2019 Annual Report

Killaloe Waste Disposal Site (A412306)

Township of Killaloe, Hagarty, and Richards

County of Renfrew, Ontario

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Executive Summary

This report has been prepared to document the results of the 2019 environmental monitoring program for the Killaloe Waste Disposal Site, located on Lot 7, Concession 8, within the amalgamated Township of Killaloe, Hagarty and Richards. The site is located two kilometres north of the Village of Killaloe on Mask Road. The Killaloe Waste Disposal Site operates in accordance with Environmental Compliance Approval A412306, for the disposal and transfer of municipal waste and recycling generated within the municipality. The site consists of 1.88 hectares of approved waste disposal area, within 31.7 hectares of total property area.

In 2019, the direction of groundwater flow within the shallow overburden of the Killaloe site, in the vicinity of the waste mound, was predominantly to the northeast towards County Road 58. The low-lying area east of the site is considered to be the downgradient receiver of groundwater. A component of groundwater flow in the vicinity of monitoring wells MW07-3S and MW07-3D was interpreted to flow towards the northwest, in the general direction of the low-lying area.

Generally, groundwater quality downgradient and east of the Killaloe site was interpreted to be impacted from a combination of landfill-related sources and naturally-occurring conditions within a low-lying area environment. Groundwater downgradient and east of the Killaloe site was interpreted to have the potential to discharge to surface during periods of significant rainfall and/or elevated groundwater table. Impacted groundwater east of the site was interpreted to be contained within the approved contaminant attenuation zone, and adequately monitored by the existing well network.

In 2019, Reasonable Use Concept non-conformances were noted at monitoring wells MW06-1S, MW06-1D, MW06-2S, and MW06-2D at the eastern and northern contaminant attenuation zone boundary. However, taking into account winter road maintenance activities along the County Road 58 and Mask Road right-of-ways, naturally-occurring and off-site sources, and parameter concentrations associated with naturally-occurring conditions within the low-lying area east of the site, the Killaloe site was interpreted to be in conformance with Guideline B-7. Therefore, the contaminant attenuation zone lands were deemed sufficient to attenuate impacts resultant of landfill-related activities from the site.

Surface water samples were obtained at surface water locations SW1, SW2, SW6 (background), and SW9 in spring 2019, while SW3 and SW5 were observed to have insufficient water for sampling purposes. During the fall 2019 sampling event, monitoring locations SW1, SW2, SW3, and SW5 were observed to be dry, while samples were obtained from locations SW6 (background) and SW9. Overall parameter concentrations were interpreted to be generally consistent with surface water quality results from background sampling location SW6. Influences of groundwater potentially discharging to surface may be occurring; however, concentrations of alkalinity, conductivity, and total dissolved solids at the surface water sampling locations at the site suggest that surface water quality was dominated by precipitation-related sources. Based on the review of surface water quality results in 2019, the low-lying area south and east of the Killaloe site was not interpreted to be significantly impacted from landfill-related factors and results were interpreted to be generally consistent with surface water within a stagnant, low-lying environment.

In 2019, no routine waste disposal activities were conducted at the Killaloe Waste Disposal Site, as the approval to dispose of construction, demolition, bulky, and leaf and yard waste at the Red Rock site has been permitted by the Ontario Ministry of the Environment, Conservation, and Parks. All regular municipal waste (i.e. bagged garbage) is compacted at the Killaloe Waste Disposal Site by the waste compaction unit at the transfer station and waste roll-off containers are transferred from the site to the approved landfill of GFL in Moose Creek, Ontario for disposal.

In 2019 and based on documentation submitted to the municipality by GFL Environmental Inc., a total of 280.15 tonnes of municipal (residential and IC&I) waste was compacted at the Killaloe site and transferred to the GFL Environmental Inc. facility for disposal. Waste volumes collected from curbside collection within the Village of Killaloe, and transferred from the Round Lake Waste Disposal Site, are also included in the above waste

tonnage. Additionally, 7.95 tonnes of municipal (residential and IC&I) waste was transferred from the Round Lake and Killaloe Waste Disposal Sites to the Ottawa Valley Waste Recovery Centre for disposal.

Construction and demolition, bulky, and leaf and yard wastes processed at the Killaloe site in fall 2019 were transferred to the Red Rock site for final disposal in late fall 2019.

Based on a topographic survey of the waste stockpiles on December 10, 2019, approximately 185 cubic metres of unprocessed construction, demolition, and bulky waste, 18 cubic metres of leaf and yard waste, and 27 cubic metres of unprocessed wood brush were stockpiled at the Killaloe site in 2019. Based on a topographic survey completed at the Red Rock Waste Disposal Site on December 10, 2019, the volume of processed construction, demolition, and bulky, and leaf and yard waste transferred from the Killaloe site to the Red Rock site for disposal in fall 2019 was approximately 1,658 cubic metres.

Based on municipal records, 9,658 residential vehicles visited the Killaloe site in 2019, disposing of 12,397 bags of regular municipal waste (i.e. bagged garbage). Additionally, approximately 497 cubic metres of construction, demolition, and bulky waste, and 12 cubic metres of shingles were accepted at the site in 2019 from the residential sector. In 2019, 345 bags, 84 half-ton truck loads, and 113 trailer loads of leaf and yard waste was accepted at the site from the residential sector.

Based on municipal records, 518 industrial, commercial, and institutional vehicles visited the Killaloe site in 2019, disposing of 3,260 bags of regular municipal waste. Additionally, approximately 311 cubic metres of construction, demolition, and bulky waste, and 19 cubic metres of shingles were accepted at the site in 2019 from the industrial, commercial, and institutional sector. In 2019, 5 trailer loads of leaf and yard waste were accepted at the site from the industrial, commercial, and institutional sector.

Recycling tonnage records provided by Beaumen Waste Management Systems Ltd., Tomlinson Group, Cascades Recovery+, and Ottawa Valley Waste Recovery Centre for the municipality indicate that approximately 143.90 tonnes of Blue Box recyclables were collected from the Killaloe and Round Lake sites in 2019. Blue Box recyclables contributing to this total included approximately 63.34 tonnes of commingled containers (tin/aluminum/plastic/glass), 44.87 tonnes of mixed fibres, and 35.69 tonnes of old corrugated cardboard. Blue Box recyclables from curbside collection within the Village of Killaloe and Blue Box recyclables transferred from the Round Lake site were included in the Blue Box recycling tonnages provided by Beaumen Waste Management Systems Ltd., Tomlinson Group, Cascades Recovery+, and Ottawa Valley Waste Recovery Centre.

According to municipal records, approximately 88.79 tonnes of scrap metal and white goods, including drained and tagged refrigerant appliances, were collected from the Killaloe Waste Disposal Site by local recycling contractors in 2019. Approximately 16.82 tonnes of household organics were diverted at the Killaloe and Round Lake Waste Disposal Sites in 2019, and processed at the Ottawa Valley Waste Recovery Centre. Based on municipal records, 41 passenger or light truck tires were collected at the Killaloe site in 2019 at the Killaloe Waste Disposal Site. The municipality diverted 15.32 tonnes of waste electrical and electronic equipment from the Killaloe Waste Disposal Site in 2019. According to municipal records, 108 Residential automotive batteries were diverted at the Killaloe site in 2019. Based on municipal records, 0.38 tonnes of single-use batteries were stockpiled and collected by an approved service provider for the 2019 operational year. Similarly, 0.443 tonnes of automotive plastics (i.e. empty oil and antifreeze containers) were collected at the Killaloe site in 2019 by an approved service provider.

The Progressive Closure Plan for the Killaloe Waste Disposal Site was approved by the Ontario Ministry of the Environment, Conservation, and Parks in November 2017. Progressive closure operations are planned to continue in 2019, consistent with the plan's five (5) year closure schedule and expected completion of closure activities by the end of 2022.

Table of Contents

1.0 Introduction 1
1.1 Site Information 1
1.2 Background 1
1.3 Purpose and Scope 3
2.0 Site Description 5
2.1 Topography and Drainage 5
2.2 Geological and Hydrogeological Conditions 5
2.3 Ecological Conditions 7
2.4 Current Service Area, Operations, and Site Facilities 8
3.0 2019 Environmental Monitoring Program 10
3.1 Groundwater Monitoring 10
3.2 Surface Water Monitoring 10
3.3 Analytical Laboratory Accreditation 11
3.4 Landfill Gas Monitoring 11
3.5 Operational Monitoring 11
4.0 Environmental Monitoring Results 13
4.1 Groundwater Quality Assessment 13
4.1.1 Groundwater Configuration 13
4.1.2 Groundwater Quality Assessment (ODWS) 14
4.1.3 Groundwater Quality Assessment (PWQO) 18
4.1.4 Residential Groundwater Quality Assessment 22
4.1.5 Reasonable Use Concept Assessment 25
4.2 Surface Water Quality Assessment 27
4.2.1 Surface Water Quality Assessment - PWQO 28
4.2.2 Surface Water Quality Assessment – 75th Percentile Historical Background 32
4.2.3 Alternative Standards Review (Groundwater and Surface Water) 33
4.3 Review of Trigger Mechanism and Contingency Plan 35
4.4 Landfill Gas Monitoring Review 36
4.5 Operations Summary 36
4.5.1 Site Operations 36
4.5.2 Waste Disposal / Transfer Summary 38
4.5.3 Site Inspections, Maintenance and/or Emergency Situations 39

4.5.4 Complaints 40
4.5.5 Monitoring and Screening Checklist 40

5.0 Conclusions and Recommendations 41

6.0 Closing 45

7.0 References 46

List of Tables

Table 1 2019 Groundwater and Surface Water Monitoring Program
Table 2 Groundwater Monitoring Well and Surface Water Sampling Locations
Table 3 Groundwater Elevations
Table 4 Groundwater Quality (ODWS)
Table 5 Groundwater Quality (PWQO)
Table 6 Surface Water Quality (PWQO)
Table 7 Surface Water Quality (75th Percentile Background)
Table 8 Alternative Standards Limits – Groundwater and Surface Water

List of Graphs

Graph 1 Trend Analysis - Ammonia (Total)
Graph 2 Trend Analysis - Barium
Graph 3 Trend Analysis - Boron
Graph 4 Trend Analysis - Chemical Oxygen Demand
Graph 5 Trend Analysis - Chloride
Graph 6 Trend Analysis - Dissolved Organic Carbon
Graph 7 Trend Analysis - Iron
Graph 8 Trend Analysis - Manganese
Graph 9 Trend Analysis - Nitrate
Graph 10 Trend Analysis - Sodium
Graph 11 Trend Analysis - Sulphate

List of Figures

Figure 1 Regional Location Plan
Figure 2 Property Plan
Figure 3 Existing Site Conditions Plan
Figure 4 Surface Water Monitoring Location Plan

Figure 5 Physiographic Region Plan
Figure 6 Bedrock Geology Plan
Figure 7 Surficial Geology Plan
Figure 8 Environmental Monitoring Location Plan – Spring 2019
Figure 9 Environmental Monitoring Location Plan – Fall 2019

List of Appendices

Appendix A Environmental Certificate of Approval A412306 and Certificate of Requirement
Appendix B Residential Well Records
Appendix C Borehole Logs
Appendix D Field Sampling Records
Appendix E Laboratory Certificates of Analysis
Appendix F Monitoring and Screening Checklist
Appendix G Statement of Service Conditions and Limitations

1.0 Introduction

1.1 Site Information

The Killaloe Waste Disposal Site operates as a waste disposal site and recycling transfer station in accordance with Environmental Compliance Approval (ECA) A412306, and the most recent amendment dated November 15, 2017 (Appendix A). The Killaloe site is located on Part of Lot 7, Concession 8, within the geographic Township of Hagarty, in the amalgamated Township of Killaloe, Hagarty and Richards, in the County of Renfrew (Figures 1 and 2). The Universal Transverse Mercator (UTM) coordinates at the site entrance gate relative to the North American Datum (NAD83) are 309794.0 metres (m) East, 5050760.0 m North, in Zone 18T (Google Earth, 2013). The site is located approximately two (2) kilometres (km) north of the Village of Killaloe and is bound to the north and east by Mask Road and County Road 58 (Round Lake Road, Figure 2).

In 2013, the Township completed construction and operation of a new waste compaction and transfer station at the site, and now all municipal waste (excluding construction and demolition [C&D], bulky, and leaf and yard waste) is collected in the waste compaction unit for transfer and disposal at the GFL Environmental Inc. (GFL) waste disposal facility in Moose Creek, Ontario. As part of the process of commissioning the new waste compaction unit, some municipal waste was disposed in the approved waste disposal area (AWDA) at the Killaloe site in early 2013 (Figure 3), along with processed C&D and bulky waste. Following Ontario Ministry of the Environment, Conservation, and Parks (MECP) approval for the use of remaining waste disposal capacity at the Township's Red Rock Waste Disposal Site (A412307) for the disposal of C&D, bulky, and leaf and yard waste on July 21, 2014, the utilization of the remaining capacity at the Killaloe Waste Disposal Site was planned to be set aside for contingency purposes (i.e. due to issues with waste compaction equipment of the transfer station, service issues with the Township's waste transportation service provider, etc.). Routine disposal within the AWDA at the Killaloe Waste Disposal Site effectively ended as of January 2014.

The Progressive Closure Plan for the Killaloe site was approved by the MECP on November 15, 2017 (Appendix A, Greenview, 2018). Per the Progressive Closure Plan, closure activities are to occur over a five (5) timespan, with all closure activities to be completed by November 15, 2022.

1.2 Background

The Killaloe Waste Disposal Site is approved to service the entire Township, and accepts waste from the Township's Round Lake Waste Disposal Site for disposal and transfer, and curbside collection of waste and Blue Box recycling from the Village of Killaloe. Following the completion of the new transfer station at the Round Lake site in the summer of 2012, municipal waste collected at the Round Lake Waste Disposal Site transfer station has been transferred to the Killaloe Waste Disposal Site for management; however, Blue Box recyclables and household organics collected and stored at the Round Lake site are transferred directly off-site for management.

On March 22, 2013, the Township received MECP Technical Support Services (TSS) surface water review comments related to the 2011 Annual Report for the Killaloe site and they were included in the correspondence section of the 2013 Annual Report (Greenview, 2014a). A response to the MECP TSS to address the surface water review comments was provided in a letter to the MECP TSS on August 13, 2013. A response to the Township's letter was provided by the MECP TSS on January 13, 2014, and the Township responded to the MECP in electronic communication dated January 22, 2014 (Greenview, 2014a).

On May 10, 2013, the Township provided the MECP Environmental Approvals Branch (EAB) with an *Addendum to the Design and Operations Plan – Municipal Solid Waste Transfer Station* (Addendum, Greenview, 2013b), which requested approval for additional on-site storage of household organics, and on-site collection of batteries (household and automotive) and automotive plastics. A response to the MECP EAB with respect to additional information related to the Addendum was submitted to the MECP on June 21, 2013 (Greenview, 2013c). An Amended ECA for the Killaloe Waste Disposal Site was issued by the MECP on July 19, 2013 (Appendix A), which consolidated all previous ECAs for the site and approved the updated site operations including waste

transfer to the GFL waste disposal facility in Moose Creek, Ontario. Construction of the new waste transfer station at the Killaloe Waste Disposal Site and commissioning was completed in spring and summer 2013, and the grand opening of the new waste transfer station occurred on August 21, 2013.

In accordance with Condition 8.1 of the Killaloe Waste Disposal Site's Amended ECA (Appendix A), a revised *Contingency and Emergency Response Plan* was submitted to the MECP for review dated September 10, 2013 (Greenview, 2013d). Similarly, a revised *Operations and Procedures Manual* for the Killaloe Waste Disposal Site was submitted to the MECP dated September 10, 2013, in accordance with Conditions 2.3 and 2.4 of the Amended ECA (Appendix A, Greenview, 2013e). On September 11, 2013, the MECP acknowledged receipt of the two (2) documents and advised that they would be used as part of the MECP's compliance requirements for the Killaloe Waste Disposal Site.

On September 27, 2013, the Township submitted a proposed *Trigger Mechanism and Contingency Plan* (Trigger Mechanism) for groundwater and surface water at the Killaloe Waste Disposal Site to the MECP EAB, in accordance with Condition 8.2 of the site's Amended ECA (Appendix A). On January 28, 2014, a conference call was held between the Township, Greenview Environmental Management Limited (Greenview), and the MECP regarding the proposed Trigger Mechanism, and on January 30, 2014 the MECP provided the Township with an electronic letter summarizing the MECP's comments relative to the proposed Trigger Mechanism and discussion points of the conference call (Greenview, 2015a).

On March 17, 2014, the Township received MECP TSS surface water review comments (dated February 5, 2014) relative to the 2012 Annual Report (Greenview, 2013a). On November 18, 2014, the Township submitted a response letter to the MECP TSS and a *Revised Trigger Mechanism and Contingency Plan* (Revised Trigger Mechanism) for review (Greenview, 2015a). On November 20, 2014, the Township received MECP TSS surface water review comments (dated November 13, 2014, Greenview, 2015a) relative to the 2013 Annual Report (Greenview, 2014a).

On November 25, 2014, the Killaloe Waste Disposal Site was inspected by a representative of the MECP Ottawa District Office. A *Solid Non-Hazardous Waste Disposal Site Inspection Report* (Inspection Report, dated December 11, 2014) related to this event was provided to the Township on December 15, 2014 (Greenview, 2015a). Per Section 5.0 (Actions Required) of the Inspection Report, the Township provided a response to the MECP prior to the requested December 31, 2014 submission date. With respect to Section 6.0 (Other Inspection Findings), the Township provided a response to the MECP Ottawa District Office by electronic mail on January 23, 2015. The electronic response was approved by the MECP Ottawa District Office in electronic communications received on January 26, 2015 (Greenview, 2015a).

On March 19, 2015, the Township received MECP TSS groundwater review comments dated February 5, 2015 relative to the 2013 Annual Report (Greenview, 2014a) and the Revised Trigger Mechanism for the Killaloe site (Greenview, 2015a).

As part of the Revised Trigger Mechanism for the Killaloe site (Greenview, 2015a), the Township proactively determined that the most effective Contingency Action for the Killaloe site was closure of the waste mound. In April 2015, the Township submitted a Progressive Closure Plan to the MECP for review and approval (Greenview, 2015b).

On July 13, 2015, the Township received MECP TSS surface water review comments to the 2014 Annual Report (Greenview, 2015a), the Progressive Closure Plan (Greenview, 2015b), and the proposed Trigger Mechanism dated May 28, 2015 (Greenview, 2016). Responses to the MECP TSS surface water review comments were addressed in the 2015 Annual Report (Greenview, 2016).

On September 1, 2015, the Township received MECP TSS groundwater review comments to the 2014 Annual Report (Greenview, 2015a) and the Progressive Closure Plan (Greenview, 2015b) dated July 27, 2015 (Greenview, 2016). Responses to the MECP TSS groundwater review comments were addressed in the 2015 Annual Report (Greenview, 2016).

On March 3, 2016, the Township received a letter from the MECP EAB stating that the file related to the application to amend the ECA for the Killaloe site regarding the Revised Trigger Mechanism had been closed, and the application to amend the ECA related to the Progressive Closure Plan for the site remained open for review (Greenview, 2017). On November 15, 2017, the MECP issued an Amendment to the ECA for the Killaloe Waste Disposal Site, which formally approved the Progressive Closure Plan (Appendix A).

In late December 2017, the stationary waste compaction unit at the Killaloe site experienced an unforeseen equipment malfunction. Due to the lack of availability of parts required for the repairs and availability of a service provider to complete the repairs during the holiday season, the stationary waste compaction equipment remained inoperable until January 12, 2018. During the compactor's downtime, approximately 1,365 bags of garbage were disposed within the contingency disposal area at the Killaloe site. A letter was sent by the Township to the MECP Ottawa District Office on January 2, 2018 to notify the District Manager of the equipment malfunction and use of the contingency disposal area (Greenview, 2018). On January 12, 2018, the Township informed the MECP Ottawa District Office by electronic communication that the stationary waste compaction unit had been recommissioned for use at the Killaloe Waste Disposal Site (Greenview, 2018).

On February 2, 2018, the Township received an Inspection Report for the Killaloe site dated January 31, 2018, which identified specific action items to be addressed by the municipality (Greenview, 2018). On February 21, 2018, the Township submitted an electronic action plan to the MECP Ottawa District Office in order to address the pertinent action items of the Inspection Report (Greenview, 2018). An electronic response from the MECP Ottawa District Office was received by the Township on February 23, 2018, which noted that the action plan adequately addressed the action items of the Inspection Report (Greenview, 2018).

On April 9, 2018, a grade stake survey was completed at the Killaloe Waste Disposal Site in order to assist Township staff with final closure operations of the AWDA. The grade stakes were installed at select locations of the AWDA to indicate grades above the final contours at closure (FCC) for the installation of barrier soil and vegetative cover, in accordance with the approved Progressive Closure Plan (Greenview, 2015b).

In accordance with Condition 8.1 of the ECA, a revised Contingency and Emergency Response Plan (Version 3.0) was prepared by the Township and submitted to the MECP Ottawa District for their file on March 06, 2020 (Greenview, 2020a). In accordance with Condition 8.6 of the ECA, an updated Fire Safety Plan (Version 2.0) was prepared by the Township and submitted to the MECP Ottawa District for their file on March 6, 2020 (Greenview, 2020b). In accordance with Conditions 2.3 and 2.4 of the ECA, a revised Operations and Procedures Manual (Version 3.0) was prepared by the Township and submitted to the MECP Ottawa District for their file on March 6, 2020 (Greenview, 2020c).

As of the time of preparation of this 2019 Annual Report, no communications were received by the Township from the MECP relative to the Killaloe Waste Disposal Site.

Greenview was retained by the Township to prepare this 2019 Annual Report for the Killaloe Waste Disposal Site.

1.3 Purpose and Scope

The purpose of this report is to provide an overview of the annual environmental monitoring, environmental compliance, and operations at the Killaloe Waste Disposal Site, in accordance with Condition 11.0 of the ECA (A412306), including the following:

- Groundwater quality assessment and Reasonable Use Concept (RUC) compliance assessment (Section 4.1).
- Surface water quality assessment (Section 4.2).
- Trigger Mechanism discussion (Section 4.3).
- Landfill gas monitoring review (Section 4.4).

- Site operational overview and capacity assessment (Section 4.5).
- Conclusions and recommendations (Section 5.0).

2.0 Site Description

The following sections present a summary of the physical characteristics for the Killaloe Waste Disposal Site. Locations of features described in this report are referenced to grid north.

2.1 Topography and Drainage

The Killaloe Waste Disposal Site is located on a generally flat, sandy plain which extends north from the Village of Killaloe. The existing waste mound is located approximately 125 m west of a low-lying area (Figures 2 and 3).

Local groundwater from the waste area has historically been interpreted to have the potential to discharge into the low-lying area east of the site (Jp2g and Golder, 2004). The MECP has also maintained that the potential exists for groundwater to discharge into the low-lying area east of the site in historical interpretive reviews (Greenview, 2016 and 2015a).

Fundamental differences between the surficial geology in the vicinity of the Killaloe site and the surficial geology in the low-lying area east of the site have been previously identified by the Ontario Geological Survey (OGS) in historical publications (OGS, 2010 and 2011), and are discussed in more detail in Section 2.2 of this report. These significant differences in surficial geology are interpreted to provide for vastly different groundwater and surface water environments, and related quality results.

Generally, surface water within the low-lying area adjacent to the site has been observed to have no discernible flow/low-flow conditions, and no interconnection exists between any surface water locations. There are no distinct surface water channels adjacent to the site, and surface water locations in the vicinity of the site have been interpreted to be formed from a combination of precipitation-related standing water in shallow pools in a perched water environment and the potential for a component of groundwater discharging to surface during periods of extensive precipitation and/or elevated groundwater table.

Generally, surface water sampling locations in the immediate vicinity of the Killaloe site, including locations SW1, SW2, SW3 and SW5 (Figure 4), have not had sufficient water for sampling purposes in recent sampling events (Greenview, 2019, 2018, 2017, 2016, 2015a, 2014a, 2013a). In the MECP TSS groundwater review dated July 27, 2015 (Greenview, 2016), the reviewer noted that the suitability of sampling locations SW1, SW2, SW3, and SW5 were questionable due to low water conditions (dry stations). The review documented that the area of groundwater discharge, based on their field observations, may be located further east and northeast and closer to Round Lake Road and Mask Road (Greenview, 2016, Figures 4, 8, and 9).

In spring 2017, significant flooding was observed in the low-lying areas south and east of the Killaloe site during the May 31, 2017 sampling event (Greenview, 2018). The flooding at the site was related to the flood disaster event that the Township, and much of Renfrew County, experienced in spring 2017.

Significant flooding within the low-lying area south and east of the Killaloe site has periodically occurred in spring months, with the last flooding conditions noted in spring 2017 (Greenview, 2019 and 2018). In 2019, conditions within the low-lying area south and east of the Killaloe site were observed to have returned to conditions generally consistent with historical norms.

2.2 Geological and Hydrogeological Conditions

The Killaloe Waste Disposal Site is located within the physiographic region known as the Algonquin Highlands, an expansive physiographic region which extends from approximately French River to the west, North Bay to the north, Renfrew to the east, the United Counties of Leeds and Grenville to the southeast, Apsley to the south, and Port Carling to the southwest (Figure 5, Chapman and Putnam, 2007).

Regional bedrock geology in the vicinity of the Killaloe Waste Disposal Site is broadly described as Mesoproterozoic (1.0 billion to 1.6 billion years old) rocks of the Central Gneiss Belt of the Grenville Province, including:

- Migmatitic rocks and gneisses of undetermined protolith (commonly layered biotite gneisses and migmatites, and locally may include quartzofeldspathic gneisses, orthogneisses, and paragneisses).
- Felsic igneous rocks (including tonaline, granodiorite, monzonite, granite, syenite, and derived gneisses).

Based on historical OGS mapping, bedrock in the vicinity of the Killaloe site is understood to be migmatitic rocks and gneisses, while areas to the north and east of the Killaloe site are understood to be felsic igneous rocks (Figure 6, OGS, 2011).

As all monitoring wells installed in the vicinity of the Killaloe Waste Disposal Site are advanced into overburden only (Appendix C), bedrock composition at the site has not been confirmed from hand sample.

Regional overburden geology in the vicinity of the Killaloe Waste Disposal Site is broadly described as Pleistocene sediments (approximately 2.5 million to 12 thousand years old) corresponding with the end of the last glaciation period in Southern Ontario (Wikipedia, 2014) and recent (Holocene, zero to 12 thousand years old) organic deposits (Figure 7, OGS, 2010).

Overburden materials in the immediate vicinity of the Killaloe site (upland areas) are understood to be Pleistocene ice-contact stratified deposits including sand and gravel, with minor silt, clay, and till. Overburden to the north and northwest of the Killaloe site reportedly consist of Pleistocene coarse-textured glaciolacustrine deposits including sand, gravel, minor silt and clay material. Overburden to the northeast, east, and south of the Killaloe site in the low-lying area is understood to consist of Holocene organic deposits including peat, muck, and marl of a much younger age than the previously described overburden materials (Figure 7, OGS, 2010). Surficial geology east of the site and in the vicinity of Round Lake Road is understood to include Pleistocene silty sand to sandy-textured till and Precambrian bedrock and related bedrock drift complex (Figure 7, OGS, 2010). Previous site observations confirmed that bedrock outcrops to surface southeast of monitoring wells MW07-3S and MW07-3D at the Killaloe Waste Disposal Site along Round Lake Road (Figures 8 and 9, Greenview, 2015a).

Based on historical observations during monitoring well installations at the Killaloe site, and related borehole logs (Appendix C), overburden material in the vicinity of the Killaloe site has predominantly consisted of sands and gravels with minor silt, whereas overburden to the northeast and east of the site in the low-lying area has predominantly consisted of organic material (peat) normally overlying sands and gravels; however, during the installation of replacement shallow groundwater monitoring well MW07-5R in June 2014, only organic material (peat) was encountered to depth at 1.14 m below ground surface (bgs, Appendix C). These overburden observations are interpreted to conform to historical OGS surficial mapping data (Figure 7).

Groundwater within the shallow overburden in the vicinity of the Killaloe site has historically been interpreted to flow within the Pleistocene ice-contact stratified deposits (sand and gravel) to the east and northeast towards the poorly drained low-lying area east of the site, consistent with the 2019 spring and fall environmental monitoring locations plans (Figures 8 and 9). As the Holocene organic (i.e. peat, muck) deposits overlie the Pleistocene ice-contact stratified deposits (sand and gravel) within the eastern low-lying area, it is interpreted that the low-lying area east of the waste mound represents a perched groundwater environment with the overlying organics (i.e. peat) material acting as an aquitard to the groundwater table in the underlying Pleistocene ice-contact stratified deposits (Figure 7). No groundwater seeps have been observed in the vicinity of the Killaloe Waste Disposal Site, particularly to the east of the site in the vicinity of the low-lying area.

In accordance with the typical values of hydraulic conductivity for soils (Bear, 1972), the range of hydraulic conductivity for clean sands and gravels is understood to be generally between 1 and 0.001 centimetres per second (cm/sec), while the range for peat is between 0.01 and 0.0001 cm/sec, which is interpreted to support the interpretation that the overlying Holocene peat within the low-lying area at the site would act as an aquitard to the groundwater table in the underlying Pleistocene sands and gravels. Further, and owing to this conclusion, water observed at surface within the peat-related low-lying area east of the site is interpreted to be related to a combination of precipitation-related sources and groundwater discharging to surface. The water observed at surface within the peat-related low-lying area is generally observed following precipitation events, and is generally

not observed at surface (dry) during periods of low precipitation. Concentrations of alkalinity, conductivity, and TDS in surface water results from within the low-lying area support the interpretation that the predominant source of surface water within the low-lying area is precipitation-related (Table 6).

2.3 Ecological Conditions

The low-lying area east of the Killaloe site is located within the Provincially Significant Wetland known as the Killaloe Swamp, which is an extensive area of approximately 1,160 ha with a catchment area of approximately 26,440 ha (Ontario Ministry of Natural Resources and Forestry [MNRF], 2010, Greenview, 2016). Within this large area, the MNRF has indicated that the Killaloe Swamp is characterized by 1% bog, 1% fen, 88% swamp, and 10% marsh (Greenview, 2016). Given the standard definitions of these four (4) main types of wetland areas, and considering bogs are areas that accumulate peat within anoxic, acidic conditions, with no stream inflow, in upland and/or extensive flat areas, the low-lying area east of the Killaloe Waste Disposal Site is interpreted to most closely typify a bog-type environment. Bogs are wetland areas that receive much of their water from precipitation-related sources (United States Geological Survey [USGS], 1999). This interpretation is consistent with previous years' Annual Reports (Greenview, 2014a, 2015a, 2016, 2017, 2018, 2019) which interpreted that the predominant source of surficial water in the low-lying area east of the site was likely precipitation-related, with a component of groundwater discharge.

Per the USGS (USGS, 1999), in wetlands where fine-grained and/or highly decomposed organic sediments (i.e. peat) are present near the wetland edge (i.e. in areas analogous to the low-lying area east of the Killaloe site), the transfer of water and solutes between groundwater and surface water is likely to be much slower than in lakes and streams where groundwater and surface water can interact more easily. Additionally, in wetland areas where there is no stream outflow, retention of chemicals/minerals/elements within the wetland environments (i.e. peat) tends to be high (USGS, 1999).

As noted above, the peat material in this low-lying area is interpreted to be concentrating available metals (most specifically iron) owing to a combination of factors including the inherent low pH, low dissolved oxygen concentrations typical of low-lying areas, decay processes, and to bacteria that concentrate iron as part of life processes within wetland environments. Given that the generally-accepted rate of accumulation of peat materials is approximately 1 millimetre per year (Keddy, 2010), and since only peat material was observed to a depth of 1.14 m below ground surface during the installation of replacement monitoring well MW07-5R in 2014 within the eastern low-lying area (Figures 8 and 9, Appendix C), the peat material east of the Killaloe site is interpreted to have had a minimum of a thousand years to slowly accumulate chemicals, minerals, and/or elements within its layers. Based on the understood low hydraulic conductivity of the peat, the likelihood of any chemicals, minerals, and/or elements to be mobilized to other areas of the Killaloe Swamp is interpreted to be low.

From a sensitive receiver perspective relative to the low-lying area east of the Killaloe site, a natural heritage study entitled *Natural Heritage Impact Study for the Killaloe and Round Lake Landfill Sites* was conducted in 2010 at the Killaloe Waste Disposal Site (Snider, 2010). The study concluded that the amount of open water in the vicinity of Mask Road and Round Lake Road (Figure 2) was very small and was generally confined to ditches and/or culverts along both roads. No open water was found within 120 m of the site. There was no evidence of threatened, endangered, or common species of turtles in the vicinity of the site and the habitat was interpreted to be marginal for turtles. There was no fish habitat present within 120 m of the adjacent areas of the site and no rare vegetation communities were identified. The general conclusions of the study noted the following within 120 m of the site:

- No threatened or endangered species.
- No fish habitat.
- No significant woodlands.
- No significant valleylands.
- No significant wildlife habitat.
- No significant Areas of Natural or Scientific Interest (ANSI).
- No significant winter deer habitat.

Surface water samples are periodically obtained within the eastern low-lying area as part of annual sampling events at the Killaloe site, subject to availability (i.e. if sufficient volumes of surface water exist for sampling purposes). Results for previous surface water sampling events are included in Table 6.

2.4 Current Service Area, Operations, and Site Facilities

The Killaloe Waste Disposal Site is located at 1049 Mask Road, near the Village of Killaloe, in the amalgamated Township of Killaloe, Hagarty, and Richards (Figures 1 and 2). The Killaloe site is approved to accept waste and recyclables from ratepayers within the boundaries of the municipality.

A sign is posted at the entrance that provides the ECA number for the site, the waste management bylaw number for the Township, hours of operation, accepted waste and recycling, permitted users, and emergency contact information. The site is accessed from the site road extending to the north from Mask Road (Figures 2 and 3). Access to the Killaloe site is restricted by a lockable gate and page wire fence around the site. The site access road extending from Mask Road has sufficient width at the entrance and within the site to allow for unimpeded winter travel and access for emergency and snow removal equipment. The site is surrounded by forested lands to the north, west and south, and by a densely-vegetated low-lying area to the east and southeast (Figures 2 and 3), providing adequate screening and restricted access to the site.

On January 1, 2013, the Township initiated a clear bag policy for all municipal waste, discontinued the acceptance of industrial, commercial, and institutional (IC&I) waste in bulk quantities (mandating that all IC&I waste be disposed of in clear bags), increased the cost of residential bag tags from $1.00 to $2.00, and initiated an IC&I bag tag program with bag tags valued at $1.00 per bag. The cost of IC&I bag tags was increased by $0.50 per year until 2015, at which point the cost was $2.00 per bag. As part of the upgrades to the waste transfer station in 2013, the Township installed updated site signage, which included image and text-based components, for easier reference of waste and recycling operations at the site for the Township's ratepayers.

The Killaloe Waste Disposal Site consists of an AWDA of 1.88 ha within a total property area of 31.7 ha inclusive of a contaminant attenuation zone (CAZ), in accordance with the Amended ECA (A412306, Appendix A). The Amended ECA approved waste cell development on top of the waste mound in Phase 1 and Phase 2 areas of the western portion of the AWDA (Figure 3).

Based on the Amended ECA (Appendix A), the Township is also approved to stockpile, shred, and use received C&D and bulky waste as alternative cover (AC) at the site, in an effort to optimize remaining site capacity. The site is approved for operation of a Reuse Centre and a burn area for clean wood and brush.

The Killaloe Waste Disposal Site is approved for the collection, stockpiling, disposal and/or transfer of the following waste and recyclable materials, per the Amended ECA (Appendix A):

Waste/Recyclable Material	Maximum Stockpiling Volume
Solid, Non-hazardous Municipal Waste (residential and IC&I)	120 m^3
Construction and Demolition (C&D) and Bulky Waste (processed and unprocessed)	1000 m^3
Blue Box Recyclables – Mixed Fibres	70 m^3
Blue Box Recyclables – Commingled Containers	70 m^3
Blue Box Recyclables – Old Corrugated Cardboard (OCC)	80 m^3
Source Separated Organics (SSO)	6.4 m^3
Scrap Metal and White Goods	100 m^3
Waste Tires	100 m^3
Refrigerant Appliances	25 units (1 unit = 1 m^3)
Waste Electrical and Electronic Equipment (WEEE)	40 m^3

Leaf and Yard Waste	500 m^3
Batteries (Single-use)	90 L
Automotive Batteries	180 units
Automotive Plastics	0.8 m^3 (800 litres)

Facilities and operations at the Killaloe site include the AWDA, recycling depot for Blue Box recyclables, source separated organics (SSO) depot, site attendant's offices, stockpiling areas for bulk recyclable materials (scrap metal and white goods, refrigerant appliances, waste tires), a leaf and yard waste storage area, C&D and bulky waste staging and processing areas, a WEEE storage area, a covered and lockable trailer for automotive and single-use batteries, an automotive plastics storage area, a Reuse Centre, and a burn area for clean wood and brush (Figure 3). The Blue Box recycling depot at the site consists of two (2) in-use roll-off containers for acceptance of regular Blue Box recyclables including mixed fibres and commingled containers (with two [2] spare roll-off containers), and an old corrugated cardboard (OCC) compaction unit and associated roll-off container. The municipal waste transfer station is located adjacent to the Blue Box recycling depot, and is equipped with a stationary waste compactor and three (3) compaction roll-off containers (one [1] in-use compaction roll-off container and two [2] spares). Additionally, the Township maintains an operations vehicle and equipment parking area for municipal vehicles and equipment (i.e. waste compaction truck, trailers, roll-off containers, etc.).

The Killaloe site receives municipal waste from the Township's mobile waste transfer station at the Round Lake Waste Disposal Site (A412303), and from curbside collection from the Village of Killaloe. Received waste is compacted and transferred to the approved GFL facility in Moose Creek, Ontario for disposal. The Killaloe site receives Blue Box recyclables from curbside collection. Blue Box recyclables and household organics collected and stored at the Round Lake site are transferred directly off-site for management. Since the MECP's issuance of the Amendment to the ECA for the Township's Red Rock Waste Disposal Site (A412307) on July 21, 2014, the Township has been permitted to transfer C&D, bulky, and leaf and yard waste from the Killaloe site to the Red Rock site for final disposal.

In order to maintain waste disposal operations at the Killaloe site, the Township utilizes heavy equipment including a John Deere 700H LT bulldozer and/or a John Deere 544E loader for compaction, grading and slope maintenance of the waste mound, and for installation of waste cover materials. Additionally, the Township purchased a used waste compaction truck in 2007 for use at the Killaloe Waste Disposal Site and within the Township, and purchased a used roll-off truck in 2013 for the on-site management of roll-off bins. In 2014, the Township purchased a new one-ton truck to be used for waste management purposes and related public works department operations.

Additionally, the Township conducts an annual Municipal Hazardous and Special Waste (MHSW) collection event in the summer months at the Township's Municipal Garage, located at 16370 Highway 60. Each MHSW collection event is serviced by an approved MHSW service provider.

3.0 2019 Environmental Monitoring Program

The following sections present a methodology of the environmental monitoring program conducted at the Killaloe Waste Disposal Site in 2019.

3.1 Groundwater Monitoring

As part of the 2019 environmental monitoring program, groundwater monitoring and sampling activities were conducted at the site by Greenview on May 7, 2019 and October 15, 2019 from the established network of groundwater monitoring wells (Table 1, Appendix A). The UTM coordinates of the groundwater monitoring wells were confirmed or measured by Greenview personnel during site visits in 2019 using a handheld geographic positioning system (GPS) instrument with an anticipated accuracy of within +/- 5 m (Table 2). During the 2019 spring and fall sampling events, the elevations were measured at each monitoring well using an electronic water level tape prior to sampling (Table 3). Based on the groundwater elevation, a well purge volume equivalent to approximately three (3) borehole volumes was calculated using a standard conversion factor relevant to the respective well diameter.

Groundwater samples were collected from each monitoring well using dedicated polyethylene tubing and inertial lift foot-valves. Samples were collected into appropriate sample bottles as provided by an accredited laboratory and the designated sample for metal parameters was field-filtered using a dedicated high capacity 45-micron filter to reduce the potential for turbidity-induced bias in the analytical results for the metal parameters.

Volatile organic compounds (VOC) were sampled as part of the 2019 groundwater monitoring program during the fall sampling event in accordance with the revised requirements noted by the MECP TSS in the groundwater review dated February 5, 2015 (Greenview, 2016, Tables 1 and 4). The revised groundwater sampling locations include BH00-4R, BH00-4A(D), MW06-1S, MW06-1D, MW06-2S, MW06-2D, MW07-3S, MW07-3D, BH04-1S, BH04-1D, MW07-5R, and surface water location SW5. As SW5 was observed to have insufficient water to sampling during the fall sampling event, no VOC sample was collected from SW5 in 2019 (Appendix D).

During the spring 2019 sampling event, monitoring well MW07-3S was observed to pump dry during sampling, and the full purge volume was not obtained (Appendix D). Similarly, during the fall 2019 sampling event, monitoring wells MW07-3S and MW07-3D were observed to pump dry during sampling, and the full purge volumes were not obtained (Appendix D)

Duplicate groundwater samples were collected for Quality Assurance and Quality Control (QA/QC) purposes from monitoring wells compared to the Ontario Drinking Water Standards (ODWS) at MW06-2D and BH00-1 in spring and fall 2019, respectively. Duplicate groundwater samples were collected for QA/QC purposes from monitoring wells compared to the Provincial Water Quality Objectives (PWQO) at BH04-1D and BH00-5 in spring and fall 2019, respectively.

All samples were submitted to an accredited analytical laboratory to be analyzed for the parameter suite listed in Table 1.

Field measurements of pH, dissolved oxygen (DO), conductivity, and temperature were recorded at each respective groundwater well immediately following the collection of the groundwater samples. Field sampling records completed during the 2019 monitoring program are included in Appendix D. The groundwater samples were recorded on a laboratory Chain of Custody Form, and placed in coolers packed with contained ice for preservation during transport to the analytical laboratory.

The results of the 2019 groundwater monitoring program are presented in Section 4.1 of this report.

3.2 Surface Water Monitoring

Surface water sampling activities were conducted by Greenview on May 7, 2019 and October 15, 2019 from the established surface water monitoring network at the site (Table 1, Figure 4). The UTM coordinates of the surface

monitoring locations were confirmed or measured by Greenview personnel during site visits in 2019 using a handheld GPS instrument with an anticipated accuracy of within +/- 5 m (Table 2).

During the 2019 spring sampling event, sample locations SW1, SW2, SW6, and, SW9 were observed to have no discernible flow, while SW3 and SW5 were observed to have insufficient water for sampling purposes (Appendix D). During the 2019 fall sampling event, sample collection was not possible from locations SW1, SW2, SW3, and SW5 as they were observed to be dry, and locations SW6 and SW9 were observed to have no discernible flow (Appendix D). Where possible, surface water samples were collected by submerging a dedicated, non-preserved, sample container into the water body and decanting into preserved sample bottles so as not to displace preservative chemicals.

Duplicate surface water samples were collected for QA/QC purposes from surface water sampling locations SW6 and SW9 during the 2019 spring and fall sampling events, respectively (Appendix D). All samples were submitted to an accredited analytical laboratory to be analyzed for the parameter suite in Table 1.

Field measurements of pH, conductivity, DO, and temperature were recorded at each respective surface water sampling location immediately following the collection of the surface water samples. Physical characteristics including depth, width, and flow velocity of each respective surface water location was recorded at the time of sampling. Field sampling records completed for the 2019 monitoring program are included in Appendix D. The surface water samples were recorded on a laboratory Chain of Custody Form, and placed in coolers packed with contained ice for preservation for transport to the analytical laboratory.

The results of the 2019 surface water monitoring program are presented in Section 4.2 of this report.

3.3 Analytical Laboratory Accreditation

Collected groundwater and surface water samples were submitted for analysis to the Caduceon Environmental Laboratories (Caduceon), located in Kingston, Ontario. Caduceon is accredited by the Canadian Association for Laboratory Accreditation (CALA), for specific environmental testing procedures listed in the scope of accreditation and is assessed biannually by CALA to the ISO/IEC 17025 standard. ISO/IEC 17025 is an international standard for both quality management and technical aspects of operating a testing laboratory. Caduceon is licensed by the MECP to perform analysis on drinking water in Ontario in accordance with the Safe Drinking Water Act.

3.4 Landfill Gas Monitoring

In accordance with MECP TSS groundwater review comments received in 2015 (Greenview, 2016), the Township instituted landfill gas monitoring for all groundwater monitoring wells at the Killaloe site in 2015.

Results of the landfill gas monitoring are included in the field sampling records in Appendix D of this report. A discussion on the results of the landfill gas monitoring in 2019 is included in Section 4.4 of this report.

3.5 Operational Monitoring

Operational monitoring at the Killaloe Waste Disposal Site is conducted regularly to document routine waste disposal and recycling activities at the site.

A topographic survey was conducted at the site on December 10, 2019, to determine the volume of C&D, bulky, and leaf and yard waste accepted at the Killaloe site in 2019 following fall 2019 processing operations and transportation of the processed waste to the Red Rock Waste Disposal Site. A survey of the waste mound was also conducted in order to determine the remaining quantities of final cover material (barrier soil and vegetative cover) required for closure operations.

With the exception of the contingency waste disposal operations noted in Section 1.2 that occurred in December 2017 and January 2018, no municipal (residential and IC&I) waste has been routinely disposed at the Killaloe Waste Disposal Site since July 2013. All municipal waste was compacted at the Killaloe Waste Disposal

Site by the waste compaction unit at the transfer station and waste roll-off containers were transferred from the site to the approved landfill of GFL in Moose Creek, Ontario for disposal.

Weekly waste record keeping activities at the Killaloe site are completed as part of regular operations at the site to monitor landfilling activities, vehicular traffic, recycling operations, and stockpiling of C&D, bulky, and leaf and yard wastes. In December 2015, updates to the Killaloe site's waste record keeping documents were completed concurrent with a waste operations staff training event held on December 14, 2015 (Greenview, 2016).

In 2020, the Township completed revised versions of the Contingency and Emergency Response Plan (Version 3.0, Greenview, 2020a), Fire Safety Plan (Version 2.0, Greenview, 2020b), and Operations and Procedures Manual (Version 3.0, Greenview, 2020c) and submitted them to the MECP Ottawa District Office for their file.

The Township submits annual waste diversion reports in accordance with the Municipal Datacall, inclusive of the Killaloe site, to the Resource Productivity and Recovery Authority (RPPA).

The results of the 2019 operational monitoring at the site are presented in Section 4.5.

4.0 Environmental Monitoring Results

The following sections present a summary of the environmental monitoring results obtained during the Killaloe Waste Disposal Site's 2019 environmental monitoring program.

4.1 Groundwater Quality Assessment

The results of the 2019 groundwater monitoring program conducted at the site are presented as follows.

Per MECP TSS groundwater review comments (Greenview, 2016), total suspended solids analysis was removed from the groundwater monitoring program as of 2015 (Tables 4 and 5). In accordance with MECP TSS groundwater review comments (February 5, 2015, Greenview, 2016) which stated "monitoring locations in areas of groundwater discharge should be compared only to PWQO", monitoring wells including BH00-3, BH00-5, BH04-1S, BH04-1D, MW07-4R, and MW07-5R were moved from Table 4 (groundwater compared to ODWS) to Table 5 (groundwater compared to PWQO). Groundwater compared to ODWS is discussed in Section 4.1.2 and groundwater compared to PWQO is discussed in Section 4.1.3 of this report. Consistent with the recommendations of the Progressive Closure Plan (Greenview, 2015b), groundwater results in the vicinity of areas of potential groundwater discharge and surface water results were also compared to the alternative standards, including limits associated with Table A and Table B of the MECP Technical Guidance Document (TGD, MECP, 2010), and the PWQO (Table 8). These results are discussed in Section 4.2.3 and identified on Table 8.

4.1.1 Groundwater Configuration

Historically, groundwater in the vicinity of the Killaloe site and to the east was interpreted to flow predominantly to the northeast, while a component of groundwater in the vicinity of monitoring wells MW07-3S and MW07-3D was interpreted to flow predominantly to the northwest (Greenview, 2019).

Groundwater elevation data obtained during the 2019 environmental monitoring program at the site are provided in Table 3. Average horizontal gradients in the vicinity of the Killaloe site and to the east, and in the vicinity of monitoring wells MW07-3S and MW07-3D, were calculated as follows:

Location	Horizontal Gradient (Spring 2019)	General Direction	Horizontal Gradient (Fall 2019)	General Direction
Vicinity of Killaloe site and to the east	0.005	Northeast	0.003	Northeast
Vicinity of monitoring wells MW07-3S & MW07-3D	0.012	Northwest	0.006	Northwest

Using groundwater elevations measured in 2019 (Table 3), vertical hydraulic gradients were calculated at the following pairs of shallow and deep monitoring wells for the spring and fall groundwater elevation monitoring events. The vertical gradients calculated in 2019 were as follows:

Monitoring Wells	Vertical Gradient (Spring 2019)	Vertical Gradient (Fall 2019)
BH00-4A(D) & BH00-4B(S)	0.002	0.004
BH04-1D & BH04-1S	0.013	0.000
MW06-1D & MW06-1S	0.018	0.016
MW06-2D & MW06-2S	0.025	0.025
MW07-3D & MW07-3S	- 0.039	- 0.019
MW10-7D & MW10-7S	- 0.013	0.003

4.1.2 Groundwater Quality Assessment (ODWS)

The results of the 2019 groundwater monitoring program for monitoring wells compared to ODWS at the Killaloe site are presented in Table 4 and the accredited laboratory Certificates of Analysis are attached in Appendix E. Analytical data were compared to ODWS (MECP, 2006), median background water quality at the site, and MECP Guideline B-7 and the RUC (MECP, 1994a). Given the proximity of monitoring wells BH00-3, BH00-5, BH04-1S, BH04-1D, MW07-4R, and MW07-5R to the low-lying area east of the site (Figures 8 and 9), and based on requirements of the MECP TSS (Greenview, 2016), the groundwater quality results from these monitoring wells were only compared to the PWQO (MECP 1994b) and Canadian Water Quality Guidelines (CWQG, Canadian Council of Resource and Environment Ministers [CCREM], 1987) for select parameters, in accordance with Table B of the MECP Technical Guidance Document (TGD, MECP, 2010), and are discussed in Section 4.1.3 of this report. Trend analysis was completed using results from the previous five (5) years and only significant trends are discussed in this report.

Duplicate groundwater samples were collected for QA/QC purposes from monitoring wells compared to ODWS at MW06-2D and BH00-1 in spring and fall 2019, and from monitoring wells compared to PWQO at BH04-1D and BH00-5 in spring and fall 2019, were similar to the identified samples, indicating that the results of the 2019 groundwater monitoring program can be interpreted with confidence.

Consistent with historical results, background groundwater quality was assessed at monitoring wells BH00-1 and BH00-2, which are located approximately 25 m north and 25 m west of the AWDA, respectively (Figures 8 and 9). BH00-1 was interpreted to be located generally upgradient (spring) and cross-gradient (fall) to the AWDA, whereas BH00-2 was interpreted to be upgradient of the AWDA (Figures 8 and 9). Background groundwater quality at the site was calculated in 2019 using the median of a minimum of the previous ten (10) sampling events from background monitoring wells BH00-1 and BH00-2, consistent with historical Annual Reports for the Killaloe site (Greenview, 2019). Consistent with historical results, some parameter concentrations at background monitoring wells BH00-1 and BH00-2 were above median background concentrations at the Killaloe site. Non-conformances of ODWS and significant groundwater trends at background groundwater locations BH00-1 and BH00-2 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
BH00-1 (Background)	• Alkalinity (low) • Iron • Manganese • pH (low)	• Alkalinity (low) • Iron • Manganese	• No significant trends	• Total Dissolved Solids (TDS)
BH00-2 (Background)	• Dissolved Organic Carbon (DOC) • pH (low)	• Alkalinity (low)	• No significant trends	• Iron

Groundwater results from BH00-1 and BH00-2 were interpreted to be representative of background water quality at the site, generally with low values for alkalinity and pH, and high concentrations of dissolved organic carbon (DOC), iron and manganese. The noted characteristics are attributed to naturally-occurring conditions in groundwater upgradient and in the vicinity of the Killaloe site.

Groundwater quality downgradient of the waste mound was evaluated using BH00-4R, BH00-4B(S), and BH00-4A(D), which historically have been used to characterize leachate quality at the site. In spring and fall 2019, results from BH00-4R, BH00-4B(S), and BH00-4A(D) exhibited most parameter concentrations above median background groundwater quality (Table 4). Non-conformances of ODWS and significant groundwater trends at BH00-4R, BH00-4B(S), and BH00-4A(D), were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
BH00-4R	• Barium • Iron • Manganese • TDS	• Barium • DOC • Iron • Manganese	• Boron	• Iron • Manganese
BH00-4B(S)	• Alkalinity (high) • Barium • DOC • Iron • Manganese • TDS	• Alkalinity (high) • Barium • DOC • Iron • Manganese • TDS	• Aluminum • Boron	• Phosphorus
BH00-4A(D)	• Alkalinity (low) • Iron • Manganese	• Iron • Manganese	• No significant trends	• No significant trends

Consistent with historical results, groundwater from BH00-4A(D) generally exhibited lower parameter concentrations than BH00-4B(S) and BH00-4R (Greenview, 2019, Table 4). High parameter concentrations immediately downgradient of the transfer station at the Killaloe site were anticipated in 2019 since BH00-4R, BH00-4A(D), and BH00-4B(S) have historically been interpreted to most represent leachate quality at the site (Figures 3, 8, and 9, Table 4). Winter road maintenance (i.e. road salt application) of the transfer station was also interpreted to be impacting downgradient groundwater quality at BH00-4R, BH00-4A(D), and BH00-4B(S).

Consistent with the requirements of the MECP TSS groundwater reviewer (Greenview, 2016), VOC were analyzed in fall 2019 at leachate monitors BH00-4R and BH00-4A(D). For BH00-4R and BH00-4A(D), all VOC concentrations were documented to be below ODWS limits (Table 4).

In July 2010, the Township installed a pair of monitoring wells, MW10-7S and MW10-7D, approximately 100 m south and upgradient/cross-gradient to the AWDA, in order to establish groundwater quality near the southern property boundary (Figures 8 and 9). In spring and fall 2019, results from MW10-7S and MW10-7D exhibited some parameter concentrations above median background water quality (Table 4). Non-conformances of ODWS and significant groundwater trends at monitoring wells MW10-7S and MW10-7D were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
MW10-7S	• Alkalinity (low)	• Alkalinity (low)	• No significant trends	• TDS
MW10-7D	• None	• None	• No significant trends	• TDS

Groundwater quality results at MW10-7S and MW10-7D were not interpreted to be impacted by landfill-related activities (Table 4).

Groundwater quality north of the site is monitored at wells MW06-2S and MW06-2D (Figures 8 and 9). MW06-2S and MW06-2D are located approximately 270 m to the north of the AWDA, adjacent to Mask Road and along the northern CAZ boundary (Figures 8 and 9). In 2019, MW06-2S and MW06-2D were interpreted to be located upgradient/cross-gradient to the Killaloe site (Figures 8 and 9). In spring and fall 2019, some parameter concentrations from MW06-2S and many parameter concentrations from MW06-2D were above median background groundwater quality (Table 4). Non-conformances of ODWS and significant groundwater trends at monitoring wells MW06-2S and MW06-2D were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
MW06-2S	• Iron • Manganese	• Alkalinity (low) • Iron • Manganese • pH (low)	• No significant trends	• Iron • Manganese • TDS
MW06-2D	• Aluminum • DOC • Iron • Manganese	• Aluminum • DOC • Iron • Manganese	• Chemical Oxygen Demand (COD) • DOC • Phosphorus	• TDS • Zinc

The source of barium in groundwater at MW06-2D is unknown, given that MW06-2D has historically been interpreted to be located upgradient/cross-gradient to the AWDA, and similar concentrations of barium were not apparent in groundwater quality results at MW06-2S (Table 4). Based on the interpreted groundwater configuration at the site in 2019, and similar to historical results (Greenview, 2019), the parameter concentrations in groundwater at monitor MW06-2D may be the result of naturally-occurring upgradient sources and/or off-site sources in the vicinity of the wells MW06-2S and MW06-2D (Table 4, Figures 8 and 9). Groundwater at MW06-2S and MW06-2D was also interpreted to be partially-impacted by winter road maintenance, due to their location immediately adjacent to Mask Road.

Consistent with the requirements of the MECP TSS groundwater reviewer (Greenview, 2016), VOC were analyzed in fall 2019 at monitors MW06-2S and MW06-2D, and all VOC concentrations were documented to be below ODWS limits (Table 4).

Groundwater quality at the eastern property and CAZ boundary at the site is assessed using monitoring wells MW06-1S and MW06-1D, which are located approximately 500 m east of the site and adjacent to County Road 58 (Figures 8 and 9). In spring and fall 2019, results from MW06-1S and MW06-1D exhibited most parameter concentrations above median background groundwater quality (Table 4). Non-conformances of ODWS and significant groundwater trends at MW06-1S and MW06-1D were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
MW06-1S	• DOC • Iron • Manganese • pH (low)	• DOC • Iron • Manganese • pH (low)	• No significant trends	• Alkalinity • Aluminum • DOC • Iron • TDS
MW06-1D	• Chloride • Manganese • pH (high) • TDS	• None	• Aluminum • Chloride • COD • Phosphorus • Sodium	• No significant trends

Parameter concentrations at MW06-1S and MW06-1D were partially attributed to the conditions within the low-lying area in the vicinity of both wells, and some parameter concentrations, including chloride, sodium and TDS, were interpreted to be related to winter road maintenance along County Road 58 (Figures 8 and 9, Table 4). Landfill-related impacts to groundwater quality at MW06-1S and MW06-1D were interpreted to be minor in comparison to impacts related to winter road maintenance and naturally-occurring conditions within the adjacent low-lying area west of County Road 58. Generally, all ODWS non-conformances at MW06-1S and MW06-1D were historically evident (Table 4).

Consistent with the requirements of the MECP TSS groundwater reviewer (Greenview, 2016), VOC were analyzed in fall 2019 at monitors MW06-1S and MW06-1D, and all VOC concentrations were documented to be below ODWS limits (Table 4).

Groundwater quality at the southeastern extent of the CAZ is assessed at monitoring wells MW07-3S and MW07-3D, approximately 195 m south of MW06-1S and MW06-1D, in the western portion of the County Road 58 right-of-way (Figures 8 and 9). When compared with background concentrations at BH00-1 and BH00-2, concentrations at MW07-3S and MW07-3D were generally higher than background concentrations for many of the parameters in the 2019 environmental monitoring program (Table 4). Non-conformances of ODWS and significant groundwater trends at monitoring wells MW07-3S and MW07-3D were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
MW07-3S	• Chloride • TDS	• DOC • Manganese	• Alkalinity • Aluminum • Sodium	• No significant trends
MW07-3D	• DOC • Manganese	• DOC • Iron • Manganese	• Alkalinity • Aluminum • Calcium • Chloride • Conductivity • DOC • Iron • Magnesium • Manganese • Sodium	• No significant trends

Consistent with historical results (Greenview, 2019), and as groundwater elevations measured at MW07-3S and MW07-3D in 2019 were the highest of any monitoring wells at the site, they were interpreted to be upgradient of the landfill's downgradient receiver, and groundwater flow in the vicinity was interpreted to be in a generally northwest direction (Figures 8 and 9). Therefore, it was interpreted that groundwater quality in the southeast corner of the CAZ was not impacted by landfill-related activities, and that the likelihood of landfill-related impacts in the future at MW07-3S and MW07-3D is low (Table 4). Parameter concentrations at MW07-3S and MW07-3D were interpreted to be related to winter road maintenance along County Road 58 and to naturally-occurring conditions in the vicinity of MW07-3S and MW07-3D.

Consistent with the requirements of the MECP TSS groundwater reviewer (Greenview, 2016), VOC were analyzed in fall 2019 at monitors MW07-3S and MW07-3D, and all VOC concentrations were documented to be below ODWS limits (Table 4).

In general, groundwater downgradient of the AWDA at the Killaloe site was interpreted to be impacted by a combination of landfill-related sources and naturally-occurring conditions within the low-lying area of the CAZ at the site (Figures 8 and 9). Monitoring wells located at the property boundaries to the north, east, and southeast were not interpreted to be significantly impacted by the landfill at the Killaloe site (Table 4). Consistent with previous MECP interpretations, the Township acknowledges that groundwater downgradient of the Killaloe site has the potential to discharge to surface during periods of significant precipitation and/or when the groundwater table is elevated. The Township has previously agreed with the MECP TSS groundwater reviewer that the area of potential groundwater discharge may be further east than the existing groundwater monitoring network in the vicinity of the Killaloe site, and likely occurs closer to Round Lake Road (Greenview, 2019, Figures 8 and 9).

4.1.3 Groundwater Quality Assessment (PWQO)

Given the proximity of monitoring wells BH00-3, BH00-5, BH04-1S, BH04-1D, MW07-4R, and MW07-5R to the low-lying area east of the site (Figures 8 and 9), and based on requirements of the MECP TSS (Greenview, 2016), the groundwater quality results from these monitoring wells were only compared to the PWQO (MECP 1994b) and Canadian Water Quality Guidelines (CWQG, Canadian Council of Resource and Environment Ministers [CCREM], 1987) for select parameters, in accordance with Table B of the MECP TGD (MECP, 2010). Trend analysis was completed using results from the previous five (5) years and only significant trends are discussed in this report.

For comparison purposes, groundwater results from background monitoring wells BH00-1 and BH00-2 were compared to the PWQO and Table B of the TGD. Non-conformances of PWQO and significant groundwater trends at background groundwater locations BH00-1 and BH00-2 were as follows (Table 5):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
BH00-1 (background)	• Chromium • Iron • pH (low) • Phosphorus	• Chromium • Iron • Phosphorus	• No significant trends	• TDS
BH00-2 (background)	• Chromium • pH (low) • Phosphorus	• Phosphorus	• No significant trends	• Iron

No non-conformances of Table B of the TGD were noted in groundwater results from background monitoring wells BH00-1 and BH00-2 in 2019 (Table 5). Based on the 2019 results, high concentrations of chromium, iron, and phosphorus, and low pH values, were interpreted to be occurring in the background of the site, and were interpreted to be resultant of naturally-occurring conditions and/or off-site sources.

Monitoring well MW07-4R is located approximately 135 m northeast of the northeast corner of the AWDA (Figure 2). In accordance with recommendations of the 2013 Annual Report (Greenview, 2014a), and since impacts with respect to drive point monitoring well construction materials were apparent in groundwater quality results at MW07-4, it was replaced with new shallow groundwater monitoring well MW07-4R on June 25, 2014 (Appendix C). MW07-4R was installed using a hand auger and completed with 2-inch PVC well materials, adjacent to drive-point monitoring well MW07-4, and the PVC well screens were appropriately backfilled with well sand (Figure 9, Appendix C). During the installation of MW07-4R in June 2014, organic material (peat) was encountered to a depth of 0.90 m bgs, underlain by fine to medium grained sand (Appendix C). These overburden observations were interpreted to conform to historical OGS surficial mapping data (Figure 7). In spring and fall 2019, results from MW07-4R exhibited some parameter concentrations above median background groundwater quality (Table 4). Non-conformances of PWQO and significant groundwater trends at MW07-4R were as follows (Table 4):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
MW07-4R	• Iron • Phosphorus	• Chromium • Phosphorus	• No significant trends	• Boron

In 2019, there were no non-conformances of the parameter limits of Table B of the TGD at shallow groundwater well MW07-4R (Table 5). Groundwater quality at MW07-4R was generally similar to background groundwater quality at the site, and had generally lower parameter concentrations in comparison to MW07-5R (Table 5), likely due to its location upgradient/cross-gradient to the primary direction of groundwater flow at the site (Figures 8

and 9). The concentrations of iron (spring), and phosphorus (spring and fall), and chromium (fall) noted at MW07-4R in 2019 were generally consistent with current and historical concentrations noted at background groundwater monitoring wells BH00-1 and BH00-2 (Table 4), and therefore were attributed to either naturally-occurring or off-site sources upgradient of the Killaloe site (Figures 8 and 9). No non-conformances of Table B of the TGD were noted in groundwater results from monitoring well MW07-4R in 2019 (Table 5). MW07-4R was not interpreted to be significantly impacted by landfill-related activities in 2019 (Table 4).

Monitoring well BH00-5 is located approximately 70 m east of BH00-4, BH00-4B(S), and BH00-4A(D). In spring and fall 2019, results from BH00-5 exhibited most parameter concentrations above median background groundwater quality (Table 4). Non-conformances of PWQO and significant groundwater trends at BH00-5 were as follows (Table 4):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
BH00-5	• Boron • Chromium • Cobalt • Iron • Phosphorus	• Aluminum • Boron • Chromium • Cobalt • Iron • Phosphorus	• Aluminum • Barium • Boron • Chloride • Chromium • COD • Potassium • Sodium • TDS	• Alkalinity • Manganese

In 2019, non-conformances of the parameter limits of Table B of the TGD at shallow groundwater well BH00-5 were noted for the concentration of chloride in spring and fall 2019 (Table 5). Based on historical and current groundwater quality results, groundwater at BH00-5 was interpreted to be impacted from landfill-related sources, winter road maintenance activities, and to naturally-occurring conditions expected near a low-lying environment (Figures 8 and 9).

Monitoring wells BH04-1S and BH04-1D are located approximately 130 m east and downgradient of the AWDA (Figures 8 and 9). In spring and fall 2019, results from BH04-1S and BH04-1D exhibited most parameter concentrations above median background groundwater quality (Table 4). Non-conformances of PWQO and significant groundwater trends at BH04-1S and BH04-1D and were as follows (Table 4):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
BH04-1S	• Boron • Chromium • Cobalt • Iron • Phosphorus	• Boron • Chromium • Cobalt • Iron • Phosphorus	• Aluminum • Boron • DOC	• Alkalinity • TDS
BH04-1D	• Boron • Chromium • Cobalt • Iron • Phosphorus	• Boron • Chromium • Cobalt • Iron • Phosphorus	• Aluminum • Ammonia (total) • Chloride • DOC	• Alkalinity • Boron • TDS

Despite PWQO non-conformances for boron (Table 5), the concentrations did not exceed the limits of Table B of the TGD for both BH04-1S and BH04-1D. Based on a review of 2019 data, there were no non-conformances of the parameter limits of Table B of the TGD from groundwater wells BH04-1S and BH04-1D (Table 5). Per details

noted in Sections 2.2 and 2.3 of this report, the PWQO non-conformances noted above were interpreted to be consistent with landfill-related impacts and to expected parameter concentrations in organic peat material in a low-lying environment, per historical OGS surficial mapping data (Figure 7). The low-lying area was interpreted to be concentrating available metals (most specifically iron) owing to a combination of factors including the inherent low pH, low dissolved oxygen concentrations typical of low-lying environments (i.e. peat bogs), decay processes, and to bacteria that concentrate iron as part of life processes within wetland environments.

Consistent with the requirements of the MECP TSS groundwater reviewer (Greenview, 2016), VOC were analyzed in fall 2019 at BH04-1S and BH04-1D (Table 4). All VOC concentrations were documented to be below PWQO limits.

Groundwater quality south and southeast of the AWDA has historically been assessed using monitoring well BH00-3 (Figures 8 and 9). In spring and fall 2019, results from BH00-3 exhibited most parameter concentrations above median background water quality (Table 4). Non-conformances of PWQO and significant groundwater trends at monitoring well BH00-3 were as follows (Table 4):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
BH00-3	• Aluminum • Boron • Cobalt • Iron • Phosphorus	• Aluminum • Boron • Chromium • Cobalt • Iron • Phosphorus	• Alkalinity • Aluminum • Barium • Boron • Calcium • Chloride • Cobalt • Conductivity • DOC • Iron • Magnesium • Manganese • Sodium • Strontium • Sulphate • TDS • Total Kjeldahl Nitrogen (TKN)	• Phosphorus

BH00-3 was interpreted to be impacted from landfill-related activities in 2019; however, naturally-occurring conditions in the background, winter road maintenance activities, off-site sources, and the low-lying area adjacent to the monitoring well were interpreted to also be contributing to the high parameter concentrations noted in 2019 (Figures 8 and 9). BH00-3 is located generally downgradient of the stockpiling areas in the transfer station for unprocessed and processed C&D and bulky waste (Figure 3).

Shallow groundwater monitoring well MW07-5R is located approximately 140 m southeast of the AWDA within the low-lying area east of the site (Figures 8 and 9). In accordance with recommendations of the 2013 Annual Report (Greenview, 2014a), and since impacts with respect to drive point monitoring well construction materials were apparent in historical groundwater quality results at MW07-5, it was replaced with new shallow groundwater monitoring well MW07-5R on June 25, 2014 (Appendix C). MW07-5R was installed using a hand auger and completed with 2-inch PVC well materials, adjacent to drive-point monitoring well MW07-5, and the PVC well screens were appropriately backfilled with well sand (Figure 9, Appendix C). During the installation of shallow groundwater monitoring well MW07-5R in June 2014, only organic material (peat) was encountered to depth at 1.14 m bgs (Appendix C). These overburden observations were interpreted to conform to historical OGS surficial

mapping data (Figure 7). In spring and fall 2019, results from MW07-5R exhibited most parameter concentrations above median background water quality (Table 4). Non-conformances of PWQO and significant groundwater trends at monitoring well MW07-5R were as follows (Table 4):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
MW07-5R	• Boron • Chromium • Iron • Phosphorus	• Boron • Chromium • Iron • Phosphorus	• Alkalinity • Aluminum • Barium • Boron • Calcium • Chloride • COD • Conductivity • DOC • Iron • Magnesium • Manganese • Phosphorus • Sodium • TDS • TKN	• Cobalt

Based on a review of 2019 data, there were no non-conformances of the parameter limits of Table B of the TGD in results from groundwater well MW07-5R in spring or fall 2019 (Table 5). Per details noted in Sections 2.2 and 2.3 of this report, the PWQO non-conformances noted above were interpreted to be consistent with landfill-related impacts, winter road maintenance activities, and to expected parameter concentrations in organic peat material in a low-lying environment, per historical OGS surficial mapping data (Figure 7). The concentrations of boron in groundwater results at MW07-5R were not in conformance with the PWQO limit; however, the concentrations of boron did not exceed the limit for boron per Table B of the TGD for either the spring or fall 2019 sampling events (Table 5). The high chromium and phosphorus concentrations in 2019 were consistent with historically documented chromium and phosphorus concentrations at background monitoring wells BH00-1 and BH00-2 (Tables 4 and 5). The low-lying area was interpreted to be concentrating available metals (most specifically iron) owing to a combination of factors including the inherent low pH, low dissolved oxygen concentrations typical of low-lying environments (i.e. peat bogs), decay processes, and to bacteria that concentrate iron as part of life processes within wetland environments.

Consistent with the requirements of the MECP TSS groundwater reviewer (Greenview, 2016), VOC were analyzed in fall 2019 at MW07-5R (Table 4). With the exception of the concentration of toluene in fall 2019 results at MW07-5R, all VOC concentrations were documented to be below PWQO limits. No other non-conformances of the PWQO limits for VOCs have been documented in results at MW07-5R since VOC analysis commenced at the sampling location in fall 2015 (Table 4), and therefore the non-conformance for the concentration of toluene may be anomalous. Sampling and analysis should continue in future fall sampling events to confirm the significance of the fall 2019 results at MW07-5R.

Given the interpreted impacts downgradient of the Killaloe site at monitoring wells located near the low-lying wetland area, and the potential for groundwater to discharge to surface further to the east, the primary contingency measure proposed by the Township was progressive closure of the Killaloe site. The Progressive Closure Plan (Greenview, 2015b) provided to the MECP for review and approval in April 2015 was approved by the MECP in November 2017 (Appendix A). Progressive closure operations of the AWDA of the Killaloe Waste

Disposal Site are to continue in 2020, with all closure activities required to be completed at the site by November 2022.

4.1.4 Residential Groundwater Quality Assessment

Residential groundwater sampling is conducted at locations R1, R2, and R3 during both the spring and fall sampling events at the Killaloe site (Figures 8 and 9). Based on groundwater flow directions in 2019, the residential sampling locations R1, R2, and R3 were interpreted to be located upgradient of the Killaloe site, consistent with historical results (Greenview, 2019). Residential sampling locations R1 and R2 are inhabited residences, and are understood to have drilled drinking water wells. Residential sampling location R3 is understood to be an uninhabited building, and based on site observations appears to be a historic homestead. The well at location R3 is a dug well with concrete casing, and is understood to be advanced into overburden only to a depth of approximately 3 m. The following satellite image indicates the locations of each of the residential sampling locations relative to the Killaloe site:

Photo 1: Satellite Image of Residential Sampling Locations Relative to Killaloe Waste Disposal Site

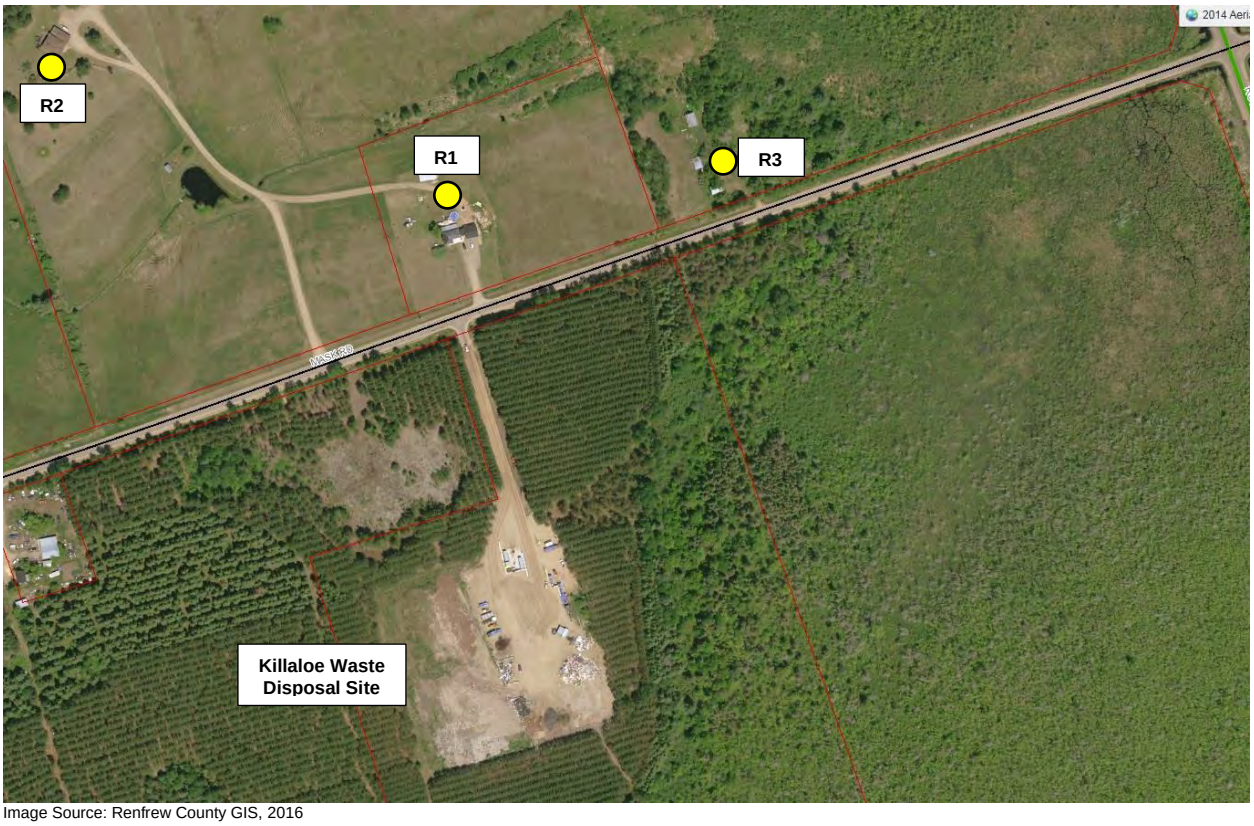
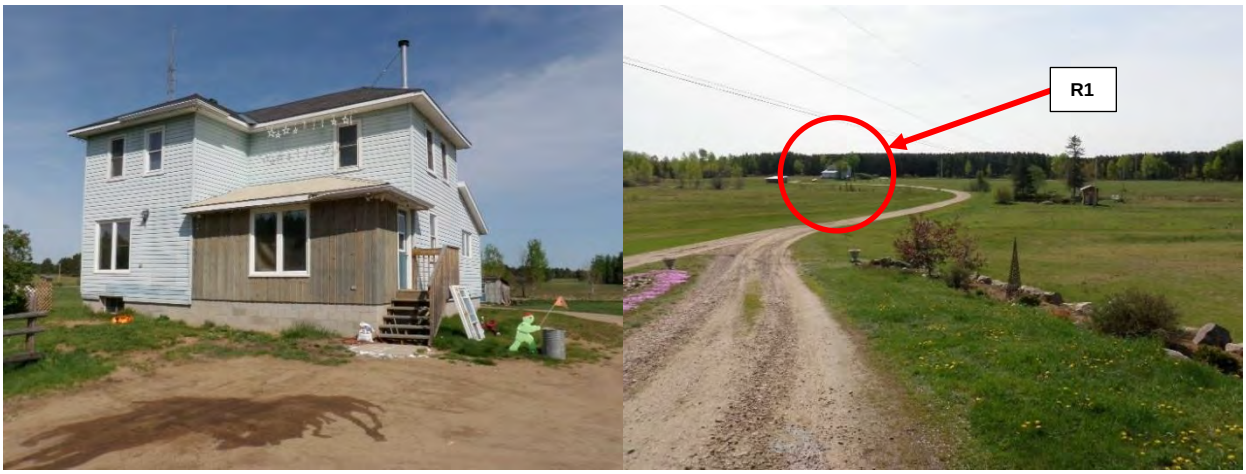


Image Source: Renfrew County GIS, 2016

Residential sampling location R1 is located at 1044 Mask Road, approximately 210 m northwest and upgradient of the northern corner of the AWDA at the Killaloe site (Figures 3, 8, and 9). During the 2015 groundwater monitoring program at the Killaloe site, Greenview requested that the homeowner of sampling location R1 provide the Township with a copy of their Ontario Water Resources Act Water Well Record (Water Well Record) for the well located on the property (Greenview, 2016). The homeowner advised Greenview that a copy of their Water Well Record was not available. Using the MECP's online Well Record mapping tool, none of the reported Water Well Records in the vicinity of residential sampling location R1 were interpreted to correlate to the location based on the available information recorded on the Water Well Records (i.e. location of well sketches). Additionally, the Township reviewed their records and no copy of a Water Well Record for the 1044 Mask Road property was available. At this time, the Township advises the MECP that they have expended all available resources to

determine information on the well construction for residential sampling location R1 and none is available. The following are photographs of the residence located at residential sampling location R1 (including a photograph of R1 as seen from sampling location R2):

Photos 2 & 3: Residential Sampling Location R1 (1044 Mask Road)



Residential sampling location R2 is located at 1046B Mask Road, approximately 475 m northwest and upgradient of the northern corner of the AWDA at the Killaloe site (Figures 3, 8, and 9). During the 2015 groundwater monitoring program at the Killaloe site, Greenview requested that the homeowner of sampling location R2 provide the Township with a copy of their Ontario Water Resources Act Water Well Record (Water Well Record) for the well located on the property (Greenview, 2016). The homeowner advised Greenview that a copy of their Water Well Record was not available. Using the MECP's online Well Record mapping tool, one (1) Water Well Record was interpreted to potentially be the record for residential sampling location R2 (Water Well Record 5508960) and is included in Appendix B. Water Well 5508960 was reported to be installed at a location that appears to coincide with 1046B Mask Road on May 21, 1988 to a maximum depth of 166 feet (50.6 m). According to the Log of Overburden and Bedrock Materials in Water Well Record 5508960, the well was advanced through overburden from surface to 11 feet (3.4 m) below ground surface (bgs), underlain by granite. By contrast, and based on information available from the Ontario Geological Survey (OGS, Figure 6), bedrock in the vicinity of residential sampling location R2 is likely magmatic rocks and gneisses of undetermined protolith. Water Well 5508960 was installed as a water supply well for domestic purposes using rotary (air) drilling techniques (Appendix B). The following is a photograph of the residence located at residential sampling location R2:

Photo 4: Residential Sampling Location R2 (1046B Mask Road)

Residential sampling location R3 is located at 1006 Mask Road, approximately 270 m northeast and upgradient of the northern corner of the AWDA at the Killaloe site (Figures 3, 8, and 9). Given that the homestead at residential sampling location R3 is uninhabited, and is understood to have been uninhabited since before 2008 based on site observations by Greenview, the homeowner was not reachable to provide a copy of a Water Well Record for the dug well to the Township. Using the MECP's online Well Record mapping tool, none of the reported Water Well Records in the vicinity of residential sampling location R3 were interpreted to correlate to the location based on the available information recorded on the Water Well Records (i.e. location of well sketches). Additionally, the Township reviewed their records and no copy of a Water Well Record for the 1006 Mask Road property was available. Given that the well at residential sampling location R3 is a dug well with concrete casing installed to an approximate depth of 3 m, and with consideration that none of the Water Well Records on the MECP's online Well Record mapping tool were interpreted to correlate with the location of R3, it is likely that no Water Well Record exists for the residential sampling location at 1006 Mask Road. At this time, the Township advises the MECP that they have expended all available resources to determine information on the well construction for residential sampling location R3 and none is available. The following is a photograph of the residence located at residential sampling location R3 and the dug well:

Photos 5 & 6: Residential Sampling Location R3 and Dug Well

Residential sampling locations R1, R2, and R3 were included as part of the 2019 groundwater monitoring program at the site (Table 1, Figures 8 and 9). Samples were collected from locations R2 and R3 during both the spring and fall 2019 sampling events, while R1 was only sampled in spring 2019 as the resident was not at home at the time of the fall 2019 sampling event (Table 4, Appendix D). Non-conformances of ODWS at residential sampling locations R1, R2, and R3 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
R1	• None	• No sample – resident not at home at time of sampling event	• No significant trends	• DOC • TDS
R2	• Iron	• Iron	• Aluminum	• No significant trends
R3	• DOC	• DOC	• No significant trends	• Conductivity • Manganese • TDS

Groundwater quality results from residential locations R1 and R2 are understood to be sampling groundwater within the bedrock aquifer, and consistent with anticipated unimpacted groundwater quality results within gneissic

bedrock (Table 4, Figure 6). The high iron concentrations noted in results from residential location R2 were interpreted to be naturally-occurring, given the location of R2 upgradient of the Killaloe site. As R3 was observed to be a dug well advanced within the local overburden, and based on OGS mapping is anticipated to be advanced within ice-contact stratified deposits (i.e. sand and gravel, minor silt, clay and till) and located adjacent to the organic deposits within the low-lying area east of the Killaloe site (Figure 7), the groundwater quality results were interpreted to be consistent with unimpacted overburden groundwater (Table 4).

Since R1, R2 and R3 were interpreted to be located upgradient and at a considerable distance from the waste mound (Figures 8 and 9), it was interpreted that there were no landfill-related impacts in 2019, and that the documented parameter concentrations at residential locations R1, R2, and R3 were resultant of naturally-occurring conditions and/or site-specific conditions on the residential properties.

4.1.5 Reasonable Use Concept Assessment

In an effort to assess potential landfill-related impacts migrating beyond the CAZ boundary, the RUC was used as an assessment tool to monitor downgradient impacts from the waste disposal site. Downgradient impacts are typically assessed using the RUC at monitoring wells located at, or in close proximity to, the downgradient CAZ boundary. The downgradient monitoring wells located near the CAZ boundary were compared to trigger concentrations for specific parameters as determined by groundwater quality at the site using the RUC for groundwater (MECP Procedure B-7-1, 1994a).

The MECP Procedure B-7-1: Determination of Contaminant Limits and Attenuation Zones iterates that in accordance with the appropriate criteria for particular uses, a change in groundwater quality on an adjacent property as a result of landfilling activities will only be accepted by the MECP as follows:

> *The quality cannot be degraded by an amount in excess of 50% of the difference between background and the Ontario Drinking Water Standards for non-health related parameters and in excess of 25% of the difference between background and the Ontario Drinking Water Standards for health-related parameters. Background is considered to be the quality of the groundwater prior to any man-made contamination.*
>
> *MECP Procedure B-7-1*

The RUC assessment was conducted using the concepts and procedures outlined in MECP Procedure B-7-1 (MECP, 1994a), specifically using the median value of individual background parameter concentrations from monitoring wells BH00-1 and BH00-2, to characterize natural groundwater quality at the site. Results from MW06-1S and MW06-1D were used for assessing site compliance with the RUC and Guideline B-7 at the eastern CAZ boundary along Round Lake Road (County Road 58), while results from MW06-2S and MW06-2D were used for assessing site compliance with the RUC and Guideline B-7 at the northern CAZ boundary along Mask Road (Figures 8 and 9). MW07-3S and MW07-3D, located near the southeastern CAZ boundary, were not included in the assessment of Guideline B-7, as historical and current groundwater elevation measurements (Table 3, Greenview, 2019, 2018, 2017, 2016, 2015a, 2014a) indicate that they are located upgradient of the AWDA at the Killaloe site, and therefore not interpreted to be susceptible to landfill-related impacts (Figures 8 and 9).

All parameters tested as part of the established annual monitoring program were used as groundwater triggers, and a respective RUC criteria value was calculated for each parameter at the Killaloe Waste Disposal Site. The trigger concentrations used to assess RUC compliance for the groundwater regime at the site are based on the RUC value for each of the respective parameters.

The RUC values for individual parameters are generated each year based on analytical results obtained from the groundwater monitoring program. If RUC non-conformances are noted, then action should be undertaken as appropriate and necessary in accordance with a defined groundwater contingency plan for the site. In cases where a groundwater contingency plan is not defined, a meeting with representatives of the MECP District Office should be held to develop an appropriate contingency plan, as necessary and appropriate for the particular site.

As the Killaloe site has previously been interpreted by the MECP to have triggered the Trigger Mechanism, contingency actions were required by the Township. The primary contingency action proposed by the Township was site closure, and a Progressive Closure Plan was submitted to the MECP for review in April 2015 (Greenview, 2015b). As a pre-emptive measure in advance of anticipated MECP approval of the Progressive Closure Plan, the Township emplaced approximately 1,000 m^3 of final cover materials on the waste mound of the Killaloe site in 2015 (Greenview, 2016). Progressive closure operations are planned to continue at the Killaloe site in 2020, given the MECP's approval of the Progressive Closure Plan in November 2017 (Appendix A).

Monitoring wells MW06-1S and MW06-1D are located approximately 500 m east and downgradient from the site, adjacent to County Road 58, and are used to assess the RUC at the eastern CAZ boundary (Figures 8 and 9). Non-conformances of RUC in spring and fall 2019 from groundwater results at downgradient monitoring wells MW06-1S and MW06-1D are included in the table below. RUC non-conformances noted in groundwater quality results from background monitoring wells BH00-1 and BH00-2 were included for comparison purposes:

Monitoring Well	RUC Non-Conformance	
	Spring 2019	Fall 2019
BH00-1 (background)	• Iron • Manganese • pH (low)	• Iron • Manganese
BH00-2 (background)	• DOC • pH (low)	• None
MW06-1S	• Aluminum • DOC • Manganese • pH (low)	• Aluminum • DOC • Manganese • pH (low)
MW06-1D	• Aluminum • Chloride • Manganese • pH (high) • TDS	• TDS

Based on the proximity of MW06-1S and MW06-1D to the low-lying area to the east of the site, the concentrations of DOC in groundwater at monitoring well MW06-1S were likely resultant of natural low-lying conditions (Figures 8 and 9, Table 4). Given that high concentrations of aluminum and manganese, and similarly low pH values, have historically been documented in background groundwater quality results at the Killaloe site (Table 4), downgradient RUC non-conformances for aluminum, manganese, and low pH at MW06-1S and MW06-1D were not interpreted to represent impacts resultant of landfill-related activities at the Killaloe site (Table 4). As MW06-1S and MW06-1D are located immediately adjacent to County Road 58 (Round Lake Road, Figures 8 and 9), the RUC non-conformances noted for chloride and TDS were interpreted to be resultant of winter road maintenance activities (Table 4). The high pH value in spring 2019 in results at MW06-1D was interpreted to be anomalous, as similarly high pH values have not been evident at either monitoring well MW06-1S or MW06-1D. At these locations, excluding the impacts related to the adjacent low-lying area and winter road maintenance activities, it was interpreted that parameter concentrations would meet the RUC at MW06-1S and MW06-1D, and the Killaloe site would be in conformance with MECP Guideline B-7 in 2019 at the downgradient eastern CAZ boundary.

Monitoring wells MW06-2S and MW06-2D are located adjacent to Mask Road and approximately 270 m northeast of the AWDA, and are used to assess the RUC at the northern CAZ boundary (Figures 8 and 9). Consistent with historical results (Greenview, 2019, 2018, 2017, 2016, 2015a, 2014), MW06-2S and MW06-2D were interpreted to be located generally upgradient/cross-gradient to the AWDA at the Killaloe site (Figures 8 and 9). Non-

conformances of RUC in spring and fall 2019 from groundwater results at MW06-2S and MW06-2D are included in the table below. RUC non-conformances noted in groundwater quality results from background monitoring wells BH00-1 and BH00-2 were included for comparison purposes:

Monitoring Well	RUC Non-Conformance	
	Spring 2019	Fall 2019
BH00-1 (background)	• Iron • Manganese • pH (low)	• Iron • Manganese
BH00-2 (background)	• DOC • pH (low)	• None
MW06-2S	• Iron • Manganese	• Alkalinity (low) • Iron • Manganese • pH (low)
MW06-2D	• Aluminum • Barium • DOC • Iron • Manganese	• Aluminum • Barium • DOC • Iron • Manganese

Based on the proximity of MW06-2S and MW06-2D to the low-lying area to the east of the site, the concentrations of DOC in groundwater at MW06-2D were interpreted to be resultant of natural low-lying conditions (Figures 8 and 9, Table 4). High DOC concentrations have also been documented in background ground water quality results at BH00-1 and BH00-2 (Table 4 and 5). Given that similar concentrations of aluminum, iron, and manganese, and similarly low pH values and alkalinity concentrations, were historically documented in background groundwater quality results at the Killaloe site, upgradient/cross-gradient RUC non-conformances for aluminum, iron, manganese, and low pH values and alkalinity concentrations at MW06-2S and MW06-2D were not interpreted to represent landfill-related impacts at the Killaloe site (Table 4). The source of the historically high barium concentrations in groundwater results at MW06-2D is unknown; however, given that MW06-2D has historically been interpreted to be located upgradient/cross-gradient to the waste mound, with a historical component of groundwater flow in the vicinity of the wells originating from off-site to the northwest (Greenview, 2012b, 2013a, 2014a, 2015a, 2016, 2017, 2018, 2019, Figures 8 and 9), the barium concentrations were interpreted to be the result of naturally-occurring upgradient and/or off-site influences. As a result, and taking into account barium in groundwater entering the CAZ from an unknown source, the Killaloe site was interpreted to be in compliance with the RUC in 2019 and in conformance with MECP Guideline B-7 at the northern CAZ boundary.

In summary, and based on a detailed review of current and historical groundwater quality results at CAZ monitoring wells MW06-1S, MW06-1D, MW06-2S, and MW06-2D (Table 4), the Killaloe site was interpreted to meet the intent of MECP Guideline B-7 and RUC in 2019.

4.2 Surface Water Quality Assessment

As part of the spring and fall 2019 surface water sampling events, physical characteristics of sampling locations SW1, SW2, SW3, SW5, SW6 (background), and SW9 were recorded (Appendix D, Table 1). Sampling location SW8 is no longer sampled as it was interpreted to be redundant to background surface water quality location SW6 (Tables 1 and 6). During the spring 2019 sampling event, sampling locations SW3 and SW5 were observed to have insufficient water to sample, and no discernible flow conditions were observed at locations SW1, SW2, SW6, and SW9 (Appendix D). During the fall 2019 sampling event, samples could not be collected from locations

SW1, SW2, SW3, and SW5 as they were observed to be dry, while no discernible flow conditions were observed at locations SW6 and SW9 (Appendix D).

For the spring 2019 sampling event, depth (m), width (m), velocity (metres per second, m/s), and discharge (cubic metres per second, m^3/s) were measured and calculated with results as follows:

Spring 2019				
Sample Location	**Depth (m)**	**Width (m)**	**Velocity (m/s)**	**Discharge (m^3/s)**
SW1	0.10	1.10	No discernible flow	
SW2	0.10	2.50	No discernible flow	
SW3	Insufficient water to sample			
SW5	Insufficient water to sample			
SW6 (background)	0.45	Too wide to measure	No discernible flow	
SW9	0.20	2.20	No discernible flow	

For the fall 2019 sampling event, depth (m), width (m), velocity (m/s), and discharge (m^3/s) were measured and calculated with results as follows:

Fall 2019				
Sample Location	**Depth (m)**	**Width (m)**	**Velocity (m/s)**	**Discharge (m^3/s)**
SW1	Dry			
SW2	Dry			
SW3	Dry			
SW5	Dry			
SW6 (background)	0.20	5.00	No discernible flow	
SW9	0.15	2.00	No discernible flow	

Surface water field sampling records are provided in Appendix D.

4.2.1 Surface Water Quality Assessment - PWQO

Background surface water quality for comparison purposes at the Killaloe Waste Disposal Site is calculated annually in each Annual Report using the 75th percentile historical value of individual background parameter concentrations from a minimum of ten (10) previous sampling events from background surface water location SW6 (Figure 4, Tables 6 and 7). Background surface water location SW6 is located approximately 1.8 kilometres (km) south of the Killaloe Waste Disposal Site along Wildlife Road.

Surface water quality results for the Killaloe site were compared to PWQO (MECP, 1994b) and the results of the 2019 surface water monitoring program are presented in Table 6. Additionally, surface water quality results were compared with the CWQG (CCREM, 1987) for select parameters, in accordance with Table B of the MECP TGD (MECP, 2010). Accredited laboratory Certificates of Analysis for the surface water quality results are provided in Appendix E. Trend analysis was completed using results from the previous five (5) years and only significant trends are discussed in this report.

Blind duplicate samples were collected at SW6 and SW9 for the spring and fall 2019 sampling events, respectively, and results were similar to the identified sample indicating that the results of the 2019 surface water monitoring program can be interpreted with confidence (Appendix D and E).

Surface water location SW6 was included in the environmental monitoring program in 2008 to further establish surface water quality south of the site, and is located approximately 1,800 m (1.8 km) south of the Killaloe site, adjacent to Wildlife Road (Figure 4). SW6 was established as representative of background surface water quality

at the site based on MECP TSS surface water review comments in a September 7, 2010 surface water memorandum, and as noted in the response letter to the MECP and revised groundwater and surface water Trigger Mechanism and Contingency Plan submitted for MECP approval on November 18, 2014 (Greenview, 2014b). Due to the considerable distance of SW6 from the Killaloe site (1,800 m), surface water quality at SW6 was interpreted to represent natural surface water quality within the expansive low-lying area south of the site (Table 6). Consistent with historical reports (Greenview, 2019, 2018, 2017, 2016, 2015a, 2014a, 2013a), SW6 was observed to be a flooded area adjacent to Wildlife Road, with many small trees and shrubs and a large amount of decaying organic matter. Surface water samples were obtained from SW6 during the spring and fall 2019 sampling events (Appendix D). During the spring 2019 sampling event, the area around SW6 was observed to be flooded, whereas during the fall 2019 sampling event, surface water levels in the vicinity of SW6 were observed to be very low. In 2019, few parameter concentrations at background surface water sampling location SW6 were above 75th percentile background surface water quality at the site in spring 2019, while some were above 75th percentile background surface water quality at the site in fall 2019 (Table 6). Non-conformances of PWQO, and significant trends, at background surface water sampling location SW6 were as follows (Table 6):

Sampling Location	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
SW6 (background)	• Iron	• Aluminum • Chromium • DO (low) • Iron • Phosphorus	• Iron • Manganese • Phosphorus	• No significant trends

In 2019, no non-conformances of Table B of the TGD were identified in spring or fall 2019 results at background sampling location SW6. SW6 was interpreted to continue to be representative of background surface water quality at the Killaloe site in 2019. Based on historical and current results at background sampling location SW6, naturally high concentrations of aluminum, chromium, copper, iron, manganese, phenols, phosphorus, and zinc, along with naturally low pH and DO values, were interpreted to be characteristic of the low-lying wetland area at the Killaloe site (Table 6).

