TOWN OF MIDLAND

2023

WASTEWATER SERVICES ANNUAL REPORT

Town of Midland Water & Wastewater Services

Definitions

The following defines terms that appear throughout this report and that will often be used for the duration of the report:

“BOD” – Biochemical Oxygen Demand

“Biosolids” - is a primarily organic solid product by wastewater treatment processes that can be beneficially recycled.

“CFU’” - Colony-Forming Unit.

“Dissolved Oxygen” (DO) - the oxygen freely available in wastewater.

“ECA” - Environmental Certificate Approval.

“Final Effluent” - sewage discharge via the sewage treatment plant outfall after undergoing the full train of unit process.

“Geometric Mean Density” is the ninth root of the product of multiplication of the results of a number of the samples over the period specified.

“I&I” (Inflow and Infiltration) means dilution of sewage decreases the effiency of treatment, and may cause sewage volumes to exceed design capacity.

“Limited Operational Flexibility” (LOF) means any modifications that the Owner is permitted to make to the works under this Approval.

“m^3” - cubic meters.

“NASM” - Non-Agricultural Source Material.

“Overflow” means any discharge to the environment from the sewage Treatment Plant at a location other than the plant outfall (i.e.:storm equalization tank). This type of by-pass recieves partial treatment before it is discharged to the environment.

“Owner” - The Corporation of the Town of Midland and its successors and assignees.

“Phosphorus” - a nonmetal of the nitrogen group.

“By-Pass” - diversion of sewage around one or more unit processes within the Sewage Treatment Plant with the diverted sewage flows being returned to the sewage Treatment Plant treatment train upstream of the final effluent sampling location and discharging to the environment through the sewage treatment plant outfall.

“PLC” - Programmable Logic Controller.

“SCADA” - Supervisory Control and Data Acquisition.

“Supernatant” - the relatively clear water layer between the sludge on the bottom and the scum on the surface of an anaerobic digester, septic tank or secondary clarifier.

“Total Ammonia” - the sum of both NH_3 and NH_4+.

“Water Supervisor” - the Water Supervisor for the Barrie Office of the Ministry.

A number of other technical terms have been used in this report but occur less frequently. Where necessary and to the reader’s benefit, definitions for these terms are provided as they occur.

Executive Summary

The purpose of the Town of Midland Wastewater Services Annual Report is to be a clear and concise assessment of the Wastewater Treatment and Collection system performance. Within the 2023 Reporting Year, there was **no failure to meet effluent limits and objectives.** However, **one (1) overflow was reported**. For more information about the by-pass and overflows, refer to the *By-pass and Overflows* section on Page 20 of this report.

This report is to provide information to all applicable stakeholders and to satisfy the regulatory requirements of the **Amended Environmental Compliance Approval *5708-A72SPG*** as issued July 20, 2016 and the **Consolidated Linear Infrastructure (CLI) for the Wastewater Collection System 122-W601 as issued August 15th, 2023.**

The Town of Midland's Wastewater System was inspected April 26, 2023 by the local MECP Branch. The primary focus of this inspection was to confirm compliance with Ministry of the Environment legislation and control documents, as well as conformance with Ministry wastewater-related policies for the inspection period. The Ministry is implementing a rigorous and comprehensive approach in the inspection of wastewater treatment systems that focuses on the collection, treatment, and discharge components as well as wastewater treatment system management practices. **No issues of non-compliance or recommendations were noted in the report.** The inspection report is available upon request.

The Owner shall prepare and submit a performance report to the Director and Water Supervisor of the MECP on an annual basis, within ninety (90) days following the end of the period being reported upon. The first such report shall cover the first annual period following the commencement of operation of the works and subsequent reports shall be submitted to cover successive annual periods following thereafter. This report is also submitted to the District Manager where a Collection System Overflow or Spill of Sewage has occurred in the reporting period. The reports shall contain, but shall not be limited to, the following information.

Wastewater Treatment Reporting Requirements:

- a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 7, including an overview of the success and adequacy of the Works;

- a description of any operating problems encountered, and corrective actions taken;

- a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works;

- a summary of any effluent quality assurance or control measures undertaken in the reporting period;

- a summary of the calibration and maintenance carried out on all effluent monitoring equipment;

- a description of efforts made, and results achieved in meeting the Effluent Objectives of Condition 6.

- a tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;

- a summary of any complaints received during the reporting period and any steps taken to address the complaints;

- a summary of all By-pass, spill or abnormal discharge events;

- a copy of all Notice of Modifications submitted to the Water Supervisor as a result of Schedule B, Section 1, with a status report on the implementation of each modification;

- a report summarizing all modifications completed as a result of Schedule B, Section 3; and;

- any other information the Water Supervisor requires from time to time.

Wastewater Collection System Report Requirements:

The Owner shall prepare an annual performance report for the Authorized System that:

- If applicable, includes a summary of all required monitoring data with an interpretation of the data and any conclusion drawn from the data evaluation about the need for future modifications to the Authorized System or system operations.

- Includes a summary of any operating problems encountered and corrective actions taken.

- Includes a summary of all calibration, maintenance, and repairs carried out on any major structure, equipment, apparatus, mechanism, or thing forming part of the Municipal Sewage Collection System.

- Includes a summary of any complaints related to the Sewage Works received during the reporting period and any steps taken to address the complaints.

- Includes a summary of all Alterations to the Authorized System within the reporting period including a list of Alterations that pose a Significant Drinking Water Threat.

- Includes a summary of all Collection System Overflow(s) and Spill(s) of Sewage, including:

a) Dates;
b) Volumes and durations;
c) If applicable, loadings for total suspended solids, BOD, total phosphorus, and total Kjeldahl nitrogen, and sampling results for E.Coli;
d) Disinfection, if any; and
e) Any adverse impact(s) and any corrective actions, if applicable.

- Includes a summary of efforts made to reduce Collection System Overflows, Spills, STP Overflows, and/or STP Bypasses, including the following items, as applicable:

a) A description of projects undertaken and completed in the Authorized System that result in overall overflow reduction or elimination including expenditures and proposed projects to eliminate overflows with an estimated budget forecast for the year following that for which the report is submitted.
b) Details of the establishment and maintenance of a PPCP, including a summary of project progress compared to the PPCP's timelines.
c) An assessment of the effectiveness of each action taken.
d) An assessment of the ability to meet Procedure F-5-1 or Procedure F-5-5 objectives (as applicable) and if able to meet the objectives, an overview of the next steps and estimated timelines to meet the objectives.
e) Public reporting approach including proactive efforts.

The Town of Midland Wastewater System is in a fit state of repair and follows industry best practices during the repair and maintenance of the system. Infrastructure review occurs regularly between Engineering and Wastewater Services to optimize priority projects and minimize common costs.

Copies of the Amended Environmental Compliance Approval *5708-A72SPG* as issued July 20th, 2016, and Consolidated Linear Infrastructure (CLI) for the Wastewater Collection System 122-W601 as issued August 15th, 2023. are available upon request.

Introduction

The Town of Midland has prepared this Performance Report for the operations conducted during the 2023 calendar year.

This Performance Report has been prepared to meet the following commitments:

- To provide the Town of Midland, as "the Owner" of the sewage works, a summary of the operation and maintenance of the wastewater treatment plant that took place during the reporting period of January 1st 2023 to December 31st 2023, and
- To comply with Condition 11 of ECA #5708-A72SPG and Schedule E 4.6 of the CLI 122-W601

This Performance Report, provided to the Town of Midland Council, conveys information related to the performance of operations and maintenance, which aids in decision-making related to system upgrades and expansion needs.

