024	0.012	0.010	---	0.03	0.1	0.07	<0.05	1.15	<0.002	<3	<5	2.2	---	362	0.148
May 25/21	332	243	550	495	8.14	7.34	-1.2	9.6	6.5	36	82.4	30.6	5.1	1.1	0.092	0.022	0.048	0.009	---	0.03	0.3	0.27	0.06	1.86	<0.002	<3	6	3.2	---	307	0.121
Oct 4/21	378	292	658	520	7.86	7.72	27.1	9.8	8.9	42	94.4	34.5	6.9	1.3	0.112	0.021	0.005	0.001	---	0.10	0.1	0.00	<0.05	0.43	<0.002	<3	<5	3.8	---	364	0.154

🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3e: Deep Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-2dBR																															
Oct 18/99	372	364	1,400	1,234	7.68	7.73	---	10.3	188	91.7	82.6	40.2	174	7.1	---	---	ND	0.038	0.03	0.31	0.69	0.38	ND	ND	ND	2	12	---	5.0	802	3.93
Jan 25/00	---	---	---	---	---	---	---	---	---	---	---	---	129	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	520	---
May 1/00	395	354	977	936	7.35	7.60	---	9.0	81.6	56.3	90.6	41.1	78.2	6.3	0.96	0.22	0.34	0.041	0.08	0.99	1.22	0.23	ND	ND	ND	5	8	---		568	1.71
Oct 23/00	358	354	935	720	7.49	7.40	---	10.3	62.0	44.3	86.9	34.3	62.1	5.21	---	---	0.38	0.048	0.02	1.23	1.71	0.48	ND	ND	ND	ND	9	---	5.0	509	1.43
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.89	0.23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	120	403	1,159	600	---	8.10	---	10.4	95.4	50.0	28.1	12.2	194	4.9	---	---	ND	0.020	0.09	0.45	1.00	0.55	ND	ND	ND	4	12	---	4.0	627	1.07
Oct 29/01	181	412	1,144	810	7.90	7.70	---	9.7	99.3	48.0	41.8	18.6	194	5.6	0.12	0.12	0.06	0.047	0.01	0.51	1.44	0.93	ND	ND	ND	9	7	---	3.0	655	0.980
Apr 17/02	99	409	1,135	720	7.55	6.80	---	9.6	90.5	51.1	23.3	10.0	263	5.6	---	---	0.28	0.018	---	0.77	0.94	0.17	ND	ND	ND	5	7	---	4.0	649	9.69
Nov 11/02	253	423	1,300	1,080	8.50	7.50	---	10.7	129	62	61.4	24.2	151	6.9	---	---	0.08	0.030	---	1.04	1.32	0.28	ND	0.1	ND	4	5	---	2.0	690	4.13
Jun 3/03	201	454	1,490	1,470	7.65	7.80	---	12.7	142	99	47.0	20.3	269	7.9	---	---	0.64	0.030	---	0.94	1.40	0.46	ND	0.1	ND	2	15	---	3.2	860	8.26
Oct 16/03	150	462	1,360	1,180	7.99	7.90	---	9.6	115	81	34.6	15.5	262	6.9	---	---	0.196	0.019	---	1.13	1.58	0.45	ND	0.1	ND	3	8	---	5.0	794	9.30
May 27/04	354	402	1,150	---	7.97	7.64	---	13.0	94.9	94	83.1	35.6	129	8.2	---	---	0.010	0.037	---	0.88	1.89	1.01	ND	1.0	ND	3	5	---	3.2	684	2.99
Oct 14/04	68	543	1,800	1,440	8.13	7.60	---	10.6	204	121	15.5	7.12	403	7.1	---	---	0.015	0.008	---	1.21	1.68	0.47	ND	ND	ND	5	6	---	3.2	1,080	21.3
Jun 1/05	167	482	1,470	1,620	---	8.52	---	12.1	175	106	40.2	16.2	254	6.9	---	---	0.235	0.015	---	0.68	1.01	0.33	ND	0.4	ND	ND	ND	---	2.6	884	8.56
Aug 23/05	312	409	1,230	1,270	7.51	---	---	11.9	106	107	76.4	29.4	163	6.7	---	---	0.309	0.002	---	0.74	1.18	0.44	ND	0.6	ND	ND	5	---	6.7	731	4.02
Nov 28/05	192	478	1,480	>19,990	---	7.23	---	12.1	128	112	45.2	19.3	295	8.5	---	---	0.012	0.007	---	0.31	0.84	0.53	ND	ND	ND	ND	13	---	3.2	887	9.27
Apr 6/06	422	422	1,070	1,080	7.72	7.42	---	6.9	78.8	93	105	39.0	106	6.6	---	---	ND	0.038	---	2.51	3.16	0.65	ND	0.2	ND	ND	ND	---	3.1	679	2.25
Jul 20/06	386	510	1,560	1,190	7.53	7.89	---	15.8	168	95	97.0	35.0	243	4.7	---	---	0.018	0.047	---	2.35	15.3	12.95	ND	0.1	0.031	31	9	---	22.7	944	5.38
Oct31/06	315	434	1,100	1,269	8.01	7.58	---	8.6	90.5	79	79.1	28.5	123	5.2	---	---	ND	0.024	---	0.67	1.00	0.33	ND	1.1	ND	ND	9	---	3.0	672	3.02
Apr 26/07	214	483	1,310	1,110	7.76	7.70	---	10.7	135	102	52.2	20.2	236	6.9	---	---	0.284	0.025	--	1.08	1.38	0.30	ND	0.2	ND	10	ND	---	3.5	844	7.01
Jul 18/07	257	420	1,100	1,045	7.62	7.38	---	14.1	84.0	64	66.6	22.1	154	5.3	---	---	0.034	0.062	---	1.24	1.86	0.62	ND	0.1	ND	ND	41	---	2.3	650	4.17
Oct 31/07	220	426	1,000	1,200	7.87	7.52	---	11.1	83.1	69	70.7	10.6	142	0.8	---	---	0.038	0.016	---	1.85	2.53	0.68	ND	0.3	ND	7	33	---	3.9	635	4.17
May 14/08	60	466	1,700	1,494	7.45	8.16	---	11.1	233	59	14.5	5.83	292	6.2	---	---	0.062	0.009	---	0.70	0.98	0.28	ND	ND	ND	10	20	---	1.5	891	16.4
Aug 5/08	62	492	2,410	2,300	7.94	8.07	---	12.7	536	38	14.9	5.96	465	8.8	---	---	0.173	0.022	---	0.36	0.93	0.57	ND	ND	ND	3	13	---	1.0	1,360	25.8
Oct.30/08	451	666	3,070	---	8.16	---	---	---	569	188	141	23.9	647	15.4	---	---	14.0	0.362	---	1.04	2.47	1.43	ND	0.1	ND	10	50	---	1.1	2,000	13.3
May 19/09	249	550	1,310	1,169	7.75	6.82	---	10.9	96.8	40	66.0	20.5	195	6.8	0.086	0.206	1.42	0.064	---	0.47	1.59	1.12	ND	0.2	ND	28	114	8.4	8.4	758	5.36
Aug 4/09	252	561	1,230	1,406	7.24	7.18	---	11.0	98.1	25	65.6	21.5	185	6.0	0.096	0.181	0.731	0.046	---	0.86	2.27	1.41	ND	0.1	0.006	20	58	7.9	7.9	740	5.06
Oct 28/09	159	264	1,840	1,680	7.62	7.56	---	8.4	196	22	39.8	14.4	395	8.0	0.089	0.336	0.903	0.044	---	1.23	2.42	1.19	ND	ND	0.015	22	49	1.7	1.7	1,070	13.6
Apr 26/10	138	626	1,610	1,520	7.98	7.74	---	9.5	154	29	34.0	12.9	320	8.3	0.070	0.351	0.355	0.029	---	0.79	1.54	0.75	ND	0.1	ND	23	20	1.8	---	936	11.9
Nov 25/10	116	581	1,610	1,212	7.75	6.87	---	7.5	154	38	26.9	11.8	318	6.7	0.047	0.338	0.237	0.028	---	0.92	1.49	0.57	ND	0.1	ND	10	14	1.9	---	906	12.9
Apr 25/11	82	573	1,560	1,508	7.84	7.67	---	9.1	174	34	19.6	8.07	323	6.1	0.039	0.339	0.218	0.021	---	0.81	1.61	0.80	ND	ND	ND	ND	14	2.4	---	910	15.5
Nov 3/11	96	523	1,580	1,431	8.13	7.78	-71	8.6	177	20	23.4	13.2	294	5.8	0.053	0.373	0.149	0.016	---	0.71	1.55	0.84	ND	ND	ND	17	19	1.4	---	849	12.0
Apr 25/12	173	499	1,720	1,403	8.01	7.72	139	9.0	193	62	39.6	18.0	290	7.9	0.061	0.278	0.448	0.029	---	0.95	1.54	0.59	ND	0.3	ND	4	31	1.2	---	914	9.60
Oct 30/12	148	516	1,530	1,179	8.08	7.86	---	10.5	177	63	35.0	14.9	271	9.0	0.061	0.392	0.579	0.025	---	0.91	1.31	0.40	ND	ND	ND	7	24	1.6	---	882	9.69
Apr 23/13	207	519	1,680	1,463	8.12	7.53	48	9.5	212	64	48.6	20.9	323	8.0	0.071	0.368	0.115	0.104	---	0.94	1.54	0.60	ND	ND	ND	4	ND	1.8	---	990	9.76
Oct 29/13	95	509	2,000	1,565	8.07	7.95	-93	8.0	267	54	23.7	11.0	444	8.6	0.054	0.627	0.410	0.023	---	1.12	1.90	0.78	ND	ND	ND	12	17	5.2	---	1,120	18.9
May 28/14	94	516	2,650	2,370	8.31	7.81	82	8.8	562	11	22.4	9.25	538	9.5	0.050	0.568	0.131	0.022	---	0.69	1.53	0.84	ND	ND	ND	11	13	3.4	---	1,460	24.1
Oct 1/14	153	474	4,940	393	8.22	7.72	-106	9.4	1,220	16	36.8	14.90	900	14.6	0.156	0.863	0.446	0.033	---	1.47	2.04	0.57	ND	ND	ND	15	33	2.9	---	2,490	31.6
May 7/15	184	558	1,470	1,298	7.84	7.44	-138	12.0	147	31	48.0	15.5	346	7.4	0.073	0.370	0.203	0.038	---	0.85	2.10	1.25	ND	ND	ND	16	39	2.1	---	931	11.1
Oct 8/15	114	738	2,310	2,520	7.98	7.57	-185	8.7	364	6	28.1	10.6	475	8.2	0.047	0.516	0.217	0.023	---	0.98	2.22	1.24	ND	ND	ND	47	35	0.4	---	1,340	19.4
Apr 26/16	126	670	3,240	3,750	8.19	7.54	-104	8.3	764	<10	30.8	11.9	664	11.5	0.061	0.705	0.131	0.031	---	0.99	1.67	0.68	<1	<1	ND	13	17	1.2	---	1,890	25.8
Oct 11/16	155	564	4,350	2,147	8.07	7.45	-95	7.6	1,230	15	36.5	15.5	899	10.6	0.182	0.640	0.122	0.025	---	1.28	1.87	0.59	<1	<1	ND	4	26	0.9	---	2,540	31.4
Apr 18/17	194	442	5,660	4,228	8.10	7.53	-127.8	6.7	1,640	13	40.5	18.4	988	17.6	0.187	0.962	0.356	0.028	---	1.37	2.74	1.37	<1	18.4	<0.001	10	26	1.9	---	3,070	32.3
Nov 2/17	167	465	5,390	3,825	8.25	7.5	-133	8.9	1,250	12	38.0	17.5	1,090	15.0	0.15	0.94	0.483	<0.01	---	1.47	2.0	0.53	<1	<1	<0.001	<3	79	1.9	---	2,701	36.7
May 24/18	185	408	6,230	3,095	9.23	7.31	-119.9	9.9	1,870	<10	43.3	18.7	1,220	19.7	0.185	1.00	0.466	0.026	---	1.67	2.2	0.53	<0.5	<0.5	<0.001	16	60	0.4	---	3,417	39.0
Oct 25/18	216	332	6,940	4,200	7.94	7.41	-420	8.5	2,030	<10	52.9	20.4	1,280	20.8	0.224	1.06	0.740	0.033	---	1.98	2.7	0.72	0.98	<0.5	0.013	14	115	1.2	---	3,607	37.9
May 1/19	205	710	5,530	3,973	7.73	7.26	-114.8	8.3	1,360	18	51.2	18.8	1,190	18.6	0.189	1.10	0.460	0.044	---	1.61	2.3	0.69	0.65	<0.5	<0.002	7	90	2.3	---	3,085	36.1
Oct 21/19	204	604	5,890	2,272	8.10	7.12	-72.1	8.9	1,440	<10	49.8	19.4	1,300	20.1	0.217	1.15	0.666	0.038	---	1.93	2.6	0.67	<0.5	<0.5	<0.002	6	39	6.8	---	3,193	39.6
Mar 31/20	220	547	6,170	3,841	7.89	7.17	-14.2	8.6	1,700	1	55.3	20.0	1,080	20.5	0.207	1.16	0.511	0.040	---	1.78	2.5	0.72	<0.05	<0.05	<0.002	16	63	2.7	---	3,207	31.6
Dec 1/20	236	625	6,110	4,681	7.65	7.44	-27.5	8.7	1,610	<10	60.1	20.9	1,210	20.0	0.249	1.23	1.000	0.053	---	1.82	2.9	1.08	<0.5	<0.5	<0.002	8	101	2.5	---	3,304	34.3
May 1/21	Decommissioned																														

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3e: Deep Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-4dBR																															
Oct 18/99	278	358	1,306	1,185	7.80	7.88	---	9.1	130	138	62.7	29.5	194	10.5	---	---	0.01	0.050	0.04	1.63	2.16	0.53	ND	1.1	ND	4	12	---	4.0	787	5.06
Jan 25/00	---	---	855	774	---	---	---	---	54.1	---	---	---	154	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	591	---
May 1/00	44	274	769	752	8.02	8.40	---	9.4	30.0	68.6	9.80	4.60	170	4.7	0.74	0.64	0.22	ND	0.07	0.59	0.83	0.24	ND	0.4	ND	5	10	---	3.0	455	11.2
Oct 23/00	129	374	1,036	670	7.78	7.60	---	11.6	67.3	55.3	27.3	14.9	182	6.3	---	---	0.01	0.038	0.06	2.51	3.55	1.04	ND	3.0	ND	10	15	---	5.0	594	6.96
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.80	0.56	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	28	372	1,140	670	---	8.50	---	12.3	90.8	66.3	6.10	3.10	239	3.7	---	---	0.13	0.012	0.09	0.27	0.98	0.71	ND	0.9	ND	4	9	---	2.0	637	19.7
Oct 29/01	13	395	1,159	1,050	8.43	8.40	---	9.9	93.8	63.1	2.90	1.50	267	3.3	0.01	0.59	0.05	0.026	0.10	0.19	0.86	0.67	0.6	ND	ND	7	12	---	4.0	672	31.7
Apr 17/02	21	364	974	770	8.24	7.10	---	8.2	55.5	47.9	4.90	2.10	212	3.3	---	---	0.02	0.005	---	0.10	0.48	0.38	ND	0.5	ND	4	6	---	2.0	546	20.2
Nov 12/02	32	396	1,170	880	8.68	7.80	---	9.7	87.6	55	7.10	3.60	247	4.0	---	---	0.08	0.010	---	0.56	0.92	0.36	0.2	0.2	ND	1	11	---	2.6	644	18.4
Jun 5/03	11	417	1,210	1,150	8.71	8.80	---	9.6	99.8	48	2.62	1.15	273	3.6	---	---	0.05	ND	---	0.76	0.90	0.14	0.3	0.1	ND	ND	16	---	2.9	681	35.4
Oct 16/03	52	384	1,090	1,070	8.41	8.70	---	8.2	82.1	46	11.0	5.98	227	4.5	---	---	0.022	0.006	---	1.21	1.44	0.23	0.2	0.1	ND	ND	13	---	9.0	605	13.7
May 27/04	42	399	1,160	1,130	8.43	8.74	---	9.8	109	61	10.6	3.67	270	4.1	---	---	0.069	0.005	---	0.49	0.70	0.21	ND	0.1	ND	ND	8	---	2.7	695	18.2
Oct 14/04	139	417	1,140	1,070	7.90	7.56	---	8.3	109	75	31.6	14.7	225	6.4	---	---	1.01	0.023	---	1.69	2.12	0.43	ND	0.2	ND	2	13	---	2.6	709	8.28
Jun 1/05	140	436	1,260	1,400	---	8.11	---	9.7	104	119	36.8	11.6	226	6.0	---	---	ND	0.011	---	0.76	1.05	0.29	ND	0.3	ND	ND	6	---	3.2	762	8.33
Aug 23/05	217	453	1,340	1,250	7.59	---	---	13.4	132	82	46.8	24.3	225	9.3	---	---	1.45	0.025	---	3.49	4.12	0.63	ND	0.1	ND	ND	22	---	9.5	789	6.65
Nov 28/05	81	386	1,110	8,340	---	7.85	---	9.7	79.4	68	19.6	7.84	243	5.8	---	---	0.047	0.009	---	0.84	1.03	0.19	ND	ND	ND	ND	ND	---	2.4	650	11.7
Apr 6/06	204	452	1,240	1,150	8.27	7.53	---	6.5	97.0	85	45.9	21.6	210	7.4	---	---	0.069	0.032	---	2.90	3.58	0.68	ND	0.1	ND	ND	10	---	5.1	735	6.40
Jul 24/06	20	483	1,330	1,410	8.06	8.57	---	11.4	116	82	4.54	2.19	303	4.5	---	---	0.020	0.002	---	0.60	0.89	0.29	ND	ND	ND	ND	12	---	5.7	798	29.2
Oct 30/06	54	472	1,360	1,462	8.18	8.62	---	8.3	136	83	12.2	5.68	293	4.4	---	---	0.288	0.008	---	0.50	0.83	0.33	ND	0.1	ND	3	8	---	2.6	819	17.4
Apr 25/07	19	400	1,060	783	8.06	8.03	---	9.4	79.3	71	4.63	1.77	210	4.2	---	---	0.046	0.003	---	0.43	0.69	0.26	ND	0.3	ND	ND	7	---	2.8	612	21.0
Jul 24/07	23	432	1,200	1,317	7.36	8.44	---	12.2	115	73	5.42	2.23	331	4.6	---	---	0.078	0.005	---	0.53	0.86	0.33	ND	0.2	ND	3	8	---	2.3	792	30.2
Nov 1/07	75	327	846	1,991	7.62	6.95	---	13.7	48.0	43	16.0	8.57	176	4.9	---	---	0.263	0.014	---	1.59	1.91	0.32	ND	0.1	ND	ND	ND	---	3.4	494	8.80
May 14/08	69	394	1,160	950	8.07	8.39	---	8.9	108	59	15.3	7.48	245	4.5	---	---	0.269	0.016	---	1.03	1.19	0.16	ND	ND	ND	4	24	---	1.7	677	12.8
Aug 5/08	58	375	972	1,018	8.01	8.56	---	12.1	81.7	48	13.1	6.27	226	4.6	---	---	0.217	0.024	---	1.11	1.32	0.21	ND	0.1	ND	ND	ND	---	1.8	607	12.9
Oct.30/08	19	363	918	990	8.29	6.72	---	7.0	65.2	41	4.34	2.01	246	3.6	---	---	0.039	0.009	---	0.84	1.06	0.22	ND	ND	ND	ND	ND	---	1.5	581	24.4
May 19/09	165	432	1,170	986	7.73	7.32	---	11.1	85.5	69	37.1	17.5	193	6.3	0.050	0.403	0.926	0.045	---	1.98	2.40	0.42	ND	0.1	ND	ND	22	1.9	1.9	672	6.56
Aug 5/09	353	585	1,400	1,530	7.10	6.76	---	9.3	101	61	74.5	40.7	177	10.2	0.142	0.298	0.919	0.069	---	7.15	7.23	0.08	ND	ND	ND	ND	21	5.2	6.8	827	4.10
Oct 28/09	332	627	1,590	1,485	7.58	7.16	---	8.2	120	63	70.0	38.2	235	10.8	0.199	0.348	3.16	0.087	---	6.66	7.46	0.80	ND	0.1	ND	<3	23	5.0	5.0	925	5.61
Apr 28/10	70	706	1,740	1,585	8.25	7.77	---	8.2	119	56	15.7	7.49	393	7.6	0.033	0.579	0.536	0.033	---	1.20	1.89	0.69	ND	ND	ND	3	14	1.8	---	1,020	20.4
Nov 25/10	83	668	1,670	1,080	7.93	7.43	---	7.2	124	53	18.6	8.96	347	5.9	0.037	0.549	0.690	0.018	---	1.62	2.90	1.28	ND	0.2	ND	ND	153	3.7	---	961	16.5
Apr 25/11	51	659	1,590	674	8.46	7.43	---	7.9	130	56	10.8	5.72	374	5.2	0.018	0.558	0.161	0.014	---	1.19	1.52	0.33	ND	0.1	ND	ND	22	4.3	---	980	22.9
Nov 3/11	158	415	1,090	1,130	8.09	7.30	48	8.1	75.0	66	34.2	17.7	143	5.0	0.035	0.345	0.193	0.038	---	1.84	2.57	0.73	ND	ND	ND	4	16	2.3	---	594	5.00
Apr 26/12	39	520	1,520	859	8.46	8.00	42	9.4	139	50	9.69	3.55	329	5.1	0.012	0.473	0.144	0.004	---	0.51	1.13	0.62	ND	ND	ND	6	11	3.8	---	849	23.0
Oct 29/12	119	564	1,410	1,218	8.21	6.97	-136	9.8	126	49	26.4	13.0	296	7.5	0.059	0.571	1.17	0.029	---	1.22	2.28	1.06	ND	0.1	ND	6	5	3.6	---	859	11.8
Apr 24/13	289	423	1,100	1,226	8.01	7.38	94	8.8	54.9	116	71.0	27.1	127	6.3	0.086	0.299	0.008	0.052	---	2.20	2.95	0.75	ND	0.4	ND	ND	5	2.7	---	661	3.26
Oct 30/13	553	798	1,630	1,344	7.40	7.24	-55	8.9	94.8	104	125	58.5	134	10.3	0.195	0.325	6.28	0.111	---	3.15	6.34	3.19	ND	ND	ND	5	176	11.7	---	1,020	2.49
May 29/14	641	434	1,300	1,187	8.06	6.92	58	12.2	36.5	250	174	50.1	74.7	5.9	0.049	0.285	ND	0.071	---	2.49	3.09	0.60	ND	0.3	ND	ND	35	6.0	---	853	1.28
Oct 1/14	566	552	1,600	969	7.64	7.04	105	10.3	64.9	242	141	51.9	116	9.8	0.094	0.311	0.914	0.100	---	4.40	4.67	0.27	ND	ND	ND	4	12	8.4	---	963	2.12
May 12/15	478	454	1,240	1,323	8.16	7.30	-34	8.5	48.0	169	120	43.1	69.3	6.3	0.070	0.191	1.59	0.060	---	3.51	4.30	0.79	ND	0.5	ND	ND	8	4.4	---	737	1.38
Oct 13/15	407	578	1,410	1,430	7.86	7.88	-64	11.2	70.9	151	92.9	42.5	146	9.1	0.073	0.338	2.08	0.080	---	4.22	5.09	0.87	ND	ND	ND	ND	9	2.5	---	866	3.15
Apr 27/16	336	325	798	920	7.92	7.10	-182	6.7	13.6	115	104	18.8	56.8	2.6	0.025	0.104	0.050	0.012	---	0.29	0.50	0.21	0.2	0.9	ND	10	8	1.9	---	511	1.35
Oct 12/16	504	515	1,360	1,216	7.85	6.96	-32	12.7	67.5	100	118	50.9	70.4	9.6	0.079	0.232	0.261	0.104	---	7.74	8.02	0.28	ND	0.6	ND	3	25	4.4	---	739	1.36
Apr 19/17	556	368	1,180	798	7.90	7.12	11.0	6.6	18.4	260	170	31.8	70.3	3.6	0.054	0.246	0.115	0.016	---	0.16	0.53	0.37	ND	2.3	ND	ND	ND	6.9	---	785	1.3
Nov 1/17	478	397	1,220	841	8.07	7.11	-77.0	9.1	27.3	202	137	33	101	5.4	0.05	0.259	0.086	0.026	---	0.48	0.9	0.42	ND	1.7	ND	ND	ND	10.8	---	752	2.01
May 28/18	543	402	1,240	962	8.01	7.04	89.1	11.4	27.4	266	162	33.5	106	4.8	0.064	0.295	0.040	0.018	---	0.34	0.5	0.16	ND	2.05	ND	ND	9	14.1	---	841	1.98
Oct 25/18	374	420	1350	847	8.11	7.36	16.1	8.2	46.0	231	109	24.8	181	6.9	0.057	0.362	0.080	0.047	---	0.77	0.9	0.13	<0.05	0.60	<0.002	<3	7	21.7	---	852	4.07
Apr 30/19	531	358	1160	879	7.89	6.99	11.8	10.8	23.1	230	161	31.3	63.9	3.3	0.048	0.244	0.035	0.010	---	0.24	0.5	0.26	<0.05	2.74	<0.002	<3	13	3.8	---	728	1.21
Oct 21/19	315	419	1310	1000	7.98	7.42	-18.5	9.6	40.5	203	87.1	23.6	185	7.3	0.048	0.359	0.088	0.031	---	0.61	0.8	0.19	<0.05	1.32	<0.002	<3	<5	5.3	---	799	4.54
Apr 1/20	520	342	1140	774	7.74	6.38	198.3	8.6	22.8	237	160	29.3	80.3	3.8	0.05	0.281	0.060	0.011	---	0.16	0.4	0.24	<0.05	2.24	<0.002	<3	<5	5	---	739	1.53
Dec 2/20	460	351	1210	457.5	7.63	7.35	-47.7	8.2	28.0	234	131	32.2	122	6.1	0.058	0.311	0.029	0.055	---	0.66	1.0	0.34	0.06	1.58	<0.002	<3	5	3.9	---	764	2.48
May 26/21	276	275	856	363.5	8.20	7.82	-31.5	9.5	26.1	138	80.6	18.1	106	3.5	0.027	0.212	0.040	0.013	---	0.34	0.5	0.16	<0.05	<0.05	<0.001	<3	5	3.8	---	538	2.78
Oct 4/21	147	317	969	803	7.87	7.35	-28.2	10.8	43.9	104	38.2	12.6	178	6.9	0.036	0.386	0.032	0.016	---	0.43	0.5	0.07	<0.05	0.63	<0.002	<3	11	4.7	---	575	6.37

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3e: Deep Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.0	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-6dBR																															
Oct 18/99	453	387	2,680	2,410	7.81	7.88	---	10.1	573	142	111	42.6	431	14.4	---	---	ND	0.106	0.06	0.41	0.64	0.23	ND	0.3	ND	ND	19	---	5.0	1,548	8.81
Jan 25/00	---	---	3,120	3,130	---	---	---	---	559	---	---	---	479	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1,622	---
May 1/00	275	395	2,710	2,710	7.32	7.60	---	9.4	547	144	65.0	27.3	481	13.3	0.51	0.76	1.04	0.058	0.12	0.61	0.95	0.34	ND	ND	ND	20	8	---	11.0	1,517	12.6
Oct 23/00	276	314	1,136	730	7.59	7.50	---	12.3	115	62.9	83.1	16.5	146	5.2	---	---	ND	0.019	0.06	0.17	0.35	0.18	ND	1.1	ND	ND	9	---	3.0	622	3.83
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.81	0.34	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	129	415	2,260	710	---	8.40	---	11.6	513	131	32.6	11.6	475	10.3	---	---	0.17	0.020	0.74	0.63	1.49	0.86	ND	ND	ND	12	31	---	4.0	1,424	18.2
Oct 24/01	302	367	1,624	1,930	7.89	7.60	---	12.9	214	110	79.4	25.3	219	8.7	0.06	0.35	0.54	0.050	0.04	0.37	0.67	0.30	ND	ND	ND	ND	7	---	2.0	878	5.48
Apr 17/02	175	435	2,560	2,230	7.45	6.70	---	9.6	450	127	45.8	14.8	473	9.7	---	---	0.66	0.068	---	0.62	0.96	0.34	ND	ND	ND	6	8	---	2.0	1,383	15.5
Nov 11/02	97	441	2,570	>1,990	8.51	7.60	---	11.2	484	130	26.0	7.89	484	7.8	---	---	0.27	0.020	---	0.74	0.89	0.15	ND	0.1	ND	2	6	---	1.6	1,406	21.3
Jun 10/03	290	483	2,670	2,760	8.16	8.30	---	11.6	535	128	83.5	19.8	383	6.9	---	---	0.77	0.040	---	0.67	0.95	0.28	ND	0.1	ND	ND	13	---	2.2	1,448	9.79
Oct 16/03	154	405	2,370	1,880	8.02	8.30	---	10.6	471	123	41.4	12.3	464	8.4	---	---	0.092	0.032	---	0.66	0.87	0.21	ND	0.1	ND	2	11	---	6.0	1,365	16.3
May 27/04	91	426	2,370	---	8.18	7.88	---	11.0	477	131	25.8	6.52	507	8.3	---	---	0.139	0.032	---	0.37	0.60	0.23	ND	ND	ND	3	5	---	1.8	1,403	23.1
Oct 14/04	217	405	1,870	1,500	7.82	7.25	---	11.5	294	122	60.3	16.1	315	7.7	---	---	ND	ND	---	0.04	0.29	0.25	ND	0.2	ND	ND	16	---	1.5	1,050	9.30
Jun 1/05	319	382	1,380	1,470	---	7.36	---	12.8	190	83	73.9	32.8	180	7.8	---	---	0.007	0.052	---	0.30	0.59	0.29	ND	ND	ND	ND	7	---	2.5	789	4.38
Aug 23/05	167	392	1,950	1,440	7.79	---	---	11.5	337	96	42.9	14.5	379	9.5	---	---	0.125	0.008	---	0.39	0.58	0.19	ND	0.2	ND	ND	ND	---	4.3	1,110	12.8
Nov 28/05	411	368	1,560	1,210	---	7.74	---	6.7	244	72	102	38.0	193	12.5	---	---	0.079	0.220	---	0.48	0.66	0.18	ND	ND	ND	ND	ND	---	1.9	871	4.15
Apr 5/06	244	420	2,360	2,150	8.16	7.50	---	7.1	475	95	59.0	23.4	418	10.8	---	---	0.380	0.028	---	0.70	0.91	0.21	ND	ND	ND	ND	5	---	4.4	1,320	11.7
Jul 24/06	218	441	2,490	2,650	7.64	7.99	---	13.5	533	95	52.6	21.0	433	10.9	---	---	0.414	0.027	---	0.76	0.98	0.22	ND	0.1	ND	ND	ND	---	2.5	1,400	12.8
Oct 30/06	240	404	1,370	1,738	7.60	7.31	---	8.7	259	72	58.6	22.7	235	8.1	---	---	0.128	0.018	---	0.33	0.52	0.19	ND	0.1	ND	ND	11	---	1.8	898	6.60
Apr 25/07	374	435	1,850	12,300	7.65	7.40	---	10.0	341	79	91.6	35.3	286	8.2	---	---	0.018	0.026	--	0.41	0.71	0.30	ND	ND	ND	3	5	---	2.3	1,100	6.43
Jul 18/07	312	438	2,570	3,140	7.81	7.49	---	13.8	569	92	77.6	28.7	427	11.0	---	---	0.078	0.035	---	0.59	0.93	0.34	ND	ND	ND	ND	48	---	2.0	1,470	10.5
Nov 1/07	235	420	2,450	2,600	7.70	7.41	---	8.8	515	86	56.5	22.9	460	11.1	---	---	0.010	0.033	---	0.64	0.92	0.28	ND	0.1	ND	ND	ND	---	2.5	1,400	13.0
May 14/08	202	478	2,910	1,531	7.81	7.61	---	9.9	647	92	48.5	19.6	558	7.5	---	---	ND	0.006	---	0.65	0.89	0.24	ND	ND	ND	3	21	---	0.9	1,660	17.1
Aug 5/08	154	459	2,490	2,640	7.83	7.65	---	11.6	559	88	36.1	15.5	450	10.5	---	---	0.212	0.019	---	0.75	0.98	0.23	ND	0.1	ND	9	ND	---	0.6	1,440	15.8
Oct.30/08	295	453	2,410	2,550	8.01	7.99	---	7.3	460	78	73.0	27.4	422	9.0	---	---	0.087	0.014	---	0.56	0.80	0.24	ND	0.2	ND	11	ND	---	0.9	1,340	10.7
May 19/09	609	547	2,840	2,330	7.82	7.65	---	12.8	607	81	164	48.4	396	8.2	0.126	0.181	2.07	0.220	---	0.64	0.83	0.19	ND	ND	ND	3	13	0.4	0.4	1,640	6.98
Aug 5/09	55	477	2,510	2,400	7.81	7.47	---	11.2	491	84	13.0	5.41	570	9.7	0.016	0.560	0.163	0.013	---	0.76	0.91	0.15	ND	0.2	ND	ND	6	0.9	0.9	1,460	33.5
Oct 28/09	56	498	2,510	1,650	7.95	7.12	---	8.6	449	91	12.8	5.92	582	9.0	0.024	0.583	0.145	0.010	---	0.69	0.85	0.16	ND	0.1	ND	ND	8	0.6	0.7	1,450	33.7
Apr 28/10	91	491	2,180	1,605	8.00	7.42	---	9.3	363	79	21.1	9.37	476	9.1	0.029	0.597	0.175	0.016	---	0.71	0.93	0.22	ND	0.2	ND	ND	6	0.6	---	1,250	21.7
Nov 25/10	70	467	1,990	1,528	7.79	5.22	---	6.9	306	77	15.3	7.62	456	7.2	0.025	0.612	0.053	0.009	---	0.83	0.92	0.09	ND	0.2	ND	ND	ND	0.9	---	1,150	23.8
Apr 25/11	95	480	1,900	1,680	8.35	7.57	---	9.9	288	78	20.2	10.8	385	7.6	0.034	0.549	0.176	0.019	---	0.63	0.88	0.25	ND	ND	ND	ND	8	0.9	---	1,080	17.2
Nov 3/11	214	467	1,820	1,820	7.95	7.36	-87	9.7	238	78	42.8	31.8	287	10.5	0.068	0.492	0.821	0.028	---	0.82	1.09	0.27	ND	ND	ND	ND	10	0.7	---	969	8.08
Apr 25/12	44	519	2,020	1,679	8.30	7.97	106	7.9	321	75	10.6	4.24	451	7.2	0.016	0.535	ND	0.007	---	0.49	0.89	0.40	ND	ND	ND	3	26	0.7	---	1,180	29.6
Oct 29/12	89	513	1,880	1,363	8.25	6.98	-163	9.7	257	71	20.1	9.51	392	10.0	0.037	0.649	0.223	0.016	---	0.64	0.77	0.13	ND	ND	ND	4	ND	0.8	---	1,070	18.0
Apr 23/13	42	497	1,760	1,729	8.26	7.48	-15	8.8	234	61	10.2	4.00	432	6.4	0.017	0.673	0.114	0.007	---	0.52	0.80	0.28	ND	ND	ND	ND	ND	2.2	---	1,050	29.0
Oct 29/13	38	464	1,470	1,070	7.98	7.14	50	8.5	184	67	9.64	3.37	418	6.6	0.014	0.611	0.096	0.012	---	0.42	0.81	0.39	ND	ND	ND	ND	ND	5.0	---	968	29.6
May 28/14	113	454	1,540	1,267	8.27	7.51	-31	9.6	187	65	27.4	10.7	338	7.8	0.034	0.500	0.274	0.017	---	0.65	0.91	0.26	ND	ND	ND	ND	6	3.6	---	909	13.9
Oct 1/14	188	422	1,360	1,281	8.17	7.78	-99	10.5	146	67	45.6	18.0	265	9.3	0.068	0.416	0.123	0.017	---	0.51	1.14	0.63	ND	ND	ND	ND	ND	2.7	---	805	8.4
May 7/15	340	418	1,130	1,190	7.93	6.69	-39	11.5	118	79	89.9	28.1	176	8.8	0.075	0.280	1.27	0.047	---	0.34	0.70	0.36	ND	0.4	ND	ND	ND	1.1	---	754	4.15
Oct 8/15	243	463	1,310	1,394	7.96	7.62	-76	9.5	138	67	57.8	23.9	194	10.0	0.067	0.298	0.027	0.016	---	0.61	0.82	0.21	ND	ND	ND	ND	10	0.8	---	769	5.43
Apr 26/16	281	442	1,210	1,329	8.14	7.36	-54	8.9	114	77	71.0	25.3	167	9.0	0.061	0.258	0.293	0.018	---	0.35	0.68	0.33	ND	0.2	ND	ND	ND	1.8	---	730	4.33
Oct 11/16	214	448	1,210	1,404	8.09	7.69	25	9.5	115	66	52.6	20.1	171	7.8	0.056	0.219	0.023	0.004	---	0.10	0.28	0.18	ND	0.6	ND	ND	7	1.7	---	704	5.08
Apr 18/17	215	470	1,420	1,356	8.11	7.49	113	7.9	148	57	51.6	21.0	243	11.0	0.078	0.379	0.611	0.029	---	0.59	1.05	0.46	ND	0.2	ND	<3	6	3.5	---	816	7.21
Duplicate	211	478	1,440	---	8.12	---	---	---	151	56	50.2	20.8	241	10.9	0.076	0.375	0.594	0.029	---	0.58	1.05	0.47	ND	ND	ND	<3	8	3.4	---	819	7.22
Nov 2/17	269	413	1,400	960	7.92	7.36	-97	9.8	107	58	63.5	26.8	200	11.7	0.076	0.307	0.539	0.024	---	0.59	0.6	0.01	ND	ND	ND	<3	9	4.4	---	716	5.31
May 23/18	249	448	1,420	1,032	8.26	7.46	-91.2	10	155	65	59.5	24.3	237	11.7	0.076	0.312	0.184	0.018	---	0.51	0.6	0.09	ND	ND	ND	<3	10	6.8	---	822	6.54
Oct 25/18	249	440	1,290	1,140	8.06	7.36	-326	9.8	110	60	59.9	24.2	204	10.8	0.076	0.286	0.032	0.011	---	0.98	1.0	0.02	<0.05	0.25	<0.005	<3	<5	3.3	---	736	5.62
Apr 30/19	194	424	1,360	964	8.25	7.57	45.9	9.3	135	59	48.1	18.0	232	8.0	0.038	0.344	0.012	0.010	---	0.33	0.5	0.17	<0.05	0.17	<0.002	<3	6	3.1	---	755	7.24
Oct 21/19	248	432	1,360	1,209	7.99	7.80	-135.7	10.0	119	51	56.8	25.9	214	12.0	0.073	0.312	0.620	0.025	---	0.77	0.9	0.13	<0.05	<0.05	<0.002	<3	<5	3.7	---	740	5.91
Mar 31/20	251	442	1,350	905	7.90	7.48	-37.2	7.7	136	52	60.2	24.5	207	11.1	0.076	0.316	0.835	0.023	---	0.65	0.8	0.15	<0.05	<0.05	<0.002	<3	<5	3.7	---	758	5.68
Dec 2/20	278	423	1,350	1,060	7.92	6.95	-25.8	8.6	134	52	65.7	27.7	227	11.6	0.086	0.300	1.140	0.024	---	0.60	0.8	0.20	<0.05	<0.05	<0.002	<3	<5	2.7	---	774	5.92
May 26/21	64	492	1,580	1,263	8.68	7.84	-96	9.5	187	42	14.8	6.6	369	8.0	0.021	0.488	0.132	0.012	---	0.61	0.7	0.09	<0.05	<0.05	<0.001	<3	5	2.3	---	924	20
Oct 4/21	293	428	1,230	1,040	7.92	7.74	-45.9	12.4	104	56	70.5	28.3	182	11.2	0.089	0.255	0.649	0.020	---	0.50	0.6	0.10	<0.05	<0.05	<0.002	<3	6	3.5	---	710	4.62

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3e: Deep Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.0	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
99-7dBR																															
Oct 18/99	47	341	1,470	1,367	8.21	8.28	---	10.1	262	24.9	11.7	4.20	347	5.9	---	---	ND	0.008	0.11	0.38	0.60	0.22	ND	ND	ND	6	10	---	6.0	861	22.1
Jan 25/00	---	---	708	715	---	---	---	---	36.1	---	---	---	26.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	405	---
May 1/00	388	299	809	758	7.20	7.40	---	8.3	46.6	52.9	99.3	34.1	27.2	1.0	0.41	0.08	0.52	0.110	0.02	0.15	0.33	0.18	ND	ND	ND	5	13	---	4.0	441	0.600
Oct 23/00	310	232	727	570	7.21	7.80	---	10.2	19.5	38.3	92.0	19.5	42.6	2.94	---	---	0.44	0.079	0.04	0.12	0.38	0.26	ND	ND	ND	ND	8	---	7.0	409	1.05
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.36	0.17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	161	307	870	430	---	8.40	---	9.2	45.7	53.4	46.8	10.7	123	3.7	---	---	0.19	0.070	0.02	0.26	0.66	0.40	ND	ND	ND	ND	6	---	2.0	468	4.22
Oct 29/01	443	373	1,072	970	7.41	7.30	---	8.5	91.1	59.9	117	36.7	37.6	3.0	0.20	0.06	1.09	0.199	0.02	0.25	0.85	0.60	ND	ND	ND	ND	11	---	4.0	571	0.780
Apr 17/02	311	258	731	390	7.26	7.30	---	8.3	35.8	56.7	91.8	19.8	36.9	2.8	---	---	0.62	0.171	---	0.27	0.44	0.17	ND	ND	ND	ND	11	---	4.0	400	0.910
Nov 11/02	437	381	911	910	7.90	7.30	---	11.1	106	56	125	30.2	71.0	1.2	---	---	0.89	0.190	---	0.39	0.70	0.31	ND	0.1	ND	1	12	---	4.0	620	1.48
Jun 3/03	255	276	752	740	7.90	8.20	---	10.5	39.4	78	75.1	16.5	59.7	3.7	---	---	0.23	0.100	---	0.42	0.54	0.12	ND	0.1	ND	ND	12	---	2.8	440	1.63
Oct 16/03	202	279	785	530	7.80	7.90	---	10.3	41.7	61	58.0	13.9	99.4	4.0	---	---	0.125	0.113	---	0.40	0.59	0.19	ND	0.2	ND	ND	11	---	6.0	447	3.04
May 27/04	120	345	919	---	8.32	8.03	---	10.3	56.1	66	32.9	9.19	178	5.3	---	---	0.034	0.049	---	0.39	0.58	0.19	ND	0.2	ND	ND	7	---	2.8	550	7.08
Oct 14/04	219	345	803	610	7.83	7.03	---	11.5	38.5	56	61.4	15.9	79.1	3.6	---	---	0.412	0.130	---	0.29	0.51	0.22	ND	0.1	ND	ND	9	---	2.4	459	2.33
Jun 1/05	248	272	778	740	---	7.07	---	10.3	38.5	63	70.5	17.6	79.3	4.0	---	---	ND	0.175	---	0.28	0.53	0.25	ND	3.0	ND	ND	6	---	2.4	446	2.19
Aug 23/05	184	304	772	720	7.86	---	---	11.4	33.7	66	54.7	11.6	104	3.7	---	---	0.503	0.041	---	0.15	0.32	0.17	ND	0.1	ND	ND	8	---	6.3	454	3.33
Nov 28/05	316	322	851	710	---	7.48	---	6.4	38.3	65	90.7	21.6	74.5	4.2	---	---	0.327	0.193	---	0.30	0.56	0.26	ND	ND	ND	ND	11	---	3.2	484	1.83
Apr 6/06	275	358	804	700	8.27	7.92	---	5.6	26.9	48	79.9	18.2	43.9	2.7	---	---	0.694	0.185	---	0.26	0.43	0.17	ND	ND	ND	ND	11	---	2.9	433	1.15
Jul 20/06	88	402	860	810	8.32	8.63	---	14.1	30.9	46	24.5	6.43	172	4.4	---	---	0.080	0.036	---	0.39	0.52	0.13	ND	0.1	ND	ND	5	---	5.7	522	7.99
Oct 30/06	221	340	692	869	7.55	7.85	---	9.4	22.1	38	64.7	14.4	71.8	3.2	---	---	0.638	0.128	---	0.20	0.48	0.28	ND	ND	ND	ND	7	---	2.7	419	2.10
Apr 25/07	176	405	894	300	8.28	7.21	---	6.1	35.1	46	64.3	3.58	187	4.3	---	---	0.005	0.069	---	0.18	0.41	0.23	ND	ND	ND	ND	5	---	2.9	583	6.14
Jul 18/07	201	334	760	688	7.75	7.49	---	13.9	25.5	44	58.6	13.3	91.3	3.5	---	---	0.009	0.028	---	0.07	0.29	0.22	ND	0.2	ND	ND	22	---	2.4	437	2.8
Oct 31/07	244	334	730	1,000	7.91	8.52	---	11.3	27.3	41	72.5	15.2	68.4	4.2	---	---	ND	ND	---	0.26	0.40	0.14	ND	0.1	ND	ND	24	---	3.8	430	1.91
May 14/08	146	384	939	750	8.07	7.84	---	9.5	53.0	47	42.3	9.68	194	3.1	---	---	ND	0.020	---	0.34	0.41	0.07	ND	ND	ND	3	8	---	2.4	580	7.00
Aug 5/08	92	384	894	860	8.08	8.01	---	13.7	49.6	46	25.8	6.60	175	5.1	---	---	0.227	0.055	---	0.38	0.58	0.20	ND	ND	ND	ND	9	---	2.5	539	7.95
Oct.30/08	125	366	800	910	8.17	6.96	---	8.4	39.3	42	35.9	8.49	155	4.0	---	---	0.200	0.069	---	0.30	0.57	0.27	ND	ND	ND	3	ND	---	2.6	505	6.04
May 14/09	60	444	1,040	717	7.92	8.18	---	10.4	54.0	45	16.8	4.47	213	4.8	0.048	0.508	0.154	0.022	---	0.39	0.51	0.12	ND	0.1	ND	ND	ND	2.2	2.2	606	11.9
Aug 4/09	147	331	802	850	7.33	7.37	---	10.8	38.6	55	41.3	10.5	132	4.1	0.074	0.205	0.013	0.094	---	0.31	0.44	0.13	ND	ND	ND	ND	9	2.7	2.8	480	4.74
Oct 24/09	88	354	935	850	7.82	6.74	---	9.8	52.8	48	25.0	6.25	178	4.4	0.050	0.265	0.019	0.071	---	0.30	0.49	0.19	ND	ND	ND	ND	11	2.5	2.6	527	8.26
Apr 26/10	171	334	822	790	7.80	7.72	---	8.7	43.5	43	50.1	11.3	132	3.6	0.091	0.232	0.106	0.048	---	0.29	0.35	0.06	ND	ND	ND	ND	6	2.8	---	485	4.39
Nov 25/10	75	395	1,120	796	8.29	8.02	---	7.1	100	28	21.2	5.33	206	3.6	0.044	0.425	0.265	0.036	---	0.41	0.44	0.03	ND	0.5	ND	ND	ND	1.5	---	604	10.4
Apr 25/11	24	393	1,070	899	8.40	8.10	---	9.9	110	26	6.42	2.00	245	4.2	0.016	0.649	0.041	<0.001	---	0.38	0.53	0.15	ND	ND	ND	ND	ND	1.8	---	629	21.6
Nov 1/11	42	388	1,120	860	8.32	7.56	-130	9.7	112	12	11.7	3.09	247	4.1	0.077	0.269	0.387	0.065	---	0.38	0.47	0.09	ND	ND	ND	ND	10	1.3	---	624	16.6
Apr 25/12	55	396	1,110	853	8.43	7.93	-65	7.1	112	19	15.2	4.12	219	4.3	0.039	0.530	0.047	0.019	---	0.35	0.56	0.21	ND	ND	ND	8	31	2.9	---	612	12.8
Oct 30/12	197	324	1,050	743	8.10	7.88	-106	11.0	52.7	28	62.3	9.98	109	2.8	0.052	0.187	ND	0.022	---	0.07	0.42	0.35	ND	0.1	ND	ND	10	4.3	---	459	3.37
Apr 23/13	80	345	775	861	8.25	8.39	36	9.0	31.9	34	24.5	4.46	162	3.3	0.031	0.441	0.010	0.017	---	0.17	0.48	0.31	ND	0.1	ND	ND	ND	4.0	---	468	7.88
Oct 29/13	109	340	695	680	8.09	6.82	158	9.2	20.5	29	33.9	5.80	138	3.3	0.035	0.205	0.011	0.026	---	0.08	0.51	0.43	ND	0.1	ND	ND	9	7.2	---	435	5.74
May 28/14	30	387	948	842	8.66	7.70	111	9.9	55.8	18	8.43	2.14	224	3.8	0.023	0.689	0.034	0.019	---	0.19	0.52	0.33	ND	ND	ND	3	33	4.3	---	544	17.8
Oct 1/14	27	377	1,040	1,036	8.61	8.86	-174	10.1	114	3	7.48	2.04	260	4.2	0.030	0.827	0.021	0.025	---	0.31	0.57	0.26	ND	ND	ND	4	ND	5.2	---	617	21.8
May 7/15	245	312	680	778	7.90	7.65	21	10.4	21.9	38	76.9	12.9	82	2.6	0.053	0.112	0.014	0.012	---	ND	0.6	0.60	ND	0.2	ND	5	10	2.0	---	423	2.28
Oct 8/15	124	348	785	964	7.93	7.57	66	10.1	32.4	34	36.7	7.80	122	3.2	0.050	0.209	0.047	0.053	---	0.14	0.38	0.24	ND	0.1	ND	ND	13	3.1	---	446	4.79
Apr 26/16	170	262	572	882	8.07	7.65	-12	5.3	25.0	44	55.3	7.81	80.2	1.8	0.037	0.145	0.027	0.007	---	0.05	0.34	0.29	ND	ND	ND	ND	11	8.3		371	2.67
Oct 11/16	149	331	708	840	8.04	7.00	50	8.9	31.4	30	42.4	10.3	101	3.1	0.097	0.156	0.037	0.067	---	0.19	0.50	0.31	ND	0.1	ND	ND	7	4.3	---	418	3.60
Apr 17/17	198	335	768	854	8.23	7.88	-19	8.2	33.3	28	61.3	11.0	72.2	2.4	0.081	0.143	0.012	0.018	---	0.05	0.50	0.45	ND	ND	ND	ND	12	5.8	---	409	2.23
Nov 2/17	172	295	684	492	8.31	7.54	-12	9.9	18.3	20	55.8	7.98	96.7	2.0	0.033	0.204	0.042	0.018	---	0.09	0.60	0.51	<0.1	0.2	<0.001	<3	9	8.4	---	379	3.21
May 24/18	192	332	776	497	8.31	7.61	-63	9.1	39.4	30	59.9	10.4	102	2.8	0.071	0.162	0.042	0.047	---	0.06	0.40	0.34	<0.05	<0.05	<0.001	<3	17	10.6	---	444	3.20
Oct 25/18	70	388	893	990	8.13	6.65	-383	9.1	46.7	21	19.6	5.03	188	4.3	0.050	0.344	0.508	0.067	---	0.39	0.50	0.11	<0.05	<0.05	<0.002	3	<5	5.2	---	519	9.80
Apr 29/19	209	315	732	504	8.06	7.41	22.3	8.6	16.8	26	66.9	10.2	83.5	1.9	0.021	0.143	0.022	0.047	---	0.15	1.00	0.85	<0.05	<0.05	<0.002	<3	29	6.1	---	395	2.51
Oct 21/19	59	333	927	682	8.20	7.79	-111.6	9.6	61.0	21	16.5	4.24	210	4.7	0.037	0.495	0.591	0.058	---	0.46	0.60	0.14	<0.05	<0.05	<0.002	<3	10	6.8	---	519	11.9
Duplicate	59	337	928	---	8.35	---	---	---	62.1	21	16.6	4.29	210	4.7	0.037	0.496	0.538	0.060	---	0.41	0.60	0.19	<0.05	0.07	<0.002	<3	5	8.1	---	522	11.9
Mar 31/20	200	301	774	577	7.93	7.76	43.4	8.4	39.8	39	60.9	11.6	103	3.5	0.094	0.221	0.068	0.053	---	0.16	0.40	0.24	<0.05	0.14	<0.002	<3	9	5.2	---	439	3.17
Dec 1/20	115	284	834	712	8.06	7.82	-4.3	8.9	70.2	24	35.0	6.7	151	3.4	0.052	0.355	0.239	0.034	---	0.25	0.50	0.25	<0.05	0.08	<0.002	<3	7	4.2	---	462	6.13
May 25/21	168	278	837	596	8.41	7.91	63.3	10.1	79.5	26	50.6	10.0	99.9	3.1	0.075	0.188	0.064	0.029	---	0.17	0.50	0.33	0.13	0.16	<0.002	<3	10	3.6	---	437	3.36
Duplicate	168	263	728	---	8.39	---	---	---	50.5	35	50.5	10.1	101	3.2	0.075	0.191	0.062	0.030	---	0.17	0.40	0.23	0.11	0.19	<0.002	<3	13	3.9	---	409	3.39
Oct 4/21	115	300	924	701	8.06	7.97	-69.7	9.8	96.1	25	32.4	8.22	165	4.8	0.096	0.359	0.471	0.072	---	0.59	0.60	0.01	<0.05	<0.05	<0.002	<3	10	4.0	---	513	6.69
Duplicate	119	305	888	---	8.02	---	---	---	72.5	26	33.5	8.50	168	4.8	0.100	0.368	0.503	0.075	---	0.43	0.70	0.27	<0.05	<0.05	<0.002	<3	18	4.1	---	498	6.73

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3e: Deep Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
00-1dBR																															
Dec 6/00	347	166	5,930	>1,990	7.10	8.10	---	7.0	1,668	40.7	100	23.5	1,090	19.4	0.59	0.57	0.01	0.119	0.10	1.22	1.62	0.40	ND	3.9	ND	ND	34	---	3.0	3,060	25.5
May 3/01	565	250	11,250	1,450	---	8.00	---	12.4	3,430	15.0	151	45.6	1,840	33.2	---	---	0.05	0.203	0.07	2.45	3.01	0.56	ND	ND	ND	8	42	---	3.0	5,668	33.7
Oct 24/01	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.77	1.05	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct 30/01	719	173	11,940	10,730	7.50	7.80	---	8.2	3,570	11.7	188	60.6	2,170	24.3	---	---	0.05	0.253	0.03	2.72	3.23	0.51	ND	ND	ND	ND	74	---	3.0	6,133	35.2
Apr 17/02	643	175	12,680	410	7.49	7.20	---	9.3	3,774	8.6	165	56.2	2,210	36.6	---	---	0.02	0.248	---	2.76	3.21	0.45	ND	ND	ND	ND	58	---	2.0	6,359	37.9
Nov 12/02	598	210	12,900	>1990	7.98	7.40	---	9.7	4,230	5	154	51.8	2,340	38.4	---	---	ND	0.230	---	2.74	3.14	0.40	<1	ND	ND	21	30	---	0.6	6,949	41.6
Jun 10/03	613	159	12,800	1,210	7.80	7.80	---	11.4	4,390	3	160	51.9	2,410	40.0	---	---	0.35	0.350	---	3.18	3.62	0.44	<3	ND	ND	ND	38	---	0.8	7,155	42.3
Oct 16/03	582	151	12,400	>1,900	7.72	8.00	---	9.6	4,460	3	152	49.1	2,770	40.6	---	---	0.022	0.299	---	3.06	3.25	0.19	ND	ND	ND	18	32	---	4.0	7,570	50.0
May 27/04	525	144	11,600	---	8.02	7.83	---	13.8	4,100	4	133	46.6	2,460	39.6	---	---	0.008	0.272	---	2.41	2.74	0.33	<3	ND	ND	7	32	---	ND	6,838	46.7
Oct 14/04	486	160	11,300	718	7.85	7.38	---	10.7	4,290	3	121	44.7	2,340	38.7	---	---	ND	1.39	---	2.65	2.96	0.31	<5	<5	ND	7	186	---	1.1	6,900	46.2
Jun 2/05	599	150	12,300	650	7.68	7.33	---	13.5	4,370	<100	153	52.8	2,390	51.6	---	---	ND	3.63	---	3.21	3.26	0.05	<10	<10	ND	ND	67	---	0.7	7,060	42.5
Aug 24/05	290	157	11,200	8,270	8.20	8.19	---	13.4	4,090	7	62.4	32.5	2,380	22.6	---	---	0.015	0.938	---	2.81	3.33	0.52	<10	<10	ND	ND	68	---	1.2	6,670	60.9
Nov 28/05	638	140	11,400	14,570	---	8.05	---	11.2	4,210	2	163	55.9	2,840	54.1	---	---	0.005	6.01	---	3.12	3.37	0.25	<10	ND	ND	ND	95	---	0.7	7,360	48.9
Apr 6/06	482	160	11,700	10,740	8.05	7.21	---	8.1	4,070	3	121	43.7	2,500	44.2	---	---	ND	4.70	---	2.61	3.14	0.53	<3	0.1	ND	6	70	---	0.8	6,840	49.6
Jul 24/06	482	150	12,200	12,540	7.63	8.37	---	15.7	4,230	3	119	45.1	2,130	42.5	---	---	0.014	7.01	---	2.90	3.12	0.22	<3	0.1	ND	4	29	---	0.8	6,630	42.3
Oct 31/06	401	168	10,900	11,990	8.24	7.30	---	9.5	3,900	4	97.3	38.4	2,000	37.4	---	---	0.006	3.66	---	2.57	2.86	0.29	<3	ND	ND	10	53	---	0.9	6,190	43.5
Apr 25/07	433	160	9,540	12,800	7.92	8.16	---	9.1	3,780	3	107	40.3	1,950	39.7	---	---	0.164	4.66	--	2.52	2.84	0.32	<10	ND	ND	19	79	---	<0.5	6,030	40.9
Jul 19/07	467	150	10,800	12,710	7.70	7.75	---	12.1	3,850	2	118	41.8	2,190	46.0	---	---	0.015	5.51	---	2.37	2.78	0.41	<10	2.5	ND	3	109	---	1.3	6,350	44.0
Oct 31/07	429	160	11,500	11,700	7.93	8.05	---	9.8	3,970	2	106	39.9	2,220	38.4	---	---	0.144	0.052	---	2.37	2.55	0.18	<3	0.1	ND	14	61	---	0.9	6,470	46.6
May 14/08	483	130	11,800	1,080	7.82	8.08	---	10.6	4,140	3	120	44.4	2,290	43.9	---	---	0.029	7.72	---	3.08	3.57	0.49	<10	ND	ND	17	206	---	<0.5	6,740	45.4
Aug 5/08	411	140	11,600	990	7.50	8.28	---	12.3	4,200	3	101	38.2	2,530	36.9	---	---	0.227	4.21	---	2.98	3.32	0.34	<10	0.1	ND	20	69	---	<0.2	7,000	54.3
Oct.30/08	483	140	12,200	940	7.62	6.51	---	7.0	4,170	2	121	43.9	2,400	40.8	---	---	0.097	3.76	---	2.51	2.68	0.17	<3	0.1	ND	22	51	---	0.2	6,870	47.5
May 19/09	501	150	10,400	1,162	7.45	7.46	---	9.1	4,020	3	124	46.6	2,090	43.0	0.440	1.01	0.072	4.65	---	2.69	3.09	0.40	<10	ND	ND	23	154	ND	ND	6,430	40.7
Aug 5/09	440	150	11,200	1,100	7.33	6.84	---	11.4	3,800	3	108	41.7	2,110	40.6	0.397	0.947	0.068	3.99	---	2.67	2.80	0.13	<3	ND	ND	24	34	0.3	0.3	6,190	43.7
Nov 3/09	532	150	12,000	OR	7.67	7.47	---	9.1	4,140	2	135	47.3	2,330	38.8	0.458	0.969	0.021	4.35	---	2.60	2.88	0.28	<3	ND	ND	11	32	0.3	0.4	6,790	44.0
Apr 28/10	510	147	12,000	11,590	7.78	7.51	---	8.0	3,970	2	131	47.7	2,430	40.0	0.450	1.13	0.014	4.06	---	2.75	3.36	0.61	<10	0.1	ND	7	108	ND	---	6,720	46.2
Nov 29/10	447	142	12,500	7,470	7.68	7.86	---	7.9	4,250	2	104	40.1	2,090	30.2	0.366	1.01	0.077	3.09	---	2.77	3.80	1.03	<3	ND	ND	8	160	ND	---	6,610	42.9
Apr 26/11	456	150	11,800	OR	7.88	7.13	---	8.6	4,030	3	111	43.3	2,580	28.8	0.516	1.03	0.261	5.08	---	3.02	3.23	0.21	<3	ND	ND	ND	52	0.3	---	6,890	52.5
Nov 3/11	334	156	11,200	OR	7.69	7.33	9	10.7	3,740	<5	76.7	47.8	1,870	25.8	0.295	1.05	0.305	4.28	---	2.11	2.87	0.76	<0.5	<0.5	ND	11	189	ND	---	5,870	41.4
Duplicate	279	151	11,900	---	7.83	---	---	---	3,890	<10	63.4	43.1	2,180	22.4	0.240	0.900	0.234	3.79	---	2.34	3.32	0.98	<1	<1	0.003	20	363	ND	---	6,300	51.7
Apr 26/12	452	145	12,000	10,460	8.00	7.20	101	10.2	4,010	<10	109	43.8	2,370	38.4	0.390	0.956	0.184	3.71	---	2.71	3.41	0.70	<1	<1	ND	10	49	ND	---	6,690	45.5
Oct 29/12	472	150	11,000	4,070	7.86	6.95	-145	10.0	3,980	<5	114	45.6	2,160	42.2	0.454	1.18	0.321	3.68	---	2.73	2.74	0.01	ND	7.6	ND	12	50	0.4	---	6,480	43.3
Apr 23/13	471	167	12,000	7,100	7.96	7.13	-67	11.4	4,070	<5	113	46.0	2,240	34.1	0.473	1.15	0.543	4.21	---	2.90	3.32	0.42	<0.5	<0.5	ND	ND	120	0.4	---	6,610	44.8
Oct 29/13	521	147	11,400	5,450	7.91	7.58	-46	8.4	4,140	<10	130	47.7	2,240	41.7	0.622	1.06	0.457	5.08	---	2.90	3.30	0.40	<1	<1	ND	4	36	1.4	---	6,700	42.7
May 28/14	446	145	11,200	11,690	8.00	7.31	-66	10.6	3,720	<10	110	41.7	2,120	35.4	0.373	1.08	0.088	3.08	---	2.39	2.89	0.50	<1	<1	ND	9	17	1.0	---	6,120	43.7
Oct 1/14	427	149	11,500	461	7.67	7.53	39	10.9	4,030	45	107	39.2	2,050	34.8	0.396	1.09	0.306	3.13	---	2.07	3.02	0.95	<3	<3	ND	17	ND	0.7	---	6,400	43.2
May 6/15	511	145	11,500	7,400	7.98	7.59	-11.5	13.2	3,990	<10	124	49.2	2,230	41.1	0.457	1.13	0.604	3.96	---	2.82	3.80	0.98	<1	<1	ND	17	25	1.1	---	6,530	42.8
May 12/15	402	142	12,200	13,609	8.06	7.80	-78.3	8.8	4,070	<10	109	39.3	1,660	33.3	0.345	1.03	0.175	2.95	---	2.80	2.90	0.10	<1	<1	ND	3	34	<0.5	---	6,660	46.9
Oct 8/15	406	157	10,900	OR	7.91	7.71	-125	11.2	3,730	<100	97.6	39.4	1,980	32.4	0.343	1.04	0.548	2.87	---	2.52	2.94	0.42	<10	<10	ND	22	25	ND	---	5,970	42.7
Apr 27/16	504	146	11,800	2,990	7.92	7.65	-42	10.2	4,090	<30	117	51.7	2,150	37.5	0.374	1.13	0.642	3.02	---	3.30	3.4	0.10	<3	<3	ND	8	22	ND	---	6,540	41.6
Oct 12/16	397	148	11,600	8,963	7.88	7.63	-74	8.1	4,050	<30	90.2	41.6	2,230	30.4	0.316	0.880	0.492	2.42	---	2.91	3.31	0.40	<3	<3	ND	9	13	0.4	---	6,540	48.7
Apr 19/17	508	141	11,800	614	7.90	7.38	146	8.9	3,960	<30	128	45.8	2,150	38.3	0.442	1.14	0.693	2.98	---	2.91	3.49	0.58	<3	<3	ND	14	14	0.8	---	6,410	41.5
Nov 1/17	478	148	11,200	79,300	8.01	7.49	-24	8.9	3,170	<50	115	46.4	2,120	28.8	0.445	1.19	0.539	2.90	---	2.70	2.7	0.00	<5	<5	ND	<3	206	0.9	---	5,581	42.2
May 23/18	482	139	11,400	8,756	7.96	7.51	-99	12.6	3,960	<30	118	45.4	2,010	38.4	0.407	1.10	0.809	2.41	---	3.06	3.1	0.04	<1	<1	ND	14	190	<0.2	---	6,261	39.9
Oct 25/18	533	134	12,500	6300	7.75	6.99	-239	9.7	3,950	<30	132	49.5	2,230	40.4	0.503	1.17	0.939	2.88	---	3.35	4.2	0.85	1.89	<1	0.003	20	91	0.4	---	6,487	42.0
GW Duplicate	529	133	12,300	---	7.86	---	---	---	4,050	<30	131	49.1	2,270	39.6	0.496	1.16	0.946	2.83	---	0.06	0.4	0.34	1.87	<1	<0.01	18	102	0.6	---	6,624	42.9
May 1/19	463	138	11,800	7382	7.70	7.34	-28.3	7.9	4,110	<30	114	43.2	2,250	37.3	0.424	1.10	0.334	2.45	---	2.75	3.2	0.45	<1	<1	<0.002	11	92	0.2	---	6,643	45.5
Oct 21/19	474	136	11,300	9141	7.72	7.26	-50.5	10.6	3,440	<30	117	44.2	2,240	40.1	0.427	1.23	0.507	2.32	---	2.90	3.0	0.10	<1	<1	<0.002	11	86	1.2	---	5,965	44.8
Mar 31/20	590	128	12,700	8206	7.81	7.55	-33.7	8.2	4,600	<1	145	55.4	2,010	46.2	0.632	1.22	<0.005	3.57	---	3.17	3.6	0.43	<0.05	<0.05	<0.002	10	628	<0.2	---	7,345	43.2
Dec 2/20	491	131	11,400	8229	7.81	7.3	-41.8	7.6	3,870	<100	119	47.2	2,230	42.2	0.432	1.20	1.22	2.18	---	2.98	3.6	0.62	<5	<5	<0.002	16	38	0.2	---	6,396	43.8
May 26/21	528	132	12,000	9941	8.16	7.34	-124.9	11.4	4,320	<30	127	51.3	2,420	44.1	0.428	1.23	1.23	2.03	---	3.16	3.3	0.14	<1	<1	<0.001	13	317	0.4	---	7,052	45.8
Oct 4/21	533	136	11,800	9402	7.69	7.32	-64.6	10.3	3,820	<10	131	49.9	2,260	43.2	0.445	1.26	1.73	2.21	---	3.10	3.1	0.00	<0.5	<0.5	<0.002	<3	28	<0.2	---	6,396	42.6

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3e: Deep Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
00-2dBR																															
Dec 6/00	125	280	1,630	1,570	7.61	9.00	---	4.5	271	39.8	29.1	12.6	256	7.9	---	---	0.10	0.165	0.19	0.41	0.64	0.23	ND	ND	ND	ND	10	---	ND	785	9.98
May 3/01	4,934	160	34,600	1,300	---	7.40	---	12.4	11,063	46.0	1,270	428	4,700	77.1	---	---	0.13	26.0	0.55	5.44	6.82	1.38	ND	ND	ND	ND	1,175	---	4.0	17,713	29.1
Oct 30/01	9,205	128	52,700	OR	7.03	7.30	---	7.2	18,600	93.3	2,370	798	8,170	143	---	---	0.01	12.1	0.16	9.01	9.92	0.91	ND	ND	ND	ND	545	---	2.0	30,275	97.1
Apr 17/02	3,456	241	20,700	7,120	7.36	7.20	---	10.2	7,855	215	891	299	3,300	45.4	---	---	0.02	5.18	---	2.79	3.68	0.89	ND	ND	ND	ND	556	---	3.0	12,759	24.4
Nov 12/02	15,732	216	73,600	>1,990	7.60	6.90	---	10.2	29,200	78	4,140	1,310	13,400	201	---	---	ND	26.8	---	13.9	17.1	3.20	<10	<10	ND	ND	**	---	ND	48,503	46.5
Jun 10/03	15,179	300	76,700	7,160	7.22	7.00	---	11.9	33,300	5	4,000	1,260	13,600	343	---	---	8.90	26.7	---	14.9	16.6	1.70	<100	ND	ND	ND	1,305	---	0.7	52,743	48.0
Oct 23/03	9,790	152	49,200	>19,990	7.55	7.20	---	8.3	20,200	178	2,530	841	8,750	180	---	---	0.275	14.4	---	8.48	9.64	1.16	ND	ND	ND	ND	860	---	5.0	32,610	38.5
May 27/04	11,600	156	55,900	---	7.63	8.42	---	12.0	24,600	200	2,990	992	9,470	149	---	---	0.008	8.92	---	10.6	10.9	0.30	<60	<60	ND	ND	895	---	0.5	38,430	38.3
Oct 14/04	13,500	115	72,200	>19,990	7.19	6.83	---	10.4	31,700	<1,000	3,450	1,190	12,300	182	---	---	ND	9.10	---	13.9	14.4	0.50	<100	<100	0.009	1	1,240	---	1.2	49,100	46.0
Jun 2/05	14,300	150	80,700	1,040	6.48	7.13	---	12.4	29,300	100	3,170	1,560	15,200	389	---	---	0.072	23.8	---	0.35	0.50	0.15	<10	20	0.002	ND	28.0	---	8.6	49,600	55.3
Aug 23/05	17,600	141	67,700	>19,990	6.60	---	---	13.4	35,800	<200	4,450	1,580	15,100	268	---	---	0.120	15.4	---	14.1	14.1	0.00	<20	<20	ND	ND	2,730	---	ND.0	57,200	49.5
Nov 28/05	9,110	250	17,500	>19,990	---	7.23	---	12.1	18,500	22	2,470	714	6,630	190	---	---	0.008	9.30	---	8.81	9.39	0.58	<100	<100	ND	ND	1,050	---	0.5	28,500	30.2
Apr 13/06	14,900	180	64,500	>19,990	6.75	7.05	---	8.8	28,700	100	3,740	1,350	13,800	204	---	---	0.044	24.2	---	11.9	13.0	1.10	<10	<10	ND	ND	2,090	---	2.2	47,800	49.3
Jul 24/06	Not sampled - Not enough to sample																														
Oct 31/06	12,300	197	60,100	1,150	7.29	7.57	---	8.9	26,700	100	3,070	1,120	11,900	198	---	---	0.006	16.3	---	9.92	9.92	0.00	<10	<10	ND	ND	2,130	---	1.1	43,300	46.7
Apr 26/07	13,600	200	7,520	OR	6.80	6.88	---	10.0	31,200	100	3,410	1,230	13,100	220	---	---	3.00	18.0	---	11.7	11.9	0.20	<10	<10	ND	ND	3,230	---	1.7	49,400	48.9
Jul 23/07	13,500	184	8,100	---	6.79	6.61	---	16.4	29,100	<300	3,400	1,210	12,900	207	---	---	0.057	17.2	---	12.3	11.9	-0.4	<30	<30	ND	ND	996	---	0.7	47,100	48.2
Nov 1/07	14,200	240	6,090	OR	6.68	6.34	---	8.8	33,200	25	3,570	1,280	13,500	219	---	---	0.022	16.8	---	12.8	14.5	1.70	<30	<30	ND	ND	4,040	---	1.8	52,000	49.3
May 14/08	5,460	228	35,100	OR	7.04	7.00	---	13.0	15,300	92	1,470	436	6,190	130	---	---	0.006	8.10	---	6.91	1.58	-5.33	<10	<10	ND	ND	1,160	---	<0.5	23,800	36.4
Aug 5/08	5,530	230	22,000	OR	6.78	6.27	---	21.6	18,000	130	1,360	518	7,650	142	---	---	0.008	7.64	---	10.4	2.30	-8.1	<1	<1	ND	ND	420	---	<0.2	28,000	44.8
Oct.30/08	8,680	240	42,200	OR	7.27	6.85	---	7.7	20,800	200	2,240	749	7,660	156	---	---	0.049	8.33	---	8.82	9.92	1.1	<10	10	ND	ND	1,370	---	0.3	32,000	35.8
May 14/09	Damaged																														
June 9/09	9,340	159	65,500	1,740	6.56	6.47	---	12.1	29,300	200	2,450	780	11,300	218	1.36	0.661	0.352	7.63	---	11.7	12.9	1.20	ND	20	ND	ND	1,150	ND	ND	44,500	50.9
Aug 5/09	13,200	160	64,300	OR	6.91	6.04	---	11.0	28,500	450	3340	1190	12,400	241	1.31	0.642	0.139	7.56	---	12.2	13.0	0.80	<30	<3	ND	21	1090	0.3	0.6	46,200	46.8
Nov 3/09	16,300	200	94,000	OR	6.58	6.28	---	9.6	31,800	200	4,100	1,470	14,900	211	1.47	0.714	0.204	9.30	---	12.9	13.8	0.90	<10	10	ND	ND	1190	0.4	0.4	52,800	50.7
Apr 28/10	14,200	186	85,600	OR	6.55	6.24	---	9.2	37,200	200	5,000	1,720	17,600	240	1.64	0.791	0.074	9.94	---	15.4	16.6	1.20	<10	<10	ND	ND	2120	ND	---	62,100	54.7
Nov 29/10	17,300	176	88,700	OR	6.39	6.15	---	8.2	40,600	136	4,420	1,530	16,500	210	1.32	0.710	0.132	8.74	---	14.5	16.6	2.10	<3	<3	ND	ND	3,080	0.6	---	63,600	54.5
Apr 26/11	16,700	170	88,900	OR	7.06	6.05	---	8.5	40,300	142	4,280	1,450	15,000	195	1.54	0.759	0.060	9.15	---	18.0	19.8	1.80	<100	<10	ND	ND	1,660	0.3	---	61,500	50.5
Nov 3/11	17,600	163	89,800	OR	6.97	6.49	21	11.8	41,900	139	4,410	1,590	16,500	164	0.969	0.617	0.026	8.53	---	13.9	20.5	6.60	<5	<5	0.004	ND	2,270	<0.2	---	64,900	54.0
Apr 26/12	19,100	167	91,300	OR	7.19	6.11	178	9.0	42,800	148	4,910	1,670	16,000	260	1.24	0.631	0.098	6.34	---	16.3	18.4	2.10	<10	<10	ND	ND	2,390	ND	---	66,000	50.5
Oct 29/12	18,600	173	91,600	14,730	7.04	5.98	-60	9.8	42,700	127	4,740	1,650	16,400	245	1.61	0.785	0.019	6.13	---	15.1	15.1	0.00	<3	<3	ND	ND	590	0.4	---	66,000	52.3
Apr 24/13	17,200	172	91,600	OR	7.12	6.13	-122	10.2	42,400	105	4,410	1,510	16,100	254	1.57	0.810	0.029	6.16	---	16.8	18.6	1.80	<3	<3	ND	ND	2,260	0.4	---	65,000	53.4
Oct 29/13	15,300	170	86,500	16,750	6.92	6.67	1	8.2	41,500	114	4,300	1,110	17,800	332	1.64	0.778	0.007	5.82	---	17.3	17.5	0.20	<10	<10	ND	ND	1,400	1.7	---	65,400	62.8
May 29/14	18,900	160	85,400	61,900	7.23	6.27	98	11.8	38,500	100	4,860	1,640	17,800	258	1.70	0.776	0.022	5.54	---	16.1	16.7	0.60	<10	<10	0.003	<3	675	0.9	---	63,200	56.3
Oct 1/14	18,300	158	89,300	11,130	7.29	6.21	159	11.2	40,000	121	4,760	1,570	18,000	255	2.24	0.863	0.036	7.37	---	16.5	18.7	2.20	<10	<10	0.003	3	1780	0.6	---	64,800	58
May 6/15	15,900	166	81,400	9,300	7.22	6.38	122	13.3	42,200	10	4,460	1,160	16,300	271	1.84	0.742	0.476	7.03	---	17.2	22.8	5.60	<1	<1	ND	<3	1,410	1.3	---	64,500	56.3
Oct 13/15	15,500	184	88,500	16,120	7.29	6.63	9	11.0	41,200	<100	4,820	1,730	18,200	338	1.46	0.605	0.297	7.20	---	16.4	18.8	2.40	<10	<10	ND	ND	780	ND	---	66,600	57.2
Apr 26/16	17,400	180	90,600	72,390	7.26	6.23	14	8.4	39,500	<100	4,430	1,540	16,200	231	2.19	0.813	0.057	9.22	---	16.3	18.6	2.30	<10	<10	0.007	ND	530	ND	---	62,200	53.5
Oct 12/16	18,300	168	93,600	72,050	7.12	6.77	120	8.1	43,100	<100	4,660	1,620	16,900	189	2.10	0.664	0.038	8.78	---	18.1	19.8	1.70	<10	<10	0.002	ND	690	0.3	---	66,800	54.5
Apr 19/17	13,600	167	91,100	64,396	7.10	5.91	60.0	6.7	39,500	162	4,330	1,480	15,500	236	4.85	0.923	0.398	19.4	---	16.3	20.4	4.10	<10	<10	0.003	ND	380	0.9	---	61,300	51.9
Nov 1/17	17,300	162	90,700	62,900	7.23	6.51	211	8.2	36,100	172	4,290	1,610	16,500	271	5.85	0.921	0.141	22.2	---	17.5	18.1	0.60	<10	<10	ND	4	7500	ND	---	59,085	54.5
May 24/18	18,600	176	90,000	OR	7.19	6.28	97	10.9	41,500	<100	4,760	1,630	17,600	265	6.27	0.872	0.213	21.7	---	17.5	17.5	0.00	<5	<5	<0.001	<30	2310	<20	---	65,920	56.2
Oct 25/18	17,900	145	93,600	58,039	7.14	6.33	92.4	7.7	43,500	<200	4,630	1,540	17,400	256	6.36	0.821	0.168	23.4	---	19.1	21.8	2.70	<10	<10	0.223	3	1300	0.6	---	67,489	56.6
May 1/19	17,100	147	62,000	61,737	6.83	6.20	46.5	8.7	40,500	1	4,300	1,540	16,200	243	6.39	0.801	0.200	21.4	---	16.8	21.4	4.60	<0.05	<0.05	<0.002	<3	3310	<0.2	---	62,926	53.9
Oct 21/19	18,600	153	91,300	72,335	7.17	5.99	20.2	9.5	40,700	<100	4,800	1,610	17,000	287	6.11	0.913	0.121	22.3	---	18.2	19.6	1.40	5.70	<5	<0.001	5	3450	0.5	---	64,551	54.2
Apr 1/20	17,700	160	60,800	61,871	6.98	5.87	145.7	8.6	42,400	61	4,490	1,570	16,600	263	5.59	0.921	0.792	29.1	---	16.1	17.5	1.40	<0.05	0.41	0.008	7	4400	<0.2	---	65,505	54.3
Dec 1/20	17,700	162	62,400	69,717	6.77	6.15	100.5	8.7	43,800	<100	4,460	1,590	16,300	256	7.16	0.898	1.320	35.2	---	16.8	16.8	0.00	<5	<5	0.008	<3	8650	<0.2	---	66,517	53.3
May 1/21	Decommissioned																														

🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).

ND – Not Detected

Table 5.3e: Deep Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

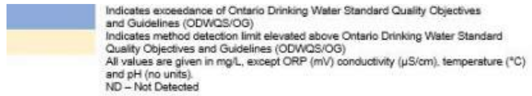
Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
00-3dBR																															
Dec 6/00	112	277	1,711	1,880	7.36	8.50	---	5.4	262	51.2	31.8	8.00	270	6.5	---	---	0.02	0.064	0.13	0.28	0.64	0.36	ND	0.7	ND	1	6	---	ND	799	11.1
May 3/01	58	353	2,380	1,420	---	8.30	---	12.3	485	71.9	17.3	3.60	486	7.8	---	---	0.16	0.099	0.11	0.33	0.83	0.50	ND	ND	ND	4	13	---	4.0	1,284	27.8
Oct 24/01	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.27	0.81	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct 30/01	174	396	5,140	5,050	7.60	7.80	---	8.3	1,300	80.3	47.1	13.6	1,000	13.9	---	---	ND	0.923	0.24	0.65	1.94	1.29	ND	ND	ND	4	68	---	8.0	2,694	33.0
Apr 17/02	679	338	9,830	8,600	7.32	7.30	---	11.2	2,872	81.7	172	60.5	1,670	28.7	---	---	0.21	5.69	---	1.74	3.36	1.62	ND	ND	ND	4	86	---	7.0	5,096	27.9
Nov 12/02	1,206	348	14,900	>1,990	7.70	7.20	---	9.9	4,800	98	295	114	2,570	47.6	---	---	0.13	15.0	---	3.09	3.95	0.86	<1	ND	ND	4	74	---	2.1	8,153	32.2
Jun 5/03	1,862	357	19,500	19,120	7.73	7.10	---	14.6	6,590	74	480	161	3,860	59.9	---	---	2.18	30.4	---	3.98	27.0	23.0	ND	ND	ND	5	148	---	3.6	11,477	38.9
Oct 16/03	2,480	339	22,300	>19,990	7.81	8.00	---	6.6	8,420	79	652	208	4,230	70.1	---	---	0.005	32.6	---	4.84	6.38	1.54	ND	ND	ND	4	715	---	20.0	13,830	36.9
May 27/04	4,070	303	30,100	---	7.66	7.10	---	14.2	12,700	80	1,110	316	5,710	90.7	---	---	0.295	37.8	---	6.32	7.11	0.79	<4	<4	ND	2	608	---	2.2	20,140	38.9
Oct 18/04	Not sampled - Not enough to sample																														
Jun 2/05	5,700	318	40,000	>19,990	6.67	6.38	---	19.5	16,100	200	1,420	521	7,180	147	---	---	0.108	45.6	---	7.37	8.74	1.37	<10	20	ND	ND	500	---	4.1	25,700	41.4
Aug 24/05	Not sampled - Not enough to sample																														
Nov 28/05	5,990	309	19,500	>19,990	---	6.70	---	11.2	14,300	21	1,620	470	6,360	172	---	---	0.365	42.4	---	8.35	8.60	0.25	<100	100	ND	ND	870	---	4.5	23,500	35.8
Apr 6/06	Not sampled - Not enough to sample																														
July 20/06	Dry																														
Oct 31/06	5,160	300	41,200	>19,990	7.26	6.72	---	7.7	15,800	200	1,240	500	8,320	140	---	---	0.207	33.7	---	7.55	8.19	0.64	<10	<10	ND	9	4,950	---	5.7	26,300	50.4
Apr 26/07	4,460	292	44,800	OR	6.85	6.66	---	11.8	16,000	100	1100	415	8,880	134	---	---	0.472	31.0	--	5.06	7.62	2.56	<100	<100	ND	ND	339	---	2.5	26,900	57.8
July 23/07	Not sampled - Not enough to sample																														
Oct 31/07	Not sampled			OR		6.69	---	14.0							---	---															
May 14/08	Not sampled																														
Aug 5/08	4,080	306	38,900	OR	6.94	6.78	---	15.9	15,000	167	1,000	382	7,430	123	---	---	0.443	27.1	---	8.14	9.38	1.24	<100	2.1	ND	9	1,120	---	0.3	24,300	50.6
Oct.30/08	5,410	306	36,600	OR	7.29	6.87	---	7.0	17,600	200	1,340	500	7,800	131	---	---	0.585	27.5	---	8.37	10.3	1.93	<10	10	ND	8	515	---	0.3	27,800	46.2
May 19/09	5,200	333	21,500	20,000	6.95	6.85	---	7.4	16,100	170	1,250	496	7,450	110	1.10	1.3	2.60	32.1	---	7.03	9.46	2.43	<10	ND	ND	4	690	ND	ND	25,800	45.1
Aug 4/09	4,590	332	45,000	OR	6.70	6.60	---	14.3	17,600	197	1140	422	7,940	147	0.847	1.05	1.10	23.4	---	8.85	9.76	0.91	ND	10	ND	5	755	0.2	0.2	27,700	51.0
Oct 26/09	---	324	47,200	---	6.96	---	---	---	16,300	198	---	---	---	---	---	---	---	---	---	8.20	9.73	1.53	<10	10	ND	4	595	0.4	0.4	---	---
Apr 26/10	5,570	342	46,000	---	7.03	---	---	---	19,600	200	1,470	559	8,660	114	0.875	1.26	1.65	27.7	---	7.67	8.96	1.29	<3	<3	ND	4	795	ND	---	30,800	48.8
Nov 29/10	6,170	334	45,800	---	7.12	---	---	---	18,800	184	1,500	588	8,940	118	0.709	1.20	1.61	29.7	---	7.59	10.3	2.71	<3	<3	ND	8	500	0.3	---	30,300	49.5
Apr 25/11	3,830	368	33,300	12,690	7.23	6.10	---	9.9	13,400	152	922	371	5,920	87	0.571	1.23	0.860	18.0	---	5.54	8.1	2.56	<10	26.8	ND	ND	1,510	0.3	---	21,300	41.6
Nov 2/11	Not enough to sample			OR		6.72	-89	9.4												8.80	10.2	1.40			ND		1,300	ND			
Apr 25/12	5,290	355	41,900	15,490	7.37	6.77	139	8.2	16,600	151	1,300	500	8,020	125	0.866	1.00	0.978	29.7	---	7.01	9.19	2.18	ND	ND	ND	ND	610	ND	---	26,900	48.0
Oct 30/12	8,500	361	42,200	OR	7.28	6.50	127	---	17,400	148	2,050	818	13,000	168	1.02	1.20	1.06	26.1	---	6.34	7.16	0.82	ND	ND	ND	ND	460	0.3	---	33,900	61.3
Apr 23/13	3,480	384	34,400	OR	7.32	6.83	18	10.2	13,500	102	866	319	5,880	79.3	0.854	1.14	7.22	22.7	---	6.40	8.50	2.10	<1	<1	ND	ND	1,260	0.9	---	21,000	43.4
Oct 29/13	4,780	355	37,200	9,660	7.25	6.63	65	7.2	14,700	121	1,210	423	7,760	137	0.924	1.06	2.59	16.2	---	7.25	10.4	3.15	<3	<3	ND	3	405	4.2	---	24,600	48.8
May 29/14	4,930	323	40,000	10,670	7.40	6.57	-62	10.1	16,900	140	1,320	398	8,540	112	1.02	1.09	3.82	18.4	---	7.90	8.08	0.18	<10	<10	ND	ND	1380	1.5	---	27,700	52.9
Oct 1/14	4,510	320	42,400	---	7.39	---	---	---	17,000	152	1,120	413	7,750	113	1.05	1.10	4.36	16.7	---	6.64	8.83	2.19	<10	<10	ND	ND	ND	2.4	---	26,700	50.2
May 6/15	5,040	336	41,800	6,480	7.56	6.48	40	16.8	17,200	135	1,270	457	8,410	134	1.07	1.11	4.70	16.9	---	6.99	13.2	6.21	<3	<3	ND	15	315	4.6	---	27,800	51.6
Oct 8/15	4,380	360	43,200	6,590	7.38	6.74	22	10.2	17,900	135	1,290	426	7,830	101	0.903	1.01	5.21	13.7	---	6.32	11.1	4.78	<10	<10	ND	9	2110	ND	---	27,900	48.3
Apr 26/16	5,320	383	43,100	34,062	7.32	8.00	-62	7.4	17,100	115	1,300	505	7,640	115	0.970	1.11	15.5	17.6	---	6.23	11.2	4.97	<10	<10	0.007	5	315	0.8	---	27,100	45.6
Oct 11/16	5,080	385	42,900	1,280	7.27	6.69	-12	12.6	17,700	<100	1,310	437	7,940	108	1.02	0.999	14.0	18.9	---	8.35	15.8	7.45	<10	<10	ND	ND	1,300	0.6	---	27,900	48.5
Apr 18/17	5,270	381	44,300	9,640	7.29	6.78	127	11.4	17,400	163	1,380	442	7,980	122	2.27	1.14	31.4	27.1		8.81	13.9	5.09	<10	<10	<0.001	9	200	1.5		27,800	47.8
Nov 1/17	Decommissioned																														

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3e: Deep Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
00-4dBR																															
Dec 6/00	228	280	727	830	7.44	8.40	---	5.7	26.0	45.7	61.1	18.3	49.1	4.0	---	---	ND	0.140	2.16	0.04	0.41	0.37	ND	1.3	ND	ND	2	---	ND	378	1.42
May 3/01	328	334	5,110	1,530	---	7.90	---	12.7	1,138	73.8	86.9	27.0	83.6	16.5	---	---	0.07	0.203	0.86	0.21	1.49	1.28	ND	ND	ND	ND	25	---	3.0	2,379	20.1
Oct 24/01	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.43	0.60	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct 30/01	299	355	5,660	5,240	7.52	7.60	---	9.7	1,400	82.5	80.0	24.1	966	16.0	---	---	ND	0.324	0.29	1.21	1.53	0.32	ND	ND	ND	ND	68	---	2.0	2,784	24.3
Apr 17/02	348	346	6,890	1,530	7.59	7.10	---	9.8	1,924	132	90.2	29.7	1,280	20.7	---	---	ND	0.356	---	1.58	1.95	0.37	ND	ND	ND	ND	26	---	3.0	3,687	29.9
Nov 12/02	401	336	7,740	>1990	8.13	7.20	---	10.5	2,360	132	105	33.8	1,430	26.2	---	---	ND	0.460	---	1.61	2.31	0.70	<1	0.1	ND	ND	30	---	1.7	4,292	31.1
Jun 5/03	368	282	7,690	7,700	8.14	8.10	---	10.3	2,050	103	97.5	30.2	1,230	25.7	---	---	ND	3.73	---	1.05	1.31	0.26	ND	0.7	ND	2	32	---	2.5	3,715	27.9
Oct 16/03	227	315	5,260	5,690	8.18	7.90	---	6.4	1,490	76	59.4	19.0	1,130	18.7	---	---	0.005	0.754	---	1.10	1.35	0.25	ND	4.8	ND	1	31	---	15.0	2,987	32.7
May 27/04	259	336	5,690	---	8.23	7.90	---	12.0	1,740	77	68.4	21.4	966	21.1	---	---	0.007	1.63	---	ND	0.22	0.22	ND	11.3	ND	ND	25	---	1.3	3,127	26.1
Oct 18/04	400	318	8,520	6,030	7.56	7.33	---	9.4	3,000	110	104	33.8	1,980	30.4	---	---	ND	5.07	---	1.84	2.07	0.23	<5	3.0	ND	3	32	---	1.3	5,440	43.1
Jun 2/05	313	340	6,450	7,390	7.54	7.19	---	14.5	1,820	148	79.7	27.7	1,140	25.1	---	---	0.011	2.95	---	0.84	1.13	0.29	<1	11.1	ND	ND	16	---	1.9	3,480	28.1
Aug 24/05	286	347	6,590	5,070	7.51	7.66	---	16.7	1,820	151	73.1	25.1	1,310	24.5	---	---	---	---	---	0.22	0.53	0.31	<1	10.3	ND	ND	17	---	3.0	3,630	33.8
Nov 28/05	317	363	7,390	8,340	---	7.85	---	9.7	2,280	178	82.3	27.2	1,750	30.3	---	---	0.005	2.92	---	0.55	1.40	0.85	<3	10.0	ND	ND	10	---	5.6	4,580	42.7
Apr 6/06	Not sampled - Not enough to sample																														
Jul 24/06	535	304	10,000	9,810	7.65	7.91	---	18.4	3,220	260	140	44.9	1,820	32.4	---	---	0.137	4.38	---	--	--	---	<3	24.6	--	--	--	---	--	5,790	34.2
Oct 31/06	Not sampled - Not enough to sample																														
Apr 26/07	Not sampled - Not enough to sample																														
July 23/07	Not sampled - Not enough to sample																														
Oct 31/07	Not sampled			1,991		6.95	---	13.7							---	---															
May 14/08	247	298	3,670	2,300	7.19	7.78	---	13.0	973	90	63.0	21.7	705	10.3	---	---	0.012	0.319	---	0.08	1.19	1.11	<3	5.5	ND	4	85	---	<0.5	2,070	19.5
Aug 5/08	399	303	7,080	7,750	7.50	7.37	---	18.3	2,410	166	106	32.7	1,480	25.4	---	---	0.629	0.423	---	0.01	0.55	0.54	<3	11.5	ND	ND	42	---	0.3	4,460	32.2
Oct.30/08	Not sampled - Not enough to sample																														
May 14/09	704	306	8,980	---	7.66	---	---	---	2,750	168	205	46.3	1,570	32.2	0.55	0.539	0.900	1.79	---	ND	0.08	0.08	ND	15.0	ND	ND	101	ND	ND	5,030	25.8
Aug 5/09	Not sampled - Not enough to sample																														
Oct 28/09	948	270	12,300	---	7.20	---	---	---	3,860	219	260	72.7	2,390	40.3	0.308	0.601	0.091	0.603	---	---	---	---	<3	23.3	---	<3	---	---	---	7,100	33.8
Apr 26/10	1,070	286	13,700	---	7.69	---	---	---	4,700	302	293	87.3	2,480	46.6	0.276	0.693	0.046	0.507	---	ND	ND	ND	<10	23	ND	--	22	ND	---	8,190	32.7
Nov 29/10	Not sampled - Not enough to sample																														
Apr 25/11	Not enough to sample			6,900		7.14	---	14.4																							
Nov 3/11	1,020	275	12,400	1,210	7.86	7.22	-11	11.3	3,820	246	252	96.1	2,390	31.0	0.144	0.681	0.025	0.811	---	ND	0.39	0.39	<10	28	ND	ND	226	ND	---	7,120	32.5
Apr 25/12	---	264	14,500	---	7.84	---	---	---	4,830	343	---	---	---	---	---	---	---	---	---	---	---	---	<1	21	---	---	---	ND	---	---	---
Oct 29/12	Not enough to sample																														
Apr 23/13	Not enough to sample																														
Oct 29/13	Not enough to sample																														
May 29/14	436	306	6,330	3,900	8.19	7.57	-19	12.0	1,860	277	107	41.1	1,220	23.2	0.228	0.531	ND	0.185	---	0.04	0.61	0.57	<3	6.8	ND	ND	30	1.5	---	3,740	25.4
Oct 1/14	538	329	8,010	4,070	7.80	7.46	-85	13.2	2,470	298	133	49.7	1,380	27.9	0.208	0.592	ND	0.017	---	ND	0.09	0.09	<1	12.0	ND	3	8	2.2	---	4,610	26
May 6/15	567	370	8,760	---	8.06	---	---	---	2,460	277	139	53.4	1,500	32.2	0.138	0.659	ND	0.124	---	0.05	0.9	0.85	<1	12.5	ND	6	61	3.8	---	4,730	27.3
Oct 8/15	585	390	8,880	---	8.11	---	---	---	2,970	325	141	56.6	1,640	30.3	0.131	0.638	ND	0.084	---	ND	0.41	0.41	<1	14.1	ND	ND	111	0.2	---	5,450	29.4
Apr 27/16	638	369	8,470	2,870	7.90	8.31	13	7.3	2,640	253	158	59.1	1,540	31.3	0.145	0.658	0.017	0.043	---	0.05	0.4	0.35	<3	17.0	ND	ND	18	0.6	---	4,980	26.6
Oct 11/16	762	353	10,300	---	7.89	---	---	---	3,400	271	185	72.7	1,770	32.9	0.145	0.594	0.019	0.095	---	ND	0.26	0.26	<3	21.0	ND	ND	35	0.6	---	6,040	27.9
Apr 18/17	Well compromised																														
Nov 1/17	461	320	6,440	4947	8.12	7.39	-32	9.0	1,540	230	110	45.3	1,130	25.5	0.225	0.556	ND	0.008	---	ND	0.2	0.2	<3	16.3	ND	ND	41	2.0	---	3,344	22.9
May 24/18	536	409	8,580	540	8.10	7.80	35	9.8	2,720	276	129	51.9	1,790	32.0	0.247	0.655	<0.005	0.038	---	0.30	0.7	0.40	<1	18.7	<0.001	<3	70	1.1	---	5,248	33.6
Oct 25/18	646	396	9880	6089	8.03	7.35	151	8.1	2,900	284	163	58.1	1,750	34.1	0.279	0.677	<0.005	0.024		0.19	0.5	0.31	1.36	21.9	<0.01	<3	55	1.9		5,427	30.0
Apr 29/19	552	387	7330	5882	8.05	7.29	-99.2	9.4	2,010	183	135	52.3	1,610	31.1	0.194	0.656	<0.005	0.052	---	0.03	0.4	0.37	<0.5	14.3	<0.002	<3	36	1.5	---	4,258	29.8
Oct 22/19	568	409	8660	3263	8.13	7.09	79.8	9.8	2,250	207	138	54.3	1,670	35.7	0.202	0.728	0.017	0.080	---	0.23	0.4	0.17	<3	3.80	<0.001	<3	130	1.3	---	4,596	30.5
Apr 7/20	Well compromised																														
Dec 1/20	Well compromised																														
May 1/21	Decommissioned																														



🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3e: Deep Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
00-5dBR																															
Dec 6/00	252	269	626	730	7.40	8.30	---	6.8	10.0	33.8	68.5	19.6	24.2	2.85	---	---	0.11	0.031	0.26	0.02	0.23	0.21	ND	ND	ND	ND	ND	---	ND	321	0.660
May 3/01	64	307	710	450	---	8.30	---	12.2	11.1	38.4	18.7	4.30	145	4.2	---	---	1.00	0.196	0.66	0.18	0.54	0.36	ND	ND	ND	ND	3	---	1.0	407	7.86
Oct 24/01	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.04	0.42	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Oct 30/01	50	339	749	610	7.89	7.60	---	8.0	11.5	43.0	14.3	3.40	166	3.9	---	---	0.05	0.218	0.43	0.03	0.23	0.20	ND	ND	ND	ND	4	---	1.0	446	10.2
Apr 17/02	33	330	721	420	7.97	6.90	---	9.3	8.8	35.5	9.20	2.50	171	3.7	---	---	0.03	0.262	---	0.19	0.32	0.13	ND	ND	ND	ND	ND	---	1.0	429	12.9
Nov 12/02	40	303	722	650	8.63	8.10	---	9.4	11.1	31	11.0	3.00	170	4.6	---	---	0.05	0.260	---	0.24	0.31	0.07	ND	0.1	ND	1	19	---	1.1	414	11.7
Jun 5/03	22	309	669	610	8.54	7.90	---	10.4	9.3	28	6.37	1.54	159	3.6	---	---	0.03	0.240	---	0.35	0.42	0.07	0.1	0.1	ND	ND	ND	---	1.0	395	14.7
Oct 16/03	13	300	651	610	8.44	8.50	---	8.1	9.2	26	3.36	1.10	152	3.6	---	---	0.244	0.102	---	0.28	0.34	0.06	ND	0.1	ND	ND	8	---	14.0	373	18.4
May 27/04	16	279	619	---	8.46	8.56	---	12.4	9.4	26	4.35	1.21	151	3.5	---	---	0.006	0.236	---	0.20	0.26	0.06	0.2	ND	ND	ND	2	---	1.1	361	16.6
Oct 18/04	13	303	645	570	8.20	8.14	---	9.2	21.3	28	3.61	0.95	146	3.2	---	---	ND	0.135	---	0.02	0.10	0.08	ND	0.2	ND	2	4	---	0.5	382	17.6
Jun 2/05	15	304	638	720	8.36	8.29	---	11.4	12.1	26	4.32	1.14	141	3.8	---	---	ND	0.359	---	0.12	0.24	0.12	0.2	0.1	ND	ND	ND	---	1.3	368	15.6
Aug 23/05	18	295	625	670	8.43	---	---	13.8	12.2	24	4.31	1.72	150	5.1	---	---	4.01	0.117	---	ND	0.24	0.24	ND	0.2	ND	ND	10	---	3.0	374	15.4
Nov 28/05	14	280	613	650	---	8.73	---	9.2	10.7	23	3.92	1.03	152	3.7	---	---	0.013	0.114	---	ND	0.13	0.13	ND	0.2	ND	ND	ND	---	0.9	360	17.7
Apr 6/06	12	286	630	480	8.44	8.70	---	7.8	11.6	21	3.14	1.00	150	3.3	---	---	ND	0.202	---	0.11	0.26	0.15	ND	0.1	ND	ND	ND	---	0.8	360	18.8
Jul 20/06	9	292	620	520	8.45	8.85	---	14.1	12.3	23	2.45	0.78	137	3.0	---	---	ND	0.095	---	ND	0.12	0.12	0.1	0.3	ND	3	5	---	5.0	352	19.5
Oct 31/06	9	296	575	670	8.52	9.05	---	7.3	12.4	21	2.44	0.81	136	3.1	---	---	ND	0.166	---	0.19	1.11	0.12	ND	ND	ND	ND	ND	---	ND	354	19.3
Apr 26/07	11	294	596	580	8.47	8.79	---	10.2	12.5	21	3.04	0.88	146	3.3	---	---	0.007	0.186	--	0.17	0.30	0.13	ND	ND	ND	ND	ND	---	1.1	364	19.0
Jul 23/07	10	280	599	580	8.43	8.64	---	16.2	11.6	21	2.72	0.78	141	3.3	---	---	0.111	0.035	---	ND	0.09	0.09	ND	0.3	ND	ND	16	---	0.8	350	19.5
Oct 31/07	327	270	630	575	8.59	8.50	---	12.2	12.7	20	102	17.5	5.2	0.5	---	---	0.011	0.002	---	0.09	0.19	0.10	0.1	0.1	ND	ND	23	---	2.2	322	0.124
May 14/08	8	272	586	570	8.42	9.10	---	9.5	13.5	20	2.21	0.68	126	2.8	---	---	0.063	0.151	---	0.23	0.29	0.06	0.1	ND	ND	ND	12	---	0.7	329	19.0
Aug 5/08	9	280	576	584	8.36	8.76	---	11.7	13.6	20	2.32	0.77	137	3.2	---	---	0.059	0.121	---	0.29	0.24	-0.05	ND	0.2	ND	ND	ND	---	0.7	345	19.8
Oct.30/08	11	321	634	600	8.53	6.98	---	7.3	19.0	20	2.74	0.91	149	3.5	---	---	0.307	0.181	---	0.30	0.68	0.38	ND	ND	ND	ND	ND	---	1.0	388	19.9
May 14/09	10	278	626	586	7.62	9.33	---	9.7	5.0	43	2.47	0.86	144	3.3	0.011	0.349	0.081	0.174	---	0.21	0.31	0.10	ND	0.7	ND	ND	6	0.6	0.6	369	20.1
Aug 4/09	9	279	618	650	8.16	8.61	---	11.9	19.6	23	2.35	0.79	144	3.2	0.008	0.353	0.036	0.062	---	0.14	0.13	-0.01	ND	0.1	ND	ND	ND	0.8	0.8	361	20.7
Oct 28/09	9	260	628	620	8.44	8.71	---	7.8	14.6	21	2.41	0.75	150	3.1	0.008	0.354	0.026	0.035	---	0.01	0.33	0.32	ND	0.1	ND	<3	<5	0.7	0.7	349	21.7
Apr 26/10	10	285	610	600	8.49	8.80	---	9.7	14.9	19	2.65	0.79	155	3.3	0.011	0.400	0.027	0.217	---	0.11	0.08	-0.03	ND	0.1	ND	ND	5	0.7	---	368	21.5
Nov 29/10	10	288	664	644	8.54	8.71	---	7.5	22.6	19	2.75	0.83	162	3.0	0.014	0.376	0.101	0.110	---	0.08	0.27	0.19	ND	0.2	ND	ND	ND	1.0	---	384	22.0
Apr 25/11	8	306	695	641	8.38	8.55	---	9.1	39.0	15	1.99	0.70	168	3.2	0.013	0.443	0.126	0.094	---	0.14	0.30	0.16	ND	0.1	ND	ND	ND	1.0	---	412	26.1
Nov 3/11	8	280	648	635	8.44	8.64	-47	10.3	18.3	17	2.68	0.84	161	3.3	0.015	0.451	0.075	0.193	---	0.04	0.28	0.24	ND	ND	ND	10	11	0.8	---	372	21.9
Apr 25/12	9	276	614	613	8.57	10.44	-74	8.7	18.1	19	2.34	0.75	138	3.0	0.012	0.336	0.053	0.296	---	0.16	0.20	0.04	ND	ND	ND	3	25	0.8	---	347	20.1
Oct 30/12	9	274	577	661	8.37	8.78	---	11.5	17.3	19	2.40	0.80	157	3.6	0.015	0.426	0.025	0.280	---	0.01	0.07	0.06	ND	ND	ND	ND	10	1.3	---	365	22.4
Apr 23/13	12	282	635	676	8.53	8.73	-230	8.9	27.5	19	3.13	1.03	157	3.3	0.026	0.459	0.146	0.185	---	0.15	0.60	0.45	ND	ND	ND	7	25	1.8	---	381	19.7
Oct 29/13	8	271	558	704	8.59	9.10	-76	7.7	19.2	18	2.21	0.71	148	3.1	0.012	0.391	0.028	0.101	---	0.11	0.41	0.30	ND	ND	ND	ND	ND	2.3	---	353	22.1
May 29/14	9	255	573	620	8.57	8.71	124	10.0	19.7	20	2.33	0.77	139	3.0	0.011	0.395	0.017	0.192	---	ND	0.75	0.75	ND	0.1	ND	3	29	3.0	---	339	20.2
Oct 1/14	4	260	655	861	8.52	8.47	-11	10.7	30.2	20	0.88	0.36	135	2.9	0.006	0.371	0.044	0.041	---	0.08	0.37	0.29	ND	ND	ND	4	ND	1.2	---	345	30.5
May 6/15	8	270	575	610	8.45	8.10	-163	10.6	22.7	19	2.11	0.76	143	3.1	0.011	0.410	0.021	0.125	---	0.18	0.30	0.12	ND	0.1	ND	3	ND	5.2	---	354	21.5
Oct 13/15	8	290	739	849	8.11	8.78	-115	11.0	41.3	19	1.97	0.75	140	4.5	0.010	0.339	0.014	0.067	---	0.06	0.21	0.15	ND	ND	ND	ND	ND	0.6	---	381	21.5
Duplicate	7	295	722	---	7.95	---	---	---	58.0	21	1.70	0.70	178	3.4	0.012	0.433	0.448	0.080	---	0.07	0.17	0.10	ND	ND	ND	7	40	0.7	---	440	29.0
Apr 26/16	9	277	610	877	8.47	8.46	-140	8.1	24.4	21	2.39	0.84	154	3.3	0.014	0.424	0.007	0.147	---	0.05	0.32	0.27	ND	ND	ND	3	5	2.5	---	373	21.9
Oct 11/16	8	285	578	720	8.38	8.81	64	9.6	21.5	20	1.85	0.72	131	2.5	0.011	0.339	ND	0.133	---	ND	0.11	0.11	ND	0.3	ND	5	ND	1.3	---	350	20.7
Apr 17/17	9	262	609	395.1	8.45	8.53	-161	6.3	24.4	21	2.27	0.83	139	3.1	0.016	0.418	0.005	0.151	---	0.16	0.47	0.31	ND	ND	ND	ND	11	2.7	---	348	20.1
Nov 1/17	9	247	607	420.3	8.54	8.38	53	8.9	18.9	17	2.07	0.83	151	3.2	0.014	0.413	0.005	0.154	---	0.10	0.30	0.20	<0.1	0.2	<0.001	<3	<5	11.2	---	342	22.4
May 24/18	8	264	608	640	8.55	8.71	-103	10.8	29.8	22	2.03	0.79	159	3.2	0.014	0.410	0.007	0.130	---	0.26	0.30	0.04	<0.05	<0.05	<0.001	<3	14	2.1	---	376	24.0
Oct 25/18	8	261	626	389.7	8.31	8.74	-57	9.3	24.6	21	2.20	0.72	156	3.1	0.013	0.423	0.006	0.159	---	0.22	0.3	0.08	<0.05	<0.05	<0.002	3	7	11.8	---	365	23.3
Apr 29/19	9	245	614	443.4	8.52	8.47	-75.7	8.7	24.2	20	2.20	0.79	141	3.1	0.010	0.417	<0.005	0.117	---	0.10	0.3	0.20	0.06	<0.05	<0.002	<3	7	3.5	---	339	20.8
Oct 22/19	9	268	614	475.1	8.50	8.53	21.4	9.1	24.1	20	2.10	0.83	155	3.5	0.013	0.444	0.005	0.145	---	0.23	0.3	0.07	0.17	0.14	<0.001	<3	<5	1.7	---	367	22.9
Mar 31/20	10	249	613	442.4	8.45	9.01	10.3	7.7	27.3	20	2.81	0.75	143	3.1	0.012	0.418	0.009	0.144	---	0.22	0.3	0.08	<0.05	0.05	<0.002	<3	5	2.2	---	346	19.6
Dec 1/20	8	238	609	470.3	8.49	8.43	-131.6	9.1	25.8	20	2.06	0.81	143	3.0	0.013	0.418	0.009	0.112	---	0.12	0.2	0.08	0.07	0.08	<0.002	<3	<5	1.3	---	338	21.4
May 25/21	8	250	616	499.2	8.66	8.55	-50.1	7.9	26.5	20	1.86	0.83	152	3.3	0.013	0.415	0.009	0.105	---	0.17	0.2	0.03	0.11	0.17	<0.002	<3	5	2.5	---	355	23.3
Oct 4/21	9	249	620	489.2	8.54	8.88	103.3	10.2	26.4	20	2.14	0.79	156	3.5	0.015	0.447	0.014	0.167	---	0.21	0.2	-0.01	<0.05	<0.05	<0.002	<3	<5	2.6	---	358	23.2

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3e: Deep Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.0	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
06-1dBR																															
Apr 13/06	205	300	1,480	1,540	7.82	7.83	---	8.4	251	65	55.7	16.0	215	7.7	---	---	0.010	0.045	---	0.39	0.63	0.24	ND	0.7	ND	ND	15	---	1.8	786	6.52
Jul 24/06	262	300	3,390	3,470	7.66	8.26	---	14.7	928	84	68.6	22.0	545	14.5	---	---	0.111	0.042	---	0.68	1.30	0.62	0.7	0.5	ND	4	28	---	11.0	1,830	14.7
Oct 31/06	324	318	6400	7,830	7.97	7.77	---	9.4	2,110	114	82.4	28.8	1,210	26.5	---	---	0.612	0.062	---	1.63	2.40	0.77	<3	ND	ND	7	53	---	12.0	3,760	29.3
Apr 26/07	436	362	8,930	780	7.58	7.58	---	12.1	3,260	143	114	37.0	1,850	46.2	---	---	2.38	0.100	---	2.26	3.08	0.82	<3	ND	ND	4	46	---	8.0	5,670	38.5
Jul 19/07	Not sampled - Not enough to sample																														
Nov 1/07	Not sampled			1,209		7.41	---	8.9																							
May 14/08	Not sampled - Not enough to sample																														
Aug 5/08	3,200	260	28,100	OR	7.12	6.74	---	16.9	9,800	370	815	283	4,840	100	---	---	6.87	0.529	---	1.15	4.77	3.62	<3	0.9	ND	3	1,220	---	1.3	16,400	37.2
Oct 30/08	Not sampled																														
May 19/09	9,800	160	15,700	OR	6.90	6.97	---	9.0	22,900	400	2,430	901	10,100	180	1.0	0.9	3.20	1.7	---	10.5	14.2	3.7	<10	10	ND	7	600	0.2	ND	37,100	44.4
Aug 5/09	---	305	1,070	---	8.16	---	---	---	149	23	---	---	---	---	---	---	---	---	---	---	---	---	ND	ND	---	6	---	---	---	---	---
Nov 3/09	13,000	160	80,800	OR	6.73	6.38	---	9.1	29,400	500	3,220	1,210	13,800	215	0.808	0.753	0.070	1.35	---	12.1	12.9	0.80	<10	10	ND	4	915	0.5	0.7	48,500	52.7
Apr 28/10	10,900	145	72,100	OR	6.72	6.57	---	7.9	29,800	400	3,270	1,180	14,200	210	0.841	0.836	0.180	1.38	---	13.4	15.5	2.10	<10	<10	ND	ND	1,130	ND	---	49,200	54.1
Nov 29/10	12,200	146	73,300	OR	6.67	6.58	---	7.3	32,600	423	3,050	1,120	13,700	194	0.552	0.702	0.310	1.28	---	12.7	15.0	2.30	<3	<3	ND	ND	1,310	0.4	---	51,200	53.7
Apr 26/11	12,500	138	73,200	---	7.26	---	---	---	30,900	426	3,140	1,120	13,700	193	---	---	---	---	---	15.1	15.8	0.70	<100	<10	ND	ND	1,290	0.5	---	49,500	53.4
Nov 3/11	12,900	134	74,100	---	7.29	---	---	---	33,700	420	3,060	1,280	13,900	162	0.366	0.592	0.017	1.08	---	12.3	14.8	2.50	<5	6	0.003	ND	1,140	ND	---	52,600	53.0
Apr 26/12	12,800	135	74,600	OR	7.44	6.50	308	9.4	31,700	464	3,210	1,160	15,500	226	0.541	0.688	ND	0.896	---	---	---	---	<10	<10	---	---	---	1.1	---	52,400	59.7
Oct 29/12	12,500	145	73,400	12,860	7.49	6.76	-34	9.4	33,700	454	3,100	1,150	14,800	212	0.544	0.806	0.026	0.844	---	13.6	15.1	1.50	<3	5.5	ND	---	8,450	0.6	---	53,600	57.8
Apr 24/13	11,500	139	73,100	---	7.59	---	---	---	33,400	476	2,870	1,050	13,200	247	0.530	0.875	0.020	0.995	---	14.4	14.5	0.10	<3	3.5	ND	ND	955	---	---	51,400	53.5
Oct 29/13	10,100	157	70,500	---	7.30	---	---	---	29,400	508	2,700	818	14,500	263	0.397	0.793	0.078	0.693	---	14.7	15.9	1.20	<10	17	ND	ND	710	1.6	---	48,400	62.6
May 29/14	11,600	---	---	14,260	---	7.20	44	19.0	---	---	2,910	1,050	13,700	237	0.345	0.882	ND	0.714	---	---	---	---	---	---	---	---	---	0.9	---	---	---
Oct 1/14	12,200	174	67,800	9,970	7.24	6.71	121	14.0	27,700	589	3,070	1,090	15,000	217	0.398	1.03	0.032	0.777	---	12.3	15	2.70	<10	14	ND	ND	880	1.1	---	47,800	59.1
May 12/15	11,600	170	69,600	62,639	7.66	6.69	200.5	11.4	30,300	604	2,890	1,050	14,000	244	0.339	1.04	ND	0.802	---	13.1	15.5	2.40	<10	20	ND	ND	38	5.3	---	49,400	56.8
Oct 13/15	9,700	170	64,400	12,590	7.45	6.70	219	10.7	27,600	606	2,780	1060	14,000	280	0.214	0.799	0.246	0.622	---	11.0	13.5	2.50	<10	20	ND	5	420	ND	---	46,500	57.3
Apr 27/16	10,200	170	66,600	8,900	7.32	6.76	133	12.1	27,400	562	2,530	935	12,700	191	0.200	0.881	ND	0.526	---	14.4	15.4	1.00	<10	20	ND	ND	915	0.6	---	44,500	54.7
Oct 12/16	9,320	158	70,700	53,336	7.36	6.81	78.3	7.6	29,700	6	2,250	1,030	13,100	169	0.223	0.917	0.062	0.645	---	14.2	15.1	0.90	ND	0.2	ND	ND	290	0.6	---	46,900	54.3
Apr 19/17	9,180	148	69,000	48,351	7.35	6.49	114.5	6.2	28,000	5	2,550	936	11,900	203	0.376	0.882	0.011	0.788	---	13.0	16.6	3.60	ND	0.3	ND	ND	100	0.9	---	43,700	51.2
Nov 1/17	10,800	141	69,700	48,900	7.47	6.80	194.0	8.3	26,300	478	2,610	1,050	12,900	223	0.550	0.931	0.011	0.877	---	14.6	15.1	0.50	<10	16	ND	8	4500	ND	---	43,779	53.9
May 28/18	11,700	145	70,000	OR	7.60	6.93	163.0	11.2	31,900	431	2,860	1,100	13,300	213	0.517	0.824	0.009	0.723	---	14.2	15.9	1.70	<5	5.54	ND	4	1880	0.6	---	49,949	53.6
Oct 25/18	11,900	139	73,200	14,000	7.20	6.10	-276	8.5	30,000	429	2,950	1,090	14,400	222	0.620	0.885	0.007	0.849	---	14.1	16.3	2.20	13.3	<5	0.061	9	2120	0.6	---	49,205	57.5
May 1/19	11,400	129	50,100	47,816	7.13	6.42	167.9	8.1	28,800	9	2,770	1,090	13,300	207	0.675	0.811	<0.005	0.922	---	14.5	15.5	1.00	<0.05	0.09	<0.002	<3	1350	0.6	---	46,227	54.2
Oct 21/19	12,800	132	72,800	57,238	7.30	6.23	141.4	9.3	28,400	378	3,130	1,210	14,500	233	0.739	0.879	0.021	0.960	---	15.5	16.5	1.00	<5	5.53	<0.002	7	2670	1.0	---	47,974	55.8
Apr 1/20	12,800	132	50,900	49,861	7.23	6.29	125.6	8.4	33,100	376	3,140	1,200	14,300	238	0.768	0.913	0.022	1.110	---	1.57	18.3	16.73	<0.05	8.29	0.002	<3	2930	0.7	---	52,392	55
Dec 2/20	12,100	125	51,500	56,405	7.18	6.18	96.9	8.1	32,700	323	2,910	1,180	13,900	273	1.080	0.958	0.007	1.330	---	14.9	17.8	2.90	<5	7.35	<0.002	4	1770	<0.2	---	51,404	54.9
May 1/21	Decommissioned																														

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3e: Deep Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.0	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
06-2dBR																															
Apr 6/06	252	390	1,150	1,050	8.21	7.59	---	7.0	68.3	141	67.8	20.0	192	8.2	---	---	0.005	0.117	---	0.38	0.81	0.43	ND	0.2	ND	ND	22	---	7.9	725	5.27
Jul 20/06	207	404	1,200	1,020	8.24	8.00	---	15.4	73.5	143	55.0	16.9	187	6.1	---	---	0.030	0.081	---	0.35	0.98	0.63	0.2	0.5	ND	ND	24	---	13.8	721	5.67
Oct 31/06	83	410	2,820	3,890	8.02	8.11	---	7.6	673	110	20.6	7.76	554	15.2	---	---	4.75	0.016	---	0.91	0.83	-0.08	<1	0.2	ND	3	71	---	17.0	1,630	26.4
Apr 25/07	123	322	4,600	3,820	7.81	7.89	---	8.9	1,380	77	30.9	11.2	903	16.5	---	---	0.024	0.032	--	1.1	1.89	0.79	<3	0.2	ND	3	33	---	6.0	2,610	35.4
Jul 18/07	71	423	3,280	2,980	7.91	7.62	---	16.4	671	155	19.5	5.33	547	10.9	---	---	0.276	0.039	---	0.39	1.40	1.01	0.6	0.9	ND	3	17	---	5.2	1,670	28.4
Oct 31/07	279	417	3,400	3,400	8.01	7.93	---	10.1	775	145	86.0	15.6	613	1.2	---	---	8.06	0.137	---	0.72	1.05	0.33	ND	0.6	ND	ND	ND	---	7.1	1,900	16.0
May 14/08	183	208	6,630	5,200	7.52	8.06	---	9.1	2,240	37	46.1	16.4	1,200	16.6	---	---	0.123	0.033	---	1.04	1.65	0.61	<3	0.2	ND	12	60	---	1.2	3,690	38.7
Aug 5/08	163	290	5,920	5,700	7.70	7.91	---	14.4	1,930	120	41.9	14.2	1,310	19.1	---	---	0.147	0.043	---	1.23	1.67	0.44	<3	4.9	ND	ND	ND	---	0.8	3,630	44.6
Oct.30/08	275	420	6,500	5,100	7.91	6.59	---	7.3	1,760	200	78.7	19.1	1,040	24.4	---	---	8.96	2.48	---	1.22	3.74	2.52	ND	15.1	ND	14	443	---	0.9	3,480	27.2
May 14/09	757	381	6,280	5,430	7.71	8.16	---	10.1	1670	202	264	23.5	1,120	20.6	0.231	1.15	3.48	1.14	---	0.63	1.72	1.09	ND	12.4	ND	10	553	0.4	0.5	3,590	17.8
Aug 4/09	177	397	6,340	6,570	7.50	7.41	---	10.3	1800	208	44.3	16.2	1280	23.0	0.152	1.18	1.47	0.048	---	0.36	1.80	1.44	<3	10.6	ND	7	53	0.8	0.8	3,660	41.8
Oct 26/09	---	---	---	530	---	7.47	---	8.7	---	---	---	---	---	---	---	---	---	---	---	0.53	8.34	7.81	---	---	ND	---	480	0.5	0.6	---	---
Apr 26/10	229	430	6,190	620	7.81	7.48	---	9.5	1,760	200	61.6	18.1	1,230	20.1	0.206	1.33	0.298	0.107	---	0.11	0.35	0.24	<3	10.9	ND	4	95	0.5	---	3,630	35.4
Nov 25/10	191	359	6,340	5,000	7.67	7.58	---	7.5	1,890	169	51.0	15.4	1,150	15.5	0.150	1.32	0.065	0.114	---	0.23	0.70	0.47	<3	5.3	ND	ND	15	0.4	---	3,530	36.2
Apr 25/11	191	377	6,530	---	7.69	---	---	---	1,970	196	47.3	17.8	1,270	20.5	0.220	1.35	2.09	0.018	---	0.19	1.63	1.44	<3	5.7	ND	ND	53	0.5	---	3,780	39.9
Nov 1/11	197	371	6,760	6,800	7.84	7.38	-98	9.7	1,970	207	48.7	18.4	1,470	16.7	0.211	1.23	0.157	0.128	---	0.26	0.93	0.67	<3	7.8	ND	9	45	0.3	---	3,990	45.7
Apr 25/12	221	442	6,230	4,500	7.92	9.48	69	7.8	1,610	277	56.1	19.5	1,400	19.9	0.229	1.10	ND	0.083	---	0.03	0.43	0.40	ND	10.2	ND	6	46	0.3	---	3,700	41.1
Oct 30/12	222	418	5,440	3,210	7.93	7.72	-79	11.7	1,700	240	58.1	18.6	1,180	20.2	0.195	1.44	0.009	0.132	---	ND	0.58	0.58	ND	10.0	ND	ND	70	0.7	---	3,500	34.4
Apr 23/13	192	380	6,580	590	8.05	7.63	-130	8.6	1,840	197	48.3	17.3	1,240	16.7	0.237	1.28	0.012	0.105	---	0.20	0.70	0.50	<1	5.2	ND	9	81	1.0	---	3,600	38.8
Oct 29/13	215	345	6,470	5,100	7.91	6.91	-20	7.2	1,940	190	55.2	18.7	1,250	19.7	0.290	1.22	0.396	0.077	---	0.13	0.95	0.82	<0.5	4.5	ND	ND	10	2.8	---	3,700	37.1
May 28/14	203	391	6,330	---	8.07	---	---	---	174	25	52.5	17.5	130	20.2	0.282	1.33	0.022	0.083	---	0.03	2.00	1.97	ND	0.8	ND	7	146	2.1	---	---	---
Oct 1/14	211	406	5,940	---	8.17	---	---	---	1,690	279	55.1	17.8	1,210	18.0	0.315	1.42	0.052	0.083	---	ND	1.08	1.08	<3	9.3	ND	7	109	2.5	---	3,550	36.1
May 7/15	251	377	6,220	---	8.05	---	---	---	1,940	241	66.0	21.0	1,100	19.1	0.292	1.28	1.91	0.213	---	0.08	1.40	1.32	ND	5.9	ND	13	49	1.4	---	3,830	35.6
Oct 13/15	106	431	5,910	---	8.04	---	---	---	1,720	292	15.2	16.6	1,190	24.0	0.119	1.26	0.013	ND	---	ND	0.69	0.69	<1	9.2	ND	5	94	0.2	---	3,550	50.2
Apr 26/16	241	426	6,230	2,453	8.12	7.40	118	5.9	111	2,130	61.2	21.3	1,200	20.2	0.233	1.38	0.102	0.148	---	0.16	0.77	0.61	<3	4.0	ND	5	26	0.5	---	3,810	33.6
Oct 11/16	207	457	5,640	3,900	7.99	7.52	-47	10	1,540	297	54.5	17.2	1,110	15.8	0.138	1.24	0.007	0.017	---	ND	0.11	0.11	<1	12.5	ND	ND	ND	0.6	---	3,360	33.4
April 17/17	239	439	5,930	3,770	8.04	7.39	115	8.0	1,520	296	63.4	19.7	1,060	18.5	0.182	1.42	0.007	0.074	---	0.08	0.76	0.68	<1	10.1	ND	ND	13	2.9	---	3,280	29.8
Nov 2/17	226	491	6,130	4,319	8.26	7.42	-80	8.7	1,350	203	57.8	19.9	1,100	19.1	0.155	1.40	0.060	0.078	---	0.13	0.40	0.27	<1	7.1	<0.001	<3	63	2.6	---	3,076	31.8
May 24/18	223	454	5,680	4,386	8.14	7.44	-69	10.2	1,680	410	58.2	18.9	1,240	19.0	0.144	1.42	0.009	0.063	---	0.20	0.50	0.30	<0.5	12.0	<0.001	<3	36	1.0	---	3,698	36.1
Oct 25/18	230	371	6,580	3,500	7.95	7.52	-364	8.6	1,730	225	59.8	19.6	1,220	19.7	0.203	1.37	1.09	0.259	---	0.37	0.6	0.23	0.81	2.73	0.020	6	<5	1.6	---	3,503	35.0
Apr 29/19	232	388	6,330	446	8.07	7.43	37.4	10.8	1,620	284	60.0	19.9	1,160	19.8	0.164	1.44	0.209	0.084	---	0.16	0.8	0.64	<0.5	8.54	<0.002	<3	31	1.5	---	3,396	33.2
Oct 21/19	230	360	6,510	2,972	8.18	7.66	33.4	15.1	1,590	224	59.0	20.1	1,360	21.0	0.200	1.39	0.923	0.168	---	0.44	0.6	0.16	<0.5	4.56	<0.002	5	65	2.5	---	3,491	39.0
Mar 31/20	237	382	6,190	4,348	7.97	7.52	-2.4	9.2	1,610	284	63.2	19.2	1,060	19.2	0.173	1.35	0.149	0.067	---	0.31	0.5	0.19	<0.05	8.11	<0.002	<3	18	1.8	---	3,289	30.0
Dec 1/20	221	350	6,300	4,837	7.84	7.67	-28.2	8.7	1,710	254	56.4	19.4	1,160	19.0	0.125	1.42	0.065	0.069	---	1.43	1.9	0.47	<0.5	5.58	<0.002	<3	11	1.2	---	3,427	34.0
May 1/21	Decommissioned																														

** - unable to perform analysis due to elevated chloride interference.

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.3e: Deep Bedrock Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.0	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
06-4dBR																															
Apr 6/06	219	302	3,980	2,360	8.09	7.65	---	8.4	1,120	76	59.8	17.0	823	17.8	---	---	0.023	0.069	---	0.60	0.97	0.37	ND	0.1	0.003	9	16	---	6.4	2,270	24.2
Jul 24/06	325	234	7,400	5,810	7.57	7.80	---	14.3	2,450	34	87.8	25.7	1,350	25.2	---	---	0.073	0.072	---	1.95	2.50	0.55	<3	ND	ND	ND	44	---	7.5	4,090	32.5
Oct 31/06	333	228	7,530	9,330	7.95	7.64	---	8.7	2,630	39	86.1	28.8	1,440	26.7	---	---	0.305	0.070	---	1.87	2.35	0.48	<3	ND	ND	20	46	---	8.3	4,390	34.3
Apr 25/07	343	208	8,600	13,170	7.73	7.41	---	14.1	2,700	29	88.1	29.8	1,520	29.4	---	---	0.174	0.056	---	2.13	2.56	0.43	<10	ND	ND	>21	---	---	4.1	4,520	35.7
Jul 24/07	336	194	8,890	10,480	7.42	7.60	---	14.7	3,100	24	86.0	29.4	1,710	32.3	---	---	0.514	0.060	---	2.22	2.57	0.35	<3	0.1	ND	9	33	---	2.7	5,100	40.6
Oct 31/07	387	190	9,130	12,790	7.71	7.55	---	12.1	3,170	22	86.9	41.3	1,770	6.1	---	---	ND	0.015	---	2.30	2.61	0.31	<3	0.1	ND	18	41	---	3.5	5,220	39.2
May 14/08	301	170	9,210	680	7.91	8.03	---	10.1	2,910	26	76.3	26.9	1,490	29.6	---	---	0.635	0.048	---	2.17	2.53	0.36	<10	ND	ND	12	64	---	0.8	4,670	37.4
Aug 5/08	326	170	8,840	9,660	7.69	7.74	---	10.2	3,300	27	82.9	28.9	1,790	29.3	---	---	0.582	0.048	---	2.24	2.57	0.33	<3	ND	ND	ND	47	---	0.7	5,360	43.1
Oct.30/08	340	170	9,570	720	7.72	6.38	---	6.7	3,220	28	88.2	29.2	2,200	30.0	---	---	0.493	0.048	---	2.22	2.53	0.31	<3	ND	ND	24	33	---	0.6	5,700	51.9
May 14/09	Not sampled - Not enough to sample																														
Aug 5/09	336	170	9,670	9,300	7.36	7.30	---	11.3	3,330	24	82.9	31.4	1,820	32.0	0.090	0.922	0.860	0.054	---	2.42	2.56	0.14	<3	ND	ND	19	43	0.7	0.7	5,430	43.3
Nov 3/09	371	160	9,830	9,000	7.76	7.65	---	8.4	3,410	22	94.0	33.2	1,970	30.1	0.102	0.961	1.10	0.046	---	2.32	2.54	0.22	<3	ND	ND	15	40	0.6	0.7	5,660	44.5
Apr 28/10	358	166	9,930	9,900	8.13	7.79	---	8.5	3,360	21	88.3	33.5	2,030	30.7	0.103	1.11	0.998	0.044	---	2.33	2.84	0.51	<3	ND	ND	8	86	0.4	---	5,660	46.7
Nov 25/10	335	167	9,760	6,390	7.58	7.82	---	5.7	3,290	21	82.7	31.2	1,770	25.6	0.104	1.03	0.807	0.046	---	1.57	2.07	0.50	<3	ND	ND	ND	12	0.6	---	5,330	42.1
Apr 26/11	349	165	9,800	7,950	7.96	7.65	---	8.0	3,310	17	72.2	29.0	1,970	21.8	0.103	1.01	1.29	0.045	---	2.48	2.62	0.14	<3	ND	ND	ND	46	0.6	---	5,540	45.9
Nov 3/11	268	161	10,100	OR	7.83	7.78	-151	9.1	3,340	15	55.4	36.3	2,060	20.2	0.074	0.953	1.56	0.043	---	2.15	2.71	0.56	<0.5	<0.5	ND	40	18	0.3	---	5,620	52.8
Apr 26/12	309	161	10,100	8,200	8.12	7.95	106	7.5	3,280	12	74.6	29.8	1,940	28.2	0.093	0.912	2.05	0.032	---	2.15	2.68	0.53	<1	<1	ND	14	60	ND	---	5,460	48.0
Oct 29/12	362	166	9,710	4,420	7.89	7.14	-124	9.4	3,400	5	89.8	33.6	1,890	33.6	0.122	1.17	0.104	0.039	---	2.22	3.08	0.86	ND	6.0	ND	19	54	0.6	---	5,580	43.3
Apr 23/13	309	295	9,830	8,800	8.31	7.72	19	8.9	3,330	<5	74.2	30.2	1,800	25.2	0.113	1.14	0.452	0.051	---	2.02	2.41	0.39	<0.5	<0.5	ND	ND	126	0.6	---	5,450	44.6
Oct 29/13	311	168	9,230	5,350	7.91	6.77	-11	8.6	3,160	<10	76.9	28.8	1,770	28.5	0.114	1.06	0.604	0.035	---	2.33	2.74	0.41	<1	<1	ND	3	25	1.8	---	5,180	43.8
May 28/14	327	161	9,680	5,210	8.04	7.81	-109	9.7	3,120	<10	81.0	30.4	1,880	28.6	0.116	1.11	0.076	0.038	---	2.10	2.53	0.43	<1	<1	ND	14	15	1.0	---	5,240	45.1
Oct 1/14	294	162	9,520	7,280	7.88	7.87	-55	12.4	3,120	<10	70.0	29	1,880	26.3	0.094	1.09	0.128	0.013	---	1.93	2.53	0.60	<1	<1	ND	19	ND	1.0	---	5,230	47.6
May 12/15	295	163	9,820	10,875	8.15	7.55	-54	9.7	3,100	<10	70.4	29.0	1,510	26.7	0.103	1.05	0.327	0.036	---	1.88	2.7	0.82	<1	<1	ND	ND	46	1.1	---	5,340	47.7
Oct 8/15	292	174	9,530	526	8.02	7.57	-145	10.1	3,390	<30	70.0	28.5	1,830	25.3	0.107	1.04	0.513	0.030	---	2.08	2.62	0.54	<3	<3	ND	7	31	ND	---	5,460	46.6
Apr 26/16	304	179	9,470	458	8.11	7.81	-79	9.0	3,350	<30	71.5	30.4	1,860	27.1	0.101	1.11	0.286	0.034	---	1.97	2.74	0.77	<3	<3	ND	ND	18	0.3	---	5,450	46.4
Oct 12/16	315	171	9,790	2,850	7.93	7.77	101	10.9	3,360	<30	74	31.6	1,840	23.5	0.123	1.18	0.187	0.033	---	1.93	2.72	0.79	<3	<3	ND	ND	47	0.8	---	5,440	45.2
Duplicate	308	169	9,700	2,850	7.88	7.77	101	10.9	3,410	<30	72.6	30.7	1,800	23.1	0.121	1.15	0.172	0.032	---	2.02	2.75	0.73	<3	<3	ND	ND	52	0.6	---	5,450	44.5
Apr 19/17	321	167	9,450	4,640	7.97	7.66	73	7.6	3,250	30	79.9	29.5	1,790	28.6	0.127	1.16	0.289	0.041	---	2.05	2.94	0.89	<3	<3	ND	11	16	1.0	---	5,310	43.5
Nov 2/17	317	167	9,340	6,870	8.06	7.66	-99	10.4	2,360	31	76.2	30.8	1,770	28.3	0.124	1.16	0.500	0.042	---	2.12	2.3	0.18	<3	<3	ND	<3	249	0.9	---	4,400	43.2
May 23/18	317	161	9,130	7,090	8.07	7.56	-127	11.9	3,260	<30	77.5	30.1	1,740	28.9	0.133	1.11	0.550	0.037	---	2.29	2.6	0.31	<1	<1	ND	7	160	0.4	---	5,233	42.5
Oct 25/18	314	163	9,620	5,600	7.88	7.25	-315	9.6	3,070	<30	76.9	29.7	1,820	28.4	0.127	1.18	0.401	0.040	---	2.44	3.1	0.66	<1	<1	0.003	12	160	0.7	---	5,122	44.7
May 1/19	305	154	9,630	5,899	7.90	7.25	-87.6	7.3	3,320	<30	74.6	28.8	1,850	27.5	0.121	1.07	0.203	0.039	---	2.22	2.5	0.28	<1	<1	<0.002	4	75	0.6	---	5,392	46.1
Oct 21/19	315	153	9,720	6,940	7.79	7.73	-37	9.9	2,950	<30	75.7	30.7	1,970	31.2	0.128	1.23	0.511	0.041	---	2.39	2.5	0.11	<1	<1	<0.002	9	74	1.3	---	5,156	48.3
Mar 31/20	317	154	9,570	288	7.92	7.43	90.1	6.1	3,300	<1	76.3	30.6	1,620	31.0	0.126	1.21	<0.005	0.039	---	2.26	2.6	0.34	<0.05	<0.05	<0.002	8	195	0.3	---	5,335	44
Dec 2/20	345	148	9,620	6,880	7.94	6.87	2.49	8.1	3,120	<30	83	33.5	1,870	32.9	0.140	1.24	0.662	0.045	---	2.27	3	0.73	<1	<1	<0.002	7	6	0.5	---	5,232	43.8
May 1/21	Decommissioned																														