Historically, SW1 was observed to be a small, shallow pool of water with abundant decaying organic matter (Figure 4, Greenview, 2019, 2018, 2017, 2016, 2015a, 2014a). Surface water location SW1 is not connected by a defined surface water channel with any of the surface water locations at the Killaloe site. Since SW1 was generally observed to be dry during many historical environmental monitoring events, and based on historical surface water quality and typically very low concentrations of such parameters as alkalinity, conductivity, and TDS, the likelihood of upgradient groundwater discharging to surface water in the vicinity of SW1 was interpreted to be low (Table 6). In spring 2019, few parameter concentrations at surface water sampling location SW1 were above 75th percentile background surface water quality at the site (Table 6). Non-conformances of PWQO, and significant trends, at surface water sampling location SW1 were as follows (Table 6):

Sampling Location	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
SW1	• Aluminum • Chromium • Iron • pH (low)	• No sample (Dry)	• No significant trends	• No significant trends

In 2019, no non-conformances of Table B of the TGD were identified in spring 2019 results. The PWQO non-conformances for concentrations of aluminum, chromium, iron, and a low pH value, were interpreted to be consistent with current and historical values documented at background surface water sampling station SW6,

and were attributed to naturally-occurring conditions (Table 6). Consistent with historical results, the predominant source of surface water at location SW1 was interpreted to be snow-melt related waters (and rainfall) in spring 2019; however, the possibility exists that groundwater could discharge to surface in the vicinity of SW1 during periods of extensive precipitation and/or elevated groundwater table. The organic peat material overburden, on which SW1 is understood to be located (Figure 7), is interpreted to be an aquitard overlying the sandy overburden and related groundwater table below (see Sections 2.2 and 2.3). Based on the review of surface water quality results in 2019, surface water sampling location SW1 was not interpreted to be significantly impacted from the Killaloe site and results were interpreted to be consistent with surface water within a stagnant, low-lying environment.

Surface water sampling location SW2 is located approximately 100 m northeast of SW1, and 100 m southeast of the waste mound, in the low-lying area east of the site (Figure 4). Historically, SW2 was observed to be a small, shallow pool of water with abundant decaying organic matter (Greenview, 2019, 2018, 2017, 2016, 2015a, 2014a). SW2 is not connected by a defined surface water channel with any of the surface water locations at the Killaloe site. Since SW2 was generally observed to be dry during many historical environmental monitoring events, and based on historical surface water quality and typically very low concentrations of such parameters as alkalinity, conductivity, and TDS, the likelihood of upgradient groundwater discharging to surface water in the vicinity of SW2 was interpreted to be low (Table 6). In 2019, few parameter concentrations at surface water sampling location SW2 were above 75th percentile background surface water quality at the site (Table 6). Non-conformances of PWQO, and significant trends, at surface water sampling location SW2 were as follows (Table 6):

Sampling Location	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
SW2	• Aluminum • Chromium • DO (low) • Iron • pH (low)	• No sample (Dry)	• Insufficient recent data for trend analysis	• Insufficient recent data for trend analysis

In 2019, no non-conformances of Table B of the TGD were identified in spring 2019 results. The PWQO non-conformances for concentrations of aluminum, chromium, DO (low), iron, and low pH values, were interpreted to be consistent with current and historical values documented at background surface water sampling station SW6, and were interpreted to naturally-occurring conditions (Table 6). Consistent with historical results, the predominant source of surface water at location SW2 was interpreted to be snow-melt related waters (and rainfall) in spring 2019; however, the possibility exists that groundwater could discharge to surface in the vicinity of SW2 during periods of extensive precipitation and/or elevated groundwater table. The organic peat material overburden, on which SW2 is understood to be located (Figure 7), is interpreted to be an aquitard overlying the sandy overburden and related groundwater table below (see Sections 2.2 and 2.3). Based on the review of surface water quality results in 2019, surface water sampling location SW2 was not interpreted to be significantly impacted from the Killaloe site and results were interpreted to be consistent with surface water within a stagnant, low-lying environment.

Surface water location SW3 is located approximately 105 m northeast of the waste disposal site, in the vicinity of MW07-4R (Figures 4, 8 and 9). Historically, SW3 was observed to be a small, shallow pool of water with abundant decaying organic matter (Greenview, 2019, 2018, 2017, 2016, 2015a, 2014a). SW3 is not connected by a defined surface water channel with any of the surface water locations at the Killaloe site. Since SW3 was generally observed to be dry during many historical environmental monitoring events, and based on historical surface water quality and typically very low concentrations of such parameters as alkalinity, conductivity, and TDS, the likelihood of upgradient groundwater discharging to surface water in the vicinity of SW3 was interpreted to be low (Table 6). SW3 was not sampled in spring 2019 as it was observed to have insufficient water for

sampling purposes, and was not sampled in fall 2019 as it was observed to be dry (Appendix D). Historically, and previous to spring 2017 (Greenview, 2018), SW3 had not been sampled since May 2009 due to low water conditions, and is not considered to be an effective location to monitor surface water quality at the site. Non-conformances of PWQO, and significant trends, at surface water sampling location SW3 were as follows (Table 6):

Sampling Location	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
SW3	• Insufficient Water to Sample	• No sample (Dry)	• Insufficient recent data for trend analysis	• Insufficient recent data for trend analysis

Historically, the predominant source of surface water in the vicinity of location SW3 was interpreted to be rainfall and snow-melt related waters; however, the possibility exists that groundwater could discharge to surface in the vicinity of SW3 during periods of extensive precipitation and/or elevated groundwater table. The organic peat material overburden, on which SW3 is understood to be located (Figure 7), is interpreted to be an aquitard overlying the sandy overburden and related groundwater table below (see Sections 2.2 and 2.3). Based on historical surface water quality results, surface water sampling location SW3 has not been interpreted to be significantly impacted from the Killaloe site and results have generally been interpreted to be consistent with surface water within a stagnant, low-lying environment.

Surface water location SW5 is located approximately 125 m east of the site, and approximately 20 m south of BH04-1S and BH04-1D (Figures 4, 8 and 9). Historically, SW5 was observed to be a small, shallow pool of water with abundant decaying organic matter (Greenview, 2019, 2018, 2017, 2016, 2015a, 2014a). SW5 is not connected by a defined surface water channel with any of the surface water locations at the Killaloe site. SW5 has only been sampled seven (7) times since May 2008 due to low water conditions, and is not considered to be an effective location to monitor surface water quality at the site. SW5 was not sampled in spring 2019 as it was observed to have insufficient water for sampling purposes, and was not sampled in fall 2019 as it was observed to be dry (Appendix D). Non-conformances of PWQO, and significant trends, at surface water sampling location SW5 were as follows (Table 6):

Sampling Location	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
SW5	• Insufficient Water to Sample	• No sample (Dry)	• Insufficient recent data for trend analysis	• Insufficient recent data for trend analysis

Based on historical surface water quality results at SW5, it is interpreted that SW5 may be influenced by groundwater discharge to surface, and impacts related to landfill-related factors have been historically apparent (Table 6); however, historically documented parameter concentrations were interpreted to be significantly lower than at nearby groundwater monitors BH04-1S, BH04-1D, and MW07-5R (Table 5), indicating that surface water quality in the vicinity of SW5 may be dominated by precipitation-related sources.

Surface water location SW9 is located 615 m northeast of the waste mound at the Killaloe site, adjacent to the southwest corner of County Road 58 and Mask Road and along the northeastern border of the CAZ (Figures 4, 8, and 9). SW9 is not connected by a defined surface water channel with any of the surface water locations at the Killaloe site (Table 6). Surface water samples were obtained from SW9 during the spring and fall 2019 sampling events (Appendix D). Evidence of beaver activity and dams have historically been documented in the vicinity of SW9; however, specific beaver activity was not observed in 2019 (Appendix D). In 2019, few parameter concentrations at surface water sampling location SW9 were above 75th percentile background surface water quality at the site in spring or fall 2019 (Table 6). Non-conformances of PWQO, and significant trends, at surface water sampling location SW9 were as follows (Table 6):

Sampling Location	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2019	Fall 2019	Increasing	Decreasing
SW9	• Aluminum • Chromium • Iron • pH (low)	• Aluminum • Chromium • Iron • Phosphorus • Zinc	• No significant trends	• TDS

In 2019, no non-conformances of Table B of the TGD were identified in spring or fall 2019 results. The PWQO non-conformances for concentrations of aluminum, chromium, iron, phosphorus, and zinc were interpreted to be consistent with historical values documented at background surface water sampling station SW6, and were interpreted to naturally-occurring conditions (Table 6). Influences of groundwater potentially discharging to surface in the vicinity of SW9 may be occurring; however, concentrations of alkalinity, conductivity, and TDS suggest that surface water quality in the vicinity of SW9 is dominated by precipitation-related sources. Based on the review of surface water quality results in 2019, surface water sampling location SW9 was not interpreted to be significantly impacted from the Killaloe site and results were interpreted to be consistent with surface water within a generally stagnant, low-lying environment.

Further to the inclusion of sampling location SW9 in the surface water monitoring program at the Killaloe site, in MECP TSS surface water review comments dated September 7, 2010, it was noted that there was no need to monitor sampling location SW9 (Greenview, 2011a); however, the Township continues to monitor location SW9 from a due diligence perspective as representative of surface water quality of the low-lying area in the vicinity of the site, recognizing that some parameter concentrations may be influenced by winter road maintenance activities.

Of significance is the fact that none of the surface water locations in the vicinity of the Killaloe site are connected via defined surface water channels; rather, they all exist within small pools of water within low-lying areas east (SW3, SW5, SW9) and south (SW1, SW2, SW6) of the site. Surface water locations SW1, SW2, SW3, and SW5 have been generally observed to be dry and/or not have sufficient surface water for sampling purposes during previous sampling events at the site. Sampling at SW6 (background) and SW9 has generally been possible for both spring and fall sampling events; however, these locations are generally under no discernible flow or low-flow conditions.

4.2.2 Surface Water Quality Assessment – 75th Percentile Historical Background

Consistent with historical reports, a review of surface water quality results compared to the 75th percentile historical background surface water was conducted as part of the 2019 Annual Report for the Killaloe site (Table 7). The background surface water location at the Killaloe site is SW6, and all parameters of the surface water program on Table 1 were used for the assessment.

As discussed in Section 4.2.1, none of the surface water locations in the vicinity of the Killaloe site are connected via defined surface water channels; rather, they all exist as small pools of water within low-lying areas east (SW3, SW5, SW9) and south (SW1, SW2, SW6) of the site. Additionally, and as noted previously, surface water locations SW1, SW2, SW3, and SW5 have generally been observed to be dry or not have sufficient water for sampling purposes during previous environmental monitoring programs at the site (Table 6).

Results from all surface water sampling locations included in the environmental monitoring program were included in the comparison to the 75th percentile historical background surface water quality at the Killaloe site as follows:

Surface Water Location	No. of Parameter Concentrations Above the 75th Percentile Background Surface Water Quality (Spring 2019)	No. of Parameter Concentrations Above the 75th Percentile Background Surface Water Quality (Fall 2019)	Three (3) Consecutive 75th Percentile Background Surface Water Quality Concentration Non-conformances
SW6 (Background)	4 of 32	22 of 32	Chloride, DO (low), Sodium
SW1	7 of 32	No Sample	n/a
SW2	8 of 32	No Sample	n/a
SW3	No Sample	No Sample	n/a
SW5	No Sample	No Sample	n/a
SW9	4 of 32	12 of 32	DO (low), Sodium

Given the historical observations that sampling locations SW1, SW2, SW3, and SW5 have had generally insufficient water to sample or dry conditions (Greenview, 2019), none of these sampling locations have had three consecutive sampling events (Table 7). Based on a review of the parameter concentrations in results from the background sampling location SW6 and locations SW1, SW2, SW3, SW5, and SW9, surface water quality results within the low-lying area in the vicinity of the Killaloe site were not interpreted to represent significant landfill-related impacts. Parameters that have exceeded the 75th percentile background for three (3) consecutive events were interpreted to be generally consistent with background surface water quality in poorly drained, low-lying environments and to winter road maintenance activities (Table 7).

4.2.3 Alternative Standards Review (Groundwater and Surface Water)

In accordance with the approved Progressive Closure Plan (Greenview, 2015b, Appendix A), surface water and groundwater results from monitoring wells in the vicinity of the low-lying area east of the Killaloe site are to be compared to alternative standard limits, in accordance with respective limits of the PWQO, and Table A and B of the TGD (MECP, 2010). Results compared to these alternative standard limits are included in Table 8 of this report.

For the 2019 environmental monitoring program, the following groundwater and surface water results were in non-conformance with the alterative standard limits (Table 8):

Sampling Location	Alternative Standard Limits Non-Conformance	
	Spring 2019	Fall 2019
BH00-1 (Background)	• Iron • Phosphorus	• Iron • Phosphorus
BH00-2 (Background)	• Phosphorus	• Phosphorus
BH00-3	• Aluminum • Cobalt • Iron • Phosphorus	• Aluminum • Cobalt • Iron • Phosphorus
BH00-5	• Barium • Cobalt • Iron • Phosphorus	• Aluminum • Barium • Cobalt • DO (low) • Iron • Phosphorus

BH04-1S	• Cobalt • Iron • Phosphorus	• Cobalt • Iron • Phosphorus • Sulphate
BH04-1D	• Cobalt • Iron • Phosphorus	• Cobalt • DO (low) • Iron • Phosphorus
MW07-4R	• Phosphorus	• Phosphorus
MW07-5R	• Iron • Phosphorus	• DO (low) • Iron • Phosphorus
SW1	• Aluminum	• No sample (Dry)
SW2	• Aluminum • DO (low)	• No sample (Dry)
SW3	• No sample (Insufficient water to sample)	• No sample (Dry)
SW5	• No sample (Insufficient water to sample)	• No sample (Dry)
SW6 (Background)	• None	• Aluminum • DO (low) • Iron • Phosphorus
SW9	• Aluminum	• Aluminum • Iron • Phosphorus

In 2019, groundwater and surface water background sampling locations identified non-conformances for concentrations of aluminum, DO (low), iron, and phosphorus which suggest elevated concentrations for these parameters in the vicinity of the site are related to naturally-occurring or off-site sources (Table 8). High concentrations of these parameters have been historically evident at the Killaloe site (Table 8), and are not likely representative of significant landfill-related impacts at the site. Low pH values have also historically been documented in background groundwater and surface water at the site, and the noted non-conformances of the alternative standards in 2019 at select locations were not interpreted to be representative of landfill-related activities (Table 8). The high barium concentrations noted at BH00-5 are likely landfill-related, as BH00-5 is located downgradient of the leachate monitoring wells of the Killaloe site (BH00-4A(D), BH00-4B(S), and BH00-4R); however, similarly high barium concentrations are not documented at other groundwater and surface water sampling locations in the vicinity of the low-lying area east of the site (Figures 8 and 9). High cobalt concentrations have periodically been documented in results from background monitoring wells BH00-1 and BH00-2, and therefore the high cobalt concentrations in monitoring wells BH00-3, BH00-5, BH04-1S, and BH04-1D were interpreted to a combination of naturally-occurring or offsite sources as well as to landfill-related activities. The high sulphate concentration in fall 2019 results at monitoring well BH04-1S was deemed to be anomalous, as similarly high concentrations have not recently been documented at any of the monitoring wells or surface water stations included in the Table 8 data set.

In summary, results in 2019 were generally consistent with 2018 results with respect to the Alternative Standard Limits identified on Table 8 (Greenview, 2019).

4.3 Review of Trigger Mechanism and Contingency Plan

In accordance with Condition 8.3 of the Amended ECA for the Killaloe site, a proposed Groundwater and Surface Water Trigger Mechanism and Contingency Plan (Trigger Mechanism) was prepared by the Township and submitted to the MECP EAB for review on September 27, 2013 (Greenview, 2014).

On January 28, 2014, a conference call occurred between the Township, Greenview, and the MECP regarding the proposed Trigger Mechanism, and on January 30, 2014 the MECP provided the Township with an electronic letter summarizing their comments relative to the proposed Trigger Mechanism and discussion points of the conference call (Greenview, 2015a). Based on the comments related to the conference call on January 28, 2014 and to MECP TSS surface water review comments (dated February 5, 2014) received by the Township from the MECP on March 17, 2014 (Greenview, 2014), the Township provided a response to the MECP in a letter dated November 18, 2014 (Greenview, 2015a). As part of the November 18, 2014 submission, and in accordance with the MECP's request for a simplified Trigger Mechanism, the Township provided a Revised Trigger Mechanism for groundwater and surface water at the Killaloe site (Greenview, 2015a). The Township notes that the Revised Trigger Mechanism was not approved by the MECP TSS groundwater and surface water reviewers in communications received in 2015 (Greenview, 2016), and the MECP TSS groundwater and surface water reviewers provided an alternative approach for a Trigger Mechanism for the site. On March 3, 2016, the Township received a letter from the MECP EAB stating that the file related to the application to amend the ECA for the Killaloe site regarding the Revised Trigger Mechanism had been closed, and the application to amend the ECA related to the Progressive Closure Plan for the site remained open for review (Greenview, 2017).

As part of the 2015 Annual Report (Greenview, 2016), the Township provided significant detail, interpretation, and supporting information regarding topography and drainage (Section 2.1), geological and hydrogeological conditions (Section 2.2), and ecological conditions (Section 2.3) with a specific focus on the poorly-drained low-lying area east of the site. These details have also been included in this Annual Report. There are significant environmental differences between the upland area in the vicinity of the Killaloe Waste Disposal Site AWDA and the lowland areas east of the site, and therefore groundwater and surface water should be reviewed in consideration of these differences (Figures 4, 6, and 7). The upland area in the vicinity of the Killaloe Waste Disposal Site AWDA is dominated by sandy material, while in the low-lying area east of the site is dominated by a thick layer of organic peat material, typical of a bog-type environment (Figure 7). As noted in Section 2.2 of this report, no groundwater seeps have been observed in the vicinity of the Killaloe Waste Disposal Site, including to the east of the site in the vicinity of the low-lying area. The overlying peat is interpreted to be performing as an aquitard east of the site.

As noted in Section 2.2, the peat material in the low-lying area is interpreted to be accumulating available metals (most specifically iron) due to a combination of factors including the inherent low pH, low dissolved oxygen typical of low-lying areas, decay processes, and bacteria that concentrate iron as part of life processes within wetland environments.

While some landfill-related impacts were interpreted downgradient of the Killaloe site, naturally-occurring conditions and external factors were also interpreted to be impacting groundwater quality results within the CAZ lands. As generally no flowing surface water system exists downgradient of the site, the ability for landfill-related constituents to mobilize is interpreted to be low, and therefore the site lands downgradient of the site are interpreted to be sufficient and appropriate for CAZ purposes.

The MECP has previously identified in communications that the Trigger Mechanism was interpreted to be activated. As a proactive measure, the Township determined that the most effective Contingency Action for the Killaloe site would be to close the waste mound and as such, submitted a Progressive Closure Plan to the MECP for review and approval in April 2015 (Greenview, 2015b). Closure of the waste mound at the Killaloe site was interpreted to be the most practical Contingency Action in order to meet with the expectations of the MECP for the Killaloe site. As the Killaloe site has been interpreted by the MECP to have triggered, a detailed review of the proposed Trigger Mechanism has not been completed as part of this 2019 Annual Report. As noted earlier

in this report, and based on a topographic capacity survey completed on November 10, 2015, approximately 1,000 m^3 of final cover material was emplaced by the Township on the AWDA of the Killaloe site in advance of the anticipated approval of the Progressive Closure Plan by the MECP (Figure 3).

The Progressive Closure Plan for the Killaloe Waste Disposal Site was approved by the MECP in November 2017 (Appendix A), and progressive closure activities commenced at the site in 2018 and have continued in 2019. Closure operations are expected to be completed by November 2022.

For due diligence purposes the Township has included five (5) year time trend graphs (Graphs 1 to 11) for the proposed key trigger parameters ammonia (total), barium, boron, COD, chloride, DOC, iron, manganese, nitrate, sodium, and sulphate in this report for the MECP's records.

4.4 Landfill Gas Monitoring Review

Landfill gas monitoring was instituted at the Killaloe site in 2015, based on review comments received from the MECP TSS groundwater reviewer in 2015 (Greenview, 2016). Landfill gas monitoring was conducted in spring and fall 2019 at all monitoring wells included in the groundwater monitoring program at the Killaloe site (Figures 8 and 9).

In spring and fall 2019, all monitoring wells included in the groundwater monitoring program were measured to have landfill gas at 0% lower explosive limit (LEL, Appendix D).

Given that the Township now has a significant data set (2015 to 2019) showing that landfill gas is not an issue at the Killaloe Waste Disposal Site, the Township requests that the MECP reconsider the requirement for annual landfill gas monitoring at the site.

4.5 Operations Summary

A summary of 2019 waste management operations at the Killaloe Waste Disposal Site is presented below.

4.5.1 Site Operations

In 2019, the Killaloe site operated as a municipal solid waste landfill and transfer station, accepting residential and IC&I waste and recyclables for transfer and processing. Additionally, the Killaloe site accepted municipal waste from the Township's Round Lake mobile waste transfer station, and curbside collection from the Village of Killaloe for transfer and processing.

The Killaloe Waste Disposal Site consists of a licensed waste disposal area of 1.88 ha within a total property area of 31.7 ha inclusive of the CAZ, in accordance with the Amended ECA (A412306, Appendix A). The Amended ECA approves waste cell development on top of the waste mound in Phase 1 and Phase 2 areas of the western portion of the AWDA (Figure 3).

The Killaloe Waste Disposal Site is approved for the collection, stockpiling, disposal and/or transfer of the waste and recyclable materials, per the Amended ECA (Appendix A), as identified in Section 2.4 of this report.

A sign is posted at the entrance to the waste disposal site that provides the ECA number for the site, the waste management bylaw number for the Township, hours of operation, accepted waste and recycling, permitted users, and emergency contact information. The site is accessed from the site road extending to the north from Mask Road (Figure 3).

Following the completion of the new transfer station at the Round Lake site in the summer of 2012, municipal waste collected at the Round Lake transfer station was transferred to the Killaloe Waste Disposal Site for management; however, Blue Box recyclables and household organics collected and stored at the Round Lake site were transferred directly off-site for management. Since the MECP's issuance of the Amendment to the ECA for the Township's Red Rock Waste Disposal Site (A412307) on July 21, 2014, the Township has been permitted to transfer C&D, bulky, and leaf and yard waste from the Killaloe site to the Red Rock site for final

disposal. No routine waste disposal activities were conducted at the Killaloe site in 2019. The utilization of remaining capacity at the Killaloe site for disposal of waste is planned to be set aside for contingency purposes (i.e. due to issues with waste compaction equipment of the transfer station, service issues with the Township's waste transportation service provider, etc.) in accordance with the Progressive Closure Plan (Greenview, 2015b). Based on a topographic capacity survey completed on November 10, 2015, approximately 1,000 m^3 of final cover material was emplaced by the Township on the AWDA of the Killaloe site in advance of the anticipated approval of the Progressive Closure Plan by the MECP (Figure 3).

On January 1, 2013, the Township initiated a clear bag policy for all municipal waste, discontinued the acceptance of IC&I waste in bulk quantities (mandating that all IC&I waste be disposed of in clear bags), increased the cost of residential bag tags from $1.00 to $2.00, and initiated an IC&I bag tag program with bag tags valued at $1.00 per bag. The cost of IC&I bag tags increased by $0.50 per year until 2015, at which point the cost was $2.00 per bag. As part of the upgrades to the waste transfer station in 2013, the Township installed updated site signage, which included image and text-based components, for easier reference of waste and recycling operations at the site for the Township's ratepayers.

In late December 2017, the stationary waste compaction unit at the Killaloe site experienced an unforeseen equipment malfunction, which required significant repairs, at temporary use of the contingency disposal area in December 2017 was required. On January 12, 2018, the Township informed the MECP Ottawa District Office by electronic communication that the stationary waste compaction unit had been recommissioned for use at the Killaloe Waste Disposal Site (Greenview, 2018).

Based on the Amended ECA (Appendix A), the Township is also approved to stockpile, shred, and use received C&D and bulky waste as alternative cover at the Killaloe site, in an effort to optimize remaining site capacity. The site is also approved for the operation of a Reuse Centre and a burn area for clean wood and brush. In 2019, clean wood and brush was processed (size-reduced) and landfilled at the Red Rock Waste Disposal Site. No burning activities were conducted by the Township at the Killaloe Waste Disposal Site in 2019.

The hours of operation at the Killaloe site in 2019 were as follows:

Day of the Week	Hours of Operation
Wednesday	7:30 a.m. – 11:30 a.m.
Friday	12:00 p.m. – 4:00 p.m.
Saturday	8.00 a.m. – 4:00 p.m.

Access to the Killaloe site is restricted by a lockable gate and page wire fence around the site. The site is surrounded by forested lands to the north, west and south, and a low-lying area to the east and southeast (Figures 8 and 9), providing adequate screening and restricted access to the site.

The site access road extending from Mask Road has sufficient width at the entrance and within the site to allow for unimpeded winter travel and access for emergency and snow removal equipment. The site access road was observed to be in good condition during the routine site inspections conducted by Greenview in 2019.

Facilities and operations at the Killaloe site include the AWDA, recycling depot for Blue Box recyclables, organics depot, site attendant's offices, stockpiling areas for bulk recyclable materials (scrap metal and white goods, refrigerant appliances, waste tires), a leaf and yard waste stockpile area, C&D and bulky waste staging and processing areas, a WEEE storage area (i.e. roll-off container), a covered and lockable trailer for automotive and single-use batteries, an automotive plastics storage area, a Reuse Centre, and a burn area for clean wood and brush (Figure 3). The Blue Box recycling depot at the site consists of two (2) in-use roll-off containers for acceptance of regular Blue Box recyclables including mixed fibres and commingled containers (with two [2] spare roll-off containers), and an old corrugated cardboard (OCC) compaction unit and associated roll-off container. The municipal waste transfer station is located adjacent to the Blue Box recycling depot, and is equipped with a waste compactor and three (3) compaction roll-off containers (one [1] in-use compaction roll-off container and

two [2] spares). Additionally, the Township maintains an operations vehicle and equipment parking area for municipal vehicles and equipment (i.e. waste compaction truck, trailers, roll-off containers, etc.). In 2015, the Township installed steel containers at the Killaloe site in order to improve the organization of scrap metal diversion at the site and to discourage against scavenging.

In summer 2012, the Township commenced with construction of an upgraded waste compaction and transfer station at the Killaloe site, which was substantially completed in late spring 2013. Once completed, the Township began transferring all municipal (residential and IC&I) waste off-site to the approved waste disposal facility of GFL in Moose Creek, Ontario. The first transfer of compacted municipal waste was conducted in July 2013. In late fall 2019, the Township transported all processed C&D, bulky, and leaf and yard waste processed at the Killaloe site in fall 2019 to the Red Rock Waste Disposal Site for disposal operations.

In order to maintain waste disposal operations at the Killaloe site, the Township utilizes heavy equipment including a John Deere 700 bulldozer and/or a John Deere 544E loader for compaction, grading and slope maintenance at the site. The Township purchased a used waste compaction truck in 2007 for use at the Killaloe Waste Disposal Site and within the Township, and purchased a used roll-off truck in 2013 for the on-site management of roll-off bins. In 2014, the Township purchased a new one-ton truck to be used for waste management purposes and related public works department operations.

The Township conducts an annual Municipal Hazardous and Special Waste (MHSW) collection event in the summer months at the Township's Municipal Garage, located at 16370 Highway 60. Each MHSW collection event is serviced by an approved MHSW service provider. In 2019, the MHSW collection event was held on August 19, 2019.

4.5.2 Waste Disposal / Transfer Summary

In 2019, no routine waste disposal activities were conducted at the Killaloe Waste Disposal Site. Following grading and compaction activities completed at the Killaloe site in 2014, and based on an updated waste capacity survey and remaining capacity assessment completed on July 24, 2014, the remaining capacity at the Killaloe site was interpreted to be approximately 1,007 m^3. Based on a topographic capacity survey completed on November 10, 2015, approximately 1,000 m^3 of final cover material was emplaced by the Township on the AWDA of the Killaloe site in advance of the anticipated approval of the Progressive Closure Plan by the MECP (Figure 3). Based on the topographic survey completed at the Killaloe site on December 10, 2019, approximately 300 m^3 of vegetative cover to be used for progressive closure operations was stockpiled on-site for future use.

C&D, bulky, and leaf and yard waste was processed at the Killaloe site in fall 2019 and transferred and landfilled at the Red Rock Waste Disposal Site in late fall 2019, and prior to the December 10, 2019 topographic capacity survey at the Red Rock and Killaloe Waste Disposal Sites. The utilization of remaining capacity at the Killaloe site for disposal of waste is planned to be set aside for contingency purposes (i.e. due to issues with waste compaction equipment of the transfer station, service issues with the Township's waste transportation service provider, etc.).

On April 9, 2018, a grade stake survey was completed at the Killaloe Waste Disposal Site in order to assist Township staff with progressive closure operations of the AWDA in 2018 and beyond. The grade stakes were installed at select locations of the AWDA to indicate grades above the final contours at closure (FCC) for the installation of barrier soil and vegetative cover, in accordance with the approved Progressive Closure Plan (Greenview, 2015b).

In 2019 and based on documentation submitted to the Township by GFL Environmental Inc., a total of 280.15 tonnes of municipal (residential and IC&I) waste was compacted at the Killaloe site and transferred to the GFL Environmental Inc. facility for disposal. Waste volumes collected from curbside collection within the Village of Killaloe, and transferred from the Township's Round Lake Waste Disposal Site, are also included in the above waste tonnage. Additionally, 7.95 tonnes of municipal (residential and IC&I) waste was transferred from the Round Lake and Killaloe Waste Disposal Sites to the Ottawa Valley Waste Recovery Centre (OVWRC) for

disposal.

Based on a topographic survey of the waste stockpiles on December 10, 2019, approximately 185 m^3 of unprocessed C&D and bulky waste, 18 m^3 of leaf and yard waste, and 27 m^3 of unprocessed wood brush were stockpiled at the Killaloe site in 2019. Based on a topographic survey completed at the Red Rock Waste Disposal Site on December 10, 2019, the volume of processed C&D, bulky, and leaf and yard waste transferred from the Killaloe site to the Red Rock site for disposal in fall 2019 was approximately 1,658 m^3.

Updates to the waste record keeping documents were prepared by the Township in 2013, and were initiated as part of site operations in 2014. Concurrent with a waste management operations staff training event in December 2015, further updates to the waste record keeping documents were completed by the Township.

Based on Township records, 9,658 residential vehicles visited the Killaloe site in 2019, disposing of 12,397 bags of regular municipal waste (i.e. bagged garbage). Additionally, approximately 497 m^3 of C&D and bulky waste, and 12 m^3 of shingles were accepted at the site in 2019 from the residential sector. In 2019, 345 bags, 84 half-ton truck loads, and 113 trailer loads of leaf and yard waste was accepted at the site from the residential sector.

Based on Township records, 518 IC&I vehicles visited the Killaloe site in 2019, disposing of 3,260 bags of regular municipal waste. Additionally, approximately 311 m^3 of C&D and bulky waste, and 19 m^3 of shingles were accepted at the site in 2019 from the IC&I sector. In 2019, 5 trailer loads of leaf and yard waste were accepted at the site from the IC&I sector.

Recycling tonnage records provided by Beaumen Waste Management Systems Ltd., Tomlinson Group, Cascades Recovery+, and OVWRC for the Township indicate that approximately 143.90 tonnes of Blue Box recyclables were collected from the Township's Killaloe and Round Lake sites in 2019. Blue Box recyclables contributing to this total included approximately 63.34 tonnes of commingled containers (tin/aluminum/plastic/glass), 44.87 tonnes of mixed fibres, and 35.69 tonnes of old corrugated cardboard. Blue Box recyclables from curbside collection within the Village of Killaloe by the Township and Blue Box recyclables transferred from the Township's Round Lake site were included in the Blue Box recycling tonnages provided by Beaumen Waste Management Systems Ltd., Tomlinson Group, Cascades Recovery+, and OVWRC.

According to Township records, approximately 88.79 tonnes of scrap metal and white goods, including drained and tagged refrigerant appliances, were collected from the Killaloe Waste Disposal Site by local recycling contractors in 2019. Approximately 16.82 tonnes of household organics were diverted at the Killaloe and Round Lake Waste Disposal Sites in 2019, and processed at the Ottawa Valley Waste Recovery Centre. Based on municipal records, 41 passenger or light truck tires were collected at the Killaloe site in 2019 at the Killaloe Waste Disposal Site. The Township diverted 15.32 tonnes of WEEE from the Killaloe Waste Disposal Site in 2019. According to Township records, 108 Residential automotive batteries were diverted at the Killaloe site in 2019. Based on Township records, 0.38 tonnes of single-use batteries were stockpiled and collected by an approved service provider for the 2019 operational year. Similarly, 0.443 tonnes of automotive plastics (i.e. empty oil and antifreeze containers) were collected at the Killaloe site in 2019 by an approved service provider.

The Township conducted a Municipal Hazardous and Special Waste (MHSW) collection event at the Township's Municipal Garage, located at 16370 Highway 60, on August 19, 2019.

4.5.3 Site Inspections, Maintenance and/or Emergency Situations

Site inspections of the waste disposal area and property at the Killaloe site were conducted by Greenview on May 7, 2019 and October 15, 2019 during the spring and fall 2019 sampling events. An additional site inspection was completed by Greenview on December 10, 2019 during the topographic survey of the stockpiled wastes at the Killaloe site. The site inspections included a cursory investigation of housekeeping/litter control aspects, monitoring well maintenance requirements in accordance with O. Reg. 903 (Wells), as amended, and a general site overview for MECP regulatory compliance issues. In 2019 there were no compliance items requiring immediate action on the part of the Township observed by Greenview during the routine site inspections. Routine

litter cleanup activities were completed by the Township operations staff on an on-going basis at the Killaloe site throughout 2019.

The Township also conducted regular investigations to verify the compliance status of the site. In accordance with the Killaloe site's ECA, the Township completed daily site inspections during each operating day for inspection criteria including: general transfer station and site conditions, site equipment, settlement areas or depressions on the waste mound, shear and/or tension cracks on the waste mound, condition of surface water drainage works, erosion and sedimentation in surface water drainage works, presence of ponded water on the waste mound, evidence of vegetative stress/distressed poplars/side slope plantings on or adjacent to the waste mound, condition of site fencing, leachate seeps, litter management, and any other maintenance items observed by the waste operations staff.

Based on a review of the 2019 daily site inspection logs completed by Township waste operations staff, no issues were noted for the Killaloe Waste Disposal Site.

The Township completed regular winter road maintenance throughout the winter months including plowing and application of winter sand. The Township conducts routine maintenance and repairs on operating equipment at the site consistent with normal operating procedures.

No emergency situations were reported at the Killaloe Waste Disposal Site in 2019.

4.5.4 Complaints

Based on Township records, there were no complaints received with respect to waste management operations within the Township and at the Killaloe Waste Disposal Site in 2019.

4.5.5 Monitoring and Screening Checklist

In accordance with the MECP TGD (MECP, 2010), the Monitoring and Screening Checklist for the Killaloe site is included as Appendix F of this report.

5.0 Conclusions and Recommendations

Based on the results of the 2019 environmental monitoring program completed for the Killaloe Waste Disposal Site, the following conclusions are provided:

- In 2019, the direction of groundwater flow within the shallow overburden of the Killaloe site, in the vicinity of the waste mound, was predominantly to the northeast towards County Road 58. The low-lying area east of the site is considered to be the downgradient receiver of groundwater. A component of groundwater flow in the vicinity of monitoring wells MW07-3S and MW07-3D was interpreted to flow towards the northwest, in the general direction of the low-lying area.
- Based on historical and current groundwater elevation measurements and water quality results, monitoring wells MW07-3S and MW07-3D are located definitively upgradient of the Killaloe site and were not interpreted to be impacted by landfill-related factors. Similarly, monitoring wells MW10-7S and MW10-7D were not interpreted to be significantly impacted from landfill-related factors, likely due to their location upgradient/cross-gradient to the waste mound at the site.
- Residential sampling locations R1, R2, and R3 were not interpreted to be impacted from the landfill, based on documented groundwater quality results and their interpreted location upgradient of the Killaloe site. Residential locations R1 and R2 are understood to be advanced into bedrock, and groundwater quality results are interpreted to be indicative of unimpacted groundwater within gneissic bedrock. Residential location R3 is a dug well with concrete casing, advanced into overburden only, and is interpreted to have groundwater characteristics typical of groundwater quality in areas adjacent to a low-lying, wetland area.
- Generally, groundwater quality downgradient and east of the Killaloe site was interpreted to be impacted from a combination of landfill-related sources and naturally-occurring conditions within a low-lying area environment. Groundwater downgradient and east of the Killaloe site was interpreted to have the potential to discharge to surface during periods of significant rainfall and/or elevated groundwater table. Impacted groundwater east of the site was interpreted to be contained within the approved CAZ, and adequately monitored by the existing well network.
- In 2019, RUC non-conformances were noted at monitoring wells MW06-1S, MW06-1D, MW06-2S, and MW06-2D at the eastern and northern CAZ boundary. However, taking into account winter road maintenance activities along the County Road 58 and Mask Road right-of-ways, naturally-occurring and off-site sources, and parameter concentrations associated with naturally-occurring conditions within the low-lying area east of the site, the Killaloe site was interpreted to be in conformance with MECP Guideline B-7. Therefore, the CAZ lands were deemed sufficient to attenuate impacts resultant of landfill-related activities from the site.
- Per MECP TSS groundwater review comments received in 2015, the sampling locations for VOC analysis were modified in 2015 to include monitoring wells BH00-4R, BH00-4A(D), BH04-1S, BH04-1D, MW07-5R, MW06-1S, MW06-1D, MW06-2S, MW06-2D, MW07-3S, MW07-3D, and surface water location SW5. In 2019, no ODWS non-conformances were noted in fall 2019 for VOC in groundwater quality results from monitoring wells BH00-4R, BH00-4A(D), MW06-1S, MW06-1D, MW06-2S, MW06-2D, MW07-3S, MW07-3D. Similarly, no PWQO non-conformances for concentrations of VOC were noted in results from groundwater wells BH04-1S and BH04-1D, while the concentration of toluene was documented to be above the PWQO limit at MW07-5R in fall 2019. No sample was obtained from SW5 in fall 2019 as the sampling location was observed to be dry.
- Surface water samples were obtained at surface water locations SW1, SW2, SW6 (background), and SW9 in spring 2019, while SW3 and SW5 were observed to have insufficient water for sampling purposes. During the fall 2019 sampling event, monitoring locations SW1, SW2, SW3, and SW5 were

observed to be dry, while samples were obtained from locations SW6 (background) and SW9. Overall parameter concentrations were interpreted to be generally consistent with surface water quality results from background sampling location SW6. Influences of groundwater potentially discharging to surface may be occurring; however, concentrations of alkalinity, conductivity, and TDS at the surface water sampling locations at the site suggest that surface water quality was dominated by precipitation-related sources. Based on the review of surface water quality results in 2019, the low-lying area south and east of the Killaloe site was not interpreted to be significantly impacted from landfill-related factors and results were interpreted to be generally consistent with surface water within a stagnant, low-lying environment.

- None of the surface water locations adjacent to the Killaloe site are connected by defined surface water channels. All locations are generally observed to be small pools of water of no discernible flow/low flow conditions within the surrounding low-lying areas.
- The MECP has previously identified in communications that the Trigger Mechanism was interpreted to be activated. As a proactive measure, the Township determined that the most effective Contingency Action for the Killaloe site would be to close the waste mound and as such, submitted a Progressive Closure Plan to the MECP for review and approval in April 2015. Closure of the waste mound at the Killaloe site was interpreted to be the most practical Contingency Action in order to meet with the expectations of the MECP for the Killaloe site. As the Killaloe site has been interpreted by the MECP to have triggered, a detailed review of the proposed Trigger Mechanism has not been completed as part of this 2019 Annual Report. The Progressive Closure Plan was approved by the MECP with the issuance of the Amendment to the ECA in November 2017, and progressive closure activities are planned to continue in 2020, with expected completion of closure activities by November 2022.
- In 2019, no routine waste disposal activities were conducted at the Killaloe Waste Disposal Site. Following grading and compaction activities completed at the Killaloe site in 2014, and based on an updated waste capacity survey and remaining capacity assessment completed on July 24, 2014, the remaining capacity at the Killaloe site was interpreted to be approximately 1,007 m^3. The utilization of remaining capacity at the Killaloe site for disposal of waste is planned to be set aside for contingency purposes (i.e. due to issues with waste compaction equipment of the transfer station, service issues with the Township's waste transportation service provider, etc.) per the Progressive Closure Plan. All regular municipal waste (i.e. bagged garbage) is compacted at the Killaloe Waste Disposal Site by the waste compaction unit at the transfer station and waste roll-off containers are transferred from the site to the approved landfill of GFL in Moose Creek, Ontario for disposal.
- In 2019 and based on documentation submitted to the Township by GFL Environmental Inc., a total of 280.15 tonnes of municipal (residential and IC&I) waste was compacted at the Killaloe site and transferred to the GFL Environmental Inc. facility for disposal. Waste volumes collected from curbside collection within the Village of Killaloe, and transferred from the Township's Round Lake Waste Disposal Site, are also included in the above waste tonnage. Additionally, 7.95 tonnes of municipal (residential and IC&I) waste was transferred from the Round Lake and Killaloe Waste Disposal Sites to the OVWRC for disposal.
- C&D (including shingles), bulky, and leaf and yard waste processed at the Killaloe site in fall 2019 was transported for disposal at the Red Rock Waste Disposal Site in late fall 2019.
- Based on a topographic survey of the waste stockpiles on December 10, 2019, approximately 185 m^3 of unprocessed C&D and bulky waste, 18 m^3 of leaf and yard waste, and 27 m^3 of unprocessed wood brush were stockpiled at the Killaloe site in 2019. Based on a topographic survey completed at the Red Rock Waste Disposal Site on December 10, 2019, the volume of processed C&D, bulky, and leaf and yard waste transferred from the Killaloe site to the Red Rock site for disposal in fall 2019 was approximately 1,658 m^3.

- Based on Township records, 9,658 residential vehicles visited the Killaloe site in 2019, disposing of 12,397 bags of regular municipal waste (i.e. bagged garbage). Additionally, approximately 497 m^3 of C&D and bulky waste, and 12 m^3 of shingles were accepted at the site in 2019 from the residential sector. In 2019, 345 bags, 84 half-ton truck loads, and 113 trailer loads of leaf and yard waste was accepted at the site from the residential sector.
- Based on Township records, 518 IC&I vehicles visited the Killaloe site in 2019, disposing of 3,260 bags of regular municipal waste. Additionally, approximately 311 m^3 of C&D and bulky waste, and 19 m^3 of shingles were accepted at the site in 2019 from the IC&I sector. In 2019, 5 trailer loads of leaf and yard waste were accepted at the site from the IC&I sector.
- Recycling tonnage records provided by Beaumen Waste Management Systems Ltd., Tomlinson Group, Cascades Recovery+, and OVWRC for the Township indicate that approximately 143.90 tonnes of Blue Box recyclables were collected from the Township's Killaloe and Round Lake sites in 2019. Blue Box recyclables contributing to this total included approximately 63.34 tonnes of commingled containers (tin/aluminum/plastic/glass), 44.87 tonnes of mixed fibres, and 35.69 tonnes of old corrugated cardboard. Blue Box recyclables from curbside collection within the Village of Killaloe by the Township and Blue Box recyclables transferred from the Township's Round Lake site were included in the Blue Box recycling tonnages provided by Beaumen Waste Management Systems Ltd., Tomlinson Group, Cascades Recovery+, and OVWRC.
- According to Township records, approximately 88.79 tonnes of scrap metal and white goods, including drained and tagged refrigerant appliances, were collected from the Killaloe Waste Disposal Site by local recycling contractors in 2019. Approximately 16.82 tonnes of household organics were diverted at the Killaloe and Round Lake Waste Disposal Sites in 2019, and processed at the Ottawa Valley Waste Recovery Centre. Based on municipal records, 41 passenger or light truck tires were collected at the Killaloe site in 2019 at the Killaloe Waste Disposal Site. The Township diverted 15.32 tonnes of WEEE from the Killaloe Waste Disposal Site in 2019. According to Township records, 108 Residential automotive batteries were diverted at the Killaloe site in 2019. Based on Township records, 0.38 tonnes of single-use batteries were stockpiled and collected by an approved service provider for the 2019 operational year. Similarly, 0.443 tonnes of automotive plastics (i.e. empty oil and antifreeze containers) were collected at the Killaloe site in 2019 by an approved service provider.
- The Township conducted a MHSW collection event at the Township's Municipal Garage, located at 16370 Highway 60, on August 19, 2019.

The following recommendations are provided to the Township for consideration as part of the 2020 environmental work program for the Killaloe Waste Disposal Site:

- Groundwater elevations should be measured at all on-site wells in spring and fall 2020.
- The groundwater monitoring program should continue in 2020 consistent with the 2019 environmental monitoring program.
- Landfill gas monitoring should continue in spring and fall 2020 at the Killaloe site; however, consideration should be given by the MECP to discontinue landfill gas monitoring, as historical results have routinely indicated that wells on-site have 0% LEL landfill gas. Once approval is granted from the MECP to discontinue landfill gas, it should be eliminated from the environmental monitoring program the following year.
- The surface water monitoring program should continue in 2020 consistent with the 2019 environmental monitoring program. Collection of samples during scheduled sampling events should only be conducted if sufficient quantities of water are available at the location to avoid potentially biased results.
- Progressive closure operations at the Killaloe Waste Disposal Site should continue in 2020, consistent

with the Progressive Closure Plan's five (5) year closure schedule and expected completion of closure activities by November 2022.

6.0 Closing

Greenview has prepared the 2019 Annual Report in accordance with MECP guidelines, and in accordance with Condition 11.0 of the ECA (A412306), to document the results of the 2019 environmental monitoring program for the Killaloe Waste Disposal Site.

This report is governed by the attached statement of service conditions and limitations (Appendix G).

All respectfully submitted by,

Greenview Environmental Management Limited

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Senior Project Manager / Geologist

Tyler H. Peters, P.Eng.
Project Director

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Tables

Table 1
2019 Groundwater and Surface Water Monitoring Program
Killaloe Waste Disposal Site

Location			Standards	Frequency	Parameters		
Groundwater (to ODWS)							
BH00-1 (background)	BH00-2 (background)	BH00-4R	ODWS	Twice (2x)	Alkalinity	Aluminum	Ammonia (total)
BH00-4A(D)	BH00-4B(S)	MW06-1S			Barium	Boron	Calcium
MW06-1D	MW06-2S	MW06-2D			Chloride	Chromium	Cobalt
MW07-3S	MW07-3D	MW10-7S			COD	Copper	DOC
MW10-7D					Iron	Magnesium	Manganese
					Nitrate	Nitrite	Phosphorus (total)
					Potassium	Silicon	Sodium
R1 (residential)	R2 (residential)	R3 (residential)		(Spring & Fall)	Strontium	Sulphate	TDS
					TKN	Zinc	
1x QA/QC (GW ODWS)							
					Field Measurements		
					Conductivity	Dissolved Oxygen	pH
	COUNT =	***17***			Temperature		
Groundwater (to PWQO)							
BH00-3	BH00-5	BH04-1S	PWQO	Twice (2x)	Alkalinity	Aluminum	Ammonia (total)
BH04-1D	MW07-4R	MW07-5R			Barium	Boron	Calcium
					Chloride	Chromium	Cobalt
1x QA/QC (GW PWQO)					COD	Copper	DOC
					Iron	Magnesium	Manganese
					Nitrate	Nitrite	Phenols
					Phosphorus (total)	Potassium	Silicon
				(Spring & Fall)	Sodium	Strontium	Sulphate
					TDS	TKN	Zinc
					Field Measurements		
					Conductivity	Dissolved Oxygen	pH
	COUNT =	***7***			Temperature	Un-ionized Ammonia (calculation)	
Groundwater (Volatile Organic Compounds to ODWS)							
BH00-4R	BH00-4A(D)	MW06-1S	ODWS	Once (1x)	EPA 624 Volatile Organic Compounds		
MW06-1D	MW06-2S	MW06-2D					
MW07-3S	MW07-3D			(Fall)			
	COUNT =	***8***					
Groundwater and Surface Water (Volatile Organic Compounds to PWQO)							
BH04-1S	BH04-1D	MW07-5R	PWQO	Once (1x)	EPA 624 Volatile Organic Compounds		
SW5							
	COUNT =	***4***		(Fall)			
Groundwater Elevations and Landfill Gas							
BH00-1 (background)	BH00-2 (background)	BH00-3	N/A	Twice (2x)	Groundwater elevations (all monitoring wells)		
BH00-4R	BH00-4A(D)	BH00-4B(S)			Landfill gas monitoring (all monitoring wells)		
BH00-5	BH04-1S	BH04-1D					
MW06-1S	MW06-1D	MW06-2S					
MW06-2D	MW07-3S	MW07-3D		(Spring & Fall)			
MW07-4R	MW07-5R	MW07-6					
MW10-7S	MW10-7D						
	COUNT =	***20***					
Surface Water							
SW1	SW2	SW3	PWQO	Twice (2x)	Alkalinity	Aluminum	Ammonia (total)
SW5	SW6 (background)	SW9			Barium	Boron	Calcium
					Chloride	Chromium	Cobalt
1x QA/QC (SW)					COD	Copper	DOC
					Iron	Magnesium	Manganese
					Nitrate	Nitrite	Phenols
					Phosphorus (total)	Potassium	Silicon
				(Spring & Fall)	Sodium	Strontium	Sulphate
					TDS	TKN	TSS
					Zinc		
					Field Measurements		
					Conductivity	Dissolved Oxygen	pH
	COUNT =	***7***			Temperature	Un-ionized Ammonia (calculation)	

Table 2
Groundwater Monitoring Well and Surface Water Sampling Locations
Killaloe Waste Transfer Site

Groundwater			
Monitor	**Zone**	**Northing**	**Easting**
BH00-1	18T	5050632	309744
BH00-2	18T	5050469	309753
BH00-3	18T	5050449	309904
BH00-4R	18T	5050573	309883
BH00-4A(D)	18T	5050566	309878
BH00-4B(S)	18T	5050566	309878
BH04-1S	18T	5050608	310008
BH04-1D	18T	5050608	310008
BH00-5	18T	5050591	309931
MW06-1D	18T	5050746	310369
MW06-1S	18T	5050746	310369
MW06-2D	18T	5050864	310040
MW06-2S	18T	5050864	310040
MW07-3D	18T	5050539	310440
MW07-3S	18T	5050539	310440
MW07-4R	18T	5050695	309979
MW07-5R	18T	5050560	310104
MW07-6	18T	5050433	310064
MW10-7D	18T	5050376	309811
MW10-7S	18T	5050376	309811
R1	18T	5050835	309791
R2	18T	5050962	309531
R3	18T	5050872	309966

Surface Water			
Monitor	**Zone**	**Northing**	**Easting**
SW1	18T	5050369	309900
SW2	18T	5050437	309941
SW3	18T	5050695	309972
SW5	18T	5050587	310014
SW6	18T	5048881	310150
SW8	18T	5050170	309409
SW9	18T	5050923	310288

Notes:

Global Positioning System (GPS) point locations acquired by Greenview using a Garmin eTrex Venture HC.

Table 3
Groundwater Elevations
Killaloe Waste Disposal Site

Monitor	Ground Elevation (m)	Top of Pipe Elevation (m)	Original Stick-Up[1] (m)	Depth of Well (m)	Well Diameter (mm)	Groundwater Elevation (m)														
						24-Oct-12	23-Apr-13	1-Nov-13	14-May-14	9-Sep-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	7-May-19	15-Oct-19
BH00-1	98.65	99.55	0.90	8.10	50.8	95.77	96.37	96.07	96.36	-	96.08	96.18	95.81	96.00	96.10	97.10	96.34	96.43	96.01	96.82	95.98
BH00-2	101.75	102.63	0.88	8.92	50.8	95.91	96.32	96.22	96.42	-	96.21	96.25	95.94	95.73	96.17	97.44	96.58	96.49	96.20	96.97	96.18
BH00-3	97.22	98.07	0.85	7.68	50.8	95.51	95.94	95.74	95.87	-	95.78	95.88	95.59	95.92	95.69	96.24	95.84	96.07	95.68	96.10	95.56
BH00-4	100.06	100.94	0.88	8.11	50.8	95.58	96.13	95.86	96.12	-	-	-	-	-	-	-	-	-	-	-	-
BH00-4R	99.46	100.17	0.71	8.55	50.8	-	-	-	-	-	95.85	95.95	95.65	95.72	95.76	96.55	95.99	96.13	95.76	96.42	95.69
BH00-4A (D)	100.11	101.05	0.94	10.88	32.1	95.60	96.15	95.88	96.14	-	95.89	96.00	95.65	96.19	95.80	96.63	96.04	96.18	95.80	96.48	95.74
BH00-4B (S)	100.11	101.05	0.94	6.34	32.1	95.58	96.12	95.84	96.11	-	95.88	96.00	95.65	96.15	95.76	96.60	96.02	96.15	95.78	96.47	95.72
BH04-1S	95.66	96.75	1.09	3.43	32.1	95.48	95.86	95.72	95.80	-	95.82	95.90	95.65	95.73	95.68	96.09	95.75	95.91	95.45	95.82	95.62
BH04-1D	95.66	96.69	1.03	8.22	32.1	95.54	95.76	95.71	95.83	-	95.84	95.91	95.65	95.81	95.63	96.14	95.79	95.91	95.49	95.88	95.62
BH00-5	96.44	97.34	0.90	8.00	50.8	95.36	95.81	95.59	95.78	-	95.62	95.63	95.36	95.74	95.45	96.04	95.63	95.76	95.39	95.90	95.31
MW06-1S	96.35	97.09	0.74	4.42	50.8	95.03	95.37	95.39	95.43	-	95.50	95.53	95.35	95.37	95.38	95.63	95.28	95.46	95.20	95.35	95.17
MW06-1D	96.27	96.89	0.62	8.93	50.8	95.10	95.41	95.44	95.46	-	95.57	95.61	95.41	95.44	95.41	95.71	95.35	95.53	95.29	95.43	95.24
MW06-2S	96.30	97.11	0.81	4.69	50.8	95.37	95.57	95.62	95.67	-	95.71	95.77	95.54	95.66	95.63	95.87	95.61	95.72	95.46	95.67	95.39
MW06-2D	96.33	97.10	0.77	8.73	50.8	95.39	95.70	95.62	95.73	-	95.77	95.81	95.53	95.69	95.64	95.97	95.67	95.80	95.55	95.77	95.49
MW07-3S	99.42	100.23	0.81	5.40	50.8	96.67	98.61	97.43	98.50	-	97.42	98.47	96.60	98.46	96.80	98.55	97.34	98.69	96.84	98.53	96.41
MW07-3D	99.41	100.23	0.82	10.53	50.8	96.55	98.41	97.31	98.27	-	97.29	98.26	96.49	98.23	96.70	98.33	97.20	98.41	96.73	98.33	96.31
MW07-4	95.65	96.67	1.02	1.36	50.8	95.46	95.61	95.61	95.64	-	-	-	-	-	-	-	-	-	-	-	-
MW07-4R	95.75	96.67	0.92	1.25	50.8	-	-	-	-	95.57	95.65	95.62	95.48	95.53	95.50	95.76	95.54	95.34	95.49	95.55	95.43
MW07-5	95.51	96.61	1.10	1.26	50.8	95.46	95.64	95.57	95.64	-	-	-	-	-	-	-	-	-	-	-	-
MW07-5R	95.77	96.61	0.84	1.14	50.8	-	-	-	-	95.66	95.74	95.81	95.55	95.61	95.59	Flooded	95.61	95.74	95.55	95.65	95.51
MW07-6	95.51	96.66	1.15	1.23	50.8	95.38	95.16	95.51	95.57	-	95.62	95.59	95.47	95.55	95.53	Flooded	95.55	95.78	95.48	95.59	95.40
MW10-7S	100.06	100.77	0.70	5.83	50.8	95.73	96.39	96.04	96.31	-	96.01	96.17	95.72	96.47	95.91	96.90	96.27	96.44	95.98	96.85	95.82
MW10-7D	99.97	100.80	0.83	9.62	50.8	95.77	96.50	96.06	96.33	-	95.98	96.19	95.77	96.46	95.95	96.86	96.26	96.54	95.98	96.80	95.83

Notes:
1. Original stick-ups based on surveyed ground and top of pipe elevations.
2. All elevations are metres above sea level (masl), relative to a site specific benchmark elevation of 100.00 m.

"-" indicates water level is not available.

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	BH00-1 (Background)														5-year Trends
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	**10**	**14**	**11**	**29**	**13**	**11**	**14**	**10**	**18**	**12**	**25**	**21**	**18**	**17**	
Aluminum	0.017	0.058	0.1	***0.0657***	***0.0719***	0.0420	***0.0884***	0.0157	0.018	< 0.01	0.030	< 0.01	0.02	0.02	0.01	< 0.01	0.01	
Ammonia, Total (as N)	0.1	N/L	N/L	0.3	0.2	0.2	0.1	< 0.1	0.1	0.1	0.2	0.17	0.02	0.15	0.17	0.17	0.15	
Barium	0.072	0.304	1.0	0.0797	0.0655	0.0733	0.0709	0.0714	0.0644	0.0740	0.0700	0.076	0.103	0.077	0.086	0.070	0.073	
Boron	0.01	1.3	5.0	0.0096	0.0065	0.0089	0.0084	0.0187	0.0153	0.0110	0.0070	0.006	0.018	0.019	0.020	0.025	0.023	
Calcium	7.5	N/L	N/L	7.60	7.17	7.03	6.17	7.43	6.46	7.74	7.01	7.24	8.09	7.30	7.96	7.42	7.22	
Chloride	12	131	250	15	14	12	13	12	12	11	13	12.5	17.2	16.2	18.8	15.3	16.1	
Chromium	0.001	0.013	0.05	0.0010	0.0018	0.00114	0.00086	0.00068	0.00073	< 0.002	< 0.002	0.001	0.001	0.001	0.001	0.001	0.002	
Chemical Oxygen Demand	9	N/L	N/L	15	10	9	< 8	10	15	13	19	12	20	17	11	< 5	13	
Cobalt	0.0016	N/L	N/L	0.00353	0.00151	0.00171	0.000323	0.000074	0.000117	< 0.005	< 0.005	< 0.005	< 0.005	0.0001	0.0002	0.0001	0.0001	
Conductivity (µS/cm) [3]	101	N/L	N/L	118	121	137	198	98	113	101	102	117	121	104	111	101	118	
Copper	0.00062	0.5	1	0.0011	0.0009	0.00097	0.00098	0.00047	0.00052	0.00040	0.00050	0.0004	0.0002	0.0006	0.0005	0.0008	0.0005	
Dissolved Organic Carbon	1.6	3.3	5	1.9	1.4	2.3	2.7	3.1	2.2	1.5	1.8	***4.0***	***4.4***	***3.7***	3.2	3.0	2.9	
Iron	7.14	7.14	0.3	**17.3**	**17.0**	**16.4**	**16.0**	**15.3**	**15.5**	**16.1**	**17.3**	**18.0**	**18.5**	**15.8**	**17.5**	**13.2**	**15.2**	
Magnesium	4.53	N/L	N/L	4.38	4.15	3.97	3.85	3.93	3.79	4.12	4.50	4.36	4.68	4.39	4.47	4.56	4.35	
Manganese	0.05	0.05	0.05	**0.0710**	0.0497	**0.0560**	**0.0537**	**0.0515**	0.0493	**0.0530**	**0.0560**	**0.057**	**0.061**	**0.053**	**0.060**	**0.055**	**0.051**	
Nitrate (as N)	0.06	2.55	10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.1	0.1	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	**6.29**	6.89	**6.16**	**6.15**	7.03	**6.38**	**6.01**	**6.45**	6.66	6.85	6.68	6.55	**6.20**	6.94	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	0.390	0.440	0.24	0.34	0.15	0.70	0.44	0.44	0.34	0.26	1.88	0.40	0.28	0.28	
Potassium	1.57	N/L	N/L	1.29	1.39	1.37	1.27	1.31	1.23	1.20	1.10	1.1	1.4	1.4	1.3	1.4	1.4	
Silicon	6.73	N/L	N/L	7.29	8.31	7.75	8.21	7.61	6.68	7.01	7.08	7.47	7.31	7.13	7.01	6.90	6.67	
Sodium	4.5	102	200	4.26	4.66	4.43	4.81	5.20	5.10	5.60	6.20	6.0	6.6	6.9	7.3	6.6	7.7	
Strontium	0.044	N/L	N/L	0.0423	0.0434	0.0396	0.0409	0.0407	0.0383	0.0440	0.0450	0.043	0.045	0.044	0.045	0.045	0.043	
Sulphate	19	260	500	19	20	20	20	19	19	20	18	18	16	20	21	20	18	
Total Dissolved Solids	79	289	500	80	100	86	100	106	97	64	68	76	81	72	78	72	72	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.3	0.4	0.3	0.4	0.4	0.3	0.5	0.3	
Zinc	0.005	2.5	5	< 0.002	< 0.002	< 0.002	0.002	0.003	0.012	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	BH00-2 (Background)														5-year Trends
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	**28**	**25**	31	**26**	**29**	**22**	32	**25**	**26**	**27**	37	**25**	30	**22**	
Aluminum	0.017	0.058	0.1	***0.0796***	0.0414	***0.0740***	**0.111**	0.0085	0.009	< 0.01	< 0.01	< 0.01	0.01	0.01	< 0.01	0.01	< 0.01	
Ammonia, Total (as N)	0.1	N/L	N/L	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.06	< 0.01	0.02	0.02	< 0.01	0.03	0.04	0.01	
Barium	0.072	0.304	1.0	0.0751	0.0647	0.0759	0.0667	0.0649	0.0526	0.0680	0.0550	0.062	0.076	0.073	0.079	0.075	0.060	
Boron	0.01	1.3	5.0	0.0099	0.0085	0.0095	0.0090	0.0150	0.0118	0.0070	< 0.005	< 0.005	0.010	0.008	0.008	0.011	0.010	
Calcium	7.5	N/L	N/L	9.65	8.01	9.72	7.12	9.53	6.86	10.10	7.29	7.93	8.17	9.51	10.3	11.8	8.57	
Chloride	12	131	250	11.0	7.6	9.5	7.1	8	5	8	6	7.2	6.0	11.8	14.3	14.5	9.2	
Chromium	0.001	0.013	0.05	< 0.0005	0.0009	0.00064	0.00013	< 0.00003	< 0.00003	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	
Chemical Oxygen Demand	9	N/L	N/L	10	< 8	< 8	< 8	< 8	< 8	50	< 5	6	17	7	< 5	< 5	< 5	
Cobalt	0.0016	N/L	N/L	0.00350	0.00220	0.00395	0.000950	0.000722	0.000672	< 0.005	< 0.005	< 0.005	< 0.005	0.0005	0.0009	0.0007	0.0006	
Conductivity (µS/cm) [3]	101	N/L	N/L	105	79	103	83	74	79	95	72	81	90	84	88	94	87	
Copper	0.00062	0.5	1	0.0009	0.0008	0.00139	0.00067	0.00069	0.00063	0.00050	0.00040	0.0010	0.0002	0.0007	0.0014	0.0005	0.0002	
Dissolved Organic Carbon	1.6	3.3	5	< 1	< 1	< 1	1.8	2.1	1.2	1.3	0.8	1.6	1.2	1.4	0.8	**14.9**	0.9	
Iron	7.14	7.14	0.3	**0.784**	**0.570**	**0.960**	**1.08**	**0.439**	**0.352**	**1.080**	0.280	**0.313**	0.296	**0.310**	**0.342**	0.249	0.291	
Magnesium	4.53	N/L	N/L	6.23	5.10	5.69	4.90	5.36	4.36	5.63	5.18	5.16	5.37	6.33	6.39	7.88	5.81	
Manganese	0.05	0.05	0.05	**0.0549**	0.0191	0.0386	0.0172	0.0165	0.0124	**0.0670**	0.0110	0.022	0.012	0.012	0.014	0.031	0.008	
Nitrate (as N)	0.06	2.55	10	< 0.06	< 0.06	< 0.06	0.06	< 0.06	0.12	< 0.1	0.20	< 0.05	0.09	0.08	0.12	< 0.05	0.12	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	**6.46**	**6.40**	**6.12**	**6.39**	6.50	**8.52**	7.59	6.50	6.85	**6.41**	6.74	7.48	**6.38**	6.65	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	0.22	0.17	0.49	0.50	0.14	0.25	3.61	0.33	0.70	2.32	0.96	0.40	0.40	0.31	
Potassium	1.57	N/L	N/L	2.05	2.12	2.04	1.94	2.18	1.85	1.70	1.80	1.7	1.9	2.2	2.1	2.4	2.1	
Silicon	6.73	N/L	N/L	6.50	5.99	6.77	7.13	6.22	4.85	6.51	5.01	5.37	5.55	5.60	5.58	6.35	5.35	
Sodium	4.5	102	200	3.60	4.11	3.69	3.98	4.25	3.92	4.30	4.50	4.3	4.1	4.9	5.0	5.1	4.5	
Strontium	0.044	N/L	N/L	0.0521	0.0432	0.0491	0.0441	0.0452	0.0371	0.0520	0.0430	0.043	0.042	0.052	0.054	0.066	0.048	
Sulphate	19	260	500	17	19	18	20	19	19	18	18	16	14	18	19	19	17	
Total Dissolved Solids	79	289	500	51	69	89	74	103	94	75	61	63	64	75	213	79	61	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.4	< 0.1	< 0.1	0.1	< 0.1	0.1	< 0.1	< 0.1	
Zinc	0.005	2.5	5	< 0.002	< 0.002	< 0.002	0.002	0.003	0.006	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	BH00-4R										5-year Trends
				14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	***385***	***308***	***363***	***301***	***476***	***480***	**565**	***312***	***343***	***262***	
Aluminum	0.017	0.058	0.1	0.0172	0.018	**0.190**	0.030	0.04	***0.07***	***0.06***	0.04	0.05	0.05	
Ammonia, Total (as N)	0.1	N/L	N/L	22.0	17.2	18.3	20.9	28.0	33.8	35.5	18.4	22.1	15.1	
Barium	0.072	0.304	1.0	**1.81**	**1.25**	**1.65**	**1.45**	**2.78**	**3.83**	**3.35**	**1.58**	**1.73**	**1.30**	
Boron	0.01	1.3	5.0	0.274	0.227	0.287	0.331	0.536	0.892	***1.45***	0.811	0.886	0.728	
Calcium	7.5	N/L	N/L	71.4	54.5	59.4	60.6	94.5	102	106	55.3	70.1	57.0	
Chloride	12	131	250	63	68	57	95	98.2	111	130	67.0	82.3	77.2	
Chromium	0.001	0.013	0.05	0.00160	0.00161	< 0.002	< 0.002	0.002	0.008	0.003	0.002	0.003	0.003	
Chemical Oxygen Demand	9	N/L	N/L	55	51	56	59	107	107	134	72	73	70	
Cobalt	0.0016	N/L	N/L	0.00102	0.000856	0.005000	< 0.005	0.010	0.005	0.0019	0.0011	0.0011	0.0011	
Conductivity (µS/cm) [3]	101	N/L	N/L	743	760	767	811	1145	1213	1205	667	716	1009	
Copper	0.00062	0.5	1	0.00059	0.00048	0.00130	0.00080	0.0010	0.0017	0.0010	0.0003	0.0008	0.0005	
Dissolved Organic Carbon	1.6	3.3	5	**14.8**	**12.3**	**11.0**	**8.9**	**12.4**	**13.2**	**18.6**	**16.0**	1.9	**15.8**	
Iron	7.14	7.14	0.3	**69.3**	**62.4**	**74.5**	**70.3**	**127**	**98.9**	**99.9**	**53.0**	**61.3**	**56.5**	
Magnesium	4.53	N/L	N/L	21.6	19.5	20.4	22.5	32.1	29.9	31.4	16.5	23.1	19.1	
Manganese	0.05	0.05	0.05	**1.18**	**0.882**	**1.090**	**1.020**	**1.88**	**1.54**	**1.38**	**0.777**	**1.00**	**0.742**	
Nitrate (as N)	0.06	2.55	10	< 0.06	< 0.06	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	6.92	8.09	7.74	6.69	6.78	7.08	6.71	6.91	6.69	6.84	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	0.08	0.21	1.70	0.09	0.22	0.10	0.07	0.07	0.05	0.08	
Potassium	1.57	N/L	N/L	59.8	41.7	50.4	45.9	62.1	86.5	99.8	57.5	64.1	49.4	
Silicon	6.73	N/L	N/L	11.9	10.3	10.7	10.7	11.2	11.6	11.6	10.8	11.3	10.2	
Sodium	4.5	102	200	35.9	32.4	35.9	40.3	60.8	69.6	85.7	48.3	51.7	38.5	
Strontium	0.044	N/L	N/L	0.558	0.446	0.468	0.511	0.701	0.735	0.762	0.411	0.486	0.419	
Sulphate	19	260	500	< 1	1	< 1	1	7	< 1	< 1	3	1	3	
Total Dissolved Solids	79	289	500	***460***	***429***	**502**	**507**	**704**	**755**	**806**	***453***	**526**	***428***	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	20.5	15.8	28.4	23.6	27.9	37.4	39.7	19.9	21.0	16.6	
Zinc	0.005	2.5	5	0.007	0.011	0.010	< 0.005	0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	

Notes:
1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Greenview ENVIRONMENTAL MANAGEMENT

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	BH00-4B(S)														5-year Trends
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	**572**	***475***	**634**	**545**	***481***	***455***	**918**	**536**	**573**	***482***	***435***	**519**	**664**	**509**	
Aluminum	0.017	0.058	0.1	0.0253	0.0271	0.0353	***0.0874***	0.0125	0.013	0.040	0.040	0.04	***0.06***	***0.06***	***0.07***	***0.06***	***0.07***	
Ammonia, Total (as N)	0.1	N/L	N/L	47.5	41.9	63.4	29.2	37.4	35.5	101.0	35.2	43.8	46.0	34.3	39.4	66.2	31.1	
Barium	0.072	0.304	1.0	**2.95**	**2.30**	**2.93**	**2.73**	**2.17**	**1.93**	**3.11**	**1.80**	**1.51**	**3.20**	**1.73**	**2.18**	**2.19**	**1.54**	
Boron	0.01	1.3	5.0	0.563	0.473	0.555	0.558	0.475	0.367	1.100	0.789	0.638	0.820	0.508	0.719	0.997	0.874	
Calcium	7.5	N/L	N/L	110.0	90.4	85.8	90.0	104	90.2	112.0	106.0	101	125	78.1	102	95.2	109	
Chloride	12	131	250	110	***150***	110	***150***	130	***150***	***141***	***194***	115	**254**	***137***	***205***	116	***134***	
Chromium	0.001	0.013	0.05	0.0042	***0.0250***	0.00541	0.00368	0.00246	0.00258	0.00500	0.00400	0.004	0.008	0.003	0.003	0.003	0.003	
Chemical Oxygen Demand	9	N/L	N/L	107	71	83	87	73	80	146	94	102	125	122	93	112	103	
Cobalt	0.0016	N/L	N/L	0.00298	0.00278	0.00610	0.00228	0.00192	0.00415	0.00900	0.01000	0.010	< 0.005	0.0014	0.0020	0.0027	0.0021	
Conductivity (µS/cm) [3]	101	N/L	N/L	420	1301	2001	1253	954	1322	1509	1336	1254	1753	967	1274	1308	1120	
Copper	0.00062	0.5	1	0.0015	0.0066	0.00181	0.00107	0.00055	0.00067	0.00250	0.00100	0.0014	0.0017	0.0006	0.0003	0.0017	0.0008	
Dissolved Organic Carbon	1.6	3.3	5	**19.2**	**13.3**	**15.2**	**24.0**	**14.0**	**19.1**	**19.9**	**8.1**	1.1	**8.8**	**11.8**	**10.6**	**17.1**	**17.5**	
Iron	7.14	7.14	0.3	**99.7**	**87.7**	**66.4**	**103**	**78.9**	**103**	**93**	**112**	**111**	**124**	**71.6**	**109**	**75.4**	**96.2**	
Magnesium	4.53	N/L	N/L	37.6	27.4	26.0	32.0	25.9	28.5	33.8	33.9	32.8	41.8	26.5	39.3	31.8	38.3	
Manganese	0.05	0.05	0.05	**2.13**	**1.36**	**1.07**	**1.34**	**1.19**	**1.46**	**1.58**	**1.67**	**1.87**	**5.31**	**1.44**	**2.45**	**1.60**	**1.90**	
Nitrate (as N)	0.06	2.55	10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.1	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	6.72	6.66	6.54	6.66	**6.39**	6.58	6.77	6.58	6.75	6.97	6.80	6.62	6.92	6.79	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	0.080	0.470	0.56	0.530	0.35	0.18	1.40	0.33	0.21	0.13	0.35	0.11	0.07	0.09	
Potassium	1.57	N/L	N/L	66.3	63.4	78.1	65.6	63.2	56.6	71.7	48.9	39.7	75.2	72.9	77.9	94.2	66.7	
Silicon	6.73	N/L	N/L	12.4	18.3	12.8	16.2	14.1	14.1	11.2	14.6	12.9	15.0	12.9	14.3	11.5	13.6	
Sodium	4.5	102	200	82.7	64.6	58.4	67.5	60.2	56.5	***121.0***	77.3	86.7	99.7	50.4	89.5	***107***	79.4	
Strontium	0.044	N/L	N/L	0.785	0.655	0.616	0.870	0.759	0.696	0.690	0.801	0.533	0.953	0.617	0.818	0.803	0.818	
Sulphate	19	260	500	32	< 0.2	15	< 0.2	< 1	1	< 1	2	< 1	< 1	< 1	< 1	< 1	1	
Total Dissolved Solids	79	289	500	**714**	109	**700**	**746**	**646**	**680**	**1240**	**922**	**827**	**1090**	**676**	**920**	**949**	**800**	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	47.2	62.9	63.2	29.9	36.9	36.6	121.0	41.5	43.1	55.2	34.5	42.2	65.1	33.9	
Zinc	0.005	2.5	5	< 0.002	< 0.002	0.002	0.003	0.003	0.009	0.011	0.008	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	BH00-4A(D)													5-year Trends
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	**22**	38	**24**	30	**28**	**23**	**29**	**26**	32	49	72	35	**26**	30	
Aluminum	0.017	0.058	0.1	**0.145**	***0.098***	***0.0841***	**0.267**	0.0346	0.037	0.030	0.040	0.02	0.03	0.04	0.03	0.05	0.03	
Ammonia, Total (as N)	0.1	N/L	N/L	0.9	1.0	0.8	1.0	0.7	0.9	0.9	1.1	0.95	1.28	1.35	1.09	1.11	1.13	
Barium	0.072	0.304	1.0	0.0866	0.1040	0.0905	0.102	0.0907	0.0786	0.0860	0.0850	0.099	0.177	0.165	0.102	0.079	0.098	
Boron	0.01	1.3	5.0	0.0178	0.0160	0.0236	0.0170	0.0449	0.0247	0.0180	0.0140	0.020	0.071	0.061	0.038	0.030	0.032	
Calcium	7.5	N/L	N/L	8.03	9.19	8.56	8.01	9.13	7.88	8.59	8.41	9.58	13.8	14.6	9.92	9.36	10.0	
Chloride	12	131	250	11.0	11.0	11	13	13	13	11	12	12.1	19.2	22.6	15.9	14.7	14.8	
Chromium	0.001	0.013	0.05	0.0019	0.0036	0.00204	0.00185	0.00163	0.00161	< 0.002	0.00200	0.002	0.002	0.002	0.002	0.002	0.002	
Chemical Oxygen Demand	9	N/L	N/L	17	< 8	14	13	9	11	49	14	37	19	27	14	31	23	
Cobalt	0.0016	N/L	N/L	0.00449	0.00131	0.00398	0.000335	0.000036	0.000144	< 0.005	< 0.005	< 0.005	< 0.005	0.0001	< 0.0001	< 0.0001	0.0001	
Conductivity (µS/cm) [3]	101	N/L	N/L	130	151	2321	145	126	147	129	130	151	214	190	139	127	140	
Copper	0.00062	0.5	1	0.0011	0.0012	0.00063	0.00111	0.00054	0.00054	0.00150	0.00040	0.0003	0.0008	0.0003	0.0004	0.0005	0.0010	
Dissolved Organic Carbon	1.6	3.3	5	1.9	1.2	1.2	3.0	< 1	1.4	1.7	1.7	**15.5**	**5.9**	**6.7**	***4.4***	***4.7***	***4.7***	
Iron	7.14	7.14	0.3	**18.0**	**19.9**	**18.8**	**20.9**	**20.1**	**19.3**	**21.1**	**22.1**	**23.9**	**32.3**	**30.3**	**23.8**	**21.3**	**22.1**	
Magnesium	4.53	N/L	N/L	3.30	3.57	3.31	3.49	3.54	3.25	3.41	3.66	3.79	5.46	5.40	3.90	4.30	4.07	
Manganese	0.05	0.05	0.05	**0.116**	**0.112**	**0.106**	**0.118**	**0.103**	**0.0916**	**0.0990**	**0.1120**	**0.132**	**0.184**	**0.206**	**0.133**	**0.120**	**0.127**	
Nitrate (as N)	0.06	2.55	10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	6.65	6.79	**6.31**	**6.47**	**6.31**	6.51	6.55	7.12	6.64	**6.46**	6.67	6.54	6.73	6.74	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	0.92	0.68	1.05	1.58	0.93	1.08	1.03	0.93	1.45	2.00	1.13	1.09	1.87	1.59	
Potassium	1.57	N/L	N/L	2.05	2.60	2.26	2.15	2.34	2.00	1.90	2.00	1.9	2.8	3.1	2.3	2.3	2.5	
Silicon	6.73	N/L	N/L	9.1	10.6	9.49	10.3	8.97	8.42	8.82	9.09	9.42	9.26	8.69	8.93	8.90	8.69	
Sodium	4.5	102	200	5.49	6.18	5.98	6.05	6.10	6.03	6.20	6.70	8.1	11.3	11.1	8.0	6.4	6.5	
Strontium	0.044	N/L	N/L	0.0458	0.0545	0.0485	0.0554	0.0516	0.0465	0.0500	0.0540	0.057	0.078	0.086	0.058	0.057	0.060	
Sulphate	19	260	500	16	14	15	16	16	16	15	14	13	10	14	18	17	15	
Total Dissolved Solids	79	289	500	66	109	94	114	131	129	74	75	82	117	118	85	75	79	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	0.8	1.1	1.0	1.2	1.0	1.0	1.2	2.2	1.2	1.5	1.6	1.1	8.2	1.2	
Zinc	0.005	2.5	5	< 0.002	< 0.002	< 0.002	0.004	0.005	0.004	0.008	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	MW06-1S														5-year Trends
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	113	113	112	131	131	117	116	110	118	119	125	115	108	109	
Aluminum	0.017	0.058	0.1	***0.0824***	***0.0951***	**0.127**	**0.155**	**0.128**	**0.149**	***0.090***	**0.140**	**0.11**	0.05	***0.07***	***0.06***	***0.09***	***0.07***	
Ammonia, Total (as N)	0.1	N/L	N/L	6.0	5.8	6.3	6.7	7.3	5.6	5.3	7.2	6.81	2.75	3.22	3.76	4.70	5.74	
Barium	0.072	0.304	1.0	0.1650	0.1160	0.161	0.150	0.131	0.120	0.139	0.112	0.139	0.266	0.195	0.200	0.146	0.132	
Boron	0.01	1.3	5.0	0.0184	0.0119	0.0154	0.0146	0.0577	0.0096	0.0110	< 0.005	< 0.005	0.016	0.010	0.009	0.012	0.012	
Calcium	7.5	N/L	N/L	41.9	41.2	40.1	38.3	52.8	42.1	46.1	40.9	42.5	45.9	45.9	43.6	44.4	40.6	
Chloride	12	131	250	78	78	87	83	93	72	88	70	74.0	66.6	80.3	77.3	83.6	69.2	
Chromium	0.001	0.013	0.05	0.0015	0.0081	0.00230	0.00168	0.00118	0.00126	< 0.002	< 0.002	0.002	0.003	0.002	0.002	0.002	0.002	
Chemical Oxygen Demand	9	N/L	N/L	115	119	118	167	50	195	180	222	187	69	135	89	108	164	
Cobalt	0.0016	N/L	N/L	0.00394	0.00936	0.00400	0.000532	0.000350	0.000277	< 0.005	< 0.005	< 0.005	< 0.005	0.0002	0.0001	0.0003	0.0003	
Conductivity (µS/cm) [3]	101	N/L	N/L	368	320	450	381	332	385	381	343	396	364	336	329	326	308	
Copper	0.00062	0.5	1	0.0009	0.0021	0.00191	0.00077	0.00053	0.00053	0.00100	0.00050	0.0007	0.0008	< 0.0001	0.0003	0.0005	0.0006	
Dissolved Organic Carbon	1.6	3.3	5	**24.6**	**38.0**	**43.0**	**75.3**	**116**	**62.5**	**71.0**	**76.8**	**77.7**	**19.0**	**44.7**	**26.3**	**52.8**	**61.4**	
Iron	7.14	7.14	0.3	**1.76**	**1.99**	**1.74**	**2.65**	**2.61**	**2.42**	**2.65**	**2.39**	**2.48**	**1.74**	**2.03**	**2.16**	**1.84**	**1.97**	
Magnesium	4.53	N/L	N/L	20.2	18.9	18.1	19.1	21.5	18.3	21.4	19.7	21.6	21.9	21.6	19.9	22.0	19.3	
Manganese	0.05	0.05	0.05	**0.380**	**0.306**	**0.342**	**0.288**	**0.299**	**0.267**	**0.362**	**0.264**	**0.335**	**0.512**	**0.479**	**0.435**	**0.419**	**0.296**	
Nitrate (as N)	0.06	2.55	10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.09	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	**6.04**	**6.45**	**6.03**	**6.04**	6.57	6.56	**6.06**	**6.00**	**6.23**	6.57	**6.25**	**6.34**	**6.34**	**6.25**	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	0.58	0.47	0.74	0.52	0.50	0.7	0.53	0.69	0.50	0.14	0.35	0.21	0.38	0.48	
Potassium	1.57	N/L	N/L	3.63	3.51	3.74	3.28	3.46	2.93	3.00	2.60	2.9	3.7	3.6	3.3	3.7	3.1	
Silicon	6.73	N/L	N/L	13.4	14.5	13.2	15.1	16.3	13.9	13.3	14.1	14.5	12.2	12.1	12.1	12.3	11.6	
Sodium	4.5	102	200	13.20	14.50	12.4	15.9	19.9	18.0	17.6	20.2	20.3	12.6	19.5	17.7	20.6	16.0	
Strontium	0.044	N/L	N/L	0.336	0.358	0.318	0.421	0.508	0.420	0.408	0.431	0.433	0.310	0.345	0.339	0.396	0.361	
Sulphate	19	260	500	1.1	3.2	0.7	3.1	< 10	< 10	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Total Dissolved Solids	79	289	500	***349***	***429***	***403***	***440***	***454***	**503**	288	256	***298***	279	252	261	257	243	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	6.6	5.4	7.2	6.1	9.5	7.6	8.2	11.1	8.8	3.3	4.7	4.6	6.3	7.5	
Zinc	0.005	2.5	5	< 0.002	0.004	< 0.002	0.002	0.004	0.012	0.007	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	MW06-1D														5-year Trends
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	86	87	92	90	95	80	96	82	89	93	97	89	93	80	
Aluminum	0.017	0.058	0.1	**0.343**	**0.221**	**0.430**	**0.418**	0.0243	0.038	0.040	0.020	0.03	0.05	***0.06***	***0.07***	***0.06***	0.05	
Ammonia, Total (as N)	0.1	N/L	N/L	0.2	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	0.2	0.23	0.28	0.23	0.25	0.28	0.26	
Barium	0.072	0.304	1.0	0.258	0.190	0.249	0.183	0.226	0.136	0.219	0.137	0.189	0.238	0.260	0.213	0.259	0.154	
Boron	0.01	1.3	5.0	0.0296	0.0342	0.0312	0.0382	0.0504	0.0420	0.0270	0.0340	0.029	0.036	0.026	0.030	0.031	0.045	
Calcium	7.5	N/L	N/L	81	70	93.9	56.5	87.5	57.3	86.4	55.7	71.4	81.3	99.8	80.4	102	62.3	
Chloride	12	131	250	***210***	***150***	***220***	130	***190***	97	***202***	105	***132***	***153***	**262**	***183***	**252**	118	
Chromium	0.001	0.013	0.05	0.0014	0.0025	0.00226	0.00086	< 0.00003	0.00004	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Chemical Oxygen Demand	9	N/L	N/L	< 8	< 8	< 8	8	10	< 8	366	544	319	77	85	221	1440	1450	
Cobalt	0.0016	N/L	N/L	0.00605	0.00143	0.00542	0.000734	0.000009	0.000024	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	0.0002	0.0001	
Conductivity (µS/cm) [3]	101	N/L	N/L	563	480	700	546	494	386	534	369	500	560	656	517	639	370	
Copper	0.00062	0.5	1	0.0024	0.0045	0.00325	0.00201	0.00050	0.00064	0.00090	0.00040	0.0005	0.0008	0.0008	0.0004	0.0018	0.0004	
Dissolved Organic Carbon	1.6	3.3	5	1.1	< 1	1.8	1.7	2.3	1.9	0.3	1.2	1.1	1.8	0.6	1.0	1.1	1.5	
Iron	7.14	7.14	0.3	**0.590**	**0.442**	**0.668**	**0.769**	0.065	0.046	0.138	0.042	0.047	0.063	0.075	0.153	0.068	0.046	
Magnesium	4.53	N/L	N/L	24.5	19.4	25.8	17.2	22.3	14.8	23.7	15.9	19.5	22.4	28.4	21.4	30.5	17.6	
Manganese	0.05	0.05	0.05	**0.097**	**0.073**	**0.0932**	**0.0701**	**0.0702**	0.0469	**0.0710**	0.0470	**0.061**	**0.069**	**0.081**	**0.068**	**0.086**	0.048	
Nitrate (as N)	0.06	2.55	10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	7.29	6.7	7.75	7.62	7.18	**6.05**	**6.01**	7.54	8.50	8.26	8.24	8.43	7.45	6.82	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	9.85	19.20	15.2	10.2	10.4	12.8	24.7	61.4	32.8	47.0	97.0	44.9	16.0	132	
Potassium	1.57	N/L	N/L	6.41	6.02	7.35	4.61	5.65	4.37	5.20	4.00	4.7	5.4	6.3	5.5	6.7	5.0	
Silicon	6.73	N/L	N/L	7.45	7.91	8.40	8.51	7.37	6.87	6.40	6.47	6.86	6.88	6.49	6.61	6.47	6.55	
Sodium	4.5	102	200	35.9	29.2	41.2	25.0	33.3	21.7	41.3	24.0	32.1	37.7	57.8	45.5	60.6	32.4	
Strontium	0.044	N/L	N/L	1.52	1.29	1.69	1.34	1.74	1.22	1.67	1.18	1.44	1.56	1.92	1.58	1.99	1.27	
Sulphate	19	260	500	29	37	36	38	35	46	34	43	30	28	30	38	31	40	
Total Dissolved Solids	79	289	500	***489***	***463***	**617**	***431***	**509**	***411***	**521**	***322***	***412***	***469***	**545**	***442***	**585**	***329***	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6	2	1.3	3.2	7.3	0.9	2.9	2.3	
Zinc	0.005	2.5	5	0.002	< 0.002	0.003	0.004	0.003	0.007	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	MW06-2S														5-year Trends
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	**27**	33	30	36	33	30	36	30	31	33	37	**28**	30	**28**	
Aluminum	0.017	0.058	0.1	0.018	0.042	0.046	**0.105**	0.0073	0.019	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	0.01	
Ammonia, Total (as N)	0.1	N/L	N/L	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	0.1	0.13	0.11	0.10	0.11	0.15	0.09	
Barium	0.072	0.304	1.0	0.070	0.059	0.0612	0.0700	0.0627	0.0759	0.0680	0.0630	0.073	0.086	0.078	0.063	0.062	0.056	
Boron	0.01	1.3	5.0	0.0264	0.0204	0.0216	0.0226	0.0331	0.0238	0.0200	0.0150	0.016	0.029	0.026	0.021	0.028	0.023	
Calcium	7.5	N/L	N/L	8.0	7.2	7.73	7.43	8.89	8.20	8.61	8.09	9.26	8.88	8.92	7.43	8.83	7.51	
Chloride	12	131	250	5.8	6.3	6.1	6.0	6	5	6	6	7.0	5.1	7.3	4.8	6.2	6.6	
Chromium	0.001	0.013	0.05	< 0.0005	0.0016	0.00074	0.00037	0.00018	0.00029	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	
Chemical Oxygen Demand	9	N/L	N/L	< 8	< 8	< 8	< 8	< 8	< 8	9	8	67	12	19	17	9	9	
Cobalt	0.0016	N/L	N/L	0.00893	0.00182	0.00358	0.000904	0.000408	0.000228	< 0.005	< 0.005	< 0.005	< 0.005	0.0004	0.0004	0.0004	0.0004	
Conductivity (µS/cm) [3]	101	N/L	N/L	87	88	104	186	83	86	90	94	101	113	87	88	81	143	
Copper	0.00062	0.5	1	< 0.0005	0.0011	0.00136	0.00150	0.00085	0.00068	0.00050	0.00040	0.0002	0.0005	0.0009	0.0004	0.0010	0.0008	
Dissolved Organic Carbon	1.6	3.3	5	1.3	< 1	1.1	2.0	< 1	1.7	1.5	1.6	2.6	2.3	3.0	2.0	2.8	2.3	
Iron	7.14	7.14	0.3	**8.76**	**6.69**	**7.45**	**8.35**	**8.01**	**13.0**	**8.1**	**8.1**	**8.97**	**7.89**	**8.67**	**7.06**	**7.55**	**6.28**	
Magnesium	4.53	N/L	N/L	4.5	4.0	4.25	4.38	4.45	4.16	4.68	5.06	5.35	4.93	5.11	3.93	5.23	4.41	
Manganese	0.05	0.05	0.05	**0.089**	**0.059**	**0.0679**	**0.0699**	**0.0638**	**0.0843**	**0.0650**	**0.0700**	**0.076**	**0.068**	**0.071**	**0.059**	**0.071**	**0.056**	
Nitrate (as N)	0.06	2.55	10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	< 0.1	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	6.81	7.06	7.58	**6.40**	7.81	6.63	**6.47**	7.24	6.72	7.02	6.82	6.93	6.54	**6.45**	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	0.220	< 0.03	0.10	0.67	0.50	0.46	0.27	0.25	3.39	0.27	0.90	0.37	0.33	0.38	
Potassium	1.57	N/L	N/L	2.09	2.26	2.04	2.06	2.08	2.07	2.00	1.90	1.9	2.3	2.5	2.1	2.4	2.1	
Silicon	6.73	N/L	N/L	6.4	6.8	6.22	7.95	6.25	7.01	5.61	6.10	6.35	6.24	5.48	5.66	5.47	5.79	
Sodium	4.5	102	200	4.21	3.69	3.51	3.85	3.75	5.08	4.10	4.50	4.2	3.8	4.0	3.6	3.8	3.6	
Strontium	0.044	N/L	N/L	0.050	0.047	0.0478	0.0564	0.0480	0.0493	0.0560	0.0540	0.058	0.052	0.056	0.046	0.056	0.048	
Sulphate	19	260	500	9.6	8.8	10	11	10	8	10	11	11	9	12	10	12	8	
Total Dissolved Solids	79	289	500	54	80	83	63	69	111	66	66	65	64	57	50	57	51	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.3	0.7	0.7	0.2	0.3	0.3	0.2	0.3	
Zinc	0.005	2.5	5	< 0.002	< 0.002	0.002	0.002	0.003	0.011	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	MW06-2D														5-year Trends
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	43	45	55	56	50	51	55	55	54	60	49	55	60	64	
Aluminum	0.017	0.058	0.1	**0.84**	**0.87**	**1.57**	**1.79**	**0.198**	**0.518**	**0.370**	**0.100**	**0.10**	***0.09***	***0.08***	***0.09***	**0.10**	**0.28**	
Ammonia, Total (as N)	0.1	N/L	N/L	0.7	0.5	0.3	0.4	0.4	0.6	0.77	0.92	0.72	0.72	0.65	0.75	0.72	0.68	
Barium	0.072	0.304	1.0	***0.450***	***0.389***	***0.517***	***0.498***	***0.361***	***0.390***	***0.339***	***0.343***	***0.387***	***0.365***	***0.382***	0.286	***0.305***	***0.356***	
Boron	0.01	1.3	5.0	0.0067	0.0066	0.0067	0.0071	0.0167	0.0088	0.009	0.007	< 0.005	0.016	0.018	0.020	0.019	0.019	
Calcium	7.5	N/L	N/L	13.5	14.4	18.1	15.1	15.5	16.3	13.5	14.1	15.8	13.6	15.1	14.1	16.1	16.8	
Chloride	12	131	250	9	9.2	6.8	7.7	15	12	8.4	7.4	6.2	6.9	10.2	7.5	7.8	8.4	
Chromium	0.001	0.013	0.05	0.0019	0.0043	0.00295	0.00310	0.00105	0.00108	< 0.002	< 0.002	0.001	< 0.001	0.001	0.001	0.002	0.002	
Chemical Oxygen Demand	9	N/L	N/L	27	33	41	36	43	45	128	980	1290	216	353	231	2600	2950	
Cobalt	0.0016	N/L	N/L	0.00919	0.00755	0.0181	0.002411	0.000074	0.000144	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	0.0001	0.0001	0.0003	
Conductivity (µS/cm) [3]	101	N/L	N/L	122	122	149	126	103	127	115	116	129	122	104	117	106	92	
Copper	0.00062	0.5	1	0.0067	0.0075	0.0138	0.00971	0.00143	0.00144	0.00120	0.00070	0.0011	0.0009	0.0007	0.0005	0.0009	0.0012	
Dissolved Organic Carbon	1.6	3.3	5	**5.4**	***4.1***	**6.9**	**7.0**	***4.9***	***4.1***	***4.4***	**5.0**	**8.5**	**7.8**	**8.3**	**7.8**	**8.6**	**8.6**	
Iron	7.14	7.14	0.3	**17.6**	**18.7**	**18.3**	**20.7**	**17.4**	**17.9**	**17.2**	**18.3**	**20.6**	**18.2**	**17.0**	**19.5**	**14.8**	**18.0**	
Magnesium	4.53	N/L	N/L	5.94	5.9	6.51	6.51	5.47	5.62	5.84	6.17	6.18	5.80	6.05	5.71	6.76	6.51	
Manganese	0.05	0.05	0.05	**0.230**	**0.239**	**0.299**	**0.278**	**0.183**	**0.216**	**0.185**	**0.201**	**0.230**	**0.185**	**0.200**	**0.196**	**0.220**	**0.233**	
Nitrate (as N)	0.06	2.55	10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	6.77	**6.45**	6.60	**6.33**	7.04	**6.38**	6.82	6.78	6.93	7.58	6.87	6.79	7.07	6.87	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	7.66	22.2	3.05	15.8	8.39	17.6	42.1	62.1	42.6	128	221	59.6	28.5	245	
Potassium	1.57	N/L	N/L	1.65	1.65	1.85	1.74	1.31	1.40	1.30	1.10	1.0	1.1	1.3	1.1	1.3	1.4	
Silicon	6.73	N/L	N/L	11.4	12.9	12.4	13.1	10.8	11.5	10.1	9.91	10.8	10.4	9.57	9.86	9.93	10.0	
Sodium	4.5	102	200	5.25	5.48	4.67	5.23	5.32	5.26	5.50	5.40	4.6	4.8	5.4	5.2	5.4	5.8	
Strontium	0.044	N/L	N/L	0.0612	0.0627	0.0663	0.0702	0.0608	0.0678	0.064	0.066	0.068	0.060	0.063	0.062	0.067	0.069	
Sulphate	19	260	500	15	16	17	17	17	18	15	15	14	13	14	15	14	12	
Total Dissolved Solids	79	289	500	89	274	269	271	257	286	98	95	91	101	77	84	93	95	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	0.6	0.8	0.6	0.6	0.7	0.9	1.1	2.8	1.6	< 30	7.9	1.7	4.6	5.0	
Zinc	0.005	2.5	5	0.006	0.009	0.012	0.013	0.003	0.014	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	MW07-3S														5-year Trends
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	116	113	175	185	181	174	146	193	155	146	158	217	189	213	
Aluminum	0.017	0.058	0.1	**0.112**	0.035	0.0165	***0.0963***	0.0053	0.008	0.020	0.010	0.02	0.03	0.05	0.03	0.03	0.04	
Ammonia, Total (as N)	0.1	N/L	N/L	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04	
Barium	0.072	0.304	1.0	0.171	0.135	0.204	0.217	0.220	0.166	0.216	0.151	0.214	0.228	0.286	0.201	0.223	0.146	
Boron	0.01	1.3	5.0	0.0071	0.0068	0.0078	0.0086	0.0135	0.0086	< 0.005	< 0.005	< 0.005	0.008	< 0.005	< 0.005	0.005	0.008	
Calcium	7.5	N/L	N/L	43.7	34.0	58.8	53.9	59.2	51.7	51.3	44.1	48.5	48.6	64.0	49.3	55.0	39.6	
Chloride	12	131	250	***190***	***170***	**250**	***190***	***240***	***160***	**266**	***138***	***220***	***199***	**306**	***192***	**252**	115	
Chromium	0.001	0.013	0.05	0.0009	0.0044	0.00244	0.00062	0.00009	0.00012	< 0.002	< 0.002	0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	
Chemical Oxygen Demand	9	N/L	N/L	14	< 8	22	22	26	13	22	50	27	45	24	26	31	40	
Cobalt	0.0016	N/L	N/L	0.00376	0.00112	0.00193	0.000812	0.000272	0.000378	< 0.005	< 0.005	< 0.005	< 0.005	0.0003	0.0003	0.0003	0.0004	
Conductivity (µS/cm) [3]	101	N/L	N/L	602	566	823	852	652	676	900	620	964	837	840	757	696	931	
Copper	0.00062	0.5	1	0.0048	0.0124	0.00609	0.00583	0.00525	0.00616	0.00680	0.00700	0.0059	0.0057	0.0065	0.0073	0.0073	0.0082	
Dissolved Organic Carbon	1.6	3.3	5	**5.4**	***3.5***	**6.5**	**9.5**	**6.6**	**5.7**	2.3	**5.7**	1.9	***3.6***	2.5	***4.2***	3.2	**6.9**	
Iron	7.14	7.14	0.3	0.111	0.060	0.043	0.183	0.019	0.019	0.143	0.006	0.008	0.009	0.009	0.018	0.017	0.006	
Magnesium	4.53	N/L	N/L	23.2	17.2	28.9	31.4	27.8	25.6	23.1	25.0	24.1	25.3	34.6	25.0	29.3	21.9	
Manganese	0.05	0.05	0.05	0.0338	0.0274	**0.0517**	**0.0769**	0.0354	**0.0659**	0.0270	**0.0700**	0.029	**0.083**	**0.052**	**0.106**	0.033	**0.084**	
Nitrate (as N)	0.06	2.55	10	1.08	0.96	1.48	1.49	2.06	1.75	1.80	1.70	1.88	2.09	***2.61***	***3.08***	***3.20***	1.96	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	6.99	6.50	6.91	6.75	**6.27**	6.60	7.96	7.30	6.74	7.71	6.66	7.42	6.94	6.86	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	2.59	0.53	0.47	4.74	0.57	1.96	1.07	1.83	0.86	1.89	1.03	0.29	0.67	0.53	
Potassium	1.57	N/L	N/L	4.59	4.85	5.42	4.73	4.63	4.30	4.00	3.90	4.0	4.6	5.2	4.5	4.9	4.1	
Silicon	6.73	N/L	N/L	9.1	11.4	10.4	12.5	9.37	10.6	7.0	9.8	7.28	9.56	7.47	9.20	7.84	9.88	
Sodium	4.5	102	200	78	89	55.7	60.6	***113***	68.4	***163.0***	82.3	***160***	***123***	***182***	***131***	***171***	***109***	
Strontium	0.044	N/L	N/L	0.297	0.230	0.368	0.414	0.435	0.341	0.405	0.315	0.379	0.317	0.462	0.334	0.422	0.273	
Sulphate	19	260	500	19	19	18	22	23	19	23	23	18	16	26	26	27	22	
Total Dissolved Solids	79	289	500	***369***	***429***	**583**	**531**	**643**	**549**	**655**	***474***	**670**	**624**	**744**	**562**	**658**	***451***	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.7	2.5	0.7	0.8	0.9	0.7	0.8	0.9	
Zinc	0.005	2.5	5	< 0.002	< 0.002	< 0.002	0.003	0.005	0.012	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:

