



## **Mildmay Water Pollution Control Plant**

**#110002194**

**2022 Summary Report**

**February 15, 2023**

**Prepared by Veolia Water**

**For the Municipality of South Bruce**

### **Contents**

C of A (#2042-8KYJH3) Reporting Requirements

## **Plant Description**

The Mildmay Water Pollution Control Plant is an Extended Aeration plant with a rated capacity of 966 m<sup>3</sup>. The collection system consists of approximately 14 km of gravity sewers and 3 lift stations. The main lift station is located on the North side of Clarke St. just northeast of the intersection of Clarke and Elora Road. It is equipped with two (2) centrifugal vertical pumps, each having a capacity of 45.5L/s at 23 meters TDH; bypass fittings on the forcemain and provision for emergency overflow from the pumping station wet well to Otter Creek; equipped with one (1) diesel generator 100 kilowatt back up diesel. Sewage is pumped through a 200mm diameter forcemain from the sewage pumping station to the sewage treatment plant. This forcemain has three (3) air relief valve chambers.

### **Sewage Treatment Plant**

A circular extended aeration plant, with an overall diameter of 23.5 m, having annular process compartments;

### **Preliminary Treatment**

- Two (2) grit channels, each channel having dimensions of 7.6 m x 0.53 m;
- One (1) manually cleaned coarse bar screen.
- A 250 millimeter diameter bypass sewer between the exit of the grit channels and the chlorine contact chamber;

### **Secondary Treatment**

- One (1) 962 m<sup>3</sup> Aeration tank with two compartments, having a sidewater depth (SWD) of 4.0 m and equipped with coarse bubble diffusers;
- One (1) 13.5 m diameter secondary clarifier with a SWD of 3.0 m and equipped with side feed clarifier mechanism, scum baffle, removable mechanical scum skimmer and scum air lift;
- One (1) return/waste activated sludge pump rated at 22 L/s at 2.1 m TDH;

### **Phosphorus Removal**

- One (1) 27.3 m<sup>3</sup> chemical storage tank with an enclosure and containment tank; addition of phosphorus removal chemicals can be done at the headworks or at the entry of the aeration tank;

### **Back-up Chlorination System**

- One (1) 28 m<sup>3</sup> chlorine contact chamber with bypass and V-notch measuring weir;
- One (1) 45.4 kg/d gas chlorinator for effluent disinfection and if required, pre-chlorination of raw sewage;
- One (1) ultrasonic water level monitor in the chlorine contact chamber, connected to a level/flow integrator and flow recorder;
- One (1) controller taking a signal from the final effluent level/flow integrator to control a water supply flow to the chlorinator for the preparation of chlorine solution to be added to the chlorine contact chamber for disinfection of secondary treated effluent;

**Blower Room**

- Three (3) air blowers, each with a rated capacity of 12.2 m<sup>3</sup> /min. at 55.2 kPa. One (1) of the three blowers is equipped with a Variable Frequency Drive that allows Operators to adjust blower speeds based on Dissolved Oxygen levels for energy conservation and process improvement.

**Sludge Stabilization**

- One (1) two-stage aerobic digester having a volume of 97 m<sup>3</sup> in the first stage and 48 m<sup>3</sup> in the second stage. The digester is equipped with a coarse bubble diffuser system and a decanting facility;
- One (1) blower with a capacity of 20.1 m<sup>3</sup>/min. at 60 kPa provides aeration and mixing of the digester. This blower is equipped with a Variable Frequency Drive that allows Operators to adjust blower speeds based on tank level for energy conservation and process improvement.

**Sludge Storage**

- a 466 m<sup>3</sup> sludge holding tank equipped with one (1) submersible mixer, a diffused aeration system and decanting device;
- one (1) submersible sludge loading pump rated at 23 L/s at 15.4 m TDH;

**Standby Power**

- one (1) 100 kW diesel generator set and one (1) 908 L fuel tank;

**Scum Well**

- a scum well equipped with one (1) submersible pump rated at 3 L/s at a 5.2 m TDH;

**Brewery Waste Holding Tank**

- a brewery waste holding tank equipped with one (1) submersible pump rated at 3 L/s at a 5.2 m

**Outfall**

- one (1) 279 millimeter outside diameter polyethylene outfall sewer complete with outfall headwall, discharging to Otter Creek;

**Miscellaneous**


- all other controls, electrical equipment, instrumentation, piping, pumps, valves, heating and ventilation systems and appurtenances essential for the proper operation of the aforementioned *Works* ; all in accordance with the following submitted supporting documents:

### **Chlorination System**

- Existing chlorination system has been retained for pre-chlorination of raw sewage, if required,

