2024 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT

Drumbo Wastewater Treatment Plant

1. GENERAL INFORMATION

Oxford County (the County) prepares a report summarizing wastewater treatment operation and treated effluent discharge quality for every municipal wastewater treatment plant (WWTP) annually. The reports detail the latest effluent quality testing results and quantity statistics, and any non-compliance conditions that may have occurred for the previous year. They are available for review by the end of March on the County website at http://www.oxfordcounty.ca/waterwastewater or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible.

If you have any questions or comments concerning the report, please contact the County at the address and phone number listed below or by email at wastewater@oxfordcounty.ca.

Wastewater Treatment Plant:	Drumbo WWTP
Wastewater Treatment Plant Number:	120002479
Environmental Compliance Approval (ECA):	7607-BYQRYA (April 29, 2021)
Reporting Period:	January 1, 2024 – December 31, 2024

Wastewater Treatment Plant Owner & Contact Information:

Oxford County Public Works Department - Wastewater Services
P.O. Box 1614
21 Reeve Street
Woodstock, ON N4S 7Y3
Telephone: 519-539-9800
Toll Free: 866-537-7778
Email: wastewater@oxfordcounty.ca

1.1 System Description

In 2019, a Schedule 'C' Class Environmental Assessment was completed which recommended increasing the Drumbo WWTP capacity from 300 m^3/day to 450 m^3/day by upgrading the existing Sequential Batch Reactor (SBR) plant to a Membrane Bioreactor (MBR) plant. Substantial completion of the expansion project was achieved in June 2024.

The Drumbo MBR WWTP is a Class II rated treatment facility as defined by Ontario Regulation (O. Reg.) 129/04, servicing the Village of Drumbo. The separate wastewater collection system includes three (3) sewage pumping stations (SPS), 6.9 kilometers of sanitary gravity sewers, and 2.7 kilometers of sanitary forcemain sewers.

The Drumbo WWTP consists of headworks, aeration reactors, two MBR trains and ultra-violet light for disinfection. A forcemain conveys treated effluent to an outfall pipe within a wetland area which discharges to the Cowan Drain. The County operates the Drumbo WWTP, utilizing the staff located at the Woodstock WWTP. Biosolids are temporarily stored at the Drumbo WWTP and routinely transported to the Woodstock or Ingersoll WWTP for digestion.

A standby generator is available to run the onsite Water Treatment Facility and the Drumbo WWTP in the event of a power failure. The wastewater system is maintained by licensed wastewater treatment system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance with the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The Drumbo WWTP is located at 93 Peterson Street, Drumbo, Ontario, with the Facility description provided below.

Facility	Drumbo WWTP
Design Capacity	450 m^3/d
2024 Average Daily Flow	265 m^3/d
2024 Maximum Daily Flow	784 m^3/d
2024 Total Volume of Wastewater	97,159 m^3/year

1.2 Major Expenses

In 2024, the Drumbo WWTP had forecasted operating and maintenance expenditures of approximately $353,000.

Planning for major wastewater system expenses is included within Oxford County's Wastewater Services Master Plan and managed according to our Asset Management and Capital Replacement Program. In addition to regular operational and maintenance expenditures, notable Capital Improvement Projects for the Village of Drumbo were forecasted at $1,229,000 which included improvements to the wastewater collection system and the Drumbo WWTP.

Notable Drumbo Capital Improvement Projects included:

- $1,029,000 for the Phase 1 expansion of the Drumbo WWTP; and
- $200,000 for the Phase 2 expansion of the Drumbo WWTP Class EA Study and Assimilative Capacity Study.

Capital Improvement Projects for all systems included:

- $427,000 to develop Countywide SCADA Master Plan for all wastewater systems.

2. SUMMARY AND INTERPRETATION OF MONITORING DATA

2.1 Effluent Quality Assurance and Control Measures

Sampling Procedure

Influent samples are taken using a 24-hour composite sampler on a monthly basis from the transfer tank. This tank receives flow from the trash tank, which has been screened in the upstream headworks area.

