Comox Valley REGIONAL DISTRICT

Staff Report

DATE: April 29, 2020

FILE: 5340-05

TO: Chair and Directors
Electoral Areas Services Committee

FROM: Russell Dyson
Chief Administrative Officer

Supported by Russell Dyson
Chief Administrative Officer

R. Dyson

RE: **Biosolids – Land Application Regulation Overview**

Purpose

This report presents information on land application of biosolids in response to a prior request from the Electoral Areas Services Committee.

Recommendation from the Chief Administrative Officer:

None. This report is for information only.

Executive Summary

- Biosolids are the solid waste particles remaining once wastewater has been treated. They contain macronutrients and organic matter that can replenish soil and help it to retain moisture.
- Due to the resources present in biosolids, their beneficial re-use is considered favourable to landfilling.
- Beneficial re-use options for biosolids, as identified by the Canadian Council of Ministers of the Environment, include forest or agricultural land application, compost production, energy production or land reclamation.
- Approximately two-thirds of biosolids produced in BC are beneficially re-used as compost (such as the Comox Valley Regional District's SkyRocket product) or through land application and reclamation.
- In BC, biosolids compost production and land application is regulated by the Organic Matter Recycling Regulation (OMRR).
- OMRR stipulates quality requirements that must be met before biosolids or biosolids-derived compost can be used.
- OMRR also includes additional requirements, provided by a qualified professional in a land application plan, prior to the application of biosolids on land.
- The application of biosolids on agricultural land is also regulated by the Agricultural Land Reserve (ALR) Use, Subdivision and Procedures Regulation.

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Background/Current Situation

Biosolids are a stabilized by-product of wastewater treatment, defined by BC's Organic Matter Recycling Regulation (OMRR) as "stabilized municipal sewage sludge resulting from a municipal waste water treatment process or septage treatment process which has been sufficiently treated to reduce pathogen densities and vector attraction to allow the sludge to be beneficially recycled in accordance with the requirements of this regulation."

Management of wastewater biosolids in Canada is guided by the Canadian Council of Ministers of the Environment (CCME) 2012 publication "Canada-Wide Approach for the Management of Wastewater Biosolids" (link). The policy established in this document promotes the beneficial use of resources contained within municipal biosolids, based on principles that recognize the resource value of biosolids, while minimizing potential risks to human and environmental health.

Agricultural land application as a fertilizer or soil conditioner is one of the management options identified in the CCME document. Other options include energy production, compost and soil products, forestry land application and land reclamation. While land application of biosolids is the most prevalent management option used in many regions of the world, there can be significant variations in rates of land application between jurisdictions, even within the same region.

On Vancouver Island, there are several biosolids management practices in place, including the Comox Valley Sewerage Service's production of SkyRocket, a Class A compost created by mixing wood chips with biosolids from the Brent Road wastewater treatment plant. The Town of Ladysmith has also recently started producing Class A compost from their biosolids. Biosolids from the Capital Regional District's new McLaughlin Point wastewater treatment plant will be sent to the lower mainland as an alternative fuel for cement production, with the CRD currently proposing land application on active or closed portions of the Hartland Landfill for short time frames when cement production ceases.

Land application of biosolids is practiced by the Regional District of Nanaimo, the City of Powell River and the Municipality of North Cowichan. The Regional District of Nanaimo's biosolids are primarily used in a forest land application project near Doumont Road. The City of Powell River and Municipality of North Cowichan have recently completed an agricultural land application on a property near the Hamm Road interchange in Comox Valley Regional District (CVRD) Puntledge – Black Creek (Electoral Area C); land application at this property is also under consideration by the RDN.

Common concerns with biosolids management options include the potential for ground and surface water contamination with pathogens, metals, pharmaceuticals and personal care products (PPCPs) and other emerging contaminants of concern (ESOCs). BC's OMRR includes criteria on presence of pathogens and metals in biosolids, and establishes the following five categories of biosolids-derived organic matter, differentiated by the process and quality criteria they have to meet, and how the resulting product can be subsequently used:

- Biosolids growing medium
- Class A compost
- Class B compost
- Class A biosolids
- Class B biosolids

A land application plan, prepared by a qualified professional, is required by OMRR prior to application of Class A or B biosolids, or Class B compost on any lands, public or private, agricultural or non-agricultural. The land application plan is to include information such as the following:

