

December 17, 2012

To: His Worship the Mayor  
and Members of City Council

Re: Wastewater Treatment Plant Upgrades Project Update

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**RECOMMENDATION OF THE EXECUTIVE COMMITTEE  
- DECEMBER 12, 2012**

That this report be received and filed.

*EXECUTIVE COMMITTEE – DECEMBER 12, 2012*

The Committee adopted a resolution to concur in the recommendation contained in the report.

Mayor Michael Fougere, Councillors: Bryon Burnett, John Findura, Jerry Flegel, Shawn Fraser, Bob Hawkins, Terry Hincks, Wade Murray, Mike O'Donnell and Barbara Young were present during consideration of this report by the Executive Committee.

The Executive Committee, at its meeting held on December 12, 2012, considered the following report from the Administration:

RECOMMENDATION

That this report be submitted to City Council on December 17, 2012 for information.

CONCLUSION

The City Administration has been engaging with external consultants to meet upgrade requirements for the City's Wastewater Treatment Plant (WWTP). The upgrades are required to do the following: replace equipment that has reached the end of its lifecycle; ensure the plant has sufficient capacity to respond to increased population and economic growth demands; and to meet new Provincial effluent standards. This is an extremely complex project and one of the largest ever undertaken by the City of Regina

Conceptual and pre-design for the WWTP upgrade has been completed with the project reaching the 20 percent design level. Based on the pre-design analysis, the Administration estimates that the capital cost upgrades will be in the range of \$167 million +/- 15% in first quarter (Q1) 2012 dollars. When construction inflation rates are carried through to construction in 2015/2016, the estimate reaches \$207 million +/- 15% in third quarter (Q3) 2015 dollars. The City has anticipated the WWTP upgrades for a number of years and the current estimate is within the scope of affordability for the Utility.

In 2012, the provincial Ministry of Environment issued the City a new WWTP Permit to Operate. The permit requires that the City meet new effluent standards in 2016. The current plant will not be able to meet these future provincial requirements, and therefore the majority of the upgrades must be completed by the end of 2016.

## BACKGROUND

Wastewater treatment is a vital service for the protection of human health and the environment. After treatment, liquid effluent is discharged downstream of the City into Wascana Creek and the Qu'Appelle River system. The treatment process disinfects the wastewater to remove pathogens and reduce nitrogen and phosphorous. Without wastewater disinfection, downstream pathogen levels would impact public safety for water use. Nitrogen and phosphorus removal protects the environment by mitigating the impact of nutrients that cause algae growth, and reducing toxicity to fish habitat.

For the past several years, the City has been planning a for the WWTP upgrade. Utility rates have been increased by 9 percent per year beginning in 2008 in anticipation of the significant investment in the WWTP. This was reflected in the 3-year utility rate cycles from 2008 to 2010, and 2011 to 2013.

In 2009, Administration initiated the selection of consulting services for the WWTP upgrade project, and in early 2011 the City engaged AECOM. In the last year, the WWTP upgrade project has made significant progress with the completion of a number of background reports, a preliminary concept plan and the pre-design phase, which brings the WWTP to the 20 percent design level.

This report provides City Council with information on the WWTP upgrade and an update on costs.

## DISCUSSION

### **Need for the WWTP Upgrade**

For the past several years, the City has been planning a significant investment in the WWTP to replace deteriorated assets, meet future growth and to meet new Provincial effluent standards.

- The assets at the WWTP have deteriorated to the point where it is difficult for the City to meet all of our operating objectives. A majority of the assets at the WWTP were constructed prior to 1980. Although basic maintenance has occurred, equipment deterioration has resulted in the requirement for significant replacement. It would cost approximately \$30 million to restore the plant to original condition without addressing other operating objectives.
- The WWTP is near capacity, treating approximately 70 million litres per day of wastewater. The future design parameters will allow for an average flow of 92 million litres per day to accommodate increased growth in Regina. The WWTP upgrade is planned for flow demands of a population of 258,000 in the year 2035, which is a growth rate of approximately 3,000 people per year.

- The Province and the City have met to discuss future effluent standards and the timeline to address these changes. Effluent standards have evolved from protecting human health from disease to include protection of watersheds. The new Provincial requirements are driven to enhance protection of the environment. These new standards will further reduce the level of dissolved nutrients that can cause algae growth and impact fish species health. A new treatment process is required to meet the new standards. The Province established the new standards in June 2012, and is requiring the City to address these effluent changes by the end of 2016.

All of these needs are required and can only be met through the WWTP upgrade. The City’s goals for the WWTP upgrade project are to meet these needs on schedule, and address the long term financial stability of the facility.

