2024 Annual Report

Marathon Wastewater Treatment Plant

Prepared for: The Ministry of the Environment, Conservation and Parks

Prepared by: Northern Waterworks Inc. on behalf of the Town of Marathon

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Contents

1 Introduction

1.1 Annual Reporting Requirements

The Marathon Wastewater Treatment Plant (WWTP) is regulated by the terms and conditions provided within amended Environmental Compliance Approval No. 4721-AG5JNV (the ECA) issued to the Corporation of the Town of Marathon on September 22, 2017. This Report summarizes the facility's performance over the previous calendar year (January 1 to December 31, 2024) and is intended to provide a performance record for future reference, to ensure that the Ministry is made aware of problems as they arise and to provide a compliance record for the terms and conditions outlined in the ECA.

This Annual Report has been prepared in accordance with Condition 11(4) of the ECA and must contain, but shall not be limited to, the following information:

- a summary and interpretation of all monitoring data and a comparison to the effluent compliance limits outlined in Condition 7 of the ECA, including an overview of the success and adequacy of the Works (refer to sections 2.3, 6.1 & 7);
- a description of any operating problems encountered and corrective actions taken (refer to section 6);
- a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the sewage works (refer to section 5.1);
- a summary of any effluent quality assurance or control measures undertaken in the reporting period (refer to section 2.2);
- a summary of the calibration and maintenance carried out on all effluent monitoring equipment (refer to section 5.2);
- a description of efforts made and results achieved in meeting the design objectives of Condition 6 of the ECA (refer to sections 2.3, 3 & 6.1);

- 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 (refer to section 4);

- a summary of any complaints received during the reporting period and any steps taken to address the complaints (refer to section 6.3);

- a summary of all bypass, overflow, spill or abnormal discharge events (refer to section 6.4);

- 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 (refer to section 5.3); and,

- a report summarizing all modifications completed as a result of Schedule B, Section 3 (refer to section 5.4).

1.2 System Description

The Marathon Wastewater Treatment Plant is owned by the Corporation of the Town of Marathon and was operated by Northern Waterworks Inc. for the duration of the reporting period. The facility utilizes an extended aeration wastewater treatment process that relies upon a combination of physical, biological and chemical processes to treat incoming wastewater. The overall goal of the treatment process is to reduce or remove contaminants from influent wastewater to a level that will not adversely impact or impair receiving waters.

The Marathon Wastewater Treatment Plant was originally constructed in 1981 as an extended aeration facility with a hydraulic capacity of 1,987 m^3/day. The facility was upgraded to its current state in 1984 by the addition of a second combined treatment unit, which increased the facility's hydraulic rated capacity to 4,400 m^3/day (average daily flow). Chlorination at the facility was changed from chlorine gas to sodium hypochlorite in 1994, only to be discontinued by regulatory exemption in 1996. A regulatory exemption was also obtained regarding the chlorination of bypass flows in 1998. Additional modifications and upgrades to the Marathon Wastewater Treatment Plant included the installation of sludge dewatering facilities in 1994, the installation of a turbo blower in 2013, the installation of phosphorus reduction equipment in 2016, and the installation of an emergency diesel generator set and second lower-capacity turbo blower in 2018.

The Marathon Wastewater Treatment Plant consists of the following components:

- influent works which receive raw sewage from the Marathon wastewater collection system and are designed for preliminary treatment. The influent works include grit removal channels, a comminutor with bar screens and a flow splitter chamber;

- an aluminum sulphate chemical feed system for phosphorus reduction consisting of one (1) bulk tank, two (2) chemical day tanks and two (2) chemical metering pumps with injection into the existing influent channel;

- Two (2) combined treatment units which each include one (1) two-celled aeration tank, one (1) clarifier and one (1) sludge holding tank (aerobic digester);

- An effluent contact chamber with flow monitoring equipment and an outfall sewer discharging final effluent to Lake Superior;

- A sludge management system including a polymer chemical feed system and a filter belt press for sludge dewatering housed within a dedicated building;

- A control building housing all air supply equipment (including two turbo blowers), an automation system for the monitoring and control of plant processes, motor control centers, a laboratory/office, washroom and garage; and,

- An emergency diesel generator located in an outdoor enclosure.

