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TOWNSHIP OF LEEDS AND THE THOUSAND ISLANDS

**Escott Waste Disposal Site
2016 Annual Monitoring, Development and
Operations Report**



Executive Summary for Escott WDS (Project #1038)

This report presents the results of the monitoring activities conducted in 2016 at the Escott Waste Disposal Site. The Site is owned and operated by the Corporation of the Township of Leeds and the Thousand Islands (TLTI) and is located on part of Lots 8, 9, 10, Broken Front Concession, in the Township of Leeds and the Thousand Islands (former Township of Front of Escott), United Counties of Leeds and Grenville, Ontario. This report was prepared on behalf of the TLTI, using data collected by the Township.

The Site is operated under Certificate of Approval (CofA) No. A441703 which permits a 1.0 hectare waste disposal area within a 15.1 hectare property. The Site has an approved waste volume of 40,000 m³ and is predicted to attain its capacity in early 2021. The site is currently actively accepting non-hazardous waste and recycling materials from within Ward 3 of the TLTI.

There are a total of seven active surface water monitoring locations located around the Site. There are a total of seven active overburden groundwater monitoring locations and four active bedrock monitoring locations. One monitoring event was conducted in 2016 over the reporting period in November, 2016.

The Site relies on natural attenuation of impacted groundwater and is subject to Ministry Guideline B-7. The Site does not conform to Guideline B-7 along the northern property boundary in that observed results exceed the established RULs. The exceedances are potentially due to high turbidity in the newly installed wells.

Potential leachate impacts to the surface waters appear to be limited to on-site surface water features. Concentrations of leachate indicators in downstream surface water stations are consistent with background concentrations.

Completion of additional site work in 2017 (completion of the progressive cover of portions of the waste fill area) will ensure that potential environmental degradation originating from the Site is minimized.

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1.0 Introduction

This report presents the results of the 2016 monitoring and operational activities conducted at the Escott Waste Disposal Site (the Site) in the Township of Leeds and the Thousand Islands (TLTI), Ontario (Figure 1, Appendix A). The Ministry of the Environment's Technical Guidance Document, Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water (November 2010) and the 2015 Escott WDS Monitoring Report have been utilized during the production of this report. This report was prepared on behalf of the TLTI, using data collected and documented by TLTI staff.

1.1 Ownership and Key Personnel

The Site is owned and maintained by the Corporation of the Township of Leeds and the Thousand Islands. Key Contacts for the Site are as follows:

Municipal Contact

Mr. Greg Borduas
Chief Administrative Officer
1233 Prince Street, P.O. Box 280
Lansdowne, Ontario, K0E 1L0
613-659-2415 ext. 213
gborduas@townshipleeds.on.ca

Environmental Professional Contact (Groundwater and Surface Water)

Mr. David Malcolm, P.Eng.
Environmental Engineer and Hydrogeologist
308 Wellington St.
Kingston, Ontario, K7K 7A8
613-548-3446 ext. 33
malcolm@malroz.com

2.0 Background

The geology, hydrogeology, physiography, and hydrology of the Site are described in this section. The descriptions provided are a summary of the investigations completed for the Site from 2001 until 2015 by other various consultants and TLTI staff.

2.1 Geological Setting

The geological setting at the Site was described in the 2015 annual Monitoring Report prepared by TLTI's former Environmental Geoscientist, Andrew Day, as follows:

“The Site is underlain by Precambrian granite. Exposed Precambrian bedrock at the Site exhibits well rounded bedrock knolls and ridges consistent with glaciation and glacio-fluvial processes.

“The bedrock wells have also encountered a thin (2 – 7 metre thick) sandstone unit overlying the Precambrian aged rock. The sandstone was only encountered in BW1 and BW3, and is likely limited locally to the area between the Precambrian bedrock highs. BW4 was cored during 2015 and did not encounter a sandstone unit.

“Bedrock is exposed at the Site along both the southern and northern edges of the waste fill area traversing nearly southwest-northeast. The bedrock highs are intermittently overlain by a veneer of overburden and are heavily vegetated. The waste fill area rests between the northern and southern bedrock highs.

“Overburden at the Site is primarily comprised of silts and clays with intermittent fine sand lenses. The material has been interpreted as a glacial-lacustrine deposit. Overburden thickness ranges from non-existent along the exposed ridges north and south of the fill area, to about 7.5 metres thick in the vicinity of the waste fill area. A layer of sandy diamiction [sic] 0.10-0.20 metres thick is present (at least intermittently) at overburden bedrock contact.

“Within low-lying areas, the Site contains recent organic deposits that have not been intrusively investigated.”

2.2 Hydrogeology Setting

The hydrogeological setting at the Site was described in the 2015 Annual Monitoring Report prepared by TLTI’s former Environmental Geoscientist, Andrew Day, as follows:

“There are two distinctive hydrogeological zones at the Site; the overburden zone and the bedrock zone. The vertical hydraulic gradient and interactive relationship between the two zones is not well studied at this Site.

“Drinking water in the vicinity of the Site is sourced from the bedrock aquifer. The closest residential water wells to the Site are located along Escott/Rockport Road southwest of the Site. Both domestic supplies are interpreted as upgradient of the waste fill area and are reported to be completely within the Precambrian bedrock. BW3 acts as a sentry well between 224 Escott Road and the waste fill area.

“The overburden zone is not used as a source of potable water in the vicinity of the Site. There are no reported uses of the overburden zone as a source of agricultural water in the vicinity of the Site. North of the waste fill area, the agricultural field is tiled [sic] drained towards the northeast and discharges at the Hickenbottom outlet into a drainage ditch that leads to the wetlands that feed La Rue Mills Creek.”

2.3 Surface Water Features

Surface Water features at the Site were described in the 2015 annual Monitoring Report prepared by TLTI’s former Environmental Geoscientist, Andrew Day, as follows:

“All water from the Site discharges to the St. Lawrence River via La Rue Mills Creek.

“North of the Site a drainage channel runs northeast under Escott/Rockport Road. The channel is manmade and is maintained for the purpose of draining run off from [sic] the agricultural fields north and west of the Site. The northern channel is nearly flat and in 2015, a low flow was observed during each sampling event. The water within the channel is typically turbid and shows no signs of leachate springs or leachate runoff.

“South of the Site a drainage channel runs northeast under Escott/Rockport Road. The Channel is within a wetland area and is influenced by the presence of Highway 401. Although not a manmade waterway, the southern drainage channel is periodically cleaned to ensure positive drainage. The southern channel is also influenced by the presence of beaver populations. There are multiple active and inactive beaver dams along the southern drainage channel. Water within the channel typically exhibits low turbidity and shows no signs of leachate springs or leachate runoff.

“There are two on-Site water features. The first is a pond southwest of the waste fill area and transfer area. The pond receives run-off from the field adjacent to Escott/Rockport Road and intermittently discharges south towards the southern drainage channel. The pond typically exhibits iron precipitate in the vicinity of SW6, however does not show any other signs of leachate springs or runoff. The water typically shows low levels of turbidity. During periods of low water levels the pond does not discharge past SW1 [Figure 3, Appendix A].

“Adjacent to the southern slope of the waste fill area is a drainage ditch that conveys runoff northwest [sic northeast] towards the Hickenbottom inlet. Water within the ditch is typically stagnant and exhibits little to no flow. In 2015, there was evidence of both leachate run-off and leachate springs within the drainage ditch. During periods of low rainfall, the ditch goes dry. The ditch does not have a clear flow channel to areas north of the Site, but is suspected to discharge during heavy precipitation or spring melt towards the tile drained fields north of the Site.”

2.4 Environmental Compliance Requirements

Section 52 of the Approval A441703 outlines requirements for the annual report (see Appendix F). This includes reporting on site capacity, waste placement, daily cover and general operations, groundwater and surface water monitoring, etc.

Consistent with previous practices by the Township, the groundwater is evaluated using Ministry Guideline B-7 “Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities” to assess if additional site control mechanisms are needed to mitigate impacted groundwater. Reasonable Use Limits (RULs) using background groundwater concentrations are calculated for the analyzed parameters with corresponding drinking water standards (see Appendix G). Monitoring wells OW11 and BW4 have been adopted as trigger wells for the overburden and bedrock groundwater at the Site, respectively.

Consistent with previous practices by the Township, the site surface water quality is evaluated using Provincial Water Quality Objectives (PWQO) to determine if the impacts to surface water bodies are within acceptable levels. Similarly, the groundwater quality in the overburden and bedrock at the Site is evaluated using Ontario Drinking Water Standards (ODWS).

2.5 MOECC Review

The MOECC provided comments on the 2015 Groundwater and Surface Water Monitoring report in a memorandum dated October 28, 2016. The memo was addressed to Nathalie Mathews, who forwarded the memo to Andrew Day (TLTI) on November 1, 2016 (Appendix C). The MOECC reviewer disagrees with the conclusion that waters in the vicinity of SW1 are showing elevated metals due to leachate influence.

The reviewer provided the following recommendations:

- Sampling of surface water stations should be completed only when flow is discernible or when the water is not stagnant.
- Sampling at the Hickenbottom inlet should resume in 2016.
- Portions of the landfill that have reached final contours should be capped.
- Future monitoring efforts should include hardness analyses.

As this review was not published until the end of October, 2016, these revisions will be addressed during the 2017 monitoring program.

2.6 Assumptions and Limitations

This report was prepared by Malroz Engineering Inc. (*Malroz*) for the exclusive use of the Township of Leeds and the Thousand Islands (TLTI). *Malroz* has relied upon Township staff for the collection of the data and reporting of all field activities. *Malroz* accepts no responsibility for the integrity of the data collected or missing data. Any third party use or reliance of this report, or decisions made based on this report, are the responsibilities of the third parties. *Malroz* accepts no responsibility for damages suffered by any third party as a result of decisions made or actions taken based on the contents of this report.

Assessment of the Site is based on the pre-established monitoring network and suite of analytical parameters. Conformance with the relevant monitoring standards is based on an interpretation of conditions at specific locations and specific depths provided by TLTI.

3.0 Development and Operation Plan

3.1 Site Access

The Escott WDS (Site) is located on part of Lots 8, 9, 10, Broken Front Concession, in the Township of Leeds and the Thousand Islands (former Township of Front of Escott), United Counties of Leeds and Grenville, Ontario. The site is located approximately 0.65 km north of Highway 401 and approximately 2.3 km northwest of the St. Lawrence River (Figure 1, Appendix A). Geodetic coordinates for the Site benchmark are as follows (2013 Site survey):

Zone:	NAD 83, 18T
Easting:	0424873.3 m (+/- 0.5 m)
Northing:	4917507.5 m (+/- 0.5 m)

Escott WDS can be accessed by Escott/Rockport Road via either County Road 2 or the Thousand Islands Parkway (Figure 1, Appendix A). In accordance with the C of A, the entrance/exit gate is locked during non-operating hours and access to the Site along its perimeter is restricted by a fence.

3.2 Description of Waste Disposal Site

The Site is operated under CofA No. A441703 which permits a 1.0 hectare landfilling Site within a 15.1 hectare property. The Site has an approved waste volume of 40,000 m³ and is actively landfilling non-hazardous waste materials from within the TLTI. Agricultural and residential land are proximal to the Site. The current Site property boundary and fill area is shown on Figure 2 (Appendix A).

We understand there have been no changes in Site operations (CofA 52(f)) during 2016.

3.3 Service Area

The waste disposal site services residents of Ward 3 in the Township of Leeds and the Thousand Islands. It is one of three active waste site locations serving TLTI (along with Lansdowne and Lyndhurst/Briar Hill).

3.4 Method of Waste Disposal

The Escott WDS uses area fill method for waste disposal. Waste is deposited at the active face of the landfill. Compaction of the waste and placement of cover material is applied once every two weeks. MANCO operates the recycling services for the Site. They provide recycling bins to residents and transport recycling materials from the WDS.

The WDS relies on natural attenuation. There are no engineered systems for leachate collection or storm water management. The Site has been approved to burn clean wood waste, following the Ministry's Guideline C-7 entitled "Burning at Landfill Sites".

We understand there is no landfill gas monitoring at the Site as landfill gas migrating from the Site is free to dissipate into the natural environment. In 2015, an elevated attendant's trailer was installed at the Site to ensure that any migrating gas does not accumulate and pose a threat to human health.

3.5 Hours of Operation

The Site's operating hours are:

Tuesdays: 8:30 a.m. – 4:45 p.m.
Saturdays: 8:30 a.m. – 4:45 p.m.

The landfill is monitored by a Township attendant during open hours.

3.6 Waste Characteristics

According to the C of A, the Site is currently actively landfilling solid non-hazardous waste and accepts recycling materials, white goods, metals and tires only for bulking and subsequent transfer off-site. No liquid industrial or hazardous wastes are accepted at the Site. The following table summarizes the amount of the recyclable material, metals, white goods and tires transferred off-site for further processing in 2016 (CofA 52 (e)).

Material	Quantity (metric tonnes)
Mixed Container	34.60
Mixed Paper	29.35
OCC	10.26
Scrap Steel	12.89

Bins for recycling materials were maintained at the subject site during 2016. Removal and processing of the recycling materials was completed by Manco recycling Systems.

Tires are not accepted at the Escott Site. Users of the site with tires are directed to the Lansdowne WDS for recycling. Any tires dumped at the gates of the Site are stockpiled and shipped to the Lansdowne WDS for recycling.

3.7 Phasing of Site Usage

Cover material is not stockpiled at the Site. Material is brought to the Site during covering operations, placed on a compacted portion of the waste fill area and utilized within 48 hours (CofA 52 (k)). Final cover has not been applied to the Site. No data regarding 2016 cover material activities were found at the time of reporting. The height and width of the waste pile should be adjusted during the application of final cover to comply with the final design (Figure 5, Appendix A).

3.8 Site Inspections

We understand that Site Inspections are carried out during each day of operation (Tuesday and Saturdays) by the Site attendant. TLTI staff reported that in 2016, monthly inspections of the waste fill area were carried out to identify erosion of the cover material, leachate springs and signs of vector and vermin infestation. We understand detailed inspections are carried out during the annual sampling events to ensure all monitors are adequately sealed at the surface, to identify landfill gas impacts, and to identify any additional problems with the operation of the Site (CofA 52 (i)).

3.9 Record Keeping

Field notes and Site records are maintained at the Township offices, 1233 Prince Street, Lansdowne, Ontario.

3.10 Remaining Site Capacity

Volume surveys of waste and cover in place were conducted on December 5, 2016 by BluMetric Environmental Inc. (see Appendix D).

According to the 2016 survey, the remaining capacity of the Escott WDS is 4,131 m³ based on a final capacity of 39,760 m³ and excluding final cover¹. The amount of daily cover and final cover are not calculated for this site, rather a lump of waste and fill is used to calculate remaining volume (CofA 52 (a)). Based on the previously calculated fill rate² of 1,000 m³ per year, the Site is expected reach the 40,000 m³ capacity in 2021.

<i>Net fill to date:</i>	39,760 m ³	
<i>Fill rate per year:</i>	1,000 m ³	
<i>Estimated remaining volume as of December 2016:</i>		4,131 m ³
		+ 240 m ³
		4,371 m ³
<i>Remaining lifespan using estimated fill rate:</i>		4 years

4.0 Description of Monitoring Program

The current monitoring plan for the Site utilizes the Ontario Drinking Water Standards (ODWS) to assess groundwater conditions and Provincial Water Quality Objectives (PWQO) to assess surface water conditions. Monitoring for groundwater and surface water was carried out by TLTI staff in November of 2016. No documents supporting additional monitoring activities during the 2016 period were found at the time this report was completed.

Results of the environmental monitoring are reported to the MOECC on an annual basis by March 30 of the year following the reporting period. However, due to Township staff issues, the MOECC granted an extension to the deadline for the 2016 report to June 30, 2017.

¹ The reason for a discrepancy between the BluMetric final capacity volume and that stated in the CofA is unknown. Calculations for the remaining capacity presented in this report have accounted for this by adding 240 m³ to the BluMetric measurements so that they are consistent with the CofA.

² This fill rate is used by past annual reports and is based on work done in 2004 by Trow Associates Inc. Malroz calculated, based on available data, an average fill rate of 594 m³ for the past 5 years. This suggests that the Trow fill rate used in past reports is a conservative measurement.

We understand that monitoring is generally conducted on a semi-annual basis. Inspections of the waste fill area are conducted visually. Potential leachate breakout along the waste slopes and nearby water bodies are assessed visually with any identified problems being intrusively investigated. Any identified leachate breakout is repaired and/or remediated as soon as feasible.

4.1 Well Inspection

No well inspection data or documents were found for the 2016 monitoring period. Well inspections are scheduled for spring of 2017 and will be included in the 2017 monitoring report.

4.2 Monitoring Frequency

Groundwater and surface water monitoring locations are scheduled to be sampled during the spring and fall of every year. However, the results of only one sampling event were available for 2016 at the time of reporting. The sampling event occurred on November 9th and 15th, 2016. Groundwater elevation measurements for 2016 have not been found.

4.3 Field and Laboratory Parameters and Analysis

The laboratory analysis for 2016 was completed by Paracel Laboratories Ltd of Ottawa, Ontario. A list of parameters is presented in Table 1 (Appendix B). Details of sample methodology have not been confirmed. However, we understand that the sampling was conducted by Andrew Day, and according to his previous report, we suspect the methods are as previously reported:

“Field measurements for temperature, pH and conductivity are collected using an YSI MPS 556. Instruments are field calibrated daily before use and certificates of calibration are maintained in Township files. Copies of the field notes for each sampling event are maintained in Township files.”

“Landfill gas is not measured at the Site. The migration of landfill gas is not anticipated to be a problem since any produced gas is free to dissipate to the atmosphere.”

Unionized ammonia concentrations were calculated by the laboratory based on lab temperatures. Field measurements were not available and as such, unionized ammonia based on field parameters could not be calculated.

4.3.1 Data Quality Evaluation

Paracel is a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory that uses MOECC recognized methods to conduct laboratory analyses. *Paracel* reports that they are accredited to conduct the analyses completed for this investigation.

Paracel has confirmed that their QA/QC programs include: method blanks, control standards, standard reference material matrix spikes, and replicate analyses. They have confirmed that the results of their QA/QC for this program meet standard practice for laboratories. The data tables show that field duplicates were taken at sampling sites SW3 and BW-4 (Appendix B).

4.4 Surface Water Monitoring Program

No field notes detailing the 2016 surface water monitoring program were available at the time of reporting. However, we understand that the sampling was conducted by Andrew Day, and according to his previous report, we suspect the methods are consistent with previous sampling program reported as:

“Surface water quantity at the Site is not measured using instruments or set gauges. Observations of the surface water flows and the depth of water at the surface water monitoring locations are recorded during each sampling event. Surface water drainage is shown on [Figure 3, Appendix A].

“Visual inspections along the waterways are conducted following the collection of each surface water samples. This procedure and order is done to prevent any disturbance (i.e. sediment) from being captured in the sample. Care is taken to ensure that a representative surface water sample is collected. If a surface water location is dry at the time of sampling, then no sample is collected.”

There are seven actively sampled surface water monitoring locations located around the Site, namely, SW3, SW4, SW5, SW7, SW8, Hickenbottom Outlet and the Hickenbottom Inlet. For unknown reasons, no samples from Hickenbottom Inlet were sent for chemical analysis in 2016. A memorandum to the MOEE dated October 28th, 2016 states that the Hickenbottom Inlet should continue to be sampled (Appendix C). Surface water monitoring locations are shown in Figure 3 (Appendix A). Since no new information about surface water stations was provided in 2016, we assume the 2015 descriptions still apply. Details regarding each sample station have been previously described as follows (AMR 2015):

Inactive Surface Water Stations

- “SW1 is located at the outflow of the pond southwest of the waste fill area. From SW1, water intermittently flows along a manmade drainage channel to the area of SW8. [This location was not sampled in 2016].
- “SW2 is located in the drainage ditch adjacent to southern side of the waste fill area. Water from SW2 flows northeast towards SW3 and the Hickenbottom Inlet. SW2 was filled and regraded during 2015 and [was] removed from the sampling program for 2016.
- “SW6 is located in the pond/wetland area southwest of the waste fill area. This location receives runoff from the waste transfer area and the surrounding agricultural fields. SW6 is a ponded sampling location that does not experience any significant flows and [was] removed from the sampling program in 2016.”.

Active Surface Water Stations

- “SW3 is located in a low lying area northeast of the waste fill area. Water is received at SW3 from SW2 and from runoff on the northeastern portion of the waste fill area. SW3 was found to be dry during both sampling events. SW3 is close to the Hickenbottom inlet sampling location and [was to be] removed from the sampling program for 2016.³
- “SW4 is located upstream of Rockport/Escott Road along the northern drainage channel. This location is used for the background surface water quality for the northern drainage channel.
- “SW5 is located downstream of SW4 along the northern drainage channel. [It was found to be dry in the fall of 2015].
- “SW7 is located upstream of the culvert under Escott/Rockport Road along the southern drainage channel. This location is used for the background surface water quality for the southern drainage channel.
- “SW8 is located within the southern drainage ditch downstream of SW7. SW8 also receives water from SW1 and SW6.

³ For unknown reasons, this well was not removed from the monitoring program and results are available for SW3 in 2016.

- *“The Hickenbottom Inlet is located northeast of the waste fill area along the page wire fence surrounding the agricultural fields north of the Site. This is the upstream location of the tile drains that drain the agricultural field northeast of the Site. The location may receive water from the area around SW3 and SW2 during periods of extreme rain or during snow melt. [Hickenbottom Inlet was found to be dry during both sampling events in 2015].⁴*
- *“The Hickenbottom Outlet is located northeast of the agricultural fields north of the Site. The location discharges the tile drained water into a manmade ditch that flows into La Rue Mills Creek. Hickenbottom Outlet receives water from the agricultural fields and from Hickenbottom Inlet during periods of high water.”*

4.5 Groundwater Monitoring Program

Sampling for the groundwater monitoring program was completed under the supervision of Andrew Day (TLTI). Details regarding the sampling methodology employed in 2016 were not available at the time of this report. Methodologies employed in 2016 have been assumed to be consistent with those used in 2015. These methodologies have been described by Andrew Day in the 2015 AMR and are provided below.

“Groundwater flow is assessed using water levels from the existing monitoring well network.

“A Site benchmark is used to control the reference elevation. The benchmark is a square iron bar located southwest of attendants shack and waste transfer area.

“The seals of all groundwater wells are visually inspected prior to sampling. Static groundwater levels are measured on all wells prior to commencing purging and sampling. All wells are purged of a minimum of three times the saturated well bore volume, or until dry three times. Tubing and foot valves are cleared of water and sediment flowing purging to ensure representative results and minimize sediment in groundwater samples. Following purging, groundwater elevations are allowed to return to 80% of static value prior to sampling. If 80% of static elevation is not reached within 24 hours of the purging event, the well is deemed to have insufficient water to sample and no sample is collected.”

⁴ For unknown reasons, the Hickenbottom Inlet was removed from the monitoring program in 2016. A MOEE memorandum in October 2016 called for its re-activation which did not occur in time for the 2016 monitoring period and will instead be instilled in 2017. Thus, it has been included among active surface wells.

No groundwater elevation data was provided for the 2016 monitoring period. Groundwater elevation maps are presented in Figures 4a and 4b (Appendix A), for the 2015 monitoring year.

There are seven active overburden groundwater monitoring locations: OW3, OW5, OW8, OW11, OW12, OW13 and OW14. There are four bedrock monitoring locations; BW1, BW2, BW3 and BW4 (drilled fall 2015). Monitoring locations are shown in Figures 2 and 4 (Appendix A). Well locations coordinates are provided in Table A below.

In 2015, OW8 and OW11 were replaced with similar overburden wells designated OW8R1, and OW11R1, respectively. This is important to note since both continue to be referred to by their original codes. A new shallow bedrock monitor, BW4, was also installed in 2015.

Table A: Monitoring Locations GPS coordinates

Monitoring Well	Easting (m)	Northing (m)	Top of Casing Elevation (masl)
BW1	424972	4917681	91.386
BW2	424812	4917651	89.815
BW3	424698	4917297	92.963
BW4	No data available		
OW3	424965	4917706	90.791
OW5	425032	4917671	90.998
OW8	424709	4917300	92.954
OW11	424999	4917755	90.187
OW12	425026	4917718	89.736
OW13	424813	4917425	92.547
OW14	424969	4917624	95.146

Easting and Northing given in metres using UTM NAD 83, Zone 18, +/- 1.0 metres

Elevations geodetic and provided in metres above sea level (masl), +/- 0.005 metres

Details regarding each sample station are stated below as per the 2015 AMR as 2016 data could not be found. Well locations are based on data presented in the 2015 AMR.

Bedrock Wells

- “BW1 is located north and downgradient of the waste fill area.
- “BW2 is northwest of the waste fill area along the northern property boundary.
- “BW3 is located southwest and upgradient of the waste fill area. BW3 acts as the background for bedrock groundwater at the Site and as a sentry well for the domestic water well at 224 Rockport/Escott Road (former MacDonald residence).