1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Greenview ENVIRONMENTAL MANAGEMENT

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	MW07-3D														5-year Trends
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	140	145	154	164	192	157	169	193	179	184	197	203	200	224	
Aluminum	0.017	0.058	0.1	**0.193**	**0.105**	***0.0998***	**0.184**	0.0099	0.012	0.020	0.020	0.03	0.05	0.04	0.05	0.05	***0.06***	
Ammonia, Total (as N)	0.1	N/L	N/L	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.05	0.02	0.04	0.04	0.05	0.05	0.04	0.05	
Barium	0.072	0.304	1.0	0.1200	0.1040	0.105	0.110	0.123	0.0904	0.1200	0.1020	0.121	0.171	0.157	0.165	0.151	0.176	
Boron	0.01	1.3	5.0	0.0111	0.0102	0.0114	0.0108	0.0158	0.0106	0.0080	< 0.005	< 0.005	0.012	0.010	0.009	0.012	0.013	
Calcium	7.5	N/L	N/L	48.9	48.0	50.5	45.7	63.2	51.6	56.8	53.3	60.1	63.4	70.8	80.1	77.1	90.4	
Chloride	12	131	250	51	49	54	48	58	46	51	48	44.9	50.0	70.1	76.8	80.5	90.8	
Chromium	0.001	0.013	0.05	0.0007	0.0027	0.00115	0.00046	< 0.00003	0.00003	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Chemical Oxygen Demand	9	N/L	N/L	9	< 8	13	< 8	14	8	354	95	< 5	21	37	14	56	58	
Cobalt	0.0016	N/L	N/L	0.00535	0.00271	0.00576	0.000770	0.000456	0.000166	< 0.005	< 0.005	< 0.005	< 0.005	0.0006	0.0005	0.0004	0.0007	
Conductivity (µS/cm) [3]	101	N/L	N/L	322	370	426	360	349	381	352	304	394	429	398	466	413	495	
Copper	0.00062	0.5	1	0.0011	0.0012	0.00158	0.00083	0.00065	0.00097	0.00060	0.00080	0.0014	0.0009	0.0002	0.0005	0.0018	0.0006	
Dissolved Organic Carbon	1.6	3.3	5	2.8	2.4	***4.0***	3.0	***4.0***	2.8	***3.6***	3.2	***4.4***	***4.5***	**6.2**	**5.7**	**6.5**	**8.8**	
Iron	7.14	7.14	0.3	0.193	0.182	0.140	0.244	0.021	0.032	0.049	0.049	0.046	0.128	0.167	**0.372**	0.135	**0.407**	
Magnesium	4.53	N/L	N/L	22.1	20.5	20.9	21.9	25.6	21.3	24.8	25.0	27.2	28.7	32.0	34.2	36.9	41.5	
Manganese	0.05	0.05	0.05	**0.099**	**0.110**	**0.110**	**0.0726**	**0.130**	**0.0589**	**0.1290**	**0.0720**	**0.064**	**0.069**	**0.168**	**0.199**	**0.077**	**0.245**	
Nitrate (as N)	0.06	2.55	10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	0.10	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	7.11	7.17	7.54	7.21	8.04	8.27	6.89	7.12	7.91	7.68	7.94	8.14	7.69	7.71	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	4.060	6.860	7.88	3.84	5.57	1.72	21.80	3.04	2.05	4.36	7.38	1.93	1.45	2.62	
Potassium	1.57	N/L	N/L	4.79	5.39	5.30	4.60	5.12	4.44	4.50	4.30	4.5	5.0	5.5	5.4	5.8	6.1	
Silicon	6.73	N/L	N/L	7.41	7.93	7.52	8.54	7.67	6.98	6.81	6.94	7.48	7.41	7.10	7.37	7.09	7.36	
Sodium	4.5	102	200	8.17	8.67	7.72	8.63	8.79	7.78	9.30	8.90	9.1	9.5	11.0	11.4	11.5	12.8	
Strontium	0.044	N/L	N/L	0.383	0.373	0.380	0.419	0.492	0.421	0.453	0.457	0.500	0.478	0.550	0.587	0.615	0.671	
Sulphate	19	260	500	23	23	26	24	26	24	25	15	21	19	25	26	25	25	
Total Dissolved Solids	79	289	500	206	***309***	***354***	257	***380***	***334***	***291***	283	***307***	***325***	***307***	***346***	***356***	***398***	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	0.5	0.3	0.6	0.5	0.5	0.4	0.6	
Zinc	0.005	2.5	5	< 0.002	0.005	< 0.002	0.003	0.002	0.007	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:

1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Greenview
ENVIRONMENTAL MANAGEMENT

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	MW10-7S														5-year Trends
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	**23**	30	**24**	**23**	**25**	**26**	**26**	**21**	**21**	**22**	**24**	**16**	**17**	**18**	
Aluminum	0.017	0.058	0.1	**0.148**	**0.134**	**0.111**	**0.176**	0.0129	0.011	< 0.01	< 0.01	< 0.01	0.01	0.01	< 0.01	< 0.01	0.05	
Ammonia, Total (as N)	0.1	N/L	N/L	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01	0.02	0.01	0.03	0.02	0.05	0.02	
Barium	0.072	0.304	1.0	0.0174	0.0204	0.0186	0.0188	0.0114	0.0114	0.0120	0.0100	0.012	0.013	0.011	0.010	0.008	0.013	
Boron	0.01	1.3	5.0	0.0062	0.0053	0.0061	0.0057	0.0075	0.0070	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	0.006	
Calcium	7.5	N/L	N/L	7.03	7.35	7.41	6.79	8.63	7.45	7.31	7.17	7.40	6.71	7.56	6.84	6.63	7.00	
Chloride	12	131	250	2.0	3.1	3.2	2.4	3	4	3	3	4.2	1.9	3.4	0.9	2.0	2.3	
Chromium	0.001	0.013	0.05	< 0.0005	0.0009	0.00055	0.00035	0.00014	0.00023	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.001	
Chemical Oxygen Demand	9	N/L	N/L	< 8	< 8	< 8	< 8	< 8	< 8	8	8	20	11	9	9	42	7	
Cobalt	0.0016	N/L	N/L	0.00327	0.00535	0.00392	0.000708	0.000020	0.000052	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	0.0001	
Conductivity (µS/cm) [3]	101	N/L	N/L	55	62	67	152	53	64	54	53	60	56	58	51	45	53	
Copper	0.00062	0.5	1	0.001	0.0013	0.00116	0.00095	0.00079	0.00065	0.0006	0.0004	0.0006	0.0005	0.0014	0.0017	0.0011	0.0013	
Dissolved Organic Carbon	1.6	3.3	5	2.8	< 1	2.2	1.9	< 1	< 1	0.9	0.8	1.5	1.9	1.9	2.7	1.8	1.3	
Iron	7.14	7.14	0.3	0.183	0.292	0.151	0.222	0.012	0.012	0.005	< 0.005	0.006	0.017	0.012	0.023	0.011	0.084	
Magnesium	4.53	N/L	N/L	3.74	3.70	3.57	3.68	3.71	3.77	3.34	3.83	3.58	3.21	3.74	3.02	3.36	3.53	
Manganese	0.05	0.05	0.05	0.0095	0.0150	0.0123	0.00665	0.00114	0.00094	0.00100	< 0.001	< 0.001	0.001	0.004	< 0.001	< 0.001	0.002	
Nitrate (as N)	0.06	2.55	10	0.14	0.16	0.18	0.12	0.14	0.23	0.20	0.20	0.20	0.08	0.20	< 0.05	< 0.05	0.05	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	6.89	**6.30**	6.65	7.05	7.06	**8.56**	**6.30**	7.17	7.06	6.87	7.05	6.66	6.96	6.58	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	0.60	1.16	1.28	0.52	1.01	1.26	1.00	1.08	2.53	3.82	0.97	0.48	2.57	0.91	
Potassium	1.57	N/L	N/L	1.19	1.16	1.10	1.11	1.04	1.11	0.90	0.80	0.8	0.9	1.0	0.9	0.9	1.0	
Silicon	6.73	N/L	N/L	6.57	7.17	6.55	8.02	6.63	6.21	5.81	6.10	6.19	6.25	5.95	6.11	5.91	6.35	
Sodium	4.5	102	200	2.01	2.07	1.89	2.12	2.19	2.15	2.40	2.60	2.5	2.3	2.5	2.7	2.5	2.3	
Strontium	0.044	N/L	N/L	0.0341	0.0385	0.0353	0.0414	0.0403	0.0391	0.0410	0.0440	0.045	0.037	0.042	0.042	0.037	0.038	
Sulphate	19	260	500	14	14	12	15	14	10	12	15	14	12	14	18	13	12	
Total Dissolved Solids	79	289	500	< 30	66	57	69	111	106	48	48	49	44	42	41	40	39	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.3	0.2	0.3	0.2	0.2	0.1	0.2	0.2	
Zinc	0.005	2.5	5	0.002	0.002	< 0.002	0.003	0.003	0.006	0.009	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	

Notes:

1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Greenview
ENVIRONMENTAL MANAGEMENT

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	MW10-7D														5-year Trends
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	35	40	36	41	40	37	40	36	36	36	36	36	36	32	
Aluminum	0.017	0.058	0.1	**0.225**	**0.191**	**0.132**	**0.209**	0.0184	0.025	0.020	0.010	0.01	0.01	0.02	0.05	0.02	0.01	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01	0.03	0.02	0.02	0.03	0.03	0.03	
Barium	0.072	0.304	1.0	0.0225	0.0241	0.0185	0.0219	0.0145	0.0142	0.0150	0.0130	0.014	0.020	0.015	0.017	0.013	0.017	
Boron	0.01	1.3	5.0	0.0066	0.0056	0.0067	0.0059	0.0079	0.0063	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	0.006	0.006	
Calcium	7.5	N/L	N/L	8.14	8.40	9.31	7.45	9.75	8.29	9.08	8.06	8.21	8.65	8.78	8.85	9.12	8.51	
Chloride	12	131	250	0.8	1.7	0.8	1.5	1	1	1	2	3.8	2.3	2.3	2.6	1.7	3.4	
Chromium	0.001	0.013	0.05	0.0018	0.0022	0.00189	0.00159	0.00161	0.00160	< 0.002	< 0.002	0.002	< 0.001	0.002	0.002	0.003	0.002	
Chemical Oxygen Demand	9	N/L	N/L	< 8	< 8	< 8	< 8	< 8	< 8	121	52	< 5	17	17	< 5	37	25	
Cobalt	0.0016	N/L	N/L	0.00516	0.00181	0.00425	0.000664	< 0.000004	0.000053	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	
Conductivity (µS/cm) [3]	101	N/L	N/L	64	64	76	208	60	69	63	61	65	62	59	62	56	129	
Copper	0.00062	0.5	1	0.0014	0.0021	0.00129	0.00130	0.00058	0.00088	0.00060	0.00030	0.0004	0.0003	0.0009	0.0006	0.0005	0.0007	
Dissolved Organic Carbon	1.6	3.3	5	2.5	< 1	1.1	1.4	2.0	< 1	0.6	1.6	0.9	1.2	0.6	0.7	1.0	1.0	
Iron	7.14	7.14	0.3	0.282	0.299	0.153	0.225	< 0.007	0.016	0.007	< 0.005	< 0.005	0.007	0.007	0.082	0.018	0.006	
Magnesium	4.53	N/L	N/L	3.95	3.87	4.10	3.75	4.16	3.95	4.20	4.55	4.28	4.65	4.50	4.55	4.69	4.78	
Manganese	0.05	0.05	0.05	0.0298	0.0190	0.0194	0.0114	0.00298	0.00390	0.00200	< 0.001	0.001	< 0.001	0.001	0.002	0.001	< 0.001	
Nitrate (as N)	0.06	2.55	10	0.08	0.14	0.10	0.17	0.13	0.15	0.20	0.30	0.21	0.21	0.20	0.19	0.09	0.16	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	7.11	6.80	6.54	7.81	7.59	7.58	6.54	7.49	7.79	6.97	8.12	7.57	7.53	7.86	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	2.960	2.570	1.65	1.83	1.09	1.40	3.69	4.61	1.43	2.21	4.55	2.30	2.48	2.35	
Potassium	1.57	N/L	N/L	1.65	1.66	1.78	1.49	1.63	1.38	1.30	1.10	1.1	1.2	1.3	1.2	1.4	1.2	
Silicon	6.73	N/L	N/L	6.39	7.46	7.16	8.12	6.88	6.56	5.78	6.87	7.01	7.26	6.47	6.91	6.16	6.90	
Sodium	4.5	102	200	2.58	2.94	2.63	2.82	2.95	3.03	2.80	3.40	3.1	2.9	3.0	3.1	2.9	3.0	
Strontium	0.044	N/L	N/L	0.0255	0.0260	0.0267	0.0274	0.0272	0.0270	0.0280	0.0300	0.028	0.030	0.029	0.032	0.029	0.034	
Sulphate	19	260	500	8.6	7.9	9.2	7.8	8	7	8	7	7	6	7	9	8	8	
Total Dissolved Solids	79	289	500	63	66	89	80	69	94	56	54	53	55	45	52	48	49	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.7	0.3	0.2	0.3	0.4	0.3	0.1	0.2	
Zinc	0.005	2.5	5	0.002	< 0.002	< 0.002	0.004	0.004	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:

1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Greenview
ENVIRONMENTAL MANAGEMENT

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	R1											5-year Trends
				01-Nov-13	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	147	56	48	48	48	38	44	36	53	44	47	
Aluminum	0.017	0.058	0.1	0.0134	0.0186	0.0217	0.021	0.010	0.020	0.02	0.03	0.03	0.01	0.03	
Ammonia, Total (as N)	0.1	N/L	N/L	0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01	0.02	0.01	0.03	0.02	0.03	
Barium	0.072	0.304	1.0	0.1060	0.0905	0.100	0.0905	0.0920	0.0580	0.061	0.069	0.078	0.075	0.073	
Boron	0.01	1.3	5.0	0.0218	0.0237	0.0247	0.0189	0.0290	0.0270	0.032	0.024	0.017	0.014	0.032	
Calcium	7.5	N/L	N/L	13.8	11.6	15.8	11.5	15.5	8.5	13.6	9.23	11.5	10.7	18.0	
Chloride	12	131	250	1.0	1.5	3	2	3	< 0.5	4	< 0.5	1.0	< 0.5	2.2	
Chromium	0.001	0.013	0.05	0.0021	0.00041	0.00051	0.00049	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.001	
Chemical Oxygen Demand	9	N/L	N/L	< 8	< 8	8	< 8	8	7	17	9	7	5	8	
Cobalt	0.0016	N/L	N/L	0.000278	0.000025	0.000280	0.000364	< 0.005	< 0.005	< 0.005	< 0.005	0.0003	0.0002	0.0003	
Conductivity (µS/cm) [3]	101	N/L	N/L	125	282	92	117	110	82	115	79	80	88	122	
Copper	0.00062	0.5	1	0.2790	0.09239	0.0858	0.0872	0.0352	0.0757	0.0277	0.0592	0.0565	0.0670	0.102	
Dissolved Organic Carbon	1.6	3.3	5	2.6	***4.4***	**5.0**	***4.5***	***3.8***	***3.4***	***3.7***	3.1	***4.1***	2.5	***3.8***	
Iron	7.14	7.14	0.3	0.015	< 0.007	0.025	0.031	0.010	< 0.005	0.009	0.036	0.024	0.013	0.009	
Magnesium	4.53	N/L	N/L	5.81	4.88	5.77	5.32	5.64	4.01	4.06	3.49	4.62	4.38	5.76	
Manganese	0.05	0.05	0.05	0.00556	0.00536	0.00955	0.0131	0.0060	0.0020	0.003	0.012	0.010	0.002	0.006	
Nitrate (as N)	0.06	2.55	10	2.51	1.53	2.40	0.95	***3.80***	0.80	2.52	0.48	0.35	0.49	***4.44***	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	7.42	6.53	7.71	7.79	7.04	7.46	7.05	7.93	6.57	6.98	6.64	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	< 0.03	< 0.03	< 0.03	< 0.03	0.05	0.03	< 0.01	0.03	0.05	0.02	0.02	
Potassium	1.57	N/L	N/L	3.95	3.56	4.38	3.46	3.20	2.90	3.0	2.8	4.1	3.3	3.8	
Silicon	6.73	N/L	N/L	5.13	5.74	4.32	4.35	3.92	4.21	4.06	4.48	4.32	4.33	4.00	
Sodium	4.5	102	200	2.63	2.34	2.92	2.26	4.80	2.40	5.7	1.8	2.5	1.7	3.6	
Strontium	0.044	N/L	N/L	0.0714	0.0670	0.0777	0.0592	0.0840	0.0480	0.066	0.043	0.058	0.052	0.087	
Sulphate	19	260	500	6.1	10	13	6	9	4	8	5	6	4	7	
Total Dissolved Solids	79	289	500	89	71	134	123	90	52	76	50	56	53	81	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	1.1	< 0.5	< 0.5	< 0.5	0.3	0.3	0.4	0.3	0.3	0.2	0.3	
Zinc	0.005	2.5	5	0.070	0.040	0.028	0.034	0.013	0.035	0.018	0.023	0.010	0.018	0.040	

Notes:
1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Greenview
ENVIRONMENTAL MANAGEMENT

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	R2													5-year Trends (sparkline)
				01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	
Alkalinity (as $CaCO_3$)	24	262	30 - 500	63	62	74	65	64	62	63	61	63	63	63	57	59	
Aluminum	0.017	0.058	0.1	0.0045	0.0067	0.0077	0.0080	0.009	< 0.01	< 0.01	< 0.01	0.03	0.02	0.02	0.02	0.03	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.03	0.01	0.05	0.04	0.05	0.05	0.06	0.04	
Barium	0.072	0.304	1.0	0.0627	0.0789	0.0694	0.0778	0.0643	0.0750	0.0660	0.08	0.086	0.064	0.068	0.074	0.076	
Boron	0.01	1.3	5.0	0.0863	0.0369	0.0747	0.0424	0.0727	0.0340	0.0470	0.024	0.073	0.079	0.076	0.035	0.075	
Calcium	7.5	N/L	N/L	18.9	20.0	17.7	21.8	18.8	20.0	19.4	21.2	21.0	19.5	20.3	21.6	21.8	
Chloride	12	131	250	1.8	2.8	2.2	2	1	3	2	4.4	2.2	2.4	2.1	4.6	3.0	
Chromium	0.001	0.013	0.05	0.0012	0.00030	< 0.00003	< 0.00003	0.00004	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.001	
Chemical Oxygen Demand	9	N/L	N/L	< 8	< 8	< 8	< 8	< 8	< 5	< 5	< 5	< 5	< 5	< 5	< 5	5	
Cobalt	0.0016	N/L	N/L	0.000069	0.000085	< 0.000004	< 0.000004	0.000027	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.0001	
Conductivity (µS/cm) [3]	101	N/L	N/L	152	347	330	71	173	129	150	162	165	124	143	130	137	
Copper	0.00062	0.5	1	0.0788	0.0761	0.07409	0.0711	0.0767	0.0276	0.0395	0.0553	0.0519	0.107	0.0354	0.126	0.0923	
Dissolved Organic Carbon	1.6	3.3	5	< 1	< 1	1.0	1.3	< 1	0.7	0.5	0.5	0.9	0.6	< 0.2	1.0	0.8	
Iron	7.14	7.14	0.3	0.120	**0.581**	0.076	0.255	0.031	0.023	0.013	0.036	0.042	0.150	0.036	**0.643**	**0.591**	
Magnesium	4.53	N/L	N/L	4.67	4.98	4.63	5.09	4.74	5.28	5.43	5.61	5.28	4.91	4.87	5.90	5.56	
Manganese	0.05	0.05	0.05	0.0128	0.0147	0.0118	0.0151	0.0115	0.0130	0.0100	0.013	0.013	0.013	0.011	0.016	0.012	
Nitrate (as N)	0.06	2.55	10	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	7.41	7.46	6.96	7.53	7.74	6.68	7.74	8.22	8.44	7.75	7.35	6.93	8.17	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.02	< 0.01	< 0.01	0.02	0.03	< 0.01	0.01	< 0.01	
Potassium	1.57	N/L	N/L	1.50	1.66	1.44	1.68	1.43	1.40	1.30	1.3	1.4	1.4	1.3	1.6	1.5	
Silicon	6.73	N/L	N/L	5.05	5.33	6.06	5.56	4.77	4.73	4.80	5.18	4.98	4.58	4.70	4.85	4.80	
Sodium	4.5	102	200	10.0	5.16	8.62	5.93	8.74	5.90	7.60	5.3	7.9	10.3	9.8	5.6	8.9	
Strontium	0.044	N/L	N/L	0.812	0.767	0.859	0.904	0.837	0.890	0.908	0.892	0.834	0.840	0.866	0.925	0.943	
Sulphate	19	260	500	25	22	24	24	21	21	21	19	19	25	24	22	23	
Total Dissolved Solids	79	289	500	83	129	106	103	143	99	100	101	102	92	95	92	95	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Zinc	0.005	2.5	5	0.045	0.038	0.058	0.047	0.060	0.018	0.034	0.031	0.038	0.026	0.025	0.025	0.045	

Notes:
1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Greenview
ENVIRONMENTAL MANAGEMENT

Table 4
Groundwater Quality (ODWS)
Killaloe Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	R3														5-year Trends
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	262	30 - 500	71	107	85	120	99	134	89	126	70	82	82	108	69	102	
Aluminum	0.017	0.058	0.1	0.028	0.019	0.0121	**0.228**	0.0305	**0.278**	< 0.01	**0.300**	0.04	0.04	0.03	0.04	***0.07***	***0.06***	
Ammonia, Total (as N)	0.1	N/L	N/L	0.1	< 0.1	0.1	< 0.1	< 0.1	0.3	< 0.01	1.87	0.03	0.03	0.01	0.02	0.05	0.14	
Barium	0.072	0.304	1.0	0.0299	0.0440	0.0314	0.0467	0.0315	0.0482	0.0760	0.0540	0.019	0.034	0.025	0.036	0.010	0.039	
Boron	0.01	1.3	5.0	0.017	0.018	0.0186	0.0186	0.0218	0.0194	0.0340	0.0090	0.007	0.016	0.010	0.008	0.014	0.014	
Calcium	7.5	N/L	N/L	25.3	37.7	29.6	35.2	33.7	43.5	20.1	40.8	19.9	27.5	28.7	41.0	16.5	38.9	
Chloride	12	131	250	1.4	1.2	1.0	1.1	< 1	1	0.7	0.8	2.8	0.5	0.6	< 0.5	0.8	1.6	
Chromium	0.001	0.013	0.05	< 0.0005	0.0023	0.00037	0.00015	0.00015	0.00026	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.001	
Chemical Oxygen Demand	9	N/L	N/L	< 8	< 8	< 8	8	< 8	9	12	25	24	14	8	8	22	17	
Cobalt	0.0016	N/L	N/L	0.000223	0.000202	0.000139	0.000180	0.000095	0.00054	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	0.0001	0.0001	0.0002	
Conductivity (µS/cm) [3]	101	N/L	N/L	113	171	217	319	126	207	119	152	107	137	102	152	81	147	
Copper	0.00062	0.5	1	0.0035	0.0029	0.00290	0.00546	0.00264	0.00503	0.00250	0.00490	0.0033	0.0021	0.0021	0.0018	0.0039	0.0034	
Dissolved Organic Carbon	1.6	3.3	5	**5.7**	2.4	***4.1***	***3.9***	***4.3***	***3.6***	***4.5***	**5.7**	**6.6**	***4.3***	3.0	3.1	**8.5**	**6.3**	
Iron	7.14	7.14	0.3	0.034	0.013	0.018	0.165	0.014	0.287	0.026	0.261	0.030	0.013	0.007	0.009	0.040	0.048	
Magnesium	4.53	N/L	N/L	1.13	1.18	1.08	1.27	1.19	1.44	5.29	1.67	1.00	1.17	1.35	1.37	0.81	1.29	
Manganese	0.05	0.05	0.05	0.0048	0.0133	0.00110	**0.0882**	0.00753	**0.0501**	0.013	**0.199**	0.003	0.011	0.002	0.007	< 0.001	0.041	
Nitrate (as N)	0.06	2.55	10	1.05	1.57	0.80	0.97	0.90	0.26	1.30	0.90	0.42	0.57	0.41	0.68	0.09	0.78	
Nitrite (as N)	0.05	0.3	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	6.56	6.5 - 8.5	6.5 - 8.5	8.07	7.51	7.75	7.97	6.63	7.66	7.83	7.94	8.00	6.95	8.14	8.45	7.85	7.65	
Phenols	-	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	N/L	N/L	0.14	0.24	0.13	0.24	0.11	0.46	0.15	0.6	0.04	0.17	0.10	0.16	0.04	0.13	
Potassium	1.57	N/L	N/L	8.19	8.18	7.67	8.05	9.77	8.93	1.4	9.8	11.0	8.4	6.9	7.5	15.0	13.1	
Silicon	6.73	N/L	N/L	4.07	4.55	4.12	5.52	4.45	4.53	4.74	4.51	4.66	5.00	4.48	4.58	4.28	4.85	
Sodium	4.5	102	200	4.11	3.79	3.28	3.39	4.01	3.86	6.00	5.40	5.0	2.9	2.4	2.4	6.4	5.3	
Strontium	0.044	N/L	N/L	0.177	0.246	0.187	0.274	0.229	0.297	0.884	0.3	0.172	0.182	0.195	0.256	0.160	0.274	
Sulphate	19	260	500	6.2	5.6	5.7	5.5	4	3	5	4	4	3	4	3	4	3	
Total Dissolved Solids	79	289	500	94	129	123	137	129	171	112	149	88	98	86	115	81	113	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	0.6	< 0.5	< 0.5	< 0.5	0.6	0.3	3.3	0.5	0.3	0.2	0.2	0.4	0.6	
Zinc	0.005	2.5	5	< 0.002	< 0.002	0.008	0.009	0.002	0.011	0.018	0.010	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Reasonable Use Criteria (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from field analysis.

Results expressed in mg/L unless otherwise noted.
Bold and Shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates no limit specified.
'-' means parameter not analyzed.

Greenview
ENVIRONMENTAL MANAGEMENT

Table 4
Volatile Organic Compounds (ODWS)
Killaloe Waste Disposal Site

Parameter	ODWS[1]	BH00-4R					BH00-4A(D)				
		14-Oct-15	24-Oct-16	17-Oct-17	25-Oct-18	15-Oct-19	14-Oct-15	24-Oct-16	17-Oct-17	25-Oct-18	15-Oct-19
Acetone	N/L	-	0.006	0.016	0.010	< 0.03	-	< 0.002	0.004	< 0.002	< 0.03
Benzene	0.001	**0.0016**	0.0009	**0.0015**	0.0006	0.0009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bromobenzene	N/L	-	< 0.0001	< 0.0001	< 0.0001	< 0.0004	-	< 0.0001	< 0.0001	< 0.0001	< 0.0004
Bromodichloromethane	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Bromoform	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Bromomethane	N/L	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0005
Carbon Tetrachloride	0.002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorobenzene	0.08	0.002	0.0016	0.003	0.0018	0.0025	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Chloroethane	N/L	< 0.005	< 0.0001	0.0018	< 0.0001	< 0.003	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.003
Chloroform	N/L	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.001	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.001
Chloromethane	N/L	< 0.005	< 0.0003	0.0005	< 0.0003	< 0.002	< 0.005	< 0.0003	< 0.0003	< 0.0003	< 0.002
Chlorotoluene,2-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorotoluene,4-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dibromo-3-Chloropropane, 1,2-	N/L	-	< 0.001	< 0.001	< 0.001	< 0.0006	-	< 0.001	< 0.001	< 0.001	< 0.0006
Dibromochloromethane	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Dibromoethane,1,2- (Ethylene Dibromide)	N/L	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002
Dibromomethane	N/L	-	< 0.001	< 0.001	< 0.001	< 0.0001	-	< 0.001	< 0.001	< 0.001	< 0.0001
1,2-Dichlorobenzene	0.2	< 0.0005	< 0.0001	0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,3-Dichlorobenzene	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,4-Dichlorobenzene	0.005	0.0013	0.0018	0.0016	0.0010	0.0011	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Dichlorodifluoromethane	N/L	-	< 0.001	< 0.001	< 0.001	< 0.002	-	< 0.001	< 0.001	< 0.001	< 0.002
Dichloroethane, 1,1-	N/L	< 0.0005	0.0001	0.0003	0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethane, 1,2-	0.005	< 0.0005	< 0.0001	< 0.0001	0.0002	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene (vinylidene chloride), 1,1-	0.014	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, cis-1,2-	N/L	0.0008	0.0003	0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	0.0003	< 0.0001	< 0.0005
Dichloroethylene, trans-1,2-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloromethane (Methylene Chloride)	0.05	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.005
Dichloropropane, 1,2-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropane,1,3-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dichloropropane,2,2-	N/L	-	< 0.0002	< 0.0002	0.0002	-	-	< 0.0002	< 0.0002	< 0.0002	-
Dichloropropylene, cis-1,3-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropylene, trans-1,3-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropene,1,1-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ethylbenzene	0.0024	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Hexachlorobutadiene	N/L	-	< 0.001	< 0.001	< 0.001	< 0.0006	-	< 0.001	< 0.001	< 0.001	< 0.0006
Hexane	N/L	-	< 0.001	< 0.001	< 0.001	< 0.005	-	< 0.001	< 0.001	< 0.001	< 0.005
Isopropylbenzene	N/L	-	< 0.0002	0.0003	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Isopropyltoluene,4-	N/L	-	< 0.0004	< 0.0004	< 0.0004	< 0.0002	-	< 0.0004	< 0.0004	< 0.0004	< 0.0002
Methyl Butyl Ketone	N/L	-	< 0.010	< 0.010	< 0.010	< 0.005	-	< 0.010	< 0.010	< 0.010	< 0.005
Methyl Ethyl Ketone	N/L	-	< 0.001	0.001	< 0.001	< 0.02	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl Isobutyl Ketone	N/L	-	< 0.001	< 0.001	< 0.001	< 0.02	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl-t-Butyl Ether	N/L	-	< 0.001	< 0.001	< 0.001	< 0.002	-	< 0.001	< 0.001	< 0.001	< 0.002
Naphthalene	N/L	-	0.001	0.0013	< 0.0007	< 0.0004	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Butylbenzene	N/L	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Propylbenzene	N/L	-	< 0.0004	< 0.0004	< 0.0004	< 0.0001	-	< 0.0004	< 0.0004	< 0.0004	< 0.0001
sec-Butylbenzene	N/L	-	< 0.0005	< 0.0005	< 0.0005	< 0.0001	-	< 0.0005	< 0.0005	< 0.0005	< 0.0001
Styrene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
tert-Butylbenzene	N/L	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Tetrachloroethane, 1,1,1,2-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Tetrachloroethane, 1,1,2,2-	N/L	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0005
Tetrachloroethylene (Perchloroethylene)	0.03	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Toluene	0.024	< 0.0005	< 0.0005	< 0.0005	0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trichlorobenzene,1,2,3-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichlorobenzene,1,2,4-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichloroethane, 1,1,1-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethane, 1,1,2-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethene (Trichloroethylene)	0.005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichlorofluoromethane	N/L	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Trichloropropane,1,2,3-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trimethylbenzene,1,2,4-	N/L	-	< 0.002	< 0.002	< 0.002	< 0.001	-	< 0.002	< 0.002	< 0.002	< 0.001
Trimethylbenzene,1,3,5-	N/L	-	< 0.0006	< 0.0006	< 0.0006	< 0.0001	-	< 0.0006	< 0.0006	< 0.0006	< 0.0001
Vinyl Chloride	0.001	0.0002	0.0004	**0.0018**	0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Xylene; total	0.3	0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0015	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0015
m-Xylene & p-Xylene	N/L	0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0010	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.001
o-Xylene	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005

Notes:
1. Ontario Drinking Water Standards (ODWS)

All results are expressed in mg/L unless otherwise stated.
Shaded areas indicate values that exceed O.D.W.S. maximum acceptable concentrations.
N/L indicates No Limit specified.
'-' means parameter not analyzed.

Table 4
Volatile Organic Compounds (ODWS)
Killaloe Waste Disposal Site

Parameter	ODWS[1]	MW06-1S								
		17-Aug-11	5-Sep-12	01-Nov-13	28-Oct-14	14-Oct-15	24-Oct-16	17-Oct-17	25-Oct-18	15-Oct-19
Acetone	N/L	-	-	-	-	-	< 0.002	< 0.002	< 0.002	< 0.03
Benzene	0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bromobenzene	N/L	-	-	-	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0004
Bromodichloromethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Bromoform	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Bromomethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0005
Carbon Tetrachloride	0.002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorobenzene	0.08	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Chloroethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.003
Chloroform	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.001
Chloromethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0003	< 0.0003	< 0.0003	< 0.002
Chlorotoluene,2-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorotoluene,4-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dibromo-3-Chloropropane, 1,2-	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0006
Dibromochloromethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Dibromoethane,1,2- (Ethylene Dibromide)	N/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002
Dibromomethane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0001
1,2-Dichlorobenzene	0.2	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,3-Dichlorobenzene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,4-Dichlorobenzene	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Dichlorodifluoromethane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.002
Dichloroethane, 1,1-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethane, 1,2-	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene (vinylidene chloride), 1,1-	0.014	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, cis-1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, trans-1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloromethane (Methylene Chloride)	0.05	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.005
Dichloropropane, 1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropane,1,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dichloropropane,2,2-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	-
Dichloropropylene, cis-1,3-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropylene, trans-1,3-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropene,1,1-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ethylbenzene	0.0024	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Hexachlorobutadiene	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0006
Hexane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.005
Isopropylbenzene	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Isopropyltoluene,4-	N/L	-	-	-	-	-	< 0.0004	< 0.0004	< 0.0004	< 0.0002
Methyl Butyl Ketone	N/L	-	-	-	-	-	< 0.010	< 0.010	< 0.010	< 0.005
Methyl Ethyl Ketone	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl Isobutyl Ketone	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl-t-Butyl Ether	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.002
Naphthalene	N/L	-	-	-	-	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Butylbenzene	N/L	-	-	-	-	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Propylbenzene	N/L	-	-	-	-	-	< 0.0004	< 0.0004	< 0.0004	< 0.0001
sec-Butylbenzene	N/L	-	-	-	-	-	< 0.0005	< 0.0005	< 0.0005	< 0.0001
Styrene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
tert-Butylbenzene	N/L	-	-	-	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Tetrachloroethane, 1,1,1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Tetrachloroethane, 1,1,2,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0005
Tetrachloroethylene (Perchloroethylene)	0.03	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Toluene	0.024	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0008
Trichlorobenzene,1,2,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichlorobenzene,1,2,4-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichloroethane, 1,1,1-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethane, 1,1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethene (Trichloroethylene)	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichlorofluoromethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Trichloropropane,1,2,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trimethylbenzene,1,2,4-	N/L	-	-	-	-	-	< 0.002	< 0.002	< 0.002	< 0.001
Trimethylbenzene,1,3,5-	N/L	-	-	-	-	-	< 0.0006	< 0.0006	< 0.0006	< 0.0001
Vinyl Chloride	0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Xylene; total	0.3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0015
m-Xylene & p-Xylene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.001
o-Xylene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005

Notes:
1. Ontario Drinking Water Standards (ODWS)

All results are expressed in mg/L unless otherwise stated.
Shaded areas indicate values that exceed O.D.W.S. maximum acceptabl
N/L indicates No Limit specified.
'-' means parameter not analyzed.

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ENVIRONMENTAL MANAGEMENT

Table 4
Volatile Organic Compounds (ODWS)
Killaloe Waste Disposal Site

Parameter	ODWS[1]	MW06-1D								
		17-Aug-11	5-Sep-12	01-Nov-13	28-Oct-14	14-Oct-15	24-Oct-16	17-Oct-17	25-Oct-18	15-Oct-19
Acetone	N/L	-	-	-	-	-	< 0.002	< 0.002	< 0.002	< 0.03
Benzene	0.001	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bromobenzene	N/L	-	-	-	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0004
Bromodichloromethane	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Bromoform	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Bromomethane	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0005
Carbon Tetrachloride	0.002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorobenzene	0.08	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Chloroethane	N/L	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.003
Chloroform	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.001
Chloromethane	N/L	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0003	< 0.0003	< 0.0003	< 0.002
Chlorotoluene,2-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorotoluene,4-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dibromo-3-Chloropropane, 1,2-	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0006
Dibromochloromethane	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Dibromoethane,1,2- (Ethylene Dibromide)	N/L	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002
Dibromomethane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0001
1,2-Dichlorobenzene	0.2	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,3-Dichlorobenzene	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,4-Dichlorobenzene	0.005	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Dichlorodifluoromethane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.002
Dichloroethane, 1,1-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethane, 1,2-	0.005	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene (vinylidene chloride), 1,1-	0.014	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, cis-1,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, trans-1,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloromethane (Methylene Chloride)	0.05	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.005
Dichloropropane, 1,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropane,1,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dichloropropane,2,2-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	-
Dichloropropylene, cis-1,3-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropylene, trans-1,3-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropene,1,1-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ethylbenzene	0.0024	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Hexachlorobutadiene	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0006
Hexane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.005
Isopropylbenzene	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Isopropyltoluene,4-	N/L	-	-	-	-	-	< 0.0004	< 0.0004	< 0.0004	< 0.0002
Methyl Butyl Ketone	N/L	-	-	-	-	-	< 0.010	< 0.010	< 0.010	< 0.005
Methyl Ethyl Ketone	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl Isobutyl Ketone	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl-t-Butyl Ether	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.002
Naphthalene	N/L	-	-	-	-	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Butylbenzene	N/L	-	-	-	-	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Propylbenzene	N/L	-	-	-	-	-	< 0.0004	< 0.0004	< 0.0004	< 0.0001
sec-Butylbenzene	N/L	-	-	-	-	-	< 0.0005	< 0.0005	< 0.0005	< 0.0001
Styrene	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
tert-Butylbenzene	N/L	-	-	-	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Tetrachloroethane, 1,1,1,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Tetrachloroethane, 1,1,2,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0005
Tetrachloroethylene (Perchloroethylene)	0.03	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Toluene	0.024	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trichlorobenzene,1,2,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichlorobenzene,1,2,4-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichloroethane, 1,1,1-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethane, 1,1,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethene (Trichloroethylene)	0.005	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichlorofluoromethane	N/L	< 0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Trichloropropane,1,2,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trimethylbenzene,1,2,4-	N/L	-	-	-	-	-	< 0.002	< 0.002	< 0.002	< 0.001
Trimethylbenzene,1,3,5-	N/L	-	-	-	-	-	< 0.0006	< 0.0006	< 0.0006	< 0.0001
Vinyl Chloride	0.001	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Xylene; total	0.3	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0015
m-Xylene & p-Xylene	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.001
o-Xylene	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005

Notes:
1. Ontario Drinking Water Standards (ODWS)

All results are expressed in mg/L unless otherwise stated.
Shaded areas indicate values that exceed O.D.W.S. maximum acceptabl
N/L indicates No Limit specified.
'-' means parameter not analyzed.

Table 4
Volatile Organic Compounds (ODWS)
Killaloe Waste Disposal Site

Parameter	ODWS[1]	MW06-2S								
		17-Aug-11	5-Sep-12	01-Nov-13	28-Oct-14	14-Oct-15	24-Oct-16	17-Oct-17	25-Oct-18	15-Oct-19
Acetone	N/L	-	-	-	-	-	< 0.002	< 0.002	< 0.002	< 0.03
Benzene	0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bromobenzene	N/L	-	-	-	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0004
Bromodichloromethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Bromoform	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Bromomethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0005
Carbon Tetrachloride	0.002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorobenzene	0.08	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Chloroethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.003
Chloroform	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.001
Chloromethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0003	< 0.0003	< 0.0003	< 0.002
Chlorotoluene,2-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorotoluene,4-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dibromo-3-Chloropropane, 1,2-	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0006
Dibromochloromethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Dibromoethane,1,2- (Ethylene Dibromide)	N/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002
Dibromomethane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0001
1,2-Dichlorobenzene	0.2	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,3-Dichlorobenzene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,4-Dichlorobenzene	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Dichlorodifluoromethane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.002
Dichloroethane, 1,1-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethane, 1,2-	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene (vinylidene chloride), 1,1-	0.014	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, cis-1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, trans-1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloromethane (Methylene Chloride)	0.05	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.005
Dichloropropane, 1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropane,1,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dichloropropane,2,2-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	-
Dichloropropylene, cis-1,3-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropylene, trans-1,3-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropene,1,1-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ethylbenzene	0.0024	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Hexachlorobutadiene	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0006
Hexane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.005
Isopropylbenzene	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Isopropyltoluene,4-	N/L	-	-	-	-	-	< 0.0004	< 0.0004	< 0.0004	< 0.0002
Methyl Butyl Ketone	N/L	-	-	-	-	-	< 0.010	< 0.010	< 0.010	< 0.005
Methyl Ethyl Ketone	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl Isobutyl Ketone	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl-t-Butyl Ether	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.002
Naphthalene	N/L	-	-	-	-	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Butylbenzene	N/L	-	-	-	-	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Propylbenzene	N/L	-	-	-	-	-	< 0.0004	< 0.0004	< 0.0004	< 0.0001
sec-Butylbenzene	N/L	-	-	-	-	-	< 0.0005	< 0.0005	< 0.0005	< 0.0001
Styrene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
tert-Butylbenzene	N/L	-	-	-	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Tetrachloroethane, 1,1,1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Tetrachloroethane, 1,1,2,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0005
Tetrachloroethylene (Perchloroethylene)	0.03	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Toluene	0.024	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trichlorobenzene,1,2,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichlorobenzene,1,2,4-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichloroethane, 1,1,1-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethane, 1,1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethene (Trichloroethylene)	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichlorofluoromethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Trichloropropane,1,2,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trimethylbenzene,1,2,4-	N/L	-	-	-	-	-	< 0.002	< 0.002	< 0.002	< 0.001
Trimethylbenzene,1,3,5-	N/L	-		-	-	-	< 0.0006	< 0.0006	< 0.0006	< 0.0001
Vinyl Chloride	0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Xylene; total	0.3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0015
m-Xylene & p-Xylene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.001
o-Xylene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005

Notes:
1. Ontario Drinking Water Standards (ODWS)

All results are expressed in mg/L unless otherwise stated.
Shaded areas indicate values that exceed O.D.W.S. maximum acceptabl
N/L indicates No Limit specified.
'-' means parameter not analyzed.

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Table 4
Volatile Organic Compounds (ODWS)
Killaloe Waste Disposal Site

Parameter	ODWS[1]	MW06-2D								
		17-Aug-11	5-Sep-12	01-Nov-13	28-Oct-14	14-Oct-15	24-Oct-16	17-Oct-17	25-Oct-18	15-Oct-19
Acetone	N/L	-	-	-	-	-	< 0.002	< 0.002	< 0.002	< 0.03
Benzene	0.001	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bromobenzene	N/L	-	-	-	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0004
Bromodichloromethane	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Bromoform	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Bromomethane	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0005
Carbon Tetrachloride	0.002	< 0.0004	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorobenzene	0.08	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Chloroethane	N/L	< 0.01	< 0.005	< 0.005	< 0.0010	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.003
Chloroform	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.001
Chloromethane	N/L	< 0.01	< 0.005	< 0.005	< 0.01	< 0.005	< 0.0003	< 0.0003	< 0.0003	< 0.002
Chlorotoluene,2-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorotoluene,4-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dibromo-3-Chloropropane, 1,2-	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0006
Dibromochloromethane	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Dibromoethane,1,2- (Ethylene Dibromide)	N/L	< 0.0004	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002
Dibromomethane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0001
1,2-Dichlorobenzene	0.2	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,3-Dichlorobenzene	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,4-Dichlorobenzene	0.005	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Dichlorodifluoromethane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.002
Dichloroethane, 1,1-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethane, 1,2-	0.005	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene (vinylidene chloride), 1,1-	0.014	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, cis-1,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, trans-1,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloromethane (Methylene Chloride)	0.05	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.005
Dichloropropane, 1,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropane,1,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dichloropropane,2,2-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	-
Dichloropropylene, cis-1,3-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropylene, trans-1,3-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropene,1,1-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ethylbenzene	0.0024	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Hexachlorobutadiene	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0006
Hexane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.005
Isopropylbenzene	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Isopropyltoluene,4-	N/L	-	-	-	-	-	< 0.0004	< 0.0004	< 0.0004	< 0.0002
Methyl Butyl Ketone	N/L	-	-	-	-	-	< 0.010	< 0.010	< 0.010	< 0.005
Methyl Ethyl Ketone	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl Isobutyl Ketone	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl-t-Butyl Ether	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.002
Naphthalene	N/L	-	-	-	-	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Butylbenzene	N/L	-	-	-	-	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Propylbenzene	N/L	-	-	-	-	-	< 0.0004	< 0.0004	< 0.0004	< 0.0001
sec-Butylbenzene	N/L	-	-	-	-	-	< 0.0005	< 0.0005	< 0.0005	< 0.0001
Styrene	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
tert-Butylbenzene	N/L	-	-	-	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Tetrachloroethane, 1,1,1,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Tetrachloroethane, 1,1,2,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0005
Tetrachloroethylene (Perchloroethylene)	0.03	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Toluene	0.024	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trichlorobenzene,1,2,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichlorobenzene,1,2,4-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichloroethane, 1,1,1-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethane, 1,1,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethene (Trichloroethylene)	0.005	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichlorofluoromethane	N/L	< 0.01	< 0.005	< 0.005	< 0.01	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Trichloropropane,1,2,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trimethylbenzene,1,2,4-	N/L	-	-	-	-	-	< 0.002	< 0.002	< 0.002	< 0.001
Trimethylbenzene,1,3,5-	N/L	-	-	-	-	-	< 0.0006	< 0.0006	< 0.0006	< 0.0001
Vinyl Chloride	0.001	< 0.0004	< 0.0002	< 0.0002	< 0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Xylene; total	0.3	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0015
m-Xylene & p-Xylene	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.001
o-Xylene	N/L	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005

Notes:
1. Ontario Drinking Water Standards (ODWS)

All results are expressed in mg/L unless otherwise stated.
Shaded areas indicate values that exceed O.D.W.S. maximum acceptabl
N/L indicates No Limit specified.
'-' means parameter not analyzed.

Table 4
Volatile Organic Compounds (ODWS)
Killaloe Waste Disposal Site

Parameter	ODWS[1]	MW07-3S								
		17-Aug-11	5-Sep-12	01-Nov-13	28-Oct-14	14-Oct-15	24-Oct-16	17-Oct-17	25-Oct-18	15-Oct-19
Acetone	N/L	-	-	-	-	-	< 0.002	< 0.002	< 0.002	< 0.03
Benzene	0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bromobenzene	N/L	-	-	-	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0004
Bromodichloromethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Bromoform	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Bromomethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0005
Carbon Tetrachloride	0.002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorobenzene	0.08	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Chloroethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.003
Chloroform	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.001
Chloromethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0003	< 0.0003	< 0.0003	< 0.002
Chlorotoluene,2-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorotoluene,4-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dibromo-3-Chloropropane, 1,2-	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0006
Dibromochloromethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Dibromoethane,1,2- (Ethylene Dibromide)	N/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002
Dibromomethane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0001
1,2-Dichlorobenzene	0.2	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,3-Dichlorobenzene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,4-Dichlorobenzene	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Dichlorodifluoromethane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.002
Dichloroethane, 1,1-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethane, 1,2-	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene (vinylidene chloride), 1,1-	0.014	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, cis-1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, trans-1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloromethane (Methylene Chloride)	0.05	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.005
Dichloropropane, 1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropane,1,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dichloropropane,2,2-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	-
Dichloropropylene, cis-1,3-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropylene, trans-1,3-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropene,1,1-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ethylbenzene	0.0024	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Hexachlorobutadiene	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0006
Hexane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.005
Isopropylbenzene	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Isopropyltoluene,4-	N/L	-	-	-	-	-	< 0.0004	< 0.0004	< 0.0004	< 0.0002
Methyl Butyl Ketone	N/L	-	-	-	-	-	< 0.010	< 0.010	< 0.010	< 0.005
Methyl Ethyl Ketone	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl Isobutyl Ketone	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl-t-Butyl Ether	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.002
Naphthalene	N/L	-	-	-	-	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Butylbenzene	N/L	-	-	-	-	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Propylbenzene	N/L	-	-	-	-	-	< 0.0004	< 0.0004	< 0.0004	< 0.0001
sec-Butylbenzene	N/L	-	-	-	-	-	< 0.0005	< 0.0005	< 0.0005	< 0.0001
Styrene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
tert-Butylbenzene	N/L	-	-	-	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Tetrachloroethane, 1,1,1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Tetrachloroethane, 1,1,2,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0005
Tetrachloroethylene (Perchloroethylene)	0.03	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Toluene	0.024	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trichlorobenzene,1,2,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichlorobenzene,1,2,4-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichloroethane, 1,1,1-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethane, 1,1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethene (Trichloroethylene)	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichlorofluoromethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Trichloropropane,1,2,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trimethylbenzene,1,2,4-	N/L	-	-	-	-	-	< 0.002	< 0.002	< 0.002	< 0.001
Trimethylbenzene,1,3,5-	N/L	-	-	-	-	-	< 0.0006	< 0.0006	< 0.0006	< 0.0001
Vinyl Chloride	0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Xylene; total	0.3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0015
m-Xylene & p-Xylene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.001
o-Xylene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005

Notes:
1. Ontario Drinking Water Standards (ODWS)

All results are expressed in mg/L unless otherwise stated.
Shaded areas indicate values that exceed O.D.W.S. maximum acceptabl
N/L indicates No Limit specified.
'-' means parameter not analyzed.

Table 4
Volatile Organic Compounds (ODWS)
Killaloe Waste Disposal Site

Parameter	ODWS[1]	MW07-3D								
		17-Aug-11	5-Sep-12	01-Nov-13	28-Oct-14	14-Oct-15	24-Oct-16	17-Oct-17	25-Oct-18	15-Oct-19
Acetone	N/L	-	-	-	-	-	< 0.002	< 0.002	< 0.002	< 0.03
Benzene	0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bromobenzene	N/L	-	-	-	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0004
Bromodichloromethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Bromoform	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Bromomethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0005
Carbon Tetrachloride	0.002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorobenzene	0.08	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Chloroethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.003
Chloroform	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.001
Chloromethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0003	< 0.0003	< 0.0003	< 0.002
Chlorotoluene,2-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorotoluene,4-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dibromo-3-Chloropropane, 1,2-	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0006
Dibromochloromethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Dibromoethane,1,2- (Ethylene Dibromide)	N/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002
Dibromomethane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0001
1,2-Dichlorobenzene	0.2	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,3-Dichlorobenzene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,4-Dichlorobenzene	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Dichlorodifluoromethane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.002
Dichloroethane, 1,1-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethane, 1,2-	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene (vinylidene chloride), 1,1-	0.014	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, cis-1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, trans-1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloromethane (Methylene Chloride)	0.05	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.005
Dichloropropane, 1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropane,1,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dichloropropane,2,2-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	-
Dichloropropylene, cis-1,3-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropylene, trans-1,3-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropene,1,1-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ethylbenzene	0.0024	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Hexachlorobutadiene	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.0006
Hexane	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.005
Isopropylbenzene	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Isopropyltoluene,4-	N/L	-	-	-	-	-	< 0.0004	< 0.0004	< 0.0004	< 0.0002
Methyl Butyl Ketone	N/L	-	-	-	-	-	< 0.010	< 0.010	< 0.010	< 0.005
Methyl Ethyl Ketone	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl Isobutyl Ketone	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl-t-Butyl Ether	N/L	-	-	-	-	-	< 0.001	< 0.001	< 0.001	< 0.002
Naphthalene	N/L	-	-	-	-	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Butylbenzene	N/L	-	-	-	-	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Propylbenzene	N/L	-	-	-	-	-	< 0.0004	< 0.0004	< 0.0004	< 0.0001
sec-Butylbenzene	N/L	-	-	-	-	-	< 0.0005	< 0.0005	< 0.0005	< 0.0001
Styrene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
tert-Butylbenzene	N/L	-	-	-	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Tetrachloroethane, 1,1,1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Tetrachloroethane, 1,1,2,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0005
Tetrachloroethylene (Perchloroethylene)	0.03	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Toluene	0.024	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trichlorobenzene,1,2,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichlorobenzene,1,2,4-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichloroethane, 1,1,1-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethane, 1,1,2-	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethene (Trichloroethylene)	0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichlorofluoromethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Trichloropropane,1,2,3-	N/L	-	-	-	-	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trimethylbenzene,1,2,4-	N/L	-	-	-	-	-	< 0.002	< 0.002	< 0.002	< 0.001
Trimethylbenzene,1,3,5-	N/L	-	-	-	-	-	< 0.0006	< 0.0006	< 0.0006	< 0.0001
Vinyl Chloride	0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Xylene; total	0.3	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0015
m-Xylene & p-Xylene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.001
o-Xylene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005

Notes:
1. Ontario Drinking Water Standards (ODWS)

All results are expressed in mg/L unless otherwise stated.
Shaded areas indicate values that exceed O.D.W.S. maximum acceptabl
N/L indicates No Limit specified.
'-' means parameter not analyzed.

Table 4
Volatile Organic Compounds (PWQO)
Killaloe Waste Disposal Site

Parameter	PWQO[1]	BH04-1S					BH04-1D					MW07-5R				
		14-Oct-15	24-Oct-16	17-Oct-17	25-Oct-18	15-Oct-19	14-Oct-15	24-Oct-16	17-Oct-17	25-Oct-18	15-Oct-19	14-Oct-15	24-Oct-16	17-Oct-17	25-Oct-18	15-Oct-19
Acetone	N/L	-	0.005	0.006	0.007	< 0.03	-	0.005	0.004	0.005	< 0.03	-	0.009	0.012	< 0.002	< 0.03
Benzene	0.1	0.0009	< 0.0005	0.0005	< 0.0005	< 0.0005	0.0008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0006	0.0007	0.0007
Bromobenzene	N/L	-	< 0.0001	< 0.0001	< 0.0001	< 0.0004	-	< 0.0001	< 0.0001	< 0.0001	< 0.0004	-	< 0.0001	< 0.0001	< 0.0001	< 0.0004
Bromodichloromethane	0.2	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Bromoform	0.06	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Bromomethane	0.0009	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0005
Carbon Tetrachloride	N/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorobenzene	0.015	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Chloroethane	N/L	< 0.005	< 0.0001	0.0009	< 0.0001	< 0.003	< 0.005	< 0.0001	0.0006	< 0.0001	< 0.003	< 0.005	< 0.0001	0.0012	< 0.0001	< 0.003
Chloroform	N/L	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.001	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.001	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.001
Chloromethane	0.7	< 0.005	< 0.0003	0.0005	< 0.0003	< 0.002	< 0.005	< 0.0003	0.0004	< 0.0003	< 0.002	< 0.005	< 0.0003	0.0005	< 0.0003	< 0.002
Chlorotoluene,2-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorotoluene,4-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dibromo-3-Chloropropane, 1,2- (Dibromochloropropane)	N/L	-	< 0.001	< 0.001	< 0.001	< 0.0006	-	< 0.001	< 0.001	< 0.001	< 0.0006	-	< 0.001	< 0.001	< 0.001	< 0.0006
Dibromochloromethane	0.04	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002
Dibromoethane,1,2- (Ethylene Dibromide)	0.005	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0002
Dibromomethane	N/L	-	< 0.001	< 0.001	< 0.001	< 0.0001	-	< 0.001	< 0.001	< 0.001	< 0.0001	-	< 0.001	< 0.001	< 0.001	< 0.0001
1,2-Dichlorobenzene	0.0025	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,3-Dichlorobenzene	0.0025	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
1,4-Dichlorobenzene	0.004	0.0005	0.0005	0.0002	0.0005	0.0006	0.0006	0.0005	0.0003	0.0004	0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Dichlorodifluoromethane	N/L	-	< 0.001	< 0.001	< 0.001	< 0.002	-	< 0.001	< 0.001	< 0.001	< 0.002	-	< 0.001	< 0.001	< 0.001	< 0.002
Dichloroethane, 1,1-	0.2	< 0.0005	0.0002	< 0.0001	0.0003	< 0.0005	< 0.0005	0.0002	0.0002	0.0002	< 0.0005	< 0.0005	0.0004	0.0005	0.0005	< 0.0005
Dichloroethane, 1,2-	0.1	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene (vinylidene chloride), 1,1-	0.04	< 0.0005	< 0.0001	0.0003	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloroethylene, cis-1,2-	0.2	0.0015	0.0009	< 0.0001	0.0012	0.001	0.0021	0.0011	0.0009	0.0010	0.0011	< 0.0005	0.0006	0.0008	0.0008	< 0.0005
Dichloroethylene, trans-1,2-	0.2	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloromethane (Methylene Chloride)	0.1	< 0.0005	< 0.0003	< 0.0014	< 0.0003	< 0.005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.005	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.005
Dichloropropane, 1,2-	0.0007	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropane,1,3-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dichloropropane,2,2-	N/L	-	< 0.0002	< 0.0002	< 0.0002	-	-	< 0.0002	< 0.0002	< 0.0002	-	-	< 0.0002	< 0.0002	< 0.0002	-
Dichloropropylene, cis-1,3-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropylene, trans-1,3-	0.007	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Dichloropropene,1,1-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ethylbenzene	0.008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Hexachlorobutadiene	0.000009	-	< 0.001	< 0.001	< 0.001	< 0.0006	-	< 0.001	< 0.001	< 0.001	< 0.0006	-	< 0.001	< 0.001	< 0.001	< 0.0006
Hexane	N/L	-	< 0.001	< 0.001	< 0.001	< 0.005	-	< 0.001	< 0.001	< 0.001	< 0.005	-	< 0.001	< 0.001	< 0.001	< 0.005
Isopropylbenzene (Cumene)	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Isopropyltoluene,4- (p-Cymene)	N/L	-	< 0.0004	< 0.0004	< 0.0004	< 0.0002	-	< 0.0004	< 0.0004	< 0.0004	< 0.0002	-	< 0.0004	< 0.0004	< 0.0004	< 0.0002
Methyl Butyl Ketone (2-Hexanone)	N/L	-	< 0.010	< 0.010	< 0.010	< 0.005	-	< 0.010	< 0.010	< 0.010	< 0.005	-	< 0.010	< 0.010	< 0.010	< 0.005
Methyl Ethyl Ketone	0.4	-	< 0.001	< 0.001	< 0.001	< 0.02	-	< 0.001	< 0.001	< 0.001	< 0.02	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl Isobutyl Ketone	N/L	-	< 0.001	< 0.001	< 0.001	< 0.02	-	< 0.001	< 0.001	< 0.001	< 0.02	-	< 0.001	< 0.001	< 0.001	< 0.02
Methyl-t-Butyl Ether	0.2	-	< 0.001	< 0.001	< 0.001	< 0.002	-	< 0.001	< 0.001	< 0.001	< 0.002	-	< 0.001	0.001	< 0.001	< 0.002
Naphthalene	0.007	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Butylbenzene	N/L	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004
n-Propylbenzene	N/L	-	< 0.0004	< 0.0004	< 0.0004	< 0.0001	-	< 0.0004	< 0.0004	< 0.0004	< 0.0001	-	< 0.0004	< 0.0004	< 0.0004	< 0.0001
sec-Butylbenzene	N/L	-	< 0.0005	< 0.0005	< 0.0005	< 0.0001	-	< 0.0005	< 0.0005	< 0.0005	< 0.0001	-	< 0.0005	< 0.0005	< 0.0005	< 0.0001
Styrene	0.004	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
tert-Butylbenzene	N/L	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Tetrachloroethane, 1,1,1,2-	0.02	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Tetrachloroethane, 1,1,2,2-	0.07	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0005
Tetrachloroethylene (Perchloroethylene)	0.05	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Toluene	0.0008	< 0.0005	< 0.0005	< 0.0005	0.0006	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	**0.0009**
Trichlorobenzene,1,2,3-	0.0009	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichlorobenzene,1,2,4-	0.0005	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trichloroethane, 1,1,1-	0.01	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethane, 1,1,2-	0.8	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichloroethene (Trichloroethylene)	0.02	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005
Trichlorofluoromethane	N/L	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.005	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.005
Trichloropropane,1,2,3-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005
Trimethylbenzene,1,2,4-	0.003	-	< 0.002	< 0.002	< 0.002	< 0.001	-	< 0.002	< 0.002	< 0.002	< 0.001	-	< 0.002	< 0.002	< 0.002	< 0.001
Trimethylbenzene,1,3,5-	0.003	-	< 0.0006	< 0.0006	< 0.0006	< 0.0001	-	< 0.0006	< 0.0006	< 0.0006	< 0.0001	-	< 0.0006	< 0.0006	< 0.0006	< 0.0001
Vinyl Chloride	0.6	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0002	< 0.0002
Xylene; total	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0015	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0015	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0015
m-Xylene & p-Xylene	N/L	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.001	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.001	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.001
o-Xylene	0.04	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005

Notes:
1. Provincial Water Quality Objectives (PWQO)

All results are expressed in mg/L unless otherwise stated.
Shaded areas indicate values that exceed O.D.W.S. maximum acceptable concentrations.
N/L indicates No Limit specified.
'-' means parameter not analyzed.

Table 5
Groundwater Quality (PWQO)
Killaloe Waste Disposal Site

Parameter	Background (median)	PWQO[1]	BH00-1 (Background)													5-year Trends
			23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	<25% decrease	10	14	11	29	13	11	14	10	18	12	25	21	18	17	
Aluminum	0.017	0.075	0.0657	0.0719	0.0420	**0.0884**	0.0157	0.018	< 0.01	0.030	< 0.01	0.02	0.02	0.01	< 0.01	0.01	
Ammonia, Total (N)	0.1	N/L	0.3	0.2	0.2	0.1	< 0.1	0.1	0.1	0.2	0.17	0.02	0.15	0.17	0.17	0.15	
Barium	0.072	N/L	0.0797	0.0655	0.0733	0.0709	0.0714	0.0644	0.0740	0.0700	0.076	0.103	0.077	0.086	0.070	0.073	
Boron	0.01	0.2	0.0096	0.0065	0.0089	0.0084	0.0187	0.0153	0.0110	0.0070	0.006	0.018	0.019	0.020	0.025	0.023	
Calcium	7.5	N/L	7.60	7.17	7.03	6.17	7.43	6.46	7.74	7.01	7.24	8.09	7.30	7.96	7.42	7.22	
Chloride	12	N/L	15	14	12	13	12	12	11	13	12.5	17.2	16.2	18.8	15.3	16.1	
Chromium	0.001	0.001	**0.0010**	**0.0018**	**0.00114**	0.00086	0.00068	0.00073	< 0.002	< 0.002	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.002**	
Chemical Oxygen Demand	9	N/L	15	10	9	< 8	10	15	13	19	12	20	17	11	< 5	13	
Cobalt	0.0016	0.0009	**0.00353**	**0.00151**	**0.00171**	0.000323	0.000074	0.000117	< 0.005	< 0.005	< 0.005	< 0.005	0.0001	0.0002	0.0001	0.0001	
Conductivity (µS/cm) [2]	101	N/L	118	121	137	198	98	113	101	102	117	121	104	111	101	118	
Copper	0.00062	0.005	0.0011	0.0009	0.00097	0.00098	0.00047	0.00052	0.00040	0.00050	0.0004	0.0002	0.0006	0.0005	0.0008	0.0005	
Dissolved Organic Carbon	1.6	N/L	1.9	1.4	2.3	2.7	3.1	2.2	1.5	1.8	4.0	4.4	3.7	3.2	3.0	2.9	
Iron	7.14	0.3	**17.3**	**17.0**	**16.4**	**16.0**	**15.3**	**15.5**	**16.1**	**17.3**	**18.0**	**18.5**	**15.8**	**17.5**	**13.2**	**15.2**	
Magnesium	4.53	N/L	4.38	4.15	3.97	3.85	3.93	3.79	4.12	4.50	4.36	4.68	4.39	4.47	4.56	4.35	
Manganese	0.05	N/L	0.0710	0.0497	0.0560	0.0537	0.0515	0.0493	0.0530	0.0560	0.057	0.061	0.053	0.060	0.055	0.051	
Nitrate (as N)	0.06	N/L	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.1	0.1	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	N/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [2]	6.56	6.5 - 8.5	**6.29**	6.89	**6.16**	**6.15**	7.03	**6.38**	**6.01**	**6.45**	6.66	6.85	6.68	6.55	**6.20**	6.94	
Phenols	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	0.03	**0.390**	**0.440**	**0.24**	**0.34**	**0.15**	**0.70**	**0.44**	**0.44**	**0.34**	**0.26**	**1.88**	**0.40**	**0.28**	**0.28**	
Potassium	1.57	N/L	1.29	1.39	1.37	1.27	1.31	1.23	1.20	1.10	1.1	1.4	1.4	1.3	1.4	1.4	
Silicon	6.73	N/L	7.29	8.31	7.75	8.21	7.61	6.68	7.01	7.08	7.47	7.31	7.13	7.01	6.90	6.67	
Sodium	4.5	N/L	4.26	4.66	4.43	4.81	5.20	5.10	5.60	6.20	6.0	6.6	6.9	7.3	6.6	7.7	
Strontium	0.044	N/L	0.0423	0.0434	0.0396	0.0409	0.0407	0.0383	0.0440	0.0450	0.043	0.045	0.044	0.045	0.045	0.043	
Sulphate	19	N/L	19	20	20	20	19	19	20	18	18	16	20	21	20	18	
Total Dissolved Solids	79	N/L	80	100	86	100	106	97	64	68	76	81	72	78	72	72	
Total Kjeldahl Nitrogen	0.5	N/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.3	0.4	0.3	0.4	0.4	0.3	0.5	0.3	
Zinc	0.005	0.02	< 0.002	< 0.002	< 0.002	0.002	0.003	0.012	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Results from field analysis.

Bold and Shaded values exceed PWQO.
N/L indicates no limit specified.
"-" means parameter not analyzed.
Results expressed in mg/L unless otherwise noted.

Greenview ENVIRONMENTAL MANAGEMENT

Table 5
Groundwater Quality (PWQO)
Killaloe Waste Disposal Site

Parameter	Background (median)	PWQO[1]	BH00-2 (Background)													5-year Trends
			23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	<25% decrease	28	25	31	26	29	22	32	25	26	27	37	25	30	22	
Aluminum	0.017	0.075	**0.0796**	0.0414	0.0740	**0.111**	0.0085	0.009	< 0.01	< 0.01	< 0.01	0.01	0.01	< 0.01	0.01	< 0.01	
Ammonia, Total (N)	0.1	N/L	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.06	< 0.01	0.02	0.02	< 0.01	0.03	0.04	0.01	
Barium	0.072	N/L	0.0751	0.0647	0.0759	0.0667	0.0649	0.0526	0.0680	0.0550	0.062	0.076	0.073	0.079	0.075	0.060	
Boron	0.01	0.2	0.0099	0.0085	0.0095	0.0090	0.0150	0.0118	0.0070	< 0.005	< 0.005	0.010	0.008	0.008	0.011	0.010	
Calcium	7.5	N/L	9.65	8.01	9.72	7.12	9.53	6.86	10.10	7.29	7.93	8.17	9.51	10.3	11.8	8.57	
Chloride	12	N/L	11.0	7.6	9.5	7.1	8	5	8	6	7.2	6.0	11.8	14.3	14.5	9.2	
Chromium	0.001	0.001	< 0.0005	0.0009	0.00064	0.00013	< 0.00003	< 0.00003	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	**0.002**	< 0.001	
Chemical Oxygen Demand	9	N/L	10	< 8	< 8	< 8	< 8	< 8	50	< 5	6	17	7	< 5	< 5	< 5	
Cobalt	0.0016	0.0009	**0.00350**	**0.00220**	**0.00395**	**0.000950**	0.000722	0.000672	< 0.005	< 0.005	< 0.005	< 0.005	0.0005	**0.0009**	0.0007	0.0006	
Conductivity (µS/cm) [2]	101	N/L	105	79	103	83	74	79	95	72	81	90	84	88	94	87	
Copper	0.00062	0.005	0.0009	0.0008	0.00139	0.00067	0.00069	0.00063	0.00050	0.00040	0.0010	0.0002	0.0007	0.0014	0.0005	0.0002	
Dissolved Organic Carbon	1.6	N/L	< 1	< 1	< 1	1.8	2.1	1.2	1.3	0.8	1.6	1.2	1.4	0.8	14.9	0.9	
Iron	7.14	0.3	**0.784**	**0.570**	**0.960**	**1.08**	**0.439**	**0.352**	**1.080**	0.280	**0.313**	0.296	**0.310**	**0.342**	0.249	0.291	
Magnesium	4.53	N/L	6.23	5.10	5.69	4.90	5.36	4.36	5.63	5.18	5.16	5.37	6.33	6.39	7.88	5.81	
Manganese	0.05	N/L	0.0549	0.0191	0.0386	0.0172	0.0165	0.0124	0.0670	0.0110	0.022	0.012	0.012	0.014	0.031	0.008	
Nitrate (as N)	0.06	N/L	< 0.06	< 0.06	< 0.06	0.06	< 0.06	0.12	< 0.1	0.20	< 0.05	0.09	0.08	0.12	< 0.05	0.12	
Nitrite (as N)	0.05	N/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [2]	6.56	6.5 - 8.5	**6.46**	**6.40**	**6.12**	**6.39**	6.50	**8.52**	7.59	6.50	6.85	**6.41**	6.74	7.48	**6.38**	6.65	
Phenols	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus, Total	0.37	0.03	**0.22**	**0.17**	**0.49**	**0.50**	**0.14**	**0.25**	**3.61**	**0.33**	**0.70**	**2.32**	**0.96**	**0.40**	**0.40**	**0.31**	
Potassium	1.57	N/L	2.05	2.12	2.04	1.94	2.18	1.85	1.70	1.80	1.7	1.9	2.2	2.1	2.4	2.1	
Silicon	6.73	N/L	6.50	5.99	6.77	7.13	6.22	4.85	6.51	5.01	5.37	5.55	5.60	5.58	6.35	5.35	
Sodium	4.5	N/L	3.60	4.11	3.69	3.98	4.25	3.92	4.30	4.50	4.3	4.1	4.9	5.0	5.1	4.5	
Strontium	0.044	N/L	0.0521	0.0432	0.0491	0.0441	0.0452	0.0371	0.0520	0.0430	0.043	0.042	0.052	0.054	0.066	0.048	
Sulphate	19	N/L	17	19	18	20	19	19	18	18	16	14	18	19	19	17	
Total Dissolved Solids	79	N/L	51	69	89	74	103	94	75	61	63	64	75	213	79	61	
Total Kjeldahl Nitrogen	0.5	N/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.4	< 0.1	< 0.1	0.1	< 0.1	0.1	< 0.1	< 0.1	
Zinc	0.005	0.02	< 0.002	< 0.002	< 0.002	0.002	0.003	0.006	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Results from field analysis.

Bold and Shaded values exceed PWQO.
N/L indicates no limit specified.
"-" means parameter not analyzed.
Results expressed in mg/L unless otherwise noted.

Table 5
Groundwater Quality (PWQO)
Killaloe Waste Disposal Site

Parameter	Background (median)	PWQO[1]	BH00-3													5-year Trends (sparkline)
			23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	
Alkalinity (as $CaCO_3$)	24	<25% decrease	218	270	282	252	381	260	410	364	547	551	582	566	577	624	
Aluminum	0.017	0.075	**0.096**	0.053	0.050	**0.111**	0.0096	0.008	0.0300	0.030	0.04	0.05	**0.08**	0.07	**0.08**	**0.14**	
Ammonia, Total (N)	0.1	N/L	0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1	0.1	0.1	0.08	0.06	0.08	0.08	0.07	0.08	
Barium	0.072	N/L	0.18	0.17	0.32	0.18	0.243	0.191	0.270	0.266	0.372	0.558	0.493	0.483	0.453	0.548	
Boron	0.01	0.2	0.110	0.091	**0.267**	0.072	0.0944	0.0616	0.0870	0.0790	0.128	0.198	**0.206**	**0.210**	**0.243**	**0.268**	
Calcium	7.5	N/L	57.4	56.7	95.2	48.7	83.3	58.9	87.7	85	114	134	126	129	125	150	
Chloride	12	N/L	30	28	32	27	38	32	44.4	49.3	45.8	46.6	66.4	69.1	61.0	64.1	
Chromium	0.001	0.001	< 0.0005	**0.007**	**0.002**	0.00031	< 0.00003	0.00005	< 0.002	< 0.002	< 0.001	**0.003**	< 0.001	< 0.001	< 0.001	**0.001**	
Chemical Oxygen Demand	9	N/L	21	16	21	10	21	16	221	110	87	65	134	155	79	132	
Cobalt	0.0016	0.0009	**0.0081**	**0.0069**	**0.0138**	**0.0048**	**0.00668**	**0.00460**	**0.00600**	**0.00800**	**0.014**	**0.014**	**0.0126**	**0.0155**	**0.0126**	**0.0152**	
Conductivity (µS/cm) [2]	101	N/L	358	376	520	373	449	423	494	584	695	807	736	818	715	1042	
Copper	0.00062	0.005	0.0015	0.0019	0.00311	0.00107	0.00099	0.00066	0.0007	0.0005	0.0009	0.0008	0.0012	0.0008	0.0018	0.0036	
Dissolved Organic Carbon	1.6	N/L	5.5	3.6	3.4	3.6	5.4	3.9	7.6	6.8	9.9	10.5	14.5	12.7	12.3	13.1	
Iron	7.14	0.3	**1.4**	**2.0**	**2.7**	**1.8**	**2.97**	**2.32**	**1.43**	**2.95**	**3.90**	**4.53**	**3.49**	**6.06**	**2.37**	**3.62**	
Magnesium	4.53	N/L	28.8	28.6	41.8	29.4	40.6	34.5	48.9	52.5	61.4	75.7	70.5	71.6	74.1	87.6	
Manganese	0.05	N/L	2.12	2.24	3.09	3.03	4.75	4.06	4.28	5.78	5.56	7.08	8.06	7.48	7.26	5.69	
Nitrate (as N)	0.06	N/L	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	N/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [2]	6.56	6.5 - 8.5	**6.38**	6.52	6.74	6.78	6.95	6.81	**6.27**	7.25	6.66	**6.37**	6.69	**6.39**	6.71	6.81	
Phenols	-	0.001	-	-	-	-	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.005**	< 0.002	< 0.002	
Phosphorus, Total	0.37	0.03	**8.02**	**6.9**	**4.14**	**3.11**	**16.3**	**5.78**	**25.8**	**6.71**	**6.15**	**5.72**	**15.3**	**17.9**	**3.45**	**8.77**	
Potassium	1.57	N/L	3.21	3.31	4.59	2.97	3.58	3.15	3.5	3.6	3.9	4.8	4.8	4.8	4.9	6.1	
Silicon	6.73	N/L	9.56	10.6	10.6	11.4	10.8	9.46	9.63	10.5	11.0	11.7	10.8	11.2	10.2	10.9	
Sodium	4.5	N/L	10.4	11.6	25.6	11	14.2	9.98	17.8	13.4	22.7	23.1	24.5	24.8	24.9	35.9	
Strontium	0.044	N/L	0.32	0.30	0.56	0.31	0.446	0.335	0.476	0.484	0.665	0.737	0.714	0.748	0.751	0.950	
Sulphate	19	N/L	13	13	16	14	20	14	22	24	23	25	44	40	35	36	
Total Dissolved Solids	79	N/L	257	389	374	349	511	374	510	475	655	680	681	704	693	740	
Total Kjeldahl Nitrogen	0.5	N/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	0.4	0.7	0.6	0.8	0.8	0.4	0.8	
Zinc	0.005	0.02	< 0.002	< 0.002	< 0.002	0.003	0.003	0.004	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Results from field analysis.

Bold and Shaded values exceed PWQO.
N/L indicates no limit specified.
"-" means parameter not analyzed.
Results expressed in mg/L unless otherwise noted.

Greenview
ENVIRONMENTAL MANAGEMENT

Table 5
Groundwater Quality (PWQO)
Killaloe Waste Disposal Site

Parameter	Background (median)	PWQO[1]	BH00-5													5-year Trends
			23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	<25% decrease	613	201	615	625	609	610	584	614	553	534	552	512	516	523	
Aluminum	0.017	0.075	0.0456	0.0631	0.0367	0.0666	0.0114	0.013	0.030	0.040	0.04	0.06	**0.08**	0.07	0.07	**0.08**	
Ammonia, Total (N)	0.1	N/L	30.5	36.3	28.5	24.6	27.9	30.2	29.7	30.7	29.2	29.2	25.7	23.8	28.8	34.4	
Barium	0.072	N/L	3.93	3.91	3.17	3.29	3.22	3.12	3.35	3.73	3.45	5.14	4.05	3.97	3.90	4.53	
Boron	0.01	0.2	**0.502**	**0.554**	**0.411**	**0.440**	**0.389**	**0.417**	**0.436**	**0.547**	**0.450**	**0.602**	**0.703**	**0.662**	**0.813**	**0.862**	
Calcium	7.5	N/L	127	114	106	89.0	121	114	102	112	101	119	113	108	111	116	
Chloride	12	N/L	120	100	89	92	78	93	83	132	83.9	107	146	113	128	133	
Chromium	0.001	0.001	**0.0043**	**0.0315**	**0.00446**	**0.00296**	**0.00187**	**0.00217**	**0.00200**	**0.00300**	< 0.001	**0.007**	**0.002**	**0.002**	**0.003**	**0.003**	
Chemical Oxygen Demand	9	N/L	99	95	86	83	88	83	96	106	69	100	106	105	109	111	
Cobalt	0.0016	0.0009	**0.0239**	**0.0213**	**0.0169**	**0.015917**	**0.0168**	**0.0133**	**0.0280**	**0.0320**	**0.020**	**0.021**	**0.0149**	**0.0175**	**0.0149**	**0.0160**	
Conductivity (µS/cm) [2]	101	N/L	1324	1319	1363	1242	1034	1321	1134	1339	1173	1262	1227	1120	1131	1960	
Copper	0.00062	0.005	0.0036	**0.0120**	0.00383	0.00299	0.00106	0.00096	0.00150	0.00150	0.0012	0.0009	0.0009	0.0007	0.0022	0.0011	
Dissolved Organic Carbon	1.6	N/L	18.4	21.1	12.7	17.5	14.4	18.8	14.1	13.5	12.9	10.8	12.9	13.2	13.4	16.7	
Iron	7.14	0.3	**119**	**111**	**96.9**	**113**	**110**	**120**	**160**	**141**	**140**	**130**	**135**	**145**	**141**	**133**	
Magnesium	4.53	N/L	42.1	35.9	31.6	31.4	32.0	34.5	29.1	39.2	30.5	34.6	36.7	32.0	35.2	37.0	
Manganese	0.05	N/L	8.01	7.29	4.63	5.11	5.69	4.38	3.64	4.35	3.16	3.72	3.81	3.37	3.54	3.06	
Nitrate (as N)	0.06	N/L	< 0.06	< 0.06	< 0.06	< 0.06	0.08	< 0.06	0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	N/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [2]	6.56	6.5 - 8.5	6.7	6.66	6.82	**6.47**	7.17	7.99	7.83	6.62	6.83	7.16	6.80	6.90	7.03	6.91	
Phenols	-	0.001	< 0.002	< 0.002	**0.002**	< 0.002	**0.010**	**0.010**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.008**	< 0.002	< 0.002	
Phosphorus, Total	0.37	0.03	**0.28**	**0.24**	**0.27**	**0.13**	**0.26**	**0.49**	**0.70**	**0.76**	**0.92**	**0.42**	**0.96**	**0.34**	**0.19**	**1.87**	
Potassium	1.57	N/L	74.9	82.2	70.9	62.9	71.7	67.6	69.9	78.4	80.5	97.1	98.2	93.3	101	116	
Silicon	6.73	N/L	14.8	18.8	13.8	15.1	16.1	13.1	13.9	14.7	13.4	14.5	14.6	14.6	13.7	14.1	
Sodium	4.5	N/L	74.8	70.3	52.1	54.7	50.4	59.4	58.4	70.1	55.5	64.0	80.9	69.4	71.2	83.9	
Strontium	0.044	N/L	0.874	0.778	0.660	0.770	0.793	0.808	0.712	0.853	0.713	0.822	0.830	0.789	0.838	0.916	
Sulphate	19	N/L	0.9	< 0.2	0.2	< 0.2	< 1	< 1	2.0	17.0	2	3	4	< 1	1	3	
Total Dissolved Solids	79	N/L	849	771	706	683	717	780	759	889	766	842	852	772	801	824	
Total Kjeldahl Nitrogen	0.5	N/L	41.4	73.1	29.2	25.7	29.2	32.7	38.2	45.2	29.3	39.1	28.1	24.3	28.8	34.7	
Zinc	0.005	0.02	< 0.002	0.003	0.002	0.004	0.004	0.010	0.012	0.010	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Results from field analysis.

Bold and Shaded values exceed PWQO.
N/L indicates no limit specified.
"-" means parameter not analyzed.
Results expressed in mg/L unless otherwise noted.

Greenview ENVIRONMENTAL MANAGEMENT

Table 5
Groundwater Quality (PWQO)
Killaloe Waste Disposal Site

Parameter	Background (median)	PWQO[1]	BH04-1S													5-year Trends
			23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	<25% decrease	267	290	287	311	303	295	300	306	316	303	328	327	287	276	
Aluminum	0.017	0.075	**0.100**	0.073	0.0536	**0.144**	0.0085	0.011	0.0200	0.020	0.02	0.04	**0.09**	0.03	0.04	0.04	
Ammonia, Total (N)	0.1	N/L	0.2	0.2	< 0.1	0.1	0.2	0.1	0.2	0.2	0.19	0.18	0.21	0.20	0.24	0.14	
Barium	0.072	N/L	0.416	0.380	0.398	0.406	0.354	0.322	0.362	0.362	0.380	0.454	0.371	0.392	0.355	0.368	
Boron	0.01	0.2	**0.273**	**0.314**	**0.339**	**0.380**	**0.381**	**0.364**	**0.388**	**0.424**	**0.446**	**0.482**	**0.451**	**0.439**	**0.456**	**0.439**	
Calcium	7.5	N/L	45.5	44.2	46.0	41.2	49.9	46.2	47.9	51.2	53.6	55.5	55.7	56.8	57.7	57.0	
Chloride	12	N/L	36	35	35	35	34	33	30	30	25.2	22.8	31.2	32.5	30.9	59.4	
Chromium	0.001	0.001	**0.0014**	**0.0127**	**0.00183**	**0.00106**	0.00046	0.00049	< 0.002	< 0.002	< 0.001	**0.004**	< 0.001	< 0.001	**0.001**	**0.001**	
Chemical Oxygen Demand	9	N/L	37	36	36	31	39	36	67	68	47	42	41	41	54	47	
Cobalt	0.0016	0.0009	**0.0064**	**0.0048**	**0.00662**	**0.002731**	**0.00247**	**0.00222**	< 0.005	< 0.005	< 0.005	< 0.005	**0.0014**	**0.0020**	**0.0018**	**0.0019**	
Conductivity (µS/cm) [2]	101	N/L	490	565	631	686	420	587	495	554	599	535	446	512	460	833	
Copper	0.00062	0.005	0.0019	**0.0066**	0.00165	0.00130	0.00043	0.00050	0.00100	0.00080	0.0007	0.0013	0.0012	0.0003	0.0005	0.0018	
Dissolved Organic Carbon	1.6	N/L	8.9	6.2	5.8	9.1	5.4	7.6	8.3	8.8	10.4	10.0	12.0	11.2	11.2	12.0	
Iron	7.14	0.3	**50.8**	**46.8**	**49.8**	**50.4**	**47.9**	**45.9**	**45.7**	**51.4**	**59.1**	**48.5**	**48.4**	**48.5**	**47.4**	**42.8**	
Magnesium	4.53	N/L	30.0	29.3	29.2	30.7	30.6	28.9	32.1	36.7	37.3	36.7	36.8	36.0	39.7	38.4	
Manganese	0.05	N/L	0.751	0.687	0.680	0.678	0.673	0.607	0.664	0.700	0.746	0.723	0.694	0.730	0.730	0.706	
Nitrate (as N)	0.06	N/L	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	N/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [2]	6.56	6.5 - 8.5	6.72	6.81	6.91	**6.40**	7.12	6.54	6.81	6.78	6.80	6.94	6.88	6.71	6.83	7.66	
Phenols	-	0.001	< 0.002	< 0.002	< 0.002	< 0.002	**0.002**	**0.002**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.002**	< 0.002	< 0.002	
Phosphorus, Total	0.37	0.03	**3.75**	**6.01**	**0.65**	**0.50**	**0.95**	**0.77**	**3.60**	**0.99**	**5.20**	**3.56**	**2.88**	**4.52**	**1.79**	**1.27**	
Potassium	1.57	N/L	4.40	5.02	4.63	4.32	4.09	3.98	3.70	4.00	3.9	4.4	4.3	4.4	4.4	4.8	
Silicon	6.73	N/L	9.3	11.6	9.55	11.1	9.85	9.34	8.74	9.64	9.51	9.52	8.58	9.33	8.63	9.33	
Sodium	4.5	N/L	52.1	50.9	45.5	46.7	42.8	42.9	42.8	42.2	39.3	38.0	39.6	40.7	37.4	38.3	
Strontium	0.044	N/L	0.234	0.231	0.231	0.267	0.258	0.249	0.247	0.280	0.282	0.262	0.266	0.277	0.284	0.289	
Sulphate	19	N/L	5.5	6.3	6.7	5.8	4	4	5	6	7	5	8	8	7	199	
Total Dissolved Solids	79	N/L	397	403	374	386	383	397	367	377	386	371	353	353	346	334	
Total Kjeldahl Nitrogen	0.5	N/L	< 0.5	< 0.5	< 0.5	0.5	0.5	< 0.5	0.7	0.7	0.6	0.7	0.6	0.6	0.6	0.4	
Zinc	0.005	0.02	< 0.002	< 0.002	< 0.002	0.003	0.004	0.008	0.015	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Results from field analysis.

Bold and Shaded values exceed PWQO.
N/L indicates no limit specified.
"-" means parameter not analyzed.
Results expressed in mg/L unless otherwise noted.

Greenview ENVIRONMENTAL MANAGEMENT

Table 5
Groundwater Quality (PWQO)
Killaloe Waste Disposal Site

Parameter	Background (median)	PWQO[1]	BH04-1D													5-year Trends
			23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	<25% decrease	308	354	319	323	337	305	295	287	281	236	241	260	250	230	
Aluminum	0.017	0.075	**0.0777**	0.0323	0.0411	**0.112**	0.0098	0.012	0.02	0.03	0.02	0.04	0.03	0.04	0.04	0.04	
Ammonia, Total (N)	0.1	N/L	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.82	0.74	0.82	0.85	0.96	0.92	
Barium	0.072	N/L	0.521	0.499	0.476	0.473	0.480	0.414	0.442	0.416	0.438	0.489	0.402	0.485	0.451	0.489	
Boron	0.01	0.2	**0.414**	**0.409**	**0.413**	**0.390**	**0.444**	**0.345**	**0.349**	**0.299**	**0.303**	**0.284**	**0.274**	**0.289**	**0.316**	**0.257**	
Calcium	7.5	N/L	63.8	62.1	58.1	51.1	66.7	55.6	56.2	54.2	55.4	52.1	50.8	61.0	60.3	62.1	
Chloride	12	N/L	36	37	33	34	33	32	29	29	25.2	21.9	34.2	46.4	53.3	56.1	
Chromium	0.001	0.001	**0.0016**	**0.0112**	**0.00203**	**0.00127**	0.00081	0.00085	< 0.002	< 0.002	**0.001**	**0.002**	**0.001**	**0.001**	**0.002**	**0.002**	
Chemical Oxygen Demand	9	N/L	29	32	38	35	31	38	41	61	33	36	31	40	36	41	
Cobalt	0.0016	0.0009	**0.00420**	**0.00348**	**0.00242**	**0.002021**	**0.00144**	**0.000983**	< 0.005	< 0.005	< 0.005	< 0.005	0.0006	**0.0011**	**0.0010**	**0.0010**	
Conductivity (µS/cm) [2]	101	N/L	571	600	647	653	510	570	510	492	545	425	393	474	470	838	
Copper	0.00062	0.005	0.0018	0.0048	0.00160	0.00125	0.00089	0.00035	0.00060	0.00040	0.0006	0.0004	0.0006	0.0011	0.0004	0.0005	
Dissolved Organic Carbon	1.6	N/L	8.2	5.8	7.0	11.6	7.5	8.1	8.7	8.7	11.1	10.7	12.6	11.0	11.1	12.0	
Iron	7.14	0.3	**34.3**	**38.4**	**34.0**	**34.4**	**37.1**	**33.9**	**37.6**	**37.2**	**38.6**	**31.9**	**30.4**	**39.0**	**36.3**	**36.7**	
Magnesium	4.53	N/L	36.7	34.5	30.9	32.0	35.1	30.4	30.8	31.5	30.9	27.3	26.5	30.3	32.1	32.1	
Manganese	0.05	N/L	1.36	1.42	1.24	1.26	1.44	1.24	1.27	1.31	1.35	1.26	1.21	1.55	1.55	1.55	
Nitrate (as N)	0.06	N/L	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	N/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [2]	6.56	6.5 - 8.5	6.66	6.75	6.62	**6.37**	7.20	6.52	6.53	6.66	6.79	7.28	6.81	6.63	6.78	7.01	
Phenols	-	0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.003**	< 0.002	< 0.002	
Phosphorus, Total	0.37	0.03	**0.43**	**0.55**	**0.37**	**0.50**	**0.15**	**0.43**	**0.64**	**0.44**	**0.97**	**0.48**	**1.35**	**0.33**	**0.27**	**0.35**	
Potassium	1.57	N/L	11.60	12.80	12.4	10.2	12.1	10.4	10.4	10.6	10.9	11.2	11.9	12.2	13.2	13.6	
Silicon	6.73	N/L	8.50	10.40	8.87	10.0	9.47	8.40	8.32	8.78	9.16	9.02	8.54	8.68	8.19	8.65	
Sodium	4.5	N/L	36.7	35.8	32.0	32.8	31.6	29.0	28.6	28.0	28.5	23.3	25.3	27.1	27.7	27.5	
Strontium	0.044	N/L	0.352	0.331	0.300	0.338	0.372	0.318	0.305	0.309	0.303	0.262	0.267	0.313	0.325	0.332	
Sulphate	19	N/L	5.5	8.4	7.6	9.6	10	8	9	9	8	7	8	8	7	7	
Total Dissolved Solids	79	N/L	431	466	400	380	411	391	368	360	356	311	282	339	345	341	
Total Kjeldahl Nitrogen	0.5	N/L	0.8	1.1	0.9	1.0	1.0	1.0	1.2	1.2	1.3	1.2	1.3	1.2	1.4	1.4	
Zinc	0.005	0.02	< 0.002	< 0.002	< 0.002	0.005	0.003	0.013	0.015	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Results from field analysis.

Bold and Shaded values exceed PWQO.
N/L indicates no limit specified.
"-" means parameter not analyzed.
Results expressed in mg/L unless otherwise noted.

Greenview ENVIRONMENTAL MANAGEMENT

Table 5
Groundwater Quality (PWQO)
Killaloe Waste Disposal Site

Parameter	Background (median)	PWQO[1]	MW07-4R											5-year Trends
			09-Sep-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	<25% decrease	10	9	16	16	14	11	28	14	11	10	10	11	
Aluminum	0.017	0.075	0.0183	0.0303	0.0179	0.014	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.01	< 0.01	0.01	
Ammonia, Total (N)	0.1	N/L	0.3	< 0.1	0.2	< 0.1	0.020	0.030	0.07	0.02	0.04	0.05	0.05	0.04	
Barium	0.072	N/L	0.0108	0.0144	0.0119	0.0138	0.0110	0.0100	0.011	0.030	0.016	0.026	0.020	0.022	
Boron	0.01	0.2	0.0045	0.0108	0.0692	0.0294	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	0.006	
Calcium	7.5	N/L	4.69	4.71	6.34	5.96	5.16	5.53	12.0	6.23	7.98	10.6	10.7	9.3	
Chloride	12	N/L	5.4	4.8	7	7	6	7	6.0	8.9	15.7	19.6	20.5	13.0	
Chromium	0.001	0.001	0.00034	0.00030	< 0.00003	0.00012	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.001**	
Chemical Oxygen Demand	9	N/L	33	< 8	17	9	125	40	684	201	376	44	88	33	
Cobalt	0.0016	0.0009	0.000609	0.000329	0.000608	0.000194	< 0.005	< 0.005	< 0.005	< 0.005	0.0002	0.0005	0.0002	0.0006	
Conductivity (µS/cm) [2]	101	N/L	146	33	40	161	41	48	50	67	55	84	73	131	
Copper	0.00062	0.005	0.00038	0.00053	0.00074	0.00067	0.00040	0.00050	0.0006	0.0012	0.0007	0.0005	0.0010	0.0012	
Dissolved Organic Carbon	1.6	N/L	< 1	2.6	< 1	1.9	1	0.5	1.7	1.3	1.3	1.3	1.6	1.6	
Iron	7.14	0.3	0.244	**0.505**	**0.578**	**0.605**	0.032	0.165	**0.698**	0.267	**0.318**	0.263	**0.823**	0.133	
Magnesium	4.53	N/L	1.88	1.99	2.15	2.32	1.88	2.20	2.10	2.36	3.31	4.19	4.62	3.94	
Manganese	0.05	N/L	0.00775	0.0160	0.0958	0.0172	0.0140	0.0070	0.093	0.051	0.067	0.029	0.062	0.007	
Nitrate (as N)	0.06	N/L	0.12	0.12	0.13	0.06	0.2	0.2	0.18	0.13	0.15	< 0.05	< 0.05	0.07	
Nitrite (as N)	0.05	N/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [2]	6.56	6.5 - 8.5	6.90	**6.44**	**6.46**	**6.41**	7.25	7.64	7.58	6.78	7.10	6.77	7.30	7.36	
Phenols	-	0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.003**	< 0.002	< 0.002	
Phosphorus, Total	0.37	0.03	**0.05**	**0.10**	**0.20**	**0.03**	**0.35**	**0.10**	**1.65**	**0.42**	**0.59**	**0.39**	**0.16**	**0.09**	
Potassium	1.57	N/L	0.873	0.97	0.867	0.935	0.600	0.700	0.4	0.8	1.0	1.1	1.1	1.1	
Silicon	6.73	N/L	6.12	7.48	5.72	6.05	5.08	5.93	5.56	6.20	5.22	6.20	5.53	6.23	
Sodium	4.5	N/L	2.54	2.96	3.31	2.64	2.40	2.90	4.3	2.5	3.5	3.6	3.7	3.5	
Strontium	0.044	N/L	0.0315	0.0333	0.0380	0.0348	0.0320	0.0350	0.050	0.042	0.062	0.072	0.073	0.064	
Sulphate	19	N/L	8.2	6.6	9	7	6	7	5	4	7	16	13	10	
Total Dissolved Solids	79	N/L	< 30	31	74	49	35	38	50	45	46	65	64	50	
Total Kjeldahl Nitrogen	0.5	N/L	-	< 0.5	< 0.5	< 0.5	1.6	0.7	5.9	2.2	2.6	1.6	0.7	0.4	
Zinc	0.005	0.02	0.001	0.003	0.005	0.004	0.005	0.006	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Results from field analysis.

