Public Works
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March 15, 2012

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Ian Ness-Jack
Provincial Officer
733 Exeter Rd.
London, Ont.

Dear Sir:

RE: 2011 Year-End Biosolids Land Application Program Report for Biosolids Centralized Storage Facility (Storage for Woodstock, Tillsonburg, and Ingersoll WWTP), and Thamesford WWTP

Attached is the monitoring report for 2011 for Oxford County's biosolids land application program. I trust this report fulfills the intent of the annual reporting requirements of the Certificates of Approval #'s A800939, 3816-76HRTS, 3549-6YNMKK, 5950-7XQKXS, 8943-6YGPQT, 6974-6FKKAY, 0098-5SSJT4, and 6821-5FVSUE.

If there are any questions, please contact me.

Yours Truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, County of Oxford

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager Wastewater Services, Oxford County
Mr. Mark Maxwell, EIT,
Project Engineer, Oxford County

Overview of the Biosolids Land Application Program

Oxford County owns and operates nine wastewater treatment plants within the County; namely, Woodstock Wastewater Treatment Plant (WWTP), Ingersoll WWTP, Tillsonburg WWTP, Thamesford WWTP, Drumbo Sequencing Batch Reactor (SBR), Norwich Lagoons, Plattsville Lagoons, Tavistock Lagoons, and the Mount Elgin Septic Tank Effluent Gravity (STEG) system with recirculating sand filters. The four larger mechanical plants generate biosolids on a daily basis while the other systems inventory the material within their treatment systems over long periods of time, or in the case of Drumbo SBR, have it transported to another facility (Woodstock) on a weekly basis for treatment.

Of the four larger mechanical plants, two plants digest material anaerobically (Woodstock and Ingersoll) and two digest biosolids aerobically (Thamesford and Tillsonburg). Woodstock WWTP produces roughly half of all the biosolids produced in the County excluding lagoons and traditionally has landfilled this material while the other plants traditionally used a combination of some land application and some landfilling of the material. This all changed with the implementation of the Biosolids Management Master Plan (BMMP) with dewatering at three of the four mechanical plants and biosolids taken for storage at the Biosolids Centralized Storage Facility (BCSF) for application to land as a nutrient.

Oxford County Biosolids program was the winner of the 2008 Biosolids Award from the Water Environment Association of Ontario for small producers. There are five main elements of the Biosolids Management Master Plan which include; more enforcement of the Oxford County Sewer use by-law, dewatering of stabilized biosolids at each of the major wastewater treatment plants, transporting thickened sludge from smaller plants to the nearest major wastewater treatment plant for processing, land application of all biosolids on approved soil conditioning sites or farms having a NASM plan, and centralized storage of biosolids when the material cannot be land applied.

The enforcement of the Oxford County sewer use bylaw was an important step, and to this end Oxford County hired two enforcement personnel, one staff member in 2006 and a second in 2009, also the wastewater department acquired additional sophisticated automatic sampling equipment. These changes were made with a view to improving both the quality and reducing the quantity of biosolids produced.

Ingersoll Wastewater Treatment Plant did not produce any dewatered Biosolids this year as the digesters were offline as the County upgraded these digesters during 2011. The material was trucked daily to the Woodstock Wastewater Treatment Plant.

The Biosolids from all facilities were compliant with the Ministry of Environment land application guidelines for 2011 and the Nutrient Management Act (NMA) regulations governing Non-Agricultural Source Material (NASM).

Sampling Description

A sample is collected from each bin that leaves the wastewater treatment plants and composited over each two week period. This is then sent out for analysis of eleven metals, nutrients and E.coli. The frequency would be consistent with the minimum frequency for small generators per NMA.

As a small generator, our sampling program will ensure two samples within 30 days of land application and two additional samples within 90 days for nutrients. This can be accomplished by monthly sampling of the biosolids and additional sampling during biosolids removal.

The samples are analyzed by SGS Lakefield Research Ltd. a CAEAL certified lab. The results are entered into an excel spreadsheet and checked for compliance to the regulations at the time of being entered. The analytical results of the dewatered Biosolids are also summarized on an annual spreadsheet to calculate monthly and yearly averages.

Biosolids analysis is provided to the contractor and farmer for their use at the time of land application by directly providing the sample analysis to the biosolids contracted land applier in PDF format when received electronically from the external lab.

Discussion of Results

Table 1 highlights the analytical results for metals versus the Ministry of The Environment's (MOE) guideline criteria and NMA criteria. All sources were compliant and were acceptable to be used as a nutrient for the land application program. More information can be found in Exhibit 1 for analytical results for different sources of biosolids.

The biosolids were resampled at the farm at the time of application and those results may be found in Exhibit 2, these samples provide a further check on the quality of the material and all samples complied with the MOE's criteria as well.

The Biosolids contractor provides Nutrient reports to individual farmer on each application to aid in the beneficial use of the product as a nutrient. The contractor's table of MOE permitted sites or NASM plans indicating spreading applications is included in Exhibit 3.

In summary, Oxford County's Biosolids Management program provided for the effective production, transport, storage, and eventual reuse as a nutrient via land application of all biosolids generated under the program. All operation and maintenance activities were performed by the staff in the wastewater treatment plants. The transportation of the biosolids from the facilities to the storage building was done through a contractor working on Oxford County's behalf. There were no notable upsets or spills during the year of operation and no complaints have been received to date.

Comparison of Generated Biosolids to
MOE Criteria for Metals in mg/kg Dry Solids

Table 1

Parameter	Woodstock WWTP	Tillsonburg WWTP	Thamesford WWTP	NMA Metals Criteria
Metals **mg/kg dry solids**	2011 Annual Average	2011 Annual Average	2011 Annual Average	Maximum
Arsenic	6.4	5	14	170
Cadmium	1.5	0.6	3.1	34
Cobalt	6.6	4	4	340
Chromium	66.7	29	16	2800
Copper	637.4	709	191	1700
Mercury	1.1	1.10	0.16	11
Molybdenum	11.2	9	5	94
Nickel	91.6	36	9	420
Lead	39.0	27	6	1100
Selenium	4.0	7	16	34
Zinc	1105.4	805	343	4200

Biosolids Centralized Storage Facility (BCSF) Operation

The Biosolids Centralized Storage Facility (BCSF) was built for the dewatered biosolids for periods when the dewatered product cannot be directly land applied. The storage building is designed to provide a minimum of 240 days storage. It is also designed with segregated storage areas so that should material be determined to be non-compliant, it can be removed and taken to landfill and not mixed with compliant Biosolids destined for land application. Please see in Table 2 below the Biosolids production rate, type, and destination.

The BCSF is located near Salford Ontario adjacent to the Oxford County Landfill and behind the compost area. This location was arrived at after public consultation through a

Class Environmental Assessment process and involvement of the local landfill liaison committee. It is operated in such a way as to minimize the impact to neighbours as all the loading and unloading activities take place inside the building. The location is far enough back and surrounded by Oxford County buffer lands as to prevent nuisance dust or noise from impacting neighbours. Trees have also been planted to help with the visual impact of the large building.

