



February 22, 2017

Municipality of West Perth  
169 St. David Street  
Mitchell, Ontario  
N0K 1N0

**ATTENTION:**      **Mr. Jeff Brick**  
                                 **CAO**

**REFERENCE:**      **Municipality of West Perth**  
                                 **Annual Wastewater Report 2016**

Please find enclosed the Municipality of West Perth, Mitchell Wastewater Treatment Facility; Annual Operations Report 2016. The report is prepared in accordance with the annual report criteria within Environmental Compliance Approval # 5159-94HKX8 containing the following;

- Section 1: A summary and interpretation of all monitoring data and comparison to effluent limits;
- Section 2: A description of any operating problems and corrective actions;
- Section 3: A summary of the maintenance activities;
- Section 4: A summary of effluent quality assurance measures;
- Section 5: A summary of calibration methods and maintenance procedures for all monitoring equipment;
- Section 6: A description of efforts made and results achieved in meeting Effluent Objectives;
- Section 7: A tabulation of sewage quantities and characteristics from all sources;
- Section 8: Sludge generation volume and disposal methods;
- Section 9: A summary of any complaints received during the reporting period and actions taken to address the complaints;
- Section 10: A summary of all by-pass, spill or abnormal discharge events;

On behalf of the municipality, a copy of this report has been sent to MOE in the London Office (Mr. Jim Miller).

Yours very truly,

Municipality of West Perth

Environmental Services

## **1. Summary and interpretation of all monitoring data and comparison to effluent limits**

The annual monitoring reports for the year are attached in accordance with the Environmental Compliance Approval requirements and guidelines for the period from January 01 to December 31, 2016.

The annualized average daily flow for the year was estimated to be 3.511 MLD, which represents approximately 49% of the expanded design capacity for the treatment facility (average day design flow 7.2 MLD). The maximum daily flow, which occurred in the month of March, was 15.345 MLD. Both the average and maximum flows for 2016 were greater (Average: 11%, Maximum: 79%) than in 2015.

The treatment plant was able to handle and treat the average daily flows, while the high peak flows are diverted and temporarily stored in the peak overflow cell for treatment when flow volumes return to normal.

The annual effluent CBOD<sub>5</sub> and suspended solids achieved the annual criteria effluent limits (concentration and loading) for the freezing and non-freezing periods.

The effluent total phosphorus achieved the monthly criteria effluent limits (concentration and loading) during the freezing and non-freezing period.

The effluent ammonia results achieved the daily criteria effluent limits (concentration and loading) for the freezing and non-freezing period.

The effluent discharge criteria in the Environmental Compliance Approval consist of two seasonal conditions 1). Freezing, and 2). Non-freezing temperature conditions, and two quality standards 1). The effluent limits which shall not be exceeded, and 2). The effluent objectives which best efforts will be made to operate the works in compliance with.

