Town of Mahone Bay – 2025 Wastewater Treatment Facility Annual Report

Introduction

As required by section 9d of the Approval to Operate (2016-096100) issued by Nova Scotia Environment and Climate Change (NSE), The town of Mahone Bay is providing the Annual Report for 2025.

Wastewater System Overview

The Mahone Bay WWTP and collection system services a population of approximately 1,000 people in the Town and services primarily residential areas with one main area of commercial development on the Main Street.
The combined storm and sanitary wastewater collection system is comprised of approximately 5.5 km of gravity sewer and 1.1 km of forcemain. The system contains three pumpstations, which are each equipped with two submersible pumps each and overflows which flow into the Mahone Bay Harbour. Pump station (PS) 1 is located at the south end of Main Street across from civic number 866, PS2 is located at the Government Wharf 683 Main Street, and PS3 is located at 563 Main Street adjacent to the Independent Grocer parking lot. Wastewater travels from PS3 to PS2 to PS1 prior to being pumped to the WWTP.
The WWTP is located at 918 Main Street and was constructed in 1994. The WWTP has a design capacity of 852 m^3/day and the treated effluent is discharged into Mahone Harbour. Wastewater is pumped from the collection system through a 200mm PVC forcemain to the headworks where it passes through a bar screen into the grit removal chamber, from there the wastewater travels through the two aerated lagoon cells for biological treatment. Following the aerated lagoons, the wastewater enters the finishing lagoon, where it is disinfected with peracetic acid. The effluent then enters a 200mm PVC gravity outfall pipe for discharge through a diffuser into Mahone Harbour.

Approval Requirements

Quantity of Wastewater

The final effluent from the WWTP is discharged into Mahone Harbour, the effluent flow is measured by a flowmeter located in the weir chamber prior to outfall pipe. The total volume of treated wastewater effluent discharged in 2025 was 231,795m^3. Table 1 provides an overview of the 2025 effluent discharge volumes, as well as the average monthly flow, the maximum flow month volume, and the low flow month volume. Figure 1 shows the daily average effluent flow monthly from 2025.

The average daily effluent flow exceeded the design flow in March and April, higher flows are associated with increased precipitation during those months and lower flows correspond to drier months.

Effluent				
Month	Totalized Volume (m3)	Average Daily Flow (m^3/day)	Maximum Daily Flow (m3/day)	Minimum Daily Flow (m3/day)
January	17668	570	955	377
February	12158	434	566	335
March	28492	919	1165	303
April	33554	1118	1364	767
May	24710	797	1686	257
June	17577	586	996	302
July	9969	322	537	96
August	12054	389	818	213
September	16299	543	859	187
October	12389	400	602	133
November	25623	854	2015	514
December	21302	687	1007	512
Total	**231795**			
Monthly Average	**19316**	**635**	**1048**	**333**
Peak Month	**33554**	**1118**	**2015**	**767**
Low Month	**9969**	**322**	**537**	**96**

