Welcome!

Biosolids Strategy & Wastewater Treatment Master Plan

Public Consultation Event

Fall 2017

December 5th: Region of Waterloo Museum, 5PM - 7:30PM
December 7th: Waterloo Memorial Recreational Complex, 5PM - 7:30PM
December 14th: Cambridge City Hall, 5PM - 7:30PM

Region of Waterloo

www.regionofwaterloo.ca/biosolids
Help the Region of Waterloo develop its **Biosolids Strategy** and **Wastewater Treatment Master Plan**

**What’s Happening Tonight?**

Open House
- Have a look at the project information on display and chat with the Project Team
- Review what we do with wastewater and biosolids today
- Provide input on the evaluation of the short-listed alternatives
- Review how the recommendations in both studies will be developed and implemented

**Tonight’s Agenda**

Work will be completed to meet the requirements of the Environmental Assessment Act as outlined by the Municipal Engineers Association Municipal Class Environmental Assessment (Oct 2000, as amended in 2007, 2011 and 2015) process.
Here is a summary of how biosolids are managed in the Region today:

13 Wastewater Treatment Plants

Over 180,000 cubic metres of wastewater is processed every day...

...equivalent to 2,500 backyard swimming pools!

Clean water is discharged to the river

Digester in the Treatment Plant use microorganisms to create biosolids

Over 1,550 tonnes of liquid biosolids are generated daily (equivalent to 80 loaded trucks every day!)

A large volume of the biosolids produced is dewatered, so that for approximately every 12 trucks, we now only need 1 truck!

SOIL AMENDMENT

Soil amendment involves applying biosolids to agricultural lands or non-agricultural lands.

DISPOSAL

When soil amendment is not possible, biosolids are disposed of in approved landfills outside the Region of Waterloo.
How are Biosolids Trucked in the Region Today?

Trucking is an important part of biosolids management in the Region today. There are two types of trips: those between wastewater treatment plants for further processing, and trips out of the Region for end use or disposal of processed biosolids.

Types of Wastewater Treatment Plants:
- **No Biosolids Digestion**: Biosolids are processed at another plant.
- **Aerobic Digestion of Biosolids**: Biosolids created in presence of air.
- **Anaerobic Digestion of Biosolids**: Biosolids created in absence of air.
Why do we Need a Biosolids Strategy?

Here are a few of the main reasons why a strategy is essential for our community.

**Leveraging Opportunities**

**Growth**

As the Region grows, there will be additional demand for biosolids management and opportunities to consider improved efficiency in service.

**Environmental Constraints**

Biosolids must be managed according to environmental and social constraints.

**Innovation**

The Region should consider opportunities for innovation.

**Managing Risk**

**Regulatory Changes**

Updates to regulations can restrict how we use biosolids.

**Security**

To plan for emergencies, contingencies, and mid- to long-term biosolids storage needs.

**Increasing Costs**

As costs continue to rise, it is important to consider the best value to the Region.

Addressing these aligns with the Region’s 2015-2018 Strategic Focus.
Roadmap to a Strategy

STAGE 1: Defining Biosolids & Project Launch
- Project launch
- Problem Statement
- Vision and Project Charter

STAGE 2: Problem Statement & Issues that Matter
- Collect data
- Review existing conditions
- Consult community on the issues that matter

Community feedback on issues that matter

STAGE 3: Project Objectives & Long List of Strategy Alternatives
- Formulate Project Objectives
- Establish decision making framework
- Develop long list of strategy alternatives.

Eight proposed long-list alternatives

STAGE 4: Short List of Strategy Alternatives
- Use Minimum Performance Questions to evaluate the long list of alternatives
- Identify short list of alternatives

Four proposed short-list alternatives

STAGE 5: Preferred Alternative
- Evaluate the short listed strategies using the objectives-based Evaluation Criteria.

Preferred alternative(s)

STAGE 6: Our Strategy
- Refine the Strategy

Region of Waterloo Council for Approval

Region of Waterloo Council will make the final decision to adopt the strategy at the end of the process. Once adopted, there will be a 30-day review period for public comment.
A Made-in-the-Region Solution

How was feedback used to make decisions?

1. Community input on issues that matter
   - How do we process this stuff?
   - Where should it go? What about odour?
   - How can it benefit our economy?
   - What is the impact on the environment?
   - What’s important to our community?
   - What are the right technologies to use?
   - What are the costs?

