Winnipeg

Water and Waste Department

Biosolids MASTER PLAN

About biosolids

Biosolids:

- are a nutrient-rich, organic, solid by-product of sewage treatment
- are subject to strict Provincial regulations
- have potential for beneficial reuse
- have a distinctive odour
- have been co-disposed with garbage at the landfill since January 2011

We are required to submit a master plan to the province by October 2014 that outlines a strategy for managing the biosolids produced by our community until 2037.

The amount of biosolids produced by our three sewage treatment plants is:

- currently about 13,500 dry tonnes per year,
- expected to increase by about 50% by 2037.

Potential options for managing our biosolids

Land application
Apply biosolids to land in either a liquid or cake form to condition the soil or to fertilize crops or other vegetation grown in the soil

Thermal oxidation
Firing biosolids at a high temperature, producing recoverable heat and energy, leaving only ash, which is suitable for beneficial reuse

Pelletization
uses heat drying technologies to produce pea-size pellets, which are suitable for beneficial reuse (e.g., fertilizer or biofuel)

Compost
Mix biosolids with woodchips and air to make compost

Land restoration/revitalization
Apply biosolids to land to replace lost topsoil (e.g., landfill cover, large construction sites, surface strip mines, parks and road cuts, wetlands, wildlife habitat, conservation areas)

Landfill disposal
Co-disposal of biosolids and municipal garbage in a landfill

We value your feedback

You can help us shape the future of biosolids management.
Please complete the form to share your thoughts.

Explanation of Criteria

Do you support these criteria?

Operational factors

Manageable level of operational complexity, proven technology, reliable

Time to implement

How quickly the option can be implemented?
Short term – one to two years
Medium term – two to five years
Long term – five years or longer

Regional suitability

Suited to Manitoba climate, resources and other regional factors

Stakeholders involved

Who is involved, opportunity for private sector involvement or partnership

Explanation of Criteria

Do you support these criteria?

Regulation

What regulations are involved
and compliance with regulations

Good neighbour practice

Ability to mitigate neighbour concerns

Ecological sustainability

Makes a net positive contribution
(e.g., nutrient recovery, energy recovery)
Minimizes environmental impacts

Cost

$ - current cost
$$ - approximately double the current cost
$$$ - approximately triple the current cost

Land Application

1

Description	Apply biosolids to land in either a liquid or wet cake form to either condition the soil or to fertilize crops or other vegetation grown in the soil
Operational Factors	Requires storage / another treatment option during the winter months because of seasonal spreading restrictions (not from November 10 – April 10) Restrictions for spreading rates of nutrients (i.e., phosphorous and nitrogen)
Time to implement	Medium term
Regional suitability	Weather and soil dependant Potential for soil conditions to meet regulatory requirements
Stakeholders involved	Opportunity for private agricultural sector (e.g., grain farmers, sod farmers) Rural municipalities where biosolids applied to land Residents neighbouring the receiving lands Opportunity for private contractors to haul and land apply
Regulation	Provincially regulated
Good neighbour practice	Potential for odour concerns with storage (particularly with lagoons for liquid biosolids)
Ecological sustainability	Considered sustainable reuse Ensure viable hauling distance (e.g., cost, carbon footprint) Benefit to farmers of receiving lands
Cost	$$

Thermal Oxidation

2

Description	Firing biosolids at a high temperature in an enclosed device to produce heat and energy
Operational Factors	Requires air pollution control Smaller land, storage and transportation requirements Can operate continuously in all weather conditions
Time to implement	Long term
Regional suitability	The business case for heat and energy recovery is more difficult to make due to low energy costs in Manitoba
Stakeholders involved	Manitoba Hydro End user of ash Opportunity for public / private operation and ash disposal
Regulation	Meet regulatory requirements for air emissions Provincially regulated
Good neighbour practice	Potential for concern about location
Ecological sustainability	**Considered sustainable reuse if:** ▸ ash is beneficially reused (e.g., filler in cement and brick manufacturing, sub-base for road construction, landfill cover) ▸ heat and energy is recovered
Cost	$$

3 Pelletization

Description	**Involves heat drying technology, which:** ▸ removes water to reduce volume and weight ▸ preserves nutrients and organic matter ▸ produces pea-sized pellets **Pellets can be:** ▸ used as fertilizer or biofuel ▸ directly applied or mixed to create fertilizer
Operational Factors	Dust is a workplace safety issue (e.g., health, hazardous) Pellets small and easy to handle
Time to implement	Long term
Regional suitability	Requires a sustainable market for pellets (decreasing demand in North America) Considered where other options are expensive or not approved by the regulator (e.g., landfilling, thermal oxidation, land application)
Stakeholders involved	Opportunity for private sector Residents near pelletizing facility
Regulation	Regulations for odour control strategy and fertilizer products (Canadian Food Inspection Agency)
Good neighbour practice	Potential for nuisance odours
Ecological sustainability	Considered sustainable reuse
Cost	$$

Composting

4

Description	Mix biosolids with woodchips and air to make compost
Operational Factors	**Compost must:** ▸ have sufficiently low metals ▸ be used off-site
Time to implement	Long term – for a program to compost the majority of our biosolids (pilot program currently underway to compost 20% of biosolids)
Regional suitability	Strong demand as soil amendment
Stakeholders involved	Opportunity for public and private sector (operate/distribute)
Regulation	Provincially regulated
Good neighbour practice	Potential for nuisance odours
Ecological sustainability	Considered sustainable reuse
Cost	$$$

Land Revitalization/Restoration

5

Description	Apply biosolids to land to replace lost topsoil (e.g., landfill cover, large construction sites, surface strip mines, parks and road cuts, wetlands, wildlife habitat, conservation areas) ▸ improves soil fertility and stability ▸ decreases erosion ▸ aids in revegetation
Operational Factors	Requires access to receiving land
Time to implement	Short term
Regional suitability	Limited sites available in Manitoba
Stakeholders involved	Residents close to receiving land Opportunity for public and private (hauling and spreading)
Regulation	Provincially regulated
Good neighbour practice	Potential for nuisance odours
Ecological sustainability	Beneficial reuse of nutrients
Cost	$ - $$$ (depends on the degree of pre-treatment)

Landfill

6

Description	Mix biosolids with municipal garbage and dispose in landfill
Operational Factors	Receiving landfill must have sufficient capacity for year-round disposal
Time to implement	Short term
Regional suitability	Available capacity at Brady Resource Management Facility (landfill) - greater than 100 years Brady has favourable conditions for co-disposal (i.e., clay layer highly impervious to contaminants leaching into groundwater)
Stakeholders involved	Opportunity for public and private contractors
Regulation	Provincially regulated
Good neighbour practice	Potential for nuisance odours
Ecological sustainability	Not considered sustainable reuse Contributes to harmful greenhouse gases Decreases landfill capacity
Cost	$