- *“BW4 is located north of BW1 and the waste fill area adjacent to OW11R1. BW4 is used to assess compliance with the reasonable use policy for bedrock groundwater at the Site.”*

Overburden Wells North of the waste fill area

- *“OW3 is located north of the waste fill area and is intended to monitor leachate migration from the Site.*
- *“OW4 is located north of the waste fill area and is intended to monitor leachate migration from the Site... OW4 was damaged during the summer of 2015 and no longer produces adequate water to sample. The well [has been] abandoned.*
- *“OW5 is located north of the waste fill area and is intended to monitor leachate migration from the Site. It is sited along the historical Site boundary.*
- *“OW11 [replaced by OW11R1 but will continue to be referred to as OW11 for consistency] is located north of the waste fill area within the agricultural field north of the Site. Together with OW12 the location is intended to delineate the northern extent of leachate migration. [OW11R1 is used to assess compliance with the reasonable use policy for overburden groundwater at the Site].*
- *“OW12 is located north east of the waste fill area within the agricultural field north of the Site. Together with OW11 the location is intended to delineate the northern extent of leachate migration.”*

Overburden Wells South of the waste fill area

- *“OW7 is located south of the waste fill area and north of the pond/wetland area. Together with OW13, the well is intended to monitor any southward leachate migration.*
- *“OW8 [replaced by OW8R1 but will continue to be referred to as OW8 for consistency] is located between the pond/wetland area and Rockport/Escott Road. OW8 is intended to act as the background for overburden groundwater in the area.*
- *“OW13 is located south of the waste fill area and north of the pond/wetland area. Together with OW7, the well is intended to monitor any southward leachate migration.”*

Leachate observation well

- *“OW14 is located adjacent to the southern side of the waste fill area. The well penetrates through the toe of the waste slope and is intended to characterize the leachate being produced from the Site.”*

4.6 Sampling Methods

Sampling was completed by TLTI employees under the supervision of Andrew Day (formerly TLTI). No documents were found describing the 2016 sampling methods, so we assume the same methods as described in the 2015 annual report apply:

“All samples are collected using laboratory provided and preserved (where appropriate) bottles. New nitrile gloves are used at each sampling location. Water level meters and field measurement probes are decontaminated prior to each sampling location. Collected samples are placed on ice and maintained at target ambient temperatures of 4 degrees Celsius until submission to the laboratory.

“Groundwater samples are collected using dedicated PVC tubing and foot valves. An adequate amount of groundwater is purged from the well and the drawdown in the well is allowed to recover to a minimum of 80% when compared to the static water level. Disposable 0.45 micron in-line filters are used to filter groundwater samples that require filtration. Groundwater is placed directly from the dedicated tubing into the laboratory supplied bottles.

“Surface water samples are collected using laboratory supplied bottles. A large un-preserved bottle is completely submerged in the surface water body (given there is adequate depth at the location). Care is taken to avoid disturbing sediment and to avoid any material that may be floating on the surface of the water body. Surface water is decanted from the large un-preserved bottle into the complete set of laboratory supplied bottles. Any surface water samples requiring filtration are submitted unfiltered and un-preserved and are subsequently filtered at the lab.

“Blind field duplicates were collected concurrent with the collection of the regular monitoring samples. Analytical results were compared to the respective duplicate to ensure that laboratory results are not anomalous.”

4.7 Operational Monitoring

Wells were reportedly surveyed in August 2013 using high precision GPS techniques (AMR 2015). This was done to ensure groundwater elevation reference points were accurate and to increase the confidence of the modeled groundwater flow direction. Newly installed wells, OW8R1, OW11R1 and BW4, were surveyed in November 2015 using the same technique (AMR 2015).

4.7.1 Changes in Operations

We have not been made aware of changes in Site operations (CofA 52(f)) in 2016.

5.0 Discussion of Results

This section discusses the findings of the surface water and groundwater quality monitoring that was conducted in 2016. Results for the surface water, overburden and bedrock water chemistry, as well as VOC's, are presented in Tables 2, 3, 4, 5, respectively (see Appendix B). Observed results have been compared to relevant standards and any observed exceedances are highlighted to allow for visual interpretation. Historic chemistry and groundwater elevation data is included in Appendix E.

5.1 Hydrogeologic Physiography

Groundwater Flow

Groundwater elevation data was unavailable for the 2016 sampling program. As such, the groundwater flow within the overburden at the Site was interpreted based on 2015 groundwater elevations and are presented in Figures 4 a and 4b (Appendix A). Groundwater contours were created based on this data and are presented in Figures 6 and 7 (Appendix A).

Groundwater flow direction within the local overburden at the Site is generally northeast. The interpretation of the groundwater flow direction supports the use of OW8R1 (formerly OW8) as a background monitoring well as it is upgradient from the landfill. Some groundwater elevation variability was observed in the fall of 2015.

Groundwater contours were also drawn based on the 2015 bedrock water elevation data and presented in Figure 7 (Appendix A). Based on these contours, bedrock groundwater is interpreted to flow towards the northeast. It should be noted, however, that overall elevation differences are no greater than 0.4 m and so are especially sensitive to changes in recharge and discharge.

Surface Water Flow

The surface water at the Site flows, overall, towards the northeast. There are three main channels: the first is an anthropogenic channel to the North of the Site, the second is a drainage ditch built adjacent to the southern slope of the waste fill area that diverts runoff towards SW3, and the third is a stream located south of the WDS. A small creek flows from the southwest end of the WDS (SW6, SW1) to the southern stream (Figure 3, Appendix A). This stream is host to several beaver dams, and outputs into La Rue Mills Creek.

5.2 Overburden Interpretation

The overburden water chemistry at the Site is characterized by seven wells: OW3, OW5, OW8, OW11, OW12, OW13 and OW14. Well OW8 is used to determine the background quality at the Site due to its location up-gradient of flow (Figure 6, Appendix A).

Historically, the leachate at the Site is monitored by well OW14. Among other parameters, this well exhibits elevated levels of the following common leachate indicators: conductivity, chloride, boron, iron and manganese.

Evidence of leachate is present in monitoring well OW11 (Table 3, Appendix B). The inferred groundwater flow direction supports the presence of leachate at OW11. However, analytical results from monitoring well OW3, located between the landfill and OW11, do not indicate the presence of leachate. This suggests the elevated leachate indicators at OW11 may be non-leachate related, or that OW3 is anomalous. Concentrations of total suspended solids (TSS) were elevated in OW11, indicating high levels of sediment, which may have contributed to elevated concentrations of leachate indicators.

Results from OW11 (compliance well) and OW14 (the leachate well) exceeded the Ontario Water Drinking Standards (ODWS) for iron and manganese (Table 3, Appendix B). Well OW11 also exceeds the ODWS for aluminum while OW14 exceeds the ODWS for alkalinity and uranium.

5.3 Bedrock Interpretation

The bedrock water chemistry at the Site is characterized by four wells: BW1, BW2, BW3 and BW4. Well BW3 is used to characterize the background chemistry as it is located up-gradient from the waste disposal site (Figure 7, Appendix A). Historically, the background chemistry has shown elevated hardness and turbidity. Turbidity measurements were not available for 2016 at the time of reporting. The well's history of high turbidity should be noted as it may influence parameters such as TSS and DOC.

Bedrock well BW1 has been used to monitor the leachate. Well BW1 shows elevated concentrations of common leachate parameters: conductivity, chloride, boron, iron and manganese (Table 4, Appendix B). Bedrock monitoring well BW1 is located about 50 metres northeast of the waste suggesting leachate is infiltrating the groundwater and migrating through the bedrock.

Monitoring well BW4, located downgradient of the BW1, shows leachate influence. Well BW4 exhibits, among other parameters, elevated chloride, boron, iron and manganese

(Table 4, Appendix B). Though elevated, the concentrations of these leachate parameters are significantly weaker than in BW1 suggesting the leachate is attenuating. Monitoring well BW2, located northwest of the waste pile, exhibits concentrations similar to the background well.

5.4 Reasonable Use Policy

The Reasonable use Policy (RUP), compares chemistry at the overburden well OW11, and at the bedrock well BW4 to Reasonable Use Limits (RULs) were established for bedrock and overburden groundwater, and calculated per the MOEEC B-7 Reasonable Use Guidance document.

RUL's were calculated for the analyzed parameters which have Ontario Drinking Water Standards (Appendix G). Overburden chemistry at compliance well OW11 and bedrock chemistry at compliance well BW4 were compared to the calculated RUL's to assess compliance with the RUP. Exceedances of the RULs in the overburden and bedrock groundwater included alkalinity, DOC, TDS, iron, manganese, and uranium. As BW4 was installed in 2015, caution must be used in evaluating the RUP in BW4 because only one year of data is available.

5.5 Surface Water Interpretation

The surface water chemistry at the Site is characterized by six sampling stations. Based on the surface water flow interpretation presented in Figure 3 (Appendix A), there are three main waterways. For the purposes of describing the chemical character of each waterway, the following section will interpret the north stream, south stream and Hickenbottom stream separately.

South Stream:

The southern stream runs approximately 375 m south of the waste pile. The flow direction of the stream is roughly parallel to the NE-SW position of the WDS. Sampling stations SW7 and SW8 are located along this stream. SW7 is used to characterize the background due to its up-stream location (Figure 3, Appendix A). It should be noted that SW7 is also located directly next to the main road (Escott Rockport Road). The background chemistry exhibits elevated chloride and iron concentrations (Table 2, Appendix B).

Station SW8 is located downstream of the WDS and SW7. This station exhibited lower concentrations than SW7 for most of the leachate parameters (conductivity, chloride, boron and iron) and only slightly more concentrated levels of manganese, though the discrepancy

is insignificant when compared to the latter's concentration shift across all six stations. This suggests little to no leachate impact at this stream.

Both south-stream stations exceed the PWQO guideline for DOC, phenolics and total phosphorous. Sampling station SW7 also exceeds the PWQO for iron.

North Stream:

The northern stream is located approximatively 75 m from the edge of the waste pile. Sampling stations SW4 and SW5 are located along this stream. SW4 is used to characterize the background due to its location up-stream (Figure 3, Appendix A). As with SW7, SW4 is also located next to the main road. However, no notably elevated concentrations are observed at SW4, suggesting road runoff is not responsible for the elevated metal concentrations in the southern stream.

The chemistry at SW5 is generally consistent with concentrations detected at the background station (SW4). The chemistry at SW5 suggests little to no leachate influence in the north stream.

Both north-stream stations exceed the PWQO guideline for the non-leachate related parameters DOC, total phosphorous and copper.

Hickenbottom Stream:

The Hickenbottom stream represents the flow directly through the waste pile. Based on the flow interpretation presented in Figure 3 (Appendix A), water flows towards the northeast. There is a small topographic depression adjacent to the north east boundary of the waste pile, where surface waters have been ponding (from historic observation) and eventually continuing to drain towards Hickenbottom Outlet. Past reports have also identified a pond southwest of the waste pile, suggesting the waste pile itself represents a topographic high and is draining on either side.

Only one surface water station (SW3) adjacent to the waste pile was sampled in 2016. As expected, SW3 exhibits significantly elevated parameters such as conductivity, chloride, boron, iron and manganese suggesting the surface water runoff northeast of the waste pile is impacted by leachate. Concentrations of leachate indicators at the downstream Hickenbottom Outlet surface water station are reduced, and more representative of background concentrations (i.e. SW4, SW7).

Sampling station SW3 exceeds the PWQO for unionized ammonia, DOC, phenolics, total phosphorous, boron, cadmium, copper, iron and lead.

5.6 Assessment of the Need for Contingency Measures

The Site does not conform to Ministry Guideline B-7 in that there are several exceedances of Reasonable Use Limits (RULs). RUL exceedances in bedrock could be the result of turbidity during the sampling event, and the very limited data (i.e. one year). The metal exceedances in the overburden compliance well (OW11R1) is notable due to their toxicity to living organisms. However, the lack of similar historic trends suggest that these results are anomalous and could be attributed to field or lab error. Continued sampling of the new wells in 2017 and 2018 will allow for a greater confidence in the observed results. The risk to residential water supplies north of the Site is minimal. A recommendation to acquire additional attenuation lands and install additional monitoring wells will be based on the 2017 sampling data from the new wells and will be presented in the 2017 annual monitoring report, due to insufficient data collected in 2016.

Surface water at the Site does exhibit some minor evidence of impact on-site that could be attributed to landfill impacts. However, observed concentrations at downstream locations are similar to those at upstream background locations, suggesting no off-site impacts. If low water quantities continue at SW1 and SW6, it will be necessary to find another sampling location between SW7 and SW8 so as to characterize the surface water south of the WDS.

Currently, the Escott waste pile exceeds the allowed perimeters outlined by CofA A441703 at a few locations. Action is required to reduce the waste pile into its permitted boundaries.

6.0 Conclusions

The Escott WDS is an active site currently accepting non-hazardous solid waste. The Site relies on natural attenuation of impacted groundwater and is subject to Ministry Guideline B-7. The Site does not conform to Guideline B-7 along the northern property boundary in that observed results exceed the established RULs.

Potential leachate impacts to the surface waters appear to be limited within the site boundaries. Concentrations of leachate indicators in downstream surface water stations do not appear to be leachate related. Completion of additional Site work in 2017 (completion of the progressive cover of portions of the waste fill area) will ensure that potential environmental degradation originating from the Site is minimalized.

1. Monitoring should continue twice per year during the spring and fall with the recommended changes outlined above.
2. Monitoring should continue to use the established parameter list.
3. Wells no longer in use should be abandoned according to O. Reg. 903.
4. Develop a groundwater action plan for submission with the 2017 annual monitoring report utilizing the 2015, 2016 and 2017 results from BW4 and OW11R1
5. Water elevation monitoring should be completed annually (see sect 5.4) with groundwater elevation data updated in 2017
6. Final cover should continue to be applied to portions of the waste fill area that have reached final contours.
7. At the time of final cover placement, adjust waste pile so that it conforms to the final design.
8. Attempt to complete surface water sampling events following rain events to increase probability of flowing conditions. Review surface water sampling locations southwest of the Site if dry conditions persist at SW2, SW6 and SW1.

If you have any questions or concerns regarding the above submission, please do not hesitate to contact the undersigned at (613) 548-3446.

Respectfully Submitted,



Camille Malcolm, B.Sc.
Environmental Geoscientist
Malroz Engineering Inc.

Reviewed by



David Malcolm, P. Eng
Project Manager
Malroz Engineering Inc.

May 30, 2017

8.0 References

Andrew Day. Annual Groundwater and Surface Water Monitoring Report for Escott WDS (ECA No. 441703), Township of Leeds and the Thousand Islands, 2015.

Ontario Drinking Water Standards (ODWS) from Ontario Regulation 169/03 of the Safe Drinking Water Act (2002). Last amendment: O. Reg. 373/15.

Provincial Water Quality Objectives (PWQO) from the Ministry of Environment and Energy's Water Management Policies & Guidelines, July 1994.

Technical Guidance Document: Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water. Ministry of the Environment, November 2010.

Trow Associates Inc., Ward 3 (Escott) Waste Disposal Site A441073 Proposed Expansion, February 18, 2004

Appendix A

Figures



Legend	
	Site Location
	Municipal/County Road
	Water Body
	Wooded Area
	Aggregate Site
	Site Benchmark UTM NAD 83, Zone 18 E – 424873.3 N – 4917507.5 Elev. – 93.44 mASL
Revisions	
Rev. #	Date
Final 1.0	01-May-2014
2014 AR	April 2015
2015 AR	April 2016
2016 AR	May 2017



Escott Waste Disposal Site

Township of Leeds and the Thousand Islands

A441703

Figure 1 – Site Location Map

Drawn by: A. Day

Checked by: A. Day

Date: May 2014



Legend

- Site Benchmark
UTM NAD 83, Zone 18
E – 424873.3
N – 4917507.5
Elev. – 93.44 mASL
- Groundwater monitoring well
- historic monitoring well
- Approximate boundary of
current and historical waste
fill area
- Approximate boundary of
property owned by the
Township

Revisions

Number	Description	Initials
1	MOE Draft	Aug 2014
2	2014 AR	April 2015
3	2015 AR	April 2016



Escott Waste Disposal
Site

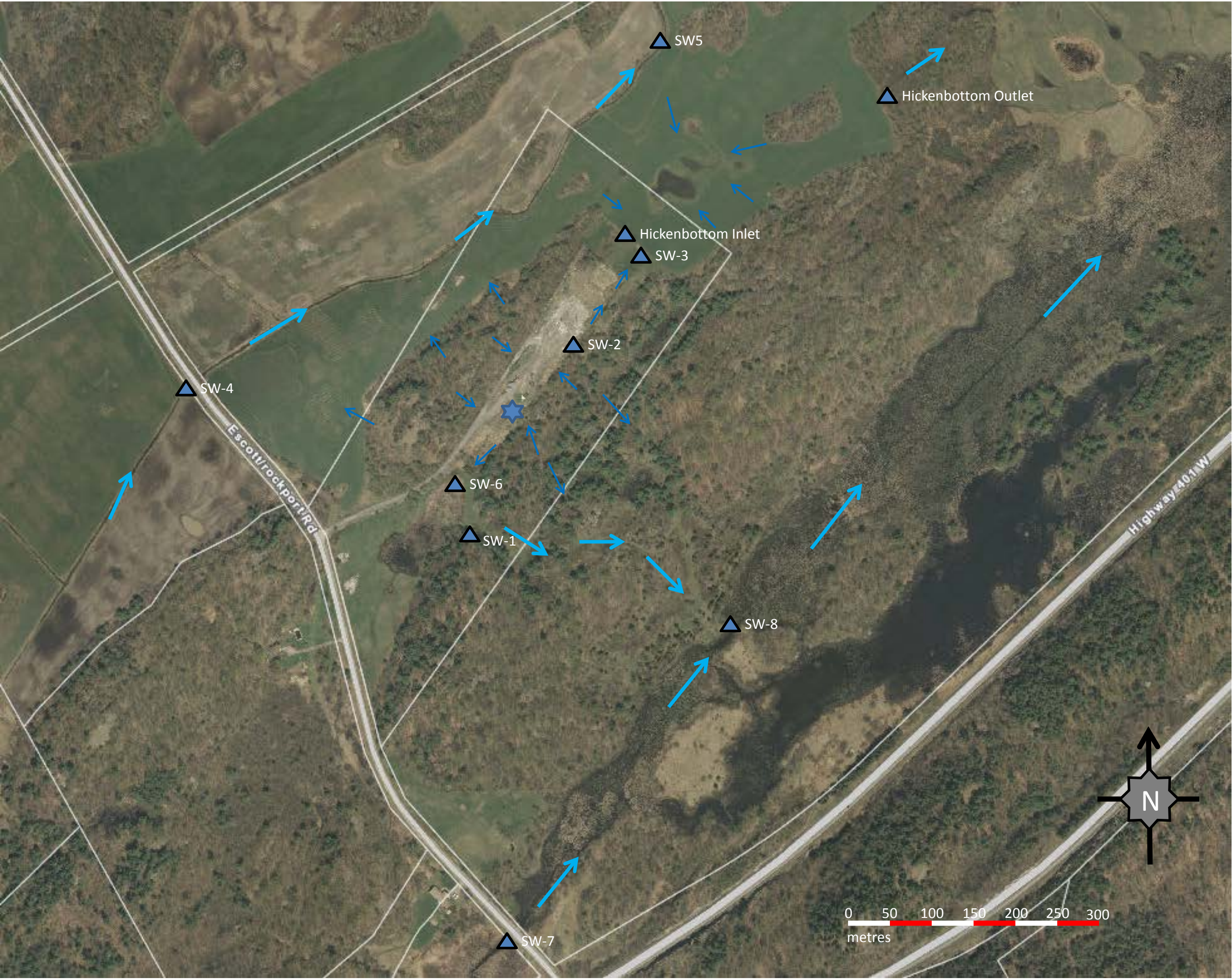
Township of Leeds and the
Thousand Islands
A441703

Figure 2 – GW Monitoring Network

Drawn by: A. Day

Checked by: A. Day

Date: April 2016



Legend

 Surface water monitoring location

 Site Benchmark
UTM NAD 83, Zone 18
E – 424873.3
N – 4917507.5
Elev. – 93.44 mASL

 Surface water body flow direction

 Surface drainage direction

Revisions

Number	Description	Initials
1	MOE Draft	Aug 2014
2	2014 AR	April 2015
3	2015 AR	April 2016



Escott Waste Disposal Site

Township of Leeds and the
Thousand Islands
A441703

Figure 3 – SW Network and Drainage

Drawn by: A. Day

Checked by: A. Day

Date: May 2014



Legend

 Groundwater monitoring well

88.77 Overburden groundwater elevations (Spring 2015)

 Site Benchmark
UTM NAD 83, Zone 18
E – 424873.3
N – 4917507.5
Elev. – 93.44 mASL

Revisions

Number	Description	Initials
1	MOE Draft	Aug 2014
2	2014 AR	April 2015
3	2015 AR	April 2016



Escott Waste Disposal Site

Township of Leeds and the
Thousand Islands
A441703

Figure 4a – Overburden Water Levels

Drawn by: A. Day

Altered by: Malroz Engineering

Date: May 2017



Legend

 Groundwater monitoring well

 89.16 Bedrock groundwater elevation
(Fall 2015)

 Site Benchmark
UTM NAD 83, Zone 18
E – 424873.3
N – 4917507.5
Elev. – 93.44 mASL

Revisions

Number	Description	Initials
1	MOE Draft	Aug 2014
2	2014 AR	April 2015
3	2015 AR	April 2016



Escott Waste Disposal
Site

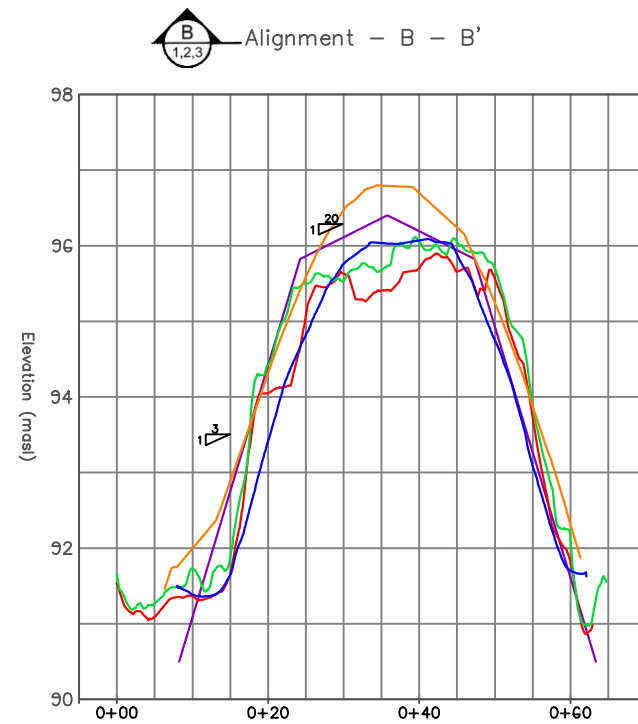
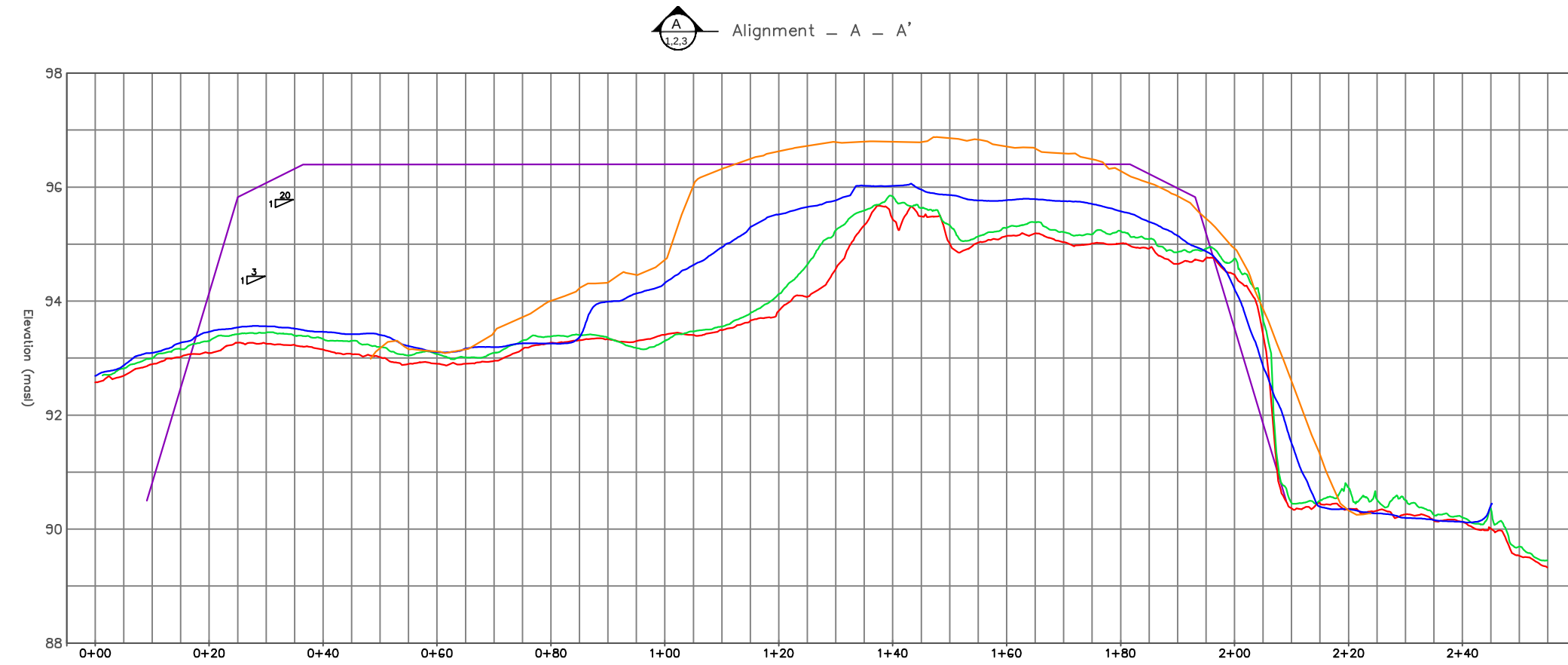
Township of Leeds and the
Thousand Islands
A441703