- Location, legal and ownership details of the subject property
- Name and address of facility where the biosolids are produced
- Proposed dates of biosolids application
- Soil concentrations of substances before application of biosolids
- Concentrations of substances in biosolids to be applied
- Biosolids application rate as it relates to soil nutrient levels required to establish or sustain plant growth

The land application plan must be submitted to the Ministry of Environment and Climate Change Strategy, the local health authority (if on agricultural land or in a watershed used as a permitted water supply) and the Agricultural Land Commission (if on agricultural land) for review and comment. The Ministry of Environment or the local health authority can request changes to the land application plan. A land application plan can also be denied by the local health authority. A land application plan is not required if land application of biosolids is otherwise authorized (i.e., by permit, approval, operational certificate or an order under the *Environmental Management Act*).

In regards to ESOCs, technology to detect these ESOCs has advanced faster than the understanding of their potential impacts to public or environmental health. As stated in the CCMEs 2009 report "Emerging Substances of Concern in Biosolids: Concentrations and effects of Treatment Processes," "The detection of ESOCs in biosolids does not automatically imply that there is a risk for human health or the environment associated with proper biosolids management."

Supporting this position are the results of a 2012 study assessing the uptake of various ESOCs into vegetable crops grown in biosolids fertilized soil in Ontario, which found low potential for uptake of these substances under normal farming conditions. A 2019 BC Ministry of Environment and Climate Change Strategy study also found that ESOCs in sampled biosolids were below European standards. BC's OMRR does not currently include standards for ESOC presence in biosolids; while standards for these substances are a common theme of consultation feedback, the ministry's current position is that research to date has not demonstrated a risk to human health or the environment from the extremely small amounts of these compounds which are present in biosolids.

In comparison to other nutrient sources available to agricultural producers, such as manure or chemical fertilizers, land application of biosolids has a more stringent regulatory framework, while providing a similar soil amendment. Schedule B of this report includes a comparison of regulatory, product composition and environmental considerations for biosolids, manure and chemical fertilizers.

Policy Analysis

At the January 13 meeting of the Electoral Areas Services Committee, the following motion was passed:

> THAT a report be prepared for a subsequent Electoral Areas Services Committee that describes the regulations and applicable rules and procedures for applying biosolids to public and private lands, both within and outside of the Agricultural Land Reserve, in British Columbia.

In British Columbia, biosolids compost production and land application is regulated by the Organic Matter Recycling Regulation under the *Environmental Management Act.*

Land application of biosolids on ALR land is also regulated by the ALR Use, Subdivision and Procedures Regulation under the *Agricultural Land Commission Act*.

Section 552 of the BC *Local Government Act* provides authority to local government to regulate farm businesses in farming areas, which could include imposing further requirements on land application of biosolids.

Schedule A of this report includes further details on BC's Regulatory Framework for Biosolids.

Options
None. This report is for information only.

Financial Factors
Biosolids management in the CVRD is undertaken by the Comox Valley Sewerage Service, which collects and treats wastewater from the Town of Comox and the City of Courtenay, and septage pumped from septic tanks in the CVRD's electoral areas. Annual operating costs for biosolids management (production of SkyRocket Class A compost) are approximately $500,000.

Legal Factors
The CVRD, as the operator of the Comox Valley Sewerage Service, is required to manage biosolids in accordance with BC's OMRR.

Regional Growth Strategy Implications
The information presented in this report relates to the following goals and objectives of the Regional Growth Strategy:

Objective 5-D: Encourage sewage management approaches and technologies that respond to public health needs and maximize existing infrastructure.

Policy 5D-3: Promote eco-industrial development that turns wastes into resources.

Objective 6-D: Increase farming activity in the Comox Valley.

Policy 6D-3: Regularly consult with farmers, farm businesses, and agricultural stakeholders on issues that may impact their ability to productively farm local lands.

Intergovernmental Factors
All levels of government in Canada play a role in biosolids management. General policy direction is provided at a federal level by the Canadian Council of Ministers of the Environment; this policy direction is enacted into regulation by the provinces.

Local governments play a key role in management of biosolids. The *Local Government Act* does provide authority to local government to enact bylaws that could impose additional requirements regarding land application of biosolids on agricultural land. Local governments are often also in the position of being significant generators of biosolids, and are therefore tasked with managing them in accordance with applicable regulations. Costs associated with biosolids management, which can be significant, are also borne by local governments.

