



North Bay Water Treatment Plant and Distribution System Report for the Period of October 1 to December 31, 2001 (Sixth Issue)

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 506/01(formerly 459/00) - 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 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 m³/day with a rated head of 83.8 m. The firm capacity of the Trout Lake pumping system is 79,500 m³/day with pump 3 out of service. In a power failure this pumping rate is reduced to 17,500 m³/day through emergency pump 5. The City's water taking permit allows a maximum withdrawal of 79,500 m³/day from Trout Lake.

Table 1: Summary of Chemical and Physical Characteristics^{1,2} of Raw Water and Treated Water entering or in the North Bay Distribution System, 2001 (with October 1 to December 31, 2001 highlighted)

Month/ 2001	Total Flow (m ³)	Ave/Day Flow (m ³)	Max/Day Flow (m ³)	Ave	Max	Ave Free	Ave Total	Ave	Max	pH	Ave	<u>Distribution System</u>	
				Turbidity (NTU) (Raw)	Turbidity ³ (NTU) (Raw)	Chlorine Residual (mg/L)	Chlorine Residual (mg/L)	Fluoride (mg/L)	Fluoride (mg/L)		Temp °C	THM ⁴ (ug/l)	Lead (ug/l)
JAN	880,590	28,406	31,855	0.38	0.42	1.00	1.21	0.79	0.90	7.3	3.7		
FEB	761,081	27,181	29,280	0.33	0.42	0.98	1.21	0.75	0.84	7.0	3.6	40.0	2.0
MAR	848,109	27,358	28,980	0.38	0.60	1.01	1.18	0.77	0.84	7.2	3.3		
APR	841,876	28,063	31,500	0.92	5.18	1.26	1.46	0.69	0.88	7.3	3.7		
MAY	982,200	31,684	38,980	0.51	0.61	1.20	1.40	0.59	0.64	7.3	4.8	50.0	N/A ⁵
JUN	1,126,990	37,566	55,040	0.61	0.74	1.13	1.37	0.60	0.69	7.2	5.7		
JUL	1,427,685	46,054	72,490	0.53	0.63	1.13	1.35	0.52	0.71	7.2	6.7		
AUG	1,459,356	47,076	75,200	0.43	0.49	1.19	1.41	0.60	0.82	7.1	7.2	86.0	9.0
SEP	882,470	29,416	33,990	0.43	0.50	1.25	1.48	0.56	0.78	7.1	7.2		
OCT	930,814	30,026	34,080	0.41	0.43	1.24	1.43	0.54	0.66	7.2	7.7		
NOV	756,927	25,230	28,420	0.46	0.60	1.21	1.41	0.54	0.58	7.6	7.7	83.0	< 2.0
DEC	807,151	26,037	30,000	0.44	0.54	1.27	1.53	0.52	0.57	7.4	4.6		
Total	11,712,703												
AVG:	756,927	25,276		0.49		1.16	1.37	0.65		7.24	5.49	64.8	
MAX:	1,459,356		75,200		5.18				0.90				9.0
PDWS ⁶ :					1.00				1.0 (+/- 0.2) ⁷			Δ100.0	10.0

- 1) Chlorine Residuals, Fluoride, pH and Average Temperature are reported for water entering the distribution system while trihalomethanes and lead are from distant points within the distribution system.
- 2) Data for other Inorganics, Nitrate/Nitrites as well as Pesticide and PCB have not been provided. The City has never experienced an exceedance in any of these parameters. Data for other parameters are available from the Engineering and Environmental Services Department 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) Not Available, sample vial was broken at lab
- 6) Provincial Drinking Water Standards: Updated standards came into effect on August 8, 2000

- 7) A new federal standard of 0.60 to 0.80 mg/ L was introduced in the first quarter of 2001 and the City adjusted fluoridation rates to comply with this new standard.

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, 2001*

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	75	75	0	75	75	0	75	75	0
FEB	59	59	0	59	59	0	59	59	0
MAR	60	60	0	60	60	0	60	60	0
APR	226	226	0	226	226	0	226	226	0
MAY	102	102	0	102	102	0	102	102	0
JUN	64	64	0	64	64	0	64	64	0
JUL	86	86	0	86	86	0	86	86	0
AUG	68	68	0	68	68	0	68	68	0
SEP	67	67	0	67	67	0	67	67	0
OCT	68	68	0	68	68	0	68	67	1^t
NOV	85	85	0	85	85	0	85	85	0
DEC	68	68	0	68	68	0	68	68	0
TOTAL	1028	1028	0	1028	1028	0	1028	1027	1
Ave/mth	85.67	85.67	0	85.67	85.67	0	85.67	85.66	0.01

*Reg. 506/01 (formerly 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).

^t Sample taken in City change room building in Champlain Park that was not in use. Building was subsequently boarded up for winter.

Notices Given within the Second Quarter of 2001

One adverse water quality event and one exceedence of a maximum allowable concentration for lead were report in the 4th quarter of 2001. An exceedance of 200 general background microbiological populations was discovered in the men's washroom at Champlain Park at the end of Premier Road in early October. The problem was isolated to this unused line as chlorine residuals and microbiological testing at surrounding buildings indicated that water quality was fine. The water service to the washroom was subsequently shut off and the building was boarded up for the winter. Also private sampling of a public building on McKeown Avenue in late December indicated that lead levels exceeded maximum allowable concentrations at several locations in the building. Follow up sampling by the City indicates that the problem is internal to the building and that water supplied from the water main at the front of the building complies with provincial standards.

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

The City of North Bay has continued to be active on several fronts to seek compliance with Ontario Regulation 506/01 (formerly 459/00). The new legislation, including updated Provincial Water Quality Standards, came into effect on August 26th, 2000. The most recent version of the 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 filed its Engineers Report 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, which reflects the recommendations that were made in the Engineers Report, provides the City with clarification as to what it must do to comply with the new Drinking Water Protection Regulations. The City has been given until October 31, 2005 to add filtration or equivalent to its treatment process through the Certificate of Approval.

Work is underway to install UV disinfection and to make the other modifications to the City's existing water treatment plant and this work is well at hand to meet the 2002 deadline. This work is being coordinated through the Ontario Clean Water Agency with engineering support being provided by CH₂ M Hill Canada Ltd. UV installation and system upgrades are considered temporary while options for filtration are investigated. The UV install will include the addition of a backup generator to ensure that UV disinfection is operable at all times and it will also 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. R. V. Anderson has indicated that the process will take until mid 2002 to complete, and that any conceived option at this time can be planned, designed and built by the 2005 deadline.

The new Certificate of Approval also specifies numerous works 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 are being implemented at the chemical storage and dispensing building. The City has added continuous 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 is working on a 2001 Compliance Report that must be filed with the province by March 31, 2002. The report, which will be available to the public at North Bay City Hall, will review compliance with terms and conditions of the Certificate of Approval and indicate actions being taken by the owner to maintain compliance. The City will also move the chlorine injection system into the water intake in early 2002.

An event of note in the 4th quarter was the discharge of sewage from a broken sanitary sewer, near Trout Lake, that services the Sage Underground Complex. The leakage made its way via Armstrong Creek to Delaney Bay of Trout Lake. The break was discovered on December 15th and repairs were completed the next day. The City's operator (OCWA) boosted chlorination and increased the monitoring of raw water quality in response to this event. The City detected no significant change in raw water quality at its intake as a result of the spill. The City is studying this service to determine if additional preventative maintenance is warranted.

Quarterly Reports are available from City Hall or at North Bay's Web Site at www.city.north-bay.on.ca.