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July 29, 2021

File: W2014L3-0002

Curtis Coleman
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Community Government of Behchokò
P/O Box 68
Behchokò, NT X0E 0Y0

Sent by email

Dzè nezì Curtis,

Re: Sewage Disposal Facility Efficacy Studies and Version 2.0 of the Operation and Maintenance Plan

The Wek'èezhii Land and Water Board (the Board) met on July 22, 2021 and considered the Community Government of Behchokò's (CGB) Efficacy Studies and Version 2.0 of the Operation and Maintenance (O&M) Plan for the Sewage Disposal Facilities (SDF) for Rae and Edzo required by Water Licence W2014L3-0002.^{1,2,3,4}

As described in the Board's Reasons for Decision, the Board has approved both the Efficacy Studies, as well as Version 2.0 of the SDF O&M Plan, with revisions to be included in re-submitted versions to the Board within 90 days (Version 1.1 of the efficacy studies and Version 2.1 of the SDF O&M Plan). The required revisions are outlined in sections 3.1.1 and 3.2.1 of the Reasons for Decision. As per the approved V2.0 of the SDF O&M Plan, the Board notes that sludge removal at both SDFs is now required as sludge depths have exceeded the system capacity. Sludge removal is to start this open-water season, and as part of the cover letter for V2.1 of the SDF O&M Plan submission, the CGB is required to provide a schedule with proposed dates to ensure sludge from these cells are removed in a timely manner.

In addition, given the concerns raised regarding the Effluent Quality Criteria (EQC) exceedances and elevated concentrations of parameters at the Edzo SDF, the Board requires the CGB to conduct a study during this open-water season that investigates the causes and implications/effects of EQC exceedances and elevated total phosphorous and un-ionized ammonia of the Edzo SDF. The CGB is to submit a report to the Board following completion of this Study and include the information outlined in Decision #4.

¹ See WLWB (www.wlwb.ca) Online Registry for [W2014L3-0002 – Behchoko – Rae SDF Efficacy Study – Mar 4 21](#)

² See WLWB Online Registry for [W2014L3-0002 – Behchoko – Edzo SDF Efficacy Study – Mar 4 21](#)

³ See WLWB Online Registry for [W2014L3-0002 – Behchoko – Sewage Disposal Facility – O and M Plan – V2.0 – Oct 30 20](#)

⁴ See WLWB Online Registry for [W2014L3-0002 – Behchoko – Water Licence – Rectification of Clerical Errors – Jul 24 15](#)

In accordance with Part B, Conditions 3 and 4, and as described in the attached Reasons for Decision, the Board has also updated Schedule 1 and the Surveillance Network Program annexed to Licence W2014L3-0002. The updated Licence can be viewed on the Online Registry.⁵

Please review the attached Reasons for Decision for further information. The Board recognizes and appreciates the hard work made by the Community Government Staff to ensure that Water Licence conditions are met.

Yours sincerely,



Joseph Mackenzie

Chair, Wek'èezhìi Land and Water Board

Attachment:

- Reasons for Decision

Copied: Wek'èezhìi Distribution List

⁵ See WLWB Online Registry (www.wlwb.ca) for [W2014L3-0002 – Behchoko – Water Licence – Updates SNP and Schedule 1 – Jul 29 21](#)



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Reasons for Decision

Reference/File Number:	W2014L3-0002
Licensee:	Community Government of Behchokq (CGB)
Subject:	Sewage Disposal Facility O&M Plan and Efficacy Studies

Decision from the Wek'èezhìi Land and Water Board Meeting of July 22, 2021

1.0 Decision

On July 22, 2021 the Wek'èezhìi Land and Water Board (WLWB or the Board) met and considered the Community Government of Behchokq's (CGB) Efficacy Studies and Version 2.0 of the Operation and Maintenance (O&M) Plan for the Sewage Disposal Facilities (SDF) required by Water Licence W2014L3-0002.^{1,2,3,4} The Board decided the following:

1. To approve Version 1.0 of the Rae and Edzo Sewage Disposal Facility Efficacy Studies.
2. To direct the CGB to submit Version 1.1 of the Rae and Edzo Efficacy Studies within 90 days of the Board's decision. Version 1.1 is to include Revisions #1 to #3.
3. To update the Surveillance Network Program (SNP) to include SNP Station 2021-E6 for the purpose of monitoring background water quality of the wetland. Station 2021-E6 is to monitor the same parameters at the same frequency as the other Edzo SDF SNP stations.
4. To direct the CGB to conduct a study during this open-water season that investigates the causes and implications/effects of EQC exceedances and elevated total phosphorous and un-ionized ammonia of the Edzo SDF. The CGB is to submit a report to the Board following completion of this Study. This report is to include, but not be limited to, the following information:
 - a) A description of how the study was conducted;
 - b) A copy of any results and a summary of findings from sampling conducted as part of the study;
 - c) An analysis of