2 Water Quality

2.1 Monitoring Programs

The minimum requirements concerning the sampling and testing of raw sewage and final effluent parameters are provided within Condition 9 (Monitoring and Recording) of the ECA. Samples are collected by licenced operators and submitted to an accredited laboratory for analysis on a monthly basis for influent (raw sewage) samples and on a biweekly basis for effluent (treated) samples. Sampling is also conducted in accordance with the Ministry's Procedure F-10-1 (*Procedures for sampling and analysis requirements for municipal and private sewage treatment works – liquid waste streams only*) and with the federal *Wastewater Systems Effluent Regulations* (WSER).

2.2 Quality Assurance & Control

Licenced operators conduct in-house testing to determine the operational performance of the various stages of the treatment process and for quality assurance purposes as it concerns final effluent parameters. Table 1 summarizes those parameters that were routinely tested for operational control or quality assurance purposes during the reporting period. This table is intended to provide a summary of effluent quality assurance measures undertaken in the reporting period as required by Condition 11(4)(d) of the ECA.

Typical control measures that may be implemented in response to test results include adjusting the rate of return activated sludge flow, altering the volume of solids removed from the treatment process, adjusting applied aluminum sulphate dosages to optimize phosphorus reduction, modifying the operation of air supply equipment, adjusting the relative flow rates to the two treatment units, and conducting plant cleaning and maintenance.

Table 1: Summary of operational control and quality assurance testing - 2024[1]

Parameter	Units	No. of Tests Conducted	Min. Result	Max. Result	Annual Average
Influent Monitoring					
Dissolved Oxygen (DO)	mg/L	82	3.63	8.25	5.92
pH	---	82	9.22	11.07	9.83
Temperature	°C	82	7.6	16.7	11.8
Effluent Monitoring					
Dissolved Oxygen	mg/L	82	4.16	8.12	5.70
pH	---	82	8.50	9.07	8.85
Temperature	°C	82	6.4	18.4	12.0
Total Suspended Solids (TSS)	mg/L	12	1.4	9.0	5.5
Process Monitoring - Treatment Unit 1					
Aeration Tank 1 - DO	mg/L	77	1.6	11.0	5.0
Aeration Tank 1 - pH	---	77	8.54	9.14	8.87
Aeration Tank 1 - TSS	mg/L	12	2400	11522	8680
Aeration Tank 2 - DO	mg/L	77	0.29	9.87	3.67
Aeration Tank 2 - pH	---	77	8.53	9.12	8.74
Aeration Tank 2 - TSS	mg/L	12	1630	11774	8290
Clarifier - Sludge Depth	feet	233	1.0	8.0	4.8
Return Activated Sludge - TSS	mg/L	12	2626	16738	11632
Process Monitoring - Treatment Unit 2					
Aeration Tank 3 - DO	mg/L	82	0.22	7.81	1.89
Aeration Tank 3 - pH	---	82	8.41	8.99	8.80
Aeration Tank 3 - TSS	mg/L	12	700	11670	7065
Aeration Tank 4 - DO	mg/L	82	0.20	6.74	1.90
Aeration Tank 4 - pH	---	82	8.41	8.99	8.78
Aeration Tank 4 - TSS	mg/L	12	672	11924	7475
Clarifier - Sludge Depth	feet	252	1.2	5.6	3.3
Return Activated Sludge - TSS	mg/L	12	688	15956	11400

1. All samples collected for operational control and quality assurance testing are grab samples.

2.3 Monitoring Results & Comparison with Performance Criteria

Raw sewage samples are collected monthly and tested for various parameters in accordance with Condition 9 (Monitoring) of the ECA. Monitoring results are summarized in Table 2.