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.4: Leachate Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
96-3s																															
Aug 12/96	Not Sampled																														
Oct 8/96	645	518	1,586	1,583	---	7.50	---	---	74.6	170	177	49.3	78.1	26.1	---	---	0.01	0.144	0.05	0.01	0.72	0.71	ND	2.8	ND	15	27	---	9.0	898	1.34
Apr 24/97	394	322	1,000	948	7.37	7.22	---	---	28.7	106	117	24.6	25.5	9.9	0.10	0.64	0.06	0.031	1.09	0.10	0.76	0.66	ND	ND	ND	4	21	---	19.0	534	0.560
Nov. 4/97	751	656	1,920	1,792	6.99	7.11	---	---	109	207	195	64.2	115	58.0	0.32	0.88	0.04	0.118	0.49	9.21	10.7	1.49	0.2	11.6	ND	15	30	---	11.0	1,206	1.83
May 7/98	653	464	1,381	1,311	6.87	7.37	---	7.9	76.7	154	190	43.2	63.3	20.4	---	---	0.05	0.007	0.60	0.25	0.99	0.74	ND	6.1	ND	5	22	---	24.0	853	1.08
Oct 8/98	861	678	1,841	1,494	6.66	7.07	---	13.4	121	169	247	59.3	86.3	35.7	---	---	3.27	4.92	0.71	1.83	2.16	0.33	ND	ND	ND	3	32	---	9.0	1,136	1.28
Apr 21/99	787	738	1,860	1,722	---	5.81	---	8.0	100	185	241	45.0	76.6	21.6	---	---	0.08	2.98	0.06	1.46	2.11	0.65	ND	0.3	ND	1	45	---	14.0	1,118	1.19
Oct 18/99	1,072	853	2,020	1,903	6.59	6.73	---	12.1	103	210	302	77.2	91.7	38.4	---	---	10.4	4.63	0.76	3.82	4.80	0.98	ND	ND	ND	4	62	---	17.0	1,339	1.22
Jan 25/00	---	---	2,030	2,070	---	---	---	6.6	122	---	---	---	89.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1,240	---
May 1/00	992	734	2,070	1,973	6.62	6.80	---	9.5	90.0	359	275	74.0	114	28.1	0.29	1.05	ND	2.41	0.12	1.51	2.85	1.34	ND	0.6	ND	6	50	---	12.0	1,388	1.58
Oct 23/00	740	741	1,655	---	7.17	---	---	---	86.3	245	188	65.7	93.5	33.3	---	---	4.06	2.49	0.96	1.60	4.38	2.78	ND	2.8	ND	10	100	---	33.0	1,177	1.50
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.62	0.97	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	833	602	1,849	700	---	7.80	---	12.2	53.6	238	254	48.1	67.1	35.9	---	---	0.66	0.614	0.17	1.53	3.07	1.54	0.2	4.3	ND	10	34	---	13.0	1,081	1.01
Oct 24/01	931	793	1,902	1,710	7.14	7.20	---	14.2	59.2	219	253	72.6	75.7	68.1	0.31	0.93	0.54	1.78	0.35	5.52	7.17	1.65	ND	1.7	ND	11	31	---	8.0	1,240	1.08
Apr 17/02	811	642	1,609	1,280	6.85	6.60	---	10.2	38.7	220	251	44.7	47.8	25.1	---	---	ND	0.221	---	0.49	1.27	0.78	ND	3.2	ND	6	27	---	10.0	1,028	0.730
Nov 12/02	735	726	1,210	1,520	7.76	7.30	---	12.8	76.0	134	200	57.2	72.5	60.5	---	---	ND	1.11	---	11.1	12.1	1.00	0.2	0.9	ND	ND	31	---	8.5	1,056	1.16
Jun 10/03	767	570	1,500	1,600	7.30	7.10	---	13.7	45.2	168	244	38.3	47.7	33.6	---	---	0.23	0.300	---	0.87	2.09	1.22	0.3	2.2	ND	1	29	---	8.5	931	0.750
Oct 16/03	811	582	1,500	1,610	7.47	7.00	---	10.4	26.1	240	256	41.6	38.2	30.4	---	---	0.154	0.261	---	0.46	1.23	0.77	0.4	4.3	ND	1	38	---	17.0	972	0.580
May 27/04	619	567	1,250	---	7.60	7.27	---	13.3	46.8	93	189	35.4	46.4	31.2	---	---	ND	0.108	---	1.36	1.98	0.62	ND	ND	ND	ND	5	---	ND	559	2.90
Oct 14/04	630	681	1,470	1,200	7.00	6.58	---	13.3	58.5	79	178	44.8	60.8	46.4	---	---	ND	0.970	---	6.92	7.60	0.68	ND	0.9	ND	5	36	---	7.8	844	1.05
Jun 1/05	606	570	1,280	1,240	---	6.78	---	13.5	43.4	87	183	36.0	44.1	30.6	---	---	0.009	0.160	---	1.08	1.71	0.63	ND	2.5	ND	ND	26	---	6.6	749	0.780
Aug 23/05	394	466	1,410	---	7.13	---	---	---	47.5	129	86.2	43.4	63.2	35.9	---	---	0.230	0.008	---	1.53	3.23	1.70	ND	2.0	ND	5	40	---	24.1	660	1.39
Nov 28/05	702	555	1,380	1,150	---	7.20	---	8.6	48.9	113	223	35.2	46.0	31.7	---	---	0.046	0.122	---	0.47	1.58	1.11	0.2	2.6	ND	ND	21	---	9.0	812	0.755
Apr 13/06	505	480	1,170	1,010	7.03	7.20	---	9.1	56.7	82	158	26.8	39.1	22.1	---	---	0.035	0.005	---	0.41	1.22	0.81	ND	2.2	ND	ND	21	---	7.3	661	0.757
Jul 24/06	508	560	1,280	1,300	6.85	7.54	---	14.6	77.2	56	150	32.5	47.9	32.1	---	---	ND	0.243	---	2.86	3.08	0.22	ND	1.5	ND	4	17	---	11.6	710	0.925
Oct 30/06	678	579	1,380	1,554	7.01	6.91	---	10.4	43.4	180	215	34.4	42.2	29.7	---	---	ND	0.125	---	0.78	1.70	0.92	ND	7.9	ND	ND	22	---	10.4	928	0.706
Apr 26/07	541	510	1,090	1,070	7.23	7.20	---	9.9	52.1	104	169	29.0	43.6	25.1	---	---	ND	0.052	---	0.64	1.35	0.71	0.2	4.8	ND	ND	16	---	7.1	751	0.816
Jul 24/07	618	585	1,220	1,312	6.88	6.70	---	16.9	59.0	86	184	38.1	54.5	36.3	---	---	ND	0.044	---	3.99	4.64	0.65	0.1	4.8	ND	ND	26	---	3.8	836	0.955
Nov 1/07	679	560	1,420	1,459	7.16	6.62	---	11.8	40.1	151	205	40.3	48.7	35.5	---	---	ND	0.079	---	1.15	1.85	0.70	0.2	8.9	ND	ND	18	---	9.4	897	0.814
May 14/08	426	513	1,050	1,080	7.29	7.13	---	11.1	30.4	60	130	24.4	33.6	21.8	---	---	ND	0.009	---	0.80	1.23	0.43	0.3	3.7	ND	5	17	---	5.4	627	0.709
Aug 6/08	475	549	1,170	1,126	7.36	7.25	---	12.3	52.4	44	137	32.4	51.0	34.2	---	---	0.056	0.210	---	3.96	4.36	0.40	ND	1.2	ND	10	11	---	4.6	690	1.02
Oct.30/08	577	576	1,250	1,170	7.24	7.06	---	9.4	53.8	41	170	37.1	56.2	35.7	---	---	ND	0.009	---	0.34	0.93	0.59	0.2	17.7	ND	ND	6	---	4.7	819	1.02
May 19/09	567	518	1,190	1,195	7.39	7.60	---	10.1	28.3	78	173	32.6	38.2	26.1	0.148	0.336	0.006	0.019	---	0.11	0.63	0.52	ND	5.5	ND	ND	9	4.9	4.9	712	0.698
Aug 5/09	510	581	1,190	1,260	7.17	6.68	---	12.9	41.4	51	144	36.5	48.6	36.0	0.165	0.347	0.066	0.201	---	3.31	3.88	0.57	ND	3.7	ND	ND	11	5.2	5.2	727	0.936
Oct 28/09	601	597	1,370	1,150	7.15	6.92	---	11.1	46.6	57	175	40.0	53.9	39.3	0.181	0.417	0.196	0.012	---	1.55	2.21	0.66	0.4	8.8	ND	ND	22	4.8	4.8	812	0.956
Apr 28/10	635	522	1,270	1,229	7.28	6.86	---	9.0	29.4	107	189	37.8	38.4	28.4	0.179	0.408	0.035	0.015	---	0.44	0.91	0.47	ND	4.2	ND	ND	15	0.7	---	763	0.667
Nov 25/10	598	543	1,260	963	7.19	6.79	---	9.1	25.0	116	183	34.5	30.7	23.3	0.168	0.494	0.023	0.035	---	0.10	0.73	0.63	ND	4.8	ND	ND	10	6.9	---	759	0.546
Apr 25/11	527	450	1,050	956	7.55	6.69	---	8.4	19.2	113	163	29.3	22.5	18.2	0.143	0.330	0.122	0.014	---	ND	0.50	0.50	ND	4.8	ND	ND	13	4.4	---	656	0.427
Nov 3/11	508	579	1,340	1,153	7.52	6.72	135	9.2	47.4	41	168	43.1	41.7	37.5	0.219	0.515	0.010	0.038	---	2.40	3.36	0.96	0.2	7.1	ND	7	15	4.3	---	761	0.743
Apr 26/12	519	454	1,200	979	8.05	7.01	-23	8.7	34.5	115	152	33.9	31.1	24.7	0.142	0.326	0.012	0.005	---	0.08	0.70	0.62	ND	6.7	ND	ND	21	5.7	---	693	0.595
Oct 29/12	781	556	1,360	1,216	7.49	6.37	-72	12.5	40.0	111	229	50.8	38.2	35.4	0.242	0.573	0.027	0.026	---	0.28	1.05	0.77	0.4	13.6	ND	13	14	6.5	---	900	0.595
Apr 24/13	579	465	1,160	1,160	7.77	6.34	-93	8.3	32.4	144	177	33.5	26.5	21.7	0.167	0.415	0.012	0.013	---	0.17	1.01	0.84	ND	4.3	ND	4	13	7.4	---	733	0.479
Oct 30/13	585	524	1,210	1,135	7.33	7.01	69	10.4	65.7	54	170	39.0	39.1	30.0	0.203	0.474	0.010	0.073	---	1.65	2.42	0.77	ND	3.0	ND	ND	10	10	---	726	0.703
May 28/14	575	431	1,190	1,055	7.84	6.89	27	9.9	67.1	94	173	34.4	32.6	22.9	0.160	0.403	ND	0.002	---	0.17	0.74	0.57	ND	3.1	ND	ND	13	4.6	---	697	0.592
Oct 1/14	DRY - Not Sampled																														
May 7/15	609	438	1,210	1,130	7.75	6.38	161	11.8	96.3	100	181	38.0	46.7	24.4	0.168	0.412	0.034	0.010	---	0.24	1.10	0.86	ND	5.4	ND	ND	13	2.5	---	774	0.824
Oct 13/15	Dry																														
Apr 27/16	559	500	1,180	1,346	7.78	7.36	106	9.3	52.4	104	166	34.9	41.7	21.1	0.143	0.397	ND	0.002	---	0.30	0.70	0.40	ND	3.9	ND	4	17	5.8	---	738	0.767
Oct 11/16	---	570	1,280	---	7.70	---	---	---	79.2	103	---	---	---	---	---	---	---	---	---	0.07	4.34	4.27	ND	1.9	ND	---	138	---	---	896	---
Apr 19/17	496	433	1,030	740	7.90	7.3	63.5	5.5	34.9	69	150	29.5	31.1	20.1	0.130	0.368	0.144	0.003	---	0.20	1.15	0.95	ND	3.5	ND	4	ND	2.8	---	611	0.608
Nov 2/17	577	512	1,220	907	8.05	6.83	-31	12.0	29.3	43	168	38.3	40.5	26.2	0.197	0.490	0.008	0.014	---	0.76	1.2	0.44	0.7	5.9	ND	<3	20	10.1	---	682	0.733
May 28/18	560	418	1,080	888	7.94	7.07	-4	9.1	76.4	46	164	36.6	37.3	23.0	0.175	0.384	ND	0.002	---	0.17	0.6	0.43	ND	3.4	ND	<3	15	11.6	---	634	0.686
Oct 25/18	Dry																														
Apr 30/19	626	412	1,400	955	7.78	6.83	88.1	8.2	154	74	186	39.1	54.7	20.7	0.179	0.381	<0.005	0.003	---	0.21	0.5	0.29	<0.05	3.16	<0.002	<3	14	1.6	---	776	0.952
Oct 21/19	762	443	1,790	1376	7.54	6.83	83.0	11.8	249	41	218	52.8	72.9	31.8	0.268	0.482	0.005	0.002	---	0.14	0.6	0.46	<0.05	9.33	<0.002	<3	16	6.0	---	932	1.15
Apr 1/20	616	403	1,710	1089	7.63	6.05	252.7	7.1	283	62	185	37.4	133	22.5	0.200	0.347	0.007	0.001	---	0.35	0.8	0.45	<0.05	1.60	<0.002	<3	8	4.1	---	965	2.33
Dec 2/20	786	425	1,960	1492	7.47	6.48	-5.6	9.3	323	49	228	52.6	149	29.0	0.266	0.433	<0.005	<0.001	---	0.03	0.4	0.37	<0.05	8.44	<0.002	<3	<5	3.3	---	1085	2.31
May 25/21	658	461	2,000	1597	7.60	6.75	99.3	10.0	349	62	185	47.5	145	26.4	0.217	0.353	<0.005	0.001	---	0.03	0.4	0.37	0.94	4.22	<0.002	<3	15	2.6	---	1091	2.46
Oct 4/21	Dry																														

🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.4: Leachate Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
97-4d																															
Apr 24/97	373	308	929	758	7.44	7.47	---	---	38.9	72.1	99.4	30.2	22.9	7.1	0.13	0.23	0.12	0.316	0.64	3.92	4.84	0.92	0.4	4.4	ND	1	7	---	8.0	482	0.520
Nov. 4/97	892	608	2,380	2,220	6.95	7.28	---	---	124	490	231	76.4	155	25.5	0.05	0.69	0.06	0.253	1.22	16.3	18.3	2.00	ND	15.7	ND	2	38	---	14.0	1,558	2.26
May 7/98	858	429	1,935	1,785	6.83	7.42	---	7.5	82.8	402	247	58.5	104	13.9	---	---	0.13	0.113	1.28	10.3	11.4	1.10	ND	23.8	ND	13	47	---	24.0	1,285	1.55
Oct 8/98	1,133	566	2,920	2,390	6.72	7.16	---	13.6	86.7	960	324	78.5	272	31.8	---	---	0.11	0.226	0.50	17.2	17.2	ND	ND	21.6	ND	5	39	---	14.0	2,211	3.52
Apr 21/99	458	352	1,273	1,188	---	7.03	---	6.2	24.0	273	138	27.5	81.3	11.8	---	---	ND	0.032	1.54	4.31	5.42	1.11	0.2	8.3	ND	9	22	---	23.0	810	1.65
Oct 18/99	741	504	2,050	945	6.98	7.40	---	9.3	52.6	573	221	45.8	175	13.9	---	---	2.67	0.146	1.13	6.78	7.98	1.20	0.2	17.9	ND	1	16	---	18.0	1,475	2.80
Jan 25/00	---	---	933	1,392	---	---	---	3.6	16.5	---	---	---	56.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	716	---
May 1/00	439	347	1,101	1,034	6.99	7.50	---	6.1	17.8	191	134	25.3	49.1	5.3	0.32	0.17	ND	ND	0.84	0.96	2.28	1.32	ND	8.7	ND	8	9	---	6.0	671	1.02
Oct 23/00	769	710	2,590	1,490	7.00	7.50	---	11.6	103	496	216	55.7	285	28.4	---	---	ND	0.121	1.37	12.2	16.1	3.90	ND	11.2	ND	2	45	---	16.0	1,676	4.47
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.19	0.66	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	586	389	1,540	860	---	8.00	---	9.2	66.8	245	177	35.0	98.6	11.8	---	---	0.57	0.067	0.88	3.20	4.53	1.33	ND	6.70	ND	7	15	---	6.0	902	1.77
Oct 29/01	903	813	2,730	2,530	7.24	6.90	---	10.0	125	480	257	63.3	276	23.2	0.11	0.51	ND	0.229	2.06	14.8	17.5	2.70	17.6	0.30	ND	ND	45	---	16.0	1,811	4.00
Apr 17/02	620	405	1,357	990	6.95	6.60	---	7.3	63.5	219	184	39.0	68.2	10.1	---	---	ND	0.056	---	1.29	2.70	1.41	0.2	8.0	ND	5	16	---	5.0	865	1.19
Nov 12/02	1,038	765	2,890	>1990	7.49	7.50	---	10.1	146	876	289	76.9	353	32.2	---	---	ND	0.320	---	14.8	20.1	5.30	0.5	15.9	ND	ND	59	---	17.0	2,324	4.77
Jun 5/03	711	411	1,540	1,740	7.62	7.40	---	8.7	81.8	311	206	47.8	121	12.8	---	---	ND	ND	---	3.09	4.04	0.95	0.8	5.6	ND	ND	32	---	8.1	1,059	1.97
Oct 16/03	677	519	1,550	1,990	7.48	7.50	---	8.0	75.3	335	198	44.3	166	17.0	---	---	0.417	0.086	---	4.64	5.78	1.14	0.6	9.2	ND	ND	31	---	14.0	1,179	2.78
May 27/04	937	633	1,910	1,810	7.29	7.00	---	8.3	73.7	440	279	58.0	154	12.5	---	---	0.006	0.128	---	2.26	3.67	1.41	0.6	3.0	ND	ND	21	---	8.7	1,406	2.19
18-Oct-04	934	910	2,660	2,230	6.82	6.54	---	9.8	125	590	270	63.0	341	27.9	---	---	0.010	0.281	---	10.8	12.3	1.50	0.6	10.7	ND	4	57	---	14.8	2,000	4.85
Jun 1/05	926	720	2,050	1,920	---	6.73	---	12.1	74.3	390	270	60.9	164	16.3	---	---	ND	0.205	---	5.70	6.68	0.98	ND	3.7	ND	ND	28	---	15.0	1,410	2.35
Aug 23/05	544	791	2,540	2,210	6.90	---	---	12.6	99.3	450	117	61.1	291	27.1	---	---	0.122	0.004	---	13.4	14.8	1.40	ND	4.3	ND	3	36	---	35.3	1,530	5.43
Nov 28/05	524	470	1,610	1,490	---	7.23	---	7.8	67.4	340	123	52.6	155	16.1	---	---	0.047	0.211	---	4.36	4.71	0.35	0.8	7.9	ND	11	89	---	508.0	1,070	2.94
Apr 6/06	511	354	995	960	7.52	7.08	---	5.6	29.0	182	155	30.3	42.4	6.8	---	---	ND	0.049	---	1.24	2.04	0.80	0.6	3.3	ND	ND	17	---	9.7	669	0.817
Jul 24/06	878	820	2,170	2,260	6.61	7.48	---	12.4	62.7	460	257	57.1	147	13.9	---	---	ND	0.176	---	5.04	6.12	1.08	0.2	2.8	ND	3	24	---	25.4	1,500	2.15
Oct 30/06	783	738	1,920	2,500	6.95	6.68	---	8.5	59.5	370	237	46.5	167	15.3	---	---	ND	0.148	---	6.96	7.43	0.47	0.2	8.8	ND	ND	20	---	11.0	1,390	2.60
Apr 25/07	694	482	1,440	1,433	7.15	7.21	---	6.9	31.3	280	212	40.1	66.7	6.6	---	---	0.030	0.066	---	1.62	2.32	0.70	0.2	2.8	ND	ND	15	---	6.0	945	1.10
Jul 24/07	814	740	1,820	1,858	6.68	6.67	---	11.9	47.9	320	245	48.8	138	12.0	---	---	0.039	0.134	---	4.75	5.77	1.02	0.5	7.6	ND	5	20	---	5.3	1,290	2.11
Nov 1/07	738	715	1,700	3,010	7.00	6.70	---	10.3	59.7	310	218	47.3	188	18.0	---	---	0.108	0.219	---	7.36	8.69	1.33	0.4	16.1	ND	6	9	---	12.2	1,340	3.02
May 14/08	704	470	1560	1,700	7.33	7.15	---	7.5	47.9	380	211	43.1	80.6	8.7	---	---	0.039	0.090	---	2.84	5.09	2.25	0.4	7.2	ND	15	68	---	7.7	1,090	1.32
Aug 5/08	822	800	1,890	1,982	7.26	7.06	---	12.1	58.0	330	244	51.2	169	19.0	---	---	0.008	0.219	---	8.78	10.4	1.62	ND	3.5	ND	3	35	---	10.9	1,380	2.57
Oct.30/08	611	630	1,690	1,730	7.29	6.62	---	8.1	52.5	320	166	47.6	157	16.3	---	---	0.707	0.325	---	6.73	8.20	1.47	0.2	8.6	ND	ND	15	---	8.9	1,190	2.77
May 19/09	846	452	1,660	1,585	7.47	6.77	---	8.4	39.8	340	251	53.2	96.6	12.7	0.049	0.511	0.035	0.139	---	2.45	4.33	1.88	0.5	6.8	ND	6	89	6.6	6.8	1,100	1.44
Aug 5/09	799	762	1,980	2,100	6.93	6.45	---	10.8	45.7	320	231	53.9	157	21.1	0.065	0.632	0.097	0.222	---	8.22	8.86	0.64	ND	9.4	ND	ND	26	10.3	10.3	1,330	2.41
Oct 28/09	457	648	1,620	1,956	7.18	6.74	---	9.6	56.2	222	104	47.9	160	18.8	0.072	0.635	0.042	0.288	---	7.34	8.44	1.10	ND	14.7	ND	<3	31	9.1	9.1	1,070	3.26
Apr 28/10	885	542	1,720	1,739	7.25	6.91	---	5.9	40.3	330	234	56.3	102	13.4	0.059	0.567	0.047	0.197	---	2.77	3.98	1.21	0.4	4.9	ND	ND	13	6.1	---	1,130	1.56
Nov 25/10	787	634	1,730	1,192	7.35	6.81	---	8.3	37.7	329	230	51.7	104	13.0	0.055	0.616	0.069	0.253	---	4.58	6.12	1.54	ND	4.6	ND	4	ND	7.8	---	1,170	1.61
Apr 25/11	555	348	1,160	1,073	7.69	6.75	---	5.9	18.2	252	170	31.4	26	5.0	0.025	0.175	0.246	0.063	---	0.53	1.75	1.22	0.3	10.8	ND	ND	19	5.0	---	761	0.48
Nov 3/11	882	784	2,120	1,584	7.47	6.91	106	8.5	37.3	267	249	63.1	129	20.7	0.077	0.780	0.133	0.336	---	11.6	12.1	0.50	ND	17.1	ND	6	43	10.4	---	1,330	1.89
Apr 26/12	797	639	1,840	1,347	7.78	6.95	63	6.7	32.2	321	240	48.2	86.5	12.6	0.049	0.394	0.023	0.124	---	5.08	6.76	1.68	ND	8.5	ND	ND	120	7.9	---	1,170	1.33
Oct 29/12	787	740	1,870	1,396	7.49	6.37	-64	12.1	40.5	225	221	56.8	143	28.9	0.093	0.744	0.279	0.335	---	9.94	10.4	0.46	0.4	27.3	ND	12	16	7.7	---	1,290	2.22
Apr 24/13	633	407	1,300	1,216	7.82	6.98	-121	6.4	16.3	273	194	35.7	41.5	8.5	0.038	0.262	0.143	0.133	---	1.93	3.39	1.46	ND	10.6	ND	12	116	7.2	---	863	0.719
Oct 30/13	852	751	1,850	1,437	7.15	6.81	168	11.4	26.7	282	254	52.6	121	21.3	0.091	0.758	0.233	0.320	---	9.29	10.9	1.61	ND	11.5	ND	3	115	12.3	---	1,260	1.80
May 29/14	776	497	1,500	1,271	7.84	6.86	82	10.5	15.6	317	234	46.3	57.3	11.7	0.055	0.475	0.026	0.190	---	3.69	5.00	1.31	0.3	6.2	ND	5	42	9.0	---	1,010	0.895
Oct 1/14	809	763	1,870	888	7.38	7.22	-87	10.4	26.2	258	239	51.2	132	27.6	0.094	0.743	0.112	0.313	---	12.6	15.7	3.10	0.6	5.0	ND	ND	16	15.8	---	1,230	2.02
May 12/15	730	552	1,520	1,755	7.87	7.40	267	6.3	20.6	225	216	46.0	84.4	16.1	0.064	0.449	0.061	0.239		6.44	7.98	1.54	ND	9.8	ND	<3	20	18.3	---	983	1.36
Oct 13/15	645	829	1,750	1,670	7.81	6.80	-24	13.4	33.8	205	179	48.0	126	25.9	0.074	0.670	0.060	0.386	---	14.6	15.9	1.30	ND	11.5	ND	ND	72	9.4	---	1,190	2.16
Apr 27/16	685	482	1,350	1,493	7.80	6.81	767	4.6	14.4	270	207	40.8	49.9	11.4	0.041	0.329	0.050	0.152	---	3.60	4.1	0.50	0.2	7.5	ND	12	17	8.4	---	921	0.829
Oct 12/16	590	561	1,860	1,546	7.80	6.92	51	11.8	26.3	236	163	44.6	83.4	21.8	0.056	0.527	ND	0.298	---	12.7	14.2	1.50	0.4	15.8	ND	ND	52	10.0	---	999	1.49
Apr 19/17	638	352	1,210	772	7.79	7.20	70.9	3.8	8.4	296	197	35.3	26.8	8.6	0.031	0.251	ND	0.135	---	1.59	2.79	1.20	0.4	5.00	ND	7	13	9.2	---	809	0.462
Nov 1/17	495	359	1,630	1,244	7.67	6.89	-59.0	12.1	15.5	200	117	49.3	87.5	25.3	0.055	0.663	ND	0.001	---	6.87	7.72	0.85	0.2	7.80	ND	<3	6	25.0	---	754	1.71
May 28/18	790	549	1,490	1,064	7.77	6.79	-33.5	8.7	13.3	291	233	50.6	52.7	14.5	0.063	0.549	ND	0.185	---	4.50	4.80	0.30	0.08	7.01	ND	<3	19	13.4	---	990	0.816
Oct 25/18	783	648	1690	1144	7.83	6.84	76.1	11.5	27.0	207	231	50.1	92	23.2	0.082	0.720	0.006	0.368	---	9.19	10.0	0.81	<0.05	10.9	0.017	5	24	6.1	---	1031	1.43
Apr 30/19	645	354	1190	798	7.86	6.88	92	7.4	8.1	265	198	36.5	26.4	8.5	0.031	0.313	0.005	0.123	---	1.60	2.5	0.90	0.39	7.74	<0.002	5	45	6.2	---	757	0.452
Oct 21/19	683	477	1370	938	7.89	7.05	58.8	12.4	13.7	202	205	41.6	51.3	14.6	0.056	0.529	<0.005	0.143	---	3.74	4.1	0.36	0.49	10.4	<0.002	11	9	9.5	---	820	0.854
Apr 1/20	472	293	875	512	7.63	6.88	94.7	5.8	5.6	154	146	26	17.5	7.6	0.027	0.246	0.015	0.057	---	0.79	1.8	1.01	0.09	5.05	<0.002	5	67	4.5	---	534	0.351
Dec 2/20	665	481	1340	559	7.59	7.18	123.2	8.7	15.3	180	197	42	51.2	14.3	0.058	0.470	0.008	0.159	---	3.09	3.7	0.61	0.32	7.93	<0.002	11	79	6.9	---	792	0.864
May 26/21	756	550	1480	1197	7.70	7.35	33.8	8.9	17.4	227	221	49.4	64.9	16.7	0.064	0.625	0.010	0.199	---	3.49	3.8	0.31	0.36	10.1	<0.001	12	12	11.4	---	931	1.03
Oct 4/21	759	592	1460	1251	7.66	6.75	-32	13.8	31.2	236	226	47.2	67.3	18.2	0.071	0.697	0.008	0.283	---	3.75	4.5	0.75	0.06	13.7	<0.002	9	18	10.6	---	985	1.06

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.4: Leachate Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
96-3d																															
Aug 12/96	560	517	1,725	1,722	---	7.30	---	13.5	231	40.3	112	68.1	118	57.7	0.28	ND	0.17	0.360	0.41	10.9	11.7	0.80	ND	1.1	ND	20	397	---	132	957	2.17
Oct 8/96	507	489	1,654	1,580	---	7.41	---	---	18.6	34.0	109	57.1	98.4	42.2	---	---	1.43	0.430	0.68	ND	12.2	12.2	ND	ND	ND	4	24	---	8.0	822	1.90
Apr 24/97	371	364	1,001	790	7.33	7.11	---	---	67.1	51.0	93.3	33.6	38.8	17.9	0.21	0.21	0.30	0.419	0.16	4.20	5.32	1.12	ND	ND	ND	3	4	---	7.0	526	0.880
Nov. 4/97	469	532	1,630	1,563	7.19	7.37	---	---	182	38.5	89.0	60.0	103	60.5	0.32	0.57	0.87	0.445	0.17	12.5	13.8	1.30	ND	ND	ND	4	25	---	7.0	870	2.07
May 7/98	495	562	1,580	1,507	7.09	7.45	---	8.8	144	66.4	114	51.0	98.3	46.3	---	---	2.06	0.446	0.42	12.8	13.5	0.70	ND	ND	ND	2	24	---	24.0	876	1.92
Oct 8/98	564	553	1,695	1,383	7.05	7.16	---	13.0	160	75.0	117	66.0	99.6	57.5	---	---	5.35	0.450	0.50	14.9	14.9	0.00	ND	ND	ND	2	29	---	9.0	932	1.82
Apr 21/99	449	500	1,399	1,363	---	6.38	---	8.9	107	67.6	105	45.3	74.0	39.9	---	---	4.61	0.274	0.13	11.1	12.3	1.20	ND	ND	ND	3	32	---	8.0	758	1.52
Oct 18/99	501	536	1,480	1,389	7.21	7.19	---	12.1	161	38.8	112	53.7	85.7	46.2	---	---	4.99	0.306	0.27	13.2	14.9	1.70	ND	ND	ND	6	21	---	5.0	841	1.67
Jan 25/00	---	---	1,505	1,440	---	---	---	9.4	140	---	---	---	79.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	768	---
May 1/00	431	486	1,250	1,252	7.04	7.20	---	10.0	91.8	54.0	110	37.9	72.9	30.9	0.72	0.33	3.51	0.312	0.47	8.16	9.05	0.89	ND	ND	ND	5	52	---	29.0	703	1.53
Oct 23/00	469	575	1,610	1,030	7.47	7.20	---	12.9	142	21.2	83.5	63.4	98.8	67.9	---	---	1.17	0.238	0.20	19.5	19.9	0.40	ND	ND	ND	2	`	---	9.0	848	1.98
Oct 24/00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.52	0.78	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
May 3/01	433	469	1,344	1,020	---	7.60	---	12.6	101	42.4	92.4	49.1	65.0	35.1	---	---	0.62	0.277	0.08	10.4	11.2	0.80	ND	ND	ND	ND	10	---	5.0	681	1.36
Oct 24/01	490	555	1,553	1,330	7.67	7.60	---	12.9	133	26.3	93.1	62.7	85.7	54.4	0.43	0.66	5.21	0.278	0.07	17.6	19.3	1.70	ND	ND	ND	5	17	---	7.0	916	1.68
Apr 17/02	508	515	1,362	1,000	7.15	6.90	---	10.5	108	42.6	108	58.0	72.7	33.2	---	---	4.34	0.300	---	9.94	10.1	0.16	ND	ND	ND	ND	14	---	5.0	749	1.40
Nov 12/02	520	519	1,240	1,410	8.14	7.40	---	12.6	161	31	99.0	66.2	85.5	57.2	---	---	4.63	0.270	---	13.7	15.6	1.90	ND	0.1	ND	3	33	---	5.8	834	1.63
Jun 10/03	514	549	1,390	1,350	7.75	7.60	---	14.0	117	30	109	58.8	73.3	36.4	---	---	0.76	0.250	---	9.61	11.4	1.79	ND	0.1	ND	1	19	---	5.2	768	1.41
Oct 16/03	551	534	1,260	1,550	7.96	7.40	---	10.8	135	55	115	64.2	69.1	37.1	---	---	0.006	0.293	---	9.82	11.1	1.28	ND	0.1	ND	ND	25	---	11.0	772	1.28
May 27/04	502	477	1,280	---	7.90	7.52	---	12.8	114	31	103	59.4	68.4	32.7	---	---	0.024	0.263	---	8.97	10.2	1.23	ND	0.4	ND	5	32	---	4.6	676	1.33
Oct 14/04	513	567	1,450	1,320	7.47	6.87	---	13.0	146	29	100	63.8	80.3	47.1	---	---	1.94	0.241	---	11.3	11.7	0.40	ND	ND	ND	2	16	---	4.8	777	1.54
Jun 1/05	520	580	1,360	780	---	8.00	---	11.6	114	25	107	61.5	70.8	34.6	---	---	5.47	0.284	---	9.57	10.1	0.53	ND	0.2	ND	ND	26	---	5.2	745	1.35
Aug 23/05	511	518	1,410	1,280	7.41	---	---	13.8	150	24	99.1	64.0	81.1	47.4	---	---	2.27	0.149	---	10.3	11.8	1.50	ND	0.1	ND	ND	13	---	14.7	745	1.56
Nov 28/05	591	565	1,360	1,140	---	7.47	---	7.7	107	33	137	60.6	66.0	20.7	---	---	3.87	0.356	---	7.94	8.29	0.35	ND	ND	ND	ND	9	---	4.5	756	1.18
Apr 6/06	531	500	1,310	1,220	7.66	7.19	---	9.0	134	52	122	54.7	60.2	24.0	---	---	3.10	0.440	---	7.70	9.27	1.57	ND	0.4	0.003	5	15	---	9.9	738	1.14
Jul 24/06	511	545	1,450	1,410	7.16	7.69	---	15.1	146	6	109	57.7	67.6	33.9	---	---	4.17	0.289	---	8.53	8.98	0.45	ND	0.2	ND	ND	15	---	7.8	729	1.30
Oct 30/06	520	558	1,290	1,633	7.23	6.91	---	10.3	136	66	113	57.9	70.0	37.6	---	---	3.08	0.296	---	8.49	8.87	0.38	ND	0.2	ND	ND	18	---	5.4	830	1.34
Apr 26/07	503	525	1,390	1,110	7.28	7.32	---	11.2	131	78	110	55.3	62.7	31.0	---	---	3.00	0.268	---	7.39	7.71	0.32	ND	0.2	ND	ND	18	---	5.8	798	1.22
Jul 24/07	535	519	1,350	1,278	7.04	7.03	---	17.7	140	55	118	58.5	68.1	34.3	---	---	1.79	0.332	---	8.40	8.56	0.16	0.2	0.3	ND	ND	12	---	2.2	800	1.28
Nov 1/07	523	507	1,290	1,480	7.29	7.10	---	11.4	140	47	112	58.7	70.8	37.1	---	---	1.43	0.287	---	8.14	9.29	1.15	ND	0.2	ND	ND	10	---	5.2	772	1.35
May 14/08	435	504	1,250	1,220	7.33	7.35	---	10.9	115	49	96.0	47.5	55.7	30.1	---	---	2.68	0.321	---	7.82	8.20	0.38	ND	0.3	ND	12	24	---	2.7	710	1.16
Aug 6/08	474	477	1,260	1,305	7.38	7.56	---	12.5	143	33	101	54.1	66.2	35.2	---	---	3.24	0.248	---	8.85	9.10	0.25	ND	0.2	ND	6	12	---	2.1	734	1.32
Oct.30/08	485	510	1,280	1,190	7.57	7.30	---	8.5	137	40	102	55.8	72.0	39.1	---	---	2.23	0.221	---	8.73	9.62	0.89	ND	0.1	ND	ND	ND	---	2.3	766	1.42
May 19/09	516	492	1,330	1,185	7.41	7.90	---	10.4	118	44	114	56.0	60.7	32.5	0.341	0.342	1.93	0.430	---	6.56	6.86	0.30	ND	0.3	ND	5	10	1.9	1.9	733	1.16
Aug 5/09	472	507	1,340	1,370	7.27	6.99	---	11.3	137	30	93.6	57.8	70.0	36.7	0.344	0.385	3.85	0.195	---	8.49	8.63	0.14	ND	0.1	ND	ND	9	2.6	2.6	745	1.40
Oct 28/09	483	501	1,400	1,220	7.31	7.25	---	10.1	137	32	99.2	57.1	70.9	38.6	0.396	0.426	3.68	0.218	---	8.22	8.66	0.44	ND	0.1	ND	ND	16	2.3	2.3	751	1.40
Apr 28/10	539	555	1,340	1,330	7.43	7.26	---	9.2	123	40	117	59.8	65.8	33.8	0.377	0.392	3.00	0.291	---	7.22	7.75	0.53	ND	0.2	ND	ND	13	0.7	---	786	1.23
Nov 25/10	518	510	1,330	1,000	7.42	7.01	---	9.2	106	44	120	52.7	54.5	26.0	0.343	0.368	1.93	0.465	---	5.73	5.73	0.00	ND	0.1	ND	3	7	2.7	---	720	1.04
Apr 25/11	459	495	1,220	1,099	7.59	6.90	---	8.5	106	43	104	48.2	47.7	21.1	0.304	0.280	2.53	0.281	---	4.94	6.91	1.97	ND	0.1	ND	ND	14	2.2	---	677	0.969
Nov 3/11	454	478	1,350	1,151	7.70	7.12	-80	10.2	130	30	110	60.6	64.9	33.0	0.384	0.445	3.94	0.247	---	6.24	7.63	1.39	ND	0.1	ND	4	12	2.2	---	727	1.23
Apr 26/12	512	489	1,360	1,067	7.99	7.22	-12	10.3	128	42	110	57.5	54.0	26.8	0.301	0.327	ND	0.261	---	3.10	6.81	3.71	ND	0.1	ND	6	16	4.4	---	717	1.04
Oct 29/12	584	495	1,310	1,186	7.84	6.67	-119	12.0	135	34	125	66.0	70.1	36.1	0.426	0.464	3.41	0.270	---	6.60	6.97	0.37	ND	0.1	ND	9	12	2.8	---	776	1.26
Apr 24/13	489	484	1,250	1,250	7.92	7.19	-122	11.9	116	36	108	53.4	55.1	26.4	0.369	0.386	1.93	0.269	---	5.68	6.66	0.98	ND	ND	ND	ND	6	2.5	---	695	1.09
Oct 30/13	544	464	1,350	1,210	7.54	7.21	-56	9.9	159	45	119	60.1	66.0	26.6	0.373	0.401	3.21	0.305	---	5.54	5.86	0.32	ND	ND	ND	ND	9	6.6	---	757	1.23
May 28/14	559	451	1,410	1,202	7.95	7.08	-40	10.0	157	48	126	59.3	67.8	26.4	0.350	0.365	1.54	0.445	---	4.37	5.93	1.56	ND	0.2	ND	7	8	4.2	---	764	1.25
Oct 1/14	517	421	1,360	1,032	7.75	7.21	-65	12.0	170	26	110	59.1	73.2	30.2	0.375	0.378	1.16	0.239	---	5.91	6.79	0.88	ND	ND	ND	3	ND	3.8	---	730	1.40
May 7/15	553	474	1,310	1,230	7.98	6.75	30	10.3	155	38	121	61.0	71.5	28.5	0.361	0.374	0.911	0.358	---	5.06	6.30	1.24	ND	0.3	ND	5	12	1.7	---	768	1.32
Oct 13/15	405	461	1,320	1,372	8.00	8.02	28	13.2	166	23	79.2	50.3	75.2	23.5	0.306	0.341	2.89	0.197	---	5.55	6.30	0.75	ND	0.1	ND	ND	32	0.9	---	705	1.63
Apr 27/16	508	501	1,260	1,423	7.88	7.13	-102	9.3	128	38	114	54.4	64.8	25.5	0.326	0.321	1.49	0.382	---	4.81	5.90	1.09	ND	0.3	ND	5	30	2.5	---	734	1.25
Oct 11/16	422	454	1,220	1,140	7.85	7.51	126	11.4	148	20	86.8	49.8	74.0	24.8	0.323	0.325	2.33	0.191	---	5.41	6.33	0.92	0.5	0.6	ND	15	15	2.0	---	682	1.57
Apr 19/17	491	443	1,230	894	8.06	7.2	-94.8	6.4	125	30	111	52.0	65.0	25.6	0.342	0.338	0.629	0.292	---	3.30	5.26	1.96	0.2	0.6	ND	18	14	1.1	---	683	1.28
Nov 2/17	501	443	1,240	913	8.18	7.01	-37	11.1	94.4	26	115	51.9	64.2	24.5	0.366	0.358	3.40	0.343	---	4.24	4.2	-0.04	ND	0.2	ND	ND	18	9.4	---	651	1.25
May 28/18	575	483	1,290	1,003	7.92	6.98	-63	11.1	133	62	127	62.6	69.7	23.4	0.358	0.350	2.10	0.377	---	4.02	4.2	0.18	ND	0.09	ND	ND	9	26.7	---	776	1.26
Duplicate	597	464	1,350	1,003	7.97	6.98	-63	11.1	148	63	134	63.8	72.7	23.8	0.362	0.342	2.00	0.427	---	3.98	5.3	1.32	ND	0.24	ND	6	17	24.1	---	792	1.29
Oct 25/18	553	398	1,510	1,363	7.90	7.22	-81.9	9.7	222	22	114	65.1	91.4	28.6	0.455	0.376	5.73	0.213	---	5.48	6.6	1.12	0.16	0.70	0.016	29	29	3.8	---	795	1.69
Apr 30/19	556	390	1,420	1,022	7.90	6.95	11.1	9.4	207	34	129	56.9	70.4	23.5	0.346	0.296	0.297	0.378	---	4.07	4.6	0.53	<0.05	0.18	<0.002	<3	9	4.6	---	761	1.30
Oct 21/19	623	387	1,800	1,359	7.95	7.20	-74	10.7	319	24	134	70.0	111	30.0	0.460	0.343	4.67	0.291	---	5.78	6.4	0.62	0.09	0.35	<0.002	7	14	2.2	---	932	1.94
Apr 1/20	656	389	1,810	1,178	7.76	6.66	34.1	8	345	38	156	64.8	105	26.8	0.417	0.316	2.15	0.402	---	4.21	5.1	0.89	<0.05	0.12	0.003	3	<5	2.9	---	976	1.78
Dec 2/20	660	362	2,020	1,464	7.71	6.68	-33.4	8.6	425	21	147	71.1	133	28.6	0.466	0.313	3.55	0.309	---	5.41	7.3	1.89	<0.05	0.06	<0.002	9	<5	1.9	---	1054	2.25
May 25/21	616	420	1,810	1,432	7.64	6.89	-27.4	9.4	333	42	139	65.4	129	25.2	0.391	0.282	2.19	0.533	---	0.02	0.4	0.38	0.89	0.97	<0.002	7	9	2.4	---	988	2.26
Oct 4/21	669	413	1,970	1,535	7.80	6.99	-76.9	11.2	410	31	147	73.4	156	29.6	0.510	0.331	5.32	0.346	---	5.06	5.8	0.74	<0.05	0.08	<0.002	5	19	2.6	---	1108	2.63

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.4: Leachate Groundwater Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
06-3dBR																															
Apr 6/06	249	454	2,440	2,160	8.22	7.33	---	8.8	461	132	61.4	23.2	452	14.2	---	---	0.029	0.257	---	1.25	1.92	0.67	ND	0.3	0.003	ND	33	---	12.8	1,400	12.5
Jul 20/06	234	358	5,300	4,960	8.18	7.75	---	14.4	1,500	82	58.8	21.2	907	18.0	---	---	0.386	0.152	---	1.59	2.04	0.45	<1	0.1	ND	6	28	---	8.6	2,790	25.8
Oct 30/06	218	210	7,150	5,830	7.67	7.49	---	9.6	2,430	26	53.0	20.8	1,250	21.3	---	---	0.559	0.128	---	1.80	2.09	0.29	<3	0.3	ND	28	38	---	5.2	3,930	36.8
Apr 26/07	211	204	7,180	6,300	7.66	7.92	---	10.0	2,690	26	53.2	19.0	1,430	20.7	---	---	1.31	0.079	---	1.88	2.17	0.29	<3	0.2	ND	22	ND	---	6.7	4,360	42.8
Jul 24/07	249	177	7,820	7,980	7.55	7.81	---	13.4	2,610	21	63.3	22.1	1,420	24.8	---	---	1.43	0.147	---	1.98	2.38	0.40	<3	0.2	ND	10	45	---	2.7	4,270	39.1
Nov 1/07	194	200	7,540	8,420	7.59	7.76	---	10.2	2,100	102	48.5	17.8	1,570	18.3	---	---	0.611	0.104	---	1.31	2.19	0.88	<3	0.2	ND	20	ND	---	15.1	3,990	49.0
May 14/08	187	170	7,860	8,370	7.40	8.03	---	10.3	2,710	31	47.3	16.7	1,420	21.0	---	---	0.335	0.048	---	2.26	2.33	0.07	<3	ND	ND	22	89	---	0.8	4,360	45.1
Aug 6/08	191	140	7,820	8,410	7.58	8.42	---	10.8	3,420	10	47.8	17.4	1,770	21.1	---	---	0.871	0.039	---	1.94	2.20	0.26	<3	ND	ND	33	24	---	0.5	5,370	55.7
Oct 30/08	197	160	8,600	6,200	7.64	6.45	---	8.3	2,760	22	50.7	17.2	1,740	22.0	---	---	0.725	0.038	---	1.98	2.22	0.24	<3	ND	ND	26	23	---	0.7	4,710	53.9
May 19/09	200	180	8,100	7,850	7.55	7.40	---	10.0	2,700	43	49.7	18.4	1,520	24.6	0.096	1.08	0.426	0.055	---	1.82	2.28	0.46	<3	ND	ND	32	96	0.5	0.5	4,460	46.9
Aug 5/09	195	150	8,360	8,500	7.81	7.59	---	10.1	2,840	13	48.1	18.1	1,610	24.2	0.091	1.01	0.836	0.043	---	2.08	2.51	0.43	<3	ND	ND	20	119	0.6	0.6	4,640	50.1
Oct 28/09	175	312	7,490	9,420	7.51	7.66	---	8.6	2,130	186	43.2	16.3	1,560	20.3	0.089	1.08	0.059	0.054	---	0.95	1.53	0.58	<3	ND	ND	ND	54	1.7	1.8	4,150	51.3
Apr 28/10	207	165	8,410	8,420	7.69	7.86	---	8.7	2,570	28	51.9	18.8	1,770	22.7	0.105	1.17	0.467	0.034	---	2.04	2.68	0.64	<10	ND	ND	ND	83	0.3	---	4,560	53.4
Nov 25/10	201	158	8,210	6,200	7.66	7.82	---	8.2	2,820	23	50.2	18.4	1,610	19.5	0.104	1.16	0.703	0.039	---	1.90	2.19	0.29	<3	ND	ND	8	162	0.6	---	4,640	49.4
Apr 25/11	205	153	8,190	6,950	7.85	7.55	---	8.9	2,850	17	51.7	18.4	1,920	18.3	0.105	1.08	0.691	0.037	---	1.79	2.19	0.40	<3	ND	ND	ND	96	0.4	---	4,970	58.4
Nov 3/11	169	151	8,710	8,160	7.73	7.66	-77	9.0	2,590	17	44.4	22.4	1,730	19.0	0.104	1.25	1.02	0.038	---	1.72	2.48	0.76	<1	<1	ND	24	40	0.3	---	4,520	52.9
Apr 26/12	189	147	8,630	6,350	8.06	7.85	-36	9.5	2,690	15	47.0	17.5	1,740	21.6	0.094	0.996	0.348	0.028	---	1.85	2.26	0.41	<1	<1	ND	12	34	0.3	---	4,620	55.0
Duplicate	191	149	8,590	---	8.09	---	---	---	2,690	15	47.4	17.6	1,740	21.9	0.095	1.00	0.374	0.029	---	1.80	2.35	0.55	<1	<1	ND	20	36	ND	---	4,620	54.9
Oct 29/12	220	146	8,300	3,610	7.87	7.22	-144	10.1	2,890	10	55.5	19.9	1,670	25.6	0.117	1.28	0.706	0.035	---	1.84	2.22	0.38	ND	4.1	ND	15	27	0.7	---	4,790	49.1
Duplicate	220	146	8,270	---	7.93	---	---	---	2,880	10	55.4	19.8	1,680	25.5	0.117	1.27	0.727	0.036	---	1.88	2.17	0.29	ND	4.0	ND	22	38	0.5	---	4,780	49.4
Apr 24/13	189	147	8,370	6,410	8.01	7.81	-47	10.0	2,710	15	47.2	17.3	1,680	20.0	0.110	1.16	0.624	0.034	---	1.85	2.38	0.53	<1	<1	ND	7	131	0.5	---	4,580	53.0
Duplicate	193	148	8,320	---	8.00	---	---	---	2,660	15	48.2	17.5	1,680	20.5	0.113	1.18	0.641	0.034	---	1.84	2.38	0.54	<1	<1	ND	6	72	0.6	---	4,530	52.7
Oct 30/13	200	143	8,130	4,050	7.85	7.97	-97	8.8	2,630	1	50.5	18.0	1,690	16.9	0.112	1.24	0.814	0.043	---	1.78	2.24	0.46	ND	ND	ND	10	25	1.4	---	4,490	51.8
May 28/14	201	143	8,420	4,560	8.00	7.73	-61	9.4	2,630	<10	50.5	18.2	1,640	21.6	0.104	1.15	0.079	0.035	---	1.88	2.21	0.33	<1	<1	ND	9	16	0.9	---	4,460	50.4
Oct 1/14	202	140	8,320	6,150	7.89	7.55	-77	10.5	2,870	<10	50.7	18.2	1,690	21.9	0.109	1.17	0.498	0.035	---	1.75	2.26	0.51	<1	<1	ND	8	15	0.7	---	4,750	51.7
Duplicate	206	144	8,310	---	7.90	---	---	---	2,880	7	52.2	18.4	1,750	22.4	0.112	1.19	0.442	0.035	---	1.75	2.25	0.50	<3	ND	ND	7	10	0.9	---	4,810	52.9
May 7/15	196	166	7,920	6100	7.92	6.84	28	10.8	2,850	14	48.6	18.2	1,450	21.4	0.112	1.18	0.339	0.036	---	1.72	2.20	0.48	<0.5	<0.5	ND	9	14	1.9	---	4,690	50.6
Oct 13/15	162	157	7,990	4,650	7.90	8.13	-29	13.8	2,640	<10	38.8	15.8	1,480	26.0	0.089	1.02	0.450	0.032	---	1.75	2.36	0.61	<1	<1	ND	12	20	ND	---	4,310	50.8
Apr 27/16	199	172	8,130	3,260	8.01	7.79	-111	10.2	2,830	<30	48.5	18.9	1,580	21.9	0.110	1.21	0.503	0.035	---	2.08	2.50	0.42	<3	<3	ND	12	23	ND	---	4,610	48.6
Duplicate	191	172	8,210	---	8.03	---	---	---	2,780	<30	46.5	18.2	1,560	21.0	0.104	1.16	0.465	0.034	---	2.19	2.60	0.41	<3	<3	ND	6	19	ND	---	4,540	48.9
Oct 11/16	181	171	7,940	> 4,000	7.88	7.86	-52	12.3	2,460	<10	44.7	16.9	1,580	19.2	0.107	1.10	0.471	0.033	---	1.81	2.54	0.73	<1	<1	ND	5	5	0.5	---	4,230	51.0
Apr 19/17	211	164	8,340	5,809	8.00	7.31	-88.6	6.8	2,660	<10	54.0	18.4	1,560	22.7	0.137	1.23	0.514	0.043	---	1.81	2.63	0.82	1.0	<1	ND	<3	17	ND	---	4,420	46.7
Nov 2/17	213	162	8,410	6,100	7.91	7.31	-158	10.6	2,350	2	53.2	19.4	1,570	23.2	0.135	1.25	0.602	0.043	---	1.90	2	0.10	<3	<0.1	ND	<3	137	1.1	---	4,122	46.8
May 28/18	215	165	8,080	6,135	8.08	7.54	-93	10.2	2,430	<10	52.7	20.3	1,770	24.7	0.139	1.32	0.435	0.040	---	2.01	2.3	0.29	<0.5	<0.5	ND	6	57	1.4	---	4,399	52.5
Oct 25/18	209	159	8,500	5255	8.07	7.73	-90.6	8.0	2,730	<30	52.5	18.8	1,610	23.4	0.145	1.29	0.584	0.041	---	2.12	2.2	0.08	<1	<1	0.012	5	65	0.9	---	4,538	48.5
Apr 30/19	212	160	8,390	6182	8.02	7.57	-97.2	10.7	2,850	<10	53.7	19.0	1,560	23.2	0.129	1.25	0.536	0.045	---	2.03	2.4	0.37	<0.5	<0.5	<0.002	<3	136	2.5	---	4,610	46.6
Oct 21/19	211	158	8,330	6240	8.06	7.24	-147	10.1	2,510	<30	52.9	19.1	1,770	24.2	0.137	1.29	0.617	0.042	---	2.17	2.4	0.23	<1	<1	<0.002	9	70	0.7	---	4,472	53.1
Apr 1/20	226	151	8,330	5341	7.82	7.43	-24.6	7.5	2,810	1	53.6	19.4	1,740	26.1	0.129	1.34	0.422	0.051	---	2	2.4	0.40	<0.05	<0.05	<0.002	9	50	0.4	---	4,741	51.2
Dec 2/20	234	143	8,330	6224	7.82	7.59	-87.6	7.7	2,740	<30	59.6	20.7	1,640	26.7	0.135	1.36	0.458	0.052	---	2	2.4	0.40	<1	<1	<0.002	9	13	<0.2	---	4,576	46.6
May 25/21	202	171	8,350	6782	7.81	7.36	-75.3	10.6	2,760	<10	50.0	18.7	1,700	24.4	0.119	1.24	0.435	0.040	---	2.08	2.3	0.22	<1.3	0.72	<0.002	14	331	0.7	---	4,653	52.1
Oct 4/21	233	163	8,520	6912	7.83	7.43	-76.9	10.3	2,880	<10	58.7	20.9	1,760	26.0	0.146	1.33	0.650	0.047	---	2.20	2.2	0.00	<0.5	<0.5	<0.002	<3	11	0.6	---	4,843	50.2

🟦	Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨	Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)

All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

Table 5.4: Trip Blank Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH Lab	pH Field	ORP	Temp.	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Phosphorus	Total Ammonia	TKN	Organic Nitrogen	Nitrite	Nitrate	Phenol	BOD	COD	DOC	TOC	TDS	SAR
ODWS/OG	80-100	30-500	Lab	Field	6.5-8.5		Field	˚C	250	500			200		1.00	5.0	0.30	0.050				0.15	1.0	10						500	
Location/date																															
Trip Blank																															
Apr 26/12	ND	ND	2	---	5.85	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	<0.005	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.622	---
Oct 29/12	ND	ND	3	---	5.81	---	---	---	ND	ND	ND	ND	0.4	ND	ND	ND	0.010	ND	---	ND	ND	ND	ND	ND	ND	6	ND	0.9	---	0.734	0.405
Apr 24/13	ND	ND	20	---	5.86	---	---	---	0.5	ND	0.06	0.04	ND	ND	ND	ND	ND	ND	---	ND	0.05	0.05	ND	ND	ND	4	ND	0.5	---	1.06	0.127
Oct 29/12	ND	ND	1	---	5.96	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.554	---
May 29/14	ND	ND	2	---	6.29	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.876	---
Oct 1/14	ND	ND	1	---	5.70	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	0.2	---	2.00	0.153
May 7/15	ND	ND	2	---	6.03	---	---	---	ND	ND	ND	ND	0.2	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	---
Oct 13/15	ND	ND	3	---	5.29	---	---	---	ND	ND	0.04	0.01	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	0.681	0.0465
Apr 26/16	ND	ND	2	---	6.09	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---
Oct 11/16	ND	ND	2	---	6.23	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	1	0.328
Apr 18/17	<1	<5	2	---	6.16	---	---	---	<0.5	<1	<0.02	<0.01	<0.2	<0.1	<0.001	0.019	<0.005	<0.001	---	ND	0.06	0.06	<0.1	<0.1	<0.001	<3	<5	<0.2	---	0.725	0.105
Nov 1/17	<1	<5	<1	---	5.87	---	---	---	<0.5	<1	<0.02	<0.02	<0.2	<0.1	<0.001	<0.005	<0.005	<0.001	---	ND	ND	ND	<0.1	<0.1	<0.001	<3	<5	<0.2	---	<1	---
May 23/18	<1	<5	1	---	6.20		---		<0.5	<1	<0.02	<0.02	<0.2	<0.1	<0.001	<0.005	<0.005	<0.001	---	<0.01	<0.1	ND	<0.05	<0.05	<0.001	<3	<5	<0.2	---	<1	---
Oct 25/18	<1	<5	<1	---	5.81	---	---	---	<0.5	<1	<0.02	<0.02	<0.2	<0.1	<0.001	<0.005	<0.005	<0.001	---	0.02	0.1	0.08	<0.05	<0.05	<0.002	<3	<5	<0.2	---	<1	---
Apr 29/19	<1	<5	2	---	6.27	---	---	---	<0.5	<1	<0.02	<0.02	<0.2	<0.1	<0.001	<0.005	<0.005	<0.001	---	<0.01	<0.1	---	<0.05	<0.05	<0.002	<3	<5	0.3	---	1	---
Oct 21/19	<1	<5	<1	---	5.53	---	---	---	0.6	<1	0.02	<0.02	<0.2	<0.1	<0.001	<0.005	<0.005	<0.001	---	0.03	<0.1	---	<0.05	<0.05	<0.002	<3	<5	0.2	---	1	-0.0071
Mar 31/20	<1	<5	2	---	5.54	---	---	---	0.7	<1	<0.02	<0.02	<0.2	<0.1	<0.001	<0.005	<0.005	<0.001	---	<0.01	<0.1	---	<0.05	<0.05	<0.002	<3	<5	<0.2	---	1	-
Dec 1/20	<1	<5	2	---	5.72	---	---	---	<0.5	<1	<0.02	<0.02	<0.2	<0.1	<0.001	<0.005	<0.005	0.001	---	0.01	<0.1	---	<0.05	<0.05	<0.002	<3	<5	<0.2	---	<1	-
May 25/21	<1	<5	<1	---	5.61	---	---	---	<0.5	<1	<0.02	<0.02	<0.2	<0.1	<0.001	<0.005	<0.005	<0.001	---	0.01	<0.1		<0.05	<0.05	<0.002	<3	<5	<0.2	---	<1	-

🟦 Indicates exceedance of Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
🟨 Indicates method detection limit elevated above Ontario Drinking Water Standard Quality Objectives and Guidelines (ODWQS/OG)
All values are given in mg/L, except ORP (mV) conductivity (µS/cm), temperature (°C) and pH (no units).
ND – Not Detected

APPENDIX

E

DOMESTIC WELL CHEMISTRY DATA

Table 5.5 - Domestic Water Chemical Analysis
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	pH		Conductivity		Temp.	ORP	Colour	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Barium	Boron	Iron	Manganese	Total Ammonia	TKN	Nitrate	Nitrite	Phenol	BOD	COD	DOC	TDS
			field	lab	field	lab																						
ODWS/OG	80-100	30-500	6.5-8.5						5	250	500			200		1.0	5.0	0.30	0.05			10	1					500
Location/Date																												
PW1																												
Jun 23/04	447	350	7.72	7.35	700	882	11.6	---	1	40.6	122	114	39.3	25.8	4.1	---	---	2.62	0.035	0.03	0.27	0.2	ND	ND	---	ND	---	552
Aug 19/05	439	328	7.45	7.57	840	857	15.2	---	---	35.8	114	109	40.8	25.7	3.9	0.032	0.022	0.24	0.020	ND	0.16	0.1	---	ND	---	9	---	522
Apr 13/06	416	328	7.49	7.46	770	851	11.7	---	ND	35.9	101	106	36.8	22.5	3.6	---	---	6.70	0.056	ND	0.08	0.1	ND	ND	---	6	---	506
Jul 16/07	443	360	7.17	7.10	815	907	15.9	---	---	36.7	108	114	38.4	24.7	3.8	---	---	2.17	0.030	ND	0.06	ND	ND	ND	ND	38	---	544
June 05/08	409	350	7.48	7.67	842	839	10.1	---	1	31.8	100	105	35.6	24.1	3.6	---	---	3.23	0.034	ND	0.07	ND	ND	ND	---	<5	---	513
June 09/09	430	320	7.28	7.52	607	844	11.2	---	3	31.1	99	109	38.5	23.6	3.9	---	---	3.95	0.038	ND	ND	0.2	ND	ND	ND	<5	---	499
Apr 28/10	469	348	7.22	7.87	860	864	10.3	---	---	31.8	99	122	40.1	21.9	4.0	0.047	0.026	4.67	0.037	ND	0.06	ND	ND	ND	ND	ND	1.3	532
Mar 29/11	421	351	7.45	6.18	834	855	8.0	---	---	25.8	88	110	35.3	20.1	3.3	0.045	0.033	4.07	0.033	ND	0.05	ND	ND	ND	ND	ND	1.4	498
Oct 29/12	406	311	7.27	7.94	862	803	15.2	-112	---	29.3	106	98.1	39.2	24.8	3.8	0.042	0.021	1.15	0.025	ND	ND	ND	ND	ND	ND	8	2.2	489
Apr 18/13	416	332	6.93	7.79	790	827	9.9	50	---	25.6	95	105	37.4	18.8	3.6	0.047	0.028	1.87	0.040	ND	ND	0.1	ND	ND	ND	ND	1.7	487
May 28/14	427	308	7.03	7.95	732	821	11.1	22	---	25.5	96	109	37.9	20.7	4.0	0.044	0.026	1.36	0.031	ND	ND	0.1	ND	ND	ND	ND	3.7	479
May 25/15	421	317	7.38	7.76	932	793	10.8	-18	---	26.7	99	107	37.6	22.7	3.6	0.044	0.009	0.883	0.030	0.02	0.18	ND	ND	ND	ND	ND	1.2	487
Oct 13/15	349	307	8.91	7.98	1281	792	11.6	24	---	32.5	102	78.5	37.2	24.6	4.3	0.048	0.029	6.79	0.029	ND	0.08	ND	ND	ND	ND	ND	8.1	470
Apr 27/16	411	305	7.21	7.94	1037	786	10.6	65	---	26.9	111	98.2	40.4	24.9	3.7	0.044	ND	1.19	0.025	0.03	0.15	0.1	ND	ND	4	ND	0.9	490
Apr 17/17	410	301	6.82	8.01	592	795	11.6	-160.5	---	30.5	88	96.7	41.0	19.5	4.3	0.510	0.334	256	0.167	ND	1.18	0.1	ND	ND	ND	23	1.8	462
Apr 30/19	392	301	7.50	8.06	593	836	9.7	-61.1	---	32.7	90	94.3	38.1	21.5	5.3	0.038	0.037	<0.005	0.015	0.25	1.10	<0.05	<0.05	<0.002	<3	18	0.4	463
Apr 01/20	No sample due to COVID-19																											
Nov 24/20	557	311	7.13	7.74	474	862	16.6	-347.4	---	36.0	84	158	39.4	18.9	4.2	1.02	0.381	736	0.258	0.13	0.30	<0.1	<0.1	<0.002	<3	7	0.6	455
May 26/21	436	283	7.76	8.33	767	784	15.0	-11.8	---	36.0	92	109	39.9	22.4	4.6	0.051	0.030	1.05	0.030	0.02	0.20	<0.05	<0.05	<0.002	<3	<5	2.3	475
PW3																												
May 4/10	409	322	7.29	7.84	740	803	11.6	---	3	31.9	75	78.9	51.5	18.5	4.4	0.092	0.063	ND	0.012	0.19	0.22	ND	ND	ND	---	5	0.9	454
Mar 29/11	358	294	7.73	6.59	698	696	6.8	---	---	10.6	81	82.0	37.2	7.7	3.0	0.084	0.046	ND	0.005	0.05	0.06	0.1	ND	ND	ND	ND	1.1	398
Apr 25/12	366	275	---[1]	7.94	647	733	5.2	252	---	21.0	70	65.5	49.2	7.8	4.3	0.080	0.040	ND	0.012	ND	0.07	0.9	ND	ND	ND	ND	1.1	386
Duplicate	372	274	---	7.84	---	684	---	---	---	21.1	70	66.5	50.0	8.0	4.4	0.081	0.039	ND	0.012	ND	0.09	0.7	ND	ND	ND	ND	1.0	388
Apr 18/13	367	292	7.42	7.96	670	684	7.9	182	---	9.5	74	79.0	41.2	8.8	4.1	0.093	0.039	0.013	0.015	ND	ND	0.5	ND	ND	ND	6	1.6	394
Duplicate	364	294	---	7.95	---	681	---	---	---	9.5	75	78.2	40.9	8.8	4.1	0.091	0.039	ND	0.015	ND	ND	0.4	ND	ND	ND	ND	1.6	394
Oct 2/14	396	277	7.43	7.89	652	743	17.2	27	---	36.9	80	71.9	52.7	18.9	3.1	0.092	0.049	0.226	0.015	0.09	0.22	ND	ND	ND	ND	ND	1.9	430
May 25/15	388	285	7.30	7.85	855	696	11.7	120	---	23.5	81	69.5	52.1	11.7	3.4	0.097	0.028	ND	0.016	0.17	0.30	ND	ND	ND	ND	ND	0.8	412
Duplicate	390	283	7.30	7.84	855	687	11.7	120	---	23.5	81	70.0	52.4	11.8	3.4	0.098	0.028	ND	0.016	0.18	0.25	ND	ND	ND	ND	ND	0.9	412
Apr 26/16	393	310	7.85	8.21	1,000	725	8.9	82	---	20.3	79	75.5	49.7	10.9	3.3	0.088	0.039	ND	0.014	0.13	0.19	ND	ND	ND	ND	ND	1.3	425
Apr 17/17	ND	228	7.58	8.01	292	479	4.0	196.6	---	2.0	13	0.19	0.04	115	0.2	0.001	0.012	0.062	0.003	ND	0.57	3.4	ND	ND	ND	ND	2.9	282
May 22/18	ND	274	7.58	8.25	930	711	12.6	77.0	---	17.7	76	0.13	0.09	196	0.5	ND	0.042	ND	ND	0.05	0.10	ND	ND	ND	ND	ND	0.9	455
Apr 30/19	<1	263	7.65	8.29	546	704	13.0	140.3	---	11.9	70	0.05	<0.02	166	0.6	<0.001	0.041	0.005	0.003	0.06	<0.1	0.14	<0.05	<0.002	<3	<5	1.6	406
01-Apr-20	No sample due to COVID-19																											
24-Nov-20	No sample, homeowners not home																											
May 26/21	389	270	8.50	8.45	285	677	10.6	55	---	22.3	73	69.6	52.4	10.2	3.3	0.093	0.048	0.361	0.015	0.15	0.30	<0.05	<0.05	<0.002	<3	<5	1.7	393

All units are in mg/L except for pH (no units), conductivity (µS/cm), temperature (°C), and ORP (mV).

1.19 - Indicates exceedance of Ontario Drinking Water Standards, Objectives and Guidelines (ODWS/OG)

ND - Not Detected

ORP - Oxidation-Reduction Potential

--- not analyzed

[1] - pH meter malfunction

APPENDIX

F

SURFACE WATER CHEMISTRY DATA

Table 4.6 - Surface Water Flow Data
North Lancaster Waste Disposal Site

Parameter Unit Location/Date	Velocity m/s	Depth m	Width m	Flow m^3/s	Precipitation[1] mm
S-1					
May 7/98	0.10	0.06	0.40	0.00	16.8
Oct 8/98	NA				14.6
Apr 19/99	0.08	0.01	0.25	0.00	4.6
Oct 18/99	Dry				8.8
Jan 25/00	Dry				1.0
Apr 27/00	0.13	0.03	0.15	0.00	0.0
Oct 26/00	Dry				0.0
Apr 24/01	NA				1.5
Dec 6/01	NA				10.4
Apr 18/02	0.10	0.60	0.03	0.00	0.5
S-1A					
Nov 22/02	0.09	0.08	1.0	0.00	0.0
April 16/03	0.14	0.15	2.0	0.02	15.0
Oct 23/03	0.03	0.20	1.2	0.00	38.8
Apr.26/04	0.20	0.10	1.0	0.01	6.0
Nov 25/04	0.25	0.08	1.5	0.02	23.5
Apr.5/05	0.13	0.30	1.5	0.03	5.8
Sept. 1/05	DRY				91.9
Nov 29/05	0.29	0.32	2.0	0.09	5.0
Apr 5/06	1.06	0.12	2.0	0.13	22.2
Aug 1/06	0	0.05	0.91	0.00	0.0
Oct 31/06	0.04	0.13	1.09	0.00	10.2
Apr 23/07	0.88	0.06	0.82	0.02	0.0
Jul 23/07	Dry				2.2
Oct 29/07	0.30	0.05	0.70	0.01	25.2
May 6/08	0.25	0.11	1.07	0.01	0.4
Nov 3/08	0.00	0.05	0.73	0.00	3.0
May 12/09	0.09	0.10	0.87	0.00	22.0
Jul 29/09	Trace Flow	0.03	0.58	0.00	8.0
Oct 26/09	0.00	0.03	0.30	0.00	23.4
Mar 29/10	0.37	0.08	0.60	0.01	10.0
Aug 23/10	Trace Flow	0.12	2.00	0.00	58.6
Oct 26/10	0.19	0.09	1.70	0.01	6.6
Mar 29/11	0.19	0.08	1.52	0.01	0.0
Aug 22/11	0.00	0.1	0.10	0.00	23.7
Dec 7/11	0.14	0.05	0.10	0.00	31.2
Apr 11/12	0.10	0.09	0.37	0.00	5.6
Oct 30/12	Trace Flow	0.08	1.20		0.0
Apr 09/13	0.34	0.13	1.25	0.03	1.8
Jul 30/13	0.08	0.06	0.30	0.00	1.0
Oct 22/13	Trace Flow	0.095	0.60	---	1.0
24-Apr-14	0.22	0.09	1.18	0.02	11.4
10-Jul-14	0.11	0.07	0.60	0.00	8.8
Oct 8/14	0.12	0.04	0.62	0.00	5.2
May 12/15	0.13	0.10	1.2	0.02	1.0
Jun 23/15	0.20	0.12	0.5	0.01	11.8
Oct 29/15	0.06	0.12	0.9	0.01	28.0
Apr 13/16	0.30	0.05	0.9	0.01	8.4
Aug 17/16	Trace Flow	0.14	0.5	---	22.0
Oct 25/16	0.20	0.14	0.4	0.01	5.5
Apr 18/17	0.18	0.06	0.6	0.01	13.6
Jul 17/17	0.20	0.08	0.2	0.00	2.1
31-Oct-17	No Flow	0.06	0.6	---	46.1
May 22/18	0.17	0.04	0.35	0.002	2.6
Nov 2/18	No Flow	0.13	1.1	---	26.4
April 11/19	1	0.05	1.5	0.075	3.0
Oct 2/19	Dry				23.8
Apr 8/20	0.18	0.04	0.9	0.007	0.0
Aug 17/20	0.09	0.05	0.3	0.001	14.8
Nov 16/20	0.17	0.05	0.4	0.003	7.0
May 26/21	0.13	0.02	0.25	0.001	0.0
Jul 14/21	Trace	0.05	0.3	Trace	29.0
Oct 4/21	0.06	0.05	0.2	0.001	24.0

Parameter Unit Location/Date	Velocity m/s	Depth m	Width m	Flow m^3/s	Precipitation[1] mm
S-2					
May 7/98	0.60	0.14	0.80	0.07	16.8
Oct 8/98	0.40	0.12	0.70	0.03	14.6
Apr 19/99	0.14	0.10	1.0	0.01	4.6
Oct 18/99	Dry				8.8
Jan 25/00	Dry				1.0
Apr 27/00	0.60	0.15	0.92	0.08	0.0
Oct 26/00	Dry				0.0
Apr 24/01	4.30	0.14	1.5	0.90	1.5
Dec 6/01	0.06	0.20	0.80	0.01	10.4
Apr 18/02	0.20	0.30	1.5	0.09	0.5
Nov 22/02	Frozen	0.30	2.0	---	0.0
April 16/03	0.22	0.62	2.0	0.27	15.0
Oct 23/03	0.01	0.19	0.62	0.00	38.8
Apr.26/04	Stagnant	0.30	1.5	---	6.0
Nov 25/04	0.00	0.31	1.0	0.00	23.5
Apr.5/05	0.43	1.83	0.46	0.36	5.8
Sept. 1/05	Dry				91.9
Nov 29/05	0.68	0.19	1.8	0.23	5.0
Apr 5/06	0.27	0.28	2.0	0.15	22.2
Aug 1/06	0.16	0.12	0.67	0.01	0.0
Oct 30/06	0.50	0.15	0.67	0.05	10.2
Apr 23/07	2.18	0.10	0.70	0.15	0.0
Jul 23/07	0.15	0.04	0.37	0.00	2.2
Oct 29/07	1.89	0.10	0.35	0.07	25.2
May 6/08	0.88	0.70	0.63	0.39	0.4
Nov 3/08	0.00	0.16	1.50	0.00	3.0
May 12/09	0.10	0.17	1.75	0.03	22.0
Jul 29/09	0.00	0.05	1.00	0.00	8.0
Oct 26/09	0.00	0.15	1.15	0.00	23.4
Mar 29/10	0.30	0.11	0.70	0.02	10.0
Aug 23/10	0.24	0.14	0.68	0.02	58.6
Oct 26/10	0.57	0.13	0.94	0.07	6.6
Mar 29/11	0.27	0.10	0.93	0.03	0.0
Aug 22/11	Dry				23.7
Dec 7/11	0.40	0.10	0.60	0.02	31.2
Apr 11/12	0.32	0.05	0.63	0.01	5.6
Oct 30/12	Trace Flow	0.18	2.00	---	0.0
Apr 09/13	0.78	0.19	1.40	0.21	1.8
Jul 30/13	0.00	0.15	1.50	---	1.0
Oct 22/13	Trace Flow	0.075	0.94	---	1.0
24-Apr-14	0.69	0.09	0.43	0.03	11.4
10-Jul-14	0.09	0.09	0.05	0.00	8.8
Oct 8/14	0.20	0.06	0.50	0.01	5.2
May 12/15	0.10	0.10	0.65	0.01	1.0
Jun 23/15	0.04	0.15	1.20	0.01	11.8
Oct 29/15	0.25	0.16	0.60	0.02	28.0
Apr 13/16	0.21	0.15	1.60	0.05	8.4
Aug 17/16	0.13	0.10	0.8	0.01	22.0
Oct 25/16	0.18	0.07	0.7	0.01	5.5
Apr 18/17	0.28	0.18	1.2	0.06	13.6
Jul 17/17	0.22	0.20	0.7	0.03	2.1
31-Oct-17	0.16	0.15	2.1	0.05	46.1
May 22/18	0.11	0.08	0.41	0.00	2.6
Nov 2/18	0.06	0.13	1.5	0.01	26.4
April 11/19	0.54	0.2	1.5	0.16	3.0
Oct 2/19	Dry				23.8
Apr 8/20	0.31	0.1	1	0.03	0.0
Aug 17/20	Dry				14.8
Nov 16/20	Trace Flow	0.02	0.3	Trace	7.0
May 26/21	Dry				0.0
Jul 14/21	Dry				29.0
Oct 4/21	Dry				24.0

1 - accumulated precipitation 2 days prior to sample collection
NA - Not Available
Jan 25/00 sample was taken using an ice fishing drill. The ice was 1 1/2 ft thick.

Table 4.6 - Surface Water Flow Data
North Lancaster Waste Disposal Site

Parameter	Velocity	Depth	Width	Flow	Precipitation[1]
Unit	m/s	m	m	m^3/s	mm
Location/Date					
SW-3					
Apr 19/99	0.45	2.00	15.0	6.75	4.6
Oct 18/99	0.19	1.00	6.0	0.57	8.8
Jan 25/00	Frozen				1.0
Apr 27/00	0.31	1.70	10.0	2.66	0.0
Oct 26/00	0.12	0.32	10.5	0.20	0.0
Apr 24/01	1.20	2.50	15.0	22.50	1.5
Dec 6/01	0.30	1.50	9.0	2.03	10.4
Apr 18/02	0.41	3.50	25.0	17.94	0.5
Nov 22/02	0.13	1.52	8.0	0.79	0.0
April 16/03	0.49	2.00	30.0	14.55	15.0
Oct 23/03	0.45	2.00	15.0	6.75	38.8
Apr.26/04	0.28	0.20	1.0	0.03	6.0
Nov 25/04	0.76	3.50	25.0	33.25	23.5
Apr 5/05	Flooded				5.8
Sept 1/05	0.38	0.33	11.5	0.72	91.9
Nov 29/05	1.03	1.98	15.0	15.30	5.0
Apr 5/06	1.40	0.31	25.0	5.44	22.2
Aug 1/06	0.38	1.80	12.0	4.10	0.0
Oct 31/06	0.23	---	15.0	---	10.2
Apr 23/07	0.37	---	8.0	---	0.0
Jul 23/07	0.83	1.30	14.5	7.82	2.2
Oct 29/07	0.57	0.72	9.0	1.85	25.2
May 6/08	0.81	---	12.0	---	0.4
Nov 3/08	0.27	0.70	0.70	0.07	3.0
May 12/09	0.20	0.74	15.0	1.11	22.0
Jul 29/09	0.11	0.20	15.0	0.17	8.0
Oct 26/09	0.08	0.52	9.0	0.19	23.4
Mar 29/10	0.25	0.60	10.0	0.75	10.0
Aug 23/10	0.07	0.50	9.0	0.16	58.6
Oct 26/10	0.14	0.45	10.0	0.32	6.6
Mar 29/11	0.08	0.31	10.0	0.12	0.0
Aug 22/11	0.2	0.43	5.0	0.22	23.7
Dec 7/11	0.10	1.0	10.0	0.50	31.2
Apr 11/12	0.18	0.44	12.0	0.48	5.6
Oct 30/12	0.14	0.5	8.0	0.26	0.0
Apr 09/13	0.36	1.7	10.0	3.06	1.8
Jul 30/ 13	Trace	0.40	8.0	---	1.0
Oct 22/13	2.90	0.50	8.0	5.80	1.0
24-Apr-14	0.30	0.47	15.0	1.06	11.4
10-Jul-14	0.07	0.49	20.0	0.34	8.8
Oct 8/14	0.28	0.50	6.0	0.42	5.2
May 12/15	---	---	---	---	1.0
Jun 23/15	0.05	3.6	10.0	0.90	11.8
Oct 29/15	0.33	1.5	8.0	1.98	28.0
Apr 13/16	0.25	1.5	10	1.88	8.4
Aug 17/16	0.13	0.5	10	0.31	22.0
Oct 25/16	0.5	0.9	12	2.70	5.5
Apr 18/17	0.33	0.9	18	2.67	13.6
Jul 17/17	0.17	0.65	15	0.83	2.1
31-Oct-17	0.07	0.7	10	0.25	46.1
May 22/18	0.13	0.71	5	0.24	2.6
Nov 2/18	0.16	1.0	4.0	0.32	26.4
April 11/19	0.28	0.46	flooded	---	3.0
Oct 2/19	Trace	0.3	5	---	23.8
Apr 8/20	0.14	1.2	8	0.69	0.0
Aug 17/20	No Flow	0.8	5	---	14.8
Nov 16/20	Trace	1.0	5	Trace	7.0
May 26/21	0.08	1.0	6	0.23	0.0
Jul 14/21	0.09	1.0	5	0.23	29.0
Oct 4/21	Trace	1.0	8	Trace	24.0

Parameter	Velocity	Depth	Width	Flow	Precipitation[1]
Unit	m/s	m	m	m^3/s	mm
Location/Date					
SW-4					
Apr 19/99	0.47	1.50	18.0	6.35	4.6
Oct 18/99	0.13	1.00	6.0	0.39	8.8
Jan 25/00	Frozen				1.0
Apr 27/00	0.42	1.30	11.5	3.11	0.0
Oct 26/00	0.09	0.54	10.3	0.25	0.0
Apr 24/01	1.60	2.50	20.0	40.00	1.5
Dec 6/01	0.39	2.00	19.0	7.41	10.4
Apr 18/02	0.54	3.50	25.0	23.54	0.5
Nov 22/02	0.25	1.52	8.0	1.52	0.0
April 16/03	0.36	2.00	35.0	12.50	15.0
Oct 23/03	0.45	2.00	15.0	6.75	38.8
Apr.26/04	0.28	0.20	1.0	0.03	6.0
Nov 25/04	0.75	3.50	25.0	32.81	23.5
Apr.5/05	Flooded				5.8
Sept. 1/05	0.25	0.31	11.0	0.43	91.9
Nov 29/05	1.11	1.98	15.0	16.48	5.0
Apr 5/06	0.84	0.30	25.0	3.19	22.2
Aug 1/06	0.38	1.80	12.0	4.10	0.0
Oct 31/06	0.76	---	10.0	---	10.2
Apr 23/07	0.37	---	8.0	---	0.0
Jul 23/07	1.14	1.50	14.5	12.40	2.2
Oct 29/07	0.36	0.76	9.0	1.23	25.2
May 6/08	0.94	---	12.0	---	0.4
Nov 3/08	0.19	0.90	8.5	0.73	3.0
May 12/09	0.13	0.62	13.0	0.52	22.0
Jul 29/09	0.08	0.30	15.0	0.18	8.0
Oct 26/09	0.16	0.52	10.0	0.42	23.4
Mar 29/10	0.11	0.43	12.0	0.28	10.0
Aug 23/10	0.13	0.50	9.0	0.29	58.6
Oct 26/10	0.14	0.38	10.0	0.27	6.6
Mar 29/11	0.14	0.33	10.0	0.23	0.0
Aug 22/11	0.15	0.39	5.0	0.15	23.7
Dec 7/11	0.09	1.50	10.0	0.68	31.2
Apr 11/12	0.18	0.44	12.0	0.48	5.6
Oct 30/12	0.14	0.60	8.0	0.34	0
Apr 09/13	0.11	Flooded	10.0	---	1.8
Jul 30/ 13	Trace	0.40	7.0	---	1.0
Oct 22/13	4.40	0.50	8.0	8.80	1.0
24-Apr-14	0.27	0.42	15.0	0.85	11.4
10-Jul-14	0.06	0.4	15.0	0.18	8.8
Oct 8/14	0.33	0.6	6.5	0.65	5.2
May 12/15	0.30	0.4	12.0	0.72	1.0
Jun 23/15	0.05	3.6	12.0	1.08	11.8
Oct 29/15	0.19	1.5	8.0	1.14	28.0
Apr 13/16	0.50	1.5	14.0	5.25	8.4
Aug 17/16	0.13	0.5	8	0.25	22.0
Oct 25/16	0.50	1.05	10	2.63	5.5
Apr 18/17	0.33	0.90	20	2.97	13.6
Jul 17/17	0.21	1.00	12	1.26	2.1
31-Oct-17	0.06	0.72	10	0.22	46.1
May 22/18	0.15	0.68	5	0.25	2.6
Nov 2/18	0.20	0.8	4	0.32	26.4
April 11/19	0.58	0.38	flooded		3.0
Oct 2/19	0	0.3	5	0.00	23.8
Apr 8/20	0.14	1.2	8	0.69	0.0
Aug 17/20	No Flow	0.8	5	---	14.8
Nov 16/20	Trace	1.0	5	Trace	7.0
May 26/21	0.08	1.0	6	0.23	0.0
Jul 14/21	0.09	1.0	5	0.23	29.0
Oct 4/21	0.04	1.0	8	0.18	24.0

1 - accumulated precipitation 2 days prior to sample collection
NA - Not Available
Jan 25/00 sample was taken using an ice fishing drill. The ice was 1 1/2 ft thick.

Table 4.6 - Surface Water Flow Data
North Lancaster Waste Disposal Site

Parameter	Velocity	Depth	Width	Flow	Precipitation[1]
Unit	m/s	m	m	m^3/s	mm
Location/Date					
SW-5					
Jan 25/00	Frozen				1.0
Apr 27/00	0.50	1.70	12.0	5.10	0.0
Oct 26/00	0.24	0.41	11.3	0.56	0.0
Apr 24/01	1.70	2.00	20.0	34.00	1.5
Dec 6/01	0.12	1.50	10.0	0.90	10.4
Apr 18/02	0.50	3.00	20.0	15.00	0.5
Nov 22/02	0.42	1.52	8.0	2.55	0.0
April 16/03	0.36	2.00	35.0	12.50	15.0
Oct 23/03	0.63	2.00	15.0	9.45	38.8
Apr.26/04	0.28	0.20	1.0	0.03	6.0
Nov 25/04	1.22	3.50	25.0	53.38	23.5
Apr.5/05	Flooded				5.8
Sept. 1/05	0.34	0.33	16.0	0.90	91.9
Nov 29/05	1.53	1.98	20.0	30.29	5.0
Apr 5/06	0.12	0.31	40.0	0.75	22.2
Aug 1/06	N/A				0.0
Oct 31/06	0.22	---	10.0	---	10.2
Apr 23/07	0.73	---	8.0	---	0.0
Jul 23/07	1.21	1.00	12.0	7.26	2.2
Oct 29/07	0.35	0.72	9.00	1.13	25.2
May 6/08	0.63	---	12.0	---	0.4
Nov 3/08	0.16	0.9	9.5	0.68	3.0
May 12/09	0.19	0.7	13	0.86	22.0
Jul 29/09	0.07	0.4	15	0.21	8.0
Oct 26/09	0.22	0.43	12	0.57	23.4
Mar 29/10	0.13	0.35	10	0.23	10.0
Aug 23/10	0.13	0.37	11	0.26	58.6
Oct 26/10	0.14	0.37	15.0	0.39	6.6
Mar 29/11	0.11	0.28	12.0	0.18	0.0
Aug 22/11	Trace	0.18	8.0	---	23.7
Dec 7/11	0.16	1.5	9.0	1.08	31.2
Apr 11/12	0.16	0.45	12.0	0.43	5.6
Oct 30/12	0.2	0.4	8.0	0.32	0.0
Apr 09/13	0.37	2.4	10.0	4.44	1.8
Jul 30/13	Trace	0.50	8.0	---	1.0
Oct 22/13	1.80	0.50	7.0	3.15	1.0
24-Apr-14	0.14	0.65	20.0	0.91	11.4
10-Jul-14	0.04	0.51	15.0	0.15	8.8
Oct 8/14	0.38	0.30	7.0	0.39	5.2
May 12/15	0.25	0.30	12.0	0.45	1.0
Jun 23/15	---	---	---	---	11.8
Oct 29/15	0.33	1.5	10.0	2.50	28.0
Apr 13/16	0.33	1.5	10	2.48	8.4
Aug 17/16	0.19	0.4	12	0.46	22.0
Oct 25/16	0.89	1.1	12	5.87	5.5
Apr 18/17	0.33	0.8	25	3.30	13.6
Jul 17/17	0.12	0.83	18	0.90	2.1
31-Oct-17	0.19	0.63	12	0.72	46.1
May 22/18	0.08	0.64	4.5	0.12	2.6
Nov 2/18	0.13	0.50	4	0.13	26.4
April 11/19	Trace	0.2	flooded	Trace	3.0
Oct 2/19	0	0.3	6	0.00	23.8
Apr 8/20	0.14	1.5	10	1.08	0.0
Aug 17/20	Dry				14.8
Nov 16/20	Trace	1.0	5	Trace	7.0
May 26/21	0.10	1.5	8	0.60	0.0
Jul 14/21	nil	0.8	4.5	No Flow	29.0
Oct 4/21	Trace	1.0	6	Trace	24.0

Parameter	Velocity	Depth	Width	Flow	Precipitation[1]
Unit	m/s	m	m	m^3/s	mm
Location/Date					
S-6					
(at Bridge)					
Nov 23/99	0.14	0.81	8.4	0.46	0.60
Jan 25/00	Frozen				1.0
Apr 27/00	0.42	1.50	10.5	3.28	0.0
Oct 26/00	0.09	0.67	8.4	0.26	0.0
Apr 24/01	1.40	1.50	15.0	15.75	1.5
Dec 6/01	0.34	1.50	10.0	2.55	10.4
Apr 18/02	1.20	2.00	12.0	14.40	0.5
Nov 22/02	0.30	1.10	10.0	1.65	0.0
April 16/03	0.82	2.00	35.0	28.63	15.0
Oct 23/03	0.69	2.00	15.0	10.35	38.8
Apr.26/04	0.42	0.20	9.5	0.40	6.0
Nov 25/04	1.85	2.50	25.0	57.81	23.5
Apr.5/05	0.36	2.50	20.0	9.00	5.8
Sept. 1/05	0.29	0.61	15.0	1.33	91.9
Nov 29/05	1.28	N/A	10.0	N/A	5.0
Apr 5/06	1.96	3.00	20.0	58.80	22.2
Aug 1/06	0.31	1.60	10.0	2.48	0.0
Oct 30/06	1.07	---	10.2	---	10.2
Apr 23/07	0.94	---	9.0	---	0.0
Jul 23/07	1.39	3.20	10.7	23.80	2.2
Oct 29/07	0.70	2.05	9.5	6.82	25.2
May 6/08	1.40	1.00	9.5	6.65	0.4
Nov 3/08	0.33	0.77	9.27	1.18	3.0
May 12/09	0.32	0.66	10.77	1.14	22.0
Jul 29/09	0.05	0.53	10.5	0.14	8.0
Oct 26/09	0.35	1.38	9.5	2.29	23.4
Mar 29/10	0.24	0.50	9.65	0.58	10.0
Aug 23/10	0.08	0.31	9.00	0.11	58.6
Oct 26/10	0.24	0.35	9.60	0.40	6.6
Mar 29/11	0.12	0.40	10.0	0.24	0.0
Aug 22/11	0.08	0.36	8.43	0.12	23.7
Dec 7/11	0.35	1.50	10.3	2.70	31.2
Apr 11/12	0.32	0.40	10.0	0.64	5.6
Oct 30/12	0.2	0.75	6.0	0.45	0.0
Apr 09/13	0.75	1.10	15.0	6.19	1.8
Jul 30/13	0.12	0.46	9.0	0.25	1.0
Oct 22/13	3.90	0.75	7.0	10.24	1.0
24-Apr-14	0.56	0.40	11.0	1.23	11.4
10-Jul-14	0.19	0.43	9.7	0.39	8.8
Oct 8/14	0.32	0.50	6.0	0.48	5.2
May 12/15	---	---	---	---	1.0
Jun 23/15	0.25	0.70	8.0	0.70	11.8
Oct 29/15	0.40	1.50	10.0	3.00	28.0
Apr 13/16	0.56	1.50	8.0	3.36	8.4
Aug 17/16	0.12	0.6	7	0.24	22.0
Oct 25/16	0.36	1.3	9	2.11	5.5
Apr 18/17	0.45	0.85	16	3.06	13.6
Jul 17/17	0.21	0.71	16	1.19	2.1
31-Oct-17	0.45	1.50	8	2.70	46.1
May 22/18	0.27	0.61	7	0.58	2.6
Nov 2/18	0.20	0.60	6	0.36	26.4
April 11/19	1.35	0.33	18	4.01	3.0
Oct 2/19	Trace	0.45	5	Trace	23.8
Apr 8/20	0.38	2.00	16	6.11	0.0
Aug 17/20	Trace	1.00	8	Trace	14.8
Nov 16/20	0.38	0.50	6	0.56	7.0
May 26/21	0.09	1.00	6	0.27	0.0
Jul 14/21	0.11	0.50	6	0.16	29.0
Oct 4/21	0.05	0.50	3.5	0.04	24.0

1 - accumulated precipitation 2 days prior to sample collection
NA - Not Available
Jan 25/00 sample was taken using an ice fishing drill. The ice was 1 1/2 ft thick.

Table 4.6 - Surface Water Flow Data
North Lancaster Waste Disposal Site

Parameter	Velocity	Depth	Width	Flow	Precipitation[1]
Unit	m/s	m	m	m^3/s	mm
Location/Date					
S-7					
Apr 18/02	Dry				0.5
Nov 22/02	Dry				0.0
April 16/03	Dry				15.0
Oct 23/03	Dry				38.8
Apr.26/04	Dry				6.0
Nov 25/04	Dry				23.5
Apr.5/05	Dry				5.8
Sept. 1/05	Dry				91.9
Nov 29/05	Dry				5.0
Apr 5/06	Dry				22.2
Aug 1/06	Dry				0.0
Oct30/06	Dry				10.2
Apr 23/07	Dry				0.0
Jul 23/07	Dry				2.2
Oct 29/07	Dry				25.2
May 6/08	Dry				0.4
Nov 3/08	Dry				3.0
May 12/09	Dry				22.0
Jul 29/09	Dry				8.0
Oct 26/09	Dry				23.4
Mar 29/10	Trace	0.02	0.17	---	10.0
Aug 23/10	Dry				58.6
Oct 26/10	Dry				66.0
Mar 29/11	Dry				0.0
Aug 22/11	Dry				23.7
Dec 7/11	Dry				31.2
Apr 11/12	Dry				5.6
Oct 30/12	Dry				
Apr 09/13	0.32	0.08	0.71	0.01	1.8
Jul 30/13	Dry				1.0
Oct 22/13	Dry				1.0
24-Apr-14	Trace	0.04	0.5	---	11.4
10-Jul-14	Dry				8.8
Oct 8/14	0	0.03	0.4	---	5.2
May 12/15	Dry				1.0
Jun 23/15	Dry				11.8
Oct 29/15	Dry	0.05	0.65	---	28.0
Apr 13/16	Trace	0.06	0.7	---	8.4
Aug 17/16	Dry	---	---	---	22.0
Oct 25/16	No Flow	0.16	0.6	---	5.5
Apr 18/17	No Flow	0.05	0.10	---	13.6
Jul 17/17	Dry				2.1
31-Oct-17	Dry				46.1
May 22/18	Dry				2.6
Nov 2/18	No Flow	0.05	0.6	---	26.4
April 11/19	Dry				3.0
Oct 2/19	Dry				23.8
Apr 8/20	Dry				0.0
Aug 17/20	No Flow	0.1	1	---	14.8
Nov 16/20	Dry				7.0
May 26/21	Dry				0.0
Jul 14/21	Dry				29.0
Oct 4/21	Dry				24.0

Parameter	Velocity	Depth	Width	Flow	Precipitation[1]
Unit	m/s	m	m	m^3/s	mm
Location/Date					
S-8					
Apr 18/02	Dry				0.5
Nov 22/02	0	0.13	1.00	0.00	0.0
April 16/03	0	0.31	1.00	0.00	15.0
Oct 23/03	Dry				38.8
Apr.26/04	stagnant	0.20	1.00	---	6.0
Apr.5/05	0.05	0.18	0.76	0.00	5.8
Sept. 1/05	Dry				91.9
Nov 29/05	0.96	0.66	1.50	0.48	5.0
Apr 5/06	0.41	0.16	1.00	0.03	22.2
Aug 1/06	Dry				0.0
Oct30/06	0	0.16	1.34	0.00	10.2
Apr 23/07	0	0.16	0.75	---	0.0
Jul 23/07	0	0.08	1.2	0.00	2.2
Oct 29/07	0	0.14	1.0	0.00	25.2
May 6/08	Dry				0.4
Nov 3/08	0	0.14	0.70	0.00	3.0
May 12/09	0	0.14	0.67	0.00	22.0
Jul 29/09	Dry				8.0
Oct 26/09	Dry				23.4
Mar 29/10	0.27	0.04	0.15	0.00	10.0
Aug 23/10	Trace Flow	0.03	3.00	0.00	58.6
Oct 26/10	Trace Flow	0.05	0.92	0.00	6.6
Mar 29/11	Trace Flow	0.02	0.15	0.00	0.0
Aug 22/11	0	0.01	0.15	0.00	23.7
Dec 7/11	0	0.10	0.5	0.00	31.2
Apr 11/12	Dry				
Oct 30/12	Dry				
Apr 09/13	0.36	0.31	1.3	0.07	1.8
Jul 30/13	Dry				1.0
Oct 22/13	Dry				1.0
24-Apr-14	Trace	0.04	0.47	`---	11.4
10-Jul-14	Dry				8.8
Oct 8/14	0	0.05	0.25	---	5.2
May 12/15	0.2	0.05	0.5	0.01	1
Jun 23/15	Dry				11.8
Oct-29/15	Trace	0.03	0.45	---	28.0
Apr 13/16	Dry	0.05	0.4	---	8.4
Aug 17/16	No Flow	0.04	0.45	---	22.0
Oct 25/16	No Flow	0.04	0.25	---	5.5
Apr 18/17	Trace	0.10	0.20	---	13.6
Jul 17/17	0	0.10	1	---	2.1
31-Oct-17	No Flow	0.03	0.3	---	46.1
May 22/18	Dry				2.6
Nov 2/18	0.09	0.06	0.5	0.001	26.4
April 11/19	0.76	0.15	0.9	0.051	3.0
Oct 2/19	Dry				23.8
Apr 8/20	0.00	0.15	0.85	0.000	0.0
Aug 17/20	Dry				14.8
Nov 16/20	Dry				7.0
May 26/21	Dry				0.0
Jul 14/21	Dry				29.0
Oct 4/21	Dry				24.0

1 - accumulated precipitation 2 days prior to sample collection
NA - Not Available
Jan 25/00 sample was taken using an ice fishing drill. The ice was 1 1/2 ft thick.

Table 4.7a - Surface Water Chemistry
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH		Temp.	ORP	Dissolved Oxygen		Colour	Turbidity	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Nitrite	Nitrate	Total Ammonia	Un-ionized Ammonia	TKN	Total Phosphorus	TOC	Phenols	BOD	COD	SAR	TDS	TSS
PWQO					6.5-8.5														0.30					0.02		0.03		0.001					
			lab	field	lab	field			mg/L	%																							
Location/Date																																	
S-1																																	
May 7/98	310	275	537	528	7.54	7.72	12.1	---	3.90	---	---	---	2.6	11.7	95.3	17.4	3.4	ND	1.09	0.215	ND	ND	ND	0.00	0.21	0.02	4.0	---	2	17	0.080	297	---
Oct 8/98	Not Sampled								---																								
Apr 19/99	287	285	587	596	---	7.24	14.9	---	10.39	---	---	---	3.4	25.0	85.6	17.7	10.2	2.3	0.47	0.066	ND	ND	ND	0.00	0.11	0.01	ND	---	<3	24	0.260	316	---
Oct 18/99	Dry								---																								
Jan 25/00	Dry								---																								
Apr 27/00	262	225	471	463	7.87	8.04	14.3	---	9.25		---	---	3.7	24.1	76.5	17.2	8.5	ND	0.02	ND	ND	ND	ND	0.00	0.12	ND	3.0	ND	ND	4	0.230	265	---
Oct 26/00	Dry								---																								
Apr 24/01	Stagnant								---																								
Dec 6/01	409	403	929	820	7.69	7.40	10.1	---	---	---	---	---	25.3	40.1	122	25.2	25.8	13.7	4.97	0.392	ND	0.7	12.2	0.06	12.7	0.91	29.0	ND	38	104	0.540	514	---
Apr 18/02	277	248	532	470	7.56	9.00	14.8	---	4.19	---	---	---	4.2	31.6	82.8	17.1	4.6	ND	0.02	ND	ND	ND	ND	0.00	0.19	0.01	3.0	ND	ND	11	0.120	289	---
S-1A **18T 538249** **UTM 5011181**																																	
Nov 22/02	270	196	660	552	8.45	---	5.9	---	6.47	---	---	---	48.4	36.0	81.0	16.5	24.7	3.3	0.12	ND	ND	4.0	0.03	0.00	0.45	ND	3.0	ND	ND	5	0.650	345	---
Apr 16/03	218	165	489	350	7.98	8.10	4.2	---	11.25	---	---	---	29.6	17.0	65.2	13.5	15.7	2.4	0.43	ND	ND	2.0	0.23	0.00	0.52	0.03	4.3	ND	ND	15	0.460	252	---
Oct. 23/03	252	222	563	540	8.50	8.90	5.8	---	9.33	---	---	---	32.2	27	75.0	15.7	15.1	3.0	0.052	0.002	ND	4.7	0.01	0.00	0.30	ND	8.0	ND	ND	9	0.410	319	---
Apr.26/04	252	223	529	400	7.98	7.33	7.0	---	10.10	---	---	---	16.3	16	75.4	15.4	9.3	2.1	0.147	0.008	ND	2.0	ND	0.00	0.17	ND	1.8	ND	ND	7	0.260	276	---
Nov 25/04	298	280	568	530	8.12	7.75	4.2	---	---		---	---	25.7	28	89.5	18.0	15.9	4.2	0.246	0.015	ND	1.9	0.02	0.00	1.07	0.20	3.7	ND	ND	25	0.402	355	---
Apr 6/05	231	236	499	420	---	7.02	5.6	---	2.79	---	---	---	16.3	16	67.9	15.0	8.6	2.2	0.053	0.004	ND	1.3	ND	0.00	0.21	ND	2.1	ND	<3	ND	0.245	271	---
Sept 1/05	Dry																																
Nov 29/05	244	210	461	470	8.21	8.24	7.7	---	---	---	---	---	9.4	13	70.6	16.4	7.9	2.1	2.58	0.099	ND	1.0	ND	0.00	0.61	0.13	2.9	ND	<3	15	0.220	250	---
Apr 5/06	239	206	483	370	8.39	7.79	4.5	---	10.30	---	---	---	18.8	13	70.6	15.2	11.4	1.6	0.292	0.009	ND	0.9	ND	0.00	0.17	0.02	1.8	ND	3	6	0.321	257	---
Aug 1/06	297	286	564	520	7.75	7.74	23.6	---	3.76	---	---	---	14.3	8	86.1	19.8	10.0	2.7	1.92	0.177	ND	0.1	ND	0.00	0.64	0.11	6.7	ND	<3	12	0.252	313	---
Oct 31/06	297	296	627	1,195	8.15	8.33	7.9	---	---	---	---	---	13.2	18	89.2	18.0	22.7	3.1	0.107	0.036	ND	0.9	ND	0.00	0.05	ND	2.4	ND	<3	<5	0.572	346	---
Apr 23/07	236	226	491	446	8.20	8.19	20.4	---	---	---	---	---	8.5	16	69.1	15.4	7.5	2.7	0.102	0.015	ND	0.6	ND	0.00	0.08	0.01	2.1	ND	<3	<5	0.212	257	---
Jul 23/07	Dry																																
Oct 29/07	291	290	605	660	8.05	8.02	9.6	---	8.15	---	---	---	17.3	22	86.4	18.1	14.6	2.6	0.064	0.003	ND	0.5	ND	0.00	0.07	ND	3.9	ND	<3	<5	0.373	334	---
May 6/08	236	220	427	450	8.16	8.11	13.0	---	0.57	---	---	---	7.4	12	70.4	14.6	7.5	1.5	0.167	0.030	ND	0.3	0.03	0.00	0.09	ND	1.5	ND	<3	<5	0.213	247	---
Nov 3/08	308	230	649	640	6.48	7.68	1.6	---	2.40	---	---	---	33.4	50	94.1	17.8	26.9	3.7	0.381	0.029	<0.1	1.7	<0.01	0.00	0.23	0.02	2.8	ND	<3	5	0.666	374	---
May 12/09	249	234	471	454	7.62	8.26	13.9	---	9.81	95.8	---	---	12.4	13	73.9	15.7	8.7	1.4	0.317	0.063	ND	0.4	0.01	0.00	0.19	0.02	1.7	ND	<3	<5	0.240	268	---
July 29/09	332	326	616	660	7.11	8.07	18.6	---	6.90	---	---	---	21.1	11	97.5	21.4	14.1	3.8	2.98	0.345	ND	0.4	ND	0.00	0.39	0.07	---	ND	<3	17	0.338	369	82
Oct 26/09	264	270	733	650	7.70	7.76	2.5	---	12.30	---	---	---	39.3	29	82.7	13.8	17.4	3.6	0.142	0.015	ND	1.0	ND	0.00	0.37	0.04	---	ND	<3	23	0.468	352	13
Mar 29/10	232	207	471	470	7.17	7.02	4.4	---	9.08	69.9	---	---	17.8	14	69.1	14.5	10.3	1.9	0.424	0.020	ND	0.9	ND	0.00	0.25	0.02	---	ND	<3	10	0.295	256	9
Aug 23/10	263	234	508	440	7.89	7.41	19.4	147	8.02	82.1	28	348	20.4	15	78.2	16.5	17.7	7.9	6.21	1.39	ND	1.0	ND	0.00	2.42	0.54	---	ND	4	107	0.475	308	330
Oct 26/10	276	273	585	568	7.04	7.40	8.9	---	9.28	80.9	17	2.5	9.6	14	81.8	17.4	8.7	1.9	0.411	0.070	ND	1.4	ND	0.00	0.15	0.01	---	ND	<3	5	0.227	304	11
Mar 29/11	226	235	487	529	6.67	8.20	0.1	---	13.34	92.5	<1	4.5	7.8	12	66.6	14.6	6.2	1.3	ND	0.011	0.2	1.0	ND	0.00	0.05	ND	---	ND	<3	22	0.180	254	3
Aug 22/11	462	274	554	560	6.92	7.39	17.4	184	6.88	72.4	11	> 1000	3.1	22	122.0	37.9	6.1	13.7	51.7	3.780	ND	0.4	0.06	0.00	1	0.69	---	ND	14	199	0.124	371	1,360
Dec 7/11	272	277	610	615	7.95	7.40	4.7	74	11.58	90.5	4	3.4	13.9	18	80.6	17.1	13.2	2.6	0.125	0.016	ND	2.4	ND	0.00	0.18	0.02	---	ND	3	12	0.348	322	3
Apr 11/12	264	244	509	569	8.28	8.20	6.5	2	13.54	111.3	1	3.7	11.4	14	76.6	17.5	8.6	1.9	0.743	0.147	ND	1.0	ND	0.00	0.16	0.03	---	ND	<3	8	0.229	281	9
Oct 30/12	368	301	818	755	8.11	7.74	12.8	-32	7.90	75.0	10	9.1	39.7	36	110	22.5	21.6	5.4	0.070	0.006	ND	9.8	ND	0.00	0.45	0.01	---	ND	<3	25	0.490	460	3
Apr 09/13	216	180	393	466	8.04	8.27	4.3	180	12.23	91.3	11	4.7	10.5	10	64.2	13.5	7.8	2.2	0.219	0.012	ND	1.7	ND	0.00	0.22	0.02	---	ND	<3	16	0.230	224	9
Jul 30/13	322	311	637	707	8.14	7.72	16.0	111	7.51	60.7	9	11.4	15.4	13	95.7	20.1	13.3	3.4	1.19	0.159	ND	1.3	ND	0.00	0.23	0.02	---	ND	3	5	0.323	355	10
Oct 22/13	368	300	557	680	8.09	7.23	10.0	221	8.95	79.8	12	10.1	15.7	15	109	23.0	15.5	4.6	0.297	0.049	ND	2.3	ND	0.00	0.30	0.03	---	ND	<3	10	0.351	374	<3
Apr 24/14	276	221	357	319	8.21	7.89	6.6	---	10.86	88.8	2	2.9	10.1	12	82.0	17.2	8.9	1.8	0.129	0.043	ND	1.2	ND	0.00	0.08	ND	---	ND	<3	6	0.234	270	<3
Jul 10/14	358	287	616	509	8.18	7.82	16.7	6.2	9.02	92.9	12	8.1	9.9	12	106	22.3	10.9	3.5	0.402	0.110	ND	2.0	ND	0.00	0.28	0.04	---	ND	<3	<5	0.251	347	9
Oct 8/14	326	275	649	467	8.31	8.14	13.1	142.2	0.94	9.1	31	7.2	26.7	21	95.1	21.5	20.5	6.8	0.188	0.014	ND	1.8	ND	0.00	0.49	0.02	---	ND	<3	9	0.493	364	4
May 12/15	325	277	637	694	8.41	8.23	13.3	119	14.20	---	13	1.0	27.3	14	96.0	20.7	17.3	3.5	0.091	0.084	ND	1.3	0.01	0.00	0.30	0.03	---	ND	<3	11	0.419	351	5
Jun 23/15	285	274	596	1	7.89	7.40	17.9	233	9.10	95.9	14	9.4	21.6	10	83.9	18.2	14.2	2.4	0.406	0.143	ND	0.4	ND	0.00	0.42	0.03	---	ND	<3	14	0.367	317	6
Oct 29/15	294	263	619	790	7.98	---	9.4	55	9.5	84.6	25	9.7	34.2	17	87.9	18.0	21.6	3.9	0.584	0.177	ND	1.4	ND	0.00	0.32	0.05	---	ND	<3	<5	0.549	347	12
Apr 13/16	231	221	500	332	8.20	7.99	5.6	166	15.5	123.2	6	5.1	15.7	15	68.0	14.9	9.6	2.4	0.088	0.010	ND	3.8	ND	0.00	0.24	ND	---	ND	<3	<5	0.274	275	5
Aug 17/16	305	256	603	500	7.94	6.90	19.3	58	7.91	86.1	10	1.5	14.0	19	91.1	18.8	12.6	1.2	0.044	0.024	ND	9.4	0.02	0.00	0.34	0.01	---	ND	ND	11	0.313	351	ND
Oct 25/16	302	269	661	525	8.02	7.66	9.6	56.2	7.00	61.8	ND	1.4	15.6	18	87.8	20.1	9.9	2.9	0.041	0.016	ND	1.9	ND	0.00	0.23	ND	---	0.003	ND	7	0.249	324	ND
Apr 18/17	254	227	518	329	8.15	7.61	5.1	159.4	13.06	103.0	ND	0.9	12.7	13	74.5	16.5	8.1	1.4	0.028	0.003	ND	3.4	ND	0.00	0.39	ND	---	ND	ND	7	0.222	277	4
Jul 17/17	341	289	616	499	8.14	---	17.1	32.0	8.7	90.0	4	18	8.2	11	99.1	22.7	10.9	2.4	0.586	0.066	ND	4.07	ND	0.00	0.3	0.03	---	ND	<3	8	0.256	328	11
Oct 31/17	225	235	461	308	8.24	7.36	7.6	152.0	9.8	82.0	12	10.3	3.6	7	67.1	14	4.4	2.3	0.064	0.01	ND	0.12	ND	0.00	0.2	0.01	---	ND	<3	<5	0.128	239	19
May 22/18	299	246	578	630	8.28	7.32	12.2	89	12	112	2	4.9	25.1	15	86.0	20.4	15.2	2.3	0.187	0.017	ND	3.76	0.02	0.00	0.3	0.02	---	ND	<3	8	0.383	312	5
Nov 2/18	167	116	350	213	7.98	7.71	5.4	180	8.67	68.8	28	19.8	8.6	39	50.0	10.1	5.0	3.9	0.963	0.013	<0.05	0.07	0.03	0.00	0.5	0.07	---	0.003	3	18	---	180	10
Apr 11/19	256	201	498	314	7.92	7.53	3.1	189	12.5	93.6	3	2.6	17.2	11	74.1	17.1	10.4	1.2	0.198	0.006	<0.05	4.02	0.03	0.00	0.5	0.02	---	0.001	<3	12	---	258	3
Oct 2/19	Dry																																
Apr 8/20	278	227	542	388	8.08	7.79	5.4	148	13.2	102	9	1.4	15.8	13	81.1	18.2	9.3	2.3	0.31	0.017	<0.05	4.12	0.08	0.00	0.6	0.05	---	<0.001	<3	10	---	281	<3
Aug 17/20	349	263	901	760	8.01	7.94	18.2	181	7.79	82.5	26	3.5	91.3	43	109	18.5	62.3	4.1	0.20	0.016	<0.05	3.22	0.02	0.00	0.8	0.07	---	<0.002	<3	17	---	477	6
Nov 16/20	374	288	773	568	8.01	7.62	8.7	214	10.9	95.8	3	1.1	38.3	24	111	23.6	22.4	3.1	1.17	0.175	<0.05	8.28	0.03	0.00	0.9	0.12	---	<0.002	<3	10	---	405	5
May 26/21	393	269	694	672	8.16	7.9	15	73.5	8.94	90.5	4	8.0	25.7	19	116	25.1	18.0	2.6	0.507	0.022	0.1	13.3	0.02	0.00	0.3	0.05	---	<0.002	<3	<5	---	360	34
Duplicate	383	274	700		8.13						5	7.7	25.4	19	113	24.4	17.7	2.6	0.508	0.02	0.1	13.2	0.03	0.00	0.3	0.04	---	<0.002	<3	<5	---	364	31
Jul 14/21	396	295	840	810	8.13	7.97	16.8	163	7.68	79.9	5	5.6	52.7	25	118	24.6	29.5	3.7	0.475	0.031	<0.05	10.1	0.12	0.00	0.4	0.03	---	<0.001	<3	<5	0.645	443	59
Duplicate	409	297	849		8.15						6	29.1	53.5	26	121	25.8	30.9	3.9	0.473	0.032	<0.05	10.2	0.03	0.00	0.5	0.07	---	<0.001	<3	8	0.665	448	108
Oct 4/21	413	312	962	828	8.28	7.91	13.3	124	8.56	81.9	3	4.1	96.2	47	123	25.6	40.6	3.0	0.282	0.009	<0.05	16.5	1.44	0.06	1.7	0.01	---	<0.002	<3	16	0.870	512	5
Duplicate	412	313	958	828	8.26	7.91	13.3	124	8.56	81.9	4	1.9	105	51	123	25.4	40.4	2.9	0.083	0.005	<0.05	18.0	0.01	0.00	0.4	<0.01	---	<0.002	<3	12	0.866	510	<3

PWQO - Provincial Water Quality Objectives

▨ - Indicates exceedence of PWQO

ND - Not Detected

Table 4.7a - Surface Water Chemistry
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH		Temp.	ORP	Dissolved Oxygen		Colour	Turbidity	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Nitrite	Nitrate	Total Ammonia	Un-ionized Ammonia	TKN	Total Phosphorus	TOC	Phenols	BOD	COD	SAR	TDS	TSS
PWQO					6.5-8.5														0.30					0.02		0.03		0.001					
			lab	field	lab	field			mg/L	%																							
Location/Date																																	
S-2 **18T 537394** **UTM 5011781**																																	
May 7/98	274	227	572	556	7.60	7.36	15.5	---	6.91	---	---	---	26.7	37.1	81.3	17.3	21.8	1.8	0.57	0.022	ND	ND	ND	0.00	0.38	0.02	5.0	---	2	33	0.570	323	---
Oct 8/98	330	296	705	572	7.55	7.33	13.3	---	---	---	---	---	39.9	25.2	96.8	21.4	26.8	3.2	0.10	0.014	ND	ND	ND	0.00	0.23	ND	8.0	---	1	24	0.640	391	---
Apr 19/99	256	246	556	584	---	8.05	12.0	---	8.77	---	---	---	18.9	37.5	75.5	16.4	17.4	2.8	0.45	0.024	ND	ND	ND	0.00	0.26	0.01	2.0	---	<3	28	0.470	317	---
Oct 18/99	Dry								---	---																							
Jan 25/00	Dry								---	---																							
Apr 27/00	284	231	558	530	7.72	7.90	9.1	---	---	---	---	---	17.6	38.3	85.5	17.2	18.1	2.9	ND	ND	ND	0.5	ND	0.00	0.29	ND	6.0	ND	ND	12	0.470	320	---
Oct 26/00	Dry								---	---																							
Apr 24/01	277	261	679	420	7.86	9.50	10.8	---	4.35	---	---	---	28.4	40.9	80.9	18.1	25.3	4.1	0.14	ND	0.4	ND	0.02	0.01	0.67	0.01	8.0	ND	5	15	0.660	356	---
Dec 6/01	336	195	778	680	7.79	7.40	9.5	---	---	---	---	---	51.8	97.3	98.1	22.1	25.9	2.5	0.03	ND	ND	4.9	ND	0.00	0.65	0.02	6.0	ND	ND	181	0.610	436	---
Apr 18/02	274	244	614	590	7.57	8.90	19.9	---	4.89	---	---	---	19.0	46.6	81.2	17.2	19.7	ND	ND	ND	ND	ND	ND	0.00	0.49	ND	2.0	ND	ND	14	0.520	330	---
Nov 22/02	170	186	458	380	8.36	---	5.5	---	2.29	---	---	---	7.0	27	50.8	10.4	11.2	0.7	0.41	ND	ND	2.1	0.04	0.00	0.41	0.03	4.6	ND	ND	15	0.370	228	---
Apr 16/03	182	158	442	280	7.84	7.80	0.6	---	11.28	---	---	---	13.7	28	52.6	12.3	17.8	1.9	0.15	ND	ND	1.4	0.32	0.00	0.55	0.02	7.2	ND	ND	29	0.570	228	---
Oct. 23/03	262	192	669	790	8.37	8.50	5.2	---	8.72	---	---	---	41.9	83	75.7	17.7	28.1	2.4	0.100	0.017	ND	2.1	0.04	0.00	0.52	ND	12.0	ND	ND	24	0.760	371	---
Apr.26/04	273	251	631	510	7.94	7.41	5.8	---	9.91	---	---	---	22.0	47	80.4	17.5	23.0	2.6	0.069	0.003	ND	0.4	ND	0.00	0.31	ND	4.7	ND	ND	15	0.600	343	---
Nov 25/04	336	290	695	660	8.16	7.70	4.3	---	---	---	---	---	50.5	81	97.7	22.2	35.4	2.8	0.100	ND	ND	ND	0.05	0.00	0.39	ND	7.0	ND	ND	21	0.840	460	---
Apr 6/05	247	214	545	520	---	6.83	1.0	---	5.55	---	---	---	17.2	42	70.9	17.0	18.1	2.7	0.074	0.006	ND	0.6	ND	0.00	0.32	0.02	3.9	ND	<3	11	0.502	297	---
Sept 1/05	Dry																																
Nov 29/05	318	260	687	860	8.38	7.69	3.2	---	---	---	---	---	30.0	56	90.7	22.2	29.7	2.6	0.067	0.002	ND	0.8	ND	0.00	0.32	0.02	5.2	ND	<3	10	0.726	388	---
Apr 5/06	228	197	465	350	8.40	7.79	1.3	---	10.36	---	---	---	10.4	29	66.1	15.3	15.9	2.1	0.256	0.006	ND	0.5	ND	0.00	0.82	0.10	6.3	ND	<3	19	0.457	258	---
Aug 1/06	346	372	793	760	7.86	8.10	22.2	---	3.84	---	---	---	33.6	27	102	22.1	38.9	3.5	0.117	0.009	ND	ND	ND	0.00	0.46	0.05	13.0	ND	<3	38	0.910	447	---
Oct 30/06	330	312	689	798	7.75	7.80	6.6	---	---	---	---	---	28.6	44	96.5	21.7	29.1	3.4	0.051	0.005	ND	0.3	0.01	0.00	0.79	0.08	5.7	ND	<3	33	0.696	412	---
Apr 23/07	298	282	704	601	8.16	8.05	15.3	---	---	---	---	---	16.8	47	86.1	20.1	22.4	3.6	0.064	0.006	ND	0.3	ND	0.00	0.27	0.02	4.6	ND	<3	10	0.565	367	---
Jul 23/07	352	346	788	735	7.79	7.80	23.0	---	6.67	---	---	---	30.8	54	104	22.1	35.8	3.2	0.033	0.003	ND	0.2	ND	0.00	0.35	ND	14.4	ND	<3	29	0.829	459	---
Oct 29/07	325	303	731	820	7.90	7.72	4.4	---	7.32	---	---	---	36.3	60	93.2	22.4	33.3	2.9	0.025	ND	ND	0.1	ND	0.00	0.22	ND	7.9	ND	<3	40	0.805	430	---
May 6/08	282	260	613	630	8.17	8.13	14.5	---	0.61	---	---	---	16.3	42	83.3	18	24.5	3.1	0.087	0.005	ND	0.2	ND	0.00	0.24	0.01	4.4	ND	<3	33	0.634	346	---
Nov 3/08	293	170	660	638	7.56	7.34	3.1	---	3.64	---	---	---	33	126	87.6	18	24.1	1.9	0.055	0.012	ND	0.3	ND	0.00	0.32	0.02	5.2	ND	<3	13	0.613	395	---
May 12/09	300	284	653	615	7.63	8.24	17.4	---	7.35	79.5	---	---	22.9	49	87.2	19.9	29.3	3.2	0.200	0.012	ND	0.1	0.02	0.00	0.34	0.03	5.3	ND	<3	13	0.737	383	---
July 29/09	337	306	670	692	7.41	7.89	25.5	---	7.80	---	---	---	28.0	30	97.6	22.6	35.3	2.6	5.81	0.418	ND	0.2	ND	0.00	0.90	0.13	---	ND	<3	31	0.837	407	218
Oct 26/09	250	240	725	600	7.82	6.86	8.6	---	---	---	---	---	34.8	69	76.9	14.2	24.6	2.3	0.252	0.011	ND	0.4	ND	0.00	0.41	0.05	---	ND	<3	45	0.675	367	72
Mar 29/10	258	229	568	560	7.37	7.50	3.1	---	9.55	72.6	---	---	18.1	45	74.4	17.6	23.0	2.8	0.047	ND	ND	0.8	ND	0.00	0.23	ND	---	ND	<3	13	0.623	323	<3
Aug 23/10	300	322	696	770	7.85	7.62	16.9	119	7.81	80.9	52	1.6	31.7	26	85.8	20.7	37.0	3.8	0.082	0.003	ND	0.1	ND	0.00	0.50	0.03	---	ND	<3	31	0.929	399	<3
Oct 26/10	306	304	691	679	7.20	7.48	8.9	---	8.37	71.7	24	0.9	21.2	40	87.9	20.9	23.0	3.1	0.038	0.004	ND	0.3	ND	0.00	0.31	0.01	---	ND	<3	10	0.572	380	3
Mar 29/11	307	296	687	717	6.70	8.03	0.7	---	11.20	78.7	4	0.9	17.3	48	87.9	21.1	22.1	3.1	ND	0.004	ND	0.9	0.08	0.00	0.28	ND	---	ND	<3	29	0.549	382	<3
Aug 22/11	Dry																																
Dec 7/11	313	277	702	699	7.94	7.86	3.3	74	10.42	78.6	16	7.6	30.1	53	88.9	22.1	31.9	3.2	0.281	0.007	ND	0.4	ND	0.00	0.22	ND	---	ND	3	13	0.784	398	<3
Apr 11/12	304	283	697	729	8.16	7.86	7.7	116	11.53	96.1	10	3.2	24.7	56	87.0	21.0	28.4	3.1	0.083	0.002	ND	0.5	ND	0.00	0.25	ND	---	ND	<3	<5	0.707	392	6
Oct 30/12	324	285	731	736	8.07	7.90	14.7	---	5.58	53.6	27	3.3	33.4	66	94.6	21.4	32.6	2.6	0.052	0.004	ND	ND	ND	0.00	0.43	0.02	---	ND	<3	<5	0.787	422	13
Duplicate	329	287	727	---	8.05	---	---	---	---	---	24	2.0	33.3	66	95.9	21.7	32.9	2.7	0.063	0.007	ND	ND	ND	0.00	0.35	0.02	---	ND	<3	13	0.790	425	<3
Apr 09/13	226	189	428	530	7.99	8.65	0.5	143	11.76	82.7	17	2.2	8.1	31	65.7	15.0	13.7	2.7	0.072	0.006	ND	0.7	ND	0.00	0.22	0.01	---	ND	<3	14	0.397	252	4
Jul 30/13	282	295	611	600	7.75	7.10	19.6	108	3.80	42.4	11	31.9	14.0	19	83.7	17.7	21.4	1.8	1.24	0.061	ND	ND	ND	0.00	0.50	0.09	---	ND	10	10	0.556	336	76
Oct 22/13	463	335	680	777	8.02	7.69	9.9	115	6.60	58.5	29	59.7	31.7	35	134	31.0	38.0	7.1	12.5	0.645	ND	0.1	0.03	0.00	2.54	0.58	---	ND	<3	74	0.769	492	1070
Apr 24/14	286	235	497	331	8.20	7.88	5.2	---	10.65	84.7	11	0.6	10.2	29	82.9	19.1	17.8	3.0	0.039	0.003	ND	0.5	ND	0.00	0.16	ND	---	ND	<3	6	0.457	305	<3
Jul 10/14	367	313	686	566	8.16	7.78	17.3	1.5	6.65	69.5	24	17.6	18.1	17	107	24.5	32.4	3.3	0.384	0.063	ND	0.1	ND	0.00	0.57	0.08	---	ND	<3	11	0.735	391	24
Oct 8/14	339	278	712	667	8.11	7.71	12.3	125.6	7.33	69.0	96	2	27.4	62	95.6	24.5	33.8	5.5	0.029	0.027	ND	ND	ND	0.00	0.49	0.02	---	ND	<3	21	0.798	416	<3
May 12/15	304	294	673	734	8.42	8.00	15.7	9.0	9.75	---	29	0.7	22.2	35	87.0	21.1	31.3	3.6	0.078	0.008	ND	0.1	0.01	0.00	0.40	0.02	---	ND	<3	16	0.782	377	<3
Jun 23/15	281	307	653	580	7.94	7.54	17.7	159	7.66	80.4	25	2.7	22.0	15	79.8	19.8	29.9	2.8	0.077	0.013	ND	0.1	ND	0.00	0.43	0.04	---	ND	<3	18	0.777	354	<3
Duplicate	295	313	655	580	7.97	7.54	17.7	159	7.66	80.4	28	1.8	22.0	15	83.9	20.8	31.3	3.0	0.090	0.015	ND	0.2	ND	0.00	0.46	0.04	---	ND	<3	15	0.793	365	<3
Oct 29/15	283	243	653	825	7.96	7.35	8.3	46	8.49	73.3	68	2.1	28.9	70	79.6	20.4	35.6	4.7	0.069	0.015	ND	0.3	ND	0.00	0.70	0.02	---	ND	<3	<5	0.920	386	3
Duplicate	278	243	658	825	8.01	7.35	8.3	46	8.49	73.3	76	2.1	28.9	70	78.4	20.0	34.9	4.7	0.088	0.011	ND	0.3	ND	0.00	0.55	0.02	---	ND	<3	<5	0.910	384	<3
Apr 13/16	223	223	497	276	8.20	7.95	0.4	183	19.09	133.6	10	1.1	9.8	33	63.9	15.4	13.5	2.3	0.040	0.002	ND	0.8	ND	0.00	0.26	ND	---	ND	<3	8	0.393	276	3
Aug 17/16	248	182	568	480	8.00	7.01	19.8	79	5.05	53.9	43	1.1	16.2	102	71.7	16.8	29.9	2.4	0.039	0.001	ND	0.4	0.06	0.00	0.69	0.02	---	ND	ND	29	0.826	349	ND
Duplicate	265	180	561	480	8.05	7.01	19.8	79	5.05	53.9	42	1.7	16.0	102	76.4	18.0	31.6	2.6	0.045	0.005	ND	0.3	0.07	0.00	0.78	0.02	---	ND	ND	26	0.846	356	ND
Oct 25/16	270	244	655	424	8.02	6.86	2.9	69	11.85	88.8	25	4.9	24.3	72	75.2	19.8	26.0	2.6	0.048	0.002	ND	0.2	ND	0.00	0.40	ND	---	0.001	ND	19	0.688	367	27
Apr 18/17	225	228	516	312.0	8.18	7.57	3.6	140.9	17.4	134.4	12	0.4	8.4	29	65.3	15.0	13.2	2.4	0.018	0.002	0.2	0.6	ND	0.00	0.46	ND	---	ND	ND	11	0.383	273	3
Jul 17/17	308	310	638	546	8.19	---	18.4	-5.0	7.45	79.4	25	1.4	10.3	13	89.5	20.4	22.8	3.5	0.054	0.014	ND	0.29	<0.01	0.00	0.39	0.07	---	ND	<3	16	0.565	345	<3
Oct 31/17	291	307	653	435	8.27	5.30	7.6	85.0	8.68	72.5	28	1.3	16.2	19	81.2	21.4	22.8	4.2	0.055	0.006	ND	0.13	<0.01	0.00	0.31	0.03	---	ND	<3	22	0.582	349	<3
May 22/18	316	291	650	680	8.26	8.02	15.9	78.0	8.77	88.3	21	61.5	20.8	26	88.2	23.2	27.2	3.7	2.22	0.069	ND	0.05	0.04	0.00	1.1	0.19	---	ND	<3	57	0.666	365	120
Nov 2/18	340	202	720	431	8.05	7.61	5.5	198	8.59	68.4	64	1.3	29.1	125	97.4	23.4	29.3	3.2	0.110	0.013	<0.05	0.05	0.02	0.00	0.6	0.02	---	0.004	<3	36	---	375	8
Apr 11/19	246	221	535	314	7.90	7.4	1.2	217	10.2	71.7	9	0.6	11.8	30	69.9	17.4	13.2	2.3	0.046	0.003	<0.05	0.79	0.03	0.00	0.3	0.02	---	0.001	<3	15	---	277	<3
Oct 2/19	Dry																							0.00									
Apr 8/20	249	208	487	344	8.01	7.49	4.6	160	4.05	31.5	10	1.0	13.6	22	72.5	16.5	12.5	2.5	0.032	0.002	<0.05	0.67	<0.01	0.00	0.2	0.01	---	<0.001	<3	11	---	251	<3
Duplicate	233	208	490	344	8.02	7.49	4.6	160	4.05	31.5	10	1.3	13.7	22	67.8	15.4	11.6	2.3	0.036	0.002	<0.05	0.66	<0.01	0.00	0.2	<0.01	---	<0.001	<3	11	---	254	3
Aug 17/20	Dry																							0.00									
Nov 16/20	343	274	729	531	8.17	7.89	6.4	197	8.45	70.9	23	2.1	42.2	40	100	22.6	30.8	2.4	0.52	0.016	<0.05	<0.05	0.03	0.00	0.4	0.04	---	<0.002	3	14	---	380	19
May 26/21	Dry																																
Jul 14/21	Dry																																
Oct 4/21	Dry																																

PWQO - Provincial Water Quality Objectives

1.09	- Indicates exceedence of PWQO

ND - Not Detected

Table 4.7a - Surface Water Chemistry
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH		Temp.	ORP	Dissolved Oxygen		Colour	Turbidity	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Nitrite	Nitrate	Total Ammonia	Un-ionized Ammonia	TKN	Total Phosphorus	TOC	Phenols	BOD	COD	SAR	TDS	TSS
PWQO					6.5-8.5														0.30					0.02		0.03		0.001					
			lab	field	lab	field			mg/L	%																							
Location/Date																																	
S-3 **18T 537031** **UTM 5012301**																																	
Apr 19/99	202	191	408	430	---	7.83	10.9	---	15.36	---	---	---	10.3	17.2	68.7	7.40	6.3	1.8	0.75	0.046	ND	ND	0.01	0.00	0.54	0.03	9.0	---	1	43	0.190	227	---
Oct 18/99	302	201	620	560	7.80	8.03	11.2	---	---	---	---	---	29.3	83.9	101	12.1	14.1	3.3	0.28	0.007	ND	0.4	ND	0.00	0.79	0.02	15.0	---	3	40	0.350	366	---
Jan 25/00	---	---	588	543	---	---	0.3	---	---	---	---	---	14.8	---	---	---	8.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	370	---
Apr 27/00	217	176	417	395	7.58	7.35	9.3	---	10.39	---	---	---	12.9	21.8	73.8	0.035	9.0	1.5	0.40	0.035	ND	0.7	0.01	0.00	0.70	0.03	12.0	ND	ND	23	0.270	236	---
Oct 26/00	285	263	586	510	7.74	9.20	9.9	---	---	---	---	---	13.8	22.7	94.0	12.2	10.6	3.1	2.40	0.130	ND	0.8	0.14	0.03	1.27	0.10	24.0	---	3	47	0.270	320	---
Apr 24/01	191	179	418	270	7.82	9.10	12.3	---	6.13	---	---	---	9.8	18.9	64.8	7.00	6.9	1.5	0.70	0.026	0.6	ND	0.02	0.00	0.82	0.03	15.0	ND	<3	37	0.220	220	---
Dec 6/01	331	176	704	600	7.70	7.50	8.0	---	---	---	---	---	31.8	115	108	14.8	19.2	3.1	0.21	ND	ND	3.4	0.02	0.00	0.86	0.04	11.0	ND	ND	67	0.460	413	---
Apr 18/02	210	157	418	400	7.49	8.90	19.2	---	4.42		---	---	12.2	35.3	71.2	7.70	7.9	1.7	0.18	0.012	ND	0.8	0.02	0.00	1.04	0.03	15.0	ND	ND	48	0.240	234	---
Nov 22/02	313	178	689	570	8.50	---	3.6	---	6.61	---	---	---	27.7	103	98.8	16.0	17.7	2.1	1.63	0.040	ND	2.6	0.04	0.00	1.14	0.07	9.2	ND	ND	27	0.440	385	---
Apr 16/03	197	136	424	340	7.72	7.90	6.1	---	9.44	---	---	---	14.7	38	65.0	8.35	11.9	2.0	1.32	0.030	ND	1.2	0.38	0.00	0.98	0.06	11.0	ND	ND	25	0.370	227	---
Oct. 23/03	211	160	478	520	8.37	8.50	5.3	---	9.18	---	---	---	17.1	49	69.9	8.94	10.4	3.2	0.612	0.031	ND	2.2	0.02	0.00	1.08	0.06	20.0	ND	2	46	0.310	262	---
Apr.26/04	221	182	457	310	7.85	7.91	6.7	---	9.70	---	---	---	14.8	27	74.7	8.29	8.6	1.3	0.428	0.031	ND	0.4	ND	0.00	0.65	0.03	10.8	ND	1	32	0.250	245	---
Nov 25/04	284	240	552	500	7.82	7.60	5.5	---	---		---	---	19.9	42	86.3	16.6	15.4	3.0	0.917	0.023	ND	1.5	0.03	0.00	0.91	0.09	8.3	ND	ND	28	0.397	334	---
Apr 6/05	254	218	554	510	---	6.84	2.3	---	5.63	---	---	---	15.2	37	71.9	18.2	23.1	3.4	2.56	0.045	ND	0.7	0.02	0.00	0.60	0.15	4.0	ND	<3	15	0.631	302	---
Sept 1/05	237	132	463	490	7.20	7.61	19.0	---	3.61	---	---	---	14.4	92	73.2	13.1	17.6	5.0	1.07	0.048	ND	0.6	0.04	0.00	1.07	0.17	12.1	ND	<3	6	0.498	293	---
Nov 29/05	257	200	496	450	8.14	7.00	3.2	---	---	---	---	---	14.9	35	85.1	10.8	9.9	1.6	0.918	0.044	ND	0.7	ND	0.00	0.64	0.05	11.1	ND	<3	26	0.269	279	---
Apr 5/06	184	150	367	240	8.25	7.69	1.3	---	10.69	---	---	---	11.3	14	61.2	7.49	8.4	1.8	2.09	0.042	ND	0.6	ND	0.00	0.64	0.08	10.0	ND	<3	21	0.271	197	---
Aug 1/06	244	232	504	460	7.70	7.81	25.1	---	3.53	---	---	---	14.4	21	82.4	9.22	10.9	1.9	0.466	0.023	ND	0.2	0.02	0.00	0.97	0.07	20.3	ND	<3	58	0.303	278	---
Oct 31/06	224	198	478	504	8.08	8.07	5.8	---	---	---	---	---	11.5	24	76.2	8.24	17.6	2.7	1.04	0.043	ND	0.8	ND	0.00	0.86	0.07	17.4	ND	<3	25	0.512	264	---
Apr 23/07	204	182	400	381	8.09	7.85	13.3	---	---	---	---	---	8.4	15	68.4	8.05	6.8	1.5	1.10	0.029	ND	0.4	ND	0.00	0.64	0.07	8.4	ND	<3	23	0.207	220	---
Jul 23/07	189	156	388	369	7.67	7.56	24.1	---	5.43	---	---	---	9.3	21	65.1	6.50	7.6	2.4	0.326	0.016	0.1	1.0	ND	0.00	1.13	0.06	15.9	ND	<3	<5	0.240	210	---
Oct 29/07	261	218	513	590	7.77	7.55	5.8	---	7.05	---	---	---	15.1	39	86.0	11.3	11.5	2.3	0.698	0.025	ND	1.4	0.01	0.00	0.79	0.05	14.3	ND	<3	55	0.309	303	---
May 6/08	213	190	388	402	8.22	7.99	14.0	---	0.77	---	---	---	9.1	13	72.6	7.81	7.8	1.2	0.890	0.038	ND	0.3	ND	0.00	0.61	0.08	10.5	ND	<3	47	0.231	227	---
Nov 3/08	246	180	490	514	7.55	7.95	2.5	---	2.45	---	---	---	19.2	41	82.8	9.45	11.5	3.1	0.615	0.020	ND	1.5	0.02	0.00	0.89	0.06	13.8	ND	<3	32	0.319	284	---
May 12/09	203	181	391	405	7.73	6.87	16.4	---	8.06	74.7	---	---	13.1	11	68.9	7.37	8.8	1.8	0.740	0.031	ND	0.6	0.03	0.00	0.98	0.08	13.5	ND	<3	35	0.269	223	---
July 29/09	254	236	509	585	7.25	7.86	24.8	---	6.05	---	---	---	20.8	9	85.0	10.2	12.2	1.4	0.346	0.035	ND	0.2	ND	0.00	0.88	0.05	---	ND	<3	<5	0.332	281	5
Oct 26/09	252	220	586	550	7.96	7.81	6.1	---	7.83	---	---	---	21.7	29	86.6	8.66	17.8	3.2	1.96	0.067	ND	1.2	ND	0.00	1.30	0.17	---	ND	<3	45	0.487	307	61
Mar 29/10	219	185	436	440	7.27	7.28	4.6	---	6.78	68.4	---	---	14.0	19	73.3	8.80	9.6	1.5	0.980	0.027	ND	0.9	0.02	0.00	0.45	0.04	---	ND	<3	34	0.282	242	19
Aug 23/10	236	224	487	560	7.87	7.44	18.6	78	7.22	77.0	54	28.7	15.9	19	76	11.1	11.5	2.6	0.825	0.033	ND	0.8	0.01	0.00	0.81	0.06	---	ND	<3	34	0.327	275	9
Oct 26/10	249	231	512	528	7.26	7.38	7.6	---	9.47	79.9	58	15.9	11.9	19	83.3	9.92	8.2	1.7	1.10	0.032	ND	0.9	ND	0.00	0.73	0.05	---	ND	<3	36	0.226	277	29
Mar 29/11	209	203	449	484	6.81	8.13	0.5	---	12.68	88.3	25	49.4	11.3	13	70.4	7.90	7.2	1.3	0.767	0.031	ND	0.8	0.04	0.00	0.60	0.06	---	ND	<3	38	0.219	237	32
Aug 22/11	241	189	471	460	7.00	7.54	19.7	208	4.76	52.4	32	93.3	15.9	26	74.9	13.0	13.0	3.8	1.97	0.061	ND	0.6	0.01	0.00	0.80	0.07	---	ND	<3	29	0.364	263	61
Dec 7/11	238	199	504	530	7.79	7.45	4.3	74	10.84	83.9	46	30.8	13.2	34	79.4	9.71	9.5	2.2	1.20	0.040	ND	2.0	ND	0.00	0.87	0.08	---	ND	<3	34	0.269	276	27
Apr 11/12	225	199	462	506	8.16	7.86	8.5	95	11.44	95.8	40	58.9	13.9	21	75.1	9.01	8.6	1.4	1.32	0.042	ND	0.5	ND	0.00	0.63	0.07	---	ND	6	31	0.249	250	26
Oct 30/12	287	225	554	607	8.16	8.23	14.3	---	10.02	95.9	80	57.6	18.0	46	96.6	11.2	11.5	1.9	1.25	0.041	ND	0.9	ND	0.00	0.99	0.09	---	ND	<3	54	0.295	324	39
Apr 09/13	184	130	300	330	7.88	7.65	3.8	114	10.98	---	40	81.3	7.5	10	61.7	7.31	7.1	2.8	1.39	0.048	ND	1.0	0.08	0.00	0.79	0.14	---	ND	<3	25	0.228	179	48
Jul 30/13	259	234	511	565	8.04	7.77	22.9	99	5.01	55.0	58	37.4	16.1	15	85.5	10.9	11.9	1.8	1.57	0.093	ND	0.3	ND	0.00	1.16	0.10	---	ND	6	39	0.322	285	69
Oct 22/13	290	245	477	570	8.05	7.51	10.0	165	9.93	88.5	66	16.6	16.0	23	96.8	11.7	12.7	2.9	0.720	0.044	ND	0.6	0.01	0.00	0.87	0.04	---	ND	<3	36	0.324	313	6
Apr 24/14	223	164	361	248	8.11	7.74	6.2	---	9.59	77.5	41	23.9	10.6	11	76.1	7.94	8.9	1.4	0.991	0.043	ND	0.6	ND	0.00	0.59	0.04	---	ND	<3	29	0.260	218	19
Jul 10/14	287	216	536	485	8.22	8.09	22.0	28.8	11.50	128.2	49	7.1	21.7	16	94.4	12.3	17.9	2.0	0.302	0.017	ND	1.1	ND	0.00	0.73	0.05	---	ND	<3	22	0.459	299	6
Oct 8/14	281	228	551	515	8.10	7.78	13.2	138.6	6.82	65.1	54	83.1	24.8	21	89.6	13.9	17.6	4.3	2.19	0.139	ND	0.4	0.03	0.00	0.93	0.14	---	ND	<3	27	0.458	312	47
May 12/15	239	209	543	588	8.38	8.28	16.6	113.4	13.84	---	51	44.3	36.9	15	77.9	10.8	24.1	2.6	1.54	0.068	ND	0.5	0.20	0.01	1.20	0.13	---	ND	<3	33	0.678	296	35
Jun 23/15	243	222	508	540	7.94	7.84	22.4	123	7.86	90.6	54	4.9	22.5	15	80.4	10.2	13.3	1.2	0.228	0.011	ND	0.9	ND	0.00	0.82	0.02	---	ND	<3	36	0.371	280	4
Oct 29/15	276	194	557	731	7.86	---	9.5	75	9.31	80.2	70	54.7	28.5	43	86.0	14.7	18.2	4.0	2.40	0.061	ND	3.9	ND	0.00	1.74	0.20	---	ND	4	<5	0.477	330	36
Apr 13/16	160	162	368	188	8.09	7.84	1.3	117	13	90	29	23.6	12.6	12	53.7	6.23	7.5	1.0	0.278	0.011	ND	1.3	ND	0.00	0.62	0.04	---	ND	<3	18	0.260	196	35
Aug 17/16	191	135	389	360	7.84	6.95	21.0	101	5.42	59.5	58	14.2	12.2	43	58.4	10.9	9.6	2.7	0.546	0.011	ND	1.8	0.10	0.00	0.96	0.12	---	ND	ND	34	0.304	226	6
Oct 25/16	246	175	575	389	7.94	7.47	4.0	83	9.60	80.6	72	8.0	25.5	60	80.9	10.7	14.6	3.0	0.211	0.006	ND	5.2	ND	0.00	1.14	0.05	---	ND	ND	44	0.406	322	8
Apr 18/17	161	153	367	234.7	8.07	7.33	4.9	142.0	---	---	46	7.1	11.4	14	54.9	5.84	6.9	1.0	0.543	0.018	0.2	0.8	ND	0.00	0.64	0.02	---	ND	ND	29	0.236	190	14
Jul 17/17	231	211	477	421.4	8.07	7.36	21.1	-36.0	4.2	47.5	94	4.3	9.1	7	79.5	7.95	8.6	1.3	0.220	0.027	ND	0.47	0.02	0.00	1.25	0.09	---	ND	<3	43	0.246	241	<3
Oct 31/17	252	206	479	266.2	8.27	7.60	8.6	150.9	11.38	98.2	60	37	11.9	15	82.8	10.9	10.8	2.7	1.160	0.069	ND	1.89	0.01	0.00	1.28	0.18	---	ND	<3	52	0.296	259	24
May 22/18	244	201	480	413.2	8.29	8.06	18.0	115.7	6.89	72.9	48	26.9	26.1	14	79.5	11.1	17.6	1.5	0.949	0.065	ND	0.23	0.06	0.00	1.0	0.09	---	ND	<3	36	0.490	272	53
Nov 2/18	267	182	559	359	7.99	7.42	6.6	174	9.24	75.1	45	41.7	29.0	42	81.1	15.5	17.1	3.3	1.35	0.022	<0.05	2.97	0.03	0.00	0.9	0.09	---	0.004	<3	29	---	290	16
Apr 11/19	188	146	373	402	7.77	7.52	2.3	226	11.2	82	35	68.1	13.3	14	62.7	7.71	8.4	1.8	1.83	0.036	<0.05	0.98	0.09	0.00	0.9	0.12	---	0.001	<3	28	---	192	51
Oct 2/19	261	201	526	396	8.10	7.41	13.9	-0.8	5.09	48.9	29	27.4	28.9	24	81.1	14.1	17.2	6.0	0.144	0.11	<0.05	<0.05	0.10	0.00	1.0	0.15	---	<0.002	<3	176	0.464	292	56
Apr 8/20	200	181	377	278	7.92	7.44	6	152	2.93	23.6	43	9.9	12.1	16	68.2	7.23	7.9	1.1	0.425	0.029	<0.05	0.73	0.02	0.00	0.6	0.04	---	<0.001	<3	33	---	194	8
Aug 17/20	255	190	501	451	7.79	7.63	20.9	182.0	0.35	4.0	46	2.9	23.4	25	79.8	13.6	17.4	4.5	0.226	0.143	<0.05	<0.05	0.04	0.00	1.0	0.19	---	<0.002	<3	31	---	259	17
Nov 16/20	311	210	634	224	8.16	8.00	5.1	231	12.4	98.8	41	40.6	29.2	65	102	13.6	16.7	2.4	0.566	0.041	<0.05	0.89	0.09	0.00	2.5	0.55	---	<0.002	5	30	---	329	37
May 26/21	259	230	502	521	8.27	7.06	21.3	67.9	6.21	70.1	56	11.2	17.6	20	84.7	11.5	11.9	0.9	0.432	0.063	0.07	0.07	0.05	0.00	1.0	0.11	---	<0.002	3	35	---	260	13
Jul 14/21	268	223	566	616	7.86	7.53	22.4	38.9	2.55	29.6	29	365	25.8	26	81.4	15.8	16.6	1.4	1.63	0.139	<0.05	0.17	0.09	0.00	1.1	0.17	---	0.001	4	32	0.441	293	380
Oct 4/21	275	225	575	485	7.95	7.67	12.7	129	6.4	60.6	26	31.0	27.1	54	83.2	16.4	13.6	4.7	1.27	0.094	<0.05	1.37	0.31	0.01	4.7	1.51	---	<0.002	6	180	0.357	298	53

