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GROUNDWATER MANAGEMENT STRATEGY DEVELOPMENT PROGRESS UPDATE, MARCH 2004

The Transportation and Works Committee recommends:

- 1. The presentation by Lloyd Lemon, Manager Water Resource Protection, be received; and**
- 2. The recommendations contained in the following report, February 19, 2004, from the Commissioner of Transportation and Works be adopted:**

1. RECOMMENDATION

It is recommended that:

1. This report be received for information by Transportation and Works Committee and Regional Council.

2. PURPOSE

This report provides Transportation and Works Committee and Regional Council with an update of the status of work to develop and implement a comprehensive groundwater management strategy for The Regional Municipality of York.

3. BACKGROUND

Work to develop a comprehensive groundwater management strategy was initiated in 2001 and has been the subject of regular reports to Committee and Regional Council. The most recent status update was provided in Clause 3 of Report No. 9 of the Commissioner of Transportation and Works as presented to Committee on October 1, 2003. Reports will continue to be provided on a regular basis.

The comprehensive groundwater management strategy is being developed to ensure that groundwater in York Region can be maintained as a sustainable, high quality source of drinking water with minimal effect on the natural environment. The first phase of the strategy is to achieve an adequate level of understanding of the groundwater resources in York Region, the potential effects of water use, and the distribution of potential threats to the safety of groundwater. This work is being performed by a several consulting firms who are working co-operatively with York Region to achieve a state-of-the art product that will not only provide a snapshot of understanding but provide tools that can continue to be used into the future. The approach taken is unique in Ontario at this time as the tools are available on a regional scale and capable of assessing effects of local changes on a regional perspective. From this improved understanding, policies, programs, and

operating procedures will be reviewed and revised or developed where necessary to provide better protection of our resources.

4. ANALYSIS AND OPTIONS

This section provides an overview of the progress made toward developing a comprehensive groundwater management strategy since the last update in October 2003. The report follows the organizational structure as introduced in previous reports. *Attachment 1* provides an overview of the current schedule of delivery for individual initiatives.

To date, the work in developing the comprehensive groundwater management strategy has focused on technical studies intended to improve overall understanding of groundwater conditions and the effects of current and future water taking. Gaining improved understanding of these conditions and the potential consequences of water taking continues to be a challenge but is imperative in order to be confident that any policies developed and implemented will be appropriate and effective. Any delays that have been experienced in reaching the current point of understanding have been rewarded in the form of a substantially higher quality product and improved confidence that future policies will be effective.

4.1 Central Hydrogeological Data Management System

The York Region Groundwater Information Management System (YRGIMS) is now in place and in regular usage by staff of the Water and Wastewater Branch. The primary datasets being managed by York Region include: records of volume pumped from municipal water supply wells, water elevations in wells monitored by York Region, and water quality in York Region municipal water supply wells (both raw and treated water quality).

Work continues to improve the operation of the YRGIMS and to integrate it more widely into York Region's business. The next step, currently under development, will allow select regional users of this information to have access to data, maps, and trend graphs through an interface on the York Region Intranet service.

4.2 Conceptual Geological Model for York Region

A digital model of the three-dimensional distribution of geological units beneath York Region has been developed by Gartner Lee Limited and Earthfx Inc. The digital model has been finalized to allow numerical modeling analysis as of October 2003. Additional data is now being collected and updated in the model for future improvements in interpretation.

A preliminary draft of a report entitled "Geology and Hydrogeology of York Region" required to document this work has been reviewed by York Region. This draft is currently being revised and updated to better address future needs of York Region, its partners, and residents. A final draft of the report is expected to be available for

circulation to the Technical Steering Committee responsible for direction of these studies in March 2004.

4.3 Numerical Groundwater Flow Model for York Region

Earthfx Inc. and Gartner Lee Limited have developed a state-of-the-art regional-scale three-dimensional groundwater flow model to represent groundwater conditions within York Region. The model has been calibrated to reproduce observed current conditions due to groundwater withdrawal from municipal wells, other permitted wells, and private wells. Satisfactory calibration was achieved in November 2003 and subsequently, the model has been applied to evaluate several scenarios of interest on behalf of York Region, primarily in support of Permit To Take Water Applications.

The approach for construction of this numerical model and some of the technical attributes were presented to a technical audience at the Annual Meeting of the Canadian Chapter of the International Association of Hydrogeologists (IAH) in Winnipeg, Manitoba in October 2003 and at the Bi-annual Conference of the International Groundwater Modelling Centre in Golden, Colorado in September 2003. The consultants report that the technical merits of the approach and the value of this model were very well received. The numerical model has also been presented to senior staff of the Groundwater division of the Geological Survey of Canada (GSC). The GSC avidly supports our approach and findings to date and is looking at adapting this approach for other regional groundwater studies in Canada.

Details of the approach followed to construct and calibrate the numerical model are to be provided in the Geology and Hydrogeology of York Region report as described above. While this report is being finalized, the model continues to be applied to address specific analysis requirements of York Region, including other components of the groundwater management strategy as described below.

