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# HALDIMAND COUNTY

Report PW-WW-02-2018 Annual Wastewater Quality Report  
For Consideration by Council in Committee on April 24, 2018

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## OBJECTIVE:

To provide a summary of wastewater treatment facilities' performance and key achievements in 2017 and planned activities for 2018.

## RECOMMENDATIONS:

1. THAT Report PW-WW-02-2018 Annual Wastewater Quality Report be received as information.

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**Approved:** Karen General, CPA, CGA, Deputy Chief Administrative Officer

## EXECUTIVE SUMMARY:

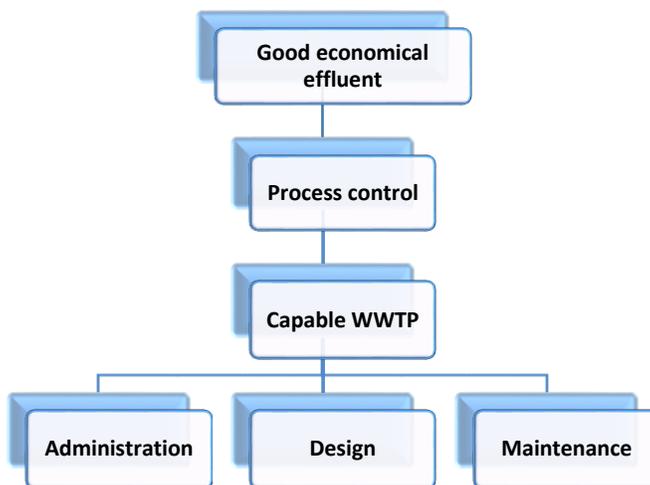
Haldimand County owns eight wastewater treatment facilities including four mechanical plants and four lagoon systems. The 2017 facility performance parameters, along with the results, have been summarized and provided within Report PW-WW-02-2018, along with some noteworthy action items that were identified as part of the Ministry of the Environment and Climate Change inspections.

Haldimand County has successfully incorporated the Composite Correction Program approach with respect to the operation, maintenance and capital program upgrades related to its wastewater facilities. This report contains key information regarding Haldimand County's approach to wastewater optimization and facility performance, as well as some key activities and achievements that occurred during the year, and plans and goals moving forward into 2018.

## BACKGROUND:

For the past nine years, Haldimand County's wastewater treatment operations staff have been participating in an optimization program. The foundation of the program is based on the Composite Correction Program, established by the US EPA in the 1970's. The focus of the program is to obtain a "good", economical effluent that meets or exceeds compliance limits. An "economical" effluent is achieved through the efficient and effective use of power, chemicals, staff time and available plant infrastructure. Since the goal is environmental protection, "good" is placed ahead of "economical" as the focus.

In the following flow chart, administration, design, and maintenance practices are the foundation necessary to establish a plant that is capable of achieving the desired performance. By applying process control activities on a day-to-day basis, the plant operators take a capable plant to the desired level of performance. The requirements of the treatment process determined by process control and testing, help establish priorities for the facility.



Haldimand County’s wastewater treatment infrastructure consists of four facultative lagoon systems, four mechanical plants and twenty pump stations. These facilities are currently operated by Veolia Water Canada, under contract to Haldimand County.

### Haldimand County Wastewater Treatment Plants (WWTP)

Mechanical Plant	Type of Plant	Design Flow	Average Flow 2017
Caledonia	Stacked conventional activated sludge plant with tertiary filtration, aerobic digestion, chlorine disinfection and de-chlorination.	7,200 m <sup>3</sup> /d	3,517 m <sup>3</sup> /d
Cayuga	Oxidation ditch, aerobic sludge digestion and storage and UV disinfection.	1,200 m <sup>3</sup> /d	800 m <sup>3</sup> /d
Dunnville	Extended aeration plant with on-site aerobic sludge treatment and storage. Effluent is chlorinated and de-chlorinated. The plant is also equipped with hauled sewage pre-treatment and storage facilities for holding and septic tanks, portable toilet wastes, and landfill leachate.	7,728 m <sup>3</sup> /d	4,288 m <sup>3</sup> /d
Hagersville	Two parallel extended aeration plants. The plant is also equipped with tertiary filtration (2 units) and ultraviolet disinfection (2 units). Facility also includes a leachate receiving station.	4,200 m <sup>3</sup> /d	2,476 m <sup>3</sup> /d

