



**OPTIONAL ANNUAL REPORT TEMPLATE**

<b>Drinking-Water System Number:</b>	220000406
<b>Drinking-Water System Name:</b>	North Bay Water Drinking Water System
<b>Drinking-Water System Owner:</b>	The Corporation of the City of North Bay
<b>Drinking-Water System Category:</b>	Large Municipal Residential
<b>Period being reported:</b>	January 1, 2011 to December 31, 2011

<p><b><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></b></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ]</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [ <input checked="" type="checkbox"/> ] No [ <input type="checkbox"/> ]</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <div style="border: 1px solid black; padding: 5px;"> <p>The Corporation of the City of North Bay P.O. Box 360 200 McIntyre Street East North Bay, ON P1B 8H8</p> </div>	<p><b><u>Complete for all other Categories.</u></b></p> <p>Number of Designated Facilities served: <input type="text"/></p> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [ <input type="checkbox"/> ] No [ <input type="checkbox"/> ]</p> <p>Number of Interested Authorities you report to: <input type="text"/></p> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [ <input type="checkbox"/> ] No [ <input type="checkbox"/> ]</p>
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**Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report**

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number
N/A	

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?  
Yes [  ] No [  ]



Indicate how you notified system users that your annual report is available, and is free of charge.

- Public access/notice via the web
- Public access/notice via Government Office
- Public access/notice via a newspaper
- Public access/notice via Public Request
- Public access/notice via a Public Library
- Public access/notice via other method \_\_\_\_\_

**Describe your Drinking-Water System**

The City of North Bay water treatment plant (WTP), water distribution facilities and water distribution piping system are owned by the Corporation of the City of North Bay. The Ontario Clean Water Agency was the Operating Authority for the WTP and water distribution facilities until June 30, 2011 at which point the City of North Bay took over operations. The City of North Bay has been Operating Authority for the WTP and water distribution facilities since June 30, 2011 at 16:00.

The City of North Bay Water Treatment System is classified as a "Large Municipal Residential" Drinking-Water System, Class 3 with Drinking-Water System Number: 220000460. The WTP, located at 248 Lakeside Drive in North Bay, treats water from Trout Lake which is part of the Mattawa River watershed. The WTP services a population of approximately 54,000 and the permit to take water permits consumption up to 79,500 cubic meters per day.

The water distribution facilities consist of the following:

Ellendale Reservoir, High lift Pump Station & Re-chlorination Facility;  
CFB Reservoir;  
Canadore Pumping Station;  
Judge Avenue Valve Chamber & Re-chlorination Station;  
Birches Road Standpipe and Re-chlorination Station; and  
Airport Road Standpipe, Booster Pumping Station and Re-chlorination Facility.

The membrane filtration water treatment plant has the design capacity of 79,500 cubic meters per day. The plant is a SCADA controlled membrane filtration system with ultraviolet and chlorine disinfection systems. The plant also includes fluoride addition along with caustic pH adjustment prior to delivery to the distribution system.

The membrane filtration plant meets the Ontario Drinking Water Standards requirements for the removal/disinfection of 3-log *Giardia Lambia*, 2-log *Cryptosporidium* and 4-log Viruses. The membrane filtration Primary Barrier provides for a 3-log *Giardia* removal, 2-log *Cryptosporidium* removal. The chlorine/UV disinfection Secondary Barrier provides for a 0.5 UV *Giardia* removal, 0.5-log UV *Cryptosporidium* removal and a 4 log chlorine virus removal.



**In general the North Bay WTP can be described as follows:**

**Intake**

**A 1200mm diameter series 45 polyethylene intake pipe, with a capacity of 80,000 cubic meters per day. The pipe, constructed in 1973, extends approximately 300 meters into Delaney Bay of Trout Lake and includes an intake structure consisting of a steel inlet bell mouth with fibre reinforced plastic (FRP) cage and is in approximately 21.5 metres of water at low water level.**

**Membrane Feed Pump Well/Prescreening**

**Two (2) parallel sub-surface well chambers with level monitoring containing, two (2) 6mm mesh manual prescreen in series, five (5) vertical turbine pumps (4 duty and one standby) rated at 20 m<sup>3</sup>/d feeding the primary membrane system.**

