Deep River Wastewater System

Waterworks # 120000612

Annual Report

Prepared For: Town of Deep River

Reporting Period of January 1st – December 31st, 2021

Issued: Mar 29, 2022

Revision: 0

Operating Authority:

OCWA

ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

This report has been prepared to meet the requirements set out in the facility Environmental Compliance Approval (ECA) #1655-7P8SPE issued February 26, 2009.

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Operations and Compliance Reliability Indices

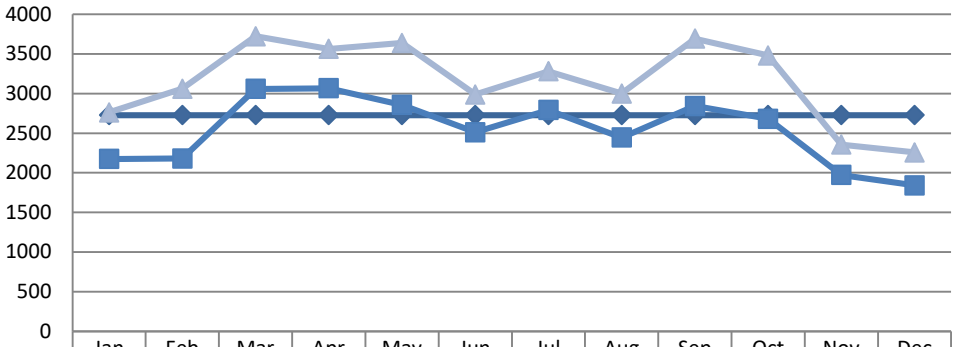
Compliance Event	# of Events
Ministry of the Environment, Conservation and Parks (MECP) Inspections	There were no inspections during this reporting period.
Ministry of Labour Inspections	There were no inspections during this reporting period.
Non-Compliances to MECP/EC	There were non-compliances during this reporting period.
Community Complaints	There were no complaints during this reporting period.
Spills	There were no spills reported during this reporting period.
By-Pass/Overflows	There were no by-passes/overflows during this reporting period.

Treatment Flows

Raw Flows (m3/d)

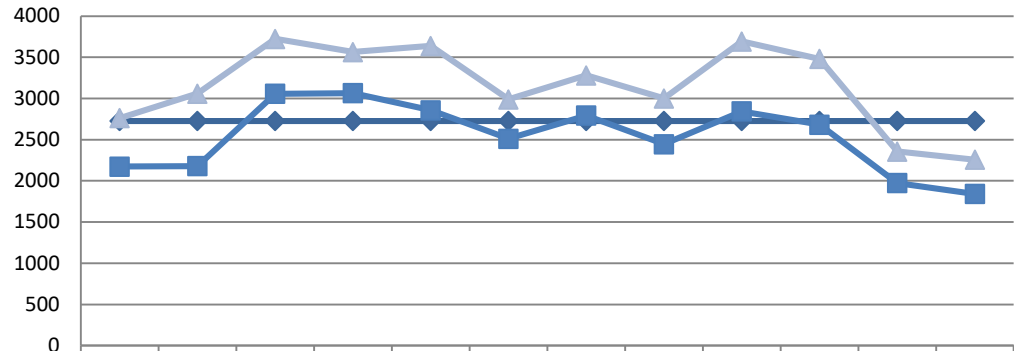
In 2021, the average daily raw flow was approx. 93.0% of the current design capacity.

The rated capacity based on the annual average daily raw flow exceeds 80%. Recommendations to reduce this influx to the sewage plant are being addressed by the Town decreasing the Infiltration & Inflow (I&I) problems throughout the collection system piping and the manhole levels. This will be a long- term strategy to deal with the I&I issues along with the sub drain to try and deal with the ongoing water table issues, also contributing to these issues.



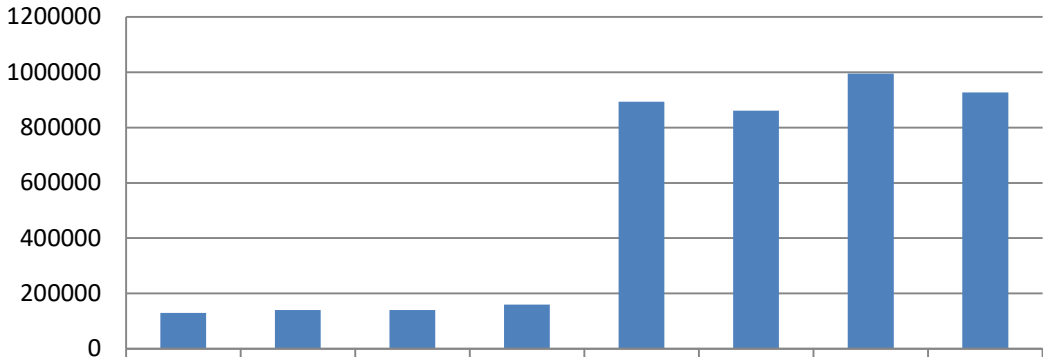
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limit	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727
Average Daily Flow (m3/d)	2174	2180	3058	3066	2857	2511	2793	2445	2843	2682	1973	1841
Maximum Daily Flow (m3\d)	2762	3060	3724	3564	3638	2989	3281	3001	3692	3481	2356	2257

Effluent Flow (m3/d)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limit	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727	2727
Average Daily Flow (m3/d)	2174	2180	3058	3066	2857	2511	2793	2445	2843	2682	1973	1841
Maximum Daily Flow (m3\d)	2762	3060	3724	3564	3638	2989	3281	3001	3692	3481	2356	2257

Annual Comparison (m3)

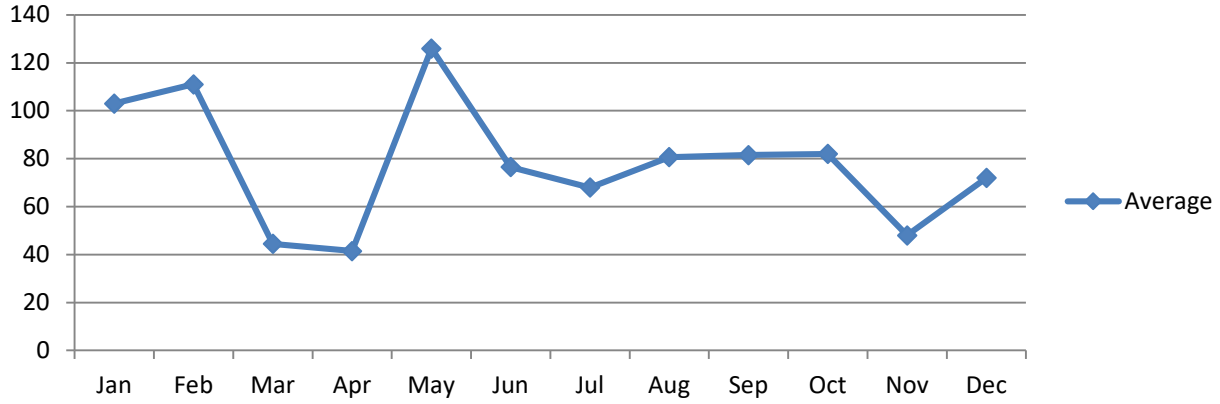


	2014	2015	2016	2017	2018	2019	2020	2021
Total Annual Flow (m3)	130193	140144	140799	159739	893702	861242	995250	926170

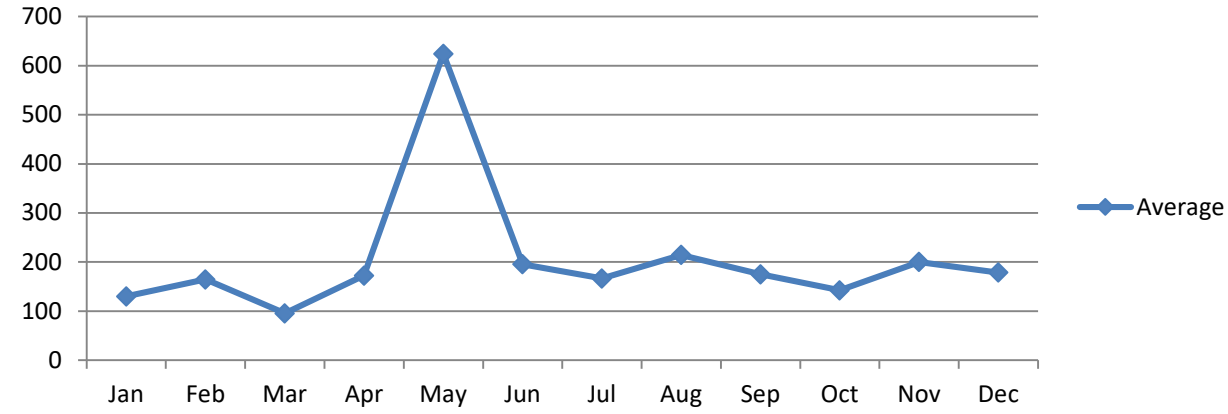
Raw Sewage Quality

Further details are included in the Performance Report (PAR) in Appendix A.