Ministry of the Environment, Conservation and Parks

The Midland Wastewater Treatment Plant is a conventional activated sludge plant owned and operated by the Town of Midland. The wastewater treatment plant was originally constructed in 1965 as a primary treatment plant. In 1980 the plant was expanded and upgraded to a secondary treatment facility. The treated effluent is discharged via a gravity outfall into Midland Bay (located on Georgian Bay). Environmental Compliance Approval (ECA) Number 5708-A72SPG was issued on July 20th, 2016, and governs the operation of the facility. The ECA identifies an average day design capacity of 15,665 m^3/day and a Peak Flow Rate of 37,000 m^3/day.

The treatment plant and collection system are operated under the following Certificates of Classification:

Class III Wastewater Treatment Certificate #89
Class II Wastewater Collection Certificate #2074

For the reporting period covered in this report, The Corporation of the Town of Midland was defined as the Operating Authority of the Wastewater Treatment Plant and the associated Wastewater Collection System.

Midland Wastewater Treatment Plant 2023 Effluent Flows (m^3)												
DATE	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Total	257,965.28	224,226.83	257,529.80	313,646.46	247,798.03	224,178.83	217,871.83	197,881.17	161,092.32	194,779.05	189,423.62	209,911.16
Avg.	8,321.46	8,008.10	8,307.41	10,454.88	7,993.48	7,472.63	7,028.12	6,383.26	5,369.74	6,283.20	6,314.12	6,771.33
Max.	13,338.84	10,769.85	10,735.78	20,668.72	11,020.07	10,356.60	9,721.70	8,605.77	6,473.17	10,864.92	7,346.06	7,432.36
Min.	6,492.74	6,449.09	5,502.13	7,970.06	6,684.22	6,343.86	6,124.00	4,790.09	4,745.81	4,924.51	5,283.05	6,147.45
Average Daily Flow		7,392.31										
Max Daily Flow		20,668.72										
YEARLY TOTAL		2,696,304.38										

Figure 1: Midland Wastewater Treatment Plant 2023 Effluent Flow

Flows

The 2023 average daily flow was 7,392.31 m^3 or 47% of plant-rated capacity. The plant discharged a total of 2,696,304.38 m^3 for the reporting period of January 1st to December 31st, 2023. The 2023 maximum daily flow occurred on April 5th when the flow recorded was 20,668.72 m^3. On this day Midland observed a large amount of precipitation and unusually mild temperatures.

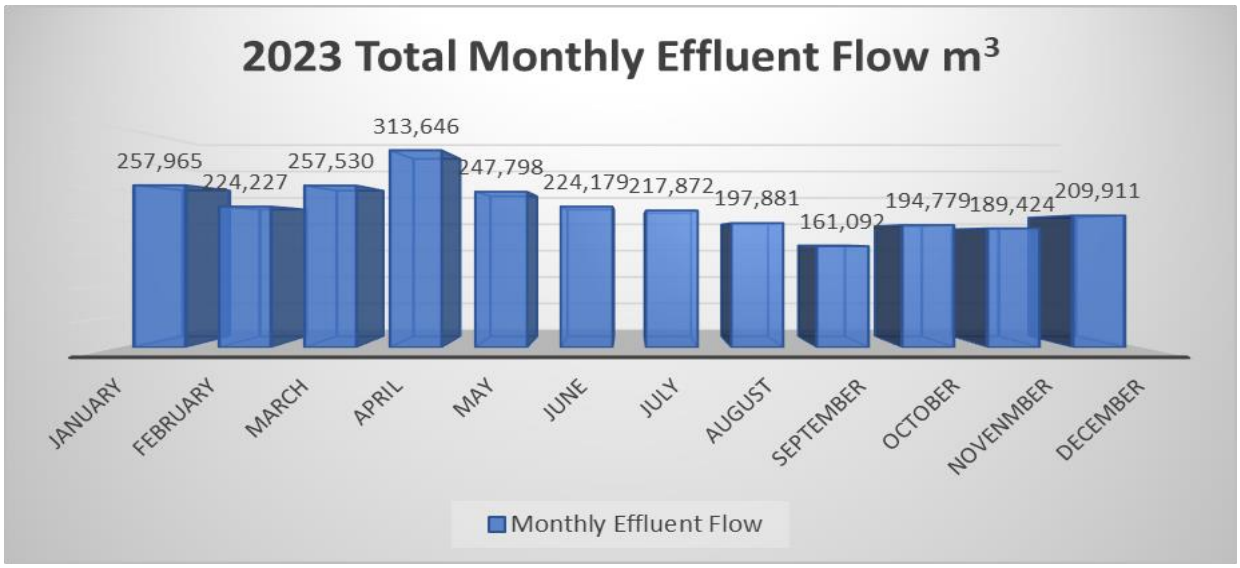


Figure 2: Monthly Effluent Flow in m^3 for 2023.

Effluent Flow

The Total Monthly Discharge Flows are consistent throughout the year with an exception in April due to seasonal thaws and infiltration. Inflow and Infiltration (I&I) are continuously being evaluated in efforts to reduce the unnecessary treatment of rainwater and runoff during thaw seasons and storm events.

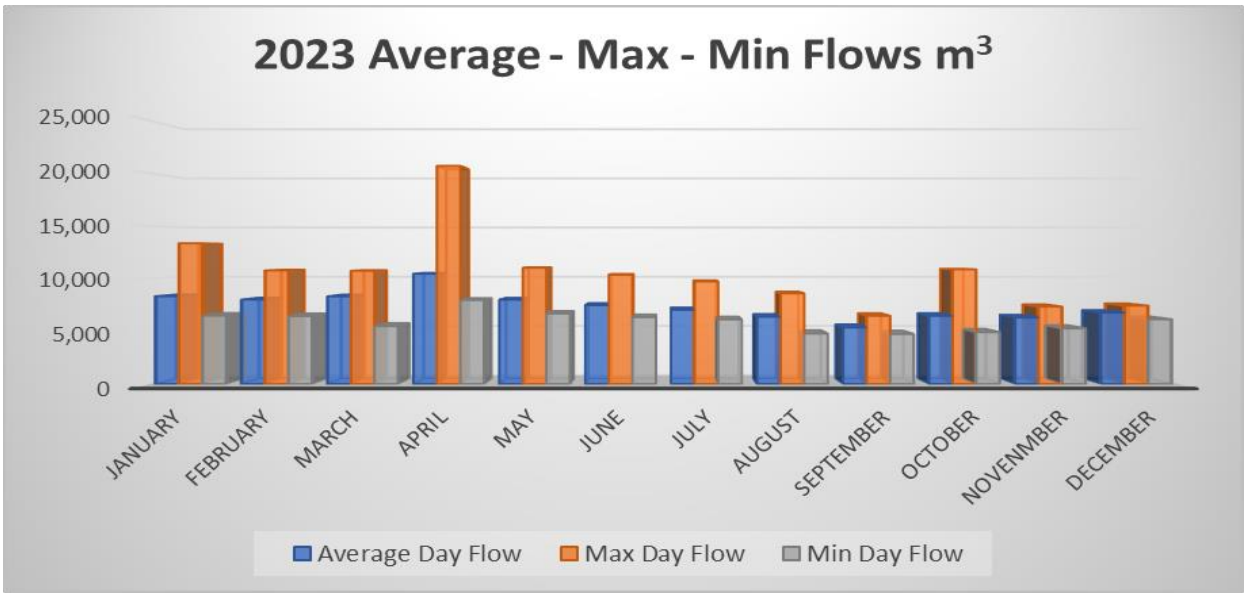


Figure 3: Monthly Average, Max and Min Day Flows in m^3 for 2023.

