



2022 Annual Report

Black Donald Waste Disposal Site (A411902)

**Township of Greater Madawaska
County of Renfrew, Ontario**

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Executive Summary

This report has been prepared to document the results of the 2022 environmental monitoring program for the Township of Greater Madawaska's Black Donald Waste Disposal Site, located on part of Lot 9, Concession 3 within the geographic Township of Brougham, in the amalgamated Township of Greater Madawaska, in the County of Renfrew.

The groundwater configuration at the site was similar to historical interpretations with an east-west oriented groundwater divide evident in the vicinity of the waste mound, and with predominant groundwater flow directions to the east, west, and southeast. Additionally, groundwater in the vicinity of the monitoring well MW08-6 was interpreted to flow to the east. As monitoring well BH3 was observed during the fall 2021 sampling event to have been destroyed, the calculated groundwater contours and flow directions in fall 2021 differed from historical interpretations due to the lack of groundwater elevation data from BH3.

Groundwater immediately downgradient from the site at monitoring wells BH1, BH3, and BH4 was interpreted to be impacted from landfill-related activities at the site. Most parameter concentrations were observed to be higher than background groundwater quality results, while non-conformances of the Ontario Drinking Water Standards were observed for alkalinity, dissolved organic carbon, hardness, iron, manganese, and total dissolved solids at select monitors.

No Reasonable Use Concept non-conformances were documented in results from downgradient monitoring well MW08-7 in 2022 that were attributed to landfill-related factors. The noted Reasonable Use Concept non-conformance in historical results at MW08-7 for dissolved organic carbon was consistent with concentrations observed in background well MW08-6. Based on the above, the Black Donald site was interpreted to meet the intent of Guideline B-7 at the downgradient eastern contaminant attenuation zone boundary in 2022. Based on 2022 results, it was extrapolated that given the considerable distance of BH4 to the downgradient southwestern contaminant attenuation zone boundary (approximately 170 m), and naturally-occurring concentrations of alkalinity, aluminum, dissolved organic carbon, hardness, manganese, and total dissolved solids in the background (BH2 and MW08-6), the Black Donald site was interpreted to meet the intent of Guideline B-7 and was interpreted to be in compliance with the Reasonable Use Concept in 2022 at the southwestern contaminant attenuation zone boundary.

Based on the surface water quality results in 2022, and the significant distance of each sampling location from the approved waste disposal area of the Black Donald site, the surface water systems south and southeast of the Black Donald site were not interpreted to be impacted from landfill-related activities. Non-conformances of the Provincial Water Quality Objectives for concentrations of dissolved oxygen (low), phosphorus, iron and zinc noted in 2022 at select sampling locations for select sampling dates were attributed to naturally-occurring conditions in the background (SW-4), as well as to low-flow / low surface water conditions. The high pH value in historical results at location SW-6 was interpreted to be anomalous.

In 2022, Provincial Water Quality Objectives non-conformances at key trigger locations SW-3 and SW-6 for concentrations of iron were attributed to low water / low-flow conditions, and not to landfill-related activities. Similarly, Provincial Water Quality Objectives non-conformances for concentrations of phosphorus at key trigger location SW-3 were generally consistent with concentrations observed at background location SW-4, and were therefore not attributed to landfill-related factors. No Reasonable Use Concept non-conformances were noted for any of the key trigger parameters at key trigger location MW08-7 following inclusion of 2022 results. Based on a review of five (5) year time trend analysis for parameters un-ionized ammonia, barium, boron, chloride, chromium, chemical oxygen demand, iron, nitrate, sodium, sulphate, total Kjeldahl nitrogen and total phosphorus, the Trigger Mechanism was not interpreted to be activated in 2022. Routine monitoring of groundwater and surface water should continue in 2022 at the Black Donald site.

The volume of processed construction, demolition, and bulky wastes landfilled at the site from December 14, 2021, to December 08, 2022, was approximately 826 cubic metres.

Based on the 2022 fill rate, the remaining capacity at the Black Donald site was calculated to be approximately 3,575 cubic metres, with a corresponding remaining site life of approximately five (4) years, based on an average (mean) five (5) year fill rate (2018 to 2022) of 857 cubic metres.

All other municipal waste generated within the Township was directed to the Township's transfer stations at the Griffith, Norway Lake, and Mount St. Patrick Waste Disposal Sites for management. No diversion operations for recyclables were conducted at the Black Donald site in 2022.

Based on Township of Greater Madawaska records, 34 tri-axles and approximately 700 cubic metres of unprocessed construction, demolition, and bulky wastes were received at the Black Donald Waste Disposal Site in 2022, prior to processing in fall 2022.

On July 19, 2022, Greenview completed a grade stake survey at the Black Donald Waste Disposal Site in order to assist the municipality with continued waste grinding and landfilling operations. The Black Donald site is currently operating as a municipal solid waste landfill, accepting municipal construction and demolition, and bulky wastes for disposal, in accordance with Environmental Compliance Approval A411902, as amended on January 24, 2013. Only processed construction, demolition, and bulky waste, and bentonite clay material, was disposed at the Black Donald Waste Disposal Site in 2022. The Black Donald site was closed to the public on April 5, 2010; however, disposal operations at the site are currently available to municipal vehicles and municipal-approved haulers only, under the supervision of Township of Greater Madawaska staff.

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1.0 Introduction

1.1 Site Information

The Black Donald Waste Disposal Site operates as a solid waste landfill for the Township of Greater Madawaska (Township) under Environmental Compliance Approval (ECA) A411902 as most recently amended on January 24, 2013 (Appendix A). The Black Donald site is located on part of Lot 9, Concession 3 within the geographic Township of Brougham, in the Township of Greater Madawaska (Figures 1 and 2). The Universal Transverse Mercator (UTM) coordinates at the site entrance gate relative to the North American Datum (NAD83) are 353188.0 metres (m) East, 5010581.0 m North, in Zone 18T (Google Earth, 2013). Access to the site is provided by Hydro Dam Road, located off County Road 508, approximately fifteen (15) kilometres (km) southwest of the Village of Calabogie (Figure 1).

The site is situated on Township-owned lands, and consists of a 1.2 hectare (ha) waste disposal site within a total licensed property area of 21.36 ha (Appendix A), inclusive of lands used for operational buffer and contaminant attenuation zone (CAZ) purposes (Figures 2 and 3).

The Black Donald site was closed to the public on April 5, 2010; however, disposal operations at the site are currently available for municipal vehicles and Township-approved haulers only, under the supervision of Township operations staff. Since April 5, 2010, the Black Donald site was used only for the stockpiling of construction and demolition (C&D) and bulky wastes prior to processing (size-reduction) and disposal within the approved waste disposal area (AWDA; Figure 2). Bentonite clay material was also emplaced at the Black Donald site in 2022, as part of regular and final cover requirements.

1.2 Background

The Township's Black Donald site is located centrally in the Township, and according to the Township's long-term waste management plan, the Black Donald site was identified for the landfilling of waste received from the Griffith, Norway Lake, and Mount St. Patrick transfer stations. The Black Donald site was closed to the public on April 5, 2010, with disposal operations available for municipal vehicles and Township-approved haulers only. Following closure of the site to the public in April 2010, the Black Donald site has been utilized for the disposal of C&D and bulky wastes, with other municipal waste generated within the Township directed to the Township's existing transfer stations for transfer and disposal to GFL Environmental Inc.

Further to the Ontario Ministry of the Environment, Conservation, and Parks (MECP) Technical Support Section (TSS) groundwater review comments (March 17, 2008; Greenview Environmental Management Limited [Greenview], 2009), three (3) additional monitoring wells were installed at the Black Donald site in June 2008 to more adequately interpret groundwater quality southeast, southwest and west of the Black Donald site, and to establish the site's conformance with the Reasonable Use Concept (RUC) and MECP Guideline B-7 near the site and CAZ boundaries. One of the new monitoring wells (MW08-6) was installed west of the site on Crown Land, with authorization from the Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNR; Greenview, 2009).

On November 16, 2010, the Township responded to the MECP regarding the Township's intent to submit an application to amend the ECA and supporting technical documentation in the form of a *Design, Operations and Development Plan* (DODP; Greenview, 2010b) for the Black Donald site by December 31, 2010, (Greenview, 2011). On December 22, 2010, the Township submitted the DODP (Greenview, 2010b) to the MECP Environmental Assessment and Approvals Branch (EAAB) and the MECP Ottawa District Office, and confirmation of receipt of the DODP was received by the Township from the MECP on January 17, 2011 (Greenview, 2011). The Township received surface water review comments to the DODP, and groundwater review comments to the DODP and the 2010 Annual Report, dated April 30, 2012, and May 30, 2012, respectively (Greenview, 2013). The MECP TSS accepted the surface water and groundwater Trigger Mechanisms presented in the DODP.

In addition, the Township received a request for additional information with respect to the DODP application from the MECP Operations Division, in correspondence in May 2012 (Greenview, 2013). The Township provided a response to the MECP, dated July 30, 2012, to address MECP TSS surface water and groundwater review comments and the request for additional information (Greenview, 2013).

The application to amend the ECA and approve the DODP for the Black Donald was approved by the MECP with an Amendment to the ECA, issued January 24, 2013 (Appendix A).

The Black Donald Waste Disposal Site was inspected by the MECP Ottawa District Office on May 26, 2015, and a related Inspection Report was provided to the Township dated July 6, 2015 (Greenview, 2016). Action items were required by the Inspection Report, and the Township provided a Compliance Action Plan to the MECP dated October 1, 2015 (Greenview, 2016). The Township committed to completion of the compliance items in accordance with the dates identified in the Compliance Action Plan. All actions were understood to have been completed for the site by November 15, 2015 (Greenview, 2016).

As part of the 2015 Annual Report (Greenview, 2016), the Township requested that the MECP consider removing the requirement for surface water sampling as part of the environmental monitoring program for the Black Donald site, given that historical surface water quality data was not interpreted to be impacted by landfill-related activities. Based on a MECP TSS surface water review of the 2015 Annual Report dated July 4, 2016, the MECP TSS recommended that surface water monitoring continue consistent with historical practices (Greenview, 2017). A subsequent letter from the MECP Ottawa District Office dated July 7, 2016, reiterated that surface water monitoring should continue as part of the annual environmental monitoring program for the Black Donald site (Greenview, 2017).

On October 16, 2019, the Township received an Inspection Report from the MECP Ottawa District Office regarding the Black Donald site, dated October 8, 2019 (Greenview, 2020). The Inspection Report included action items to be addressed by the Township, which were addressed in an Action Plan prepared by Greenview dated November 25, 2019, and sent to the MECP Ottawa District Office on November 26, 2019 (Greenview, 2020). The MECP Ottawa District Office acknowledged receipt of the Action Plan on November 27, 2019, and approval of the Action Plan and related compliance dates was received from the MECP Ottawa District Office on December 3, 2019 (Greenview, 2020). A further request for confirmation of completion of the action items was received from the MECP dated February 6, 2020. As part of the response, the Township was required to submit photographs to the MECP in accordance with their request. The Township submitted their response to the MECP Ottawa District Office on February 14, 2020, which was approved by the MECP in an electronic communication dated February 18, 2020 (Greenview, 2020).

At the time of preparation of this 2022 Annual Report, no communications were understood to have been received by the Township from the MECP relative to the Black Donald Waste Disposal Site and the 2022 monitoring year.

Greenview was retained by the Township to complete the 2022 environmental monitoring and reporting program at the Black Donald Waste Disposal Site.

1.3 Purpose and Scope

The purpose of this report is to provide an overview of the annual monitoring, environmental compliance, and operations at the Black Donald site, in accordance with Condition 27 of the ECA (A411902), including the following:

- Groundwater quality assessment and RUC (MECP Guideline B-7) compliance (Section 4.1).
- Surface water quality assessment (Section 4.2).
- Trigger Mechanism review (Section 4.3).
- Site operational overview and capacity assessment (Section 4.4).

- Conclusions and recommendations (Section 5.0).

2.0 Site Description

The following sections present a summary of the physical characteristics for the Black Donald site. Locations of features described in this report are referenced to grid north.

2.1 Topography and Drainage

The Black Donald site is located on a topographic bedrock high with slopes extending from the waste pile to the southeast and east towards Hydro Dam Road. Topography south and west of the site slopes to the south and west, respectively (Figures 3, 4 and 5).

Surface water drainage patterns at the site were reportedly altered in 2001 with the construction of drainage ditches along the northeastern boundary of the site adjacent to Hydro Dam Road and at the southwest corner of the site. The drainage ditches were constructed in the fall of 2001 to avoid surface water ponding on-site and to promote surface water runoff. Historically, surface water at and adjacent to (downstream) the site was monitored three (3) times annually, in the spring, summer, and fall, at the established surface water monitoring locations SW-1, SW-2, SW-3, SW-4, SW-5, SW-6, and SW-7 (Figure 3). Following receipt of MECP TSS surface water review comments in October 2009, surface water locations SW-1, SW-2, and SW-7 were removed from the environmental monitoring program at the Black Donald site (Greenview, 2010a). All existing surface water locations in the environmental monitoring program at the site are included on Figure 3.

2.2 Hydrogeological Conditions

The Black Donald site is located on terrain consistent with rugged aspects of the Canadian Shield. Groundwater flow is governed largely by local topography and the presence of a dense bedrock unit beneath a more permeable overburden unit (Gartner Lee Limited [Gartner Lee], 1999). The predominant pathways of groundwater flow were interpreted to be downhill towards to the southeast and southwest (Figures 4, 5, and 6).

Overburden geology at the Black Donald Waste Disposal Site is characterized by a thin veneer of sandy overburden materials, approximately 0.3 to 1.5 metres (m) in thickness, overlying a fractured marble bedrock unit (Golder, 2007). Bedrock outcrops, knolls, and knob hills are prevalent in the vicinity of the Black Donald site, which confirms the shallow nature of overburden soils and the proximity of the bedrock contact to surface near the site (Gartner Lee, 1999).

A site reconnaissance was completed at the Black Donald site on August 21, 2007, to determine potential locations for additional monitoring wells. The reconnaissance was conducted further to MECP TSS groundwater review comments dated December 18, 2006 (Greenview, 2007). Following approval from the MNMNR to install a monitoring well on Crown Land to the northwest of the site, a monitoring well (MW08-6) was installed on June 5, 2008, to assist in establishing the site's conformance with MECP Guideline B-7 at the western CAZ boundary. Monitoring wells MW08-5 and MW08-7 were installed on June 5, 2008, to the southwest and southeast of the site to assess conformance with MECP Guideline B-7 at the respective CAZ boundaries (Figures 4, 5, and 6).

Historical and recent groundwater elevations recorded at the site indicate that a shallow groundwater divide is present in the vicinity of the waste mound and that predominant directions of groundwater flow are to the southeast and southwest (Golder, 2007; SGS Lakefield Research Ltd. [SGS], 2005). In 2008, an eastward trending groundwater flow direction was interpreted in the vicinity of MW08-6 (Greenview, 2009). Based on the upgradient location of MW08-6 relative to the waste mound, groundwater quality at MW08-6 was interpreted to be characteristic of background groundwater quality at the site (Greenview, 2010). A north-south oriented groundwater basin was also interpreted to exist in the vicinity of BH4 and MW08-5, based on groundwater elevations and contours measured and calculated from field measurements (Greenview, 2009 and 2010).

Groundwater elevations and quality are monitored twice annually in the spring and fall, at monitoring wells BH1, BH2, BH3, BH4, MW08-5, MW08-6, and MW08-7 (Table 1; Figure 4 and 5).

In fall 2021, monitoring well BH3 was observed to have been destroyed by equipment used at the site for waste grading and cover emplacement. A new monitoring well is required to be installed at the Black Donald site in order to replace BH3; the replacement monitoring well for BH3 should be installed in approximately the same location and to a similar depth as the former monitoring well (Figures 4, 5, and 6).

All available borehole logs for the Black Donald site are included in Appendix B. The available borehole logs include details regarding well construction for the corresponding monitoring wells.

2.3 Land Use

The lands currently occupied by the Black Donald site are designated as “WD” Waste Disposal, per the County’s Official Plan (County of Renfrew, 2003). Adjacent land use is designated as “RU”, Rural. A utility corridor with an overhead electricity transmission line exists west of the site, in a northeasterly-southwesterly orientation.

There are no residential drinking water or commercial wells in close proximity to the Black Donald site. The closest residential well is understood to be located approximately 700 m northwest and upgradient of the site, on Black Donald Road.

2.4 Operational Setting

The Black Donald site currently consists of a 1.2 ha waste disposal site within a total licensed property area of 21.36 ha, inclusive of lands used for operational buffer and CAZ purposes (Appendix A; Figure 2).

The Black Donald site was closed to the public for waste and recycling operations on April 5, 2010, as detailed in correspondence to the MECP dated March 9, 2010, regarding a waste management plan update from the Township (Greenview, 2010b).

The Black Donald site is approved to accept waste from the entire Township, and currently operates as an active waste disposal site receiving municipal C&D and bulky wastes for processing and disposal. As part of the waste management plan for the site, disposal operations at the site are currently available for municipal vehicles and Township-approved haulers only, under the supervision of Township operations staff (Greenview, 2010b). In 2022, only C&D and bulky waste was accepted, processed, and disposed at the Black Donald site. Bentonite clay material was emplaced at the site and used for regular and/or final cover in 2022.

Access to the site is provided by Hydro Dam Road, located off County Road 508 near Black Donald Lake, approximately 15 km southwest of the Village of Calabogie (Figures 1 and 2). The Black Donald site is bound to the south and east by forested lands, and by a utility corridor to the west of the site.

3.0 2022 Environmental Monitoring Program

The following sections present a methodology of the environmental monitoring program conducted at the Black Donald site in 2022.

3.1 Groundwater Monitoring

Groundwater monitoring and sampling activities were conducted by Greenview on May 04, 2022, and October 27, 2022, from the network of groundwater monitoring wells as part of the 2022 environmental monitoring program at the site (Table 1; Figures 4, 5, and 6). The UTM coordinates of the groundwater monitoring wells were confirmed or measured by Greenview personnel during site visits in 2022 using a handheld geographic positioning system (GPS) instrument with an anticipated accuracy of within +/- 5 m (Table 2). For the 2022 spring and fall sampling events, groundwater elevations were measured at each monitoring well using an electronic water level tape prior to sampling (Appendix C). Based on the groundwater elevation, a well purge volume equivalent to approximately three (3) borehole volumes was calculated for each well using a standard conversion factor relevant to the respective well diameter. Additionally, groundwater elevations were measured at all wells on August 18, 2022, as part of the 2021 summer surface water sampling event (Appendix C).

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 bottle 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.

Based on the approved groundwater monitoring program for the Black Donald site, analysis of volatile organic compounds (VOC) is conducted every five (5) years, and was last conducted in spring 2022 at monitoring well BH-1 (Table 1). The next sampling event for VOC at the Black Donald site is scheduled for 2027.

Field measurements of pH, conductivity, temperature, and dissolved oxygen (DO) were recorded at each respective groundwater well immediately following the collection of the groundwater samples. Field sampling records completed during the 2022 monitoring program are included in Appendix C. 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.

MW08-5 has not been sampled due to low water conditions since October 2008 (Greenview, 2009). As noted in Section 2.2, monitoring well BH3 was observed to have been destroyed in fall 2021 and should be replaced.

Duplicate groundwater samples were collected for Quality Assurance and Quality Control (QA/QC) purposes from monitoring well BH2 during the spring and fall sampling events in 2022 (Appendix C).

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

The results of the 2022 groundwater monitoring program are presented in Section 4.1 of this report.

3.2 Surface Water Monitoring

Surface water monitoring and sampling activities were conducted by Greenview on May 04, 2022, August 18, 2022, and October 27, 2022, from the established surface water monitoring locations at the site (Table 1; Figure 3). The UTM coordinates of the surface monitoring locations were confirmed or measured by Greenview personnel during site visits in 2022 using a handheld GPS instrument with an anticipated accuracy of within +/- 5 m (Table 2).

The 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.

No discernible flow conditions were documented for sampling locations SW-3, SW-4, and SW-5 in summer and fall 2022 (Appendix C).

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 were recorded at the time of sampling. Field sampling records completed for the 2022 monitoring program are included in Appendix C. 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.

Duplicate surface water samples were collected for QA/QC purposes from SW-3 during the spring 2022 sampling event, and from SW-6 during the summer and fall 2022 sampling events (Appendix C).

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

The results of the 2022 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

Landfill gas monitoring is not part of the current environmental monitoring program for the site. The waste mound at the Black Donald site is covered with porous soil materials, allowing natural gas flux to the atmosphere. Overburden geology at and adjacent to the site is characterized by shallow, sandy materials, overlying a dense bedrock unit. These overburden and bedrock characteristics, coupled with the extended distance to the nearest residence, provide a minimal risk of landfill gases impinging off-site receivers.

3.5 Operational Monitoring

Operational monitoring at the Black Donald site was conducted regularly to document routine waste disposal activities at the site.

A topographic survey was conducted on December 08, 2022, to determine the current capacity status at the site. Daily waste records at the Black Donald site were completed by Township staff at the end of each operating day as part of regular operations at the site to monitor landfilling activities (C&D and bulky waste) and vehicular traffic. No recycling activities were conducted at the Black Donald site in 2022, as all diversion operations were directed to the Township's transfer stations at the Norway Lake, Griffith, and Mount St. Patrick Waste Disposal Sites.

On July 19, 2022, Greenview completed a grade stake survey at the Black Donald Waste Disposal Site in order to assist the municipality with continued waste grinding and landfilling operations.

The Township submits annual reports in accordance with the Municipal Datacall, inclusive of the Black Donald site, to the Resource Productivity and Recovery Authority (RPPRA). The results of the operational monitoring are presented in Section 4.4 of this report.

4.0 Environmental Monitoring Results

The following sections present a summary of the environmental monitoring results of the 2022 environmental monitoring program conducted at the Black Donald site.

4.1 Groundwater Quality Assessment

The results of the 2022 groundwater monitoring program conducted at the site are presented as follows.

4.1.1 Groundwater Configuration

In 2022, and consistent with historical interpretations (Greenview, 2022), an east/west groundwater divide was interpreted to be present in the vicinity of the waste mound, with groundwater flow radiating to the east, west, and to the southeast (Figures 4, 5, and 6). Groundwater flow in the spring and summer of 2022 in the vicinity of monitoring well MW08-6 was interpreted to be to the east, and appeared to converge in the vicinity of monitoring well BH4 with westward groundwater flow from the vicinity of the waste mound. The area south of monitoring well BH4 was interpreted to be a groundwater basin, channelling groundwater in the general direction of monitoring well MW08-5 and the downgradient southwestern CAZ boundary (Figures 4 and 5). Given that BH3 was observed to have been destroyed, a groundwater elevation was not available at the location in 2022, and therefore the groundwater contours and horizontal gradients for the Black Donald Waste Disposal Site were not able to be calculated in 2022 consistent with historical assessments (Figure 6).

Groundwater elevation data obtained during the 2022 groundwater monitoring program are provided in Table 3. Average horizontal gradients were interpreted to have four (4) distinct directions of flow in spring, summer, and fall 2022 (Figures 4, 5, and 6), and average horizontal gradients in the vicinity of the Black Donald site were calculated as follows:

Location	Horizontal Gradient (Spring 2022)	Predominant Direction	Horizontal Gradient (Summer 2022)	Predominant Direction	Horizontal Gradient (Fall 2022)	Predominant Direction
West of Groundwater Divide	n/a	West	n/a	West	n/a	n/a
East of Groundwater Divide	0.079	East	0.083	East	0.080	East
Southeast of BH3	n/a	Southeast	n/a	Southeast	n/a	n/a
West of Site and Vicinity of MW08-6	0.066	East	0.083	East	0.066	East

4.1.2 Groundwater Quality

The results of the 2022 groundwater monitoring program are presented in Table 4 and the accredited laboratory Certificates of Analysis are attached in Appendix D. Analytical data were compared to the Ontario Drinking Water Standards (ODWS; MECP, 2006), median background water quality at the site, and MECP Guideline B-7 and RUC (MECP, 1994a). Background groundwater quality was calculated using the median of a minimum of the previous ten (10) sampling event results from background monitoring wells BH2 and MW08-6. Trend analysis was completed using results from the previous five (5) years and only significant trends are discussed in this report.

The blind duplicate samples collected from monitoring well BH2 during the spring and fall 2022 sampling events were similar to the identified samples, indicating that the results of the 2022 groundwater monitoring program can be interpreted with confidence.

In 2022, and consistent with historical reports, background groundwater quality at the Black Donald site was assessed at monitoring well BH2, located north and upgradient of the site, and along the groundwater divide (Greenview, 2022; Figures 4, 5, and 6). In 2022, some parameter concentrations in the spring and fall 2022 samples collected from BH2 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at background groundwater monitoring location BH2 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
BH2 (background)	<ul style="list-style-type: none"> • Chloride • Chromium • Iron • Manganese • Zinc 	<ul style="list-style-type: none"> • Chromium • Manganese 	<ul style="list-style-type: none"> • No significant trends 	<ul style="list-style-type: none"> • Ammonia (total)

High aluminum, dissolved organic carbon (DOC), and hardness concentrations have been documented in historical results from background well BH2 (Table 4). High hardness concentrations are likely due to the underlying marble bedrock as identified through borehole logs for monitoring wells that are part of the groundwater monitoring program and from local bedrock exposure in the vicinity of the site (Table 4; Appendix C). Similarly, high aluminum and DOC concentrations were interpreted to be resultant of naturally-occurring conditions and/or off-site sources in the vicinity of the site, given the position of BH2 along the groundwater divide and upgradient of the interpreted directions of groundwater flow at the site (Figures 4, 5, and 6). Groundwater at BH2 was interpreted to continue to be representative of background groundwater quality at the site with the inclusion of 2022 results.

Consistent with recommendations in the 2008 Annual Report, and based on the interpretation that monitoring well MW08-6 is upgradient of the site, results from MW08-6 were used in 2022, in conjunction with results from monitoring well BH2, to determine background groundwater quality at the site (Figures 4, 5, and 6; Table 4). MW08-6 is located on Crown land approximately 90 m west and upgradient of monitoring well BH4 (Figure 2). MW08-6 was installed in 2008 to determine whether impacts resultant of landfill-related activities were occurring west of the site; however, subsequent groundwater flow calculations and field observations suggested that MW08-6 was not downgradient of the waste mound and was instead an upgradient (background) monitoring well (Figures 4, 5, and 6). In 2022, some parameter concentrations in the spring and fall 2022 samples collected from MW08-6 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at background groundwater monitoring location MW08-6 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
MW08-6	<ul style="list-style-type: none"> • Cadmium • Chloride • Chromium • Iron 	<ul style="list-style-type: none"> • Chromium 	<ul style="list-style-type: none"> • Barium 	<ul style="list-style-type: none"> • No significant trends

	<ul style="list-style-type: none"> • Manganese • Zinc 			
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Based on 2022 results, parameter concentrations at MW08-6 were generally comparable to those at BH2 (Table 4). Consistent with historical results (Table 4), and since groundwater flow in the vicinity of MW08-6 was interpreted to be to the east, impacts resultant of landfill-related activities at MW08-6 were interpreted to be unlikely. Therefore, the parameter concentrations documented at MW08-6 were interpreted to be naturally-occurring and/or related to off-site sources (Figures 4, 5, and 6). Consequently, the high historical concentrations for aluminum, DOC, and hardness, and to a lesser extent iron and manganese, in results for background monitoring well MW08-6 (and BH2) were interpreted to be resultant from naturally-occurring conditions and/or off-site sources upgradient of the site. Consistent with historical reports (Greenview, 2022), results from MW08-6 were interpreted to be representative of background groundwater quality at the Black Donald site in 2022 (Table 4).

Monitoring well BH1 is located approximately 25 m east and downgradient of the AWDA boundary, on the northwest side of Hydro Dam Road (Figure 4). In 2022, most parameter concentrations in samples collected from BH1 were above the median background concentrations (Table 4) and groundwater at BH1 was interpreted to be most representative of leachate quality at the Black Donald site (Table 4). Non-conformances of ODWS and significant groundwater trends at groundwater monitoring location BH1 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
BH1	<ul style="list-style-type: none"> • Alkalinity • Cadmium • Chromium • DOC • Hardness • Iron • Manganese • Total Dissolved Solids (TDS) 	<ul style="list-style-type: none"> • Alkalinity • Chromium • DOC • Iron • Manganese • TDS 	<ul style="list-style-type: none"> • No significant trends 	<ul style="list-style-type: none"> • Calcium • Chloride • Chemical Oxygen Demand (COD) • Hardness • Potassium

Consistent with historical assessments (Greenview, 2022), groundwater in the vicinity of BH1 was interpreted to be impacted from landfill-related activities at the Black Donald site. High parameter concentrations were expected given the location of the monitoring well immediately downgradient of the waste mound (Figures 4, 5, and 6). Given the proximity of BH1 to Hydro Dam Road, impacts related to winter road maintenance activities were also interpreted in groundwater quality results from BH1 (Table 4).

Monitoring well MW08-7 is located approximately 180 m southeast and downgradient of the AWDA, along the eastern CAZ boundary (Figures 4, 5, and 6). In 2022, some parameter concentrations in samples collected from downgradient well MW08-7 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at groundwater monitoring location MW08-7 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
MW08-7	<ul style="list-style-type: none"> • Boron • Cadmium 	<ul style="list-style-type: none"> • Boron • Cadmium 	<ul style="list-style-type: none"> • Alkalinity • Barium 	<ul style="list-style-type: none"> • No significant trends

	<ul style="list-style-type: none"> • Chromium • Iron • Manganese • Zinc 	<ul style="list-style-type: none"> • Chromium • Iron • Manganese • Zinc 	<ul style="list-style-type: none"> • Potassium 	
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When compared with groundwater results from BH1, located immediately downgradient from the waste mound and interpreted to be most representative of leachate quality at the site, results from downgradient well MW08-7 in 2022 were interpreted to represent that significant attenuation was occurring between BH1 and the eastern CAZ boundary (Figures 4, 5, and 6; Table 4). No significant impacts related to the waste disposal activities at the Black Donald Waste Disposal Site were interpreted to be occurring in the vicinity of MW08-7 following completion of the 2022 groundwater monitoring program.

Historically, groundwater immediately south of the waste mound was assessed at monitoring well BH3, located approximately 15 m southeast of the existing limit of waste at the site (Figures 4, 5, and 6). In historical results, many parameter concentrations in samples collected from BH3 were above the median background concentrations (Table 4). No samples were obtained from BH3 in 2022, as the well was observed to have been destroyed by waste site equipment. Non-conformances of ODWS and significant groundwater trends at groundwater monitoring location BH3 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
BH3	<ul style="list-style-type: none"> • No sample (well destroyed) 	<ul style="list-style-type: none"> • No sample (well destroyed) 	<ul style="list-style-type: none"> • Insufficient data for determining trends 	<ul style="list-style-type: none"> • Insufficient data for determining trends

Groundwater at BH3 was interpreted to be impacted by landfill-related activities at the Black Donald site in historical results; however, lower concentrations were generally documented in groundwater results at BH3 than at leachate monitoring well BH1 (Table 4). This interpretation was consistent with the position of BH3 along the groundwater divide and partially cross-gradient to the primary directions of groundwater flow to the east and west (Figures 4, 5, and 6). Given that BH3 was observed to have been destroyed in fall 2021, a new monitoring well should be installed at approximately the same location as BH3, in order to effectively replace BH3 and to continue monitoring groundwater quality along the interpreted groundwater divide.

Monitoring well BH4 is located adjacent to the western corner of the AWDA (Figure 2). BH4 was interpreted to be located downgradient of the waste mound and in the immediate direction of the western portion of groundwater flow from the site, based on 2022 data (Figures 4, 5, and 6). In 2022, most parameter concentrations in samples collected from BH4 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at groundwater monitoring location BH4 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
BH4	<ul style="list-style-type: none"> • Cadmium • Chromium • DOC • Hardness • Iron • Sulphate • TDS • Zinc 	<ul style="list-style-type: none"> • Aluminum • Chromium • DOC • Hardness • Manganese • TDS 	<ul style="list-style-type: none"> • Calcium 	<ul style="list-style-type: none"> • Ammonia (un-ionized; lab-tested)

Based on 2022 results, groundwater at BH4 was interpreted to be impacted by landfill-related activities; however, to a lesser extent than at leachate monitoring well BH1 (Table 4). The interpretation that groundwater in the western portion of groundwater flow at the site was less impacted than the eastern component of groundwater flow at the Black Donald site was supported by horizontal gradients calculated in spring, summer, and fall 2022 and documented groundwater quality (Figures 4, 5, and 6; Table 4). Considering the groundwater flow directions calculated following 2022 groundwater monitoring events and based on similar historical calculations, BH4 was interpreted to be the downgradient receiver of groundwater flow from the vicinity of the waste mound and from the northwest in the vicinity of monitoring well MW08-6 (Figures 4 and 5).

Monitoring well MW08-5 is situated approximately 140 m southwest of the AWDA, and approximately 15 m from the western CAZ boundary in an area of elevated topography (Figures 4, 5, and 6). Consistent with historical sampling events (Table 4; Greenview, 2022), MW08-5 was observed to have insufficient groundwater for sampling purposes during the spring and fall 2022 sampling events (Appendix C). As such, groundwater samples were not collected.

With due consideration of MECP TSS comments dated March 17, 2008 (Greenview, 2009), requesting that VOC be tested once per year at the Black Donald site, the environmental monitoring program for the site was amended to include the analysis of VOC in 2009 at monitoring well BH4. Following the completion of the 2009 environmental monitoring program and the interpretation of BH1 as most representative of leachate quality at the site, VOC sampling was amended from BH4 to BH1 for the 2010 environmental monitoring program (Greenview, 2011; Table 4). Analysis for VOC is currently scheduled once every five (5) years in accordance with Schedule B of the ECA (Appendix A; Table 1). VOC were last sampled at BH1 in spring 2017 and all results were below ODWS limits (Table 4). The next sampling event for VOC at the Black Donald site is scheduled for 2027 (Table 1).

4.1.3 Reasonable Use Concept Assessment

In an effort to assess potential landfill-related impacts migrating beyond the site boundary, the RUC was used as an assessment tool to monitor downgradient impacts from the Black Donald site. Downgradient impacts are typically assessed using the RUC at monitoring wells located at, or in close proximity to, the downgradient CAZ boundaries. The downgradient monitoring wells located near the CAZ boundaries 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, 1994), specifically using the median value of individual background parameter concentrations from monitoring wells BH2 and MW08-6 to characterize natural groundwater quality at the site.

The RUC assessment at the eastern CAZ boundary was conducted using results from monitoring well MW08-7. Based on the direction of groundwater flow, the RUC assessment at the southwestern CAZ boundary should be conducted using results from monitoring well MW08-5; however, since MW08-5 did not have sufficient groundwater to sample during the spring and fall 2022 sampling events, monitoring well BH4, located upgradient of MW08-5, was used to establish compliance with RUC and conformance with MECP Guideline B-7 in 2022.

BH4 is located west of the waste mound and had previously been used to establish conformance with MECP Guideline B-7 near the western CAZ boundary at the site prior to the installation of MW08-5 in 2008 (Greenview, 2009). BH3 was not used to assess RUC and MECP Guideline B-7, due to its location along the groundwater divide and in close proximity to the waste mound, and since it was observed to be destroyed in fall 2021; similarly, MW08-6 was not used to establish compliance with RUC and conformance with MECP Guideline B-7 due to its interpreted location upgradient of the waste mound (Figures 4, 5, and 6).

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 Black Donald site. The trigger concentrations used to assess RUC compliance for the groundwater regime at the site are based on the RUC for each of the respective parameters.

The RUC values for individual parameters should be 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 District MECP office should be held to develop an appropriate contingency plan, as necessary and appropriate for the particular site.

Monitoring well MW08-7 was installed downgradient of the waste mound and approximately 180 m southeast of monitoring well BH1 to assess compliance with RUC and MECP Guideline B-7 at the eastern property and CAZ boundary (Figures 4, 5, and 6). Non-conformances of RUC in spring and fall 2022 from groundwater results at downgradient well MW08-7 are included in the table below. RUC non-conformances noted in groundwater quality from background monitoring wells BH-2 and MW08-6 were included for comparison purposes:

Monitoring Well	RUC Non-Conformance	
	Spring 2022	Fall 2022
BH2 (background)	<ul style="list-style-type: none"> • Chloride • Chromium • Iron • Manganese • Zinc 	<ul style="list-style-type: none"> • Chromium • Manganese
MW08-6 (background)	<ul style="list-style-type: none"> • Cadmium • Chloride • Chromium • Iron • Manganese • Zinc 	<ul style="list-style-type: none"> • Chromium
MW08-7 (east CAZ boundary)	<ul style="list-style-type: none"> • Boron • Cadmium • Chromium • Iron • Manganese • Zinc 	<ul style="list-style-type: none"> • Boron • Cadmium • Chromium • Iron • Manganese • Zinc

Given that the RUC non-conformance for the concentration of DOC in historical results from downgradient monitoring well MW08-7 was also documented to occur in results from background monitoring wells BH2 and MW08-6 for the same historical sampling event, the noted RUC non-conformance for DOC in previous results at MW08-7 was attributed to naturally-occurring conditions upgradient of the site and/or off-site sources, and not to

landfill-related factors (Table 4). Based on the above, the Black Donald site was interpreted to meet the intent of MECP Guideline B-7 at the downgradient eastern CAZ boundary in 2022.