## Haldimand County Lagoon Systems

Lagoon System	Description	Design Flow (m <sup>3</sup> /d)	Average Flow 2017 (m <sup>3</sup> /d)	Discharge Period	Effluent Discharge
Jarvis	4-cell lagoon system	853	985	Spring: 7 - 10 days in April. Fall: 30 - 45 days from November.	Sandusk Creek
Townsend	4-cell lagoon system (3 cells for wastewater treatment, 1 cell for biosolids storage)	2,095	272	Spring: 50% free of ice cover for 14 – 45 days. Fall: starting on October 15, continuing for at least 14 days and ending on November 30.	Nanticoke Creek
Oswego	2-cell lagoon system	85	105	Specific daily flow rate for March, April, May, November and December.	Oswego Creek
LEIP (Lake Erie Industrial Park)	3-cell lagoon system	657	617	Spring and Fall: discharge when conditions allow.	Centre Creek

### ANALYSIS:

Municipalities are required to meet effluent quality compliance and objective limits as defined in the Environmental Compliance Approval which is issued by the Ministry of Environment and Climate Change (MOECC). Haldimand County has also committed to meeting the voluntary targets established through the Grand River Conservation Authority (GRCA) Water Management Plan in 2014 (Report PW-WW-05-2014 Grand River Watershed Water Management Plan).

To understand MOECC limits and objectives, and GRCA voluntary targets as outlined in the following chart:

- The MOECC effluent limits should never be exceeded. These are set by the Ministry based on maximum levels of nutrients or other parameters being sent to the receiving water. Each plant is evaluated based on its specific receiving water. There are no defined penalties for exceeding these limits, however they are reportable. The MOECC expectation is that a plan be put in place to address the non-compliance issue(s) including a due date to complete the actions.
- The MOECC effluent objectives set out for each facility are criteria that the plant is designed to meet. There are no penalties for exceeding these objectives.
- The GRCA voluntary targets are more stringent as they aim to improve overall receiving water quality. There also are no penalties for exceeding these targets.

## Performance

Facility	Performance Parameter	MOECC Compliance Limit	MOECC Compliance Objective	GRCA Voluntary Targets
Caledonia	<b>Phosphorous</b>	0.3	0.15	0.15
	<b>Ammonia</b>			
	May 1 – November 30	1.0	0.75	0.75
	December 1 – April 30	2.0	1.5	1.5
Cayuga	<b>Phosphorous</b>	0.75	0.50	0.50
	<b>Ammonia</b>			
	October 1 – May 31	4	N/A	5
	June 1 – September 30	2	N/A	3
Dunnville	<b>Phosphorous</b>	1.0	0.5	0.5
	<b>Ammonia</b>			
	December 1 – April 30	N/A	10	5
	May 1 – November 30	N/A	5	3
Hagersville (January 1 to May 11, 2017)	<b>Phosphorous</b>	1.0	0.8	N/A
	<b>Ammonia</b>			
	May 1 – October 31	6	3.0	N/A
	November 1 – April 30	10	5.0	N/A
Hagersville (Effective May 11, 2017)	<b>Phosphorous</b>			
	June 1 – November 30	0.15	0.10	N/A
	December 1 – April 30	0.20	0.14	
	<b>Ammonia</b>			
	May 1 – October 31	2.20	0.73	N/A
	November 1 – April 30	3.60	2.20	N/A

### Haldimand County Wastewater Treatment Plant Performance Parameters

All wastewater facilities met the Ministry of the Environment and Climate Change (MOECC) effluent compliance limits for 2017.

As a result of re-rating the Hagersville WWTP capacity to 4,200 m<sup>3</sup>/d from 3,055 m<sup>3</sup>/d, the plant is required to achieve more stringent effluent objectives and limits. During the re-rating process, the plant demonstrated the ability to achieve the more stringent effluent requirements. The Hagersville WWTP did, however, exceed the total suspended solids objective concentration in October. The plant also exceeded the total phosphorous objective in February, June and October. These exceedances were a combination of wet weather events and process upsets, therefore no further action was required by the MOECC.

Caledonia, Cayuga and Dunnville wastewater treatment facilities are located along the Grand River watershed. In the County's partnership with the GRCA, effluent targets have been established. These targets are voluntary and do not result in additional operating costs, but focus on educating and empowering operational staff to enhance process control while improving overall river health. Failure to meet these targets will not result in penalties or cause significantly harmful impacts on the receiving waters. The Caledonia, Cayuga and Dunnville wastewater treatment facilities achieved ammonia and phosphorus objectives in all twelve months. The Hagersville treatment facility does not have GRCA targets as it is not located along the Grand River watershed.