In the CVRD, member municipalities also influence biosolids management through their sewer use bylaws that regulate materials permissible for discharge into the sewer system.

Interdepartmental Involvement
This report was prepared by staff in the Engineering Services Branch.

Citizen/Public Relations

Public concern with wastewater management practices is not uncommon, and biosolids management is no exception. Typical public concerns with biosolids land application include the potential for ground and surface water contamination with heavy metals, pharmaceuticals and other emerging contaminants of concern.

Attachments: Appendix A – "Province of BC Biosolids infographic" (https://www2.gov.bc.ca/assets/gov/environment/waste-management/organic-waste/infographic-biosolids_march_2017.pdf)

Schedule A – "Province of BC Regulatory Framework for Biosolids" (https://www2.gov.bc.ca/assets/gov/environment/waste-management/organic-waste/biosolids/regulatory_framework.pdf)
Schedule B – "Soil amendment and fertilizer comparison, Province of BC" (https://www2.gov.bc.ca/assets/gov/environment/waste-management/organic-waste/biosolids/biosolids-manure-comparison.pdf)

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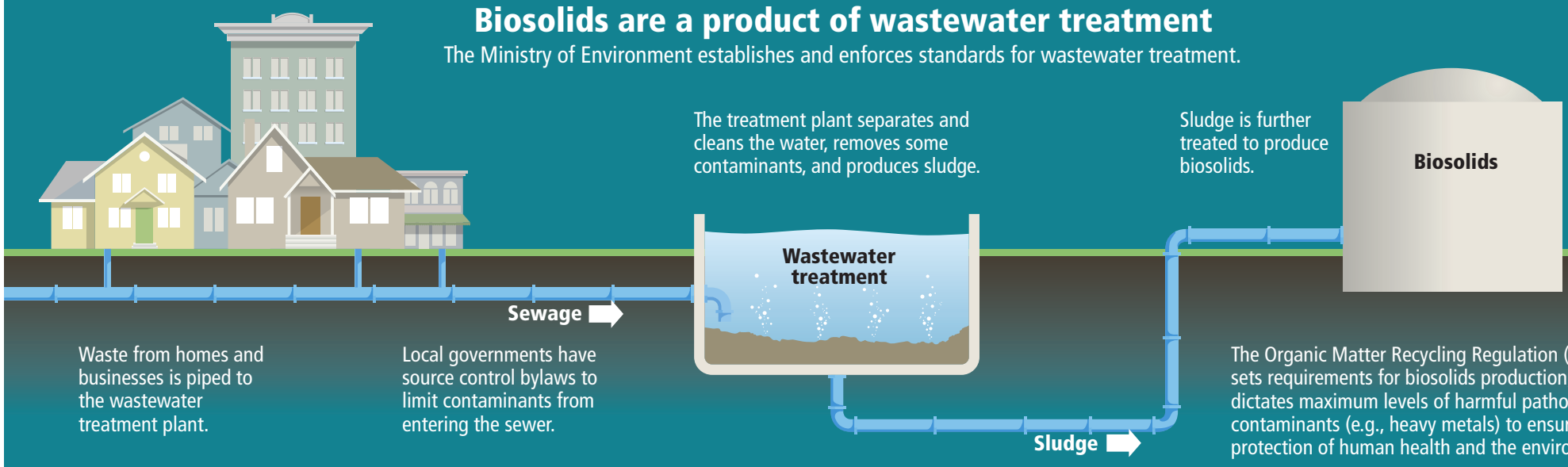
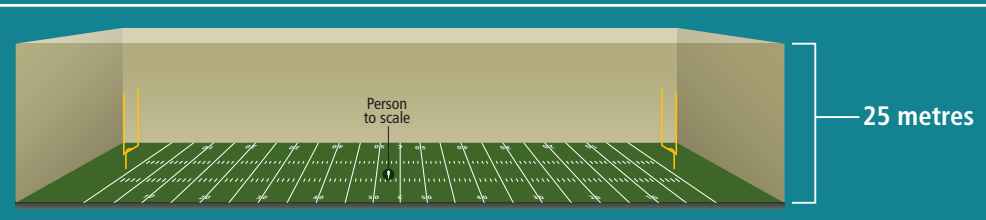
BIOSOLIDS IN BRITISH COLUMBIA

Biosolids are a product of wastewater treatment

The Ministry of Environment establishes and enforces standards for wastewater treatment.