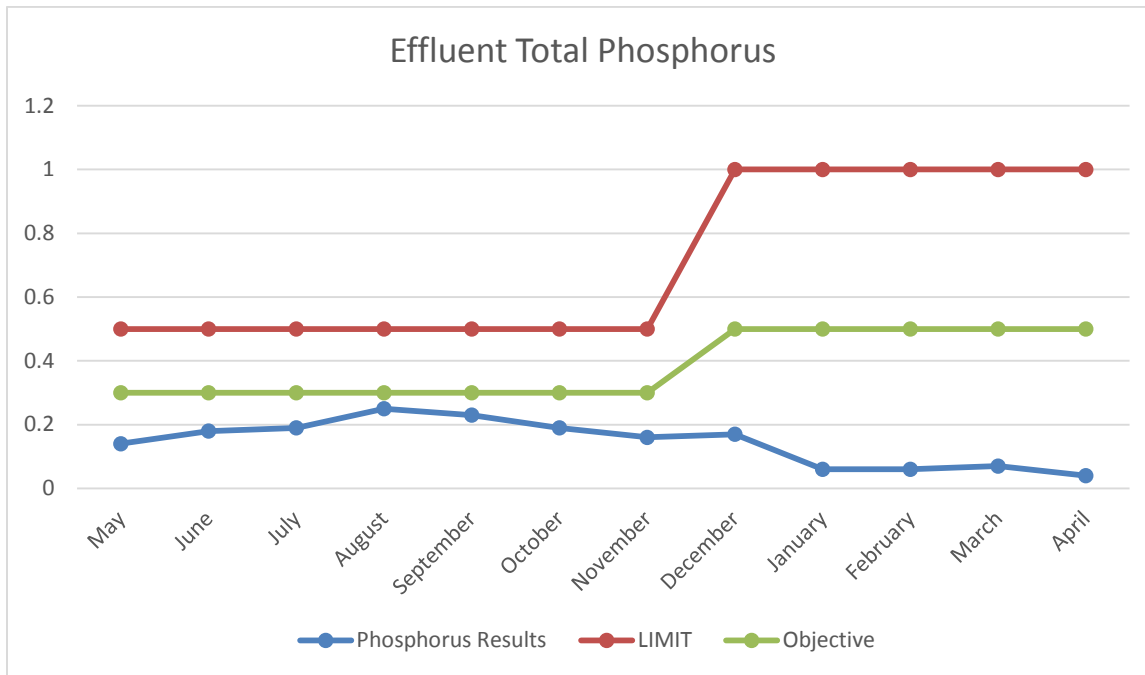
The plant was able to achieve the criteria for the more stringent effluent objectives in all parameters tested.

The Dissolved Oxygen (DO) level was recorded above 4.0 mg/l during the non-freezing period and above 5.0mg/l during the freezing period. The pH remained between the 6.5 to 9.0 criteria throughout the year.

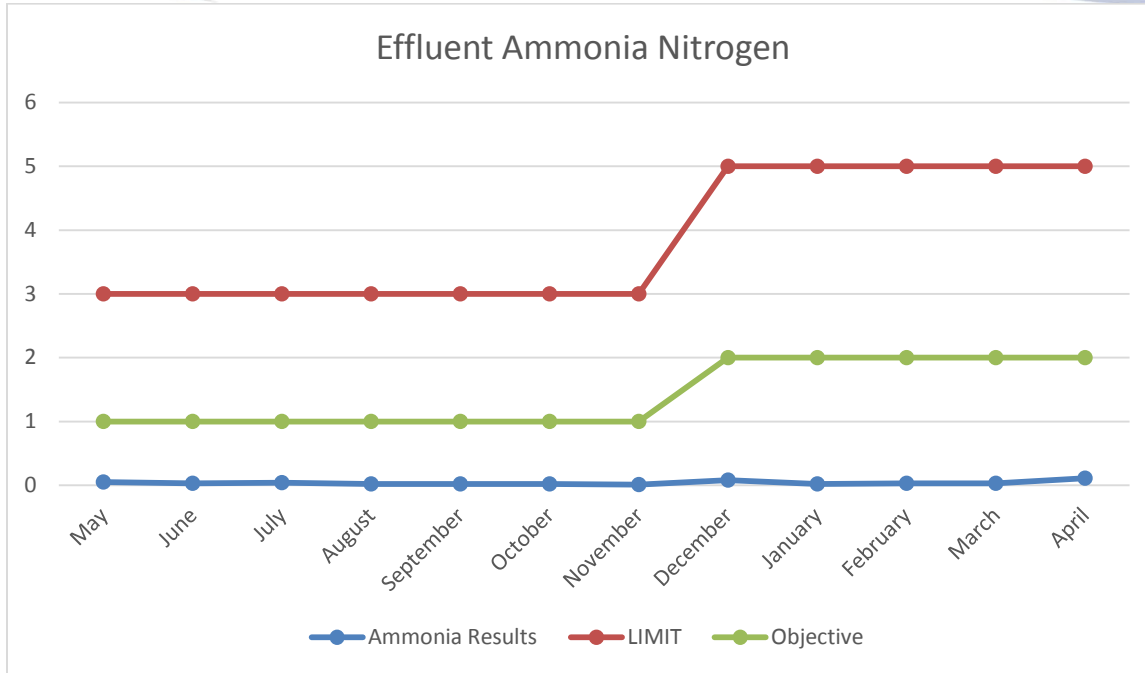
Summarized the annualized effluent concentration for Carbonaceous Biochemical Oxygen Demand, Suspended Solids, Total Ammonia and DO as follows:

<b>Effluent Quality</b>	<b>Annual Average Concentration mg/L</b>	<b>Concentration Criteria mg/L @ freezing</b>	<b>Concentration Criteria mg/L @ non-freezing</b>	<b>Compliance</b>
<b>CBOD<sub>5</sub></b>	<b>0.08</b>	<b>&lt;15</b>	<b>&lt;10</b>	<b>Annual</b>
<b>Suspended Solids</b>	<b>2.06</b>	<b>&lt;15</b>	<b>&lt;10</b>	<b>Annual</b>
<b>Ammonia</b>	<b>0.04</b>	<b>&lt;5.0</b>	<b>&lt;3.0</b>	<b>Daily</b>
<b>Dissolved Oxygen</b>	<b>7.93</b>	<b>&gt;5</b>	<b>&gt;4</b>	<b>Monthly</b>

For the effluent total phosphorus, we have summarized the effluent on monthly basis in accordance with the Environmental Compliance Approval:

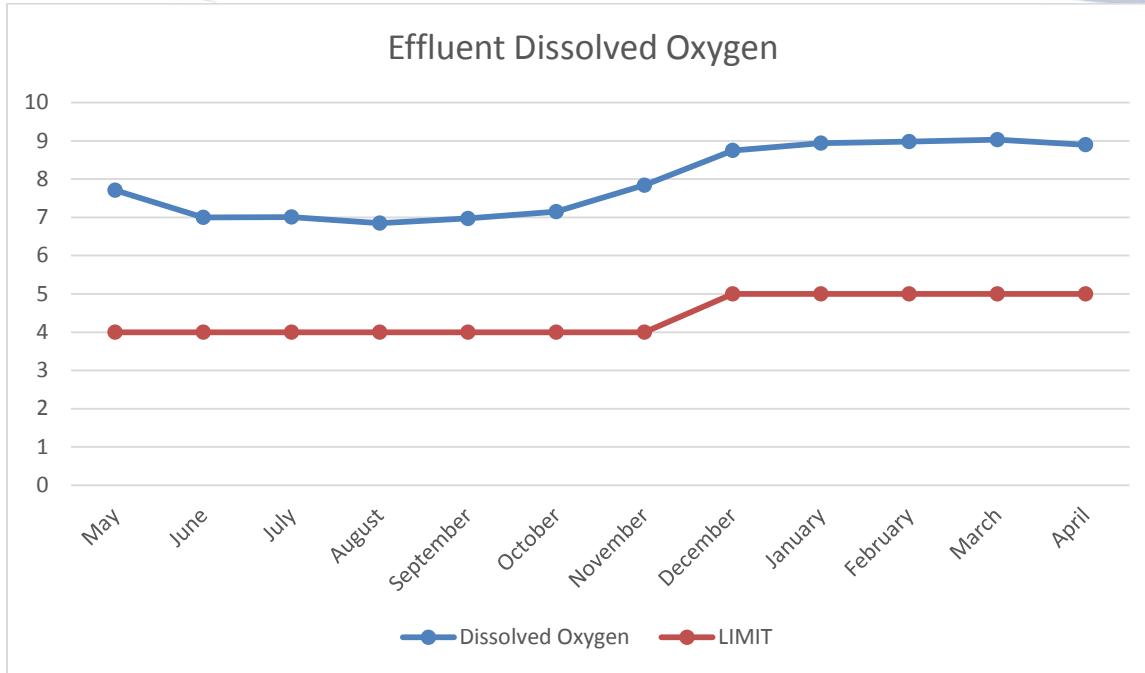


For the effluent Ammonia, we have summarized the effluent on monthly basis in accordance with the Environmental Compliance Approval:



For the effluent Dissolved Oxygen, we have summarized the effluent on monthly basis in accordance with the Environmental Compliance Approval:

**Note:** Unlike the previous charts the dissolved oxygen parameter must be maintained above the limit.



The calculated removal efficiencies achieved at the treatment plant for the main effluent parameters are highlighted as follows:

- CBOD<sub>5</sub> removal efficiency was 99.9%
- Suspended solids removal efficiency was 99.1%
- Total Phosphorus removal efficiency was 98.3%

The annualized average effluent loading is compared to the loading criteria for both the non-freezing and freezing period in the table below:

<b>Effluent Parameter</b>	<b>Loading Kg/day</b>	<b>Loading Criteria kg/day @ freezing</b>	<b>Loading Criteria kg/day @ non-freezing</b>
<b>CBOD<sub>5</sub></b>	<b>0.22</b>	<b>108 annual</b>	<b>72 annual</b>
<b>Suspended Solids</b>	<b>7.05</b>	<b>108 annual</b>	<b>72 annual</b>
<b>Total Phosphorus</b>	<b>0.42</b>	<b>7.2 annual</b>	<b>3.6 annual</b>
<b>Ammonia</b>	<b>0.15</b>	<b>36 daily</b>	<b>21.6 daily</b>

The annual average effluent loading for CBOD<sub>5</sub>, Suspended Solids and Total Phosphorus achieved compliance with the Environmental Compliance Approval effluent loading criteria. The daily ammonia loading also achieved compliance with the Environmental Compliance Approval effluent loading criteria.

The E coli results did not exceed 200 counts per 100 mL during the required disinfection period from March 15 to October 30. The pH level for the wastewater effluent averaged 7.63 and the dissolved oxygen averaged 7.93 mg/l for the year 2016.

The maximum monthly average un-ionized ammonia value for 2016 was 0.009 mg/L, The ECA requires un-ionized value to be less than 0.1 mg/L at all times.

## **2. Description of operating problems and corrective actions**

Q1 2016: Called for Herbert pump 3 fail, noticed generator running, main breaker tripped half way, breaker would not reset. Opened up panel evidence of water and black residue. Prestige replaced main breaker with a temporary breaker.

Sommers Generator recommended not to run Herbert St. generator for safety issues.

Q2 2016: Prestige replaced temporary breaker with new main breaker at Herbert St.

New generator installed at Herbert St.

Q3 2016: No operating problems.

Q4 2016: No operating problems.

### **3. Summary of maintenance activities**

Outlook Task Manager was being used to schedule the maintenance activities at the treatment plant from January to March. In April the switch was made to Megamation. The operators are able to generate preventive maintenance and corrective work orders; as well as document work performed and issue work order history reports.

A highlight of the major maintenance carried out for 2016 is outlined below:

- The raw sewage pumps at both the Hebert and James Pump Stations were inspected and maintained by the operators.
- The Herbert Street, James Street and Sewage plant diesel generators received their annual service in early 2016 and are inspected and ran monthly
- The RAS, WAS and influent flow meters were calibrated by an outside contractor;
- Annual greasing and oil changes were completed on all blowers, Vibration readings are taken annually
- Blower 3 anti-freeze was changed
- All submersible pumps were inspected.
- Number one and two aerobic digesters including headers and piping were cleaned, inspected and serviced by the operators in the spring and fall
- The air lift piping on all the filter air lifts were pulled and inspected
- The UV system was monitored daily by the operators in 2016 for proper intensity and the lenses cleaned monthly, the bulbs were replaced as needed, H2 Flow serviced
- Outside contractors inspected the gas detectors, diesel generators, chain falls, beams and lab equipment.
- Mechanical contractor rebuild RAS pump #2
- Replaced belt on grit vortex
- Digester Sludge pump 2 pulled for repairs
- Surface finishing contractor resealed Clarifier 1 and 2
- Electrical contractor ran new wire for digester pumps
- Electrical contractor installed new hoist at Herbert St. SPS
- Construction contractor resealed the receiving station tanks
- Electrical contractor repaired grit room exhaust fan



#### **4. Influent – Effluent Quality Assurance Measures**

The influent sample is obtained by a 24hr composite sampler (AquaCell), located at the headwork's of the treatment plant after screen and grit removal. A 100 ml sample is collected every 40 minutes.

