



Meaford Wastewater Treatment Plant Annual Report for the year 2024

Environmental Compliance Approval: 9036-AZFPV6

This 2024 Report for the above-referenced facility summarizes the performance and related activities in accordance with ECA; Condition 11 (4) a through m as follows;

Table 1: Sampling Type and Frequency

Source (Composite)	Parameter	Frequency	Method
Influent	Flow (m3)	Daily	Flow Meter
	CBOD5, TSS, TP, TKN, Ammonia Nitrogen, Nitrite & Nitrate Nitrogen, Alkalinity, pH	Monthly	External Analysis
Effluent	Flow (m3)	Daily	Open Channel Flow Meter
	CBOD5, TSS, TP, TKN, Ammonia Nitrogen, Nitrite & Nitrate Nitrogen	Weekly	External Analysis
	E. Coli	Weekly	External Analysis
	pH	Weekly	In-House & External Analysis
	Temperature	Weekly	In-House & External Analysis

Introduction

The Municipality of Meaford is pleased to provide the Ministry of the Environment, Conservation and Parks (MECP) with the 2024 Annual Report for the Meaford Wastewater Treatment Plant (WWTP). In 2024 the Meaford WWTP operated under the Environmental Compliance Approval Number 9036-AZFPV6 dated October 10, 2018.

The Report is designed to inform the MECP of the quality of effluent being discharged from this plant. The entire treatment process at the Meaford Water Pollution Control Plant can best be described as a “transformation”.

A transformation from a harmful wastewater into two useful end products:

- a) A disinfected treated effluent
- b) An agricultural liquid fertilizer

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System Description

The Meaford WWTP is a high-rate plant consisting of three remote and one onsite sewage pumping stations. The facility is located in a residential area, which is susceptible to noise and odour complaints. The facility has received significant improvements over the past several years, including the addition of a leachate/septic receiving facility during 2005. Also, during this upgrade, the headworks was upgraded with the addition of a fine screen and auger system, the mechanical aeration was replaced with fine air diffusers/blowers, and the chlorine disinfection system was replaced with a UV disinfection system. Past upgrades include the Bighead Pumping station (#1) replacement in 1991, the #3 Station (highway 26 West) was replaced in 1994, and in 1996 the additional biosolids storage facility was completed. In 2014, the existing generator at the main plant was replaced with a new 120kW generator.

- Capacity: 3,910 m³/day
- Classification: Class 3 Wastewater Collection, Class 2 Wastewater Plant
- Service Area: Municipality of Meaford
- Service Population: 4,749
- In Service Date: 1970
- Effluent Receiver: Georgian Bay
- Major Plant Processes: High-Rate Process with Continuous Effluent Discharge
Continuous Ultraviolet Disinfection (new in 2005)
No Phosphorus Removal
Aerobic Digestion with agricultural land disposal of biosolids

Sampling Procedures

Table 2: Raw Sewage Monitoring

Parameters	Sample Type	Frequency
CBOD5	Composite	Monthly
Total Suspended Solids	Composite	Monthly
Total Phosphorus	Composite	Monthly
Total Kjeldahl Nitrogen	Composite	Monthly
Ammonia Nitrogen	Composite	Monthly
Nitrite + Nitrate Nitrogen	Composite	Monthly
Alkalinity, pH	Composite	Monthly

Table 3: Effluent Monitoring

Parameters	Sample Type	Frequency
CBOD5	Composite	Weekly
Total Suspended Solids	Composite	Weekly
Total Phosphorus	Composite	Weekly
Total Kjeldahl Nitrogen	Composite	Weekly
Ammonia Nitrogen	Composite	Weekly
Nitrite + Nitrate Nitrogen	Composite	Weekly
pH	Grab	Weekly
Escherchia Coli	Grab	Weekly
Temperature	Grab	Weekly

Aerobic sludge is collected and tested as per the sampling requirements found in Schedule D in ECA #9036-AZFPV6

All chemical and bacteriological sample analyses are conducted by an accredited lab, SGS Lakefield Research Ltd.

Flows

The total flow treated in 2024 was 735,496 m³, which is down 87,955 m³ from 2023, which is relatively consistent flows for the last two years. The 2024 annual average daily flow was 2,014 m³ per day, operating at approximately 52% of the design capacity. The Maximum peak daily flow of 165 L/s occurred in December 2024 which was caused by heavy rain and some snow melt.

