



# North Bay Water Treatment Plant and Distribution System Report for the Period of April 1 to June 30, 2002 (Issue Eight)

Prepared by  
City of North Bay Engineering and Environmental Services Department with data supplied by the  
Ontario Clean Water Agency

*This report is prepared in compliance with Section 12, Ontario Regulation 459/00 (as amended) - Drinking Water Protection, as approved under the Ontario Water Resource Act (R.S.O. 2000).*

## **North Bay's Water System:**

The City of North Bay obtains its municipal water supply from Trout Lake, a high quality surface water source. The North Bay Water Treatment Plant, rated as a level 2 facility, is located at 248 Lakeside Drive, North Bay. Water is drawn from Delaney Bay at a depth of 21.5 m through a 1200 mm polyethylene intake structure approximately 300 meters from shore. The intake is situated 4 meters above the lake bottom. Water treatment at the North Bay Water Treatment Plant consists of coarse screening, disinfection through the continuous feed of sodium hypochlorite (chlorine), fluoridation and pH adjustments using soda ash prior to distribution. The plant is owned by the City of North Bay and is operated by the Ontario Clean Water Agency (OCWA) under a long-term contract. OCWA's operating staff certification exceeds the certification required for the North Bay facility.

The North Bay Water Treatment Plant has been automated and can be run remotely through a Supervisory Control and Data Acquisition (SCADA) system operated by the Ontario Clean Water Agency. All key processes are fully alarmed. Raw and treated water turbidity, as well as the treated water free chlorine residual, pH, fluoride and flow are continuously monitored and recorded. Post chlorination occurs within the distribution system at the Ellendale Highlift Reservoir, the Judge Avenue Valve Chamber, CFB Reservoir and the Birches Road Standpipe. Continuous alarmed chlorine residual monitoring is carried out at these remote locations as well as at the Canadore Pumping Station. Treatment and pumping stations are operated by OCWA, with the distribution system being maintained by City forces (North Bay Public Works).

The City of North Bay water distribution system has 5 pressure zones. Zone 1, below the North Bay escarpment, is pressurized from the Ellendale Highlift Reservoir (4.0 Million Imperial Gallon (MIG) capacity) located at the top of Ellendale Road, North Bay. Pressure in Zone 1A, south of the Judge Avenue Valve Chamber is pressurized from the Birches Road Standpipe (1.5 MIG capacity) located on Birches Road. Zone 2 (Canadore College area) and Zone 3 (Airport Hill) are pressurized by pumping stations located on Gormanville Road and at the Ellendale Highlift Reservoir. Zone 4 is pressurized by a small reservoir at CFB North Bay (0.4 MIG capacity) and by residual pressure from Zone 3. The system is fully monitored and controlled by OCWA through the SCADA system. The City of North Bay's distribution system is rated as a level 4 system.

North Bay's water system serves a population of approximately 54,000 and the Treatment Plant has a total capacity of 115,900 m<sup>3</sup>/day with a rated head of 83.8 m. The firm capacity of the Trout Lake pumping system is 79,500 m<sup>3</sup>/day with pump 3 out of service. In a power failure this pumping rate is reduced to 17,500 m<sup>3</sup>/day through emergency pump 5. The City's water taking permit allows a maximum withdrawal of 79,500 m<sup>3</sup>/day from Trout Lake.

**Table 1: Summary of Chemical and Physical Characteristics<sup>1, 2</sup> of Treated Water entering the North Bay Distribution System and data for Maximum Residency Time Parameters, 2002 (April 1 to June 30, 2002 highlighted)**

Month/ 2001	Total Flow (m <sup>3</sup> )	Ave/Day Flow (m <sup>3</sup> )	Max/Day Flow (m <sup>3</sup> )	Ave	Max	Ave Free	Ave Total	Ave	Max	pH	Ave	Ave	<u>Distribution System</u>	
				Turbidity (NTU) (Treated)	Turbidity <sup>3</sup> (NTU) (Treated)	Chlorine Residual (mg/L)	Chlorine Residual (mg/L)	Fluoride (mg/L)	Fluoride (mg/L)		Temp °C	UVT	THM <sup>4</sup> (ug/l)	Lead (ug/l)
JAN	827,331	26,688	28,560	0.35	0.74	1.27	1.47	0.51	0.58	7.33	3.14	83.85	-	-
FEB	720,722	25,740	32,810	0.32	0.33	1.28	1.48	0.51	0.58	7.31	3.12	83.78	77.0	< 2.0
MAR	782,149	25,231	29,460	0.42	0.88	1.29	1.47	0.52	0.62	7.34	3.10	83.69	-	-
<b>APR</b>	<b>785,570</b>	<b>26,186</b>	<b>36,800</b>	<b>0.66</b>	<b>1.36</b>	<b>1.40</b>	<b>1.61</b>	<b>0.55</b>	<b>0.82</b>	<b>7.31</b>	<b>3.27</b>	<b>81.73</b>	-	-
<b>MAY</b>	<b>828,053</b>	<b>26,711</b>	<b>35,822</b>	<b>0.62</b>	<b>0.69</b>	<b>1.21</b>	<b>1.40</b>	<b>0.51</b>	<b>0.60</b>	<b>7.33</b>	<b>5.81</b>	<b>83.31</b>	<b>110.0</b>	<b>&lt; 2.0</b>
<b>JUN</b>	<b>999,750</b>	<b>31,658</b>	<b>37,300</b>	<b>0.52</b>	<b>0.60</b>	<b>1.18</b>	<b>1.36</b>	<b>0.52</b>	<b>0.56</b>	<b>7.30</b>	<b>6.78</b>	<b>84.92</b>		
JUL														
AUG														
SEP														
OCT														
NOV														
DEC														
Total AVG														
MAX:													89.0	
PDWS <sup>5</sup> :				1.00				0.8 <sup>6</sup>					Δ100.0	10.0