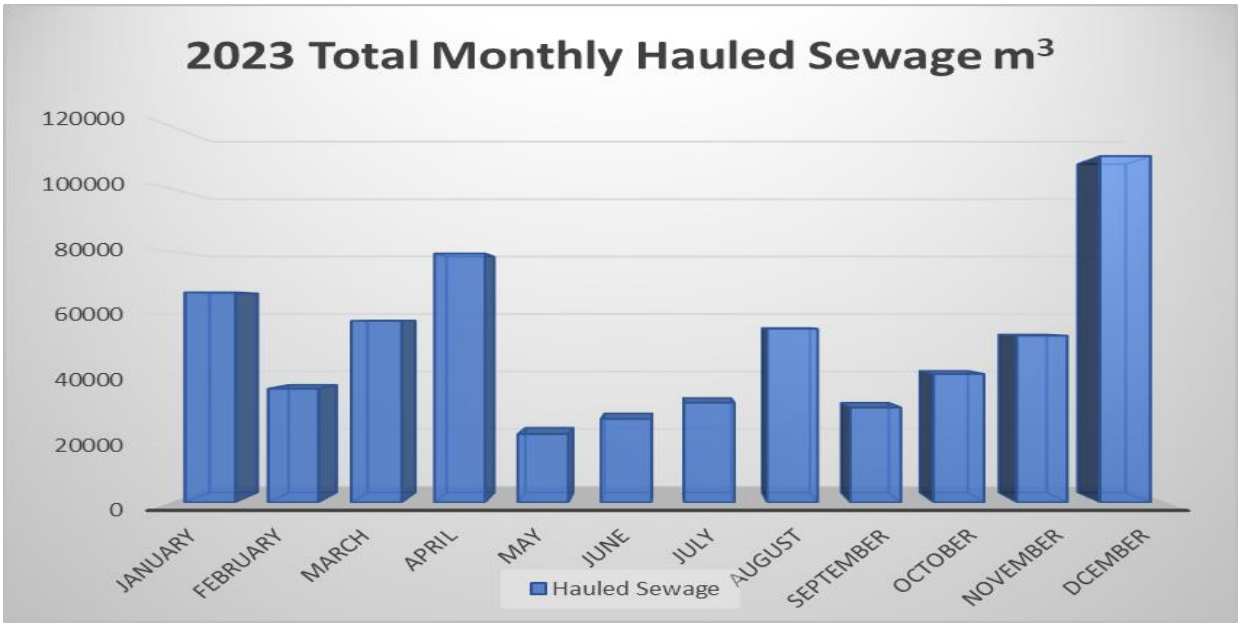


Figure 4: Total Monthly Septage Received m^3 for 2023.

Septage Receiving

Within the reporting period of January 1st to December 31st, 2023, the Wastewater Treatment Plant receives additional sewage in the forms of septic and holding tanks, portable toilets, grease traps, marine waste, and recreational vehicle holding tanks. The septage received is stored in holding tanks and pumped to the primary clarifier at a time so as not to upset the treatment process.

Influent and Effluent ECA Wastewater Paramaters

Midland Wastewater Treatment Plant 2023 Effluent Loading				
EFFLUENT LOADING 2023				
Effluent Parameter	**Effluent Objectives**			
	Concentration Objective		**Loading Objective**	
	ECA Objective mg/l	**Midland WTC Concentration mg/l**	**ECA Objective kg/Month**	**Midland WTC Loading kg/Month**
CBOD^5	7	3.06	4856	688.52
Total Suspended Solids	7	4.85	4856	1089.15
Total Phosphorus	0.3	0.104	146	22.83
Total Ammonia	5	0.29		
June 1st to August 31st				
Total Residual Chlorine	<0.02	0.008		
Effluent Parameter	**Effluent Limits**			
	Average Concentration		**Average Loading**	
	ECA Limit mg/l	**Midland WTC Concentration mg/l**	**ECA Limit kg/Year**	**Midland WTC Concentration kg/Year**
CBOD^5	10	3.06		
Total Suspended Solids	10	4.85		
Total Phosphorus				
Monthly Limit	0.4	0.104		
Annual Limit	0.5	0.104	1716	281.09
Total Ammonia				
June 1st to August 31st	10	0.29		
September 1st to May 31st	15	1.47		
Total Residual Chlorine	0.02	0.008		

Figure 5: Total Monthly Effluent Loading for 2023

Summary and Interpretation of Monitoring Data

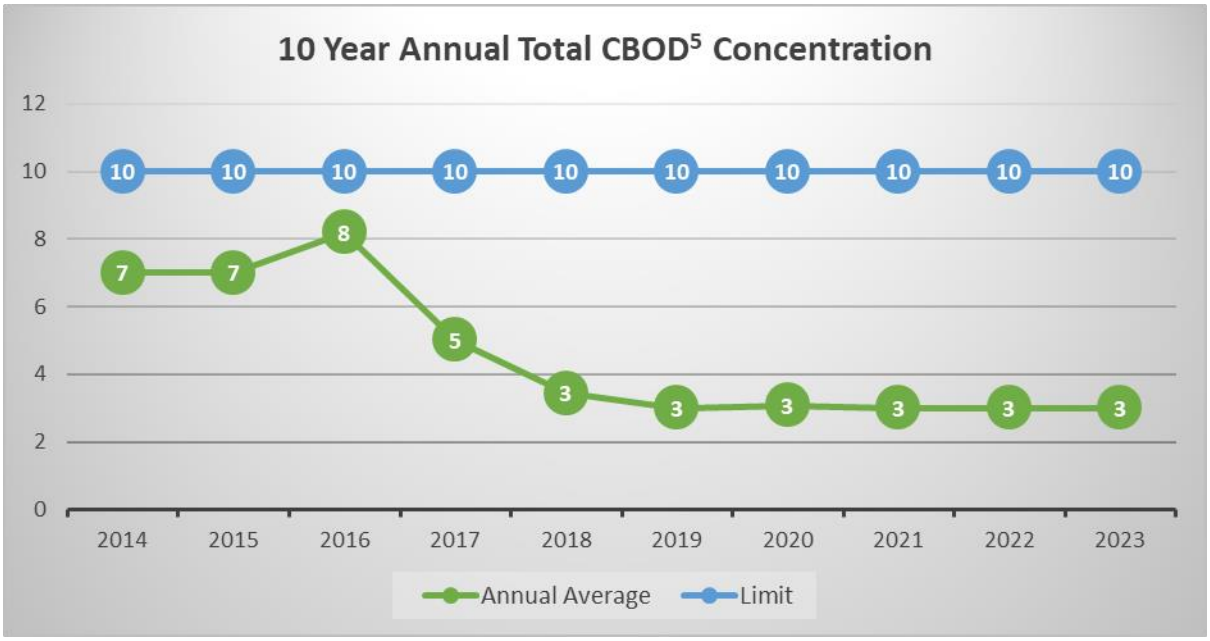


Figure 6: 10 Year Annual Total $CBOD_5$.

Total $CBOD_5$

From the ECA, the Annual Average Concentration limit for Carbonaceous Biochemical Oxygen Demand ($CBOD_{5)}$ to the environment is 10 mg/l. During the Reporting Period of January 1st to December 31st, 2023, Midland's Monthly Average $CBOD_5$ was 3.0 mg/l and the Annual Average was 3.1 mg/l. $CBOD_5$ is a 5-day test that represents the quantity of oxygen that is consumed during aerobic processes of decomposition of organic materials, caused by microorganisms. The BOD therefore provides information on the impact the organic portion of the effluent will have on the oxygen level of the receiving stream, and on the aquatic life of the bay.

