



Water and Waste Department • Service des eaux et des déchets

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Manitoba Conservation and Climate
Climate Change and Environmental Protection Division
Environmental Approvals Branch
1007 Century Street
Winnipeg, MB R3H 0W4

Attention: Shannon Kohler, Director

**RE: NOTICE OF ALTERATION, ENVIRONMENT ACT LICENCE NO. 1089 E RR
CITY OF WINNIPEG BIOSOLIDS LAND APPLICATION**

Please accept this letter as a request for a Notice of Alteration to Environment Act Licence 1089 E RR.

The City of Winnipeg is developing a biosolids land application program for wastewater biosolids, as recommended in the 2014 Biosolids Master Plan. The City proposes to run a program for biosolids land application of up to 20,000 wet tonnes in 2020 while the Environment Act Licence is under review.

The following sections provide information on the proposed program. Section 1 outlines the approach for the 2020 program. Section 2 outlines the potential effects, mitigation measures and approach to field storage of biosolids. Section 3 includes discussion on regulatory compliance.

1.0 PROGRAM APPROACH

The 2020 land application program will comply with applicable Act(s) and Regulations, including the *Environment Act*, *The Water Protection Act* and the *Nutrient Management Regulation*.

1.1 Description

The 2020 land application program includes the uniform application of up to 20,000 wet tonnes of biosolids. The prescribed application rates will be determined by a Professional Agrologist based on the parameters outlined in the *Nutrient Management Regulation*.

The program will apply biosolids based on crop nutrient uptake and removal which will involve matching agronomic needs with biosolids prescription rates. Application rates will be based on crop uptake and removal of nitrogen and phosphorus for a multi-year application event with the objective of returning to the same agricultural fields on a four year land rotation in order to accommodate nutrient removal, post application monitoring and crop rotations.

The biosolids are tested bi-weekly for nutrient and metals parameters to ensure that an accurate prescription rate is developed. In addition to the nutrient parameters, inorganic parameters will be reviewed including the loading and accumulation of metals, recognizing the limiting metals are copper, cadmium, mercury, arsenic, nickel, chromium, lead and zinc.

Based on preliminary calculations, the 2020 program will require between 400 to 500 hectares (988 – 1,235 acres) of land depending upon the approach to the prescription for nitrogen or phosphorus (two times crop removal). The application rate and land area will be confirmed with supplemental analytical information for biosolids and soil parameters.

The biosolids will be transported to the application sites, where field storage will be required. All required mitigation measures will be followed for field storage of biosolids. This approach will require mitigations for odour, stormwater leachate management, security, and placement and access during wet weather. More information on the potential concerns and mitigation measures are included in Section 2.

The application will be completed using a 50 ton J. Bond & Sons Ltd. (JBS) spreader equipped with rear seal end gates, GPS, auto steer and real time scale system for proper application rates. This technology allows the equipment to adapt to precision agriculture practices.

1.2 Notifications

Prior to each application of biosolids, notification will be provided to the Rural Municipality Reeve and Council, farm producers and immediately adjacent neighbours. The notification process shall include the following:

- Notify landowners and immediately adjacent neighbours prior to land application. The notice will include details on the application site, application timing, regulatory framework and contact information for questions or concerns.
- Respond to any questions or queries from the public within 3 days.

1.3 Monitoring

For the 2020 program soil sampling will be completed until 2023. The anticipated number of soil sampling points for the 2020 program is outlined in the table below, based on typical Environment Act Licence requirements.

Soil Sampling Points

Activity	Year	Est. Number of Soil Sampling Points
2020 Land Application Program	2020	15-17
2020 Program Monitoring	2021	15-17
2020 Program Monitoring	2022	15-17
2020 Program Monitoring	2023	15-17

The soil sampling and analytical requirements of agricultural fields will be completed on a standard benchmark point basis within a representative soil polygon and landscape position.

Benchmark sampling will be completed based on 24 hectare (60 acre) parcels as typically prescribed by Environment Act Licences. Benchmark sampling is a geo-referenced sample point where up to eight sub-samples are collected for a composite sample. The benchmark location will be selected based on the most representative soil polygon and landscape position as outlined by regulatory requirements. The anticipated soil analysis program is based on the following:

- Two sample depths per benchmark sample point (from 0 to 15 cm and 15 to 60 cm depths).
- Each sample will be analyzed for:
 - Physical characteristics: nutrient profile and metals
 - Nutrient characteristics: nitrogen profile (total nitrogen, nitrate-nitrogen, ammonium nitrogen), Olsen-bicarbonate phosphorous (0-15cm), potassium and sulfate-sulfur
 - CCME metals profile (0-15cm sample depth, and will include analysis for: As, Cd, Cr, Cu, Pb, Hg, Ni and Zn).

Soil samples will be submitted to a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited laboratory for analysis. This accreditation is based on international standards (ISO 17025) and involves extensive site audits and ongoing performance evaluations.

The biosolids will continue to be tested bi-weekly for nutrient and metals parameters.

