McGarry Water & Wastewater Systems Quarterly Operations Report

Prepared By: The Ontario Clean Water Agency | Prepared for: The Township of McGarry

SYSTEM OVERVIEW | October 1 to December 31, 2021

Highlights

Virginiatown-Kearns Drinking Water System

- An Integrated Systems Audit which focused on OCWA's Occupational Health and Safety System (OHSS) was completed in October. Refer to the Health and Safety section below for findings.
- Inlet and discharge lines replaced on hypo metering system.
- Outlet flange and shut off valve replaced on sodium hypochlorite bulk tank.
- One watermain break occurred this quarter. Refer to *Incidents* below for details.

McGarry Wastewater Treatment Lagoon

- Replaced lagoon diffusers
- The effluent exceeded the monthly regulatory limit for total phosphorus (TP) and total suspended solids (TSS) in October. Refer to *Incidents* below for details.
- One (1) spill event occurred at the lagoon. Refer to *Incidents* below for details.

Asset Management

Preventative, corrective and emergency maintenance are performed as recommended by the manufacturer. Work is scheduled using OCWA's Workplace Management System (Maximo). Corrective and emergency maintenance is also managed using Maximo.

Capital Plan Progress

The tables below provide the status of capital work completed to date in 2021.

Capital Item – Water Treatment System	Status
Annual generator maintenance	Complete – April 13, 2021
Silent check valve (spare)	Complete – April 21, 2021
Annual lifting device inspection	Complete – April 26, 2021
DWQMS third party audit (SAI Global)	Complete – May 4, 2021
Permit to Take Water Renewal	Complete – August 21, 2021
Silent check valve replacement (Well No. 2)	Complete – November 15, 2021

CAPITAL ITEM - WASTEWATER LAGOON SYSTEM	STATUS
Replace check valves on blowers	Complete – February 8, 2021
Annual generator maintenance	Complete – April 13, 2021
Annual lifting device inspection	Complete – April 26, 2021
Jockey pump (spare)	Complete – June 22, 2021
Replace lagoon diffuser	Complete - August

CALL-OUT SUMMARY

Number of Call-outs this Quarter:	0 (water system)	0 (sewage lagoon)
Total Call-outs to Date (2021):	3	
Annual Call-out Allowance:	8	
Details of the Call-outs:	No call-outs this quarter	

Note: Not all call backs are billed to the Owner; depends on the nature of the call.

FLOW SUMMARIES

Virginiatown-Kearns Water Treatment Plant (Tower Flows) – Historical Flow Comparison

Year	Total Treated Flows (m^3)	Maximum Treated Flow (m^3/d)	Average Daily Treated Flow (m^3/d)	Average Day % of Rated Capacity (2045 m^3/d)
2021	**142,720**	**789**	**391**	**19.1%**
2020	188,494	889	515	25.2%
2019	230,717	991	632	30.9%
2018	337,340	1870	924	45.2%
2017*	383,370	2724	1050	51.3%

McGarry Lagoon – Historical Flow Comparison

Year	Total Influent Flow (m^3)	Maximum Influent Flow (m^3/d)	Average Daily Influent Flow (m^3/d)	Average Day % of Design Capacity (1135 m^3/d)
2021	**349,792**	**10,000**	**958**	**84.4%***
2020	476,828	6191	1303	115%
2019	475,681	7585	1303	115%
2018	575,627	7896	1580	139%
2017**	662,826	8257	1816	160%

*Effluent flows are reduced in 2021 because of an on-going spill. Refer to "*Incidents*" below for details.

** Infrastructure work began in 2017 and continued in 2018 to significantly reduce water loss in the distribution system and excess flow into the sewage collection system.