Dewatered sludge samples are collected annually and tested for total solids, total phosphorus and metals in accordance with the Ministry's Procedure F-10-1 (*Procedures for sampling and analysis requirements for municipal and private sewage treatment works – liquid waste streams only*). Annual sludge sample results are provided in Table 3.

Table 2: Influent sampling results

Sample Date	BOD5 (mg/L)	TSS (mg/L)	Total P (mg/L)	TKN (mg/L)
10 Jan 2024	155	218	6.04	58.7
7 Feb 2024	139	123	4.85	41.7
6 Mar 2024	104	45.9	4.12	31.6
4 Apr 2024	163	137	4.37	39.7
3 May 2024	114	99.0	3.90	41.2
11 Jun 2024	160	151	4.55	46.2
11 Jul 2024	200	119	4.53	47.2
7 Aug 2024	110	57.1	4.32	43.8
5 Sep 2024	128	75.9	3.94	37.8
3 Oct 2024	155	142	5.08	53.6
12 Nov 2024	107	86.6	3.96	42.3
12 Dec 2024	175	202	4.87	50.0

Table 3 - Annual Dewatered Sludge sampling results			
Solids, total (TS) %	10.5	Mercury, total mg/kg	0.547
Arsenic, total mg/kg	2.19	Molybdenum, total mg/kg	12.2
Cadmium, total mg/kg	0.953	Nickel, total mg/kg	17.4
Chromium, total mg/kg	19.4	Phosphorus, total mg/kg	24,300
Cobalt, total mg/kg	1.92	Potassium, total mg/kg	2670
Copper, total mg/kg	474	Selenium, total mg/kg	4.24
Lead, total mg/kg	19.5	Zinc, total mg/kg	642

In accordance with Condition 11(4)(a) of the ECA, this report must provide a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Condition 7 of the ECA. The sewage works must be operated and maintained such that effluent compliance limits are not exceeded. For the purposes of determining compliance, the daily concentration of a parameter shall not exceed the corresponding maximum daily concentration limit for the effluent parameters carbonaceous biochemical oxygen demand (CBOD5), total suspended solids and total phosphorus, where the daily concentration means the concentration of a contaminant in the effluent discharged over any single day, as measured by a composite or grab sample, whichever is required. The limit for effluent pH is expressed as a single sample result range in the ECA.

In addition to comparing monitoring results to the effluent limits and in accordance with Condition 10(4)(f) of the ECA, this report must include a description of efforts made and results achieved in meeting the design objectives. Objectives are summarized in Condition 6 (Design Objectives) of the ECA, and the sewage works must be designed, constructed and operated to achieve these objectives. Design objectives are set at more stringent values than compliance limits and they are expressed in the same manner. Best efforts must also be applied to ensure that the effluent from the facility is essentially free of floating and settleable solids and does not contain oil or any other substances in amounts sufficient to create a visible film or sheen or foam or discolouration on the receiving waters. Design objectives related to flow rates are discussed in section 3.

Table 4 summarizes effluent monitoring results and compares them to the relevant compliance limits and design objectives for all regulated parameters. Effluent total phosphorus exceeded the compliance limit and design objective of 1.0 mg/L in 9 of 26 samples collected during the reporting period, for an exceedance rate of 35%. Effluent total suspended solids exceeded the design objective of 10 mg/L on two (2) occasions during the reporting period. Refer to section 6.1 of this report for more information on effluent compliance limit and objective exceedances.