The building has sufficient room to house 7,000 m^3 of material and would be built in two phases. The existing phase includes 12 bays; and a future phase 2 would add an additional four. The facility has sufficient space to accommodate the 240-day storage requirements for the plants although not all systems will dewater and store at first. Thamesford WWTP will stay with a liquid land application program for the time being and phased in to dewatering at a later time. The individual bays are slightly inclined with cement walls to allow for easy piling of the material. The incoming material is segregated by system and month and is deposited in the appropriate bay, after which Oxford County staff push the biosolids into higher piles at the back of the bay using the existing loader. There are large passive ventilation panels in the walls to allow for good ventilation and light into the building. The building is not connected to hydro. While there are lights, they would be powered by a portable generator only if needed during times of biosolids removal. The daily transport of the material into the storage facility will be done during daylight hours.

Table 2

FACILITY	2011 Biosolids Land Applied (wet tonnes or m^3/ dry tonnes)	2011 Biosolids Stored BCSF or Thamesford Tank	2011 Raw Sludge Hauled Between Plants	Total Biosolids Generated Dry tonnes	Biosolids Type	2011 Destination
Woodstock WWTP	2927 tonnes/ 703 dry tonnes	1329 tonnes/ 319 dry tonnes		1022 dry tonnes	Anaerobic dewatered	Storage Facility & Land Application
Ingersoll WWTP			11812 m^3	n/a	Co-thickened Primary Sludge	Woodstock WWTP
Tillsonburg WWTP	341 tonnes/ 68 dry tonnes	954 tonnes/ 131 dry tonnes		199 dry tonnes	Aerobic dewatered	Storage facility & Land Application
Thamesford WWTP	8618 m^3/ 216 dry tonnes	700 m^3/ 17 dry tonnes		233 dry tonnes	Aerobic liquid	Land Application
Drumbo SBR		_	1362 m^3	n/a	Co-thickened Primary Sludge	Woodstock WWTP