Table 1: 2025 Effluent Discharge Volume and Flow Overview

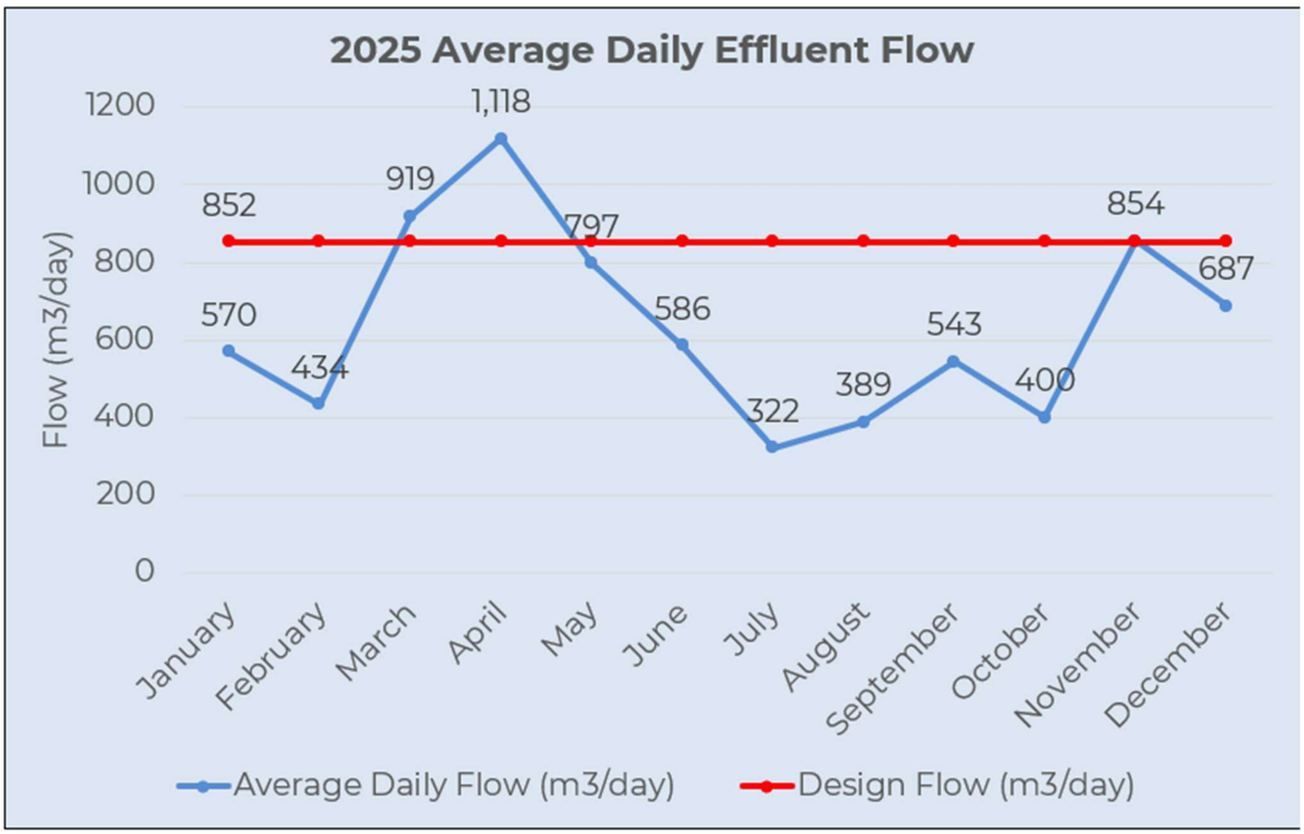

Figure 1: 2025 Average Daily Effluent Flow

Quality of Treated Effluent

Wastewater Effluent samples were collected monthly and submitted to AGAT laboratories for analysis. AGAT Laboratories, located in Dartmouth Nova Scotia, holds a valid CALA accreditation, see Appendix A. Wastewater analysis for the Town of Mahone Bay includes the parameters outlined in Table 2. In addition to the monthly samples sent to AGAT, operations staff collected and analyzed routine wastewater effluent samples for pH and peracetic acid residuals.

Parameter	Effluent Limit	Sample Type	Minimum Frequence	Avering Period	Location
CBOD5	25 mg/L	Grab	Monthly	Quarterly	Treated Effluent Discharge
TSS	25 mg/L	Grab	Monthly	Quarterly	Treated Effluent Discharge
E.Coli	200 *E. coli* /100mls	Grab	Monthly	Quarterly*	Treated Effluent Discharge
pH	range 6-9	Grab	Monthly	Quarterly	Treated Effluent Discharge
Plant Volumes		N/A	Continuous	Quarterly	Treated Effluent Discharge
Fish Toxicity	Non-acutely lethal	Grab	As Requested	N/A	Treated Effluent Discharge
Total Chlorine Residual**	0.02 mg/L	Grab	Monthly	Quarterly	Treated Effluent Discharge

Table 2: Effluent Parameters as Outlined in Approval to Operate

*Geometric mean

**The WWTP no longer uses chlorine disinfection (as of February 2021).

Table 3 shows the quarterly averages for each effluent parameter. The effluent analytical results are compared to the effluent limits in the following Figures 2 through 7. Exceedances shown on Q3 E.Coli and Q4 CBOD.

Month	CBOD (mg/L)	TSS (mg/L)	un-Ionized Ammonia (mg/L)	E. Coli (MPN/100mL)	pH
Q1	8	9	0.10	13	7.62
	< 25 mg/L	< 25 mg/L	< 1.25mg/L	200 E.Coli/100mL	6 to 9
Q2	4	5	0.05	16	7.19
	< 25 mg/L	< 25 mg/L	< 1.25mg/L	200 E.Coli/100mL	6 to 9
Q3	5	8	0.04	216	7.04
	< 25 mg/L	< 25 mg/L	< 1.25mg/L	200 E.Coli/100mL	6 to 9
Q4	29	7	0.05	126	6.66
	< 25 mg/L	< 25 mg/L	< 1.25mg/L	200 E.Coli/100mL	6 to 9

Table 3: 2025 Effluent Quality Quarterly Averages

CBOD$_5$ monitoring was conducted monthly and sample results were within the performance limit in all months except for October. In accordance with effluent limits, the averaged quarterly results were less then 25 mg/L for Q1, Q2, & Q3, as shown in Figure 2.