As previously described, MW08-5 is located approximately 155 m south of BH4 and near the downgradient southwestern CAZ boundary (Figures 4, 5, and 6). MW08-5 is located on a topographical high and is adjacent to an apparent groundwater basin receiving groundwater flow from both west of the waste mound and east of monitoring well MW08-6 (Figures 4, 5, and 6). Since MW08-5 did not have sufficient water to sample in both spring and fall 2022, a RUC assessment of groundwater quality results was not possible for MW08-5 following the completion of the 2022 environmental monitoring program (Appendix C). Instead, a RUC assessment was completed using results from BH4, located upgradient of MW08-5 and adjacent to the AWDA boundary (Figures 4, 5, and 6).

Prior to the installation of MW08-5 in 2008, BH4 was used to establish RUC and conformance with MECP Guideline B-7 near the southwestern CAZ boundary (Figures 4, 5, and 6). According to the interpreted hydraulic gradients and groundwater flow direction west of the AWDA, BH4 is interpreted to be the downgradient receiver of groundwater flow from both the west and east, and is interpreted to be situated within a groundwater basin (Figures 4, 5, and 6). Non-conformances of RUC in spring and fall 2022 at BH4 are included in the table below. RUC non-conformances noted in groundwater results from background monitoring wells BH-2 and MW08-6 were included for comparison purposes:

Monitoring Well	RUC Non-Conformance	
	Spring 2022	Fall 2022
BH2 (background)	<ul style="list-style-type: none"> • Chloride • Chromium • Iron • Manganese • Zinc 	<ul style="list-style-type: none"> • Chromium • Manganese
MW08-6 (background)	<ul style="list-style-type: none"> • Cadmium • Chloride • Chromium • Iron • Manganese • Zinc 	<ul style="list-style-type: none"> • Chromium
BH4 (southwest CAZ boundary)	<ul style="list-style-type: none"> • Alkalinity • Aluminum • Cadmium • Chromium • DOC • Hardness • Iron • Sulphate • TDS • Zinc 	<ul style="list-style-type: none"> • Aluminum • Chromium • DOC • Hardness • Manganese • Sulphate • TDS

The noted RUC non-conformances at BH4 in 2022 were generally consistent with historical results (Table 4; Greenview, 2022), and were interpreted to be partially resultant of landfill-related activities, naturally-occurring conditions and/or off-site sources upgradient of the site (Figures 4, 5, and 6).

Groundwater elevation data from spring and summer 2022 suggest that groundwater flow in the vicinity of monitoring well MW08-6 (background) was predominantly to the east, in the general direction of BH4, and it was

interpreted that parameter concentrations resultant of landfill-related factors originating in the vicinity of the waste mound would not likely migrate past the western CAZ boundary (Figures 4 and 5). Instead, groundwater was interpreted to flow in a southerly direction along the apparent groundwater basin towards MW08-5 and the downgradient southwestern CAZ boundary. Therefore, it is interpreted that given the considerable distance of BH4 to the downgradient southwestern CAZ boundary (approximately 170 m), and naturally-occurring high concentrations of alkalinity, aluminum, DOC, hardness, and TDS in the background, the Black Donald site was interpreted to meet the intent of MECP Guideline B-7 and was in compliance with RUC in 2022 at the southwestern CAZ boundary. Groundwater flow directions calculated in fall 2022 (Figure 6) were noted to be different from historical interpretations at the site, given the lack of elevation data from BH3, which was observed to have been destroyed. Replacement of monitoring well BH3 in 2022 is required in order to re-establish the groundwater flow data for the Black Donald Waste Disposal Site.

4.2 Surface Water Quality Assessment

As part of the spring, summer and fall 2022 surface water sampling events, physical characteristics of sampling locations SW-3, SW-4 (background), SW-5, and SW-6 were recorded.

For the spring 2022 sampling event, depth (m), width (m), velocity (metres per second, m/s), and discharge (cubic metres per second, m³/s) were measured and calculated with results as follows:

Spring 2022				
Sample Location	Depth (m)	Width (m)	Velocity (m/s)	Discharge (m ³ /s)
SW-3	0.19	1.50	0.13	0.032
SW-4 (background)	0.19	1.00	0.25	0.043
SW-5	0.71	8.00	0.25	1.278
SW-6	0.10	4.00	0.33	0.120

For the summer 2022 sampling event, depth (m), width (m), velocity (m/s), and discharge (m³/s) were measured and calculated with results as follows:

Summer 2022				
Sample Location	Depth (m)	Width (m)	Velocity (m/s)	Discharge (m ³ /s)
SW-3	Insufficient water for sampling purposes		No Discernible Flow	
SW-4 (background)	0.20	Insufficient water for sampling purposes	No Discernible Flow	
SW-5	0.30	Insufficient water for sampling purposes	No Discernible Flow	
SW-6	0.40	4.00	0.33	0.480

For the fall 2022 sampling event, depth (m), width (m), velocity (m/s), and discharge (m³/s) were measured and calculated with results as follows:

Fall 2022				
Sample Location	Depth (m)	Width (m)	Velocity (m/s)	Discharge (m ³ /s)
SW-3	0.10	2.00	No Discernible Flow	
SW-4 (background)	Insufficient water for sampling purposes		No Discernible Flow	
SW-5	0.20	2.50	No Discernible Flow	
SW-6	0.15	3.00	No Discernible Flow	

Results of the 2022 surface water monitoring program the Black Donald site were compared to PWQO (MECP, 1994b) and are presented in Table 5. Additionally, surface water quality results were compared with the 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). Accredited laboratory Certificates of Analysis for the surface water quality results are provided in Appendix D. Background surface water quality was calculated using the 75th percentile of a minimum of the previous ten (10) sampling event results from background surface water monitoring location SW-4. Trend analysis was completed using results from the previous five (5) years and only significant trends are discussed in this report.

The blind duplicate samples collected from SW-3 during the spring 2022 sampling event, and SW-6 during the summer and fall 2022 sampling events, respectively, were similar to the identified samples, indicating that the results of the 2022 surface water monitoring program can be interpreted with confidence.

Background surface water location SW-4 (Figure 3) is located approximately 500 metres (m) northeast and upstream of the AWDA of the Black Donald site (Figure 3). The following photographs are representative of background surface water location SW-4:

Photograph 1: Surface Water Location SW-4 (Spring, Summer, Fall 2021 [left to right])



SW-4 was observed to have no discernible flow during the summer and fall 2022 sampling events (Appendix C). In spring 2022, few parameter concentrations at SW-4 were above 75th percentile background surface water quality at the site while some parameter concentrations at SW-4 were above the 75th percentile in fall 2022 (Table 5). Non-conformances of PWQO, and significant trends, at background surface water sampling location SW-4 were as follows (Table 5):

Sampling Location	PWQO Non-Conformance			Five (5) Year Trend Analysis	
	Spring 2022	Summer 2022	Fall 2022	Increasing	Decreasing
SW-4 (background)	<ul style="list-style-type: none"> Phosphorus 	<ul style="list-style-type: none"> DO (low) Phosphorus 	<ul style="list-style-type: none"> No sample 	<ul style="list-style-type: none"> No significant trends 	<ul style="list-style-type: none"> No significant trends

In historical results, the concentrations of cadmium and nitrite at background location SW-4 were documented to be in non-conformance with the concentration limits of Table B of the TGD (Table 5). Consistent with historical results, surface water quality at SW-4 was interpreted to be representative of background surface water quality at the site. Background surface water location SW-4 has been observed to have historically high concentrations of phenols, phosphorus, and zinc, and low DO concentrations, attributed to naturally-occurring conditions and/or off-site sources (Table 5).

Surface water location SW-5 was relocated prior to the 2007 surface water monitoring program per MECP TSS surface water review comments (Greenview, 2008). SW-5 was relocated downstream of SW-4, at a wetland area northeast of the site. SW-5 is located at approximately the mid-point between background location SW-4

and the furthest downstream sampling location SW-3, and approximately 600 m southeast of the AWDA of the Black Donald Site (Figure 3). The following photographs are representative of surface water location SW-5:

Photograph 2: Surface Water Location SW-5 (Spring & Summer 2021, Fall 2020 [left to right])



In summer and fall 2022, no discernible flow conditions were observed at SW-5 (Appendix C). Beaver activity in the vicinity of SW-5 has historically been observed; however, no specific beaver activity was noted in the vicinity of SW-5 in 2022 (Appendix C). In 2022, few parameter concentrations at SW-5 were above 75th percentile background surface water quality at the site (Table 5). Non-conformances of PWQO, and significant trends, at surface water sampling location SW-5 were as follows (Table 5):

Sampling Location	PWQO Non-Conformance			Five (5) Year Trend Analysis	
	Spring 2022	Summer 2022	Fall 2022	Increasing	Decreasing
SW-5	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Zinc 	<ul style="list-style-type: none"> No significant trends 	<ul style="list-style-type: none"> No significant trends

Consistent with historical results noted at background location SW-4, the concentration of nitrite at SW-5 was historically documented to be in non-conformance with the concentration limit of Table B of the TGD (Table 5). Historically, SW-5 has not been interpreted to be impacted by landfill related activities (Greenview, 2022), the noted PWQO non-conformances in historical results from location SW-5 were interpreted to be consistent with expected results in a no-flow, wetland environment. Surface water sampling location SW-5 was not interpreted to be impacted from landfill-related activities in 2022 (Appendix C; Table 5).

Sampling location SW-6 drains a low-lying depressional area that collects surface water drainage from the adjacent elevated topographic areas (Figure 3), and flows eastward through a cross-culvert under Hydro Dam Road. SW-6 is located approximately 1,150 m south of the AWDA of the Black Donald site (Figure 3). The following photographs are representative of surface water location SW-6:

Photograph 3: Surface Water Location SW-6 (Spring & Summer 2021, Fall 2020 [left to right])



In 2022, few parameter concentrations at SW-6 were above 75th percentile background surface water quality at the site (Table 5). Non-conformances of PWQO, and significant trends, at SW-6 were as follows (Table 5):

Sampling Location	PWQO Non-Conformance			Five (5) Year Trend Analysis	
	Spring 2022	Summer 2022	Fall 2022	Increasing	Decreasing
SW-6	• None	• None	• None	• No significant trends	• No significant trends

Consistent with the non-conformance noted at background location SW-4, the concentration of nitrite at SW-6 was historically documented to be in non-conformance with the concentration limit of Table B of the TGD (Table 5). Historically, SW-6 has not been interpreted to be impacted by landfill related activities (Greenview, 2022). In spring and summer 2022, the PWQO non-conformance for concentrations of phosphorus at SW-4 was noted. Historically, the noted PWQO non-conformance for the concentration of phosphorus at SW-6 was consistent with the concentration documented at background location SW-4 in historical results. The high pH value in previous results at SW-6 was interpreted to be anomalous, as similarly high pH values have not historically been documented at SW-6 prior to that results (Table 5). Results from location SW-6 in 2022 were interpreted to be consistent with typical wetland characteristics in surface water. Surface water sampling location SW-6 was not interpreted to be impacted from landfill-related activities in 2022 (Appendix C; Table 5).

Surface water location SW-3, located furthest downstream of the site and approximately 1,300 m southwest of the AWDA of the Black Donald site, originates from a wetland area located to the southeast of the site (Figure 3). The following photographs are representative of surface water location SW-3:

Photograph 4: Surface Water Location SW-3 (Spring, Summer, Fall 2021 [left to right])



Consistent with historical observations, SW-3 was observed to be a shallow pool of water surrounded on all sides by trees and shrubs common in low-lying environments, and was observed to have no discernible flow for the summer and fall 2022 sampling event (Figure 3; Appendix C). Surface water quality results at SW-3 were generally similar to, and in most cases exhibited lower concentrations than, background surface water quality results at SW-4 in 2022 (Table 5). In 2022, some parameter concentrations at SW-3 were above 75th percentile background surface water quality at the site (Table 5). Non-conformances of PWQO, and significant trends, at surface water sampling location SW-3 were as follows (Table 5):

Sampling Location	PWQO Non-Conformance			Five (5) Year Trend Analysis	
	Spring 2022	Summer 2022	Fall 2022	Increasing	Decreasing
SW-3	• None	• No sample	• Iron • Phosphorus	• No significant trends	• No significant trends

Consistent with some results at background location SW-4, the concentration of cadmium in spring and fall 2022 at location SW-3, and historically the concentration of nitrite, were documented to be in non-conformance with the concentration limits of Table B of the TGD (Table 5). Historically, SW-3 has not been interpreted to be impacted by landfill related activities (Greenview, 2022), and results from SW-3 were interpreted to be generally

consistent with background surface water quality results at SW-4 (Table 5). Surface water sampling location SW-3 was not interpreted to be impacted from landfill-related activities in 2022 (Appendix C; Table 5).

The surface water systems in the vicinity of the Black Donald site, as sampled during the 2022 environmental monitoring program, were not interpreted to be impacted from landfill-related activities. Given the significant distances of the surface water sampling locations from the Black Donald site, impacts resultant of landfill-related activities are not anticipated to have the potential to occur.

4.3 Trigger Mechanism Review

The review of the groundwater and surface water Trigger Mechanism for the Black Donald Waste Disposal Site is provided below.

Consistent with the Trigger Mechanism as outlined in the DODP (Greenview, 2010) issued on December 22, 2010, the twelve (12) key trigger parameters included in the Trigger Mechanism were reviewed in detail including ammonia (un-ionized), barium, boron, chloride, chromium, chemical oxygen demand (COD), iron, nitrate, sodium, sulphate, total kjeldahl nitrogen (TKN) and total phosphorus, as part of the source-pathway-receptor model for contaminant analysis. Based on the 2022 review, the Trigger Mechanism was not interpreted to be activated.

As part of the Trigger Mechanism analysis at the Black Donald site, a source-pathway-receptor model was used in the evaluation of contaminants across the site. Monitoring wells BH2 and MW08-6 (background), BH1 and BH4 (leachate characterization), and MW08-7 (along flow path and receptor trigger location) were used for the Trigger Mechanism analysis for groundwater, while surface water locations SW-4 (background), and SW-3 and SW-6 (receptor trigger locations) were used for the Trigger Mechanism analysis for surface water at the Black Donald site (Figures 3, 4, 5, and 6). Graphs illustrating the key trigger parameters used as part of the 2022 environmental monitoring program at the above sampling locations for the previous five (5) year period, including un-ionized ammonia, barium, boron, chloride, chromium, COD, iron, nitrate, sodium, sulphate, TKN and total phosphorus, are included in Graphs 1 through 12, respectively. The following is a detailed review of each of the key trigger parameters used in the Trigger Mechanism evaluation. Generally, seasonal variations in concentrations are apparent.

4.3.1 Un-ionized Ammonia

Un-ionized ammonia concentrations for the previous five (5) year period (as available) at key groundwater and surface water trigger locations are illustrated in Graph 1. The highest concentrations of un-ionized ammonia were noted in leachate characterization monitoring well BH1, while concentrations at all other key trigger locations appear to be relatively low and generally stable over time. With the exception of an increasing trend for un-ionized ammonia in historical results from leachate monitoring well BH1, no increasing trends were noted for concentrations of un-ionized ammonia at any of the other key trigger locations following inclusion of 2022 results. The trend analysis, as illustrated on Graph 1, indicated that un-ionized ammonia concentrations were generally stable downgradient and downstream of the Black Donald site. All un-ionized ammonia concentrations in surface water were below the PWQO limit. The Trigger Mechanism was not interpreted to be activated with respect to un-ionized ammonia in 2022.

4.3.2 Barium

Barium concentrations for the previous five (5) year period (as available) at key groundwater and surface water trigger locations are illustrated in Graph 2. The highest concentrations of barium were noted in leachate characterization monitoring well BH1 and BH4, while low concentrations of barium were noted at the groundwater background locations (BH2 and MW08-6). The highest barium concentration for the surface water monitoring locations was noted at background monitoring location SW-3 in fall 2022. Monitoring location SW-6 exhibited the lowest barium concentration in summer 2022. An increasing trend for the concentration of barium was noted

at groundwater location MW08-6 and MW08-7 following inclusion of 2022 results, but all barium concentrations in groundwater locations were below the ODWS and RUC limits. A decreasing trend was interpreted in results from leachate monitoring well BH1 in historical results. The trend analysis, as illustrated on Graph 2, indicated that barium concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to barium in 2022.

4.3.3 Boron

Boron concentrations for the previous five (5) year period (as available) at key groundwater and surface water trigger locations are illustrated in Graph 3. The highest concentrations of boron were noted in leachate characterization monitoring wells BH1 and BH4, while low concentrations of boron were noted at the groundwater background locations (BH2 and MW08-6), groundwater receptor trigger location MW08-7, surface water receptor trigger locations (SW-3 and SW-6) and background surface water location SW-4. No increasing trends for concentrations of boron were noted at any of the key trigger locations following inclusion of 2022 results. All 2022 groundwater-related boron concentrations have been below RUC limits (although historically BH1 and BH4 have had boron concentrations above the RUC limits), while all boron concentrations at all locations have been below the ODWS limits. All recent surface water results have been below the PWQO limits. The trend analysis, as illustrated in Graph 3, indicated that boron concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to boron in 2022.

4.3.4 Chloride

Chloride concentrations for the previous five (5) year period (as available) at key groundwater and surface water trigger locations are illustrated in Graph 4. The highest concentrations of chloride in groundwater were noted in results at leachate well SW-4 in summer 2022, while low concentrations of chloride were noted at background groundwater locations BH2 and MW08-6 and at surface water receptor trigger location SW-3. Following inclusion of 2022 results, as illustrated in Graph 5, chloride concentrations were generally stable downgradient and downstream of the Black Donald site, with the exception of a historically interpreted decreasing trend for chloride at leachate monitoring well BH1. All recently documented chloride concentrations have been below ODWS and RUC limits for both groundwater and surface water. The Trigger Mechanism was not interpreted to be activated with respect to chloride in 2022.

4.3.5 Chromium

Chromium concentrations for the previous five (5) year period (as available) at key groundwater and surface water trigger locations are illustrated in Graph 5. All chromium concentrations in groundwater and surface water were noted to be equal to or below the detection limit. No increasing trends were noted for concentrations of chromium at any of the key trigger locations following inclusion of 2022 results. All concentrations in groundwater monitoring wells were below the ODWS and RUC limits in 2022. Similarly, no concentrations in surface water were above the PWQO limit in 2022. The trend analysis, as illustrated on Graph 5, indicated that chromium concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to chromium in 2022.

4.3.6 Chemical Oxygen Demand (COD)

COD concentrations for the previous five (5) year period (as available) at key groundwater and surface water trigger locations are illustrated in Graph 6. The highest concentrations of COD were noted at leachate monitoring well BH4 in 2022, while the lowest concentrations of COD were noted at background groundwater location BH2. No increasing trends were noted for concentrations of COD at any of the key trigger locations following inclusion of 2022 results. The trend analysis, as illustrated in Graph 6, indicated that some seasonal variability of COD

concentrations downgradient and downstream of the Black Donald site is occurring. The Trigger Mechanism was not interpreted to be activated with respect to COD in 2022.

4.3.7 Iron

Iron concentrations for the previous five (5) year period (as available) at key groundwater and surface water trigger locations are illustrated in Graph 7. The highest concentrations of iron were noted at leachate characterization monitoring well BH1, while significantly lower concentrations of iron were noted at all other groundwater and surface water sampling locations in 2022. Given that iron concentrations in leachate monitoring well BH1 were historically significantly higher than concentrations documented for all other sampling locations, iron concentrations for leachate monitoring well BH1 were historically removed from Graph 7 for graphical purposes. With the exception of an increasing trend for concentrations of iron at surface water location SW-3, no increasing trends for concentrations of iron were noted at any of the other key trigger locations following inclusion of 2022 results, while decreasing trends were interpreted in results from BH1. Iron concentrations at leachate monitor BH1 were noted to be decreasing, based on 2022 results. Only leachate monitoring well BH1 was noted to have concentrations of iron consistently in non-conformance with ODWS and RUC limits, while surface water locations were noted to have higher iron concentrations during summer and fall sampling events, which were attributed to low-water / low-flow environments at the sampling locations. Surface water location SW-6 was documented to have iron concentrations above the PWQO (and ODWS) in historical results. In fall 2022, iron concentrations exceeded ODWS limits for SW-3. The trend analysis, as illustrated in Graph 7, indicated that iron concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to iron in 2022.

4.3.8 Nitrate

Nitrate concentrations for the previous five (5) year period (as available) at key groundwater and surface water trigger locations are illustrated in Graph 8. The highest concentrations of nitrate were noted at leachate characterization monitoring well BH1 in spring 2022, while low concentrations of nitrate were noted at all other groundwater and surface water sampling locations. With the exception of a minor increasing trend historically recorded for concentrations of nitrate at leachate well BH1, no increasing trends for concentrations of nitrate were noted at any of the key trigger locations following inclusion of 2022 results. In 2022, a decreasing trend was interpreted in results from leachate monitoring well BH4. All recent concentrations of nitrate from all sampling locations are significantly below the ODWS and RUC limits. The trend analysis, as illustrated in Graph 8, indicated that nitrate concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to nitrate in 2022.

4.3.9 Sodium

Sodium concentrations for the previous five (5) year period (as available) at key groundwater and surface water trigger locations are illustrated in Graph 9. The highest concentrations of sodium were noted in leachate characterization monitoring well BH1, while low concentrations of sodium were noted at the groundwater background locations (BH2 and MW08-6) and at surface water location SW-3. The dominant source of sodium in the vicinity of the site is interpreted to be road salt (sodium chloride) from winter road maintenance and not landfill-related activities. All recent concentrations of sodium from all sampling locations were below the ODWS and RUC limits, with the exception of RUC non-conformances in results from leachate monitoring well BH1 in fall 2020, fall 2021 and fall 2022. As illustrated in Graph 9, sodium concentrations were interpreted to be generally stable downgradient and downstream of the Black Donald site, with the exception of an interpreted increasing trend in results from leachate monitoring well BH1. The Trigger Mechanism was not interpreted to be activated with respect to sodium in 2022.

4.3.10 Sulphate

Sulphate concentrations for the previous five (5) year period (as available) at key groundwater and surface water trigger locations are illustrated in Graph 10. The highest concentrations of sulphate were noted in leachate monitoring well BH4, while low concentrations of sulphate were noted at the background groundwater locations (BH2 and MW08-6), groundwater receptor trigger location MW08-7, surface water locations (SW-3 and SW-6) and background surface water location SW-4. A minor increasing trend for concentrations of sulphate was historically noted in results for leachate monitoring well BH1. All recent concentrations of sulphate from all sampling locations (with the exception of BH4, as it significantly exceeded RUC limits in fall 2022) were significantly below the ODWS and RUC limits. The trend analysis, as illustrated on Graph 10, indicated that sulphate concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to sulphate in 2022.

4.3.11 Total Kjeldahl Nitrogen

TKN concentrations for the previous five (5) year period (as available) at key groundwater and surface water trigger locations are illustrated in Graph 11. The highest concentrations of TKN were noted in results from leachate characterization monitoring well BH1, while low concentrations of TKN were noted at the groundwater background locations (BH2 and MW08-6), groundwater leachate characterization well BH4, groundwater receptor trigger location MW08-7, surface water receptor trigger locations (SW-3 and SW-6) and background surface water location SW-4. A decreasing trend was interpreted in results from leachate monitoring well BH1. The trend analysis, as illustrated on Graph 11, indicated that TKN concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to TKN in 2022.

4.3.12 Total Phosphorus

Total phosphorus concentrations for the previous five (5) year period (as available) at key groundwater and surface water trigger locations are illustrated in Graph 12. The highest concentrations of total phosphorus have historically been documented in results from monitoring well MW08-7, while concentrations of total phosphorus at all other trigger locations (SW-3 and SW-6) were generally low. The high total phosphorus concentrations in 2018 and 2020 at MW08-7 did not coincide with high concentrations at any upgradient monitoring wells or surface water locations, and therefore it was interpreted that phosphorus concentrations at MW08-7 were not attributed to landfill-related factors. High concentrations of phosphorus were noted in results from background surface water location SW-4 and at trigger location SW-3. No increasing trends for concentrations of total phosphorus were noted at any of the key trigger locations following inclusion of 2022 results. The trend analysis, as illustrated on Graph 12, indicated that total phosphorus concentrations were generally stable downgradient and downstream of the Black Donald site. The Trigger Mechanism was not interpreted to be activated with respect to total phosphorus in 2022.

4.3.13 Trigger Mechanism Review Summary

In fall 2022 and in historical results, PWQO non-conformances at key trigger location SW-3 for concentrations of iron was attributed to low water / low-flow conditions, and not to landfill-related activities. Similarly, PWQO non-conformances for concentrations of phosphorus at key trigger location SW-3 in fall 2022 and in historical results were generally consistent with concentrations observed at background location SW-4, and were therefore not attributed to landfill-related factors. No RUC non-conformances were noted for any of the key trigger parameters at key trigger location MW08-7 following inclusion of 2022 results.

Based on a review of five (5) year time trend analysis for parameters un-ionized ammonia, barium, boron, chloride, chromium, COD, iron, nitrate, sodium, sulphate, TKN and total phosphorus, the Trigger Mechanism was not interpreted to be activated in 2022. Routine monitoring of groundwater and surface water should continue in 2022 at the Black Donald site.

4.4 Operations Summary

A summary of 2022 waste management operations at the Black Donald Waste Disposal Site is presented below.

4.4.1 Site Operations

In 2022, the site operated as a municipal solid waste landfill, accepting C&D and bulky wastes for disposal, in accordance with ECA A411902 and the most recent amendment dated January 24, 2013 (Appendix A). The Black Donald site was closed to the public on April 5, 2010; however, disposal operations at the site are currently available to municipal vehicles and Township-approved haulers only, under the supervision of Township operations staff (Greenview, 2010b). The application to amend the ECA and approve the DODP for the Black Donald site was approved by the MECP with an amendment to the ECA, issued January 24, 2013 (Appendix A).

A sign is posted at the entrance to the site which indicates that the site is closed to the public, that access to the site is available to Township and authorized personnel only, emergency contact information, and the ECA number for the site. In response to the Inspection Report provided to the Township from the MECP Ottawa District Office in 2015 and the Township's proposed Compliance Action Plan (Greenview, 2016), the entrance sign to the Black Donald site was replaced with a new sign in November 2015.

Access to the site is provided by Hydro Dam Road, located off County Road 508, approximately 15 km southwest of the Village of Calabogie. Site access is restricted by a lockable gate at the site entrance, and the site is surrounded by forested lands, which provide adequate screening and restricted access for vehicular traffic, aside of the maintained site entrance-way. Per the Inspection Report provided to the Township from the MECP Ottawa District Office in 2015 and the Township's proposed Compliance Action Plan (Greenview, 2016), upgrades were completed by the Township to restrict access to the site from unauthorized persons in October 2015. The Township continues to monitor unauthorized access to the site and upgrades the site accordingly on an as-needed basis.

The site access road extending from Hydro Dam 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 serviceable condition during the routine site inspections conducted by Greenview during site visits in 2022.

In accordance with Condition 23 of the Amendment to the ECA (Appendix A) and the MECP 2019 Inspection Report (Greenview, 2020), completion of Weekly Inspection Logs at the Black Donald site commenced as of November 22, 2019. Additionally, a "No Dumping" sign was installed at the site gates as of December 31, 2019, in accordance with the requirements of the 2019 Inspection Report (Greenview, 2020).

4.4.2 Waste Disposal / Transfer Summary

The Black Donald Waste Disposal Site was closed to the public on April 5, 2010; however, disposal operations at the site are currently available to municipal vehicles and Township-approved haulers only, under the supervision of Township operations staff (Greenview, 2010b). In 2022, the Black Donald site was used only to stockpile C&D and bulky wastes generated from within the Township for processing (size-reduction) and disposal. C&D and bulky waste processing activities were completed at the site in fall 2022. No recycling operations were conducted at the Black Donald site in 2022.

Additionally in 2021, the Township accepted a significant quantity of bentonite clay material from a nearby construction project. The bentonite clay material was emplaced at the site as final cover material and as regular cover in areas of the AWDA.

In 2022, the volume of processed C&D and bulky wastes processed and disposed at the Black Donald Waste Disposal Site was determined by a specialized survey and design technique referred to as digital terrain modelling (DTM). The DTM method is a computer-based process that compares two (2) topographic surfaces or digital terrain models, and calculates the prismatic volumetric difference.

To calculate the volume of waste disposed at the site in 2022, the topographic survey conducted on December 08, 2022, was compared to the topographic survey conducted on December 14, 2021, at the Black Donald site. The volumetric difference of waste (processed and unprocessed C&D and bulky waste) disposed at the site during this time span was approximately 826 cubic metres (m³), following compaction and grading operations at the site.

Based on the 2022 fill rate of 826 m³ (processed and unprocessed C&D and bulky waste) and the approved final contours at closure (FCC) for the Black Donald site, the remaining site capacity as of December 08, 2022, was approximately 3,575 m³. Given the average (mean) five (5) year fill rate (2017 to 2022) of 857 m³ and the remaining capacity of 3,575 m³, the estimated remaining site life for the Black Donald site is approximately four (4) years.

Based on Township records, 34 tri-axes and approximately 700 m³ of unprocessed C&D and bulky wastes were received at the Black Donald Waste Disposal Site in 2022, prior to processing in fall 2022.

As processed C&D and bulky wastes are approved as alternative daily cover (ADC) for the Black Donald site (Appendix A), no aggregate-based cover materials (i.e. sand, etc.) were utilized as part of operations in 2022. As noted above, bentonite clay material was emplaced at the site in 2021 for use as regular and/or final cover.

On July 19, 2022, Greenview completed a grade stake survey at the Black Donald Waste Disposal Site in order to assist the municipality with continued waste grinding and landfilling operations.

Waste operations training for Township waste operation staff was conducted by Greenview on June 12, 2017. In 2013, the Township passed a new waste management by-law (By-law No. 09 – 2013), to establish, maintain and regulate a system for the disposal of municipal waste, recyclables, and other refuse (Greenview, 2014).

4.4.3 Site Inspections and Maintenance

Site inspections of the waste disposal area and property at the Black Donald site were conducted by Greenview on May 04, 2022, August 18, 2022, and October 27, 2022 during the spring, summer, and fall sampling events. Greenview also conducted a site inspection on December 08, 2022, during the annual capacity survey. The Township also conducted periodic investigations to verify the compliance status of the site.

The Township exercises routine litter management activities at the Black Donald site on each operating day, and litter cleanup activities were completed by the Township at the Black Donald site on an as-needed basis in 2022.

In spring 2014, the Township planted one hundred (100) red pine seedlings along the northeastern AWDA boundary at the Black Donald site, in order to provide a visual buffer for the site from Hydro Dam Road (Figure 2). Additionally, in late 2012, 2013, 2014, and 2015, the Township installed large boulders in specific areas along the northwestern property boundary and in the vicinity of the AWDA in order to restrict access to the site from unauthorized persons.

With the exception of monitoring well BH3, which was observed to have been destroyed in fall 2022 by site equipment and is schedule to be replaced in 2022, all monitoring wells at the Black Donald Waste Disposal Site were observed to be in good condition in 2022, in accordance with O.Reg. 903 (Wells).

As of November 22, 2019, the Township commenced with the completion of weekly inspections at the Black Donald site, in accordance with Condition 23 of the Amendment to the ECA (Appendix A).

4.4.4 Complaints

There were no reported complaints received by the Township with respect to waste management operations at the Black Donald Waste Disposal Site in 2022.

4.4.5 Monitoring and Screening Checklist

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

5.0 Conclusions and Recommendations

Based on the results of the 2022 environmental monitoring program completed for the Black Donald Waste Disposal Site, the following conclusions are provided:

- The groundwater configuration at the site in 2022 was consistent with historical interpretations with an east-west oriented groundwater divide evident in the vicinity of the waste mound, and predominant groundwater flow directions to the east, west, and southeast. Additionally, groundwater in the vicinity of the monitoring well MW08-6 was interpreted to flow to the east. As monitoring well BH3 was observed to have been destroyed during the fall 2021 sampling event, no sample could be obtained during the 2022 sampling events.
- Groundwater immediately downgradient from the site at monitoring wells BH1 and BH4, and historically BH3 was interpreted to be impacted from landfill-related activities in 2022. Most parameter concentrations were above median background groundwater quality results, with non-conformances of ODWS for concentrations of alkalinity, DOC, hardness, iron, manganese, and TDS noted at select monitors. The generally lower parameter concentrations historically noted at monitoring well BH3 compared to those at monitoring wells BH1 and BH4 were attributed to its location partially cross-gradient to the waste mound and along the groundwater divide at the site. Results from monitoring well BH1 were interpreted to be most representative of leachate quality at the Black Donald site at this time.
- Per the ECA for the Black Donald site, samples were last collected for VOC analysis from BH1 in spring 2022, and all values were below ODWS limits. Samples are collected at BH1 every five (5) years, and the next sampling event for VOC analysis at monitoring well BH1 is scheduled for 2027.
- No RUC non-conformances were documented in results from downgradient monitoring well MW08-7 in 2022 that were attributed to landfill-related factors. Given that the RUC non-conformance for the concentration of DOC in historical results from downgradient monitoring well MW08-7 was also documented to occur in results from background monitoring wells BH2 and MW08-6 for the same historical sampling event, the noted RUC non-conformance for DOC in historical results at MW08-7 was attributed to naturally-occurring conditions upgradient of the site and/or off-site sources, and not to landfill-related factors (Table 4). Based on the above, the Black Donald site was interpreted to meet the intent of MECP Guideline B-7 at the downgradient eastern CAZ boundary in 2022.
- Based on the surface water quality results in 2022, and the significant distance of each sampling location from the AWDA of the Black Donald site, the surface water systems south and southeast of the Black Donald site were not interpreted to be impacted from landfill-related activities. Non-conformances of PWQO for concentrations of DO (low), phosphorus, iron and zinc noted in 2022 at select sampling locations for select sampling dates were attributed to naturally-occurring conditions in the background (SW-4), as well as to low-flow / low surface water conditions. The high pH value in historical results at location SW-6 was interpreted to be anomalous.
- In 2022, PWQO non-conformances at key trigger locations SW-3 and historically SW-6 for concentrations of iron were attributed to low water / low-flow conditions, and not to landfill-related activities. Similarly, PWQO non-conformances for concentrations of phosphorus at key trigger location SW-3 were generally consistent with concentrations observed at background location SW-4, and were therefore not attributed to landfill-related factors. No RUC non-conformances were noted for any of the key trigger parameters at key trigger location MW08-7 following inclusion of 2022 results. Based on a review of five (5) year time trend analysis for parameters un-ionized ammonia, barium, boron, chloride, chromium, COD, iron, nitrate, sodium, sulphate, TKN and total phosphorus, the Trigger Mechanism was not interpreted to be activated in 2022. Routine monitoring of groundwater and surface water should continue in 2022 at the Black Donald site.

- To calculate the volume of waste disposed at the site in 2022, the topographic survey conducted on December 08, 2022, was compared to the topographic survey conducted on December 14, 2021, at the Black Donald site. The volumetric difference of waste (processed and unprocessed C&D and bulky waste) disposed at the site during this time span was approximately 826 cubic metres (m³), following compaction and grading operations at the site.
- Based on the 2022 fill rate of 826 m³ (processed and unprocessed C&D and bulky waste) and the approved final contours at closure (FCC) for the Black Donald site, the remaining site capacity as of December 08, 2022, was approximately 3,575 m³. Given the average (mean) five (5) year fill rate (2018 to 2022) of 857 m³ and the remaining capacity of 3,575 m³, the estimated remaining site life for the Black Donald site is approximately four (4) years.
- Based on Township records, 34 tri-axes and approximately 700 m³ of unprocessed C&D and bulky wastes were received at the Black Donald Waste Disposal Site in 2022, prior to processing in fall 2022.
- All other municipal waste generated within the Township was directed to the Township's transfer stations at the Griffith, Norway Lake, and Mount St. Patrick Waste Disposal Sites for management. No diversion operations for recyclables were conducted at the Black Donald site in 2022.
- On July 19, 2022, Greenview completed a grade stake survey at the Black Donald Waste Disposal Site in order to assist the municipality with continued waste grinding and landfilling operations. In 2022, the Black Donald site operated as a municipal solid waste landfill, accepting C&D and bulky wastes for disposal, in accordance with ECA A411902 (as amended on January 24, 2013). The Black Donald site was closed to the public on April 5, 2010; however, disposal operations at the site are currently available to municipal vehicles and Township-approved haulers only, under the supervision of Township operations staff.