EXHIBIT 1

2011 Woodstock WWTP Dewatered Sludge

Lab Number		CA136063-JAN11	CA13309-JAN11	CA13154-FEB11	CA13445-FEB11	CA12086-MAR11	CA12409-MAR11	CA12728-MAR11	CA12248-APR11	CA12432-APR11	CA13159-MAY11	CA12498-MAY11			CA12073-JUN11	CA12450-JUN11	CA12756-JUN11	CA12133-JUL11	CA13450-JUL11	CA12094-AUG11	CA12392-AUG11	CA13156-SEP11	CA13780-SEP11	CA13171-OCT11	CA11873-NOV11	**CA13104-NOV11**	**CA12357-DEC11**	**CA12502-DEC11**	
Sample Date		5-Jan-11	19-Jan-11	3-Feb-11	16-Feb-11	2-Mar-11	16-Mar-11	30-Mar-11	13-Apr-11	20-Apr-11	4-May-11	18-May-11	Average		1-Jun-11	15-Jun-11	29-Jun-11	6-Jul-11	20-Jul-11	3-Aug-11	18-Aug-11	31-Aug-11	28-Sep-11	5-Oct-11	16-Nov-11	**30-Nov-11**	**14-Dec-11**	**21-Dec-11**	Average
Specific Gravity		1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.2	1.1		1.1	1.0	1.1	1.1	1.0	1.1	1.1	1.0	1.0	1.0	1.0	1.1	1.0	1.1	1.1
Oil & Grease (total)		40000	39000	35000	39000	43000	37000	37000	59000	58000	44000	57000	44363.6		49000	33000	47000	47000	37000	38000	50380	49000	46000	42000	38000	50000	38000	44000	43455.7
pH	**units**	8.21	8.07	7.72	7.19	7.85	7.93	6.85	7.35	7.05	7.55	7.61	7.6	**units**	7.07	7.46	7.22	7.58	7.34	7.64	7.42	7.32	7.26	7.13	6.66	7.51	6.94	7.46	7.3
Alkalinity (as CaCO3)		8790	7640	8300		7820	9970	4610	8720		8840	8000	8076.7		4370	4890	1910	12700	2150	4470	2800	3930	2600	2930	1480	5600	2800	5600	4159.3
Total Solids	mg/L	234000	251000	234000	229000	237000	258000	247000	247000	237000	220000	274000	242545.5	mg/L	250000	255000	256000	238000	263000	275000	284000	268000	259000	257000	245000	267000	247000	285000	260642.9
Volatile Solids	mg/L	142000	158000	142000	138000	139000	138000	138000	139000	134000	120000	158000	140545.5	mg/L	142000	135000	122000	123000	137000	95000	135000	137000	137000	135000	133000	148000	130000	156000	133214.3
Total Nitrogen-kjeldahl (N)	mg/L	10200	12000	12000	10000	12000	12000	13000	11000	7200	8400	9800	10690.9	mg/L	9400	9400	8600	8800	7800	7900	9680	9600	8800	9300	9600	9300	8700	14000	9348.6
Ammonia+Ammonium (N)	mg/L	2100	1900	1800	1800	2000	1900	1100	1000	1100	600	1100	1490.9	mg/L	800	400	900	1400	800	520	473.0	400	300	700	800	1100	700	1100	742.4
Nitrite as N	mg/L	0.3	6.0	0.3	2.4	0.3	0.4	0.7	3.4	0.3	0.3	0.3	1.3	mg/L	0.4	0.3	0.3	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	1.1	0.4
Nitrate as N	mg/L	0.3	0.3	0.3	0.3	0.3	0.6	0.3	0.3	0.3	0.3	0.3	0.3	mg/L	0.3	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.3	0.3
Nitrite+Nitrate as N	mg/L	0.3	6.0	0.3	2.4	0.3	1.0	0.7	3.4	0.3	0.3	0.3	1.4	mg/L	0.4	0.3	0.5	0.3	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.6	1.1	0.4
As Arsenic	mg/L	2	1	1	1	1	1	1	1	0.8	1.2	1.3	1.1	mg/kg	11	36	4.2	6.1	5.9	3.8	5.4	5.5	2.2	5.2	6.5	6.1	5.8	2.6	7.6
B Boron	mg/L	11	3	15	9	6	3	3	6	3	7	8	6.7	mg/kg	67	27	30	25	29	30	29	32	34	30	31.0	26	40	30	32.9
Ca Calcium	mg/L				7900	8000	11000	10000	10000		11000	10000	9700.0	mg/kg	38000	42000	44000	50000		43000	43000	44000	47000	42000	40000	30000	4700	38000	38900.0
Cd Cadmium	mg/L	0.48	0.36	0.56	0.38	0.49	0.17	0.17	0.59	1.3	1.3	0.15	0.5	mg/kg	3.3	0.63	0.2	1.6	0.19	0.69	0.46	0.30	0.31	0.4	0.8	1.0	0.53	0.56	0.8
Co Cobalt	mg/L	1.7	1.4	1.7	1.6	1.6	1.2	1.4	1.5	1.0	2	2	1.6	mg/kg	8	7	6	6	6	7	6	7	8	8	6	4	8	6	6.6
Cr Chromium	mg/L	16	14	17	16	17	17	15	16	15	16	17	16.0	mg/kg	67	66	64	74	59	75	72	71	82	67	62	44	79	58	67.1
Cu Copper	mg/L	150	130	150	140	140	160	140	160	150	150	160	148.2	mg/kg	580	600	570	630	490	620	620	680	760	710	680	540	1100	620	657.1
Hg Mercury	mg/L	0.6	0.1	0.1	1	0.6	0.3	0.3	0.2	0.3	0.200	0.2	0.3	mg/kg	0.8	0.7	1.1	1.3	0.8	0.7	0.8	0.4	1.0	1.1	1.1	0.9	1.1	0.9	0.9
K Potassium	mg/L	260	210	210	200	190	280	250	200	200	230	260	226.4	mg/kg	790	920	910	970	740	870	1000	1000	870	940	960	740	1100	910	908.6
Mg Magnesium	mg/L				950	1000	1500	1400	1200		1200	1300	1221.4	mg/kg	4500	5300	5600	6700		5800	5800	5800	5800	5500	5000	3700	6200	5100	5446.2
Mo Molybdenum	mg/L	3.1	2.5	3.6	3.1	3.2	3.1	2.8	2.8	1.9	2.1	1.5	2.7	mg/kg	3.8	8.6	5.7	9.5	8.5	17	11	12	14	13	13	11	16	13	11.2
Na Sodium	mg/L	250	250	280	270	260	280	260	230	230	250	260	256.4	mg/kg	950	930	840	970	690	880	800	910	960	900	960	770	1100	1300	925.7
Ni Nickel	mg/L	40	35	36	29	28	26	24	24	23	25	21	28.3	mg/kg	75	96	81	86	57	63	56	53	61	63	69	57	110	72	71.4
P Phosphorus	mg/L	9400	7400	9000	8400	7800	8400	7700	7300	6700	7400	7800	7936.4	mg/kg	29000	30000	27000	30000	22000	29000	28100	29000	36000	29000	30000	22000	33000	25000	28507.1
Pb Lead	mg/L	8.2	7.9	8.0	6.2	7.0	9.0	7.7	9.8	8.1	9.4	10	8.3	mg/kg	33	32	33	110	25.0	35	41.0	44	45	36	38	26	67	34	42.8
Se Selenium	mg/L	1	1	1	1	1	1	1	1	1	1	1	1.0	mg/kg	4	4	4	4	4	4	4	4	5	4	4	4	2	4	3.9
Zn Zinc	mg/L	290	270	320	280	270	270	240	300	260	280	260	276.4	mg/kg	990	1100	940	1100	770	980	990	1100	1300	1100	1200	900	1600	970	1074.3
E Coli (cfu/1gm dried wgt)		115385	376912	103419	27860	42236	62674	106883	26721	23207	30909	19708	54803.0		88000	74510	13320	249580	133080	72000	35246	54478	2664	34630	45306	124419	34008	162105	52313.5
E Coli (cfu/100gm)		2700000	2650000	2200000	580000	910000	1470000	2400000	660000	550000	680000	450000	1113282.3		2000000	1900000	310000	5400000	3500000	1800000	910000	146000	69000	890000	1110000	3020000	840000	4200000	1101425.4
All results less than MDL taken as MDL																													
Results Compared to Criteria																													
As Arsenic	**mg/kg**	8.5	4.0	4.3	x	4.2	3.9	4.0	4.0	3.4	5.5	4.7			**11**	**36**	**4**	**6**	**6**	**4**	**5**	**6**	**2**	**5**	**7**	**6**	**6**	**3**	6.4
Cd Cadmium	**mg/kg**	2.1	1.4	2.4	1.7	2.1	0.7	0.7	2.4	5.5	5.9	0.5			**3.3**	**0.6**	**0.2**	**1.6**	**0.2**	**0.7**	**0.5**	**0.3**	**0.3**	**0.4**	**0.8**	**1.0**	**0.5**	**0.6**	1.5
Co Cobalt	**mg/kg**	7.3	5.6	7.3	7.0	6.8	4.7	5.7	6.1	4.2	9.1	7.3			**8**	**7**	**6**	**6**	**6**	**7**	**6**	**7**	**8**	**8**	**6**	**4**	**8**	**6**	6.6
Cr Chromium	**mg/kg**	68	56	73	70	72	66	61	65	63	73	62			**67**	**66**	**64**	**74**	**59**	**75**	**72**	**71**	**82**	**67**	**62**	**44**	**79**	**58**	66.7
Cu Copper	**mg/kg**	641	518	641	611	591	620	567	648	633	682	584			**580**	**600**	**570**	**630**	**490**	**620**	**620**	**680**	**760**	**710**	**680**	**540**	**1100**	**620**	637.4
Hg Mercury	**mg/kg**	2.56	0.40	0.43	2.18	2.53	1.16	1.21	0.81	1.27	0.91	0.73			**0.8**	**0.7**	**1.1**	**1.3**	**0.8**	**0.7**	**0.8**	**0.4**	**1.0**	**1.1**	**1.1**	**0.9**	**1.1**	**0.9**	1.1
Mo Molybdenum	**mg/kg**	13	10	15	14	14	12	11	11	8	10	5			**3.8**	**8.6**	**5.7**	**9.5**	**8.5**	**17.0**	**11.0**	**12.0**	**14.0**	**13.0**	**13.0**	**11.0**	**16.0**	**13.0**	11.2
Ni Nickel	**mg/kg**	171	139	154	127	118	101	97	97	97	114	77			**75**	**96**	**81**	**86**	**57**	**63**	**56**	**53**	**61**	**63**	**69**	**57**	**110**	**72**	91.6
Pb Lead	**mg/kg**	35	31	34	27	30	35	31	40	34	43	36			**33**	**32**	**33**	**110**	**25**	**35**	**41**	**44**	**45**	**36**	**38**	**26**	**67**	**34**	39.0
Se Selenium	**mg/kg**	4	4	4	4	4	4	4	4	4	5	4			**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**5**	**4**	**4**	**4**	**2**	**4**	4.0
Zn Zinc	**mg/kg**	1239	1076	1368	1223	1139	1047	972	1215	1097	1273	949			**990**	**1100**	**940**	**1100**	**770**	**980**	**990**	**1100**	**1300**	**1100**	**1200**	**900**	**1600**	**970**	1105.4