1.4 Reporting

The results of the 2020 program will be summarized in a report and submitted to the regulator. Information to be included in the report includes the following:

- Nutrient Management Plans and prescription rates.
- Land application details including; location, spread area, tonnage spread, application rates and date(s).
- Summary of analytical results for biosolids sampling and soil sampling including locations, quantities, certificates of analysis.
- Summary of all public enquiries and complaints about the biosolids land application program including the response and follow-up actions.
- Summary of all incidents, accidents and spills including corrective and preventative action taken.
- Recommendations (if any).

2.0 POTENTIAL EFFECTS

The potential effects to the environment and to human health and proposed mitigation measures are summarized in Section 2.

2.1 Potential Environmental Effects

The potential environmental effects of biosolids land application, with the proposed mitigation measures, are summarized in the table below:

Potential Environmental Concerns and Proposed Mitigation Measures

Potential Environmental Concern	Proposed Mitigation
Impacts to groundwater	<ul style="list-style-type: none"> • Biosolids will comply with all applicable regulations to protect groundwater, including the Nutrient Management Regulation. • Biosolids will be applied at targeted prescription rates. • The program will comply with all required buffer zones and setback distances from groundwater wells. • The program will follow the typical Environment Act Licence requirement to apply and/ or store biosolids on land that has at least 1.5m of clay till.
Impacts to surface water	<ul style="list-style-type: none"> • Biosolids will comply with all applicable regulations to protect surface water, including the Nutrient Management Regulation. • Biosolids will be applied at targeted prescription rates. • The program will comply with all required buffer zones and setback distances from water bodies. • The program will follow the requirement to apply only during the application season, i.e. no application on frozen soil.
Nutrient Loading	<ul style="list-style-type: none"> • Biosolids will be applied at targeted prescription rates. • The program will follow all required buffer zones and setback distances. • The program will consider the availability of the nutrient source, the overall crop rotation, residual nutrients available within the soil profile, and other factors. • The soil will be monitored for 3 years following application.
Metals	<ul style="list-style-type: none"> • There are limits in the City of Winnipeg's Sewer By-Law for many contaminants, and industries out of compliance are subject to By-law enforcement. • Biosolids will be sampled bi-weekly and analyzed for metals. • Soil sampling will be conducted prior to application and samples will be analyzed for metals. • The CCME guidelines for soil quality will be followed. • The soil will be monitored for 3 years following application.

Potential Environmental Concern	Proposed Mitigation
Odour	<ul style="list-style-type: none"> • The program will follow best management practices for odour management outlined in the CCME Guidance Document for Beneficial Use of Biosolids and the US EPA Guide to Field Storage of Biosolids. • The program will follow all required buffer zones and setback distances. • Biosolids will be incorporated into the soil within 48 hours of application.

2.2 Potential Human Health Effects

The potential human health effects of biosolids land application, with the proposed mitigation measures, are summarized in the table below:

Potential Human Health Concerns and Proposed Mitigation Measures

Potential Human Health Concern	Proposed Mitigation
Metals	<ul style="list-style-type: none"> • There are limits in the City of Winnipeg's Sewer By-Law for many contaminants, and industries out of compliance are subject to By-law enforcement. • Biosolids are sampled bi-weekly and analyzed for metals. • Soil sampling will be conducted prior to application and samples will be analyzed for metals. • The CCME guidelines for soil quality will be followed. • The soil will be monitored for 3 years following application.
Pathogens	<ul style="list-style-type: none"> • Biosolids to be applied are anaerobically digested at the sewage treatment plant, which significantly reduces pathogens, and produces US EPA Class B biosolids. • Once biosolids are applied, pathogen survival decreases significantly due to climate exposure (desiccation, UV light) and the soil environment (pH, temperature, competing organisms, etc.) • The program will follow the crop restrictions typically outlined in Environment Act Licences, which limits the crops that can be planted in the 3 years following application.
Emerging Contaminants of Concern	<ul style="list-style-type: none"> • Scientists, health experts and agronomists continually review regulatory requirements and standards for land application to verify that they protect food safety and human health. Revisions are made as necessary, based on new science or technology.

2.3 Field Storage of Biosolids

The City's proposed approach to field storage will be consistent with the best management practices outlined in the CCME Guidance Document for Beneficial Use of Biosolids (2012) and the US EPA Guide to Field Storage of Biosolids (2000). The field storage approach will comply with the Livestock Manure and Mortalities Management Regulation (LMMMR) (42/98). The mitigation measures for in-field storage are described in the table below.