Table 4: Effluent monitoring results summary and comparison with performance criteria - 2024

Effluent Parameter[1]	Units	Objective[2] (MDC or Range)	Limit[2] (MDC or Range)	No. of Samples	Min. Result	Max. Result	Annual Average[3]	Annual % Removal	No. of Exceedances	
									Objective	Limit
CBOD5	mg/L	10	15	26	<2.0	6	2.5	n/a	0	0
TSS	mg/L	10	15	26	<3.0	13.3	4.8	95%	2	0
Total P	mg/L	1.0	1.0	26	0.26	4.62	1.07	76%	0	9
pH[4]	---	6.5 – 9.0	6.0 – 9.5	82	8.50	9.07	8.85	n/a	0	0

1. CBOD5 = carbonaceous biochemical oxygen demand; TSS = total suspended solids; Total P = total phosphorus; TAN = total ammonia nitrogen.
2. MDC = Maximum Daily Concentration, where the daily concentration means the concentration of a contaminant in the effluent discharged over any single day, as measured by a composite or grab sample, whichever is required.
3. Values less than the analytical lower detection limit are assigned a value equal to the detection limit for the determination of the annual average concentration.
4. Results from the in-house testing program are used to determine performance against the objective and compliance limit for the effluent parameter pH.

3 Flow Monitoring

Condition 6(2) of the ECA states that the Owner shall use best efforts to operate the facility within its rated capacity. The rated capacity of the Marathon Wastewater Treatment Plant refers to the average daily flow for which the sewage works are approved to handle, where average daily flow is defined as the cumulative total effluent flow from the facility during a calendar year divided by the number of days during which effluent was discharged in that year. Specifically, the Owner shall ensure that the average daily flow of effluent from the treatment plant does not exceed 4,400 m^3/day over the course of a calendar year. In accordance with Condition 6(3), the Owner shall also assess the issues and provide recommendations to the Water Supervisor if the annual average daily flow reaches 80% of the facility's rated capacity. Table 5 summarizes flow monitoring results for the current reporting period.

Table 5: Effluent flow monitoring results and solids management summary - 2024

Month	Effluent Flow Monitoring Results				Solids Management Results	
	Total Volume (m^3)	Average Daily Flow (m^3/day)	Capacity Assessment (%)	Maximum Daily Flow (m^3/day)	Dewatered Sludge Volume Removed (Filter Press) (m^3)	Sludge Volume Removed from Digester (Vacuum Truck) (m^3)
Jan	30,428	982	22%	1,439	0	0
Feb	36,892	1,318	30%	1,549	0	0
Mar	40,669	1,312	30%	2,345	0	274
Apr	37,351	1,245	28%	1,682	0	170
May	41,013	1,323	30%	1,535	0	0
Jun	40,088	1,336	30%	1,570	0	0
Jul	40,675	1,312	30%	1,784	0	0
Aug	39,483	1,274	29%	1,603	16	0
Sep	33,593	1,120	25%	1,582	0	0
Oct	25,078	809	18%	898	16	0
Nov	26,420	881	20%	1,019	0	0
Dec	28,670	925	21%	1,108	8	0
Total	420,360	---	---	---	40	444
Average	35,030	1,153	26%	---	13	---

Throughout the reporting period approximately 420,360 m^3 of effluent was deposited by the facility. On an average day in 2024, 1,153 m^3 of effluent was discharged to the natural environment, which represents 26% of the rated capacity of the facility (4,400 m^3/day). The maximum amount of effluent deposited on a given day in 2024 was 2,345 m^3, representing approximately 52% of the rated capacity. Approximately 198,472 m^3 (47% of the total) was discharged by combined treatment unit no. 1, while the remaining 221,888 m^3 (53%) was discharged by combined treatment unit no. 2.

Table 6 summarizes recent historical flow monitoring results for the Marathon Wastewater Treatment Plant. Average daily flows over the previous ten (10) reporting periods have been stable and the facility has operated at between 22% and 26% of its rated capacity. The system is expected to operate within its rated capacity over the next reporting period.