2010 & 2011Tillsonburg WWTP Dewatered Sludge

Lab Number		CA12514-DEC11	CA13173-DEC11	CA14910-NOV11	CA14577-NOV11	CA13440-OCT11	CA13249-OCT11	CA12166-OCT11	CA13785-SEP11	CA12515-SEP11	CA11170-SEP11	CA13273-SEP11	CA12025-SEP11	CA12523-AUG11	CA12304-JUL11	CA12235-JUN11			CA13153-MAY11	CA13461-APR11	CA13142-APR11	CA12392-MAR11	CA13153-MAR11	CA13408-FEB11	CA12079-FEB11	CA12312-JAN11	CA13074-JAN11		
Sample Date		21-Dec-11	7-Dec-11	16-Nov-11	2-Nov-11	19-Oct-11	12-Oct-11	5-Oct-11	28-Sep-11	21-Sep-11	7-Sep-11	7-Sep-11	31-Aug-11	26-Aug-11	13-Jul-11	8-Jun-11			5-May-11	20-Apr-11	6-Apr-11	16-Mar-11	2-Mar-11	16-Feb-11	3-Feb-11	19-Jan-11	5-Jan-11		
												August Dewatered					Average										Average	
Specific Gravity		1	1.0	1.0	1.0	1.0	1.1	1.0	1	1.0	1.0	1.1	1.1	1.1	1.1	1.2	*1.0*		1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	*1.1*	
Oil & Grease (total)		3000	3400	2200	4200	4700	4800	6100	6000	6300	7700			5060	8000	3700	*5012*		2100	3500	2900	1900	2100	2000	3100	2400	2500	*2500*	
pH	units	6.43	6.09	5.94	6.60	6.58	7.13	6.55	6.44	6.49	6.44	6.93	6.93	6.61	6.24	6.77	*6.54*	units	6.05	7.25	6.86	6.38	6.77	6.04	6.17	6.75	6.41	*6.52*	
Alkalinity (mg/L as CaCO3)		775	1880	495	775	1680	1510	555	635	1170	371	2580	2580	1340	958	881	*1212*		444	1130	940	680	1050	820	1670	1180	591	*945*	
Total Solids	mg/L	200000	216000	211000	222000	210000	229000	253000	217000	224000	193000	193000	193000	223000	255900	243000	*218860*	mg/L	179000	216000	207000	247000	230000	222000	313000	212000	229000	*228333*	
Volatile Solids	mg/L	135000	141000	138000	142000	132000	148000	165000	140000	147000	125000	123000	123000	141000	168000	163000	*142067*	mg/L	123000	149000	149000	17100	165000	161000	223000	150000	160000	*144122*	
Total Nitrogen-kjeldahl (N)	mg/L	8800	19000	7900	8800	10000	5200	9200	7300	9400	8400	7700	7700	8540	8800	800	*8503*	mg/L	8300	9900	11000	10000	14000	12000	15000	11000	10700	*11322*	
Ammonia+Ammonium (N)	mg/L	200	200	100	100	1100	<110	<100	<100	100	100	200	200	100	240	600	*270*	mg/L	200	500	210	200	400	280	600	200	600	*354*	
Nitrite as N	mg/L	77	1.6	4.6	38	1.3	39	2.0	1.2	31	21	1	1.0	27	150	59	*30*	mg/L	18	1.7	37.0	81.0	1.3	0.3	2.4	22.0	110.0	*30.4*	
Nitrate as N	mg/L	160	350	300	177	120	110	180	350	195	210	23	23	87	220	5.8	*167*	mg/L	2.3	1.5	3.4	7.7	1.0	0.3	1.9	14.0	110.0	*15.8*	
Nitrite+Nitrate as N	mg/L	240	350	300	215	121	149	180	350	220	230	24	24	114	370	65	*197*	mg/L	20	3.2	7.1	89.0	2.3	0.3	4.3	36.0	220.0	*42.5*	
As Arsenic	mg/kg																	mg/L	0.5	1.0	2.0	1	1	1	1	1	2	*1.2*	
B Boron	mg/kg	55	46	38	47	42	33	32	47	38	42	27	27	25	**8**	**23**	***35***	mg/L	4.0	6	16	3	4	9	7	3	9	*6.8*	
Ca Calcium	mg/kg	29000	41000	30000	45000	31000	29000	26000	36000	29000	35000	31000	31000	32300			***32715***												
Cd Cadmium	mg/kg																	mg/L	0.22	0.13	0.12	0.05	0.15	0.08	0.3	0.05	0.15	*0.14*	
Co Cobalt	mg/kg																	mg/L	1.0	1.0	0.5	0.3	0.6	0.4	0.7	0.3	0.5	*0.59*	
Cr Chromium	mg/kg																	mg/L	4.4	4.9	4.6	5.9	5.4	5.2	7.6	4.4	7.1	*5.5*	
Cu Copper	mg/kg																	mg/L	120	120	130	160	140	130	190	110	170	*141*	
Hg Mercury	mg/kg																	mg/L	0.3	0.2	0.2	0.2	0.2	0.1	0.5	0.2	0.3	*0.2*	
K Potassium	mg/kg	3000	3200	2400	2400	2300	2200	1900	2500	2300	2800	2200	2200	2200	**2000**	**2100**	***2380***	mg/L	490	670	770	710	830	630	840	500	680	*680*	
Mg Magnesium	mg/kg	3300	4600	3400	5000	3800	3400	2900	4100	3400	4200	3700	3700	3600	**3300**														
Mo Molybdenum	mg/kg																	mg/L	1.1	1.6	1.3	2.4	2.3	2.2	3.1	1.6	2.5	*2.0*	
Na Sodium	mg/kg	1700	2300	1700	2100	1700	1630	1400	1900	1700	2000	1800	1800	1900	**1600**	**1400**	***1775***	mg/L	280	340	380	430	410	370	540	330	430	*390*	
Ni Nickel	mg/kg																	mg/L	6	11	8	8	8	7	10	6	10	*8*	
P Phosphorus	mg/kg	40000	56000	41000	59000	41000	40000	36000	51000	40000	48000	40000	40000	47000	**38000**	**33000**	***43333***	mg/L	7500	7600	8100	1000	8600	8100	1200	6900	1100	*5567*	
Pb Lead	mg/kg																	mg/L	4.7	4.5	4.7	6.2	5.0	5.2	6.3	3.4	5.6	*5.1*	
Se Selenium	mg/kg																	mg/L	2	1	1	1	1	2	1	2	1	*1*	
Zn Zinc																		mg/L	130	140	150	180	160	150	210	190	190	*167*	
E Coli (cfu/1gm dried wgt)		3700	16204	4739	1937	52381	57642	16601	115207	2098	44041	444560	444560	10852	64478	4346	*85556*		48603	1884	11691	37409	29652	24279	119489	117925	148472	*59934*	Geomean
E Coli (cfu/100gm)		74000	350000	100000	43000	1100000	1200000	420000	2500000	47000	850000	7800000	7800000	220000	1500000	88000	*1606133*		870000	37000	220000	840000	620000	490000	3400000	2500000	3400000	*1375222*	
All results less than MDL taken as MDL																													