The following recommendations are provided to the Township for consideration as part of the 2022 work program for the Black Donald Waste Disposal Site:

- The 2022 groundwater monitoring program for the site should continue to include sampling events in the spring and fall at the existing monitoring wells BH1, BH2, BH3, BH4, MW08-5, MW08-6, and MW08-7 for the parameter suite shown in Table 1.
- Groundwater monitoring wells BH2 and MW08-6 should continue to be used to define background groundwater quality at the site.
- The 2022 surface water monitoring program at the site should continue to include sampling events in the spring, summer, and fall inclusive of surface water sampling stations SW-3, SW-4, SW-5, and SW-6, for the parameter suite shown in Table 1. Collection of surface water samples during scheduled sampling events should only be conducted if sufficient quantities of water are available at the sampling location to avoid potentially biased results.
- Monitoring well BH3, which was observed during the fall 2021 sampling event to have been destroyed, should be replaced with a new monitoring well in approximately the same location with a similar depth below ground surface.

6.0 Closing

Greenview has prepared this 2022 Annual Report in accordance with MECP guidelines and Condition 27 of the ECA (A411902) to document site operations in 2022, and the results of the 2022 environmental monitoring program for the Black Donald Waste Disposal Site.

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

All respectfully submitted by,

Greenview Environmental Management Limited



Tyler H. Peters, P.Eng.
Project Director



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Tables



Table 1
2022 Groundwater and Surface Water Monitoring Program
Black Donald Waste Disposal Site

Location		Frequency	Parameters			
Groundwater						
BH1	BH2	Twice (2x)	Alkalinity	Aluminum	Ammonia (total)	
BH3R	BH4		Barium	Boron	Cadmium	
MW08-5	MW08-6		Calcium	Chloride	Chromium	
MW08-7			Cobalt	COD	Copper	
			DOC	Hardness	Iron	
			Magnesium	Manganese	Nitrate	
1x QA/QC			Phenols	Phosphorus (total)	Potassium	
		(Spring & Fall)	Silicon	Sodium	Strontium	
			Sulphate	TDS	TKN	
			Zinc			
			Field Measurements			
			Conductivity	Dissolved Oxygen	pH	
			Temperature			
COUNT =	8					
Groundwater (Volatile Organic Compounds)						
BH1		Once (1x)	EPA 624 Volatile Organic Compounds			
		(Spring) Every Five Years (Next in 2022)				
COUNT =	1					
Surface Water						
SW-3	SW-4	Three Times (3x)	Alkalinity	Ammonia (total)	Barium	
SW-5	SW-6		BOD	Boron	Cadmium	
			Calcium	Chloride	Chromium	
			COD	Copper	DOC	
1x QA/QC			Hardness	Iron	Magnesium	
			Manganese	Nitrate	Nitrite	
			Phenols	Phosphorus (total)	Potassium	
		(Spring, Summer, & Fall)	Sodium	Strontium	Sulphate	
			TDS	TKN	TSS	
			Zinc			
			Field Measurements			
			Conductivity	Dissolved Oxygen	pH	
			Temperature	Un-ionized Ammonia (calculation)		
COUNT =	5					

Table 2
Groundwater Monitoring Well and Surface Water Sampling Locations
Black Donald Waste Disposal Site

Groundwater			
Monitor	Zone	Northing	Easting
BH1	18T	5010512	353241
BH2	18T	5010578	353185
BH3	18T	5010421	353188
BH4	18T	5010428	353115
MW08-5	18T	5010294	353052
MW08-6	18T	5010427	353017
MW08-7	18T	5010522	353374

Surface Water			
Monitor	Zone	Northing	Easting
SW-3	18T	5009153	353021
SW-4	18T	5010921	353450
SW-5	18T	5009774	353354
SW-6	18T	5009323	353300

Notes:

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


































Table 3
Groundwater Elevations
Black Donald Waste Disposal Site

Monitor	Ground Elevation (m) ¹	Top of Pipe Elevation (m) ¹	Stick-Up (m)	Depth of Well (m) ²	Well Diameter (mm)	Water Elevation (m)																				
						24-May-16	31-Aug-16	26-Oct-16	08-May-17	18-Sep-17	25-Oct-17	02-May-18	14-Aug-18	30-Oct-18	14-May-19	20-Aug-19	16-Oct-19	23-Apr-20	19-Aug-20	27-Oct-20	19-May-21	19-Aug-21	04-Nov-21	04-May-22	18-Aug-22	27-Oct-22
BH1	93.60	94.18	0.58	8.25	50.8	87.47	87.47	87.36	90.90	88.09	88.37	90.08	88.02	87.81	89.87	88.10	87.12	89.91	89.95	88.99	89.53	88.70	88.72	89.92	89.20	88.72
BH2	98.98	99.79	0.81	7.06	50.8	95.77	95.27	95.02	96.91	95.49	95.88	96.63	95.32	95.23	96.39	94.85	94.49	96.43	93.83	95.82	96.04	95.49	95.88	96.46	96.14	95.58
BH3	99.80	100.67	0.87	8.61	50.8	97.28	96.74	97.26	97.13	96.65	96.63	97.05	96.72	96.62	96.96	96.22	95.67	96.94	97.05	96.93	96.83	96.63	-	-	-	-
BH4	95.96	96.80	0.84	6.97	50.8	93.20	92.47	92.66	94.10	93.01	93.36	93.71	92.61	92.55	93.57	92.54	92.05	93.53	93.32	93.33	93.32	92.93	93.30	93.39	91.82	93.13
MW08-5	105.03	106.06	1.03	12.52	50.5	92.62	92.56	92.55	92.64	92.56	92.56	92.56	92.57	92.56	92.56	92.56	92.56	92.57	92.57	92.57	92.56	92.57	92.55	92.56	92.66	92.55
MW08-6	102.23	103.22	0.99	22.74	50.8	97.71	97.85	97.89	97.94	97.81	97.88	97.90	97.91	97.72	97.90	97.57	97.44	97.90	97.85	97.93	97.85	97.77	97.91	97.87	97.62	97.84
MW08-7	77.785	78.717	0.93	7.70	50.8	77.86	74.73	74.88	78.08	77.40	77.34	77.98	76.33	75.33	78.00	76.47	75.39	77.95	76.27	75.63	77.83	77.03	76.72	77.90	77.44	77.14

Notes:
1. Elevations surveyed by SGS Lakefield Research Ltd.
2. Depth of well below ground surface (m).
All elevations are relative to a site specific benchmark elevation of 100.00 m.
*- indicates water level is not available.

Table 4
Groundwater Quality
Black Donald Waste Disposal Site

Parameter	Background (median)	RUC ¹	ODWS ²	BH1														5-year Trends
				24-May-16	26-Oct-16	08-May-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	16-Oct-19	23-Apr-20	27-Oct-20	18-May-21	04-Nov-21	04-May-22	27-Oct-22	(sparkline)
Alkalinity (as CaCO ₃)	202	353	30 - 500	780	815	773	790	733	680	703	670	613	724	722	800	602	646	
Aluminum	0.03	0.065	0.1	0.060	0.10	0.12	0.11	0.10	0.10	0.10	0.12	0.09	0.06	0.07	0.09	0.06	0.07	
Ammonia, Total (as N)	0.02	N/L	N/L	7.27	8.79	6.23	7.20	6.48	5.94	5.85	2.66	5.03	1.39	6.03	5.54	5.27	1.91	
Ammonia, Un-ionized ³	0.00022	N/L	N/L	0.01559	0.01119	0.00611	0.00915	0.00150	0.00686	0.01208	0.00579	0.01407	0.00646	0.01656	0.01735	0.00646	0.00464	
Barium	0.019	0.3	1	0.142	0.170	0.213	0.196	0.152	0.144	0.121	0.131	0.111	0.088	0.121	0.122	0.116	0.076	
Boron	0.01	1.3	5	1.19	1.37	1.33	1.53	1.62	1.48	1.66	1.53	1.20	0.911	1.68	1.14	1.29	0.610	
Cadmium	0.000015	0.0013	0.005	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	0.000017	< 0.000015	< 0.000028	< 0.000028	< 0.000028	< 0.000015	0.000015	
Calcium	79	N/L	N/L	186	215	288	252	225	200	203	220	196	173	214	187	175	133	
Chloride	0.8	125	250	69.0	13.3	56.4	55.0	59.2	46.4	49.7	50.5	33.5	37.5	43.4	37.7	33.8	20.6	
Chromium	0.001	0.013	0.05	< 0.002	0.002	0.001	< 0.001	< 0.002	< 0.001	< 0.001	0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	
Cobalt	0.0004	N/L	N/L	0.0072	0.0053	0.0077	0.0050	0.0044	0.0097	0.0039	0.0072	0.0060	0.0026	0.0066	0.0054	0.0071	0.0019	
Chemical Oxygen Demand	5	N/L	N/L	62	61	62	69	66	48	58	40	45	29	63	33	32	15	
Conductivity (µS/cm) ⁴	284	N/L	N/L	160	1170	1106	1150	1060	1041	1001	909	913	1086	1102	1044	741	924	
Copper	0.002	0.5	1	< 0.002	< 0.002	< 0.002	0.003	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0015	< 0.002	0.0026	0.0015	
Dissolved Organic Carbon	2.1	3.6	5	16.0	17.9	17.6	21.1	18.7	17.4	22.1	17.1	16.2	9.7	18.4	18.4	14.4	7.7	
Hardness (as CaCO ₃)	209	357	500	592	684	886	784	705	621	644	687	614	544	672	596	550	445	
Iron	0.007	0.2	0.3	7.40	14.60	23.60	17.70	6.31	6.70	0.898	3.19	5.03	0.668	0.014	4.87	5.24	1.04	
Magnesium	2.8	N/L	N/L	30.9	35.8	40.4	37.4	34.7	29.5	33.1	33.3	30.2	27.2	33.5	31.2	27.6	27.4	
Manganese	0.001	0.03	0.05	1.80	1.97	3.68	2.10	1.15	1.25	1.06	1.10	1.07	0.190	1.27	0.917	1.17	0.315	
Nitrate (as N)	0.10	2.6	10	0.2	44.2	0.10	0.32	0.73	0.05	1.06	0.60	0.89	0.48	1.88	0.31	0.27	0.63	
pH (units) ⁴	7.65	6.5 - 8.5	6.5 - 8.5	7.11	6.84	6.81	6.83	6.14	6.81	7.15	7.08	6.94	7.44	7.19	7.25	6.86	7.13	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.018	< 0.001	0.001	0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	
Phosphorus, Total	0.03	N/L	N/L	0.04	0.04	0.05	0.02	0.06	0.02	0.05	0.02	0.02	0.03	0.03	0.03	< 0.01	0.02	
Potassium	2.4	N/L	N/L	15.0	17.8	18.6	17.4	16.9	15.4	15.3	15.2	13.7	10.4	14.1	12.5	11.9	7.8	
Silicon	4.38	N/L	N/L	9.24	11.10	12.30	11.80	9.69	8.63	9.10	8.78	9.90	9.02	9.80	10.9	10.4	7.44	
Sodium	3	101.3	200	75.2	82.4	76.3	76.3	86.8	71.3	71.3	60.2	70.0	141	96.8	138	86.3	120	
Strontium	0.26	N/L	N/L	0.509	0.625	0.680	0.665	0.618	0.521	0.595	0.592	0.500	0.467	0.585	0.554	0.473	0.417	
Sulphate	12	256	500	31	93	24	29	40	36	42	36	42	68	62	55	49	38	
Total Dissolved Solids	231	366	500	895	946	875	909	818	806	823	773	703	872	848	857	707	715	
Total Kjeldahl Nitrogen	0.2	N/L	N/L	10.4	13.6	8.8	8.9	8.2	7.7	7.3	3.4	5.8	1.9	6.0	5.9	5.9	2.3	
Zinc	0.005	2.5	5	< 0.005	< 0.005	< 0.005	0.007	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	0.005	

Notes:

1. Reasonable Use Concept (RUC) criteria.
 2. Ontario Drinking Water Standards (ODWS).
 3. Results obtained from laboratory analysis.
 4. Results obtained from field analysis.
- All results are expressed in mg/L unless otherwise stated.
 Bold and shaded values exceed the ODWS.
 Bold and Italic values exceed RUC limits.
 N/L indicates No Limit.
 *** indicates results obtained from lab analysis
 ** indicates parameter not analyzed.

**Table 4
Groundwater Quality
Black Donald Waste Disposal Site**

Parameter	Background (median)	RUC ¹	ODWS ²	BH2 (Background)														5-year Trends (sparkline)
				24-May-16	26-Oct-16	08-May-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	16-Oct-19	23-Apr-20	27-Oct-20	18-May-21	04-Nov-21	04-May-22	27-Oct-22	
Alkalinity (as CaCO ₃)	202	353	30 - 500	232	225	240	218	210	207	220	207	208	201	221	240	238	224	
Aluminum	0.03	0.065	0.1	0.02	0.28	0.07	0.05	0.05	0.03	0.05	0.06	0.05	0.02	0.03	0.06	0.03	0.05	
Ammonia, Total (as N)	0.02	N/L	N/L	< 0.01	< 0.01	< 0.01	< 0.01	0.03	0.03	0.04	0.02	0.03	0.01	0.01	0.02	0.01	< 0.01	
Ammonia, Un-ionized ³	0.00022	N/L	N/L	0.00000	0.00006	0.00007	0.00008	0.00002	0.00021	0.00035	0.00035	0.00032	0.00029	0.00006	0.00010	0.00007	0.00005	
Barium	0.019	0.3	1	0.014	0.019	0.034	0.020	0.017	0.018	0.020	0.017	0.018	0.019	0.019	0.021	0.020	0.020	
Boron	0.01	1.3	5	< 0.005	0.007	< 0.005	0.019	0.009	0.005	0.055	0.010	0.010	< 0.005	0.010	0.010	0.012	0.005	
Cadmium	0.000015	0.0013	0.005	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	0.000016	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	0.000016	0.000014	
Calcium	79	N/L	N/L	77.8	88.6	111	92.1	88.0	79.0	90.3	89.7	91.1	89.7	97.8	98.3	97.4	89.5	
Chloride	0.8	125	250	< 0.5	86.8	< 0.5	0.8	< 0.5	0.7	0.8	1.1	1.1	1.1	0.9	0.7	< 0.5	0.7	
Chromium	0.001	0.013	0.05	< 0.002	< 0.002	0.0009	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	
Cobalt	0.0004	N/L	N/L	0.0002	0.0006	< 0.0001	< 0.0001	< 0.0001	0.0002	0.0002	0.0004	0.0003	0.0002	0.0002	0.0003	0.0002	0.0001	
Chemical Oxygen Demand	5	N/L	N/L	< 5	< 5	< 5	< 5	5	< 5	< 5	< 5	6	< 5	< 5	< 5	< 5	< 5	
Conductivity (µS/cm) ⁴	284	N/L	N/L	320	319	298	322	156	286	275	277	248	306	299	401	260	324	
Copper	0.002	0.5	1	0.003	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0012	0.002	0.0018	0.0009	
Dissolved Organic Carbon	2.1	3.6	5	1.3	1.3	1.5	2.7	1.5	2.3	3.2	2.1	2.6	2.0	2.1	5.7	2.2	0.8	
Hardness (as CaCO ₃)	209	357	500	205	235	293	243	232	207	242	236	241	236	257	259	258	234	
Iron	0.007	0.2	0.3	< 0.005	0.016	< 0.005	0.007	0.009	0.058	0.035	< 0.005	0.007	< 0.005	< 0.005	0.021	< 0.005	0.005	
Magnesium	2.8	N/L	N/L	2.55	3.27	3.85	3.07	2.81	2.40	3.97	2.75	3.25	2.84	3.05	3.11	3.51	2.59	
Manganese	0.001	0.03	0.05	< 0.001	0.003	0.001	< 0.001	< 0.001	0.001	0.030	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Nitrate (as N)	0.10	2.6	10	< 0.1	0.1	< 0.05	0.12	< 0.05	< 0.05	0.18	0.14	0.12	0.06	0.11	< 0.05	0.09	0.16	
pH (units) ⁴	7.65	6.5 - 8.5	6.5 - 8.5	6.06	7.60	7.69	7.65	6.70	7.62	7.81	7.97	7.89	8.28	7.56	7.46	7.64	7.51	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.005	< 0.001	< 0.001	0.006	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	
Phosphorus, Total	0.03	N/L	N/L	0.02	0.02	0.02	0.04	0.03	0.01	0.03	0.01	0.02	0.02	0.02	0.01	0.02	0.03	
Potassium	2.4	N/L	N/L	2.2	3.0	3.3	3.3	2.8	2.6	3.1	3.0	3.2	3.1	2.9	3.1	3.1	2.7	
Silicon	4.38	N/L	N/L	5.15	6.26	7.17	7.07	5.89	5.41	5.81	5.74	6.76	6.27	6.49	6.71	7.02	4.23	
Sodium	3	101.3	200	2.7	3.7	3.3	3.1	2.8	2.5	4.6	2.7	3.0	2.8	2.6	3.2	3.3	2.2	
Strontium	0.26	N/L	N/L	0.145	0.184	0.218	0.189	0.170	0.148	0.191	0.178	0.197	0.173	0.190	0.195	0.205	0.160	
Sulphate	12	256	500	12	31	11	11	12	17	12	17	13	17	13	16	15	10	
Total Dissolved Solids	231	366	500	237	256	261	245	221	230	231	229	225	234	233	242	251	235	
Total Kjeldahl Nitrogen	0.2	N/L	N/L	< 0.1	0.3	0.1	0.2	0.2	0.2	< 0.1	0.1	< 0.1	0.1	0.1	0.1	0.2	< 0.1	
Zinc	0.005	2.5	5	0.009	< 0.005	0.006	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	

Notes:
1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Bold and shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates No Limit.
*** indicates results obtained from lab analysis
** indicates parameter not analyzed.

**Table 4
Groundwater Quality
Black Donald Waste Disposal Site**

Parameter	Background (median)	RUC ¹	ODWS ²	BH3											5-year Trends (sparkline)
				24-May-16	26-Oct-16	08-May-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	16-Oct-19	23-Apr-20	27-Oct-20	18-May-21	
Alkalinity (as CaCO ₃)	202	353	30 - 500	379	405	179	452	194	413	234	326	171	407	303	
Aluminum	0.03	0.065	0.1	0.04	0.05	0.04	0.09	0.05	0.10	0.05	0.11	0.05	0.06	0.04	
Ammonia, Total (as N)	0.02	N/L	N/L	< 0.01	0.01	< 0.01	0.04	0.01	0.02	0.02	0.02	0.02	< 0.01	0.01	
Ammonia, Un-ionized ³	0.00022	N/L	N/L	0.000002	0.000013	0.000042	0.000075	0.000010	0.000026	0.000130	0.000136	0.000058	0.000055	0.000037	
Barium	0.019	0.3	1	0.077	0.107	0.035	0.116	0.029	0.091	0.037	0.092	0.033	0.135	0.083	
Boron	0.01	1.3	5	0.291	0.444	0.049	0.705	0.052	0.428	0.093	0.721	0.059	0.376	0.208	
Cadmium	0.000015	0.0013	0.005	0.00005	< 0.00002	< 0.000014	0.000030	0.000085	0.000043	< 0.000015	0.000029	< 0.000015	< 0.000028	< 0.000015	
Calcium	79	N/L	N/L	152	201	82.0	219	75.6	188	93.0	195	73.2	200	143	
Chloride	0.8	125	250	8.5	< 0.5	0.6	6.1	0.9	4.6	1.5	6.4	1.0	4.5	1.9	
Chromium	0.001	0.013	0.05	< 0.002	< 0.002	0.0005	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.001	
Cobalt	0.0004	N/L	N/L	0.0005	0.0019	0.0002	0.0006	< 0.0001	0.0007	0.0002	0.0008	0.0002	< 0.0002	0.0002	
Chemical Oxygen Demand	5	N/L	N/L	13	8	7	20	12	12	10	7	12	12	8	
Conductivity (µS/cm) ⁴	284	N/L	N/L	691	773	325	730	298	717	426	668	283	649	528	
Copper	0.002	0.5	1	0.003	< 0.002	0.004	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	0.0021	
Dissolved Organic Carbon	2.1	3.6	5	5.7	7.2	4.5	10.9	3.8	8.5	6.2	8.3	4.5	6.2	5.6	
Hardness (as CaCO ₃)	209	357	500	436	576	230	624	212	538	265	559	207	571	409	
Iron	0.007	0.2	0.3	< 0.005	0.027	< 0.005	0.011	< 0.005	0.015	0.005	0.008	< 0.005	< 0.005	< 0.005	
Magnesium	2.8	N/L	N/L	13.9	18.0	6.15	18.6	5.70	16.5	7.87	17.5	5.90	17.2	12.6	
Manganese	0.001	0.03	0.05	0.007	0.067	0.006	0.048	0.003	0.024	0.001	0.023	0.005	0.036	0.002	
Nitrate (as N)	0.10	2.6	10	0.4	0.1	0.10	0.55	0.07	0.82	0.28	0.11	0.09	0.83	0.75	
pH (units) ⁴	7.65	6.5 - 8.5	6.5 - 8.5	6.01	6.89	7.45	7.00	6.78	6.86	7.64	7.59	7.25	7.50	7.34	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
Phosphorus, Total	0.03	N/L	N/L	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.02	
Potassium	2.4	N/L	N/L	1.8	2.3	0.9	3.3	0.8	2.3	1.0	2.1	0.9	2.0	1.8	
Silicon	4.38	N/L	N/L	3.01	3.32	2.41	4.38	2.30	3.43	2.36	3.23	2.52	3.80	3.40	
Sodium	3	101.3	200	11.6	15.2	2.8	15.7	2.3	9.5	2.7	11.7	2.1	6.4	4.0	
Strontium	0.26	N/L	N/L	0.310	0.433	0.153	0.469	0.149	0.387	0.192	0.420	0.154	0.446	0.324	
Sulphate	12	256	500	114	18	14	132	16	181	40	209	16	128	49	
Total Dissolved Solids	231	366	500	531	607	210	608	212	590	272	526	192	547	346	
Total Kjeldahl Nitrogen	0.2	N/L	N/L	0.3	0.5	1.7	0.4	0.2	0.3	0.1	0.3	0.1	0.3	0.2	
Zinc	0.005	2.5	5	0.033	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:

1. Reasonable Use Concept (RUC) criteria.
 2. Ontario Drinking Water Standards (ODWS).
 3. Results obtained from laboratory analysis.
 4. Results obtained from field analysis.
- All results are expressed in mg/L unless otherwise stated.
 Bold and shaded values exceed the ODWS.
 Bold and Italic values exceed RUC limits.
 N/L indicates No Limit.
 *** indicates results obtained from lab analysis
 ** indicates parameter not analyzed.

**Table 4
Groundwater Quality
Black Donald Waste Disposal Site**

Parameter	Background (median)	RUC ¹	ODWS ²	BH4														5-year Trends
				24-May-16	26-Oct-16	08-May-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	16-Oct-19	23-Apr-20	27-Oct-20	18-May-21	04-Nov-21	04-May-22	27-Oct-22	(sparkline)
Alkalinity (as CaCO ₃)	202	353	30 - 500	548	459	550	416	360	409	599	505	618	505	320	406	469	251	
Aluminum	0.03	0.065	0.1	0.05	0.04	0.11	0.09	0.08	0.09	0.11	0.13	0.12	0.08	0.05	0.09	0.08	0.14	
Ammonia, Total (as N)	0.02	N/L	N/L	0.03	< 0.01	0.49	0.05	0.02	0.06	1.00	0.57	0.63	0.20	0.01	0.03	0.11	0.12	
Ammonia, Un-ionized ³	0.00022	N/L	N/L	0.00004	0.00001	0.00091	0.00007	0.00013	0.00008	0.00347	0.00202	0.00170	0.00023	0.00002	0.00008	0.00019	0.00020	
Barium	0.019	0.3	1	0.078	0.068	0.127	0.095	0.059	0.059	0.099	0.090	0.120	0.110	0.062	0.067	0.091	0.117	
Boron	0.01	1.3	5	0.731	0.280	1.42	0.460	0.480	0.327	2.21	1.57	2.96	2.22	0.384	0.245	1.25	0.373	
Cadmium	0.000015	0.0013	0.005	< 0.00002	< 0.00002	0.000020	< 0.000014	< 0.000015	< 0.000015	< 0.000029	0.000092	< 0.000015	0.000065	< 0.000015	< 0.000015	< 0.000015	0.000025	
Calcium	79	N/L	N/L	191	149	252	184	170	163	229	234	291	266	185	181	264	358	
Chloride	0.8	125	250	18.6	11.8	25.7	3.8	16.4	6.9	44.9	25.4	82.5	36.5	4.3	1.7	41.4	10.5	
Chromium	0.001	0.013	0.05	< 0.002	< 0.002	0.0005	< 0.001	< 0.002	< 0.001	< 0.001	0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	
Cobalt	0.0004	N/L	N/L	0.0007	0.0008	0.0006	< 0.0001	< 0.0001	0.0002	0.0011	0.0013	0.0016	0.0012	0.0002	0.0001	0.0009	0.0059	
Chemical Oxygen Demand	5	N/L	N/L	23	< 5	30	18	21	< 5	65	29	87	38	7	< 5	27	45	
Conductivity (µS/cm) ⁴	284	N/L	N/L	851	744	966	737	623	780	887	950	971	1534	681	786	820	1218	
Copper	0.002	0.5	1	0.0050	< 0.002	0.0030	0.0040	0.0020	< 0.002	0.0040	0.0050	0.0070	0.0050	0.0024	0.002	0.0051	0.0037	
Dissolved Organic Carbon	2.1	3.6	5	9.2	3.4	11.8	7.9	6.5	7.2	24.9	15.9	22.0	15.9	6.2	7.8	13.8	12.5	
Hardness (as CaCO ₃)	209	357	500	552	432	729	541	493	461	673	674	860	775	529	509	766	1010	
Iron	0.007	0.2	0.3	< 0.005	< 0.005	< 0.005	0.010	< 0.005	0.007	0.005	0.005	0.005	< 0.005	< 0.005	0.011	< 0.005	0.009	
Magnesium	2.8	N/L	N/L	18.1	14.8	24.2	19.6	16.5	13.0	24.4	21.6	32.2	27.0	16.1	13.8	25.7	27.2	
Manganese	0.001	0.03	0.05	0.006	0.019	0.108	0.195	0.002	0.066	0.015	1.60	0.004	0.852	0.012	0.036	0.010	7.98	
Nitrate (as N)	0.10	2.6	10	1.9	1.8	0.73	0.23	2.37	0.39	0.42	0.14	1.15	0.18	0.51	< 0.05	0.19	0.08	
pH (units) ⁴	7.65	6.5 - 8.5	6.5 - 8.5	6.94	6.91	7.09	6.87	7.67	6.88	7.35	7.31	7.26	6.83	7.01	7.17	7.02	6.98	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.005	< 0.001	< 0.001	0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	
Phosphorus, Total	0.03	N/L	N/L	0.02	0.02	0.03	0.02	0.03	0.03	0.03	0.02	0.03	0.02	0.04	0.01	0.02	0.02	
Potassium	2.4	N/L	N/L	8.3	9.6	13.7	13.2	8.9	7.0	13.3	12.4	17.8	15.4	7.8	7.9	11.5	11.4	
Silicon	4.38	N/L	N/L	5.31	6.26	6.72	7.59	4.68	5.11	6.30	6.03	7.86	7.24	5.60	6.14	6.86	5.05	
Sodium	3	101.3	200	25.7	18.1	39.8	23.5	17.5	10.6	40.6	33.9	65.9	55.7	10.9	7.3	30.7	21.9	
Strontium	0.26	N/L	N/L	0.420	0.362	0.525	0.488	0.414	0.385	0.578	0.659	0.794	0.748	0.469	0.449	0.648	0.821	
Sulphate	12	256	500	147	206	122	113	192	101	151	145	233	156	174	95	< 1	455	
Total Dissolved Solids	231	366	500	746	530	736	551	568	518	806	665	927	727	488	470	764	956	
Total Kjeldahl Nitrogen	0.2	N/L	N/L	0.6	0.4	1.1	0.4	0.4	0.3	2.0	1.2	2.0	1.1	0.2	0.2	0.7	1.0	
Zinc	0.005	2.5	5	0.024	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	

Notes:
1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L unless otherwise stated.
Bold and shaded values exceed the ODWS.
Bold and Italic values exceed RUC limits.
N/L indicates No Limit.
*** indicates results obtained from lab analysis
** indicates parameter not analyzed.

**Table 4
Groundwater Quality
Black Donald Waste Disposal Site**

Parameter	Background (median)	RUC ¹	ODWS ²	MW08-6 (Background)														5-year Trends (sparkline)
				24-May-16	26-Oct-16	08-May-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	16-Oct-19	23-Apr-20	27-Oct-20	18-May-21	04-Nov-21	04-May-22	27-Oct-22	
Alkalinity (as CaCO ₃)	202	353	30 - 500	194	173	183	172	180	168	171	162	153	145	160	183	169	161	
Aluminum	0.03	0.065	0.1	0.03	0.02	0.05	0.05	0.05	0.03	0.04	0.05	0.04	< 0.01	0.02	0.04	0.02	0.03	
Ammonia, Total (as N)	0.02	N/L	N/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.03	0.02	0.02	< 0.01	< 0.01	0.04	< 0.01	< 0.01	
Ammonia, Un-ionized ³	0.00022	N/L	N/L	0.00003	0.00007	0.00013	0.00016	0.00025	0.00012	0.00086	0.00023	0.00021	0.00006	0.00010	0.00049	0.00011	0.00013	
Barium	0.019	0.3	1	0.016	0.017	0.020	0.018	0.019	0.017	0.019	0.019	0.019	0.020	0.020	0.021	0.023	0.026	
Boron	0.01	1.3	5	0.008	0.005	0.005	0.014	0.008	< 0.005	0.012	0.011	0.008	< 0.005	0.008	0.008	0.007	0.008	
Cadmium	0.000015	0.0013	0.005	0.00003	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000029	0.000017	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	0.000013	
Calcium	79	N/L	N/L	63.8	69.2	82.5	71.1	72.1	61.5	70.9	66.8	65.1	64.5	69.4	71.5	68.5	63.7	
Chloride	0.8	125	250	< 0.5	2.3	< 0.5	0.8	< 0.5	0.7	1.0	1.0	0.9	0.8	0.6	< 0.5	< 0.5	0.5	
Chromium	0.001	0.013	0.05	< 0.002	< 0.002	0.0006	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	
Cobalt	0.0004	N/L	N/L	0.0020	0.0007	0.0003	0.0003	0.0004	0.0005	0.0004	0.0005	0.0005	0.0005	0.0004	0.0005	0.0005	0.0007	
Chemical Oxygen Demand	5	N/L	N/L	< 5	< 5	< 5	20	7	< 5	5	< 5	6	< 5	< 5	< 5	5	< 5	
Conductivity (µS/cm) ⁴	284	N/L	N/L	261	240	129	238	245	286	237	391	192	294	232	257	199	240	
Copper	0.002	0.5	1	0.003	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0019	0.003	0.0022	0.0018	
Dissolved Organic Carbon	2.1	3.6	5	2.0	2.1	2.1	3.3	2.0	2.8	3.9	2.7	3.4	5.5	2.5	9.4	3.1	2.5	
Hardness (as CaCO ₃)	209	357	500	170	184	219	189	192	164	189	178	174	172	186	191	183	170	
Iron	0.007	0.2	0.3	0.063	< 0.005	< 0.005	0.016	< 0.005	0.005	< 0.005	< 0.005	0.006	0.018	< 0.005	0.009	< 0.005	0.014	
Magnesium	2.8	N/L	N/L	2.58	2.76	3.03	2.76	2.88	2.47	2.90	2.73	2.80	2.62	3.09	2.96	2.91	2.63	
Manganese	0.001	0.03	0.05	0.031	0.002	0.001	0.001	< 0.001	0.001	< 0.001	0.001	0.002	0.002	< 0.001	0.001	< 0.001	0.002	
Nitrate (as N)	0.10	2.6	10	0.4	0.2	0.19	0.07	< 0.05	0.19	0.38	0.30	0.16	0.09	0.14	0.19	0.11	0.13	
pH (units) ⁴	7.65	6.5 - 8.5	6.5 - 8.5	7.27	7.64	7.94	7.98	8.19	7.87	8.28	7.80	7.82	7.59	7.75	7.89	7.79	7.90	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	0.003	< 0.001	< 0.001	0.003	< 0.002	< 0.002	0.003	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	
Phosphorus, Total	0.03	N/L	N/L	0.03	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.01	0.02	0.03	0.01	0.01	< 0.01	
Potassium	2.4	N/L	N/L	1.9	1.8	2.2	2.0	1.9	1.5	1.7	2.0	1.8	2.0	1.8	1.7	1.7	2.0	
Silicon	4.38	N/L	N/L	3.35	3.60	4.15	3.86	3.29	3.12	3.38	3.13	3.46	3.32	3.44	3.40	3.52	2.41	
Sodium	3	101.3	200	3.0	2.8	2.8	2.5	2.4	2.0	1.9	2.1	2.0	2.0	2.1	1.9	2.1	2.1	
Strontium	0.26	N/L	N/L	0.326	0.355	0.411	0.357	0.362	0.302	0.330	0.332	0.319	0.313	0.372	0.306	0.345	0.299	
Sulphate	12	256	500	11	36	10	7	10	9	9	8	7	8	7	8	8	9	
Total Dissolved Solids	231	366	500	201	196	205	191	191	186	184	170	164	170	168	183	177	171	
Total Kjeldahl Nitrogen	0.2	N/L	N/L	0.1	0.2	0.2	0.2	0.2	0.2	< 0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	
Zinc	0.005	2.5	5	0.009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	

Notes:

1. Reasonable Use Concept (RUC) criteria.
 2. Ontario Drinking Water Standards (ODWS).
 3. Results obtained from laboratory analysis.
 4. Results obtained from field analysis.
- All results are expressed in mg/L unless otherwise stated.
 Bold and shaded values exceed the ODWS.
 Bold and Italic values exceed RUC limits.
 N/L indicates No Limit.
 *** indicates results obtained from lab analysis
 ** indicates parameter not analyzed.