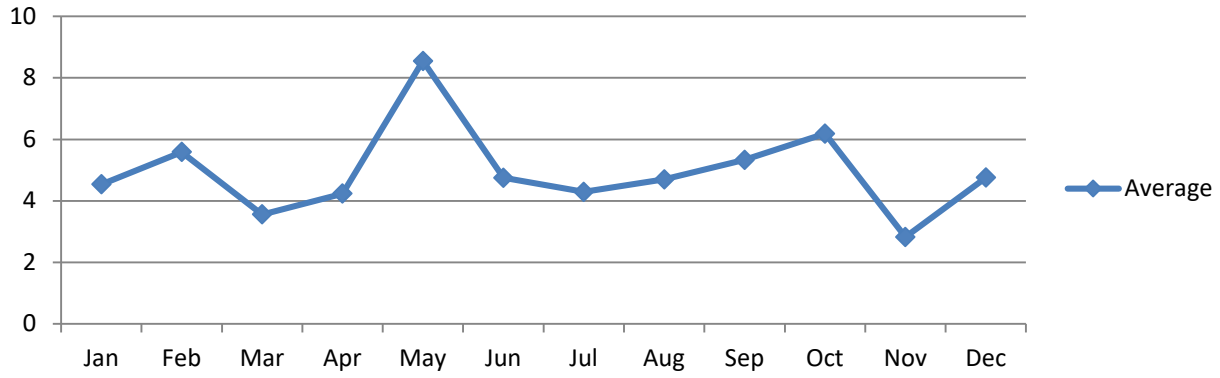
CBOD5 (mg/L)



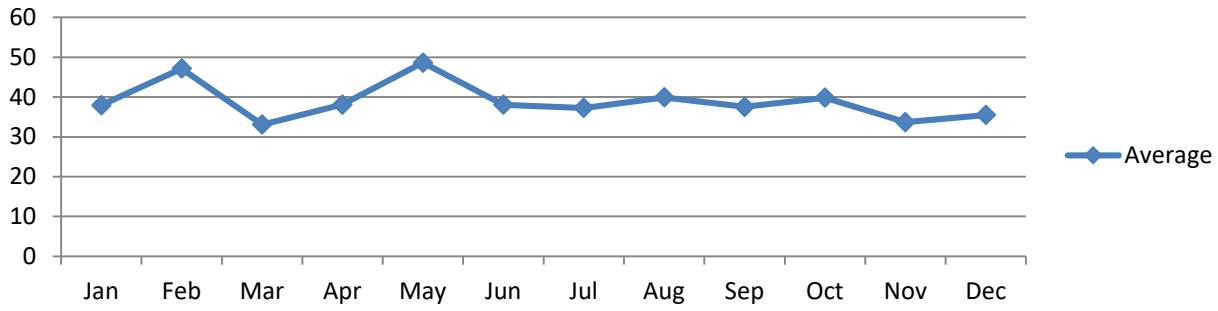
Total Suspended Solids (mg/L)



Total Phosphorus (mg/L)



Total Kjeldahl Nitrogen (mg/L)



Effluent Quality Assurance and Control Measures Taken

Effluent control measures include in-house sampling and testing for operational parameters such as suspended solids, phosphorus, and dissolved oxygen. In-house testing provides real time results which are then used to enhance process and operational performance. All in-house sampling and analysis are performed by certified operations staff utilizing approved methods and protocols for sampling, analysis and recording as specified in the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", the Ministry's publication, "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the publication, "Standard Methods for the Examination of Water and Wastewater".

All final effluent samples collected during the reporting period to meet ECA sampling requirements were submitted to Eurofins laboratory in Ottawa for analysis. Eurofins has been deemed accredited by the Canadian Association for Laboratory Accreditation (CALA), meeting strict provincial guidelines including an extensive quality assurance/quality control program. By choosing this laboratory, the Ontario Clean Water Agency is ensuring appropriate control measures are undertaken during sample analysis. The pH and temperature parameters were analyzed in the field at the time of sample collection by certified operators, to ensure accuracy and precision of the results obtained. The unionized ammonia was calculated using the total ammonia nitrogen concentration, pH and temperature, as required by the facility ECA. The Deep River STP uses AquaTox Testing & Consulting Inc. for the testing of Acute Lethality. It's laboratory in Puslinch, ON is also accreditated under CALA.

Effluent Quality

Further details are included in the Performance Report (PAR) in Appendix A.

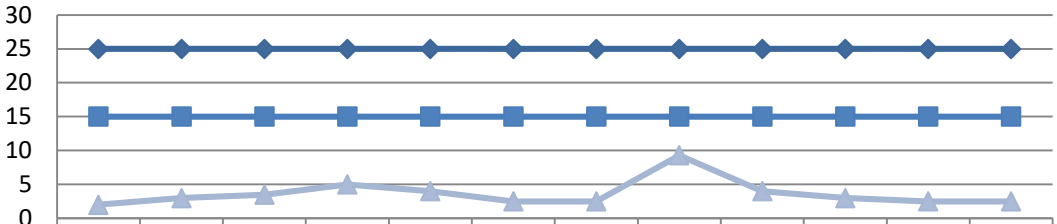
CBOD5

Compliance

Compliance is based on an Annual Average Concentration and Annual Average Loading.

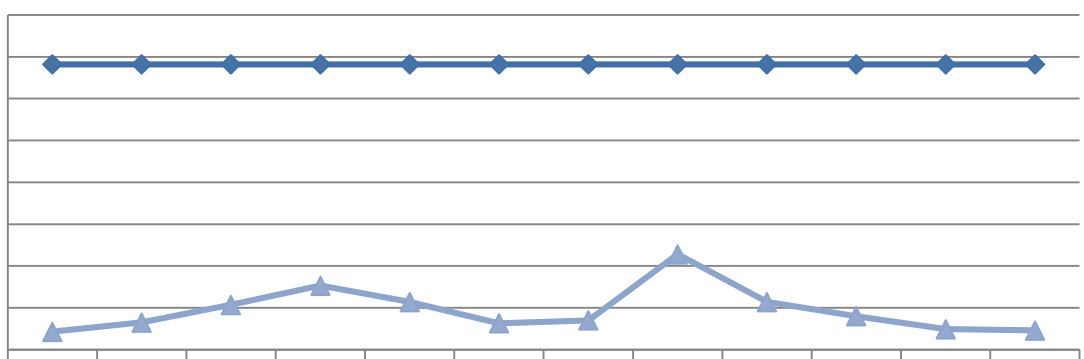
	Limit	Annual Average	Met Compliance
Concentration (Obj.)	25.0 mg/L	3.7 mg/L	Met
Loading (Limit)	68.2 kg/d	9.4 kg/d	Met

Concentration (mg/L)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ECA Limit	25	25	25	25	25	25	25	25	25	25	25	25
ECA Objective	15	15	15	15	15	15	15	15	15	15	15	15
Average	2	3	3.5	5	4	2.5	2.5	9.3	4	3	2.5	2.5

Loading (kg/d)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ECA Limit	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2
Average	4.3	6.5	10.7	15.3	11.4	6.3	7	22.8	11.4	8	4.9	4.6

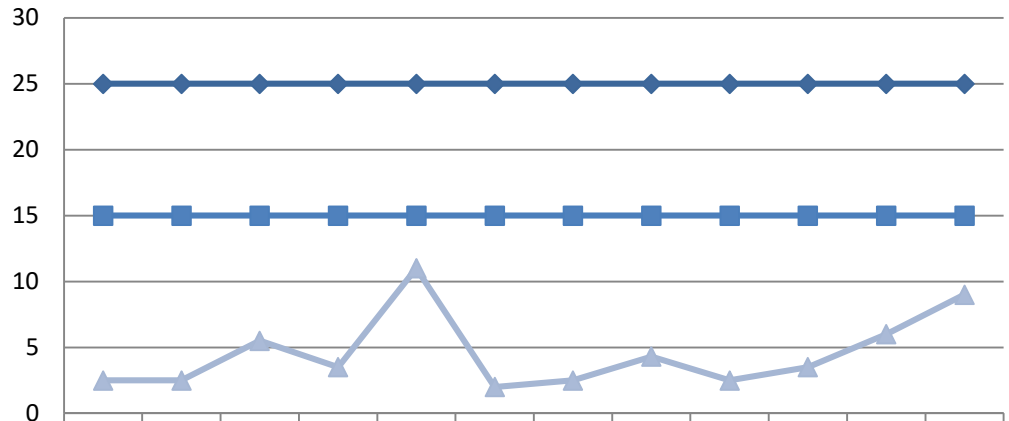
Total Suspended Solids

Compliance

Compliance is based on an Annual Average Concentration and Annual Average Loading.