### **UV Disinfection System**

- a 300 mm diameter pipe from the existing outlet box in the chlorine contact chamber to the outdoor UV disinfection channel;
- an outdoor 5.31 m x 0.6 m x 0.9 m depth concrete channel equipped with a UV disinfection unit with a *Peak Flow Rate* of 49.1 L/s, complete with level control weir;
- a 300 mm diameter outlet pipe from the UV disinfection channel to the existing outfall chamber.

|  | <b>Mildmay Wastewater Compliance Report 2022</b> |        |        |        |        |        |       |        |       |        | Facility Classification: Class 2 Waste Water Treatment<br>Total Design Capacity: 966 m3/day<br>Receiving Waters: Otter Creek |        |                |         |         |         |       |
|-----------------------------------------------------------------------------------|--------------------------------------------------|--------|--------|--------|--------|--------|-------|--------|-------|--------|------------------------------------------------------------------------------------------------------------------------------|--------|----------------|---------|---------|---------|-------|
|                                                                                   | Jan                                              | Feb    | Mar    | Apr    | May    | Jun    | Jul   | Aug    | Sep   | Oct    | Nov                                                                                                                          | Dec    | Total          | Minimum | Average | Maximum | Limit |
| <b>Flow</b>                                                                       |                                                  |        |        |        |        |        |       |        |       |        |                                                                                                                              |        |                |         |         |         |       |
| Influent Total Flow (m3/mth)                                                      | 11,075                                           | 13,088 | 19,309 | 16,111 | 12,274 | 11,404 | 9,629 | 10,205 | 9,895 | 10,576 | 10,152                                                                                                                       | 11,822 | 145,540        |         | 12,128  |         |       |
| Influent Average Day Flow (m3/d)                                                  | 357                                              | 467    | 623    | 537    | 396    | 380    | 311   | 329    | 330   | 341    | 338                                                                                                                          | 394    |                | 400     |         | 966     |       |
| Influent Max Day Flow (m3/d)                                                      | 504                                              | 932    | 911    | 763    | 537    | 548    | 420   | 487    | 517   | 403    | 509                                                                                                                          | 993    |                |         | 993     |         |       |
| <b>Biochemical O2 Demand</b>                                                      |                                                  |        |        |        |        |        |       |        |       |        |                                                                                                                              |        |                |         |         |         |       |
| Influent Average Raw CBOD (mg/L)                                                  | 184                                              | 186    | 108    | 64     | 133    | 98     | 188   | 159    | 404   | 170    | 274                                                                                                                          | 186    |                | 180     | 404     |         |       |
| Effluent Average CBOD (mg/L)                                                      | 3                                                | 3      | 2      | 2      | 2      | 2      | 2     | 2      | 2     | 2      | 3                                                                                                                            | 3      |                | 2       | 3       | 25      |       |
| Eff. CBOD Loading (kg/d)                                                          | 0.93                                             | 0.90   | 1.06   | 1.07   | 0.77   | 0.77   | 0.66  | 0.72   | 0.74  | 0.76   | 1.13                                                                                                                         | 1.06   |                | 0.9     |         |         |       |
| Percent Removal                                                                   | 98.6                                             | 98.7   | 98.1   | 96.9   | 98.5   | 98.0   | 98.9  | 98.7   | 99.5  | 98.8   | 98.9                                                                                                                         | 98.7   |                | 98.5 %  |         |         |       |
| <b>Suspended Solids</b>                                                           |                                                  |        |        |        |        |        |       |        |       |        |                                                                                                                              |        |                |         |         |         |       |
| Influent Average TSS (mg/L)                                                       | 247                                              | 246    | 91     | 109    | 195    | 70     | 67    | 224    | 262   | 310    | 244                                                                                                                          | 388    |                | 204     | 388     |         |       |
| Effluent Average TSS (mg/L)                                                       | 9                                                | 5      | 5      | 4      | 7      | 4      | 7     | 4      | 4     | 3      | 4                                                                                                                            | 5      |                | 5       | 13      | 25      |       |
| Eff. SS Loading (kg/d)                                                            | 3.22                                             | 1.76   | 2.66   | 2.06   | 2.68   | 1.34   | 2.13  | 1.29   | 1.29  | 1.17   | 1.32                                                                                                                         | 1.91   |                | 1.9     |         |         |       |
| Percent Removal                                                                   | 96.2                                             | 98.2   | 94.5   | 96.3   | 96.7   | 95.0   | 90.3  | 98.4   | 98.7  | 99.0   | 98.6                                                                                                                         | 98.8   |                | 96.7 %  |         |         |       |