PWQO - Provincial Water Quality Objectives

1.09	- Indicates exceedence of PWQO

ND - Not Detected

Table 4.7a - Surface Water Chemistry
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH		Temp.	ORP	Dissolved Oxygen		Colour	Turbidity	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Nitrite	Nitrate	Total Ammonia	Un-ionized Ammonia	TKN	Total Phosphorus	TOC	Phenols	BOD	COD	SAR	TDS	TSS
PWQO					6.5-8.5														0.30					0.02		0.03		0.001					
Location/Date			lab	field	lab	field			mg/L	%																							
S-4 **18T 537096** **UTM 5012336**																																	
Apr 19/99	206	199	424	434	---	7.86	11.1	---	15.86	---	---	---	10.5	17.8	69.4	7.80	6.7	1.9	0.67	0.043	ND	0.2	0.01	0.00	0.52	0.03	9.0	---	1	45	0.200	235	---
Oct 18/99	299	200	618	561	7.82	8.00	11.4	---	---	---	---	---	29.3	83.9	100	12.0	14.1	3.2	0.32	0.007	ND	0.4	ND	0.00	0.80	0.02	17.0	---	3	40	0.350	365	---
Jan 25/00	Frozen																																
Apr 27/00	210	181	418	397	7.52	7.49	9.4	---	10.57	---	---	---	12.8	21.7	71.1	7.90	9.0	1.4	0.45	0.035	ND	0.7	ND	0.00	0.66	0.03	12.0	ND	ND	33	0.270	236	---
Oct 26/00	289	266	588	510	7.67	8.80	9.8	---	---	---	---	---	14.0	22.8	95.0	12.6	10.3	3.2	2.90	0.128	ND	0.8	0.13	0.01	1.24	0.10	18.0	---	4	41	0.260	324	---
Apr 24/01	198	184	429	280	7.85	9.00	12.1	---	5.69	---	---	---	10.3	19.7	66.9	7.50	7.2	1.4	0.94	0.035	0.6	ND	0.02	0.00	0.75	0.03	14.0	ND	<3	31	0.220	227	---
Dec 6/01	338	177	707	570	7.71	7.60	7.8	---	---	---	---	---	32.0	113	110	15.3	12.9	3.0	0.21	0.005	ND	3.4	0.02	0.00	1.08	0.04	11.0	ND	ND	35	0.310	408	---
Apr 18/02	212	158	425	380	7.42	9.00	18.7	---	5.01	---	---	---	12.4	35.7	71.5	8.10	8.1	1.4	0.17	0.008	ND	0.9	0.02	0.01	0.93	0.03	16.0	0.003	ND	44	0.240	236	---
Nov 22/02	317	174	660	570	8.45	---	4.0	---	6.20	---	---	---	26.8	99	99.8	16.5	16.9	2.6	1.65	0.040	ND	2.7	0.03	0.00	0.98	0.07	8.0	ND	ND	30	0.410	369	---
Apr 16/03	201	137	430	340	7.78	7.90	5.4	---	9.71	---	---	---	14.2	36	64.6	9.59	12.4	2.2	2.25	0.040	ND	1.4	0.13	0.00	0.89	0.07	10.1	ND	ND	25	0.380	228	---
Oct. 23/03	214	157	483	520	8.37	8.50	5.3	---	8.92	---	---	---	17.0	49	70.3	9.23	10.6	3.1	0.595	0.021	ND	2.2	0.02	0.00	0.98	0.04	18.0	ND	1	43	0.320	262	---
Apr.26/04	220	189	469	340	7.87	7.49	6.6	---	9.96	---	---	---	14.8	28	73.2	9.12	9.5	1.4	0.461	0.028	ND	0.5	ND	0.00	0.62	0.03	9.6	ND	ND	30	0.280	251	---
Nov 25/04	284	220	515	500	7.79	7.58	5.5	---	---	---	---	---	19.4	41	92.0	13.1	24.6	3.4	1.30	0.042	ND	1.7	0.04	0.00	1.01	0.07	10.5	ND	ND	36	0.636	329	---
Apr 6/05	214	170	457	380	---	6.58	4.7	---	3.98	---	---	---	14.6	27	59.1	14.9	14.9	4.7	1.03	0.318	ND	0.6	0.15	0.00	4.51	2.06	17.1	ND	5	81	0.443	239	---
Sept 1/05	239	132	464	540	7.65	7.64	18.9	---	2.47	---	---	---	14.4	91	74.2	13.1	18.9	5.7	1.03	0.047	ND	0.6	0.04	0.00	1.00	0.16	12.0	ND	<3	12	0.532	295	---
Nov 29/05	257	200	514	650	8.18	6.90	3.8	---	---	---	---	---	13.5	37	83.3	11.9	11.4	1.6	0.660	0.029	ND	0.8	ND	0.00	0.52	0.03	9.5	ND	<3	24	0.310	282	---
Apr 5.06	189	150	373	220	8.23	7.73	1.3	---	10.48	---	---	---	11.2	14	62.1	8.16	8.8	1.9	2.32	0.048	ND	0.6	ND	0.00	0.83	0.12	7.2	ND	<3	24	0.279	200	---
Aug 1/06	260	220	506	450	7.70	7.83	25.2	---	3.55	---	---	---	14.4	21	87.6	9.98	11.7	2.0	0.497	0.025	ND	0.1	ND	0.00	1.00	0.07	20.8	ND	<3	50	0.315	278	---
Oct 31/06	225	199	485	496	8.04	7.94	7.9	---	---	---	---	---	11.5	24	76.2	8.49	17.5	2.7	1.09	0.043	ND	0.8	ND	0.00	0.83	0.07	17.7	ND	<3	26	0.506	265	---
Apr 23/07	203	186	410	380	8.05	7.82	14.4	---	---	---	---	---	8.8	16	67.3	8.53	7.3	1.6	1.48	0.030	ND	0.4	ND	0.00	0.57	0.06	8.1	ND	3	24	0.223	225	---
Jul 23/07	189	159	375	393	7.64	7.48	22.6	---	5.34	---	---	---	9.4	21	64.8	6.66	7.7	2.4	0.333	0.016	ND	1.0	ND	0.00	1.11	0.06	14.4	ND	<3	28	0.242	212	---
Oct 29/07	265	218	520	590	7.70	7.58	5.8	---	7.12	---	---	---	15.6	39	86.1	12.1	12.3	2.3	0.760	0.025	ND	1.4	0.07	0.00	0.76	0.04	14.6	ND	<3	53	0.328	306	---
May 6/08	235	210	467	420	8.19	7.97	14.2	---	0.67	---	---	---	9.6	18	75.1	11.4	10.5	2.0	2.840	0.065	ND	0.5	<0.01	0.00	0.56	0.08	8.8	ND	<3	45	0.299	256	---
Nov 3/08	248	180	499	516	7.58	7.45	2.6	---	2.22	---	---	---	19.3	41	83.0	9.79	11.5	3.1	0.617	0.019	ND	1.5	0.03	0.00	0.84	0.05	13.7	ND	<3	34	0.318	283	---
May 12/09	208	180	393	391	7.66	7.98	15.2	---	7.76	75.5	---	---	13.1	11	70.8	7.64	8.0	1.9	0.652	0.034	ND	0.9	0.02	0.00	0.91	0.06	13.5	ND	<3	32	0.242	226	---
Jul 29/09	255	231	497	530	7.31	7.89	24.8	---	6.45	---	---	---	20.5	10	85.1	10.3	12.2	1.4	0.351	0.031	ND	0.1	ND	0.00	0.84	0.04	---	ND	<3	41	0.333	279	5
Oct 26/09	225	230	579	560	7.95	7.71	5.8	---	8.20	---	---	---	20.8	29	75.5	8.71	12.3	2.8	1.08	0.029	ND	1.3	ND	0.00	0.86	0.08	---	ND	<3	48	0.356	291	57
Mar 29/10	230	196	462	450	7.27	7.50	4.7	---	8.43	66.3	---	---	14.6	24	74.5	10.6	11.8	1.8	1.15	0.028	ND	0.9	ND	0.00	0.48	0.04	---	ND	<3	16	0.339	260	24
Aug 23/10	251	260	570	650	7.79	7.36	17.8	121	9.18	95.6	46	24.0	20.0	20	73.7	16.4	20.9	3.3	0.758	0.016	ND	1.3	ND	0.00	0.54	0.05	---	ND	<3	24	0.574	317	7
Oct 26/10	262	258	587	609	7.31	7.45	9.0	---	9.65	82.0	32	21.2	14.2	26	81.5	14.2	12.3	2.2	0.918	0.024	ND	0.9	ND	0.00	0.58	0.05	---	ND	<3	22	0.330	310	31
Mar 29/11	258	225	504	527	6.87	8.09	0.5	---	12.66	89.0	22	43.0	11.8	20	81.5	13.1	12.0	1.8	1.64	0.036	ND	0.8	0.04	0.00	0.52	0.06	---	ND	<3	36	0.325	280	32
Aug 22/11	228	188	567	480	7.04	7.48	19.7	187	4.62	50.2	37	76.7	15.9	26	70.6	12.6	12.0	3.8	2.49	0.066	0.1	0.6	0.02	0.00	0.70	0.09	---	ND	<3	23	0.347	257	43
Dec 7/11	246	202	508	540	7.79	7.54	4.4	48	10.98	85.0	46	20.0	13.5	34	81.3	10.4	10.4	2.2	0.820	0.023	0.1	2.0	ND	0.00	0.72	0.05	---	ND	3	31	0.288	282	19
Apr 11/12	254	214	501	515	8.20	7.83	7.8	23	11.47	96.0	36	26.1	14.8	26	80.8	12.6	12.6	1.7	0.921	0.039	ND	0.5	ND	0.00	0.53	0.05	---	ND	<3	24	0.343	279	17
Oct 30/12	297	238	571	638	8.17	8.22	13.8	-75	10.3	98.1	50	43.7	17.1	44	93.4	15.4	14.0	2.2	0.829	0.024	ND	0.8	ND	0.00	0.74	0.05	---	ND	<3	35	0.354	332	18
Apr 09/13	182	132	300	371	7.87	7.93	3.7	181	12.54	107.4	23	84.2	7.7	10	61.0	7.17	7.1	2.9	1.47	0.050	ND	1.1	0.08	0.00	0.67	0.15	---	ND	<3	28	0.229	180	48
Jul 30/13	258	245	525	584	8.08	7.66	21.3	100	4.02	39.6	44	32.4	14.2	17	82.6	12.6	12.3	1.6	0.410	0.030	ND	0.3	ND	0.00	0.83	0.10	---	ND	5	33	0.332	289	37
Oct 22/13	278	250	486	609	8.03	7.70	10.1	160	10.08	90.2	58	18.5	15.4	24	89.6	13.1	13.0	2.7	0.740	0.038	ND	0.6	0.01	0.00	0.68	0.03	---	ND	<3	27	0.338	311	7
Apr 24/14	211	166	363	255	8.10	7.75	6.3	---	9.48	77.0	43	19.3	10.5	11	71.0	8.07	8.8	1.3	0.759	0.027	ND	0.6	ND	0.00	0.58	0.04	---	ND	<3	24	0.263	214	20
Jul 10/14	263	215	522	483	8.23	8.03	21.7	26.2	11.00	128.7	50	8.4	21.3	16	86.7	11.2	15.9	1.8	0.274	0.015	ND	1.2	ND	0.00	0.76	0.05	---	ND	3	23	0.427	287	3
Oct 8/14	281	227	543	512	8.12	7.73	13.2	135.1	6.73	64.3	51	120.0	23.5	20	88.1	14.8	17.0	4.4	3.27	0.151	ND	0.6	ND	0.00	1.07	0.19	---	ND	<3	25	0.441	309	96
May 12/15	255	213	551	598	8.36	8.38	16.9	108.7	12.15	---	46	34.1	27.4	22	77.8	14.8	23.7	2.7	2.02	0.058	ND	0.4	0.12	0.01	1.10	0.17	---	ND	<3	41	0.645	301	45
Jun 23/15	248	223	532	520	7.96	7.85	22.3	137	7.79	89.7	52	5.8	22.1	15	81.9	10.4	13.5	1.3	0.237	0.011	ND	1.0	ND	0.00	0.91	0.02	---	ND	<3	35	0.374	283	3
Oct 29/15	286	193	548	706	7.84	---	9.9	94	9.32	80.4	72	57.9	28.6	41	88.5	15.9	19.1	4.2	2.66	0.091	ND	3.7	ND	0.00	1.60	0.19	---	ND	4	<5	0.490	332	51
Apr 13/16	159	163	372	210	8.09	7.78	1.3	152	11.55	86.8	34	12.5	12.6	12	53.3	6.33	7.7	1.0	0.260	0.009	ND	1.3	ND	0.00	0.53	0.02	---	ND	<3	14	0.264	197	12
Aug 17/16	193	140	393	370	7.86	6.80	20.6	92	5.36	58.7	54	22.8	13.4	43	58.6	11.4	11.7	3.1	0.740	0.036	ND	2.0	0.10	0.00	1.02	0.12	---	ND	6	31	0.367	235	11
Oct 25/16	232	184	559	386	7.98	7.50	5.5	81	8.33	66.5	70	8.5	24.0	58	74.3	11.3	13.9	2.7	0.287	0.008	ND	4.9	ND	0.00	0.95	0.05	---	ND	ND	39	0.396	317	10
Apr 18/17	175	158	373	245.0	8.10	7.15	4.8	135	---	---	47	7.5	11.3	14	58.1	7.35	7.8	1.1	0.279	0.01	0.1	0.5	ND	0.00	0.84	0.02	---	ND	ND	22	0.256	197	9
Jul 17/17	229	218	470	418.0	8.04	---	21.2	-11.0	4.43	49.8	94	6.9	9.1	7	78.4	7.98	8.6	1.5	0.290	0.024	ND	0.43	0.05	0.00	1.16	0.08	---	ND	<3	40	0.246	244	6
Oct 31/17	249	208	484	269.9	8.21	7.59	8.8	147.4	10.62	90.7	58	34.4	12.6	15	80.5	11.7	11.1	2.8	1.420	0.088	ND	1.83	0.01	0.00	1.16	0.18	---	ND	<3	50	0.306	260	25
May 22/18	228	212	491	411.3	8.33	8.05	16.8	128.8	8.34	86.4	42	18.7	23.8	15	72.3	11.4	15.4	1.3	0.626	0.045	ND	0.35	0.04	0.00	0.70	0.05	---	ND	<3	25	0.444	267	15
Duplicate	242	212	480	411.3	8.32	8.05	16.8	128.8	8.34	86.4	42	20.2	23.6	15	76.9	12.2	16.6	1.4	0.645	0.049	ND	0.34	0.04	0.00	0.70	0.05	---	ND	<3	23	0.464	274	15
Nov 2/18	194	145	419	269	7.91	7.25	8.5	178	8.56	73.3	44	59.7	15.4	24	54.4	14.1	9.3	2.6	2.05	0.023	<0.05	3.71	0.03	0.00	1.0	0.13	---	0.002	<3	31	---	216	26
Apr 11/19	185	147	378	230	7.78	7.56	1.7	202	9.41	65.5	35	70.7	13.2	14	61.2	7.72	8.3	1.8	1.67	0.034	<0.05	1.00	0.11	0.00	0.8	0.11	---	0.001	<3	28	---	195	44
Oct 2/19	260	222	523	370	8.13	7.59	13.7	60	4.79	46.3	28	26.3	28.9	24	80.5	14.2	16.8	6.1	0.021	0.036	<0.05	<0.05	0.05	0.00	0.7	0.07	---	<0.002	<3	21	0.454	303	82
Apr 8/20	195	159	389	288	7.95	7.39	5.9	153	2.28	18.3	40	10.2	12.1	17	64.9	7.98	8	1.2	0.437	0.024	<0.05	0.74	0.02	0.00	0.6	0.04	---	<0.001	<3	24	---	200	12
Aug 17/20	249	190	500	456	7.76	7.61	21.0	152	6.21	69.7	47	13.5	22.3	25	76.9	13.9	16.6	4.5	0.685	0.167	<0.05	<0.05	0.04	0.00	1.8	0.30	---	<0.002	10	43	---	258	23
Nov 16/20	330	209	628	217	8.20	8.06	5.3	231	12.4	99.4	41	18.2	29.6	65	109	14.1	17.8	2.2	0.627	0.017	<0.05	0.97	0.05	0.00	0.8	0.04	---	<0.002	3	26	---	326	10
May 26/21	267	228	495	530	8.36	7.98	21.8	51.5	7.16	81.7	55	24.5	17.6	20	86.9	12.2	12	0.9	0.511	0.059	0.07	0.09	0.05	0.00	1.1	0.10	---	<0.002	9	35	---	256	19
Jul 14/21	322	225	566	625	7.86	7.48	23	59.1	4.18	48.7	34	21.9	26.1	26	98.2	18.6	20.1	5.3	0.648	0.662	<0.05	<0.05	0.16	0.01	2.7	0.35	---	<0.001	20	88	0.488	293	116
Oct 4/21	247	210	553	466	7.92	7.82	12.7	155	7.54	72.6	30	15.4	29.8	52	75.7	14.0	13.2	4.3	0.438	0.019	<0.05	1.33	0.05	0.00	0.8	0.06	---	<0.002	<3	29	0.366	287	9

PWQO - Provincial Water Quality Objectives
1.09 - Indicates exceedence of PWQO
ND - Not Detected

Table 4.7a - Surface Water Chemistry
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH		Temp.	ORP	Dissolved Oxygen		Colour	Turbidity	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Nitrite	Nitrate	Total Ammonia	Un-ionized Ammonia	TKN	Total Phosphorus	TOC	Phenols	BOD	COD	SAR	TDS	TSS
PWQO					6.5-8.5														0.30					0.02		0.03		0.001					
Location/Date			lab	field	lab	field			mg/L	%																							
S-5 **18T 537620** **UTM 5012289**																																	
Jan 25/00	Frozen																																
Apr 27/00	211	177	416	392	7.54	7.90	9.5	---	10.57	---	---	---	12.9	21.9	71.1	8.10	8.9	1.4	0.10	0.033	ND	0.7	0.01	0.00	0.65	0.03	13.0	---	ND	26	0.270	234	---
Oct 26/00	285	267	585	520	7.45	8.40	10.4	---	---	---	---	---	13.7	22.8	93.9	12.7	10.6	3.2	2.09	0.119	ND	0.8	0.12	0.01	1.22	0.10	20.0	---	3	42	0.270	322	---
Apr 24/01	196	178	280	421	8.90	8.05	12.4	---	5.70	---	---	---	9.9	19.1	66.7	7.20	6.6	1.5	1.16	0.043	0.6	ND	0.02	0.00	0.83	0.04	15.0	ND	<3	34	0.210	222	---
Dec 6/01	330	174	705	650	7.71	7.40	7.8	---	---	---	---	---	31.8	115	108	14.7	13.8	2.9	0.19	ND	ND	3.4	0.01	0.00	1.06	0.03	12.0	ND	ND	40	0.330	406	---
Apr 18/02	216	157	419	380	7.43	8.90	20.0	---	3.74	---	---	---	12.1	34.9	73.6	7.80	6.3	1.2	0.31	0.027	ND	0.8	0.02	0.00	0.95	0.03	15.0	ND	ND	38	0.190	234	---
Nov 22/02	301	174	677	560	8.36	---	3.6	---	5.81	---	---	---	27.7	103	93.8	16.2	18.5	2.0	3.68	0.110	ND	2.6	0.03	0.00	1.12	0.11	9.5	ND	ND	37	0.460	381	---
Apr 16/03	189	138	427	340	7.77	7.90	5.9	---	9.23	---	---	---	14.3	37	62.4	8.01	11.4	1.8	1.17	0.030	ND	1.3	0.16	0.00	0.97	0.06	10.9	ND	ND	33	0.360	224	---
Oct. 23/03	210	160	495	440	8.38	7.90	5.3	---	9.27	---	---	---	16.6	50	68.5	9.36	9.9	3.1	0.692	0.018	ND	2.5	ND	0.00	1.01	0.05	18.0	ND	1	42	0.300	262	---
Apr.26/04	219	185	451	310	7.87	7.39	6.8	---	9.92	---	---	---	14.6	27	73.8	8.37	8.5	1.3	0.511	0.033	ND	0.5	ND	0.00	0.66	0.03	10.5	ND	1	32	0.250	246	---
Nov 25/04	281	220	517	480	7.79	7.65	5.3	---	---	---	---	---	19.5	41	91.4	12.8	24.6	3.4	1.32	0.059	ND	1.8	0.03	0.00	0.90	0.08	10.8	ND	ND	37	0.640	330	---
Apr 6/05	168	140	371	290	---	6.73	3.3	---	2.63	---	---	---	8.9	20	52.1	9.20	13.5	3.1	1.68	0.027	ND	1.1	0.02	0.00	1.89	0.15	5.9	ND	<3	20	0.455	196	---
Sept 1/05	245	144	474	490	7.84	7.67	19.3	---	3.66	---	---	---	15.9	86	76.0	13.5	21.5	4.5	1.33	0.124	ND	0.3	ND	0.00	1.19	0.16	12.3	ND	8	12	0.596	303	---
Nov 29/05	255	200	498	520	8.15	7.97	2.6	---	---	---	---	---	12.1	35	83.7	11.1	9.8	1.6	0.703	0.032	ND	0.9	ND	0.00	0.60	0.04	10.6	ND	<3	30	0.268	276	---
Apr 5/06	133	159	374	270	8.21	7.70	4.3	---	6.62	---	---	---	10.9	20	41.8	7.00	6.7	4.1	10.6	0.171	0.1	1.7	0.11	0.00	2.34	0.67	12.3	ND	<3	46	0.251	200	---
Aug 1/06	242	238	506	460	7.73	7.88	25.7	---	3.68	---	---	---	14.5	21	81.6	9.25	10.9	1.9	0.577	0.025	ND	0.1	0.02	0.00	0.96	0.07	20.5	ND	<3	52	0.305	281	---
Oct 31/06	181	199	435	492	8.05	7.86	6.6	---	---	---	---	---	11.4	24	59.9	7.55	8.1	2.4	0.267	0.047	ND	0.8	ND	0.00	0.91	0.07	12.6	ND	<3	23	0.261	237	---
Apr 23/07	202	185	420	382	7.99	7.91	15.9	---	---	---	---	---	8.5	16	67.1	8.39	6.8	1.6	1.95	0.037	ND	0.4	ND	0.00	0.61	0.07	8.6	ND	<3	23	0.209	224	---
Jul 23/07	192	158	373	383	7.57	7.40	25.7	---	4.67	---	---	---	9.4	21	65.9	6.72	7.7	2.4	0.404	0.017	0.1	1.1	ND	0.00	1.13	0.06	15.6	ND	<3	55	0.242	213	---
Oct 29/07	265	224	544	580	7.71	7.63	7.1	---	7.02	---	---	---	15.1	40	86.9	11.5	11.6	2.2	0.548	0.022	ND	1.4	0.07	0.00	0.77	0.04	13.9	ND	<3	56	0.311	308	---
May 6/08	221	190	404	406	8.21	8.11	16.5	---	0.76	---	---	---	9.2	13	74.9	8.11	8.0	1.3	0.729	0.038	ND	0.3	ND	0.00	0.81	0.09	10.4	ND	<3	50	0.234	232	---
Nov 3/08	251	180	500	517	7.58	7.43	2.6	---	2.29	---	---	---	19.3	42	84.5	9.72	11.6	3.2	0.640	0.020	ND	1.6	0.04	0.00	0.86	0.05	14.0	ND	<3	36	0.319	286	---
May 12/09	201	179	395	387	7.67	8.15	15.7	---	8.42	82.0	---	---	13.3	11	68.3	7.26	8.7	1.8	0.565	0.028	ND	0.6	0.02	0.00	0.91	0.06	13.5	ND	<3	30	0.268	221	---
Jul 29/09	254	236	503	540	7.36	7.68	24.2	---	5.42	---	---	---	20.0	8	84.7	10.3	11.8	1.4	0.336	0.030	ND	0.1	ND	0.00	0.84	0.04	---	ND	<3	43	0.322	279	6
Oct 26/09	227	220	581	550	7.94	7.80	6.3	---	---	---	---	---	22.1	28	77.8	7.80	12.1	2.8	0.630	0.019	ND	1.0	ND	0.00	0.84	0.06	---	ND	7	74	0.350	288	34
Mar 29/10	229	190	443	550	7.37	6.80	4.7	---	8.77	68.2	---	---	14.3	20	76.0	9.47	9.7	1.7	1.41	0.065	ND	1.0	0.01	0.00	0.59	0.05	---	ND	<3	21	0.280	251	23
Aug 23/10	236	224	476	560	7.96	7.77	19.8	19.9	10.48	114.7	46	54.7	15.0	18	74.7	12.1	11.2	2.6	1.42	0.058	ND	0.5	0.03	0.00	0.78	0.07	---	ND	<3	33	0.318	272	13
Oct 26/10	249	231	515	527	7.34	7.45	10.0	---	9.48	80.7	64	28.8	12.1	19	83.0	10.1	8.2	1.7	0.952	0.033	ND	0.9	ND	0.00	0.78	0.06	---	ND	<3	30	0.227	278	29
Mar 29/11	221	214	480	501	6.94	8.08	2.1	---	12.69	90.2	18	89.5	14.1	16	70.5	10.9	9.5	1.2	1.98	0.047	ND	1.8	0.02	0.00	0.66	0.10	---	ND	<3	41	0.279	261	76
Aug 22/11	241	194	474	470	7.10	7.48	20.2	145	5.56	61.6	36	17.1	16.8	25	76.4	12.2	13	3.9	0.686	0.036	ND	0.2	0.02	0.00	0.6	0.03	---	ND	<3	26	0.363	264	10
Dec 7/11	262	201	513	539	7.80	7.64	4.3	86	11.14	86.6	46	54.8	13.3	34	86.6	11.0	10.2	2.7	2.12	0.084	ND	2.2	ND	0.00	1.10	0.14	---	ND	4	41	0.274	288	37
Apr 11/12	232	202	471	515	8.20	7.83	7.8	23	11.24	96.6	43	240	13.9	21	74.7	11.0	8.5	2.2	5.24	0.114	ND	0.6	ND	0.00	0.67	0.11	---	ND	<3	40	0.244	256	192
Oct 30/12	289	227	563	604	8.16	7.74	14.3	---	9.34	91.3	70	46.5	18.0	47	96.9	11.5	11.5	1.9	1.01	0.036	ND	0.9	ND	0.00	0.94	0.06	---	ND	4	47	0.294	327	20
Apr 09/13	181	131	301	365	7.89	7.95	6.7	127	10.74	81.7	47	82.6	7.7	10	60.5	7.35	7.0	2.5	1.37	0.042	ND	1.1	0.08	0.00	0.82	0.14	---	ND	<3	26	0.225	179	53
Jul 30/13	256	235	512	560	8.06	7.78	22.8	112	4.39	52.0	52	11.4	15.3	17	84.4	10.9	10.9	1.8	0.435	0.122	ND	0.6	0.07	0.00	1.04	0.08	---	ND	4	24	0.295	284	31
Oct 22/13	300	247	480	603	8.13	7.96	10.2	135	11.97	106.8	64	18.6	15.9	24	99.8	12.3	13.1	3.2	0.672	0.056	ND	0.6	0.01	0.00	0.80	0.02	---	ND	<3	28	0.328	320	4
Apr 24/14	237	167	365	254	8.11	7.74	6.6	---	9.49	77.5	44	24.2	10.6	11	80.4	8.71	9.5	1.5	1.13	0.038	ND	0.6	ND	0.00	0.61	0.05	---	ND	<3	30	0.269	226	26
Jul 10/14	282	215	539	500	8.26	8.06	22.7	21.2	11.13	129.1	50	7.3	22.4	17	92.1	12.5	18.6	2.2	0.270	0.021	ND	1.1	ND	0.00	0.76	0.05	---	ND	<3	19	0.482	299	3
Oct 8/14	281	229	553	440	8.14	7.78	13.9	---	6.38	61.5	58	88.0	23.7	20	89.3	14.0	17.0	4.3	2.24	0.133	ND	0.4	0.02	0.00	1.01	0.15	---	ND	<3	24	0.442	310	55
May 12/15	241	211	544	594	8.41	8.31	15.0	102.5	14.07	---	51	27.2	34.4	16	78.2	11.0	23.2	2.3	1.07	0.057	ND	0.5	0.19	0.01	1.00	0.09	---	ND	<3	27	0.650	295	24
Jun 23/15	249	220	530	510	7.98	7.91	22.7	134	8.42	97.5	52	4.6	22.5	15	82.2	10.6	13.6	1.3	0.241	0.012	ND	0.9	ND	0.00	0.95	0.02	---	ND	<3	35	0.374	282	<3
Oct 29/15	290	196	564	739.0	7.86	---	9.3	76.0	9.5	82.0	70	68.7	29.6	41	90.3	15.5	19.0	4.0	2.43	0.070	ND	3.9	ND	0.00	1.55	0.18	---	ND	5	<5	0.485	337	68
Apr 13/16	170	161	369	211	8.11	7.83	1.6	179	14.67	104.7	34	14.1	12.4	12	57.0	6.58	8.1	1.0	0.263	0.010	ND	1.3	ND	0.00	0.58	0.03	---	ND	<3	13	0.270	200	14
Aug 17/16	234	173	458	410	7.91	6.91	20.7	98	5.49	60.9	48	13.0	12.3	50	70.4	14.1	12.1	3.5	0.500	0.011	ND	1.4	0.07	0.00	0.85	0.17	---	ND	ND	30	0.345	273	3
Oct 25/16	232	177	578	392	7.98	7.62	2.9	69	11.85	88.8	72	8.1	25.3	60	76.0	10.2	13.8	2.8	0.201	0.006	ND	5.3	ND	0.00	1.14	0.05	---	ND	ND	38	0.394	317	4
Duplicate	236	177	585	392	7.98	7.62	2.9	69	11.85	88.8	78	6.9	25.2	60	77.5	10.4	14.0	2.8	0.212	0.006	ND	5.2	ND	0.00	1.19	0.05	---	ND	ND	42	0.396	319	3
Apr 18/17	159	156	370	245.1	8.11	7.58	6.5	124	10.93	89.2	48	8.7	11.4	14	54.0	5.76	6.7	0.9	0.308	0.012	0.2	0.8	ND	0.00	0.86	0.02	---	ND	ND	25	0.233	191	9
Jul 17/17	246	213	461	426.8	8.04	---	23.0	-7.0	8.75	101.9	80	10.2	9.2	7	83.7	9.02	9.7	1.5	0.388	0.055	ND	0.49	0.06	0.00	1.65	0.16	---	ND	<3	52	0.268	249	4
Oct 31/17	247	207	483	268.7	8.23	7.56	6.7	151.7	10.37	89.5	62	42.2	12.7	15	80.6	11.1	10.6	2.7	1.59	0.09	ND	1.89	0.01	0.00	1.22	0.21	---	ND	<3	51	0.293	258	25
May 22/18	242	202	470	403.4	8.33	7.99	17.3	27.3	7.59	78.2	45	19.7	25.0	15	77.9	11.4	16.2	1.4	0.700	0.064	ND	0.35	0.05	0.00	0.8	0.07	---	ND	<3	34	0.454	269	13
Nov 2/18	270	189	587	366	8.01	7.49	6.5	195	8.91	72.6	46	30.3	30.1	46	81.5	16.1	17.4	4.0	1.08	0.022	<0.05	2.91	0.03	0.00	0.8	0.10	---	0.004	<3	31	---	304	18
Duplicate	278	194	588	366	7.98	7.49	6.5	195	8.91	72.6	39	25.0	31.3	45	84.4	16.2	18.7	3.3	1.01	0.017	<0.05	2.73	0.04	0.00	0.9	0.07	---	0.004	3	27	---	305	18
Apr 11/19	183	150	384	264	7.77	7.43	6.0	209	8.11	65.2	36	37.0	12.8	14	61.0	7.48	8.2	1.8	0.996	0.022	<0.05	1.03	0.10	0.00	0.7	0.09	---	0.001	<3	25	---	198	24
Oct 2/19	266	201	533	311	8.05	7.64	14.0	-63.1	1.55	15.1	30	14.3	28.6	24	81.8	14.9	17.1	6.2	0.030	0.049	<0.05	<0.05	0.06	0.00	0.7	0.07	---	<0.002	<3	23	0.457	294	8
Apr 8/20	183	156	385	284	7.93	7.39	6.1	148	1.97	15.8	43	9.8	12.3	17	61.9	6.77	6.9	1	0.381	0.021	<0.05	0.83	0.02	0.00	0.5	0.03	---	<0.001	<3	24	---	198	11
Aug 17/20	Dry																																
Nov 16/20	352	221	657	236	8.04	7.75	5.6	7.75	11.9	96.8	37	52.4	27.2	73	113.0	17	16.4	3	2.13	0.118	<0.05	0.83	0.08	0.00	2.0	0.29	---	<0.002	3	35	---	341	94
May 26/21	274	230	506	538	8.32	7.96	22.3	61.6	8.49	98.8	55	14.1	17.6	23	88.1	13	11.9	1.4	2.61	0.117	0.07	0.06	0.17	0.02	2.6	0.34	---	<0.002	18	59	---	262	78
Jul 14/21	334	223	571	635	7.83	7.48	23.0	50.9	3.05	35.8	33	284.0	27.4	25	98.0	21.6	20.3	5.7	11.0	2.03	<0.05	0.08	0.17	0.01	7.4	1.45	---	<0.001	21	183	0.484	296	4080
Oct 4/21	255	205	545	478	7.99	7.64	13.9	68.7	7.06	68.5	31	12.5	31.0	55	78.6	14.3	13.6	4.7	0.361	0.017	0.05	1.27	0.05	0.00	0.8	0.06	---	<0.002	<3	31	0.370	282	7

PWQO - Provinci - Indicates exceedence of PWQO
1.09
ND - Not Detected

Table 4.7a - Surface Water Chemistry
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH		Temp.	ORP	Dissolved Oxygen		Colour	Turbidity	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Nitrite	Nitrate	Total Ammonia	Un-ionized Ammonia	TKN	Total Phosphorus	TOC	Phenols	BOD	COD	SAR	TDS	TSS
PWQO					6.5-8.5														0.30					0.02		0.03		0.001					
Location/Date			lab	field	lab	field			mg/L	%																							
S-6																																	
Jan 25/00	---	---	590	610	---	---	0.2	---	---	---	---	---	14.8	---	---	---	8.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	374	---
Apr 27/00	214	176	418	384	7.56	7.80	9.6	---	10.63	---	---	---	12.9	21.8	69.4	8.20	8.9	1.5	0.41	0.034	ND	0.7	ND	0.00	0.65	0.03	12.0	ND	ND	22	0.270	232	---
Oct 26/00	293	257	590	520	7.43	8.20	10.3	---	---	---	---	---	13.9	23.0	95.0	13.4	10.9	3.2	2.50	0.120	ND	0.8	0.12	0.00	1.15	0.10	18.0	---	4	47	0.280	320	---
Apr 24/01	180	177	421	280	7.90	9.00	12.3	---	5.15	---	---	---	10.3	19.1	61.1	6.60	6.7	1.4	0.92	0.065	0.7	ND	0.01	0.00	0.72	0.03	13.0	ND	5	31	0.220	216	---
Dec 6/01	335	176	706	560	7.70	7.80	---	---	---	---	---	---	32.2	115	109	15.3	20.1	3.1	0.25	ND	ND	3.4	0.01	---	0.93	0.04	11.0	ND	ND	79	0.480	416	---
Apr 18/02	217	154	426	410	7.47	9.10	19.0	---	4.57	---	---	---	12.2	35.1	74.0	7.80	6.3	1.0	0.19	0.012	ND	0.9	0.02	0.01	0.87	0.03	16.0	ND	ND	41	0.190	233	---
Nov 22/02	295	166	668	560	8.35	---	3.5	---	6.41	---	---	---	28.3	102	92.8	15.3	19.0	1.3	1.33	0.050	ND	2.4	0.03	0.00	1.15	0.09	9.5	ND	1	29	0.480	370	---
Apr 16/03	188	133	702	320	7.71	7.90	5.8	---	9.72	---	---	---	106	30	64.1	6.67	55.6	4.0	0.45	0.010	ND	0.7	0.41	0.00	1.05	0.09	6.4	ND	ND	28	1.77	350	---
Oct. 23/03	204	158	499	500	8.37	8.20	4.9	---	9.18	---	---	---	16.8	48	67.3	8.73	10.0	3.1	0.779	0.024	ND	2.2	0.06	0.00	1.04	0.05	20.0	ND	1	44	0.300	256	---
Apr.26/04	217	187	460	330	7.93	7.23	6.9	---	10.15	---	---	---	14.5	28	73.2	8.26	8.4	1.3	0.457	0.031	ND	0.4	ND	0.00	0.71	0.03	10.2	ND	ND	34	0.250	247	---
Nov 25/04	285	220	520	480	7.82	7.43	5.3	---	---	---	---	---	19.8	41	93.0	12.8	26.1	3.4	1.48	0.053	ND	1.8	0.03	0.00	1.05	0.08	11.2	ND	ND	36	0.673	332	---
Apr 6/05	142	130	322	220	---	7.02	4.9	---	2.61	---	---	---	8.9	13	47.7	5.55	12.7	3.0	1.39	0.029	ND	0.7	0.05	0.00	0.87	0.12	7.1	ND	<3	22	0.465	168	---
Sept 1/05	220	164	444	460	7.75	7.67	19.7	---	3.16	---	---	---	18.4	47	65.6	13.6	20.1	4.1	1.09	0.060	ND	0.1	ND	0.00	0.84	0.10	11.4	ND	<3	7	0.591	265	---
Nov 29/05	244	190	498	470	8.19	7.27	3.6	---	---	---	---	---	15.0	34	79.7	10.8	11.0	1.7	1.27	0.036	ND	0.8	ND	0.00	0.55	0.04	10.2	ND	<3	26	0.307	271	---
Apr 5/06	132	153	348	230	8.24	7.57	2.0	---	10.50	---	---	---	11.4	14	39.2	8.24	8.8	2.1	3.04	0.059	ND	0.6	0.10	0.00	0.81	0.12	7.5	ND	<3	25	0.333	179	---
Aug 1/06	264	236	506	540	7.71	7.88	24.9	---	3.53	---	---	---	13.2	22	88.9	10.1	10.5	1.9	0.468	0.024	ND	ND	0.03	0.00	0.97	0.07	20.8	ND	<3	55	0.283	287	---
Oct 30/06	230	201	433	507	7.57	7.74	5.6	---	---	---	---	---	11.3	23	78.1	8.60	8.5	2.5	1.09	0.037	ND	0.9	0.03	0.00	0.23	0.01	12.3	ND	<3	12	0.243	258	---
Apr 23/07	206	183	421	387	7.96	7.85	14.4	---	---	---	---	---	8.4	16	69.1	8.09	6.9	1.5	1.04	0.027	ND	0.4	ND	0.00	0.55	0.06	8.4	ND	<3	23	0.210	223	---
Jul 23/07	190	162	377	381	7.57	7.43	19.2	---	4.75	---	---	---	9.2	20	65.0	6.68	7.6	2.3	0.373	0.017	0.1	1.0	ND	0.00	1.11	0.06	13.6	ND	<3	53	0.240	213	---
Oct 29/07	266	216	522	580	7.79	7.56	7.0	---	7.62	---	---	---	15.3	39	87.4	11.5	11.6	2.3	0.862	0.025	ND	1.4	0.04	0.00	0.83	0.05	14.8	ND	<3	58	0.311	303	---
May 6/08	216	200	410	400	8.20	7.98	12.4	---	0.84	---	---	---	9.1	13	73.6	7.88	7.9	1.2	0.654	0.031	ND	0.3	ND	0.00	0.51	0.05	10.3	ND	<3	37	0.233	232	---
Nov 3/08	247	170	503	511	7.60	7.52	2.5	---	2.30	---	---	---	19.5	41	83.1	9.49	11.9	3.2	0.546	0.019	ND	1.5	0.01	0.00	0.85	0.05	13.9	ND	<3	35	0.328	277	---
May 12/09	201	179	428	386	7.66	8.24	15.1	---	8.31	81.2	---	---	13.2	11	68.4	7.29	8.7	1.8	0.555	0.030	ND	0.7	0.02	0.00	0.86	0.07	13.7	ND	<3	32	0.267	222	---
Jul 29/09	255	232	508	532	7.36	7.56	24.0	---	4.06	---	---	---	19.9	9	85.4	10.2	11.8	1.4	0.337	0.029	ND	0.1	ND	0.00	0.85	0.04	---	ND	<3	39	0.321	277	4
Oct 26/09	221	220	579	550	8.10	7.77	5.9	---	8.61	---	---	---	22.3	29	75.8	7.63	11.9	2.7	0.673	0.020	ND	1.2	ND	0.00	0.77	0.05	---	ND	<3	41	0.348	287	13
Mar 29/10	222	187	443	440	7.35	7.30	4.7	---	8.68	67.4	---	---	15.0	20	74.2	8.85	10.0	1.5	0.866	0.026	ND	0.9	ND	0.00	0.50	0.04	---	ND	<3	22	0.291	246	16
Duplicate	221	187	444	440	7.49	7.30	4.7	---			---	---	15.2	20	74.1	8.80	9.9	1.5	0.857	0.026	ND	0.9	ND	0.00	0.50	0.04	---	ND	<3	22	0.290	247	16
Aug 23/10	231	222	469	550	7.99	7.64	19.1	138	9.64	104.3	59	27.7	15.2	16	74.3	11.0	11.2	2.4	0.647	0.028	ND	0.4	0.02	0.00	0.81	0.06	---	ND	<3	33	0.319	265	8
Oct 26/10	247	231	512	516	7.31	7.43	9.4	---	8.49	80.8	52	26.8	12.1	19	82.6	9.91	8.3	1.7	0.915	0.033	ND	0.9	ND	0.00	0.78	0.05	---	ND	<3	31	0.229	277	26
Mar 29/11	210	204	449	488	6.98	8.08	1.0	---	12.82	91.2	29	35.4	11.7	13	70.8	8.01	7.6	1.3	0.731	0.028	ND	0.8	0.03	0.00	0.63	0.05	---	ND	<3	39	0.228	240	20
Duplicate	204	204	449	488	7.07	8.08	1.0	---			30	80.6	11.4	13	68.2	8.16	7.2	1.3	2.33	0.052	ND	0.8	0.04	0.00	0.76	0.10	---	ND	<3	36	0.218	238	60
Aug 22/11	224	199	476	480	7.07	7.48	20.4	160	5.19	57.5	35	17.2	16.8	23	71.0	11.2	12	3.2	0.657	0.032	ND	0.1	ND	0.00	0.6	0.03	---	ND	<3	28	0.348	257	6
Duplicate	225	198	476	480	7.18	7.48	20.4	160			36	20.6	16.8	23	71.3	11.3	12	3.3	0.797	0.038	ND	0.1	ND	0.00	0.6	0.02	---	ND	<3	22	0.350	257	9
Dec 7/11	217	199	502	527	7.86	7.01	3.9	86	10.91	84.7	49	18.4	13.4	34	72.6	8.75	8.7	1.9	0.583	0.019	ND	2.0	ND	0.00	0.67	0.04	---	ND	<3	31	0.258	268	14
Duplicate	236	199	504	---	7.82	---	---	---			47	18.7	13.5	34	78.9	9.48	9.5	2.1	0.563	0.019	ND	2.0	ND	---	0.69	0.04	---	ND	<3	31	0.270	276	10
Apr 11/12	197	203	472	475	8.19	8.14	7.2	102	11.41	93.2	40	26.0	14.4	21	65.9	7.88	7.8	1.2	0.839	0.029	ND	0.5	ND	0.00	0.86	0.05	---	ND	<3	26	0.242	242	15
Duplicate	232	203	475	---	8.23	---	---	---			43	24.6	14.3	21	77.7	9.16	9.1	1.3	0.845	0.032	ND	0.5	ND	---	0.66	0.05	---	ND	<3	23	0.261	257	16
Oct 30/12	286	223	546	605	8.10	8.01	11.9	-59	9.09	84.5	70	63.2	18.4	46	95.9	11.2	11.6	2.0	1.15	0.065	ND	1.0	ND	0.00	0.81	0.06	---	ND	<3	45	0.297	324	36
Apr 09/13	173	125	285	310	7.87	7.65	3.1	121	11.01	82.0	72	82.8	7.3	9	57.6	7.07	6.5	2.5	1.37	0.044	ND	1.0	0.08	0.00	1.06	0.16	---	ND	<3	27	0.216	170	53
Duplicate	174	127	290	---	7.88	---	---	---	---	---	44	88.0	7.4	10	57.7	7.13	6.6	2.5	1.40	0.044	ND	1.0	0.08	---	0.90	0.15	---	ND	<3	24	0.219	172	45
Jul 30/13	253	228	502	562	8.17	7.92	21.8	113	4.31	42.6	12	9.1	15.6	15	84.8	10.1	11.5	1.5	0.311	0.029	ND	0.3	ND	0.00	0.74	0.04	---	ND	4	31	0.315	277	4
Duplicate	249	230	510	---	8.18	---	---	---	---	---	52	13.3	15.6	15	83.1	9.99	11.3	1.5	0.290	0.028	ND	0.3	ND	---	0.71	0.03	---	ND	<3	31	0.313	276	4
Oct 22/13	324	244	487	599	8.15	8.11	9.7	128	12	104.2	68	15.9	16.0	23	108	13.1	13.8	2.9	0.736	0.044	ND	0.6	0.01	0.00	0.92	0.03	---	ND	<3	32	0.334	327	5
Duplicate	270	245	480	---	8.12	---	---	---	---	---	68	15.2	16.1	23	90.1	10.9	11.4	2.2	0.655	0.034	ND	0.6	0.01	---	0.79	0.03	---	ND	<3	32	0.301	304	7
Apr 24/14	209	165	360	255	8.11	7.79	6.90	---	9.02	74.4	43	20.7	10.8	11	71.2	7.52	8.5	1.3	0.904	0.030	ND	0.6	0.01	0.00	0.72	0.06	---	ND	<3	29	0.255	213	21
Duplicate	234	164	355	255	8.13	7.79	6.90	---	9.02	74.4	39	20.7	10.8	11	79.8	8.41	9.4	1.4	1.03	0.037	ND	0.6	ND	0.00	0.48	0.03	---	ND	<3	25	0.266	223	19
Jul 10/14	274	215	543	488	8.20	7.91	21.4	22.7	9.34	107.7	49	8.1	23.3	17	89.5	12.2	19.1	2.1	0.298	0.018	ND	1.3	0.01	0.00	0.77	0.05	---	ND	<3	21	0.503	298	3
Duplicate	278	212	524	488	8.20	7.94	21.40	22.70	9.34	107.7	50	7.8	23.4	17	90.9	12.4	19.5	2.1	0.343	0.019	ND	1.3	0.01	0.00	0.76	0.05	---	ND	<3	20	0.510	299	3
Oct 8/14	275	224	536	553	8.13	---	13.20	93.00	6.59	63.6	52	88.1	21.9	18	87.7	13.7	15.5	3.9	2.060	0.127	ND	0.5	0.03	0.00	0.99	0.14	---	ND	<3	28	0.406	299	42
May 12/15	237	212	542	587	8.37	8.19	11.40	####	12.72	---	52	20.4	34.7	15	77.2	10.7	22.6	2.3	0.997	0.053	ND	0.4	0.23	0.01	1.00	0.08	---	ND	<3	33	0.639	293	15
Jun 23/15	241	221	523	540	7.98	7.84	22.4	123.0	7.86	90.6	58	5.0	22.7	15	79.5	10.3	13.3	1.2	0.259	0.011	ND	0.9	ND	0.00	0.87	0.02	---	ND	<3	29	0.373	279	3
Oct 29/15	285	197	561	733	7.88	---	8.4	47	9.43	81.3	58	64.6	30.2	42	89.1	15.1	19.1	4.1	2.31	0.072	ND	4.0	0.01	0.00	1.56	0.17	---	ND	5	<5	0.492	338	52
Apr 13/16	169	161	366	213	8.12	9.85	1.9	181	16	116	31	14.3	12.7	12	56.8	6.53	8.1	1.0	0.294	0.009	ND	1.3	ND	0.00	0.46	0.03	---	ND	<3	11	0.270	200	13
Aug 17/16	218	177	437	400	7.88	6.83	20.8	112	4.53	50.5	48	12.7	13.0	47	66.6	12.5	12.3	3.0	0.426	0.018	ND	1.5	0.10	0.00	0.86	0.12	---	ND	ND	27	0.363	268	3
Oct 25/16	249	195	581	392	7.97	7.56	4.2	80	6.98	53.9	76	7.6	25.4	60	81.8	10.9	14.8	3.0	0.236	0.006	ND	5.3	ND	0.00	0.97	0.04	---	ND	ND	42	0.407	336	3
Apr 18/17	170	156	370	249.3	8.11	7.64	7.0	145.7	10.71	87.8	51	8.8	11.4	14	57.6	6.22	7.4	1.0	0.351	0.013	0.2	0.8	ND	0.00	0.76	0.02	---	ND	ND	27	0.247	196	12
Duplicate	160	156	368	---	8.10	---	---	---	---	---	53	8.9	11.4	14	54.4	5.85	6.9	1.0	0.330	0.012	0.2	0.8	ND	0.00	0.75	0.02	---	ND	ND	27	0.237	191	10
Jul 17/17	233	213	464	425	8.07	---	21.7	4.0	5.06	57.6	90	4.3	9.2	7	79.8	8.09	8.7	1.3	0.201	0.027	ND	0.48	0.05	0.00	1.14	0.08	---	ND	<3	40	0.249	243	<3
Duplicate	236	214	462	---	8.07	---	---	---	---	---	88	4.1	9.2	7	80.9	8.21	8.8	1.4	0.208	0.028	ND	0.48	0.05	0.00	1.16	0.07	---	ND	<3	48	0.25	245	<3
Oct 31/17	245	205	482	485	8.2	5.82	8.8	80.0	8.1	69.7	58	45.2	12.8	15	79.7	11.2	10.7	2.8	1.8	0.097	ND	1.92	0.02	0.00	1.21	0.21	---	ND	<3	52	0.297	257	42
Duplicate	253	230	481	---	8.2	---	---	---	---	---	60	43.3	12.7	15	82.5	11.3	10.9	2.8	1.78	0.096	ND	1.92	0.02	0.00	1.18	0.29	---	ND	<3	51	0.298	275	44
May 22/18	228	205	494	530	8.32	7.08	17	87	12	129	49	22.6	26.4	15	74.0	10.4	16.1	1.4	0.664	0.052	ND	0.29	0.04	0.00	0.8	0.06	---	ND	<3	31	0.464	266	16
Nov 2/18	287	193	595	376	8.02	7.52	6.6	187	8.25	67.2	41	26.2	31.3	45	87.3	16.8	19.5	3.4	1.06	0.018	<0.05	2.74	0.03	0.00	0.9	0.07	---	<0.002	<3	27	---	309	14
Apr 11/19	183	149	381	236	7.79	7.35	3.1	192	10.5	78.8	36	64.2	13.6	14	60.5	7.62	8.4	1.8	1.47	0.032	<0.05	1.07	0.16	0.00	0.8	0.11	---	0.001	<3	32	---	196	41
Duplicate	186	148	381	236	7.79	7.35	3.1	192	10.5	78.8	36	61.2	13.4	14	61.6	7.72	8.4	1.8	1.76	0.036	<0.05	1.01	0.16	0.00	0.9	0.11	---	0.002	<3	35	---	196	43
Oct 2/19	271	198	528	390	8.04	7.74	13	84.4	5.27	50.1	29	10.8	29.6	23	82.9	15.5	18.0	6.5	0.020	0.036	<0.05	<0.05	0.05	0.00	0.7	0.07	---	<0.002	<3	23	0.476	295	6
Duplicate	270	201	527	390	8.06	7.74	13	84.4	5.27	50.1	29	11.0	29.5	23	82.2	15.7	18.2	6.6	0.021	0.042	<0.05	<0.05	0.07	0.00	0.7	0.06	---	<0.002	<3	20	0.482	296	7
Apr 8/20	189	155	383	280	7.94	7.55	6.2	140	13.5	111	44	8.7	12.1	16	64.2	6.89	7.5	1.0	0.393	0.022	<0.05	0.71	0.02	0.00	0.5	0.04	---	<0.001	<3	27	---	197	11
Aug 17/20	252	188	484	433	7.93	7.87	21.5	169	2.68	30.5	39	3.3	21.5	21	78.8	13.4	15.9	3.0	0.18	0.026	<0.05	<0.05	0.03	0.00	0.7	0.08	---	<0.002	<3	29	---	250	3
Nov 16/20	306	210	625	444	8.19	8.03	4.7	199	13.1	104	41	17.6	29.1	65	101	13	16.5	2.1	0.601	0.023	<0.05	0.93	0.04	0.00	0.8	0.03	---	<0.002	<3	22	---	324	24
Duplicate	325	210	629		8.21						41	18.2	29.1	65	107	13.9	16.9	2.1	0.583	0.017	<0.05	0.92	0.04	0.00	0.8	0.04	---	<0.002	<3	25	---	326	12
May 26/21	266	227	500	522	8.33	7.82	21.1	71.8	4.7	53.3	52	11.8	18.3	21	87.5	11.6	12.0	0.9	0.621	0.07	0.08	0.09	0.05	0.00	0.9	0.10	---	<0.002	6	21	---	259	14
Jul 14/21	255	222	569	626	7.88	7.51	22.7	156	4.47	52.1	32	3.6	28.2	26	77.6	14.8	18.0	0.8	0.121	0.029	<0.05	0.08	0.06	0.00	0.7	0.05	---	<0.001	<3	23	0.491	295	3
Oct 4/21	243	208	547	465	7.94	7.29	11.9	119	3.77	34.9	32	14.8	32.7	58	75.0	13.5	13.0	4.5	0.426	0.017	0.06	1.23	0.05	0.00	0.8	0.05	---	<0.002	<3	35	0.363	283	8

PWQO - Provincial Water Quality Objectives
1.09 - Indicates exceedence of PWQO
ND - Not Detected

Table 4.7a - Surface Water Chemistry
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH		Temp.	ORP	Dissolved Oxygen		Colour	Turbidity	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Nitrite	Nitrate	Total Ammonia	Un-ionized Ammonia	TKN	Total Phosphorus	TOC	Phenols	BOD	COD	SAR	TDS	TSS
PWQO					6.5-8.5														0.30					0.02		0.03		0.001					
			lab	field	lab	field			mg/L	%																							
Location/Date																																	
S-7																																	
Apr 18/02	Dry																																
Nov 22/02	Dry																																
Apr 16/03	Dry																																
Oct. 23/03	Dry																																
Apr.26/04	Dry																																
Nov 25/04	Dry																																
Apr 6/05	Dry																																
Sept 1/05	Dry																																
Aug 1/06	Dry																																
Oct 31/06	Dry																																
Apr 23/07	Dry																																
Jul 23/07	Dry																																
Oct 29/07	Dry																																
May 6/08	Dry																																
Nov 3/08	Dry																																
May 12/09	Dry																																
Jul 29/09	Dry																																
Oct 26/09	Dry																																
Mar 29/10	310	143	914	810	7.54	7.75	5.8	---	9.21	72.0	---	---	181	40	90.4	20.4	92.5	3.4	1.74	0.075	ND	0.2	0.05	0.00	0.51	0.09	---	ND	<3	21	2.29	516	26
Aug 23/10	Dry																																
Oct 26/10	Dry																																
Mar 29/11	Dry																																
Aug 22/11	Dry																																
Dec 7/11	Dry																																
Apr 11/12	Dry																																
Oct 30/12	Dry																																
Apr 09/13	171	138	289	330	8.11	8.90	4.7	112	11.93	95.6	28	12.5	3.7	12	54.0	8.71	3.1	1.5	0.203	0.008	ND	0.1	ND	0.00	0.07	ND	---	ND	<3	8	0.103	166	10
Jul 30/13	Dry																																
Oct 22/13	Dry																																
Apr 24/14	368	221	679	502	8.17	7.79	9.6	---	7.41	65.5	15	13.7	53.3	73	105	25.5	17.7	3.1	0.115	0.145	ND	0.3	0.05	0.00	0.46	0.04	---	ND	<3	18	0.403	412	8
Jul 10/14	Dry																																
Oct 8/14	287	114	626	573	7.93	7.56	13.5	100	7.14	69.9	30	17	112	28	86.0	17.5	10.9	6.0	0.330	0.009	ND	ND	ND	0.00	0.66	0.05	---	ND	8	18	0.280	328	29
May 12/15	Dry																																
Jun 23/15	Dry																																
Oct 29/15	217	134	509	652	7.91	---	10.0	77	10.33	92.6	47	29.2	73.7	18	69.4	10.5	8.1	5.8	0.213	0.005	ND	ND	0.01	0.00	0.37	0.03	---	ND	<3	<5	0.241	266	25
Apr 13/16	471	245	1260	715	8.14	7.76	4.8	189	8.66	67.5	17	17.0	238	41	143	27.5	55.5	2.6	0.027	0.002	ND	0.2	ND	0.00	0.31	ND	---	ND	<3	5	1.11	655	30
Duplicate	437	242	1310	715	8.13	7.76	4.8	189	8.66	67.5	17	15.3	244	40	133	25.5	51.5	2.5	0.047	0.002	ND	ND	ND	0.00	0.34	0.03	---	ND	<3	5	1.07	641	15
Aug 17/16	Dry																																
Oct 25/16	237	214	504	342	8.01	7.56	3.2	78	5.13	38.4	31	5.6	24.0	13	72.5	13.6	9.0	3.3	0.090	0.024	ND	ND	0.01	0.00	0.31	0.03	---	ND	ND	21	0.254	264	ND
Apr 18/17	352	218	946	838	8.32	7.79	18.3	147.7	6.84	72.8	25	78.7	153	40	110	18.8	25.0	3.6	2.03	0.022	ND	ND	ND	0.00	0.72	0.01	---	ND	ND	17	0.58	483	135
Jul 17/17	Dry																																
Oct 31/17	Dry																																
May 22/18	Dry																																
Nov 2/18	229	129	479	260	8.14	7.88	5.3	173	10.4	81.5	29	8.2	47.6	29	72.0	11.8	8.3	4.7	0.239	0.006	<0.05	<0.05	0.03	0.00	0.5	0.02	---	<0.002	<3	20	---	248	17
Apr 11/19	Dry																							0.00									
Oct 2/19	Dry																							0.00									
Apr 8/20	Dry																							0.00									
Aug 17/20	240	66	504	418	7.78	8.08	23.1	173	2.54	29.7	41	26.4	100	16	76.4	12	8.2	4.4	0.657	0.027	<0.05	0.06	0.03	0.00	0.6	0.13	---	<0.002	<3	27	---	261	21
Duplicate	246	62	482		7.80						39	42.9	98	13	78.6	12	8.2	4.5	0.669	0.028	<0.05	0.06	0.03	0.00	0.6	0.13	---	0.002	<3	25	---	249	21
Nov 16/20	Dry																																
May 26/21	Dry																																
Jul 14/21	Dry																																
Oct 4/21	Dry																																

PWQO - Provincial Water Quality Objectives
▨ - Indicates exceedence of PWQO
ND - Not Detected

Table 4.7a - Surface Water Chemistry
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH		Temp.	ORP	Dissolved Oxygen		Colour	Turbidity	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Nitrite	Nitrate	Total Ammonia	Un-ionized Ammonia	TKN	Total Phosphorus	TOC	Phenols	BOD	COD	SAR	TDS	TSS
PWQO					6.5-8.5														0.30					0.02		0.03		0.001					
			lab	field	lab	field			mg/L	%																							
Location/Date																																	
S-8 **18T 538117** **UTM 5012217**																																	
Apr 18/02	Dry									---																							
Nov 22/02	138	106	404	310	8.27	---	3.4	---	4.17	---	---	---	40.3	11	41.8	8.16	20.3	ND	0.38	ND	ND	0.1	0.03	0.00	0.26	0.04	3.7	ND	ND	14	0.750	186	---
Apr 16/03	192	131	434	660	7.79	7.80	3.5	---	4.47	---	---	---	15.1	37	62.7	8.61	11.7	2.2	2.68	0.040	ND	1.3	0.20	0.00	1.07	0.07	11.2	ND	ND	33	0.370	222	---
Oct. 23/03	Dry																																
Apr.26/04	435	270	1,420	1,110	7.75	7.19	7.6	---	5.95	---	---	---	250	56	140	20.9	109	2.4	0.379	0.045	ND	ND	0.03	0.00	0.59	0.06	4.5	ND	1	16	2.27	738	---
Nov 25/04	250	200	704	650	7.97	7.81	3.8	---	---		---	---	91.7	50	82.8	10.6	65.8	4.0	0.576	0.015	ND	0.2	ND	0.00	0.45	0.09	4.5	ND	ND	16	1.81	419	---
Apr 6/05	201	206	516	460	---	7.01	4.9	---	2.46	---	---	---	37.0	15	62.7	10.8	25.8	2.0	0.074	0.006	ND	0.3	ND	0.00	0.31	0.04	3.5	ND	<3	7	0.792	276	---
Sept 1/05	Dry																																
Nov 29/05	175	150	452	540	8.33	8.95	3.3	---	---	---	---	---	46.7	8.0	51.6	11.3	21.0	1.0	0.410	0.005	ND	0.2	ND	0.00	0.33	0.07	3.8	ND	<3	7	0.690	228	---
Apr 5/06	221	173	595	440	8.31	8.08	3.7	---	10.78	---	---	---	74.1	14	67.8	12.5	37.1	1.0	0.195	0.003	ND	0.1	ND	0.00	0.15	0.01	1.9	ND	<3	50	1.09	310	---
Aug 1/06	Dry																																
Oct 30/06	234	238	421	487	7.99	8.27	5.5	---	---		---	---	3.1	12	70.4	14.0	3.40	1.2	0.081	ND	ND	ND	ND	0.00	0.11	0.01	4.0	ND	<3	7	0.097	247	---
Apr 23/07	458	290	1,450	1,359	7.85	7.83	15.7	---	---		---	---	279	68	139	26.9	111	2.4	0.148	0.017	ND	0.4	ND	0.00	0.24	0.03	4.5	ND	<3	10	2.27	802	---
Jul 23/07	363	264	1,090	1,051	7.69	7.74	20.6	---	3.92	---	---	---	176	33	112	20.0	88.6	2.6	0.074	0.004	ND	0.2	ND	0.00	0.46	0.05	5.4	ND	<3	21	2.02	593	---
Oct 29/07	363	284	1,120	1,230	7.61	7.46	4.8	---	7.62	---	---	---	173	46	107	23.1	84.5	2.5	0.153	0.005	ND	0.2	ND	0.00	0.17	0.06	3.4	ND	<3	21	1.93	608	---
May 6/08	Dry																																
Nov 3/08	303	260	893	953	7.60	7.13	2.7	---	2.16	---	---	---	129	37	97.7	14.3	77.8	1.8	0.107	0.007	ND	0.1	ND	0.00	0.24	0.08	2.6	ND	<3	11	1.94	511	---
May 12/09	513	290	1780	1,660	7.56	8.20	21.4	---	6.92	78.9	---	---	336	60	159	28	152	1.8	0.323	0.017	ND	0.2	0.02	0.00	0.31	0.04	1.5	ND	<3	9	2.92	910	---
Jul 29/09	Dry																																
Oct 26/09	Dry																																
Mar 29/10	230	176	527	580	7.57	7.68	5.9	---	7.73	61.5	---	---	54.8	16	69.1	13.9	20.8	1.2	0.602	0.007	ND	0.2	0.02	0.00	0.22	0.04	---	ND	<3	8	0.596	282	18
Aug 23/10	321	195	794	800	7.77	7.40	19.8	134	8.24	92.7	22	13.3	89.5	107	93.0	21.4	38.6	2.6	0.299	0.008	ND	0.4	ND	0.00	0.27	0.04	---	ND	<3	18	0.938	471	6
Oct 26/10	262	244	546	539	7.52	7.96	9.9	---	10.93	97.4	20	8.3	19.2	21	75.7	17.7	9.2	1.5	0.416	0.009	ND	0.1	ND	0.00	0.24	0.05	---	ND	<3	9	0.249	292	16
Mar 29/11	198	209	432	459	7.03	8.24	0.5	---	13.03	91.1	8	18.9	9.3	9	57.6	13.0	8.2	0.9	1.22	0.015	ND	0.1	ND	0.00	0.21	0.04	---	ND	<3	27	0.253	225	18
Aug 22/11	467	260	1000	960	7.21	7.56	23.3	144	5.55	65.4	14	30.7	71.8	172	140	28.8	45.9	2.1	0.448	0.011	ND	0.2	0.05	0.00	0.30	0.02	---	ND	6	23	0.923	617	103
Dec 7/11	294	194	665	781	7.81	7.03	3.5	84	11.54	87.7	28	24.4	61.7	58	84.5	20.1	31.6	2.1	0.558	0.006	ND	0.3	ND	0.00	0.32	0.06	---	ND	<3	13	0.803	375	12
Apr 11/12	Dry																																
Oct 30/12	Dry																																
Apr 09/13	88	81	174	146.5	7.81	8.62	3.5	124	11.92	87.2	35	7.3	3.5	4	26.3	5.47	3.7	2.3	0.305	0.012	ND	0.1	0.08	0.00	0.41	0.12	---	ND	<3	15	0.169	94.7	7
Jul 30/13	Dry																																
Oct 22/13	Dry																																
Apr 24/14	420	228	831	653	8.10	7.61	11.5	---	6.60	60.9	13	34.0	85.3	103	128	24.6	35.0	2.4	0.134	0.005	ND	0.8	0.01	0.00	0.25	0.03	---	ND	<3	11	0.743	519	<3
Jul 10/14	Dry																																
Oct 8/14	290	123	641	660	7.96	7.34	13.0	89	7.50	71.8	22	24.7	111	34	86.4	18	15.2	3.3	0.181	0.005	ND	0.1	ND	0.00	0.36	0.05	---	ND	<3	13	0.389	342	12
Duplicate	293	123	644	660	7.94	7.34	13.0	89	7.50	71.8	25	23.3	112	34	86.8	18.5	15.1	3.4	0.226	0.007	ND	0.1	ND	0.00	0.39	0.06	---	ND	<3	13	0.383	344	12
May 12/15	Dry																																
Jun 23/15	Dry																																
Oct 29/15	173	142	401	535	7.91	---	9.2	49	10.3	91.0	47	19.3	33.7	20	52.3	10.4	12.1	3.6	0.348	0.006	ND	ND	ND	0.00	0.43	0.08	---	ND	<3	<5	0.401	217	8
Apr 13/16	257	225	569	351	8.18	7.86	4.0	180	13	101	19	5.3	37.9	25	77.8	15.2	20.4	1.6	0.123	0.002	ND	0.4	ND	0.00	0.26	0.02		ND	<3	<5	0.553	315	<3
Aug 17/16	203	145	419	370	7.85	6.68	18.8	77	6.81	73.1	33	20.1	20.9	10	58.2	13.9	16.5	1.3	0.883	0.016	ND	8.3	0.06	0.00	0.79	0.08	---	ND	ND	13	0.504	245	13
Oct 25/16	234	166	464	353	7.93	7.55	8.2	80	7.07	61.0	13	320	13.7	13	62.8	18.7	11.5	0.3	0.976	0.040	ND	10.1	0.04	0.00	1.31	0.27	---	ND	ND	43	0.326	265	109
Apr 18/17	250	208	598	418	8.15	7.61	8.8	184	10.59	92.5	7	4.2	32.2	29	67.6	19.6	15.2	0.8	0.107	0.002	ND	5.0	ND	0.00	0.39	0.01	---	ND	ND	8	0.419	311	9
Jul 17/17	255	235	505	421	7.88	7.36	17.8	39.0	6.87	72.3	5	2.3	10.1	13	64.7	22.6	14.4	0.4	0.056	0.004	<0.05	10.2	0.01	0.00	0.34	0.03	---	<0.001	<3	<5	0.393	266	<3
Oct 31/17	224	194	491	488	8.22	5.81	11.2	64.0	9.26	84.2	6	7.1	9.4	12	58.2	19.1	10.8	0.8	0.141	0.002	<0.05	9.48	<0.01	0.00	0.35	0.02	---	<0.001	<3	6	0.314	226	<3
May 22/18	Dry																																
Nov 2/18	170	96	394	245.0	7.95	7.60	6.6	178	10.7	87.6	31	35.4	21.7	15	49.0	11.5	13.2	2.9	1.39	0.017	<0.05	10.5	0.03	0.00	1.1	0.14	---	0.002	<3	19	---	203	12
Apr 11/19	180	141	404	233.0	7.51	7.14	1.2	190	10.4	73.4	20	25.1	21.1	11	51.8	12.3	12.9	2.6	0.649	0.023	<0.05	2.99	0.11	0.00	1.2	0.18	---	0.001	<3	33	---	208	66
Oct 2/19	Dry																																
Apr 8/20	260	188	576	433.1	7.82	7.15	4.1	155	13.6	105	7	2.2	31.1	28	72.4	19.3	13	1.4	0.061	0.005	<0.05	6.97	0.05	0.00	0.6	0.1	---	<0.001	<3	9	---	299	<3
Aug 17/20	Dry																																
Nov 16/20	Dry																																
May 26/21	Dry																																
Jul 14/21	Dry																																
Oct 4/21	Dry																																

PWQO - Provincial Water Quality Objectives

▨ - Indicates exceedence of PWQO

ND - Not Detected

Table 4.7a - Surface Water Chemistry
North Lancaster Waste Disposal Site

Parameter	Hardness	Alkalinity	Conductivity		pH		Temp.	ORP	Dissolved Oxygen		Colour	Turbidity	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Nitrite	Nitrate	Total Ammonia	Un-ionized Ammonia	TKN	Total Phosphorus	TOC	Phenols	BOD	COD	SAR	TDS	TSS
PWQO					6.5-8.5														0.30					0.02		0.03		0.001					
			lab	field	lab	field			mg/L	%																							
Location/Date																																	
Trip Blank																																	
Apr 11/12	<1	<5	2	---	5.96	---	---	---	---	---	1	0.3	ND	ND	0.03	ND	ND	ND	0.010	ND	ND	ND	ND	ND	ND	ND	---	ND	<3	ND	0.000	0.527	ND
Apr 09/13	<1	<5	1	---	5.58	---	---	---	---	---	1	0.7	0.5	ND	0.05	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	---	ND	<3	<5	0.006	0.724	<3
Jul 30/13	<1	<5	2	---	5.97	---	---	---	---	---	6	0.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	ND	---	ND	ND	---	ND	<3	5	---	---	<3
Oct 22/13	<1	<5	2	---	5.72	---	---	---	---	---	1	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	---	ND	<3	<5	---	---	<3
Apr 24/14	<1	<5	1	---	5.84	---	---	---	---	---	<2	0.4	ND	ND	0.11	0.03	ND	ND	0.026	0.001	ND	ND	ND	---	ND	ND	---	ND	<3	<5	0.046	0.430	<3
Jul 10/14	<1	<5	2	---	6.13	---	---	---	---	---	<2	<0.1	ND	ND	0.03	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	---	ND	<3	<5	-0.0211	<1	<3
Oct 8/14	<1	<5	2	---	6.02	---	---	---	---	---	3	0.2	ND	ND	ND	ND	0.3	ND	ND	ND	ND	ND	ND	---	ND	ND	---	ND	<3	<5	---	0.792	<3
May 12/15	<1	<3	<1	---	5.78	---	---	---	---	---	<2	1.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	---	ND	<3	<5	0.0202	<1	<3
Oct 29/15	<1	<5	2	---	5.24	---	---	---	---	---	12	0.2	ND	ND	0.03	ND	ND	ND	ND	0.005	ND	ND	ND	---	ND	ND	---	ND	<3	<5	-0.0329	0.390	<3
Apr 13/16	<1	<5	2	---	6.14	---	---	---	---	---	<2	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	---	ND	<3	<5	0.213	<1	<3
Aug 17/16	ND	ND	2	---	6.16	---	---	---	---	---	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	---	ND	ND	ND	---	---	ND
Oct 25/16	ND	ND	2	---	6.13	---	---	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	ND	ND	---	ND	ND	ND	---	0.744	ND
Apr 18/17	ND	ND	2	---	6.08	---	---	---	---	---	3	0.1	ND	ND	ND	0.03	ND	ND	ND	ND	ND	ND	ND	---	0.15	ND	---	ND	ND	ND	---	---	ND
Jul 17/17	<1	<5	3	---	6.40	---	---	---	---	---	<2	0.1	<0.5	<1	<0.02	<0.01	<0.2	<0.1	<0.005	<0.001	<0.05	<0.05	<0.01	---	<0.05	<0.01	---	<0.001	<3	<5		<1	<3
Oct 31/17	<1	<5	<1	---	6.21	---	---	---	---	---	<2	<0.1	<0.5	<1	0.02	<0.02	<0.2	<0.1	<0.005	<0.001	<0.05	<0.05	<0.01	---	<0.05	<0.01	---	<0.001	<3	5	0.0152	<1	<3
May 22/18	<1	<5	1	---	5.95	---	---	---	---	---	<2	0.1	<0.5	<1	<0.02	<0.02	<0.2	<0.1	<0.005	<0.001	<0.05	<0.05	<0.01	---	<0.1	<0.01	---	<0.001	<3	<5	---	<1	<3
Nov 2/18	<1	<5	1	---	5.63	---	---	---	---	---	<2	0.2	<0.5	<1	<0.02	<0.02	<0.2	<0.1	<0.005	<0.001	<0.05	<0.05	0.02	---	<0.1	<0.01	---	0.003	<3	<5	---	<3	<3
Apr 11/19	<1	---	---	---	---	---	---	---	---	---	---	---	---	---	<0.02	<0.02	<0.2	<0.1	<0.005	<0.001	---	---	0.13	---	<0.1	<0.01	---	0.001	---	5	---	---	---
Oct 2/19	<1	<5	<1	---	5.37	---	---	---	---	---	<2	0.4	<0.5	<1	<0.02	<0.02	<0.2	<0.1	<0.005	<0.001	<0.05	<0.05	<0.01	---	<0.1	<0.01	---	<0.002	<3	<5	0.169	2	<3
Apr 8/20	<1	<5	<1	---	5.56	---	---	---	---	---	<2	0.4	0.6	<1	0.03	<0.02	<0.2	<0.1	<0.005	<0.001	<0.05	<0.05	<0.01	---	<0.1	<0.01	---	<0.001	<3	<5	---	<3	<3
Aug 17/20	<1	<5	<1	---	5.60	---	---	---	---	---	<2	0.2	<0.5	<1	<0.02	<0.02	<0.2	<0.1	<0.005	<0.001	<0.05	<0.05	<0.01	---	<0.1	<0.01	---	<0.002	<3	<5	---	<3	<3
Nov 16/20	<1	<5	2	---	5.73	---	---	---	---	---	<2	0.4	<0.5	<1	<0.02	<0.02	<0.2	<0.1	<0.005	<0.001	<0.05	<0.05	0.02	---	<0.1	<0.01	---	<0.002	<3	<5	---	<3	<3
Jul 14/21	<1	<5	1	---	5.34	---	---	---	---	---	<2	0.3	1.1	<1	0.02	<0.02	<0.2	<0.1	<0.005	<0.001	<0.05	<0.05	0.02	---	<0.1	0.02	---	<0.001	---	<5	0	<3	---
Oct 4/21	<1	<5	<1	---	5.78	---	---	---	---	---	<2	0.1	<0.5	<1	<0.02	<0.02	<0.2	<0.1	<0.005	<0.001	<0.05	<0.05	<0.01	---	<0.1	<0.01	---	<0.002	<3	<5	---	<3	<3

PWQO - Provincial Water Quality Objectives

▨ - Indicates exceedence of PWQO

ND - Not Detected

Table 4.7b - Surface Water Metals Analysis
North Lancaster Waste Disposal Site

Parameter	Arsenic	Barium	Boron	Cadmium	Total Chromium	Copper	Lead	Mercury	Nickel	Zinc	Aluminum	Berylium	Cobalt	Selenium	Silver	Strontium	Vanadium
PWQO			0.2	0.0005		0.005	0.005	0.0002	0.025	0.02	0.075			0.1	0.0001		0.006
Location/Date																	
S-1																	
May 7/98	---	---	---	ND	ND	0.0050	---	ND	ND	0.030	1.31	---	---	ND	ND	---	---
Oct 8/98	Not Sampled																
Apr 19/99	---	0.09	0.06	ND	ND	0.0200	ND	ND	ND	ND	0.38	---	---	ND	ND	0.28	---
Oct 18/99	Dry																
Apr 27/00	---	0.07	0.06	ND	ND	ND	ND	ND	ND	ND	0.06	---	---	ND	ND	0.21	ND
Oct 26/00	Dry																
Apr 24/01	Stagnant																
Dec 6/01	---	---	---	ND	ND	0.0020	ND	0.0001	ND	0.020	0.18	---	---	ND	ND	---	---
Apr 18/02	---	---	---	ND	ND	ND	ND	ND	ND	ND	ND	---	---	ND	ND	---	---
S-1A																	
Nov 22/02	---	---	---	ND	ND	ND	0.0011	ND	ND	ND	0.14	---	---	ND	ND	---	---
Apr 16/03	---	---	---	ND	ND	0.0020	0.0002	ND	ND	ND	0.46	---	---	ND	ND	---	---
Oct 23/03	---	---	---	ND	0.008	0.0160	0.0005	ND	ND	0.005	0.06	---	---	ND	ND	---	---
Apr 26/04	---	---	---	ND	ND	ND	0.0008	ND	ND	ND	0.16	---	---	ND	ND	---	---
Nov 25/04	---	---	---	ND	ND	ND	ND	ND	ND	0.049	0.29	---	---	ND	ND	---	---
Apr 6/05	---	---	---	ND	ND	ND	ND	ND	ND	0.012	0.06	---	---	ND	ND	---	---
Sept 1/05											Dry						
Nov 29/05	---	---	---	ND	0.005	0.0030	ND	ND	ND	0.019	2.39	---	---	ND	ND	---	---
Apr 5/06				ND	ND	ND	0.0005	ND	ND	0.013	0.30		---	ND	ND		
Aug 1/06	---	---	---	0.0003	0.006	0.004	0.0017	ND	ND	0.014	1.69	---	---	ND	ND	---	---
Oct 31/06	---	---	---	ND	ND	0.0310	0.0003	ND	ND	0.016	0.06	---	---	0.0007	ND	---	---
Apr 23/07	---	---	---	ND	ND	0.0007	ND	ND	ND	ND	0.11	---	0.0007	ND	ND	---	---
Jul 23/07																	
Oct 29/07	---	---	---	ND	ND	ND	ND	ND	ND	ND	0.07	---	---	0.003	ND	---	---
May 6/08	---	---	---	ND	ND	ND	ND	<0.00003	ND	ND	0.04	---	---	ND	ND	---	---
Nov 3/08	---	---	---	ND	ND	0.017	ND	ND	ND	0.04	0.24	---	---	ND	ND	---	---
May 12/09	ND	0.041	0.008	ND	ND	ND	ND	ND	ND	ND	0.29	---	---	0.005	ND		
July 29/09	0.0006	0.122	0.024	0.00006	0.005	0.004	0.0001	ND	---	0.020	---	---	---	---	---	---	---
Oct 26/09	ND	0.078	0.013	ND	ND	ND	ND	ND	---	0.006	---	---	---	---	---	---	---
Mar 29/10	ND	0.058	ND	ND	ND	ND	0.0004	ND	---	ND	---	---	---	---	---	---	---
Aug 23/10	0.001	0.19	0.038	0.0002	0.010	0.013	0.0037	ND	ND	0.118	---	---	---	---	---	---	---
Oct 26/10	ND	0.068	0.012	ND	0.009	ND	0.0002	ND	ND	ND	---	---	---	---	---	---	---
Mar 29/11	0.0001	0.044	ND	ND	0.017	ND	ND	ND	ND	ND	---	---	---	---	---	---	---
Aug 22/11	0.0021	0.755	0.048	0.00059	0.060	0.046	0.0172	0.00002	0.05	0.28	---	---	---	---	---	---	---
Dec 7/11	0.0002	0.074	ND	ND	0.011	ND	0.00006	ND	ND	ND	---	---	---	---	---	---	---
Apr 11/12	0.0002	0.066	0.009	ND	ND	ND	0.00026	ND	ND	ND	---	---	---	---	---	---	---
Oct 30/12	0.0003	0.119	0.013	ND	ND	ND	ND	ND	ND	0.006	---	---	---	---	---	---	---
Apr 9/13	0.0003	0.052	0.008	ND	ND	0.0017	0.00014	ND	ND	ND	---	---	---	---	---	---	---
Jul 30/13	0.0003	0.095	0.019	0.00003	ND	0.0018	0.00033	0.00004	ND	ND	---	---	---	---	---	---	---
Oct 22/13	0.0003	0.107	0.022	0.00014	0.004	ND	0.00093	ND	ND	ND	---	---	---	---	---	---	---
24-Apr-14	0.0001	0.055	0.010	ND	ND	0.0008	0.00006	ND	0.0026	ND	---	---	---	---	---	---	---
10-Jul-14	0.0002	0.088	0.025	ND	ND	0.0005	0.00028	ND	ND	0.009	---	---	---	---	---	---	---
Oct 8/14	0.0005	0.089	0.033	ND	ND	0.0012	0.00004	ND	0.0029	ND	---	---	---	---	---	---	---
May 12/15	0.0002	0.087	0.009	ND	ND	0.0008	ND	ND	0.0050	ND	---	---	---	---	---	---	---
Jun 23/15	0.0007	0.078	0.011	0.00005	ND	0.0029	0.00045	ND	ND	ND	---	---	---	---	---	---	---
Oct 29/15	0.0002	0.091	0.017	ND	ND	0.0011	0.00013	ND	ND	ND	---	---	---	---	---	---	---
Apr 13/16	ND	0.052	0.010	ND	ND	0.0003	ND	ND	ND	ND	---	---	---	---	---	---	---
Aug 17/16	0.0003	0.070	0.017	0.00003	ND	0.0011	0.00008	ND	ND	ND	---	---	---	---	---	---	---
Oct 25/16	0.0001	0.067	0.019	ND	ND	0.0006	0.00003	ND	0.0027	ND	---	---	---	---	---	---	---
Apr 18/17	ND	0.056	0.014	ND	ND	ND	ND	ND	0.0025	ND	---	---	---	---	---	---	---
Jul 17/17	0.0002	0.095	0.035	ND	ND	0.0008	0.00032	ND	0.0029	0.020	---	---	---	---	---	---	---
Oct 31/17	0.0001	0.052	0.009	0.000034	ND	0.0029	0.00021	ND	0.003	ND	---	---	---	---	---	---	---
May 22/18	0.0003	0.082	0.019	ND	ND	0.0006	0.00007	ND	0.0037	0.026	---	---	---	---	---	---	---
Nov 2/18	0.0002	0.075	0.007	0.000030	0.002	0.0079	0.00058	<0.00002	0.0022	0.016	---	---	---	---	---	---	---
Apr 11/19	<0.0001	0.056	0.007	<0.000015	<0.001	0.0008	0.00006	<0.00002	0.0012	0.008	---	---	---	---	---	---	---
Apr 8/20	0.0001	0.06	0.012	<0.000015	<0.001	0.0033	0.00029	<0.00002	0.0015	0.008	---	---	---	---	---	---	---
Aug 17/20	0.0002	0.141	0.118	0.000019	<0.001	0.003	0.00007	<0.00002	0.0011	0.01	---	---	---	---	---	---	---
Nov 16/20	0.0002	0.123	0.024	0.000053	0.002	0.0025	0.00076	<0.00002	0.0015	0.014	---	---	---	---	---	---	---
May 26/21	0.0001	0.098	0.021	<0.000015	<0.001	0.0011	0.00020	<0.00002	0.0007	0.011	---	---	---	---	---	---	---
Duplicate	0.0001	0.095	0.020	<0.000015	<0.001	0.0011	0.00017	<0.00002	0.0008	0.015	---	---	---	---	---	---	---
Jul 14/21	0.0002	0.136	0.031	<0.000015	0.001	0.0017	0.00020	<0.00002	0.0008	0.029	---	---	---	---	---	---	---
Duplicate	0.0002	0.139	0.032	<0.000015	0.002	0.0021	0.00019	<0.00002	0.0007	0.017	---	---	---	---	---	---	---
Oct 4/21	0.0002	0.125	0.022	<0.000015	<0.001	0.0011	0.00012	<0.00002	0.0005	0.027	---	---	---	---	---	---	---
Duplicate	0.0001	0.121	0.022	<0.000015	0.001	0.0010	0.00045	<0.00002	0.0004	0.017	---	---	---	---	---	---	---

PWQO - Provincial Water Quality Objectives

1.31 - Indicates exceedence of PWQO

ND - Not Detected

Table 4.7b - Surface Water Metals Analysis
North Lancaster Waste Disposal Site

Parameter PWQO Location/Date	Arsenic	Barium	Boron 0.2	Cadmium 0.0005	Total Chromium	Copper 0.005	Lead 0.005	Mercury 0.0002	Nickel 0.025	Zinc 0.02	Aluminum 0.075	Berylium	Cobalt	Selenium 0.1	Silver 0.0001	Strontium	Vanadium 0.006
S-2																	
May 7/98	---	---	---	0.0001	ND	0.0030	---	ND	ND	0.030	0.80	---	---	ND	0.0001	---	---
Oct 8/98	---	---	---	ND	0.010	ND	ND	ND	ND	ND	0.25	---	---	ND	ND	---	---
Apr 19/99	---	0.06	0.03	ND	ND	0.0450	ND	ND	ND	ND	0.51	---	---	ND	ND	0.27	---
Oct 18/99	Dry																
Apr 27/00	---	0.06	0.04	ND	ND	ND	ND	ND	ND	ND	ND	---	---	ND	ND	0.29	ND
Oct 26/00	Dry																
Apr 24/01	ND	0.09	0.13	ND	0.050	ND	ND	ND	0.09	0.100	0.12	0.026	0.0009	ND	ND	0.33	0.03
Dec 6/01	---	---	---	ND	ND	0.0010	ND	ND	ND	ND	0.05	---	---	ND	ND	---	---
Apr 18/02	---	---	---	ND	ND	ND	0.0011	ND	ND	ND	0.36	---	---	ND	ND	---	---
Nov 22/02	---	---	---	ND	ND	0.0002	0.0004	ND	ND	ND	0.07	---	---	ND	ND	---	---
Apr 26/04	---	---	---	ND	0.007	0.0260	0.0010	ND	ND	ND	0.13	---	---	ND	ND	---	---
Nov 25/04	---	---	---	ND	ND	ND	0.0009	ND	ND	ND	0.07	---	---	ND	ND	---	---
Apr 6/05	---	---	---	ND	ND	ND	ND	ND	ND	0.008	0.12	---	---	0.001	ND	---	---
Sept 1/05	---	---	---	ND	ND	ND	ND	ND	ND	ND	0.09	---	---	ND	ND	---	---
Aug 29/05	Dry																
Apr 5/06	---	---	---	ND	ND	ND	ND	ND	ND	ND	0.07	---	---	ND	ND	---	---
Aug 1/06	---	---	---	ND	ND	ND	0.0005	ND	ND	ND	0.28	---	---	ND	ND	---	---
Oct 30/06	---	---	---	0.0002	ND	ND	0.0007	ND	ND	ND	0.08	---	---	ND	ND	---	---
Apr 23/07	---	---	---	ND	ND	ND	0.0003	ND	ND	ND	0.04	---	ND	ND	ND	---	---
Jul 23/07	---	---	---	ND	ND	0.0009	ND	ND	ND	0.010	0.08	---	0.0009	ND	ND	---	---
Oct 29/07	---	---	---	ND	ND	ND	ND	<0.00003	ND	ND	0.02	---	---	0.001	ND	---	---
May 6/08	---	---	---	ND	ND	ND	ND	<0.00003	ND	ND	0.03	---	---	ND	ND	---	---
Nov 3/08	---	---	---	ND	ND	ND	ND	0.00004	ND	0.015	0.05	---	---	ND	ND	---	---
May 12/09	ND	0.054	0.087	ND	ND	ND	ND	ND	ND	ND	0.24	---	---	0.004	ND	---	---
July 29/09	0.0015	0.13	0.107	0.00005	0.011	0.015	5.81	ND	---	0.081	---	---	---	---	---	---	---
Oct 26/09	ND	0.062	0.047	ND	ND	ND	ND	ND	---	0.014	---	---	---	---	---	---	---
Mar 29/10	ND	0.057	0.063	ND	ND	ND	ND	ND	---	ND	---	---	---	---	---	---	---
Aug 23/10	ND	0.076	0.119	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---
Oct 26/10	ND	0.066	0.092	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---
Mar 29/11	0.0002	0.065	0.089	ND	0.010	ND	ND	ND	0.01	ND	---	---	---	---	---	---	---
Aug 22/11	Dry																
Dec 7/11	0.0003	0.068	0.073	ND	0.003	ND	0.00013	ND	ND	0.008	---	---	---	---	---	---	---
Apr 11/12	0.0003	0.069	0.094	ND	ND	ND	0.00007	ND	ND	ND	---	---	---	---	---	---	---
Oct 30/12	0.0003	0.072	0.104	ND	ND	ND	ND	ND	ND	0.006	---	---	---	---	---	---	---
Duplicate	0.0004	0.074	0.107	0.00004	ND	ND	0.00034	ND	ND	0.007	---	---	---	---	---	---	---
Apr 9/13	0.0003	0.048	0.080	ND	ND	0.0017	0.00006	ND	ND	ND	---	---	---	---	---	---	---
Jul 30/13	0.0004	0.100	0.100	0.00002	ND	0.0020	0.00049	ND	ND	ND	---	---	---	---	---	---	---
Oct 22/13	0.0015	0.238	0.112	0.00035	0.027	0.023	0.00863	ND	0.02	0.271	---	---	---	---	---	---	---
24-Apr-14	0.0002	0.062	0.087	ND	ND	0.0007	0.00003	ND	0.0021	ND	---	---	---	---	---	---	---
10-Jul-14	0.0004	0.087	0.144	ND	ND	0.0004	0.00048	ND	ND	0.013	---	---	---	---	---	---	---
Oct 8/14	0.0006	0.078	0.165	ND	ND	0.0007	0.00006	ND	0.0041	ND	---	---	---	---	---	---	---
May 12/15	0.0003	0.076	0.133	ND	ND	0.0005	ND	ND	0.0040	ND	---	---	---	---	---	---	---
Jun 23/15	0.0008	0.060	0.115	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---
Duplicate	0.0008	0.063	0.121	ND	ND	0.0019	0.00004	ND	ND	ND	---	---	---	---	---	---	---
Oct 29/15	0.0002	0.071	0.128	ND	ND	0.0008	0.00003	ND	ND	ND	---	---	---	---	---	---	---
Duplicate	0.0002	0.070	0.126	ND	ND	0.0009	0.00004	ND	ND	ND	---	---	---	---	---	---	---
Apr 13/16	ND	0.044	0.070	ND	ND	0.0002	ND	0.00004	ND	ND	---	---	---	---	---	---	---
Aug 17/16	0.0005	0.065	0.232	0.00005	ND	0.0021	0.00009	ND	ND	ND	---	---	---	---	---	---	---
Duplicate	0.0005	0.074	0.244	0.00003	ND	0.0021	0.00005	ND	ND	ND	---	---	---	---	---	---	---
Oct 25/16	0.0002	0.059	0.124	0.00003	ND	0.0013	0.00012	ND	0.0035	ND	---	---	---	---	---	---	---
Apr 18/17	0.0001	0.054	0.102	ND	ND	0.0001	ND	ND	0.0029	ND	---	---	---	---	---	---	---
Jul 17/17	0.0003	0.075	0.150	ND	0.026	0.0004	0.00003	ND	0.0035	ND	---	---	---	---	---	---	---
Oct 31/17	0.0002	0.066	0.109	ND	ND	0.0004	0.00004	ND	0.0036	ND	---	---	---	---	---	---	---
May 22/18	0.0006	0.112	0.134	0.000083	0.005	0.0069	0.00154	ND	0.0082	0.035	---	---	---	---	---	---	---
Nov 2/18	0.0002	0.086	0.129	0.000017	<0.001	0.0016	0.00009	<0.00002	0.0060	0.012	---	---	---	---	---	---	---
Apr 11/19	0.0001	0.053	0.086	<0.000015	<0.001	0.0005	0.00006	<0.00002	0.0015	<0.005	---	---	---	---	---	---	---
Apr 8/20	0.0001	0.057	0.088	<0.000015	<0.001	0.0009	0.00005	<0.00002	0.0015	0.009	---	---	---	---	---	---	---
Duplicate	<0.0001	0.053	0.082	<0.000015	<0.001	0.0008	0.00006	<0.00002	0.0012	0.008	---	---	---	---	---	---	---
Aug 17/20	Dry																
Nov 16/20	0.0002	0.093	0.108	0.000043	0.002	0.0022	0.00056	<0.00002	0.0028	0.011	---	---	---	---	---	---	---
May 26/21	Dry																
Jul 14/21	Dry																
Oct 4/21	Dry																

PWQO - Provincial Water Quality Objectives
1.31 - Indicates exceedence of PWQO
ND - Not Detected

Table 4.7b - Surface Water Metals Analysis
North Lancaster Waste Disposal Site

Parameter	Arsenic	Barium	Boron	Cadmium	Total Chromium	Copper	Lead	Mercury	Nickel	Zinc	Aluminum	Berylium	Cobalt	Selenium	Silver	Strontium	Vanadium
PWQO			0.2	0.0005		0.005	0.005	0.0002	0.025	0.02	0.075			0.1	0.0001		0.006
Location/Date																	
S-3																	
Apr 19/99	---	0.03	0.02	ND	ND	ND	ND	ND	0.02	ND	0.65	---	---	ND	ND	0.25	---
Oct 18/99	---	---	---	ND	ND	ND	ND	ND	ND	ND	0.34	---	---	ND	ND	---	---
Apr 27/00	---	0.03	0.01	ND	ND	ND	ND	ND	ND	ND	0.37	---	---	ND	ND	0.25	ND
Oct 26/00	ND	0.05	ND	ND	ND	ND	0.0020	ND	ND	0.020	2.18	ND	ND	ND	ND	0.33	0.02
Apr 24/01	ND	0.03	0.01	ND	ND	0.0010	ND	ND	ND	ND	0.91	ND	ND	ND	ND	0.20	ND
Dec 6/01	---	---	---	ND	ND	0.0020	ND	ND	ND	ND	0.21	---	---	ND	ND	---	---
Apr 18/02	---	---	---	ND	ND	ND	ND	ND	ND	ND	0.15	---	---	ND	ND	---	---
Nov 22/02	---	---	---	ND	ND	0.0089	0.0009	ND	ND	0.010	1.37	---	---	ND	ND	---	---
Apr 16/03	---	---	---	ND	0.010	0.0035	0.0010	ND	ND	ND	1.48	---	---	ND	ND	---	---
Oct 23/03	---	---	---	ND	0.007	0.0150	0.0009	ND	ND	0.016	0.69	---	---	ND	ND	---	---
Apr 26/04	---	---	---	ND	ND	0.0020	0.0009	ND	ND	ND	0.34	---	---	ND	ND	---	---
Nov 25/04	---	---	---	ND	0.003	0.0030	0.0006	ND	ND	0.006	1.03	---	---	0.001	ND	---	---
Apr 6/05	---	---	---	<0.0010	0.008	0.0230	<0.0050	ND	ND	0.044	2.65	---	---	ND	<0.0010	---	---
Sept 1/05	---	---	---	ND	0.003	0.0140	ND	ND	ND	0.023	0.72	---	---	ND	ND	---	---
Nov 29/05	---	---	---	ND	ND	0.0020	ND	ND	ND	0.011	0.69	---	---	ND	ND	---	---
Apr 5/06	---	---	---	ND	0.005	0.0030	0.0012	ND	ND	0.011	1.86	---	---	ND	ND	---	---
Aug 1/06	---	---	---	0.0003	0.002	0.0030	0.0006	ND	ND	ND	0.50	---	---	ND	ND	---	---
Oct 31/06	---	---	---	ND	0.003	0.0360	0.0007	ND	ND	0.058	0.71	---	---	ND	ND	---	---
Apr 23/07	---	---	---	ND	0.002	0.0017	0.0004	ND	ND	0.008	0.87	---	0.0017	ND	ND	---	---
Jul 23/07	---	---	---	---	ND	---	ND	ND	0.00005	---	0.29	---	ND	ND	ND	ND	---
Oct 29/07	---	---	---	ND	ND	0.002	ND	<0.00003	ND	0.006	0.69	---	---	0.001	ND	---	---
May 6/08	---	---	---	ND	0.002	ND	ND	<0.00003	ND	0.006	0.79	---	---	0.003	ND	---	---
Nov 3/08	---	---	---	ND	ND	ND	ND	0.00004	ND	ND	0.53	---	---	ND	ND	---	---
May 12/09	0.0008	0.022	0.011	ND	ND	ND	ND	ND	ND	0.007	0.85	---	---	0.003	ND	---	---
July 29/09	0.0017	0.034	0.017	0.00009	ND	ND	0.00012	ND	---	ND	---	---	---	---	---	---	---
Oct 26/09	ND	0.039	0.021	ND	0.003	0.010	0.0007	0.00002	---	0.027	---	---	---	---	---	---	---
Mar 29/10	ND	0.033	ND	ND	0.002	ND	0.0005	ND	---	0.007	---	---	---	---	---	---	---
Aug 23/10	ND	0.042	0.022	ND	0.002	0.003	0.0004	ND	ND	ND	---	---	---	---	---	---	---
Oct 26/10	ND	0.037	0.016	ND	ND	ND	0.0004	ND	ND	ND	---	---	---	---	---	---	---
Mar 29/11	0.0004	0.032	0.008	0.00010	0.013	ND	0.00075	ND	ND	0.005	---	---	---	---	---	---	---
Aug 22/11	0.0011	0.051	0.033	0.00008	0.005	0.004	0.00196	ND	ND	0.010	---	---	---	---	---	---	---
Dec 7/11	0.0007	0.039	ND	0.00002	0.003	0.004	0.00052	ND	ND	0.009	---	---	---	---	---	---	---
Apr 11/12	0.0005	0.037	0.010	ND	0.002	0.002	0.0005	ND	ND	0.008	---	---	---	---	---	---	---
Oct 30/12	0.0006	0.045	0.005	ND	0.002	0.004	0.00051	ND	ND	0.009	---	---	---	---	---	---	---
Apr 9/13	0.0005	0.066	0.010	0.00002	0.003	0.0051	0.00108	ND	ND	0.053	---	---	---	---	---	---	---
Jul 30/13	0.0008	0.044	0.020	0.00004	0.003	0.0039	0.00131	ND	ND	ND	---	---	---	---	---	---	---
Oct 22/13	0.0007	0.050	0.018	0.00011	0.004	0.006	0.00076	ND	ND	0.104	---	---	---	---	---	---	---
24-Apr-14	0.0004	0.032	0.011	0.00002	0.002	0.0024	0.00044	ND	0.0027	0.008	---	---	---	---	---	---	---
10-Jul-14	0.0006	0.036	0.026	ND	ND	0.0013	0.00016	ND	ND	0.011	---	---	---	---	---	---	---
Oct 8/14	0.0008	0.052	0.026	ND	0.004	0.0031	0.00072	ND	0.0043	0.010	---	---	---	---	---	---	---
May 12/15	0.0005	0.048	0.007	ND	0.007	0.0022	0.00039	ND	0.0046	0.023	---	---	---	---	---	---	---
Jun 23/15	0.0012	0.021	0.011	ND	ND	0.0006	0.00005	ND	ND	ND	---	---	---	---	---	---	---
Oct 29/15	0.0005	0.063	0.035	0.00003	0.007	0.0046	0.00057	ND	ND	0.028	---	---	---	---	---	---	---
Apr 13/16	0.0002	0.019	ND	ND	ND	0.0011	0.00016	0.00002	ND	ND	---	---	---	---	---	---	---
Aug 17/16	0.0008	0.035	0.034	0.00002	ND	0.0042	0.00028	ND	ND	ND	---	---	---	---	---	---	---
Oct 25/16	0.0005	0.032	0.020	ND	ND	0.0024	0.00011	ND	0.0032	ND	---	---	---	---	---	---	---
Apr 18/17	0.0004	0.024	0.012	0.000022	0.001	0.0015	0.00025	ND	0.0032	0.005	---	---	---	---	---	---	---
Jul 17/17	0.0007	0.03	0.019	0.000204	ND	0.0042	0.00032	ND	0.0043	0.010	---	---	---	---	---	---	---
Oct 31/17	0.0004	0.054	0.023	0.000043	0.002	0.0061	0.00066	ND	0.0053	0.042	---	---	---	---	---	---	---
May 22/18	0.0008	0.047	0.020	0.000050	0.002	0.0063	0.00075	ND	0.0064	0.030	---	---	---	---	---	---	---
Nov 2/18	0.0003	0.057	0.026	0.000034	0.003	0.0103	0.00071	<0.00002	0.0035	0.021	---	---	---	---	---	---	---
Apr 11/19	0.0004	0.033	0.009	0.000045	0.004	0.0041	0.00109	<0.00002	0.0041	0.016	---	---	---	---	---	---	---
Oct 2/19	0.0006	0.049	0.020	<0.000015	<0.001	0.0004	0.00003	<0.00002	0.0007	0.008	---	---	---	---	---	---	---
Apr 8/20	0.0003	0.027	0.011	0.000015	0.001	0.0021	0.0002	<0.00002	0.002	0.02	---	---	---	---	---	---	---
Aug 17/20	0.0007	0.046	0.103	<0.000015	<0.001	0.001	0.00005	<0.00002	0.001	0.137	---	---	---	---	---	---	---
Nov 16/20	0.0003	0.043	0.034	0.000019	0.001	0.0021	0.00026	<0.00002	0.0016	0.008	---	---	---	---	---	---	---
May 26/21	0.0008	0.027	0.021	<0.000015	<0.001	0.0013	0.00016	<0.00002	0.0017	0.008	---	---	---	---	---	---	---
Jul 14/21	0.0007	0.046	0.043	0.000028	0.003	0.0035	0.00071	<0.00002	0.0029	0.037	---	---	---	---	---	---	---
Oct 4/21	0.0005	0.047	0.029	0.000020	0.003	0.003	0.00061	<0.00002	0.0024	0.025	---	---	---	---	---	---	---

PWQO - Provincial Water Quality Objectives

1.31 - Indicates exceedence of PWQO

ND - Not Detected

Table 4.7b - Surface Water Metals Analysis
North Lancaster Waste Disposal Site

Parameter	Arsenic	Barium	Boron	Cadmium	Total Chromium	Copper	Lead	Mercury	Nickel	Zinc	Aluminum	Berylium	Cobalt	Selenium	Silver	Strontium	Vanadium
PWQO			0.2	0.0005		0.005	0.005	0.0002	0.025	0.02	0.075			0.1	0.0001		0.006
Location/Date																	
S-4																	
Apr 19/99	---	0.03	0.01	ND	ND	ND	ND	ND	0.02	ND	0.56	---	---	ND	ND	0.25	---
Oct 18/99	---	---	---	ND	ND	ND	ND	ND	ND	ND	0.37	---	---	ND	ND	---	---
Apr 27/00	---	0.03	0.01	ND	ND	ND	ND	ND	ND	ND	0.40	---	---	ND	ND	0.24	ND
Oct 26/00	ND	0.05	0.02	ND	ND	ND	ND	ND	0.02	0.020	2.85	ND	ND	ND	ND	0.33	0.01
Apr 24/01	ND	0.04	0.02	ND	0.010	0.0010	ND	ND	ND	ND	0.83	ND	0.0001	ND	ND	0.20	ND
Dec 6/01	---	---	---	ND	ND	0.0030	ND	ND	ND	ND	0.22	---	---	ND	ND	---	---
Apr 18/02	---	---	---	ND	ND	ND	ND	ND	0.02	ND	0.06	---	---	ND	ND	---	---
Nov 22/02	---	---	---	ND	ND	0.0029	0.0009	ND	ND	0.020	1.47	---	---	ND	ND	---	---
Apr 16/03	---	---	---	ND	0.010	0.0030	0.0008	ND	ND	ND	2.26	---	---	ND	ND	---	---
Oct 23/03	---	---	---	ND	0.008	0.0210	0.001	ND	ND	0.013	0.62	---	---	ND	ND	---	---
Apr 26/04	---	---	---	ND	0.001	0.0020	0.0009	ND	ND	ND	0.38	---	---	ND	ND	---	---
Nov 25/04	---	---	---	ND	0.003	0.0520	0.0007	ND	ND	0.149	1.11	---	---	ND	ND	---	---
Apr 6/05	---	---	---	<0.0020	0.064	0.0510	0.0230	ND	0.04	0.140	26.5	---	---	ND	<0.0020	---	---
Sept 1/05	---	---	---	ND	0.004	0.0140	0.0011	0.0001	ND	0.026	0.69	---	---	ND	ND	---	---
Nov 29/05	---	---	---	ND	ND	ND	ND	ND	ND	ND	0.46	---	---	ND	ND	---	---
Apr 5/06	---	---	---	ND	0.006	0.004	0.0014	ND	ND	0.022	2.02	---	---	ND	ND	---	---
Aug 1/06	---	---	---	0.0002	0.002	0.002	0.0005	ND	ND	0.011	0.54	---	---	ND	ND	---	---
Oct 31/06	---	---	---	ND	0.003	0.034	0.0008	ND	ND	0.020	0.77	---	---	0.0003	ND	---	---
Apr 23/07	---	---	---	ND	0.003	0.0017	0.0004	ND	ND	0.007	1.15	---	---	ND	ND	---	---
Jul 23/07	---	---	---	ND	ND	ND	ND	0.00005	ND	ND	0.30	---	---	ND	ND	---	---
Oct 29/07	---	---	---	ND	ND	ND	ND	ND	ND	0.007	0.71	---	---	ND	ND	---	---
May 6/08	---	---	---	ND	0.007	0.005	ND	ND	ND	0.013	3.06	---	---	0.002	ND	---	---
Nov 3/08	---	---	---	ND	ND	ND	ND	ND	ND	0.005	0.56	---	---	ND	ND	---	---
May 12/09	ND	0.024	0.011	ND	ND	ND	ND	ND	ND	0.022	0.91	---	---	0.002	ND	---	---
July 29/09	0.0016	0.034	0.017	ND	ND	ND	0.00012	ND	---	ND	---	---	---	---	---	---	---
Oct 26/09	ND	0.039	0.014	ND	0.003	ND	0.0002	ND	---	0.006	---	---	---	---	---	---	---
Mar 29/10	ND	0.040	0.007	ND	0.003	0.002	0.0005	ND	---	0.011	---	---	---	---	---	---	---
Aug 23/10	ND	0.053	0.068	ND	0.002	ND	0.0004	ND	ND	ND	---	---	---	---	---	---	---
Oct 26/10	ND	0.046	0.040	ND	0.015	0.003	0.0004	ND	ND	ND	---	---	---	---	---	---	---
Mar 29/11	0.0003	0.051	0.028	0.00002	0.012	0.009	0.00049	ND	0.01	0.031	---	---	---	---	---	---	---
Aug 22/11	0.0011	0.051	0.031	0.00005	0.006	0.003	0.00147	ND	ND	0.006	---	---	---	---	---	---	---
Dec 7/11	0.0006	0.037	ND	ND	0.004	0.003	0.00040	ND	ND	0.011	---	---	---	---	---	---	---
Apr 11/12	0.0004	0.041	0.026	ND	ND	ND	0.00031	ND	ND	ND	---	---	---	---	---	---	---
Oct 30/12	0.0005	0.045	0.022	ND	ND	0.002	0.00024	ND	ND	0.008	---	---	---	---	---	---	---
Apr 9/13	0.0005	0.061	0.010	0.00005	0.0035	0.0048	0.00115	0.00002	0.10	0.099	---	---	---	---	---	---	---
Jul 30/13	0.0006	0.038	0.027	ND	ND	0.0022	0.00018	ND	ND	ND	---	---	---	---	---	---	---
Oct 22/13	0.0006	0.056	0.031	0.00010	0.003	0.005	0.00081	ND	ND	0.067	---	---	---	---	---	---	---
24-Apr-14	0.0004	0.030	0.013	0.00002	ND	0.0021	0.00033	ND	0.0024	0.006	---	---	---	---	---	---	---
10-Jul-14	0.0007	0.033	0.024	ND	ND	0.0016	0.00014	ND	ND	0.014	---	---	---	---	---	---	---
Oct 8/14	0.0009	0.059	0.028	0.00003	0.006	0.0046	0.00117	ND	0.0060	0.022	---	---	---	---	---	---	---
May 12/15	0.0005	0.053	0.042	ND	0.005	0.0027	0.00050	ND	0.0044	0.009	---	---	---	---	---	---	---
Jun 23/15	0.0012	0.022	0.012	0.00004	ND	0.0026	0.00109	ND	ND	ND	---	---	---	---	---	---	---
Oct 29/15	0.0004	0.069	0.036	0.00003	0.007	0.0046	0.00064	ND	ND	0.028	---	---	---	---	---	---	---
Apr 13/16	0.0002	0.019	0.005	ND	ND	0.0009	0.00025	0.00003	ND	ND	---	---	---	---	---	---	---
Aug 17/16	0.0007	0.040	0.053	0.00010	0.002	0.0086	0.00119	ND	ND	ND	---	---	---	---	---	---	---
Oct 25/16	0.0004	0.032	0.027	ND	ND	0.0025	0.00018	ND	0.0031	ND	---	---	---	---	---	---	---
Apr 18/17	0.0003	0.026	0.023	0.000015	ND	0.0011	0.00007	ND	0.0028	0.005	---	---	---	---	---	---	---
Jul 17/17	0.0007	0.03	0.020	0.00002	ND	0.0014	0.00012	ND	0.0035	0.009	---	---	---	---	---	---	---
Oct 31/17	0.0004	0.052	0.024	0.000063	0.002	0.0058	0.00075	ND	0.0055	0.029	---	---	---	---	---	---	---
May 22/18	0.0008	0.044	0.021	0.000045	0.001	0.0056	0.00057	ND	0.0060	0.026	---	---	---	---	---	---	---
Duplicate	0.0010	0.045	0.024	ND	0.002	0.0015	0.00028	ND	0.0051	0.025	---	---	---	---	---	---	---
Nov 2/18	0.0004	0.055	0.035	0.000053	0.005	0.0117	0.00121	<0.00002	0.0042	0.025	---	---	---	---	---	---	---
Apr 11/19	0.0004	0.032	0.011	0.000030	0.004	0.0037	0.00083	<0.00002	0.0035	0.017	---	---	---	---	---	---	---
Oct 2/19	0.0007	0.045	0.044	<0.000015	<0.001	0.0005	0.00003	<0.00002	0.0007	0.023	---	---	---	---	---	---	---
Apr 8/20	0.0003	0.028	0.018	<0.000015	<0.001	0.0016	0.00018	<0.00002	0.0014	0.013	---	---	---	---	---	---	---
Aug 17/20	0.0007	0.047	0.104	<0.000015	0.001	0.0014	0.00017	<0.00002	0.0014	0.010	---	---	---	---	---	---	---
Nov 16/20	0.0003	0.045	0.023	0.000016	0.001	0.002	0.0002	<0.00002	0.0015	0.011	---	---	---	---	---	---	---
May 26/21	0.0008	0.032	0.022	<0.000015	<0.001	0.0015	0.00019	<0.00002	0.0015	0.030	---	---	---	---	---	---	---
Jul 14/21	0.0007	0.056	0.174	0.000052	<0.001	0.0022	0.00024	<0.00002	0.0017	0.026	---	---	---	---	---	---	---
Oct 4/21	0.0005	0.040	0.012	<0.000015	<0.001	0.0014	0.00015	<0.00002	0.0013	0.020	---	---	---	---	---	---	---

PWQO - Provincial Water Quality Objectives
1.31 - Indicates exceedence of PWQO
ND - Not Detected

Table 4.7b - Surface Water Metals Analysis
North Lancaster Waste Disposal Site

Parameter	Arsenic	Barium	Boron	Cadmium	Total Chromium	Copper	Lead	Mercury	Nickel	Zinc	Aluminum	Berylium	Cobalt	Selenium	Silver	Strontium	Vanadium
PWQO			0.2	0.0005		0.005	0.005	0.0002	0.025	0.02	0.075			0.1	0.0001		0.006
Location/Date																	
S-5																	
Apr 27/00	---	0.03	0.01	ND	ND	ND	ND	ND	ND	ND	0.32	---	---	ND	ND	0.24	0.01
Oct 26/00	ND	0.04	ND	ND	ND	ND	ND	ND	ND	0.020	1.92	ND	ND	ND	ND	0.33	0.01
Apr 24/01	ND	0.07	0.04	ND	0.020	0.0040	ND	ND	0.03	ND	1.02	0.004	0.0001	ND	ND	0.23	0.02
Dec 6/01	---	---	---	ND	ND	ND	ND	ND	ND	ND	0.20	---	---	ND	ND	---	---
Apr 18/02	---	---	---	ND	ND	ND	ND	ND	ND	ND	0.25	---	---	ND	ND	---	---
Nov 22/02	---	---	---	ND	ND	0.0050	0.0022	ND	ND	0.020	2.84	---	---	ND	ND	---	---
Apr 16/03	---	---	---	ND	0.010	0.0040	0.0016	ND	ND	ND	1.27	---	---	ND	ND	---	---
Oct 23/03	---	---	---	ND	0.009	0.0120	0.0009	ND	ND	0.006	0.84	---	---	ND	ND	---	---
Apr 26/04	---	---	---	ND	0.001	0.0020	0.0010	ND	ND	ND	0.41	---	---	ND	ND	---	---
Nov 25/04	---	---	---	ND	0.004	0.0530	0.0009	ND	ND	0.108	1.05	---	---	ND	ND	---	---
Apr 6/05	---	---	---	<0.0010	0.006	0.0190	ND	ND	ND	0.033	1.75	---	---	ND	<0.0050	---	---
Sept 1/05	---	---	---	ND	0.003	0.0160	ND	ND	ND	0.022	0.75	---	---	ND	ND	---	---
Nov 29/05	---	---	---	ND	0.002	0.0030	ND	ND	ND	ND	0.57	---	---	ND	ND	---	---
Oct 31/06	---	---	---	ND	ND	0.045	0.0008	ND	ND	0.025	0.40	---	---	ND	ND	---	---
Apr 23/07	---	---	---	0.0028	0.005	0.0027	0.0016	ND	ND	0.009	1.48	---	---	ND	ND	---	---
Jul 23/07	---	---	---	ND	ND	ND	ND	0.00004	ND	0.009	0.35	---	---	ND	ND	---	---
Oct 29/07	---	---	---	ND	ND	ND	ND	ND	ND	ND	0.48	---	---	ND	ND	---	---
May 6/08	---	---	---	ND	ND	ND	ND	0.00006	ND	0.008	0.62	---	---	ND	ND	---	---
Nov 3/08	---	---	---	ND	ND	ND	ND	ND	ND	0.007	0.63	---	---	0.005	ND	---	---
May 12/09	ND	0.022	0.011	ND	ND	ND	ND	ND	ND	ND	0.73	---	---	ND	ND	---	---
July 29/09	0.0016	0.034	0.017	0.00004	ND	ND	0.00012	ND	---	ND	---	---	---	---	---	---	---
Oct 26/09	ND	0.035	0.011	ND	ND	ND	ND	ND	---	ND	---	---	---	---	---	---	---
Mar 29/10	ND	0.039	ND	ND	0.003	0.003	0.0008	ND	---	0.010	---	---	---	---	---	---	---
Aug 23/10	0.0005	0.047	0.025	ND	0.089	0.006	0.0005	ND	ND	0.011	---	---	---	---	---	---	---
Oct 26/10	ND	0.037	0.016	ND	0.003	ND	0.0005	ND	ND	ND	---	---	---	---	---	---	---
Mar 29/11	0.0003	0.050	0.010	0.00008	0.017	0.007	0.00095	ND	ND	0.010	---	---	---	---	---	---	---
Aug 22/11	0.0011	0.046	0.041	ND	0.002	0.002	0.00024	ND	ND	ND	---	---	---	---	---	---	---
Dec 7/11	0.0006	0.048	ND	0.00009	0.006	0.006	0.00132	ND	ND	0.021	---	---	---	---	---	---	---
Apr 11/12	0.0007	0.062	0.012	0.00005	0.013	0.007	0.00157	ND	ND	0.021	---	---	---	---	---	---	---
Oct 30/12	0.0006	0.044	0.006	ND	ND	0.003	0.00049	ND	ND	0.011	---	---	---	---	---	---	---
Apr 9/13	0.0005	0.064	0.011	0.00009	0.0033	0.006	0.00154	ND	0.02	0.034	---	---	---	---	---	---	---
Jul 30/13	0.0008	0.036	0.016	0.00007	ND	0.0042	0.00071	ND	ND	ND	---	---	---	---	---	---	---
Oct 22/13	0.0005	0.058	0.021	0.00014	0.003	0.008	0.00088	ND	ND	0.115	---	---	---	---	---	---	---
24-Apr-14	0.0003	0.035	0.011	ND	0.005	0.0029	0.00044	ND	0.0126	0.008	---	---	---	---	---	---	---
10-Jul-14	0.0006	0.036	0.028	ND	ND	0.0015	0.00014	ND	ND	0.013	---	---	---	---	---	---	---
Oct 8/14	0.0007	0.051	0.026	ND	0.004	0.0040	0.00074	ND	0.0037	0.018	---	---	---	---	---	---	---
May 12/15	0.0005	0.037	0.007	ND	0.003	0.0018	0.00031	ND	0.0040	0.006	---	---	---	---	---	---	---
Jun 23/15	0.0011	0.022	0.012	ND	ND	0.0006	0.00006	ND	ND	ND	---	---	---	---	---	---	---
Oct 29/15	0.0004	0.068	0.031	0.00003	0.007	0.0045	0.00057	ND	ND	0.027	---	---	---	---	---	---	---
Apr 13/16	0.0002	0.020	ND	ND	ND	0.0010	0.00011	ND	ND	ND	---	---	---	---	---	---	---
Aug 17/16	0.0007	0.044	0.056	0.00003	ND	0.0034	0.00023	ND	ND	ND	---	---	---	---	---	---	---
Oct 25/16	0.0004	0.030	0.020	ND	ND	0.0021	0.00009	ND	0.0030	ND	---	---	---	---	---	---	---
Duplicate	0.0004	0.031	0.020	ND	ND	0.0023	0.00009	ND	0.0031	ND	---	---	---	---	---	---	---
Apr 18/17	0.0003	0.022	0.013	ND	ND	0.0012	0.00008	ND	0.003	ND	---	---	---	---	---	---	---
Jul 17/17	0.0007	0.041	0.032	0.000025	ND	0.0015	0.00014	ND	0.0038	0.024	---	---	---	---	---	---	---
Oct 31/17	0.0004	0.053	0.019	0.000057	0.002	0.0061	0.00081	ND	0.0058	0.044	---	---	---	---	---	---	---
May 22/18	0.0009	0.046	0.015	0.000020	0.001	0.0016	0.00031	ND	0.0053	0.029	---	---	---	---	---	---	---
Nov 2/18	0.0003	0.055	0.029	0.000025	0.003	0.0064	0.00066	<0.00002	0.0029	0.018	---	---	---	---	---	---	---
Duplicate	0.0003	0.055	0.029	0.000025	0.003	0.0067	0.00073	<0.00002	0.0034	0.015	---	---	---	---	---	---	---
Apr 11/19	0.0003	0.029	0.009	0.000025	0.003	0.0027	0.00049	<0.00002	0.0028	0.011	---	---	---	---	---	---	---
Oct 2/19	0.0006	0.052	0.012	<0.000015	<0.001	0.0004	0.00005	<0.00002	0.0008	0.006	---	---	---	---	---	---	---
Apr 8/20	0.0003	0.025	0.009	0.000017	0.001	0.0019	0.00021	<0.00002	0.0018	0.008	---	---	---	---	---	---	---
Aug 17/20	Dry																
Nov 16/20	0.0005	0.060	0.033	0.000039	0.004	0.0056	0.00088	<0.00002	0.0039	0.018	---	---	---	---	---	---	---
May 26/21	0.0010	0.055	0.021	0.000033	0.005	0.0036	0.00084	<0.00002	0.0038	0.021	---	---	---	---	---	---	---
Jul 14/21	0.0021	0.134	0.154	0.000177	0.018	0.0161	0.00438	<0.00002	0.0137	0.059	---	---	---	---	---	---	---
Oct 4/21	0.0004	0.043	0.011	<0.000015	<0.001	0.0012	0.00011	<0.00002	0.0010	0.018	---	---	---	---	---	---	---

PWQO - Provincial Water Quality Objectives
1.31 - Indicates exceedence of PWQO
ND - Not Detected

Table 4.7b - Surface Water Metals Analysis
North Lancaster Waste Disposal Site

Parameter	Arsenic	Barium	Boron	Cadmium	Total Chromium	Copper	Lead	Mercury	Nickel	Zinc	Aluminum	Berylium	Cobalt	Selenium	Silver	Strontium	Vanadium
PWQO			0.2	0.0005		0.005	0.005	0.0002	0.025	0.02	0.075			0.1	0.0001		0.006
Location/Date																	
S-6																	
Apr 27/00	---	0.03	0.01	ND	ND	ND	ND	ND	ND	ND	0.30	---	---	ND	ND	0.24	0.01
Oct 26/00	ND	0.05	0.02	ND	ND	ND	ND	ND	ND	ND	2.48	ND	ND	ND	ND	0.33	0.01
Apr 24/01	ND	0.05	0.02	ND	ND	0.0030	ND	ND	ND	ND	0.97	0.004	ND	ND	ND	0.21	ND
Dec 6/01	---	---	---	ND	ND	0.0030	ND	ND	ND	ND	0.23	---	---	0.001	ND	---	---
Apr 18/02	---	---	---	ND	ND	ND	ND	ND	ND	ND	0.18	---	---	ND	ND	---	---
Nov 22/02	---	---	---	ND	ND	0.0050	0.0011	ND	ND	0.010	1.09	---	----	ND	ND	---	---
Apr 16/03	---	---	---	ND	0.010	0.0030	0.0008	ND	ND	0.050	0.76	---	---	ND	ND	---	---
Oct 23/03	---	---	---	ND	0.008	0.0180	0.0011	ND	ND	0.007	0.84	---	---	ND	ND	---	---
Apr 26/04	---	---	---	ND	0.002	0.0030	0.0010	ND	ND	ND	0.38	---	---	ND	ND	---	---
Nov 25/04	---	---	---	ND	0.004	0.0560	0.0008	ND	ND	0.339	1.25	---	---	ND	ND	---	---
Apr 6/05	---	---	---	<0.0010	0.004	0.0240	ND	ND	ND	0.052	1.26	---	---	ND	<0.0010	---	---
Sept 1/05	---	---	---	ND	0.003	0.0110	ND	ND	ND	0.017	0.67	---	---	ND	ND	---	---
Nov 29/05	---	---	---	ND	0.003	0.0030	ND	ND	ND	0.007	1.03	---	---	ND	ND	---	---
Apr 5/06	---	---	---	ND	0.008	0.0040	0.0014	ND	ND	0.014	2.62	---	---	ND	ND	---	---
Aug 1/06	---	---	---	0.0003	0.003	0.0020	0.0007	ND	ND	ND	0.51	---	---	ND	ND	---	---
Oct 30/06	---	---		ND	0.003	0.0020	0.0009	ND	ND	0.016	0.91	---	0.002	ND	ND	---	---
Apr 23/07	---	---	---	ND	ND	0.0016	0.0004	ND	ND	0.006	0.81	---	---	ND	ND	---	---
Jul 23/07	---	---	---	ND	ND	0.002	ND	0.00003	ND	ND	0.32	---	---	0.002	ND	---	---
Oct 29/07	---	---	---	ND	ND	0.259	ND	ND	ND	0.006	0.58	---	---	ND	ND	---	---
May 6/08	---	---	---	ND	ND	ND	ND	ND	ND	0.006	0.57	---	---	ND	ND	---	---
Nov 3/08	---	---	---	ND	ND	0.003	ND	0.00003	ND	0.006	0.45	---	---	0.002	ND	---	---
May 12/09	0.0006	0.022	0.011	ND	ND	ND	ND	ND	ND	ND	0.68	---	---	ND	ND	---	---
July 29/09	0.0016	0.034	0.017	0.00005	ND	ND	0.00012	ND	---	ND	---	---	---	---	---	---	---
Oct 26/09	ND	0.033	0.012	ND	ND	ND	ND	ND	---	0.007	---	---	---	---	---	---	---
Mar 29/10	ND	0.034	ND	ND	0.002	ND	0.0004	ND	---	0.006	---	---	---	---	---	---	---
Duplicate	ND	0.034	ND	ND	ND	0.002	0.0004	ND	---	0.006	---	---	---	---	---	---	---
Aug 23/10	0.0006	0.040	0.023	ND	ND	ND	0.0004	ND	ND	ND	---	---	---	---	---	---	---
Oct 26/10	ND	0.036	0.016	ND	ND	ND	0.0004	ND	ND	ND	---	---	---	---	---	---	---
Mar 29/11	0.0004	0.030	0.007	0.00005	0.019	ND	0.00068	ND	ND	ND	---	---	---	---	---	---	---
Duplicate	0.0005	0.044	0.006	0.00463	0.006	0.006	0.00127	ND	ND	0.010	---	---	---	---	---	---	---
Aug 22/11	0.001	0.041	0.038	ND	0.002	0.002	0.00023	ND	ND	ND	---	---	---	---	---	---	---
Duplicate	0.001	0.042	0.037	0.00005	ND	0.002	0.00126	ND	ND	ND	---	---	---	---	---	---	---
Dec 7/11	0.0004	0.031	ND	ND	0.003	0.004	0.00022	ND	ND	0.007	---	---	---	---	---	---	---
Duplicate	0.0005	0.033	ND	ND	ND	0.002	0.00022	ND	ND	ND	---	---	---	---	---	---	---
Apr 11/12	0.0004	0.030	0.008	ND	ND	ND	0.00029	ND	ND	ND	---	---	---	---	---	---	---
Duplicate	0.0004	0.034	0.010	ND	ND	ND	0.00028	ND	ND	0.006	---	---	---	---	---	---	---
Oct 30/12	0.0006	0.047	0.005	ND	0.002	0.003	0.00046	ND	ND	0.010	---	---	---	---	---	---	---
Apr 9/13	0.0005	0.058	0.009	0.00003	0.0027	0.0034	0.00093	ND	0.02	0.026	---	---	---	---	---	---	---
Duplicate	0.0005	0.06	0.010	0.00002	0.0028	0.0033	0.00089	ND	0.05	0.030	---	---	---	---	---	---	---
Jul 30/13	0.0007	0.034	0.014	ND	ND	0.0023	0.00013	ND	ND	ND	---	---	---	---	---	---	---
Duplicate	0.0007	0.034	0.014	0.00006	ND	0.0037	0.00057	ND	ND	ND	---	---	---	---	---	---	---
Oct 22/13	0.0007	0.058	0.021	0.00013	0.003	0.006	0.00068	ND	ND	0.074	---	---	---	---	---	---	---
Duplicate	0.0006	0.050	0.019	0.00009	0.002	0.004	0.00060	ND	ND	0.043	---	---	---	---	---	---	---
24-Apr-14	0.0003	0.029	0.010	ND	0.002	0.0022	0.00037	ND	0.0025	0.006	---	---	---	---	---	---	---
Duplicate	0.0004	0.034	0.011	ND	0.003	0.0044	0.00074	ND	0.0028	0.014	---	---	---	---	---	---	---
10-Jul-14	0.0006	0.035	0.027	ND	ND	0.0013	0.00016	ND	ND	0.009	---	---	---	---	---	---	---
Duplicate	0.0006	0.040	0.028	ND	ND	0.0015	0.00013	ND	ND	0.010	---	---	---	---	---	---	---
Oct 8/14	0.0009	0.049	0.024	0.00002	0.004	0.0037	0.00081	ND	0.0043	0.010	---	---	---	---	---	---	---
May 12/15	0.0004	0.038	0.006	ND	0.002	0.0015	0.00046	ND	0.0035	0.008	---	---	---	---	---	---	---
Jun 23/15	0.0012	0.021	0.011	ND	ND	0.0010	0.00008	ND	ND	ND	---	---	---	---	---	---	---
Oct 29/15	0.0004	0.065	0.027	0.00002	0.007	0.0048	0.00059	ND	ND	0.040	---	---	---	---	---	---	---
Apr 13/16	0.0002	0.020	ND	ND	ND	0.0009	0.00009	ND	ND	ND	---	---	---	---	---	---	---
Aug 17/16	0.0007	0.041	0.051	ND	ND	0.0024	0.00018	ND	ND	ND	---	---	---	---	---	---	---
Oct 25/16	0.0004	0.033	0.021	ND	ND	0.0023	0.00011	ND	0.0032	ND	---	---	---	---	---	---	---
Apr 18/17	0.0003	0.024	0.016	ND	ND	0.0013	0.0002	ND	0.0029	0.009	---	---	---	---	---	---	---
Duplicate	0.0003	0.022	0.014	ND	ND	0.0011	0.00007	ND	0.0028	ND	---	---	---	---	---	---	---
Jul 17/17	0.0006	0.03	0.019	ND	<0.001	0.0011	0.00006	ND	0.0033	0.006	---	---	---	---	---	---	---
Duplicate	0.0007	0.031	0.019	0.000017	<0.001	0.0012	0.00008	ND	0.0038	0.008	---	---	---	---	---	---	---
Oct 31/17	0.0005	0.052	0.019	0.000071	0.003	0.0072	0.00091	ND	0.0062	0.027	---	---	---	---	---	---	---
Duplicate	0.0005	0.053	0.020	0.000059	0.003	0.0063	0.00086	ND	0.006	0.030	---	---	---	---	---	---	---
May 22/18	0.0009	0.046	0.015	ND	0.002	0.0018	0.00035	ND	0.0054	0.030	---	---	---	---	---	---	---
Nov 2/18	0.0003	0.056	0.030	0.000023	0.003	0.0094	0.00055	<0.00002	0.0030	0.014	---	---	---	---	---	---	---
Apr 11/19	0.0004	0.032	0.009	0.000035	0.003	0.0036	0.00074	<0.00002	0.0034	0.013	---	---	---	---	---	---	---
Duplicate	0.0004	0.033	0.009	0.000042	0.003	0.0036	0.00151	<0.00002	0.0032	0.011	---	---	---	---	---	---	---
Oct 2/19	0.0007	0.053	0.013	<0.000015	0.001	0.0004	0.00003	<0.00002	0.0014	<0.005	---	---	---	---	---	---	---
Duplicate	0.0007	0.052	0.012	<0.000015	0.002	0.0004	<0.00002	<0.00002	0.0007	0.018	---	---	---	---	---	---	---
Apr 8/20	0.0003	0.025	0.011	<0.000015	0.001	0.002	0.0002	<0.00002	0.0018	0.008	---	---	---	---	---	---	---
Aug 17/20	0.0006	0.048	0.104	<0.000015	<0.001	0.0008	0.00008	<0.00002	0.0008	0.012	---	---	---	---	---	---	---
Nov 16/20	0.0004	0.043	0.024	<0.000015	0.001	0.0022	0.0002	<0.00002	0.0016	0.009	---	---	---	---	---	---	---
Duplicate	0.0003	0.044	0.022	<0.000015	0.001	0.0019	0.00029	<0.00002	0.0014	0.006	---	---	---	---	---	---	---
May 26/21	0.0008	0.027	0.020	<0.000015	0.001	0.0016	0.00025	<0.00002	0.0017	0.008	---	---	---	---	---	---	---
Jul 14/21	0.0005	0.036	0.026	<0.000015	<0.001	0.0009	0.00005	<0.00002	0.0007	0.014	---	---	---	---	---	---	---
Oct 4/21	0.0005	0.043	0.010	<0.000015	0.001	0.0012	0.00015	<0.00002	0.0012	0.020	---	---	---	---	---	---	---

PWQO - Provincial Water Quality Objectives

1.31 - Indicates exceedence of PWQO

ND - Not Detected

Table 4.7b - Surface Water Metals Analysis
North Lancaster Waste Disposal Site

Parameter	Arsenic	Barium	Boron	Cadmium	Total Chromium	Copper	Lead	Mercury	Nickel	Zinc	Aluminum	Berylium	Cobalt	Selenium	Silver	Strontium	Vanadium
PWQO			0.2	0.0005		0.005	0.005	0.0002	0.025	0.02	0.075			0.1	0.0001		0.006
Location/Date																	
S-7																	
Apr 18/02	Dry																
Nov 22/02	Dry																
Apr 16/03	Dry																
Oct 23/03	Dry																
Apr 26/04	Dry																
Nov 25/04	Dry																
Sept 1/05	Dry																
Aug 1/06	Dry																
Oct 31/06	Dry																
Apr 23/07	Dry																
Jul 23/07	Dry																
Oct 29/07	Dry																
May 6/08	Dry																
Nov 3/08	Dry																
May 12/09	Dry																
July 29/09	Dry																
Oct 26/09	Dry																
Mar 29/10	0.0016	0.069	0.039	ND	0.003	0.003	0.0026	ND	---	0.019	---	---	---	---	---	---	---
Oct 26/10	Dry																
Mar 29/11	Dry																
Aug 22/11	Dry																
Dec 7/11	Dry																
Apr 11/12	Dry																
Oct 30/12	Dry																
Apr 9/13	0.0003	0.035	0.038	ND	ND	0.0011	0.00024	ND	ND	ND	---	---	---	---	---	---	---
Jul 30/13	Dry																
Oct 22/13	Dry																
24-Apr-14	0.0006	0.072	0.025	ND	ND	0.0013	0.00008	ND	0.0028	0.031	---	---	---	---	---	---	---
10-Jul-14	Dry																
Oct 8/14	0.0026	0.066	0.014	ND	0.004	0.0035	0.00018	ND	0.0028	0.012	---	---	---	---	---	---	---
May 12/15	Dry																
Jun 23/15	Dry																
Oct 29/15	0.0010	0.065	0.016	ND	ND	0.0021	0.00005	ND	ND	ND	---	---	---	---	---	---	---
Apr 13/16	0.0002	0.101	0.005	ND	ND	0.0010	ND	0.00003	ND	ND	---	---	---	---	---	---	---
Duplicate	0.0002	0.094	ND	ND	ND	0.0010	0.00003	ND	ND	ND	---	---	---	---	---	---	---
Aug 17/16	Dry																
Oct 25/16	0.0008	0.042	0.026	ND	ND	0.0013	0.00008	ND	0.0028	ND	---	---	---	---	---	---	---
Apr 18/17	0.0008	0.099	0.022	0.000023	0.005	0.0033	0.00078	ND	0.0067	0.008	---	---	---	---	---	---	---
Jul 17/17	dry																
Oct 31/17	Dry																
May 22/18	Dry																
Nov 2/18	0.0002	0.069	0.007	<0.000015	<0.001	0.0029	0.00046	<0.00002	0.0012	0.015	---	---	---	---	---	---	---
Apr 11/19	Dry																
Apr 8/20	Dry																
Aug 17/20	0.0004	0.053	0.099	0.00002	0.001	0.0031	0.00043	<0.00002	0.0016	0.012	---	---	---	---	---	---	---
Duplicate	0.0004	0.054	0.098	<0.000015	0.001	0.0031	0.00043	<0.00002	0.0025	0.013	---	---	---	---	---	---	---
Nov 16/20	Dry																
May 26/21	Dry																
Jul 14/21	Dry																
Oct 4/21	Dry																

PWQO - Provincial Water Quality Objectives
1.31 - Indicates exceedence of PWQO
ND - Not Detected

Table 4.7b - Surface Water Metals Analysis
North Lancaster Waste Disposal Site

Parameter	Arsenic	Barium	Boron	Cadmium	Total Chromium	Copper	Lead	Mercury	Nickel	Zinc	Aluminum	Berylium	Cobalt	Selenium	Silver	Strontium	Vanadium
PWQO			0.2	0.0005		0.005	0.005	0.0002	0.025	0.02	0.075			0.1	0.0001		0.006
Location/Date																	
S-8																	
Apr 18/02	Dry																
Nov 22/02	---	---	---	ND	ND	ND	0.0012	ND	ND	0.030	0.38	---	---	ND	ND	---	---
Apr 16/03	---	---	---	ND	0.020	0.0030	0.0011	ND	ND	ND	2.65	---	---	ND	ND	---	---
Oct 23/03	Dry																
Apr 26/04	---	---	---	ND	0.001	0.0020	0.0011	ND	ND	0.144	0.33	---	---	ND	ND	---	---
Nov 25/04	---	---	---	ND	ND	0.0520	0.0008	ND	ND	0.532	0.62	---	---	ND	ND	---	---
Apr 6/05	---	---	---	<0.0010	ND	ND	ND	ND	ND	0.014	0.11	---	---	ND	<0.0010	---	---
Sept 1/05	Dry																
Nov 29/05	---	---	---	0.0001	ND	ND	ND	ND	ND	0.008	0.46	---	---	ND	ND	---	---
Apr 5/06	---	---	---	ND	ND	ND	0.0036	ND	ND	0.011	0.20	---		ND	ND	---	---
Aug 1/06	Dry																
Oct 30/06	---	---	---	ND	ND	ND	0.0003	ND	ND	ND	0.10	---	ND	ND	ND	---	---
Apr 23/07	---	---	---	ND	ND	0.0020	0.0001	ND	ND	0.098	0.10	---		0.004	ND	---	---
Jul 23/07	---	---	---	ND	ND	0.002	ND	0.00005	ND	0.019	0.13	---		0.006	ND	---	---
Oct 29/07	---	---	---	ND	ND	ND	ND	ND	ND	0.027	0.22	---		0.006	ND	---	---
May 6/08	Dry																
Nov 3/08	---	---	---	ND	ND	ND	ND	0.00003	ND	0.042	0.11	---		ND	ND	---	---
May 12/09	0.0016	0.076	0.009	ND	ND	ND	ND	ND	ND	0.033	0.40	---	---	0.005	ND	---	---
July 29/09	Dry																
Oct 26/09	Dry																
Mar 29/10	ND	0.044	ND	ND	ND	ND	0.0002	ND	---	0.038	---	---	---	---	---	---	---
Aug 23/10	0.0009	0.063	0.034	ND	ND	ND	0.0003	ND	ND	0.520	---	---	---	---	---	---	---
Oct 26/10	ND	0.045	0.007	ND	0.002	ND	0.0003	ND	ND	0.138	---	---	---	---	---	---	---
Mar 29/11	0.0002	0.039	ND	ND	0.022	ND	0.00043	ND	ND	0.033	---	---	---	---	---	---	---
Aug 22/11	0.0012	0.096	0.046	0.00011	ND	0.003	0.00132	ND	ND	0.068	---	---	---	---	---	---	---
Dec 7/11	0.0007	0.054	ND	ND	0.002	0.002	0.00032	ND	ND	0.469	---	---	---	---	---	---	---
Apr 11/12	Dry																
Oct 30/12	Dry																
Apr 9/13	0.0003	0.025	0.0003	0.025	0.0003	0.0019	0.00019	0.00003	ND	0.006	---	---	---	---	---	---	---
Jul 30/13	Dry																
Oct 22/13	Dry																
24-Apr-14	0.0005	0.075	0.010	0.00002	ND	0.0018	0.0116	ND	0.0035	0.715	---	---	---	---	---	---	---
10-Jul-14	Dry																
Oct 8/14	0.0028	0.055	0.017	ND	ND	0.0014	0.0001	ND	0.0028	0.541	---	---		---	---	---	---
Duplicate	0.0032	0.056	0.017	0.00003	ND	0.0024	0.0002	ND	0.0029	0.492	---	---		---	---	---	---
May 12/15	Dry																
Jun 23/15	Dry																
Oct 29/15	0.0005	0.043	0.011	ND	ND	0.0016	0.00013	ND	ND	0.054	---	---	---	---	---	---	---
Apr 13/16	0.0004	0.042	0.014	ND	ND	0.0011	ND	ND	ND	0.073	---	---	---	---	---	---	---
Aug 17/16	0.0004	0.049	0.021	0.00004	0.002	0.0026	0.00063	ND	ND	0.097	---	---	---	---	---	---	---
Oct 25/16	0.0003	0.052	0.006	0.00005	0.004	0.0053	0.00179	ND	0.0040	0.147	---	---	---	---	---	---	---
Apr 18/17	0.0002	0.037	0.011	ND	ND	0.0006	ND	ND	0.0028	0.065	---	---	---	---	---	---	---
Jul 17/17	0.0001	0.033	0.009	<0.000014	<0.001	0.0007	0.00003	<0.00002	0.0020	0.151	---	---	---	---	---	---	---
Oct 31/17	0.0002	0.033	0.007	<0.000014	<0.001	0.0009	0.00006	<0.00002	0.0021	0.037	---	---	---	---	---	---	---
May 22/18	Dry																
Nov 2/18	0.0003	0.056	0.005	0.00003	0.002	0.0074	0.00070	<0.00002	0.0026	0.062	---	---	---	---	---	---	---
Apr 11/19	0.0002	0.043	0.007	0.000025	0.002	0.0047	0.00037	<0.00002	0.0023	0.020	---	---	---	---	---	---	---
Apr 8/20	0.0002	0.04	0.006	<0.000015	<0.001	0.0024	0.00014	<0.00002	0.0014	0.112	---	---	---	---	---	---	---
Aug 17/20	Dry																
Nov 16/20	Dry																
May 26/21	Dry																
Jul 14/21	Dry																
Oct 4/21	Dry																
Trip Blank																	
Apr 11/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---
Apr 9/13	0.0001	ND	ND	ND	ND	0.0004	ND	ND	ND	ND	---	---	---	---	---	---	---
Jul 30/13	ND	ND	ND	ND	ND	0.0005	ND	ND	ND	ND	---	---	---	---	---	---	---
Oct 22/13	0.0003	ND	0.019	0.00009	ND	ND	0.00054	ND	ND	ND	---	---	---	---	---	---	---
24-Apr-14	ND	ND	ND	ND	ND	0.0001	ND	ND	0.0015	ND	---	---	---	---	---	---	---
10-Jul-14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---
Oct 8/14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---
May 12/15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---
Oct 29/15	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.007	---	---	---	---	---	---	---
Apr 13/16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---
Aug 17/16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---
Oct 25/16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---
Apr 18/17	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	---	---	---	---	---	---	---
Jul 17/17	<0.0001	<0.001	<0.005	<0.000014	<0.001	<0.0001	<0.00002	<0.00002	<0.0002	<0.005	---	---	---	---	---	---	---
Oct 31/17	<0.0001	<0.001	<0.005	<0.000014	<0.001	<0.0001	<0.00002	<0.00002	<0.0002	<0.005	---	---	---	---	---	---	---
May 22/18	<0.0001	<0.001	<0.005	<0.000015	<0.001	<0.0001	<0.00002	<0.00002	<0.0002	<0.005	---	---	---	---	---	---	---
Nov 2/18	<0.0001	<0.001	<0.005	<0.000015	<0.001	0.0002	<0.00002	<0.00002	<0.0002	<0.005	---	---	---	---	---	---	---
Apr 11/19	<0.0001	<0.001	<0.005	<0.000015	<0.001	<0.0001	<0.00002	<0.00002	<0.0002	<0.005	---	---	---	---	---	---	---
Oct 2/19	<0.0001	<0.001	<0.005	<0.000015	<0.001	<0.0001	<0.00002	<0.00002	<0.0002	<0.005	---	---	---	---	---	---	---
Apr 8/20	<0.0001	0.001	<0.005	<0.000015	<0.001	0.0002	0.00002	<0.00002	<0.0002	0.007	---	---	---	---	---	---	---
Aug 17/20	<0.0001	<0.001	<0.005	<0.000015	<0.001	<0.0001	<0.00002	<0.00002	0.0003	<0.005	---	---	---	---	---	---	---
Nov 16/20	<0.0001	<0.001	<0.005	<0.000015	<0.001	<0.0001	<0.00002	<0.00002	<0.0002	<0.005	---	---	---	---	---	---	---
Jul 14/21	<0.0001	<0.001	<0.005	<0.000015	<0.001	<0.0001	<0.00002	<0.00002	<0.0002	<0.005	---	---	---	---	---	---	---
Oct 4/21	<0.0001	<0.001	<0.005	<0.000015	<0.001	<0.0001	<0.00002	<0.00002	<0.0002	<0.005	---	---	---	---	---	---	---

PWQO - Provincial Water Quality Objectives
1.31 - Indicates exceedence of PWQO
ND - Not Detected

Table 4.7c: Shallow Overburden Groundwater PWQO Comparison
North Lancaster Waste Disposal Site

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
97-2s					
Apr 24/97	7.59	6.96	0.04	0.10	0.010
Nov. 4/97	7.26	7.71	0.05	0.12	ND
May 7/98	7.12	7.51	---	0.11	ND
Oct 8/98	7.03	7.30	---	0.01	ND
Apr 21/99	---	7.36	---	ND	ND
Oct 18/99	7.26	7.42	---	ND	ND
Jan 25/00	---	---	---	---	---
May 1/00	7.12	7.60	0.12	2.15	ND
Oct 23/00	7.45	---	---	0.02	ND
Oct 24/00	---	---	0.16	---	---
May 3/01	---	8.20	---	2.31	ND
Oct 24/01	7.55	7.70	0.08	3.77	ND
Apr 17/02	7.11	6.60	---	ND	ND
Nov 11/02	7.75	7.50	---	0.02	ND
Jun 10/03	7.58	7.80	---	0.13	ND
Oct 16/03	7.59	8.20	---	0.210	ND
May 27/04	7.67	7.58	---	0.005	ND
Oct 14/04	7.71	7.15	---	0.019	ND
Jun 1/05	---	7.02	---	0.006	ND
Aug 23/05	Dry				
Nov 28/05	---	7.60	---	ND	ND
Apr 5/06	7.80	7.37	---	0.010	ND
Jul 24/06	7.10	7.83	---	ND	ND
Oct 30/06	7.19	9.94	---	ND	ND
Apr 25/07	7.33	7.51	---	0.037	ND
Jul 18/07	7.42	7.25	---	0.032	ND
Nov 1/07	7.56	7.03	---	0.026	ND
May 14/08	7.56	7.86	---	0.055	ND
Aug 5/08	7.65	7.98	---	0.058	ND
Oct 30/08	7.52	6.59	---	0.009	ND
May 19/09	7.62	7.35	0.097	0.043	ND
Aug 5/09	7.29	6.79	0.150	0.012	ND
Oct 28/09	7.34	---	---	---	ND
Apr 28/10	7.32	7.01	0.106	0.082	ND
Nov 25/10	7.42	7.02	0.099	0.062	ND
Apr 25/11	7.73	6.98	0.020	0.021	ND
Nov 3/11	7.70	6.84	0.264	0.018	ND
Apr 25/12	7.79	7.26	0.025	0.042	ND
Oct 29/12	7.64	6.60	0.207	0.151	ND
Apr 23/13	7.84	7.48	0.034	0.089	ND
Oct 29/13	7.64	6.84	0.148	0.206	ND
May 28/14	7.90	7.20	0.056	0.014	ND
Oct 1/14	Dry				
May 7/15	7.73	6.58	0.134	ND	ND
Apr 26/16	7.94	7.21	0.067	ND	ND
Oct 11/16	7.98	---	0.096	0.013	ND
Apr 18/17	7.83	7.19	0.056	<0.005	<0.001
Nov 2/17	8.03	7.09	0.032	0.006	<0.001
May 23/18	8.06	7.15	0.076	< 0.005	ND
Oct 25/18	8.04	---	---	---	---
Apr 30/19	7.91	7.04	0.010	< 0.005	< 0.002
Oct 21/19	7.91	---	0.086	< 0.005	---
Mar 31/20	7.76	7.25	0.046	0.012	<0.002
Dec 2/20	7.52	6.49	0.162	0.046	<0.002
May 25/21	8.06	7.06	0.119	0.051	<0.002
Oct 4/21	Not Sampled				

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
00-1s					
Dec 6/00	7.90	7.90	---	0.01	ND
May 3/01	---	8.40	---	ND	ND
Oct 24/01	---	---	0.05	---	---
Oct 30/01	7.28	8.00	---	ND	ND
Apr 17/02	7.49	7.20	---	0.01	ND
Nov 12/02	7.79	7.70	---	ND	ND
Jun 10/03	7.76	8.10	---	0.22	ND
Oct 16/03	7.60	7.80	---	0.234	ND
May 27/04	8.07	7.70	---	0.006	ND
Oct 14/04	7.56	6.98	---	ND	ND
2-Jun-05	7.51	7.33	---	ND	ND
Aug 23/05	7.39	---	---	0.822	ND
Nov 28/05	---	7.95	---	ND	ND
Apr 6/06	8.16	7.46	---	ND	ND
Jul 24/06	7.28	7.64	---	ND	ND
Oct 31/06	7.65	8.61	---	ND	ND
Apr 25/07	7.74	7.72	---	ND	ND
Jul 19/07	7.71	7.18	---	0.027	ND
Oct 31/07	7.76	7.28	---	0.061	ND
May 14/08	8.06	7.99	---	ND	ND
Aug 5/08	7.80	7.78	---	0.007	ND
Oct. 30/08	7.91	7.72	---	ND	ND
May 19/09	7.60	7.05	0.022	0.095	ND
Aug 5/09	7.52	6.90	0.041	0.020	ND
Nov 3 /09	7.57	6.96	0.046	0.057	ND
Apr 28/10	7.93	6.93	0.024	0.031	ND
Nov 29/10	7.62	7.33	0.029	0.039	ND
Apr 26/11	7.98	7.24	ND	0.035	ND
Nov 3/11	7.78	7.07	0.077	0.028	ND
Apr 26/12	8.09	7.66	0.013	ND	ND
Oct 29/12	7.77	6.76	0.056	0.011	ND
Apr 23/13	Damaged				
Oct 30/13	7.39	7.24	0.062	ND	ND
May 29/14	8.21	7.30	0.014	ND	ND
Duplicate	8.19	---	0.014	ND	ND
Oct 1/14	7.69	7.00	0.036	ND	ND
Jun 8/15	7.95	6.87	0.026	ND	ND
Oct 8/15	7.74	7.37	0.039	ND	ND
Apr 27/16	8.00	7.49	ND	ND	ND
Oct 12/16	8.06	7.67	0.035	ND	ND
Apr 19/17	8.07	7.55	0.010	ND	ND
Nov 1/17	8.09	7.18	0.049	ND	ND
May 22/18	Damaged				
Oct 25/18	8.11	7.15	0.033	0.005	< 0.002
May 1/19	7.82	7.62	0.009	< 0.005	< 0.002
Oct 21/19	7.88	6.98	0.026	< 0.005	< 0.002
Mar 31/20	7.7	7.5	0.012	0.012	<0.002
Dec 2/20	7.55	7.33	0.037	0.038	<0.002
May 26/21	8.11	6.98	0.023	0.012	<0.001
Oct 4/21	7.55	6.99	0.035	0.056	<0.002

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
00-2s					
Dec 6/00	7.00	7.90	---	ND	ND
May 3/01	---	8.20	---	0.10	ND
Oct 24/01	---	---	0.05	---	---
Oct 30/01	7.37	7.60	---	0.15	ND
Apr 17/02	7.39	7.10	---	0.01	ND
Nov 12/02	8.13	7.60	---	0.03	ND
Jun 10/03	7.88	8.10	---	0.47	ND
Oct 23/03	8.08	7.80	---	0.583	ND
May 27/04	8.00	7.93	---	0.051	ND
Oct 14/04	7.92	7.24	---	0.077	ND
Jun 2/05	7.56	6.22	---	0.065	ND
Aug 23/05	7.46	---	---	1.06	ND
Nov 28/05	---	8.08	---	0.310	ND
Apr 13/06	7.34	7.43	---	0.150	ND
Jul 24/06	7.32	7.91	---	0.578	ND
Oct31/06	7.96	6.58	---	0.802	ND
Apr 26/07	7.46	8.93	---	0.331	ND
Jul 23/07	8.11	7.92	---	0.431	ND
Nov 1/07	7.63	7.41	---	0.586	ND
May 14/08	7.98	7.85	---	0.492	ND
Aug 5/08	7.76	7.51	---	0.361	ND
Oct.30/08	8.25	8.03	---	0.436	ND
May 19/09	7.59	8.12	0.041	0.389	ND
Aug 5/09	7.65	7.19	0.053	0.467	ND
Nov 3/09	8.01	7.72	0.059	0.444	ND
Apr 28/10	7.02	7.17	0.074	0.519	ND
Nov 29/10	7.71	7.84	0.061	0.291	ND
Apr 26/11	8.30	7.36	0.042	0.019	ND
Nov 3/11	7.89	7.31	0.073	0.548	ND
Apr 26/12	8.16	7.04	0.051	0.405	ND
Oct 29/12	7.84	7.23	0.062	0.553	ND
Apr 24/13	8.05	7.20	0.058	0.642	ND
Oct 29/13	7.88	7.48	0.055	0.380	ND
May 29/14	8.13	7.11	0.044	0.339	ND
Oct 2/14	7.99	7.14	0.047	0.500	0.005
May 6/15	7.97	7.11	0.055	0.316	ND
Oct 13/15	7.95	7.57	0.041	0.332	ND
Apr 26/16	7.99	7.68	0.035	0.210	ND
Oct 12/16	8.04	7.45	0.030	0.228	ND
Apr 19/17	7.93	7.04	0.044	0.517	ND
Nov 1/17	8.02	7.36	0.041	0.215	ND
May 24/18	8.06	7.32	0.032	0.120	< 0.001
Oct 25/18	8.00	7.77	0.029	0.253	< 0.002
May 1/19	7.90	7.17	0.037	0.202	0.012
Oct 22/19	7.98	7.20	0.017	< 0.005	0.001
Apr 1/20	7.81	7.17	0.047	0.283	0.003
Dec 1/20	7.71	7.18	0.043	0.325	<0.002
May 26/21	8.26	7.22	0.040	0.300	<0.001
Oct 4/21	7.72	7.15	0.039	0.371	<0.002

All values are in mg/L, except pH (no units).

