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**Subject:** Biosolids Master Plan Update

**Report to:** Public Works Committee

**Report date:** Tuesday, October 8, 2024

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## Recommendations

1. That report PW 31-2024 be **RECEIVED** for information.

## Key Facts

- The purpose of this report is to present the results of the 2024 Biosolids Master Plan Update. The original Biosolids Master Plan was developed in 2001 and last updated in 2012.
- Sewage biosolids are the waste organic material that remains after wastewater is treated. Although a waste product, biosolids are nutrient rich due to their high nitrogen and phosphorus content making them suitable for reuse in agriculture.
- The practice of the Region has been to directly apply approximately 50% of the liquid biosolids to agricultural land and dewater the remaining quantity for further processing into a fertilizer product by a third-party. These diversified programs avoid the need to dispose of biosolids in landfills thereby conserving landfill space for other uses.
- The Master Plan Update reviewed current practices for biosolids management and provides strategies for the future to address regulatory and technological changes, and to apply best management practices through to 2031 and beyond.
- Proposed strategies from the Master Plan Update were evaluated using several criteria including Life Cycle Costs, Greenhouse Gas Emissions, Potential for Beneficial Reuse, Long Term Sustainability, Resiliency, Truck Traffic, and Ease of Implementation.
- Key recommendations outlined in the Master Plan Update include:
  - Examine the feasibility of a Centralized Digestion Facility at the Garner Road site that considers including Source Separated Organics (Green Bin Material)
  - Initiate design of combined dewatering and cake storage facility

- Increase the newly developed Dewatered Cake Land Application. Consider developing a separate contract for land application of dewatered biosolids (cake land application)
- Continue both land application of liquid sewage biosolids to agricultural land, and dewatering liquid biosolids with further processing into a fertilizer product

## **Financial Considerations**

There are no immediate financial implications as a result of this report. The Master Plan Update sets out a range of recommendations for management of biosolids over the next 6 years (2031) and beyond (2051). High level cost estimates have been included in the Master Plan Update for each strategy. Staff will return to Council with further recommendations for projects or programs consistent with this report's recommended strategies in future years. It should be noted that additional liquid biosolids and dewatered biosolids storage will be required before 2031.

## **Analysis**

### **Current State**

All of the biosolids currently produced by the Region are beneficially re-used. Approximately half of the material is applied to local agricultural lands as part of a liquid biosolids land application program. The material is offered at no charge to the local agricultural community. The other half of the material is further processed via onsite mechanical centrifuges that removes excess water to form what is called a dewatered cake. This "cake" is then sent to a third-party contractor for further processing into a fertilizer-grade material that is sold to the agricultural industry. An infographic in Appendix 1 provides details as to volumes transferred between different processes. Some aerial pictures of the facility in operation are provided in Appendix 3.

The following summarizes the current state processes occurring on site and responsibilities of the Region, the liquid biosolids contractor and the alkaline stabilization contractor.

### Niagara Region

- Owns the Garner Road Biosolids facility including ten (10) storage lagoons, three (3) storage tanks, two (2) stormwater ponds and centrate/supernatant pumping station.
- Owns and operates the WWTPs where the biosolids are produced in digesters.

- Operates two (2) centrifuges and produces dewatered biosolids (dewatered cake).
- Reviews manifests and audits process to ensure value for money is maintained.
- Enters loads and samples into database and completes annual reports to the MECP.
- Coordinates activities of contractors for pickup of biosolids at each plant.

#### Liquid Biosolids Contractor (currently Thomas Nutrient Solutions)

- Provides a complement of drivers, tankers and trucks to transport material.
- Transports liquid biosolids by tanker and truck from the WWTPs and three WTPs to the Garner Road Facility.
- Coordinates the transfer of material from the tankers to the storage lagoons and tanks.
- Manages the liquid levels in the lagoons.
- Maintains a “land bank” of agricultural sites where biosolids can be land applied.
- Manages land application events by providing trucks and tankers to deliver biosolids to land.
- Completes manifests for each transfer to and from site.

#### Alkaline Biosolids Contractor (Currently Walker Environmental Niagara Biosolids)

- Provides trailers to be used to store dewatered cake produced by Region for transport.
- Transports dewatered cake from Garner Road and Niagara Falls WWTP to Niagara Biosolids Facility in Thorold (operated by Walker Industries).
- Produces N-Rich product by alkaline stabilization (N-Viro Process).
- Sells N-Rich product to their customers.

### **Master Plan Update Methodology**

The Master Plan Update followed the same approach as that used in the Municipal Environmental Assessment (MEA) process. The MEA process is used for most large capital projects and requires public notices, public information centers (PICs), engagement with interested parties at various stages, and posting of draft plans for input. Consultation with the province (MECP), area municipalities, indigenous communities, residents and businesses was part of the process.

The work included background research, best practices review, and a jurisdictional scan. Based on this work, together with consultation results, a long-list of technologies

were evaluated which resulted in seven (7) strategies that were sent forward for detailed evaluation and scoring using the ten (10) criteria below:

1. Greenhouse Gas Emissions
2. Nutrient Recovery and Potential for Beneficial Reuse by Agricultural users
3. Proven Performance
4. Odour at Garner Road Facility
5. Truck Traffic
6. Long Term Sustainability
7. Ease of Operation
8. Resiliency
9. Ease of Implementation
10. Life Cycle Cost

Of the seven (7) strategies, the highest scoring strategies were carried forward as recommendations.

### **Recommendations and Key Findings**

Overall, the study recommends increasing diversification of how biosolids are managed in the Region by increasing the land application of dewatered cake. The Master Plan Update recommends that the Region:

- Examine the feasibility of a Centralized Digestion Facility at the Garner Road site that considers including Source Separated Organics (Green Bin Material)
- Increase storage of both liquid biosolids and dewatered cake by constructing either tanks or storage lagoon for liquid biosolids and storage buildings for dewatered cake storage
- Optimize on-site operations such as increasing the operational run-time of the centrifuge to produce more cake
- Decommission Dewatering equipment at Niagara Falls WWTP
- Implement sampling program to verify solids concentration for materials leaving the Garner Road facility.

More information about key findings and proposed actions can be found in Appendix 2.

## Alternatives Reviewed

The “do nothing” alternative was considered, however, the Region’s biosolids facility is expected to exceed capacity in approximately 6-7 years. For this reason, staff are proposing to pursue the recommendations outlined in this report. Further recommendation will present new opportunities for cost avoidance and environmental gains.

## Relationship to Council Strategic Priorities

The beneficial reuse of sewage biosolids, recommended improvements, and reductions in trucking proposed by the Master Plan aligns with the Effective Region by implementing continuous improvement and modernized processes and the Green and Resilient Region by focusing on reducing our collective carbon footprint.

## Other Pertinent Reports

### [PW 19-2023 Biosolids Update](#)

(<https://pub-niagararegion.escibemeetings.com/Meeting.aspx?Id=d9fafcaa-e78e-41a3-8289-8dc48dd1f2bf&Agenda=Agenda&lang=English&Item=14&Tab=attachments>)

PW 12-2017          Niagara Region Liquid Biosolids Management Program Contract Renewals

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## **Appendices**

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| Appendix 1 | Biosolids Management Infographic    |
| Appendix 2 | Key Findings                        |
| Appendix 3 | Photographs of Garner Road Facility |