**Membrane Feed Strainers**

**Five (5) 300 micron automatic membrane feed strainers (four duty and one standby).**

**Treatment Plant Process Areas**

**A building housing the following process components:**

- primary and secondary membrane filtration system;**
- primary and secondary UV disinfection system;**
- split chlorine contact tank;**
- split highlift pump well**
- three (3) chemical storage and delivery rooms housing membrane cleaning and neutralization chemical systems, pre-chlorination system, primary disinfection chemical system, residual chlorination chemical system, alkalinity adjustment system, and fluoride addition system;**
- highlift pumping;**
- Generator room;**
- Electrical room.**
- compressor/blower room**

**Treatment Plant & Administration Areas**

**Two floor administrative area including laboratory/control room, server room, multipurpose training room, offices, washrooms, women's and men's locker rooms, janitor room, building mechanical room and storage room.**

**Membrane Filtration**

**Eleven (11) pressurized primary membrane racks treating water from the membrane feed strainers, two(2) pressurized secondary membrane racks treating non-chemical backwash water from the primary membrane racks. The primary racks have a maximum production flow rate of 78.7 MLD based on raw water flow rate of 79.5 MLD, Ancillary systems including backwash pumps, instrument air for operating valves and integrity testing membranes, process blowers, and chemical cleaning and neutralization systems.**



**UV Disinfection Systems**

Three (3) 600mm UV reactors (two duty and one standby) treating water from the eleven (11) pressurized primary membrane racks and two (2) secondary membrane racks. Each reactor contains medium pressure high intensity lamps housed in quartz sleeve and equipped with self cleaning mechanism and intensity sensor.

**Chemical systems for:**

**Zebra mussel control**

**Primary disinfection**

**Secondary (residual) disinfection**

**Fluoride Dosing**

**Alkalinity Adjustment**

**Membrane cleaning**

**Membrane cleaning solutions neutralization**

**Chlorine Contact Tank #1 and #2**

Two (2) baffled chlorine contact tanks in series with storage volumes of 688 cubic meters (tank #1) and 502 cubic meters (tank #2).

**High Lift Pump Well #1 and #2**

High lift pump well #1 has a capacity of approximately 240 cubic meters and is equipped with one (1) variable speed and two (2) constant speed vertical turbine high lift pumps each rated at 20 MLD. High lift pump well #2 has a capacity of approximately 240 cubic meters and is equipped with one (1) variable speed and one (1) constant speed vertical turbine high lift pump each rated at 20 MLD.

**Generator Room**

One (1) dual fuel generator set (NG/Diesel) with a rating of 2050KW, to provide power during peak hours and emergency situations.

**Wastewater Disposal System**

**Primary Membrane Backwash Tank**

Tank with a volume of approximately 310 cubic meters,

Two (2) membrane feed pumps supplying water to the Secondary Membrane System.

**Secondary Waste Tank**

Tank with a volume of approximately 130 cubic meters,

Two (2) pumps, one duty and one standby, to deliver water to the sanitary sewer.

**Neutralization Tank #1 and #2**

Two (2) tanks each with a volume of 150 cubic meters, pH and Chlorine Residual analyzers.

**Sanitary Sewage Disposal**



One sump with two (2) submersible pumps in the Administration Area and two (2) sumps and two (2) submersible pumps in the Process Area discharging to the sanitary sewer along Lakeside Drive

The treated water is pumped to the distribution system.

The water distribution facilities can be described as follows:

**Ellendale Reservoir, Highlift Pumping Station and Re-chlorination Facility**

The facility is a reinforced concrete at-grade, double cell, un-baffled, treated water reservoir, located at the east end of Ellendale Drive. The reservoir has an approximate capacity of 18,200 cubic meters, with dimensions of 71 meters by 38 meters by 7 meters. The facility is equipped with a sodium hypochlorite re-chlorination system, on-line continuous water quality analyzers for free chlorine and turbidity and a standby generator to operate the facility during power outages.

**Birchs Road Standpipe and Re-chlorination Station**

The facility consists of one (1) 39 meter high, 19 meter diameter, 11,775 cubic meter capacity, steel, un-baffled, treated water standpipe, located near the southwest corner of Birchs Road and Booth Road. The facility is equipped with sodium hypochlorite re-chlorination system, on-line continuous water quality analyzers for free chlorine and turbidity and fixed 7.5kW, 120/240 Volt single phase, diesel powered generator to power the re-chlorination and SCADA communications during prolonged power outages.

