

**PUBLIC UTILITIES COMMISSION
FOR THE MUNICIPALITY OF CHATHAM-KENT
TILBURY WATER POLLUTION CONTROL PLANT**

2019 PERFORMANCE REPORT

January 1 to December 31, 2019

Certificate of Approval # 6980-6BLJ9R

Plant Description

The Tilbury Wastewater Treatment Plant is located north of Highway 401 in the Town of Lakeshore and treats domestic and industrial wastewater generated by the Town of Tilbury. Wastewater is collected by 8 sanitary pump stations with the Lyon Street Pump Station supplying the facility. This mechanical treatment plant replaced the existing lagoon system. The final effluent is discharged into Tremblay Creek.

The Tilbury Wastewater Treatment Plant upgrade was completed in late December of 2004. The design capacity of the plant is 5,434m³/day with a Peak Flow Rate of 13,700m³/day.

A portion of the lagoon system was turned into a wildlife wetland.

The treatment system includes the following processes:

- Headworks building
- Orbal oxidation ditch
- Two secondary clarifiers
- Tertiary Treatment building
- Ultra Violet Light disinfection

REPORTING REQUIREMENTS UNDER CERTIFICATE OF APPROVAL #6980-6BLJ9R

Summary and Interpretation of Monitoring and Comparison to the Effluent Limits: Condition 10 (6) (a)

Tables 1 & 2 outline the monthly average results for parameters tested compared to the limits outlined in the Certificate of Approval Table 2 Effluent Limits.

Exceedances of the average monthly concentration effluent limit for Ammonia occurred in the months of May, June, and September.

Exceedances of the average daily effluent loading limit for Ammonia occurred in the months of May and June.

An exceedance of the average monthly concentration effluent limit for Total Suspended Solids occurred in the month of May.

An exceedance of the average monthly concentration effluent limit for Total Carbonaceous BOD occurred in the month of May.

Exceedances of the average monthly concentration effluent limit for Total Phosphorus occurred in the months of January, February, March, April, May, June, July, August, September, October, November, and December.

Exceedances of the average daily effluent loading limit for Total Phosphorus occurred in the months of August, September, October, and November.

The PUC has determined that the root cause is intermittent discharges of non-reactive

phosphorus from a local industry and is working closely with the industry to address the issue.

Success and Adequacy of the Works

During the reporting period, the annual average daily flow was 1,717 m³/day, which represents approximately 32% of the rated capacity of 5,434m³/day. The maximum daily flow was 8,443 m³/day, which is 62% of the Peak Flow Rate of 13,700 m³/day

Table 1: Summary of Monitoring Data and Comparison to Effluent Limits & Objectives – Concentrations as well as rated capacity to the sewage works

Plant rated capacity of 5,434m³/day

Total sewage flow to the works during a calendar year divided by the number of days during which sewage was flowing to the works that year

| Month | Total Monthly Flow m ³ | Avg Daily Flow /Month m ³ /day | Avg Daily Flow/ Year m ³ /day | % of Plant Capacity | CBOD ₅ mg/L | Total S.S. mg/L | Total Ammonia mg/L | Total P mg/L | pH Min | pH Max | E.Coli/100 mL CFU GeoMean |
|----------------------------|--|---|--|---------------------|------------------------|-----------------|--------------------|--------------|-----------|--------|---------------------------|
| Limits: May 1 – Oct 31 | None | None | 5,434 | 100 | 10 | 10 | 2.0 | 0.50 | 6.0 – 9.5 | | 150 |
| Limits: Nov 1 – Apr 31 | None | None | 5,434 | 100 | 10 | 10 | 4.0 | 0.50 | 6.0 – 9.5 | | 150 |
| Objectives: May 1 – Oct 31 | None | None | 5,434 | 100 | 5 | 5 | 1.0 | 0.30 | 6.0 – 9.5 | | 100 |
| Objectives: Nov 1 – Apr 31 | None | None | 5,434 | 100 | 5 | 5 | 2.0 | 0.30 | 6.0 – 9.5 | | 100 |
| Jan | 46,499 | 1,500 | | | 3.6 | 7 | 2.65 | 0.97 | 7.4 | 8.4 | 10 |
| Feb | 54,448 | 1,945 | | | 3.3 | 6 | 1.38 | 0.76 | 7.4 | 8.4 | 10 |
| Mar | 51,063 | 1,647 | | | 2.3 | 5 | 0.54 | 0.85 | 7.5 | 8.2 | 24 |
| Apr | 66,060 | 2,202 | | | 4.4 | 7 | 3.04 | 0.85 | 7.4 | 8.1 | 13 |
| May | 55,330 | 1,785 | | | 10.5 | 12 | 13.63 | 1.13 | 6.7 | 8.3 | 10 |
| Jun | 50,716 | 1,691 | | | 2.5 | 4 | 6.88 | 1.09 | 6.9 | 7.9 | 10 |
| Jul | 52,919 | 1,707 | | | 2.0 | 2 | 0.57 | 1.06 | 6.4 | 7.5 | 10 |
| Aug | 53,730 | 1,733 | | | 2.0 | 2 | 0.44 | 1.85 | 6.6 | 7.5 | 11 |
| Sept | 48,920 | 1,631 | | | 2.4 | 2 | 2.25 | 1.78 | 6.5 | 7.8 | 27 |
| Oct | 54,089 | 1,745 | | | 2.5 | 2 | 0.33 | 1.80 | 6.8 | 7.6 | 19 |
| Nov | 51,013 | 1,700 | | | 2.0 | 4 | 0.24 | 1.75 | 6.8 | 7.9 | 23 |
| Dec | 41,894 | 1,351 | | | 2.0 | 5 | 0.18 | 1.79 | 6.8 | 8.1 | 15 |
| YEAR | | | 1,717 | 32% | | | | | | | |
| | Yearly Total Flow m³ | Yearly Maximums | | | | | | | | | |
| | 626,683 | 2,202 | | | 10.5 | 12 | 13.63 | 1.85 | 7.5 | 8.4 | 27 |