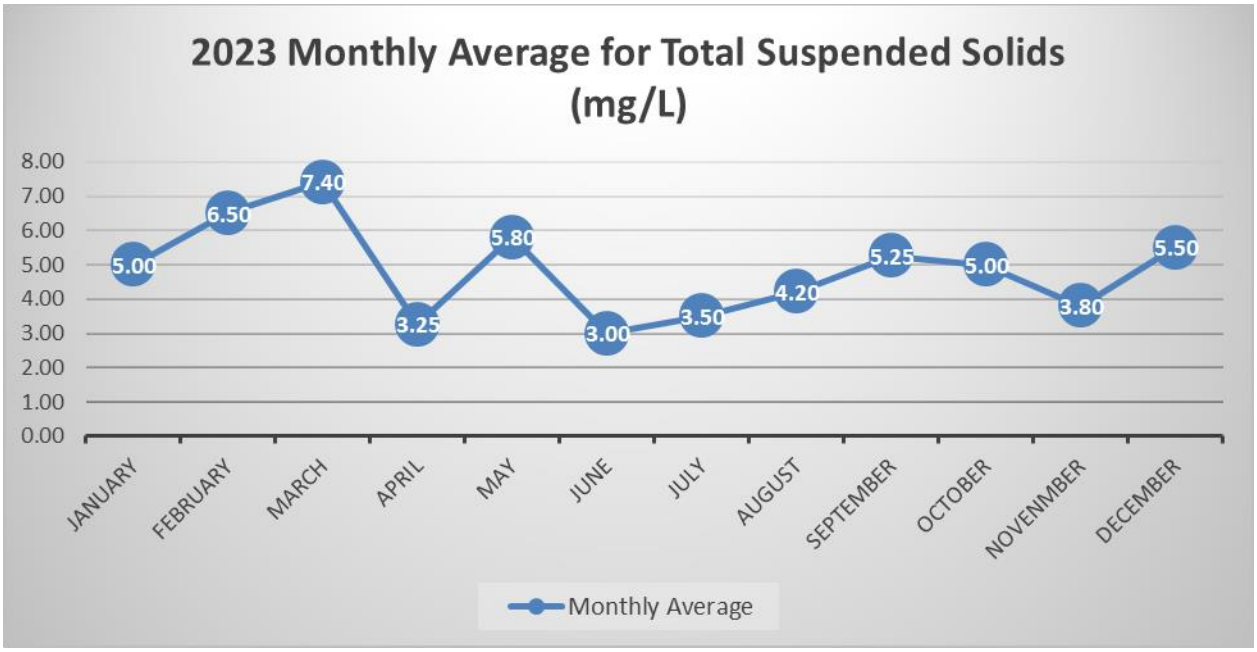


Figure 7: Monthly Average for Total Suspended Solids in mg/L.

Total Suspended Solids

As defined in the ECA, Annual Average Concentration limit for Total Suspended Solids (TSS) released to the environment is 10 mg/l. During the Reporting Period of January 1st and December 31st, 2023, Midland's Annual Average was 4.85 mg/l. TSS can include a wide variety of material, such as silt, decaying plant and animal matter, and industrial wastes. High concentrations of suspended solids can lower water quality by absorbing light. Waters then become warmer and lessen the ability of the water to hold oxygen necessary for aquatic life.

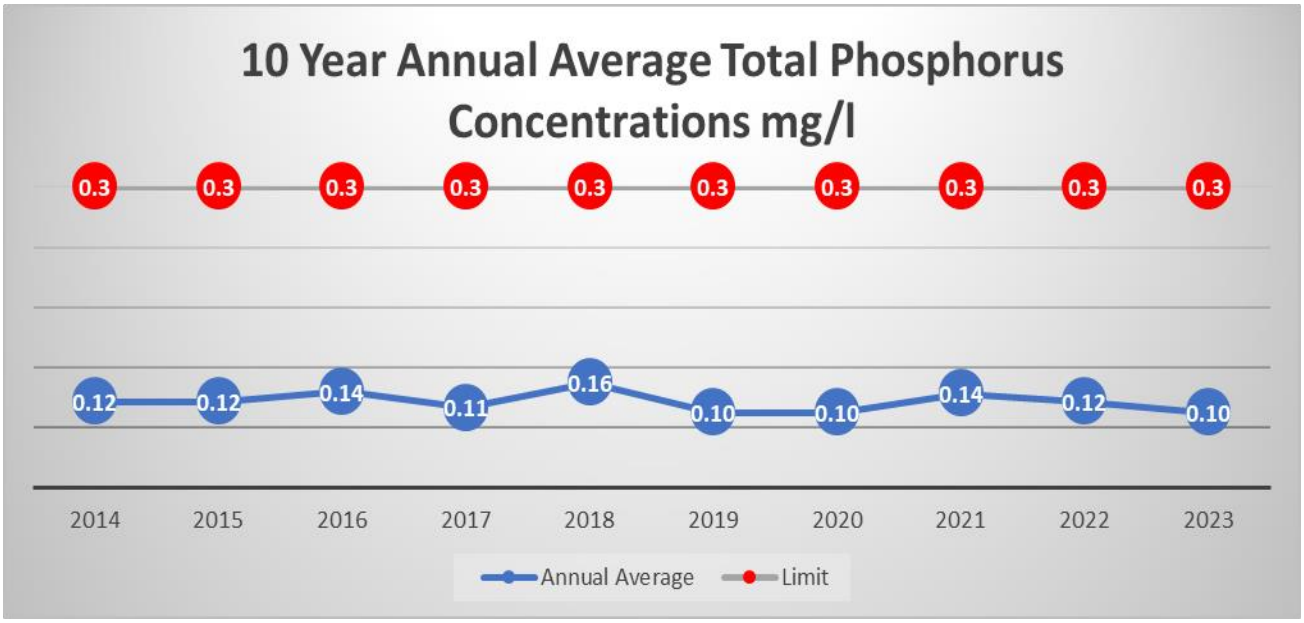


Figure 8: 10 Year Annual Average Total Phosphorus Concentrations

Total Phosphorus

Total Phosphorus is the sum of reactive, condensed and organic phosphorous. It is an essential element for plant life, but when there is too much of it in water, it can speed up eutrophication (a reduction in dissolved oxygen in water bodies caused by an increase of mineral and organic nutrients) of rivers and lakes.

The highest average monthly total phosphorus concentration of 0.18 mg/L took place during the month of September. This concentration results in a total monthly loading for September of 25.37 kg.

The annual average concentration of 0.104 mg/L was below the annual yearly objective of 0.3 mg/L and also well below the 0.4 mg/L monthly limit dictated by the ECA. The total annual phosphorus loading of 281.09 kg/year is well below the ECA limit of 1,716 kg/year. The monthly objective for phosphorus of 146 kg/month was also achieved with a monthly loading average of 22.83 kg/ month.