A 24hr-composite sampler (Epic), located downstream of the effluent UV channel obtains the effluent sample. A 75 ml sample is collected every 15 minutes.

The effluent and influent samples were sent to Maxxam Analytics Inc. in Mississauga, Ontario. Maxxam is responsible for performing the quality assurance and control checks. For quality assurance purposes, the operator will split samples with the analytical tests performed in-house and at the contract laboratory. The operator performs a comparison of the sample results.

#### **5. Calibration methods/Maintenance procedures for monitoring equipment**

Copies of the calibration reports for the return activated sludge, waste activated sludge, and filter backwash water and influent flow meters are filed at the sewage plant.

D.O. probes and meters are cleaned and calibrated as per the manufactures specifications, by the operators.

The pH meter is calibrated once a month and replaced on an annual basis. The meter is used on a daily basis and calibration is checked prior to usage, by the operators.

#### **6. Efforts made and results achieved in meeting Effluent Objectives**

The annual effluent CBOD<sub>5</sub> achieved the effluent objectives for the concentration criteria and loading criteria in both the freezing and non-freezing periods.

The annual effluent suspended solids achieved the effluent objectives for the concentration criteria and loading criteria in both the freezing and non-freezing periods.

The effluent ammonia results achieved the effluent objectives for the concentration and loading criteria in both the freezing and non-freezing periods.

The effluent total phosphorus results achieved the effluent objectives for the concentration and loading criteria for both the freezing period and non-freezing periods.

## 7. Monthly Sewage quantities and characteristics from all sources

The plant received sewage from collection system connected sources this reporting period; the town of Mitchell, including residential and small business operations. Parmalat Canada dairy processing plant and Sofina Foods livestock processing plant.

While quantities from all sources are monitored independently, characteristics of the sewage from the Town, Parmalat and Sofina Foods are combined as they are not segregated in the collection system.

In adherence to the operating Environmental Compliance Approval; imported waste flows are monitored and samples are taken for outside analysis on a weekly basis when received.

Total monthly sewage quantities from all sources are tabulated in the following table. Note volumes followed by a \* indicate final effluent wash water quantities.

<b>Monthly Quantities from source</b>	<b>Town of Mitchell Million Liters</b>	<b>Parmalat Dairy Million Liters</b>	<b>Sofina Foods Million Liters</b>	<b>Imported waste Million Liters</b>
<b>January</b>	<b>135.023</b>	<b>18.255</b>	<b>0.000</b>	<b>0.000</b>
<b>February</b>	<b>163.186</b>	<b>20.583</b>	<b>0.000</b>	<b>0.000</b>
<b>March</b>	<b>185.468</b>	<b>37.602</b>	<b>0.000</b>	<b>0.000</b>
<b>April</b>	<b>163.902</b>	<b>50.867</b>	<b>0.218</b>	<b>0.000</b>
<b>May</b>	<b>90.862</b>	<b>55.536</b>	<b>0.418</b>	<b>0.000</b>
<b>June</b>	<b>76.376</b>	<b>37.605</b>	<b>0.357</b>	<b>0.000</b>
<b>July</b>	<b>68.929</b>	<b>40.894</b>	<b>0.252</b>	<b>0.000</b>
<b>August</b>	<b>79.667</b>	<b>25.454</b>	<b>0.194</b>	<b>0.000</b>
<b>September</b>	<b>67.837</b>	<b>31.799</b>	<b>0.310</b>	<b>0.000</b>
<b>October</b>	<b>68.255</b>	<b>31.898</b>	<b>0.339</b>	<b>0.000</b>