Refer to Appendix A for historical flow trends which compare flows from 2017 to 2021

REGULATORY

Sampling, Testing and Monitoring

- ✓ All water samples required under O. Regulation 170/03 were collected and tested in the fourth quarter and fell within regulatory limits.
- ✓ The system complied with its water taking permit and municipal license having no raw or treated water flow exceedances during this quarter.
- ✓ All sewage samples required under the system's Environmental Compliance Approval *(*ECA) were collected and tested in the fourth quarter.
  - ➢ In October, the effluent failed to meet the monthly regulatory limit of 0.5 mg/L for Total Phosphorus (TP) and the monthly regulatory limit of 25 mg/L for Total Suspended Solids (TSS).
  - ➢ Results from the weekly sampling of the spill material are included as part of the monthly effluent concentration and waste loading concentrations as per MECP. Sampling began on November 23, 2021
- ✓ The sewage treatment system complied with its rated capacity this quarter, however Effluent flows are reduced in the third quarter because of an on-going spill.
- ✓ Refer to Appendix B for Performance Assessment Reports which provide summaries of water usage, wastewater treatment volumes and regulatory results for the quarter.

Reporting

- ✓ No regulatory reporting required this quarter.

Inspections/Audits

- ✓ The annual QEMS Management Review meeting required under the Drinking Water Quality Management Standard (DWQMS) was held on December 15th. Minutes of the meeting were provided to OCWA's upper Management and the Owner on December 16, 2021.

INCIDENTS

Virginiatown-Kearns Drinking Water System

- One (1) watermain break occurred this quarter:

  October 18, 2021 @ 1330 hours - watermain break on Government Road due to a split bell caused by deterioration. No homes were affected by the break. Break classified by OCWA OIC as a Category 1 with no suspected or evident contamination directed to users. Local Health Unit notified as a courtesy. Positive pressure and air gap maintained throughout repair. Repaired with 2 clamps and new piping (approx. 3 ft) meeting AWWA specifications. Disinfection and flushing performed (FCR = 0.97 mg/L). Service restored on October 18th at 1955 hours.

McGarry Wastewater Treatment Lagoon

- Two (2) effluent exceedances occurred in the fourth quarter:

1. **Total Phosphorus Exceedance (SAC Ref No. 3057-C8FLY7)** – for the month of October 2021 **-** the effluent exceeded the average TP limit of 0.5 mg/L having a monthly average concentration of 0.875 mg/L (results are: Oct. 5 = 0.369, Oct. 12 = 1.57, Oct. 19 = 0.50, Oct. 25 = 1.06 mg/L).

2. **Total Suspended Solids Exceedance (SAC Ref No. 3057-C8FLY7)** – The effluent exceeded the average TSS limit of 25 mg/L having a monthly average concentration of 28.8 mg/L (results are: Oct. 5 = 4.5, Oct. 12 = 93, Oct. 19 = 1.0, Oct. 25 = 16.5 mg/L).

A large amount of duckweed was present in cell 2 & 3. Town removed duckweed from the surface of the cells at the end of August and beginning of September to help reduce increasing TP and TSS concentrations, but the duckweed that sank into the lagoon is causing increased levels in October. Alum was increased to help drop levels.

- One (1) spill and one (1) planned bypass event occurred in the fourth quarter.

Spill (SAC Ref No. 1-1FK7NF) - In November, operators noticed that the effluent flow discharging to the receiver (Larder Lake) was much less than the flow entering the lagoon. The effluent flow discharging to the receiver was approximately 80 to 85 % less than the flow entering the lagoon. Operators also noticed that it was difficult to collect a composite sample due to the low flows.

On November 23, 2021, the Senior Operations Manager toured the lagoon site and discovered a stream of treated effluent discharging from Cell No. 3 to wetlands which eventually made its way to Larder Lake.

Two inspectors from the MECP attended the site on November 24th and walked around the site. They indicated that the spill is discharging to the wetland at the roadside and likely making its way through the culverts that go under the highway to the wetland in front of the mine across the road. There is a berm between the wetland and the mine's tailings pond which would also prevent any mixing.

Cause:
The suspected cause of the spill is unknown, however it is believed that the liner in Cell No. 3 is damaged.

Corrective Actions:
A sample of the spill material will be collected weekly and will be tested for effluent parameters required in the ECA (ammonia, total phosphorus, E. coli, cBOD5, TSS pH and temperature).