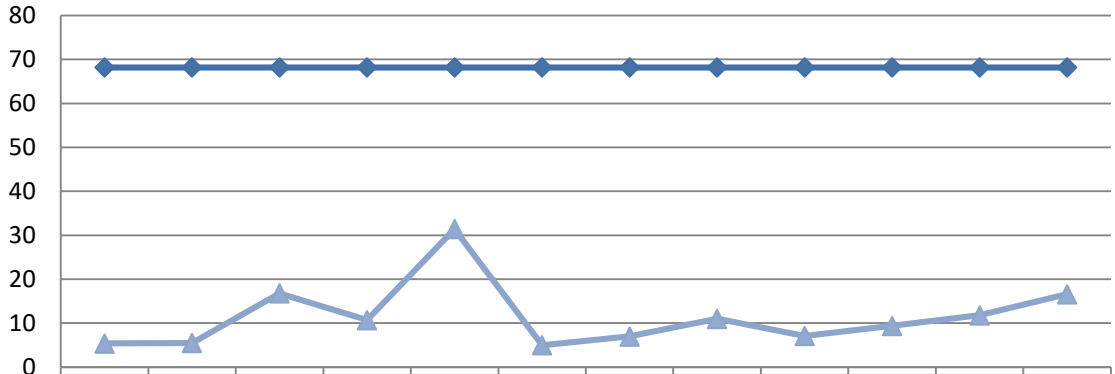
	Limit	Annual Average	Met Compliance
Concentration	25.0 mg/L	4.6 mg/L	Met
Loading	68.2 kg/d	11.4 kg/d	Met

Concentration (mg/L)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ECA Limit	25	25	25	25	25	25	25	25	25	25	25	25
ECA Objective	15	15	15	15	15	15	15	15	15	15	15	15
Average	2.5	2.5	5.5	3.5	11	2	2.5	4.3	2.5	3.5	6	9

Loading (kg/d)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ECA Limit	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2	68.2
Average	5.4	5.5	16.8	10.7	31.4	5	7	11	7.1	9.4	11.8	16.6

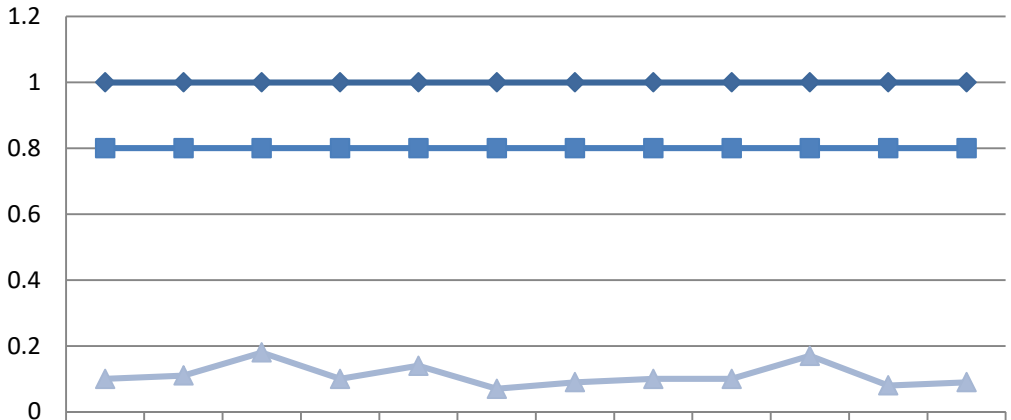
Total Phosphorus

Compliance

Compliance is based on a Monthly Average Concentration and Monthly Average Loading.

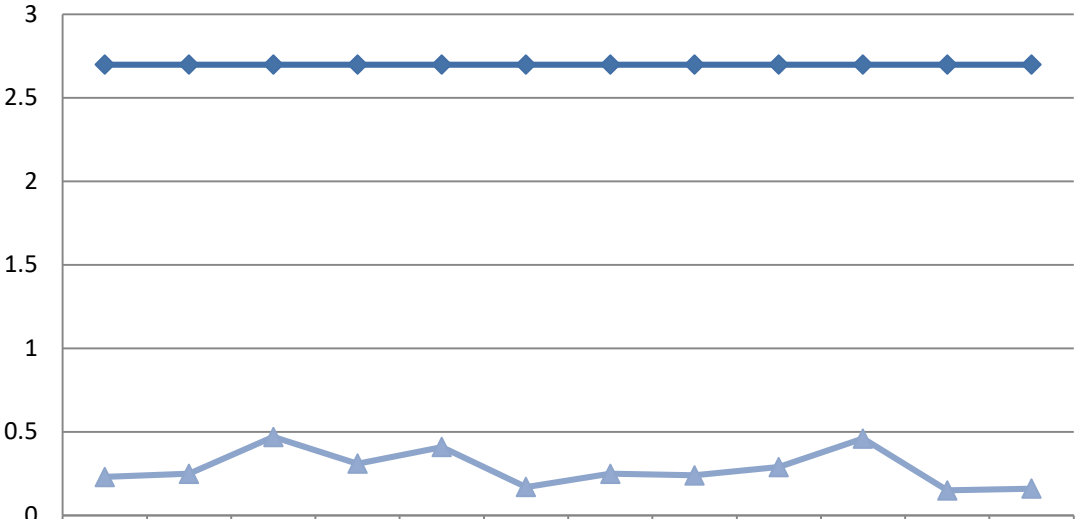
	Limit	Monthly Average	Met Compliance
Concentration	1.0 mg/L	0.11 mg/L	Met
Loading	2.7 kg/d	0.28 kg/d	Met

Concentration (mg/L)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ECA Limit	1	1	1	1	1	1	1	1	1	1	1	1
ECA Objective	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Average	0.1	0.11	0.18	0.1	0.14	0.07	0.09	0.1	0.1	0.17	0.08	0.09

Loading (kg/d)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ECA Limit	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Average	0.23	0.25	0.47	0.31	0.41	0.17	0.25	0.24	0.29	0.46	0.15	0.16

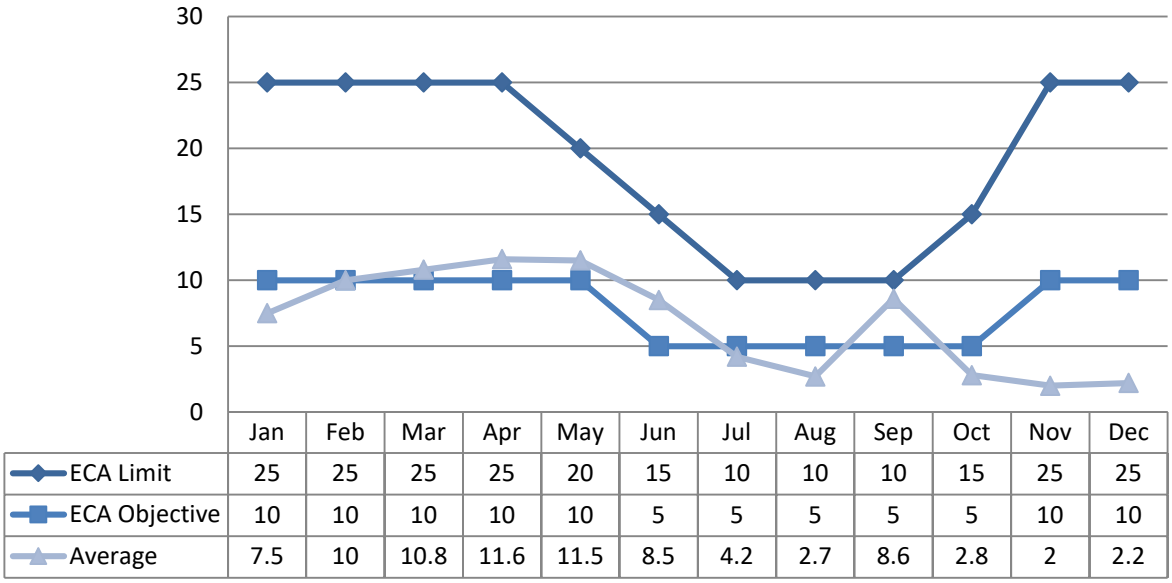
Total Ammonia Nitrogen

Compliance

Compliance is based on a various Monthly Average Concentrations and various Monthly Average Loadings.