Table 2: Summary of Monitoring Data and Comparison to Influent Limits - Loadings

| Month | Avg Daily Influent Flow /Month m³/day | CBOD₅ kg/day | Total S.S. kg/day | Total P kg/day | Total Ammonia kg/day |
|-------------------------------|---|--------------------------------|--------------------------|-----------------------|-----------------------------|
| Limits: May 1 – Oct 31 | None | 54.0 | 54.0 | 2.7 | 10.8 |
| Limits: Nov 1 – Apr 31 | None | 54.0 | 54.0 | 2.7 | 21.6 |
| Jan | 1,500 | 5.4 | 11.1 | 1.5 | 4.0 |
| Feb | 1,945 | 6.3 | 11.7 | 1.5 | 2.7 |
| Mar | 1,647 | 3.7 | 8.2 | 1.4 | 0.9 |
| Apr | 2,202 | 9.7 | 15.9 | 1.9 | 6.7 |
| May | 1,785 | 18.7 | 21.4 | 2.0 | 24.3 |
| Jun | 1,691 | 4.2 | 7.2 | 1.8 | 11.6 |
| Jul | 1,707 | 3.4 | 2.8 | 1.8 | 1.0 |
| Aug | 1,733 | 3.5 | 3.9 | 3.2 | 0.8 |
| Sept | 1,631 | 3.9 | 3.6 | 2.9 | 3.7 |
| Oct | 1,745 | 4.4 | 3.5 | 3.1 | 0.6 |
| Nov | 1,700 | 3.5 | 6.2 | 3.0 | 0.4 |
| Dec | 1,351 | 2.7 | 7.3 | 2.4 | 0.2 |
| Yearly | | | | | |
| Maximums | | | | | |
| | | 18.7 | 21.4 | 3.2 | 24.3 |

**Operating Problems and Corrective Action:
Condition 10 (6) (b)**

The Tilbury Water Pollution Control Plant has experienced numerous exceedances during this reporting period. A consultant was brought in to address the operational issues and thus far, there have been improvements in all areas except for phosphorus. The PUC has determined that the root cause is intermittent discharges of non-reactive phosphorus from a local industry and is working closely with the industry to address the issue.

**Summary of Maintenance Activities:
Condition 10 (6) (c)**

Routine maintenance was performed throughout the reporting period. Chatham-Kent PUC utilises an electronic preventative maintenance program to track preventative maintenance. In addition to the routine maintenance, the following additional maintenance activities were completed for the reporting period:

| | |
|---|-----------|
| • Filter Cloth | \$ 50,000 |
| • Blower | 30,000 |
| • New UV Bulbs (x 2) | 12,600 |
| • Pump | 7,000 |
| • Tower Chlorine Analyser Repair | 5,500 |
| • Hypo Metering Pump for Re-Chlorination Station Repair | 5,000 |

**Quality Assurance and Control Measures:
Condition 10 (6) (d)**

The Chatham-Kent Public Utilities Commission followed a sampling schedule developed in accordance with the Certificate of Approval and applicable regulations for this reporting period.

Composite chemistry samples of the raw flow were collected using an auto sampler. Chemistry samples were submitted weekly to an accredited laboratory for analysis of CBOD₅, Total Suspended Solids, Total Kjeldhal Nitrogen, Nitrite and Nitrate, Total Phosphorus, Total Ammonia Nitrogen, Alkalinity and pH.

Composite chemistry samples of the effluent were collected using an auto sampler. Chemistry samples were submitted weekly to an accredited laboratory for analysis of CBOD₅, Total Suspended Solids, Total Kjeldhal Nitrogen, Total Phosphorus and Total Ammonia Nitrogen, Alkalinity, pH, Nitrite and Nitrate and Unionized Ammonia.

Bacteriological samples of the effluent were collected weekly according to the Sampling Program. Bacteriological samples were submitted weekly to an accredited laboratory for analysis.

In house samples were analysed by a licensed operator for pH and temperature.

Calibration and Maintenance on Effluent Monitoring Equipment Condition 10 (6) (e)

All required probes and sensors are cleaned, maintained and/or calibrated on a monthly basis or as required by manufacturers' specifications.

Monitoring equipment calibration/verification report(s) included for the following:

- Influent flow meter
- Effluent flow meter
- Spectrophotometer
- DO meter
- pH meter

Effluent Objectives Condition 10 (6) (f)

Table 1 outlines monthly average results of parameters tested compared to the objectives outlined in the Certificate of Approval Table 1 Effluent Objectives.

The following criteria was exceeded during this reporting period for the effluent objectives outlined in Condition 6 Effluent Objectives of the Certificate of Approval:

Total Suspended Solids in the following months:
January, February, April, May, and December.

Total Ammonia-Nitrogen in the following months:
January, April, May, June, and September.

Total Carbonaceous BOD in the following month: May.

Total Phosphorous in the following months:
January, February, March, April, May, June, July, August, September, October, November, and December.

The PUC has determined that the root cause of the majority of the issues is intermittent discharges from a local industry and is working closely with the industry to address them.

Sludge Management Condition 10 (6) (g)

During the reporting period no waste activated sludge was transferred for sludge stabilization and storage.

Outline of Anticipated Volumes in Next Reporting Period

The sludge production and sludge handling method for the coming reporting period is anticipated to be the similar to that of this reporting period.