¹ See WLWB (www.wlwb.ca) Online Registry for [W2014L3-0002 – Behchoko – Rae SDF Efficacy Study – Mar 4 21](#)

² See WLWB Online Registry for [W2014L3-0002 – Behchoko – Edzo SDF Efficacy Study – Mar 4 21](#)

³ See WLWB Online Registry for [W2014L3-0002 – Behchoko – Sewage Disposal Facility – O and M Plan – V2.0 – Oct 30 20](#)

⁴ See WLWB Online Registry for [W2014L3-0002 – Behchoko – Water Licence – Rectification of Clerical Errors – Jul 24 15](#)

- i. the potential external sources (i.e., outside of the SDF) that are contributing to the exceedances and elevated concentrations. If any external sources are found to be contributing to the exceedances, provide a description with timelines of what change(s) are required (e.g., changes to the SNP) to address this;
 - ii. whether exceedances and elevated concentrations result from SDF design and/or operations; and if so, a description of what changes to the design and/or operations are required;
 - d) An analysis of the achievability of the Licence EQC for all parameters. If the analysis finds that EQC are no longer achievable, please describe what changes to the EQC are needed and/or what information is required in order to inform a potential change to the EQC;
 - e) A discussion of any potential effects on Great Slave Lake at the discharge location as a result of elevated levels of total phosphorous and un-ionized ammonia reporting from the Edzo SDF; and
 - f) Any other mitigations or investigations that need to be conducted to address EQC exceedances and elevated levels of total phosphorous and un-ionized ammonia, or to increase the efficiency of the SDFs, including a discussion of available contingencies while other investigations are occurring.
5. To approve Version 2.0 of the Sewage Disposal Facility Operation and Maintenance Plan (SDF O&M Plan).
 6. To direct the CGB to submit Version 2.1 of the SDF O&M Plan 90 days of the Board's decision. Version 2.1 of the SDF is to include Revisions A to F.
 7. To direct the CGB to remove the sludge in the Edzo lagoon cells and Cell 1 of the Rae lagoon as per sections 4.4.1 and 3.4.1 of the SDF O&M Plan as soon as possible starting this open-water season. The CGB is to provide a schedule with proposed sludge removal dates in the cover letter of the revised SDF O&M Plan (Version 2.1) and is to submit a letter confirming sludge removal to the Board and the Inspector once sludge removal is completed.
 8. To update the SNP to include sampling of free chlorine and total aluminum to the Rae and Edzo SNP SDF stations as recommended by GNWT-ENR comments 8 and 9.
 9. To reiterate the requirements of Part D, Condition 13 and Schedule 2 and direct CGB to provide a complete characterization of the Rae and Edzo sludge leaving the Water Supply Facilities with a supporting cover letter to the Board within 90 days of the Board's decision;
 10. To update Schedule 1 to include the submission of field parameters (pH and temperature) and field notes as part of CGB's Annual Report; and
 11. To update the SNP to reflect sampling at Frank Channel.

2.0 Background

2.1 Sewage Disposal Facilities

The community of Behchokq has two Sewage Disposal Facilities – one serving Rae and one serving Edzo. Sewage from Rae is trucked into a two-cell lagoon system and then decanted into a wetland system that flows down to Frank Channel. Cell 1 of the Rae SDF was initially constructed in the late 1970s/early 1980s. Edzo sewage is trucked into another two-cell system that flows continuously into dredged ditches and disperses into a wetland system prior to reaching Great Slave Lake. The Edzo SDF was constructed in the

early 1970s when the community was established. In addition to receiving wastewater from each of the communities, the systems also receive backwash and/or sludge from their respective Water Supply Facilities (discussed further in section 3.4 of this Reasons for Decision). Both Rae and Edzo have a separate sludge pit next to its lagoon cells.