The water level in Cell No. 3 was lowered and a visual inspection of the liner was performed. Liner material was observed to be piled up in the eastern corner of the cell. Pederson Construction Inc. was called on-site on December 2, 2021 to assess the liner and determine if they have the equipment to straighten the liner and re-apply the sand. The vendor of the liner was contacted and indicated that repairing the liner in the sub-zero temperatures could cause further damage and was not recommended. In the meantime, the effluent stream will continue to discharge into the wetlands.

Planned Bypass (SAC Ref. No. 1-1GWH4A) - A request to bypass Cell No. 3 was submitted to MECP on December 3rd. This was to allow Cell No. 2 to discharge directly to the effluent chamber and out to Larder Lake. This was required to keep Cell No. 3 drained and to inspect the condition of Cell No. 2.

The MECP approved the request with the following conditions. To collect a grab sample of the Cell No. 2 effluent at the start of the bypass and to collected weekly composite samples of the partially treated effluent, to collect weekly grab samples of the spill material, to monitor the spill material for any change in flow and effect on the environment and to report any effluent exceedances to MECP.

The bypass started on December 9th at 2:00 PM and terminated on December 21st at 1:00 PM. The investigation of the lagoon was inconclusive. No change in the spill was observed and no negative impacts to the environment occurred. Weekly sampling and monitoring of the spill will occur until the Spring when further investigation can occur.

COMPLAINTS

- No complaints were documented this quarter.

HEALTH AND SAFETY

- All safety equipment at each plant was checked monthly to ensure that they are in good working order
- An Integrated Systems Audit was conducted for the Virginiatown water treatment system in November. The audit is a proactive check to drive continual improvement of OCWA's Occupational Health and Safety System (OHSS). The following findings were identified in the audit report:
  - Update Form 82 posted at the well house - Complete
  - Ladder and rail system at the water tower is due for inspection. Last inspected by Landmark in 2011. – Identified in the 2022 capital letter
  - A noise survey has not be done – In progress
  - No written Working Alone procedure in place - Cell phone application being piloted

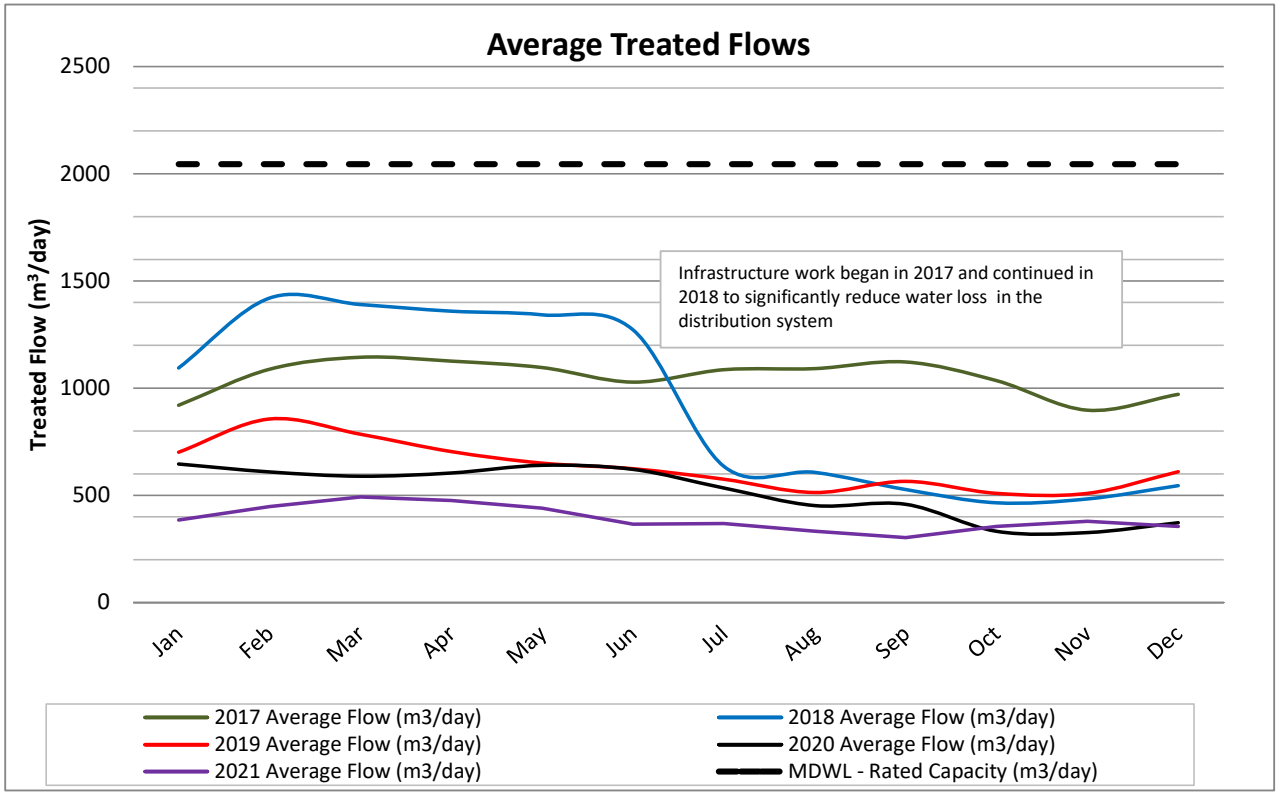
- Health and Safety Training/Sessions completed this quarter include:
  - ✓ Lock-out Tag-out
  - ✓ Lifting Devices
  - ✓ OCWA's Chemical Use/Handling
  - ✓ Personal Protective Equipment Policy
  - ✓ Contingency Plan Test – Unsafe Water
  - ✓ Working at Heights
  - ✓ Traffic Control