Bold and Shaded values exceed PWQO.
N/L indicates no limit specified.
"-" means parameter not analyzed.
Results expressed in mg/L unless otherwise noted.

Greenview ENVIRONMENTAL MANAGEMENT

Table 5
Groundwater Quality (PWQO)
Killaloe Waste Disposal Site

Parameter	Background (median)	PWQO[1]	MW07-5R											5-year Trends
			09-Sep-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	(sparkline)
Alkalinity (as $CaCO_3$)	24	<25% decrease	221	234	187	247	258	358	225	342	325	339	367	
Aluminum	0.017	0.075	0.0446	0.0225	0.0187	0.011	0.0200	0.020	0.04	0.04	0.05	0.05	0.05	
Ammonia, Total (N)	0.1	N/L	3.4	2.7	1.3	1.8	1.4	1.8	1.63	1.38	1.61	1.46	1.69	
Barium	0.072	N/L	0.339	0.302	0.352	0.401	0.457	0.441	0.651	0.415	0.604	0.552	0.641	
Boron	0.01	0.2	0.0104	0.0111	0.0409	0.0292	0.1020	0.1510	0.187	0.185	**0.258**	**0.288**	**0.300**	
Calcium	7.5	N/L	41.1	36.8	50.5	51.8	55.7	52.5	61.0	56.8	68.4	69.5	74.9	
Chloride	12	N/L	49	46	47	67	74	80	67.4	81.0	105	105	103	
Chromium	0.001	0.001	**0.00165**	0.00083	0.00040	0.00041	< 0.002	< 0.002	**0.003**	< 0.001	< 0.001	**0.001**	**0.001**	
Chemical Oxygen Demand	9	N/L	78	73	55	68	256	466	253	682	165	350	598	
Cobalt	0.0016	0.0009	**0.00141**	**0.001208**	0.000832	0.000766	**0.011000**	**0.008000**	< 0.005	0.0008	0.0007	0.0008	0.0007	
Conductivity (µS/cm) [2]	101	N/L	628	793	591	754	699	608	784	627	831	750	828	
Copper	0.00062	0.005	0.00095	0.00031	0.00056	0.00056	0.00060	0.00060	0.0004	0.0003	0.0005	0.0018	0.0013	
Dissolved Organic Carbon	1.6	N/L	12.2	12.6	8.1	8.5	8.8	8.1	9.6	10.2	10.6	11.3	12.9	
Iron	7.14	0.3	**75.1**	**82.8**	**109**	**128**	**144**	**150**	**150**	**143**	**181**	**182**	**162**	
Magnesium	4.53	N/L	21.2	19.5	20.8	23.4	27.0	29.3	30.2	30.4	33.6	38.3	41.3	
Manganese	0.05	N/L	0.564	0.556	0.631	0.652	0.689	0.827	0.720	0.859	0.783	0.858	0.790	
Nitrate (as N)	0.06	N/L	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.05	N/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [2]	6.56	6.5 - 8.5	**6.44**	6.72	6.77	**6.36**	**6.45**	**6.45**	6.63	6.55	6.67	6.84	6.93	
Phenols	-	0.001	**0.038**	**0.007**	**0.004**	**0.002**	< 0.001	< 0.001	< 0.001	< 0.001	**0.005**	< 0.002	< 0.002	
Phosphorus, Total	0.37	0.03	**0.11**	**0.11**	**0.11**	**0.09**	**0.19**	**0.41**	**0.17**	**0.63**	**0.28**	**0.25**	**0.39**	
Potassium	1.57	N/L	10.4	10.3	3.13	2.77	2.40	2.30	2.90	3.2	3.2	3.7	3.7	
Silicon	6.73	N/L	12.4	12.8	10.9	11.1	10.0	9.3	10.7	7.72	9.74	8.27	8.77	
Sodium	4.5	N/L	31.8	29.2	16.9	19.4	29.1	29.8	34.8	41.5	54.2	64.4	75.0	
Strontium	0.044	N/L	0.269	0.267	0.289	0.301	0.299	0.302	0.319	0.302	0.356	0.368	0.398	
Sulphate	19	N/L	0.5	3.8	1	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Total Dissolved Solids	79	N/L	340	294	283	400	389	498	384	436	494	510	541	
Total Kjeldahl Nitrogen	0.5	N/L	-	2.6	1.8	2.2	6.3	14.6	4.5	16.2	8.5	6.1	11.5	
Zinc	0.005	0.02	0.005	0.003	0.006	0.006	0.015	0.010	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Results from field analysis.

Bold and Shaded values exceed PWQO.
N/L indicates no limit specified.
"-" means parameter not analyzed.
Results expressed in mg/L unless otherwise noted.

Greenview
ENVIRONMENTAL MANAGEMENT

Table 6
Surface Water Quality (PWQO)
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO [1]	SW1						5-year Trends (sparkline)
			01-Nov-13	18-May-16	31-May-17	17-Oct-17	24-Apr-18	07-May-19	
Alkalinity ($CaCO_3$)	71	< 25% decrease	10	12	21	15	8	11	
Aluminum	0.12	0.075	**0.113**	**0.170**	**0.29**	**0.08**	**0.09**	**0.12**	
Ammonia, Total (as N)	0.1	N/L	< 0.1	0.04	0.12	0.03	0.04	0.04	
Ammonia, Un-ionized (as N) [2]	0.0003	0.02	0.000037	0.000045	0.000032	0.000001	0.000003	0.000007	
Barium	0.054	N/L	0.0194	0.0170	0.047	0.027	0.010	0.037	
Boron	0.016	0.2	0.0053	< 0.005	0.007	0.011	< 0.005	0.038	
Calcium	20.6	N/L	5.97	5.48	12.0	9.54	3.05	13.2	
Chemical Oxygen Demand	52	N/L	75	76	157	74	49	53	
Chloride	6.5	N/L	3.0	2.3	4.4	2.6	4.5	5.9	
Chromium	0.001	0.001	0.0007	< 0.002	**0.001**	< 0.001	< 0.001	**0.001**	
Cobalt	0.0003	0.0009	0.00021	0.00020	**0.0014**	0.0002	0.0002	0.0001	
Conductivity (µS/cm) [3]	148	N/L	43	20	49	45	25	42	
Copper	0.0012	0.005	0.0008	0.0044	0.0008	**0.0070**	0.0010	0.0010	
Dissolved Organic Carbon	19.5	N/L	27.1	40.0	43.0	21.3	12.6	20.2	
Dissolved Oxygen [3]	7.22	5	5.22	7.98	**4.01**	**4.52**	7.17	5.58	
Iron	3.06	0.3	**0.53**	**0.55**	**1.81**	**0.908**	**0.450**	**0.391**	
Magnesium	8.48	N/L	2.68	2.74	4.54	3.27	1.73	4.42	
Manganese	0.202	N/L	0.0476	0.0330	0.200	0.051	0.050	0.023	
Nitrate (as N)	0.06	N/L	< 0.06	< 0.1	< 0.05	< 0.05	< 0.05	0.08	
Nitrite (as N)	0.06	N/L	< 0.03	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	7.58	6.5 - 8.5	**6.33**	6.88	**6.06**	**5.54**	**5.95**	**6.00**	
Phenols	0.002	0.001	< 0.001	< 0.001	**0.001**	< 0.001	< 0.001	< 0.002	
Phosphorus, Total	0.06	0.03	**0.030**	**0.070**	**0.077**	**0.04**	**0.03**	0.02	
Potassium	1.7	N/L	0.52	0.10	1.8	0.6	0.7	0.6	
Silicon	5.77	N/L	7.40	3.83	4.97	6.78	2.87	2.49	
Sodium	3.9	N/L	2.32	3.10	4.3	3.9	2.7	5.9	
Strontium	0.13	N/L	0.0350	0.0310	0.091	0.063	0.020	0.083	
Sulphate	8	N/L	8.0	5.0	3	< 1	2	6	
Total Dissolved Solids	149	N/L	89	30	38	27	24	34	
Total Suspended Solids	7	N/L	4	4	6	4	< 3	4	
Total Kjeldahl Nitrogen	1.0	N/L	0.6	1.3	1.67	0.8	0.5	0.7	
Zinc	0.005	0.02	0.006	< 0.005	**0.042**	**0.027**	< 0.005	< 0.005	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding PWQO.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Greenview ENVIRONMENTAL MANAGEMENT

Table 6
Surface Water Quality (PWQO)
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO [1]	SW2					5-year Trends (sparkline)	SW3	5-year Trends (sparkline)	SW5			5-year Trends (sparkline)
			23-Apr-13	31-May-17	17-Oct-17	24-Apr-18	07-May-19		31-May-17		14-May-15	31-May-17	24-Apr-18	
Alkalinity ($CaCO_3$)	71	< 25% decrease	5	10	23	11	10		11	-	283	227	67	
Aluminum	0.12	0.075	**0.132**	**0.34**	**0.14**	**0.09**	**0.13**		**0.31**	-	0.0078	0.04	0.05	
Ammonia, Total (as N)	0.1	N/L	< 0.1	0.29	0.04	0.02	0.06		0.12	-	< 0.1	0.07	0.92	
Ammonia, Un-ionized (as N) [2]	0.0003	0.02	0.000047	0.000086	0.000010	0.000002	0.000011		0.000009	-	0.00105	0.00045	0.00281	
Barium	0.054	N/L	0.0136	0.056	0.039	0.021	0.038		0.045	-	0.115	0.164	0.035	
Boron	0.016	0.2	0.0077	0.009	0.009	0.005	0.037		0.006	-	0.0868	0.080	0.066	
Calcium	20.6	N/L	4.66	11.4	11.6	7.89	13.3		11.1	-	54.9	57.6	15.5	
Chemical Oxygen Demand	52	N/L	68	156	134	33	52		135	-	103	96	32	
Chloride	6.5	N/L	3.6	5.2	4.1	9.3	6.8		6.5	-	39	65.0	3.1	
Chromium	0.001	0.001	< 0.0005	**0.002**	< 0.001	< 0.001	**0.001**		**0.002**	-	0.00010	< 0.001	< 0.001	
Cobalt	0.0003	0.0009	0.000205	**0.0030**	0.0008	0.0002	0.0001		0.0007	-	0.000827	**0.0009**	0.0004	
Conductivity (µS/cm) [3]	148	N/L	37	73	54	27	43		63	-	488	690	116	
Copper	0.0012	0.005	0.0009	0.0040	**0.0066**	0.0013	0.0008		0.0023	-	0.00043	0.0007	0.0014	
Dissolved Organic Carbon	19.5	N/L	21.1	40.3	48.0	11.7	12.9		39.1	-	52.2	19.8	8.9	
Dissolved Oxygen [3]	7.22	5	**3.68**	8.94	**3.92**	8.25	**2.35**		**2.75**	-	**4.85**	**2.85**	7.65	
Iron	3.06	0.3	**0.33**	**3.12**	**2.77**	**0.579**	**0.409**		**0.663**	-	**4.35**	**4.68**	**0.875**	
Magnesium	8.48	N/L	2.24	2.77	4.42	3.06	4.44		2.77	-	33.9	33.5	6.14	
Manganese	0.202	N/L	0.0151	0.533	0.174	0.057	0.022		0.386	-	0.462	0.896	0.497	
Nitrate (as N)	0.06	N/L	< 0.06	< 0.05	< 0.05	0.08	< 0.05		< 0.05	-	< 0.06	< 0.05	0.09	
Nitrite (as N)	0.06	N/L	< 0.03	< 0.05	< 0.05	< 0.05	< 0.05		< 0.05	-	< 0.03	< 0.05	< 0.05	
pH (units) [3]	7.58	6.5 - 8.5	6.56	**5.91**	**6.19**	**6.12**	**6.01**		**5.42**	-	7.55	7.21	7.45	
Phenols	0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002		**0.005**	-	**0.001**	< 0.001	< 0.001	
Phosphorus, Total	0.06	0.03	0.018	**0.214**	**0.06**	**0.04**	0.01		**0.530**	-	**0.080**	**0.135**	**0.04**	
Potassium	1.7	N/L	0.86	1.0	0.4	0.9	0.5		2.7	-	7.62	10.6	3.0	
Silicon	5.77	N/L	3.38	4.17	5.74	2.93	1.98		5.09	-	8.93	8.13	3.04	
Sodium	3.9	N/L	2.46	4.5	4.3	4.1	5.8		3.0	-	28.5	33.6	7.6	
Strontium	0.13	N/L	0.0279	0.094	0.077	0.056	0.083		0.065	-	0.377	0.395	0.105	
Sulphate	8	N/L	6.6	6	< 1	3	6		2	-	< 10	4	< 1	
Total Dissolved Solids	149	N/L	91	41	38	27	32		33	-	426	371	90	
Total Suspended Solids	7	N/L	2	20	30	< 3	3		14	-	14	30	< 3	
Total Kjeldahl Nitrogen	1.0	N/L	0.6	2.47	1.4	0.5	0.6		2.18	-	1.2	1.73	1.3	
Zinc	0.005	0.02	0.005	**0.069**	**0.025**	**0.024**	0.006		**0.113**	-	0.003	**0.040**	< 0.005	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding PWQO.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Greenview ENVIRONMENTAL MANAGEMENT

Table 6
Surface Water Quality (PWQO)
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO [1]	SW6 (Background)														5-year Trends (sparkline)
			23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	
Alkalinity ($CaCO_3$)	71	< 25% decrease	25	35	48	81	59	64	52	69	71	82	34	54	36	123	
Aluminum	0.12	0.075	0.0530	0.0467	0.0174	**0.0969**	0.0449	**0.193**	0.030	0.050	0.02	0.04	0.04	**0.14**	0.06	**0.13**	
Ammonia, Total (as N)	0.1	N/L	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.4	0.02	0.01	0.02	0.04	0.03	0.04	0.05	0.06	
Ammonia, Un-ionized (as N) [2]	0.0003	0.02	0.00083	0.00031	0.00015	0.00002	0.00008	0.00085	0.00024	0.00008	0.00007	0.00027	0.00001	0.00002	0.00009	0.00029	
Barium	0.054	N/L	0.0198	0.0256	0.0318	0.0387	0.0295	0.0551	0.0240	0.0410	0.039	0.050	0.017	0.061	0.044	0.072	
Boron	0.016	0.2	0.0071	0.0067	0.0075	0.0035	0.0051	0.0213	< 0.005	0.0070	0.006	0.010	< 0.005	0.014	0.038	0.016	
Calcium	20.6	N/L	8.3	10.6	15.4	17.3	14.4	19.9	12.7	20.1	18.6	20.1	9.66	20.7	19.2	33.4	
Chemical Oxygen Demand	52	N/L	42	47	36	43	49	47	48	81	49	53	22	67	31	78	
Chloride	6.5	N/L	3.0	5.1	4.1	6.6	4	5	4	5	6.1	4.2	9.3	8.0	8.4	7.9	
Chromium	0.001	0.001	< 0.0005	0.0007	0.00027	0.00028	0.00031	0.00088	< 0.002	< 0.002	**0.001**	< 0.001	< 0.001	< 0.001	< 0.001	**0.001**	
Cobalt	0.0003	0.0009	0.000169	0.000196	0.000097	0.000098	0.000162	0.000397	< 0.0001	0.000200	< 0.0001	0.0003	< 0.0001	0.0003	< 0.0001	0.0003	
Conductivity (µS/cm) [3]	148	N/L	70	90	146	126	84	148	98	104	146	186	55	90	74	339	
Copper	0.0012	0.005	0.0008	0.0007	0.00017	0.00020	0.00023	0.00101	0.00010	0.00020	0.0001	**0.0069**	0.0014	**0.0060**	0.0002	0.0012	
Dissolved Organic Carbon	19.5	N/L	13.9	15.6	16.4	20.8	18.3	15.0	24.5	33.0	18.3	19.9	11.2	23.5	11.8	15.8	
Dissolved Oxygen [3]	7.22	5	7.06	8.92	8.22	7.21	**3.77**	6.50	**4.61**	**4.34**	**4.30**	**2.57**	11.36	**3.46**	5.59	**4.93**	
Iron	3.06	0.3	**0.59**	**1.24**	**0.356**	**1.65**	**1.43**	**3.41**	**0.48**	**3.20**	**0.686**	**5.27**	**0.477**	**7.10**	**0.370**	**3.65**	
Magnesium	8.48	N/L	3.59	4.74	6.39	8.30	6.14	8.12	6.21	8.50	8.00	8.49	4.39	8.45	6.45	14.1	
Manganese	0.202	N/L	0.015	0.050	0.0115	0.0522	0.0515	0.250	0.010	0.052	0.028	0.226	0.070	0.418	0.013	0.242	
Nitrate (as N)	0.06	N/L	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.06	N/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	7.58	6.5 - 8.5	7.62	7.31	6.72	**6.11**	6.60	7.04	7.73	7.79	7.08	7.63	6.73	6.55	6.92	7.45	
Phenols	0.002	0.001	< 0.001	< 0.001	**0.003**	< 0.001	**0.001**	**0.001**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.016**	< 0.002	< 0.002	
Phosphorus, Total	0.06	0.03	0.011	0.022	< 0.009	0.015	0.011	**0.096**	0.010	**0.060**	0.016	**0.07**	**0.03**	**0.06**	0.01	**0.13**	
Potassium	1.7	N/L	1.07	1.77	1.03	1.37	1.02	1.45	0.60	1.20	1.1	1.4	1.0	3.0	1.1	3.3	
Silicon	5.77	N/L	2.95	5.12	0.94	8.26	3.04	3.84	1.23	6.39	2.79	6.79	3.03	5.98	1.89	3.12	
Sodium	3.9	N/L	2.29	2.51	3.37	3.21	3.06	3.12	3.60	3.80	3.9	3.2	2.5	5.0	5.1	5.2	
Strontium	0.13	N/L	0.046	0.060	0.0649	0.0928	0.0686	0.111	0.057	0.132	0.081	0.103	0.041	0.116	0.098	0.157	
Sulphate	8	N/L	7.5	8.1	3.8	0.8	< 1	22	4	1	2	< 1	< 1	7	2	7	
Total Dissolved Solids	149	N/L	103	100	117	154	97	177	71	89	88	99	39	80	51	147	
Total Suspended Solids	7	N/L	2	2	< 2	3	2	14	3	12	4	12	< 3	5	< 3	7	
Total Kjeldahl Nitrogen	1.0	N/L	0.5	0.6	0.5	0.7	0.7	1.4	0.7	1.2	0.74	0.8	0.4	1.1	0.4	2.0	
Zinc	0.005	0.02	0.002	0.003	0.004	0.002	0.001	0.004	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	**0.020**	< 0.005	0.013	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding PWQO.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Greenview ENVIRONMENTAL MANAGEMENT

Table 6
Surface Water Quality (PWQO)
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO [1]	SW9													5-year Trends (sparkline)
			23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19	
Alkalinity ($CaCO_3$)	71	< 25% decrease	20	38	27	49	34	40	15	42	31	27	34	29	16	34	
Aluminum	0.12	0.075	0.0465	0.0552	0.0436	0.0677	0.0633	**0.394**	0.04	**0.08**	0.07	0.05	0.05	0.06	**0.08**	**0.08**	
Ammonia, Total (as N)	0.1	N/L	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	0.02	0.01	0.04	0.04	0.13	0.04	0.06	0.05	
Ammonia, Un-ionized (as N) [2]	0.0003	0.02	0.00008	0.00016	0.00138	0.00002	0.00010	0.00001	0.00004	0.00005	0.00009	0.00004	0.00001	0.00005	0.00004	0.00050	
Barium	0.054	N/L	0.0298	0.0372	0.0297	0.0485	0.0338	0.0461	0.016	0.062	0.043	0.042	0.031	0.052	0.040	0.046	
Boron	0.016	0.2	0.011	0.005	0.0110	0.0054	0.0084	0.0088	< 0.005	0.009	0.011	0.011	0.014	0.006	0.047	0.015	
Calcium	20.6	N/L	9.96	10.1	8.24	10.7	8.04	10.4	5.4	13.6	11.7	14.9	12.0	18.8	14.2	11.4	
Chemical Oxygen Demand	52	N/L	57	100	70	117	62	67	66	112	83	86	35	97	49	91	
Chloride	6.5	N/L	70	19	6.7	12	8	14	7.7	14.8	7.2	17.3	5.1	30.7	5.0	14.5	
Chromium	0.001	0.001	< 0.0005	**0.0026**	0.00048	**0.00127**	0.00024	0.00069	< 0.002	< 0.002	**0.001**	< 0.001	< 0.001	< 0.001	**0.001**	**0.001**	
Cobalt	0.0003	0.0009	0.000196	0.000399	0.000223	0.000529	0.000394	0.000633	0.0001	0.0005	0.0006	0.0002	0.0002	0.0003	0.0001	0.0002	
Conductivity (µS/cm) [3]	148	N/L	161	113	321	101	66	100	59	93	79	94	59	101	59	85	
Copper	0.0012	0.005	0.0011	0.0011	0.00049	0.00038	0.00083	0.00235	< 0.0001	0.0005	0.0005	**0.0077**	0.0017	**0.0087**	0.0010	0.0010	
Dissolved Organic Carbon	19.5	N/L	16.8	35.8	31.1	58.0	22.2	23.0	30.4	52.0	19.5	29.8	11.8	36.5	14.8	41.5	
Dissolved Oxygen [3]	7.22	5	**4.25**	8.92	5.72	**4.21**	**2.43**	**3.66**	6.54	**4.08**	**4.05**	5.06	5.08	6.56	5.96	5.54	
Iron	3.06	0.3	**0.59**	**4.36**	**2.04**	**6.51**	**3.77**	**2.85**	**0.64**	**7.71**	**3.40**	**1.22**	**1.32**	**3.04**	**0.544**	**6.54**	
Magnesium	8.48	N/L	3.52	5.17	4.29	5.33	3.73	4.95	2.79	6.84	4.84	6.00	5.12	8.10	4.81	6.03	
Manganese	0.202	N/L	0.0254	0.0968	0.0464	0.152	0.0763	0.0746	0.02	0.138	0.150	0.068	0.099	0.090	0.014	0.065	
Nitrate (as N)	0.06	N/L	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	0.1	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05	
Nitrite (as N)	0.06	N/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) [3]	7.58	6.5 - 8.5	6.60	7.03	7.96	**6.20**	6.66	**5.52**	6.85	7.63	6.84	6.73	**6.06**	6.99	**6.46**	7.75	
Phenols	0.002	0.001	< 0.001	< 0.001	**0.003**	< 0.001	**0.002**	**0.001**	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.003**	< 0.002	< 0.002	
Phosphorus, Total	0.06	0.03	0.017	0.024	0.019	0.028	**0.047**	0.029	0.020	**0.050**	**0.056**	**0.04**	0.02	0.02	0.01	**0.04**	
Potassium	1.7	N/L	1.47	1.72	0.924	1.91	2.61	3.06	0.2	2.5	1.6	1.2	1.1	0.7	0.6	1.7	
Silicon	5.77	N/L	2.76	7.04	1.57	9.17	2.08	6.28	1.3	8.46	1.30	6.08	3.49	5.99	1.58	8.79	
Sodium	3.9	N/L	38.5	8.84	4.68	6.15	4.50	5.97	5.80	10.5	5.7	10.0	7.4	12.8	7.2	8.1	
Strontium	0.13	N/L	0.0646	0.0744	0.0557	0.0955	0.0501	0.0633	0.04	0.101	0.091	0.101	0.086	0.135	0.093	0.074	
Sulphate	8	N/L	9.1	0.4	2.2	0.2	< 10	< 1	1	< 1	< 1	< 1	2	< 1	4	< 1	
Total Dissolved Solids	149	N/L	186	157	117	157	103	154	40	81	50	72	53	85	37	64	
Total Suspended Solids	7	N/L	< 2	< 6	3	7	12	9	< 3	14	18	4	< 3	< 3	3	8	
Total Kjeldahl Nitrogen	1.0	N/L	0.6	0.9	0.7	1.0	0.8	0.7	0.9	1.3	1.13	0.9	0.6	1.0	0.6	1.3	
Zinc	0.005	0.02	0.004	0.003	0.006	0.006	0.005	0.008	< 0.005	< 0.005	**0.033**	**0.049**	**0.023**	0.014	< 0.005	**0.026**	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding PWQO.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Table 7
Surface Water Quality (75th Percentile Background)
Killaloe Waste Disposal Site

Parameter	75th Percentile Background Surface Water Quality [1]	SW1						
		23-Apr-13	01-Nov-13	18-May-16	31-May-17	17-Oct-17	24-Apr-18	07-May-19
Alkalinity ($CaCO_3$)	71	8	10	12	21	15	8	11
Aluminum	0.122	0.098	0.113	**0.170**	**0.29**	0.08	0.09	0.12
Ammonia, Total (as N)	0.1	**0.40**	< 0.1	0.04	**0.12**	0.03	0.04	0.04
Ammonia, Un-ionized (as N) [2]	0.0003	0.000036	0.000037	0.000045	0.000032	0.000001	0.000003	0.000007
Barium	0.054	0.013	0.0194	0.017	0.047	0.027	0.010	0.037
Boron	0.016	0.0072	0.0053	< 0.005	0.007	0.011	< 0.005	**0.038**
Calcium	20.6	4.7	5.97	5.48	12.0	9.54	3.05	13.2
Chemical Oxygen Demand	52	**63**	**75**	**76**	**157**	**74**	49	**53**
Chloride	6.5	4.0	3.0	2.3	4.4	2.6	4.5	5.9
Chromium	0.001	< 0.0005	0.0007	< 0.002	**0.001**	< 0.001	< 0.001	**0.001**
Cobalt	0.0003	0.000180	0.000206	0.000200	**0.0014**	0.0002	0.0002	0.0001
Conductivity (µS/cm) [3]	148	35	43	20	49	45	25	42
Copper	0.0012	0.0009	0.0008	**0.0044**	0.0008	**0.0070**	0.0010	0.0010
Dissolved Organic Carbon	19.5	**20.4**	**27.1**	**40**	**43.0**	**21.3**	12.6	**20.2**
Dissolved Oxygen [3]	7.22	**2.90**	**5.22**	7.98	**4.01**	**4.52**	**7.17**	**5.58**
Iron	3.06	0.27	0.53	0.55	1.81	0.908	0.450	0.391
Magnesium	8.48	2.4	2.68	2.74	4.54	3.27	1.73	4.42
Manganese	0.202	0.0110	0.0476	0.0330	0.200	0.051	0.050	0.023
Nitrate (as N)	0.06	< 0.06	< 0.06	< 0.1	< 0.05	< 0.05	< 0.05	**0.08**
Nitrite (as N)	0.06	< 0.03	< 0.03	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	5.84	6.33	6.88	6.06	5.54	5.95	6.00
Phenols	0.002	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.002
Phosphorus, Total	0.06	0.022	0.030	**0.070**	**0.077**	0.04	0.03	0.02
Potassium	1.7	0.93	0.52	0.10	**1.8**	0.6	0.7	0.6
Silicon	5.77	3.3	**7.4**	3.8	4.97	**6.78**	2.87	2.49
Sodium	3.9	2.5	2.32	3.1	**4.3**	**3.9**	2.7	**5.9**
Strontium	0.13	0.028	0.035	0.031	0.091	0.063	0.020	0.083
Sulphate	8	7	**8**	5	3	< 1	2	6
Total Dissolved Solids	149	63	89	30	38	27	24	34
Total Suspended Solids	7	< 2	4	4	6	4	< 3	4
Total Kjeldahl Nitrogen	1.0	0.6	0.6	**1.3**	**1.67**	0.8	0.5	0.7
Zinc	0.005	0.004	**0.006**	< 0.005	**0.042**	**0.027**	< 0.005	< 0.005

Notes:
1. 75th Percentile Background Surface Water Quality (SW6)
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding 75th Percentile Background (SW6).
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Greenview ENVIRONMENTAL MANAGEMENT

Table 7
Surface Water Quality (75th Percentile Background)
Killaloe Waste Disposal Site

Parameter	75th Percentile Background Surface Water Quality [1]	SW2					SW3	SW5		
		23-Apr-13	31-May-17	17-Oct-17	24-Apr-18	07-May-19	31-May-17	14-May-15	31-May-17	24-Apr-18
Alkalinity ($CaCO_3$)	71	5	10	23	11	10	11	**283**	**227**	67
Aluminum	0.122	**0.132**	**0.34**	**0.14**	0.09	**0.13**	**0.31**	0.0078	0.04	0.05
Ammonia, Total (as N)	0.1	< 0.1	**0.29**	0.04	0.02	0.06	**0.12**	< 0.1	0.07	**0.92**
Ammonia, Un-ionized (as N) [2]	0.0003	0.000047	0.000086	0.000010	0.000002	0.000011	0.00001	**0.00105**	**0.00045**	**0.00281**
Barium	0.054	0.0136	**0.056**	0.039	0.021	0.038	0.045	**0.115**	**0.164**	0.035
Boron	0.016	0.0077	0.009	0.009	0.005	**0.037**	0.006	**0.0868**	**0.080**	**0.066**
Calcium	20.6	4.66	11.4	11.6	7.89	13.3	11.1	**54.9**	**57.6**	15.5
Chemical Oxygen Demand	52	**68**	**156**	**134**	33	**52**	**135**	**103**	**96**	32
Chloride	6.5	3.6	5.2	4.1	**9.3**	**6.8**	**6.5**	**39**	**65.0**	3.1
Chromium	0.001	< 0.0005	**0.002**	< 0.001	< 0.001	**0.001**	**0.002**	0.00010	< 0.001	< 0.001
Cobalt	0.0003	0.000205	**0.0030**	**0.0008**	0.0002	0.0001	**0.0007**	**0.000827**	**0.0009**	**0.0004**
Conductivity (µS/cm) [3]	148	37	73	54	27	43	63	**488**	**690**	116
Copper	0.0012	0.0009	**0.0040**	**0.0066**	**0.0013**	0.0008	**0.0023**	0.00043	0.0007	**0.0014**
Dissolved Organic Carbon	19.5	**21.1**	**40.3**	**48.0**	11.7	12.9	**39.1**	**52.2**	**19.8**	8.9
Dissolved Oxygen [3]	7.22	**3.68**	8.94	**3.92**	8.25	**2.35**	**2.75**	**4.85**	**2.85**	7.65
Iron	3.06	0.327	**3.12**	2.77	0.579	0.409	0.663	**4.35**	**4.68**	0.875
Magnesium	8.48	2.24	2.77	4.42	3.06	4.44	2.77	**33.9**	**33.5**	6.14
Manganese	0.202	0.0151	**0.533**	0.174	0.057	0.022	**0.386**	**0.462**	**0.896**	**0.497**
Nitrate (as N)	0.06	< 0.06	< 0.05	< 0.05	**0.08**	< 0.05	< 0.05	< 0.06	< 0.05	**0.09**
Nitrite (as N)	0.06	< 0.03	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.03	< 0.05	< 0.05
pH (units) [3]	7.58	6.56	5.91	6.19	6.12	6.01	5.42	7.55	7.21	7.45
Phenols	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	**0.005**	0.001	< 0.001	< 0.001
Phosphorus, Total	0.06	0.018	**0.214**	**0.06**	0.04	0.01	**0.530**	**0.080**	**0.135**	0.04
Potassium	1.7	0.86	1.0	0.4	0.9	0.5	**2.7**	**7.62**	**10.6**	**3.0**
Silicon	5.77	3.4	4.17	5.74	2.93	1.98	5.09	**8.93**	**8.13**	3.04
Sodium	3.9	2.46	**4.5**	**4.3**	**4.1**	**5.8**	3.0	**28.5**	**33.6**	**7.6**
Strontium	0.13	0.0279	0.094	0.077	0.056	0.083	0.065	**0.377**	**0.395**	0.105
Sulphate	8	6.6	6	< 1	3	6	2	< 10	4	< 1
Total Dissolved Solids	149	91	41	38	27	32	33	**426**	**371**	90
Total Suspended Solids	7	2	**20**	**30**	< 3	3	**14**	**14**	**30**	< 3
Total Kjeldahl Nitrogen	1.0	0.6	**2.47**	**1.4**	0.5	0.6	**2.18**	**1.2**	**1.73**	**1.3**
Zinc	0.005	**0.005**	**0.069**	**0.025**	**0.024**	**0.006**	**0.113**	0.003	**0.040**	< 0.005

Notes:
1. 75th Percentile Background Surface Water Quality (SW6)
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding 75th Percentile Background
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Greenview
ENVIRONMENTAL MANAGEMENT

Table 7
Surface Water Quality (75th Percentile Background)
Killaloe Waste Disposal Site

Parameter	75th Percentile Background Surface Water Quality [1]	SW6 (Background)													
		23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19
Alkalinity ($CaCO_3$)	71	25	35	48	**81**	59	64	52	69	**71**	**82**	34	54	36	**123**
Aluminum	0.122	0.053	0.047	0.0174	0.097	0.0449	**0.193**	0.030	0.050	0.02	0.04	0.04	**0.14**	0.06	**0.13**
Ammonia, Total (as N)	0.1	**0.1**	< 0.1	< 0.1	< 0.1	< 0.1	**0.4**	0.0	0.0	0.02	0.04	0.03	0.04	0.05	0.06
Ammonia, Un-ionized (as N) [2]	0.0003	**0.00083**	**0.00031**	0.00015	0.00002	0.00008	**0.00085**	0.00024	0.00008	0.00007	0.00027	0.00001	0.00002	0.00009	0.00029
Barium	0.054	0.0198	0.0256	0.0318	0.0387	0.0295	**0.0551**	0.0240	0.0410	0.039	0.050	0.017	**0.061**	0.044	**0.072**
Boron	0.016	0.0071	0.0067	0.0075	0.0035	0.0051	**0.0213**	< 0.005	0.0070	0.006	0.010	< 0.005	0.014	**0.038**	**0.016**
Calcium	20.6	8.3	10.6	15.4	17.3	14.4	19.9	12.7	20.1	18.6	20.1	9.66	**20.7**	19.2	**33.4**
Chemical Oxygen Demand	52	42	47	36	43	49	47	48	**81**	49	**53**	22	**67**	31	**78**
Chloride	6.5	3.0	5.1	4.1	**6.6**	4	5	4	5	6.1	4.2	**9.3**	**8.0**	**8.4**	**7.9**
Chromium	0.001	< 0.0005	0.0007	0.00027	0.00028	0.00031	0.00088	< 0.002	< 0.002	**0.001**	< 0.001	< 0.001	< 0.001	< 0.001	**0.001**
Cobalt	0.0003	0.000169	0.000196	0.000097	0.000098	0.000162	**0.000397**	< 0.0001	0.000200	< 0.0001	**0.0003**	< 0.0001	**0.0003**	< 0.0001	**0.0003**
Conductivity (µS/cm) [3]	148	70	90	146	126	84	**148**	98	104	146	**186**	55	90	74	**339**
Copper	0.0012	0.0008	0.0007	0.00017	0.0002	0.00023	0.00101	0.00010	0.00020	0.0001	**0.0069**	**0.0014**	**0.0060**	0.0002	**0.0012**
Dissolved Organic Carbon	19.5	13.9	15.6	16.4	**20.8**	18.3	15.0	**24.5**	**33.0**	18.3	**19.9**	11.2	**23.5**	11.8	15.8
Dissolved Oxygen [3]	7.22	**7.06**	8.92	8.22	**7.21**	**3.77**	**6.50**	**4.61**	**4.34**	**4.30**	**2.57**	11.36	**3.46**	**5.59**	**4.93**
Iron	3.06	0.59	1.24	0.356	1.65	1.43	**3.41**	0.48	**3.20**	0.686	**5.27**	0.477	**7.10**	0.370	**3.65**
Magnesium	8.48	3.59	4.74	6.39	8.30	6.14	8.12	6.21	**8.50**	8.00	**8.49**	4.39	8.45	6.45	**14.1**
Manganese	0.202	0.015	0.050	0.0115	0.052	0.0515	**0.250**	0.010	0.052	0.028	**0.226**	0.070	**0.418**	0.013	**0.242**
Nitrate (as N)	0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	**0.10**	**0.10**	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrite (as N)	0.06	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	7.62	7.31	6.72	6.11	6.60	7.04	7.73	7.79	7.08	7.63	6.73	6.55	6.92	7.45
Phenols	0.002	< 0.001	< 0.001	**0.003**	< 0.001	0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.016**	< 0.002	< 0.002
Phosphorus, Total	0.06	0.011	0.022	< 0.009	0.015	0.011	**0.096**	0.010	**0.060**	0.016	**0.07**	0.03	**0.06**	0.01	**0.13**
Potassium	1.7	1.07	**1.77**	1.03	1.37	1.02	1.45	0.60	1.20	1.1	1.4	1.0	**3.0**	1.1	**3.3**
Silicon	5.77	2.95	5.12	0.94	**8.26**	3.04	3.84	1.23	**6.39**	2.79	**6.79**	3.03	**5.98**	1.89	3.12
Sodium	3.9	2.29	2.51	3.37	3.21	3.06	3.12	3.60	3.80	**3.9**	3.2	2.5	**5.0**	**5.1**	**5.2**
Strontium	0.13	0.046	0.060	0.0649	0.093	0.0686	0.111	0.057	**0.132**	0.081	0.103	0.041	0.116	0.098	**0.157**
Sulphate	8	7.5	**8.1**	3.8	0.8	< 1	**22**	4	1	2	< 1	< 1	7	2	7
Total Dissolved Solids	149	103	100	117	**154**	97	**177**	71	89	88	99	39	80	51	147
Total Suspended Solids	7	2	2	< 2	3	2	**14**	3	**12**	4	**12**	< 3	5	< 3	**7**
Total Kjeldahl Nitrogen	1.0	0.5	0.6	0.5	0.7	0.7	**1.4**	0.7	**1.2**	0.74	0.8	0.4	**1.1**	0.4	**2.0**
Zinc	0.005	0.002	0.003	0.004	0.002	0.001	0.004	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	**0.020**	< 0.005	**0.013**

Notes:
1. 75th Percentile Background Surface Water Quality (SW6)
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding 75th Percentile Background
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Greenview ENVIRONMENTAL MANAGEMENT

Table 7
Surface Water Quality (75th Percentile Background)
Killaloe Waste Disposal Site

Parameter	75th Percentile Background Surface Water Quality [1]	SW9													
		23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19
Alkalinity ($CaCO_3$)	71	20	38	27	49	34	40	15	42	31	27	34	29	16	34
Aluminum	0.122	0.0465	0.0552	0.0436	0.0677	0.0633	**0.394**	0.04	0.08	0.07	0.05	0.05	0.06	0.08	0.08
Ammonia, Total (as N)	0.1	< 0.1	< 0.1	< 0.1	< 0.1	**0.1**	< 0.1	0.02	0.01	0.04	0.04	**0.13**	0.04	0.06	0.05
Ammonia, Un-ionized (as N) [2]	0.0003	0.00008	0.00016	**0.00138**	0.00002	0.00010	0.00001	0.00004	0.00005	0.00009	0.00004	0.00001	0.00005	0.00004	**0.00050**
Barium	0.054	0.0298	0.0372	0.0297	0.0485	0.0338	0.0461	0.016	**0.062**	0.043	0.042	0.031	0.052	0.040	0.046
Boron	0.016	0.011	0.005	0.0110	0.0054	0.0084	0.0088	< 0.005	0.009	0.011	0.011	0.014	0.006	**0.047**	0.015
Calcium	20.6	9.96	10.1	8.24	10.7	8.04	10.4	5.4	13.6	11.7	14.9	12.0	18.8	14.2	11.4
Chemical Oxygen Demand	52	**57**	**100**	**70**	**117**	**62**	**67**	**66**	**112**	**83**	**86**	35	**97**	49	**91**
Chloride	6.5	**70**	**19**	**6.7**	**12**	**8**	**14**	**7.7**	**14.8**	**7.2**	**17.3**	5.1	**30.7**	5.0	**14.5**
Chromium	0.001	< 0.0005	**0.0026**	0.00048	**0.00127**	0.00024	0.00069	< 0.002	< 0.002	**0.001**	< 0.001	< 0.001	< 0.001	**0.001**	**0.001**
Cobalt	0.0003	0.000196	**0.000399**	0.000223	**0.000529**	**0.000394**	**0.000633**	0.0001	**0.0005**	**0.0006**	0.0002	0.0002	**0.0003**	0.0001	0.0002
Conductivity (µS/cm) [3]	148	**161**	113	**321**	101	66	100	59	93	79	94	59	101	59	85
Copper	0.0012	0.0011	0.0011	0.00049	0.0004	0.00083	**0.00235**	< 0.0001	0.00050	0.0005	**0.0077**	**0.0017**	**0.0087**	0.0010	0.0010
Dissolved Organic Carbon	19.5	16.8	**35.8**	**31.1**	**58**	**22.2**	**23.0**	**30.4**	**52.0**	**19.5**	**29.8**	11.8	**36.5**	14.8	**41.5**
Dissolved Oxygen [3]	7.22	**4.25**	8.92	**5.72**	**4.21**	**2.43**	**3.66**	**6.54**	**4.08**	**4.05**	**5.06**	**5.08**	**6.56**	**5.96**	**5.54**
Iron	3.06	0.59	**4.36**	2.04	**6.51**	**3.77**	2.85	0.64	**7.71**	**3.40**	1.22	1.32	3.04	0.544	**6.54**
Magnesium	8.48	3.52	5.17	4.29	5.33	3.73	4.95	2.79	6.84	4.84	6.00	5.12	8.10	4.81	6.03
Manganese	0.202	0.0254	0.0968	0.0464	0.152	0.0763	0.0746	0.02	0.138	0.150	0.068	0.099	0.090	0.014	0.065
Nitrate (as N)	0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	**0.1**	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05
Nitrite (as N)	0.06	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	6.6	7.03	7.96	6.20	6.66	5.52	6.85	7.63	6.84	6.73	6.06	6.99	6.46	7.75
Phenols	0.002	< 0.001	< 0.001	**0.003**	< 0.001	**0.002**	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.003**	< 0.002	< 0.002
Phosphorus, Total	0.06	0.017	0.024	0.019	0.028	0.047	0.029	0.02	0.05	0.056	0.04	0.02	0.02	0.01	0.04
Potassium	1.7	1.47	**1.72**	0.924	**1.91**	**2.61**	**3.06**	0.2	**2.5**	1.6	1.2	1.1	0.7	0.6	1.7
Silicon	5.77	2.76	**7.04**	1.57	**9.17**	2.08	**6.28**	1.30	**8.46**	1.30	**6.08**	3.49	**5.99**	1.58	**8.79**
Sodium	3.9	**38.5**	**8.84**	**4.68**	**6.15**	**4.50**	**5.97**	**5.80**	**10.5**	**5.7**	**10.0**	**7.4**	**12.8**	**7.2**	**8.1**
Strontium	0.13	0.0646	0.0744	0.0557	0.0955	0.0501	0.0633	0.04	0.101	0.091	0.101	0.086	**0.135**	0.093	0.074
Sulphate	8	**9**	0.4	2.2	0.2	< 10	< 1	1.0	< 1	< 1	< 1	2	< 1	4	< 1
Total Dissolved Solids	149	**186**	**157**	117	**157**	103	**154**	40	81	50	72	53	85	37	64
Total Suspended Solids	7	< 2	< 6	3	**7**	**12**	**9**	< 3	**14**	**18**	4	< 3	< 3	3	**8**
Total Kjeldahl Nitrogen	1.0	0.6	0.9	0.7	1.0	0.8	0.7	0.9	**1.3**	**1.13**	0.9	0.6	1.0	0.6	**1.3**
Zinc	0.005	0.004	0.003	**0.006**	**0.006**	**0.005**	**0.008**	< 0.005	< 0.005	**0.033**	**0.049**	**0.023**	**0.014**	< 0.005	**0.026**

Notes:
1. 75th Percentile Background Surface Water Quality (SW6)
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding 75th Percentile Background
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Greenview
ENVIRONMENTAL MANAGEMENT

Table 8
Groundwater & Surface Water Quality
Alternative Standard Limits
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	Alternative Standard Limits	Source	BH00-1 (Background)														
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19
Alkalinity ($CaCO_3$)	71	< 25% decrease	PWQO	10	14	11	29	13	11	14	10	18	12	25	21	18	17
Aluminum	0.12	0.075	PWQO	0.0657	0.0719	0.0420	**0.0884**	0.0157	0.018	< 0.01	0.030	< 0.01	0.02	0.02	0.01	< 0.01	0.01
Ammonia, Total (as N)	0.1	N/L	PWQO	0.3	0.2	0.2	0.1	< 0.1	0.1	0.1	0.2	0.17	0.02	0.15	0.17	0.17	0.15
Ammonia, Un-ionized (as N) [2]	0.0003	0.100	Table A - TGD	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	0.054	2.300	Table A - TGD	0.0797	0.0655	0.0733	0.0709	0.0714	0.0644	0.0740	0.0700	0.076	0.103	0.077	0.086	0.070	0.073
Boron	0.016	3.550	Table A - TGD	0.0096	0.0065	0.0089	0.0084	0.0187	0.0153	0.0110	0.0070	0.006	0.018	0.019	0.020	0.025	0.023
Calcium	20.6	N/L	PWQO	7.60	7.17	7.03	6.17	7.43	6.46	7.74	7.01	7.24	8.09	7.30	7.96	7.42	7.22
Chemical Oxygen Demand	52	N/L	PWQO	15	10	9	< 8	10	15	13	19	12	20	17	11	< 5	13
Chloride	6.5	180	Table A - TGD	15	14	12	13	12	12	11	13	12.5	17.2	16.2	18.8	15.3	16.1
Chromium	0.001	0.064	Table A - TGD	0.0010	0.0018	0.00114	0.00086	0.00068	0.00073	< 0.002	< 0.002	0.001	0.001	0.001	0.001	0.001	0.002
Cobalt	0.0003	0.0009	PWQO	**0.00353**	**0.00151**	**0.00171**	0.000323	0.000074	0.000117	< 0.005	< 0.005	< 0.005	< 0.005	0.0001	0.0002	0.0001	0.0001
Conductivity (µS/cm) [3]	148	N/L	PWQO	118	121	137	198	98	113	101	102	117	121	104	111	101	118
Copper	0.0012	0.0069	Table A - TGD	0.0011	0.0009	0.00097	0.00098	0.00047	0.00052	0.00040	0.00050	0.0004	0.0002	0.0006	0.0005	0.0008	0.0005
Dissolved Organic Carbon	19.5	N/L	PWQO	1.9	1.4	2.3	2.7	3.1	2.2	1.5	1.8	4.0	4.4	3.7	3.2	3.0	2.9
Dissolved Oxygen [3]	7.22	5	PWQO	-	-	-	-	-	-	-	-	-	-	8.10	5.84	6.86	7.33
Iron	3.06	1.000	Table A - TGD	**17.3**	**17.0**	**16.4**	**16.0**	**15.3**	**15.5**	**16.1**	**17.3**	**18.0**	**18.5**	**15.8**	**17.5**	**13.2**	**15.2**
Magnesium	8.48	N/L	PWQO	4.38	4.15	3.97	3.85	3.93	3.79	4.12	4.50	4.36	4.68	4.39	4.47	4.56	4.35
Manganese	0.202	N/L	PWQO	0.0710	0.0497	0.0560	0.0537	0.0515	0.0493	0.0530	0.0560	0.057	0.061	0.053	0.060	0.055	0.051
Nitrate (as N)	0.06	2.9	Table B - TGD	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.1	0.1	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05
Nitrite (as N)	0.06	0.06	Table B - TGD	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	6.0 - 9.0	Table A - TGD	6.29	6.89	6.16	6.15	7.03	6.38	6.01	6.45	6.66	6.85	6.68	6.55	6.20	6.94
Phenols	0.002	0.04	Table A - TGD	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, Total	0.06	0.03	PWQO	**0.390**	**0.440**	**0.24**	**0.34**	**0.15**	**0.70**	**0.44**	**0.44**	**0.34**	**0.26**	**1.88**	**0.40**	**0.28**	**0.28**
Potassium	1.7	N/L	PWQO	1.29	1.39	1.37	1.27	1.31	1.23	1.20	1.10	1.1	1.4	1.4	1.3	1.4	1.4
Silicon	5.77	N/L	PWQO	7.29	8.31	7.75	8.21	7.61	6.68	7.01	7.08	7.47	7.31	7.13	7.01	6.90	6.67
Sodium	3.9	N/L	PWQO	4.26	4.66	4.43	4.81	5.20	5.10	5.60	6.20	6.0	6.6	6.9	7.3	6.6	7.7
Strontium	0.13	N/L	PWQO	0.0423	0.0434	0.0396	0.0409	0.0407	0.0383	0.0440	0.0450	0.043	0.045	0.044	0.045	0.045	0.043
Sulphate	8	100	Table A - TGD	19	20	20	20	19	19	20	18	18	16	20	21	20	18
Total Dissolved Solids	149	N/L	PWQO	80	100	86	100	106	97	64	68	76	81	72	78	72	72
Total Suspended Solids	7	N/L	PWQO	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	1.0	N/L	PWQO	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.3	0.4	0.3	0.4	0.4	0.3	0.5	0.3
Zinc	0.005	0.089	Table A - TGD	< 0.002	< 0.002	< 0.002	0.002	0.003	0.012	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

Notes:
1. Alternative Standard Limits in accordance with MECP-approved Progressive Closure Plan, containing standard limits per the PWQO, and Table A or B of TGD (MECP, 2010).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding alternative standard limits.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Table 8
Groundwater & Surface Water Quality
Alternative Standard Limits
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	Alternative Standard Limits	Source	BH00-2 (Background)													
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19
Alkalinity ($CaCO_3$)	71	< 25% decrease	PWQO	28	25	31	26	29	22	32	25	26	27	37	25	30	22
Aluminum	0.12	0.075	PWQO	**0.0796**	0.0414	0.0740	**0.111**	0.0085	0.009	< 0.01	< 0.01	< 0.01	0.01	0.01	< 0.01	0.01	< 0.01
Ammonia, Total (as N)	0.1	N/L	PWQO	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.06	< 0.01	0.02	0.02	< 0.01	0.03	0.04	0.01
Ammonia, Un-ionized (as N) [2]	0.0003	0.100	Table A - TGD	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	0.054	2.300	Table A - TGD	0.0751	0.0647	0.0759	0.0667	0.0649	0.0526	0.0680	0.0550	0.062	0.076	0.073	0.079	0.075	0.060
Boron	0.016	3.550	Table A - TGD	0.0099	0.0085	0.0095	0.0090	0.0150	0.0118	0.0070	< 0.005	< 0.005	0.010	0.008	0.008	0.011	0.010
Calcium	20.6	N/L	PWQO	9.65	8.01	9.72	7.12	9.53	6.86	10.10	7.29	7.93	8.17	9.51	10.3	11.8	8.57
Chemical Oxygen Demand	52	N/L	PWQO	10	< 8	< 8	< 8	< 8	< 8	50	< 5	6	17	7	< 5	< 5	< 5
Chloride	6.5	180	Table A - TGD	11.0	7.6	9.5	7.1	8	5	8	6	7.2	6.0	11.8	14.3	14.5	9.2
Chromium	0.001	0.064	Table A - TGD	< 0.0005	0.0009	0.00064	0.00013	< 0.00003	< 0.00003	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001
Cobalt	0.0003	0.0009	PWQO	**0.00350**	**0.00220**	**0.00395**	**0.000950**	0.000722	0.000672	< 0.005	< 0.005	< 0.005	< 0.005	0.0005	**0.0009**	0.0007	0.0006
Conductivity (µS/cm) [3]	148	N/L	PWQO	105	79	103	83	74	79	95	72	81	90	84	88	94	87
Copper	0.0012	0.0069	Table A - TGD	0.0009	0.0008	0.00139	0.00067	0.00069	0.00063	0.00050	0.00040	0.0010	0.0002	0.0007	0.0014	0.0005	0.0002
Dissolved Organic Carbon	19.5	N/L	PWQO	< 1	< 1	< 1	1.8	2.1	1.2	1.3	0.8	1.6	1.2	1.4	0.8	14.9	0.9
Dissolved Oxygen [3]	7.22	5	PWQO	-	-	-	-	-	-	-	-	-	-	6.38	6.95	6.24	6.45
Iron	3.06	1.000	Table A - TGD	0.784	0.570	0.960	**1.08**	0.439	0.352	**1.080**	0.280	0.313	0.296	0.310	0.342	0.249	0.291
Magnesium	8.48	N/L	PWQO	6.23	5.10	5.69	4.90	5.36	4.36	5.63	5.18	5.16	5.37	6.33	6.39	7.88	5.81
Manganese	0.202	N/L	PWQO	0.0549	0.0191	0.0386	0.0172	0.0165	0.0124	0.0670	0.0110	0.022	0.012	0.012	0.014	0.031	0.008
Nitrate (as N)	0.06	2.9	Table B - TGD	< 0.06	< 0.06	< 0.06	0.06	< 0.06	0.12	< 0.1	0.20	< 0.05	0.09	0.08	0.12	< 0.05	0.12
Nitrite (as N)	0.06	0.06	Table B - TGD	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	6.0 - 9.0	Table A - TGD	6.46	6.40	6.12	6.39	6.50	8.52	7.59	6.50	6.85	6.41	6.74	7.48	6.38	6.65
Phenols	0.002	0.04	Table A - TGD	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus, Total	0.06	0.03	PWQO	**0.22**	**0.17**	**0.49**	**0.50**	**0.14**	**0.25**	**3.61**	**0.33**	**0.70**	**2.32**	**0.96**	**0.40**	**0.40**	**0.31**
Potassium	1.7	N/L	PWQO	2.05	2.12	2.04	1.94	2.18	1.85	1.70	1.80	1.7	1.9	2.2	2.1	2.4	2.1
Silicon	5.77	N/L	PWQO	6.50	5.99	6.77	7.13	6.22	4.85	6.51	5.01	5.37	5.55	5.60	5.58	6.35	5.35
Sodium	3.9	N/L	PWQO	3.60	4.11	3.69	3.98	4.25	3.92	4.30	4.50	4.3	4.1	4.9	5.0	5.1	4.5
Strontium	0.13	N/L	PWQO	0.0521	0.0432	0.0491	0.0441	0.0452	0.0371	0.0520	0.0430	0.043	0.042	0.052	0.054	0.066	0.048
Sulphate	8	100	Table A - TGD	17	19	18	20	19	19	18	18	16	14	18	19	19	17
Total Dissolved Solids	149	N/L	PWQO	51	69	89	74	103	94	75	61	63	64	75	213	79	61
Total Suspended Solids	7	N/L	PWQO	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	1.0	N/L	PWQO	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.4	< 0.1	< 0.1	0.1	< 0.1	0.1	< 0.1	< 0.1
Zinc	0.005	0.089	Table A - TGD	< 0.002	< 0.002	< 0.002	0.002	0.003	0.006	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

Notes:
1. Alternative Standard Limits in accordance with MECP-approved Progressive Closure Plan, containing stand
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding alternative standard limits.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Table 8
Groundwater & Surface Water Quality
Alternative Standard Limits
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	Alternative Standard Limits	Source	BH00-3													
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19
Alkalinity ($CaCO_3$)	71	< 25% decrease	PWQO	218	270	282	252	381	260	410	364	547	551	582	566	577	624
Aluminum	0.12	0.075	PWQO	**0.096**	0.053	0.050	**0.111**	0.0096	0.008	0.0300	0.030	0.04	0.05	**0.08**	0.07	**0.08**	**0.14**
Ammonia, Total (as N)	0.1	N/L	PWQO	0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1	0.1	0.1	0.08	0.06	0.08	0.08	0.07	0.08
Ammonia, Un-ionized (as N) [2]	0.0003	0.100	Table A - TGD	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	0.054	2.300	Table A - TGD	0.18	0.17	0.32	0.18	0.243	0.191	0.270	0.266	0.372	0.558	0.493	0.483	0.453	0.548
Boron	0.016	3.550	Table A - TGD	0.110	0.091	0.267	0.072	0.0944	0.0616	0.0870	0.0790	0.128	0.198	0.206	0.210	0.243	0.268
Calcium	20.6	N/L	PWQO	57.4	56.7	95.2	48.7	83.3	58.9	87.7	85	114	134	126	129	125	150
Chemical Oxygen Demand	52	N/L	PWQO	21	16	21	10	21	16	221	110	87	65	134	155	79	132
Chloride	6.5	180	Table A - TGD	30	28	32	27	38	32	44.4	49.3	45.8	46.6	66.4	69.1	61.0	64.1
Chromium	0.001	0.064	Table A - TGD	< 0.0005	0.007	0.002	0.00031	< 0.00003	0.00005	< 0.002	< 0.002	< 0.001	0.003	< 0.001	< 0.001	< 0.001	0.001
Cobalt	0.0003	0.0009	PWQO	**0.0081**	**0.0069**	**0.0138**	**0.0048**	**0.00668**	**0.00460**	**0.00600**	**0.00800**	**0.014**	**0.014**	**0.0126**	**0.0155**	**0.0126**	**0.0152**
Conductivity (µS/cm) [3]	148	N/L	PWQO	358	376	520	373	449	423	494	584	695	807	736	818	715	1042
Copper	0.0012	0.0069	Table A - TGD	0.0015	0.0019	0.00311	0.00107	0.00099	0.00066	0.0007	0.0005	0.0009	0.0008	0.0012	0.0008	0.0018	0.0036
Dissolved Organic Carbon	19.5	N/L	PWQO	5.5	3.6	3.4	3.6	5.4	3.9	7.6	6.8	9.9	10.5	14.5	12.7	12.3	13.1
Dissolved Oxygen [3]	7.22	5	PWQO	-	-	-	-	-	-	-	-	-	-	7.35	7.19	7.39	5.12
Iron	3.06	1.000	Table A - TGD	**1.4**	**2.0**	**2.7**	**1.8**	**2.97**	**2.32**	**1.43**	**2.95**	**3.90**	**4.53**	**3.49**	**6.06**	**2.37**	**3.62**
Magnesium	8.48	N/L	PWQO	28.8	28.6	41.8	29.4	40.6	34.5	48.9	52.5	61.4	75.7	70.5	71.6	74.1	87.6
Manganese	0.202	N/L	PWQO	2.12	2.24	3.09	3.03	4.75	4.06	4.28	5.78	5.56	7.08	8.06	7.48	7.26	5.69
Nitrate (as N)	0.06	2.9	Table B - TGD	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrite (as N)	0.06	0.06	Table B - TGD	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	6.0 - 9.0	Table A - TGD	6.38	6.52	6.74	6.78	6.95	6.81	6.27	7.25	6.66	6.37	6.69	6.39	6.71	6.81
Phenols	0.002	0.04	Table A - TGD	-	-	-	-	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.005	< 0.002	< 0.002
Phosphorus, Total	0.06	0.03	PWQO	**8.02**	**6.9**	**4.14**	**3.11**	**16.3**	**5.78**	**25.8**	**6.71**	**6.15**	**5.72**	**15.3**	**17.9**	**3.45**	**8.77**
Potassium	1.7	N/L	PWQO	3.21	3.31	4.59	2.97	3.58	3.15	3.5	3.6	3.9	4.8	4.8	4.8	4.9	6.1
Silicon	5.77	N/L	PWQO	9.56	10.6	10.6	11.4	10.8	9.46	9.63	10.5	11.0	11.7	10.8	11.2	10.2	10.9
Sodium	3.9	N/L	PWQO	10.4	11.6	25.6	11	14.2	9.98	17.8	13.4	22.7	23.1	24.5	24.8	24.9	35.9
Strontium	0.13	N/L	PWQO	0.32	0.30	0.56	0.31	0.446	0.335	0.476	0.484	0.665	0.737	0.714	0.748	0.751	0.950
Sulphate	8	100	Table A - TGD	13	13	16	14	20	14	22	24	23	25	44	40	35	36
Total Dissolved Solids	149	N/L	PWQO	257	389	374	349	511	374	510	475	655	680	681	704	693	740
Total Suspended Solids	7	N/L	PWQO	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	1.0	N/L	PWQO	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	0.4	0.7	0.6	0.8	0.8	0.4	0.8
Zinc	0.005	0.089	Table A - TGD	< 0.002	< 0.002	< 0.002	0.003	0.003	0.004	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

Notes:
1. Alternative Standard Limits in accordance with MECP-approved Progressive Closure Plan, containing stand
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding alternative standard limits.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Table 8
Groundwater & Surface Water Quality
Alternative Standard Limits
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	Alternative Standard Limits	Source	BH00-5													
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19
Alkalinity ($CaCO_3$)	71	< 25% decrease	PWQO	613	201	615	625	609	610	584	614	553	534	552	512	516	523
Aluminum	0.12	0.075	PWQO	0.0456	0.0631	0.0367	0.0666	0.0114	0.013	0.030	0.040	0.04	0.06	**0.08**	0.07	0.07	**0.08**
Ammonia, Total (as N)	0.1	N/L	PWQO	30.5	36.3	28.5	24.6	27.9	30.2	29.7	30.7	29.2	29.2	25.7	23.8	28.8	34.4
Ammonia, Un-ionized (as N) [2]	0.0003	0.100	Table A - TGD	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	0.054	2.300	Table A - TGD	**3.93**	**3.91**	**3.17**	**3.29**	**3.22**	**3.12**	**3.35**	**3.73**	**3.45**	**5.14**	**4.05**	**3.97**	**3.90**	**4.53**
Boron	0.016	3.550	Table A - TGD	0.502	0.554	0.411	0.440	0.389	0.417	0.436	0.547	0.450	0.602	0.703	0.662	0.813	0.862
Calcium	20.6	N/L	PWQO	127	114	106	89.0	121	114	102	112	101	119	113	108	111	116
Chemical Oxygen Demand	52	N/L	PWQO	99	95	86	83	88	83	96	106	69	100	106	105	109	111
Chloride	6.5	180	Table A - TGD	120	100	89	92	78	93	83	132	83.9	107	146	113	128	133
Chromium	0.001	0.064	Table A - TGD	0.0043	0.0315	0.00446	0.00296	0.00187	0.00217	0.00200	0.00300	< 0.001	0.007	0.002	0.002	0.003	0.003
Cobalt	0.0003	0.0009	PWQO	**0.0239**	**0.0213**	**0.0169**	**0.015917**	**0.0168**	**0.0133**	**0.0280**	**0.0320**	**0.020**	**0.021**	**0.0149**	**0.0175**	**0.0149**	**0.0160**
Conductivity (µS/cm) [3]	148	N/L	PWQO	1324	1319	1363	1242	1034	1321	1134	1339	1173	1262	1227	1120	1131	1960
Copper	0.0012	0.0069	Table A - TGD	0.0036	**0.0120**	0.00383	0.00299	0.00106	0.00096	0.00150	0.00150	0.0012	0.0009	0.0009	0.0007	0.0022	0.0011
Dissolved Organic Carbon	19.5	N/L	PWQO	18.4	21.1	12.7	17.5	14.4	18.8	14.1	13.5	12.9	10.8	12.9	13.2	13.4	16.7
Dissolved Oxygen [3]	7.22	5	PWQO	-	-	-	-	-	-	-	-	-	-	5.63	5.77	7.51	**3.18**
Iron	3.06	1.000	Table A - TGD	**119**	**111**	**96.9**	**113**	**110**	**120**	**160**	**141**	**140**	**130**	**135**	**145**	**141**	**133**
Magnesium	8.48	N/L	PWQO	42.1	35.9	31.6	31.4	32.0	34.5	29.1	39.2	30.5	34.6	36.7	32.0	35.2	37.0
Manganese	0.202	N/L	PWQO	8.01	7.29	4.63	5.11	5.69	4.38	3.64	4.35	3.16	3.72	3.81	3.37	3.54	3.06
Nitrate (as N)	0.06	2.9	Table B - TGD	< 0.06	< 0.06	< 0.06	< 0.06	0.08	< 0.06	0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrite (as N)	0.06	0.06	Table B - TGD	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	6.0 - 9.0	Table A - TGD	6.7	6.66	6.82	6.47	7.17	7.99	7.83	6.62	6.83	7.16	6.8	6.9	7.03	6.91
Phenols	0.002	0.04	Table A - TGD	< 0.002	< 0.002	0.002	< 0.002	0.010	0.010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.008	< 0.002	< 0.002
Phosphorus, Total	0.06	0.03	PWQO	**0.28**	**0.24**	**0.27**	**0.13**	**0.26**	**0.49**	**0.70**	**0.76**	**0.92**	**0.42**	**0.96**	**0.34**	**0.19**	**1.87**
Potassium	1.7	N/L	PWQO	74.9	82.2	70.9	62.9	71.7	67.6	69.9	78.4	80.5	97.1	98.2	93.3	101	116
Silicon	5.77	N/L	PWQO	14.8	18.8	13.8	15.1	16.1	13.1	13.9	14.7	13.4	14.5	14.6	14.6	13.7	14.1
Sodium	3.9	N/L	PWQO	74.8	70.3	52.1	54.7	50.4	59.4	58.4	70.1	55.5	64.0	80.9	69.4	71.2	83.9
Strontium	0.13	N/L	PWQO	0.874	0.778	0.660	0.770	0.793	0.808	0.712	0.853	0.713	0.822	0.830	0.789	0.838	0.916
Sulphate	8	100	Table A - TGD	0.9	< 0.2	0.2	< 0.2	< 1	< 1	2.0	17.0	2	3	4	< 1	1	3
Total Dissolved Solids	149	N/L	PWQO	849	771	706	683	717	780	759	889	766	842	852	772	801	824
Total Suspended Solids	7	N/L	PWQO	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	1.0	N/L	PWQO	41.4	73.1	29.2	25.7	29.2	32.7	38.2	45.2	29.3	39.1	28.1	24.3	28.8	34.7
Zinc	0.005	0.089	Table A - TGD	< 0.002	0.003	0.002	0.004	0.004	0.010	0.012	0.010	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

Notes:
1. Alternative Standard Limits in accordance with MECP-approved Progressive Closure Plan, containing stand
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding alternative standard limits.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Table 8
Groundwater & Surface Water Quality
Alternative Standard Limits
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	Alternative Standard Limits	Source	BH04-1S													
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19
Alkalinity ($CaCO_3$)	71	< 25% decrease	PWQO	267	290	287	311	303	295	300	306	316	303	328	327	287	276
Aluminum	0.12	0.075	PWQO	**0.100**	0.073	0.0536	**0.144**	0.0085	0.011	0.0200	0.020	0.02	0.04	**0.09**	0.03	0.04	0.04
Ammonia, Total (as N)	0.1	N/L	PWQO	0.2	0.2	< 0.1	0.1	0.2	0.1	0.2	0.2	0.19	0.18	0.21	0.20	0.24	0.14
Ammonia, Un-ionized (as N) [2]	0.0003	0.100	Table A - TGD	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	0.054	2.300	Table A - TGD	0.416	0.380	0.398	0.406	0.354	0.322	0.362	0.362	0.380	0.454	0.371	0.392	0.355	0.368
Boron	0.016	3.550	Table A - TGD	0.273	0.314	0.339	0.380	0.381	0.364	0.388	0.424	0.446	0.482	0.451	0.439	0.456	0.439
Calcium	20.6	N/L	PWQO	45.5	44.2	46.0	41.2	49.9	46.2	47.9	51.2	53.6	55.5	55.7	56.8	57.7	57.0
Chemical Oxygen Demand	52	N/L	PWQO	37	36	36	31	39	36	67	68	47	42	41	41	54	47
Chloride	6.5	180	Table A - TGD	36	35	35	35	34	33	30	30	25.2	22.8	31.2	32.5	30.9	59.4
Chromium	0.001	0.064	Table A - TGD	0.0014	0.0127	0.00183	0.00106	0.00046	0.00049	< 0.002	< 0.002	< 0.001	0.004	< 0.001	< 0.001	0.001	0.001
Cobalt	0.0003	0.0009	PWQO	**0.0064**	**0.0048**	**0.00662**	**0.002731**	**0.00247**	**0.00222**	< 0.005	< 0.005	< 0.005	< 0.005	**0.0014**	**0.0020**	**0.0018**	**0.0019**
Conductivity (µS/cm) [3]	148	N/L	PWQO	490	565	631	686	420	587	495	554	599	535	446	512	460	833
Copper	0.0012	0.0069	Table A - TGD	0.0019	0.0066	0.00165	0.00130	0.00043	0.00050	0.00100	0.00080	0.0007	0.0013	0.0012	0.0003	0.0005	0.0018
Dissolved Organic Carbon	19.5	N/L	PWQO	8.9	6.2	5.8	9.1	5.4	7.6	8.3	8.8	10.4	10.0	12.0	11.2	11.2	12.0
Dissolved Oxygen [3]	7.22	5	PWQO	-	-	-	-	-	-	-	-	-	-	10.11	6.43	6.67	6.89
Iron	3.06	1.000	Table A - TGD	**50.8**	**46.8**	**49.8**	**50.4**	**47.9**	**45.9**	**45.7**	**51.4**	**59.1**	**48.5**	**48.4**	**48.5**	**47.4**	**42.8**
Magnesium	8.48	N/L	PWQO	30.0	29.3	29.2	30.7	30.6	28.9	32.1	36.7	37.3	36.7	36.8	36.0	39.7	38.4
Manganese	0.202	N/L	PWQO	0.751	0.687	0.680	0.678	0.673	0.607	0.664	0.700	0.746	0.723	0.694	0.730	0.730	0.706
Nitrate (as N)	0.06	2.9	Table B - TGD	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrite (as N)	0.06	0.06	Table B - TGD	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	6.0 - 9.0	Table A - TGD	6.72	6.81	6.91	6.40	7.12	6.54	6.81	6.78	6.80	6.94	6.88	6.71	6.83	7.66
Phenols	0.002	0.04	Table A - TGD	< 0.002	< 0.002	< 0.002	< 0.002	0.002	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.002	< 0.002
Phosphorus, Total	0.06	0.03	PWQO	**3.75**	**6.01**	**0.65**	**0.50**	**0.95**	**0.77**	**3.60**	**0.99**	**5.20**	**3.56**	**2.88**	**4.52**	**1.79**	**1.27**
Potassium	1.7	N/L	PWQO	4.40	5.02	4.63	4.32	4.09	3.98	3.70	4.00	3.9	4.4	4.3	4.4	4.4	4.8
Silicon	5.77	N/L	PWQO	9.3	11.6	9.55	11.1	9.85	9.34	8.74	9.64	9.51	9.52	8.58	9.33	8.63	9.33
Sodium	3.9	N/L	PWQO	52.1	50.9	45.5	46.7	42.8	42.9	42.8	42.2	39.3	38.0	39.6	40.7	37.4	38.3
Strontium	0.13	N/L	PWQO	0.234	0.231	0.231	0.267	0.258	0.249	0.247	0.280	0.282	0.262	0.266	0.277	0.284	0.289
Sulphate	8	100	Table A - TGD	5.5	6.3	6.7	5.8	4	4	5	6	7	5	8	8	7	**199**
Total Dissolved Solids	149	N/L	PWQO	397	403	374	386	383	397	367	377	386	371	353	353	346	334
Total Suspended Solids	7	N/L	PWQO	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	1.0	N/L	PWQO	< 0.5	< 0.5	< 0.5	0.5	0.5	< 0.5	0.7	0.7	0.6	0.7	0.6	0.6	0.6	0.4
Zinc	0.005	0.089	Table A - TGD	< 0.002	< 0.002	< 0.002	0.003	0.004	0.008	0.015	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

Notes:
1. Alternative Standard Limits in accordance with MECP-approved Progressive Closure Plan, containing stand
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding alternative standard limits.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Table 8
Groundwater & Surface Water Quality
Alternative Standard Limits
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	Alternative Standard Limits	Source	BH04-1D													
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19
Alkalinity ($CaCO_3$)	71	< 25% decrease	PWQO	308	354	319	323	337	305	295	287	281	236	241	260	250	230
Aluminum	0.12	0.075	PWQO	**0.0777**	0.0323	0.0411	**0.112**	0.0098	0.012	0.02	0.03	0.02	0.04	0.03	0.04	0.04	0.04
Ammonia, Total (as N)	0.1	N/L	PWQO	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.82	0.74	0.82	0.85	0.96	0.92
Ammonia, Un-ionized (as N) [2]	0.0003	0.100	Table A - TGD	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	0.054	2.300	Table A - TGD	0.521	0.499	0.476	0.473	0.480	0.414	0.442	0.416	0.438	0.489	0.402	0.485	0.451	0.489
Boron	0.016	3.550	Table A - TGD	0.414	0.409	0.413	0.390	0.444	0.345	0.349	0.299	0.303	0.284	0.274	0.289	0.316	0.257
Calcium	20.6	N/L	PWQO	63.8	62.1	58.1	51.1	66.7	55.6	56.2	54.2	55.4	52.1	50.8	61.0	60.3	62.1
Chemical Oxygen Demand	52	N/L	PWQO	29	32	38	35	31	38	41	61	33	36	31	40	36	41
Chloride	6.5	180	Table A - TGD	36	37	33	34	33	32	29	29	25.2	21.9	34.2	46.4	53.3	56.1
Chromium	0.001	0.064	Table A - TGD	0.0016	0.0112	0.00203	0.00127	0.00081	0.00085	< 0.002	< 0.002	0.001	0.002	0.001	0.001	0.002	0.002
Cobalt	0.0003	0.0009	PWQO	**0.00420**	**0.00348**	**0.00242**	**0.002021**	**0.00144**	**0.000983**	< 0.005	< 0.005	< 0.005	< 0.005	0.0006	**0.0011**	**0.0010**	**0.0010**
Conductivity (µS/cm) [3]	148	N/L	PWQO	571	600	647	653	510	570	510	492	545	425	393	474	470	838
Copper	0.0012	0.0069	Table A - TGD	0.0018	0.0048	0.00160	0.00125	0.00089	0.00035	0.00060	0.00040	0.0006	0.0004	0.0006	0.0011	0.0004	0.0005
Dissolved Organic Carbon	19.5	N/L	PWQO	8.2	5.8	7.0	11.6	7.5	8.1	8.7	8.7	11.1	10.7	12.6	11.0	11.1	12.0
Dissolved Oxygen [3]	7.22	5	PWQO	-	-	-	-	-	-	-	-	-	-	6.25	6.43	5.87	**3.62**
Iron	3.06	1.000	Table A - TGD	**34.3**	**38.4**	**34.0**	**34.4**	**37.1**	**33.9**	**37.6**	**37.2**	**38.6**	**31.9**	**30.4**	**39.0**	**36.3**	**36.7**
Magnesium	8.48	N/L	PWQO	36.7	34.5	30.9	32.0	35.1	30.4	30.8	31.5	30.9	27.3	26.5	30.3	32.1	32.1
Manganese	0.202	N/L	PWQO	1.36	1.42	1.24	1.26	1.44	1.24	1.27	1.31	1.35	1.26	1.21	1.55	1.55	1.55
Nitrate (as N)	0.06	2.9	Table B - TGD	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrite (as N)	0.06	0.06	Table B - TGD	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	6.0 - 9.0	Table A - TGD	6.66	6.75	6.62	6.37	7.20	6.52	6.53	6.66	6.79	7.28	6.81	6.63	6.78	7.01
Phenols	0.002	0.04	Table A - TGD	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003	< 0.002	< 0.002
Phosphorus, Total	0.06	0.03	PWQO	**0.43**	**0.55**	**0.37**	**0.50**	**0.15**	**0.43**	**0.64**	**0.44**	**0.97**	**0.48**	**1.35**	**0.33**	**0.27**	**0.35**
Potassium	1.7	N/L	PWQO	11.60	12.80	12.4	10.2	12.1	10.4	10.4	10.6	10.9	11.2	11.9	12.2	13.2	13.6
Silicon	5.77	N/L	PWQO	8.50	10.40	8.87	10.0	9.47	8.40	8.32	8.78	9.16	9.02	8.54	8.68	8.19	8.65
Sodium	3.9	N/L	PWQO	36.7	35.8	32.0	32.8	31.6	29.0	28.6	28.0	28.5	23.3	25.3	27.1	27.7	27.5
Strontium	0.13	N/L	PWQO	0.352	0.331	0.300	0.338	0.372	0.318	0.305	0.309	0.303	0.262	0.267	0.313	0.325	0.332
Sulphate	8	100	Table A - TGD	5.5	8.4	7.6	9.6	10	8	9	9	8	7	8	8	7	7
Total Dissolved Solids	149	N/L	PWQO	431	466	400	380	411	391	368	360	356	311	282	339	345	341
Total Suspended Solids	7	N/L	PWQO	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	1.0	N/L	PWQO	0.8	1.1	0.9	1.0	1.0	1.0	1.2	1.2	1.3	1.2	1.3	1.2	1.4	1.4
Zinc	0.005	0.089	Table A - TGD	< 0.002	< 0.002	< 0.002	0.005	0.003	0.013	0.015	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

Notes:
1. Alternative Standard Limits in accordance with MECP-approved Progressive Closure Plan, containing stand
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding alternative standard limits.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Table 8
Groundwater & Surface Water Quality
Alternative Standard Limits
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	Alternative Standard Limits	Source	MW07-4R											
				09-Sep-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19
Alkalinity ($CaCO_3$)	71	< 25% decrease	PWQO	10	9	16	16	14	11	28	14	11	10	10	11
Aluminum	0.12	0.075	PWQO	0.0183	0.0303	0.0179	0.014	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.01	< 0.01	0.01
Ammonia, Total (as N)	0.1	N/L	PWQO	0.3	< 0.1	0.2	< 0.1	0.020	0.030	0.07	0.02	0.04	0.05	0.05	0.04
Ammonia, Un-ionized (as N) [2]	0.0003	0.100	Table A - TGD	-	-	-	-	-	-	-	-	-	-	-	-
Barium	0.054	2.300	Table A - TGD	0.0108	0.0144	0.0119	0.0138	0.0110	0.0100	0.011	0.030	0.016	0.026	0.020	0.022
Boron	0.016	3.550	Table A - TGD	0.0045	0.0108	0.0692	0.0294	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	0.006
Calcium	20.6	N/L	PWQO	4.69	4.71	6.34	5.96	5.16	5.53	12.0	6.23	7.98	10.6	10.7	9.26
Chemical Oxygen Demand	52	N/L	PWQO	33	< 8	17	9	125	40	684	201	376	44	88	33
Chloride	6.5	180	Table A - TGD	5.4	4.8	7	7	6	7	6.0	8.9	15.7	19.6	20.5	13.0
Chromium	0.001	0.064	Table A - TGD	0.00034	0.00030	< 0.00003	0.00012	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001
Cobalt	0.0003	0.0009	PWQO	0.000609	0.000329	0.000608	0.000194	< 0.005	< 0.005	< 0.005	< 0.005	0.0002	0.0005	0.0002	0.0006
Conductivity (µS/cm) [3]	148	N/L	PWQO	146	33	40	161	41	48	50	67	55	84	73	131
Copper	0.0012	0.0069	Table A - TGD	0.00038	0.00053	0.00074	0.00067	0.00040	0.00050	0.0006	0.0012	0.0007	0.0005	0.0010	0.0012
Dissolved Organic Carbon	19.5	N/L	PWQO	< 1	2.6	< 1	1.9	1	0.5	1.7	1.3	1.3	1.3	1.6	1.6
Dissolved Oxygen [3]	7.22	5	PWQO	-	-	-	-	-	-	-	-	10.17	7.13	11.58	5.09
Iron	3.06	1.000	Table A - TGD	0.244	0.505	0.578	0.605	0.032	0.165	0.698	0.267	0.318	0.263	0.823	0.133
Magnesium	8.48	N/L	PWQO	1.88	1.99	2.15	2.32	1.88	2.20	2.10	2.36	3.31	4.19	4.62	3.94
Manganese	0.202	N/L	PWQO	0.00775	0.0160	0.0958	0.0172	0.0140	0.0070	0.093	0.051	0.067	0.029	0.062	0.007
Nitrate (as N)	0.06	2.9	Table B - TGD	0.12	0.12	0.13	0.06	0.2	0.2	0.18	0.13	0.15	< 0.05	< 0.05	0.07
Nitrite (as N)	0.06	0.06	Table B - TGD	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	6.0 - 9.0	Table A - TGD	6.90	6.44	6.46	6.41	7.25	7.64	7.58	6.78	7.10	6.77	7.30	7.36
Phenols	0.002	0.04	Table A - TGD	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003	< 0.002	< 0.002
Phosphorus, Total	0.06	0.03	PWQO	**0.05**	**0.10**	**0.20**	**0.03**	**0.35**	**0.10**	**1.65**	**0.42**	**0.59**	**0.39**	**0.16**	**0.09**
Potassium	1.7	N/L	PWQO	0.873	0.97	0.867	0.935	0.600	0.700	0.4	0.8	1.0	1.1	1.1	1.1
Silicon	5.77	N/L	PWQO	6.12	7.48	5.72	6.05	5.08	5.93	5.56	6.20	5.22	6.20	5.53	6.23
Sodium	3.9	N/L	PWQO	2.54	2.96	3.31	2.64	2.40	2.90	4.3	2.5	3.5	3.6	3.7	3.5
Strontium	0.13	N/L	PWQO	0.0315	0.0333	0.0380	0.0348	0.0320	0.0350	0.050	0.042	0.062	0.072	0.073	0.064
Sulphate	8	100	Table A - TGD	8.2	6.6	9	7	6	7	5	4	7	16	13	10
Total Dissolved Solids	149	N/L	PWQO	< 30	31	74	49	35	38	50	45	46	65	64	50
Total Suspended Solids	7	N/L	PWQO	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	1.0	N/L	PWQO	-	< 0.5	< 0.5	< 0.5	1.6	0.7	5.9	2.2	2.6	1.6	0.7	0.4
Zinc	0.005	0.089	Table A - TGD	0.001	0.003	0.005	0.004	0.005	0.006	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005

Notes:
1. Alternative Standard Limits in accordance with MECP-approved Progressive Closure Plan, containing stand
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding alternative standard limits.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Table 8
Groundwater & Surface Water Quality
Alternative Standard Limits
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	Alternative Standard Limits	Source	MW07-5R										
				09-Sep-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19
Alkalinity ($CaCO_3$)	71	< 25% decrease	PWQO	221	234	187	247	258	358	225	342	325	339	367
Aluminum	0.12	0.075	PWQO	0.0446	0.0225	0.0187	0.011	0.0200	0.020	0.04	0.04	0.05	0.05	0.05
Ammonia, Total (as N)	0.1	N/L	PWQO	3.4	2.7	1.3	1.8	1.4	1.8	1.63	1.38	1.61	1.46	1.69
Ammonia, Un-ionized (as N) [2]	0.0003	0.100	Table A - TGD	-	-	-	-	-	-	-	-	-	-	-
Barium	0.054	2.300	Table A - TGD	0.339	0.302	0.352	0.401	0.457	0.441	0.651	0.415	0.604	0.552	0.641
Boron	0.016	3.550	Table A - TGD	0.0104	0.0111	0.0409	0.0292	0.1020	0.1510	0.187	0.185	0.258	0.288	0.300
Calcium	20.6	N/L	PWQO	41.1	36.8	50.5	51.8	55.7	52.5	61.0	56.8	68.4	69.5	74.9
Chemical Oxygen Demand	52	N/L	PWQO	78	73	55	68	256	466	253	682	165	350	598
Chloride	6.5	180	Table A - TGD	49	46	47	67	74	80	67.4	81.0	105	105	103
Chromium	0.001	0.064	Table A - TGD	0.00165	0.00083	0.00040	0.00041	< 0.002	< 0.002	0.003	< 0.001	< 0.001	0.001	0.001
Cobalt	0.0003	0.0009	PWQO	**0.00141**	**0.001208**	0.000832	0.000766	**0.011000**	**0.008000**	< 0.005	0.0008	0.0007	0.0008	0.0007
Conductivity (µS/cm) [3]	148	N/L	PWQO	628	793	591	754	699	608	784	627	831	750	828
Copper	0.0012	0.0069	Table A - TGD	0.00095	0.00031	0.00056	0.00056	0.00060	0.00060	0.0004	0.0003	0.0005	0.0018	0.0013
Dissolved Organic Carbon	19.5	N/L	PWQO	12.2	12.6	8.1	8.5	8.8	8.1	9.6	10.2	10.6	11.3	12.9
Dissolved Oxygen [3]	7.22	5	PWQO	-	-	-	-	-	-	-	5.84	**3.88**	6.46	**3.96**
Iron	3.06	1.000	Table A - TGD	**75.1**	**82.8**	**109**	**128**	**144**	**150**	**150**	**143**	**181**	**182**	**162**
Magnesium	8.48	N/L	PWQO	21.2	19.5	20.8	23.4	27.0	29.3	30.2	30.4	33.6	38.3	41.3
Manganese	0.202	N/L	PWQO	0.564	0.556	0.631	0.652	0.689	0.827	0.720	0.859	0.783	0.858	0.790
Nitrate (as N)	0.06	2.9	Table B - TGD	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrite (as N)	0.06	0.06	Table B - TGD	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	6.0 - 9.0	Table A - TGD	6.44	6.72	6.77	6.36	6.45	6.45	6.63	6.55	6.67	6.84	6.93
Phenols	0.002	0.04	Table A - TGD	0.038	0.007	0.004	0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.005	< 0.002	< 0.002
Phosphorus, Total	0.06	0.03	PWQO	**0.11**	**0.11**	**0.11**	**0.09**	**0.19**	**0.41**	**0.17**	**0.63**	**0.28**	**0.25**	**0.39**
Potassium	1.7	N/L	PWQO	10.4	10.3	3.13	2.77	2.40	2.30	2.90	3.2	3.2	3.7	3.7
Silicon	5.77	N/L	PWQO	12.4	12.8	10.9	11.1	10.0	9.3	10.7	7.72	9.74	8.27	8.77
Sodium	3.9	N/L	PWQO	31.8	29.2	16.9	19.4	29.1	29.8	34.8	41.5	54.2	64.4	75.0
Strontium	0.13	N/L	PWQO	0.269	0.267	0.289	0.301	0.299	0.302	0.319	0.302	0.356	0.368	0.398
Sulphate	8	100	Table A - TGD	0.5	3.8	1	2	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Dissolved Solids	149	N/L	PWQO	340	294	283	400	389	498	384	436	494	510	541
Total Suspended Solids	7	N/L	PWQO	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	1.0	N/L	PWQO	-	2.6	1.8	2.2	6.3	14.6	4.5	16.2	8.5	6.1	11.5
Zinc	0.005	0.089	Table A - TGD	0.005	0.003	0.006	0.006	0.015	0.010	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

Notes:
1. Alternative Standard Limits in accordance with MECP-approved Progressive Closure Plan, containing stand
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding alternative standard limits.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Table 8
Groundwater & Surface Water Quality
Alternative Standard Limits
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	Alternative Standard Limits	Source	SW1							SW2				
				23-Apr-13	01-Nov-13	18-May-16	31-May-17	17-Oct-17	24-Apr-18	07-May-19	23-Apr-13	31-May-17	17-Oct-17	24-Apr-18	07-May-19
Alkalinity ($CaCO_3$)	71	< 25% decrease	PWQO	8	10	12	21	15	8	11	5	10	23	11	10
Aluminum	0.12	0.075	PWQO	**0.098**	**0.113**	**0.170**	**0.29**	**0.08**	**0.09**	**0.12**	**0.132**	**0.34**	**0.14**	**0.09**	**0.13**
Ammonia, Total (as N)	0.1	N/L	PWQO	0.4	< 0.1	0.04	0.12	0.03	0.04	0.04	< 0.1	0.29	0.04	0.02	0.06
Ammonia, Un-ionized (as N) [2]	0.0003	0.100	Table A - TGD	0.000036	0.000037	0.000045	0.000032	0.000001	0.000003	0.000007	0.000047	0.000086	0.000010	0.000002	0.000011
Barium	0.054	2.300	Table A - TGD	0.0127	0.0194	0.0170	0.047	0.027	0.010	0.037	0.0136	0.056	0.039	0.021	0.038
Boron	0.016	3.550	Table A - TGD	0.0072	0.0053	< 0.005	0.007	0.011	< 0.005	0.038	0.0077	0.009	0.009	0.005	0.037
Calcium	20.6	N/L	PWQO	4.67	5.97	5.48	12.0	9.54	3.05	13.2	4.66	11.4	11.6	7.89	13.3
Chemical Oxygen Demand	52	N/L	PWQO	63	75	76	157	74	49	53	68	156	134	33	52
Chloride	6.5	180	Table A - TGD	4.0	3.0	2.3	4.4	2.6	4.5	5.9	3.6	5.2	4.1	9.3	6.8
Chromium	0.001	0.064	Table A - TGD	< 0.0005	0.0007	< 0.002	0.001	< 0.001	< 0.001	0.001	< 0.0005	0.002	< 0.001	< 0.001	0.001
Cobalt	0.0003	0.0009	PWQO	0.00018	0.00021	0.00020	**0.0014**	0.0002	0.0002	0.0001	0.000205	**0.0030**	0.0008	0.0002	0.0001
Conductivity (µS/cm) [3]	148	N/L	PWQO	35	43	20	49	45	25	42	37	73	54	27	43
Copper	0.0012	0.0069	Table A - TGD	0.0009	0.0008	0.0044	0.0008	**0.0070**	0.0010	0.0010	0.0009	0.0040	0.0066	0.0013	0.0008
Dissolved Organic Carbon	19.5	N/L	PWQO	20.4	27.1	40.0	43.0	21.3	12.6	20.2	21.1	40.3	48.0	11.7	12.9
Dissolved Oxygen [3]	7.22	5	PWQO	**2.90**	5.22	7.98	**4.01**	**4.52**	7.17	5.58	**3.68**	8.94	**3.92**	8.25	**2.35**
Iron	3.06	1.000	Table A - TGD	0.27	0.53	0.55	**1.81**	0.908	0.450	0.391	0.33	**3.12**	**2.77**	0.579	0.409
Magnesium	8.48	N/L	PWQO	2.36	2.68	2.74	4.54	3.27	1.73	4.42	2.24	2.77	4.42	3.06	4.44
Manganese	0.202	N/L	PWQO	0.0110	0.0476	0.0330	0.200	0.051	0.050	0.023	0.0151	0.533	0.174	0.057	0.022
Nitrate (as N)	0.06	2.9	Table B - TGD	< 0.06	< 0.06	< 0.1	< 0.05	< 0.05	< 0.05	0.08	< 0.06	< 0.05	< 0.05	0.08	< 0.05
Nitrite (as N)	0.06	0.06	Table B - TGD	< 0.03	< 0.03	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.03	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	6.0 - 9.0	Table A - TGD	**5.84**	6.33	6.88	6.06	**5.54**	**5.95**	6.00	6.56	**5.91**	6.19	6.12	6.01
Phenols	0.002	0.04	Table A - TGD	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002
Phosphorus, Total	0.06	0.03	PWQO	0.022	**0.030**	**0.070**	**0.077**	**0.04**	**0.03**	0.02	0.018	**0.214**	**0.06**	**0.04**	0.01
Potassium	1.7	N/L	PWQO	0.93	0.52	0.10	1.8	0.6	0.7	0.6	0.86	1.0	0.4	0.9	0.5
Silicon	5.77	N/L	PWQO	3.26	7.40	3.83	4.97	6.78	2.87	2.49	3.38	4.17	5.74	2.93	1.98
Sodium	3.9	N/L	PWQO	2.52	2.32	3.10	4.3	3.9	2.7	5.9	2.46	4.5	4.3	4.1	5.8
Strontium	0.13	N/L	PWQO	0.0275	0.0350	0.0310	0.091	0.063	0.020	0.083	0.0279	0.094	0.077	0.056	0.083
Sulphate	8	100	Table A - TGD	6.5	8.0	5.0	3	< 1	2	6	6.6	6	< 1	3	6
Total Dissolved Solids	149	N/L	PWQO	63	89	30	38	27	24	34	91	41	38	27	32
Total Suspended Solids	7	N/L	PWQO	< 2	4	4	6	4	< 3	4	2	20	30	< 3	3
Total Kjeldahl Nitrogen	1.0	N/L	PWQO	0.6	0.6	1.3	1.67	0.8	0.5	0.7	0.6	2.47	1.4	0.5	0.6
Zinc	0.005	0.089	Table A - TGD	0.004	0.006	< 0.005	0.042	0.027	< 0.005	< 0.005	0.005	0.069	0.025	0.024	0.006

Notes:
1. Alternative Standard Limits in accordance with MECP-approved Progressive Closure Plan, containing stand
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding alternative standard limits.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Table 8
Groundwater & Surface Water Quality
Alternative Standard Limits
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	Alternative Standard Limits	Source	SW3	SW5		
				31-May-17	14-May-15	31-May-17	24-Apr-18
Alkalinity ($CaCO_3$)	71	< 25% decrease	PWQO	11	283	227	67
Aluminum	0.12	0.075	PWQO	**0.31**	0.0078	0.04	0.05
Ammonia, Total (as N)	0.1	N/L	PWQO	0.12	< 0.1	0.07	0.92
Ammonia, Un-ionized (as N) [2]	0.0003	0.100	Table A - TGD	0.000009	0.00105	0.00045	0.00281
Barium	0.054	2.300	Table A - TGD	0.045	0.115	0.164	0.035
Boron	0.016	3.550	Table A - TGD	0.006	0.0868	0.080	0.066
Calcium	20.6	N/L	PWQO	11.1	54.9	57.6	15.5
Chemical Oxygen Demand	52	N/L	PWQO	135	103	96	32
Chloride	6.5	180	Table A - TGD	6.5	39	65.0	3.1
Chromium	0.001	0.064	Table A - TGD	0.002	0.00010	< 0.001	< 0.001
Cobalt	0.0003	0.0009	PWQO	0.0007	0.000827	**0.0009**	0.0004
Conductivity (µS/cm) [3]	148	N/L	PWQO	63	488	690	116
Copper	0.0012	0.0069	Table A - TGD	0.0023	0.00043	0.0007	0.0014
Dissolved Organic Carbon	19.5	N/L	PWQO	39.1	52.2	19.8	8.9
Dissolved Oxygen [3]	7.22	5	PWQO	**2.75**	**4.85**	**2.85**	7.65
Iron	3.06	1.000	Table A - TGD	0.663	**4.35**	**4.68**	0.875
Magnesium	8.48	N/L	PWQO	2.77	33.9	33.5	6.14
Manganese	0.202	N/L	PWQO	0.386	0.462	0.896	0.497
Nitrate (as N)	0.06	2.9	Table B - TGD	< 0.05	< 0.06	< 0.05	0.09
Nitrite (as N)	0.06	0.06	Table B - TGD	< 0.05	< 0.03	< 0.05	< 0.05
pH (units) [3]	7.58	6.0 - 9.0	Table A - TGD	**5.42**	7.55	7.21	7.45
Phenols	0.002	0.04	Table A - TGD	0.005	0.001	< 0.001	< 0.001
Phosphorus, Total	0.06	0.03	PWQO	**0.530**	**0.080**	**0.135**	**0.04**
Potassium	1.7	N/L	PWQO	2.7	7.62	10.6	3.0
Silicon	5.77	N/L	PWQO	5.09	8.93	8.13	3.04
Sodium	3.9	N/L	PWQO	3.0	28.5	33.6	7.6
Strontium	0.13	N/L	PWQO	0.065	0.377	0.395	0.105
Sulphate	8	100	Table A - TGD	2	< 10	4	< 1
Total Dissolved Solids	149	N/L	PWQO	33	426	371	90
Total Suspended Solids	7	N/L	PWQO	14	14	30	< 3
Total Kjeldahl Nitrogen	1.0	N/L	PWQO	2.18	1.2	1.73	1.3
Zinc	0.005	0.089	Table A - TGD	0.113	0.003	0.040	< 0.005