| <b>Phosphorus</b>                                                                 |                                                  |        |        |        |        |        |       |        |       |        |                                                                                                                              |        |                |         |         |         |       |
| Influent Average TP (mg/L)                                                        | 3.81                                             | 4.73   | 2.83   | 2.80   | 4.15   | 1.94   | 4.44  | 4.88   | 4.48  | 6.02   | 4.84                                                                                                                         | 3.58   |                | 4.04    | 6.02    |         |       |
| Effluent Average TP (mg/L)                                                        | 0.36                                             | 0.16   | 0.16   | 0.21   | 0.31   | 0.31   | 0.43  | 0.37   | 0.45  | 0.38   | 0.41                                                                                                                         | 0.26   |                | 0.32    | 0.60    | 1       |       |
| Eff. Phosphorus Loading (kg/d)                                                    | 0.12                                             | 0.06   | 0.08   | 0.11   | 0.12   | 0.12   | 0.14  | 0.13   | 0.17  | 0.14   | 0.15                                                                                                                         | 0.11   |                | 0.1     |         |         |       |
| Percent Removal                                                                   | 90.6                                             | 96.6   | 94.5   | 92.7   | 92.5   | 84.3   | 90.3  | 92.3   | 90.0  | 93.8   | 91.6                                                                                                                         | 92.9   |                | 91.8 %  |         |         |       |
| <b>Nitrogen Series</b>                                                            |                                                  |        |        |        |        |        |       |        |       |        |                                                                                                                              |        |                |         |         |         |       |
| Influent Average TKN (mg/L)                                                       | 35.00                                            | 47.00  | 34.40  | 30.60  | 33.40  | 49.90  | 58.80 | 46.40  | 44.50 | 53.50  | 52.10                                                                                                                        | 40.30  |                | 43.83   |         |         |       |
| Effluent Average NH3+NH4 (mg/L)                                                   | 0.10                                             | 0.10   | 0.10   | 0.10   | 0.10   | 0.10   | 0.10  | 0.13   | 0.10  | 0.10   | 0.10                                                                                                                         | 0.10   |                | 0.10    | 0.20    | 8       |       |
| Effluent Average Nitrate (mg/L)                                                   | 24.03                                            | 20.10  | 14.70  | 9.55   | 17.20  | 26.10  | 20.90 | 17.43  | 18.30 | 17.65  | 22.95                                                                                                                        | 23.10  |                | 19.44   | 26.7    |         |       |
| Effluent Average Nitrite (mg/L)                                                   | 0.04                                             | 0.03   | 0.03   | 0.03   | 0.03   | 0.04   | 0.04  | 0.04   | 0.04  | 0.05   | 0.03                                                                                                                         | 0.03   |                | 0.04    | 0.07    |         |       |
| <b>pH</b>                                                                         |                                                  |        |        |        |        |        |       |        |       |        |                                                                                                                              |        |                |         |         |         |       |
| Influent Average pH                                                               | 7.34                                             | 7.96   | 7.67   | 7.66   | 7.73   | 7.44   | 7.81  | 7.47   | 7.87  | 7.55   | 7.49                                                                                                                         | 8.00   |                | 7.34    | 7.67    | 8.00    |       |
| Effluent Average pH                                                               | 6.93                                             | 6.92   | 7.00   | 7.03   | 7.07   | 7.12   | 7.17  | 7.26   | 7.27  | 7.23   | 7.22                                                                                                                         | 7.25   |                | 6.80    | 7.12    | 7.40    |       |
| <b>UV Disinfection</b>                                                            |                                                  |        |        |        |        |        |       |        |       |        |                                                                                                                              |        |                |         |         |         |       |
| Average UV Intensity                                                              | 3.52                                             | 3.72   | 4.14   | 4.66   | 5.55   | 5.42   | 6.12  | 6.43   | 6.20  | 4.49   | 3.75                                                                                                                         | 3.36   |                | 4.8     | 8.0     |         |       |
| <b>Disinfection</b>                                                               |                                                  |        |        |        |        |        |       |        |       |        |                                                                                                                              |        |                |         |         |         |       |
| E. Coli Geo. Mean per 100mL                                                       | 27                                               | 12     | 5      | 4      | 4      | 3      | 2     | 5      | 5     | 9      | 25                                                                                                                           | 31     | Geometric Mean | 7       | 11      | 31      | 200   |