2. Understanding the themes and creating the project objectives

3. Developing the evaluation criteria and indicators

4. Presenting the evaluation results for discussion

Key stakeholders in the consultation process

Groups that play a key role in providing input, feedback, and direction on the Biosolids Strategy include:

- Community members
- Elected officials
- Regulatory bodies
- Technical experts
- Academic advisors
- Aboriginal communities
- Community-based organizations
- Business and industry experts
- Agricultural groups
- Environmental and scientific experts
- Municipal staff
Developing a Biosolids Strategy Alternative

There are three components that make up a biosolids strategy alternative.

A. Solids Preparation/Modification
Technologies to prepare organic material to become biosolids and reduce volume.

B. Biosolids Processing and Storage
Core technologies to create biosolids from the organic solids separated from our wastewater. A key consideration is the storage of biosolids, as discussed on Panel #7.

C. Biosolids End Uses and Disposal
End use and disposal options can include:
- Agricultural Soil Amendment
- Non-Agricultural Soil Amendment
- Energy Recovery
- Landfill

Wastewater collected from around the Region is treated at one of the Region's 13 wastewater treatment plants.

Treated water meeting Provincial standards is returned to a nearby water body.

Processed biosolids are transported for storage, end use or disposal.
How do Biosolids get Stored?

The Region currently does not have storage facilities for biosolids.

There are TWO key types of storage needed:

1. **Operational Storage:** More Immediate Need
   - Provides security during short-term emergencies
   - Located at or near existing treatment plants, to hold approximately 10-days’ worth of dewatered biosolids
   - Holds material awaiting final processing or end use/disposal

2. **Product Storage:** Future Long-Term Need
   - Provides security during the winter season
   - Located along with a new processing facility to hold approximately 4 months’ worth of processed biosolids
   - Holds material awaiting transportation to the final end use or disposal destination.

In the future, the way we store biosolids will depend on how much water is in the material.

The type of processing can reduce or increase the quantity of liquid by different amounts. However, reducing the amount of biosolids has been a key part of the Region’s management approach to date.

Depending on how much liquid the biosolids contains, the volume of material would vary, and so would the type of **product storage** needed!

**Types of Storage Facilities**

**Outdoor Facility**
- If more than 75% liquid

For very wet material, an outdoor facility could be used such as a tank with a flexible covering or lagoon with protective berms and liners to prevent biosolids from leaking out.

**Indoor Facility**
- If less than 75% Liquid

For drier material, an indoor facility could be used such as a barn or tension-fabric storage unit.
How Were Alternatives Evaluated?

**Work collaboratively to find solutions**
The process of identifying and implementing the Preferred Strategy brings together the issues that matter to the community and integrates them into decision-making.

1. **Build on existing infrastructure**
   - The Region has significant investment in infrastructure and a strategy that maximizes this investment is preferred
   - Compatibility with existing Regional wastewater and biosolids processing infrastructure
   - Level of new supporting municipal infrastructure required (e.g. roads, power and water services, etc.)
   - Potential for aligning with other municipal initiatives in future
   - Flexibility in adapting to changing government regulations, policies and market demands, and population growth

2. **Protect the natural environment**
   - The preferred strategy should minimize impacts to the environment and surroundings
   - Environmental effects of the facility and end uses
   - Energy balance and potential to recover energy
   - Adaptability to climate change impacts
   - Level of greenhouse gas emissions produced
   - Risk of landfilling of final product

3. **Minimize and manage operational risk**
   - The preferred strategy should allow the Region to provide continual, uninterrupted biosolids management service to the public
   - Impacts of disruption to biosolids management services, processing, maintenance, and labour supply
   - Potential for volume reduction of final product
   - Impacts of disruption to quality of biosolids product

4. **Protect quality of life**
   - The existing quality of life for citizens should be maintained when planning for biosolids infrastructure
   - Management of odour
   - Management of dust from process or trucking
   - Management of noise
   - Management of visual effects
   - Management of trucking
   - Potential impacts to source water protection
   - Potential to manage processing, end uses and/or disposal within Waterloo Region

5. **Protect health and safety**
   - The preferred strategy should limit health and safety risks to workers and the public
   - Relative health risks posed to the public
   - Relative health risks posed to workers
   - Reduction or elimination of undesirable components in the biosolids
   - Potential nature of an accident or adverse event

