

2021 Annual Report

North Bay Wastewater Treatment System

Description of the Works

Wastewater Treatment Plant:

The original sewage plant was built in 1961-62 providing secondary treatment for 18,160 cubic meters/day. The plant was expanded in 1973 to a capacity of 36,320 cubic meters/day, and in 1984 the plant was expanded again to its present capacity of 54,500 cubic meters/day. Phosphorus removal was included in the 1984 expansion/upgrade. In order to protect spawning grounds, the plant operates a discontinuous chlorination program (chlorination period is May 15th to October 15th).

The North Bay Wastewater Treatment Plant is a conventional activated sludge facility, using biological oxidation, anaerobic sludge digestion than centrifugation for sludge dewatering. The plant treats urban wastewater and discharges the processed effluent water into Lake Nipissing. The solid sludge material produced through primary settlement and the biological secondary treatment process "activated sludge process", is stabilized through anaerobic digestion which reduces its organic content and renders it non-putrescible. The anaerobically digested sludge is thickened by centrifugation with polymer addition. Dewatered sludge with an approximate solids concentration of 19-24% is hauled from the Wastewater Treatment Plant and utilized at the Merrick Landfill Site as sections are closed and used as a topping material.

The works consist of:

Preliminary Treatment

- A raw sewage pumping station with two (2) debris grinders and four variable speed raw sewage pumps, two(2) rated at 72,640 m³/d against 10.4 m TDH. Two (2) upgraded variable speed raw sewage pumps each rated at 95,904 m³/d against 10.9m TDH
- Two (2) mechanically cleaned bar screen.
- One (1) screening screw conveyor and dewatering press
- Two (2) vortex grit removal tanks with a total peak flow capacity of flow of 108,960 m³/d.
- Two (2) 2.83 m³/min. blowers and three (3) 1.42 m³/min blowers
- One (1) grit classifier and dewatering screw

Primary Treatment

- Four (4) primary clarifiers each with surface area of 250.25 m² providing a total surface area of 1001 m² and two (2) large primary clarifiers each with a surface area of 613.7 m² providing a total surface area of 1227 m²;
- Four (4) waste sludge pumps, two (2) with rated capacity of 18.9 L/s for clarifiers 1-4 and two (2) with rated capacity of 22.5 L/s for clarifiers 5 & 6.

Secondary Treatment

- Three (3) aeration tanks providing a total volume of 10,150 m³ with each tank equipped with fine bubble diffused aeration system, and Six (6) positive displacement lobe type blowers, each rated at 500 c.f.m. at a maximum of 14 p.s.i.;
- Four secondary clarifiers (#1-4) each with volume of 3,383m³ providing a total surface area of 1,340 m² and two (2) large rectangular clarifiers (#5-6) each with surface area of 739 m² providing a total surface area of 1,478 m².
- One (1) constant speed waste activated sludge (WAS) pump for secondary clarifiers #1-4 having a rated capacity of 27.6 L/s at 24.7 m TDH.
- Two (2) return activated sludge (RAS) pumps with Variable frequency drives for secondary clarifier's #1-4, each having a rated capacity of 415 L/s.
- Five (5) RAS/WAS sludge pumps for secondary clarifiers #5-6, each having a rated capacity of 76 L/s at 9.1 m TDH.
- Two (2) chemical metering pumps for chemical addition for phosphorus removal, each having a rated capacity of 18 - 32 L/hr.
- Two industrial effluent water pumps (one duty and one standby) each rated at 3.5 L/s at 59.8 m TDH.

Disinfection & Discharge

- A chlorine disinfection system consisting of two chlorine contact tanks, one providing a volume of 764 m³ and a second chlorine contact tank providing a total volume of 784 m³.
- Two 3,200L CAPTOR storage tanks.
- A dechlorinating system consisting of two chemical metering pumps each rated at 12.3 liters per hour, and three oxidation reduction potential (ORP) probes to monitor chlorine residuals.
- Approximately 322 m of 1500 mm diameter discharge/outfall pipe, discharging from an overflow chamber into Lake Nipissing.

