



Water and Waste Department • Service des eaux et des déchets

February 6, 2018

Our File No.: G-161

Manitoba Sustainable Development
Climate Change and Environmental Protection Division
Environmental Approvals Branch
Suite 160 – 123 Main Street (Box 80)
Winnipeg, MB R3C 1A5

Attention: Tracey Braun, M.Sc., Director

RE: Summit Soil Fabrication Pilot Project Request for Approval

Please accept this letter as a request for approval to proceed with the Summit Soil Fabrication Pilot Project under the Exemption Clause (6) of the *Classes of Development Regulation*.

Please see the attached proposal for the pilot project on the use of biosolids and other organic and inorganic residuals to fabricate a soil for the vegetative support layer as part of the final cover system at Summit Landfill, managed by the City of Winnipeg ("The City").

Should you have any questions or require additional information, please feel free to contact the undersigned at (204) 794-4601 or at rpark@winnipeg.ca. Thank you for your consideration.

Yours truly,

Randy Park, CET
Acting Manager, Solid Waste Services

BR/dd

c: M.L. Geer, CPA, CA, Water and Waste Department (email)
Becky Raddatz, Solid Waste Service Planner, Water and Waste Department



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Summit Landfill Soil Fabrication Pilot Project

February 2018

Prepared For:

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Proposal

Background:

The City of Winnipeg (The City) is investigating beneficial use options for its municipal biosolids to meet objectives outlined in the City's Biosolids Master Plan. North End Sewage Treatment Plant (NEWPCC) produces nearly 4,000 wet tonnes of biosolids monthly. Currently, a portion of the biosolids is being diverted to a composting project at Brady Road Resource Management Facility (BRRMF) and a pilot project for agricultural land application. The remaining quantities of biosolids are being landfilled at the BRRMF. The City is undertaking the Summit Soil Fabrication Pilot Project to complement these existing programs.

In early 2017, the City implemented a pilot project to generate a fabricated biosolids amended soil for final cover at BRRMF. This project proved to be an operationally effective beneficial use option. As a next step the City is proposing to conduct a three year soil fabrication pilot project at the Summit Road Landfill, with two new feedstocks: wood grindings and a screened sand and grit mix from street sweeping operations.

Summit Road Landfill is a closed secure site north of Optimist Park near CenterPort Canada Way. It retains a leachate management system and the City monitors surface water, groundwater, leachate, and landfill gas at this site.

Objective Statement:

The objective of this three year pilot project is to determine if soil fabrication is a viable long term option for completing the cap system at Summit Landfill. It will also serve to examine the potential for providing an all season beneficial reuse option for biosolids. Using biosolids, sand and grit from street sweeping and woodchips, the fabricated soil will be designed to support vegetation growth, divert biosolids from being buried and restore the landfill to a native prairie landscape.

Overview:

This three year pilot project is designed to develop and analyze operational soil fabrication at Summit Landfill. Each pilot year will consist of two operational phases; generally one cold weather and one warm weather phase. Interim, Annual and Final Reports are to be submitted to the Director of Sustainable Development, Province of Manitoba and the Director of Water and Waste, City of Winnipeg. Biosolids will not be stockpiled at Summit Landfill prior to mixing with the feedstocks.

Year 1(2018)

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- Winter - project planning and bench scale assessment to determine soil fabrication “recipe”
 - **Request for Regulatory Approval to Manitoba Sustainable Development (MSD)**
 - Soil fabrication and placement – one month operational phase
- Spring – seeding and analysis
 - Seed fabricated soil with native grasses mix and winter rye
 - **Year 1 Interim Winter Report** –including an analysis of operations, material and environmental monitoring
- Summer - project planning, warm weather soil fabrication and vegetation
 - Soil fabrication and placement – one month operational phase
 - **Year 1 Interim Summer Report** – including an analysis of operations, material and environmental monitoring
- Fall – Analysis of year end results, review of operations and environmental monitoring plan
 - **Year 1 Annual Report**– Overview and analysis of Year 1 Pilot Project, lessons learned and planned adjustments for Year 2.

Year 2 (2019)

- Repeat timeline, make adjustments accordingly
- An interim report will be completed after each operational phase and an annual report will be completed at the end of the year.
 - **Year 2 Interim Winter Report**
 - **Year 2 Interim Summer Report**
 - **Year 2 Annual Report**

Year 3 (2020)

- Repeat timeline, make adjustments accordingly
- An interim report will be completed after each operational phase and an annual report will be completed at the end of the year.
 - **Year 3 Interim Winter Report**



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- *Year 3 Interim Summer Report*
- *Year 3 Annual Report*
- *Pilot Project Final Report*

Results from the three year pilot project will be used to inform a business case in conjunction with identifying a regulatory approval framework for a full scale soil fabrication operation at Summit Landfill.