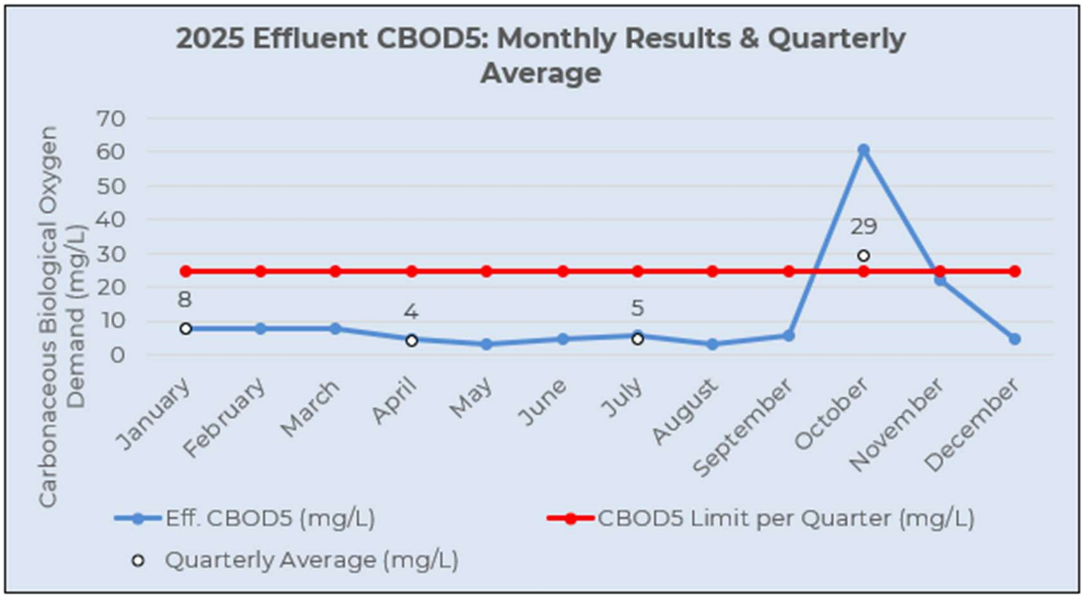

Figure 2: 2025 Effluent CBOD Results

TSS monitoring was conducted monthly and sample results were within performance limits in all months. In accordance with effluent limits, averaged quarterly results were less than 25 mg/L as shown in Figure 3.