**Table 4
Groundwater Quality
Black Donald Waste Disposal Site**

Parameter	Background (median)	RUC ¹	ODWS ²	MW08-7														5-year Trends
				24-May-16	26-Oct-16	08-May-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	16-Oct-19	23-Apr-20	27-Oct-20	18-May-21	04-Nov-21	04-May-22	27-Oct-22	(sparkline)
Alkalinity (as CaCO ₃)	202	353	30 - 500	188	182	180	210	189	176	182	176	178	170	185	237	207	220	
Aluminum	0.03	0.065	0.1	0.02	0.03	0.05	0.05	0.04	0.04	0.14	0.05	0.05	0.01	0.02	0.05	0.02	0.03	
Ammonia, Total (as N)	0.02	N/L	N/L	< 0.01	< 0.01	< 0.01	0.01	0.01	0.02	0.02	0.02	0.02	< 0.01	0.02	< 0.01	< 0.01	< 0.01	
Ammonia, Un-ionized ³	0.00022	N/L	N/L	0.00001	0.00012	0.00005	0.00023	0.00001	0.00024	0.00019	0.00041	0.00003	0.00051	0.00007	0.00024	0.00008	0.00010	
Barium	0.019	0.3	1	0.033	0.036	0.049	0.048	0.040	0.036	0.045	0.041	0.047	0.040	0.042	0.048	0.047	0.056	
Boron	0.01	1.3	5	< 0.005	< 0.005	< 0.005	0.011	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	
Cadmium	0.000015	0.0013	0.005	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	
Calcium	79	N/L	N/L	57.7	61.4	82.7	71.9	72.2	56.9	79.9	67.6	74.5	64.6	73.3	78.5	81.1	76.5	
Chloride	0.8	125	250	39.1	< 0.5	47.0	31.7	39.7	33.4	57.6	49.9	46.7	32.6	31.4	36.2	51.9	47.3	
Chromium	0.001	0.013	0.05	< 0.002	< 0.002	0.0004	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	
Cobalt	0.0004	N/L	N/L	< 0.0001	0.0003	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0006	0.0002	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	
Chemical Oxygen Demand	5	N/L	N/L	50	25	< 5	12	21	< 5	10	15	26	11	< 5	< 5	< 5	9	
Conductivity (µS/cm) ⁴	284	N/L	N/L	306	301	321	378	282	291	308	323	269	303	284	402	296	396	
Copper	0.002	0.5	1	< 0.002	< 0.002	0.003	0.002	0.002	< 0.002	< 0.002	< 0.002	0.003	< 0.002	0.0014	0.002	0.0027	0.0021	
Dissolved Organic Carbon	2.1	3.6	5	2.3	2.2	2.5	3.5	2.3	2.6	3.8	2.7	3.2	3.2	2.9	5.2	2.6	1.5	
Hardness (as CaCO ₃)	209	357	500	175	186	246	214	215	169	243	202	223	192	220	233	241	225	
Iron	0.007	0.2	0.3	< 0.005	0.026	< 0.005	< 0.005	< 0.005	0.009	0.350	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	
Magnesium	2.8	N/L	N/L	7.43	7.79	9.67	8.25	8.40	6.58	10.6	7.94	9.02	7.37	8.92	8.90	9.26	8.14	
Manganese	0.001	0.03	0.05	< 0.001	0.002	< 0.001	< 0.001	< 0.001	0.001	0.023	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Nitrate (as N)	0.10	2.6	10	0.1	0.2	0.09	< 0.05	0.06	< 0.05	0.21	0.09	0.13	< 0.05	0.17	0.07	0.16	0.11	
pH (units) ⁴	7.65	6.5 - 8.5	6.5 - 8.5	6.90	7.97	7.67	8.07	6.85	7.94	7.97	8.13	7.16	8.30	7.80	7.87	7.82	7.81	
Phenols	0.002	N/L	N/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003	< 0.002	< 0.002	0.003	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	
Phosphorus, Total	0.03	N/L	N/L	2.73	0.80	0.15	0.12	1.23	0.21	0.37	0.62	1.20	1.12	0.12	0.10	0.12	0.07	
Potassium	2.4	N/L	N/L	1.1	1.2	1.5	1.9	1.3	1.3	1.3	1.5	1.5	1.6	1.5	1.7	1.6	1.7	
Silicon	4.38	N/L	N/L	3.08	3.74	4.13	5.08	3.58	3.41	3.38	3.47	3.80	3.73	3.78	4.45	3.93	2.94	
Sodium	3	101.3	200	23.2	29.7	28.2	36.1	22.0	23.9	20.1	28.5	26.5	26.0	22.5	32.7	25.1	30.4	
Strontium	0.26	N/L	N/L	0.103	0.117	0.142	0.135	0.123	0.103	0.142	0.128	0.137	0.112	0.132	0.143	0.141	0.128	
Sulphate	12	256	500	10	10	12	2	7	5	10	5	12	6	9	4	9	3	
Total Dissolved Solids	231	366	500	252	268	305	289	252	245	291	256	267	242	242	285	291	297	
Total Kjeldahl Nitrogen	0.2	N/L	N/L	0.3	0.2	0.8	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.1	
Zinc	0.005	2.5	5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:

1. Reasonable Use Concept (RUC) criteria.
 2. Ontario Drinking Water Standards (ODWS).
 3. Results obtained from laboratory analysis.
 4. Results obtained from field analysis.
- All results are expressed in mg/L unless otherwise stated.
 Bold and shaded values exceed the ODWS.
 Bold and Italic values exceed RUC limits.
 N/L indicates No Limit.
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 ** indicates parameter not analyzed.

Table 4
Groundwater Quality
Black Donald Waste Disposal Site

Parameter	ODWS ¹	BH4		BH1			
		29-Apr-09	3-May-10	16-May-11	16-Apr-12	08-May-17	04-May-22
Acetone	N/L	-	-	-	-	0.008	0.03
Benzene	0.001	< 0.001	0.00066	< 0.0005	0.0008	< 0.0005	< 0.0005
Bromobenzene	N/L	-	-	-	-	< 0.0001	< 0.0004
Bromodichloromethane	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.002
Bromoform	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.005
Bromomethane	N/L	< 0.0009	< 0.0005	< 0.0015	< 0.0005	< 0.0003	< 0.0005
Carbon Tetrachloride	0.002	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Monochlorobenzene (Chlorobenzene)	0.08	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0005
Chloroethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.003
Chloroform	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0003	< 0.001
Chloromethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0003	< 0.002
Chlorotoluene,2-	N/L	-	-	-	-	< 0.0002	< 0.0002
Chlorotoluene,4-	N/L	-	-	-	-	< 0.0002	< 0.0002
Dibromo-3-Chloropropane, 1,2-	N/L	-	-	-	-	< 0.001	< 0.0006
Dibromochloromethane	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.002
Dibromoethane,1,2- (Ethylene Dibromide)	N/L	< 0.001	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002
Dibromomethane	N/L	-	-	-	-	< 0.001	< 0.0001
Dichlorobenzene, 1,2-	0.2	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichlorobenzene, 1,3-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichlorobenzene, 1,4-	0.005	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0005
Dichlorodifluoromethane	N/L	-	-	-	-	< 0.001	< 0.002
Dichloroethane,1,1-	N/L	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloroethane,1,2-	0.005	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloroethene, cis-1,2-	N/L	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloroethene, trans-1,2-	N/L	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloroethene,1,1-	0.014	< 0.00066	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloromethane (Methylene Chloride)	0.05	< 0.005	< 0.002	< 0.0005	< 0.0005	< 0.0003	< 0.005
Dichloropropane,1,2-	N/L	< 0.0007	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloropropane,1,3-	N/L	-	-	-	-	< 0.0002	< 0.0002
Dichloropropane,2,2-	N/L	-	-	-	-	< 0.0002	< 0.0002
Dichloropropene, cis-1,3-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloropropene, trans-1,3-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Dichloropropene, 1,1-	N/L	-	-	-	-	< 0.0002	< 0.0002
Ethylbenzene	0.0024	< 0.001	0.0014	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Hexachlorobutadiene	N/L	-	-	-	-	< 0.001	< 0.0006
Hexane	N/L	-	-	-	-	< 0.001	< 0.005
Isopropylbenzene	N/L	-	-	-	-	< 0.0002	< 0.0002
Isopropyltoluene,4-	N/L	-	-	-	-	< 0.0004	< 0.0002
Methyl Butyl Ketone	N/L	-	-	-	-	< 0.01	< 0.005
Methyl Ethyl Ketone	N/L	-	-	-	-	0.002	< 0.02
Methyl Isobutyl Ketone	N/L	-	-	-	-	< 0.001	< 0.02
Methyl-t-butyl Ether	N/L	-	-	-	-	0.001	< 0.002
Naphthalene	N/L	-	-	-	-	< 0.0007	< 0.0004
n-Butylbenzene	N/L	-	-	-	-	< 0.0007	< 0.0004
n-Propylbenzene	N/L	-	-	-	-	< 0.0004	< 0.0001
sec-Butylbenzene	N/L	-	-	-	-	< 0.0005	< 0.0001
Styrene	N/L	< 0.004	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
tert-Butylbenzene	N/L	-	-	-	-	< 0.0001	< 0.0001
Tetrachloroethane 1,1,1,2-	N/L	< 0.002	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Tetrachloroethane 1,1,2,2-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0005
Tetrachloroethene	0.03	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0002	< 0.0005
Toluene	0.024	< 0.0008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Trichlorobenzene,1,2,3-	N/L	-	-	-	-	< 0.0002	< 0.0005
Trichlorobenzene,1,2,4-	N/L	-	-	-	-	< 0.0002	< 0.0005
Trichloroethane,1,1,1-	N/L	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Trichloroethane,1,1,2-	N/L	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Trichloroethylene	0.005	< 0.005	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005
Trichlorofluoromethane	N/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.0001	< 0.005
Trichloropropane,1,2,3-	N/L	-	-	-	-	< 0.0002	< 0.0005
Trimethylbenzene,1,2,4-	N/L	-	-	-	-	< 0.002	< 0.001
Trimethylbenzene,1,3,5-	N/L	-	-	-	-	< 0.0006	< 0.0001
Vinyl Chloride	0.001	< 0.0005	< 0.0005	< 0.0002	0.00022	< 0.0002	< 0.0002
Xylene (Total)	0.3	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Xylene, m,p-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.001
Xylene, o-	N/L	< 0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0005

Notes:
1. Ontario Drinking Water Standards (ODWS).

Shaded areas indicate values that exceed ODWS maximum acceptable concentrations.

N/L indicates No Limit specified.

-" means parameter not analyzed.


































*2-chloroethyl vinyl ether analyzed from sample preserved with HCl.

Table 5
Surface Water Quality
Black Donald Waste Disposal Site

Parameter	Background (75th Percentile)	PWOO ¹	SW-3															5-year Trends (sparkline)
			24-May-16	08-May-17	18-Sep-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	23-Apr-20	19-Aug-20	27-Oct-20	18-May-21	19-Aug-21	04-Nov-21	04-May-22	27-Oct-22	
Alkalinity (as CaCO ₃)	228	25% Decrease	126	62	185	143	78	155	78	81	154	134	121	228	120	94	158	
Ammonia, Total (as N)	0.1	NL	< 0.01	< 0.01	0.02	0.02	< 0.01	0.04	0.04	0.02	< 0.01	0.01	< 0.01	0.12	0.02	< 0.01	0.03	
Ammonia, Un-ionized (as N) ²	0.00145	0.02	0.00001	0.00011	0.00004	0.00036	0.00038	0.00010	0.00023	0.00010	0.00003	0.00003	0.00006	0.00703	0.00010	0.00004	0.00005	
Barium	0.065	NL	0.024	0.008	0.036	0.019	0.008	0.034	0.013	0.012	0.025	0.018	0.020	0.035	0.022	0.016	0.086	
Boron	0.006	0.2	0.007	< 0.005	0.006	0.006	0.006	< 0.005	< 0.005	< 0.005	0.009	0.008	0.006	0.006	0.005	0.006	< 0.005	
Biological Oxygen Demand	4	NL	< 3	< 2	< 2	< 2	< 2	< 3	< 3	< 3	20	< 3	< 3	< 3	< 3	< 3	< 3	
Cadmium	0.0000155	0.0002	< 0.00002	< 0.000014	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	0.000015	< 0.000015	0.000032	0.000018	0.000058	
Calcium	89	NL	45.8	22.4	66.4	44.3	22.7	66.0	30.5	32.8	63.4	51.2	43.1	79.7	41.6	31.6	56.4	
Chromium	0.001	0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Chloride	73	NL	< 0.5	< 0.5	0.5	1.0	< 0.5	0.8	0.7	0.9	1.4	1.2	0.7	1.1	0.7	< 0.5	0.8	
Chemical Oxygen Demand	21	NL	8	10	20	12	12	9	40	13	19	13	10	21	15	8	26	
Conductivity (µS/cm) ³	591	NL	261	136	370	278	169	-	169	-	-	283	-	-	-	-	-	
Conductivity (µS/cm) ⁴	501	NL	193	78	273	203	115	181	104	92	244	228	174	283	161	164	226	
Copper	0.001	0.005	0.0006	0.0006	0.0001	0.0002	0.0005	0.0005	0.0006	0.0005	0.0007	0.0004	0.0010	0.0003	0.0008	0.0013	0.0015	
Disolved Oxygen ⁴	9.44	5	9.00	12.34	7.50	4.62	9.06	4.16	8.42	10.48	5.09	8.75	6.30	9.90	7.27	9.81	5.73	
Dissolved Organic Carbon	8.5	NL	4.3	5.4	6.2	7.1	3.9	6.2	5.1	4.2	5.9	6.2	5.8	8.8	5.7	5.2	8.0	
Hardness (as CaCO ₃)	263	NL	136	67	202	134	68	201	90	97	184	152	127	235	125	94	168	
Iron	0.087	0.3	0.291	0.051	0.118	0.044	0.008	0.100	0.055	0.015	0.016	0.073	0.098	0.309	0.456	0.178	3.76	
Magnesium	11	NL	5.26	2.66	8.75	5.54	2.73	8.65	3.45	3.54	6.16	5.79	4.62	8.68	5.13	3.57	6.47	
Manganese	0.034	NL	0.250	0.003	0.235	0.074	0.001	0.079	0.016	0.001	0.034	0.046	0.026	0.912	0.550	0.134	4.45	
Nitrate (as N)	0.06	NL	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	0.19	< 0.05	0.18	0.06	< 0.05	< 0.05	0.11	0.09	< 0.05	0.10	
Nitrite (as N)	0.06	NL	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07	< 0.05	< 0.05	< 0.05	< 0.05	
pH (units) ⁴	7.81	6.5 - 8.5	6.78	7.98	6.89	7.97	8.44	7.32	7.61	7.70	7.11	7.39	7.52	8.29	7.64	7.41	7.05	
Phenols	0.002	0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Phosphorus, Total	0.024	0.03	< 0.01	0.01	0.03	0.02	0.01	< 0.01	0.05	< 0.01	0.01	0.01	0.03	0.05	0.04	0.02	0.13	
Potassium	1.91	NL	0.8	0.3	0.8	1.0	0.7	0.4	0.5	0.5	0.4	0.9	0.8	1.4	0.9	0.6	1.5	
Sodium	37	NL	1.3	0.5	5.8	1.2	0.9	2.7	1.1	1.3	1.2	1.5	1.5	1.6	1.5	1.4	1.6	
Strontium	0.18	NL	0.076	0.035	0.149	0.076	0.035	0.133	0.047	0.047	0.087	0.075	0.067	0.127	0.065	0.050	0.091	
Sulphate	7.15	NL	7	5	< 1	2	4	4	5	6	9	4	7	< 1	3	6	1	
Total Dissolved Solids	355	NL	136	75	204	153	86	163	86	92	176	145	121	225	124	97	162	
Total Kjeldahl Nitrogen	0.5	NL	0.19	0.2	0.3	0.3	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.5	0.5	0.2	0.7	
Total Suspended Solids	4	NL	< 3	< 3	< 3	< 3	< 3	< 3	< 3	3	< 3	< 3	29	4	< 3	< 3	66.0	
Zinc	0.007	0.02	< 0.005	0.012	0.038	0.042	< 0.005	0.012	0.006	< 0.005	< 0.005	0.005	0.026	0.014	0.010	< 0.005	0.013	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L, unless otherwise stated.
Shaded area with bold text indicates PWQO exceedance.
NL indicates No Limit.
*** indicates results obtained from lab analysis

Table 5
Surface Water Quality
Black Donald Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO ¹	SW-4 (Background)															5-year Trends (sparkline)	
			24-May-16	08-May-17	18-Sep-17	25-Oct-17	02-May-18	30-Oct-18	14-May-19	23-Apr-20	19-Aug-20	27-Oct-20	18-May-21	19-Aug-21	04-Nov-21	04-May-22	18-Aug-22		
Alkalinity (as CaCO ₃)	228	25% Decrease	196	133	246	216	138	226	145	144	214	220	202	243	227	170	233		
Ammonia, Total (as N)	0.1	NL	< 0.01	< 0.01	0.02	0.02	0.01	0.02	0.02	0.01	0.02	0.01	0.02	0.16	0.05	0.02	0.01	0.04	
Ammonia, Un-ionized (as N) ²	0.00145	0.02	0.00016	0.00011	0.00012	0.00023	0.00029	0.00009	0.00019	0.00006	0.00020	0.00002	0.00252	0.00338	0.00010	0.00008	0.00038		
Barium	0.065	NL	0.052	0.028	0.065	0.051	0.036	0.067	0.045	0.034	0.078	0.067	0.049	0.069	0.052	0.042	0.060		
Boron	0.006	0.2	0.006	< 0.005	< 0.005	0.006	0.005	< 0.005	< 0.005	< 0.005	0.092	0.007	0.006	0.007	0.005	0.005	0.007		
Biological Oxygen Demand	4	NL	< 3	< 2	< 2	< 2	< 2	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3		
Cadmium	0.0000155	0.0002	0.00003	< 0.000014	0.000017	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	0.000018	< 0.000015	< 0.000015	< 0.000015	< 0.000015		
Calcium	89	NL	71.1	45.2	86.6	74.2	52.1	101	62.0	56.2	93.9	104	71.3	88.1	66.7	59.2	80.8		
Chromium	0.001	0.001	< 0.002	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		
Chloride	73	NL	47.1	23.8	55.8	60.2	37.2	72.7	56.5	35.5	46.6	80.8	37.4	56.0	78.6	45.1	60.7		
Chemical Oxygen Demand	21	NL	15	11	24	13	12	19	16	12	26	18	12	27	10	6	28		
Conductivity (µS/cm) ³	591	NL	542	361	345	640	388	-	473	-	-	683	-	-	-	-	-		
Conductivity (µS/cm) ⁴	501	NL	436	213	515	464	263	396	298	209	429	546	345	421	457	267	528		
Copper	0.001	0.005	0.0007	0.0006	0.0006	0.0003	0.0008	0.0003	0.0011	0.0008	0.0015	0.0006	0.0010	0.0010	0.0005	0.0007	0.0004		
Disolved Oxygen ⁴	9.44	5	9.56	14.37	4.05	6.32	9.30	3.40	10.28	11.37	5.12	9.40	7.99	2.90	8.36	8.06	4.11		
Dissolved Organic Carbon	8.5	NL	5.9	5.5	9.4	8.9	4.6	8.4	5.9	4.4	11.7	5.2	5.9	9.3	7.1	5.3	8.4		
Hardness (as CaCO ₃)	263	NL	212	135	260	221	153	304	183	166	277	302	210	259	257	175	239		
Iron	0.087	0.3	0.022	0.017	0.124	0.085	0.009	0.088	0.025	0.021	0.085	0.069	0.032	0.131	0.065	0.024	0.173		
Magnesium	11	NL	8.31	5.32	10.7	8.68	5.62	12.60	6.83	6.15	10.2	10.3	7.71	9.52	9.82	6.64	8.86		
Manganese	0.034	NL	0.018	0.001	0.054	0.052	0.002	0.042	0.002	0.002	0.031	0.020	0.008	0.056	0.023	0.001	0.037		
Nitrate (as N)	0.06	NL	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.10	< 0.05	< 0.05	< 0.05	< 0.05		
Nitrite (as N)	0.06	NL	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.10	< 0.05	< 0.05	< 0.05	< 0.05		
pH (units) ⁴	7.81	6.5 - 8.5	7.82	7.95	7.36	7.78	8.28	7.55	7.80	7.74	7.58	7.14	7.93	8.29	7.62	7.67	7.48		
Phenols	0.002	0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		
Phosphorus, Total	0.024	0.03	0.03	0.01	0.03	0.02	0.01	< 0.01	0.02	< 0.01	0.01	< 0.01	0.08	0.02	0.03	0.08	0.03		
Potassium	1.91	NL	1.6	0.8	1.5	1.4	1.3	1.5	1.5	1.2	1.6	1.9	1.8	2.1	2.0	1.5	1.9		
Sodium	37	NL	32.3	16.6	36.6	36.6	19.6	32.7	30.4	22.5	29.6	38.4	28.8	36.9	41.7	26.0	34.3		
Strontium	0.18	NL	0.138	0.085	0.187	0.144	0.095	0.210	0.111	0.099	0.181	0.168	0.131	0.169	0.156	0.113	0.161		
Sulphate	7.15	NL	7	5	< 1	1	6	6	7	7	10	2	8	< 1	< 1	8	1		
Total Dissolved Solids	355	NL	285	199	190	352	200	355	245	211	309	355	261	338	351	238	319		
Total Kjeldahl Nitrogen	0.5	NL	0.29	0.2	0.3	0.3	0.2	0.3	0.2	0.1	0.4	0.3	0.7	0.4	0.3	0.8	0.4		
Total Suspended Solids	4	NL	5	< 3	< 3	4	< 3	3	< 3	4	< 3	< 3	5	6	< 3	< 3	270		
Zinc	0.007	0.02	< 0.005	< 0.005	< 0.005	0.043	< 0.005	0.011	0.008	< 0.005	0.030	< 0.005	0.021	0.012	0.007	< 0.005	< 0.005		

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L, unless otherwise stated.
Shaded area with bold text indicates PWQO exceedance.
NL indicates No Limit.
*** indicates results obtained from lab analysis

Table 5
Surface Water Quality
Black Donald Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO ¹	SW-6																		5-year Trends (sparkline)		
			19-Oct-15	08-May-17	18-Sep-17	25-Oct-17	02-May-18	14-Aug-18	30-Oct-18	14-May-19	20-Aug-19	16-Oct-19	23-Apr-20	19-Aug-20	27-Oct-20	18-May-21	19-Aug-21	04-Nov-21	04-May-22	18-Aug-22		27-Oct-22	
Alkalinity (as CaCO ₃)	228	25% Decrease	160	132	180	138	105	189	165	111	154	147	145	143	148	144	184	136	129	173	180		
Ammonia, Total (as N)	0.1	NL	< 0.1	< 0.01	0.03	0.02	< 0.01	0.04	0.03	0.02	0.08	0.04	0.01	0.01	0.02	0.02	0.03	0.02	0.01	0.03	0.02		
Ammonia, Un-ionized (as N) ²	0.00145	0.02	0.00018	0.00008	0.00010	0.00032	0.00014	0.00032	0.00020	0.00017	0.00132	0.00038	0.00008	0.00025	0.00005	0.00012	0.000216	0.00010	0.00005	0.00077	0.00012		
Barium	0.065	NL	0.0396	0.028	0.052	0.040	0.029	0.056	0.059	0.037	0.048	0.042	0.032	0.061	0.048	0.042	0.058	0.039	0.034	0.052	0.049		
Boron	0.006	0.2	0.0106	< 0.005	0.023	0.011	0.014	0.018	0.008	0.012	0.016	0.025	0.014	0.110	0.017	0.021	0.021	0.015	0.018	0.014	0.015		
Biological Oxygen Demand	4	NL	< 4	< 2	< 2	< 2	< 2	< 2	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3		
Cadmium	0.0000155	0.0002	< 0.000003	< 0.000014	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015		
Calcium	89	NL	56.0	46.8	60.0	43.1	35.3	60.4	67.0	44.4	55.6	52.0	44.7	64.4	58.8	49.2	64.0	50.3	41.9	63.2	64.0		
Chromium	0.001	0.001	0.00004	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Chloride	73	NL	13	14.9	5.0	2.6	6.0	8.0	9.0	7.6	5.9	6.8	5.6	9.9	8.5	4.5	9.9	5.6	6.8	4.7	5.4		
Chemical Oxygen Demand	21	NL	19	10	27	24	26	29	26	20	32	34	16	36	33	23	32	25	18	36	20		
Conductivity (µS/cm) ³	591	NL	-	330	660	278	227	388	-	256	-	-	-	-	338	-	-	-	-	-	-		
Conductivity (µS/cm) ⁴	501	NL	240	202	300	217	156	352	227	171	230	361	150	259	272	232	268	202	169	321	256		
Copper	0.001	0.005	0.00042	0.0004	< 0.0001	0.0001	0.0004	0.0003	0.0004	0.0005	0.0005	0.0006	0.0007	0.0003	0.0004	0.0005	0.0003	0.0003	0.0006	0.0004	0.0003		
Disolved Oxygen ⁴	9.44	5	5.88	7.70	4.69	8.89	8.72	2.80	5.20	8.71	2.97	4.57	11.30	8.17	5.63	5.43	3.88	4.67	6.34	6.03	6.97		
Dissolved Organic Carbon	8.5	NL	8.4	6.4	12.1	13.7	5.7	12.4	11.9	8.0	12.0	11.1	6.6	16.2	12.2	11.1	13.1	12.5	8.8	16.8	11.4		
Hardness (as CaCO ₃)	263	NL	171	148	186	134	107	183	208	134	168	160	136	194	177	150	193	154	128	191	193		
Iron	0.087	0.3	0.165	0.029	0.228	0.079	0.034	0.797	0.380	0.051	0.329	0.244	0.030	0.267	0.158	0.049	0.424	0.122	0.087	0.216	0.125		
Magnesium	11	NL	7.60	7.50	8.86	6.41	4.62	7.90	9.93	5.64	7.15	7.23	5.80	8.00	7.31	6.47	8.07	6.92	5.62	7.99	8.09		
Manganese	0.034	NL	0.0122	0.017	0.037	0.012	0.002	0.146	0.077	0.003	0.052	0.022	0.002	0.032	0.025	0.034	0.086	0.013	0.004	0.019	0.022		
Nitrate (as N)	0.06	NL	< 0.06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.08	0.09	< 0.05	0.08	< 0.05	0.11		
Nitrite (as N)	0.06	NL	< 0.03	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
pH (units) ⁴	7.81	6.5 - 8.5	7.15	7.78	7.03	7.89	7.91	7.31	7.70	7.68	7.60	7.74	7.74	7.84	7.33	7.28	8.26	7.59	7.36	7.77	7.54		
Phenols	0.002	0.001	0.001	0.004	< 0.001	< 0.001	< 0.001	< 0.002	0.004	< 0.002	0.003	0.005	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001		
Phosphorus, Total	0.024	0.03	0.027	0.02	0.01	0.01	0.01	0.06	< 0.01	0.02	0.05	0.03	< 0.01	0.02	0.01	0.02	0.02	0.01	0.01	0.01	< 0.01		
Potassium	1.91	NL	0.860	1.3	0.5	1.3	0.8	0.9	2.0	0.8	0.5	1.0	0.8	0.6	2.3	1.0	0.7	1.1	0.8	0.9	1.3		
Sodium	37	NL	5.41	5.9	4.4	2.1	4.0	5.4	6.4	5.1	4.1	4.3	4.5	7.0	4.9	4.4	6.6	3.7	5.2	5.0	5.0		
Strontium	0.18	NL	0.0974	0.087	0.134	0.084	0.065	0.128	0.156	0.079	0.110	0.102	0.078	0.132	0.103	0.094	0.124	0.094	0.079	0.119	0.118		
Sulphate	7.15	NL	5	6	< 1	2	3	1	3	5	24	5	6	3	4	1	3	5	2	2	2		
Total Dissolved Solids	355	NL	226	182	363	153	118	200	192	131	170	165	131	173	174	148	206	152	139	170	190		
Total Kjeldahl Nitrogen	0.5	NL	< 0.5	0.3	0.4	0.3	0.2	0.5	0.5	0.3	0.6	0.6	0.2	0.5	0.5	0.3	0.4	0.5	0.3	0.6	0.4		
Total Suspended Solids	4	NL	2	< 3	< 3	< 3	< 3	6	< 3	3	11	5	< 3	< 3	5	< 3	4	< 3	< 3	3	< 3		
Zinc	0.007	0.02	< 0.002	< 0.005	0.005	1.60	< 0.005	0.017	0.018	0.005	< 0.005	< 0.005	< 0.005	0.027	< 0.005	0.019	0.011	0.009	0.010	0.016	0.023		

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L, unless otherwise stated.
Shaded area with bold text indicates PWQO exceedance.
NL indicates No Limit.
*** indicates results obtained from lab analysis

**Table 5
Surface Water Quality
Black Donald Waste Disposal Site**

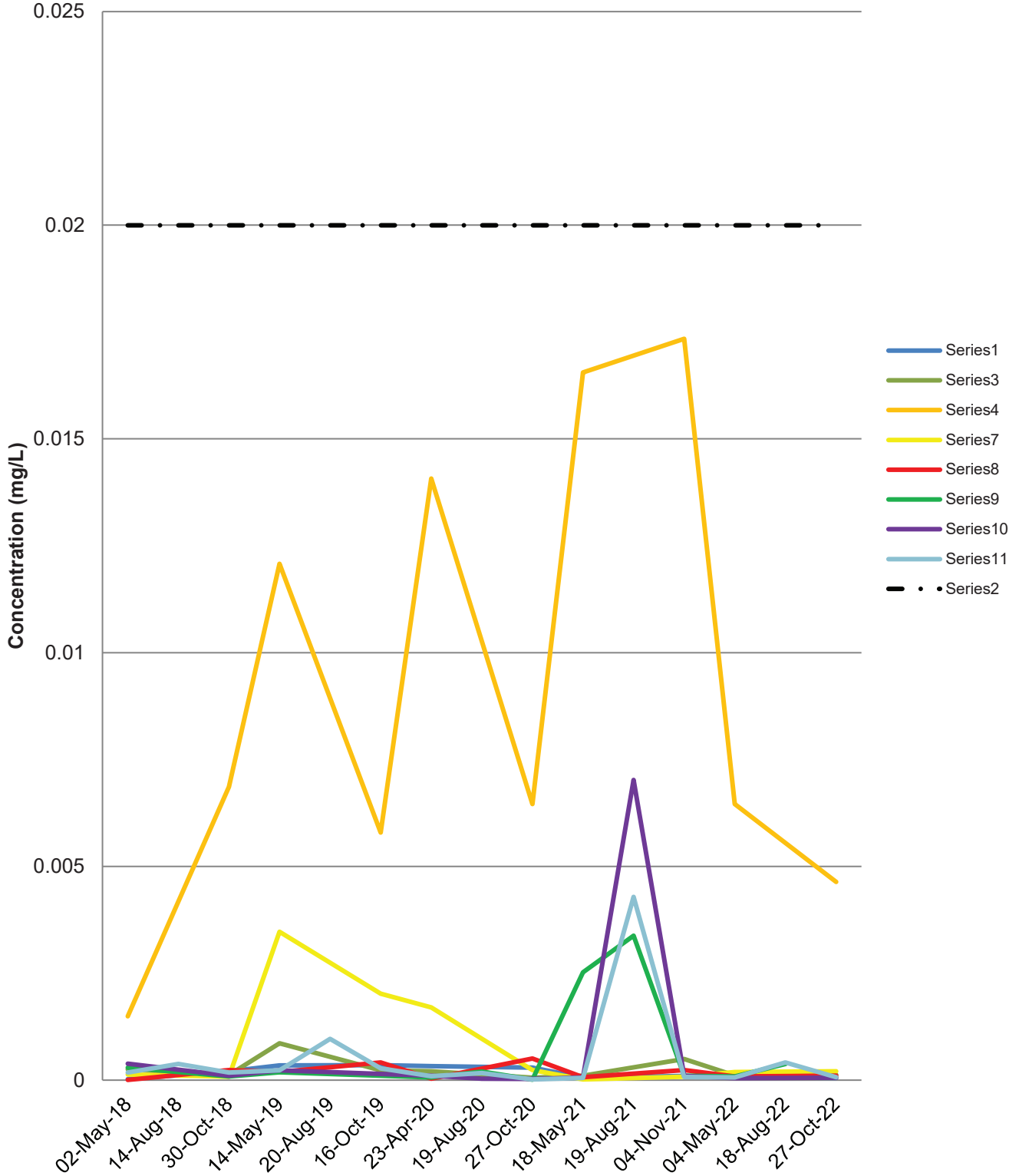
Parameter	Background (75th Percentile)	PWQO ¹	SW-6																				5-year Trends (sparkline)
			24-May-16	31-Aug-16	26-Oct-16	08-May-17	16-Sep-17	25-Oct-17	02-May-18	14-Aug-18	30-Oct-18	14-May-19	20-Aug-19	16-Oct-19	23-Apr-20	19-Aug-20	27-Oct-20	18-May-21	19-Aug-21	04-Nov-21	04-May-22	18-Aug-22	
Alkalinity (as CaCO ₃)	228	25% Decrease	174	213	198	99	184	176	109	225	177	121	215	188	124	159	170	150	196	178	136	197	189
Ammonia, Total (as N)	0.1	NL	< 0.01	0.08	< 0.01	< 0.01	0.02	0.02	< 0.01	0.02	0.02	0.02	0.05	0.03	0.01	< 0.01	0.01	0.01	0.03	0.01	< 0.01	0.02	< 0.01
Ammonia, Un-ionized (as N) ²	0.00145	0.02	0.00013	0.00216	0.00005	0.00007	0.00005	0.00024	0.00018	0.00038	0.00018	0.00023	0.00097	0.00028	0.00009	0.00017	0.00002	0.00005	0.00429	0.00007	0.00007	0.00041	0.00007
Barium	0.065	NL	0.0450	0.053	0.045	0.021	0.058	0.035	0.026	0.058	0.052	0.031	0.057	0.045	0.030	0.054	0.040	0.038	0.052	0.036	0.030	0.046	0.038
Boron	0.006	0.2	0.0070	0.015	< 0.005	0.008	0.016	0.010	0.011	0.015	< 0.005	0.006	0.009	0.010	0.010	0.0095	0.012	0.018	0.014	0.010	0.012	0.007	0.010
Biological Oxygen Demand	4	NL	< 3	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3
Cadmium	0.0000155	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Calcium	89	NL	62.9	78.2	84.6	37.2	68.2	55.8	39.1	77.5	72.9	46.4	83.4	71.5	52.4	70.5	71.2	53.0	74.6	67.4	46.7	69.9	63.2
Chromium	0.001	0.001	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chloride	73	NL	11	29.1	32.1	10.0	15.4	13.4	10.5	20.8	29.1	16.3	23.9	23.7	13.2	20.0	30.2	8.7	25.6	27.8	16.8	16.9	17.8
Chemical Oxygen Demand	21	NL	16	17	7	16	28	19	20	29	18	19	22	15	19	29	16	20	24	13	14	35	40
Conductivity (µS/cm) ³	591	NL	385	511	-	243	361	390	256	499	-	304	-	-	-	446	-	-	-	-	-	-	-
Conductivity (µS/cm) ⁴	501	NL	320	427	305	151	321	283	173	417	280	195	344	527	157	299	360	236	300	285	186	362	296
Copper	0.001	0.005	0.0020	0.0004	0.0002	0.0005	0.0003	0.0002	0.0004	0.0003	0.0003	0.0005	0.0002	0.0004	0.0004	0.0007	0.0005	0.0006	0.0004	0.0003	0.0014	0.0003	0.0003
Disolved Oxygen ⁴	9.44	5	12.80	9.2	7.78	13.93	8.83	10.57	10.65	7.86	10.65	11.50	6.75	6.25	14.85	8.82	13.69	8.23	6.98	12.9	8.21	8.03	10.06
Dissolved Organic Carbon	8.5	NL	7.2	6.6	6.4	7.9	10.8	11.0	5.9	12.0	7.3	7.5	9.3	6.2	6.1	13.7	7.5	11.0	9.0	8.1	8.1	13.4	9.4
Hardness (as CaCO ₃)	263	NL	189	236	256	112	209	169	117	237	226	139	249	218	156	210	212	158	222	203	140	208	190
Iron	0.087	0.3	0.065	0.510	0.112	0.022	0.221	0.122	0.024	0.323	0.161	0.048	0.991	1.34	0.036	0.266	0.139	0.235	0.211	0.110	0.036	0.154	0.086
Magnesium	11	NL	7.80	9.93	10.9	4.64	9.46	7.22	4.63	10.5	10.7	5.49	9.96	9.55	6.02	8.14	8.31	6.32	8.75	8.47	5.57	8.19	7.73
Manganese	0.034	NL	0.0280	0.085	0.017	0.002	0.052	0.021	0.002	0.500	0.028	0.005	0.370	0.181	0.006	0.041	0.025	0.049	0.038	0.018	0.003	0.018	0.015
Nitrate (as N)	0.06	NL	< 0.1	0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.17	0.06	< 0.05	0.07	< 0.05	< 0.05	0.10	0.11	< 0.05	0.08	< 0.05
Nitrite (as N)	0.06	NL	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.08	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
pH (units) ⁴	7.81	6.5 - 8.5	7.60	7.86	7.69	7.72	6.98	7.79	8.06	7.77	7.89	7.85	7.87	7.80	7.87	7.75	7.33	8.65	7.82	7.54	7.78	7.61	7.61
Phenols	0.002	0.001	< 0.001	< 0.001	< 0.001	0.006	< 0.001	< 0.001	< 0.001	< 0.002	0.004	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Phosphorus, Total	0.024	0.03	< 0.01	< 0.01	0.01	0.02	0.02	0.03	< 0.01	0.03	< 0.01	0.02	0.04	0.03	< 0.01	0.02	< 0.01	0.03	0.01	< 0.01	< 0.01	< 0.01	0.01
Potassium	1.91	NL	1.00	1.5	1.6	0.6	0.9	1.3	0.9	1.6	1.6	0.9	0.9	2.9	0.8	0.9	1.5	0.9	1.2	1.3	1.0	1.1	1.5
Sodium	37	NL	8.3	13.8	15.9	7.8	13.3	9.6	6.6	13.2	16.0	9.6	12.5	11.1	8.7	11.9	16.8	7.1	15.7	16.4	9.7	11.4	11.4
Strontium	0.18	NL	0.123	0.172	0.186	0.070	0.184	0.114	0.072	0.182	0.181	0.087	0.164	0.149	0.090	0.149	0.136	0.104	0.157	0.133	0.090	0.140	0.123
Sulphate	7.15	NL	6	10	14	4	1	3	4	1	6	6	2	7	6	6	7	6	2	6	7	2	3
Total Dissolved Solids	355	NL	201	271	278	134	199	215	131	258	236	156	253	241	154	206	230	161	245	228	161	213	218
Total Kjeldahl Nitrogen	0.5	NL	0.2	0.4	0.2	0.3	0.4	0.3	0.2	0.5	0.3	0.2	0.3	0.4	0.2	0.4	0.3	0.4	0.3	0.3	0.3	0.4	0.3
Total Suspended Solids	4	NL	< 3	< 3	4	< 3	3	< 3	< 3	< 3	< 3	4	< 3	5	11	3	3	< 3	7	< 3	< 3	3	< 3
Zinc	0.007	0.02	< 0.005	< 0.005	< 0.005	< 0.005	0.065	0.016	< 0.005	0.021	0.012	0.007	< 0.005	< 0.005	< 0.005	0.025	< 0.005	0.013	0.009	0.006	< 0.005	< 0.005	< 0.005