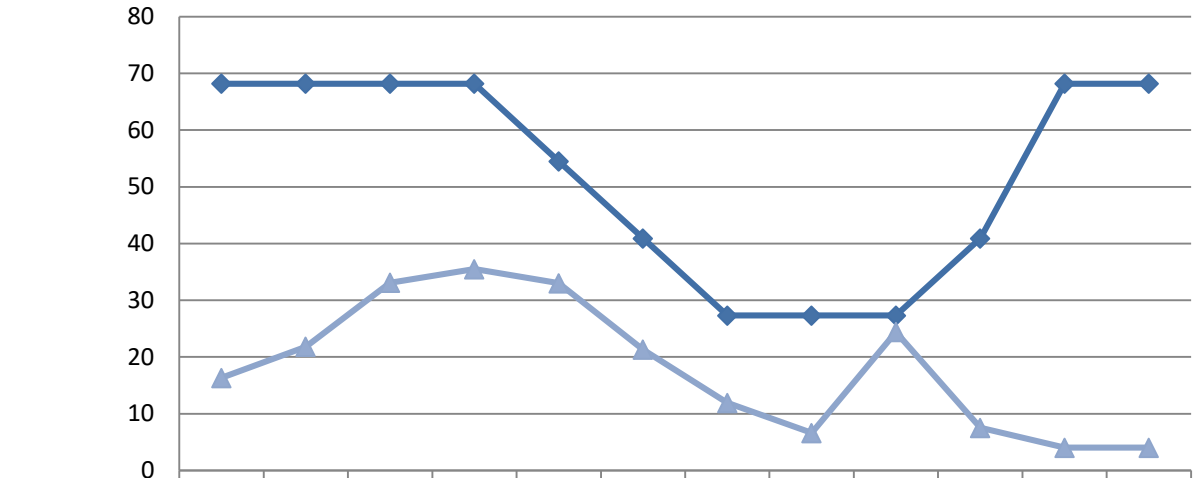
	Limit	Monthly Average	Met Compliance	Corrective Action
Concentration	Varies by month	6.9 mg/L	Met	
Loading	Varies by month	18.3 kg/d	Met	
Concentration Obj. Exceedance - Mar	10 mg/L	10.8 mg/L	Not Met	Checked SBR aeration rates, sludge blanket depths, and monitored DO performance.
Concentration Obj. Exceedance - Apr	10 mg/L	11.6 mg/L	Not Met	
Concentration Obj. Exceedance - May	10 mg/L	11.5 mg/L	Not Met	
Concentration Obj. Exceedance - Jun	5 mg/L	8.5 mg/L	Not Met	
Concentration Obj. Exceedance - Sept	5 mg/L	8.6 mg/L	Not Met	

Concentration (mg/L)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ECA Limit	25	25	25	25	20	15	10	10	10	15	25	25
ECA Objective	10	10	10	10	10	5	5	5	5	5	10	10
Average	7.5	10	10.8	11.6	11.5	8.5	4.2	2.7	8.6	2.8	2	2.2

Loading (kg/d)



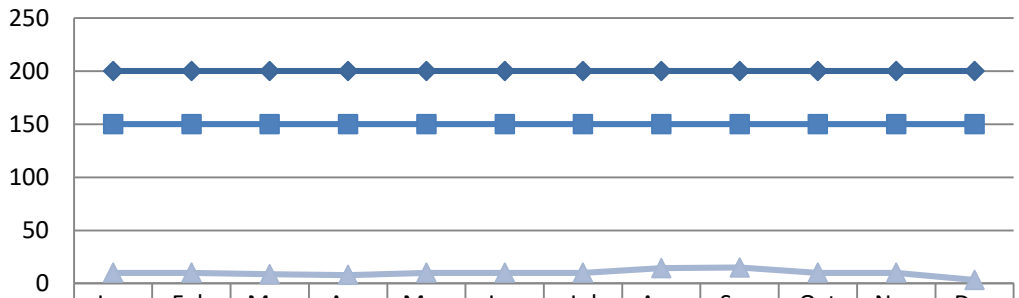
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ECA Limit	68.2	68.2	68.2	68.2	54.5	40.9	27.3	27.3	27.3	40.9	68.2	68.2
Average	16.3	21.8	33.1	35.5	33	21.3	11.9	6.6	24.4	7.5	4	4

E-coli

Compliance

Date	Exceedance of	Limit	Value	Corrective Action
There were no Non-Compliance events during the reporting period.				

Geometric Mean (cfu/100mL)



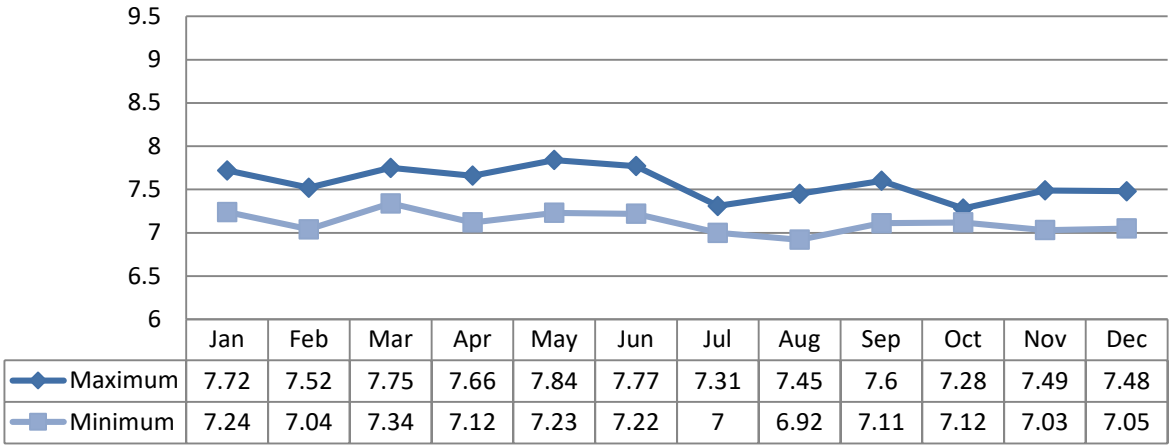
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ECA Limit	200	200	200	200	200	200	200	200	200	200	200	200
ECA Objective	150	150	150	150	150	150	150	150	150	150	150	150
Average	10	10	9	8	10	10	10	14	15	10	10	3

pH

Compliance

Date	Exceedance of	Limit	Value	Corrective Action
There were no Non-Compliance events during the reporting period.				

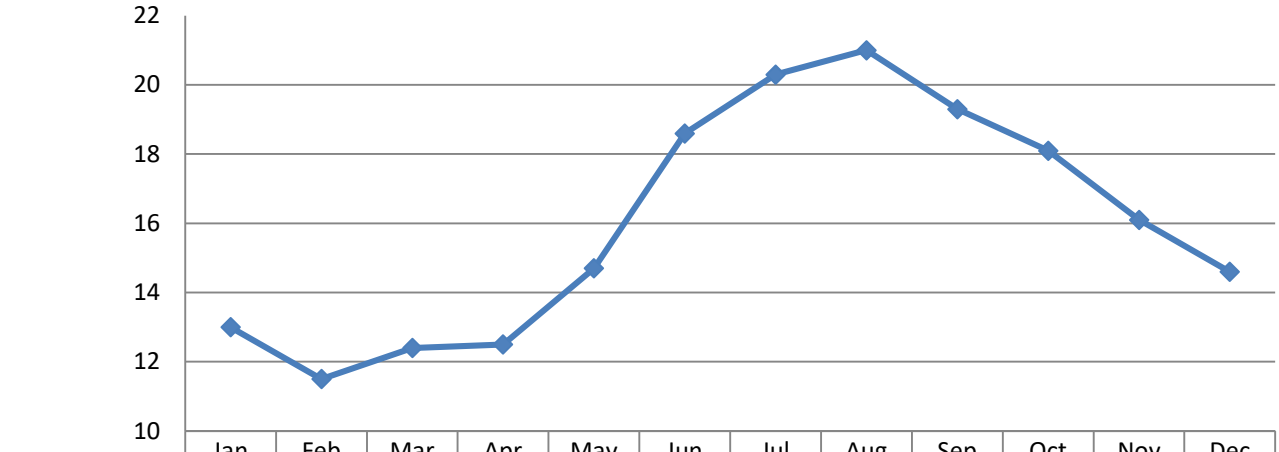
pH is to remain in the range of 6.0 - 9.5. Each instance the pH is outside of this range, it is reported as a non-compliance. The objective is 6.5 - 9.0, inclusively.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum	7.72	7.52	7.75	7.66	7.84	7.77	7.31	7.45	7.6	7.28	7.49	7.48
Minimum	7.24	7.04	7.34	7.12	7.23	7.22	7	6.92	7.11	7.12	7.03	7.05