Sludge Processing

- A sludge digestion and storage system consisting of: one (1) anaerobic digester (primary digester) providing a digestion volume of 3,434 m³ and two (2) anaerobic digesters (secondary digesters), each having the volume of 2,060 m³ to provide a total digestion volume of 7,580 m³;

and one (1) digested sludge holding tank having a volume of approximately 1,500 m³.

- One Bird Model 3700 dewatering centrifuge and one Andritz Model sludge dewatering centrifuge capable of dewatering sludge up to 680 kg/h of dry solids.

Back-up Power and Electrical Equipment

- Two (2) 750 kW, 347/600V diesel driven power generator. Each generator containing an attached 7,466 L double walled fuel tank provides partial emergency power to the raw sewage pumps and critical plant processes during power outages. Sized for future addition of secondary treatment equipment.
- All other controls, electrical equipment, instrumentation, piping, pumps, valves and appurtenances essential for the proper operation of the aforementioned sewage works.

Registration of the Wastewater Works:

Municipal Location	City of North Bay
Works Number	110000533
Facility Classification	WWC Level II, Certificate #1447
	issued 21 September, 1990
	WWTP Level IV, Certificate #154
	issued 17 January, revised 2012
	upgraded to a class 4
Certificate of Approval	Certificate of Approval #7304-9KPKKK
Population Served	54,000 people

Wastewater Collection System Pumping Station Descriptions:

The Barber (Coreen/Wickstead) sewage lift pumping station Is a factory built wet well/dry well station without an overflow. It has two (2) 30 HP, 575 Volt, 3 Phase, Flygt submersible pumps. It is also equipped with a 125 KVA standby diesel gen set to provide emergency power. A small building on site houses the pump controls and the standby gen set.

The Booth Road sewage lift pumping station Is a wet well type station without an overflow. It has two (2) 20 HP, 575 Volt, 3 Phase, Flygt submersible pumps. It is also equipped with a 62.5 KVA standby gen set to provide emergency power. A small building on site houses the pump controls and the standby gen set.

The Chapais Street sewage lift pumping station Is a wet well type station with an overflow. It has two (2) 3.5 HP, 220 Volt, 3 Phase, Flygt submersible pumps. It is also equipped with a 50 KVA standby gen set to provide emergency power. The gen set is an external, fixed pad mounted, self-contained unit. There is no building at this site, only an above ground pump control panel for the pumps which are located in a sub grade wet well.

The Foran sewage lift pumping station Is a wet well type station with an overflow. It has two (2) 5 HP, 220 Volt, 3 Phase, Flygt submersible pumps. This station does not have a permanently installed standby gen set to provide emergency power. A mobile gen set must be used to provide emergency power when required. There is no building at this site, only an above ground pump control panel for the pumps which are located in a sub grade wet well.

The Gertrude Road sewage lift pumping station Is a factory built 3.6m diameter by 7.7m deep wet well/dry well station. It has two (3) 12 HP Flygt submersible pumps capable of a peak flow of 76 l/s. It is also equipped with a 32.5 KVA standby gen set to provide emergency power. Site is equipped with a Kohler 80KW standby power diesel generator with sound dampening enclosure. There is no building at this site, only an above ground pump control panel for the pumps which are located in a sub grade well.

The Judge Street sewage lift pumping station Is a factory built wet well/dry well station without an overflow. It has two (2) 20 HP, 575 Volt, 3 Phase, Flygt pumps. It is also equipped with a 75 KVA standby gen set to provide emergency power. A small building at this site houses the pump controls and the standby gen set.

The Lakeside pumping station Is a dry well/wet well type station without an overflow. It has two (2) 3.5 HP, 220 Volt, 3 Phase, Flygt submersible pumps. This pumping station does not have a permanently installed standby gen set to provide emergency power. A mobile 32.5 KVA standby gen set stored at the Public works must be transported to the site and used to provide emergency power to this station when required. There is no building at this site, only an above ground pump control panel for the pumps which are located in a sub grade dry well.