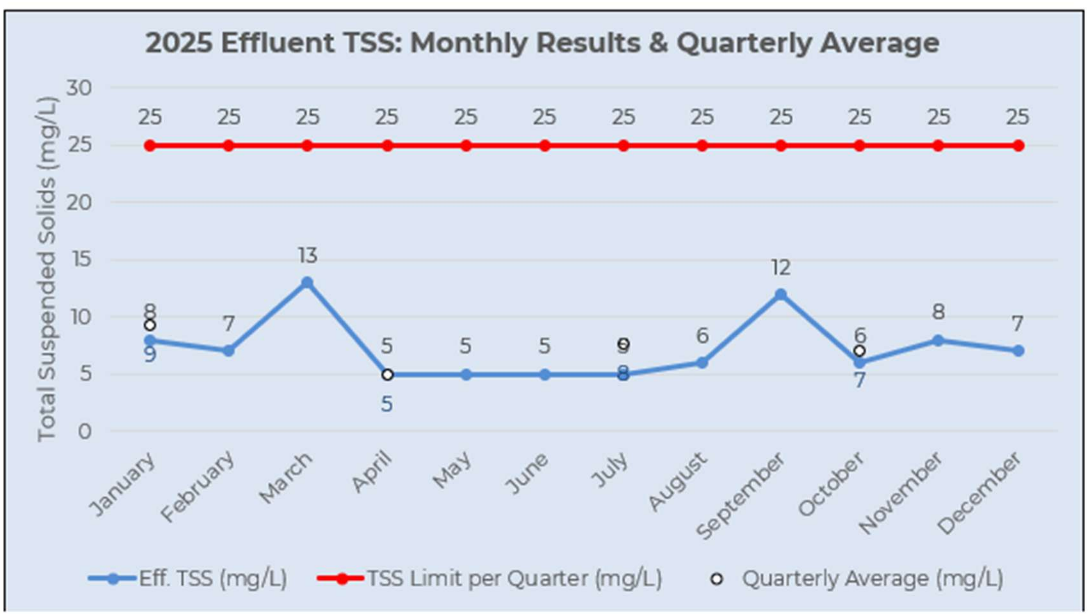

Figure 3: 2025 Effluent TSS Results

Operations staff conducted pH monitoring daily during regular operations.
Monthly averaged results were within performance limits in all months. In accordance with effluent limits, averaged quarterly results were within the range of 6-9 as shown in Figure 4.

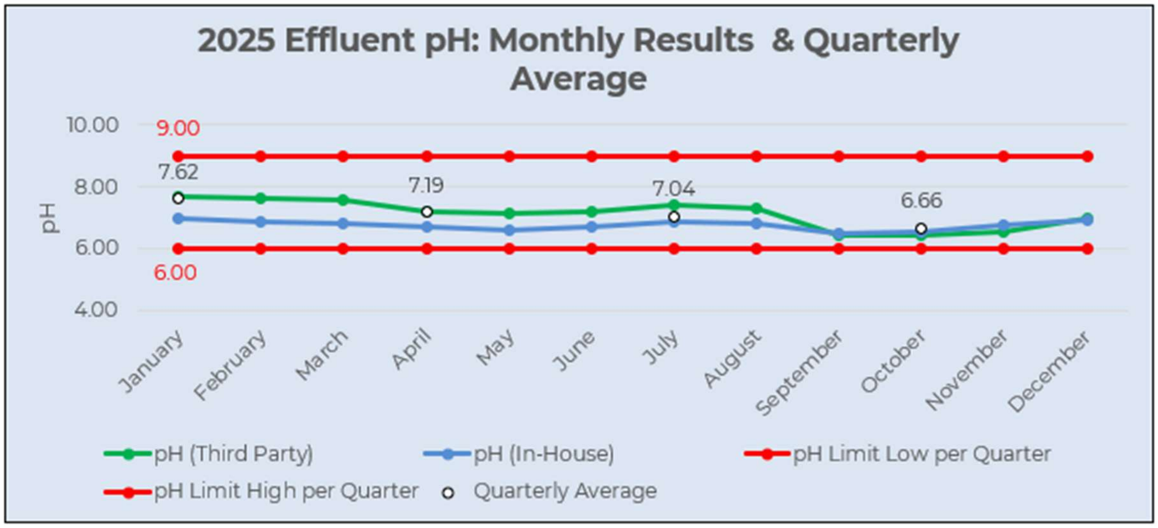

Figure 4: 2025 Effluent pH Results

E. coli monitoring was conducted monthly, sample results have exceeded performance limits during August, September, and November. In accordance with effluent limits, the geometrically averaged quarterly results for 2025 were less than 200 MPN/100mLs for Q1, Q2, and Q4 as shown in Figure 5.

