DILLON CONSULTING

Ridge Landfill Expansion Environmental Assessment

Mining Assessment Work Plan (Final)

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1.0 Project and Work Plan Overview

This Mining Assessment work plan has been prepared to support the environmental assessment (EA) for the Ridge Landfill expansion and is based on the commitments made in the final amended Terms of Reference (ToR) for the EA that was approved by the Ministry of the Environment, Conservation and Parks in May of 2018.

Waste Connections of Canada (Waste Connections) is proposing an expansion of the Ridge Landfill in order to continue to provide long-term residual disposal capacity for the company's large IC&I customer base and as a regional and inter-regional waste management facility to serve the projected increase in population and economic growth in southern and central Ontario.

WCC owns approximately 334 hectares (ha) of lands west of Erieau Road and an approximately 21 ha property east of Erieau Road. The existing Landfill Site Area, which is permitted by an ECA from the MOECP for waste management and environmental work purposes, is 262 ha. The area within which waste disposal is permitted, called the Waste Fill Area, is 131 ha or half of the Landfill Site Area. As of December 2017, it is estimated that the existing Waste Fill Area at the Ridge Landfill site will provide waste disposal capacity until approximately 2021 at the current fill rate.

The current approved capacity for the Ridge Landfill is 21 million cubic metres (m3). The site is approved to accept a maximum of 1,300,000 tonnes of waste per year (the MOECP approved annual waste disposal rate). The EA does not propose to increase the maximum annual fill rate (this would remain as-is); however, Waste Connections is seeking the EA to increase the life of the facility for a 20 year planning period, from 2022-2041.

The waste being landfilled is approximately 98% IC&I waste and 2% residential waste. As part of the EA approval, Waste Connections would agree to reduce their IC&I service area from all of Ontario to just southern and central Ontario, and their residential service area from Chatham-Kent and the neighbouring counties of Essex, Lambton, Middlesex and Elgin, to only the Municipality of Chatham-Kent.

This work plan outlines the tasks to support the Mining Assessment component of the Environmental Assessment approval for the new expansion. This work plan also includes the tasks to address the additional commitments associated with the Terms of Reference submission and approval.

A summary of additional commitments for the Mining Assessment discipline is provided below.

Commitment	Reference to applicable section in EA or supporting document
As part of developing the site development alternatives, a review of other experience at landfill mining operations related to odour will be undertaken.	Mining Assessment work plan Section 2.0.

2.0 Landfill Mining Assessment

2.1 Background

Mining the Old Landfill has been identified as an option to gain additional landfill capacity. Although the Ministry of the Environment and Climate Change (MOECP) has approved some landfill mining projects in Ontario, odours and health and safety are typically the top concerns associated with landfill mining, followed by leachate management and slope stability.

We are proposing to complete a desktop mining assessment at the Old Landfill portion of the Ridge Landfill to assess the technical and economic feasibility of landfill mining and identify the potential for common concerns associated with landfill mining operations. This assessment will include review of the following:

- Dillon's report prepared for the Trail Landfill mining pilot project for the City of Ottawa.
- Dillon's experience with the mining component of the Design and Operations Report prepared for the City of Sault Ste. Marie landfill expansion.
- Notes of site visit and phone calls with the City of Barrie Landfill mining full-scale project.
- Notes of site visit at the Ocean County landfill mining project in New Jersey.
- Literature review of relevant recent mining projects, including in the Town of Blue Mountains in Ontario.

It is expected that the mining assessment will provide information to enhance the site understanding and comfort level related to mining operations. Information gathered in the mining assessment program will confirm capacity estimates at the landfill and will feed into the evaluation criteria for determining the preferred site development alternative method.

2.2 Study Area

For the purposes of the Landfill Mining Scope of Work, the study area has been defined as follows:

- On-Site Study Area ("on-site") – This study area will be modified for the Landfill Mining discipline to be confined to the area of the Old Landfill (including the Infill Area).

This is appropriate since this is the only location on the Ridge Landfill property for which landfill mining is proposed.

3.0 Scope of Work Description

The main goal of the landfill mining desktop assessment is to review background data related to site information such as type or source of waste reported in the annual reports and historical leachate levels (if available). A literature review of the practices implemented at other sites where landfill mining has taken place and best management practice recommendations to address potential impacts (including odours) will also be considered as part of this assessment. We will also conduct an interview with Waste Connections employees that worked on site in the past. The information collected will be used in the EA process as a resource in the development and evaluation of landfill mining in the context of the site development alternatives. Specifically, the following information will be collected and used to assess the viability of landfill mining at the Old Landfill and to assess potential impacts and mitigation measures associated with landfill mining:

The desktop landfill mining assessment will involve:

- Review of the type and quantity of waste disposed at each mound within the Old Landfill.
- Review of the historical leachate and groundwater levels of the Old Landfill, if available.
- Confirmation and refinement of the base design and elevations of the Old Landfill base. This will be achieved using the borehole information obtained in the hydrogeology program and other documents available on file such as historical ground contours, figures and drawings.
- Estimate the quantity of waste and soil cover excavation expected for each mound.
- Prepare a process diagram and identify operational requirements (e.g., maintaining an open working face in another area of the site to take residual waste from the mining operations, stockpiles and processing locations).
- Estimate the soil fraction that can be recovered by waste screening for each mound.
- Estimate the quantity of screened waste requiring disposal assuming different scenarios (i.e. shredding residual waste, no shredding, and percentage of metal material recover).
- Review and assess landfill gas and emissions monitoring data for the Old Landfill such as gas vents data (if available) and surface emission scan reports to estimate areas of higher odour potential within the Old Landfill.
- Identify concerns with waste types, odours, etc. for each mound.
- Identify the equipment required for mining operations.
- Review best practices from other landfills.
- Identify environmental considerations and mitigation measures (e.g., for odour).
- Estimate costs.

4.0 Assumptions

- No field investigations will take place as part of this scope of work.
- We will make up to five (5) phone calls to other landfills to discuss their experience. Each call will be no longer than 30 minutes in length and the calls will be conducted by Dillon's Landfill Mining technical lead.
- Assessment of waste type and quantities will be based on available background information.

5.0 Deliverable

We will deliver a Draft Report of the Landfill Mining Desktop Assessment for Waste Connections review. Following review and comment of the draft report, we will finalize and submit the Final Report.

6.0 Budget

The budget will be presented under a separate cover.