The Lake Heights sewage lift pumping station Is a wet well type station with an overflow. It has two (2) 29 HP, 575 Volt, 3 Phase, Flygt submersible pumps. It is also equipped with a 62 KVA standby gen set to provide emergency power. A small building at this site houses the pump controls and the standby gen set.

The Marsh Drive sewage lift pumping station Is a wet well type station without an overflow. It has two (2) 30 HP, 575 Volt, 3 Phase, and Gorman Rupp above ground pumps. This pumping station is located at the Marsh Landfill site and collects the leachate and pumps it into the municipal sewage system. This station does not have a permanently installed standby gen set to provide emergency power. A mobile gen set must be transported to the site and used to provide emergency power when required. A small building at this site houses the above ground pumps with suction piping extending into the wet well and pump controls.

The Marshall Sewage lift pumping station is a wet well type station without an overflow. It has (3) dry submersible pumps, (1) 75 HP, 575 Volt, 3 Phase, Crane Deming dry pit pump and (2) 85 Hp Flygt pumps with a 240 L/s capacity respectively. The station is also equipped with a 150KW 600/347 volt standby generator to provide emergency power. The structure houses the pump controls and the standby gen set in the above ground level of the building and also the dry well pumps in a below ground (basement) level. Access is provided via a separate external door to a staircase which leads down to a screening unit for wastewater entering the stations wet well.

The Merlin Street sewage lift pumping station Is a wet well type station with an overflow. It has two (2) 3.5 HP, 575 Volt, 3 Phase, Flygt submersible pumps. It is also equipped with a 35 KVA standby gen set to provide emergency power. The gen set is an external, fixed pad mounted, self-contained unit. There is no building at this site, only an above ground pump control panel for the pumps which are located in a sub grade wet well.

The Northgate sewage lift pumping station Is a wet well type station without an overflow. It has two (2) 9.4 HP, 575 Volt, 3 Phase, Flygt submersible pumps. It is also equipped with a 75 KVA standby gen set to provide emergency power. The gen set is an external, fixed pad mounted, self-contained unit. There is no building at this site, only an above ground pump control panel for the pumps which are located in a sub grade wet well.

The Premier Road sewage lift pumping station Is a factory built wet well/dry well station without an overflow. It has two (2) 2 HP, 575 Volt, 3 Phase, Allis Chalmers/Smith & Lovelace pumps. It is also equipped with a 35 KVA standby gen set to provide emergency power. The gen set is an external, fixed pad mounted, self-contained unit. There is no building at this site, only an above ground pump control panel for the pumps which are located in a sub grade wet well.

The Tenth Street pumping station Is a wet well type station with an overflow. It has two (2) 5 HP, 600 Volt, 3 Phase, and Flygt submersible pump. (This station is operational in the summer months only) This station does not have a permanently installed standby gen set to provide emergency power. There is no building at this site, only an above ground pump control panel for the pumps which are located in a sub grade wet well.

The Timmins/Gorman sewage lift pumping station Is a wet well type station with an overflow. It has two (2) 7.5 HP, 230 Volt, 3 Phase, Flygt submersible pumps. This station does not have a permanently installed standby gen set to provide emergency power. A mobile gen set/thawing stored by the city must be transported to the site and used to provide emergency power when required. A very small building at this site houses the pump controls for the pumps which are located in a sub grade dry well/wet well.

The Wallace Road sewage lift pumping station Is a factory built dry well/wet well station without an overflow. It has two (2) 30 HP, 575 Volt, 3 Phase, Allis Chalmers pumps. It is also equipped with a 41.25 KVA standby gen set to provide emergency power. The gen set is an external, fixed pad mounted, self-contained unit. There is no building at this site, only an above ground pump control panel for the pumps which are located in a sub grade dry well.