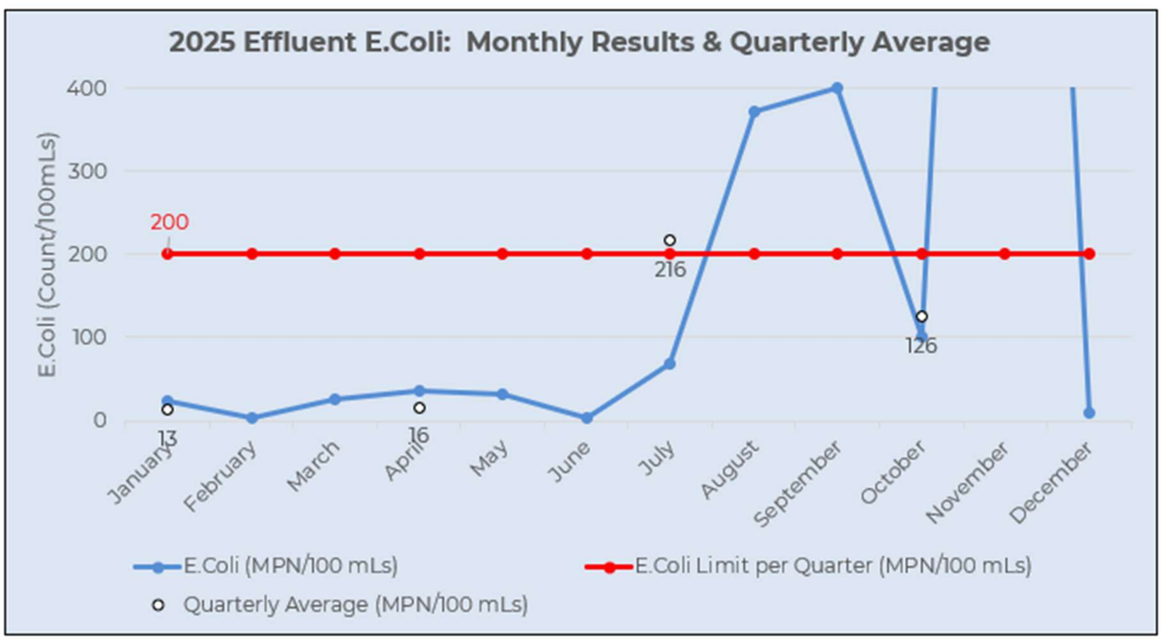

Figure 5: 2025 Effluent *E. coli* Results

Operations staff conducted Peracetic Acid Residual (PAAR) monitoring routinely during regular operations. 2025 PAAR monthly results and Quarterly results are as shown in Figure 6.

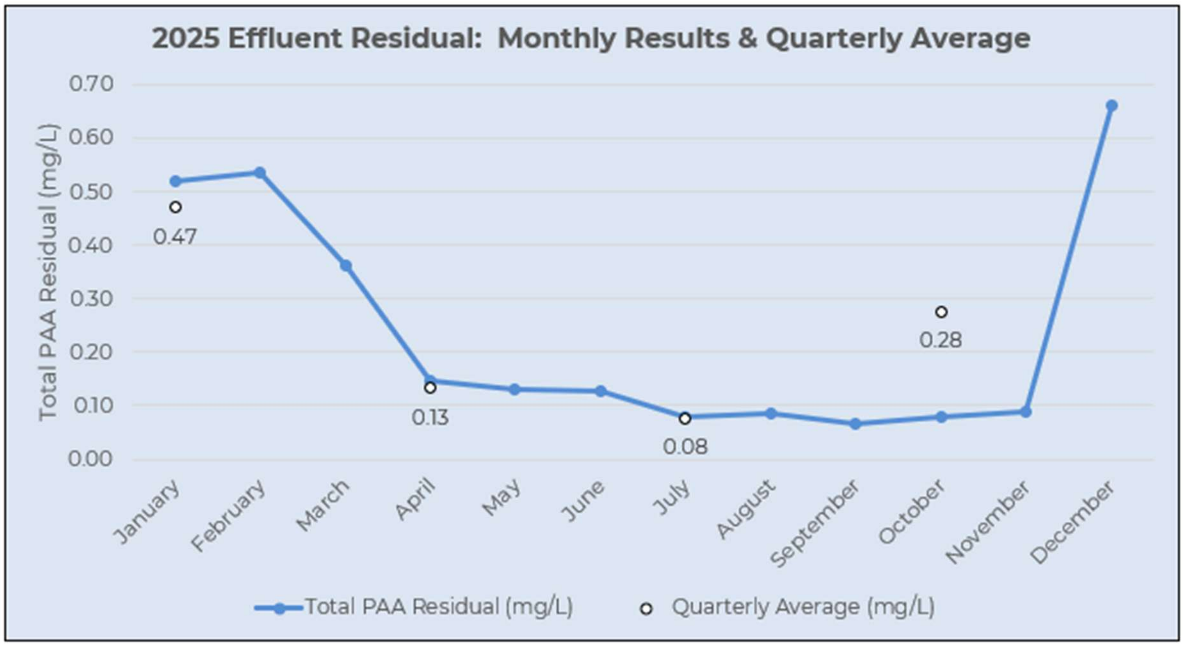

Figure 6: 2025 Peracetic Acid Residual Results

Emergency/Upset Conditions

The Town of Mahone Bay sewage interceptor system is a combined storm and sewage collection system. The combined system results in overflow events from the pumping stations into Mahone Harbour due to storm or precipitation events which cause increased flow and infiltration. Overflow events, including the date, time, volume, duration, and cause are promptly reported to Environment Canada. The total pumping station overflow volume for 2025 was 26,166 m^3. All overflow events were due to weather events, power outages, and tide infiltration. Table 4 outlines 2025 pumping station overflow events by month and Figure 7 compares 2025 overflow events at each pumping station versus total precipitation data taken from the Environment Canada historical data available for Halifax International Airport Weather Station.