**Cost Update**

A significant amount of analysis on the WWTP upgrade has been completed throughout 2011 and 2012. The work includes 21 technical reports, a Preliminary Concepts Plan Report, and a Pre-Design Report. A short-list of liquid treatment, biosolids management and wet weather technologies and processes were analyzed through a triple bottom line approach.

The criteria for the analysis took into consideration the financial, environmental, social and operational requirements of the City. The assessment process narrowed down the Administration’s recommended processing option to a non-proprietary biological nutrient removal process used by most major cities in Canada.

The concept includes:

Existing	Upgrade by
Primary plant (separates solids and liquid)	Reuse with retrofit
Biosolids management systems (digesters and dewatering to break down organic solids)	Reuse with retrofit
Secondary treatment lagoons (removes micro organisms and organic material from the liquid stream)	Replace with a new biological nutrient removal process. Reuse with retrofit some lagoons for wet weather/peak flow management
Existing tertiary clarifiers (phosphorous removal)	Add new filtration for lower phosphorus requirements
Disinfection (ultraviolet light that deactivates pathogens)	Replace with new

**Table 1**

There is approximately \$50 to \$60 million worth of value in some of the existing infrastructure at the WWTP. The upgrade plan includes the reuse of this infrastructure to maximize its use and reduce the overall capital cost of the project. The cost savings from infrastructure reuse is taken into account in the updated estimate.

The last update given to Council on cost estimates this year was \$153 million +/- 20% including a cost escalator of 8 percent each year after 2012. The escalator is meant to reflect the increased costs for materials and labour due to a booming local construction market. Construction is scheduled to begin in 2014, and is expected to be substantially complete by the end of 2016. If we carry those costs forward when construction is at a significant level of completion, the estimated cost is \$200 million.

Since that last update, the Administration has been working with AECOM to do further design analysis and ascertain more detailed estimates. The work has led to a revised construction estimate of \$207 million in 2015. The increased estimate is attributable to the following factors:

- A more detailed level of design and more project specific cost information; and
- Risk items identified during pre-design, such as sludge removal from lagoons and odour control, which might be mitigated on further investigation.

	<b>Initial Estimate</b>	<b>Revised Estimate</b>
<b>Confidence level</b>	+/- 20%	+/- 15%
<b>(Q1) 2012 Estimated Cost</b>	\$153 million	\$167 million
<b>Escalation Factor</b>	8%	6%
<b>(Q3) 2015 Estimated Cost</b>	\$200 million	\$207 million
<b>Cost Estimate Range</b>	\$160M-240M	\$176M-238M

**Table 2**

Estimates are based on current market conditions. Local market conditions may further increase cost at the time of construction. Determining the cost of a project of this complexity can only be priced by the market through a competitive procurement process. The current estimate uses 20 percent level design, industry price inquiries, and market conditions. A 20 percent level design is only accurate for budget estimating, and will require significant work for market pricing. Uncertainties in the project create risk to prospective bidders, which will translate into financial risk premiums. How these risks are managed and who retains the responsibility will be key in the pricing and affordability of the WWTP upgrade.

In June 2012, Administration was authorized to review procurement options for delivering the WWTP upgrade project. Analysis continues on a recommended procurement approach, with options including traditional methods and those that would include alternative service delivery. Administration will report to City Council in early 2013 with a recommendation on a procurement approach.

## RECOMMENDATION IMPLICATIONS

### Financial Implications

The City has anticipated the WWTP upgrades for a number of years and its cost has been reflected in the utility rate model and utility rates. The upgrades to the WWTP will require the City to undertake significant debt. The debt for the Water and Sewer Utility could be as high as \$150 million.

The long term financial plan for the WWTP, through a financial model and procurement option, will be addressed through forthcoming decisions of City Council. Debt from the WWTP and other programs will need to be strategically managed over the next few years.

Environmental Implications

The WWTP upgrade will enhance environmental conditions in the downstream receiving waters of Wascana Creek and the Qu'Appelle River system. This may result in improved aesthetic conditions as a result of reduced algae levels and improved fish habitat.

Strategic Implications

Upgrades to the WWTP will ensure that the City continues to meet its Wastewater Treatment Permit to Operate. In addition, an upgraded WWTP is an important piece of the City's infrastructure portfolio to ensure that future capacity demands can be met, due to economic and population growth.

Substantial debt will be required in order to finance the project. The allocation of City debt to this project will constrain the City's ability to borrow for other major capital projects based on current borrowing limits and where existing debt is currently committed. As a result, the City's debt will need to be closely and strategically managed in the coming years.

Other Implications

None with respect to this report.

Accessibility Implications

None with respect to this report.

COMMUNICATIONS

A communications plan has been developed to provide information on the WWTP upgrade.

DELEGATED AUTHORITY

Disposition of this report is within the authority of the Executive Committee.

Respectfully submitted,

EXECUTIVE COMMITTEE



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Amber Smale, A/Secretary