Table 6 Recent historical effluent flow monitoring results

Year	Total Volume (m^3)	Average Daily Flow (m^3/day)	Capacity Assessment (Average Daily Flows)	Maximum Daily Flow (m^3/day)
2015	382,367	1,048	24%	2,342
2016	369,975	1,011	23%	1,891
2017	371,576	1,018	23%	2,004
2018	351,099	962	22%	1,802
2019	371,992	1,019	23%	2,803
2020	363,884	994	23%	1,697
2021	368,923	1,011	23%	1,936
2022	360,957	989	22%	1,559
2023	350,657	961	22%	1,703
2024	420,360	1,153	26%	2,345

4 Solids Management

In accordance with Condition 11(4)(g) of the ECA, this report must provide a tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated over the next reporting period and a summary of the locations to where the sludge was disposed. The concentration of solids in the treatment process is controlled by directing activated sludge (i.e., waste activated sludge) to the aerobic digesters (sludge holding tanks) of the respective combined treatment units. Sludge is then stabilized and transferred to a dewatering system for further processing, such that solids are concentrated and much of the water present is removed and returned to the influent works. Dewatered sludge is hauled by trailer as processed organic waste by Northern Waterworks Inc. under amended ECA no. 5924-5NPKL7. During the reporting period, dewatered sludge was hauled exclusively to the drying beds at the Marathon waste disposal site (ECA no. A591806). Solids management methods and disposal areas to be utilized over the next reporting period are not expected to change.
In certain situations, stabilized activated sludge may be removed directly from the aerobic digesters using a vacuum truck. During the reporting period, sludge was removed from the digester on two occasions by Phil's Septic Pumping Service Inc. (hauled as processed organic waste under amended ECA no. A900484).

A tabulation of the amount of sludge generated and removed during the reporting period is provided in **Table 5**, and recent historical sludge volumes are provided in **Table 7**. In 2024, 40 m^3 of dewatered sludge was generated and removed. Additionally, approximately 444 m^3 of sludge was removed from the digesters during the reporting period.

Table 7: Recent historical sludge volumes

Year	Dewatered Sludge Volume Removed (Filter Press) (m^3)	Sludge Volume Removed from Digester (Vacuum Truck) (m^3)
2015	648	0
2016	656	0
2017	536	0
2018	752	0
2019	568	0
2020	840	250
2021	712	425
2022	540	419
2023	304	407
2024	40	444

5 Maintenance and Modifications

5.1 Planned Maintenance, Repairs & Minor Modifications

In accordance with Condition 11(4)(c) of the ECA, this report must include a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the sewage works. A planned maintenance program is employed at the facility that ensures that the sewage works and related equipment that are installed or used to achieve compliance are properly operated and maintained. Licenced Operators perform routine maintenance on all equipment including pumps, air supply equipment, monitoring equipment, alarm systems, safety equipment and other treatment components.

Additional significant maintenance activities and minor repairs and modifications that occurred during the reporting period are summarized in Table 8.

Table 8: Summary of maintenance activities and minor repairs and modifications - 2024

Date	Task
Jan/Feb 2024	Frozen / broken lines caused issues with effluent flow throughout plant, resulting in filter press downtime, working on repairing / thawing all lines to restore full operation of filter press. Ongoing weather dependent work.
1 Mar 2024 to	RAS pumps repaired
5 Mar 2024	Alum pump repaired
22 Apr 2024	Generator testing/inspection completed by Wajax
24 Apr 2024	Electrical inspections completed by TBTE
24-25 Apr 2024	Using a vacuum truck provided and operated by Phil's Septic Pumping Service Inc. to remove solids.
24-May-2024	Sling Choker performed on-site hoist inspections
23 Jul 2024	Digestor 1 to Filter Press valve repaired.
Jul/Aug 2024	Operators entered aerations for cleaning assisting removal of rags, sludge etc., repairs were made to "boot strapping" replaced all straps, repaired air line secured back to wall in aeration 2, opened plant and transferred solids from Plant 2 over to kick start biological process in Plant 1
31 Jul 2024	Rake arm caster wheels installed returning normal operation to rake arm assembly