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.
All results are expressed in mg/L, unless otherwise stated.
Shaded area with bold text indicates PWQO exceedance.
NL indicates No Limit.
*** indicates results obtained from lab analysis

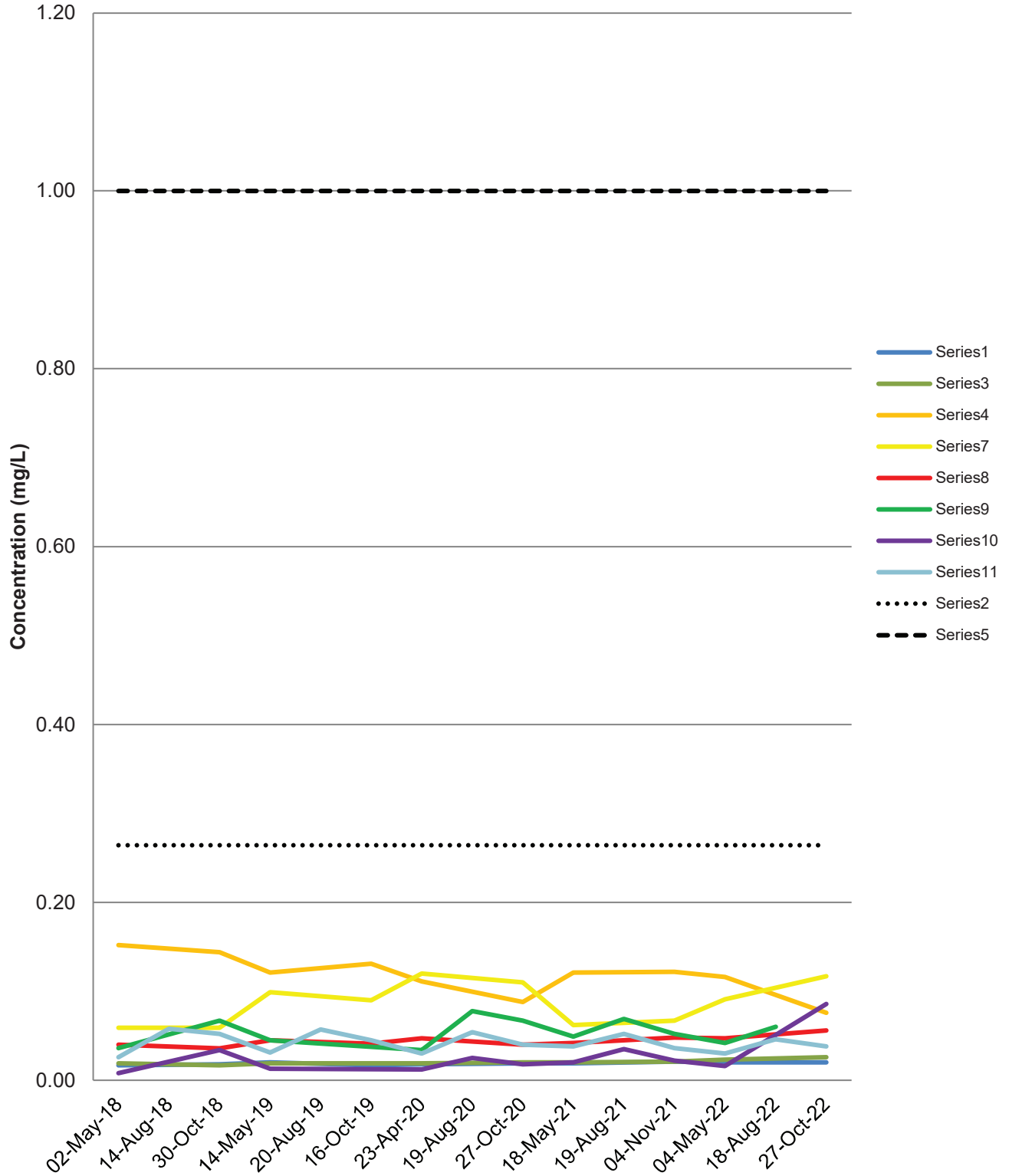
Graphs



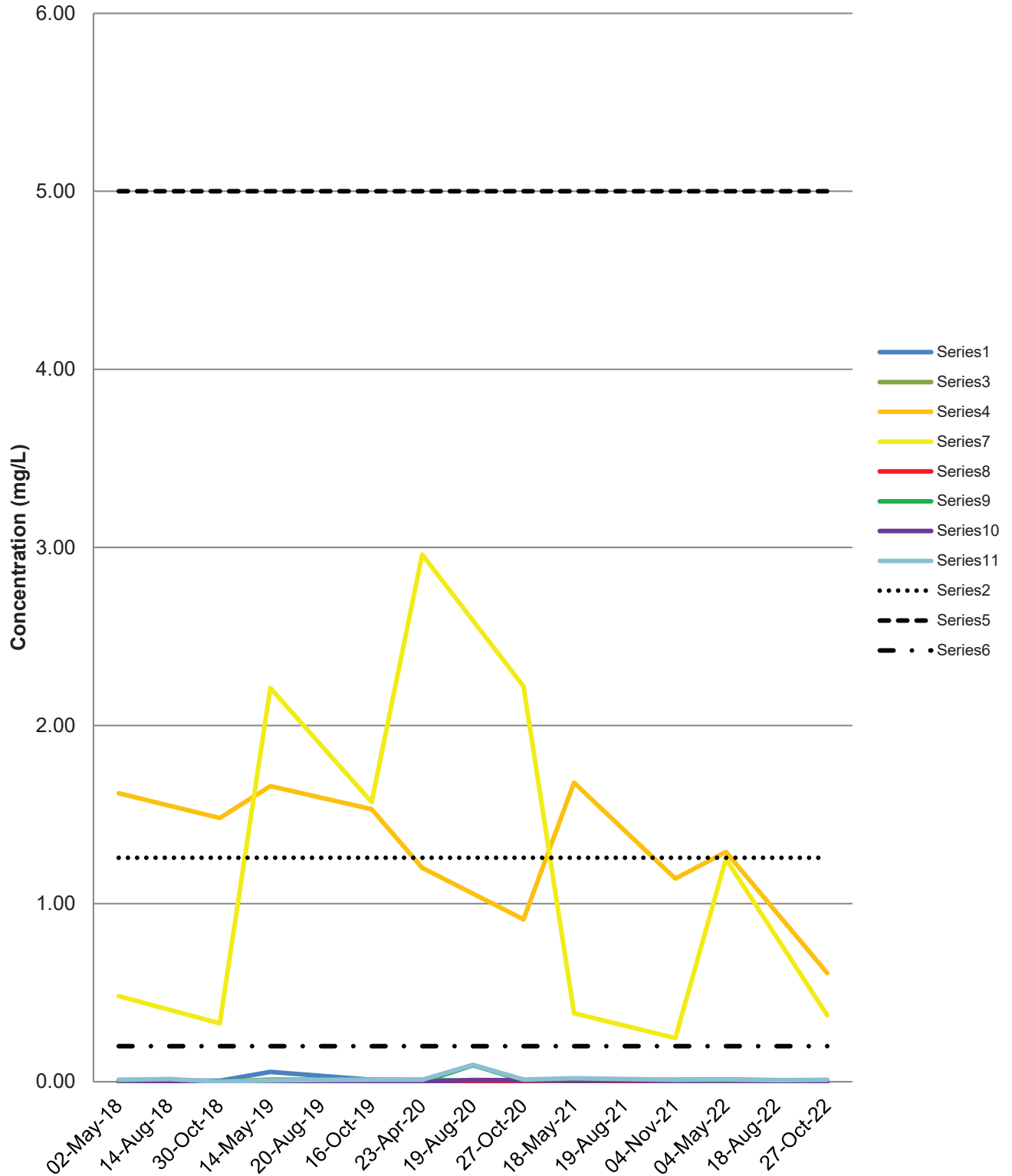
Graph 1
Trend Analysis - Ammonia (Un-ionized) - Groundwater and Surface Water
Black Donald Waste Disposal Site



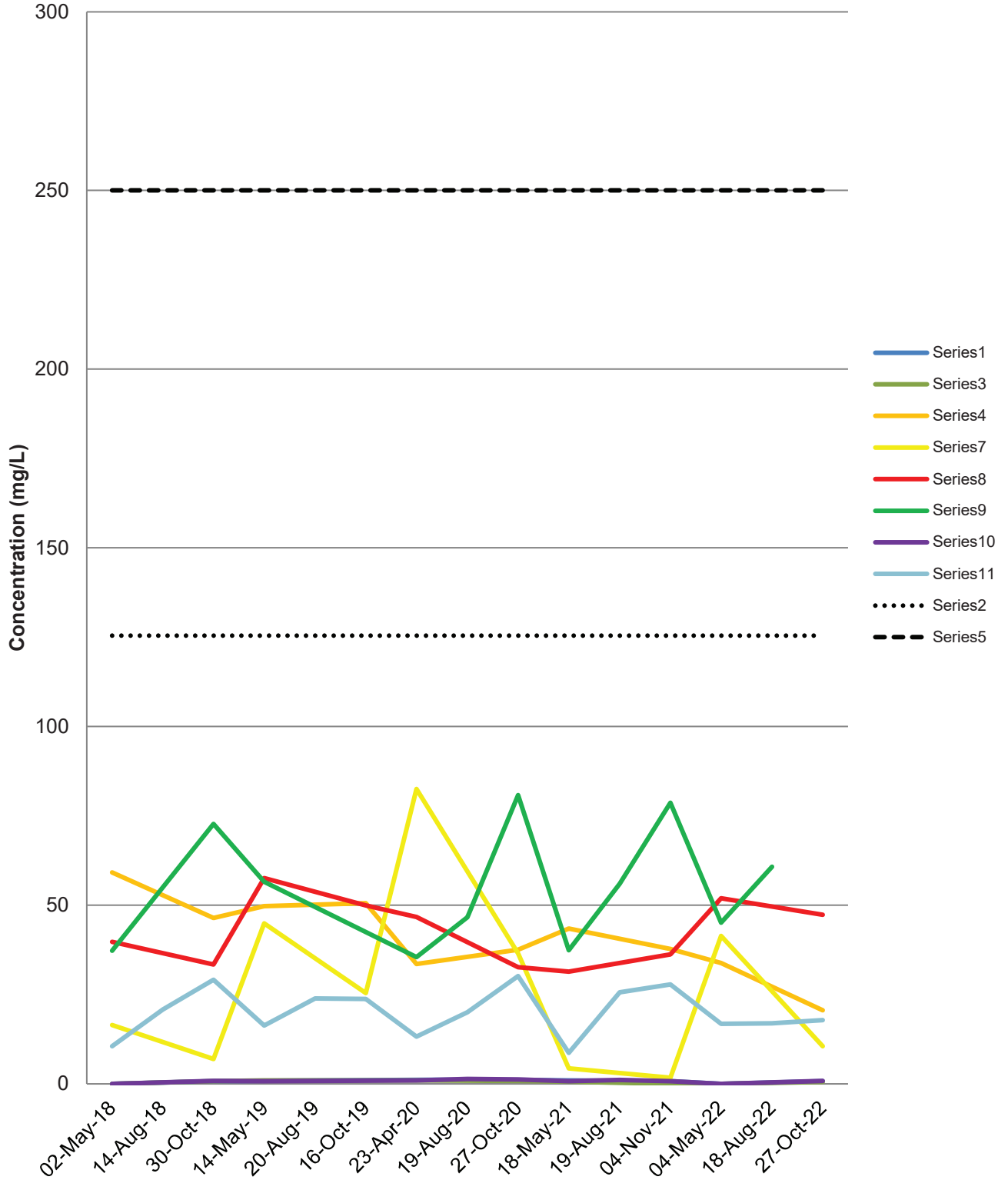
Graph 2
Trend Analysis - Barium - Groundwater and Surface Water
Black Donald Waste Disposal Site



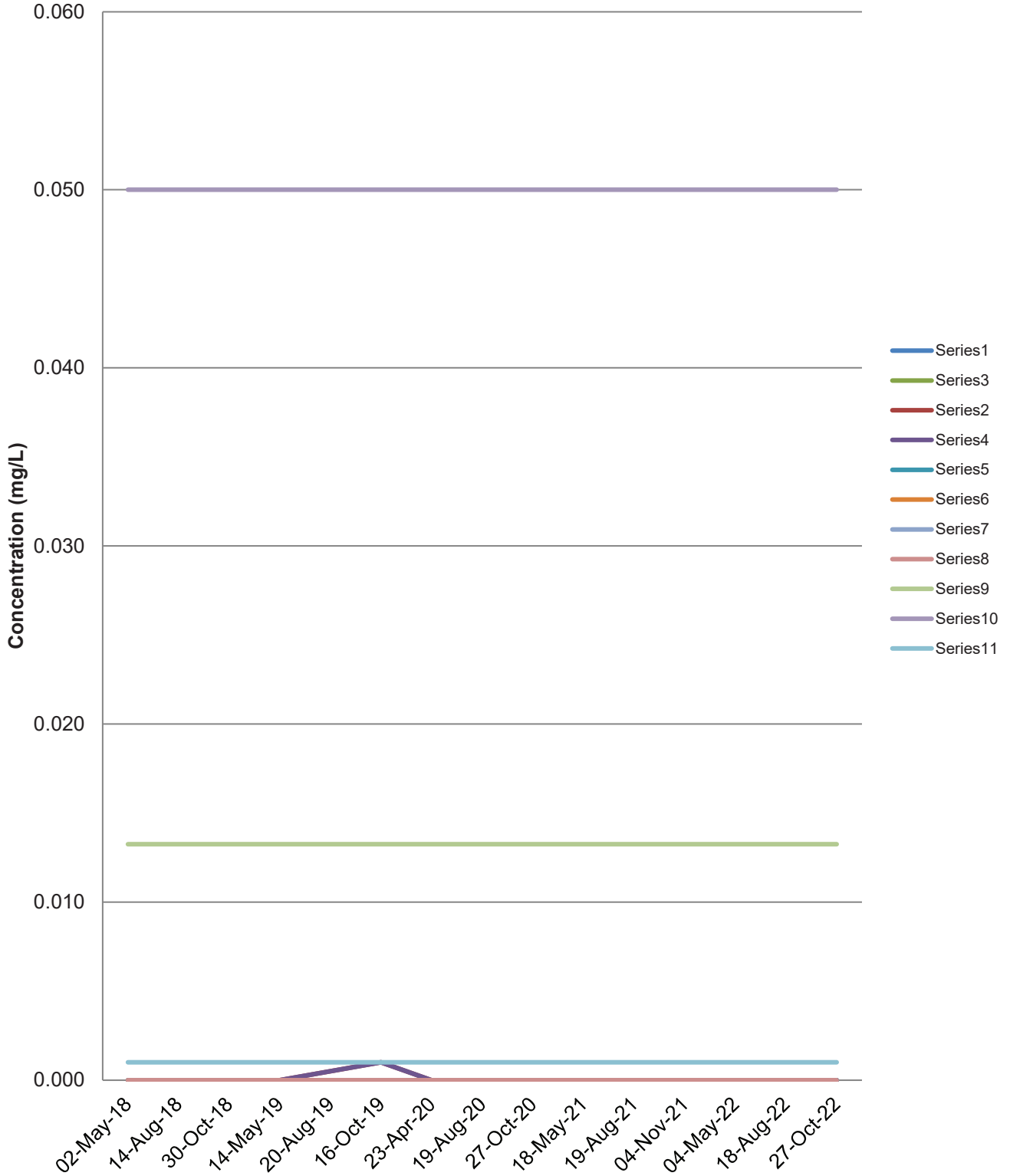
Graph 3
Trend Analysis - Boron - Groundwater and Surface Water
Black Donald Waste Disposal Site



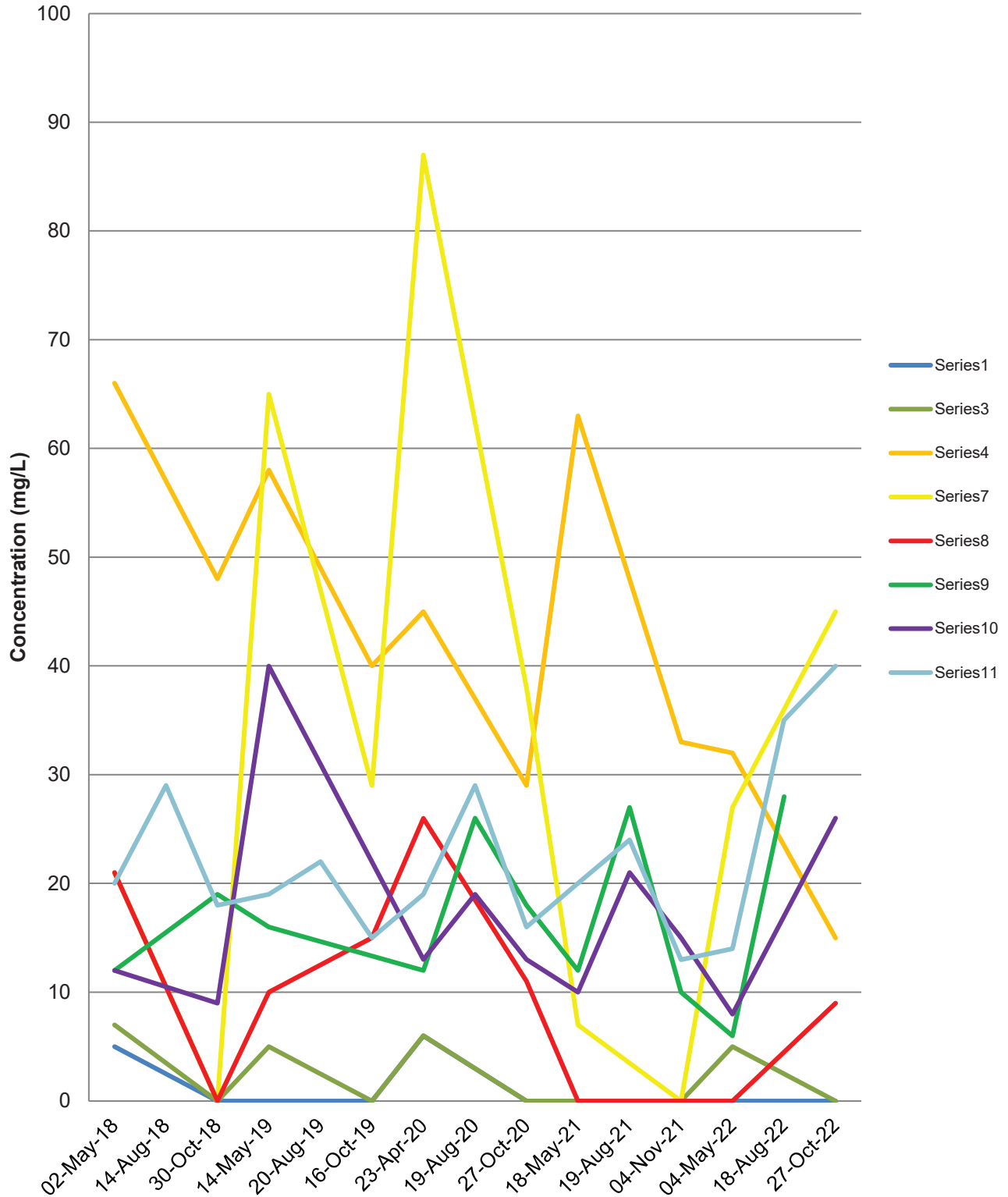
Graph 4
Trend Analysis - Chloride - Groundwater and Surface Water
Black Donald Waste Disposal Site



Graph 5
Trend Analysis - Chromium - Groundwater and Surface Water
Black Donald Waste Disposal Site

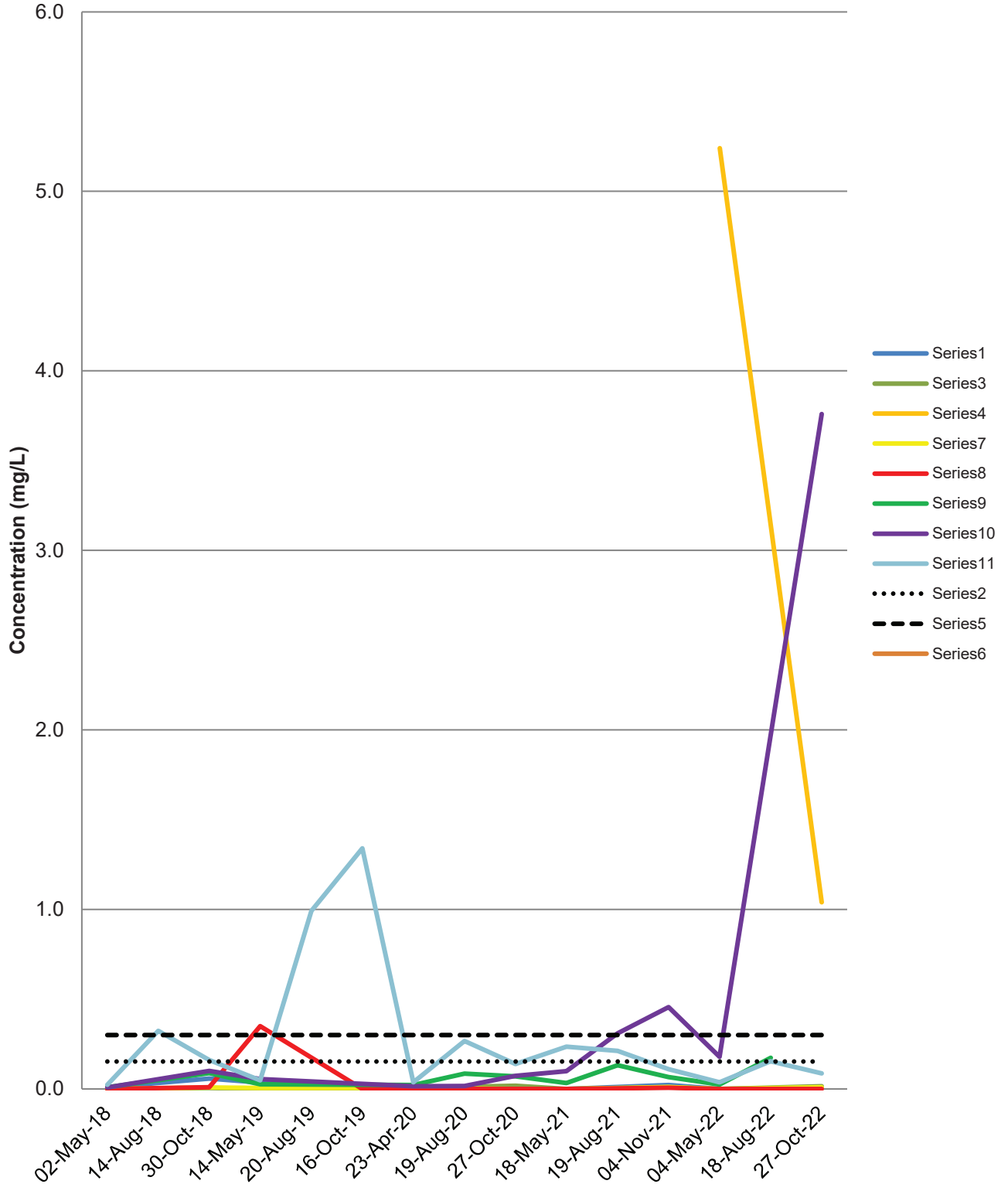


Graph 6
Trend Analysis - COD - Groundwater and Surface Water
Black Donald Waste Disposal Site

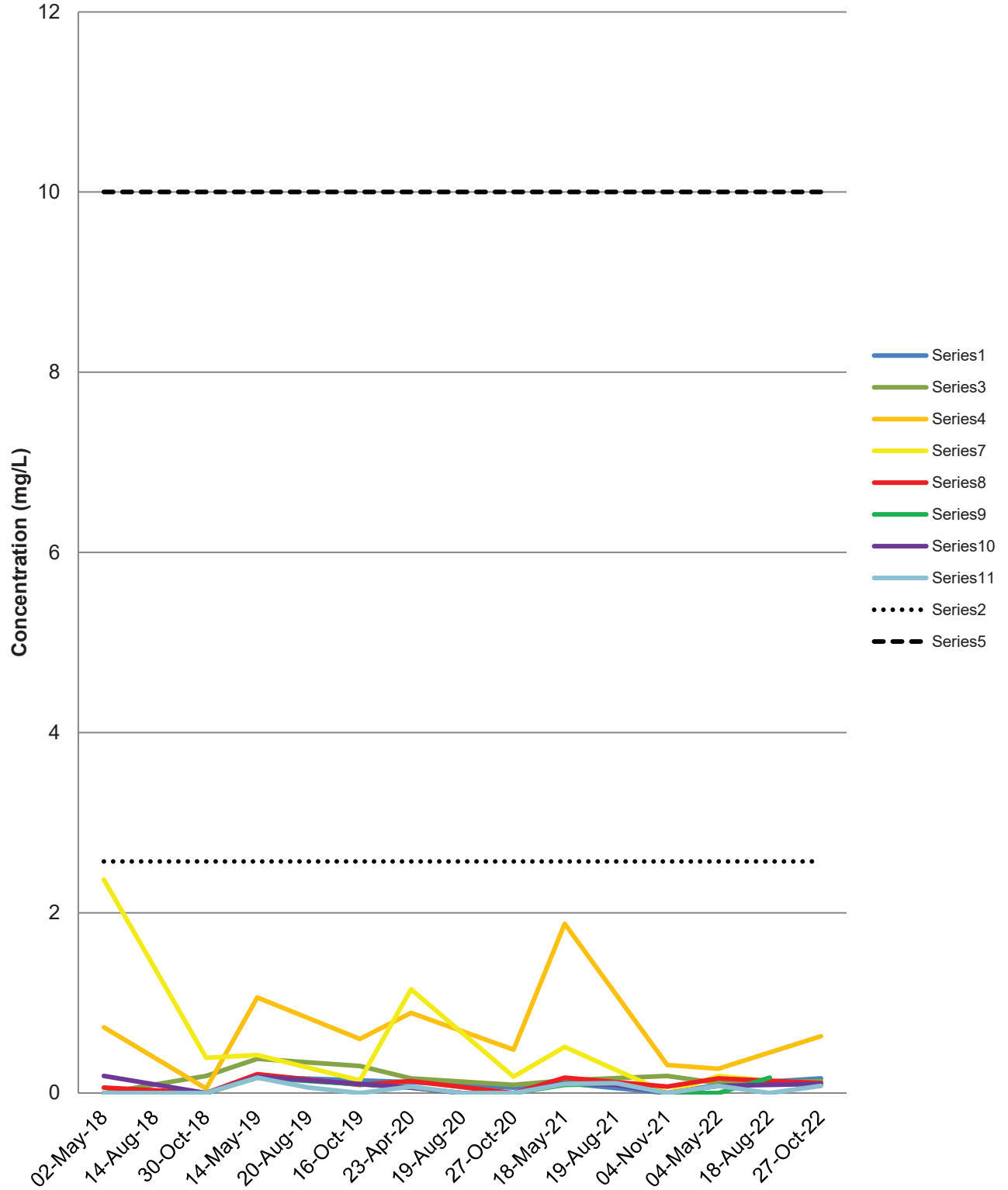


Graph 7
Trend Analysis - Iron - Groundwater and Surface Water
Black Donald Waste Disposal Site

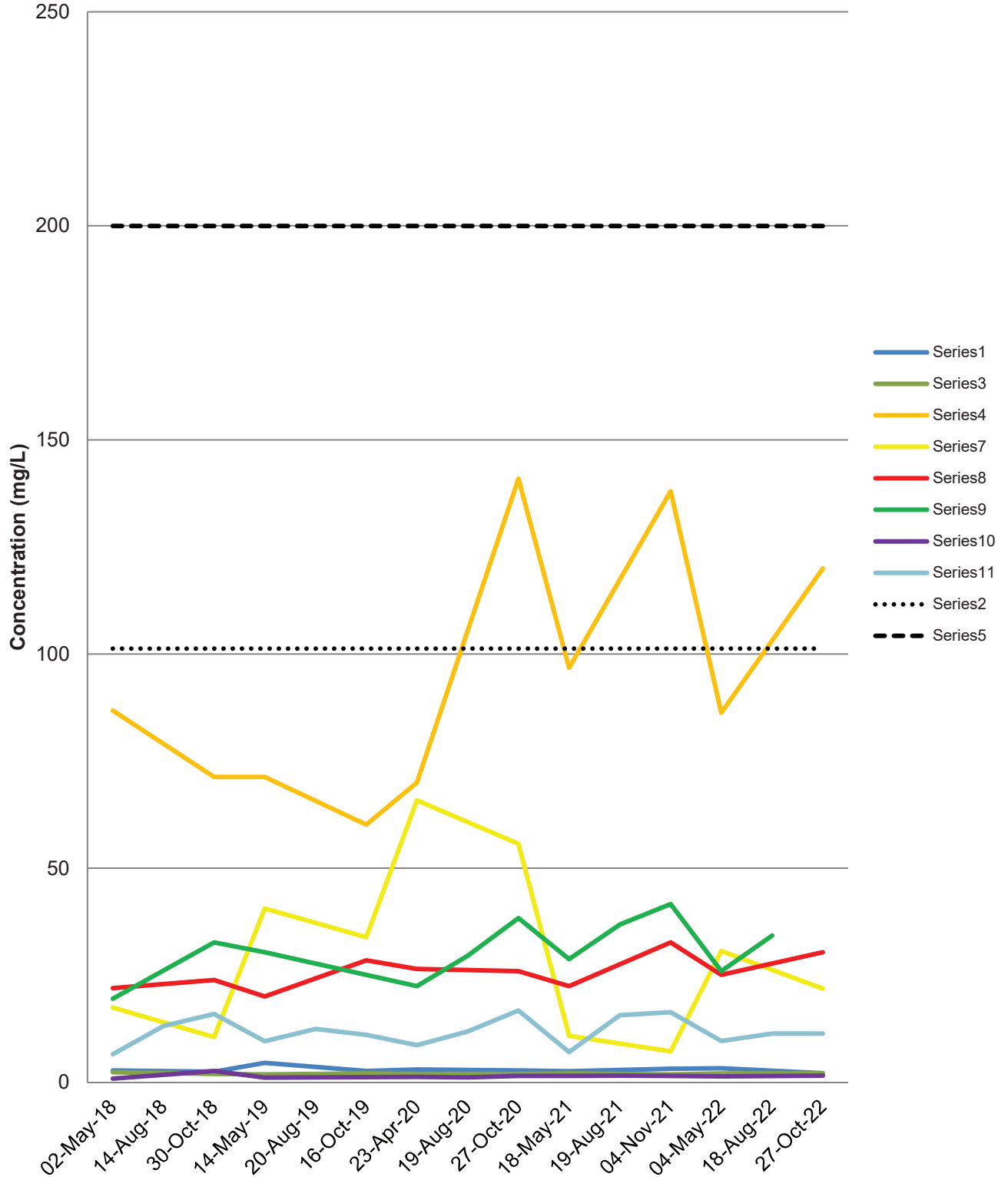
Note:
High iron concentrations for leachate monitoring well BH1 deleted for graphical purposes.