**Judge Avenue Valve Chamber and Re-chlorination Station**

The facility consists of a valve and re-chlorination station, located near the northeast corner of Judge Avenue and Lakeshore Drive, equipped with a sodium hypochlorite re-chlorination system, on-line continuous water quality analyzers for free chlorine and turbidity, a fixed 7.5kW 120.240 Volt single phase, diesel powered generator to power the re-chlorination and SCADA communications during prolonged power outages, and valve control that is integrated with Birches Standpipe.

**CFB North Bay Reservoir and Re-chlorination Facility**

The facility consists of one (1) 1820 cubic meter capacity, un-baffled reservoir and a re-chlorination facility located at the north end of Manston Crescent. The facility is equipped with a sodium hypochlorite re-chlorination system, on line continuous water quality analyzer for free chlorine and a standby pump to provide water during power outages.

**Canadore Pumping Station**

The facility is equipped with highlift pumps and pressurized cushion tanks to maintain pressure in the pressurized zone of the distribution system servicing Canadore College and Nipissing University. There is an on-line continuous water quality analyzer to monitor free chlorine residual and a 200kW, 347/600 Volt, 3 phase diesel generator to provide power and SCADA communications during prolonged power outages.



**Airport Standpipe, Booster Pumping Station**

This 4,000 cubic meter water storage standpipe, booster pumping station and re-chlorination facility was constructed in 2009. With the standpipe, high lift pumps and pressurized cushion tanks this facility maintains pressure in the pressurized zone of the distribution system servicing the Airport and Carmichael Drive areas. The overall system consists of pressure zones 4 and 5 which accommodate a total of nine pumps, including three booster pumps (2 duty and 1 standby) for Zone 4, four booster pumps (3 duty and 1 standby) and two fire pumps for Zone 5. The water standpipe is connected to the zone 4 distribution header to provide zone 4 fire flow and peak hour demand. It is also connect to the zone 5 fire pumps suction header to provide zone 5 fire demand. Zone 5 is equipped with four (4) pneumatic tanks connected to the Zone 5 discharge header to mitigate minor pressure fluctuations within the distribution system, and to provide some volume of available storage during power interruptions before the standby power system engages. This will mitigate the potential for negative pressure in the distribution system.

**List all water treatment chemicals used over this reporting period**

Sodium Hydroxide  
Sodium Hypochlorite  
Hydrofluosilicic Acid

**Were any significant expenses incurred to?**

- Install required equipment
- Repair required equipment
- Replace required equipment

**Please provide a brief description and a breakdown of monetary expenses incurred**

Major repair and replacement to ensure reliable treatment and distribution of water to the water system.

The major capital repairs and replacements include:

- WTP membrane filtration emergency bypass piping
- Repair to Ellendale Reservoir sodium hypochlorite pumps
- New water heater installed at Ellendale Reservoir
- Sump pump replaced at Judge Valve Chamber
- Pump #1 outlet valve replaced at Ellendale
- Chemical Resistive Coating installed at chemical loading station at WTP
- Additional Support for Reverse Filtration line installed at WTP
- Energy Saving SCADA highlift pumping mode programmed at WTP
- Third party flow meter calibration at all water system sites
- Annual hoist and crane inspections for all equipment at all water systems facilities.



- Annual maintenance of generators at all water facilities
- Watermain looping at Champlain St (looped 150mm to 300mm)
- Replaced 100mm watermain with 200mm watermain on First Avenue from Sherbrooke to Wyld
- Replaced 150m of 150mm watermain from entrance of Public Works yard (Franklin St) thru to True North
- Replaced 30m of 400mm watermain in front of Sears at Northgate Square
- Installed 300m of 300mm watermain along Memorial Dr. lopping the 150mm main at the Marina with the new 300mm main installed under the CPR tracks and new underpass
- Replaced 70m of 100mm watermain with 150mm watermain thru the Armories between High St and Chippewa
- Installed 6 m of 150mm watermain with new 200mm watermain at High St. and Aubrey St.
- Looped dead end watermain at First Ave E to dead end watermain at Second Avenue E by installing 150m of 150mm watermain adjacent to Chippewa Creek.
- Replaced 400mm and 200mm watermain on Main St from Oak St. to Regina St.
- Replaced 200mm watermain on First St from Commercial St. to Front St.
- New 600mm watermain on Pearce St. from Airport Rd to Francis St.
- 150m of 300mm watermain installed at the Waterfront Park.
- 40 m of 150mm watermain replaced on Surrey Dr. from Airport Rd. to Francis St.

**Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre**

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
7-Mar-11	Hexachlorocyclopentadiene	0.08	ug/L	Reported to the MOE and MOH as required. Re-sample collected and submitted on 23 Mar 2011. Instructions given by the MOH on 01 April 2011 that concentrations of less than 1 ug/L are considered byproducts of chlorine disinfection and therefore no further actions required AWQI# 100270	1-Apr-11
23-Mar-11	Hexachlorocyclopentadiene	0.14	ug/L	Reported to the MOE and MOH as required. Instructions given by the MOH on 01 April 2011 that concentrations of less than 1 ug/L are considered byproducts of chlorine disinfection and therefore no further actions required AWQI# 100397	1-Apr-11



10-May-11	Failure of SCADA DATA Collection & Trending	N/A	N/A	This incident was not a true adverse water quality incident however a non-compliance notification to the MOE was made through MOE SAC. MOE SAC issued an AWQI# when notification was made to them. The SCADA system failed upon rebooting following some new programming. Additional reboots were required to reactivate the data recording and trending. A gap in data collection/trending resulted from the period from 10:18 hrs to 11:00 hrs on 10 May 2011. Notification made to the MOE as required. AWQI# 100818	
17-June-11	Total Coliforms	5		Reported to the MOE and MOH as required. Health unit recommendation to flush the watermain on Circle lake Rd and re-sample (1 upstream and 1 downstream). Flushing and re-sampling was completed June 17, 2011. Re-sample results met Ontario Drinking Water Quality Standards. AWQI 101462	18-June-11
30-Aug-11	Lead	26	ug/L	Reported to MOE and MOH as required on date sample results received 06-Sept-11. Flushed and re-sampled on 07-Sept-11. Re-sample results met Ontario Drinking Water Quality Standards. AWQI #103155	07-Sept-11
13-Oct-11	Total Coliforms  Ecoli	32  3		Reported to the MOE and MOH as required. Chlorine trending and online CT calculations show CT of 35.58 mg.min/L a time of sampling. Chlorine residual at time of sampling 1.32 free chlorine, 1.5 total chlorine. It is suspected that the raw sample was labeled as treated POE. Re-sample taken 13-Oct-2011 at 14:36. Re-sample results meet the Ontario Drinking Water Quality Standards (no EC and no TC) AWQI #103796	14-Oct-11





**Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.**

	Number of Samples	Range of E.Coli (#)-(#)	Range of Total Coliform Results (#)-(#)	Number of samples Background Colony Counts	Range of Back-ground Colony Counts	Number of HPC Samples	Range of HPC Results (#)-(#)
<b>Raw</b>	53	0-4	0-200	53	29->200	N/A	N/A
<b>Treated</b>	53	0-3	0-32	53	0->200	53	0-31
<b>Distribution Fixed Sites</b>	364	0-0	0-0	364	0-12	104	0-4
<b>Distribution Random Sites</b>	520	0-0	0-0	520	0-20	156	0-20

**Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.**

<b>POE Grab Samples</b>	Number of Grab Samples	Range of Results (min #)-(max #)
<b>Turbidity</b>	<b>227</b>	<b>0.025 – 0.123 NTU</b>
<b>Chlorine</b>	<b>241</b>	<b>0.95 – 1.67 mg/L</b>
<b>Fluoride (If the DWS provides fluoridation)</b>	<b>53</b>	<b>0.30 – 0.65 mg/L</b>

***NOTE:** For continuous monitors use 8760 as the number of samples.*

<b>Distribution Free Chlorine Grab Samples</b>	Number of Grab Samples	Range of Results (min #)-(max #)
<b>Chlorine Fixed Sites</b>	<b>3649</b>	<b>0.16 - 2.14 mg/L</b>
<b>Chlorine Random Sites</b>	<b>520</b>	<b>0.1-1.34 mg/L</b>