Notes:
1. Alternative Standard Limits in accordance with MECP-approved Progressive Closure Plan, containing stand
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding alternative standard limits.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Table 8
Groundwater & Surface Water Quality
Alternative Standard Limits
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	Alternative Standard Limits	Source	SW6 (Background)													
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19
Alkalinity ($CaCO_3$)	71	< 25% decrease	PWQO	25	35	48	81	59	64	52	69	71	82	34	54	36	123
Aluminum	0.12	0.075	PWQO	0.0530	0.0467	0.0174	**0.0969**	0.0449	**0.193**	0.030	0.050	0.02	0.04	0.04	**0.14**	0.06	**0.13**
Ammonia, Total (as N)	0.1	N/L	PWQO	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.4	0.02	0.01	0.02	0.04	0.03	0.04	0.05	0.06
Ammonia, Un-ionized (as N) [2]	0.0003	0.100	Table A - TGD	0.00083	0.00031	0.00015	0.00002	0.00008	0.00085	0.00024	0.00008	0.00007	0.00027	0.00001	0.00002	0.00009	0.00029
Barium	0.054	2.300	Table A - TGD	0.0198	0.0256	0.0318	0.0387	0.0295	0.0551	0.0240	0.0410	0.039	0.050	0.017	0.061	0.044	0.072
Boron	0.016	3.550	Table A - TGD	0.0071	0.0067	0.0075	0.0035	0.0051	0.0213	< 0.005	0.0070	0.006	0.010	< 0.005	0.014	0.038	0.016
Calcium	20.6	N/L	PWQO	8.3	10.6	15.4	17.3	14.4	19.9	12.7	20.1	18.6	20.1	9.66	20.7	19.2	33.4
Chemical Oxygen Demand	52	N/L	PWQO	42	47	36	43	49	47	48	81	49	53	22	67	31	78
Chloride	6.5	180	Table A - TGD	3.0	5.1	4.1	6.6	4	5	4	5	6.1	4.2	9.3	8.0	8.4	7.9
Chromium	0.001	0.064	Table A - TGD	< 0.0005	0.0007	0.00027	0.00028	0.00031	0.00088	< 0.002	< 0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001
Cobalt	0.0003	0.0009	PWQO	0.000169	0.000196	0.000097	0.000098	0.000162	0.000397	< 0.0001	0.000200	< 0.0001	0.0003	< 0.0001	0.0003	< 0.0001	0.0003
Conductivity (µS/cm) [3]	148	N/L	PWQO	70	90	146	126	84	148	98	104	146	186	55	90	74	339
Copper	0.0012	0.0069	Table A - TGD	0.0008	0.0007	0.00017	0.00020	0.00023	0.00101	0.00010	0.00020	0.0001	**0.0069**	0.0014	0.0060	0.0002	0.0012
Dissolved Organic Carbon	19.5	N/L	PWQO	13.9	15.6	16.4	20.8	18.3	15.0	24.5	33.0	18.3	19.9	11.2	23.5	11.8	15.8
Dissolved Oxygen [3]	7.22	5	PWQO	7.06	8.92	8.22	7.21	**3.77**	6.50	**4.61**	**4.34**	**4.30**	**2.57**	11.36	**3.46**	5.59	**4.93**
Iron	3.06	1.000	Table A - TGD	0.59	**1.24**	0.356	**1.65**	**1.43**	**3.41**	0.48	**3.20**	0.686	**5.27**	0.477	**7.10**	0.370	**3.65**
Magnesium	8.48	N/L	PWQO	3.59	4.74	6.39	8.30	6.14	8.12	6.21	8.50	8.00	8.49	4.39	8.45	6.45	14.1
Manganese	0.202	N/L	PWQO	0.015	0.050	0.0115	0.0522	0.0515	0.250	0.010	0.052	0.028	0.226	0.070	0.418	0.013	0.242
Nitrate (as N)	0.06	2.9	Table B - TGD	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrite (as N)	0.06	0.06	Table B - TGD	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	6.0 - 9.0	Table A - TGD	7.62	7.31	6.72	6.11	6.60	7.04	7.73	7.79	7.08	7.63	6.73	6.55	6.92	7.45
Phenols	0.002	0.04	Table A - TGD	< 0.001	< 0.001	0.003	< 0.001	0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.016	< 0.002	< 0.002
Phosphorus, Total	0.06	0.03	PWQO	0.011	0.022	**< 0.009**	0.015	0.011	**0.096**	0.010	**0.060**	0.016	**0.07**	**0.03**	**0.06**	0.01	**0.13**
Potassium	1.7	N/L	PWQO	1.07	1.77	1.03	1.37	1.02	1.45	0.60	1.20	1.1	1.4	1.0	3.0	1.1	3.3
Silicon	5.77	N/L	PWQO	2.95	5.12	0.94	8.26	3.04	3.84	1.23	6.39	2.79	6.79	3.03	5.98	1.89	3.12
Sodium	3.9	N/L	PWQO	2.29	2.51	3.37	3.21	3.06	3.12	3.60	3.80	3.9	3.2	2.5	5.0	5.1	5.2
Strontium	0.13	N/L	PWQO	0.046	0.060	0.0649	0.0928	0.0686	0.111	0.057	0.132	0.081	0.103	0.041	0.116	0.098	0.157
Sulphate	8	100	Table A - TGD	7.5	8.1	3.8	0.8	< 1	22	4	1	2	< 1	< 1	7	2	7
Total Dissolved Solids	149	N/L	PWQO	103	100	117	154	97	177	71	89	88	99	39	80	51	147
Total Suspended Solids	7	N/L	PWQO	2	2	< 2	3	2	14	3	12	4	12	< 3	5	< 3	7
Total Kjeldahl Nitrogen	1.0	N/L	PWQO	0.5	0.6	0.5	0.7	0.7	1.4	0.7	1.2	0.74	0.8	0.4	1.1	0.4	2.0
Zinc	0.005	0.089	Table A - TGD	0.002	0.003	0.004	0.002	0.001	0.004	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.020	< 0.005	0.013

Notes:
1. Alternative Standard Limits in accordance with MECP-approved Progressive Closure Plan, containing stand
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding alternative standard limits.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

Table 8
Groundwater & Surface Water Quality
Alternative Standard Limits
Killaloe Waste Disposal Site

Parameter	Background (75th Percentile)	Alternative Standard Limits	Source	SW9													
				23-Apr-13	01-Nov-13	14-May-14	28-Oct-14	14-May-15	14-Oct-15	18-May-16	24-Oct-16	31-May-17	17-Oct-17	24-Apr-18	25-Oct-18	07-May-19	15-Oct-19
Alkalinity ($CaCO_3$)	71	< 25% decrease	PWQO	20	38	27	49	34	40	15	42	31	27	34	29	16	34
Aluminum	0.12	0.075	PWQO	0.0465	0.0552	0.0436	0.0677	0.0633	**0.394**	0.04	**0.08**	0.07	0.05	0.05	0.06	**0.08**	**0.08**
Ammonia, Total (as N)	0.1	N/L	PWQO	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	0.02	0.01	0.04	0.04	0.13	0.04	0.06	0.05
Ammonia, Un-ionized (as N) [2]	0.0003	0.100	Table A - TGD	0.00008	0.00016	0.00138	0.00002	0.00010	0.00001	0.00004	0.00005	0.00009	0.00004	0.00001	0.00005	0.00004	0.00050
Barium	0.054	2.300	Table A - TGD	0.0298	0.0372	0.0297	0.0485	0.0338	0.0461	0.016	0.062	0.043	0.042	0.031	0.052	0.040	0.046
Boron	0.016	3.550	Table A - TGD	0.011	0.005	0.0110	0.0054	0.0084	0.0088	< 0.005	0.009	0.011	0.011	0.014	0.006	0.047	0.015
Calcium	20.6	N/L	PWQO	9.96	10.1	8.24	10.7	8.04	10.4	5.4	13.6	11.7	14.9	12.0	18.8	14.2	11.4
Chemical Oxygen Demand	52	N/L	PWQO	57	100	70	117	62	67	66	112	83	86	35	97	49	91
Chloride	6.5	180	Table A - TGD	70	19	6.7	12	8	14	7.7	14.8	7.2	17.3	5.1	30.7	5.0	14.5
Chromium	0.001	0.064	Table A - TGD	< 0.0005	0.0026	0.00048	0.00127	0.00024	0.00069	< 0.002	< 0.002	0.001	< 0.001	< 0.001	< 0.001	0.001	0.001
Cobalt	0.0003	0.0009	PWQO	0.000196	0.000399	0.000223	0.000529	0.000394	0.000633	0.0001	0.0005	0.0006	0.0002	0.0002	0.0003	0.0001	0.0002
Conductivity (µS/cm) [3]	148	N/L	PWQO	161	113	321	101	66	100	59	93	79	94	59	101	59	85
Copper	0.0012	0.0069	Table A - TGD	0.0011	0.0011	0.00049	0.00038	0.00083	0.00235	< 0.0001	0.0005	0.0005	**0.0077**	0.0017	**0.0087**	0.0010	0.0010
Dissolved Organic Carbon	19.5	N/L	PWQO	16.8	35.8	31.1	58.0	22.2	23.0	30.4	52.0	19.5	29.8	11.8	36.5	14.8	41.5
Dissolved Oxygen [3]	7.22	5	PWQO	**4.25**	8.92	5.72	**4.21**	**2.43**	**3.66**	6.54	**4.08**	**4.05**	5.06	5.08	6.56	5.96	5.54
Iron	3.06	1.000	Table A - TGD	0.59	**4.36**	**2.04**	**6.51**	**3.77**	**2.85**	0.64	**7.71**	**3.40**	**1.22**	**1.32**	**3.04**	0.544	**6.54**
Magnesium	8.48	N/L	PWQO	3.52	5.17	4.29	5.33	3.73	4.95	2.79	6.84	4.84	6.00	5.12	8.10	4.81	6.03
Manganese	0.202	N/L	PWQO	0.0254	0.0968	0.0464	0.152	0.0763	0.0746	0.02	0.138	0.150	0.068	0.099	0.090	0.014	0.065
Nitrate (as N)	0.06	2.9	Table B - TGD	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.1	0.1	< 0.05	< 0.05	0.05	< 0.05	< 0.05	< 0.05
Nitrite (as N)	0.06	0.06	Table B - TGD	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) [3]	7.58	6.0 - 9.0	Table A - TGD	6.60	7.03	7.96	6.20	6.66	**5.52**	6.85	7.63	6.84	6.73	6.06	6.99	6.46	7.75
Phenols	0.002	0.04	Table A - TGD	< 0.001	< 0.001	0.003	< 0.001	0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003	< 0.002	< 0.002
Phosphorus, Total	0.06	0.03	PWQO	0.017	0.024	0.019	0.028	**0.047**	0.029	0.020	**0.050**	**0.056**	**0.04**	0.02	0.02	0.01	**0.04**
Potassium	1.7	N/L	PWQO	1.47	1.72	0.924	1.91	2.61	3.06	0.2	2.5	1.6	1.2	1.1	0.7	0.6	1.7
Silicon	5.77	N/L	PWQO	2.76	7.04	1.57	9.17	2.08	6.28	1.3	8.46	1.30	6.08	3.49	5.99	1.58	8.79
Sodium	3.9	N/L	PWQO	38.5	8.84	4.68	6.15	4.50	5.97	5.80	10.5	5.7	10.0	7.4	12.8	7.2	8.1
Strontium	0.13	N/L	PWQO	0.0646	0.0744	0.0557	0.0955	0.0501	0.0633	0.04	0.101	0.091	0.101	0.086	0.135	0.093	0.074
Sulphate	8	100	Table A - TGD	9.1	0.4	2.2	0.2	< 10	< 1	1	< 1	< 1	< 1	2	< 1	4	< 1
Total Dissolved Solids	149	N/L	PWQO	186	157	117	157	103	154	40	81	50	72	53	85	37	64
Total Suspended Solids	7	N/L	PWQO	< 2	< 6	3	7	12	9	< 3	14	18	4	< 3	< 3	3	8
Total Kjeldahl Nitrogen	1.0	N/L	PWQO	0.6	0.9	0.7	1.0	0.8	0.7	0.9	1.3	1.13	0.9	0.6	1.0	0.6	1.3
Zinc	0.005	0.089	Table A - TGD	0.004	0.003	0.006	0.006	0.005	0.008	< 0.005	< 0.005	0.033	0.049	0.023	0.014	< 0.005	0.026

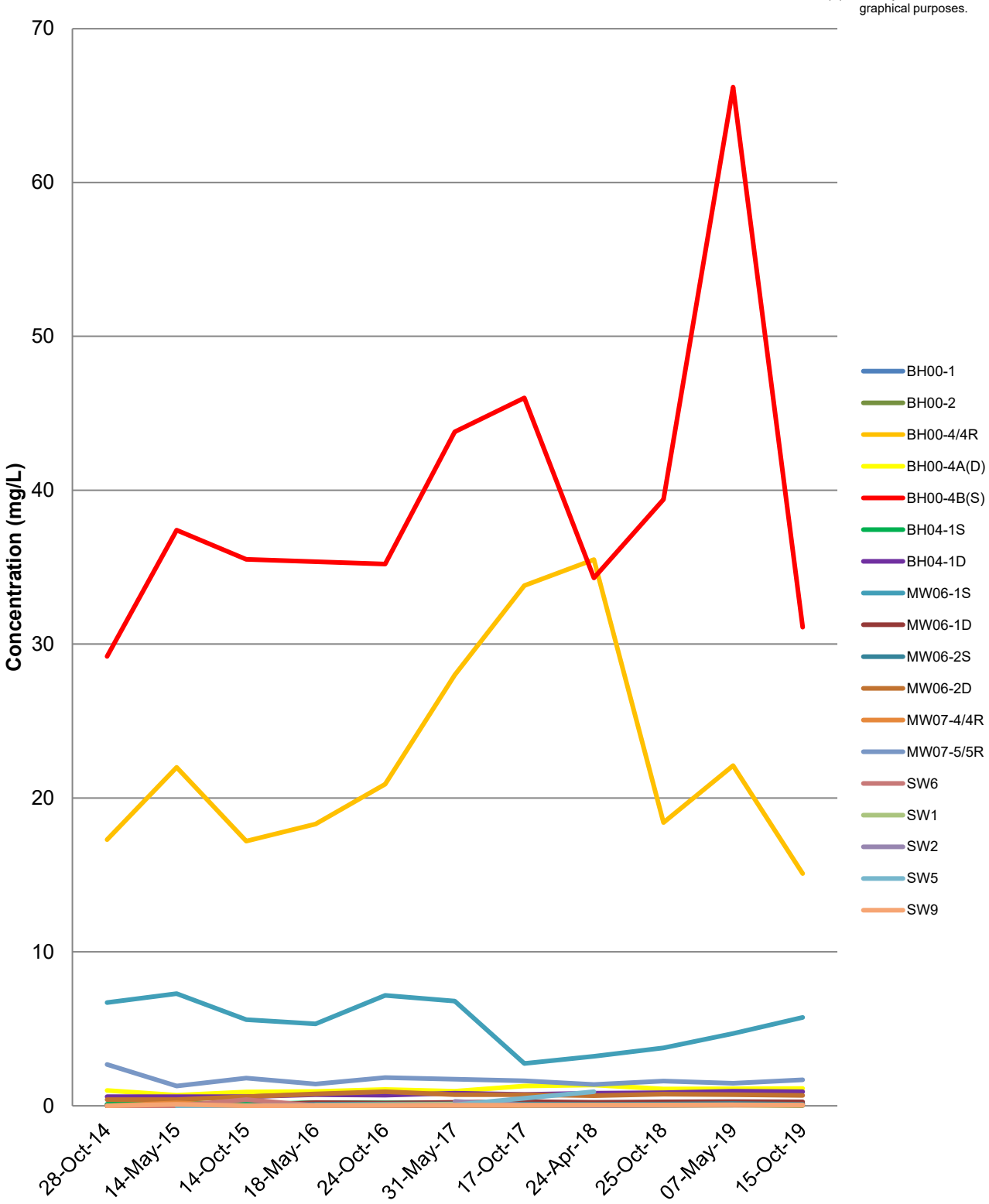
Notes:
1. Alternative Standard Limits in accordance with MECP-approved Progressive Closure Plan, containing stand
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.

Bold text and shading indicate values exceeding alternative standard limits.
N/L indicates No Limit.
All results are expressed in mg/L unless otherwise stated.

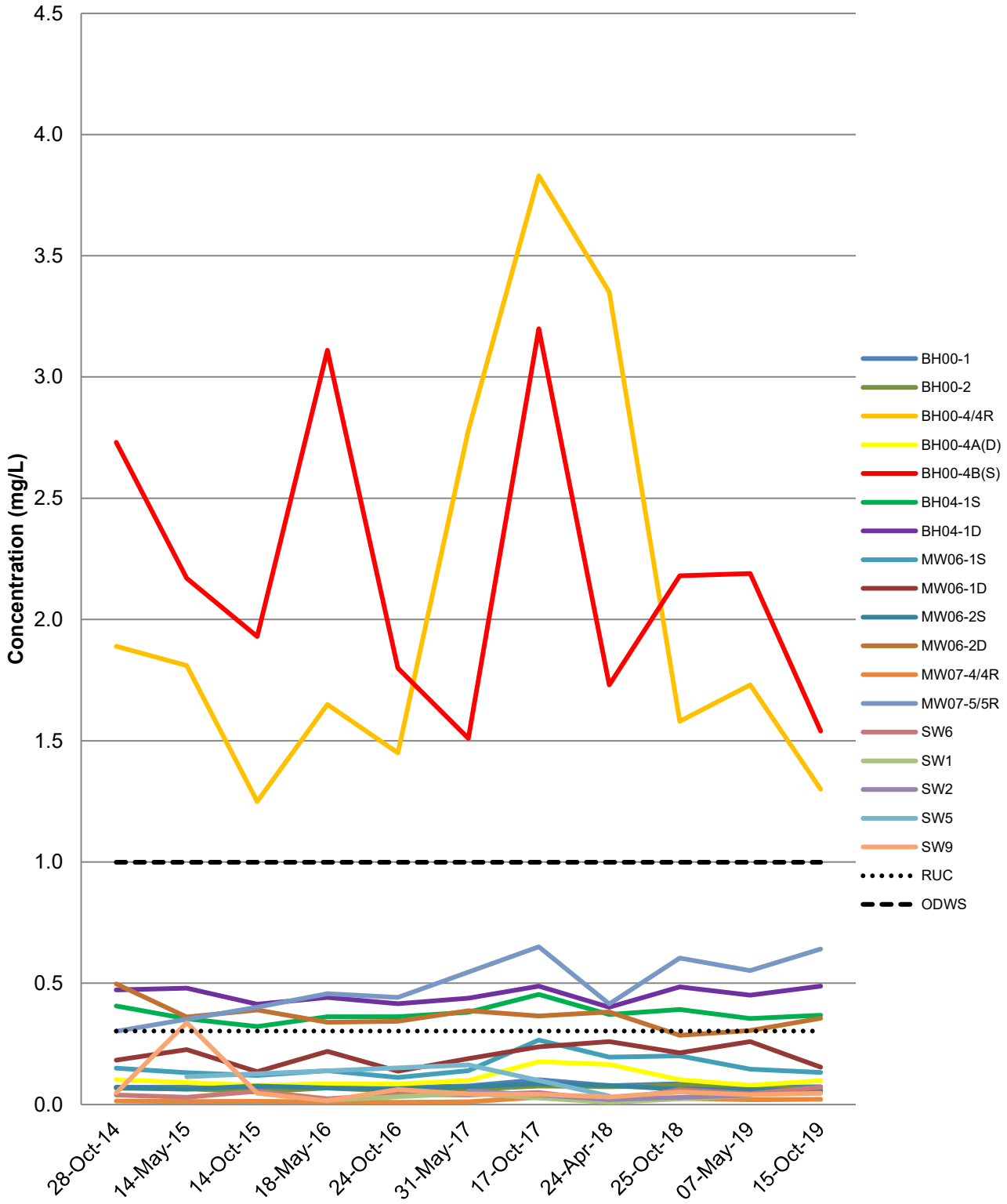
Graphs

Graph 1
Trend Analysis - Ammonia (Total) - Groundwater and Surface Water
Killaloe Waste Disposal Site

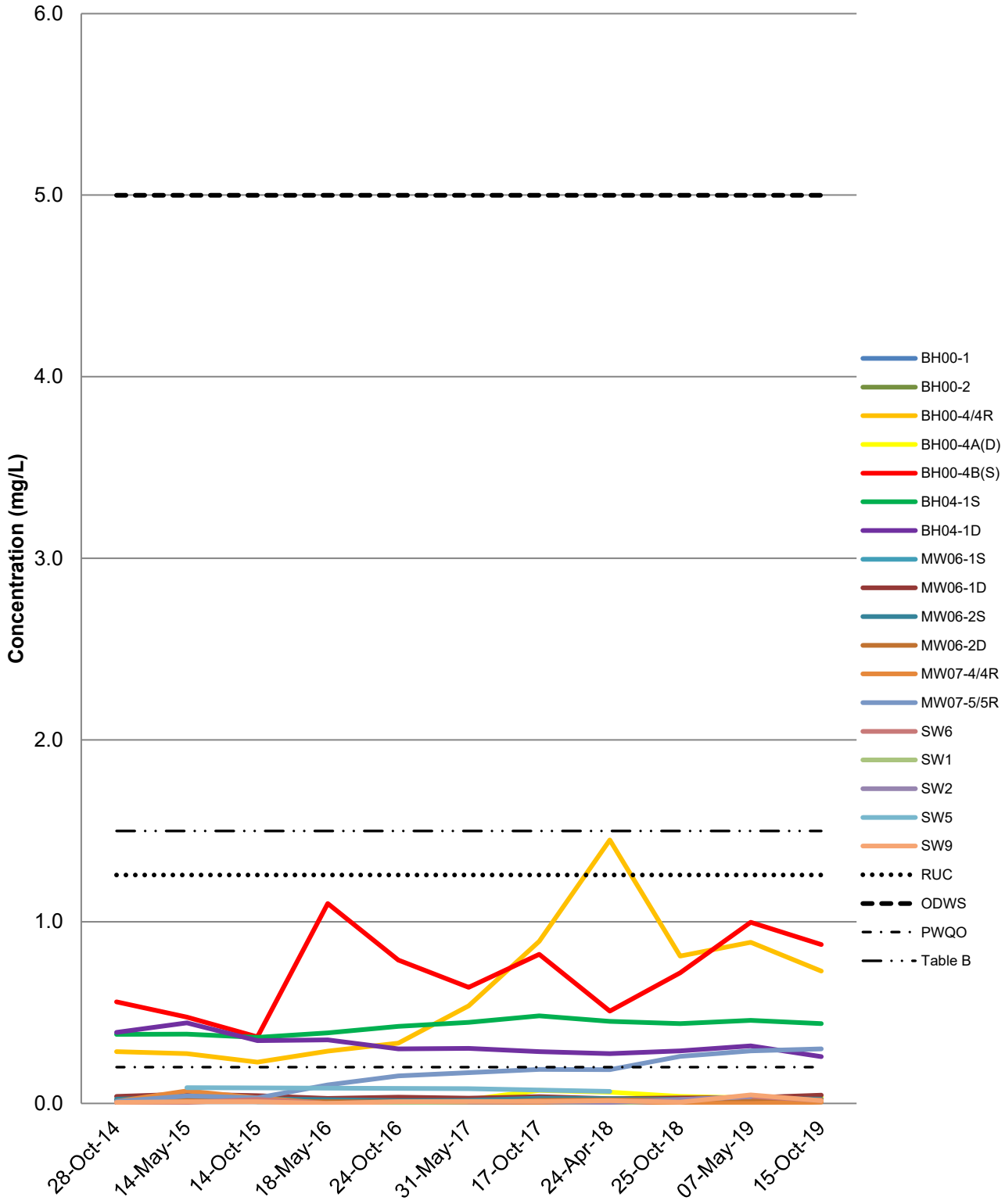
Note:
Anomolous ammonia (total) concentration of 101.0 mg/L deleted from BH00-4B(S) from May 18, 2016 for graphical purposes.



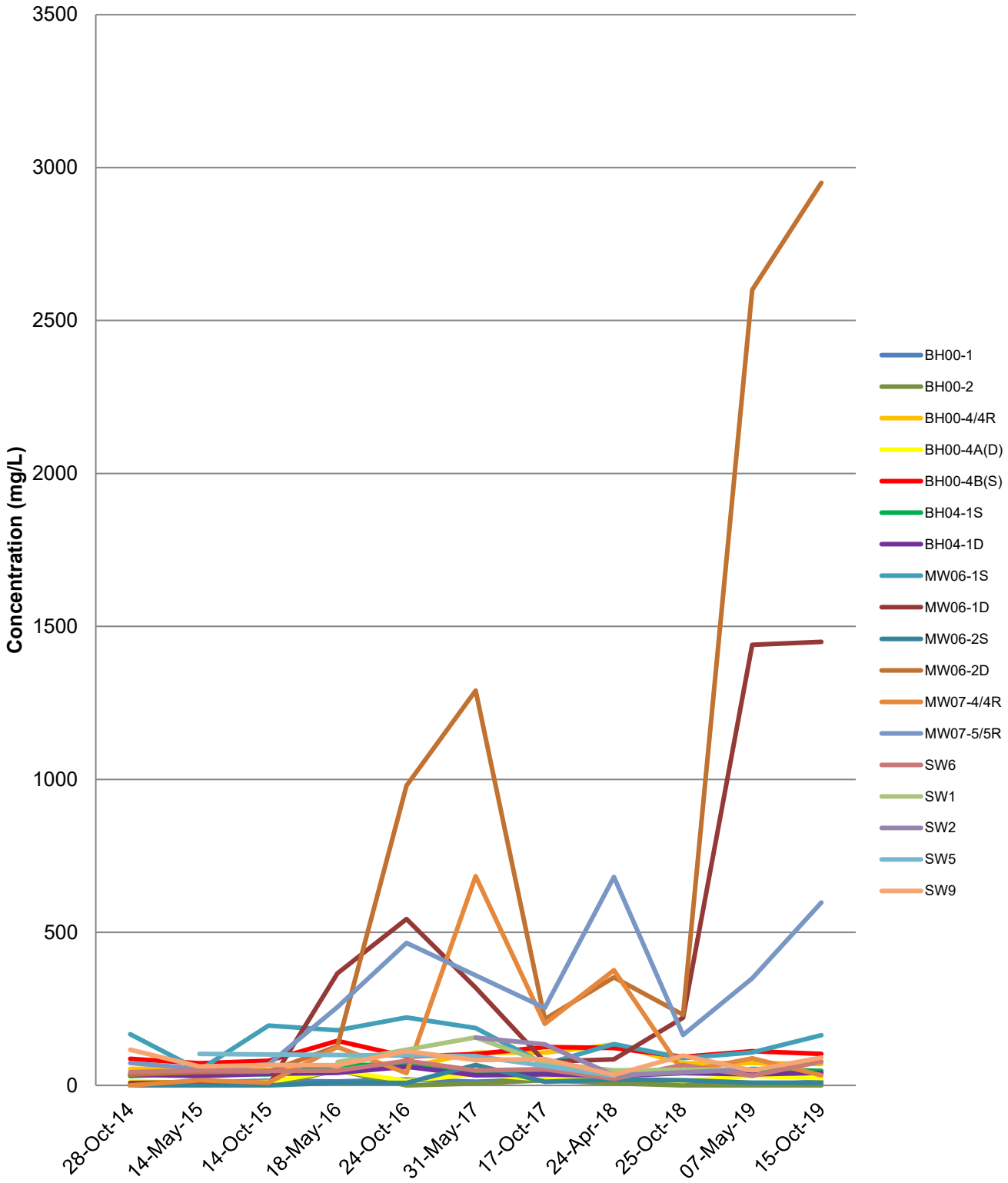
Graph 2
Trend Analysis - Barium - Groundwater and Surface Water
Killaloe Waste Disposal Site



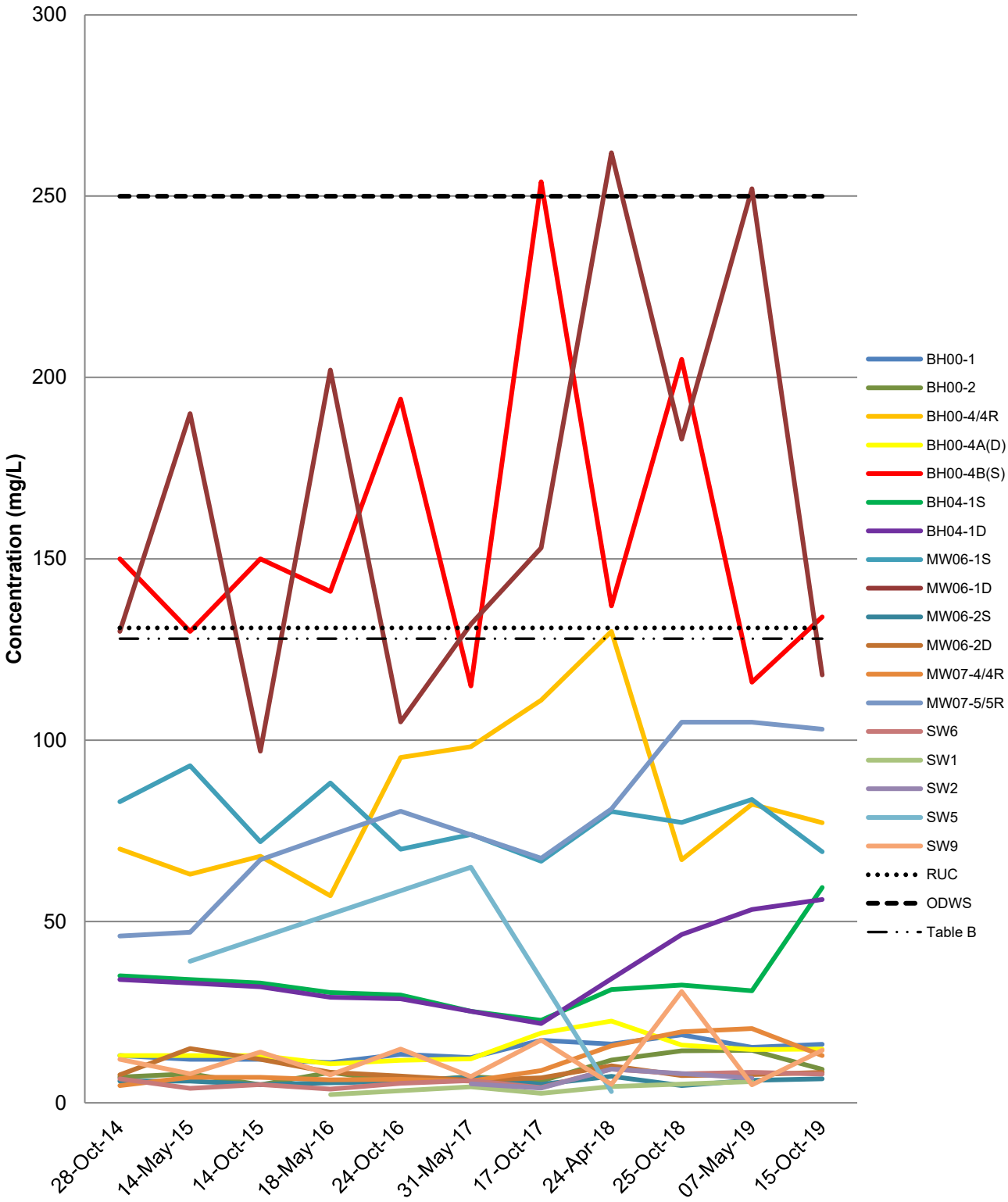
Graph 3
Trend Analysis - Boron - Groundwater and Surface Water
Killaloe Waste Disposal Site



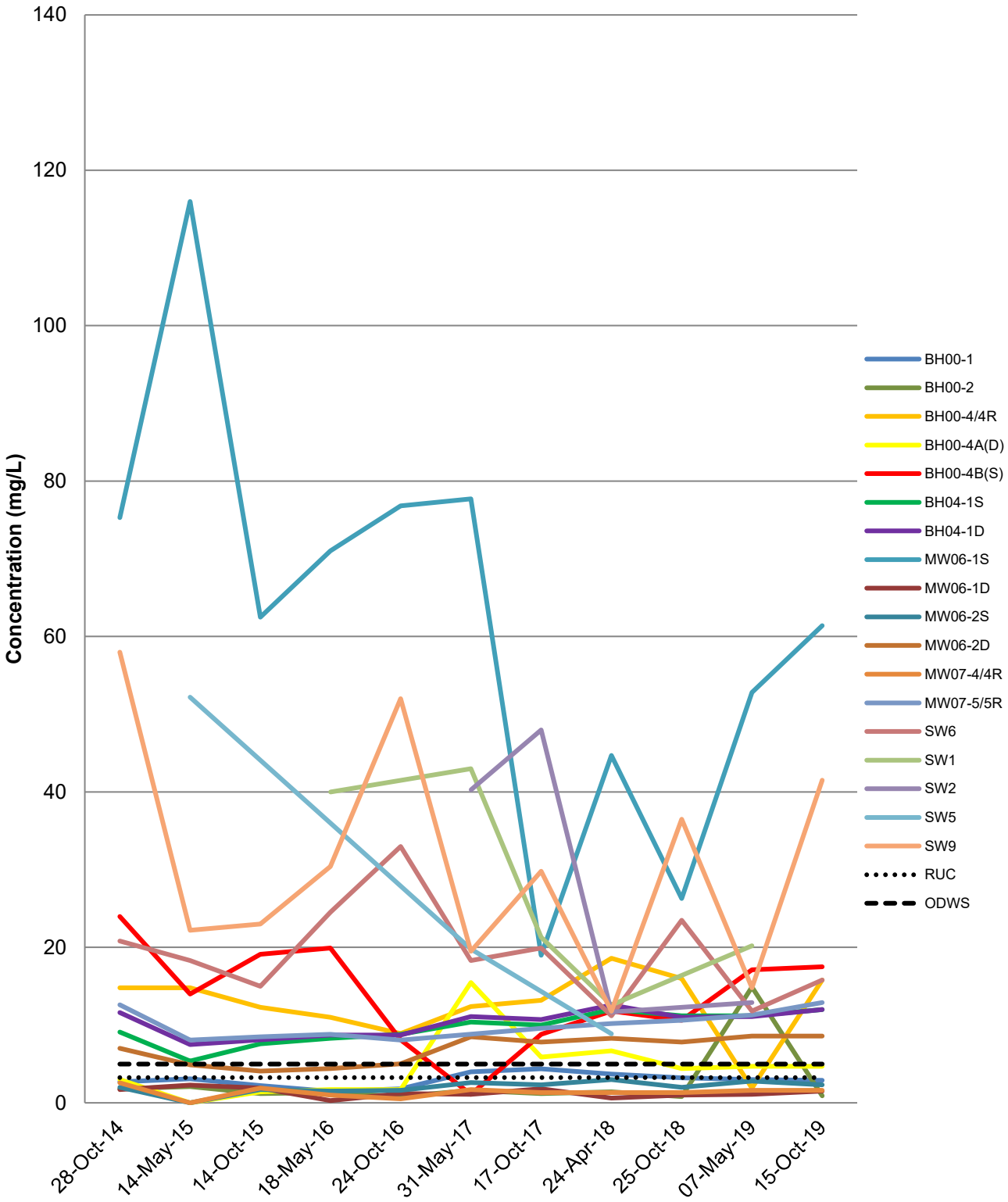
Graph 4
Trend Analysis - Chemical Oxygen Demand - Groundwater and Surface Water
Killaloe Waste Disposal Site



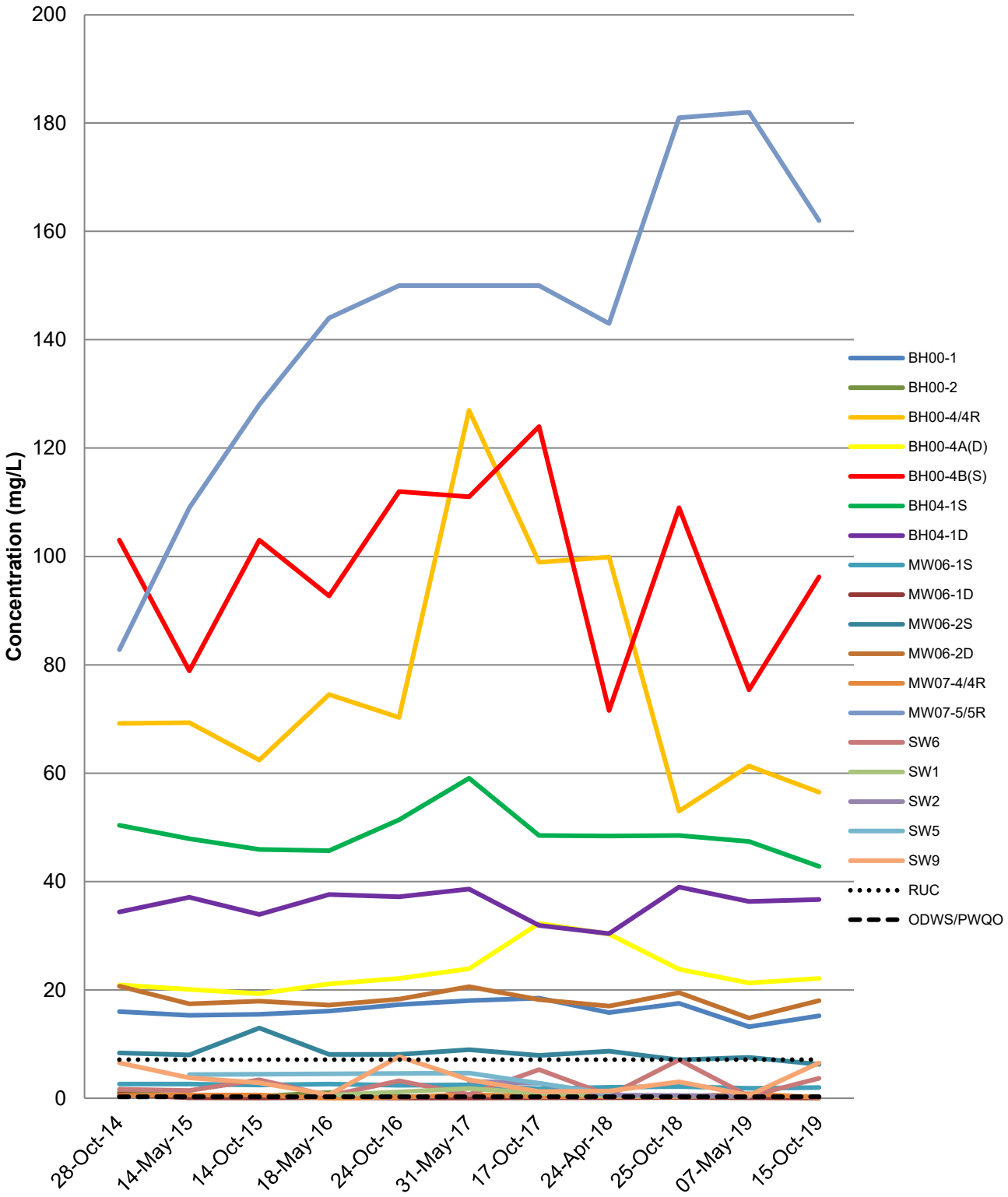
Graph 5
Trend Analysis - Chloride - Groundwater and Surface Water
Killaloe Waste Disposal Site



Graph 6
Trend Analysis - Dissolved Organic Carbon - Groundwater and Surface Water
Killaloe Waste Disposal Site

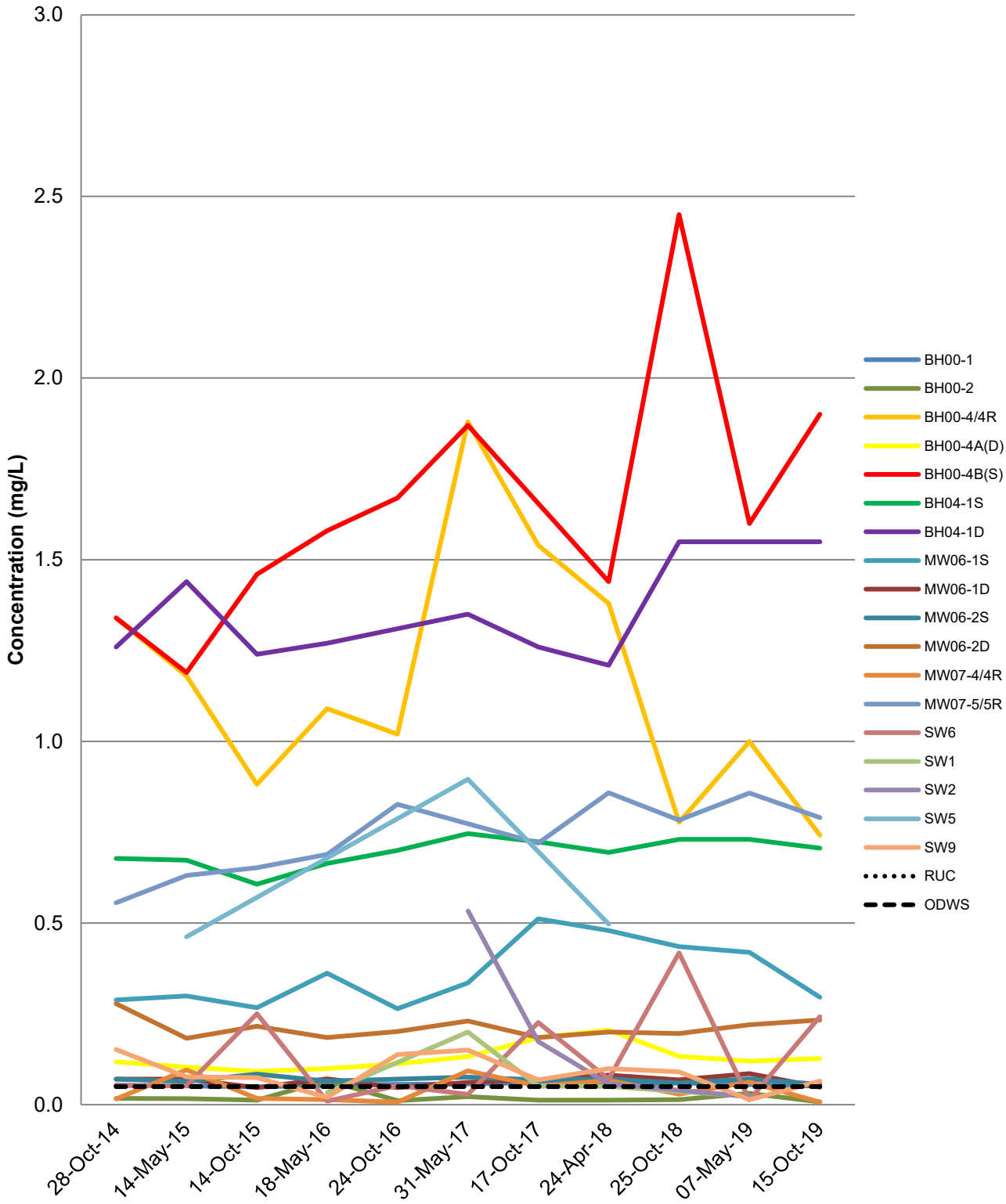


Graph 7
Trend Analysis - Iron - Groundwater and Surface Water
Killaloe Waste Disposal Site

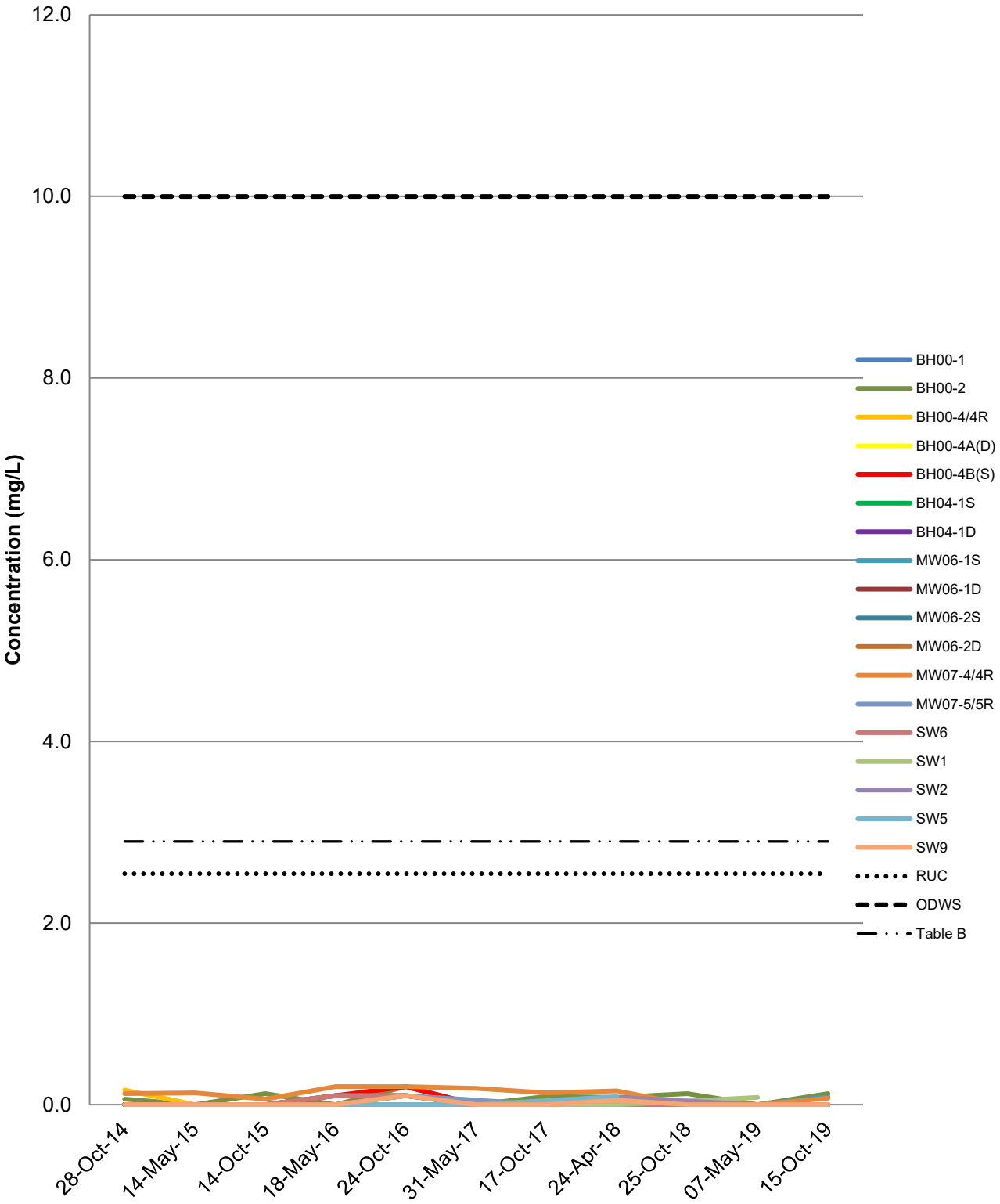


Graph 8
Trend Analysis - Manganese - Groundwater and Surface Water
Killaloe Waste Disposal Site

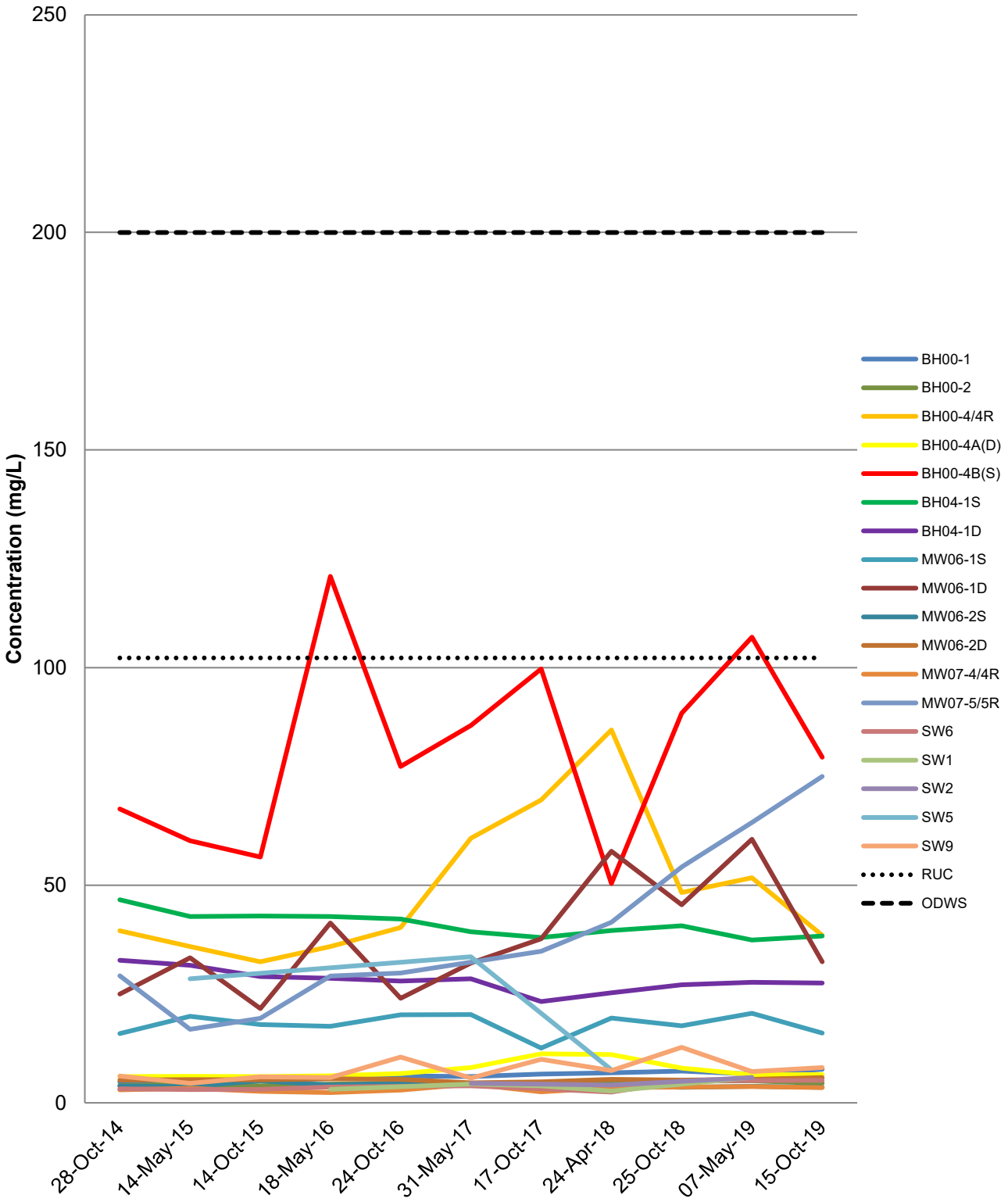
Note:
Anomolous manganese concentration of 5.31 mg/L deleted from BH00-4B(S) from October 17, 2017 for graphical purposes.



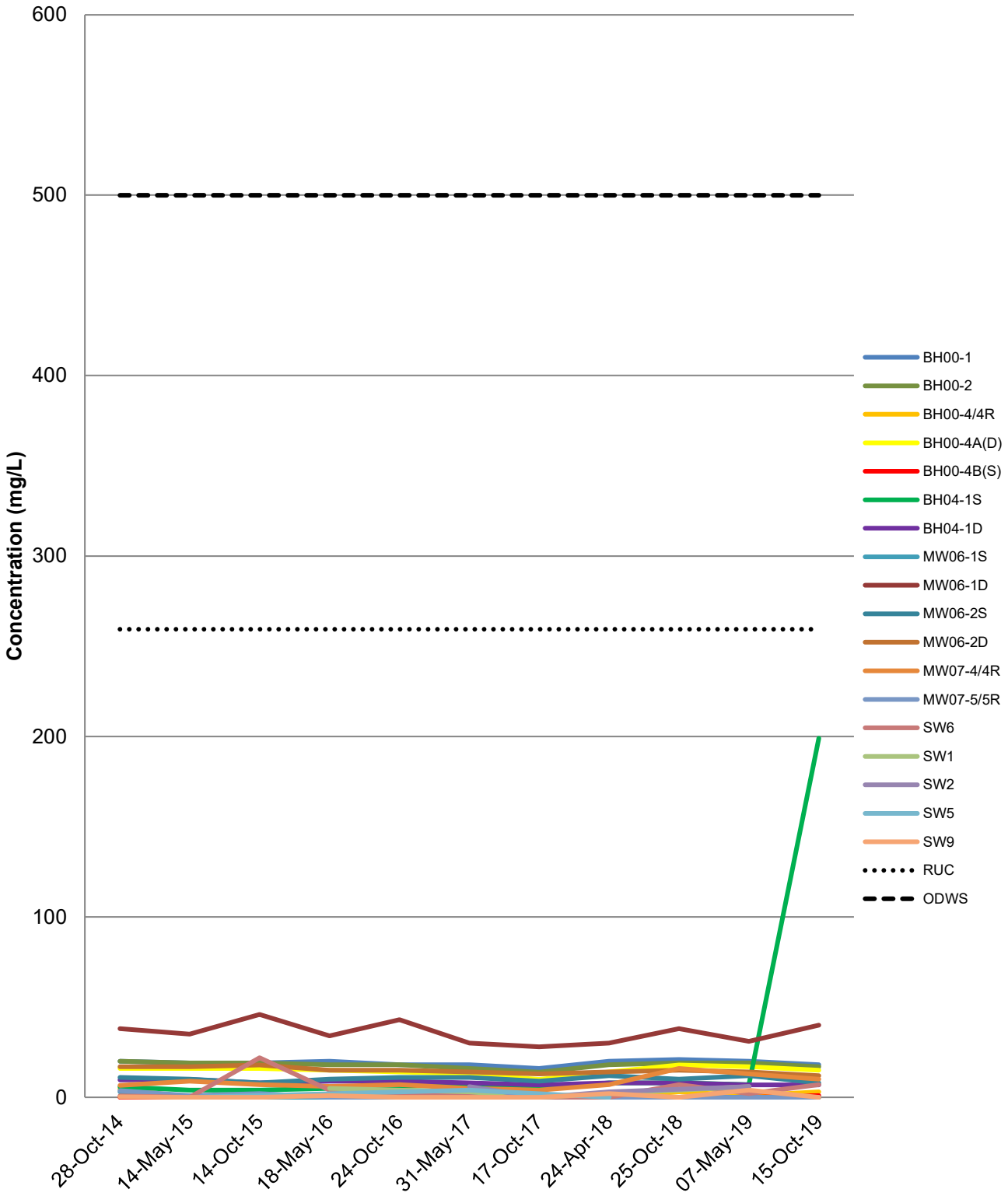
Graph 9
Trend Analysis - Nitrate - Groundwater and Surface Water
Killaloe Waste Disposal Site



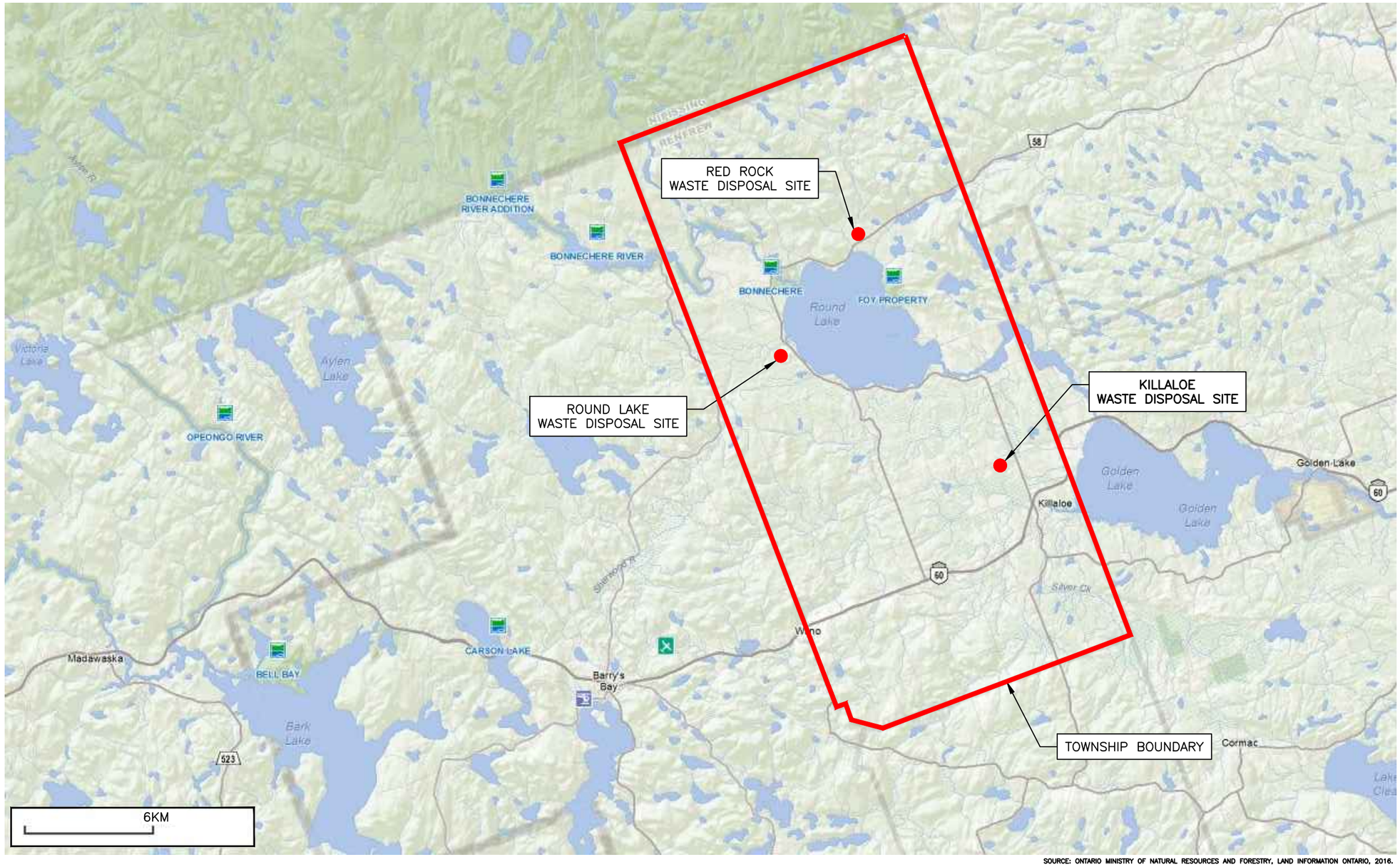
Graph 10
Trend Analysis - Sodium - Groundwater and Surface Water
Killaloe Waste Disposal Site



Graph 11
Trend Analysis - Sulphate - Groundwater and Surface Water
Killaloe Waste Disposal Site



Figures



SOURCE: ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY, LAND INFORMATION ONTARIO, 2016.

Greenview ENVIRONMENTAL MANAGEMENT
13 Commerce Court
Bancroft, Ontario
613.332.0657
greenview-environmental.ca

No.	DATE	BY	REMARKS
1	MAR16–20	SDK	ISSUED FOR MECP REVIEW
0	JAN08–20	SDK	ISSUED FOR CLIENT REVIEW

DRAWN BY: SDK	CHECKED BY: DMH
DESIGNED BY: SDK	APPROVED BY: DMH
SCALE: AS NOTED	DATE: MAR 2020

CLIENT: CORPORATION OF THE TOWNSHIP OF KILLALOE-HAGARTY-RICHARDS

PROJECT:

REGIONAL LOCATION PLAN
2019 ANNUAL REPORT
KILLALOE WASTE DISPOSAL SITE
TOWNSHIP OF KILLALOE, HAGARTY AND RICHARDS

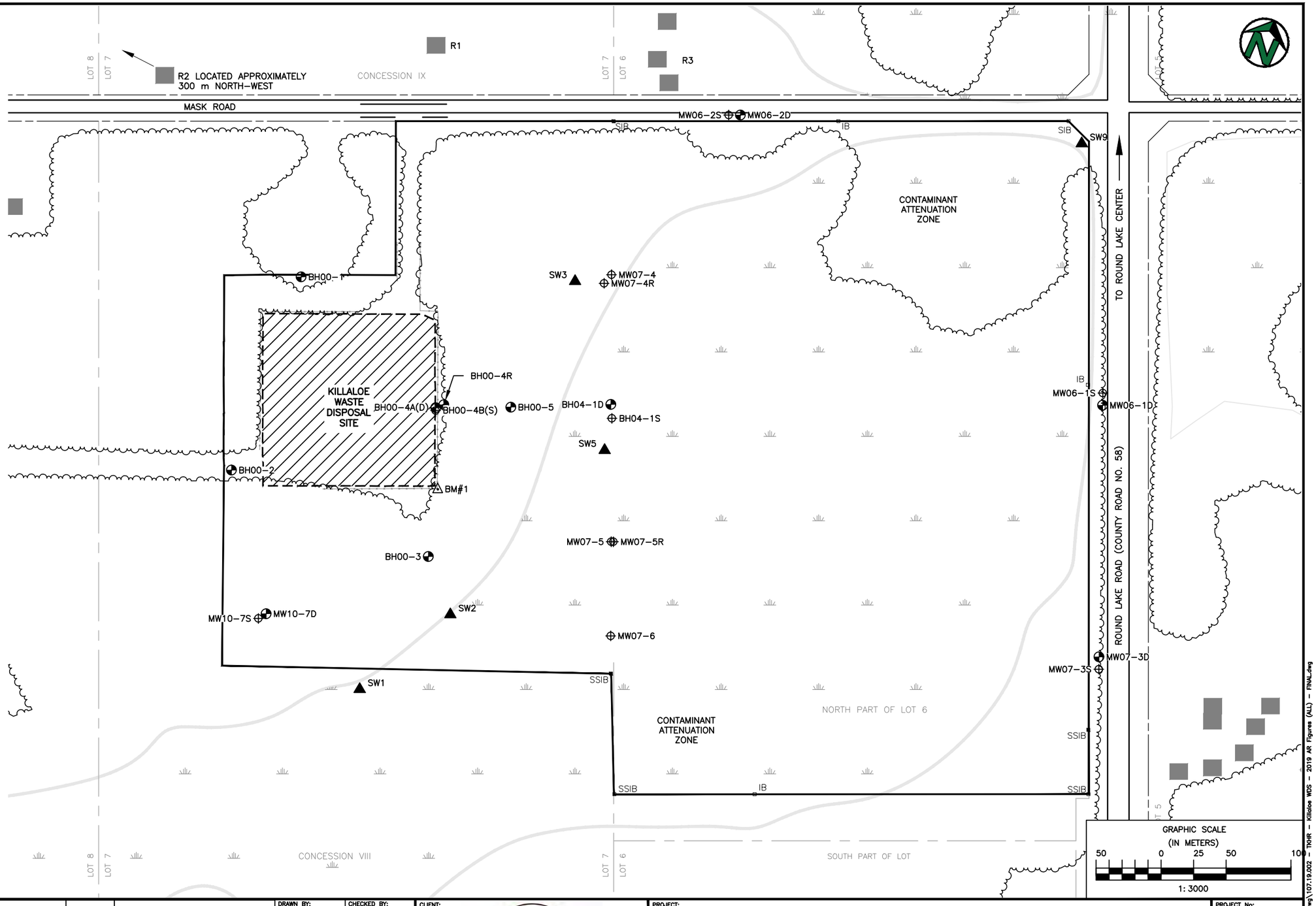
PROJECT No: 107.19.002

FIGURE: 1

G:\AutoCAD\107 KHR\002 Killaloe\dwg\107.19.002 – TKHR – Killaloe WDS – 2019 AR Figures (ALL) – FINAL.dwg

LEGEND

- PROPERTY BOUNDARY / CONTAMINANT ATTENUATION ZONE
- APPROVED WASTE DISPOSAL AREA
- RIGHT OF WAY
- LOT LINE
- IB SIB — PROPERTY BARS
- APPROXIMATE TREE LINE
- LOW-LYING AREA
- BH04-1S — SHALLOW GROUNDWATER MONITORING WELL
- BH00-2 — DEEP GROUNDWATER MONITORING WELL
- SW2 — SURFACE WATER SAMPLING LOCATION
- BM#1 — BENCHMARK



NOTES

1. BENCHMARK
   BM#1
   TOP OF IRON BAR AT SOUTHEAST CORNER OF SITE.
   ASSUMED ELEVATION = 100.00m.
2. UPDATED TOPOGRAPHIC SURVEYS COMPLETED BY GREENVIEW ON DECEMBER 10, 2019.

Greenview ENVIRONMENTAL MANAGEMENT
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No.	DATE	BY	REMARKS
1	MAR16-20	SDK	ISSUED FOR MECP REVIEW
0	JAN08-20	SDK	ISSUED FOR CLIENT REVIEW

DRAWN BY:	CHECKED BY:
SDK	DMH
DESIGNED BY:	APPROVED BY:
SDK	DMH
SCALE:	DATE:
1:3000	MAR 2020

CLIENT: CORPORATION OF THE TOWNSHIP OF KILLALOE-HAGARTY-RICHARDS

PROJECT:

PROPERTY PLAN
2019 ANNUAL REPORT
KILLALOE WASTE DISPOSAL SITE
TOWNSHIP OF KILLALOE, HAGARTY, AND RICHARDS

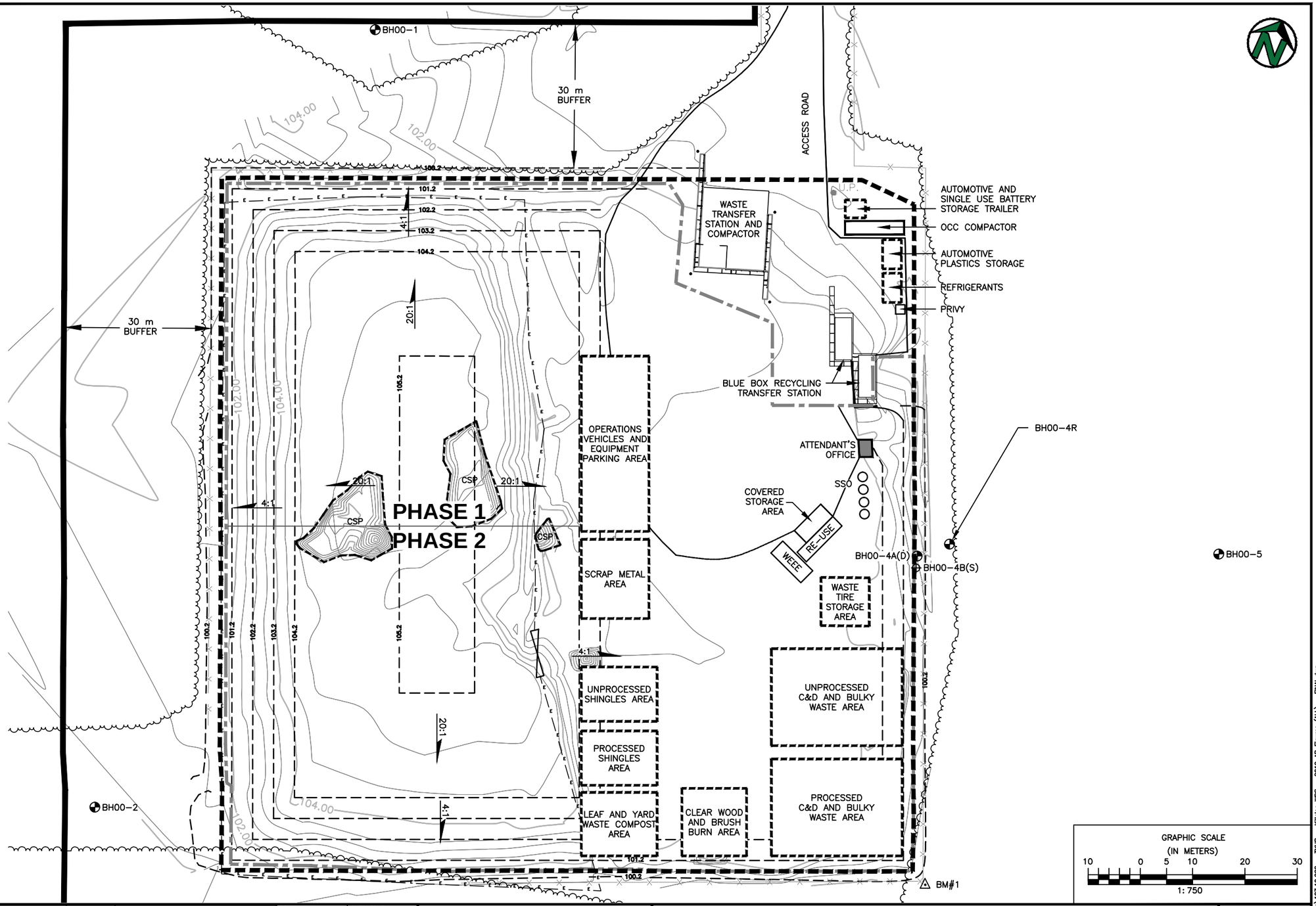
PROJECT No: 107.19.002

FIGURE: 2

G:\AutoCAD\107 KHR\002 Killaloe\dwg\107.19.002 - TKHR - Killaloe WDS - 2019 AR Figures (ALL) - FINAL.dwg

LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- EXISTING LIMIT OF WASTE
- 102.00 MAJOR TOPOGRAPHIC CONTOUR LINE (2m)
- MINOR TOPOGRAPHIC CONTOUR LINE (0.5m)
- 102.2 FINAL CONTOURS AT CLOSURE (TO TOP OF WASTE)
- ON-SITE ROAD
- APPROXIMATE TREE LINE
- FENCE
- E ELECTRIC BEAR FENCE
- U.P. OVERHEAD UTILITY POLE
- 20:1 FINAL CONTOURS AT CLOSURE GRADE
- BH04-1S SHALLOW GROUNDWATER MONITORING WELL
- BH00-2 DEEP GROUNDWATER MONITORING WELL
- SW2 SURFACE WATER SAMPLING LOCATION
- SSO SOURCE-SEPARATED ORGANICS
- BM#1 BENCHMARK
- COVER STOCKPILE (CSP)



GRAPHIC SCALE (IN METERS)
10 0 5 10 20 30
1: 750

NOTES

1. BENCHMARK
   BM#1
   TOP OF IRON BAR AT SOUTHEAST CORNER OF SITE.
   ASSUMED ELEVATION = 100.00m.
2. UPDATED TOPOGRAPHIC SURVEYS COMPLETED BY GREENVIEW ON DECEMBER 10, 2019.

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No.	DATE	BY	REMARKS
1	MAR16-20	SDK	ISSUED FOR MECP REVIEW
0	JAN08-20	SDK	ISSUED FOR CLIENT REVIEW

DRAWN BY: SDK | CHECKED BY: DMH
DESIGNED BY: SDK | APPROVED BY: DMH
SCALE: 1:750 | DATE: MAR 2020

CLIENT: CORPORATION OF THE TOWNSHIP OF KILLALOE-HAGARTY-RICHARDS

PROJECT:

EXISTING SITE CONDITIONS PLAN
2019 ANNUAL REPORT
KILLALOE WASTE DISPOSAL SITE
TOWNSHIP OF KILLALOE, HAGARTY, AND RICHARDS

PROJECT No: 107.19.002

FIGURE: 3

G:\AutoCAD\107 KHR\002 Killaloe\dwg\107.19.002 - TKHR - Killaloe WDS - 2019 AR Figures (ALL) - FINAL.dwg

NOTE: ALL LOCATIONS APPROXIMATE.

SOURCE: GOOGLE EARTH, 2016.

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No.	DATE	BY	REMARKS
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0	JAN08–20	SDK	ISSUED FOR CLIENT REVIEW

DRAWN BY: SDK | CHECKED BY: DMH
DESIGNED BY: SDK | APPROVED BY: DMH
SCALE: NTS | DATE: MAR 2020

CLIENT: CORPORATION OF THE TOWNSHIP OF KILLALOE-HAGARTY-RICHARDS

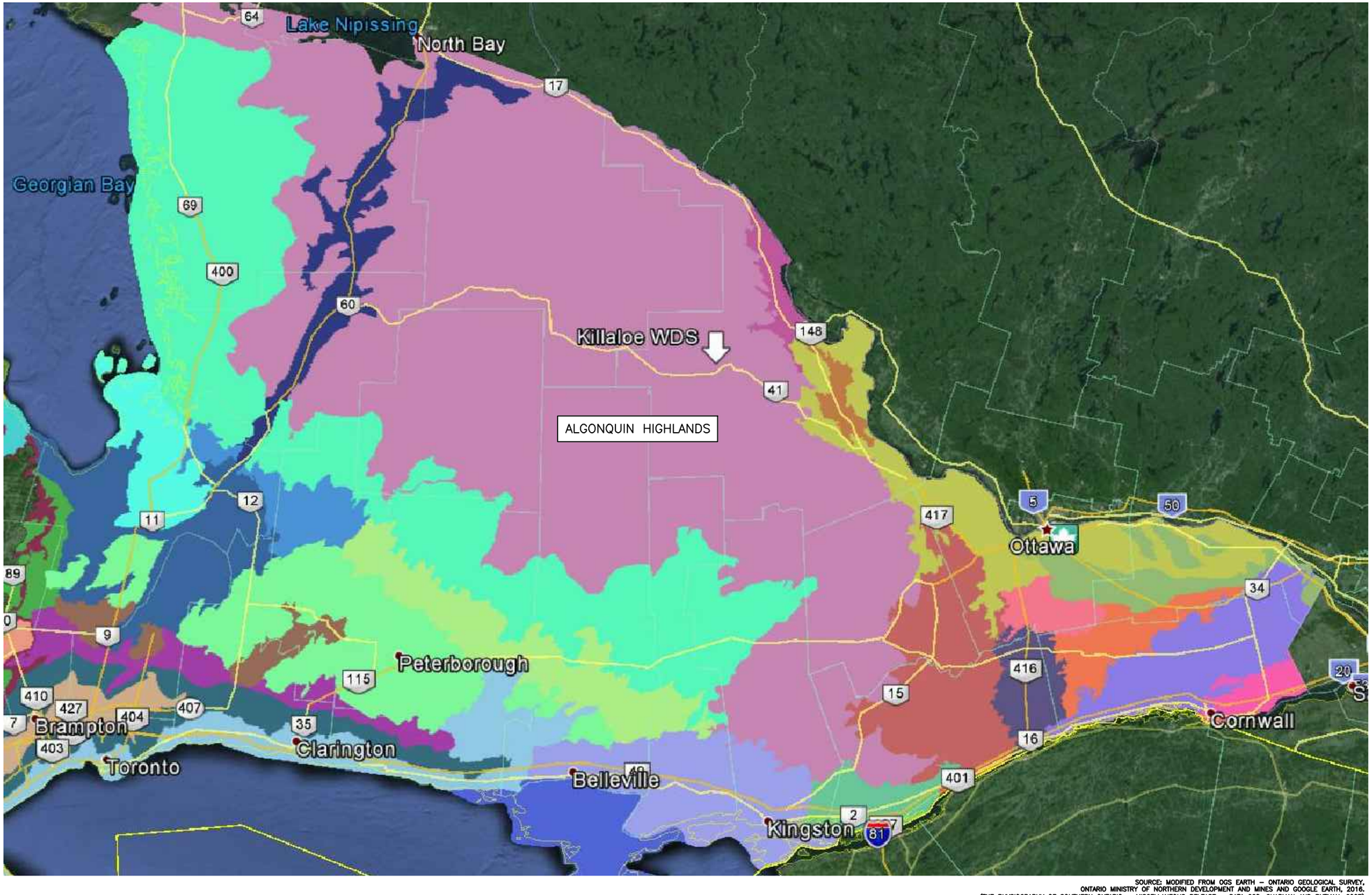
PROJECT:

SURFACE WATER MONITORING LOCATION PLAN
2019 ANNUAL REPORT
KILLALOE WASTE DISPOSAL SITE
TOWNSHIP OF KILLALOE, HAGARTY AND RICHARDS

PROJECT No: 107.19.002

FIGURE: 4

G:\AutoCAD\107 KHR\002 Killaloe\Dwg\107.19.002 – TKHR – Killaloe WDS – 2019 AR Figures (ALL) – FINAL.dwg



SOURCE: MODIFIED FROM OGS EARTH – ONTARIO GEOLOGICAL SURVEY, ONTARIO MINISTRY OF NORTHERN DEVELOPMENT AND MINES AND GOOGLE EARTH, 2016. (THE PHYSIOGRAPHY OF SOUTHERN ONTARIO – MISCELLANEOUS RELEASE – DATA 228, CHAPMAN AND PUTMAN, 2007)

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DRAWN BY: SDK | CHECKED BY: DMH
DESIGNED BY: SDK | APPROVED BY: DMH
SCALE: NTS | DATE: MAR 2020

CLIENT: CORPORATION OF THE TOWNSHIP OF KILLALOE-HAGARTY-RICHARDS

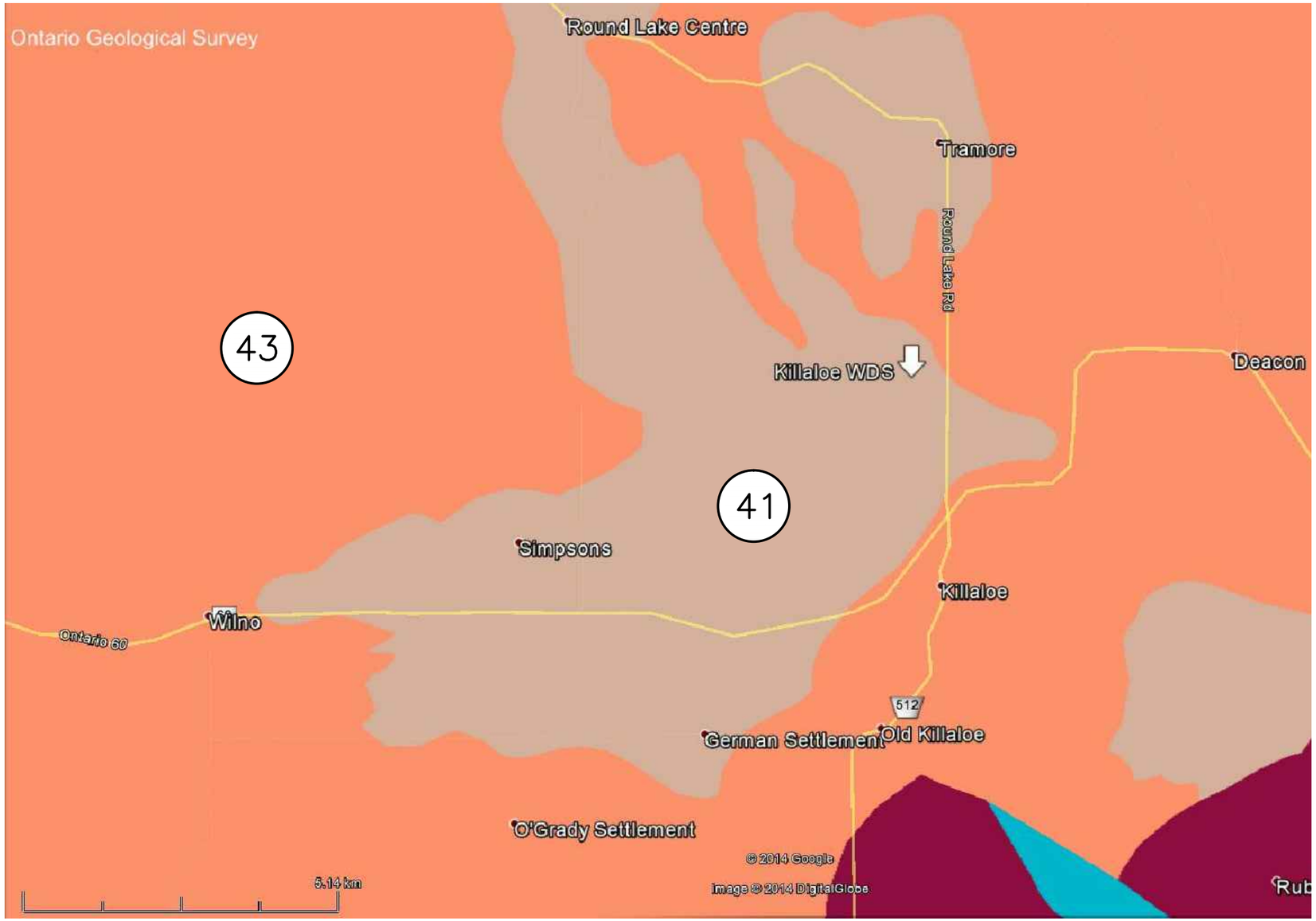
PROJECT:

PHYSIOGRAPHIC REGION PLAN
2019 ANNUAL REPORT
KILLALOE WASTE DISPOSAL SITE
TOWNSHIP OF KILLALOE, HAGARTY AND RICHARDS

PROJECT No: 107.19.002

FIGURE: 5

G:\AutoCAD\107 KHR\002 Killaloe\Dwg\107.19.002 – TKHR – Killaloe WDS – 2019 AR Figures (ALL) – FINAL.dwg



SOURCE: MODIFIED FROM OGS EARTH – ONTARIO GEOLOGICAL SURVEY, ONTARIO MINISTRY OF NORTHERN DEVELOPMENT AND MINES AND GOOGLE EARTH, 2016. (1:250,000 SCALE BEDROCK GEOLOGY, SEAMLESS COVERAGE OF THE PROVINCE OF ONTARIO; MISCELLANEOUS RELEASE – DATA 126 – REVISION 1 (2011))

(41) MIGMATITIC ROCKS AND GNEISSES OF UNDETERMINED PROTOLITH (COMMONLY LAYERED BIOTITE GNEISSES AND MIGMATITES; LOCALLY INCLUDES QUARTZOFELDSPATHIC GNEISSES, ORTHOGNEISSES, PARAGNEISSES (MEZOPROTEROZOIC; 1.0 BILLION TO 1.6 BILLION YEARS OLD).

(43) FELSIC IGNEOUS ROCKS: TONALITE, GRANODIORITE, MONZONITE, GRANITE, SYENITE; DERIVED GNEISSES (MEZOPROTEROZOIC; 1.0 BILLION TO 1.6 BILLION YEARS OLD).

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No.	DATE	BY	REMARKS
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0	JAN08–20	SDK	ISSUED FOR CLIENT REVIEW

DRAWN BY:	CHECKED BY:
SDK	DMH
DESIGNED BY:	APPROVED BY:
SDK	DMH
SCALE:	DATE:
AS NOTED	MAR 2020

CLIENT: CORPORATION OF THE TOWNSHIP OF KILLALOE-HAGARTY-RICHARDS

PROJECT:

BEDROCK GEOLOGY PLAN
2019 ANNUAL REPORT
KILLALOE WASTE DISPOSAL SITE
TOWNSHIP OF KILLALOE, HAGARTY AND RICHARDS

PROJECT No: 107.19.002

FIGURE: 6

G:\AutoCAD\107 KHR\002 Killaloe\Dwg\107.19.002 – TKHR – Killaloe WDS – 2019 AR Figures (ALL) – FINAL.dwg

(1) PRECAMBRIAN BEDROCK
(PRECAMBRIAN; > 635 MILLION YEARS OLD)

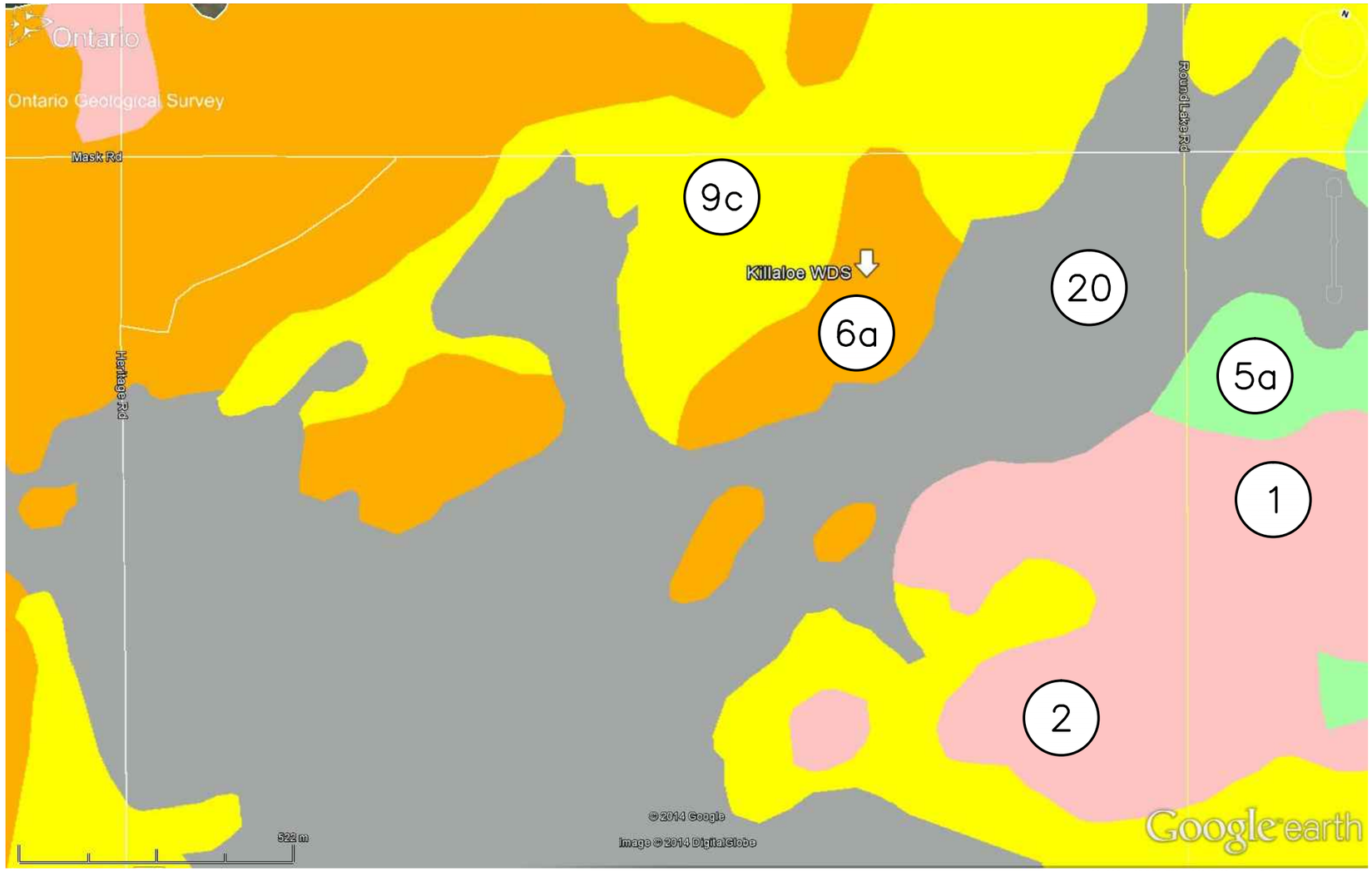
(2) BEDROCK–DRIFT COMPLEX IN PRECAMBRIAN TERRAIN
(PRECAMBRIAN; > 635 MILLION YEARS OLD)

(5a) TILL:
SILTY SAND TO SAND–TEXTURED TILL ON PRECAMBRIAN TERRAIN
(PLEISTOCENE; 0.126 TO 2.58 MILLION YEARS OLD)

(6a) ICE–CONTACT STRATIFIED DEPOSITS:
SAND AND GRAVEL, MINOR SILT, CLAY, AND TILL
(IN MORAINES, ESKERS, KAMES, AND CREVASSE FILLS)
(PLEISTOCENE; 0.126 TO 2.58 MILLION YEARS OLD)

(9c) COARSE–TEXTURED GLACIOLACUSTRINE DEPOSITS:
SAND, GRAVEL, MINOR SILT, AND CLAY
(FORESHORE AND BASINAL DEPOSITS)
(PLEISTOCENE; 0.126 TO 2.58 MILLION YEARS OLD)

(20) ORGANIC DEPOSITS:
PEAT, MUCK, MARL
(HOLOCENE; 0 TO 11,700 YEARS OLD)



SOURCE: MODIFIED FROM OGS EARTH – ONTARIO GEOLOGICAL SURVEY, ONTARIO MINISTRY OF NORTHERN DEVELOPMENT AND MINES AND GOOGLE EARTH (SURFICIAL GEOLOGY OF SOUTHERN ONTARIO; MISCELLANEOUS RELEASE – DATA 128 – REVISED (2010) GEOLOGICAL DATES FROM WIKIPEDIA.ORG – GEOLOGICAL TIME SCALE (2014).

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No.	DATE	BY	REMARKS
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DRAWN BY: SDK | CHECKED BY: DMH
DESIGNED BY: SDK | APPROVED BY: DMH
SCALE: AS NOTED | DATE: MAR 2020

CLIENT: CORPORATION OF THE TOWNSHIP OF KILLALOE-HAGARTY-RICHARDS

PROJECT:

SURFICIAL GEOLOGY PLAN
2019 ANNUAL REPORT
KILLALOE WASTE DISPOSAL SITE
TOWNSHIP OF KILLALOE, HAGARTY AND RICHARDS

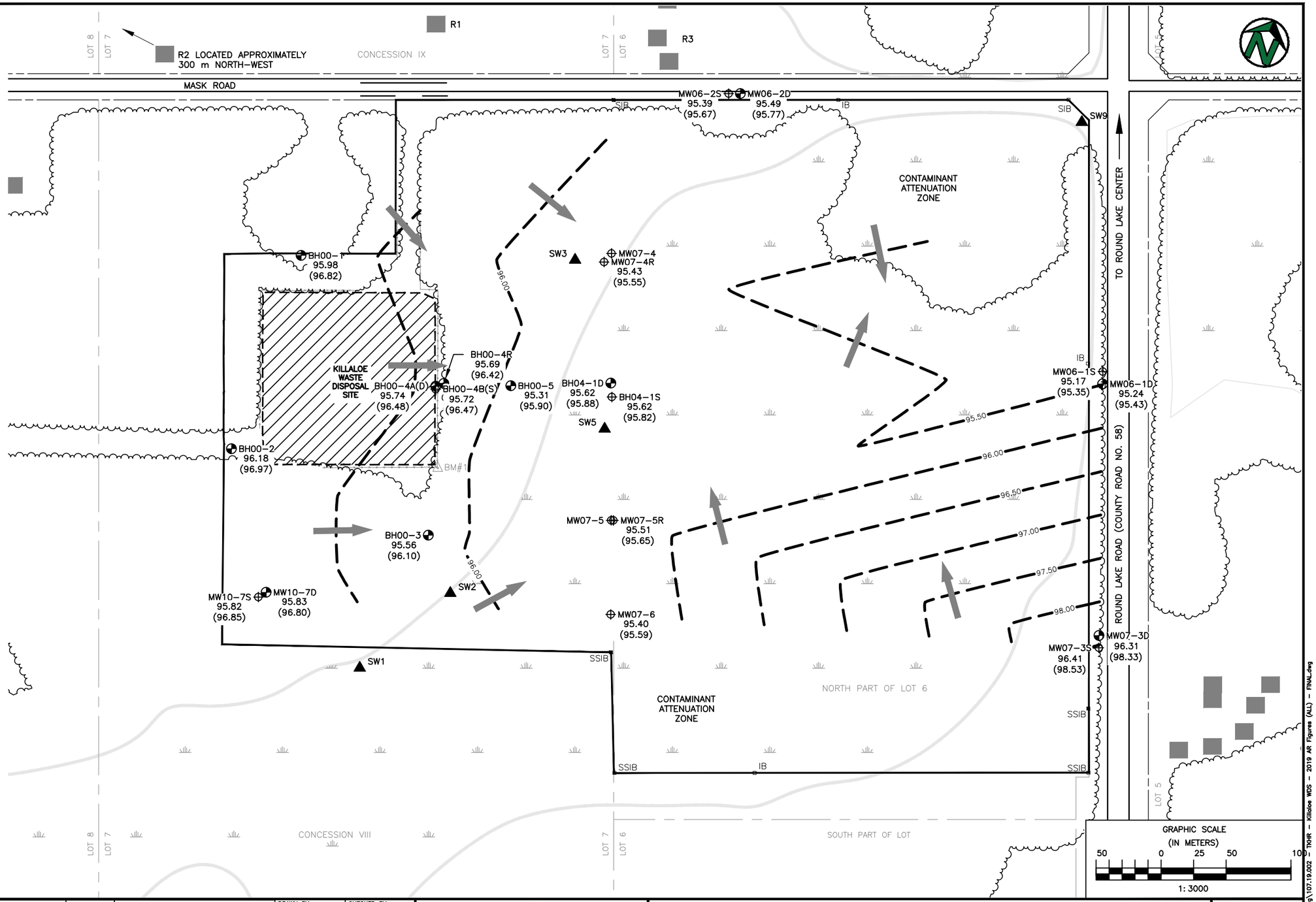
PROJECT No: 107.19.002

FIGURE: 7

G:\AutoCAD\107 KHR\002 Killaloe\dwg\107.19.002 – TKHR – Killaloe WDS – 2019 AR Figures (ALL) – FINAL.dwg

LEGEND

- PROPERTY BOUNDARY / CONTAMINANT ATTENUATION ZONE
- APPROVED WASTE DISPOSAL AREA
- RIGHT OF WAY
- LOT LINE
- IB, SIB — PROPERTY BARS
- APPROXIMATE TREE LINE
- LOW-LYING AREA
- BH04-1S — SHALLOW GROUNDWATER MONITORING WELL
- BH00-2 — DEEP GROUNDWATER MONITORING WELL
- SW2 — SURFACE WATER SAMPLING LOCATION
- 96.00 — EQUIPOTENTIAL CONTOUR (MAY 7, 2019)
- 95.44 (95.41) — GROUNDWATER ELEVATIONS OCTOBER 15, 2019 (MAY 7, 2019)
- GROUNDWATER FLOW DIRECTION
- BM#1 — BENCHMARK



NOTES

1. BENCHMARK
   BM#1
   TOP OF IRON BAR AT SOUTHEAST CORNER OF SITE.
   ASSUMED ELEVATION = 100.00m.
2. UPDATED TOPOGRAPHIC SURVEYS COMPLETED BY GREENVIEW ON DECEMBER 10, 2019.