4.4 Potential Contaminant Source Inventory

Comments on the draft report describing the inventory of potential contaminant sources in York Region as prepared by Marshall Macklin Monaghan Limited and Golder Associates Limited (MMM/Golder) have not yet been received from the Ontario Ministry of the Environment. York Region plans to finalize the report by April 30, 2004.

York Region staff continues to work with MMM/Golder to introduce the mapping products developed in this study into the York Region Geographic Information System (GIS).

4.5 Water Use Inventory

Comments on the draft report describing the inventory of water use in York Region as prepared by Marshall Macklin Monaghan Limited and Golder Associates Limited (MMM/Golder) have not yet been received from the Ontario Ministry of the Environment. York Region plans to finalize the report by April 30, 2004.

York Region staff continues to work with MMM/Golder to introduce the mapping products developed in this study into the York Region Geographic Information System (GIS).

4.6 Wellhead/Source Protection Policy/Area Development

Preliminary outlines of wellhead protection areas were developed in April 2003 and provided to the local municipalities for inclusion in Official Plan Amendments to meet requirements of the Oak Ridges Moraine Conservation Plan.

The calibrated numerical groundwater flow model has been applied to update these wellhead protection areas. York Region staff is currently reviewing the implications of these wellhead protection areas and are initiating internal discussions on potential policy for future introduction into the Regional Official Plan.

4.7 Aquifer Management Guidance – Yonge Street Aquifer

The requirement to improve understanding of the Yonge Street Aquifer that serves as the primary water supply for Newmarket, Aurora, Holland Landing, Sharon, and Queensville was the driving force behind the construction of the regional-scale numerical groundwater flow model. The calibrated model is now being applied to confirm the maximum sustainable rate of water taking that the aquifer(s) can support, identify any impacts that might arise from the water taking, optimize the operating parameters for the regional municipal wells and identify any uncertainties in the analysis that could be reduced if additional information was available.

Gartner Lee Limited is expected to begin delivering analysis findings for discussion with York Region staff as they become available. These studies will be complete in time to meet the requirements for renewing the Permit To Take Water by September 2004.

4.8 Water Resource Exploration – Whitchurch-Stouffville

Jagger Hims Limited has been overseeing work to locate and develop new water supplies to meet the future needs of the Community of Stouffville since July 2003. The initial phase of test drilling identified two potentially favourable sites. Detailed hydrogeological testing was completed at these sites in December 2003. Jagger Hims Inc. is finalizing the analysis of these test results.

MacViro Inc. was contracted to undertake a Class Environmental Assessment in support of the new water supply requirement. Jagger Hims and MacViro are working closely to incorporate the findings of the exploration program into the Environmental Assessment process.

4.9 Technical Groundwater Studies – King City/Schomberg

Conestoga Rovers and Associates Limited and MMM/Golder have submitted detailed plans for field work to improve understanding of hydrogeological conditions surrounding the production wells at King City and Schomberg, respectively. Field work for these programs was initially delayed due to restrictions in access. Plans are in place to complete the field work in the spring of 2004. All work remains on track to meet

requirements to provide Hydrogeological study reports to the Ontario Ministry of the Environment in support of Permit To Take Water renewal applications in September 2004.

4.10 Long Term Planning – Groundwater Management Strategy

The findings of the technical studies described above will form the basis for the long term groundwater management strategy. As these findings become available, staff will begin to initiate future studies and programs toward the objective of ensuring the long-term sustainability of our high quality groundwater resource.

Studies and programs planned for initiation in 2004 include:

- Development of the policy framework for the York Region Aquifer/Source Protection Plan.
- Initiation of detailed studies within proposed wellhead protection areas.
- Development of a communications and education strategy.
- Identification of future work components that will improve confidence in understanding of groundwater conditions.
- Initiation of studies to compile and assess the distribution of groundwater quality within York Region.
- Initiation of a program for installing “sentry wells” to identify potential contaminants in groundwater upstream of the production wells.

5. FINANCIAL IMPLICATIONS

All work underway as reported above is being delivered within currently approved budgets.

Allowance has been provided in the draft 2004 Capital Budget and 10 year Capital Plan to initiate planned future work as outlined in Section 4.10. Individual projects will be initiated in accordance with regional purchasing policies.

6. LOCAL MUNICIPAL IMPACT

The initiatives in progress, as outlined in this report, are essential to ensuring that an adequate supply of high quality drinking water remains available to service the local municipalities. The implementation of wellhead or source protection policy, as required by the Oak Ridges Moraine Conservation Plan, or under Source Protection legislation, will directly affect official plans on both a regional and local municipal level. Staff of York Region and the local municipalities will be required to co-operate in developing workable aquifer or wellhead protection policies and in communicating these to achieve public acceptance.

7. CONCLUSION

York Region continues to make excellent progress in developing a comprehensive strategy for groundwater management and protection. The management and analysis tools developed to date have been recognized and applauded by international experts at technical seminars. All projects are proceeding within currently approved budgets.

The Senior Management Group has reviewed this report.

(A copy of the attachment referred to in the foregoing is included with this report and is also on file in the Office of the Regional Clerk.)