

## Reviewer Comments and Proponent Responses

Project: Town of Fort Smith - municipal Water Licence – Sludge Management Plan  
 Board: Mackenzie Valley Land and Water Board  
 Proponent: Town of Fort Smith

File Number: MV2011L3-0001  
 Review Comments Due: November 26, 2024  
 Proponent Responses Due: March 10, 2025

No.	Topic	Reviewer Comment	Reviewer Recommendation	Proponent Response	Board Decision
<b>Fisheries and Oceans Canada (DFO) - Ms. Anna-Maija LaFlamme</b>					
1		DFO has reviewed the Town of Fort Smith - Municipal Water Licence documents in accordance with DFO's mandate and has no comments at this time.	DFO has no recommendations at this time.	Noted	Noted.
<b>GNWT-ECC (Environment and Climate Change) - Environmental Regulatory Analyst</b>					
1	GNWT-ECC Cover Letter	<p>The Department of Environment and Climate Change, Government of the Northwest Territories has reviewed the application at reference based on its mandated responsibilities under the Waters Act and has provided comments and recommendations for consideration of the Mackenzie Valley Land and Water Board.</p> <p>For any technical questions, please contact Ariel Greenblat, Water Management Advisor at <a href="mailto:Ariel_Greenblat@gov.nt.ca">Ariel_Greenblat@gov.nt.ca</a> and Celena Hoeve, Regulatory and Science Advisor at <a href="mailto:Celena_Hoeve@gov.nt.ca">Celena_Hoeve@gov.nt.ca</a> with the Regulatory and Permitting Division.</p> <p>Should you have any general questions or concerns, please do not hesitate to contact <a href="mailto:gnwt_ea@gov.nt.ca">gnwt_ea@gov.nt.ca</a>.</p>	N/A	Noted	Noted.
2	Nutrient Availability	Government of Northwest Territories Environment and Climate Change (GNWT-ECC) is seeking clarification on whether there are alternative options, or strategies, when/if the recommended ratios of nutrients (i.e., C:N and C:P) are not met.	GNWT-ECC recommends including steps and/or recommendations to Section 3.0 or 6.0 if nitrogen or phosphorus are too high or low relative to carbon to confirm nutrients are within sustainable limits. For	This will be used as daily and intermediate cover. Vegetation growth may be considered for final growth cover	Noted that the Town is not currently planning to close the SWDF, so daily and intermediate cover is being planned for, not final cover.

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			example, adding nutrients artificially if they are too low to promote vegetation growth.		
3	Assumed Sludge Characteristics	Section 5.1 states: "While lagoon sludge analytical characteristics can vary widely depending on the source and treatment, at this time it is assumed that the lagoon sludge is indicative of typical municipal residential lagoon sludge and given that there is a lack of heavy industry in the Town of Fort Smith, it is assumed that mean values as outlined in Table 3 can be considered to generally describe the sludge quality." The source for the values in Table 3 is a Master's Thesis on the characteristics of biosolids in Manitoba. It is unclear how this was determined to be an appropriate source for predicting sludge characteristics in Fort Smith.	GNWT-ECC recommends using bio-solid characteristics from a peer-reviewed source, ideally including data from the Northwest Territories, if analytical tests will not be conducted on the sludge. Alternatively, if a small-scale trial is to be completed, as stated in section 6.0, a representative elementary volume should be used to conduct the trial and determine sludge characteristics, which can then be compared to the current values in Table 3.	This will be used as daily and intermediate cover. Vegetation growth may be considered for final growth cover	The Board notes that the Town plans to follow the <i>LWB Guidelines for Municipal Sludge Management (2024)</i> (the Guidelines), and meet the quality requirements prior to reuse.
4	Fine Gravel Particle Size	Section 5.1, Fine Grain Gravel, states that "fine grain materials are composed of sand and gravel with a particle size less than 20 mm". GNWT-ECC is clarifying whether the particle size was meant to be 2 mm, as neither sand, nor fine gravel is 20 mm.	GNWT-ECC recommends adjusting the particle size to something smaller or describing the fabricated matrix particle size to medium/coarse grained gravel.	This will be used as daily and intermediate cover. Vegetation growth may be considered for final growth cover	The Board notes the Town plans to follow the Guidelines, and does not plan to create the fabricated matrix described.
5	C:P Ratio	Section 3.0 states: "Should the Carbon to Phosphorous (C:P) ratio be between 200:1 and 300:1, mineralization and immobilization balance each other to result in no net release of phosphorus from the decomposing organics, whereas if the C:P ratio is within the identified range (200:1 to 300:1) phosphorus can be released and available." Both statements seem to relate to the C:P ratio range of 200:1 and 300:1, suggesting that phosphorus both will and will not be released in that range. There is likely an error in these statements.	GNWT-ECC recommends that the Town of Fort Smith (Fort Smith) clarify which C:P ratios may cause phosphorus to be released.	This will be used as daily and intermediate cover. Vegetation growth may be considered for final growth cover	The Board notes the Town plans to follow the Guidelines, and does not plan to create the fabricated matrix described.
6	Required and Recommended Parameters	Table 2 includes a required parameters as well as recommended parameters for sludge analysis. It is unclear whether the	GNWT-ECC recommends that Fort Smith commit to testing for both the required and	This will be used as daily and intermediate cover. Vegetation growth may be	The Board notes the Town plans to follow the Guidelines, which include the list of