The Waterfront Storm Water pumping station located at Community Waterfront Friends Waterfront Park in the City of North Bay, designed for peak flow of 113L/s, consisting of a 3.81m x 3.81m precast concrete structure wet well equipped with two (2) 20HP, 600 Volt, 3 Phase, Flygt Model 3153.181 LT submersible pumps, one for duty and one for standby, each pump has a rated capacity of 110 L/s at a total dynamic head of 8.2m, complete with electrical and electronic control systems, float control systems, discharge piping, valves, and all other appurtenances necessary to have a complete and operable pumping station, discharging to the proposed 1200mm diameter storm sewer via the proposed 300mm diameter storm water force main.

Summary & Interpretation of Sampling and Monitoring Data:

The Certificate of Approval (C of A) #5207304-9KPKKK issued for the North Bay Wastewater Treatment Plant on July 31, 2014 requires the Owner to prepare and submit a performance report annually within (90) days following the period reported on.

The City of North Bay acts as the operating authority and operated the North Bay Wastewater Treatment Facility and the Wastewater Collection System in 2021. This Annual Wastewater System Report covers the period from 01 Jan 2021 to 31 December 2021.

Summary of Raw Sewage Sampling Data and Annual Flow Data

The sewage treatment plant has the *Rated Capacity* of 54,480 m³/day with a secondary treatment Peak Flow Rate of 108,960 m³/day. In 2021 the average daily raw sewage flow was 31,929 m³/day. Therefore the annual average day flow was within the design capacity, with the average daily flow running at 59% of the wastewater systems rated design capacity.

The annual minimum daily raw sewage flow was 22,120m³/day and occurred in February 2021. The maximum daily raw sewage flow was 70,407 m³/day and occurred in September 2021.

The total raw sewage flow for the year was 11,654,081 m³.

Raw Sewage Sampling Summary:

The operator collects a composite sample of raw sewage on a monthly basis sending it to Near North Laboratories in North Bay for analysis for BOD₅, Total Suspended Solids, TKN and Total Phosphorus as required by the ECA. The reported analysis results are forwarded to City of North Bay staff.

The average raw sewage BOD₅ concentration was 90.55 mg/L.

The average raw sewage Total Suspended Solids (TSS) concentration was 69.35 mg/L.

The average raw sewage Total Phosphorus (TP) concentration was 2.12 mg/L

The average raw sewage Total Kjeldahl Nitrogen (TKN) concentration was 24.87 mg/L.

See the accompanying North Bay WWTP 2021 Monthly Data Summary for complete raw wastewater flow and analyses data.

Treated Sewage Sampling Summary

The annual average treated sewage effluent CBOD₅ was 5.51 mg/L.

The annual average treated sewage effluent Total Suspended Solids (TSS) was 7.17 mg/L.

The annual average treated sewage effluent Total Phosphorus (TP) was 0.64mg/L.

The average monthly geometric mean of treated sewage effluent E. coli during the period of chlorination was 13.88 CFU/100 mL.

The Ann. Avg. treated sewage effluent Total Chlorine residual during the period of chlorination was 0.48 mg/L.

The annual average treated sewage effluent pH was 6.88

The annual average sewage effluent temperature was 14.7 degrees C

Effluent Chlorination and E Coli Levels:

The sewage treatment plant effluent is chlorinated using chlorine gas during the disinfection period of May 15 to October 15. In 2021 a total of 6,174.52kg of chlorine was used. The average dosage of Cl₂ applied in 2021 was 1.35 mg/L. The average chlorine residual in the effluent was 0.48 mg/L before dechlorination. The minimum and maximum E Coli levels measured in the effluent during the period of chlorination were respectively 5 CFU/100ml and 170 CFU/100ml. The annual average for monthly geometric means for E Coli level in the effluent for 2021 was 13.88 CFU/100ml. The Monthly Geometric Mean Density Objectives of 150 counts/100 mL for E.coli *Effluent Limits* set in the ECA was achieved for all chlorination season of 2021.