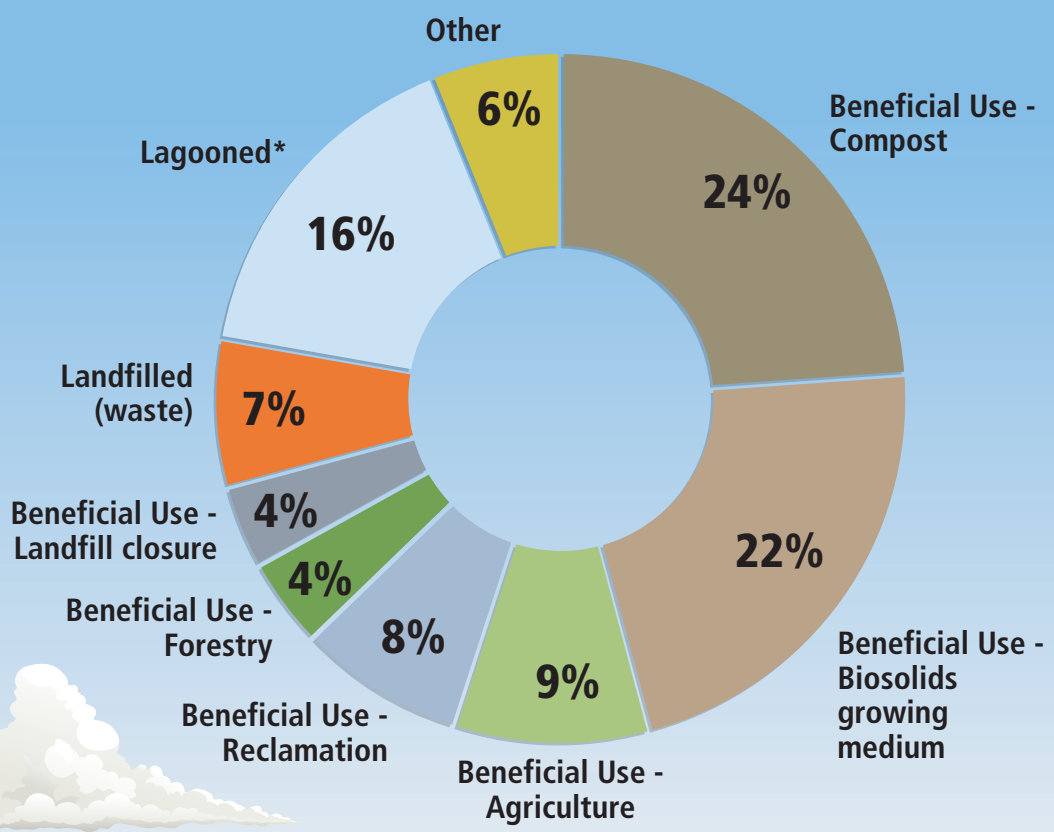
38,000 dry tonnes of biosolids are produced in BC every year, enough to cover a football field 25 metres deep.



Biosolids are used in many beneficial ways

Biosolids can be applied to land to support forestry, agriculture or land reclamation

Some local governments send sludge or biosolids to the landfill. The Canadian Council of Ministers of Environment recommends against this, as it wastes resources and increases greenhouse gas emissions.



Biosolids

- add organic matter and plant nutrients to the soil
- store carbon in soil and decrease greenhouse gas emissions
- increase soil water holding capacity
- sustain healthy soils

Biosolids can be mixed with wood chips, yard waste, or other ingredients to create compost or biosolids growing medium. These materials are well suited for landscaping and agriculture.

Compost facilities and soil amendments are regulated by the Organic Matter Recycling Regulation (or permits).