**Community Complaints:
Condition 10 (6) (h)**

There were no Customer Complaints received during the reporting period.

**By-pass, Spill, or Abnormal Discharge Events:
Condition 10 (6) (i)**

There were no by-pass, spill, or abnormal discharge events for the reporting period beyond those already discussed.

**Other Information the District Manager Requires:
Condition 10 (6) (j)**

No other information was required from the District Manager during this reporting period.

APPENDIX A

Yearly Operational Data Summary for the Reporting Period

| | Jan-19 | Feb-19 | Mar-19 | Apr-19 | May-19 | Jun-19 | Jul-19 | Aug-19 | Sep-19 | Oct-19 | Nov-19 | Dec-19 | TOTAL | MAX | MIN | AVG |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Raw Sewage Flow | | | | | | | | | | | | | | | | |
| Total Flow 1000m ³ | 46.499 | 54.448 | 51.063 | 66.060 | 55.330 | 50.716 | 52.919 | 53.730 | 48.920 | 54.089 | 51.013 | 41.894 | 626.683 | 66.06 | 41.89 | 52.22 |
| Raw Peak Flow L/Sec | 61.0 | 62.0 | 60.0 | 218.0 | 154.0 | 160.0 | 162.0 | 158.0 | 65.0 | 170.0 | 170.0 | 157.0 | | 218.0 | 60.0 | 133.1 |
| WAS Flow 1000m ³ | 5.65 | 6.59 | 8.05 | 5.57 | 4.87 | 9.96 | 5.77 | 4.93 | 5.71 | 5.74 | 3.92 | 3.91 | 70.68 | 9.96 | 3.91 | 5.89 |
| RAS Flow 1000m ³ | 182.73 | 171.86 | 184.40 | 168.32 | 161.97 | 135.32 | 90.41 | 71.82 | 76.52 | 121.56 | 85.55 | 82.09 | 1532.55 | 184.40 | 71.82 | 127.71 |
| Cell 1 & 2 to Plant 1000m ³ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Wetland to Plant 1000m ³ | 2.51 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.04 | 0.09 | 0.00 | 0.00 | 2.65 | 2.51 | 0.00 | 0.22 |
| Overflow to Lagoons 1000m ³ | 0.10 | 0.16 | 0.23 | 8.46 | 0.22 | 0.39 | 0.29 | 0.03 | 0.01 | 0.19 | 0.11 | 0.01 | 10.22 | 8.46 | 0.01 | 0.85 |
| Raw Pump Hours | 402.4 | 474.1 | 444.3 | 542.1 | 471.1 | 429.9 | 474.2 | 491.0 | 460.6 | 459.9 | 443.2 | 377.1 | 5469.9 | 542.1 | 377.1 | 455.8 |
| Avg. Daily Flow 1000m ³ | 1.500 | 1.945 | 1.647 | 2.202 | 1.785 | 1.691 | 1.707 | 1.733 | 1.631 | 1.745 | 1.700 | 1.351 | 20.64 | 2.20 | 1.35 | 1.72 |
| Raw Sewage Average | | | | | | | | | | | | | | | | |
| Ammonia as N, mg/L | 14 | 11 | 15.8 | 14 | 17.5 | 15 | 18.3 | 17 | 15.0 | 16.5 | 12 | 19.0 | | 19.0 | 10.9 | 15.4 |
| Nitrogen, T. Kjeldahl as N, mg/L | 19 | 15.0 | 24 | 19 | 21 | 24 | 24.0 | 20.5 | 19 | 19.5 | 15 | 22 | | 24 | 15.0 | 20.1 |
| pH | 8.61 | 8.04 | 8.24 | 7.78 | 8.10 | 8.37 | 7.76 | 8.39 | 8.10 | 7.68 | 7.83 | 7.59 | | 8.61 | 7.59 | 8.04 |
| Phosphorous, Total as P, mg/L | 2.78 | 1.75 | 4.03 | 3.02 | 3.98 | 4.50 | 3.55 | 3.13 | 4.30 | 4.98 | 3.75 | 4.14 | | 4.98 | 1.75 | 3.66 |
| Solids, Suspended mg/L | 72 | 76 | 88 | 150 | 98 | 104 | 67 | 76 | 172 | 170 | 128 | 124 | | 172 | 67 | 110 |
| Alkalinity CaCO ₃ , mg/L | 540 | 338 | 525 | 362 | 385 | 515 | 308 | 365 | 344 | 303 | 343 | 276 | | 540 | 276 | 384 |
| CBOD ₅ , mg/L | 115 | 51 | 136 | 98 | 98 | 101 | 77 | 73 | 125 | 78 | 71 | 88 | | 136 | 51 | 93 |
| Final Effluent Flow | | | | | | | | | | | | | | | | |
| Total Flow 1000m ³ | 61.817 | 74.739 | 61.038 | 81.866 | 62.160 | 56.608 | 58.950 | 69.587 | 67.364 | 74.575 | 66.398 | 57.149 | 792.251 | 81.87 | 56.61 | 66.02 |
| Avg. Daily Flow m ³ | 1994.09 | 2669.26 | 1968.96 | 2728.86 | 2005.17 | 1886.94 | 1901.62 | 2244.74 | 2245.46 | 2405.65 | 2213.27 | 1843.53 | | 2728.86 | 1843.53 | 2175.63 |
| Treated Peak Flow L/Sec | 72.0 | 75.0 | 73.0 | 144.0 | 97.0 | 96.0 | 82.0 | 82.0 | 76.0 | 102.0 | 67.0 | 88.0 | | 144.0 | 67.0 | 87.8 |
| Final Effluent Average | | | | | | | | | | | | | | | | |
| pH | 7.9 | 7.9 | 7.9 | 7.8 | 7.7 | 7.5 | 7.0 | 7.1 | 7.1 | 7.3 | 7.3 | 7.4 | | 7.9 | 7.0 | 7.5 |
| Ammonia as N, mg/L | 2.65 | 1.38 | 0.54 | 3.04 | 13.63 | 6.88 | 0.57 | 0.44 | 2.25 | 0.33 | 0.24 | 0.18 | | 13.63 | 0.18 | 2.68 |
| NH ₃ Un-ionized | 0.0364 | 0.0121 | 0.0094 | 0.0371 | 0.1585 | 0.1127 | 0.0078 | 0.0083 | 0.0413 | 0.0221 | 0.0060 | 0.0083 | | 0.1585 | 0.0060 | 0.0383 |
| NH ₃ Un-ionized (FEDERAL) | 0.0688 | 0.0398 | 0.0073 | 0.0650 | 0.2450 | 0.1287 | 0.005 | 0.008 | 0.014 | 0.002 | 0.002 | 0.001 | | 0.245 | 0.001 | 0.049 |
| Nitrogen, T. Kjeldahl as N, mg/L | 3.4 | 2.2 | 1.5 | 4.0 | 14.9 | 8.4 | 1.6 | 1.1 | 3.0 | 1.2 | 1.1 | 1.0 | | 14.85 | 0.974 | 3.6 |
| Nitrate as N, mg/L | 5.8 | 4.6 | 4.9 | 5.5 | 5.0 | 6.0 | 8.4 | 4.9 | 5.1 | 4.8 | 5.5 | 10.3 | | 10.3 | 4.6 | 5.9 |
| Nitrite as N, mg/L | 0.146 | 0.181 | 0.090 | 0.240 | 0.189 | 1.076 | 0.672 | 0.833 | 0.345 | 0.390 | 0.318 | 0.258 | | 1.076 | 0.090 | 0.395 |
| Phosphorous, Total as P, mg/L | 0.97 | 0.76 | 0.85 | 0.85 | 1.13 | 1.09 | 1.06 | 1.85 | 1.78 | 1.80 | 1.75 | 1.79 | | 1.85 | 0.76 | 1.31 |
| Solids, Suspended mg/L | 7 | 6 | 5 | 7 | 12 | 4 | 2 | 2 | 2 | 2 | 4 | 5 | | 12 | 2 | 5 |
| Alkalinity CaCO ₃ , mg/L | 292 | 268 | 280 | 280 | 330 | 305 | 192 | 245 | 184 | 223 | 243 | 230 | | 330 | 184 | 256 |
| CBOD ₅ , mg/L | 3.6 | 3.3 | 2.3 | 4.4 | 10.5 | 2.5 | 2.0 | 2.0 | 2.4 | 2.5 | 2.0 | 2.0 | | 10.5 | 2.00 | 3.3 |
| D.O. Avg. mg/L | 4.47 | 4.74 | 3.71 | 2.75 | 1.43 | 2.31 | 2.50 | 2.44 | 2.57 | 2.52 | 3.29 | 3.34 | | 4.74 | 1.43 | 3.01 |
| Temperature C | 10.3 | 9.8 | 10.4 | 12.8 | 16.3 | 19.8 | 22.4 | 23.7 | 23.8 | 20.9 | 16.6 | 14.0 | | 23.8 | 9.8 | 16.7 |
| E-Coil Average /100mL | 10 | 10 | 24 | 13 | 10 | 10 | 10 | 11 | 27 | 19 | 23 | 15 | | 27 | 10 | 15.1 |