🟦 Shaded cells indicate concentrations exceeding Provincial Water Quality Objectives (PWQO)

ND - Not Detected

Table 4.7c: Shallow Overburden Groundwater PWQO Comparison
North Lancaster Waste Disposal Site

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
00-3s					
Dec 6/00	7.69	8.70	---	0.14	ND
May 3/01	---	8.10	---	0.43	ND
Oct 24/01	---	---	0.15	---	---
Oct 30/01	7.89	7.80	---	ND	ND
Apr 17/02	7.31	6.90	---	ND	ND
Nov 12/02	8.59	8.00	---	ND	ND
Jun 5/03	8.26	8.30	---	0.210	ND
Oct 16/03	8.26	7.90	---	0.189	ND
May 27/04	8.30	8.24	---	ND	ND
Oct 18/04	7.92	7.71	---	ND	ND
Jun 2/05	7.88	---	---	ND	ND
Aug 23/05	8.09	---	---	3.83	ND
Nov 28/05	---	8.71	---	0.009	ND
Apr 6/06	7.92	7.56	---	ND	ND
Jul 20/06	7.84	8.06	---	ND	ND
Oct31/06	8.04	8.10	---	ND	ND
Apr 26/07	7.43	7.93	---	ND	ND
Jul 23/07	7.99	8.20	---	0.018	ND
Oct 31/07	7.85	7.80	---	0.035	ND
May 14/08	7.38	8.24	---	0.006	ND
Aug 5/08	7.95	8.09	---	0.012	ND
Oct.30/08	7.94	8.15	---	ND	ND
May 19/09	7.78	8.45	0.137	0.021	ND
Aug 4/09	7.55	7.19	0.129	0.011	ND
Oct 26/09	7.94	7.78	0.132	ND	ND
Apr 26/10	8.23	7.74	0.147	0.006	ND
Nov 29/10	8.19	8.09	0.145	0.037	ND
Apr 25/11	8.32	7.70	0.142	0.015	ND
Nov 3/11	7.98	7.71	0.177	0.024	ND
Apr 25/12	8.15	8.02	0.120	ND	ND
Oct 30/12	8.18	7.89	0.162	ND	ND
Apr 23/13	8.14	7.63	0.158	0.086	ND
Oct 29/13	8.12	7.45	0.135	ND	ND
May 29/14	8.30	8.22	0.126	ND	ND
Oct 1/14	8.02	7.69	0.150	ND	ND
May 6/15	8.19	7.60	0.152	0.012	ND
Oct 8/15	7.96	8.03	0.153	ND	ND
Apr 26/16	8.16	7.59	0.152	ND	ND
Oct 11/16	8.19	7.93	0.109	ND	ND
Apr 18/17	8.18	7.65	0.175	<0.005	<0.001
Nov 1/17	8.27	7.74	0.161	<0.005	<0.001
May 24/18	8.30	7.76	0.148	< 0.005	< 0.001
Oct 25/18	8.08	7.97	0.161	< 0.005	< 0.002
Apr 29/19	8.23	7.78	0.152	< 0.005	< 0.002
Oct 22/19	8.17	8.17	0.176	< 0.005	< 0.001
Mar 31/20	8.07	8.27	0.15	0.009	<0.002
Dec 2/20	8.14	7.18	0.165	0.018	<0.002
May 25/21	8.46	8.16	0.145	0.035	<0.002
Oct 4/21	7.97	7.92	0.159	<0.005	<0.002

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
00-4s					
Dec 6/00	7.44	8.30	---	ND	ND
May 3/01					
Apr 17/02	7.59	7.00	---	ND	ND
Nov 12/02	7.95	7.90	---	0.48	ND
Jun 5/03	7.90	8.00	---	0.16	ND
Oct 16/03	8.07	7.90	---	0.026	ND
May 27/04	8.01	7.72	---	ND	ND
Oct 18/04	7.54	7.21	---	ND	ND
Jun 2/05	7.27	---	---	ND	ND
Aug 24/05	7.30	7.47	---	0.012	ND
Nov 28/05	---	7.84	---	0.008	ND
Apr 13/06	7.55	7.54	---	0.055	ND
Aug 4/06	7.50	7.83	---	ND	ND
Oct31/06	7.78	7.70	---	ND	ND
Apr 25/07	7.53	7.51	---	ND	ND
Jul 23/07	7.75	7.31	---	ND	ND
Oct 31/07	8.01	7.64	---	0.105	ND
May 14/08	7.41	7.50	---	ND	ND
Aug 5/08	7.67	7.79	---	ND	ND
Oct.30/08	7.79	7.83	---	ND	ND
May 14/09	7.69	8.18	0.026	0.016	ND
Aug 4/09	7.42	7.44	0.024	0.022	ND
Oct 28/09	7.51	7.02	0.013	0.009	ND
Apr 26/10	7.80	7.40	0.031	< 0.005	ND
Nov 22/10	---	7.44	---	---	---
Apr 25/11	7.93	7.28	0.04	0.034	ND
Nov 2/11	Not Sampled				
Apr 25/12	7.91	7.88	0.010	ND	ND
Oct 29/12	Not Sampled				
Apr 23/13	7.95	7.48	0.035	0.237	ND
May 29/14	8.13	7.43	0.026	ND	ND
May 6/15	8.02	7.24	0.032	0.026	ND
Apr 27/16	8.00	7.42	ND	ND	ND
Apr 17/17	8.07	7.45	0.033	ND	ND
May 22/18	8.21	7.54	0.032	0.021	ND
Apr 29/19	8.09	7.27	0.032	< 0.005	< 0.002
Apr 7/20	7.98	7.24	0.027	<0.005	<0.002
May 26/21	8.14	7.19	0.021	0.047	0.001

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
06-1s					
Apr 13/06	7.65	7.62	---	ND	ND
Jul 24/06	7.13	7.88	---	ND	ND
Oct 31/06	7.45	7.43	---	0.007	ND
Apr 26/07	7.41	7.48	---	0.015	ND
Jul 19/07	7.64	7.12	---	0.242	ND
Nov 1/07	7.47	7.50	---	0.077	ND
May 14/08	7.82	7.71	---	0.035	ND
Aug 5/08	7.70	7.34	---	0.007	ND
Oct 30/08	8.07	7.86	---	ND	ND
May 19/09	7.52	7.88	0.005	0.040	ND
Aug 5/09	7.45	6.95	0.021	0.195	ND
Nov 3/09	7.69	7.44	0.021	0.023	ND
Apr 28/10	7.73	7.33	ND	0.021	ND
Nov 29/10	7.55	7.10	0.007	0.063	ND
Ap 26/11	7.73	7.31	ND	0.093	ND
Nov 3/11	8.09	7.07	0.025	0.130	ND
Apr 26/12	8.12	7.26	ND	0.022	ND
Oct 29/12	7.72	7.40	0.010	0.012	ND
May 8/13	7.74	7.24	ND	0.011	ND
Oct 29/13	7.40	7.55	ND	0.015	ND
May 29/14	8.17	7.25	ND	ND	ND
Oct 1/14	7.93	7.41	0.027	ND	ND
May 12/15	8.16	7.72	ND	0.012	ND
Oct 13/15	7.82	7.48	0.023	0.031	ND
Apr 27/16	7.95	7.48	ND	0.006	ND
Oct 12/16	Dry				
Apr 19/17	7.91	7.42	0.006	ND	ND
Nov 1/17	7.94	7.20	0.009	0.007	ND
May 28/18	7.73	7.66	ND	ND	ND
Oct 24/18	Not enough to sample				
May 1/19	7.94	7.77	0.005	< 0.005	< 0.002
Oct 21/19	7.94	7.26	0.008	< 0.005	< 0.002
Apr 1/20	7.96	7.66	0.007	<0.005	0.004
Dec 2/20	7.88	6.75	0.006	0.005	<0.002
May 25/21	8.07	---	0.006	0.019	<0.002
Oct 4/21	7.59	7.14	0.012	0.087	<0.002

All values are in mg/L, except pH (no units).

▨ Shaded cells indicate concentrations exceeding Provincial Water Quality Objectives (PWQO)

ND - Not Detected

Table 4.7d: Deep Overburden Groundwater PWQO Comparison
North Lancaster Waste Disposal Site

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
96-2d					
Aug 12/96	---	7.10	---	0.64	ND
Oct 8/96	---	7.77	---	ND	ND
Apr 24/97	7.36	7.25	0.02	0.16	ND
Nov. 4/97	7.40	7.91	---	0.03	ND
May 7/98	7.24	7.54	---	0.06	ND
Oct 8/98	7.20	7.34	---	0.01	ND
Apr 21/99	---	7.39	---	0.01	ND
Oct 18/99	7.28	7.53	---	ND	ND
Jan 25/00	---	---	---	---	---
May 1/00	7.13	7.50	---	ND	ND
Oct 23/00	7.45	7.70	---	ND	ND
May 3/01	---	8.20	---	0.02	ND
Oct 24/01	7.44	7.60	---	6.57	ND
Apr 17/02	7.32	6.70	---	ND	0.001
Nov 11/02	7.82	7.40	---	2.56	ND
Jun 3/03	7.47	7.70	---	0.09	ND
Oct 16/03	7.44	7.20	---	0.152	ND
May 27/04	7.77	7.37	---	ND	ND
Oct 14/04	7.46	6.84	---	0.014	ND
Jun 1/05	---	7.02	---	0.005	ND
Aug 23/05	7.26	---	---	1.80	ND
Nov 28/05	---	7.51	---	ND	ND
Apr 6/06	7.79	7.64	---	ND	ND
Jul 20/06	7.46	7.46	---	0.014	ND
Oct 31/06	7.60	7.42	---	ND	ND
Apr 25/07	7.21	7.62	---	ND	ND
Jul 18/07	7.44	7.10	---	0.106	ND
Oct 31/07	7.82	7.39	---	0.393	ND
May 14/08	7.09	7.58	---	0.02	ND
Aug 5/08	7.81	8.09	---	0.029	ND
Oct.30/08	7.85	6.71	---	0.316	ND
May 19/09	7.75	7.25	---	0.016	ND
Aug 4/09	7.17	7.03	ND	0.010	ND
Oct 28/09	7.47	7.24	ND	0.026	ND
Apr 26/10	7.66	7.16	ND	0.023	ND
Nov 25/10	7.43	7.19	ND	0.036	ND
Apr 25/11	7.96	7.14	ND	0.042	ND
Nov 3/11	7.76	7.18	0.031	0.026	ND
Apr 25/12	7.80	8.57	ND	ND	ND
Oct 30/12	7.74	7.44	0.009	0.023	ND
Apr 23/13	7.89	6.86	ND	0.082	ND
Oct 29/13	7.72	7.31	ND	ND	ND
May 28/14	7.99	7.19	ND	ND	ND
Oct 1/14	7.97	7.21	0.006	0.023	ND
May 7/15	7.65	7.09	0.030	0.060	ND
Oct 8/15	7.74	7.14	0.072	1.91	ND
Apr 26/16	7.86	7.11	0.020	0.010	ND
Oct 11/16	7.73	7.34	0.036	1.14	ND
Apr 18/17	7.93	7.41	0.030	<0.005	<0.001
Nov 2/17	8.12	7.13	0.025	0.008	<0.001
May 24/18	7.99	7.05	0.023	0.036	< 0.001
Oct 25/18	7.80	6.95	0.148	3.04	0.004
May 1/19	7.90	7.20	0.017	0.038	< 0.002
Oct 21/19	7.78	6.77	0.167	3.49	< 0.002
Mar 31/20	7.73	7.12	0.041	0.066	<0.002
Dec 2/20	7.59	6.77	0.061	0.094	<0.002
May 25/21	8.07	6.80	0.006	0.012	<0.002
Oct 4/21	7.47	6.93	0.232	4.40	<0.002

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
06-1d					
Apr 13/06	7.49	7.55	---	0.013	ND
Jul 24/06	7.11	7.82	---	0.005	ND
Oct31/06	7.49	7.38	---	ND	ND
Apr 26/07	7.41	7.51	---	0.015	ND
Jul 19/07	7.75	7.11	---	0.034	ND
Nov 1/07	7.48	7.40	---	4.20	ND
May 14/08	7.95	7.99	---	0.064	ND
Aug 5/08	7.68	7.28	---	0.072	ND
Oct.30/08	8.13	7.54	---	ND	ND
May 19/09	7.99	8.12	ND	0.065	ND
Aug 5/09	7.70	6.96	0.014	0.025	ND
Nov 3/09	7.66	7.39	0.016	0.012	ND
Apr 28/10	7.88	7.48	ND	0.067	ND
Nov 29/10	7.51	7.07	ND	0.047	ND
Apr 25/11	7.70	7.41	ND	0.057	ND
Nov 3/11	8.05	7.01	0.031	0.167	ND
Apr 26/12	8.09	7.28	ND	0.073	ND
Oct 29/12	7.72	7.20	0.015	0.501	ND
Apr 24/13	8.13	7.29	0.009	0.937	ND
Oct 29/13	7.67	6.93	ND	0.121	ND
May 29/14	8.12	7.22	0.006	0.119	ND
Oct 1/14	7.96	7.23	0.024	0.562	ND
May 6/15	7.99	6.98	0.012	0.038	ND
Duplicate	7.96	6.98	0.012	0.049	ND
Oct 8/15	7.73	7.27	0.013	0.344	ND
Apr 27/16	8.00	7.62	ND	0.137	ND
Oct 12/16	7.99	7.35	0.007	ND	ND
Apr 19/17	7.89	7.74	ND	ND	ND
Nov 1/17	7.99	7.28	0.014	0.009	ND
Duplicate	7.98	7.28	0.013	ND	ND
May 28/18	8.23	7.66	ND	0.046	ND
Oct 25/18	8.00	6.53	0.010	< 0.005	< 0.002
May 1/19	7.93	7.60	< 0.005	< 0.005	< 0.002
Oct 21/19	7.94	7.41	0.008	< 0.005	< 0.002
Apr 1/20	7.92	7.66	0.007	0.005	0.005
Dec 2/20	7.87	6.63	0.008	0.019	<0.002
May 25/21	8.05	8.11	0.006	0.033	<0.002
Oct 4/21	7.68	7.09	0.009	0.517	<0.002

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
06-4d					
Apr 6/06	7.63	7.26	---	ND	0.003
Jul 24/06					
Oct31/06	7.58	7.30	---	ND	ND
Apr 25/07	7.62	7.69	---	0.012	ND
Jul 24/07	7.13	7.18	---	0.041	ND
Oct 31/07	8.07	7.22	---	ND	ND
May 14/08	8.08	8.20	---	0.061	ND
Aug 5/08	7.90	7.57	---	0.309	ND
Oct.30/08	7.88	6.73	---	ND	ND
May 19/09	7.60	8.12	0.012	0.020	ND
Aug 5/09	7.16	6.76	0.028	0.019	ND
Nov 3/09	7.45	7.31	0.028	0.058	ND
Apr 28/10	7.96	7.47	0.009	0.052	ND
Nov 25/10	7.43	7.24	0.015	0.061	ND
Apr 26/11	8.32	7.76	ND	0.075	ND
Nov 2/11		7.45			
Apr 26/12	8.10	7.40	ND	0.051	ND
Oct 29/12	7.77	6.85	0.030	0.068	ND
Apr 23/13	7.94	7.40	0.009	0.072	ND
Oct 29/13	7.66	6.83	0.027	0.033	ND
May 28/14	8.13	7.49	0.013	0.009	ND
May 12/15	8.15	7.55	1.05	0.327	ND
Oct 8/15	8.02	7.57	1.04	0.513	ND
Apr 26/16	8.11	7.81	1.11	0.286	ND
Oct 12/16	7.93	7.77	1.18	0.187	ND
Duplicate	7.88	7.77	1.15	0.172	ND
Apr 19/17	7.97	7.66	1.16	0.289	ND
Nov 2/17	8.06	7.66	1.16	0.500	<0.001
May 23/18	8.17	7.64	0.011	ND	ND
Oct 24/18	Not enough to sample				
May 1/19	7.82	7.43	0.006	< 0.005	< 0.002
Oct 21/19	7.87	7.32	0.017	< 0.005	< 0.002
Mar 31/20	7.86	7.24	0.007	0.024	<0.002
Dec 2/20	7.73	6.72	0.007	0.014	<0.002
May 25/21	Dry				
Oct 4/21	Dry				

All values are in mg/L, except pH (no units).

▨ Shaded cells indicate concentrations exceeding Provincial Water Quality Objectives (PWQO)

ND - Not Detected

Table 4.7e: Shallow Bedrock Groundwater PWQO Comparison
North Lancaster Waste Disposal Site

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
99-2sBR					
Apr 21/99	---	7.15	---	0.02	ND
Oct 18/99	7.24	7.27	---	2.22	ND
Jan 25/00	---	---	---	---	---
May 1/00	7.18	7.60	0.04	ND	ND
Oct 23/00	7.23	7.30	---	2.16	ND
Oct 24/00	---	---	0.23	---	---
May 3/01	---	7.90	---	1.04	ND
Oct 24/01	7.50	7.60	0.14	3.76	ND
Apr 17/02	7.11	6.90	---	0.16	ND
Nov 11/02	7.81	7.50	---	3.06	ND
Jun 3/03	7.44	7.70	---	0.840	ND
Oct 16/03	7.74	7.40	---	0.430	ND
May 27/04	7.76	7.44	---	0.159	ND
Oct 14/04	7.31	6.72	---	1.51	ND
Jun 1/05	---	7.02	---	1.18	ND
Aug 23/05	7.41	---	---	0.650	ND
Nov 28/05	---	7.27	---	0.009	ND
Apr 6/06	7.78	7.34	---	ND	ND
Jul 20/06	7.52	7.74	---	1.14	ND
Oct 31/06	7.65	7.23	---	1.93	ND
Apr 25/07	7.41	7.40	---	0.071	ND
Jul 18/07	7.34	6.98	---	1.18	ND
Oct 31/07	7.72	7.16	---	0.338	ND
May 14/08	6.87	7.31	---	ND	ND
Aug 5/08	7.62	7.35	---	0.771	ND
Oct.30/08	7.76	6.77	---	3.02	ND
May 19/09	7.58	7.26	0.066	0.330	ND
Aug 4/09	7.11	7.23	0.067	2.24	ND
Oct 28/09	7.23	7.07	0.075	2.91	ND
Apr 26/10	7.66	7.21	0.056	0.018	ND
Nov 25/10	7.49	7.25	0.047	0.602	ND
Apr 25/11	7.94	7.18	0.037	0.031	ND
Nov 2/11	7.68	6.92	0.090	0.372	ND
Apr 26/12	7.77	9.83	0.046	ND	ND
Oct 30/12	7.66	7.34	0.104	2.09	ND
Apr 23/13	7.77	6.89	0.091	0.357	ND
Oct 29/13	7.69	7.31	0.066	0.859	ND
Duplicate	7.76	---	0.064	1.16	ND
May 28/14	7.97	7.19	0.054	ND	ND
Oct 1/14	7.93	7.27	0.078	0.336	ND
May 7/15	7.79	6.98	0.057	1.13	ND
Oct 8/15	7.68	7.17	0.084	1.68	ND
Apr 26/16	7.83	7.17	0.047	1.50	ND
Oct 11/16	7.79	7.36	0.069	1.69	ND
Apr 18/17	7.93	7.27	0.082	2.20	<0.001
Nov 2/17	8.15	7.07	0.063	1.53	<0.001
May 24/18	8.00	7.10	0.053	1.13	< 0.001
Oct 25/18	7.89	7.05	0.136	1.80	< 0.002
May 1/19	7.50	7.00	0.077	1.29	< 0.002
Oct 21/19	7.78	6.83	0.186	2.22	< 0.002
Mar 31/20	7.69	7.14	0.11	1.34	<0.002
Dec 1/20	7.47	7.30	0.13	1.81	<0.002
May 25/21	8.23	6.77	0.11	1.15	<0.002
Oct 4/21	7.55	7.05	0.207	2.10	<0.002

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
99-6sBR					
Apr 21/99	---	7.00	---	3.12	ND
Oct 18/99	7.18	7.09	---	3.92	ND
Jan 25/00	---	---	---	---	---
May 1/00	6.99	7.40	0.15	0.39	ND
Oct 23/00	7.36	7.60	---	ND	ND
Oct 24/00	---	---	0.23	---	---
May 3/01	---	7.80	---	0.14	ND
Oct 24/01	7.59	7.60	0.19	7.91	ND
Apr 17/02	6.94	6.70	---	3.27	ND
Nov 11/02	7.82	7.50	---	1.21	ND
Jun 3/03	7.62	7.60	---	0.82	ND
Oct 16/03	7.59	7.50	---	0.409	ND
May 27/04	7.86	7.60	---	0.327	ND
Oct 14/04	7.53	6.86	---	0.211	ND
Jun 1/05	---	7.05	---	0.393	ND
Aug 23/05	7.30	---	---	0.494	ND
Nov 28/05	---	6.32	---	0.877	ND
Apr 5/06	7.58	6.92	---	1.10	ND
Jul 24/06	7.33	7.82	---	0.325	ND
Oct 30/06	7.28	7.71	---	2.59	ND
Apr 25/07	7.21	7.24	---	0.395	ND
Jul 18/07	7.55	7.14	---	0.622	ND
Nov 1/07	7.48	7.21	---	3.27	ND
May 14/08	7.56	7.41	---	0.93	ND
Aug 5/08	7.74	7.57	---	0.304	ND
Oct.30/08	7.78	6.90	---	0.524	ND
May 19/09	7.49	7.03	0.378	0.188	ND
Aug 5/09	7.68	6.85	0.079	0.508	ND
Oct 28/09	7.24	6.94	0.152	0.785	ND
Apr 28/10	6.89	6.93	0.194	2.65	ND
Nov 25/10	7.38	7.07	0.222	3.21	ND
Apr 25/11	7.60	6.94	0.135	1.30	ND
Nov 3/11	7.91	6.98	0.138	0.864	ND
Apr 25/12	7.68	7.05	0.147	1.37	ND
Oct 29/12	7.75	6.71	0.177	0.868	ND
Apr 23/13	7.90	7.17	0.200	1.28	ND
Oct 29/13	7.71	7.31	0.104	0.644	ND
May 28/14	7.90	7.10	0.166	0.952	ND
Oct 1/14	7.96	7.78	0.134	1.67	ND
May 7/15	7.72	6.90	0.169	0.806	ND
Oct 8/15	7.78	7.51	0.154	0.932	ND
Apr 26/16	7.94	7.62	0.145	0.943	ND
Oct 11/16	7.93	7.10	0.168	0.977	ND
Apr 18/17	7.82	7.10	0.190	0.932	<0.001
Nov 2/17	8.13	7.16	0.155	0.964	<0.001
May 23/18	8.03	7.09	0.110	0.455	ND
Oct 25/18	7.83	7.02	0.133	0.012	0.004
Apr 30/19	7.88	6.97	0.133	0.125	< 0.002
Oct 21/19	7.79	7.06	0.183	0.771	< 0.002
Mar 31/20	7.73	7.15	0.134	0.708	<0.002
Dec 2/20	7.8	6.72	0.144	0.816	<0.002
May 25/21	8.2	6.98	0.145	1.19	<0.002
Oct 4/21	7.65	7.16	0.257	1.77	<0.002

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
00-2sBR					
Dec 6/00	8.06	9.00	---	3.67	ND
May 3/01	---	8.40	---	0.37	0.006
Oct 24/01	---	---	1.05	---	---
Oct 30/01	7.87	7.70	---	1.43	ND
Apr 17/02	8.14	7.40	---	0.02	ND
Nov 12/02	8.56	7.80	---	ND	ND
Jun 10/03	7.87	9.00	---	0.050	ND
Oct 23/03	8.41	8.60	---	0.008	ND
May 27/04	8.14	7.36	---	0.031	ND
Oct 14/04	8.62	8.82	---	0.007	0.019
Jun 2/05	8.32	7.94	---	0.007	ND
Aug 23/05	8.50	---	---	0.590	<0.007
Nov 28/05	---	8.73	---	0.006	0.005
Apr 13/06	7.80	8.18	---	0.007	0.008
Jul 24/06	8.33	8.48	---	ND	0.012
Oct31/06	8.05	8.51	---	ND	0.014
Apr 26/07	8.24	8.93	---	ND	0.005
Jul 23/07	8.57	8.15	---	0.010	0.012
Nov 1/07	7.89	8.45	---	0.026	0.009
May 14/08	8.18	8.99	---	0.025	0.004
Aug 5/08	7.98	7.91	---	0.022	ND
Oct.30/08	8.40	6.72	---	ND	0.004
May 19/09	7.78	8.05	0.545	0.023	0.031
Aug 5/09	8.16	7.71	0.474	0.033	0.009
Nov 3/09	8.54	8.24	0.459	0.144	0.010
Apr 28/10	8.64	8.00	0.564	0.046	0.009
Nov 29/10	7.81	8.22	0.586	0.183	0.012
Apr 26/11	8.40	8.12	0.509	0.020	ND
Nov 3/11	8.29	7.92	0.673	0.050	0.011
Apr 26/12	8.36	8.14	0.526	ND	0.014
Oct 29/12	8.32	7.87	0.626	ND	0.009
Apr 24/13	8.03	7.39	0.551	0.022	ND
Oct 29/13	8.28	8.19	0.498	0.006	0.005
May 29/14	8.40	8.25	0.589	ND	0.008
Oct 1/14	8.24	7.89	0.619	0.057	0.003
May 6/15	8.37	7.86	0.563	0.017	0.003
Oct 13/15	7.93	7.90	0.505	ND	0.009
Apr 26/16	8.19	8.07	0.552	ND	ND
Oct 12/16	8.16	7.90	0.477	ND	0.009
Apr 19/17	8.20	7.36	0.560	0.009	0.002
Nov 1/17	8.29	7.73	0.503	ND	0.010
May 24/18	8.14	7.83	0.497	0.005	0.013
Oct 25/18	8.12	8.08	0.553	< 0.005	< 0.002
May 1/19	8.14	7.69	0.492	< 0.005	< 0.002
Oct 22/19	8.31	7.72	0.566	0.005	0.009
Apr 1/20	8.21	7.99	0.560	0.008	0.022
Dec 1/20	8.04	7.69	0.517	0.007	0.012
May 26/21	8.49	7.65	0.530	0.005	<0.001
Oct 4/21	8.18	7.64	0.525	<0.005	0.014

All values are in mg/L, except pH (no units).

▨ Shaded cells indicate concentrations exceeding Provincial Water Quality Objectives (PWQO)

ND - Not Detected

Table 4.7e: Shallow Bedrock Groundwater PWQO Comparison
North Lancaster Waste Disposal Site

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
00-4sBR					
Dec 6/00	7.53	8.80	---	0.02	ND
May 3/01	---	8.30	---	0.31	ND
Oct 24/01	---	---	0.41	---	---
Oct 30/01	7.70	7.80	---	ND	ND
Apr 17/02	7.42	6.90	---	0.03	ND
Nov 12/02	8.11	8.00	---	0.28	ND
Jun 5/03	8.40	8.20	---	0.08	ND
Oct 16/03	8.14	7.90	---	ND	ND
May 27/04	8.26	8.23	---	0.010	ND
Oct 18/04	7.66	7.22	---	0.059	ND
Jun 2/05	7.87	7.72	---	0.009	ND
Aug 23/05	8.18	---	---	0.410	ND
Nov 28/05	---	8.00	---	0.034	ND
Apr 6/06	8.31	7.77	---	0.195	ND
Jul 24/06	7.95	8.16	---	0.006	ND
Oct31/06	8.11	8.16	---	ND	0.004
Apr 25/07	7.91	8.04	---	ND	0.012
Jul 23/07	7.82	---	---	0.116	ND
Oct 31/07	8.62	7.72	---	0.084	ND
May 14/08	6.17	8.33	---	0.020	0.008
Aug 5/08	7.82	8.34	---	ND	ND
Oct.30/08	7.88	8.07	---	0.037	ND
May 14/09	8.08	8.60	0.429	0.017	0.006
Aug 4/09	7.73	7.96	0.429	0.022	0.006
Oct 28/09	7.86	7.51	0.184	0.102	ND
Apr 26/10	8.23	7.77	0.490	0.037	0.004
Nov 29/10	8.16	8.02	0.461	0.053	0.006
Apr 25/11	7.88	7.84	0.424	0.031	0.006
Nov 2/11	7.96	7.89	0.527	0.033	0.005
Apr 25/12	8.14	7.96	0.303	0.018	ND
Oct 30/12	8.13	7.84	0.438	0.150	0.003
Apr 23/13	8.31	7.70	0.536	0.020	0.007
Oct 29/13	8.23	8.17	0.474	0.010	0.004
May 29/14	8.26	7.89	0.493	0.006	0.002
Oct 1/14	8.32	8.26	0.469	ND	ND
May 6/15	8.12	7.26	0.144	0.033	ND
Oct 8/15	7.81	7.58	0.073	0.030	ND
Apr 26/16	8.10	7.60	0.182	0.020	ND
Oct 11/16	7.98	7.56	0.042	0.006	ND
Apr 17/17	8.07	7.50	0.135	0.024	ND
Nov 1/17	8.14	7.45	0.080	0.041	ND
May 24/18	8.13	7.91	0.209	0.015	< 0.001
Oct 25/18	8.02	7.77	0.101	0.026	< 0.002
Apr 29/19	8.27	8.13	0.441	< 0.005	0.011
Oct 22/19	8.11	7.32	0.066	0.027	< 0.001
Apr 7/20	7.89	7.5	0.185	0.027	<0.002
Dec 1/20	7.87	7.39	0.079	0.024	<0.002
May 26/21	8.24	7.71	0.192	0.03	<0.001
Oct 4/21	7.89	7.57	0.119	0.017	<0.002

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
00-5sBR					
Dec 6/00	7.33	8.60	---	0.01	ND
May 3/01	---	8.20	---	0.15	ND
Oct 24/01	---	---	0.03	---	---
Oct 30/01	7.60	8.00	---	ND	ND
Apr 17/02	7.41	7.10	---	ND	ND
Nov 12/02	8.11	7.60	---	ND	ND
Jun 5/03	7.89	8.50	---	0.57	ND
Oct 16/03	7.81	7.90	---	0.132	ND
May 27/04	7.82	7.68	---	ND	ND
Oct 18/04	7.42	6.97	---	ND	ND
Jun 2/05	7.46	7.34	---	ND	ND
Aug 23/05	7.76	---	---	1.16	ND
Nov 28/05	---	7.62	---	0.005	ND
Apr 6/06	7.70	7.41	---	ND	ND
Jul 20/06	7.60	7.85	---	ND	ND
Oct31/06	7.80	7.65	---	ND	ND
Apr 25/07	7.49	7.61	---	ND	ND
Jul 23/07	7.61	7.38	---	0.033	ND
Oct 31/07	7.89	7.27	---	1.40	ND
May 14/08	7.67	7.95	---	0.064	ND
Aug 5/08	7.73	7.49	---	0.021	ND
Oct.30/08	8.00	6.70	---	ND	ND
May 14/09	8.41	8.12	0.012	0.029	ND
Aug 4/09	7.27	7.43	0.025	0.032	ND
Oct 28/09	7.49	7.57	0.013	0.059	ND
Apr 26/10	7.66	7.25	0.045	0.130	ND
Nov 29/10	8.02	7.45	0.036	0.069	ND
Apr 25/11	7.91	7.36	0.024	0.035	ND
Nov 3/11	7.87	7.28	0.048	0.031	ND
Apr 25/12	7.96	7.42	0.044	0.029	ND
Oct 30/12	7.99	7.58	0.033	0.045	ND
Apr 23/13	7.91	7.57	0.055	0.122	ND
Oct 29/13	7.93	7.81	ND	0.034	ND
May 29/14	8.14	7.37	0.030	0.016	ND
Oct 1/14	7.91	7.66	0.019	ND	ND
May 6/15	8.03	7.15	0.015	ND	ND
Oct 8/15	7.77	7.26	0.017	ND	ND
Apr 26/16	7.99	7.68	ND	ND	ND
Oct 11/16	7.97	7.58	ND	ND	ND
Apr 17/17	8.00	7.64	0.014	ND	ND
Nov 1/17	8.13	7.33	0.018	ND	ND
May 24/18	8.06	7.43	0.017	< 0.005	< 0.001
Oct 25/18	7.98	7.59	0.021	< 0.005	< 0.002
Apr 29/19	8.04	7.32	0.015	0.155	< 0.002
Oct 22/19	7.99	7.62	0.026	0.005	< 0.001
Mar 31/20	7.84	7.61	0.016	0.009	<0.002
Dec 1/20	7.84	7.07	0.024	0.012	<0.002
May 25/21	8.14	7.34	0.022	0.048	<0.002
Oct 4/21	7.86	7.72	0.021	0.005	<0.002

All values are in mg/L, except pH (no units).

▨ Shaded cells indicate concentrations exceeding Provincial Water Quality Objectives (PWQO)

ND - Not Detected

Table 4.7f: Deep Bedrock Groundwater PWQO Comparison
North Lancaster Waste Disposal Site

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
99-6dBR					
Oct 18/99	7.81	7.88	---	ND	ND
Jan 25/00	---	---	---	---	---
May 1/00	7.32	7.60	0.76	1.04	ND
Oct 23/00	7.59	7.50	---	ND	ND
Oct 24/00	---	---	0.34	---	---
May 3/01	---	8.40	---	0.17	ND
Oct 24/01	7.89	7.60	0.35	0.54	ND
Apr 17/02	7.45	6.70	---	0.66	ND
Nov 11/02	8.51	7.60	---	0.27	ND
Jun 10/03	8.16	8.30	---	0.77	ND
Oct 16/03	8.02	8.30	---	0.092	ND
May 27/04	8.18	7.88	---	0.139	ND
Oct 14/04	7.82	7.25	---	ND	ND
Jun 1/05	---	7.36	---	0.007	ND
Aug 23/05	7.79	---	---	0.125	ND
Nov 28/05	---	7.74	---	0.079	ND
Apr 5/06	8.16	7.50	---	0.380	ND
Jul 24/06	7.64	7.99	---	0.414	ND
Oct 30/06	7.60	7.31	---	0.128	ND
Apr 25/07	7.65	7.40	---	0.018	ND
Jul 18/07	7.81	7.49	---	0.078	ND
Nov 1/07	7.70	7.41	---	0.010	ND
May 14/08	7.81	7.61	---	ND	ND
Aug 5/08	7.83	7.65	---	0.212	ND
Oct.30/08	8.01	7.99	---	0.087	ND
May 19/09	7.82	7.65	0.181	2.07	ND
Aug 5/09	7.81	7.47	0.560	0.163	ND
Oct 28/09	7.95	7.12	0.583	0.145	ND
Apr 28/10	8.00	7.42	0.597	0.175	ND
Nov 25/10	7.79	5.22	0.612	0.053	ND
Apr 25/11	8.35	7.57	0.549	0.176	ND
Nov 3/11	7.95	7.36	0.492	0.821	ND
Apr 25/12	8.30	7.97	0.535	ND	ND
Oct 29/12	8.25	6.98	0.649	0.223	ND
Apr 23/13	8.26	7.48	0.673	0.114	ND
Oct 29/13	7.98	7.14	0.611	0.096	ND
May 28/14	8.27	7.51	0.500	0.274	ND
Oct 1/14	8.17	7.78	0.416	0.123	ND
May 7/15	7.93	6.69	0.280	1.27	ND
Oct 8/15	7.96	7.62	0.298	0.027	ND
Apr 26/16	8.14	7.36	0.258	0.293	ND
Oct 11/16	8.09	7.69	0.219	0.023	ND
Apr 18/17	8.11	7.49	0.379	0.611	<0.001
Duplicate	8.12	---	0.375	0.594	<0.001
Nov 2/17	7.92	7.36	0.307	0.539	<0.001
May 23/18	8.26	7.46	0.312	0.184	ND
Oct 25/18	8.06	7.36	0.286	0.032	< 0.005
Apr 30/19	8.25	7.57	0.344	0.012	< 0.002
Oct 21/19	7.99	7.80	0.312	0.620	< 0.002
Mar 31/20	7.9	7.48	0.316	0.835	<0.002
Dec 2/20	7.92	6.95	0.300	1.140	<0.002
May 26/21	8.68	7.84	0.488	0.132	<0.001
Oct 4/21	7.92	7.74	0.255	0.649	<0.002

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
00-1dBR					
Dec 6/00	7.10	8.10	0.57	0.01	ND
May 3/01	---	8.00	---	0.05	ND
Oct 24/01	---	---	1.05	---	---
Oct 30/01	7.50	7.80	---	0.05	ND
Apr 17/02	7.49	7.20	---	0.02	ND
Nov 12/02	7.98	7.40	---	ND	ND
Jun 10/03	7.80	7.80	---	0.35	ND
Oct 16/03	7.72	8.00	---	0.022	ND
May 27/04	8.02	7.83	---	0.008	ND
Oct 14/04	7.85	7.38	---	ND	ND
Jun 2/05	7.68	7.33	---	ND	ND
Aug 24/05	8.20	8.19	---	0.015	ND
Nov 28/05	---	8.05	---	0.005	ND
Apr 6/06	8.05	7.21	---	ND	ND
Jul 24/06	7.63	8.37	---	0.014	ND
Oct 31/06	8.24	7.30	---	0.006	ND
Apr 25/07	7.92	8.16	---	0.164	ND
Jul 19/07	7.70	7.75	---	0.015	ND
Oct 31/07	7.93	8.05	---	0.144	ND
May 14/08	7.82	8.08	---	0.029	ND
Aug 5/08	7.50	8.28	---	0.227	ND
Oct.30/08	7.62	6.51	---	0.097	ND
May 19/09	7.45	7.46	1.01	0.072	ND
Aug 5/09	7.33	6.84	0.947	0.068	ND
Nov 3/09	7.67	7.47	0.969	0.021	ND
Apr 28/10	7.78	7.51	1.13	0.014	ND
Nov 29/10	7.68	7.86	1.01	0.077	ND
Apr 26/11	7.88	7.13	1.03	0.261	ND
Nov 3/11	7.69	7.33	1.05	0.305	ND
Duplicate	7.83	---	0.900	0.234	0.003
Apr 26/12	8.00	7.20	0.956	0.184	ND
Oct 29/12	7.86	6.95	1.18	0.321	ND
Apr 23/13	7.96	7.13	1.15	0.543	ND
Oct 29/13	7.91	7.58	1.06	0.457	ND
May 28/14	8.00	7.31	1.08	0.088	ND
Oct 1/14	7.67	7.53	1.09	0.306	ND
May 6/15	7.98	7.59	1.13	0.604	ND
May 12/15	8.06	7.80	1.03	0.175	ND
Oct 8/15	7.91	7.71	1.04	0.548	ND
Apr 27/16	7.92	7.65	1.13	0.642	ND
Oct 12/16	7.88	7.63	0.88	0.492	ND
Apr 19/17	7.90	7.38	1.14	0.693	ND
Nov 1/17	8.01	7.49	1.19	0.539	ND
May 23/18	7.96	7.51	1.10	0.809	ND
Oct 25/18	7.75	6.99	1.17	0.939	0.003
GW Duplicate	7.86	6.99	1.16	0.946	< 0.01
May 1/19	7.70	7.34	1.10	0.334	< 0.002
Oct 21/19	7.72	7.26	1.23	0.507	< 0.002
Mar 31/20	7.81	7.55	1.22	<0.005	<0.002
Dec 2/20	7.81	7.30	1.20	1.22	<0.002
May 26/21	8.16	7.34	1.23	1.23	<0.001
Oct 4/21	7.69	7.32	1.26	1.73	<0.002

Parameter	pH Lab	pH Field	Boron	Iron	Phenol
PWQO	6.5-8.5		0.2	0.30	0.001
Location/date					
00-5dBR					
Dec 6/00	7.40	8.30	---	0.11	ND
May 3/01	---	8.30	---	1.00	ND
Oct 24/01	---	---	0.42	---	---
Oct 30/01	7.89	7.60	---	0.05	ND
Apr 17/02	7.97	6.90	---	0.03	ND
Nov 12/02	8.63	8.10	---	0.05	ND
Jun 5/03	8.54	7.90	---	0.03	ND
Oct 16/03	8.44	8.50	---	0.244	ND
May 27/04	8.46	8.56	---	0.006	ND
Oct 18/04	8.20	8.14	---	ND	ND
Jun 2/05	8.36	8.29	---	ND	ND
Aug 23/05	8.43	---	---	4.01	ND
Nov 28/05	---	8.73	---	0.013	ND
Apr 6/06	8.44	8.70	---	ND	ND
Jul 20/06	8.45	8.85	---	ND	ND
Oct 31/06	8.52	9.05	---	ND	ND
Apr 26/07	8.47	8.79	---	0.007	ND
Jul 23/07	8.43	8.64	---	0.111	ND
Oct 31/07	8.59	8.50	---	0.011	ND
May 14/08	8.42	9.10	---	0.063	ND
Aug 5/08	8.36	8.76	---	0.059	ND
Oct.30/08	8.53	6.98	---	0.307	ND
May 14/09	7.62	9.33	0.349	0.081	ND
Aug 4/09	8.16	8.61	0.353	0.036	ND
Oct 28/09	8.44	8.71	0.354	0.026	ND
Apr 26/10	8.49	8.80	0.400	0.027	ND
Nov 29/10	8.54	8.71	0.376	0.101	ND
Apr 25/11	8.38	8.55	0.443	0.126	ND
Nov 3/11	8.44	8.64	0.451	0.075	ND
Apr 25/12	8.57	10.44	0.336	0.053	ND
Oct 30/12	8.37	8.78	0.426	0.025	ND
Apr 23/13	8.53	8.73	0.459	0.146	ND
Oct 29/13	8.59	9.10	0.391	0.028	ND
May 29/14	8.57	8.71	0.395	0.017	ND
Oct 1/14	8.52	8.47	0.371	0.044	ND
May 6/15	8.45	8.10	0.410	0.021	ND
Oct 13/15	8.11	8.78	0.339	0.014	ND
Duplicate	7.95	---	0.433	0.448	ND
Apr 26/16	8.47	8.46	0.424	0.007	ND
Oct 11/16	8.38	8.81	0.339	ND	ND
Apr 17/17	8.45	8.53	0.418	0.005	ND
Nov 1/17	8.54	8.38	0.413	0.005	<0.001
May 24/18	8.55	8.71	0.410	0.007	< 0.001
Oct 25/18	8.31	8.74	0.423	0.006	< 0.002
Apr 29/19	8.52	8.47	0.417	< 0.005	< 0.002
Oct 22/19	8.50	8.53	0.444	0.005	< 0.001
Mar 31/20	8.45	9.01	0.418	0.009	<0.002
Dec 1/20	8.49	8.43	0.418	0.009	<0.002
May 25/21	8.66	8.55	0.415	0.009	<0.002
Oct 4/21	8.54	8.88	0.447	0.014	<0.002

All values are in mg/L, except pH (no units).

🟦 Shaded cells indicate concentrations exceeding Provincial Water Quality Objectives (PWQO)

ND - Not Detected

Table 4.7g- Surface Water Trigger Mechanisms

North Lancaster Waste Disposal Site

Parameter	Na	K	Ca	SO_4	Cl	$NO_3 + NO_2$	NH_3
Trigger Limit	32.3	6.0	154.4	49.6	60.9	5.8	0.12
S-1A							
Nov 22/02	24.7	3.3	81.0	36.0	48.4	4.0	0.03
Apr 16/03	15.7	2.4	65.2	17.0	29.6	2.0	0.23
Oct. 23/03	15.1	3.0	75.0	27.0	32.2	4.7	0.01
Apr.26/04	9.3	2.1	75.4	16.0	16.3	2.0	ND
Nov 25/04	15.9	4.2	89.5	28.0	25.7	1.9	0.02
Apr 6/05	8.6	2.2	67.9	16.0	16.3	1.3	ND
Sept 1/05	Dry						
Nov 29/05	7.9	2.1	70.6	13.0	9.4	1.1	ND
Apr 6/06	11.4	1.6	70.6	13.0	18.8	0.9	ND
Aug 1/06	10.0	2.7	86.1	8.0	14.3	0.1	ND
Oct. 31/06	22.7	3.1	89.2	18.0	13.2	0.9	ND
Apr. 23/07	7.5	2.7	69.1	16.0	8.5	0.6	ND
Jul 23/07	Dry						
Oct 29/07	14.6	2.6	86.4	22	17.3	0.5	ND
May 6/08	7.5	1.5	70.4	12	7.4	0.3	0.03
Nov 3/08	26.9	3.7	94.1	50	33.4	1.7	<0.01
May 12/09	8.7	1.4	73.9	13	12.4	0.4	0.01
July 29/09	14.1	3.8	97.5	11	21.1	0.4	ND
Oct 26/09	17.4	3.6	82.7	29	39.3	1.0	ND
Mar 29/10	10.3	1.9	69.1	14	17.8	0.9	ND
Aug 23/10	17.7	7.9	78.2	15	20.4	1.0	ND
Oct 26/10	8.7	1.9	81.8	14	9.6	1.4	ND
Mar 29/11	6.2	1.3	66.6	12	7.8	1.1	ND
Aug 22/11	6.1	13.7	122	22	3.1	0.4	0.06
Dec 7/11	13.2	2.6	8.6	18	13.9	2.5	ND
Apr 11/12	8.6	1.9	76.6	14	11.4	1.1	ND
Oct 30/12	21.6	5.4	110	36	39.7	9.9	ND
Apr 09/13	7.8	2.2	64.2	10	10.5	1.8	ND
Jul 30/13	13.3	3.4	95.7	13	15.4	1.4	ND
Oct 22/13	15.5	4.6	109	15	15.7	2.4	ND
Apr 24/14	8.9	1.8	82	12	10.1	1.2	ND
July 10/14	10.9	3.5	106	12	9.9	2.0	ND
Oct 8/14	20.5	6.8	95.1	21	26.7	1.8	ND
May 12/15	17.3	3.5	96.0	14	27.3	1.3	0.01
Jun 23/15	14.2	2.4	83.9	10	21.6	0.4	ND
Oct 29/15	21.6	3.9	87.9	17	34.2	1.4	ND
Apr 13/16	9.6	2.4	68.0	15	15.7	3.8	ND
Aug 17/16	12.6	1.2	91.1	19	14.0	9.4	0.02
Oct 25/16	9.9	2.9	87.8	18	15.6	1.9	ND
Apr 18/17	8.1	1.4	74.5	13	12.7	3.4	ND
Jul 17/17	10.9	2.4	99.1	11	8.2	4.1	ND
Oct 31/17	4.4	2.3	67.1	7	3.6	0.1	ND
May 22/18	15.2	2.3	86.0	15	25.1	3.76	0.02
Nov 2/18	5.0	3.9	50.0	39	8.6	0.07	0.03
Apr 11/19	10.4	1.2	74.1	11	17.2	4.02	0.03
Oct 2/19	Dry						
Apr 8/20	9.3	2.3	81.1	13	15.8	4.12	0.08
Aug 17/20	62.3	4.1	109	43	91.3	3.2	0.02
Nov 16/20	22.4	3.1	111	24	38.3	8.3	0.03
May 26/21	18.0	2.6	116	19	25.7	13.4	0.02
Duplicate	17.7	2.6	113	19	25.4	13.3	0.03
Jul 14/21	29.5	3.7	118	25	52.7	10.1	0.12
Duplicate	30.9	3.9	121	26	53.5	10.2	0.03
Oct 4/21	40.6	3.0	123	47	96.2	16.5	1.44
Duplicate	40.4	2.9	123	51	105	18.0	0.01

Parameter	Na	K	Ca	SO_4	Cl	$NO_3 + NO_2$	NH_3
Trigger Limit	45.1	5.0	159.4	98.2	56.2	2.0	0.08
S-2							
May 7/98	21.8	1.8	81.3	37.1	26.7	ND	ND
Oct 8/98	26.8	3.2	96.8	25.2	39.9	ND	ND
Apr 19/99	17.4	2.8	75.5	37.5	18.9	ND	ND
Oct 18/99	Dry						
Jan 25/00	Dry						
Apr 27/00	18.1	2.9	85.5	38.3	17.6	0.5	ND
Oct 26/00	Dry						
Apr 24/01	25.3	4.1	80.9	40.9	28.4	0.4	0.02
Dec 6/01	25.9	2.5	98.1	97.3	51.8	4.9	ND
Apr 18/02	19.7	ND	81.2	46.6	19.0	ND	ND
Nov 22/02	11.2	0.7	50.8	27.0	7.0	2.1	0.04
Apr 16/03	17.8	1.9	52.6	28.0	13.7	1.4	0.32
Oct. 23/03	28.1	2.4	75.7	83.0	41.9	2.1	0.04
Apr.26/04	23.0	2.6	80.4	47.0	22.0	0.4	ND
Nov 25/04	35.4	2.8	97.7	81.0	50.5	ND	0.05
Apr 6/05	18.1	2.7	70.9	42.0	17.2	0.6	ND
Sept 1/05	Dry						
Nov 29/05	29.7	2.6	90.7	56.0	30.0	0.9	ND
Apr 6/06	15.9	2.1	66.1	29.0	10.4	0.5	ND
Aug 1/06	38.9	3.5	102	27.0	33.6	ND	ND
Oct. 31/06	29.1	3.4	96.5	44.0	28.6	0.3	0.01
Apr. 23/07	22.4	3.6	86.1	47.0	16.8	0.3	ND
Jul 23/07	35.8	3.2	104	54	30.8	0.2	ND
Oct 29/07	33.3	2.9	93.2	60	36.3	0.1	ND
May 6/08	24.5	3.1	83.3	42	16.3	0.2	ND
Nov 3/08	24.1	1.9	87.6	126	33	0.3	ND
May 12/09	29.3	3.2	87.2	49	22.9	0.1	0.02
July 29/09	35.3	2.6	97.6	30	28.0	0.2	ND
Oct 26/09	24.6	2.3	76.9	69	34.8	0.4	ND
Mar 29/10	23.0	2.8	74.4	45	18.1	0.8	ND
Aug 23/10	37.0	3.8	85.8	26	31.7	0.1	ND
Oct 26/10	23.0	3.1	87.9	40	21.2	0.3	ND
Mar 29/11	22.1	3.1	87.9	48	17.3	0.9	0.08
Aug 22/11	Dry						
Dec 7/11	31.9	3.2	88.9	53	30.1	0.4	ND
Apr 11/12	28.4	3.1	87.0	56	24.7	0.6	ND
Oct 30/12	32.6	2.6	94.6	66	33.4	0.1	ND
Duplicate	32.9	2.7	95.9	66	33.3	0.1	ND
Apr 09/13	13.7	2.7	65.7	31	8.1	0.8	ND
Jul 30/13	21.4	1.8	83.7	19	14.0	0.1	ND
Oct 22/13	38.0	7.1	134	35	31.7	0.2	ND
April 24/14	17.8	3.0	82.9	29	10.2	0.5	ND
July 10/14	32.4	3.3	107	17	18.1	0.1	ND
Oct 8/14	33.8	5.5	95.6	62	27.4	ND	ND
May 12/15	31.3	3.6	87.0	35	22.2	0.1	0.01
Jun 23/15	29.9	2.8	79.8	15	22.0	0.1	ND
Duplicate	31.3	3.0	83.9	15	22.0	0.2	ND
Oct 29/15	35.6	4.7	79.6	70	28.9	0.3	ND
Duplicate	34.9	4.7	78.4	70	28.9	0.3	ND
Apr 13/16	13.5	2.3	63.9	33	9.8	0.8	ND
Aug 17/16	29.9	2.4	71.7	102	16.2	0.4	0.06
Duplicate	31.6	2.6	76.4	102	16.0	0.3	0.07
Oct 25/16	26.0	2.6	75.2	72	24.3	0.2	ND
Apr 18/17	13.2	2.4	65.3	29	8.4	0.8	ND
Jul 17/17	22.8	3.5	89.5	13	10.3	0.3	ND
Oct 31/17	22.8	4.2	81.2	19	16.2	0.1	ND
May 22/18	27.2	3.7	88.2	26	20.8	0.05	0.04
Nov 2/18	29.3	3.2	97.4	125	29.1	0.05	0.02
Apr 11/19	13.2	2.3	69.9	30	11.8	0.79	0.03
Oct 2/19	Dry						
Apr 8/20	12.5	2.5	72.5	22	13.6	0.67	<0.01
Duplicate	11.6	2.3	67.8	22	13.7	0.66	<0.01
Aug 17/20	Dry						
Nov 16/20	30.8	2.4	100	40	42.2	<0.05	0.03
May 26/21	Dry						
Jul 14/21	Dry						
Oct 4/21	Dry						

Parameter	Na	K	Ca	SO_4	Cl	$NO_3 + NO_2$	NH_3
Trigger Limit	22.6	4.6	162.7	95.6	35.2	2.4	0.12
S-3							
Apr 19/99	6.3	1.8	68.7	17.2	10.3	ND	0.01
Oct 18/99	14.1	3.3	101	83.9	29.3	0.4	ND
Jan 25/00	8.9	---	---	---	14.8	---	---
Apr 27/00	9.0	1.5	73.8	21.8	12.9	0.7	0.01
Oct 26/00	10.6	3.1	94.0	22.7	13.8	0.8	0.14
Apr 24/01	6.9	1.5	64.8	18.9	9.8	0.6	0.02
Dec 6/01	19.2	3.1	108	115	31.8	3.4	0.02
Apr 18/02	7.9	1.7	71.2	35.3	12.2	0.8	0.02
Nov 22/02	17.7	2.1	98.8	103	27.7	2.6	0.04
Apr 16/03	11.9	2.0	65.0	38.0	14.7	1.2	0.38
Oct. 23/03	10.4	3.2	69.9	49.0	17.1	2.2	0.02
Apr.26/04	8.6	1.3	74.7	27.0	14.8	0.4	ND
Nov 25/04	15.4	3.0	86.3	42.0	19.9	1.5	0.03
Apr 6/05	23.1	3.4	71.9	37.0	15.2	0.7	0.02
Sept 1/05	17.6	5.0	73.2	92.0	14.4	0.6	0.04
Nov 29/05	9.9	1.6	85.1	35.0	14.9	0.8	ND
Apr 6/06	8.4	1.8	61.2	14.0	11.3	0.6	ND
Aug 1/06	10.9	1.9	82.4	21.0	14.4	0.2	0.02
Oct. 31/06	17.6	2.7	76.2	24.0	11.5	0.8	ND
Apr. 23/07	6.8	1.5	68.4	15.0	8.4	0.4	ND
Jul 23/07	7.6	2.4	65.1	21	9.3	1.0	ND
Oct 29/07	11.5	2.3	86.0	39	15.1	1.4	0.01
May 6/08	7.8	1.2	72.6	13	9.1	0.3	ND
Nov 3/08	11.5	3.1	82.8	41	19.2	1.5	0.02
May 12/09	8.8	1.8	68.9	11	13.1	0.6	0.03
July 29/09	12.2	1.4	85.0	9	20.8	0.2	ND
Oct 26/09	17.8	3.2	86.6	29	21.7	1.2	ND
Mar 29/10	9.6	1.5	73.3	19	14.0	0.9	0.02
Aug 23/10	11.5	2.6	76.0	19	15.9	0.8	0.01
Oct 26/10	8.2	1.7	83.3	19	11.9	0.9	ND
Mar 29/11	7.2	1.3	70.4	13	11.3	0.8	0.04
Aug 22/11	13	3.8	74.9	26	15.9	0.6	0.01
Dec 7/11	9.5	3.2	79.4	34	13.2	2.0	ND
Apr 11/12	8.6	1.4	75.1	21	13.9	0.6	ND
Oct 30/12	11.5	1.9	96.6	46	18.0	1.0	ND
Apr 09/13	7.1	2.8	61.7	10	7.5	1.1	0.08
Jul 30/13	11.9	1.8	85.5	15	16.1	0.4	ND
Oct 22/13	12.7	2.9	96.8	23	16.0	0.7	0.01
Apr 24/14	8.9	1.4	76.1	11	10.6	0.6	ND
Jul 10/14	17.9	2.0	94.4	16	21.7	1.1	ND
Oct 8/14	17.6	4.3	89.6	21	24.8	0.4	0.03
May 12/15	24.1	2.6	77.9	15	36.9	0.5	0.20
Jun 23/15	13.3	1.2	80.4	15	22.5	0.9	ND
Oct 29/15	18.2	4.0	86.0	43	28.5	3.9	ND
Apr 13/16	7.5	1.0	53.7	12	12.6	1.3	ND
Aug 17/16	9.6	2.7	58.4	43	12.2	1.8	0.10
Oct 25/16	14.6	3.0	80.9	60	25.5	5.2	ND
Apr 18/17	6.9	1.0	54.9	14	11.4	1.0	ND
Jul 17/17	8.6	1.3	79.5	7	9.1	0.5	0.02
Oct 31/17	10.8	2.7	82.8	15	11.9	1.9	0.01
May 22/18	17.6	1.5	79.5	14	26.1	0.23	0.06
Nov 2/18	17.1	3.3	81.1	42	29	3.02	0.03
Apr 11/19	8.4	1.8	62.7	14	13.3	1.0	0.09
Oct 2/19	17.2	6.0	81.1	24	28.9	<0.05	0.10
Apr 8/20	7.9	1.1	68.2	16	12.1	0.73	0.02
Aug 17/20	17.4	4.5	79.8	25	23.4	<0.05	0.04
Nov 16/20	16.7	2.4	102	65	29.2	0.89	0.09
May 26/21	11.9	0.9	84.7	20	17.6	0.14	0.05
Jul 14/21	16.6	1.4	81.4	26	25.8	0.17	0.09
Oct 4/21	13.6	4.7	83.2	54	27.1	1.37	0.31

Notes: 1- Trigger limit based on data from May 1998 to November 2004. Trigger limit for S-7 based on data from March 2010 to October 2015. Trigger limit is two times baseline data.
2- Trigger occurs when baseline levels are doubled on three consecutive sets of samples on any four of seven selected parameters.
3- Water quality data for each of the monitoring stations are to be evaluated as independent data sets.
4- Concentration assumed at half the detection limit where indication is less than detection limit.

▨ - Indicates exceedence of Trigger Limit

Table 4.7g- Surface Water Trigger Mechanisms
North Lancaster Waste Disposal Site

Parameter	Na	K	Ca	SO$_4$	Cl	NO$_3$ + NO$_2$	NH$_3$
Trigger Limit	23.7	4.7	164.0	94.6	35.6	2.3	0.07
S-4							
Apr 19/99	6.7	1.9	69.4	17.8	10.5	0.2	0.01
Oct 18/99	14.1	3.2	100	83.9	29.3	0.4	ND
Jan 25/00	Frozen						
Apr 27/00	9.0	1.4	71.1	21.7	12.8	0.7	ND
Oct 26/00	10.3	3.2	95.0	22.8	14.0	0.8	0.13
Apr 24/01	7.2	1.4	66.9	19.7	10.3	0.6	0.02
Dec 6/01	12.9	3.0	110	113	32.0	3.4	0.02
Apr 18/02	8.1	1.4	71.5	35.7	12.4	0.9	0.02
Nov 22/02	16.9	2.6	99.8	99.0	26.8	2.7	0.03
Apr 16/03	12.4	2.2	64.6	36.0	14.2	1.4	0.13
Oct. 23/03	10.6	3.1	70.3	49.0	17.0	2.2	0.02
Apr.26/04	9.5	1.4	73.2	28.0	14.8	0.5	ND
Nov 25/04	24.6	3.4	92.0	41.0	19.4	ND	0.04
Apr 6/05	14.9	4.7	59.1	27.0	14.6	0.6	0.15
Sept 1/05	18.9	5.7	74.2	91.0	14.4	0.6	0.04
Nov 29/05	11.4	1.6	83.3	37.0	13.5	0.9	ND
Apr 6/06	8.8	1.9	62.1	14.0	11.2	0.6	ND
Aug 1/06	11.7	2.0	87.6	21.0	14.4	0.1	ND
Oct. 31/06	17.5	2.7	76.2	24.0	11.5	0.8	ND
Apr. 23/07	7.3	1.6	67.3	16.0	8.8	0.4	ND
Jul 23/07	7.7	2.4	64.8	21	9.4	1.0	ND
Oct 29/07	12.3	2.3	86.1	39	15.6	1.4	0.07
May 6/08	10.5	2.0	75.1	18	9.6	0.5	<0.01
Nov 3/08	11.5	3.1	83.0	41	19.3	1.5	0.03
May 12/09	8.0	1.9	70.8	11	13.1	0.9	0.02
Jul 29/09	12.2	1.4	85.1	10	20.5	0.1	ND
Oct 26/09	12.3	2.8	75.5	29	20.8	1.3	ND
Mar 29/10	11.8	1.8	74.5	24	14.6	0.9	ND
Aug 23/10	20.9	3.3	73.7	20	20.0	1.3	ND
Oct 26/10	12.3	2.2	81.5	26	14.2	0.9	ND
Mar 29/11	12	1.8	81.5	20	11.8	0.8	0.04
Aug 22/11	12	3.8	70.6	26	15.9	0.7	0.02
Dec 7/11	10.4	2.2	81.3	34	13.5	2.1	ND
Apr 11/12	12.6	1.7	80.8	26	14.8	0.6	ND
Oct 30/12	14.0	2.2	93.4	44	17.1	0.9	ND
Apr 09/13	7.1	2.9	61.0	10	7.7	1.2	0.08
Jul 30/13	12.3	1.6	82.6	17	14.2	0.4	ND
Oct 22/13	13.0	2.7	89.6	24	15.4	0.7	0.01
Apr 24/14	8.8	1.3	71.0	11	10.5	0.6	ND
July 10/14	15.9	1.8	86.7	16	21.3	1.2	ND
Oct 8/14	17.0	4.4	88.1	20	23.5	0.6	ND
May 12/15	23.7	2.7	77.8	22	27.4	0.4	0.12
Jun 23/15	13.5	1.3	81.9	15	22.1	1.0	ND
Oct 29/15	19.1	4.2	88.5	41	28.6	3.7	ND
Apr 13/16	7.7	1.0	53.3	12	12.6	1.3	ND
Aug 17/16	11.7	3.1	58.6	43	13.4	2.0	0.10
Oct 25/16	13.9	2.7	74.3	58	24.0	4.9	ND
Apr 18/17	7.8	1.1	58.1	14	11.3	0.6	ND
Jul 17/17	8.6	1.5	78.4	7	9.1	0.4	0.05
Oct 31/17	11.1	2.8	80.5	15	12.6	1.8	0.01
May 22/18	15.4	1.3	72.3	15	23.8	0.35	0.04
Duplicate	16.6	1.4	76.9	15	23.6	0.34	0.04
Nov 2/19	9.3	2.6	54.4	24	15.4	3.76	0.03
Apr 11/19	8.3	1.8	61.2	14	13.2	1.00	0.11
Oct 2/19	16.8	6.1	80.5	24	28.9	<0.05	0.05
Apr 8/20	8.0	1.2	64.9	17	12.1	0.74	0.02
Aug 17/20	16.6	4.5	76.9	25	22.3	<0.05	0.04
Nov 16/20	17.8	2.2	109	65	29.6	0.97	0.05
May 26/21	12	0.9	86.9	20	17.6	0.16	0.05
Jul 14/21	20.1	5.3	98.2	26	26.1	<0.05	0.16
Oct 4/21	13.2	4.3	75.7	52	29.8	1.33	0.05

Parameter	Na	K	Ca	SO$_4$	Cl	NO$_3$ + NO$_2$	NH$_3$
Trigger Limit	23.8	4.4	160.6	94.3	34.6	3.0	0.08
S-5							
Jan 25/00	Frozen						
Apr 27/00	8.9	1.4	71.1	21.9	12.9	0.7	0.01
Oct 26/00	10.6	3.2	93.9	22.8	13.7	0.8	0.12
Apr 24/01	6.6	1.5	66.7	19.1	9.9	0.6	0.02
Dec 6/01	13.8	2.9	108	115	31.8	3.4	0.01
Apr 18/02	6.3	1.2	73.6	34.9	12.1	0.8	0.02
Nov 22/02	18.5	2.0	93.8	103	27.7	2.6	0.03
Apr 16/03	11.4	1.8	62.4	37.0	14.3	1.3	0.16
Oct. 23/03	9.9	3.1	68.5	50.0	16.6	2.5	ND
Apr.26/04	8.5	1.3	73.8	27.0	14.6	0.5	ND
Nov 25/04	24.6	3.4	91.4	41.0	19.5	1.8	0.03
Apr 6/05	13.5	3.1	52.1	20.0	8.9	1.1	0.02
Sept 1/05	21.5	4.5	76.0	86.0	15.9	0.3	ND
Nov 29/05	9.8	1.6	83.7	35.0	12.1	1.0	ND
Apr 6/06	6.7	4.1	41.8	20.0	10.9	1.8	0.11
Aug 1/06	10.9	1.9	81.6	21.0	14.5	0.1	0.02
Oct. 31/06	8.1	2.4	59.9	24.0	11.4	0.8	ND
Apr. 23/07	6.8	1.6	67.1	16.0	8.5	0.4	ND
Jul 23/07	7.7	2.4	65.9	21	9.4	1.1	ND
Oct 29/07	11.6	2.2	86.9	40	15.1	1.4	0.07
May 6/08	8.0	1.3	74.9	13	9.2	0.3	ND
Nov 3/08	11.6	3.2	84.5	42	19.3	1.6	0.04
May 12/09	8.7	1.8	68.3	11	13.3	0.6	0.02
Jul 29/09	11.8	1.4	84.7	8	20.0	0.1	ND
Oct 26/09	12.1	2.8	77.8	28	22.1	1.0	ND
Mar 29/10	9.7	1.7	76.0	20	14.3	1.0	0.01
Aug 23/10	11.2	2.6	74.7	18	15.0	0.5	0.03
Oct 26/10	8.2	1.7	83.0	19	12.1	0.9	ND
Mar 29/11	9.5	1.2	70.5	16	14.1	1.8	0.02
Aug 22/11	13	3.9	76.4	25	16.8	0.2	0.02
Dec 7/11	10.2	2.7	86.6	34	13.3	2.2	ND
Apr 11/12	8.5	2.2	74.7	21	13.9	0.7	ND
Oct 30/12	11.5	1.9	96.9	47	18.0	1.0	ND
Apr 09/13	7.0	2.5	60.5	10	7.7	1.2	0.08
Jul 30/13	10.9	1.8	84.4	17	15.3	0.7	0.07
Oct 22/13	13.1	3.2	99.8	24	15.9	0.7	0.01
Apr 24/14	9.5	1.5	80.4	11	10.6	0.6	ND
July 10/14	18.6	2.2	92.1	17	22.4	1.1	ND
Oct 8/14	17.0	4.3	89.3	20	23.7	0.4	0.02
May 12/15	23.2	2.3	78.2	16	34.4	0.5	0.19
Jun 23/15	13.6	1.3	82.2	15	22.5	0.9	ND
Oct 29/15	19.0	4.0	90.3	41	29.6	3.9	ND
Apr 13/16	8.1	1.0	57.0	12	12.4	1.3	ND
Aug 17/16	12.1	3.5	70.4	50	12.3	1.4	0.07
Oct 25/16	13.8	2.8	76.0	60	25.3	5.3	ND
Duplicate	14.0	2.8	77.5	60	25.2	5.2	ND
Apr 18/17	6.7	0.9	54.0	14	11.4	1.0	ND
Jul 17/17	9.7	1.5	83.7	7	9.2	0.5	0.06
Oct 31/17	10.6	2.7	80.6	15	12.7	1.9	0.01
May 22/18	16.2	1.4	77.9	15	25	0.35	0.05
Nov 2/18	17.4	4	81.5	46	30.1	2.96	0.03
Duplicate	18.7	3.3	84.4	45	31.3	2.38	0.004
Apr 11/19	8.2	1.8	61.0	14	12.8	1.03	0.10
Oct 2/19	17.1	6.2	81.8	24	28.6	<0.05	0.06
Apr 8/20	6.9	1	61.9	17	12.3	0.83	0.02
Aug 17/20	Dry						
Nov 16/20	16.4	3	113	73	27.2	0.83	0.08
May 26/21	11.9	1.4	88.1	23	17.6	0.13	0.17
Jul 14/21	20.3	5.7	98	25	27.4	0.08	0.17
Oct 4/21	13.6	4.7	78.6	55	31	1.32	0.05

Parameter	Na	K	Ca	SO$_4$	Cl	NO$_3$ + NO$_2$	NH$_3$
Trigger Limit	32.7	4.7	159.8	92.6	51.2	2.8	0.14
S-6							
Jan 25/00	8.1	---	---	---	14.8	---	---
Apr 27/00	8.9	1.5	69.4	21.8	12.9	0.7	ND
Oct 26/00	10.9	3.2	95.0	23.0	13.9	0.8	0.12
Apr 24/01	6.7	1.4	61.1	19.1	10.3	0.7	0.01
Dec 6/01	20.1	3.1	109	115	32.2	3.4	0.01
Apr 18/02	6.3	1.0	74.0	35.1	12.2	0.9	0.02
Nov 22/02	19.0	1.3	92.8	102	28.3	2.4	0.03
Apr 16/03	55.6	4.0	64.1	30.0	106	0.7	0.41
Oct. 23/03	10.0	3.1	67.3	48.0	16.8	2.2	0.06
Apr.26/04	8.4	1.3	73.2	28.0	14.5	0.4	ND
Nov 25/04	26.1	3.4	93.0	41.0	19.8	1.8	0.03
Apr 6/05	12.7	3.0	47.7	13.0	8.9	0.7	0.05
Sept 1/05	20.1	4.1	65.6	47.0	18.4	0.1	ND
Nov 29/05	11.0	1.7	79.7	34.0	15.0	0.9	ND
Apr 6/06	8.8	2.1	39.2	14.0	11.4	0.6	0.10
Aug 1/06	10.5	1.9	88.9	22.0	13.2	ND	0.03
Oct. 31/06	8.5	2.5	78.1	23.0	13.2	0.9	0.03
Apr. 23/07	6.9	1.5	69.1	16.0	13.2	0.4	ND
Jul 23/07	7.6	2.3	65.0	20	9.2	1.0	ND
Oct 29/07	11.6	2.3	87.4	39	15.3	1.4	0.04
May 6/08	7.9	1.2	73.6	13	9.1	0.3	ND
Nov 3/08	11.9	3.2	83.1	41	19.5	1.5	0.01
May 12/09	8.7	1.8	68.4	11	13.2	0.7	0.02
Jul 29/09	11.8	1.4	85.4	9	19.9	0.1	ND
Oct 26/09	11.9	2.7	75.8	29	22.3	1.2	ND
Mar 29/10	10.0	1.5	74.2	20	15.0	0.9	ND
Duplicate	9.9	1.5	74.1	20	15.2	0.9	ND
Aug 23/10	11.2	2.4	74.3	16	15.2	0.4	0.02
Oct 26/10	8.3	1.7	82.6	19	12.1	0.9	ND
Mar 29/11	7.6	1.3	70.8	13	11.7	0.8	0.03
Aug 22/11	12	3.2	71.0	23	16.8	0.1	ND
Dec 7/11	8.7	1.9	72.6	34	1.4	2.0	ND
Apr 11/12	7.8	1.2	65.9	21	14.4	0.6	ND
Duplicate	9.1	1.3	77.7	21	14.3	0.6	ND
Oct 30/12	11.6	2.0	95.9	46	18.4	1.1	ND
Apr 09/13	6.5	2.5	57.6	9	7.3	1.1	0.08
Duplicate	6.6	2.5	57.7	10	7.4	1.1	0.08
Jul 30/13	11.5	1.5	84.8	15	15.6	0.4	ND
Duplicate	11.3	1.5	83.1	15	15.6	0.4	ND
Oct 22/13	13.8	2.9	108	23	16.0	0.7	0.01
Duplicate	11.4	2.2	90.1	23	16.1	0.7	0.01
Apr 24/14	8.5	1.3	71.2	11	10.8	0.6	0.01
Duplicate	9.4	1.4	79.8	11	10.8	0.6	ND
Jul 10/14	19.1	2.1	89.5	17	23.3	1.3	0.01
Duplicate	19.5	2.1	90.9	17	23.4	1.3	0.01
Oct 8/14	15.5	3.9	87.7	18	21.9	0.5	0.03
May 12/15	22.6	2.3	77.2	15	34.7	0.4	0.23
Jun 23/15	13.3	1.2	79.5	15	22.7	0.9	ND
Oct 29/15	19.1	4.1	89.1	42	30.2	4.0	0.01
Apr 13/16	8.1	1.0	56.8	12	12.7	1.3	ND
Aug 17/16	12.3	3.0	66.6	47	13.0	1.5	0.10
Oct 25/16	14.8	3.0	81.8	60	25.4	5.3	ND
Apr 18/17	7.4	1.0	57.6	14	11.4	1.0	ND
Duplicate	6.9	1.0	54.4	14	11.4	1.0	ND
Jul 17/17	8.7	1.3	79.8	7	9.2	0.5	0.05
Duplicate	8.8	1.4	80.9	7	9.2	0.5	0.05
Oct 31/17	10.7	2.8	79.7	15	12.8	1.9	0.02
Duplicate	10.9	2.8	82.5	15	12.7	1.9	0.02
May 22/18	16.1	1.4	74	15	26.4	0.3	0.04
Nov 2/18	19.5	3.4	87.3	45	31.3	2.79	0.03
Apr 11/19	8.4	1.8	60.5	14	13.6	1.07	0.16
Duplicate	8.4	1.8	61.6	14	13.4	1.01	0.16
Oct 2/19	18.0	6.5	82.9	23	29.6	<0.05	0.05
Duplicate	18.2	6.6	82.2	23	29.5	<0.05	0.07
Apr 8/20	7.5	1.0	64.2	16	12.1	0.71	0.02
Aug 17/20	15.9	3.0	78.8	21	21.5	<0.05	0.03
Nov 16/20	16.5	2.1	101	65	29.1	0.93	0.04
Duplicate	16.9	2.1	107	65	29.1	0.92	0.04
May 26/21	12.0	0.9	87.5	21	18.3	0.17	0.05
Jul 14/21	18.0	0.8	77.6	26	28.2	0.08	0.06
Oct 4/21	13.0	4.5	75	58	32.7	1.29	0.05

Notes: 1- Trigger limit based on data from May 1998 to November 2004. Trigger limit for S-7 based on data from March 2010 to October 2015. Trigger limit is two times baseline data.
2- Trigger occurs when baseline levels are doubled on three consecutive sets of samples on any four of seven selected parameters.
3- Water quality data for each of the monitoring stations are to be evaluated as independent data sets.
4- Concentration assumed at half the detection limit where indication is less than detection limit.

11.0 - Indicates exceedence of Trigger Limit

Table 4.7g- Surface Water Trigger Mechanisms
North Lancaster Waste Disposal Site

Parameter	Na	K	Ca	SO_4	Cl	$NO_3 + NO_2$	NH_3
Trigger Limit	52.9	7.9	161.9	68.4	169.5	0.3	0.05
S-7							
Mar 29/10	92.5	3.4	90.4	40	181	0.2	0.05
Aug 23/10	Dry						
Oct 26/10	Dry						
Mar 29/11	Dry						
Aug 22/11	Dry						
Dec 7/11	Dry						
Apr 11/12	Dry						
Oct 30/12	Dry						
Apr 09/13	3.1	1.5	54.0	12	3.7	0.1	ND
Jul 30/13	Dry						
Oct 22/13	Dry						
24-Apr-14	17.7	3.1	105	73	53.3	0.3	0.05
10-Jul-14	Dry						
Oct 8/14	10.9	6.0	86.0	28	112	ND	ND
May 12/15	Dry						
Jun 23/15	Dry						
Oct 29/15	8.1	5.8	69.4	18	73.7	ND	0.01
Apr 13/16	55.5	2.6	143	41	238	0.2	ND
Duplicate	51.5	2.5	133	40	244	ND	ND
Aug 17/16	Dry						
Oct 25/16	9	3.3	72.5	13	24	ND	0.01
Apr 18/17	25	3.6	110	40	153	ND	ND
Jul 17/17	Dry						
Oct 31/17	Dry						
May 22/18	Dry						
Nov 2/18	8.3	4.7	72	29	47.6	<0.1	0.03
Apr 11/19	Dry						
Oct 2/19	Dry						
Apr 8/20	Dry						
Aug 17/20	8.2	4.4	76.4	16	100	0.06	0.03
Duplicate	8.2	4.5	78.6	13	98	0.06	0.03
Nov 16/20	Dry						
May 26/21	Dry						
Jul 14/21	Dry						
Oct 4/21	Dry						

Parameter	Na	K	Ca	SO_4	Cl	$NO_3 + NO_2$	NH_3
Trigger Limit	103.4	4.3	163.7	77.0	198.6	0.8	0.13
S-8							
Apr 18/02	Dry						
Nov 22/02	20.3	ND	41.8	11.0	40.3	0.1	0.03
Apr 16/03	11.7	2.2	62.7	37.0	15.1	1.3	0.20
Oct. 23/03	Dry						
Apr.26/04	109	2.4	140	56.0	250	ND	0.03
Nov 25/04	65.8	4.0	82.8	50.0	91.7	0.2	ND
Apr 6/05	25.8	2.0	62.7	15.0	37.0	0.3	ND
Sept 1/05	Dry						
Nov 29/05	21.0	1.0	51.6	8.0	46.7	0.3	ND
Apr 6/06	37.1	1.0	67.8	14.0	74.1	0.1	ND
Aug 1/06	Dry						
Oct. 31/06	3.4	1.2	70.4	12.0	3.1	ND	ND
Apr. 23/07	111	2.4	139	68.0	279	0.4	ND
Jul 23/07	88.6	2.6	112	33	176	0.2	ND
Oct 29/07	84.5	2.5	107	46	173	0.2	ND
May 6/08	Dry						
Nov 3/08	77.8	1.8	97.7	37	129	0.1	ND
May 12/09	152	1.8	159	60	336	0.2	0.02
Jul 29/09	Dry						
Oct 26/09	Dry						
Mar 29/10	20.8	1.2	69.1	16	54.8	0.2	0.02
Aug 23/10	38.6	2.6	93.0	107	89.5	0.4	ND
Oct 26/10	9.2	1.5	75.7	21	19.2	0.1	ND
Mar 29/11	8.2	0.9	57.6	9	9.3	0.1	ND
Aug 22/11	45.9	2.1	140.0	172	71.8	0.2	0.05
Dec 7/11	31.6	2.1	84.5	58	61.7	0.3	ND
Apr 11/12	DRY						
Oct 30/12	DRY						
Apr 09/13	3.7	2.3	26.3	4	3.5	0.2	0.08
Jul 30/13	DRY						
Oct 22/13	DRY						
Apr 24/14	ND	ND	0.11	ND	ND	ND	ND
Jul 10/14	ND	ND	0.03	ND	ND	ND	ND
Oct 8/14	0.3	ND	ND	ND	ND	ND	ND
May 12/15	DRY						
Jun 23/15	DRY						
Oct 29/15	12.1	3.6	52.3	20	33.7	ND	ND
Apr 13/16	20.4	1.6	77.8	25	37.9	0.4	ND
Aug 17/16	16.5	1.3	58.2	10	20.9	8.3	0.06
Oct 25/16	11.5	0.3	62.8	13	13.7	10.1	0.04
Apr 18/17	15.2	0.8	67.6	29	32.2	5.0	ND
Jul 17/17	14.4	0.4	64.7	13	10.1	10.2	0.01
Oct 31/17	10.8	0.8	58.2	12	9.4	9.48	ND
May 22/18	Dry						
Nov 2/18	13.2	2.9	49	15	21.7	10.55	0.03
Apr 11/19	12.9	2.6	51.8	11	21.1	2.99	0.11
Oct 2/19	Dry						
Apr 8/20	13	1.4	72.4	28	31.1	6.97	0.05
Aug 17/20	Dry						
Nov 16/20	Dry						
May 26/21	Dry						
Jul 14/21	Dry						
Oct 4/21	Dry						

Notes: 1- Trigger limit based on data from May 1998 to November 2004. Trigger limit for S-7 based on data from March 2010 to October 2015. Trigger limit is two times baseline data.
2- Trigger occurs when baseline levels are doubled on three consecutive sets of samples on any four of seven selected parameters.
3- Water quality data for each of the monitoring stations are to be evaluated as independent data sets.
4- Concentration assumed at half the detection limit where indication is less than detection limit.

11.0 - Indicates exceedence of Trigger Limit

Table 4.8A: Surface Water Quality Results Compared to Assessment Criteria (Table A)
North Lancaster Waste Disposal Site

Parameter	pH	Chloride	Sulphate	Iron	Unionized Ammonia	Phenols	Arsenic	Barium	Boron	Cadmium	Total Chromium	Copper	Lead	Zinc
Criteria	6.0-9.0	180	100	1.0	0.10	0.04	0.15	2.3	3.55	0.00021	0.064	0.0069	0.002	0.089
Location /Date	lab													
S-1A(Background)														
May 26/21	8.16	25.7	19	0.507	0.00	<0.002	0.0001	0.098	0.021	<0.000015	<0.001	0.0011	0.00020	0.011
Duplicate	8.13	25.4	19	0.508	0.00	<0.002	0.0001	0.095	0.020	<0.000015	<0.001	0.0011	0.00017	0.015
Jul 14/21	8.13	52.7	25	0.475	0.00	<0.001	0.0002	0.136	0.031	<0.000015	0.001	0.0017	0.00020	0.029
Duplicate	8.15	53.5	26	0.473	0.00	<0.001	0.0002	0.139	0.032	<0.000015	0.002	0.0021	0.00019	0.017
Oct 4/21	8.28	96.2	47	0.282	0.06	<0.002	0.0002	0.125	0.022	<0.000015	<0.001	0.0011	0.00012	0.027
Duplicate	8.26	105	51	0.083	0.00	<0.002	0.0001	0.121	0.022	<0.000015	0.001	0.0010	0.00045	0.017
S-2														
May 26/21	Dry													
Jul 14/21	Dry													
Oct 4/21	Dry													
S-3 (Beaudette R.)														
May 26/21	8.27	17.6	20	0.432	0.00	<0.002	0.0008	0.027	0.021	<0.000015	<0.001	0.0013	0.00016	0.008
Jul 14/21	7.86	25.8	26	1.63	0.00	0.001	0.0007	0.046	0.043	0.000028	0.003	0.0035	0.00071	0.037
Oct 4/21	7.95	27.1	54	1.27	0.01	<0.002	0.0005	0.047	0.029	0.00002	0.003	0.0030	0.00061	0.025
S-4 (Beaudette R.)														
May 26/21	8.36	17.6	20	0.511	0.00	<0.002	0.0008	0.032	0.022	<0.000015	<0.001	0.0015	0.00019	0.030
Jul 14/21	7.86	26.1	26	0.648	0.01	<0.001	0.0007	0.056	0.174	0.000052	<0.001	0.0022	0.00024	0.026
Oct 4/21	7.92	29.8	52	0.438	0.00	<0.002	0.0005	0.040	0.012	<0.000015	<0.001	0.0014	0.00015	0.020
S-5 (Beaudette R.)														
May 26/21	8.32	17.6	23	2.61	0.02	<0.002	0.0010	0.055	0.021	0.000033	0.005	0.0036	0.00084	0.021
Jul 14/21	7.83	27.4	25	11.0	0.01	<0.001	0.0021	0.134	0.154	0.000177	0.018	0.0161	0.00438	0.059
Oct 4/21	7.99	31.0	55	0.361	0.00	<0.002	0.0004	0.043	0.011	<0.000015	<0.001	0.0012	0.00011	0.018
S-6 (Beaudette R.)														
May 26/21	8.33	18.3	21	0.621	0.00	<0.002	0.0008	0.027	0.020	<0.000015	0.001	0.0016	0.00025	0.008
Jul 14/21	7.88	28.2	26	0.121	0.00	<0.001	0.0005	0.036	0.026	<0.000015	<0.001	0.0009	0.00005	0.014
Oct 4/21	7.94	32.7	58	0.426	0.00	<0.002	0.0005	0.043	0.010	<0.000015	0.001	0.0012	0.00015	0.020
S-7														
May 26/21	Dry													
Jul 14/21	Dry													
Oct 4/21	Dry													
S-8														
May 26/21	Dry													
Jul 14/21	Dry													
Oct 4/21	Dry													

▨ - Indicates exceedance of assessment criteria

All values are in mg/L except pH (pH units)
Criteria as per MOE Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (November 2010)

Table 4.8B: Surface Water Quality Results (Table B) Compared to Alternative Review Criteria
North Lancaster Waste Disposal Site

Parameter	Chloride	Phenols	Nitrite	Nitrate	Boron	Cadmium	Zinc
Criteria	120	0.004	0.06	13	1.50	0.00009	0.03
Location/Date							
S-1A(Background)							
May 26/21	25.7	<0.002	0.10	13.30	0.021	<0.000015	0.011
Duplicate	25.4	<0.002	0.10	13.20	0.020	<0.000015	0.015
Jul 14/21	52.7	<0.001	<0.05	10.10	0.031	<0.000015	0.029
Duplicate	53.5	<0.001	<0.05	10.20	0.032	<0.000015	0.017
Oct 4/21	96.2	<0.002	<0.05	16.50	0.022	<0.000015	0.027
Duplicate	105.0	<0.002	<0.05	18.00	0.022	<0.000015	0.017
S-2							
May 26/21	Dry						
Jul 14/21	Dry						
Oct 4/21	Dry						
S-3 (Beaudette R.)							
May 26/21	17.6	<0.002	0.07	0.07	0.021	<0.000015	0.008
Jul 14/21	25.8	0.001	<0.05	0.17	0.043	0.000028	0.037
Oct 4/21	27.1	<0.002	<0.05	1.37	0.029	0.00002	0.025
S-4 (Beaudette R.)							
May 26/21	17.6	<0.002	0.07	0.09	0.022	<0.000015	0.030
Jul 14/21	26.1	<0.001	<0.05	<0.05	0.174	0.000052	0.026
Oct 4/21	29.8	<0.002	<0.05	1.33	0.012	<0.000015	0.020
S-5 (Beaudette R.)							
May 26/21	17.6	<0.002	0.07	0.06	0.021	0.000033	0.021
Jul 14/21	27.4	<0.001	<0.05	0.08	0.154	0.000177	0.059
Oct 4/21	31.0	<0.002	0.05	1.27	0.011	<0.000015	0.018
S-6 (Beaudette R.)							
May 26/21	18.3	<0.002	0.08	0.09	0.02	<0.000015	0.008
Jul 14/21	28.2	<0.001	<0.05	0.08	0.026	<0.000015	0.014
Oct 4/21	32.7	<0.002	0.06	1.23	0.01	<0.000015	0.02
S-7							
May 26/21	Dry						
Jul 14/21	Dry						
Oct 4/21	Dry						
S-8							
May 26/21	Dry						
Jul 14/21	Dry						
Oct 4/21	Dry						

🟦 - Indicates exceedance of CWQG

All values are in mg/L except pH (pH units)

Criteria as per MOE Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (November 2010)

APPENDIX

G

FIELD RECORD SHEETS

Site Name: North Lancaster Waste Disposal Site Project No. 111-55592

Site Specific Notes

Collect groundwater and surface water duplicates
Landfill gas monitored in spring.
Collect WL at SW-2 and bridge during SW sampling

GROUNDWATER PURGE AND SAMPLE

Date	25-May-21	26-May-21	04-Oct-21	If YES, Complete Detail Section
Field Staff	AF/SW/HK	SW/JBH	AM/KDV/GR/JBH	
Weather Conditions	Wind/Cloud	Sun	Sun	
~ Temperature	18°C	25°C	13°C	
~ Precipitation (ie n/a, light, heavy)	n/a	n/a	n/a	
What purging/sampling methods were used? (circle)	[✓ Waterra Bailer Pump]	[✓ Waterra Bailer Pump]	[✓ Waterra Bailer Pump]	
Were there wells that could not be purged or purged dry?	Y	N	Y	C
Does any waterra, string, or bailers need to be replaced?	N	N	N	A
Were any locks or caps missing/damaged?	N	N	N	A
Was any waterra inaccesible?	N	N	N	A
Were any PVC/metal casings damaged?	N	N	N	A
Were any supplies used? (filters, caps, waterra, etc.)	Y	Y	Y	E
Which well was used for the groundwater duplicate?	99-7dBR	N/A	99-7dbr	
Were there any wells that could not be field filtered?	N	N	N	B
Were there any wells that could not be sampled?	Y	N	Y	C
Were odour/colour/sheens observed?	N	N	N	D
Were any seeps or staining observed?	N	N	N	D
Were any major changes to the site observed?	N	N	N	D

SURFACE WATER SAMPLE

Date	May 26/21	14-Jul-21	04-Oct-21			If YES, Complete Detail Section
Field Staff	SW	SW	AM/KDV/GR/JBH			
Weather Conditions	Sunny	Sun/Cloud	Sun			
~ Temperature	25°C	25°C	13°C			
~ Precipitation (ie n/a, light, heavy)	n/a	medium	n/a			
	Y/N	Y/N	Y/N	Y/N		
Were all instruments calibrated? (pH, Cond. ORP, DO)	Y	Y	Y			F
Were any supplies used? (filters, caps, waterra, etc.)	Y	Y	Y			E
Locations not sampled/reason.	Y	Y	Y			
Where was the surface water duplicate?	S-1A	S-1A	S-1A			
Were any odour/colour/sheens observed?	N	N	N			D

Site Name: North Lancaster Landfill Job No. 111-55592

GAS MONITORING

Date				If YES, Complete Detail Section
Field Staff				
Weather Conditions				
~ Temperature (°C)				
~ Precipitation (ie n/a, light, heavy)				
Were all instruments calibrated? (Eagle, Gasteck)				F
Were any supplies used? (filters, caps, waterra, etc.)				E
Were any well caps missing?				C
Was there any drift in the calibration by the end of the day?				E

Site Name: North Lancaster Waste Disposal Site Project No. 111-55592

SECTION A **Well Conditions**

Monitoring Well: Date:
Equipment Required: Cap
Corrected By/Date:

Monitoring Well: Date:
Equipment Required:
Corrected By/Date:

Monitoring Well: Date:
Equipment Required: Cap
Corrected By/Date:

Monitoring Well: Date:
Equipment Required:
Corrected By/Date:

Monitoring Well: Date:
Equipment Required:
Corrected By/Date:

Monitoring Well: Date:
Equipment Required:
Corrected By/Date:

SECTION B **Wells That Could Not Be field filtered**

Date		Wells

SECTION C **Wells That Were Purged Dry or Could Not Be Purged/Sampled**

Date: [✓ Purge] Sample

Date [✓ Purge] Sample

SECTION D **Other Comments**

Date	Location	Field Staff	Comments
25-May-21	99-dBR	AF/SW/HK	Duplicate
	97-2s		PVC pinched.
	99-3sBR		Water level from ground level, not from top.
	99-9s		Not enough for parameters.
	06-2s		Dry.
	06-4d		To dry to sample.
	06-1s		No parameters.
26-May-21	S-2	SW	Tree clearing on property where S-2 flows from
	S-2, S-7, S-8		Dry.
	00-1dBR		Artesian water sample, full to top of PVC.
	S-1A		Duplicate
14-Jul-21	S-2, S-7, S-8	AF	Dry.
04-Oct-21	06-4d	AM/KDV/GR/JBH	No sample, not enough water.
	00-2sbr 00-2s		Sulphur odour from both wells, stronger from 00-1sbr.
	S-2, S-7, S-8		Dry

SECTION E **Supplies Used**

Date	Waterra (m)	PVC Cap	Filters	Bailers	Lock	J-Plug		Footvalve
25-May-21			18					
26-May-21			24					
14-Jul-21			5					
04-Oct-21			29					

APPENDIX

H

ELECTRONIC DATA (CD)

H-1 ENVIRONMENTAL COMPLIANCE APPROVAL

GENIVAR
Received
DEC 21 2011
By:

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A481403
Notice No. 1
Issue Date: December 13, 2011

The Corporation of the Township of South Glengarry
Post Office Box, No. 220
Lancaster, Ontario
K0C 1N0

Site Location: 2nd Line Road
Lot East 1/2 Lot 25, Part 1, Concession 6
South Glengarry Township, United Counties of Stormont, Dundas and Glengarry

You are hereby notified that I have amended Approval No. A481403 issued on March 30, 2010 for the use and operation of a landfill site for the disposal of non-hazardous, solid municipal waste with a 3.8 hectare landfill footprint within a total site area of 47.3 hectares , as follows:

I The following definitions are hereby added to this Approval:

"Approval" means this Environmental Compliance Approval, including all items, conditions and Schedules attached to and forming part of this Certificate, as amended by the Director.

"Director" means any *Ministry* employee appointed by the Minister pursuant to Part II.1 of the Environmental Protection Act, as amended.

II The following conditions are hereby amended:

14. (1) The Owner shall maintain the groundwater rights for the property known as Part of West half of Lot 25 in the Township of South Glengarry, County of Glengarry, lying south of the Beaudette River over the entire contaminating lifespan of the site.

(2) The 11.1 hectare land referred to in sub-condition (1), as shown in Figure 2.3 of Item 29 in Schedule "A", forms part of the Site's Contaminant Attenuation Zone.

28. Only the following types of waste shall be accepted at the *Site* :
- non-hazardous, solid municipal waste, and
- non-hazardous, solid commercial, industrial, and institutional waste.

32. Only waste that is generated in the Township of South Glengarry shall be accepted at the *Site* .

54. (1) No additional waste, including waste cover material, shall be landfilled outside the limit of the base contours and the final contours shown in Figure 3.6.1 in Item 16 in Schedule "A" attached to this Approval.

(2) The waste filled beyond the approved limit to the east, south and west of the Site shall forthwith be capped with final cover.

(3) By October 31, 2012, the Owner shall complete acquisition of the adjacent land to the east of the Site to maintain a minimum 30 meter buffer zone.

(4) If the land acquisition referred to in sub-condition (3) can not be completed, the Owner shall remove the waste filled beyond the approved limit to the east of the Site to maintain a minimum 30 meter buffer zone.

56. Cover material shall be applied as follows:

- Daily Cover - On a weekly basis, the entire working face shall be covered with a minimum thickness of 150 mm of soil cover;

- Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm of soil cover shall be placed; and

- Final Cover - In areas where landfilling has been completed to final contours, a minimum 600 mm thick layer of final cover soil shall be placed having a hydraulic conductivity value of 10^{-7} m/s or less in lifts of 150 mm or less. The final cover material shall be compacted to 95% Standard Proctor Density (SPD). A layer of 150 mm of topsoil shall be placed above the 600 mm thick soil layer. Fill areas shall be progressively completed and have final cover and topsoil applied once final contours are reached.

58. Public access to the Site for waste deposition shall only be allowed during the following time periods:
- 9 am to 5 PM - Monday , Thursday and Saturday

III The following conditions are hereby added to this Approval:

Recycle and Reclamation Area

105. (1) The recycle and reclamation area shall be established only in the buffer area of the Site.

(2) No Household Hazardous Waste shall be accepted at this Site.

(3) The Owner shall ensure that the wastes are stored in a safe and secure manner; that the recycling and reclamation activities does not impede, or is impeded by any other landfilling activities, and that the wastes are properly handled, packaged or contained so as not to pose any threat to the

general public, Site personnel or the environment.

(4) The Owner shall ensure that the recycling and reclamation activities are conducted in a manner which minimizes the impacts of odour, dust, litter, noise and traffic on the general public, Site personnel and the environment.

(5) The electronic wastes received shall be intact and destined for a site at which the waste is to be processed for the recovery of materials.

(6) The Owner shall ensure that adequate fire-fighting and contingency spill cleanup equipment is available at the Site and that on-site supervisor is familiar with the use of such equipment and its location(s) on the Site.

Alternative Final Cover

106. (1) Application of biosolids from Green Valley sewage lagoon as an alternative final cover material on a pilot basis, all in accordance with Items 24 through 28 in Schedule "A", is hereby approved.

(2) The final cover consisting of a minimum 600 mm thick alternative final cover material specified in subcondition (1), overlain with 150 mm thick topsoil, shall be applied progressively as the proposed final waste surface as shown in Fig. 1 Site Development Plan, included in Item 24 in Schedule "A" of this Approval, is reached. The chemical quality of the alternative final cover material shall, as a minimum, meet the criteria for Industrial/Commercial/Community Property Use for Surface Soil in a Stratified Site Condition Standards in a Non-Potable Groundwater Condition, specified in Table 5 of the Soil Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA (April 2011). All areas of final cover shall have appropriate slopes within the range of 4H:1V (25%) on the sides, and 20H:1V (5%) on top areas, and shall be vegetated as soon as practically possible.

(3) The pilot scale alternative final cover application shall be carried out for a maximum of 24 months, and shall terminate anytime should any of the following adverse effects occur and are deemed to result from the application of the alternative final cover material:

- odour
- deterioration of vegetative cover
- vector and vermin
- groundwater quality exceeds the Guideline B-7 objectives at the Site boundaries
- surface water leaving the Site boundaries exceeds PWQO, and
- stability issues on side slopes

(4) Upon completion of the pilot scale application of the alternative final cover material, the Owner shall submit an application to the Director for approval of the full scale application of the alternative final cover material based on its performance during the pilot study.

(5) Evaluation of the performance of the alternative final cover material shall be included in the annual report.

IV The following items are hereby added to Schedule "A":

24. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated January 31, 2011, signed by Ewen MacDonald, Township of South Glengarry. A letter dated January 31, 2011 addressed to Director, Waste Management Branch of the Ministry of the Environment from John St. Marseille, GENIVAR Inc. regarding North Lancaster Landfill Certificate of Approval No. A481403 Amendment, North Lancaster Landfill Test Pit Geotechnical Assessment, and Figure 3.12 showing Monitoring Locations Buffer Area & Recycle /reclamation Areas are included as supporting information.

25. Letter dated September 9, 2011 addressed to Ewen MacDonald, Township of South Glengarry from Rick Li, Ministry of the Environment providing comments on the application for amendment to the Certificate.

26. Letter dated September 23, 2011 addressed to Rick Li, Ministry of the Environment from John St. Marseille, GENIVAR Inc providing a response to the MOE comments (Item 25).

27. Letter dated September 28, 2011 addressed to Rick Li, Ministry of the Environment from John St. Marseille, GENIVAR Inc providing additional testing results for the Green Valley Biosolids.

28. Letter dated October 28, 2011 addressed to Rick Li, Ministry of the Environment from John St. Marseille, GENIVAR Inc regarding sampling and testing of the Green Valley Biosolids in accordance with O. Reg 511.

29. Letter dated November 18, 2011 addressed to Rick Li, Ministry of the Environment from John St. Marseille, GENIVAR Inc regarding the total site area and the landfill footprint.

30. Letter dated December 5, 2011 addressed to Rick Li, Ministry of the Environment from John St. Marseille, GENIVAR Inc regarding the total site area and the landfill footprint.

The reasons for this amendment to the Approval are as follows:

1. The reason for amending Condition 28 is to allow waste from commercial, industrial and institutional sources to be accepted at the Site.

2. The reason for amending Condition 32 is to clarify that the service area of the Site includes the entire Township of South Glengarry.

3. The reason for amending Condition 54 is to ensure the waste Fill Beyond Approved Limit (FBAL) is properly managed and sufficient buffer zone be established.

4. The reason for amending Condition 56 is to clarify the final cover application.

5. The reason for amending Condition 58 is to clarify the site operation hours.

6. The reason for Condition 105 is to ensure the recycling and reclamation activities are conducted in a manner that minimizes potential impact on the environment and the landfill operation.

7. The reason for Condition 106 is to allow the application of biosolids from Green Valley Lagoon as an alternative final cover material on a pilot basis.

This Notice shall constitute part of the approval issued under Approval No. A481403 dated March 30, 2010

In accordance with Section 139 of the Environmental Protection Act, 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 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance 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

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in

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, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection 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) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 13th day of December, 2011

Tes Gebrezghi

Tesfaye Gebrezghi, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

RL/
c: District Manager, MOE Cornwall
John St. Marseille, Genivar ✓

Ministry of the Environment
Environmental Assessment and
Approvals Branch
Floor 12A
2 St Clair Ave W
Toronto ON M4V 1L5
Fax: (416)314-8452
Telephone: (416) 314-5138

Ministère de l'Environnement
Direction des évaluations et des
autorisations environnementales
Étage 12A
2 av St Clair O
Toronto ON M4V 1L5
Télécopieur : (416)314-8452
Téléphone : (416) 314-5138

Ontario

March 31, 2010

RECEIVED
APR - 6 2010
The Thompson
Rosemount Group

Mr. Derik Brandt, CAO
The Corporation of the Township of South Glengarry
6 Oak St
Post Office Box, No. 220
Lancaster, Ontario
K0C 1N0

Dear Mr. Brandt:

Re: Application for Approval of Proposed Expansion
North Lancaster landfill, Certificate of Approval A481403
South Glengarry Township, United Counties of Stormont, Dundas & Glengarry
MOE Reference Number 4688-7FFGYD

Please find attached an amended Certificate of Approval (C of A) for the North Lancaster Landfill site dated March 30, 2010. The amended C of A revokes and replaces all previous approvals for the site. In addition, the C of A approves the expansion of the site in accordance with the approval under the Environmental Assessment Act. The capacity of the existing and the expanded site is now defined as 242,000 cubic metres of waste.

The site is approved to accept non-hazardous solid municipal waste. Municipal waste as defined under Ontario Regulation 347 means.

a. *any waste, whether or not it is owned, controlled or managed by a municipality, except*
  i. hazardous waste,
  ii. liquid industrial waste, or
  iii. gaseous waste, and
b. *solid fuel, whether or not it is waste, that is derived in whole or in part from the waste included in clause (a).*

Any waste that meets the above definition of non-hazardous solid municipal waste is approved for disposal at the site.

If you have any questions regarding the above, please contact me at the above phone number.

Yours truly,

Greg Washuta

Greg Washuta, P.Eng., M.Eng., F.E.C.
Senior Review Engineer-Waste

c: Jason Ryan, District Manager, MOE Cornwall
John St. Marseille, P. Eng., The Thompson Rosemount Group Inc. ✓
Lisa Chalmers, MOE, Cornwall Area
Bruce Metcalfe, Technical Support, MOE, Eastern Region
Frank Crossley, Technical Support, MOE, Eastern Region

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDED PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE

NUMBER A481403
Issue Date: March 30, 2010

The Corporation of the Township of South Glengarry
6 Oak St
Post Office Box, No. 220
Lancaster, Ontario
K0C 1N0

Site Location: North Lancaster Landfill
Lot Pt. Lot 25, Concession 6 and 7
South Glengarry Township, United Counties of Stormont, Dundas and Glengarry

You have applied in accordance with Section 27 of the Environmental Protection Act for approval of:

the use and operation of a landfill site for the disposal of non-hazardous, solid municipal waste with a 3.4 hectare landfill footprint within a total site area of 32.3 hectares.

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

Definitions

For the purposes of this Certificate the following definitions apply,

"*Anniversary Date* " means the date on which waste is first received at the *Site* ;

"*Crown* " means Her Majesty the Queen in the Right of Ontario;

"*Certificate* " means this entire provisional Certificate of Approval document, issued in accordance with section 39 of the *EPA* , and includes any schedules to it, the application and the supporting documentation listed in schedule "A;

"*Director* " means any *Ministry* employee appointed in writing by the Minister pursuant to section 5 of the EPA as a Director for the purposes of Part V of the EPA;

"*District Manager* " means the District Manager of the local district office of the Ministry in which the Site is geographically located;

"*EC* " means *Environmental Committee* ;

"*EPA* " means *Environmental Protection Act* , R.S.O. 1990, c. E. 19, as amended;

"*Ministry* " means the Ontario Ministry of the Environment;

"*Operator* " has the same meaning as "operator" as defined in s.25 of the *EPA* ;

"*Owner* " means The Corporation of the Township of South Glengarry and its successors and assigns;

"*PA* " means the *Pesticides Act* , R.S.O. 1990, c. P-11, as amended from time to time;

"*Provincial Officer* " means any person designated in writing by the Minister as a provincial officer pursuant to section 5 of the *OWRA* or section 5 of the *EPA* or section 17 of *PA* .

"*Regional Director* " means the Regional Director of the local Regional Office of the Ministry in which the Site is located.

"*Regulation 232* " or "*Reg. 232* " means Ontario Regulation 232/98 (New Landfill Standards) made under the *EPA* , as amended from time to time;

"*Regulation 347* " or "*Reg. 347* " means Regulation 347, R.R.O. 1990, made under the *EPA* , as amended from time to time;

"*Site* " means the entire waste disposal site, including the buffer lands,and contaminant attenuation zone located at Pt. Lot 25, Concession 6 and 7, South Glengarry Township in the United Counties of Stormont, Dundas and Glengarry 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

GENERAL

Compliance

1. The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Site* is notified of the *Certificate* and the conditions herein and shall take all reasonable measures to ensure the person complies with the same.

2. Any person authorized to carry out work on or operate any aspect of the *Site* shall comply with the conditions of this *Certificate* .

In Accordance

3. Except as otherwise provided for in this *Certificate* , the *Site* shall be designed, developed, built, operated and maintained in accordance with the application for this *Certificate* , dated June 27, 2008, and the supporting documentation listed in Schedule "A".

Other Legal Obligations

4. The issuance of, and compliance with, this *Certificate* does not:

- relieve any person of any obligation to comply with any provision of the *EPA* or any other applicable statute, regulation or other legal requirement; or
- limit in any way the authority of the *Ministry* to require certain steps be taken or to request that any further information related to compliance with this *Certificate* be provided to the *Ministry* ;

unless a provision of this *Certificate* specifically refers to the other requirement or authority and clearly states that the other requirement or authority is to be replaced or limited by the this *Certificate* .

Adverse Effect

5. The *Owner* and *Operator* shall take all reasonable steps to minimize and ameliorate any adverse effect or impairment of water quality resulting from the operation of the *Site* , including such accelerated or additional monitoring as may be necessary to determine the nature of the effect or impairment.

6. The *Owner* or *Operator* shall remain responsible for any contravention of any other condition of this *Certificate* or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect or impairment of water quality.

Furnish Information

7. Any information requested by the *Director* or a *Provincial Officer* concerning the *Site* and its operation under this *Certificate* , including but not limited to any records required to be kept by this *Certificate* shall be provided in a timely manner.

8. The receipt of any information by the *Ministry* or the failure of the *Ministry* to prosecute any person or to require any person to take any action, under this *Certificate* or under any statute, regulation or subordinate legal instrument, in relation to the information, shall not be construed as:

- an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any condition of this *Certificate* or any statute, regulation or other subordinate legal requirement; or
- acceptance by the *Ministry* of the information's completeness or accuracy.

Freedom of Information Act

9. Any information related to this Certificate and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, RSO 1990, CF-31.

Interpretation

10. Where there is a conflict between a provision of any document, including the application, referred to in this *Certificate* , and the conditions of this *Certificate,* the conditions in this *Certificate* shall take precedence.

11. Where there is a conflict between the application and a provision in any documents listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the *Ministry* approved the amendment.

12. Where there is a conflict between any two documents listed in Schedule "A", other than the application, the document bearing the most recent date shall take precedence.

13. The conditions of this *Certificate* are severable. If any condition of this *Certificate* , or the application of any condition of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *Certificate* shall not be affected thereby.

Acquisition of Groundwater Rights

14. The Owner shall obtain and maintain the groundwater rights for the property known as Part of West half of Lot 25 in the Township of South Glengarry, County of Glengarry, lying south of the Beaudette River over the entire contaminating lifespan of the site.

Certificate of Prohibition

15. Pursuant to Section 197 of the *EPA* , no person having an interest in the *Site* shall deal with the *Site* in any way without first giving a copy of this *Certificate* to each person acquiring an interest in the *Site* as a result of the dealing.

16. Two copies of a completed Certificate of Prohibition, containing a registerable description of the *Site* , shall be submitted to the Director for the Director's signature within 60 calendar days of the date of this *Certificate.*

17. The Certificate of Prohibition shall be registered in the appropriate land registry office on title to the *Site* and a duplicate registered copy shall be submitted to the *Director* within 10 calendar days of receiving the Certificate of Prohibition signed by the *Director* .

No Transfer or Encumbrance

18. No portion of this *Site* shall be transferred or encumbered prior to or after closing of the *Site* unless

the *Director* is notified in advance and is satisfied with the arrangements made to ensure that all conditions of this *Certificate* will be carried out and that sufficient financial assurance is deposited with the *Ministry* to ensure that these conditions will be carried out.

Change of Owner

19. The *Owner* shall notify the *Director* , in writing, and forward a copy of the notification to the *District Manager* , within 30 days of the occurrence of any changes in the following information:

- the ownership of the *Site* ;
- the Operator of the *Site* ;
- the address of the *Owner* or *Operator* ;
- the partners, where the *Owner* or *Operator* 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. B.17, shall be included in the notification;
- the name of the corporation where the *Owner* or *Operator* is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act* , R. S. O. 1990, c. C.39, shall be included in the notification.

20. In the event of any change in the 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 forward to the *Director* and *District Manager* .

Inspections

21. No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *OWRA* , the *EPA* , or the *PA* , of any place to which this *Certificate* relates, and without limiting the foregoing:

- to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *Certificate* are kept;
- to have access to, inspect, and copy any records required to be kept by the conditions of this *Certificate* ;
- to inspect the *Site,* related equipment and appurtenances;
- to inspect the practices, procedures, or operations required by the conditions of this *Certificate* ; and
- to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *Certificate* or the *EPA* , the *OWRA* or the *PA* .

CONSTRUCTION, INSTALLATION and PLANNING

Major Works

22. For the purposes of this *Certificate* the following are *Major Works* :

- gas management system;
- leachate management system;
- groundwater management system; and
- liner.

23. The final detailed design of each *Major Work* shall include the following:

- design drawings and specifications;
- a detailed quality assurance / quality control (QA/QC) program for construction of the major work, including necessary precautions to avoid disturbance to the underlying soils; and
- details on the monitoring, maintenance, repair and replacement of the engineered components of the major work, if any.

24. No construction of a Major Work shall commence prior the Director approving, in writing, the final detailed design of that Major Work. Each major work shall be constructed in accordance with the approved final detailed design and the QA/QC procedures shall be implemented as approved by the Director.

Landfill Base and Final Contour drawings:

25. Prior to commencement on the landfill base and the final contours, the Owner shall submit design drawings that are signed and stamped by a Professional Engineer for approval by the Director. In addition, cross-sectional drawings shall clearly indicate the high groundwater table elevation at the Site. Landfill base grades shall also be indicated clearly.

26. In addition, prior to commencement of construction of the landfill base, the Owner shall submit to the Director for approval a detailed Quality Assurance/Quality Control (QA/QC) program for the construction of the base. The QA/QC program should include the following items:

    - the amount of rocks/gravels allowed;
    - removal of sand seams;
    - placement of clay;
    - compaction of clay;
    - moisture content;
    - frequency of compaction testing;
    - contingency plans if compaction results are not achieved;
    - contingency plans if any other results do not meet QA/QC plan criteria.

Geotechnical Assessment

27. Prior to commencement of construction of the landfill base, the Owner shall submit a detailed geotechnical assessment to the Director for approval. The Geotechnical Assessment shall be in accordance with O. Reg. 232/98.

Waste Type

28. Only the following types of waste shall be accepted at the *Site* :

- non-hazardous, solid municipal waste.

29. Any waste type not listed in the previous condition shall not be accepted at the *Site* .

Capacity

30. The amount of waste deposited at the existing and expanded site shall not exceed the site capacity of the **242,000 cubic metres** which includes the existing site and the proposed expansion.

Daily Waste Limit

31. No more than **100 tonnes of waste per day** may be accepted at the *Site* .

Service Area

32. Only waste that is generated **in the former Township of Lancaster that is now a portion of the Township of South Glengarry** shall be accepted at the *Site* . The Township may on a contingency basis receive waste from the entire Township of South Glengarry.

Re-Vegetation

33. The Owner shall ensure that any natural areas that are disturbed during the construction and operation of the landfill will be re-vegetated with an appropriate species such as native deciduous and coniferous species. Species selected for re-vegetation must complement the surrounding native vegetation communities adjacent to the landfill.

Signage

34. A sign shall be installed and maintained at the main entrance/exit to the *Site* on which is legibly displayed the following information:

- the name of the *Site* and *Owner* ;
- the number of the Certificate;
- the name of the *Operator;*
- the normal hours of operation;
- the allowable and prohibited waste types;
- a warning against unauthorized access;
- the telephone number to which complaints may be directed;
- a twenty-four (24) hour emergency telephone number (if different from above); and
- a warning against dumping outside the *Site* .

35. The Owner shall install and maintain signs to direct vehicles to working face and recycling areas.

36. The Owner shall provide signs at recycling depot informing users what materials are acceptable and directing users to appropriate storage area.

Proper Operation

37. The *Site* shall be properly operated and maintained at all times. All waste shall be managed and disposed of in accordance with the *EPA* , *Regulation 347* , *Regulation 232* , and the requirements of this *Certificate.* At no time shall the discharge of a contaminant that causes or is likely to cause an

adverse effect be permitted.

Waste Inspection

38. The *Operator* shall develop and implement a program to inspect waste to ensure that the waste is of a type approved for acceptance under this *Certificate* .

39. All loads of waste must be properly inspected by trained site personnel prior to acceptance at the site and waste vehicles must be diverted to appropriate areas for waste disposal.

Waste Deposition

40. The Owner shall deposit waste in a manner that minimizes exposure area at the landfill working face and all waste shall be compacted before cover is applied.

41. No waste shall be deposited in groundwater or surface water at the site.

Vermin, etc.

42. The *Site* shall be operated and maintained such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

Scavenging

43. No scavenging is to occur at the Site.

Dust

44. The Owner shall control fugitive dust emissions from on site sources including but not limited to on-site roads, stockpiled cover material and, closed landfill area prior to seeding especially during times of dry weather conditions. If necessary, major sources of dust shall be treated with water and/or dust suppression materials to minimize the overall dust emissions from the site.

Noise

45. The Owner shall comply with noise criteria in MOE Guideline entitled "Noise Guidelines for Landfill Sites".

Burning of Waste Prohibited

46a. Burning of municipal waste at the *Site* is prohibited.

46b. Burning of clean wood and brush can occur in accordance with the Ministry Guideline "Burning at Landfill Sites", and in a supervised and controlled manner.

LANDFILL GAS:

47. All buildings are to be free of any landfill gas accumulation. The Owner shall provide adequate ventilation systems to relieve landfill gas accumulations in buildings if necessary.

SURFACE WATER:

48. The Owner shall take all appropriate measures to minimize surface water from coming in contact with waste. Temporary berms and ditches shall be constructed around active waste disposal areas to prevent extraneous surface water from coming in contact with the active working face.

49. The owner shall not discharge surface water to receiving water bodies without an approval under Section 53 of the OWRA.

LITTER CONTROL:

50. The Owner shall take all practical steps to prevent escape of litter from the site. The Owner shall inspect and collect litter from the site on a weekly basis during the spring, summer and fall months. During winter months, litter collection shall be completed on a bi-weekly frequency. All loose, windblown litter shall be collected and disposed of at the landfill working face.

Site Security

51. The Owner shall install and maintain a 1.2 metre high post and page wire fence on the northern boundary of the site.

Operations Manual

52. An operations and procedures manual that addresses the requirements of this *Certificate* shall be prepared within 6 months of the issuance date of this Certificate to the satisfaction of the District Manager, and shall include the following:

- Health and safety;
- Operation and maintenance of the site;
- Waste acceptance;
- Waste disposal area and development;
- Nuisance management;
- Leachate management;
- Landfill gas management;
- Surface water/Storm water management;
- Inspections and monitoring;
- Contingency plans and emergency procedures;
- Complaints; and,
- Reporting and record keeping.

53. The operations and procedures manual shall be:

- retained at the Site;
- kept up to date through periodic revisions; and
- be available for inspection by *Ministry* staff.

Landfill Limits

54. No waste, including daily cover, intermediate cover or final cover layer, shall be landfilled outside the limits of the base contours and the final contours shown in Figure 3.6.1 in Item 16 in Schedule "A" attached to this *Certificate* .

Landfill Operations

55. Landfilling operations shall be conducted in accordance with Item 16 and Item 21 in Schedule "A" attached to this *Certificate* .

Landfill Cover:

56. Cover material shall be applied as follows:

- Daily Cover - On a weekly basis, the entire working face shall be covered with a minimum thickness of 150 mm of soil cover;

- Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm of soil cover shall be placed; and

- Final Cover - In areas where landfilling has been completed to final contours, a minimum 600 mm thick layer of final cover soil shall be placed having a hydraulic conductivity value of 10^{-7} m/s or less in lifts of 150 mm or less. The final cover material shall be compacted to 95% Standard Proctor Density (SPD). A layer of 150 mm of topsoil shall be placed above the 600 mm thick soil layer. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours.

Final Landfill Slopes

57. The final slopes of the landfill shall be in the range of 5% to 33%.

Hours of Operation

58. Waste shall only be accepted at the Site during the following time periods:
    - 9 am to 5 PM - Monday , Thursday and Saturday

59. With the prior written approval of the *District Manager* , the time periods may be extended to accommodate seasonal or unusual quantities of waste.

60. The Owner may provide limited hours of operation provided that the hours are posted at the landfill

gate and that suitable notice is provided to the public of any change in operating hours.

61. Upon reasonable notice to the Director, contingency actions may take place outside normal hours of operation. Emergency response may occur at any time as required.

Site Security

62. During non-operating hours, the *Site* entrance and exit gates shall be locked and the *Site* shall be secured against access by unauthorized persons

Road Maintenance

63. On-site roads shall be provided and maintained in a manner that vehicles hauling waste to and on the site may travel readily and safely on any operating day. During winter months, when the site is in operation, roads must be maintained to ensure safe access to the landfill working face. Access roads must be clear of mud, ice and debris which may create hazardous conditions.

Site Inspections

64. The owner shall inspect the site monthly for:
- Presence of leachate seeps;
- Condition of surface water drainage works;
- Erosion and sedimentation in surface water drainage system;
- Presence of any ponded water;
- Adequacy of cover material;
- Evidence of vegetative stress;
- Condition of groundwater monitoring wells;
- Presence of insects, vermin, rodents and scavenging animals;
- Condition of fence surrounding the site; and,
- General site appearance.

Employees and Training

65. A training plan for all employees that operate any aspect of the site shall be developed and implemented by the *Operator.* Only trained employees shall operate any aspect of the *Site* or carry out any activity required under this *Certificate* . For the purpose of this *Certificate* "trained" means knowledgeable either through instruction or practice in:

- the relevant waste management legislation *including EPA, O. Reg. 347 and 558* , regulations and guidelines;
- major environmental *and occupational health and safety* concerns pertaining to the waste to be handled;
- the proper handling of wastes;
- the management procedures including the use and operation of equipment for the processes and wastes to be handled;

- the emergency response procedures;
- the specific written procedures for the control of nuisance conditions;
- the *terms, conditions and operating* requirements of this *Certificate* and,
- proper inspection, receiving and recording procedures and the activities to be undertaken during and after a load rejection.

MONITORING, RECORDING NOTIFICATION

Daily Inspections and Log Book

66. An inspection of the entire *Site* and all equipment on the *Site* shall be conducted each day the *Site* is in operation to ensure that the site is being operated in compliance with this *Certificate* . Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the *Site* if needed.

67. A record of the inspections shall kept in a daily log book *or a dedicated electronic file* that includes:
    - the name and signature of person that conducted the inspection;
    - the date and time of the inspection;
    - the list of any deficiencies discovered;
    - the recommendations for remedial action; and
    - the date, time and description of actions taken.

68. A record shall be kept in the daily log book of all refusal of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

GROUNDWATER MONITORS

69. The Owner shall ensure all groundwater monitoring wells are properly capped, locked and protected from damage.

70. In areas where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells and they shall be properly re-secured.

71. Any groundwater monitoring wells included in the monitoring program shall be assessed, repaired, replaced or decommissioned as required.

72. The Owner shall repair or replace any monitoring well which is destroyed or in any way made inoperable for sampling such that no more than one sampling event is missed.

73. All monitoring wells that are no longer required as part of the groundwater monitoring program and have been approved by the Director for abandonment, shall be decommissioned in accordance with good standard practice that will prevent contamination through the abandoned well and in accordance with Ontario Regulation 903. A report on the decommissioning shall be provided in the annual monitoring report for the period during which the well was decommissioned.

74. Any new or replacement well that is installed on Site shall be added to the groundwater monitoring program immediately.

New Background Deep Bedrock well

75. The Owner shall in consultation with the Ministry on the location install a background deep bedrock well within one (1) year of the date of this Certificate.

Monitoring Program

76. Monitoring programs shall be carried out for groundwater and surface water in accordance with Schedules "B" and "C", "D", attached to this *Certificate* .

77. No alterations to the groundwater or surface water monitoring programs shall be implemented prior to receiving written agreement from the District Manager or written approval from the Director.

Groundwater and Surface Water Trigger Mechanisms

78. The Owner shall follow the trigger mechanisms for groundwater and surface water as detailed in Item 12 of Schedule "A".

79. In the event a result of a monitoring test carried out under a monitoring program does not comply with the standards set out in the above condition, the *Owner* shall:
- notify the District Manager immediately upon receipt of the result;
- conduct confirmatory sampling within 30 days of the trigger event date;
- conduct an investigation into the cause of the adverse result and submit a report to the *District Manager* that includes an assessment of whether contingency measures need to be carried out;
- if contingency measures are needed, submit detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures, and a schedule as to when these measures will be implemented, to the *Director* and notify *District Manager* ; and
- implement the required contingency measures upon approval by the *Director* .

Complaints Procedure

80. If at any time, the *Owner* receives complaints regarding the operation of the *Site* , the *Owner* shall respond to these complaints according to the following procedure:

   a. The *Owner* shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;
   b. The Owner, upon notification of the complaint, shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and
   c. The Owner shall complete and retain on-site a report written within one (1) week of the

complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents.

81. The Owner shall designate a person to receive any complaints and to respond with a written notice of action as soon as possible. The Owner shall post site complaints procedure at site entrance. All complaints and the Owner's actions taken to remedy the complaints must be summarized in the Annual Report.

Monthly Records

82. Monthly site inspection records in the form of a written log or a dedicate electronic file shall include...

    a. the type, date and time of arrival, hauler, and quantity (tonnes) of all waste received at the site;
    b. the area of the Site in which waste disposal operations are taking place;
    c. a calculation of the total quantity (tonnes) of waste received at the Site during each operating day and each operating week;
    d. the amount of any leachate removed, or treated and discharged from the Site;
    e. a record of litter collection activities and the application of any dust suppressants;
    f. a record of the daily inspections;
    g. a description of any out-of-service period of any control, treatment, disposal or monitoring facilities, the reasons for the loss of service, and action taken to restore and maintain service;
    h. type and amount of daily, intermediate and final cover used;
    i. maintenance and repairs performed on equipment employed at the site;
    j. complaints received and actions taken to resolve them;
    k. emergency situations and actions taken to resolve them; and
    l. any other information required by the District Manager.

Record Retention

83. Except as authorized in writing by the Director, all records required by this Certificate shall be retained at the Site for a minimum of two (2) years from their date of creation.

84. The Owner shall retain all documentation listed in Schedule "A" for as long as this Certificate is valid.

85. All monthly summary reports are to be kept at the site until they are included in the Annual Report.

86. The Owner shall retain employee training records as long as the employee is working at the site.

87. The Owner shall make all of the above documents available for inspection upon request of Ministry staff.

EMERGENCY SITUATIONS:

88. In the event of a fire or discharge of a contaminant to the environment, site staff shall contact the MOE Spills Action Centre (1-800-268-6060) and the District Office of the MOE.

89. The Owner shall submit to the District Manager a written report within 3 days of the spill or incident, outlining the nature of the incident, remedial measures taken and measures taken to prevent future occurrences at the Site.

90. The Owner shall prepare an Emergency Response Manual for the site within ninety (90) days of issuance of this Certificate of approval in consultation with local emergency response agencies. The Emergency Response Manual should indicate the responsibility of each of the stakeholders with respect to handling possible emergency situations.

91. The Emergency Response Manual shall be updated on a regular basis and be provided to the District Manager within one month of the revision date.

92. The Owner shall ensure that adequate fire fighting and contingency spill clean up equipment is available and that emergency response personnel are familiar with its use and location.

Environmental Committee

93. The Owner shall use its best efforts to establish and maintain an Environmental Committee (EC) for the Site in order to ensure that public concerns are addressed and that mitigation measures including waste diversion initiatives are undertaken where appropriate.

94. The EC shall serve as a focal point for dissemination, review and exchange of information and monitoring results relevant to the operation of the Site.

95. The need for an EC shall be reviewed on a yearly basis by the Owner.

96. If the EC is not functioning, the Owner shall publish a notice at least annually inviting expressions of interest in the formation of the EC.

97. If there is no interest from the public in continuing the existing EC or establishing and participating in a new committee once sufficient public notice has been given of the intention not to have an EC, the Owner with approval from the District Manager, may dispense with the EC.

Annual Report

98. A written report on the development, operation and monitoring of the *Site* , shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the *District Manager* , by March 31, 2010 and every March 31st of each year thereafter , and shall cover the 12 month period of the previous calendar year.

99. The Annual Report shall include the following:

a. the results and an interpretive analysis of the results of all leachate, groundwater, surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs;
b. an assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the *Site* , and the adequacy of and need to implement the contingency plans;
c. site plans showing the existing contours of the *Site;*
d. areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period;
e. areas of excavation during the reporting period;
f. the progress of final cover, vegetative cover, and any intermediate cover application;
g. previously existing site facilities;
h. facilities installed during the reporting period;
i. site preparations and facilities planned for installation during the next reporting period;
j. calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the *Site* during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;
k. a calculation of the remaining capacity of the site, an estimate of the remaining site life *and a comparison of actual capacity used to approved site capacity* ;
l. a summary of the quantity of any leachate or pre-treated leachate removed from the *Site* or leachate treated and discharged from the Site during each operating week;
m. a summary of the weekly, maximum daily and total annual quantity (tonnes) of waste received at the Site;
n. a summary of any complaints received and the responses made;
o. a discussion of any operational problems encountered at the *Site* and corrective action taken;
p. a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903;
q. any other information with respect to the site which the *District Manager* or Regional Director may require from time to time;
r. a statement of compliance with all conditions of this Certificate of Approval and other relevant Ministry groundwater and surface water requirements;
s. Summary of inspections undertaken at the site;
t. any changes in operations, equipment or procedures employed at the site; and,
u. Recommendations regarding any proposed changes in operations of the site.

Closure Plan

100.At least 2 years prior or when 90% of the site capacity is reached, whichever comes first, the Owner shall submit to the Director for approval, with copies to the District Manager and the EC, a detailed site closure plan pertaining to the termination of landfilling operations at this *Site* , post-closure inspection, maintenance and monitoring, and end use. The plan shall include the following:

- a plan showing *Site* appearance after closure;
- a description of the proposed end use of the *Site* ;

- a descriptions of the procedures for closure of the *Site*, including:
  i. advance notification of the public of the landfill closure;
  ii. posting of a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
  iii. completion, inspection and maintenance of the final cover and landscaping;
  iv. site security;
  v. removal of unnecessary landfill-related structures, buildings and facilities; and
  vi. final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
- a schedule indicating the time-period for implementing sub-conditions i) to vi) above.
- descriptions of the procedures for post-closure care of the Site, including:
  a. operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
  b. record keeping and reporting; and
  c. complaint contact and response procedures;
- an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas; and
- an updated estimate of the contaminating life span of the *Site* , based on the results of the monitoring programs to date.

101.The *Site* shall be closed in accordance with the closure plan as approved by the *Director.*

102.Upon closure of the site, the following features will be inspected, recorded and maintained on a quarterly basis:

- evidence of settlement;
- cover soil integrity;
- vegetative cover;
- surface water drainage works;
- erosion and sediment in surface water drainage system; and
- groundwater monitoring wells.

103.A vegetative cover consisting of vegetation that is suited to local conditions and that is capable with minimal care of providing vigorous, plentiful cover no later than its 3rd growing season shall be established over all completed areas to control erosion and minimize evaportranspiration. Complete planting as soon as possible after reaching final contours.

104.If weather conditions do not allow timely placement of final and vegetative cover, silt curtains shall be employed to minimize silt loadings to surface water bodies.

SCHEDULE "A":

1. Application for a Certificate of Approval for a Waste Disposal Site for the Township of Lancaster Waste Disposal Site, signed and dated February 3, 1977.

2. Map entitled "Annex A - Map, Township of Lancaster" submitted February 1977.

3. Map entitled "Annex B - Location Plan" submitted February 1977.

4. Map entitled "Annex C - Township of Lancaster Proposed Land Fill Site Plan" submitted February, 1977.

5. Letter from M.J. Samson, Clerk, Corporation of the Township of Lancaster to G. J. McKenna, Ministry of the Environment, Cornwall dated September 22, 1977.

6. Map entitled "Township of Lancaster Proposed Land Fill Site Development Plan" submitted November 23, 1977.

7. Application for a Certificate of Approval for a Waste Disposal Site (Transfer) for the Township of Lancaster Landfill Site, signed and dated October 14, 1994.

8. Figure entitled "Township of Lancaster Site Plan Waste Disposal Site E. 1/2 Lot 25, Conc. 6 Proposed Transfer Station" dated September 1994.

9. Document entitled "Plan of Operation" submitted by the Township of Lancaster on October 14, 1994.

10. Letter dated November 7, 1994 from Marc Robert, Senior Environmental Officer, South-eastern Region, Ministry of the Environment to M.J. Samson, Clerk Treasurer, Corporation of the Township of Lancaster.

11. Letter and attachments from M.J. Samson, Clerk Treasurer, Corporation of the Township of Lancaster to Marc Robert, Senior Environmental Officer, South-eastern Region, Ministry of the Environment, dated November 16, 1994.

12. Order in Council number 1305/2003 under Section 9 of the Environmental Assessment Act dated June 18, 2003.

13. Notice of Approval to Proceed with the Undertaking for an Environmental Assessment related to the Township of South Glengarry Solid Waste Management Strategy, EA File MU-0915-02 dated May 13, 2003.

14. Document entitled "Lancaster WDS Model Update and Model Simulations Technical Memorandum" dated April 2008, prepared by Schlumberger Water Services Waterloo.

15. Application for a Provisional Certificate of Approval for a Waste Disposal Site for the North Lancaster Landfill, signed and dated June 27, 2008.

16. Document entitled "North Lancaster Landfill Expansion Design Report (EPA Part V Application)" dated June 2008, prepared by The Thompson Rosemount Group Inc.

17. Document entitled "North Lancaster Landfill Expansion Design Report (EPA Part V Application)

Appendices" dated June 2008, prepared by The Thompson Rosemount Group Inc.

18. Memorandum dated November 3, 2008 from B.W. Metcalfe, Senior Environmental Officer (Surface Water), Technical Support Section, Eastern Region, Ministry of the Environment to L. Chalmers, Senior Environmental Officer, Cornwall Area Office, Ministry of the Environment.

19. Memorandum dated March 13, 2009 from Frank Crossley, Hydrogeologist, Technical Support Section, Eastern Region, Ministry of the Environment to L. Chalmers, Senior Environmental Officer, Cornwall Area Office, Ministry of the Environment.

20. Letter dated April 22, 2009 from Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, Ministry of the Environment to Derik Brandt, CAO, The Corporation of the Township of South Glengarry.

21. Letter and attachments dated June 4, 2009 from John St. Marseille, Senior Associate/Manager-Environmental, The Thompson Rosemount Group Inc. to Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, Ministry of the Environment.

22. Letter dated June 30, 2009 from John St. Marseille, Senior Associate/Manager- Environmental, The Thompson Rosemount Group Inc. to L. Chalmers, Senior Environmental Officer, Cornwall Area Office, Ministry of the Environment.
23. Letter dated December 23, 2009 from John St. Marseille, Senior Associate/Manager- Environmental, The Thompson Rosemount Group Inc. to Greg Washuta, Senior Waste Engineer, Waste Unit, EAAB, Ministry of the Environment.

SCHEDULE "B": GROUNDWATER MONITORING

Groundwater sampling is to be completed on the following frequency:

Monitor Type	Well Identification	Sampling Frequency
Background	96-1S 99-1D 99-1sBR	annual
Leachate	96-3S 96-3D 06-3dBR 97-4d 99-4sBR 99-4dBR	Semi-annual
Down Gradient		
West	97-3d	Semi-annual
	99-3sBR	Annual
	99-9s	Semi-annual
	99-9sBR	Semi-annual
Northwest	99-8s	Semi-annual

	99-8sBR 99-7s 99-7sBR 99-7dBR	Semi-annual annual annual Semi-annual
North	96-2d 99-2sBR 99-2dBR	Semi-annual
Northeast	97-2s 99-6sBR 99-6dBR	Semi-annual
East	97-1s 99-5sBR	Annual
CAZ		
East	06-4d 06-4dBR	Semi-annual
Northeast	00-1s 00-1dBR 00-2s 00-2sBR 00-2dBR 06-1s 06-1d 06-1dBR	Semi-annual
North	00-3s 00-3dBR	Semi-annual
Northwest	00-4s	Annual
	00-4sBR 00-4dBR 00-5sBR 00-5dBR	Semi-annual
	06-2s 06-2d	Annual
	06-2dBR	Semi-annual
DOMESTIC WELLS (provided homeowner concurrence obtained)		
	PW1, PW-2, PW-3	Annual

Groundwater samples are to be analyzed for the following parameters:

GENERAL CHEMISTRY:	pH, conductivity, hardness, ion balance, Total Dissolved Solids.
MAJOR IONS:	Alkalinity, chloride, sodium, sulphate, calcium, magnesium, potassium
METALS:	Barium, boron, iron, manganese
NUTRIENTS:	Dissolved Organic Carbon, Ammonia, Organic Nitrogen, Nitrate, nitrite, Biochemical Oxygen Demand, Chemical Oxygen Demand. Total Kjedahl Nitrogen

OTHER: phenol

Detection limits shall be low enough in order to allow for comparison with the Ministry's Ontario Drinking Water Standards.

Conductivity, pH and temperature readings are to be taken from samples collected from each well during each sampling event.

Schedule "C" is added to the Certificate

SCHEDULE "C": SURFACE WATER MONITORING

Surface water monitoring shall take place at stations S1, S2, S3, S4, S5, S6, S7 and S8 in the spring, summer and fall of each year.

One blind duplicate sample shall be collected during each sampling event for quality assurance/quality control.

Velocity, depth and cross sectional area measurements shall be taken at each surface water station during each sampling event. In cases where this is not possible, other methods should be used to assess stream flow.

Weather conditions during and 48 hours prior to the sampling event are to be observed and recorded.

Surface water samples shall be analyzed for the following:

GENERAL CHEMISTRY: pH, conductivity, hardness, ion balance.
MAJOR IONS: Alkalinity, chloride, sulphate, sodium, potassium
METALS: Arsenic, barium, boron, cadmium, chromium, copper, iron, lead, manganese,nickel, zinc
NUTRIENTS: Nitrate, nitrite, Total ammonia, Un-ionized ammonia, Total Kjedahl Nitrogen, Total phosphorus, Biochemical Oxygen Demand, Chemical Oxygen Demand.
OTHER: Mercury, phenols, turbidity, colour, temperature, Total Suspended Solids, Total Dissolved Solids

Detection limits shall be low enough in order to provide comparisons with the Ministry's Provincial Water Quality Objectives.

Conductivity, pH, temperature and Dissolved Oxygen readings are to be taken at each surface water station during each sampling event.

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

1. *The reason for the definitions is to define the specific meaning of terms and simplify the wording of conditions in this Certificate of Approval.*
2. *The reason for Conditions 1 and 2 is to ensure that the Site is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.*
3. *The reason for Conditions 3, 4, 5, 6, 9 to 13, 52 and 53 is to clarify the legal rights and responsibilities of the Owner under this Certificate of Approval.*
4. *Conditions 7 and 8 are included to ensure that the appropriate Ministry staff have ready access to information and the operations of the Site, which are approved under this Certificate.*
5. *Conditions 15 to 17 inclusive are included, pursuant to subsection 197(1) of the EPA, to provide that any persons having an interest in the Site are aware that the land has been approved and used for the purposes of waste disposal.*
6. *The reasons for Condition 18 are to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this Certificate of Approval.*
7. *The reasons for Conditions 19 & 20 are to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.*
8. *The reason for Condition 21 is to ensure that appropriate Ministry staff have ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Certificate of Approval. This condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA and OWRA.*
9. *The reason for Conditions 28, 29 and 32 is to specify the approved areas from which waste may be accepted at the Site and the types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.*
10. *The reason for Conditions 30 and 54 is to specify restrictions on the extent of landfilling at this Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity of the site. Approval to landfill beyond these limits would require an application with supporting documentation submitted to the Director.*
11. *The reason for Conditions 14 is to ensure that there is adequate space around the perimeter of the waste fill area in which contaminant attenuation may occur and various monitoring, maintenance and environmental control activities can take place.*
12. *The reason for Conditions 34, 35 and 36 is to ensure that users of the Site are fully aware of*

important information and restrictions related to Site operations under this Certificate of Approval.