## Ministry of the Environment and Climate Change (MOECC) Inspections

Wastewater treatment plant inspections are performed by the MOECC approximately every four years. These inspections occur to ensure that the County's wastewater plants are operating as per their assigned Environmental Compliance Approvals (ECA). The performance data that has been collected in the previous four years (between inspections), is reviewed against the effluent compliance objectives and limits. The Caledonia WWTP was the only facility inspected by the MOECC in 2017. The previous inspection was conducted in 2011. For the 2017 inspection, the performance period of 2011 to 2017 was reviewed by the Ministry. Any performance issues that are identified are communicated or reported to the MOECC as they occur. The performance of the treatment facilities is jointly reviewed and discussed with operations staff on a monthly basis. If there are performance or operational issues, actions are jointly identified to address the problem(s) as they arise.

There were no non-compliance items identified.

There were two Best Practice Recommendations made for the Caledonia WWTP which included:

- Spill containment was not provided for the process chemicals and/or standby power generator fuel. The recommended action was to undertake repairs on secondary containment at the treatment and pump stations. Annual inspections should be conducted in order to document the condition of all chemical and fuel secondary containment areas.
  - Council has approved funds from the 2018 Capital Budget to repair and replace containment areas at the main treatment facility and the Paisley Pump Station.
  - An annual inspection procedure has been developed by Veolia to address any condition or infrastructure changes and Veolia staff have been asked to notify the County as necessary.
- During the physical inspection of the Domtar Pump Station, it was noted that several holes have been created by the replacement of monitoring equipment which is exposed to the natural environment and is allowing rainwater and snow melt to enter the collection system. The recommended action was to repair these holes.
  - These repairs were completed shortly after the inspection.

Also noted:

- The facility did not meet the MOECC final effluent objectives for total phosphorous, chlorine residual and pH in 2012, 2013 and 2014. There were no actions or recommendations at this time as objectives have been met since 2015.
  - The County was undergoing onsite technical assistance at the Caledonia WWTP during 2012 - 2014 to address operational issues, therefore no best practice or actions were required.

## Key Achievements in 2017

- Successfully re-rated the Hagersville WWTP from 3,055 m<sup>3</sup> to 4,200 m<sup>3</sup>.
- Implemented phosphorous special study at the Cayuga WWTP to show that the secondary plant is capable of achieving the GRCA target of 0.3 mg/L or lower total effluent phosphorous in order to improve the quality of the receiving waters.
  - Moving forward, the same study will be implemented at the Dunnville WWTP.

- Continued the receiving water studies for the Jarvis and Sandusk Creeks and for the Centre Creek receiving water from the Lake Erie Industrial Park.
- Completed performance and capacity assessments at the Caledonia and Cayuga wastewater treatment facilities to assess current treatment capabilities and plan for future upgrades.
- Completed onsite fill/draw assessment of the McKay Pump Station in Cayuga in order to assist with determining true capacity and capability to handle development within that area of Cayuga.
- Initiated construction of the Dunnville wastewater facility upgrades.
  - New pre-treatment system;
  - Return activated sludge equipment;
  - Waste sludge thickening tanks and equipment;
  - Control building.

### **Planned Activities for 2018**

Below is a list of planned projects and process improvements for 2018. Accomplishing these items will potentially improve performance and allow, in some cases, for increased capacity.

- Continue receiving water studies for Sandusk Creek, Nanticoke Creek, Centre Creek and the Grand River. The work is being carried out to support discussions with MOECC for additional wastewater treatment capacity.
- Complete construction of the Dunnville Wastewater Treatment Plant (WWTP) upgrades.
  - New pre-treatment system;
  - Return activated sludge equipment;
  - Waste sludge thickening tanks and equipment;
  - Control building.
- Caledonia WWTP aeration diffuser upgrades to achieve design capacity.
- Initiate construction of Townsend biosolids upgrades.
  - Earth works to separate Cell #4 into three cells;
  - Concrete pad for loading and offloading;
  - Slip pipes and decanting equipment.
- Engineering work for identifying preferred option to obtain additional treatment capacity within Jarvis including:
  - Municipal Class Schedule 'C' EA;
  - ECA Approvals;
  - Design and tendering of proposed upgrades.
- Facilitate the Hagersville Wastewater Treatment Plant performance and capacity assessment.
- Facilitate performance based workshops and special studies including mass control, phosphorous removal and digester performance with Veolia staff, to empower operators to practice data based decision making and improve critical thinking.
- Comprehensive review of pump stations within the County to determine deficiencies and development of approach to address them.

**FINANCIAL/LEGAL IMPLICATIONS:**

Not applicable.

**STAKEHOLDER IMPACTS:**

A collaborative effort between the Divisions of Water and Wastewater Operations, Engineering Services, Economic Development & Tourism and Community Development & Partnerships is required to successfully deliver program activities.

**REPORT IMPACTS:**

Agreement: No

By-law: No

Budget Amendment: No

Policy: No

**ATTACHMENTS:**

None.