APPENDIX A

Historical Flow Trends

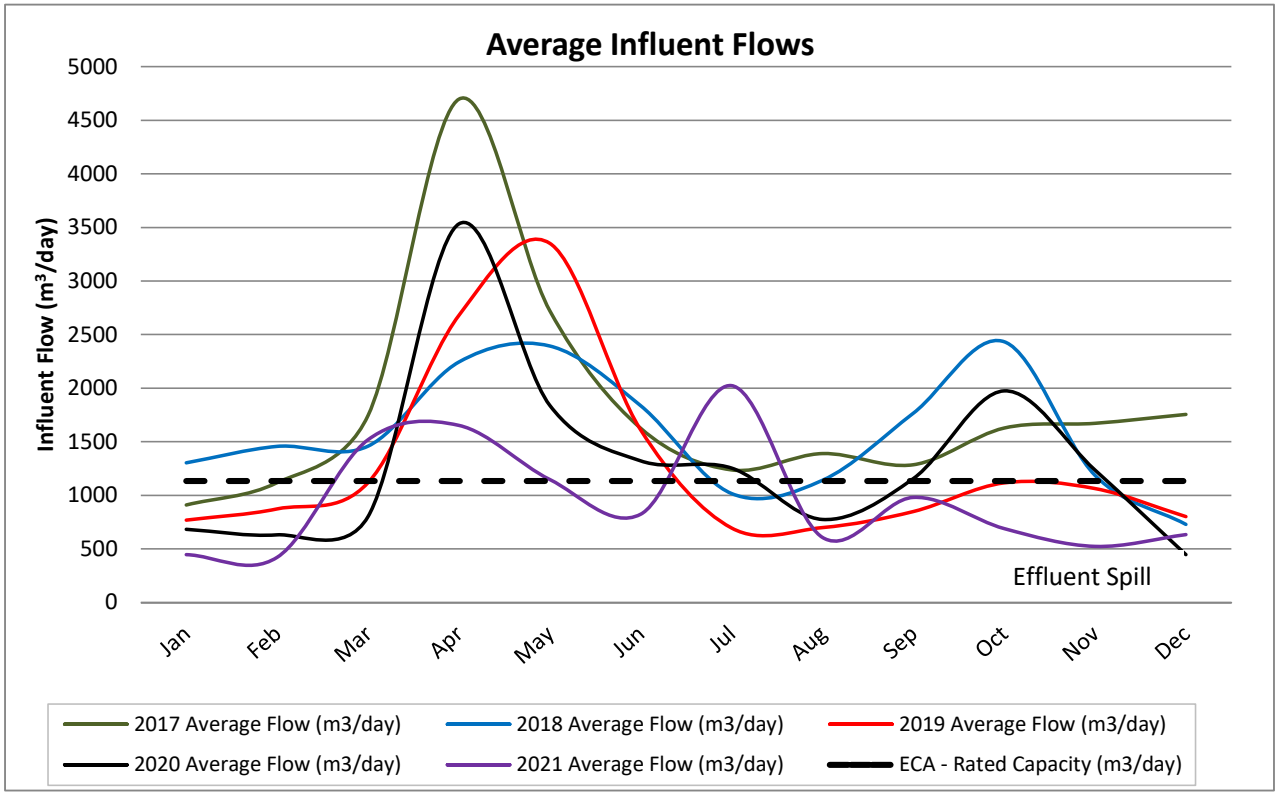
Virginiatown-Kearns Water Treatment System - Average Treated Water Tower Flows from 2017 to 2021

