



February 25, 2022

Conservation, Climate and Parks
Environmental Stewardship Division
Environmental Approvals Branch
1007 Century Street
Winnipeg, MB R3H 0W4

Client File No.: 1069.10
020-17-08-11-00
020-17-08-11-0N

Attention: James Capotosto, Director

**RE: NOTICE OF ALTERATION – CITY OF WINNIPEG SOUTH END WATER POLLUTION
CONTROL CENTRE (SEWPCC) – ENVIRONMENT ACT LICENCE
NO. 2716RR**

On March 15, 2021 Manitoba Conservation and Climate (MCC) – now Conservation, Climate and Parks (CCP) – responded to the City of Winnipeg’s (City) Notice of Alteration (NOA) submitted on December 18, 2020 whereby the City requested a one-year extension to December 31, 2021 to meet the total phosphorus limit of 1.0 mg/l and to report back by September 30, 2021 with an updated construction completion date. MCC requested the City provide a revised NOA by September 30, 2021.

On September 8, 2021 a virtual meeting was held between MCC and the City to discuss the progress and status of the South End Water Pollution Control Centre (SEWPCC) upgrades. At this meeting the City shared several significant schedule milestones for October and November that would impact the critical path and, because of this, the City requested an extension for the NOA submission to November 30, 2021 (from September 30, 2021); this was approved by MCC on September 29, 2021.

On November 10, 2021 another virtual meeting was held between MCC and the City to discuss the continued construction and commissioning issues at SEWPCC and to advise MCC that the critical milestones for October and November were not met, Biological Nutrient Removal (BNR) demonstration testing had not started as planned, and SEWPCC would not achieve licence compliance by December 31, 2021.

The City submitted a Notice of Alteration on November 30, 2021, explaining the issues that were impacting schedule as well as an updated commissioning sequence. This submission which was approved by MCC, recommended revised dates as follows:

- start date of January 10, 2022 for the Biological Nutrient Removal (BNR) demonstration testing and seeding
- end of March 2022 for compliance with the licence limit for total phosphorous under average flow conditions
- period between March and June 2022 for compliance with the licence limit for total nitrogen under average flow conditions
- end of July 2022 for compliance with all licence effluent limits for all flow conditions
- date of January 31, 2023 for full licence compliance

Since November 30, 2021, the City of Winnipeg has been providing regular updates to MCC on events that have caused further delay and this formal Notice of Alteration request, as discussed with MCC on February 24, 2022, provides an updated commissioning sequence and revised compliance dates.

These delays have been caused by the following:

- A current imbalance on December 25, 2021 led to a failure of the recycle pumps used to prevent freezing of the BNR system prior to seeding;
- The recycle pumps were designed as a level two priority alarm; as a result, emergency call out was not issued resulting in a delay identifying the failure.

This resulted in the following impacts:

- Significant release of media from the IFAS tanks to the secondary clarifiers;
- Investigation into root cause and implementation of short and long-term mitigative measures to ensure plant stability;
- Ongoing efforts to recover the IFAS media from the secondary clarifiers. It is anticipated this will take another few weeks to complete. The City is working with the contractor to review options to accelerate this process.

As a result of these issues, the BNR demonstration testing has been postponed beyond mid-February 2022. This creates additional risks of plant instability during seeding due to cold effluent temperatures (which limit nitrification) and high flows (which can cause biomass washout) during the spring freshet.

After thorough analysis of the risks, exacerbated by extreme cold and snowfall accumulation this winter, seeding will be deferred until June 1, 2022 due to cold effluent and high probability of a major spring flood event. By this time, effluent temperatures will have risen to a point where nitrification can occur. As well, while river levels and associated plant flows vary greatly, on a typical year they will have decreased sufficiently to allow for the successful build of biomass without washout from high flows.

As stated previously, ferric dosing to reduce phosphorous levels is expected to start approximately 1 week following the start of demonstration testing. Based on this schedule, it is expected that phosphorous concentrations will be reduced incrementally as BNR tanks are sequentially seeded and will be below the 1.0 mg/l licence requirement by the end of August 2022.

SEWPCC COMMISSIONING SEQUENCE

The following identifies the updated steps required for commissioning, associated operational risks and current status. Table 1 has also been revised to reflect the June seeding start date through the commissioning activities to stable operation and licence compliance.

Area C:

Chemical Building

- Remediate final prerequisites for demonstration testing of the ferric dosing system prior to start of seeding.

Electrical Building

- Final demonstration testing prior to seeding.