6. **Be cost effective and provide value**
   - The cost of the preferred strategy must be reasonable to the Region, both now and in the future
   - Relative life cycle cost
   - Potential to apply for carbon credits
   - Local economic benefit
   - Value of end product
   - Potential for leadership in the area of biosolids management

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*How Were Alternatives Evaluated?*
Alternative #1: Produce Fertilizer

This alternative would make a fertilizer product. Different technologies can produce fertilizer products with slightly varying volumes. The focus will be on technologies that reduce the volume of biosolids, such as stabilization or hydrolysis. The facility would have space to store 4 months’ of processed biosolids. This alternative could be built as either a single larger centralized facility (Option A) or four smaller decentralized facilities (Option B).

**Evaluating the Alternative**

**Summary of Results**

**OPTION B: Multiple Decentralized Facilities**

- Some alignment with current Regional infrastructure, with some flexibility to adapt to future change
- May result in some increased volume in final biosolids product
- Low potential to align with other Regional Management initiatives
- Option A allows for better utilization of existing infrastructure

**OPTION A: Centralized Facility**

- Identified potential risks of contamination to the surrounding environment (air, water, groundwater) that can be mitigated
- Option B may have greater environmental effects depending on the locations of the facilities
- Fairly high greenhouse gas emissions

**Life Cycle Cost**

- **OPTION A:** $186M to $239M
- **OPTION B:** $291M to $340M

**Greenhouse Gases**

- Equivalent to approx. 7,700 cars driven for 1 year
- Equivalent to approx. 7,300 cars driven for 1 year

**Daily Trucking**

- In
- Out

**End Uses**

- Agricultural Soil Amendment
- Non-Agricultural Soil Amendment
- Landfill

**Fertilizer product may be sold to generate revenue for the Region**
Alternative #2: Produce Compost

This alternative would transform biosolids into a regulated Category A compost, which would contain approximately three times as much organic material from an external source (typically wood chips) compared to biosolids. The organic material would be trucked to the facility and mixed with the biosolids as a bulking material. Different technologies can produce compost products with slightly varying volumes. The facility would have a compost processing and curing area and space to store 4 months' of compost product.

Centralized Facility

- Composting processing area
- Odour control
- Curing and storage area
- Amendment warehouse
- Screening building
- Administration building

Evaluating the Alternative

**Summary of Results**

**Life Cycle Cost**

$297M to $346M

**Greenhouse Gases**

- Equivalent to approx. 2,200 cars driven for 1 year

**Daily Trucking**

- In
- Out

**End Uses**

- Agricultural soil amendment
- Non-agricultural soil amendment
- Landfill

**Environment**

- Some alignment with current Regional infrastructure, however would require sourcing, management and transport of a new stream of organic bulking material
- Large volume of final compost product, requiring significant storage space
- Potential to align with other Regional management initiatives
- Limited new processing infrastructure needed

- Large facility footprint with identified potential risks of contamination to the surrounding environment (air, water, groundwater) that can be mitigated
- Potential positive benefits in moisture and organic matter addition to soil where compost is applied
- Low levels of greenhouse gas emissions associated with processing, but high levels associated with trucking

**Operational Risk**

- Large facility footprint required resulting in challenges to siting the facility

**Quality of Life**

- Potential impacts to the surrounding community resulting from odour and trucking
- Noise, dust, and other nuisances can be well managed

**Health and Safety**

- Potential for some flammability risk of the compost product
- Limited levels of risk with respect to adverse events

**Cost & Value**

- Life cycle cost could range significantly depending on processing system
- Compost product may be sold to generate revenue for the Region

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**In 10m x 17m SINGLE FAMILY HOME (FOR ILLUSTRATION PURPOSES ONLY)**
Alternative #3: Produce Dried, Low-Volume Fertilizer

This alternative would add further drying to the Region’s current biosolids management process to substantially reduce the total amount of product. The product is a fertilizer that could be used as a fuel in certain applications. The facility would have space to store 4 months’ of fertilizer product.

