



March 2, 2023

Mr. Frank Gross, C.Tech.  
Manager of Transportation & Waste  
County of Oxford  
21 Reeve Street  
Woodstock, ON N4S 7Y3

**Subject: Executive Summary - 2022 Water Monitoring Report  
Holbrook Landfill, County of Oxford**

Dear Sir:

## INTRODUCTION

WSP Canada Inc. (WSP) was retained by the County of Oxford (County) to prepare the 2022 Water Monitoring Report for the closed Holbrook Landfill. At the request of the County, WSP has prepared this letter as an executive summary of the report.

## BACKGROUND

The closed Holbrook Landfill (site) is located on Part of Lots 20 and 21, Concession III near the village of Holbrook in the Township of Norwich. The site is located north of Quaker Street (Norwich Road 3), and is bounded by agricultural land to the east and west, and Long Point Region Conservation Authority (LPRCA) wetlands to the north and south. It is understood that the landfill site originally started accepting waste around 1970, and was assumed by the County of Oxford in 1982. The landfill operated until July 1986, at which time it was capped and seeded as part of the staged development and closure of the site. The closed site is currently operated under Ministry of the Environment, Conservation and Parks (MECP) Amended Environmental Compliance Approval (ECA) No. A070702, dated March 6, 2018. Annual monitoring was completed at the site in 2022 in accordance with ECA requirements.

## SUMMARY

Groundwater movement in the shallow flow system across most of the site is inferred to be southwesterly towards the on-site creek, while shallow groundwater movement in the western portion of the site (west of the creek) is inferred to flow east towards the creek. However, the shallow flow system groundwater elevations indicate that a mound exists in the fill area, inducing a localized radial flow away from the fill area to the east and southeast. Thus, groundwater flow in the shallow flow system across the majority of the site is inferred to converge on the on-site

Suite 700  
55 King Street  
St. Catharines, ON, Canada L2R 3H5

T: +1 905 687-1771  
F: +1 905 687-1773  
wsp.com



stream, with a minor component of localized shallow groundwater flow from the fill area toward the east and southeast.

Groundwater movement in the deeper flow system is inferred to be in a generally south to southeasterly direction beneath the site. The horizontal hydraulic gradient across the site is low, with a grade change of less than 1 m from the north to southeast limits of the site.

There may have been some historical landfill impacts in a number of the shallow groundwater flow system wells adjacent to the northeast and particularly to the east and southeast of the landfill; however, most of these have abated such that there was no clear indication of leachate influence in the shallow observation wells at the downgradient property boundaries to the east/southeast at the site during 2022. The shallow groundwater quality complies with Guideline B-7 (as established by the MECP as a mechanism to assess the acceptable level of leachate impacts on the groundwater system), with the exception of hardness, chloride, alkalinity, sodium and dissolved organic carbon (DOC) at observation well 26R, and hardness and nitrate at well 44. Concentrations of hardness are interpreted to be naturally elevated in the shallow flow system. The nitrate exceedance at well 44 is not likely to be the result of a landfill leachate impact as nitrate has not been detected within the leachate; the concentration is likely the result of agricultural activities that surround this well location. It is inferred that road salting and/or off-site sources are a contributing factor in the exceedances at observation well 26R. Based on the groundwater elevation and chemistry results at wells 45 and 46, the elevated concentrations and trigger exceedances in property boundary well 26R do not appear to be the result of shallow groundwater migrating from the landfill mound. Groundwater appears to flow north from the property boundary at 26R toward monitoring well 46. Meanwhile, key parameter concentrations within monitoring wells 45 and 46 were well below the concentrations at 26R.

There was no clear indication of leachate influence in the deeper groundwater flow system at the property boundaries in 2022. The deep groundwater quality complies with Guideline B-7, with the exception of hardness and iron at wells 27, 37R and 38. Concentrations of hardness and iron are interpreted to be naturally elevated in the deep flow system.

None of the groundwater trigger criteria at the site were exceeded during 2022, with the exception of the chloride concentration at observation well 26R. Based on the groundwater elevation and chemistry results at wells 45 and 46, the elevated concentrations and trigger exceedances in property boundary well 26R do not appear to be the result of shallow groundwater migrating from the landfill mound.

Surface water quality in the wetland at the northeast site boundary, and the northern and southeast on-site retention ponds was not measurably affected by the landfill in 2022. Surface water quality at intermediate station C04 along the on-site stream and retention pond P02 in the central part of the site were inferred to be slightly influenced by the landfill. Surface water quality in the on-site stream leaving the site (station C01) has been affected by landfill influences from the upstream portions of the on-site stream, shallow groundwater discharge, and possibly road salting activities. However, the landfill influences in the surface water quality leaving the site are very weak, based on the monitoring results, with chloride values below the Canadian Environmental Quality Guideline (CEQG) water quality guideline for the protection of aquatic life. Surface water quality leaving the site at station C01 complies with the current trigger level boundary criteria.

No methane was detected during the 2022 monitoring event at any of the landfill gas monitoring probes, located adjacent to the east, northeast, and north of the landfill mound.

## RECOMMENDATIONS

Based on the findings of the 2022 monitoring program, the following recommendations are provided for consideration.

- Monitoring should be continued at the site in 2023 with the recommended program presented in Section 7.0 of the 2022 Water Monitoring Report;
- The landfill slopes should continue to be inspected to confirm that there are no leachate seeps in the area;
- Supplemental groundwater samples should continue to be collected in 2023 at observation wells 45 and 46 to further evaluate the source of the trigger exceedances at observation well 26R; and
- Once monitoring for the expanded parameter database has been completed for a few years, the groundwater and surface water trigger mechanism plans should be re-assessed. A minimum of eight data sets should be collected for each parameter, before re-assessing.

Yours truly,



Albert Siertsema, P.Eng., PMP  
Project Engineer  
Earth & Environment

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