<b>November</b>	<b>74.347</b>	<b>31.733</b>	<b>0.426</b>	<b>0.337</b>
<b>December</b>	<b>108.054</b>	<b>33.431</b>	<b>0.407</b>	<b>1.038</b>
<b>Totals</b>	<b>1,281.906</b>	<b>415.657</b>	<b>2.921</b>	<b>1.375</b>

The following chart is a comparison of anticipated monthly average daily flow versus, actual average daily flow from all sources.

<b>Average daily flow Vs. anticipated daily flow M<sup>3</sup></b>	<b>Town of Mitchell M<sup>3</sup></b>	<b>Parmalat Dairy M<sup>3</sup></b>	<b>Sofina Foods M<sup>3</sup></b>	<b>Imported Waste M<sup>3</sup></b>
<b><i>Anticipated</i></b>	<b>4,755</b>	<b>2,000</b>	<b>350</b>	<b>95</b>
<b>January</b>	<b>4356</b>	<b>589</b>	<b>0</b>	<b>0</b>
<b>February</b>	<b>5627</b>	<b>710</b>	<b>0</b>	<b>0</b>
<b>March</b>	<b>5983</b>	<b>1213</b>	<b>0</b>	<b>0</b>
<b>April</b>	<b>5463</b>	<b>1696</b>	<b>7</b>	<b>0</b>
<b>May</b>	<b>2931</b>	<b>1791</b>	<b>13</b>	<b>9</b>
<b>June</b>	<b>2546</b>	<b>1253</b>	<b>12</b>	<b>0</b>
<b>July</b>	<b>2224</b>	<b>1319</b>	<b>8</b>	<b>0</b>
<b>August</b>	<b>2570</b>	<b>821</b>	<b>6</b>	<b>0</b>
<b>September</b>	<b>2261</b>	<b>1060</b>	<b>10</b>	<b>0</b>
<b>October</b>	<b>2202</b>	<b>1029</b>	<b>11</b>	<b>0</b>
<b>November</b>	<b>2478</b>	<b>1058</b>	<b>14</b>	<b>11</b>
<b>December</b>	<b>3486</b>	<b>1078</b>	<b>13</b>	<b>33</b>

Monthly average Characteristics of sewage by source; this table shows the combined sewage from the Town of Mitchell, the Parmalat Dairy and Sofina Foods.

<b>Characteristics of combined sources</b>	<b>CBOD5 mg/l</b>	<b>TKN mg/l</b>	<b>Total Phosphorus mg/l</b>	<b>Total Suspended solids mg/l</b>
<b>January</b>	<b>225.00</b>	<b>17.8</b>	<b>6.4</b>	<b>217.1</b>
<b>February</b>	<b>207.00</b>	<b>20.4</b>	<b>5.0</b>	<b>147.0</b>
<b>March</b>	<b>233.50</b>	<b>14.7</b>	<b>4.4</b>	<b>146.9</b>
<b>April</b>	<b>199.00</b>	<b>14.4</b>	<b>2.9</b>	<b>96.6</b>
<b>May</b>	<b>288.00</b>	<b>21.2</b>	<b>4.6</b>	<b>166.9</b>
<b>June</b>	<b>272.50</b>	<b>24.0</b>	<b>8.5</b>	<b>290.7</b>
<b>July</b>	<b>550.00</b>	<b>29.0</b>	<b>11.3</b>	<b>313.3</b>
<b>August</b>	<b>394.00</b>	<b>26.6</b>	<b>7.9</b>	<b>241.9</b>
<b>September</b>	<b>337.50</b>	<b>30.0</b>	<b>10.7</b>	<b>260.8</b>
<b>October</b>	<b>442.00</b>	<b>29.6</b>	<b>13.7</b>	<b>227.5</b>
<b>November</b>	<b>450.00</b>	<b>20.3</b>	<b>17.1</b>	<b>378.8</b>
<b>December</b>	<b>128.75</b>	<b>18.9</b>	<b>5.2</b>	<b>153.2</b>