***NOTE:** For continuous monitors use 8760 as the number of samples.*

<b>POE on-line Continuous Analyzers</b>	Number of Grab Samples	Range of Results (min #)-(max #)
<b>Turbidity</b>	<b>8760</b>	<b>0.01 – 1.52 mg/L</b>
<b>Chlorine</b>	<b>8760</b>	<b>0.78 - 2.27 mg/L</b>
<b>Fluoride (If the DWS provides fluoridation)</b>	<b>8760</b>	<b>0.16 - 0.89 mg/L</b>

***NOTE:** For continuous monitors use 8760 as the number of samples.*

**Summary of Inorganic parameters tested during this reporting period or the most recent sample results**

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	07 Mar 11	<0.5	ug/L	no
Arsenic	07 Mar 11	<1	ug/L	no
Barium	07 Mar 11	12.0	ug/L	no
Boron	07 Mar 11	<10	ug/L	no
Cadmium	07 Mar 11	<0.1	ug/L	no
Chromium	07 Mar 11	<5	ug/L	no
Mercury	07 Mar 11	<0.0001	mg/L	no
Selenium	07 Mar 11	<2	ug/L	no
Sodium	07 Mar 11	12	mg/L	no
Uranium	07 Mar 11	<0.1	ug/L	no
Fluoride	18 Feb 09	0.6	mg/L	no
Nitrite	22 Feb 11	<0.01	mg/L	no
	16 May 11	<0.01	mg/L	
	15 Aug 11	<0.04	mg/L	
Nitrate	22 Feb 11	0.2	mg/L	no
	16 May 11	0.1	mg/L	
	15 Aug 11	0.353	mg/L	

\*only for drinking water systems testing under Schedule 15.2; this includes large municipal non-residential systems, small municipal non-residential systems, non-municipal seasonal residential systems, large non-municipal non-residential systems, and small non-municipal non-residential systems

**Summary of lead testing under Schedule 15.1 during this reporting period**

(applicable to the following drinking water systems; large municipal residential systems, small municipal residential systems, and non-municipal year-round residential systems)

	Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Unit of Measure	Number of Exceedances
<b>Round 1 Dec 15 2010 to Apr 15 2011</b>	<b>Plumbing</b>	<b>88</b>	<b>&lt;0.001 – 0.014</b>	<b>mg/L</b>	<b>1</b>
	<b>Distribution</b>	<b>16</b>	<b>&lt;0.001 – 0.003</b>	<b>mg/L</b>	<b>0</b>
<b>Round 2 June 15 2011 to Oct 15 2011</b>	<b>Plumbing</b>	<b>88</b>	<b>&lt;0.001 – 0.023</b>	<b>mg/L</b>	<b>5</b>
	<b>Distribution</b>	<b>16</b>	<b>&lt;0.001 – 0.036</b>	<b>mg/L</b>	<b>1</b>

**Summary of Organic parameters sampled during this reporting period or the most recent sample results**

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	07 Mar 11	<0.5	ug/L	no
Aldicarb	07 Mar 11	<5	ug/L	DL>1/2 MAC