In the 2014 Reasons for Decision (RFD) for the renewal of the CGB Licence, the Board noted that special studies related to the SDFs of Rae and Edzo were not completed during the term of the previous Licence (MV2003L3-0010) and so the Board required new special studies to investigate the effectiveness of the SDF systems.⁵ Part D, Conditions 14 and 15 of the Licence require CGB to submit Efficacy Studies on both the Rae and Edzo SDFs for Board approval by December 31, 2016 and as set out in Schedule 3. As noted, these studies were to be submitted by December 31, 2016. In Appendix A of the same RFD, the Board had approved Version 1.0 of the SDF O&M Plan with revisions to be included in the next version and submitted as soon as possible. Over the last several years, reminders to submit the outstanding submissions have been communicated by staff and have been formally communicated by both the Inspectors and the Board.⁶

For the SDF O&M Plan, Part H, Condition 1 of the W2014L3-0002 Licence requires the CGB to annually review and revise its SDF O&M Plan as necessary to reflect “changes in operation or technology, or as requested by the Board”. Version 2.0 of the SDF O&M Plan was submitted to satisfy Part H, Condition 1 and to address the Board’s 2014 Reasons for Decision.

2.2 Public Review

Version 2.0 of the SDF O&M Plan was received on October 30, 2020, and the Efficacy Studies were received on March 4, 2021. These documents were distributed for public review on May 5, 2021, inviting reviewers to provide comments and recommendations using the Online Review System (ORS) by June 2, 2021. In addition to these submissions, a geotechnical inspection for the SDFs was conducted as per Part D, Condition 10 and was linked for reviewers’ information in the Item for Review. This document was not for Board approval.

Comments and recommendations were received by Environment and Climate Change Canada (ECCC) and the Government of the Northwest Territories department of Environment and Natural Resources (GNWT-ENR). Board staff also submitted questions. During the public review period, a request to extend the reviewer comment deadline by one week was received and granted. The reviewer comment deadline was extended to June 9, 2021. CGB/BluMetric submitted responses by the adjusted response deadline of June 23, 2021. Reviewer recommendations and proponent responses are available on the WLWB Online Registry.⁷

⁵ See WLWB Online Registry for [W2014L3-0002 – Behchoko – Water Licence – Reasons for Decision – Oct 27 14](#)

⁶ See WLWB Online Registry for [W2014L3-0002 – Behchoko – Water Licence Inspection – May 16 2017 – May 24 17](#) and [W2014L3-0002 – Behchoko – Letter to Chief and Council re Compliance – Feb 7 20](#)

⁷ See WLWB Online Registry for [W2014L3-0002 – Behchoko – SDF – O and M Plan – V2.0 – Review Summary and Attachments – Jun 23 21](#)

3.0 Reasons for Decision

3.1 Efficacy Studies

3.1.1 Satisfaction of Licence Requirements

A conformity check of the Efficacy Studies was conducted for both Rae and Edzo against Schedule 3 of the Licence. Aside from the late submission, the Board believes that CGB has satisfied Schedule 3 of the Licence but has identified areas where clarification and further investigation is required. These are outlined in the sections 3.1.2 and 3.1.3 of the Reasons for Decision. The Board believes that the Efficacy Studies satisfy the Licence requirements and do not believe there are issues raised during the public review that should prevent the Board from approving the Efficacy Studies. Therefore, the Board approves the Efficacy Studies with additional direction to submit a revised version within 90 days of the Board's decision. The Board believes the revisions are small in nature and so a submission within this timeframe is achievable.

- ***Decision #1: The Board approves Version 1.0 of Rae and Edzo Sewage Disposal Facility Efficacy Studies.***
- ***Decision #2: The CGB is to submit Version 1.1 of the Rae and Edzo Efficacy Studies within 90 days of the Board's decision. Version 1.1 is to include Revisions #1 to #3.***

3.1.2 Revisions to Efficacy Studies

In reviewing comments and recommendations made during the public review, the Board believes there are some details and errors in the Efficacy Studies that would benefit from clarification and included in a revised version. These errors include those identified by ECCC regarding references to 'Frank Channel', 'Areal Loading Rate', and 'Maximum Average concentration' (ECCC comment 5). ECCC also recommended that underlying data and calculations used for Table 7 be provided to support interpretation of the results (ECCC comment 6). CGB committed to fix the errors and provide underlying data and calculations in a revised report. During the public review, Board staff also requested clarification on the meaning of 'elevated' and locations where 'elevated' levels of total phosphorous and un-ionized ammonia were found (Board staff comment 8). CGB clarified that 'elevated' meant above CCME Water Quality Guidelines and committed to include SNP locations where elevated levels were found in the revised report as well.