Results Compared to Criteria																													Criteria
As Arsenic	mg/kg	3.0	3.5	4.2	4.3	4.6	2.4	2.8	5.7	4.3	3.0	4.0	3.0	4.5	5.3	27.0			3	5	10	4	4	5	3	5	9	*5*	170
Cd Cadmium	mg/kg	0.25	0.41	0.24	1.2	0.81	0.92	0.67	0.55	0.84	0.51	0.48	0.63	0.40	0.20	0.37			1.2	0.6	0.6	0.2	0.7	0.4	0.9	0.2	0.7	*0.6*	34
Co Cobalt	mg/kg	5	5	5	4	5	2	2	4	4	5	5	5	4	4	4			6	5	2	1	3	2	2	1	2	*4*	340
Cr Chromium	mg/kg	28	43	28	46	29	34	28	38	28	36	30	34	37	29	15			25	23	22	24	23	23	24	21	31	*29*	2800
Cu Copper	mg/kg	680	950	700	930	720	710	650	880	720	900	720	870	850	650	520			670	556	628	648	609	586	607	519	742	*709*	1700
Hg Mercury	mg/kg	1.0	1.6	1.9	1.3	1	1.2	0.9	0.7	1.5	1.1	0.8	0.8	1.2	1.1	0.7			1.68	0.93	0.97	0.81	0.87	0.45	1.60	0.94	1.31	*1.10*	11
Mo Molybdenum	mg/kg	9.1	12	8.5	10	7.1	8.3	7.4	9.7	7.8	9.7	7.7	8.0	9.2	7.5	8.7			6	7	6	10	10	10	10	8	11	*9*	94
Ni Nickel	mg/kg	34	50	36	47	32	33	29	40	32	40	33	37	38	27	23			34	51	39	32	35	32	32	28	44	*36*	420
~~Pb Lead~~	**~~mg/kg~~**	**~~24~~**	**~~32~~**	**~~23~~**	**~~43~~**	**~~28~~**	**~~36~~**	**~~24~~**	**~~34~~**	**~~28~~**	**~~32~~**	**~~26~~**	**~~32~~**	**~~33~~**	**~~25~~**	**~~20~~**			**~~26~~**	**~~21~~**	**~~23~~**	**~~25~~**	**~~22~~**	**~~23~~**	**~~20~~**	**~~16~~**	**~~24~~**	***~~27~~***	**~~1100~~**
Se Selenium	mg/kg	5	6	5	6	7	4	10	10	4	5	8	11	8	4	8			11	5	5	4	4	9	3	9	4	*7*	34
Zn Zinc	mg/kg	730	1000	780	1200	780	790	720	990	790	970	810	940	940	690	590			726	648	725	729	696	676	671	896	830	*805*	4200

2011 Thamesford WWTP Secondary Digester

Lab Number		CA13086-JAN11	CA13118-FEB11	CA12075-Mar11	CA13135-APR11	CA13173-MAY11	CA12068-JUN11	CA12085-AUG11	CA12146-JULY11	CA12169-SEP11	CA13607-SEP11	CA12148-OCT11	CA12303-OCT11	CA14738-NOV11	CA13425-NOV11	CA12057-DEC11	CA13360-DEC11	CA14215-JAN12		
Sample Date		5-Jan-11	2-Feb-11	2-Mar-11	6-Apr-11	4-May-11	1-Jun-11	3-Aug-11	6-Jul-11	7-Sep-11	21-Sep-11	5-Oct-11	12-Oct-11	9-Nov-11	16-Nov-11	1-Dec-11	14-Dec-11	29-Dec-11		
																			Average	
pH	units	7.09	7.00	6.76	6.92	7.04	7.07	7.00	7.58	7.16	7.17	7.23	7.16	7.05	6.68	6.4	6.34	6.94	*6.98*	
Alkalinity (as CaCO3)		744	842	479	1220	828	872	1050	545	540	375	228	744	618	251	79	80	37	*561*	
Total Solids	mg/L	31700	29600	26816	36500	26400	26500	30000	13400	21300	23300	23000	30600	25100	29600	12500	12900	20300	*24677*	
Volatile Solids	mg/L	23200	21400	19061	25500	18000	17700	19500	8580	13500	15300	15200	20500	16700	18900	8100	8500	13900	*16679*	
Total Nitrogen-kjeldahl (N)	mg/L	2270	1800	1750	1840	1510	1440	1340	3490	1020	1370	442	1370	1610	1800	684	620	1440	*1517*	
Ammonia+Ammonium (N)	mg/L	121	171	98.8	326	404	144	200	53.6	62.9	45.4	21	70.8	89.9	30.3	13.7	13.6	30.0	*111.5*	
Nitrite as N	mg/L	1.6	0.8	1.2	0.3	1.3	2.1	2.5	0.3	0.6	0.4	1.6	0.7	1.0	1.6	3.5	1.6	0.5	*1.27*	
Nitrate as N	mg/L	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	46	0.3	0.3	63	100	87	11	*18*	
Nitrite+Nitrate as N	mg/L	1.6	0.8	1.5	0.3	1.3	2.1	2.5	0.3	0.6	0.8	48	0.7	1.0	65	100	89	11	*19*	
Oil & Grease (Total)	mg/L	91.0	63.0	105	74	49	54	24	8	12	9	10	28	12	50		2	34	*39.06*	
As Arsenic	mg/L	0.3	0.3	0.3	0.3	0.3	0.7	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	*0.32*	
B Boron	mg/L	1.3	1.1	0.79	2.0	1.4	11	1.3	0.66	1.1	1.1	1.2	1.2	1.2	1.4	0.5	0.63	0.68	*1.68*	
Cd Cadmium	mg/L	0.03	0.03	0.03	0.03	0.11	0.75	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	*0.08*	
Co Cobalt	mg/L	0.05	0.05	0.05	0.06	0.20	0.74	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.07	*0.10*	
Cr Chromium	mg/L	0.3	0.4	0.5	0.8	0.6	1.2	0.5	0.1	0.3	0.3	0.3	0.4	0.3	0.4	0.1	0.2	0.4	*0.42*	
Cu Copper	mg/L	5.2	5.3	4.8	7.2	4.8	5.6	6.8	2.3	5	4.9	4.6	6	5	6.6	1.7	2.3	3.3	*4.79*	
Hg Mercury	mg/L	0.001	0.002	0.043	0.002	0.002	0.001	0.002	0.002	0.001	0.001	0.001	0.002	0.003	0.003	0.001	0.002	0.001	*0.004*	
K Potassium	mg/L	170	150	130	150	130	120	100	88	100	110	110	120	100	130	72	98	110	*117*	
Mo Molybdenum	mg/L	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.1	0.1	0.1	*0.12*	
Na Sodium	mg/L	300	330	320	390	400	400	490	350	490	470	400	390	440	550	300	400	330	*397*	
Ni Nickel	mg/L	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.1	0.2	0.2	0.2	0.3	0.2	0.3	0.1	0.1	0.2	*0.21*	
P Phosphorus	mg/L	1000	930	840	1400	930	1000	1100	410	800	820	760	1000	900	1200	320	400	570	*846*	
Pb Lead	mg/L	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	*0.14*	
Se Selenium	mg/L	0.3	0.3	0.3	0.3	0.3	1.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	*0.37*	
Zn Zinc	mg/L	9.4	8.4	7.1	12.0	8.4	9.2	12	3.9	10	9.7	9.1	11	9.7	12	3.2	4.1	6.1	*8.55*	
E Coli (cfu/1gm dried wgt)		167192	202703	208831	142466	253788	101887	150000	231343	136150	181674	139130	91503	195219	111486	368000	410853	187192	*192907*	Geomean
E Coli (cfu/100gm)		530000	600000	560000	520000	670000	270000	450000	310000	290000	400000	320000	280000	490000	330000	460000	530000	380000	*434706*	
All results less than MDL taken as MDL																				