Table 8: Summary of maintenance activities and minor repairs and modifications - 2024	
Date	Task
8 Aug 2024	8th Filter Press Polymer Pump repaired
6 Aug 2024	6th RAS pump repaired
24 Oct 2024	4th RAS Pump 2 and 4th RAS Pump 1 repaired
18 Oct 2024	Calibration verification for the two (2) effluent flow measuring devices was conducted by a representative from Synergy Controls Corporation. Both flow measuring devices passed calibration verification.
18-Sep-2024	The two (2) backflow prevention devices at the treatment facility were tested and inspected by a qualified professional from Robert's Plumbing & Sheet Metal Co. Both devices passed the testing protocol.
18-19 Sep 2024	Using a vacuum truck provided and operated by Phil's Septic Pumping Service Inc., the chlorine contact chamber was cleaned and inspected.

5.2 Flow Monitoring Equipment Calibration and Maintenance

Condition 9(6) of the ECA requires the Owner to install and maintain continuous flow measuring devices to measure the effluent from the treatment facility with an accuracy to within plus or minus 15 percent of the actual flowrate for the entire design range of the flow measuring devices. Flow measurement equipment described in the ECA includes a flow metering system consisting of two (2) ultrasonic flow meters, one (1) for each effluent contact chamber associated with the respective combined treatment units.

Flow measurement devices are inspected daily and calibration is verified annually. Calibration or replacement is indicated if devices fail the calibration verification protocol. Calibration verification for the two (2) flow meters was conducted by a representative from Synergy Controls Corporation on October 16, 2024. Both flow measuring devices passed calibration verification.

5.3 Summary of Schedule B, Section 1 Modifications

In accordance with Condition 11(4)(j) of the ECA, this report must include copies 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. Such modifications must adhere to the criteria for limited operational flexibility and may affect sewage pumping stations, sewage treatment processes, the sewage treatment plant outfall, or sanitary sewers.

No Schedule B, Section 1 modifications were completed during the reporting period.

5.4 Summary of Schedule B, Section 3 Modifications

In accordance with Condition 11(4)(k) of the ECA, this report must summarize all modifications completed as a result of Schedule B, Section 3. Such modifications refer to normal or emergency operational modifications, such as repairs, reconstructions or other improvements that are part of maintenance activities, including cleaning or renovations to existing approved equipment, provided that the modification is made with equivalent equipment. Such modifications are not required to follow the Limited Operational Flexibility notification protocols, provided that the number of pieces and description of the equipment as described in the ECA does not change.

No Schedule B, Section 3 modifications were completed during the reporting period.

6 Operating Problems

In accordance with Condition 11(4)(b) of the ECA, this report must provide a description of any operating problems encountered and corrective actions taken during the reporting period. For the purposes of this report, operating problems may be indicated by 1) effluent compliance limit and design objective exceedances, 2) bypasses, overflows, spills and abnormal discharge events, 3) complaints and 4) significant equipment, infrastructure and process failures.

6.1 Effluent Compliance Limit and Design Objective Exceedances

Compliance limit and design objective exceedances in 2025 can be attributed to minor process upsets and temporary process modifications.

6.1.1 Total Phosphorus

Best efforts to achieve the effluent compliance limits and design objectives for total phosphorous focused on modifying aluminum sulphate dosages along with reducing the concentration of solids in the treatment process by using a vacuum truck to remove activated sludge from the digesters. In a continued effort to improve biological phosphorous reduction an anaerobic zone has been maintained in the inlet of all four basins while still maintaining adequate mixing. Due to the configuration of the respective treatment units, approximately 33% of the total aeration tank volume in treatment unit #1 (aeration tanks 1 and 2) is dedicated to this anoxic zone, while approximately 50% of the aeration tank volume in treatment unit #2 (aeration tanks 3 and 4) is dedicated to this anoxic zone.