- ***Revision #1: CGB is to fix references as per ECCC comment 5 in Version 1.1 of the Efficacy Studies.***
- ***Revision #2: CGB is to include underlying data and calculations used for Table 7 in Version 1.1 of the Efficacy Studies.***
- ***Revision #3: CGB is to clarify that 'elevated' levels of both total phosphorous and un-ionized ammonia are above the CCME Water Quality Guidelines and to identify the SNP locations where they are elevated in Version 1.1 of the Efficacy Studies.***

3.1.3 Next Steps and Future Investigation

In the efficacy study for the Edzo SDF, BluMetric identified effluent results frequently exceeding Effluent Quality Criteria (EQC) for biological oxygen demand (BOD₅), faecal coliforms, and total suspended solids (TSS) and recommended further investigation into the issue. The recommended investigations were proposed to focus on understanding background conditions. To assess whether there are any other sources contributing to elevated concentrations within the wetland, the Edzo SDF Efficacy Report

recommends an assessment of background water quality of the wetland be added to the SNP and compared to those SNP stations throughout the Edzo SDF (i.e., SNP stations 2014-E2, E3, and E4). Based on the results of the study, further investigations into changes to design/operations of the SDF, location of SNP sampling, and potentially EQC of the licence may be necessary. In addition, it was raised in the Report that although there was treatment occurring, there were still 'elevated' levels of total phosphorous and un-ionized ammonia above CCME Water Quality Guidelines in both Rae and in Edzo.

During the public review, Board staff asked when such a study would start, how long it would take, where this background station would be located, and whether this station would be a permanent addition to the SNP (Board staff comment 1). CGB/BluMetric stated that an investigation to find a suitable background station could start this summer and would be a permanent part of the SNP. CGB/BluMetric also stated that this station be located "in similar wetland conditions [as the other Edzo SDF SNP stations] and removed from any historical loadings associated with the SDF." This location is consistent with ECCC's recommendation for a background SNP station (see ECCC comment 6).

Given the current unknown cause(s) for the exceedances at the Edzo SDF, the Board is of the opinion that monitoring at a background station is a necessary first step and that further investigation is required. As such, the Board has included the monitoring of a background wetland station in the SNP.⁸

- ***Decision #3: The Board has updated the Surveillance Network Program (SNP) to include SNP Station 2021-E6 for the purpose of monitoring background water quality of the wetland. Station 2021-E6 is to monitor the same parameters at the same frequency as the other Edzo SDF SNP stations.***

The Board has also decided to direct the CGB to conduct a study that addresses the causes of the EQC exceedances and elevated levels of total phosphorous and un-ionized ammonia. In an ideal situation, the proponent would propose a study for public review and Board consideration; however, given the historical⁹ and on-going exceedances within the facility and opportunity to conduct some of the investigations this summer, the Board has outlined more prescriptive action to ensure that these issues can be addressed sooner. To better understand the conditions at the Edzo SDF, the CGB is to investigate the cause and implications/effects of these exceedances and elevated concentrations. As mentioned above, BluMetric suggested that there may be other sources in the wetland that may be contributing to elevated concentrations and EQC exceedances. BluMetric also stated that "compliance criteria at 2014-E3 may be too stringent for natural background and/or capabilities of the system" and if the investigation indicated that current compliance criteria are appropriate, "design and/or operational modification should be implemented." During the public review, Board staff asked about whether increased sewage generation rates and sludge levels within the lagoon cells affected the efficacy of the SDF and BluMetric's recommendations (Board staff comments 4 and 6). CGB/BluMetric responded by stating that both increased sewage rates and sludge amounts would reduce the efficacy of the SDF by reducing the retention time (i.e., treatment time) in the lagoon cells. To ensure all potential causes are explored, the

⁸ As per Part B, Condition 3 of CGB's Water Licence, the Board has the authority to amend the SNP at its discretion.

⁹ At SNP station 2014-E3, there have been exceedances of EQC for BOD₅, Total Suspended Solids (TSS), and Faecal Coliforms from 2016-2021.

Board has included an analysis of external sources, SDF design/operations, and EQC as part of the investigation. Because effluent leaving the Edzo SDF enters Great Slave Lake, a fish-bearing waterbody, the Board believes that a discussion on potential effects of total phosphorous and un-ionized ammonia on the lake should be included as part of the study report. Furthermore, it was unclear if there were any contingency measures for sewage management should issues continue or worsen and so Board staff asked the CGB to describe its plan to manage Waste should either of the SDFs no longer function as intended (Board staff comment 9). In response, CGB committed to providing this information in the SDF O&M Plan. Should the investigation below influence available contingency options, the Board believes a revision to the SDF O&M Plan to include this information would not be necessary at this time. Instead, a requirement for discussing contingency options is included as part (f) of the investigation below. The need for an update to the SDF O&M Plan can be considered in review of the investigation report.