❖ **Monthly average characteristics of the imported waste source.**

Imported waste products accounted for less than 1% of total annual plant flow. Imported waste products are slowly metered into the head works of treatment process where they mix with the influent from the pump stations. In accordance with the operating Environmental Compliance Approval, weekly samples of the imported waste are taken, where applicable; sampling has been primarily of the high strength sources. On those occasions where the carrier has not filled the designated sample containers, operators sampled directly from the receiving station and identified these samples as “Mixed”.

<b>Imported Waste Characteristics</b>	<b>CBOD<sub>5</sub> mg/l</b>	<b>TKN mg/l</b>	<b>Total Phosphorus mg/l</b>	<b>Total suspended solids mg/l</b>
<b>January</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>February</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>March</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>April</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>May</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>June</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>July</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>August</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>September</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>October</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>November</b>	<b>18336</b>	<b>367</b>	<b>320.2</b>	<b>2006.3</b>
<b>December</b>	<b>1285</b>	<b>197.6</b>	<b>25</b>	<b>325</b>

### Annual average characteristics of imported waste by source

Imported Waste Quality	BOD <sub>5</sub> mg/l	TKN mg/l	Total Phosphorus Mg/l	Total suspended solids mg/l	Volume Received Million Liters
Mitchell Feed Mill	39	8.1	19.77	104.5	0.032
Rothsay	N/A	N/A	N/A	N/A	N/A
Cadbury	N/A	N/A	N/A	N/A	N/A
Kellogg's	N/A	N/A	N/A	N/A	N/A
Other	2500	390	11	460	0.030
Natrel	27500	545	480	3000	0.061
Maple Leaf	N/A	N/A	N/A	N/A	N/A

### 8. Sludge generation volume and disposal methods

The annual compliance summary provides a tabulation of sludge generation for 2016. In total, approximately 29028.8m<sup>3</sup> of sludge was wasted.

Based on current loadings, we expect a similar amount of sludge generation in 2017.

Digested sludge from the WWTP and from the sludge storage lagoon are removed by Ontario Greenways Inc.

Biosolids are applied to sites approved by the OMAFRA/MOECC for land application of biosolids. This year there was land application of biosolids.

The summary of the sludge applied during 2016 and the projections for the year 2017 are as follows:

<b>YEAR</b>	<b>LAND APPLICATION SITE NUMBER</b>	<b>SLUDGE APPLIED TO LAND/ M3</b>
<b>2016</b>	<b>N/A</b>	<b>N/A</b>
<b>2017 Projection</b>	<b>11 Sites Available</b>	

Sufficient capacity is available within the existing approved land application sites for 2017. The acquisition and submission of application site approval requests are currently conducted by the contracted and licensed Hauler / land application contractor.