Anoxic zones were not maintained from June to Sept 2024. This caused exceedances until anoxic zones were re-established. Results have shown these changes to facility operations have been effective in reducing total phosphorous concentrations. The effectiveness of the anoxic zones in the aeration tanks will continue to be closely monitored and evaluated throughout 2025 along with adjustments to the alum dosing and effective waste management strategies. Total phosphorous concentrations are expected to remain within limits in 2025.

Table 9 summarizes recent historical effluent total phosphorus results. The table also summarizes the 2022 results following the initial establishment of the aeration tank anoxic zones. There was no improvement in performance in 2024 with respect to effluent total phosphorus reduction, and the stated goals of the sewage treatment program were not achieved but the number of exceedances did not increase.

Table 9: Recent historical effluent total phosphorus results summary

Year/ Time Period	Total No. of Samples	Average Concentration (mg/L)	% Removal	Total No. of Compliance Limit Exceedances	Compliance Limit Exceedance Rate
2014	26	2.67	37%	26	100%
2015	26	2.50	44%	26	100%
2016	26	2.70	39%	26	100%
2017	26	2.47	56%	24	92%
2018	26	1.09	76%	15	58%
2019	26	1.40	72%	21	81%
2020	27	0.95	86%	11	41%
2021	26	1.02	87%	11	43%
2021- outlier excluded[1]	25	0.82	89%	10	40%
2022	26	0.86	83%	9	35%
2023- outlier excluded[2]	27	2.84	75%	9	33%
2024	26	1.07	76%	9[3]	35%

1. The sample result of 6.08 mg/L from May 5, 2021, is excluded. This outlier result was associated with an equipment failure that interfered with the extended aeration treatment process.
2. The sample result of 48.7 mg/L from July 9, 2023, is excluded. This outlier result was associated with process upset that interfered with the extended aeration treatment process.
3. Anoxic zones not maintained June-Sept 2024. This caused exceedances until anoxic zones were re-established.

6.1.2 Total Suspended Solids

During the reporting period, effluent total suspended solids exceeded the design objective of 10 mg/L on two (2) occasions, but did not exceed the compliance limit.

Table 10 summarizes recent historical effluent total suspended solids (TSS) results. Despite the compliance limit exceedance, effluent TSS annual average concentrations have been below the design objective for the previous ten (10) reporting periods. Percent removals have consistently been between 95 and 98%, with the exception of 2023. These results suggest that the facility is providing effective secondary treatment for an extended aeration facility with total phosphorus removal, as per Ministry Guideline F-5-1. Specifically, the facility achieved the effluent TSS design objective of 10 mg/L and the compliance limit of 15 mg/L for the entire

reporting period, insofar as these limits are normally expressed either as a monthly or annual average concentration.

Table 10: Recent historical effluent total suspended solids results summary

Year	Total No. of Regulatory Effluent Samples	Annual Average Conc. (mg/L)	Annual % Removal	Design Objective		Compliance Limit	
				Total No. of Exceedances	Exceedance Rate	Total No. of Exceedances	Exceedance Rate
2015	26	5.3	97%	1	4%	1	4%
2016	26	4.8	97%	1	4%	0	0%
2017	26	5.7	97%	2	8%	0	0%
2018	26	5.7	97%	2	8%	2	8%
2019	26	6.5	96%	4	15%	3	12%
2020	27	6.2	96%	6	22%	3	11%
2021	26	5.2	98%	2	8%	1	4%
2022	25	5.2	96%	1	4%	1	4%
2023	27	14.3[1]	86%[1]	3	11%	6	22%
2024	26	4.8	95%	2	8%	0	0%

[1]July 9, 2023 TSS result (2450 mg/L) excluded from this calculation, but included in the total number of