Effluent samples are taken weekly using a 24-hour composite sampler programmed to sample several times each hour, following MBR treatment and disinfection. Samples are taken on site and tested for pH, dissolved oxygen (DO), and temperature.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are collected and analyzed in the field.

2.2 WWTP Performance and Effluent Quality

Final Effluent Compliance Limits

Compliance limits are defined as the maximum effluent concentrations permitted for a given parameter set by the Ministry of Environment, Conservation and Parks (MECP). Compliance limits are detailed within each WWTP ECA. The limits are determined to prevent impairment to the receiving water body quality. The Owner is legally obligated to operate and maintain the treatment system to ensure the compliance limits are achieved.

In 2024, the Drumbo WWTP provided effective treatment with 610 samples out of 631 meeting compliance, or 97% compliance to its regulatory limits for all effluent discharged from the WWTP.

In January, portions of the WWTP were under construction and the new MBR plant was being brought online, which resulted in a non-compliance related to effluent Total Ammonia Nitrogen (TAN):

- The Total Ammonia Nitrogen Monthly Average Daily Effluent Loading Concentration was 1.78 kg/d, which was above the ECA Total Ammonia Nitrogen Monthly Average Daily Effluent Loading Concentration Limit of 1.36 kg/d
- The Total Ammonia Nitrogen Monthly Average Effluent Concentration was 4.80 mg/L, which was above the ECA Total Ammonia Nitrogen Monthly Average Concentration of 4.5 mg/L

One of the treatment trains was offline, which impacted the Operator’s ability to maintain an adequate biomass concentration and sludge retention time, which led to increased effluent TAN concentrations. To respond, additional staff time was dedicated to the plant to monitor/adjust

biomass concentrations, perform microscopic analysis of the biomass and communicate conditions and recovery status to the Project Design Engineers.

During the months of February and March, portions of the WWTP were under construction and the new MBR plant was being brought online, which resulted in several non-compliances related to effluent Dissolved Oxygen (DO):

- The Single Sample Result Dissolved Oxygen Concentration Limit minimum of 5 mg/L was not met on:
    - February 7, 2024, with a result of 3.2 mg/L
    - February 14, 2024, with a result of 3.6 mg/L
    - February 21, 2024, with a result of 2.1 mg/L
    - February 28, 2024, with a result of 2.0 mg/L
    - March 6, 2024, with a result of 2.3 mg/L
    - March 13, 2024, with a result of 2.1 mg/L
    - March 20, 2024, with a result of 2.3 mg/L

One of the two aeration tanks was under construction, which limited the amount of air and dissolved oxygen being added into the system. To respond, operations provided regular updates of plant conditions to the Project Design Engineers.

In October, a non-compliance occurred related to effluent Dissolved Oxygen (DO):

- The Single Sample Result Dissolved Oxygen Concentration Limit minimum of 5 mg/L was not met on October 9, 2024, with result of 4.5 mg/L.

The WWTP had experienced several objective failures for DO since the MBR plant had reached substantial completion in June. The new fine bubble aeration diffusion system was operating at a higher-than-expected pressure, causing the aeration blowers to be operating in an overload condition. To resolve this, the blowers speed had to be reduced. This solution provided ample aeration DO but reduced the WWTP effluent DO concentration. The Project Design Engineers began actively sourcing additional technology to be installed that will increase the effluent DO concentration prior to discharge. Installation of an inline air sparger is underway and expected to be completed soon.

All non-compliances were reported to the MECP at the time of the event.

Influent Streams and Effluent Streams

On a weekly basis, as a minimum, the operator measures pH of both the influent and effluent streams.

There was no single pH result for the effluent outside the discharge limit of 6.0 - 9.5 in 2024.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix ‘A’.