| | Jan-19 | Feb-19 | Mar-19 | Apr-19 | May-19 | Jun-19 | Jul-19 | Aug-19 | Sep-19 | Oct-19 | Nov-19 | Dec-19 | TOTAL | MAX | MIN | AVG |
|--|----------|---------|----------|---------|---------|---------|--------|--------|--------|--------|---------|---------|-----------|---------|-------|--------|
| Orbal System | | | | | | | | | | | | | | | | |
| Dissolved Oxygen Outer mg/L | 0.74 | 0.54 | 0.53 | 0.62 | 0.57 | 0.00 | 0.66 | 0.27 | n/a | 0.28 | 0.28 | 0.54 | | 0.74 | 0.00 | 0.46 |
| Dissolved Oxygen Effluent mg/L | 6.96 | 5.40 | 4.19 | 4.84 | 3.21 | 0.00 | 4.62 | 4.85 | n/a | 2.84 | 3.32 | 4.08 | | 6.96 | 0.00 | 4.03 |
| Temperature (Orbal Effluent) C | 9.9 | 9.6 | 10.8 | 12.7 | 16.1 | 0.0 | 21.9 | 23.5 | n/a | 21.2 | 17.7 | 15.3 | | 23.5 | 0.0 | 14.4 |
| 30 mins mg/L | 145 | 177 | 158 | 116 | 102 | 151 | 432 | 614 | 452 | 503 | 403 | 350 | | 614 | 102 | 300 |
| MILSS mg/L | 2124 | 2651 | 2301 | 1652 | 1768 | 1727 | 1416 | 1474 | 1311 | 1643 | 1958 | 2092 | | 2651 | 1311 | 1843 |
| MILVSS | 1677 | 2061 | 1770 | 1449 | 1452 | 1383 | 1165 | 1202 | 1150 | 1409 | 1606 | 1704 | | 2061 | 1150 | 1502 |
| MILVSS % | 79 | 76 | 77 | 82 | 78 | 79 | 81 | 84 | 89 | 86 | 82 | 81 | | 89 | 76 | 81 |
| SVI | 68.0 | 66.5 | 68.3 | 66.2 | 59.0 | 87.6 | 288.6 | 404.8 | 326.4 | 305.8 | 205.0 | 165.7 | | 404.8 | 59.0 | 176.0 |
| F/M (BOD) | 0.03 | 0.02 | 0.03 | 0.12 | 0.03 | 0.05 | 0.04 | 0.04 | 0.05 | 0.03 | 0.04 | 0.03 | | 0.12 | 0.02 | 0.04 |
| F/M (COD) | 0.09 | 0.06 | 0.11 | 0.16 | 0.08 | 0.19 | 0.09 | 0.12 | 0.14 | 0.09 | 0.08 | 0.07 | | 0.19 | 0.06 | 0.11 |
| MCRT days | 14.37 | 11.38 | 10.42 | 80.34 | 37.49 | 9.38 | 14.39 | 39.55 | 11.33 | 7.09 | 16.63 | 9.76 | | 80.3 | 7.1 | 21.8 |
| RAS | | | | | | | | | | | | | | | | |
| Suspended Solids mg/L | 3058 | 3579 | 3198 | 2211 | 2308 | 2497 | 2650 | 2667 | 2251 | 2497 | 3329 | 3293 | | 3579 | 2211 | 2795 |
| Volatile Suspended Solids mg/L | 2431 | 2748 | 2361 | 1828 | 1824 | 1904 | 2063 | 2190 | 1935 | 2090 | 2665 | 2707 | | 2748 | 1824 | 2229 |
| Rvss % | 79 | 76 | 76 | 80 | 77 | 77 | 79 | 82 | 86 | 84 | 81 | 82 | | | | |
| RAS Flow % | 296 | 230 | 302 | 206 | 261 | 239 | 153 | 103 | 114 | 163 | 129 | 144 | | 302 | 103 | 195 |
| Alum | | | | | | | | | | | | | | | | |
| Feed ml/min | 330 | 355 | 355 | 353 | 233 | 124 | 30 | 25 | 22 | 36 | 68 | 121 | | 355 | 22 | 171 |
| Used Kg | 5233.85 | 9371.83 | 10375.95 | 7545.21 | 3458.96 | 2486.00 | 558.88 | 480.63 | 390.91 | 671.42 | 1146.30 | 2672.51 | | 10376.0 | 390.9 | 3699.4 |
| Dosage mg/L | 111.8 | 179.2 | 212.3 | 121.9 | 78.2 | 52.5 | 10.6 | 9.1 | 8.1 | 12.1 | 23.1 | 66 | | 212.3 | 8.1 | 73.7 |
| Federal (Quarterly) | | | | | | | | | | | | | | | | |
| Final Flow Qtr. m3 | 197593.6 | | | | | | | | | | | | 198122.79 | | | |
| CBOD Qtr. mg/L | 3.0 | | | | | | | | | | | | 2.17 | | | |
| SS Qtr. mg/L | 6.1 | | | | | | | | | | | | 3.65 | | | |
| Number of Days | 90 | | | | | | | | | | | | 92 | | | |
| Federal WSER Acute Lethality | | | | | | | | | | | | | | | | |
| Average Daily Volume Effluent (m ³): | 2171 | | | | | | | | | | | | | | | |