- ***Decision #4: The CGB is to conduct a study during this open-water season that investigates the causes and implications/effects of EQC exceedances and elevated total phosphorous and un-ionized ammonia of the Edzo SDF. The CGB is to submit a report to the Board following completion of this Study. This report is to include, but not be limited to, the following information:***
- a. A description of how the study was conducted;***
 - b. A copy of any results and a summary of findings from sampling conducted as part of the study;***
 - c. An analysis of***
 - i. the potential external sources (i.e., outside of the SDF) that are contributing to the exceedances and elevated concentrations. If any external sources are found to be contributing to the exceedances, provide a description with timelines of what change(s) are required (e.g., changes to the SNP) to address this;***
 - ii. whether exceedances and elevated concentrations result from SDF design and/or operations; and if so, a description of what changes to the design and/or operations are required;***
 - d. An analysis of the achievability of the Licence EQC for all parameters. If the analysis finds that EQC are no longer achievable, please describe what changes to the EQC are needed and/or what information is required in order to inform a potential change to the EQC;***
 - e. A discussion of any potential effects on Great Slave Lake at the discharge location as a result of elevated levels of total phosphorous and un-ionized ammonia reporting from the Edzo SDF; and***
 - f. Any other mitigations or investigations that need to be conducted to address EQC exceedances and elevated levels of total phosphorous and un-ionized ammonia, or to increase the efficiency of the SDFs, including a discussion of available contingencies while other investigations are occurring.***

The study should rely on water sampling results collected through the SNP. However, if it is determined that there are not enough results to base the study on, the Board expects that additional sampling take

place as necessary. As required by Schedule 1, Condition 1(i) of the Licence, it is also expected that a summary of this study be included in a future Annual Report following completion.

There were other recommendations raised by reviewers regarding enhancing or ensuring treatment at the Rae and Edzo SDFs is maintained (ECCC comment 4 and GNWT-ENR comment 1). With respect to the Edzo SDF, the Board believes that the above study addresses issues and recommendations raised by reviewers. With respect to the Rae SDF, GNWT-ENR recommended that the CGB explore reductions for phosphorous and ammonia loadings into the Rae SDF (GNWT-ENR comment 1) and ECCC recommended that the CGB investigate optimizing treatment of organics removal at the Rae lagoon (ECCC comment 1). Given that current EQC are being met and that recent repairs to the Rae decant structures have been made, the Board does not believe an investigation is needed at this time.¹⁰ The Board agrees with CGB/BluMetric's response to ECCC comment 2 in that further investigations may be considered and required in the future if water quality issues at the Rae SDF arise (e.g., trends in SNPs, EQC exceedances).

3.2 Version 2.0 of the Sewage Disposal Facility Operation and Maintenance Plan (SDF O&M Plan)

3.2.1 Satisfaction of Board's Previous Direction

A conformity check of Version 2.0 of the SDF O&M Plan was conducted for Rae and Edzo against the Board's 2014 Reasons for Decision. The required revisions included updating SNP details, a Process Flow Diagram for Edzo, and Sludge Management procedures; and describing Honeybag Pit management. The Board believes that CGB has satisfied the Board's previous direction.

Version 2.0 also included "revisions and modifications to operational practices to improve system performance and ensure that the Rae SDF and Edzo SDF are operated in accordance with the respective requirements listed in Part D of the Water Licence." The Board believes the changes made to Version 2.0 of the SDF O&M Plan are in line with the Licence and provide additional guidance for the CGB to ensure the function of the SDFs. No concerns were raised from reviewers regarding the additions made to the SDF O&M Plan. Based on the review of the submission and the comments and responses made during the public review, the Board has not identified any issues that would it from approving V2.0 of the SDF O&M Plan and thus, approves Version 2.0.

- ***Decision #5: The Board approves Version 2.0 of the Sewage Disposal Facility Operation and Maintenance Plan (SDF O&M Plan).***

The Board has however identified revisions (i.e., A to F) that would provide greater clarity and these are described in section 3.2.2 of this Reasons for Decision. The nature of these revisions are similar to those required for the Efficacy Studies so the Board believes a revised Version (i.e., Version 2.1) of the SDF O&M Plan can be submitted to the Board within 90 days of the Board's decision.