Influent Wastewater Characteristics (annual average)		
Parameter	**Concentration (mg/L)**	**Loading (kg/d)**
BOD_5	275	73
Total Suspended Solids	227	60
Total Phosphorus	7	2
Total Kjeldahl Nitrogen	42	11

Effluent Parameter	**Sample Frequency**	**ECA Effluent Limit (Monthly Average)** (mg/L unless otherwise indicated)	**Monthly Average Result Min-Max** (mg/L unless otherwise indicated)	**Percentage Removal**
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	weekly	9.3*/6.2**	2.0 – 2.4	98.9 – 99.1
Total Suspended Solids (TSS)	weekly	9.3*/6.2**	2.0 – 3.4	98.5 – 99.1
Total Phosphorus (TP)	weekly	0.46*/0.30**	0.1 – 0.25	96.4 – 98.6
Total Ammonia Nitrogen (TAN) (May 1 to October 31)	weekly	2.7*/1.8**	0.1	--
Total Ammonia Nitrogen (TAN) (Nov. 1 to April 30)	weekly	4.5*/3.0**	0.1 – 4.8	--
E. coli	weekly	200 colonies/100 mL (monthly Geometric Mean Density)	1.5 – 2.4 colonies/100 mL (month Geometric Mean Density)	--
DO (any single sample)	weekly	5.0 or higher	2.0 – 9.0	--
pH (any single sample)	weekly	6.0 - 9.5	6.5 – 8.5	--
*ECA Effluent Limits used up to/including May 31/24, prior to completion of construction of all proposed works **ECA Effluent Limits used after May 31/24, upon completion of construction of all proposed works				

2.3 Final Effluent Design Objectives

Objectives are non-enforceable effluent quality values which the Owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives (summarized below) are to be used as a mechanism to trigger corrective action proactively, and voluntarily, before environmental impairment occurs and before the compliance limits are exceeded.

The following table presents the range of effluent discharge values vs. ECA Objectives:

Effluent Parameter	**Sample Frequency**	**Monthly Average Objective Concentration** (mg/L unless otherwise indicated)	**Monthly Average Result Min-Max** (mg/L unless otherwise indicated)
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	weekly	4.7	2.0 – 2.4
Total Suspended Solids (TSS)	weekly	4.7	2.0 – 3.4
Total Phosphorus (TP)	weekly	0.27	0.1 – 0.25
Total Ammonia Nitrogen (TAN) (May 1 to October 31)	weekly	1.8	0.1
Total Ammonia Nitrogen (TAN) (November 1 to April 30)	weekly	3.6	0.1 – 4.8
E. coli	weekly	150 colonies/100 mL (monthly Geometric Mean Density)	1.5 – 2.4 colonies/100 mL (month Geometric Mean Density)
DO (any single sample)	weekly	6 or higher	2.0 – 9.0
pH (any single sample)	weekly	6.5 - 8.5	6.5 – 8.0

The WWTP had difficulty meeting its final effluent objectives throughout the commissioning and finalization of construction. It is expected that with the installation of an inline air sparger in early 2025, the dissolved oxygen concentration in the effluent will consistently meet the objective concentration.

Exceedances of Monthly Average Objective Concentrations/Limits in 2024, are included the following table:

Month	**Parameter**	**Objective** (mg/L unless otherwise indicated)	**Monthly Average Result** (mg/L unless otherwise indicated)
January 2024	TAN	3.6	4.8
January 2024	FLOW	300 m^3/day	372 m^3/day
April 2024	FLOW	300 m^3/day	327 m^3/day
May 2024	FLOW	300 m^3/day	311 m^3/day

Failure to achieve the required Single Sample Objective Concentrations in 2024, are included in the following table:

Date	Parameter	Objective (mg/L unless otherwise indicated)	Result (mg/L unless otherwise indicated)
January 23, 2024	DO	6.0	5.7
February 5, 2024	DO	6.0	5.4
February 7, 2024	DO	6.0	3.2
February 14, 2024	DO	6.0	3.6
February 21, 2024	DO	6.0	2.1
February 28, 2024	DO	6.0	2.0
March 6, 2024	DO	6.0	2.3
March 13, 2024	DO	6.0	2.1
March 20, 2024	DO	6.0	2.3
April 4, 2024	DO	6.0	5.3
July 3, 2024	DO	6.0	5.3
July 9, 2024	DO	6.0	5.4
July 10, 2024	DO	6.0	5.3
July 18, 2024	DO	6.0	5.4
September 6, 2024	DO	6.0	5.8
September 11, 2024	DO	6.0	5.5
October 9, 2024	DO	6.0	4.5
October 15, 2024	DO	6.0	5.9