Figure 4b – Bedrock Water Elevations

Drawn by: A. Day

Altered by: Malroz Engineering

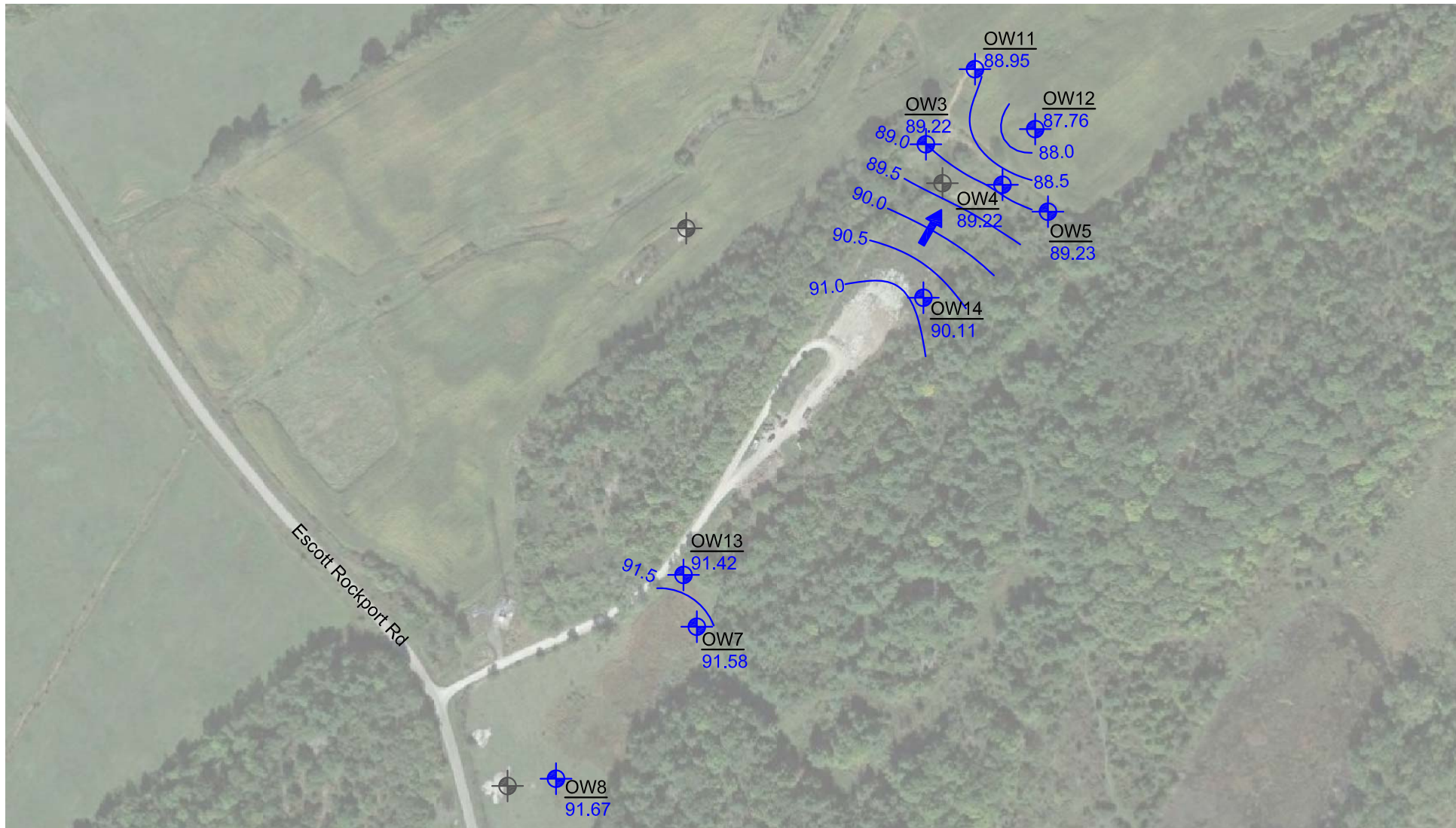
Date: May 2017



- LEGEND
- FINAL DESIGN CONTOURS
 - EXISTING GROUND (SURVEYED ON DEC 5, 2016)
 - EXISTING GROUND (SURVEYED ON JULY 28, 2016)
 - EXISTING GROUND (SURVEYED ON NOV 28, 2014)
 - EXISTING GROUND (SURVEYED ON MAY 6, 2014)

Figure 5

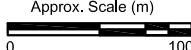
1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK
REFERENCES PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS. VERTICAL EXAGGERATION: 10x				
1:1000 0m 5m 10m 15m 20m 25m THIS SCALE IS TO BE USED TO OBTAIN APPROXIMATE DIMENSIONS FOR INFORMATION				
CLIENT TOWNSHIP OF LEEDS AND THE THOUSAND ISLANDS				
PROJECT ESCOTT WASTE DISPOSAL SITE SITE TOPOGRAPHY				
TITLE CROSS SECTIONS				
		3108 Corp Road PO Box 430 Ottawa, Ontario K0A 1L0 TEL: (613) 839-3053 FAX: (613) 839-5376 Email: info@blumetric.ca Web: http://www.blumetric.ca		
PROJECT 160477		DATE 2017-01-23		
DRAWN YL	CHECKED YL	DWGNO. 05	REV 0	

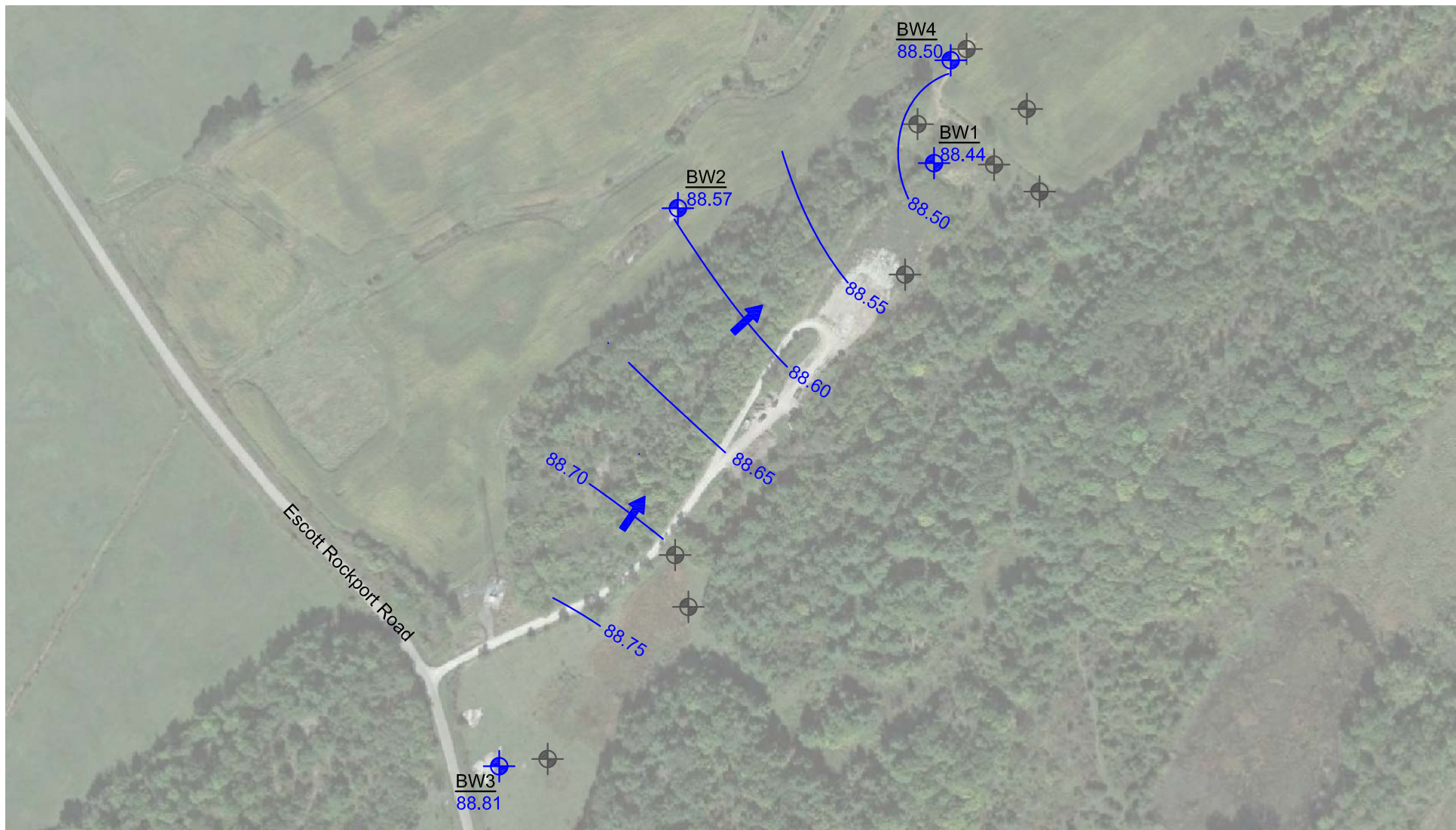


Legend

-  OW7 overburden monitoring well location
-  bedrock monitoring well location
- 91.00 overburden groundwater elevation (Spring 2015)
- 91.0 — inferred shallow groundwater contours (Spring 2015)
-  inferred flow direction

Figure based on TLTI 2015 AMR and Google Earth imagery

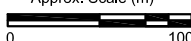
D1	17/05/05	issued in draft	KC	CM
Rev	Date	Description	By	Chk
Inferred Shallow Groundwater Contours				
Escott Waste Disposal Site Township of Leeds and the Thousand Islands				
File: 1038-100.00		Figure 6		
Approx. Scale (m)				
				



Legend

-  BW1 bedrock monitoring well location
-  overburden monitoring well location
- 91.00 bedrock groundwater elevation (Fall 2015)
-  91.00 — inferred bedrock groundwater contours (Fall 2015)
-  inferred flow direction

Figure based on TLTI 2015 AMR and Google Earth imagery

D1	17/05/05	issued in draft	KC	CM
Rev	Date	Description	By	Chk
Inferred Bedrock Groundwater Contours				
Escott Waste Disposal Site Township of Leeds and the Thousand Islands				
File: 1038-100.00		Figure 7		
Approx. Scale (m)				
				

Appendix B

Tables

Table 1 - Sampling Parameters and Locations

Escott Waste Disposal Site

ECA # A441703

Township of Leeds and the Thousand Islands

Parameters	Groundwater		Surface Water	
	Spring and Fall		Spring and Fall	
Lab	Alkalinity	Cadmium	Alkalinity	Barium
	N - Ammonia	Calcium	N-NH3	Boron
	BOD	Chromium	N-NH3 unionized	Cadmium
	COD	Cobalt	BOD	Calcium
	DOC	Copper	COD	Chromium
	Conductivity	Iron	DOC	Cobalt
	Hardness	Lead	Conductivity	Copper
	pH	Magnesium	Hardness	Iron
	Phenolics	Manganese	pH	Lead
	Phosphorus (total)	Potassium	Phenolics	Magnesium
	TDS	Silver	Phosphorus (total)	Manganese
	TSS	Sodium	Phosphorus, total dissolved	Nickel
	N - Total Kjeldahl	Strontium	TDS	Potassium
	Chloride	Uranium	TSS	Silver
	N - Nitrate	Vanadium	N - Total Kjeldahl	Sodium
	N - Nitrite	Zinc	Chloride	Strontium
	Sulphate		N - Nitrate	Vanadium
	Mercury		N - Nitrite	Zinc
	Aluminum		Sulphate	
	Arsenic	VOCs (as needed)	Aluminum	
	Barium		Mercury	
	Boron		Arsenic	
Field	<i>*unknown</i>		<i>*unknown</i>	
Locations	BW1	OW8	SW3	
	BW2	OW11	SW4	
	BW3	OW12	SW5	
	BW4	OW14	SW7	
	OW3		SW8	
	OW5		Hickenbottom Outlet	

Table 2
Surface Water Chemistry Analysis

Location			SW3	SW3	SW4	SW5	SW7	SW8	Hickenbottom Outlet	PWQO
Parameters	Units	MDL	09-Nov-16	09-Nov-16	09-Nov-16	09-Nov-16	09-Nov-16	09-Nov-16	09-Nov-16	
				DUP						
Alkalinity, total	mg/L	5	484	485	100	138	92	118	237	see note ¹
Ammonia as N	mg/L	0.01	1.71	1.53	0.06	0.06	0.06	0.08	0.05	
Ammonia, unionized ²	mg/L	0.001	0.025	0.028	0.005	0.0007	0.0005	0.001	0.001	0.02
BOD	mg/L	2	7	7	3	21	3	3	2	
Chemical Oxygen Demand	mg/L	10	46	51	38	92	48	46	22	
Dissolved Organic Carbon	mg/L	0.5	9.6	10.3	9.8	12.8	11.9	9.9	2.3	5
Conductivity	uS/cm	5	1110	1090	391	492	664	581	538	
Hardness	mg/L		413	422	166	222	139	128	271	
pH	pH Units	0.1	7.7	7.6	8.4	7.4	7.3	7.5	7.7	6.5-8.5
Phenolics	mg/L	0.001	0.010	0.008	<	<	0.008	0.005	<	0.001
Phosphorus, total	mg/L	0.01	0.05	0.06	0.09	0.05	0.10	0.07	0.06	0.02
Phosphorus, total dissolved	mg/L	0.01	<	<	0.01	0.04	0.07	0.02	0.02	
Total Dissolved Solids	mg/L	10	548	562	252	322	372	320	314	
Total Suspended Solids	mg/L	2	66	70	26	19	5	7	6	
Total Kjeldahl Nitrogen	mg/L	0.1	2.1	2.1	1.2	1.0	0.9	0.9	0.5	
Chloride	mg/L	1	75	76	17	14	105	89	3	
Nitrate as N	mg/L	0.1	<	<	<	0.1	<	<	8.3	
Nitrite as N	mg/L	0.05	<	<	<	<	<	<	<	
Sulphate	mg/L	1	16	16	67	103	64	28	18	410
Aluminum, dissolved	ug/L	1	10	8	74	45	22	19	16	
Mercury	ug/L	0.1	<	<	<	<	<	<	<	0.2
Arsenic	ug/L	1	2	2	<	<	<	<	<	5
Barium	ug/L	1	223	232	66	79	52	44	62	
Boron	ug/L	10	742	796	17	24	26	18	22	200
Cadmium	ug/L	0.1	0.7	0.8	<	<	0.1	<	0.2	0.5
Calcium	ug/L	100	111000	113000	41900	55900	37000	32500	61400	
Chromium	ug/L	1	1	1	<	1	<	<	2	1
Cobalt	ug/L	0.5	1.6	1.7	<	<	<	<	<	0.9
Copper	ug/L	0.5	6.8	7.1	6.0	5.6	1.4	0.7	3.4	5
Iron	ug/L	100	11100	11700	203	256	417	292	471	300
Lead	ug/L	0.1	5.2	5.5	0.1	0.3	0.2	0.1	0.4	5
Magnesium	ug/L	200	33100	33700	14900	19900	11300	11400	28500	
Manganese	ug/L	5	949	985	8	34	72	90	12	
Nickel	ug/L	1	6	6	1	1	<	<	1	25
Potassium	ug/L	100	7300	7620	3990	2390	3930	2950	1140	
Silver	ug/L	0.1	<	<	<	<	<	<	<	
Sodium	ug/L	200	44400	45500	9430	10300	54300	51300	9070	
Strontium	ug/L	10	511	525	182	254	217	204	331	
Vanadium	ug/L	0.5	1.4	1.4	2.3	2.2	0.6	0.5	2.4	
Zinc	ug/L	5	91	98	<	<	11	<	<	

Notes:

"<" denotes result below method detection limit

"SW ###" denotes surface water station ID

"MDL" denotes method detection limit

results reported in mg/L unless indicated otherwise

¹ alkalinity should not be decreased by more than 25% of the natural concentration

² unionized ammonia reported by laboratory and calculated using lab measured pH and temperature

shading indicates parameters exceeding PWQO

 denotes exceedance of Provincial Water Quality Guidelines

Input: MH
Checked: C1

Table 3
Overburden Chemistry Analysis

Location			OW3	OW5	OW8	OW11	OW12	OW13	OW14	ODWS		RUL
Parameters	Units	MDL	15-Nov-16	15-Nov-16	15-Nov-16	15-Nov-16	15-Nov-16	15-Nov-16	15-Nov-16			
Alkalinity, total	mg/L	5	336	268	397	419	402	390	1070	500	OG	453
Ammonia as N	mg/L	0.01	0.07	0.05	0.02	0.37	0.06	0.09	0.76			
BOD	mg/L	2	3	<	<	7	<	<	3			
Chemical Oxygen Demand	mg/L	10	83	20	72	176	20	59	32			
Dissolved Organic Carbon	mg/L	0.5	2.3	1.6	2.1	4.6	2.3	2.2	7.7	5	AO	3.38
Conductivity	uS/cm	5	692	465	706	907	697	687	2000			
Hardness	mg/L		366	237	337	440	300	354	1040	100	OG	256
pH	pH Units	0.1	7.5	7.7	7.6	7.6	7.8	7.7	7.2	6.5-8.5	OG	
Phenolics	mg/L	0.001	<	<	<	<	<	<	0.006			
Phosphorus, total	mg/L	0.01	7.19	0.93	0.13	2.28	0.32	0.66	0.73			
Total Dissolved Solids	mg/L	10	398	266	342	486	368	364	1150	500	AO	472
Total Suspended Solids	mg/L	2	23900	1320	242	3670	648	1580	1760			
Total Kjeldahl Nitrogen	mg/L	0.1	0.6	0.2	0.1	0.8	0.1	0.1	1.1			
Chloride	mg/L	1	16	1	1	35	2	2	80	250	AO	126
Nitrate as N	mg/L	0.1	0.3	<	0.4	<	<	0.2	<	10.0	CS	2.61
Nitrite as N	mg/L	0.05	<	<	<	0.09	<	<	<	1.0	CS	0.39
Sulphate	mg/L	1	40	12	7	42	11	8	75	500	AO	262
Mercury	ug/L	0.1	<	<	<	<	<	<	<	1	CS	0.3
Aluminum	ug/L	1	72	75	52	120	87	64	59	100	OG	151
Arsenic	ug/L	1	<	<	<	<	<	1	3	25	CS	8
Barium	ug/L	1	136	101	97	160	129	193	381	1000	CS	318
Boron	ug/L	10	31	16	13	264	60	34	93	5000	CS	1260
Cadmium	ug/L	0.1	<	<	<	<	<	<	<	5	CS	1.3
Calcium	ug/L	100	91500	59500	83800	120000	43000	70300	184000			
Chromium	ug/L	1	1	<	2	<	<	<	<	50	CS	13
Cobalt	ug/L	0.5	<	<	<	1.2	<	0.6	4.4			
Copper	ug/L	0.5	<	<	<	<	<	<	<	1000	AO	501
Iron	ug/L	100	<	<	<	830	<	<	2570	300	AO	238
Lead	ug/L	0.1	<	<	<	<	<	<	<	10	CS	4
Magnesium	ug/L	200	33400	21500	30900	34200	46800	43300	142000			
Manganese	ug/L	5	<	16	<	343	<	57	568	50	AO	67
Potassium	ug/L	100	1670	1680	1040	4610	2740	2660	3990			
Silver	ug/L	0.1	<	<	<	<	<	<	<			
Sodium	ug/L	200	9000	5370	10800	21700	20200	17500	36600	200000	AO	108000
Strontium	ug/L	10	356	147	279	1670	943	578	933			
Uranium	ug/L	0.1	1.0	0.8	1.7	7.7	4.2	1.6	21.1	20	CS	6
Vanadium	ug/L	0.5	1.5	1.1	<	<	1.8	1.0	<			
Zinc	ug/L	5	<	<	<	<	<	<	<	5000	AO	2505

Notes:

"<" denotes result below method detection limit

"OW ###" denotes overburden monitoring well

"MDL" denotes method detection limit

results reported in mg/L unless indicated otherwise

shading indicates parameters exceeding ODWS

denotes exceedance of Ontario Drinking Water Standards

AO indicates aesthetic objective OG indicates objective guideline CS indicates chemical standard

denotes compliance parameter exceeds the reasonable use policy

Input: MH

Checked: CM

Table 4
Bedrock Chemistry Analysis

Location			BW1	BW2	BW3	BW4	BW4 ⁺	ODWS		RUL
Parameters	Units	MDL	09-Nov-16	09-Nov-16	09-Nov-16	09-Nov-16	09-Nov-16			
Alkalinity, total	mg/L	5	983	182	390	464	467	500	OG	427
Ammonia as N	mg/L	0.01	4.66	0.05	0.02	0.80	0.86			
BOD	mg/L	2	<	<	<	<	<			
COD	mg/L	10	54	21	<	55	77			
DOC	mg/L	0.5	13.2	5.6	3.2	5.8	5.9	5	AO	3.5
Conductivity	uS/cm	5	2200	386	768	998	1010			
Hardness	mg/L		1030	157	353	497	473	100	OG	234
pH	pH Units	0.1	7.2	7.7	7.8	7.5	7.5	6.5-8.5	OG	
Phenolics	mg/L	0.001	0.005	<	<	0.002	0.002			
Phosphorus, total	mg/L	0.01	<	0.03	<	0.49	0.42			
Total Dissolved Solids	mg/L	10	1330	212	428	568	546	500	AO	454
Total Suspended Solids	mg/L	2	12	61	5	622	1340			
Total Kjeldahl Nitrogen	mg/L	0.1	5.1	0.4	<	1.0	0.9			
Chloride	mg/L	1	120	4	17	37	37	250	AO	134
Nitrate as N	mg/L	0.1	<	<	<	<	<	10.0	CS	2.7
Nitrite as N	mg/L	0.05	<	<	<	<	<	1.0	CS	0.47
Sulphate	mg/L	1	194	15	22	49	50	500	AO	261
Mercury	ug/L	0.1	<	<	<	<	<	1	CS	0.3
Aluminum	ug/L	1	3	8	<	2	4	100	OG	54
Arsenic	ug/L	1	2	<	<	<	<	25	CS	6.5
Barium	ug/L	1	370	63	171	170	191	1000	CS	361
Boron	ug/L	10	598	77	26	301	280	5000	CS	1270
Cadmium	ug/L	0.1	<	<	<	<	<	5	CS	1.3
Calcium	ug/L	100	247000	47800	84100	135000	131000			
Chromium	ug/L	1	<	<	<	<	<	50	CS	13
Cobalt	ug/L	0.5	12.6	<	<	0.9	0.9			
Copper	ug/L	0.5	0.6	<	1.2	<	<	1000	AO	501
Iron	ug/L	100	3260	105	<	596	599	300	AO	170
Lead	ug/L	0.1	<	<	<	0.2	0.2	10	CS	2.6
Magnesium	ug/L	200	100000	9010	34800	38400	35600			
Manganese	ug/L	5	3210	47	<	376	379	50	AO	28
Potassium	ug/L	100	6480	2520	2350	4520	4580			
Silver	ug/L	0.1	<	<	<	<	<			
Sodium	ug/L	200	64300	6620	12400	20500	21500	200000	AO	105380
Strontium	ug/L	10	1260	865	376	1590	1530			
Uranium	ug/L	0.1	14.6	4.2	4.6	14.1	14.3	20	CS	5
Vanadium	ug/L	0.5	<	0.6	<	<	<			
Zinc	ug/L	5	<	<	<	<	<	5000	AO	2503

Notes:

"<" denotes result below method detection limit

"BW ###" denotes bedrock monitoring well

"MDL" denotes method detection limit

"+" duplicate sample

results reported in mg/L unless indicated otherwise

shading indicates parameters exceeding ODWS



denotes exceedance of Ontario Drinking Water Standards

AO indicates aesthetic objective

OG indicates objective guideline

CS indicates chemical standard



denotes exceedance of reasonable use policy

Input: MH

Checked: CM

Table 5
Groundwater VOC Analysis

Location			BW1	BW2	BW3	BW4	BW4	OW3	OW5	OW8	OW11	OW12	OW13	OW14	ODWS	
Parameters	UNITS	MDL	09-Nov-16	09-Nov-16	09-Nov-16	09-Nov-16	09-Nov-16 DUP	15-Nov-16	15-Nov-16	15-Nov-16	15-Nov-16	15-Nov-16	15-Nov-16	15-Nov-16		
Acetone	ug/L	5.0	<		<	<	<							<		
Benzene	ug/L	0.5	<		<	<	<							<	1	CS
Bromodichloromethane	ug/L	0.5	<		<	<	<							<		
Bromoform	ug/L	0.5	<		<	<	<							<		
Bromomethane	ug/L	0.5	<		<	<	<							<		
Carbon Tetrachloride	ug/L	0.2	<		<	<	<							<	2	CS
Chlorobenzene	ug/L	0.5	<		<	<	<							<		
Chloroethane	ug/L	1.0	<		<	<	<							<		
Chloroform	ug/L	0.5	<		<	<	<							<		
Chloromethane	ug/L	3.0	<		<	<	<							<		
Dibromochloromethane	ug/L	0.5	<		<	<	<							<		
Dichlorodifluoromethane	ug/L	1.0	<		<	<	<							<		
Ethylene dibromide (dibromoethane, 1,2-	ug/L	0.2	<		<	<	<							<		
1,2-Dichlorobenzene	ug/L	0.5	<		<	<	<							<	200	CS
1,3-Dichlorobenzene	ug/L	0.5	<		<	<	<							<		
1,4-Dichlorobenzene	ug/L	0.5	<		<	<	<							<	5	CS
1,1-Dichloroethane	ug/L	0.5	<		<	<	<							<		
1,2-Dichloroethane	ug/L	0.5	<		<	<	<							<	5	CS
1,1-Dichloroethylene	ug/L	0.5	<		<	<	<							<	14	CS
cis-1,2-Dichloroethylene	ug/L	0.5	<		<	<	<							<		
trans-1,2-Dichloroethylene	ug/L	0.5	<		<	<	<							<		
1,2-Dichloroethylene, total	ug/L	0.5	<		<	<	<							<		
1,2-Dichloropropane	ug/L	0.5	<		<	<	<							<		
cis-1,3-Dichloropropylene	ug/L	0.5	<		<	<	<							<		
trans-1,3-Dichloropropylene	ug/L	0.5	<		<	<	<							<		
1,3-Dichloropropene, total	ug/L	0.5	<		<	<	<							<		
Ethylbenzene	ug/L	0.5	<		<	<	<							<	2.4	AO
Hexane	ug/L	1.0	<		<	<	<							<		
Methyl Ethyl Ketone (2-Butanone)	ug/L	5.0	<		<	<	<							<		
Methyl Butyl Ketone (2-Hexanone)	ug/L	10.0	<		<	<	<							<		
Methyl Isobutyl Ketone	ug/L	5.0	<		<	<	<							<		
Methyl tert-butyl ether	ug/L	2.0	<		<	<	<							<		
Methylene Chloride	ug/L	5.0	<		<	<	<							<		
Styrene	ug/L	0.5	<		<	<	<							<		
1,1,1,2-Tetrachloroethane	ug/L	0.5	<		<	<	<							<		
1,1,2,2-Tetrachloroethane	ug/L	0.5	<		<	<	<							<		
Tetrachloroethylene	ug/L	0.5	<		<	<	<							<	30	CS
Toluene	ug/L	0.5	<		<	<	<							<	24	AO
1,1,1-Trichloroethane	ug/L	0.5	<		<	<	<							<		
1,1,2-Trichloroethane	ug/L	0.5	<		<	<	<							<		
Trichloroethylene	ug/L	0.5	<		<	<	<							<	5	CS
Trichlorofluoromethane	ug/L	1.0	<		<	<	<							<		
1,3,5-Trimethylbenzene	ug/L	0.5	<		<	<	<							<		
Vinyl Chloride	ug/L	0.5	<		<	<	<							<	1	CS
m/p-Xylene	ug/L	0.5	<		<	<	<							<		
o-Xylene	ug/L	0.5	<		<	<	<							<		
Xylenes, total	ug/L	0.5	<		<	<	<							<	300	AO

Notes:

"<" denotes result below method detection limit

"BW ###" denotes bedrock monitoring well

"OW ###" denotes overburden monitoring well

"MDL" denotes method detection limit

AO indicates aesthetic objective OG indicates objective guideline CS indicates chemical standard

Input: MH

Checked: CM

Appendix C
2016 MOECC Correspondence



MEMORANDUM

October 28, 2016

TO: Nathalie Matthews
Senior Environmental Officer
Kingston District Office
Eastern Region

FROM: Laurel Rudd
Surface Water Evaluator
Technical Support Section
Eastern Region

RE: 2015 Groundwater and Surface Water Monitoring Report
Escott Waste Disposal Site
Lots 9 and 10, Concession BF, Ward 3, former Township of Front of Escott
County of Leeds

I have reviewed the above mentioned report and provide the following comments relative to surface water quality impact concerns, for your consideration.

Background

The Escott landfill is licensed under Provisional Environmental Compliance Approval No. A441703. The site has been in operation since 1980. The method of filling was revised to an aerial method of land filling following receipt of the amended Environmental Compliance Approval in 2004. I conducted an inspection of the site on April 19, 2007. The site has an approved waste volume of 40,000 m³.

Site Description

The Escott landfill is located north of Rockport. The site and surrounding landscape is rural residential and agricultural. The terrain is typical Canadian Shield with gently rolling hills and low swamp lands in the valleys. Overburden soils vary from a thin veneer of topsoil over bedrock to wetlands and bogs to glacial lacustrine deposits of silty clay. Groundwater flow in the overburden is reported to be to the northeast. As well, *groundwater/leachate mounding within the waste mound may result in groundwater flow to occur to the southwest of the fill area*, (MOECC, S. Trimper, Hydrogeologist, memorandum, January 5, 2016).

There are two watercourses in the vicinity of the landfill. One agricultural drainage ditch is located to the northwest which drains into LaRue Mills Creek (northwest ditch). The second watercourse is located southeast of the site and drains through marshlands ultimately into LaRue Mills Creek (southeast tributary). LaRue Mills Creek drains into the St. Lawrence River located approximately 7 kilometres from the site. A small marsh/pond exists adjacent to the landfill on the south side. This marsh/pond drains in an easterly direction into the southeast

tributary. Drainage from the landfill is said to migrate generally towards this watercourse and the small marsh/pond. However, during my site inspection I also observed drainage in a ditch adjacent to the landfill footprint draining in a northeasterly direction toward an open field. Located at the property fence line was a Hickenbottom inlet. The Hickenbottom outlet is located approximately 320 metres from the inlet and discharges to a wetland of LaRue Mills Creek.

Surface Water Quality Monitoring Program

The surface water quality program includes six (6) sampling stations. SW-2 is located in a drainage ditch directly adjacent to the landfill footprint on the east side. SW-2 is usually dry or stagnant, samples were obtained in 2015. This ditch drains in the direction of the Hickenbottom inlet located north of the fill area at the edge of a field. Field tile drainage originating from the Hickenbottom inlet outlets at the fringe of a wetland located northeast of the landfill. SW-1 is located at the outlet to the marsh/pond south of the fill area. SW-7 and SW-8 are located on the southeast tributary which becomes LaRue Creek. SW-4 and SW-5 are located on the northwest ditch. Sampling was conducted in May and November in 2015. Samples were also collected from the Hickenbottom outlet only during this monitoring period. *Leachate at this site is reported to be characterized by elevated alkalinity, chloride, dissolved organic carbon (DOC), sodium, total suspended solids (TSS), barium, boron, iron and manganese*, (MOECC, Shawn Trimper, Hydrogeologist, January 5, 2016) .

Conclusions and Recommendations

Background water quality is characterized by elevated iron, aluminum, manganese and total phosphorus. Phosphorus is likely attributed to upstream agricultural activities. Manganese is frequently found in association with elevated iron.

Surface water at the site can be divided into three flow paths. According to the consultant, the northern flow path (SW4 and SW5) *is not currently being impacted by landfill activities*. Based upon my review of the recent (2015) sample results there is no indication of influences from the landfill to the northwest ditch. Iron, total phosphorus and aluminum are all elevated above the Provincial Water Quality Objectives (PWQOs) however, this is naturally occurring.

According to the consultant, *the southern flow path along La Rue Mills Creek is experiencing minor impacts from landfilling activities. The ponded water southwest of the Site in the vicinity of SW1 show elevated metals that could be attributed to landfilling activities*. Based on my review of sample results there is little difference between upstream and downstream on the southwest tributary of LaRue Creek. The Pond outlet (SW1) is not showing any indication of influences from landfill generated leachate. The Pond inlet (SW6) indicates elevated concentrations of numerous parameters, however, solids are elevated as well which indicates that samples were likely obtained from stagnant water resulting from the inadvertent capture of sediment in the samples collected. Numerous metals are elevated above respective PWQOs, however, most are not leachate characteristic parameters for this landfill. In contrast, leachate parameters unique to this landfill, in particular, boron, sodium, barium and manganese are not elevated at SW1. Therefore, I do not concur with the consultant's conclusion that waters in the vicinity of SW1 are showing elevated metals that could be attributed to landfilling activities. These elevated concentrations of metals are likely the result of sediment capture in the samples collected. In the future, surface water sampling should only be undertaken when flow is discernible or the water is not stagnant.

The Hickenbottom inlet is the upstream inlet for the tile drain system located within the agricultural field located north and northeast of the site. Samples obtained from the Hickenbottom inlet in 2014 indicated minor influences of landfill leachate as evidenced by elevated boron above the PWQO during this survey period. Samples were not collected at this location in 2015. Water quality at the outlet does not show any sign of landfill leachate likely due to dilution. The consultant indicated that grading and filling along the waste mound near SW2 will help to prevent leachate migration and will promote the infiltration of impacted waters. Applying final cover to the portions of the waste mound that have reached final contours will help to minimize impacted runoff. I concur with this approach. In light of the fact that recent sample results indicate that landfill leachate is still migrating into the Hickenbottom inlet, I recommend these remedial measures be undertaken. As well, future monitoring efforts should include sampling at the inlet to the Hickenbottom.

I noted that hardness has not been included in the parameters analyzed for. Hardness is an important modifying factor in water quality, in that it can significantly influence the form and hence toxicity of numerous heavy metals. Future monitoring efforts should include water hardness.

The consultant recommends that monitoring continue twice per year during the spring and fall with the recommendations as outlined above. I concur.

If you have any questions regarding the above I would be pleased to discuss them with you.

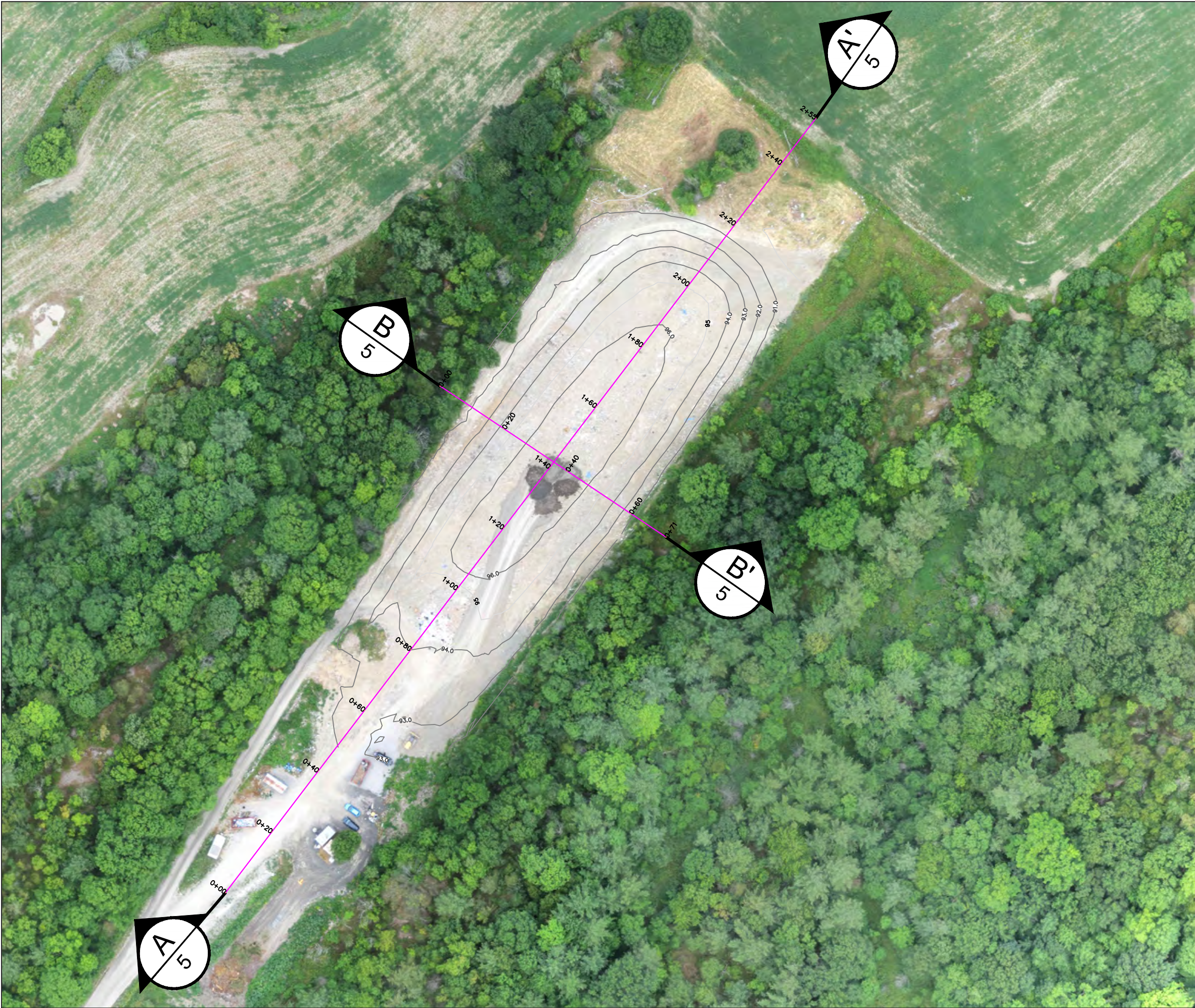


Laurel Rudd
LR/sh

c: File SW LG LT 03 06 (Escott Waste Disposal Site)
Shawn Trimper
LR/IDS #0255-A9EHE9

Appendix D

BluMetric Volume Survey



LEGEND

EXISTING GROUND (SURVEYED ON DEC 5, 2016)

CROSS SECTIONS

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK
REFERENCES PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS. AERIAL IMAGERY ACQUIRED ON JULY 28, 2016 1:1000 0 m 5 m 10 m 15 m 20 m 25 m THIS SCALE TO BE USED TO OBTAIN APPROXIMATE DIMENSIONS FOR INFORMATION N				
CLIENT				
TOWNSHIP OF LEEDS AND THE THOUSAND ISLANDS				
PROJECT				
ESCOTT WASTE DISPOSAL SITE SITE TOPOGRAPHY				
TITLE				
FINAL COVER TOPOGRAPHY AND CROSS SECTION LOCATIONS				
3108 Carp Road PO Box 430 Ottawa, Ontario K0A 1L0 TEL: (613) 839-3053 FAX: (613) 839-5376 Email: info@blumetric.ca Web: http://www.blumetric.ca				
PROJECT #		DATE		
160477		2017-01-23		
DRAWN	CHECKED	DWG NO.	REV	
YL	YL	01	0	



LEGEND

EXISTING GROUND (SURVEYED ON JULY 28, 2016)

CROSS SECTIONS

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK
REFERENCES PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS. AERIAL IMAGERY ACQUIRED ON NOV 28, 2014				
1:1000 0 m 5 m 10 m 15 m 20 m 25 m THIS SCALE TO BE USED TO OBTAIN APPROXIMATE DIMENSIONS FOR INFORMATION				
CLIENT				
TOWNSHIP OF LEEDS AND THE THOUSAND ISLANDS				
PROJECT				
ESCOTT WASTE DISPOSAL SITE SITE TOPOGRAPHY				
TITLE				
WASTE VOLUMETRICS NOVEMBER 28, 2014 TO JULY 28, 2016				
		3108 Carp Road PO Box 430 Ottawa, Ontario K0A 1L0 TEL: (613) 839-3053 FAX: (613) 839-5376 Email: info@blumetric.ca Web: http://www.blumetric.ca		
PROJECT # 160477		DATE 2017-01-23		
DRAWN YL	CHECKED YL	DWG NO. 02	REV 0	



- LEGEND
- FINAL DESIGN CONTOURS
 - CROSS SECTIONS

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.
AERIAL IMAGERY ACQUIRED ON NOV 28, 2014

1:1000 0 m 5 m 10 m 15 m 20 m 25 m

THIS SCALE TO BE USED TO OBTAIN APPROXIMATE DIMENSIONS FOR INFORMATION



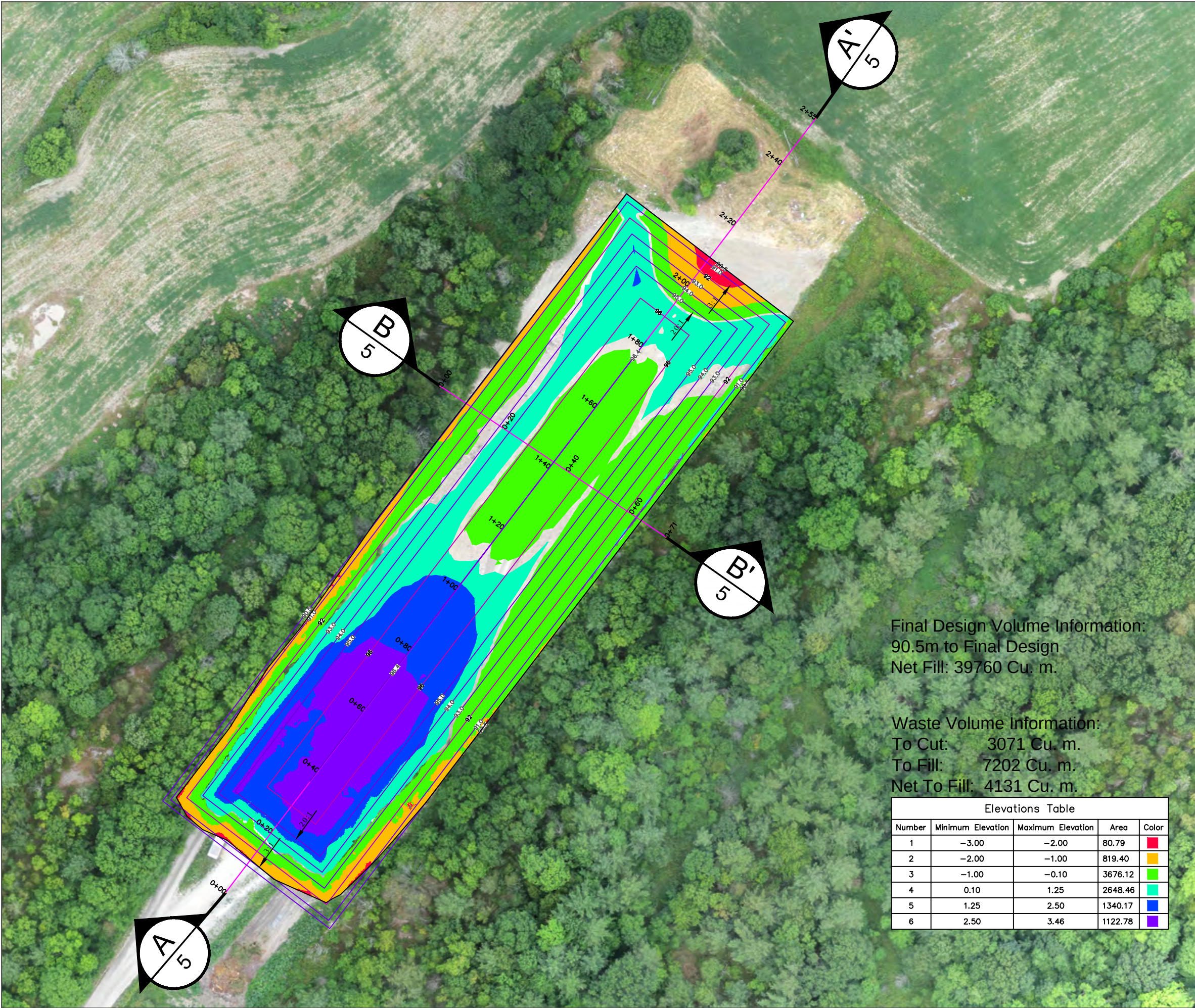
CLIENT
TOWNSHIP OF LEEDS
AND THE THOUSAND ISLANDS

PROJECT
ESCOTT WASTE DISPOSAL SITE
SITE TOPOGRAPHY

TITLE
FINAL DESIGN

BluMetric Environmental
3108 Carp Road PO Box 430
Ottawa, Ontario K0A 1L0
TEL: (613) 839-3053 FAX: (613) 839-5376
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT # 160477	DATE 2017-01-23		
DRAWN YL	CHECKED YL	DWG NO. 03	REV 0



- LEGEND
- FINAL DESIGN CONTOURS
 - CROSS SECTIONS

1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK

REFERENCES
PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS.
AERIAL IMAGERY ACQUIRED ON NOV 28, 2014

1:1000 0 m 5 m 10 m 15 m 20 m 25 m

THIS SCALE TO BE USED TO OBTAIN APPROXIMATE DIMENSIONS FOR INFORMATION



Final Design Volume Information:
90.5m to Final Design
Net Fill: 39760 Cu. m.

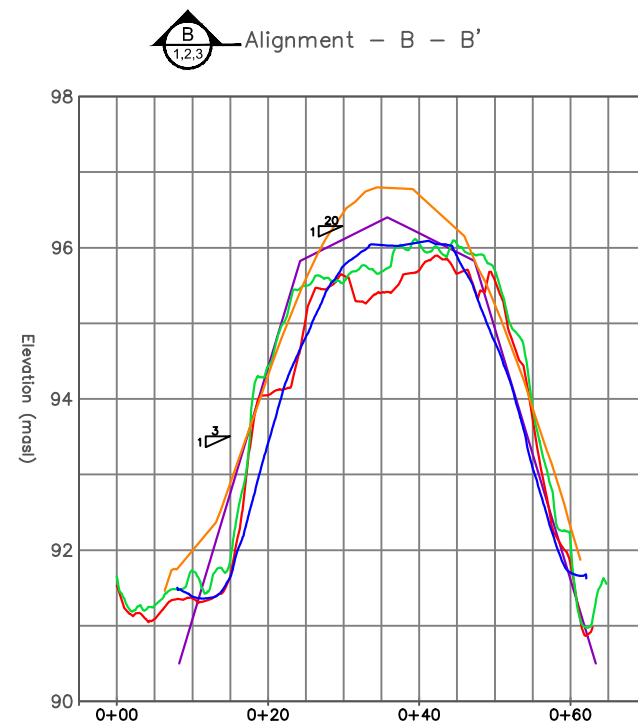
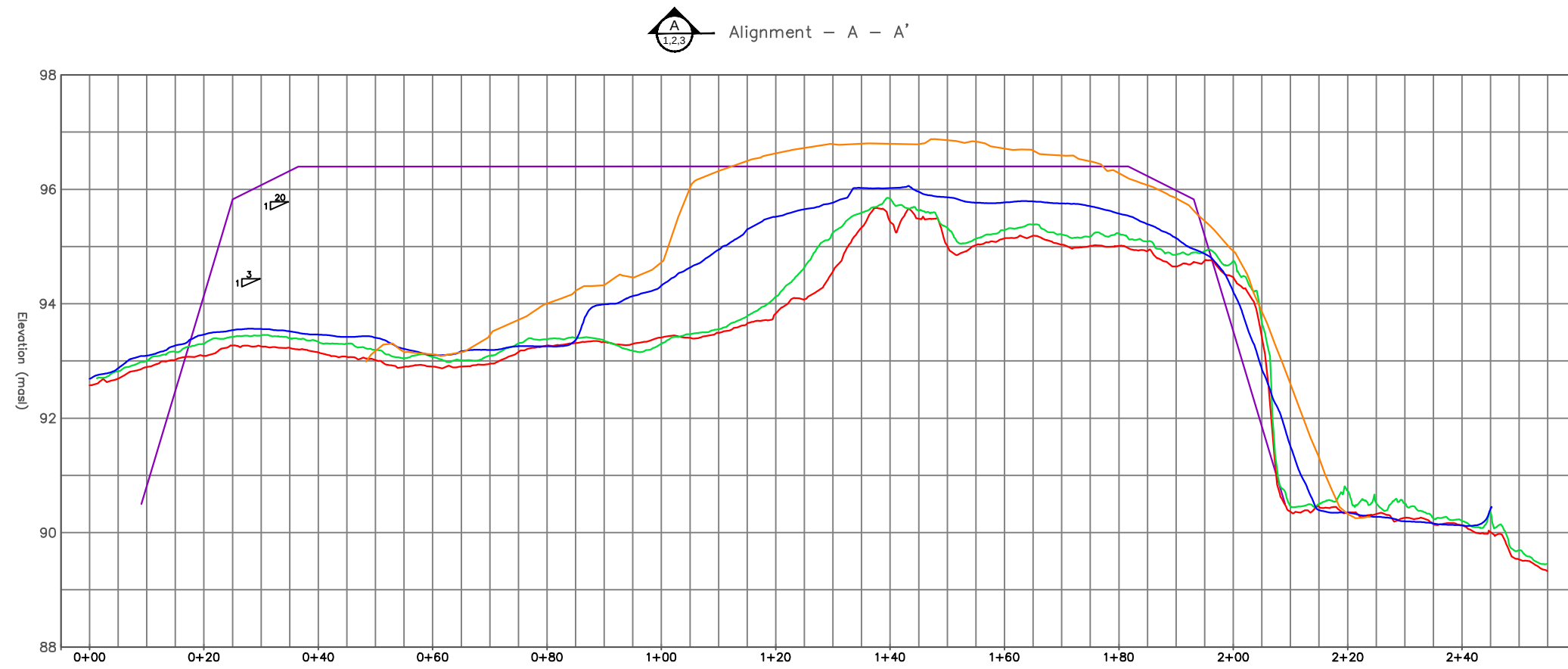
Waste Volume Information:
To Cut: 3071 Cu. m.
To Fill: 7202 Cu. m.
Net To Fill: 4131 Cu. m.