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017 Average Flow (m^3/day)	920	1088	1144	1126	1096	1028	1086	1091	1122	1035	897	971
2018 Average Flow (m^3/day)	1094	1420	1390	1359	1342	1272	635	607	527	465	483	545
2019 Average Flow (m^3/day)	701	856	785	704	650	624	575	513	565	509	509	610
2020 Average Flow (m^3/day)	646	609	589	604	640	621	534	452	458	332	326	372
2021 Average Flow (m^3/day)	385	448	492	476	440	365	369	332	303	355	378	355
MDWL - Rated Capacity (m^3/day)	2045	2045	2045	2045	2045	2045	2045	2045	2045	2045	2045	2045



McGarry Lagoon - Average Influent Flows from 2017 to 2021

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017 Average Flow (m^3/day)	910	1119	1745	4697	2723	1626	1238	1390	1286	1628	1672	1755
2018 Average Flow (m^3/day)	1304	1457	1459	2244	2394	1837	1017	1141	1766	2434	1187	729
2019 Average Flow (m^3/day)	769	874	1118	2679	3352	1611	696	699	849	1117	1064	802
2020 Average Flow (m^3/day)	683	632	802	3533	1840	1322	1255	775	1156	1975	1236	447
2021 Average Flow (m^3/day)	447	422	1519	1653	1148	824	2024	608	981	690	524	634
ECA - Rated Capacity (m^3/day)	1135	1135	1135	1135	1135	1135	1135	1135	1135	1135	1135	1135



APPENDIX B

Performance Assessment Reports

Facility: [5085] VIRGINIATOWN-KEARNS (MCGARRY) DRINKING WATER SYSTE

Works: [220000317]

