

Solids Management End-Uses

Land Application

Land application is a common practice where solids generated in the wastewater treatment process are incorporated into the soil of certain areas. Potential application areas include agricultural land, forests, or reclamation sites. These solids have a high nutrient and organic value that can help with plant growth in the areas they are land applied. Raw wastewater solids cannot be directly land applied. Only solids that have been stabilized through a thermal, chemical, or biological process (e.g., digestion, thermal drying, composting) can be land applied. Land application is the current solids management approach used by the Regional Municipality of Waterloo.



Figure 1. Agricultural land application of wastewater solids
(Courtesy: <http://www.omafra.gov.on.ca/english/nm/nasm/info/brochure.htm>)

Compost Distribution

Composting involves the biological degradation of solids in a controlled aerobic environment to produce a humus-like stable product. The compost is a marketable product with high nutrient value that can be used as a soil conditioner and fertilizer for agricultural land, gardens, and rangelands. Raw solids cannot be directly used as a compost. Only solids that have been stabilized through the composting process can be used. Composting is a well-established process for treating solids with many applications across North America. The Regional Municipality of Halton plans to initiate a study in 2021 for a new Region-owned solids composting facility.



Figure 2. Photo of Typical Biosolids Composting Product.



Figure 3. Examples of compost processes operated at the Moncton Biosolids Composting Facility in Riverview, New Brunswick (left photo), and at the Goldsboro Biosolids Composting Facility in North Carolina (right photo).

Fertilizer Product

Solids generated in the wastewater treatment process have high nutrient value and may be marketed as a fertilizer product to create a revenue stream for the City. The generated fertilizer product can compete with other fertilizer products for agricultural, landscaping, or household use. Solids must be stabilized to qualify as a fertilizer product. The City of Toronto currently stabilizes solids via palletisation to create a fertilizer product at the Ashbridges Bay Treatment Plant.



Figure 4. Photo of fertilizer product generated from wastewater solids through a palletisation process.

Landfilling

Solids may be disposed of in a landfill if they do not qualify for beneficial use such as land application, compost distribution, or marketing as a fertilizer product. Raw solids cannot be disposed of in a landfill directly. Stabilized solids or ash from an incineration process can be landfilled. Landfilling is the City of London's current solids management strategy for incineration ash and alkaline stabilized solids.



Figure 5. A truck unloading biosolids to a landfill in Vancouver
(Courtesy: <https://www.bcclocalnews.com/news/tnrd-utilizing-biosolids-to-close-landfills-in-region/>)

Manufacturing Industry

Solids can be incorporated into the manufacturing process for different products such as cement, brick, or glass aggregates. This strategy requires the manufacturer to have the capability to receive, store, and use solids in their manufacturing process. The solids product required (i.e., raw or stabilized solids, or ash) depends on the industry and the specific manufacturer. Solids can also be converted into fuel products to offset fuel consumption at the plant or sold as a utility. The Duffin Creek Water Pollution Control Plant, operated by the Regional Municipalities of Durham and York, currently has an agreement with a cement manufacturer to incorporate dewatered ash into their cement product.



Figure 6. St. Mary's Cement facility in Bowmanville, ON that incorporates solids from the Duffin Creek Water Pollution Control Plant in their cement products.
 (Courtesy: <http://www.stmaryscement.com/Pages/Media%20Centre/News/Cementing-the-future.aspx>)



Figure 7. Example of a sludge-to-fuel process operated at the Silicon Valley Clean Water Agency Water Resource Recovery Facility in Redwood City, California

Contract out for Management

Solids management may be contracted out to an external contractor. Raw or stabilized solids can be hauled off-site by one or more contractors, and stored, further processed, distributed, or disposed of by the contractors. The specific solids management method (e.g., land application, compost, fertilizer product, landfill) would be determined by the contractor, and the City would select one or more contractors through a competitive bidding process. The City of Guelph currently contracts out their solids management to Lystek who operates their thermal hydrolysis process on site from April 1st to November 30th to produce a fertilizer product. Solids are processed at Lystek's Dundalk facility for the rest of the year.



Figure 8. Photos of the Lystek facility operated at the Guelph Wastewater Treatment Plant (Courtesy: <https://lystek.com/projects/guelph/>)