Temperature

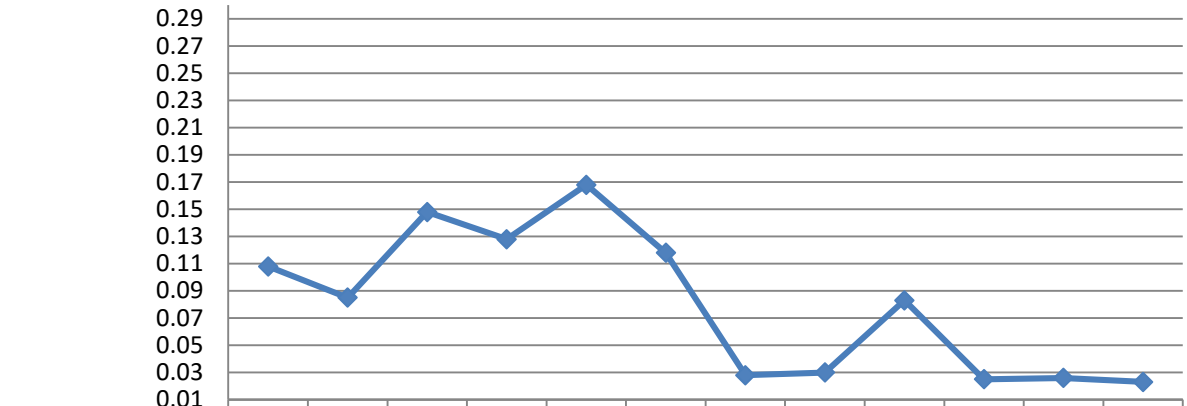
Temperature is required to be tested, but there are no compliance limits for this parameter.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average C	13	11.5	12.4	12.5	14.7	18.6	20.3	21	19.3	18.1	16.1	14.6

Un-ionized Ammonia

Un-Ionized is required to be tested, but there are no compliance limits for this parameter.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average mg/L	0.108	0.085	0.148	0.128	0.168	0.118	0.028	0.03	0.083	0.025	0.026	0.023

Acute Lethality

There was one (1) sample collected in 2021 and tested for acute lethality for both Rainbow Trout and Daphnia magna. This sampling is required annually, both provincially and federally. Results are displayed as % mortality. An adverse result is a > 50% mortality rate.

Date	Rainbow Trout	Daphnia Magna
Jul 27, 2021	0	0

Operating Issues

There were no major operating issues during 2021.

Maintenance

The Deep River STP uses a Workplace Management System (WMS) called Maximo. This is a comprehensive computerized maintenance tracking system. The system creates work orders for scheduled maintenance on an annual, semi-annual, monthly, quarterly and weekly basis. The service work is recorded in the work order history. This ensures routine and preventive maintenance is performed. Emergency and capital repair maintenance is completed and added to the system.

During the 2021 calendar year, a total of 352 Work Orders were completed at the Deep River Sewage Treatment Plant. A breakdown of this total is listed below:

Maintenance Type	# Completed in 2021
Corrective Work Orders	95
Emergency Work Orders	0
Preventative Work Orders	195
Operational Work Orders	48
Capital Work Orders	11
Call Back Work Orders	3

Major Maintenance Summary (Capital)

WO #	Description
2133285	• Building of new gantry crane.
2091101	• Miscellaneous Capital Items purchased, such as: material to repair sewage drain lines, batteries for diesel generator, liquid guage, batteries for rotork actuator, valve for basement water line, material for blower adaptor plates, and other hardware.
2363343	• Purchase of eight (8) light fixtures for the basement.
2271320	• Costs associated with the annual clean-out of the equalization tank.
2540892	• Purchase of UV bulb stock for the sewage plant.
2225607/1015596	• Construction of an insulated box to cover hydrant.
2581541	• Repair of the generator after it ran 17 hours straight through a power outage. The solenoid on the starter and wires had melted. The repair was done by Gal Power.
2177356	• Replacement of the motor on the main air compressor at the plant.
2503395	• Costs associated with Stroma repairs done remotely to assist operations in DO performance for the SBR's.
2542322	• Costs associated with Stroma repairs done remotely to assist operations with the digester blower program.
2543976	• Repair of the sludge holding tank blower.

Calibration Reports

Flow meter calibration reports are included in Appendix B.

Proposed Alterations, Extensions, or Replacement to Works

In 2021, a number of alternations and replacements were completed at the sewage plant, including: a new grinder installed, new gantry crane, SBR #1 and equalization tank clean-outs, a new SBR back-up blower installed, new digester blower installed, basement LED lighting upgrade, SBR #3 rising stem valve was purchased but not installed, and a new generator starter was installed.

Some alternations and replacements planned in 2022 include: a second new grinder, modification to the sludge loading pipe, SBR railing repair, roof ice dam installation, new pH probe, SBR blower isolation valves, and a clean out of SBR #3.

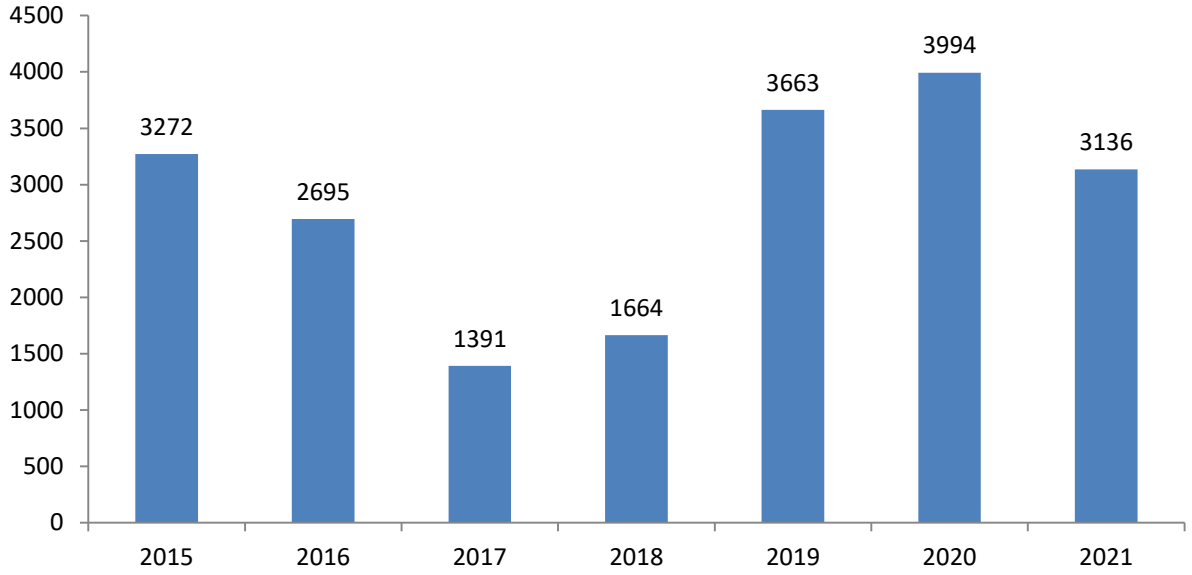
Sludge Generation

Sludge generated from the treatment plant is spread on agricultural land during the spreading season, as per the Nutrient Management Act, O. Reg. 267/03. OCWA contracted the sludge hauling in 2021 to Bio-Ag. All NASM Plans are done under their authority.

Sludge Disposal Summary – NASM Land Applications

Date	Disposal Location	NASM Approval Number	Total Volume (m3)
May 2021	Yantha – TV Tower Farm	24041	608
Jul 2021	Scott Tabbert – Christink Farm	23184	434
Jul 2021	Sunny Hillcrest – Home Farm	24707	601
Oct 2021	Hales Creek Farm – East or TV Tower Farms	24584	458.48
Nov 2021	Hales Creek Farm – East or TV Tower Farms	24584	1 034.68
		Total Sludge	3 136.16

Annual Comparison (m3/year)



It is anticipated that sludge volumes will be similar in the 2022 season, as in 2021.