APPENDIX B

Calibration Reports for the Reporting Period



Endress Hauser
ProMag Series
Verification Report

AS FOUND CERTIFICATION
FORWARD FLOW DIRECTION
PASS

| CLIENT DETAIL | | [MUT] MANUFACTURER | EQUIPMENT DETAIL | |
|---|---|--------------------|---------------------------------|--|
| CUSTOMER | Municipality of Chatham-Kent Tilbury | ENDRESS & HAUSER | Promag 50P | |
| CONTACT | Dan Carroll Senior Operator, Water / Waste Water 519-682-9033 | MODEL | 6A042716000 | |
| | | CONVERTER S/N: | Pull Plug on Unit | |
| | | FUSE | | |
| | | PLANT ID | Tilbury - Lyons Pumping Station | |
| | | METER ID | Raw Flow Meter | |
| | | FIT ID | FIT-102 | |
| | | CLIENT TAG | Flow Meter FIT-102 | |
| | | OTHER | N/A | |
| | | GPS COORDINATES | N42 16.121 W082 26.133 | |
| VER. BY - FM <i>Travis Krayetski</i> | | VERIFICATION DATE | March 15, 2019 | |
| Quality Management Standards Information - Reference equipment and instrumentation used to conduct this verification test is found in our AC- QMS document at the time this test was | | CAL. FREQUENCY | Annual | |
| | | CAL. DUE DATE | March, 2020 | |

| PROGRAMMING PARAMETERS | | | FORWARD TOTALIZER INFORMATION | | |
|------------------------|-----|---------|--|---------|----|
| DIAMETER (DN) | mm | 300 | AS FOUND | 2766169 | M3 |
| F.S. FLOW - MAG | LPS | 706.838 | AS LEFT | 2766244 | M3 |
| F.S. RANGE - O/P | LPS | 400.000 | DIFFERENCE | 75 | M3 |
| TUBE k-FACTOR | | 1.22970 | TEST CRITERIA | | |
| TUBE zero | | 0 | AS FOUND CERTIFICATION TEST | Yes | |
| | | | FORWARD FLOW DIRECTION | Yes | |
| | | | ALLOWABLE [%] ERROR | 5 | |
| | | | COMPONENTS TESTED | | |
| | | | CONVERTER DISPLAY | Yes | |
| | | | mA OUTPUT | Yes | |
| | | | TOTALIZER | Yes | |
| | | | ACCURACY BASED ON [% o.r.] | Yes | |
| | | | ERROR DOCUMENTED IN THIS REPORT; BASED ON % o.r. | | |