Effluent Total Phosphorus Levels:

After primary treatment is completed the sewage ferric sulfate (iron salts) is added at the beginning of the secondary treatment process to reduce the Total Phosphorus level. The monthly averages for Total Phosphorus in the effluent ranged from 0.33 mg/L to 0.90 mg/L. The annual average Total Phosphorus level measured of the effluent was 0.64mg/L. Therefore the *Annual Average Effluent Objective of 0.8 mg/L* set in the ECA was achieved in 2021.

See the accompanying North Bay 2021 Summary of Sewage Effluent Sampling Data and Annual Flow Data for complete wastewater effluent flow and analyses data.

ECA Effluent Compliance Limits and Operational Objectives

Please see table below which shows the ECA effluent compliance limits, operational objectives and North Bay Wastewater Treatment Plant Effluent results for 2021.

Effluent Parameter	Annual Average	Concentration	
	(mg/L unless otherwise indicated)		
	Compliance	Operational	2021
	Limit	Objective	Results
CBOD5	25	15	5.51
Total Suspended Solids (TSS)	25	15	7.17
Total Phosphorus (TP)	1	0.8	0.64
Total Ammonia Nitrogen	N/A	N/A	11.02
E. Coli * ¹	200 counts/100ml	150 counts/100ml	13.88
	(monthly Geometric Mean Density)	(Monthly Geometric Mean Density)	
Total Chlorine Residual* ¹	N/A	N/A	0.48
pH	6.0-9.5	6.5-8.5	6.88
Temperature	N/A	N/A	14.7

*¹ During the disinfection period between May 15 to October 15, every year.

Weekly samples are taken immediately to Near North Laboratories in North Bay for analysis. Should the samples not be processed for analysis immediately, they are refrigerated at 4° C until analysed in the laboratory.

The ECA Annual Average Concentration Effluent Limits of 25.0 mg/L for CBOD₅, 25.0 mg/L for Suspended Solids, 1.0 mg/L for Total Phosphorus were all met. Therefore, the plant was in compliance with the ECA. The pH of the effluent ranged between pH 6.25 to pH 7.73 and averaged pH 6.88. This met the ECA effluent limits for pH being maintained between pH 6.0 to 9.5, inclusive at all times otherwise.

The ECA Effluent Objective concentrations of 15.0 mg/L for CBOD₅, 0.8 mg/L for Total Phosphorus, 15.0 mg/L for Suspended and were achieved. The pH Objective of maintaining between 6.5 – 8.5 was achieved most of the time through the year with exception of a small percentage of days.

The Monthly Geometric Mean Density of 150 counts/100 mL for E.coli Effluent Objective set in the ECA was achieved all chlorination months. The average monthly geometric mean for the sewage effluent E. Coli during the period of chlorination was 13.88 CFU/100 mL.

Tabulation of the Volume of Sludge Generated

Sludge that settles to the bottom of the primary clarifier tanks, referred to as primary sludge is drawn from the tanks and pumped to the primary digester for reduction through the primary and secondary sludge digestion processes. The digested sludge is then processed through centrifugation to thicken the sludge to reduce water content. Thickened sludge (19 to 23% solids) is then hauled away from the wastewater facility. The sludge is hauled to Merrick Landfill site and is then mixed with sand and used as a topping material to cover closed out sections of the landfill. The sludge blended with the sand is nutrient rich and promotes vegetative growth to cover the closed out sections of the landfills

In 2021 the volume of primary sludge produced was 31,089 m³. The total volume of digested sludge that was processed through dewatering after the digestion process was 30,002 m³. The total weight of dewatered sludge that was hauled away from the WWTP was 2,890,010 Kg which was taken to the Merrick Landfill site to be blended with sand and used for top cover which stimulates rapid vegetation growth.

Sludge was removed on a regular basis for the sewage effluent CBOD₅, Suspended Solids and total phosphorus to meet compliance criteria.