Greenview ENVIRONMENTAL MANAGEMENT
13 Commerce Court
Bancroft, Ontario
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No.	DATE	BY	REMARKS
1	MAR16-20	SDK	ISSUED FOR MECP REVIEW
0	JAN08-20	SDK	ISSUED FOR CLIENT REVIEW

DRAWN BY: SDK | CHECKED BY: DMH
DESIGNED BY: SDK | APPROVED BY: DMH
SCALE: 1:3000 | DATE: MAR 2020

CLIENT: CORPORATION OF THE TOWNSHIP OF KILLALOE-HAGARTY-RICHARDS

PROJECT:

ENVIRONMENTAL MONITORING LOCATION PLAN – SPRING 2019 ANNUAL REPORT KILLALOE WASTE DISPOSAL SITE TOWNSHIP OF KILLALOE, HAGARTY, AND RICHARDS

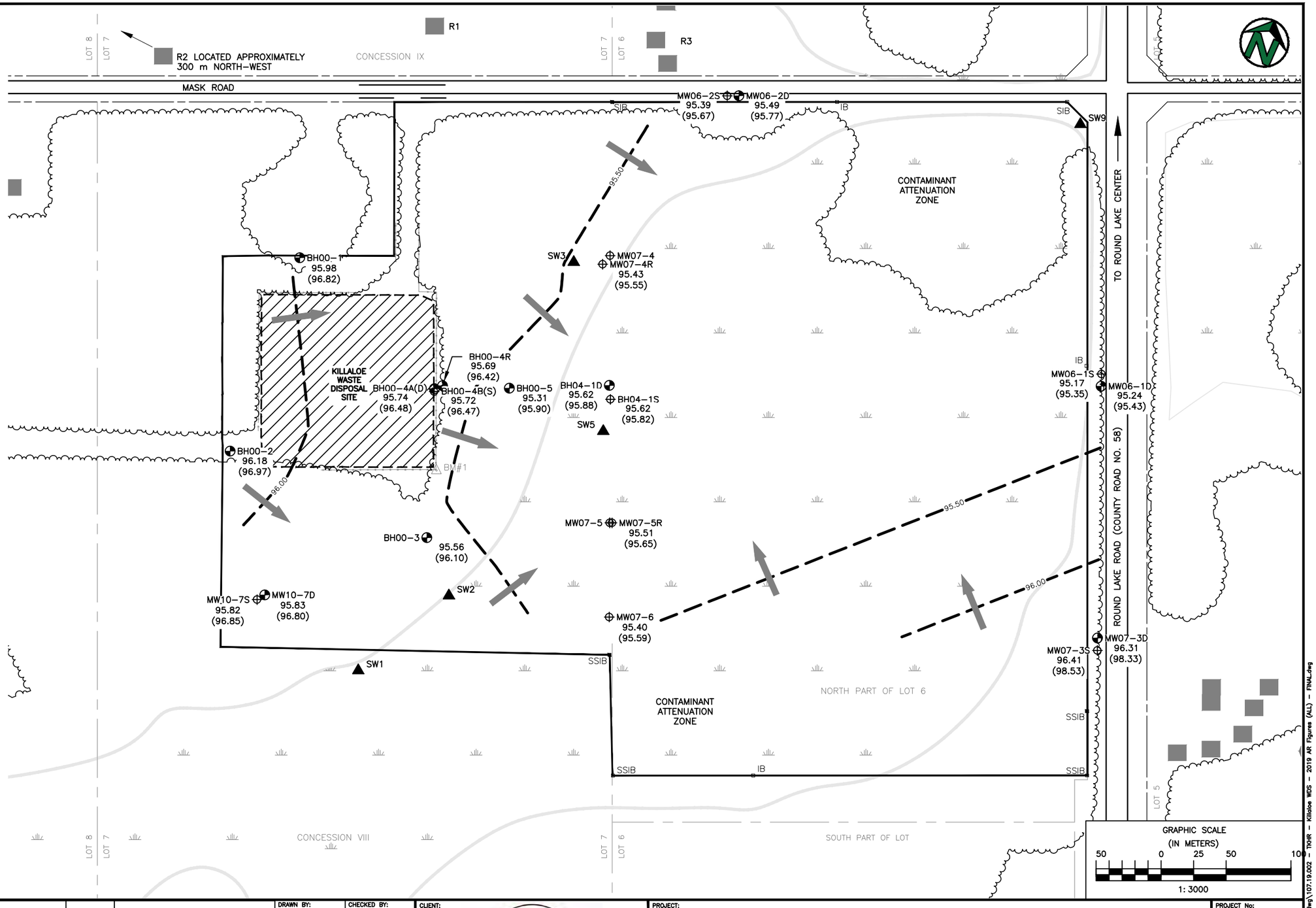
PROJECT No: 107.19.002

FIGURE: 8

G:\AutoCAD\107 KHR\002 Killaloe\dwg\107.19.002 - TKHR - Killaloe WDS - 2019 AR Figures (ALL) - FINAL.dwg

LEGEND

- PROPERTY BOUNDARY / CONTAMINANT ATTENUATION ZONE
- APPROVED WASTE DISPOSAL AREA
- RIGHT OF WAY
- LOT LINE
- IB, SIB — PROPERTY BARS
- APPROXIMATE TREE LINE
- LOW-LYING AREA
- BH04-1S — SHALLOW GROUNDWATER MONITORING WELL
- BH00-2 — DEEP GROUNDWATER MONITORING WELL
- SW2 — SURFACE WATER SAMPLING LOCATION
- 96.00 — EQUIPOTENTIAL CONTOUR (OCTOBER 15, 2019)
- 95.44 (95.41) — GROUNDWATER ELEVATIONS OCTOBER 15, 2019 (MAY 07, 2019)
- GROUNDWATER FLOW DIRECTION
- BM#1 — BENCHMARK



NOTES

1. BENCHMARK
   BM#1
   TOP OF IRON BAR AT SOUTHEAST CORNER OF SITE.
   ASSUMED ELEVATION = 100.00m.
2. UPDATED TOPOGRAPHIC SURVEYS COMPLETED BY GREENVIEW ON DECEMBER 10, 2019.

Greenview ENVIRONMENTAL MANAGEMENT
13 Commerce Court
Bancroft, Ontario
613.332.0057
greenview-environmental.ca

No.	DATE	BY	REMARKS
1	MAR16-20	SDK	ISSUED FOR MECP REVIEW
0	JAN08-20	SDK	ISSUED FOR CLIENT REVIEW

DRAWN BY: SDK | CHECKED BY: DMH
DESIGNED BY: SDK | APPROVED BY: DMH
SCALE: 1:3000 | DATE: MAR 2020

CLIENT: CORPORATION OF THE TOWNSHIP OF KILLALOE-HAGARTY-RICHARDS

PROJECT:

ENVIRONMENTAL MONITORING LOCATION PLAN – FALL 2019 ANNUAL REPORT KILLALOE WASTE DISPOSAL SITE TOWNSHIP OF KILLALOE, HAGARTY, AND RICHARDS

PROJECT No: 107.19.002

FIGURE: 9

G:\AutoCAD\107 KHR\002 Killaloe\dwg\107.19.002 – TKHR – Killaloe WDS – 2019 AR Figures (ALL) – FINAL.dwg

Appendix A

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A412306
Notice No. 1
Issue Date: November 15, 2017

The Corporation of the Township of Killaloe, Hagarty, and Richards
1 John St
Killaloe, Ontario
K0J 2A0

Site Location: Killaloe Waste Disposal Site
1049 Mask Road, R.R. #2
Lot 6 and 7, Concession 8
Township of Killaloe, Hagarty and Richards, County of Renfrew
K0J 2A0

You are hereby notified that I have amended Approval No. A412306 issued on July 19, 2013 for the use and operation of an 1.88 hectare landfill site known as the Killaloe Waste Disposal site, waste transfer station, and a Reuse Centre within a 31.7 hectare total site area , as follows:

The following Condition is hereby revoked and replaced with the following:

12.0 Site Closure

12.1 The Progressive Closure Plan and monitoring program contained therein for the Site is hereby approved in accordance with Items 23 and 24 in Schedule "A"

(1) The proposed "contingency disposal area" may be used provided it is entirely contained within the existing approved final contours and is subject to the previous approved waste capacity. The district office must be notified prior to accepting waste to be placed in the designated contingency area.

12.2. The Site shall be closed in accordance with the closure plan as approved.

The following items are added to Schedule A:

23. Application package submitted for approval dated April 14, 2015 and received on April 17, 2015

24. Progressive Closure Plan - Killaloe Waste Disposal Site (A412306) - dated April 2015, prepared by Greenview Environmental Management Limited.

25. Memo from Dan Hagan, Greenview Environmental Management Limited to Ben Hendry, MOECC, dated October 31, 2017 - Response to Draft Amendment to ECA

The reason(s) for this amendment to the Approval is (are) as follows:

1. Condition 12.1 is to acknowledge fulfilment of condition 8.2 and include the above documents in Schedule A.

2. Condition 12.2 is to confirm that the site is to be closed in accordance with the plan.

This Notice shall constitute part of the approval issued under Approval No. A412306 dated July 19, 2013

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

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

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 15th day of November, 2017

THIS APPROVAL WAS MAILED
NOV 2 2 2017
ON _____
(Signed)

Dale Gable, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

BH/
c: District Manager, MOECC Ottawa
Dan Hagan/ Tyler Peters, Greenview Environmental management Limited

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A412306
Issue Date: July 19, 2013

The Corporation of the Township of Killaloe, Hagarty and Richards
1 John St
Post Office Box, No. 35
Killaloe, Ontario
K0J 2A0

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Project No. :

Site Location: Killaloe Waste Disposal Site
1049 Mask Road
R.R. #2
Lot 6 and 7, Concession 8
Township of Killaloe, Hagarty and Richards, County of Renfrew
K0J 2A0

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

the use and operation of an 1.88 hectare landfill site known as the Killaloe Wase Disposal site, waste transfer station, and a Reuse Centre within a 31.7 hectare total site area to be used for the landfilling of Municipal Waste and for the transfer of the following types of waste:

solid, non-hazardous, residential and IC&I waste, processed and unprocessed Construction and Demolition (C&D) and bulky waste, Blue Box recyclables (commingled containers, mixed fibres, and old corrugated cardboard (OCC)), leaf and yard waste, Source Separated Organic Waste (SSO), refrigerant appliances, scrap metal, white goods, waste tires, Waste Electronic and Electrical Equipment (WEEE), automotive batteries, batteries 9single-use) and automotive plastics.

For the purpose of this environmental compliance approval, the following definitions apply:

"Act" and ***"EPA"*** means the *Environmental Protection Act, R.S.O. 1990, C.E-19* as amended;

"Adverse Effect" means the same as the definition in the EPA;

"Blue Box Recyclables" *or* ***"Blue Box Waste"*** means commingled containers (tin, aluminium, steel, plastic, mixed glass), mixed fibres, and old corrugated cardboard (OCC) for the operations approved in this *Approval;*

"Bulky Waste Materials" or ***"Bulky Household Items"*** mean large items of waste materials, such as appliances and furniture;

"Compaction Equipment" means an apparatus that compresses refuse into relatively small packs for handy disposal;

"Construction and Demolition Waste" *or* ***"C&D Waste"*** means waste building materials and rubble produced from construction, renovation, repair or demolition operations on houses, commercial buildings, pavements and other structures;

"Design and Operations Plan" means the Design and Operations Plan contained within Item 18 of Schedule "A" of this *Approval* that the Owner has submitted to the Ministry as supporting technical information for the application to amend the current Approval for the Killaloe Waste Disposal Site, as described in Item 18 of Schedule "A";

"Director" means any *Ministry* employee appointed in writing by the Minister pursuant to section 5 of the EPA as a

Director for the purposes of Part V of the EPA;

"District Manager" refers to the District Manager in the Ministry of the Environment's Ottawa District Office;

"***District Office***" refers to the Ministry of the Environment Ottawa District Office;

"EAB" refers to the *Environmental Approvals Branch* of the *Ministry of the Environment;*

"Environmental Compliance Approval" or "ECA" or ***"Approval"*** means this entire provisional Environmental Compliance Approval document, issued in accordance with *Section 20.2* of the *EPA*, and includes any schedules to it, the application and the supporting documentation listed in Schedule "A";

"EPA" means *Environmental Protection Act, R.S.O. 1990*, c. E. 19, as amended from time to time;

"Industrial, Commercial and Institutional Waste" or ***"IC&I Waste"*** means waste generated by industrial, commercial and institutional business sectors;

"Leaf and Yard Waste" means leafs, grass clippings, tree and shrub trimmings, fruits and vegetables from gardens, flowers, natural Christmas trees (evergreens) and similar organic plant materials generated from gardening and yard maintenance activities at residential and other properties;

"***MOE***" or "***Ministry***" refers to the Ontario Ministry of the Environment;

"Municipal Waste" is as defined in *Ontario Regulations 347,* R.R.O. 1990;

"***Operator***" has the same meaning as "operator" as defined in *s.25* of the *EPA*;

"***Owner***" means the Township of Killaloe, Hagarty and Richards;

"O. Reg. 101/94" means *Ontario Regulation 101/94* as amended from time to time;

"Organic Waste" or ***"Source Separated Organic Waste"*** or ***"SSO Waste"***or ***"SSO"*** means source separated residential and/or commercial non-hazardous organic waste consisting of one or more of the following components: food waste, soiled paper products, leaf and yard waste;

"***PA***" means the *Pesticides Act*, R.S.O. 1990, c. P-11, as amended from time to time;

"Provincial Officer" means any person designated in writing by the Minister as a provincial officer pursuant to *Section 5* of the *OWRA* or section 5 of the *EPA* or section 17 of *PA;*

"Regional Director" refers to the Director of the *Ministry of the Environment*'s Eastern Regional Office;

"*Regulation 347*" or "*Reg. 347*" or "O. Reg. 347" means Regulation 347, R.R.O. 1990, made under the *EPA*, as amended from time to time;

"Refrigerant Appliances" means any piece of equipment having a specific function and using refrigerants, which are chemicals used in a cooling mechanism, such as an air conditioner, etc.;

"Residential Waste" means waste generated in single and multi-family homes, including newspapers, clothing, disposable tableware, food packaging, cans, bottles, food scraps and yard trimmings other than those that are diverted to composting;

"RUPO" means the Ministry of the Environment Reasonable Use Policy Objectives (Guideline B-7);

"Scrap Metal" means discarded metal suitable for reprocessing;

"Site" or ***"WDS"*** refers to the Killaloe Waste Disposal *Site* and lands owned by the Owner described as:

- Part of Lots 6 and 7, Concession 8, Township of Killaloe, Hagarty and Richards, County of Renfrew;

"Waste Electrical and Electronic Equipment" or ***"WEEE"*** means devices listed in Ontario Regulation 393/04, as amended;

"Waste Fill Area" means the area on the surface of the site beneath which or above which waste is disposed by landfilling;

"Waste Transfer Facility" or ***"Waste Transfer Station"*** or **"WTS"** refers to the area of land contiguous to the landfill area and part of the Site, to be used for the temporary storage of wastes prior to the removal of the wastes from the Site or for final disposal at the Site;

"Waste Tires" or ***"Tire Units"*** means the definition provided in Section 6 (1) (a), (b) and (c) of Regulation 347 of the Act or as amended from time to time;

"White Goods" means white goods end of life appliances including refrigerators, freezers, stoves, dish washers, clothes washers, clothes dryers, air conditioners, microwaves, ovens, hot water tanks and dehumidifiers.

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

TERMS AND CONDITIONS

1.0 TERMS AND CONDITIONS

General

1.1 The Requirements specified in this ECA are the requirements under the *Environmental Protection Act, R.S.O. 1990.* The issuance of this Approval in no way abrogates the Applicant's legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.

1.2 The *Owner* shall ensure that all communications/correspondence made pursuant to this ECA includes reference to the ECA approval number A 412306.

1.3 The obligations imposed by the terms and conditions of this ECA are obligations of due diligence.

Compliance

1.4 The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Site* is notified of the *ECA* and the conditions herein and shall take all reasonable measures to ensure the person complies with the same.

1.5 Any person authorized to carry out work on or operate any aspect of the *Site* shall comply with the conditions of this *ECA*.

In Accordance

1.6 Except as otherwise provided for in this *ECA*, the *Site* shall be operated and maintained in accordance with the application for *Environmental Compliance Approval for a Waste Disposal Site*, dated September 21, 1998, and the supporting documentation listed in Schedule "A".

Other Legal Obligations

1.7 The issuance of, and compliance with, this *ECA* does not:

(a) relieve any person of any obligation to comply with any provision of the *EPA* or any other applicable statute, regulation or other legal requirement; or

(b) limit in any way the authority of the *Ministry* to require certain steps be taken or to request that any further information related to compliance with this *ECA* be provided to the *Ministry* ;

unless a provision of this *ECA* specifically refers to the other requirement or authority and clearly states that the other requirement or authority is to be replaced or limited by this *ECA* .

Adverse Effect

1.8 The *Owner* or *Operator* remain responsible for any contravention of any other condition of this *ECA* or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect or impairment of air and/or water quality.

Furnish Information

1.9 Any information requested by the *Director* or a *Provincial Officer* concerning the *Site* and its operation under this *ECA* , including but not limited to any records required to be kept by this *ECA* shall be provided in a timely manner.

1.10 The receipt of any information by the *Ministry* or the failure of the *Ministry* to prosecute any person or to require any person to take any action, under this *ECA* or under any statute, regulation or subordinate legal instrument, in relation to the information, shall not be construed as:

i. an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any condition of this *ECA* or any statute, regulation or other subordinate legal requirement; or

ii.. acceptance by the *Ministry* of the information's completeness or accuracy.

1.11 Any information related to this *ECA* and contained in *Ministry* files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, RSO 1990, CF-31.

Interpretation

1.12 Where there is a conflict between a provision of any document, including the application, referred to in this *ECA*, and the conditions of this *ECA,* the conditions in this *ECA* shall take precedence.

1.13 Where there is a conflict between the application and a provision in any documents listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the *Ministry* approved the amendment in writing.

1.14 Where there is a conflict between any two documents listed in Schedule "A", other than the application, the document bearing the most recent date shall take precedence.

1.15 The conditions of this *ECA* are severable. If any condition of this *ECA*, or the application of any condition of this *ECA* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *ECA* shall not be affected thereby.

Certificate of Requirement

1.16 Pursuant to Section 197 of the *EPA*, no person having an interest in the *Site* shall deal with the *Site* in any way without first giving a copy of this *ECA* to each person acquiring an interest in the *Site* as a result of the dealing.

1.17 In the event any additional land is acquired for the *Site*, then two (2) copies of a completed Certificate of Requirement, containing a registerable description of the additional lands for the *Site*, shall be submitted to the Director for the Director's signature within sixty (60) calendar days of any amendment to this *ECA* that incorporates the land into the *ECA*.

1.18 In the event any additional land is acquired for the *Site*, then the Certificate of Requirement shall be registered in the appropriate land registry office on title to the *Site* and a duplicate registered copy shall be submitted to the *Director* within ten (10) calendar days of receiving the Certificate of Requirement signed by the *Director*.

No Transfer or Encumbrance

1.19 No portion of this *Site* shall be transferred or encumbered prior to or after closing of the *Site* unless the *Director* is notified in advance and is satisfied with the arrangements made to ensure that all conditions of this *ECA* will be carried out and that sufficient financial assurance is deposited with the *Ministry* to ensure that these conditions will be carried out.

Change of Owner

1.20 The *Owner* shall notify the *Director*, in writing, and forward a copy of the notification to the *District Manager*, within 30 days of the occurrence of any changes in the following information:

i. the ownership of the *Site* ;
ii. the Operator of the *Site* ;
iii. the address of the *Owner* or *Operator* ;
iv. the partners, where the *Owner* or *Operator* is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act* , R. S. O. 1990, c. B.17, shall be included in the notification;
v. the name of the corporation where the *Owner* or *Operator* is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act* , R. S. O. 1990, c. C.39, shall be included in the notification.

1.21 In the event of any change in the ownership of the *Site*, other than a change to a successor municipality, the *Owner* shall notify in writing the succeeding owner of the existence of this *ECA*, and a copy of such notice shall be forward to the *Director* and *District Manager*.

Inspections

1.22 No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *EPA* or the *PA*, of any place to which this *ECA* relates, and without limiting the foregoing:

i. to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *ECA* are kept;
ii. to have access to, inspect, and copy any records required to be kept by the conditions of this *ECA* ;
iii. to inspect the *Site,* related equipment and appurtenances;
iv. to inspect the practices, procedures, or operations required by the conditions of this *ECA*; and
v. to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *ECA* or the *EPA* or the *PA*.

2.0 GENERAL OPERATIONS

Proper Operation

2.1 The *Site* shall be properly operated and maintained at all times. All waste shall be managed and disposed of in accordance with the *EPA* and *Regulation 347* and the requirements of this *ECA.* At no time shall the discharge of a contaminant that causes or is likely to cause an *Adverse Effect* be permitted.

2.2. Waste shall be managed and landfilled at the *Site* in accordance with items listed in Schedule "A".

Operations Manual

2.3 An operations and procedures manual that addresses the requirements of this *ECA* shall be prepared and submitted to the *District Manager* for approval within ninety (90) days of the issuance of this amendment and shall include the following:

(a) Health and safety;
(b) Operation and maintenance of the *Site*;
(c) Waste acceptance;
(d) Waste disposal area and development;

(e) Nuisance management;
(f) Surface water/Storm water management;
(g) Inspections and monitoring;
(h) Contingency plans and emergency procedures;
(i) Complaints; and,
(j) Reporting and record keeping.

2.4 The operations and procedures manual shall be:
i. retained at the *Site*;
ii. reviewed on an annual basis and updated by the *Owner* as required; and
iii. be available for inspection by *Ministry* staff.

Capacity

2.5 (1) The final volumetric capacity of the *Site* is **84,962 cubic metres** (including waste and daily cover material); and

(2) The total capacity as identified in Condition No. 2.5 (1) does not include the final cover.

2.6 Unused approved volumetric capacity shall be deposited on top of the landfill according to the documents listed in Schedule "A".

Service Area

2.7 Only Municipal Waste that is generated in the within the boundaries of the Township of Killaloe, Hagarty and Richards shall be accepted at the *Site*. No waste shall be received for disposal at this *Site* from outside the approved service area.

Hours of Operation

2.8 (1) Waste shall only be accepted at the *Site* during the following time periods:
i. Wednesday - 7:30 a.m. to 11:30 p.m.;
ii. Friday - 12:00 p.m. to 4:00 p.m., and
iii. Saturday – 8:00 a.m. to 4:00 p.m.

(2) The site will remain closed to ratepayers and IC&I generators on: Christmas Day, Boxing Day, New Year's Day, Good Friday, Easter Sunday, Easter Monday, Canada Day.

(3) Amending the hours of operation requires *Director*'s Approval.

2.9 With the prior written approval of the *District Manager*, the time periods may be extended to accommodate seasonal or unusual quantities of waste.

2.10 The *Owner* may provide limited hours of operation provided that the hours are posted at the landfill gate and that suitable notice is provided to the public of any change in operating hours.

2.11 Upon reasonable notice to the *Director*, contingency actions may take place outside normal hours of operation. Emergency response may occur at any time as required.

Signage

2.12 (1) Signs shall be placed at the landfill *Site* entrance/exit indicating, at a minimum, the following:
(a) Name of the landfill and name of the *Owner/Operator*;
(b) *MOE ECA* Number;
(c) Days and hours of operation and public use;
(d) Contact telephone number at the Township of Killaloe, Hagarty and Richards;

(e) Service area for the *Site*;
(f) Types of waste accepted and prohibited;
(g) Overview of landfill complaints procedure, including a phone number for registering a complaint;
(h) Unauthorized entry is prohibited; and
(i) A warning against dumping wastes outside the *Site*

(2) The *Owner* shall install and maintain signs to direct vehicles to working face and recycling areas.

(3) The *Owner* shall provide signs at recycling depot informing users what materials are acceptable and directing users to appropriate storage area.

Site Security

2.13 During non-operating hours, the *Site* entrance and exit gates shall be locked and the *Site* shall be secured against access by unauthorized persons.

On-Site Roads

2.14 On-*Site* roads shall be provided and maintained in a manner that vehicles hauling waste to and on the *Site* may travel readily and safely on any operating day. During winter months, when the *Site* is in operation, roads must be maintained to ensure safe access to the landfill working face. On-*Site* roads must be clear of mud, ice and debris which may create hazardous conditions.

Waste Inspection Procedures

2.15 The *Operator* shall develop and implement a program to inspect waste to ensure that the waste is of a type approved for acceptance under this *ECA*.

Waste Inspection and Deposition

2.16 All loads of waste must be properly inspected by trained site personnel prior to acceptance at the *Site* and waste vehicles must be diverted to appropriate areas for waste disposal.

Litter Control

2.17 The *Owner* shall take all practical steps to prevent escape of litter from the *Site*. The *Owner* shall inspect and collect litter from the *Site* on a monthly basis from April to November and as needed between December and March. All loose, windblown litter shall be collected and disposed of at the landfill working face.

Vermin, Scavenging, Dust, Litter, Odour, Noise, etc.

2.18 The *Site* shall be operated and maintained such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

2.19 No scavenging is to occur at the *Site*.

Dust

2.20 The *Owner* shall control fugitive dust emissions from on-***Site*** sources including but not limited to on-*Site* roads, stockpiled cover material and, landfill area prior to seeding especially during times of dry weather conditions. If necessary, major sources of dust shall be treated with water and/or dust suppression materials to minimize the overall dust emissions from the *Site*.

Noise

2.21 The *Owner* shall comply with noise criteria in MOE Guideline entitled *"Noise Guidelines for Landfill Sites."*

Overall Surface Water Management

2.22 (1) The *Owner* shall take all appropriate measures to minimize surface water from coming in contact with waste. Temporary berms and ditches shall be constructed around active waste disposal areas to prevent extraneous surface water from coming in contact with the active working face.

(2) The *Owner* shall not discharge surface water to receiving water bodies without an approval under the *EPA*.

Landfill Gas

2.23 All buildings are to be free of any landfill gas accumulation. The *Owner* shall provide adequate ventilation systems to relieve landfill gas accumulations in buildings if necessary.

3.0 LANDFILL SITE OPERATIONS

Landfill Operations

3.1 Except as otherwise provided by these Conditions, the landfilling operations at the *Site* shall be conducted in accordance with the Application for an *Environmental Compliance Approval* for a Waste Disposal Site for the Corporation of the Township of Killaloe, Hagarty and Richards, dated September 21, 1998, and the supporting documentation, plans and specifications listed in Schedule "A".

Waste Types

3.2 Only solid, non-hazardous *Municipal Waste* which includes wastes generated by residential and IC&I generators within the Township of Killaloe, Hagarty, and Richards shall be accepted at the *Site* for landfilling.

Unacceptable Waste

3.3 i. The *Owner* shall conduct appropriate inspections and ensure that appropriate controls are in place to prevent the acceptance and landfilling of liquid industrial waste and hazardous waste and to prevent the acceptance of waste from outside the approved service area.

ii. The *Owner* shall record in the daily records for the *Site* operations any occurrence of unacceptable waste delivered to the *Site*, the name of the waste hauler delivering the waste to the *Site* and waste generator (if known).

iii. The *Owner* shall forthwith notify the *District Manager* of any and all waste load refusals at the *Site* related to requirements in this *ECA*, including service area and waste types.

Burning of Waste

3.4 (1) Burning of waste is not permitted at the *Site* with the exception of the material under Condition 3.4 (2).

(2) Only clean wood and brush shall be permitted for burning. Burning of the materials shall be completed as per the Ministry of the Environment Guideline C-7 (Burning at landfill Sites);

Waste Placement

3.5 No waste shall be landfilled outside of the **limit of fill area** for the *Site* as shown in Item 6 in Schedule "A" attached to this *ECA*.

3.6 No waste shall be landfilled below the **base grades** as discussed and shown in Item 6 in Schedule "A" attached to this *ECA*.

3.7 i. No waste shall be landfilled at any time above the **final waste grades** as shown in Item 8 in Schedule "A" attached to this *ECA*; and

ii. Final slopes above grade at the time of *Site* closure within the waste fill area shall be within the range of 4H:1V (25%) and 20H:1V (5%).

3.8 Waste placement shall occur at a minimum 1 meter above the highest groundwater table elevation at the *Site*.

3.9 No waste shall be landfilled in the buffer area.

3.10 The *Owner* shall deposit waste in a manner that minimizes exposure area at the landfill working face and all waste shall be compacted before cover is applied.

Cover Material

3.11 i. Daily Cover - By the end of each working day, the entire working face shall be compacted and covered with a minimum thickness of 150 mm of soil cover or an approved thickness of alternative cover material.

ii. Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm of soil cover or an approved thickness of alternative cover material shall be placed.

Alternative Daily Cover Material

3.12 Clean soil, non-hazardous contaminated soils, temporary or movable low permeability flexible membranes, asphalt shingles, leaf and yard waste mixed with sand and composted leaf and yard waste are the alternative daily cover material approved under this *ECA*;

3.13 The *Owner* shall ensure that the non-hazardous contaminated soils, temporary or movable low permeability flexible membranes, asphalt shingles, leaf and yard waste mixed with sand and composted leaf and yard waste used as alternative daily cover, does not cause an adverse environmental effect. If any adverse effect is caused, the *Owner* shall immediately stop the use of such material and resume the use of other approved daily cover or clean soil.

3.14 (1) Contaminated soil for use as daily cover shall be stockpiled within the limits of landfilling.

(2) The amount of contaminated soil stockpiled for use as daily cover shall not exceed **500 cubic metres** at any time.

3.15 Contaminated soil may be used for daily/intermediate cover but only on slopes where surface water drainage is into the waste fill and isolated from the storm water collection system.

3.16 The *Owner* must ensure that measures are in place for the on site treatment and disposal of any contaminated run off from the contaminated soils stockpile.

3.17 Prior to receipt at the *Site*, each source of contaminated soils which are to be used as daily or intermediate cover shall be tested to determine if the soils meet the criteria in this *ECA* and a copy of the test results shall be kept in the daily records for the site as required.

Additional Alternative Daily Cover Material

3.18 The alternative cover material shall be non-hazardous in accordance to *Reg. 347* and will be expected to perform at least as well as soil in relation to the following functions:

(a) Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;

(b) Provision for an aesthetic condition of the landfill during the active life of the Site;

(c) Provision for vehicle access to the active tipping face; and

(d) Compatibility with the design of the *Site* for groundwater protection and leachate management.

3.19. Shredded Construction & Demolition and Bulky waste as per Item 14 of Schedule "A" is an additional alternative

daily cover material approved under this *ECA*.

3.20 Maximum amount of material stored in the *Construction & Demolition* and *bulky household* items area shall be **1000 m^3**;

3.21 The *Owner* shall undertake the necessary precautionary measures for fire prevention when stockpiling material to be used as alternative cover (example - limit potential for spontaneous combustion, etc.).

3.22 The *Owner* shall ensure that the material used as alternative daily cover, does not cause an *adverse effect*. If any adverse effect is caused, the *Owner* shall immediately stop the use of such material and resume the use of other approved daily cover or clean soil.

3.23 Sufficient soil or other approved alternative daily cover material (ADC) will be available for use, either when site conditions do not permit use of the alternative material, or if performance of the material is unsatisfactory.

Waste Processing

3.24 The *Owner* shall ensure that the following:

i. that all *ECA* required for the equipment for the operation and processing waste at the *Site* have been obtained by the *Owner*; or

ii. that a retained contractor has all the *ECA*'s for the equipment to be used to process waste at the *Site*.

Contaminant Attenuation Zone

3.25 (a) The *Owner* must continue to own the property rights to the Contaminant Attenuation Zone for all of the contaminating life span of the *Site*.

(b) The ownership of the property rights must include the right to:

(i) discharge contaminants from the operations at the *Site* into the Contaminant Attenuation Zone;

(ii) enter into the Contaminant Attenuation Zone and onto the surface above the Contaminant Attenuation Zone for purposes of testing, monitoring, intercepting contaminants and carrying out remedial work;

(iii) install, operate and maintain works, for the purposes mentioned in clause (ii), in or the Contaminant Attenuation Zone, including on the surface above the Contaminant Attenuation Zone; and

(iv) prevent the owner(s) of the land(s) in which the Contaminant Attenuation Zone is located from paving, erecting a structure or making any use of land(s) above or in the vicinity of the contaminant attenuation zone that would interfere with the functioning of the Contaminant Attenuation Zone or with the exercise of any of the rights mentioned in this subsection.

(c) The *Owner* shall notify the *Director* in writing within thirty (30) days after any change in his, her or its ownership of the property rights in the Contaminant Attenuation Zone.

Landfill Surface Water Management

3.26 Stormwater runoff generated from the active waste fill area shall be considered contaminated and treated as leachate. Operational methods shall ensure that any precipitation falling onto active waste fill areas, not under final cover, shall be directed into the waste or into a control structure for testing prior to confirm surface water can be discharged to the natural environment.

4.0 WASTE TRANSFER STATION AND COMPOSTING PAD

Waste Transfer Facility

4.1 Except as otherwise provided by these Conditions, the *Transfer Station* shall be designed, developed, used, maintained and operated, and all facilities, equipment and fixtures shall be built and/or installed in accordance with the Application for an *ECA* for an upgraded Waste Transfer Station at Killaloe Waste Disposal Site for the Corporation of the Township of Killaloe, Hagarty and Richards dated January 31, 2012, and the supporting documentation, plans and specifications listed in Schedule "A".

4.2 The Owner shall limit transfer activities to the receiving and transferring of solid, non-hazardous, *Residential and IC&I Waste, Blue Box Recyclables* (commingled containers, mixed fibres, and OCC), *Leaf and Yard Waste, Construction and Demolition and Bulky Waste, SSO, Refrigerant Appliances, Scrap Metal and White Goods, Waste Tires, WEEE,* automotive batteries, single-use batteries and automotive plastics generated within the Township of Killaloe, Hagarty and Richards, as described in Item 18 and 20 of Schedule "A".

4.3 The *Owner* shall ensure that all waste accepted for transfer shall be segregated either into bins with lids or doors, or in designated areas as defined by barriers. All bins and designated waste storage areas shall be clearly labelled.

4.4 The *Owner* shall ensure that each day on which the *Site* is open to accept waste for transfer, the *Site* is inspected and litter is picked up in the waste transfer area.

Waste Quantity

4.5 The maximum storage capacity for the *Waste Transfer Facility* and for each type of material is as follows:

Material	Total Volume (m^3)
Blue Box Recyclable – Commingled Containers	70
Blue Box Recyclable – Mixed Fibres	70
Blue Box Recyclable - OCC	80
Residential and IC&I Waste	120
SSO	6.4
Scrap Metal and White Goods	100
Waste Tires	100
Refrigerants	25 units (1 unit = 1 m^3)
WEEE	40
Leaf and Yard Waste	500
Automotive Batteries	180(1)
Automotive Plastics	0.8 (800 L)
Batteries (Single use)	2 - 45 L Drums
C&D and Bulky Waste	1000 (unprocessed and processed)

Notes: (1) See Item 22 in Appendix A for Estimation

Operations

4.6 Recycling activities shall be completed as per *Ontario Regulation 101/94.*

4.7 Recyclable materials shall be properly separated and each area properly identified. The areas shall be kept in a neat and tidy manner.

4.8 All storage containers/bins used to store waste and/or recyclable materials shall be maintained in good condition to prevent leakage. The *Owner* shall immediately remove from service any leaking container. Containers/bins used to store

clean scrap metal may be equipped with drainage holes to permit the drainage of rainwater.

4.9 The operating hours of the *Waste Transfer Facility* shall in as those in Condition 2.8 in this *ECA*.

4.10 All waste types shall be segregated either into bins with locks and doors, or in designated areas defined by barriers. All bins and designated waste storage areas shall be clearly labelled.

4.11 The *Owner* shall ensure that all white goods received at the *Waste Transfer Facility* have been drained of any refrigerants, and have the appropriate paperwork (current ODP card) demonstrating that the refrigerants have been removed. In the event the *Owner* accepts white goods that have not been drained, the *Owner* shall retain a certified technician to properly drain and tag the appliances on a quarterly basis.

4.12 No waste shall be received at the *Waste Transfer Station* except during operating hours when the *Waste Transfer Station* is under the supervision of the trained personnel.

4.13 The *Owner* shall remove all scrap metal and appliances from the *Waste Transfer Facility* at an interval not to exceed six (6) months.

4.14 (1) The *Owner* shall remove *Residential and IC&I Waste* received at the transfer station once the on-*Site* compaction equipment reaches capacity and/or as required.

(2) Unprocessed *C&D and Bulky Waste* stockpiled in the *C&D and Bulky Waste Staging Area* shall be processed on at minimum on an annual basis.

(3) Processed *C&D and Bulky Waste* stockpiled in the C&D and Bulky Waste Staging Area shall be removed from the area within one **month** year of processing and placed on the landfill for use as daily cover. Any additional waste material not being used for daily cover shall be landfilled at the *Site* in accordance with this *ECA* or transported by a licensed waste hauler to an appropriate waste disposal facility.

Composting Pad

4.15 Composting operations at the *Site* shall be carried out in a manner as not to interfere with normal waste disposal operations as approved in this *ECA*.

4.16 (i) The *Owner* may compost leaf and yard waste and clean wood and brush for the purpose of producing daily cover material as described in Items 6 and 7 in Schedule "A".

(ii) Any composted material leaving the site shall be managed as a waste in accordance with *Ontario Regulation 347* and the *Act*.

(iii) The amount of material to be composted shall not exceed **500 cubic metres per year**.

(iv) The amount of composted material stockpiled for use as daily cover shall not exceed **500 cubic metres** at any time.

(v) Composted material stockpiled for use as daily cover shall not be stockpiled longer than 1 year. Material older than 1 year shall be disposed of in accordance with *Ontario Regulation 347* and the *Act*.

4.17. Should the ensuing compost be destined for use by the general public, composting operations at the *Site* shall be carried out in accordance with the Ministry's Guidelines "Ontario Compost Quality Standards" (Standards) and "Guideline for Production of Compost in Ontario" (Guideline) dated 2012.

4.18 Should the ensuing compost be destined for use as alternative cover material at the *Site*, composting operations at the *Site* must be carried out in a manner that does not cause groundwater or surface water contamination, offensive odours or encourage the presence of vermin or any other *adverse effect*.

Organic Depot Program

4.19 The organic depot program at the *Site* shall consist of the on-*Site* collection and transfer of organic waste that is stored in a maximum of eight (8) specialized MOLOK containers with a total storage capacity of **6.4 cubic meters** in accordance with the specifications and location in Item 20 in Schedule "A".

4.20 (1) The *Owner* shall ensure that containers used to store organic waste are leakproof, lockable and bear resistant;

(2) The *Owner* shall monitor the containers in which organic waste is stored for:

i. decomposition to ensure that the organic waste has not decomposed to the point where it is unacceptable for the intended receiving facility; and
ii. odours; and

(3) The *Owner* shall empty the containers used to store organic waste and transfer the organic waste from the *Site* forthwith when:

i. the maximum capacity approved in Condition 4.5 has been reached; or
ii. the organic waste has decomposed to the point where it is unacceptable to the original intended receiving facility; or
iii. the organic waste is creating odours that are causing off-*Site* impacts and/or negative impact to Site users.

5.0 TRAINING

Employees and Training

5.1 A training plan for all employees that operate any aspect of the site shall be developed and implemented by the *Operator*. Only trained employees shall operate any aspect of the *Site* or carry out any activity required under this *ECA*. For the purpose of this *ECA* "trained" means knowledgeable either through instruction or practice in:

i. the relevant waste management legislation *including EPA, O. Reg. 347*, regulations and guidelines;
ii. major environmental *and occupational health and safety* concerns pertaining to the waste to be handled;
iii. the proper handling of wastes;
iv. the management procedures including the use and operation of equipment for the processes and wastes to be handled;
v. the emergency response procedures;
vi. the specific written procedures for the control of nuisance conditions;
vii. the *terms, conditions and operating* requirements of this *ECA* and,
viii. proper inspection, receiving and recording procedures and the activities to be undertaken during and after a load rejection.

6.0 INSPECTIONS AND RECORD KEEPING

Daily Inspections and Log Book

6.1 An inspection of the entire *Site* and all equipment on the *Site* shall be conducted each day the *Site* is in operation to ensure that the site is being operated in compliance with this *ECA*. Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the *Site* if needed.

6.2 A record of the inspections shall be kept in a daily log book *or a dedicated electronic file* that includes:

i. the name and signature of person that conducted the inspection;
ii. the date and time of the inspection;
iii. the list of any deficiencies discovered;
iv. the recommendations for remedial action; and
v. the date, time and description of actions taken.

6.3 A record shall be kept in the daily log book of all the following:

i. the type, date, hauler (residential or IC&I), and estimated quantity (i.e. cubic metres) of all waste received at the *Site*; and,
ii. a list of the refusal of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

Daily Operations Records

6.4 The *Owner* shall establish a daily operating report of the landfilling and waste diversion operations, in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

(a) type and estimated amount of waste received at the *Site* for landfilling;
(b) area of the *Site* in which landfilling operations are taking place;
(c) type, source and amount of daily or intermediate cover used;
(d) waste types and quantities of recyclable wastes received at the *Site*;
(e) source of their generation;
(f) waste types and quantities of recyclable wastes transferred off the *Site*;
(g) destination of recyclable wastes transferred off the *Site*;
(h) records of litter pick-up activities and any dust suppression activities undertaken at the *Site*;
(i) maintenance and repairs performed on the equipment used at the Site;
(j) summary of emergency situations and actions taken to address them;
(k) any environmental and operational problems and any mitigative actions taken;
(l) any recommendations to minimize environmental impacts from the operation of the waste diversion areas to improve such operations in this regard; and
(m) any other information required by the *District Manager*.

Site Inspections

6.5 During *Site* operations, the *Owner* shall inspect the *Site* monthly for the following items but not limited to these items:

i. General settlement areas or depressions on the waste mound;
ii. Shear and tension cracks on the waste mound;
iii. Condition of surface water drainage works;
iv. Erosion and sedimentation in surface water drainage system;
v. Presence of any ponded water on the waste mound;
vi. Evidence of vegetative stress, distressed poplars or side slope plantings on or adjacent to the waste mound; and
vii. Condition of fence surrounding the *Site*.

6.6 The *Owner* shall inspect the waste mound and surrounding areas weekly for presence of leachate seeps. Any leachate seeps that are discovered shall be repaired within 48 hours of notice by the *Owner*.

Waste Refusal Records

6.7 A record shall be kept in the daily log book of all refusals of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

6.8 (a) The *Owner* shall retain all documentation listed in Schedule "A" for as long as this *ECA* is valid.

(b) The *Owner* shall retain at the Site, all records required by this *ECA* 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 above documents and records available for inspection upon request by the staff of the *Ministry*.

Record Retention

6.9 Except as authorized in writing by the *Director*, all records required by this *ECA* shall be retained at the *Site* for a minimum of two (2) years from their date of creation.

6.10 The *Owner* shall retain all documentation listed in Schedule "A" for as long as this *ECA* is valid.

6.11 All Daily Operations Records and Monthly Inspection Reports, as required by Conditions 6.4 and 6.5, are to be kept at the *Site* until they are included in the Annual Report.

6.12 The *Owner* shall retain employee training records as long as the employee is working at the *Site*.

6.13 The *Owner* shall make all of the above documents available for inspection upon request of *Ministry* staff.

7.0 MONITORING

7.1 The Site shall be operated in such a way as to ensure compliance with the following:

(a) Reasonable Use Guideline B-7 for the protection of the groundwater at the *Site*;

(b) Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives*, as amended from time to time or limits set by the Regional Director, for the protection of the surface water at and off the Site.

7.2 (a) The *Owner* shall construct and maintain to the satisfaction of the *Ministry*, a groundwater monitoring network which fully delineates the horizontal and vertical extent of leachate migration resulting from the landfilling activities at the *Site*.

(b) Groundwater samples from all wells in the above-described monitoring network will be obtained and analyzed in the Spring and Fall of each year, in accordance with Schedule "B". Groundwater elevations in all monitoring wells shall be measured during each monitoring event prior to obtaining water quality samples.

7.3. A certified Professional Geoscientist or Engineer possessing appropriate hydrogeologic training and experience will execute or directly supervise the execution of the groundwater monitoring and reporting program.

Groundwater Monitors

7.4 The *Owner* shall ensure all groundwater monitoring wells are properly capped, locked and protected from damage.

7.5 In areas where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells and they shall be properly re-secured.

7.6 All groundwater monitoring wells whether included in the monitoring program or not shall be assessed, repaired, replaced or decommissioned as required. Any well being decommissioned shall be decommissioned in accordance with good standard practice that will prevent contamination through the abandoned well and in accordance with Ontario Regulation 903.

7.7 The *Owner* shall repair or replace any monitoring well included in the monitoring program which is destroyed or in any way made inoperable for sampling such that no more than one sampling event is missed.

7.8 Any monitoring well included in the monitoring program that is no longer required as part of the groundwater monitoring program may be decommissioned provided its removal from the monitoring program has been approved by the

Director. A report on the decommissioning shall be provided in the annual monitoring report for the period during which the well was decommissioned.

Monitoring Programs

7.9. (1) Monitoring programs shall be carried out for groundwater and surface water, in accordance with Schedule "B".

(2) The *Owner* shall include stream flow measurements at each monitoring station as a component of the surface water monitoring program identified in Condition 7.9 (1)

(3) For any changes to the monitoring program, the *Owner* shall in a cover letter request the acceptance of the changes by the *District Manager*.

(4) Within fourteen (14) days of receiving the writing correspondence from the *District Manager* confirming that the *District Manager* is in agreement with the proposed changes to the monitoring program, the *Owner* shall forward a letter identifying the proposed changes and a copy of the correspondences from the *District Manager*, to the *Director* requesting the *ECA* be amended to approve the proposed changes prior to implementation.

Compliance Criteria

7.10 The *Owner* shall ensure the *Site* is in compliance with *MOE* Guideline B-7 Reasonable Use Concept is applied and met at all points on the property line which are impacted by leachate from the *Site*.

8.0 CONTINGENCY PLANNING

Contingency Plan

8.1 The *Owner* shall maintain a Contingency Plan for the operation of the *Site*. The Plan shall include, but not necessarily limited to:

(i) Having a *Site* Attendant on-site during all public operating hours;
(ii) As-built drawings which accurately reflect the final *Site* plan layout and clearly indicates all storage areas;
(iii) Emergency response procedures to be undertaken in the event of an incident, medical emergency or process upset;
(iv) A list of contingency equipment and materials, including names and telephone numbers of companies available for emergency response;
(v) A notification protocol, with names and telephone numbers of persons to be contacted, including Township Management Staff, the Ministry of the Environment
Spills Action Centre, the Ministry of the Environment District Office and the local Fire and Police Departments.

8.2 By no later than **September 30, 2013**, the *Owner* shall submit to the *Director* for approval, with a copy to the *District Manager*, a contingency plan to address surface water and groundwater issues at the *Site*.

8.3 The *Owner* shall ensure that the contingency equipment and materials outlined in the Contingency Plan are immediately available on the *Site* at all times, in a good state of repair, and fully operational;

8.4 The *Owner* shall ensure that all operating personnel are fully trained in the use of the contingency equipment and materials outlined in the Contingency Plan, and in the procedures to be employed in the event of an emergency;
8.5 The *Owner* shall review and update the emergency response plan on an annual basis as a minimum. In particular the Owner shall ensure that the names and telephone numbers of the persons to be contacted are up-to-date.

Fire Safety Plan

8.6 (i) The *Owner* shall prepare and submit a Fire Safety Plan to the local fire service authority.

(ii) After receiving written concurrence/approval for the Fire Safety Plan from the local fire service authority, the *Owner*

shall submit a copy to the

District Manager.

(iii) No WEEE waste shall be received at the *Site* unless written concurrence from the *District Manager* has been obtained indicating compliance with Conditions 8.6 (i) and 8.6(ii) above.

8.7 The Municipality shall take immediate measures to clean-up all spills, related discharges and process upsets of wastes which result from the operation of the *Site*. All spills and upsets shall be immediately reported to the **Ministry's Spills Action Centre at (416) 325 3000 or 1-800-268-6060.**

9.0 COMPLAINTS PROCEDURE

9.1 If at any time, the *Owner* receives complaints regarding the operation of the *Site*, the *Owner* shall respond to these complaints according to the following procedure:

(a) The *Owner* shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;

(b) The *Owner*, upon notification of the complaint, shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and

(c) The *Owner* shall complete a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents. A copy of the report shall be retained on-*Site*.

9.2 The *Owner* shall post site complaints procedure at the *Site* entrance along with the name and phone number of a suitable, local contact to receive complaints or questions related to the *Site*. All complaints and the *Owner*'s actions taken to remedy the complaints must be summarized in the Annual Report.

10.0 EMERGENCY SITUATIONS

10.1 In the event of a fire or discharge of a contaminant to the environment, *Site* staff shall contact the *MOE* Spills Action Centre (1-800-268-6060) and the *District Office* of the *MOE*.

10.2 The *Owner* shall submit to the *District Manager* a written report within 3 days of the spill or incident, outlining the nature of the incident, remedial measures taken and measures taken to prevent future occurrences at the Site.

10.3 All wastes resulting from an emergency situation shall be managed and disposed of in accordance with O.Reg. 347.

10.4 The *Owner* shall ensure that any updates to the Emergency Response Manual for the *Site* are submitted to the *District* Manager within fourteen (14) days of being issued. The Emergency Response Manual should indicate the responsibility of each of the stakeholders with respect to handling possible emergency situations.

10.5 The Emergency Response Manual shall be updated on a regular basis and be provided to the *District Manager* within one month of the revision date.

10.6 The *Owner* shall ensure that adequate fire fighting and contingency spill clean up equipment is available and that emergency response personnel are familiar with its use and location.

10.7 All equipment and materials required to handle the emergency situations shall be:

(a) kept on hand at all times that waste landfilling and/or handling is undertaken at the *Site*; and

(b) be adequately maintained and kept in good repair.

10.8. The *Owner* shall ensure that the emergency response personnel are familiar with the use of such equipment and its location(s).

11.0 ANNUAL REPORTING

11.1 A written report on the development, operation, monitoring and closure of the *Site*, shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the *Regional Director* and the *District Manager* by **March 31st** of each year and shall cover the year ending the preceding December 31st.

11.2 The Annual Report shall include the following:

(a) calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the *Site* during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;
(b) *Site* plan(s) showing the existing contours of the *Site*, areas of landfilling operations during the reporting period, areas of intended operation during the next reporting period, areas of excavation during the reporting period, the progress of final cover, vegetative cover, and any intermediate cover application, previously existing site facilities, facilities installed during the reporting period and site preparations and facilities planned for installation during the next reporting period;
(c) a calculation of the remaining approved capacity of the *Site* and an estimate of the remaining *Site* life;
(d) summary of cover stock piling activities including use, timing, locations and erosion protection;
(e) waste types and quantities of recyclable wastes received and transferred off the *Site*;
(f) destinations of recyclable wastes transferred off the *Site*;
(g) summary of litter pick-up and any dust suppression activities undertaken at the *Site*;
(h) summary of maintenance and repairs performed on the equipment used at the *Site*;
(i) summary of inspections undertaken at the *Site*;
(j) summary of complaints received and actions taken to resolve them;
(k) summary of emergency situations and actions taken to address them;
(l) any environmental and operational problems and any mitigative actions taken;
(m) any recommendations to minimize environmental impacts from the operation of the landfill and waste diversion areas to improve such operations in this regard;
(n) the results and an interpretive analysis of the results of all leachate, groundwater and surface water monitoring, including an assessment of the need to amend the monitoring programs;
(o) an assessment of the operation of the *Site*, the need to amend the design or operation of the *Site*, and the adequacy of and need to implement the contingency plans;
(p) a report on the status of all monitoring wells and a statement as to compliance with *O.Reg. 903*; and
(q) any other information required by the *District Manager*.

12.0 SITE CLOSURE

12.1 At least two (2) years prior to the anticipated date of closure of this *Site,* the *Owner* shall submit to the *Director* for approval, with copies to the *District Manager*, a detailed *Site* closure plan pertaining to the termination of landfilling operations at this *Site*, post-closure inspection, maintenance and monitoring and end use. The plan shall include the following:

(a) a plan showing *Site* appearance after closure;
(b) a description of the proposed end use of the *Site*;
(c) a descriptions of the procedures for closure of the *Site,* including:

(i) advance notification of the public of the landfill closure;

(ii) posting of a sign at the *Site* entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
(iii) completion, inspection and maintenance of the final cover and landscaping;
(iv) *Site* security;
(v) removal of unnecessary landfill-related structures, buildings and facilities; and
(vi) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater and surface water ; and
(vii) a schedule indicating the time-period for implementing sub-conditions (i) to (vi) above;

(d) descriptions 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 and surface water;
(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 for leachate; and

(f) an updated estimate of the contaminating life span of the *Site*, based on the results of the monitoring programs to date.

12.2. The *Site* shall be closed in accordance with the closure plan as approved by the *Director*.

SCHEDULE "A"

This Schedule "A" forms part of ECA No. A 412306:

1. Application to amend a Certificate of Approval for a Waste Disposal Site dated September 21, 1998 and signed by Janice Bush, Reeve, Township of Hagarty & Richards.

2. Document entitled "Design and Operations Report for the Killaloe Landfill Site, Provisional Certificate of Approval A412306", dated September 1998 and prepared by The Greer Galloway Group Inc.

3. Letter from I.. Parrot, MOE to K. Mooder, The Greer Galloway Group Inc., dated November 12, 1999 re: Ministry Review Comments.

4. Letter from K. Mooder, The Greer Galloway Group Inc. to I. Parrot, MOE, dated January 10, 2000 re: Response to Ministry Review Comments dated November 12, 1999, including Addendum.

5. Letter from K. Mooder, The Greer Galloway Group Inc. to I. Parrot, MOE, dated May 2, 2000 re: Additional Information on Environmental Monitoring Program.

6. Document entitled "Site Operations and Development Plan, Killaloe Waste Disposal Site", dated December 2004 and prepared by SGS Lakefield Research Limited.

7. Application to amend a Certificate of Approval for a Waste Disposal Site, dated December 22, 2004 and signed by Ms. Lorna Hudder, CAO/Clerk- Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards.

8. Letter from Ms. Lorna Hudder, CAO/Clerk- Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards, to Ranjani Munasinghe, MOE, dated July 22, 2005 as a response to the MOE comments dated June 7, 2005.

9. Letter dated January 27, 2006 from Christine M. Wolf, SGS Lakefield Research Limited to Ms. Lorna Huder, CAO/Clerk - Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards, Re: Groundwater Modelling Results.

10. Letter from Ms. Lorna Huddler, CAO/Clerk- Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards, to Ranjani Munasinghe, MOE, dated March 29, 2006 as a response to the MOE comments for hydrogeological and surface water reviews by Mark Phillips, MOE and Kyle Stephenson, MOE.

11. Technical Review Comments from Kyle Stephenson, MOE, sent on June 7, 2006 to Ranjani Munasinghe.

12. Application to amend a Certificate of Approval for a Waste Disposal Site, dated June 21, 2007 and signed by Ms. Lorna Hudder, CAO/Clerk-Treasurer, the Corporation of the Corporation of the Township of Killaloe, Hagarty and Richards.

13. Document dated June 27, 2007, prepared by Mr. Tyler Peters, Project Manager, Greenview Environmental Management Ltd., providing supporting information.

14. Application to amend a Certificate of Approval for a Waste Disposal Site, dated March 27, 2008 and signed by Lorna Hudder, CAO/Clerk - Treasurer, The Corporation of the Township of Killaloe, Hagarty and Richards.

15. Document dated April 16, 2008, prepared by Tyler H. Peters, P.Eng, Project Manager, Greenview Environmental Management Ltd., providing supporting information.

16. Application for a Certificate of Approval for the operation of a Waste Electrical and Electronic Equipment facility dated June 17, 2010 and signed by Lorna Hudder, CAO/Clerk, Treasurer, The Corporation of the Township of Killaloe, Hagarty and Richards. The application includes the Design and Operations Report; Notification Letters sent to adjacent property owners, tenants and residents; Ontario Electronic Stewardship Guidelines and Killaloe Waste Disposal Site Plan.

17. Response letter to the MOE, addressing four major concerns raised by residents dated April 6, 2011, and prepared by Lorna Hudder, CAO/Clerk-Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards.

18. Application for amendment to Environmental Compliance Approval for a Waste Disposal Site (landfill/transfer) and supporting documentation, dated January 31, 2012 and signed by Dan Hagan, B.Sc., Project Geologist at Greenview Environmental Management on behalf of the Township of Killaloe, Hagarty and Richards, requesting approval for an updated Development and Operations Plan to reflect additional capacity. The supporting documentation included the following:

    i. Report entitled "Design and Operations Plan - Municipal Solid Waste Transfer Station for Killaloe Waste Disposal Site (A412306), Township of Killaloe, Hagarty and Richards, County of Renfrew, Ontario by Greenview Environmental management Limited (File No. 107.12.005), and dated January 31, 2012.

19. Memorandum dated August 28, 2011 to Ms. Emily Tieu, Ottawa District Office, Ministry of the Environment from Mr. Kyle Stephenson, Technical Support Section - Eastern Region, Ministry of the Environment providing comments on the 2011 annual report.

20. Letter report dated May 10, 2013 addressed to Mr. Dale Gable, Ministry of the Environment from Mr. Dan Hagan, Greenview Environmental Management Limited requesting additional storage capacity at the waste transfer station for batteries, automotive plastics and SSO.

21. Letter dated June 18, 2013 addressed to Ms. Lorna Hudder, Township of Killaloe, Hagerty and Richards from Mr. Dale Gable, Ministry of the Environment requesting additional information on the storage of automotive batteries and storage containers.

22. Letter dated June 21, 2013 addressed to Mr. Dale Gable, Ministry of the Environment from Mr. Dan Hagan, Greenview Environmental Management Limited providing additional information on the batteries storage and storage containers.

SCHEDULE "B"

Location	Frequency	Parameters
Groundwater BH00-1, BH00-2, BH00-3, BH00-4A(D), BH00-4B(S), MW06-1S, MW06-1D, MW06-2S, MW06-2D, MW07-3S, MW07-3D, MW10-7S, MW10-7D R1, R2, R3 (Residential) 1 QA/QC	Twice (Spring and Fall) Field Measurements (pH, Conductivity, Temperature)	Alkalinity, aluminium, ammonia, barium, boron, calcium, chloride, chromium, cobalt, COD, copper, DOC, iron, magnesium, manganese, nitrate, nitrite, potassium, silicon, sodium, strontium, sulphate, TDS, TKN, total phosphorus, zinc
Groundwater BH00-1, BH00-5, MW06-1S, MW06-1D, MW06-2S, MW06-2D, MW07-3S, MW07-3D,	Once (Fall)	EPA 624 VOC's
Groundwater BH00-4, BH00-5, BH04-1S, BH04-1D, MW07-4, MW07-5	Twice (Spring and Fall) Field Measurements (pH, Conductivity, Temperature)	Same as below for surface water parameters
Groundwater BH00-1, BH00-2, BH00-3, BH00-4 BH00-4A(D), BH00-4B(S), BH00-5, MW06-1S, MW06-1D, MW06-2S, MW06-2D, MW07-3S, MW07-3D, MW07-4, MW07-5, MW07-6, MW10-7S, MW10-7D	Twice (Spring and Fall)	Groundwater Elevations (all monitoring wells)
Surface Water SW1, SW2, SW3, SW5, SW6, SW8, SW9 1 QA/QC	Twice (Spring and Fall) Field Measurements (pH, Conductivity, Dissolved Oxygen, Temperature, Unionized Ammonia [calculation])	Alkalinity, aluminium, ammonia, barium, boron, calcium, chloride, chromium, cobalt, COD, copper, DOC, iron, magnesium, manganese, nitrate, nitrite, phenols, potassium, silicon, sodium, strontium, sulphate, TDS, TKN, TSS (Total Suspended Solids), total phosphorus, zinc

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

1. *The reason for Condition 1.1, 1.2, 1.3, 1.4 and 1.5 is to ensure that the Site is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.*
2. *The reason for Conditions 1.6, 1.7, 1.8, 1.12, 1.13, 1.14 and 1.15 is to clarify the legal rights and responsibilities of the Owner under this ECA.*
3. *Conditions 1.9, 1.10 and 1.11 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 ECA.*
4. *Conditions 1.16, 1.17 and 1.18 are included, pursuant to subsection 197(1) of the EPA, to provide that any persons having an interest in the Site are aware that the land has been approved and used for the purposes of waste disposal.*

5. *The reasons for Condition 1.19 are to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this ECA.*
6. *The reasons for Condition 1.20 and 1.21 are to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.*
7. *The reason for Condition 1.22 is to ensure that appropriate Ministry staff have ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this ECA. This condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA and OWRA.*
8. *Conditions 2.1, 2.2, 3.1, 4.1, 4.2, 4.3 and 4.4 are included in order to ensure that waste disposal, waste transfer operations at the site is undertaken in accordance with applicable Ministry of the Environment regulations and guidelines. Compliance with these regulations and guidelines will ensure that the site does not cause and adverse effect on the environment.*
9. *Conditions 2.3 and 2.4 are to ensure the Owner has a operations plans for the site that details all current operations at the site and that a copy is kept on site for the Owner, the Owner's staff and/or operator. This is to ensure the site is operating is a safe manner and the environment and human health are protected.*
10. *Condition 2.5 and 2.6 specifies the maximum amount of waste that may be received at the site based on the previously approved Environmental Assessment for the Site.*
11. *The reason for Conditions 2.7, 3.2, 3.3, 3.4 and 4.5 is to specify the approved areas from which waste may be accepted at the Site and the types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.*
12. *The reasons for Conditions 2.8, 2.9, 2.10 and 2.11 are to specify the normal hours of operation for the landfill Site and a mechanism for amendment of the hours of operation.*
13. *The reason for Conditions 2.12 inclusive is to ensure that users of the Site are fully aware of important information and restrictions related to Site operations under this ECA.*
14. *The reason for Condition 2.13 are to specify site access to/from the Site and to ensure the controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.*
15. *The reason condition 2.14 has been included is to ensure that access roads are clear and do not pose a safety hazard to the general public.*
16. *Condition 2.15 is needed in order to make certain that the waste received at the site is in accordance with the ECA and O. Reg. 347.*
17. *Condition 2.16 is necessary in order to ensure that all waste loads are inspected and waste that is disposed of at the site is in accordance with the terms and conditions in this ECA.*
18. *The reasons for Conditions 2.17, 2.18 and 2.20 are to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.*
19. *The reasons for Condition 2.19 are the protection of public health and safety and minimization of the potential for damage to environmental control, monitoring and other works at the landfill Site. Scavenging is the uncontrolled removal of material from waste at a landfill site.*
20. *The reason for Condition 2.21 is to ensure that noise from or related to the operation of the landfill is kept to within Ministry limits and does not result in a hazard or nuisance to any person.*
21. *The reasons for Conditions 10.1 and 10.2 are to ensure that the Ministry is informed of any spills or fires at the Site and to provide public health and safety and environmental protection.*
22. *The reason for Condition 2.22 is to ensure that appropriate measures are taken in order to prevent surface water from contacting waste so as not to cause an adverse effect on the environment.*
23. *Condition 2.23 has been inserted in order to ensure that concentrations of landfill gas do not pose a hazard to human health or the environment.*
24. *The reason for Condition 3.4 is that open burning of municipal waste is unacceptable because of concerns with air emissions, smoke and other nuisance affects, and the potential fire hazard.*
25. *The reason for Condition 3.5, 3.6, 3.7, 3.8, 3.9, and 3.10 is to specify restrictions on the extent of landfilling at this Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity of the site. Approval to landfill beyond these limits would require an application with supporting documentation submitted to the Director.*
26. *The reason for Condition 3.11 is to ensure that landfilling operations are conducted in an environmentally acceptable manner. Daily and intermediate cover is used to control potential nuisance effects, to facilitate vehicle access on the site, and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site*

requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the site.

27. *The reason for Condition 3.12, through 3.23 is to allow the Owner to use alternative daily cover at the Site and in a manner that would not result in a hazard or nuisance to the natural environment.*
28. *The reason for Condition 3.24 is to ensure the Owner and any retained contractor uses the exact equipment for the operation and processing waste at the Site as approved in this ECA.*
29. *The reason for Condition 3.25 is to require the Owner to obtain property rights to land(s) that is required for a Contaminant Attenuation Zone that is necessary for attenuation of contamination resulting from the operation of the Site or to use an alternative method to bring the site into compliance with Reasonable Use Policy Objectives.*
30. *The reason for Condition 3.26 is to ensure impacted surface water at the site is handled in a manner that does not impact the environment or human health.*
31. *The reasons for Conditions 4.6 through 4.14 are to ensure the site operation completed in accordance with Ministry standards, and to ensure long-term protection of the health and safety of the public and the environment.*
32. *The reasons for Conditions 4.15 through 4.18 are to ensure that the Owner undertake the composting activities in accordance with Ministry's requirements and in a manner that would not result in a hazard or nuisance to the natural environment.*
33. *The reasons for Conditions 4.19 through 4.20 are to approve the on-Site collection, storage and transfer of organic waste at the Site using the two (2) specialized MOLOK containers and requires that the on-Site organic waste activities be protective of the natural environment and human health.*
34. *The reason for Condition 5.1 is to ensure that the Site is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.*
35. *The reasons for Conditions 6.1, 6.2, 6.3, 6.5 and 6.6 are to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this ECA, the EPA and its regulations.*
36. *Conditions 6.1 and 6.2 are needed to ensure regular inspections of the site are conducted in order to protect the natural environment.*
37. *The reason for Conditions 6.4, 6.7 through 6.14; and 11.1 and 11.2 are to ensure that accurate waste records are maintained to ensure compliance with the conditions in this ECA (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the EPA and its regulations.*
38. *The reason for Conditions 7.1 through 7.8 inclusive is to ensure protection of the natural environment and the integrity of the groundwater monitoring network.*
39. *The reason for Conditions 7.9 and 7.10 are to demonstrate that the landfill site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.*
40. *The reason for Conditions 8.1 through 8.5 is to ensure that the Owner follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site. A remedial action / contingency plan is necessary to ensure protection of the natural environment. A leachate contingency plan is a specific requirement of Reg. 232.*
41. *The reason for Conditions 8.6 is to ensure that the Municipality follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site and is prepared and properly equipped to take action in the event of a spill, fire or other operation upset.*
42. *The reason for Conditions 8.7 is to ensure that the Municipality immediately notifies the Ministry of any spills as required in Part X of the Act so that appropriate spills response can be determined.*
43. *The reason for Conditions 9.1 and 9.2 is to establish a forum for the exchange of information and public dialogue on activities carried out at the landfill Site. Open communication with the public and local authorities is important in helping to maintain high standards for site operation and environmental protection.*
44. *Conditions 10.1 through 10.8 are contained in the ECA to guarantee that appropriate measures are taken by the County to prevent future occurrences of spills or fires at the site and to protect public health and safety and the environment.*
45. *The reasons for Conditions 11.1 and 11.2 are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.*
46. *The reason for Conditions 12.1 and 12.2 is to ensure that final closure of the Site is completed in an aesthetically*

pleasing manner and to ensure the long-term protection of the natural environment.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A412306 issued on September 1, 2000

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

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

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-3717 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 19th day of July, 2013

Tesfaye Gebrezghi, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

DG/
c: District Manager, MOE Ottawa
Dan Hagan, Greenview Environmental Management

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A412306
Notice No. 5
Issue Date: August 1, 2012

The Corporation of the Township of Killaloe, Hagarty and Richards
1 John St
Post Office Box, No. 35
Killaloe, Ontario
K0J 2A0

Site Location: Killaloe Waste Disposal Site
1049 Mask Road
R.R. #2
Part of lots 6 and 7, Concession 8
Township of Killaloe, Hagarty and Richards,
County of Renfrew
K0J 2A0

You are hereby notified that I have amended Approval No. A412306 issued on September 1, 2000 and amended through notices dated July 27, 2006, December 5, 2007, May 13, 2008 and August 10, 2011 for a Waste Disposal Site (landfill/transfer), as follows:

I. The following Condition is hereby added to this ECA:

57 . The Owner is hereby approved to proceed with the detailed design and upgrading the Waste Transfer Station at the Killaloe Waste Disposal Site as described in Item 18 of Schedule "A".

II. The following items are hereby added to Schedule "A":

18. Application for amendment to Environmental Compliance Approval for a Waste Disposal Site (landfill/transfer) and supporting documentation, dated January 31, 2012 and signed by Dan Hagan, B.Sc., Project Geologist at Greenview Environmental Management on behalf of the Township of Killaloe, Hagarty and Richards, requesting approval for an updated Development and Operations Plan to reflect additional capacity. The supporting documentation included the following:

i. Report entitled "Design and Operations Plan - Municipal Solid Waste Transfer Station for Killaloe Waste Disposal Site (A412306), Township of Killaloe, Hagarty and Richards, County of Renfrew, Ontario by Greenview Environmental management Limited (File No. 107.12.005), and dated January 31, 2012.

19. Email from Albena Bukurova, EIT, Project Engineer Intern - Waste, EAB, MOE to Lorna Hudder, Clerk, Township of Killaloe, Hagarty and Richards and Tyler Peters, P.Eng., Project Manager, Greenview Environmental Management Limited, dated May 11, 2012, providing First Draft ECA No. A412306 Killaloe waste Disposal Site for comments.

20. Email from Dan Hagan, , B.Sc., Project Geologist, Greenview Environmental Management Limited, to Albena Bukurova, EIT, Project Engineer Intern - Waste, EAB, dated May 24, 2012 submitting a response letter from Tyler Peters, P.Eng., Project Manager, Greenview Environmental Management Limited in regards to the revised Draft ECA for the Killaloe WDS as received from MOE on May 11, 2012 providing comments on the revised Draft ECA of behalf of the Township of Killaloe, Hagarty and Richards, and supporting documentation.

21. Email from Tyler Peters, P.Eng., Project Manager, Greenview Environmental Management Limited to Albena

Bukurova, EIT, Project Engineer Intern - Waste, EAB, MOE, dated June 5, 2012, requesting a partial approval of the application to allow Township to proceed with detailed design and establishment of the upgraded transfer station facility at the Killaloe Waste Disposal Site.

22. Email from Albena Bukurova, EIT, Project Engineer Intern - Waste, EAB, MOE to Tyler Peters, P.Eng., Project Manager, Greenview Environmental Management Limited, dated June 8, 2012, providing confirmation on issuance of Notice of partial approval of the application to allow Township to proceed with detailed design and establishment of the upgraded transfer station facility at the Killaloe Waste Disposal Site, which Notice of partial approval shall be revoked and replaced by the consolidated ECA should the TSS review is complete.

The reasons for this amendment to the Approval are as follows:

1. The reason for this amendment to the Approval is to issue a partial approval of the application with MOE Reference Number 4121-8R3PRB, submitted by the Township of Killaloe, Hagarty and Richards, in order to allow the Township to proceed with the proposed project based on the forthcoming consolidated ECA, which shall revoke and replace this Notice.

2. The reason for Condition 57 is to allow the Township of Killaloe, Hagarty and Richards to complete detailed design and establish the new transfer station facilities at the Killaloe Waste Disposal Site.

This Notice shall constitute part of the approval issued under Approval No. A412306 dated September 1, 2000, as amended.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

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

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 1st day of August, 2012

Tesfaye Gebrezghi, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

AB/
c: District Manager, MOE Ottawa
Tyler Peters, Greenview Environmental Management

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A412306
Issue Date: July 19, 2013

The Corporation of the Township of Killaloe, Hagarty and Richards
1 John St
Post Office Box, No. 35
Killaloe, Ontario
K0J 2A0

Site Location: Killaloe Waste Disposal Site
1049 Mask Road
R.R. #2
Lot 6 and 7, Concession 8
Township of Killaloe, Hagarty and Richards, County of Renfrew
K0J 2A0

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

the use and operation of an 1.88 hectare landfill site known as the Killaloe Wase Disposal site, waste transfer station, and a Reuse Centre within a 31.7 hectare total site area to be used for the landfilling of Municipal Waste and for the transfer of the following types of waste:

solid, non-hazardous, residential and IC&I waste, processed and unprocessed Construction and Demolition (C&D) and bulky waste, Blue Box recyclables (commingled containers, mixed fibres, and old corrugated cardboard (OCC)), leaf and yard waste, Source Separated Organic Waste (SSO), refrigerant appliances, scrap metal, white goods, waste tires, Waste Electronic and Electrical Equipment (WEEE), automotive batteries, batteries 9single-use) and automotive plastics.

For the purpose of this environmental compliance approval, the following definitions apply:

"Act" and ***"EPA"*** means the *Environmental Protection Act, R.S.O. 1990, C.E-19* as amended;

"Adverse Effect" means the same as the definition in the EPA;

"Blue Box Recyclables" *or* ***"Blue Box Waste"*** means commingled containers (tin, aluminium, steel, plastic, mixed glass), mixed fibres, and old corrugated cardboard (OCC) for the operations approved in this *Approval;*

"Bulky Waste Materials" or ***"Bulky Household Items"*** mean large items of waste materials, such as appliances and furniture;

"Compaction Equipment" means an apparatus that compresses refuse into relatively small packs for handy disposal;

"Construction and Demolition Waste" *or* ***"C&D Waste"*** means waste building materials and rubble produced from construction, renovation, repair or demolition operations on houses, commercial buildings, pavements and other structures;

"Design and Operations Plan" means the Design and Operations Plan contained within Item 18 of Schedule "A" of this *Approval* that the Owner has submitted to the Ministry as supporting technical information for the application to amend the current Approval for the Killaloe Waste Disposal Site, as described in Item 18 of Schedule "A";

"Director" means any *Ministry* employee appointed in writing by the Minister pursuant to section 5 of the EPA as a

Director for the purposes of Part V of the EPA;

"District Manager" refers to the District Manager in the Ministry of the Environment's Ottawa District Office;

"*District Office*" refers to the Ministry of the Environment Ottawa District Office;

"EAB" refers to the *Environmental Approvals Branch* of the *Ministry of the Environment;*

"Environmental Compliance Approval" or "ECA" or ***"Approval"*** means this entire provisional Environmental Compliance Approval document, issued in accordance with *Section 20.2* of the *EPA*, and includes any schedules to it, the application and the supporting documentation listed in Schedule "A";

"EPA" means *Environmental Protection Act, R.S.O. 1990*, c. E. 19, as amended from time to time;

"Industrial, Commercial and Institutional Waste" or ***"IC&I Waste"*** means waste generated by industrial, commercial and institutional business sectors;

"Leaf and Yard Waste" means leafs, grass clippings, tree and shrub trimmings, fruits and vegetables from gardens, flowers, natural Christmas trees (evergreens) and similar organic plant materials generated from gardening and yard maintenance activities at residential and other properties;

"*MOE*" or "***Ministry***" refers to the Ontario Ministry of the Environment;

"Municipal Waste" is as defined in *Ontario Regulations 347,* R.R.O. 1990;

"*Operator*" has the same meaning as "operator" as defined in *s.25* of the *EPA*;

"*Owner*" means the Township of Killaloe, Hagarty and Richards;

"O. Reg. 101/94" means *Ontario Regulation 101/94* as amended from time to time;

"Organic Waste" or ***"Source Separated Organic Waste"*** or ***"SSO Waste"***or ***"SSO"*** means source separated residential and/or commercial non-hazardous organic waste consisting of one or more of the following components: food waste, soiled paper products, leaf and yard waste;

"***PA***" means the *Pesticides Act*, R.S.O. 1990, c. P-11, as amended from time to time;

"Provincial Officer" means any person designated in writing by the Minister as a provincial officer pursuant to *Section 5* of the *OWRA* or section 5 of the *EPA* or section 17 of *PA;*

"Regional Director" refers to the Director of the *Ministry of the Environment*'s Eastern Regional Office;

"*Regulation 347*" or "*Reg. 347*" or "O. Reg. 347" means Regulation 347, R.R.O. 1990, made under the *EPA*, as amended from time to time;

"Refrigerant Appliances" means any piece of equipment having a specific function and using refrigerants, which are chemicals used in a cooling mechanism, such as an air conditioner, etc.;

"Residential Waste" means waste generated in single and multi-family homes, including newspapers, clothing, disposable tableware, food packaging, cans, bottles, food scraps and yard trimmings other than those that are diverted to composting;

"RUPO" means the Ministry of the Environment Reasonable Use Policy Objectives (Guideline B-7);

"Scrap Metal" means discarded metal suitable for reprocessing;

"Site" or ***"WDS"*** refers to the Killaloe Waste Disposal *Site* and lands owned by the Owner described as:

- Part of Lots 6 and 7, Concession 8, Township of Killaloe, Hagarty and Richards, County of Renfrew;

"Waste Electrical and Electronic Equipment" or ***"WEEE"*** means devices listed in Ontario Regulation 393/04, as amended;

"Waste Fill Area" means the area on the surface of the site beneath which or above which waste is disposed by landfilling;

"Waste Transfer Facility" or ***"Waste Transfer Station"*** or **"WTS"** refers to the area of land contiguous to the landfill area and part of the Site, to be used for the temporary storage of wastes prior to the removal of the wastes from the Site or for final disposal at the Site;

"Waste Tires" or ***"Tire Units"*** means the definition provided in Section 6 (1) (a), (b) and (c) of Regulation 347 of the Act or as amended from time to time;

"White Goods" means white goods end of life appliances including refrigerators, freezers, stoves, dish washers, clothes washers, clothes dryers, air conditioners, microwaves, ovens, hot water tanks and dehumidifiers.

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

TERMS AND CONDITIONS

1.0 TERMS AND CONDITIONS

General

1.1 The Requirements specified in this ECA are the requirements under the *Environmental Protection Act, R.S.O. 1990.* The issuance of this Approval in no way abrogates the Applicant's legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.

1.2 The *Owner* shall ensure that all communications/correspondence made pursuant to this ECA includes reference to the ECA approval number A 412306.

1.3 The obligations imposed by the terms and conditions of this ECA are obligations of due diligence.

Compliance

1.4 The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Site* is notified of the *ECA* and the conditions herein and shall take all reasonable measures to ensure the person complies with the same.

1.5 Any person authorized to carry out work on or operate any aspect of the *Site* shall comply with the conditions of this *ECA*.

In Accordance

1.6 Except as otherwise provided for in this *ECA*, the *Site* shall be operated and maintained in accordance with the application for *Environmental Compliance Approval for a Waste Disposal Site*, dated September 21, 1998, and the supporting documentation listed in Schedule "A".

Other Legal Obligations

1.7 The issuance of, and compliance with, this *ECA* does not:

(a) relieve any person of any obligation to comply with any provision of the *EPA* or any other applicable statute, regulation or other legal requirement; or

(b) limit in any way the authority of the *Ministry* to require certain steps be taken or to request that any further information related to compliance with this *ECA* be provided to the *Ministry* ;

unless a provision of this *ECA* specifically refers to the other requirement or authority and clearly states that the other requirement or authority is to be replaced or limited by this *ECA* .

Adverse Effect

1.8 The *Owner* or *Operator* remain responsible for any contravention of any other condition of this *ECA* or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect or impairment of air and/or water quality.

Furnish Information

1.9 Any information requested by the *Director* or a *Provincial Officer* concerning the *Site* and its operation under this *ECA* , including but not limited to any records required to be kept by this *ECA* shall be provided in a timely manner.

1.10 The receipt of any information by the *Ministry* or the failure of the *Ministry* to prosecute any person or to require any person to take any action, under this *ECA* or under any statute, regulation or subordinate legal instrument, in relation to the information, shall not be construed as:

i. an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any condition of this *ECA* or any statute, regulation or other subordinate legal requirement; or
ii.. acceptance by the *Ministry* of the information's completeness or accuracy.

1.11 Any information related to this *ECA* and contained in *Ministry* files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, RSO 1990, CF-31.

Interpretation

1.12 Where there is a conflict between a provision of any document, including the application, referred to in this *ECA*, and the conditions of this *ECA,* the conditions in this *ECA* shall take precedence.

1.13 Where there is a conflict between the application and a provision in any documents listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the *Ministry* approved the amendment in writing.

1.14 Where there is a conflict between any two documents listed in Schedule "A", other than the application, the document bearing the most recent date shall take precedence.

1.15 The conditions of this *ECA* are severable. If any condition of this *ECA*, or the application of any condition of this *ECA* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *ECA* shall not be affected thereby.

Certificate of Requirement

1.16 Pursuant to Section 197 of the *EPA*, no person having an interest in the *Site* shall deal with the *Site* in any way without first giving a copy of this *ECA* to each person acquiring an interest in the *Site* as a result of the dealing.

1.17 In the event any additional land is acquired for the *Site*, then two (2) copies of a completed Certificate of Requirement, containing a registerable description of the additional lands for the *Site*, shall be submitted to the Director for the Director's signature within sixty (60) calendar days of any amendment to this *ECA* that incorporates the land into the *ECA*.

1.18 In the event any additional land is acquired for the *Site*, then the Certificate of Requirement shall be registered in the appropriate land registry office on title to the *Site* and a duplicate registered copy shall be submitted to the *Director* within ten (10) calendar days of receiving the Certificate of Requirement signed by the *Director*.

No Transfer or Encumbrance

1.19 No portion of this *Site* shall be transferred or encumbered prior to or after closing of the *Site* unless the *Director* is notified in advance and is satisfied with the arrangements made to ensure that all conditions of this *ECA* will be carried out and that sufficient financial assurance is deposited with the *Ministry* to ensure that these conditions will be carried out.

Change of Owner

1.20 The *Owner* shall notify the *Director*, in writing, and forward a copy of the notification to the *District Manager*, within 30 days of the occurrence of any changes in the following information:

i. the ownership of the *Site* ;
ii. the Operator of the *Site* ;
iii. the address of the *Owner* or *Operator* ;
iv. the partners, where the *Owner* or *Operator* is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act* , R. S. O. 1990, c. B.17, shall be included in the notification;
v. the name of the corporation where the *Owner* or *Operator* is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act* , R. S. O. 1990, c. C.39, shall be included in the notification.

1.21 In the event of any change in the ownership of the *Site*, other than a change to a successor municipality, the *Owner* shall notify in writing the succeeding owner of the existence of this *ECA*, and a copy of such notice shall be forward to the *Director* and *District Manager*.

Inspections

1.22 No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *EPA* or the *PA*, of any place to which this *ECA* relates, and without limiting the foregoing:

i. to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *ECA* are kept;
ii. to have access to, inspect, and copy any records required to be kept by the conditions of this *ECA* ;
iii. to inspect the *Site,* related equipment and appurtenances;
iv. to inspect the practices, procedures, or operations required by the conditions of this *ECA*; and
v. to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *ECA* or the *EPA* or the *PA*.

2.0 GENERAL OPERATIONS

Proper Operation

2.1 The *Site* shall be properly operated and maintained at all times. All waste shall be managed and disposed of in accordance with the *EPA* and *Regulation 347* and the requirements of this *ECA.* At no time shall the discharge of a contaminant that causes or is likely to cause an *Adverse Effect* be permitted.

2.2. Waste shall be managed and landfilled at the *Site* in accordance with items listed in Schedule "A".

Operations Manual

2.3 An operations and procedures manual that addresses the requirements of this *ECA* shall be prepared and submitted to the *District Manager* for approval within ninety (90) days of the issuance of this amendment and shall include the following:

(a) Health and safety;
(b) Operation and maintenance of the *Site*;
(c) Waste acceptance;
(d) Waste disposal area and development;

(e) Nuisance management;
(f) Surface water/Storm water management;
(g) Inspections and monitoring;
(h) Contingency plans and emergency procedures;
(i) Complaints; and,
(j) Reporting and record keeping.

2.4 The operations and procedures manual shall be:
i. retained at the *Site*;
ii. reviewed on an annual basis and updated by the *Owner* as required; and
iii. be available for inspection by *Ministry* staff.

Capacity

2.5 (1) The final volumetric capacity of the *Site* is **84,962 cubic metres** (including waste and daily cover material); and

(2) The total capacity as identified in Condition No. 2.5 (1) does not include the final cover.

2.6 Unused approved volumetric capacity shall be deposited on top of the landfill according to the documents listed in Schedule "A".

Service Area

2.7 Only Municipal Waste that is generated in the within the boundaries of the Township of Killaloe, Hagarty and Richards shall be accepted at the *Site*. No waste shall be received for disposal at this *Site* from outside the approved service area.

Hours of Operation

2.8 (1) Waste shall only be accepted at the *Site* during the following time periods:
i. Wednesday - 7:30 a.m. to 11:30 p.m.;
ii. Friday - 12:00 p.m. to 4:00 p.m., and
iii. Saturday – 8:00 a.m. to 4:00 p.m.

(2) The site will remain closed to ratepayers and IC&I generators on: Christmas Day, Boxing Day, New Year's Day, Good Friday, Easter Sunday, Easter Monday, Canada Day.

(3) Amending the hours of operation requires *Director*'s Approval.

2.9 With the prior written approval of the *District Manager*, the time periods may be extended to accommodate seasonal or unusual quantities of waste.

2.10 The *Owner* may provide limited hours of operation provided that the hours are posted at the landfill gate and that suitable notice is provided to the public of any change in operating hours.

2.11 Upon reasonable notice to the *Director*, contingency actions may take place outside normal hours of operation. Emergency response may occur at any time as required.

Signage

2.12 (1) Signs shall be placed at the landfill *Site* entrance/exit indicating, at a minimum, the following:
(a) Name of the landfill and name of the *Owner/Operator*;
(b) *MOE ECA* Number;
(c) Days and hours of operation and public use;
(d) Contact telephone number at the Township of Killaloe, Hagarty and Richards;

(e) Service area for the *Site*;
(f) Types of waste accepted and prohibited;
(g) Overview of landfill complaints procedure, including a phone number for registering a complaint;
(h) Unauthorized entry is prohibited; and
(i) A warning against dumping wastes outside the *Site*

(2) The *Owner* shall install and maintain signs to direct vehicles to working face and recycling areas.

(3) The *Owner* shall provide signs at recycling depot informing users what materials are acceptable and directing users to appropriate storage area.

Site Security

2.13 During non-operating hours, the *Site* entrance and exit gates shall be locked and the *Site* shall be secured against access by unauthorized persons.

On-Site Roads

2.14 On-*Site* roads shall be provided and maintained in a manner that vehicles hauling waste to and on the *Site* may travel readily and safely on any operating day. During winter months, when the *Site* is in operation, roads must be maintained to ensure safe access to the landfill working face. On-*Site* roads must be clear of mud, ice and debris which may create hazardous conditions.

Waste Inspection Procedures

2.15 The *Operator* shall develop and implement a program to inspect waste to ensure that the waste is of a type approved for acceptance under this *ECA*.

Waste Inspection and Deposition

2.16 All loads of waste must be properly inspected by trained site personnel prior to acceptance at the *Site* and waste vehicles must be diverted to appropriate areas for waste disposal.

Litter Control

2.17 The *Owner* shall take all practical steps to prevent escape of litter from the *Site*. The *Owner* shall inspect and collect litter from the *Site* on a monthly basis from April to November and as needed between December and March. All loose, windblown litter shall be collected and disposed of at the landfill working face.

Vermin, Scavenging, Dust, Litter, Odour, Noise, etc.

2.18 The *Site* shall be operated and maintained such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

2.19 No scavenging is to occur at the *Site*.

Dust

2.20 The *Owner* shall control fugitive dust emissions from on-***Site*** sources including but not limited to on-*Site* roads, stockpiled cover material and, landfill area prior to seeding especially during times of dry weather conditions. If necessary, major sources of dust shall be treated with water and/or dust suppression materials to minimize the overall dust emissions from the *Site*.

Noise

2.21 The *Owner* shall comply with noise criteria in MOE Guideline entitled *"Noise Guidelines for Landfill Sites."*

Overall Surface Water Management

2.22 (1) The *Owner* shall take all appropriate measures to minimize surface water from coming in contact with waste. Temporary berms and ditches shall be constructed around active waste disposal areas to prevent extraneous surface water from coming in contact with the active working face.

(2) The *Owner* shall not discharge surface water to receiving water bodies without an approval under the *EPA*.

Landfill Gas

2.23 All buildings are to be free of any landfill gas accumulation. The *Owner* shall provide adequate ventilation systems to relieve landfill gas accumulations in buildings if necessary.

3.0 LANDFILL SITE OPERATIONS

Landfill Operations

3.1 Except as otherwise provided by these Conditions, the landfilling operations at the *Site* shall be conducted in accordance with the Application for an *Environmental Compliance Approval* for a Waste Disposal Site for the Corporation of the Township of Killaloe, Hagarty and Richards, dated September 21, 1998, and the supporting documentation, plans and specifications listed in Schedule "A".

Waste Types

3.2 Only solid, non-hazardous *Municipal Waste* which includes wastes generated by residential and IC&I generators within the Township of Killaloe, Hagarty, and Richards shall be accepted at the *Site* for landfilling.

Unacceptable Waste

3.3 i. The *Owner* shall conduct appropriate inspections and ensure that appropriate controls are in place to prevent the acceptance and landfilling of liquid industrial waste and hazardous waste and to prevent the acceptance of waste from outside the approved service area.

ii. The *Owner* shall record in the daily records for the *Site* operations any occurrence of unacceptable waste delivered to the *Site*, the name of the waste hauler delivering the waste to the *Site* and waste generator (if known).

iii. The *Owner* shall forthwith notify the *District Manager* of any and all waste load refusals at the *Site* related to requirements in this *ECA*, including service area and waste types.

Burning of Waste

3.4 (1) Burning of waste is not permitted at the *Site* with the exception of the material under Condition 3.4 (2).

(2) Only clean wood and brush shall be permitted for burning. Burning of the materials shall be completed as per the Ministry of the Environment Guideline C-7 (Burning at landfill Sites);

Waste Placement

3.5 No waste shall be landfilled outside of the **limit of fill area** for the *Site* as shown in Item 6 in Schedule "A" attached to this *ECA*.

3.6 No waste shall be landfilled below the **base grades** as discussed and shown in Item 6 in Schedule "A" attached to this *ECA*.

3.7 i. No waste shall be landfilled at any time above the **final waste grades** as shown in Item 8 in Schedule "A" attached to this *ECA*; and

ii. Final slopes above grade at the time of *Site* closure within the waste fill area shall be within the range of 4H:1V (25%) and 20H:1V (5%).

3.8 Waste placement shall occur at a minimum 1 meter above the highest groundwater table elevation at the *Site*.

3.9 No waste shall be landfilled in the buffer area.

3.10 The *Owner* shall deposit waste in a manner that minimizes exposure area at the landfill working face and all waste shall be compacted before cover is applied.

Cover Material

3.11 i. Daily Cover - By the end of each working day, the entire working face shall be compacted and covered with a minimum thickness of 150 mm of soil cover or an approved thickness of alternative cover material.

ii. Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm of soil cover or an approved thickness of alternative cover material shall be placed.

Alternative Daily Cover Material

3.12 Clean soil, non-hazardous contaminated soils, temporary or movable low permeability flexible membranes, asphalt shingles, leaf and yard waste mixed with sand and composted leaf and yard waste are the alternative daily cover material approved under this *ECA*;

3.13 The *Owner* shall ensure that the non-hazardous contaminated soils, temporary or movable low permeability flexible membranes, asphalt shingles, leaf and yard waste mixed with sand and composted leaf and yard waste used as alternative daily cover, does not cause an adverse environmental effect. If any adverse effect is caused, the *Owner* shall immediately stop the use of such material and resume the use of other approved daily cover or clean soil.

3.14 (1) Contaminated soil for use as daily cover shall be stockpiled within the limits of landfilling.

(2) The amount of contaminated soil stockpiled for use as daily cover shall not exceed **500 cubic metres** at any time.

3.15 Contaminated soil may be used for daily/intermediate cover but only on slopes where surface water drainage is into the waste fill and isolated from the storm water collection system.

3.16 The *Owner* must ensure that measures are in place for the on site treatment and disposal of any contaminated run off from the contaminated soils stockpile.

3.17 Prior to receipt at the *Site*, each source of contaminated soils which are to be used as daily or intermediate cover shall be tested to determine if the soils meet the criteria in this *ECA* and a copy of the test results shall be kept in the daily records for the site as required.

Additional Alternative Daily Cover Material

3.18 The alternative cover material shall be non-hazardous in accordance to *Reg. 347* and will be expected to perform at least as well as soil in relation to the following functions:

(a) Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;

(b) Provision for an aesthetic condition of the landfill during the active life of the Site;

(c) Provision for vehicle access to the active tipping face; and

(d) Compatibility with the design of the *Site* for groundwater protection and leachate management.

3.19. Shredded Construction & Demolition and Bulky waste as per Item 14 of Schedule "A" is an additional alternative

daily cover material approved under this *ECA*.

3.20 Maximum amount of material stored in the *Construction & Demolition* and *bulky household* items area shall be **1000 m^3**;

3.21 The *Owner* shall undertake the necessary precautionary measures for fire prevention when stockpiling material to be used as alternative cover (example - limit potential for spontaneous combustion, etc.).

3.22 The *Owner* shall ensure that the material used as alternative daily cover, does not cause an *adverse effect*. If any adverse effect is caused, the *Owner* shall immediately stop the use of such material and resume the use of other approved daily cover or clean soil.

3.23 Sufficient soil or other approved alternative daily cover material (ADC) will be available for use, either when site conditions do not permit use of the alternative material, or if performance of the material is unsatisfactory.

Waste Processing

3.24 The *Owner* shall ensure that the following:

i. that all *ECA* required for the equipment for the operation and processing waste at the *Site* have been obtained by the *Owner*; or

ii. that a retained contractor has all the *ECA*'s for the equipment to be used to process waste at the *Site*.

Contaminant Attenuation Zone

3.25 (a) The *Owner* must continue to own the property rights to the Contaminant Attenuation Zone for all of the contaminating life span of the *Site*.

(b) The ownership of the property rights must include the right to:

(i) discharge contaminants from the operations at the *Site* into the Contaminant Attenuation Zone;

(ii) enter into the Contaminant Attenuation Zone and onto the surface above the Contaminant Attenuation Zone for purposes of testing, monitoring, intercepting contaminants and carrying out remedial work;

(iii) install, operate and maintain works, for the purposes mentioned in clause (ii), in or the Contaminant Attenuation Zone, including on the surface above the Contaminant Attenuation Zone; and

(iv) prevent the owner(s) of the land(s) in which the Contaminant Attenuation Zone is located from paving, erecting a structure or making any use of land(s) above or in the vicinity of the contaminant attenuation zone that would interfere with the functioning of the Contaminant Attenuation Zone or with the exercise of any of the rights mentioned in this subsection.

(c) The *Owner* shall notify the *Director* in writing within thirty (30) days after any change in his, her or its ownership of the property rights in the Contaminant Attenuation Zone.

Landfill Surface Water Management

3.26 Stormwater runoff generated from the active waste fill area shall be considered contaminated and treated as leachate. Operational methods shall ensure that any precipitation falling onto active waste fill areas, not under final cover, shall be directed into the waste or into a control structure for testing prior to confirm surface water can be discharged to the natural environment.

4.0 WASTE TRANSFER STATION AND COMPOSTING PAD

Waste Transfer Facility

4.1 Except as otherwise provided by these Conditions, the *Transfer Station* shall be designed, developed, used, maintained and operated, and all facilities, equipment and fixtures shall be built and/or installed in accordance with the Application for an *ECA* for an upgraded Waste Transfer Station at Killaloe Waste Disposal Site for the Corporation of the Township of Killaloe, Hagarty and Richards dated January 31, 2012, and the supporting documentation, plans and specifications listed in Schedule "A".

4.2 The Owner shall limit transfer activities to the receiving and transferring of solid, non-hazardous, *Residential and IC&I Waste, Blue Box Recyclables* (commingled containers, mixed fibres, and OCC), *Leaf and Yard Waste, Construction and Demolition and Bulky Waste, SSO, Refrigerant Appliances, Scrap Metal and White Goods, Waste Tires, WEEE,* automotive batteries, single-use batteries and automotive plastics generated within the Township of Killaloe, Hagarty and Richards, as described in Item 18 and 20 of Schedule "A".

4.3 The *Owner* shall ensure that all waste accepted for transfer shall be segregated either into bins with lids or doors, or in designated areas as defined by barriers. All bins and designated waste storage areas shall be clearly labelled.

4.4 The *Owner* shall ensure that each day on which the *Site* is open to accept waste for transfer, the *Site* is inspected and litter is picked up in the waste transfer area.

Waste Quantity

4.5 The maximum storage capacity for the *Waste Transfer Facility* and for each type of material is as follows:

Material	Total Volume (m^3)
Blue Box Recyclable – Commingled Containers	70
Blue Box Recyclable – Mixed Fibres	70
Blue Box Recyclable - OCC	80
Residential and IC&I Waste	120
SSO	6.4
Scrap Metal and White Goods	100
Waste Tires	100
Refrigerants	25 units (1 unit = 1 m^3)
WEEE	40
Leaf and Yard Waste	500
Automotive Batteries	180(1)
Automotive Plastics	0.8 (800 L)
Batteries (Single use)	2 - 45 L Drums
C&D and Bulky Waste	1000 (unprocessed and processed)

Notes: (1) See Item 22 in Appendix A for Estimation

Operations

4.6 Recycling activities shall be completed as per *Ontario Regulation 101/94.*

4.7 Recyclable materials shall be properly separated and each area properly identified. The areas shall be kept in a neat and tidy manner.

4.8 All storage containers/bins used to store waste and/or recyclable materials shall be maintained in good condition to prevent leakage. The *Owner* shall immediately remove from service any leaking container. Containers/bins used to store

clean scrap metal may be equipped with drainage holes to permit the drainage of rainwater.

4.9 The operating hours of the *Waste Transfer Facility* shall in as those in Condition 2.8 in this *ECA*.

4.10 All waste types shall be segregated either into bins with locks and doors, or in designated areas defined by barriers. All bins and designated waste storage areas shall be clearly labelled.

4.11 The *Owner* shall ensure that all white goods received at the *Waste Transfer Facility* have been drained of any refrigerants, and have the appropriate paperwork (current ODP card) demonstrating that the refrigerants have been removed. In the event the *Owner* accepts white goods that have not been drained, the *Owner* shall retain a certified technician to properly drain and tag the appliances on a quarterly basis.

4.12 No waste shall be received at the *Waste Transfer Station* except during operating hours when the *Waste Transfer Station* is under the supervision of the trained personnel.

4.13 The *Owner* shall remove all scrap metal and appliances from the *Waste Transfer Facility* at an interval not to exceed six (6) months.

4.14 (1) The *Owner* shall remove *Residential and IC&I Waste* received at the transfer station once the on-*Site* compaction equipment reaches capacity and/or as required.

(2) Unprocessed *C&D and Bulky Waste* stockpiled in the *C&D and Bulky Waste Staging Area* shall be processed on at minimum on an annual basis.

(3) Processed *C&D and Bulky Waste* stockpiled in the C&D and Bulky Waste Staging Area shall be removed from the area within one **month** year of processing and placed on the landfill for use as daily cover. Any additional waste material not being used for daily cover shall be landfilled at the *Site* in accordance with this *ECA* or transported by a licensed waste hauler to an appropriate waste disposal facility.

Composting Pad

4.15 Composting operations at the *Site* shall be carried out in a manner as not to interfere with normal waste disposal operations as approved in this *ECA*.

4.16 (i) The *Owner* may compost leaf and yard waste and clean wood and brush for the purpose of producing daily cover material as described in Items 6 and 7 in Schedule "A".

(ii) Any composted material leaving the site shall be managed as a waste in accordance with *Ontario Regulation 347* and the *Act*.

(iii) The amount of material to be composted shall not exceed **500 cubic metres per year**.

(iv) The amount of composted material stockpiled for use as daily cover shall not exceed **500 cubic metres** at any time.

(v) Composted material stockpiled for use as daily cover shall not be stockpiled longer than 1 year. Material older than 1 year shall be disposed of in accordance with *Ontario Regulation 347* and the *Act*.