Elevations Table				
Number	Minimum Elevation	Maximum Elevation	Area	Color
1	-3.00	-2.00	80.79	
2	-2.00	-1.00	819.40	
3	-1.00	-0.10	3676.12	
4	0.10	1.25	2648.46	
5	1.25	2.50	1340.17	
6	2.50	3.46	1122.78	

CLIENT	TOWNSHIP OF LEEDS AND THE THOUSAND ISLANDS			
PROJECT	ESCOTT WASTE DISPOSAL SITE SITE TOPOGRAPHY			
TITLE	WASTE VOLUMETRICS DECEMBER 5, 2016 TO FINAL DESIGN			

BluMetric Environmental
3108 Carp Road PO Box 430
Ottawa, Ontario K0A 1L0
TEL: (613) 839-3053 FAX: (613) 839-5376
Email: info@blumetric.ca
Web: http://www.blumetric.ca

PROJECT # 160477	DATE 2017-01-23			
DRAWN YL	CHECKED YL	DWG NO. 04	REV 0	



LEGEND				
— FINAL DESIGN CONTOURS				
— EXISTING GROUND (SURVEYED ON DEC 5, 2016)				
— EXISTING GROUND (SURVEYED ON JULY 28, 2016)				
— EXISTING GROUND (SURVEYED ON NOV 28, 2014)				
— EXISTING GROUND (SURVEYED ON MAY 6, 2014)				
1				
REV.	DESCRIPTION	YY/MM/DD	BY	CHK
REFERENCES PROPRIETARY INFORMATION MAY NOT BE REPRODUCED OR DIVULGED WITHOUT PRIOR WRITTEN CONSENT OF BLUMETRIC ENVIRONMENTAL INC. DO NOT SCALE DRAWING. THIS DRAWING MAY HAVE BEEN REDUCED. ALL SCALE NOTATIONS INDICATED ARE BASED ON 11"x17" FORMAT DRAWINGS. VERTICAL EXAGGERATION: 10x				
1:1000 0 m 5 m 10 m 15 m 20 m 25 m THIS SCALE TO BE USED TO OBTAIN APPROXIMATE DIMENSIONS FOR INFORMATION				
CLIENT TOWNSHIP OF LEEDS AND THE THOUSAND ISLANDS				
PROJECT ESCOTT WASTE DISPOSAL SITE SITE TOPOGRAPHY				
TITLE CROSS SECTIONS				
PROJECT # 160477		DATE 2017-01-23		
DRAWN YL	CHECKED YL	DWG NO. 05	REV 0	

Appendix E

Historic Data Tables

Table 1 - Sampling Parameters

Escott Waste Disposal Site

ECA # A441703

Township of Leeds and the Thousand Islands

Parameters	Groundwater			Surface Water	
	Spring		Fall	Spring and Fall	
Lab	Alkalinity	Total phosphorus	Alkalinity	Alkalinity	Potassium
	Ammonia	Potassium	Aluminum	Ammonia	Suspended Solids
	Aluminum	Sodium	Ammonia	un-ionized ammonia	sodium
	Arsenic	Suspended Solids	Barium	aluminum	silver
	Barium	Total Dissolved Solids	Boron	Arsenic	Total Dissolved Solids
	Boron	Sulphate	Calcium	Barium	Sulphate
	Cadmium	Zinc	Chloride	Boron	Zinc
	Calcium	Biochemical Oxygen Demand	Conductivity	Cadmium	Biochemical Oxygen Demand
	Chloride	Chemical Oxygen Demand	Iron	Chloride	Chemical Oxygen Demand
	Chromium	Dissolved Organic Carbon	Magnesium	Chromium	Dissolved Organic Carbon
	Conductivity	Phenol	Nitrate	Cobalt	Hardness
	Copper	Hardness	pH	Conductivity	Phenol
	Iron		Potassium	Copper	
	Lead		Sodium	Iron	
	Magnesium		Suspended Solids	Lead	
	Manganese		Total Dissolved Solids	Mercury	
	Mercury		Sulphate	nickel	
	Nitrate		Biochemical Oxygen Demand	Nitrate	
	Nitrite		Chemical Oxygen Demand	Nitrite	
	Total Kjeldahl Nitrogen		Dissolved Organic Carbon	pH	
pH		Total Kjeldahl Nitrogen	Total phosphorus		
Field	Temperature		Temperature	Temperature	
	pH		pH	pH	
	Conductivity		Conductivity	Conductivity	
				Dissolved Oxygen	
				Flow	

Ref: Landfill Standards - A guideline on the regulatory and approval requirements for new or expanding landfilling sites - Schedule 5

Table 2 - Groundwater Reasonable Use Limits

Escott Waste Disposal Site

ECA # A441703

Township of Leeds and the Thousand Islands

Parameter	Average Background Concentraion (P_b)	ODWSOG Concentration Limit (C_m)	Factor %	Reasonable Use Limit (C_{allow})
Alkalinity	415	500	50	458
Barium	0.086	1	25	0.315
Boron	0.006	5	25	1.25
Chloride	2	250	50	126
DOC	1.7	5	50	3.35
Iron	0.073	0.3	50	0.186
Manganese	0.099	0.05	50	0.099
Sodium	17.2	200	50	109
TDS	434	500	50	467

Developed according to Procedure B-7-1 using OW8 as representative of backgorund conditions

Current RUL are taken from 2012 annual report

Table 3 - Groundwater Levels and Elevations
Escott Waste Disposal Site
ECA # A441703
Township of Leeds and the Thousand Islands

Location	Ground Surface (mASL)	Elevation (m ASL)	Apr-09		Nov-09		Apr-10		Oct-10		Apr-11		Nov-11		Apr-12		Nov-12		Jul-13		Oct-13		Jun-14		Oct-14	
			Static Water Level (mbtoc)	Water Elevation (m ASL)	Static Water Level (mbtoc)	Water Elevation (m ASL)	Static Water Level (mbtoc)	Water Elevation (m ASL)	Static Water Level (mbtoc)	Water Elevation (m ASL)	Static Water Level (mbtoc)	Water Elevation (m ASL)	Static Water Level (mbtoc)	Water Elevation (m ASL)	Static Water Level (mbtoc)	Water Elevation (m ASL)	Static Water Level (mbtoc)	Water Elevation (m ASL)	Static Water Level (mbtoc)	Water Elevation (m ASL)	Static Water Level (mbtoc)	Water Elevation (m ASL)	Static Water Level (mbtoc)	Water Elevation (m ASL)	Static Water Level (mbtoc)	Water Elevation (m ASL)
Overburden Groundwater Monitors																										
OW 3	89.754	90.791	1.62	89.17	1.59	89.20	1.26	89.53	1.59	89.20	1.13	89.66	1.39	89.40	1.39	89.40	3.11	87.68	2.21	88.58	1.31	89.48	1.35	89.44	1.80	88.99
OW 4	89.785	91.042	0.46	90.58	1.73	89.31	1.57	89.47	1.73	89.31	1.42	89.62	1.67	89.37	1.67	89.37	3.10	87.94	2.78	88.26	1.71	89.33	2.01	89.03	1.88	89.16
OW 5	90.057	90.998	1.75	89.25	1.90	89.10	2.62	88.38	1.90	89.10	1.04	89.96	1.04	89.96	1.04	89.96	2.61	88.39	2.23	88.77	1.51	89.49	1.77	89.23	1.25	89.75
OW 7	92.405	92.994	1.02	91.97	1.44	91.55	1.48	91.51	1.44	91.55	1.80	91.19	1.80	91.19	1.80	91.19	Dry		2.64	90.35	2.29	90.70	2.13	90.86	2.40	90.59
OW 8	91.8	92.954	1.12	91.83	1.29	91.66	1.32	91.63	1.29	91.66	1.25	91.70	1.45	91.50	1.45	91.50	3.23	89.72	2.15	90.80	2.19	90.76	1.67	91.28	1.84	91.11
OW 11	89.346	90.187	Damaged		Damaged		1.04	89.15	Damaged		0.60	89.59	0.93	89.26	0.93	89.26	0.93	89.26	1.65	88.54	0.71	89.48	0.67	89.52	1.09	89.10
OW 12	88.644	89.736	1.27	88.47	Damaged		1.71	88.03	Damaged		1.34	88.40	1.57	88.17	1.57	88.17	1.57	88.17	1.95	87.79	1.24	88.50	1.41	88.33	1.41	88.33
OW 13	91.541	92.547	0.50	92.05	1.42	91.13	1.13	91.42	1.42	91.13	0.90	91.65	1.24	91.31	1.24	91.31	2.23	90.32	1.69	90.86	1.14	91.41	1.19	91.36	1.57	90.98
OW14	93.141	95.14											4.34	90.80	4.37	90.77	5.62	89.52	3.79	91.35	3.60	91.54	4.58	90.56	4.13	91.01
Bedrock Groundwater Monitors																										
BW 1	90.082	91.386	1.50	89.89	2.10	89.29	1.63	89.76	2.10	89.29	1.16	90.23	1.75	89.64	1.84	89.55	3.42	87.97	2.23	89.16	1.97	89.42	1.80	89.59	2.47	88.92
BW 2	89.094	89.815	0.52	89.30	0.86	88.96	0.62	89.20	0.86	88.96	0.28	89.54	0.66	89.16	0.75	89.07	1.97	87.85	0.76	89.06	0.65	89.17	0.62	89.20	1.02	88.80
BW 3	92.267	92.963	2.33	90.63	3.18	89.78	2.53	90.43	3.18	89.78	2.09	90.87	2.71	90.25	2.70	90.26	4.44	88.52	3.56	89.40	3.09	89.87	2.89	90.07	3.24	89.72

Table 4 - Surface Water Chemistry
Escott Waste Disposal Site
ECA # A441703
Township of Leeds and the Thousand Islands

Location	PARAMETERS		Alkalinity	N-NH3	N-NH3 un-ionized	BOD	Calcium	Chloride	COD	Conductivity	DOC	Hardness	N - Nitrate	N - Nitrite	N - Total Kjeldahl	pH	Phenols	Phosphorus (total)	Potassium	Sodium	Sulphate	TDS	TSS	Aluminum	Arsenic	Barium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Silver	Zinc	
	MDL		1	0.03	0.005	0.5	0.5	0.5	5	1	0.2	1	0.2	0.2	0.03	0.01	0.001	0.002	0.1	0.1	0.5	2	1	0.005	0.002	0.005	0.005	0.0001	0.005	0.0001	0.0005	0.03	0.0005	0.05	0.005	0.00005	0.001	0.0001	0.005	
	UNITS		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
	PWQO		mg/L	mg/L	0.02											6.5-8.5	0.001 (I)	0.03 (I)							0.025 (I)	0.1	0.2	0.05	0.0001	0.0009 (I)	0.0009 (I)	0.002	0.3	0.001	0.002	0.005	0.0002	0.0001	0.005	
	CWQG																0.004	0.004								0.1 pH >6.5	0.005		1.5		0.0021	0.064	0.0052	0.069	0.15	0.002	0.00077	0.039	0.00012	0.089
APV	Date	Type				0		180							13	0.06		0.961																						
SW1	1-Jun-01		95	0.1		13	29	14		300	13		0.5		1.1		0.13	1.8	11			160	910	0.65	nd	0.09	nd	0.0003	nd	0.001	0.018	2	0.005	11	0.075		nd	0.0006	0.06	
	1-Nov-01		343	0.03		nd	91.4	83		1200	9.6	551	nd	nd	1.18	7.92	0.166	6.3	43.1			778	9	1.12	nd	0.096	0.893	nd	0.0007	0.0035	1.29	0.0008	37	0.008		0.003	nd	0.011		
	1-Jun-03		130	0.05	nd	1.6	36.4	18.2		299	17	142	nd		1.06	7.59	0.126	3.6	8		1.8	194	52	1.44	nd	0.063	0.017	nd	0.008	0.0027	1.98	0.0013	12.7	0.08	0.002	nd	0.02			
	1-Oct-04		123	nd	nd	3.2	31.3	25		316	21.5	133	nd		1.67	7.7	0.279	10.7	9.6		1.4	204	79	2.31	nd	0.079	0.018	nd	nd	0.0013	0.0035	2.97	0.0015	11.9	0.174	0.003	nd	0.019		
	1-Oct-05		90	0.06	nd	3	30	14		215	10.5	116	nd		3.9	7.75	1.05	8.7	6.4		4	237	780	11	0.002	0.21	0.013	nd	0.021	0.0014	0.015	19	0.0098	12	1	0.013	nd	0.064		
	1-Apr-06		164	nd	nd	2	51	31		386	12.3	140	nd		1	7.8	0.21	5.1	1.2		5	243	71	1.8	nd	0.076	0.016	nd	nd	0.004	2.6	0.0015	16	0.1	0.002	nd	0.012			
	1-Oct-06	DUP	91	0.26	<0.02	6	27	23		244	18.3	96	<0.1		3.8	7.5	1.2	7.1	7.6		1	168	300	11	0.002	0.17	0.014	0.0002	0.017	0.012	17	0.0072	12	0.67	0.01	<0.0001	0.055			
	1-Oct-06		80	0.2	<0.02	8	26	17		221	20.4	85	0.8		5	7.5	2.6	6.7	7.7		<1	150	290	7.7	0.001	0.14	0.013	0.0001	0.012	0.009	13	0.0058	11	0.58	0.007	<0.0001	0.046			
	1-May-07		144	0.28	<0.05	42	30.7	24.9		380	13.5	122	<0.1		0.9	6.65	8.4	4.6	19.4		3	251	4470	16.3	0.0026	0.742	0.045	0.001	0.02	0.05	0.993	0.0218	10.9	0.713	0.02	<0.0001	0.227			
	1-Nov-08		117	<0.05	<0.05	<2	33.2	28		330	17	131	<0.1		1.3	6.87	0.13	14.1	13.6		3	182	8	0.27	<0.03	0.046	0.008	<0.005	<0.002	<0.002	<0.002	1.27	<0.02	11.6	0.251	<0.01	<0.005	<0.005		
	1-Apr-09		127	0.06	<0.05	3	37.4	27		338	9.8	143	0.2	<0.1	1.5	6.93	0.34	5.6	12.9		6	186	310	0.498	0.0008	0.054	0.016	<0.001	<0.001	<0.0005	0.0754	1.04	0.0002	<0.01	<0.0001	0.1	<0.0001	<0.005		
	19-Nov-09		104	<0.05	<0.05	7	27.2	22		216	19.8	113	<0.1	<0.1	0.7	6.79	0.62	11.3	11.3		1	161	320	1.85	0.0012	0.09	0.019	<0.0001	0.005	0.0027	4.01	10.8	0.598	<0.0001	<0.01	<0.0001	0.02	<0.0001	<0.005	
	10-Jul-10		37	0.13	<0.05	5	16.9	2		801	20	71	<0.1	<0.1	6.89	0.84	1.5	1.8	<1		1	162	162	4.2	0.0008	0.076	0.025	0.0001	0.02	0.0085	5.37	6.86	0.339	<0.0001	0.275	<0.0001	0.046			
	10-Jul-10	DUP	57	0.08	<0.05	4	14.2	5		8	131	19.6	<0.1	<0.1	1.5	6.91	<0.001	0.3	0.9	2.5	<1	124	12	0.2	0.0009	0.039	0.03	0.0001	0.003	0.0022	2.48	5.74	0.221	0.01	<0.0001	<0.005				
	19-Oct-10		77	<0.01	<0.01	<2	21.8	18		44	246	15.2	87	<0.1	1	7.36	<0.001	0.1	0.42	7.3	3	135	10	0.3	0.0007	0.042	0.021	<0.0001	<0.002	<0.0005	0.002	0.845	0.0003	7.8	0.289	<0.0002	<0.01	<0.0001	<0.005	
	19-Oct-10	DUP	76	<0.01	<0.01	2	21.9	18		41	241	15.6	87	<0.1	1	7.33	<0.001	0.08	7.5	7.2	3	133	28	0.33	0.0006	0.042	0.023	0.0001	0.003	<0.0005	0.001	0.995	0.0003	7.77	0.291	0.00003	<0.01	<0.0001	<0.005	
	1-Apr-11		73	<0.05	<0.05	2	21.7	13		27	207	7.8	83	<0.1	<0.1	0.5	7.53	<0.001	0.05	2.8	7.4	4	114	2	0.61	0.0003	0.035	0.015	<0.0002	0.003	<0.0001	0.0008	0.599	0.00007	7.11	0.015	<0.0002	<0.01	<0.0002	<0.005
	11-Nov-11		134	0.1	<0.01	11	38.2	38		100	395	16.1	149	0.2	<0.1	2.1	7.76	<0.001	0.57	7.8	15	1	217	392	0.03	0.0006	0.053	<0.0005	<0.0002	0.003	0.0002	0.0011	0.571	0.00051	8.3	0.085	<0.0002	<0.01	<0.0002	<0.005
	19-Apr-12		138	<0.01	<0.01	5				88	332	12.8		0.1	<0.1	5.4	7.84	0.01	0.038	0.019		1	183	68	0.01	0.0008	0.038	0.019	<0.0002	<0.002	0.0006	0.18	<0.0003	<0.0002	<0.0001	<0.005	<0.0003	<0.005		
	23-Oct-13		89	<0.050	<0.0001	<2.0	23.9	21.7		76	240	22.5	95	<0.10	<0.10	0.82	7.13	<0.0010	0.0374	<0.0010	<2.0	150	15.6	0.479	<0.0010	0.0374	<0.0010	0.0082	<0.00050	0.0008	0.838	<0.00050	8.5	0.0319	<					

Table 4 - Surface Water Chemistry continued
Escott Waste Disposal Site
ECA # A441703
Township of Leeds and the Thousand Islands

Location	PARAMETERS		Alkalinity	N-NH3	N-NH3 nitrified	BOD	Calcium	Chloride	COD	Conductivity	DOC	Hardness	N - Nitrate	N - Nitrite	N - Total Kjeldahl	pH	Phenols	Phosphorus (total)	Potassium	Sodium	Sulphate	TDS	TSS	Aluminum	Arsenic	Barium	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Silver	Zinc	
	MDL	1	0.03	0.005	0.5	0.5	0.5	5	1	0.2	1	0.2	0.2	0.03	0.01	0.001	0.002	0.1	0.1	0.5	2	1	0.005	0.002	0.005	0.005	0.0001	0.005	0.0001	0.0005	0.03	0.0005	0.05	0.005	0.00005	0.001	0.0001	0.005		
	UNITS	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pH units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
	PWQO			0.02												6.5-8.5	0.001 (i)	0.03 (i)							0.075 (i)	0.1	0.025	0.3	0.0002		0.0009 (i)	0.002	0.3	0.0005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	CWQO																0.004	0.06							0.1 pH >6.5	0.005	1.5	3.55	0.00021	0.064	0.0052	0.069	0.3	0.001			0.00077	0.039	0.00012	0.089
	APV						0		180								0.961									0.15	2.3													
Date	Type																																							
SW6	1-Sep-03	258	0.25	0.007	3.8	89	20.9			582	23.9	277	0.4	nd	1.68	7.87		0.64	8.9	0.0164	0.0285	402	576	10.7	0.003	0.247	0.067	0.0002	0.015	0.0041	0.0173	8.71	0.0059	27.2	0.234		0.011	nd	0.047	
	1-Jun-04	418	0.07	nd	2.1	109	13.2			746	29	408	nd		0.59	8		0.306	5.2	12.6	3.1	452	47	5.62	0.002	0.181	0.085	0.0001	0.007	0.002	0.008	5.35	0.0039	33.6	0.302		0.006	nd	0.035	
	1-Oct-04	234	0.03	nd	2.5	61.7	30.9			563	19.9	274	nd		2.42	8.19		0.381	10.3	14.1	25.3	352	129	4.32	0.002	0.191	0.034	0.0002	0.007	0.0016	0.0119	3.32	0.0036	24.1	0.116		0.005	nd	0.024	
	1-Oct-05	200	nd	nd	5	77	47			517	14	269	nd		1.2	7.89		0.546	17	16	5	398	30	0.45	0.001	0.061	0.022	nd	nd	0.0021	0.004	2.3	0.0009	16	1.6		0.001	nd	0.017	
	1-Apr-06	615	0.34	nd	4	17	174			1490	51.2	520	nd		4	8.1		66	6	66	6	966	360	17	0.005	0.32	0.06	0.008	0.029		0.037	22	0.035	61	2.1		0.02	nd	0.16	
	1-Oct-06	288	0.14	<0.00002	3	110	128			907	7.4	380	<0.00002		2	8.1		0.44	13	29	34	556	140	1.7	0.003	0.17	0.085	<0.0001	<0.005	0.007	0.007	2	0.0052	34	0.46		0.001	<0.0001	0.023	
	1-May-07	364	0.19	<0.05	30	65.2	11.1			697	19.7	278	0.2		12	7.38		2.8	6	23.4	3	460	580	5.03	0.0063	0.329	0.064	<0.0001	0.011		0.028	0.266	0.01	27.9	1.26		<0.01	<0.0001	0.111	
	1-May-07	340	0.26	<0.05	42	63.7	11.9			684	19.7	273	<0.1		1.9	7.13		2.8	6.4	24.6	3	452	1070	2.8	0.0072	0.321	0.064	<0.0001	0.008		0.025	0.394	0.0081	27.7	1.62		<0.001	<0.0001	0.104	
	1-Oct-07	240	0.21	<0.05	15	89.6	105			860	16.2	337	0.2		7	7.28		2.5	15.2	38.9	48	577	1810	0.91	<0.03	0.144	0.062	<0.0005	<0.002		0.013	1.01	<0.02	31.2	0.084		<0.01	<0.005	0.023	
	1-Nov-08	346	<0.05	<0.05	2	109	18			707	6.3	401	0.2		1.2	7.47		0.22	4.7	19.7	12	389	26	2.22	<0.03	0.148	0.037	<0.005	0.007		0.019	2.61	<0.02	27.5	0.096		<0.01	<0.005	0.091	
	1-Apr-09	326	<0.05	<0.05	4	93.8	18	62		671	7	348	0.9	<0.1	1.4	7		<0.001	0.25	6.5	11.6	8	369	106	0.554	0.0025	0.097	0.046	<0.0001	<0.001	<0.0005	0.0013	1.52	0.0013	27.6	0.252	<0.0002	<0.01	0.0001	<0.005
	19-Nov-09	356	<0.05	<0.05	5	105	37	125		818	9.3	385	0.3	<0.1	2.1	7.47		0.63	14.6	17.7	21	450	172	3.11	0.0058	0.192	0.055	0.0002	0.007		0.0128	4.57	29.9	0.369		<0.01	0.0001	0.047		
	1-Jul-10	393	0.16	<0.05	5	106	24	149		1050	14.3	410	0.1	<0.1	1.6	7.98		0.005	0.6	10.4	19.4	3	118	3.65	0.0104	0.193	0.127	0.0001	0.009		0.0132	6.57	35.4	0.534		<0.01	<0.0001	0.152		
	19-Oct-10	361	<0.01	<0.01	2	113	2	105		932	5.2	411	<0.1	<0.1	1.4	7.98		<0.001	0.39	14.7	25.7	24	512	138	1.52	0.0058	0.186	0.09	<0.0001	0.007	<0.0005	0.0101	2.49	0.0111	31.5	0.184		<0.01	<0.0001	0.043
	1-Apr-11	302	<0.05	<0.05	31	102	21	82		669	4.9	360	0.1	<0.1	2.1	8.02		<0.001	0.52	7.4	12.3	10	368	202	1.11	0.0005	0.127	0.074	<0.0002	0.004		0.00006	25.5	0.177	<0.0002	<0.01	<0.0002	<0.005		
	11-Nov-11	97	0.04	<0.01	<2	23.6	12	35		275	11.6	91	<0.1	<0.1	0.6	7.64		<0.001	0.07	1.6	19.8	5	151	30	0.02	0.0003	0.026	<0.005	<0.0002	<0.002	0.0001	0.0005	0.342	0.00008	7.87	0.051	<0.0002	<0.01	<0.0002	<0.005
	23-Oct-13	242	<0.050	<0.00012	<2.0	73.5	50.1		57	643	24.6	273	<0.10	<0.10	0.8	7.5		<0.0010	0.305	14.3	19.2	27.5	391	15.6	0.382	0.0018	0.0875	0.053	<0.00090	0.00103	0.0017	1.02	0.00050	21.7	0.0558	<0.0010	0.0011	<0.0010	0.0064	
	12-Jun-14	401	0.103	0.00083	7.5	121	52.4	184			875	23.6	439	<0.10	<0.10	5.2	7.89		<0.0010	0.94	23.5	39.1	13.3	546	167	6.56	0.0096	0.231	0.201	0.000209	0.0113	0.00444	0.0213	8.4	0.00711	33.6	0.926	<0.00010	0.0096	<0.00010
SW7	1-Sep-03	26	0.13	nd	2.6	8.4	2.4			79	15.5	29	nd	nd	0.96	6.56		0.232	3.1	1.8	7.4	76	157	5.15	nd	0.077	0.026	0.0001	0.017	0.0018	0.0043	3.6	0.004	3.67	0.142		0.005	nd	0.015	
	1-Jun-04	48	nd	nd	3	13	1.6			112	8.4	50	nd		0.59	7.9		0.252	2.1	2.8	5.2	84	64	7.19	0.003	0.098	0.009	0.0002	0.008		0.0028	0.0041	6.01	0.0057	5.67	0.311	0.000006	nd	0.031	
	1-Oct-04	49	0.08	nd	0.6	12.9	9.7			137	11.5	57	nd		0.086	7.52		0.106	2.9	3.6	5.3	106	32	1.01	nd	0.035	nd	nd	nd	nd	0.0005	0.0019	0.93	0.0008	4.84	0.056	0.001	nd	0.006	
	1-Oct-05	89	nd	nd	nd	23	31			278	10.1	110	nd		0.7	7.97		0.044	2.2	24	9	170	2	0.16	nd	0.028	0.012	nd	nd	nd	0.005	0.027	nd	7.5	0.006	nd	nd	0.006		
	1-Apr-06	263	0.2																																					