- ***Decision #6: The CGB is to submit Version 2.1 of the SDF O&M Plan 90 days of the Board's decision. Version 2.1 of the SDF is to include Revisions A to F.***

¹⁰ See WLWB Online Registry for [W2014L3-0002 – Behchoko – 2020 Annual Report – Apr 1 21](#)

3.2.2 Revisions to the SDF O&M Plan

The Board believes revisions to the O&M Plan are required to reflect commitments made by CGB during the public review and to ensure clarity of future O&M Plans. The revisions are based on comments raised during the public review (GNWT-ENR comment 10; Board staff comments 9 and 10) and review of the submission.

Revision History

To provide clarity between versioning by the consultant and versioning as per the Public Registry, page ii of the SDF O&M Plan is to include an additional column to the revision history table to match the naming of documents on the public registry (i.e., Revision 2.1 is Version 1.0 on the Public Registry, Revision 3.0 'this report' is Version 2.0 on the Public Registry, next revision is Version 2.1 on the Public Registry, etc.)

- ***Revision A: The CGB is to update the revision history table (page ii) to include Versioning that matches what is on the Board's Public Registry in Version 2.1 of the SDF O&M Plan.***

Decant Timing Options

During the public review, GNWT-ENR recommended that the CGB clarify the timings of the decant at the Rae SDF to ensure optimum wastewater treatment, specifically to ensure that initial annual decant occurs once freshet has ended (GNWT-ENR comment 10). The CGB agreed with GNWT-ENR's recommendation and committed to revise the O&M Plan to clarify.

- ***Revision B: The CGB is to revise section 4.6 of the SDF O&M Plan to address GNWT-ENR Comment 10 in Version 2.1 of the SDF O&M Plan.***

Emergency Response

The Board has identified that emergency response contacts (section 6) may need to be updated to reflect current staff at the CGB and GNWT-ENR. For clarity, this change is to be included in a revised Version of the SDF O&M Plan.

- ***Revision C: The CGB is to revise the emergency response section (section 6) to reflect current up-to-date contacts and to include a section on emergency planning should SDFs no longer function as intended in Version 2.1 of the SDF O&M Plan.***

Nuisance Management

During the public review, Board staff requested CGB describe whether nuisance¹¹ had been or is currently an issue at the SDF and what CGB plans to do to mitigate potential issues (Board staff comment 10). CGB responded stating that there were no known nuisance issues at either SDF and committed to updating sections 3.5 and 4.5 of the SDF O&M Plan to reflect this. Although there are presently no known nuisance issues, in the case that it becomes an issue in the future, the Board expects the CGB update its SDF O&M Plan to include proposed mitigations.

¹¹ Nuisance is described as something that causes a problem (e.g., wildlife)

- **Revision D: The CGB is to revise sections 3.5 and 4.5 to reflect its response to Board staff comment 10 and include a commitment to submit a revised SDF O&M Plan with proposed mitigations if nuisance becomes an issue in the future.**

Location of Truck Dumping Station

In Figure 2 of the SDF O&M Plan, the Board notes that there are two dumping stations for the Rae SDF, one of which appears to be a location that would dispose sewage Waste directly into Cell 2. As per section 3.2.2 of the SDF O&M Plan, it is the Board's understanding that raw sewage is only discharged from the truck dumping station into Cell 1. The figure is to be updated to more accurately reflect the process outlined in 3.2.2.

- **Revision E: CGB is to update Figure 2 to more accurately reflect the process outlined in section 3.2.2 in Version 2.1 of the SDF O&M Plan.**

Reference to Water Treatment Facility/Water Supply Facility

The Board notes that the SDF O&M Plan includes two references to the same facility: the "Water Supply Facility" and the "Water Treatment Facility". To reduce confusion and to be in line with the Water Licence, references to the "Water Treatment Facility" are to be changed to the "Water Supply Facility".