Note: Acute Lethality Sample was collected June 13, 2022. The results came back non lethal.

## By-Passes

There were no by-passes in 2022.

**Table 2 BYPASS AND OVERFLOW SUMMARY FOR 2022**

| MONTH        | Primary Bypass         |                  |                 | Secondary Bypass       |                  |                 | Plant Overflows        |                  |                 | Collection System Overflows |                  |             |
|--------------|------------------------|------------------|-----------------|------------------------|------------------|-----------------|------------------------|------------------|-----------------|-----------------------------|------------------|-------------|
|              | No. of Events (events) | Duration (hours) | Volume (1000m3) | No. of Events (events) | Duration (hours) | Volume (1000m3) | No. of Events (events) | Duration (hours) | Volume (1000m3) | No. of Events (events)      | Duration (hours) | Volume (m3) |
| January      | 0                      |                  |                 | 0                      |                  |                 | 0                      |                  |                 | 0                           |                  |             |
| February     | 0                      |                  |                 | 0                      |                  |                 | 0                      |                  |                 | 0                           |                  |             |
| March        | 0                      |                  |                 | 0                      |                  |                 | 0                      |                  |                 | 0                           |                  |             |
| April        | 0                      |                  |                 | 0                      |                  |                 | 0                      |                  |                 | 0                           |                  |             |
| May          | 0                      |                  |                 | 0                      |                  |                 | 0                      |                  |                 | 0                           |                  |             |
| June         | 0                      |                  |                 | 0                      |                  |                 | 0                      |                  |                 | 0                           |                  |             |
| July         | 0                      |                  |                 | 0                      |                  |                 | 0                      |                  |                 | 0                           |                  |             |
| August       | 0                      |                  |                 | 0                      |                  |                 | 0                      |                  |                 | 0                           |                  |             |
| September    | 0                      |                  |                 | 0                      |                  |                 | 0                      |                  |                 | 0                           |                  |             |
| October      | 0                      |                  |                 | 0                      |                  |                 | 0                      |                  |                 | 0                           |                  |             |
| November     | 0                      |                  |                 | 0                      |                  |                 | 0                      |                  |                 | 0                           |                  |             |
| December     | 0                      |                  |                 | 0                      |                  |                 | 0                      |                  |                 | 0                           |                  |             |
| <b>TOTAL</b> | 0                      | 0                | 0               | 0                      | 0                | 0               | 0                      | 0                | 0               | 0                           | 0                | 0           |

Note: An 'Event' means an occurrence or occurrences of a bypass or overflow separated by a period of more than 12 hours between the occurrence(s) or the event(s) and the previous event, at each location.



## **Operating Problems**

- During 2022 there were no operational issues that significantly impacted the quality of effluent.
- There are significant differences between “dry period” flows and “wet period” flows. This is not unusual for older collection systems.

## **Major Maintenance**

In 2022 there were no Major Maintenance issues that had a significant impact on the quality of the Final Effluent. Additional maintenance other than routine maintenance included:

**January 26** - Replaced belts for Blower #2

**February 11** - Sensaphone Sentinel Monitoring Systems were installed at the small Lift Stations in Mildmay.

## **QA/QC Measures**

All required regulatory and C of A analyses were performed by E3 Lab Services. In addition, routine in house laboratory sampling was undertaken to ensure compliance and included, but was not limited to: 30 minute Settling, Suspended Solids, Final Effluent Total Phosphorus, pH, and temperature.

## **Effluent Monitoring Equipment**

The following is a list of the monitoring equipment at the Water Pollution Control Plant for the final effluent:

- Hach Pocket Colorimeter 2 Phosphate – Total Phosphorus
- Hach HQ 40d– pH, Dissolved Oxygen
- Endress Hauser- Dissolved Oxygen, pH, Temperature
- Hach Pocket colorimeter 2 – Total Cl<sub>2</sub> residual (for back-up in event of UV malfunction)
- Digital Scale for MLSS

## **Calibration and Service of Equipment**

- May 30, 2022 - Calibration of gas detectors by Hetek
- July 6, 2022 – Annual inspection of lifting equipment.
- May 18, 2022 - Calibration of flow monitoring equipment by SPD Sales Limited– Effluent
- November 16, 2022 - Calibration of gas detectors by Hetek

## **Effluent Objectives**

1. Dissolved Phosphorus tests were used to indicate the required Alum dosage.
2. pH measurements were taken to ensure levels were between 6.0 and 9.0 and water quality.
3. Dissolved oxygen was measured to ensure that adequate aeration is being carried out.
4. Mixed liquor suspended solids and 30 minute settling tests are used to determine adequate microbiological populations and to set the sludge wasting rates.

## **Bio Solids Volume**

The hauled Bio-Solids quantity in 2022 was approximately 1,050 m<sup>3</sup>. The volume of Biosolids hauled was up by 450 m<sup>3</sup> compared to the 2021 volume. Bio-Solids quantities are expected to be similar in 2023.

On May 17th, 540 m<sup>3</sup> of biosolids were hauled to the SDR 15 North Carrick - Field 2 Lot 16 Conc 10 (NASM #22300)

On October 24th, 510 m<sup>3</sup> of biosolids were hauled to the SDR 15 North Carrick - Field 1 Lot 16 Conc 10 (NASM #22300)

## **Customer Complaints**

No complaints were known to have been received.

## **Information for the District Manager**

No additional information was known to have been requested from the District Manager.

## **Recommendations**

1. Consider adding standby power to Vincent St. Lift Station.
2. Replacement of Effluent Water Pump
3. Long term replacement of Aeration tank Blowers