13. *The reason for Conditions 22 to 27 inclusive and 49 is to specify other approvals required for works and activities related to the operation of this Site as a landfill.*

14. *Condition 33 is necessary in order to fulfil the requirements under Condition 9 of Item 12 of Schedule "A".*

15. *The reasons for Conditions 58 to 61 are to specify the normal hours of operation for the landfill Site and a mechanism for amendment of the hours of operation.*

16. *The reason for Condition 65 is to ensure that the Site is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.*

17. *The reasons for Conditions 51 and 52 are to specify site access to/from the Site and to ensure the controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.*

18. *The reason for Condition 56 is to ensure that landfilling operations are conducted in an environmentally acceptable manner. Daily and intermediate cover is used to control potential nuisance effects, to facilitate vehicle access on the site, and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the site.*

19. *The reasons for Conditions 37, 40, 41, 42, 44, 47, 48, 50, 55, 63, 64 and 66 are to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.*

20. *The reason for Condition 46a is that open burning of municipal waste is unacceptable because of concerns with air emissions, smoke and other nuisance affects, and the potential fire hazard.*

21. *The reasons for conditions 46b are to define what type of waste may be burned at the Site, to define the procedures to be undertaken before and after the burning event, to ensure that burning at the Site is completed in accordance with Ministry of Environment's guidelines and to guarantee that burning does not result in a hazard or nuisance to the environment and the health and safety of people.*

22. *The reasons for Condition 43 are the protection of public health and safety and minimization of the potential for damage to environmental control, monitoring and other works at the landfill Site. Scavenging is the uncontrolled removal of material from waste at a landfill site.*

23. *The reason for Conditions 38 and 39 is to specify appropriate waste inspection procedures are undertaken so that waste that is disposed of at the site is in accordance with the type specified in this*

Certificate of Approval.

24. *The reason for Condition 45 is to ensure that noise from or related to the operation of the landfill is kept to within Ministry limits and does not result in a hazard or nuisance to any person.*

25. *Condition 57 has been included in order to ensure final slopes of the landfill are safe and secure and do not pose a threat to the environment.*

26. *The reason for Conditions 75, 76 and 77 is to demonstrate that the landfill site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.*

27. *The reasons for Conditions 69 through 74 inclusive are to ensure protection of the natural environment and the integrity of the groundwater monitoring network.*

28. *The reason for Conditions 78 and 79 is to ensure that the Owner follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site. A remedial action / contingency plan is necessary to ensure protection of the natural environment.*

29. *The reason for Conditions 80 and 81 is to establish a forum for the exchange of information and public dialogue on activities carried out at the landfill Site. Open communication with the public and local authorities is important in helping to maintain high standards for site operation and environmental protection.*

30. *The reasons for Condition 67, 68 and 82 to 87 inclusive are to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this Certificate of Approval, the EPA and its regulations.*

31. *Conditions 93 to 97 inclusive have been included in order to fulfil the requirements of the approval under the Environmental Assessment Act and to ensure that there is open communication with the public.*

32. *The reasons for Conditions 98 and 99 are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.*

33. *The reasons for Conditions 101 to 104 inclusive are to ensure that final closure of the Site is completed in an aesthetically pleasing manner and to ensure the long-term protection of the natural environment.*

34. *The reasons for Condition 88 are to ensure that the Ministry is informed of any spills or fires at the*

Site and to provide public health and safety and environmental protection.

35. *Conditions 89 to 92 inclusive are contained in the Certificate to guarantee that appropriate measures are taken by the County to prevent future occurrences of spills or fires at the site and to protect public health and safety and the environment.*

This Provisional Certificate of Approval revokes and replaces Certificate(s) of Approval No. A481403 issued on June 24, 1980 and all subsequent amendments.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, 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 142 of the Environmental Protection Act, 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 waste disposal site is 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 39, *Environmental Protection 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 waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 30th day of March, 2010

Tes Gebrezghi

Tesfaye Gebrezghi, P.Eng.
Director
Section 39, *Environmental Protection Act*

GW/
c: District Manager, MOE Cornwall
Derik Brandt, CAO, The Corporation of the Township of South Glengarry
John St. Marseille, P. Eng., The Thompson Rosemount Group Inc. ✓
Lisa Chalmers, MOE, Cornwall Area
Bruce Metcalfe, Technical Support, MOE, Eastern Region
Frank Crossley, Technical Support, MOE, Eastern Region

H-2 GEOPHYSICAL SURVEY

NOTRA

SUMMARY OF THE GEOPHYSICAL SURVEYS CONDUCTED NORTH LANCASTER LANDFILL TWP. OF SOUTH GLENGARRY, ONTARIO

Submitted To:

Thompson Rosemount Group Inc.
300-2197 Riverside Drive
Ottawa, On
K1H 7X3

Date
3 June 2009

Prepared By:

NOTRA Inc.
Dennis Gamble, P.Geo.

EXECUTIVE SUMMARY

Elevated conductivities have been noted in several monitoring wells at the northern portion of the North Lancaster Landfill in the Township of South Glengarry. To help determine whether these observations are related to road salt storage or the land fill site a geophysical survey was commissioned to measure the apparent conductivity the area in question.

The Thompson Rosemount Group Inc. contracted NOTRA Inc. to provide geophysical services to aid in the site investigations, particularly in identifying apparent conductivity trends related to possible road salt storage and Landfill runoff.

On 5 and 6 May 2009 a series of two geophysical surveys were conducted over open portions of the 4 Hectare area identified by The Rosemount Group Inc. Using a DGPS for positioning reference, all open areas were surveyed with a Geonics EM-31short and Standard EM-31(Long). When possible, some data was collected within forested areas to help define geophysical features noted.

Aside from buried metallic debris associated with landfill activities, two conductivity features were noted in the data collected. One small feature was noted moving north (downhill) from the main landfill site. This was limited to low apparent conductivity values and more pronounced in the data collected with the EM-31short, implying a shallow source. An extremely high feature (near surface) was identified with both instruments on the lower landfill site. A strong conductivity feature moving to the northwest is evident from this that extends off site.

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1.0 Introduction

On 5 and 6 May 2009, two geophysical surveys were conducted to help provide a site characterization of the sub surface to aid in defining the extent of any possible conductivity plumes associated with road salt storage and a land fill operations.

The geophysical surveys were conducted to help determine if high conductivity observations noted in monitoring wells may be due to road salt storage rather than landfill activities.

The Geophysical surveys included both the standard Geonics EM31(Long) and the Geonics EM-31s(Short) apparent conductivity meters conducted at a ideal resolution of 4m x 0.4 m.

A Trimble Pro-XRS DGPS was used to log data locations and topographical features.

2.0 Methodology and Approach

The extent to be surveyed was established by The Rosemount Thompson Group Inc. The GPS was used to collect data at a line spacing of approximately 4 meters using both geophysical instruments. All features such as observed monitoring wells, survey control points, and other topographical features are presented along with the geophysical data on the resulting maps and may be used to relocate anomaly locations.

The EM-31 instruments consist of a transmitter/receiver separated on a 2m (short) or 4m (Long) boom. Data collection within forested areas is near impossible due to the dimensions. Initially all open areas were surveyed. Following in field analysis some additional data was collected within the forested area with the short EM-31.

The EM-31s is a horizontal loop EM instrument with a transmitter –receiver separation of 2m. This instrument can measure the apparent conductivity, which can be used to map conductive contamination plumes, do a depth of at least 3 meters (short) or 6 meters (Long). Changes in the sub surface conditions can be mapped with this instrument. Bedrock typically will have a low apparent conductivity near 0 mS/m while wet sand and silt may have higher values of 10 to 20 mS/m. Clay or contamination may have conductivities in the order of 20 to 100 mS/m.
Although not sensitive to smaller pieces of metal, large objects such as barrels, piping or cables will result in a large amplitude response well in excess of that expected from contamination plumes.

For a typical land fill environment, an elevated apparent conductivity is expected over the location of the buried debris with a possible elevated apparent conductivity outlining the flow direction of contaminated fluids. If the metal content is significant within the land fill the In-Phase and apparent conductivity may show rapid variations in amplitude and sign.

3.0 Results

Refer to Annex A - Maps:

- EM-31 Long Apparent Conductivity Map
- EM-31 Short Apparent Conductivity Map

See maps EM31s Apparent Conductivity, Total Magnetic Field and Summary.

The position reference of the data collected was in UTM NAD 83 Zone 18. The North Lancaster Landfill site has a unique coordinate system in place, utilized by all field and CAD work. Using two reference bench marks on the site, the translation parameters were determined such that all data can be presented in Local Coordinates.

The Translation Coordinates are as follows

$E_L = (E_u-E_o)\ \mathrm{Cos(alph)} - (N_u-N_o)\ \mathrm{Sin(alpha)} + E_{LO}$

$N_L = (E_u-E_o)\ \mathrm{Sin(alph)} + (N_u-N_o)\ \mathrm{Cos(alpha)} + N_{LO}$

With E_u, N_u the measured UTM coordinate
E_o = 537780.654 N_o = 5012008.061
E_{LO} = 10000 N_{LO} = 5000
Rotation Angle Alpha = 1.32142^o

Survey coverage was limited to open areas for the preliminary data coverage. Following assessment of the preliminary data, additional data was collected as possible within the forested area with the EM-31s. The standard EM-31 was not manageable due to the 4 meter length.

Both EM-31's outlined a significant conductivity high in excess of 80mS/m on an open grassy area approximately 25m x 25m. From this there is the appearance of an elevated conductivity plume migrating to the northwest within the fill area.

The grass area is comprised of fill including concrete, some metals and tree debris. The elevated conductivity feature increases in amplitude at the natural ground north of the fill, coincident with standing water. The elevated conductivity was traced across the path way into a tilled field.

Only minor elevated conductivity was noted migrating from the land fill site. The amplitude of this was limited to around 20 Ohm/m over a small distance.

Numerous metal items comprise the fill in the northern edge of the main landfill, resulting in an unstable apparent conductivity measurement, however, the over all conductivity appears to be only slightly above background where metal is not detected.

A small area of high apparent conductivity east of the larger anomaly discussed is due to metals in this area. Included are a fence, culvert and some surface debris including a large holding tank.

4.0 Conclusions

A significant elevated conductivity anomaly is present that may represent the storage location of road salt. From this a conductivity trend can be followed to the north, across the open area of fill, then, on natural ground levels, north over to a tilled field. The apparent conductivity feature increased in size and appeared to be somewhat coincident with surface water.

In the northern area of the main landfill site surveyed, only a small shallow (EM-31s) apparent conductivity trend is present. This feature is less than 20 meters wide and had amplitudes under 30 mS/m.

5.0 Statement of Limitations

This Geophysical Survey Report has been prepared exclusively for The Rosemount Thompson Group Inc. The purpose of this report is to provide them with an assessment of the potential for the presence of buried debris within the survey area outlined at the Caron Street site. This report is neither an endorsement nor a condemnation of the subject property.

The geophysical techniques employed typically produce clear geophysical anomalies over a metallic anomalies or conductive contamination within there detection depths. However, each technique has limitations, especially in areas in which buried utilities or surface metal is present. For the purpose of this survey, buried metallic items were not identified not was there any attempt to resolve them.

The results and conclusions documented in this report have been prepared for a specific application to this project and have been developed in a manner with that level of skill normally exercised by qualified professionals currently practising in this area of geophysical surveying. No other warranty, expressed or implied, is made.

Reports or memoranda resulting from this assignment are not to be used in whole or in part outside The Rosemount Thompson Group Inc. without prior written permission.

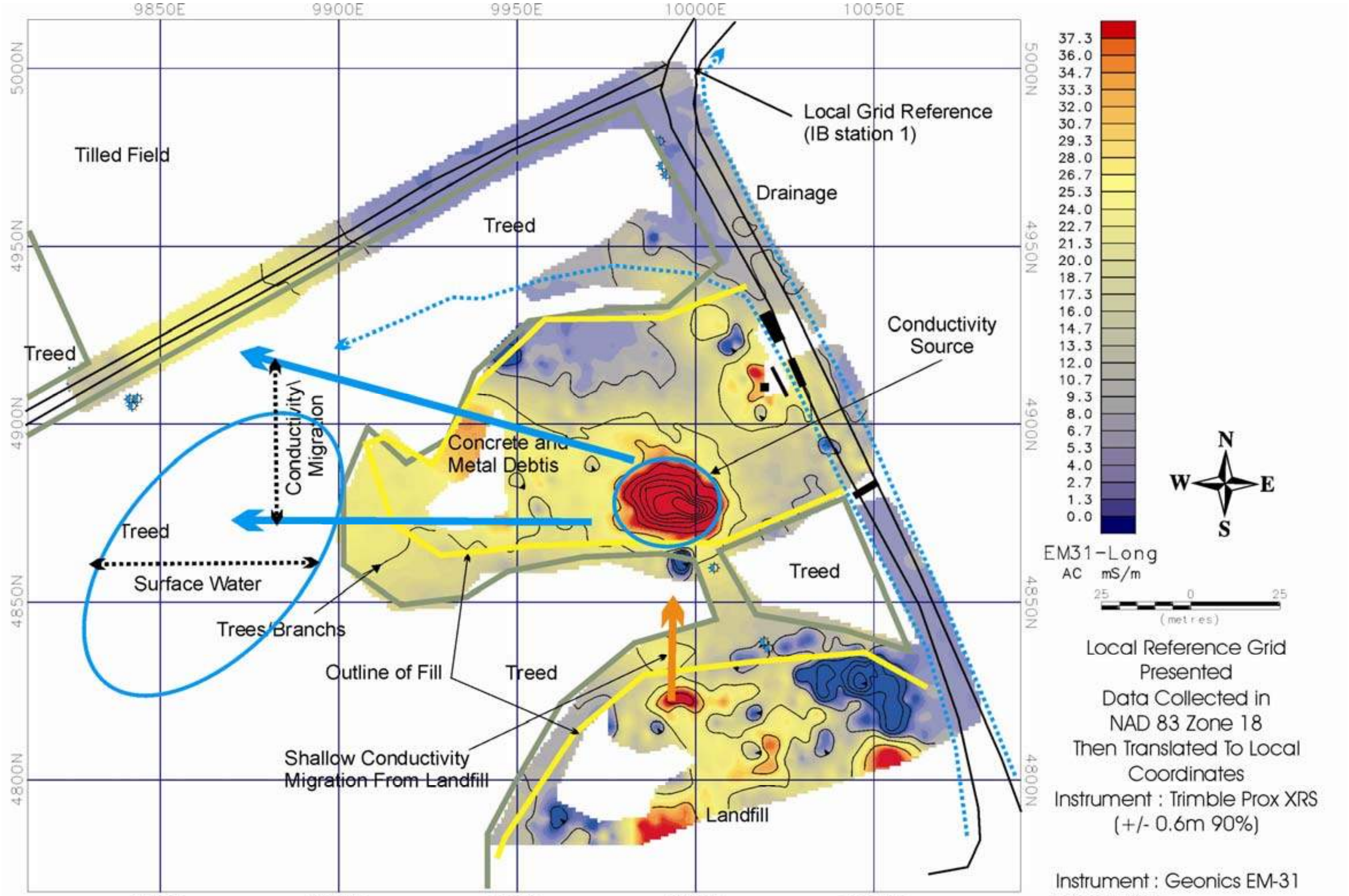
Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. NOTRA Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

If new information is developed in future work (which may include excavations, boreholes, or other studies), NOTRA should be contacted to re-evaluate the conclusions of this report and to provide amendments as required.

Dennis Gamble, P.Geo
Senior Geophysicist, Notra Inc.
May 15, 2009

ANNEX A
GEOPHYSICS MAPS

EM-31 Long Apparent Conductivity Map
EM-31 Short Apparent Conductivity Map



Local Reference Grid
Presented
Data Collected in
NAD 83 Zone 18
Then Translated To Local
Coordinates
Instrument : Trimble Prox XRS
(+/- 0.6m 90%)

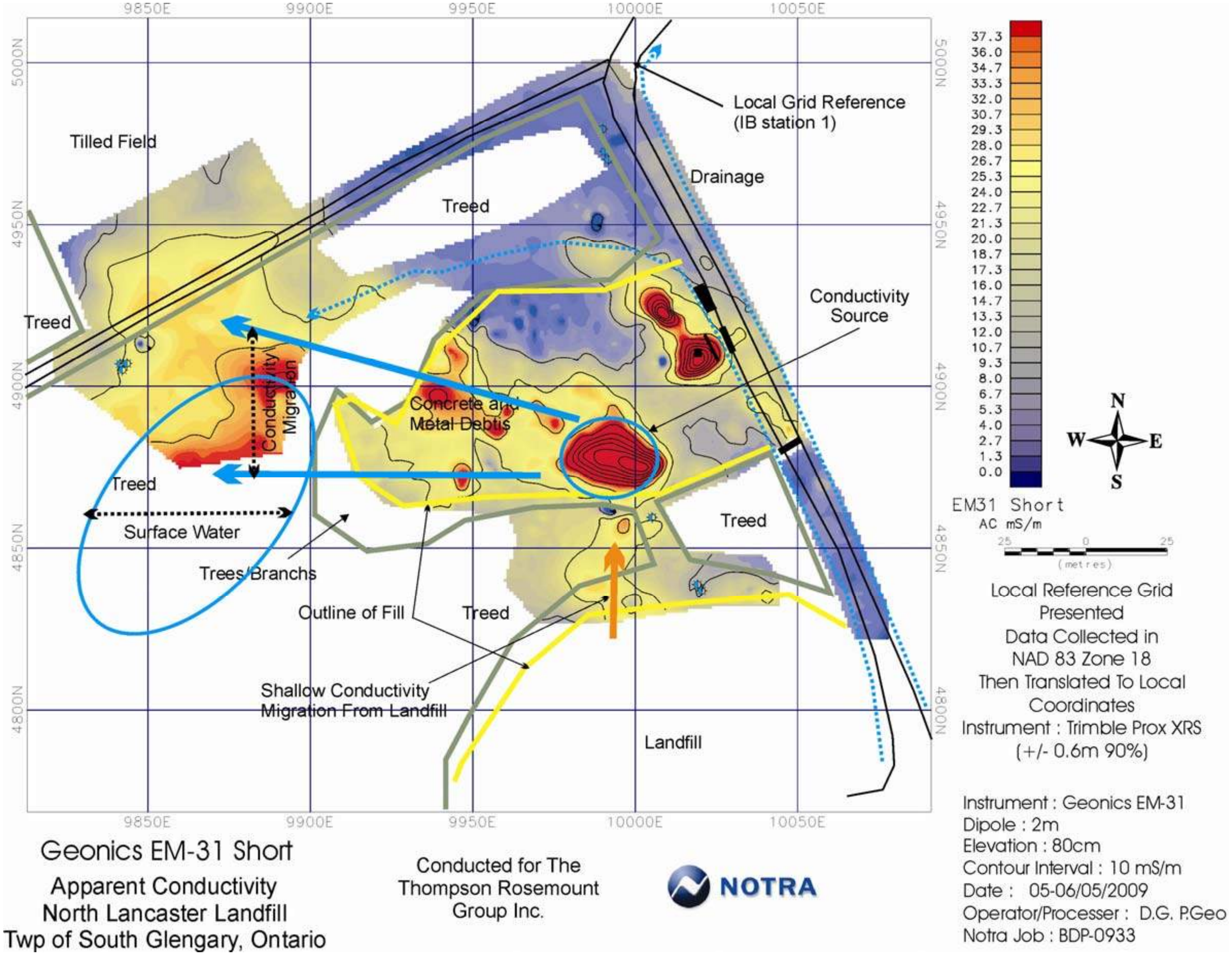
Geonics EM-31 Long

Apparent Conductivity
North Lancaster Landfill
Twp of South Glengary, Ontario

Conducted for The
Thompson Rosemount
Group Inc.

NOTRA

Instrument : Geonics EM-31
Dipole : 4m
Elevation : 80cm
Contour Interval : 10 mS/m
Date : 05-06/05/2009
Operator/Processer : D.G. P.Geo
Notra Job : BDP-0933


9850E
9900E
9950E
10000E
10050E
5000N
4950N
4900N
4850N
4800N
Tilled Field
Treed
Treed
Local Grid Reference
(IB station 1)
Drainage
Conductivity
Source
Conductivity
Migration
Concrete and
Metal Debris
Treed
Surface Water
Trees/Branchs
Outline of Fill
Treed
Treed
Shallow Conductivity
Migration From Landfill
Landfill
37.3
36.0
34.7
33.3
32.0
30.7
29.3
28.0
26.7
25.3
24.0
22.7
21.3
20.0
18.7
17.3
16.0
14.7
13.3
12.0
10.7
9.3
8.0
6.7
5.3
4.0
2.7
1.3
0.0
EM31 Short
AC mS/m
N
W
E
S
25
0
25
(metres)
Local Reference Grid
Presented
Data Collected in
NAD 83 Zone 18
Then Translated To Local
Coordinates
Instrument : Trimble Prox XRS
(+/- 0.6m 90%)
Instrument : Geonics EM-31
Dipole : 2m
Elevation : 80cm
Contour Interval : 10 mS/m
Date : 05-06/05/2009
Operator/Processer : D.G. P.Geo
Notra Job : BDP-0933
Geonics EM-31 Short
Apparent Conductivity
North Lancaster Landfill
Twp of South Glengary, Ontario
Conducted for The
Thompson Rosemount
Group Inc.
NOTRA

H-3 NORTH LANCASTER WASTE DISPOSAL SITE LOGS

Free Dump Day - Sat June 5-2021

12158
13935
15474
1612
15170
14544
10827
13511
11861
1507
12410
14673
15832
14431
12101
13225
15431
14851
1611
11384
12758
1612
1614
15078
8930
14071
1391
1615
14791
14591
0163

14815
13185
11242
10336
0438
1611
1440
14431
12790
12469
15151
0163
15832
1616
13185
14450
14673
15548
12702
1610
0432
1572
1618
10336
14450
15252
14000
10194
14946
15795
15832
15883
15475

1612
1442
1290
12052
1552
1619
1440
1445
0397
1513
13799
12863
12706
13799
15331
15959
14431
14959
14576
15151
13766
10194
15503
15435
14576
12366
8349
10194
1612
0163

14911
1618
0131
15170
0114
14431
1615
15169
11292
0162
10194
0082
10020
0432
10432
0432
-1612
0429
1333
0131
0432
15331

Total
116

DATE: June 3-21

TOWNSHIP OF SOUTH GLENGARRY
BEAVER BROOK LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
HGC - [illegible]	11 Road Side Pick Up		Garbage	Fully Loaded
GRS - 200.00 - 405	1	Commercial	Garbage	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
483927	12859	1	1 20.00	—	—	Const Material
483928	14112	1	✓ 10.00	—	—	Garbage
483929	11069	1	2 20.00	—	—	Const Material
483921	0435	1	3 20.00	—	—	Const Material
483922	12258	1	4 20.00	—	—	Garbage
483923	15152	1	✓ 10.00	—	—	Garbage
483924	13550	2	5 20.00	—	—	Garbage
483925	15423	1	✓ 10.00	—	—	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

money
2 X 100 = 200.00

loads
5 X 10 = 50
5 × 20 = 100
1 × 50 = 50
200.00

OTHER VEHICLES

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
483935	12758	1	✓ 10-00	—	—	Garbage
483936	0281	1	✓ 10.00	—	—	Garbage
483937	15366	1	✓ 50.00	—	—	[illegible] Wood

DATE: June 10-21

TOWNSHIP OF SOUTH GLENGARRY
BEAVER BROOK LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
H G C - No Charge	11 Load	Side Lect 21/2	Garbage	Fully Loaded
Tamara B Hall 200.00-454 -	1	Commercial	Const Material	Fully Loaded
Wood Creation - 50.00 - 448 -	1	Commercial	Wood	Fully Loaded
GRS - 200.00 - 398	1	Commercial	Garbage	Fully Loaded
Tomlinson - 400.00 - 367	1	Commercial	Longevity	Fully Loaded
Tamara B Hall - 200.00 - 453	1	Commercial	Const Material	Fully Loaded
Tomlinson - 200.00 - 419	1	Commercial	Garbage	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
483938	15872	1	1 10.00	—	—	Garbage
483939	4183	1	2 10.00	—	—	Garbage
483940	15548	1	20.00 1	—	—	Const Material
483941	1534	1	20.00 2	—	—	Const Material
483942	12643	1	20.00 3	—	—	Const Material
—	0060	1	—	No Charge		Brush
—	0023	1	—	No Charge		Brush
483943	14399	1	3 10.00	—	—	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
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DE = Demolition
F = Full

ATTENDANTS SIGNATURE

money.
1 X100 = 100
1x 50 = 050
2x 20 = 40
1x 10 = 10
4x 5 = 20
220

Loads.
6x10
3x20
2x50

OTHER VEHICLES

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
—	12410	2	—	No Charge	Brush
—	0495	1	—	No Charge	Brush
483944	0341	1	4 10.00	— —	Garbage
—	15524	1	—	No Charge	Brush
483945	0361	1	1 50.00	— —	Shingle
483946	15745	1	5 10.00	— —	Garbage
—	14398	1	—	No Charge	Brush
483947	13550	1	6 10.00	— —	Garbage
—	12290	1	—	No charge	E - Waste
—	12400	1	—	No charge	Brush
483948	1621	1	2 50.00	— —	Shingles

DATE: June 12-21

TOWNSHIP OF SOUTH GLENGARRY
BEAVER BROOK LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
483949	15154	1	1 10.00	—	—	Garbage
483950	10300	1	2 10.00	—	—	Garbage
—	12410	1	—	No Charge		Brush
483951	0258	1	150.00	—	—	Shingles
483952	0151	1	3 10.00	—	—	Garbage
483953	8249	1	4 10.00	—	—	Garbage
485954	12790	1	5 10.00	—	—	Garbage
483955	1622	1	6 10.00	—	—	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
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I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

loads.
14 X 10.00
4 X 20
2 X 50

money.
6 X 10 = 60
8 X 20 = 160
2 X 50 = 100

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
483956	0151.	2	4 20.00	—	—	Garbage
—	14823	1	—	No Charge		Brush
—	1440	1	—	No Charge		Brush
—	15355	1	—	No Charge		E-Waste
—	1618	1	—	No Charge		Brush
483957	14100	1	7 10.00	—	—	Garbage
483958	12237	1	8 10.00	—	—	Garbage
483959	1361	1	9 10.00	—	—	Garbage
483960	14261 -	1	10 10.00	—	—	Garbage
483961	15144	1	11 10.00	—	—	Garbage
—	12410	1	—	No Charge		Brush
483962	1558	1	12 10.00	—	—	Garbage
—	1435	1	—	No Charge		Brush
483963	0442	1	13 10.00	—	—	Garbage
483964	15151 -	1	1 20.00	—	—	Garbage
483965	1584	1	14 10.00	—	—	Garbage
483966	12469.	1	2 20.00	—	—	Const Material
483967	1513	1	2 50.00	—	—	Shingles
483968	13685	1	3 20.00	—	—	Const Material
—	1588	1	—	No Charge		Brush

DATE: June 17-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
HGC - No Charge	SG	Load Side Load	2H Garbage	Fully Loaded
Tomlinson - 200.00 - 423	1	Commercial	Garbage	Fully Loaded
Tomlinson - 200.00 - 422	1	Commercial	Garbage	Fully Loaded
GBS - 200.00 - 399	1	Commercial	Garbage	Fully Loaded
Tomlinson - 400.00 - 408	1	Commercial	Longevity	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
—	12410	1	—	No Charge		Brush
483969	14765	1 -	1 10.00	—	—	Garbage
483970	12964	1 -	2 10.00	—	—	Garbage
483971	10167	1 -	3 10.00	—	—	Garbage
483972	15832	1 -	4 10.00	—	—	Garbage
—	12469	1	—	No Charge		E-Waste
483973	17325 -	1	—	50.00	—	Shingles
483974	15832 -	1	5 10.00	—	—	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
—	0410	1	—	No Charge		E-Waste
483975	12410 -	1	6 10.00 -	—	—	Garbage
483976	15548 -	1	7 10.00 -	—	—	Garbage
483977	Villeneuve Creations	4 -	— -	400.00	—	Tree Stumps
483978	12550	1 -	8 10.00 -	—	—	Garbage
~~[illegible]~~	~~[illegible]~~	~~1~~	—	~~No Charge~~		~~Brush~~
—	1440	1	—	No charge		Brush
483979	14546	1 -	9 10.00 -	—	—	Garbage
483980	0485	1 -	10 10.00 -	—	—	Garbage

DATE: June 19-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
—	0272	1	—	No charge	Brush
483981	14261	1	1 20.00	— —	Const Wood
483982	12052	1	1 10.00	— —	Hart bags
—	0128	1	—	No charge	Brush
—	14597	1	—	No Charge	Brush
483983	14064	1	2 20.00	— —	Const Material
—	0272	1	—	No Charge	Brush
—	15795	1	—	No Charge	Brush

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
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ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
483984	15832	1	2 10.00	—	—	Garbage
—	1024	1	—	No Charge		Brush
483985	14452	1	3 10.00	—	—	Garbage
483986	1449	1	1 50.00	—	—	Shingles
483987	10237	1	4 10.00	—	—	Garbage
483988	1612	1	5 10.00	—	—	Garbage
483989	12333	1	3 20.00	—	—	Const Material
—	0071	1	—	No Charge		Brush
483990	0409	1	6 10.00	—	—	Garbage
—	11910	1	—	No Charge		Brush
—	1024	1	—	No Charge		Brush
483991	15156	1	4 20.00	—	—	Const Material
483992	15435	1	2 50.00	—	—	Shingles
—	0071	1	—	No Charge		Brush
483993	13123	1	7 10.00	—	—	Garbage
483994	1572	1	8 10.00	—	—	Garbage
483995	1587	1	9 10.00	—	—	Garbage
483996	14911	1	10 10.00	—	—	Garbage
—	0071	1	—	No Charge		Brush
—	12716	1	—	No Charge		Brush
483997	0074	1	5 20.00	—	—	Const
483998	1445	1	3 50.00	—	—	Shingles
483999	1577	1	6 20.00	—	—	Const

DATE: June 24-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
HGC - No charge	11	Road Side Pick Up	Garbage	Fully Loaded
GRS - 200.00 - 404	1	Commercial	Garbage	Fully Loaded
Tomlinson - 200.00 - 426	1	Commercial	Garbage	Fully Loaded
Tomlinson - 200.00 - 427	1	Commercial	Garbage	Fully Loaded
Tomlinson - 400.00 - 409	1	Commercial	[illegible]	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
484000	11069	1	1 10.00	—	—	Garbage
6 84001	14467	1	- 2 10.00	—	—	Garbage
6 84002	11096	1	- 3 10.00	—	—	Garbage
6 84003	14546	1	- 4 10.00	—	—	Garbage
—	0033	1	—	No charge		Brush
—	15911	1	—	No charge		Brush
684004	15832	1	- 5 10.00	—	—	Garbage
684005	1252	1	- 1 20.00	—	—	[illegible]

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
684006	15170 -	1	2 20.00	—	—	Const Material
684007	15325 -	1	6 10.00	—	—	Garbage
684008	1626 -	1	7 10.00	—	—	Garbage
—	1435	1	—	No Charge		Brush
—	0333	1	—	No Charge		Brush
684009	0193 -	1	8 10.00	—	—	Garbage
1 Load from 4841 Second Line Road				No Charge		Garbage
684010	1442 -	1	3 20.00	—	—	Const
684011	15832 -	1	9 10.00	—	—	Garbage
684012	14720 -	1	1 50.00	—	—	Shingles
—	1586	1	—	No Charge		Brush
684013	10020 -	1	10 10.00	—	—	Garbage
684014	1627 -	1	11 10.00	—	—	Garbage
—	0333	1	—	No Charge		Brush
—	1435	1	—	No Charge		Brush
684015	15832 -	1	12 10.00	—		Garbage
—	13935	1	—	No Charge		Brush
—	1586	1	—	No Charge		Brush
684016	1354 -	1	4 20.00	—	—	Const
684017	13550 -	1	13 10.00	—	—	Garbage
684018	0039 -	1	2 50.00	—	—	Shingles
684019	1423 -	1	14 10.00	—	—	Garbage
—	14869	1	—	No Charge		Brush

DATE: June 26-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
684020	15548	1	1 10.00 1	—	—	Garbage
684021	1627	1 ✓	2 10.00 2	—	—	Garbage
684022	1449	1 ✓	150.00	—	—	Shingles
684023	1263	1 ✓	3 10.00. 3	—	—	Garbage
684024	0450	1 ✓	4 10.00. 4	—	—	Garbage
—	0114	1	—	No charge		Garbage
—	14893	1	—	No charge		Brush
684025	15865	1 ✓	5 10.00. 5	—	—	Recycling
						Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial

I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
684026	14261 -	1	610.00 6	—	—	Garbage
684027	1632 -	1	710.00 7	—	—	Garbage
684028	1449 -	1	250.00	—	—	Const Waste
684029	15435 -	1	350.00	—	—	Shingles
684030	1633 -	1	810.00 8	—	—	Garbage
—	1370	1	—	No Charge		Brush
—	0114	1	—	No Charge		Brush
684031	1558 -	1	910.00 9	—	—	Garbage
684032	8349 -	1	1010.00 10	—	—	Garbage
684033	1634 -	1	1110.00 11	—	—	Garbage
684034	1588 -	1	1210.00 12	—	—	Garbage
684035	1305 -	1	1310.00 13	—	—	Garbage
684036	0485 -	1	120.00	—	—	Const Material
684037	14339 -	2	140.00	—	—	Const Waste

DATE: July 3-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
—	13935	1	—	No charge		Brush
—	0120	1	—	No charge		Brush
684038	1322	1	1 20.00	—	—	Const Material
684039	0094	1	1 10.00	—	—	Garbage
684040	13629	1	2 20.00	—	—	Const Material
684041	14546	1	2 10.00	—	—	Garbage
—	0281	1	—	No charge		Brush
684042	0499	1	3 10.00	—	—	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
684043	14261	1	4 10.00 -	—	—	Garbage
684044	1584	1	5 10.00 -	—	—	Garbage
684045	0446	1	6 10.00	—	—	Garbage
—	13945	1	—	No Charge		Brush
684046	15674	1	7 10.00 -	—	—	Garbage
—	15852	1	—	No charge		Brush
684047	14261	1	8 10.00 - -	—	—	Garbage
684048	8672	1	1 50.00. -	—	—	Shingles
—	1322	1	—	No Charge		Brush
684049	11885	1	9 10.00	—	—	Garbage
—	11910	1	—	no charge		Brush
684050	12469	1	3 20.00	—	—	Const Material
684051	0084	1	10 10.00	—	—	Garbage
684052	15393	1	11 10.00	—	—	Garbage
684053	13085	1	12 10.00	—	—	Garbage
684054	2448	1	4 20.00	—	—	Const Material
684055	4183	1	13 10.00 -	—	—	Garbage
684056	14270	1	2 50.00.	—	—	Shingles
684057	15012	1	14 10.00	—	—	Garbage
684058	0113	1	15 10.00	—	—	Garbage
—	11920	2	—	No Charge		Brush
684059	0151	1	5 20.00.	—	—	Const Material
684060	0409	1	6 20.00.	—	—	Const Material
—	0114	2	—	No Charge		Brush
684061	12327	1	7 20.00	—	—	Const Material
684062	14597	1	16 10.00	—	—	Garbage
684063	15151	1	8 20.00 -	—	—	Const Material
684064	12469	1	17 10.00	—	—	Garbage
684065	19154	1	3 50.00	—	—	Const & Garbage
684066	12790	1	18 10.00	—	—	Garbage
684067	0489	1	9 20.00	—	—	Const Material

DATE: July 8-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yards, 4 bags, etc.
HGC - No Charge	11	Road Side Pick Up	Garbage	Fully Loaded
JRS - 200.00 - 403	1	Commercial	Garbage	Fully Loaded
Tomlinson - 400.00 - 410	1	Commercial	[illegible]	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
—	15170	1	—	No Charge	Brush
—	2071	1	—	No Charge	Brush
—	1639	1	—	No Charge	Recycling
684068	0436	1	1 10.00	— —	Garbage
—	1640	1	—	No Charge	E-Waste
684069	1641	1	1 50.00	— —	Const Material
684070	14150	1	2 10.00	— —	Garbage
684071	1586	1	3 10.00	— —	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

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ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
684072	15943	2	1 20.00 -	—	—	Hardboard
684073	13970	1	4 10.00 -	—	—	Hardboard
684074	15151	1	2 20.00 -	—	—	Const Material
684075	15597	1	5 10.00 -	—	—	Hardboard
684076	15883	1	6 10.00 -	—	—	Hardboard
684077	6311	1	7 10.00 -	—	—	Hardboard
684078	13550	1	8 10.00 -	—	—	Hardboard
—	0071	1	—	No Charge		Brush
684079	6311	1	2 50.00 -	—	—	Const Mater
—	15393	1	—	No charge		Brush
684080	1645	1	9 10.00	—	—	Hardboard
—	14399	1	—	No charge		Brush
684081	1646	1	10 10.00	—	—	Hardboard
684082	0703	1	11 10.00	—	—	Hardboard
—	1346	1	—	No Charge		Brush

DATE: July 10-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
Waste Connection 5080-450	1	Commercial	Waste	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
—	0272	1	—	No Charge	Brush
684083	0311	1	1 10.00	— —	Garbage
684084	8349	1	2 10.00	— —	Garbage
—	1639	1	—	No charge	Recycling
684085	14100	1	3 10-00	— —	Garbage
684086	0272	1	1 20.00	— —	Clean Material
—	8235	1	—	No charge	Brush
—	0233	1	—	No Charge	Brush

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
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DE = Demolition
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ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
684087	1320	1	4 10.00	—	—	Hardcore
684088	13882	1	5 10.00	—	—	Hardcore
684089	1558	1	2 20.00	—	—	Soil Material
—	1647	1	—	No Charge	—	Brush
684090	14322	1	4 10.00	—		Hardcore
684091	12032	1	7 10.00	—	—	Hardcore
—	0233	1	—	No Charge		Brush
684092	1612	1	8 10.00	—	—	Hardcore
684093	12720	1	1 50.00	—	—	Sand Material
—	0163	1	—	No Charge		Brush
—	1586	1	—	No Charge		Brush
684094	8930	1	2 50.00	—	—	Shingle
—	15506	1	—	No Charge		Brush
—	13935	1	—	No Charge		Brush
684095	0485	1	3 50.00	—	—	Sand Material

DATE: July 15-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
HGC - No Charge	III	Road Side Pick Up	Garbage	Fully Loaded
GFS - 200.00 - 400	1	Commercial	Garbage	Fully Loaded
Tomlinson - 400.00 - 411	1	Commercial	Longevity	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
—	1322	1	—	No Charge		Brush
—	12101	1	—	No Charge		Brush
684096	1311	1	" 20-00	—	—	Const Material
—	0436	1	—	No Charge		Brush
684097	14034	1	1 50.00	—	—	Const Material
684098	1024	1	1 10-00	—	—	Garbage
684099	8518	1	2 20.00	—	—	Const Material
684100	12701	1	3 20.00	—	—	Const Material

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial

I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
684101	10100	1	2 10.00 -	—	—	Garbage
684102	13550	1	3 10.00 -	—	—	Garbage
684103	14889	1	4 20.00 -	—	—	Carpet Material
—	14672	1	—	No Charge		Brush
—	0306	1	—	No charge		Brush
684104	12052	1	4 10.00 -	—	—	Garbage
—	14467	1	—	No charge		Brush
684105	8383	1	5 10.00 -	—	—	Garbage
—	1647	1	—	No charge		Brush
684106	0151	1	6 10.00 -	—	—	Garbage
684107	14889	1	7 10.00 -	—	—	Garbage
—	0165	1	—	No Charge		Brush
684108	15831	1	8 10.00 -	—		Garbage

DATE: July 17-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
—	14501	1	—	No charge	Brush
—	1322	1	—	No charge	Brush
684109	15891	1	1 10.00	— —	Garbage
684110	14815	1	2 10.00	— —	Garbage
684111	0322	1	3 10.00	— —	Garbage
—	8946	1	—	No charge	Brush
—	0281	1	—	No charge	Brush
684112	14071	1	1 50.00	— —	Shingles

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
Numbers					
684113	0100	1	-1 20.00	— —	Const Material
684114	0706	1	4 10.00	— —	Hardfill
—	15421	1	—	No Charge	Brush
—	0401	1	—	No Charge	Brush
684115	12327	1	5- 10.00	— —	Hardfill
—	0066	1	—	No Charge	Brush
684116	1286	1	6-10.00	— —	Hardfill
684117	13192	1	2-20.00-	— —	Const Material
684118	14501	1 -	2-50.00-	— —	Shingles
—	1397	1	—	No Charge	E-Waste
684119	8783	1	7 -10.00-	— —	Hardfill
684120	1513	1	3 -50.00	— —	Shingles
684121	11191	1 -	3 -20.00	— —	Const Material
684122	12790	1	4 50.00	— —	Shingles
684123	1635	1	8 10.00	— —	Hardfill
—	0214	1	—	No Charge	Brush
684124	0309	1	9 10.00	— —	Hardfill
684125	1635	1	10 10.00	— —	Hardfill
684126	0039	1	11 10.00	— —	Hardfill
684127	12366	1	12 10.00	— —	Hardfill
—	14501	1	—	No Charge	Brush
—	13935	1	—	No Charge	Brush
684128	12469	1	13 10.00	— —	Hardfill
—	8700	1	—	No Charge	Brush
684129	1423	1	14 10.00	— —	Hardfill
684130	15474	1	15 10.00	— —	Hardfill
684131	15914	1	5 50.00	— —	Shingles & Wood
—	0214	1	—	No Charge	Brush
684132	15360	1	6 50.00	— —	Shingles & Wood

DATE: July 22-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
HGC- No Charge	11 Load	Side Pick U/P	Garbage	Fully Loaded
Wood Creations-50.00-442	1	Commercial	Woods	Fully Loaded
GRS - 200.00 -401	1	Commercial	Garbage	Fully Loaded
Wood Creations 50.00-452	1	Commercial	Wood	Fully Loaded
Tomlinson-400.00-412	1	Commercial	Garbage-Longevity	Fully Loaded
Wood Creations 50.00-451	1	Commercial	Wood	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
—	1322	1	—	No Charge	Brush
684133	13433	1	1 10.00	— —	Garbage
684134	0322	1	2 10.00	— —	Garbage
—	12102	1	—	No Charge	Brush
684135	15423	1	3 10.00	— —	Garbage
684136	13123	1	20.00	— —	Const Wood
684137	1558	1	4 10.00	— —	Garbage
684138	1290	1	5 10.00	— —	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
684139	14889	1	6 10.00	—	—	Garbage
—	15506	1	—	No Charge		Brush
684140	15994	1	7 10.00	—	—	Garbage
684141	1441	1	8 10.00	—	—	Garbage
684142	1627	1	9 10.00	—	—	Garbage
—	14545	1	—	No Charge		E-Waste
[illegible]	11885	1	—	No Charge		Brush
684143	0151	1	10 10.00	—	—	Garbage
684144	15025	1	11 10.00	—	—	Garbage
—	12410	1	—	No Charge		Brush
684145	0707	1	12 10.00	—	—	Garbage
[illegible]	17101	1	—	No Charge		Brush
684146	15435	1	50.00	—	—	Shingles
684147	17355	2	[illegible]	100.00	—	Shingles & Wood
—	14501	1	—	No Charge		Brush.

DATE: 24/7/21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
684148	04981		1 20		
684149	15904		1 10		
684150	0464		2 10		
684151	1649		3 10		
68152	012247		4 10		
684153	15022		26	10	
684154	15943		5 10		
684155	12052		6 10 /80		

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

80.-

Receipt Numbers	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
684156	10300		7 10.-		
684157	12758		8 10.-		
684158	13089		50.-		
684159	15553		9 10.-		
684160	15356		10 10.-		
684161	14661		11 10.-		
684162	2072		12 10.-		
684163	15832		13 10.-		
684164	1388		14 10.-		
684165	8522		15 10.-		
684166	13591		16 10.-		
684167	1626		17 10.-		
~~684168~~			~~10.-~~		[illegible]
684169	1442		18 10.-		
684170	13347		19 10.-		
—	0442	1	—	No Charge	Brush
—	1322	1	—	No Charge	Brush
—	13206	1	—	No Charge	Brush
—	0272	1	—	No Charge	Brush
—	0447	1	—	No Charge	Brush
—	15532	1	—	No Charge	Brush
—	0341	1	—	No Charge	Brush

DATE: July 29-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
HGC-No charge	11 Road	Side Pick UP	Garbage	Fully Loaded
Tomlinson - 400.00 - 413	1	Commercial	Longevity	Fully Loaded
GRS - 200,00 - 402	1	Commercial	Garbage	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
684171	19614	1	1 10.00	—	—	Garbage
684172	0712	1	2 10.00	—	—	Garbage
684173	0706	1	3 10.00	—	—	Garbage
684124	1505	1	1 20.00	—	—	Cand material
684175	6311	1	4 10.00	—	—	Garbage
684176	1526	1	5 10.00	—	—	Garbage
684177	8522	1	6 10.00	—	—	Garbage
684178	14130	1	7 10.00	—	—	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt Numbers	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
[redacted]	0713	1	—	No Charge		E-Waste
—	15614	1	—	No Charge		Recycling
684179	0715	1	8 10.00	—	—	Garbage
—	13055	1	—	No Charge		Brush
684180	0711	1	9 10.00	—	—	Garbage
—	1292	1	—	No Charge		E-Waste
—	1240	1	—	No Charge		Brush
—	1588	1	—	No Charge		Brush
684181	15566	1	1 50.00	—	—	Shingles
684182	12052	1	2 50.00	—	—	Stones - Const
684183	13550	1	10 10.00	—	—	Garbage
684184	13892	1	2 20.00	—	—	Garbage
—	1397	1	—	No Charge		Brush
684185	14893	1	3 20.00	—	—	Const Material
684186	12052	1	3 50.00	—	—	Const Material

DATE: July 31-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
—	0447	1	—	No Charge	Brush
—	13435	1	—	No Charge	Brush
684187	1572	1	1 10.00	— —	Garbage
684188	8341	1	2 10.00	— —	Garbage
—	1639	1	—	No charge	Brush
684189	1588	1	3 10.00	— —	Garbage
—	0436	1	—	No charge	Brush
—	14501	1	—	No charge	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
—	15506	1	—	No Charge		Brush
684190	15558	1	4 10.00	—	—	Garbage
—	12360	1	—	No Charge		Brush
684191	13935	1	5 10.00	—	—	Garbage
684192	1623	2	6 20.00	—	—	Garbage
684193	12216	1	4 10.00	—	—	Wood
—	14292	1	—	No Charge		Brush
684194	15832	1	7 10.00	—	—	Garbage
684195	6316	1	8 10.00	—	—	Garbage
684196	85475	1	—	50.00	—	Shingle
—	13330	1	—	No charge		Brush
684197	6311	1	9 10.00	—	—	Garbage

DATE: Aug 5-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
HEC - No Charge	11 Road Side Pick Up		Garbage	Fully Loaded
Tomlinson - 400.00 - 414	1	Commercial	Garbage Longevity	Fully Loaded
G&S - 200.00 - 495	1	Commercial	Garbage	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
684198	0138	1	1 10-00	—	—	Garbage
684199	0176	1	2 10.00	—	—	Garbage
—	1322	1	—	Brush No Charge		Brush
684200	14997	1	3 10.-0	—	—	Garbage
334801	13473	1	4 10.00	—	—	Garbage
334802	15994	1	20.00	—	—	Const Material
334803	1276	1	5 10.00	—	—	Garbage
334804	13005	1	6 10.00	—	—	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
—	14612	1	—	No Charge		Brush
334805	13882	1	7 10-00	—	—	Hardcore
—	15932	1	—	No Charge		Brush
334806	14421	1	1 20-00	—	—	Const Material
334807	0066	1	2 20-00	—	—	Const Material
—	1320	1	—	No Charge		Brush
334808	15475	1	3. —	50.00	—	Shingles
334809	13435	1	8 10.00	—	—	Hardcore
334810	1513	1	2 50.00	—	—	Shingles
334811	11112	1	9 10.00	—	—	Hardcore
334812	1354	1	10 10.00	—	—	Hardcore
334813	0272	1	11 10.00	—	—	Hardcore
334814	14501	1	3 20.00	—	—	Const Material
334815	13550	1	12 10.00	—	—	Hardcore

DATE: Aug 7-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
334816	0128	1	1 10.00	— —	Garbage
—	1639	1	—	No Charge	Recycling
334817	12031	1	2 10.00	— —	Garbage
334818	12959	1	3 10.00	— —	Garbage
—	15502	1	—	No Charge	Brush
334819	0421	1	4 10.00	— —	Garbage
334820	0281	1	5 10.00	— —	Garbage
334821	11112	1	6 10.00	— —	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt Numbers	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
334822	1628	1	7 10-00	—	—	Garbage
334823	14884	1	8 10-00	—	—	Garbage
—	1387	1	—	No Charge		Brush
—	0026	1	—	No Charge		Brush
—	14501	1	—	No Charge		Brush
334824	1346	1	9 10.00	—	—	Garbage
334825	14776	1	10 10:00	—	—	Garbage
—	11910	1	—	No Charge		Brush
334826	1659	1	1 50.00	—	—	Shingles
334827	8783	1	1 20.00	—	—	Const Material
334828	0287	1	11 10.00	—	—	Garbage
334829	1612	1	12 10.00	—	—	Garbage
334830	1638	1	13 10.00	—	—	Garbage
334831	15340	1	14 10.00	—	—	Garbage
334832	1623	1	15 10-00	—	—	Garbage
334833	15360	1	2 50.00	—	—	Shingles
334834	15331	1	3 50.00	—	—	Shingles

DATE: Aug 12-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
HGC - No charge	11 Load	Side Pick U/P	Garbage	Fully Loaded
Tomlinson - 400.00 - 460	1	Commercial	Garbage	Fully Loaded
GFS - 200.00 - 493	1	Commercial	Garbage	Fully Loaded
Tomlinson - 400.00 - 415	1	Commercial	Compactor	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
334839	19832	1	✓ 10.00	— —	Garbage
—	14546	1	—	No Charge	E-Waste
—	1265	1	—	No Charge	Brush
—	0436	1	—	No Charge	Brush
—	0322	2	—	No Charge	Brush
334836	0712	1	✓ 10.00	— —	Garbage
334837	1504	1	✓ 20.00	— —	Clean Material
—	11910	1	—	No Charge	Brush

Daily Diary (record cover operations, refusals, visitors, etc.)

Dallas Vian dropped off a culvert
No charge.
11

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
—	0410	1	—	No Charge		E-Waste
334838	0413	1	3 10.00	—	—	Hardwood
334839	15170	1	2 20.00	—	—	Const Material
—	13320	1	—	No Charge		Brush
334840	1435	1	4 ~~10.00~~	A —	—	Hardwood
—	0233	1	—	No Charge		Brush
334841	1660	1	4 10.00	—	—	Hardwood
334842	15883	1	3 20.00	—	—	Const Material
—	11910	1	—	No Charge		Brush
334843	17325	1	—	50.00	←	Shingles

DATE: Aug 14-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
334844	1448 -	1	1 50-00	—	—	Shingles
334845	12713 -	1	1 10 .00	—	—	Garbage
334846	14893 -	1	1 20.00	—	—	Const Material
—	1639	1	—	No Charge		Brush
334847	0170 -	1	2 20-00	—	—	Const Materials
334848	1361 -	1	2 10.00	—	—	Garbage
334849	1661 -	1		10.00	—	Garbage
334850	12032 -	1	3 10-00	—	—	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial

I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
334851	1448 -	1	3 20-00	—	—	Const Material
334852	1305 -	1	4 10-00	—	—	Garbage
334853	12366 -	1	5 10-00	—	—	Garbage
334854	1541 -	1	4 20-00	—	—	Const Material
334855	1536 -	1	6 10-00 -	—	—	Garbage
—	15401	1	—	No charge		Brush
334856	0498 -	1	7 10.00	—	—	Garbage
—	0322	1	—	No Charge		Brush
334857	0437 -	1	8 10.00	—	—	Garbage
334858	0119 -	1	9 10-00.	—	—	Garbage
—	0091	1	—	No Charge		Brush
334859	12991 -	1	10 10-00	—	—	Garbage
334860	14068 -	1	11 10-00	—	—	Garbage
334861	1543 -	1	12 10.00	—	—	Garbage
334862	1650 -	1	13 10.00	—	—	Garbage
334863	12790 -	1	14 10.00.	—	—	Garbage
—	15566	1	—	No Charge		Brush
—	1639	1	—	No Charge		Brush
334864	0324 -	1	15 10.00	—	—	Garbage
334865	10064 -	1	16 10-00 -	—	—	Garbage
334866	12072 -	1	17 10.00	—	—	Garbage
—	14869	1	—	No Charge		Brush
334867	12787 -	1	18 10-00	—	—	Garbage
334868	15161 -	1	19 10.00	—	—	Garbage
—	0306	1	—	No Charge		Brush
—	0026	1	—	No Charge		Brush
334869	1862 -	1	250.00	—		Shingels
334870	1585 -	1	20 10.00	—	—	Garbage
334871	15435	1	21 100.00	—	—	Shingels

DATE: Aug 19-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
AGC - Road Side Pick Up	11	No Charge	Garbage	Fully Loaded
Tomlinson - 400.00 - 416	1	Commercial	Segregated	Fully Loaded
C&S - 200.00 - 492	1	Commercial	Garbage	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
—	12101	1	—	No Charge	Brush
—	10205	1	—	No Charge	Brush
—	19852	1	—	No Charge	Brush
334872	1665	1	10.00	— —	Garbage
334873	15151	1	20.00	— —	Const Material
—	0436	1	—	No Charge	Brush
334874	15152	1	10.00	— —	Garbage
334875	0434	1	50.00	— —	Const Material

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial

I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
334876	0717	1	3 10.00	—	—	Garbage
334877	15832	1	4 10.00	—	—	Garbage
334878	15994	1	5 10.00	—	—	Garbage
334879	13550	1	6 10.00	—	—	Garbage
334880	0434	1	2 20.00	—	—	Const material
334881	13330	1	7 10.00	—	—	Garbage

DATE: Aug 21-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
334882	15822	1	✓ 10.00	— —	Garbage
—	15765	1	—	No Charge	Brush
—	0272	1	—	No Charge	Brush
—	0114	1	—	No Charge	Brush
—	13511	1	—	No Charge	Brush
—	0005	1	—	No Charge	Brush
—	1639	1	—	No Charge	Brush
334883	1669	1	2 10.00	— 1	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
—	1618	1	—	No Charge		Brush
—	1558	1	—	No Charge		E-Waste
334884	1670	1	3 10.00	—	—	Garbage
334885	1669	1	4 10.00	—	—	Garbage
334886	14889	1	5 10.00	—	—	Garbage
334887	1526	1	6 10.00	—	—	Garbage
334888	16423	1	7 10.00	—	—	Garbage
—	12716	1	—	No Charge		Brush
334889	10801	1	1 50.00	—	—	Shingles
—	15891	1	—	No Charge		Brush
334890	1654	1	8 10.00	—	—	Garbage
334891	0374	1	9 10.00	—	—	Garbage

DATE: Aug 25-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
Wood Creations # 446 - 50.00	1	Commercial	Wood	Fully Loaded
GRS - 200.00 - 486	1	Commercial	Garbage	Fully Loaded
Tomlinson 400.00 - 417 -	1	Commercial	[illegible]	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
334892	1444	1	10.00 1	—	—	Garbage.
—	15393	1	—	No Charge		Brush
—	1560	1	—	NO Charge		Brush
334893	1320	1	10.00 2	—	—	Garbage
334894	1655	1	10.00 3	—	—	Garbage
334895	1563	1	10.00 4	—	—	Garbage
—	0401	1	—	NO Charge		Recycling
334896	1442	1	20.00	—	—	Const Material

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
334897	13123	1	2 20.00	—	—	Const Materials
—	14501	1	—	No Charge		Brush
334898	6481	1	10-00 5	—	—	Garbage
334899	13550	1	10-00 4	—	—	Garbage

DATE: ~~April~~ Aug. 28-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt Registration Numbers		NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
—	13935	1	—	No charge		Brush
334900	14884	1	1 20-00	—	—	Const Material
334901	1578	1	2 20-00	—	—	Const Material
—	0026	1	—	No Charge		Brush
334902	1623	1	1 10.00	—	—	Garbage
334903	13970	1	2 10.00	—	—	Garbage
334904	14932	1	1 50.00	—	—	Shingles
—	0436	1	—	No Charge		Brush

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial

I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
—	1322	1	—	No Charge		Brush
334905	12790	1	3 10.00	—	—	Garbage
—	14501	1	—	No Charge		Brush
334906	8930	4	4 10.00	—	—	Garbage
334907	0499	1	5 10.00	—	—	Garbage
334908	15194	1	3 20.00	—	—	Const Material
—	0214	1	—	No Charge		Brush
334909	1398	1	4 20.00	—	—	Const Material
334910	0149	1	6 10.00	—	—	Garbage
334911	0486	1	7 10.00	—	—	Garbage
334912	13089	1	5 20.00	—	—	Const Material

DATE: Sept 2-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
HGC - No Charge - Road Side Pick Up			Garbage	Fully Loaded
Tomlinson 400.00 - 488	1	Commercial	Longevity	Fully Loaded
Tomlinson 400.00 - 465	1	Commercial	Garbage	Fully Loaded
G-RS-200.00 - 494	1	Commercial	Garbage	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
334913	15857	1	1 10.00	—	—	Garbage
334914	1338	1	2 10.00	—	—	Garbage
—	0163	1	—	No charge		Brush
334915	13935	1	3 10.00	—	—	Garbage
334916	1552	1	4 10.00	—	—	Garbage
—	13111	1	—	No Charge		Brush
—	15401	1	—	No Charge		Brush
334917	14776	1	5 10.00	—	—	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
—	13111	1	—	no charge		Brush
334918	14867	1	1. 50.00	—	—	Shingles
—	0322	1	—	no Charge		Brush
334918	15832	1	6 10.00	—	—	Garbage
—	12366	1	—	no Charge		Brush
334920	0481	1	1 20.00	—	—	Const Material
334921	6015	1	2 50.00	—	—	Shingles
—	0436	1	—	no Charge		Brush
334922	14720	1	7 10.00	—	—	Garbage
334923	11180	1	~~[illegible]~~	20.00	—	Garbage
334924	13550	1	8 10.00	—	—	Garbage
334925	1606	1	9 10.00	—	—	Garbage
—	0047	1	—	no Charge		Brush
334926	1278	1	10 10.00		—	Garbage
334927	15652	1	11 10.00	—	—	Garbage
—	14869	1	—	no Charge		Brush
—	12790	1	—	no Charge		Brush
—	1412	1	—	no Charge		Brush

DATE: Sept 4-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
334928	12565	1	1 10.00	—	—	Garbage
334929	15848	✓ 1	5 50.00	—	—	Shingles
334930	12287	✓ 1	2 10.00	—	—	Garbage
—	16504	1	—	No Charge		Brush
334931	6583	✓ 1	3 10.00	—	—	Garbage
—	14869	1	—	No Charge		Brush
334932	14270	✓ 1	4 10.00	—	—	Garbage
334933	1454	✓ 1	5 10.00	—	—	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

0723 - No Charge. A Counselor said it was free for them. 2 loads

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt Numbers	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
334934	0324	✓ 1	6 10.00	—	—	Garbage /
334935	0274	✓ 1	4 50.00	—	—	Shingles & Wood
334936	15025	✓ 1	3 50.00	—	—	Shingles
334937	1366	✓ 1	7 10.00	—	—	Garbage
334938	1650	✓ 1	8 10.00	—	—	Garbage
334939	1346	✓ 1	9 10.00	—	—	Garbage
334940	6583	✓ 1	10 10.00	—	—	Garbage
334941	0071 ✓	1	11 10.00	—	—	Garbage
—	1435	1	—	No Charge		E-Waste
334942	14000 ✓	1	2 50.00	—	—	Shingles /
334943	0231 ✓	1	1 50.00	—	—	Shingles & Wood
334944	10026	1	12 10.00	—	—	Garbage

DATE: Sept 9-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
G-RS-200.00-481	1	Commercial	Garbage	Fully Loaded
Brown Const-200.00-0523	1	Commercial	Construction	Fully Loaded
Brown Const-200.00-0524	1	Commercial	Construction	Fully Loaded
Brown Const-200.00-0507	1	Commercial	Construction	Fully Loaded
Tomlinson-400.00-497	1	Commercial	Longevity	Fully Loaded
Brown Const-200.00-0508	1	Commercial	Construction	Fully Loaded
Brown Const-200.00-0510	1	Commercial	Construction	Fully Loaded
Brown Const-200.00-0509	1	Commercial	Sanitation	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
—	1322	1	—	No charge	Brush
334945	15614	1	1 10.00	— —	Tires
—	1322	1	—	No charge	Brush
334946	11354	1	2 10.00	— —	Garbage
334947	0363	1	3 10.00	— —	Garbage
334948	13089	1	4 10.00	— —	Garbage
334949	0039	1	20.00	— —	Const + Garbage
—	0436	1	—	No Charge	Brush

Daily Diary (record cover operations, refusals, visitors, etc.)

Brown Const-200.00-0522-1-Commercial-Const-Fully Loaded
Brown Const-200.00-0521-1-Commercial-Const-Fully Loaded
Brown Const-Gave me a cheque 200.00-1-Commercial-Const-Fully Loaded
Brown Const-Gave me a Cheque 200.00-1-Commercial-Const-Fully Loaded
Brown Const-Gave me a Cheque 200.00-1-Commercial-Const-Fully Loaded
Brown Const-Gave me a cheque 200.00-1-Commercial-Const-Fully Loaded

ATTENDANTS SIGNATURE

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
—	1322	1	—	No Charge		Brush
334950	13550	1	5 10.00	—	—	Garbage
334951	1354	1	6 10.00	—	—	Garbage
334952	1423	1	7 10.00	—	—	Garbage
—	12290	1	—	No Charge		Brush
—	0039	1	—	No Charge		Brush

DATE: Sept 11-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
—	1322	1	—	No Charge		Brush
334953	1311	1	~~[illegible]~~	10.00	—	Garbage
334954	1572	1	1 10-00	—	—	Garbage
—	1322	1	—	No Charge		Brush
334955	0216	1	2 10.00	—	—	Garbage
334956	0311	1	3 10-00	—	—	Garbage
334957	14884	1	4 10.00	—	—	Garbage
334958	1650	1	5 10:00	—	✓	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial

I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
334959	12403	1	6 10.00	—	—	Plastic
—	1423	1	—	No Charge		Brush
334960	0051	1	7 10.00	—	—	Garbage
—	0322	2	—	No Charge		Brush
—	1322	1	—	No Charge		Brush
334961	0311	1	8 10.00	—	—	Garbage
334962	8930	1	50.00	—	—	Shingles
334963	1463	1	9 10.00	—	—	Garbage
—	1423	1	—	No Charge		Brush
334964	15932	1	10 10.00	—	—	Garbage
334965	8592	1	11 10.00	—	—	Garbage
334966			25.00	—	—	Shingles
334967	7459	1	12 10.00	—	—	Garbage
334968	15330	1	13 10.00	—	—	Garbage
—	12410	1	—	No Charge		Brush
334969	12032	1	14 10.00	—	—	Garbage
334970	15435	2	~~15~~ 100.00	—	—	Shingles & Wood
334971	12032	1	15 10.00	—	—	Garbage
334972	1584	1	16 10.00	—	—	Garbage
334973	15151	1	1 20.00	—	—	Const Material
334974	8930	1	2 20.00	—	—	Const Material

335695

DATE: Sept 16-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
HGC- No charge	1	Road Side Pick UP	Household	Fully Loaded
Tomlinson - 400.00 - 0559	1	Commercial	Household	Fully Loaded
GRS - 200.00 - 488	1	Commercial	Household	Fully Loaded
GRS - 200.00 - 487	1	Commercial	Household	Fully Loaded
Tomlinson - 400.00 - 489	1	Commercial	Longevity	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS	DESCRIPTION
—	1571	1	—	No charge	Brush
—	1522	1	—	No charge	Brush
334976	13674	1	20.00	— —	Sand Material
334977	14501	1	10.00 ✓	— —	Household
—	0436	1	—	No charge	Brush
—	13069	1	—	No charge	Brush
334978	15504	1	10.00 ✓	— —	Household
334979	1966	1	10.00 ✓	— —	Household

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
—	14968	1	—	No Charge		Brush
—	1322	1	—	No Charge		Brush
334980	1468	1	10-00 ✓	—	—	Garbage
334981	13269	1	10-00 ✓	—	—	Garbage
—	14968	1	—	No Charge		Brush
334982	14765	1	10.00 ✓	—	—	Garbage
334983	15548	1	10-00 ✓	—	—	Garbage
334984	13550	1	10.00 ✓	—	—	Garbage
—	F2410	1	—	No Charge		Brush
—	1322	1	—	No Charge		Brush
—	13069	1	—	No Charge		Brush
334985	15745	2	70.00	—	—	Const Material

DATE: Sept 18-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
Wood Creations - 50.00 - 443	1	Commercial	Wood Construction	Fully Loaded
Wood Creations 50.00 - 444	1	Commercial	Wood Construction	Fully Loaded
Wood Creations 50.00 - 442	1	Commercial	Wood Construction	Fully Loaded
Wood Creations - 50.00 - 445	1	Commercial	Wood Construction	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
—	0302	1	—	No Charge		Brush
—	1265	1	—	No Charge		Brush
334986	12012	1	1 10.00 X	—	—	Garbage
334987	12158	1	2 10.00 X	—	—	Garbage
334988	1542	1	3 10.00 X	—	—	Garbage
334989	15593	1	4 10.00 X	—	—	Garbage
334990	0725	1	5 10.00 X	—	—	Garbage
334991	1535	1	6 10.00 X 60.00	—	—	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
334992	13059	1	1 50.00	—	—	Shingles
334993	12225	1	7 10.00	—	—	Garbage
—	12784	1	— 40	No Charge		Brush
334994	0725	1	8 10.00	—	—	Garbage
334995	8522	1	1 20.00	—	—	Const Material
334996	15865	1	2 20.00	—	—	Const Material
334997	1420	1	3 20.00	—	—	Const Material
334998	1423	1	9 10.00	—	—	Garbage
—	13393	1	— 80	No Charge		Brush
334999	8830	1	2 50.00	—	—	Shingles
335000	14884	1	10 10.00	—	—	Garbage
540601	0725	1	11 10.00	—	—	Garbage
—	12301	1	— 70	No Charge		E-Waste
540602	0446	1	12 10.00	—	—	Garbage
540603	12032	1	13 10.00	—	—	Garbage
540604	0151	1	4 20.00	—	—	Const Material
—	1443	1	— 40	No Charge		E-Waste
540605	15832	1	14 - 10.00	—	—	Garbage
540606	8783	1	15 - 10.00	—	—	Garbage
540607	8009	1	16 - 10.00	—	—	Garbage
540608	1658	1	17 10.00	—	—	Garbage
540609	0210	1	18 10.00	—	—	Garbage
—	0322	1	— 50	No Charge		Brush
540610	13915	1	5 20.00	—	—	Shingles
540611	15474	1	6 20.00	—	—	Const Material
540612	1460	1	19 10.00	—	—	Garbage
			50			

410.

DATE: Sept 23-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
HGC-No charge Load	Side Pick up	11	Garbage	Fully Loaded
CAS - 200.00 - 489	1	Commercial	Garbage	Fully Loaded
Tomlinson - 400.00 - 500	1	Commercial	Longevity	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
540613	1650	1	1 10.00	—	—	Garbage
540614	1468	1	2 10.00	—	—	Garbage
540615	0726	1	3 10.00	—	—	Garbage
540616	1469	1	4 10.00	—	—	Garbage
—	1322	1	—	No Charge		Brush
—	1446	1	—	No Charge		E-Waste
540617	13089	1	5 10.00	—	—	Garbage
540618	0500	1	1 50.00	—	—	Shingles

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
—	1322	1	—	No Charge		Brush
540619	13450	1	1 20.00	—	—	Garbage
540620	1552	1	2 20.00	—	—	Const Material
540621	13550	1	C 10.00	—	—	Garbage
540622	13677	1	—	50.00	—	Const Wood & Plastic
—	1322	1	—	No Charge		Brush
540623	0402	1	7 10.00	—	—	Garbage
540624	1470	1	3 20.00	—	—	Const Wood
540625	15435	1	8 10.00	—	—	Garbage

DATE: Sept 25-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.

OTHER VEHICLES (use back of form if necessary)

Receipt Numbers	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
—	1322	1	✓ —	No Charge		Brush
540626	1515	1	✓ 10.00	—	—	Garbage
—	0498	1	—	No Charge		Brush
—	15421	1	✓ —	No Charge		Brush
540627	1399	1	✓ 10.00	—	—	Garbage
540628	15924	1	✓ 10.00	—	—	Garbage
540629	0324	1	✓ 10.00	—	—	Garbage
—	14803	1	—	No Charge		E-Waste

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling	I = Industrial
X = Cash Dumping	DE = Demolition
D = Domestic	F = Full
CO = Commercial	

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
—	1640	1	—	No Charge		E-Waste
—	1322	1	—	No Charge		Brush
540630	1612	1	✓10.00	—	—	Garbage
540631	13111	1	✓10.00	—	—	Garbage
540632	12520	1	✓10.00	—	—	Garbage
540633	1443	1	✓10.00	—	—	Garbage
540634	14210	1	✓40.00	—	—	Garbage
540635	0272	1	✓20.00	—	—	Const Wood
540636	0075	1	✓10.00	—	—	Garbage
540637	12403	1	✓10.00	—	—	Garbage
540638	13842	1	✓10.00	—	—	Garbage
540639	0382	1	✓10.00	—	—	Garbage
540640	14584	1	✓20.00	—	—	Const Material
540641	14584	1	✓20.00	—	—	Const Material
540642	13548	1	✓10.00	—	—	Garbage
—	0152	1	—	No Charge		E-Waste
540643	15492	1	50.00	—	—	Shingles
540644	1361	1	✓10.00	—	—	Garbage
540645	1420	1	✓20.00	—	—	Const Material
540646	14887	1	✓10.00	—	—	Garbage
540647	1618	1	✓10.00	—	—	Garbage
540648	13330	1	✓10.00	—	—	Garbage

DATE: Sept 30-21

TOWNSHIP OF SOUTH GLENGARRY
NORTH LANCASTER LANDFILL SITE
DAILY RECORD FORM

GARBAGE PACKERS

OPERATOR	SOURCE	TYPE Domestic, Industrial, Commercial or Institutional	DESCRIPTION For example: mixes, grass clippings, demolition debris, etc	ESTIMATE OF QUANTITY For example: fully loaded, 6 cubic yeards, 4 bags, etc.
HGC - No Charge	11	Road Side Pick Up	Garbage	Fully Loaded
GRS - 200.00 - 498	1	Commercial	Garbage	Fully Loaded
Tomlinson - 400.00 - 0501	1	Commercial	Renovations	Fully Loaded

OTHER VEHICLES (use back of form if necessary)

Receipt	Registration Numbers	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
540649	11801	1	1 50.00	—	—	Shingles
—	14120	1	—	No Charge		Brush
—	1522	1	—	No Charge		Brush
—	10237	1	—	No Charge		Brush
—	1440	1	—	No Charge		Brush
540650	14795	1	1 10.00	—	—	Garbage
540651	12012	1	2 10.00	—	—	Garbage
540652	1340	1	3 10.00	—	—	Garbage

Daily Diary (record cover operations, refusals, visitors, etc.)

ABBREVIATIONS:

R = Recycling
X = Cash Dumping
D = Domestic
CO = Commercial
I = Industrial
DE = Demolition
F = Full

ATTENDANTS SIGNATURE

OTHER VEHICLES

Receipt	Registration	NUMBER OF LOADS	CASH	CHEQUE / TICKETS		DESCRIPTION
Numbers						
540653	0237	1	4 10.00	—	—	Garbage
—	15891	1	—	No Charge		Brush
—	0332	3	—	No Charge		Brush
540654	0326	1	5 10.00	—	—	Garbage
540655	15055	1	6 10.00	—	—	Garbage
—	13935	1	—	No Charge		Brush
540656	1284	1	7 10.00	—	—	Garbage
540657	1513	1	1 20.00	—	—	Const Material
540658	15181	1	2 20.00	—	—	Const Material

DATE	$10.00	$50.00	$200.00	NAME	$400.00	NAME2	Roadside	Tomlinson	G.R.S.	IGC Managemer	Demo	Meyer	NOTES
2021 NUMBER OF LOADS													
BEAVERBROOK & NORTH LANCASTER LANDFILL SITE													
2-Jan-21	6	1											
5-Jan-21	7	2	2	Tomlinson, GRS	1	Longevity							
9-Jan-21	13	2											
12-Jan-21	8	2	3	Tomlinson, GRS	1	Wood Creations							
16-Jan-21	6	1											
19-Jan-21	5	2	2	Tomlinson, GRS	1	Longevity							
23-Jan-21	11	1											
26-Jan-21	10	4	3	Tomlinson, GRS	1	Longevity							
30-Jan-21	13	1											
2-Feb-21	3	4	5	Tomlinson, GRS	1	Longevity							
6-Feb-21	10												
9-Feb-21	7	4	1	Tomlinson	1	Longevity							
13-Feb-21	11	1											
16-Feb-21	3	1			1	Longevity							
20-Feb-21	7	2											
23-Feb-21	8	2	4	GRS Tomlinson	1	Longevity							
27-Feb-21	14	1											
2-Mar-21	9	2	2	Tomlinso, GRS	1	Longevity							
6-Mar-21	19	1											
9-Mar-21	10	2	5	Tomlinson, GRS	1	Longevity							
13-Mar-21	26	1											
16-Mar-21	11	1	1	Tomlinson	1	Longevity							
20-Mar-21	24	5											
23-Mar-21	17	4	6	Tomlinson, GRS	1	Longevity							

DATE	$10.00	$50.00	$200.00	NAME	$400.00	NAME2	Roadside	Tomlinson	G.R.S.	IGC Managemen	Demo	Meyer	NOTES
27-Mar-21	18	4											
30-Mar-21	7	2	6	Tomlinson, GRS	1	Longevity							
3-Apr-21	25	3											
6-Apr-21	16.5	5	7.5	Tomlinson, GRS	1	Longevity							
10-Apr-21	33	6	1	Hagen Farm Inc									
13-Apr-21	16	2	6	Tomlinson, GRS	1	Longevity							
17-Apr-21	32	7											
20-Apr-21	7	5	3	Tomlinson, GRS	1	Longevity							
24-Apr-21	34	6											
27-Apr-21	15	1	5	Tomlinson, GRS	1	Longevity							
4-May-21	7	2	4	Tomlinson, GRS	0	Longevity							
8-May-21	20	1	0		0								
11-May-21	12	0	8	Tomlinson, GRS	1	Longevity							
15-May-21	27	2	0		0								
18-May-21	13	2	4	Tomlinson, GRS	1	Longevity							
22-May-21	37	3	0		0								
25-May-21			5	Tomlinson, GRS	1	Longevity							Free day x92
29-May-21													free day x131
North Lancaster													
17-Jun-21	10	1			1								
19-Jun-21	22	2											
24-Jun-21	22	2	3	Tomlinson, GRS	1	Longevity							
26-Jun-21	13	3											
total	67	8	3		2								

DATE	$10.00	$50.00	$200.00	NAME	$400.00	NAME2	Roadside	Tomlinson	G.R.S.	IGC Managemer	Demo	Meyer	NOTES
3-Jul-21	18	3											
8-Jul-21	14	2	1	GRS	1	Longevity							
10-Jul-21	8	4		(1) Wood Creations									
15-Jul-21	16	1	1	GRS	1	Longevity							
17-Jul-21	21	6											
22-Jul-21	14	1											
24-Jul-21	22	1											
29-Jul-21	16	3	1	GRS	1	Longevity							
31-Jul-21	11	1											
total	140	22	3		3								
5-Aug-21	18	3	1	GRS	1	Longevity							
7-Aug-21	17	3	1	GRS	2	Longevity, Tomlinson							
14-Aug-21	28	4											
19-Aug-21	11	1	1	GRS	1	Longevity							
21-Aug-21	9	1											
25-Aug-21	10												
28-Aug-21	17	1											
total	110	13	3		4								
2-Sep-21	13	2	3	Tomlinson (2) GRS (1)									
4-Sep-21	12	5											
9-Sep-21	9		7	CMC Innov. (6) GRS (1)	1	Longevity							
11-Sep-21	20	3.5											
16-Sep-21	12	1	2	GRS	2	Longevity (1) Tomlinson (1)							
18-Sep-21	31	6											
23-Sep-21	14	1	1	GRS	1	Longevity							
25-Sep-21	26	1											
30-Sep-21	11	1	1	GRS	1	Longevity							
total	148	20.5	14		5								

DATE	$10.00	$50.00	$200.00	NAME	$400.00	NAME2	Roadside	Tomlinson	G.R.S.	GC Managemer	Demo	Meyer	NOTES
Beaver Brook													
2-Oct-21	10		3										
5-Oct-21	8	3	2	Tomlinson, GRS	2	Tomlinson, Longevity							
9-Oct-21	25	6											
12-Oct-21	12	1	6	GRS (1) Tomlinson (5)	1	Longevity							
16-Oct-21	11	2											
19-Oct-21	6	1	4	GRS (1) Tomlinson (3)	1	Longevity							
23-Oct-21	22	1											
26-Oct-21	2	3	5	GRS (1) Tomlinson (4)	1	Longevity							
30-Oct-21	13	1											
2-Nov-21	8	2	5	GRS (1) Tomlinson (4)	1	Longevity							
6-Nov-21	19	4											
9-Nov-21	5	2	3	Tomlinson (2) GRS (1)	1	Longevity							
13-Nov-21	15	2											
16-Nov-21	12		4	Tomlinson (3) GRS (1)	1	Longevity							
20-Nov-21	20	1											
23-Nov-21	8		3	Tomlinson (2) GRS (1)	1	Longevity							
27-Nov-21	10												
30-Nov-21	9		3	Tomlinson (2) GRS (1)	1	Longevity							
4-Dec-21	8	2											
7-Dec-21	8	1	3	GRS (1) Tomlinson (2)	2	Tomlinson (1) Longevity (1)							
11-Dec-21	4	1											
14-Dec-21	6	2.5	3	GRS (1) Tomlinson (2)	1	Longevitty							

DATE	$10.00	$50.00	$200.00	NAME	$400.00	NAME2	Roadside	Tomlinson	G.R.S.	IGC Managemer	Demo	Meyer	NOTES
18-Dec-21	11	2	4	cash									
21-Dec-21	6		3	GRS (1) Tomlinson (2)	1	Longevitty							
28-Dec-21	8	1	1	GRS	2	Tomlinson							

Township of South Glengarry
Hazardous Waste Day
September 25, 2021
119 Military Rd, Smithfield Park
Lancaster, ON

Name	Quantity Received
Florescent Tubes for Recycling	110kg
Fire Extinguishers with compressed or liquefied gas	84kg
Oxidizing solid n.o.s (nitrates)	208kg
Corrosive Liquid (Sulfuric acid)	200L
Aerosols	589kg
Paint Related Material	3219 kg
Propane	353kg
Flammable Liquid (adhesive)	7509L
Flammable Liquid (gasoline)	150L
Pesticide, Liquid, Toxic (Malathlon)	908kg
Corrosive Liquid, Toxic N.O.S (sodium hydroxide)	500L
Medicine, Solid, Toxic, N.O.S, pharmaceuticals	92kg
Glycol	168kg
Fertilizer	167kg
Medical Waste (Sharps)	9kg
Oil Filters	271kg
Oil	160L
Propane	821kg
Oil	1600L
Paint Related Material	8698kg
Solid Non-Hazardous Material (empty plastic containers)	214kg
Batteries, Dry, Containing Potassium Hydroxide Solid, electric storage	859kg

H-4 WSP STANDARD OPERATING PROCEDURES

FIELD PROCEDURES MANUAL

Subject:	Odour Identification	Procedure No. FS 3.1	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall use the Odour Identification Procedure for the identification of odours during the completion of field tasks.

2 PURPOSE

2.1 To provide a consistent and repeatable methodology for the identification of odours. As each employee will react differently to different odours, a systematic procedure of identification is required.

3. SCOPE

3.1 The requirement to follow the Odour Identification procedure applies to each employee that is responsible for completing field tasks.

4. RESPONSIBILITIES

4.1 It is the responsibility of technical employees to follow the Odour Identification procedure during the completion of field tasks where odours are present.

4.2 The Project Manager is responsible for ensuring that technical employees are aware that odour identification is required as part of the assigned field tasks.

4.3 This procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 Odour - Is a sensation detected by the olfactory glands.

5.2 Odourant – The volatile chemical, vapour, mist, or dust, that produces the odour.

5.3 TLV - Threshold Limit Value.

5.4 Detection – A threshold concentration where a chemical odour is noted.

5.5 Recognition – A threshold concentration where a chemical can be identified by its odour.

6. REFERENCES AND RELATED PROCEDURES

6.1 Hazardous Materials Compliance Sheet – Templegate Information Services Inc.

6.2 Health and Safety Policy and Procedures

7. METHODOLOGY

7.1 Prior to completion of an assigned field task, identify the chemicals of concern. Determine the odour threshold and TLV for each chemical of concern. Obtain the required personal protective equipment.

7.2 Where an odour is detected, record the following.
¾ Identify the technical employee making the observation.

¾ Location on the site.
¾ Ambient odour of the site.
¾ Date and time.
¾ Weather conditions.
¾ Probable source of the odour.

7.3 Complete the odour identification as outlined in the following steps.
¾ Physical Reaction - Watery eyes, sore throat, taste, stuffy nose, etc.
¾ Physiological Reaction - Does the odour induce an increased heart rate, breathing rate, etc.
¾ Resemblance - Does the odour resemble odours from a known material? Use one of the following more common descriptors.
  ƒ Alcohol
  ƒ Ammonia
  ƒ Diesel
  ƒ Gas
  ƒ Garlic
  ƒ Fishy
  ƒ Hydrogen sulphide (rotten eggs)
  ƒ Manure
  ƒ Moth balls
  ƒ Sewage
  ƒ Solvent
  ƒ Swampy
  ƒ Do not use the following descriptors : organic, leachate.

8. HEALTH AND SAFETY PRECAUTIONS

8.1 Strong odours can evoke pronounced physiological responses, decrease the heart rate, dilate peripheral blood vessels, and flood the bloodstream with adrenaline. Responses may include watery eyes, stuffy nose, constricted throat and shallow respiration, and death.

8.2 An understanding of the chemicals of concern for each task is essential to identify the dangerous threshold limit values (TLV) and odour thresholds.

9. ATTACHMENTS

9.1 Odour Threshold Values from Hazardous Materials Compliance Sheet

Table 4
Odour Threshold Values[1]

Compound	Odour Threshold[2]	Type of Threshold[3]	Range[4]	Description
Acetaldehyde	0.067	D	0.0028-1000.0	green sweet, alcohol
	0.21	R		
Acetic acid	0.074	D	0.010-31.0	sour
	1.0	R		
Acetic anhydride	<0.14	D	0.12-0.36	sour acid
	0.36	R		
Acetone	62.0	D	0.4-800.0	chemical sweet, pungent
	130.0	R		
Acrolein	1.8	D	0.022-1.8	burnt sweet, pungent
Acrylonitrile	1.6	D	1.6-22.0	onion-garlic, pungent, sweet
	21.4	R		
Allyl amine	28.0	R		
Allyl chloride	0.47	R		onion-garlic, pungent, sweet, green
Ammonia	17	D	0.043-53	barn-like, pungent
	46.8	R		
Aniline	2.4	D	0.012-10.0	sweet, oily, pungent
Benzene	61.0	D	0.78-160.0	sweet, solvent
	97.0	R		
Benzyl chloride	0.041	D		sweet, solvent
Bromine	0.047	R	<0.0099-0.46	sweet, bleach, pungent, irritating
Butylene oxide	0.71	R		sweet alcohol
Butyraldehyde	0.039	R		sweet rancid
Butyric acid	0.001	R		cheese, sour
Camphor	0.079	D	0.0026-0.96	camphorous
Carbon disulphide	0.21	R	0.016-0.42	vegetable, sulphide, medicinal
Carbon tetrachloride	250	R	1.6-706.0	sweet, pungent
Chloral	0.047	R		sweet, fruity
Chlorine	0.08	D	0.021-3.4	bleach, sweet, pungent, suffocating
	0.314	R		
Chloroform	192	D	0.6-1413.0	sweet, suffocating
Cyclohexane	780	D	0.52-784.0	sweet, sharp, solvent/oil
Diethyl amine	0.053	D	0.0033-14.3	musty, fishy
	0.75	R		
Diethyl sulphide	0.006	R		
Dimethyl amine	0.047	R	0.00076-1.6	rotten fish, dirty clothes
Dimethyl formamide	100.0	R	0.47-100.0	fishy, sweet, floral, pungent
Dimethyl sulphide	0.001	R		cooked vegetable, sulphide
Dioxane	12.0	D	0.81-2609.0	sweet, alcohol
	17.0	R		
Ethanol	100.0	R	0.34-40333.0	sweet, floral, alcohol
Ethyl acrylate	0.00037	R	0.0002-0.0013	sweet, hot plastic, earthy
Ethyl mercaptan	0.0004	R	0.0001-18.0	earthy, sulphide, rotten cabbage
Formaldehyde	1.0	R	0.027-9770.0	hay-straw, sweet, pungent
Hydrogen chloride	10.0	R	0.255-10.0	burnt, pungent, irritating

Compound	**Odour Threshold**[2]	**Type of Threshold**[3]	**Range**[4]	**Description**
Hydrogen selenide	0.3	n.s.		garlic
Hydrogen sulphide	0.0045	R	0.00007-1.4	boiled or rotten eggs
Isobutanol	3.6	D	0.012-165.0	sweet, musty
	9.8	R		
Isobutyraldehyde	0.336	R		sweet, fruity
Methanol	160	D	3.3-198656	sour/sweet, fruity
	690	R		
Methyl amine	0.021	R	0.0009-4.68	fishy, pungent
Methyl chloride	>10.0	R		sweet, ether-like
Methyl isobutyl ketone	0.88	D	0.1-16.0	sweet/sharp
	2.1	R		
Methyl mercaptan	0.001	R	0.0000002-0.56	cabbage, sulphide, pungent
Methyl methacrylate	0.34	R	0.014-0.46	sulphide, plastic, pungent
Morpholine	0.011	D	0.011-0.07	fishy
—	0.07	R		
Nitrobenzene	0.37	D	0.0004-29.0	shoe polish, almonds, sweet, pungent
Perchloroethylene	71	R	2.0-71.0	ether-like
Phenol	0.06	D	0.0045-1.0	medicinal, sweet, creosote-like
Phosgene	1.0	R	0.12-5.7	hay-like, sweet
Phosphine	0.14	R	0.01-5.0	onion, mustard, garlic
Pyridine	0.74	R	0.012-12.0	burnt, pungent, nauseating
Styrene	0.15	R	0.0047-61.0	sharp/sweet, solvent, rubbery
Sulphur chlorides	0.001	R		sulphide
Sulphur dioxide	4.4	R	0.33-5.0	heavy, oppressive (taste and feel)
Toluene	1.6	D	0.021-69.0	moth balls, sweet, sour/burnt, rubbery
	11.0	R		
Toluene diisocyanate	2.14	R		medicinal, sweet, fruity, pungent
Trichloroethylene	110.0	R	0.5-167.0	sweet, ether-like, solvent
Trimethyl amine	0.8	R	0.00011-0.87	0.00011-0.87 fishy, pungent
Vinyl acetate	0.4	R	0.11-0.4	sour/sharp
Xylene	40.0	R	0.081-40.0	sweet

Notes, Table 4:

1 — adapted from: Odor Control, including Hazardous/Toxic Odors, H.E. Hesketh and F.L. Cross, Technomic Publishing Co. Ltd., Lancaster, PA, 1989; Odors from Stationary and Mobile Sources, National Academy of Sciences, Washington, DC, 1979; Odor Thresholds for Chemicals with Established Occupational Health Standards, American Industrial Hygiene Asociation, Akron, OH, 1989; and Research on Chemical Odors, Part I — Odor Thresholds for 53 Commercial Chemicals, Manufacturing Chemists Association, October, 1968

2 — the lowest level detected or recognized by a human being (in practice, usually by 50% of a panel of "sniffers") measured in parts per million (ppm) by volume

3 — D (detection), or R (recognition)

4 — range of all referenced values in parts per million (ppm)

Subject:	Temperature Measurement	Procedure No. FS 3.3	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall measure the temperature of a liquid using the following standardized methodology.

2. PURPOSE

2.1 To provide a consistent and repeatable methodology for the measurement of the temperature of a liquid.

3. SCOPE

3.1 The requirement to follow the Temperature Measurement procedure applies to technical employees who are responsible for completing field tasks.

4. RESPONSIBILITIES

4.1 It is the responsibility of technical employees to follow the Temperature Measurement procedure for the measurement of temperature in a liquid.

4.2 The Project Manager is responsible for ensuring that technical employees are aware that temperature measurements of liquids are required as part of the assigned field tasks.

4.3 This procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 None

6. REFERENCE AND RELATED PROCEDURES

6.1 Equipment Documentation – FS 12.4

7. METHODOLOGY

7.1 Ensure that the instrument is functioning properly prior to use.

7.2 Equipment shall be calibrated according to the manufacturer’s direction before use each day. Confirmatory calibration shall also be made periodically throughout the day. Record the calibration results on the Equipment Calibration Record form within the dedicated project field book.

7.3 If the temperature probe cannot be placed directly into the liquid, extract the liquid from the source and place it into an appropriate container. Of note, a larger container will reduce atmospheric effects. Testing should be completed within one minute of extraction for results most representative of actual conditions.

7.4 Immerse the temperature probe into the liquid and allow it to stabilize. Record the stable reading on the appropriate form in the project field book.

7.5 Decontaminate the probe with a detergent and distilled water solution followed by a distilled water rinse.

8. ATTACHMENTS

8.1 None

Subject:	Conductivity Measurement	Procedure No. FS 3.4	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall measure the conductivity of a liquid using the following standardized methodology.

2. PURPOSE

2.1 To provide a consistent and repeatable methodology for the measurement of the conductivity of a liquid.

3. SCOPE

3.1 The requirement to follow the Conductivity Measurement procedure applies to technical employees who are responsible for completing field tasks.

4. RESPONSIBILITIES

4.1 It is the responsibility of technical employees to follow the Conductivity Measurement procedure for the measurement of conductivity in a liquid.

4.2 The Project Manager is responsible for ensuring that technical employees are aware that conductivity measurements of liquids are required as part of the assigned field tasks.

4.3 This procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 Conductivity – may also be referred to as specific conductance or electrical conductivity.

6. REFERENCE AND RELATED PROCEDURES

6.1 Equipment Decontamination – FS 12.4

7. METHODOLOGY

7.1 Ensure that the instrument is functioning properly prior to use.

7.2 Equipment shall be calibrated according to the manufacturer's direction before use each day. For reference, an operations manual is contained within the travel case for the instrument. Confirmatory calibration shall also be made periodically throughout the day. Record the calibration results on the Equipment Calibration Record form within the dedicated project field book.

7.3 Conductivity measurements shall be completed before pH measurements.

7.4 If the conductivity probe cannot be placed directly into the liquid, extract the liquid from the source and place it into an appropriate container. Of note, a larger container will reduce atmospheric effects. Testing should be completed within one minute of extraction for results most representative of actual conditions.

7.5 Immerse the calibrated conductivity probe into the liquid and allow readings to stabilize. Record the stable reading on the appropriate form in the project field book.

7.5 Decontaminate the probe with a detergent and distilled water solution followed by a distilled water rinse.

8. ATTACHMENTS

8.1 None

Subject:	pH Measurement	Procedure No. FS 3.5	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall measure the pH of a liquid using the following standardized methodology.

2. PURPOSE

2.1 To provide a consistent and repeatable methodology for the measurement of pH in a liquid.

3. SCOPE

3.1 The requirement to follow the pH Measurement procedure applies to technical employees who are responsible for completing field tasks.

4. RESPONSIBILITIES

4.1 It is the responsibility of technical employees to follow the pH Measurement procedure for the measurement of temperature in a liquid.

4.2 The Project Manager is responsible for ensuring that technical employees are aware that pH measurements of a liquid are required as part of the assigned field tasks.

4.3 The procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 None

6. REFERENCE AND RELATED PROCEDURES

6.1 Equipment Decontamination - FS 12.4

7. METHODOLOGY

7.1 Ensure that the equipment is functioning properly prior to use.

7.2 Equipment shall be calibrated according to the manufacturer’s direction before use each day. For reference, an operations manual is contained within the travel case for the instrument. Confirmatory calibration shall also be made periodically throughout the day. Record the calibration results on the Equipment Calibration Record form within the dedicated project field book.

7.3 If the pH probe cannot be placed directly into the liquid, extract the liquid from the source and place it into an appropriate container. Of note, a larger container will reduce atmospheric effects. Testing should be completed within one minute of extraction for results most representative of actual conditions.

7.4 Immerse the pH probe into the liquid, stir slowly with probe, and allow readings to stabilize. Record the stable reading on the appropriate form in the project field book.

7.5 Decontaminate the probe with a detergent and distilled water solution followed by a distilled water rinse.

8. ATTACHMENTS

8.1 None

Subject:	Dissolved Oxygen Measurement	Procedure No. FS 3.6	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall measure the dissolved oxygen of a liquid using the following standardized methodology.

2. PURPOSE

2.1 To provide a consistent and repeatable methodology for the measurement of the dissolved oxygen of a liquid.

3. SCOPE

3.1 The requirement to follow the Dissolved Oxygen Measurement procedure applies to technical employees who are responsible for completing field tasks.

4. RESPONSIBILITIES

4.1 It is the responsibility of technical employees to follow the Dissolved Oxygen Measurement procedure for the measurement of dissolved oxygen in a liquid.

4.2 The Project Manager is responsible for ensuring that technical employees are aware that dissolved oxygen measurements of liquids are required as part of the assigned field tasks.

4.3 The procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 Dissolved Oxygen – May also be referred to as DO.

6. REFERENCE AND RELATED PROCEDURES

6.1 Temperature Measurement – FS 3.4

6.2 Sample Storage – FS 5.2

6.3 Equipment Decontamination – FS 12.4

7. METHODOLOGY

7.1 Ensure that the DO meter is functioning properly prior to use. Check calibration records before signing out the instrument. Ensure additional membranes and calibration solutions are included in the carrying case. Check with the office field services coordinator if you require any materials.

7.2 Ensure that the DO meter probe is filled with electrolyte solution, that the probe membrane is free of wrinkles, and that there are no bubbles trapped on the face of the membrane prior to leaving the office. Replace the membrane according to the manufacturer’s directions if any of the visual checks noted above are observed.

7.3 Equipment shall be calibrated according to the manufacturer’s direction before use each day. For reference, an operations manual is contained within the travel case for the meter. Confirmatory calibration shall also be made throughout the day as required. Record the calibration results on the Equipment Calibration Record form within the project field book.

7.4 For most representative measurement results, immerse the probe into the liquid being measured and ensure that flowing water is passing the probe; either by natural stream flow or by slowly moving the probe through still water. Alternatively, a representative water sample may be collected into a container for DO measurement. Of note, a larger container will reduce atmospheric effects. Testing should be completed within one minute of extraction for results most representative of actual conditions.

7.5 Record the DO reading in both mg/L and % saturation on the appropriate form in the project field book.

7.6 Decontaminate the DO meter probe with a detergent and distilled water solution followed by a thorough distilled water rinse.

8. ATTACHMENTS

8.1 None

Subject:	Surface Water Flow Measurements	Procedure No. FS 7.1	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall complete surface water flow measurements by following this standardized methodology.

2. PURPOSE

2.1 To provide a consistent and repeatable methodology for completing surface water flow measurements.

3. SCOPE

3.1 The requirement to follow the Surface Water Flow Measurement procedure applies to technical employees who are responsible for completing field tasks.

4. RESPONSIBILITY

4.1 It is the responsibility of technical employees to follow the Surface Water Flow Measurement procedure for the collection of surface water flow measurements.

4.2 Project Managers are responsible for informing technical employees if surface water flow measurements are required.

4.3 This procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 GPS – Global Positioning System

6. REFERENCE AND RELATED PROCEDURES

6.1 Surface Water Sampling – FS 7.2.

7. METHODOLOGY

7.1 Provide a subjective flow estimate in the Project Field Book. Estimates can include slow, fast, ponded, no flow, standing water.

7.1.1 Establish an area along the channel to be tested which has reasonable access and is safe. Examine the banks of the channel, and select a portion of the channel where no undercutting of either bank exists. Further, examine the stream channel for any submerged rocks or other debris that may impede the taking of accurate velocity measurements across the channel. Note high flow markings on banks. Consider the high flow marking if flow measurements will be taken over the seasons.

7.1.2 Mark the location on both banks with a well marked stake. If the location selected will be used for repeated measurements, then permanently mark on both banks with stakes that are set above any high channel flow. Further marking with orange flagging tape and the taking of photographs are recommended. Locate the designated surface water station on a site map with measurements from a stationary point and with GPS co-ordinates.

7.1.3 Extend a measuring tape or survey chain across the channel and secure it on both sides.

7.1.4 Carefully remove any stones from the stream bed, along a line that velocity measurements will be made.

7.1.5 Divide the channel into suitable sections. If the channel is wider than 10 m, then sub-sections should represent ~10% of the flow. Number the sections and determine the cross sectional area of each section. Record the area of each numbered section on the Surface Water Flow Measurement form within the Project Field Book. A copy of the form is attached.

7.1.6 At each vertical division line, determine the velocity at a point 60% of the total depth below the surface of the water as the mean velocity.

Should a channel be 0.76 metres deep or greater, a method measuring velocities at 20% and 80% of the total depth below the surface is required. The average of the two readings is considered to be average for the vertical division line.

7.1.7 Stand behind, and to the side of the meter while measuring the velocity of the water flow.

7.1.8 Hold the meter as near vertical as possible. Face the cones or probe, depending on the type of meter used, directly into the channel flow. Note the presence or absence of any channel debris compared to the last channel flow measurement.

7.1.9 Repeat velocity measurements three or more times at each division line, and record on the appropriate form in the Project Field Book.

7.1.10 If using the mechanical current meter, compute the number of counts per second as from the current meter and record it in the Project Field Book.

7.1.11 Compute the velocity of the water at each point of the division line using the appropriate formula.

7.1.12 Calculate and record the volume of water passing through each section:
VOLUME = AREA x VELOCITY

7.1.13 Calculate the total volume of the entire stream channel.

7.1.14 If time permits carry out a quick check of the results using a floating object to estimate stream velocity and carry out a quick cross sectional check for the volume of water. Refer to step 7.2 for a detailed procedure.

7.1.15 Clean the meter after every use, return to the holding case and let air dry.

7.1.16 In cases where the channel depths will not facilitate a mechanical current meter (in channels of depth less than 15 cm), then you can use the **electromagnetic velocity meter.**

7.1.17 Repeat steps 1 to 16, excluding step 10 and 11. The velocity measurement can be read directly from the meter's display.

7.2 The manual floating object method should be used to give an estimated flow rate.

7.2.1. Select a straight section of the stream channel approximately 2 to 3 metres long. If repeat flow measurements are to be taken, then use suitable stakes to mark and identify the surface water station.

7.2.2 Clear the channel of vegetation and other debris that will inhibit flow measurements.

7.2.3 Mark out a **start** and **finish** point along the channel edge.

7.2.4 Place a floating but partially submerged object upstream of the start point, as close to the centre of the channel as possible and release the object. An example of a floating object is a tennis ball with a slit in the side. A steel ball bearing or small stone placed inside will help to partially submerge the tennis ball.

7.2.5 Using a stopwatch, determine the time required for the floating object to travel the marked distance.

7.2.6 Repeat the measurements at least three times to determine an average time of travel and calculate a velocity.

7.2.7 Determine the cross-sectional area of the channel by measuring depth and width of the channel at the start, mid-point, and finish of the channel tested. Draw a cross-section of the stream to further clarify the numbers.

7.2.8 Calculate the volume at each of the locations tested, then calculate a total average volume.

7.2.9 Record data on the Field Surface Water Flow Rate form in the Project Field Book.

8. HEALTH AND SAFETY PRECAUTIONS

8.1 Employees shall be aware of cold water temperatures and slip/trip/fall hazards.

9. ATTACHMENTS

9.1 Surface Water Flow Measurement form.

9.2 Field Surface Water Flow Rate form.

SURFACE WATER FLOW MEASUREMENT

PROJECT: ______________________ **DATE:** ____________

S/W STATION: ____________ **PROJECT NO.:** ____________ **WEATHER:** ____________

STATION 1 Is The (L) (R) Side Facing (U) (D) Stream **TIME:** ____________

(CIRCLE APPROPRIATE LETTER)

	STA (m)	DEPTH OF WATER (m)	VELOCITY *(m/s @ __ %)	VELOCITY *(m/s @ __ %)	COMMENTS
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

SAMPLING TEAM: ______________________

Revision 3/Mar 2010

NOTE: * **If depth > 1 m, readings taken at 20 % and 80 %, otherwise reading taken at 60 % depth from top of water.**

FIELD SURFACE WATER FLOW RATE FORM

SHEET ____ **OF** ____

PROJECT NAME: ____________________

PROJECT NO. : ____________________

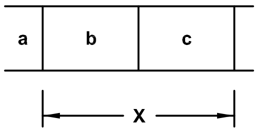
SURFACE WATER STATION NO. : ____________________

DATE d / m / y	WIDTH (m)			DEPTH (m)			(A) AVERAGE CROSS SECTIONAL AREA * $(m)^2$	(B) TIME TRIAL (sec)					(C) AVERAGE VELOCITY ** (m / s)	(D) FLOW RATE *** $(m / s)^3$	REMARKS / FIELD STAFF
	a	b	c	d_1	d_2	d_3		B1	B2	B3	B4	B5			

* (A) = $\frac{a(d_1) + b(d_2) + c(d_3)}{3}$

** (C) = $\frac{5X}{B1 + B2 + B3 + B4 + B5}$

*** (D) = (A) (C)



d_1 = depth along a
d_2 = depth along b
d_3 = depth along c

SURFACE WATER SAMPLING LOCATION SKETCH

WATER CHEMISTRY

pH ____

cond. µs ____

T C° ____

NOT TO SCALE
(DISTANCES AS SHOWN)

Revsion 3 / Mar 2010

Subject:	Surface Water Sampling	Procedure No. FS 7.2	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall complete the collection of surface water samples by following this standardized methodology.

2. PURPOSE

2.1 To provide a consistent and repeatable methodology for the collection of surface water samples.

3. SCOPE

3.1 The requirement to follow the Surface Water Sampling procedure applies to technical employees who are responsible for completing field tasks.

4. RESPONSIBILITY

4.1 It is the responsibility of technical employees to follow the Surface Water Sampling procedure for the collection of surface water samples.

4.2 The Project Manager is responsible for ensuring that technical employees are aware that the collection of surface water samples are required as part of the assigned field tasks.

4.3 This procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 None.

6. REFERENCE AND RELATED PROCEDURES

6.1 Sample Preservation – FS 5.5.

6.2 Equipment Decontamination – FS 12.4.

6.3 Sample Labeling – FS 5.1.

6.4 Sample Storage – FS 5.2.

7. METHODOLOGY

7.1 If required, assemble the sampling pole. Make certain the sample bottle, nuts and bolts are secure, and the clamp is secured to the aluminum pole.

7.2 Wearing the proper protective equipment, including gloves such as latex or nitrile, take a grab sample by slowly submerging an inverted sample bottle. Minimize surface disturbance by slowly filling the sample bottle by turning it on its side, then fully upright. The water sample shall be collected below the water surface.

7.3 Once full, retrieve the sample from the surface water with minimal disturbance. If sample bottles were not used for sample collection, carefully transfer the water sample to an appropriate laboratory pre-cleaned sample bottle.

7.4 Collect samples from near shore, unless boats are available and their use is permitted.

7.5 Cap the sample bottle. If the sample bottle does not contain a preservative, then follow procedures for preservation and proper sample storage and transport.

7.6 If sample bottles are not used for each sample, decontaminate equipment and sample collection bottle as outlined in the procedure for equipment decontamination.

7.7 Dismantle the sampling pole and store properly until next use.

7.8 Record pertinent information in the Project Field Book regarding the location of the sample, body of water sample taken from, general description of water sampled, and relative chemical parameters.

7.9 Repeat steps 1 to 8 for each surface water sample collected.

7.10 If you do not have an extension pole and it is deemed appropriate to use your hands to hold the sample bottle in the stream, lake or pond, then follow the procedure below.

7.10.1 Wear protective gloves as required.

7.10.2 Hold the mouth of the sample bottle upstream into the current flow, with your hand downstream from the mouth of the bottle. Collect the water sampled below the water

7.10.3 Rinse the bottle, unless the bottle has preservative in it.

7.10.4 Cap the sample bottle and store in a transport container such as a cooler. Follow the procedure for sample storage and transport.

8. HEALTH AND SAFETY PRECAUTIONS

8.1 Caution must be exercised while opening and filling sample container that contains an acid preservative.

9. ATTACHMENTS

9.1 None

Subject:	Field Equipment Clean-Up	Procedure No. FS 12.3	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall follow a standardized methodology for field equipment clean-up upon completion of field tasks.

2. PURPOSE

2.1 To provide a standardized methodology for the proper completion of field equipment clean-up upon completion of field tasks.

3. SCOPE

3.1 The requirement to follow the field equipment clean-up procedure applies to technical employees who are responsible for completing field tasks.

4. RESPONSIBILITIES

4.1 It is the responsibility of technical employees to follow the field equipment clean-up procedure after certain field tasks are completed and once the field work program has been completed.

4.2 The Project Manager is responsible for ensuring that technical employees follow the field equipment clean-up procedure after certain field tasks are complete and once the field work program has been completed.

4.3 This procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 PPE - Personal Protective Equipment.

5.2 MSDS – Material Safety Data Sheet(s)

6. REFERENCE AND RELATED PROCEDURES

6.1 Interface Probe Decontamination – FS 12.2.

6.2 Equipment Decontamination – FS 12.4.

7. METHODOLOGY

7.1 Equipment shall be safely and properly stored or carried within designated instrument cases, boxes or bags during the field work program. Where possible, all equipment shall be cleaned in the field following the prescribed use of the particular piece of equipment. Water level meters, chemistry meters, soil probe, hand auger and various hand tools will be rinsed off between each use and kept clean and free of gross particulates such as mud, vegetation, and ice and snow.

7.2 When performing field tasks on a contaminated site, each piece of equipment will be properly decontaminated between each sampling and monitoring location and before removal from the site, by following the proper decontamination procedure(s). By maintaining relatively clean equipment throughout the field work program, the amount of time and energy required to perform final cleaning of all field equipment will be kept to a minimum.

7.3 After completion of the field work program, return all of the equipment you have signed out and used on the project, to the designated equipment storage facility. It is now time to inspect and thoroughly clean all of the equipment.

7.4 Equipment that has been previously decontaminated prior to leaving a contaminated site may be placed back onto the storage shelf you originally obtained it from. The equipment that still requires additional cleaning will now be cleaned.

7.5 For most equipment, such as meters and various hand tools, the method of the cleaning procedure is similar. Organize the equipment around the area of the cleaning sink. While wearing appropriate personal protective clothing such as nitrile gloves and eye protection, begin cleaning each piece of equipment. Where some gross particulate matter is still visible, use a nylon brush or your gloved hands to clean off the material.

7.6 Decontaminate the equipment by using a spray or squirt bottle containing a solution of potable water and 5 percent Decon 75. Thoroughly, rinse each piece of equipment and final rinse using potable water.

7.7 Perform a final rise using analyte-free water for chemistry meters and water level meters. Pad dry prior to storing on shelves.

7.8 The rinse water will be directed into the cleaning sink. Any excess rinse water splashed over the sides of the sink will be thoroughly cleaned up by mopping the floor and wiping down the countertop using a cotton cleaning rag or paper towel.

7.9 If the piece of equipment requires air drying, then leave it at one end of the countertop and tag it indicating it has been cleaned and is air drying.

7.10 When the equipment has been clean-up, then place it back onto the storage shelf.

7.11 Repeat steps 7.06 to 7.11 for each piece of equipment that requires cleaning.

7.12 Ensure the countertop, sink and immediate floor area are thoroughly cleaned up and if applicable, decontaminated and sterilized using a solution of potable water and 5 percent Decon 75.

7.13 Submersible pumps require cleaning and can be effectively cleaned within a water trough or the sink depending on the pump's size and weight. For a large pump, use one of the available water troughs and fill it to a third or a half, ensuring that the pump intake is covered with water. Angle the pump down if necessary. Add 1 litre of chlorine bleach to the water and a cup of Decon 75. Re-circulate the water through the pump for 10 minutes and then let stand for a minimum of four hours or overnight if practical. If the water trough is left unattended, then place a notice tag on it indicating the contents of the water solution. Drain the water trough and pad dry the pump. Insert the pump within its clean PVC container and replace back onto the storage shelf.

7.14 Follow step 7.13 when a submersible pump will be used in a residential water well for the purposes of a pumping test. Document the decontamination/sterilization procedure within the proper section of the Project Field Book. Step 7.13 shall be completed before and after the pump is used in a residential water well.

7.15 Large equipment such as the van and ATV/trailer, require the use of the pressure washer for proper cleaning. Power-wash large equipment outside of the storage facility. Where available, run the van through a commercial vehicle wash bay.

7.16 Sign-in **ALL** of the equipment you brought back within the equipment log book.

7.17 If equipment requires servicing or repair, place it on the floor in the area designated

"project equipment staging area" or onto the "equipment repair table" and tag it using the "equipment repair notice" form. This form can be found in the form holder mounted next to the equipment repair table

8. HEALTH AND SAFETY

8.1 Care is required in handling of decontamination materials. Read the pertinent MSDS sheets of each contained material prior to use.

9. ATTACHMENTS

9.1 None

Subject:	Water Level Monitoring	Procedure No. FS 14.2	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall follow a standardized methodology for water level monitoring.

2. PURPOSE

2.1 To provide a standardized methodology for monitoring of aqueous and non-aqueous phase liquids.

3. SCOPE

3.1 The requirement to follow the Water Level Monitoring procedure applies to technical employees who are responsible for completing field tasks.

4. RESPONSIBILITIES

4.1 It is the responsibility of technical employees to follow the Water Level Monitoring procedure for all aqueous and non-aqueous phase liquids.

4.2 The Project Manager is responsible for ensuring that technical employees are instructed in the proper method for collecting water levels and are aware of site conditions.

4.3 This procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 None

6. REFERENCE AND RELATED PROCEDURES

6.1 Equipment Decontamination – FS 12.4.

7. METHODOLOGY

7.1 Ensure that calibrated water level tape or co-axial cable and probe are cleaned prior to use, using proper decontamination procedures.

7.2 A water level meter designated for leachate shall be used in leachate contaminated monitoring wells only.

7.3 A clean water level tape shall be used in domestic wells. The water level tape shall to be cleaned before and after collecting a water level at each individual well using proper decontamination procedures.

7.4 Water level tapes used at contaminated sites shall be cleaned before and after collecting a water level at each individual well using proper decontamination procedures.

7.5 Test water level tapes using the test button.

7.6 Lower the probe and calibrated tape or co-axial cable down the monitoring well until the meter indicates probe contact with the liquid.

7.7 Raise and lower the tape slightly so that the audible meter sounds on and off confirming liquid contact. Unless otherwise instructed by the Project Manager, record the liquid level where the calibrated tape or co-axial cable intersects the highest point on the monitoring well. Use a meter measure in combination with the co-axial cable.

7.8 Record the water level to the nearest 0.01 m onto the Groundwater Level Monitoring Field Record form.

7.9 Repeat steps 7.06 and 7.07 to confirm the water level measurement.

7.10 Check the water level against previously recorded water levels to ensure conformity of the reading.

7.11 Decontaminate the water level tape and probe before use in any other monitor on the same site.

7.12 For monitoring wells that are equipped with poly tubing for the purpose of purging and sampling, and where there is insufficient space to use a standard tape and probe, measure and record a water level using a co-axial meter. Do not disturb the poly tubing any more than necessary to allow the meter probe to pass along the length of the tubing to the groundwater level.

8. ATTACHMENTS

8.1 Groundwater Level Monitoring Field Record form.

Subject:	Monitor Purging	Procedure No. FS 14.3	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall follow a standardized methodology for purging groundwater monitoring wells.

2. PURPOSE

2.1 To provide a standardized methodology for the purging of groundwater monitoring wells.

3. SCOPE

3.1 The requirement to follow the Monitor Purging procedure applies to technical employees who are responsible for completing field tasks.

4. RESPONSIBILITIES

4.1 It is the responsibility of technical employees to follow the Monitor Purging procedure for all monitoring wells being sampled.

4.2 The Project Manager is responsible for ensuring that technical employees are knowledgeable in well purging procedures prior to beginning a sampling program.

4.3 This procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 Purging is the method of removing standing water from a monitor prior to the sampling.

6. REFERENCE AND RELATED PROCEDURES

6.1 Keith, L.H. “Environmental Sampling and Analysis; A Practical Guide”, Lewis Publishers, ISBN 0-87371-381, 1991.

6.2 Ministry of the Environment Guidance on Sampling and Analytical Methods, February 1999.

6.3 Water Level Monitoring – FS 14.2.

6.4 Equipment Decontamination – FS 12.4.

7. METHODOLOGY

7.1 Carefully unlock the protective well cover and remove the inner monitor cap. Avoid the introduction of any foreign material into the well.

7.2 Measure the monitor liquid level in accordance with the applicable procedures.

7.3 Calculate the standing volume of liquid in the monitoring well using the following method:

Volume (L) = 0.000785 [Monitor Pipe Internal Diameter (mm)]^2 x [Total Monitor Length (m) – Water Level Below Top of Pipe (m)]

7.4 Ensure that purging equipment (if not dedicated) is cleaned using standard decontamination procedures.

7.5 Commence purging by one of the following methods:

- Bailer – bottom filling Teflon, stainless steel or plastic. This method is recommended for low yield monitors;
- Inertial life pumps (i.e. Waterra tubing and a check (foot) valve);
- Positive displacement pumps such as QED or RediFlo.

7.6 In fine-grained soils, one standing monitor volume should be purged prior to liquid sampling.

7.7 In coarse-grained soils, three standing monitor volumes should be removed prior to sampling.

7.8 Purge volumes should be removed by starting at the air/water interface and continue downward as the water level falls.

7.9 Record all volumes removed on the development/Purging Record form in the Project Field Book.

7.10 On the purging record sheets in the Project Field Book, record pH, conductivity and temperature after each standing monitor volume is removed.

7.11 Upon completion of monitor purging, carefully remove non-dedicated purging equipment and decontaminate according to proper procedures. Dedicated equipment shall be properly secured in the monitor.

7.12 Replace and secure locking mechanism to the protective casing and monitor.

8. ATTACHMENTS

8.1 Development/Purging Record form.

Subject:	Monitoring Well Sampling	Procedure No. FS 14.4	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall follow a standardized methodology for monitoring well sampling.

2. PURPOSE

2.1 To provide a standardized methodology for monitoring well sampling.

3. SCOPE

3.1 The requirement to follow the Monitoring Well Sampling procedure applies to technical employees who are responsible for completing field tasks.

4. RESPONSIBILITY

4.1 It is the responsibility of technical employees to follow the Monitoring Well Sampling procedure for all monitoring wells being sampled.

4.2 The Project Manager is responsible for ensuring that technical employees are knowledgeable in monitoring well sampling procedures prior to beginning a sampling program.

4.3 This procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 None.

6. REFERENCE AND RELATED PROCEDURES

6.1 Equipment Decontamination – FS 12.4.

6.2 Water Level Monitoring – FS 14.2.

6.3 Sample Filtration – FS 5.4.

7. METHODOLOGY

7.1 Ensure that the sampling equipment which comes in contact with the liquid has been properly decontaminated, unless the sampling equipment is dedicated to the groundwater monitor.

7.2 Measure the liquid level in the monitor prior to sampling. Compare to previous readings to confirm validity.

7.3 Retrieve the liquid sample as soon as practical after purging. If recovery is slow, or if there is an insufficient volume for complete sampling, then sample retrieval should be prioritized.

7.4 Analyses will be prioritized in order of the parameters volatilization sensitivity. When applicable, the order of sampling should be as follows:
a) volatile and semi volatile organics
b) isotopes
c) general chemistry

Samples will also be required for determination of field parameters and periodically for duplicate samples.

7.5 Volatile and semi-volatile organics shall be sampled using a depth specific sampler, syringe sampler bottom filling stainless steel or Teflon bailer. The bailer shall be equipped with a stainless steel leader or in combination connected to a ñ 6 mm diameter nylon rope. Dedicated inertial type pumps may also be used.

7.6 Slowly lower the sampling apparatus to below the air/water interface such that the sample is not in contact with the nylon rope. Whenever possible the sample shall be collected in the upper portion of the screened interval.

7.7 Retrieve the sample and carefully transfer the liquid to a prepared sample bottle. Hold the sample bottle at a 45 degree angle and carefully fill.

7.8 Filter the sample if required.

7.9 Place a small volume of the sampled water into a clear glass container and measure the field parameters of pH, temperature and specific conductance. When air temperatures drop, use polyethalene containers to avoid sudden temperature changes to the liquid.

7.10 Record all the sampling information on the Water Sampling Field Data Sheet in the project field book.

8. ATTACHMENTS

8.1 Water Sampling Field Data Sheet.

8.2 Routine Groundwater and Surface Water Monitoring Equipment and Supplies Checklist.

WATER SAMPLING FIELD DATA SHEET

SHEET ____ **OF** ____

PROJECT NAME: ______________________ **PROJECT NO:** ____________

MONITOR NO.: ______________________ **LAB SAMPLE NO.:** ____________

DATA

ELEVATION OF MONITOR PIPE T.O.P. (mASL): ____________

PIPE MATERIAL: ____________

PIPE DIAMETER (mm): ____________

SCREEN MATERIAL: ____________

SCREENED INTERVAL (m) BELOW T.O.P.: ____________

GPS COORDINATES: Latitude ____________ Longitude ____________

STATIC WATER LEVEL BELOW T.O.P. (m): ____________

BOTTOM DEPTH BELOW T.O.P. (m): ____________

PURGING DATA

METHOD: BAILER: ☐ WATERRA: ☐

FIELD PERSONNEL: ____________

OTHER: ____________

DATE(s): ____________

INITIAL STANDING VOLUME (L): ____________

PUMPING RATE (L/min): ____________

TOTAL VOLUME PURGED (L): ____________

WAS WELL PURGED DRY ? YES NO

NUMBER OF WELL VOLUMES PURGED: ____________

WAS WELL PURGED BELOW FILTER PACK ? YES NO

COMMENTS: ____________

IS PUMPING EQUIP. DEDICATED TO SAMPLE LOCATION ? YES NO

WAS PURGING RECORD COMPLETED ? YES NO

SAMPLING DATA

METHOD: BAILER: ☐ WATERRA: ☐

FIELD PERSONNEL: ____________

OTHER: ____________

DATE (s): ____________

PRESENT WATER LEVEL BELOW T.O.P. (m): ____________

TIME: ____________

DEPTH OF SAMPLE BELOW T.O.P. (m): ____________

AIR TEMPERATURE (C): ____________

COMMENTS: ____________

WEATHER CONDITIONS: ____________

IS SAMPLING EQUIP. DEDICATED TO SAMPLE LOCATION ? YES NO

PRESERVATION DATA

FILTERED: ____________

COOL TO 4°C: ____________

PRESERVATIVES:

H_2SO_4: ____________

HNO_3: ____________

OTHER: ____________

SAMPLE HANDLING

LABORATORY CONTACT: ____________

TELEPHONE: ____________

CHAIN OF CUSTODY FORM ? YES NO

PHYSICAL CHEMICAL DATA

APPEARANCE: ____________

ODOUR: ____________

TEMPERATURE (° C): ____________

pH: ____________

SPECIFIC CONDUCTANCE (umhos/cm): ____________

TURBIDITY (NTU): ____________

REMARKS

T.O.P. = TOP OF PIPE

BOTTLES COLLECTED

TYPE: ____________

NUMBER: ____________

Revision 3 / Mar 2010

ROUTINE GROUNDWATER AND SURFACE WATER MONITORING EQUIPMENT AND SUPPLIES CHECKLIST

This is a comprehensive list of equipment and supplies. It is presented as a checklist and is therefore, understood that all items listed below may not necessarily be required. The assigned task(s) and discussion with your project manager will indicate the items required to properly perform the assignment**.** ***The items which are bold and italic are recommended for routine usage.***

INFORMATION

- ***Project Field Book***

- ***Various data recording forms***
  - ***Water levels***
  - ***Development/purging***
  - ***Sampling***
  - ***Calibration***
  - ***Slug testing***

- ***Health & Safety Plan***

- ***Relevant JHL Procedures***

- ***Site map***

- ***Geological mapping information***

- ***Client contact information***

- ***Existing borehole logs***

- Geological Cross-section

- Water well records

- ***Site access information***

EQUIPMENT

- ***Level D PPE***
- ***Cellular work phone***
- ***Backpack***
- ***Flow velocity meter***
- ***Water level meter(s) (designated landfill or clean)***
- ***Chemistry meters***
  - ***pH***
  - ***Conductivity***
  - ***Temperature***
  - ***Turbidity***
  - ***D.O.***
- ***Decon spray bottle***
- ***DI $H_2$0 spray bottle***
- TOV meter
- Gastechtor meter
- Methane meter
- ***Graduated bucket***
- ***Hand tools, screw drivers tape measure, bolt cutters***
- ***Straight knife,*** Hack saw
- ***Appropriate seasonal clothing***
- ***Vehicle*** (personal or JHL van)
- ATV and Trailer if required
- Generator, electrical cords
- Laptop computer & memory card / disc
- ***GPS unit***
- ***Clip board***
- Camera
- Propane torch (seasonal)
- ***Site gate key***
- ***Monitor lock key(s)***

CONSUMABLE SUPPLIES

- ***Garbage bags and ties***
- ***Pens/pencils/markers***
- ***Waterra tubing***
- ***Foot valves***
- J-plug(s)
- Flowing well packer assembly
- Cotton cleaning rags
- Plastic sheeting
- ***Flagging tape***
- Camera film or flash card
- Spare batteries
- ***Decon 75 cleaning solution***
- ***De-ionized water***
- ***Potable rinsing water and container(s)***
- ***Sample bottles/coolers/ice packs***
- ***Spare cooler to hold ice packs***
- ***Inline filters or barrel filter***
- ***Spare locks***
- ***Floatable ball*** *for manual flow velocity measurements*
- ***Marking paint / stakes***
- ***Sun screen lotion***
- ***Sun glasses / hat***
- Air horn
- Fox 40 whistle(s)
- Chlorox cleaning towelets

HEALTH and SAFETY

- ***First aid kit***
- Eppi pen
- Flash light
- ***Bug repellant***
- ***Drinking water***

SPECIALTY EQUIPMENT

- Canoe, paddles and life preservers
- Nitrogen bottles and valves
- Metallic slugs and cable
- Transducers and laptop with appropriate software
- Graduated cylinders
- Hydrolift pump(s) / generator
- Bug jacket

SPECIALTY SUPPLIES
(Required for maintenance)

- Monitor end slip-on caps
- Silica sand
- Bentonite pellets
- Protective steel casings
- Additional riser pipe of the appropriate diameter
- Nitrogen gas
- Mineral oil for locks

Subject:	Microbiological Sampling	Procedure No. FS 14.7	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall follow a standardized methodology for microbiological sampling.

2. PURPOSE

2.1 To provide a standardized methodology for microbiological sampling.

3. SCOPE

3.1 The requirement to follow the Microbiological Sampling procedure applies to technical employees who are responsible for completing field tasks.

4. RESPONSIBILITY

4.1 It is the responsibility of technical employees to follow the Microbiological Sampling procedure for all monitoring wells being sampled.

4.2 The Project Manager is responsible for ensuring that technical employees are knowledgeable in monitoring well sampling procedures prior to beginning a sampling program.

4.3 This procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 None.

6. REFERENCE AND RELATED PROCEDURES

6.1 Field Testing – FS 3.0.

6.2 Equipment Decontamination – FS 12.4.

6.3 Water Level Monitoring – FS 14.2.

6.4 Monitor Sampling – FS 14.4.

6.5 Domestic Well Sampling – FS 14.5.

7. METHODOLOGY

7.1 Ensure that the sampling equipment which comes in contact with the liquid has been properly decontaminated, unless the sampling equipment is dedicated to the groundwater monitor.

7.2 Measure the liquid level in the monitor or well prior to sampling where practical. Compare to previous readings to confirm validity.

7.3 Retrieve the liquid sample as soon as practical after purging. If recovery is slow, or if there is an insufficient volume for complete sampling, then sample retrieval should be prioritized.

7.4 Collect the water sample from the monitoring well or domestic well using the applicable procedure.

7.5 Samples should be collected in clean, sterile glass or autoclavable plastic bottles containing 0.1 ml of a 1.8% solution of sodium thiosulfate per 100 ml of sample bottle capacity to neutralize any residual disinfectant. This should neutralize at least 5 mg/litre of available chlorine and will be suitable for routine sampling. In special situations where the chlorine residual may be greater, as for example in emergencies, additional thiosulfate is required.

7.6 Retrieve the sample and carefully transfer the liquid to a prepared sample bottle. Hold the sample bottle at a 45 degree angle and carefully fill.

7.7 Place a small volume of the sampled water into a clear glass container and measure the field parameters of pH, temperature and specific conductance. When air temperatures drop, use polyethalene containers to avoid sudden temperature changes to the liquid.

7.8 Samples should be kept cool and in the dark, preferably at 4-10º C, and transported to the laboratory as quickly as possible for examination, ideally within six hours of collection, but never more than 24 hours later.

7.9 Record all the sampling information on the Water Sampling Field Data Sheet in the project field book.

8. ATTACHMENTS

8.1 None.

Subject:	Volatile Organic Sampling	Procedure No. FS 14.8	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall follow a standardized methodology for volatile organic sampling for water.

2. PURPOSE

2.1 To provide a standardized methodology for volatile organic sampling.

3. SCOPE

3.1 The requirement to follow the Volatile Organic Sampling procedure applies to technical employees who are responsible for completing field tasks.

4. RESPONSIBILITY

4.1 It is the responsibility of technical employees to follow the Volatile Organic Sampling procedure for water samples.

4.2 The Project Manager is responsible for ensuring that technical employees are knowledgeable in monitoring well sampling procedures prior to beginning a sampling program.

4.3 This procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 None.

6. REFERENCE AND RELATED PROCEDURES

6.1 Equipment Decontamination – FS 12.4.

6.2 Water Level Monitoring – FS 14.2.

6.3 Monitor Sampling – FS 14.4.

7. METHODOLOGY

7.1 Ensure that the sampling equipment which comes in contact with the liquid has been properly decontaminated, unless the sampling equipment is dedicated to the groundwater monitor which typically is either waterra tubing or a bailer.

7.2 Measure the liquid level in the monitor prior to sampling. Compare to previous readings to confirm validity.

7.3 Retrieve the liquid sample as soon as practical after purging. If recovery is slow, or if there is an insufficient volume for complete sampling, then sample retrieval should be prioritized.

7.4 Volatile organics shall be sampled using a depth specific sampler, syringe sampler bottom filling stainless steel, Teflon bailer or modified inertial lift pump. The bailer shall be equipped with a stainless steel leader or in combination connected to a ñ 6 mm diameter nylon rope. Dedicated inertial type pumps may also be used, (waterra tubing and attached foot valve).

7.5 Slowly lower the sampling apparatus to below the air/water interface such that the sample is not in contact with the nylon rope. Whenever possible the sample shall be collected in the upper portion of the screened interval.

7.6 Retrieve the sample and carefully transfer the liquid to a prepared sample bottle. Hold the sample bottle at a 45 degree angle and carefully fill. Use glass vials with Teflon septum caps.

7.7 Place a small volume of the sampled water into a clear glass container and measure the field parameters of pH, temperature and specific conductance. When air temperatures drop, use polyethalene containers to avoid sudden temperature changes to the liquid.

7.8 Keep samples cool (4º C).

7.9 If analyses can't proceed within four days (96 hours), add HCI to minimize bacterial activity.

7.10 Holding times are 14 days.

7.11 Maintain zero head space in samples by having no bubbles present. When filling, cap the bottle when it has a reverse meniscus.

7.12 Record all the sampling information on the Water Sampling Field Data Sheet in the project field book.

8. ATTACHMENTS

8.1 None.

Subject:	Combustible Gas Monitoring	Procedure No. FS 15.2	Revision: 1
To:	All Field Staff	Issue Date:	January 1, 2004
Issued by:	Field Services Committee	Revision Date:	June 1, 2010

1. PROCEDURE

1.1 Technical employees shall use a combustible gas detector to conduct work safely in a potentially hazardous environment and for monitoring purposes at select sites in the field (landfills).

2. PURPOSE

2.1 To provide a consistent and repeatable methodology for the measurement of combustible gases in the field for safety and monitoring purposes.

3. SCOPE

3.1 The requirement to follow the Combustible Gas Monitoring Procedure applies to technical employees who are responsible for completing field tasks.

4. RESPONSIBILITIES

4.1 It is the responsibility of technical employees to follow the Combustible Gas Monitoring Procedure to safety work in a potentially hazardous environment and to effectively monitor combustible gases at select sites in the field.

4.2 The Project Manager is responsible for ensuring that technical employees are aware that combustible gas monitoring is required as part of assigned field tasks for select projects.

4.3 This procedure shall be updated as required by the Field Services Committee.

5. DEFINITIONS

5.1 PFB – Project Field Book

5.2 LEL – Lower Explosive Limit

6. REFERENCE AND RELATED PROCEDURES

6.1 Total Organic Vapour Monitoring – FS 15.1.

6.2 Oxygen Monitoring – FS 15.2.

6.03 Equipment Calibration – FS 3.2.

7. METHODOLOGY

7.1 Calibrate all required equipment at the start of each day. Complete a calibration record sheet and include it in the PFB. Calibrations should be carried out according to the manufacturer’s specifications. Ensure the battery power supply pack for the monitoring equipment is fully charged before field operations begin.

7.2 During field activities where combustible gases may be a concern, combustible gas measurements should be taken continuously in the work area. For monitoring purposes (i.e. landfills) measurements are taken on a set timetable (monthly, semi-annually, etc.). Measurements for monitoring purposes are typically taken from the area of study (i.e. monitoring well).

7.3 Record measurements based on a timed interval. Typically, a ceiling concentration can be set on the combustible gas monitor, which when exceeded sounds an alarm. Usually this level is approximately 10 % LEL.

7.4 The LEL of a combustible vapour is the minimum concentration of the material in air which will propagate flame on contact with an ignition source. The LEL is unique for each substance. Typically, combustible gas monitoring equipment measures as parts per million (ppm) and as a percentage of the LEL (%LEL).

7.5 Combustible gas concentrations between 10 and 25 %LEL indicate that work can continue in that area, but with extreme caution. Concentrations greater than 25 %LEL present a fire and/or explosion hazard, and work should stop immediately.

7.6 Periodic calibration checks of the combustible gas monitoring equipment may be carried out in order to maintain detailed quality control.