Table 4: 2023 and 2024 Daily Flow Data

	Average Day 2023 m ³	Average Day 2024 m ³	Peak Day 2023 L/s	Peak Day 2024 L/s	Total Month 2023 m ³	Total Month 2024 m ³
January	3,061	2,445	150	102	94,883	75,793
February	2,735	2,343	131	112	76,585	67,943
March	2,952	2,117	76	130	91,518	65,642
April	3,235	3,079	165	136	97,055	92,370
May	2,348	2,001	115	154	72,796	62,023
June	1,506	1,554	111	126	45,181	46,628
July	1,563	1,727	96	134	48,462	53,542
August	1,755	1,578	132	124	54,390	48,933
September	1,540	1,478	102	98	46,190	44,343
October	2,123	1,422	119	109	65,798	42,667
November	1,890	1,526	98	114	56,712	45,772
December	2,383	2,898	104	165	73,881	89,840
				Totals	823,451	735,496

Plant Performance & Effluent Quality

There were no operating problems encountered or corrective actions required at the Meaford Wastewater Treatment Plant.

Detailed (daily) analytical data is available at the Meaford WWTP administrative office. The annual and monthly averages and loadings are summarized below.

Although the Meaford WWTP is designed as a High Rate Activated Sludge Plant, it continues to perform well, being operated as an activated sludge plant. During 2024, all annual loading limits and monthly average concentration limits were met as per the Certificate of Approval.

All lab analysis for the Meaford WWTP were tested by an accredited lab, SGS Lakefield, and collected as per Guidelines set by the Ministry of Environment, Conservation and Parks.

Table 5: Treatment Efficiency and Loading Limits

	Annual Average Raw	Annual Average Effluent	Annual Average Loading Limits	Efficiency %
CBOD	91.08	4.58	9.20	95.0
T.S.S	60.50	8.22	16.52	86.4
Total Phosphorus	2.57	2.05	4.11	20.4
Ammonia Nitrogen	22.83	0.90		96.1
Loading Limits	CBOD Annual Avg. (Limit 78.2kg/d)	TSS Annual Avg. (Limit 78.2kg/d)	Phosphorus Annual Avg. (Limit 15.6kg/d)	Total Ammonia Nitrogen
January	9.779	15.646	3.085	0.440
February	8.199	11.713	2.776	0.527
March	8.469	11.116	1.858	0.423
April	14.162	25.861	2.488	0.862
May	8.002	18.505	3.471	1.200
June	6.605	8.548	4.530	1.476
July	6.908	14.507	5.060	2.280
August	11.443	15.389	4.005	0.552
September	7.020	22.169	3.976	4.212
October	5.780	20.918	4.305	3.661
November	7.246	9.916	4.615	0.824
December	12.171	11.591	4.196	1.565

The maximum final effluent E-coli monthly geometric mean density was 21.9 per 100ml.

Effluent Objectives and Limits

The effluent from the facility did not meet the monthly Total Phosphorus objective for June, July, August, September, October and November 2024 due to the fact there is no phosphorus removal in the plant. The TSS objectives were over in September and October due to clarifier operational issues caused by heat and low flows.

By-passing, Overflow and Abnormal Conditions

There were no bypass events at the Meaford WWTP during 2024.

There was no instance of overflow conditions during 2024 at the WWTP, summarized in table below.

EVENT # (YYYY-##)	LOCATION	RECEIVING WATER	VOLUME (m3)	APPROX. START	APPROX. END	DURATION (HRS)

Maintenance and Calibration Activities

Plant maintenance, including non-scheduled maintenance is monitored using a manual

workorder system. Completed maintenance reports are available onsite. All routine and preventative maintenance was conducted as scheduled in 2024. All three (3) standby generators were tested monthly.

Several repairs or improvements to equipment on the works were made or identified in 2024 as follows:

Plant

Return Sludge Chamber concrete work and new Sluice Valves (x2) Installed.
 Rebuilt Septage Pump Installed.
 Aeration Tank #2 Sand and Grit Cleaned Out.

Pumping Stations

SPS #5 New Pumps (x2), Piping and Control Panel Installed.
 SPS #2 New Sluice Gate Valves Installed in Wet Well (x3)
 SPS #3 3hp Pump Rebuilt

Septage Receiving Works

The Meaford WWTP continued to only accept septage from within its Municipal Boundaries as previously agreed by council. In 2024, the Meaford WWTP treated approximately 30,855 gallons (116.8m3) of septage/holding tank waste.

