

## **2011 MAJOR PROJECTS UPDATE - EAST WELLFIELD EXPANDED HYDROGEOLOGICAL STUDY AND WASTEWATER TREATMENT PLANT ZERO IMPACT ANALYSIS**

### **ISSUE**

As a component of the Town's 2011 Major Projects budget, Council approved the "Wellfield Expanded Hydro geological Study" (Phases 1 and 2) and the "Wastewater Treatment Plant Zero Effluent Impact & Future Treatment Analysis" projects. Phase 1 of the Wellfield Expanded Hydrogeological Study is complete and representatives from Stantec and EPCOR will be in attendance to provide a summary of their findings.

### **BACKGROUND**

#### Raw water supply wells:

When new wells are developed, a series of boreholes are completed in a promising wellfield location and pump tests are conducted to determine the potential long term yield (pump rate) that can be expected at that location. If the yield shows an adequate and continuous supply can be achieved without interfering with other wells in the area, an application to complete the well is submitted to Alberta Environment for approval. After this process is completed and a licensed approval is granted with a specific pump rate, the well is completed by installing a well casing, screen, a pump sized to meet the approved rate of diversion, and pipeline to the water treatment facility.

Over time and after years of production, wells will tend to lose their ability to pump at the original designed rates due to mineral deposits, deterioration of the screens and the gradual filling of voids around the well structure from silt events / flooding etc. Routine maintenance activities such as purging the well structure and the subsurface aquifer around the well every few years reduces the reduction in pumping capacity but like any subsurface infrastructure will eventually need to be replaced or upgraded.

The maximum licensed pump rate remains with the original well license regardless of what the well is actually able to produce. In addition, the owner of a number of wells located on the same parcels of land can transfer allocations and pump rates to other wells that are capable of pumping the volume specified in the original license, providing that the overall allocation and pump rates listed on the total of the licenses is not exceeded.

Such is the case with both of the Town of Okotoks well fields whereby supplemental wells have been installed to ensure the "ability to pump" the necessary water to supply the Town's water supply needs is maintained. These wells have a licensed pump rate attached but do not have a specific annual allocation of water approved. The allocation is transferred from other existing licensed wells that do not have sufficient pumping capacity left to divert the maximum water allowed and from new wells acquired through purchases and transfers. It is important to note that in order for the Town to receive approval for the transfer of a well license through a purchase or transfer process, the Town must first

ensure that the “works” (pumping capacity and pipelines) are in place to be able to divert the volume of water being transferred in accordance with the approved pump rate. Otherwise the transfer will not be approved.

## REPORT

### 1. “Wellfield Expanded Hydrogeological Study”

Phase 1 - \$80,000 - Complete

Phase 2 - \$200,000 - Planned completion in 2012

This project is intended to investigate future raw water sources and locations available to enhance the Town’s existing well pumping capabilities and ensure that the pump rates acquired with the new well licence transfers that the Town is securing will be available to meet future water demands within the community.

This project is divided into two phases. The first phase was designed to scope out the options for raw water supply expansion. The second phase is designed to pursue a detailed analysis of the preferred options identified in Phase 1 and develop an appropriate future expansion plan complete with cost estimates and timelines.

**Phase I:** (\$80,000) of this project was designed to scope out the potential feasible options available to increase the Town’s wellfield water production capacity to ensure sufficient raw water production is in place to meet the Town’s finite growth model needs. It included providing a desktop review of available reports and studies, discussions with local well drilling companies to garner any additional information, review of options available and the viability of these options as they relate to the Town of Okotoks needs.

A summary of the list of options explored is as follows:

- Expand east well field (in any / either direction)
- Expand west well field; Develop a new well field Deep well (groundwater) source
- Direct intake from Sheep River (surface or infiltration)
- Raw water storage
- Upgrade raw water wells to collector wells (similar to well 6)
- Develop conceptual level designs for viable options and obtain approximate capital costs.
- Cost benefit analysis of alternatives
- Submission of a Phase 1 study report identifying short listed alternatives recommended for subsequent detailed study in Phase 2

**Phase II:** (\$200,000) is planned to proceed immediately and will take most of 2012 to complete to capture accurate seasonal data and due to the nature of the work involved. The program involves further analysis of recommendations from Phase 1 including such activities as:

- Subsurface geophysical investigation of potential raw water sources identified by the report in Phase I within the existing well field.
- Subsurface geophysical investigation of potential new well field opportunities east and / or west of the existing well fields as identified in Phase I of the report.
- Further exploratory test well drilling of possible new well opportunities as identified in Phase I of the report. More detailed investigation of findings from Phase I of the report.

## **2. WWTP Zero Effluent Impact & Future Treatment Analysis**

To complete a study of what wastewater treatment improvements are required to achieve as near as possible a zero Wastewater Treatment Plant effluent impact on the receiving waters (Sheep River). As a leading edge initiative, this project involved working directly with the regulators Alberta Environment and Environment Canada to establish final effluent parameters that far exceed the current requirements and produces the minimal amount of loading on the Sheep River as possible with today's technologies. In addition this study will assess the impacts of increased capacity beyond the current facility's design of 10ML / day (30,000+ people) in order to determine potential technologies and costs should there be a desire to become a semi-regional hub for Wastewater Treatment.