- **Revision F: CGB is to change any references to "Water Treatment Facility" to "Water Supply Facility" in Version 2.1 of the SDF O&M Plan.**

3.3 Sludge

Based on details included in section 4.4.1 of the SDF O&M Plan, it was identified during the public review that sludge removal at the Edzo SDF had been triggered; however, it was unclear if it had been removed and if it was contributing to the degrading effluent quality (Board staff comment 6). CGB responded that sludge had not yet been removed and that sludge amounts may affect the treatment of sewage by reducing the storage volume and lowering the retention time within the lagoon cells. Sludge removal was going to be assessed by CGB "in the near future". The Board notes that sludge removal from Cell 1 of the Rae SDF has also been triggered. As per sections 4.4.1 and 3.4.1 of the SDF O&M Plan, the Board directs CGB to remove the sludge in the Edzo lagoon cells and Cell 1 of the Rae SDF. In light of the conclusions made in the Efficacy Studies, sludge removal is to occur as soon as possible, starting this open-water season. CGB is to outline when sludge removal should take place to ensure that it occurs in a timely manner (i.e., a schedule with proposed sludge removal dates) in the cover letter of the revised SDF O&M Plan (Version 2.1). A letter confirming sludge removal is complete should also be submitted to the Board and the Inspector to ensure sludge removal occurs as expected.

- **Decision #7: The CGB is to remove the sludge in the Edzo lagoon cells and Cell 1 of the Rae lagoon as per sections 4.4.1 and 3.4.1 of the SDF O&M Plan as soon as possible, starting this open-water season. The CGB is to provide a schedule with proposed sludge removal dates in the cover letter of the revised SDF O&M Plan (Version 2.1) and is to submit a letter confirming sludge removal to the Board and the Inspector once sludge removal is completed.**

3.4 Water Supply Facility Residuals

As described briefly in the background section, some of the Water Supply Facility (WSF) residuals (i.e., backwash and sludge) are either pumped or piped into the Rae and Edzo SDFs. Backwash from Rae is discharged into Great Slave Lake while the sludge is trucked to the lagoon of the Rae SDF. Meanwhile for Edzo, both sludge and backwash are mixed and piped into the Edzo lagoon. The deposit of these residuals pre-date the current licence and there is limited information on the quantity and quality of sludge and backwash produced.¹² With respect to backwash, the Board notes that correspondence from 2004 from ECCC (Environment Canada at the time) states that the “quality of water being returned [to the lake] should not cause any concern with the Board as the solids concentration is in the range of what would be expected from a well operated secondary wastewater treatment facility” and that the Board may want to monitor the water quality of this water.¹³ Based on the review of historical SNPs annexed to CGB’s Licences,¹⁴ it does not appear that monitoring of these residuals were required. During the public review, GNWT-ENR made several comments regarding these residuals (see GNWT-ENR comments 2-8). GNWT-ENR recommended that the CGB provide volumes and quality characterizations of the WSF residuals disposed of in Great Slave Lake and in the SDFs, including some of this information within the SDF O&M Plan. To support its recommendations, GNWT provided a study prepared by the Centre for Water Resources Studies from Dalhousie University on the “Recommendations for Municipal Water Treatment Plant Waste Residuals in the Northwest Territories” (GNWT-ENR comment 15). The study states that “efforts should be made to collect WTP waste volumes and water quality data, as it will provide information that will be relevant for determining the best management and disposal practices.” As such, GNWT-ENR also recommended that additional parameters such as free chlorine and total aluminum be included in the SNP for both Rae and Edzo SDFs. CGB indicated that the information required from the WSF is outside the scope the SDF O&M Plan and that some of the requested information is not tracked by the CGB. The CGB deferred the SNP requirement recommendations to the Board.

WSF residuals such as backwash and sludge are not included in the CGB’s current licence and there is no requirement for the submission of an O&M Plan for the WSF. The Board recognizes that the questions raised by GNWT-ENR during this public review about the quality and quantity of backwash discharged into Great Slave Lake, along with the information presented in Appendix C (identifying water quality and quantity of the backwash into Great Slave Lake), have highlighted an information gap to potentially be investigated and note it has been several years since the initial construction and commissioning of the WSFs. However, the Board believes that issues pertaining to WSF residuals can be addressed, if necessary, in a separate proceeding as was recently done for the Gameti Water Licence W2018L3-0001 and the Wekweèti Water Licence W2017L3-0001.¹⁵ For efficiency, should the Board wish to address this gap via an amendment to the Licence, the Board will wait until the submission of the investigation into the Edzo SDF be submitted and considered. This is because that investigation could lead to the need for an amendment to the EQCs for the Edzo SDF and it would be more efficient to address both these issues in

¹² See WLWB Online Registry for [MV2003L3-0010 – Behchoko – Letter from GNWT-MACA RE Water Treatment Plant and Reservoir Upgrades – Feb 22 05](#)

¹³ Ibid.