The total treated sewage effluent flow for the year 2021 was 11,654,081 m³ minus 2,890,010 Kg of sludge with an approximate 23 - 26 % solids concentration which was hauled away from the facility for disposal.

See the accompanying North Bay 2021 Summary of Sewage Sludge Volumes and Disposal Data for complete wastewater effluent flow and analyses data.

Summary of Effluent Quality Assurance or Control Measures Taken:

In 2021 as on going efforts to ensure optimal operation or the treatment process and best possible effluent quality the following measures were followed:

- Routine data reviews to identify trends or developing process problems
- In-house sampling in addition to regulatory sampling required by the ECA
- Routine maintenance on all equipment
- Process changes to optimize treatment effectiveness
- On-going training of operators
- Upgrading equipment where needed to increase effectiveness of plant

Operational Problems and Corrective Actions

- Each year we have periodic issues with a sludge matte developing on the secondary clarifiers #5 & #6. This is believed to be of a result in swings of temperature and F/M ratios. To mitigate this issue we have reduced our biology concentrations which we carry in the plant and have an operator cleaning up any sludge accumulation daily when there is an occurrence.
 - This sludge matte resulted in an odour complaints from a nearby resident on April 23, 2021 during the cleaning process. This was reported to our MECP inspector as required.

Summary of Plant Sewage By-passes or Abnormal Discharge Events

There were no secondary bypasses that occurred from the North Bay Wastewater Treatment Plant during the 2021 reporting period. A secondary by-pass would be initiated by operations staff to avoid losing the biomass due to solids being flushed out of the aeration tanks and secondary clarifiers during high flow conditions. The events would be reported to the Ministry of the Environment as required and samples would be collected for analysis thorough out the events.

There was two spills and no bypasses at the lift stations in 2021:

1. On April 27, 2021 there was a sewage spill at Patton St. dumping station, this was caused by a sewer back up. There was approximately 1,200 Liters spilled into the ditch which lasted approximately 20 minutes. The spill was cleaned up as much as possible with a vactor truck and samples taken for the lab. The spill was reported to the MECP
2. On May 14, 2021 there was a sewage spill at Patton St. dumping station, this was caused by a sewer back up. There was approximately 1,200 Liters spilled into the ditch which lasted approximately 20 minutes. The spill was cleaned up as much as possible with a vactor truck and samples taken for the lab. The spill was reported to the MECP SAC Reference #1-FV52X

Flow Measurement & Annual Calibration

The annual calibrations of the raw sewage flow meters were completed in November 2021. In addition other flow meters throughout the sewage treatment plant were calibrated at the same time.

Documentation and Reporting

An emergency SOP manual with procedures to deal with emergencies and complaints is kept updated and is stored for easy reference at the North Bay Wastewater Treatment Plant; along with SDS data sheets for the treatment

chemicals. The Certificate of approval ECA for the facility is posted at the facility along with copies of the Facility Classification certificate. A copy of the wastewater treatment plant manual with process descriptions, procedures, checklists, treatment calculations and pertinent information for the operation of the facility is readily available for reference for the operators.

Plant logbooks, daily and monthly data record sheets are completed and retained as required by the ECA. Process treatment records and lab analysis report data are entered into a spreadsheet. The annual report will be filed with the MECP as required by the ECA

Facility Maintenance

Certified electricians, SCADA technician, mechanics and operators, who operate the treatment facility and conduct maintenance of the appurtenances of the wastewater treatment system.