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		<p>recommended parameters would be analyzed for each sample or only under certain circumstances.</p> <p>Additionally, as per the Draft Guidelines for Municipal Sludge Management for Passive Sewage Treatment Systems in the Northwest Territories, not all recommended analytes were included in Table 2. Specifically, the following parameters are missing: petroleum hydrocarbons F1-F4, ammonia, E. coli, and salmonella.</p>	<p>recommended parameters in all samples.</p> <p>GNWT-ECC recommends that Fort Smith add petroleum hydrocarbons F1-F4, ammonia, E. coli, and salmonella to the list of parameters for testing, or justify why those parameters are not relevant.</p>	considered for final growth cover	analytical parameters referred to.
7	Alternative Uses	Section 5.0 mentions that the fabricated matrix would need to meet criteria for use as alternate daily cover (ADC) or alternate intermediate cover (AIC). It is unclear what the criteria are for using the fabricated matrix as ADC or AIC. Section 4.0 does discuss the additional analysis that would be recommended if the fabricated matrix is to be used as ADC or AIC, however it is unclear what results would be considered acceptable for those uses.	GNWT-ECC recommends that Fort Smith discuss the criteria that would need to be met to use the fabricated matrix as ADC or AIC.	This will be used as daily and intermediate cover. Vegetation growth may be considered for final growth cover	The Board notes the Town plans to follow the Guidelines, and does not plan to create the fabricated matrix described.
8	Table 4 – Mix Ratio	Table 4 outlines the mix ratio for the fabricated matrix, providing a ratio of one part sludge, two parts wood chips, and three parts fine grain gravel. GNWT-ECC notes that the last two rows of Table 4 do not follow that ratio.	GNWT-ECC recommends that Fort Smith either correct the values in Table 4 to follow the ratio provided or provide rationale for why not all values match the ratio.	This will be used as daily and intermediate cover. Vegetation growth may be considered for final growth cover	The Board notes the Town plans to follow the Guidelines, and does not plan to create the fabricated matrix described.
9	Volume of Fabricated Matrix	Section 5.2 mentions 800 m <sup>3</sup> of fabricated matrix. It is unclear how an estimate of 800 m <sup>3</sup> was obtained. Section 5.1 estimates that the anticipated volume of biosolids would be approximately 200 m <sup>3</sup> . If that is the case, then approximately 1200 m <sup>3</sup> of fabricated matrix would be expected based on the ratio in Table 4.	GNWT-ECC recommends that Fort Smith clarify how the 800 m <sup>3</sup> volume of fabricated sludge used in Section 5.2 was obtained.	This is an error in the report, The Town will follow the end-use guidelines as per the Guideline for municipal sludge management for passive treatment systems in the NWT.	Noted.
10	Maximum Allowable Concentrations	Table 1 outlines the maximum allowable concentrations for sewage sludge to be used as landfill cover. The source is listed as	GNWT-ECC recommends that Fort Smith discuss how it was determined that the criteria in	The Town will follow the end-use guidelines as per the Guideline for municipal	Noted.