Table 6: Septage

Month	Portables Loads	Portables Gallons	Holding Tank Loads	Holding Tank Gallons	Septic Loads	Septic Gallons	Total Gallons
January	6	705			4	4200	4905
February	Pump out	for repair					0
March	Pump out	for repair					0
April	Pump out	for repair					0
May	Pump out	for repair					0
June	Pump out	for repair					0
July	Pump out	for repair					0
August	Pump out	for repair					0
September	Pump out	for repair					0
October	Pump out	for repair					0
November	27	5,570			2	1200	6,770
December	16	3,280	2	4,800	7	11,100	19,180
					Overall	Total	30,855

Biosolids Facility

Digested sludge produced at the Meaford WWTP was land-applied in accordance with the Nutrient Management Act 2002 and Ontario Regulation 267/03.

Grab samples of digested (aerobic) sludge are collected as the sludge truck is being filled. In

2024 sludge sample analyses was carried out by SGS Lakefield Research Limited.

Region of Huronia Environmental Services Ltd (ROHES) was contracted to haul and spread sludge from the Meaford plant in 2024.

A total Volume of 2,286 m³ of sludge went into the Region of Huronia Environmental Services Ltd lagoon. Estimated allowable hauled sludge amounts have been estimated at approximately 2,600 m³ annually.

The plant is achieving greater storage capacity than the 6-month storage capacity that is presently required by the Ministry of Environment, Conservation and Parks.

Monthly Haulage volumes from the plant were as follows:

Month	Cubic Metres	Month	Cubic Metres
January	0	July	1264
February	0	August	0
March	0	September	0
April	0	October	0
May	0	November	1022
June	0	December	0

Inspections

There were no regulatory inspections during the 2024 review period.

Alarm Response

The Environmental Services staff responded without interruption or loss of service to all plant and pumping station alarms.

Complaint Summary

There were no complaints received during this reporting period with regard to the Meaford WWTP.

Operational Objectives

The Meaford Water Pollution Control Plant continues to provide excellent wastewater treatment. Meaford and its operators will continue to strive through expertise and knowledge to meet all objectives and to continually improve and optimize the efficiency of the facility.

Discussion

The following are tables summarizing the results received for the period of January 2024 to December 2024 for the following parameters, with the maximum concentrations of the effluent parameters as outlined in the Terms and Conditions for ECA 9036-AZFPV6.

2024 Sewage Lab Results Monthly Averages

Month	Raw	Parameters	Effluent Sample Sets					Monthly Average Concentration	Monthly Average Concentration Objective	Monthly Average Concentration Limits	MIN	MAX	Monthly Geometric Mean
			1	2	3	4	5						
January	37	CBOD5	4	4	4	4	4	4.0	15.0	20.0mg/l	4	4	
	41	T.S.S	5	8	4	7	8	6.4	15.0	20mg/l	4	8	
	0.22	Total Phosphorus	1.11	1.55	1.28	1.67	0.7	1.26	2.0	4mg/l	0.7	1.67	
	13	T.A.N-Freezing	0.2	0.1	0.1	0.3	0.2	0.2	3.0	Freezing Period- 5mg/l	0.1	0.3	
		E-Coli	58	10	28	22	14	26.4	N/A	200 cfu/100mL	10	58	21.9
	19.7	TKN	0.8	1.6	0.6	0.5	1.1	0.9			0.5	1.6	
	7.88	pH	7.38	7.56	7.38	7.49	7.45	7.5	pH maintained between 6-9.5		7.38	7.56	
February	45	CBOD5	4	4	2	4		3.5	15.0	20.0mg/l	2	4	
	32	T.S.S	7	4	4	5		5.0	15.0	20mg/l	4	7	
	1.47	Total Phosphorus	0.94	1.11	1.65	1.04		1.19	2.0	4mg/l	0.94	1.65	
	12.2	T.A.N- NON-Freezing	0.2	0.2	0.3	0.2		0.2	3.0	Freezing Period- 5	0.2	0.3	
		E-Coli	32	4	58	6		25.0	N/A	200 cfu/100mL	4	58	14.5
	19.2	TKN	1.1	0.7	1.2	1.5		1.1			0.7	1.5	
	7.81	pH	7.43	7.34	8.02	7.85		7.7	pH maintained between 6-9.5		7.34	8.02	
March	44	CBOD5	4	4	4	4		4.0	15.0	20.0mg/l	4	4	
	31	T.S.S	4	7	4	6		5.3	15.0	20mg/l	4	7	
	1.44	Total Phosphorus	1.05	1.25	0.56	0.65		0.88	2.0	4mg/l	0.56	1.25	
	13.2	T.A.N-NON-Freezing	0.2	0.1	0.2	0.3		0.2	3.0	Freezing Period- 5	0.1	0.3	
		E-Coli	2	4	6	2		3.5	N/A	200 cfu/100mL	2	6	3.1
	17.1	TKN	0.5	1	1.9	1		1.1			0.5	1.9	
	7.63	pH	7.48	7.35	7.55	7.29		7.4	pH maintained between 6-9.5		7.29	7.55	