3. OVERFLOWS, BYPASSSING, UPSETS, SPILLS, AND ABNORMAL CONDITIONS

There were no overflow events at the Drumbo WWTP in 2024.

There were no complaints in 2024.

In 2024, work undertaken to eliminate Bypass/Overflow events (in conformance with MECP Procedure F-5-1, meant to ensure all wastewater receives at minimum secondary treatment or greater, as the normal standard of treatment) included the installation of a new check valve and pipe work at the Drumbo Main Sewage Pumping Station (SPS), reducing pump downtime. Additionally, a new duck bill check valve was installed at the SPS overflow point to significantly reduce the chance of water from the storm retention pond flowing back into the wastewater collections network.

The planned Phase 2 capacity expansion of the Drumbo WWTP, in combination with the implementation of a new Inflow & Infiltration (I&I) Reduction Program, will aim to reduce the chances of any overflow events.

4. MAINTENANCE OF WORKS

The operating and maintenance staff at the Drumbo WWTP conducts regularly scheduled maintenance of the plant equipment. The Drumbo WWTP utilizes a database system known as Cartegraph to issue work orders and maintain records for regular maintenance and repair at the Drumbo WWTP.

The Limited Operational Flexibility for modifications to the Drumbo WWTP was not used in 2024.

5. MONITORING EQUIPMENT MAINTENANCE AND CALIBRATION

The calibration of flow meters is conducted yearly by JBF Controls Ltd. in accordance with the requirements of the ECA. The records are kept on-site at the Drumbo WWTP.

All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Drumbo WWTP.

6. BIOSOLIDS PROGRAM

Co-thickened primary sludge and thickened waste activated sludge is transported from the Drumbo WWTP to the Woodstock or Ingersoll WWTP for further treatment.

Biosolids are anaerobically digested and dewatered at the Woodstock or Ingersoll WWTP using Alfa-Laval Centrifuges. The biosolids are then stored at the County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at: www.oxfordcounty.ca/services-for-you/water-wastewater/wastewater/reports-and-policies.

7. INSPECTION, PILOTS, AND TRIALS

The MECP did not conduct a facility inspection of the Drumbo WWTP in 2024. The MECP inspections typically occur on a three-year schedule.

Plant Expansion Phase 1 Completed

In 2021, construction began to expand the rated capacity of the Drumbo WWTP from 300 m^3/day to 450 m^3/day. The upgrade included headworks, Membrane Bioreactors (MBR), disinfection equipment, and new plant backup power supply. The construction was completed and reached substantial completion in June 2024. Plant effluent performance has been vastly improved, as well as increased resiliency to the impacts of climate change and inflow/infiltration within the collection network.