Aldrin + Dieldrin	07 Mar 11	<0.01	ug/L	no
Atrazine + N-dealkylated metabolites	07 Mar 11	<1	ug/L	no
Azinphos-methyl	07 Mar 11	<2	ug/L	no
Bendiocarb	07 Mar 11	<2	ug/L	no
Benzene	07 Mar 11	<0.1	ug/L	no
Benzo(a)pyrene	07 Mar 11	<0.009	ug/L	DL>1/2 MAC
Bromoxynil	07 Mar 11	<0.5	ug/L	no
Carbaryl	07 Mar 11	<5	ug/L	no
Carbofuran	07 Mar 11	<5	ug/L	no
Carbon Tetrachloride	07 Mar 11	<0.1	ug/L	no
Chlordane (Total)	07 Mar 11	<0.01	ug/L	no
Chlorpyrifos	07 Mar 11	<1	ug/L	no
Cyanazine	07 Mar 11	<1	ug/L	no
Diazinon	07 Mar 11	<1	ug/L	no
Dicamba	07 Mar 11	<1	ug/L	no
1,2-Dichlorobenzene	07 Mar 11	<0.2	ug/L	no
1,4-Dichlorobenzene	07 Mar 11	<0.2	ug/L	no
Dichlorodiphenyltrichloroethane (DDT) + metabolites	07 Mar 11	<0.02	ug/L	no
1,2-Dichloroethane	07 Mar 11	<0.2	ug/L	no
1,1-Dichloroethylene (vinylidene chloride)	07 Mar 11	<0.1	ug/L	no
Dichloromethane	07 Mar 11	<0.5	ug/L	no
2-4 Dichlorophenol	07 Mar 11	<0.5	ug/L	no
2,4-Dichlorophenoxy acetic acid (2,4-D)	07 Mar 11	<1	ug/L	no
Diclofop-methyl	07 Mar 11	<0.9	ug/L	no
Dimethoate	07 Mar 11	<3	ug/L	no
Dinoseb	07 Mar 11	<1	ug/L	no
Diquat	07 Mar 11	<7	ug/L	no
Diuron	07 Mar 11	<10	ug/L	no
Glyphosate	07 Mar 11	<10	ug/L	no
Heptachlor + Heptachlor Epoxide	07 Mar 11	<0.01	ug/L	no
Hexachlorocyclopentadiene	07 Mar 11 23 Mar 11	0.08 0.14	ug/L ug/L	Present re-sample present
Lindane (Total)	07 Mar 11	<0.006	ug/L	no
Malathion	07 Mar 11	<5	ug/L	no
Methoxychlor	07 Mar 11	<0.02	ug/L	no
Metolachlor	07 Mar 11	<0.5	ug/L	no
Metribuzin	07 Mar 11	<5	ug/L	no
Monochlorobenzene	07 Mar 11	<0.1	ug/L	no
Paraquat	07 Mar 11	<1	ug/L	no
Parathion	07 Mar 11	<1	ug/L	no
Pentachlorophenol	07 Mar 11	<0.5	ug/L	no
Phorate	07 Mar 11	<0.5	ug/L	no

Picloram	07 Mar 11	<5	ug/L	no
Polychlorinated Biphenyls(PCB)	07 Mar 11	<0.05	ug/L	no
Prometryne	07 Mar 11	<0.3	ug/L	no
Simazine	07 Mar 11	<1	ug/L	no
THM (NOTE: show latest annual average)	07 Mar 11	77.4	ug/L	no
Temephos	07 Mar 11	<10	ug/L	no
Terbufos	07 Mar 11	<0.5	ug/L	DL>1/2 MAC
Tetrachloroethylene	07 Mar 11	<0.1	ug/L	no
2,3,4,6-Tetrachlorophenol	07 Mar 11	<0.5	ug/L	no
Triallate	07 Mar 11	<1	ug/L	no
Trichloroethylene	07 Mar 11	<0.1	ug/L	no
2,4,6-Trichlorophenol	07 Mar 11	<0.5	ug/L	no
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	07 Mar 11	<1	ug/L	no
Trifluralin	07 Mar 11	<1	ug/L	no
Vinyl Chloride	07 Mar 11	<0.2	ug/L	no

THM Dist Sample Location 55 Aviation Ave & 201 Pinewood Park *The last quarter of 2011 sample was missed and therefore the last quarter results from 2010 is used for the 4 quarter average	1 <sup>st</sup> Quarter Result Value	2 <sup>nd</sup> Quarter Result Value	3 <sup>rd</sup> Quarter Result Value	4 <sup>th</sup> Quarter Result Value 2010	Unit of Measure	Exceedance
<b>Date Sampled</b>	22 Feb 11	16 May 11	15 Aug 11	09 Nov 10	ug/L	No
<b>Bromodichloromethane</b>	3.0 3.2	3.1 3.2	3.0 3.2	4.1 4.2	ug/L	No
<b>Bromoform</b>	<0.2 <0.2	<0.2 <0.2	<0.4 <0.4	<0.2 <0.2	ug/L	No
<b>Chloriform</b>	50.0 70.5	65.3 77.5	55.8 62.2	77.3 85.7	ug/L	No
<b>Dibromochloromethane</b>	<0.2 <0.2	<0.2 <0.2	<0.3 <0.3	<0.2 <0.2	ug/L	No
<b>Total Trihalomethanes</b>	53.0 73.7	68.4 80.7	58.8 65.4	81.4 89.9	ug/L	No
<b>Total Tirhalomethanes 4 Quarter Average</b>					77.4	No