WATER USAGE		10/2021		11/2021		12/2021		<--Total-->		<--Avg.-->		<--Max.-->		<--Min.-->		Max. Capacity
Flows:																
Raw Flow: Monthly Total - Well 1 (Cheminis) (m^3)		11153		11704		11490		34347								
Raw Flow: Monthly Avg - Well 1 (Cheminis) (m^3/d)		359.77		390.13		370.65				373.52						
Raw Flow: Monthly Max - Well 1 (Cheminis) (m^3/d)		553		484		461						553				2044.8
Raw Flow: Monthly Total - Well 2 (Standby) (m^3)		194		209		271		674								
Raw Flow: Monthly Avg - Well 2 (Standby) (m^3/d)		6.26		6.97		8.74				7.32						
Raw Flow: Monthly Max - Well 2 (Standby) (m^3/d)		59		71		71						71				1500
Treated Flow: Monthly Total - Treated Water (POE) (m^3)		11347		11913		11761		35021								
Treated Flow: Monthly Avg - Treated Water (POE) (m^3/d)		366.03		397.1		379.39				380.84						
Treated Flow: Monthly Max - Treated Water (POE) (m^3/d)		555		488		461						555				2045
RAW WATER		10/2021		11/2021		12/2021		<--Total-->		<--Avg.-->		<--Max.-->		<--Min.-->		Limits
Turbidity:																
Raw: Max Turbidity - Well 1 (Cheminis) (NTU)		0.48		0.21		0.22						0.48				N/A
Raw: Max Turbidity - Well 2 (Standby) (NTU)		0.475		0.29		0.39						0.475				N/A
TREATED WATER		10/2021		11/2021		12/2021		<--Total-->		<--Avg.-->		<--Max.-->		<--Min.-->		Limits
Chlorine Residuals:																
Treated: Min Free Cl2 Resid - Treated Water (POE) (mg/L)		1.226		1.33		1.168								1.168		CT*
Treated: Max Free Cl2 Resid - Treated Water (POE) (mg/L)		1.454		1.543		1.49						1.543				
Bacti Samples:																
Treated Bacti: # of samples - Treated Water (POE)		4		5		4		13								13
Treated Bacti: # of TC exceedances - Treated Water (POE)		0		0		0		0								0
Treated Bacti: # of EC exceedances - Treated Water (POE)		0		0		0		0								0
Chemical Parameters:																
Treated: Max Nitrite - Treated Water (POE) (mg/L)	<	0.05									<	0.05				1
Treated: Max Nitrate - Treated Water (POE) (mg/L)		0.8										0.8				10
Chlorine Residuals:																
Dist: Min Free Cl2 Resid - Residual No. 1 (mg/L)		0.54		0.91		0.78								0.54		0.05
Dist: Min Free Cl2 Resid - Residual No. 2 (mg/L)		0.45		0.83		0.79								0.45		0.05
Dist: Min Free Cl2 Resid - Residual No. 3 (mg/L)		0.81		0.99		1.02								0.81		0.05
Dist: Min Free Cl2 Resid - Residual No. 4 (mg/L)		0.83		1.07		1.02								0.83		0.05
Dist: Max Free Cl2 Resid - Residual No. 1 (mg/L)		1.25		1.49		1.29						1.49				
Dist: Max Free Cl2 Resid - Residual No. 2 (mg/L)		1.32		1.32		1.25						1.32				
Dist: Max Free Cl2 Resid - Residual No. 3 (mg/L)		1.29		1.25		1.26						1.29				
Dist: Max Free Cl2 Resid - Residual No. 4 (mg/L)		1.16		1.53		1.15						1.53				
Bacti Samples:																
Dist Bacti: # of samples - VT-3 (Bacti)		4		5		4		13								13
Dist Bacti: # of TC exceedances - VT-3 (Bacti)		0		0		0		0								0
Dist Bacti: # of EC exceedances - VT-3 (Bacti)		0		0		0		0								0
Dist Bacti: # of samples - VT-4 (Bacti)		4		5		4		13								13
Dist Bacti: # of TC exceedances - VT-4 (Bacti)		0		0		0		0								0
Dist Bacti: # of EC exceedances - VT-4 (Bacti)		0		0		0		0								0
Chemical Parameters:																
Distribution: Max THM - Distribution Water (µg/l)		3										3				100**
Distribution: Max HAA - Distribution Water (µg/l)		10										10				80***

NOTES:

* CT is the concentration of chlorine in the water times the time of contact that the chlorine has with the water. It is used to demonstrate the level of disinfection treatment in the water. CT calculations are performed for the Virginiatown-Kearns water plant if the free chlorine residual level drops below 0.10 mg/L to ensure primary disinfection is achieved. CT was met this quarter.