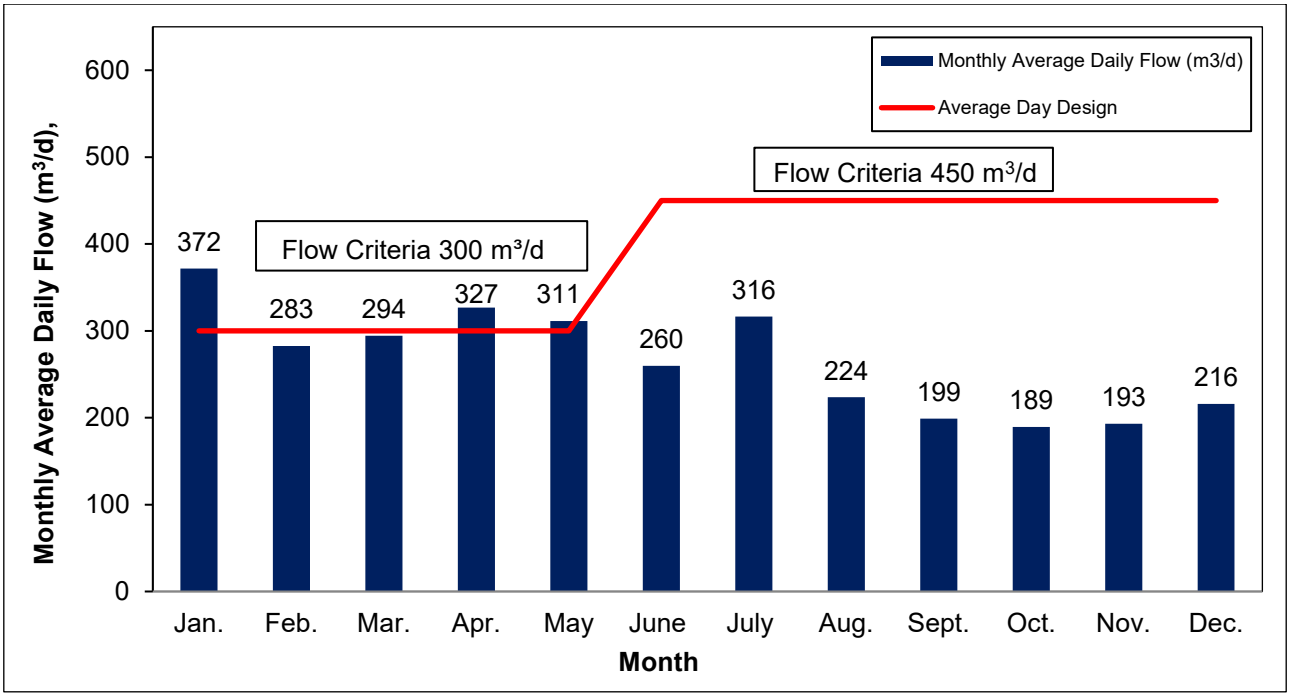
EA for Plant Expansion Phase 2 in Progress

In April 2024, a Municipal Class Environmental Assessment (EA) Study for the Drumbo WWTP Phase 2 Expansion commenced. The purpose of the study is to explore a wide range of