Notably, the design objective and compliance limit in the ECA are expressed as a maximum daily concentration and are more stringent than the requirements in Guideline F-5-1. If the facility were regulated in a manner consistent with other secondary treatment plants, it is likely that there would be little to no effluent TSS design objective or compliance limits exceedances. That is, the operational performance of the Marathon Wastewater Treatment Plant is consistent with other secondary treatment facilities with respect to effluent TSS concentrations. A goal of the sewage treatment program in 2025 and beyond is to maintain historical performance with respect to effluent TSS results, including achieving an annual average concentration less than 10 mg/L and an annual percent removal greater than 95%. Operational performance with respect to effluent total suspended solids concentrations is considered adequate and no significant operational changes are required.

6.2 Bypasses, Overflows, Spills and Abnormal Discharge Events

In accordance with Condition 11(4)(i) of the ECA, this report must provide a summary of all bypasses, plant overflows, spills or abnormal discharge events.

A bypass means a diversion of sewage around one or more unit-processes within the treatment facility, excluding preliminary treatment processes, whereby diverted sewage flows are returned to the treatment facility upstream of the effluent sampling location and are discharged to the environment through the approved effluent disposal facilities. Bypasses are prohibited except in emergency situations or in situations where the event is planned and is a direct and unavoidable result of a planned repair or maintenance procedure. Due to the configuration of the Marathon WWTP, all diverted sewage flows to the bypass line at the facility are classified as bypasses.

An overflow means a discharge to the environment from the Works at designed locations other than the approved effluent disposal facilities or via the effluent disposal facilities downstream of the final effluent sampling points. Overflows are also prohibited except in emergency situations or in situations where the event is planned and is a direct and unavoidable result of a planned repair or maintenance procedure. Overflows generally occur in the wastewater collection system.

Spills are releases of pollutants into the natural environment from or out of a structure, vehicle or other container that is abnormal in quality or quantity in light of all the circumstances of the discharge. Spills include the releases of all pollutants other than raw sewage or partially treated sewage, which are otherwise classified as Class I spills and are exempt from Part X of the EPA. Specifically, spills of raw or partially treated sewage are discharges (bypasses and overflows) that are authorized by and are conducted in accordance with an environmental compliance approval.

Abnormal discharge events include any other abnormal events not otherwise classified as a bypass, overflow, or spill.

No bypasses, overflows, spills or abnormal discharges occurred during the reporting period.

6.3 Complaints

In accordance with Condition 11(4)(h) of the ECA, this report must provide a summary of any complaints received during the reporting period and any steps taken to address the complaints.

There were no customer complaints received for the Marathon Wastewater System during the reporting period.

6.4 Equipment, Infrastructure and Process Failures

Operating problems associated with significant equipment, infrastructure and process failures that occurred during the reporting period are summarized in Table 9. These failures exclude minor equipment faults or power supply interruptions that otherwise do not significantly impact the treatment process.

Table 9: Summary of significant equipment, infrastructure, and process failures - 2024

Event Date	Event Description
	none

7 Conclusion

In accordance with Condition 10(4)(a) of the ECA, this report must include an overview of the success and adequacy of the sewage works. Water quality and flow monitoring results suggest a successful and adequate sewage treatment program, with the exception of effluent total phosphorus concentrations during the period when anoxic zones were not maintained. Under normal operations, the Marathon Wastewater Treatment Plant was capable of consistently meeting all other design objectives and compliance limits for all final effluent parameters. Additionally, all flows from the sewage works were below the rated capacity for the facility.

A goal of the sewage treatment program in 2025 is to continue to reduce the magnitude and frequency of effluent total phosphorus limit exceedances by optimizing treatment processes and maximizing biological and chemical phosphorus reduction. Specifically, best efforts will be applied to operate and maintain the facility to achieve a) an effluent total phosphorus annual average concentration below 1.0 mg/L, b) an annual percent removal greater than 90% and c) a compliance limit exceedance rate below 15%.