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	½ MAC VALUE	MAC VALUE	Date of Sample
*Aldicarb	<5 lab detection level	ug/L	4.5	9	07 Mar 11
*Benzo(a)pyrene	<0.009 lab detection limit	ug/L	0.005	0.01	07 Mar 11
*Hexachlorocyclopentadiene	0.08 0.14	ug/L ug/L	n/a	n/a	07 Mar 11 23 Mar 11
Lead	0.036	mg/L	0.005		30-Aug-11

\*In all the cases marked with \* the analysis result value was less than the lab detection limit. However the lab detection limit is above the ½ MAC value.

# SUMMARY REPORT FOR THE NORTH BAY WATER TREATMENT SYSTEM

## 2011 Report

This report is a summary of water quality information for the North Bay Water Treatment System, published in accordance with Schedule 22 of Ontario's Drinking-Water Systems Regulation for the reporting period of January 1, 2011 to December 31, 2011. This report is based on all information received within the stated reporting period and items that remained outstanding in the last reporting periods that have been carried forward.

The North Bay Water Treatment System is categorized as a Large Municipal Residential Drinking Water System.

The Ontario Clean Water Agency was the Operating Authority for the WTP and water distribution facilities until June 30, 2011 at which point the City of North Bay took over operations. The City of North Bay has been Operating Authority for the WTP and water distribution facilities since June 30, 2011 at 16:00.

The following table lists the requirements that the system failed to meet and the measures taken to correct the failure:

Drinking Water Legislation	List the requirement(s) the system failed to meet	Specify the duration of the failure (i.e. date(s))	Describe the measure taken to correct the failure	Status (complete or outstanding)
Exceedance with MDWL & the standards prescribed in O.Reg. 169/03 (ODWQS)	The following is a list of the adverse sampling results from the North Bay WTP & DS over the year of 2011.		Adverse Sample Notifications were made to the MOE and Health Unit as required and corrective actions were taken by the operations staff	Complete
	Hexachlorocyclopentadiene found present in annual organic sample	07 Mar 2011	Reported to the MOE and MOH as required. Re-sample collected and submitted on 23 Mar 2011. Instructions given by the MOH on 01 April 2011 that concentrations of less than 1 ug/L are considered by-products of chlorine disinfection and therefore no further actions required. AWQI #100270	Complete
	Hexachlorocyclopentadiene found present in annual organic re-sample	23 Mar 2011	Reported to the MOE and MOH as required. Instructions given by the MOH on 01 April 2011 that concentrations of less than 1 ug/L	Complete

			are considered by-products of chlorine disinfection and therefore no further actions required. AWQI #100397	
	Failure of SCADA DATA Collection/Trending	10 May 2011	This incident was not a true adverse water quality incident however a non-compliance notification to the MOE was made through MOE SAC. MOE SAC issued an AWQI# when notification was made to them. The SCADA system failed upon rebooting following some new programming. Additional reboots were required to reactivate the data recording and trending. A gap in data collection/trending resulted for the period from 10:18hrs to 11:00hrs on 10 May 2011. Notification made to the MOE as required. AWQI#100818	Complete
	Total Coliforms	17 June 2011	Reported to the MOE and MOH as required. Health unit recommendation to flush the watermain on Circle lake Rd and re-sample (1 upstream and 1 downstream). Flushing and re-sampling was completed June 17, 2011. Re-sample results met Ontario Drinking Water Quality Standards. AWQI# 101462	Complete
	Lead	30 Aug 2011	Reported to MOE and MOH as required on date sample results received 06-Sept-11. Flushed and re-sampled on 07-Sept-11. Re-sample results met Ontario Drinking Water Quality Standards. AWQI #103155	Complete
	E-coli, Total Coliforms	13 Oct 2011	Reported to the MOE and MOH as required. Chlorine trending and online CT calculations show CT of 35.58 mg.min/L at time of sampling. Chlorine residual at time of sampling 1.32 free chlorine, 1.5 total chlorine. It is suspected that the raw sample was labeled as treated POE. Re-sample taken 13-Oct-2011 at 14:36. Re-sample results meet the Ontario Drinking Water Quality Standards AWQI#103796	Complete