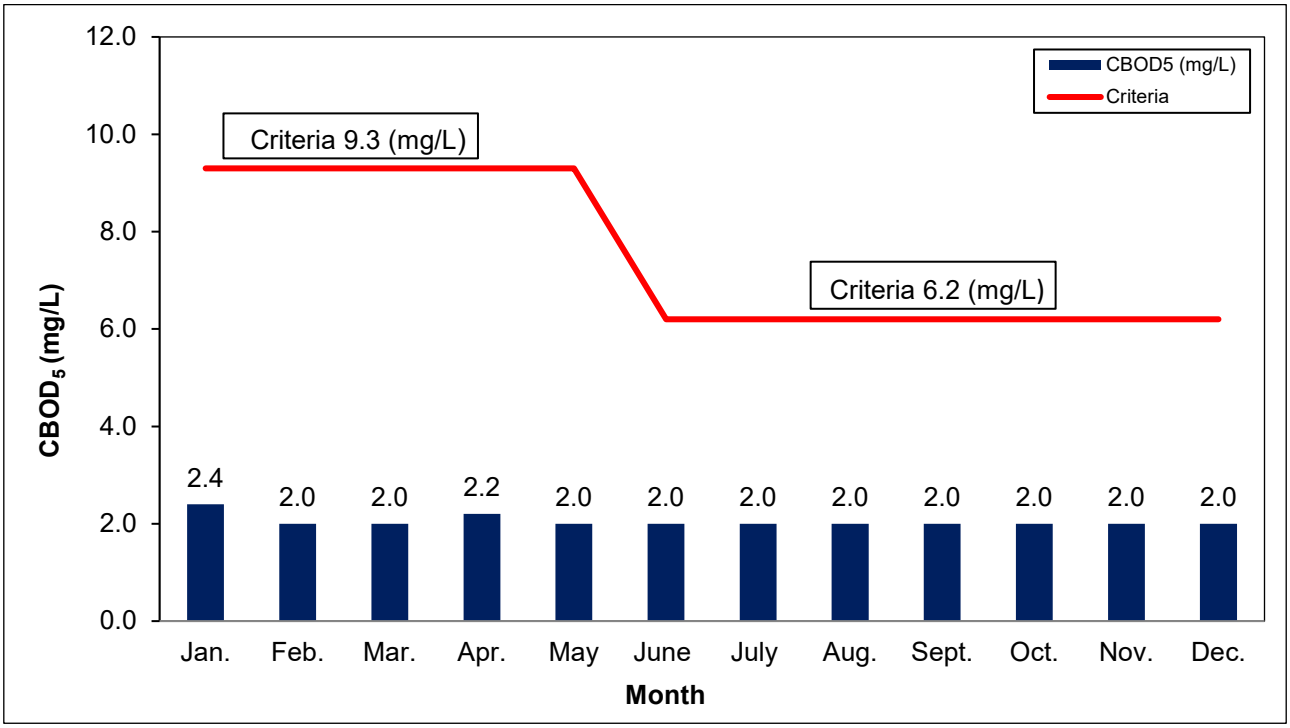
possibilities for expanding the Drumbo WWTP to increase capacity above 600 m^3 per day in order to determine the most appropriate solution that will support the growing wastewater servicing needs within the Village of Drumbo, in the Township of Blandford-Blenheim.

APPENDIX A: GRAPHS OF 2024 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS

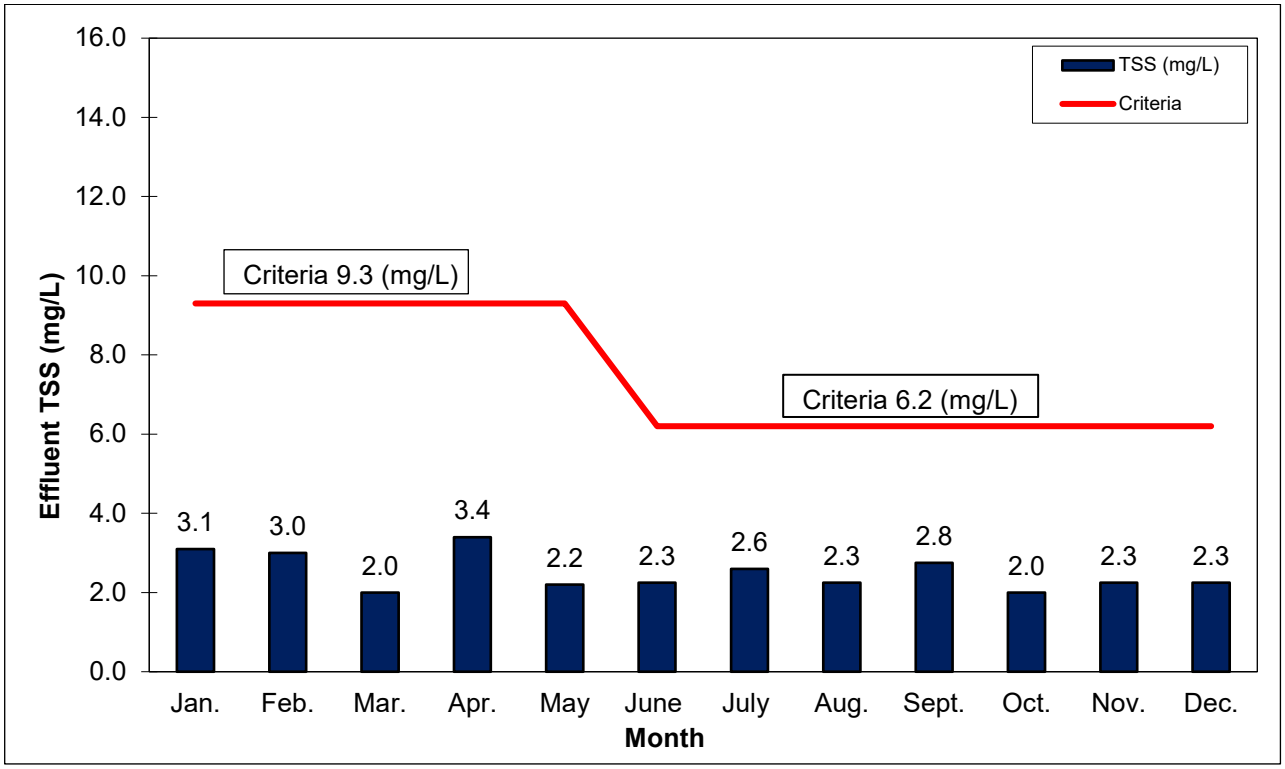
Drumbo WWTP Monthly Average Daily Flow in Cubic Meters per day, 2024



