

**Minutes - Standing Committee on Fiscal Issues - October 12, 2004**

**REPORTS**

**Minute No. 50      North End Water Pollution Control Centre (NEWPCC) Wastewater  
Disinfection  
File WS-7.1**

**STANDING COMMITTEE DECISION:**

The Standing Committee on Fiscal Issues concurred in the administrative recommendation and received the report as information.

**Minutes - Standing Committee on Fiscal Issues - October 12, 2004**

DECISION MAKING HISTORY:

Moved by Councillor Thomas,

That the administrative recommendation be concurred in.

Carried

**RE: NORTH END WATER POLLUTION CONTROL CENTRE (NEWPCC)  
WASTEWATER DISINFECTION**

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**FOR SUBMISSION TO:** The Standing Policy Committee on Fiscal Issues

**ORIGINAL REPORT SIGNED BY:** The Director of the Water and Waste Department

**REPORT DATE:** October 5, 2004

**RECOMMENDATION(S):**

That this report be received as information.

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**REPORT SUMMARY**

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**KEY ISSUES:**

- The Province has mandated the City of Winnipeg to provide a disinfection system at the NEWPCC by the 2006 recreational season.
- Implementation of an Ultraviolet (UV) Light Effluent Disinfection Facility at the NEWPCC is required to meet anticipated Province of Manitoba effluent license limits.
- NEWPCC secondary effluent has low light transmissivity characteristics (UVt) which requires more UV lamp equipment to disinfect the wastewater.
- An internal preliminary risk assessment indicated the following risks:
  - Manitoba Conservation has yet to issue the official license for this facility.
  - *Manitoba Conservation's license requirements may increase the project cost(s) beyond the initial estimate.*

**IMPLICATIONS OF THE RECOMMENDATION(S):**

**General Implications**

- |                                     |   |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | None  |
| <input type="checkbox"/>            | For the organization overall and/or for other departments               |
| <input type="checkbox"/>            | For the community and/or organizations external to the City of Winnipeg |
| <input type="checkbox"/>            | Involves a multi-year contract  |

Comment(s):

**Policy Implications**

- |                                     |                   |
|-------------------------------------|-------------------|
| <input checked="" type="checkbox"/> | No                |
| <input type="checkbox"/>            | Yes - Comment(s): |

**Environmental Implications**

- |                                     |   |
|-------------------------------------|---|
| <input type="checkbox"/>            | None  |
| <input checked="" type="checkbox"/> | Yes - Comment(s): Year round disinfection of NEWPCC effluent. |

**Human Resources Implications**

<input type="checkbox"/>
<input checked="" type="checkbox"/>

No

Yes - Comment(s): Additional staff will be required to maintain and operate the new facility.

**Financial Implications**

<input type="checkbox"/>
<input checked="" type="checkbox"/>

Within approved current and/or capital budget

Current and/or capital budget adjustment required.

Comment(s): Additional capital funding has been identified in the 2005 Capital Program as submitted for Council's consideration.

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## REPORT

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### REASON FOR THE REPORT:

At its meeting held on December 16, 1999 City Council adopted a policy whereby all Capital projects with a total estimated cost of \$10 million or more be submitted by the associated Civic Department to the Standing Policy Committee on Fiscal Issues for review and recommendation prior to any bid solicitation being issued.

### HISTORY:

- 1992 The Clean Environment Commission (CEC) convened Public Hearings regarding application of the Manitoba Surface Water Quality Objectives for the Red River, Assiniboine River, and tributaries. As a result of the hearings the CEC made recommendations, which are intended to protect the Red and Assiniboine Rivers such that their use is not adversely impacted.
- 1993 Minister of Environment adopted the Clean Environment Commission (CEC) recommendations requiring the City to disinfect effluent from its three wastewater treatment plants during the summer recreation season from May 1<sup>st</sup> to September 30<sup>th</sup>.
- 2001 Council approved Capital funding in the amount of \$6,480,000 for the NEWPCC disinfection facility.
- 2002 Council approved Capital funding in the amount of \$8,520,000 for the NEWPCC disinfection facility.
- 2003 In January competitive proposals were requested from a number of consulting engineering firms for disinfection and centrate treatment improvements to the NEWPCC.
- 2003 In January and April, at the request of the Province of Manitoba, the Manitoba Clean Environment Commission (CEC) conducted public hearing on the City of Winnipeg's Wastewater Collection and Treatment Systems.
- 2003 On April 14, the City assigned Earth Tech (Canada) Inc. to undertake the design and construction of a centrate treatment and secondary effluent disinfection system for the NEWPCC.
- 2003 On August 26, the CEC issued their report on the hearings recommending that Manitoba Conservation establish "interim" effluent limits for Winnipeg's three Water Pollution Control Centres in accordance with their Water Quality Standards, Objectives and Guidelines, and further that the City of Winnipeg be directed to plan for removal of nutrients, specifically nitrogen and phosphorous from its treated wastewater discharges.

