Agenda – Council – February 25, 2021

Report – Standing Policy Committee on Water and Waste, Riverbank Management and the Environment – February 9, 2021

Item No. 2 New Capital Project for Interim Chemical Phosphorous Removal for the North End Sewage Treatment Plant

STANDING COMMITTEE RECOMMENDATION:

On February 17, 2021, the Executive Policy Committee concurred in the recommendation of the Standing Policy Committee on Water and Waste, Riverbank Management and the Environment and submitted the following to Council:

1. That the NEWPCC Interim Phosphorus Removal capital project be approved as a 2021 capital project, outside of the normal budget process, with an AACE Class 4 capital cost estimate of $10,500,000.00, included as Appendix A.

2. That, subject to approval of Recommendation 1, the financial operating and Environmental Projects Reserve implications of the NEWPCC Interim Phosphorus Removal project be referred to the 2022 Budget process.

3. That the Winnipeg Public Service be directed to work with stakeholders to look at the optimization of interim solutions to continue to lower phosphorus levels discharged from the North End Sewage Treatment Plant.

4. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

Report – Standing Policy Committee on Water and Waste, Riverbank Management and the Environment – February 9, 2021

DECISION MAKING HISTORY:

EXECUTIVE POLICY COMMITTEE RECOMMENDATION:

On February 17, 2021, the Executive Policy Committee concurred in the recommendation of the Standing Policy Committee on Water and Waste, Riverbank Management and the Environment and submitted the matter to Council.

STANDING COMMITTEE RECOMMENDATION:

On February 9, 2021, the Standing Policy Committee on Water and Waste, Riverbank Management and the Environment concurred in the recommendation of the Winnipeg Public Service, with the following amendment:

- Add the following new Recommendation 3 and renumber the remaining recommendation accordingly:

    "3. That the Winnipeg Public Service be directed to work with stakeholders to look at the optimization of interim solutions to continue to lower phosphorus levels discharged from the North End Sewage Treatment Plant."

and submitted the matter to the Executive Policy Committee and Council.

ADMINISTRATIVE REPORT

Title: **NEW CAPITAL PROJECT FOR INTERIM CHEMICAL PHOSPHOROUS REMOVAL FOR THE NORTH END SEWAGE TREATMENT PLANT**

Critical Path: **Standing Policy Committee on Water and Waste, Riverbank Management and the Environment – Executive Policy Committee – Council**

AUTHORIZATION

Author	Department Head	CFO	CAO
Geoff Patton, P. Eng., Manager of Engineering Services	M. L. Geer, CPA, CA, Director, Water and Waste Department	P. Olafson, Interim CFO	M. Ruta, Interim CAO

EXECUTIVE SUMMARY

The North End Sewage Treatment Plant (NEWPCC) is not able to meet a phosphorous removal limit of 1 mg/L with the current infrastructure. An effluent phosphorus limit of 1 mg/L is an Environment Act Licence requirement. Studies have indicated that some phosphorous removal (not to a level of 1 mg/L) is possible on an interim basis, in advance of the full upgrade, at NEWPCC. Additional infrastructure at NEWPCC is required to implement this change.

The estimated capital and annual operating cost to reduce phosphorous on an interim basis is $10.5 million and $2.2 million, respectively. This would reduce the annual load of NEWPCC phosphorous to the Red River by approximately eight to 23 percent. Winnipeg's overall current contribution to Lake Winnipeg is approximately 4% with 70% of that total from the NEWPCC. With Interim Phosphorous Removal the City's relative contribution would decrease to approximately 3.5 – 3.8%. It is estimated that the interim phosphorus removal infrastructure at NEWPCC can be online by August 2023. It is expected that the proposed interim phosphorus removal infrastructure at NEWPCC will not be eligible for funding from other levels of government.

A new 2021 capital project to implement the interim phosphorus removal infrastructure at NEWPCC is recommended so that work on the proposed change can begin as soon as possible. It is also recommended that the operating budget implications of the proposed change be referred to the 2022 budget process.

The City of Winnipeg currently contributes approximately four percent of the total annual phosphorus loading to Lake Winnipeg. Upon completion of the currently proposed $1.8 billion NEWPCC Upgrade project it is estimated the City will contribute approximately

two percent of the total annual phosphorus loading to Lake Winnipeg. The estimated capital and operating costs for interim phosphorous removal at NEWPCC have not been included in previously approved budgets and are not included in the scope of the $1.8 billion NEWPCC Upgrade project.