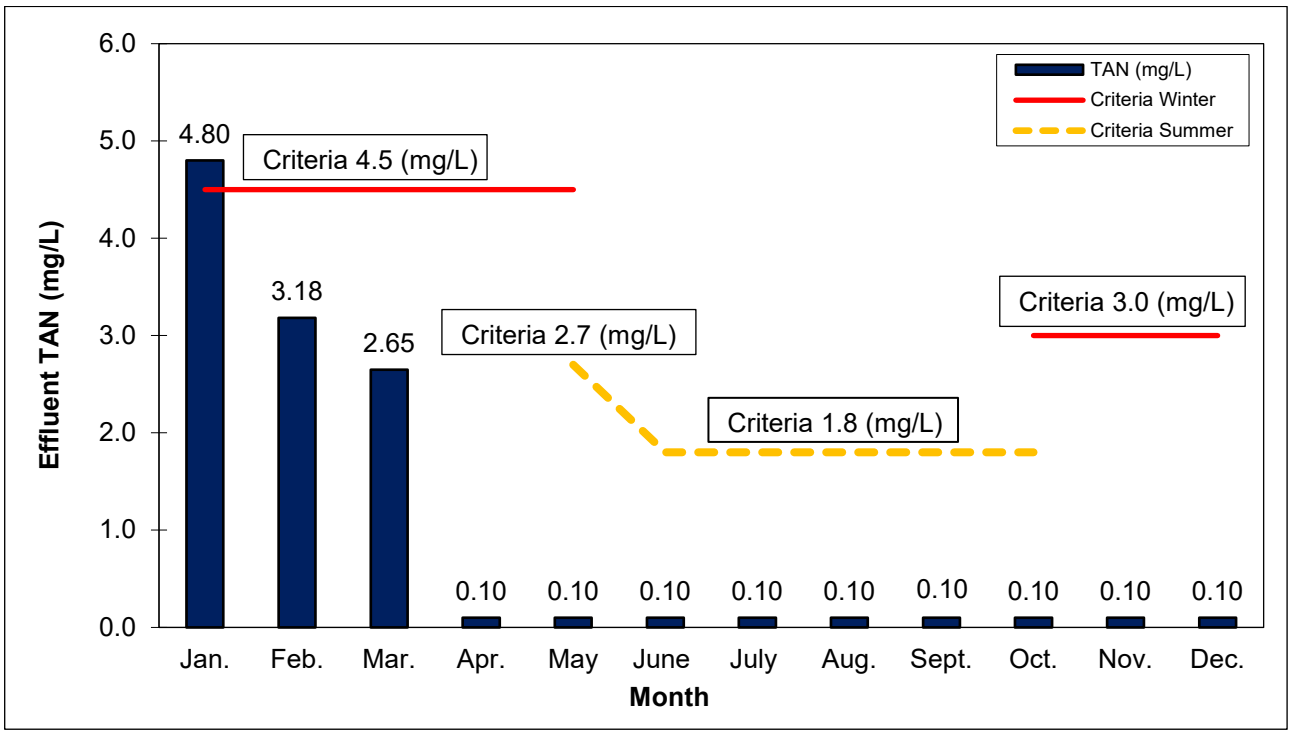
Drumbo WWTP Effluent, Monthly Average $CBOD_5$ (mg/L), 2024