- 2003 On September 26, the Assistant Deputy Minister of Manitoba Conservation wrote a letter to the Director of the Water and Waste Department advising of their plans to reflect the CEC report recommendations in Environment Act Licenses for the City's wastewater treatment plants.
- 2003 On November 26, Council concurred in the recommendation of Executive Policy Committee and adopted an increase to the Sewer Utility's rates to be effective January 1, 2004.
- 2003/4 On December 10, February 2 and February 24, meetings were held between the City and the Province to discuss plans for wastewater system improvements.
- 2004 On June 23, Council received as information a report outlining the work schedule and financing plan for the sewer utility that includes implementing effluent disinfection at the NEWPCC by 2006.

## **DISCUSSION:**

### **MAJOR PROJECT STEERING COMMITTEE**

Administrative policy for projects with capital cost exceeding \$10 million requires formation of Major Project Steering Committee. The Committee has been formed and its members are:

Barry D. MacBride, Director and Chair  
Mike Ruta, Corporate Controller  
Bill Larkin, Director of Public Works  
Harry Finnigan, Director of Planning, Property and Development.

The Committee has reviewed this report and recommended that the report be sent to Fiscal Issues Committee.

### **REGULATORY REQUIREMENTS**

The August 2003 CEC public hearing recommendations, and the September 26, 2003 letter from Manitoba Conservation identified the requirement that the City implement year round secondary effluent disinfection at the NEWPCC by the 2006 recreation season. Additional discussions subsequently held with the Province upheld this requirement. Through development of the project design, the Water and Waste Department has had dialogue with Manitoba Conservation where it was agreed that only dry weather flow will be treated on a year round basis. Wet weather disinfection requirements will be reviewed after the implementation of full biological nutrient removal at the NEWPCC and development of the combined sewer overflow management plan.

The design criteria is 380 ML/day of flow and the disinfection target is 200 E.coli and 200 fecal coliform organisms/100mL. The benefit will be a reduced bacterial count from the final effluent to the Red River.

## **ENGINEERING**

Preliminary/conceptual design:

Preliminary studies and conceptual design started in April 2003 and were completed in March of 2004 at a cost of \$464,428. Laboratory costs of \$27,572 have yet to be charged to this project. The work consisted of historical information review, site inspection, equipment and infrastructure evaluation, effluent testing, evaluation of disinfection alternatives, and preparation of a report. The following activities were undertaken and recommendations were derived from the preliminary and concept design work:

- Use UV light to disinfect the secondary effluent. The selection was based on the consultant's evaluation of nine disinfection alternatives on the basis of environmental impact, safety, and cost.
- Collimated beam and effluent light transmissivity testing were conducted to determine preliminary sizing and performance limitations of UV disinfection process.
- The existing outfall from the NEWPCC to the Red River must be upgraded prior to the addition of the disinfection facility or any other treatment process. A comparison of twinning the outfall, temporary and permanent pumping alternatives was conducted. Based on capacity, flood protection, cost and construction risk, it was determined that a temporary pump station will be implemented with the UV facility. The temporary station will remain in service until about 2014 when nutrient removal facilities will be required at the NEWPCC.
- The secondary effluent has low UV transmissivity and therefore the UV equipment designer/supplier must consider the characteristics of the effluent as part of the system design parameters.
- Two types of UV equipment, low pressure and medium pressure, are considered most suitable for NEWPCC effluent characteristics.

