



SUMMARY OF RESULTS

DATE: February 6, 2023
MEMO TO: Kerstin Vroom
FROM: Tim McBride
RE: 2022 Annual Monitoring Report, Chapman Waste Disposal Site, Magnetawan, Ontario
PINCHIN FILE: 225335.006

Pinchin Ltd. (Pinchin) was retained by the Corporation of the Municipality of Magnetawan (Client) to prepare the 2022 annual groundwater and surface water monitoring report for the Chapman Waste Disposal Site (the Site) to assess the hydraulic media for contaminants of concern as a compliance requirement under the Site Certificate of Approval (CofA) Number **A521202** and the applicable regulatory requirements.

As per previous annual monitoring events, groundwater and surface water was sampled twice annually by Pinchin during 2022, in the spring and fall.

Seven overburden groundwater monitoring wells have historically been utilized at the Site (BH1, BH2, BH3, BH4, BH5-II, BH6-II, and BH7-II). As part of the leachate management plan study completed by Pinchin, several additional monitoring wells were installed at the Site during September 2018 to support the existing monitoring well network. This included the addition of two new background wells (BH11 and BH3-II) to replace the previously destroyed BH3, one cross-gradient well (BH10-I), deeper nested wells at two existing monitoring locations which are consistently dry (BH4-II and BH6-III) and two additional downgradient wells (BH8-I and BH9-I). All wells were inspected during 2022 and found to be in good condition. No wells displayed evidence of a condition non-compliant with Ontario Regulation 903, with the exception of BH1, BH2, and BH3-II which have the PVC riser too tall to close the casing lid. Additionally, four surface water locations were monitored for the Site (SW1, SW2, SW3, and SEEP).

The Site currently operates as a typical natural attenuation waste disposal facility. No liner or other leachate collection/management system is in place at the Site. The 2019 Leachate Management Plan Study report indicated that a leachate-impacted groundwater seep/spring had been identified in a downgradient area (east of the Site, upstream from SW3, and in the vicinity of well BH9), resulting in the discharge of said waters to an adjacent surface water feature. This discharge essentially short circuits the natural attenuation process and has the potential to have negative effects on the surface water feature. The Corporation of the Municipality of Magnetawan initiated a proactive approach to leachate management and retained Pinchin to complete the Leachate Management Plan Study. The surface water quality data collected for the study indicated that an impact



from the leachate seep is being observed in the two adjacent creeks, and it was recommended that steps should be taken to eliminate the seep.

These steps include infilling the incised valley and relocating the creek to eliminate the seep, creating an extended CAZ boundary for additional leachate attenuation to occur prior to discharge to surface water bodies.

As part of the 2019 Leachate Management Study Report completed by Pinchin in April 2019, a trigger level monitoring program and contingency plan was proposed for the Chapman Waste Disposal Site, which is to be implemented at the Site following the elimination of the seep. The proposed Trigger Level Monitoring Program is a three-tiered program that includes routine monitoring (i.e. the semi-annual monitoring program), compliance monitoring and confirmation monitoring. While this trigger level monitoring program has been developed following industry standard/best management practices it is subject to revision. Revisions to the program have been completed by Pinchin as outlined in the Updated Trigger Plan Report. This report will be submitted to the MECP for review. Following acceptance of the revised trigger level monitoring program and the remediation of the leachate seep, the evaluation of the Site performance will be completed utilizing the new criteria. However, for discussion purposes only, the 2022 annual monitoring report evaluated the Site with respect to the Updated Trigger Plan, in addition to the Guideline B-7.

A single trigger level exceedance was quantified at BH6-III and BH8-I for manganese using the geometric mean of the available database at each of these trigger wells versus the modified Guideline B-7 (based on the 75th percentile of the background concentrations at the new background well BH11). However, at the time of preparation of this report, only 8 successive sampling events have been completed for newly installed monitoring wells BH6-III and BH8-I; further monitoring is required to establish a more robust data set before an accurate evaluation of the trigger levels can be completed for these monitoring locations. All of the trigger level concentrations were satisfied at both surface water trigger level monitoring locations with the exception of iron at SW2 during the fall and at SW3 during the spring and fall. It should be noted that although the iron concentrations quantified at SW3 are elevated, iron concentrations at furthest downgradient location SW2 are generally similar or lower in comparison to background concentrations at SW1. It should also be noted that the implementation of the trigger level monitoring program is only recommended once the proposed mitigation measures associated with the leachate seep are completed.

Actual Site compliance was evaluated based on the MECP's Guideline B-7 criteria. Based on the results obtained from the existing groundwater monitoring wells and surface water monitoring locations, Pinchin has not identified any significant landfill related impacts at the Site. Concentrations of pH, TDS, iron, nitrate, DOC, and manganese parameters within the groundwater samples analyzed at the furthest downgradient monitoring locations (BH5-II, BH6-III, BH7-II, BH8-I, and BH9-I) which exceeded the Guideline B-7 criteria are likely attributed to either naturally occurring conditions within the shallow unconfined aquifer on-site or from temperate impacts from leachate sourced from the waste deposits at the Site.



All exceedances of the Guideline B-7 RUC are related to operational guidelines and/or aesthetic objectives associated with drinking water systems and are not considered to be an immediate significant human health or environmental concern originating from the Site, with the exception of nitrate which is a health-related parameter. The elevated concentrations of nitrate are only quantified in some downgradient wells and often fluctuate throughout the historical record. Therefore, these concentrations should be confirmed during the next monitoring period. Furthermore, concentrations of nitrate quantified at the downgradient groundwater wells are not interpreted to be impacting the surface water quality at the Site as nitrate concentrations are observed to be at low levels at downstream monitoring locations SW3 (near-field) and SW2 (far-field).

Based on a review of the existing dataset and regulatory requirements to date, Pinchin recommends the following:

- Continue with routine monitoring of all the available groundwater monitoring wells and surface water monitoring locations. Groundwater and surface water monitoring shall be completed with analyses for the parameters identified in the historical monitoring record. Monitoring well BH4-II should also be analysed for mercury and VOCs. It is recommended that groundwater and surface water monitoring be completed during the spring and late fall to generate a baseline data set, to evaluate trends, and to determine the need and scope of a long-term monitoring program for the Site. Considering the dataset completed thus far, it is Pinchin's opinion that sampling should continue in 2023 before the adequacy of the monitoring program can be fully evaluated;
- It is recommended that the three-tiered trigger level monitoring program, developed as part of the 2019 Leachate Management Plan Study and the Updated Trigger Plan be implemented for the Site once the mitigative measures for the seep are executed;
- The riser at monitoring wells BH3-11, BH1, and BH2 should be cut and re-surveyed (tied into the existing survey data for the monitoring network); and
- The Client should continue to ensure that the requirements as specified in the CofA are adhered to, with respect to operation of the Chapman Waste Disposal Site.