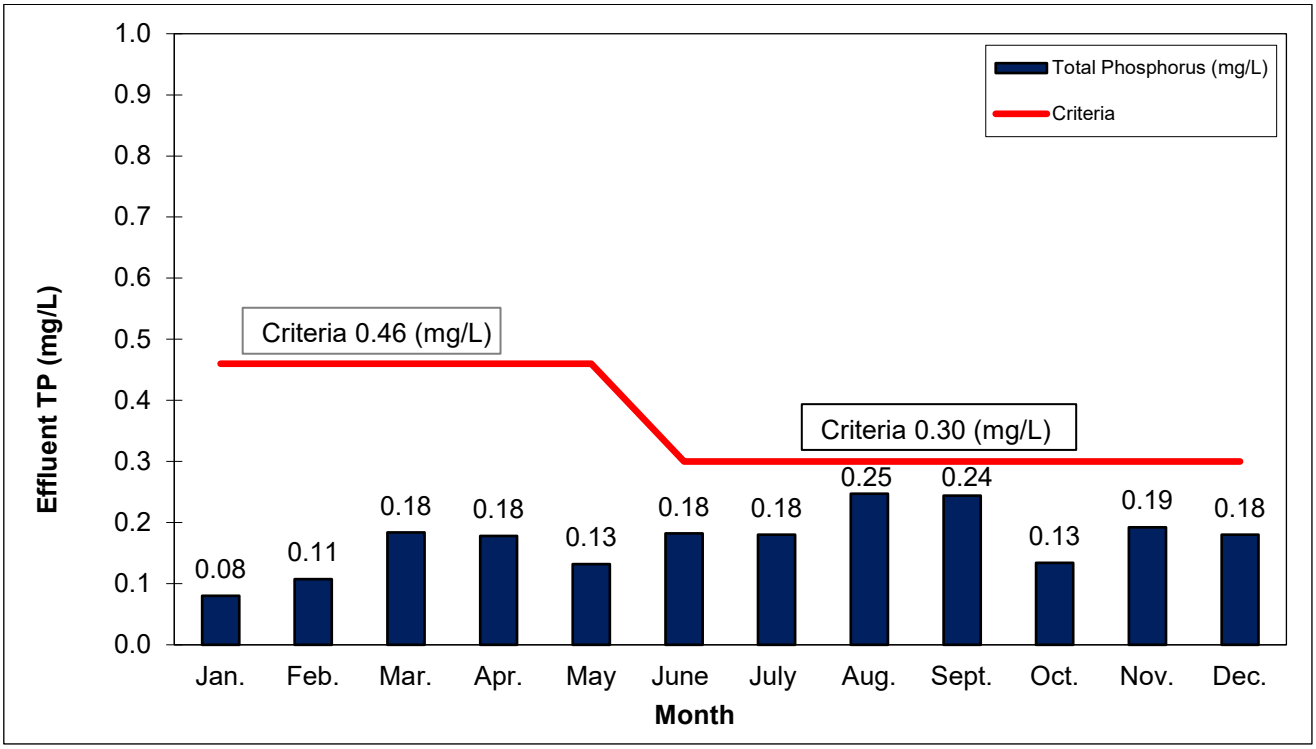
Drumbo WWTP Effluent, Monthly Average TSS (mg/L), 2024



Drumbo WWTP Effluent, Monthly Average TAN (mg/L), 2024



Drumbo WWTP Effluent, Monthly Average TP (mg/L), 2024



Drumbo WWTP Effluent, Monthly Geometric Mean Density E. coli (colonies/100 mL), 2024