Area R: BNR

- Remediate final deficiencies identified during IWT to be completed prior to seeding as part of demonstration testing.
- Currently, the released IFAS media is being recovered from the secondary clarifiers and returned to the three tanks. Approximately 70% of the total media is on site; the remaining is expected prior to the start of seeding in June.
- Demonstration testing and seeding of BNR Tank 1 will start on or around June 6, 2022; Tanks 2 and 3 will be tested sequentially following stable operation of the prior tank
 - “Seeding” begins with the transportation of waste activated sludge (WAS) from the West End Water Pollution Control Centre (WEWPCC); the WAS helps start the bacterial growth which is required for the biological nutrient removal process
 - Stable operation is expected to take three to four weeks per tank although with warmer effluent temperatures this may be accelerated
 - Once Tank 1 is stable and bacteria has been established, Tank 2, and subsequently Tank 3, will be tested. From experience, Tanks 2 and 3 will reach stable operation in a shorter period of time because the bacteria in Tank 1 will help populate the other tanks
 - As each tank comes online, chemical dosing with ferric will be used to reduce phosphorous concentrations incrementally.

Based on modelling, as each BNR Tank is brought online the effluent quality will incrementally improve towards licence compliance. With Tank 1 operating, approximately 43% of the primary effluent will go through the BNR; this increases to 85% and 100% with Tanks 2 and 3, respectively. The individual process and combined effluent parameters are indicated in Table 2 for the various stages of BNR commissioning.

Table 1: SEWPCC Commissioning Sequence

| Task | Revised Start | Previous Expected Completion | Revised Expected Completion |
|---|----------------------|-------------------------------------|------------------------------------|
| Area C: Chemical Ferric delivery pre-requisites | May 16, 2022 | Dec 17, 2021 | May 17, 2022 |
| Area C: Electrical demonstration testing | Apr 11, 2022 | Dec 17, 2021 | May 2, 2022 |
| Area R: Demonstration prerequisites | Started | Dec 17, 2021 | May 2, 2022 |
| Area R: Load media in 3 BNR tanks, including recovered from SC3 and new | Started | Dec 17, 2021 | Prior to seeding |
| Area R: Tank 1 Seeding and Stable Operations | Jun 6, 2022 | Feb 11, 2022 | Jun 30, 2022 |
| Area R: Tank 2 Seeding and Stable Operations | Jul 4, 2022 | Mar 11, 2022 | Jul 29, 2022 |
| Area R: Tank 3 Seeding and Stable Operations | Aug 2, 2022 | Mar 29, 2022 | Aug 29, 2022 |
| Phosphorous Removal with Chemical Trimming | | Mar 29, 2022 | Aug 29, 2022 |
| Compliance with Nutrient Limits for all Flow Conditions | | Jul 31, 2022 | Sep 30, 2022 |
| Licence Compliance with full Biological Nutrient Removal | | Jan 31, 2023 | Jul 31, 2023 |

Risks to BNR Commissioning

The following are some key risks related to licence compliance:

- Continued quality and schedule impacts by the contractor with respect to the remediation of deficiencies to move to demonstration testing and seeding. The project team continues to work with the contractor to resolve scheduling and work plan deficiencies
- Supply chain issues still present a challenge and increase the risk of receiving the remaining materials
- BNR commissioning will be diverting flows from the high purity oxygen (HPO) system; during this transition, there may be minor impacts to the effluent quality

Table 2: Average Effluent Quality at Different BNR Commissioning Stages

| Commissioning Stage | HPO Secondary Effluent | BNR Effluent | Combined Effluent | Expected Date | Revised Date |
|--|-----------------------------|------------------------------|-------------------------------|-------------------|-----------------|
| BNR Tank 1 in Stable Operation | Flow, ML/d 22 to 26 | Flow, ML/d 16 to 20 | Flow, ML/d 42 | February 11, 2022 | June 30, 2022 |
| | BOD, mg/L 10 | BOD, mg/L 10 | BOD, mg/L 10 | | |
| | TSS, mg/L 10 | TSS, mg/L 10 | TSS, mg/L 10 | | |
| | NH ₃ -N, mg/L 40 | NH ₃ -N, mg/L 2 | NH ₃ -N, mg/L 23.7 | | |
| | TKN, mg/L 55 | TN, mg/L 12 | TN, mg/L 36.6 | | |
| | TP, mg/L 4.5 | TP, mg/L 0.8 | TP, mg/L 2.9 | | |
| BNR Tanks 1 and 2 in Stable Operation | Flow, ML/d 4 to 8 | Flow, ML/d 32 to 36 | Flow, ML/d 40 | March 11, 2022 | July 29, 2022 |
| | BOD, mg/L 10 | BOD, mg/L 10 | BOD, mg/L 10 | | |
| | TSS, mg/L 10 | TSS, mg/L 10 | TSS, mg/L 10 | | |
| | NH ₃ -N, mg/L 40 | NH ₃ -N, mg/L 2 | NH ₃ -N, mg/L 4.7 | | |
| | TKN, mg/L 55 | TN, mg/L 12 | TN, mg/L 14 | | |
| | TP, mg/L 4.5 | TP, mg/L 0.8 | TP, mg/L 1.3 | | |
| BNR Tanks 1, 2 and 3 in Stable Operation (40% Media) | | Flow, ML/d 48 | Flow, ML/d 48 | March 29, 2022 | August 29, 2022 |
| | | BOD, mg/L 10 | BOD, mg/L 10 | | |
| | | TSS, mg/L 10 | TSS, mg/L 10 | | |
| | | NH ₃ -N, mg/L 2 | NH ₃ -N, mg/L 2 | | |
| | | TN, mg/L 12 | TN, mg/L 12 | | |
| | | TP, mg/L 0.8 | TP, mg/L 0.8 | | |
| BNR Tanks 1, 2 and 3 in Full Operation (100% Media and Design Flows and Loads) | | Flow, ML/d 90 | Flow, ML/d 90 | July 31, 2022 | Sept 30, 2022 |
| | | BOD, mg/L 8 | BOD, mg/L 8 | | |
| | | TSS, mg/L 8 | TSS, mg/L 8 | | |
| | | NH ₃ -N, mg/L 1.5 | NH ₃ -N, mg/L 1.5 | | |
| | | TN, mg/L 11 | TN, mg/L 11 | | |
| | | TP, mg/L 0.8 | TP, mg/L 0.8 | | |