Interim chemical phosphorous removal will reduce Citywide sewage treatment (Biosolids) capacity. This impact has been included in the previously identified remaining treatment capacity highlighted in a November 2020 report to Council, but the overall impact will have to be verified with full scale implementation and when the South End Sewage Treatment Plant upgrade is completed.

The Department is scheduled to provide regular remaining sewage treatment capacity (Biosolids) estimates to the Standing Policy Committee on Water and Waste, Riverbank Management and the Environment starting in June 2021.

RECOMMENDATIONS

1. That Council approve the NEWPCC Interim Phosphorus Removal capital project as a 2021 capital project, outside of the normal budget process, with an AACE Class 4 capital cost estimate of $10,500,000.00, included as Appendix A.

2. That, subject to approval of Recommendation 1, the financial operating and Environmental Projects Reserve implications of the NEWPCC Interim Phosphorus Removal project be referred to the 2022 Budget process.

3. That the Proper Officers of the City be authorized to do all things necessary to implement the intent of the foregoing.

REASON FOR THE REPORT

Council must authorize any change to the Capital Budget.

Council approval is required in order to expend capital funds for the work.

IMPLICATIONS OF THE RECOMMENDATIONS

Upon approval of the recommendations the Public Service will proceed to procure contracts for the NEWPCC Interim Phosphorus Removal capital project. The financial operating implications will be referred to the 2022 budget process.

If approved by Council this work will affect the Environmental Projects Reserve and may result in the delay of other planned projects/works.

The estimated direct and indirect economic impact of this expenditure is:

Economic Impact	Manitoba	Rest of Canada
Gross Domestic Product (GDP)	$3.8 million	$1.3 million
Person Years of Employment	35	10
Federal Government Tax Revenue	$0.5 million	$0.1 million
Provincial Government Tax Revenue	$0.5 million	N/A

Source: Statistics Canada. Table 36-10-0594-01 Input-output multipliers, detail level. Note that the 2016 GDP at basic prices simple multipliers for non-residential building construction [BS23B000] and other engineering construction [BS23C500] were used to assess this investment. Federal and provincial government tax revenue estimates include GST, MRST, personal income taxes, corporate income taxes and other sources of taxes and fees. These are estimated using the multipliers noted above in conjunction with effective tax rates calculated from the economic accounts produced by Statistics Canada.

HISTORY/DISCUSSION

The North End Sewage Treatment Plant (NEWPCC) is the City's oldest and largest sewage treatment plant, treating wastewater for approximately 65 percent of the City and 100 percent of the City's sludge and wastewater solids (Biosolids). It has a licence requirement to remove phosphorous to 1 mg/L in its final effluent. The date to meet this requirement was December 31, 2019.

On June 23, 2016 the City indicated to its regulator, Manitoba Conservation and Climate, that the December 31, 2019 date would not be achievable.

On January 23, 2019, Manitoba Conservation and Climate, requested that the City submit a Notice of Alteration with an alternative analysis report explaining options to expedite phosphorous removal to 1 mg/L.

On July 30, 2019, the City of Winnipeg submitted a Notice of Alteration for its North End Sewage Treatment Plant licence. The Notice of Alteration indicated that the NEWPCC would not be able to remove phosphorous to 1 mg/L by December 31, 2019 and an extension was requested to December 31, 2021, so that interim chemical phosphorous removal could be studied and a plan developed. This would also give time for the impacts of the SEWPCC Upgrade on the City's sludge treatment system to be verified.

The submission included a preliminary study on interim chemical phosphorous removal options for the NEWPCC plant. The study concluded that due to capacity constraints and infrastructure configurations the NEWPCC would not be able to achieve 1 mg/L chemical phosphorous removal. The report concluded that while some chemical phosphorous removal may be achievable, further modeling and testing would be required to quantify.

In November 2019, the City of Winnipeg requested proposals for Interim Phosphorous Removal modeling and testing. The successful proponent was AECOM.

On December 5, 2019, Manitoba Conservation and Climate did not approve the Notice of Alteration and required the City to participate in a Project Steering Committee, made up of Provincial and City staff, to develop plans for short term phosphorous compliance and overall compliance with all parameters in the NEWPCC licence. The Project Steering Committee was required to share information with a Project Advisory Committee, which is made up of various public interest groups and co-Chaired by the Province and City of Winnipeg.