Summary of Complaints

Location	Date	Nature of Complaint	Actions Taken
There were no complaints received during this reporting period.			

Summary of By-Pass, Overflows, Spill or Abnormal Discharge Events

Date/Time	Duration	Cause	Details	Volume (m3)
There were no by-passes, overflows, spills or abnormal discharge events during this reporting period.				

Appendix A

Performance Assessment Report

Ontario Clean Water Agency
Performance Assessment Report Wastewater/Lagoon

From: 01/01/2021 to 31/12/2021

Report extracted 02/22/2022 10:00

Facility: [5853] DEEP RIVER WASTEWATER TREATMENT FACILITY

Works: [120000612]

	01/2021	02/2021	03/2021	04/2021	05/2021	06/2021	07/2021	08/2021	09/2021	10/2021	11/2021	12/2021	<--Total-->	<--Avg.-->	<--Max.-->	<--Criteria-->
Flows:																
Raw Flow: Total - Raw Sewage (m^3)	67393.57	61035.42	94787.00	91967.27	88567.92	75325.38	86581.15	75801.43	85300.89	83150.21	59195.79	57064.00	926170.03			
Raw Flow: Avg - Raw Sewage (m^3/d)	2173.99	2179.84	3057.65	3065.58	2857.03	2510.85	2792.94	2445.21	2843.36	2682.26	1973.19	1840.77		2535.22		
Raw Flow: Max - Raw Sewage (m^3/d)	2762.13	3059.91	3724.16	3563.91	3637.76	2988.92	3281.30	3000.56	3691.58	3481.04	2355.68	2257.34			3724.16	
Eff. Flow: Total - Final Effluent (m^3)	67393.57	61035.42	94787.00	91967.27	88567.92	75325.38	86581.15	75801.43	85300.89	83150.21	59195.79	57064.00	926170.03			
Eff. Flow: Avg - Final Effluent (m^3/d)	2173.99	2179.84	3057.65	3065.58	2857.03	2510.85	2792.94	2445.21	2843.36	2682.26	1973.19	1840.77		2535.22		2727.0
Eff. Flow: Max - Final Effluent (m^3/d)	2762.13	3059.91	3724.16	3563.91	3637.76	2988.92	3281.30	3000.56	3691.58	3481.04	2355.68	2257.34			3724.16	
Carbonaceous Biochemical Oxygen Demand: CBOD:																
Raw: Avg cBOD5 - Raw Sewage (mg/L)	103.000	111.000	44.500	41.500	126.000	76.500	68.000	80.667	81.500	82.000	48.000	72.000		77.889	126.000	
Raw: # of samples of cBOD5 - Raw Sewage (mg/L)	2	2	2	2	2	2	2	3	2	2	2	2	25			
Eff: Avg cBOD5 - Final Effluent (mg/L)	2.000	3.000	3.500	5.000	4.000	< 2.500	< 2.500	9.333	4.000	3.000	2.500	2.500		< 3.653	9.333	25.0
Eff: # of samples of cBOD5 - Final Effluent (mg/L)	2	2	2	2	2	2	2	3	2	2	2	2	25			
Loading: cBOD5 - Final Effluent (kg/d)	4.348	6.540	10.702	15.328	11.428	< 6.277	< 6.982	22.822	11.373	8.047	4.933	4.602		< 9.448	22.822	
Biochemical Oxygen Demand: BOD5:																
Total Suspended Solids: TSS:																
Raw: Avg TSS - Raw Sewage (mg/L)	130.000	164.500	95.500	172.500	624.000	195.500	166.500	214.333	175.000	142.500	200.000	178.500		204.903	624.000	
Raw: # of samples of TSS - Raw Sewage (mg/L)	2	2	2	2	2	2	2	3	2	2	2	2	25			
Eff: Avg TSS - Final Effluent (mg/L)	< 2.500	< 2.500	< 5.500	< 3.500	11.000	< 2.000	< 2.500	< 4.333	< 2.500	3.500	6.000	< 9.000		< 4.569	11.000	25.0
Eff: # of samples of TSS - Final Effluent (mg/L)	2	2	2	2	2	2	2	3	2	2	2	2	25			
Loading: TSS - Final Effluent (kg/d)	< 5.435	< 5.450	16.817	< 10.730	31.427	< 5.022	< 6.982	< 10.596	< 7.108	9.388	11.839	< 16.567		< 11.447	31.427	
Percent Removal: TSS - Raw Sewage (mg/L)	98.077	98.480	94.241	97.971	98.237	98.977	98.498	97.978	98.571	97.544	97.000	94.958			98.977	
Total Phosphorus: TP:																
Raw: Avg TP - Raw Sewage (mg/L)	4.538	5.585	3.558	4.235	8.545	4.750	4.290	4.698	5.333	6.183	2.824	4.755		4.941	8.545	
Raw: # of samples of TP - Raw Sewage (mg/L)	4	4	5	4	4	5	4	5	4	4	5	4	52			
Eff: Avg TP - Final Effluent (mg/L)	0.104	0.114	0.154	0.102	0.143	0.069	0.088	0.099	0.103	0.171	< 0.077	0.088		< 0.109	0.171	1.0
Eff: # of samples of TP - Final Effluent (mg/L)	4	4	5	4	4	5	4	5	4	4	5	4	52			
Loading: TP - Final Effluent (kg/d)	0.226	0.248	0.472	0.313	0.407	0.173	0.246	0.242	0.294	0.459	< 0.152	0.162		< 0.283	0.472	
Percent Removal: TP - Raw Sewage (mg/L)	97.708	97.963	95.660	97.591	98.332	98.547	97.943	97.897	98.064	97.230	97.280	98.155			98.547	

Nitrogen Series:																								
Raw: Avg TKN - Raw Sewage (mg/L)		37.950		47.125		33.100		38.100		48.650		38.060		37.275		39.900		37.525		39.850		33.700		35.500				38.895		48.650		
Raw: # of samples of TKN - Raw Sewage (mg/L)		4		4		5		4		4		5		4		5		4		4		5		4		52						
Eff: Avg TAN - Final Effluent (mg/L)		7.505		10.023		10.826		11.575		11.513		8.476		4.245	<	2.718		8.565		2.799	<	2.041		2.172			<	6.871		11.575	5.0 - 10.0 - 15.0 - 2	
Eff: # of samples of TAN - Final Effluent (mg/L)		4		4		5		4		4		5		4		5		4		4		5		4		52						
Loading: TAN - Final Effluent (kg/d)		16.316		21.847		33.102		35.484		32.892		21.282		11.856	<	6.646		24.353		7.507	<	4.027		3.999			<	18.276		35.484		
Disinfection:																																
Eff: GMD E. Coli - Final Effluent (cfu/100mL)		10.000		10.000		8.706		7.953		10.000		10.000		10.000		14.310		14.953		10.000		10.000		3.162				9.924		14.953		200.0
Eff: # of samples of E. Coli - Final Effluent (cfu/100		4		4		5		4		4		5		4		5		4		4		5		6		54						

Appendix B

Calibration Reports

KROHNE
Altometer

KROHNE Altometer
Production facility
of Krohne AG, Basel

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E-mail : Helpdesk@Krohne-altometer.nl
Website : http://Krohne.com

FLOWMETER VERIFICATION CHECK CERTIFICATE

Measurement:	
Operator:	A VALENTE
Date of verification:	29-09-2021
Flowmeter:	DR WAS

Flowmeter:		MagCheck info	
Converter type:	IFC010	MagCheck Serial No.:	00640486
Number:	00069498	MagCheck date of Calibration:	15-03-2021
Order number:			
Full scale range:	60 l/s		
Current output:	4 - 20		
Frequency output:	0-1000 Hz		
Diameter:	80 mm / 3 inch		
PC:	2.5		
Field frequency:	1/6		
Empty pipe:	No		

Results:	
Field current	O.K.
Field frequency	O.K.
ADC 25%	O.K.
ADC 50%	O.K.
ADC 75%	O.K.
ADC 100%	O.K.
Current output 4mA	O.K.
Current output 20mA	O.K.
Pulse output	O.K.
Coil resistance	O.K.
Resistance electrode 1 with filled pipe	O.K.
Resistance electrode 1 with empty pipe	Not measured
Resistance electrode 2 with filled pipe	O.K.
Resistance electrode 2 with empty pipe	Not measured
Isolation	O.K.