Results Compared to Criteria																				Criteria
As Arsenic	mg/kg	9	10	11	8	11	26	10	22	14	13	13	10	12	10	24	23	15	*14*	170
Cd Cadmium	mg/kg	0.9	1.0	1.1	0.8	4.2	28.3	1.0	2.2	1.4	1.3	1.3	1.0	1.2	1.0	2.4	2.3	1.5	*3.1*	34
Co Cobalt	mg/kg	2	2	2	2	8	28	2	4	2	2	2	2	2	2	4	4	3	*4*	340
Cr Chromium	mg/kg	9	14	19	22	23	45	17	7	14	13	13	13	12	14	8	16	20	*16*	2800
Cu Copper	mg/kg	164	179	179	197	182	211	227	172	235	210	200	196	199	223	136	178	163	*191*	1700
Hg Mercury	mg/kg	0.03	0.07	1.60	0.05	0.08	0.04	0.07	0.15	0.05	0.04	0.04	0.07	0.12	0.10	0.08	0.16	0.05	*0.16*	11
Mo Molybdenum	mg/kg	6	3	4	3	4	4	3	7	5	4	9	7	4	7	8	8	5	*5*	94
Ni Nickel	mg/kg	6	7	7	8	8	11	10	7	9	9	9	10	8	10	8	8	10	*9*	420
Pb Lead	mg/kg	6	3	4	5	4	8	7	7	5	4	4	7	4	7	8	8	5	*6*	1100
Se Selenium	mg/kg	9	10	11	8	11	57	10	22	14	13	13	10	12	10	24	23	15	*16*	34
Zn Zinc	mg/kg	297	284	265	329	318	347	400	291	469	416	396	359	386	405	256	318	300	*343*	4200

EXHIBIT 2

2011 Results of Analysis of Samples of Biosolids Taken at Farm Application Site
Biosolids Centralized Storage Facility Woodstock WWTP

Sample Date		Aug. 29,30 & 31, 2011	November 8 & 9, 2011	November 17 & 18, 2011			Avaerage Results		
		NASM #20245	NASM #20295	NASM #20295					
Total Solids	mg/L	226000	270000	223000			239667		
Volatile Solids	mg/L	121000	128000	123000			124000		
Specific Gravity		1.0	1.1	1.0			1.0		
pH	units	8.41	8.03	8.28			8.24		
Alkalinity (as CaCO3)		14900	9800	10700			11800		
Ammonia+Ammonium (N)	mg/L	400	2100	2000			1500		
Nitrogen-kjeldahl (N)	mg/L	13000	10000	11000			11333		
Nitrite as N	mg/L	8.5	6.3	57			23.9		
Nitrate as N	mg/L	0.3	0.8	0.3			0.5		
Nitrite+Nitrate as N	mg/L	8.5	7.1	57			24.2		
As Arsenic	mg/kg	2	8.4	2			4		
B Boron	mg/kg	36	21	34			30		
Ca	mg/kg	50000	44000	60000			51333		
Cd Cadmium	mg/kg	0.74	0.67	0.26			0.56		
Co Cobalt	mg/kg	8	7	7			7		
Cr Chromium	mg/kg	98	69	63			77		
Cu Copper	mg/kg	720	620	660			667		
Hg Mercury	mg/kg	1.0	0.9	1.2			1.0		
P Phosphorus	mg/kg	35000	31000	33000			33000		
K Potassium	mg/kg	1400	710	980			1030		
Mn Magnesium	mg/kg	6700	5100	6600			6133		
Mo Molybdenum	mg/kg	10	12	11			11		
Na Sodium	mg/kg	1300	830	1100			1077		
Ni Nickel	mg/kg	100	82	140			107		
Pb Lead	mg/kg	41	44	37			41		
Se Selenium	mg/kg	7	4	4			5		
Zn Zinc	mg/kg	1200	1200	1200			1200		
E Coli (cfu/1gm dried wgt)		16814	1467	359			6213		
E.Coli (cfu/100gm)		380000	36000	8000			47833	Geomean	
All results less than MDL taken as MDL									
Results Compared to Criteria								**Criteria**	
As Arsenic	mg/kg	2	8	34			15	170	
Cd Cadmium	mg/kg	0.74	0.67	0.26			0.56	34	
Co Cobalt	mg/kg	8	7	7			7	340	
Cr Chromium	mg/kg	98	69	63			77	2800	
Cu Copper	mg/kg	720	620	660			667	1700	
Hg Mercury	mg/kg	1	1	1.2			1	11	
Mo Molybdenum	mg/kg	10	12	1100			374	94	
Ni Nickel	mg/kg	100	82	140			107	420	
Pb Lead	mg/kg	41	44	37			41	1100	
Se Selenium	mg/kg	7	4	4			5	34	
Zn Zinc	mg/kg	1200	1200	1200			1200	4200	

2011 Results of Analysis of Samples of Biosolids Taken at Farm Application Site
Biosolids Source Tillsonburg WWTP

Sample Date		Nov. 7, 2011					Avaerage Results		
		NASM # 20295							
Total Solids	mg/L	192000					192000		
Volatile Solids	mg/L	121000					121000		
Specific Gravity		1.1					1.1		
pH	units	7.86					7.86		
Alkalinity (as CaCO3)		6000					6000		
Ammonia+Ammonium (N)	mg/L	1700					1700		
Nitrogen-kjeldahl (N)	mg/L	5900					5900		
Nitrite as N	mg/L	0.3					0.3		
Nitrate as N	mg/L	0.3					0.30		
Nitrite+Nitrate as N	mg/L	0.3					0.3		
As Arsenic	mg/L	0.7					0.70		
B Boron	mg/L	3.0					3.00		
Cd Cadmium	mg/L	0.05					0.05		
Co Cobalt	mg/L	1					1.00		
Cr Chromium	mg/L	6.5					6.50		
Cu Copper	mg/L	150					150.00		
Hg Mercury	mg/L	0.2					0.20		
P Phosphorus	mg/L	9400					9400		
K Potassium	mg/L	420					420		
Mn Magnesium	mg/L								
Mo Molybdenum	mg/L	2.2					2.20		
Na Sodium	mg/L	330					330		
Ni Nickel	mg/L	7.0					7.00		
Pb Lead	mg/L	6.8					6.80		
Se Selenium	mg/L	2					2.00		
Zn Zinc	mg/L	180.0					180.00		
E Coli (cfu/1gm dried wgt)		2693					2693	Geomean	
All results less than MDL taken as MDL									