Third Party Review

The City has procured the services of an expert consultant in residuals management. The consultant will conduct all bench scale testing and soil mix ratios, operational review and initial training, and review on all project plans and reports.

Operations

The feedstocks will be mixed with biosolids according to the ratios identified by the bench scale testing. In Year 1, fabricated soil will be spread over a designated plot area at a depth of 0.6 m. Loaders and dozers will be used in Year 1 Winter phase. Biosolids will not be stockpiled on site, rather mixed with feedstock as soon as they arrive. Notification of an Environmental Officer will occur 5 days prior to biosolids arriving on site and within 5 days after completion.

Location

The pilot will begin at the southerly portion of the landfill, shown on Figure 1, and will generally move north over the three years. The first soil plots will be located on the west facing slope. The slope will be scraped of existing invasive vegetation prior to placing fabricated soil. The soil mixing will be conducted up slope of the soil plots. This is a level area, approximately 150 m wide and 300 m long, with an access road suitable for biosolids trucks.

Environmental Monitoring

This project will examine how to operationally maximize the diversion of biosolids from landfill while making a vegetative supportive layer of the landfill cap system which minimizes adverse environmental impacts or risk to public health. Consideration has been given to minimize the risk of adverse impacts on the environment through the following monitoring components.

Surface Water Sampling

Surface water samples will be collected from a swale created along the west side of the winter phase year one soil fabrication and control plots (Figure 1). Future phases will have swales designed according to the topographic surface of the plot. In order to minimize any confounding factors caused by stagnant water, sampling will occur within 24 hours of a rainfall or runoff

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event, when steady downstream flow can be observed in a swale designed to catch runoff.

Samples will be tested for:

- Dissolved ammonia
- Dissolved nitrate-nitrite nitrogen
- Total Kjeldhal nitrogen
- Dissolved phosphorous (as orthophosphate)

Surface water sampling results will be compared with the Manitoba Water Quality Standards, Objectives, and Guidelines and analyzed for dissolved nitrogen and phosphorus. The first two water samples will be collected within approximately one week and one month after soil placement, if conditions permit. Additional sampling events will occur after major rainfall events, and during spring runoff with a maximum of 10 rain events per year.

Soil Sampling and Analysis

Samples of fabricated soil will be collected from the treatment plots after spreading is complete. The soil samples within the treatment plots and control plot will be collected using a stratified-randomized design. The treatment area will be stratified into four quadrants, and one composite soil sample consisting of five randomized subsamples will be collected. All soil samples will be collected from 0-15 cm and 30-60 cm depths and analyzed for the following:

- Organic matter, total organic carbon
- Ammonium, nitrate, total Kjeldhal nitrogen (TKN)
- Available phosphorous, sulfur, potassium
- Trace elements (arsenic, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, zinc)
- pH, electrical conductivity

Soil samples will be collected from the fabricated and control plots in the spring (no later than June 1) and fall (no later than October 31) in the first year. In subsequent years, the soil will be sampled on an as needed basis. Soil samples will be compared to the Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines for the production of environmental and human health, industrial application.

Vegetation Monitoring

The plots will be vegetated using a broadcast seeding technique, with winter rye and native prairie grasses. Vegetation monitoring will be conducted twice annually, in conjunction with the soil monitoring. An assessment of the aboveground biomass will be done using a visual determination of density.



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Odour Management

Evaluation of potential odour issues will be completed daily during operational phases. A daily log with observations will be made documenting the weather conditions, operations and any odour issues. Odour will be graded on a scale of 1-10, similar to a scale currently at place at BRRMF. Any odours will be described and addressed accordingly.

If odour issues are detected operations will be reviewed and adjusted. Berms around the mixing area will be erected to mitigate odour movement. The mixing area will be adjusted based on wind conditions.

Environmental Protection

This demonstration is designed to show how fabricated soils can be used safely without adverse environmental impact or risk to public health and consideration has been given to minimize the risk of adverse impacts on the environment through the following considered design and monitoring components:

- The project is located within the boundaries of the Summit Road Landfill leachate and surface water collection and containment system. Any unintended leaching of nutrients would remain within the surface water management system.
- Regular monitoring of soil vegetation and water over a three year period will enable a strong assessment of the potential of fabricated soils to be used in landfill closure processes, and provide a strong foundation for understanding potential leaching from fabricated soils.

Communication over the Three Year Pilot Project

As part of this pilot project the City proposes to provide MSD with the following reports:

- **Six Interim Reports** – To be delivered within two months of the completion each operational phase
- **Three Annual Reports** – To be delivered within three months of the operational year
- **One Final Report** – To be delivered within six months of the completion of the three year pilot project.