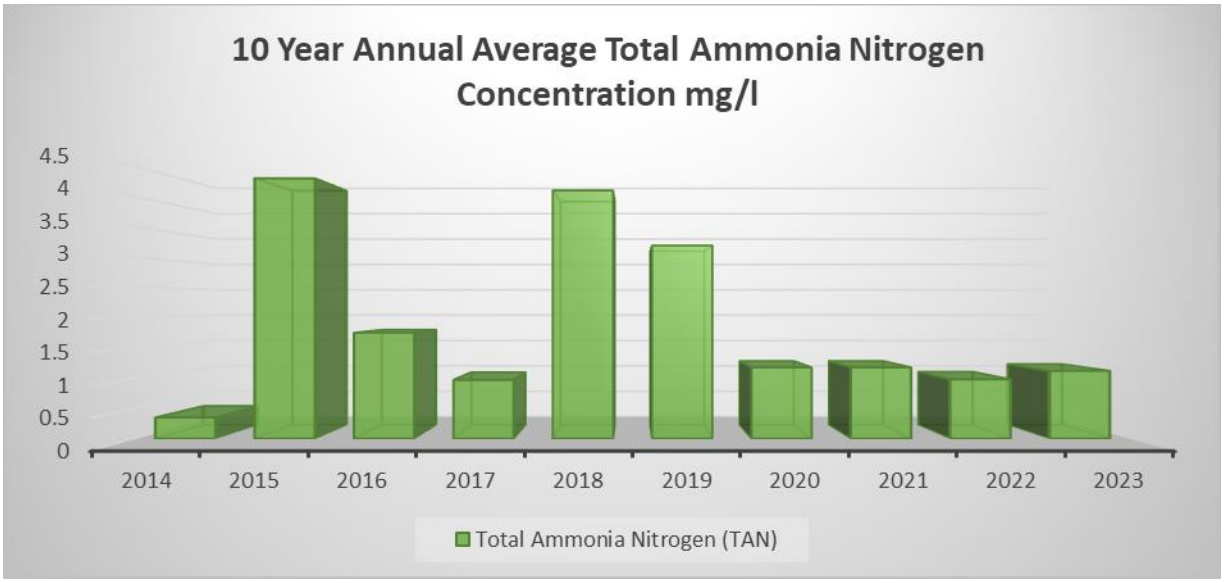


Figure 9: 10 Year Annual Average Total Ammonia Nitrogen Concentration

Total Ammonia Nitrogen

Total Ammonia is the sum of the free ammonia-nitrogen plus the amount of nitrogen from ammonia that has combined with chlorine. Ammonia pollution is a matter of increasing concern for regulatory authorities because of the serious threat it poses to the balance of sensitive habitats and to flora and fauna. Controlling ammonia discharges from wastewater treatment can make a significant contribution to reducing its environmental impact.

The average concentration of Total Ammonia Nitrogen (T.A.N.) between June 1st, 2023 to August 31st, 2023 (Summer) was 0.29 mg/L, the ECA limit is 10 mg/L.

The average concentration of Total Ammonia Nitrogen (T.A.N.) between January 1st, 2023 to May 31st, 2023 and September 1st, 2023 and December 31st 2023 (Winter) was 1.47 mg/L, the ECA limit is 15 mg/L.

The loading objective 5.0 mg/l identified in the ECA was also achieved for the reporting period of January 1st to December 31st, 2023.

Midland Wastewater Treatment Plant 2023 Chlorine Usage and Effluent Residuals														
	January	February	March	April	May	June	July	August	September	October	November	December	Total	Monthly Average
Monthly Chlorine Usage	264.04	386.62	209.36	309.85	446.87	477.45	421.39	451.21	366.85	418.47	446.91	429.21	4628.23	
Monthly Average Daily Chlorine Use	8.52	13.81	6.75	10.33	14.42	15.92	14.05	14.56	12.23	13.50	14.90	13.85		12.73
Monthly Average Effluent Residual	0.002	0.016	0.017	0.006	0.007	0.007	0.006	0.006	0.002	0.009	0.010	0.005		0.008

Figure 10: Monthly and daily chlorine usage in Kgs.

Chlorine Usage

The monthly usage of Chlorine was consistent throughout 2023 with a total usage of 4628.23 kg. The average daily usage also remained consistent and remained between 6.75 kg/day and 15.92 kg/day for the reporting period of January 1st and December 31st, 2023. The Total Chlorine Residual of 0.008 mg/l in the Effluent was well below the 0.02 mg/l Objective and Limits set out in the ECA.

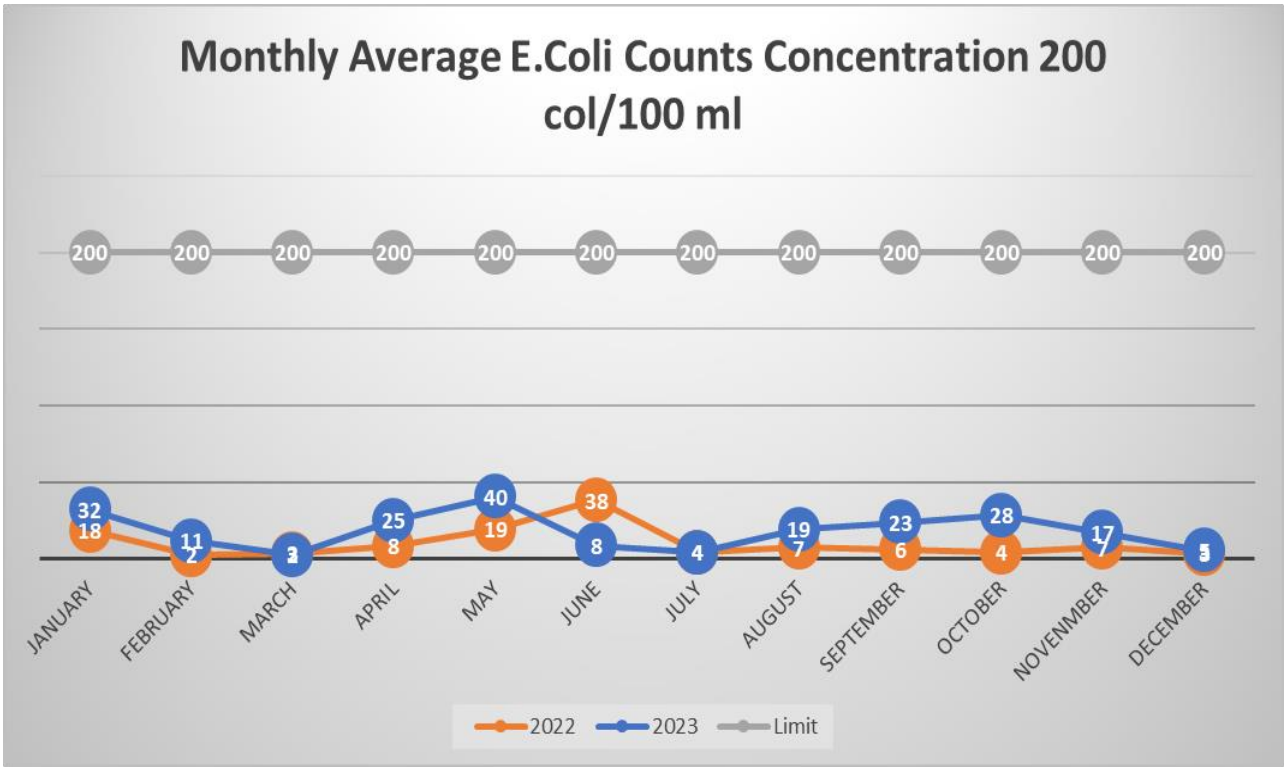


Figure 11: Monthly Average E.Coli Count Concentration 200 col/100 ml

E.Coli

Escherichia coli (*E. coli*) are a group of bacteria commonly found in the intestines of warm-blooded animals, including people. *E. coli* in freshwater can indicate the presence of pathogens (disease-causing organisms) from animal or human feces. The pathogens can cause illness for anyone who ingests them.

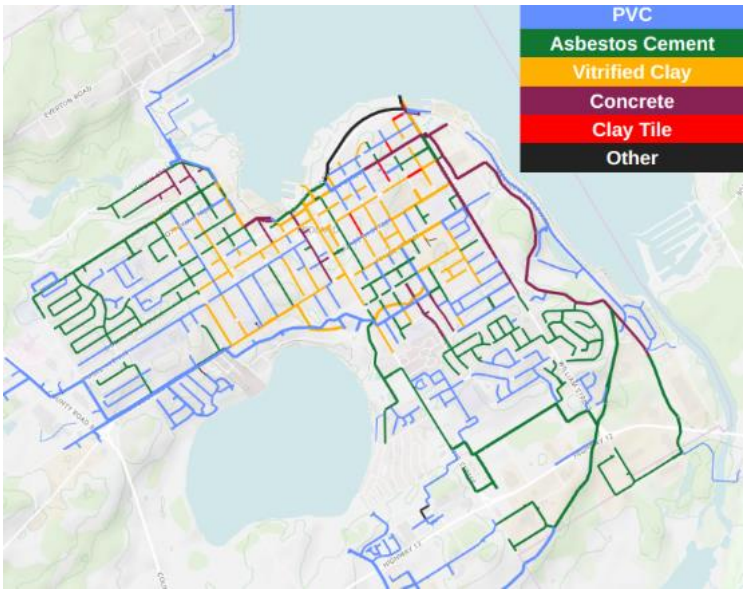
From the ECA, the E.Coli. on a Monthly Geometric Mean, must be less than 200 Colony-Forming units/100 ml (CFU's) released to the environment. Midland's Monthly Average E.coli count was 10 organisms per 100 ml of effluent discharged from the works.