4.17. Should the ensuing compost be destined for use by the general public, composting operations at the *Site* shall be carried out in accordance with the Ministry's Guidelines "Ontario Compost Quality Standards" (Standards) and "Guideline for Production of Compost in Ontario" (Guideline) dated 2012.

4.18 Should the ensuing compost be destined for use as alternative cover material at the *Site*, composting operations at the *Site* must be carried out in a manner that does not cause groundwater or surface water contamination, offensive odours or encourage the presence of vermin or any other *adverse effect*.

Organic Depot Program

4.19 The organic depot program at the *Site* shall consist of the on-*Site* collection and transfer of organic waste that is stored in a maximum of eight (8) specialized MOLOK containers with a total storage capacity of **6.4 cubic meters** in accordance with the specifications and location in Item 20 in Schedule "A".

4.20 (1) The *Owner* shall ensure that containers used to store organic waste are leakproof, lockable and bear resistant;

(2) The *Owner* shall monitor the containers in which organic waste is stored for:

i. decomposition to ensure that the organic waste has not decomposed to the point where it is unacceptable for the intended receiving facility; and
ii. odours; and

(3) The *Owner* shall empty the containers used to store organic waste and transfer the organic waste from the *Site* forthwith when:

i. the maximum capacity approved in Condition 4.5 has been reached; or
ii. the organic waste has decomposed to the point where it is unacceptable to the original intended receiving facility; or
iii. the organic waste is creating odours that are causing off-*Site* impacts and/or negative impact to Site users.

5.0 TRAINING

Employees and Training

5.1 A training plan for all employees that operate any aspect of the site shall be developed and implemented by the *Operator*. Only trained employees shall operate any aspect of the *Site* or carry out any activity required under this *ECA*. For the purpose of this *ECA* "trained" means knowledgeable either through instruction or practice in:

i. the relevant waste management legislation *including EPA, O. Reg. 347*, regulations and guidelines;
ii. major environmental *and occupational health and safety* concerns pertaining to the waste to be handled;
iii. the proper handling of wastes;
iv. the management procedures including the use and operation of equipment for the processes and wastes to be handled;
v. the emergency response procedures;
vi. the specific written procedures for the control of nuisance conditions;
vii. the *terms, conditions and operating* requirements of this *ECA* and,
viii. proper inspection, receiving and recording procedures and the activities to be undertaken during and after a load rejection.

6.0 INSPECTIONS AND RECORD KEEPING

Daily Inspections and Log Book

6.1 An inspection of the entire *Site* and all equipment on the *Site* shall be conducted each day the *Site* is in operation to ensure that the site is being operated in compliance with this *ECA*. Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the *Site* if needed.

6.2 A record of the inspections shall be kept in a daily log book *or a dedicated electronic file* that includes:

i. the name and signature of person that conducted the inspection;
ii. the date and time of the inspection;
iii. the list of any deficiencies discovered;
iv. the recommendations for remedial action; and
v. the date, time and description of actions taken.

6.3 A record shall be kept in the daily log book of all the following:

i. the type, date, hauler (residential or IC&I), and estimated quantity (i.e. cubic metres) of all waste received at the *Site*; and,
ii. a list of the refusal of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

Daily Operations Records

6.4 The *Owner* shall establish a daily operating report of the landfilling and waste diversion operations, in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

(a) type and estimated amount of waste received at the *Site* for landfilling;
(b) area of the *Site* in which landfilling operations are taking place;
(c) type, source and amount of daily or intermediate cover used;
(d) waste types and quantities of recyclable wastes received at the *Site*;
(e) source of their generation;
(f) waste types and quantities of recyclable wastes transferred off the *Site*;
(g) destination of recyclable wastes transferred off the *Site*;
(h) records of litter pick-up activities and any dust suppression activities undertaken at the *Site*;
(i) maintenance and repairs performed on the equipment used at the Site;
(j) summary of emergency situations and actions taken to address them;
(k) any environmental and operational problems and any mitigative actions taken;
(l) any recommendations to minimize environmental impacts from the operation of the waste diversion areas to improve such operations in this regard; and
(m) any other information required by the *District Manager*.

Site Inspections

6.5 During *Site* operations, the *Owner* shall inspect the *Site* monthly for the following items but not limited to these items:

i. General settlement areas or depressions on the waste mound;
ii. Shear and tension cracks on the waste mound;
iii. Condition of surface water drainage works;
iv. Erosion and sedimentation in surface water drainage system;
v. Presence of any ponded water on the waste mound;
vi. Evidence of vegetative stress, distressed poplars or side slope plantings on or adjacent to the waste mound; and
vii. Condition of fence surrounding the *Site*.

6.6 The *Owner* shall inspect the waste mound and surrounding areas weekly for presence of leachate seeps. Any leachate seeps that are discovered shall be repaired within 48 hours of notice by the *Owner*.

Waste Refusal Records

6.7 A record shall be kept in the daily log book of all refusals of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

6.8 (a) The *Owner* shall retain all documentation listed in Schedule "A" for as long as this *ECA* is valid.

(b) The *Owner* shall retain at the Site, all records required by this *ECA* 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 above documents and records available for inspection upon request by the staff of the *Ministry*.

Record Retention

6.9 Except as authorized in writing by the *Director*, all records required by this *ECA* shall be retained at the *Site* for a minimum of two (2) years from their date of creation.

6.10 The *Owner* shall retain all documentation listed in Schedule "A" for as long as this *ECA* is valid.

6.11 All Daily Operations Records and Monthly Inspection Reports, as required by Conditions 6.4 and 6.5, are to be kept at the *Site* until they are included in the Annual Report.

6.12 The *Owner* shall retain employee training records as long as the employee is working at the *Site*.

6.13 The *Owner* shall make all of the above documents available for inspection upon request of *Ministry* staff.

7.0 MONITORING

7.1 The Site shall be operated in such a way as to ensure compliance with the following:

(a) Reasonable Use Guideline B-7 for the protection of the groundwater at the *Site*;

(b) Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives*, as amended from time to time or limits set by the Regional Director, for the protection of the surface water at and off the Site.

7.2 (a) The *Owner* shall construct and maintain to the satisfaction of the *Ministry*, a groundwater monitoring network which fully delineates the horizontal and vertical extent of leachate migration resulting from the landfilling activities at the *Site*.

(b) Groundwater samples from all wells in the above-described monitoring network will be obtained and analyzed in the Spring and Fall of each year, in accordance with Schedule "B". Groundwater elevations in all monitoring wells shall be measured during each monitoring event prior to obtaining water quality samples.

7.3. A certified Professional Geoscientist or Engineer possessing appropriate hydrogeologic training and experience will execute or directly supervise the execution of the groundwater monitoring and reporting program.

Groundwater Monitors

7.4 The *Owner* shall ensure all groundwater monitoring wells are properly capped, locked and protected from damage.

7.5 In areas where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells and they shall be properly re-secured.

7.6 All groundwater monitoring wells whether included in the monitoring program or not shall be assessed, repaired, replaced or decommissioned as required. Any well being decommissioned shall be decommissioned in accordance with good standard practice that will prevent contamination through the abandoned well and in accordance with Ontario Regulation 903.

7.7 The *Owner* shall repair or replace any monitoring well included in the monitoring program which is destroyed or in any way made inoperable for sampling such that no more than one sampling event is missed.

7.8 Any monitoring well included in the monitoring program that is no longer required as part of the groundwater monitoring program may be decommissioned provided its removal from the monitoring program has been approved by the

Director. A report on the decommissioning shall be provided in the annual monitoring report for the period during which the well was decommissioned.

Monitoring Programs

7.9. (1) Monitoring programs shall be carried out for groundwater and surface water, in accordance with Schedule "B".

(2) The *Owner* shall include stream flow measurements at each monitoring station as a component of the surface water monitoring program identified in Condition 7.9 (1)

(3) For any changes to the monitoring program, the *Owner* shall in a cover letter request the acceptance of the changes by the *District Manager*.

(4) Within fourteen (14) days of receiving the writing correspondence from the *District Manager* confirming that the *District Manager* is in agreement with the proposed changes to the monitoring program, the *Owner* shall forward a letter identifying the proposed changes and a copy of the correspondences from the *District Manager*, to the *Director* requesting the *ECA* be amended to approve the proposed changes prior to implementation.

Compliance Criteria

7.10 The *Owner* shall ensure the *Site* is in compliance with *MOE* Guideline B-7 Reasonable Use Concept is applied and met at all points on the property line which are impacted by leachate from the *Site*.

8.0 CONTINGENCY PLANNING

Contingency Plan

8.1 The *Owner* shall maintain a Contingency Plan for the operation of the *Site*. The Plan shall include, but not necessarily limited to:

(i) Having a *Site* Attendant on-site during all public operating hours;
(ii) As-built drawings which accurately reflect the final *Site* plan layout and clearly indicates all storage areas;
(iii) Emergency response procedures to be undertaken in the event of an incident, medical emergency or process upset;
(iv) A list of contingency equipment and materials, including names and telephone numbers of companies available for emergency response;
(v) A notification protocol, with names and telephone numbers of persons to be contacted, including Township Management Staff, the Ministry of the Environment
Spills Action Centre, the Ministry of the Environment District Office and the local Fire and Police Departments.

8.2 By no later than **September 30, 2013**, the *Owner* shall submit to the *Director* for approval, with a copy to the *District Manager*, a contingency plan to address surface water and groundwater issues at the *Site*.

8.3 The *Owner* shall ensure that the contingency equipment and materials outlined in the Contingency Plan are immediately available on the *Site* at all times, in a good state of repair, and fully operational;

8.4 The *Owner* shall ensure that all operating personnel are fully trained in the use of the contingency equipment and materials outlined in the Contingency Plan, and in the procedures to be employed in the event of an emergency;
8.5 The *Owner* shall review and update the emergency response plan on an annual basis as a minimum. In particular the Owner shall ensure that the names and telephone numbers of the persons to be contacted are up-to-date.

Fire Safety Plan

8.6 (i) The *Owner* shall prepare and submit a Fire Safety Plan to the local fire service authority.

(ii) After receiving written concurrence/approval for the Fire Safety Plan from the local fire service authority, the *Owner*

shall submit a copy to the

District Manager.

(iii) No WEEE waste shall be received at the *Site* unless written concurrence from the *District Manager* has been obtained indicating compliance with Conditions 8.6 (i) and 8.6(ii) above.

8.7 The Municipality shall take immediate measures to clean-up all spills, related discharges and process upsets of wastes which result from the operation of the *Site*. All spills and upsets shall be immediately reported to the **Ministry's Spills Action Centre at (416) 325 3000 or 1-800-268-6060.**

9.0 COMPLAINTS PROCEDURE

9.1 If at any time, the *Owner* receives complaints regarding the operation of the *Site*, the *Owner* shall respond to these complaints according to the following procedure:

(a) The *Owner* shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;

(b) The *Owner*, upon notification of the complaint, shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and

(c) The *Owner* shall complete a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents. A copy of the report shall be retained on-*Site*.

9.2 The *Owner* shall post site complaints procedure at the *Site* entrance along with the name and phone number of a suitable, local contact to receive complaints or questions related to the *Site*. All complaints and the *Owner*'s actions taken to remedy the complaints must be summarized in the Annual Report.

10.0 EMERGENCY SITUATIONS

10.1 In the event of a fire or discharge of a contaminant to the environment, *Site* staff shall contact the *MOE* Spills Action Centre (1-800-268-6060) and the *District Office* of the *MOE*.

10.2 The *Owner* shall submit to the *District Manager* a written report within 3 days of the spill or incident, outlining the nature of the incident, remedial measures taken and measures taken to prevent future occurrences at the Site.

10.3 All wastes resulting from an emergency situation shall be managed and disposed of in accordance with O.Reg. 347.

10.4 The *Owner* shall ensure that any updates to the Emergency Response Manual for the *Site* are submitted to the *District* Manager within fourteen (14) days of being issued. The Emergency Response Manual should indicate the responsibility of each of the stakeholders with respect to handling possible emergency situations.

10.5 The Emergency Response Manual shall be updated on a regular basis and be provided to the *District Manager* within one month of the revision date.

10.6 The *Owner* shall ensure that adequate fire fighting and contingency spill clean up equipment is available and that emergency response personnel are familiar with its use and location.

10.7 All equipment and materials required to handle the emergency situations shall be:

(a) kept on hand at all times that waste landfilling and/or handling is undertaken at the *Site*; and

(b) be adequately maintained and kept in good repair.

10.8. The *Owner* shall ensure that the emergency response personnel are familiar with the use of such equipment and its location(s).

11.0 ANNUAL REPORTING

11.1 A written report on the development, operation, monitoring and closure of the *Site*, shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the *Regional Director* and the *District Manager* by **March 31st** of each year and shall cover the year ending the preceding December 31st.

11.2 The Annual Report shall include the following:

(a) calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the *Site* during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;
(b) *Site* plan(s) showing the existing contours of the *Site*, areas of landfilling operations during the reporting period, areas of intended operation during the next reporting period, areas of excavation during the reporting period, the progress of final cover, vegetative cover, and any intermediate cover application, previously existing site facilities, facilities installed during the reporting period and site preparations and facilities planned for installation during the next reporting period;
(c) a calculation of the remaining approved capacity of the *Site* and an estimate of the remaining *Site* life;
(d) summary of cover stock piling activities including use, timing, locations and erosion protection;
(e) waste types and quantities of recyclable wastes received and transferred off the *Site*;
(f) destinations of recyclable wastes transferred off the *Site*;
(g) summary of litter pick-up and any dust suppression activities undertaken at the *Site*;
(h) summary of maintenance and repairs performed on the equipment used at the *Site*;
(i) summary of inspections undertaken at the *Site*;
(j) summary of complaints received and actions taken to resolve them;
(k) summary of emergency situations and actions taken to address them;
(l) any environmental and operational problems and any mitigative actions taken;
(m) any recommendations to minimize environmental impacts from the operation of the landfill and waste diversion areas to improve such operations in this regard;
(n) the results and an interpretive analysis of the results of all leachate, groundwater and surface water monitoring, including an assessment of the need to amend the monitoring programs;
(o) an assessment of the operation of the *Site*, the need to amend the design or operation of the *Site*, and the adequacy of and need to implement the contingency plans;
(p) a report on the status of all monitoring wells and a statement as to compliance with *O.Reg. 903*; and
(q) any other information required by the *District Manager*.

12.0 SITE CLOSURE

12.1 At least two (2) years prior to the anticipated date of closure of this *Site*, the *Owner* shall submit to the *Director* for approval, with copies to the *District Manager*, a detailed *Site* closure plan pertaining to the termination of landfilling operations at this *Site*, post-closure inspection, maintenance and monitoring and end use. The plan shall include the following:

(a) a plan showing *Site* appearance after closure;
(b) a description of the proposed end use of the *Site*;
(c) a descriptions of the procedures for closure of the *Site*, including:

(i) advance notification of the public of the landfill closure;

(ii) posting of a sign at the *Site* entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
(iii) completion, inspection and maintenance of the final cover and landscaping;
(iv) *Site* security;
(v) removal of unnecessary landfill-related structures, buildings and facilities; and
(vi) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater and surface water ; and
(vii) a schedule indicating the time-period for implementing sub-conditions (i) to (vi) above;

(d) descriptions 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 and surface water;
(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 for leachate; and

(f) an updated estimate of the contaminating life span of the *Site*, based on the results of the monitoring programs to date.

12.2. The *Site* shall be closed in accordance with the closure plan as approved by the *Director*.

SCHEDULE "A"

This Schedule "A" forms part of ECA No. A 412306:

1. Application to amend a Certificate of Approval for a Waste Disposal Site dated September 21, 1998 and signed by Janice Bush, Reeve, Township of Hagarty & Richards.

2. Document entitled "Design and Operations Report for the Killaloe Landfill Site, Provisional Certificate of Approval A412306", dated September 1998 and prepared by The Greer Galloway Group Inc.

3. Letter from I.. Parrot, MOE to K. Mooder, The Greer Galloway Group Inc., dated November 12, 1999 re: Ministry Review Comments.

4. Letter from K. Mooder, The Greer Galloway Group Inc. to I. Parrot, MOE, dated January 10, 2000 re: Response to Ministry Review Comments dated November 12, 1999, including Addendum.

5. Letter from K. Mooder, The Greer Galloway Group Inc. to I. Parrot, MOE, dated May 2, 2000 re: Additional Information on Environmental Monitoring Program.

6. Document entitled "Site Operations and Development Plan, Killaloe Waste Disposal Site", dated December 2004 and prepared by SGS Lakefield Research Limited.

7. Application to amend a Certificate of Approval for a Waste Disposal Site, dated December 22, 2004 and signed by Ms. Lorna Hudder, CAO/Clerk- Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards.

8. Letter from Ms. Lorna Hudder, CAO/Clerk- Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards, to Ranjani Munasinghe, MOE, dated July 22, 2005 as a response to the MOE comments dated June 7, 2005.

9. Letter dated January 27, 2006 from Christine M. Wolf, SGS Lakefield Research Limited to Ms. Lorna Huder, CAO/Clerk - Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards, Re: Groundwater Modelling Results.

10. Letter from Ms. Lorna Huddler, CAO/Clerk- Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards, to Ranjani Munasinghe, MOE, dated March 29, 2006 as a response to the MOE comments for hydrogeological and surface water reviews by Mark Phillips, MOE and Kyle Stephenson, MOE.

11. Technical Review Comments from Kyle Stephenson, MOE, sent on June 7, 2006 to Ranjani Munasinghe.

12. Application to amend a Certificate of Approval for a Waste Disposal Site, dated June 21, 2007 and signed by Ms. Lorna Hudder, CAO/Clerk-Treasurer, the Corporation of the Corporation of the Township of Killaloe, Hagarty and Richards.

13. Document dated June 27, 2007, prepared by Mr. Tyler Peters, Project Manager, Greenview Environmental Management Ltd., providing supporting information.

14. Application to amend a Certificate of Approval for a Waste Disposal Site, dated March 27, 2008 and signed by Lorna Hudder, CAO/Clerk - Treasurer, The Corporation of the Township of Killaloe, Hagarty and Richards.

15. Document dated April 16, 2008, prepared by Tyler H. Peters, P.Eng, Project Manager, Greenview Environmental Management Ltd., providing supporting information.

16. Application for a Certificate of Approval for the operation of a Waste Electrical and Electronic Equipment facility dated June 17, 2010 and signed by Lorna Hudder, CAO/Clerk, Treasurer, The Corporation of the Township of Killaloe, Hagarty and Richards. The application includes the Design and Operations Report; Notification Letters sent to adjacent property owners, tenants and residents; Ontario Electronic Stewardship Guidelines and Killaloe Waste Disposal Site Plan.

17. Response letter to the MOE, addressing four major concerns raised by residents dated April 6, 2011, and prepared by Lorna Hudder, CAO/Clerk-Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards.

18. Application for amendment to Environmental Compliance Approval for a Waste Disposal Site (landfill/transfer) and supporting documentation, dated January 31, 2012 and signed by Dan Hagan, B.Sc., Project Geologist at Greenview Environmental Management on behalf of the Township of Killaloe, Hagarty and Richards, requesting approval for an updated Development and Operations Plan to reflect additional capacity. The supporting documentation included the following:

> i. Report entitled "Design and Operations Plan - Municipal Solid Waste Transfer Station for Killaloe Waste Disposal Site (A412306), Township of Killaloe, Hagarty and Richards, County of Renfrew, Ontario by Greenview Environmental management Limited (File No. 107.12.005), and dated January 31, 2012.

19. Memorandum dated August 28, 2011 to Ms. Emily Tieu, Ottawa District Office, Ministry of the Environment from Mr. Kyle Stephenson, Technical Support Section - Eastern Region, Ministry of the Environment providing comments on the 2011 annual report.

20. Letter report dated May 10, 2013 addressed to Mr. Dale Gable, Ministry of the Environment from Mr. Dan Hagan, Greenview Environmental Management Limited requesting additional storage capacity at the waste transfer station for batteries, automotive plastics and SSO.

21. Letter dated June 18, 2013 addressed to Ms. Lorna Hudder, Township of Killaloe, Hagerty and Richards from Mr. Dale Gable, Ministry of the Environment requesting additional information on the storage of automotive batteries and storage containers.

22. Letter dated June 21, 2013 addressed to Mr. Dale Gable, Ministry of the Environment from Mr. Dan Hagan, Greenview Environmental Management Limited providing additional information on the batteries storage and storage containers.

SCHEDULE "B"

Location	Frequency	Parameters
Groundwater BH00-1, BH00-2, BH00-3, BH00-4A(D), BH00-4B(S), MW06-1S, MW06-1D, MW06-2S, MW06-2D, MW07-3S, MW07-3D, MW10-7S, MW10-7D R1, R2, R3 (Residential) 1 QA/QC	Twice (Spring and Fall) Field Measurements (pH, Conductivity, Temperature)	Alkalinity, aluminium, ammonia, barium, boron, calcium, chloride, chromium, cobalt, COD, copper, DOC, iron, magnesium, manganese, nitrate, nitrite, potassium, silicon, sodium, strontium, sulphate, TDS, TKN, total phosphorus, zinc
Groundwater BH00-1, BH00-5, MW06-1S, MW06-1D, MW06-2S, MW06-2D, MW07-3S, MW07-3D,	Once (Fall)	EPA 624 VOC's
Groundwater BH00-4, BH00-5, BH04-1S, BH04-1D, MW07-4, MW07-5	Twice (Spring and Fall) Field Measurements (pH, Conductivity, Temperature)	Same as below for surface water parameters
Groundwater BH00-1, BH00-2, BH00-3, BH00-4 BH00-4A(D), BH00-4B(S), BH00-5, MW06-1S, MW06-1D, MW06-2S, MW06-2D, MW07-3S, MW07-3D, MW07-4, MW07-5, MW07-6, MW10-7S, MW10-7D	Twice (Spring and Fall)	Groundwater Elevations (all monitoring wells)
Surface Water SW1, SW2, SW3, SW5, SW6, SW8, SW9 1 QA/QC	Twice (Spring and Fall) Field Measurements (pH, Conductivity, Dissolved Oxygen, Temperature, Unionized Ammonia [calculation])	Alkalinity, aluminium, ammonia, barium, boron, calcium, chloride, chromium, cobalt, COD, copper, DOC, iron, magnesium, manganese, nitrate, nitrite, phenols, potassium, silicon, sodium, strontium, sulphate, TDS, TKN, TSS (Total Suspended Solids), total phosphorus, zinc

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

1. *The reason for Condition 1.1, 1.2, 1.3, 1.4 and 1.5 is to ensure that the Site is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.*
2. *The reason for Conditions 1.6, 1.7, 1.8, 1.12, 1.13, 1.14 and 1.15 is to clarify the legal rights and responsibilities of the Owner under this ECA.*
3. *Conditions 1.9, 1.10 and 1.11 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 ECA.*
4. *Conditions 1.16, 1.17 and 1.18 are included, pursuant to subsection 197(1) of the EPA, to provide that any persons having an interest in the Site are aware that the land has been approved and used for the purposes of waste disposal.*

5. *The reasons for Condition 1.19 are to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this ECA.*
6. *The reasons for Condition 1.20 and 1.21 are to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.*
7. *The reason for Condition 1.22 is to ensure that appropriate Ministry staff have ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this ECA. This condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA and OWRA.*
8. *Conditions 2.1, 2.2, 3.1, 4.1, 4.2, 4.3 and 4.4 are included in order to ensure that waste disposal, waste transfer operations at the site is undertaken in accordance with applicable Ministry of the Environment regulations and guidelines. Compliance with these regulations and guidelines will ensure that the site does not cause and adverse effect on the environment.*
9. *Conditions 2.3 and 2.4 are to ensure the Owner has a operations plans for the site that details all current operations at the site and that a copy is kept on site for the Owner, the Owner's staff and/or operator. This is to ensure the site is operating is a safe manner and the environment and human health are protected.*
10. *Condition 2.5 and 2.6 specifies the maximum amount of waste that may be received at the site based on the previously approved Environmental Assessment for the Site.*
11. *The reason for Conditions 2.7, 3.2, 3.3, 3.4 and 4.5 is to specify the approved areas from which waste may be accepted at the Site and the types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.*
12. *The reasons for Conditions 2.8, 2.9, 2.10 and 2.11 are to specify the normal hours of operation for the landfill Site and a mechanism for amendment of the hours of operation.*
13. *The reason for Conditions 2.12 inclusive is to ensure that users of the Site are fully aware of important information and restrictions related to Site operations under this ECA.*
14. *The reason for Condition 2.13 are to specify site access to/from the Site and to ensure the controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.*
15. *The reason condition 2.14 has been included is to ensure that access roads are clear and do not pose a safety hazard to the general public.*
16. *Condition 2.15 is needed in order to make certain that the waste received at the site is in accordance with the ECA and O. Reg. 347.*
17. *Condition 2.16 is necessary in order to ensure that all waste loads are inspected and waste that is disposed of at the site is in accordance with the terms and conditions in this ECA.*
18. *The reasons for Conditions 2.17, 2.18 and 2.20 are to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.*
19. *The reasons for Condition 2.19 are the protection of public health and safety and minimization of the potential for damage to environmental control, monitoring and other works at the landfill Site. Scavenging is the uncontrolled removal of material from waste at a landfill site.*
20. *The reason for Condition 2.21 is to ensure that noise from or related to the operation of the landfill is kept to within Ministry limits and does not result in a hazard or nuisance to any person.*
21. *The reasons for Conditions 10.1 and 10.2 are to ensure that the Ministry is informed of any spills or fires at the Site and to provide public health and safety and environmental protection.*
22. *The reason for Condition 2.22 is to ensure that appropriate measures are taken in order to prevent surface water from contacting waste so as not to cause an adverse effect on the environment.*
23. *Condition 2.23 has been inserted in order to ensure that concentrations of landfill gas do not pose a hazard to human health or the environment.*
24. *The reason for Condition 3.4 is that open burning of municipal waste is unacceptable because of concerns with air emissions, smoke and other nuisance affects, and the potential fire hazard.*
25. *The reason for Condition 3.5, 3.6, 3.7, 3.8, 3.9, and 3.10 is to specify restrictions on the extent of landfilling at this Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity of the site. Approval to landfill beyond these limits would require an application with supporting documentation submitted to the Director.*
26. *The reason for Condition 3.11 is to ensure that landfilling operations are conducted in an environmentally acceptable manner. Daily and intermediate cover is used to control potential nuisance effects, to facilitate vehicle access on the site, and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site*

requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the site.

27. *The reason for Condition 3.12, through 3.23 is to allow the Owner to use alternative daily cover at the Site and in a manner that would not result in a hazard or nuisance to the natural environment.*
28. *The reason for Condition 3.24 is to ensure the Owner and any retained contractor uses the exact equipment for the operation and processing waste at the Site as approved in this ECA.*
29. *The reason for Condition 3.25 is to require the Owner to obtain property rights to land(s) that is required for a Contaminant Attenuation Zone that is necessary for attenuation of contamination resulting from the operation of the Site or to use an alternative method to bring the site into compliance with Reasonable Use Policy Objectives.*
30. *The reason for Condition 3.26 is to ensure impacted surface water at the site is handled in a manner that does not impact the environment or human health.*
31. *The reasons for Conditions 4.6 through 4.14 are to ensure the site operation completed in accordance with Ministry standards, and to ensure long-term protection of the health and safety of the public and the environment.*
32. *The reasons for Conditions 4.15 through 4.18 are to ensure that the Owner undertake the composting activities in accordance with Ministry's requirements and in a manner that would not result in a hazard or nuisance to the natural environment.*
33. *The reasons for Conditions 4.19 through 4.20 are to approve the on-Site collection, storage and transfer of organic waste at the Site using the two (2) specialized MOLOK containers and requires that the on-Site organic waste activities be protective of the natural environment and human health.*
34. *The reason for Condition 5.1 is to ensure that the Site is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.*
35. *The reasons for Conditions 6.1, 6.2, 6.3, 6.5 and 6.6 are to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this ECA, the EPA and its regulations.*
36. *Conditions 6.1 and 6.2 are needed to ensure regular inspections of the site are conducted in order to protect the natural environment.*
37. *The reason for Conditions 6.4, 6.7 through 6.14; and 11.1 and 11.2 are to ensure that accurate waste records are maintained to ensure compliance with the conditions in this ECA (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the EPA and its regulations.*
38. *The reason for Conditions 7.1 through 7.8 inclusive is to ensure protection of the natural environment and the integrity of the groundwater monitoring network.*
39. *The reason for Conditions 7.9 and 7.10 are to demonstrate that the landfill site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.*
40. *The reason for Conditions 8.1 through 8.5 is to ensure that the Owner follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site. A remedial action / contingency plan is necessary to ensure protection of the natural environment. A leachate contingency plan is a specific requirement of Reg. 232.*
41. *The reason for Conditions 8.6 is to ensure that the Municipality follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site and is prepared and properly equipped to take action in the event of a spill, fire or other operation upset.*
42. *The reason for Conditions 8.7 is to ensure that the Municipality immediately notifies the Ministry of any spills as required in Part X of the Act so that appropriate spills response can be determined.*
43. *The reason for Conditions 9.1 and 9.2 is to establish a forum for the exchange of information and public dialogue on activities carried out at the landfill Site. Open communication with the public and local authorities is important in helping to maintain high standards for site operation and environmental protection.*
44. *Conditions 10.1 through 10.8 are contained in the ECA to guarantee that appropriate measures are taken by the County to prevent future occurrences of spills or fires at the site and to protect public health and safety and the environment.*
45. *The reasons for Conditions 11.1 and 11.2 are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.*
46. *The reason for Conditions 12.1 and 12.2 is to ensure that final closure of the Site is completed in an aesthetically*

pleasing manner and to ensure the long-term protection of the natural environment.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A412306 issued on September 1, 2000

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

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

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-3717 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 19th day of July, 2013

Tesfaye Gebrezghi, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

DG/
c: District Manager, MOE Ottawa
Dan Hagan, Greenview Environmental Management

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A412306
Notice No. 5
Issue Date: August 1, 2012

The Corporation of the Township of Killaloe, Hagarty and Richards
1 John St
Post Office Box, No. 35
Killaloe, Ontario
K0J 2A0

Site Location: Killaloe Waste Disposal Site
1049 Mask Road
R.R. #2
Part of lots 6 and 7, Concession 8
Township of Killaloe, Hagarty and Richards,
County of Renfrew
K0J 2A0

You are hereby notified that I have amended Approval No. A412306 issued on September 1, 2000 and amended through notices dated July 27, 2006, December 5, 2007, May 13, 2008 and August 10, 2011 for a Waste Disposal Site (landfill/transfer) , as follows:

I. The following Condition is hereby added to this ECA:

57 . The Owner is hereby approved to proceed with the detailed design and upgrading the Waste Transfer Station at the Killaloe Waste Disposal Site as described in Item 18 of Schedule "A".

II. The following items are hereby added to Schedule "A":

18. Application for amendment to Environmental Compliance Approval for a Waste Disposal Site (landfill/transfer) and supporting documentation, dated January 31, 2012 and signed by Dan Hagan, B.Sc., Project Geologist at Greenview Environmental Management on behalf of the Township of Killaloe, Hagarty and Richards, requesting approval for an updated Development and Operations Plan to reflect additional capacity. The supporting documentation included the following:

i. Report entitled "Design and Operations Plan - Municipal Solid Waste Transfer

Station for Killaloe Waste Disposal Site (A412306), Township of Killaloe, Hagarty and Richards, County of Renfrew, Ontario by Greenview Environmental management Limited (File No. 107.12.005), and dated January 31, 2012.

19. Email from Albena Bukurova, EIT, Project Engineer Intern - Waste, EAB, MOE to Lorna Hudder, Clerk, Township of Killaloe, Hagarty and Richards and Tyler Peters, P.Eng., Project Manager, Greenview Environmental Management Limited, dated May 11, 2012, providing First Draft ECA No. A412306 Killaloe waste Disposal Site for comments.

20. Email from Dan Hagan, , B.Sc., Project Geologist, Greenview Environmental Management Limited, to Albena Bukurova, EIT, Project Engineer Intern - Waste, EAB, dated May 24, 2012 submitting a response letter from Tyler Peters, P.Eng., Project Manager, Greenview Environmental Management Limited in regards to the revised Draft ECA for the Killaloe WDS as received from MOE on May 11, 2012 providing comments on the revised Draft ECA of behalf of the Township of Killaloe, Hagarty and Richards, and supporting documentation.

21. Email from Tyler Peters, P.Eng., Project Manager, Greenview Environmental Management Limited to Albena Bukurova, EIT, Project Engineer Intern - Waste, EAB, MOE, dated June 5, 2012, requesting a partial approval of the application to allow Township to proceed with detailed design and establishment of the upgraded transfer station facility at the Killaloe Waste Disposal Site.

22. Email from Albena Bukurova, EIT, Project Engineer Intern - Waste, EAB, MOE to Tyler Peters, P.Eng., Project Manager, Greenview Environmental Management Limited, dated June 8, 2012, providing confirmation on issuance of Notice of partial approval of the application to allow Township to proceed with detailed design and establishment of the upgraded transfer station facility at the Killaloe Waste Disposal Site, which Notice of partial approval shall be revoked and replaced by the consolidated ECA should the TSS review is complete.

The reasons for this amendment to the Approval are as follows:

1. *The reason for this amendment to the Approval is to issue a partial approval of the application with MOE Reference Number 4121-8R3PRB, submitted by the Township of Killaloe, Hagarty and Richards, in order to allow the Township to proceed with the proposed project based on the forthcoming consolidated ECA, which shall revoke and replace this Notice.*

2. *The reason for Condition 57 is to allow the Township of Killaloe, Hagarty and Richards to complete detailed design and establish the new transfer station facilities at the Killaloe Waste Disposal Site.*

This Notice shall constitute part of the approval issued under Approval No. A412306 dated September 1, 2000, as amended.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by th Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall

state:

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

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 1st day of August, 2012

THIS NOTICE WAS MAILED
ON August 2, 2012
(Signed)

Tesfaye Gebrezghi, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

AB/
c: District Manager, MOE Ottawa
Tyler Peters, Greenview Environmental Management

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A412306
Notice No. 4
Issue Date: August 10, 2011

The Corporation of the Township of Killaloe, Hagarty and Richards
1 John St
Post Office Box, No. 39
Killaloe, Ontario
K0J 2A0

Site Location: 1049 Mask Road
R.R. #2
Lot 7, Concession 8
Killaloe, Hagarty and Richards Township, County of Renfrew
K0J 2A0

You are hereby notified that I have amended Provisional Certificate of Approval No. A412306 issued on September 1, 2000 for a Waste Disposal Site , as follows:

I. The following conditions are hereby revoked and amended:

47. Maximum amount of material stored in the Construction & Demolition and bulky household items area shall be1000 m^3.

53.(c) Blue Box recyclables shall not exceed 140 cubic metres.

II. The following Conditions are hereby added:

54.1 Contingency Planning

(a) The Company shall maintain a Contingency and Emergency Response Plan for the operation of the Site. The Plan shall include, but not necessarily limited to:

(i) Having a Site Attendant on-site during all public operating hours;
(ii) As-built drawings which accurately reflect the final *Site* plan layout and clearly indicates all storage areas;
(iii) Emergency response procedures to be undertaken in the event of an incident, medical emergency or process upset;

(iv) A list of contingency equipments and materials, including names and telephone numbers of companies available for emergency response;

(v) A notification protocol, with names and telephone numbers of persons to be contacted, including Township Management Staff, the Ministry of the Environment Spills Action Centre, the Ministry of the Environment District Office and the local Fire and Police Departments.

(b) A copy of the Contingency and Emergency Response Plan shall be kept on the Site at all times, in a central location available to all staff, and a copy shall be submitted to the District Manager by no later than **October 31, 2011**;

(c) The Municipality shall ensure that the contingency equipment and materials outlined in the Contingency and Emergency Response Plan are immediately available on the Site at all times, in a good state of repair, and fully operational;

(d) The Municipality shall ensure that all operating personnel are fully trained in the use of the contingency equipment and materials outlined in the Contingency and Emergency Response Plan, and in the procedures to be employed in the event of an emergency;

(e) The Municipality shall review and update the emergency response plan on an annual basis as a minimum. In particular the Municipality shall ensure that the names and telephone numbers of the persons to be contacted as required under Condition 15.1 (a)(v) are up-to-date.

54.2 Fire Safety Plan

(i) No later than 30 days from the date of issuance of this Certificate, the Owner shall prepare and submit a Fire Safety Plan to the local fire service authority.

(ii) No later than 10 days after receiving written concurrence/approval for the Fire Safety Plan from the local fire service authority, the Owner shall submit a copy to the District Manager.

(iii) No WEEE waste shall be received at the Site unless written concurrence from the District Manager has been obtained indicating compliance with Conditions 54.2(i) and 54.2(ii) above.

55. The Municipality shall take immediate measures to clean-up all spills, related discharges and process upsets of wastes which result from the operation of the Site. All spills and upsets shall be immediately reported to the **Ministry's Spills Action Centre at (416) 325-3000 or 1-800-268-6060.**

56. Waste Electrical and Electronic Equipment (WEEE) shall not exceed 40 cubic metres.

III **Schedule "A"**

This Schedule "A" forms part of this Certificate of Approval

1. Application for a Certificate of Approval for the operation of a Waste Electrical and Electronic Equipment facility dated June 17, 2010 and signed by Lorna Hudder, CAO/Clerk, Treasurer, The Corporation of the Township of Killaloe, Hagarty and Richards. The application includes the Design and Operations Report; Notification Letters sent to adjacent property owners, tenants and residents; Ontario Electronic Stewardship Guidelines and Killaloe Waste Disposal Site Plan.

2. Response letter to the MOE, addressing four major concerns raised by residents dated April 6, 2011, and prepared by Lorna Hudder, CAO/Clerk-Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards.

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

1. *The reason for amending Condition 47 is to increase the maximum volume of construction & demolition and bulky waste materials within the established staging and processing area.*

2. *The reason for amending Condition 53(c) is to increase the volume of blue box materials stored and/or processed on Site.*

3. *The reasons for Condition 54.1 and 54.2 are to ensure that the Municipality follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site and is prepared and properly equipped to take action in the event of a spill, fire or other operation upset.*

4. *The reason for Condition 55 is to ensure that the Municipality immediately notifies the Ministry of any spills as required in Part X of the Act so that appropriate spills response can be determined.*

5. *The reason for Condition 56 is to ensure the Municipality does not exceeds the volume of WEEE materials managed on Site.*

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A412306 dated September 1, 2000

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

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

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

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

This Notice must be served upon:

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

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

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

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 10th day of August, 2011

Tesfaye Gebrezghi, P.Eng.
Director
Section 39, *Environmental Protection Act*

CJ/

c: District Manager, MOE Ottawa
Tyler Peters, P. Eng., Greenview Environmental Management Limited

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A412306
Notice No. 3
Issue Date: May 13, 2008

The Corporation of the Township of Killaloe, Hagarty and Richards
1 John Street, Post Office Box, No. 39
Killaloe, Ontario
K0J 2A0

Site Location: Killaloe Waste Disposal Site
1049 Mask Rd., Part Lot 7, Concession 8,
Geographic Township of Hagarty, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A412306 issued on September 1, 2000 and amended on July 27, 2006 and December 5, 2007 for the use and operation of an 1.88 hectare landfill site within an 11.51 hectare total site area , as follows:

I. The following Conditions are hereby added to the Certificate:

M. Organic Waste Depot Program

51. The organic waste depot program at the Site shall consist of the on-Site collection and transfer of organic waste that is stored in a maximum of two (2) specialized MOLOK containers with a total storage capacity of 1.6 cubic metres in accordance with the specifications of item number 16 of Schedule "A".

52. (a) The Owner shall ensure that containers used to store organic waste are leakproof, lockable and bear resistant; and

(b) The Owner shall monitor the containers in which organic waste are stored for:

(i) decomposition to ensure that the organic waste has not decomposed to the point where it is unacceptable for the intended receiving facility; and

(ii) odours; and

(c) The Owner shall empty the containers used to store organic waste and transfer the organic waste from the Site forthwith when:

(i) the maximum capacity approved in Condition 51 has been reached; or

(ii) the organic waste has decomposed to the point where it is unacceptable to the receiving facility; or

(iii) the organic waste is creating odours that are creating a negative impact on Site users or off-Site.

N. Storage of Recyclable Waste

53. The total amount of waste present and stored on Site shall not exceed the following limits:

(a) corrugated cardboard shall not exceed 40 cubic metres;

(b) marketable scrap metal, including aluminium and steel cans, shall not exceed 100 cubic metres;

(c) Blue Box Recyclables shall not exceed 70 cubic metres;

(d) organic waste shall not exceed 1.6 cubic metres;

(e) the volume of tire units shall not exceed 100 cubic metres.

II. The following definition is added to the Definition section of the Certificate:

(j) "organic waste" means source separated residential non-hazardous organic waste consisting of a combination of one or more of the following components: food waste, soiled paper products, leaf and yard waste, sanitary products and pet wastes.

(k) "tire units" means the definition provided in Section 6 (1) (a), (b) and (c) of Regulation 347 of the Act or as amended from time to time.

III. Definition (b) of the Certificate which defines "Applicant", "Owner" and "Operator" is hereby revoked and replaced with the following:

(b) "Applicant", "Owner" and "Operator" means the Corporation of the Township of Killaloe, Hagarty and Richards including its officers, employees, agents or contractors.

IV. The following items are hereby added to Schedule "A":

15. Application to amend a Certificate of Approval for a Waste Disposal Site, dated March 27, 2008 and signed by Lorna Hudder, CAO/Clerk - Treasurer, The Corporation of the Township of Killaloe, Hagardy and Richards.

16. Document dated April 16, 2008, prepared by Tyler H. Peters, P.Eng, Project Manager, Greenview

Environmental Management Ltd., providing supporting information.

The reasons for this amendment to the Certificate of Approval are as follows:

1. Condition numbers 51 and 52 approves the on-Site collection, storage and transfer of organic waste at the Site using the two (2) specialized MOLOK containers and requires that the on-Site organic waste activities be protective of the natural environment and human health.

2. Condition 53 gives clarity to how much recyclable waste is allowed to be stored at the Site. The current reference in the Certificate to the Site been used for the management of recyclable material is contained in the September 1998 Design and Operations Report (DOR) which is #2 of Schedule "A". The 1998 DOR did not specify quantities of recyclables that could be stored at the Site.

3. The definitions are added to clarify the meaning of the words "organic waste" and "tire units".

4. Item III is added to provide the correct reference that matches the name on the Certificate.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A412306 dated September 1, 2000

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

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

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

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

This Notice must be served upon:

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

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the**

Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 13th day of May, 2008

THIS NOTICE WAS MAILED
ON May 21, 2008
N.P
(Signed)

Tesfaye Gebrezghi, P.Eng.
Director
Section 39, *Environmental Protection Act*

JC/

c: District Manager, MOE Ottawa
Tyler Peter, P.Eng., Greenview Environmental Management Limited ✓

Ontario

Ministry of the Environment | Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A412306
Notice No. 2
Issue Date: December 5, 2007

The Corporation of the Township of Killaloe, Hagarty and Richards
Post Office Box, No. 39
Killaloe, Ontario
K0J 2A0

Site Location: Killaloe Waste Disposal Site
Lot 7, Concession 8
Geographic Township of Hagarty
Killaloe, Hagarty and Richards Township, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A412306 issued on September 1, 2000, and amended on July 27, 2006 for the use and operation of an 1.88 hectare landfill site within an 11.51 hectare total site area , as follows:

I. Condition 31 (a) is hereby revoked and replace by:

31.(a) By July 27, 2009, the Owner shall purchase or obtain a written easement agreement with the property owner(s) of the land(s) required for the Contaminant Attenuation Zone, which will provide the property rights necessary to establish the Contaminant Attenuation Zone; or implement remedial measures as in Items 7 to 12 inclusive in the Schedule "A" of this Certificate, to bring the site into compliance with Reasonable Use Policy Objectives at the property boundary.

II. The following Conditions are hereby added to the Certificate:

Additional Alternative Cover Material:

45. The alternative cover material shall be non-hazardous in accordance to *Reg. 347* and will be expected to perform at least as well as soil in relation to the following functions:

(a) Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;

(b) Provision for an aesthetic condition of the landfill during the active life of the Site;

(c) Provision for vehicle access to the active tipping face; and

(d) Compatibility with the design of the *Site* for groundwater protection, leachate management and landfill gas management.

46. Shredded Construction & Demolition and Bulky waste as per Item 14 of Schedule "A" is an additional alternative daily cover material approved under this Certificate.

47. Maximum amount of material stored in the Construction & Demolition and bulky household items area is 500 m^3;

48. The Owner shall undertake the necessary precautionary measures for fire prevention when stockpiling material to be used as alternative cover (example - limit potential for spontaneous combustion, etc.).

49. The Owner shall ensure that the material used as alternative daily cover, does not cause an adverse environmental effect. If any adverse effect is caused, the Owner shall immediately stop the use of such material and resume the use of other approved daily cover or clean soil.

50. Sufficient soil daily cover material or other approved daily cover material will be available for use, either when site conditions do not permit use of the alternative material, or if performance of the material is unsatisfactory.

III. The following items are hereby added to Schedule "A":

13. Application to amend a Certificate of Approval for a Waste Disposal Site, dated June 21, 2007 and signed by Ms. Lorna Hudder, CAO/Clerk-Treasurer, the Corporation of the Corporation of the Towns! of Killaloe, Hagarty and Richards.

14. Document dated June 27, 2007, prepared by Mr. Tyler Peters, Project Manager, Greenview Enviromental Management Ltd., providing supporting information.

The reasons for this amendment to the Certificate of Approval are as follows:

1. Condition 31 (a) approves the extention of the deadline for establishing the Contaminant Attenuation Zone.

2. Conditions 45, 46 and 47 approves the temporary storage of construction and demolition waste and bulky items until enough quantity is accumulated for reducing the size.

3. The reasons for Conditions 48, 49 and 50 are to specify the performance requirements of alternative cover material so that the use of alternative cover material does not cause and adverse effect.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A412306 dated September 1, 2000, as amended.

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 eachportion 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., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

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

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 5th day of December, 2007

THIS NOTICE WAS MAILED
ON Dec. 7, 2007
(Signed)

Tesfaye Gebrezghi, P.Eng.
Director
Section 39, *Environmental Protection Act*

AT/

c: District Manager, MOE Ottawa
Tyler H. Peter, P.Eng., Greenview Environmental Management Limited

Ontario

Ministry of the Environment | Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A412306
Notice No. 1
Issue Date: July 27, 2006

The Corporation of the Township of Killaloe, Hagarty and Richards
PO Box 39
Killaloe, Ontario
K0J 2A0

Site Location: Killaloe Waste Disposal Site
Lot 7, Concession 8, Hagarty Twp.
Killaloe, Hagarty and Richards Township, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A412306 issued on September 1, 2000 for the use and operation of an 1.88 hectare landfill site within an 11.51 hectare total site area, as follows:

Condition Numbers 19, 20, 21, 22 and 23 including Schedule "B" are revoked and the following conditions are added:

D. SITE OPERATIONS

19. Unused approved volumetric capacity shall be deposited on top of the landfill according to the documents listed in Schedule "A".

E. COMPOSTING

20. Composting operations at the Site shall be carried out in a manner as not to interfere with normal waste disposal operations as approved in this Certificate.

21. Should the ensuing compost be destined for use by the general public, composting operations at the Site shall be carried out in accordance with the Ministry's *Interim Guidelines for the Production and Use of Aerobic Compost in Ontario*, dated November 1991, and revised from time to time.

22. Should the ensuing compost be destined for use as alternative cover material at the Site, composting operations at the Site must be carried out in a manner that does not cause groundwater or surface water contamination, offensive odours or encourage the presence of vermin or any other adverse effect.

F. MONITORING AND REPORTING

23. The Site shall be operated in such a way as to ensure compliance with the following:

(a) Reasonable Use Guideline B-7 for the protection of the groundwater at the Site;

(b) Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives*, as amended from time to time or limits set by the Regional Director, for the protection of the surface water at and off the Site.

24. (a) The Owner shall monitor surface water and groundwater as approved in Items 7-12 (inclusive) construct and maintain to the satisfaction of the Ministry, a groundwater monitoring network which fully delineates the horizontal and vertical extent of leachate migration resulting from the landfilling activities at the Site.

(b) Groundwater samples from all wells in the above-described monitoring network will be obtained and analyzed at least once during maximum water level conditions and at least once during the minimum water level conditions. Groundwater elevations in all monitoring wells shall be measured during each monitoring event prior to obtaining water quality samples.

25. A certified Professional Geoscientist or Engineer possessing appropriate hydrogeologic training and experience will execute or directly supervise the execution of the groundwater monitoring and reporting program.

26. A written report on the development, operation and monitoring of the Site, shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the District Manager no later than March 31st of the year following the period being reported upon.

27. The Annual Report shall include the following:

(a) calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the Site during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;
(b) site plan(s) showing the existing contours of the Site, areas of landfilling operations during the reporting period, areas of intended operation during the next reporting period, areas of excavation during the reporting period, the progress of final cover, vegetative cover, and any intermediate cover application, previously existing site facilities, facilities installed during the reporting period and site preparations and facilities planned for installation during the next reporting period;
(c) a calculation of the remaining approved capacity of the Site and an estimate of the remaining Site life;
(d) summary of cover stock piling activities including use, timing, locations and erosion protection;
(e) waste types and quantities recyclable wastes received and transferred off the Site;
(f) destinations of recyclable wastes transferred off the Site;
(g) summary of litter pick-up and any dust suppression activities undertaken at the Site;
(h) summary of maintenance and repairs performed on the equipment used at the Site;

(i) summary of inspections undertaken at the Site;
(j) summary of complaints received and actions taken to resolve them;
(k) summary of emergency situations and actions taken to address them;
(l) any environmental and operational problems and any mitigative actions taken;
(m) any recommendations to minimize environmental impacts from the operation of the landfill and waste diversion areas to improve such operations in this regard;
(n) the results and an interpretive analysis of the results of all leachate, groundwater and surface water monitoring, including an assessment of the need to amend the monitoring programs;
(o) an assessment of the operation of the Site, the need to amend the design or operation of the Site, and the adequacy of and need to implement the contingency plans;
(p) a report on the status of all monitoring wells and a statement as to compliance with O.Reg. 903; and
(q) any other information required by the District Manager.

G. GROUNDWATER WELLS / MONITORS

28. The Owner shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.

29. Where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells and the wells shall be properly re-secured.

30. 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 District Manager for abandonment, shall be decommissioned by the Owner, as required, in accordance with O.Reg. 903, that will prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the Annual Report for the period during which the well was decommissioned.

H. CONTAMINANT ATTENUATION ZONE

31. (a) Within twelve (12) months from the date of this Certificate, the Owner shall purchase or obtain a written easement agreement with the property owner(s) of the land(s) required for the Contaminant Attenuation Zone, which will provide the property rights necessary to establish the Contaminant Attenuation Zone; or implement remedial measures as in Items 7 to 12 inclusive in the Schedule "A" of this Certificate, to bring the site into compliance with Reasonable Use Policy Objectives at the property boundary.

(b) The Owner must continue to own the property rights to the Contaminant Attenuation Zone for all of the contaminating life span of the Site.

(c) The ownership of the property rights must include the right to:

(i) discharge contaminants from the operations at the Site into the Contaminant Attenuation Zone;

(ii) enter into the Contaminant Attenuation Zone and onto the surface above the Contaminant Attenuation Zone for purposes of testing, monitoring, intercepting contaminants and carrying out remedial work;

(iii) install, operate and maintain works, for the purposes mentioned in clause (ii), in or the Contaminant Attenuation Zone, including on the surface above the Contaminant Attenuation Zone; and

(iv) prevent the owner(s) of the land(s) in which the Contaminant Attenuation Zone is located from paving, erecting a structure or making any use of land(s) above or in the vicinity of the contaminant attenuation zone that would interfere with the functioning of the Contaminant Attenuation Zone or with the exercise of any of the rights mentioned in this subsection.

(d) The Owner shall notify the Director in writing within thirty (30) days after any change in his, her or its ownership of the property rights in the Contaminant Attenuation Zone.

32. The Owner shall ensure that the written easement agreement, specified in Condition 31(a) includes an agreement of the property owner(s) of the land(s) required for the Contaminant Attenuation Zone, to register a Certificate of Requirement on title to the land(s) to be used as the Contaminant Attenuation Zone.

I. ALTERNATIVE DAILY COVER MATERIAL

33. Clean soil, non-hazardous contaminated soils, temporary or movable low permeability flexible membranes, asphalt shingles, leaf and yard waste mixed with sand and composted leaf and yard waste are the alternative daily cover material approved under this Certificate;

34. The Company shall ensure that the non-hazardous contaminated soils, temporary or movable low permeability flexible membranes, asphalt shingles, leaf and yard waste mixed with sand and composted leaf and yard waste used as alternative daily cover, does not cause an adverse environmental effect. If any adverse effect is caused, the Company shall immediately stop the use of such material and resume the use of other approved daily cover or clean soil.

J. RECORDS KEEPING

Daily Operations Records

35. The Owner shall establish a daily operating report of the landfilling and waste diversion operations, in

the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

(a) type and estimated amount of waste received at the Site for landfilling;
(b) area of the Site in which landfilling operations are taking place;
(c) type, source and amount of daily or intermediate cover used;
(d) waste types and quantities recyclable wastes received at the Site;
(e) source of their generation;
(f) waste types and quantities of recyclable wastes transferred off the Site;
(g) destination of recyclable wastes transferred off the Site;
(h) records of litter pick-up activities and any dust suppression activities undertaken at the Site;
(i) maintenance and repairs performed on the equipment used at the Site;
(j) summary emergency situations and actions taken to address them;
(k) any environmental and operational problems and any mitigative actions taken;
(l) any recommendations to minimize environmental impacts from the operation of the waste diversion areas to improve such operations in this regard; and
(m) any other information required by the District Manager.

Inspections Records

36. The Owner shall establish and maintain a written record of the weekly Site inspections. 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.

Waste Refusal Records

37. A record shall be kept in the daily log book of all refusals of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

38. (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, 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 above documents and records available for inspection upon request by the staff of the Ministry.

K. EMERGENCY SITUATIONS

39. (a) 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.

(b) In addition, the Owner shall submit, to the District Manager a written report within three (3) business days of the emergency situation, outlining the nature of the incident, remedial measures taken, handling of waste generated as a result of the emergency situation and the measures taken to prevent future occurrences at the Site.

40. All wastes resulting from an emergency situation shall be managed and disposed of in accordance with O.Reg. 347.

41. All equipment and materials required to handle the emergency situations shall be:

(a) kept on hand at all times that waste landfilling and/or handling is undertaken at the Site; and
(b) be adequately maintained and kept in good repair.

42. The Owner shall ensure that the emergency response personnel are familiar with the use of such equipment and its location(s).

L. CLOSURE PLAN

43. At least two (2) years prior to the anticipated date of closure of this Site, the Owner shall submit to the Director for approval, with copies to the District Manager, a detailed site closure plan pertaining to the termination of landfilling operations at this Site, post-closure inspection, maintenance and monitoring and end use. The plan shall include the following:

(a) a plan showing Site appearance after closure;
(b) a description of the proposed end use of the Site;
(c) a descriptions of the procedures for closure of the Site, including:
  (i) advance notification of the public of the landfill closure;
  (ii) posting of a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
  (iii) completion, inspection and maintenance of the final cover and landscaping;
  (iv) site security;
  (v) removal of unnecessary landfill-related structures, buildings and facilities; and
  (vi) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas; and
  (vii) a schedule indicating the time-period for implementing sub-conditions (i) to (vi) above;

(d) descriptions 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;
  (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 for leachate and methane gas; and

(f) an updated estimate of the contaminating life span of the Site, based on the results of the monitoring programs to date.

44. The Site shall be closed in accordance with the closure plan as approved by the Director.

The following are added to the Schedule "A"

7. Document entitled "Site Operations and Development Plan, Killaloe Waste Disposal Site", dated December 2004 and prepared by SGS Lakefield Research Limited.

8. Application to amend a Certificate of Approval for a Waste Disposal Site, dated December 22, 2004 and signed by Ms. Lorna Hudder, CAO/Clerk- Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards.

9. Letter from Ms. Lorna Hudder, CAO/Clerk- Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards, to Ranjani Munasinghe, MOE, dated July 22, 2005 as a response to the MOE comments dated June 7, 2005.

10. Letter dated January 27, 2006 from Christine M. Wolf, SGS Lakefield Research Limited to Ms. Lorna Huder, CAO/Clerk - Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards, Re: Groundwater Modelling Results.

11. Letter from Ms. Lorna Huddler, CAO/Clerk- Treasurer, the Corporation of the Township of Killaloe, Hagarty and Richards, to Ranjani Munasinghe, MOE, dated March 29, 2006 as a response to the MOE comments for hydrogeological and surface water reviews by Mark Phillips, MOE and Kyle Stephenson, MOE.

12. Technical Review Comments from Kyle Stephenson, MOE, sent on June 7, 2006 to Ranjani Munasinghe.

The reason(s) for this amendment to the Certificate of Approval is (are) as follows:

7. This notice is issued to allow the Owner to use the approved capacity, approve the composting operation, to allow the use of alternative daily cover and to update the Certificate.

8. Condition 19 is included to allow the Owner to use the unused approved capacity.

9. Conditions 20, 21 and 22 are included to ensure that the Owner undertake the composting activities in accordance with Ministry's requirements and in a manner that would not result in a hazard or nuisance to the natural environment.

10. Condition 23 is included to provide the groundwater and surface water limits to prevent water pollution at the Site.

11. Conditions 24 and 25 are included to require the Municipality to demonstrate that the Site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.

12. Conditions 26, 27, 35, 36, 37 and 38 inclusive are included to ensure that accurate records are maintained to ensure compliance with the conditions in this Certificate, the *EPA* and its regulations.

13. Conditions 28, 29 and 30 are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.

14. Conditions 31 and 32 are included to require the Owner to obtain property rights to land(s) that is required for a Contaminant Attenuation Zone that is necessary for attenuation of contamination resulting from the operation of the Site or to use an alternative method to bring the site into compliance with Reasonable Use Policy Objectives.

15. The reason for the Conditions 33 and 34 to allow the Owner to use alternative daily cover at the Site and in a manner that would not result in a hazard or nuisance to the natural environment.

16. Condition 39 is included to ensure that emergency situations are reported to the Ministry to ensure public health and safety and environmental protection.

17. Condition 40, 41 and 42 are included to ensure that emergency situations are handled in a manner to minimize the likelihood of an adverse effect and to ensure public health and safety and environmental protection.

18. Condition 43 and 44 are included to ensure that final closure of the Site is completed in an aesthetically pleasing manner, in accordance with Ministry standards, and to ensure the long-term protection of the health and safety of the public and the environment.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A412306 dated September 1, 2000, as amended.

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 eachportion 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., Suite 1700
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

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

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 27th day of July, 2006

THIS NOTICE WAS MAILED
ON July 28 2006
JL
(Signed)

Tesfaye Gebrezghi, P.Eng.
Director
Section 39, *Environmental Protection Act*

RM/
c: District Manager, MOE Ottawa
Tyler Peters, SGS Lakefield Research Limited √

Ontario

Ministry of the Environment *Ministère de l'Environnement*

PROVISIONAL CERTIFICATE OF APPROVAL FOR A WASTE MANAGEMENT SYSTEM
NO. A-412306

Under the Environmental Protection Act and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

The Corporation of the Township of Killaloe, Hagarty & Richards
1 John Street, P.O. Box 39
Killaloe, Ontario
K0J 2A0

for the Waste Management System serving of a 1.88 hectare landfill within an 11.51 hectare total Site area;

and subject to the following conditions:

The application and supporting information as listed in Schedule "A", which is attached to this Provisional Certificate of Approval and forms part of this Certificate;

Located: Part Lot 7, Concession 8 (Hagarty Township)
Township of Killaloe, Hagarty & Richards
County of Renfrew

which includes the use of the site only for the disposal *of the following categories of waste (Note: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval)* Municipal Waste

and subject to the following conditions:

A. DEFINITIONS

For the purpose of this Provisional Certificate of Approval:

(a) "Act" and "EPA" mean the Environmental Protection Act, R.S.O. 1990, C. E-19 as amended;

(b) "Applicant", "Owner" and "Operator" mean the Township of Hagarty and Richards, including its officers, employees, agents or contractors;

(c) "Certificate" means this entire Provisional Certificate of Approval including its schedules, if any, issued in accordance with Section 27, Part V of the Environmental Protection Act;

(d) "Director" means a Director, Environmental Assessment and Approvals Branch of the Ministry of the Environment;

(e) "District Manager" means the District Manager of the Ottawa District Office, Eastern Region of the Ministry;

(f) "Ministry" means the Ontario Ministry of the Environment (MOE);

(g) "Municipal Waste" is as defined in Ontario Regulation 347, R.R.O. 1990;

(h) "O.Reg. 232" means Ontario Regulation 232/98 (Landfilling Sites), R.R.O. 1990;

(i) "RUPO" means the Ministry of the Environment Reasonable Use Policy Objectives (Guideline B-7);

(j) "Site" means the landfill site as described in this Certificate; and

(k) "Waste fill area" means the area on the surface of the site beneath which or above which waste is disposed by landfilling.

B. GENERAL

1. The Provisional Certificate of Approval No. A 412306, dated April 2, 1980 is hereby revoked and replaced by this Certificate.

2. Except as otherwise provided by these Conditions, the Site shall be operated and maintained, in accordance with the Applications for a Certificate of Approval for a Waste Disposal Site, dated September 21, 1998, and its supporting documents as listed in Schedule "A".

3. The requirements specified in this Certificate are the requirements under the Environmental Protection Act, R.S.O. 1990. The issuance of this Certificate in no way abrogates the Applicant's legal obligation to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.

4. The requirements of the Certificate are severable. If any requirement of this Provisional Certificate of Approval, or the application of any requirement of the Provisional Certificate of Approval to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of the Provisional Certificate of Approval shall not be affected in any way.

5. The Applicant shall ensure compliance with all the terms and conditions of this Certificate. Any non-compliance constitutes a violation of the Environmental Protection Act, R.S.O. 1990 and its grounds for enforcement.

6. (a) The Applicant shall, forthwith upon request of the Director, District Manager, or Provincial Officer (as defined in the Act), furnish any information requested by such persons with respect to compliance with this Certificate, including but not limited to, any records required to be kept under this Certificate; and

(b) In the event, the Applicant 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 Applicant, or to require the Applicant 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 or omission of the Applicant relating to the Information, amounting to non-compliance with this Certificate or any statute or regulation.

The Applicant shall allow Ministry personnel, or a Ministry authorized representative(s), upon presentation of credentials, to:

(a) carry out any and all inspections authorized by Section 156, 157 or 158 of the Environmental Protection Act, R.S.O. 1990, Section 15, 16 or 17 of the Ontario Water Resources Act, R.S.O. 1990, or Section 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 where the records required by the conditions of this Certificate are kept;

ii. have access to and copy, at reasonable times, 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.

8. (a) Where there is a conflict between a provision of any document referred to in Schedule "A" and the conditions of this Certificate, the conditions in this Certificate shall take precedence; and

(b) Where there is a conflict between documents listed in Schedule "A", the document bearing the most recent date shall prevail.

9. The Applicant shall ensure that all communications/correspondence made pursuant to this Certificate includes reference to the Certificate approval number A 412306.

10. The Applicant shall notify the Director in writing of any of the following changes within thirty (30) days of the change occurring:

(a) change of Applicant or Operator of the Site or both;

(b) change of address or address of the new Applicant;

(c) change of partners where the Applicant 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 Applicant 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 o 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 Applicant 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 10(d), supra.

11. In the event of any change in ownership of the Site, the Applicant shall notify, in writing, the succeeding owner of the existence of this Certificate, and a copy of such notice shall be forwarded to the Director.

12. 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.

13. All records and monitoring data required by the conditions of this Certificate shall be kept on the Owners's premises for a minimum period of two (2) years from the date of their creation.

14. The obligations imposed by the terms and conditions of this Certificate are obligations of due diligence.

C. PROHIBITION AND REGISTRATION ON TITLE

15. (a) Pursuant to Section 197 of the EPA, neither the Applicant nor any person having an interest in the Site shall deal with the Site in any way without first giving a copy of the Provisional Certificate of Approval to each person acquiring an interest in the Site as a result of the dealing;

(b) By December 31, 2000, the Applicant shall submit to the Director for the Director's signature two (2) copies of a completed Certificate of Prohibition containing a register able description of the Site, in accordance with Form 1 of O. Reg. 14/92; and

(c) Within ten (10) calendar days of receiving the Certificate of Prohibition, the Applicant shall register the Certificate of Prohibition in the appropriate Land Registry Office on title and immediately following registration, submit to the Director the duplicate registered copy.

D. SITE OPERATIONS

16. This Site shall only receive Municipal Waste that is generated from within the Township of Hagarty & Richards and the Village of Killalo

17. The final volumetric capacity of this Site, excluding final cover, i 84,962 cubic metres.

18. Waste shall be managed and landfilled at the Site in accordance with the items listed in Schedule "A".

19. The Owner shall have installed an additional five (5) groundwater monitoring wells, as specified in Item (6) of Schedule "A", no later than November 30, 2000.

E. MONITORING AND REPORTING

20. The Owner shall conduct surface and ground water sampling at the frequencies and for the parameters specified in Schedule "B", as modified by the District Manager. By March 31, 2001 and on an annual basis thereafter, the Owner shall submit to the District Manager, an Annual Report that contains the following, for the previous calendar year:

    (a) the analytical results of the sampling program;
    (b) an analysis of the results of the monitoring programs conducted at the Site to date;
    (c) recommendations for the monitoring or operation of the Site for the following calendar year;
    (d) for the first two Annual Reports, and at a frequency specified the District Manager thereafter, a site plan, including cross sectional drawings, showing the current extent of waste dispo
    (e) an estimate of the total amount of waste landfilled and an estimate of the Site's remaining capacity;
    (f) a statement as to compliance with the terms and conditions of Certificate;
    (g) a summary of complaints regarding the operation the Site and Owner's response to those complaints; and
    (h) an assessment of the need to develop and implement contingen plans for leachate control.

F. Site Closure

21. One (1) year prior to the Site reaching the capacity specified in Condition (17), the Owner shall submit to the Director, for approval, a plan for the closure, monitoring and long term maintenance of the Site.

G. EMERGENCIES

22. In case of an emergency or a spill at this Site, the Applicant shall forthwith call the Ministry of the Environment Spills Action Centre (1-800-268-6060) or the District Office.

H. RECORD KEEPING

23. The Company shall maintain records of the results of all inspections and monitoring and a summary of all activities associated with the Site (e.g. spills, maintenance work) in a record book located at the Site.

SCHEDULE "A"

This Schedule "A" forms part of Provisional Certificate of Approval No. A 412306:

1. Application to amend a Certificate of Approval for a Waste Disposal Site, dated September 21, 1998 and signed by Janice Bush, Reeve, Township of Hagarty & Richards.

2. Document entitled "Design and Operations Report for the Killaloe Landfill Site, Provisional Certificate of Approval A412306", dated September 1998 and prepared by The Greer Galloway Group Inc.

3. Letter from I. Parrott, MOE to K. Mooder, The Greer Galloway Group Inc dated November 12, 1999 re: Ministry Review Comments.

5. Letter from K. Mooder, The Greer Galloway Group Inc. to I. Parrott, MOE, dated January 10, 2000 re: Response to Ministry Review Comments dated November 12, 1999, including Addendum.

6. Letter from K. Mooder, The Greer Galloway Group Inc. to I. Parrott, MOE, dated May 2, 2000 re: Additional Information on Environmental Monitoring Program.

SCHEDULE "B"

Groundwater Monitoring

In the summer and fall of the year 2000, groundwater samples shall be taken from monitoring wells A, B, 00-1, 00-2, 00-3, 00-4A, 00-4B, 00-5A, 00-5B and private residence wells R1, R2 and R3, and analysed for the following parameters:

(1) Field Measured Parameters:

water level, temperature, conductivity, pH

(2) Laboratory Measured Parameters:

calcium, magnesium, sodium, potassium, aluminum, barium, boron, chromium, cobalt, copper, iron, manganese, total phosphorus, silicon, strontium, zinc, alkalinity, TDS, chloride, ammonia, nitrate and sulphate, TKN, COD, DOC.

Surface Water Monitoring

In the spring, summer and fall of the year 2000, samples shall be taken from Surface Water Stations SW-1 (upstream), SW-2 (adjacent) and SW-3 (downstream) and analysed for the following parameters:

(1) Field Measured Parameters:

flow rate, DO, pH, conductivity, temperature,

(2) Laboratory Measured Parameters:

ammonia, chloride, calcium, magnesium, potassium, sodium, aluminum, barium, boron, chromium, cobalt, copper, iron, manganese, total phosphorus, silocon, strontium, zinc, phenols, alkalinity, sulphate, nitrite, nitrate and sulphate, TKN, COD, DOC and TDS.

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

1. Conditions 1, 3, 4, 5, 6, 8, 9, 10, 11, 12 and 13 are to clarify the legal rights and obligations of this Certificate.

2. Condition 7 is to ensure that the appropriate Ministry staff have rea access to the waste Site to inspect the operations that are approved under this Certificate. The condition is supplementary to the power of entry afforded a Provincial Officer pursuant to the Environmental Protection Act, as amended.

3. Conditions 2, 20 and 23 are to ensure that the waste disposal Site is operated in accordance with the application for this Certificate and supporting information and not in any way or under any name which the Director has not been asked to consider.

4. Condition 14 is required to clarify that the terms and conditions of this Certificate impose a standard of due diligence and not absolute liability.

5. The reason for Condition 15, which requires registration of the Certificate, is that Section 46 of the Environmental Protection Act prohibits any use being made of the lands after they cease to be used for waste disposal purposes within a period of twenty-five years fr the year in which such land ceased to be used, unless the approval o the Minister for the proposed use has been given. The purpose of thi prohibition is to protect future occupants of the site and the environment from any hazards which might occur as a result of waste being disposed of on the site. This prohibition and potential hazard should be drawn to the attention of future owners and occupants by th Certificate being registered on title.

6. The reason for Conditions 16, 17, 18, 19, 21 and 22 is to ensure tha the Site is operated and maintained in a manner that protects the health and safety of people and the environment.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990 c. E-19, you may written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this No require a hearing by the Board. Section 142 of the Environmental Protection Act, as amended provides tha Notice requiring a hearing shall state:

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.*

In addition to these legal requirements, 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 management system is located.*

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

This Notice must be served upon:

The Secretary,*
Environmental Appeal Board,
1300 Yonge St., 12th Floor,
P.O. Box 2382
Toronto, Ontario.
M4P 1E4

AND

The Director,
Section 39, Environmental Protection Act,
Ministry of the Environment,
2 St. Clair Ave. W., 12A Floor,
Toronto, Ontario.
M4V 1L5

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

DATED AT TORONTO this 1st *day of* September, 2000.

THIS IS A TRUE COPY O[illegible]
ORIGINAL CERTIFICATE MAILED

ON Sept. 1/00

LD

(SIGNED)

A. Dominski, P. Eng.,
Director,
Section 39,
Environmental Protection Act

L/ld

District Manager, MOE Ottawa District Office

LRO # 49 Certificate

Receipted as RE103980 on 2009 05 14 at 09:20

The applicant(s) hereby applies to the Land Registrar.

yyyy mm dd Page 1 of 3

Properties

PIN	57520 - 0101 LT
Description	PT LT 6 CON 8 HAGARTY, PT 1, 49R18569 ; TWP OF KILLALOE, HAGARTY & RICHARDS
Address	KILLALOE
PIN	57520 - 0097 LT
Description	PART OF LOT 7, CONCESSION 8, HAGARTY BEING PART 1 ON 49R958 AND PART 1 ON 49R13673.
Address	KILLALOE

Party From(s)

Name DIRECTOR APPOINTED UNDER SECTION 5 OF THE ENVIRONMENTAL PROTECTION ACT

Address for Service 2 St. Clair Avenue West
Floor 12A
Toronto, Ontario
M4V 1L5

This document is not authorized under Power of Attorney by this party.

This document is being authorized by a representative of the Crown.

Party To(s) *Capacity* *Share*

Name THE CORPORATION OF THE TOWNSHIP OF KILLALOE, HAGARTY AND RICHARDS

Address for Service 1 John Street
Killaloe, Ontario
K0J 2A0

Statements

Schedule: See Schedules

Signed By

Darlene Okum 203 Nelson Street
Pembroke
K8A 3N1

acting for Party From(s) Signed 2009 05 14

Tel 6137352313
Fax 6137352013

Submitted By

ROY C. REICHE, BARRISTER & SOLICITOR 203 Nelson Street
Pembroke
K8A 3N1

2009 05 14

Tel 6137352313
Fax 6137352013

Fees/Taxes/Payment

Statutory Registration Fee	$60.00
Total Paid	$60.00

Certificate of Requirement
(s. 197 *Environmental Protection Act*, R.S.O. 1990, c. E19)

S. 197(2) Environmental Protection Act

This is to certify that pursuant to a Provisional Certificate of Approval No. A412306 Issued on September 1, 2000, and amended on July 27, 2006; December 5, 2007 and May 13, 2008 for the use and operation of an 1.88 hectare landfill site within an 11.51 hectare total site area, more particularly described in Schedule "A" attached hereto, the following persons, THE CORPORATION OF THE TOWNSHIP OF KILLALOE,

HAGARTY AND RICHARDS

are prohibited from dealing with the property described in Schedule "A" without first giving a copy of the Provisional Certificate of Approval, together with the amendments referred to above, to each person acquiring an interest in the property as a result of the dealing.

Under subsection 197(3) of the Environmental Protection Act, the prohibition applies to each person who, subsequent to the registration of this certificate, acquires an interest in the property.

SCHEDULE "A"

Part of Lot 7, Concession 8, Hagarty, being Part 1, on 49R958 and Part 1 on 49R13673, Township of Killaloe, Hagarty and Richards, being all of PIN 57520-0097 (LT);

Part Lot 6, Concession 8, Hagarty, Part 1, 49R16569; Township of Killaloe, Hagarty and Richards, being all of PIN 57520-0101 (LT);

Appendix B

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 (1-2) 5508960 MUNICIP 55014 (10-14) CON. (15-22, 23-24)

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC	LOT (25-27)
RENFREW	HAGARTY	9	7

[redacted]

ADDRESS: 25 Riding Way, Kanata Ont. K2M-1C0

DATE COMPLETED (48-53): DAY 21 MO 5 YR 88

21 (1-2) UTM ZONE (10) EASTING (12-17) NORTHING (18-24) SC (25) ELEVATION (26-30) RC BASIN CODE (31-47) I II III IV

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BRN	SAND	GRAVEL COUBLES	LOOSE DRY	0	4
GRY	BOULDER			4	9
BRN	SAND	11 11		9	11
RED GRY	GRANITE		AVG.	11	27
BRN	SEAM,	BROKEN ROCK. SILT		27	29
GRY	GRANITE		AVG.	29	67
RED	"		FAST AVG	67	90
RED, GRY	"		AVG	90	107
RED	"		"	107	118
RED GRY	"		FAST AVG.	118	166

31

32 (1-2, 10, 14-15, 21, 32, 43, 54, 65, 75, 80)

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
10-13: 158	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS (14)
15-18	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS (19)
20-23	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS (24)
25-28	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS (29)
30-33	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS (34)

(80)

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
10-11: 6 1/4	(12) 1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	188	0	13-16: 43
17-18: 6 1/8	(19) 1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC	—	43	20-23: 166
24-25	(26) 1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			27-30

SCREEN

SIZE(S) OF OPENING (SLOT NO.) (31-33)	DIAMETER (34-38) INCHES	LENGTH (39-40) FEET

MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN (41-44) FEET	(30)

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	(80)

71 PUMPING TEST

PUMPING TEST METHOD (10): 1 ☐ PUMP 2 ☒ BAILER — AIR

PUMPING RATE (11-14): 8 GPM

DURATION OF PUMPING (15-16 HOURS, 17-18 MINS): 1 HOURS

STATIC LEVEL	WATER LEVEL END OF PUMPING
19-21: 22 FEET	22-24: 166 FEET

(25) WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY

15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
26-28: 71 FEET	29-31: 42 FEET	32-34: 24 FEET	35-37: 22 FEET

IF FLOWING, GIVE RATE (38-41) GPM:

PUMP INTAKE SET AT: FEET

(42) WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING (43-45): 150 FEET

RECOMMENDED PUMPING RATE (46-49): 8 GPM

(50-53)

(54) FINAL STATUS OF WELL

1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 8 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED POOR QUALITY; 7 ☐ UNFINISHED; 9 ☐ DEWATERING

(55-56) WATER USE

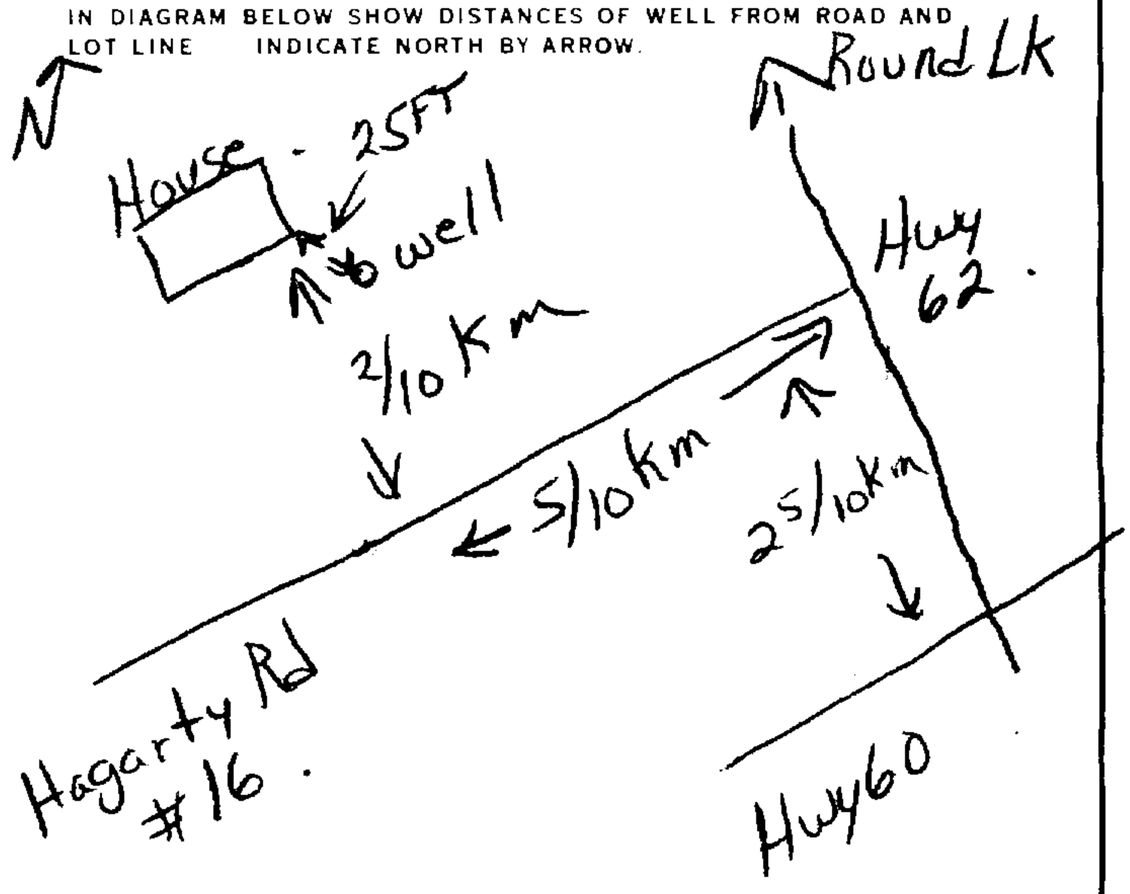
1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

(57) METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☒ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING; ☐ DIGGING; ☐ OTHER

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



10482

DRILLERS REMARKS

CONTRACTOR

NAME OF WELL CONTRACTOR: EARL V MARQUARDT & SON INC. — WELL CONTRACTOR'S LICENCE NUMBER: 3611

ADDRESS: PALMER RAPIDS ONT. K0J-2E0

NAME OF WELL TECHNICIAN: TERRY MARQUARDT — WELL TECHNICIAN'S LICENCE NUMBER: T0062

SIGNATURE OF TECHNICIAN/CONTRACTOR: Terry Marquardt — SUBMISSION DATE: DAY 8 MO 6 YR 88

OFFICE USE ONLY

DATA SOURCE (58)	CONTRACTOR (59-62)	DATE RECEIVED (63-68)	(80)
	3611	JUN 14 1988	

DATE OF INSPECTION: INSPECTOR:

REMARKS:

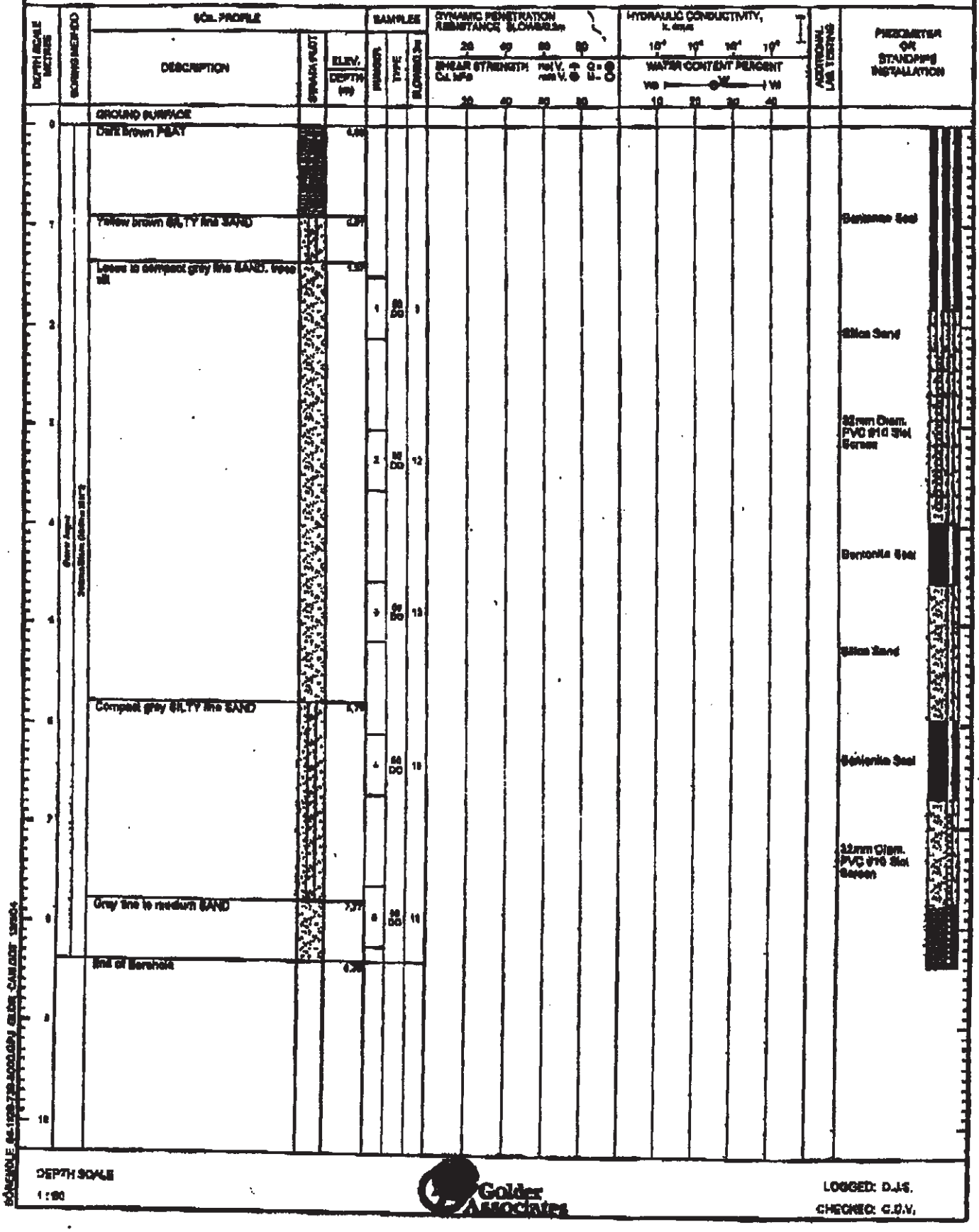
MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Appendix C

RECORD OF BOREHOLE: 04-1

PROJECT: 04-1120-728-5000
LOCATION: See Site Plan
SAMPLER HAMMER, 64kg; DROP, 760mm
BORING DATE: Mar. 11, 2004
SHEET 1 OF 1
DATUM: Not Surveyed
PENETRATION TEST HAMMER, 64kg; DROP, 760mm



DEPTH SCALE
1:50

Golder Associates

LOGGED: D.J.S.
CHECKED: C.D.V.

PROJECT: 991-2844

RECORD OF BOREHOLE: BH 00-1

SHEET 1 OF 1

LOCATION:

BORING DATE: 09/05/2000

DATUM: Local

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q- ●, U- ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		98.65							
	Power Auger 200mm DIAM. (Hollow Stem)	Light brown fine SAND, trace to some silt		0.00							Bentonite Seal
				97.89							
1		Compact, fine to coarse SAND, trace fine gravel		0.76	1	50 DO	11				
2											
				95.91							Native & Caved Backfill
3		Loose to very loose brown to grey, fine to medium SAND, occasional to trace silt, stratified		2.74	2	50 DO	9				
4											
5					3	50 DO	3				Bentonite Seal
6											Sand Backfill
					4	50 DO	2				
7											50mm PVC # 10 Slot Screen
				91.03							
		Very loose grey fine SAND, some medium sizes		7.62	5	50 DO	3				
8				90.42							Sand Backfill
		END OF BOREHOLE		8.23							
9											W.L. Elev. In Screen at 96.24m July 21, 2000
10											
11											
12											
13											
14											
15											

BOREHOLE 991-2844.GPJ GLDR_CAN.GDT 3/28/01

DEPTH SCALE
1 : 75

Golder Associates

LOGGED: D.W.M.
CHECKED:

PROJECT: 991-2844

RECORD OF BOREHOLE: BH 00-2

SHEET 1 OF 1

LOCATION:

BORING DATE: 08/05/2000

DATUM: Local

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○; 20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		101.75							
	Power Auger 200mm DIAM. (Hollow Stem)	Light brown fine SAND, trace silt		0.00							Bentonite Seal
1				100.84							
		Compact brown fine to coarse SAND, trace silt		0.91	1	50 DO	21				
2											
3				98.70							Native and Caved Backfill
		Compact brown fine to medium SAND, trace silt		3.05	2	50 DO	14				
4				97.18							
		Compact brown to grey fine SAND, trace silt, stratified		4.57	3	50 DO	22				
5											▽
6				95.65							Bentonite Seal
		Loose brown to grey fine to medium SAND, trace silt, stratified iron staining		6.10	4	50 DO	9				
7											Sand Backfill
				94.13							
		Very loose grey fine SAND, trace silt		7.62	5	50 DO	4				
8											50mm PVC # 10 Slot Screen
9				92.61							
		END OF BOREHOLE		9.14							
10											W.L. Elev. In Screen at 96.43m July 21, 2000
11											
12											
13											
14											
15											

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: D.W.M.

CHECKED: M.V.

BOREHOLE 991-2844.GPJ GLDR_CAN.GDT 3/28/01

PROJECT: 991-2844

RECORD OF BOREHOLE: BH 00-3

SHEET 1 OF 1

LOCATION:

BORING DATE: 08/05/2000

DATUM: Local

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q- ●, rem V. ⊕ U- ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		97.22							
0	Power Auger 200mm DIAM. (Hollow Stem)	Loose to compact brown to grey fine SAND, trace to some silt, occasional seams, stratified mica flakes		0.00	1	50 DO	5				Bentonite Seal
1											
2					2	50 DO	18				Native and Caved Backfill
3											
4				92.65							Bentonite Seal
5		Compact brown grey, fine to medium SAND, trace silt, occasional silty sand seams, stratified		4.57	3	50 DO	24				Sand Backfill
6				91.12							
7		Loose brown to grey SILT, frequent silty sand seams		6.10	4	50 DO	6				50mm PVC # 10 Slot Screen
8				89.60							
		Compact brown to grey, fine to medium SAND, some coarse sizes, trace to some silt		7.62	5	50 DO	18				Sand Backfill
		END OF BOREHOLE		88.99 8.23							
9											W.L. Elev. In Screen at 95.77m July 21, 2000
10											
11											
12											
13											
14											
15											

BOREHOLE 991-2844.GPJ GLDR_CAN.GDT 3/28/01

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: D.W.M.

CHECKED:

PROJECT: 991-2844

RECORD OF BOREHOLE: BH 00-4

SHEET 1 OF 1

LOCATION:

BORING DATE: 04/05/2000

DATUM: Local

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		100.06							
0	Power Auger 200mm DIAM. (Hollow Stem)	Loose, brown, fine to medium SAND, some coarse sizes, stratified		0.00							Bentonite Seal
1											
2					1	50 DO	7				
3				97.01							Native and Caved Backfill
4		Loose, brown, fine to coarse SAND, stratified		3.05	2	50 DO	9				
5		Very loose, brown, fine to medium SAND, some coarse sizes, iron odour		95.49 4.57	3	50 DO	3				Bentonite Seal
6				93.96							Sand Backfill
7		Very loose, grey, fine to coarse SAND, some black - green staining, trace silt		6.10	4	50 DO	5				50mm PVC # 10 Slot Screen
8				91.83	5	50 DO	3				
9		END OF BOREHOLE		8.23							W.L. Elev. In Screen at 95.94m July 21, 2000
10											
11											
12											
13											
14											
15											

BOREHOLE 991-2844.GPJ GLDR_CAN.GDT 3/28/01

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: D.W.M.

CHECKED:

PROJECT: 991-2844

RECORD OF BOREHOLE: BH 00-4D & BH 00-4S

SHEET 1 OF 1

LOCATION:

BORING DATE: 09/05/2000

DATUM: Local

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		100.11							
0	Power Auger 200mm DIAM. (Hollow Stem)	Loose, brown, fine to medium SAND, some coarse sizes, stratified		0.00							Bentonite Seal
1											
2											Native and Cave Backfill
3				97.06							
		Loose, brown, fine to coarse SAND, stratified		3.05							Bentonite Seal
4											
				95.54							Sand Backfill
		Very loose, brown, fine to medium SAND, some coarse sizes, iron odour		4.57							
5											50mm PVC # 10 Slot Screen S (Shallow)
6				94.01							
		Very loose, grey, fine to coarse SAND, some black - green staining, trace silt		6.10							
7											Native and Cave Backfill
8											
9											Bentonite Seal
											Sand Backfill
10											50mm PVC # 10 Slot Screen D (Deep)
11				88.83							
		END OF BOREHOLE		11.28							
12											W.L. Elev. In Shallow Screen at 95.95m July 21, 2000
13											
14											W.L. Elev. In Deep Screen at 95.93m July 21, 2000
15											

BOREHOLE 991-2844.GPJ GLDR_CAN.GDT 4/11/01

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: D.W.M.

CHECKED:

PROJECT: 991-2844

RECORD OF BOREHOLE: BH 00-5

SHEET 1 OF 1

LOCATION:

BORING DATE: 05/05/2000

DATUM: Local

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q- ●, U- ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		96.44							
		TOPSOIL		0.10							
		Light brown to yellow silty, fine to medium SAND		94.92							Bentonite Seal
1											
		Loose to very loose, brown, fine to medium SAND, trace silt		1.52	1	50 DO	6				
2											
					2	50 DO	2				Native and Caved Backfill
3											
	Power Auger 200mm DIAM. (Hollow Stem)			91.67							
4		Very loose, brown to green, fine SAND, some silt, stratified		4.57	3	50 DO	2				
5											
											Bentonite Seal
6					4	50 DO	2				Sand Backfill
7											
				88.62							50mm PVC # 10 Slot Screen
		Very loose, grey, fine SAND, trace silt		7.62	5	50 DO	2				
8				88.21							Sand Backfill
		END OF BOREHOLE		8.23							
9											
											W.L. Elev. In Screen at 95.85m July 21, 2000
10											
11											
12											
13											
14											
15											

BOREHOLE 991-2844.GPJ GLDR_CAN.GDT 3/28/01

DEPTH SCALE

1 : 75

Golder Associates

LOGGED: D.W.M.

CHECKED: M.V.

Greenview
ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
69 Cteak Avenue, P.O. Box 100
Bancroft, Ontario K0L 1C0
t: (613) 332-0057
f: (613) 332-1767
e: solutions@greenview-environmental.ca

Log of Monitoring Well: BH06-1S

Project No.: 107.06.002

Project: Killaloe WDS

Client: Township of Killaloe, Hagarty and Richards

Location: See Site Plan

SUBSURFACE STRATA PROFILE			SAMPLE					
Depth (ft / m)	Symbol	Description	No.	Type	% R	SPT N-Value (0 15 30 45 60)	Well Completion Details	Comments
0		Ground Surface					Stick-up = 0.74 m	
0 – 3		**Peat** Dark brown, organic peat, moist, loosely compacted. Saturated at 0.91 m. Fragments of partially decomposed plant and wood debris.	1	AS	100		Concrete	
			2	SS	10			
			3	SS	20		Bentonite Chips	
			4	SS	20			
3 – 4.6		**Medium to Coarse Sand** Grey, medium to coarse sand with trace sub-angular granitic gravel, wet, loosely compacted.	5	SS	60		Silica Sand	
			6	SS	95		Well Screen = 1.52 m x 0.05m	
4.6		End of Borehole						

Drilled By: Lantech Drilling Ltd.

Logged By: S. Reynolds

Drill Method: Hollow Stem Augers

Checked By: T. Peters

Drill Date: August 1, 2006

Sheet: 1 of 1

Greenview
ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
69 Cleak Avenue, P.O. Box 100
Bancroft, Ontario K0L 1C0
t: (613) 332-0057
f: (613) 332-1767
e: solutions@greenview-environmental.ca

Log of Monitoring Well: BH06-1D

Project No.: 107.06.002

Project: Killaloe WDS

Client: Township of Killaloe, Hagarty and Richards

Location: See Site Plan

Depth (ft / m)	Symbol	Description	No.	Type	% R	SPT N-Value (0 15 30 45 60)	Well Completion Details	Comments
		Ground Surface						Stick-up = 0.62 m
0		**Peat** Dark brown, organic peat, moist, loosely compacted. Saturated at 0.91 m. Fragments of partially decomposed plant and wood debris.	1	AS	100			Concrete
2 / 1			2	SS	10			Bentonite Chips
4			3	SS	20			
6			4	SS	20			
8 / 3			5	SS	60			
10		**Medium to Coarse Sand** Grey, medium to coarse sand with trace sub-angular granitic gravel, wet, loosely compacted.	6	SS	95			Bentonite Grout
12			7	SS	80			
14 / 5		**Fine to Medium Sand** Grey, fine to medium sand with trace sub-angular granitic gravel, wet, loosely compacted.	8	SS	85			
16			9	SS	80			Bentonite Chips
18		**Fine Sandy Silt** Grey, fine sandy silt, wet, moderately compacted and sticky.	10	SS	80			Silica Sand
20 / 7			11	SS	80			
22			12	SS	65			Well Screen = 1.52 m x 0.05m
24 / 9		End of Borehole						
26								
28								
30								
32								

Drilled By: Lantech Drilling Ltd.

Drill Method: Hollow Stem Augers

Drill Date: July 31, 2006

Logged By: S. Reynolds

Checked By: T. Peters

Sheet: 1 of 1

Greenview
ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
69 Cleak Avenue, P.O. Box 100
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t: (613) 332-0057
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Log of Monitoring Well: BH06-2S

Project No.: 107.06.002

Project: Killaloe WDS

Client: Township of Killaloe, Hagarty and Richards

Location: See Site Plan

SUBSURFACE STRATA PROFILE			SAMPLE					
Depth (ft / m)	Symbol	Description	No.	Type	% R	SPT N-Value (0 15 30 45 60)	Well Completion Details	Comments
0		Ground Surface					Stick-up = 0.81	
0 – 2 / 0 – 1		**Fill** Light brown, medium to coarse sand, dry, loosely compacted with rounded gravel and cobbles.	1	AS	100		Concrete	
2 – 4 / 1		**Topsoil** Dark brown, organic topsoil, moist, loosely compacted.					Bentonite Chips	
4 – 10 / 1 – 3		**Fine to Medium Sand** Grey, fine to medium sand with localized trace silt, moist, loosely compacted. Light brown striations at 8 feet.	2	SS	65			
			3	SS	65		Silica Sand	
			4	SS	60			
			5	SS	55		Well Screen = 1.52 m x 0.05 m	
16 – 18 / 5		**Fine to Medium Silty Sand** Grey, fine to medium silty sand, wet, loosely compacted. End of Borehole						

Drilled By: Lantech Drilling Ltd.