Table 5 - PWQO exceedances
Escott Waste Disposal Site
ECA # A441703
Township of Leeds and the Thousand Islands

Location	PARAMETERS		N-NH3 (unionized)	pH	Phenols	Phosphorus (total)	Aluminum	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Mercury	Nickel	Silver	Zinc
	MDL		0.005	0.01	0.001	0.002	0.005	0.002	0.005	0.0001	0.005	0.0001	0.0005	0.03	0.0005	0.00005	0.001	0.0001	0.005
	UNITS		mg/L	pH units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	PWQO		0.02	6.5-8.5	0.001	0.03	0.075	0.1	0.2	0.0002	0.089	0.0009	0.005	0.3	0.005	0.0002	0.025	0.0001	0.03
	Date	Type																	
Hickenbottom Inlet	12-JUN-14		0.0011	8.18	<0.0010	0.118	2.67	<0.0010	0.843	<0.000090	0.00404	0.00141	0.0029	2.89	0.00137	<0.00010	0.0047	<0.00010	0.0161
Hickenbottom Outlet	22-Jul-13		<0.000085	7.35	<0.0010	0.072	0.239	<0.0010	0.159	<0.000090	0.00058	<0.00050	0.0031	0.119	<0.00050	<0.00010	0.0014	<0.00010	<0.0030
Hickenbottom Outlet	23-OCT-13		<0.00017	7.45	<0.0010	0.053	3.05	<0.0010	0.016	<0.000090	0.00388	0.00054	0.0025	1.81	0.00076	<0.00010	0.002	<0.00010	0.0081
Hickenbottom Outlet	12-JUN-14		0.000164	7.67	<0.0010	0.092	1.45	<0.0010	0.219	<0.000090	0.00206	0.0006	0.0041	1.09	0.00057	<0.00010	0.0027	<0.00010	0.0061
Hickenbottom Outlet	16-OCT-14		<0.00019	7.39	<0.0010	0.151	4.32	<0.0010	0.135	0.000091	0.00549	0.00122	0.0096	3.03	0.00122	<0.00010	0.0043	<0.00010	0.0137
SW1	23-OCT-13		<0.00011	7.13	<0.0010	0.18	0.479	<0.0010	0.027	<0.000090	0.00082	<0.00050	<0.0010	0.838	<0.00050	<0.00010	<0.0010	<0.00010	0.0038
SW1	12-JUN-14		0.00046	7.43	0.0014	0.382	1.58	0.0011	0.021	<0.000090	0.00256	0.00069	0.002	2.03	0.00121	<0.00010	0.0018	<0.00010	0.0339
SW1	16-OCT-14		<0.000058	7.45	<0.0010	0.213	10.2	0.0017	0.106	<0.000090	0.00797	0.0025	0.008	5.27	0.00323	<0.00010	0.006	<0.00010	0.0402
SW1	16-OCT-14		0.000093	7.47	<0.0010	0.185	12	0.0017	0.018	<0.000090	0.00908	0.0026	0.0072	5.81	0.00305	<0.00010	0.0064	<0.00010	0.0231
SW2	12-JUN-14		0.036	7.94	<0.0010	0.044	0.078	<0.0010	0.658	<0.000090	0.00057	0.00091	<0.0010	5.93	<0.00050	<0.00010	0.0026	<0.00010	<0.0030
SW2	26-OCT-14		0.017	7.86	<0.0010	0.123	0.419	0.0015	0.902	<0.000090	0.00103	0.00065	0.0017	15.4	0.00083	<0.00010	0.0027	<0.00010	0.0138
SW4	22-Jul-13	DUP	0.00336	7.82	0.001	0.321	2.55	0.002	0.015	<0.000090	0.00339	0.0019	0.0036	4.03	0.00102	<0.00010	0.0032	<0.00010	0.0107
SW4	22-Jul-13		0.00348	7.73	0.002	0.328	3.08	0.002	0.015	<0.000090	0.00393	0.00202	0.0038	4.38	0.00111	<0.00010	0.0037	<0.00010	0.0127
SW4	23-OCT-13		0.00051	7.27	<0.0010	0.06	1.17	<0.0010	0.015	<0.000090	0.00177	<0.00050	0.0067	0.754	<0.00050	<0.00010	0.0021	<0.00010	0.0078
SW4	12-JUN-14		0.00029	7.66	0.0011	0.212	1.52	<0.0010	0.02	<0.000090	0.00218	0.00059	0.0038	1.34	0.00064	<0.00010	0.0021	<0.00010	0.0074
SW4	12-JUN-14		0.00328	7.66	<0.0010	0.183	1.3	<0.0010	0.02	<0.000090	0.00189	0.00055	0.0036	1.22	0.00059	<0.00010	0.002	<0.00010	0.0097
SW4	16-OCT-14		<0.00022	7.61	<0.0010	0.119	3.23	<0.0010	0.028	0.000118	0.0045	0.00151	0.0061	2.8	0.00119	<0.00010	0.0039	<0.00010	0.0146
SW5	22-Jul-13		0.00258	8.05	0.001	0.439	1.43	0.0015	0.043	<0.000090	0.00198	0.0013	0.0026	1.67	0.00081	<0.00010	0.0024	<0.00010	0.0091
SW5	23-OCT-13		<0.00015	7.25	<0.0010	0.102	1.67	<0.0010	0.018	<0.000090	0.00237	0.00053	0.0049	1.24	0.00056	<0.00010	0.0022	<0.00010	0.0092
SW5	12-JUN-14		0.000617	7.68	<0.0010	0.209	1.86	<0.0010	0.02	<0.000090	0.00263	0.00072	0.004	1.73	0.0007	<0.00010	0.0025	<0.00010	0.0071
SW5	16-OCT-14		0.0023	8	<0.0010	0.324	3.83	0.001	0.032	<0.000090	0.00528	0.00233	0.0043	3.71	0.00122	<0.00010	0.0047	<0.00010	0.0165
SW6	23-OCT-13		<0.00012	7.5	<0.0010	0.305	0.382	0.0018	0.053	<0.000090	0.00103	<0.00050	0.0017	1.09	<0.00050	<0.00010	0.0011	<0.00010	0.0064
SW6	12-JUN-14		0.00083	7.89	<0.0010	0.94	6.56	0.0096	0.201	0.000209	0.0113	0.00444	0.0213	8.4	0.00711	<0.00010	0.0096	<0.00010	0.0653
SW7	22-Jul-13	DUP	<0.00015	8.01	<0.0010	0.095	0.092	<0.0010	0.015	<0.000090	<0.00050	<0.00050	<0.0010	0.858	<0.00050	<0.00010	<0.0010	<0.00010	0.0065
SW7	23-OCT-13		0.00048	7.45	<0.0010	0.04	0.034	<0.0010	0.013	<0.000090	<0.00050	<0.00050	<0.0010	0.365	<0.00050	<0.00010	<0.0010	<0.00010	0.0085
SW7	23-OCT-13		0.00049	7.39	<0.0010	0.061	0.032	<0.0010	0.014	<0.000090	<0.00050	<0.00050	<0.0010	0.356	<0.00050	<0.00010	<0.0010	<0.00010	<0.0030
SW7	12-JUN-14		0.00064	7.62	<0.0010	0.211	0.065	<0.0010	0.02	<0.000090	<0.00050	<0.00050	<0.0010	1.02	<0.00050	<0.00010	<0.0010	<0.00010	0.0104
SW7	16-OCT-14		<0.00024	7.46	<0.0010	0.032	0.02	<0.0010	0.016	0.000454	<0.00050	<0.00050	<0.0010	0.555	<0.00050	<0.00010	<0.0010	<0.00010	<0.0030
SW8	22-Jul-13		<0.00015	7.44	0.002	0.36	0.149	<0.0010	0.014	<0.000090	<0.00050	<0.00050	<0.0010	3.27	<0.00050	<0.00010	<0.0010	<0.00010	<0.0030
SW8	23-Oct-13		0.00042	7.13	<0.0010	0.034	0.17	<0.0010	0.013	<0.000090	<0.00050	<0.00050	<0.0010	0.526	<0.00050	<0.00010	<0.0010	<0.00010	<0.0030
SW8	12-JUN-14		<0.00015	7.81	<0.0010	0.137	1.91	<0.0010	0.016	<0.000090	0.00297	0.00094	0.0017	2.01	0.00109	<0.00010	0.0019	<0.00010	0.0102
SW8	16-OCT-14		<0.000072	7.67	<0.0010	0.108	0.634	<0.0010	0.019	<0.000090	0.00091	<0.00050	<0.0010	0.876	<0.00050	<0.00010	<0.0010	<0.00010	0.0051

Table 6 - Overburden Groundwater Chemistry
 Ecum Waste Disposal Site
 ECA # A441703
 Township of Leeds and the Thousand Islands

Location	PARAMETERS	Date	Type	pH	Alkalinity	N - Ammonia	BOD	Calcium	Chloride	COD	Conductivity	DOC	Hardness	Magnesium	N - Nitrate	N - Nitrite	N - Total (Kjeldahl)	pH	Phenols	Phosphorus (total)	Potassium	Sodium	Sulphate	Total Dissolved Solids	Total Suspended Solids	Aluminum	Arsenic	Barium	Boron	Cadmium	Chromium - m	Copper	Iron	Lead	Manganese	Mercury	Nickel	Silver	Zinc		
					mg/L (DS)	mg/L	mg/L	mg/L	mg/L (DS)	uS/cm (DS)	mg/L (DS)	mg/L	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)	mg/L (DS)
DW 2	1-May-01	150	21	170	260	1300		820	120	0.1	72	7.1		51	200	16	1800		0.01	nd	1.6	1.4	nd	nd	nd	0.8	nd	0.4		0.035	nd	0.06									
	1-Nov-01	1480	18.8	172	272	1320		1320	120	nd	120	120	nd	72	131		1720		nd	0.006	1.22	1.54	nd	nd	nd	0.0009	0.234		0.03	nd	0.015										
	1-Aug-02	1507	1320	2.2	197	1320		899	120	nd	152	7.17		152	7.17		1710		0.01	0.005	0.005	1.87	nd	nd	0.0005	0.205		0.027	nd	0.005											
	1-Nov-02	1680	16.6	159	279	1130		893	120	nd	152	7.17		152	7.17		1710		nd	0.007	0.036	1.81	nd	nd	0.0051	0.007		0.031	nd	0.002	nd										
	1-Nov-02	1700	1320	16.1	180	277	1300		978	128	nd	152	7.17		152	7.17		1710		nd	0.007	0.035	1.94	nd	nd	0.005	0.001	0.006		0.029	nd	0.01									
	1-Jun-03	1320	11.9	158	232	1170		899	120	nd	152	7.17		152	7.17		1710		nd	0.007	0.036	1.54	nd	nd	0.005	0.008		0.03	nd	0.01											
	1-Jun-03	1320	11.8	166	238	1170		899	120	nd	152	7.17		152	7.17		1710		nd	0.007	0.035	1.55	nd	nd	0.007	nd	0.07	nd	0.031												
	1-Sep-03	1320	11.9	168	233	1170		897	120	nd	152	7.17		152	7.17		1710		nd	0.008	0.033	1.68	nd	nd	0.005	nd	0.78	0.0033	0.255												
	1-Jun-04	1260	74.9	19.7	165	235	1250		44	904	nd	152	7.17		152	7.17		1710		0.005	0.006	0.031	1.27	nd	nd	0.001	0.73	0.001	0.234												
	1-Oct-04	1250	N/A	16.4	179	205		2820	37.2	nd	156	nd		97.5	7.6		59.8		nd	0.006	0.039	1.49	nd	nd	nd	0.02	0.12	nd	0.29												
DW 4	1-Jun-05	1390	nd	17	151	192	886		127	nd	nd	nd	nd	156	nd		77.3	7.6		59.8		nd	nd	nd	0.006	0.12	nd	0.22													
	1-Oct-05	1270	80.8	81	200	138		2440	32	786	110	nd		81	7.86		57		0.006	nd	0.68	1.3	nd	nd	nd	6.4	nd	0.36													
	1-Apr-06	1310	59	180	155	1250		35	140	120	nd			68	7.9		55		0.008	0.009	1	1.2	nd	nd	nd	5.8	nd	0.31													
	1-Apr-06	1330	59	20	180	161		2640	34.6	900	110	nd			72	7.8		42		0.008	0.007	1.3	1.3	nd	nd	nd	4.6	nd	0.48												
	1-Oct-06	1270	12	190	173		2820	36.7	860	120	nd			83	7.7		63		0.011	0.007	0.09	1.4	nd	nd	nd	0.0005	0.29														
	1-Oct-06	1380	13	180	172		2830	36.7	860	120	nd				83	7.7		63		0.011	0.007	0.09	1.4	nd	nd	nd	0.0005	0.29													
	1-May-07	1210	15	183	144		2540	24.3	860	98	nd			70	7.88		43.6		0.003	0.003	0.542	0.773	nd	nd	nd	0.0002	0.404														
	1-May-07	1300	12	181	174		2400	27.6	889	105	10	nd			70.5	7.95		40.5		0.003	0.003	0.538	0.745	nd	nd	nd	0.0002	0.404													
	1-Oct-07	1270	>21	159	264		95.8	884	116					20	6.95		72.4		0.48	<0.01	0.813	1.36	nd	nd	nd	0.002	0.64														
	1-Oct-07	1110	110	121	105	254		111	864	116				120	6.95		72.4		0.02	<0.01	0.772	1.36	nd	nd	nd	0.002	0.64														
DW 5	13-Jul-08	1110	110	121	105	254		111	864	116				120	6.95		72.4		0.02	<0.01	0.772	1.36	nd	nd	nd	0.002	0.64														
	1-Nov-08	1160	14	192	176		2790	19.3	935	111	<0.1			40	7.01		49.1		0.001	0.001	0.845	1.05	nd	nd	nd	0.002	1.04														
	1-Apr-09	873	79	238	149	1100	112	1030	112	0.29				25.6	8.1	264		13.8		0.009	0.009	0.249	0.129	nd	nd	nd	0.0002	0.005	0.18												
	19-Nov-09	1160	115	6	169	207	503	1330	20.3	899	116	0.1			100	6.87	0.004	9.2		0.14	0.083	0.897	1.49	nd	nd	nd	0.0002	0.002													
	15-Apr-10	1160	115	4	168	206	306	1360	20.1	902	117	<0.1		74.1	6.87	0.005	7.8		0.17	0.083	0.889	1.52	nd	nd	nd	0.0002	0.002														
	14-Apr-10	911	0.53	5	166	818	299	1840	7	1110	162	<0.1	<0.1	2.35	7.44		48		0.013	0.013	0.925	1.51	nd	nd	nd	0.0002	0.002														
	11-Nov-11	911	0.53	5	166	818	299	1840	7	1110	162	<0.1	<0.1	2.35	7.44		48		0.013	0.013	0.925	1.51	nd	nd	nd	0.0002	0.002														
	11-Nov-11	911	0.53	5	166	818	299	1840	7	1110	162	<0.1	<0.1	2.35	7.44		48		0.013	0.013	0.925	1.51	nd	nd	nd	0.0002	0.002														
	11-Nov-11	911	0.53	5	166	818	299	1840	7	1110	162	<0.1	<0.1	2.35	7.44		48		0.013	0.013	0.925	1.51	nd	nd	nd	0.0002	0.002														
	11-Nov-11	911	0.53	5	166	818	299	1840	7	1110	162	<0.1	<0.1	2.35	7.44		48		0.013	0.013	0.925	1.51	nd	nd	nd	0.0002	0.002														
DW 6	2-Oct-12	903	0.196	1.1	118	77.9	1490	1750	14.1	1100	149	nd		0.1	7.48		54		0.004	0.004	0.846	1.001	0.0004	0.002																	
	2-Oct-12	903	0.196	1.1	118	77.9	1490	1750	14.1	1100	149	nd		0.1	7.48		54		0.004	0.004	0.846	1.001	0.0004	0.002																	
	2-Oct-12	905	0.597	4.5	183	84	17	1820	10.3	1130	163	<0.50	0.005	1.14	7.4		0.0015	1.6		0.167	<0.00000	<0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	
	2-Oct-12	905	0.597	4.5	183	84	17	1820	10.3	1130	163	<0.50	0.005	1.14	7.4		0.0015	1.6		0.167	<0.00000	<0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	
	2-Oct-12	905	0.597	4.5	183	84	17	1820	10.3	1130	163	<0.50	0.005	1.14	7.4		0.0015	1.6		0.167	<0.00000	<0.00000	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	
	2-Oct-12	905	0.597	4.5	183	84	17	1820	10.3	1130	163	<0.50	0.005	1.14	7.4		0.0015	1.6		0.167	<0.00000																				

Table 6 - Overburden Groundwater Chemistry continued
Excerpt Waste Disposal Site
ICR # 444703
Township of Leeds and the Thousand Islands

Location	PARAMETERS		Alkalinity	N - Ammonia	BOD	Calcium	Chloride	COD	Conductivity	DOC	Hardness	Magnesium	N - Nitrate	N - Nitrite	N - Total (Kjeldahl)	pH	Phenols	Phosphorus (total)	Potassium	Sodium	Sulphate	Total Dissolved Solids	Total Suspended Solids	Aluminum	Arsenic	Barium	Boron	Cadmium	Chromium (6)	Copper	Iron	Lead	Manganese	Mercury	Nickel	Silver	Zinc	
	UNITS	CONVERSIONS	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
			100 (CG)			250 (AO)				5 (AO)	80-100 (G)	10 (MAC)	1 (MAC)		6.5-8.5 (CG)				200 (AO)	500 (AO)		0.10 (CG)		0.10 (CG)	1	5	0.005	0.05	1 (AO)	0.1 (AO)	0.01 (AO)	0.001 (AO)					5 (AO)	
Date	Type																																					
DW 7	1-May-01	260		2	88	2					210	39	nd		0.59	7.9			2	8.8	9.3	280	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	1-Nov-01	197		nd	57.7	1.4					206	14.8	nd		0.2	7.75			8.1	2.0	250	0.005	nd	0.052	0.011	nd	nd	0.0021	nd	0.0006	0.057	nd	nd	nd	nd	0.008		
	1-Aug-02	225		0.6	52.2	2.5					213	39	nd		0.43	8.08			0.05	5.1	10.4	250	0.014	nd	0.011	nd	nd	0.0091	nd	nd	nd	nd	nd	nd	nd	0.002	nd	0.013
	1-Jun-03	163		nd	48.3	3.4					167	11.2	nd		0.24	7.11			0.6	4.7	8.9	184	0.033	nd	0.027	nd	nd	0.0014	nd	nd	nd	nd	nd	nd	nd	0.007	nd	
	1-Sep-03	244	0.04	nd	2.9	8.8	2.3				408	3.9	240	16.9	nd	0.39	7.84			1.2	4.9	10.8	246	nd	0.044	0.006	nd	nd	0.0015	nd	nd	nd	nd	nd	nd	nd	0.003	
	1-Jun-04	198		0.15	nd	52	1.5				366	4.8	177	11.3	nd	0.039	nd			0.6	4.8	11.3	222	0.039	nd	0.027	nd	nd	0.0013	nd	0.0009	0.072	nd	nd	nd	nd	0.036	
	1-Oct-04	22		nd	52.4	3.4	4	2			438	8.08	0.2		0.2	8.04			0.7	5.4	11.8	268	0.036	nd	0.031	0.011	nd	nd	0.0146	nd	0.0177	0.011	nd	nd	nd	nd	0.013	
	1-Jun-05	225	0.4	nd	50.6	3.4	4				410	8.2	0.07		0.67	8.23			1.6	7.8	10.1	640	0.028	nd	0.01	nd	nd	nd	0.012	nd	0.017	0.011	nd	nd	nd	nd	0.023	
	1-Oct-05	135	nd	nd	nd	nd	243	8			123	3.4	nd		0.5	8.34			0.31	9		370	0.04	nd	0.01	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.016	
	1-Apr-06	302		0.17	nd	44	2				170	14	nd		0.5	8.1			1.1	8		233	0.034	nd	0.042	0.036	nd	nd	0.003	nd	nd	nd	nd	nd	nd	nd	0.288	
	1-Oct-06	101	0.21	-2	27	3	222				95	1.3	0.3		7	7.6			0.95	7.7	14	140	0.046	nd	0.001	0.016	+0.01	+0.0001	+0.005	0.007	+0.05	+0.0005	0.017		+0.001	0.016		
	1-May-07	96	0.12	-2	11.9	1.1	150	2.9	90		1.09	0.2	0.2		1.4	8.54		5.3	0.55	10.3	9	99	0.04	0.0011	0.013	+0.005	+0.00002	+0.002	0.001	0.35	+0.00002	0.013		0.019				
	1-Jul-08	139		0.04	nd	nd	421				145	14.9	0.2		0.8	7.15			0.47	8.01	19.9	9	0.022	0.012	0.011	0.021	0.002	0.0001	0.15						0.019			
	1-Nov-08	104		0	24.1	1	235	7.9	89		6307	0.1			6.8	7.81						129	0.77	0.03	0.019	+0.005	+0.005	+0.002	0.0404	+0.02	0.285	nd		+0.001				
	1-Apr-09	172	0.3	15	15	1	361	4.2	128		10.4			-0.1	10	7.03			1.5	4.1	11	199	0.007	0.058	0.006	+0.0001	0.004	0.0008	2.66	0.0038	0.056			0.005				
	19-Nov-09	180	0.73	9	55.6	2		146	171	7	136	13.9	0.3			7.25	+0.001	7.8	0.8	4.4	12		10300	0.09	0.0007	0.022	+0.005	+0.00002	+0.002	0.002	0.074	+0.00002	0.363			+0.005		
	21-Oct-10	72	0.55	10	15.4	2	175	3.9	18			4.69	0.2			8.6	7.35	+0.001		0.6	1.6	9	11	96	0.006	0.024	+0.005	+0.00002	0.002	+0.002	0.495	0.00049	0.232			+0.001		
	1-Nov-11	11	0.048	-2	13	1.5	525	1.7	176		21.3	+0.1	-0.1		0.31	8.03	+0.001	0.16	0.6	9		289	780	0.06	0.0003	0.076	0.0033	0.0003	0.186	0.0006	0.27				0.005			
	19-Apr-12	215	0.084	12	52.8	1.7	1610	431	2			227	17.2	0.1	-0.1	13.4	7.8	+0.001	15.3	1.3	4.4	9	9	237	28100	0.006	0.064	0.005	+0.00002	+0.00002	0.0005	0.313	0.0001	0.524			+0.005	
	22-Jul-13	239		+0.050	+2.0	89.2	+0.0	+0.0				317	24.7	0.0	+0.0	1.09	7.82	0.006	0.53	1.3	15.8	17	962	380	+0.010	0.006	+0.0001	+0.00009	+0.0005	+0.010	+0.0001	+0.0005	0.027	+0.0001		0.033		
	23-Oct-13	286		+0.050	+2.0	89.9	+0.0	+0.0				245	17.2	+0.0	+0.0	-0.15	7.82			7.95	12.7		386	648	+0.010	0.006	+0.0001	+0.00009	+0.0005	+0.010	+0.0001	+0.0005	0.027	+0.0001		0.033		
	23-Oct-13	283		+0.050	+2.0	70.2	+2.0	+2.0				32	13.2	2.4	0.7		17.4	+0.010	0.317	1.3	14.3		417	417	+0.010	+0.0001	+0.00009	+0.0005	+0.010	+0.050	+0.0005	0.019	+0.0001		+0.0010			
	25-Jun-14	25		+0.0	75.8	+2.0	+0.0	+0.0				171	15.9	+0.0	+0.0	0.2	7.74	+0.010	0.317	1.3	14.3		417	417	+0.010	+0.0001	+0.00009	+0.0005	+0.010	+0.050	+0.0005	0.019	+0.0001		+0.0010			
	25-Jun-14	264		+0.050	+2.0	76.5	+2.0	+2.0				12	54.2	2.9	0.7		17.4	+0.010	0.317	1.3	14.3		417	417	+0.010	+0.0001	+0.00009	+0.0005	+0.010	+0.050	+0.0005	0.019	+0.0001		+0.0010			
	16-Oct-14	309	0.094	-2.0	7.4	2		-0.1	95.1	2.3	274	20.1	+0.10	+0.10	0.3	7.78	+0.010	0.216	1.4	7.51	11.2	319	348	+0.010	+0.0001	0.061	+0.010	+0.00009	+0.0005	+0.010	+0.050	+0.0005	0.0461	+0.0001		0.031		
DW 8	1-May-01	1460		77	1.5		850				480	71	0.3		0.3	7.6			2.3	30		460	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
	1-Nov-01	466		nd	104	1.2					440	44.9	nd		0.47	7.84			2.3	20		423	nd	nd	0.147	0.013	nd	nd	0.0047	nd	0.0009	0.045			0.003	nd		
	1-Aug-02	496		nd	89.3	1.4					395	44.7	nd		0.68	7.79			2.8	18.1	75.5	390	0.017	nd	0.148	0.013	nd	nd	0.0052	nd	nd	0.034			0.005	nd		
	1-Nov-02	396		92	0.8						791	31	nd		0.25	7.81			3.5	16.6	81	496	nd	nd	0.11	0.009	nd	nd	0.0019	nd	nd	nd	nd	nd	nd	nd	0.009	
	1-Jun-03	418		nd	93.1	0.8					385	37	nd		0.2	7.55			1.6	21.5	36	414	0.008	nd	0.078	0.008	nd	nd	0.0018	nd	nd	nd	nd	nd	nd	nd	0.007	
	1-Sep-03	415	0.07	nd	100	1.6					714	2.6			0.42	7.85			2.3	17.2	49.1	428	nd	0.031	0.018	nd	nd	0.0015	nd	nd	nd	nd	nd	nd	nd	0.002	nd	
	1-Jun-04	415	0.04	nd	91.6	nd					795	2.9	0.2		0.15	7.77			1.2	19.9	31	442	0.012	nd	0.006	nd	nd	0.0012	nd	nd	nd	nd	nd	nd	nd	0.015		
	1-Oct-04	412		nd	99.7	0.6					717	3.4			0.19	8.12			1.5	18.5	32.9	438	0.006	nd	0.081	0.007	nd	nd	0.0016	nd	0.0011	nd	nd	nd	nd	nd	0.012	
	1-Jun-05	417	0.1	nd	96.2	0.4					717	3.4			0.19	8.12			1.7	17.1	23.7	440	0.006	nd	0.11	0.009	nd	nd	0.0019	nd	0.001	0.033			0.004	nd		
	1-Apr-06	381		nd	nd	nd	105	8.2	7.4		41	nd			0.3	8.15			1.5	29		440	0.008	nd	0.078	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.012	
	1-Sep-06	415	nd	nd	100	1.6					717	3.4			0.19	8.12			1.5	29		440	0.008</															