On January 31, 2020, the Project Steering Committee submitted an Interim Phosphorous Reduction Plan and Nutrient Removal Implementation Plan.

On September 30, 2020, an update to Interim Chemical Phosphorous Removal and the NEWPCC Upgrade was re-submitted to the Province.

From January to December 2020, the City of Winnipeg has studied Interim Chemical Phosphorous Removal for the NEWPCC. This study included:

- Computer simulations of treatment processes
- Laboratory testing of wastewater samples
- Site investigations and drawing reviews

Due to the COVID-19 pandemic, AECOM was unable to conduct laboratory tests for the maximum month flow conditions in 2020. Maximum month refers to the 30-day period where flows are highest in the treatment plant, typically during the spring flood season. Maximum month laboratory testing is planned for spring 2021 but, based on annual average testing, is expected to match computer simulations.

As of October 16, 2020, the Province has changed the operation of the Project Steering and Advisory Committees. The Committees will now be led by the City of Winnipeg with participation of provincial staff and stakeholders.

On December 21, 2020 the City submitted the findings of AECOM's interim chemical phosphorous study to Manitoba Conservation and Climate. The findings concluded that interim chemical phosphorous removal may be able to reduce phosphorous annual phosphorous loads at the NEWPCC by eight to 23 percent but that the final amount would depend on full scale testing, the rate of growth and development in the City, and the impacts of the SEWPCC upgrade.

Due to capacity constraints and infrastructure configuration, interim chemical phosphorous removal would not be feasible during maximum-month flows or when portions of the sludge treatment plant are offline for maintenance and service.

AECOM's study determined that additional infrastructure would be needed, including new chemical storage tanks and buildings, process piping, pumps etc. A new chemical

storage building is required as ferric chloride, the chemical to be used for interim phosphorus removal, cannot be stored outside for extended periods of time as it will freeze at temperatures below -26 degrees Celsius.

The Association for the Advancement of Cost Engineering (AACE) Class 4 capital cost estimate for the interim phosphorus removal infrastructure at NEWPCC, is $10.5 million. The annual operating cost for chemical phosphorous removal is estimated to be approximately $2.2 million. It is expected that the interim phosphorus removal infrastructure will be in operation by August 2023 but the project schedule will need to be reviewed as design work is initiated.

It is expected that the proposed interim phosphorus removal infrastructure at NEWPCC will not be eligible for funding from other levels of government. Funding applications have already been provided for the NEWPCC Headworks and Biosolids Upgrade projects under the Investing in Canada Infrastructure Program (ICIP) Green Infrastructure Stream. The deadline for the funding application submission to the first round of the ICIP was set by the Province for September 12, 2019. Future ICIP funding submission rounds may occur, though no timelines have been declared for this.

The scope of the full NEWPCC Upgrade does not include a new chemical facility as proposed for the interim phosphorus removal project. In order to preserve the investment in this new facility, the Department will repurpose the building, likely as material storage, during the full NEWPCC Upgrade projects.

In November 2020, the City indicated that the sewage treatment system (Biosolids) has approximately 90,000 people equivalent capacity remaining. The estimated impacts of chemical sludge treatment on capacity were accounted for when calculating the 90,000 people equivalent value. The actual impacts on capacity, however, will need to be verified with full scale testing after the SEWPCC Upgrade has been completed.

If there is a provincial regulator requirement to maximize possible interim phosphorus removal at NEWPCC, development within the City of Winnipeg and capital region will be limited until a the new Biosolids facility is constructed.

FINANCIAL IMPACT

Financial Impact Statement

Date: January 19, 2021

Project Name:

First Year of Program **2021**

NEW CAPITAL PROJECT FOR INTERIM CHEMICAL PHOSPHOROUS REMOVAL FOR THE NORTH END SEWAGE TREATMENT PLANT

	2021	2022	2023	2024	2025
Capital					
Capital Expenditures Required	$ 10,500,000	$ -	$ -	$ -	$ -
Less: Existing Budgeted Costs	-	-	-	-	-
Additional Capital Budget Required	$ 10,500,000	$ -	$ -	$ -	$ -
Funding Sources:					
Debt - Internal	$ -	$ -	$ -	$ -	$ -
Debt - External	-	-	-	-	-
Grants (Enter Description Here)	-	-	-	-	-
Reserves, Equity, Surplus	10,500,000	-	-	-	-
Other - Enter Description Here	-	-	-	-	-
Total Funding	$ 10,500,000	$ -	$ -	$ -	$ -
Total Additional Capital Budget Required	$ 10,500,000				
Total Additional Debt Required	$ -				
Current Expenditures/Revenues					
Direct Costs	$ -	$ -	$ 2,200,000	$ 2,200,000	$ 2,200,000
Less: Incremental Revenue/Recovery	-	-	-	-	-
Net Cost/(Benefit)	$ -	$ -	$ 2,200,000	$ 2,200,000	$ 2,200,000
Less: Existing Budget Amounts	-	-	-	-	-
Net Budget Adjustment Required	$ -	$ -	$ 2,200,000	$ 2,200,000	$ 2,200,000

Additional Comments: Funds for this new Capital project, if approved by Council, will be made available from the Environmental Projects Reserve (EPR). The EPR will be affected and may result in the delay of other planned projects/works. It is recommended that the financial operating and EPR implications of the NEWPCC Interim Phosphorus Removal project to be referred to the 2022 Budget process.

"Original signed by L. Szkwarek, CPA, CGA"
Lucy Szkwarek, CPA, CGA
Manager of Finance and Administration

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CONSULTATION

This Report has been prepared in consultation with:

N/A

OURWINNIPEG POLICY ALIGNMENT

This report is in accordance with the OurWinnipeg policies through

01-3 Prosperity Direction 1: Provide efficient and focused civic administration and governance. This report supports demonstration of accountability through service performance measurement and reporting.

02-2 Environment: Interim chemical phosphorous removal will reduce the environmental impact of our citizens on the Red River and the downstream lakes and rivers.

WINNIPEG CLIMATE ACTION PLAN ALIGNMENT

N/A

SUBMITTED BY

Department: Water and Waste
Division: Engineering Services
Prepared by: M. Paetkau, M.Sc., P.Eng., Acting Branch Head for Wastewater Planning and Project Delivery
Date: January 19, 2021
File No.: S-1146

Attachment:

Appendix A: Project Capital Detail Sheet

WATER & WASTE - SEWAGE DISPOSAL SYSTEM FUND

Project Name: **NEWPCC Interim Chemical Phosphorous Removal Upgrades**

Standing Policy Committee:	Water and Waste, Riverbank Management and the Environment		
Dept ID:	200752	Investment Driver:	Regulatory
Department:	Water and Waste	Service:	Wastewater
Project:	TBD	**OurWinnipeg:**	Environment

AUTHORIZATION	Previous Budgets	2021 Estimate	FORECAST 2022	2023	2024	2025	2026	Five-Year Forecast Total	Six-Year Total
Project Costs ($000's)	-	10,500	-	-	-	-	-	-	10,500
Financed by:									
Environmental Projects Reserve		10,500							10,500

CASH FLOW	2021	2022	2023	2024	2025	2026	Beyond 2026	Total
Project Costs ($000's)	10,500	-		-	-	-	-	10,500
Financed by:								
Environmental Projects Reserve	10,500							10,500

NET OPERATING IMPACT ($000's)	2021	2022	2023	2024	2025	2026
Operating costs			2,200	2,200	2,200	2,200
Debt and finance charges						
Transfer to General Capital Fund						
Total Direct Costs	-	-	2,200	2,200	2,200	2,200
Less: Incremental Revenue/Recovery						
Net Cost/(Benefit)	-	-	2,200	2,200	2,200	2,200
Incremental Full Time Equivalent Positions	-	-	-	-	-	-

Class Estimate: See table below

@	2021	2022	2023	2024	2025	2026
Class Estimate	3/4					
Preliminary Design	300					
Detailed Design & Construction	10,200					

The North End Sewage Treatment Plant (NEWPCC) does not currently meet a phosphorous removal limit of 1 mg/L, which is an Environment Act Licence requirement. Studies have indicated that some chemical phosphorous removal is possible on an interim basis, but not to the 1 mg/L Licence requirement. Additional infrastructure at NEWPCC is required to implement this change. This capital project includes the preliminary design, detailed design and construction of the interim phosphorus removal infrastructure.

A class 3 estimate will be obtained prior to construction.

The expected life of the building is 50 years and the mechanical components are 25 years.