Proposed Mitigation Measures for Field Storage of Biosolids

Proposed Approach	Environmental Aspect to Mitigate	Supporting Argument
Locate biosolids storage location at least 100 m from any surface water course, sinkhole, and spring or well and in a manner that does not cause pollution of surface water, groundwater or soil.	Access to surface water, sinkhole, spring or well.	<ul style="list-style-type: none"> Manitoba Environment Act, LMMMR.
Only biosolids that contain more than 25% solids matter and/or meet a slump test requirement can be stored in field.	Access to surface water, sinkhole, spring or well.	<ul style="list-style-type: none"> Manitoba Environment Act, LMMMR.
Locate biosolids storage location at a site with the presence of clay and clay till to a depth of 1.5 metres.	Access to groundwater impacts through leachate	<ul style="list-style-type: none"> Manitoba Environment Act Licence Schedule A as applied to biosolids land application programs.
Locate biosolids storage site at least 1600 m from designated residential area, 300 m from a residence, at least 30 m from property line with residence and at least 15 m from property line without residence.	Odour buffer zone and good neighbour practices.	<ul style="list-style-type: none"> Farm Practices Guidelines for Pig Producers in Manitoba (2007). Table 11 – Recommended Distances from Residential Areas and Property Lines for Applying Manure. Application method: Irrigation – assumed to be most odour generating practice hence most separation distances applied. US EPA Guide to Field Storage of Biosolids National Manual of Good Practices for Biosolids, National Biosolids Partnership, June 2011.

Proposed Approach	Environmental Aspect to Mitigate	Supporting Argument
Biosolids field storage shall be removed and land applied in a field storage area between May 1 and November 10 of the year stored.	Odour, exposure management	<ul style="list-style-type: none"> • Manitoba Environment Act, LMMMR.
After the biosolids are removed, the field storage area must remain empty of biosolids for at least 12 months. Before storing biosolids in the area again, the site must grow a crop on the emptied biosolids storage area that will deplete the area of any leached nutrients.	Odour, exposure and nutrient management	<ul style="list-style-type: none"> • Manitoba Environment Act, LMMMR.
The field storage location would be established to be of sufficient capacity to store all the managed biosolids to be used on the land application site for the period of time needed for its application as a fertilizer.	Odour, exposure and nutrient management	<ul style="list-style-type: none"> • BC Environment Management Act Clause 18. • US EPA Guide to Field Storage of Biosolids • National Manual of Good Practices for Biosolids, National Biosolids Partnership, June 2011.
Develop a Best Management Practice, site selection requirement and operations checklist prior to implementing a field storage location.	Best Management Practices and good neighbour practices	<ul style="list-style-type: none"> • US EPA Guide to Field Storage of Biosolids • National Manual of Good Practices for Biosolids, National Biosolids Partnership, June 2011.

3.0 REGULATORY COMPLIANCE

The City's current Environment Act Licence (EAL) 1089 E RR for biosolids land application was originally issued in 1989 and revised in 2000, before the Nutrient Management Regulation came into force in 2008.

In January 2018, the City submitted an Environment Act Proposal for a new EAL for biosolids land application, which is currently under review. The City is working on the closure of EAL1089 E RR.

In order to operate the 2020 biosolids land application program, the City would like to request the suspension of the following clauses in EAL 1089 E RR:

1. Clause 6, 7, 8, 9 and Appendix A which are associated with the temporary storage facility in the Rural Municipality (RM) of West St. Paul, application timing, leachate associated with temporary storage and notification to the RM of West St. Paul. The temporary storage facility in the RM of West St. Paul is no longer used for biosolids storage. For the 2020 program, the City proposes to conduct temporary storage of biosolids according to the approach outlined in this letter.
2. Clause 13(a) which outlines the 300 meter setback distance from occupied residences for land application. For the 2020 program, the City proposes a 75 meter setback distance from any occupied residence for land application. The 75 meter setback distance is a recommended practice provided in the Farm Practice for Pig Producers in Manitoba (April 2007) for material that is surface applied and incorporated within 48 hours. The reduced setback distance ensures that as much of the agricultural surface area receives the benefit of biosolids application enhancing the agronomic and economic benefits for the farm producer. With continued urban sprawl occurring, having a 300 m setback distance from residences may reduce the useable area on a parcel of land so significantly that it may eliminate the parcel due to insufficient land available. The City requests that the 75 meter setback distance be applied and allow good neighbour practices to establish additional setback if and when required to accommodate individual concerns.
3. Clause 14 which outlines the maximum application of biosolids as 56 dry tonnes per hectare. As explained in this letter, the 2020 program will apply biosolids using the agronomic rates and methods outlined in the Nutrient Management Regulation.
4. Clause 21 and Appendix B which outlines the monitoring program. For the 2020 program, the City proposes to apply the monitoring program outlined in this letter.

The 2020 program will comply with all applicable regulations, including the provincial Nutrient Management Regulation, the Water Protection Act, the Environment Act, the Livestock Manure and Mortalities Management Regulation and the Workplace Safety and Health Act.

Should you have any questions on this letter, please contact me at 204-986-7435 or by email at ccarroll@winnipeg.ca.

Yours truly,

A handwritten signature in blue ink, appearing to read 'C. Carroll'.

Chris W. Carroll, P. Eng., MBA
Manager of Wastewater Services Division

Attachment

RV/dr

c: M.L. Geer, CPA, CA, Water and Waste Department (email)
G.K. Patton, P. Eng., Water and Waste Department (email)
D.E. Griffin, P. Eng., Water and Waste Department (email)
D. Keam, WSP Canada Group Limited (email)