Based on the verification results stated above, this certificate confirms that the accuracy of this electromagnetic flowmeter is within +/- 1% of the original factory calibration values

KROHNE Altometer is certified according to ISO9001

KROHNE
Altometer

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FLOWMETER VERIFICATION CHECK CERTIFICATE

Measurement:	
Operator:	A VALENTE
Date of verification:	29-09-2021
Flowmeter:	DR WAS

Flowmeter:		MagCheck info	
Converter type:	IFC010	MagCheck Serial No.:	00640486
Number:	00069498	MagCheck date of Calibration:	15-03-2021
Order number:			
Full scale range:	60 l/s		
Current output:	4 - 20		
Frequency output:	0-1000 Hz		
Diameter:	80 mm / 3 inch		
PC:	2.5		
Field frequency:	1/6		
Empty pipe:	No		

Results:	
Field current	O.K.
Field frequency	O.K.
ADC 25%	O.K.
ADC 50%	O.K.
ADC 75%	O.K.
ADC 100%	O.K.
Current output 4mA	O.K.
Current output 20mA	O.K.
Pulse output	O.K.
Coil resistance	O.K.
Resistance electrode 1 with filled pipe	O.K.
Resistance electrode 1 with empty pipe	Not measured
Resistance electrode 2 with filled pipe	O.K.
Resistance electrode 2 with empty pipe	Not measured
Isolation	O.K.

Based on the verification results stated above, this certificate confirms that the accuracy of this electromagnetic flowmeter is within +/- 1% of the original factory calibration values

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Device identification:	DR WAS	Full scale range:	60 l/s
Medium:	SEWAGE	Current output:	4 - 20
Converter type:	IFC010	Frequency output:	0-1000 Hz
Number:	00069498	Diameter:	80 mm / 3 inch
Order number:		PC:	2.5
		Field frequency:	1/6
		Empty pipe:	No

Field current
Nullvalue: 133.237 mA Lower limit: 132.837 mA (-0.3%) Upper limit: 133.637 mA (+0.3%)
29-09-2021: 133.205 mA (-0.03%)

Field frequency
Nullvalue: 9.167 Hz Lower limit: 7.792 Hz (-15%) Upper limit: 10.542 Hz (+15%)
29-09-2021: 10 Hz (-8.33%)

ADC 25%
Nullvalue: 25 % Lower limit: 24.9 % (-0.4%) Upper limit: 25.1 % (+0.4%)
29-09-2021: 24.986 % (-0.06%)

ADC 50%
Nullvalue: 50 % Lower limit: 49.8 % (-0.4%) Upper limit: 50.2 % (+0.4%)
29-09-2021: 49.956 % (-0.09%)

ADC 75%
Nullvalue: 75 % Lower limit: 74.7 % (-0.4%) Upper limit: 75.3 % (+0.4%)
29-09-2021: 74.961 % (-0.06%)

ADC 100%
Nullvalue: 100 % Lower limit: 99.6 % (-0.4%) Upper limit: 100.4 % (+0.4%)
29-09-2021: 99.948 % (-0.06%)

Current output 4mA
Nullvalue: 4 mA Lower limit: 3.968 mA (-0.3% - 0.02 mA) Upper limit: 4.032 mA (+0.3% + 0.02 mA)
29-09-2021: 3.998 mA (-0.04%)

Current output 20mA
Nullvalue: 20 mA Lower limit: 19.92 mA (-0.3% - 0.02 mA) Upper limit: 20.08 mA (+0.3% + 0.02 mA)
29-09-2021: 19.988 mA (-0.06%)

Pulse output
Nullvalue: 500 Hz Lower limit: 499 Hz (-0.2%) Upper limit: 501 Hz (+0.2%)
29-09-2021: 499.95 Hz (-0.01%)

Coil resistance
Lower limit: 30 Ohm Upper limit: 250 Ohm
29-09-2021: 103.668 Ohm

Resistance electrode 1 with filled pipe
Lower limit: 0.15 kOhm Upper limit: 250 kOhm
29-09-2021: 4.103 kOhm

Resistance electrode 1 with empty pipe
29-09-2021: Not measured

Resistance electrode 2 with filled pipe
Lower limit: 0.15 kOhm Upper limit: 250 kOhm
29-09-2021: 4.047 kOhm

Resistance electrode 2 with empty pipe
29-09-2021: Not measured

Isolation
Lower limit: 2 MOhm
29-09-2021: 21 MOhm

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Website : http://Krohne.com

FLOWMETER VERIFICATION CHECK CERTIFICATE

Measurement:

Operator:	A VALENTE
Date of verification:	09-09-2021
Flowmeter:	ACTIFLO 1

Flowmeter:

Converter type:	IFC010
Number:	00541726
Order number:	
Full scale range:	92.58 l/s
Current output:	4 - 20
Frequency output:	0-1000 Hz
Diameter:	200 mm / 8 inch
PC:	9.089
Field frequency:	1/6
Empty pipe:	No

MagCheck info

MagCheck Serial No.:	00640486
MagCheck date of Calibration:	15-03-2021

Results:

Field current	O.K.
Field frequency	O.K.
ADC 25%	O.K.
ADC 50%	O.K.
ADC 75%	O.K.
ADC 100%	O.K.
Current output 4mA	O.K.
Current output 20mA	O.K.
Pulse output	O.K.
Coil resistance	O.K.
Resistance electrode 1 with filled pipe	O.K.
Resistance electrode 1 with empty pipe	Not measured
Resistance electrode 2 with filled pipe	O.K.
Resistance electrode 2 with empty pipe	Not measured
Isolation	O.K.

Based on the verification results stated above, this certificate confirms that the accuracy of this electromagnetic flowmeter is within +/- 1% of the original factory calibration values

Device identification:	ACTIFLO 1	Full scale range:	92.6 l/s
Medium:	WATER	Current output:	4 - 20
Converter type:	IFC010	Frequency output:	0-1000 Hz
Number:	00541726	Diameter:	200 mm / 8 inch
Order number:		PC:	9.089
		Field frequency:	1/6
		Empty pipe:	No

Field current
Nullvalue: 133.347 mA Lower limit: 132.947 mA (-0.3%) Upper limit: 133.747 mA (+0.3%)
09-09-2021: 133.366 mA (+0.01%)

Field frequency
Nullvalue: 9.167 Hz Lower limit: 7.792 Hz (-15%) Upper limit: 10.542 Hz (+15%)
09-09-2021: 10.004 Hz (-8.36%)

ADC 25%
Nullvalue: 25 % Lower limit: 24.882 % (-0.4715%) Upper limit: 25.118 % (+0.4715%)
09-09-2021: 24.946 % (-0.22%)

ADC 50%
Nullvalue: 50 % Lower limit: 49.8 % (-0.4%) Upper limit: 50.2 % (+0.4%)
09-09-2021: 49.902 % (-0.2%)

ADC 75%
Nullvalue: 75 % Lower limit: 74.7 % (-0.4%) Upper limit: 75.3 % (+0.4%)
09-09-2021: 74.882 % (-0.16%)

ADC 100%
Nullvalue: 100 % Lower limit: 99.6 % (-0.4%) Upper limit: 100.4 % (+0.4%)
09-09-2021: 99.796 % (-0.21%)

Current output 4mA
Nullvalue: 4 mA Lower limit: 3.968 mA (-0.3% - 0.02 mA) Upper limit: 4.032 mA (+0.3% + 0.02 mA)
09-09-2021: 4.002 mA (+0.04%)

Current output 20mA
Nullvalue: 20 mA Lower limit: 19.92 mA (-0.3% - 0.02 mA) Upper limit: 20.08 mA (+0.3% + 0.02 mA)
09-09-2021: 20.004 mA (+0.02%)

Pulse output
Nullvalue: 500 Hz Lower limit: 499 Hz (-0.2%) Upper limit: 501 Hz (+0.2%)
09-09-2021: 499.969 Hz (-0.01%)

Coil resistance
Lower limit: 30 Ohm Upper limit: 250 Ohm
09-09-2021: 210 Ohm

Resistance electrode 1 with filled pipe
Lower limit: 0.15 kOhm Upper limit: 250 kOhm
Electrode interruption
09-09-2021: > 21 MOhm

Resistance electrode 1 with empty pipe
09-09-2021: Not measured

Resistance electrode 2 with filled pipe
Lower limit: 0.15 kOhm Upper limit: 250 kOhm
Electrode interruption
09-09-2021: > 21 MOhm