Several UV equipment suppliers were evaluated and then short-listed to five that were deemed potential suppliers of equipment meeting the requirements for disinfecting the NEWPCC effluent. These five suppliers were requested to submit qualifications, and two qualified suppliers were invited to move to the proposal stage. Preliminary work on equipment and facility sizing was also completed.

Detailed Design:

From the preliminary and conceptual engineering design, it was determined that the undertaking of the facility design would be achieved in two phases. The first phase would involve determination of the specific UV equipment to be supplied followed by a second phase involving

the balance of all other facility components appropriate for the selected UV disinfection equipment. Detailed design commenced in April 2004 and is scheduled for completion by July 2005. The budget for detailed design, which includes functional design, is \$1,227,000. Activities for the two detailed design phases are described following:

#### -UV Light Equipment Supply

A request for proposal, rather than a tender document, was prepared and issued to both of the pre-selected UV light equipment vendors. The request for proposal recognized that two significantly different types of UV disinfection equipment could be supplied. In this regard specific technical requirements for each type of system were provided in the request for proposal and evaluation criteria were also described in detail. The request for proposal was issued to the two preselected UV equipment vendors in June 2004 with a submission date of July 30, 2004. Two proposals were received and evaluated. The consultant has provided the City with a letter that recommends award of the UV equipment supply contract at a cost of \$6,414,000. Design activities on this equipment procurement phase of the work will be complete upon award of the contract.

#### -UV Facility

Following award of the UV equipment supply contract, the UV equipment vendor will provide detailed design requirements allowing the consultant to proceed with detailed design of the balance of the facility. Detailed design on this portion of the work is scheduled to commence in October 2004 and be completed by July 2005. At this time, the facility construction contract details have not been finalized. Detailed design activities on this phase of the work have not yet commenced.

#### Contract Administration and Commissioning:

The consultant will develop an administration manual to address the following requirements:

- Pre-construction meetings
- Review meetings
- Change orders
- Progress payments
- Quality control
- Contractor submittals
- Site memos
- Communication protocol
- Shop drawing processing procedure

In addition to the above tasks, the consultant will coordinate inspections to determine substantial and total completion. The consultant will also coordinate development of as-built drawings, operation manuals, and summary of project information into one package.

In the commissioning phase the consultant will, with the contractor and equipment supplier, develop a testing and commissioning schedule, coordinate startup, equipment calibrations, equipment testing, and verify equipment warranty start date. Contract administration work is expected to start in October 2004 with commissioning activities completed by June 2006 at an estimated cost of \$1,200,000.

### **UV FACILITY CONSTRUCTION**

The UV facility construction will be undertaken through separate UV equipment supply and UV facility construction contracts described as follows:

UV Equipment Supply Contract:

Award of the UV equipment supply contract is pending. The contract amount is \$6,414,000.

UV Facility Construction Contract:

Design on this portion of the work has not commenced. Details on this portion of the work have not been finalized, but it is expected that a single tender for the construction of the facility will be advertised. The budget estimate for this portion of the work is \$17,167,000.

### **CAPITAL BUDGET REQUIREMENTS (IN \$000S)**

<u>Year</u>	<u>Authorized Capital</u>	<u>Actual + Projected Cashflows</u>	<u>Cumulative Capital Budget Remaining</u>
2001	\$ 6,500	\$ -	\$ 6,500
2002	8,520	-	15,020
2003	-	250	14,770
2004	-	912	13,858
2005	11,500	18,386	6,972
2006	-	6,972	0
<b><u>Total</u></b>	<b>\$ 26,520</b>	<b>\$ 26,520</b>	<b>\$ -</b>

Additional cost detail is provided in Appendix 1.

The 2004 Adopted Capital Budget and 2005 to 2009 Five Year Forecast identified \$5,900,000 of project costs for NEWPCC Outfall Capacity and Flood Protection Upgrading (\$3,500,000 in 2005, \$1,000,000 in 2006 and \$4,400,000 in 2007). Total funding of \$6,500,000 is required in 2005 to proceed with the works to address the objectives of that project as part of this larger project. The funding in 2006 and 2007 as noted above is included in the \$6,500,000 in 2005.

The NEWPCC secondary effluent has low UV transmissivity caused by total suspended solids (TSS), soluble organic compounds, and other influent constituents that have adverse effects on

UV transmissivity. As a result of the low transmissivity, more UV equipment is required. An additional \$5,000,000.00 is required in 2005 to meet the project requirements.