Results Compared to Criteria								Criteria	
As Arsenic	mg/kg	4					4	170	
Cd Cadmium	mg/kg	0.3					0.3	34	
Co Cobalt	mg/kg	5					5	340	
Cr Chromium	mg/kg	34					34	2800	
Cu Copper	mg/kg	781					781	1700	
Hg Mercury	mg/kg	1.04					1.04	11	
Mo Molybdenum	mg/kg	11					11	94	
Ni Nickel	mg/kg	36					36	420	
Pb Lead	mg/kg	35					35	1100	
Se Selenium	mg/kg	10					10	34	
Zn Zinc	mg/kg	938					938	4200	

2011 Results of Analysis of Samples of Biosolids Taken at Farm Application Site
Biosolids Source Thamesford WWTP

Sample Date		April 1 & 3, 2010	August 10 & 11, 2011	Nov. 2,3,4,5, 2011			Avaerage Results		
		S-0709-96	NASM # 20247	NASM # 20246					
Total Solids	mg/L	25300	28700	17100			23700		
Volatile Solids	mg/L	18400	19300	10600			16100		
Specific Gravity		1.0	1	1.0			1.0		
pH	units	6.83	7.38	7.34			7.18		
Alkalinity (as CaCO3)		1540	224	1890			1218		
Ammonia+Ammonium (N)	mg/L	404	121	265			263		
Nitrogen-kjeldahl (N)	mg/L	1880	1730	1060			1557		
Nitrite as N	mg/L	3.2	7.4	1.5			4.0		
Nitrate as N	mg/L	0.3	0.6	< 0.3			0.45		
Nitrite+Nitrate as N	mg/L	3.2	8	1.5			4.2		
As Arsenic	mg/L	0.3	0.3	0.3			0.30		
B Boron	mg/L	0.7	0.96	0.67			0.78		
Cd Cadmium	mg/L	0.03	0.03	0.03			0.03		
Co Cobalt	mg/L	0.05	0.05	0.05			0.05		
Cr Chromium	mg/L	0.4	0.5	0.3			0.40		
Cu Copper	mg/L	4.3	5.2	3.5			4.33		
Hg Mercury	mg/L	0.001	0.001	0.001			0.00		
P Phosphorus	mg/L	700	830	570			700		
K Potassium	mg/L	110	110	85			102		
Mn Magnesium	mg/L								
Mo Molybdenum	mg/L	0.1	0.1	0.1			0.10		
Na Sodium	mg/L	310	310	350			323		
Ni Nickel	mg/L	0.2	0.3	0.2			0.23		
Pb Lead	mg/L	0.3	0.2	0.1			0.20		
Se Selenium	mg/L	0.3	0.8	0.3			0.47		
Zn Zinc	mg/L	8.8	10	8.0			8.93		
E Coli (cfu/1gm dried wgt)		1936759	229965	1871345			941088	Geomean	
All results less than MDL taken as MDL									
Results Compared to Criteria								**Criteria**	
As Arsenic	mg/kg	12	10	18			13	170	
Cd Cadmium	mg/kg	1.2	1.0	1.8			1.3	34	
Co Cobalt	mg/kg	2	2	3			2	340	
Cr Chromium	mg/kg	16	17	18			17	2800	
Cu Copper	mg/kg	170	181	205			185	1700	
Hg Mercury	mg/kg	0.04	0.03	0.06			0.04	11	
Mo Molybdenum	mg/kg	4	3	6			4	94	
Ni Nickel	mg/kg	8	10	12			10	420	
Pb Lead	mg/kg	12	7	6			8	1100	
Se Selenium	mg/kg	12	28	18			19	34	
Zn Zinc	mg/kg	348	348	468			388	4200	

EXHIBIT 3

Thamesford Biosolids- Composite Samples Farm S-0709-129
Nutrient Concentration (mg/L - Wet Basis)
Results From SGS Lakefield Research Limited

Date Sampled	Organic N	Plant Avail N	Copper	Potassium	Phosphorus	Zinc	So;ids mg/kg
4 Recent Avg.	130.27	1940	5.1	923.33	150	8.3	29440
4/14/2011	1880	404	4.3	110	700	8.8	25300
Average mg/L	**1005.13**	**1172.00**	**4.70**	**516.67**	**425.00**	**8.55**	**27350.00**
Kg/m^3	1.01	1.17	0.00	0.52	0.43	0.01	27.35

Total Area: ha	**36.4**	**Total Voluume**		**79..8**	**M^3/Ha**	**Dry**	
Total Area: ac	**89.91**	**Applied m3**	**2906**	**32.3**	**M^3/Ac**	**Tonnes/ha**	**2.2**

NUTRIENT VALUE (LBS / ACRE)

Nutrient	Organic N	Plant Aval N	Copper	Potassium	Zinc	Total Solids
Kg/Ha	**80.24**	**93.57**	**0.38**	**41.25**	**0.68**	**2183.49**
LBS/ Acre	**71.64**	**83.53**	**0.33**	**36.82**	**0.61**	**1949.23**

ORGANIC N (TKN) RELEASE

YEAR	% N Release	LBs N/ Acre
Year 1	**30%**	**21.49**
Year 2	**10%**	**7.16**
Year 3	**5%**	**3.58**

Phosphorus Availability

Year 1	**40%**	**12.12**
Year 2	**40%**	**12.12**
Year 3	**20%**	**6.06**
Based on OMAFRA's NMAN Software		

Metals Not Beneficial for Agriculture

Metals Beneficial for Agriculture

Application Rate of Metals (LBS/Acre)

Metal	Copper	Zinc	Chromium	Lead	Nickel	Molybdemum	Selenium	Arsenic	Cobalt	Cadmium	Mercury
Kg/ Ha	**0.38**	**0.68**	**0.03**	**0.02**	**0.02**	**0.01**	**0.02**	**0.02**	**0.00**	**0.00**	**0.00**
LBS/ Arce	**0.33**	**0.61**	**0.03**	**0.02**	**0.01**	**0.01**	**0.02**	**0.02**	**0.00**	**0.00**	**0.00**
Allowable	**12.14**	**29.46**	**20.80**	**8.03**	**3.18**	**0.71**	**0.24**	**1.25**	**2.41**	**0.24**	**0.08**

2011 Biosolids Applied - Oxford Cake

Month	Date(s)	Township	County	NASM Plan ID	Acres Spread	% Solids	Ingersoll WT	Tillsonburg WT	Woodstock WT	Total WT
August										
	29	Nissouri	Middlesex	20245	94.8	25.62	0	0	1236.63	1236.63
November										
	7,8,17,18	SW Oxford	Oxford	20295	68.35	26.44	0	341.15	1690	2031.15
			Yearly Total:		**163.15**	**-**	**0**	**341.15**	**2926.63**	**3267.78**

2011 Biosolids Applied - Thamesford

Month	Date(s)	Township	County	NASM Plan ID	Acres Spread	% Solids	Thamesford Cubic Meters
August							
	10 & 11	Nissouri	Middlesex	20247	40.06	2.91	3212
November							
	2,3,4,5	Nissouri	Middlesex	20246	43.22	2.91	2500
			Yearly Total:		**83.28**	**-**	**5712**

Public Works
P. O. Box 1614, 21 Reeve St.,, Woodstock Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

March 15th, 2012

District Manager,
Ministry of the Environment
London District Office
C/o
Mr. Ian Ness-Jack
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Report Woodstock Wastewater Treatment Plant (WWTP) 2011 (Certificate of Approval #5950-7XQKXS)

This year-end report is prepared as required by the Certificate of Approval # 5950-7XQKXS.

