The Regional Municipality of Halton

Report To:	Regional Chair and Members of Regional Council
From:	Andrew Farr, Commissioner, Public Works
Date:	April 21, 2021
Report No:	PW-10-21
Re:	Ensuring Long Term Sustainability of Halton Region's Biosolids Management Program

RECOMMENDATION

THAT Regional staff be directed to proceed with a Municipal Class Environmental Assessment Study, as the initial phase to implementing Biosolids Composting in Halton Region, as outlined in Report No. PW-10-21 re: "Ensuring Long Term Sustainability of Halton Region's Biosolids Management Program".

REPORT

Executive Summary

- In June 2012, Regional Council endorsed Report No. PW-43-12 re: "Biosolids Master Plan", which identified a Biosolids Management Strategy to enhance and ensure the maintenance of a sustainable, environmentally sound and cost effective Biosolids Management Program. The Biosolids Management Strategy concluded that the current farmland application program is not sustainable over the long term and recommended to "Investigate Biosolids Composting opportunities to enhance Halton's land application program".

- Jacobs Engineering Group Inc. was retained in 2017 to conduct a Biosolids Composting Feasibility Study. Based on the results of an economic, social and environmental cost-benefit analysis, it is recommended that Halton Region construct a Halton Region owned facility to compost up to 100 per cent of Halton Region's biosolids year round production, utilizing a Covered Aerated Static Pile technology.

- Adopting the recommended biosolids composting initiative will reduce current program risk and reduce greenhouse gas emissions significantly. It would be equivalent to taking up to 1,000 cars off the road, and achieve carbon negative status for Halton Region's Biosolids Management Program. This supports Regional Council's commitment to reducing the collective carbon footprint and mitigating impacts of climate change.

- The Composting Feasibility Study found the projected 20–year net present value, using capital, operating and maintenance life cycle costing for the Biosolids Composting Facility to be comparable to the cost of the Halton Region's current biosolids program.

- With Regional Council's approval of Report No. PW-10-21, staff will initiate a Municipal Class Environmental Assessment Study to identify the preferred site for the construction of a Halton Region owned biosolids composting facility. The study will include public engagement with key stakeholders including Indigenous communities, public interest groups, the local municipalities and public agencies.

Background

Halton Region owns and operates six wastewater treatment plants that clean wastewater and safely returns the water back to the environment. The solids by-product of the wastewater treatment process, known as "biosolids", is rich in organic matter and nutrients that can help support healthy plant growth and soils. In Halton Region, this resource is produced in both a "liquid" and "dewatered" form and has been made available to the agricultural community for crop production over the past four decades.

The Biosolids Master Plan considered increasing constraints and vulnerabilities on the land application program. The most notable constraint was population growth and changing demographics in Halton Region, resulting in a combination of increased biosolids in the face of diminishing local farmland. As recently as 2000, Halton Region had sufficient land to ensure all biosolids could be applied locally. In 2021, the program currently exports approximately 75 per cent of the biosolids production outside Halton Region to either agricultural land, reclamation facilities or an approved landfill.

Furthermore, the program is designed to depend on third party contracted facilities which can also pose a significant risk to the program. In 2013, a local third party facility was suddenly closed down, forcing the contractor to consider alternative management methods for Halton Region's biosolids. Since this event and to ensure a year round destination, the best solution proposed during the procurement process by Halton Region's current contractor is to transport dewatered biosolids 420 kilometres to Sudbury, Ontario, for mineland reclamation.

Exporting increased amounts of biosolids at longer haulage distances has shown to have significant negative impacts on the program both environmentally and financially. For example, the program has seen a gradual increase in trucking kilometers outside the Region since the early 2000s and is currently estimated at 500,000 kilometres per year, which consumes approximately 200,000 litres of diesel fuel and emits 550,000 kilograms of greenhouse gases. In addition, Halton Region is exporting over five million kilograms of organic matter contained in the biosolids that could otherwise be used by local communities and industries to improve soil health and help fight climate change within Halton Region.

Other significant constraints and vulnerabilities associated with the land application program include:

- New restrictive regulatory requirements, including a potential provincial ban on landfilling organics; Halton Region's primary emergency contingency option; and,
- Weather dependency and an increased vulnerability due to extreme weather events and trends as a result of climate change.

The Biosolids Master Plan confirmed that these constraints and vulnerabilities could continue to increase the financial and environmental risk to Halton Region.

The resulting Master Plan Strategy included recommendations to "Investigate Biosolids Composting opportunities to enhance Halton's land application program" and to "Investigate Thermal Oxidation (Incineration) partnerships opportunities outside Halton to diversify the biosolids management program."