Table 7- Bedrock Groundwater Chemistry
Escott Waste Disposal Site
ECA # A441703
Township of Leeds and the Thousand Islands

Location	PARAMETERS		Alkalinity	N - Ammonia	BOD	Calcium	Chloride	COD	Conductivity	DOC	Hardness	Magnesium	N - Nitrate	N - Nitrite	N - Total Kjeldahl	pH	Phenols	Phosphorus (total)	Potassium	Sodium	Sulphate	Total Dissolved Solids	Total Suspended Solids	Aluminum	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Nickel	Silver	Zinc	
	UNITS		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pH units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		
	ODWSOG		500 (OG)					250 (AO)						5 (AO)	80-100 (OG)		10 (MAC)	1 (MAC)				200*(AO)	500 (AO)			0.10 (OG)		1	5	0.005	0.05	1 (AO)	0.3 (AO)	0.01	0.05 (AO)	0.0001		
	RUL																																					
	Date	Type																																				
BW 1	1-Sep-03		1010	5.03	5	234	72.6		1680	13.4	972	93.7	nd	nd	6	7.44			6.8	53.9	136	1220		nd	nd	0.522	0.857	nd	nd	0.0122	0.5	0.0013	3.71			0.01	nd	0.011
	1-Sep-03	DUP	1010	4.98	3.2	244	72.3		1700	13.7	1010	97.6	nd	nd	5.7	7.27			7	56	133	1220		nd	nd	0.544	0.869	nd	nd	0.0127	0.49	nd	3.86			0.011	nd	0.01
	1-Jun-04		684	4.04	4.1	180	41.8		1410	6	772	78.2	nd	nd	4.36	7.18			6.1	39.9	142	908		nd	nd	0.38	0.498	nd	nd	0.0048	0.66	0.001	2.82			0.006	nd	0.013
	1-Oct-04	DUP	934		1.4	256	67		1830	15.3	1060	102	nd	nd	6.92	7.81			7.7	58.2	135	1220		nd	nd	0.552	0.926	nd	nd	0.008	1.66	nd	3.71			0.009	nd	nd
	1-Oct-04		979		12.5	259	67.1		1860	15.3	1080	105	nd	nd	6.05	7.67			7.9	60.7	133	1230		nd	nd	0.558	0.935	nd	nd	0.0083	1.67	nd	3.71			0.01	nd	nd
	1-Jun-05		728	5.3	5	198	40.7		1490	11	791	77.3	nd	nd	6	8.04			6.7	40.1	142	1080		nd	nd	0.384	0.42	nd	nd	0.007	0.89	nd	2.51			0.005	nd	0.01
	1-Oct-05	DUP	987	5.3	8	260	55		1700	11	897	110	nd	nd	6	7.96			8.7		102	1160		nd	0.001	0.51	0.77	nd	nd	0.004	1.9	nd	3.4			N/A	nd	0.008
	1-Apr-06		763	4.64	4	190	35		1500	6.5	810	79	nd	nd	5.2	8.1			7.4		117	890		nd	0.001	0.36	0.45	nd	nd	0.006	1.2	nd	2.6			nd		
	1-Oct-06		998		5	240	73		1880	11.8	1000	96	<0.1		6	7.9			8.4		81	1110		0.017	0.001	0.47	0.71	<0.0001	<0.005		1.9	<0.0005	3.2			0.02		
	1-May-07	DUP	684		3	206	45.9		1280	62.1	832	76.7	<0.1		6	6.92			7.2	38.3	115	847		0.12	0.0009	0.347	0.395	<0.00002	<0.002	0.003	1.37	0.00027	2.55			0.057		
	1-Oct-07		896		9	239	103			23.1	1030	104	<0.1		8	6.85			8.5	59.4	73	1410		<0.01	<0.03	0.485	0.757	<0.005	<0.002	<0.002	2.23	<0.02	3.21			0.039		
	11-Jul-08		767		7	207	59		1630	7.9	862	84.1	<0.1		6.2	6.84			7.2	40	98	897		<0.01	0.003	0.364	0.44	<0.00002	<0.002	0.0004	1.42	0.00049	2.55			0.008		
	1-Nov-08	DUP	908		4	224	76		1880	9.6	937	91.6	<0.1		7.4	7.13			8.4	<0.01	12	1030		<0.01	<0.03	0.319	0.667	<0.005	0.003	1.51	<0.02	2.41			nd	nd	<0.005	
	1-Nov-08		909		3	224	79		1900	9.5	936	91.6	0.1		6.9	7.18			8.4	<0.01	105	1040		<0.01	<0.03	0.322	0.663	<0.005	0.003	1.58	<0.02	2.43			<0.005			
	1-Apr-09		719	7.2	<2	197	69		1620	7.4	849	86.8	<0.1	<0.1	6.1	6.7	<0.001	<0.01	8.2	45.9	131	891	10	<0.01	0.0023	0.247	0.413	<0.00002	<0.002	0.0019	0.068	<0.00002	2		<0.01	<0.00002	0.009	
	19-Nov-09	DUP	856	7.55	<2	228	89	37	1930	9.2	968	96.6	<0.1		9	6.67	<0.001	<0.01	8.6	49.4	121	1060		<0.01	0.0028	0.419	0.551	<0.00002	<0.002	<0.002	2.37	<0.00002	2.95			0.006		
	19-Nov-09		880	7.6	<2	226	90	39	1940	8.7	959	95.7	<0.1		9	6.63	<0.001	<0.01	8.6	48.7	123	1070		<0.01	0.0033	0.417	0.547	<0.00002	<0.002	0.002	2.38	<0.00002	2.92			<0.005		
	14-Apr-10		822	5.48	<3	178	92.2		1840	7.4	963	95	0.1		5.9	6.83	<0.001		7.8	44.7	163		<0.01	0.0026	0.403	0.5	0.00005	<0.002	0.003	2.01	0.00006	2.88			<0.005			
	21-Oct-10	DUP	964	8.4	3	275	135		2240	8.8	1160	116	<0.1		8.5	7.24	<0.001		9.9	70.9	169	1230		0.05	0.0027	0.577	0.867	<0.00002	<0.002	0.004	3.04	0.00007	3.71			<0.005		
	1-Apr-11		787	5.6	2	227	110	39	1950	9.2	1040	114	<0.1	<0.1	5.2	7.65	<0.001		8.4	57.6	174	1070	18	0.07	0.0027	0.471	0.583	<0.00002	0.0034	0.0032	2.56	0.00004	3.51		<0.01	<0.005		
	11-Nov-11		902	5.6	5	302	120	44	2210	9.8	1260	123	<0.1	<0.1	7.47	7.09	<0.001		7.3	65.6	219	1220	22	0.07	0.004	0.488	0.674	0.00004	<0.002	0.003	3.25	0.00015	3.71		<0.01	0.007		
	18-Apr-12	DUP	708	4.13	4	205	95.4	5	1820	6.6	899	94.1	<0.1	<0.1	4.8	7.46	<0.001	0.04	6.5	46.5	188	999	16	0.02	0.002	0.326	0.387	0.00002	0.001	0.002	2	0.00104	2.92			0.007		
	2-Oct-12		995	4.71	7	256	12.8	40	2180	8.6	1160	127	<0.1	<0.1	5.9	7.03	<0.001		7.6	68.1	130	1200	18	0.07	0.0035	0.46	0.761	0.00006	<0.002	0.003	2.64	<0.00002	3.65	<0.00002		0.005		
	23-Jul-13		902	4.09	<2.0	294	114	42	2020	13.3	1190	112	<0.50	<0.50	3.96	7.28	<0.0010	<0.030	6.8	58.7	229	1530	14.4	0.0024	0.519	0.495	<0.000090	<0.00050	0.001	2.15	<0.00050	4.31	<0.00010	0.0096	<0.00010	<0.0030		
	23-OCT-13	DUP	1150	4.88	<2.0	286	115	78	2240	17.1	1170	110	<0.10	<0.10	5.83	7.04			7.3	62.4	165	1430	14.8			0.492	0.76		3.38	<0.00050	3.87	<0.00010						
	23-OCT-13		1060	4.97	<2.0	287	115	59	2240	17	1180	111	<0.10	<0.10	5.43	6.96			7.4	63.7	165	1430																

Table 8- Groundwater RUL exceedances
Escott Waste Disposal Site
ECA # A441703
Township of Leeds and the Thousand Islands

Location	PARAMETERS		Alkalinity	Chloride	DOC	Sodium	Total Dissolved Solids	Barium	Boron	Iron	Manganese
	UNITS		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	ODWSOG		500 (OG)	250 (AO)	5 (AO)	200*(AO)	500	1	5	0.3 (AO)	0.05 (AO)
	RUL		458	126	3.35	109	467	0.315	1.25	0.186	0.099
	Date	Type									
BW 1	23-Jul-13	DUP	902	114	13.3	58.7	1530	0.519	0.495	2.15	4.31
BW 1	23-OCT-13		1150	115	17.1	62.4	1430	0.492	0.76	3.38	3.87
BW 1	23-OCT-13		1060	115	17.0	63.7	1430	0.513	0.7	3.29	3.86
BW 1	25-JUN-14		680	93	10.0	51.1	1160	0.374	0.383	2.55	3.28
BW 1	17-OCT-14		945	102	16.2	63.1	1290	0.432	0.601	3.08	3.73
BW 3	22-Jul-13	DUP	352	19	1.2	12.8	408	0.154	0.017	<0.050	0.0053
BW 3	22-Jul-13		365	19	1.9	12.1	410	0.151	0.018	<0.050	<0.0010
BW 3	23-OCT-13		381	16.7	2.5	12	399	0.144	0.021	<0.050	<0.0010
BW 3	25-JUN-14		330	18.4	1.2	12.5	394	0.152	0.019	<0.050	<0.0010
BW 3	16-OCT-14		364	17	1.1	12.6	374	0.146	0.019	<0.050	<0.0010
OW 11	23-Jul-13		493	50	6.4	26.1	746	0.283	0.383	1.12	0.42
OW 11	23-OCT-13		474	43	5.7	21.6	626	0.208	0.352	1.29	0.299
OW 11	25-JUN-14		479	48.1	6.9	24.3	687	0.199	0.344	1.3	0.34
OW 11	17-OCT-14		458	36.6	5.2	19.2	533	0.157	0.313	1.06	0.236
OW 12	23-Jul-13		381	<10	<1.0	20.1	372	0.158	0.058	<0.050	0.0022
OW 12	23-OCT-13		394	<2.0	1.4	18.3	352	0.133	0.059	<0.050	0.0011
OW 12	25-JUN-14		337	<2.0	<1.0	19.2	354	0.12	0.055	<0.050	<0.0010
OW 12	17-OCT-14		361	<2.0	<1.0	17.6	316	0.112	0.063	<0.050	0.0027
OW 13	22-Jul-13		385	<10	1.1	17.4	388	0.234	0.032	<0.050	0.0305
OW 13	23-OCT-13		425	<2.0	2.2	16.7	379	0.258	0.032	<0.050	0.0232
OW 13	25-JUN-14	DUP	343	<2.0	1.8	15.2	352	0.207	0.034	<0.050	0.0241
OW 13	16-OCT-14		384	2.3	1.1	19.1	360	0.221	0.028	<0.050	0.0309
OW 14	23-Jul-13		995	84	10.3	52.6	1160	0.6	0.167	2.28	0.635
OW 14	23-OCT-13		1010	56.3	7.0	36	1080	0.344	0.07	1.45	0.699
OW 14	17-OCT-14		974	78	8.2	46.7	997	0.478	0.137	2.81	0.516
OW 14	17-OCT-14		976	76	8.4	47.3	1010	0.477	0.141	2.83	0.517
OW 3	23-Jul-13		336	18	1.2	9.19	448	0.147	0.023	<0.050	0.0035
OW 3	23-OCT-13		349	7.2	4.7	8.97	405	0.0781	0.01	<0.050	0.0036
OW 3	25-JUN-14		310	19.2	1.2	8.03	427	0.121	0.019	<0.050	0.039
OW 3	17-OCT-14		332	19.1	1.4	8.31	387	0.107	0.029	<0.050	0.01
OW 4	23-Jul-13		481	47	3.8	35.2	650	0.311	2.03	<0.050	0.0131
OW 4	23-OCT-13		453	35.6	3.1	22.8	525	0.213	1.59	<0.050	0.0051
OW 4	25-JUN-14		382	35.2	2.2	24.7	506	0.197	1.64	<0.050	0.0104
OW 4	17-OCT-14		441	39.2	2.3	29.7	540	0.217	1.98	<0.50	0.021
OW 5	23-Jul-13		258	<10	<1.0	5.79	272	0.142	0.012	<0.050	0.0131
OW 5	23-OCT-13		262	<2.0	1.5	5.24	277	0.106	<0.010	<0.050	0.0121
OW 5	25-JUN-14	DUP	231	<2.0	<1.0	5.6	289	0.158	<0.010	<0.050	0.0147
OW 5	17-OCT-14		271	<2.0	<1.0	6.08	271	0.151	0.017	<0.050	0.0163
OW 7	22-Jul-13		259	<10	2.7	15.8	302	0.0638	<0.010	<0.050	0.027
OW 7	23-OCT-13		286	<2.0	2.4	7.95	308	0.0616	<0.010	<0.050	0.019
OW 7	23-OCT-13		283	<2.0	2.4	7.96	312	0.0631	<0.010	<0.050	0.019
OW 7	25-JUN-14	DUP	265	<2.0	1.7	13.2	328	0.0669	<0.010	<0.050	0.119
OW 7	25-JUN-14		264	<2.0	2.9	13.2	323	0.0674	<0.010	<0.050	0.12
OW 7	16-OCT-14		309	2	2.3	7.51	319	0.061	<0.010	0.105	0.0461
OW 8	22-Jul-13		414	<10	1.3	16.7	436	0.0899	<0.010	<0.050	0.0045
OW 8	23-OCT-13		443	<2.0	2.4	17	446	0.0985	<0.010	<0.050	0.0012

Appendix F
CofA A441703



Ontario

Ministry
of the
Environment

Ministère
de
l'Environnement

AMENDED PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A441703

The Corporation of the Township of Leeds and the Thousand Islands
PO Box 129
Lansdowne, Ontario
K0E 1L0

Site Location: Ward 3 (Escott) Landfill Site
Lot 9, 10, Concession Broken Front Concession
Leeds and the Thousand Islands Township, United Counties of Leeds and Grenville

You have applied in accordance with Section 27 of the Environmental Protection Act for approval of:

a 1 hectare landfilling area and a transfer station for recyclable materials, white goods, scrap metal and tires, within a 15.1 hectare site

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

- a. "Owner" means The Corporation of the Township of Leeds and the Thousand Islands;
- b. "Ministry" means the Ministry of the Environment;
- c. "Director" means the one or more persons who from time to time are so designated for the purpose of Section 37 of the Environmental Protection Act ;
- d. "Regional Director" means the Director, Eastern Region, Ministry of the Environment;
- e. "Certificate" means this Provisional Certificate of Approval No. A441073, as amended from time to time, including all schedules attached to and forming part of this Certificate;
- f. "Site" means Ward 3 (Escott) Waste Disposal Site with its associated buildings and storage facilities located on Lot 9, 10, Concession Broken Front Concession, Leeds and the Thousand Islands Township, United Counties of Leeds and Grenville;
- g. "EPA " mean the Environmental Protection Act , R.S.O. 1990, C. E-19 as amended;
- h. "O.Reg. 558" means Ontario Regulation 558/00 issued to amend O.Reg. 347;
- i. "O.Reg. 347" means Ontario Regulation 347 (General-Waste Management Regulation), R.R.O. 1990, as amended;

- j. “summer season” means the time period between May 1 to October 31;
- k. “winter season” means the time period between November 1 to April 31;
- l. “District Manager” means the District Manager, Kingston District Office, Eastern Region; and
- m. “white goods which contain refrigerants” means white goods which contain, or may contain refrigerants, and which include, but are not restricted to refrigerators, freezers and air-conditioning systems.

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

TERMS AND CONDITIONS

GENERAL

1. This Certificate revokes all previously issued Provisional Certificates of Approval issued under Part V of the EPA for this Site. The approval given herein including the terms and conditions set out replaces all previously issued approvals and related terms and conditions under Part V of the EPA for this Site.
2. The Site shall be developed, operated and maintained in accordance with all of the plans and specifications in the documents listed in Schedule "A". Should there be discrepancies between the documents listed in Schedule "A" and the conditions in this Certificate, the conditions shall take precedence. Should there be discrepancies between the documents listed in Schedule "A", the document bearing the most recent date shall take precedence.
3. Requirements specified in this Certificate are minimum requirements and do not abrogate the need to take all reasonable steps to avoid violating the provisions of other applicable legislation. The Owner shall ensure compliance with all the terms and conditions of this Certificate. Any noncompliance constitutes a violation of the EPA and is grounds for enforcement.
4. The requirements of this Certificate are severable. If any requirements of this Certificate to any circumstances is held invalid, the application of such requirement to other circumstances and the remainder of this Certificate shall not be affected thereby.
5. The Owner shall ensure that all communications/correspondence made pursuant to this Certificate includes reference to this Certificate number.

NOTIFICATION OF CHANGES

6. The Owner shall notify the Director in writing of any of the following changes within thirty (30) days of the change occurring:
 - (a) change of Owner or Operator of the Site or both;
 - (b) change of address or address of the new Owner;
 - (c) change of 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 , 1991 shall be included in the notification to the Director;
 - (d) any change of name of the corporation where the Owner or Operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (Form 1 or 2 of O. Reg. 182, Chapter C-39, R.R.O. 1990 as amended from time to time), filed under the Corporations Information Act shall be included in the notification to the Director; and
 - (e) change in directors or officers of the corporation where the Owner or Operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" as referred to in 6(d), supra.
7. In the event of any changes in ownership of the Site, the Owner shall notify, in writing, the succeeding owner of the existence of this Certificate, and a copy of such written notice shall be forwarded to the Director and the District Manager.

INSPECTIONS

8. The Owner shall allow Ministry personnel, or a Ministry authorized representative(s), upon presentation of credentials, to:
 - (a) carry out any and all inspections authorized by Sections 156, 157 or 158 of the EPA , Sections 15, 16 or 17 of the Ontario Water Resources Act , R.S.O. 1990, or Sections 19 or 20 of the Pesticides Act , R.S.O. 1990, as amended from time to time, of any place to which this Certificate relates, and

without restricting the generality of the foregoing to:
 - (b) (i) enter upon the premises or the location where the records required by the conditions of this Certificate are kept;
 - (ii) have access to and copy, at any reasonable time, any records required by the conditions of this Certificate;

- (iii) inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices or operations required by the conditions of this Certificate, and
- (iv) sample and monitor, at reasonable times, for the purposes of assuring compliance with the conditions of this Certificate.

RELEASE OF INFORMATION

9. (a) The Owner shall, forthwith upon request of the Director, District Manager, or Provincial Officer (as defined in the EPA), furnish any information requested by such persons with respect to compliance with the Certificate, including but not limited to, any records required to be kept under this Certificate; and
- (b) In the event, the Owner provides the Ministry with information, records, documentation or notification in accordance with this Certificate (for the purposes of this Condition referred to as "Information"),
- (i) the receipt of Information by the Ministry;
 - (ii) the acceptance by the Ministry of the Information's completeness or accuracy; or
 - (iii) the failure of the Ministry to prosecute the Owner, or to require the Owner to take any action, under this Certificate or any statute or regulation in relation to the Information.

shall not be construed as an approval, excuse or justification by the Ministry of any act omission of the Owner relating to the Information, amounting to noncompliance with this Certificate or any statute or regulation.

10. Any information relating 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 , R.S.O. 1990, C.F-31.

CERTIFICATE OF PROHIBITION

11. Pursuant to Section 197 of the EPA , neither the Owner nor any person having an interest in the property that the Site is on, shall deal with the property in any way without first giving a copy of this Certificate to each person acquiring an interest in the property as a result of the dealing.