**OPTION A: Centralized Facility**

- Life Cycle Cost: $156M
- Greenhouse Gases: Equivalent to approx. 2,500 cars driven for 1 year
- Daily Trucking: 10m x 17m SINGLE FAMILY HOME (FOR ILLUSTRATION PURPOSES ONLY)

**OPTION B: Multiple Decentralized Facilities**

(Only 1 Facility Shown)

- Life Cycle Cost: $335M
- Greenhouse Gases: Equivalent to approx. 2,700 cars driven for 1 year
- Daily Trucking: 10m x 17m SINGLE FAMILY HOME (FOR ILLUSTRATION PURPOSES ONLY)

**Evaluating the Alternative**

**Summary of Results**

**OPTION A: Centralized Facility**

- **Environment**: Potential to align with other Regional management initiatives
- **Operational Risk**: Operational flexibility to manage risks related to disruptions in ability to process or manage biosolids
- **Health and Safety**: More sophisticated technical process, requiring greater operating skill
- **Cost & Value**: Life cycle cost is reasonable

**OPTION B: Multiple Decentralized Facilities**

- **Environment**: Identified potential risks of contamination to the surrounding environment (air, water, groundwater) that can be mitigated
- **Operational Risk**: Operational flexibility to manage risks related to disruptions in ability to process or manage biosolids
- **Health and Safety**: Greater potential impacts to the surrounding community resulting from odour and trucking
- **Cost & Value**: Life cycle cost is reasonable

**End Uses**

- Agricultural Soil Amendment
- Non-Agricultural Soil Amendment
- Landfill
- Energy from Solids
- Incineration
**Alternative #4: Thermal Reduction to Ash**

This alternative would reduce the current digested and dewatered biosolids to ash for use as an industrial input such as in the making of cement, or disposal in landfill. A limited amount of storage would be needed for this alternative. In the Region of Waterloo, there is no current industrial use for the ash so the product would likely be landfilled.

**Evaluating the Alternative**

**Summary of Results**

- **Infrastructure Alignment**
  - Alignment with current Regional infrastructure, with some flexibility to adapt to future change
  - Potential to align with other Regional management initiatives in the future

- **Environment**
  - Identified potential risks of contamination to the surrounding environment (air, water, groundwater) that can be mitigated
  - High level of energy demand and greenhouse gas emissions
  - End product goes directly to landfill

- **Operational Risk**
  - Low volume of end product that is easy to manage

- **Quality of Life**
  - Lower impacts to the surrounding community resulting from odour and trucking
  - Noise, dust, and other nuisances can be well managed

- **Health and Safety**
  - More sophisticated technical process, requiring greater operating skill
  - Limited levels of risk with respect to adverse events

- **Cost & Value**
  - Life cycle cost is reasonable
  - Final ash product does not have market value and would have a cost associated with landfilling.
## Overall Evaluation Summary

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<th>OBJECTIVE</th>
<th>Alternative #1: Produce Fertilizer</th>
<th>Alternative #2: Produce Compost</th>
<th>Alternative #3: Produce Dried Low Volume Fertilizer</th>
<th>Alternative #4: Thermal Reduction to Ash</th>
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What is the Process to Implement the Strategy?

The Region’s current biosolids management approach can be continued into the next decade, provided that contingency storage is constructed as soon as possible.

The Biosolids Strategy would be updated around 2025 to confirm that the Preferred Strategy is still the best route forward.
Next Steps

By-the-numbers Consultation Summary

- **256** attendees at 5 Public Consultation Centres
- **502** responses to a Telephone Survey
- **Four Online Surveys** with almost **500 responses**
- **13 Pop-Up Events** with over **1,650 attendees**
- **400 Engagement** with **over 865 Colouring Books handed out to children**
- **1650 Pop-Up Events** with over **400 Grade 7 & 8 students through an activity presented at a Science Fair**

Upcoming Schedule

**EARLY 2018**
- Presentation of the Draft Biosolids Strategy to Region Council
- 30-Day Public review period for the Draft Biosolids Strategy document and pop-up events across the Region.

**SPRING 2018**
- Finalization of the Biosolids Strategy

How You Can Help...

Give us your feedback on the project objectives, evaluation criteria, and strategy alternatives, to help us as we develop the short list of alternatives.

- Ask questions today
- Fill out the survey here or online
- Sign up for our contact list
- Visit [www.regionofwaterloo.ca/biosolids](http://www.regionofwaterloo.ca/biosolids)

And if you have questions or comments, please do not hesitate to contact:

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