7.7 Recharge battery packs as required, and ensure that there is always a charged battery pack.

8. ATTACHMENTS

8.1 None

H-5 PHOTOGRAPHIC INVENTORY

00-1

00-1dbr

00-1s

00-2dbr

00-2sbr

00-3s

00-3s

00-4br

00-4dbr(l) & 00-4sbr(r)

00-4s

00-4s

00-5

00-5sbr(l) & 00-5dbr(r)

06-1

06-1s & 06-1d

06-1dbr

	
06-2dbr	**06-2dbr-d-s**
	
06-2s / 06-2d	**06-3dbr**

06-3dbr

06-4

06-4d

06-4dbr

96-1s

96-2 & 99-2

96-2d

96-3

96-3d

96-3s

97-1s

99-1s & 99-5sbr

97-2s

97-2s

97-3(r) & 99-3sbr(l)

97-3d

97-4d

99-1sbr(l), 99-1d(m) & 96-1s(r)

99-1sbr

99-2dbr

	
99-2sbr	**99-3sbr**
	
99-4dbr(l), 99-4sbr(m), & 97-4d(r)	**99-4dbr**

99-5sbr

99-6dbr

99-6dbr

99-6sbr

	
99-6sbr	**99-7**
	
99-7br	**99-7s**

	
99-7sbr	**99-8**
	
99-8s	**9-8sbr**

	
99-9	**99-9br**
	
99-9s	

S-1A

S-2

S-3

S-4

	
S-5	**S-6**
	
S-7	**S-8**

H-6 *BAILTEST ANALYSIS AND WELL RECORDS*

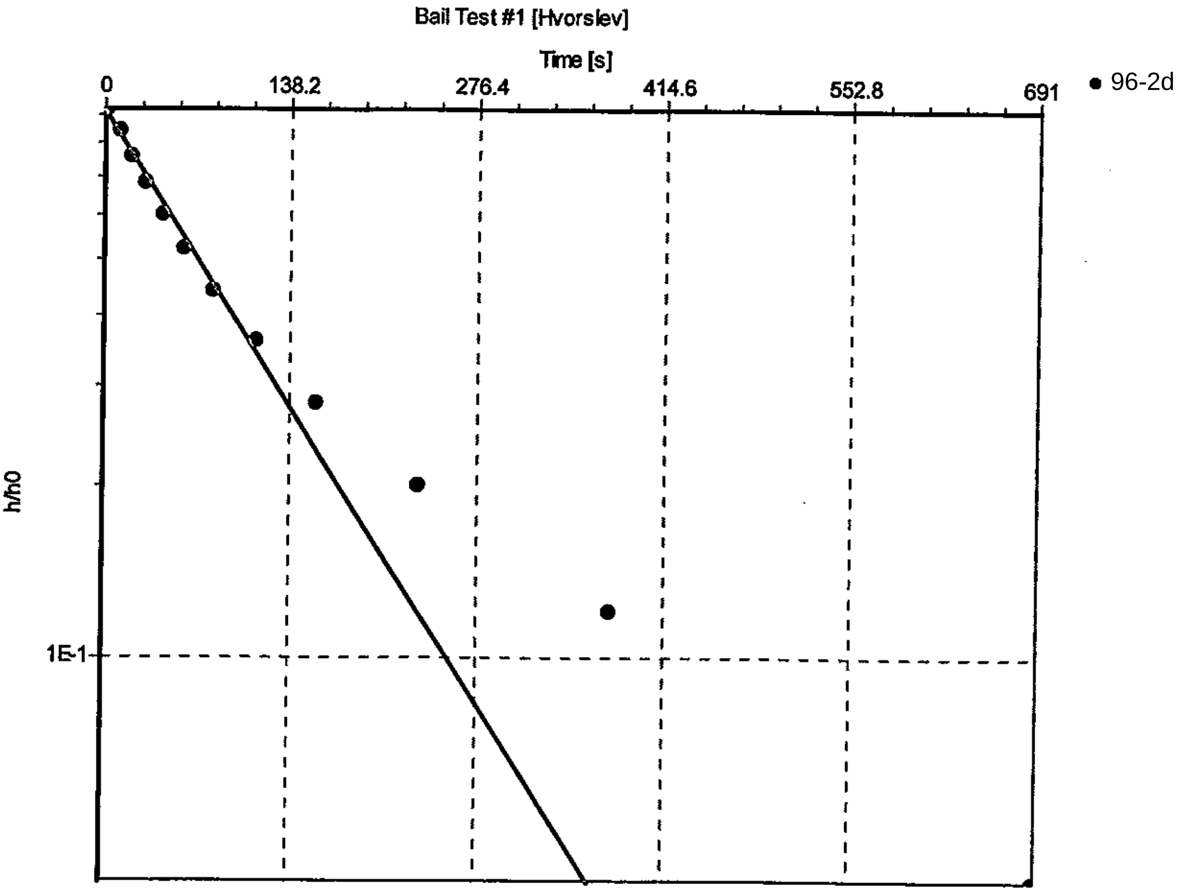
Thompson Rosemount Group
1345 Rosemount Ave.
Cornwall, Ontario, Canada
Phone: (613) 933-5602

Slug Test Analysis Report

Project: N. Lancaster Salt Plume Evaluation

Number: 95620

Client:



Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: **5.43E-6 [m/s]**

Test parameters:

Test Well:	96-2d	Aquifer Thickness:
Casing radius:	0.025 [m]	
Screen length:	1.5 [m]	
Boring radius:	0.076 [m]	

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Cornwall, Ontario, Canada
Phone: (613) 933-5602

Slug Test Data Report

Project: N. Lancaster Salt Plume Evaluation

Number: 95620

Client:

Page 1

Test Well: 96-2d

Depth to Static WL: 2.15 [m]

Location:

Recorded by: JBH

Date: 8/12/96

Slug Test: **Bail Test #1**

Test Well: 96-2d

Casing radius: 0.025 [m]

Boring radius: 0.076 [m]

Screen length: 1.5 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	3.40	1.25
2	3	3.30	1.15
3	11	3.20	1.05
4	20	3.10	0.95
5	31	3.00	0.85
6	44	2.90	0.75
7	60	2.80	0.65
8	81	2.70	0.55
9	113	2.60	0.45
10	159	2.50	0.35
11	234	2.40	0.25
12	376	2.30	0.15
13	691	2.20	0.05

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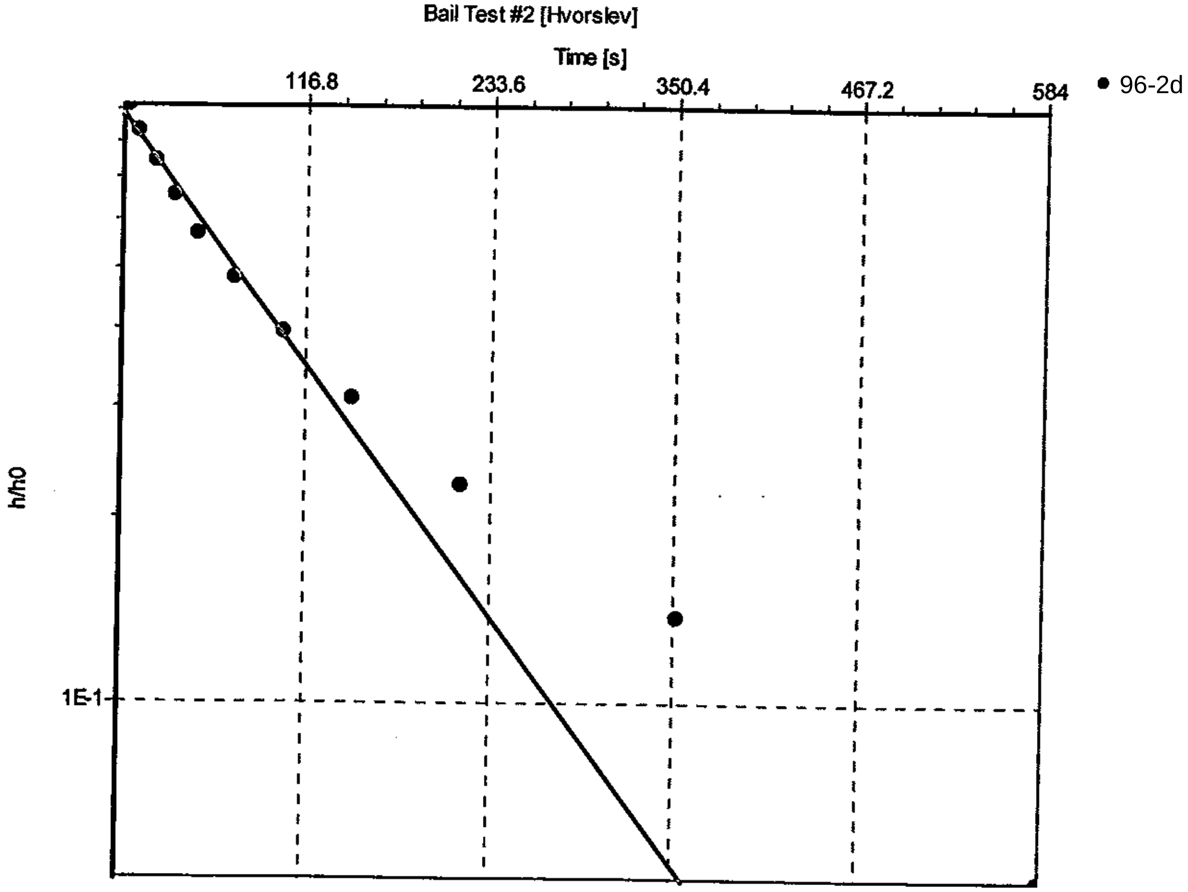
1345 Rosemount Ave.
Cornwall, Ontario, Canada
Phone: (613) 933-5602

Slug Test Analysis Report

Project: N. Lancaster Salt Plume Evaluation

Number: 95620

Client:



Slug Test: Bail Test #2

Analysis Method: Hvorslev

Analysis Results:

Conductivity: 4.98E-6 [m/s]

Test parameters:

Test Well: 96-2d

Casing radius: 0.025 [m]

Screen length: 1.5 [m]

Boring radius: 0.076 [m]

Aquifer Thickness:

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Slug Test Data Report

Project: N. Lancaster Salt Plume Evaluation
Number: 95620
Client:
Page 1

Test Well: 96-2d

Depth to Static WL: 2.16 [m]
Location:
Recorded by: JBH
Date: 8/12/96

Slug Test: **Bail Test #2**
Test Well: 96-2d
Casing radius: 0.025 [m]
Boring radius: 0.076 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	3.32	1.16
2	4	3.22	1.06
3	10	3.12	0.96
4	21	3.02	0.86
5	33	2.92	0.76
6	49	2.82	0.66
7	72	2.72	0.56
8	103	2.62	0.46
9	147	2.52	0.36
10	216	2.42	0.26
11	352	2.32	0.16
12	584	2.22	0.06

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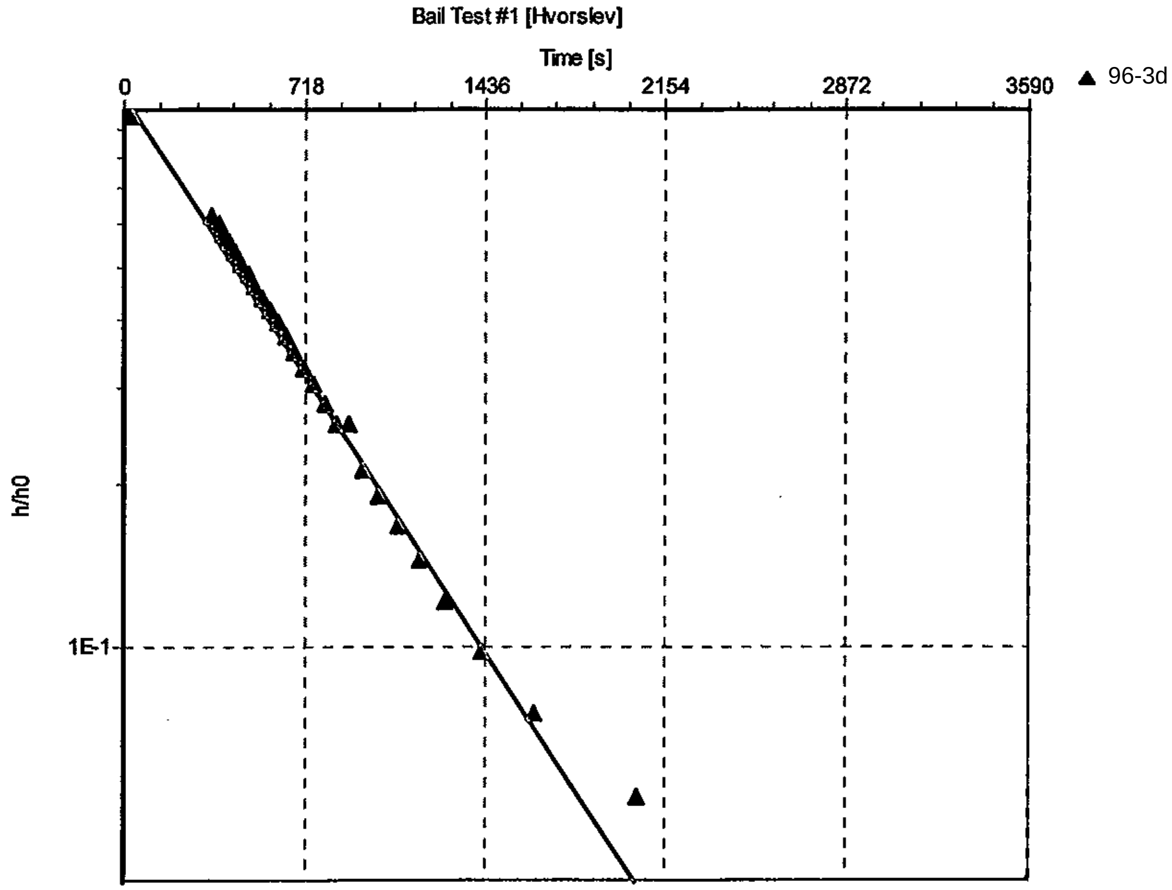
Project: N. Lancaster Salt Plume Evaluation

Number: 95620

Client:



Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results: **Conductivity:** **1.02E-6 [m/s]**

Test parameters:	**Test Well:**	96-3d	**Aquifer Thickness:**
	Casing radius:	**0.025 [m]**	
	Screen length:	**1.5 [m]**	
	Boring radius:	**0.076 [m]**	

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Slug Test Data Report

Project: N. Lancaster Salt Plume Evaluation
Number: 95620
Client:
Page 1

Test Well: 96-3D

Depth to Static WL: 3.4 [m]
Location:
Recorded by: JBH
Date: 8/12/96

Slug Test: **Bail Test #1**
Test Well: 96-3D
Casing radius: 0.025 [m]
Boring radius: 0.076 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	7.77	4.37
2	13	7.67	4.27
3	29	7.57	4.17
4	348	6.13	2.73
5	377	6.03	2.63
6	394	5.93	2.53
7	411	5.83	2.43
8	440	5.73	2.33
9	465	5.63	2.23
10	490	5.53	2.13
11	520	5.43	2.03
12	546	5.33	1.93
13	576	5.23	1.83
14	609	5.13	1.73
15	640	5.03	1.63
16	676	4.93	1.53
17	712	4.83	1.43
18	752	4.73	1.33
19	794	4.63	1.23
20	841	4.53	1.13
21	891	4.53	1.13
22	949	4.33	0.93
23	1011	4.23	0.83
24	1084	4.13	0.73
25	1171	4.03	0.63
26	1277	3.93	0.53
27	1421	3.83	0.43
28	1636	3.73	0.33
29	2042	3.63	0.23
30	3590	3.56	0.16

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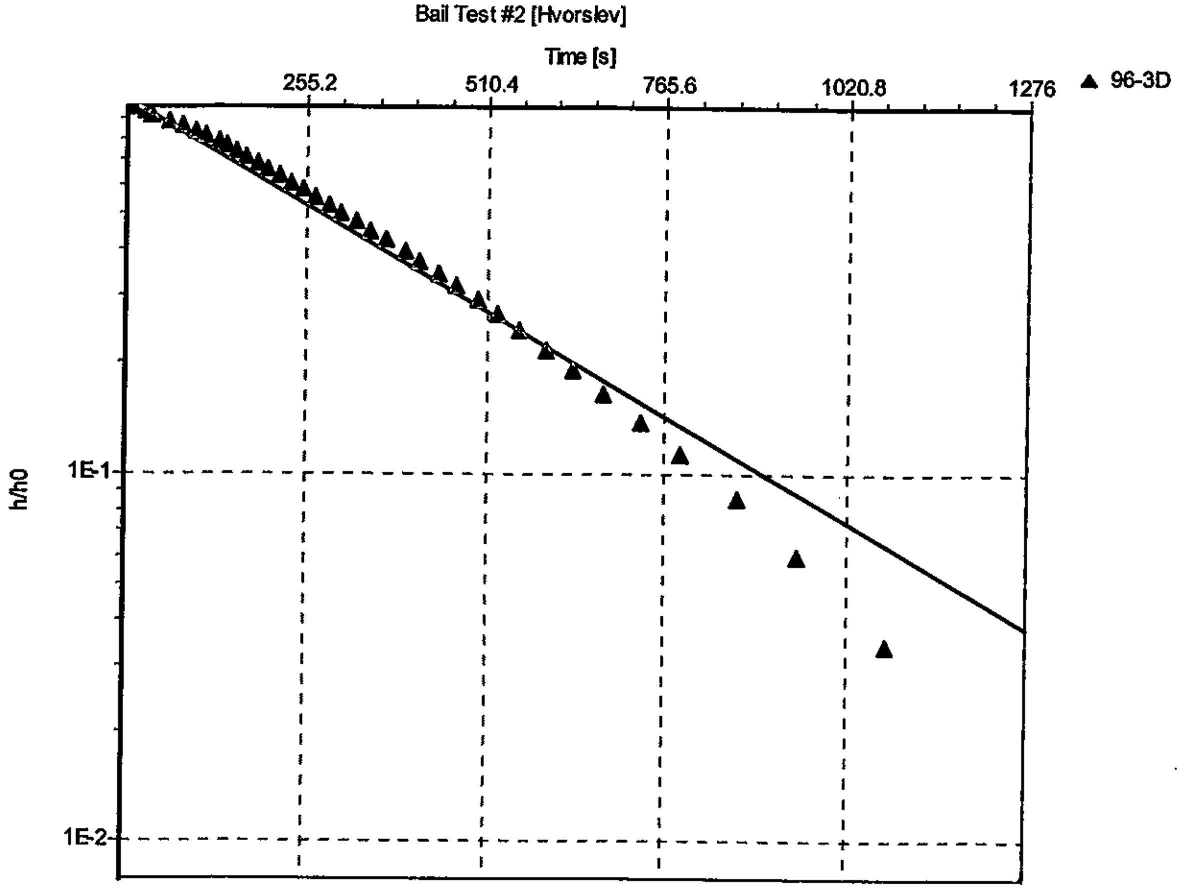
Slug Test Analysis Report

Project: N. Lancaster Salt Plume Evaluation

Number: 95620

Client:



Slug Test: **Bail Test #2**

Analysis Method: **Hvorslev**

Analysis Results: Conductivity: 1.61E-6 [m/s]

Test parameters:

Test Well: 96-3D
Casing radius: 0.025 [m]
Screen length: 1.5 [m]
Boring radius: 0.076 [m]
Aquifer Thickness:

Comments:

Evaluated by: JS
Evaluation Date: 9/12/02

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Slug Test Data Report
Project: N. Lancaster Salt Plume Evaluation
Number: 95620
Client:
Page 1

Test Well: **96-3D**
Depth to Static WL: 3.65 [m]
Location:
Recorded by: JBH
Date: 8/12/96

Slug Test: **Bail Test #2**
Test Well: 96-3D
Casing radius: 0.025 [m]
Boring radius: 0.076 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	7.48	3.83
2	12	7.38	3.73
3	25	7.28	3.63
4	33	7.18	3.53
5	59	7.08	3.43
6	79	6.98	3.33
7	97	6.88	3.23
8	110	6.78	3.13
9	130	6.68	3.03
10	143	6.58	2.93
11	156	6.48	2.83
12	170	6.38	2.73
13	185	6.28	2.63
14	200	6.18	2.53
15	216	6.08	2.43
16	233	5.98	2.33
17	249	5.88	2.23
18	267	5.78	2.13
19	286	5.68	2.03
20	304	5.58	1.93
21	325	5.48	1.83
22	346	5.38	1.73
23	366	5.28	1.63
24	394	5.18	1.53
25	415	5.08	1.43
26	441	4.98	1.33
27	466	4.88	1.23
28	497	4.78	1.13
29	526	4.68	1.03
30	557	4.58	0.93
31	594	4.48	0.83

Thompson Rosemount Group 1345 Rosemount Ave. Cornwall, Ontario, Canada Phone: (613) 933-5602	**Slug Test Data Report** Project: N. Lancaster Salt Plume Evaluation Number: 95620 Client: Page 2

Test Well:	**96-3D**	**Slug Test:**	**Bail Test #2**
		Test Well:	96-3D
Depth to Static WL:	3.65 [m]	Casing radius:	0.025 [m]
Location:		Boring radius:	0.076 [m]
Recorded by:	JBH	Screen length:	1.5 [m]
Date:	8/12/96	Aquifer Thickness:	

	Time [s]	Depth to WL [m]	Drawdown [m]
32	633	4.38	0.73
33	678	4.28	0.63
34	731	4.18	0.53
35	787	4.08	0.43
36	868	3.98	0.33
37	951	3.88	0.23
38	1077	3.78	0.13
39	1276	3.68	0.03

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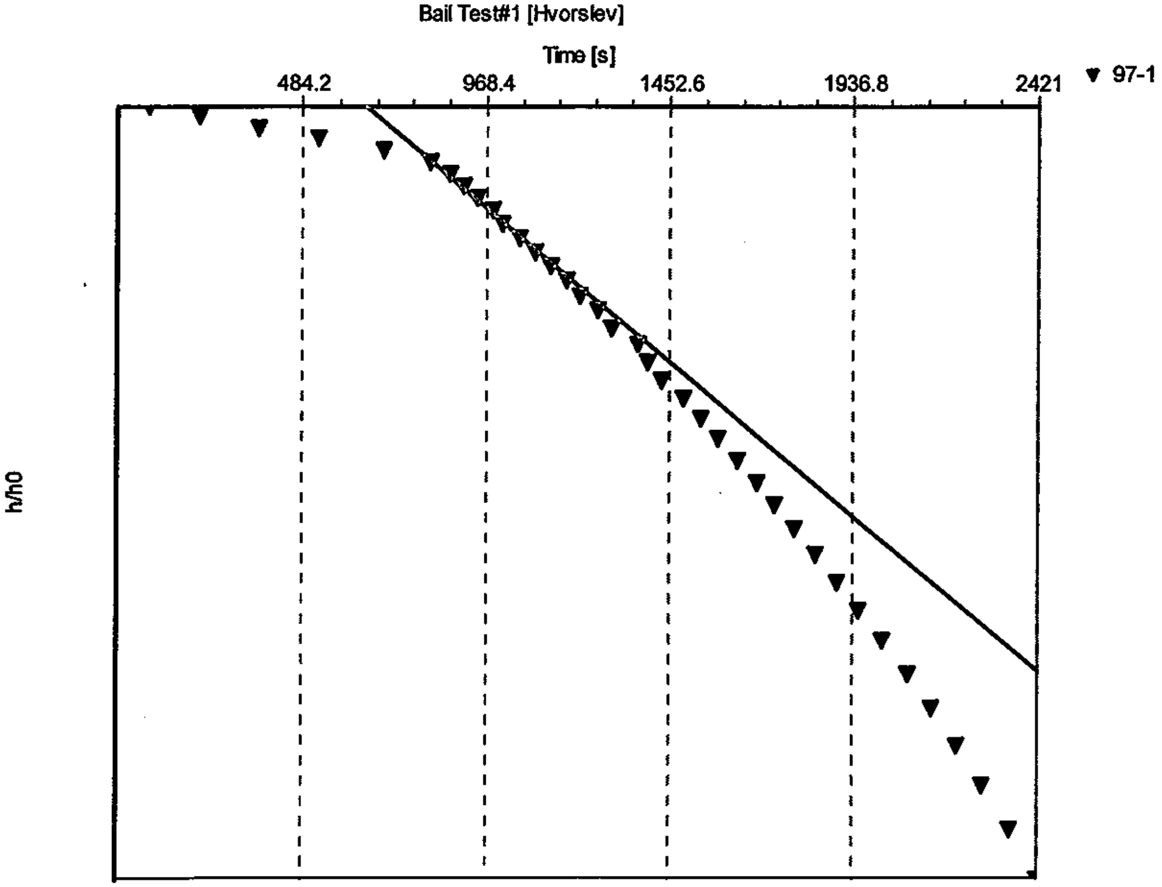
Phone: (613) 933-5602

Slug Test Analysis Report

Project: N. Lancaster Salt Plume Evaluation

Number: 95620

Client:



Slug Test: **Bail Test#1**

Analysis Method: **Hvorslev**

Analysis Results: **Conductivity:** **4.11E-7 [m/s]**

Test parameters:	Test Well:	97-1	Aquifer Thickness:
	Casing radius:	0.025 [m]	
	Screen length:	1.5 [m]	
	Boring radius:	0.076 [m]	

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Slug Test Data Report

Project: N. Lancaster Salt Plume Evaluation

Number: 95620

Client:

Page 1

Test Well:	**97-1**	**Slug Test:**	**Bail Test#1**
		Test Well:	97-1
Depth to Static WL:	2.03 [m]	Casing radius:	0.025 [m]
Location:		Boring radius:	0.076 [m]
Recorded by:	JBH	Screen length:	1.5 [m]
Date:	4/8/97	Aquifer Thickness:	

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	4.40	2.37
2	85	4.35	2.32
3	218	4.30	2.27
4	370	4.25	2.22
5	527	4.20	2.17
6	696	4.15	2.12
7	820	4.10	2.07
8	870	4.05	2.02
9	911	4.00	1.97
10	947	3.95	1.92
11	985	3.90	1.87
12	1013	3.85	1.82
13	1059	3.80	1.77
14	1100	3.75	1.72
15	1140	3.70	1.67
16	1180	3.65	1.62
17	1219	3.60	1.57
18	1263	3.55	1.52
19	1303	3.50	1.47
20	1369	3.45	1.42
21	1392	3.40	1.37
22	1432	3.35	1.32
23	1486	3.30	1.27
24	1531	3.25	1.22
25	1580	3.20	1.17
26	1629	3.15	1.12
27	1682	3.10	1.07
28	1729	3.05	1.02
29	1782	3.00	0.97
30	1840	2.95	0.92
31	1897	2.90	0.87

Thompson Rosemount Group 1345 Rosemount Ave. Cornwall, Ontario, Canada Phone: (613) 933-5602	**Slug Test Data Report** Project: N. Lancaster Salt Plume Evaluation Number: 95620 Client:
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Test Well:	**97-1**	**Slug Test:**	**Bail Test#1**
		Test Well:	97-1
Depth to Static WL:	2.03 [m]	Casing radius:	0.025 [m]
Location:		Boring radius:	0.076 [m]
Recorded by:	JBH	Screen length:	1.5 [m]
Date:	4/8/97	Aquifer Thickness:	

	Time [s]	Depth to WL [m]	Drawdown [m]
32	1952	2.85	0.82
33	2013	2.80	0.77
34	2080	2.75	0.72
35	2142	2.70	0.67
36	2210	2.65	0.62
37	2277	2.60	0.57
38	2349	2.55	0.52
39	2421	2.50	0.47

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Slug Test Analysis Report

Project: N. Lancaster Salt Plume Evaluation

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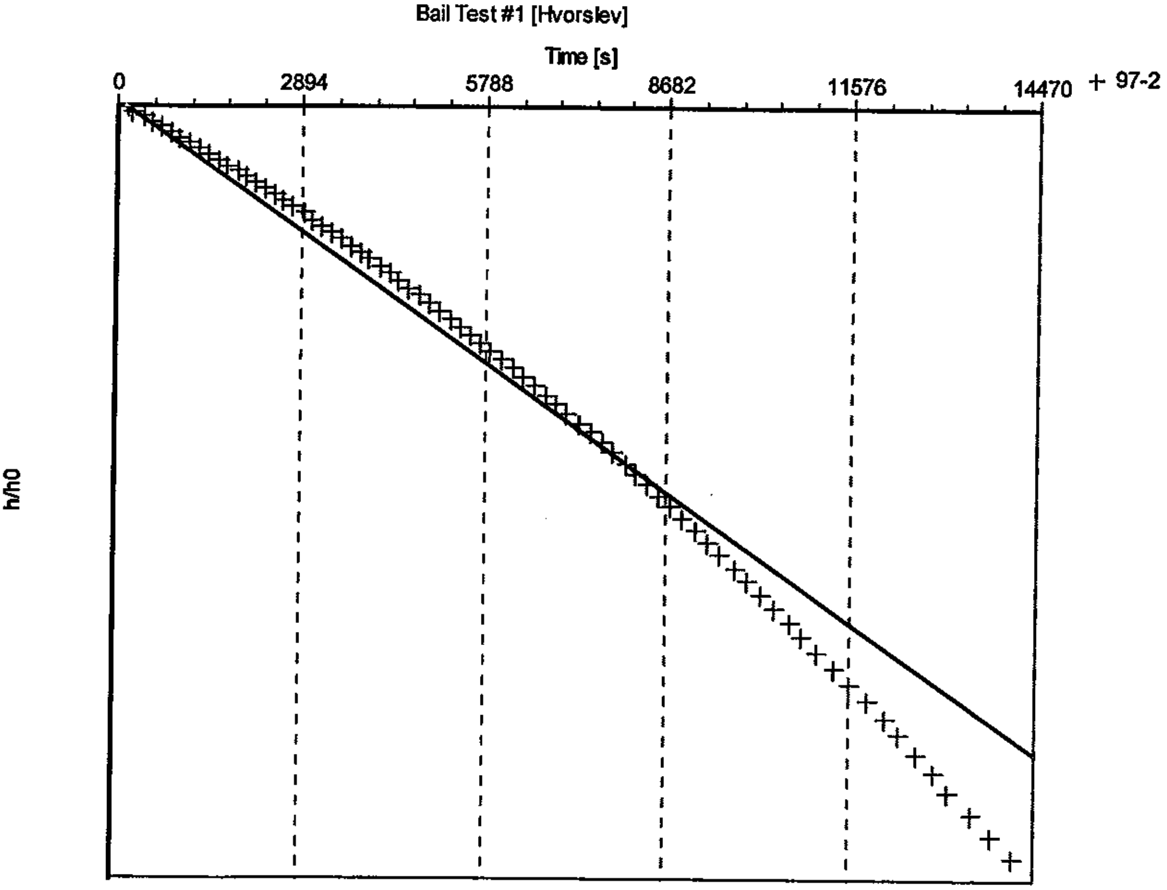
Client:



Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: 5.74E-8 [m/s]

Test parameters:

Test Well: 97-2

Casing radius: 0.025 [m]

Screen length: 1.5 [m]

Boring radius: 0.076 [m]

Aquifer Thickness:

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Slug Test Data Report

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Test Well:	**97-2**	**Slug Test:**	**Bail Test #1**
		Test Well:	97-2
Depth to Static WL:	3.85 [m]	Casing radius:	0.025 [m]
Location:		Boring radius:	0.076 [m]
Recorded by:	JBH	Screen length:	1.5 [m]
Date:	6/5/97	Aquifer Thickness:	

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	5.80	1.95
2	169	5.79	1.94
3	216	5.77	1.92
4	398	5.75	1.90
5	532	5.73	1.88
6	675	5.71	1.86
7	828	5.69	1.84
8	955	5.67	1.82
9	1124	5.65	1.80
10	1270	5.63	1.78
11	1424	5.61	1.76
12	1562	5.59	1.74
13	1710	5.57	1.72
14	1869	5.55	1.70
15	2001	5.53	1.68
16	2159	5.51	1.66
17	2310	5.49	1.64
18	2453	5.47	1.62
19	2599	5.45	1.60
20	2744	5.43	1.58
21	2919	5.41	1.56
22	3051	5.39	1.54
23	3205	5.37	1.52
24	3358	5.35	1.50
25	3521	5.33	1.48
26	3667	5.31	1.46
27	3821	5.29	1.44
28	3964	5.27	1.42
29	4126	5.25	1.40
30	4278	5.23	1.38
31	4422	5.21	1.36

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Test Well: **97-2**

Depth to Static WL: 3.85 [m]

Location:

Recorded by: JBH

Date: 6/5/97

Slug Test: **Bail Test #1**

Test Well: 97-2

Casing radius: 0.025 [m]

Boring radius: 0.076 [m]

Screen length: 1.5 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
32	4581	5.19	1.34
33	4755	5.17	1.32
34	4897	5.15	1.30
35	5060	5.13	1.28
36	5237	5.11	1.26
37	5395	5.09	1.24
38	5560	5.07	1.22
39	5721	5.05	1.20
40	5863	5.03	1.18
41	6048	5.01	1.16
42	6222	4.99	1.14
43	6395	4.97	1.12
44	6583	4.95	1.10
45	6755	4.93	1.08
46	6920	4.91	1.06
47	7078	4.89	1.04
48	7266	4.87	1.02
49	7458	4.85	1.00
50	7642	4.83	0.98
51	7815	4.81	0.96
52	8027	4.79	0.94
53	8178	4.77	0.92
54	8362	4.75	0.90
55	8540	4.73	0.88
56	8722	4.71	0.86
57	8923	4.69	0.84
58	9124	4.67	0.82
59	9309	4.65	0.80
60	9508	4.63	0.78
61	9744	4.61	0.76
62	9940	4.59	0.74

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Test Well: **97-2**

Depth to Static WL: 3.85 [m]
Location:
Recorded by: JBH
Date: 6/5/97

Slug Test: **Bail Test #1**
Test Well: 97-2
Casing radius: 0.025 [m]
Boring radius: 0.076 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
63	10152	4.57	0.72
64	10372	4.55	0.70
65	10606	4.53	0.68
66	10800	4.51	0.66
67	11047	4.49	0.64
68	11326	4.47	0.62
69	11564	4.45	0.60
70	11844	4.43	0.58
71	12118	4.41	0.56
72	12346	4.39	0.54
73	12617	4.37	0.52
74	12886	4.35	0.50
75	13123	4.33	0.48
76	13482	4.31	0.46
77	13793	4.29	0.44
78	14138	4.27	0.42
79	14470	4.25	0.40

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Slug Test Analysis Report

Project: N. Lancaster Salt Plume Evaluation

Number: 95620

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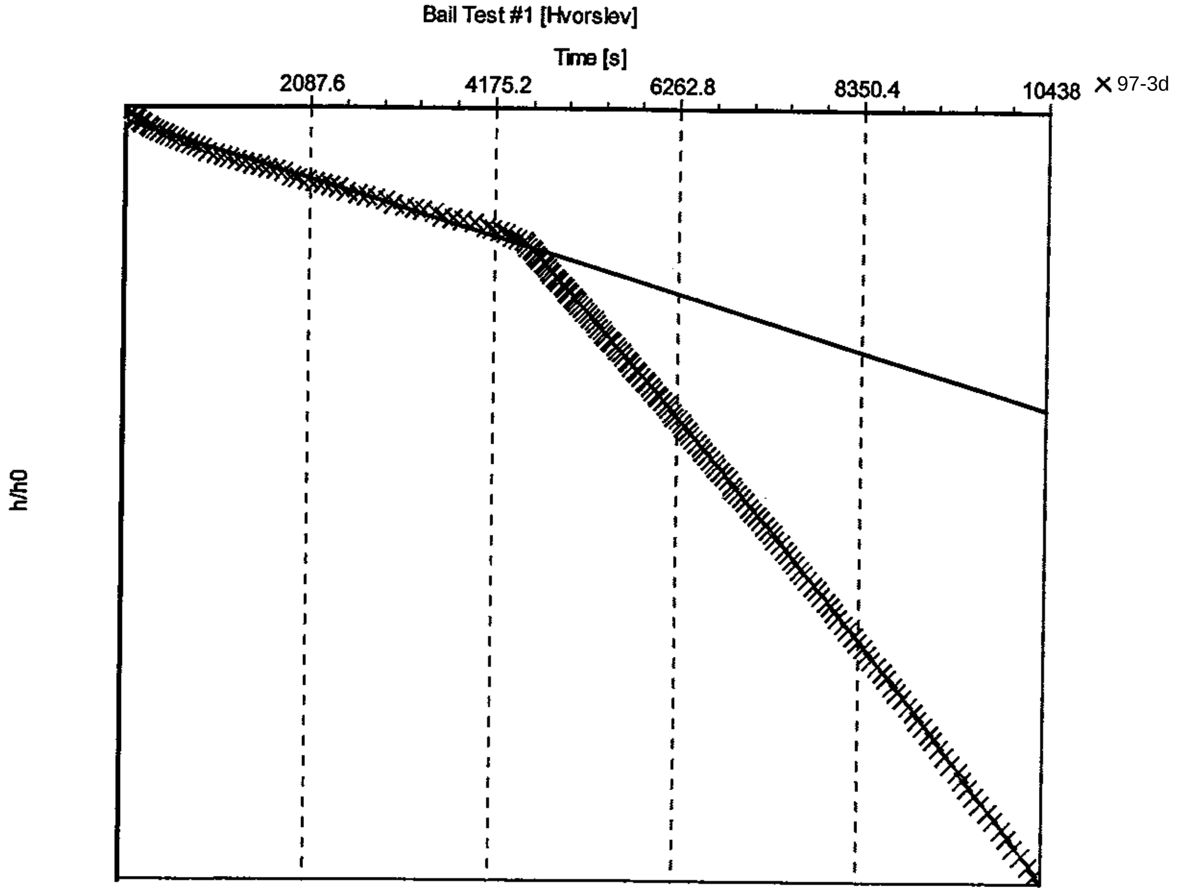

Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: 3.59E-8 [m/s]

Test parameters:

Test Well: 97-3d

Casing radius: 0.025 [m]

Screen length: 1.5 [m]

Boring radius: 0.076 [m]

Aquifer Thickness:

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Slug Test Data Report
Project: N. Lancaster Salt Plume Evaluation
Number: 95620
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Test Well: 97-3d
Depth to Static WL: 1.85 [m]
Location:
Recorded by: JBH
Date: 6/5/97

Slug Test: **Bail Test #1**
Test Well: 97-3d
Casing radius: 0.025 [m]
Boring radius: 0.076 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	6.73	4.88
2	2	6.70	4.85
3	9	6.68	4.83
4	24	6.66	4.81
5	46	6.64	4.79
6	71	6.62	4.77
7	101	6.60	4.75
8	140	6.58	4.73
9	170	6.56	4.71
10	210	6.54	4.69
11	256	6.52	4.67
12	297	6.50	4.65
13	342	6.48	4.63
14	388	6.46	4.61
15	435	6.44	4.59
16	491	6.42	4.57
17	549	6.40	4.55
18	607	6.38	4.53
19	667	6.36	4.51
20	734	6.34	4.49
21	800	6.32	4.47
22	874	6.30	4.45
23	940	6.28	4.43
24	1015	6.26	4.41
25	1103	6.24	4.39
26	1180	6.22	4.37
27	1272	6.20	4.35
28	1353	6.18	4.33
29	1439	6.16	4.31
30	1530	6.14	4.29
31	1627	6.12	4.27

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Slug Test Data Report
Project: N. Lancaster Salt Plume Evaluation
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Client:

Test Well: 97-3d

Depth to Static WL: 1.85 [m]

Location:

Recorded by: JBH

Date: 6/5/97

Slug Test: **Bail Test #1**

Test Well: 97-3d

Casing radius: 0.025 [m]

Boring radius: 0.076 [m]

Screen length: 1.5 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
32	1722	6.10	4.25
33	1794	6.08	4.23
34	1881	6.06	4.21
35	1969	6.04	4.19
36	2066	6.02	4.17
37	2162	6.00	4.15
38	2244	5.98	4.13
39	2334	5.96	4.11
40	2432	5.94	4.09
41	2526	5.92	4.07
42	2643	5.90	4.05
43	2740	5.88	4.03
44	2848	5.86	4.01
45	2951	5.84	3.99
46	3055	5.82	3.97
47	3185	5.80	3.95
48	3285	5.78	3.93
49	3383	5.76	3.91
50	3509	5.74	3.89
51	3616	5.72	3.87
52	3719	5.70	3.85
53	3838	5.68	3.83
54	3959	5.66	3.81
55	4084	5.64	3.79
56	4171	5.62	3.77
57	4250	5.60	3.75
58	4315	5.58	3.73
59	4378	5.56	3.71
60	4445	5.54	3.69
61	4509	5.52	3.67
62	4544	5.50	3.65

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Test Well: 97-3d

Slug Test: **Bail Test #1**
Test Well: 97-3d

Depth to Static WL: 1.85 [m]
Casing radius: 0.025 [m]

Location:
Boring radius: 0.076 [m]

Recorded by: JBH
Screen length: 1.5 [m]

Date: 6/5/97
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
63	4570	5.48	3.63
64	4596	5.46	3.61
65	4625	5.44	3.59
66	4652	5.42	3.57
67	4679	5.40	3.55
68	4707	5.38	3.53
69	4736	5.36	3.51
70	4754	5.34	3.49
71	4780	5.32	3.47
72	4811	5.30	3.45
73	4838	5.28	3.43
74	4866	5.26	3.41
75	4895	5.24	3.39
76	4920	5.22	3.37
77	4952	5.20	3.35
78	4983	5.18	3.33
79	5012	5.16	3.31
80	5039	5.14	3.29
81	5072	5.12	3.27
82	5100	5.10	3.25
83	5123	5.08	3.23
84	5152	5.06	3.21
85	5185	5.04	3.19
86	5215	5.02	3.17
87	5246	5.00	3.15
88	5277	4.98	3.13
89	5313	4.96	3.11
90	5339	4.94	3.09
91	5369	4.92	3.07
92	5405	4.90	3.05
93	5435	4.88	3.03

Test Well: 97-3d

Depth to Static WL: 1.85 [m]

Location:

Recorded by: JBH

Date: 6/5/97

Slug Test: **Bail Test #1**

Test Well: 97-3d

Casing radius: 0.025 [m]

Boring radius: 0.076 [m]

Screen length: 1.5 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
94	5462	4.86	3.01
95	5491	4.84	2.99
96	5528	4.82	2.97
97	5556	4.80	2.95
98	5590	4.78	2.93
99	5622	4.76	2.91
100	5655	4.74	2.89
101	5687	4.72	2.87
102	5712	4.70	2.85
103	5749	4.68	2.83
104	5782	4.66	2.81
105	5818	4.64	2.79
106	5849	4.62	2.77
107	5887	4.60	2.75
108	5926	4.58	2.73
109	5956	4.56	2.71
110	5991	4.54	2.69
111	6025	4.52	2.67
112	6061	4.50	2.65
113	6099	4.48	2.63
114	6133	4.46	2.61
115	6168	4.44	2.59
116	6206	4.42	2.57
117	6240	4.40	2.55
118	6277	4.38	2.53
119	6316	4.36	2.51
120	6351	4.34	2.49
121	6390	4.32	2.47
122	6418	4.30	2.45
123	6463	4.28	2.43
124	6497	4.26	2.41

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Slug Test Data Report
Project: N. Lancaster Salt Plume Evaluation
Number: 95620
Client:

Test Well: 97-3d
Depth to Static WL: 1.85 [m]
Location:
Recorded by: JBH
Date: 6/5/97

Slug Test: **Bail Test #1**
Test Well: 97-3d
Casing radius: 0.025 [m]
Boring radius: 0.076 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
125	6533	4.24	2.39
126	6568	4.22	2.37
127	6610	4.20	2.35
128	6646	4.18	2.33
129	6698	4.16	2.31
130	6728	4.14	2.29
131	6761	4.12	2.27
132	6809	4.10	2.25
133	6854	4.08	2.23
134	6889	4.06	2.21
135	6930	4.04	2.19
136	6976	4.02	2.17
137	7020	4.00	2.15
138	7062	3.98	2.13
139	7098	3.96	2.11
140	7141	3.94	2.09
141	7186	3.92	2.07
142	7226	3.90	2.05
143	7275	3.88	2.03
144	7317	3.86	2.01
145	7364	3.84	1.99
146	7397	3.82	1.97
147	7447	3.80	1.95
148	7500	3.78	1.93
149	7544	3.76	1.91
150	7592	3.74	1.89
151	7635	3.72	1.87
152	7687	3.70	1.85
153	7733	3.68	1.83
154	7774	3.66	1.81
155	7836	3.64	1.79

Slug Test Data Report

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Client:

Test Well:	97-3d
Depth to Static WL:	1.85 [m]
Location:	
Recorded by:	JBH
Date:	6/5/97

Slug Test:	**Bail Test #1**
Test Well:	97-3d
Casing radius:	0.025 [m]
Boring radius:	0.076 [m]
Screen length:	1.5 [m]
Aquifer Thickness:	

	Time [s]	Depth to WL [m]	Drawdown [m]
156	7882	3.62	1.77
157	7930	3.60	1.75
158	7987	3.58	1.73
159	8038	3.56	1.71
160	8080	3.54	1.69
161	8133	3.52	1.67
162	8186	3.50	1.65
163	8237	3.48	1.63
164	8293	3.46	1.61
165	8349	3.44	1.59
166	8404	3.42	1.57
167	8456	3.40	1.55
168	8508	3.38	1.53
169	8565	3.36	1.51
170	8630	3.34	1.49
171	8683	3.32	1.47
172	8751	3.30	1.45
173	8801	3.28	1.43
174	8858	3.26	1.41
175	8926	3.24	1.39
176	8985	3.22	1.37
177	9037	3.20	1.35
178	9097	3.18	1.33
179	9168	3.16	1.31
180	9218	3.14	1.29
181	9288	3.12	1.27
182	9350	3.10	1.25
183	9422	3.08	1.23
184	9495	3.06	1.21
185	9551	3.04	1.19
186	9622	3.02	1.17

Slug Test Data Report

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Test Well: 97-3d

Depth to Static WL: 1.85 [m]

Location:

Recorded by: JBH

Date: 6/5/97

Slug Test: **Bail Test #1**

Test Well: 97-3d

Casing radius: 0.025 [m]

Boring radius: 0.076 [m]

Screen length: 1.5 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
187	9682	3.00	1.15
188	9758	2.98	1.13
189	9840	2.96	1.11
190	9903	2.94	1.09
191	9985	2.92	1.07
192	10063	2.90	1.05
193	10128	2.88	1.03
194	10212	2.86	1.01
195	10301	2.84	0.99
196	10375	2.82	0.97
197	10438	2.80	0.95

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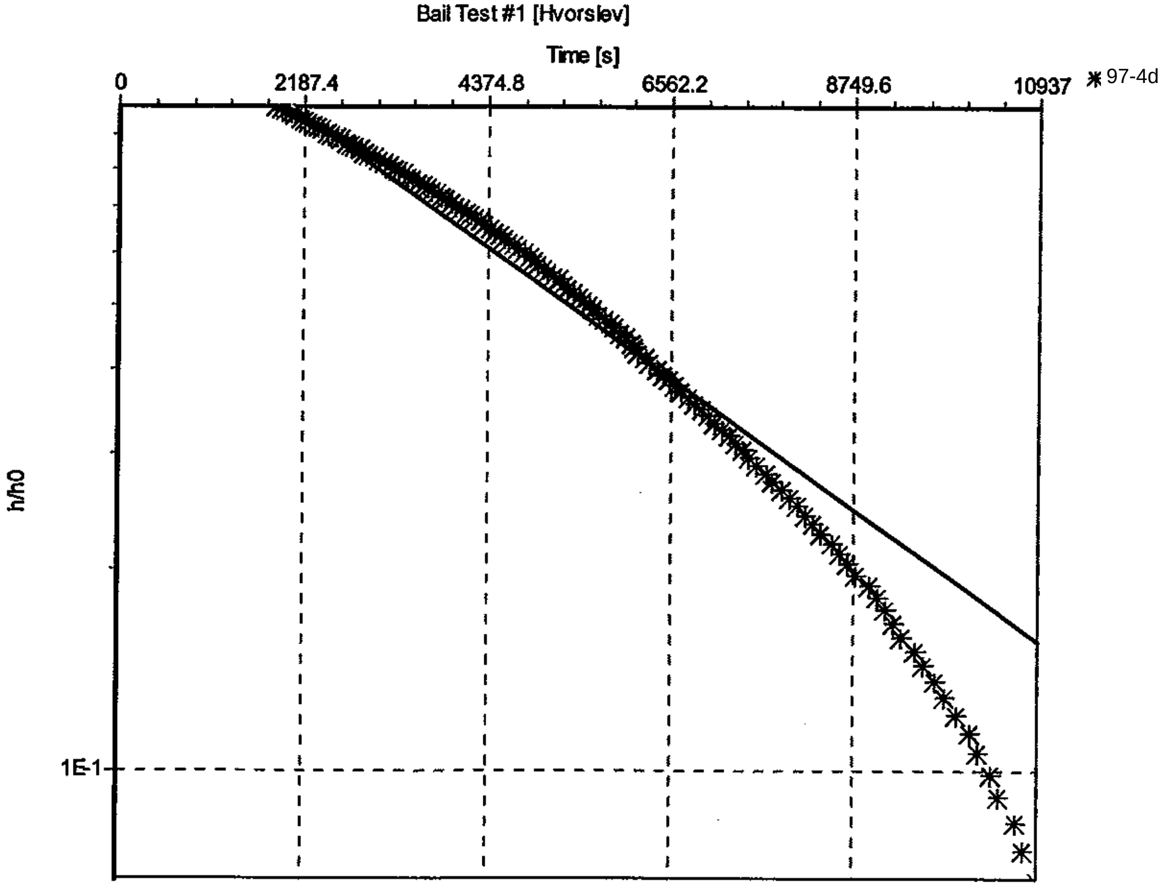
Slug Test Analysis Report

Project: N. Lancaster Salt Plume Evaluation

Number: 95620

Client:



Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results: Conductivity: 1.29E-7 [m/s]

Test parameters:

Test Well:	97-4d	Aquifer Thickness:	
Casing radius:	0.025 [m]		
Screen length:	1.5 [m]		
Boring radius:	0.076 [m]		

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Slug Test Data Report

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Test Well: 97-4d

Slug Test: Ball Test #1

Test Well: 97-4d

Depth to Static WL: 3.07 [m]

Casing radius: 0.025 [m]

Location:

Boring radius: 0.076 [m]

Recorded by: JBH

Screen length: 1.5 [m]

Date: 6/5/97

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	5.71	2.64
2	1853	5.69	2.62
3	1916	5.67	2.60
4	1960	5.65	2.58
5	2026	5.63	2.56
6	2079	5.61	2.54
7	2135	5.59	2.52
8	2193	5.57	2.50
9	2245	5.55	2.48
10	2298	5.53	2.46
11	2353	5.51	2.44
12	2395	5.49	2.42
13	2468	5.47	2.40
14	2529	5.45	2.38
15	2580	5.43	2.36
16	2640	5.41	2.34
17	2697	5.39	2.32
18	2750	5.37	2.30
19	2805	5.35	2.28
20	2864	5.33	2.26
21	2917	5.31	2.24
22	2970	5.29	2.22
23	3040	5.27	2.20
24	3086	5.25	2.18
25	3153	5.23	2.16
26	3211	5.21	2.14
27	3263	5.19	2.12
28	3315	5.17	2.10
29	3372	5.15	2.08
30	3431	5.13	2.06
31	3485	5.11	2.04

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Test Well: 97-4d

Depth to Static WL: 3.07 [m]

Location:

Recorded by: JBH

Date: 6/5/97

Slug Test: **Bail Test #1**

Test Well: 97-4d

Casing radius: 0.025 [m]

Boring radius: 0.076 [m]

Screen length: 1.5 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
32	3544	5.09	2.02
33	3605	5.07	2.00
34	3656	5.05	1.98
35	3710	5.03	1.96
36	3770	5.01	1.94
37	3822	4.99	1.92
38	3876	4.97	1.90
39	3938	4.95	1.88
40	3996	4.93	1.86
41	4061	4.91	1.84
42	4123	4.89	1.82
43	4170	4.87	1.80
44	4227	4.85	1.78
45	4281	4.83	1.76
46	4339	4.81	1.74
47	4399	4.79	1.72
48	4456	4.77	1.70
49	4521	4.75	1.68
50	4575	4.73	1.66
51	4627	4.71	1.64
52	4688	4.69	1.62
53	4742	4.67	1.60
54	4801	4.65	1.58
55	4864	4.63	1.56
56	4916	4.61	1.54
57	4972	4.59	1.52
58	5030	4.57	1.50
59	5089	4.55	1.48
60	5154	4.53	1.46
61	5212	4.51	1.44
62	5265	4.49	1.42

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Slug Test Data Report
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Test Well: 97-4d

Depth to Static WL: 3.07 [m]
Location:
Recorded by: JBH
Date: 6/5/97

Slug Test: **Bail Test #1**
Test Well: 97-4d
Casing radius: 0.025 [m]
Boring radius: 0.076 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
63	5327	4.47	1.40
64	5384	4.45	1.38
65	5448	4.43	1.36
66	5512	4.41	1.34
67	5570	4.39	1.32
68	5629	4.37	1.30
69	5696	4.35	1.28
70	5757	4.33	1.26
71	5822	4.31	1.24
72	5880	4.29	1.22
73	5950	4.27	1.20
74	6027	4.25	1.18
75	6079	4.23	1.16
76	6117	4.21	1.14
77	6164	4.19	1.12
78	6243	4.17	1.10
79	6308	4.15	1.08
80	6387	4.13	1.06
81	6456	4.11	1.04
82	6534	4.09	1.02
83	6602	4.07	1.00
84	6678	4.05	0.98
85	6758	4.03	0.96
86	6840	4.01	0.94
87	6916	3.99	0.92
88	6991	3.97	0.90
89	7077	3.95	0.88
90	7168	3.93	0.86
91	7241	3.91	0.84
92	7324	3.89	0.82
93	7416	3.87	0.80

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Test Well: 97-4d
Slug Test: **Bail Test #1**
Test Well: 97-4d
Depth to Static WL: 3.07 [m]
Casing radius: 0.025 [m]
Location:
Boring radius: 0.076 [m]
Recorded by: JBH
Screen length: 1.5 [m]
Date: 6/5/97
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
94	7492	3.85	0.78
95	7584	3.83	0.76
96	7691	3.81	0.74
97	7770	3.79	0.72
98	7873	3.77	0.70
99	7980	3.75	0.68
100	8075	3.73	0.66
101	8162	3.71	0.64
102	8263	3.69	0.62
103	8357	3.67	0.60
104	8482	3.65	0.58
105	8578	3.63	0.56
106	8669	3.61	0.54
107	8767	3.59	0.52
108	8926	3.57	0.50
109	9016	3.55	0.48
110	9111	3.53	0.46
111	9205	3.51	0.44
112	9301	3.49	0.42
113	9459	3.47	0.40
114	9553	3.45	0.38
115	9708	3.43	0.36
116	9806	3.41	0.34
117	9960	3.39	0.32
118	10117	3.37	0.30
119	10216	3.35	0.28
120	10371	3.33	0.26
121	10470	3.31	0.24
122	10678	3.29	0.22
123	10783	3.27	0.20
124	10937	3.25	0.18

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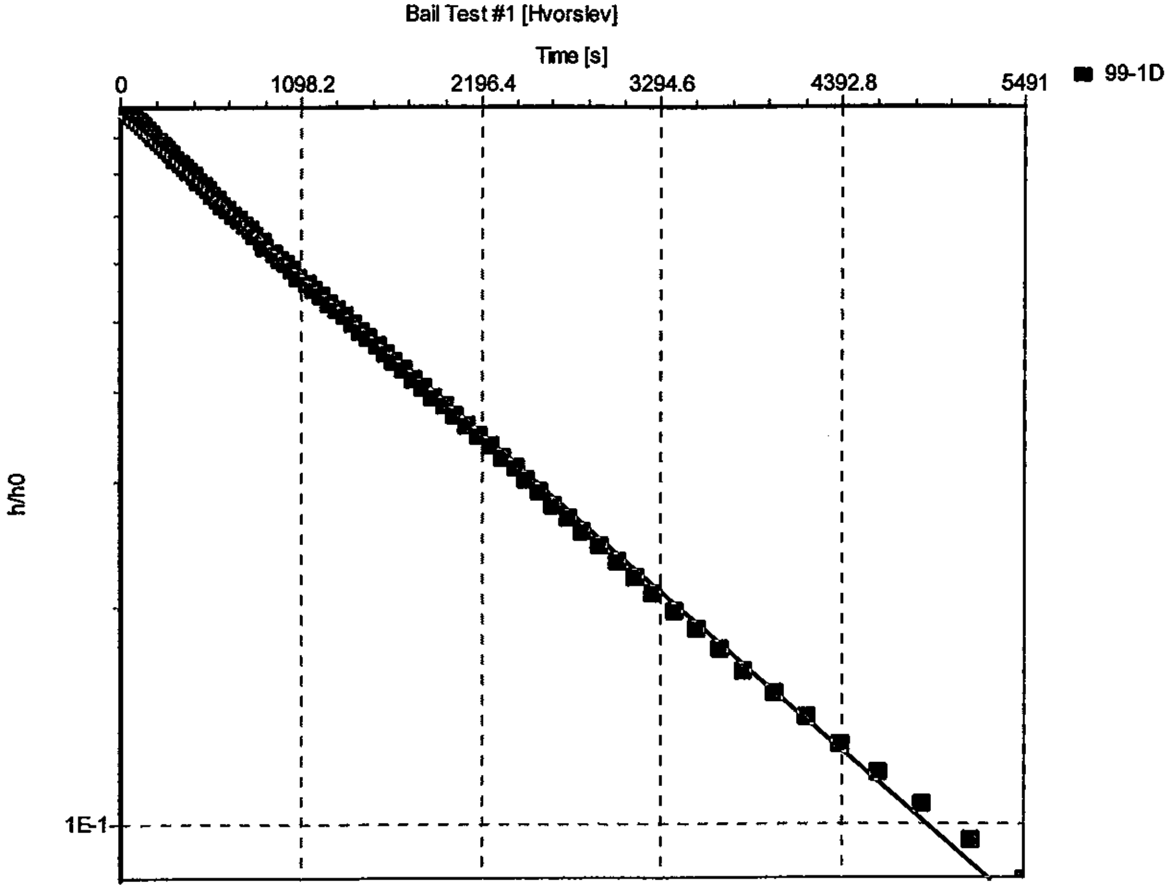
Slug Test Analysis Report

Project: N. Lancaster Salt Plume Evaluation

Number: 95620

Client:



Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results: Conductivity: 3.56E-7 [m/s]

Test parameters:

Test Well: 99-1D

Casing radius: 0.025 [m]

Screen length: 1.5 [m]

Boring radius: 0.038 [m]

Aquifer Thickness:

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Test Well: 99-1D
Depth to Static WL: 1.17 [m]
Location:
Recorded by: JBH
Date: 4/8/99

Slug Test: **Bail Test #1**
Test Well: 99-1D
Casing radius: 0.025 [m]
Boring radius: 0.038 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	9.90	8.73
2	17	9.80	8.63
3	41	9.70	8.53
4	62	9.60	8.43
5	84	9.50	8.33
6	106	9.40	8.23
7	129	9.30	8.13
8	153	9.20	8.03
9	177	9.10	7.93
10	197	9.00	7.83
11	222	8.90	7.73
12	247	8.80	7.63
13	275	8.70	7.53
14	300	8.60	7.43
15	327	8.50	7.33
16	354	8.40	7.23
17	380	8.30	7.13
18	408	8.20	7.03
19	437	8.10	6.93
20	469	8.00	6.83
21	497	7.90	6.73
22	524	7.80	6.63
23	554	7.70	6.53
24	584	7.60	6.43
25	612	7.50	6.33
26	648	7.40	6.23
27	681	7.30	6.13
28	717	7.20	6.03
29	749	7.10	5.93
30	784	7.00	5.83
31	819	6.90	5.73

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Test Well: 99-1D
Depth to Static WL: 1.17 [m]
Location:
Recorded by: JBH
Date: 4/8/99

Slug Test: **Bail Test #1**
Test Well: 99-1D
Casing radius: 0.025 [m]
Boring radius: 0.038 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
32	856	6.80	5.63
33	876	6.70	5.53
34	928	6.60	5.43
35	970	6.50	5.33
36	1001	6.40	5.23
37	1039	6.30	5.13
38	1081	6.20	5.03
39	1134	6.10	4.93
40	1177	6.00	4.83
41	1221	5.90	4.73
42	1267	5.80	4.63
43	1312	5.70	4.53
44	1359	5.60	4.43
45	1407	5.50	4.33
46	1460	5.40	4.23
47	1509	5.30	4.13
48	1563	5.20	4.03
49	1614	5.10	3.93
50	1657	5.00	3.83
51	1717	4.90	3.73
52	1782	4.80	3.63
53	1846	4.70	3.53
54	1902	4.60	3.43
55	1968	4.50	3.33
56	2037	4.40	3.23
57	2102	4.30	3.13
58	2175	4.20	3.03
59	2247	4.10	2.93
60	2317	4.00	2.83
61	2402	3.90	2.73
62	2465	3.80	2.63

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Test Well: **99-1D**
Depth to Static WL: 1.17 [m]
Location:
Recorded by: JBH
Date: 4/8/99

Slug Test: **Bail Test #1**
Test Well: 99-1D
Casing radius: 0.025 [m]
Boring radius: 0.038 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
63	2544	3.70	2.53
64	2637	3.60	2.43
65	2727	3.50	2.33
66	2817	3.40	2.23
67	2917	3.30	2.13
68	3022	3.20	2.03
69	3135	3.10	1.93
70	3245	3.00	1.83
71	3375	2.90	1.73
72	3503	2.80	1.63
73	3653	2.70	1.53
74	3798	2.60	1.43
75	3982	2.50	1.33
76	4172	2.40	1.23
77	4377	2.30	1.13
78	4608	2.20	1.03
79	4871	2.10	0.93
80	5170	2.00	0.83
81	5491	1.90	0.73

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Slug Test Analysis Report
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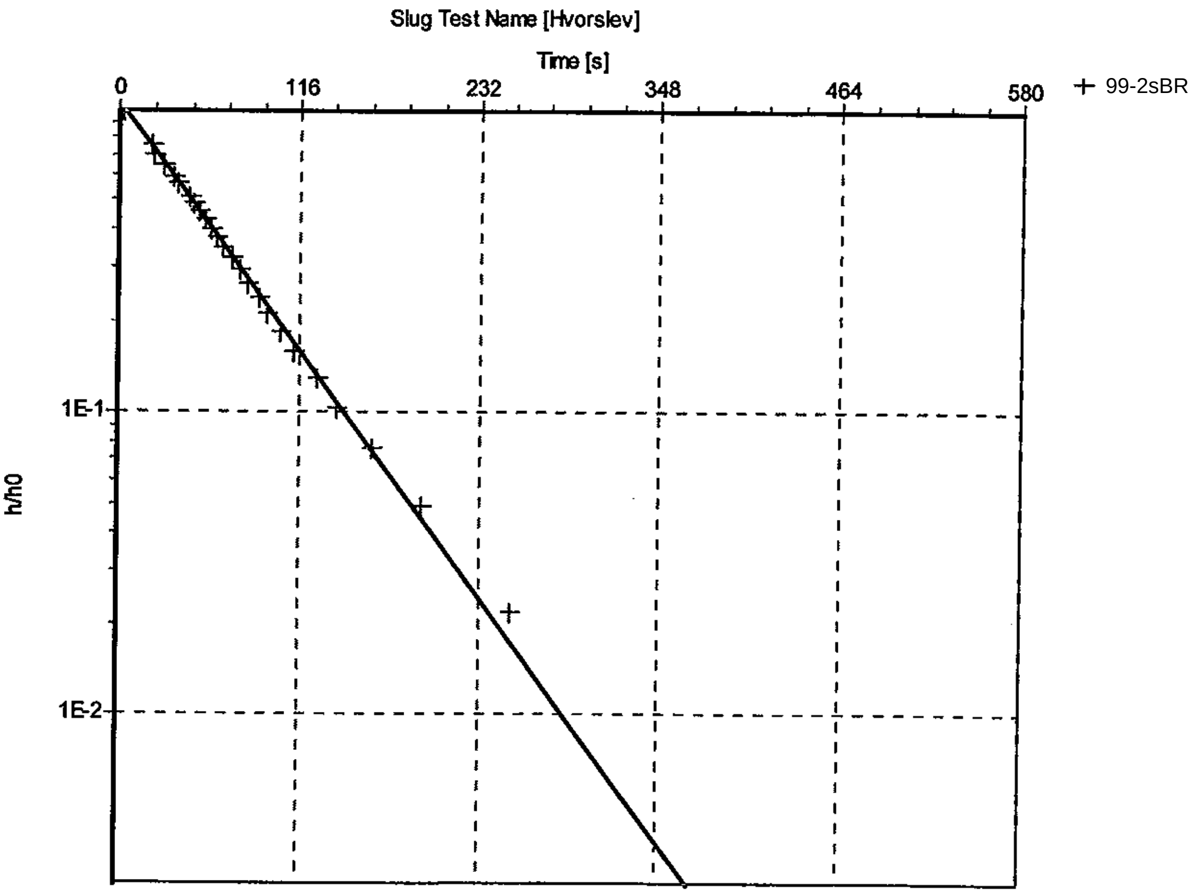

Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: **4.65E-6 [m/s]**

Test parameters:

Test Well: 99-2sBR

Casing radius: 0.025 [m]

Screen length: 1.5 [m]

Boring radius: 0.38 [m]

Aquifer Thickness:

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Test Well: 99-2sBR
Depth to Static WL: 1.82 [m]
Location:
Recorded by: JBH
Date: 4/8/99

Slug Test: **Bail Test #1**
Test Well: 99-2sBR
Casing radius: 0.025 [m]
Boring radius: 0.38 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	5.50	3.68
2	3	5.43	3.61
3	20	4.60	2.78
4	22	4.40	2.58
5	28	4.20	2.38
6	34	4.00	2.18
7	37	3.90	2.08
8	44	3.70	1.88
9	47	3.60	1.78
10	50	3.50	1.68
11	54	3.40	1.58
12	58	3.30	1.48
13	62	3.20	1.38
14	66	3.10	1.28
15	72	3.00	1.18
16	77	2.90	1.08
17	82	2.80	0.98
18	90	2.70	0.88
19	95	2.60	0.78
20	104	2.50	0.68
21	113	2.40	0.58
22	127	2.30	0.48
23	140	2.20	0.38
24	163	2.10	0.28
25	195	2.00	0.18
26	253	1.90	0.08
27	580	1.83	0.01

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Slug Test Analysis Report

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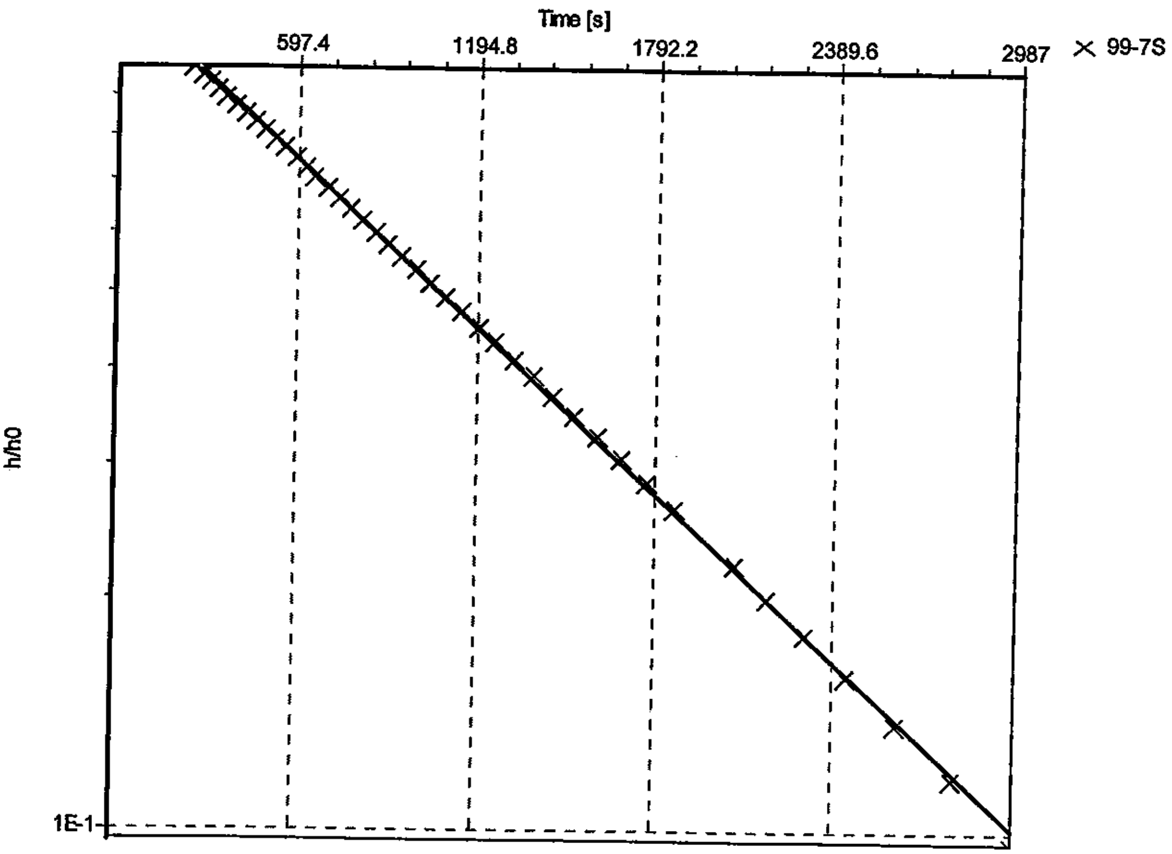
Bail Test #1 [Hvorslev]



Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: 5.21E-7 [m/s]

Test parameters:

Test Well:	99-7S	Aquifer Thickness:
Casing radius:	0.025 [m]	
Screen length:	1.5 [m]	
Boring radius:	0.076 [m]	

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Slug Test Data Report
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Test Well: **99-7S**

Depth to Static WL: 0.97 [m]
Location:
Recorded by: JBH
Date: 4/8/99

Slug Test: **Bail Test #1**
Test Well: 99-7S
Casing radius: 0.025 [m]
Boring radius: 0.076 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	3.35	2.38
2	245	3.30	2.33
3	280	3.25	2.28
4	303	3.20	2.23
5	330	3.15	2.18
6	360	3.10	2.13
7	390	3.05	2.08
8	423	3.00	2.03
9	455	2.95	1.98
10	485	2.90	1.93
11	520	2.85	1.88
12	552	2.80	1.83
13	589	2.75	1.78
14	626	2.70	1.73
15	652	2.65	1.68
16	696	2.60	1.63
17	734	2.55	1.58
18	774	2.50	1.53
19	816	2.45	1.48
20	858	2.40	1.43
21	900	2.35	1.38
22	944	2.30	1.33
23	995	2.25	1.28
24	1041	2.20	1.23
25	1093	2.15	1.18
26	1147	2.10	1.13
27	1202	2.05	1.08
28	1259	2.00	1.03
29	1320	1.95	0.98
30	1384	1.90	0.93
31	1454	1.85	0.88

Thompson Rosemount Group 1345 Rosemount Ave. Cornwall, Ontario, Canada Phone: (613) 933-5602	**Slug Test Data Report** Project: N. Lancaster Salt Plume Evaluation Number: 95620 Client:	Page 2

Test Well:	**99-7S**	**Slug Test:**	**Bail Test #1**
		Test Well:	99-7S
Depth to Static WL:	0.97 [m]	Casing radius:	0.025 [m]
Location:		Boring radius:	0.076 [m]
Recorded by:	JBH	Screen length:	1.5 [m]
Date:	4/8/99	Aquifer Thickness:	

	Time [s]	Depth to WL [m]	Drawdown [m]
32	1525	1.80	0.83
33	1598	1.75	0.78
34	1680	1.70	0.73
35	1761	1.65	0.68
36	1854	1.60	0.63
37	2054	1.50	0.53
38	2169	1.45	0.48
39	2295	1.40	0.43
40	2437	1.35	0.38
41	2594	1.30	0.33
42	2784	1.25	0.28
43	2987	1.20	0.23

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Slug Test Analysis Report

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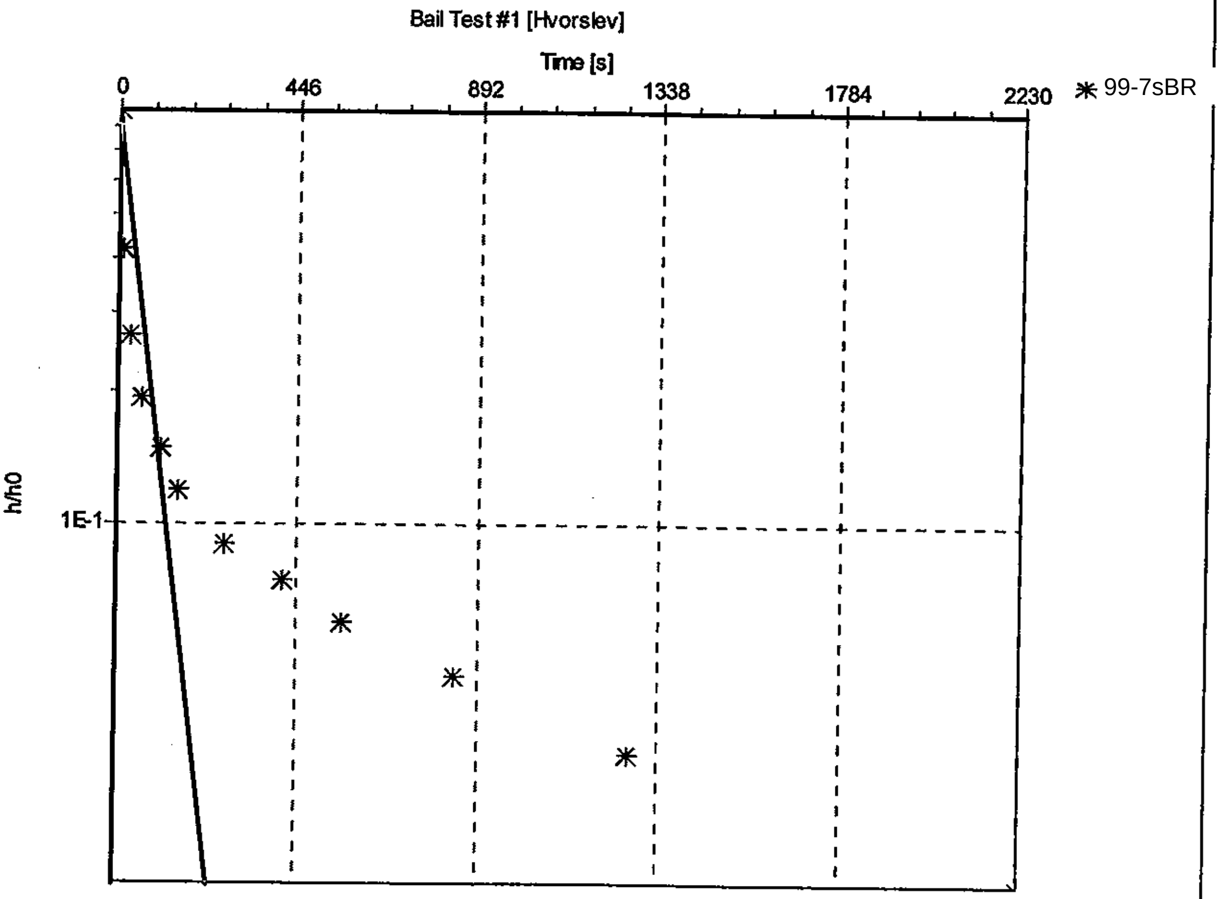

Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: 1.31E-5 [m/s]

Test parameters:

Test Well: 99-7sBR

Casing radius: 0.025 [m]

Screen length: 1.5 [m]

Boring radius: 0.038 [m]

Aquifer Thickness:

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Test Well: 99-7sBR

Slug Test: **Bail Test #1**

Test Well: 99-7sBR

Depth to Static WL: 0.92 [m]

Casing radius: 0.025 [m]

Location:

Boring radius: 0.038 [m]

Recorded by: JBH

Screen length: 1.5 [m]

Date: 4/8/99

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	1.59	0.67
2	2	1.50	0.58
3	11	1.20	0.28
4	29	1.10	0.18
5	58	1.05	0.13
6	105	1.02	0.10
7	153	1.00	0.08
8	265	0.98	0.06
9	414	0.97	0.05
10	560	0.96	0.04
11	836	0.95	0.03
12	1263	0.94	0.02
13	2230	0.93	0.01

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Slug Test Analysis Report

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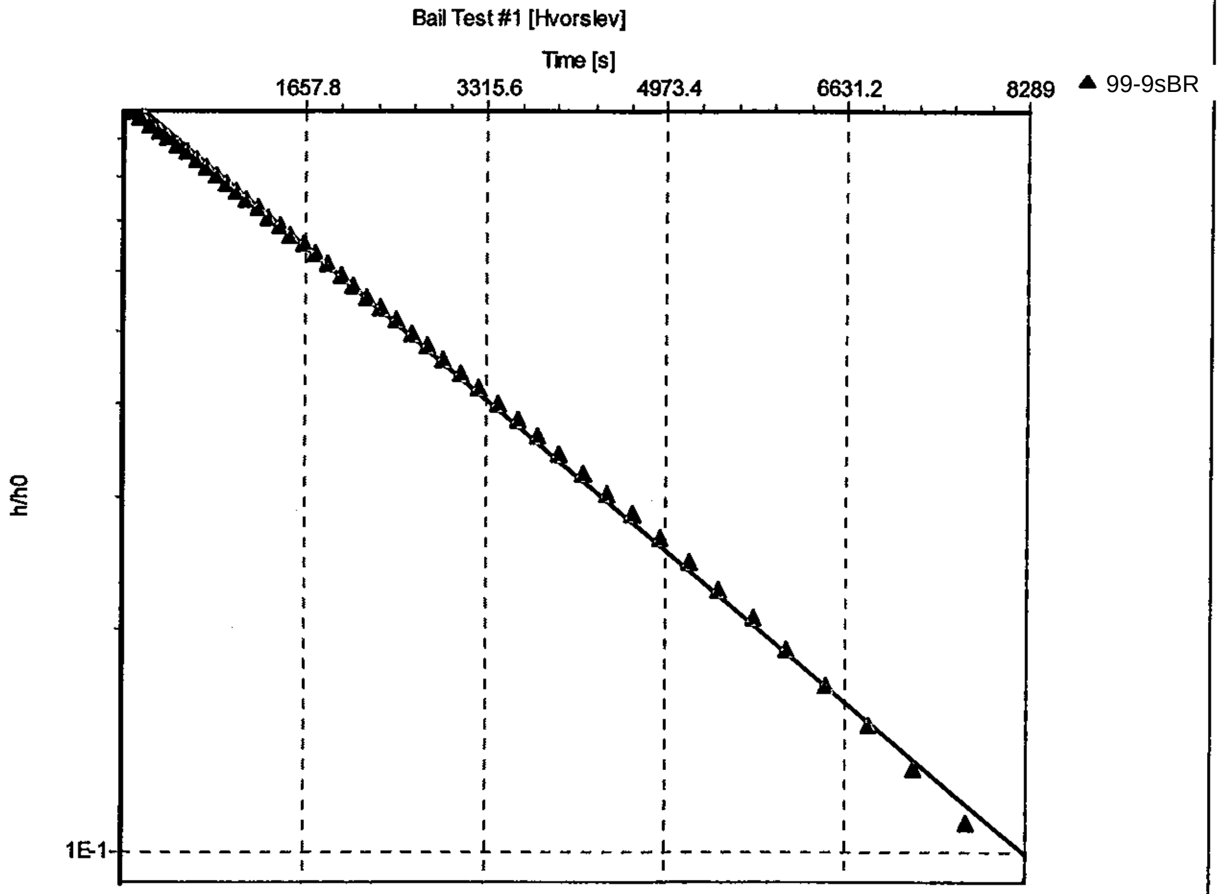
Client:



Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results: Conductivity: 2.17E-7 [m/s]

Test parameters:

Test Well: 99-9sBR

Casing radius: 0.025 [m]

Screen length: 1.5 [m]

Boring radius: 0.038 [m]

Aquifer Thickness:

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Test Well: 99-9sBR
Depth to Static WL: 3.03 [m]
Location:
Recorded by: JBH
Date: 5/5/99

Slug Test: **Bail Test #1**
Test Well: 99-9sBR
Casing radius: 0.025 [m]
Boring radius: 0.038 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	8.20	5.17
2	65	8.10	5.07
3	146	8.00	4.97
4	230	7.90	4.87
5	319	7.80	4.77
6	406	7.70	4.67
7	495	7.60	4.57
8	576	7.50	4.47
9	665	7.40	4.37
10	755	7.30	4.27
11	844	7.20	4.17
12	938	7.10	4.07
13	1029	7.00	3.97
14	1124	6.90	3.87
15	1221	6.80	3.77
16	1319	6.70	3.67
17	1424	6.60	3.57
18	1525	6.50	3.47
19	1637	6.40	3.37
20	1752	6.30	3.27
21	1864	6.20	3.17
22	1978	6.10	3.07
23	2100	6.00	2.97
24	2225	5.90	2.87
25	2356	5.80	2.77
26	2491	5.70	2.67
27	2633	5.60	2.57
28	2779	5.50	2.47
29	2928	5.40	2.37
30	3087	5.30	2.27
31	3246	5.20	2.17

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Test Well: 99-9sBR

Depth to Static WL: 3.03 [m]

Location:

Recorded by: JBH

Date: 5/5/99

Slug Test: **Bail Test #1**

Test Well: 99-9sBR

Casing radius: 0.025 [m]

Boring radius: 0.038 [m]

Screen length: 1.5 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
32	3425	5.10	2.07
33	3609	5.00	1.97
34	3790	4.90	1.87
35	3993	4.80	1.77
36	4208	4.70	1.67
37	4424	4.60	1.57
38	4659	4.50	1.47
39	4904	4.40	1.37
40	5177	4.30	1.27
41	5454	4.20	1.17
42	5771	4.10	1.07
43	6090	4.00	0.97
44	6444	3.90	0.87
45	6851	3.80	0.77
46	7266	3.70	0.67
47	7747	3.60	0.57
48	8289	3.50	0.47

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Slug Test Analysis Report

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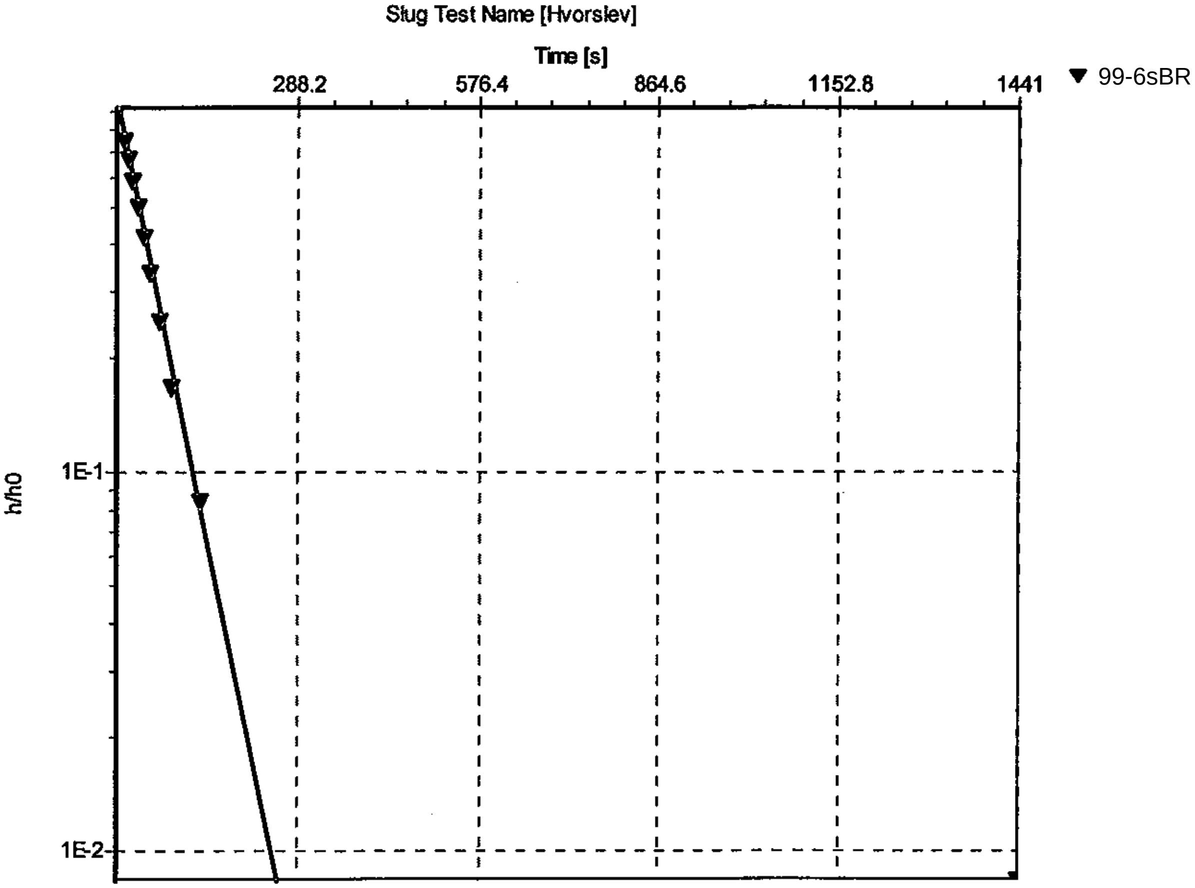

Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results: **Conductivity:** **1.41E-5 [m/s]**

Test parameters:

Test Well: 99-6sBR

Casing radius: 0.025 [m]

Screen length: 1.5 [m]

Boring radius: 0.038 [m]

Aquifer Thickness:

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

Thompson Rosemount Group 1345 Rosemount Ave. Cornwall, Ontario, Canada Phone: (613) 933-5602		**Slug Test Data Report**	
		Project: N. Lancaster Salt Plume Evaluation	
		Number: 95620	
		Client:	Page 1

Test Well:	99-6sBR	**Slug Test:**	**Bail Test #1**
		Test Well:	99-6sBR
Depth to Static WL:	4.2 [m]	Casing radius:	0.025 [m]
Location:		Boring radius:	0.038 [m]
Recorded by:	JBH	Screen length:	1.5 [m]
Date:	5/5/99	Aquifer Thickness:	

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	5.40	1.20
2	4	5.30	1.10
3	14	5.10	0.90
4	19	5.00	0.80
5	26	4.90	0.70
6	34	4.80	0.60
7	43	4.70	0.50
8	54	4.60	0.40
9	68	4.50	0.30
10	89	4.40	0.20
11	134	4.30	0.10
12	1441	4.21	0.01

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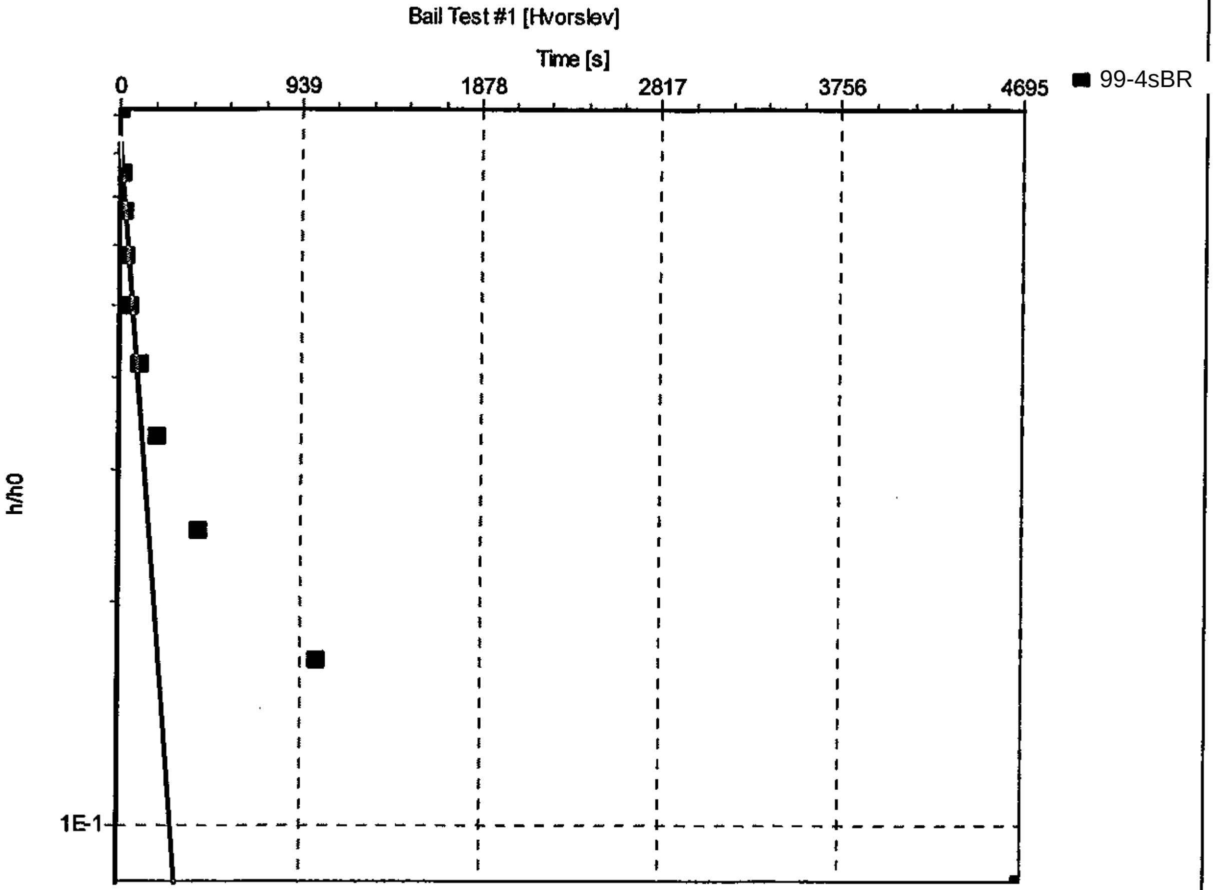
Slug Test Analysis Report

Project: N. Lancaster Salt Plume Evaluation

Number: 95620

Client:



Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results: Conductivity: 6.05E-6 [m/s]

Test parameters:

Test Well: 99-4sBR

Casing radius: 0.025 [m]

Screen length: 1.5 [m]

Boring radius: 0.038 [m]

Aquifer Thickness:

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Slug Test Data Report
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Test Well: 99-4sBR
Slug Test: 99-4sBR
Test Well: 99-4sBR
Depth to Static WL: 5.1 [m]
Casing radius: 0.025 [m]
Location:
Boring radius: 0.038 [m]
Recorded by: JBH
Screen length: 1.5 [m]
Date: 5/5/99
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	5.70	0.60
2	3	5.65	0.55
3	10	5.55	0.45
4	17	5.50	0.40
5	30	5.45	0.35
6	54	5.40	0.30
7	98	5.35	0.25
8	195	5.30	0.20
9	405	5.25	0.15
10	1023	5.20	0.10
11	4695	5.15	0.05

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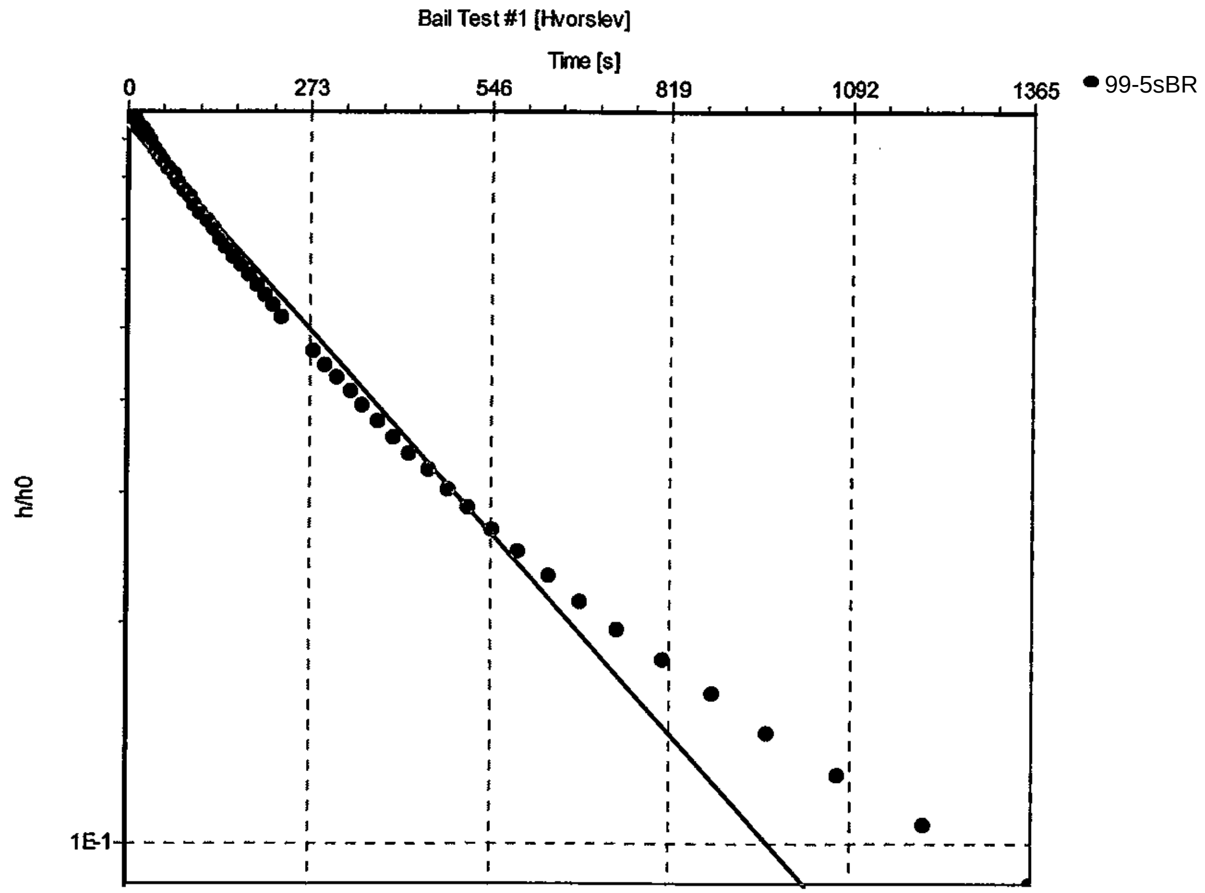
Slug Test Analysis Report

Project: N. Lancaster Salt Plume Evaluation

Number: 95620

Client:



Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results: **Conductivity:** **1.79E-6 [m/s]**

Test parameters:

Test Well: 99-5sBR

Casing radius: 0.025 [m]

Screen length: 1.5 [m]

Boring radius: 0.038 [m]

Aquifer Thickness:

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

Thompson Rosemount Group 1345 Rosemount Ave. Cornwall, Ontario, Canada Phone: (613) 933-5602		**Slug Test Data Report**	
		Project: N. Lancaster Salt Plume Evaluation	
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		Client:	Page 1
Test Well:	99-5sBR	**Slug Test:**	**Bail Test #1**
		Test Well:	99-5sBR
Depth to Static WL:	2.81 [m]	Casing radius:	0.025 [m]
Location:		Boring radius:	0.038 [m]
Recorded by:	JBH	Screen length:	1.5 [m]
Date:	5/5/99	Aquifer Thickness:	

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	8.40	5.59
2	6	8.30	5.49
3	11	8.20	5.39
4	16	8.10	5.29
5	24	8.00	5.19
6	29	7.90	5.09
7	35	7.80	4.99
8	42	7.70	4.89
9	49	7.60	4.79
10	55	7.50	4.69
11	63	7.40	4.59
12	70	7.30	4.49
13	78	7.20	4.39
14	86	7.10	4.29
15	94	7.00	4.19
16	102	6.90	4.09
17	111	6.80	3.99
18	121	6.70	3.89
19	130	6.60	3.79
20	140	6.50	3.69
21	149	6.40	3.59
22	160	6.30	3.49
23	172	6.20	3.39
24	183	6.10	3.29
25	195	6.00	3.19
26	207	5.90	3.09
27	220	5.80	2.99
28	233	5.70	2.89
29	280	5.40	2.59
30	297	5.30	2.49
31	315	5.20	2.39

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Slug Test Data Report
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Test Well: 99-5sBR
Depth to Static WL: 2.81 [m]
Location:
Recorded by: JBH
Date: 5/5/99

Slug Test: **Bail Test #1**
Test Well: 99-5sBR
Casing radius: 0.025 [m]
Boring radius: 0.038 [m]
Screen length: 1.5 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
32	335	5.10	2.29
33	354	5.00	2.19
34	378	4.90	2.09
35	400	4.80	1.99
36	426	4.70	1.89
37	454	4.60	1.79
38	484	4.50	1.69
39	515	4.40	1.59
40	551	4.30	1.49
41	589	4.20	1.39
42	635	4.10	1.29
43	685	4.00	1.19
44	740	3.90	1.09
45	810	3.80	0.99
46	883	3.70	0.89
47	966	3.60	0.79
48	1073	3.50	0.69
49	1205	3.40	0.59
50	1365	3.30	0.49

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Slug Test Analysis Report

Project: N. Lancaster Salt Plume Evaluation

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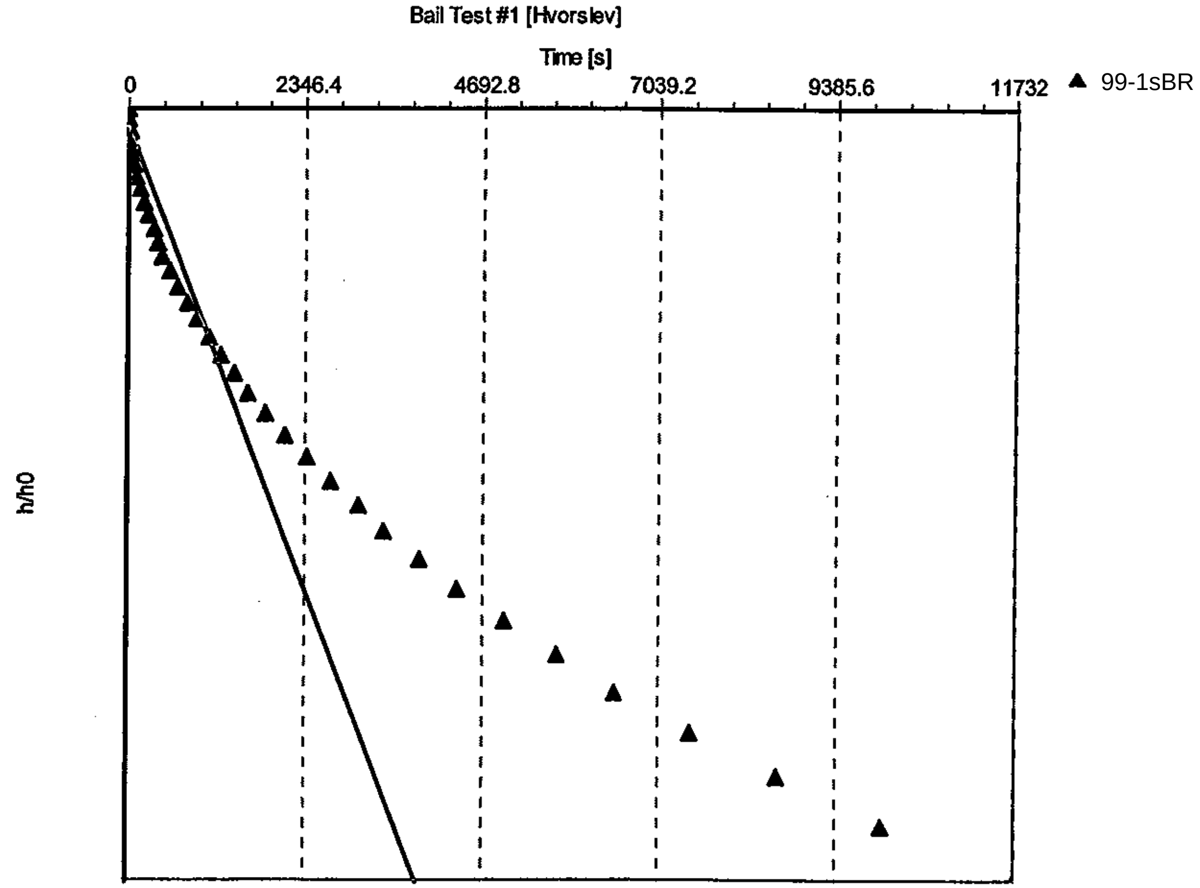
Client:



Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: **2.02E-7 [m/s]**

Test parameters:	Test Well:	99-1sBR	Aquifer Thickness:
	Casing radius:	0.025 [m]	
	Screen length:	3 [m]	
	Boring radius:	0.038 [m]	

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Slug Test Data Report

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Test Well: 99-1sBR

Depth to Static WL: 7.81 [m]

Location:

Recorded by: JBH

Date: 11/22/99

Slug Test: **Ball Test #1**

Test Well: 99-1sBR

Casing radius: 0.025 [m]

Boring radius: 0.038 [m]

Screen length: 3 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	12.16	4.35
2	3	12.06	4.25
3	11	11.96	4.15
4	22	11.86	4.05
5	36	11.76	3.95
6	55	11.66	3.85
7	82	11.56	3.75
8	114	11.46	3.65
9	154	11.36	3.55
10	202	11.26	3.45
11	260	11.16	3.35
12	327	11.06	3.25
13	399	10.96	3.15
14	440	10.86	3.05
15	549	10.76	2.95
16	661	10.66	2.85
17	784	10.56	2.75
18	917	10.46	2.65
19	1057	10.36	2.55
20	1215	10.26	2.45
21	1399	10.16	2.35
22	1602	10.06	2.25
23	1836	9.96	2.15
24	2075	9.86	2.05
25	2362	9.76	1.95
26	2675	9.66	1.85
27	3038	9.56	1.75
28	3402	9.46	1.65
29	3849	9.36	1.55
30	4364	9.26	1.45
31	4967	9.16	1.35

Thompson Rosemount Group 1345 Rosemount Ave. Cornwall, Ontario, Canada Phone: (613) 933-5602		**Slug Test Data Report**	
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		Number: 95620	
		Client:	Page 2
Test Well:	99-1sBR	**Slug Test:**	**Bail Test #1**
		Test Well:	99-1sBR
Depth to Static WL:	7.81 [m]	Casing radius:	0.025 [m]
Location:		Boring radius:	0.038 [m]
Recorded by:	JBH	Screen length:	3 [m]
Date:	11/22/99	Aquifer Thickness:	

	Time [s]	Depth to WL [m]	Drawdown [m]
32	5671	9.06	1.25
33	6476	8.96	1.15
34	7452	8.86	1.05
35	8610	8.76	0.95
36	9998	8.66	0.85
37	11732	8.56	0.75

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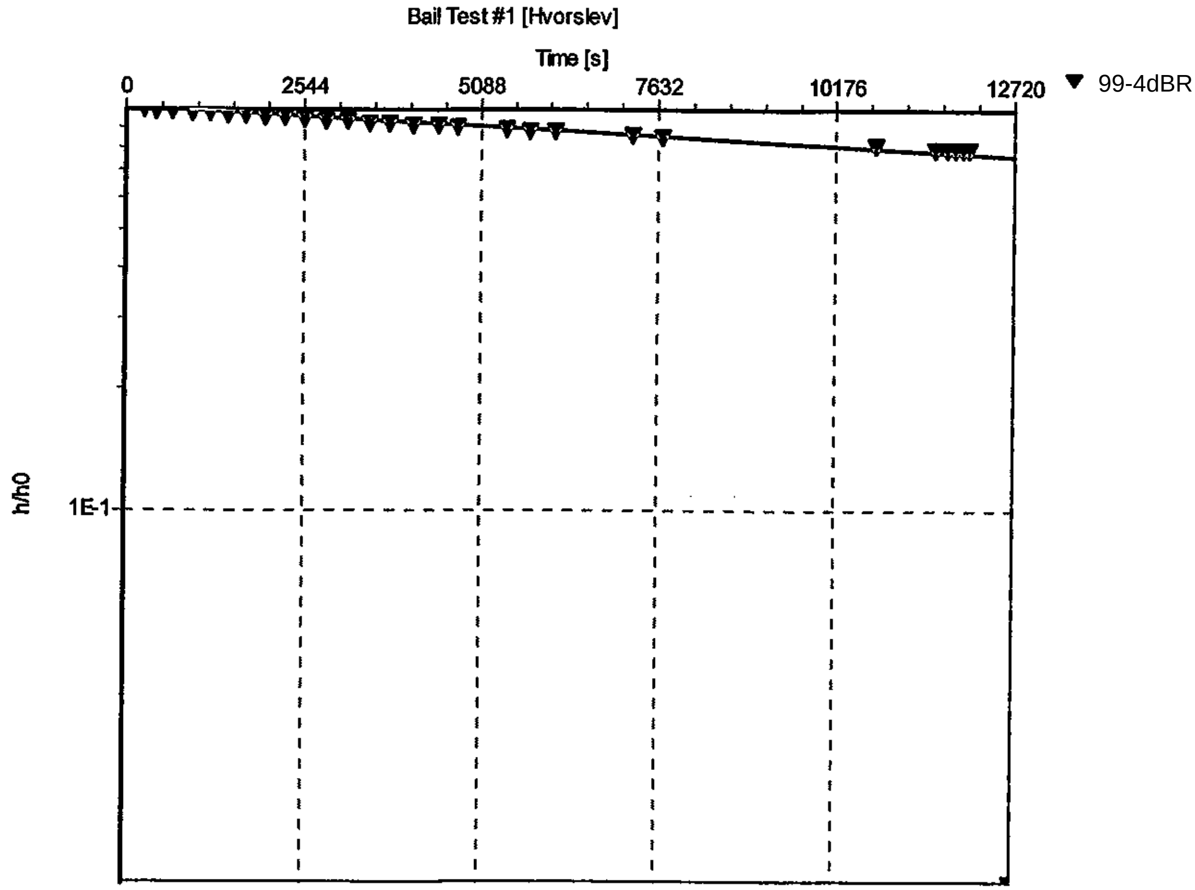
Client:



Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: 5.90E-9 [m/s]

Test parameters:

Test Well: 99-4dBR

Casing radius: 0.025 [m]

Screen length: 6 [m]

Boring radius: 0.038 [m]

Aquifer Thickness:

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Slug Test Data Report

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Test Well: 99-4dBR

Depth to Static WL: 6.04 [m]

Location:

Recorded by: JBH

Date: 11/22/99

Slug Test: **Bail Test #1**

Test Well: 99-4dBR

Casing radius: 0.025 [m]

Boring radius: 0.038 [m]

Screen length: 6 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	22.40	16.36
2	250	22.30	16.26
3	420	22.20	16.16
4	649	22.10	16.06
5	919	22.00	15.96
6	1179	21.90	15.86
7	1434	21.80	15.76
8	1692	21.70	15.66
9	1980	21.60	15.56
10	2255	21.50	15.46
11	2548	21.40	15.36
12	2854	21.30	15.26
13	3166	21.20	15.16
14	3467	21.10	15.06
15	3770	21.00	14.96
16	4091	20.90	14.86
17	4465	20.80	14.76
18	4761	20.70	14.66
19	5455	20.50	14.46
20	5800	20.40	14.36
21	6150	20.30	14.26
22	7278	20.00	13.96
23	7697	19.90	13.86
24	10750	19.20	13.16
25	11597	19.01	12.97
26	11745	18.98	12.94
27	11874	18.95	12.91
28	11985	18.92	12.88
29	12060	18.90	12.86
30	12720	6.23	0.19

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Slug Test Analysis Report

Project: N. Lancaster Salt Plume Evaluation

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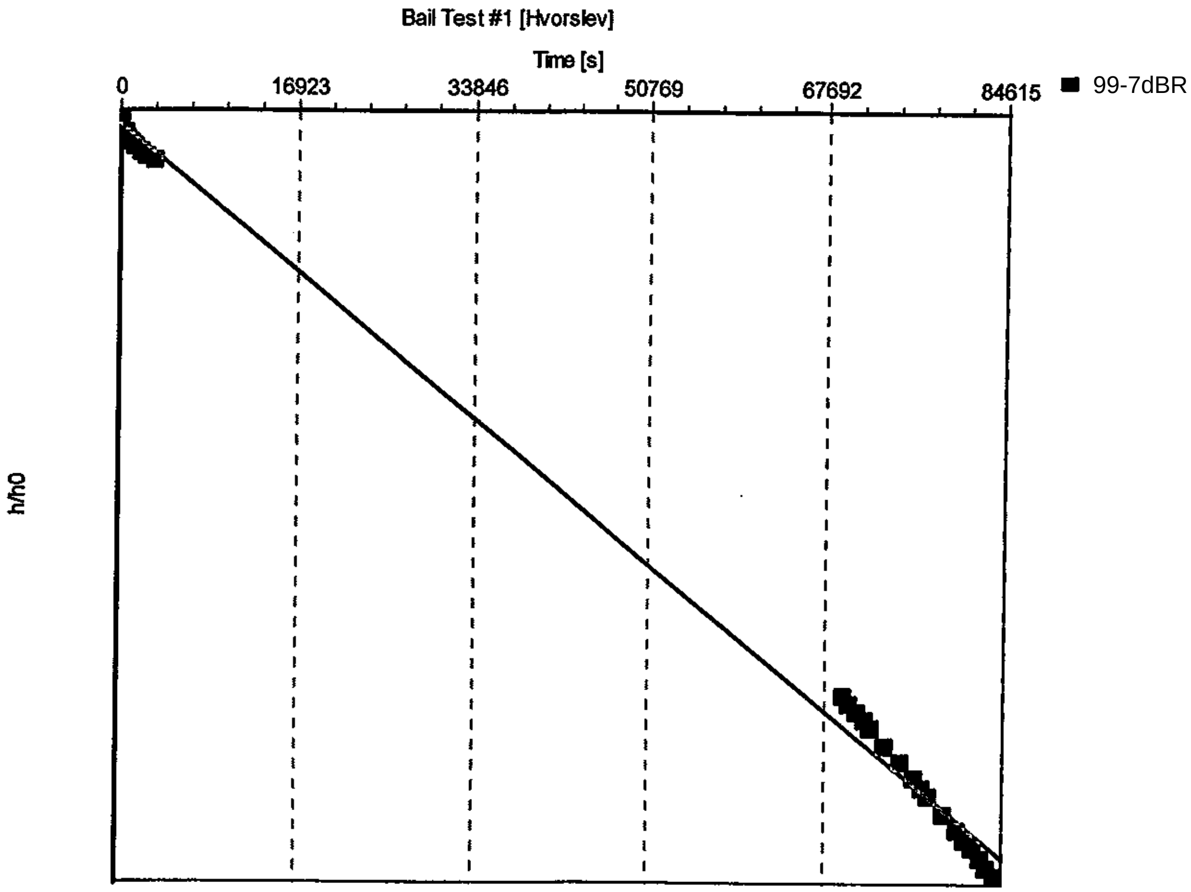
Client:



Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results: Conductivity: 2.22E-9 [m/s]

Test parameters:

Test Well: 99-7dBR

Casing radius: 0.025 [m]

Screen length: 6 [m]

Boring radius: 0.038 [m]

Aquifer Thickness:

Comments:

Evaluated by: JS

Evaluation Date: 9/12/02

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Slug Test Data Report
Project: N. Lancaster Salt Plume Evaluation
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Test Well: 99-7dBR

Depth to Static WL: 2.04 [m]

Location:

Recorded by: JBH

Date: 11/22/99

Slug Test: **Ball Test #1**

Test Well: 99-7dBR

Casing radius: 0.025 [m]

Boring radius: 0.038 [m]

Screen length: 6 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	25.30	23.26
2	6	25.20	23.16
3	16	25.10	23.06
4	32	25.00	22.96
5	67	24.90	22.86
6	367	24.70	22.66
7	579	24.60	22.56
8	894	24.50	22.46
9	1315	24.40	22.36
10	1829	24.30	22.26
11	2445	24.20	22.16
12	3134	24.10	22.06
13	69296	15.20	13.16
14	70004	15.10	13.06
15	70655	15.00	12.96
16	71370	14.90	12.86
17	72065	14.80	12.76
18	73419	14.60	12.56
19	74792	14.40	12.36
20	76171	14.20	12.16
21	76855	14.10	12.06
22	77561	14.00	11.96
23	78968	13.80	11.76
24	80379	13.60	11.56
25	81080	13.50	11.46
26	81787	13.40	11.36
27	82493	13.30	11.26
28	83197	13.20	11.16
29	83909	13.10	11.06
30	84615	13.00	10.96

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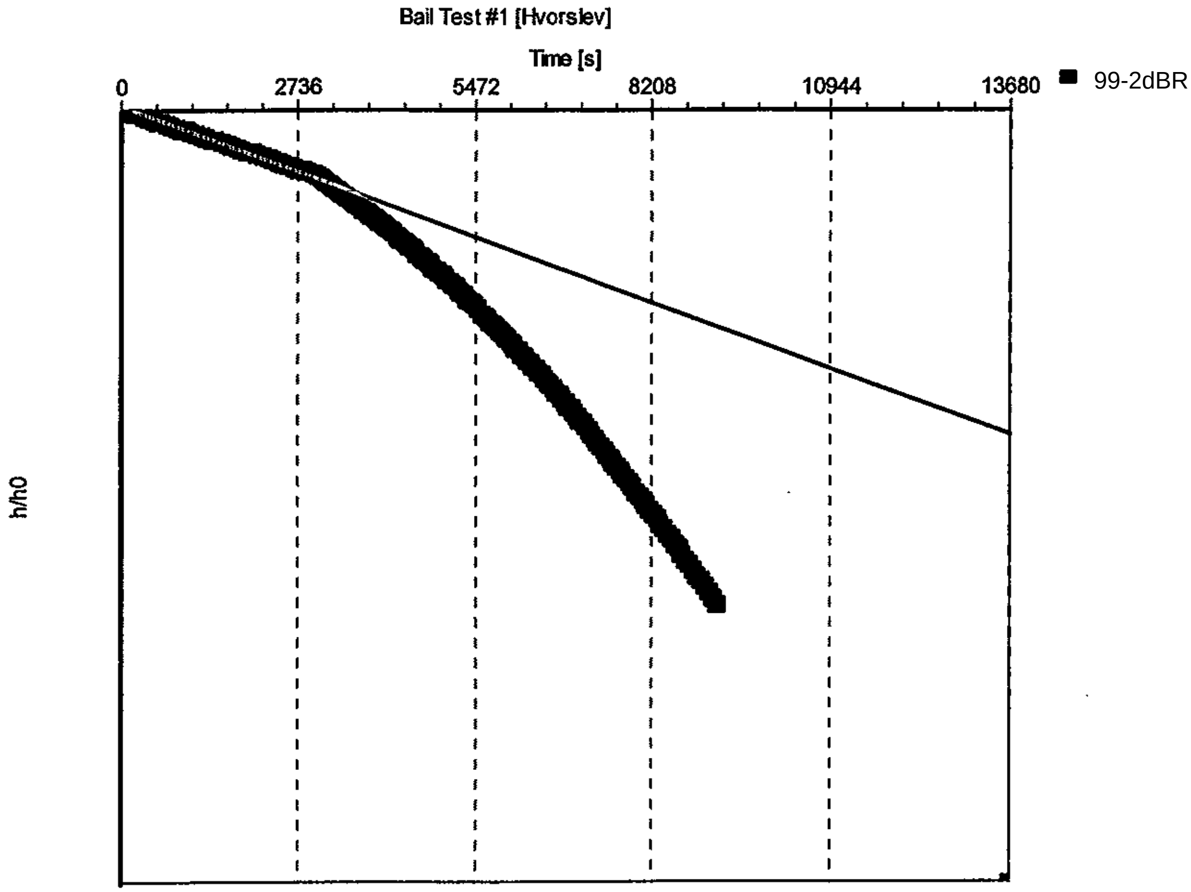
Slug Test Analysis Report

Project: N. Lancaster 99-2dBR

Number:

Client:



<u>Slug Test:</u> **Bail Test #1**

<u>Analysis Method:</u> **Hvorslev**

<u>Analysis Results:</u> Conductivity: 1.74E-8 [m/s]

<u>Test parameters:</u>

Test Well: 99-2dBR
Casing radius: 0.025 [m]
Screen length: 6 [m]
Boring radius: 0.038 [m]
Aquifer Thickness:

<u>Comments:</u>

Evaluated by: JS
Evaluation Date: 9/12/02

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Slug Test Data Report

Project: N. Lancaster 99-2dBR
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Test Well: 99-2dBR
Depth to Static WL: 2.73 [m]
Location:
Recorded by: JBH
Date: 11/23/99

Slug Test: Bail Test #1
Test Well: 99-2dBR
Casing radius: 0.025 [m]
Boring radius: 0.038 [m]
Screen length: 6 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	0	26.31	23.58
2	54	26.21	23.48
3	113	26.11	23.38
4	169	26.01	23.28
5	258	25.91	23.18
6	329	25.81	23.08
7	395	25.71	22.98
8	475	25.61	22.88
9	546	25.51	22.78
10	618	25.41	22.68
11	695	25.31	22.58
12	772	25.21	22.48
13	845	25.11	22.38
14	921	25.01	22.28
15	1000	24.91	22.18
16	1076	24.81	22.08
17	1154	24.71	21.98
18	1233	24.61	21.88
19	1309	24.51	21.78
20	1386	24.41	21.68
21	1466	24.31	21.58
22	1547	24.21	21.48
23	1630	24.11	21.38
24	1708	24.01	21.28
25	1790	23.91	21.18
26	1868	23.81	21.08
27	1947	23.71	20.98
28	2026	23.61	20.88
29	2108	23.51	20.78
30	2189	23.41	20.68
31	2270	23.31	20.58

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Slug Test Data Report

Project: N. Lancaster 99-2dBR

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Test Well: 99-2dBR

Depth to Static WL: 2.73 [m]

Location:

Recorded by: JBH

Date: 11/23/99

Slug Test: **Ball Test #1**

Test Well: 99-2dBR

Casing radius: 0.025 [m]

Boring radius: 0.038 [m]

Screen length: 6 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
32	2347	23.21	20.48
33	2427	23.11	20.38
34	2508	23.01	20.28
35	2584	22.91	20.18
36	2666	22.81	20.08
37	2747	22.71	19.98
38	2823	22.61	19.88
39	2896	22.51	19.78
40	2976	22.41	19.68
41	3050	22.31	19.58
42	3090	22.21	19.48
43	3131	22.11	19.38
44	3173	22.01	19.28
45	3215	21.91	19.18
46	3254	21.81	19.08
47	3296	21.71	18.98
48	3337	21.61	18.88
49	3380	21.51	18.78
50	3420	21.41	18.68
51	3460	21.31	18.58
52	3504	21.21	18.48
53	3543	21.11	18.38
54	3584	21.01	18.28
55	3625	20.91	18.18
56	3667	20.81	18.08
57	3749	20.61	17.88
58	3794	20.51	17.78
59	3830	20.41	17.68
60	3870	20.31	17.58
61	3912	20.21	17.48
62	3954	20.11	17.38

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Slug Test Data Report
Project: N. Lancaster 99-2dBR
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Test Well: 99-2dBR
Depth to Static WL: 2.73 [m]
Location:
Recorded by: JBH
Date: 11/23/99

Slug Test: **Bail Test #1**
Test Well: 99-2dBR
Casing radius: 0.025 [m]
Boring radius: 0.038 [m]
Screen length: 6 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
63	3997	20.01	17.28
64	4035	19.91	17.18
65	4077	19.81	17.08
66	4118	19.71	16.98
67	4158	19.61	16.88
68	4200	19.51	16.78
69	4242	19.41	16.68
70	4284	19.31	16.58
71	4325	19.21	16.48
72	4365	19.11	16.38
73	4406	19.01	16.28
74	4447	18.91	16.18
75	4487	18.81	16.08
76	4529	18.71	15.98
77	4570	18.61	15.88
78	4610	18.51	15.78
79	4654	18.41	15.68
80	4693	18.31	15.58
81	4735	18.21	15.48
82	4780	18.11	15.38
83	4818	18.01	15.28
84	4862	17.91	15.18
85	4904	17.81	15.08
86	4945	17.71	14.98
87	4988	17.61	14.88
88	5027	17.51	14.78
89	5070	17.41	14.68
90	5112	17.31	14.58
91	5155	17.21	14.48
92	5197	17.11	14.38
93	5237	17.01	14.28

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Slug Test Data Report
Project: N. Lancaster 99-2dBR
Number:
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Test Well: 99-2dBR

Depth to Static WL: 2.73 [m]

Location:

Recorded by: JBH

Date: 11/23/99

Slug Test: **Bail Test #1**

Test Well: 99-2dBR

Casing radius: 0.025 [m]

Boring radius: 0.038 [m]

Screen length: 6 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
94	5280	16.91	14.18
95	5322	16.81	14.08
96	5363	16.71	13.98
97	5406	16.61	13.88
98	5447	16.51	13.78
99	5492	16.41	13.68
100	5574	16.21	13.48
101	5620	16.11	13.38
102	5654	16.01	13.28
103	5698	15.91	13.18
104	5747	15.81	13.08
105	5790	15.71	12.98
106	5834	15.61	12.88
107	5876	15.51	12.78
108	5922	15.41	12.68
109	5965	15.31	12.58
110	6010	15.21	12.48
111	6052	15.11	12.38
112	6095	15.01	12.28
113	6142	14.91	12.18
114	6184	14.81	12.08
115	6229	14.71	11.98
116	6273	14.61	11.88
117	6316	14.51	11.78
118	6364	14.41	11.68
119	6408	14.31	11.58
120	6455	14.21	11.48
121	6498	14.11	11.38
122	6545	14.01	11.28
123	6587	13.91	11.18
124	6635	13.81	11.08

Thompson Rosemount Group
1345 Rosemount Ave.
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Phone: (613) 933-5602

Slug Test Data Report

Project: N. Lancaster 99-2dBR

Number:

Client:

Test Well: 99-2dBR

Depth to Static WL: 2.73 [m]

Location:

Recorded by: JBH

Date: 11/23/99

Slug Test: Ball Test #1

Test Well: 99-2dBR

Casing radius: 0.025 [m]

Boring radius: 0.038 [m]

Screen length: 6 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
125	6678	13.71	10.98
126	6724	13.61	10.88
127	6767	13.51	10.78
128	6810	13.41	10.68
129	6859	13.31	10.58
130	6905	13.21	10.48
131	6947	13.11	10.38
132	6995	13.01	10.28
133	7044	12.91	10.18
134	7088	12.81	10.08
135	7134	12.71	9.98
136	7182	12.61	9.88
137	7230	12.51	9.78
138	7277	12.41	9.68
139	7325	12.31	9.58
140	7370	12.21	9.48
141	7420	12.11	9.38
142	7466	12.01	9.28
143	7513	11.91	9.18
144	7563	11.81	9.08
145	7612	11.71	8.98
146	7660	11.61	8.88
147	7712	11.51	8.78
148	7764	11.41	8.68
149	7812	11.31	8.58
150	7865	11.21	8.48
151	7914	11.11	8.38
152	7969	11.01	8.28
153	8020	10.91	8.18
154	8072	10.81	8.08
155	8125	10.71	7.98

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Slug Test Data Report
Project: N. Lancaster 99-2dBR
Number:
Client:
Page 6

Test Well: 99-2dBR
Depth to Static WL: 2.73 [m]
Location:
Recorded by: JBH
Date: 11/23/99

Slug Test: **Bail Test #1**
Test Well: 99-2dBR
Casing radius: 0.025 [m]
Boring radius: 0.038 [m]
Screen length: 6 [m]
Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
156	8178	10.61	7.88
157	8233	10.51	7.78
158	8288	10.41	7.68
159	8343	10.31	7.58
160	8394	10.21	7.48
161	8450	10.11	7.38
162	8508	10.01	7.28
163	8563	9.91	7.18
164	8623	9.81	7.08
165	8679	9.71	6.98
166	8735	9.61	6.88
167	8796	9.51	6.78
168	8849	9.41	6.68
169	8912	9.31	6.58
170	8975	9.21	6.48
171	9037	9.11	6.38
172	9098	9.01	6.28
173	9159	8.91	6.18
174	9222	8.81	6.08
175	13680	5.56	2.83

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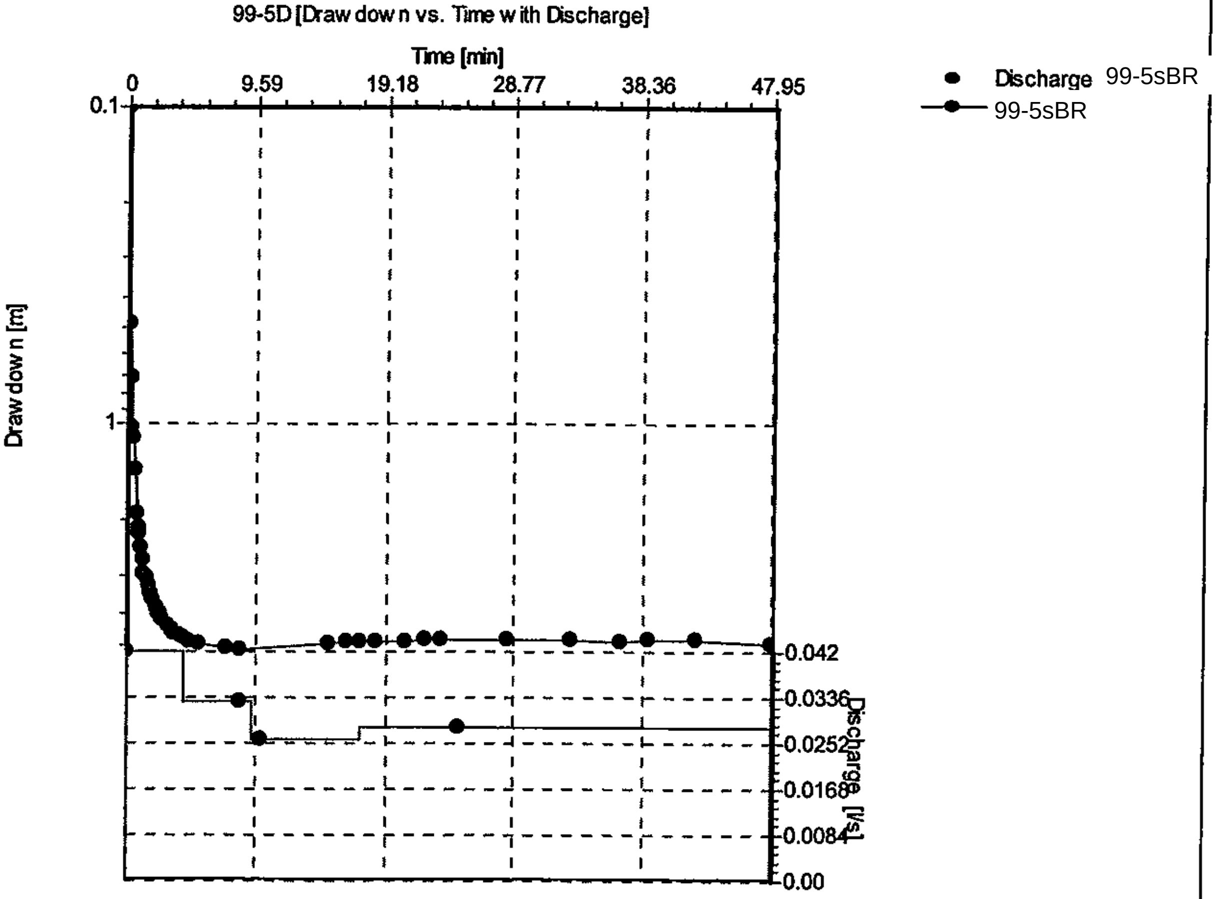
Pumping Test Analysis Report
Project: N. Lancaster Salt Plume Evaluation
Number: 95620
Client:



Pumping Test: 99-5sBR

Analysis Method: **Drawdown vs. Time with Discharge**

Analysis Results:

Test parameters:

Pumping Well:	99-5sBR	Aquifer Thickness:	2.5 [m]
Casing radius:	0.025 [m]		
Screen length:	1.5 [m]		
Boring radius:	0.038 [m]		
Discharge Rate:	0.029420925 [l/s]		

Comments:

Evaluated by: JS
Evaluation Date: 9/12/02

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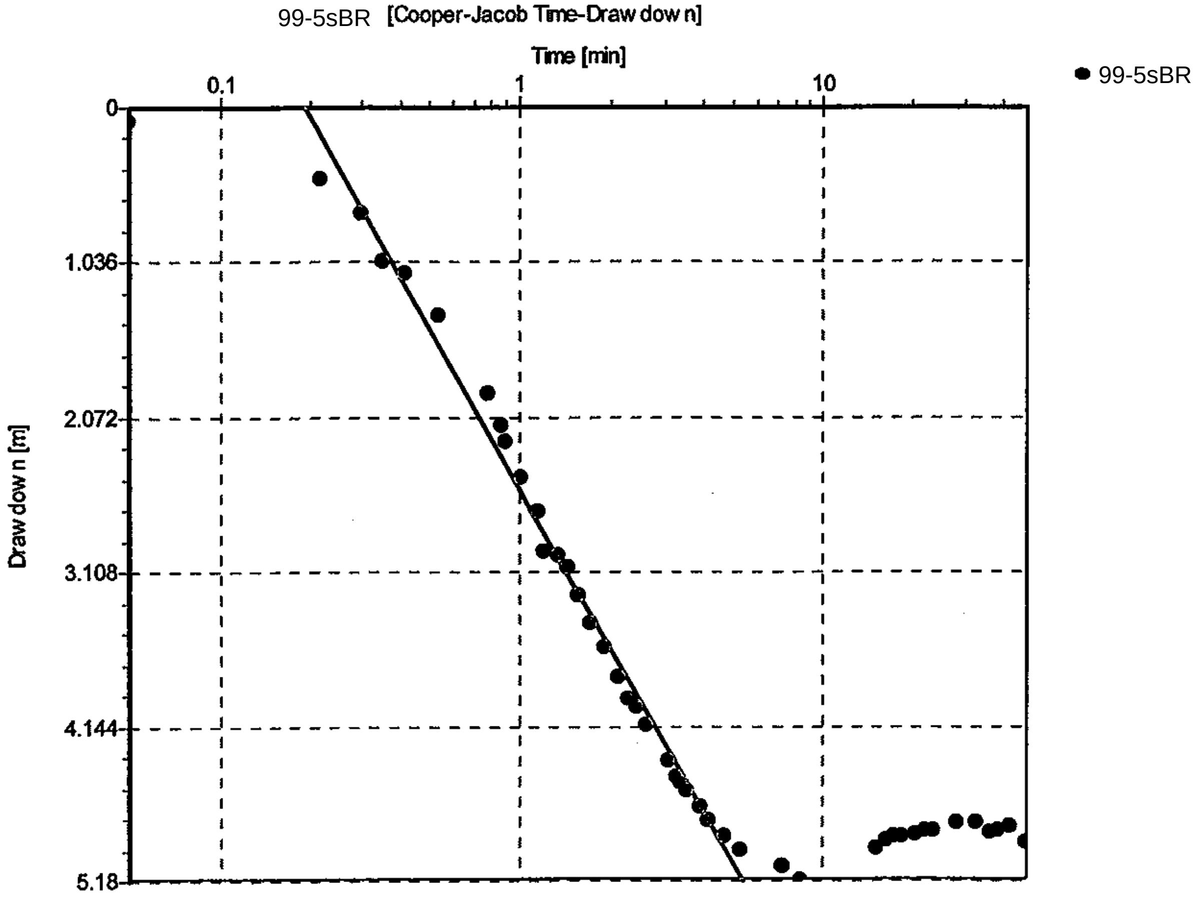
Cornwall, Ontario, Canada
Phone: (613) 933-5602

Pumping Test Analysis Report

Project: N. Lancaster Salt Plume Evaluation

Number: 95620

Client:



Pumping Test: 99-5sBR

Analysis Method: **Cooper-Jacob Time-Drawdown**

Analysis Results:	Transmissivity:	1.51E-6 [m^2/s]	Conductivity:	6.04E-7 [m/s]

Test parameters:	Pumping Well:	99-5sBR	Aquifer Thickness:	2.5 [m]
	Casing radius:	0.025 [m]	Confined Aquifer	
	Screen length:	1.5 [m]		
	Boring radius:	0.038 [m]		
	Discharge Rate:	0.029420925 [l/s]		

Comments:

Evaluated by: JS

Evaluation Date: 9/13/02

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Pumping Test Data Report
Project: N. Lancaster Salt Plume Evaluation
Number: 95620
Client:
Page 1

Data observed at: 99-5sBR
Distance from PW: 0 [m]
Depth to Static WL: 2.92 [m]
Location:
Recorded by: JBH
Date: 1/25/00

Pumping Test: 99-5sBR
Pumping Well: 99-5sBR
Casing radius: 0.025 [m]
Boring radius: 0.038 [m]
Screen length: 1.5 [m]
Aquifer Thickness: 2.5 [m]

	Time [min]	Depth to WL [m]	Drawdown [m]
1	0	2.92	0.00
2	0.05	3.02	0.10
3	0.217	3.40	0.48
4	0.3	3.63	0.71
5	0.35	3.95	1.03
6	0.417	4.03	1.11
7	0.533	4.31	1.39
8	0.783	4.83	1.91
9	0.867	5.05	2.13
10	0.9	5.16	2.24
11	1.017	5.39	2.47
12	1.167	5.62	2.70
13	1.217	5.89	2.97
14	1.35	5.92	3.00
15	1.45	6.00	3.08
16	1.567	6.18	3.26
17	1.733	6.37	3.45
18	1.9	6.54	3.62
19	2.117	6.73	3.81
20	2.3	6.88	3.96
21	2.45	6.93	4.01
22	2.633	7.06	4.14
23	3.083	7.30	4.38
24	3.3	7.40	4.48
25	3.417	7.44	4.52
26	3.567	7.50	4.58
27	3.933	7.60	4.68
28	4.217	7.70	4.78
29	4.717	7.80	4.88
30	5.333	7.90	4.98
31	7.367	8.00	5.08

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Pumping Test Data Report
Project: N. Lancaster Salt Plume Evaluation
Number: 95620
Client:
Page 2

Data observed at: 99-5sBR
Distance from PW: 0 [m]
Depth to Static WL: 2.92 [m]
Location:
Recorded by: JBH
Date: 1/25/00

Pumping Test: 99-5sBR
Pumping Well: 99-5sBR
Casing radius: 0.025 [m]
Boring radius: 0.038 [m]
Screen length: 1.5 [m]
Aquifer Thickness: 2.5 [m]

	Time [min]	Depth to WL [m]	Drawdown [m]
32	8.45	8.10	5.18
33	15.083	7.88	4.96
34	16.283	7.83	4.91
35	17.4	7.80	4.88
36	18.517	7.80	4.88
37	20.633	7.79	4.87
38	22.183	7.77	4.85
39	23.383	7.76	4.84
40	28.217	7.71	4.79
41	33.083	7.71	4.79
42	36.783	7.78	4.86
43	38.75	7.76	4.84
44	42.217	7.74	4.82
45	47.95	7.85	4.93

Pumping Well 99-5sBR
January 25, 2000

Drawdown

Time				Static	Flow	Cond.	Temp.
Hr	min	s	min.min	Level (m)	L/s	uS/cm	°C
11	45	0	0.00	2.92	0.042		
11	45	3	0.05	3.02			
11	45	13	0.22	3.40			
11	45	18	0.30	3.63			
11	45	21	0.35	3.95			
11	45	25	0.42	4.03			
11	45	32	0.53	4.31			
11	45	47	0.78	4.83			
11	45	52	0.87	5.05			
11	45	54	0.90	5.16			
11	46	1	1.02	5.39			
11	46	10	1.17	5.62			
11	46	13	1.22	5.89			
11	46	21	1.35	5.92			
11	46	27	1.45	6.00			
11	46	34	1.57	6.18			
11	46	44	1.73	6.37			
11	46	54	1.90	6.54			
11	47	7	2.12	6.73			
11	47	18	2.30	6.88			
11	47	27	2.45	6.93			
11	47	38	2.63	7.06			
11	48	5	3.08	7.30			
11	48	18	3.30	7.40			
11	48	25	3.42	7.44			
11	48	34	3.57	7.50			
11	48	56	3.93	7.60			
11	49	13	4.22	7.70			
11	49	43	4.72	7.80			
11	50	20	5.33	7.90			
11	52	22	7.37	8.00			
11	53	27	8.45	8.10	0.033	652	8.5
12	0	5	15.08	7.88			
12	1	17	16.28	7.83			
12	2	24	17.40	7.80			
12	3	31	18.52	7.80	0.026		
12	5	38	20.63	7.79			
12	7	11	22.18	7.77			
12	8	23	23.38	7.76			
12	13	13	28.22	7.71			
12	18	5	33.08	7.71	0.028		
12	21	47	36.78	7.78			
12	23	45	38.75	7.76			
12	27	13	42.22	7.74			
12	32	57	47.95	7.85			

Observation Well 97-1

Time			Static
Hr	min	min.min.	Level (m)
11	45	0.00	2.72
11	51	6.00	2.72
12	0	15.00	2.72
12	5	20.00	2.72
12	20	35.00	2.73
12	34	49.00	2.74

Waterloo Hydrogeologic
180 Columbia St. W.
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ph.(519)746-1798

Pumping test analysis
Time-Drawdown plot
with discharge

Date: 15.02.2000
Page 1

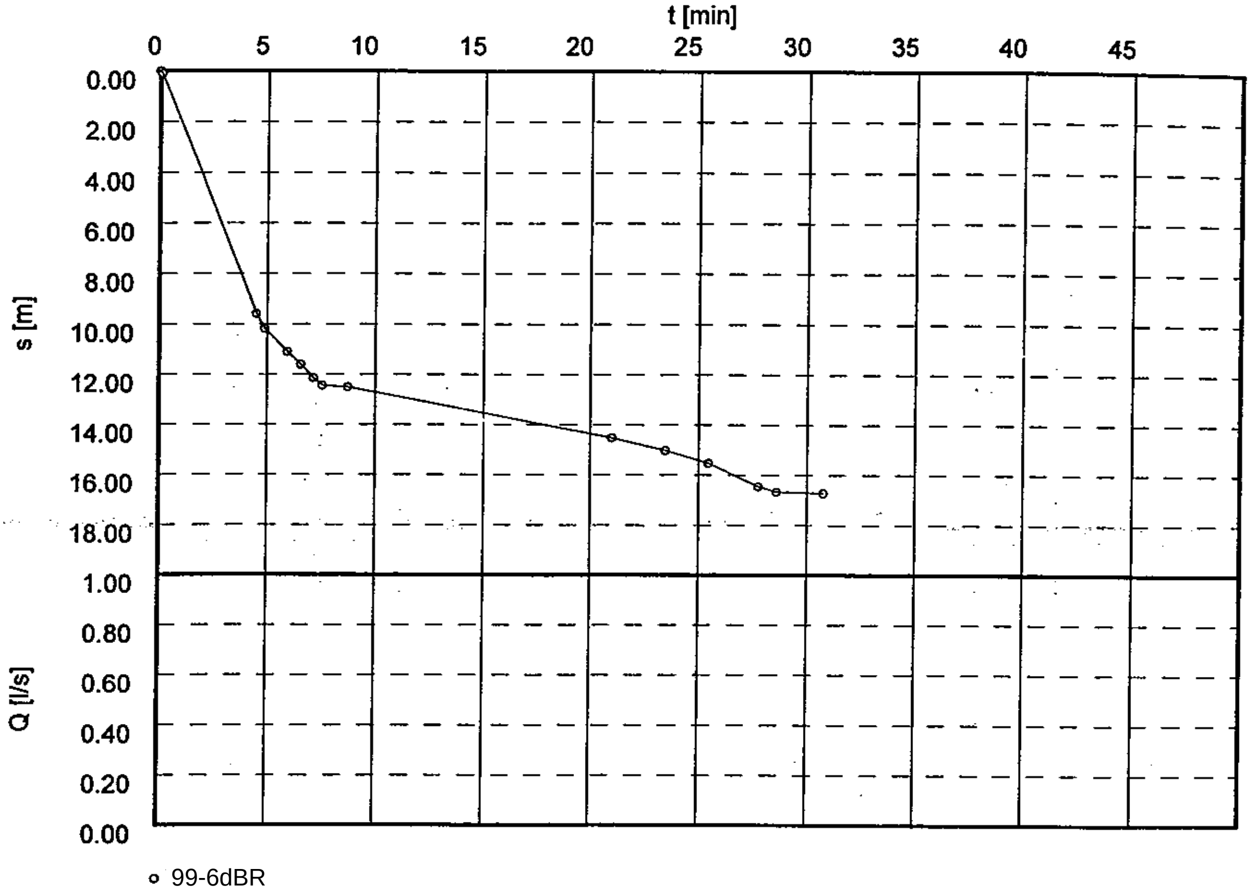
Project: North Lancaster Landfill

Evaluated by: KM

Pumping Test No. 1

Test conducted on: January 25, 2000

99-6dBR



Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown plot with discharge	Date: 15.02.2000 Page 2 Project: North Lancaster Landfill Evaluated by: KM

Pumping Test No. 1	Test conducted on: January 25, 2000
99-6dBR	99-6dBR
	Distance from the pumping well 0.010 m

Static water level: 10.580 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]	
1	0.00	10.580	0.000	
2	0.08	10.680	0.100	
3	4.50	20.170	9.590	
4	4.90	20.760	10.180	
5	5.95	21.680	11.100	
6	6.58	22.190	11.610	
7	7.17	22.720	12.140	
8	7.58	23.030	12.450	
9	8.75	23.090	12.510	
10	21.02	25.100	14.520	
11	23.50	25.600	15.020	
12	25.47	26.110	15.530	
13	27.77	27.030	16.450	
14	28.60	27.250	16.670	
15	30.75	27.300	16.720	

Waterloo Hydrogeologic
180 Columbia St. W.
Waterloo,Ontario,Canada
ph.(519)746-1798

Pumping test analysis
Time-Drawdown-method after
COOPER & JACOB
Confined aquifer

Date: 15.02.2000 Page 1

Project: North Lancaster Landfill

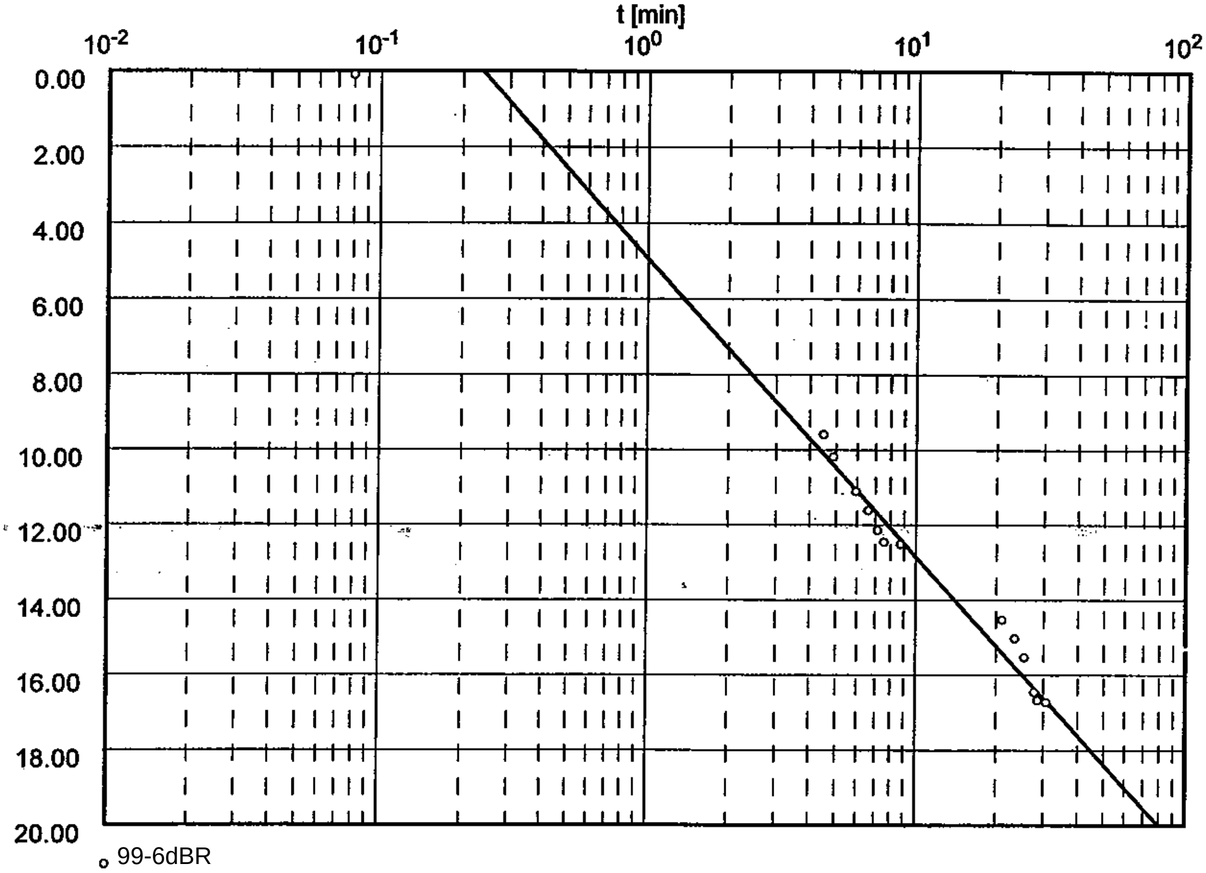
Evaluated by: KM

Pumping Test No. 1

Test conducted on: January 25, 2000

99-6dBR

Discharge 0.04 l/s



Transmissivity [m²/min]: 5.27×10^{-5}

Storativity: 2.81×10^{-1}

Waterloo Hydrogeologic 180 Columbia St. W. Waterloo,Ontario,Canada ph.(519)746-1798	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 15.02.2000	Page 2
		Project: North Lancaster Landfill	
		Evaluated by: KM	

Pumping Test No. 1	Test conducted on: January 25, 2000
99-6dBR	99-6dBR
Discharge 0.04 l/s	Distance from the pumping well 0.010 m
Static water level: 10.580 m below datum	

	Pumping test duration [min]	Water level [m]	Drawdown [m]	
2	0.08	10.680	0.100	
3	4.50	20.170	9.590	
4	4.90	20.760	10.180	
5	5.95	21.680	11.100	
6	6.58	22.190	11.610	
7	7.17	22.720	12.140	
8	7.58	23.030	12.450	
9	8.75	23.090	12.510	
10	21.02	25.100	14.520	
11	23.50	25.600	15.020	
12	25.47	26.110	15.530	
13	27.77	27.030	16.450	
14	28.60	27.250	16.670	
15	30.75	27.300	16.720	

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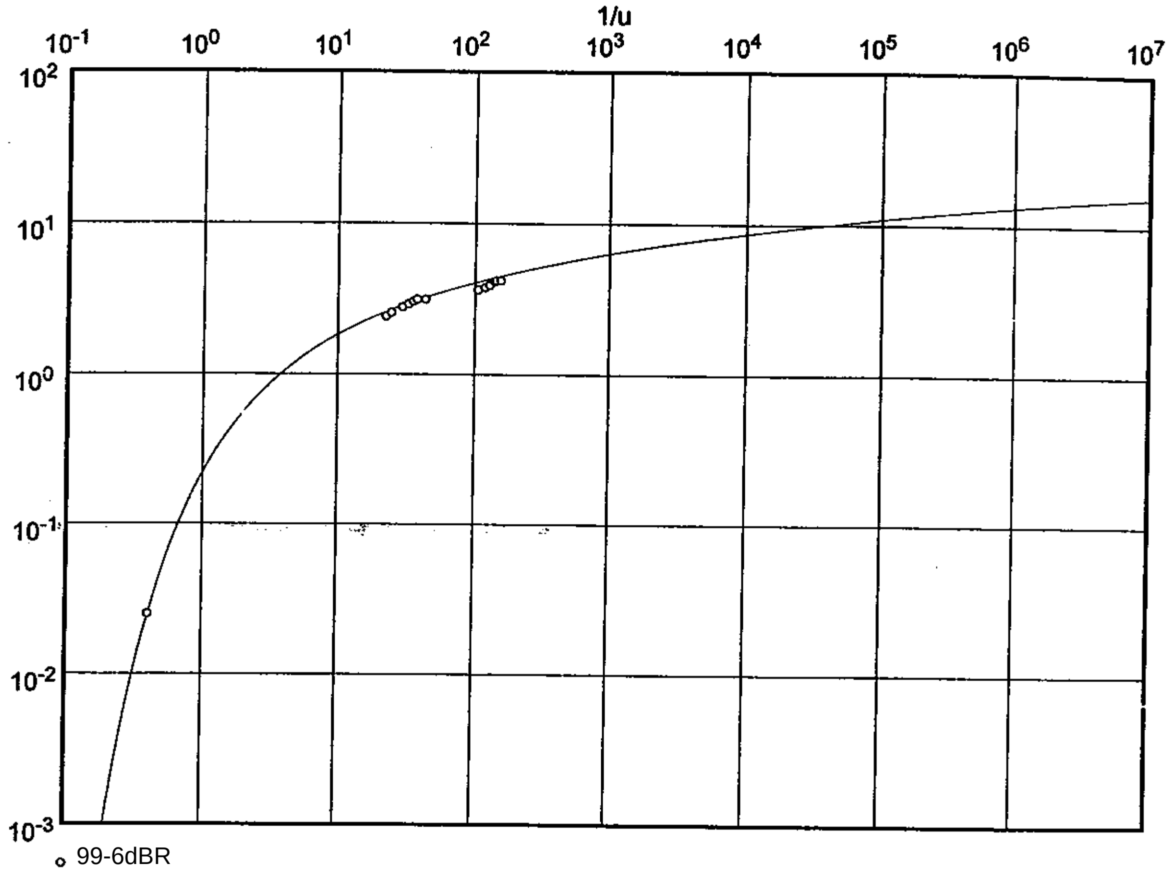
Pumping test analysis
Theis analysis method
Confined aquifer

Date: 15.02.2000 Page 1
Project: North Lancaster Landfill
Evaluated by: KM

Pumping Test No. 1
Test conducted on: January 25, 2000
99-6dBR
Discharge 0.04 l/s



Transmissivity [m²/min]: 4.55×10^{-5}

Storativity: 3.63×10^{-1}

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Pumping test analysis
Theis analysis method
Confined aquifer

Date: 15.02.2000 Page 2
Project: North Lancaster Landfill
Evaluated by: KM

Pumping Test No. 1	Test conducted on: January 25, 2000
99-6dBR	99-6dBR
Discharge 0.04 l/s	Distance from the pumping well 0.010 m

Static water level: 10.580 m below datum

	Pumping test duration [min]	Water level [m]	Drawdown [m]	
2	0.08	10.680	0.100	
3	4.50	20.170	9.590	
4	4.90	20.760	10.180	
5	5.95	21.680	11.100	
6	6.58	22.190	11.610	
7	7.17	22.720	12.140	
8	7.58	23.030	12.450	
9	8.75	23.090	12.510	
10	21.02	25.100	14.520	
11	23.50	25.600	15.020	
12	25.47	26.110	15.530	
13	27.77	27.030	16.450	
14	28.60	27.250	16.670	
15	30.75	27.300	16.720	

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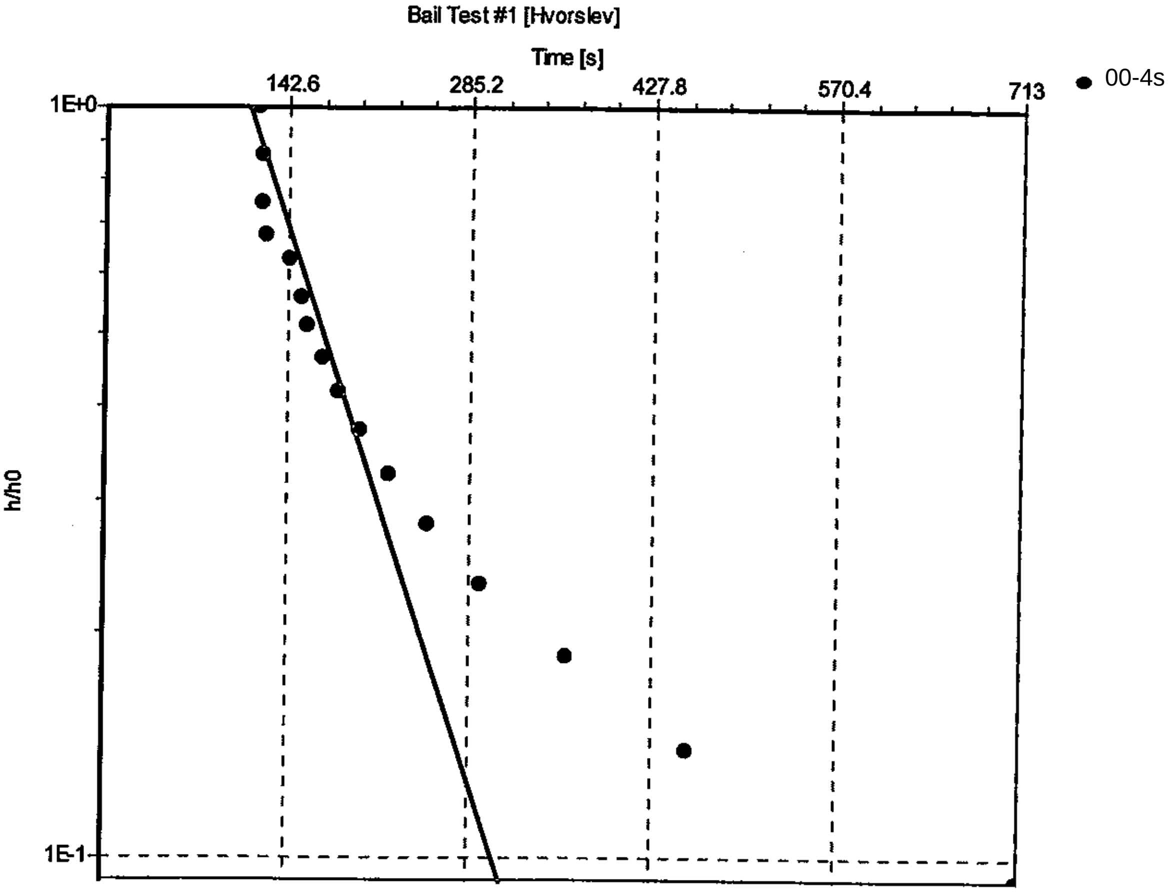
Slug Test Analysis Report
Project: N. Lancaster 00-4s
Number:
Client:



Slug Test: **Bail Test #1**

Analysis Method: **Hvorslev**

Analysis Results:

Conductivity: **7.43E-6 [m/s]**

Test parameters:
Test Well: 00-4s
Casing radius: **0.025 [m]**
Screen length: **1.5 [m]**
Boring radius: **0.076 [m]**
Aquifer Thickness:

Comments:

Evaluated by: JS
Evaluation Date: 9/13/02

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Cornwall, Ontario, Canada
Phone: (613) 933-5602

Slug Test Data Report

Project: N. Lancaster 00-4s

Number:

Client:

Page 1

Test Well: 00-4s

Depth to Static WL: 1.28 [m]

Location:

Recorded by: JBH

Date: 11/30/00

Slug Test: Bail Test #1

Test Well: 00-4s

Casing radius: 0.025 [m]

Boring radius: 0.076 [m]

Screen length: 1.5 [m]

Aquifer Thickness:

	Time [s]	Depth to WL [m]	Drawdown [m]
1	120	1.71	0.43
2	122	1.65	0.37
3	123	1.60	0.32
4	125	1.57	0.29
5	144	1.55	0.27
6	154	1.52	0.24
7	158	1.50	0.22
8	170	1.48	0.20
9	183	1.46	0.18
10	200	1.44	0.16
11	223	1.42	0.14
12	253	1.40	0.12
13	295	1.38	0.10
14	362	1.36	0.08
15	455	1.34	0.06
16	713	1.32	0.04

```
 CONCESSION         WELL EASTING  ELEV                   DIA   OF   FOUND LVL  LVL  RATE TIME  WATER       DEPTHS IN FEET TO WHICH
    ETC        LOT   NO  NORTHING FEET DATE DRILLER INS WATER FEET  FEET FEET GPM  HR/MN  USE           FORMATIONS EXTEND


 MUNICIPALITY CODE 23003  (CONTINUED...)

                    2120 5007300                                                               GREY HPAN HARD 0042 GREY GRVL BLDR HARD
                                                                                               0054 GREY STNS HARD 0067
  CON         7  11   23-  541850   225 02/76  1414    5  FR     54    20   35   10  1/00 DO   BESNER GUY
                    1655 5015200                                                               BRWN TPSL SOFT 0004 BRWN HPAN HARD 0045
                                                                                               GREY GRVL HARD 0049 BLCK ROCK HARD 0056
  CON         7  14   23-  541040   210 07/68  1414    5  FR     56    20   35   10  1/00 DO   HUMBLE R
                     960 5014220                                                               HPAN BLDR 0025 HPAN 0050 GRVL 0055 LMSN
                                                                                               0058
  CON         7  14   23-  541099   225 08/79  1414    6  FR     63    31   50    8  1/00 DO   BESNER & FRERES
                    2320 5014499                                                               PRDG 0022 GREY HPAN BLDR HARD 0050 GREY
                                                                                               GRVL HARD 0053 GREY STNS HARD 0065
  CON         7  15   23-  540760   245 05/71  3302    6  FR     58    18   40    3  1/00 ST   BERNARD G B
                    1243 5013950                                                               HPAN 0044 GRVL 0049 ROCK 0072
  CON         7  16   23-  540265   250 04/65  1414    5  FR     55    15   30    5  1/00 ST DO GOULET L
                     660 5014000                                                               YLLW TPSL 0010 HPAN 0046 GRVL 0054 GREY
                                                                                               ROCK 0060
  CON         7 -17   23-  540250   230 03/56  1632    2  FR    100    22   50    1  1/00 ST DO VACHAN T
                     661 5013590                                                               MSND BLDR 0031 BLUE LMSN 0135
  CON         7  17   23-  540500   245 09/60  4609    5  FR     67    28   35   10  2/00 DO   GEORGES J
                     662 5013150                                                               PRDG 0014 HPAN BLDR 0042 LMSN 0067
  CON         7  17   23-  540135   255 09/64  3302    6  FR    142    82  114    3  8/00 DO   SEPARATE SCHOOL
                     663 5013640                                                               PRDG 0030 HPAN 0080 ROCK 0142
  CON         7  17   23-  539350   257 01/65  3302    6  FR     73    43   46    5  4/00 ST   JARDINE C
                     664 5015175                                                               PRDG 0022 HPAN 0041 ROCK 0073
  CON         7  18   23-  539740   225 08/68  3302    4  FR     50    30   32    5  3/00 DO   MCDOUGALL J J
                     991 5013330                                                               PRDR 0030 HPAN 0050 ROCK 0080
  CON         7  20   23-  538440   260 02/68  3302    5  SU     60    44   46    4  4/00 ST DO OUIMET D
                     990 5014340                                                               HPAN 0038 GRVL 0042 ROCK 0060
  CON         7  21   23-  538611   235 10/73  1414    6  FR     54    25   37   10  1/00 DO   LEMIEUX E R
                    1633 5013228                                                               BRWN HPAN BLDR 0039 GREY GRVL 0048 BLCK
                                                                                               ROCK 0055
  CON         7  22   23-  537550   250 10/70  1517    6  FR     76    30   65    5  1/00 DO   REMI CAMPEAU
                    1190 5014158                                                               BRWN TPSL 0010 GREY OBDN 0044 MSND 0080
  CON         7  22   23-  537600   250 02/73  3302    6  FR     48    12   18    3  1/00 DO   VANLOENEN J
                    1411 5014200                                                               HPAN 0035 ROCK 0048
  CON         7  22   23-  538350   225 11/78  3302    6  FR     78    20   29    2  1/00 ST   TYTYE M
                    2082 5012750                                                               HPAN 0054 STNS 0080
  CON         7  23   23-  537973   250 06/73  1414    6  FR     52     6   42   15  1/00 DO   DAVIS BRUCE
                    1405 5012511                                                               GREY HPAN 0032 GREY GRVL 0042 BLCK ROCK
                                                                                               0056
  CON         7  23   23-  537650   225 10/76  1414    6  FR     40     2   10   40  1/00 DO   BURTON HAROLD
                    1725 5013000                                                                RED CLAY SOFT 0012 BLUE CLAY SOFT 0033
                                                                                               GREY GRVL BLDR HARD 0038 WHIT LMSN HARD
                                                                                               0041
  CON     3   7  24   23-  538150   215 01/69  4815    6  FR     69    22   70    2  1/00 DO   CAMPEAU A
                    1021 5012060                                                                RED GRVL STNS 0012 BRWN BLDR 0016 BRWN
                                                                                               GRVL 0031 BRWN BLDR 0037 GREY GRVL 0048
                                                                                               BRWN LMSN 0080
  CON     2   7  25   23-  537250   245 05/77  3302    6  FR     90    15   28    3  1/00 ST   LEGAULT MARCEL
                    1800 5012450                                                               HPAN 0038 ROCK 0092
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                          UTM                            CSG KIND  WATER STAT PUMP TEST TEST                 OWNER/LOG/SCREEN
 CONCESSION         WELL EASTING  ELEV                   DIA  OF   FOUND LVL  LVL  RATE TIME  WATER      DEPTHS IN FEET TO WHICH
    ETC        LOT   NO  NORTHING FEET DATE DRILLER INS WATER FEET  FEET FEET GPM  HR/MN  USE           FORMATIONS EXTEND


 MUNICIPALITY CODE 23003  (CONTINUED...)

  CON    \    7  25   23-  537500   240 09/77  1505    6  FR    293    30  300    1  1/00 DO   ROTHGET R
                    1928 5011800                                                               BRWN FILL LOOS PCKD 0002 BRWN CLAY BLDR
                                                                                               HARD 0034 BRWN CLAY SAND GRVL 0054 GREY
                                                                                               LMSN STNS HARD 0303
  CON         7  26   23-  536740   250 07/71  4609    6  FR     50    10   30    5  1/00 DO   REMI E
                    1305 5012550                                                               BRWN HPAN BLDR 0025 GREY GRYL BLDR 0040
                                                                                               GREY LMSN 0053
  CON         7  27   23-  536430   225 05/65  1414    5  FR    105    25   50    5  1/00 ST DO CUERRIERE M
                     665 5012310                                                               HPAN 0050 BLCK MSND 0053 LMSN 0098 BLCK
                                                                                               ROCK 0112
  CON         7  28   23-  536030   245 01/68  4609    6  FR     61    15   24    7  1/60 ST DO VIAU A
                    1024 5012320                                                               CLAY 0016 HPAN BLDR 0031 LMSN 0061
  CON         7  29   23-  535350   225 08/57  4308    6  FR     79    17   19    4  1/00 ST DO VIAU E
                     666 5012240                                                               HPAN 0064 GRVL 0066 GREY LMSN 0085
  CON         7  30   23-  535640   250 02/69  4815    6  FR     45    29   65    2  1/00 DO   MORAWSKI G
                    1023 5010920                                                                RED BLDR 0018 GREY GRVL 0023 GREY ROCK
                                                                                               0025 GREY LMSN 0069
  CON         7  31   23-  534900   250 01/56  4308    6  FR     74    15   25    8   /30 ST DO BRUNET J
                     667 5011790                                                               HPAN 0054 GRVL 0055 LMSN 0085
  CON         7  34   23-  533700   225 08/76  1414    6  FR     75    20   49    8  1/00 DO   LAMBERT CHARLES
                    1718 5011650                                                               GREY HPAN BLDR HARD 0056 GREY ROCK HARD
                                                                                               0075
  CON         7  35   23-  533969   250 10/73  1414    6  FR     58    12   40   10  1/00 DO   CAMPEAU ADOLPHUS
                    1457 5010516                                                               BLCK TPSL 0006 BRWN HPAN 0030 BRWN SAND
                                                                                               0040 BRWN GRVL 0045 WHIT LMSN 0060
  CON         7  35   23-  533150   225 09/77  1414    6  FR     34     8   87    7  1/00 DO   LAVARI R
                    1912 5011550                          FR     75                            BLUE HPAN HARD 0025 BLCK STNS HARD 0034
                      *                                   FR    100                            BLUE STNS HARD 0102
  CON         7  36   23-  533760   250 10/69  1414    5  SU     55    30   40   12  1/45 DO   MACDONALD M
                    1087 5010200                                                               BRWN GRVL 0010 GREY HPAN BLDR 0040 BLUE
                                                                                               GRVL 0047 WHIT LMSN 0054 BLCK ROCK 0057
  CON         7  36   23-  532700   240 02/76  1414    5  FR     69     5   25   10  1/00 DO   CHARBONNEAU ROBERT
                    1654 5011300                                                                RED CLAY SOFT 0012 BLUE CLAY SOFT 0064
                                                                                               GREY GRVL HARD 0066 BLCK ROCK HARD 0070
  CON         7  37   23-  532500   215 01/76  1414    6  FR     61     7   30   10  1/00 DO   MCDONALD CAMERON
                    1658 5010650                                                               BRWN TPSL SOFT 0002 GREY HPAN 0049 GREY
                                                                                               GRVL HARD 0054 GREY LMSN HARD 0062
  CON         7  38   23-  532225   240 11/60  4609    5  FR     70    12   24   14  2/00 DO   MCDONALD J
                     668 5011110                                                               PRDG 0012 HPAN BLDR 0025 QSND 0045 GRVL
                                                                                               0050 LMSN 0070
  CON         7  38   23-  532925   250 05/66  1411    5  FR     45    16   35    5  2/00 DO   GAUTHIER M
                     669 5009675                                                               CLAY BLDR 0020 GRVL CLAY 0030 CLAY 0042
                                                                                               GRVL STNS 0051
  CON         7  38   23-  532120   225 07/70  4609    6  FR     70    12   60    3  1/00 DO   CHARBONNEAU P E
                    1151 5010840                                                               BRWN TPSL 0001 BRWN HPAN BLDR 0021 GREY
                                                                                               GRVL BLDR 0062 GREY QSND BLDR 0070
  CON         7  38   23-  532050   235 06/76  1414    6  FR     43     5   10   20  1/00 DO   BAKER L
                    1706 5010950                                                               GREY HPAN HARD 0035 GREY GRVL HARD 0044
  CON         7  38   23-  532799   250 06/79  4609    6  FR     50    21   40   20  1/00 DO   CAMPEAU R
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- CONTINUED -

Ontario Ministry of the Environment

Well Tag Number (P A 036063

A 036063

Well Record

Regulation 903 Ontario Water Resources Act

page 1 of 2

Instructions for Completing Form

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- Questions regarding completing this application can be directed to the Water Well Help Desk (Toll Free) at 1-888-396-9355.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only
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Well Owner's Information and Location of Well Information

First Name: Township of
Last Name: South Glengarry
Mailing Address (Street Number/Name, RR, Lot, Concession): P.O Box 220
County/District/Municipality:
Township/City/Town/Village: Lancaster
Province: Ontario
Postal Code: K0C1N0
Telephone Number (include area code):
Address of Well Location (County/District/Municipality): Glengarry
Township: South Glengarry
Lot: 24
Concession: 7
RR#/Street Number/Name: Con 6/7 Road Allowance
City/Town/Village: North Lancaster
Site/Compartment/Block/Tract etc.:
GPS Reading: NAD 83 Zone 18 Easting 538045 Northing 5012038
Unit Make/Model: magellan
Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see Instructions)

General Colour	Most common material	Other Materials	General Description	Depth Metres From	To
	sandy clay			0	4.3
	gravel.			4.3	5.2

monitoring well 06-1A
2 piezometers (06-1s
06-1d)

Hole Diameter

Depth Metres From	To	Diameter Centimetres
0	5.2	20.32

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres From	To
Casing				
15.88	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.48	+.9	1.5
2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	06-1AS	+.9.	2.0
2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	061Ad	+.9	3.0
Screen				
Outside diam		Slot No.		
2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	⑤	2.0	3.6
		⑩	3.0	4.6
No Casing or Screen				
	☒ Open hole gravel.		4.6	5.2

Water Record

Water found at ___ Metres / Kind of Water

☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

After test of well yield, water was ☐ Clear and sediment free ☐ Other, specify
Chlorinated ☐ Yes ☐ No

Test of Well Yield

Pumping test method
Pump intake set at - (metres)
Pumping rate - (litres/min)
Duration of pumping ___hrs + ___ min
Final water level end of pumping ___ metres
Recommended pump type. ☐ Shallow ☐ Deep
Recommended pump depth. ___ metres
Recommended pump rate. (litres/min)
If flowing give rate - (litres/min)
If pumping discontinued, give reason.

Draw Down Time min	Water Level Metres	Recovery Time min	Water Level Metres
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

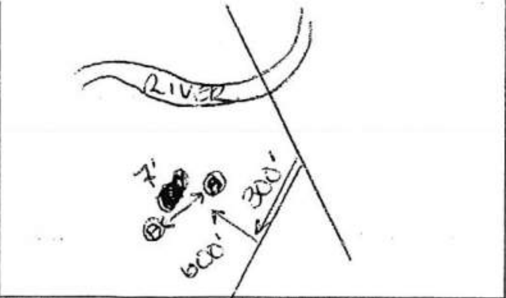
Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
5.2	4.6	gravel	
4.6	2.7	sand	
2.7	2.4	holeplug	
2.4	0.6	sand	
0.6	0	holeplug	

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 64747
Date Well Completed YYYY MM DD: 2006 03 20
Was the well owner's information package delivered? ☐ Yes ☐ No
Date Delivered YYYY MM DD: NA

Method of Construction

☐ Cable Tool ☐ Rotary (conventional) ☐ Rotary (reverse) ☐ Rotary (air) ☒ Air percussion ☐ Boring ☐ Diamond ☐ Jetting ☐ Driving ☐ Digging ☐ Other

Water Use

☐ Domestic ☐ Stock ☐ Irrigation ☐ Industrial ☐ Commercial ☐ Municipal ☐ Public Supply ☒ Not used ☐ Cooling & air conditioning ☐ Other

Final Status of Well

☐ Water Supply ☒ Observation well ☐ Test Hole ☐ Recharge well ☐ Abandoned, insufficient supply ☐ Abandoned, poor quality ☐ Unfinished ☐ Dewatering ☐ Replacement well ☐ Abandoned, (Other)

Well Contractor/Technician Information

Name of Well Contractor: Airlock Drilling Co Ltd
Well Contractor's Licence No.: 1119
Business Address (street name, number, city etc.): RR#1 Richmond, Ont
Name of Well Technician (last name, first name): Hogan Dan
Well Technician's Licence No.: T3058
Signature of Technician/Contractor: X
Date Submitted YYYY MM DD

Ministry Use Only
Data Source
Contractor
Date Received YYYY MM DD
Date of Inspection YYYY MM DD
Remarks
Well Record Number

0506E (08/2006)

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Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below)

A036063

Well Record

Regulation 903 Ontario Water Resources Act

page 2 of 2

Instructions for Completing Form

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- Please print clearly in blue or black ink only.

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Well Owner's Information and Location of Well Information

First Name / Last Name: Township of South Glengarry

Mailing Address (Street Number/Name, RR,Lot,Concession): P.O. Box 220

County/District/Municipality:

Township/City/Town/Village: Lancaster

Province: Ontario

Postal Code: K0C1N0

Telephone Number (include area code):

Address of Well Location (County/District/Municipality): Glengarry

Township: South Glengarry

Lot: 24

Concession: 7

RR#/Street Number/Name: Con 6/7 Road Allowance

City/Town/Village: North Lancaster.

Site/Compartment/Block/Tract etc.:

GPS Reading: NAD 83 Zone 18 Easting 538045 Northing 5012238

Unit Make/Model: Magellan

Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth Metres From	Depth Metres To
	Sandy clay			0	4.3
	gravel			4.3	5.5
dark grey / black	Limestone			5.5	29.70
		Monitoring well	06-1B (06-1dBR)		

Hole Diameter

Depth Metres From	Depth Metres To	Diameter Centimetres
0	29.7	15.23

Water Record

Water found at ___ Metres / Kind of Water

- ☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
- ☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
- ☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

After test of well yield, water was ☐ Clear and sediment free ☐ Other, specify

Chlorinated ☐ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres From	Depth Metres To
Casing			T.O.C	
15.88	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized		0	6.4
2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized		0	23.60 ~~[illegible]~~
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam		Slot No.		
2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized		23.6	29.7
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

Pumping test method	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ___ hrs + ___ min	2		2	
Final water level end of pumping ___ metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ___ metres	5		5	
Recommended pump rate. (litres/min)	10		10	
	15		15	
If flowing give rate - (litres/min)	20		20	
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	Depth set at - Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
29.7	22.2	Sand	
22.2	0	hole plug	

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.

↑N

See map Page 1

Method of Construction

☐ Cable Tool ☐ Rotary (conventional) ☐ Rotary (reverse) ☐ Rotary (air) ☒ Air percussion ☐ Boring ☐ Diamond ☐ Jetting ☐ Driving ☐ Digging ☐ Other

Water Use

☐ Domestic ☐ Stock ☐ Irrigation ☐ Industrial ☐ Commercial ☐ Municipal ☐ Public Supply ☒ Not used ☐ Cooling & air conditioning ☐ Other

Final Status of Well

☐ Water Supply ☒ Observation well ☐ Test Hole ☐ Recharge well ☐ Abandoned, insufficient supply ☐ Abandoned, poor quality ☐ Unfinished ☐ Dewatering ☐ Replacement well ☐ Abandoned, (Other)

Audit No. Z 64748

Date Well Completed: 2006 02 20

Was the well owner's information package delivered? ☐ Yes ☐ No

Date Delivered: NA

Well Contractor/Technician Information

Name of Well Contractor: Air Rock Drilling Co Ltd

Well Contractor's Licence No.: 1119

Business Address (street name, number, city etc.): RR#1 Richmond, Ont

Name of Well Technician (last name, first name): Hogan Dan

Well Technician's Licence No.: T3058

Signature of Technician/Contractor: X

Date Submitted:

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Data Source | Contractor

Date Received | Date of Inspection

Remarks | Well Record Number

0506E (08/2006)

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Ontario Ministry of the Environment

Well Tag Number (Pl A 036061

A036061

Well Record

Regulation 903 Ontario Water Resources Act

page 1 of 2

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- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only MUN CON LOT

Well Owner's Information and Location of Well Information

First Name: Township of | Last Name: South Glengarry | Mailing Address (Street Number/Name, RR,Lot,Concession): P.O. Box 220

County/District/Municipality: | Township/City/Town/Village: Lancaster | Province: **Ontario** | Postal Code: K0C 1N0 | Telephone Number (include area code):

Address of Well Location (County/District/Municipality): Glengarry | Township: South Glengarry | Lot: 25 | Concession: 7

RR#/Street Number/Name: Con 6/7 Road Allowance | City/Town/Village: North Lancaster. | Site/Compartment/Block/Tract etc.:

GPS Reading NAD 83 Zone 18 Easting 537398 Northing 5011908 | Unit Make/Model: Magellan | Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth Metres From	Depth Metres To
	sandy clay			0	3.96
	gravel			3.96	5.48

Monitoring Well 06-2A
2 piezometers installed 06-2S
06-2d.

Hole Diameter

Depth Metres From	Depth Metres To	Diameter Centimetres
0	5.48	20.32

Water Record

Water found at ___ Metres / Kind of Water

- ☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
- ☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
- ☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

After test of well yield, water was ☐ Clear and sediment free ☐ Other, specify

Chlorinated ☐ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres From	Depth Metres To
Casing				
15.88	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.48	TOC 0	2.4
2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	06-2S	+.9	1.38
2	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	06-2d	+.9	2.73
Screen				
Outside diam 2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	Slot No. 06-2S	1.38	2.90
		06-2d	2.73	4.25
No Casing or Screen				
	☒ Open hole gravel		4.25	5.48

Test of Well Yield

Pumping test method
Pump intake set at - (metres)
Pumping rate - (litres/min)
Duration of pumping ___ hrs + ___ min
Final water level end of pumping ___ metres
Recommended pump type. ☐ Shallow ☐ Deep
Recommended pump depth. ___ metres
Recommended pump rate. (litres/min)
If flowing give rate - (litres/min)
If pumping discontinued, give reason.

Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

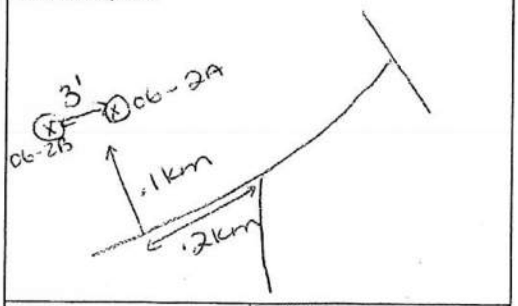
Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	Depth set at - Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
5.48	4.57	Gravel	
4.57	3.05	Sand	
3.05	2.74	holeplug	
2.74	1.52	Sand.	
1.5	0	holeplug	

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Method of Construction

☐ Cable Tool ☐ Rotary (conventional) ☐ Rotary (reverse) ☐ Rotary (air) ☒ Air percussion ☐ Boring ☐ Diamond ☐ Jetting ☐ Driving ☐ Digging ☐ Other

Water Use

☐ Domestic ☐ Stock ☐ Irrigation ☐ Industrial ☐ Commercial ☐ Municipal ☐ Public Supply ☒ Not used ☐ Cooling & air conditioning ☐ Other

Final Status of Well

☐ Water Supply ☒ Observation well ☐ Test Hole ☐ Recharge well ☐ Abandoned, insufficient supply ☐ Abandoned, poor quality ☐ Unfinished ☐ Dewatering ☐ Replacement well ☐ Abandoned, (Other)

Audit No. Z 64749

Date Well Completed YYYY 2006 MM 10 DD 21

Was the well owner's information package delivered? ☐ Yes ☐ No

Date Delivered YYYY MM DD NA

Well Contractor/Technician Information

Name of Well Contractor: Airock Drilling Co Ltd | Well Contractor's Licence No.: 1119

Business Address (street name, number, city etc.): RR#1 Richmond, Ont

Name of Well Technician (last name, first name): Hogan Dan | Well Technician's Licence No.: T3058

Signature of Technician/Contractor: X | Date Submitted YYYY MM DD

Ministry Use Only

Data Source | Contractor

Date Received YYYY MM DD | Date of Inspection YYYY MM DD

Remarks | Well Record Number

0506E (08/2006)

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Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below)
A036061

Well Record

Regulation 903 Ontario Water Resources Act

page 2 of 2

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Well Owner's Information and Location of Well Information

See Page 1

First Name	Last Name	Mailing Address (Street Number/Name, RR,Lot,Concession)	
County/District/Municipality	Township/City/Town/Village	Province Ontario	Postal Code / Telephone Number (include area code)
Address of Well Location (County/District/Municipality)	Township	Lot	Concession
RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.	
GPS Reading NAD 83 Zone Easting Northing	Unit Make/Model	Mode of Operation: ☐ Undifferentiated ☐ Averaged ☐ Differentiated, specify	

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth Metres From	To
	sandy clay			0	3.96
	gravel			3.96	5.49
dark grey/black	Limestone			5.49	27.7

Monitoring Well - 06-2B (06-2d BR)
piezometer installed.

Hole Diameter

Depth Metres From	To	Diameter Centimetres
0	27.7	15.23

Water Record

Water found at ___ Metres / Kind of Water
- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:

After test of well yield, water was ☐ Clear and sediment free ☐ Other, specify ___

Chlorinated ☐ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres From	To
Casing				
15.88	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.48	TOC 0	6.7
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized		+.9	21.6
Screen				
Outside diam	Material	Slot No.		
2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized		21.6	27.7
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

Pumping test method	Draw Down Time min	Water Level Metres	Recovery Time min	Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ___ hrs + ___ min	2		2	
Final water level end of pumping ___ metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ___ metres	5		5	
Recommended pump rate. (litres/min)	10		10	
If flowing give rate - (litres/min)	15		15	
If pumping discontinued, give reason.	20		20	
	25		25	
	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record ☒ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
27.7	20.1	Sand	
20.1	0	holeplug	

Location of Well

In diagram below show distances of well from road, lot line, and building Indicate north by arrow.

See map page 1

Method of Construction

☐ Cable Tool ☐ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☒ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

☐ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☒ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☐ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☒ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Audit No. Z 64750

Date Well Completed YYYY MM DD: 2006 03 31

Was the well owner's information package delivered? ☐ Yes ☐ No

Date Delivered YYYY MM DD: NA

Well Contractor/Technician Information

Name of Well Contractor: Airlock Drilling Co Ltd
Well Contractor's Licence No.: 1119
Business Address (street name, number, city etc.): RR#1 Richmond, Ont
Name of Well Technician (last name, first name): Logan Dan
Well Technician's Licence No.: T3058
Signature of Technician/Contractor: X
Date Submitted YYYY MM DD

Ministry Use Only

Data Source | Contractor
Date Received YYYY MM DD | Date of Inspection YYYY MM DD
Remarks | Well Record Number

0506E (08/2006)

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Ontario Ministry of the Environment

Well Tag Number (Ple A 036062

AO 36062

Well Record

Regulation 903 Ontario Water Resources Act

page 1 of 1

Instructions for Completing Form

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- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Help Desk (Toll Free) at 1-888-396-9355.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only
MUN
CON
LOT

Well Owner's Information and Location of Well Information

First Name: Township of
Last Name: South Glengarry
Mailing Address (Street Number/Name, RR,Lot,Concession): P.O. Box 220
County/District/Municipality:
Township/City/Town/Village: Lancaster
Province: Ontario
Postal Code: K0C1N0
Telephone Number (include area code):
Address of Well Location (County/District/Municipality): Glengarry
Township: South Glengarry
Lot: 25
Concession: 6
RR#/Street Number/Name: Con 6/7 Road Allowance
City/Town/Village: North Lancaster.
Site/Compartment/Block/Tract etc.:
GPS Reading: NAD 83 Zone 18 Easting 537789 Northing 5011865
Unit Make/Model: magellan
Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see Instructions)

General Colour	Most common material	Other Materials	General Description	Depth Metres From	Depth Metres To
	Clay	gravel		0	5.8
darkgrey	limestone			5.8	29.0

Monitoring well 06-3dBR
1 piezometer installed.

Hole Diameter

Depth Metres From	Depth Metres To	Diameter Centimetres
0	29.0	15.23

Water Record

Water found at ___ Metres / Kind of Water
☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
☐ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
After test of well yield, water was ☐ Clear and sediment free ☐ Other, specify
Chlorinated ☐ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres From	Depth Metres To
Casing				
15.88	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.48	TOC 0	6.7.
2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized		+.9	22.9
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	Material	Slot No.		
2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized		22.9	29.0
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

Pumping test method	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ___ hrs + ___ min	2		2	
Final water level end of pumping ___ metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ___ metres	5		5	
Recommended pump rate. (litres/min)	10		10	
	15		15	
If flowing give rate - (litres/min)	20		20	
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

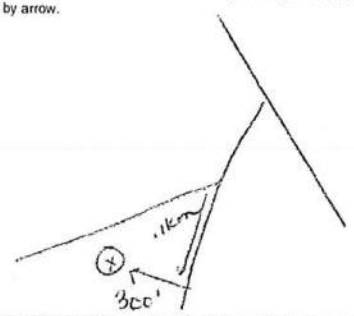
Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	Depth set at - Metres To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
29.0	20.1	sand	
20.1	0	holeplug	

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 64751
Date Well Completed YYYY 2006 MM 03 DD 21
Was the well owner's information package delivered? ☐ Yes ☐ No
Date Delivered YYYY MM DD NA

Method of Construction

☐ Cable Tool ☐ Rotary (conventional) ☐ Rotary (reverse)
☐ Rotary (air) ☒ Air percussion ☐ Boring
☐ Diamond ☐ Jetting ☐ Driving
☐ Digging ☐ Other

Water Use

☐ Domestic ☐ Stock ☐ Irrigation
☐ Industrial ☐ Commercial ☐ Municipal
☐ Public Supply ☒ Not used ☐ Cooling & air conditioning
☐ Other

Final Status of Well

☐ Water Supply ☒ Observation well ☐ Test Hole
☐ Recharge well ☐ Abandoned, insufficient supply ☐ Abandoned, poor quality
☐ Unfinished ☐ Dewatering ☐ Replacement well
☐ Abandoned, (Other)

Well Contractor/Technician Information

Name of Well Contractor: Air Rock Drilling Co Ltd
Well Contractor's Licence No.: 1119
Business Address (street name, number, city etc.): RR#1 Richmond, Ont
Name of Well Technician (last name, first name): Hogan Dan
Well Technician's Licence No.: T3058
Signature of Technician/Contractor: x
Date Submitted YYYY MM DD

Ministry Use Only

Data Source
Contractor
Date Received YYYY MM DD
Date of Inspection YYYY MM DD
Remarks
Well Record Number

0506E (08/2006)

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Ontario Ministry of the Environment

Well Tag Number (F A 036064

A036064

Well Record

Regulation 903 Ontario Water Resources Act

page 1 of 2.

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- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only MUN ___ CON ___ LOT ___

Well Owner's Information and Location of Well Information

First Name / Last Name: Township of South Glengarry

Mailing Address (Street Number/Name, RR,Lot,Concession): P.O. Box 220

County/District/Municipality:

Township/City/Town/Village: Lancaster

Province: Ontario

Postal Code: K0C1N0

Telephone Number (include area code):

Address of Well Location (County/District/Municipality): Glengarry

Township: South Glengarry

Lot: 24

Concession: 6

RR#/Street Number/Name: Con 6 | 7 Road Allowance

City/Town/Village: North Lancaster

Site/Compartment/Block/Tract etc.:

GPS Reading NAD 83 Zone 18 Easting 537988 Northing 5012931

Unit Make/Model: magellan

Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify ___

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth Metres From	Depth Metres To
	Sandy clay	gravel.		0	4.9
dark grey / black	limestone			4.9	27.9
	monitoring well 06-4d BR				

Hole Diameter

Depth Metres From	Depth Metres To	Diameter Centimetres
0	27.9	15.24

Water Record

Water found at ___ Metres / Kind of Water

___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: ___

___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: ___

___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: ___

After test of well yield, water was ☐ Clear and sediment free ☐ Other, specify ___

Chlorinated ☐ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres From	Depth Metres To
Casing				
15.88	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.48	TOC 0	5.6
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized		7.9	21.8
Screen				
Outside diam		Slot No.		
2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	–	21.8	27.9
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

Pumping test method	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ___ hrs + ___ min	2		2	
Final water level end of pumping ___ metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ___ metres	5		5	
Recommended pump rate. (litres/min)	10		10	
	15		15	
If flowing give rate - (litres/min)	20		20	
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

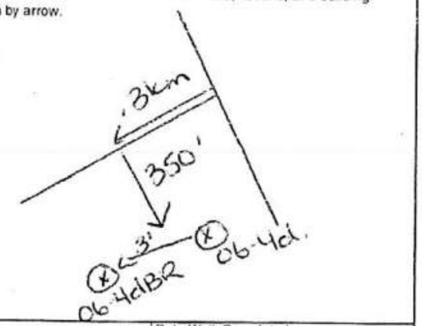
Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	Depth set at - Metres To	Material and type (bentonite slurry, neat cement slurry) etc	Volume Placed (cubic metres)
27.9	20.7	sand	
20.7	0	holeplug	

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Method of Construction

☐ Cable Tool ☐ Rotary (conventional) ☐ Rotary (reverse) ☐ Rotary (air) ☒ Air percussion ☐ Boring ☐ Diamond ☐ Jetting ☐ Driving ☐ Digging ☐ Other ___

Water Use

☐ Domestic ☐ Stock ☐ Irrigation ☐ Industrial ☐ Commercial ☐ Municipal ☐ Public Supply ☒ Not used ☐ Cooling & air conditioning ☐ Other ___

Final Status of Well

☐ Water Supply ☒ Observation well ☐ Test Hole ☐ Recharge well ☐ Abandoned, insufficient supply ☐ Abandoned, poor quality ☐ Unfinished ☐ Dewatering ☐ Replacement well ☐ Abandoned, (Other) ___

Audit No. Z 64752

Date Well Completed YYYY 2006 MM 02 DD 22

Was the well owner's information package delivered? ☐ Yes ☐ No

Date Delivered YYYY MM DD: NA

Well Contractor/Technician Information

Name of Well Contractor: Air Rock Drilling Co Ltd

Well Contractor's Licence No.: 1119

Business Address (street name, number, city etc.): RR#1 Richmond, Ont

Name of Well Technician (last name, first name): Hogan Dan

Well Technician's Licence No.: T3058

Signature of Technician/Contractor: x

Date Submitted YYYY MM DD

Ministry Use Only

Data Source

Contractor

Date Received YYYY MM DD

Date of Inspection YYYY MM DD

Remarks

Well Record Number

0506E (08/2006)

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Ontario Ministry of the Environment

Well Tag Number (Place sticker and print number below)

A036064

Well Record

Regulation 903 Ontario Water Resources Act

page 2 of 2

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Well Owner's Information and Location of Well Information

See Page

First Name	Last Name	Mailing Address (Street Number/Name, RR,Lot,Concession)	
County/District/Municipality	Township/City/Town/Village	Province Ontario	Postal Code	Telephone Number (include area code)
Address of Well Location (County/District/Municipality)	Township	Lot	Concession
RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.	
GPS Reading NAD 83 Zone Easting Northing	Unit Make/Model	Mode of Operation: ☐ Undifferentiated ☐ Averaged ☐ Differentiated, specify	

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth Metres From	To
	Sandy clay	gravel		0	4.90
	Monitoring well		06-4d		

Hole Diameter

Depth Metres From	To	Diameter Centimetres
0	4.90	15.24

Water Record

Water found at ___ Metres / Kind of Water

☐ m ☐ Gas ☐ Other: ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

☐ m ☐ Gas ☐ Other: ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

☐ m ☐ Gas ☐ Other: ☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

After test of well yield, water was ☐ Clear and sediment free ☐ Other, specify

Chlorinated ☐ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth Metres From	To
Casing				
15.88	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.48	TOC 0	2.4
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized		+.6	3.22
Screen				
Outside diam 2"	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	Slot No.	3.22	4.74
No Casing or Screen				
	☒ Open hole gravel.		4.74	4.90

Test of Well Yield

Pumping test method	Draw Down Time min	Water Level Metres	Recovery Time min	Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ___ hrs + ___ min	2		2	
Final water level end of pumping ___ metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ___ metres	5		5	
Recommended pump rate. (litres/min)	10		10	
If flowing give rate - (litres/min)	15		15	
	20		20	
If pumping discontinued, give reason.	25		25	
	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record ☒ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc	Volume Placed (cubic metres)
4.9	4.6	Gravel	
4.6	2.4	Sand	
2.4	0	holeplug	

Location of Well

In diagram below show distances of well from road, lot line, and building Indicate north by arrow.

See map page 1

Method of Construction

☐ Cable Tool ☐ Rotary (conventional) ☐ Rotary (reverse) ☐ Rotary (air) ☒ Air percussion ☐ Boring ☐ Diamond ☐ Jetting ☐ Driving ☐ Digging ☐ Other

Water Use

☐ Domestic ☐ Stock ☐ Irrigation ☐ Industrial ☐ Commercial ☐ Municipal ☐ Public Supply ☒ Not used ☐ Cooling & air conditioning ☐ Other

Final Status of Well

☐ Water Supply ☒ Observation well ☐ Test Hole ☐ Recharge well ☐ Abandoned, insufficient supply ☐ Abandoned, poor quality ☐ Unfinished ☐ Dewatering ☐ Replacement well ☐ Abandoned, (Other)

Audit No. Z 64745

Date Well Completed YYYY 2006 MM 03 DD 22

Was the well owner's information package delivered? ☐ Yes ☐ No

Date Delivered YYYY N/A MM DD

Well Contractor/Technician Information

Name of Well Contractor: Air Rock Drilling Co Ltd

Well Contractor's Licence No.: 1119

Business Address (street name, number, city etc): RR#1 Richmond, Ont

Name of Well Technician (last name, first name): Hogan Dan

Well Technician's Licence No.: T3058.

Signature of Technician/Contractor: X

Date Submitted YYYY MM DD

Ministry Use Only

Data Source | Contractor

Date Received YYYY MM DD | Date of Inspection YYYY MM DD

Remarks | Well Record Number

0506E (08/2006)

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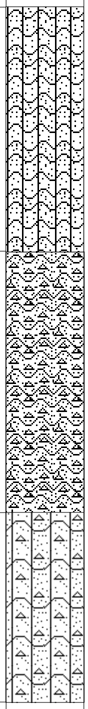
DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: July 24, 1996

HOLE #: **MW-96-1**

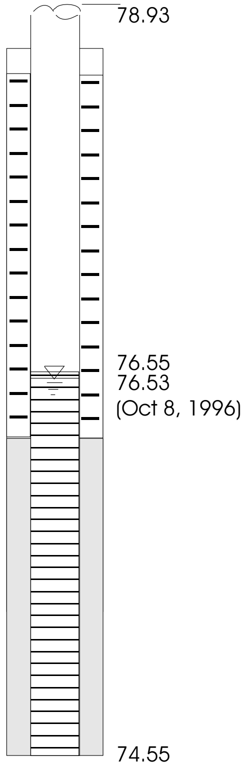
REMARKS: Southeast Corner of Site

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG



SOIL DESCRIPTION		STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value	DEPTH (m)	ELEV. (m)
Ground Surface	78.2					0.0	78.23
MARL - Silty sand with marine shells becoming grey stiff clay with brown silt lenses below 1.2 m.			SS	1	2 5		
						0.5	77.73
			SS	2	3 7	1.0	77.23
	76.9						
BROWN TILL - Silt, sand, and gravel becoming wet below 1.6 m.						1.5	76.73
			SS	3	10 12		
						2.0	76.23
			SS	4	22 16	2.5	75.73
	75.6						
GREY TILL - Silty clay sand with gravel. Becoming wet below 3 m. Boulder encountered below 3.5 m.							
			SS	5	37 22	3.0	75.23
						3.5	74.73
	74.6						
Borehole Terminated Auger Refusal in Boulders.							
						4.0	74.23
						4.5	73.73

WELL DETAILS



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consulting engineers
CORNWALL KINGSTON

The THOMPSON ROSEMOUNT Group

FIGURE TITLE

BOREHOLE LOG

JOB

FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE MAY 1998

SCALE NOT TO SCALE

DRAWN JASB

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: July 24, 1996

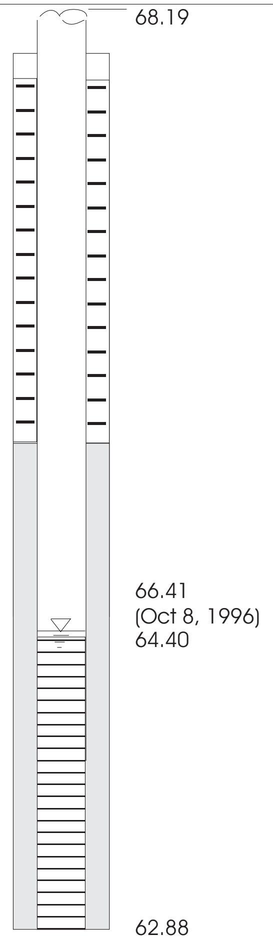
HOLE #: **MW-96-2d**

REMARKS: Northwest Corner of Site

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value	DEPTH (m)	ELEV. (m)
Ground Surface 67.5						
BROWN TILL - Silty sand and gravel, becoming moist below 1.5 m.					0.0	67.45
		SS	1	2 5		
					0.5	66.95
		SS	2	8 8	1.0	66.45
					1.5	65.95
		SS	3	8 11	2.0	65.45
64.8					2.5	64.95
GREY TILL - Silty sand and clay with gravel. Becoming wet below 3 m. Boulders encountered below 3.5 m.		SS	4	7 9	3.0	64.45
		SS	5	>50	3.5	63.95
		SS	6	10 >50	4.0	63.45
62.9					4.5	62.95
Borehole Terminated Auger Refusal in Boulders.						
					5.0	62.45

WELL DETAILS



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CORNWALL KINGSTON

The THOMPSON ROSEMOUNT Group

FIGURE TITLE: BOREHOLE LOG

JOB: FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE: MAY 1998

SCALE: NOT TO SCALE

DRAWN: JASB

JOB No.: 95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: July 24, 1996

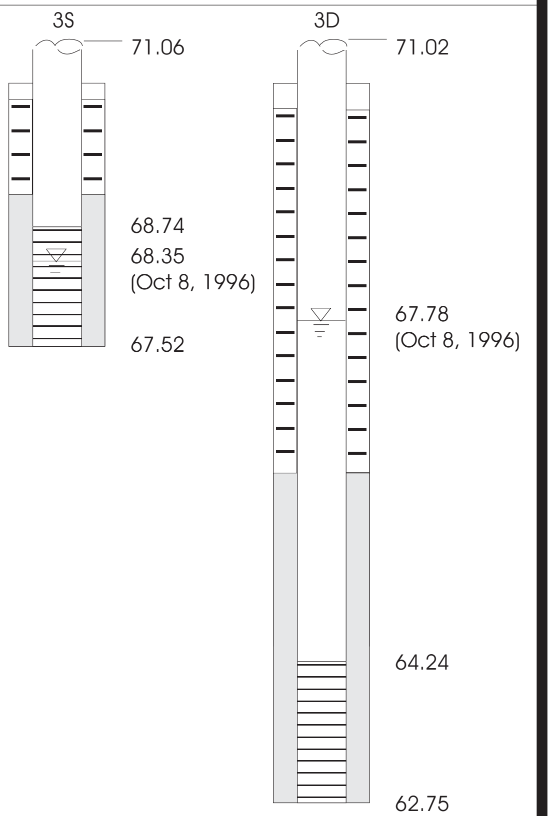
HOLE #: **MW-96-3**

REMARKS: North of Landfill Pile

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE		N -Value	DEPTH (m)	ELEV. (m)
		TYPE	No.			
Ground Surface 70.3					0.0	70.26
BROWN TILL - Silty sand with clay and cobbles. Becoming wet below 2 m. Boulders below 3 m.		SS	1	2 3		
					1.0	69.26
		SS	2	13 22		
					2.0	68.26
		SS	3	13 10		
		SS	4	11 >50	3.0	67.26
		SS	5	20 22	4.0	66.26
65.7						
GREY TILL - Silty sand and clay with gravel. Boulders encountered, auger refusal at 5 m.		SS	6	18 >50	5.0	65.26
		Switched to Tricone				
					6.0	64.26
					7.0	63.26
62.8						
Borehole Terminated in Till.						
					8.0	62.26
					9.0	61.26
					10.0	60.26

WELL DETAILS



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consulting engineers
CORNWALL KINGSTON

The THOMPSON ROSEMOUNT Group

FIGURE TITLE

BOREHOLE LOG

JOB

FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE MAY 1998

SCALE NOT TO SCALE

DRAWN JASB

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: April 1, 1997

HOLE #: **MW-97-1s**

REMARKS: East Property Line (Main Gate)

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION		STRAT.
Ground Surface	73.96	
ORGANIC MATTER - Dark brown, soft, silty clay with rootlets.	73.92	
BROWN TILL - Silt, sand, and gravel, with oxidized lenses. Sand, gravel and cobbles increasing with depth. Becoming wet below 3.0 m. Saturated sand and gravel seam from 3.0 to 3.4 m. Moist below 3.4 m with increasing stiff clay.	70.16	
Borehole Terminated.		

SAMPLE		N -Value
TYPE	No.	
SS	1	3 12
SS	2	12 >50 (cobble)
SS	3	28 >50 (cobble)
SS	4	26 >50
SS	5a 5b	10 20
SS	6	26 30

DEPTH (m)	ELEV. (m)
0.0	73.96
0.5	73.46
1.0	72.96
1.5	72.46
2.0	71.96
2.5	71.46
3.0	70.96
3.5	70.46
4.0	69.96
4.5	69.46

WELL DETAILS

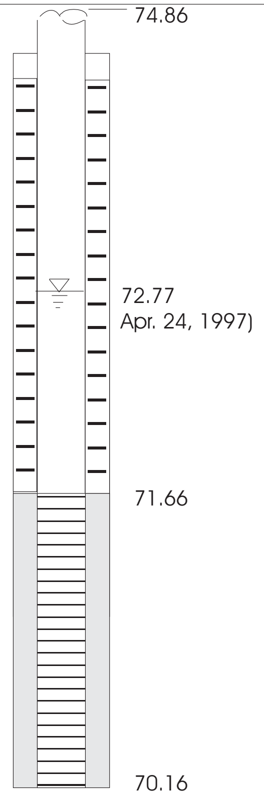

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FIGURE TITLE

BOREHOLE LOG

JOB FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE MAY 1998

SCALE NOT TO SCALE

DRAWN JASB

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: April 1, 1997

HOLE #: **MW-97-2s**

REMARKS: Northeast Corner of Site

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value
Ground Surface 68.38				
ORGANIC MATTER - Wet Dark brown, soft, silty clay with gravel and rootlets. 68.34		SS	1	2 5
BROWN TILL - Silt, sand, and gravel becoming moist below 1.6 m. Cobbles below 1.8m. Boulders below 2.7 to 3.1 m. Saturated sand and gravel seams from 4.3 to 4.5 m.		SS	2	5 11
		SS	3	10 >50
		SS	4	10 >50
		SS	5	28 32
		SS	6	16 >50
63.48		SS	7	7 8
Borehole Terminated.				

DEPTH (m)	ELEV. (m)
0.0	68.38
0.5	67.88
1.0	67.38
1.5	66.88
2.0	66.38
2.5	65.88
3.0	65.38
3.5	64.88
4.0	64.38
4.5	63.88
5.0	63.38

WELL DETAILS

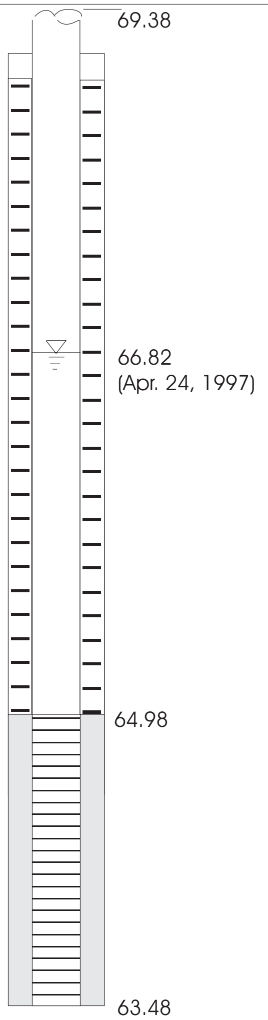

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FIGURE TITLE

BOREHOLE LOG

JOB

FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE MAY 1998

SCALE NOT TO SCALE

DRAWN JASB

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: March 30, 1999

HOLE #: MW-97-3d (rehabilitated)

REMARKS: West of Landfill (South)

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE No.	N -Value	DEPTH (m)	ELEV. (m)
Ground Surface 72.91 MARL - Wet, brown, silty clay with marine shells and rootlets.				0.0	72.91
	SS	1	1 2		
				0.5	72.41
72.23 BROWN TILL - Wet, Silty sand, with clay, gravel and cobbles.					
	SS	2	8 >50 (cobble)	1.0	71.91
				1.5	71.41
	SS	3	7 34 (cobble)	2.0	70.91
				2.5	70.41
69.93 GREY TILL - Silty sand with gravel and clay. Becoming saturated at 4.0 m. Boulders encountered at 3.0 m.	SS	4	7 >50 (cobble)	3.0	69.91
				3.5	69.41
				4.0	68.91
				4.5	68.41
	SS	5	>50 (no sample)	5.0	67.91
				5.5	67.41
	SS	6			
Borehole Terminated. 66.81				6.0	66.91

WELL DETAILS

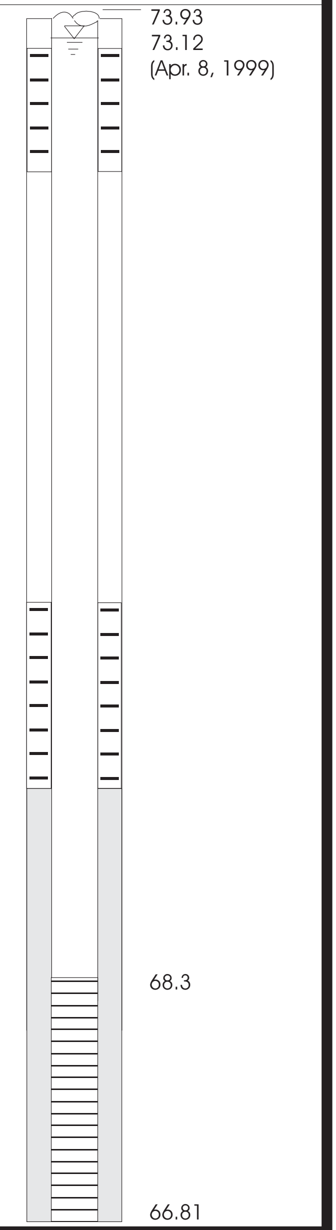

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FIGURE TITLE

BOREHOLE LOG

JOB

FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE APRIL 1999

SCALE NOT TO SCALE

DRAWN JBH

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: March 31, 1997

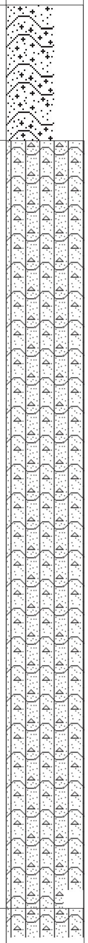
HOLE #: **MW-97-4d**

REMARKS: West of Landfill (North)

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION		SAMPLE TYPE	SAMPLE No.	N -Value
Ground Surface	69.89			
ORGANIC MATTER - Dark brown moist silty sand and rootlets.		SS	1	2 4
	69.19			
BROWN TILL - Moist, brown, silty sand with clay and gravel. Cobbles below 1.5 m. Becoming saturated below 3 m. Clay content increasing with depth.		SS	2	9 8
		SS	3	15 28
		SS	4	10 18
		SS	5	10 12
		SS	6	12 15
		SS	7	16 18
	65.19			
GREY TILL - Saturated silty clay with sand and gravel.	64.99			
Borehole Terminated.				

STRAT.



DEPTH (m)	ELEV. (m)
0.0	69.89
0.5	69.39
1.0	68.89
1.5	68.39
2.0	67.89
2.5	67.39
3.0	66.89
3.5	66.39
4.0	65.89
4.5	65.39
5.0	64.89
5.5	64.39

WELL DETAILS

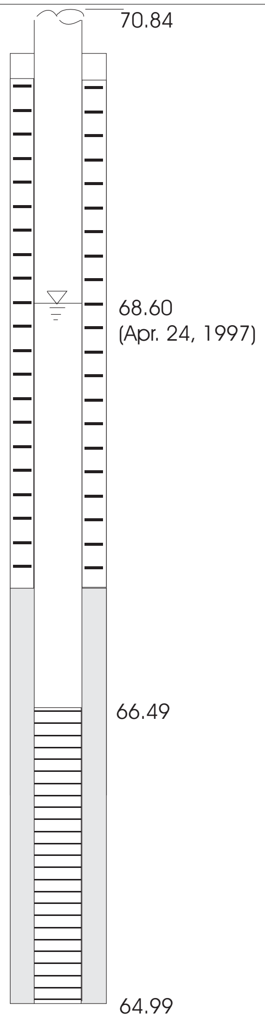


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FIGURE TITLE: BOREHOLE LOG

DATE: MAY 1998

SCALE: NOT TO SCALE

JOB: FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DRAWN: JASB

JOB No.: 95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: March 31, 1999

HOLE #: **MW-99-1d**

REMARKS: Southeast corner of site.

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value	DEPTH (m)	ELEV. (m)
Ground Surface 78.25					0.0	78.25
ORGANIC MATTER - clay, gravel, and rootlets. 77.6		SS	1	4		
TILL - brown, sandy clay with coarse sand and gravel, dense, non-cohesive.					1.0	77.25
		SS	2	17		
					2.0	76.25
		SS	3	45		
Becomes wet at 2.4 m.						
		SS	4	R		
74.6					3.0	75.25
TILL - grey, with sand and gravel, dense, non-cohesive. 74.1		SS	5	36	4.0	74.25
BOULDERS - with clay seams and gravel.		CS	6			
					5.0	73.25
		CS	7			
		CS	8		6.0	72.25
					7.0	71.25
		CS	9			
					8.0	70.25
		CS	10		9.0	69.25
		CS	9		10.0	68.25
67.6						
LIMESTONE - bedrock 67.3		CS	10			
Borehole Terminated.					11.0	67.25
					12.0	66.25

WELL DETAILS

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FIGURE TITLE: BOREHOLE LOG

JOB: FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE: APRIL 1999

SCALE: NOT TO SCALE

DRAWN: JBH

JOB No.: 95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: October 5, 1999

HOLE #: **MW-99-1SBR**

REMARKS: Southeast corner of site

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION		STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value
Ground Surface	78.46				
TILL - brown sandy clay, dry.	71.16				
TILL - brown sandy clay, with boulders, dry.	62.91				
BEDROCK - limestone with shale seams.	51.03				
Borehole Terminated.					

DEPTH (m)	ELEV. (m)
0.0	78.46
3.0	75.46
6.0	72.46
9.0	69.46
12.0	66.46
15.0	63.46
18.0	60.46
21.0	57.46
24.0	54.46
27.0	51.46
30.0	48.46
33.0	45.46

WELL DETAILS

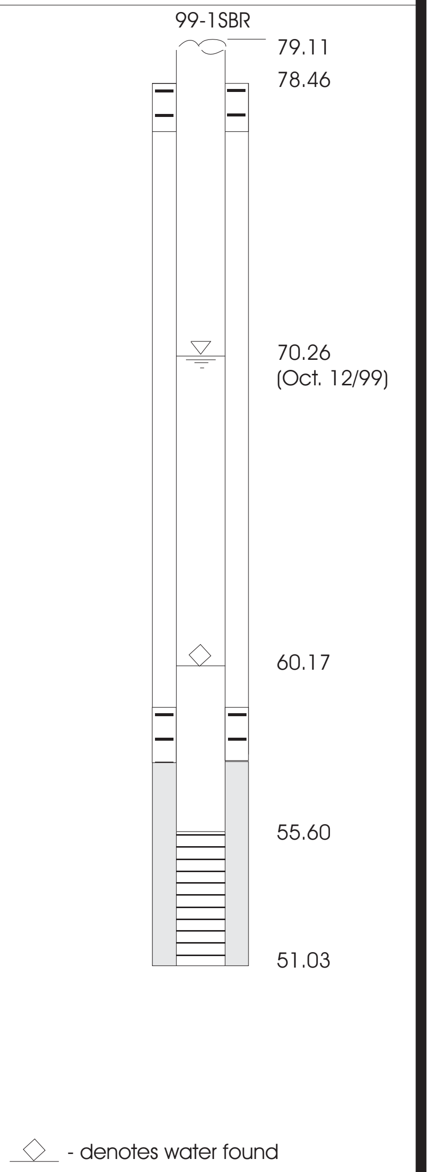

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FIGURE TITLE: BOREHOLE LOG

JOB: FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE: OCTOBER 1999

SCALE: NOT TO SCALE

DRAWN: KM

JOB No.: 95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: April 6, 1999

HOLE #: **MW-99-2SBR**

REMARKS: Northwest corner of landfill footprint

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value	DEPTH (m)	ELEV. (m)
Ground Surface 67.40						
ORGANIC MATTER - black, silty sand. 67.3		SS	1a	3	0.0	67.40
CLAY - brown, compact, dry.		SS	1b			
					1.0	66.40
65.9		SS	2	12		
TILL - brown, sandy clay and gravel, firm, cohesive, and moist.					2.0	65.40
		SS	3	24		
					3.0	64.40
63.1		SS	4	R	4.0	63.40
BEDROCK - Limestone with clay seams.		CS	5			
					5.0	62.40
					6.0	61.40
		CS	6			
					7.0	60.40
					8.0	59.40
		CS	7			
					9.0	58.40
57.7		CS	8			
Borehole Terminated.					10.0	57.40
					11.0	56.40

WELL DETAILS

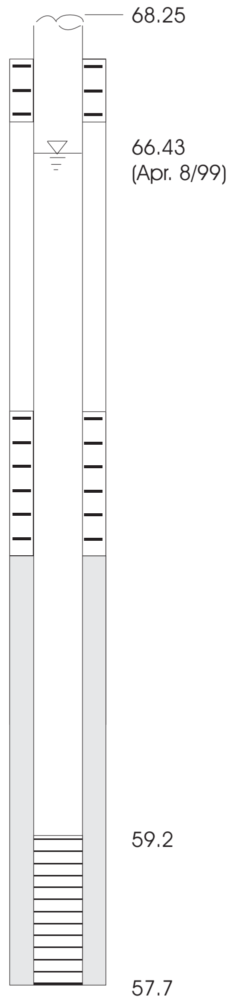

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FIGURE TITLE BOREHOLE LOG

DATE APRIL 1999

SCALE NOT TO SCALE

JOB FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DRAWN JBH

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: October 5, 1999

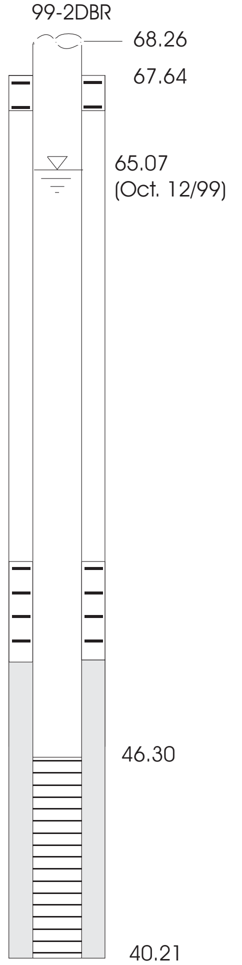
HOLE #: **MW-99-2DBR**

REMARKS: Northwest corner of site

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value	DEPTH (m)	ELEV. (m)
Ground Surface 67.64						
TILL - brown sandy clay, dry.					0.0	67.64
					3.0	64.64
62.76 BEDROCK - Limestone with shale seams.					6.0	61.64
					9.0	58.64
					12.0	55.64
					15.0	52.64
					18.0	49.64
					21.0	46.64
					24.0	43.64
40.21 Borehole Terminated.					27.0	40.64
					30.0	37.64
					33.0	34.64

WELL DETAILS



◇ - denotes water found

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FIGURE TITLE

BOREHOLE LOG

JOB

FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE OCTOBER, 1999

SCALE NOT TO SCALE

DRAWN KM

JOB No. 95620

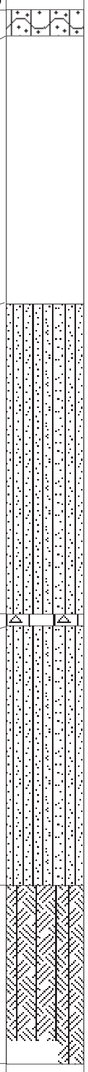
DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: March 30, 1999

HOLE #: **MW-99-3SBR**

REMARKS: West of landfill (south)

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG



SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE No.	N -Value	DEPTH (m)	ELEV. (m)
Ground Surface 73.00				0.0	73.00
ORGANIC MATTER - black, silty clay. 72.7	SS	1	4		
TILL - brown, sandy clay with gravel and cobbles, dense, non-cohesive.				1.0	72.00
	SS	2	42		
				2.0	71.00
	SS	3	50		
				3.0	70.00
69.9 TILL - grey, sandy clay, dense, non-cohesive.					
	SS	4	R		
				4.0	69.00
				5.0	68.00
	SS	5	R		
Wet below 6.1 m.	SS	6	R	6.0	67.00
66.7 Boulders with clay.	CS	7			
66.1 TILL - grey, sandy clay, dense, non-cohesive.				7.0	66.00
	CS	8		8.0	65.00
63.9 BEDROCK - Limestone with clay seams.				9.0	64.00
	CS	9			
				10.0	63.00
62.0 Borehole Terminated.	CS	10		11.0	62.00
				12.0	61.00

WELL DETAILS

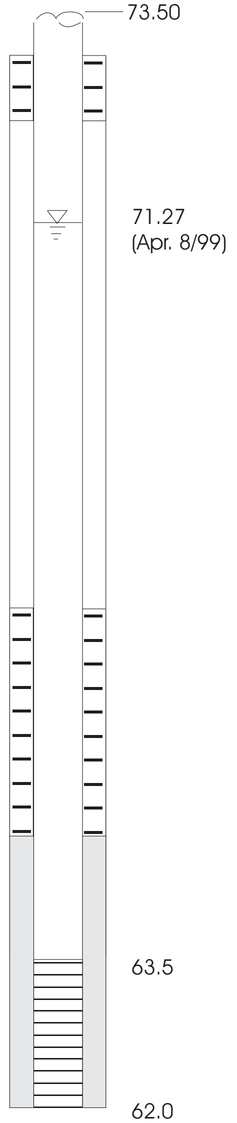


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FIGURE TITLE: BOREHOLE LOG

DATE: APRIL 1999

SCALE: NOT TO SCALE

JOB: FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DRAWN: JBH

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

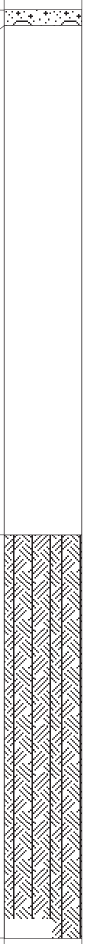
DRILLING DATE: April 6, 1999

HOLE #: **MW-99-4SBR**

REMARKS: West of Landfill (North)

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value	DEPTH (m)	ELEV. (m)
Ground Surface 69.97					0.0	69.97
ORGANIC MATTER - black, silty sand. 69.8		SS SS	1a 1b	6		
TILL - brown, sandy clay with gravel and cobbles, cohesive, and moist.					1.0	68.97
		SS	2	20		
					2.0	67.97
		SS	3	40		
					3.0	66.97
					4.0	65.97
		SS	4	54		
					5.0	64.97
64.5 BEDROCK - Limestone with clay seams.		SS	5	R		
					6.0	63.97
		CS	6			
					7.0	62.97
		CS	7		8.0	61.97
					9.0	60.97
60.3 Borehole Terminated.		CS	8			
					10.0	59.97
					11.0	58.97



WELL DETAILS

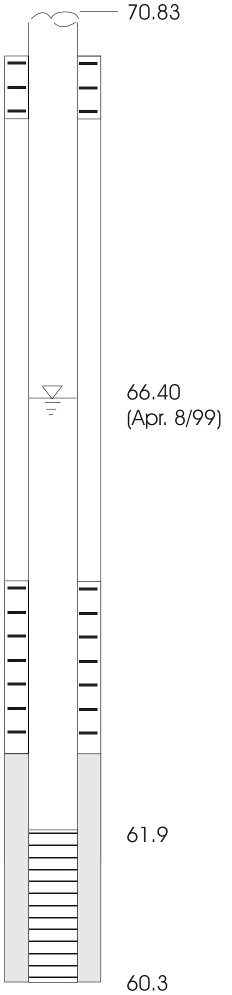


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FIGURE TITLE

BOREHOLE LOG

JOB

FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE APRIL 1999

SCALE NOT TO SCALE

DRAWN JBH

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

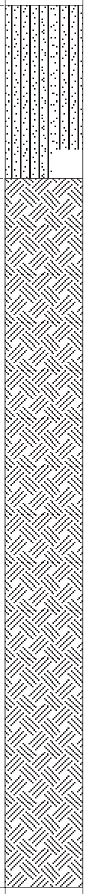
DRILLING DATE: October 5, 1999

HOLE #: **MW-99-4DBR**

REMARKS: West of landfill (North)

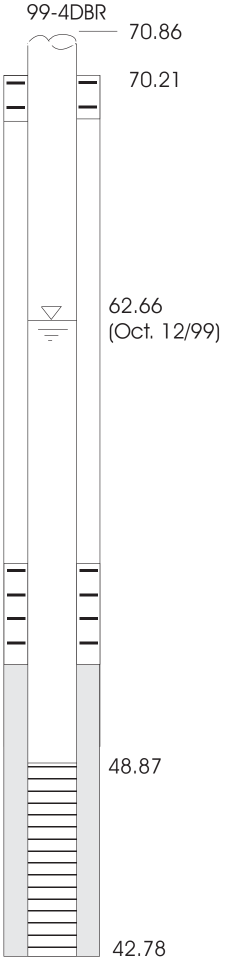
BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION		STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value
Ground Surface	70.21				
TILL - brown sandy clay, dry.	64.72				
BEDROCK - Limestone with shale seams.	42.78				
Borehole Terminated.					



DEPTH (m)	ELEV. (m)
0.0	70.21
3.0	67.21
6.0	64.21
9.0	61.21
12.0	58.21
15.0	55.21
18.0	52.21
21.0	49.21
24.0	46.21
27.0	43.21
30.0	40.21
33.0	37.21

WELL DETAILS



◇ - denotes water found

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FIGURE TITLE

BOREHOLE LOG

JOB

FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE OCTOBER, 1999

SCALE NOT TO SCALE

DRAWN KM

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

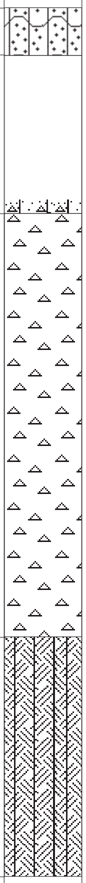
DRILLING DATE: March 30, 1999

HOLE #: **MW-99-5SBR**

REMARKS: East property line (main gate)

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION		STRAT.	SAMPLE		N -Value
			TYPE	No.	
Ground Surface	74.06				
ORGANIC MATTER - silty clay with rootlets.	73.4		SS	1	2
TILL - Brown sandy clay with cobbles, dense, non-cohesive. Wet below 1.3 m.			SS	2	54
	71.9		SS	3	76
BOULDERS, cobbles and gravel.			CS	4	
			CS	5	
			CS	6	
			CS	7	
			CS	8	
	67.5				
LIMESTONE - bedrock with clay seams.			CS	9	
			CS	10	
			CS	11	
	65.0		CS	12	
Borehole Terminated.					



DEPTH (m)	ELEV. (m)
0.0	74.06
1.0	73.06
2.0	72.06
3.0	71.06
4.0	70.06
5.0	69.06
6.0	68.06
7.0	67.06
8.0	66.06
9.0	65.06
10.0	64.06
11.0	63.06

WELL DETAILS

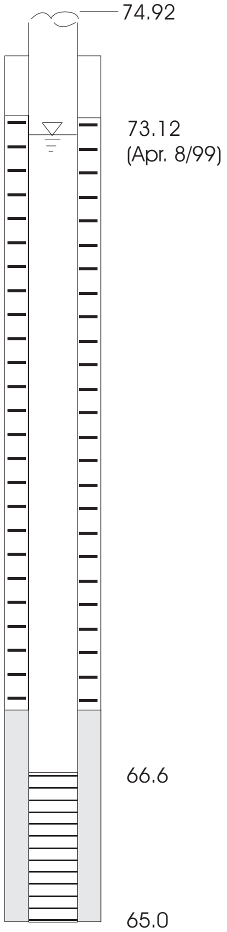


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FIGURE TITLE: BOREHOLE LOG

JOB: FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE: APRIL 1999
SCALE: NOT TO SCALE
DRAWN: JBH
JOB No. 95620

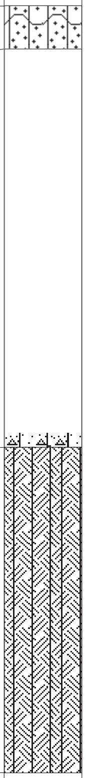
DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: March 30, 1999

HOLE #: **MW-99-6SBR**

REMARKS: Northeast corner of site

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE		N -Value	DEPTH (m)	ELEV. (m)
		TYPE	No.			
Ground Surface 68.49					0.0	68.49
ORGANIC MATTER - silty clay with rootlets. 68.0		SS	1a	2		
TILL - Brown sandy clay with gravel and cobbles, dense, non-cohesive.		SS	1b			
					1.0	67.49
		SS	2	24		
					2.0	66.49
					3.0	65.49
		SS	3	>50		
					4.0	64.49
Wet below 4.3 m. 63.9		SS	4	R		
BEDROCK - Limestone with clay seams.					5.0	63.49
		CS	5		6.0	62.49
					7.0	61.49
60.5		CS	6			
Borehole Terminated.					8.0	60.49
					9.0	59.49
					10.0	58.49
					11.0	57.49

WELL DETAILS

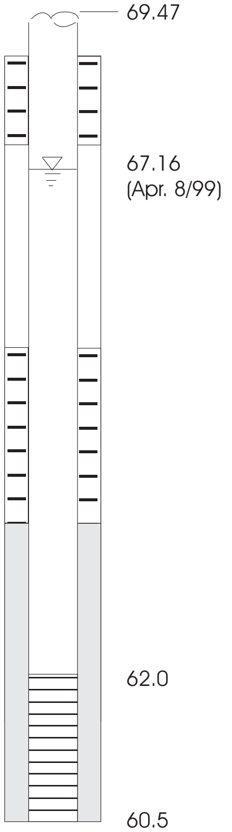


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FIGURE TITLE

BOREHOLE LOG

DATE	APRIL 1999
SCALE	NOT TO SCALE
DRAWN	JBH
JOB No.	95620

JOB

FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: October 5, 1999

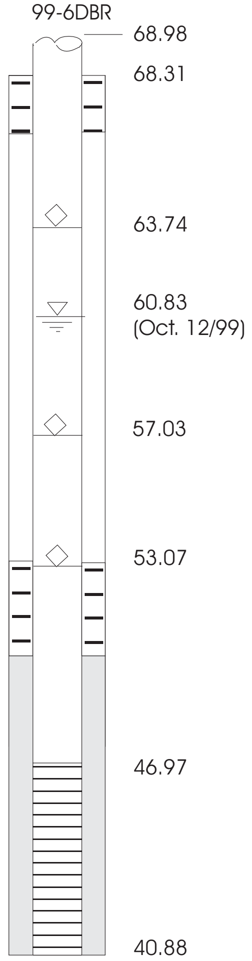
HOLE #: **MW-99-6DBR**

REMARKS: Northeast corner of site

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value	DEPTH (m)	ELEV. (m)
Ground Surface 68.31						
TILL - brown sandy clay.					0.0	68.31
					3.0	65.31
63.74 BEDROCK - Limestone with shale seams.					6.0	62.31
					9.0	59.31
					12.0	56.31
					15.0	53.31
					18.0	50.31
					21.0	47.31
					24.0	44.31
					27.0	41.31
40.88 Borehole Terminated.					30.0	38.31
					33.0	35.31

WELL DETAILS



◇ - denotes water found

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FIGURE TITLE

BOREHOLE LOG

JOB

FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE	OCTOBER, 1999
SCALE	NOT TO SCALE
DRAWN	KM
JOB No.	95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: April 6, 1999

HOLE #: **MW-99-7s**
MW-99-7SBR

REMARKS: Northwest corner of Landfill
Property Line

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	Elev.	SAMPLE TYPE	SAMPLE No.	N -Value
Ground Surface	66.05			
ORGANIC MATTER - black, silty sand.	65.4	SS	1	5
SANDY CLAY - greyish brown with red seams, soft, cohesive and moist.	63.3	SS SS SS	2 3 4	7 6 8
TILL - grey sandy clay and gravel, compact cohesive, and moist.	63.0	SS	5	R
BEDROCK - Limestone with clay seams.	58.0	CS CS CS CS	6 7 8 9	
Borehole Terminated.				

DEPTH (m)	ELEV. (m)
0.0	66.05
1.0	65.05
2.0	64.05
3.0	63.05
4.0	62.05
5.0	61.05
6.0	60.05
7.0	59.05
8.0	58.05
9.0	57.05
10.0	56.05
11.0	55.05

WELL DETAILS

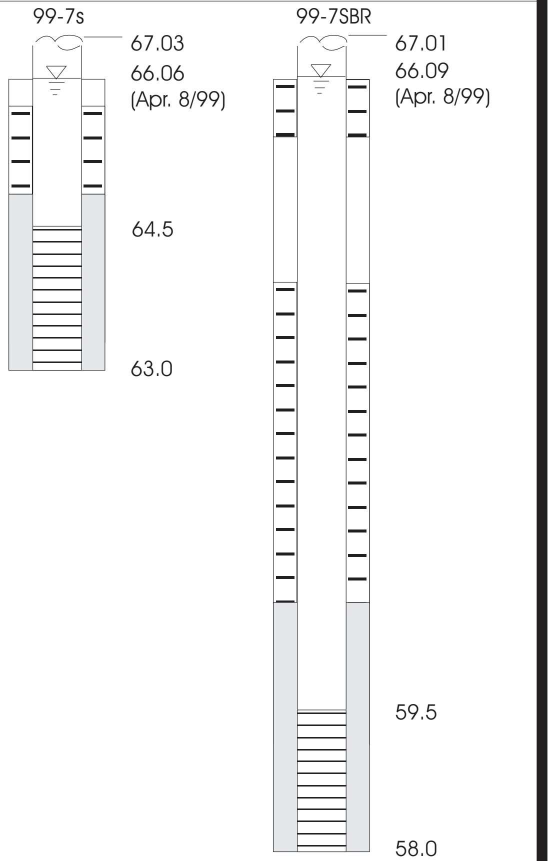

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FIGURE TITLE
BOREHOLE LOG

JOB
FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE APRIL 1999

SCALE NOT TO SCALE

DRAWN JBH

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

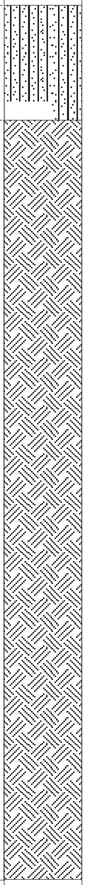
DRILLING DATE: October 5, 1999

HOLE #: **MW-99-7DBR**

REMARKS: Northwest corner of Landfill
Property Line

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value
Ground Surface 66.18				
TILL - brown sandy clay, dry. 62.22				
BEDROCK - Limestone with shale seams. 38.75				
Borehole Terminated.				



DEPTH (m)	ELEV. (m)
0.0	66.18
3.0	63.18
6.0	60.18
9.0	57.18
12.0	54.18
15.0	51.18
18.0	48.18
21.0	45.18
24.0	42.18
27.0	39.18
30.0	36.18
33.0	33.18

WELL DETAILS

◇ - denotes water found

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The THOMPSON ROSEMOUNT Group

FIGURE TITLE: BOREHOLE LOG

JOB: FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE	OCTOBER, 1999
SCALE	NOT TO SCALE
DRAWN	KM
JOB No.	95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: April 19, 1999

HOLE #: **MW-99-8s**
MW-99-8SBR

REMARKS: Northwest corner of Landfill
Property Line

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE		N -Value	DEPTH (m)	ELEV. (m)
		TYPE	No.			
Ground Surface 66.96					0.0	66.96
ORGANIC MATTER - clay, wet, non-cohesive. 66.9		SS	1	4		
CLAY - brown, non-cohesive, wet. 65.6					1.0	65.96
TILL - brown, sandy clay and gravel, dense, non-cohesive, and moist.		SS	2	24		
					2.0	64.96
		SS	3	22		
64.2		SS	4	R		
BEDROCK - Limestone fractured at interface, black.					3.0	63.96
		CS	5			
					4.0	62.96
		CS	6			
		CS	7			
					5.0	61.96
					6.0	60.96
		CS	8			
					7.0	59.96
59.3		CS	9			
Borehole Terminated.					8.0	58.96
					9.0	57.96
					10.0	56.96
					11.0	55.96

WELL DETAILS

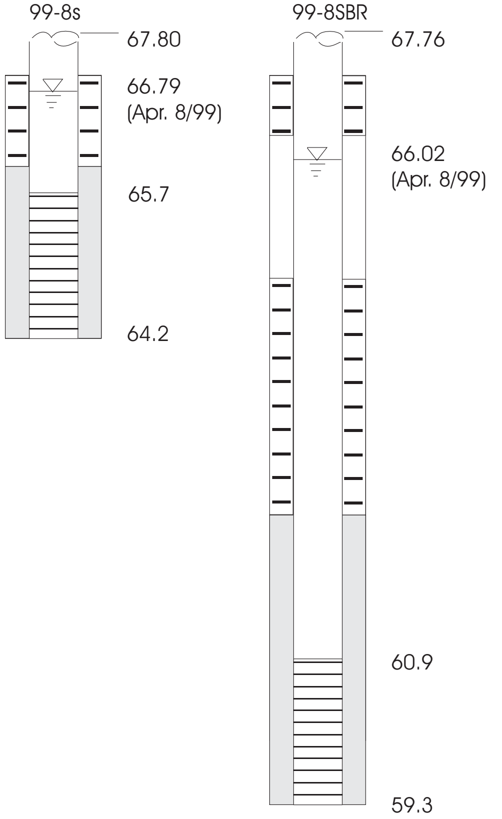

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FIGURE TITLE

BOREHOLE LOG

DATE APRIL 1999

SCALE NOT TO SCALE

JOB FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DRAWN JBH

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

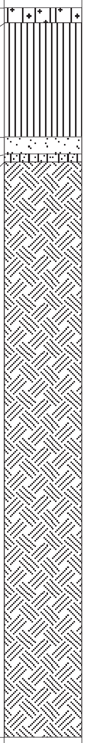
DRILLING DATE: April 20, 1999

HOLE #: **MW-99-9s**
MW-99-9SBR

REMARKS: Northeast corner of Landfill
Property Line

BORING BY: CME - 55 TRACK-MOUNTED DRILL RIG

SOIL DESCRIPTION	Elev.
Ground Surface	67.85
ORGANIC MATTER - clay, wet, non-cohesive.	67.7
CLAY - brownish grey, non-cohesive, very dense, and wet.	66.5
SAND - seam.	66.3
TILL - brown sandy clay, very dense, moist and non-cohesive.	66.3
BEDROCK - Limestone, fractured black	60.2
Borehole Terminated.	



SAMPLE TYPE	SAMPLE No.	N -Value
SS	1	7
SS	2	14
SS	3	R
CS	4	
CS	5	
CS	6	
CS	7	
CS	8	

DEPTH (m)	ELEV. (m)
0.0	67.85
1.0	66.85
2.0	65.85
3.0	64.85
4.0	63.85
5.0	62.85
6.0	61.85
7.0	60.85
8.0	59.85
9.0	58.85
10.0	57.85
11.0	56.85

WELL DETAILS

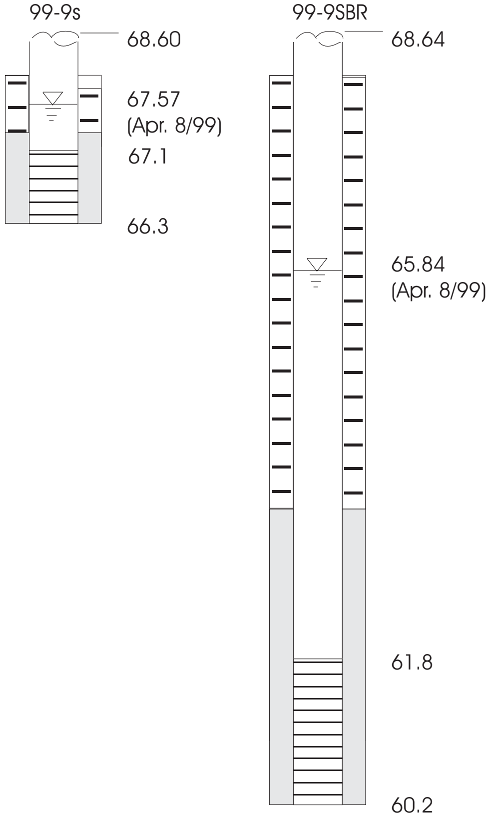


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FIGURE TITLE: BOREHOLE LOG

JOB: FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE: APRIL 1999
SCALE: NOT TO SCALE
DRAWN: JBH
JOB No.: 95620

DATUM: Geodetic BM No. 96 80.345 m

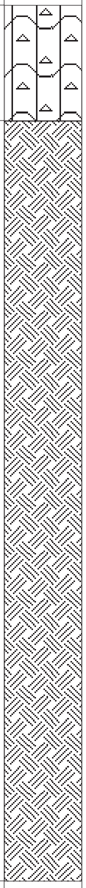
DRILLING DATE: November 22, 2000

HOLE #: **MW-00-1s**
MW-00-1DBR

REMARKS:

BORING BY: AIR ROTARY DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value	DEPTH (m)	ELEV. (m)
Ground Surface 63.81 TILL - silty clay and gravel compact, brown, with some wet seams below 3.0 m.					0.0	63.81
60.15 BEDROCK - limestone					3.0	60.81
					6.0	57.81
					9.0	54.81
					12.0	51.81
					15.0	48.81
					18.0	45.81
					21.0	42.81
					24.0	39.81
36.38 Borehole Terminated.					27.0	36.81
					30.0	33.81
					33.0	30.81



WELL DETAILS

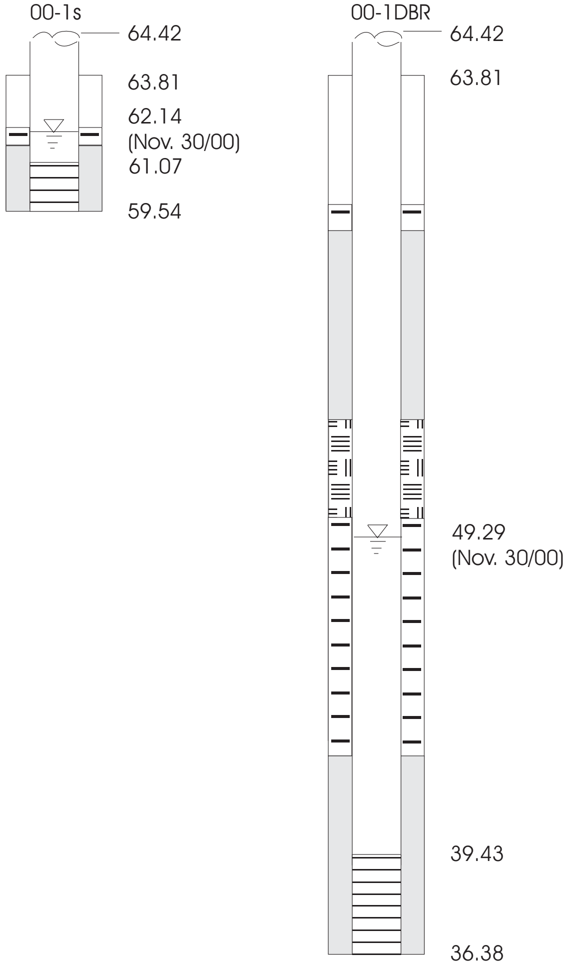


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FIGURE TITLE
BOREHOLE LOG

JOB
FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE JANUARY 2001

SCALE NOT TO SCALE

DRAWN JBH

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

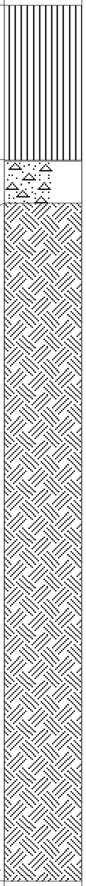
DRILLING DATE: November 22, 2000

HOLE #: MW- 00-2s
MW-00-2sbr
MW-00-2dbr

REMARKS:

BORING BY: AIR ROTARY DRILL RIG

SOIL DESCRIPTION		STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value
Ground Surface	63.57				
MARINE CLAY - soft, saturated, grey blue clay..	58.69				
GRAVEL - Marine outwash, coarse and medium rounded gravel with some sand, saturated.	57.47				
BEDROCK - shale, black.	36.14				
Borehole Terminated.					



DEPTH (m)	ELEV. (m)
0.0	63.57
3.0	60.57
6.0	57.57
9.0	54.57
12.0	51.57
15.0	48.57
18.0	45.57
21.0	41.57
24.0	39.57
27.0	36.57
30.0	33.57
33.0	30.57

WELL DETAILS

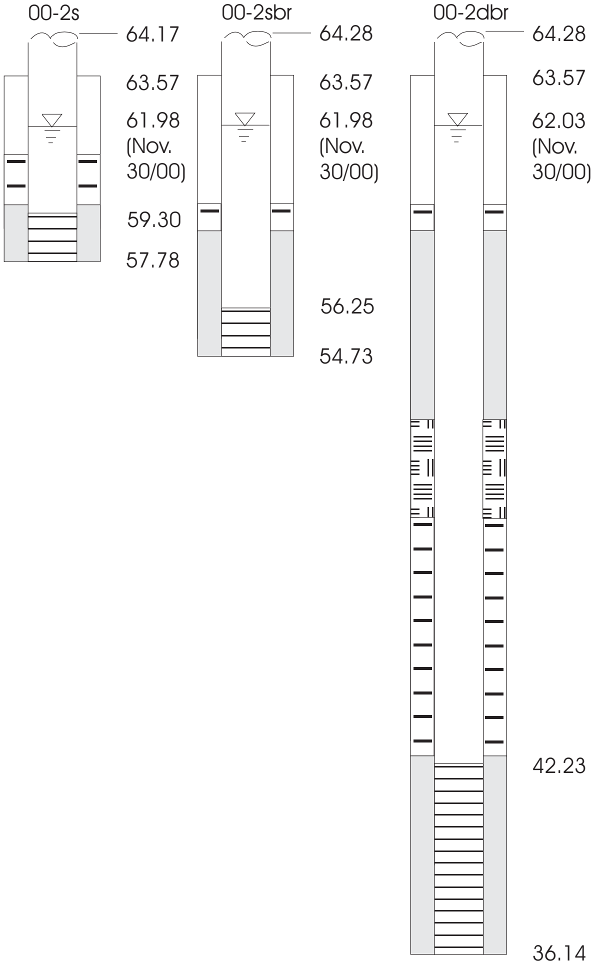


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FIGURE TITLE BOREHOLE LOG

DATE NOVEMBER 2000

SCALE NOT TO SCALE

JOB FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DRAWN JBH

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: November 22, 2000

HOLE #: **MW-00-3s**
MW-00-3dbr

REMARKS:

BORING BY: AIR ROTARY DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value	DEPTH (m)	ELEV. (m)
Ground Surface 64.12						
MARINE CLAY - soft, saturated, grey blue clay					0.0	64.12
59.55					3.0	61.12
BEDROCK - limestone.					6.0	58.12
					9.0	55.12
					12.0	52.12
					15.0	49.12
					18.0	46.12
					21.0	43.12
					24.0	40.12
36.28					27.0	37.12
Borehole Terminated.					30.0	34.12
					33.0	31.12

WELL DETAILS

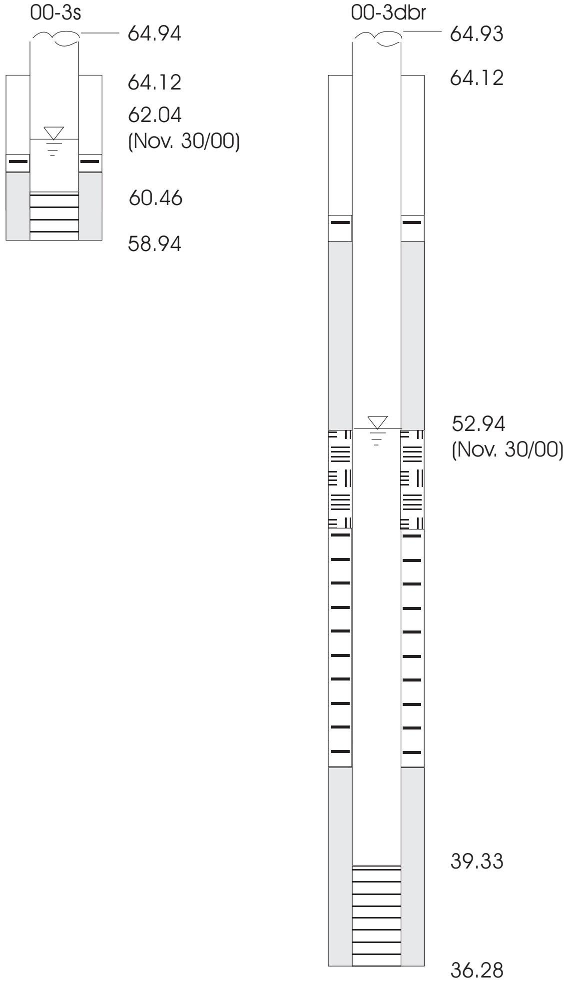

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FIGURE TITLE

BOREHOLE LOG

JOB

FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE	JANUARY 2001
SCALE	NOT TO SCALE
DRAWN	JBH
JOB No.	95620

DATUM: Geodetic BM No.96 =80.345 m

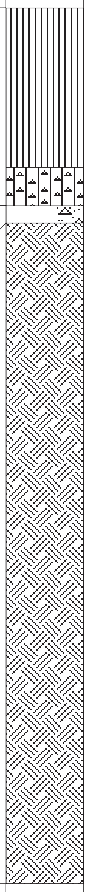
DRILLING DATE: November 22, 2000

HOLE #: **MW- 00-4s**
MW-00-4sbr
MW-00-4dbr

REMARKS: MONITOR 00-4d WAS REHABILITATED JAN 4, 2002
A NEW RISER AND UNION WERE INSTALLED. THE
NEW TOP OF RISER ELEVATION IS 63.52m

BORING BY: AIR ROTARY DRILL RIG

SOIL DESCRIPTION	STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value	DEPTH (m)	ELEV. (m)
Ground Surface 62.62						
MARINE CLAY - soft, saturated, grey blue clay.					0.0	62.62
					3.0	59.62
Boulders encountered below 5.2 m. 56.52						
GRAVEL - marine outwash, coarse and medium rounded gravel with some coarse sand, saturated. 55.91					6.0	56.62
BEDROCK - shale, black.					9.0	53.62
Water found at 11.5 - 12.2 m.					12.0	50.62
					15.0	47.62
					18.0	44.62
					21.0	41.62
Water found at 24.4 - 25.0 m.					24.0	38.62
35.19						
Borehole Terminated.					27.0	35.62
					30.0	32.62
					33.0	29.62



WELL DETAILS

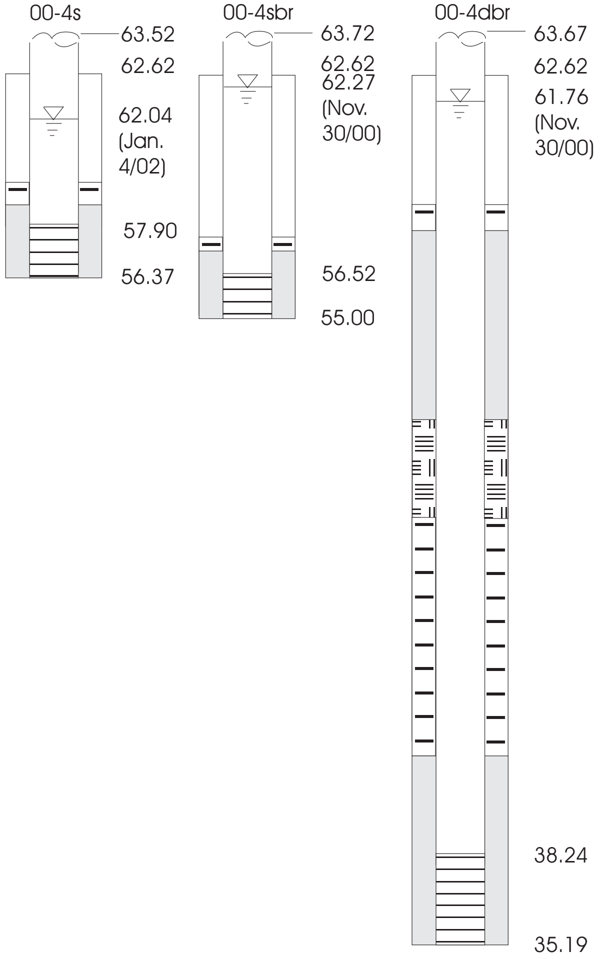


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FIGURE TITLE

BOREHOLE LOG

JOB

LANCASTER WASTE DISPOSAL SITE
ENVIRONMENTAL ASSESSMENT
SOUTH GLENGARRY TOWNSHIP

DATE JANUARY 2002

SCALE NOT TO SCALE

DRAWN DP

JOB No. 95620

DATUM: Geodetic BM No. 96 80.345 m

DRILLING DATE: November 22, 2000

HOLE #: **MW-00-5sbr**
MW-00-5dbr

REMARKS:

BORING BY: AIR ROTARY DRILL RIG

SOIL DESCRIPTION

Ground Surface 73.62

TILL - compact brown silty clay and gravel with boulders below 6.1 m. Becomes grey below 3.7 m.

62.34

BEDROCK - shale, black.

Water Found at 22.0 - 24.4 m.

46.19

Borehole Terminated.

STRAT.	SAMPLE TYPE	SAMPLE No.	N -Value	DEPTH (m)	ELEV. (m)
				0.0	73.62
				3.0	70.62
				6.0	67.62
				9.0	64.62
				12.0	61.62
				15.0	58.62
				18.0	55.62
				21.0	52.62
				24.0	49.62
				27.0	46.62
				30.0	43.62
				33.0	40.62

WELL DETAILS

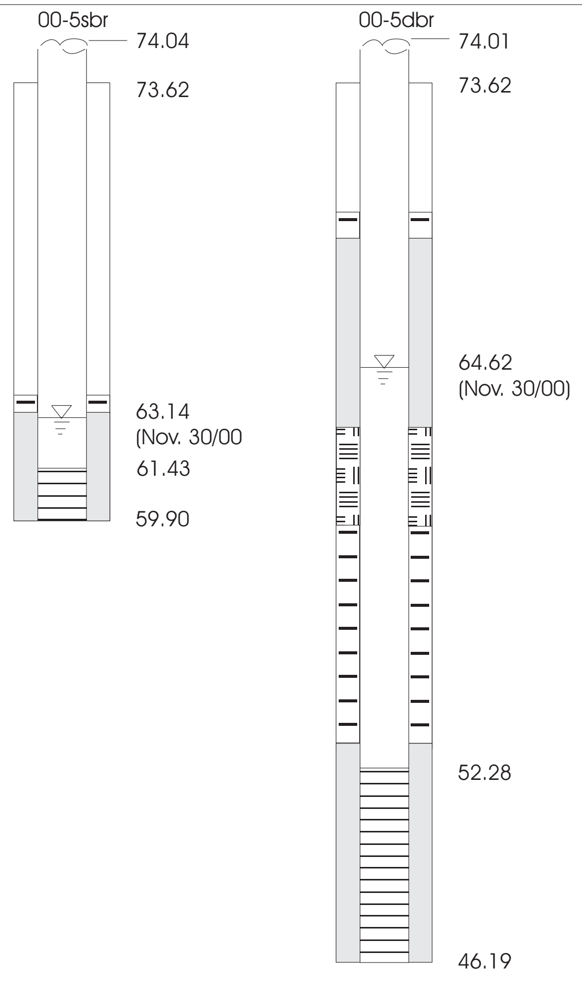

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FIGURE TITLE
BOREHOLE LOG

JOB
FORMER TOWNSHIP OF LANCASTER
WASTE DISPOSAL SITE
ENVIRONMENTAL IMPACT ASSESSMENT

DATE	JANUARY 2001
SCALE	NOT TO SCALE
DRAWN	JBH
JOB No.	95620

The Thompson Rosemount Group Inc.
architects & consulting engineers
CORNWALL GULEPH KINGSTON OTTAWA

North Lancaster Landfill

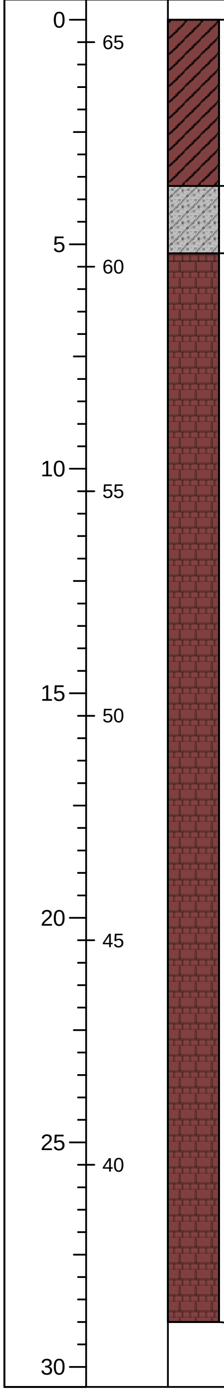
Borehole No. 06-1DBR
06-1D
06-1S

Date Started:	: February 20, 2006	Company Rep.	: JS
Date Completed:	: February 20, 2006	Northing Coord.	:
Hole Diameter:	: 0.10m	Easting Coord.	:
Drilling Method:	: Auger	Survey By:	:
Sampling Method:	: Split Spoon	Logged By:	: KK

Static Water Level
▼ 16.41m 06-1DBR
▽ 1.37m 06-1D
◆ 1.37m 06-1S

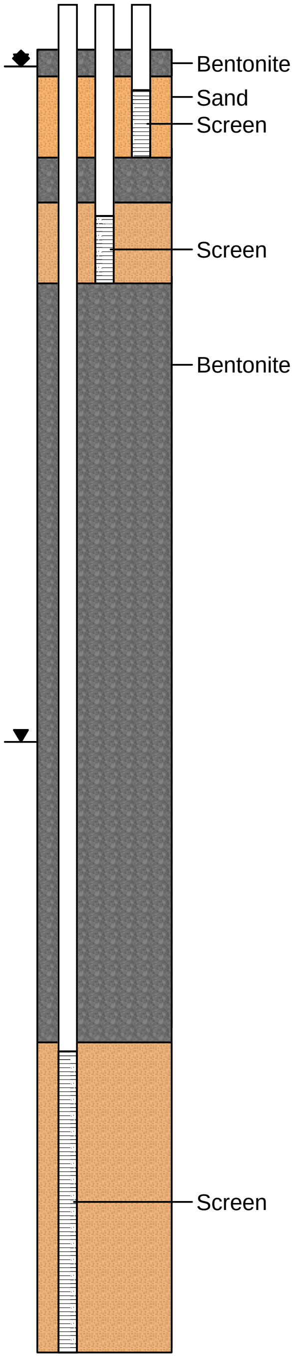
Well1: 06-1DBR- Top of PVC Elev.- 66.26
Well2: 06-1D- Top of PVC Elev.- 66.04
Well3: 06-1S- Top of PVC Elev.- 66.04

Depth in Meters | Surf. Elev. 65.5 | GRAPHIC | DESCRIPTION



DESCRIPTION	
CLAY, brown, firm, moist	63.10
GRAVEL, with traces of clay, grey	60.35
BEDROCK, limestone with shale seams	36.54

END OF HOLE AT 29.00m



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CORNWALL GULEPH KINGSTON OTTAWA

North Lancaster Landfill

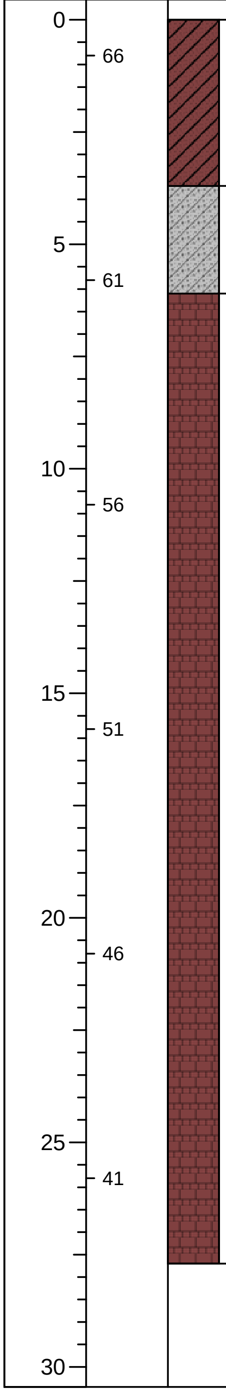
Borehole No. 06-2DBR
06-2D
06-2S

Date Started:	: February 21, 2006	Company Rep.	: JS
Date Completed:	: February 21, 2006	Northing Coord.	:
Hole Diameter:	: 0.10m	Easting Coord.	:
Drilling Method:	: Auger	Survey By:	:
Sampling Method:	: Split Spoon	Logged By:	: KK

Static Water Level
▼ 9.68m 06-2DBR
▽ 1.25m 06-2D
◆ 1.17m 06-2S

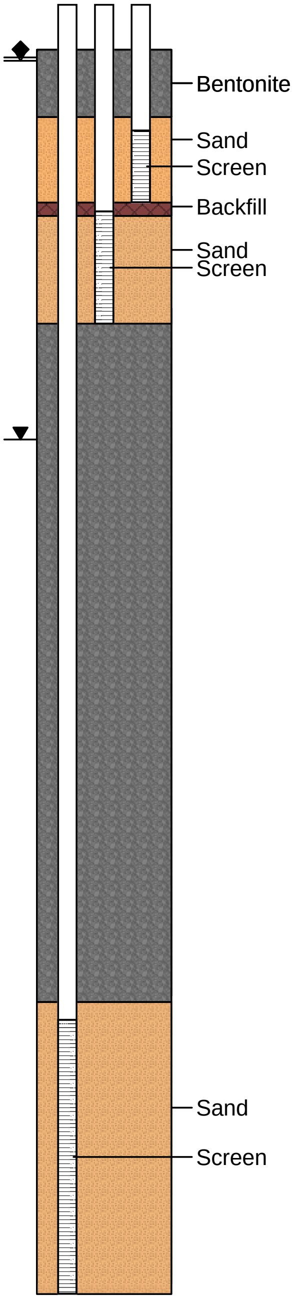
Well1: 06-2DBR- Top of PVC Elev.- 67.52
Well2: 06-2D- Top of PVC Elev.- 67.46
Well3: 06-2S- Top of PVC Elev.- 67.37

Depth in Meters | Surf. Elev. 66.8 | GRAPHIC



DESCRIPTION	
SANDY CLAY, brown, firm, moist	63.46
GRAVEL, grey	60.72
BEDROCK, limestone	39.12

END OF HOLE AT 27.70m



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CORNWALL GULEPH KINGSTON OTTAWA

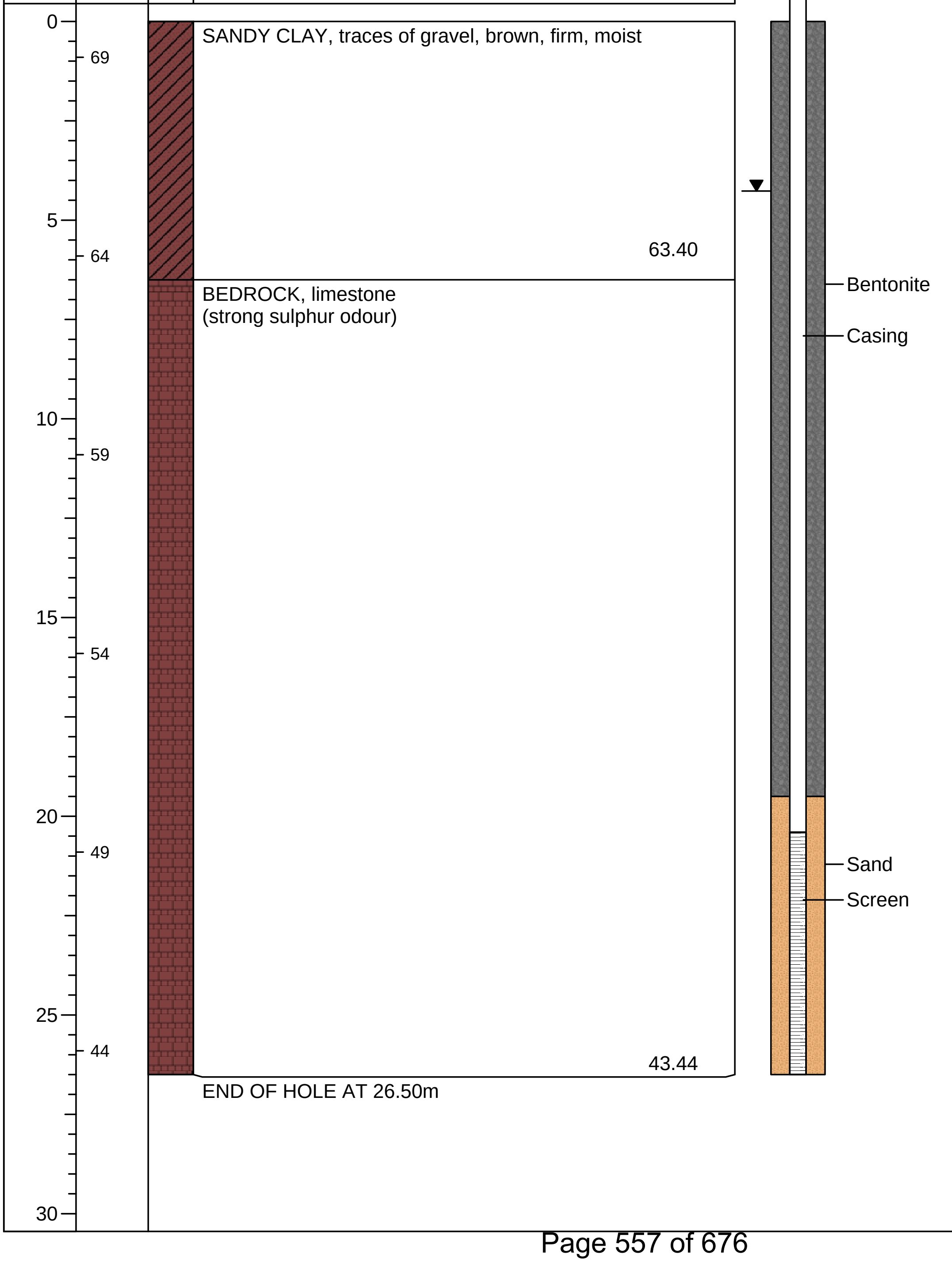
North Lancaster Landfill

Borehole No. 06-3DBR

Date Started:	: February 21, 2006	Company Rep.	: JS
Date Completed:	: February 21, 2006	Northing Coord.	:
Hole Diameter:	: 0.10m	Easting Coord.	:
Drilling Method:	: Auger	Survey By:	:
Sampling Method:	: Split Spoon	Logged By:	: KK

Static Water Level
▼ 5.27m
▽

Well: 06-3DBR- Top of PVC Elev.- 70.60



SANDY CLAY, traces of gravel, brown, firm, moist

BEDROCK, limestone
(strong sulphur odour)

END OF HOLE AT 26.50m

07-06-2010 X:\2009\09106012\borehole logs\06-3.bor

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CORNWALL GULEPH KINGSTON OTTAWA

North Lancaster Landfill

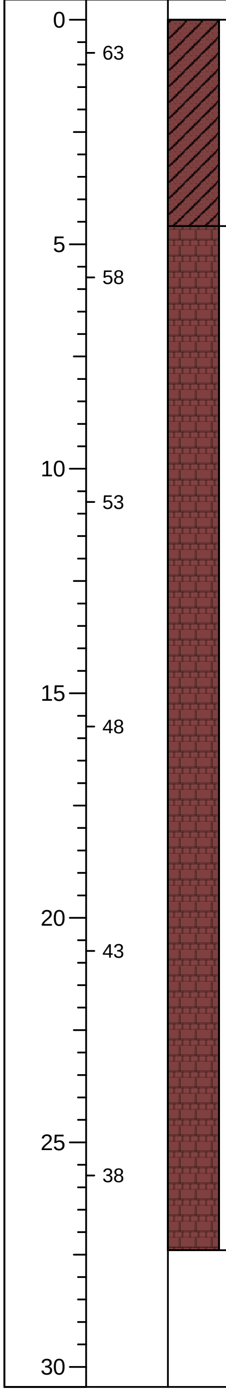
Borehole No. 06-4DBR
06-4D

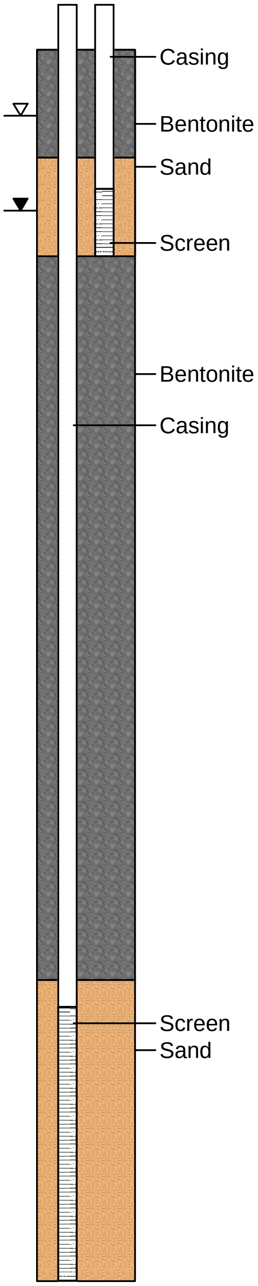
Date Started:	: February 22, 2006	Company Rep.	: JS
Date Completed:	: February 22, 2006	Northing Coord.	:
Hole Diameter:	: 0.10m	Easting Coord.	:
Drilling Method:	: Auger	Survey By:	:
Sampling Method:	: Split Spoon	Logged By:	: KK

Static Water Level
▼ 4.58m 06-4DBR
▽ 2.47m 06-4D

Well1: 06-4DBR- Top of PVC Elev.- 64.47
Well2: 06-4D- Top of PVC Elev.- 64.56

Depth in Meters	Surf. Elev. 63.74	GRAPHIC	DESCRIPTION
0		▨	SANDY CLAY, traces of gravel, brown, firm, moist 59.16
5		▦	BEDROCK, limestone (strong sulphur odour) 36.34
			END OF HOLE AT 27.40m





07-06-2010 X:\2009\09106012\borehole logs\06-4DBR.bor

H-7 HISTORICAL DATA

H-8 *CERTIFICATES OF ANALYSIS AND CALIBRATION CERTIFICATES*

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095485 **REPORT No. B21-15852**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 27-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		PW1	PW3		
			Sample I.D.		B21-15852-1	B21-15852-2		
			Date Collected		26-May-21	26-May-21		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	28-May-21/O	436	389		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Jun-21/O	283	270		
pH @25°C	pH Units		SM 4500H	05-Jun-21/O	8.33	8.45		
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Jun-21/O	784	677		
Chloride	mg/L	0.5	SM4110C	01-Jun-21/O	36.0	22.3		
Nitrite (N)	mg/L	0.05	SM4110C	01-Jun-21/O	< 0.05	< 0.05		
Nitrate (N)	mg/L	0.05	SM4110C	01-Jun-21/O	< 0.05	< 0.05		
Sulphate	mg/L	1	SM4110C	01-Jun-21/O	92	73		
Calcium	mg/L	0.02	SM 3120	28-May-21/O	109	69.6		
Magnesium	mg/L	0.02	SM 3120	28-May-21/O	39.9	52.4		
Sodium	mg/L	0.2	SM 3120	28-May-21/O	22.4	10.2		
Potassium	mg/L	0.1	SM 3120	28-May-21/O	4.6	3.3		
Barium	mg/L	0.001	SM 3120	28-May-21/O	0.051	0.093		
Boron	mg/L	0.005	SM 3120	28-May-21/O	0.030	0.048		
Iron	mg/L	0.005	SM 3120	28-May-21/O	1.05	0.361		
Manganese	mg/L	0.001	SM 3120	28-May-21/O	0.030	0.015		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	0.02	0.15		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	17-Jun-21/K	0.2	0.3		
Phenolics	mg/L	0.002	MOEE 3179	07-Jun-21/K	< 0.002	< 0.002		
BOD(5 day)	mg/L	3	SM 5210B	28-May-21/K	< 3	< 3		
COD	mg/L	5	SM5220C	28-May-21/K	< 5	< 5		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	01-Jun-21/O	2.3	1.7		
Anion Sum	meq/L		Calc.	07-Jun-21/O	8.58	7.55		
Cation Sum	meq/L		Calc.	07-Jun-21/O	9.87	8.33		
% Difference	%		Calc.	07-Jun-21/O	6.97	4.87		
Ion Ratio	AS/CS		Calc.	07-Jun-21/O	0.870	0.907		
Sodium Adsorption Ratio	-		Calc.	07-Jun-21/O	0.466	0.224		

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095485 **REPORT No. B21-15852**

Report To:
WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 27-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		PW1	PW3		
			Sample I.D.		B21-15852-1	B21-15852-2		
			Date Collected		26-May-21	26-May-21		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-21/O	475	393		
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-21/O	849	726		
TDS(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	0.605	0.581		
EC(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	1.08	1.07		
Langelier Index(25°C)	S.I.		Calc.	07-Jun-21/O	1.36	1.27		

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095590

REPORT No. B21-15683

Rev. 1

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 25-May-21
DATE REPORTED: 12-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		96-3s	96-3d	06-3dbr	
			Sample I.D.		B21-15683-1	B21-15683-2	B21-15683-3	
			Date Collected		25-May-21	25-May-21	25-May-21	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	27-May-21/O	658	616	202	
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	04-Jun-21/O	461	420	171	
pH @25°C	pH Units		SM 4500H	04-Jun-21/O	7.60	7.64	7.81	
Conductivity @25°C	µmho/cm	1	SM 2510B	04-Jun-21/O	2000	1810	8350	
TDS(ion sum calc.)	mg/L	1	Calc.	08-Jun-21/O	1091	988	4653	
Chloride	mg/L	0.5	SM4110C	31-May-21/O	349	333	2760	
Nitrite (N)	mg/L	0.05	SM4110C	31-May-21/O	0.94	0.89	< 1.3	
Nitrate (N)	mg/L	0.05	SM4110C	31-May-21/O	4.22	0.97	0.72	
Sulphate	mg/L	1	SM4110C	31-May-21/O	62	42	< 10	
Calcium	mg/L	0.02	SM 3120	27-May-21/O	185	139	50.0	
Magnesium	mg/L	0.02	SM 3120	27-May-21/O	47.5	65.4	18.7	
Sodium	mg/L	0.2	SM 3120	27-May-21/O	145	129	1700	
Potassium	mg/L	0.1	SM 3120	27-May-21/O	26.4	25.2	24.4	
Barium	mg/L	0.001	SM 3120	27-May-21/O	0.217	0.391	0.119	
Boron	mg/L	0.005	SM 3120	27-May-21/O	0.353	0.282	1.24	
Iron	mg/L	0.005	SM 3120	27-May-21/O	< 0.005	2.19	0.435	
Manganese	mg/L	0.001	SM 3120	27-May-21/O	0.001	0.533	0.040	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	0.03	0.02	2.08	
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	17-Jun-21/K	0.4	0.4	2.3	
Phenolics	mg/L	0.002	MOEE 3179	01-Jun-21/K	< 0.002	< 0.002	< 0.002	
BOD(5 day)	mg/L	3	SM 5210B	27-May-21/K	< 3	7	14	
COD	mg/L	5	SM5220C	27-May-21/K	15	9	331	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	28-May-21/O	2.6	2.4	0.7	
Anion Sum	meq/L		Calc.	08-Jun-21/O	20.7	18.8	81.4	
Cation Sum	meq/L		Calc.	08-Jun-21/O	20.1	18.7	78.6	
% Difference	%		Calc.	08-Jun-21/O	1.44	0.193	1.75	
Ion Ratio	AS/CS		Calc.	08-Jun-21/O	1.03	1.00	1.04	

NOTE: Revision created to correct Nitrite value for 06-3dbr.

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095590 **REPORT No. B21-15683**

Rev. 1

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 25-May-21
DATE REPORTED: 12-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		96-3s	96-3d	06-3dbr	
			Sample I.D.		B21-15683-1	B21-15683-2	B21-15683-3	
			Date Collected		25-May-21	25-May-21	25-May-21	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium Adsorption Ratio	-		Calc.	08-Jun-21/O	2.46	2.26	52.1	
Conductivity (calc.)	µmho/cm		Calc.	08-Jun-21/O	1902	1769	7895	
TDS(calc.)/EC(actual)	-		Calc.	08-Jun-21/O	0.546	0.546	0.557	
EC(calc.)/EC(actual)	-		Calc.	08-Jun-21/O	0.951	0.979	0.945	
Langelier Index(25°C)	S.I.		Calc.	08-Jun-21/O	1.02	0.903	0.189	

NOTE: Revision created to correct Nitrite value for 06-3dbr.

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Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095588, G095589 **REPORT No. B21-15689**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 25-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		99-9s	99-8s	99-8sbr	99-7s
			Sample I.D.		B21-15689-1	B21-15689-2	B21-15689-3	B21-15689-4
			Date Collected		25-May-21	25-May-21	25-May-21	25-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	27-May-21/O	71	373	415	271
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Jun-21/O	91	301	376	241
pH @25°C	pH Units		SM 4500H	05-Jun-21/O	8.06	8.15	8.29	8.15
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Jun-21/O	190	725	946	576
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-21/O	89	415	522	313
Chloride	mg/L	0.5	SM4110C	31-May-21/O	0.7	16.4	60.4	16.9
Nitrite (N)	mg/L	0.05	SM4110C	31-May-21/O	0.07	0.08	0.10	0.07
Nitrate (N)	mg/L	0.05	SM4110C	31-May-21/O	0.21	0.12	0.16	0.08
Sulphate	mg/L	1	SM4110C	31-May-21/O	3	65	42	39
Calcium	mg/L	0.02	SM 3120	27-May-21/O	22.3	94.9	99.1	80.1
Magnesium	mg/L	0.02	SM 3120	27-May-21/O	3.83	33.0	40.8	17.1
Sodium	mg/L	0.2	SM 3120	27-May-21/O	3.8	23.7	41.8	14.0
Potassium	mg/L	0.1	SM 3120	27-May-21/O	0.3	0.5	5.4	1.0
Barium	mg/L	0.001	SM 3120	27-May-21/O	0.019	0.076	0.235	0.047
Boron	mg/L	0.005	SM 3120	27-May-21/O	0.005	0.016	0.127	0.015
Iron	mg/L	0.005	SM 3120	27-May-21/O	0.408	0.339	2.91	0.166
Manganese	mg/L	0.001	SM 3120	27-May-21/O	0.083	0.327	0.290	0.023
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	0.18	0.03	2.68	0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	17-Jun-21/K	4.3	0.4	2.5	0.2
Phenolics	mg/L	0.002	MOEE 3179	01-Jun-21/K	< 0.002	< 0.002	< 0.002	< 0.002
BOD(5 day)	mg/L	3	SM 5210B	28-May-21/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	27-May-21/K	105	12	14	9
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	31-May-21/O	4.3	3.9	4.1	6.6
Anion Sum	meq/L		Calc.	07-Jun-21/O	1.92	7.86	10.1	6.11
Cation Sum	meq/L		Calc.	07-Jun-21/O	1.64	8.53	10.6	6.05
% Difference	%		Calc.	07-Jun-21/O	7.80	4.10	2.42	0.503
Ion Ratio	AS/CS		Calc.	07-Jun-21/O	1.17	0.921	0.953	1.01

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095588, G095589 **REPORT No. B21-15689**

Report To:
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1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

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Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 25-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		99-9s	99-8s	99-8sbr	99-7s
			Sample I.D.		B21-15689-1	B21-15689-2	B21-15689-3	B21-15689-4
			Date Collected		25-May-21	25-May-21	25-May-21	25-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium Adsorption Ratio	-		Calc.	07-Jun-21/O	0.197	0.534	0.892	0.370
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-21/O	167	742	936	569
TDS(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	0.469	0.573	0.552	0.543
EC(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	0.880	1.02	0.990	0.988
Langelier Index(25°C)	S.I.		Calc.	07-Jun-21/O	0.00472	1.14	1.40	0.992

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DATE RECEIVED: 25-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		99-7sbr	99-7dbr	06-2d	96-2d
			Sample I.D.		B21-15689-5	B21-15689-6	B21-15689-7	B21-15689-8
			Date Collected		25-May-21	25-May-21	25-May-21	25-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	27-May-21/O	307	168	404	286
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Jun-21/O	268	278	287	254
pH @25°C	pH Units		SM 4500H	05-Jun-21/O	8.34	8.41	8.28	8.07
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Jun-21/O	657	837	723	514
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-21/O	366	437	420	277
Chloride	mg/L	0.5	SM4110C	31-May-21/O	25.8	79.5	3.4	3.6
Nitrite (N)	mg/L	0.05	SM4110C	31-May-21/O	0.09	0.13	0.07	0.07
Nitrate (N)	mg/L	0.05	SM4110C	31-May-21/O	0.11	0.16	1.43	0.23
Sulphate	mg/L	1	SM4110C	31-May-21/O	44	26	101	11
Calcium	mg/L	0.02	SM 3120	27-May-21/O	88.9	50.6	96.6	90.4
Magnesium	mg/L	0.02	SM 3120	27-May-21/O	20.6	10.0	39.5	14.5
Sodium	mg/L	0.2	SM 3120	27-May-21/O	23.0	99.9	5.7	4.3
Potassium	mg/L	0.1	SM 3120	27-May-21/O	1.4	3.1	0.8	0.3
Barium	mg/L	0.001	SM 3120	27-May-21/O	0.147	0.075	0.031	0.041
Boron	mg/L	0.005	SM 3120	27-May-21/O	0.042	0.188	< 0.005	0.006
Iron	mg/L	0.005	SM 3120	27-May-21/O	1.02	0.064	0.054	0.012
Manganese	mg/L	0.001	SM 3120	27-May-21/O	0.223	0.029	0.004	< 0.001
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	0.40	0.17	0.03	0.04
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	17-Jun-21/K	0.6	0.5	0.7	0.2
Phenolics	mg/L	0.002	MOEE 3179	01-Jun-21/K	< 0.002	< 0.002	< 0.002	< 0.002
BOD(5 day)	mg/L	3	SM 5210B	28-May-21/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	27-May-21/K	9	10	15	< 5
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	31-May-21/O	5.8	3.6	3.7	4.9
Anion Sum	meq/L		Calc.	07-Jun-21/O	6.99	8.39	8.05	5.44
Cation Sum	meq/L		Calc.	07-Jun-21/O	7.26	7.79	8.34	5.90
% Difference	%		Calc.	07-Jun-21/O	1.87	3.74	1.77	4.08
Ion Ratio	AS/CS		Calc.	07-Jun-21/O	0.963	1.08	0.965	0.922

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Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

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DATE RECEIVED: 25-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

				Client I.D.	99-7sbr	99-7dbr	06-2d	96-2d
				Sample I.D.	B21-15689-5	B21-15689-6	B21-15689-7	B21-15689-8
				Date Collected	25-May-21	25-May-21	25-May-21	25-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium Adsorption Ratio	-		Calc.	07-Jun-21/O	0.571	3.36	0.123	0.111
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-21/O	661	774	739	520
TDS(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	0.556	0.522	0.581	0.539
EC(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	1.01	0.925	1.02	1.01
Langelier Index(25°C)	S.I.		Calc.	07-Jun-21/O	1.26	1.10	1.26	0.989

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095588, G095589 **REPORT No. B21-15689**

Report To:
WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 25-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		99-2sbr	00-5sbr	00-5dbr	GW Duplicate
			Sample I.D.		B21-15689-9	B21-15689-10	B21-15689-11	B21-15689-12
			Date Collected		25-May-21	25-May-21	25-May-21	25-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	27-May-21/O	417	332	8	168
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Jun-21/O	368	243	250	263
pH @25°C	pH Units		SM 4500H	05-Jun-21/O	8.23	8.14	8.66	8.39
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Jun-21/O	921	550	616	728
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-21/O	509	307	355	409
Chloride	mg/L	0.5	SM4110C	31-May-21/O	45.0	6.5	26.5	50.5
Nitrite (N)	mg/L	0.05	SM4110C	31-May-21/O	0.10	0.06	0.11	0.11
Nitrate (N)	mg/L	0.05	SM4110C	31-May-21/O	0.39	1.86	0.17	0.19
Sulphate	mg/L	1	SM4110C	31-May-21/O	61	36	20	35
Calcium	mg/L	0.02	SM 3120	27-May-21/O	98.4	82.4	1.86	50.5
Magnesium	mg/L	0.02	SM 3120	27-May-21/O	41.5	30.6	0.83	10.1
Sodium	mg/L	0.2	SM 3120	27-May-21/O	33.4	5.1	152	101
Potassium	mg/L	0.1	SM 3120	27-May-21/O	5.5	1.1	3.3	3.2
Barium	mg/L	0.001	SM 3120	27-May-21/O	0.214	0.092	0.013	0.075
Boron	mg/L	0.005	SM 3120	27-May-21/O	0.106	0.022	0.415	0.191
Iron	mg/L	0.005	SM 3120	27-May-21/O	1.15	0.048	0.009	0.062
Manganese	mg/L	0.001	SM 3120	27-May-21/O	0.042	0.009	0.105	0.030
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	2.28	0.03	0.17	0.17
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	17-Jun-21/K	2.3	0.3	0.2	0.4
Phenolics	mg/L	0.002	MOEE 3179	01-Jun-21/K	< 0.002	< 0.002	< 0.002	< 0.002
BOD(5 day)	mg/L	3	SM 5210B	28-May-21/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	27-May-21/K	16	6	5	13
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	31-May-21/O	4.7	3.2	2.5	3.9
Anion Sum	meq/L		Calc.	07-Jun-21/O	9.91	5.91	6.19	7.45
Cation Sum	meq/L		Calc.	07-Jun-21/O	10.1	6.88	6.87	7.84
% Difference	%		Calc.	07-Jun-21/O	1.14	7.57	5.19	2.58

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095588, G095589 **REPORT No. B21-15689**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 25-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		99-2sbr	00-5sbr	00-5dbr	GW Duplicate
			Sample I.D.		B21-15689-9	B21-15689-10	B21-15689-11	B21-15689-12
			Date Collected		25-May-21	25-May-21	25-May-21	25-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ion Ratio	AS/CS		Calc.	07-Jun-21/O	0.977	0.859	0.901	0.950
Sodium Adsorption Ratio	-		Calc.	07-Jun-21/O	0.712	0.121	23.3	3.39
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-21/O	905	582	609	721
TDS(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	0.553	0.558	0.577	0.561
EC(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	0.982	1.06	0.989	0.990
Langelier Index(25°C)	S.I.		Calc.	07-Jun-21/O	1.33	0.999	-0.126	1.05

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Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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DATE RECEIVED: 25-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		Trip Blank	00-3s	99-6sbr	97-2s
			Sample I.D.		B21-15689-13	B21-15689-14	B21-15689-15	B21-15689-16
			Date Collected		25-May-21	25-May-21	25-May-21	25-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	27-May-21/O	< 1	328	435	417
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Jun-21/O	< 5	281	387	424
pH @25°C	pH Units		SM 4500H	05-Jun-21/O	5.61	8.46	8.20	8.06
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Jun-21/O	< 1	686	1000	1120
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-21/O	< 1	364	571	608
Chloride	mg/L	0.5	SM4110C	31-May-21/O	< 0.5	46.4	68.3	81.7
Nitrite (N)	mg/L	0.05	SM4110C	31-May-21/O	< 0.05	0.10	0.12	0.25
Nitrate (N)	mg/L	0.05	SM4110C	31-May-21/O	< 0.05	0.23	0.11	0.96
Sulphate	mg/L	1	SM4110C	31-May-21/O	< 1	17	46	43
Calcium	mg/L	0.02	SM 3120	27-May-21/O	< 0.02	61.6	104	111
Magnesium	mg/L	0.02	SM 3120	27-May-21/O	< 0.02	42.4	42.6	34.0
Sodium	mg/L	0.2	SM 3120	27-May-21/O	< 0.2	22.2	66.9	77.0
Potassium	mg/L	0.1	SM 3120	27-May-21/O	< 0.1	5.8	7.6	6.1
Barium	mg/L	0.001	SM 3120	27-May-21/O	< 0.001	0.106	0.236	0.152
Boron	mg/L	0.005	SM 3120	27-May-21/O	< 0.005	0.145	0.145	0.119
Iron	mg/L	0.005	SM 3120	27-May-21/O	< 0.005	0.035	1.19	0.051
Manganese	mg/L	0.001	SM 3120	27-May-21/O	< 0.001	0.037	0.122	0.028
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	0.01	0.05	1.54	1.27
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	17-Jun-21/K	< 0.1	1.6	1.6	1.5
Phenolics	mg/L	0.002	MOEE 3179	01-Jun-21/K	< 0.002	< 0.002	< 0.002	< 0.002
BOD(5 day)	mg/L	3	SM 5210B	28-May-21/K	< 3	< 3	< 3	6
COD	mg/L	5	SM5220C	27-May-21/K	< 5	24	10	11
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	31-May-21/O	< 0.2	2.0	3.8	2.1
Anion Sum	meq/L		Calc.	07-Jun-21/O	0.000	7.29	10.6	11.7
Cation Sum	meq/L		Calc.	07-Jun-21/O	0.000841	7.68	12.0	11.9
% Difference	%		Calc.	07-Jun-21/O	100	2.60	5.97	0.784

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095588, G095589 **REPORT No. B21-15689**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 25-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		Trip Blank	00-3s	99-6sbr	97-2s
			Sample I.D.		B21-15689-13	B21-15689-14	B21-15689-15	B21-15689-16
			Date Collected		25-May-21	25-May-21	25-May-21	25-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ion Ratio	AS/CS		Calc.	07-Jun-21/O	0.000	0.949	0.887	0.984
Sodium Adsorption Ratio	-		Calc.	07-Jun-21/O	-	0.533	1.40	1.64
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-21/O	< 1	695	1022	1071
TDS(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	-	0.530	0.570	0.544
EC(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	-	1.01	1.02	0.958
Langelier Index(25°C)	S.I.		Calc.	07-Jun-21/O	-	1.25	1.33	1.26

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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DATE RECEIVED: 25-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		06-1d	06-1s		
			Sample I.D.		B21-15689-17	B21-15689-18		
			Date Collected		25-May-21	25-May-21		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	27-May-21/O	364	363		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Jun-21/O	296	288		
pH @25°C	pH Units		SM 4500H	05-Jun-21/O	8.05	8.07		
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Jun-21/O	632	610		
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-21/O	352	347		
Chloride	mg/L	0.5	SM4110C	31-May-21/O	5.7	5.0		
Nitrite (N)	mg/L	0.05	SM4110C	31-May-21/O	< 0.05	0.08		
Nitrate (N)	mg/L	0.05	SM4110C	31-May-21/O	0.14	0.19		
Sulphate	mg/L	1	SM4110C	31-May-21/O	32	32		
Calcium	mg/L	0.02	SM 3120	27-May-21/O	101	101		
Magnesium	mg/L	0.02	SM 3120	27-May-21/O	27.1	26.9		
Sodium	mg/L	0.2	SM 3120	27-May-21/O	8.3	8.1		
Potassium	mg/L	0.1	SM 3120	27-May-21/O	1.2	1.2		
Barium	mg/L	0.001	SM 3120	27-May-21/O	0.082	0.083		
Boron	mg/L	0.005	SM 3120	27-May-21/O	0.006	0.006		
Iron	mg/L	0.005	SM 3120	27-May-21/O	0.033	0.019		
Manganese	mg/L	0.001	SM 3120	27-May-21/O	0.019	0.009		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	0.03	0.04		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	17-Jun-21/K	0.3	3.1		
Phenolics	mg/L	0.002	MOEE 3179	01-Jun-21/K	< 0.002	< 0.002		
BOD(5 day)	mg/L	3	SM 5210B	28-May-21/K	< 3	< 3		
COD	mg/L	5	SM5220C	27-May-21/K	7	89		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	31-May-21/O	3.5	5.3		
Anion Sum	meq/L		Calc.	07-Jun-21/O	6.73	6.59		
Cation Sum	meq/L		Calc.	07-Jun-21/O	7.66	7.64		
% Difference	%		Calc.	07-Jun-21/O	6.47	7.41		

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Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095588, G095589 **REPORT No. B21-15689**

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Attention: Jennifer Brown-Hawn

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2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 25-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		06-1d	06-1s		
			Sample I.D.		B21-15689-17	B21-15689-18		
			Date Collected		25-May-21	25-May-21		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ion Ratio	AS/CS		Calc.	07-Jun-21/O	0.878	0.862		
Sodium Adsorption Ratio	-		Calc.	07-Jun-21/O	0.189	0.186		
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-21/O	652	646		
TDS(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	0.557	0.569		
EC(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	1.03	1.06		
Langelier Index(25°C)	S.I.		Calc.	07-Jun-21/O	1.07	1.08		

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095484, 095485 **REPORT No. B21-15849**

Report To:
WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 26-May-21
DATE REPORTED: 21-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		99-9sbr	97-4d	99-4sbr	99-4dbr
			Sample I.D.		B21-15849-1	B21-15849-2	B21-15849-3	B21-15849-4
			Date Collected		26-May-21	26-May-21	26-May-21	26-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	28-May-21/O	316	756	559	276
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Jun-21/O	281	550	422	275
pH @25°C	pH Units		SM 4500H	05-Jun-21/O	8.30	7.70	8.07	8.20
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Jun-21/O	589	1480	1170	856
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-21/O	319	931	653	538
Chloride	mg/L	0.5	SM4110C	01-Jun-21/O	11.9	17.4	108	26.1
Nitrite (N)	mg/L	0.05	SM4110C	01-Jun-21/O	< 0.05	0.36	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	01-Jun-21/O	< 0.05	10.1	0.07	< 0.05
Sulphate	mg/L	1	SM4110C	01-Jun-21/O	18	227	49	138
Calcium	mg/L	0.02	SM 3120	28-May-21/O	78.7	221	111	80.6
Magnesium	mg/L	0.02	SM 3120	28-May-21/O	28.9	49.4	68.6	18.1
Sodium	mg/L	0.2	SM 3120	28-May-21/O	9.9	64.9	49.4	106
Potassium	mg/L	0.1	SM 3120	28-May-21/O	2.8	16.7	11.1	3.5
Barium	mg/L	0.001	SM 3120	28-May-21/O	0.162	0.064	0.189	0.027
Boron	mg/L	0.005	SM 3120	28-May-21/O	0.070	0.625	0.453	0.212
Iron	mg/L	0.005	SM 3120	28-May-21/O	0.130	0.010	1.16	0.040
Manganese	mg/L	0.001	SM 3120	28-May-21/O	0.021	0.199	0.031	0.013
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	0.21	3.49	1.76	0.34
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	18-Jun-21/K	3.9	3.8	2.1	0.5
Phenolics	mg/L	0.001	MOEE 3179	03-Jun-21/K	< 0.001	< 0.001	< 0.001	< 0.001
BOD(5 day)	mg/L	3	SM 5210B	28-May-21/K	5	12	< 3	< 3
COD	mg/L	5	SM5220C	28-May-21/K	106	12	14	5
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	01-Jun-21/O	3.5	11.4	3.9	3.8
Anion Sum	meq/L		Calc.	07-Jun-21/O	6.33	17.0	12.5	9.12
Cation Sum	meq/L		Calc.	07-Jun-21/O	6.83	18.6	13.8	10.2
% Difference	%		Calc.	07-Jun-21/O	3.81	4.60	5.04	5.78
Ion Ratio	AS/CS		Calc.	07-Jun-21/O	0.927	0.912	0.904	0.891

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095484, 095485 **REPORT No. B21-15849**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 26-May-21
DATE REPORTED: 21-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		99-9sbr	97-4d	99-4sbr	99-4dbr
			Sample I.D.		B21-15849-1	B21-15849-2	B21-15849-3	B21-15849-4
			Date Collected		26-May-21	26-May-21	26-May-21	26-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium Adsorption Ratio	-		Calc.	07-Jun-21/O	0.243	1.03	0.909	2.78
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-21/O	600	1450	1187	897
TDS(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	0.542	0.631	0.557	0.629
EC(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	1.02	0.982	1.01	1.05
Langelier Index(25°C)	S.I.		Calc.	07-Jun-21/O	1.20	1.28	1.27	1.07

1 . Cations Run from unpreserved bottle

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095484, 095485 **REPORT No. B21-15849**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 26-May-21
DATE REPORTED: 21-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		97-3d	99-3sbr	96-1s	99-1d
			Sample I.D.		B21-15849-5	B21-15849-6	B21-15849-7	B21-15849-8
			Date Collected		26-May-21	26-May-21	26-May-21	26-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	28-May-21/O	408	580	371	349
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Jun-21/O	286	485	313	260
pH @25°C	pH Units		SM 4500H	05-Jun-21/O	8.18	7.93	7.78	8.17
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Jun-21/O	703	1200	666	579
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-21/O	406	675	369	332
Chloride	mg/L	0.5	SM4110C	01-Jun-21/O	25.3	73.9	2.1	4.1
Nitrite (N)	mg/L	0.05	SM4110C	01-Jun-21/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	01-Jun-21/O	< 0.05	0.97	0.05	0.09
Sulphate	mg/L	1	SM4110C	01-Jun-21/O	57	60	44	51
Calcium	mg/L	0.02	SM 3120	28-May-21/O	75.9	121	103	69.6
Magnesium	mg/L	0.02	SM 3120	28-May-21/O	53.1	67.5	27.6	42.5
Sodium	mg/L	0.2	SM 3120	28-May-21/O	19.7	51.1	4.0	6.9
Potassium	mg/L	0.1	SM 3120	28-May-21/O	2.5	6.5	1.0	2.3
Barium	mg/L	0.001	SM 3120	28-May-21/O	0.079	0.222	0.074	0.100
Boron	mg/L	0.005	SM 3120	28-May-21/O	0.021	0.421	0.030	0.032
Iron	mg/L	0.005	SM 3120	28-May-21/O	0.086	0.540	< 0.005	0.011
Manganese	mg/L	0.001	SM 3120	28-May-21/O	0.024	0.310	< 0.001	0.006
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	0.06	2.37	0.04	0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	18-Jun-21/K	0.6	2.8	0.5	0.5
Phenolics	mg/L	0.001	MOEE 3179	03-Jun-21/K	0.002	< 0.001	< 0.001	< 0.001
BOD(5 day)	mg/L	3	SM 5210B	28-May-21/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	28-May-21/K	12	19	5	8
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	01-Jun-21/O	2.6	5.9	3.0	3.2
Anion Sum	meq/L		Calc.	07-Jun-21/O	7.62	13.1	7.23	6.38
Cation Sum	meq/L		Calc.	07-Jun-21/O	9.08	14.2	7.61	7.33
% Difference	%		Calc.	07-Jun-21/O	8.76	4.04	2.56 [1]	6.96
Ion Ratio	AS/CS		Calc.	07-Jun-21/O	0.839	0.922	0.950	0.870

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Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095484, 095485 **REPORT No. B21-15849**

Report To:

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1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 26-May-21
DATE REPORTED: 21-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		97-3d	99-3sbr	96-1s	99-1d
			Sample I.D.		B21-15849-5	B21-15849-6	B21-15849-7	B21-15849-8
			Date Collected		26-May-21	26-May-21	26-May-21	26-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium Adsorption Ratio	-		Calc.	07-Jun-21/O	0.424	0.923	0.0896	0.161
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-21/O	759	1193	668	622
TDS(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	0.577	0.563	0.554	0.574
EC(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	1.08	0.995	1.00	1.07
Langelier Index(25°C)	S.I.		Calc.	07-Jun-21/O	1.05	1.22	0.836	0.985

1 . Cations Run from unpreserved bottle

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

				Client I.D.	99-1sbr	97-1s	99-5sbr	00-1s
				Sample I.D.	B21-15849-9	B21-15849-10	B21-15849-11	B21-15849-12
				Date Collected	26-May-21	26-May-21	26-May-21	26-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	28-May-21/O	131	326	501	456
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Jun-21/O	180	262	317	307
pH @25°C	pH Units		SM 4500H	05-Jun-21/O	8.48	8.06	8.03	8.11
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Jun-21/O	387	521	865	904
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-21/O	218	295	475	517
Chloride	mg/L	0.5	SM4110C	01-Jun-21/O	2.0	4.1	69.2	83.4
Nitrite (N)	mg/L	0.05	SM4110C	01-Jun-21/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	01-Jun-21/O	< 0.05	0.08	< 0.05	0.09
Sulphate	mg/L	1	SM4110C	01-Jun-21/O	24	11	40	50
Calcium	mg/L	0.02	SM 3120	28-May-21/O	20.7	94.8	108	125
Magnesium	mg/L	0.02	SM 3120	28-May-21/O	19.3	21.6	56.3	34.8
Sodium	mg/L	0.2	SM 3120	28-May-21/O	37.5	5.7	10.3	38.2
Potassium	mg/L	0.1	SM 3120	28-May-21/O	5.2	0.3	0.9	1.8
Barium	mg/L	0.001	SM 3120	28-May-21/O	0.107	0.070	0.141	0.064
Boron	mg/L	0.005	SM 3120	28-May-21/O	0.373	0.008	0.025	0.023
Iron	mg/L	0.005	SM 3120	28-May-21/O	0.017	0.138	0.145	0.012
Manganese	mg/L	0.001	SM 3120	28-May-21/O	0.003	0.034	0.016	< 0.001
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	0.51	0.02	0.01	< 0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	18-Jun-21/K	0.5	0.6	< 0.1	0.2
Phenolics	mg/L	0.001	MOEE 3179	03-Jun-21/K	< 0.001	< 0.001	< 0.001	< 0.001
BOD(5 day)	mg/L	3	SM 5210B	28-May-21/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	28-May-21/K	< 5	6	< 5	< 5
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	01-Jun-21/O	2.9	5.3	2.1	2.0
Anion Sum	meq/L		Calc.	07-Jun-21/O	4.18	5.60	9.11	9.53
Cation Sum	meq/L		Calc.	07-Jun-21/O	4.42	6.77	10.5	10.8
% Difference	%		Calc.	07-Jun-21/O	2.81	9.46	7.10	6.31

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095484, 095485 **REPORT No. B21-15849**

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Attention: Jennifer Brown-Hawn

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Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 26-May-21
DATE REPORTED: 21-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		99-1sbr	97-1s	99-5sbr	00-1s
			Sample I.D.		B21-15849-9	B21-15849-10	B21-15849-11	B21-15849-12
			Date Collected		26-May-21	26-May-21	26-May-21	26-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ion Ratio	AS/CS		Calc.	07-Jun-21/O	0.945	0.827	0.867	0.881
Sodium Adsorption Ratio	-		Calc.	07-Jun-21/O	1.42	0.137	0.200	0.779
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-21/O	397	565	906	954
TDS(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	0.563	0.567	0.549	0.572
EC(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	1.03	1.09	1.05	1.06
Langelier Index(25°C)	S.I.		Calc.	07-Jun-21/O	0.619	1.01	1.10	1.23

1 . Cations Run from unpreserved bottle

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		00-1dbr	00-2s	00-2sbr	00-4sbr
			Sample I.D.		B21-15849-13	B21-15849-14	B21-15849-15	B21-15849-16
			Date Collected		26-May-21	26-May-21	26-May-21	26-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	28-May-21/O	528	320	216	261
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Jun-21/O	132	276	279	241
pH @25°C	pH Units		SM 4500H	05-Jun-21/O	8.16	8.26	8.49	8.24
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Jun-21/O	12000	717	1090	596
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-21/O	7052	413	598	338
Chloride	mg/L	0.5	SM4110C	01-Jun-21/O	4320	39.1	162	16.0
Nitrite (N)	mg/L	0.05	SM4110C	01-Jun-21/O	< 1	< 0.05	< 0.05	0.09
Nitrate (N)	mg/L	0.05	SM4110C	01-Jun-21/O	< 1	< 0.05	< 0.05	2.03
Sulphate	mg/L	1	SM4110C	01-Jun-21/O	< 30	47	35	40
Calcium	mg/L	0.02	SM 3120	28-May-21/O	127	88.1	33.0	64.5
Magnesium	mg/L	0.02	SM 3120	28-May-21/O	51.3	24.2	32.4	24.3
Sodium	mg/L	0.2	SM 3120	28-May-21/O	2420	46.7	157	44.2
Potassium	mg/L	0.1	SM 3120	28-May-21/O	44.1	1.8	10.6	4.0
Barium	mg/L	0.001	SM 3120	28-May-21/O	0.428	0.117	0.710	0.147
Boron	mg/L	0.005	SM 3120	28-May-21/O	1.23	0.040	0.530	0.192
Iron	mg/L	0.005	SM 3120	28-May-21/O	1.23	0.300	0.005	0.030
Manganese	mg/L	0.001	SM 3120	28-May-21/O	2.03	0.026	0.007	0.005
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	3.16	0.03	0.70	0.19
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	18-Jun-21/K	3.3	0.2	1.2	0.3
Phenolics	mg/L	0.001	MOEE 3179	03-Jun-21/K	< 0.001	< 0.001	< 0.001	< 0.001
BOD(5 day)	mg/L	3	SM 5210B	28-May-21/K	13	< 3	7	< 3
COD	mg/L	5	SM5220C	28-May-21/K	317	< 5	20	5
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	01-Jun-21/O	0.4	1.7	1.4	2.4
Anion Sum	meq/L		Calc.	07-Jun-21/O	125	7.59	10.9	6.27
Cation Sum	meq/L		Calc.	07-Jun-21/O	117	8.48	11.5	7.26
% Difference	%		Calc.	07-Jun-21/O	3.02	5.57	2.66	7.32

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		00-1dbr	00-2s	00-2sbr	00-4sbr
			Sample I.D.		B21-15849-13	B21-15849-14	B21-15849-15	B21-15849-16
			Date Collected		26-May-21	26-May-21	26-May-21	26-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ion Ratio	AS/CS		Calc.	07-Jun-21/O	1.06	0.895	0.948	0.864
Sodium Adsorption Ratio	-		Calc.	07-Jun-21/O	45.8	1.14	4.65	1.19
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-21/O	11121	748	1091	618
TDS(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	0.590	0.575	0.548	0.568
EC(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	0.931	1.04	0.999	1.04
Langelier Index(25°C)	S.I.		Calc.	07-Jun-21/O	0.830	1.18	0.981	0.979

1 . Cations Run from unpreserved bottle

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SAMPLE MATRIX: Groundwater

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P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		00-4s	99-6dbr		
			Sample I.D.		B21-15849-17	B21-15849-18		
			Date Collected		26-May-21	25-Jun-21		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	28-May-21/O	342	64		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Jun-21/O	232	492		
pH @25°C	pH Units		SM 4500H	05-Jun-21/O	8.14	8.68		
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Jun-21/O	576	1580		
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-21/O	330	924		
Chloride	mg/L	0.5	SM4110C	01-Jun-21/O	11.0	187		
Nitrite (N)	mg/L	0.05	SM4110C	01-Jun-21/O	< 0.05	< 0.05		
Nitrate (N)	mg/L	0.05	SM4110C	01-Jun-21/O	1.47	< 0.05		
Sulphate	mg/L	1	SM4110C	01-Jun-21/O	53	42		
Calcium	mg/L	0.02	SM 3120	28-May-21/O	89.6	14.8		
Magnesium	mg/L	0.02	SM 3120	28-May-21/O	28.8	6.62		
Sodium	mg/L	0.2	SM 3120	28-May-21/O	6.6	369		
Potassium	mg/L	0.1	SM 3120	28-May-21/O	1.1	8.0		
Barium	mg/L	0.001	SM 3120	28-May-21/O	0.103	0.021		
Boron	mg/L	0.005	SM 3120	28-May-21/O	0.021	0.488		
Iron	mg/L	0.005	SM 3120	28-May-21/O	0.047	0.132		
Manganese	mg/L	0.001	SM 3120	28-May-21/O	0.004	0.012		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	0.01	0.61		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	18-Jun-21/K	0.3	0.7		
Phenolics	mg/L	0.001	MOEE 3179	03-Jun-21/K	0.001	< 0.001		
BOD(5 day)	mg/L	3	SM 5210B	28-May-21/K	< 3	< 3		
COD	mg/L	5	SM5220C	28-May-21/K	< 5	5		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	01-Jun-21/O	2.1	2.3		
Anion Sum	meq/L		Calc.	07-Jun-21/O	6.16	16.0		
Cation Sum	meq/L		Calc.	07-Jun-21/O	7.16	17.6		
% Difference	%		Calc.	07-Jun-21/O	7.47	4.76		

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095484, 095485 **REPORT No. B21-15849**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 26-May-21
DATE REPORTED: 21-Jun-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		00-4s	99-6dbr		
			Sample I.D.		B21-15849-17	B21-15849-18		
			Date Collected		26-May-21	25-Jun-21		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ion Ratio	AS/CS		Calc.	07-Jun-21/O	0.861	0.909		
Sodium Adsorption Ratio	-		Calc.	07-Jun-21/O	0.155	20.0		
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-21/O	615	1580		
TDS(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	0.572	0.586		
EC(calc.)/EC(actual)	-		Calc.	07-Jun-21/O	1.07	1.00		
Langelier Index(25°C)	S.I.		Calc.	07-Jun-21/O	1.02	1.04		

1 . Cations Run from unpreserved bottle

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095556, 096346

REPORT No. B21-32389

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 06-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		GW Duplicate	06-1S	06-1D	00-1S
			Sample I.D.		B21-32389-1	B21-32389-2	B21-32389-3	B21-32389-4
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	04-Oct-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	07-Oct-21/O	119	398	393	689
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Oct-21/O	305	283	274	351
pH @25°C	pH Units		SM 4500H	06-Oct-21/O	8.02	7.59	7.68	7.55
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Oct-21/O	888	716	716	1450
TDS(ion sum calc.)	mg/L	1	Calc.	14-Oct-21/O	498	379	370	834
Chloride	mg/L	0.5	SM4110C	06-Oct-21/O	72.5	16.0	15.9	178
Nitrite (N)	mg/L	0.05	SM4110C	06-Oct-21/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	06-Oct-21/O	< 0.05	5.34	5.88	< 0.05
Sulphate	mg/L	1	SM4110C	06-Oct-21/O	26	41	40	131
Calcium	mg/L	0.02	SM 3120	07-Oct-21/O	33.5	116	113	187
Magnesium	mg/L	0.02	SM 3120	07-Oct-21/O	8.50	26.5	26.7	54.2
Sodium	mg/L	0.2	SM 3120	07-Oct-21/O	168	8.8	8.7	71.3
Potassium	mg/L	0.1	SM 3120	07-Oct-21/O	4.8	1.1	1.0	3.1
Barium	mg/L	0.001	SM 3120	07-Oct-21/O	0.100	0.084	0.083	0.115
Boron	mg/L	0.005	SM 3120	07-Oct-21/O	0.368	0.012	0.009	0.035
Iron	mg/L	0.005	SM 3120	07-Oct-21/O	0.503	0.087	0.517	0.056
Manganese	mg/L	0.001	SM 3120	07-Oct-21/O	0.075	0.006	0.020	0.001
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Oct-21/K	0.43	0.03	0.01	0.03
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	12-Oct-21/K	0.7	1.2	0.9	< 0.1
Phenolics	mg/L	0.002	MOEE 3179	08-Oct-21/K	< 0.002	< 0.002	< 0.002	< 0.002
BOD(5 day)	mg/L	3	SM 5210B	07-Oct-21/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	08-Oct-21/K	18	25	15	11
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	07-Oct-21/O	4.1	3.4	3.2	2.0
Anion Sum	meq/L		Calc.	14-Oct-21/O	8.68	7.34	7.16	14.7
Cation Sum	meq/L		Calc.	14-Oct-21/O	9.88	8.36	8.28	17.0
% Difference	%		Calc.	14-Oct-21/O	6.48	6.49	7.23	6.99

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON™
ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095556, 096346 **REPORT No. B21-32389**

Report To:
WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 06-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		GW Duplicate	06-1S	06-1D	00-1S
			Sample I.D.		B21-32389-1	B21-32389-2	B21-32389-3	B21-32389-4
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	04-Oct-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ion Ratio	AS/CS		Calc.	14-Oct-21/O	0.878	0.878	0.865	0.869
Sodium Adsorption Ratio	-		Calc.	14-Oct-21/O	6.73	0.193	0.192	1.18
Conductivity (calc.)	µmho/cm		Calc.	14-Oct-21/O	873	701	687	1458
TDS(calc.)/EC(actual)	-		Calc.	14-Oct-21/O	0.560	0.529	0.517	0.575
EC(calc.)/EC(actual)	-		Calc.	14-Oct-21/O	0.983	0.979	0.960	1.01
Langelier Index(25°C)	S.I.		Calc.	14-Oct-21/O	0.566	0.652	0.718	0.873

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Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095556, 096346 **REPORT No. B21-32389**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
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Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 06-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		00-1DBR	99-4SBR	99-4DBR	99-9SBR
			Sample I.D.		B21-32389-5	B21-32389-6	B21-32389-7	B21-32389-8
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	04-Oct-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	07-Oct-21/O	533	567	147	361
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Oct-21/O	136	406	317	303
pH @25°C	pH Units		SM 4500H	06-Oct-21/O	7.69	7.64	7.87	7.76
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Oct-21/O	11800	1180	969	680
TDS(ion sum calc.)	mg/L	1	Calc.	14-Oct-21/O	6396	644	575	355
Chloride	mg/L	0.5	SM4110C	06-Oct-21/O	3820	113	43.9	17.6
Nitrite (N)	mg/L	0.05	SM4110C	06-Oct-21/O	< 0.5	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	06-Oct-21/O	< 0.5	< 0.05	0.63	< 0.05
Sulphate	mg/L	1	SM4110C	06-Oct-21/O	< 10	48	104	17
Calcium	mg/L	0.02	SM 3120	07-Oct-21/O	131	111	38.2	91.1
Magnesium	mg/L	0.02	SM 3120	07-Oct-21/O	49.9	70.4	12.6	32.4
Sodium	mg/L	0.2	SM 3120	07-Oct-21/O	2260	42.0	178	11.5
Potassium	mg/L	0.1	SM 3120	07-Oct-21/O	43.2	10.8	6.9	3.2
Barium	mg/L	0.001	SM 3120	07-Oct-21/O	0.445	0.184	0.036	0.230
Boron	mg/L	0.005	SM 3120	07-Oct-21/O	1.26	0.377	0.386	0.077
Iron	mg/L	0.005	SM 3120	07-Oct-21/O	1.73	1.97	0.032	0.523
Manganese	mg/L	0.001	SM 3120	07-Oct-21/O	2.21	0.032	0.016	0.027
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Oct-21/K	3.10	2.27	0.43	0.19
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	12-Oct-21/K	3.1	2.9	0.5	1.0
Phenolics	mg/L	0.002	MOEE 3179	08-Oct-21/K	< 0.002	< 0.002	< 0.002	< 0.002
BOD(5 day)	mg/L	3	SM 5210B	07-Oct-21/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	08-Oct-21/K	28	14	11	37
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	07-Oct-21/O	< 0.2	3.6	4.7	5.3
Anion Sum	meq/L		Calc.	14-Oct-21/O	111	12.3	9.79	6.90
Cation Sum	meq/L		Calc.	14-Oct-21/O	110	13.7	10.9	7.84
% Difference	%		Calc.	14-Oct-21/O	0.0317	5.46	5.26	6.40

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095556, 096346 **REPORT No. B21-32389**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 06-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		00-1DBR	99-4SBR	99-4DBR	99-9SBR
			Sample I.D.		B21-32389-5	B21-32389-6	B21-32389-7	B21-32389-8
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	04-Oct-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ion Ratio	AS/CS		Calc.	14-Oct-21/O	1.00	0.897	0.900	0.880
Sodium Adsorption Ratio	-		Calc.	14-Oct-21/O	42.6	0.767	6.37	0.264
Conductivity (calc.)	µmho/cm		Calc.	14-Oct-21/O	10211	1180	957	669
TDS(calc.)/EC(actual)	-		Calc.	14-Oct-21/O	0.544	0.544	0.593	0.522
EC(calc.)/EC(actual)	-		Calc.	14-Oct-21/O	0.869	0.997	0.988	0.984
Langelier Index(25°C)	S.I.		Calc.	14-Oct-21/O	0.390	0.822	0.481	0.748

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Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
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DATE RECEIVED: 06-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		99-8SBR	99-8S	99-7DBR	96-2D
			Sample I.D.		B21-32389-9	B21-32389-10	B21-32389-11	B21-32389-12
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	04-Oct-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	07-Oct-21/O	482	422	115	676
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Oct-21/O	386	292	300	573
pH @25°C	pH Units		SM 4500H	06-Oct-21/O	7.66	7.70	8.06	7.47
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Oct-21/O	1040	919	924	1460
TDS(ion sum calc.)	mg/L	1	Calc.	14-Oct-21/O	583	515	513	827
Chloride	mg/L	0.5	SM4110C	06-Oct-21/O	65.8	59.6	96.1	97.9
Nitrite (N)	mg/L	0.05	SM4110C	06-Oct-21/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	06-Oct-21/O	< 0.05	< 0.05	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	06-Oct-21/O	60	105	25	67
Calcium	mg/L	0.02	SM 3120	07-Oct-21/O	121	112	32.4	148
Magnesium	mg/L	0.02	SM 3120	07-Oct-21/O	43.3	34.6	8.22	74.5
Sodium	mg/L	0.2	SM 3120	07-Oct-21/O	47.1	27.9	165	63.7
Potassium	mg/L	0.1	SM 3120	07-Oct-21/O	5.8	0.9	4.8	11.9
Barium	mg/L	0.001	SM 3120	07-Oct-21/O	0.323	0.140	0.096	0.497
Boron	mg/L	0.005	SM 3120	07-Oct-21/O	0.153	0.058	0.359	0.232
Iron	mg/L	0.005	SM 3120	07-Oct-21/O	3.66	0.008	0.471	4.40
Manganese	mg/L	0.001	SM 3120	07-Oct-21/O	0.360	0.001	0.072	0.099
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Oct-21/K	3.52	0.13	0.59	12.8
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	12-Oct-21/K	4.0	0.3	0.6	13.2
Phenolics	mg/L	0.002	MOEE 3179	08-Oct-21/K	< 0.002	< 0.002	< 0.002	< 0.002
BOD(5 day)	mg/L	3	SM 5210B	07-Oct-21/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	08-Oct-21/K	16	10	10	25
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	07-Oct-21/O	5.4	6.8	4.0	7.8
Anion Sum	meq/L		Calc.	14-Oct-21/O	10.8	9.70	9.23	15.6
Cation Sum	meq/L		Calc.	14-Oct-21/O	12.3	9.67	9.65	17.7
% Difference	%		Calc.	14-Oct-21/O	6.36	0.144	2.23	6.37

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095556, 096346 **REPORT No. B21-32389**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 06-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		99-8SBR	99-8S	99-7DBR	96-2D
			Sample I.D.		B21-32389-9	B21-32389-10	B21-32389-11	B21-32389-12
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	04-Oct-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ion Ratio	AS/CS		Calc.	14-Oct-21/O	0.880	1.00	0.956	0.880
Sodium Adsorption Ratio	-		Calc.	14-Oct-21/O	0.934	0.590	6.69	1.07
Conductivity (calc.)	µmho/cm		Calc.	14-Oct-21/O	1038	906	904	1444
TDS(calc.)/EC(actual)	-		Calc.	14-Oct-21/O	0.561	0.561	0.555	0.567
EC(calc.)/EC(actual)	-		Calc.	14-Oct-21/O	0.999	0.986	0.978	0.990
Langelier Index(25°C)	S.I.		Calc.	14-Oct-21/O	0.858	0.751	0.584	0.905

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095556, 096346 **REPORT No. B21-32389**

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Attention: Jennifer Brown-Hawn

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2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 06-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		99-2SBR	00-5SBR	00-5DBR	00-4SBR
			Sample I.D.		B21-32389-13	B21-32389-14	B21-32389-15	B21-32389-16
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	04-Oct-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	07-Oct-21/O	570	378	9	330
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Oct-21/O	416	292	249	273
pH @25°C	pH Units		SM 4500H	06-Oct-21/O	7.55	7.86	8.54	7.89
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Oct-21/O	1230	658	620	667
TDS(ion sum calc.)	mg/L	1	Calc.	14-Oct-21/O	700	364	358	372
Chloride	mg/L	0.5	SM4110C	06-Oct-21/O	107	8.9	26.4	14.8
Nitrite (N)	mg/L	0.05	SM4110C	06-Oct-21/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	06-Oct-21/O	< 0.05	0.43	< 0.05	0.81
Sulphate	mg/L	1	SM4110C	06-Oct-21/O	80	42	20	49
Calcium	mg/L	0.02	SM 3120	07-Oct-21/O	137	94.4	2.14	84.0
Magnesium	mg/L	0.02	SM 3120	07-Oct-21/O	55.2	34.5	0.79	29.1
Sodium	mg/L	0.2	SM 3120	07-Oct-21/O	57.9	6.9	156	27.0
Potassium	mg/L	0.1	SM 3120	07-Oct-21/O	6.8	1.3	3.5	3.5
Barium	mg/L	0.001	SM 3120	07-Oct-21/O	0.283	0.112	0.015	0.174
Boron	mg/L	0.005	SM 3120	07-Oct-21/O	0.207	0.021	0.447	0.119
Iron	mg/L	0.005	SM 3120	07-Oct-21/O	2.10	0.005	0.014	0.017
Manganese	mg/L	0.001	SM 3120	07-Oct-21/O	0.075	0.001	0.167	0.004
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Oct-21/K	2.85	0.10	0.21	0.15
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	12-Oct-21/K	3.0	0.1	0.2	0.2
Phenolics	mg/L	0.002	MOEE 3179	08-Oct-21/K	< 0.002	< 0.002	< 0.002	< 0.002
BOD(5 day)	mg/L	3	SM 5210B	07-Oct-21/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	08-Oct-21/K	13	< 5	< 5	10
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	07-Oct-21/O	5.0	3.8	2.6	4.6
Anion Sum	meq/L		Calc.	14-Oct-21/O	13.0	6.99	6.13	6.96
Cation Sum	meq/L		Calc.	14-Oct-21/O	14.4	7.89	7.07	7.86
% Difference	%		Calc.	14-Oct-21/O	5.08	5.99	7.13	6.11

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095556, 096346 **REPORT No. B21-32389**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 06-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		99-2SBR	00-5SBR	00-5DBR	00-4SBR
			Sample I.D.		B21-32389-13	B21-32389-14	B21-32389-15	B21-32389-16
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	04-Oct-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ion Ratio	AS/CS		Calc.	14-Oct-21/O	0.903	0.887	0.867	0.885
Sodium Adsorption Ratio	-		Calc.	14-Oct-21/O	1.06	0.154	23.2	0.646
Conductivity (calc.)	µmho/cm		Calc.	14-Oct-21/O	1236	674	617	677
TDS(calc.)/EC(actual)	-		Calc.	14-Oct-21/O	0.569	0.553	0.578	0.557
EC(calc.)/EC(actual)	-		Calc.	14-Oct-21/O	1.01	1.02	0.995	1.02
Langelier Index(25°C)	S.I.		Calc.	14-Oct-21/O	0.823	0.847	-0.187	0.798

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Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095556, 096346 **REPORT No. B21-32389**

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Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 06-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		00-3S	99-6DBR	99-6SBR	97-3D
			Sample I.D.		B21-32389-17	B21-32389-18	B21-32389-19	B21-32389-20
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	04-Oct-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	07-Oct-21/O	357	293	595	410
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Oct-21/O	322	428	434	340
pH @25°C	pH Units		SM 4500H	06-Oct-21/O	7.97	7.92	7.65	7.85
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Oct-21/O	856	1230	1380	789
TDS(ion sum calc.)	mg/L	1	Calc.	14-Oct-21/O	440	710	762	442
Chloride	mg/L	0.5	SM4110C	06-Oct-21/O	63.9	104	161	26.2
Nitrite (N)	mg/L	0.05	SM4110C	06-Oct-21/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	06-Oct-21/O	< 0.05	< 0.05	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	06-Oct-21/O	36	56	50	54
Calcium	mg/L	0.02	SM 3120	07-Oct-21/O	69.1	70.5	139	76.8
Magnesium	mg/L	0.02	SM 3120	07-Oct-21/O	45.0	28.3	60.3	53.1
Sodium	mg/L	0.2	SM 3120	07-Oct-21/O	25.7	182	77.7	22.7
Potassium	mg/L	0.1	SM 3120	07-Oct-21/O	6.4	11.2	9.4	3.4
Barium	mg/L	0.001	SM 3120	07-Oct-21/O	0.133	0.089	0.367	0.089
Boron	mg/L	0.005	SM 3120	07-Oct-21/O	0.159	0.255	0.257	0.025
Iron	mg/L	0.005	SM 3120	07-Oct-21/O	< 0.005	0.649	1.77	0.694
Manganese	mg/L	0.001	SM 3120	07-Oct-21/O	0.023	0.020	0.180	0.115
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Oct-21/K	0.05	0.50	1.89	0.58
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	12-Oct-21/K	0.3	0.6	2.0	0.9
Phenolics	mg/L	0.002	MOEE 3179	08-Oct-21/K	< 0.002	< 0.002	< 0.002	0.013
BOD(5 day)	mg/L	3	SM 5210B	07-Oct-21/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM5220C	08-Oct-21/K	7	6	13	20
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	07-Oct-21/O	2.4	3.5	3.9	3.4
Anion Sum	meq/L		Calc.	14-Oct-21/O	8.99	12.7	14.3	8.66
Cation Sum	meq/L		Calc.	14-Oct-21/O	8.43	14.1	15.8	9.36
% Difference	%		Calc.	14-Oct-21/O	3.20	5.40	5.00	3.87

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095556, 096346 **REPORT No. B21-32389**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 06-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		00-3S	99-6DBR	99-6SBR	97-3D
			Sample I.D.		B21-32389-17	B21-32389-18	B21-32389-19	B21-32389-20
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	04-Oct-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ion Ratio	AS/CS		Calc.	14-Oct-21/O	1.07	0.898	0.905	0.925
Sodium Adsorption Ratio	-		Calc.	14-Oct-21/O	0.592	4.62	1.39	0.488
Conductivity (calc.)	µmho/cm		Calc.	14-Oct-21/O	808	1219	1370	805
TDS(calc.)/EC(actual)	-		Calc.	14-Oct-21/O	0.513	0.577	0.554	0.560
EC(calc.)/EC(actual)	-		Calc.	14-Oct-21/O	0.944	0.991	0.996	1.02
Langelier Index(25°C)	S.I.		Calc.	14-Oct-21/O	0.854	0.917	0.948	0.805

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Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095556, 096346 **REPORT No. B21-32389**

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Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 06-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		00-2SBR	00-2S		
			Sample I.D.		B21-32389-21	B21-32389-22		
			Date Collected		04-Oct-21	04-Oct-21		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	07-Oct-21/O	219	336		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Oct-21/O	298	287		
pH @25°C	pH Units		SM 4500H	06-Oct-21/O	8.18	7.72		
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Oct-21/O	1060	728		
TDS(ion sum calc.)	mg/L	1	Calc.	14-Oct-21/O	579	411		
Chloride	mg/L	0.5	SM4110C	06-Oct-21/O	146	28.8		
Nitrite (N)	mg/L	0.05	SM4110C	06-Oct-21/O	< 0.05	< 0.05		
Nitrate (N)	mg/L	0.05	SM4110C	06-Oct-21/O	< 0.05	< 0.05		
Sulphate	mg/L	1	SM4110C	06-Oct-21/O	23	50		
Calcium	mg/L	0.02	SM 3120	07-Oct-21/O	34.4	92.9		
Magnesium	mg/L	0.02	SM 3120	07-Oct-21/O	32.4	25.3		
Sodium	mg/L	0.2	SM 3120	07-Oct-21/O	153	38.6		
Potassium	mg/L	0.1	SM 3120	07-Oct-21/O	10.7	2.0		
Barium	mg/L	0.001	SM 3120	07-Oct-21/O	0.764	0.122		
Boron	mg/L	0.005	SM 3120	07-Oct-21/O	0.525	0.039		
Iron	mg/L	0.005	SM 3120	07-Oct-21/O	< 0.005	0.371		
Manganese	mg/L	0.001	SM 3120	07-Oct-21/O	0.007	0.037		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Oct-21/K	0.74	0.09		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	12-Oct-21/K	0.8	< 0.1		
Phenolics	mg/L	0.002	MOEE 3179	08-Oct-21/K	0.014	< 0.002		
BOD(5 day)	mg/L	3	SM 5210B	07-Oct-21/K	< 3	< 3		
COD	mg/L	5	SM5220C	08-Oct-21/K	27	6		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	07-Oct-21/O	1.4	3.1		
Anion Sum	meq/L		Calc.	14-Oct-21/O	10.5	7.61		
Cation Sum	meq/L		Calc.	14-Oct-21/O	11.3	8.48		
% Difference	%		Calc.	14-Oct-21/O	3.63	5.41		

G Clarkin

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095556, 096346 **REPORT No. B21-32389**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 06-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		00-2SBR	00-2S		
			Sample I.D.		B21-32389-21	B21-32389-22		
			Date Collected		04-Oct-21	04-Oct-21		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ion Ratio	AS/CS		Calc.	14-Oct-21/O	0.930	0.897		
Sodium Adsorption Ratio	-		Calc.	14-Oct-21/O	4.49	0.916		
Conductivity (calc.)	µmho/cm		Calc.	14-Oct-21/O	1058	741		
TDS(calc.)/EC(actual)	-		Calc.	14-Oct-21/O	0.545	0.565		
EC(calc.)/EC(actual)	-		Calc.	14-Oct-21/O	0.996	1.02		
Langelier Index(25°C)	S.I.		Calc.	14-Oct-21/O	0.718	0.684		

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G096345 **REPORT No. B21-32365**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 06-Oct-21
DATE REPORTED: 13-Oct-21
SAMPLE MATRIX: Leachate

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		97-4D	96-3D	06-3DBR	
			Sample I.D.		B21-32365-1	B21-32365-2	B21-32365-3	
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	06-Oct-21/O	759	669	233	
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Oct-21/O	592	413	163	
pH @25°C	pH Units		SM 4500H	06-Oct-21/O	7.66	7.80	7.83	
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Oct-21/O	1460	1970	8520	
TDS(ion sum calc.)	mg/L	1	Calc.	13-Oct-21/O	985	1108	4843	
Chloride	mg/L	0.5	SM4110C	08-Oct-21/O	31.2	410	2880	
Nitrite (N)	mg/L	0.05	SM4110C	08-Oct-21/O	0.06	< 0.05	< 0.5	
Nitrate (N)	mg/L	0.05	SM4110C	08-Oct-21/O	13.7	0.08	< 0.5	
Sulphate	mg/L	1	SM4110C	08-Oct-21/O	236	31	< 10	
Calcium	mg/L	0.02	SM 3120	06-Oct-21/O	226	147	58.7	
Magnesium	mg/L	0.02	SM 3120	06-Oct-21/O	47.2	73.4	20.9	
Sodium	mg/L	0.2	SM 3120	06-Oct-21/O	67.3	156	1760	
Potassium	mg/L	0.1	SM 3120	06-Oct-21/O	18.2	29.6	26.0	
Barium	mg/L	0.001	SM 3120	06-Oct-21/O	0.071	0.510	0.146	