- 1) All data is for water entering the distribution system as measured at the North Bay Water Treatment Plant while trihalomethanes and lead are from distant points within the distribution system. Flow, Turbidity, Chlorine Residuals, Fluoride and pH are continuously monitored. Water temperature and Ultraviolet Transmittance (UVT) are averaged from daily grab samples. Trihalomethanes and Lead are measured from grab samples taken quarterly.
- 2) Data for other Inorganics, Nitrate/Nitrites as well as Pesticide and PCB is collected quarterly. Data has not been provided to conserve space. The City has never experienced an exceedance in any of these parameters. Data for these unreported parameters are available from the 3<sup>rd</sup> Floor North Bay City Hall upon request.
- 3) Turbidity: A measure of water clarity. "The maximum acceptable concentration is 1.0 Nephelometric Turbidity Unit (NTU) for water entering the distribution system." "An appearance related aesthetic objective of 5.0 NTU has been set for water taken at consumers' taps." (Quoted directly from the PWQS definition of Turbidity)
- 4) Trihalomethanes: Chlorine can react with natural organics in water to create byproducts generally known as trihalomethanes. The maximum acceptable concentration is 100.0 ug/L based on four quarterly moving annual average test results.
- 5) Provincial Drinking Water Standards: Updated standards came into effect on August 8, 2000

- 6) A new federal standard of 0.60 to 0.80 mg/ L was introduced in the first quarter of 2001.



## Microbiological Characteristics of North Bay's Treated Water:

Monitoring for bacterial life in the water distribution system has been an ongoing program of the City of North Bay for decades. Microbiological monitoring consists of testing for Total Coliform bacteria, *Escherichia Coli* (*E. Coli*) bacteria and bacterial General Background Populations. Data presented in Table 2 is reported as pass or fail. A water sample fails to meet Provincial Water Quality Standards, and constitutes an adverse reportable event, if greater than zero Colony Forming Units (CFU)/100 ml of either Total Coliform or *E. Coli* bacteria are encountered or if General Background Populations exceed 200 CFU/100 ml in treated water. The City is required to sample weekly and must take a minimum of 62 samples per month within the distribution system. Chlorine residuals are measured in advance of microbiological sampling to ensure that chlorination levels meet provincial standards. If a microbiological sample detects adverse water quality conditions, additional confirmatory testing, including sites around the test failure site, are immediately undertaken. If unacceptable growth in the City's system is confirmed, chlorination rates are boosted and water mains in the affected area are flushed until chlorine residuals are restored and microbiological growth is controlled.

**Table 2: Microbiological Test Results for City of North Bay Water Distribution System, 2002\***

Month	<u>Total Coliforms</u>			<u>E. Coli</u>			<u>General Background</u>		
	No. Taken	Pass	Fail	No. Taken	Pass	Fail	No. Taken	Pass	Fail
JAN	85	85	0	85	85	0	85	85	0
FEB	68	68	0	68	68	0	68	68	0
MAR	68	68	0	68	68	0	68	68	0
<b>APR</b>	<b>147</b>	<b>147</b>	<b>0</b>	<b>147</b>	<b>147</b>	<b>0</b>	<b>147</b>	<b>147</b>	<b>0</b>
<b>MAY</b>	<b>89</b>	<b>89</b>	<b>0</b>	<b>89</b>	<b>89</b>	<b>0</b>	<b>89</b>	<b>89</b>	<b>0</b>
<b>JUN</b>	<b>71</b>	<b>70</b>	<b>1</b>	<b>71</b>	<b>71</b>	<b>0</b>	<b>71</b>	<b>71</b>	<b>0</b>
JUL									
AUG									
SEP									
OCT									
NOV									
DEC									
<b>TOTAL</b>	<b>528</b>	<b>527</b>	<b>1</b>	<b>528</b>	<b>528</b>	<b>0</b>	<b>528</b>	<b>528</b>	<b>0</b>
<b>Ave/mth</b>	<b>88</b>	<b>88</b>	<b>0</b>	<b>88</b>	<b>88</b>	<b>0</b>	<b>88</b>	<b>88</b>	<b>0</b>

\*Reg 459/00 requires the City to take a minimum of 62 samples per month in the distribution system. Data includes result from treated water as it enters the distribution system and is in addition to the required 62 (usually 4/month).