2024 Sewage Lab Results Monthly Averages

Month	Raw	Parameters	Effluent Sample Sets					Monthly Average Concentration	Monthly Average Concentration Objective	Monthly Average Concentration Limits	MIN	MAX	Monthly Geometric Mean
			1	2	3	4	5						
April	41	CBOD5	6	5	4	4	4	4.6	15.0	20.0mg/l	4	6	
	116	T.S.S	16	7	9	4	6	8.4	15.0	20mg/l	4	16	
	2.49	Total Phosphorus	1.1	0.74	0.53	0.43	1.24	0.81	2.0	4mg/l	0.43	1.24	
	19.1	T.A.N-Freezing	0.4	0.1	0.4	0.2	0.3	0.3	3.0	Freezing Period- 5mg/l	0.1	0.4	
		E-Coli	2	2	10	2	48	12.8	N/A	200 cfu/100mL	2	48	5.2
	24.2	TKN	0.6	1.7	1.3	0.8	0.7	1.0			0.6	1.7	
	7.63	pH	7.35	7.67	8.14	7.64	7.43	7.6	pH maintained between 6-9.5		7.35	8.14	
May	75	CBOD5	4	4	4	4		4.0	15.0	20.0mg/l	4	4	
	28	T.S.S	9	6	15	7		9.3	15.0	20mg/l	6	15	
	1.58	Total Phosphorus	1.11	1.59	1.89	2.35		1.74	2.0	4mg/l	1.11	2.35	
	14.1	T.A.N- NON-Freezing	0.3	0.4	1.3	0.4		0.6	3.0	Non-Freezing Period- 3	0.3	1.3	
		E-Coli	2	2	2	70		19.0	N/A	200 cfu/100mL	2	70	4.9
	16.3	TKN	0.5	1.4	3	0.8		1.4			0.5	3	
	7.85	pH	7.55	7.48	7.29	7.29		7.4	pH maintained between 6-9.5		7.29	7.55	
June	118	CBOD5	5	4	4	4		4.3	15.0	20.0mg/l	4	5	
	48	T.S.S	6	3	7	6		5.5	15.0	20mg/l	3	7	
	2.9	Total Phosphorus	2.51	3.29	3.52	2.34		2.92	2.0	4mg/l	2.34	3.52	
	25.9	T.A.N-NON-Freezing	1.1	1	1.1	0.6		1.0	3.0	Non-Freezing Period- 3	0.6	1.1	
		E-Coli	2	2	2	2		2.0	N/A	200 cfu/100mL	2	2	2.0
	29.8	TKN	2	2.1	2	0.5		1.7			0.5	2.1	
	7.69	pH	7.33	7.23	7.26	7.28		7.3	pH maintained between 6-9.5		7.23	7.33	