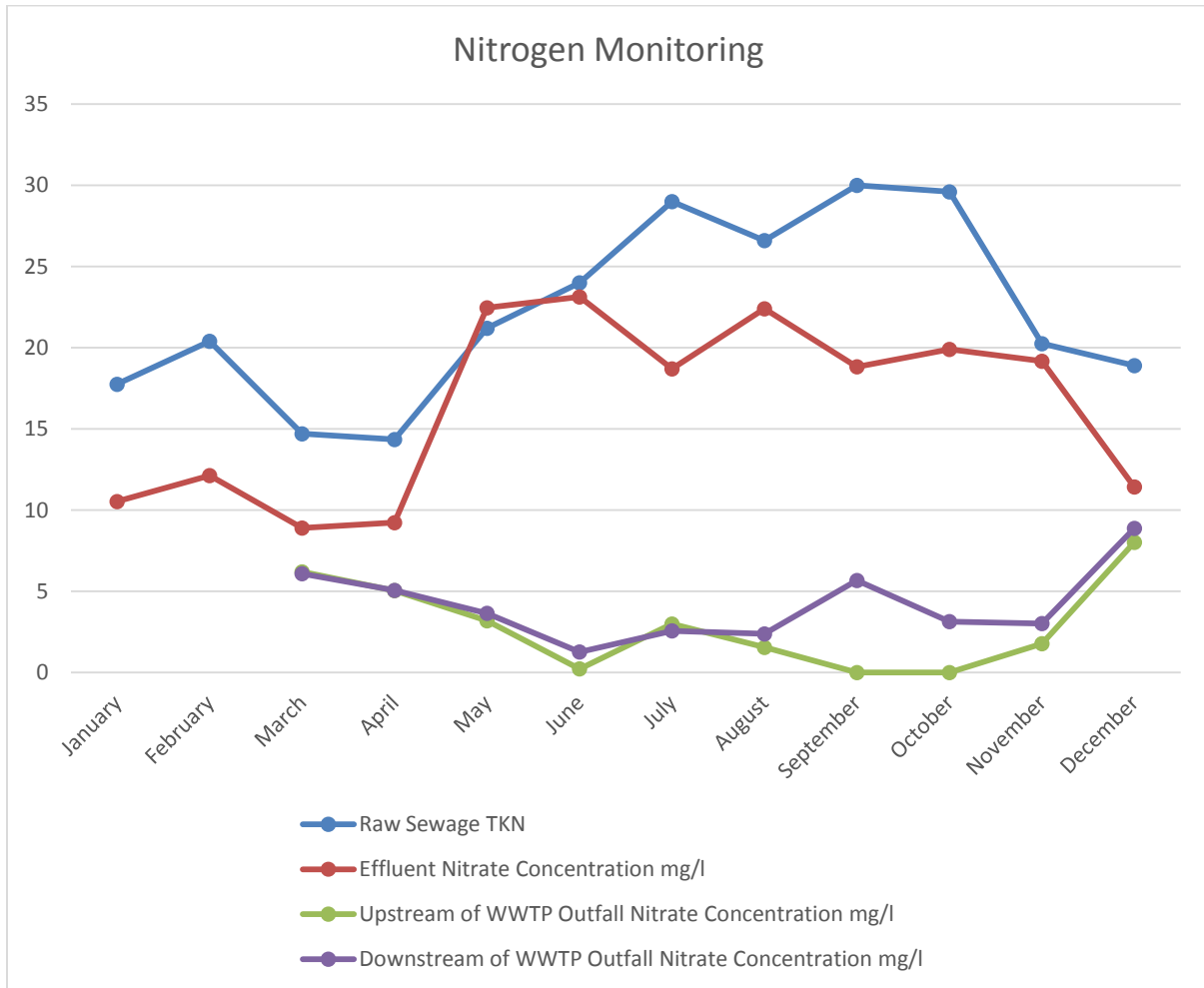
**9. Summary of complaints and action taken to address complaints**

No complaints were reported to operations staff in 2016.

**10. Summary of all by-pass, spill or abnormal discharge events**

No by-pass, spills or abnormal discharge events.

## Nitrogen Monitoring Summary



### Summary

Based on ongoing sampling results, the most significant increase of nitrate in the North Thames River occurs during the summer when stream flow is low and minimal effluent dilution is provided. Correspondingly, background nitrate levels in the North Thames River appear to reduce in the summer which in part offsets the impact of additional nitrate loadings from the wastewater treatment plant during this time period.

The work plan developed by West Perth to date does not include a component for ecological impacts, if any, from higher nitrate values in the North Thames River.



We understand that high nitrate values may be linked to impacts on amphibians during the egg stage of amphibian life cycle (spring). Results to date would indicate a minimal nitrate increase during the spring time, due to higher dilution and to some degree, higher background nitrate levels in the North Thames River during the spring season.

For 2017, the work plan will continue, sampling at the West Perth Line 29 location, and that likely the Line 29 location be used to assess the net increase of nitrate levels in the North Thames River.