| FLOW TUBE SIMULATION | | | | | | | |
|-----------------------|------------|-------|--------|------------------------|--------|---------|--------------|
| | | 0.0 | 100.0 | 200.0 | 300.0 | 400.0 | LPS |
| | | 0.0 | 14.1 | 28.3 | 42.4 | 56.6 | % F.S. Flow |
| | | 0.0 | 25.0 | 50.0 | 75.0 | 100.0 | % F.S. Range |
| REF. FLOW RATE | | 0.00 | 100.00 | 200.00 | 300.00 | 400.00 | LPS |
| MUT [Reading] | | 0.00 | 99.10 | 197.56 | 296.73 | 395.73 | LPS |
| MUT [Difference] | | 0.00 | -0.90 | -2.44 | -3.27 | -4.27 | LPS |
| MUT [% Error] | | n/a | -0.90 | -1.22 | -1.09 | -1.07 | % |
| mA OUTPUT | | 4.000 | 8.000 | 12.000 | 16.000 | 20.000 | mA |
| MUT [Reading] | min. 4 mA | 4.000 | 7.959 | 11.912 | 15.870 | 19.816 | mA |
| MUT [Difference] | max. 20 mA | 0.000 | -0.041 | -0.088 | -0.130 | -0.184 | mA |
| MUT [% Error] | | 0.00 | -0.51 | -0.73 | -0.81 | -0.92 | % |
| TOTALIZER | | | | REF. FLOW RATE | | 400.000 | LPS |
| | | | | TOTALIZER [MUT] | | 26.0 | M3 |
| | | | | TEST TIME | | 65.10 | SECONDS |
| | | | | TOTALIZER [REF] | | 26.040 | M3 |
| | | | | ERROR | | -0.15 | % |

| COMMENTS | | | QUALITY MANAGEMENT STANDARDS INFO. | | | RESULTS | | |
|----------|--|--|------------------------------------|--------|------|-----------|------------|-----------|
| | | | [QMS] INFORMATION | IDENT. | ID # | TEST | AVG % o.r. | PASS FAIL |
| | | | [REFERENCE] FTS | E&H-FC | 1 | DISPLAY | -1.07 | PASS |
| | | | PROCESS METER | DMM | 12 | mA OUTPUT | -0.60 | PASS |
| | | | ANALOG METER | AM | N/A | TOTALIZER | -0.15 | PASS |
| | | | STOP WATCH | SW | Yes | | | |

This report reflects the test results of the overall accuracy for the above flow converter using the specified manufacturers flow tube simulator to within the specified tolerance as identified within this report.



Multi-Wavelength Colorimeter
Verification Report

PASS

JFW

AS FOUND CERTIFICATION

| | | |
|--|--|---|
| CUSTOMER CONTACT Municipality of Chatham-Kent Maru Lakshmanan Chief Operator Tilbury ON T. 226 312 2025 x4352 C. 519-358 5222 E. marul@chatham-kent.ca | [MUT] MANUFACTURER MODEL SERIAL NUMBER CLIENT TAG LOCATION OTHER | HACH DR3900 1604407 Tilbury 05 Tilbury STP n/a |
|--|--|---|

| | | |
|--|--|--|
| VER. BY Randy Nichol Quality Management Standards Information - Standards, reference equipment, and instrumentation used to conduct this test outlining the lot#, and expiry date is found in our current | TOLERANCE [mg/L] STANDARD RECOVERY [%] VERIFICATION DATE CAL. FREQUENCY CAL. DUE DATE | 0.05 90 Mar 12, 2019 Annual March 2020 |
|--|--|--|

CHLORINE [Cl₂] SECONDARY STANDARDS

| STANDARD | BLANK [mg/L] | | | READING mg/L | PASS FAIL |
|----------|--------------|-----|------|--------------|-----------|
| | | +/- | | | |
| STD 1 | 0.25 | +/- | 0.09 | 0.23 | PASS |
| STD 2 | 0.94 | +/- | 0.10 | 0.93 | PASS |
| STD 3 | 1.71 | +/- | 0.14 | 1.71 | PASS |

CHLORINE [Cl₂] PRIMARY STANDARDS

| | | | |
|------------------------------|-------|------------------------|--------|
| STANDARD VALUE [mg/L] | 27.3 | BLANK SAMPLE SIZE [mL] | 10.0 |
| STANDARD ADDITIONS SIZE [mL] | 0.200 | DPD LOT# | A8134 |
| | | EXPIRY DATE | May-23 |

| SAMPLE TEST # | Cl ₂ STANDARD mL | COMBINED SAMPLE mL | REFERENCE STANDARD mg/L | REFERENCE READING mg/L | MUT READING mg/L | DIFF. ERROR mg/L | PASS FAIL | STANDARD RECOVERY % |
|------------------------|-----------------------------|--------------------|-------------------------|------------------------|------------------|------------------|-----------|---------------------|
| BLANK | 0 | 10.000 | 0 | 0 | 0 | 0 | PASS | N/A |
| STD 1 | 0.200 | 10.200 | 0.54 | 0.53 | 0.52 | -0.01 | PASS | 98.1 |
| STD 2 | 0.400 | 10.400 | 1.05 | 1.00 | 1.01 | 0.01 | PASS | 95.2 |
| STD 3 | 0.600 | 10.600 | 1.55 | 1.43 | 1.45 | 0.02 | PASS | 92.3 |
| AVERAGE RESULTS | | | | | | 0.01 | PASS | 95.2 |