Summary of 2021 Major Maintenance Activities , Capital Upgrades or Equipment Replacement at the Facility:

- Rebuilt Primary Clarifier #5, replacing all chain/wear shoes and 4 sprockets. Also built up metal on floor and side rails and added antiwear strips.
- Engineering was tendered out for the design to replace Digester #4
- Installation of a new actuator valve and pipe work for the sludge transfer line when digester #4 contrsuction takes place.
- Building of panel for new sludge transfer system when digester #4 contruction begins.
- Capital building upgrades including lighting and new electrical room built in centrifuge building.
- Cleaned rag blanket which accumulated in head end wet well.
- Cleaning of accumulated grit in bottom of aeration cells, all air stones were cleaned while tanks were empty. Repaired broken stones.
- Sent one of the gas compressors out to be rebuilt for digester mixing system, waiting to get it back and the second will be sent out.
- Rebuilt Moyno cake pump in the Centrifuge building.
- Emergency Repairs for Secondary Clarifier #1 & #2.
- Concrete repairs on old secondary clarifier feed channel and to the weirs on Secondary Clarifiers #1 & #2.
- Replaced 42m of 300mm sanitary sewer on McLeod St.
- Replaced 110m of 250mm sanitary sewer on Regina St.
- Replaced 260m of 200mm sanitary line on Third Ave.

- Replaced 255m of 375mm storm drain on Third Ave.
- Replaced 52m of 250mm of sanitary main on Cassels St.
- Replaced 90m of 375mm sanitary main on Wallace Rd.
- Replaced 31m of 250mm sanitary main on Wallace Rd.
- Replaced 390m of 250mm sanitary force main on Wallace Rd.

Summary of Complaints Received and Steps Taken to Address Them:

One Complaints were brought to our attention in 2021:

- This sludge matte resulted in an odour complaints from a nearby resident on April 23, 2021 during the cleaning process. This was reported to our MECP inspector as required.

Report prepared by

Jonathan Dewey, C-tech.
Operations Supervisor Water & Wastewater Facilities
March 21, 2022

MONTHLY PROCESS DATA

Facility: North Bay Waste Water Treatment Plant
 Classification: Class 4 Treatment, Class 2 Wastewater Collection
 Water Receiver: Lake Nipissing

Period: January 1, 2021 to December 31, 2021
 Population Served: 54,000
 Total Design Capacity (m3/d): 54,540

	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Summary
Raw Sewage													
Volume (m3/d)													
<i>Avg</i>	25,368	23,144	36,540	33,378	29,211	27,703	35,644	31,794	33,836	41,660	31,122	32,841	31,928.99
<i>Max</i>	27,086	28,847	66,240	42,493	36,456	49,268	67,804	45,762	70,407	60,359	35,432	44,999	70,407.00
<i>Min</i>	23,527	22,120	23,225	28,577	24,641	23,749	26,673	26,490	24,748	33,608	28,299	27,842	22,120.00
<i>Sum</i>	786,416	648,020	1,132,762	1,001,343	905,563	831,101	1,104,972	985,611	1,015,084	1,291,471	933,662	1,018,076	11,654,081.00
Peak Flow (M3/d)													
<i>Max</i>	67,450	75,825	99,524	66,800	66,262	101,487	107,773	101,124	105,637	101,624	95,262	65,275	107,773.0
BOD5													
<i>Avg</i>	76.0	164.5	151.1	54.6	98.5	51.4	71.7	75.3	88.5	63.9	83.6	107.5	90.55
Total Phosphorus (mg/L)													
<i>Avg</i>	2.91	3.79	2.64	1.51	1.79	1.81	0.53	1.61	4.49	1.01	1.48	1.82	2.12
TKN (mg/L)													
<i>Avg</i>	31.40	44.76	27.49	12.50	23.40	31.20	21.70	20.40	38.40	6.22	17.00	24.00	24.87
Suspended Solids (mg/L)													
<i>Avg</i>	56.4	175.0	48.6	37.5	119.0	51.6	30.1	29.7	179.0	53.4	18.3	33.6	69.35

MONTHLY PROCESS DATA

Facility: North Bay Waste Water Treatment Plant
 Classification: Class 4 Treatment, Class 2 Wastewater Collection
 Water Receiver: Lake Nipissing

Period: January 1, 2021 to December 31, 2021
 Population Served: 54,000
 Total Design Capacity (m3/d): 54,540