12. The Owner shall:

- (a) within sixty (60) days of the date of this Certificate, submit to the Director for the Director's signature two copies of a completed Certificate of Prohibition containing a registerable description of the property that the Site is on, in accordance with Form 1 of Ontario Regulation 14/92 and
- (b) within ten (10) calendar days of receiving the Certificates of Prohibition signed by the Director, register the Certificate of Prohibition in the appropriate Land Registry Office on title to the property that the Site is on and shall submit to the Director immediately following registration the duplicate registered copy.

SERVICE AREA

13. The approved service area for the Site is only **Ward 3, Front of Escott**, of the Township of Leeds and the Thousand Islands.

WASTE TYPES

14. (a) Only solid non-hazardous waste shall be accepted at the Site for landfilling.
- (b) Only recyclable wastes, white goods, metals and tires shall be accepted at the Site for bulking and subsequent transfer off-site for further processing.
- (c) No liquid industrial wastes or hazardous wastes as defined under O.Reg. 347 and O.Reg. 558 shall be accepted at the Site.

SITE CAPACITY

15. The total waste disposal volume of the Site, including the waste, daily cover and intermediate cover, but excluding final cover, is 40,000 cubic metres. This capacity includes the existing and proposed waste to be landfilled.

WASTE PLACEMENT

16. In the areas not previously used for landfilling, no waste shall be placed lower than 0.5 metre below the existing ground.
17. Disposal of waste shall only occur within the areas as delineated on Drawing No. OP-1, entitled "Operations/Development Plan" dated December 16, 2003.
18. Drawing showing final contours shall be revised each year and submitted with the Annual Report required by Condition 52, to reflect the degree of excavation in the fill area not used for trenching and the amount of the final cover stripped from the existing trenches.

DAILY AND INTERIM COVER

19. (a) Daily and interim cover material shall consist of a permeable material and it shall be applied in accordance with Item 4 of Schedule "A". Crushed glass may be mixed with the soil to be used for daily and interim covers.
- (b) The Owner shall keep records of the cover application activities in accordance with Condition 50.
- (c) Daily cover and interim cover shall be applied as follows:
- (i) At least once bi-weekly during the summer season, at end of the working day, the entire working face shall be covered with a minimum thickness of 150 mm of daily cover.
 - (ii) At least once monthly during the winter season, at end of the working day, the entire working face shall be covered with a minimum thickness of 150 mm of daily cover.
 - (iii) In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm of interim cover shall be placed.
- (d) The frequency of application and the cover thickness in subsections (i), (ii) and (iii) are minimum requirements, and may have to be increased if environmental adverse effects have been found to occur.

OPERATIONAL ISSUES

20. (a) The normal operating hours of the Site shall be as follows:
- Tuesdays: 8:30 a.m. - 4:45 p.m.
Saturdays: 8:30 a.m. - 4:45 p.m.
- (b) The Owner may provide alternative hours of operation providing that they are correctly posted at the Site gate, that suitable public notice is given of any change and that there are no objections or complaints from the public regarding the hours of operation.
21. The Owner shall ensure that all loads of waste are properly inspected by trained Site personnel prior to acceptance at the Site and that the vehicles are directed to the appropriate areas for disposal or transfer of the waste. The Owner shall notify the District Manager, in writing, of load rejections at the Site within three (3) days from their occurrence.
22. Waste shall be deposited in a manner that minimizes the exposure area at the landfill working face and shall be compacted before cover material is applied.

23. (a) The Owner shall ensure that no burning of waste is taking place at the Site.
- (b) The Owner shall ensure that burning of clean wood waste approved to take place at the Site, is done in accordance with the Ministry's Guideline C-7, entitled "Burning at Landfill Sites", dated April 1994, and updated from time to time.
24. The Owner shall ensure that no scavenging is taking place at the Site.
25. The Owner shall ensure that all buildings at the Site are free of any possible landfill gas accumulation. If necessary, the Owner shall provide adequate ventilation systems to relieve landfill gas accumulations in the buildings at the Site.
26. The access road and on-site roads shall be provided and maintained so that vehicles hauling waste to and from the Site may travel readily and safely on any operating day.

SIGNS

27. The Owner shall maintain a sign at the main entrance/exit to the Site on which the following information is legibly displayed:
- (a) name of the Site and Owner;
 - (b) this Certificate number;
 - (c) normal hours of operation;
 - (d) allowable and prohibited waste types;
 - (e) telephone number to which complaints may be directed;
 - (f) twenty-four hour emergency telephone number (if different from above);
 - (g) a warning against unauthorized access; and
 - (h) a warning against dumping outside the Site.
28. The Owner shall install and maintain signs at the Site to direct vehicles to the working face, the recycling bins and the other disposal or storage areas designated for wastes requiring special handling procedures.

SITE SECURITY

29. The Owner shall maintain a fence around the Site and the entrance/exit gate to provide control of the Site access.
30. During nonoperating hours, the Owner shall ensure that the Site entrance/exit gate is locked and the Site is secured against access by unauthorized persons.
31. No waste shall be received at the Site except during the operating hours when the Site is under the supervision of trained Site personnel.

SURFACE WATER MANAGEMENT

32. Temporary berms and ditches shall be constructed around the active waste disposal area, as necessary, to prevent extraneous surface water from contacting the active working face.

BIRD, ANIMAL, VECTOR AND VERMIN CONTROL

33. Scavenging birds and animals shall be adequately controlled at the Site to prevent any adverse effects.
34. Vector and vermin shall be adequately controlled at the Site using a licensed exterminator to prevent any adverse effects.

LITTER CONTROL

35. The Owner shall take all practical steps to prevent the escape of litter from the Site. Regular pick-up of litter at the Site and along the access road in the vicinity of the Site shall be carried out. Litter fencing shall be erected around the working area of the landfill as required.

DUST CONTROL

36. The Owner shall control fugitive dust emissions from the on-site sources including, but not be limited to the on-site roads, stockpiled cover material and closed landfill areas. If necessary, the major sources of dust shall be treated with water and/or dust suppression materials to minimize the overall dust emissions from the Site.
37. The Owner shall ensure that reasonable efforts are made to keep the access road used by vehicles to leave the Site, free of waste or excess mud or dirt.

NOISE

38. Noise from or related to the operation of the landfill shall be kept to a minimum and in any event, the Owner shall comply with the criteria set out in the Ministry's guideline entitled "Noise Guidelines for Landfill Sites".

TRAFFIC CONTROL

39. The Owner shall post visible signs along the traffic route providing clear directions to the Site.

VISUAL SCREENING

40. The Owner shall maintain adequate screening of the waste disposal activities undertaken at the Site from the traffic on Escott Road and the surrounding properties.

ENVIRONMENTAL MONITORING

- 41. (a) Groundwater and surface water monitoring shall be undertaken in accordance with the monitoring programs included in Item 1 of Schedule "A".
- (b) Within twelve (12) months from the date of this Certificate, the Owner shall submit to the District Manager a proposal for additional bedrock monitoring wells.
- (c) No changes to the groundwater and surface water monitoring programs shall be implemented prior to receiving a written approval from the District Manager.

GROUNDWATER WELLS/MONITORS

- 42. The Owner shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.
- 43. Where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells, and the wells shall be properly re-secured.
- 44. Any groundwater monitoring wells included in the on-going monitoring program that are damaged shall be assessed, repaired, replaced or decommissioned by the Owner, as required.
 - (a) The Owner shall repair or replace any monitoring well which is destroyed or in any way made to be inoperable for sampling such that no more than one regular sampling event is missed.
 - (b) All monitoring wells which are no longer required as part of the groundwater monitoring program, and have been approved by the Director for abandonment, shall be decommissioned by the Owner, as required, in accordance with **Ontario Regulation 903**, that will prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the annual monitoring report for the period during which the well was decommissioned.

INSPECTIONS

- 45. (a) The Owner shall ensure that monthly Site inspections, are undertaken by trained Site personnel.
- (b) The areas to be inspected shall include, but not be limited to the following:
 - (i) condition of the active disposal areas, the recyclable bins, the tire pile, the white goods pile and the scrap metal pile;
 - (ii) condition of the surface water drainage works;

- (iii) presence of any ponded water at the Site;
 - (iv) condition of the on-site roads for evidence of excessive erosion and fugitive dust emissions;
 - (v) presence of litter at the Site's perimeter and litter fences;
 - (vi) condition of the intermediate cover and of the final cover;
 - (vii) presence of birds, vector, vermin and animals;
 - (viii) condition of the on-site facilities, the fence, the gate and its lock and the signs required by this Certificate;
 - (ix) condition of the groundwater monitoring wells required for the groundwater monitoring program approved by this Certificate;
 - (x) amount of the cover material to ensure that sufficient daily cover is available at all times that the Site is in operation; and
 - (xi) presence of leachate springs.
- (c) Records of inspections shall be created in accordance with Condition 49.

TRAINING

46. All operators of the Site shall be trained in the following areas:
- (a) terms, conditions and operating requirements of this Certificate;
 - (b) operation and management of the landfill and the other waste storage areas as described in the documents in Schedule "A" attached to this Certificate unless otherwise required by the conditions of this Certificate;
 - (c) outline of the responsibilities of the operators of the Site;
 - (d) any environmental concerns pertaining to wastes being handled at the Site;
 - (e) proper inspection, receiving and recording procedures and the activities to be undertaken during and after a load rejection;
 - (f) occupational health and safety concerns pertaining to the wastes to be handled at the Site;
 - (g) relevant environmental legislation and regulations, including but not limited to the EPA and O. Reg. 347; and

- (h) operation of equipment and procedures to be followed in the event of an emergency situation.

RECORDS KEEPING

- 47. (a) The Owner shall retain all documentation listed in Schedule “A” for as long as this Certificate is valid.
- (b) The Owner shall retain at the Site or at the municipal office, all records required by this Certificate, for a minimum of two (2) years from the date of their creation.
- (c) The Owner shall retain the employee training records for as long as the employee is working at the Site.
- (d) The Owner shall make all of the documents and records required by this Certificate available for inspection upon request by the staff of the Ministry.

COMPLAINTS

- 48. The Owner shall record the name and address of complaint, and the date, time and nature of complaint and the actions taken to address the cause of the complaint, in a log book or a computer file.

INSPECTIONS

- 49. The Owner shall establish and maintain a written record of the Site inspections as required by Condition 45. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:
 - (a) date and time of inspection;
 - (b) name, title and signature of trained personnel conducting the inspection;
 - (c) a listing of all the areas inspected and any deficiencies observed; and
 - (d) recommendations for remedial action and the completion date of such action.

COVER APPLICATION

- 50. The Owner shall establish and maintain a written record of the cover application activities as required by Condition 19. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:
 - (a) date and time of cover application; and
 - (b) type of cover and thickness applied.

WHITE GOODS

51. The Owner shall establish and maintain a written record of the white goods handling activities as required by Condition 57. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

- (a) date of the record;
- (b) types, quantities and source of white goods which contain refrigerants received;
- (c) details on removal of refrigerants as required by Ontario Regulation 189; and
- (d) the quantities and destination of the white goods and/or refrigerants transferred.

ANNUAL REPORT

52. The Owner shall prepare and submit an Annual Report to the District Manager by March 30 of the year following the calendar year covered by the report which shall include at a minimum, the following:

- (a) calculations of the volume of waste landfilled, the daily and interim covers, the final cover and the overall volume of the Site capacity used during the reporting period;
- (b) a comparison of the actual capacity used to the estimates of the capacity estimated;
- (c) an estimate of the remaining Site life;
- (d) updated drawing to show the proposed final contours of the finished waste mound;
- (e) amount of the recyclable materials, metals, white goods and tires transferred off-site for further processing
- (f) any changes in operations, equipment, or procedures used at the Site, any operating problems encountered and corrective actions taken;
- (g) details on the monitoring program undertaken, outlining monitor locations, analytical parameters sampled, and frequency of sampling;
- (h) an analysis and interpretation of the surface water and groundwater monitoring data, a review of the adequacy of the monitoring program, conclusions of the monitoring data, and recommendations for any changes that may be necessary;
- (i) summary of inspections undertaken at the Site;
- (j) summary of any public complaints received and the responses made;

- (k) a discussion of cover stockpile activities including use, timing, locations and erosion protection;
 - (l) status update on the final cover placement, and seeding activities undertaken in the closed sections of the landfill;
 - (m) updated drawing to show the proposed final contours of the finished waste mound;
 - (n) a statement as to compliance with all conditions of this Certificate and the other relevant Ministry's groundwater and surface water requirements;
 - (o) recommendations respecting any proposed changes in the operation of the Site; and
 - (p) any other information that the Regional Director or the District Manager may require.
53. The frequency or timing of the submission of the Annual Report from Condition 52 may be changed with the written approval from the District Manager.

EMERGENCY SITUATIONS

54. Any spills, fires or other emergency situations shall be forthwith reported directly to the Ministry's Spills Action Centre (1-800-268-6060) and shall be cleaned up immediately.
- In addition, the Owner shall submit, to the District Manager a written report within three (3) days of any spill or incident, outlining the nature of the incident, remedial measures taken and the measures taken to prevent future occurrences at the Site.
55. The Owner shall ensure that adequate fire fighting and contingency spill clean-up equipment is available and that the emergency response personnel are familiar with the use of such equipment and its location(s).

LANDFILL CLOSURE

56. At least two (2) years prior to the anticipated date of closure of the landfill at this Site or the date when 90 per cent of the total waste disposal volume is reached, whichever occurs first, the Owner shall submit to the Director for approval, with a copy to the District Manager, a detailed Site Closure Plan pertaining to the termination of the landfilling operations at the Site, post-closure inspection, maintenance and monitoring and the end use. The plan shall include, but not be limited to the following:
- (a) plan showing Site appearance after closure;
 - (b) description of the proposed end use for the Site;

- (c) descriptions of the procedures for closure of the Site, including but not be limited to, the following:
 - (i) advance notification of the public of the Site closure;
 - (ii) posting 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 after landfill closure;
 - (v) removal of unnecessary landfill-related structures, buildings and facilities; and
 - (vi) final construction of any necessary control, treatment, disposal and monitoring facilities for ground and surface water and for landfill gas.
- (d) description of the procedures for post-closure care of the Site, including:
 - (i) operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas, if applicable;
 - (ii) record keeping and reporting; and
 - (iii) complaint contact and response procedures.
- (e) an assessment of the adequacy of and need to implement the contingency plans; and
- (f) an estimate of the contaminating life span of the Site, based on the results of the monitoring programs to-date.

WHITE GOODS HANDLING

57. With respect to accepting white goods containing refrigerants, the Owner shall ensure that:
- (a) all white goods which contain refrigerants which have not been tagged by a licensed technician to verify that the equipment no longer contains refrigerants, are stored in a separate area in an upright position; and
 - (b) white goods which contain refrigerants received on-site shall be shipped off-site in order to have the refrigerants removed by a licensed technician in accordance with Ontario Regulation 189; or
 - (c) the refrigerant is removed on-site from white goods by a licensed technician, in accordance with Ontario Regulation 189, prior to shipping white goods off-site; and
 - (d) records of white goods handling shall be created in accordance with Condition 51.

SCHEDULE "A"

1. Application for a Certificate of Approval for a Waste Disposal Site, signed by Paula A. Formanek, Trow Associates Inc., and dated February 19, 2004, and the supporting documentation prepared by Trow Associates Inc. consisting of the following documents:
 - (a) Report entitled "Ward 3 (Escott) Waste Disposal Site A441073 Proposed Expansion", dated February 18, 2004, prepared by Trow Associates Inc., excluding Section 5.16, entitled "Triggering Mechanisms and Contingency Measures - Leachate Migration" and excluding Section 5.6, entitled "Final Grading, Cover Systems and Source of Materials"
 - (b) Drawing No. SP-1, entitled "Site Plan" dated December 16, 2003
 - (c) Drawing No. EC-1, entitled "Existing Conditions" dated December 16, 2003
 - (d) Drawing No. OP-1, entitled "Operations/Development Plan" dated December 16, 2003
 - (e) Drawing No. PFC-1, entitled "Proposed Pre-Aerial Fill Contours" dated June 21, 2004
 - (f) Drawing No. SECT-1, entitled "Cross Sections" dated December 16, 2003
2. Letter dated January 29, 2004 from John Trudgen, Clerk-Administrator, The Township of Leeds and the Thousand Islands, to Director, Environmental Assessment and Approvals Branch, Ministry of Environment, providing the authorization for Trow Associates Inc. to act as the Township's agent.
3. Letter dated June 22, 2004 from Paula A. Formanek, Trow Associates Inc., to Margaret Wojcik, Ministry of Environment, providing the following additional information:
 - permeability of the daily and interim cover
 - permeability of the final cover over the existing trenches
 - frequency of the daily cover application
 - description of the alternative daily/interim cover
 - specifications relating to burning of clean wood waste
 - clarification of the existing capacity of the waste landfilled to-date
 - details of the public consultation
4. Letter dated July 14, 2004 from Paula A. Formanek, Trow Associates Inc., to Margaret Wojcik, Ministry of Environment, providing the following additional information:
 - timing of the final cover application
 - procedures for compaction of waste and placement of daily cover
 - days and hours of operation of the waste disposal site
 - agreement to 300 mm interim cover thickness
 - frequency of daily cover application during winter months

- proposal for ensuring hydraulic conductivity continuity between the existing and the new waste
- minimum slope for top of the waste mound
- further clarification related to the existing capacity of the waste landfilled to-date

5. Letter dated September 28, 2004 from Paula A. Formanek, Trow Associates Inc., to Margaret Wojcik, Ministry of Environment, providing the following additional information:

- confirmation of the daily cover application frequency
- confirmation of the site area

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

1. Conditions 1, 3-7, inclusive and 10 are included to clarify the legal rights and responsibilities of the Owner.
2. Condition 2 is included to ensure that the Site is operated 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. Conditions 8 and 9 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. Condition 8 is supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA , the Ontario Water Resources Act , and the Pesticides Act , as amended.
4. Conditions 11 and 12 are included, pursuant to subsection 197(1) of the EPA , to ensure 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.
5. Conditions 13 and 14 are included to specify the approved areas from which waste may be accepted at the Site and the types of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.
6. Conditions 15, 16, 17 and 18 are included 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. Condition 16 is also included to specify restrictions on the extent of landfilling within the fill area to maintain a vertical separation between the groundwater table and the waste.
7. Condition 19 is included to specify the requirement of daily or interim cover applications to control potential nuisance effects, to facilitate vehicle access on the Site and to ensure an acceptable Site appearance.

8. Condition 20 is included to specify the hours of operation for the landfill Site and a mechanism for amendment of the hours of operation.
9. Condition 21 is included to require inspections that would ensure that only approved waste types are accepted at the Site and that the Ministry is notified of any attempts to dispose off unacceptable wastes.
10. Condition 22 is included to require waste compaction to maximize the capacity of the Site and to provide environmental benefits associated with greater compaction of waste.
11. Condition 23(a) is included to prohibit burning of waste at the Site because of concerns with air emissions, smoke and other nuisance effects and the potential fire hazard. Condition 23(b) is included to control burning of wood products at the Site, to minimize potential environmental adverse effects.
12. Condition 24 is included to ensure protection of public health and safety, and minimization of potential damage to environmental controls, monitoring and other works at the Site due to uncontrolled removal of materials from waste at the Site.
13. Condition 25 is included to ensure that all buildings and structures at the Site are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the Site.
14. Condition 26 is included to require reasonable maintenance of the on-site roads to ensure safe delivery of waste to the working face or to and from the other waste types storage areas.
15. Conditions 27 and 28 are included to ensure that the users of the Site are fully aware of important information and restrictions related to the Site operations as specified by this Certificate.
16. Conditions 29, 30 and 31 are included to ensure that the Site access and integrity are controlled by preventing unauthorized access when the Site is closed and no Site attendant is on duty.
17. Condition 32 is included to ensure that drainage onto or leaving the Site does not adversely affect Site operations or create a nuisance or a hazard to the health and safety of the environment.
18. Conditions 33 - 40, inclusive, and 57 are included to ensure that the Site is designed and operated in a way that does not result in a hazard or nuisance to the natural environment or any persons.
19. Condition 41 is included to provide information that demonstrates that the Site is performing as designed and the impacts on the natural environment are within the Ministry's limits. Condition 41(b) is also included to require the Owner to install additional bedrock wells to delineate the leachate impacts in the bedrock unit.

20. Conditions 42, 43 and 44 are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.
21. Condition 45 is included to ensure that regular inspections are conducted at the Site, to verify that the Site is operated in accordance to this Certificate and in a manner that would not result in a hazard or nuisance to the natural environment or any persons.
22. Condition 46 is included to ensure that the Site is operated and supervised by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any persons.
23. Conditions 47 - 53, inclusive, are included to ensure that information pertaining to Site development, operations and monitoring data is documented and any possible improvements to Site design, operations or monitoring programs are identified. Condition 48 is also included to ensure that any complaints related to Site operations are addressed in a timely manner and actions are taken to prevent similar complaints from occurring again. Condition 52 is also included to provide the Ministry with a concise and organized tool to review the Site activities and the effectiveness of the design and to verify compliance with the conditions of this Certificate and other relevant Ministry's requirements.
24. Condition 54 is included to ensure that incidents of spills are reported to the Ministry to ensure public health and safety and environmental protection.
25. Condition 55 is included to ensure that the Owner is prepared to handle emergency situations that may arise at the Site and that staff and equipment are available to handle such situations.
26. Condition 56 is included to ensure that final closure of the Site is completed in an aesthetically pleasing manner and to ensure long-term protection of the natural environment.

This Provisional Certificate of Approval revokes and replaces Certificate(s) of Approval No. A441703 issued on May 11, 1982

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
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of Environment and Energy
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 4th day of October, 2004



Ian Parrott, P.Eng.
Director
Section 39, *Environmental Protection Act*

MW/

c: District Manager, MOE Kingston - District
Paula Formanek, Trow Associates Inc.

Appendix G

Reasonable Use Policy (RUP)

Groundwater Reasonable Use Limits

Escott Waste Disposal Site

ECA # A441703

Township of Leeds and the Thousand Islands

$$C_m = C_b + x(C_r - C_b)$$

Overburden Wells

Parameter	Units	ODWSOG Concentration Limit (C _r)	(OW8) Average Background Concentration (C _b)	Constant (x)	Reasonable Use Limit (C _m)
Alkalinity	mg/L	500	405	0.5	453
DOC	mg/L	5	1.8	0.5	3.4
Total Dissolved Solids	mg/L	500	444	0.5	472
Chloride	mg/L	250	2	0.5	126
N - Nitrate	mg/L	10	0.15	0.25	2.61
N - Nitrite	mg/L	1	0.18	0.25	0.39
Sulphate	mg/L	500	23	0.5	262
Mercury	mg/L	0.001	0.000034	0.25	0.00028
Aluminum	mg/L	0.1	0.20	0.5	0.15
Arsenic	mg/L	0.025	0.0026	0.25	0.0082
Barium	mg/L	1	0.09	0.25	0.32
Boron	mg/L	5	0.0069	0.25	1.26
Cadmium	mg/L	0.005	0.000033	0.25	0.0013
Chromium	mg/L	0.05	0.0013	0.25	0.013
Copper	mg/L	1	0.0019	0.5	0.50
Iron	mg/L	0.3	0.18	0.5	0.24
Lead	mg/L	0.01	0.0016	0.25	0.004
Manganese	mg/L	0.05	0.08	0.5	0.067
Sodium	mg/L	200	17	0.5	108
Uranium	mg/L	0.02	0.0016	0.25	0.006
Zinc	mg/L	5	0.0097	0.5	2.50

Bedrock Wells

Parameter	Units	ODWSOG Concentration Limit (C _r)	(BW3) Background Concentration (C _b)	Constant (x)	Reasonable Use Limit (C _m)
Alkalinity	mg/L	500	354	0.5	427
DOC	mg/L	5	1.9	0.5	3.5
Total Dissolved Solids	mg/L	500	411	0.5	455
Chloride	mg/L	250	18	0.5	134
N - Nitrate	mg/L	10	0.24	0.25	2.68
N - Nitrite	mg/L	1	0.29	0.25	0.46
Sulphate	mg/L	500	21	0.5	260
Mercury	mg/L	0.001	0.0002	0.25	0.0004
Aluminum	mg/L	0.1	0.009	0.5	0.054
Arsenic	mg/L	0.025	0.0003	0.25	0.0065
Barium	mg/L	1	0.15	0.25	0.36
Boron	mg/L	5	0.021	0.25	1.27
Cadmium	mg/L	0.005	0.00005	0.25	0.0013
Chromium	mg/L	0.05	0.001	0.25	0.013
Copper	mg/L	1	0.001	0.5	0.50
Iron	mg/L	0.3	0.04	0.5	0.17
Lead	mg/L	0.01	0.0001	0.25	0.0026
Manganese	mg/L	0.05	0.008	0.5	0.029
Sodium	mg/L	200	13	0.5	106
Uranium	mg/L	0.02	0.005	0.25	0.008
Zinc	mg/L	5	0.0071	0.5	2.50