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		correspondence from the Inspector, which is included in Appendix A. The values presented in Table 1 appear to be taken from the Fort Simpson licence, which is one of the resources included in Appendix A. However, Appendix A also includes links to Compost Quality Guidelines from the Canadian Council of Ministers of the Environment (CCME) and the GNWT Environmental Guideline for Contaminated Site Remediation. The criteria for the Fort Simpson licence appear to be based on the CCME Compost Quality Guidelines, but the GNWT Environmental Guideline for Contaminated Site Remediation include more stringent criteria for several parameters. It is unclear how it was determined that the criteria in the Fort Simpson licence were the most appropriate values to use in this plan.	the Fort Simpson licence were the most appropriate values to use for sludge reuse criteria.	sludge management for passive treatment systems in the NWT.	
<b>Environment and Climate Change Canada (ECCC) - Ms. Maja Crawley</b>					
1		Environment and Climate Change Canada has reviewed the plan according to our mandate and has no comments at this time.	ECCC has no recommendations at this time.	Noted	Noted.
<b>MVLWB - Erica Janes</b>					
1	Section 4.0 Sampling Method and Analysis	Board staff note that this section assumes sludge has been placed on a drying pad. It is Board staff's understanding that the sludge removed from Cell 1 several years ago is currently contained in a Geotube.	Please comment on whether the sludge being contained in a Geotube changes and details of the sampling methods to be used.	Cell 1W is in a geotube and Cell 1E will be utilizing pre established drying pad.	Noted.
2	Section 5.1 Components for Sludge Fabricated Matrix	This section discusses use of street sweepings as a potential source of fine grain gravel for incorporation into the fabricated matrix, as long as it doesn't contain any metal, chemicals, refuse or sharp objects.	How does the Town plan to ensure that any street sweepings used for incorporation into the fabricated matrix will not contain any metal, chemicals, refuse or sharp objects that may damage equipment, cause a health and safety concern, or introduce contaminants that would pose a challenge to the cover material's	The Town will follow the end-use guidelines as per the Guideline for municipal sludge management for passive treatment systems in the NWT.	The Board notes the Town plans to follow the Guidelines, and does not plan to create the fabricated matrix described.

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			ability to act as a vegetative growth medium?		
3	Section 6.0 Recommendations	Board staff note that this submission was developed by a consultant to the Town, and contains no indication from the Town as to whether recommendations included will be followed.	Please provide a response to each of the recommendations included in Section 6.0, including whether the Town plans to conduct a trial of the sludge fabricated matrix mixing ratio, and whether the Town plans to use the sludge fabricated matrix as intermediate or final cover.	The Town will follow the end-use guidelines as per the Guideline for municipal sludge management for passive treatment systems in the NWT.	Noted. Adequate response.
4	Sludge Re-use Criteria	Board staff note that the Town proposed re-use criteria as per the Village of Fort Simpson's Water Licence, Part D, Condition 12; however, the Board recently published the Guideline for Municipal Sludge Management for Passive Treatment Systems in the NWT. <a href="https://mvlwb.com/media/2032/download?inline">https://mvlwb.com/media/2032/download?inline</a>	Can the Town meet the sludge re-use criteria outlined in Section 5.3 of the Guidelines, for the required parameters in Table 2?	The Town will follow the end-use guidelines as per the Guideline for municipal sludge management for passive treatment systems in the NWT.	Noted.



November 25th, 2024

Erica Janes  
Regulatory Specialist  
Mackenzie Valley Land and Water Board  
P.O. Box 2130 4922-48th Street  
Yellowknife, NT. X1A 2P6

Dear Erica Janes,

**RE: Town of Fort Smith - municipal Water Licence Sludge Management Plan (Sewage Disposal Facilities Operation and Maintenance Plan Version 1.2)**

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The Department of Environment and Climate Change, Government of the Northwest Territories has reviewed the application at reference based on its mandated responsibilities under the *Waters Act* and has provided comments and recommendations for consideration of the Mackenzie Valley Land and Water Board.

For any technical questions, please contact Ariel Greenblat, Water Management Advisor at [Ariel.Greenblat@gov.nt.ca](mailto:Ariel.Greenblat@gov.nt.ca) and Celena Hoeve, Regulatory and Science Advisor at [Celena.Hoeve@gov.nt.ca](mailto:Celena.Hoeve@gov.nt.ca) with the Regulatory and Permitting Division.

Should you have any general questions or concerns, please do not hesitate to contact [gnwt\\_ea@gov.nt.ca](mailto:gnwt_ea@gov.nt.ca).

Sincerely,

Shakita Jensen  
Environmental Regulatory Analyst  
Environment Impact Assessment  
Department of Environment and Climate Change