Operational Improvements

Artificial Intelligence

To develop an efficient life-cycle management strategy for wastewater infrastructure assets, and maintain good levels of service, we are faced with the challenge of making decisions that not only prevent pipe failures whenever possible, but also minimize the consequences of these failures. Consequently, an effective risk management decision support system should integrate both likelihood and failure (LoF) and cost of failure (CoF) of linear assets to improve the overall reliability of the water and wastewater distribution networks. However, predicting each of these components accurately is a task that presents several challenges.

On the one hand, the likelihood of failure of a given pipe depends not only on its physical and structural characteristics, but also environmental and operational factors. Given the very high number of parameters that can reduce the useful life of linear infrastructure, a computational, AI-based approach can leverage existing sewer infrastructure and failure history data to identify groups of pipes that are most at risk of failure.



On the other hand, cost of failure estimation has traditionally been a highly subjective endeavor, which can be attributed to the fact that - direct and indirect - economic, social, and environmental costs are usually difficult to quantify and compare. However, by combining historical work order data and domain knowledge from municipal staff, it is possible to build a data-driven model that provides the most up-to-date insights regarding the potential socio-economic impacts of future pipe failures.

As such, these datasets are now be used in conjunction with Machine Learning algorithms to identify the most critical pipes in terms of overall risk, which combines their likelihood of failure as well as their cost of failure. The use of innovative, data-driven decision-making tools will help ensure that future investments have the greatest positive impact while limiting adverse consequences related to infrastructure failure.

NASM/Biosolids

In 2023, 12,138 m^3 of Digested Biosolids were hauled from the Town of Midland Wastewater Treatment Plant under contract L04-49844 by Region of Huronia Environmental Services (ROHES). This is a 1% decrease from 2022. Efforts by staff to increase supernatant procedures has reduced the amount of Biosolids hauled by ROHES and stored at lagoons located in New Lowell during the winter months and apply to land in the summer months. Biosolids production volumes are expected to be near or slightly less in the 2024 calendar year.

2023 Biosolids Generated and Hauled

2023 Biosolids Generated and Hauled													
2023	January	February	March	April	May	June	July	August	September	October	November	December	Total
Loads	26	15	25	26	31	26	30	17	16	29	25	23	289
Volume m3	1092	630	1050	1092	1302	1092	1260	714	672	1218	1050	966	12138

Table 1: 2023 Biosolids Generated and Hauled

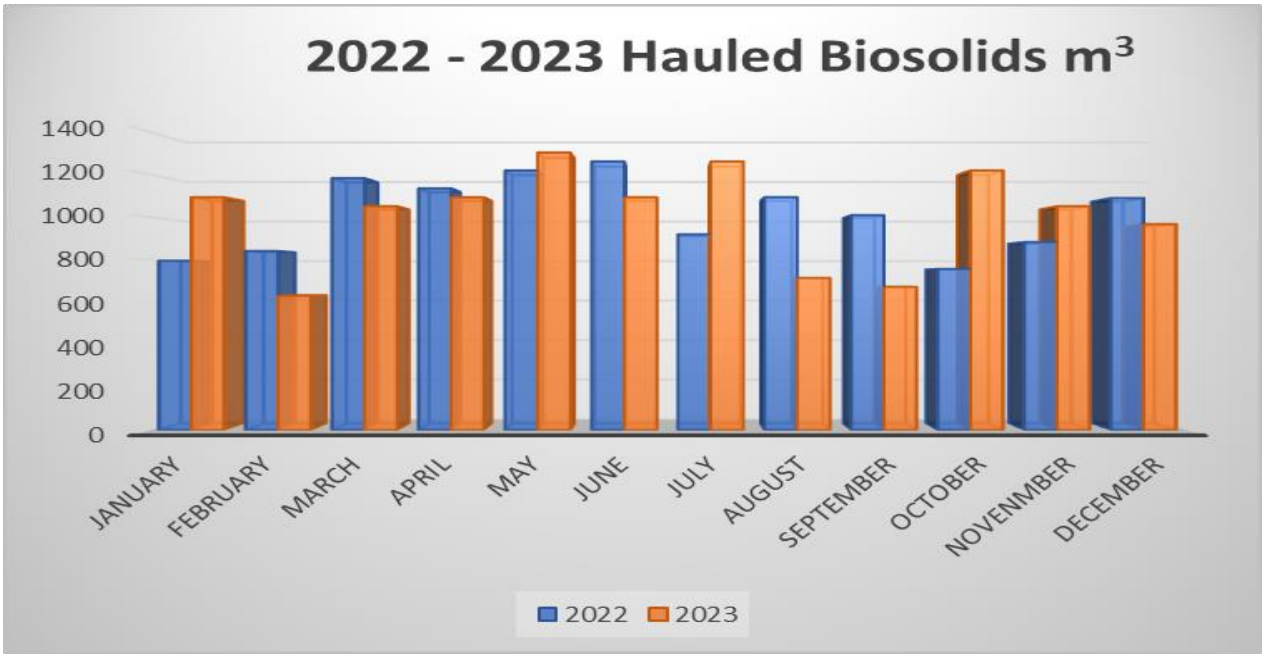


Figure 12: 2022-2023 Hauled Biosolids

Summary of Effluent Quality Assurance and Control Measures

Midland Wastewater Operators collect samples from Raw Sewage, Primary Clarifier Effluent, Aeration Effluent, Primary and Secondary Digesters, and Final Effluent regularly throughout the work week and month. Staff use standardized and accepted laboratory techniques when samples are tested for various parameters in-house for process control and effluent quality assurance. A spreadsheet is used to track in-house lab results to perform several calculations used to monitor and measure the effectiveness of the plant's performance. In addition to the in-house analysis, samples are collected weekly and sent to a certified laboratory, Caduceon Environmental Laboratories. These sample results are used to determine compliance with the ECA and Ministry Regulation.

Bypasses and Overflows

There was (1) overflow event during the reporting period of January 1st to December 31st 2023. The measured volume discharged to Georgian Bay from the treatment plant was 1640 m3 and the event lasted 5 hours.

Overflows are reported to the Ministry of Environment, Conservation and Parks (MECP) as well as to the Town of Midland's social platforms.

2023 By-Pass and Overflow Report					
Date	**Location**	**Type**	**Volume m^3**	**Duration (Hrs)**	**Rainfall (mm)**
April 5, 2023	Plant	Overflow	1640.40	4.52	48.4

Sample results of applicable parameters are found in Appendix A of this report.

Calibrations

All flow meters, level transmitter, probes and analyzers are calibrated as per the manufacturers recommendations by a trained, knowledgeable and experienced technician. Calibrations are completed a minimum of once a year. Calibration was completed in June 2023 by SCG Flowmetrix. Calibration Certificates are submitted and retained electronically for each unit and devices. Below is a list of locations of units and devices and description.