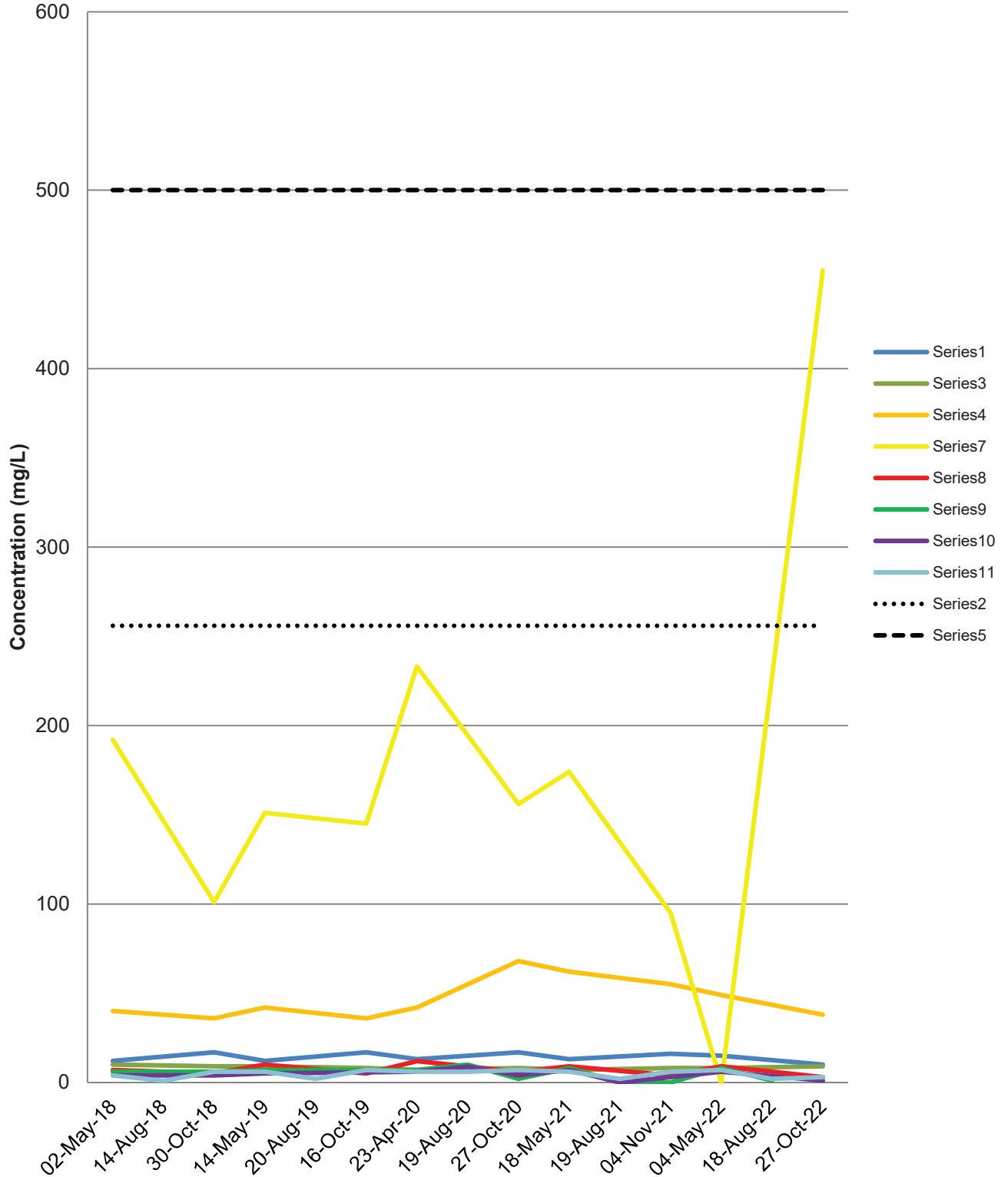
Graph 8
Trend Analysis - Nitrate - Groundwater and Surface Water
Black Donald Waste Disposal Site



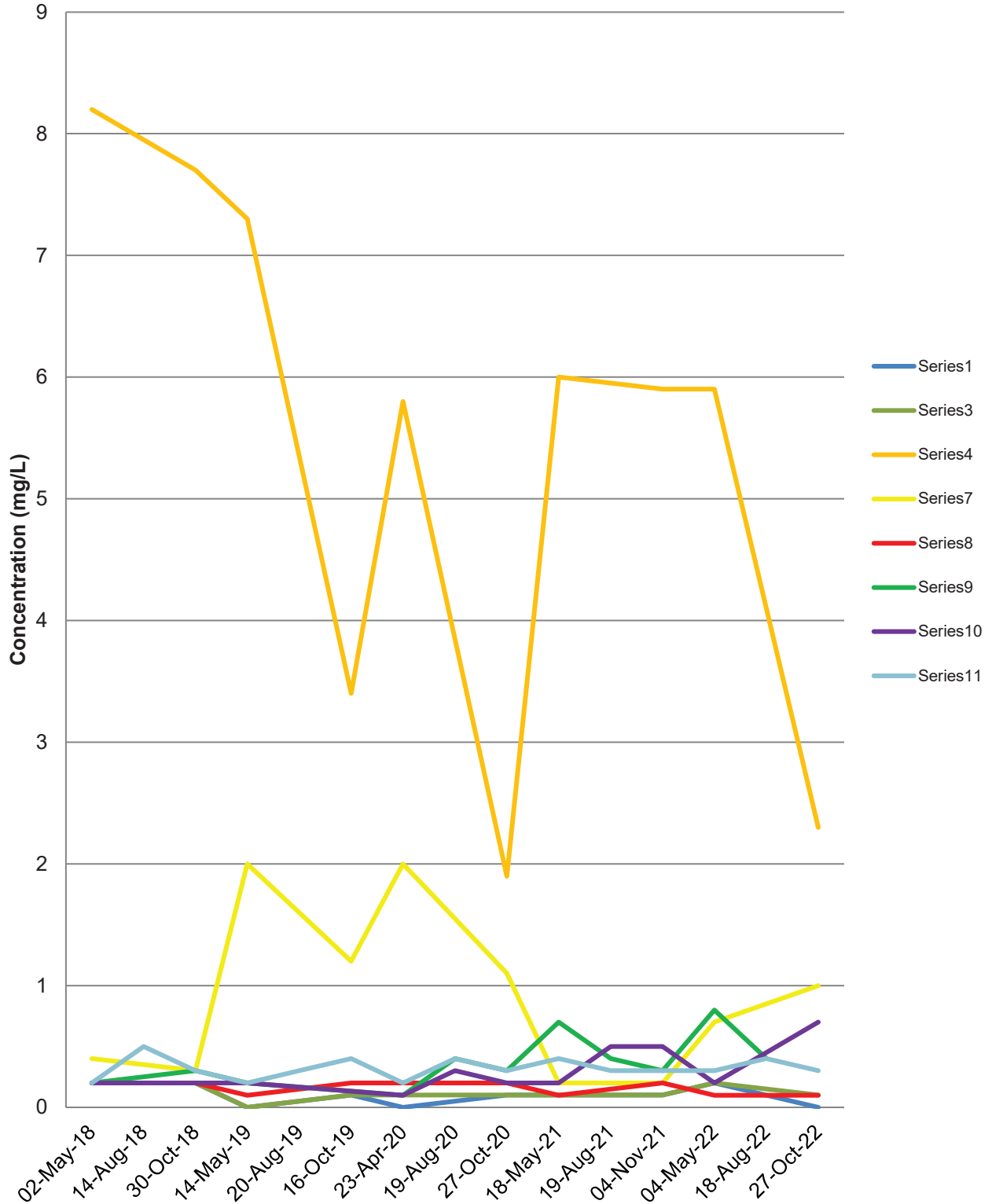
Graph 9
Trend Analysis - Sodium - Groundwater and Surface Water
Black Donald Waste Disposal Site



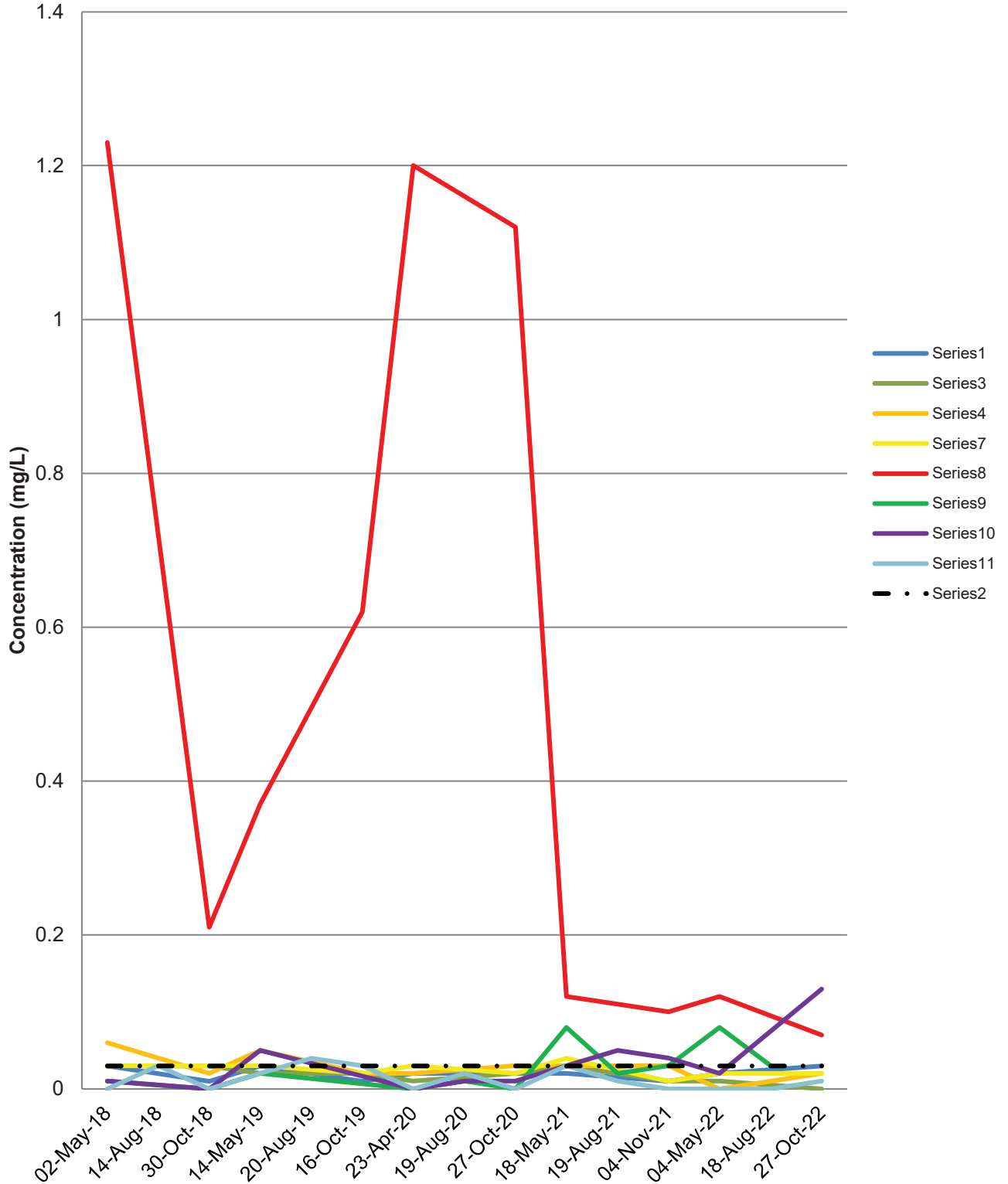
Graph 10
Trend Analysis - Sulphate - Groundwater and Surface Water
Black Donald Waste Disposal Site



Graph 11
Trend Analysis - TKN - Groundwater and Surface Water
Black Donald Waste Disposal Site

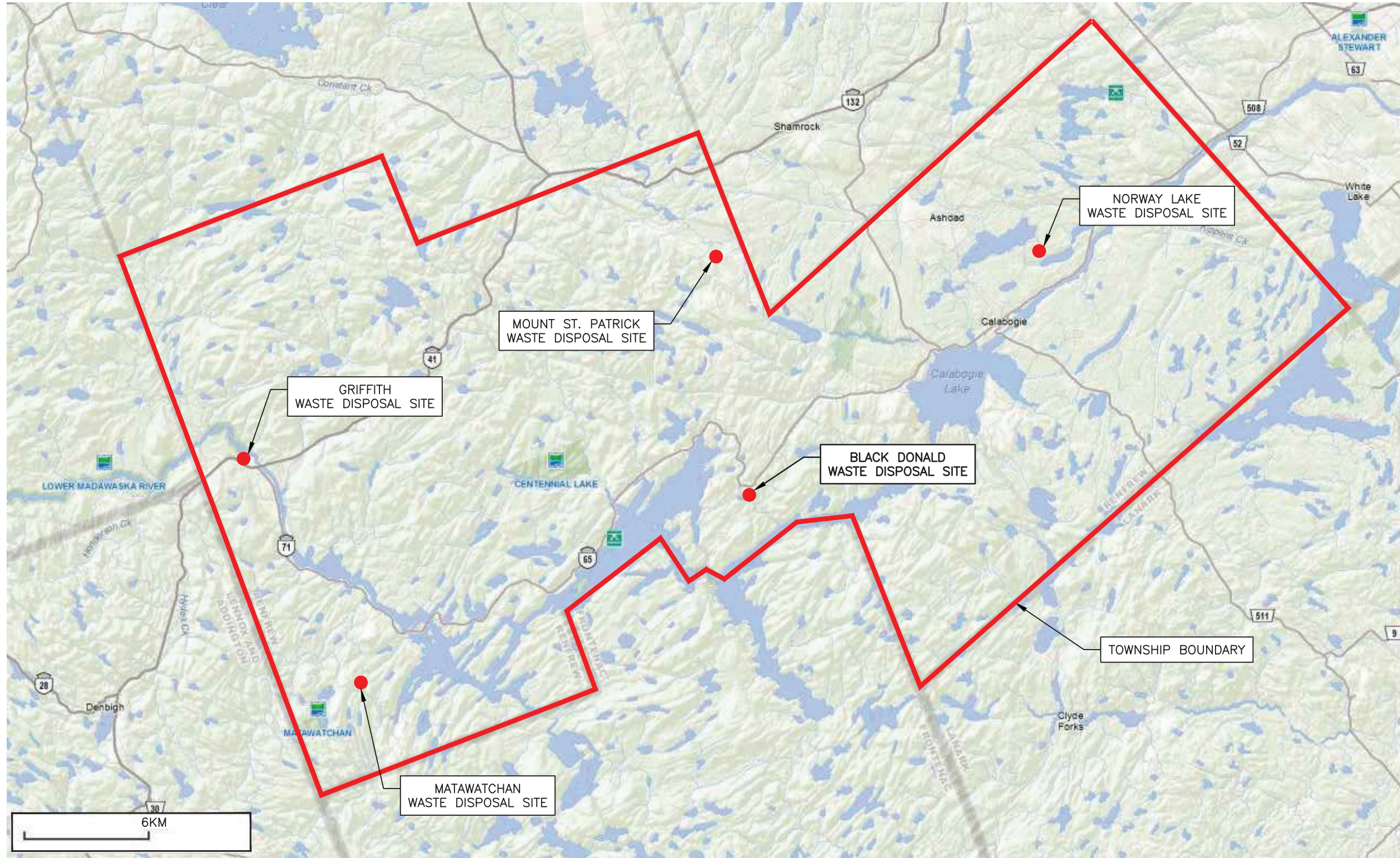


Graph 12
Trend Analysis - Total Phosphorus - Groundwater and Surface Water
Black Donald Waste Disposal Site



Figures





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



13 Commerce Court
Bancroft, Ontario
613.332.0057
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0	DEC21-22	THP	ISSUED FOR REPORT
No.	DATE	BY	REMARKS

DRAWN BY:	CHECKED BY:
MAG	MAG
DESIGNED BY:	APPROVED BY:
MAG	THP
SCALE:	DATE:
AS NOTED	DEC-22

CLIENT:

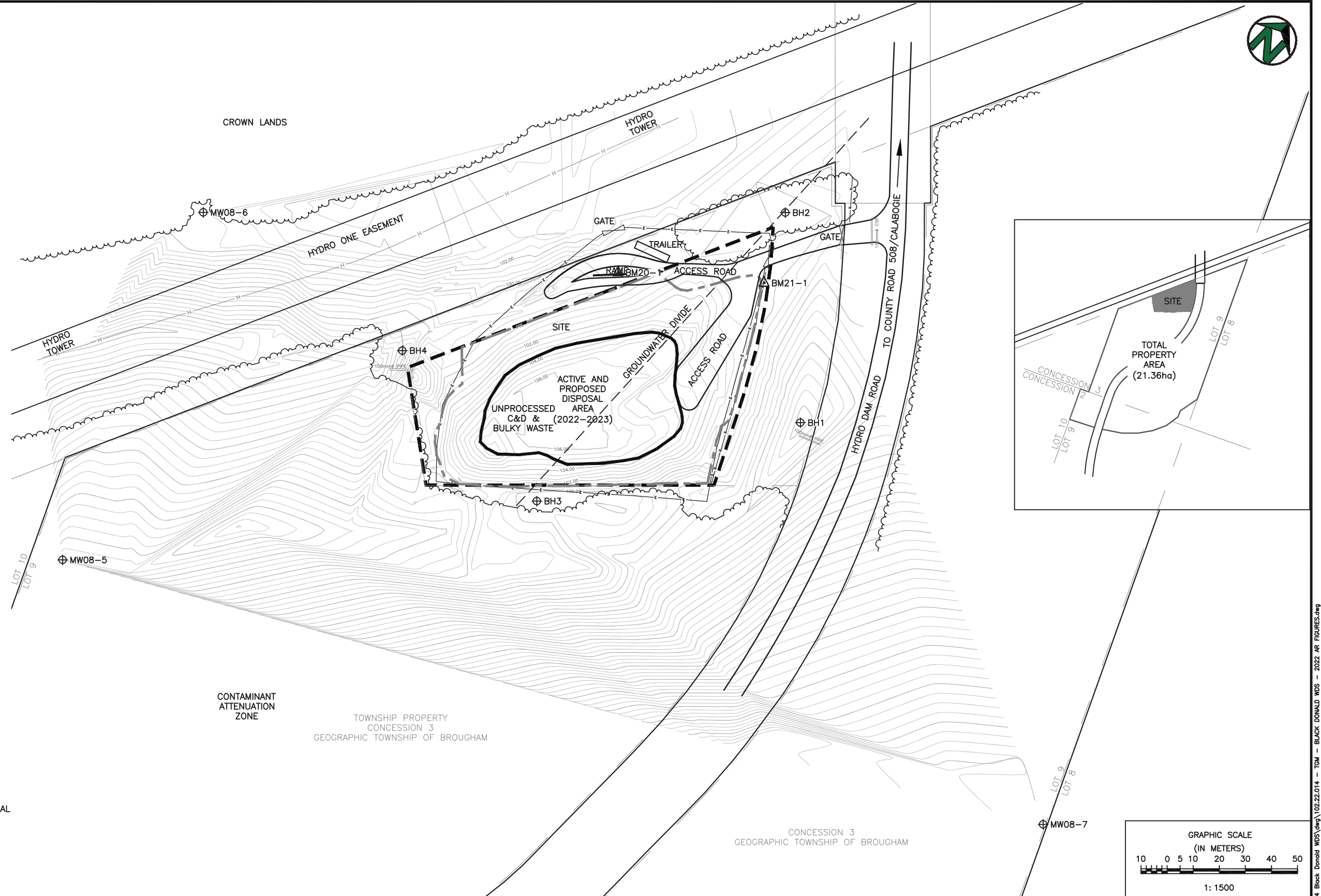
PROJECT:

REGIONAL LOCATION PLAN
2022 ANNUAL MONITORING REPORT
BLACK DONALD WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

PROJECT No:	102.22.014
FIGURE:	1
	1 OF 6

LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- EXISTING LIMIT OF WASTE
- APPROXIMATE ACTIVE DISPOSAL AREA
- CONTAMINANT ATTENUATION ZONE
- 100.00 MAJOR TOPOGRAPHIC CONTOUR (2m)
- MINOR TOPOGRAPHIC CONTOUR (0.5m)
- ON-SITE ROAD
- RIGHT-OF-WAY
- FENCELINE
- ELECTRIC BEAR FENCE
- APPROXIMATE TREE LINE
- HYDRO ONE EASEMENT
- OVERHEAD UTILITIES
- ⊕ BH4 GROUNDWATER MONITORING WELL
- △ BM BENCHMARK
- UNPROCESSED C&D & BULKY WASTE



NOTES

1. BENCHMARKS
 BM21-1
 IB ALONG FENCE LINE HEADING UP TO ACTIVE DISPOSAL AREA.
 ELEVATION = 100.818mm
2. DRAWING BASED ON DIGITAL INFORMATION BY GOLDER ASSOCIATES, 2006.
3. UPDATED TOPOGRAPHIC SURVEYS OF ACTIVE AREA COMPLETED BY GREENVIEW ON DECEMBER 08, 2022.

Greenview
 ENVIRONMENTAL MANAGEMENT

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

No.	DATE	BY	REMARKS
0	DEC21-22	THP	ISSUED FOR REPORT

DRAWN BY: MAG	CHECKED BY: MAG
DESIGNED BY: MAG	APPROVED BY: THP
SCALE: 1:1500	DATE: DEC-22

CLIENT:

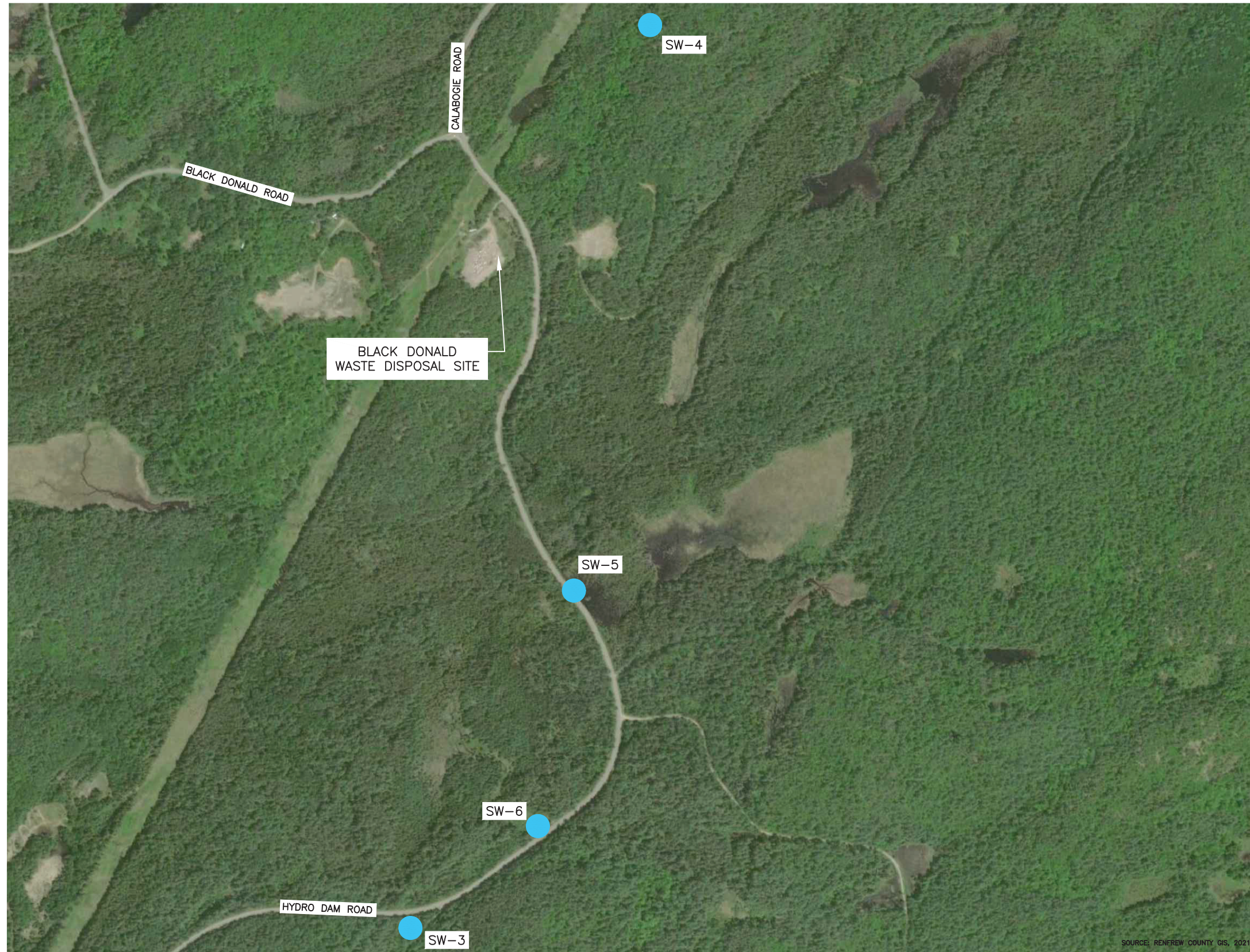
 THE TOWNSHIP OF
 GREATER MADAWASKA

PROJECT:
 EXISTING SITE CONDITIONS PLAN
 2022 ANNUAL MONITORING REPORT
 BLACK DONALD WASTE DISPOSAL SITE
 TOWNSHIP OF GREATER MADAWASKA

PROJECT No:
102.22.014

FIGURE:
2

2 OF 6



SOURCE: RENFREW COUNTY GIS, 2021.

NOTE: ALL LOCATIONS APPROXIMATE.



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

No.	DATE	BY	REMARKS
0	DEC21-22	THP	ISSUED FOR REPORT

DRAWN BY: MAG	CHECKED BY: MAG
DESIGNED BY: MAG	APPROVED BY: THP
SCALE: NTS	DATE: DEC-22

CLIENT:

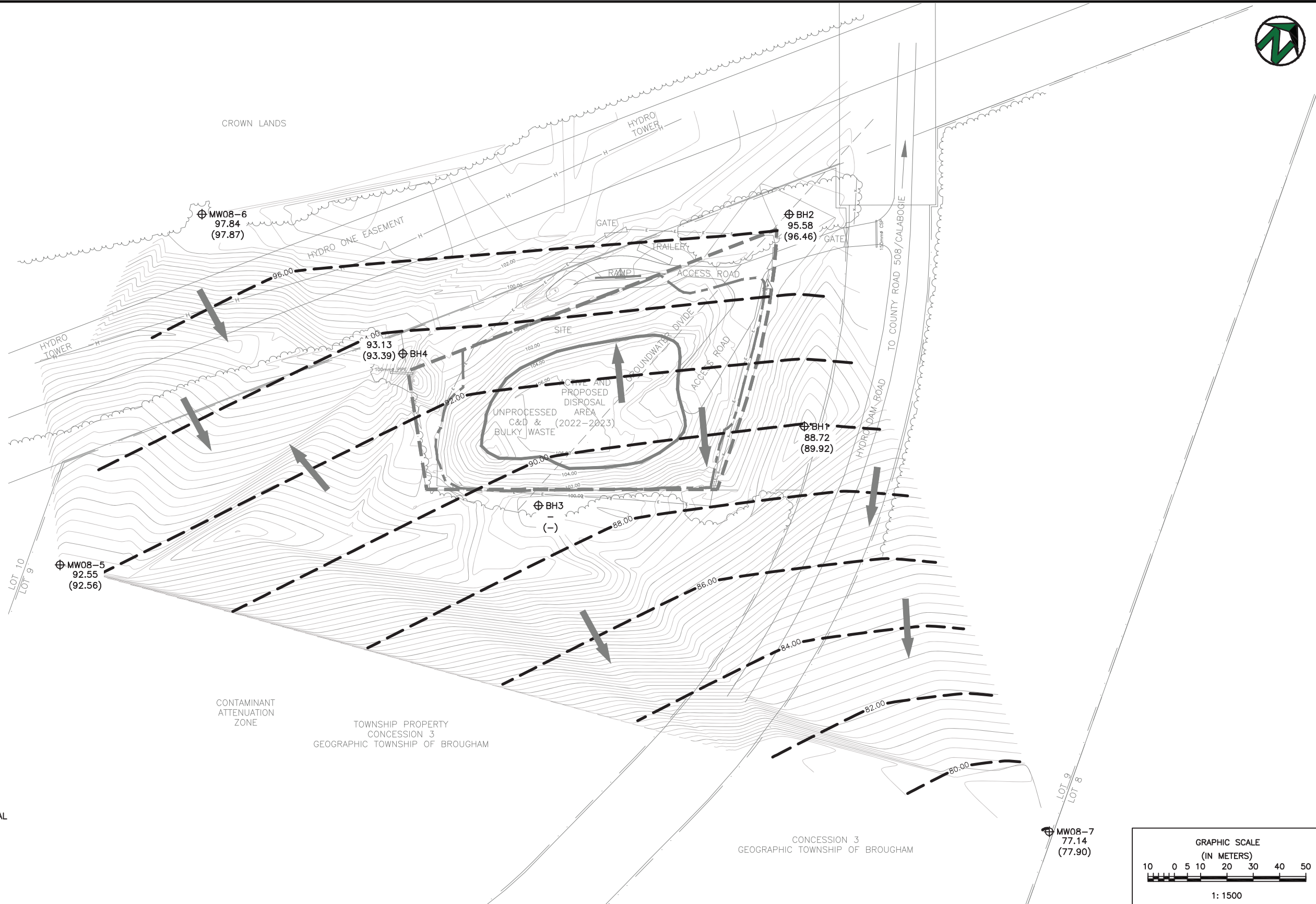
PROJECT:

SURFACE WATER MONITORING LOCATION PLAN
2022 ANNUAL MONITORING REPORT
BLACK DONALD WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

PROJECT No: 102.22.014
FIGURE: 3
3 OF 6

LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- EXISTING LIMIT OF WASTE
- APPROXIMATE ACTIVE DISPOSAL AREA
- CONTAMINANT ATTENUATION ZONE
- TOPOGRAPHIC CONTOUR LINE
- ON-SITE ROAD
- RIGHT-OF-WAY
- FENCELINE
- ELECTRIC BEAR FENCE
- APPROXIMATE TREE LINE
- HYDRO ONE EASEMENT
- OVERHEAD UTILITIES
- BH4 GROUNDWATER MONITORING WELL
- 96.00 EQUIPOTENTIAL CONTOUR (MAY 04, 2022)
- 88.18 GROUNDWATER ELEVATIONS (OCTOBER 27, 2022 (MAY 04, 2022))
- GROUNDWATER FLOW DIRECTION
- BENCHMARK
- UNPROCESSED C&D & BULKY WASTE



NOTES

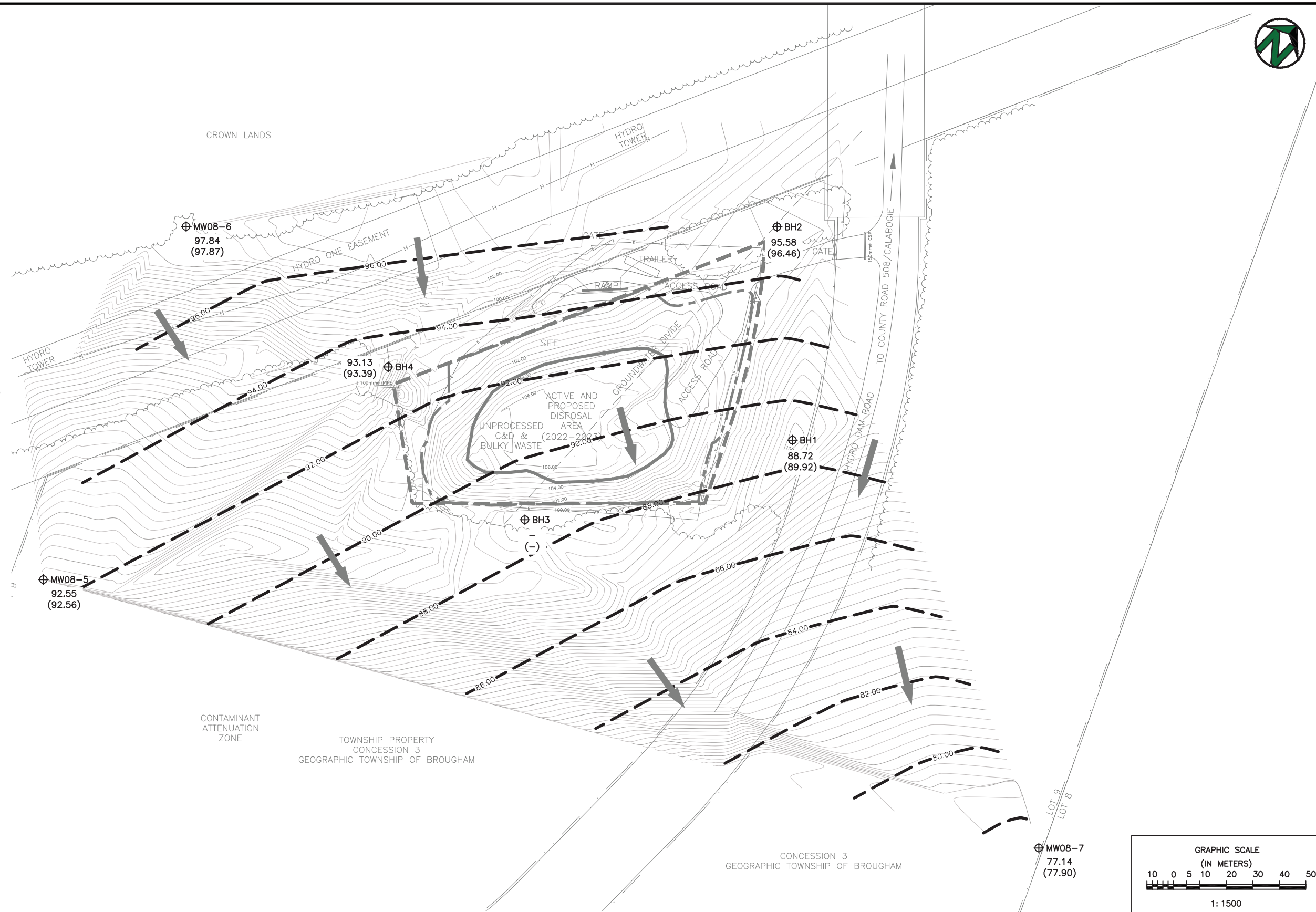
1. BENCHMARKS
BM21-1
IB ALONG FENCE LINE HEADING UP TO ACTIVE DISPOSAL AREA.
ELEVATION = 100.818mm
2. DRAWING BASED ON DIGITAL INFORMATION BY GOLDER ASSOCIATES, 2006.
3. UPDATED TOPOGRAPHIC SURVEYS OF ACTIVE AREA COMPLETED BY GREENVIEW ON DECEMBER 08, 2022.

<p>13 Commerce Court Bancroft, Ontario 613.332.0057 greenview-environmental.ca</p>					DRAWN BY: MAG	CHECKED BY: MAG	<p>CLIENT: THE TOWNSHIP OF GREATER MADAWASKA</p>	PROJECT: ENVIRONMENTAL MONITORING LOCATION PLAN – SPRING 2022 ANNUAL MONITORING REPORT BLACK DONALD WASTE DISPOSAL SITE TOWNSHIP OF GREATER MADAWASKA	PROJECT No: 102.22.014
					DESIGNED BY: MAG	APPROVED BY: THP			FIGURE: 4
	0	DEC21-22	THP	ISSUED FOR REPORT	SCALE: 1:1500	DATE: DEC-22			4 OF 6
	No.	DATE	BY	REMARKS					

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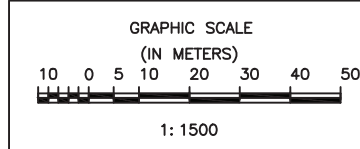
LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- EXISTING LIMIT OF WASTE
- APPROXIMATE ACTIVE DISPOSAL AREA
- CONTAMINANT ATTENUATION ZONE
- 100.00 TOPOGRAPHIC CONTOUR LINE
- ON-SITE ROAD
- RIGHT-OF-WAY
- FENCELINE
- ELECTRIC BEAR FENCE
- APPROXIMATE TREE LINE
- HYDRO ONE EASEMENT
- OVERHEAD UTILITIES
- ⊕ BH4 GROUNDWATER MONITORING WELL
- 96.00 EQUIPOTENTIAL CONTOUR (OCTOBER 27, 2022)
- 88.18 GROUNDWATER ELEVATIONS (OCTOBER 27, 2022)
- 89.16 GROUNDWATER ELEVATIONS (MAY 04, 2022)
- ← GROUNDWATER FLOW DIRECTION
- △ BM BENCHMARK
- UNPROCESSED C&D & BULKY WASTE



NOTES

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IB ALONG FENCE LINE HEADING UP TO ACTIVE DISPOSAL AREA.
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13 Commerce Court
Bancroft, Ontario
613.332.0057
greenview-environmental.ca

No.	DATE	BY	REMARKS
0	DEC21-22	THP	ISSUED FOR REPORT

DRAWN BY: MAG	CHECKED BY: MAG
DESIGNED BY: MAG	APPROVED BY: THP
SCALE: 1:1500	DATE: DEC-22

CLIENT:
 THE TOWNSHIP OF GREATER MADAWASKA

PROJECT:
ENVIRONMENTAL MONITORING LOCATION PLAN – FALL
2022 ANNUAL MONITORING REPORT
BLACK DONALD WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

PROJECT No:
102.22.014

FIGURE:
6

6 OF 6

G:\Vat020\102.22.014 - Black Donald WDS.dwg | 102.22.014 - TGM - BLACK DONALD WDS - 2022 AR FIGURES.dwg

Appendix A



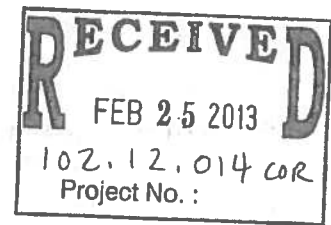
AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A411902

Notice No. 3

Issue Date: January 24, 2013

The Corporation of the Township of Greater Madawaska
1101 Francis St
Post Office Box, No. 180
Greater Madawaska, Ontario
K0J 1H0



Site Location: Black Donald Waste Disposal Site
34 Hydro Dam Rd
Greater Madawaska Township, County of Renfrew

You are hereby notified that I have amended Approval No. A411902 issued on March 27, 1980, and amended on October 12, 2001 and July 12, 2002 for the use and operation of a 1.2 hectare waste disposal site, as follows:

This Notice of Amendment updates the Approval to reflect current site operations, approves alternative daily cover and the Site Trigger and Contingency Plan.

The following definitions are added:

"Approval" means this Environmental Compliance Approval and any Schedules to it, including the application and supporting documentation listed in Schedule "A".

"Construction and Demolition and Bulky Waste" or "C&D waste" means wastes resulting from construction, and includes the following: asphalt shingles, mattresses, furniture, carpet, tree stumps, drywall, wallboard, wood (painted and unpainted).

The following Conditions are revoked and replaced:

- (15) (a) The Owner shall develop the Site in accordance with the Site Design, Operations and Development Plan, dated December 22, 2010, item 7 of Schedule "A".
- (b) The Site shall be constructed, operated and maintained in an environmentally safe manner, which minimizes the impacts of dust, odour, noise, litter, vector and vermin on the general public, Site

personnel, and the natural environment.

- (16) (a) The Site shall only receive only non-hazardous solid Construction and Demolition and Bulky Waste, and leaf and yard waste, generated from within the Township of Greater Madawaska.
- (b) The Site may receive non-hazardous solid domestic waste from within the Township of Greater Madawaska, on a temporary basis, only with prior written authorization from the District Manager.
- (c) Prior notification of 48-hours must be provided to the District Manager for receipt of any domestic waste.
- (23) The Owner shall conduct weekly inspections of the equipment and facilities at the Site to ensure that they are maintained in good working condition at all times. Any deficiencies, which might negatively impact the environment, which are detected during these inspections shall be recorded in a log, and promptly corrected.
- (26) The Owner shall implement the Site surfacewater and groundwater monitoring program as described in Schedule "B" of this Approval.

Site Trigger and Contingency Plan

- (29) The Owner shall establish the surfacewater and groundwater trigger and contingency plan, as described in Section 6.2 of the Design, Development and Operations Plan, item 7 of Schedule "A".

The following Conditions are added:

Waste Processing

- (35) (a) The Owner shall ensure that only Ministry-approved contractors carry out the processing of the Construction and Demolition and Bulky Waste at the Site.
- (b) The Owner shall ensure that Construction and Demolition and Bulky Waste is stored and processed within the landfill footprint, as shown in Figure 6, Proposed Site Design, of item 7 of Schedule "A".

Leaf and Yard

- (36) (a) The Owner shall ensure that leaf and yard storage and composting is conducted as described in the Site Design, Operations and Development Plan, item 7 of Schedule "A".
- (b) A maximum of 1000 cubic metres of leaf and yard waste may be temporarily stored within the staging area.
- (c) Leaf and yard wastes shall be moved to the established composting area within three months of arrival

at the Site.

- (d) A maximum of 500 cubic metres of leaf and yard waste may be processed within the composting area at any time.
- (d) Composted leaf and yard waste may only be used as alternative daily cover at the Site, it may not be re-used by the public.