Lift Station Overflow (m3)			
Month	PS #1	PS #2	PS #3
January	0.0	0.0	2190.0
February	0.0	0.0	2154.0
March	0.0	0.0	9747.0
April	2.0	379.0	8509.0
May	0.0	0.0	77.0
June	0.0	0.0	0.0
July	0.0	0.0	0.0
August	0.0	0.0	0.0
September	0.0	0.0	0.0
October	0.0	0.0	0.0
November	0.0	0.0	853.0
December	0.0	0.0	2255.0
Total	2.0	379.0	25785.0
Monthly Average	0.2	31.6	2148.8
Peak Month	2.0	379.0	9747.0
Low Month	0.0	0.0	0.0

Table 4: 2025 Pumping Station Overflow Events by Month

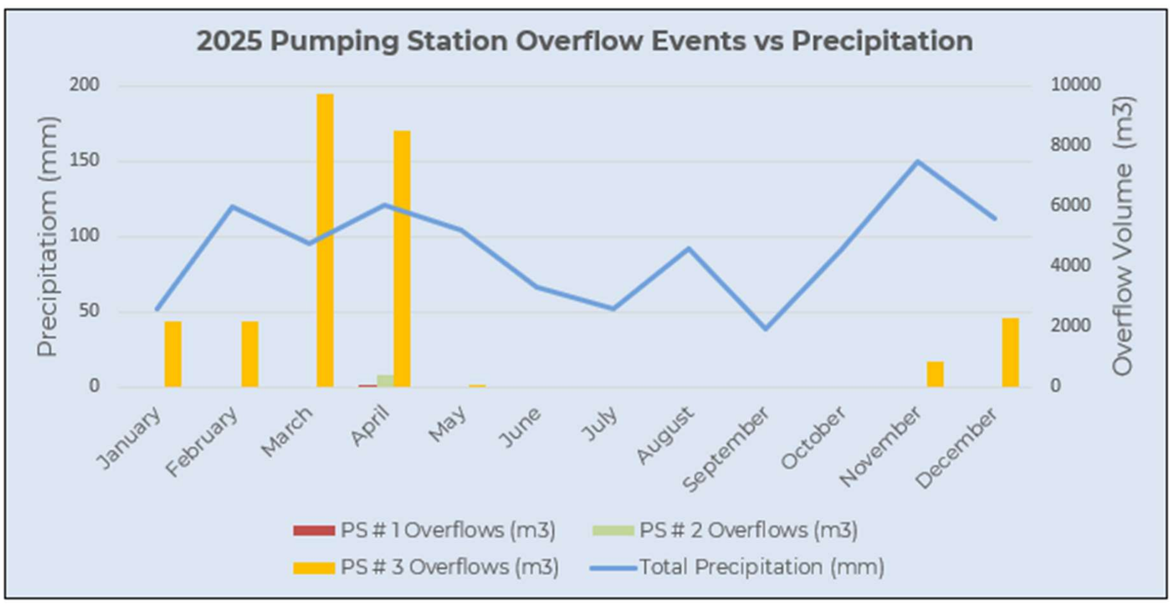

Figure 7: 2025 Pumping Station Overflow vs Total Precipitation

Complaints & Follow-Up Actions

The Town of Mahone Bay received a total of four wastewater related complaints in 2025. All complaints were assigned to Operations staff who conducted site visits or a follow up in all cases. Two of the complaints were sewer blockages, one deteriorated lateral, and one complaint was about sewer smell. There were four new sewer connections made in 2025.

Conclusion

All required effluent sampling and monitoring were completed. Emergency and upset conditions which occurred at the pumping stations were recorded and reported. Each sewer related complaint was investigated and resolved. During the reporting period, the Town of Mahone Bay operated the WWTP and associated works in accordance with the current approval.

Yours very truly,

Town of Mahone Bay

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Appendix A

Certificate of Accreditation for AGAT Laboratories

CALA

Canadian Association for Laboratory Accreditation Inc.

Certificate of Accreditation

AGAT Laboratories (Dartmouth)
AGAT Laboratories Ltd.
11 Morris Drive
Unit 122
Dartmouth, Nova Scotia

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

Accreditation No.:	1003588
Issued On:	9/21/2024
Accreditation Date:	12/7/2007
Expiry Date:	3/21/2027

President and CEO

CALA