The North Bay Water Treatment Plant (WTP) has the design capacity of 79,500 cubic meters of water per day. The WTP is a SCADA controlled membrane filtration system with ultraviolet and chlorine disinfection systems. The plant also includes fluoride addition along with caustic pH adjustment prior to delivery to the distribution. The WTP meets the Ontario Drinking Water Standards requirements for the removal/disinfection of 2-log *Cryptosporidium* oocysts, 3-log *Giardia* cysts, and 4-log Viruses.

The North Bay WTP achieves the above performance criteria using membrane filtration (0.1 micron pore size), ultraviolet (UV) inactivation and chlorine disinfection.

The filtration process meets the criteria listed in the Procedure for Disinfection of Drinking Water in Ontario for membrane filtration, including;

1. Maintain effective backwash procedures, including filter-to-waste or an equivalent procedure, to ensure that the effluent turbidity requirements are met at all times;
2. Monitor integrity of the membrane by continuous particle counting or equivalent effective means (e.g., intermittent pressure decay measurements) (Note: intermittent pressure decay monitored at the North Bay WTP).
3. Continuously monitor filtrate turbidity; and,
4. Meet the performance criterion for filtered water turbidity of less than or equal to 0.1 NTU in 99% of the measurements each month.

The following is a breakdown of the pathogen removal credits for the North Bay WTP:

- Membrane filtration provides 3.0 log removal of *Giardia*, 2-log removal of *Cryptosporidium*
- UV inactivation provides 0.5-log removal of *Giardia* and 0.5-log removal of *Cryptosporidium*
- Chlorine disinfection provides 4-log removal of viruses

All of the filter rack effluent lines are equipped with continuously monitored, recorded and alarmed turbidity analyzers which will shut down the respective rack if a reading exceeds 0.1 NTU.

Filtered water is directed through the UV disinfection units prior to entering the contact chambers. The two chlorine contact tanks can be operated separately or in sequence and still provide the required 4 log disinfection. This facility is equipped with continuously monitored, recorded and alarmed CT calculation. The SCADA system also automatically takes data from several sources (flow, temperature, free chlorine residual, pH, water depth in contact tanks, and which contact tank is in service) and calculates the log removal credits achieved for *Giardia* & Viruses.

The following information presents the Annual Record of Water Taking for the North Bay Water Treatment Plant and the treated water consumption.

#### Raw Water Taking

In overview some 12,713,539 cubic meters of water were taken from Trout Lake during the year of 2011. The average water taking for 2011 was 34,925 cubic meters per day. The maximum water taking



per day was 51,870 cubic meters in July and this was 65% of the maximum 79,500 cubic meters per day allowed under the Permit to Take Water.

Raw Water Taking	Total Taking (m3/d)	Average Day (m3/d)	Max Day (m3/d)	Max Day % of PTTW allowable (79,500 m3/d)
2011	12,752,104	34,925	51,870	65%
2010	12,736,244	34,894	51,139	64%
2009	12,341,188	33,496	51,339	65%
2008	12,503,512	34,161	54,123	68%
2007	13,928,611	38,161	54,684	70%

The 2011 total raw water taking was up by 0.1% from 2010

#### Treated Water

In overview some 12,563,903 cubic meters of water were delivered to the distribution system during the year 2011. The average treated water delivered to the distribution system was 34,408 cubic metres per day for 2011. The maximum water delivered to the distribution system per day during 2011 was 51,450 cubic meters in July and this was 65% of the 78,700 cubic meters per day rated capacity of the plant.

Treated Water Taking	Total Taking (m3/d)	Average Day (m3/d)	Max Day (m3/d)	Max Day % of PTTW allowable (78,700 m3/d)
2011	12,563,903	34,408	51,450	65%
2010	12,584,670	34,479	50,820	65%
2009	12,341,188	33,496	51,339	65%
2008	12,503,512	34,161	54,123	68%
2007	13,928,611	38,161	54,684	70%

The 2011 total treated water volume delivered into the distribution system was down by 0.2% from 2010

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