The study noted above has been completed and is presented for Council's consideration.

## **RECOMMENDATION**

That the "Wellfield Expanded Hydrogeological Study – (Phase 1) and WWTP Zero Impact Analysis reports be received as information.

### **Attachments:**

1. 2011 Capital Project Sheet - Wellfield Expanded Hydrogeological Study
2. 2011 Capital Project Sheet - WWTP Zero Effluent Impact & Future Treatment Analysis
3. Stantec Presentations - Raw Water Study Phase 1, November 28, 2011 and WWTP Zero Impact Assessment, November 28, 2011

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November 21, 2011

**Project Name:** Wellfield Expanded Hydrogeological Study

**Project Code:** 41011

**Project Costs:** \$280,000

**Funding Sources:**

**Water & Sewer Depreciation** \$280,000

**Council Strategic Direction:**

MANAGING COMMUNITY GROWTH, ENSURING QUALITY INFRASTRUCTURE, PROMOTING ENVIRONMENTAL RESPONSIBILITY AND STEWARDSHIP - With the efforts by the Town of Okotoks to secure additional well licenses to increase overall withdrawal volumes of raw water, it is important to ensure that well capacities meet withdrawal volumes and therefore raw water sources are required. To ensure that there are no delays between initial investigation and testing of new raw water sources it is important that Phase II of this project be included at this time as well.

**Project Description:**

This project would investigate future raw water sources available to enhance exiting well allocations and ensure that well licence transfers that the Town is securing will be available to meet future water demands within the community.

Study, investigation and testing to be conducted involving the area outside of the existing East Well Field site. This project will be completed in two phases. Phase I: Desktop review of available reports and studies Discussions with Aaron Drilling to garner any additional information Review of options available and the viability of these, preliminary list of options as follows: Expand east well field (in any / either direction) Expand west well field Develop a new well field Deep well (groundwater) source Direct intake from Sheep River (surface or infiltration) Raw water storage Upgrade raw water wells to collector wells (similar to well 6) Develop conceptual level designs for viable options and obtain approximate capital costs. Cost benefit analysis of alternatives Stakeholder workshop (to be attended by Town, EPCOR and Consultant Team) Submission of a Phase 1 study report identifying short listed alternatives recommended for subsequent detailed study in Phase 2 Phase II: Further analysis of recommendations from Phase II, which could include such activities as: Subsurface Geophysical investigation of potential raw water sources identified by the report in Phase I within the well field. Subsurface Geophysical investigation of potential new well field opportunities east and / or west of the existing East Well Field that may be identified in Phase I of the report. Further exploratory test well drilling of possible new well opportunities as identified in Phase I of the report. More detailed investigation of findings from Phase I of the report

**Project Benefits:**

Maximum licensed raw water pump rates are maintained and supply issues during severe drought periods can be achieved. This gives assurance to residents that the water supply is maintained at a level sufficient to meet their needs even under extreme circumstances.

This project will identify raw water sources required to meet the needs of the community and to ensure that as growth occurs the demand that accompanies that growth can be met.

**Project Name: WWTP Zero Effluent Impact & Future Treatment Analysis**

**Project Code: 42010**

**Project Costs: \$80,000**

**Funding Sources:**

**Water & Sewer Depreciation Reserve \$80,000**

**Council Strategic Direction:**

PROMOTE ENVIRONMENTAL RESPONSIBILITY AND STEWARDSHIP AND ENSURES QUALITY INFRASTRUCTURE by utilizing the latest technologies available. The project shows the Town of Okotoks' desire to step outside the box in a lead role and work with the regulators to establish higher environmental quality standards for the region and the Province.

**Project Description:**

To complete a study of what wastewater treatment improvements are required to achieve as near as possible a zero WWTP effluent impact on the receiving waters (Sheep River).

As a leading edge initiative, this project involves working directly with the regulators AE & EC to establish final effluent parameters that far exceed the current requirements and produces the minimal amount of loading on the Sheep River as possible with today's technologies. In addition this study will assess the impacts of increased capacity beyond the current facility's design of 10ML / day (30,000 people) in order to determine potential technologies and costs should there be a desire to become a semi-regional hub for Wastewater Treatment.

**Project Benefits:**

Public confidence and high regard with the regulators and Environmental Stewardship Groups that the Town of Okotoks is committed to and is in fact delivering on the highest quality return flows to the Sheep River. The project clearly shows the Town's commitment to stepping outside the box in a proactive manner with respect to raising the bar for quality of wastewater effluents....well before changes are imposed by the regulators. It sets Okotoks alone with respect to Environmental Stewardship in the fact we are driving changes.

Working with the Regulators, this analysis will define the next generation of treated effluent quality parameters required to ensure the Return Flows from the Town of Okotoks Wastewater Treatment Plant are of such a high quality as to mitigate/eliminate any impact on the receiving stream (Sheep River).