	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Summary
Final Effluent													
Temp Grab (oC)													
<i>Avg</i>	12.1	10.6	11.0	11.7	13.4	16.9	17.8	19.6	18.4	16.7	15.1	11.6	14.7
<i>Max</i>	14.6	11.5	13.4	15.0	15.4	18.4	20.9	21.1	20.4	20.4	16.7	15.0	21.1
<i>Min</i>	10.3	9.8	9.3	9.8	11.0	15.6	15.9	17.4	16.2	13.1	12.5	9.5	9.3
NH3: Ammonia as N (mg/L)													
<i>Avg</i>	13.97	22.93	14.57	18.48	19.95	17.05	7.09	2.89	4.60	3.12	5.21	3.43	11.02
CBOD5 (mg/L)													
<i>Avg</i>	3.60	4.23	4.52	4.03	3.63	3.26	7.38	7.14	5.28	6.10	8.18	8.48	5.51
PH													
<i>Avg</i>	7.04	7.14	7.22	7.04	7.11	6.73	6.99	6.52	6.58	7.06	6.65	6.63	6.88
<i>Max</i>	7.37	7.73	7.71	7.34	7.25	6.91	7.21	6.72	6.73	7.31	7.03	6.80	7.73
<i>Min</i>	6.66	6.85	6.90	6.78	6.66	6.43	6.85	6.26	6.48	6.84	6.25	6.52	6.25
Total Phosphorus (mg/L)													
<i>Avg</i>	0.84	0.90	0.52	0.33	0.48	0.61	0.77	0.63	0.54	0.75	0.71	0.62	0.64
TKN (mg/L)													
<i>Avg</i>	14.68	37.87	18.89	23.70	20.03	20.90	8.65	4.20	6.50	4.38	7.24	6.22	14.31
Suspended Solids (mg/L)													
<i>Avg</i>	3.00	5.05	12.00	9.68	5.58	4.14	5.05	5.86	13.78	6.30	8.04	7.23	7.17
E-coli (cfu/100 mL)													
<i>Geo Mean</i>					14.14	12.01	14.36	15.43	5.00	22.36			13.88
<i>Max</i>					20.0	100.0	170.0	100.0	5.0	50.0			170
<i>Min</i>					10.0	5.0	5.0	5.0	5.0	10.0			5
Chlorine used (kg)													
<i>Sum</i>					381.33	879.45	785.51	1803.64	1295.23	1029.36			6,174.52
Chlorine Dosage (mg/L)													
<i>Avg</i>					0.74	1.07	1.08	1.83	1.55	1.71			1.35
Total Chlorine Res. (mg/L)													
<i>Avg</i>					0.55	0.58	0.49	0.37	0.45	0.53			0.48

MONTHLY PROCESS DATA

Facility: North Bay Waste Water Treatment Plant
 Classification: Class 4 Treatment, Class 2 Wastewater Collection
 Water Receiver: Lake Nipissing

Period: January 1, 2021 to December 31, 2021
 Population Served: 54,000
 Total Design Capacity (m3/d): 54,540

	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Summary
Sludge/Biosolids Handling													
Volume to Primary Digester (m3)													
<i>Sum</i>	3,186	2,772	3,794	3,696	3,893	2,676	2,390	1,708	1,486	1,091	1,780	2,618	31,089.00
Sludge (Liquid) Volume Processed (m3)													
<i>Sum</i>	1,870	2,130	3,260	3,621	1,398	2,773	2,717	2,796	2,608	1,992	3,130	1,707	30,002.00
Sludge (Thickened) Volume Hauled x 1,000 Kg													
<i>Sum</i>	227.32	245.07	300.47	306.24	158.47	327.89	224.23	240.00	277.45	163.31	237.20	182.36	2,890.01
<i>loads</i>	16.00	19.00	23.0	22.0	11.0	23.0	17.0	17.0	20.0	12.0	16.0	12.0	