

Executive Summary

Background Information

There are problems with water quality from individual wells which service the lower peninsula area for residential, commercial, institutional and industrial buildings. Various consultants, government agencies and the Curve Lake First Nation have conducted detailed groundwater quality studies in the area of the Community from 1988 to 2002. High levels of sodium, turbidity, iron and nitrate were present in numerous groundwater supplies. The Water Feasibility Study is also in response to recommendations outlined in the report entitled, "Engineering Assessment of the Curve Lake (Nishnawbeke) Subdivision Water System" dated April 2004. Subsequently, a well drilling program was carried in 2004 and 2006 to obtain a sufficient quantity of groundwater to supply the Curve Lake Community. An Aquifer Evaluation Report relating to evaluation of the quality, quantity and security of the groundwater supply was prepared in June 2006. A draft Groundwater Treatability Study for the Curve Lake Communal Water System was carried out and submitted in August 2008.

Community Growth and Future Housing Development

The existing on-reserve community population is estimated at 906 in 2004 not including non-status individuals residing on the permanent cottage lots. Projected total on-reserve population for 2031 is 1,379 and 1,809 with the non-status individuals living on leased permanent cottage lots. The projected number of new housing units required over the next 20 years is approximately 172 units, which results in a total number of active housing units of 493 in the year 2031.

Water Demands and Water Storage

There are significant commercial, institutional and industrial water demands at the Curve Lake First Nation Community. The estimated population equivalent of the twenty-two (22) commercial, institutional and industrial facilities in 2004 was approximately 155 persons. Therefore, the total population equivalent in 2004 was approximately 1,061. The population equivalent for the 20 year design to the year 2031 is estimated to be 1,592. Based on this population equivalent, an average day design water demand is estimated at 428 m³/day and the estimated maximum day water demand is 1,070 m³/day (163.5 IGPM). The per capita day water demand is estimated at 250 L/day. In accordance with Ministry of the Environment Guidelines, 1,045 m³/day of storage is required. It was determined that this storage should be located in an elevated water storage tower in the lower peninsula on Weequod Street South.

Water Service Area

It is proposed to service Phase I and Phase II areas within the next 20 years to the year 2031. These areas are shown on **Figure ES-1** attached. The service areas include a proposed commercial/industrial park located near Rollies Point Road and the proposed subdivision on the Stinson Property.

Evaluation of Water System Alternatives

Twelve (12) water system alternative were evaluated for treatment and supply of water to the Curve Lake First Nation Community. All communal water systems using groundwater or surface water include filtration, UV disinfection and chlorination plus treatment for manganese removal. The follow are the water treatment alternatives.

- Alternative 1 - Slow Sand Filtration with Ozonation
- Alternative 2 - Direct Sand Filtration with Catalytic Green Sand Filtration
- Alternative 3 - Membrane Filtration with Catalytic Green Sand Filtration
- Alternative 4 - Ultrafiltration Filtration with Catalytic Green Sand Filtration
- Alternative 5 - Catalytic Green Sand Filtration followed by Cartridge Filtration
- Alternative 6 - Connection to the Lakefield Municipal Water System
- Alternative 7 - Trucking of Municipal Water to Individual Homes
- Alternative 8 - Surface Water Filtration - Buckhorn Lake - Slow Sand Filtration with Ozonation
- Alternative 9 - Point of Entry Treatment at Individual Homes
- Alternative 10 - Macrolite Filtration
- Alternative 11 - Infiltration Gallery - Buckhorn Lake - Slow Sand Filtration with Ozonation

Note: Alternative 12 – Near Shore (Buckhorn Lake) Wells at McIlroy Point, was not reviewed further as it was concluded in the report titled “Assessment of Water from Near Shore (Buckhorn Lake) Wells at McIlroy Point, Curve Lake First Nation,” December, 2009, GENIVAR Consultants LP, that there was not sufficient water in the wells to supply the required design flow of 1,070 m³/day (163.5 IGPM).

The following additional facilities are provided for all filtration alternatives.

- Storage Area
- Office
- MCC Control Room
- Laboratory
- SCADA Control System

- Handicap Washroom with Shower
- Lockers
- Sodium Hypochloride Storage Room
- Small Lunch/Meeting Room
- High Lift Pump Area

Recommended Alternative

Treatment for Alternative 1 and 10 were pilot tested from April 19 to July 26, 2010 and a report prepared by GENIVAR Consultants LP, indicated that both alternatives treated the water for Well #10 satisfactorily and that either alternative is recommended from an engineering and life cycle cost perspective. At a meeting on November 16, 2010 at the Curve Lake First Nation, the Project Team selected Alternative 10 as the preferred alternative. This alternative would treat the water from Well #'s 2, 3, 7 and 10.

The recommended alternative for the Curve Lake First Nation Water System is Alternative 10 (**See Figures ES-1, ES-2 and ES-3**) which is the Oshkigamig Nibiwigamig (Water Treatment Plant) with a capacity of 1,070 m³/day and would consist of Macrolite filtration treatment of water from Well's #2, 3, 7 and 10, 453 m³ of clearwell storage, 1,045 m³ of elevated glass fused to steel storage facility and approximately 16 km of watermain to service Phases I and II. The capital cost is \$19,924,319 with an annual operating and maintenance cost of \$203,600 and a life cycle cost of \$22,957,144. This cost includes the decommissioning of 350 individual wells, which presently service most of the existing Community.

Implementation Plan

The following is the recommended implementation schedule for the Curve Lake First Nation water system.

• Meeting with the Project Team to discuss the final Water Feasibility Study and Pilot Testing Study Report.	November, 2010
• INAC and Curve Lake First Nation and Project Team approval to proceed with Alternative 10.	December, 2010
• Submission of revised PPA and Water System Report to INAC	January, 2011
• Proceed with final design and contract documents, including field work.	June, 2011
• Submission of final design, drawings and contract specifications	December, 2011

• Approval to proceed with tendering for construction of Oshkigamig Nibiwigamig (Water Treatment Plant), elevated water storage facility and watermains - Alternative 10.	February, 2012
• Advertise for tenders.	February, 2012
• Close of tenders.	March, 2012
• Evaluation of tenders and recommendation for award.	April, 2012
• Award of Contract.	April, 2012
• Pre-construction meeting	April, 2012
• Mobilization and start of construction	May, 2012
• Substantial Completion for watermains, elevated storage and Oshkigamig Nibiwigamig (Water Treatment Plant)	August, 2013
• One (1) year maintenance period.	August 2013 to August, 2014