Water and Waste
Eaux et déchets

Manitoba Environment and Climate
Environmental Stewardship Division
Environmental Approvals Branch
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July 28, 2023
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Our File No.: S-1146, EMS
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Attention: Agnes Wittmann, Director

RE: QUARTERLY PROGRESS REPORT FOR NEWPCC INTERIM PHOSPHOROUS REMOVAL: APRIL 1 - JUNE 30, 2023

The City of Winnipeg (City) is pleased to submit 2023 Quarter 2 Progress Report for Interim Phosphorous in accordance with the conditional approval of the Notice of Alteration for the North End Sewage Treatment Plant (NEWPCC). The work conducted for the period of April 1 to June 30, 2023 is summarized in this report.

April

Piping installations for ferric chloride in the galleries of the sewage treatment plant started and continued into May and June. A concrete pour for the rail shed was executed and electrical work started onsite for power feed and conduit laying. The electrical work is scheduled to take several months to complete.

May

The foundation works for the buildings was mostly completed by end of May. Block wall construction started and piping and electrical work continued. Building construction will continued into Q3.

June

Mechanical works continued with carrier piping and supports for ferric chloride. Shutdowns for valve replacements were scheduled for Q3.

Building envelope work continued. Containment pits for chemical spills were constructed and preparations were made to store, inspect, and install the storage tanks which are expected to arrive in July.

The estimated phosphorous concentrations throughout the various phases of the NEWPCC Upgrade were based on preliminary AECOM studies and are shown in Table 1.

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Table 1: Total phosphorous concentrations through various phases of the NEWPCC Upgrade

Phase	Period	Total Phosphorous NEWPCC Final Effluent	
		Modelled Data*	Monitored Data
Stage 1: Phosphorous reduction with existing infrastructure	Until August 2021	Approximately 4.0 to 4.5 mg/L annual average	3.6 mg/L (Average 2017 to 2021)
Stage 2: Maximized phosphorous reduction through optimization with existing infrastructure	August 2021 to November 30, 2023	Approximately 3.5 mg/L annual average	2.3 mg/L (Average 2022 onward)
Stage 3: Interim phosphorous reduction through additional infrastructure as approved on May 28, 2021	December 1, 2023 to December 2030	Approximately 2.5 to 3.0 mg/L annual average [1]	
Stage 4: Enhanced interim phosphorous reduction to as low as the 1.0 mg/L effluent phosphorous limit following commissioning of the Biosolids Facility	January 2031 to commissioning of Nutrient Removal Facility	1 mg/L [2]	
Stage 5: Ongoing phosphorous removal meeting the 1.0 mg/L effluent phosphorous limit	TBD based on commissioning of Nutrient Removal Facility	1 mg/L	

* Based on the 'NEWPCC Interim Phosphorous Removal and Detail Review and Benchscale Testing Report, December 2020

[1] phosphorous levels may increase as City growth consumes sludge processing capacity

[2] phosphorous levels may increase after January 2032 dependant on sludge loading levels (assuming maximum sludge generating scenario)

Monitored total phosphorous concentrations at NEWPCC indicate the plant has been outperforming anticipated modelled data. The results have been trending downward, with noticeably lower total phosphorous concentrations for Stage 2. The City is working on decreasing sludge loading to the existing digesters by removing grease, scum, and grit through various projects.

The modelled data is a conservative estimate of total phosphorous concentrations. The model was developed based on historical wastewater loadings and factored in the projected impacts of upgrades at SEWPCC. Actual results are dependent on many variables, such as:

- the overall health and performance of the treatment bacteria;
- the performance of various processes;
- wet weather flow;
- changes in development;
- industrial activity (especially high strength industry);
- ongoing capital improvements

With the commissioning of the Interim Phosphorous facility at the end of 2023, it is anticipated that total phosphorous will further decrease. Based on the better than expected results over the past several years, it is expected that the plant could be at or near licence limits for phosphorous for portions of the year through the use of chemical removal.

The City will continue to optimize phosphorous removal within existing digester capacity to the greatest extent possible with the various dosing points. Actual results will depend on full scale testing following commissioning of the Interim Phosphorous facility and the various factors described above.

Phosphorous concentrations in the final effluent are reported in the NEWPCC's monthly compliance reports and can be found online at winnipeg.ca/wwcompliance.

The overall schedule for the Interim Phosphorous Removal project is shown in Table 2.

Table 2: Schedule for Interim Phosphorous Removal

Deliverable	Description	Contractual Dates	% Complete May Report	% Complete June Report	Originally Projected Date	Revised or Completed Date	Work Remaining
Consultant RFP	Draft, review and post for Tender	N/A	100%	100%	July 2021	July 31, 2021	Complete
	Evaluation, Admin Report, approvals and Award	N/A	100%	100%	September 30, 2021	September 28, 2021	Complete
Preliminary Design (PD)	PD plus reviews and approval by WWD	February 3, 2022	100%	100%	March 31, 2022	February 2, 2022	Complete
Detailed Design (DD)	DD plus reviews and approval by WWD	May 18, 2022	100%	100%	June 30, 2022	May 18, 2022	Complete
Construction Tender	Draft, review and post for Tender	May 26	100%	100%	June 30, 2022	June 13, 2022	Complete
	Tender posting period	May 26, 2022 to June 23, 2022	100%	100%	June 30, 2022	June 13, 2022 to July 28, 2022	Complete
	Award Recommendation, Admin Report, approvals & Award	July 15, 2022	100%	100%	June 30, 2022	September 22, 2022	Complete
Construction and Commissioning	Substantial Performance	July 20, 2023	35%	45%	June 30, 2023	November 30, 2023	Ongoing
	Total Performance	August 31, 2023			September 30, 2023	January 26. 2024	
	Warranty Period	August 31, 2024			December 31, 2024	January 29, 2025	
Full Scale Testing and Implementation	Process review, dosing estimates, trouble shooting, optimization	August 31, 2024			December 31, 2024	January 29, 2025	
Closeout	Certificate of Acceptance	September 2, 2024			December 31, 2024	January 30, 2025	

Phosphorous Optimization

The NEWPCC Operators have maximized ferric dosing to the sequencing batch reactors (SBRs) and digesters based on the existing ferric chloride pumping capacity. The average SBR effluent phosphorous load for Q1 2023 is 68 kg/day which corresponds with an average effluent concentration of 36 mg/L.

This is more than historical levels, which ranged from 6 to 35 kg/day. The higher effluent levels is likely caused by ongoing operational adjustments and recalibrations as the SEWPCC plant transitions from chemical phosphorous removal to biological phosphorous removal. Biological phosphorous removal at SEWPCC is occurring due to the warmer influent temperature. The phosphorous removed biologically from SEWPCC will be released in the NEWPCC digesters which will then have to compensate its ferric chloride dosing.

The SBRs are performing better than intended in their original design and are below the licence limit of 119 kg/day of phosphorous specified in Clause 27 of the NEWPCC Licence No. 2684 RRR.

Should you have any questions on this report, please contact Michelle Paetkau at 204-986-4904 or by email at mpaetkau@winnipeg.ca.

Sincerely,

C Wiebe

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