The use of thermal oxidation in other municipalities in southern Ontario is quite limited, and based on research by the consultant, there are no plans to build new merchant thermal oxidation facilities in the Province of Ontario. For this reason, along with jurisdictional challenges of establishing agreements with other municipalities to manage Halton Region's biosolids at an existing external facility, thermal oxidation is no longer considered a sustainable option for Halton Region.

This conclusion led to finalizing the Biosolids Composting Feasibility Study, which recommends that biosolids composting is a suitable and an environmentally significant solution for Halton Region.

Discussion

The Biosolids Composting Feasibility Study looked at:

- The viability of the product commercially through a market assessment;
- An approach to manage the program;
- Selection of a preferred facility/technology;
- A triple bottom line business case analysis including a sensitivity analysis; and,
- An implementation strategy and schedule.

A copy of the Executive Summary Report of the completed Biosolids Composting Feasibility Study is provided as Attachment #1 to this report for additional detail and consists of the following key phases:

Biosolids Compost Market Assessment

An extensive market survey to determine potential consumers concluded that opportunity and demand exists for a biosolids compost product for the following markets:

- Environmental (hydro-seeding, erosion control and landscaping);
- Horticultural (lawn and garden industry, nurseries, bulk soil blend sales); and,
- Agricultural (local farmers).

Based on the results of the market research, the quality of the new biosolids compost material broadens the options for end use. This is especially true locally as more farmers in Halton Region will be able to use the biosolids compost product, which realizes the additional benefit of returning valuable nutrients compost back to Halton Region's soils.

Identifying and Evaluating Biosolids Composting Management Alternatives

Options to manage and produce a biosolids compost including the following three Management Model Alternatives were assessed:

1. Build a Halton Region owned biosolids composting facility;
2. Incorporate biosolids into Halton Region's existing composting processes (leaf and yard waste, Source Separated Organics);and,
3. Contracting the biosolids composting to vendors with existing composting facilities.

Through vendor surveys, Alternative 3 was deemed not feasible due to a shortage of existing composting facilities province-wide. Additionally, vendors were concerned with an untested Ontario market for biosolids compost; and that co-composting would degrade their compost product from Category AA to Category A under the Provincial Standards.

Alternative 2 was also not preferred as it would also downgrade Halton Region's product and restrict Halton Region's green bin and/or leaf and yard waste compost options.

Alternative 1, a Halton Region owned biosolids composting facility is the most promising alternative and was further explored with a detailed business case analysis as described in the following sections. The preferred alternative addresses the lack of existing composting facilities issue and eliminates product mixing that would require reclassification of the compost product.

Selection of Preferred Biosolids Composting Facility and Business Case

The selection of the preferred Biosolids Composting Facility for Halton Region considered all social, economic and environmental factors. To ensure a thorough evaluation, a multi-criteria decision-making framework was used to develop the recommended Biosolids Composting Facility and utilized for a two-step approach. The first step involved selecting the most suitable technology that considered:

- Capital, operating and maintenance costs;
- 20-year lifecycle cost;
- Operational flexibility;
- Maintenance requirements;
- Offsite odour risks;

- Health and safety; and
- Land requirements.

The Covered Aerated Static Pile facility was selected as the preferred technology. This technology involves mechanically mixing biosolids with a bulking agent (typically woodchips or bulk brush) and then stacking the mixture into large piles over a bed of pipes so that air can be drawn down through the composting material.

The evaluation then considered the size of the biosolids composting facility and selected the scenario to handle all of Halton Region's dewatered biosolids and 50 to 100 per cent of liquid biosolids. The 50 to 100 per cent range provides flexibility for local farmers to continue using liquid biosolids as they are today or to use the new composted biosolids.

Business Case - Financial

A financial business case was used to compare the current Biosolids Management Program (Status Quo) to a Halton Region owned Biosolids Composting Facility. Table 1 shows the 20-year net present value total lifecycle cost for each option, which illustrates the two options are comparable. Based on the estimated Operating Cost in Table 1 for Status Quo and Biosolids Composting, the average annual operating budget would be approximately $5.1 million and $3.4 million respectively.