¹⁴ For MV2003L3-0010 or W2014L3-0002

¹⁵ See WLWB Online Registry for [Wekweèti – WL Amendment – RFD – Aug 20 20](#) and [Gameti – Water Licence – Amendment – Reasons for Decision – Aug 19 19](#). As per paragraph 36(b) of the *Waters Act*, the Board may consider an amendment under its own motion.

one proceeding. In the meantime, the Board believes that including parameters in the SNP (i.e., total aluminum and free chlorine) to better understand the potential effects (if any) of inputs from the WSF into the SDFs is a reasonable step and has included these changes to the SNP. The Board notes that the frequency of sampling for these parameters was not described by GNWT-ENR; however, in reviewing SNP Reports, the Board has found that aluminum has at times already been analyzed for as part of monitoring for other total trace metals once between June and October for 2014-E2, E3, E4, R3, and R4. It has also been included and analyzed at SNP station 2014-R2 (located at the Rae SDF near the decant structure) at least 10 days prior to decant. The Board believes this frequency to monitor aluminum and free chlorine once between June and October when a trace sample is already taken, and at R2 (which should only occur once or twice per sampling season), is reasonable and appropriate.¹⁶ Future changes to the SNP can occur anytime in accordance with Part B, Condition 6.

- ***Decision #8: The Board has updated the Surveillance Network Program to include sampling of free chlorine and total aluminum to the Rae and Edzo SNP SDF stations as recommended by GNWT-ENR comments 8 and 9.***

As per Part D, Condition 13 of the Licence, the CGB is required to submit characterizations of the sludge from the WSFs that include parameters outlined in Schedule 2. The Board has received results and has been working with CGB to address outstanding requirements; however, note that what has been submitted is still incomplete (i.e., some parameters are still missing for the Rae sludge and it is unclear where samples were taken and what has been submitted for the Edzo sludge). Since the issue of WSF residuals has been raised during this public review, the Board reiterates the requirements of Part D, Condition 13 and Schedule 2 that the characterization of the Rae and Edzo sludge leaving the WSFs be submitted to the Board. The Board requires a single complete sludge characterization submission be submitted within 90 days of the Board's decision to ensure a timely and efficient public review process. This submission should include either new results or rationale for missing results as well as indicate where samples were taken in a supporting cover letter.

- ***Decision #9: The Board reiterates the requirements of Part D, Condition 13 and Schedule 2 and directs CGB to provide a complete characterization of the Rae and Edzo sludge leaving the Water Supply Facilities with a supporting cover letter to the Board within 90 days of the Board's decision.***

3.5 Other

3.5.1 Field Measurements

During the public review, ECCC recommended that the SDF O&M Plan and the SNP Training Manual incorporate requirements for field parameters such as pH, temperature, and field notes for weather conditions, watercourse/waterbody conditions, and effluent observations (ECCC comment 2). These results would then be reported in the Annual Report and according to ECCC, would assist with the interpretation of monitoring results. CGB states that the SDF O&M Plan submitted for Board approval already states that field measurements should be recorded and deferred to the WLWB for requirements

¹⁶ See WLWB Online Registry for [W2014L3-0002 – Behchoko – SNP Report – Site R4, E2, E3, and E4 – Final Report – June 29 2016 – Jul 22 16](#) as an example.

to have these details included in the SNP Manual. The Board agrees with ECCC's rationale and given the approval of the SDF O&M Plan, no changes to the SDF O&M Plan are required. However, to ensure that the results would be included in the Annual Report, the Board has updated Schedule 1 (Annual Report). For consistency, updates to the SNP Manual and the Annual Report Template to include a section on taking field measurements will also be made by Board staff as soon as possible.

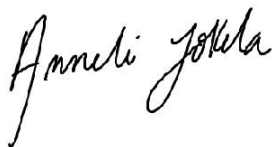
- **Decision #10: The Board updated Schedule 1 to include the submission of field parameters (pH and temperature) and field notes as part of CGB's Annual Report.**

3.5.2 Other minor revision to the SNP

In reviewing the documents, the Board has identified that incorrect reference to 'Frank's Channel' was included in the SNP and has corrected this error.

- **Decision #11: The Board updated the Surveillance Network Program to reflect sampling at Frank Channel.**

Signed the 29th of July 2021, on behalf of the Wek'èezhii Land and Water Board



Witness



Joseph Mackenzie
Chair, Wek'èezhii Land and Water Board