Boron	mg/L	0.005	SM 3120	06-Oct-21/O	0.697	0.331	1.33	
Iron	mg/L	0.005	SM 3120	06-Oct-21/O	0.008	5.32	0.650	
Manganese	mg/L	0.001	SM 3120	06-Oct-21/O	0.283	0.346	0.047	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Oct-21/K	3.75	5.06	2.20	
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	12-Oct-21/K	4.5	5.8	2.2	
Phenolics	mg/L	0.002	MOEE 3179	08-Oct-21/K	< 0.002	< 0.002	< 0.002	
BOD(5 day)	mg/L	3	SM 5210B	07-Oct-21/K	9	5	< 3	
COD	mg/L	5	SM5220C	08-Oct-21/K	18	19	11	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	06-Oct-21/O	10.6	2.6	0.6	
Anion Sum	meq/L		Calc.	13-Oct-21/O	18.6	20.5	84.4	
Cation Sum	meq/L		Calc.	13-Oct-21/O	18.8	21.6	82.0	
% Difference	%		Calc.	13-Oct-21/O	0.640	2.62	1.50	

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G096345 **REPORT No. B21-32365**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 06-Oct-21
DATE REPORTED: 13-Oct-21
SAMPLE MATRIX: Leachate

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592-07
WATERWORKS NO.

			Client I.D.		97-4D	96-3D	06-3DBR	
			Sample I.D.		B21-32365-1	B21-32365-2	B21-32365-3	
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ion Ratio	AS/CS		Calc.	13-Oct-21/O	0.987	0.949	1.03	
Sodium Adsorption Ratio	-		Calc.	13-Oct-21/O	1.06	2.63	50.2	
Conductivity (calc.)	µmho/cm		Calc.	13-Oct-21/O	1511	2002	8172	
TDS(calc.)/EC(actual)	-		Calc.	13-Oct-21/O	0.674	0.562	0.568	
EC(calc.)/EC(actual)	-		Calc.	13-Oct-21/O	1.03	1.02	0.959	
Langelier Index(25°C)	S.I.		Calc.	13-Oct-21/O	1.28	1.07	0.258	

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095483 **REPORT No. B21-15858**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 26-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		S-1A	S-3	S-4	S-5
			Sample I.D.		B21-15858-1	B21-15858-2	B21-15858-3	B21-15858-4
			Date Collected		26-May-21	26-May-21	26-May-21	26-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	01-Jun-21/O	393	259	267	274
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Jun-21/O	269	230	228	230
pH @25°C	pH Units		SM 4500H	05-Jun-21/O	8.16	8.27	8.36	8.32
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Jun-21/O	694	502	495	506
Total Dissolved Solids	mg/L	3	SM 2540D	07-Jun-21/O	360	260	256	262
Total Suspended Solids	mg/L	3	SM2540D	28-May-21/K	34	13	19	78
Turbidity	NTU	0.1	SM 2130	28-May-21/O	8.0	11.2	24.5	14.1
Colour	TCU	2	SM 2120C	28-May-21/O	4	56	55	55
Chloride	mg/L	0.5	SM4110C	01-Jun-21/O	25.7	17.6	17.6	17.6
Nitrite (N)	mg/L	0.05	SM4110C	01-Jun-21/O	0.10	0.07	0.07	0.07
Nitrate (N)	mg/L	0.05	SM4110C	01-Jun-21/O	13.3	0.07	0.09	0.06
Sulphate	mg/L	1	SM4110C	01-Jun-21/O	19	20	20	23
Calcium	mg/L	0.02	SM 3120	01-Jun-21/O	116	84.7	86.9	88.1
Magnesium	mg/L	0.02	SM 3120	01-Jun-21/O	25.1	11.5	12.2	13.0
Sodium	mg/L	0.2	SM 3120	01-Jun-21/O	18.0	11.9	12.0	11.9
Potassium	mg/L	0.1	SM 3120	01-Jun-21/O	2.6	0.9	0.9	1.4
Arsenic	mg/L	0.0001	EPA 200.8	10-Jun-21/O	0.0001	0.0008	0.0008	0.0010
Barium	mg/L	0.001	SM 3120	01-Jun-21/O	0.098	0.027	0.032	0.055
Boron	mg/L	0.005	SM 3120	01-Jun-21/O	0.021	0.021	0.022	0.021
Cadmium	mg/L	).000015	EPA 200.8	10-Jun-21/O	< 0.000015	< 0.000015	< 0.000015	0.000033
Chromium	mg/L	0.001	EPA 200.8	10-Jun-21/O	< 0.001	< 0.001	< 0.001	0.005
Copper	mg/L	0.0001	EPA 200.8	10-Jun-21/O	0.0011	0.0013	0.0015	0.0036
Iron	mg/L	0.005	SM 3120	01-Jun-21/O	0.507	0.432	0.511	2.61
Lead	mg/L	0.00002	EPA 200.8	10-Jun-21/O	0.00020	0.00016	0.00019	0.00084
Manganese	mg/L	0.001	SM 3120	01-Jun-21/O	0.022	0.063	0.059	0.117
Mercury	mg/L	0.00002	SM 3112 B	28-May-21/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Nickel	mg/L	0.0002	EPA 200.8	10-Jun-21/O	0.0007	0.0017	0.0015	0.0038

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095483 **REPORT No. B21-15858**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 26-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		S-1A	S-3	S-4	S-5
			Sample I.D.		B21-15858-1	B21-15858-2	B21-15858-3	B21-15858-4
			Date Collected		26-May-21	26-May-21	26-May-21	26-May-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Zinc	mg/L	0.005	SM 3120	01-Jun-21/O	0.011	0.008	0.030	0.021
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	0.02	0.05	0.05	0.17
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	17-Jun-21/K	0.3	1.0	1.1	2.6
Phosphorus-Total	mg/L	0.01	E3199A.1	17-Jun-21/K	0.05	0.11	0.10	0.34
BOD(5 day)	mg/L	3	SM 5210B	28-May-21/K	< 3	3	9	18
COD	mg/L	5	SM5220C	28-May-21/K	< 5	35	35	59
Phenolics	mg/L	0.002	MOEE 3179	07-Jun-21/K	< 0.002	< 0.002	< 0.002	< 0.002
Anion Sum	meq/L		Calc.	07-Jun-21/O	7.47	5.52	5.49	5.58
Cation Sum	meq/L		Calc.	07-Jun-21/O	8.73	5.74	5.92	6.16
% Difference	%		Calc.	07-Jun-21/O	7.78	1.93	3.72	4.95
Ion Ratio	AS/CS		Calc.	07-Jun-21/O	0.856	0.962	0.928	0.906
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-21/O	699	529	536	546
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-21/O	369	285	287	296
Langelier Index(25°C)	S.I.		Calc.	07-Jun-21/O	1.20	1.12	1.21	1.19

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095483 **REPORT No. B21-15858**

Report To:
WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 26-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		S-6	Duplicate		
			Sample I.D.		B21-15858-5	B21-15858-6		
			Date Collected		26-May-21	26-May-21		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	01-Jun-21/O	266	383		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Jun-21/O	227	274		
pH @25°C	pH Units		SM 4500H	05-Jun-21/O	8.33	8.13		
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Jun-21/O	500	700		
Total Dissolved Solids	mg/L	3	SM 2540D	07-Jun-21/O	259	364		
Total Suspended Solids	mg/L	3	SM2540D	28-May-21/K	14	31		
Turbidity	NTU	0.1	SM 2130	28-May-21/O	11.8	7.7		
Colour	TCU	2	SM 2120C	28-May-21/O	52	5		
Chloride	mg/L	0.5	SM4110C	01-Jun-21/O	18.3	25.4		
Nitrite (N)	mg/L	0.05	SM4110C	01-Jun-21/O	0.08	0.10		
Nitrate (N)	mg/L	0.05	SM4110C	01-Jun-21/O	0.09	13.2		
Sulphate	mg/L	1	SM4110C	01-Jun-21/O	21	19		
Calcium	mg/L	0.02	SM 3120	01-Jun-21/O	87.5	113		
Magnesium	mg/L	0.02	SM 3120	01-Jun-21/O	11.6	24.4		
Sodium	mg/L	0.2	SM 3120	01-Jun-21/O	12.0	17.7		
Potassium	mg/L	0.1	SM 3120	01-Jun-21/O	0.9	2.6		
Arsenic	mg/L	0.0001	EPA 200.8	10-Jun-21/O	0.0008	0.0001		
Barium	mg/L	0.001	SM 3120	01-Jun-21/O	0.027	0.095		
Boron	mg/L	0.005	SM 3120	01-Jun-21/O	0.020	0.020		
Cadmium	mg/L	).000015	EPA 200.8	10-Jun-21/O	< 0.000015	< 0.000015		
Chromium	mg/L	0.001	EPA 200.8	10-Jun-21/O	0.001	< 0.001		
Copper	mg/L	0.0001	EPA 200.8	10-Jun-21/O	0.0016	0.0011		
Iron	mg/L	0.005	SM 3120	01-Jun-21/O	0.621	0.508		
Lead	mg/L	0.00002	EPA 200.8	10-Jun-21/O	0.00025	0.00017		
Manganese	mg/L	0.001	SM 3120	01-Jun-21/O	0.070	0.020		
Mercury	mg/L	0.00002	SM 3112 B	28-May-21/O	< 0.00002	< 0.00002		
Nickel	mg/L	0.0002	EPA 200.8	10-Jun-21/O	0.0017	0.0008		

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095483 **REPORT No. B21-15858**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 26-May-21
DATE REPORTED: 18-Jun-21
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		S-6	Duplicate		
			Sample I.D.		B21-15858-5	B21-15858-6		
			Date Collected		26-May-21	26-May-21		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Zinc	mg/L	0.005	SM 3120	01-Jun-21/O	0.008	0.015		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	11-Jun-21/K	0.05	0.03		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	17-Jun-21/K	0.9	0.3		
Phosphorus-Total	mg/L	0.01	E3199A.1	17-Jun-21/K	0.10	0.04		
BOD(5 day)	mg/L	3	SM 5210B	28-May-21/K	6	< 3		
COD	mg/L	5	SM5220C	28-May-21/K	21	< 5		
Phenolics	mg/L	0.002	MOEE 3179	07-Jun-21/K	< 0.002	< 0.002		
Anion Sum	meq/L		Calc.	07-Jun-21/O	5.50	7.54		
Cation Sum	meq/L		Calc.	07-Jun-21/O	5.90	8.51		
% Difference	%		Calc.	07-Jun-21/O	3.51	6.06		
Ion Ratio	AS/CS		Calc.	07-Jun-21/O	0.932	0.886		
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-21/O	537	691		
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-21/O	288	367		
Langelier Index(25°C)	S.I.		Calc.	07-Jun-21/O	1.19	1.17		

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095487 **REPORT No. B21-22131**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 15-Jul-21
DATE REPORTED: 27-Jul-21
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		S-1A	S-3	S-4	S-5
			Sample I.D.		B21-22131-1	B21-22131-2	B21-22131-3	B21-22131-4
			Date Collected		14-Jul-21	14-Jul-21	14-Jul-21	14-Jul-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	19-Jul-21/O	396	268	322	334
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	15-Jul-21/O	295	223	225	223
pH @25°C	pH Units		SM 4500H	15-Jul-21/O	8.13	7.86	7.86	7.83
Conductivity @25°C	µmho/cm	1	SM 2510B	15-Jul-21/O	840	566	566	571
Total Dissolved Solids	mg/L	3	SM 2540D	16-Jul-21/O	443	293	293	296
Total Suspended Solids	mg/L	3	SM2540D	19-Jul-21/K	59	380	116	4080
Turbidity	NTU	0.1	SM 2130	19-Jul-21/O	5.6	365	21.9	284
Colour	TCU	2	SM 2120C	19-Jul-21/O	5	29	34	33
Chloride	mg/L	0.5	SM4110C	16-Jul-21/O	52.7	25.8	26.1	27.4
Nitrite (N)	mg/L	0.05	SM4110C	16-Jul-21/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	16-Jul-21/O	10.1	0.17	< 0.05	0.08
Sulphate	mg/L	1	SM4110C	16-Jul-21/O	25	26	26	25
Calcium	mg/L	0.02	SM 3120	19-Jul-21/O	118	81.4	98.2	98.0
Magnesium	mg/L	0.02	SM 3120	19-Jul-21/O	24.6	15.8	18.6	21.6
Sodium	mg/L	0.2	SM 3120	19-Jul-21/O	29.5	16.6	20.1	20.3
Potassium	mg/L	0.1	SM 3120	19-Jul-21/O	3.7	1.4	5.3	5.7
Arsenic	mg/L	0.0001	EPA 200.8	20-Jul-21/O	0.0002	0.0007	0.0007	0.0021
Barium	mg/L	0.001	SM 3120	19-Jul-21/O	0.136	0.046	0.056	0.134
Boron	mg/L	0.005	SM 3120	19-Jul-21/O	0.031	0.043	0.174	0.154
Cadmium	mg/L	).000015	EPA 200.8	20-Jul-21/O	< 0.000015	0.000028	0.000052	0.000177
Chromium	mg/L	0.001	EPA 200.8	20-Jul-21/O	0.001	0.003	< 0.001	0.018
Copper	mg/L	0.0001	EPA 200.8	20-Jul-21/O	0.0017	0.0035	0.0022	0.0161
Iron	mg/L	0.005	SM 3120	19-Jul-21/O	0.475	1.63	0.648	11.0
Lead	mg/L	0.00002	EPA 200.8	20-Jul-21/O	0.00020	0.00071	0.00024	0.00438
Manganese	mg/L	0.001	SM 3120	19-Jul-21/O	0.031	0.139	0.662	2.03
Mercury	mg/L	0.00002	SM 3112 B	20-Jul-21/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Nickel	mg/L	0.0002	EPA 200.8	20-Jul-21/O	0.0008	0.0029	0.0017	0.0137

NOTE: Insufficient sample provided to perform TSS & BOD on Trip Blank.

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095487 **REPORT No. B21-22131**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 15-Jul-21
DATE REPORTED: 27-Jul-21
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		S-1A	S-3	S-4	S-5
			Sample I.D.		B21-22131-1	B21-22131-2	B21-22131-3	B21-22131-4
			Date Collected		14-Jul-21	14-Jul-21	14-Jul-21	14-Jul-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Zinc	mg/L	0.005	SM 3120	19-Jul-21/O	0.029	0.037	0.026	0.059
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	19-Jul-21/K	0.12	0.09	0.16	0.17
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	21-Jul-21/K	0.4	1.1	2.7	7.4
Phosphorus-Total	mg/L	0.01	E3199A.1	21-Jul-21/K	0.03	0.17	0.35	1.45
Phenolics	mg/L	0.001	MOEE 3179	19-Jul-21/K	< 0.001	0.001	< 0.001	< 0.001
BOD(5 day)	mg/L	3	SM 5210B	16-Jul-21/K	< 3	4	20	21
COD	mg/L	5	SM5220C	19-Jul-21/K	< 5	32	88	183
Anion Sum	meq/L		Calc.	21-Jul-21/O	8.63	5.76	5.78	5.76
Cation Sum	meq/L		Calc.	21-Jul-21/O	9.32	6.22	7.51	8.39
% Difference	%		Calc.	21-Jul-21/O	3.89	3.81	13.0[1]	18.6[1]
Ion Ratio	AS/CS		Calc.	21-Jul-21/O	0.925	0.927	0.769	0.687
Sodium Adsorption Ratio	-		Calc.	21-Jul-21/O	0.645	0.441	0.488	0.484
TDS(ion sum calc.)	mg/L	1	Calc.	21-Jul-21/O	431	304	331	345
Conductivity (calc.)	µmho/cm		Calc.	21-Jul-21/O	800	563	628	633
TDS(calc.)/EC(actual)	-		Calc.	21-Jul-21/O	0.514	0.536	0.585	0.604
EC(calc.)/EC(actual)	-		Calc.	21-Jul-21/O	0.952	0.995	1.11	1.11
Langelier Index(25°C)	S.I.		Calc.	21-Jul-21/O	1.21	0.677	0.762	0.717

[1] Outside of 10% Acceptance Criteria, solids present

NOTE: Insufficient sample provided to perform TSS & BOD on Trip Blank.

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Final Report

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Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 15-Jul-21
DATE REPORTED: 27-Jul-21
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		S-6	SW Duplicate	Trip Blank	
			Sample I.D.		B21-22131-5	B21-22131-6	B21-22131-7	
			Date Collected		14-Jul-21	14-Jul-21	14-Jul-21	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	19-Jul-21/O	255	409	< 1	
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	15-Jul-21/O	222	297	< 5	
pH @25°C	pH Units		SM 4500H	15-Jul-21/O	7.88	8.15	5.34	
Conductivity @25°C	µmho/cm	1	SM 2510B	15-Jul-21/O	569	849	1	
Total Dissolved Solids	mg/L	3	SM 2540D	16-Jul-21/O	295	448	< 3	
Total Suspended Solids	mg/L	3	SM2540D	19-Jul-21/K	3	108		
Turbidity	NTU	0.1	SM 2130	19-Jul-21/O	3.6	29.1	0.3	
Colour	TCU	2	SM 2120C	19-Jul-21/O	32	6	< 2	
Chloride	mg/L	0.5	SM4110C	16-Jul-21/O	28.2	53.5	1.1	
Nitrite (N)	mg/L	0.05	SM4110C	16-Jul-21/O	< 0.05	< 0.05	< 0.05	
Nitrate (N)	mg/L	0.05	SM4110C	16-Jul-21/O	0.08	10.2	< 0.05	
Sulphate	mg/L	1	SM4110C	16-Jul-21/O	26	26	< 1	
Calcium	mg/L	0.02	SM 3120	19-Jul-21/O	77.6	121	0.02	
Magnesium	mg/L	0.02	SM 3120	19-Jul-21/O	14.8	25.8	< 0.02	
Sodium	mg/L	0.2	SM 3120	19-Jul-21/O	18.0	30.9	< 0.2	
Potassium	mg/L	0.1	SM 3120	19-Jul-21/O	0.8	3.9	< 0.1	
Arsenic	mg/L	0.0001	EPA 200.8	20-Jul-21/O	0.0005	0.0002	< 0.0001	
Barium	mg/L	0.001	SM 3120	19-Jul-21/O	0.036	0.139	< 0.001	
Boron	mg/L	0.005	SM 3120	19-Jul-21/O	0.026	0.032	< 0.005	
Cadmium	mg/L	0.000015	EPA 200.8	20-Jul-21/O	< 0.000015	< 0.000015	< 0.000015	
Chromium	mg/L	0.001	EPA 200.8	20-Jul-21/O	< 0.001	0.002	< 0.001	
Copper	mg/L	0.0001	EPA 200.8	20-Jul-21/O	0.0009	0.0021	< 0.0001	
Iron	mg/L	0.005	SM 3120	19-Jul-21/O	0.121	0.473	< 0.005	
Lead	mg/L	0.00002	EPA 200.8	20-Jul-21/O	0.00005	0.00019	< 0.00002	
Manganese	mg/L	0.001	SM 3120	19-Jul-21/O	0.029	0.032	< 0.001	
Mercury	mg/L	0.00002	SM 3112 B	20-Jul-21/O	< 0.00002	< 0.00002	< 0.00002	
Nickel	mg/L	0.0002	EPA 200.8	20-Jul-21/O	0.0007	0.0007	< 0.0002	

NOTE: Insufficient sample provided to perform TSS & BOD on Trip Blank.

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G095487 **REPORT No. B21-22131**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 15-Jul-21
DATE REPORTED: 27-Jul-21
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		S-6	SW Duplicate	Trip Blank	
			Sample I.D.		B21-22131-5	B21-22131-6	B21-22131-7	
			Date Collected		14-Jul-21	14-Jul-21	14-Jul-21	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Zinc	mg/L	0.005	SM 3120	19-Jul-21/O	0.014	0.017	< 0.005	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	19-Jul-21/K	0.06	0.03	0.02	
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	21-Jul-21/K	0.7	0.5	< 0.1	
Phosphorus-Total	mg/L	0.01	E3199A.1	21-Jul-21/K	0.05	0.07	0.02	
Phenolics	mg/L	0.001	MOEE 3179	19-Jul-21/K	< 0.001	< 0.001	< 0.001	
BOD(5 day)	mg/L	3	SM 5210B	16-Jul-21/K	< 3	< 3		
COD	mg/L	5	SM5220C	19-Jul-21/K	23	8	< 5	
Anion Sum	meq/L		Calc.	21-Jul-21/O	5.78	8.70	0.0315	
Cation Sum	meq/L		Calc.	21-Jul-21/O	5.90	9.63	0.00239	
% Difference	%		Calc.	21-Jul-21/O	1.07	5.10	85.9	
Ion Ratio	AS/CS		Calc.	21-Jul-21/O	0.979	0.903	13.2	
Sodium Adsorption Ratio	-		Calc.	21-Jul-21/O	0.491	0.665	0.000	
TDS(ion sum calc.)	mg/L	1	Calc.	21-Jul-21/O	299	439	1	
Conductivity (calc.)	µmho/cm		Calc.	21-Jul-21/O	556	816	3	
TDS(calc.)/EC(actual)	-		Calc.	21-Jul-21/O	0.525	0.517	1.04	
EC(calc.)/EC(actual)	-		Calc.	21-Jul-21/O	0.976	0.961	2.28	
Langelier Index(25°C)	S.I.		Calc.	21-Jul-21/O	0.673	1.24	-	

1 Outside of 10% Acceptance Criteria, solids present

NOTE: Insufficient sample provided to perform TSS & BOD on Trip Blank.

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G096173 **REPORT No. B21-32376**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 05-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		S-1A	S-3	S-4	S-5
			Sample I.D.		B21-32376-1	B21-32376-2	B21-32376-3	B21-32376-4
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	04-Oct-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	07-Oct-21/O	413	275	247	255
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Oct-21/O	312	225	210	205
pH @25°C	pH Units		SM 4500H	06-Oct-21/O	8.28	7.95	7.92	7.99
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Oct-21/O	962	575	553	545
Total Dissolved Solids	mg/L	3	SM 2540D	08-Oct-21/O	512	298	287	282
Total Suspended Solids	mg/L	3	SM2540D	07-Oct-21/K	5	53	9	7
Turbidity	NTU	0.1	SM 2130	07-Oct-21/O	4.1	31.0	15.4	12.5
Colour	TCU	2	SM 2120C	07-Oct-21/O	3	26	30	31
Chloride	mg/L	0.5	SM4110C	08-Oct-21/O	96.2	27.1	29.8	31.0
Nitrite (N)	mg/L	0.05	SM4110C	08-Oct-21/O	< 0.05	< 0.05	< 0.05	0.05
Nitrate (N)	mg/L	0.05	SM4110C	08-Oct-21/O	16.5	1.37	1.33	1.27
Sulphate	mg/L	1	SM4110C	08-Oct-21/O	47	54	52	55
Calcium	mg/L	0.02	SM 3120	07-Oct-21/O	123	83.2	75.7	78.6
Magnesium	mg/L	0.02	SM 3120	07-Oct-21/O	25.6	16.4	14.0	14.3
Sodium	mg/L	0.2	SM 3120	07-Oct-21/O	40.6	13.6	13.2	13.6
Potassium	mg/L	0.1	SM 3120	07-Oct-21/O	3.0	4.7	4.3	4.7
Arsenic	mg/L	0.0001	EPA 200.8	07-Oct-21/O	0.0002	0.0005	0.0005	0.0004
Barium	mg/L	0.001	SM 3120	07-Oct-21/O	0.125	0.047	0.040	0.043
Boron	mg/L	0.005	SM 3120	07-Oct-21/O	0.022	0.029	0.012	0.011
Cadmium	mg/L	).000015	EPA 200.8	07-Oct-21/O	< 0.000015	0.000020	< 0.000015	< 0.000015
Chromium	mg/L	0.001	EPA 200.8	07-Oct-21/O	< 0.001	0.003	< 0.001	< 0.001
Copper	mg/L	0.0001	EPA 200.8	07-Oct-21/O	0.0011	0.0030	0.0014	0.0012
Iron	mg/L	0.005	SM 3120	07-Oct-21/O	0.282	1.27	0.438	0.361
Lead	mg/L	0.00002	EPA 200.8	07-Oct-21/O	0.00012	0.00061	0.00015	0.00011
Manganese	mg/L	0.001	SM 3120	07-Oct-21/O	0.009	0.094	0.019	0.017
Mercury	mg/L	0.00002	SM 3112 B	08-Oct-21/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Nickel	mg/L	0.0002	EPA 200.8	07-Oct-21/O	0.0005	0.0024	0.0013	0.0010

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Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G096173

REPORT No. B21-32376

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 05-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		S-1A	S-3	S-4	S-5
			Sample I.D.		B21-32376-1	B21-32376-2	B21-32376-3	B21-32376-4
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	04-Oct-21
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Zinc	mg/L	0.005	SM 3120	07-Oct-21/O	0.027	0.025	0.020	0.018
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Oct-21/K	1.44	0.31	0.05	0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	13-Oct-21/K	1.7	4.7	0.8	0.8
Phosphorus-Total	mg/L	0.01	E3199A.1	13-Oct-21/K	0.01	1.51	0.06	0.06
Phenolics	mg/L	0.002	MOEE 3179	08-Oct-21/K	< 0.002	< 0.002	< 0.002	< 0.002
BOD(5 day)	mg/L	3	SM 5210B	07-Oct-21/K	< 3	6	< 3	< 3
COD	mg/L	5	SM5220C	08-Oct-21/K	16	180	29	31
Anion Sum	meq/L		Calc.	12-Oct-21/O	11.1	6.48	6.22	6.21
Cation Sum	meq/L		Calc.	12-Oct-21/O	10.2	6.31	5.64	5.83
% Difference	%		Calc.	12-Oct-21/O	4.21	1.38	4.87	3.15
Ion Ratio	AS/CS		Calc.	12-Oct-21/O	1.09	1.03	1.10	1.07
Sodium Adsorption Ratio	-		Calc.	12-Oct-21/O	0.870	0.357	0.366	0.370
TDS(ion sum calc.)	mg/L	1	Calc.	12-Oct-21/O	524	336	316	321
Conductivity (calc.)	µmho/cm		Calc.	12-Oct-21/O	943	604	568	579
TDS(calc.)/EC(actual)	-		Calc.	12-Oct-21/O	0.545	0.584	0.571	0.588
EC(calc.)/EC(actual)	-		Calc.	12-Oct-21/O	0.981	1.05	1.03	1.06
Langelier Index(25°C)	S.I.		Calc.	12-Oct-21/O	1.40	0.769	0.680	0.754

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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CADUCEON
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G096173 **REPORT No. B21-32376**

Report To:
WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 05-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		S-6	SW Duplicate	Trip Blank	
			Sample I.D.		B21-32376-5	B21-32376-6	B21-32376-7	
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	07-Oct-21/O	243	412	< 1	
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	06-Oct-21/O	208	313	< 5	
pH @25°C	pH Units		SM 4500H	06-Oct-21/O	7.94	8.26	5.78	
Conductivity @25°C	µmho/cm	1	SM 2510B	06-Oct-21/O	547	958	< 1	
Total Dissolved Solids	mg/L	3	SM 2540D	08-Oct-21/O	283	510	< 3	
Total Suspended Solids	mg/L	3	SM2540D	07-Oct-21/K	8	< 3	< 3	
Turbidity	NTU	0.1	SM 2130	07-Oct-21/O	14.8	1.9	0.1	
Colour	TCU	2	SM 2120C	07-Oct-21/O	32	4	< 2	
Chloride	mg/L	0.5	SM4110C	08-Oct-21/O	32.7	105	< 0.5	
Nitrite (N)	mg/L	0.05	SM4110C	08-Oct-21/O	0.06	< 0.05	< 0.05	
Nitrate (N)	mg/L	0.05	SM4110C	08-Oct-21/O	1.23	18.0	< 0.05	
Sulphate	mg/L	1	SM4110C	08-Oct-21/O	58	51	< 1	
Calcium	mg/L	0.02	SM 3120	07-Oct-21/O	75.0	123	< 0.02	
Magnesium	mg/L	0.02	SM 3120	07-Oct-21/O	13.5	25.4	< 0.02	
Sodium	mg/L	0.2	SM 3120	07-Oct-21/O	13.0	40.4	< 0.2	
Potassium	mg/L	0.1	SM 3120	07-Oct-21/O	4.5	2.9	< 0.1	
Arsenic	mg/L	0.0001	EPA 200.8	07-Oct-21/O	0.0005	0.0001	< 0.0001	
Barium	mg/L	0.001	SM 3120	07-Oct-21/O	0.043	0.121	< 0.001	
Boron	mg/L	0.005	SM 3120	07-Oct-21/O	0.010	0.022	< 0.005	
Cadmium	mg/L	.000015	EPA 200.8	07-Oct-21/O	< 0.000015	< 0.000015	< 0.000015	
Chromium	mg/L	0.001	EPA 200.8	07-Oct-21/O	0.001	0.001	< 0.001	
Copper	mg/L	0.0001	EPA 200.8	07-Oct-21/O	0.0012	0.0010	< 0.0001	
Iron	mg/L	0.005	SM 3120	07-Oct-21/O	0.426	0.083	< 0.005	
Lead	mg/L	0.00002	EPA 200.8	07-Oct-21/O	0.00015	0.00045	< 0.00002	
Manganese	mg/L	0.001	SM 3120	07-Oct-21/O	0.017	0.005	< 0.001	
Mercury	mg/L	0.00002	SM 3112 B	08-Oct-21/O	< 0.00002	< 0.00002	< 0.00002	
Nickel	mg/L	0.0002	EPA 200.8	07-Oct-21/O	0.0012	0.0004	< 0.0002	

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G096173 **REPORT No. B21-32376**

Report To:

WSP Canada Inc.
1345 Rosemont Ave.,
Cornwall ON K6J 3E5 Canada
Attention: Jennifer Brown-Hawn

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 05-Oct-21
DATE REPORTED: 14-Oct-21
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: North Lancaster WDS
P.O. NUMBER: 111-55592
WATERWORKS NO.

			Client I.D.		S-6	SW Duplicate	Trip Blank	
			Sample I.D.		B21-32376-5	B21-32376-6	B21-32376-7	
			Date Collected		04-Oct-21	04-Oct-21	04-Oct-21	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Zinc	mg/L	0.005	SM 3120	07-Oct-21/O	0.020	0.017	< 0.005	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	07-Oct-21/K	0.05	0.01	< 0.01	
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	13-Oct-21/K	0.8	0.4	< 0.1	
Phosphorus-Total	mg/L	0.01	E3199A.1	13-Oct-21/K	0.05	< 0.01	< 0.01	
Phenolics	mg/L	0.002	MOEE 3179	08-Oct-21/K	< 0.002	< 0.002	< 0.002	
BOD(5 day)	mg/L	3	SM 5210B	07-Oct-21/K	< 3	< 3	< 3	
COD	mg/L	5	SM5220C	08-Oct-21/K	35	12	< 5	
Anion Sum	meq/L		Calc.	12-Oct-21/O	6.39	11.6	0.000	
Cation Sum	meq/L		Calc.	12-Oct-21/O	5.56	10.1	0.000	
% Difference	%		Calc.	12-Oct-21/O	6.95	6.96	-	
Ion Ratio	AS/CS		Calc.	12-Oct-21/O	1.15	1.15	-	
Sodium Adsorption Ratio	-		Calc.	12-Oct-21/O	0.363	0.866	-	
TDS(ion sum calc.)	mg/L	1	Calc.	12-Oct-21/O	322	536	< 1	
Conductivity (calc.)	µmho/cm		Calc.	12-Oct-21/O	576	955	< 1	
TDS(calc.)/EC(actual)	-		Calc.	12-Oct-21/O	0.589	0.559	-	
EC(calc.)/EC(actual)	-		Calc.	12-Oct-21/O	1.05	0.997	-	
Langelier Index(25°C)	S.I.		Calc.	12-Oct-21/O	0.691	1.37	-	

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

Pine Environmental Services, Inc.

Instrument ID 43682
Description Landtec GEM5000
Calibrated 5/7/2021 2:52:31PM

Manufacturer CES Landtec
Model Number GEM5000
Serial Number/ Lot Number G505686
Location Ontario
Department

State Certified
Status Pass
Temp °C 23.2
Humidity % 26

Calibration Specifications

Group # 1
Group Name Methane (CH4)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.0 / 0.0	%Volume	0.0	%Volume	0.0	0.0	0.00%	Pass
50.0 / 50.0	%Volume	50.0	%Volume	50.3	50.0	0.00%	Pass

Group # 2
Group Name Carbon Dioxide (CO2)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.0 / 0.0	%Volume	0.0	%Volume	0.0	0.0	0.00%	Pass
35.0 / 35.0	%Volume	35.0	%Volume	35.3	35.0	0.00%	Pass

Group # 3
Group Name Oxygen (O2)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
20.9 / 20.9	%Volume	20.9	%Volume	20.7	20.9	0.00%	Pass
18.0 / 18.0	%Volume	18.0	%Volume	17.8	18.0	0.00%	Pass

Group # 4
Group Name Carbon Monoxide (CO)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0 / 0	PPM	0	PPM	0	0	0.00%	Pass
50 / 50	PPM	50	PPM	52	50	0.00%	Pass

Group # 5
Group Name Hydrogen Sulfide (H2S)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

Pine Environmental Services, Inc.

Instrument ID 43682
Description Landtec GEM5000
Calibrated 5/7/2021 2:52:31PM

Group # 5
Group Name Hydrogen Sulfide (H2S)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.0 / 0.0	PPM	0.0	PPM	0.0	0.0	0.00%	Pass
10.0 / 10.0	PPM	10.0	PPM	10.0	10.0	0.00%	Pass

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date
R0D 4-GAS 18%OXY_1244099	R0D 4-GAS 18%OXY H2S10PPM CO50PPM CH4_50%LEL_1244093	Calgaz		1244093		2/20/2022
R0D 50%CH4/35%C02/N2_1252175	R0D 50%CH4/35%C02/N2_1252175	Calgaz		1252175		2/28/2025
R0D AIR ZERO THC <1 PPM 1265563	R0D AIR ZERO THC <1 PPM 1265563	Calgaz		1265563		2/28/2025

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Shawn Neely

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

Pine Environmental Services, Inc.

Instrument ID 23729
Description Gem 5000
Calibrated 5/7/2021 12:49:02PM

Manufacturer CES Landtec
Model Number GEM5000
Serial Number/ Lot Number G502518
Location Ontario
Department

State Certified
Status Pass
Temp °C 23
Humidity % 25

Calibration Specifications

Group # 1
Group Name Methane (CH4)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.0 / 0.0	%Volume	0.0	%Volume	0.0	0.0	0.00%	Pass
15.0 / 15.0	%Volume	15.0	%Volume	14.6	15.0	0.00%	Pass

Group # 2
Group Name Carbon Dioxide (CO2)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.0 / 0.0	%Volume	0.0	%Volume	0.0	0.0	0.00%	Pass
15.0 / 15.0	%Volume	15.0	%Volume	15.1	15.0	0.00%	Pass

Group # 3
Group Name Carbon Monoxide (CO)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0 / 0	PPM	0	PPM	0	0	0.00%	Pass
50 / 50	PPM	50	PPM	51	50	0.00%	Pass

Group # 4
Group Name Hydrogen Sulfide (H2S)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.0 / 0.0	PPM	0.0	PPM	0.0	0.0	0.00%	Pass
10.0 / 10.0	PPM	10.0	PPM	9.8	10.0	0.00%	Pass

Group # 5
Group Name Oxygen (O2)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

Pine Environmental Services, Inc.

Instrument ID 23729
Description Gem 5000
Calibrated 5/7/2021 12:49:02PM

Group # 5
Group Name Oxygen (O2)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
18.0 / 18.0	%Volume	18.0	%Volume	18.3	18.0	0.00%	Pass
20.9 / 20.9	%Volume	20.9	%Volume	21.2	20.9	0.00%	Pass

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date
ON MIXGAS GEM CO2-15% 1022080	ON MIXGAS GEM(CH4 15% CO2 15%) LOT: 1022080	Calgaz	41113	1022080		12/31/2023
ON MIXGAS O2-18% LOT#1303164	ON MIXGAS O2-18% LOT#1303164	Calgaz	41103	1303164		5/30/2022

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Kevin Johnson

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

STAFF REPORT S.R. No. 149-2022

PREPARED BY: Sarah McDonald. P. Eng. – GM Infrastructure Services

PREPARED FOR: Council of the Township of South Glengarry

COUNCIL DATE: September 20, 2022

SUBJECT: Request for Use of Green Road - 18803 County Road 18

BACKGROUND:

1. The Township received a written application for use of a green road in accordance with By-law 33-14 from the residents at 18803 County Road 18, located east of Martintown.

2. The Unopened Road Allowance runs north-south between Beaverbrook Road and the Raisin River. It is located along the west side of 18803 County Road 18 and currently appears to be the location of the property's entrance.

3. The application request is attached and includes the information required by By-law 33-14, namely:

    a. Intended Use
    b. Applicant's Interest in Allowance
    c. Accurate Location and Description Plan

4. Permission from the municipality and, in this case, approval from Council is required for the requested usage.

ANALYSIS

5. **Intended Use**: Driveway access from County Road 18 (see attached location and description plan).

6. **Applicant's Interest in Allowance**: Landowners would like to pursue the severance of the existing residence, with the potential construction of a new dwelling further north on the retained property.

7. **Accurate Location and Description Plan**: The provided location and description plan is attached.

8. The SDG Counties – Transportation Services did not grant permission for an additional residential entranceway which has prompted this request.

9. There is an existing driveway entrance partially on the green road that services the existing residential house.

10. Any use of a green road that is supported by Council requires conditions to be met prior to entering into the agreement:

    a. That a legal survey must be completed on the sections of the road allowance that would be cleared and ditched.
    b. All work would be completed at the applicant's expense.
    c. The applicant must provide proof of Insurance.
    d. All work must be inspected by the Township

11. The General Manager of Infrastructure does not support the use of a green road as a private access.

IMPACT ON 2022 BUDGET:

N/A

ALIGNMENT WITH STRATEGIC PLAN:

N/A

RECOMMENDATION:

BE IT RESOLVED THAT Staff Report 149-2022 be received and that the Council of the Township of South Glengarry

______ approves the request for use of green road as a driveway access, pending a successful severance application and directs Administration to draft an agreement and proceed in clearing the required conditions.

______ does not approve the request for use of a green road as a driveway access.

Recommended to Council for Consideration by:
CAO – TIM MILLS

Dear members of South Glengarry Council,

We are writing to request permission to use a portion the unopened road allowance between County Road 18 and Beaverbrook Road that runs along the west side of our property to provide residential access to a future build site.

Members of Council, we would like to build a new passive solar house on our property, however we were not granted permission from SDG County Department of Transportation Services to add a residential entranceway along the frontage. Our property has a residential entranceway to access our current home, as well as a commercial entranceway to access our farm and the rest of our forested property. We plan to sever and sell an approximately 1-acre lot where our current home sits, and we would like to build a new passive solar home along the edge of our forest behind our organic garlic farm on our remaining 34 acres. We are able to sever this lot as our property has only been severed once before, however we are not able to use the remaining commercial entranceway to access a residential home. The location where we would like to build is approximately 600m from County Road 18, and we are requesting use of a portion of the unopened road allowance between County Road 18 and Beaverbrook Road to provide residential access this location. Thank you for your consideration.

Sincerely,
Edwin Ferguson and Sarah McCullough

Residential access from unopened road allowance

Proposed new house location

Unopened road allowance between County Rd. 18 and Beaverbrook Rd.

18803 County Road 18 Residential access

SG-F-14

THE CORPORATION OF THE
TOWNSHIP OF SOUTH GLENGARRY
BY-LAW NO 33-14
FOR THE YEAR 2014

BEING A BY-LAW TO ESTABLISH POLICIES WITH RESPECT TO THE USE OF UNOPENED MUNICIPAL ROAD ALLOWANCES

WHEREAS the Municipality has a number of unopened Original road allowances which are owned by, and are under the jurisdiction of, this Municipality.

AND WHEREAS while the public has a right to travel these unopened road allowances, they do not have the authority to alter or change the existing topography without the consent of the Municipality.

AND WHEREAS from time to time the Municipality receives Applications from persons who wish to make use and make changes to an unopened road allowance.

AND WHEREAS such Applications are dealt with on "a case by case" basis having regard to the Policies set out as Schedule "A" attached.

AND WHEREAS the purpose of this By-law is to establish these Policies.

<u>BE IT ENACTED AS A BY-LAW OF THE CORPORATION OF THE TOWNSHIP OF SOUTH GLENGARRY AS FOLLOWS:</u>

1. Short Title

1.1 That this By-Law shall be known as the "Policy for Use/Alteration of Unopened Road Allowances"

2. That the use/alteration of unopened road allowances be subject to the requirements outlined in the Standards for the use of an unopened road allowance attached hereto as Schedule "A" and forming part of this By-Law

3. That any person contravening the requirements of this by-law shall be guilty of an offence and shall be liable to penalties as provided for in the, *Provincial Offenses Act, R.S.O., 1990. c. P.33.*

4. That this by-law shall come into full force and effect upon the final passing thereof.

READ *A FIRST AND SECOND TIME IN OPEN COUNCIL DATED JUNE 9th, 2014*

MAYOR

M LeBrun

CLERK

SCHEDULE "A" TO BY-LAW 33-14

1. Policy

Schedule "A" is a policy setting out the criteria to be considered by the Municipality on receipt of an Application to use and make changes to an unopened original road allowance.

2. Definition

"Original road allowance" - means the following:

2.1 Those roads laid out in the original Township survey of South Glengarry

2.2 Colonization Roads

2.3 Roads created by Justices in Quarter Sessions (up to 1841)

2.4 Roads created by District Councils on and after 1841 to 1850

3. "Case by Case"

Each Application shall be considered on a "case by case" analysis based on the following criteria.

4. Criteria Re: Use of Unopened Road Allowances

4.1 Structure

No person shall erect a dock or any kind of structure on an unopened Original road allowance owned by the Municipality.

4.2 Storage

No person shall store any vehicle, boat, trailer, etc. on an unopened Original road allowance owned by the Municipality.

4.3 Permission from the Municipality

No person shall perform any work, remove any trees, soil, or other material or erect upon or use any unopened Original road allowance without the specific approval from Council.

4.4 Application

Applicants for permission to use or alter an opened road allowance shall be submitted in writing. The Applicant must state the intended use, the applicant's interest in the allowance, and be accompanied by an accurate location and description plan.

1. Criteria to be Considered:

If Council is in favour of permitting the use of the unopened road allowances, the following policies shall apply, as determined by the Municipality:

2. Survey

Surveys may be required to confirm that the proposed use will not encroach on adjacent privately owned lands.

3. Expense

All work to be done and approved by the Municipality shall be at the applicant's expense. A cost estimate of the work to be completed by the applicant shall be approved by the Municipality.

4. Work Permitted

The applicant may be required to prepare an outline of the work proposed to see if it is within the terms approved by Council.

5. Insurance

The applicant may be required to carry liability insurance with respect to their use of the road and the Municipality must be added as an insured on such policies. The insurance company shall give an undertaking to the Municipality that the policy will not be cancelled on less than 30 days notice in writing to the Clerk of the Municipality.

Cancellation of the insurance coverage without the consent of Council shall constitute a breach of the Agreement between the applicant and the Municipality.

6. Letter of Credit

The applicant may be required to file a Letter of Credit (or cash) in connection with the work approved by the Municipality. The amount of the Letter of Credit (which must be from a Chartered Bank) will depend upon the work to be done and the circumstances of the area under consideration.

7. Inspection

The Municipality shall inspect the work only to the extent of confirming that the work performed is in accordance with the Agreement that was signed with the Municipality.

8. Posting of Signs

The applicant may be required to post signs stating

"Road not assumed by the municipality, use at your own risk".

The applicant is responsible to replace signs which are removed or destroyed. Failure to replace when notified by the Municipality shall constitute a breach of this agreement.

13. Farm Equipment

Application for permission to use an unopened road allowance with farming equipment for farming exercises shall, after investigation and approval by the General Manager of Infrastructure Services, be granted by a permission letter as opposed to a formal Agreement with the Municipality.

14. The Agreement

The applicant shall be required to sign an Agreement with the Municipality which shall:

i. Outline the work to be required

ii. Set out the security required by the Municipality

iii. Set out such additional matters that the Municipality may require

15. Breach of Agreement

Any breach of the Agreement to be signed between the Municipality and the applicant, will entitle the Municipality to cancel the contract and terminate the privileges extended in the Agreement.

SOUTH GLENGARRY
Ontario's Celtic Heartland

STAFF REPORT S.R. No. 150-2022

PREPARED BY: Sarah McDonald, P. Eng. – GM Infrastructure Services

PREPARED FOR: Council of the Township of South Glengarry

COUNCIL DATE: September 20, 2022

SUBJECT: Federation of Canadian Municipalities Grant Agreement

BACKGROUND:

1. The Township of South Glengarry prepared a revised Asset Management Plan (AMP) to meet the requirements of O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure.

2. To assist with the development of the 2022 AMP and the Lancaster Water Model, the Township was successful in receiving the following funding:

    a. Federation of Canadian Municipalities, Municipal Asset Management Program (MAMP), $45,238
    b. Service modernization funding for small and rural communities, $30,000

3. The MAMP funding notice stipulated a funding start date of October 29, 2021 and a funding end date of October 31, 2022.

ANALYSIS:

4. To receive funding for the work that has been completed and the little that is outstanding, the Township is required to enter into the attached Grant Agreement.

5. The Township received the Grant Agreement for completion on August 24, 2022.

IMPACT ON 2022 BUDGET:

6. The Township will receive $45,238.00 towards the development of the 2022 Asset Management Plan (complete) and the Lancaster Water Models (nearing completion).

ALIGNMENT WITH STRATEGIC PLAN:

Goal 2: Invest in Infrastructure and its sustainability

RECOMMENDATION:

BE IT RESOLVED THAT Staff Report 150-2022 be received and that By-law 62-2022 being a by-law to enter into a Grant Agreement with the Federation of Canadian Municipalities be read a first, second and third time, passed, signed and sealed in open council this 20th day of September 2022.

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Recommended to Council for Consideration by:
CAO – TIM MILLS

THE CORPORATION OF THE
TOWNSHIP OF SOUTH GLENGARRY
BY-LAW 62-2021
FOR THE YEAR 2022

BEING A BY-LAW TO ENTER INTO A GRANT AGREEMENT WITH THE FEDERATION OF CANADIAN MUNICIPALITIES (FCM).

WHEREAS the *Municipal Act, 2001*, c. 25 s. 5 (1) provides that the powers of a municipal corporation are to be exercised by its council;

AND WHEREAS the *Municipal Act, 2001*, c. 25 s. 5 (3) provides that the powers of every council are to be exercised by by-law;

AND WHEREAS Council of the Township of South Glengarry desires to enter into a Grant Agreement with the Federation of Canadian Municipalities.

NOW THEREFORE THE COUNCIL OF THE CORPORATION OF THE TOWNSHIP OF SOUTH GLENGARRY ENACTS AS FOLLOWS:

1. **THAT** the Grant Agreement attached hereto as Schedule “A” shall form part of this by-law.

2. **THAT** the Mayor and Clerk be authorized to enter into said agreement.

3. **THAT** this by-law shall come into force and take effect on the date of its final passing.

READ A FIRST, SECOND AND THIRD TIME, PASSED, SIGNED AND SEALED IN OPEN COUNCIL THIS 20TH DAY OF SEPTEMBER, 2022.

MAYOR: ____________________ ***CLERK:*** ____________________

GRANT AGREEMENT

THIS AGREEMENT is effective as of the date of last signature on the signature page.

BETWEEN:

THE CORPORATION OF THE TOWNSHIP OF SOUTH GLENGARRY

(herein called "**Recipient**")

-and-

FEDERATION OF CANADIAN MUNICIPALITIES

(herein called "**FCM**")

WHEREAS:

(a) the Government of Canada and FCM have established the Municipal Asset Management Program (herein called **MAMP**);

(b) the Government of Canada has funded the Municipal Asset Management Program, which is being administered by FCM;

(c) FCM has agreed to provide the Recipient with a grant for use by the Recipient solely for the project described in this Agreement; and

(d) this Agreement contains the terms for the administration and remittance of the grant by FCM to the Recipient and the use of the grant by the Recipient.

NOW THEREFORE, the Parties hereby agree as follows:

ARTICLE 1
DEFINITIONS AND SCHEDULES

1.01 Definitions. Whenever used in this Agreement and unless the context otherwise requires, the following terms have the following meanings:

"**Agreement**" means this agreement, including all schedules, and all amendments or restatements as permitted;

"**Business Day**" means any day other than a Saturday, Sunday or statutory holidays in the Province of Ontario;

"**Claim**" has the meaning ascribed thereto in Section 13.01 of this Agreement;

"**Confidential Information**" has the meaning ascribed thereto in Section 11.01 of this Agreement.

"**Eligible Activities**" means any reasonable activities necessary to complete the Project as described in Part 2 of Schedule A attached hereto.

"**Eligible Expenditure Date**" has the meaning ascribed thereto in Part 4 of Schedule C attached hereto;

"**Eligible Expenditures**" means those permitted expenditures described in Part 4 of Schedule C attached hereto, for which the Recipient may use the Grant;

"**Grant**" means the grant set forth in Article 2;

"**Grant Amount**" means the amount to be disbursed by FCM on account of the Grant up to the maximum amount set forth in Part 1 of Schedule B attached hereto;

"**Indemnified Parties**" has the meaning ascribed thereto in Section 13.01 of this Agreement;

"**Parties**" means FCM and the Recipient, and "**Party**" refers to any one of them;

"**Project**" means the project described in Part 2 of Schedule A attached hereto;

"**Project End Date**" has the meaning ascribed thereto in Part 2 of Schedule A attached hereto; and

"**Project Start Date**" has the meaning ascribed thereto in Part 2 of Schedule A attached hereto;

"**Receiving Party**" has the meaning ascribed thereto in Section 11.01 of this Agreement.

1.02 Schedules. The following annexed Schedules, which may be amended by FCM from time to time, form part of this Agreement and the Parties shall comply with all terms and conditions set-out therein:

Schedule A: Part 1: Conditions of Contribution
Part 2: Description of Project, Statement of Work and Project Expenditures
Part 3: Reporting Requirements and Project Deliverables

Schedule B: Part 1: Grant Amount
Part 2: Particulars of the Sources of Funding
Part 3: Contribution Schedule/Period of Funding

Schedule C: Part 1: Request for Contribution, Letter of Attestation and Expense Claim
Part 2: Report Templates
Part 3: Accepted Practices
Part 4: Eligible Expenditures

Schedule D: Contact Information

ARTICLE 2
THE GRANT

2.01 Grant Purpose. FCM is providing the Grant to the Recipient for the sole purpose of assisting the Recipient in the performance of the Project, as described in Part 2 of Schedule A attached hereto.

2.02 Grant Amount. Subject to and in accordance with the terms and conditions of this Agreement and in reliance upon the representations, warranties and covenants of the Recipient hereinafter set forth, FCM agrees to contribute towards the Eligible Expenditures, the Grant Amount, as more particularly described in Part 1 of Schedule B attached hereto.

2.03 Disbursement of Grant.

(a) FCM shall disburse the Grant in accordance with Part 3 of Schedule B attached hereto.

(b) No portion of the Grant shall be disbursed by FCM without it first receiving from the Recipient a completed Request for Contribution in accordance with Part 1 of Schedule C attached hereto.

(c) Provided that the Conditions of Contribution set-out in Part 1 of Schedule A attached hereto are satisfied, the Recipient may request the Grant by delivering to FCM the appropriate

Request for Contribution in accordance with Part 1 of Schedule C attached hereto at least 30 days before the requested date of disbursement; the requested date of disbursement may be delayed if the Request for Contribution delivered by the Recipient to FCM is not, in FCM's sole discretion, satisfactory and revisions or supplemental documentation are required.

2.04 Term. This Agreement shall continue in force until FCM has received and notified the Recipient of its satisfaction with all reports required to be completed by the Recipient in accordance with the terms and conditions of this Agreement, or until the Agreement has been terminated in accordance with Section 12.01, whichever shall first occur.

ARTICLE 3
CONDITIONS OF CONTRIBUTION

3.01 Conditions of Contribution. Subject to Section 2.03, the obligation of FCM to disburse the Grant to the Recipient is conditional upon the Recipient satisfying the conditions set-out in Part 1 of Schedule A attached hereto, to the satisfaction of FCM.

ARTICLE 4
REPRESENTATIONS AND WARRANTIES

4.01 Representations and Warranties. The Recipient represents and warrants that:

(a) it is duly established under the laws of the Province of Ontario and has the legal power and authority to enter into, and perform its obligations under this Agreement and the Project;

(b) this Agreement has been duly authorized and executed by it and constitutes a valid and binding obligation of it, enforceable against it in accordance with its terms;

(c) neither the making of this Agreement nor the compliance with its terms and the terms of the Project will conflict with or result in the breach of any of the terms, conditions or provisions of, or constitute a default under any indenture, debenture, agreement or other instrument or arrangement to which the Recipient is a party or by which it is bound, or violate any of the terms or provisions of the Recipient's constating documents or any license, approval, consent, judgment, decree or order or any statute, rule or regulation applicable to the Recipient;

(d) no litigation, arbitration or administrative proceedings are current or pending or have been threatened, and so far as the Recipient is aware no claim has been made, which is likely to have an adverse effect on its preparation and/or delivery of the Project or its compliance with its obligations under this Agreement; and

(e) it has the right to grant the license set out in Section 6.02 of this Agreement.

ARTICLE 5
COVENANTS

5.01 Affirmative Covenants. Unless FCM shall otherwise agree in writing, the Recipient covenants and agrees that it shall:

(a) use the Grant only for Eligible Activities relating to the Project;

(b) carry out the Project and conduct the activities thereof in compliance with all applicable laws and regulations and, without restricting the generality of the foregoing, in compliance with all labour, environmental, health and safety and human rights legislation applicable to the Project;

(c) carry out the Project with due diligence and efficiency and in accordance with sound engineering, scientific, financial and business practices;

(d) ensure that Project contracts are awarded in a way that is fair, transparent, competitive and consistent with value for money principles (the optimal combination of quality, service, time and cost considerations, over the useful life of the good, service or asset acquired for the purposes of Eligible Activities);

(e) provide FCM with prompt notice of any:

   (i) material change to the Project;

   (ii) proposed change in the nature or scope of its legal status; or

   (iii) act, event, litigation or administrative proceeding that does or may materially and adversely affect the Project or may materially and adversely affect the ability of the Recipient to perform its obligations under this Agreement or the Project

(f) comply with FCM's reporting requirements by using the latest version of the report templates, provided for indicative purposes in Schedule C, Part 2, which are amended from time to time by FCM and made available to the Recipient after signature of the Agreement; and

(g) repay any amounts owed to FCM, as determined by FCM, within 30 days of receiving such notice by FCM.

5.02 Negative Covenants. Unless FCM shall otherwise agree in writing, the Recipient shall not:

(a) use the Grant for expenditures that are not Eligible Expenditures;

(b) for 5 years after the end date of this Agreement, sell, assign, transfer, lease, exchange or otherwise dispose of, or contract to sell, assign, transfer, lease, exchange or otherwise dispose of, any of the real or personal property, whether movable or immovable, acquired, purchased, constructed, rehabilitated or improved, in whole or in part, with the Grant (the "**Assets**"); if at any time within 5 years after the end date of this Agreement, the Recipient sells, assigns, transfers, leases, exchanges or otherwise disposes of any Asset other than to the Government of Canada, a local government, or with the Government of Canada's consent, the Recipient may be required to pay back to FCM, at FCM's sole discretion, all or a portion of the Grant that was disbursed by FCM to the Recipient.

ARTICLE 6
INTELLECTUAL PROPERTY

6.01 Intellectual Property. Copyright in all reports, documents and deliverables prepared in connection with this Agreement and listed in the Schedules of this Agreement by or on behalf of the Recipient (the "Recipient Documentation") will be the exclusive property of, and all ownership rights shall vest in either the Recipient or, subject to the Recipient's ability to grant the license set out in Section 6.02, a person or entity engaged to develop the Recipient Documentation on behalf of the Recipient.

6.02 License. The Recipient hereby grants to FCM an irrevocable, perpetual, worldwide, royalty-free, license, to use, publish, make improvements to, sub-license, translate and copy the Recipient Documentation. This license shall survive the expiration or termination of this Agreement.

ARTICLE 7
APPROPRIATIONS

7.01 Appropriations. Notwithstanding FCM's obligation to make any payment under this Agreement, this obligation does not arise if, at the time when a payment under this Agreement becomes due, the Parliament of Canada has not passed an appropriation that is sufficient and constitutes lawful authority for the Government of Canada making the necessary payment to FCM for the project or program in relation to which the Grant is being provided. FCM may reduce, delay or terminate any payment under this Agreement in response to the reduction or delay of appropriations or departmental funding levels in respect of transfer payments, the project or program in relation to which the Grant is being provided, or otherwise, as evidenced by any appropriation act or the federal Crown's main or supplementary estimates expenditures. FCM will not be liable for any direct, indirect, consequential, exemplary or punitive damages, regardless of the form of action, whether in contract, tort or otherwise, arising from any such reduction, delay or termination of funding.

ARTICLE 8
MEMBERS OF THE HOUSE OF COMMONS AND SENATE

8.01 No member of the House of Commons or the Senate of Canada will be admitted to any share or part of this Agreement, or to any benefit arising from it, that is not otherwise available to the general public. The Recipient will promptly inform FCM should it become aware of the existence of any such situation.

ARTICLE 9
NO BRIBES

9.01 The Recipient guarantees that no bribe, gift or other inducement has been paid, given, promised or offered to any person in order to obtain this Agreement. Similarly, no person has been employed to solicit or secure the Agreement upon any agreement for a commission, percentage, brokerage or contingent fee. The Recipient also guarantees that it has no financial interest in the business of any third party that would affect its objectivity in carrying out the Project.

ARTICLE 10
AUDIT AND ACCESS

10.01 Audit and Access.

(a) FCM reserves the right to undertake, at any time, at its expense, any audit of the records and accounts of the Recipient in relation to the Project. The Recipient agrees to ensure that prompt and timely corrective action is taken in response to any audit findings and recommendations conducted in accordance with this Agreement. The Recipient will submit to FCM in a timely manner, a report on follow-up actions taken to address recommendations and results of the audit.

(b) The Recipient shall maintain proper and accurate financial accounts and records, including but not limited to its contracts, invoices, statements, receipts, employee timesheets, and vouchers, in respect of the Project. The Recipient covenants and agrees that it shall keep all such books and records of the Project until March 31, 2031.

(c) Upon FCM's request with reasonable prior notice thereto, the Recipient shall provide FCM and its designated representatives with reasonable and timely access to sites, facilities, and any documentation relating to the Project for the purposes of audit, inspection, monitoring, evaluation, and ensuring compliance with this Agreement, and permit FCM to communicate directly with, including the receipt of information from, its external auditors regarding its accounts and operations relating to the Project.

(d) The Government of Canada, the Auditor General of Canada, and their designated representatives, to the extent permitted by law, will at all times be permitted to inspect the terms and conditions of this Agreement and any records and accounts respecting the Project and will have reasonable and timely access to sites, facilities and any documentation relevant for the purpose of audit.

(e) The covenants, rights and obligations contained in this Article 10 shall survive the termination or expiry of this Agreement.

ARTICLE 11
CONFIDENTIALITY

11.01 Confidentiality.

(a) All processes, documents, data, plans, material, policies or information pertaining to either Party's operations which is obtained by the other Party ("**Receiving Party**") or furnished to the Receiving Party in connection with this Agreement and expressly identified as confidential thereby, including, without limitation, the terms of this Agreement, ("**Confidential Information**") shall be maintained by the Receiving Party in strict confidence and shall not be disclosed to any person or entity for any reason or used by the Receiving Party except as necessary for it to perform its obligations hereunder.

(b) The limitations contained in this section shall not apply to (a) Confidential Information which is in the public domain at the time of disclosure; (b) Confidential Information that becomes part of the public domain after disclosure through no fault of the Receiving Party; (c) Confidential Information that the Receiving Party can prove was known by the Receiving Party at the time of disclosure; (d) Confidential Information that the Receiving Party can prove was supplied to the Receiving Party by a third party or was independently developed by the Receiving Party; or (e) Confidential Information required to be disclosed pursuant to judicial process.

ARTICLE 12
TERMINATION

12.01 Termination of the Agreement.

(a) FCM may terminate this Agreement:

(i) if the Recipient breaches any term or condition of this Agreement, and fails to remedy such breach upon the expiry of 15 Business Days' written notice from FCM of such breach or, with respect to a breach that cannot be remedied within the 15 Business Day period, such longer period of time as FCM may reasonably provide the Recipient to remedy the breach, provided the Recipient has commenced to remedy the breach within the 15 Business Day period and is actively and diligently taking appropriate measures to remedy the breach;

(ii) if the Recipient becomes insolvent and/or proceedings have been commenced under any legislation or otherwise for its dissolution, liquidation or winding-up, or bankruptcy, insolvency or creditors' arrangement proceedings have been commenced by or against the Recipient;

(iii) if, in FCM's sole discretion, the Project cannot be completed as initially presented; and

(iv) if the Parliament of Canada fails to pass an appropriation that is sufficient and constitutes lawful authority for the Government of Canada making the necessary payment to FCM for the project or program in relation to which the Grant is being provided.

(b) Either Party may, on not less than 30 days' prior written notice to the other Party, terminate this Agreement.

12.02 Effect of Termination. If this Agreement is terminated pursuant to Section 12.01, the Recipient may be:

(a) reimbursed for all or a portion of the expenses they have incurred in relation to the Project up to the effective date of termination; or

(b) required to pay back to FCM all or a portion of the Grant Amount that was disbursed by FCM to the Recipient prior to the effective date of termination, within 30 days of receiving such notice by FCM;

as applicable, all subject to FCM's sole discretion and satisfaction, taking into consideration out-of-pocket expenses incurred and results reported by the Recipient in connection with the Project.

ARTICLE 13
INDEMNITY

13.01 Indemnity. The Recipient hereby agrees to indemnify and hold harmless FCM and its officers, directors, employees and agents (collectively, the "**Indemnified Parties**") from and against any and all liability, loss, costs, damages and expenses (including legal, expert and consultant fees), causes of action, actions, claims, demands, lawsuits or other proceedings (collectively, a "**Claim**"), by whomever made, sustained, incurred, brought or prosecuted, in any way arising out of or in connection with the Project or otherwise in connection with this Agreement, but only to the extent that such Claim arises out of or is in connection with the Recipient's breach of this Agreement or is caused by the negligence or wilful misconduct of the Recipient in the performance of its obligations hereunder or otherwise in connection with the Project.

13.02 Intellectual Property Indemnity. Recipient shall defend or settle at its expense any claim or suit against FCM arising out of or in connection with an assertion that the Recipient Intellectual Property infringes any intellectual property right and Recipient shall indemnify and hold harmless FCM from damages, costs, and attorneys' fees, if any, finally awarded in such suit or the amount of the settlement thereof; provided that (i) Recipient is promptly notified in writing of such claim or suit, and (ii) Recipient shall have the sole control of the defense and/or settlement thereof.

ARTICLE 14
MISCELLANEOUS PROVISIONS

14.01 Notice. Any notice, document or other communication required to be given under this Agreement shall be in writing and shall be sufficiently given if sent by personal delivery/courier, registered mail or email to the other Party at its address indicated in Schedule D attached hereto, or to such other address, email address or person that the Party designates in writing to the other Party. The notice shall be deemed to have been delivered on the day of personal delivery, on the day received by email (as evidenced by a transmission confirmation), or on the fifth day following mailing.

14.02 Relationship of the Parties. The relationship between the Recipient and FCM is, and shall at all times be and remain, essentially that of a recipient and a grantor, and this Agreement does not and shall not be deemed to create a joint venture, partnership, and fiduciary or agency relationship between the Parties for any purpose. Neither the Recipient, nor any of its personnel are engaged as an employee, servant or agent of FCM.

14.03 Public Announcements. The Recipient shall cooperate with FCM, who will lead the preparation and issuance of the public funding announcement for the Project and/or the coordination of a public announcement event attended by FCM and the Government of Canada. The Recipient will be informed of the process immediately after the signature of this Agreement. If any public statement or release is so required, the Recipient shall promptly inform FCM of upcoming promotional events related to the Project and allow FCM and the Government of Canada to participate in such media activities or events.

14.04 Project Branding. The Recipient shall recognize and state in an appropriate manner, as approved by FCM, the financial assistance offered by FCM concerning the Project and the contribution of the Government of Canada to FCM, as specified in Part 3 of Schedule C attached hereto. If requested by FCM, the Recipient shall have affixed, in content, form, location and manner acceptable to FCM, signage acknowledging the contribution of FCM and the Government of Canada to the Project. The Recipient shall adhere to the policies regarding the use of graphic design elements and signage as specified in Part 3 of Schedule C attached hereto.

14.05 Entire Agreement. This Agreement constitutes the entire understanding between the Parties with respect to the subject matter hereof and supersedes all prior understandings, negotiations and discussions, whether written or oral. There are no conditions, covenants, agreements, understandings, representations, warranties or other provisions, express or implied, collateral, statutory or otherwise, relating to the subject matter hereof except as herein provided.

14.06 Survival. Except as otherwise provided herein, those sections of this Agreement which, by the nature of the rights or obligations set-out therein might reasonably be expected to survive any termination or expiry of this Agreement, shall survive any termination or expiry of this Agreement.

14.07 Amendments. No amendment of the Agreement will have any force or effect unless reduced to writing and signed by both Parties.

14.08 Assignment. The Recipient cannot assign this Agreement without the prior written consent of FCM.

14.09 Enurement. This Agreement shall enure to the benefit of, and shall be binding upon, the Parties and their respective, heirs, executors, administrators, successors and permitted assigns.

14.10 Governing Law. This Agreement shall be governed by and construed in accordance with the law of the Province of Ontario and the federal laws of Canada applicable therein.

14.11 Severability. Each of the binding provisions contained in this Agreement is distinct and severable. Any declaration by a court of competent jurisdiction of the invalidity or unenforceability of any binding provision or part of a binding provision will not affect the validity or enforceability of any other provision of this Agreement.

14.12 Waiver. No waiver of any provision of this Agreement shall be effective unless made in writing and signed by the waiving Party. The failure of any Party to require the performance of any term or obligation of this Agreement, or the waiver by any Party of any breach of this Agreement, shall not prevent any subsequent enforcement of such term or obligation or be deemed a waiver of any subsequent breach.

14.13 Counterparts. This Agreement may be executed and delivered (including by facsimile transmission or in protocol document format ("PDF")) in one or more counterparts, each of which when executed shall be deemed to be an original but all of which taken together shall constitute one and the same agreement.

[SIGNATURE PAGE FOLLOWS]

IN WITNESS WHEREOF, the Parties hereto have executed and delivered this Agreement as of the date written below.

THE CORPORATION OF THE TOWNSHIP OF SOUTH GLENGARRY

Per: ______________________________
Name: Sarah McDonald
Title: General Manager - Infrastructure

Date: ____________________

Per: ______________________________
Name:
Title:

Date: ____________________

I/We have authority to bind the Recipient herein.

FEDERATION OF CANADIAN MUNICIPALITIES

Per: ______________________________
Name: Kate Fleming
Title: Director, Low Carbon Cities Canada and MAMP

Date: ____________________

I have authority to bind FCM herein.

Schedule A

Part 1 Conditions of Contribution

The obligation of FCM to disburse the Grant Amount is conditional upon the Recipient satisfying the following conditions, to the satisfaction of FCM:

- Completed Request for Contribution in the form of Part 1 of Schedule C;
- Receipt and acceptance of Final Report, which is due within 30 days of Project end date, in accordance with the reporting template Part 2 of Schedule C;
- Receipt and acceptance of Evidence of Deliverables, as noted in the Final Report;
- Receipt and acceptance of Expense claim;
- Letter of Attestation for Expense Claim, including confirmation that all expenses claimed are Eligible Expenditures, in the format of Part 4 of Schedule C.

The Recipient acknowledges and agrees that, notwithstanding the foregoing conditions, FCM's obligation to disburse the Grant Amount is subject to Article 7 of the Agreement.

Schedule A

Part 2 Description of Project, Statement of Work and Project Expenditures

The Recipient will undertake a Project in accordance with the phases, activities and/or milestones outlined in the below Statement of Work.

Project Number: MAMP 16448 – The Corporation of the Township of South Glengarry, Ontario
Project Title: South Glengarry – Asset Management Plan Development – Road, Bridges, Water Infrastructure Assets
Project Sector: Asset Management (MAMP)
Project Type: MAMP Projects

Project Start Date	Project End Date
29 October 2021	31 October 2022

Project Description
The Township of South Glengarry (South Glengarry) will collaborate with EVB Engineering Inc. to integrate a new system that will provide up-to-date information regarding the Township's critical asset inventories and their respective conditions. This will enhance South Glengarry's Asset Management (AM) practices to effectively report on asset conditions and drive financing decisions that will maximize the useful life of these systems.

The project will involve the following activities:
- Prepare updated inventories for critical roads, bridges, water, wastewater, and stormwater assets
- Collect data on the condition of these critical assets
- Develop comprehensive modelling reports for critical assets' respective systems

Activity	Deliverable
1. Collect data on identified critical assets, including condition data, to prepare up-to-date inventory reports for the AMP and develop comprehensive models for the critical asset systems	A document or set of documents including: • Copies of the asset inventory and condition assessment reports for approximately 766 kilometres of roads, 58 bridges, 32 kilometres of wastewater mains, 29.5 kilometres of water mains, 7 pumping stations, 3 water treatment facilities, 2 lagoon systems, 1 water tower, and 1 wastewater treatment facility; and • Copies of the comprehensive modelling reports.
2. Set up a cross-functional asset management team/committee with updated job descriptions to include asset management responsibilities	A document or set of documents including: • A copy of the asset management team/committee's Terms of Reference and minutes of initial meetings to develop Terms of Reference; and • Copies of the updated job descriptions confirmed with minutes for the job description development meetings with our cross-functional asset management team/committee.
3. Train all staff members on basic asset management concepts and train cross-functional asset management team/committee members on advanced asset management concepts	A document or set of documents including: • Copies of training attendance records and copies of training materials for staff members on basic asset management concept; and • Copies of training attendance records and copies of training materials for cross-functional asset management team/committee members on advanced asset management concepts.

Activity	Start date:	End date:	Eligible Expenditures ($)	Ineligible Expenditures ($)	Total Expenditure ($)
Collect data on our identified critical assets, including condition data, to prepare up-to-date inventory reports for our AMP and develop comprehensive models for our critical asset systems	29 October 2021	31 October 2022			
Marco, Adam - Prepare asset inventory for approximately 766 kilometres of roads, 58 bridges, 32 kilometres of wastewater mains, 29.5 kilometres of water mains, 7 pumping stations, 3 water treatment facilities, 2 lagoon systems, 1 water tower, and 1 wastewater treatment facility			$16,512.00	$0.00	**$16,512.00**
Marco, Adam - Prepare condition assessment reports for approximately 766 kilometres of roads, 58 bridges, 32 kilometres of wastewater mains, 29.5 kilometres of water mains, 7 pumping stations, 3 water treatment facilities, 2 lagoon systems, 1 water tower, and 1 wastewater treatment facility			$4,578.00	$0.00	**$4,578.00**
Francois. Robyn, Ken - Develop WaterCAD Model of approximately 32 kilometres of wastewater mains, 29.5 kilometres of water mains, 7 pumping stations, 3 water treatment facilities, 2 lagoon systems, 1 water tower, and 1 wastewater treatment facility and complete model calibration for new AMP			$34,257.00	$0.00	**$34,257.00**

Activity 1 Subtotals			**$55,347.00**	**$0.00**	**$55,347.00**
Set up a cross-functional asset management team/committee with updated job descriptions to include asset management responsibilities	29 October 2021	31 October 2022			
CAO, Director of Finance Services/Treasurer, Managers of Infrastructure - Formal establishment of cross-functional asset management team/committee (In-Kind Contribution)			$0.00	$0.00	**$0.00**
CAO, Director of Finance Services/Treasurer, Managers of Infrastructure - Update job descriptions to include new roles and responsibilities for asset management programming (In-Kind Contribution)			$0.00	$0.00	**$0.00**
Activity 2 Subtotals			**$0.00**	**$0.00**	**$0.00**
Training all staff members on basic asset management concepts and training cross-functional asset management team/committee members on advanced asset management concepts	29 October 2021	31 October 2022			
South Glengarry Administrative Team - Training and related materials on basic asset management concepts provided by cross-functional team members (In-Kind Contribution)			$0.00	$0.00	**$0.00**
CAO, Director of Finance Services/Treasurer, Managers of Infrastructure - Advanced asset management training and materials to gain knowledge on best industry asset management practices and to obtain the skills necessary to integrate these practices within our asset management programming			$1,200.00	$0.00	**$1,200.00**
Activity 3 Subtotals			**$1,200.00**	**$0.00**	**$1,200.00**
Total Expenditures			**$56,547.00**	**$0.00**	**$56,547.00**

Total Eligible Expenditures	$56,547.00

Schedule A

Part 3 Reporting Requirements and Project Deliverables

The following report is to be provided to FCM at the completion of the Project. The format of the report is as provided in Part 2 of Schedule C.

Name of Report	Due Date:	Content
Final Report	30 November 2022	The content and format of this report is provided in Schedule C, Part 2.

Schedule B

Part 1 Grant amount

Subject to the terms and conditions of this Agreement, FCM agrees to contribute towards the Eligible Expenditures an amount (the "**Grant Amount**") that is equal to the lesser of:

the sum of forty-five thousand two-hundred thirty seven dollars and sixty cents ($45,237.60); or

eighty percent (80.0%) of Eligible Expenditures;

Notwithstanding the foregoing, if the aggregate amount of funding received or to be received from all sources of funding, other than the Recipient, as described in Part 2 of Schedule B (all as determined and calculated by FCM) is greater than the total expenditures incurred by the Recipient in respect of the Project then FCM may reduce the Grant Amount to such amount as it deems appropriate, in its sole and absolute discretion.

Schedule B

Part 2 Particulars of the Sources of Funding

The funding sources for this initiative are outlined in the table below. Each funding source indicates the amount of funding and when the funding was confirmed or is expected to be confirmed.

Funding source	Description	Confirmed (Y/N)	Date committed Day month year	Amount ($)	% of total budget
FCM Grant	Grant	Y	29 October 2021	$45,237.60	80.0%
The Corporation of the Township of South Glengarry	Reserves	Y	3 August 2021	$11,309.40	20.0%
			Total funding:	**$56,547.00**	**100.0%**

Budget total expenditures	**$56,547.00**
Budget total Eligible Expenditures	**$56,547.00**

Schedule B

Part 3 Payment Schedule/ Period of Funding

FCM will disburse the Grant Amount as determined in this table upon completion of activities, as evidenced by submission and acceptance by FCM of the Final Report and a Request for Contribution.

The Final Report and Request for Contribution must be submitted at least 30 days prior to the requested date of disbursement.

The Recipient must notify FCM in writing of any anticipated delays in this disbursement schedule. FCM reserves the right to adjust dates of disbursement or amounts subject to Article 7 of the Agreement.

Deliverable	Date of Report Submission	Forecast Date of Disbursement	Maximum Amount of Disbursement
Final Report	30 November 2022	6 January 2023	**$45,237.60**

Period of Funding:

The Period of Funding is defined as the period between the Project Start Date and 30 days after the Project End Date as set out in Part 2 of Schedule A.

Schedule C

Part 1 Request for Contribution, Letter of Attestation and Expense Claim

[LETTERHEAD OF THE RECIPIENT]

[Address]
[Date]

Federation of Canadian Municipalities
24 Clarence Street
Ottawa, Ontario
K1N 5P3

Attention: Anjali Parikh
Project Officer - MAMP

Ladies and Gentlemen:

Re: MAMP – no. 16448 Agreement between the Federation of Canadian Municipalities (as Trustee) and The Corporation of the Township of South Glengarry ("Recipient") (the "Agreement")

I, **[Instruction: insert the name of a person named in the Agreement]**, the **[Instruction: insert the title]**, of the Recipient certify and confirm that the Recipient is requesting the Contribution and that the Recipient has satisfied each condition of contribution listed below. I understand that all information below must be submitted and accepted in order for FCM to be able to proceed to funds transfer.

I am attaching to this request for contribution all documents specified in Part 1 of Schedule A:

- Project Final Report, with all content specified in the template (Part 2 of Schedule C);
- The deliverables (as indicate in the final report);
- Letter of Attestation;
- Expense Claim.

In addition, I have also attached the following documents:

- An updated statement of funding sources and amounts (Part 2 of Schedule B);
- The request to receive payment by direct deposit.

Signature: ______________________________ Date: ____________________________

Schedule C

Letter of Attestation for Expense Claim

[LETTERHEAD OF THE RECIPIENT]

[Address]
[Date]

TO: The Federation of Canadian Municipalities

This letter of attestation (the "**Letter**") is issued pursuant to the Agreement #16448 (project number) dated (the "**Agreement**") between the Federation of Canadian Municipalities ("**FCM**") and The Corporation of the Township of South Glengarry (the "**Recipient**"), and in support of the expense claim submitted by the Recipient to FCM for reimbursement of expenses incurred and paid by the Recipient in relation to the Project (the "**Expense Claim**").

All defined terms used in this Letter and not otherwise defined shall have the corresponding meaning in the Agreement.

I am an authorized officer of the Recipient and I hereby certify, in satisfaction of the terms and conditions of the Agreement, that:

i. All expenses claimed in the Expense Claim have been incurred and paid by the Recipient;

ii. All expenses claimed in the Expense Claim relate to the Project;

iii. All expenses claimed in the Expense Claim relate to Eligible Activities in compliance with the eligible activity requirements described in Part 4 of Schedule C to the Agreement; and

iv. All expenses claimed in the Expense Claim are Eligible Expenditures in compliance with the eligible expenditure requirements described in Part 4 of Schedule C to the Agreement.

v. All expenses claimed have been incurred during the Period of Funding.

____
Name and title of authorized officer of Recipient

__________________________ ____________________
Signature Date

Expense Claim

[LETTERHEAD OF THE RECIPIENT]

[Address]
[Date]

Project Number	MAMP 16448
Project Title	South Glengarry – Asset Management Plan Development – Road, Bridges, Water Infrastructure Assets

The following expenditures have been incurred from the period between Day Month Year and Day Month Year for the completion of the activities identified.

Activity Completed	Total Budgeted Expenditures ($) (as per Part 2 of Schedule A per activity)	Total Actual Eligible Expenditures Net of Tax Rebates per activity ($)	Total Actual Ineligible Expenditures Net of Tax Rebates per activity ($)	Total Actual Expenditures Net of Tax Rebates per activity ($)
1. Collect data on our identified critical assets, including condition data, to prepare up-to-date inventory reports for our AMP and develop comprehensive models for our critical asset systems	**$55,347.00**			
2. Set up a cross-functional asset management team/committee with updated job descriptions to include asset management responsibilities	**$0.00**			
3. Training all staff members on basic asset management concepts and training cross-functional asset management team/committee members on	**$1,200.00**			

advanced asset management concepts				
Total Expenditure ($)	**$56,547.00**	**$**	**$**	**$**

Expenditures Incurred by Expenditure Category (as per Part 4 of Schedule C)	**Total Actual Eligible Expenditures Net of Tax Rebates ($)**	**Total Actual Ineligible Expenditures Net of Tax Rebates ($)**	**Total Actual Expenditures Net of Tax Rebates ($)**
Administrative and Overhead Expenditures			
Capital Expenditures			
Equipment Rental			
In-Kind	N/A		
Training			
Professional and/or Technical Services			
Staff remuneration			
Supplies and Materials			
Travel and accommodation			
Total Expenditures Incurred ($)	**$**	**$**	**$**

FCM FEDERATION OF CANADIAN MUNICIPALITIES FÉDÉRATION CANADIENNE DES MUNICIPALITÉS

REQUEST TO RECEIVE PAYMENT BY DIRECT DEPOSIT (EFT)

Applicant Information (please print to sign)

● NEW APPLICATION ○ UPDATE EXISTING INFORMATION

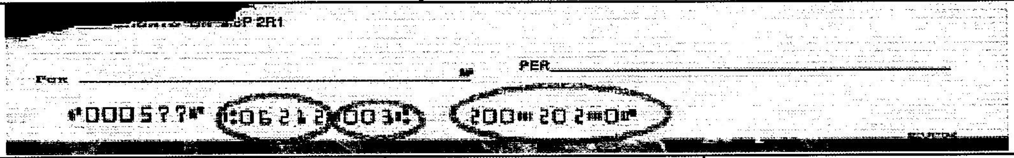
GRANTS / LOANS RECIPIEN▾

Recipient/Vendor Name			
Address			
City	Province Select... ▾	Postal Code	
Email address for remittance advice			
Name			
Title		Phone	
Signature		Date (DD/MM/YYYY)	

☐ I (We) agree to authorize FCM to deposit payments directly to the below-noted account.

Please attach a void cheque or have your bank/financial institution complete the following:

Financial Institution Information - Please have your financial institution complete the following


[redacted] P 2R1

FOR

PER

000577 06212 003 200 202 0

Financial Institution (FI) Transit Number	FI Number (3 digit number)	Account number (max 12 digit number)

FI Name

FI Address

Name of FI Officer

Titlle of FI Officer

Signature of FI Officer

Phone # of FI Officer

Please scan and email the completed form to your contact at FCM

MAMP 16448
(31 pages)

Schedule C

Part 2 Completion Report Template

FINAL REPORT

FCM's Municipal Asset Management Program (MAMP)

This template is provided for information purposes only. The final version, to be submitted as part of the final reporting requirement, may be subject to change.

Project number	(Pre-filled by MAMP)(Pre-filled by MAMP)
Project title	(Pre-filled by MAMP)
Name of lead applicant (organization)	(Pre-filled by MAMP)
Name of Authorized Officer (signatory)	
Date	

Note: If completing this form electronically, the boxes will expand to accommodate text.

1. Reporting on activities

Activity	Completed? Y/Partial/No	Deliverable	Title of submitted deliverable document
1. (Pre-filled by MAMP)	Choose an item	(Pre-filled by MAMP)	
2. (Pre-filled by MAMP)	Choose an item	(Pre-filled by MAMP)	
3. (Pre-filled by MAMP)	Choose an item	(Pre-filled by MAMP)	

For any activities marked No or Partial above, please explain the deviation from the scope of work.

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(31 pages)

2. Reporting on outcomes

Conduct a final self-assessment using the Asset Management Readiness Scale. We recommend that you bring a cross-functional group of staff together to do this assessment. Referring to the Asset Management Readiness Scale, look at the outcome statements for each level. Identify which outcomes you have achieved. If you have completed all the outcomes for a particular level, you have completed that level. Based on your self-assessment, complete the table below.

Competency	**Project readiness level at start of project** (as stated in application)	**Project readiness level at end of project** (level for which you have completed all outcomes)	**Notes on progress made** For each outcome area in which you made progress during the project, provide one sentence to describe the actions taken. (Note: these areas correspond with outcomes identified in the Asset Management Readiness Scale)	
1. Policy and governance	(Pre-filled by MAMP)	Choose a level	Policy and objectives	
			Strategy and frameworks	
			Measurement and monitoring	
2. People and leadership	(Pre-filled by MAMP)	Choose a level	Cross-functional groups	
			Accountability	
			Resourcing and commitment	
3. Data and information	(Pre-filled by MAMP)	Choose a level	Asset data	
			Performance data	
			Financial data	
4. Planning and decision-making	(Pre-filled by MAMP)	Choose a level	Documentation and standardization	
			Asset investment plans	
			Budgets	
5. Contribution to asset management practice	(Pre-filled by MAMP)	Choose a level	Training and development	
			Knowledge sharing — internal	
			Knowledge sharing — external	

Were there additional factors or programs — other than FCM project funding — that contributed to your project outcomes? If so, please provide a short description of any other important contributing factors.

3. Identifying other outcomes

In addition to the outcomes described in the table above, please describe any other changes that occurred because of your project. Examples might include a change in interest in asset management, cost savings, a change in departmental budget priorities, and so on.

For each additional change that you have observed, please answer the following questions:

- What change did you observe over the course of the project?
- What/who contributed to this change?
- How do you know this change has happened?
- Why is this change important?

Other changes
1.
2.
3.

4. Lessons learned

What worked well?
What would you recommend to other municipalities undertaking the same work?
Please provide 1–3 lessons.

Lesson (one short statement)	**Description** (provide any additional detail here)
1.	
2.	
3.	

What would you do differently?
If you were to do this project again, what would you change? Please provide 1–3 lessons.

Lesson (one short statement)	**Description** (provide any additional detail here)
1.	
2.	
3.	

Note: These lessons will be compiled and shared, without attribution, with other municipalities and practitioners to advance asset management knowledge.

5. Resources

Please list and describe any external human resources (i.e. organizations or personnel) that you worked with during the project.

Name of organization or person	How did you identify this organization or person?	Brief description of their contribution
1.		
2.		
3.		

Please list and evaluate other key information sources, tools, templates, training materials, etc., that you used to assist your work during this project. *Note: This list may be used to inform other municipalities and organizations of available information and resources.*

Title of tool/resource	How did you identify this tool/resource?	How useful was the tool/resource?	Description/comments
1.		Choose an item	
2.		Choose an item	
3.		Choose an item	
4.		Choose an item	
5.		Choose an item	

6. Reporting on budget

Please complete the final budget reporting template, found in Schedule C of your contract, including all eligible expenses, and submit it together with this final report. Please confirm whether either or both of the following statements are true:

☐ The actual expenditure for any activity in this project deviated by more than 15% from the budget presented in the application.

☐ Some of the expenditures included in the final budget report were used for activities marked as Partial or Not Completed in Question 1.

If you ticked either of the above statements, please explain why your actual expenditures varied from the original activity budget. FCM staff may contact you for further details.

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(31 pages)

7. Next steps

What are your next steps to improve your community's asset management practices?

Next step	Do you need outside help to take this next step? If so, what help do you need?
1.	
2.	
3.	

8. Interest in knowledge sharing

Peer learning is a priority for FCM's Municipal Asset Management Program (MAMP). Please indicate if you are interested in sharing your lessons through MAMP with peer municipalities and organizations.

☐ Yes, we are interested in sharing our results and experiences at peer learning events.

9. Individuals involved in reporting

Please list the titles of the individuals that contributed to, or were consulted in, the completion of this report.

10. Comments (for FCM internal use) *(optional)*

FCM will continue to adapt and improve the MAMP program throughout its life cycle. We welcome all feedback about the program, or your experience, that might help us make it more useful in the future.

11. Testimonials (for public use) *(optional)*

FCM and Infrastructure Canada would appreciate a testimonial as to the value that MAMP funding has provided.

How has the Municipal Asset Management Program supported your municipality or organization in making better-informed infrastructure decisions? Why is this important for your community?

☐ Yes, I give my permission to use the above statements publicly, with attribution to the municipality or organization.

Signature

☐ By typing my name below and submitting this report, I am providing my signature and I certify that the above final report is complete and accurate in its entirety.

____

Signed by the Authorized Officer

MAMP 16448
(31 pages)

Schedule C

Part 3 Accepted Practices

The Recipient shall incorporate the following language into the Final Plan or Final Study or Final Capital Project, as applicable, and the Final Completion Report, unless it has received written notice to the contrary from FCM:

> "© 202X, **The Corporation of the Township of South Glengarry**. All Rights Reserved.
> The preparation of this project was carried out with assistance from the Government of Canada and the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the authors, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them."

Schedule C

Part 4 Eligible Activities and Expenditures

Eligible expenses must be incurred after Eligible Expenditure Date of 29 October 2021.

Expenditure Category	Eligible expenditures	Ineligible expenditures
1) Pre-application	N/A	• Any expenditure incurred prior to FCM's eligible expenditure date. • Expenditure of developing this proposal or application.
2) Administrative and Overhead Expenditures	Administrative expenditures that are directly linked to and have been incurred for the project, such as: • Communication expenditures (e.g. long-distance calls or faxes). • Outsourced printing or photocopying. • Acquisition of documents used exclusively for the project. • Document translation. • Transportation, shipping and courier expenditures for delivery of materials essential for the project. • Design and production of communication products to promote project outcomes and benefits to the public.	General overhead expenditures incurred in the regular course of business, such as: • Office space, real estate fees and supplies. • Financing charges and interest payments. • Promotional items. • Permits or certifications. • Advertising, website development, project education materials or expenditures to disseminate project communications products. • Hospitality expenses (food and drink, alcohol, entertainment, etc.).

3) Capital Expenditures	Purchase of software related to asset management *Note: FCM's contribution to this expense may not exceed 50% of FCM's total contribution to the project.*	• Any other capital expenditures or amortization expenses. • Development of a software program
4) Equipment Rental	• Rental of tools and equipment. • Related operating expenditures such as fuel and maintenance expenditures.	Rental of tools or equipment related to regular business activities.
5) In-Kind	N/A	Any goods and services received through donation.
6) Training	• Expenditures associated with accessing reference materials such as standards, templates and toolkits. • Expenditures associated with attending training sessions, (provided externally) or bringing training in-house. • Food and drink, to the extent that these costs comply with the Treasury Board of Canada guidelines, and to the extent that they are necessary to conduct the training/workshop sessions.	Any other hospitality expenses such as: • Food and drink • Alcohol • Door prizes • Entertainment • Music • Decorations • Flowers, centerpieces • Etc.
7) Professional and/or Technical Services	Fees for professional or technical consultants and contractors, incurred in support of eligible activities.	• Expenditures associated with regular business activities not related to the project. • Legal fees.
8) Staff Remuneration	Daily rates actually paid by the Eligible Recipient to its Employees in Canada for time actually worked on the implementation of the Project. The daily rate per employee shall include the following costs: a) direct salaries: actual and justifiable sums paid by the Eligible Recipient to Employees in accordance with the Eligible Recipient's pay scales as regular salary <u>excluding</u> overtime pay and bonuses.	• In-kind contribution of services. • Participant salaries. • Expenditures related to regular business activities. • Overtime Pay • Bonuses / performance pay. • Fringe benefits such as; o sick days o pension plan o any other fringe benefits not listed as eligible • Costs related to ongoing or other business activities and not specifically required for the project. • Professional membership fees or dues.

	b) fringe benefit: in accordance with the Eligible Recipient's policies, as follows: i. time-off benefits (prorated to the annual percentage (%) of time actually worked on the implementation of the Project): allowable number of days to be paid by the Eligible Recipient for the following payable absences: statutory holidays, annual vacation, and paid benefits: actual sums paid by the Eligible Recipient for paid benefits (prorated to the annual percentage (%) of time actually worked on the implementation of the Project): the Eligible Recipient's contribution to employment insurance and workers' compensation plans (where applicable), health and medical insurance, group life insurance, or other mandatory government benefits; *Note: Labour costs must be documented in a manner that meets audit standards for verification of eligibility of cost and level of effort.*	
9) Supplies and materials	Supplies and materials required to undertake the project.	Expenditures related to regular business activities
10) Taxes	The portion of Provincial/Harmonized Sales Tax and Goods and Services Tax for which your organization is not eligible for rebate.	The portion of Provincial /Harmonized Sales Tax and Goods and Services Tax for which your organization is eligible for rebate, and any other expenditures eligible for rebates.

11) Travel and Accommodation	For individuals on travel status (individuals travelling more than 16 km from their assigned workplace - using the most direct, safe and practical road.); • Travel and associated expenses for implementing partners, guest speakers and consultants to the extent that the travel and accommodation rates comply with the Treasury Board of Canada guidelines, and to the extent that such travel is necessary to conduct the initiative. www.canada.ca/en/treasury-board-secretariat/services/travel-relocation/travel-government-business.html • *Where justified, participant travel costs may be claimed with prior written consent from FCM. Under no circumstances will participant honorariums be covered.*	

Note: Invoices, receipts and timesheets (where applicable), must be sufficiently detailed to enable verification of expenditure eligibility and level of effort.

Schedule D

Contact Information

Notices and Requests.

Any notice, demand, request, or other communication to be given or made under this Agreement to FCM or to the Recipient, other than a notice of default, shall be in writing and may be made or given by personal delivery, by ordinary mail, by facsimile or by electronic mail. A notice of default shall be in writing and delivered by registered mail. Notices shall be addressed as follows:

FCM

Federation of Canadian Municipalities
24 Clarence Street
Ottawa, Ontario
K1N 5P3

Attention: Anjali Parikh, Project Officer
Email: aparikh@fcm.ca

Recipient

Township of South Glengarry
6 Oak Street, PO Box 220
Lancaster, Ontario
K0C 1N0

Attention: Sarah McDonald, General Manager - Infrastructure
Email: smcdonald@southglengarry.com

INFORMATION REPORT

REPORT TO: Council of the Township of South Glengarry

MEETING DATE: September 20, 2022

SUBJECT: CLRC Arena Floor Project Update

PREPARED BY: Sherry-Lynn Servage, GM Parks, Recreation and Culture

The Char-Lan Recreation Centre Floor and Dasherboard Project is nearing completion. The arena floor was successfully poured on Monday, July 25 and was properly cured before moving forward with the installation of the dasherboards.

The dasherboard company, Athletica Sport Systems, has been on site installing the boards, netting and glass components of the project. Athletica Sport Systems experienced delays with glass and the lift gate, which allows for the ice resurfacer to enter the arena floor. Fortunately, these items are now on site and are in the process of being installed.

Once all components have been installed, the floor must be cleaned thoroughly before moving forward with turning the refrigeration plant on. Once the refrigeration plant has been turned on, the plant must bring down the temperature of the floor at a slower than usual rate because the concrete floor is new. If the concrete floor lowers in temperature at a fast rate, the floor could crack. Once the arena floor has reached the proper temperature, the ice making process will commence. In addition to these steps, there are many moving parts in order to finalize this project including thorough cleaning, storage installation, moving items from dressing rooms back to storage under the bleachers, additional in ice logo installation, etc.

At the May 16 Council Meeting it was determined that October 6 would be the revised re-opening date of the Char-Lan Recreation Centre due to the structural concerns that needed to be addressed. Administration and project management is continuing to plan on an October 6 re-opening date.

All rental users were informed of this revised reopening date and administration has continued to update them throughout this process. Rental users are aware that if the facility is able to re-open earlier, notice will be provided.

INFORMATION REPORT

REPORT TO: Council of the Township of South Glengarry

MEETING DATE: September 20, 2022

SUBJECT: National Day for Truth and Reconciliation

PREPARED BY: Tim Mills, CAO

In 2021, the Government of Canada passed legislation dedicating September 30th as the National Day for Truth and Reconciliation to ensure public commemoration of the history and legacy of residential schools, a vital component of the reconciliation process.

On September 17, 2021, the Council of the Township of South Glengarry passed Resolution 319-2022, affirming Council's support and recognition of this important day.

Throughout the past year, Administration and Council have taken initiative to continue learning and contributing to reconciliation, including:

Manty Township Staff and Council have completed 4 Seasons of Reconciliation training, which provides education about the history and culture of Indigenous communities in Canada, the history of residential schools and treaties around the country.

- Working collaboratively with the Mohawk Council of Akwesasne (MCA) and Parks Canada to transfer ownership of Tsikatsinakwahere (Cairn Island) to the MCA.

The Township will again be recognizing the National Day for Truth and Reconciliation on September 30, 2022. The Township office and all other administrative offices will be closed on this day. There will be no change to waste collection as a result of the office closure.

Additionally, the *Every Child Matters* orange flag will be raised at the municipal office and the Char-Lan Recreation Centre. This flag brings awareness to the residential school experience and symbolizes that all children are important – including the ones left behind and the adult survivors who are still healing from the trauma of residential schools.

Administration will continue to seek and participate in reconciliation and develop meaningful partnerships with our community stakeholders in the process.

INFORMATION REPORT

REPORT TO: Council of the Township of South Glengarry

MEETING DATE: September 20, 2022

SUBJECT: Disposal of Roads Fleet Assets (Sept 2022)

PREPARED BY: Sarah McDonald, P. Eng. – GM Infrastructure

1. The South Glengarry Infrastructure Services - Roads Division has removed the following fleet vehicles from service:

    a. One x 2002 International Tandem
    b. One x 1998 Volvo Tandem
    c. One x 2009 GMC Sierra

2. The vehicles were approved to be replaced by Council (S.R. No. 98-2021, S.R. No. 99-2021 & S.R. No. 26-2021).

3. The vehicles are not required by other Township services.

4. The two Tandems be disposed of via the GovDeals sales service and posted on our website.The sale option will follow the provisions of By-law 36-07, Disposition of Assets.

5. The GMC Sierra will be sold as scrap metal. The vehicle is approaching 500,000km and requires extensive work, including a new differential.

6. Any funds from the sale and scrap of the vehicles will result in a revenue for the Roads Equipment Reserve.

INFORMATION REPORT

REPORT TO: Council of the Township of South Glengarry

MEETING DATE: September 19, 2022

SUBJECT: Departmental Update – Infrastructure Services (August 2022)

PREPARED BY: Sarah McDonald, P. Eng. – GM Infrastructure Services

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Staffing Highlight: James Levac accepted the position of Roads Lead Hand!

Administration

- Glen Walter EA – Facility Visit to Long Sault Wastewater Treatment Plant
- Environment Committee Meeting (August 23, 2022)
- Consultant discussions (service reviews, five-structures, asset management)
- Interviews for Infrastructure Coordinator position
- Interviews for Water Operator vacancy

Preparatory Investigations

- MacDonald Road (near Kenyon Concession 1), topographic survey completed
- Annual Sidewalk Condition Assessment completed

Water / Wastewater Division

- Water & Sewer Routine Operations
- Contractor Site Meetings
- Dean from North Glengarry filled the Overall Responsible Operator position while Dillen was on Vacation
- Hypo Deliveries
- Sodium + Fluoride Sampling
- Federal Inspection (Lancaster Lagoon)
- Pump Station Cleaning (All Sewage Stations)
- Valve Repair (South Beech PS)
- Valve and Check Valve Repair (South Beech PS)
- Haul Sludge

- Meter Inspections Continued

Roads Division

- Monitor weather forecasts
- Summer grading – second pass ongoing
- Summer mowing – push-back ongoing
- Culvert Replacements
- General pothole repair
- Routine Day Road Patrols
- **Sign Maintenance – incidence of street sign theft across the Township is increasing, there are locations where signs are removed within days of being replaced**
- Roadside Debris Collection

Waste Management

- Landfill Compaction Maintenance Duties – North Lancaster Landfill Site
- Receipt and response to inquiries related to the current recycling / garbage contract
- Review and response to requests for garbage bag limit exemptions
- Environment Committee Meeting

Municipal Drains

- Filion Drain – Consultant Review Meeting
- Ongoing review and maintenance (MacDonald Technical Services Inc.)

Engineering Services

- Reviewed severance applications
- Reviewed entrance permits
- Continued review of filled-in ditch applications (x5 or 6)
- Prepared draft Infrastructure Fees Schedule

Active Subdivisions	**Active Site Plan Control**
• Sapphire Estates Phase 5 ○ Earth works being completed • South Beech	• LTC Facility ○ Meeting with Developers Transportation Consultant

○ Received engineering submission for review • Place St. Laurent Phase 5 ○ Received intent to submit request for final acceptance	

Training

- VoyentAlert! training for Infrastructure, Water, and Communications
- AccessE11 (complaint tracking) training for GM Infrastructure
- Ongoing, all staff

Health, Safety, and Environment

- Mental Health First Aid (GM Infrastructure, Water Director, Roads Lead Hand)
- Monthly inspections

INFORMATION REPORT

REPORT TO:	Council of the Township of South Glengarry
MEETING DATE:	September 20, 2022
SUBJECT:	Departmental Update – Corporate Services (August 2022)
PREPARED BY:	Kelli Campeau, GM Corporate Services/Clerk

CAO'S OFFICE

- Attended various Council and Committee meetings (Regular Council Meeting, Special Council Meeting, Airport Commission meetings).
- Met with and addressed various constituent concerns and complaints.
- Preparation and review of Staff Reports.
- Attended and facilitated Management Team meetings.
- Attended and facilitated Quarterly Budget Meetings.
- Managed various HR matters.
- Work on various legal files.
- Ongoing Review of Asset Management Plan.
- Continued work on Cornwall Electric Streetlight file.
- Attended meetings with MNP regarding financial Audit.
- Attended SDG CAO's Meeting.
- Attended Roads Committee meetings.
- Reviewed Interim Report with KPMG related to Service Delivery Review project.
- Attended Williamstown Fair Opening Ceremonies.
- Attended various meetings related to grants.
- Attended Association of Municipalities of Ontario conference in Ottawa.
- Attended Student Appreciation Lunch
- Attended Kington Airport for RATI Grant Announcement for Cornwall Regional Airport
- Completed Mental Health First Aid Training

CLERK'S OFFICE

- Council and Committee agenda/meeting preparation, facilitation, and wrap-up.
- Attended management team meetings.
- Prepared documentation for legal files.

- Preparation of Staff Reports and by-laws.
- Provided Commissioner of Oath services as needed (approx. one per day).
- Issued marriage and lottery licences.
- Provided marriage solemnization services.
- Continued work on Service Delivery Review Project and Reviewed Interim Report with KPMG related to Service Delivery Review project.
- Organization of records (basement re-organization).
- Ongoing Preparation for 2022 Municipal Election, including registration and certifying of candidates, updating the Preliminary List of Voters and development of Voter Information pamphlet distributed with the final tax bill.
- Attended SDG Clerk's Meetings.
- Prepared and attended Elections Booth at the Williamstown Fair.
- Facilitated various procurement openings.
- Assisted Finance department as needed.
- Deputy Clerk Completed Basic Emergency Management Training
- Ongoing Grant tracking and reporting

COMMUNICATIONS

- Daily preparation of website and social media content.
- Responded to general inquiries received through website and social media.
- Preparation of Council Meeting Newsletter.
- Preparation of Elections communications plan and advertisements.
- Assisted Economic Development with various communications projects (Meet our Marinas campaign, Business & Community Awards Gala).
- Preparation of materials for Williamstown Fair Booth.
- Managed Council meeting technology and livestream.
- Preparation for launch of Recycle Coach app.

COMMUNICATIONS STATS

- YouTube Stats:
  - +2 new subscribers
  - 280 video views
  - Most watched videos:
    - August 2nd Regular Council Meeting (85 views)
    - RFP 24-2022 Tree Removal Services (25 views)
    - August 2nd Special Meeting (24 views)
    - RFP 22-2022 1st Line Bridge Culvert (20 views)
    - Tender 21-2022 Stone Dust (13 views)
- Website – Most Popular Searches:

  - Pay Online (19)
  - Bids and Tenders (17)
  - Zoning Map (6)
  - Property Taxes (6)
  - Cloud Permit (6)
- Facebook Stats – Posts with Highest Reach
  - County Rd. 2 Closure (31.2K)
  - Fraser Creek Pizza Farm (20K)
  - Glen Walter Park Play Structure (19.2K)
  - Airport Funding Announcement (17.1K)
  - County Road 34 Closure Notice (14.2K)

INFORMATION REPORT

REPORT TO: Council of the Township of South Glengarry

MEETING DATE: September 20, 2022

SUBJECT: Departmental Update – Parks, Recreation and Culture (August 2022)

PREPARED BY: Sherry-Lynn Servage, GM of Parks, Recreation and Culture

ADMINISTRATION:

- Facility bookings and coordination
- Facilitating with Boys and Girls Club Camp
- Assisting Economic Development with Awards Gala Event
- Recreation software implementation - ongoing
- Glen Walter Waterfront Park – facilitating signage installs
- Glen Walter Regional Park – play structure, landscaping, assistance with sponsorship signage
- Green and Inclusive Community Building Grant – ongoing
- Grant Funding Coordination and Reporting – ongoing
- OTF Capital Funding Application
- Review of Video Surveillance Policy
- RFQ 24-2022 – Tree and Stump Removal
    - Issued, site visit, open
- Tender 25-2022 - Peanut Line Bridge Repair – CR19
    - Issued, site visit, open and coordinating with EVB Engineering
- ORFA Training – Basic Arena Refrigeration – E. Ruest and B. Murphy completed
- External Meetings
    - Char-Lan Recreation Centre Floor and Dasher Board Project
        - Ongoing site visits, construction meetings and project coordination with EVB Engineering, Bradley Contracting, CIMCO and Athletica Sport Systems
    - Parks and Recreation Master Plan Consultants – coordinating Council presentation and final docs
    - Junior B Rebels – CLRC Advertisements
    - Martintown Horticultural Society – requested items

    - ICIP Funding Webinar – Progress Reporting
    - Nor’Westers Museum – Contractor – Facility Maintenance
    - Lancaster Heights – Resident
    - Landscape Contractor – Glen Walter Regional Park
    - Mental Health First Aid 2 Day Training
    - SDG Recreation Networking Meeting
- Internal Meetings
    - Departmental Team Meetings – ongoing
    - Management meetings – ongoing
    - Departmental budget update – Finance
    - Peanut Line Signage - Planning and Fire Dept.

OPERATIONS

- Recreation facility prep, cleaning and maintenance - ongoing
- Schedules – Facility Operators and students
- Tree management – ongoing
- Ongoing maintenance requests
    - Lancaster Library
    - Lan-Char Medical Centre/Dentist
    - Main Office
- Sport Field Prep and ongoing maintenance
- Painting sport bleachers
- Park and Peanut Line inspections and maintenance
- Garbage pickup
- Tennis/Pickleball Court cleaning/maintenance
- Ongoing flower boxes and flower bed maintenance – Lancaster, Main Office, CLRC and Martintown Community Centre
- Splash Pad ongoing maintenance
- Williamstown Fair – assistance and delivery of multiple park items
- North Lancaster and Empey Poirier Park Inspections and facilitated removal of structures
- Installation of Martintown Horticultural Society chairs and benches

HEALTH AND SAFETY

- Building and site inspections continue.

INFORMATION REPORT

REPORT TO: Council of the Township of South Glengarry

MEETING DATE: September 20, 2022

SUBJECT: Departmental Update - Planning, Building and Enforcement (August 2022)

PREPARED BY: Joanne Haley- GM, Planning Building and Enforcement

Planning

- Received, processed and reviewed consent, minor variance, site plan control and zoning amendment applications
- Prepared staff reports and information reports for Council meetings
- Conducted pre-consultation meetings with members of the public for planning inquiries
- Worked on Township owned lands
- Worked on subdivision files in various stages
- Participated in biweekly Management Meetings
- Conducted staff meetings
- Reviewed draft staff/info report
- Prepared staff reports and info reports
- Conducted site visits
- Attended a court proceeding
- Provided ongoing training to Economic Development Officer
- Participated in business grand opening- Fraser Creek Pizza
- Worked on preparations for the 2022 Business & Community Awards Gala
- Attended Awards Gala Committee meeting
- Met with KPMG consultants' re- minor variances.
- Participated in mental health first aid

Building

- Received and processed building permit applications
- Conducted pre-consultation sessions with members of the public for building permit inquiries
- Attended various walk-in appointments with the public
- Completed Site Plan Control reviews
- Conducted building inspections
- Prepared work order reports for lawyers

- Conducted septic system file searches
- Prepared statistical reports for Tarion, MPAC, CMHC, and Statistics Canada
- Received applications for and assigned civic addresses
- Ordered and distributed civic address signs and posts
- Applied, reviewed and issued building permits via Cloud Permit
- Changed Civic Addresses to correct number sequence
- Inspected open legacy building permits as a result of work order requests
- Addressed reports and internal sightings of residents building without permits
- Worked with SDG to better address necessary changes to support the shift to NG911
- Uploaded septic permits to GIS
- Assisted with dog bite reports
- Attended and passed Mental Health First Aid Training
- Prepared documentation for and attended court proceedings

GIS & Planning

- Filed in TOMRMS zoning by-laws, site plan control, subdivision, consents
- Prepared and mailed out minor variance and zoning amendment notices along with minutes and decisions
- Performed duties as Building Information Officer (BIO)
- Attended Community Living collaboration meeting
- Attended staff meeting
- Prepared maps for staff as required (Building, Planning)
- Commissioned documents as required
- Attended Cloudpermit Planning update meeting (virtual)
- Completed online course for Truth and Reconciliation
- Attended meeting to discuss signage locations for Peanut line
- Attended ESRI – ArcGIS Insights 101 webinar
- Provide assistance to summer student when required
- Attended Mental Health First Aid Training

By- Law

- Responded and investigated By-law complaints.
- Investigated Dog Attacks.
- Corresponded and assist with OPP and Ministry of the Solicitor General.
- Attended Staff meeting.
- Collected and installed Minor Variance Signs.
- Collected Civic Posts and Blades.
- Conducted Pool Permit reviews and inspections.
- Arranged and attended meetings with the public.
- Conducted Breeding and Boarding Kennel Inspections.
- Attended and reviewed sites that are building without permits.

- Attended Mental Health First Aid Training

Economic Development

- Awards Gala ticket sales promotion (editorial, YourTV spot), sponsor management, nomination review/selection and event planning
- Lancaster retail business tour with Lori McIsaac (South Eastern Ontario Tourism) for feedback and retail strategy
- Grand opening/ribbon cutting for new business (Fraser Creek Pizza Farm)
- Attended local economic development officer meetings
- Community Guide Economic Development Office Page
- Review/Edit South Glengarry Tourism Videos
- Two-day educational event
- Provided support to businesses for new funding programs
- Responded to general inquiries from existing and potential Business Owners
- Responded to real estate and developer inquiries

Emergency Planning

- Monitored all EMO situation reports and updates

INFORMATION REPORT

REPORT TO: Council of the Township of South Glengarry

MEETING DATE: Sept. 20, 2022

SUBJECT: Departmental Update – Fire Services (August 2022)

PREPARED BY: Dave Robertson, Fire Chief

OPERATIONS and RESPONSES:

- Motor Vehicle Collisions: 3
- Alarms: 3. Medical: 3
- Burn Complaint / Unauthorized Burns: 4
- Fire – Structural: 4, Brush / Grass: 1, Vehicle: 2, Other: 0
- False: Public Hazard: 0
- Rescue: 2
- Incidents of note.
    - Recreational aircraft crash
    - 2 residential structure fires

TRAINING:

- Auto extrication and motor vehicle collision responses.

FIRE PREVENTION:

- Staff provided medical 1st response services to the Williamstown Fair

HEALTH AND SAFETY:

- Building inspections continue

ADMINISTRATION:

- Amateur Radio Emergency Service installation at the Beaver Brook radio tower.
- Meetings with Parks Canada regarding a possible shared water source for fire suppression system at the Sir John Johnson House
- Consultation / Committees
    - Hwy 401 construction projects – Emergency Management Group

  - Canadian Assoc of Fire Chiefs, RPAS (Drone) Committee
  - Municipal construction projects (traffic safety plans)
- New Water Tanker vehicle (T3) was received and placed into service
- Project management oversight for new Williamstown Fire Station location – renovation
- Discussion on Peanut Line signage related to emergency response.
- Fire staff conducted a site overhaul of the Airport Road training grounds.

2021 Division Road North
Kingsville, Ontario N9Y 2Y9
Phone: (519) 733-2305
www.kingsville.ca
kingsvilleworks@kingsville.ca

COPY VIA EMAIL (Premier@ontario.ca) September 1, 2022

The Hon. Doug Ford, Premier of Ontario
Legislative Building
1 Queen’s Park
Toronto, ON M7A 1A1

Dear Premier Ford:

RE: Town of Kingsville Council Resolution #336-08292022 in opposition to Bill 3, Strong Mayors, Building Homes Act, 2022

At its Special Meeting held August 29, 2022 Council of The Corporation of the Town of Kingsville passed a Resolution against Bill 3 as follows:

Resolution #336-08292022
Moved by Councillor Kimberly DeYong
Seconded by Councillor Laura Lucier

“WHEREAS the Government of Ontario, through the Minister of Municipal Affairs and Housing, has introduced Bill 3 which is described as "An Act to amend various statutes with respect to special powers and duties of heads of council";

AND WHEREAS this Bill, if enacted, will initially apply to the City of Toronto and City of Ottawa, but will later be expanded to include other municipalities according to a statement made by the Premier at the 2022 AMO annual conference;

AND WHEREAS this Bill, if enacted, will give Mayors additional authority and powers, and correspondingly take away authority and powers from Councils and professional staff, and will include giving the Mayor the authority to propose and adopt the Municipal budget and to veto some decisions of Council;

AND WHEREAS this Bill, if enacted, will give authority over professional staff to the Mayor, including that of the Chief Administrative Officer;

AND WHEREAS these changes will result in a reduction of independence for professional staff including the CAO, who currently provide objective information to the Council and public and will now take direction from the Mayor alone when the Mayor so directs;

AND WHEREAS these are surprising and unnecessary changes to the historical balance of power between a Mayor and Council, and which historically gave the final say in all matters to the will of the majority of the elected Council.

THEREFORE, this Council of the Town of Kingsville, passes this resolution to petition the Government of Ontario that:

1. These changes to the *Municipal Act, 2001*, are unnecessary and will negatively affect the Town of Kingsville;
2. That if the Ontario Government deems these changes necessary in large single-tier municipalities such as Toronto and Ottawa, that such changes should not be implemented in smaller municipalities;
3. That the Ontario Government should enact legislation clarifying the role of Mayor, Council and Chief Administrative Officer, similar to those recommended by the Ontario Municipal Administrator's Association and those recommended by Justice Marrocco in the Collingwood judicial inquiry of 2020; and
4. That if the stated goal of this legislation is to construct more housing in Ontario that this can be accomplished through other means including amendment of the *Planning Act* and funding of more affordable housing.

Council further directs the Clerk to ensure that a copy of this resolution be provided to the Premier of Ontario, the Minister of Municipal Affairs and Housing, the "Standing Committee on Heritage, Infrastructure and Cultural Policy", Kingsville's MPP, the Association of Municipalities of Ontario, and other Municipalities in Ontario."

RECORDED VOTE – Carried Unanimously

	YEA	NAY
Deputy Mayor Gord Queen	X	
Councillor Kimberly DeYong	X	
Councillor Tony Gaffan	X	
Councillor Laura Lucier	X	
Councillor Thomas Neufeld	X	
Councillor Larry Patterson	X	
Results	6	0

If you have any questions or comments please contact Paula Parker at pparker@kingsville.ca.

Yours very truly,

Paula Parker
Town Clerk, on behalf of Kingsville Council

cc: The Honourable Steve Clark, Minister of Municipal Affairs and Housing (Steve.Clark@pc.ola.org)
Standing Committee on Heritage, Infrastructure and Cultural Policy; Attn.: Committee Clerk Isaiah Thorning (schicp@ola.org)
Anthony Leardi, MPP – Essex (Anthony.Leardi@pc.ola.org)
Association of Municipalities of Ontario (AMO) (amo@amo.on.ca)
All Ontario Municipalities

THE CORPORATION OF THE TOWNSHIP OF SOUTH GLENGARRY
BY-LAW NUMBER 63-2022
FOR THE YEAR 2022

BEING A BY-LAW A BY-LAW TO ADOPT, CONFIRM AND RATIFY MATTERS DEALT WITH BY RESOLUTION.

WHEREAS s.5 (3) of the *Municipal Act, 2001*, provides that the powers of municipal corporation are to be exercised by its Council by by-law; and

AND WHEREAS it is deemed expedient that the proceedings, decisions and votes of the Council of the Corporation of the Township of South Glengarry at this meeting be confirmed and adopted by by-law;

NOW THEREFORE THE COUNCIL OF THE CORPORATION OF THE TOWNSHIP OF SOUTH GLENGARRY ENACTS AS FOLLOWS:

1. **THAT** the action of the Council at its regular meeting of September 20, 2022 in respect to each motion passed and taken by the Council at its meetings, is hereby adopted, ratified and confirmed, as if each resolution or other action was adopted, ratified and confirmed by its separate by-law; and;

2. **THAT** the Mayor and the proper officers of the Township of South Glengarry are hereby authorized and directed to do all things necessary to give effect to the said action, or to obtain approvals where required, and except where otherwise provided, The Mayor and the Clerk are hereby directed to execute all documents necessary in that behalf and to affix the corporate seal of the Township to all such documents.

3. **THAT** if due to the inclusion of a particular resolution or resolutions this By-law would be deemed invalid by a court of competent jurisdiction then Section 1 to this By-law shall be deemed to apply to all motions passed except those that would make this By-law invalid.

4. **THAT** where a “Confirming By-law” conflicts with other by-laws the other by-laws shall take precedence. Where a “Confirming By-law” conflicts with another “Confirming By-law” the most recent by-law shall take precedence.

READ A FIRST, SECOND AND THIRD TIME, PASSED, SIGNED AND SEALED IN OPEN COUNCIL THIS 20TH DAY OF SEPTEMBER 2022.

MAYOR: ______________________ **CLERK:** ______________________