Cover

(37)(a) The Owner shall ensure that cover material is applied at the Site as follows:

- Intermediate - Once every six (6) months, across the entire working face, and/or in areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 0.3 metre of soil or an approved thickness of alternative cover material shall be placed; and
 - Final -In areas where landfilling has been completed to final contours, a minimum of 0.6 metre thick layer of final cover soil shall be placed, followed by 0.15 metre of topsoil.
- (b) In the event that domestic waste is received at the Site on a temporary basis, daily cover shall be applied, at the end of each working day, consisting of a minimum of 0.15 m of soil.

Alternative Daily Cover

- (c) The Owner may apply the following materials as alternative intermediate cover, in the same thicknesses as described in Condition 37 (a):
- leaf and yard waste mixed with soil cover and/or wood chips;
 - composted or partially-composted leaf and yard waste;
 - asphalt shingles;
 - clean wood chips;
 - contaminated soil - non-hazardous;
 - processed C&D and bulky waste materials.

Schedule "A"

The following items are added to Schedule "A".

7. Report entitled "Design, Operations and Development Plan, Black Donald Waste Disposal Site (A411902), Township of Greater Madawaska, County of Renfrew, Ontario", prepared by Greenview Environmental Management Limited, dated December 22, 2010.
8. Letter dated July 30, 2012, from Dan Hagan, Greenview Environmental Management, to Lynda Mulcahy, MOE, RE: Application for Approval of Waste Disposal Sites, Black Donald Waste Disposal Site (A411902), Township of Greater Madawaska, County of Renfrew, MOE reference number: 3866-CTJ5V, with responses to waste review comments and questions.
9. e-mail from Dan Hagan, Greenview Environmental Management Limited, to Lynda Mulcahy, MOE, sent August 22, 2012, 9:57am, Subject: RE TGM - Black Donald WDS - Application for Approval of Waste Disposal Sites - MOE Request for Additional Information (MOE Reference Number: 3866-8CTJ5V)

Schedule "B" is added to the Approval

Site Groundwater and Surfacewater Monitoring Program

Location	Frequency	Parameters
<p><u>Groundwater</u> BH1, BH2, BH3, BH4, MW08-5, MW08-6, MW08-7</p> <p>1 QA/QC</p>	<p>Twice per year (Spring, Fall)</p>	<p>Alkalinity, aluminum, ammonia, barium, boron, cadmium, calcium, chromium, cobalt, chloride, COD, copper, DOC, hardness, iron, magnesium, manganese, nitrate, phenols, potassium, silicon, sodium, strontium, sulphate, total phosphorus, TKN, TDS, zinc</p> <p>field measurements (pH, conductivity, temperature), water levels</p>
<p>BH1</p>	<p>Once every 5 years (Spring)</p>	<p>VOCs - EPA 624</p>
<p><u>Surface Water</u> SW-3, SW-4, SW-5, SW-6</p> <p>1 QA/QC</p>	<p>Three Times (Spring, Summer, Fall)</p>	<p>Alkalinity, ammonia, BOD, boron, cadmium, calcium, chloride, COD, copper, DOC, hardness, iron, magnesium, manganese, nitrate, nitrite, phenols, potassium, sodium, strontium, sulphate, total phosphorus, TKN, TDS, zinc, TSS</p> <p>Field Measurements (pH, conductivity, dissolved oxygen, temperature, unionized ammonia (calculation))</p>

The reasons for this amendment to the Approval are as follows:

Condition 15 was revised to reflect the updated Design, Operations and Development plan for the Site, and to ensure the Site does not cause nuisance or impacts.

Condition 16 was revised to clarify the currently-approved wastes that may be received at the Site.

Condition 23 was revised to update the Site inspection requirement.

Condition 26 was revised to reflect the updated Site monitoring programs.

Condition 29 was added to approve the Site trigger and contingency plan.

Condition 35 is added to ensure that storage and processing of construction and demolition wastes are carried out as described in the updated Design, Operations and Development plan, and are carried out in an environmentally-safe manner.

Condition 36 is added to ensure that leaf and yard waste storage and composting is carried out as described in the updated Design, Operations and Development plan, and are carried out in an environmentally-safe manner.

Condition 37 is included to specify cover requirements for the Site, to ensure operations to not cause impacts or nuisance.

Schedule B was added to the Approval to include the updated Site monitoring program.

This Notice shall constitute part of the approval issued under Approval No. A411902 dated March 27, 1980

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

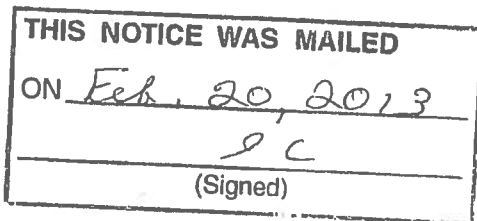
AND

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 24th day of January, 2013



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

LM/

c: District Manager, MOE Ottawa
Tyler H. Peters, Greenview Environmental Management Limited ✓

K. Helmer
SIRE BM C 03 250 ✓

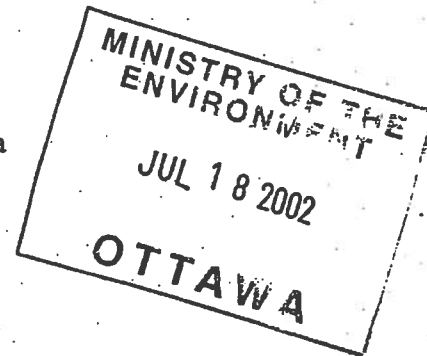


Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A411902
Notice No. 2

Ontario

The Corporation of the Township of Greater Madawaska
1101 Francis Street
Bagot, Blythfield And Brougham, Ontario
K0J 1H0



Site Location: Black Donald Waste Disposal Site
34 Hydro Dam Road
Greater Madawaska Township, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A411902 issued on March 27, 1980, and amended on October 22, 2001 for submission of development and operations report as per Condition No. (14) of October 22, 2001 amendment, as follows:

Condition No. (14) is hereby revoked.

The following conditions of approval are added to the Provisional Certificate of Approval:

SITE OPERATIONS:

- (15) The Site shall be constructed, operated and maintained in an environmentally safe manner, which minimizes the impacts of dust, odour, noise, litter, vector and vermin on the general public, Site personnel, and the natural environment, all in accordance to the Development and Operations Plan, Items 4, 5 and 6 of Schedule "A".
- (16) The Site shall only receive non-hazardous municipal waste that is generated from within the Township of Greater Madawaska.
- (17) The normal daily hours of operation for receiving waste at the Site are 7 am to 9 pm.
- (18) The total volumetric capacity of the Site, including waste, daily, interim and final cover, is 46,785 cubic meters.
- (19) The Owner shall ensure that there is no burning of waste, trees, brush and or clean wood piles at the Site.
- (20) All incoming waste shall be inspected prior to being received at the Site to ensure that the Site is approved to accept such a waste.

- (21) The Owner shall ensure that all wastes at the Site are managed and disposed of in accordance with Ontario Regulation 347, R.R.O. 1990, as amended.
- (22) The Owner 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.
- (23) The Owner shall conduct daily inspections of the equipment and facilities at the Site to ensure that they are maintained in good working condition all the times. Any deficiencies, which might negatively impact the environment, detected during these inspections shall be recorded in a log, and promptly corrected.
- (24) (a) A sign shall be posted in a prominent location at the entrance of the Site stating the hours of operation, the Owner's name, staff contact and telephone number to call in the event of an emergency or any complaints;
- (b) Complaints received from the public or adjacent neighbours shall be recorded in a log book created and maintained for this purpose.
- (25) (a) The Owner shall immediately take all measures necessary to contain and clean up any spill or leak which may result from the operation at this Site;
- (b) All spills and upsets shall be immediately reported to the Ottawa District Office or the Ministry's Spills Action Centre at 416-325-3000 or 1-800-268-6060, and the Municipality, and shall be recorded in a log book as to the nature of the spill or upset, and the action taken for clean-up, correction and prevention of future occurrences; and
- (c) All waste material resulting from a spill or process upset, shall be managed and disposed of in accordance with Ontario Regulation 347, R.R.O. 1990, as amended.

MONITORING AND REPORTING REQUIREMENTS

- (26) Surface and groundwater monitoring shall be conducted in accordance to Section 9.1 and 9.2, Item 4 of Schedule "A" provided that the following conditions are met:
- (a) Prior to the development of the Site, the Owner shall establish that the seasonal high water table is at least one meter below the proposed excavation bottom;
- (b) In addition to the parameters listed in Table 2, Section 9.1, Item 4 of Schedule "A", Nitrate and Ammonia shall be included for groundwater monitoring; and
- (c) The background groundwater monitoring well (BH-1) shall be established further away from the waste pile, and one groundwater monitoring well shall be established at the midway point of the Site's southern boundary.
- (27) By March 31, 2003, and on an annual basis thereafter, the Owner shall submit to the District Manager, an annual report on the development, operation and monitoring of the Site, including any

recommendations or changes to the annual monitoring program, in accordance to Section 10.1, Item 4 of Schedule "A".

- (28) A written approval from the District Manager shall be obtained for any changes to the annual monitoring program prior to these changes being implemented.
- (29) (a) In accordance to the Phased Plan outlined in Section 9.1, Item 4 of the Schedule "A", and by March 31, 2003, included in the annual monitoring report, the Owner shall submit to the District Manager for written approval, trigger levels for initiating investigative activities into the cause of an increase in contaminant concentrations as established by the surface and ground water monitoring programs along with appropriate investigative activities and contingency measures;
- (b) Within six (6) months from exceedance of the established trigger levels, the Owner shall submit to the Director for approval, the design of appropriate contingency measures and provide detailed plans, specifications and description for the design, operation and maintenance for the appropriate remedial actions; and
- (c) The remedial actions shall be implemented within nine months from the approval by the Director.

BUFFER AREA AND CONTAMINANT ATTENUATION ZONE

- (30) Within 60 days of issuance of this Amendment, the Owner shall arrange for a legal survey of the Site and required buffer area, as specified in Items 4 and 5 of Schedule A, to be conducted by an Ontario Land Surveyor registered under the Surveyors Act.
- (31) (a) By June 30, 2003, the Owner shall acquire the lands required for the contaminant attenuation zone in accordance to Figure 2 and Drawing 1, Item 4 of the Schedule "A". Alternatively, the Owner shall propose, by June 30, 2003, to the Director for approval, other methods for bringing the Site into compliance with respect to Guideline B-7, Reasonable Use Criteria and other applicable Ministry Regulations, Guidelines and Policies.
- (b) (i) By June 30, 2003, the Owner shall acquire lands required for the 30 meter southern and western buffer areas in accordance to Drawing 1, Item 4 of the Schedule "A". Alternatively, the Owner shall propose, by June 30, 2003, to the Director for approval, other Site development methods to allow for a 30 meter southern and western buffer within the current Site boundary.
- (ii) The Owner shall not commence waste disposal activities on the southern and western Site boundary until Condition (31)(b)(i) has been met.
- (c) Within 30 days of purchase of lands noted in Condition (31)(a) and (31)(b), the Owner shall submit to the Director an updated legal survey of these lands for addition of these lands to the Certificate of Approval.

- (32) The Owner shall ensure that no wastes are deposited within the designated 15 meter northern buffer area and the 30 meter eastern buffer area after the date of issuance of this Certificate of Approval.

PROHIBITION AND REGISTRATION ON TITLE

- (33) Pursuant to Section 197 of the EPA neither the Owner nor any person having an interest in the Site shall deal with the Site in any way without first giving a copy of this Certificate to each person acquiring an interest in the Site as a result of the dealing.

(a) The Owner shall:

(i) Within sixty (60) calendar days of the date of this Certificate, submit to the Director for the Director's signature two (2) copies of a completed Certificate of Prohibition containing a registerable description of the Site, in accordance with Form 1 of O. Reg. 14/92 (Document General- Form 4- Land Registration Reform Act); and

(ii) Within ten (10) calendar days of receiving the Certificate of Prohibition signed by the Director, register the Certificate of Prohibition in the appropriate Land Registry Office on title to the Site and submit to the Director immediately following registration the duplicate registered copy.

SITE CLOSURE

- (34) Within 2 years prior to the Site reaching its final capacity specified in this Amendment, the Owner shall submit to the Director, for approval, a plan for closure, post closure monitoring and maintenance of the Site. The plan shall include but not be limited to the final contours of the Site, completion, inspection and maintenance of the final cover, an assessment of the adequacy of the monitoring and contingency plans and any other post closure monitoring and care.

The following items are added to SCHEDULE "A":

4. Township of Greater Madawaska, Black Donald Waste Disposal Site, Site Development and Operations Plan, Prepared by Jp2g Consultants Inc. dated January 2001.

5. Letter and accompanying documents dated November 13, 2001, from Brian Whitehead, Jp2g Consultants Inc., addressed to John Kaasalainen, MOE.

6. Letter dated March 13, 2002, from Nafiseh Pourhassani, P. Eng., MOE, addressed to Cathy Reddy, The Corporation of the Township of Greater Madawaska.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A411902 dated March 27, 1980 and amended on October 22, 2001.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

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

The Notice should also include:

- 3. The name of the appellant;
- 4. The address of the appellant;
- 5. The Certificate of Approval number;
- 6. The date of the Certificate of Approval;
- 7. The name of the Director;
- 8. The municipality within which the waste disposal site is located;

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

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, Environmental Protection Act
Ministry of 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 12th day of July, 2002

THIS NOTICE WAS MAILED
ON July 15 / 2002
J.C.
(Signed)



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

NP/
c: District Manager, MOE Ottawa District Office
Andrew Polley, MOE, Ottawa District Office ✓
Bruce Harman, Lakefield Research Ltd.

A. P. [unclear] / F. U.
Pls. establish trading of
compliance dates. [initials]



Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A 411902
Notice No. 1

Corporation of the Township of Greater Madawaska
P.O. Box 180
1101 Francis Street,
Calabogie, Ontario
K0J 1H0

OCT 25 2001
OTTAWA

Site Location: Black Donald Waste Disposal Site
Pt. Lot 9, Conc. 3, 34 Hydro Dam Road
Geographical Township of Brougham
Township of Greater Madawaska, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A 411902 issued on March 27, 1980 for an increase in the site service area to include the Township of Greater Madawaska, as follows:

The following conditions of approval are added to the Provisional Certificate of Approval:

DEFINITIONS

- (2) For the purpose of this Certificate of Approval, unless the contrary intention appears, the following words and phrases shall have the following meaning attributed to them:
 - 2.1 "Adverse Effect" is as defined in the Environmental Protection Act, R.S.O. 1990.
 - 2.2 "Applicant" and/or "Owner" means the Township of Greater Madawaska.
 - 2.3 "Certificate" means the Provisional Certificate of Approval No. A 411902, as amended from time to time, including all schedules attached to and forming part of the Certificate.
 - 2.4 "Crown" means Her Majesty the Queen in Right of Ontario.
 - 2.5 "Director" means the one or more persons who from time to time are so designated for the purpose of Part V of the Environmental Protection Act.
 - 2.6 "District Manager" means the District Manager of the Ministry's Ottawa District Office.
 - 2.7 "EPA" means the Environmental Protection Act, R.S.O. 1990, Chapter E.19, as amended.
 - 2.8 "Ministry" and/or "MOE" means the Ontario Ministry of the Environment.
 - 2.9 "ODWS" means the Ontario Drinking Water Standards, as amended.
 - 2.10 "OWRA" means the Ontario Water Resources Act, R.S.O. 1990, as amended.

- 2.11 "PWQO" means the Provincial Water Quality Objectives, as amended.
- 2.12 "Site" means the entire waste disposal site including the landfilling area and the buffer lands as listed in Schedule "A" of the Certificate and consisting of approximately a 1.2 hectare landfill site.
- 2.13 "Supporting Documentation" refers to the reports listed in Schedule "A" of the Certificate.

GENERAL

- (3) The requirements specified in this Provisional Certificate of Approval are the requirements under the Environmental Protection Act, R.S.O. 1990. The issuance of this Provisional Certificate of 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.
- (4) The requirements of this Provisional Certificate of Approval are severable. If any requirement of this Provisional Certificate of Approval, or the application of any requirement of this Provisional Certificate of Approval to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this 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 Provisional Certificate of Approval. Any non-compliance constitutes a violation of the Environmental Protection Act, R.S.O. 1990 and is 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 Provisional Certificate of Approval, including but not limited to, any records required to be kept under this Provisional Certificate of Approval; and
- (b) In the event the Applicant provides the Ministry with information, records, documentation or notification in accordance with this Provisional Certificate of Approval (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 Provisional Certificate of Approval 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 Provisional Certificate of Approval or any statute or regulation.

- (7) 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 Provisional Certificate of Approval 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 Provisional Certificate of Approval are kept;
 - (ii) have access to and copy, at reasonable times, any records required by the conditions of this Provisional Certificate of Approval;
 - (iii) inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this Provisional Certificate of Approval; and
 - (iv) sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this Provisional Certificate of Approval.
- (8) (a) Where there is a conflict between a provision of any document referred to in Schedule "A", and the conditions of this Provisional Certificate of Approval, the conditions in this Provisional Certificate of Approval 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 Provisional Certificate of Approval includes reference to the Provisional Certificate of Approval number A411902.
- (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 or 2 of O. Reg. 182, Chapter C-39, R.R.O. 1990 as amended from time to time), filed under the Corporations Information Act shall be included in the notification to the Director; and
- (e) change in directors or officers of the corporation where the 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 9(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 Provisional Certificate of Approval, and a copy of such notice shall be forwarded to the Director.
- (12) Any information relating to this Provisional Certificate of Approval 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 Provisional Certificate of Approval must be kept on the Owner's premises for a minimum period of two (2) years from the date of their creation.

DEVELOPMENT AND OPERATIONS

- (14) Within 3 months of the date of this Notice, the Applicant shall submit to the Director for approval an updated development and operations report and supporting hydrogeological study outlining how the remaining capacity of the Site is to be utilized. These reports shall include the following information
- site plans showing the waste disposal footprint, buffer zones, and contaminant attenuation zones, if required, including the ownership of such lands;
 - site operation and development plans;
 - daily/intermediate/final cover requirements;
 - security, fencing, signage, site supervision, housekeeping and screening requirements;
 - surface drainage plans, leachate and gas control plans;
 - a proposed monitoring program for landfill gas, leachate, groundwater, and surface water including trigger mechanisms and contingency plans;
 - reporting requirements; and
 - closure plans.

All in accordance with the following plans and specifications which are added to Schedule "A" of the Certificate:

1. The Application for a Provisional Certificate of Approval for a Waste Disposal Site dated January 11, 2001 as signed by Cathy Reddy, Clerk Treasurer of the Township of Greater Madawaska.
2. The letter dated January 31, 2001 to Mr. A. Dominski of the Ministry of the Environment, Environmental Assessment and Approvals Branch from Mr. Brian Whitehead of Jp2g Consultants Inc. providing the purpose and basis for this amendment.
3. The letter dated March 1, 2001 to Mr. A. Dominski of the Ministry of the Environment, Environmental Assessment and Approvals Branch from Mr. Brian Whitehead of Jp2g Consultants Inc. requesting that the proposed amendment be split into two parts, one for the service area change and another for the site development aspects as well as the reasons for this request.

The reasons for this amendment to the Certificate of Approval are as follows:

The reasons for this amendment are to allow for an increase in service area for the waste disposal site and to update the Certificate to meet the Ministry's current requirements.

The reasons for each of the conditions of approval are as follows:

- 1) *The reason for Condition (2) is to define the specific meaning of terms used to simplify the conditions in this Certificate.*
- 2) *The reason for Conditions (3), (4), (5), (8), (9), (10), (11), (12) and (13) is to clarify the legal rights and responsibilities of the Owner.*
- 3) *The reason for Condition (6) and (7) is to ensure that the appropriate Ministry staff have ready access to information and the operations of the Site which are approved under this Provisional Certificate of Approval. Condition (7) is supplementary to the powers of entry afforded a Provincial Officer pursuant to the Environmental Protection Act, the Ontario Water Resources Act, and the Pesticides Act, as amended.*
- 4) *The reason for Condition (14) is to ensure that the continued use and operation of the Site is done in an environmentally acceptable manner.*

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No.A 411902 dated March 27, 1980, 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 Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. 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; 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 Appeal Board
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

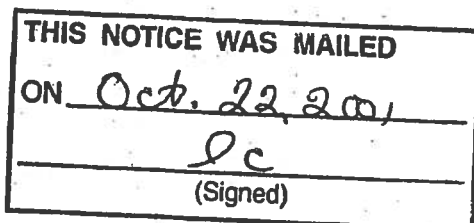
AND

The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

* Further information on the Environmental Appeal Board's requirements for an appeal can be obtained directly from the Board 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 12th day of October, 2001



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

JK/

c: District Manager, MOE Ottawa ✓
Brian Whitehead, Planner, Jp2g Consultants Inc.



Ontario

Ministry
of the
Environment

133 Dalton St., Box 820
Kingston, Ontario
K7L 4X6

March 27, 1980

Township of Brougham
Dacre, Ontario
NOJ 1NO

RE: Dump Site
Lot 9, Concession III
Township of Brougham
County of Renfrew

The enclosed revised Provisional Certificate of Approval contains a condition requiring it be registered on title. The reason for this condition is attached to the Certificate.

Two copies of the Certificate and reasons are on long paper to facilitate registration. Both of these should be taken to the Land Registry Office and one returned to the Director with registration particulars.

If your Certificate does not contain sufficient legal description for registration because you have not given one to the Director, you will have to provide one under Section 23(1) (e) of The Registry Act or in your application under The Land Titles Act.

In the event that the site including its buffer, is part of a larger parcel of land and you do not wish to prepare a new survey at this time, you may register the Certificate against the larger parcel of land. If you do so, the Director is prepared, if requested in the future.

1. In the case of land recorded under The Land Titles Act, to consent to an application to delete the registration from the title of lands not within the site including its buffer zone, and
2. In the case of land recorded under The Registry Act, to issue a Certificate that lands not used for the actual disposal of waste or buffer zone have not been so used.

Such documents would be issued after suitable draft documents including legal description were submitted by you or your successor. The purpose of such documents would be to assure subsequent purchasers that the lands in question were not affected by section 46 of the Environmental Protection Act.

Yours very truly


Director



Ministry
of the
Environment

Provisional Certificate No. A 411902

PROVISIONAL CERTIFICATE OF APPROVAL WASTE DISPOSAL SITE

Under The Environmental Protection Act, 1971 and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Township of Brougham
Dacre, Ontario
NOJ 1NO

for the use and operation of a 1.2 hectare dump site

all in accordance with the following plans and specifications:

Located: Lot 9, Concession III
Township of Brougham
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) domestic and 5% other wastes, limited to scrap metal, brush, lumber and construction debris.

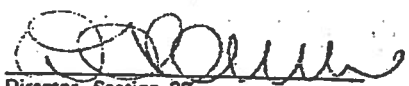
and subject to the following conditions:

1. No operation shall be carried out at the site after sixty days from this condition becoming enforceable unless this Certificate including the reasons for this condition has been registered by the applicant as an instrument in the appropriate Land Registry Office against title to the site and a duplicate registered copy thereof has been returned by the applicant to the Director.

THIS IS A TRUE COPY OF THE
ORIGINAL CERTIFICATE MAILED
ON Apr 9/80

(Signed)

Dated this 27th day of March, 19 80.


Director, Section 39,
The Environmental Protection Act 1971



Ministry of the
Environment

Ontario

NOTICE

TO: Township of Brougham
Dacre, Ontario
NOJ 1NO

You are hereby notified that Provisional Certificate of Approval No. A 411902 has been issued to you subject to the conditions outlined therein.

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

The reason for the condition requiring registration of the Certificate is that Section 46 of The Environmental Protection Act, 1971 prohibits any use being made of the lands after they cease to be used for waste disposal purposes in order 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 the Certificate being registered on title.

You may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board.

This Notice should be served upon:

The Secretary,
Environmental Appeal Board, AND
1 St. Clair Ave. West,
5th Floor,
Toronto, Ontario.
M4V 1K7

The Director,
Section 39
Ministry of the Environment,

DATED this 27th day of March , 1980 .

AA M 1111

16



Document General

Form 4 -- Land Registration Reform Act, 1984

DVC 4 OUPHAM CO. LIMITED
Form No. 883

D

AB5 V

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">FOR OFFICE USE ONLY</p> <p style="font-size: 2em; font-weight: bold;">R 0429800</p> <p style="text-align: center;">CERTIFICATE OF REGISTRATION CERTIFICAT DE REGISTREMENT RENTREY (C01 PLR 109E)</p> <p style="text-align: center;">Feb 28 AM 9 41 Medawaska</p> <p style="text-align: center;">PART 2</p>	(1) Registry <input checked="" type="checkbox"/> Land Titles <input type="checkbox"/>		(2) Page 1 of 2 pages <i>1/1</i>	
	(3) Property Identifier(s) Block 57375 Property 57375		Property 0029 (R) 0030 (R) Additional: See Schedule <input type="checkbox"/>	
	(4) Nature of Document: CERTIFICATE OF PROHIBITION FOR WASTE DISPOSAL SITE, CERTIFICATE OF APPROVAL NO. A411902 SECTION 197(2), ENVIRONMENTAL PROTECTION ACT			
	(5) Consideration Dollars \$			
	(6) Description Part of Lot 9, Con 2 & Concession 3 Geographic Township of Brougham, Township of being Parts 1 to 4, Plan 49R-15646 <i>Greater Madawaska SWI</i>			
	New Property Identifiers		Additional: See Schedule <input type="checkbox"/>	
	Executions		Additional: See Schedule <input type="checkbox"/>	
(7) This Document Contains: (a) Redescription New Easement Plan/Sketch <input type="checkbox"/> (b) Schedule for: Description <input type="checkbox"/> Additional Parties <input type="checkbox"/> Other <input checked="" type="checkbox"/>				
(8) This Document provides as follows: See Schedule				
(9) This Document relates to instrument number(s) Continued on Schedule <input type="checkbox"/>				
(10) Party(ies) (Set out Status or Interest) Name(s) MINISTRY OF THE ENVIRONMENT By one of its Directors Appointed under s.5 Environmental Protection Act				
		Signature(s) <i>G.A.E. WASHMUTA</i>	Date of Signature Y M D 2006 2 24	
(11) Address for Service 2 St. Clair Avenue West, Floor 12A, Toronto, Ontario, M4V 1L5				
(12) Party(ies) (Set out Status or Interest) Name(s)				
		Signature(s)	Date of Signature Y M D	
(13) Address for Service				
(14) Municipal Address of Property not assigned		(15) Document Prepared by: HOWARD A. LITWICK Barrister & Solicitor 300-39 Eberston Road Ottawa (Nepean), ON K2H 8R2		
		FOR OFFICE USE ONLY		
		Fees and Tax		
		Registration Fee <i>60.00</i>		
		Total		



Schedule

Form 5 — Land Registration Reform Act

DYE & DUMAS CO. INC.—Form No. 900
Amended NOV. 1992

12

S

Page 2

Additional Property Identifier(s) and/or Other Information

CERTIFICATE OF PROHIBITION

s. 197(2) Environmental Protection Act

This is to certify that pursuant to an Amendment to Provisional Certificate of Waste Disposal Site Number A411902, dated July 12, 2002, relating to the landfill site more particularly described in Box (6) on page one of this instrument, the following person, namely The Corporation of the Township of Greater Madawaska is prohibited from dealing with the property described in the aforesaid Box (6) on page one without first giving a copy of the Amended Provisional Certificate of Approval 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.

FOR OFFICE
USE ONLY

Appendix B



BOREHOLE LOG	PROJECT: 21-373	BOREHOLE: 1	1 of 1
HYDROGEOLOGICAL INVESTIGATION Black Donald Landfill FOR: Township of Brougham		DATE: 13 July 2001 GEOLOGIST BJS ELEVATION 93.4 m	

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						N VALUE				WATER CONTENT (%)						
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD										
											15	30	45	60	10	20	30	40		
1		SAND Reddish and medium brown fine sand, trace to some medium and coarse sand, trace fine and coarse gravel, trace silt, subtle laminations, moist, compact. -occasional cobbles observed below 0.6 m. -heavy oxidation observed below 1.2 m.	1	SS	20	2	80													
1.5		2	SS	25	3	70														
		3	SS	37/	8	50														
2		MARBLE BEDROCK Light grey to whitish marble bedrock, massive, pepper appearance, some oxidation along fractures between about 1.7 m and 3.1 m. Weathered section - broken rock between about 1.7 m and 1.9 m. Open fracture with oxidation at about 2.10 m to 2.12 m. Minor oxidation along fracture at about 2.8 m.	4	HQ	0.08m		100	78												
3		5	HQ			96	100													
4		6	HQ			106	96													
5		7	HQ			100	82													
7.7	Borehole terminated at 7.69 m in marble bedrock.																			

Project No: 10392-001
 Project: Black Donald Waste Disposal Site
 Client: Township of Greater Madawaska
 Location: Black Donald
 Logged By: D.Bucholtz

Log of Borehole: BH2

Depth	Symbol	Description	Elev.	N Value	Method	Type	Well Installation	Remarks
0		Ground Surface - 98.984m						Well Equipped with lockable steel casing and weather proof lock.
0.82		Top Soil Black, organic, dry, with rootlets	-0.15	22	SS		Concrete	Stick-up = 0.82
1.64		Sand Fine, loose, dry	-0.61		HQ		0.05m dia. PVC	
2.46		Marble Bedrock Light grey to white with black specks.			HQ		Bentonite	
3.28		Fractures from 1.52m to 2.74m.			HQ			
4.10		Fractures oxidized.			HQ			
4.92		Mostly competent, fractures @ 3.35m, 4.88m, 6.40m.			HQ			WL October 8, 2002 = 4.18m
5.74					HQ		Silica Sand	
6.56					HQ			
7.38					HQ			
7.20		End of Borehole	-7.08		HQ			

Drill Method: CME 75 Diamond Bit Coring

Drill Date: September 23, 2002

Checked by: B.Harman

Sheet: 1 of 1

185 Concession Street
 Lakefield, ON, Canada
 K0L 2H0

Project No: 10392-001 **Log of Borehole: BH3**

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: Black Donald Logged By: D.Bucholtz

Depth	Symbol	Description	Elev.	N Value	Method	Type	Well Installation	Remarks
ft -3 -2 -1 0	m -1 0	Ground Surface - 99.004m	1					Well Equipped with lockable steel casing and weather proof lock.
0		Sand Fine, brown, loose, dry	-0.3	50	SS			Stick-up = 0.86 Concrete
1		Marble Bedrock Light gray to white with black specks.			HQ			0.05m dia. PVC
2		Fractures with sand and root from 0.30m to 2.85m.			HQ			Bentonite
3		Fractures oxidized.			HQ			
4		Mostly competent, fractures @ 4.17m, 5.94m, 7.01m, 7.47m.			HQ			WL October 8, '02 = 3.53m
5					HQ			
6					HQ			
7					HQ			Silica Sand
8					HQ			
8			-8.53					Screen = 1.52m x 0.052m
29		End of Borehole						

Drill Method: CME 75 Diamond Bit Coring

Drill Date: September 25, 2002

Checked by: B.Harman

Sheet: 1 of 1

185 Concession Street
Lakefield, ON, Canada
K0L 2H0

Project No: 10392-001 **Log of Borehole: BH4**

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: Black Donald Logged By: D.Bucholtz

Depth	Symbol	Description	Elev.	N Value	Method	Type	Well Installation	Remarks
0		Ground Surface - 95.962m	.1					Well Equipped with lockable steel casing and weather proof lock.
0.10		Sand Medium, brown, dry, with rootlets in top 0.10m	-0.61	50 (0.15m)		SS	Concrete	Stick-up = 0.84
1		Marble Bedrock Light grey to white with black specks.		-		HQ	0.05m dia. PVC	
2		Heavily fractured from 0.61m to 3.04m.		-		HQ	Bentonite	
3		Soft, brittle, verticle fracture with sand from 3.66m to 4.27m		-		HQ		
4		Fractures oxidized.		-		HQ		
5		Mostly competent, fractures @ 4.72m, 5.64m, 6.25m.		-		HQ		Wl. October 8, 02 = 4.08m
6				-		HQ		
7			-7			HQ		
7		End of Borehole						
8								
9								
10								
11								
12								
13								
14								
15								
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17								
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19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								

Drill Method: CME 75 Diamond Bit Coring

Drill Date: September 23, 2002

Checked by: B.Harman

Sheet: 1 of 1

185 Concession Street
Lakefield, ON, Canada
K0L 2H0



Greenview

ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
 68 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: MW08-5

Project No.: 102.08.014

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: See Site Plan

SUBSURFACE STRATA PROFILE			SAMPLE				Well Completion Details	Comments	
Depth	Symbol	Description	No.	Type	% R	SPT N-Value			
						0 15 30 45 60			
ft m		Ground Surface						Stick-up = 0.89 m	
-4								Concrete	
-2									
0		Top Soil Dark brown, organic, dry, loosely compacted.	1	AS	40				Bentonite Chips
2	1	Fine to Medium Sand Light brown to grey, fine to medium sand, dry, loosely compacted.	2	HQ	80				
4									
6									
8		Marble Bedrock Light grey to white with black specks, marble bedrock.	3	HQ	100				
10	3								
12		Oxidized fractures from 1.83 m to 2.82 m, and from 11.25 m to 12.50 m.	4	HQ	90				
14		Mostly competent, fractures from 6.55 m to 11.12 m.							
16	5		5	HQ	100				
18									
20									
22	7		6	HQ	100				
24									
26									
28			7	HQ	100				
30	9								
32			8	HQ	100				
34									
36	11		9	HQ	100				
38									
40									
42	13		10	HQ	100				
44		End of Borehole							

Well screen = 3.05 m x 0.05 m

Water level June 5, 2008 = 12.85 m.

Drilled By: Lantech Drilling Ltd.

Logged By: J. Bailey

Drill Method: CME 75 Diamond Bit Coring

Checked By: T. Peters

Drill Date: June 2, 2008

Sheet: 1 of 1



Greenview

ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
 59 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: MW08-6

Project No.: 102.08.014

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: See Site Plan

SUBSURFACE STRATA PROFILE			SAMPLE				Well Completion Details	Comments
Depth	Symbol	Description	No.	Type	% R	SPT N-Value		
						0 15 30 45 60		
ft m								
4		Ground Surface					Stick-up = 0.87 m	
0		Top Soil Dark brown, organic, dry, loosely compacted.	1	AS	25		Concrete	
2	1	Fine to Medium Sand Light brown, fine to medium sand, dry, loosely compacted.	2	HQ	100		Bentonite Chips	
6		Marble Bedrock Light grey to white with black specks, marble bedrock.						
8		Heavily fractured from 0.05m to 1.45m.	3	HQ	100			
10	3	Oxidized fractures @ 3.81m, 4.17m, 5.28m, 5.59m, and 7.48m.						
12			4	HQ	100		Silica Sand	
14								
16	5							
18			5	HQ	95		Water level June 5, 2008 = 5.50 m	
20								
22	7							
24			6	HQ	100			
26								
28								
30	9		7	HQ	100			
32								
34			8	HQ	100			
36	11							

Drilled By: Lantech Drilling Ltd.

Drill Method: CME 75 Diamond Bit Coring

Drill Date: June 3, 2008

Logged By: J. Bailey

Checked By: T. Peters

Sheet: 1 of 2



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: MW08-6

Project No.: 102.08.014

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: See Site Plan

SUBSURFACE STRATA PROFILE			SAMPLE				Well Completion Details	Comments	
Depth	Symbol	Description	No.	Type	% R	SPT N-Value			
						0 15 30 45 60			
38			9	HQ	100				
40			12						
42									
44									
46			14						
48									
50									
52			16						
54									
56									
58									
60			18						
62									
64									
66			20						
68									
70									
72	22								
74									
76		End of Borehole							

Well screen = 6.10 m x 0.05 m

Drilled By: Lantech Drilling Ltd.