Table 1: Net present value lifecycle cost comparison of the current Biosolids Management Program (Status Quo) and a new Halton Region owned Biosolids Composting Facility:

Description	Status Quo	New Halton Region owned Biosolids Composting Facility
Operating Cost (million)	$101	$68 - $64
Capital Cost (million)	-	$44 - $50
20-year Total Net Present Value Lifecycle Cost (million)	$101	$112 - $114

The composting program estimates are based on constructing the new facility on Region owned property with the Halton Waste Management Site and Biosolids Management Centre being considered as potential sites. The preferred recommended site location will be reviewed and proposed through the Municipal Class Environmental Assessment Study process.

The composting program estimates also used a conservative estimate of revenue generated from the sale of the compost product of approximately $6 per tonne. In comparison, the Moncton Wastewater Sewerage Commission in New Brunswick prices their biosolids compost at almost $20 per tonne, with local demand exceeding supply.

It should be noted that there is a high potential for Provincial and Federal capital funding opportunities that could help offset the capital construction costs but have not been factored into the cost estimates in Table 1.

Business Case - Environmental Sustainability and Climate Change

An important component of the business case was to estimate and compare the greenhouse gas emissions of the status quo program to the recommended biosolids composting program. The Biosolids Emissions Assessment Model, developed by the Canadian Council of Ministers of the Environment, indicates that biosolids composting could result in a reduction of approximately 4,000 to 4,500 tonnes of carbon dioxide per year or equivalent to removing 900 to 1,000 cars off Halton Region roads, thereby achieving Carbon Negative status for the Biosolids Management Program.

Business Case - Sensitivity Analysis

A sensitivity analysis was completed to compare the worst case financial and greenhouse gas emission impacts on the status quo and biosolids composting programs. The results of the sensitivity analysis concluded that the status quo program has the potential to escalate significantly higher than the biosolids composting program for both cost and greenhouse gas emissions when known risks are factored in.

Conclusion and Next Steps

The purpose of investigating biosolids composting as part of the Biosolids Master Plan Strategy was to mitigate the financial and environmental risks associated with the current program constraints and vulnerabilities. This composting strategy will address current risks in the following ways:

- Reduce the programs carbon footprint by keeping biosolids compost local thereby minimizing haulage distances;
- Recover organics that are currently being exported by expanding and diversifying local end use markets;
- Comparable cost to the Status Quo program;
- Reduce dependency on third party facilities by building a Halton Region owned Composting Facility;
- Compost application can be practiced year round and is less impacted by weather and climate change;
- Proven technology with decades of successful operations worldwide and in Canada; and,
- Produce an enhanced product with further pathogen and odour reduction.

Subject to the approval of Report No. PW-10-21, the next step is for staff to initiate and complete a Municipal Class Environmental Assessment Study, which will evaluate all potential Regional sites as well as other non-Regional potential sites and recommend the preferred location for the construction of a Halton Region owned biosolids composting facility, confirm the technology design details and refine the cost estimates. As per the Municipal Class Environmental Assessment process, engagement with affected or interested key stakeholders will commence in the fall of 2021, and throughout the study, which is anticipated to be complete in the fall of 2023. Key stakeholders include, but are

not limited to: Regional Council, the general public, review agencies, local municipalities, Indigenous communities, and Halton Region's agricultural community.

At the conclusion of the Municipal Class Environmental Assessment process, staff will report the findings and proposed with Regional Council for approval prior to proceeding with the design and construction of the new biosolids composting facility. Under the current proposed schedule staff anticipate reporting the proposed direction to Regional Council in early to mid-2023 with detailed design scheduled to commence later in 2023. Construction is currently planned to commence in 2027 with an overall completion date of 2029.

FINANCIAL/PROGRAM IMPLICATIONS

There is sufficient budget in capital project S3284A (Energy & Resource Management Strategy) to complete the above noted Municipal Class Environmental Assessment Study.

The Composting Feasibility Study provides a high level summary of costs associated with constructing and operating a new Region-owned Biosolids Composting Facility compared to the current Biosolids program, including an estimated capital cost of $50M and annual operating costs of $3.4M.

Recommendations from the Municipal Class Environmental Assessment Study will determine a preferred site location for a future biosolids composting facility and refine capital and costs for consideration by Regional Council prior to proceeding further with the project. Upon approval staff will incorporate these costs into a future Budget and Business Plan and a future Water, Wastewater and Transportation Master Plan, which will also identify any growth components that can be recouped in a future Development Charges By-law Study.

Respectfully submitted,

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Andrew Farr
Commissioner, Public Works

Approved by

Jane MacCaskill
Chief Administrative Officer

If you have any questions on the content of this report, please contact: Nitti Subramaniam Tel. # 7285

Attachments: Attachment #1 – Halton Region Biosolids Composting Feasibility Study – Executive Summary Report