COMMENTS

| [QMS] INFORMATION | ITEM | ID # |
|-----------------------|------------|------|
| [REFERENCE] HACH PCII | HACH PC II | 1 |
| 10.0 mL PIPETTE | HACH-PP-10 | 1 |
| 0.2 mL PIPETTE | G-PP-2 | 1 |
| SECONDARY STANDARDS | AS-CLSS | 1 |
| PRIMARY STANDARDS | AS-CLPS | 1 |
| ABSORBANCE STANDARDS | AS-ABS | 1 |

| ABSORBANCE CHECKS | | |
|-------------------|--------|-----------|
| WAVELENGTH | TESTED | PASS/FAIL |
| 420 nm | Yes | PASS |
| 520 nm | Yes | PASS |
| 560 nm | Yes | PASS |
| 610 nm | Yes | PASS |

Primary and Secondary standards were used to confirm the overall accuracy of this instrument along with conducting an analytical comparative technique against a reference meter. All values are considered "AS FOUND" readings. If the "AS FOUND" readings were not within acceptable limits, an "AS LEFT" report will be issued if the instrument was able to be calibrated to indicate the overall accuracy of the meter. If the meter was not calibrated for any reason, a comment will be issued for this instrument.

Dissolved Oxygen Verification/Calibration Report



T1W1W

AS LEFT

PASS

| | | |
|---|--|--|
| CUSTOMER CONTACT Municipality of Chatham-Kent Maru Lakshmanan Chief Operator Tilbury ON T. 226 312 2025 x4352 C. 519-358 5222 E. marul@chatham-kent.ca | [MUT] MANUFACTURER MODEL SERIAL NUMBER CLIENT TAG LOCATION OTHER | HACH HQ30D 080200018124 Tilbury STP Tilbury STP n/a |
| VER. BY Randy Nichol | TOLERANCE [pH] | 0.05 |
| Quality Management Standards Information - Standards, reference equipment, and instrumentation used to conduct this test outlining the lot#, and expiry date is found in our current | VERIFICATION DATE CAL. FREQUENCY CAL. DUE DATE | Mar 12, 2019 Annual Mar-2020 |

AS FOUND

| | |
|---------------------------|------|
| DO Concentration [mg/L] | 8.05 |
| DO Concentration [%] | 89.1 |
| Barometric Pressure [hpa] | 1010 |
| Temperature | 20.1 |
| | |

AS LEFT

| | |
|---------------------------|------|
| DO Concentration [mg/L] | 9.31 |
| DO Concentration [%] | 98.9 |
| Barometric Pressure [hpa] | 1010 |
| Temperature | 18.1 |
| | |

COMMENTS

[QMS] INFORMATION

ITEM

ID #

Performed calibration as per manufacturers suggested technique

NIST Traceable Buffers were used to confirm the overall accuracy of this instrument. "AS FOUND" readings and "AS FOUND" readings are reported within this report. A temperature device was used to measure and record the buffer temperature to correct for pH values due to the effects related to buffer temperature.

Dissolved Oxygen Verification/Calibration Report



T/WN

AS LEFT

PASS

| | |
|---|---|
| CUSTOMER CONTACT Municipality of Chatham-Kent Maru Lakshmanan Chief Operator Tilbury ON T. 226 312 2025 x4352 C. 519-358 5222 E. marul@chatham-kent.ca | [MUT] MANUFACTURER Aysix MODEL 3100 SERIAL NUMBER 30S7385 CLIENT TAG Wheatley LOCATION Tilbury STP OTHER n/a |
| VER. BY Randy Nichol | TOLERANCE [pH] 0.05 |
| Quality Management Standards Information - Standards, reference equipment, and instrumentation used to conduct this test outlining the lot#, and expiry date is found in our current | VERIFICATION DATE Mar 12, 2019 CAL. FREQUENCY Annual CAL. DUE DATE Mar-2020 |

AS FOUND

| | |
|---------------------------|------|
| DO Concentration [mg/L] | 8.3 |
| DO Concentration [%] | n/a |
| Barometric Pressure [hpa] | n/a |
| Temperature | 15.5 |
| | |

AS LEFT

| | |
|---------------------------|------|
| DO Concentration [mg/L] | 9.3 |
| DO Concentration [%] | n/a |
| Barometric Pressure [hpa] | n/a |
| Temperature | 15.6 |
| | |

COMMENTS

Comparison Match to HQ30D 080200018124

[QMS] INFORMATION

ITEM

ID #

Performed calibration as per manufacturers suggested technique

NIST Traceable Buffers were used to confirm the overall accuracy of this instrument. "AS FOUND" readings and "AS FOUND" readings are reported within this report. A temperature device was used to measure and record the buffer temperature to correct for pH values due to the effects related to buffer temperature.

Dissolved Oxygen Verification/Calibration Report



T / W / W

AS LEFT

PASS

| | | | |
|-------------------------|---|---|---|
| CUSTOMER CONTACT | Municipality of Chatham-Kent Maru Lakshmanan Chief Operator Tilbury ON T. 226 312 2025 x4352 C. 519-358 5222 E. marul@chatham-kent.ca | [MUT] MANUFACTURER MODEL SERIAL NUMBER CLIENT TAG LOCATION OTHER | Aysix 3100 N/A (on wall) Tilbury STP Tilbury STP n/a |
|-------------------------|---|---|---|

| | | | |
|----------------|--------------|-----------------------|------|
| VER. BY | Randy Nichol | TOLERANCE [pH] | 0.05 |
|----------------|--------------|-----------------------|------|

| | | |
|--|---|------------------------------------|
| Quality Management Standards Information - Standards, reference equipment, and instrumentation used to conduct this test outlining the lot#, and expiry date is found in our current | VERIFICATION DATE CAL. FREQUENCY CAL. DUE DATE | Mar 12, 2019 Annual Mar-2020 |
|--|---|------------------------------------|