*Lagooned: biosolids that are being processed in lagoons at wastewater treatment plants

Use of biosolids is strictly controlled for human health and environmental protection

The Organic Matter Recycling Regulation provides strict controls on how biosolids may be used for agriculture, forestry or land reclamation

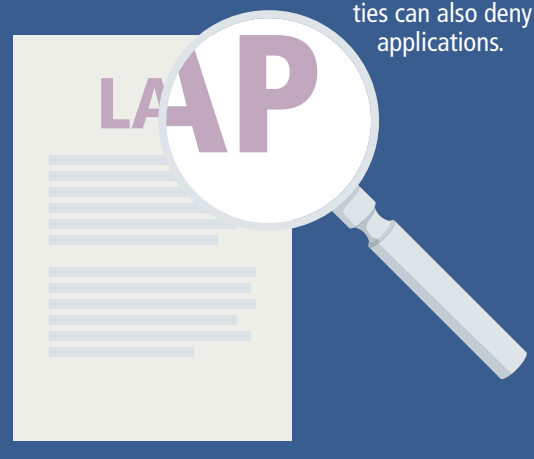
1

A qualified professional must prepare a Land Application Plan (LAP) that specifies where, how much and when the biosolids will be applied.

2

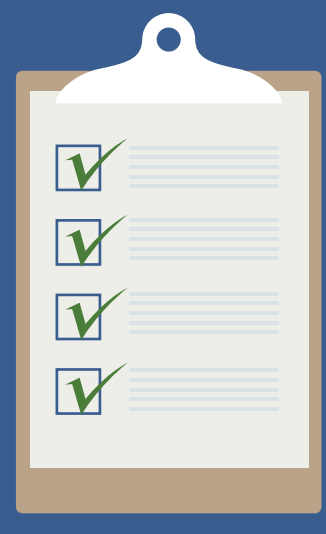
The LAP is submitted to the Ministry of Environment as well as to Health Authorities (if used on agricultural land or in a watershed used as a permitted water supply) and the Agricultural Land Commission (if on agricultural land).

The Ministry of Environment and Health Authorities can request changes to the LAP to address potential concerns about human health or the environment. Health Authorities can also deny land applications.



3

A qualified professional must certify that the LAP was followed and that the soil standards for contaminants were met.



This infographic provides guidance and is not a legal document. In all cases the Environmental Management Act and Organic Matter Recycling Regulation will prevail.

British Columbia's Regulatory Framework for Biosolids*

Environmental Management Act (EMA) & Public Health Act	Agricultural Land Commission Act	Local Government Act
Organic Matter Recycling Regulation (OMRR)	ALR Use, Subdivision and Procedures Regulation	
Requirements	Requirements	Requirements
• Establishes 5 biosolids categories:(1)Class A (2)Class B (3)Class A compost (4)Class B compost (5)Biosolids Growing Medium; • Sets out requirements related to the production, distribution, storage, sale and use or land application of all categories of biosolids and biosolids-compost; • Sets out required pathogen reduction processes and limits, vector attraction reduction standards, as well as detailed numeric standards for substance concentrations and soil standards related to: arsenic, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium and zinc; • Establishes required sampling and analysis protocols, frequency and record-keeping; • Requires that all sampling and analysis be conducted using "British Columbia Laboratory Methods Manual: 2005 — for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air Samples"; • Requires that a Land Application Plan (LAP) is developed and signed by a Qualified Professional prior to any land application of Biosolids Class A, Class B or Class B compost. The operator must notify the Ministry 30 calendar days prior to the planned land application. Additional notifications are required for applications on agricultural land, in a watershed, or on ALR land. • Sets out required information to be included in the Land Application Plan (schedule 7 of OMRR); • Defines acceptable land application methods, including setback requirements, signage requirements and time-delay requirements prior to grazing (60 days) or agricultural activity (18-38 months).	• Use of biosolids, in accordance with LAP under OMRR, is permissable as a fertilizer/soil conditioner on ALR land; • Requires that all ALR biosolids land applications meet OMRR requirements; • Provides the ability for Local Government and/or First Nations to prohibit or regulate production, storage and application of Class A compost if any of the produced compost is used off-farm.	• Empowers Local Government to develop zoning bylaws that regulate use, density, siting, size and dimensions of land and buildings (e.g. composting facilities); • Gives authority to prevent Local Government from prohibiting or restricting the use of land for a farm business in a farming area; • Gives authority to empower Local Government to make farm bylaws to regulate the conduct of farm operations (including land application of biosolids); • Empowers the agriculture minister to set standards for farm bylaws.

* Other legislation and regulations that should be taken into consideration (although not primarily concerned with biosolids) include: Farm Practice Protection (Right to Farm) Act, The Community Charter, Contaminated Sites Regulation, Waste Discharge Regulation, Drinking Water Protection Act & Drinking Water Protection Regulation, Regulated Activities Regulation, Forest and Range Practices Act, Range Planning and Practices Regulation, the Range Act.