## Notices Given within the Second Quarter of 2002

Eight adverse water quality events were reported in the second quarter of 2002. The City again experienced elevated turbidity at the start of freshet in 2002. Turbidity exceeded the minimum provincial standard on April 10<sup>th</sup>, 2002 after the system had been taken off line when high turbidity was detected in Trout Lake on April 9<sup>th</sup> 2002. Turbidity, reported as peaking at 1.36 NTU, lasted about 12 hours in total above the 1.0 NTU standard. Short duration spikes on pump start ups were also reported on April 11<sup>th</sup> and 16<sup>th</sup>, 2002. The City undertook short-term steps to isolate an erosion zone near Margaret Street, thought to be the main source of particles that can reach the City's water intake in Delaney Bay of Trout Lake. The City was able to demonstrate that turbidity could be controlled through this

technique.

Four events were reported for chlorine residuals that were lower than the 0.05 mg/L indicator of no chlorine. One low chlorine residual site also experienced a detectable Total Coliform count that exceeded the zero standard. Lines were flushed by North Bay Public Works until chlorine residuals, exceeding 0.20 mg/L, were achieved. Follow up microbiological testing indicated that flushing to restore chlorine residuals controlled all growth.

### **Steps Taken within the Quarter to comply with Provincial Water Quality Standards**

The City of North Bay has continued to be active to seek compliance with Ontario Regulation 459/00 in 2002. New drinking water legislation, including updated Provincial Water Quality Standards, came into effect on August 26<sup>th</sup>, 2000. A new consolidated Certificate of Approval (No. 4118-55JMHT) for the North Bay Water Treatment Plant was issued on December 19, 2001. This Certificate specifies that the City must add UV disinfection, move its point of chlorination into the water intake and make other repairs to the existing plant as specified in the Engineers Report by the end of 2002. The City has been given until October 31, 2005 to add filtration or equivalent to its treatment process. Certificate of Approval conditions reflect recommendations made in the Engineers Report prepared for the North Bay Water Works that was filed with the Ministry of the Environment on March 31, 2001. It included a thorough evaluation of raw source water as well as treated and distributed water in the North Bay system and recommendations on compliance issues were also included. The Certificate of Approval provides the City with clarification as to what it must do to comply with the new Drinking Water Protection Regulations.

Ultraviolet disinfection has been installed at the North Bay Water Treatment Plant and was commissioned in the second quarter of 2002. The UV system will be backed up with new backup generator to ensure that UV disinfection is operable at all times and to permit the City to operate its water system indefinitely in a limited fashion during blackout periods.

How the City will achieve compliance with the requirement to add filtration or equivalent at the City's Water Treatment Plant will be determined through a Municipal Class C Environmental Assessment that will select the appropriate technology through a public process. R. V. Anderson has been hired by the City to complete the Environmental Assessment. Two public open houses have been held to confirm that Trout Lake is the long-term source and to select the preferred method of filtration. R. V. Anderson has indicated that the process will be completed in the third quarter of 2002 and that the preferred options can be constructed in time to meet the provincial 2005 deadline.

The new Certificate of Approval also specifies other tasks that must be completed by the City including written procedures for notifying the Medical Officer of Health and MOE, developing contingency plans for emergency situations, enhancing operation manual(s), developing a complaint recording and tracking system and completion of smaller upgrades recommended in the Engineers Report. Modifications have been implemented at the chemical storage and dispensing building. The City, through OCWA, has upgraded turbidity monitoring of treated water before distribution and also at the Ellendale Highlift Reservoir and the Judge Avenue Valve Chamber. A chlorine injection system has been installed at the CFB Reservoir. The City filed its 2001 Compliance Report with province on March 31, 2002. This report, which is available to the public at North Bay City Hall, has been received by North Bay City Council and confirmation of council's acceptance has been sent to the Ministry of the Environment.

The City has awarded the reconstruction of a Margaret Street drainage course to Bruman Construction and this work will be completed in the third quarter of 2002. This project is expected to remove the threat of spring freshet induced turbidity spikes that has caused reportable high turbidity events in the City's water supply in both 2001 and 2002. In 2001 the event resulted in the issuance of a Boil Water Advisory by the local Health Unit for a two-

week period.

Quarterly Reports are available from City Hall or at North Bay's Web Site at [www.city.north-bay.on.ca](http://www.city.north-bay.on.ca).