** Maximum Allowable Concentration (MAC) for Trihalomethanes (THMS) = 100 ug/L (Four Quarter Running Average). The running average to end of the quarter = **1.8 ug/L**

*** Maximum Allowable Concentration (MAC) for Haleoacetic Acids (HAAs) = 80 ug/L (Four Quarter Running Average). The running average to end of the quarter = **< 8.5 ug/L**

Facility: [1022] McGARRY WASTEWATER TREATMENT LAGOON

Works: [120000024]

FLOWS		10/2021		11/2021		12/2021		<--Total-->		<--Avg.-->		<--Max.-->		Avg. Capacity
Flows:														
Raw Flow: Total - Influent (m^3)		21380		15707		19649		56736						
Raw Flow: Avg - Influent (m^3/d)		689.68		523.57		633.84				615.69				1135
Raw Flow: Max - Influent (m^3/d)		2111		866		2062						2111		
Eff. Flow: Total - Effluent (m^3)		10045		7251		11849		29145						
Eff. Flow: Avg - Effluent (m^3/d)		324.03		241.7		382.23				315.99*				1135
Eff. Flow: Max - Effluent (m^3/d)		1439		1857		1556						1857		
INFLUENT & EFFLUENT		10/2021		11/2021		12/2021		<--Total-->		<--Avg.-->		<--Max.-->		Monthly Limits
Biochemical Oxygen Demand: BOD5:														
Raw: # of samples of BOD5 - Influent (mg/L)		1		1		1		3						1
Raw: Avg BOD5 - Influent (mg/L)		7.7		10		30				15.9		30		
Carbonaceous Biochemical Oxygen Demand: CBOD:														
Eff: # of samples of cBOD5 - Effluent (mg/L)		4		7		7		18						18**
Eff: Avg cBOD5 - Effluent (mg/L)		1.175		1.129	<	1			<	1.101		1.175		25
Loading: cBOD5 - Effluent (kg/d)		0.381		0.273	<	0.382			<	0.345		0.382		28.4
Total Suspended Solids: TSS:														
Raw: # of samples of TSS - Influent (mg/L)		1		1		1		3						3
Raw: Avg TSS - Influent (mg/L)		16.5		16		18.5				17		18.5		
Eff: # of samples of TSS - Effluent (mg/L)		4		5		4		13						13
Eff: Avg TSS - Effluent (mg/L)	<	28.75***	<	12.286	<	1.429			<	14.155	<	28.75		25
Loading: TSS - Effluent (kg/d)	<	9.316	<	2.969	<	0.546			<	4.277	<	9.316		28.4
Percent Removal: TSS - Influent (mg/L)		-74.242		23.214		92.278						92.278		
Total Phosphorus: TP:														
Raw: # of samples of TP - Influent (mg/L)		1		1		1		3						3
Raw: Avg TP - Influent (mg/L)		0.893		0.238		0.331				0.487		0.893		
Eff: # of samples of TP - Effluent (mg/L)		4		7		7		18						18**
Eff: Avg TP - Effluent (mg/L)		0.875****		0.299		0.115				0.429		0.875		0.5
Loading: TP - Effluent (kg/d)		0.283		0.072		0.044				0.133		0.283		0.6
Percent Removal: TP - Influent (mg/L)		2.044		-25.51		65.3						65.3		
Nitrogen Series:														
Raw: # of samples of TKN - Influent (mg/L)		1		1		1		3						3
Raw: Avg TKN - Influent (mg/L)		9.4		8		4.7				7.367		9.4		
Eff: # of samples of TAN - Effluent (mg/L)		4		7		7		18						18**
Eff: Avg TAN - Effluent (mg/L)	<	0.09	<	0.693		2.32			<	1.034		2.32		5
Loading: TAN - Effluent (kg/d)	<	0.029	<	0.167		0.887			<	0.361		0.887		5.7
Disinfection:														
Eff: # of samples of E. Coli - Effluent (cfu/100mL)		4		7		7		18						18**
Eff: GMD E. Coli - Effluent (cfu/100mL)		8.66		9.211		405.873				141.248		405.873		N/A

NOTES:

* Effluent flows are reduced in the third quarter because of an on-going spill. Refer to "*Incidents*" in the report for details.

** Results from the weekly sampling of the spill material are included as part of the monthly effluent concentration and waste loading concentrations as per MECP. Sampling begain on November 23rd.

*** October - The effluent failed to meet the monthly regulatory limit of 0.5 mg/L for Total Phosphorus (TP).

**** October - The effluent failed to meet the monthly regulatory limit of 25 mg/L for Total Suspended Solids (TSS).