	Date	Location	Description	Serial #
1	June 6 2023	Midland WWTP	WAS Flow Meter	A98 14063
2	June 6 2023	Midland WWTP	RAS Flow Meter	302418
3	June 5 2023	Midland WWTP	Final Effluent Flow Meter	PBD/L3050094
4	June 5 2023	Midland WWTP	Raw Sewage Tank Level	PDB/K0020132
5	June 5 2023	Midland WWTP	Bypass Flow Meter	PBD/A7210157
6	June 5 2023	Midland WWTP	Calcium Thiosulfate Level North	PBD/A6281118
7	June 5 2023	Midland WWTP	Calcium Thiosulfate Level South	PBD/A680892
8	June 5 2023	Midland WWTP	Dechlor Chemical Flow Meter	N1K1225102
9	June 5 2023	Midland WWTP	Storm Tank Overflow Meter	PBD/L3271235
10	June 5 2023	Midland WWTP	Storm Tank Level	PBD/L3271195
11	June 5 2023	Midland WWTP	Influent Flow Meter	N/A
12	June 5 2023	Midland WWTP	Primary Raw Sludge Flow Meter	A964188
13	June 6 2023	Midland WWTP	Alum Pump #1 Flow Meter	N1K2145086
14	June 6 2023	Midland WWTP	Alum Pump #2 Flow Meter	N1K2145145
15	June 5 2023	Midland WWTP	Bio-Solids Haulage Flow	N1K502510
16	June 6 2023	Midland WWTP	Septage Tank Level	N/A
17	June 5 2023	Midland WWTP	Chlorine Tank Level	PBD/L4010338
18	June 5 2023	Midland WWTP	Secondary Flow to Clarifier	N/A
19	June 6 2023	Midland WWTP	Sodium Hypochlorite Flow	N1K4105037
20	June 6 2023	Aberdeen SPS #3	Well Level	N/A
21	June 6 2023	Aberdeen SPS #3	Station Flow	PBD/L0234564
22	June 6 2023	Pillsbury SPS #4	Well Level	PBD/M3040016
23	June 6 2023	Pillsbury SPS #4	Station Flow	3K620000240145
24	June 6 2023	Howard SPS #5	Well Level	N/A
25	June 6 2023	Russ Howard SPS #5	Station Flow	N1LO105139
26	June 7 2023	Vindin SPS #6	Well Level	PBD/W2190022
27	June 7 2023	Vindin SPS #6	Outflow Meter	1320A359
28	June 7 2023	Bay Port SPS #7	Station Flow Meter	282948
29	June 7 2023	Bay Port SPS #7	Well Level	PBD/X5290260
	June 7 2023	Chamber A	Bypass Flow Meter	JNB/M71600000003
30	June 7 2023	Chamber A	Bypass Flow Meter	JNB/M80700000005
31	June 7 2023	Bay SPS #1	Well Level	N/A
32	June 6 2023	Midland WWTP	Strainer Outlet Pressure	K8273700
33	June 6 2023	Midland WWTP	Strainer Inlet Pressure	K8273700

Summary of Maintenance Performed Throughout the Reporting Period

In addition to regular maintenance management programs and maintenance to all effluent monitoring equipment, works were upgraded or replaced by the Capital Plan as follows:

Treatment and Lift Station Facilities

- New radar level sensors for Chamber B
- New Secondary Clarifier V Notch Weirs

Collection System

- SL-RAT Program
- Collection System Cleaning
- Lift Station Clean Outs
- 1400m Sanitary Sewer CIPP Relining

Summary of Complaints Received Throughout the Reporting Period

There were no complaints received by the Town of Midland municipal staff throughout the Reporting Period for the Town of Midland Wastewater Treatment Plant for odour.

Summary of monitoring data

The collection system's current operational status is satisfactory, with no data indicating a need for immediate changes. Ongoing vigilance and routine checks are recommended to maintain this level of performance and to make informed decisions about any necessary adjustments in response to evolving conditions or demands.

Summary of efforts made to reduce Collection System Overflows

Efforts to reduce Collection System Overflows (CSOs) encompass a comprehensive approach aimed at enhancing the reliability and efficiency of sewer systems. These efforts include:

- Sewer Relining: This involves the application of a new liner inside existing sewer pipes to seal cracks, prevent leaks, and improve flow capacity without the need for extensive excavation. Sewer relining extends the life of sewer infrastructure and is a cost-effective method to mitigate overflows.

- Sewer Repair: Repair work is essential for addressing immediate issues such as blockages, breaks, and collapses in the sewer system. Timely repairs prevent minor issues from escalating into major overflows, thus maintaining the system's integrity.

- Inspection: Regular inspections are crucial for identifying potential problems before they lead to overflows. Inspections help in detecting cracks, blockages, root intrusions, and other issues that might compromise the sewer system's functionality.

- CCTV Work: Closed-circuit television (CCTV) inspections provide a detailed view of the sewer system's internal conditions. This technology enables the identification of defects and obstructions within pipes, facilitating targeted repairs and maintenance.

- Acoustic Assessments: Acoustic monitoring techniques are used to detect changes in the flow characteristics within the sewer system. These assessments can identify potential blockages or abnormalities in the system, often before they become visible or lead to overflows.

- Installation of Monitoring Equipment: Advanced monitoring equipment, such as flow meters and level sensors, are installed within the sewer system to provide real-time data on flow rates and levels. This information is crucial for early detection of overflow conditions and for making informed decisions on system operations.

- Strategic Asset Replacements: Aging or severely damaged sections of the sewer system are strategically replaced to ensure reliability and to prevent overflows. This involves prioritizing replacements based on risk assessments and the critical nature of the assets to the overall system performance. 2023 saw the replacement of a section of sanitary on Queens St. This replacement removed a known combined sewer at $249,555.00. Form SS1 is available upon request.

These efforts collectively contribute to reducing the incidence and impact of Collection System Overflows by enhancing the structural integrity, capacity, and operational efficiency of sewer systems. Through a combination of technological advancements, strategic planning, and proactive maintenance, municipalities and utility companies can effectively manage and mitigate the challenges associated with CSOs.

Details of Procedure F-5-5 are being met, and all reasonable efforts to reduce CSOs will continue.

Additional Sampling

The Federal Government for the Department of Oceans and Fisheries requires the WWTP to sample for Acute Lethality Testing. An acute lethality test with fish for wastewater involves exposing selected fish species to wastewater samples under controlled conditions to assess toxicity. The test, usually lasting 96 hours, monitors fish survival and health at various wastewater concentrations. Results help gauge the wastewater's impact on aquatic life. The results are included in Appendix B of this report.

Limited Operational Flexibility-Notice of Modifications Form

There were no Limited Operation Flexibility or Notice of Modification forms submitted throughout the Reporting Period. All upgrades/modifications have been completed following the Terms and Conditions of the ECA.

Closing Remarks

Throughout the Reporting Period the Midland WWTP and Collection System have been operated to the best of its ability while subject to construction activity, and seasonal influences. With continued construction and typical average daily flows, operations staff expect the WWTP to operate as designed over the next Reporting Period.

APPENDIX A

CADUCEON ENVIRONMENTAL LABORATORIES

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 23-006632 - Rev. 0

Report To:
Town of Midland
575 Dominion Ave.
Midland, ON L4R 1R2

CADUCEON Environmental Laboratories
2378 Holly Lane
Ottawa, ON K1V 7P1

Attention: Andre Pepin

DATE RECEIVED: 2023-Apr-10
DATE REPORTED: 2023-Apr-19
SAMPLE MATRIX: Waste Water

CUSTOMER PROJECT: Secondary Bypass
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
CBOD5 (Liquid)	3	KINGSTON	MDUBIEN	2023-Apr-13	BOD-001	SM 5210B
Cond/pH/Alk Auto (Liquid)	3	OTTAWA	SBOUDREAU	2023-Apr-10	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
E.Coli m-TECH Media (Liquid)	3	OTTAWA	AHIRSI	2023-Apr-10	EC-001	MECP E3371
Ammonia (Liquid)	3	KINGSTON	VWATTS	2023-Apr-13	NH3-001	SM 4500NH3
TP & TKN (Liquid)	3	KINGSTON	KDIBBITS	2023-Apr-14	TPTKN-001	MECP E3516.2
TSS (Liquid)	3	KINGSTON	AMANIYA	2023-Apr-13	TSS-001	SM 2540D