Drill Method: CME 75 Diamond Bit Coring

Drill Date: June 3, 2008

Logged By: J. Bailey

Checked By: T. Peters

Sheet: 2 of 2



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: MW08-7

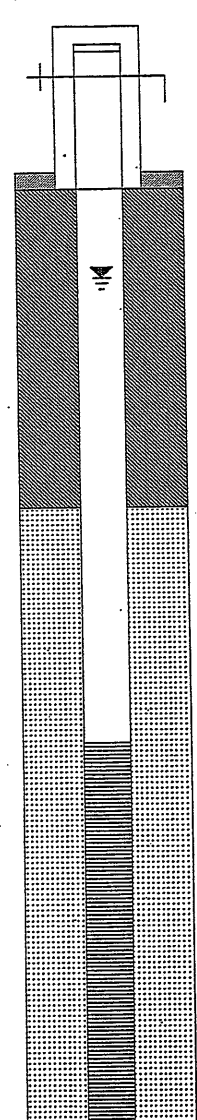
Project No.: 102.08.014

Project: Black Donald Waste Disposal Site

Client: Township of Greater Madawaska

Location: See Site Plan

SUBSURFACE STRATA PROFILE			SAMPLE				Well Completion Details	Comments
Depth	Symbol	Description	No.	Type	% R	SPT N-Value		
ft m						0 200 400 600		
0		Ground Surface						
0 - 1		Medium Sand and Gravel Brown, medium sand with small to medium gravel, wet, compacted.	1	AS				
1 - 3		Fine to Medium Sand and Gravel Light brown, fine to medium sand with small to medium gravel, wet, compacted.	2	SS	10			
3 - 4			3	SS	5			
4 - 5			4	SS	15			
5 - 7		Fine to Medium Sand Light brown, fine to medium sand, wet, compacted, small to medium cobble at 3.05 m.	5	SS	50			
7 - 24			6	SS	10			
24 - 26			7	SS	75			
26 - 28		End of Borehole						



Stick-up = 0.85 m

Concrete

Water level June 5, 2008 = 0.91 m

Bentonite Chips

Silica Sand

Well screen = 3.05 m x 0.05 m

Drilled By: Lantech Drilling Ltd.

Logged By: J. Bailey

Drill Method: Hollow Stem Augers

Checked By: T. Peters

Drill Date: June 5, 2008

Sheet: 1 of 1

Appendix C



Appendix D



C.O.C.: G108796

REPORT No. B22-13166 (I)

Report To:

Greenview Environmental Management
 13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Caduceon Environmental Laboratories
 285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

Attention: Mike Grasby

DATE RECEIVED: 06-May-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 18-May-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Client I.D.		BH1	BH2	BH4	MW08-6
			Sample I.D.	Date Collected	B22-13166-1	B22-13166-2	B22-13166-3	B22-13166-4
			Reference Method	Date/Site Analyzed				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	09-May-22/O	602	238	469	169
Chloride	mg/L	0.5	SM4110C	09-May-22/O	33.8	< 0.5	41.4	< 0.5
Nitrate (N)	mg/L	0.05	SM4110C	09-May-22/O	0.27	0.09	0.19	0.11
Sulphate	mg/L	1	SM4110C	09-May-22/O	49	15	< 1	8
Phosphorus-Total	mg/L	0.01	E3516.2	10-May-22/K	< 0.01	0.02	0.02	0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	10-May-22/K	5.9	0.2	0.7	0.2
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	12-May-22/K	5.27	0.01	0.11	< 0.01
TDS (Calc. from Cond.)	mg/L	1	Calc.	10-May-22	707	251	764	177
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	10-May-22/O	14.4	2.2	13.8	3.1
Phenolics	mg/L	0.001	MOEE 3179	09-May-22/K	< 0.001	< 0.001	< 0.001	< 0.001
COD	mg/L	5	SM5220C	11-May-22/K	32	< 5	27	5
Hardness (as CaCO3)	mg/L	1	SM 3120	10-May-22/O	550	258	766	183
Aluminum	mg/L	0.01	SM 3120	10-May-22/O	0.06	0.03	0.08	0.02
Barium	mg/L	0.001	SM 3120	10-May-22/O	0.116	0.020	0.091	0.023
Boron	mg/L	0.005	SM 3120	10-May-22/O	1.29	0.012	1.25	0.007
Cadmium	mg/L	0.000015	EPA 200.8	12-May-22/O	< 0.000015	0.000016	< 0.000015	< 0.000015
Calcium	mg/L	0.02	SM 3120	10-May-22/O	175	97.4	264	68.5
Chromium	mg/L	0.001	EPA 200.8	12-May-22/O	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	12-May-22/O	0.0071	0.0002	0.0009	0.0005
Copper	mg/L	0.0001	EPA 200.8	12-May-22/O	0.0026	0.0018	0.0051	0.0022
Iron	mg/L	0.005	SM 3120	10-May-22/O	5.24	< 0.005	< 0.005	< 0.005
Magnesium	mg/L	0.02	SM 3120	10-May-22/O	27.6	3.51	25.7	2.91
Manganese	mg/L	0.001	SM 3120	10-May-22/O	1.17	< 0.001	0.010	< 0.001
Potassium	mg/L	0.1	SM 3120	10-May-22/O	11.9	3.1	11.5	1.7
Silicon	mg/L	0.01	SM 3120	10-May-22/O	10.4	7.02	6.86	3.52
Sodium	mg/L	0.2	SM 3120	10-May-22/O	86.3	3.3	30.7	2.1
Strontium	mg/L	0.001	SM 3120	10-May-22/O	0.473	0.205	0.648	0.345



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

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C.O.C.: G108796

REPORT No. B22-13166 (I)

Report To:

Greenview Environmental Management
 13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 06-May-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 18-May-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Client I.D.		BH1	BH2	BH4	MW08-6
			Reference Method	Date/Site Analyzed	Sample I.D.	Date Collected	Sample I.D.	Date Collected
Zinc	mg/L	0.005	SM 3120	10-May-22/O	0.006	< 0.005	< 0.005	< 0.005



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Michelle Dubien
 Lab Manager

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JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 18-May-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Client I.D.	MW08-7	GW QA/QC		
Sample I.D.	B22-13166-5	B22-13166-6		
Date Collected	04-May-22	04-May-22		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	09-May-22/O	207	236		
Chloride	mg/L	0.5	SM4110C	09-May-22/O	51.9	< 0.5		
Nitrate (N)	mg/L	0.05	SM4110C	09-May-22/O	0.16	0.09		
Sulphate	mg/L	1	SM4110C	09-May-22/O	9	16		
Phosphorus-Total	mg/L	0.01	E3516.2	10-May-22/K	0.12	0.01		
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	10-May-22/K	0.1	0.1		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	12-May-22/K	< 0.01	< 0.01		
TDS (Calc. from Cond.)	mg/L	1	Calc.	10-May-22	291	249		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	10-May-22/O	2.6	2.0		
Phenolics	mg/L	0.001	MOEE 3179	09-May-22/K	< 0.001	< 0.001		
COD	mg/L	5	SM5220C	11-May-22/K	< 5	< 5		
Hardness (as CaCO3)	mg/L	1	SM 3120	10-May-22/O	241	260		
Aluminum	mg/L	0.01	SM 3120	10-May-22/O	0.02	0.03		
Barium	mg/L	0.001	SM 3120	10-May-22/O	0.047	0.020		
Boron	mg/L	0.005	SM 3120	10-May-22/O	< 0.005	0.011		
Cadmium	mg/L	0.00015	EPA 200.8	12-May-22/O	< 0.00015	< 0.00015		
Calcium	mg/L	0.02	SM 3120	10-May-22/O	81.1	98.4		
Chromium	mg/L	0.001	EPA 200.8	12-May-22/O	< 0.001	< 0.001		
Cobalt	mg/L	0.0001	EPA 200.8	12-May-22/O	< 0.0001	0.0003		
Copper	mg/L	0.0001	EPA 200.8	12-May-22/O	0.0027	0.0020		
Iron	mg/L	0.005	SM 3120	10-May-22/O	< 0.005	< 0.005		
Magnesium	mg/L	0.02	SM 3120	10-May-22/O	9.26	3.49		
Manganese	mg/L	0.001	SM 3120	10-May-22/O	< 0.001	< 0.001		
Potassium	mg/L	0.1	SM 3120	10-May-22/O	1.6	3.1		
Silicon	mg/L	0.01	SM 3120	10-May-22/O	3.93	7.04		
Sodium	mg/L	0.2	SM 3120	10-May-22/O	25.1	3.3		
Strontium	mg/L	0.001	SM 3120	10-May-22/O	0.141	0.205		



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

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C.O.C.: G108796

REPORT No. B22-13166 (i)

Report To:

Greenview Environmental Management
 13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 06-May-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 18-May-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Client I.D.	MW08-7	GW QA/QC		
Sample I.D.	B22-13166-5	B22-13166-6		
Date Collected	04-May-22	04-May-22		
Reference Method	Date/Site Analyzed			
Zinc	SM 3120	10-May-22/O	< 0.005	< 0.005

Parameter	Units	R.L.
Zinc	mg/L	0.005



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

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C.O.C.: G108796

REPORT No. B22-13166 (ii)

Report To:

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 13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories
 285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 06-May-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 18-May-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.		BH1			
			Sample I.D.		B22-13166-1			
			Date Collected		04-May-22			
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Acetone	µg/L	30	EPA 8260	10-May-22/R	< 30			
Benzene	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5			
Bromobenzene	µg/L	0.4	EPA 8260	10-May-22/R	< 0.4			
Bromodichloromethane	µg/L	2	EPA 8260	10-May-22/R	< 2			
Bromoform	µg/L	5	EPA 8260	10-May-22/R	< 5			
Bromomethane	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5			
Carbon Tetrachloride	µg/L	0.2	EPA 8260	10-May-22/R	< 0.2			
Chloroethane	µg/L	3	EPA 8260	10-May-22/R	< 3			
Chloroform	µg/L	1	EPA 8260	10-May-22/R	< 1			
Chloromethane	µg/L	2	EPA 8260	10-May-22/R	< 2			
Chlorotoluene, 2-	µg/L	0.2	EPA 8260	10-May-22/R	< 0.2			
Chlorotoluene, 4-	µg/L	0.2	EPA 8260	10-May-22/R	< 0.2			
Dibromo-3-Chloropropane, 1,2-	µg/L	0.6	EPA 8260	10-May-22/R	< 0.6			
Dibromochloromethane	µg/L	2	EPA 8260	10-May-22/R	< 2			
Dibromoethane, 1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	10-May-22/R	< 0.2			
Dibromomethane	µg/L	0.1	EPA 8260	10-May-22/R	< 0.1			
Dichlorobenzene, 1,2-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5			
Dichlorobenzene, 1,3-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5			
Dichlorobenzene, 1,4-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5			
Dichlorodifluoromethane	µg/L	2	EPA 8260	10-May-22/R	< 2			
Dichloroethane, 1,1-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5			
Dichloroethane, 1,2-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5			
Dichloroethylene, 1,1-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5			
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5			
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5			



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Site Analyzed=K-Kingston, W-Windsor, O-Ottawa, R-Richmond Hill, B-Barrie

Michelle Dubien
 Lab Manager

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C.O.C.: G108796

REPORT No. B22-13166 (ii)

Report To:

Greenview Environmental Management

13 Commerce Crt., PO Box 100

Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave

Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 06-May-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 18-May-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.	BH1			
			Sample I.D.	B22-13166-1			
			Date Collected	04-May-22			
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	10-May-22/R	< 5		
Dichloropropane,1,2-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Dichloropropane,1,3-	µg/L	0.2	EPA 8260	10-May-22/R	< 0.2		
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Dichloropropene,1,1-	µg/L	0.2	EPA 8260	10-May-22/R	< 0.2		
Ethylbenzene	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Hexachlorobutadiene	µg/L	0.6	EPA 8260	10-May-22/R	< 0.6		
Hexane	µg/L	5	EPA 8260	10-May-22/R	< 5		
Isopropylbenzene	µg/L	0.2	EPA 8260	10-May-22/R	< 0.2		
Isopropyltoluene,4-	µg/L	0.2	EPA 8260	10-May-22/R	< 0.2		
Methyl Butyl Ketone	µg/L	5	EPA 8260	10-May-22/R	< 5		
Methyl Ethyl Ketone	µg/L	20	EPA 8260	10-May-22/R	< 20		
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	10-May-22/R	< 20		
Methyl-t-butyl Ether	µg/L	2	EPA 8260	10-May-22/R	< 2		
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Naphthalene	µg/L	0.4	EPA 8260	10-May-22/R	< 0.4		
n-Butylbenzene	µg/L	0.4	EPA 8260	10-May-22/R	< 0.4		
n-Propylbenzene	µg/L	0.1	EPA 8260	10-May-22/R	< 0.1		
sec-Butylbenzene	µg/L	0.1	EPA 8260	10-May-22/R	< 0.1		
Styrene	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
tert-Butylbenzene	µg/L	0.1	EPA 8260	10-May-22/R	< 0.1		
Tetrachloroethane,1,1,1,2-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Tetrachloroethane,1,1,2,2-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Tetrachloroethylene	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Toluene	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		



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 Lab Manager

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REPORT No. B22-13166 (ii)

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Attention: Mike Grasby

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285 Dalton Ave

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Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 06-May-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 18-May-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.	BH1			
			Sample I.D.	B22-13166-1			
			Date Collected	04-May-22			
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Trichlorobenzene, 1,2,3-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Trichlorobenzene, 1,2,4-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Trichloroethane, 1,1,1-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Trichloroethane, 1,1,2-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Trichloroethylene	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Trichlorofluoromethane	µg/L	5	EPA 8260	10-May-22/R	< 5		
Trichloropropane, 1,2,3-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		
Trimethylbenzene, 1,2,4-	µg/L	1	EPA 8260	10-May-22/R	< 1		
Trimethylbenzene, 1,3,5-	µg/L	0.1	EPA 8260	10-May-22/R	< 0.1		
Vinyl Chloride	µg/L	0.2	EPA 8260	10-May-22/R	< 0.2		
Xylene, m,p-	µg/L	1.0	EPA 8260	10-May-22/R	< 1.0		
Xylene, o-	µg/L	0.5	EPA 8260	10-May-22/R	< 0.5		



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C.O.C.: G108796

REPORT No. B22-13169

Report To:

Greenview Environmental Management

13 Commerce Crt., PO Box 100

Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave

Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 06-May-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 18-May-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Parameter	Units	R.L.	Client I.D.		SW QAQC	SW3	SW4	SW5
			Reference Method	Date/Site Analyzed	B22-13169-1	B22-13169-2	B22-13169-3	B22-13169-4
					04-May-22	04-May-22	04-May-22	04-May-22
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	10-May-22/O	93	94	170	129
Chloride	mg/L	0.5	SM4110C	09-May-22/O	< 0.5	< 0.5	45.1	6.6
Nitrite (N)	mg/L	0.05	SM4110C	09-May-22/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	09-May-22/O	0.07	0.08	< 0.05	0.08
Sulphate	mg/L	1	SM4110C	09-May-22/O	6	6	8	5
BOD(5 day)	mg/L	3	SM 5210B	11-May-22/K	< 3	< 3	< 3	< 3
Total Suspended Solids	mg/L	3	SM2540D	12-May-22/K	3	< 3	< 3	< 3
Phosphorus-Total	mg/L	0.01	E3516.2	10-May-22/K	0.01	0.02	0.08	0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	10-May-22/K	0.2	0.2	0.8	0.3
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	12-May-22/K	< 0.01	< 0.01	0.01	0.01
TDS (Calc. from Cond.)	mg/L	1	Calc.	11-May-22	97	97	238	139
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	09-May-22/O	5.1	5.2	5.3	8.8
Phenolics	mg/L	0.001	MOEE 3179	11-May-22/K	< 0.001	< 0.001	< 0.001	< 0.001
COD	mg/L	5	SM5220C	11-May-22/K	8	8	6	18
Hardness (as CaCO3)	mg/L	1	SM 3120	10-May-22/O	91	94	175	128
Barium	mg/L	0.001	SM 3120	10-May-22/O	0.013	0.016	0.042	0.034
Boron	mg/L	0.005	SM 3120	10-May-22/O	0.007	0.006	0.005	0.018
Cadmium	mg/L	0.000015	EPA 200.8	11-May-22/O	< 0.000015	0.000018	< 0.000015	< 0.000015
Calcium	mg/L	0.02	SM 3120	10-May-22/O	30.6	31.6	59.2	41.9
Chromium	mg/L	0.001	EPA 200.8	11-May-22/O	< 0.001	< 0.001	< 0.001	< 0.001
Copper	mg/L	0.0001	EPA 200.8	11-May-22/O	0.0006	0.0013	0.0007	0.0006
Iron	mg/L	0.005	SM 3120	10-May-22/O	0.015	0.178	0.024	0.087
Magnesium	mg/L	0.02	SM 3120	10-May-22/O	3.46	3.57	6.64	5.62
Manganese	mg/L	0.001	SM 3120	10-May-22/O	0.009	0.134	0.001	0.004
Potassium	mg/L	0.1	SM 3120	10-May-22/O	0.6	0.6	1.5	0.8
Sodium	mg/L	0.2	SM 3120	10-May-22/O	0.9	1.4	26.0	5.2
Strontium	mg/L	0.001	SM 3120	10-May-22/O	0.048	0.050	0.113	0.079



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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
 Lab Manager

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C.O.C.: G108796

REPORT No. B22-13169

Report To:

Greenview Environmental Management
 13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

DATE RECEIVED: 06-May-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 18-May-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Parameter	Units	R.L.	Client I.D.		SW QAQC	SW3	SW4	SW5
			Reference Method	Date/Site Analyzed	Sample I.D.			
Zinc	mg/L	0.005	SM 3120	10-May-22/O	< 0.005	< 0.005	< 0.005	0.010



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DATE RECEIVED: 06-May-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 18-May-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Parameter	Units	R.L.	Client I.D.		SW6			
			Reference Method	Date/Site Analyzed	B22-13169-5			
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	10-May-22/O	136			
Chloride	mg/L	0.5	SM4110C	09-May-22/O	16.8			
Nitrite (N)	mg/L	0.05	SM4110C	09-May-22/O	< 0.05			
Nitrate (N)	mg/L	0.05	SM4110C	09-May-22/O	0.08			
Sulphate	mg/L	1	SM4110C	09-May-22/O	7			
BOD(5 day)	mg/L	3	SM 5210B	11-May-22/K	< 3			
Total Suspended Solids	mg/L	3	SM2540D	12-May-22/K	< 3			
Phosphorus-Total	mg/L	0.01	E3516.2	10-May-22/K	< 0.01			
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	10-May-22/K	0.3			
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	12-May-22/K	< 0.01			
TDS (Calc. from Cond.)	mg/L	1	Calc.	11-May-22	161			
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	09-May-22/O	8.1			
Phenolics	mg/L	0.001	MOEE 3179	11-May-22/K	< 0.001			
COD	mg/L	5	SM5220C	11-May-22/K	14			
Hardness (as CaCO3)	mg/L	1	SM 3120	10-May-22/O	140			
Barium	mg/L	0.001	SM 3120	10-May-22/O	0.030			
Boron	mg/L	0.005	SM 3120	10-May-22/O	0.012			
Cadmium	mg/L	0.000015	EPA 200.8	11-May-22/O	< 0.000015			
Calcium	mg/L	0.02	SM 3120	10-May-22/O	46.7			
Chromium	mg/L	0.001	EPA 200.8	11-May-22/O	< 0.001			
Copper	mg/L	0.0001	EPA 200.8	11-May-22/O	0.0014			
Iron	mg/L	0.005	SM 3120	10-May-22/O	0.036			
Magnesium	mg/L	0.02	SM 3120	10-May-22/O	5.57			
Manganese	mg/L	0.001	SM 3120	10-May-22/O	0.003			
Potassium	mg/L	0.1	SM 3120	10-May-22/O	1.0			
Sodium	mg/L	0.2	SM 3120	10-May-22/O	9.7			
Strontium	mg/L	0.001	SM 3120	10-May-22/O	0.090			



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 Lab Manager

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 Bancroft Ontario K0L1C0

Caduceon Environmental Laboratories
 285 Dalton Ave
 Kingston Ontario K7K 6Z1
 Tel: 613-544-2001
 Fax: 613-544-2770

Attention: Mike Grasby

DATE RECEIVED: 06-May-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 18-May-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

			Client I.D.	SW6			
			Sample I.D.	B22-13169-5			
			Date Collected	04-May-22			
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Zinc	mg/L	0.005	SM 3120	10-May-22/O	< 0.005		



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C.O.C.: G097153

REPORT No. B22-26633

Report To:

Greenview Environmental Management

13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 19-Aug-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 07-Sep-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Client I.D.	SW-4	SW-5	SW-6	SW QAQC
Sample I.D.	B22-26633-1	B22-26633-2	B22-26633-3	B22-26633-4
Date Collected	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	SW-4	SW-5	SW-6	SW QAQC
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	22-Aug-22/O	233	173	197	193
Chloride	mg/L	0.5	SM4110C	23-Aug-22/O	60.7	4.7	16.9	16.9
Nitrite (N)	mg/L	0.05	SM4110C	23-Aug-22/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	23-Aug-22/O	0.17	< 0.05	< 0.05	< 0.05
Sulphate	mg/L	1	SM4110C	23-Aug-22/O	1	2	2	2
BOD(5 day)	mg/L	3	SM 5210B	19-Aug-22/K	< 3	< 3	< 3	< 3
Total Suspended Solids	mg/L	3	SM2540D	24-Aug-22/K	270	3	3	3
Phosphorus-Total	mg/L	0.01	E3516.2	30-Aug-22/K	0.03	0.01	< 0.01	0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	30-Aug-22/K	0.4	0.6	0.4	0.4
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	25-Aug-22/K	0.04	0.03	0.02	0.02
TDS (Calc. from Cond.)	mg/L	1	Calc.	24-Aug-22	319	170	213	208
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	22-Aug-22/O	8.4	16.8	13.4	13.1
Phenolics	mg/L	0.001	MOEE 3179	25-Aug-22/K	< 0.001	< 0.001	< 0.001	< 0.001
COD	mg/L	5	SM5220C	25-Aug-22/K	28	36	35	28
Hardness (as CaCO3)	mg/L	1	SM 3120	01-Sep-22/O	239	191	208	209
Barium	mg/L	0.001	SM 3120	01-Sep-22/O	0.060	0.052	0.046	0.046
Boron	mg/L	0.005	SM 3120	01-Sep-22/O	0.007	0.014	0.007	0.007
Cadmium	mg/L	0.00015	EPA 200.8	02-Sep-22/O	< 0.00015	< 0.00015	< 0.00015	< 0.00015
Calcium	mg/L	0.02	SM 3120	01-Sep-22/O	80.8	63.2	69.9	70.1
Chromium	mg/L	0.001	EPA 200.8	02-Sep-22/O	< 0.001	< 0.001	< 0.001	< 0.001
Copper	mg/L	0.0001	EPA 200.8	02-Sep-22/O	0.0004	0.0004	0.0003	0.0002
Iron	mg/L	0.005	SM 3120	01-Sep-22/O	0.173	0.216	0.154	0.149
Magnesium	mg/L	0.02	SM 3120	01-Sep-22/O	8.86	7.99	8.19	8.22
Manganese	mg/L	0.001	SM 3120	01-Sep-22/O	0.037	0.019	0.018	0.020
Potassium	mg/L	0.1	SM 3120	01-Sep-22/O	1.9	0.9	1.1	1.1
Sodium	mg/L	0.2	SM 3120	01-Sep-22/O	34.3	5.2	11.4	11.5
Strontium	mg/L	0.001	SM 3120	01-Sep-22/O	0.161	0.119	0.140	0.139



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Michelle Dubien
 Lab Manager

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C.O.C.: G097153

REPORT No. B22-26633

Report To:

Greenview Environmental Management

13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 19-Aug-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 07-Sep-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Client I.D.	SW-4	SW-5	SW-6	SW QAQC
Sample I.D.	B22-26633-1	B22-26633-2	B22-26633-3	B22-26633-4
Date Collected	18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-22

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Zinc	mg/L	0.005	SM 3120	01-Sep-22/O	< 0.005	0.016	< 0.005	< 0.005



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 Lab Manager

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C.O.C.: G111073

REPORT No. B22-33252

Report To:

Greenview Environmental Management

13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 28-Oct-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 06-Dec-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Client I.D.	BH1	BH2	BH4	MW08-6
Sample I.D.	B22-33252-1	B22-33252-2	B22-33252-3	B22-33252-4
Date Collected	27-Oct-22	27-Oct-22	27-Oct-22	27-Oct-22

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	BH1	BH2	BH4	MW08-6
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	02-Nov-22/O	646	224	251	161
Chloride	mg/L	0.5	SM4110C	11-Nov-22/O	20.6	0.7	10.5	0.5
Nitrate (N)	mg/L	0.05	SM4110C	11-Nov-22/O	0.63	0.16	0.08	0.13
Sulphate	mg/L	1	SM4110C	11-Nov-22/O	38	10	455	9
Phosphorus-Total	mg/L	0.01	E3516.2	11-Nov-22/K	0.02	0.03	0.02	< 0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	11-Nov-22/K	2.3	< 0.1	1.0	0.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	10-Nov-22/K	1.91	< 0.01	0.12	< 0.01
TDS (Calc. from Cond.)	mg/L	1	Calc.	04-Nov-22	715	235	956	171
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	04-Nov-22/O	7.7	0.8	12.5	2.5
Phenolics	mg/L	0.001	MOEE 3179	05-Dec-22/K	< 0.001	< 0.001	< 0.001	< 0.001
COD	mg/L	5	SM5220C	24-Nov-22/K	15	< 5	45	< 5
Hardness (as CaCO3)	mg/L	1	SM 3120	15-Nov-22/O	445	234	1010	170
Aluminum	mg/L	0.01	SM 3120	15-Nov-22/O	0.07	0.05	0.14	0.03
Barium	mg/L	0.001	SM 3120	15-Nov-22/O	0.076	0.020	0.117	0.026
Boron	mg/L	0.005	SM 3120	15-Nov-22/O	0.610	0.005	0.373	0.008
Cadmium	mg/L	0.00010	EPA 200.8	09-Nov-22/O	0.000015	0.000014	0.000025	0.000013
Calcium	mg/L	0.02	SM 3120	15-Nov-22/O	133	89.5	358	63.7
Chromium	mg/L	0.001	EPA 200.8	09-Nov-22/O	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	09-Nov-22/O	0.0019	0.0001	0.0059	0.0007
Copper	mg/L	0.0001	EPA 200.8	09-Nov-22/O	0.0015	0.0009	0.0037	0.0018
Iron	mg/L	0.005	SM 3120	15-Nov-22/O	1.04	0.005	0.009	0.014
Magnesium	mg/L	0.02	SM 3120	15-Nov-22/O	27.4	2.59	27.2	2.63
Manganese	mg/L	0.001	SM 3120	15-Nov-22/O	0.315	< 0.001	7.98	0.002
Potassium	mg/L	0.1	SM 3120	15-Nov-22/O	7.8	2.7	11.4	2.0
Silicon	mg/L	0.01	SM 3120	15-Nov-22/O	7.44	4.23	5.05	2.41
Sodium	mg/L	0.2	SM 3120	15-Nov-22/O	120	2.2	21.9	2.1
Strontium	mg/L	0.001	SM 3120	15-Nov-22/O	0.417	0.160	0.821	0.299



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 Lab Manager

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C.O.C.: G111073

REPORT No. B22-33252

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Greenview Environmental Management

13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 28-Oct-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 06-Dec-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Client I.D.	BH1	BH2	BH4	MW08-6
Sample I.D.	B22-33252-1	B22-33252-2	B22-33252-3	B22-33252-4
Date Collected	27-Oct-22	27-Oct-22	27-Oct-22	27-Oct-22

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Zinc	mg/L	0.005	SM 3120	15-Nov-22/O	0.005	0.006	0.006	0.005



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DATE RECEIVED: 28-Oct-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 06-Dec-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Client I.D.	MW08-7	GW QA/QC	
Sample I.D.	B22-33252-5	B22-33252-6	
Date Collected	27-Oct-22	27-Oct-22	

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	02-Nov-22/O	220	223		
Chloride	mg/L	0.5	SM4110C	11-Nov-22/O	47.3	0.7		
Nitrate (N)	mg/L	0.05	SM4110C	11-Nov-22/O	0.11	0.22		
Sulphate	mg/L	1	SM4110C	11-Nov-22/O	3	11		
Phosphorus-Total	mg/L	0.01	E3516.2	11-Nov-22/K	0.07	0.01		
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	11-Nov-22/K	0.1	< 0.1		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	10-Nov-22/K	< 0.01	< 0.01		
TDS (Calc. from Cond.)	mg/L	1	Calc.	04-Nov-22	297	235		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	04-Nov-22/O	1.5	0.6		
Phenolics	mg/L	0.001	MOEE 3179	05-Dec-22/K	< 0.001	< 0.001		
COD	mg/L	5	SM5220C	24-Nov-22/K	9	< 5		
Hardness (as CaCO3)	mg/L	1	SM 3120	15-Nov-22/O	225	242		
Aluminum	mg/L	0.01	SM 3120	15-Nov-22/O	0.03	0.04		
Barium	mg/L	0.001	SM 3120	15-Nov-22/O	0.056	0.021		
Boron	mg/L	0.005	SM 3120	15-Nov-22/O	< 0.005	0.005		
Cadmium	mg/L	0.00010	EPA 200.8	09-Nov-22/O	< 0.00010	0.000011		
Calcium	mg/L	0.02	SM 3120	15-Nov-22/O	76.5	92.5		
Chromium	mg/L	0.001	EPA 200.8	09-Nov-22/O	< 0.001	< 0.001		
Cobalt	mg/L	0.0001	EPA 200.8	09-Nov-22/O	< 0.0001	0.0001		
Copper	mg/L	0.0001	EPA 200.8	09-Nov-22/O	0.0021	0.0007		
Iron	mg/L	0.005	SM 3120	15-Nov-22/O	< 0.005	< 0.005		
Magnesium	mg/L	0.02	SM 3120	15-Nov-22/O	8.14	2.55		
Manganese	mg/L	0.001	SM 3120	15-Nov-22/O	< 0.001	< 0.001		
Potassium	mg/L	0.1	SM 3120	15-Nov-22/O	1.7	2.6		
Silicon	mg/L	0.01	SM 3120	15-Nov-22/O	2.94	4.16		
Sodium	mg/L	0.2	SM 3120	15-Nov-22/O	30.4	2.2		
Strontium	mg/L	0.001	SM 3120	15-Nov-22/O	0.128	0.157		



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

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

C.O.C.: G111073

REPORT No. B22-33252

Report To:

Greenview Environmental Management

13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 28-Oct-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 06-Dec-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Client I.D.	MW08-7	GW QA/QC		
Sample I.D.	B22-33252-5	B22-33252-6		
Date Collected	27-Oct-22	27-Oct-22		

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Zinc	mg/L	0.005	SM 3120	15-Nov-22/O	< 0.005	0.005		



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Attention: Mike Grasby

Caduceon Environmental Laboratories

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 Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 28-Oct-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 06-Dec-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Client I.D.	SW-3	SW-5	SW-6	SW QA/QC
Sample I.D.	B22-33254-1	B22-33254-2	B22-33254-3	B22-33254-4
Date Collected	27-Oct-22	27-Oct-22	27-Oct-22	27-Oct-22

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	SW-3	SW-5	SW-6	SW QA/QC
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	02-Nov-22/O	158	180	189	182
Chloride	mg/L	0.5	SM4110C	11-Nov-22/O	0.8	5.4	17.8	18.6
Nitrite (N)	mg/L	0.05	SM4110C	11-Nov-22/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	11-Nov-22/O	0.10	0.11	0.08	0.12
Sulphate	mg/L	1	SM4110C	11-Nov-22/O	1	2	3	4
BOD(5 day)	mg/L	3	SM 5210B	10-Nov-22/K	< 3	< 3	< 3	< 3
Total Suspended Solids	mg/L	3	SM2540D	04-Nov-22/K	66	< 3	< 3	< 3
Phosphorus-Total	mg/L	0.01	E3516.2	11-Nov-22/K	0.13	< 0.01	0.01	0.01
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	11-Nov-22/K	0.7	0.4	0.3	0.3
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	10-Nov-22/K	0.03	0.02	< 0.01	< 0.01
TDS (Calc. from Cond.)	mg/L	1	Calc.	04-Nov-22	162	190	218	218
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	07-Nov-22/O	8.0	11.4	9.4	8.7
Phenolics	mg/L	0.001	MOEE 3179	05-Dec-22/K	< 0.001	< 0.001	< 0.001	< 0.001
COD	mg/L	5	SM5220C	25-Nov-22/K	26	20	40	16
Hardness (as CaCO3)	mg/L	1	SM 3120	14-Nov-22/O	168	193	190	191
Barium	mg/L	0.001	SM 3120	14-Nov-22/O	0.086	0.049	0.038	0.038
Boron	mg/L	0.005	SM 3120	14-Nov-22/O	< 0.005	0.015	0.010	0.011
Cadmium	mg/L	0.000015	EPA 200.8	15-Nov-22/O	0.000058	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	0.02	SM 3120	14-Nov-22/O	56.4	64.0	63.2	63.5
Chromium	mg/L	0.001	EPA 200.8	15-Nov-22/O	< 0.001	< 0.001	< 0.001	< 0.001
Copper	mg/L	0.0001	EPA 200.8	15-Nov-22/O	0.0015	0.0003	0.0003	0.0003
Iron	mg/L	0.005	SM 3120	14-Nov-22/O	3.76	0.125	0.086	0.079
Magnesium	mg/L	0.02	SM 3120	14-Nov-22/O	6.47	8.09	7.73	7.79
Manganese	mg/L	0.001	SM 3120	14-Nov-22/O	4.45	0.022	0.015	0.015
Potassium	mg/L	0.1	SM 3120	14-Nov-22/O	1.5	1.3	1.5	1.5
Sodium	mg/L	0.2	SM 3120	14-Nov-22/O	1.6	5.0	11.4	11.4
Strontium	mg/L	0.001	SM 3120	14-Nov-22/O	0.091	0.118	0.123	0.125



R.L. = Reporting Limit

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Michelle Dubien
 Lab Manager

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C.O.C.: G111073

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Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 28-Oct-22

JOB/PROJECT NO.: Black Donald_WDS

DATE REPORTED: 06-Dec-22

P.O. NUMBER: 102.22.014

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Client I.D.	SW-3	SW-5	SW-6	SW QA/QC
Sample I.D.	B22-33254-1	B22-33254-2	B22-33254-3	B22-33254-4
Date Collected	27-Oct-22	27-Oct-22	27-Oct-22	27-Oct-22

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Zinc	mg/L	0.005	SM 3120	14-Nov-22/O	0.013	0.023	< 0.005	< 0.005



R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an *

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Appendix E



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: Black Donald WDS
Location (e.g. street address, lot, concession): Part of Lot 9, Concession 3, geographic Township of Brougham, Township of Greater Madawaska
GPS Location (taken within the property boundary at front gate/front entry):
North American Datum (NAD83) are 353188.0 metres (m) East, 5010581.0 m North, in Zone 18T
Municipality: Township of Greater Madawaska

Client and/or Site Owner: Township of Greater Madawaska

Monitoring Period (Year): 2022

This Monitoring Report is being submitted under the following:

- Certificate of Approval No.: A411902
- Director's Order No.: _____
- Provincial Officer's Order No.: _____
- Other: _____

Report Submission Frequency: Annual Other specify : _____

The site is: active inactive 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

If yes, provide details: _____

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:

Monitoring well BH3 was observed to be destroyed in fall 2021. Replacement required in 2022.

- 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
See Report		

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

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

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:

Name: Tyler H. Peters, P.Eng.

Seal:

Signature: 

Date: Feb17-23



CEP Contact Information:

Company: Greenview Environmental Address:

Telephone No.: 613-332-0057

Fax No. :

E-mail Address: solutions@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 creeks/pooled water - See report

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
See Report		

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
See Report		

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.

- 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.

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:

CEP Signature:  _____
 Relevant Discipline P.Eng. _____
 Date: (yyyy/mm/dd): Feb17-23 _____

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: solutions@greenview-environmental.ca

Appendix F



Statement of Service Conditions & Limitations

The following conditions and limitations shall form an integral part of any agreement between Greenview and the Client. In the event of duplication or conflict, the most stringent shall supercede the other.

Provision of Services and Payment

Upon documented acceptance of Greenview's proposed services and conditions in written form by the Client, Greenview may commence work on the proposed services directly.

Greenview's offers for services in the form of proposals, quotations, bids, tenders, or other like an offering to a Client are formulated upon available information at the time of the offer submission. In the event of discovery of unknown conditions, or any other unknown circumstance that may arise following the presentation of Greenview's offer to the Client, Greenview reserves the right to negotiate terms with the Client with respect to changes in scope, fees, disbursements, or the like as may be fair and reasonable considering the discovery.

Upon retention of Greenview's services related to any commission, the Client agrees to remit payment for the services rendered for the specified period within (30) days of the invoice date 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. Interest on any overdue accounts may be applied accordingly.

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 proposals, services, work, or documentation preparation was performed by Greenview.

Facts, conditions, information, and circumstances may vary with time and locations and Greenview's services are based on a review of such matters as they existed at the 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 its 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 strictly 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. Any such unauthorised reproduction, in whole or in part, is considered a breach of trust or contract, as applicable by law.

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