Resistance electrode 2 with empty pipe
09-09-2021: Not measured

Isolation
Lower limit: 2 MOhm
09-09-2021: 21 MOhm

KROHNE
Altometer

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Website : http://Krohne.com

FLOWMETER VERIFICATION CHECK CERTIFICATE

Measurement:

Operator:	A VALENTE
Date of verification:	29-09-2021
Flowmeter:	ACTIFLO 2

Flowmeter:

Converter type:	IFC010
Number:	00541738
Order number:	
Full scale range:	333.3 m3/h
Current output:	4 - 20
Frequency output:	0-1000 Hz
Diameter:	200 mm / 8 inch
PC:	9.346
Field frequency:	1/6
Empty pipe:	No

MagCheck info

MagCheck Serial No.:	00640486
MagCheck date of Calibration:	15-03-2021

Results:

Field current	O.K.
Field frequency	O.K.
ADC 25%	O.K.
ADC 50%	O.K.
ADC 75%	O.K.
ADC 100%	O.K.
Current output 4mA	O.K.
Current output 20mA	O.K.
Pulse output	O.K.
Coil resistance	O.K.
Resistance electrode 1 with filled pipe	O.K.
Resistance electrode 1 with empty pipe	Not measured
Resistance electrode 2 with filled pipe	O.K.
Resistance electrode 2 with empty pipe	Not measured
Isolation	O.K.

Based on the verification results stated above, this certificate confirms that the accuracy of this electromagnetic flowmeter is within +/- 1% of the original factory calibration values

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Device identification:	ACTIFLO 2	Full scale range:	333.3 m3/h
Medium:	WATER	Current output:	4 - 20
Converter type:	IFC010	Frequency output:	0-1000 Hz
Number:	00541738	Diameter:	200 mm / 8 inch
Order number:		PC:	9.346
		Field frequency:	1/6
		Empty pipe:	No

Field current
Nullvalue: 133.664 mA Lower limit: 133.263 mA (-0.3%) Upper limit: 134.065 mA (+0.3%)
29-09-2021: 133.664 mA (-0.01%)

Field frequency
Nullvalue: 9.167 Hz Lower limit: 7.792 Hz (-15%) Upper limit: 10.542 Hz (+15%)
29-09-2021: 10.002 Hz (-8.35%)

ADC 25%
Nullvalue: 25 % Lower limit: 24.882 % (-0.4715%) Upper limit: 25.118 % (+0.4715%)
29-09-2021: 24.92 % (-0.32%)

ADC 50%
Nullvalue: 50 % Lower limit: 49.8 % (-0.4%) Upper limit: 50.2 % (+0.4%)
29-09-2021: 49.899 % (-0.21%)

ADC 75%
Nullvalue: 75 % Lower limit: 74.7 % (-0.4%) Upper limit: 75.3 % (+0.4%)
29-09-2021: 74.806 % (-0.26%)

ADC 100%
Nullvalue: 100 % Lower limit: 99.6 % (-0.4%) Upper limit: 100.4 % (+0.4%)
29-09-2021: 99.781 % (-0.22%)

Current output 4mA
Nullvalue: 4 mA Lower limit: 3.968 mA (-0.3% - 0.02 mA) Upper limit: 4.032 mA (+0.3% + 0.02 mA)
29-09-2021: 4.004 mA (+0.1%)

Current output 20mA
Nullvalue: 20 mA Lower limit: 19.92 mA (-0.3% - 0.02 mA) Upper limit: 20.08 mA (+0.3% + 0.02 mA)
29-09-2021: 19.999 mA (-0.01%)

Pulse output
Nullvalue: 500 Hz Lower limit: 499 Hz (-0.2%) Upper limit: 501 Hz (+0.2%)
29-09-2021: 499.944 Hz (-0.02%)

Coil resistance
Lower limit: 30 Ohm Upper limit: 250 Ohm
29-09-2021: 67.193 Ohm

Resistance electrode 1 with filled pipe
Lower limit: 0.15 kOhm Upper limit: 250 kOhm
29-09-2021: 9.683 kOhm

Resistance electrode 1 with empty pipe
29-09-2021: Not measured

Resistance electrode 2 with filled pipe
Lower limit: 0.15 kOhm Upper limit: 250 kOhm
29-09-2021: 9.856 kOhm

Resistance electrode 2 with empty pipe
29-09-2021: Not measured

Isolation
Lower limit: 2 MOhm
29-09-2021: 21 MOhm

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FLOWMETER VERIFICATION CHECK CERTIFICATE

Measurement:

Operator:	A VALENTE
Date of verification:	29-09-2021
Flowmeter:	ACTIFLO 3

Flowmeter:

Converter type:	IFC010
Number:	00601047
Order number:	
Full scale range:	333.3 m3/h
Current output:	4 - 20
Frequency output:	0-1000 Hz
Diameter:	200 mm / 8 inch
PC:	9.275
Field frequency:	1/6
Empty pipe:	No

MagCheck info

MagCheck Serial No.:	00640486
MagCheck date of Calibration:	15-03-2021

Results:

Field current	O.K.
Field frequency	O.K.
ADC 25%	O.K.
ADC 50%	O.K.
ADC 75%	O.K.
ADC 100%	O.K.
Current output 4mA	O.K.
Current output 20mA	O.K.
Pulse output	O.K.
Coil resistance	O.K.
Resistance electrode 1 with filled pipe	O.K.
Resistance electrode 1 with empty pipe	Not measured
Resistance electrode 2 with filled pipe	O.K.
Resistance electrode 2 with empty pipe	Not measured
Isolation	O.K.

Based on the verification results stated above, this certificate confirms that the accuracy of this electromagnetic flowmeter is within +/- 1% of the original factory calibration values

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ISO 9001

Trends

Device identification:	ACTIFLO 3	Full scale range:	333.3 m3/h
Medium:	WATER	Current output:	4 - 20
Converter type:	IFC010	Frequency output:	0-1000 Hz
Number:	00601047	Diameter:	200 mm / 8 inch
Order number:		PC:	9.275
		Field frequency:	1/6
		Empty pipe:	No

Field current
Nullvalue: 133.8 mA Lower limit: 133.399 mA (-0.3%) Upper limit: 134.201 mA (+0.3%)
30-08-2013: 133.775 mA (-0.02%)

Field frequency
Nullvalue: 9.167 Hz Lower limit: 7.792 Hz (-15%) Upper limit: 10.542 Hz (+15%)
30-08-2013: 9.999 Hz (-8.32%)

ADC 25%
Nullvalue: 25 % Lower limit: 24.882 % (-0.4715%) Upper limit: 25.118 % (+0.4715%)
30-08-2013: 24.965 % (-0.14%)

ADC 50%
Nullvalue: 50 % Lower limit: 49.8 % (-0.4%) Upper limit: 50.2 % (+0.4%)
30-08-2013: 49.98 % (-0.05%)

ADC 75%
Nullvalue: 75 % Lower limit: 74.7 % (-0.4%) Upper limit: 75.3 % (+0.4%)
30-08-2013: 74.891 % (-0.15%)

ADC 100%
Nullvalue: 100 % Lower limit: 99.6 % (-0.4%) Upper limit: 100.4 % (+0.4%)
30-08-2013: 99.846 % (-0.16%)

Current output 4mA
Nullvalue: 4 mA Lower limit: 3.968 mA (-0.3% - 0.02 mA) Upper limit: 4.032 mA (+0.3% + 0.02 mA)
30-08-2013: 4.004 mA (+0.08%)

Current output 20mA
Nullvalue: 20 mA Lower limit: 19.92 mA (-0.3% - 0.02 mA) Upper limit: 20.08 mA (+0.3% + 0.02 mA)
30-08-2013: 20.006 mA (+0.03%)

Pulse output
Nullvalue: 500 Hz Lower limit: 499 Hz (-0.2%) Upper limit: 501 Hz (+0.2%)
30-08-2013: 499.944 Hz (-0.02%)

Coil resistance
Lower limit: 30 Ohm Upper limit: 250 Ohm
30-08-2013: 68.315 Ohm

Resistance electrode 1 with filled pipe
Lower limit: 0.15 kOhm Upper limit: 250 kOhm
30-08-2013: 10.28 kOhm

Resistance electrode 1 with empty pipe
30-08-2013: Not measured

Resistance electrode 2 with filled pipe
Lower limit: 0.15 kOhm Upper limit: 250 kOhm
30-08-2013: 10.658 kOhm

Resistance electrode 2 with empty pipe
30-08-2013: Not measured

Isolation
Lower limit: 2 MOhm
30-08-2013: 21 MOhm