AS FOUND

| | |
|---------------------------|------|
| DO Concentration [mg/L] | 12.6 |
| DO Concentration [%] | n/a |
| Barometric Pressure [hpa] | n/a |
| Temperature | 10.5 |
| | |

AS LEFT

| | |
|---------------------------|------|
| DO Concentration [mg/L] | 9.3 |
| DO Concentration [%] | n/a |
| Barometric Pressure [hpa] | n/a |
| Temperature | 10.5 |
| | |

COMMENTS

Comparison Match to HQ30D 080200018124

[QMS] INFORMATION

ITEM

ID #

Performed calibration as per manufacturers suggested technique

NIST Traceable Buffers were used to confirm the overall accuracy of this instrument. "AS FOUND" readings and "AS FOUND" readings are reported within this report. A temperature device was used to measure and record the buffer temperature to correct for pH values due to the effects related to buffer temperature.



AS FOUND CERTIFICATION

PASS

CLIENT DETAIL

CUSTOMER Municipality of Chatham-Kent Tilbury
CONTACT Dan Carroll
Senior Operator, Water / Waste Water
519-682-9033

EQUIPMENT DETAIL

[MUT] MANUFACTURER Milltronics
MODEL OCMIII
CONVERTER SERIAL NUMBER 082204105XV

PLANT ID Tilbury STP
METER ID Final Effluent
FIT ID FIT-701
CLIENT TAG Flow Meter FIT-701
OTHER N/A
GPS COORDINATES N42 16.344 W082 26.874

VER. BY - FM Paris Machuk

Quality Management Standards Information -
Reference equipment and instrumentation used to
conduct this verification test is found in our AC-
QMS document at the time this test was

VERIFICATION DATE March 15, 2019
CAL. FREQUENCY Annual
CAL. DUE DATE March, 2020

PROGRAMMING PARAMETERS

| | | |
|-----------------------|--------|-------|
| THROAT DIMENSION (DN) | inches | 12 |
| EMPTY DISTANCE | m | 1.204 |
| MAX. HEAD | m | 0.762 |
| DEAD ZONE | m | 0.137 |
| BLANKING DISTANCE | m | 0.305 |
| MAX. FLOW | LPS | 456.8 |
| F.S. RANGE - O/P | LPS | 456.8 |

| | | |
|------------------|----------|----|
| TOTALIZER | | |
| AS FOUND | 14125619 | M3 |
| AS LEFT | 14125799 | M3 |
| DIFFERENCE | 180 | M3 |

| | | |
|-----------------------------|-----|--|
| TEST CRITERIA | | |
| AS FOUND CERTIFICATION TEST | Yes | |
| ALLOWABLE [%] ERROR | 5 | |

COMPONENTS TESTED

| | |
|----------------------------|-----|
| CONVERTER DISPLAY | Yes |
| mA OUTPUT | Yes |
| TOTALIZER | Yes |
| ACCURACY BASED ON [% o.r.] | No |

Ultrasonic sensor installed to ensure full scale flow condition

ERROR DOCUMENTED IN THIS REPORT, BASED ON % F.S.

AS FOUND TEST RESULTS

| | | 8.4 | 24.2 | 37.5 | 69.5 | 97.6 | % F.S. Range | |
|-----------------------------------|----------------|---------------|----------------|----------------|----------------|----------------|----------------|---------|
| | | 0.150 | 0.300 | 0.400 | 0.600 | 0.750 | m | |
| REF. FLOW RATE | | 38.497 | 110.559 | 171.297 | 317.513 | 445.922 | LPS | |
| MUT [Reading] | | 39.754 | 112.600 | 173.770 | 320.240 | 448.030 | LPS | |
| MUT [Difference] | | 1.257 | 2.041 | 2.473 | 2.727 | 2.108 | LPS | |
| MUT [% Error] | | 0.28 | 0.45 | 0.54 | 0.60 | 0.46 | % | |
| mA OUTPUT | | 5.348 | 7.872 | 10.000 | 15.121 | 19.618 | mA | |
| MUT [Reading] | min. 4.000 mA | 5.368 | 7.930 | 10.076 | 15.225 | 19.718 | mA | |
| MUT [Difference] | max. 20.000 mA | 0.020 | 0.058 | 0.076 | 0.104 | 0.100 | mA | |
| MUT [% Error] | | 0.10 | 0.29 | 0.38 | 0.52 | 0.50 | % | |
| TOTALIZER - REF. FLOW RATE | | | | | | | 445.922 | LPS |
| TOTALIZER [MUT] | | | | | | | 44 | M3 |
| TEST TIME | | | | | | | 98.99 | SECONDS |
| CALC. TOTALIZER | | | | | | | 44.142 | M3 |
| ERROR | | | | | | | -0.32 | % |

COMMENTS

QUALITY MANAGEMENT STANDARDS INFO.

| [QMS] INFORMATION | IDENT. | ID # |
|-------------------|------------|------|
| [REFERENCE] LEVEL | Sim. BOARD | n/a |
| PROCESS METER | DMM | 11 |
| STOP WATCH | SW | Yes |

RESULTS

| TEST | AVG %FS | PASS FAIL |
|-----------|---------|-----------|
| DISPLAY | 0.51 | PASS |
| mA OUTPUT | 0.36 | PASS |
| TOTALIZER | -0.32 | PASS |

This report reflects the test results of the overall accuracy for the above flow converter using the specified manufacturers flow tube simulator to within the specified tolerance as identified within this report.