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

			Client I.D.	Storm Tank Bypass 1 A	Storm Tank Bypass 1 B	Storm Tank Bypass 2 A	Storm Tank Bypass 2 B	Storm Tank Bypass 3 A
			Sample I.D.	23-006632-1	23-006632-2	23-006632-3	23-006632-4	23-006632-5
			Date Collected	2023-04-05	2023-04-05	2023-04-05	2023-04-05	2023-04-05
Parameter	Units	R.L.		-	-	-	-	-
E coli	CFU/100mL	1			380000		260000	
pH @25°C	pH units	-		7.34		7.49		7.91
CBOD5	mg/L	3		15		14		16
Total Suspended Solids	mg/L	3		82		74		58
Phosphorus (Total)	mg/L	0.01		1.25		1.35		1.06
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05		4.07		4.31		3.90

Steve Garrett
Director of Laboratory Services

APPENDIX B

NAUTILUS ENVIRONMENTAL

Certificate of Analysis

ACUTE LETHALITY BIOASSAY REPORT
(Single-Concentration Test)

CLIENT:
Town of Midland, 200 Bay Street, Midland, ON L4R 1J5

TEST RESULTS:

Sample Name[1]	Sample Number	Date Collected	Date Received	Date Tested	Test Species[2]	Percent Mortality[3]	Method Deviations
Final Effluent	2070-0012301	28-Mar-23	29-Mar-23	30-Mar-23	RBT	0%	None

1 - Results relate only to the sample tested. Tested as received from client.
2 - Test Type and Species RBT = Rainbow Trout 96-hour 100% Effluent Concentration Acute Lethality Test
3 - Most regulations regard ≤50% mortality to be a "pass". Check your applicable regulatory requirements.

TEST PROTOCOLS:

Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Environmental Technology Centre, Ottawa, Ontario, Report EPS 1/RM/13 Second Edition – December 2000, including May 2007 and February 2016 Amendments. (Nautilus Test Method RT-SC-R1.7)

REFERENCE/HEALTH DATA:

Date Reference Test Initiated: 09-Feb-23 **Reference Chemical:** Phenol **Fish Lot #:** LF260123
96-Hour LC50: 10.00 mg/L **95% Confidence Limits:** 8.03 mg/L; 12.45 mg/L
Historic Geometric Mean LC50: 9.03 mg/L **Historic Warning Limits (± 2 SD):** 6.56 mg/L; 12.42 mg/L

TEST RESULTS APPROVED BY:

Date: April 4, 2023

C. D'Andrea

Carol D'Andrea
Laboratory Supervisor

Y:\bioassays\2023\2000\2070-001\2070-0012301 T

704 Mara Street Point Edward, ON N7V 1X4
519-339-8787

NAUTILUS ENVIRONMENTAL

Certificate of Analysis

ACUTE LETHALITY BIOASSAY REPORT
(Single-Concentration Test)

CLIENT:
Town of Midland, 200 Bay Street, Midland, ON L4R 1J5

TEST RESULTS:

Sample Name[1]	Sample Number	Date Collected	Date Received	Date Tested	Test Species[2]	Percent Mortality[3]	Method Deviations
Final Effluent	2070-0012302	08-Jun-23	09-Jun-23	09-Jun-23	RBT	0%	None

1 - Results relate only to the sample tested. Tested as received from client.
2 - Test Type and Species RBT = Rainbow Trout 96-hour 100% Effluent Concentration Acute Lethality Test
3 - Most regulations regard ≤50% mortality to be a "pass". Check your applicable regulatory requirements.

TEST PROTOCOLS:

Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Environmental Technology Centre, Ottawa, Ontario, Report EPS 1/RM/13 Second Edition – December 2000, including May 2007 and February 2016 Amendments. (Nautilus Test Method RT-SC-R1.7)

REFERENCE/HEALTH DATA:

Trout

Date Reference Test Initiated: 05-May-23 **Reference Chemical:** Phenol **Fish Lot #:** LF120423
96-Hour LC50: 7.58 mg/L **95% Confidence Limits:** 6.65 mg/L; 8.64 mg/L
Historic Geometric Mean LC50: 8.94 mg/L **Historic Warning Limits (± 2 SD):** 6.69 mg/L; 11.95 mg/L

TEST RESULTS APPROVED BY:

Date: June 20, 2023

C. D'Andrea

Carol D'Andrea
Laboratory Supervisor

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704 Mara Street Point Edward, ON N7V 1X4
519-339-8787

NAUTILUS ENVIRONMENTAL

Certificate of Analysis

ACUTE LETHALITY BIOASSAY REPORT
(Single-Concentration Test)

CLIENT:
Town of Midland, 200 Bay Street, Midland, ON L4R 1J5

TEST RESULTS:

Sample Name[1]	Sample Number	Date Collected	Date Received	Date Tested	Test Species[2]	Percent Mortality[3]	Method Deviations
Final Effluent	2070-0012303	23-Aug-23	25-Aug-23	25-Aug-23	RBT	0%	None

1 - Results relate only to the sample tested. Tested as received from client.
2 - Test Type and Species RBT = Rainbow Trout 96-hour 100% Effluent Concentration Acute Lethality Test
3 - Most regulations regard ≤50% mortality to be a "pass". Check your applicable regulatory requirements.

TEST PROTOCOLS:

Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Environmental Technology Centre, Ottawa, Ontario, Report EPS 1/RM/13 Second Edition – December 2000, including May 2007 and February 2016 Amendments. (Nautilus Test Method RT-SC-R1.7)

REFERENCE/HEALTH DATA:

Trout

Date Reference Test Initiated: 11-Aug-23 **Reference Chemical:** Phenol **Fish Lot #:** LF250723
96-Hour LC50: 6.60 mg/L **95% Confidence Limits:** 5.78 mg/L; 7.52 mg/L
Historic Geometric Mean LC50: 8.73 mg/L **Historic Warning Limits (± 2 SD):** 6.55 mg/L; 11.64 mg/L

TEST RESULTS APPROVED BY:

Date: September 5, 2023

C. D'Andrea

Carol D'Andrea
Laboratory Supervisor

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NAUTILUS ENVIRONMENTAL

Certificate of Analysis

ACUTE LETHALITY BIOASSAY REPORT
(Single-Concentration Test)

CLIENT:
Town of Midland, 200 Bay Street, Midland, ON L4R 1J5

TEST RESULTS:

Sample Name[1]	Sample Number	Date Collected	Date Received	Date Tested	Test Species[2]	Percent Mortality[3]	Method Deviations
Final Effluent	2070-0012304	15-Nov-23	17-Nov-23	17-Nov-23	RBT	0%	None

1 - Results relate only to the sample tested. Tested as received from client.
2 - Test Type and Species RBT = Rainbow Trout 96-hour 100% Effluent Concentration Acute Lethality Test
3 - Most regulations regard ≤50% mortality to be a "pass". Check your applicable regulatory requirements.

TEST PROTOCOLS:

Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Environmental Technology Centre, Ottawa, Ontario, Report EPS 1/RM/13 Second Edition – December 2000, including May 2007 and February 2016 Amendments. (Nautilus Test Method RT-SC-R1.7)

REFERENCE/HEALTH DATA:

Trout

Date Reference Test Initiated: 11-Nov-23 **Reference Chemical:** Zinc **Fish Lot #:** LF251023
96-Hour LC50: 0.82 mg/L **95% Confidence Limits:** 0.69 mg/L; 0.98 mg/L
Historic Geometric Mean LC50: 0.31 mg/L **Historic Warning Limits (± 2 SD):** 0.13 mg/L; 0.75 mg/L
Historic 99% Warning Limits: (± 3 SD) 0.09 mg/L; 1.16 mg/L
*Outside Historic 95% Warning Limits, inside 99% Warning Limits

TEST RESULTS APPROVED BY:

Date: December 1, 2023

C. D'Andrea

Carol D'Andrea
Laboratory Supervisor

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