2024 Sewage Lab Results Monthly Averages

Month	Raw	Parameters	Effluent Sample Sets						Monthly Average Concentration	Monthly Average Concentration Objective	Monthly Average Concentration Limits	MIN	MAX	Monthly Geometric Mean
			1	2	3	4	5	6						
July	132	CBOD5	4	4	4	4	4	4.0	15.0	20.0mg/l	4	4		
	75	T.S.S	12	12	2	7	9	8.4	15.0	20mg/l	2	12		
	3.56	Total Phosphorus	3.21	3.18	2.44	2.6	3.22	2.93	2.0	4mg/l	2.44	3.22		
	29.8	T.A.N-NON-Freezing	2.3	3.6	0.3	0.2	0.2	1.32	3.0	Non-Freezing Period- 3mg/l	0.2	3.6		
		E-Coli	2	2	2	2	2	2.0	N/A	200 cfu/100mL	2	2	2.0	
	33.3	TKN	2.4	5.9	1.9	0.5	1.9	2.52			0.5	5.9		
	7.4	pH	7.2	7.87	7.32	7.31	7.25	7.4	pH maintained between 6-9.5		7.2	7.87		
August	112	CBOD5	14	4	5	6		7.3	15.0	20.0mg/l	4	14		
	49	T.S.S	7	10	7	15		9.8	15.0	20mg/l	7	15		
	2.86	Total Phosphorus	2.53	2.64	2	2.98		2.54	2.0	4mg/l	2	2.98		
	29.2	T.A.N- NON-Freezing	0.2	0.2	0.7	0.3		0.35	3.0	Non-Freezing Period- 3 mg/l	0.2	0.7		
		E-Coli	2	2	16	16		9.0	N/A	200 cfu/100mL	2	16	5.7	
	30.6	TKN	0.5	2	2.2	1.8		1.63			0.5	2.2		
	7.43	pH	7.42	7.54	7.74	7.92		7.7	pH maintained between 6-9.5		7.42	7.92		
September	132	CBOD5	4	4	6	5		4.8	15.0	20.0mg/l	4	6		
	78	T.S.S	19	13	14	14		15.0	15.0	20mg/l	13	19		
	4.5	Total Phosphorus	2.8	2.6	2.19	3.17		2.69	2.0	4mg/l	2.19	3.17		
	34.2	T.A.N-NON-Freezing	0.4	0.2	9.7	1.1		2.85	3.0	Non-Freezing Period- 3 mg/l	0.2	9.7		
		E-Coli	16	2	2	54		18.5	N/A	200 cfu/100mL	2	54	7.7	
	41.4	TKN	1.7	0.5	9.7	1.1		3.25			0.5	9.7		
	7.55	pH	7.17	7.91	7.23	7.05		7.3	pH maintained between 6-9.5		7.05	7.91		

September's 3rd Set of Samples, high T.A.N. due to only running on 1 Aeration Tank, other one was undergoing maintenance and parts replaced

2024 Sewage Lab Results Monthly Averages

Month	Raw	Parameters	Effluent Sample Sets						Monthly Average Concentration	Monthly Average Concentration Objective	Monthly Average Concentration Limits	MIN	MAX	Monthly Geometric Mean
			1	2	3	4	5	6						
October	147	CBOD5	5	8	6	5	4	5.6	15.0	20.0mg/l	4	8		
	62	T.S.S	12	24	9	18	13	15.2	15.0	20mg/l	9	24		
	4.31	Total Phosphorus	3.07	2.89	2.78	3.66	3.24	3.13	2.0	4mg/l	2.78	3.66		
	37.6	T.A.N-NON-Freezing	1.2	2.9	5.1	3.1	1	2.66	3.0	Freezing Period-5mg/l	1	5.1		
		E-Coli	2	22	80	2	70	35.2	N/A	200 cfu/100mL	2	80	13.8	
	37.4	TKN	1.7	3.6	6.3	4.8	2.3	3.74			1.7	6.3		
	7.48	pH	7.1	7.22	6.97	7.17	7.03	7.1	pH maintained between 6-9.5		6.97	7.22		
November	129	CBOD5	5	4	6	4		4.8	15.0	20.0mg/l	4	6		
	62	T.S.S	7	7	5	7		6.5	15.0	20mg/l	5	7		
	3.64	Total Phosphorus	3.78	2.92	3.38	2.02		3.03	2.0	4mg/l	2.02	3.78		
	31.1	T.A.N- NON-Freezing	1.3	0.3	0.6	0.3		0.63	3.0	Freezing Period-5mg/l	0.3	1.3		
		E-Coli	2	40	2	4		12.0	N/A	200 cfu/100mL	2	40	5.0	
	36.4	TKN	2	1	1.9	2.7		1.90			1	2.7		
	7.65	pH	7.6	7.17	7.84	7.24		7.5	pH maintained between 6-9.5		7.17	7.84		
December	81	CBOD5	5	4	4	4	4	4.2	15.0	20.0mg/l	4	5		
	104	T.S.S	5	7	3	2	3	4.0	15.0	20mg/l	2	7		
	1.8	Total Phosphorus	2.38	1.59	1.58	0.86	0.83	1.45	2.0	4mg/l	0.83	2.38		
	14.6	T.A.N-NON-Freezing	0.3	0.6	0.6	0.6	0.6	0.54	3.0	Freezing Period-5mg/l	0.3	0.6		
		E-Coli	2	30	4	23	22	16.2	N/A	200 cfu/100mL	2	30	10.4	
	17.5	TKN	1.7	1.2	1.4	1.7	1.2	1.44			1.2	1.7		
	7.28	pH	7.04	7.29	7.37	8.01	7.66	7.5	pH maintained between 6-9.5		7.04	8.01		