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Soil Amendment and Fertilizer Comparison

Agricultural producers have long recognized the need to enhance soil properties, including its structure, fertility and water retention by using soil amendments such as fertilizers and conditioners. Nutrient sources vary in their biological and chemical properties and characteristics. Some nutrients, notably nitrogen, can be lost from agricultural byproducts (e.g., manure) into the environment at any point in the nutrient management process. Careful management of any soil amendment is required to ensure that surface runoff and/or leachate does not contaminate water supplies.

The table below provides a summary comparison of the regulatory framework, product composition and general environmental considerations for three common soil amendments used in British Columbia: (1) biosolids, (2) manure, and (3) chemical fertilizers.

Regulatory Framework			
	Biosolids	**Manure**	**Chemical Fertilizer**
1. Is the product regulated?	YES production, use, monitoring requirements under OMRR	YES no quality or monitoring requirements, some use requirements under AWCR	YES Production and quality regulated under CFIA (no use or monitoring)
2. Is product testing required?	YES pathogen and metals testing	NO no testing requirements	YES metals testing
3. Are there requirements to reduce pathogens prior to use?	YES pathogen reduction is a regulatory requirement	NO no pathogen reduction requirements	YES Pathogen reduction for salmonella and fecal coliform
4. Does the product meet Canadian Food Inspection Agency (CFIA) limits for metals?	YES biosolids must meet CFIA metal concentration limits (same limits as OMRR)	N/A manure is known to contain heavy metals, but there is no testing requirement	YES product must meet CFIA metal concentration limits.
5. Are there regulated application buffer zones from sensitive areas such as water bodies?	YES risk-based buffer zones based on soil compounds and pathogen destruction periods	NO exempt from Riparian Areas Regulation (some protection measures under AWCR)	No requirements agricultural operations exempt from Riparian Areas Regulation
Product Composition			
	Biosolids	**Manure**	**Chemical Fertilizer**
1. What is the primary feedstock for the product?	treated municipal sewage	animal excrement (urine and feces) from livestock and poultry animals and soiled bedding (e.g., straw, wood shavings or sand)	manufactured product; mining and chemical processes.
2. What are the soil amendment benefits?	• soil nutrients (e.g., phosphorus, nitrogen) • organic matter	• soil nutrients (e.g. phosphorus, nitrogen) • organic matter	• soil nutrients only (e.g. phosphorus, nitrogen)
3. What is the phosphorus source?	naturally-occurring byproduct	naturally-occurring byproduct	mined from phosphate rock (environmental impact, costly, resource-intensive)
4. Does the product contain heavy metals?	YES (all products have comparable list of possible metals)[1]	YES (all products have comparable list of possible metals)	YES (all products have comparable list of possible metals)
5. Are there organic pollutants such as antibiotics?	YES	YES	NO
General Environmental Considerations			
	Biosolids	**Manure**	**Chemical Fertilizer**
1. Overall phosphorus and nitrogen release rates[2]	variable, generally in the slower range	variable, generally in the medium to fast range	rapid-release (unless treated for slow release)
2. Total free nitrate[3]	variable, generally in the lower range	variable, generally in the medium to high range	high (not bound to organics)
3. Product publicly available for purchase	YES product meets regulated standards prior to sale	YES accessible without restrictions or testing	YES product meets regulated standards prior to sale
4. Relative Greenhouse Gas (GHG) impact of soil enhancement	GHG reduction potential (carbon storage in soils)	GHG reduction potential (carbon storage in soils)	N/A
5. Relative Greenhouse Gas (GHG) impact of product development	N/A no new materials required	N/A no new materials required	GHG increase [4] production and importation of product materials

[1] *See Schedules 9 and 10 of the* Organic Matter Recycling Regulation *(OMRR) for a list metals under OMRR.*

[2] *A slower release of nutrients improves soil characteristics while minimizing environmental impacts.*

[3] *Free nitrate may leach into groundwater and cause pollution.*

[4] *Production and importation of chemical fertilizers is a GHG contributor. Production of Ammonium Nitrate and Phosphate generate the equivalent of 3.5 and 0.5 tonnes of Co2, respectively.*