## **RISK ASSESSMENT/MITIGATION**

A formal risk assessment/mitigation process will be conducted early in the detailed design stage. However, at this time, the following risk factors and preliminary mitigation efforts have been identified.

### License requirement:

Manitoba Conservation has not yet issued a formal Environmental Act License for the NEWPCC. If the actual license requirements exceed what has been assumed for design criteria, the cost of the project could increase. To meet the June, 2006 completion deadline, design work is proceeding on the basis of design criteria that have been submitted to, and acknowledged by, officials of the Approvals Branch of Manitoba Conservation.

### Project management:

The NEWPCC disinfection project will be a complex engineering assignment that will span over three years from start to finish. The following measures have been undertaken to ensure proper management of the project.

- To manage the project successfully over its life, a dedicated project management team has been assembled with the necessary skills and experience, including a Project Director dedicated to this project.
- The City of Winnipeg Project Director will review the financial status of the Disinfection project with the Departmental Controller on a quarterly basis.
- A risk management process will be implemented that will identify potential risks and mitigative strategies as the project proceeds.

## **FINANCIAL IMPACT:**

The following financial impact statement for this project has been prepared in accordance with the recommendation adopted by Council on December 13, 2000.

**Project Name:**

**NORTH END WATER POLLUTION CONTROL CENTRE (NEWPCC)  
WASTEWATER DISINFECTION**

**COMMENTS:**

As this report is submitted for informational purposes only, there is no financial impact related to the recommendation.

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Moira L. Geer C.A.  
Manager of Finance & Administration

**IN PREPARING THIS REPORT THERE WAS CONSULTATION WITH AND  
CONCURRENCE BY: N/A**

**THIS REPORT SUBMITTED BY:**

Water and Waste Department  
Engineering Division  
Prepared by: D. G. Gibson, P. Eng./J. Mensah, P. Eng.  
File No. 020-17-08-09-01

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## **APPENDIX 1**

**EFFLUENT DISINFECTION - NEWPCC**  
**WATER AND WASTE DEPARTMENT - ENGINEERING DIVISION**  
**APPENDIX 1**  
**As at September 21, 2004**

Components	COSTS				PROJECTED COSTS TO COMPLETE			Total Costs Remaining to Complete	TOTAL Total Project Cost	VARIANCE Variance from Budget ( Unfavourable )
	Total Budgeted Costs	Approved Budget To Date	Costs Incurred up to last report	Costs submitted this report	Total Costs Incurred to Date (per G/L) 21-Sep-04	2004	2005			
<b>ENGINEERING</b>										
A) PRELIMINARY DESIGN/CONCEPTUAL	492,000	492,000	-	464,428	464,428	27,572	-	27,572	492,000	0
B) FUNCTIONAL/DETAILED DESIGN	1,227,000	1,227,000	-	95,500	95,500	574,500	557,000	1,131,500	1,227,000	0
C) CONTRACT ADMIN/COMMISSIONING	1,200,000	1,200,000	-	-	-	-	840,000	360,000	1,200,000	0
<b>Total Engineering</b>	<b>2,919,000</b>	<b>2,919,000</b>	<b>-</b>	<b>559,928</b>	<b>559,928</b>	<b>602,072</b>	<b>1,397,000</b>	<b>360,000</b>	<b>2,359,072</b>	<b>0</b>
<b>FACILITIES CONSTRUCTION</b>										
A) UV EQUIPMENT SUPPLY	6,414,000	6,414,000	-	-	-	-	5,132,000	1,282,000	6,414,000	0
B) BUILDING CONSTRUCTION	17,187,000	5,687,000	-	-	-	-	11,857,000	5,330,000	17,187,000	0
<b>Total Facilities Construction</b>	<b>23,601,000</b>	<b>12,081,000</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>16,989,000</b>	<b>6,612,000</b>	<b>23,601,000</b>	<b>-</b>
<b>Total</b>	<b>26,520,000</b>	<b>15,020,000</b>	<b>-</b>	<b>559,928</b>	<b>559,928</b>	<b>602,072</b>	<b>18,386,000</b>	<b>6,972,000</b>	<b>25,960,072</b>	<b>-</b>
Percentage Complete						2%				