REMAINING PROJECT UPGRADE WORK ACTIVITIES

Due to the schedule slippage and work to recover IFAS media, the remaining construction work has been reprioritized with revised dates – described below and in Table 3.

- Secondary Clarifiers 1 & 2**
 Refurbishment of the secondary clarifiers (SC) 1 & 2 commenced September 20th, 2021 following the stable operation of SC 4 & 5. Work involves the concrete refurbishment, installation of new weir baffles, electrical controls, mechanical skimmer and walkway. Additional rehabilitation work has been identified with a revised completion of September 1, 2022.
- Grit and Screening Building (Area G) Demonstration Test**
 Commissioning has been delayed as a result of automation deficiency items and commissioning delays. This work is ongoing with a revised completion date of March 25, 2022.

- Secondary Clarifiers 4 & 5 Demonstration Test**
 Demonstration testing and stable operation of SC 4 and 5 has been achieved and are operating without issue. The contractor still needs to complete documentation and final contract deliverables. This work is ongoing and expected to be complete with handover in February 2022.
- High Rate Clarification System Demonstration Test**
 The high rate clarifiers testing and commissioning has been delayed to allow the contractor to focus on Areas S and R. This work is expected to be completed in September 2022.
- Raw Sewage Pump #2 Demonstration Test**
 The raw sewage pump #2 to be installed and tested during the low flow period of 2023. This work is expected to be complete by March 31, 2023.
- HPO Tanks conversion to Fermenters and Biofilter, Demonstration Test**
 Work on the HPO Tank conversion to fermenters will occur once seeding of the BNR is completed and stable. An estimated completion is July 31, 2023.

Table 3: Remaining Upgrade Work to Achieve Full Biological Nutrient Removal

| Task | Revised Start | Previous Expected Completion | Revised Expected Completion |
|--|---------------|------------------------------|-----------------------------|
| Area S: Secondary Clarifiers 1 & 2 | Started | March 29, 2022 | September 1, 2022 |
| Area G: Grit and Screen Commissioning | Ongoing | February 28, 2022 | March 25, 2022 |
| Area S: Secondary Clarifiers 4 & 5 | Ongoing | January 31, 2022 | February 28, 2022 |
| Area K: High Rate Clarification System | March 2022 | September 9, 2022 | No Change |
| Raw Sewage Pump #2 | November 2022 | March 31, 2023 | No Change |
| HPO Tank Conversion | June 2022 | January 31, 2023 | July 31, 2023 |

With the revised schedule, compliance with licence limits under average flow conditions should be achieved by end of August 2022 barring extended flood or high flow conditions. Licence limit compliance for all flow conditions should be achieved by September 2022 with full licence compliance, including biological nutrient removal, anticipated by July 31, 2023.

The City will continue to provide updates on the progress and schedule of critical milestones as part of the regular SEWPCC Biological Nutrient Removal and Upgrade Project summary reports. The City of Winnipeg continues to work diligently on the SEWPCC upgrade as well as seeking opportunities to accelerate schedule where possible.

Should you wish to review this information in more detail, we would be pleased to meet with your team. If you have any questions about this letter, please contact Mr. Colin Javra at 204-986-4480 or by email at cjavra@winnipeg.ca.

Sincerely,



Jon Goodbrandson, for:

Chris Carroll, P.Eng.
Manager of Wastewater Services

CMJ/dr

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