Drill Method: Hollow Stem Augers

Drill Date: August 1, 2006

Logged By: S. Reynolds

Checked By: T. Peters

Sheet: 1 of 1

Greenview
ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
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t: (613) 332-0057
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Log of Monitoring Well: BH06-2D

Project No.: 107.06.002

Project: Killaloe WDS

Client: Township of Killaloe, Hagarty and Richards

Location: See Site Plan

Depth (ft / m)	Symbol	Description	No.	Type	% R	SPT N-Value (0 15 30 45 60)	Well Completion Details	Comments
-4 /								
-2 /								
0 /		Ground Surface						
2 / 1		**Fill** Light brown, medium to coarse sand, dry, loosely compacted with rounded gravel and cobbles.	1	AS	100			Stick-up = 0.77
								Concrete
								Bentonite Chips
4 /		**Topsoil** Dark brown, organic topsoil, moist, loosely compacted.						
6 /		**Fine to Medium Sand** Grey, fine to medium sand with localized trace silt, moist, loosely compacted. Light brown striations at 8 feet.	2	SS	65			
8 /			3	SS	65			
10 / 3			4	SS	60			
12 /								Bentonite Grout
14 /			5	SS	55			
16 / 5		**Fine to Medium Silty Sand** Grey, fine to medium silty sand, wet, loosely compacted.	6	SS	45			
18 /			7	SS	45			
20 /			8	SS	65			
22 /								Bentonite Chips
24 / 7			9	SS	75			
								Silica Sand
26 /		**Fine Silt with Trace Sand** Grey, fine silt with trace sand, wet, moderately compacted.	10	SS	50			
28 /			11	SS	80			Well Screen = 1.52 m x 0.05 m
30 / 9		End of Borehole						
32 /								

Drilled By: Lantech Drilling Ltd.

Logged By: S. Reynolds

Drill Method: Hollow Stem Augers

Checked By: T. Peters

Drill Date: August 1, 2006

Sheet: 1 of 1

Greenview
ENVIRONMENTAL MANAGEMENT
Greenview Environmental Management Limited
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e: solutions@greenview-environmental.ca

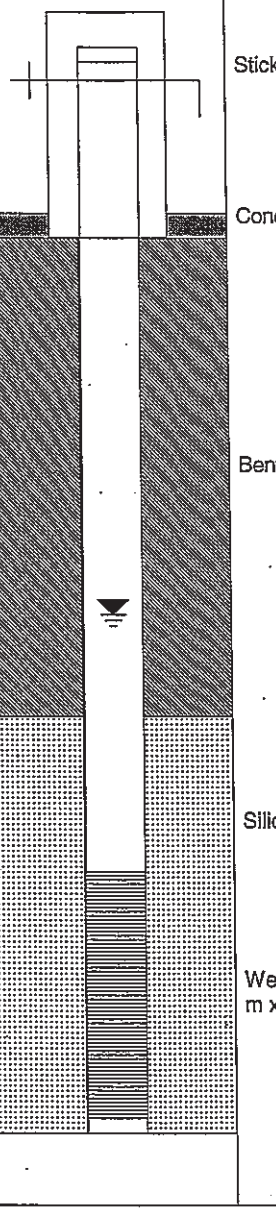
Log of Monitoring Well: MW07-3S

Project No.: 107.07.002

Project: Killaloe WDS

Client: Township of Killaloe, Hagarty and Richards

Location: See Site Plan

Depth (ft / m)	Symbol	Description	No.	Type	% R	SPT N-Value (0 200 400 600)	Well Completion Details	Comments
-4 / -2								Stick-up = 0.69 m
0		Ground Surface						
0		**Fill** Light brown, medium to coarse sand, with trace gravel, loosely compacted.	1	AS	100			Concrete
2 / 1		**Medium to Coarse Sand** Grey, medium to coarse sand, with trace sub-angular gravel, loosely compacted. Saturated at 2.44 m.	2	SS	50			
4			3	SS	60			Bentonite Chips
6			4	SS	50			
8 / 3			5	SS	40			
10			6	SS	30			Silica Sand
12		**Fine to Medium Sand** Grey, fine to medium sand with trace sub-angular gravel, wet, loosely compacted.	7	SS	40			Well Screen = 1.52 m x 0.05 m
14 / 5								
16								
18		End of Borehole						

Drilled By: Lantech Drilling Ltd.

Drill Method: Hollow Stem Augers

Drill Date: March 26, 2007

Logged By: J. Bailey

Checked By: S. Reynolds

Sheet: 1 of 1

Greenview
ENVIRONMENTAL MANAGEMENT
Greenview Environmental Management Limited
69 Cleak Avenue, P.O. Box 100
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t: (613) 332-0057
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e: solutions@greenview-environmental.ca

Log of Monitoring Well: MW07-3D

Project No.: 107.07.002

Project: Killaloe WDS

Client: Township of Killaloe, Hagarty and Richards

Location: See Site Plan

Depth (ft / m)	Symbol	Description	No.	Type	% R	SPT N-Value (0 200 400 600)	Well Completion Details	Comments
-4 / -2 / 0		Ground Surface					Stick-up = 0.77 m	
0		**Fill** Light brown, medium to coarse sand, with trace gravel, loosely compacted.	1	AS	100		Concrete	
2 / 4 / 1		**Medium to Coarse Sand** Grey, medium to coarse sand, with trace sub-angular gravel, loosely compacted. Saturated at 2.44 m.	2	SS	50		Bentonite Chips	
6			3	SS	60			
8			4	SS	50			
10 / 3			5	SS	40			
12		**Fine to Medium Sand** Grey, fine to medium sand with trace sub-angular gravel, wet, moderately compacted.	6	SS	30		Bentonite Grout	
14								
16 / 5			7	SS	40			
18			8	SS	30			
20			9	SS	50			
22 / 7		**Fine Sandy Silt** Grey, fine silty sand with trace sub-angular gravel, wet, very compact.	10	SS	75			
24								
26			11	SS	80		Bentonite Chips	
28			12	SS	80		Silica Sand	
30 / 9			13	SS	50			
32								
34			14	SS	60		Well Screen = 1.52 m x 0.05 m	
36 / 11		End of Borehole						
38								

Drilled By: Lantech Drilling Ltd.

Logged By: J. Bailey

Drill Method: Hollow Stem Augers

Checked By: S. Reynolds

Drill Date: March 26, 2007

Sheet: 1 of 1

Borehole Log: MW10-7S

Greenview ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
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Project No.: 107.10.002

Project: Killaloe Waste Disposal Site

Client: Township of Killaloe, Hagarty and Richards

Location: Killaloe, Ontario

SUBSURFACE STRATA PROFILE			SAMPLE					
Depth	Symbol	Description	No.	Type	% R	SPT N-Value (15 30 45)	Well Completion Details	Comments
ft / m								
-3.0 / -1.0		Ground Surface						
1.0		**Organic Matter** Dark brown, organic peat, loosely compacted, dry	1	SS	40	•	Concrete	
		Sand Grey/white, fine to medium grained sand, loose to compact, wet @ 4.5 metres below surface						
3.0			2	SS	60	•		
5.0			3	SS	60	•		
7.0 / 2.0							Bentonite Hole Plug	
9.0			4	SS	60	•		
11.0			5	SS	45	•		
13.0 / 4.0			6	SS	50	•	Static Water Level (MW10-7S) July 28, 2010 = 4.83 metres	
15.0			7	SS	80	•	Silica Sand	
17.0			8	SS	80	•	Well Screen = 1.52 metres x 0.05 metres	
19.0 / 6.0		End of Borehole						

Drilled By: Lantech Drilling Services Inc.

Drill Method: Hollow Stem Augers

Drill Date: July 27, 2010

Logged By: Dan Hagan, B.Sc.

Checked By: Tyler Peters, P.Eng.

Sheet: 1 of 1

Greenview
ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
69 Cleak Avenue, PO Box 100
Bancroft, ON K0L 1C0
t: (613) 332-0057
f: (613) 332-1767
e: solutions@greenview-environmental.ca

Borehole Log: MW10-7D

Project No.: 107.10.002

Project: Killaloe Waste Disposal Site

Client: Township of Killaloe, Hagarty and Richards

Location: Killaloe, Ontario

Depth (ft)	Depth (m)	Symbol	Description	No.	Type	% R	SPT N-Value (15 30 45)	Well Completion Details	Comments
-3.0									
-1.0			Ground Surface						
1.0			**Organic Matter** Dark brown, organic peat, loosely compacted, dry	1	SS	40			Concrete
3.0			**Sand** Grey/white, fine to medium grained sand, loose to compact, wet @ 4.5 metres below surface	2	SS	60			
5.0				3	SS	60			Bentonite Hole Plug
7.0	2.0			4	SS	60			
9.0				5	SS	45			
11.0				6	SS	50			Static Water Level (MW10-7D) July 28, 2010 = 4.84 metres
13.0	4.0			7	SS	80			
15.0				8	SS	80			
17.0				9	SS	90			
19.0	6.0			10	SS	60			Silica Sand
21.0			**Clay with Silt** Grey clay with silt, very compact, wet	11	SS	70			
23.0				12	SS	35			Well Screen = 3.05 metres x 0.05 metres
25.0				13	SS	50			
27.0	8.0		**Sand and Gravel** Fine to course grained sand with gravel, minor silt, compact, wet						
29.0									
31.0									
33.0	10.0		End of Borehole						

Drilled By: Lantech Drilling Services Inc.

Logged By: Dan Hagan, B.Sc.

Drill Method: Hollow Stem Augers

Checked By: Tyler Peters, P.Eng.

Drill Date: July 26, 2010

Sheet: 1 of 1

WELL LOG MW07-4R

Greenview ENVIRONMENTAL MANAGEMENT

CLIENT Township of Killaloe, Hagarty, and Richards
PROJECT NAME Killaloe Waste Disposal Site
PROJECT NUMBER 107.14.002
PROJECT LOCATION Killaloe, Ontario
DATE STARTED 6/25/14 **COMPLETED** 6/25/14
GROUND ELEVATION _____ **HOLE SIZE** 0.2 m
DRILLING CONTRACTOR GEML
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY DMH **CHECKED BY** THP
AT END OF DRILLING ---
NOTES
1hrs AFTER DRILLING 0.14 m

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM (Stickup = 0.92 m)
			Organics (peat), dark brown, wet	Concrete
0.5				Silica Sand
			0.90 Sand, fine to medium grained, grey, wet	
1.0				Well Screen (1.1 m)
			1.25	

Bottom of hole at 1.25 m.

WELL LOG MW07-5R

Greenview
ENVIRONMENTAL MANAGEMENT

CLIENT Township of Killaloe, Hagarty, and Richards
PROJECT NAME Killaloe Waste Disposal Site
PROJECT NUMBER 107.14.002
PROJECT LOCATION Killaloe, Ontario
DATE STARTED 6/25/14 **COMPLETED** 6/25/14
GROUND ELEVATION _____ **HOLE SIZE** 0.2 m
DRILLING CONTRACTOR GEML
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY DMH **CHECKED BY** THP
AT END OF DRILLING ---
NOTES
1hrs AFTER DRILLING 0.10 m

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM (Stickup = 0.84 m)
			Organics (Peat), dark brown, wet	Concrete
0.5				Silica Sand
1.0				Well Screen (0.92 m)
1.14			Bottom of hole at 1.14 m.	

BOREHOLE LOG BH00-4R

Greenview ENVIRONMENTAL MANAGEMENT

CLIENT Township of Killaloe, Hagarty, and Richards
PROJECT NAME Killaloe Waste Disposal Site
PROJECT NUMBER 107.14.002
PROJECT LOCATION Killaloe, Ontario
DATE STARTED 10/20/14 **COMPLETED** 10/20/14
GROUND ELEVATION _____ **HOLE SIZE** 0.2
DRILLING CONTRACTOR Lantech Drilling Services Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hollow Stem Auger (0.108 m)
AT TIME OF DRILLING ---
LOGGED BY DMH **CHECKED BY** THP
AT END OF DRILLING 4.17 m
NOTES
AFTER DRILLING ---

DEPTH (m)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)
			0.20 Organics (topsoil), dark brown, dry			
	1		Sand, fine to coarse grained, minor gravel (<1 cm), brown, dry	SS 1	80	2-3-3-3 (6)
	2					
	3			SS 2	66	4-5-4-4 (9)
1	4					
	5		1.52			
	6		Sand, fine to coarse grained, brown-grey, dry	SS 3	75	5-5-4-4 (9)
2	7					
	8			SS 4	72	3-5-7-8 (12)
	9					
3	10		3.05			
	11		Sand, fine to medium grained, brown-grey, damp	SS 5	74	4-5-5-3 (10)
	12					
			3.81			
4	13		Sand, fine to medium grained, dark grey, wet	SS 6	59	3-2-3-3 (5)
	14					
	15			SS 7	52	2-2-2-3 (4)
5	16					
	17		5.33			
	18		Sand with Silt, very fine to fine grained, dark grey, wet	SS 8	59	1-2-2-3 (4)
	19					
6	20			SS 9	44	2-2-1-1 (3)
	21		6.48			
	22		Silt, grey, wet			
7	23		7.11	SS 10	36	4-3-3-4 (6)
	24		Sand, fine to coarse grained, minor gravel (< 1 cm), grey, wet			
	25		7.62			
	26		Sand, very fine to medium grained, minor gravel (1 cm - 2 cm), dark grey, wet	SS 11	77	2-3-3-4 (6)
8	27		8.23			
	28					

▲ SPT N VALUE ▲ (20, 40, 60, 80)

WELL DIAGRAM: Stickup = 0.73 m; Bentonite Hole Plug; Silica Sand; Well Screen (3.05 m)

Bottom of hole at 8.55 m.

GREENVIEW - MW LOG - MAY18-2011 107.14.002 - KILLALOE WDS - BH00-4R - OCT24-14.GPJ GINT STD CANADA.GDT 10/28/14

Appendix D

Greenview
ENVIRONMENTAL MANAGEMENT

FIELD SAMPLING RECORD - GROUND WATER & LANDFILL GAS

LOCATION: Killaloe Waste Disposal Site

DATE: May 7, 2019

SAMPLED BY: DMH / TJC / AMP

PROJECT NO.: 107.19.002

WEATHER (SAMPLE DAY): Overcast, 7°C

WEATHER (PREVIOUS DAY): Sunny, 21°C

Monitoring Location	Static Water Level	Borehole Depth (m)	Stick - Up (m)	Borehole Diameter (mm)	Purge Volumes (L)		Temperature (°C)	pH (units)	Conductivity (µS)	Dissolved Oxygen (mg/L)	Landfill Gas (%LEL)	Observations				Comments
					Needed	Obtained						Colour	Clarity	Odour	Sheen	
BH00-1	2.73	8.79	0.90	50.8	37	37	7.04	6.20	101	6.86	0%	clear	cloudy	none	none	
BH00-2	5.66	8.84	0.88	50.8	20	20	7.48	6.38	94	6.24	0%	brown	cloudy	none	none	
BH00-3	1.97	8.49	0.85	50.8	40	40	5.69	6.71	715	7.39	0%	dark grey	opaque	none	none	Sandy / Silty
BH00-4R	3.75	9.18	0.88	50.8	33	33	8.78	6.69	716	6.47	0%	clear	cloudy	none	none	
BH00-4B (S)	4.58	7.14	0.94	31.8	8	8	8.64	6.92	1308	5.72	0%	brown	cloudy	none	none	
BH00-4A (D)	4.57	11.73	0.94	31.8	22	22	9.28	6.73	127	5.07	0%	grey	cloudy	none	none	
BH00-5	1.44	8.84	0.90	50.8	45	45	7.10	7.03	1131	7.51	0%	light yellow	cloudy	sulphur	none	Sandy / Silty
BH04-1S	0.93	4.38	1.09	31.8	11	11	7.70	6.83	460	6.67	0%	grey	cloudy	none	none	
BH04-1D	0.81	9.12	1.03	31.8	25	25	8.26	6.78	470	5.87	0%	clear	cloudy	none	none	GW QA/QC (PWQO)
MW06-1S	1.74	5.03	0.74	50.8	20	20	7.14	6.34	326	6.10	0%	brown	clear	sulphur	none	
MW06-1D	1.46	9.64	0.62	50.8	49	49	7.37	7.45	639	4.61	0%	grey	opaque	none	none	
MW06-2S	1.44	5.49	0.81	50.8	25	25	5.86	6.54	81	6.05	0%	brown	cloudy	none	none	
MW06-2D	1.33	9.14	0.77	50.8	47	47	7.18	7.07	106	1.18	0%	grey	opaque	none	none	GW QA/QC (ODWS)
MW07-3S	1.70	6.21	0.81	50.8	27	20	6.19	6.94	696	8.76	0%	light brown	opaque	none	none	Pumped Dry
MW07-3D	1.90	11.52	0.82	50.8	58	58	7.27	7.69	413	961.00	0%	grey	opaque	none	none	Silty
MW07-4R	1.12	2.14	1.02	50.8	6	6	5.21	7.30	73	11.58	0%	light brown	opaque	none	none	
MW07-5R	0.96	1.98	1.10	50.8	7	7	7.04	6.84	750	6.46	0%	dark brown	opaque	none	none	
MW07-6	1.07	2.45	1.15	50.8	-	-	-	-	-	-	0%	-	-	-	-	
MW10-7S	3.92	6.20	0.70	50.8	14	14	5.32	6.96	45	11.81	0%	brown	cloudy	none	none	Sandy
MW10-7D	4.00	10.32	0.83	50.8	38	38	6.97	7.53	56	8.70	0%	-	-	-	-	Sandy / Silty
R1	-	-	-	-	-	-	16.20	6.64	122	6.85	-	clear	clear	none	none	
R2	-	-	-	-	-	-	13.38	6.93	130	3.75	-	clear	clear	none	none	
R3	-	-	-	-	-	-	3.45	7.85	81	13.17	-	clear	clear	none	none	

Greenview
ENVIRONMENTAL MANAGEMENT

FIELD SAMPLING RECORD - SURFACE WATER

LOCATION: Killaloe Waste Disposal Site | DATE: May 7, 2019 | SAMPLED BY: DMH / TJC / AMP

PROJECT NO.: 107.19.002 | WEATHER (SAMPLE DAY): Overcast, 7°C | WEATHER (PREVIOUS DAY): Sunny, 21°C

Sample Station	Depth (m)	Width (m)	Distance (m)	Time (s)	Correction (.9=S, .8=R)	Velocity (m/s)	Discharge (m^3/s)	Temperature (°C)	pH (units)	Conductivity (µS)	Dissolved Oxygen (mg/L)	Observations				Comments
												Colour	Clarity	Odour	Sheen	
SW1	0.10	1.10	-- No Discernible Flow --					8.52	6.00	42	5.58	yellow	clear	none	none	
SW2	0.10	2.50	-- No Discernible Flow --					8.99	6.01	43	2.35	yellow	clear	none	none	
SW3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Insufficient Water to Sample
SW5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Insufficient Water to Sample
SW6	0.45	Too Wide to Measure	-- No Discernible Flow --					11.87	6.92	74	5.59	light yellow	clear	none	none	SW QA/QC
SW9	0.20	2.20	-- No Discernible Flow --					11.95	6.46	59	5.96	light yellow	clear	none	none	

Greenview
ENVIRONMENTAL MANAGEMENT

FIELD SAMPLING RECORD - GROUND WATER & LANDFILL GAS

LOCATION: Killaloe Waste Disposal Site

DATE: October 15, 2019

SAMPLED BY: DMH / TJC

PROJECT NO.: 107.19.002

WEATHER (SAMPLE DAY): Sunny, 5°C

WEATHER (PREVIOUS DAY): Sunny, 10°C

Monitoring Location	Static Water Level	Borehole Depth (m)	Stick - Up (m)	Borehole Diameter (mm)	Purge Volumes (L)		Temperature (°C)	pH (units)	Conductivity (µS)	Dissolved Oxygen (mg/L)	Landfill Gas (%LEL)	Observations				Comments
					Needed	Obtained						Colour	Clarity	Odour	Sheen	
BH00-1	3.57	8.76	0.90	50.8	31	31	8.09	6.94	118	7.33	0%	clear	cloudy	none	none	GW QA/QC (ODWS) - Sandy
BH00-2	6.45	9.86	0.88	50.8	21	21	7.08	6.65	87	6.45	0%	clear	cloudy	none	none	
BH00-3	2.51	8.56	0.85	50.8	36	36	6.72	6.81	1042	5.12	0%	dark grey	opaque	sulphur	none	
BH00-4R	4.48	9.18	0.88	50.8	28	28	8.08	6.84	1009	5.22	0%	clear	opaque	sulphur	none	
BH00-4B (S)	5.33	7.17	0.94	31.8	7	7	8.56	6.79	1120	4.94	0%	clear	cloudy	sulphur	none	
BH00-4A (D)	5.31	11.72	0.94	31.8	20	20	8.29	6.74	140	9.34	0%	light grey	opaque	sulphur	none	
BH00-5	2.03	8.82	0.90	50.8	41	41	7.83	6.91	1960	3.18	0%	clear	cloudy	sulphur	none	GW QA/QC (PWQO)
BH04-1S	1.13	4.36	1.09	31.8	10	10	9.38	7.66	833	6.89	0%	grey	opaque	sulphur	none	
BH04-1D	1.07	8.91	1.03	31.8	23	23	8.18	7.01	838	3.62	0%	clear	cloudy	sulfur	none	
MW06-1S	1.92	5.04	0.74	50.8	18	18	9.36	6.25	308	3.59	0%	tea	cloudy	sulphur	none	
MW06-1D	1.65	9.67	0.62	50.8	48	48	8.27	6.82	370	5.00	0%	grey	opaque	sulphur	none	
MW06-2S	1.72	5.51	0.81	50.8	23	23	9.81	6.45	143	11.54	0%	light brown	cloudy	none	none	
MW06-2D	1.61	9.20	0.77	50.8	46	46	8.99	6.87	92	10.52	0%	grey	opaque	none	none	Silty/Sandy
MW07-3S	3.82	6.21	0.81	50.8	15	8	10.89	6.86	931	4.22	0%	light brown	opaque	none	none	Pumped Dry
MW07-3D	3.92	11.52	0.82	50.8	46	28	10.15	7.71	495	5.29	0%	light brown	opaque	none	none	Pumped Dry
MW07-4R	1.24	2.17	1.02	50.8	6	6	9.85	7.36	131	5.09	0%	light brown	cloudy	none	none	Sandy
MW07-5R	1.10	1.98	1.10	50.8	5	5	8.82	6.93	828	3.96	0%	brown	opaque	organic	none	Floating Organics
MW07-6	1.26	2.44	1.15	50.8	-	-	-	-	-	-	0%	-	-	-	-	Water Level Only
MW10-7S	4.95	6.18	0.70	50.8	8	8	6.93	6.58	53	9.73	0%	clear	clear	none	none	
MW10-7D	4.97	10.32	0.83	50.8	32	32	6.66	7.86	129	13.10	0%	grey	opaque	none	none	
R1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No Sample - Resident Not at Home
R2	-	-	-	-	-	-	15.38	8.17	137	7.00	-	clear	clear	none	none	
R3	-	-	-	-	-	-	11.82	7.65	147	7.50	-	clear	clear	none	none	Floating Organics

Greenview ENVIRONMENTAL MANAGEMENT

FIELD SAMPLING RECORD - SURFACE WATER

LOCATION: Killaloe Waste Disposal Site | DATE: October 15, 2019 | SAMPLED BY: DMH / TJC

PROJECT NO.: 107.19.002 | WEATHER (SAMPLE DAY): Sunny, 5°C | WEATHER (PREVIOUS DAY): Sunny, 10°C

Sample Station	Depth (m)	Width (m)	Distance (m)	Time (s)	Correction (.9=S, .8=R)	Velocity (m/s)	Discharge (m^3/s)	Temperature (°C)	pH (units)	Conductivity (µS)	Dissolved Oxygen (mg/L)	Observations				Comments
												Colour	Clarity	Odour	Sheen	
SW1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
SW2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
SW3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
SW5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
SW6	0.20	5.00	-- No Discernible Flow --					8.92	7.45	339	4.93	tea	clear	none	none	
SW9	0.15	2.00	-- No Discernible Flow --					9.45	7.75	85	5.54	tea	clear	none	none	SW QA/QC

Appendix E

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G77521

REPORT No. B19-12692

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 09-May-19
DATE REPORTED: 06-Jun-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER: -
WATERWORKS NO.

			Client I.D.		BH00-1-(Background)	BH00-2-(Background)	BH00-4R	BH00-4A (D)
			Sample I.D.		B19-12692-1	B19-12692-2	B19-12692-3	B19-12692-4
			Date Collected		07-May-19	07-May-19	07-May-19	07-May-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	13-May-19/O	18	30	343	26
pH @25°C	pH Units		SM 4500H	13-May-19/O	6.32	6.81	6.77	6.37
Conductivity @25°C	µmho/cm	1	SM 2510B	13-May-19/O	141	156	986	147
Chloride	mg/L	0.5	SM4110C	18-May-19/O	15.3	14.5	82.3	14.7
Nitrite (N)	mg/L	0.05	SM4110C	18-May-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	18-May-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	18-May-19/O	20	19	1	17
Phosphorus-Total	mg/L	0.01	E3199A.1	23-May-19/K	0.28	0.40	0.05	1.87
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	23-May-19/K	0.5	< 0.1	21.0	8.2
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	16-May-19/K	0.17	0.04	22.1	1.11
TDS (Calc. from Cond.)	mg/L	1	Calc.	16-May-19	72	79	526	75
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	17-May-19/O	3.0	14.9	1.9	4.7
Phenolics	mg/L	0.002	MOEE 3179	16-May-19/K				
COD	mg/L	5	SM 5220D	21-May-19/O	< 5	< 5	73	31
Aluminum	mg/L	0.01	SM 3120	16-May-19/O	< 0.01	0.01	0.05	0.05
Barium	mg/L	0.001	SM 3120	16-May-19/O	0.070	0.075	1.73	0.079
Boron	mg/L	0.005	SM 3120	16-May-19/O	0.025	0.011	0.886	0.030
Calcium	mg/L	0.02	SM 3120	16-May-19/O	7.42	11.8	70.1	9.36
Chromium	mg/L	0.001	EPA 200.8	14-May-19/O	0.001	0.002	0.003	0.002
Cobalt	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0001	0.0007	0.0011	< 0.0001
Copper	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0008	0.0005	0.0008	0.0005
Iron	mg/L	0.005	SM 3120	16-May-19/O	13.2	0.249	61.3	21.3
Magnesium	mg/L	0.02	SM 3120	16-May-19/O	4.56	7.88	23.1	4.30
Manganese	mg/L	0.001	SM 3120	16-May-19/O	0.055	0.031	1.00	0.120
Potassium	mg/L	0.1	SM 3120	16-May-19/O	1.4	2.4	64.1	2.3
Silicon	mg/L	0.01	SM 3120	16-May-19/O	6.90	6.35	11.3	8.90

M. Dubien

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G77521

REPORT No. B19-12692

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 09-May-19
DATE REPORTED: 06-Jun-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER: -
WATERWORKS NO.

	Client I.D.			BH00-1-(Background)	BH00-2-(Background)	BH00-4R	BH00-4A (D)
	Sample I.D.			B19-12692-1	B19-12692-2	B19-12692-3	B19-12692-4
	Date Collected			07-May-19	07-May-19	07-May-19	07-May-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**			
Sodium	mg/L	0.2	SM 3120	16-May-19/O	6.6	5.1	51.7	6.4
Strontium	mg/L	0.001	SM 3120	16-May-19/O	0.045	0.066	0.486	0.057
Zinc	mg/L	0.005	SM 3120	16-May-19/O	< 0.005	< 0.005	< 0.005	< 0.005

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G77521

REPORT No. B19-12692

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 09-May-19
DATE REPORTED: 06-Jun-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER: -
WATERWORKS NO.

			Client I.D.		BH-00-4B (S)	MW06-1S	MW06-1D	MW06-2S
			Sample I.D.		B19-12692-5	B19-12692-6	B19-12692-7	B19-12692-8
			Date Collected		07-May-19	07-May-19	07-May-19	07-May-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	13-May-19/O	664	108	93	30
pH @25°C	pH Units		SM 4500H	13-May-19/O	6.92	6.51	8.14	6.63
Conductivity @25°C	µmho/cm	1	SM 2510B	13-May-19/O	1730	497	1090	113
Chloride	mg/L	0.5	SM4110C	18-May-19/O	116	83.6	252	6.2
Nitrite (N)	mg/L	0.05	SM4110C	18-May-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	18-May-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	18-May-19/O	< 1	< 1	31	12
Phosphorus-Total	mg/L	0.01	E3199A.1	23-May-19/K	0.07	0.38	16.0	0.33
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	23-May-19/K	65.1	6.3	2.9	0.2
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	16-May-19/K	66.2	4.70	0.28	0.15
TDS (Calc. from Cond.)	mg/L	1	Calc.	16-May-19	949	257	585	57
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	17-May-19/O	17.1	52.8	1.1	2.8
Phenolics	mg/L	0.002	MOEE 3179	16-May-19/K				
COD	mg/L	5	SM 5220D	21-May-19/O	112	108	1440	9
Aluminum	mg/L	0.01	SM 3120	16-May-19/O	0.06	0.09	0.06	< 0.01
Barium	mg/L	0.001	SM 3120	16-May-19/O	2.19	0.146	0.259	0.062
Boron	mg/L	0.005	SM 3120	16-May-19/O	0.997	0.012	0.031	0.028
Calcium	mg/L	0.02	SM 3120	16-May-19/O	95.2	44.4	102	8.83
Chromium	mg/L	0.001	EPA 200.8	14-May-19/O	0.003	0.002	< 0.001	< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0027	0.0003	0.0002	0.0004
Copper	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0017	0.0005	0.0018	0.0010
Iron	mg/L	0.005	SM 3120	16-May-19/O	75.4	1.84	0.068	7.55
Magnesium	mg/L	0.02	SM 3120	16-May-19/O	31.8	22.0	30.5	5.23
Manganese	mg/L	0.001	SM 3120	16-May-19/O	1.60	0.419	0.086	0.071
Potassium	mg/L	0.1	SM 3120	16-May-19/O	94.2	3.7	6.7	2.4
Silicon	mg/L	0.01	SM 3120	16-May-19/O	11.5	12.3	6.47	5.47
Sodium	mg/L	0.2	SM 3120	16-May-19/O	107	20.6	60.6	3.8

M. Dubien

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Michelle Dubien
Lab Manager

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Final Report

C.O.C.: G77521

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Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 09-May-19
DATE REPORTED: 06-Jun-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER: -
WATERWORKS NO.

			Client I.D.		BH-00-4B (S)	MW06-1S	MW06-1D	MW06-2S
			Sample I.D.		B19-12692-5	B19-12692-6	B19-12692-7	B19-12692-8
			Date Collected		07-May-19	07-May-19	07-May-19	07-May-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Strontium	mg/L	0.001	SM 3120	16-May-19/O	0.803	0.396	1.99	0.056
Zinc	mg/L	0.005	SM 3120	16-May-19/O	< 0.005	< 0.005	< 0.005	< 0.005

Michelle Dubien
Lab Manager

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P.O. NUMBER: -
WATERWORKS NO.

			Client I.D.		MW06-2D	MW07-3S	MW07-3D	MW10-7S
			Sample I.D.		B19-12692-9	B19-12692-10	B19-12692-11	B19-12692-12
			Date Collected		07-May-19	07-May-19	07-May-19	07-May-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	13-May-19/O	60	189	200	17
pH @25°C	pH Units		SM 4500H	13-May-19/O	6.97	6.97	8.06	6.93
Conductivity @25°C	µmho/cm	1	SM 2510B	13-May-19/O	183	1220	686	79
Chloride	mg/L	0.5	SM4110C	18-May-19/O	7.8	252	80.5	2.0
Nitrite (N)	mg/L	0.05	SM4110C	18-May-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	18-May-19/O	< 0.05	3.20	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	18-May-19/O	14	27	25	13
Phosphorus-Total	mg/L	0.01	E3199A.1	23-May-19/K	28.5	0.67	1.45	2.57
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	23-May-19/K	4.6	0.8	0.4	0.2
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	16-May-19/K	0.72	0.04	0.04	0.05
TDS (Calc. from Cond.)	mg/L	1	Calc.	16-May-19	93	658	356	40
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	17-May-19/O	8.6	3.2	6.5	1.8
Phenolics	mg/L	0.002	MOEE 3179	16-May-19/K				
COD	mg/L	5	SM 5220D	21-May-19/O	2600	31	56	42
Aluminum	mg/L	0.01	SM 3120	16-May-19/O	0.10	0.03	0.05	< 0.01
Barium	mg/L	0.001	SM 3120	16-May-19/O	0.305	0.223	0.151	0.008
Boron	mg/L	0.005	SM 3120	16-May-19/O	0.019	0.005	0.012	< 0.005
Calcium	mg/L	0.02	SM 3120	16-May-19/O	16.1	55.0	77.1	6.63
Chromium	mg/L	0.001	EPA 200.8	14-May-19/O	0.002	0.001	< 0.001	0.001
Cobalt	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0001	0.0003	0.0004	< 0.0001
Copper	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0009	0.0073	0.0018	0.0011
Iron	mg/L	0.005	SM 3120	16-May-19/O	14.8	0.017	0.135	0.011
Magnesium	mg/L	0.02	SM 3120	16-May-19/O	6.76	29.3	36.9	3.36
Manganese	mg/L	0.001	SM 3120	16-May-19/O	0.220	0.033	0.077	< 0.001
Potassium	mg/L	0.1	SM 3120	16-May-19/O	1.3	4.9	5.8	0.9
Silicon	mg/L	0.01	SM 3120	16-May-19/O	9.93	7.84	7.09	5.91

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Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G77521

REPORT No. B19-12692

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 09-May-19
DATE REPORTED: 06-Jun-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER: -
WATERWORKS NO.

			Client I.D.		MW06-2D	MW07-3S	MW07-3D	MW10-7S
			Sample I.D.		B19-12692-9	B19-12692-10	B19-12692-11	B19-12692-12
			Date Collected		07-May-19	07-May-19	07-May-19	07-May-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium	mg/L	0.2	SM 3120	16-May-19/O	5.4	171	11.5	2.5
Strontium	mg/L	0.001	SM 3120	16-May-19/O	0.067	0.422	0.615	0.037
Zinc	mg/L	0.005	SM 3120	16-May-19/O	< 0.005	< 0.005	< 0.005	< 0.005

Michelle Dubien
Lab Manager

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER: -
WATERWORKS NO.

			Client I.D.		MW10-7D	R1(Residential)	R2(Residential)	R3(Residential)
			Sample I.D.		B19-12692-13	B19-12692-14	B19-12692-15	B19-12692-16
			Date Collected		07-May-19	07-May-19	07-May-19	07-May-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	13-May-19/O	36	47	57	69
pH @25°C	pH Units		SM 4500H	13-May-19/O	7.82	6.96	7.89	8.20
Conductivity @25°C	µmho/cm	1	SM 2510B	13-May-19/O	95	159	181	159
Chloride	mg/L	0.5	SM4110C	18-May-19/O	1.7	2.2	4.6	0.8
Nitrite (N)	mg/L	0.05	SM4110C	18-May-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	18-May-19/O	0.09	4.44	< 0.05	0.09
Sulphate	mg/L	1	SM4110C	18-May-19/O	8	7	22	4
Phosphorus-Total	mg/L	0.01	E3199A.1	23-May-19/K	2.48	0.02	0.01	0.04
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	23-May-19/K	0.1	0.3	< 0.1	0.4
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	16-May-19/K	0.03	0.03	0.06	0.05
TDS (Calc. from Cond.)	mg/L	1	Calc.	16-May-19	48	81	92	81
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	17-May-19/O	1.0	3.8	1.0	8.5
Phenolics	mg/L	0.002	MOEE 3179	16-May-19/K				
COD	mg/L	5	SM 5220D	21-May-19/O	37	8	< 5	22
Aluminum	mg/L	0.01	SM 3120	16-May-19/O	0.02	0.03	0.02	0.07
Barium	mg/L	0.001	SM 3120	16-May-19/O	0.013	0.073	0.074	0.010
Boron	mg/L	0.005	SM 3120	16-May-19/O	0.006	0.032	0.035	0.014
Calcium	mg/L	0.02	SM 3120	16-May-19/O	9.12	18.0	21.6	16.5
Chromium	mg/L	0.001	EPA 200.8	14-May-19/O	0.003	0.001	0.001	0.001
Cobalt	mg/L	0.0001	EPA 200.8	14-May-19/O	< 0.0001	0.0003	< 0.0001	0.0001
Copper	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0005	0.102	0.126	0.0039
Iron	mg/L	0.005	SM 3120	16-May-19/O	0.018	0.009	0.643	0.040
Magnesium	mg/L	0.02	SM 3120	16-May-19/O	4.69	5.76	5.90	0.81
Manganese	mg/L	0.001	SM 3120	16-May-19/O	0.001	0.006	0.016	< 0.001
Potassium	mg/L	0.1	SM 3120	16-May-19/O	1.4	3.8	1.6	15.0

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Michelle Dubien
Lab Manager

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P.O. NUMBER: -
WATERWORKS NO.

			Client I.D.		MW10-7D	R1(Residential)	R2(Residential)	R3(Residential)
			Sample I.D.		B19-12692-13	B19-12692-14	B19-12692-15	B19-12692-16
			Date Collected		07-May-19	07-May-19	07-May-19	07-May-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Silicon	mg/L	0.01	SM 3120	16-May-19/O	6.16	4.00	4.85	4.28
Sodium	mg/L	0.2	SM 3120	16-May-19/O	2.9	3.6	5.6	6.4
Strontium	mg/L	0.001	SM 3120	16-May-19/O	0.029	0.087	0.925	0.160
Zinc	mg/L	0.005	SM 3120	16-May-19/O	< 0.005	0.040	0.025	< 0.005

M. Dubien

Michelle Dubien
Lab Manager

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JOB/PROJECT NO.: Killaloe WDS
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WATERWORKS NO.

			Client I.D.		BH00-3	BH00-5	BH04-1S	BH04-1D
			Sample I.D.		B19-12692-17	B19-12692-18	B19-12692-19	B19-12692-20
			Date Collected		07-May-19	07-May-19	07-May-19	07-May-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	13-May-19/O	577	516	287	250
pH @25°C	pH Units		SM 4500H	13-May-19/O	6.87	6.82	6.92	6.84
Conductivity @25°C	µmho/cm	1	SM 2510B	13-May-19/O	1280	1470	666	664
Chloride	mg/L	0.5	SM4110C	18-May-19/O	61.0	128	30.9	53.3
Nitrite (N)	mg/L	0.05	SM4110C	18-May-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	18-May-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	18-May-19/O	35	1	7	7
Phosphorus-Total	mg/L	0.01	E3199A.1	23-May-19/K	3.45	0.19	1.79	0.27
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	23-May-19/K	0.4	28.8	0.6	1.4
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	16-May-19/K	0.07	28.8	0.24	0.96
TDS (Calc. from Cond.)	mg/L	1	Calc.	16-May-19	693	801	346	345
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	17-May-19/O	12.3	13.4	11.2	11.1
Phenolics	mg/L	0.002	MOEE 3179	16-May-19/K	< 0.002	< 0.002	< 0.002	< 0.002
COD	mg/L	5	SM 5220D	21-May-19/O	79	109	54	36
Aluminum	mg/L	0.01	SM 3120	16-May-19/O	0.08	0.07	0.04	0.04
Barium	mg/L	0.001	SM 3120	16-May-19/O	0.453	3.90	0.355	0.451
Boron	mg/L	0.005	SM 3120	16-May-19/O	0.243	0.813	0.456	0.316
Calcium	mg/L	0.02	SM 3120	16-May-19/O	125	111	57.7	60.3
Chromium	mg/L	0.001	EPA 200.8	14-May-19/O	< 0.001	0.003	0.001	0.002
Cobalt	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0126	0.0149	0.0018	0.0010
Copper	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0018	0.0022	0.0005	0.0004
Iron	mg/L	0.005	SM 3120	16-May-19/O	2.37	141	47.4	36.3
Magnesium	mg/L	0.02	SM 3120	16-May-19/O	74.1	35.2	39.7	32.1
Manganese	mg/L	0.001	SM 3120	16-May-19/O	7.26	3.54	0.730	1.55
Potassium	mg/L	0.1	SM 3120	16-May-19/O	4.9	101	4.4	13.2
Silicon	mg/L	0.01	SM 3120	16-May-19/O	10.2	13.7	8.63	8.19

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Lab Manager

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER: -
WATERWORKS NO.

			Client I.D.		BH00-3	BH00-5	BH04-1S	BH04-1D
			Sample I.D.		B19-12692-17	B19-12692-18	B19-12692-19	B19-12692-20
			Date Collected		07-May-19	07-May-19	07-May-19	07-May-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium	mg/L	0.2	SM 3120	16-May-19/O	24.9	71.2	37.4	27.7
Strontium	mg/L	0.001	SM 3120	16-May-19/O	0.751	0.838	0.284	0.325
Zinc	mg/L	0.005	SM 3120	16-May-19/O	< 0.005	< 0.005	< 0.005	< 0.005

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G77521

REPORT No. B19-12692

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 09-May-19
DATE REPORTED: 06-Jun-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER: -
WATERWORKS NO.

			Client I.D.		MW07-4R	MW07-5R	QA/QC (GW ODWS)	QA/QC(GW PWQO)
			Sample I.D.		B19-12692-21	B19-12692-22	B19-12692-23	B19-12692-24
			Date Collected		07-May-19	07-May-19	07-May-19	07-May-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	13-May-19/O	10	339	63	245
pH @25°C	pH Units		SM 4500H	13-May-19/O	6.30	6.43	7.01	6.87
Conductivity @25°C	µmho/cm	1	SM 2510B	13-May-19/O	126	959	183	655
Chloride	mg/L	0.5	SM4110C	18-May-19/O	20.5	105	7.6	53.2
Nitrite (N)	mg/L	0.05	SM4110C	18-May-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	18-May-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	18-May-19/O	13	< 1	14	7
Phosphorus-Total	mg/L	0.01	E3199A.1	23-May-19/K	0.16	0.25	405	0.68
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	23-May-19/K	0.7	6.1	5.8	1.3
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	16-May-19/K	0.05	1.46	0.80	0.97
TDS (Calc. from Cond.)	mg/L	1	Calc.	16-May-19	64	510	93	340
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	17-May-19/O	1.6	11.3	8.7	11.1
Phenolics	mg/L	0.002	MOEE 3179	16-May-19/K	< 0.002	< 0.002		< 0.002
COD	mg/L	5	SM 5220D	21-May-19/O	88	350	6800	39
Aluminum	mg/L	0.01	SM 3120	16-May-19/O	< 0.01	0.05	0.10	0.04
Barium	mg/L	0.001	SM 3120	16-May-19/O	0.020	0.552	0.311	0.462
Boron	mg/L	0.005	SM 3120	16-May-19/O	< 0.005	0.288	0.020	0.320
Calcium	mg/L	0.02	SM 3120	16-May-19/O	10.7	69.5	16.2	61.2
Chromium	mg/L	0.001	EPA 200.8	14-May-19/O	< 0.001	0.001	0.002	0.002
Cobalt	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0002	0.0008	0.0001	0.0010
Copper	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0010	0.0018	0.0009	0.0004
Iron	mg/L	0.005	SM 3120	16-May-19/O	0.823	182	15.5	37.2
Magnesium	mg/L	0.02	SM 3120	16-May-19/O	4.62	38.3	6.68	32.4
Manganese	mg/L	0.001	SM 3120	16-May-19/O	0.062	0.858	0.221	1.57
Potassium	mg/L	0.1	SM 3120	16-May-19/O	1.1	3.7	1.3	13.3

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G77521

REPORT No. B19-12692

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 09-May-19
DATE REPORTED: 06-Jun-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER: -
WATERWORKS NO.

			Client I.D.		MW07-4R	MW07-5R	QA/QC (GW ODWS)	QA/QC(GW PWQO)
			Sample I.D.		B19-12692-21	B19-12692-22	B19-12692-23	B19-12692-24
			Date Collected		07-May-19	07-May-19	07-May-19	07-May-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Silicon	mg/L	0.01	SM 3120	16-May-19/O	5.53	8.27	9.67	8.24
Sodium	mg/L	0.2	SM 3120	16-May-19/O	3.7	64.4	5.3	27.9
Strontium	mg/L	0.001	SM 3120	16-May-19/O	0.073	0.368	0.066	0.327
Zinc	mg/L	0.005	SM 3120	16-May-19/O	< 0.005	< 0.005	< 0.005	< 0.005

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Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G77519

REPORT No. B19-12684

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 09-May-19
DATE REPORTED: 25-May-19
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		SW1	SW2	SW6(Background)	SW9
			Sample I.D.		B19-12684-1	B19-12684-2	B19-12684-3	B19-12684-4
			Date Collected		07-May-19	07-May-19	07-May-19	07-May-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	13-May-19/O	11	10	36	16
pH @25°C	pH Units		SM 4500H	13-May-19/O	6.76	6.71	7.49	7.07
Conductivity @25°C	µmho/cm	1	SM 2510B	13-May-19/O	67	64	101	74
Chloride	mg/L	0.5	SM4110C	21-May-19/O	5.9	6.8	8.4	5.0
Nitrite (N)	mg/L	0.05	SM4110C	21-May-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	21-May-19/O	0.08	< 0.05	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	21-May-19/O	6	6	2	4
Total Suspended Solids	mg/L	3	SM2540D	16-May-19/K	4	3	< 3	3
Phosphorus-Total	mg/L	0.01	E3199A.1	23-May-19/K	0.02	0.01	0.01	0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	23-May-19/K	0.7	0.6	0.4	0.6
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	16-May-19/K	0.04	0.06	0.05	0.06
TDS (Calc. from Cond.)	mg/L	1	Calc.	15-May-19	34	32	51	37
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	18-May-19/O	20.2	12.9	11.8	14.8
Phenolics	mg/L	0.002	MOEE 3179	16-May-19/K	< 0.002	< 0.002	< 0.002	< 0.002
COD	mg/L	5	SM 5220D	17-May-19/O	53	52	31	49
Aluminum	mg/L	0.01	SM 3120	14-May-19/O	0.12	0.13	0.06	0.08
Barium	mg/L	0.001	SM 3120	14-May-19/O	0.037	0.038	0.044	0.040
Boron	mg/L	0.005	SM 3120	14-May-19/O	0.038	0.037	0.038	0.047
Calcium	mg/L	0.02	SM 3120	14-May-19/O	13.2	13.3	19.2	14.2
Chromium	mg/L	0.001	EPA 200.8	14-May-19/O	0.001	0.001	< 0.001	0.001
Cobalt	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0001	0.0001	< 0.0001	0.0001
Copper	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0010	0.0008	0.0002	0.0010
Iron	mg/L	0.005	SM 3120	14-May-19/O	0.391	0.409	0.370	0.544
Magnesium	mg/L	0.02	SM 3120	14-May-19/O	4.42	4.44	6.45	4.81
Manganese	mg/L	0.001	SM 3120	14-May-19/O	0.023	0.022	0.013	0.014
Potassium	mg/L	0.1	SM 3120	14-May-19/O	0.6	0.5	1.1	0.6

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G77519

REPORT No. B19-12684

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 09-May-19
DATE REPORTED: 25-May-19
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		SW1	SW2	SW6(Background)	SW9
			Sample I.D.		B19-12684-1	B19-12684-2	B19-12684-3	B19-12684-4
			Date Collected		07-May-19	07-May-19	07-May-19	07-May-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Silicon	mg/L	0.01	SM 3120	14-May-19/O	2.49	1.98	1.89	1.58
Sodium	mg/L	0.2	SM 3120	14-May-19/O	5.9	5.8	5.1	7.2
Strontium	mg/L	0.001	SM 3120	14-May-19/O	0.083	0.083	0.098	0.093
Zinc	mg/L	0.005	SM 3120	14-May-19/O	< 0.005	0.006	< 0.005	< 0.005

Michelle Dubien
Lab Manager

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DATE RECEIVED: 09-May-19
DATE REPORTED: 25-May-19
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		1 QA/QC			
			Sample I.D.		B19-12684-5			
			Date Collected		07-May-19			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	13-May-19/O	36			
pH @25°C	pH Units		SM 4500H	13-May-19/O	7.46			
Conductivity @25°C	µmho/cm	1	SM 2510B	13-May-19/O	99			
Chloride	mg/L	0.5	SM4110C	21-May-19/O	4.9			
Nitrite (N)	mg/L	0.05	SM4110C	21-May-19/O	< 0.05			
Nitrate (N)	mg/L	0.05	SM4110C	21-May-19/O	< 0.05			
Sulphate	mg/L	1	SM4110C	21-May-19/O	4			
Total Suspended Solids	mg/L	3	SM2540D	16-May-19/K	3			
Phosphorus-Total	mg/L	0.01	E3199A.1	23-May-19/K	0.01			
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	23-May-19/K	0.5			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	16-May-19/K	0.04			
TDS (Calc. from Cond.)	mg/L	1	Calc.	15-May-19	50			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	18-May-19/O	12.0			
Phenolics	mg/L	0.002	MOEE 3179	16-May-19/K	< 0.002			
COD	mg/L	5	SM 5220D	17-May-19/O	35			
Aluminum	mg/L	0.01	SM 3120	14-May-19/O	0.06			
Barium	mg/L	0.001	SM 3120	14-May-19/O	0.044			
Boron	mg/L	0.005	SM 3120	14-May-19/O	0.037			
Calcium	mg/L	0.02	SM 3120	14-May-19/O	18.9			
Chromium	mg/L	0.001	EPA 200.8	14-May-19/O	0.001			
Cobalt	mg/L	0.0001	EPA 200.8	14-May-19/O	< 0.0001			
Copper	mg/L	0.0001	EPA 200.8	14-May-19/O	0.0009			
Iron	mg/L	0.005	SM 3120	14-May-19/O	0.450			
Magnesium	mg/L	0.02	SM 3120	14-May-19/O	6.19			
Manganese	mg/L	0.001	SM 3120	14-May-19/O	0.016			
Potassium	mg/L	0.1	SM 3120	14-May-19/O	1.1			
Silicon	mg/L	0.01	SM 3120	14-May-19/O	1.77			

M. Dubien

Michelle Dubien
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

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Report To:

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Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 09-May-19
DATE REPORTED: 25-May-19
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		1 QA/QC			
			Sample I.D.		B19-12684-5			
			Date Collected		07-May-19			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Sodium	mg/L	0.2	SM 3120	14-May-19/O	4.9			
Strontium	mg/L	0.001	SM 3120	14-May-19/O	0.098			
Zinc	mg/L	0.005	SM 3120	14-May-19/O	< 0.005			

M. Dubien

Michelle Dubien
Lab Manager

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CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G91538

REPORT No. B19-33526 (i)

Rev. 1

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 16-Dec-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		BH00-1	BH00-2	BH00-4R	BH00-4A(D)
			Sample I.D.		B19-33526-1	B19-33526-2	B19-33526-3	B19-33526-4
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	22-Oct-19/O	17	22	262	30
Chloride	mg/L	0.5	SM4110C	31-Oct-19/O	16.1	9.2	77.2	14.8
Nitrite (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05	0.12	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	31-Oct-19/O	18	17	3	15
Phosphorus-Total	mg/L	0.01	E3199A.1	22-Oct-19/K	0.28	0.31	0.08	1.59
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	22-Oct-19/K	0.3	< 0.1	16.6	1.2
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Oct-19/K	0.15	0.01	15.1	1.13
TDS (Calc. from Cond.)	mg/L	1	Calc.	23-Oct-19	72	61	428	79
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-Oct-19/O	2.9	0.9	15.8	4.7
Phenolics	mg/L	0.002	MOEE 3179	22-Oct-19/K				
COD	mg/L	5	SM 5220D	30-Oct-19/O	13	< 5	70	23
Aluminum	mg/L	0.01	SM 3120	24-Oct-19/O	0.01	< 0.01	0.05	0.03
Barium	mg/L	0.001	SM 3120	24-Oct-19/O	0.073	0.060	1.30	0.098
Boron	mg/L	0.005	SM 3120	24-Oct-19/O	0.023	0.010	0.728	0.032
Calcium	mg/L	0.02	SM 3120	24-Oct-19/O	7.22	8.57	57.0	10.0
Chromium	mg/L	0.001	EPA 200.8	28-Oct-19/O	0.002	< 0.001	0.003	0.002
Cobalt	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0001	0.0006	0.0011	0.0001
Copper	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0005	0.0002	0.0005	0.0010
Iron	mg/L	0.005	SM 3120	24-Oct-19/O	15.2	0.291	56.5	22.1
Magnesium	mg/L	0.02	SM 3120	24-Oct-19/O	4.35	5.81	19.1	4.07
Manganese	mg/L	0.001	SM 3120	24-Oct-19/O	0.051	0.008	0.742	0.127
Potassium	mg/L	0.1	SM 3120	24-Oct-19/O	1.4	2.1	49.4	2.5
Silicon	mg/L	0.01	SM 3120	24-Oct-19/O	6.67	5.35	10.2	8.69
Sodium	mg/L	0.2	SM 3120	24-Oct-19/O	7.7	4.5	38.5	6.5
Strontium	mg/L	0.001	SM 3120	24-Oct-19/O	0.043	0.048	0.419	0.060
Zinc	mg/L	0.005	SM 3120	24-Oct-19/O	< 0.005	< 0.005	< 0.005	< 0.005

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G91538

REPORT No. B19-33526 (i)

Rev. 1

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 16-Dec-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		BH00-1	BH00-2	BH00-4R	BH00-4A(D)
			Sample I.D.		B19-33526-1	B19-33526-2	B19-33526-3	B19-33526-4
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				

1 Revison due to division of reports by Client request

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

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Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 16-Dec-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		BH00-4B(S)	MW06-1S	MW06-1D	MW06-2S
			Sample I.D.		B19-33526-5	B19-33526-6	B19-33526-7	B19-33526-8
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	22-Oct-19/O	509	109	80	28
Chloride	mg/L	0.5	SM4110C	31-Oct-19/O	134	69.2	118	6.6
Nitrite (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05	0.09	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	31-Oct-19/O	1	< 1	40	8
Phosphorus-Total	mg/L	0.01	E3199A.1	22-Oct-19/K	0.09	0.48	132	0.38
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	22-Oct-19/K	33.9	7.5	2.3	0.3
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Oct-19/K	31.1	5.74	0.26	0.09
TDS (Calc. from Cond.)	mg/L	1	Calc.	23-Oct-19	800	243	329	51
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-Oct-19/O	17.5	61.4	1.5	2.3
Phenolics	mg/L	0.002	MOEE 3179	22-Oct-19/K				
COD	mg/L	5	SM 5220D	30-Oct-19/O	103	164	1450	9
Aluminum	mg/L	0.01	SM 3120	24-Oct-19/O	0.07	0.07	0.05	0.01
Barium	mg/L	0.001	SM 3120	24-Oct-19/O	1.54	0.132	0.154	0.056
Boron	mg/L	0.005	SM 3120	24-Oct-19/O	0.874	0.012	0.045	0.023
Calcium	mg/L	0.02	SM 3120	24-Oct-19/O	109	40.6	62.3	7.51
Chromium	mg/L	0.001	EPA 200.8	28-Oct-19/O	0.003	0.002	< 0.001	0.001
Cobalt	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0021	0.0003	0.0001	0.0004
Copper	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0008	0.0006	0.0004	0.0008
Iron	mg/L	0.005	SM 3120	24-Oct-19/O	96.2	1.97	0.046	6.28
Magnesium	mg/L	0.02	SM 3120	24-Oct-19/O	38.3	19.3	17.6	4.41
Manganese	mg/L	0.001	SM 3120	24-Oct-19/O	1.90	0.296	0.048	0.056
Potassium	mg/L	0.1	SM 3120	24-Oct-19/O	66.7	3.1	5.0	2.1
Silicon	mg/L	0.01	SM 3120	24-Oct-19/O	13.6	11.6	6.55	5.79
Sodium	mg/L	0.2	SM 3120	24-Oct-19/O	79.4	16.0	32.4	3.6
Strontium	mg/L	0.001	SM 3120	24-Oct-19/O	0.818	0.361	1.27	0.048
Zinc	mg/L	0.005	SM 3120	24-Oct-19/O	< 0.005	< 0.005	< 0.005	< 0.005

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Steve Garrett
Director of Laboratory Services

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G91538

REPORT No. B19-33526 (i)

Rev. 1

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 16-Dec-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		BH00-4B(S)	MW06-1S	MW06-1D	MW06-2S
			Sample I.D.		B19-33526-5	B19-33526-6	B19-33526-7	B19-33526-8
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				

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WATERWORKS NO.

			Client I.D.		MW06-2D	MW07-3S	MW07-3D	GW QA/QC (ODWS)
			Sample I.D.		B19-33526-9	B19-33526-10	B19-33526-11	B19-33526-12
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	22-Oct-19/O	64	213	224	17
Chloride	mg/L	0.5	SM4110C	31-Oct-19/O	8.4	115	90.8	15.8
Nitrite (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05	1.96	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	31-Oct-19/O	12	22	25	18
Phosphorus-Total	mg/L	0.01	E3199A.1	22-Oct-19/K	245	0.53	2.62	0.83
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	22-Oct-19/K	5.0	0.9	0.6	0.3
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Oct-19/K	0.68	0.04	0.05	0.16
TDS (Calc. from Cond.)	mg/L	1	Calc.	23-Oct-19	95	451	398	72
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-Oct-19/O	8.6	6.9	8.8	3.0
Phenolics	mg/L	0.002	MOEE 3179	22-Oct-19/K				
COD	mg/L	5	SM 5220D	30-Oct-19/O	2950	40	58	10
Aluminum	mg/L	0.01	SM 3120	24-Oct-19/O	0.28	0.04	0.06	0.01
Barium	mg/L	0.001	SM 3120	24-Oct-19/O	0.356	0.146	0.176	0.076
Boron	mg/L	0.005	SM 3120	24-Oct-19/O	0.019	0.008	0.013	0.021
Calcium	mg/L	0.02	SM 3120	24-Oct-19/O	16.8	39.6	90.4	7.36
Chromium	mg/L	0.001	EPA 200.8	28-Oct-19/O	0.002	< 0.001	< 0.001	0.002
Cobalt	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0003	0.0004	0.0007	0.0001
Copper	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0012	0.0082	0.0006	0.0005
Iron	mg/L	0.005	SM 3120	24-Oct-19/O	18.0	0.006	0.407	15.7
Magnesium	mg/L	0.02	SM 3120	24-Oct-19/O	6.51	21.9	41.5	4.34
Manganese	mg/L	0.001	SM 3120	24-Oct-19/O	0.233	0.084	0.245	0.052
Potassium	mg/L	0.1	SM 3120	24-Oct-19/O	1.4	4.1	6.1	1.4
Silicon	mg/L	0.01	SM 3120	24-Oct-19/O	10.0	9.88	7.36	6.75
Sodium	mg/L	0.2	SM 3120	24-Oct-19/O	5.8	109	12.8	7.7

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Rev. 1

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Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		MW06-2D	MW07-3S	MW07-3D	GW QA/QC (ODWS)
			Sample I.D.		B19-33526-9	B19-33526-10	B19-33526-11	B19-33526-12
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Strontium	mg/L	0.001	SM 3120	24-Oct-19/O	0.069	0.273	0.671	0.043
Zinc	mg/L	0.005	SM 3120	24-Oct-19/O	< 0.005	< 0.005	< 0.005	< 0.005

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		MW10-7S	MD10-7D	BH00-3	BH00-5
			Sample I.D.		B19-33526-13	B19-33526-14	B19-33526-18	B19-33526-19
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	22-Oct-19/O	18	32	624	523
Chloride	mg/L	0.5	SM4110C	31-Oct-19/O	2.3	3.4	64.1	133
Nitrite (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	31-Oct-19/O	0.05	0.16	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	31-Oct-19/O	12	8	36	3
Phosphorus-Total	mg/L	0.01	E3199A.1	22-Oct-19/K	0.91	2.35	8.77	1.87
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	22-Oct-19/K	0.2	0.2	0.8	34.7
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Oct-19/K	0.02	0.03	0.08	34.4
TDS (Calc. from Cond.)	mg/L	1	Calc.	23-Oct-19	39	49	740	824
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-Oct-19/O	1.3	1.0	13.1	16.7
Phenolics	mg/L	0.002	MOEE 3179	22-Oct-19/K			< 0.002	< 0.002
COD	mg/L	5	SM 5220D	30-Oct-19/O	7	25	132	111
Aluminum	mg/L	0.01	SM 3120	24-Oct-19/O	0.05	0.01	0.14	0.08
Barium	mg/L	0.001	SM 3120	24-Oct-19/O	0.013	0.017	0.548	4.53
Boron	mg/L	0.005	SM 3120	24-Oct-19/O	0.006	0.006	0.268	0.862
Calcium	mg/L	0.02	SM 3120	24-Oct-19/O	7.00	8.51	150	116
Chromium	mg/L	0.001	EPA 200.8	28-Oct-19/O	0.001	0.002	0.001	0.003
Cobalt	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0001	< 0.0001	0.0152	0.0160
Copper	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0013	0.0007	0.0036	0.0011
Iron	mg/L	0.005	SM 3120	24-Oct-19/O	0.084	0.006	3.62	133
Magnesium	mg/L	0.02	SM 3120	24-Oct-19/O	3.53	4.78	87.6	37.0
Manganese	mg/L	0.001	SM 3120	24-Oct-19/O	0.002	< 0.001	5.69	3.06
Potassium	mg/L	0.1	SM 3120	24-Oct-19/O	1.0	1.2	6.1	116
Silicon	mg/L	0.01	SM 3120	24-Oct-19/O	6.35	6.90	10.9	14.1
Sodium	mg/L	0.2	SM 3120	24-Oct-19/O	2.3	3.0	35.9	83.9
Strontium	mg/L	0.001	SM 3120	24-Oct-19/O	0.038	0.034	0.950	0.916

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Director of Laboratory Services

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Final Report

C.O.C.: G91538

REPORT No. B19-33526 (i)

Rev. 1

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 16-Dec-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		MW10-7S	MD10-7D	BH00-3	BH00-5
			Sample I.D.		B19-33526-13	B19-33526-14	B19-33526-18	B19-33526-19
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Zinc	mg/L	0.005	SM 3120	24-Oct-19/O	< 0.005	< 0.005	< 0.005	< 0.005

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SAMPLE MATRIX: Groundwater

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P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		BH04-1S	BH04-1D	MW07-4R	MW07-5R
			Sample I.D.		B19-33526-20	B19-33526-21	B19-33526-22	B19-33526-23
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	22-Oct-19/O	276	230	11	367
Chloride	mg/L	0.5	SM4110C	31-Oct-19/O	59.4	56.1	13.0	103
Nitrite (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05	< 0.05	0.07	< 0.05
Sulphate	mg/L	1	SM4110C	31-Oct-19/O	199	7	10	< 1
Phosphorus-Total	mg/L	0.01	E3199A.1	22-Oct-19/K	1.27	0.35	0.09	0.39
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	22-Oct-19/K	0.4	1.4	0.4	11.5
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Oct-19/K	0.14	0.92	0.04	1.69
TDS (Calc. from Cond.)	mg/L	1	Calc.	23-Oct-19	334	341	50	541
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-Oct-19/O	12.0	12.0	1.6	12.9
Phenolics	mg/L	0.002	MOEE 3179	22-Oct-19/K	< 0.002	< 0.002	< 0.002	< 0.002
COD	mg/L	5	SM 5220D	30-Oct-19/O	47	41	33	598
Aluminum	mg/L	0.01	SM 3120	24-Oct-19/O	0.04	0.04	0.01	0.05
Barium	mg/L	0.001	SM 3120	24-Oct-19/O	0.368	0.489	0.022	0.641
Boron	mg/L	0.005	SM 3120	24-Oct-19/O	0.439	0.257	0.006	0.300
Calcium	mg/L	0.02	SM 3120	24-Oct-19/O	57.0	62.1	9.26	74.9
Chromium	mg/L	0.001	EPA 200.8	28-Oct-19/O	0.001	0.002	0.001	0.001
Cobalt	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0019	0.0010	0.0006	0.0007
Copper	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0018	0.0005	0.0012	0.0013
Iron	mg/L	0.005	SM 3120	24-Oct-19/O	42.8	36.7	0.133	162
Magnesium	mg/L	0.02	SM 3120	24-Oct-19/O	38.4	32.1	3.94	41.3
Manganese	mg/L	0.001	SM 3120	24-Oct-19/O	0.706	1.55	0.007	0.790
Potassium	mg/L	0.1	SM 3120	24-Oct-19/O	4.8	13.6	1.1	3.7
Silicon	mg/L	0.01	SM 3120	24-Oct-19/O	9.33	8.65	6.23	8.77
Sodium	mg/L	0.2	SM 3120	24-Oct-19/O	38.3	27.5	3.5	75.0
Strontium	mg/L	0.001	SM 3120	24-Oct-19/O	0.289	0.332	0.064	0.398

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		BH04-1S	BH04-1D	MW07-4R	MW07-5R
			Sample I.D.		B19-33526-20	B19-33526-21	B19-33526-22	B19-33526-23
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Zinc	mg/L	0.005	SM 3120	24-Oct-19/O	< 0.005	< 0.005	< 0.005	< 0.005

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		QA/QC(PWQO)			
			Sample I.D.		B19-33526-24			
			Date Collected		15-Oct-19			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	22-Oct-19/O	530			
Chloride	mg/L	0.5	SM4110C	31-Oct-19/O	133			
Nitrite (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05			
Nitrate (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05			
Sulphate	mg/L	1	SM4110C	31-Oct-19/O	3			
Phosphorus-Total	mg/L	0.01	E3199A.1	22-Oct-19/K	0.60			
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	22-Oct-19/K	34.3			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Oct-19/K	32.8			
TDS (Calc. from Cond.)	mg/L	1	Calc.	23-Oct-19	824			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-Oct-19/O	17.1			
Phenolics	mg/L	0.002	MOEE 3179	22-Oct-19/K	< 0.002			
COD	mg/L	5	SM 5220D	30-Oct-19/O	115			
Aluminum	mg/L	0.01	SM 3120	24-Oct-19/O	0.08			
Barium	mg/L	0.001	SM 3120	24-Oct-19/O	4.55			
Boron	mg/L	0.005	SM 3120	24-Oct-19/O	0.843			
Calcium	mg/L	0.02	SM 3120	24-Oct-19/O	118			
Chromium	mg/L	0.001	EPA 200.8	28-Oct-19/O	0.003			
Cobalt	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0155			
Copper	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0010			
Iron	mg/L	0.005	SM 3120	24-Oct-19/O	133			
Magnesium	mg/L	0.02	SM 3120	24-Oct-19/O	36.5			
Manganese	mg/L	0.001	SM 3120	24-Oct-19/O	3.09			
Potassium	mg/L	0.1	SM 3120	24-Oct-19/O	112			
Silicon	mg/L	0.01	SM 3120	24-Oct-19/O	13.9			
Sodium	mg/L	0.2	SM 3120	24-Oct-19/O	81.5			

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Steve Garrett
Director of Laboratory Services

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G91538

REPORT No. B19-33526 (i)

Rev. 1

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 16-Dec-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		QA/QC(PWQO)			
			Sample I.D.		B19-33526-24			
			Date Collected		15-Oct-19			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Strontium	mg/L	0.001	SM 3120	24-Oct-19/O	0.892			
Zinc	mg/L	0.005	SM 3120	24-Oct-19/O	< 0.005			

1. Revison due to division of reports by Client request

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G91538

REPORT No. B19-33526 (i)

Rev. 2

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 16-Dec-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		R2(Residential)			
			Sample I.D.		B19-33526-16			
			Date Collected		15-Oct-19			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	22-Oct-19/O	59			
Chloride	mg/L	0.5	SM4110C	31-Oct-19/O	3.0			
Nitrite (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05			
Nitrate (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05			
Sulphate	mg/L	1	SM4110C	31-Oct-19/O	23			
Phosphorus-Total	mg/L	0.01	E3199A.1	22-Oct-19/K	< 0.01			
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	22-Oct-19/K	< 0.1			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Oct-19/K	0.04			
TDS (Calc. from Cond.)	mg/L	1	Calc.	23-Oct-19	95			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-Oct-19/O	0.8			
Phenolics	mg/L	0.002	MOEE 3179	22-Oct-19/K				
COD	mg/L	5	SM 5220D	30-Oct-19/O	5			
Aluminum	mg/L	0.01	SM 3120	24-Oct-19/O	0.03			
Barium	mg/L	0.001	SM 3120	24-Oct-19/O	0.076			
Boron	mg/L	0.005	SM 3120	24-Oct-19/O	0.075			
Calcium	mg/L	0.02	SM 3120	24-Oct-19/O	21.8			
Chromium	mg/L	0.001	EPA 200.8	28-Oct-19/O	0.001			
Cobalt	mg/L	0.0001	EPA 200.8	28-Oct-19/O	< 0.0001			
Copper	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0923			
Iron	mg/L	0.005	SM 3120	24-Oct-19/O	0.591			
Magnesium	mg/L	0.02	SM 3120	24-Oct-19/O	5.56			
Manganese	mg/L	0.001	SM 3120	24-Oct-19/O	0.012			
Potassium	mg/L	0.1	SM 3120	24-Oct-19/O	1.5			
Silicon	mg/L	0.01	SM 3120	24-Oct-19/O	4.80			
Sodium	mg/L	0.2	SM 3120	24-Oct-19/O	8.9			

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Director of Laboratory Services

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REPORT No. B19-33526 (i)

Rev. 2

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Caduceon Environmental Laboratories
285 Dalton Ave
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Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 16-Dec-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		R2(Residential)			
			Sample I.D.		B19-33526-16			
			Date Collected		15-Oct-19			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Strontium	mg/L	0.001	SM 3120	24-Oct-19/O	0.943			
Zinc	mg/L	0.005	SM 3120	24-Oct-19/O	0.045			

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G91538

REPORT No. B19-33526 (i)

Rev. 3

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 16-Dec-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		R3(Residential)			
			Sample I.D.		B19-33526-17			
			Date Collected		15-Oct-19			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	22-Oct-19/O	102			
Chloride	mg/L	0.5	SM4110C	31-Oct-19/O	1.6			
Nitrite (N)	mg/L	0.05	SM4110C	31-Oct-19/O	< 0.05			
Nitrate (N)	mg/L	0.05	SM4110C	31-Oct-19/O	0.78			
Sulphate	mg/L	1	SM4110C	31-Oct-19/O	3			
Phosphorus-Total	mg/L	0.01	E3199A.1	22-Oct-19/K	0.13			
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	22-Oct-19/K	0.6			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Oct-19/K	0.14			
TDS (Calc. from Cond.)	mg/L	1	Calc.	23-Oct-19	113			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-Oct-19/O	6.3			
Phenolics	mg/L	0.002	MOEE 3179	22-Oct-19/K				
COD	mg/L	5	SM 5220D	30-Oct-19/O	17			
Aluminum	mg/L	0.01	SM 3120	24-Oct-19/O	0.06			
Barium	mg/L	0.001	SM 3120	24-Oct-19/O	0.039			
Boron	mg/L	0.005	SM 3120	24-Oct-19/O	0.014			
Calcium	mg/L	0.02	SM 3120	24-Oct-19/O	38.9			
Chromium	mg/L	0.001	EPA 200.8	28-Oct-19/O	0.001			
Cobalt	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0002			
Copper	mg/L	0.0001	EPA 200.8	28-Oct-19/O	0.0034			
Iron	mg/L	0.005	SM 3120	24-Oct-19/O	0.048			
Magnesium	mg/L	0.02	SM 3120	24-Oct-19/O	1.29			
Manganese	mg/L	0.001	SM 3120	24-Oct-19/O	0.041			
Potassium	mg/L	0.1	SM 3120	24-Oct-19/O	13.1			
Silicon	mg/L	0.01	SM 3120	24-Oct-19/O	4.85			
Sodium	mg/L	0.2	SM 3120	24-Oct-19/O	5.3			

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Director of Laboratory Services

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REPORT No. B19-33526 (i)

Rev. 3

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Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 16-Dec-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		R3(Residential)			
			Sample I.D.		B19-33526-17			
			Date Collected		15-Oct-19			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Strontium	mg/L	0.001	SM 3120	24-Oct-19/O	0.274			
Zinc	mg/L	0.005	SM 3120	24-Oct-19/O	< 0.005			

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G91538

REPORT No. B19-33526 (ii)

Report To:

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13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 05-Nov-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		BH00-4R	BH00-4A(D)	MW06-1S	MW06-1D
			Sample I.D.		B19-33526-3	B19-33526-4	B19-33526-6	B19-33526-7
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Acetone	µg/L	30	EPA 8260	22-Oct-19/R	< 30	< 30	< 30	< 30
Benzene	µg/L	0.5	EPA 8260	22-Oct-19/R	0.9	< 0.5	< 0.5	< 0.5
Bromobenzene	µg/L	0.4	EPA 8260	22-Oct-19/R	< 0.4	< 0.4	< 0.4	< 0.4
Bromodichloromethane	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	< 2
Bromoform	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	< 5
Bromomethane	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Tetrachloride	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Chloroethane	µg/L	3	EPA 8260	22-Oct-19/R	< 3	< 3	< 3	< 3
Chloroform	µg/L	1	EPA 8260	22-Oct-19/R	< 1	< 1	< 1	< 1
Chloromethane	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	< 2
Chlorotoluene,2-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Chlorotoluene,4-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Dibromo-3-Chloropropane, 1,2-	µg/L	0.6	EPA 8260	22-Oct-19/R	< 0.6	< 0.6	< 0.6	< 0.6
Dibromochloromethane	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	< 2
Dibromoethane,1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Dibromomethane	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	< 0.1
Dichlorobenzene,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	0.5	EPA 8260	22-Oct-19/R	1.1	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	< 2
Dichloroethane,1,1-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethylene,1,1-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5

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Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G91538

REPORT No. B19-33526 (ii)

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 05-Nov-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		BH00-4R	BH00-4A(D)	MW06-1S	MW06-1D
			Sample I.D.		B19-33526-3	B19-33526-4	B19-33526-6	B19-33526-7
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	< 5
Dichloropropane,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropane,1,3-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene,1,1-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Ethylbenzene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Hexachlorobutadiene	µg/L	0.6	EPA 8260	22-Oct-19/R	< 0.6	< 0.6	< 0.6	< 0.6
Hexane	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	< 5
Isopropylbenzene	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Isopropyltoluene,4-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Methyl Butyl Ketone	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	< 5
Methyl Ethyl Ketone	µg/L	20	EPA 8260	22-Oct-19/R	< 20	< 20	< 20	< 20
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	22-Oct-19/R	< 20	< 20	< 20	< 20
Methyl-t-butyl Ether	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	< 2
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	22-Oct-19/R	2.5	< 0.5	< 0.5	< 0.5
Naphthalene	µg/L	0.4	EPA 8260	22-Oct-19/R	< 0.4	< 0.4	< 0.4	< 0.4
n-Butylbenzene	µg/L	0.4	EPA 8260	22-Oct-19/R	< 0.4	< 0.4	< 0.4	< 0.4
n-Propylbenzene	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	< 0.1
sec-Butylbenzene	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	< 0.1
Styrene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
tert-Butylbenzene	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	< 0.1
Tetrachloroethane,1,1,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,2,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	0.8	< 0.5

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Michelle Dubien
Lab Manager

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Final Report

C.O.C.: G91538

REPORT No. B19-33526 (ii)

Report To:

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Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 05-Nov-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		BH00-4R	BH00-4A(D)	MW06-1S	MW06-1D
			Sample I.D.		B19-33526-3	B19-33526-4	B19-33526-6	B19-33526-7
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Trichlorobenzene,1,2,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorobenzene,1,2,4-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane,1,1,1-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane,1,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	< 5
Trichloropropane,1,2,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trimethylbenzene,1,2,4-	µg/L	1	EPA 8260	22-Oct-19/R	< 1	< 1	< 1	< 1
Trimethylbenzene,1,3,5-	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	< 0.1
Vinyl Chloride	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Xylene, m,p-	µg/L	1.0	EPA 8260	22-Oct-19/R	< 1.0	< 1.0	< 1.0	< 1.0
Xylene, o-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5

Michelle Dubien
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON™ ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G91538

REPORT No. B19-33526 (ii)

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 05-Nov-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		MW06-2S	MW06-2D	MW07-3S	MW07-3D
			Sample I.D.		B19-33526-8	B19-33526-9	B19-33526-10	B19-33526-11
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Acetone	µg/L	30	EPA 8260	22-Oct-19/R	< 30	< 30	< 30	< 30
Benzene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Bromobenzene	µg/L	0.4	EPA 8260	22-Oct-19/R	< 0.4	< 0.4	< 0.4	< 0.4
Bromodichloromethane	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	< 2
Bromoform	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	< 5
Bromomethane	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Carbon Tetrachloride	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Chloroethane	µg/L	3	EPA 8260	22-Oct-19/R	< 3	< 3	< 3	< 3
Chloroform	µg/L	1	EPA 8260	22-Oct-19/R	< 1	< 1	< 1	< 1
Chloromethane	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	< 2
Chlorotoluene,2-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Chlorotoluene,4-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Dibromo-3-Chloropropane, 1,2-	µg/L	0.6	EPA 8260	22-Oct-19/R	< 0.6	< 0.6	< 0.6	< 0.6
Dibromochloromethane	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	< 2
Dibromoethane,1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Dibromomethane	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	< 0.1
Dichlorobenzene,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorodifluoromethane	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	< 2
Dichloroethane,1,1-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethane,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloroethylene,1,1-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5

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Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G91538

REPORT No. B19-33526 (ii)

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 05-Nov-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		MW06-2S	MW06-2D	MW07-3S	MW07-3D
			Sample I.D.		B19-33526-8	B19-33526-9	B19-33526-10	B19-33526-11
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	< 5
Dichloropropane,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropane,1,3-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloropropene,1,1-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Ethylbenzene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Hexachlorobutadiene	µg/L	0.6	EPA 8260	22-Oct-19/R	< 0.6	< 0.6	< 0.6	< 0.6
Hexane	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	< 5
Isopropylbenzene	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Isopropyltoluene,4-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Methyl Butyl Ketone	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	< 5
Methyl Ethyl Ketone	µg/L	20	EPA 8260	22-Oct-19/R	< 20	< 20	< 20	< 20
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	22-Oct-19/R	< 20	< 20	< 20	< 20
Methyl-t-butyl Ether	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	< 2
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	µg/L	0.4	EPA 8260	22-Oct-19/R	< 0.4	< 0.4	< 0.4	< 0.4
n-Butylbenzene	µg/L	0.4	EPA 8260	22-Oct-19/R	< 0.4	< 0.4	< 0.4	< 0.4
n-Propylbenzene	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	< 0.1
sec-Butylbenzene	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	< 0.1
Styrene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
tert-Butylbenzene	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	< 0.1
Tetrachloroethane,1,1,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethane,1,1,2,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Tetrachloroethylene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5

R.L. = Reporting Limit
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Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G91538

REPORT No. B19-33526 (ii)

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 05-Nov-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		MW06-2S	MW06-2D	MW07-3S	MW07-3D
			Sample I.D.		B19-33526-8	B19-33526-9	B19-33526-10	B19-33526-11
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	15-Oct-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Toluene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorobenzene,1,2,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorobenzene,1,2,4-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane,1,1,1-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethane,1,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichloroethylene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	< 5
Trichloropropane,1,2,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5
Trimethylbenzene,1,2,4-	µg/L	1	EPA 8260	22-Oct-19/R	< 1	< 1	< 1	< 1
Trimethylbenzene,1,3,5-	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	< 0.1
Vinyl Chloride	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	< 0.2
Xylene, m,p-	µg/L	1.0	EPA 8260	22-Oct-19/R	< 1.0	< 1.0	< 1.0	< 1.0
Xylene, o-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	< 0.5

Michelle Dubien
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G91538

REPORT No. B19-33526 (ii)

Report To:

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13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 05-Nov-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		BH04-1S	BH04-1D	MW07-5R	
			Sample I.D.		B19-33526-20	B19-33526-21	B19-33526-23	
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Acetone	µg/L	30	EPA 8260	22-Oct-19/R	< 30	< 30	< 30	
Benzene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	0.7	
Bromobenzene	µg/L	0.4	EPA 8260	22-Oct-19/R	< 0.4	< 0.4	< 0.4	
Bromodichloromethane	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	
Bromoform	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	
Bromomethane	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Carbon Tetrachloride	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	
Chloroethane	µg/L	3	EPA 8260	22-Oct-19/R	< 3	< 3	< 3	
Chloroform	µg/L	1	EPA 8260	22-Oct-19/R	< 1	< 1	< 1	
Chloromethane	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	
Chlorotoluene,2-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	
Chlorotoluene,4-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	
Dibromo-3-Chloropropane, 1,2-	µg/L	0.6	EPA 8260	22-Oct-19/R	< 0.6	< 0.6	< 0.6	
Dibromochloromethane	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	
Dibromoethane,1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	
Dibromomethane	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	
Dichlorobenzene,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Dichlorobenzene,1,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Dichlorobenzene,1,4-	µg/L	0.5	EPA 8260	22-Oct-19/R	0.6	0.5	< 0.5	
Dichlorodifluoromethane	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	
Dichloroethane,1,1-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Dichloroethane,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	1.0	1.1	< 0.5	
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Dichloroethylene,1,1-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	

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Michelle Dubien
Lab Manager

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REPORT No. B19-33526 (ii)

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Attention: Tyler Casey

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285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 05-Nov-19
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		BH04-1S	BH04-1D	MW07-5R	
			Sample I.D.		B19-33526-20	B19-33526-21	B19-33526-23	
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	
Dichloropropane,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Dichloropropane,1,3-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Dichloropropene,1,1-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	
Ethylbenzene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Hexachlorobutadiene	µg/L	0.6	EPA 8260	22-Oct-19/R	< 0.6	< 0.6	< 0.6	
Hexane	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	
Isopropylbenzene	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	
Isopropyltoluene,4-	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	
Methyl Butyl Ketone	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	
Methyl Ethyl Ketone	µg/L	20	EPA 8260	22-Oct-19/R	< 20	< 20	< 20	
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	22-Oct-19/R	< 20	< 20	< 20	
Methyl-t-butyl Ether	µg/L	2	EPA 8260	22-Oct-19/R	< 2	< 2	< 2	
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Naphthalene	µg/L	0.4	EPA 8260	22-Oct-19/R	< 0.4	< 0.4	< 0.4	
n-Butylbenzene	µg/L	0.4	EPA 8260	22-Oct-19/R	< 0.4	< 0.4	< 0.4	
n-Propylbenzene	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	
sec-Butylbenzene	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	
Styrene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
tert-Butylbenzene	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	
Tetrachloroethane,1,1,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Tetrachloroethane,1,1,2,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Tetrachloroethylene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	

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Michelle Dubien
Lab Manager

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SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		BH04-1S	BH04-1D	MW07-5R	
			Sample I.D.		B19-33526-20	B19-33526-21	B19-33526-23	
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Toluene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	0.9	
Trichlorobenzene,1,2,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Trichlorobenzene,1,2,4-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Trichloroethane,1,1,1-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Trichloroethane,1,1,2-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Trichloroethylene	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Trichlorofluoromethane	µg/L	5	EPA 8260	22-Oct-19/R	< 5	< 5	< 5	
Trichloropropane,1,2,3-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	
Trimethylbenzene,1,2,4-	µg/L	1	EPA 8260	22-Oct-19/R	< 1	< 1	< 1	
Trimethylbenzene,1,3,5-	µg/L	0.1	EPA 8260	22-Oct-19/R	< 0.1	< 0.1	< 0.1	
Vinyl Chloride	µg/L	0.2	EPA 8260	22-Oct-19/R	< 0.2	< 0.2	< 0.2	
Xylene, m,p-	µg/L	1.0	EPA 8260	22-Oct-19/R	< 1.0	< 1.0	< 1.0	
Xylene, o-	µg/L	0.5	EPA 8260	22-Oct-19/R	< 0.5	< 0.5	< 0.5	

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

CADUCEON™ ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G91402

REPORT No. B19-33529

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 01-Nov-19
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		SW6	SW9	SW QA/QC	
			Sample I.D.		B19-33529-1	B19-33529-2	B19-33529-3	
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	21-Oct-19/O	123	34	34	
Chloride	mg/L	0.5	SM4110C	29-Oct-19/O	7.9	14.5	14.5	
Nitrite (N)	mg/L	0.05	SM4110C	29-Oct-19/O	< 0.05	< 0.05	< 0.05	
Nitrate (N)	mg/L	0.05	SM4110C	29-Oct-19/O	< 0.05	< 0.05	< 0.05	
Sulphate	mg/L	1	SM4110C	29-Oct-19/O	7	< 1	< 1	
Total Suspended Solids	mg/L	3	SM2540D	23-Oct-19/K	7	8	9	
Phosphorus-Total	mg/L	0.01	E3199A.1	21-Oct-19/K	0.13	0.04	0.05	
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	21-Oct-19/K	2.0	1.3	1.4	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	23-Oct-19/K	0.06	0.05	0.05	
TDS (Calc. from Cond.)	mg/L	1	Calc.	22-Oct-19	147	64	63	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	30-Oct-19/O	15.8	41.5	43.9	
Phenolics	mg/L	0.002	MOEE 3179	22-Oct-19/K	< 0.002	< 0.002	< 0.002	
COD	mg/L	5	SM 5220D	29-Oct-19/O	78	91	91	
Aluminum	mg/L	0.01	SM 3120	23-Oct-19/O	0.13	0.08	0.10	
Barium	mg/L	0.001	SM 3120	23-Oct-19/O	0.072	0.046	0.045	
Boron	mg/L	0.005	SM 3120	23-Oct-19/O	0.016	0.015	0.011	
Calcium	mg/L	0.02	SM 3120	23-Oct-19/O	33.4	11.4	10.6	
Chromium	mg/L	0.001	EPA 200.8	25-Oct-19/O	0.001	0.001	0.001	
Cobalt	mg/L	0.0001	EPA 200.8	25-Oct-19/O	0.0003	0.0002	0.0003	
Copper	mg/L	0.0001	EPA 200.8	25-Oct-19/O	0.0012	0.0010	0.0010	
Iron	mg/L	0.005	SM 3120	23-Oct-19/O	3.65	6.54	6.37	
Magnesium	mg/L	0.02	SM 3120	23-Oct-19/O	14.1	6.03	5.78	
Manganese	mg/L	0.001	SM 3120	23-Oct-19/O	0.242	0.065	0.069	
Potassium	mg/L	0.1	SM 3120	23-Oct-19/O	3.3	1.7	1.5	
Silicon	mg/L	0.01	SM 3120	23-Oct-19/O	3.12	8.79	8.58	
Sodium	mg/L	0.2	SM 3120	23-Oct-19/O	5.2	8.1	7.7	
Strontium	mg/L	0.001	SM 3120	23-Oct-19/O	0.157	0.074	0.071	

M. Dubien

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

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Final Report

C.O.C.: G91402

REPORT No. B19-33529

Report To:

Greenview Environmental Management
13 Commerce Crt., PO Box 100
Bancroft Ontario K0L1C0
Attention: Tyler Casey

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 17-Oct-19
DATE REPORTED: 01-Nov-19
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Killaloe WDS
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		SW6	SW9	SW QA/QC	
			Sample I.D.		B19-33529-1	B19-33529-2	B19-33529-3	
			Date Collected		15-Oct-19	15-Oct-19	15-Oct-19	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Zinc	mg/L	0.005	SM 3120	23-Oct-19/O	0.013	0.026	0.008	

Michelle Dubien
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Appendix F

Appendix D-Monitoring and Screening Checklist
General Information and Instructions

General Information: The checklist is to be completed, and submitted with the Monitoring Report.
Instructions: A complete checklist consists of:

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

Definition of Groundwater CEP:
For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:

(a) the person holds a licence, limited licence or temporary licence under the *Professional Engineers Act*; or

(b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..

Definition of Surface water CEP:
A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

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

Monitoring Report and Site Information

Waste Disposal Site Name: Killaloe WDS
Location (e.g. street address, lot, concession): Lot 7, Concession 8, Township of Killaloe, Hagarty, and Richards
GPS Location (taken within the property boundary at front gate/front entry):
North American Datum (NAD83) are 309794.0 metres (m) East, 5050760.0 m North, in Zone 18T
Municipality: Township of Killaloe, Hagarty, and Richards

Client and/or Site Owner: Township of Killaloe, Hagarty, and Richards

Monitoring Period (Year): 2019
This Monitoring Report is being submitted under the following:

- Certificate of Approval No.: A412306
- Director's Order No.: _____
- Provincial Officer's Order No.: _____
- Other: _____

Report Submission Frequency: Annual [X] Other [ ] specify : _____

The site is: active [ ] inactive [X] closed [ ]

If closed, specify C of A, control or authorizing document closure date: _____

Has the nature of the operations at the site changed during this monitoring period? Yes [ ] No [X]
If yes, provide details:
Progressive closure activities continued in 2019, per the approved Progressive Closure Plan.

Groundwater WDS Verification:

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

Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:

☒ Yes ☐ No

If no, list exceptions:

See report.

2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document(s):

☒ Yes ☐ No ☐ Not applicable

If no, list exceptions below or attach information.

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

3) a) Some or all groundwater, leachate and WDS gas sampling and monitoring requirements have been established or defined outside of a ministry C of A, authorizing, or control document.

☐ Yes ☒ No ☐ Not applicable

b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:

☐ Yes ☐ No ☐ Not applicable

If no, list exceptions or attach additional information.

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

4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):

☒ Yes ☐ No

If no, specify:

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.

☒ Yes ☐ No

If no, the potential design and operational concerns/exceptions are as follows:

See report.

6) The site meets compliance and assessment criteria.

☒ Yes ☐ No

If no, list and explain exceptions

CAZ interpreted to be sufficient. See report.

7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.

☐ Yes ☐ No

If no, list exceptions and explain reason for increase/change.

See report.

8) Is one or more of the following risk reduction practices in place at the site:

(a) There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/treatment; or
(b) There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or
(c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation):
- ***i.*** The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and
- ***ii.*** Seasonal and annual water levels and water quality fluctuations are well understood.

☒ Yes Note which practice(s): (a) ☐ b) ☐ c) ☒
☐ No

9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):

☒ Yes ☐ No ☐ Not applicable

If yes, list value(s) that are/have been exceeded and follow-up action taken

MECP has previously interpreted that Trigger Mechanism has triggered at site.

A Progressive Closure Plan for Killaloe site was submitted as Contingency Action to MECP in April 2015, and approved with the issuance of Amendment to ECA dated Nov15-17. Progressive closure operations continued at the site in 2019.

See report.

Groundwater CEP Declaration:

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

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

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

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:
☒ No changes to the monitoring program are recommended
☐ The following change(s) to the monitoring program is/are recommended:

_____

☐ No changes to the site design and operation are recommended
☒ The following change(s) to the site design and operation is/are recommended:

Per MECP approval of Progressive Closure Plan (Nov15-17),
progressive closure operations to continue in 2020.

Name: Dan Hagan, P.Geo. Seal:

Signature: _____ Date: Mar26-20

CEP Contact Information:
Company: Greenview Environmental Address:
Telephone No.: Fax No. : E-mail Address:
613-332-0057 dan.hagan@greenview-environmental.ca

Co-signers for additional expertise provided:

Signature: _____ Date: _____

Signature: _____ Date: _____

Surface Water WDS Verification:

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):
Name (s) Un-named pools of water (not connected by defined SW channel)
Distance(s) See report

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

Sampling and Monitoring Program Status:

1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:

☒ Yes ☐ No

If no, identify issues.

See report.

2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):

☒ Yes ☐ No ☐ Not applicable (No C of A, authorizing/ control document applies)

If no, specify below or provide details in an attachment.

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

3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.

☐ Yes ☒ No ☐ Not applicable

b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:

☐ Yes ☐ No ☐ Not applicable

If no, specify below or provide details in an attachment.

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

4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):

☒ Yes ☐ No

If no, specify:

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

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

☐ Yes ☒ No

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

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
See report		

6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?

☐ Yes ☒ No

If yes, specify

See report

7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.

☒ Yes ☐ No

If no, list parameters and stations that is outside the expected range. Identify whether parameter concentrations show an increasing trend or are within a high historical range.

See report.

8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g. , PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):

☒ Yes ☐ No ☐ Not known ☐ Not applicable

If yes, provide details and whether remedial measures are necessary.

See report

9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):

☒ Yes ☐ No ☐ Not applicable

If yes, list value(s) that are/have been exceeded and follow-up action taken.

MECP has previously interpreted that Trigger Mechanism has triggered at site.

A Progressive Closure Plan for Killaloe site was submitted as Contingency Action to MECP in April 2015 and was approved with the issuance of Amendment to ECA dated Nov15-17. Progressive closure operations to continue in 2020.

See report.

Surface Water CEP Declaration:

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

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

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

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:
☒ No changes to the monitoring program are recommended
☐ The following change(s) to the monitoring program is/are recommended:

_____

☐ No changes to the site design and operation are recommended
☒ The following change(s) to the site design and operation is/are recommended:

_____

Progressive closure operations to continue in 2020.

_____ _____

CEP Signature:: _____
Relevant Discipline P.Geo.
Date: (yyyy/mm/dd): Mar26-20

CEP Contact Information:
Company: Greenview Environmental Management Limited
Address: 13 Commerce Court, Bancroft, Ontario, K0L 1C0
Telephone No.: 613-332-0057
Fax No. :
E-mail Address: dan.hagan@greenview-environmental.ca

Appendix G

Greenview
ENVIRONMENTAL MANAGEMENT

Statement of Service Conditions and Limitations

Provision of Services and Payment

Upon documented acceptance of Greenview's proposed services, costs and associated terms by the client, Greenview may commence work on the proposed services directly. Upon retention of Greenview's services related to this project, the client agrees to remit payment for the services rendered for the specified period within (30) days of receipt as invoiced by Greenview on a typical monthly basis, unless otherwise arranged between the client and Greenview. In the event of non-payment by the client, Greenview reserves the right, without external influence or expense, to discontinue services and retain any documentation, data, reports, or other project information until such time as payment is received by Greenview.

Warranty, Limitations, and Reliance

Greenview relies on background and historical information from the client to determine the appropriate scope of services to meet the client's objectives, in accordance with applicable legislation, guidelines, industry practices, and accepted methodologies.

Greenview provides its services under the specific terms and conditions of a specific proposal (and where necessary formal contract), in accordance with the above requirements and the *Limitations Act 2002,* as amended, only.

The hypotheses, results, conclusions, and recommendations presented in documentation authored by Greenview are founded on the information provided by the client to Greenview in preparation for the work. Facts, conditions, and circumstances discovered by Greenview during the performance of the work requested by the client are assumed by Greenview to be part of preparatory information provided by the client as part of the proposal stage of the project. Greenview assumes that, until notified or discovered otherwise, that the information provided by, or obtained by Greenview from, the client is factual, accurate, and represents a true depiction of the circumstances that exist related to the time of the work.

Greenview relies on its clients to inform Greenview if there are changes to any related information to the work. Greenview does not review, analyze or attempt to verify the accuracy or completeness of the information or materials provided, or circumstances encountered, other than in accordance with applicable accepted industry practice. Greenview will not be responsible for matters arising from incomplete, incorrect or misleading information or from facts or circumstances that are not fully disclosed to or that are concealed from Greenview during the period that services, work, or documentation preparation was performed by Greenview.

Facts, conditions, information and circumstances may vary with time and locations and Greenview's work is based on a review of such matters as they existed at the particular time and location indicated in its documentation. No assurance is made by Greenview that the facts, conditions, information, circumstances or any underlying assumptions made by Greenview in connection with the work performed will not change after the work is completed and documentation is submitted. If any such changes occur or additional information is obtained, Greenview should be advised and requested to consider if the changes or additional information affect its findings or results.

When preparing documentation, Greenview considers applicable legislation, regulations, governmental guidelines and policies to the extent they are within its knowledge, but Greenview is not qualified to advise with respect to legal matters. The presentation of information regarding applicable legislation, regulations, not intended to and should not be interpreted as constituting a legal opinion concerning the work completed or conditions outlined in a report. All legal matters should be reviewed and considered by an appropriately qualified legal practitioner.

Greenview's services, work and reports are provided solely for the exclusive use of the client which has retained the services of Greenview and to which its reports are addressed. Greenview is not responsible for the use of its services, work or reports by any other party, or for the reliance on, or for any decision which is made by any party using the services or work performed by or a report prepared by Greenview without Greenview's express written consent. Any party that uses, relies on, or makes a decision based on services or work performed by Greenview or a report prepared by Greenview without Greenview's express written consent, does so at its own risk. Except as set out herein, Greenview specifically disclaims any liability or responsibility to any third party for any loss, damage, expense, fine, penalty or other such thing which may arise or result from the use of, reliance on or decision based on any information, recommendation or other matter arising from the services, work or reports provided by Greenview.

Site Reviews and Assessments

A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Greenview's work or report considers any locations or times other than those from which information, sample results and data were specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those based on extrapolations.

Only conditions, and substances, at the site and locations chosen for study by the client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the client. Any physical or other aspects of the site that were not chosen for study by the client, or any other matter not specifically addressed in a report prepared by Greenview, are beyond the scope of the work performed by Greenview and such matters have not been investigated or addressed.

Confidentiality

Greenview provides proposals, reports, assessments, designs, and any other work for the sole party identified as the client or potential client in the case of proposals.

For proposals specifically, the information contained therein is confidential, proprietary information, and shall not be reproduced or disclosed to any other party than to that of the addressee of the original proposal submission, without prior written permission of Greenview.