I trust this report fulfills the intent of the Certificate of Approval annual reporting requirements. If there are any questions, please contact me.

Yours Truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, County of Oxford

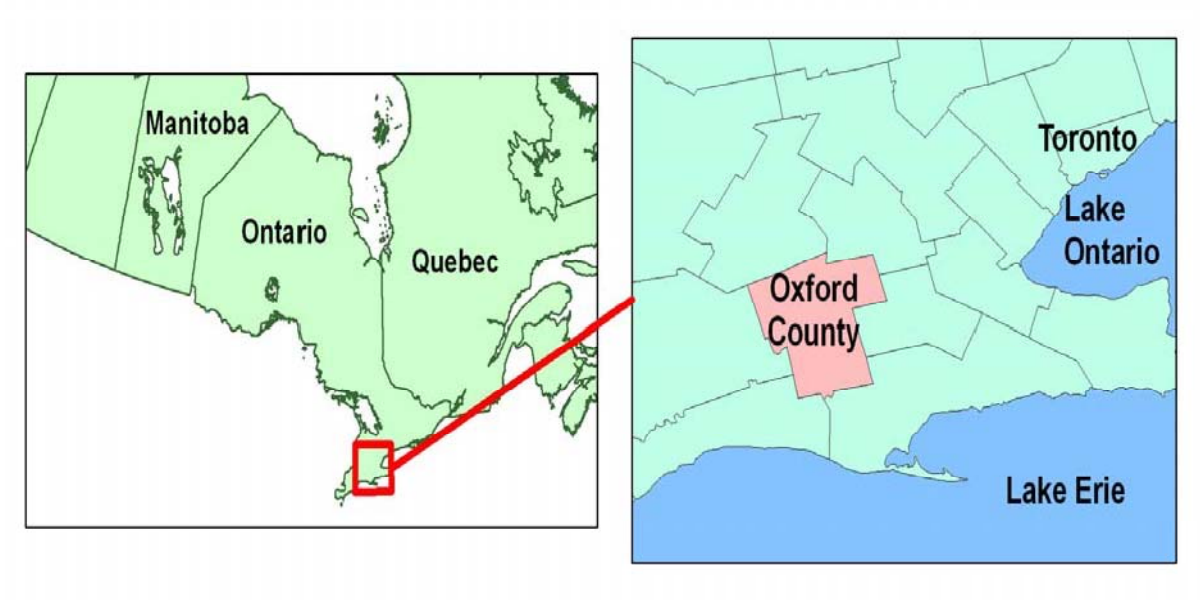
c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager Wastewater Services, Oxford County
Mr. Mark Maxwell, EIT
Project Engineer, Oxford County

Background

Oxford County owns and operates nine wastewater treatment plants (WWTPs) within the County; namely, Woodstock WWTP, Ingersoll WWTP, Tillsonburg WWTP, Thamesford WWTP, Drumbo Sequencing Batch Reactor (SBR), Norwich Lagoons, Plattsville Lagoons, Tavistock Lagoons, and the Mount Elgin Septic Tank Effluent Gravity (STEG) system with recirculating sand filters.

Oxford County is centrally located in Southwestern Ontario and in 1975 was restructured from 18 municipalities to its current 8. The County was given ownership of all municipal water and wastewater systems as part of the restructuring; however, from 1975 to 2000 the operations were subcontracted to the area municipalities and local Public Utility Commissions (PUCs). In 2000, Oxford County took over direct management and operations of all of the water and wastewater systems. Currently, Woodstock and Tillsonburg water distribution and wastewater collection systems are operated under Service Agreements with the respective municipality.

Figure 1 – Location of Oxford County



Treatment Plant Description

The Woodstock WWTP provides wastewater treatment for residential, commercial and industrial users in the City of Woodstock and for the Villages of Embro and Innerkip. It also provides treatment for septic tank waste, hauled waste, holding tank waste, and landfill leachate from within Oxford County. In 2009, the plant completed a hydraulic capacity upgrade increasing the plant capacity from 25,000 m^3 per day to the current approved average daily flow capacity of 33,000 m^3/d, with a peak flow capacity of 66,000 m^3/d.

The Woodstock WWTP is a conventional activated sludge system consisting of primary and secondary treatment, with an outfall pipe to the Thames River. The facility adds ferrous chloride into the reactors for phosphorous removal; sodium hypochlorite is added seasonally for disinfection along with sodium bisulfite for de-chlorination. The facility provided effective wastewater treatment in 2011, with an average flow for the plant of 23,954 m^3/day which represents 72.6% of the design capacity of 33,000 m^3/day. The total flow for 2011 was 8,743,358 m^3.

Figure 2 – Woodstock WWTP Aerial Photo

Plant Effluent Compliance Criteria

Facility - Woodstock Wastewater Treatment Plant
Design Capacity - 33,000 m^3 / day
Average Daily Flow - 23,954 m^3 / day
Receiving Area - Thames River
Classification - WWT – IV
Certificate(s) of Approval #5950-7XQKXS

Effluent Parameter	Monthly Average Concentration (milligrams per litre unless otherwise indicated)	Monthly Average Loading (kilograms per day unless otherwise indicated)
Column 1	Column 2	Column 3
$CBOD_5$		
- May 01 to November 30	15.0	495
- December 01 to April 30	20.0	660
Total Suspended Solids	15.0	495
Total Phosphorus	0.75	25.0
Total Ammonia Nitrogen (Ammonia Nitrogen + Ammonium Nitrogen)		
- May 01 to November 30	3.0	99
- December 01 to April 30	5.0	165
Total Chlorine Residual Note 1	less than 0.05	-
E. Coli Note 1	200 counts/100 mL (monthly *Geometric Mean Density)*	-
pH of the effluent maintained between 6.0 to 9.5, inclusive, at all times		

Note 1 Between May 01 to October 31.

Sampling Procedure

Wastewater samples are collected on a weekly basis. Raw sewage samples are collected where the sewer trunks combine before entering the sewage works. A composite sampler collects samples over a 24-hour period. Following primary treatment, a second 24-hour composite sample is collected.

A final Effluent 24-hour composite sample is collected following secondary treatment, disinfection and de-chlorination but prior to the effluent discharge to the Thames River. Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance, except for pH, DO, chlorine residual and temperature, which are field collected. All in-house testing is done for process control and is not included in this report.

Flows

The total flow treated in 2011 was 8,743,358 m^3. The daily average flow was 23,954 m^3/day which represents 72.6% of the Woodstock WWTP's rated capacity of 33,000 m^3/d.

Raw Sewage Quality

The annual average raw sewage BOD_5 concentration to the plant was approximately 132 mg/L, which represents an average loading of 3,162 kg/day. The average suspended solids concentration was approximately 196 mg/L (or 4,695 kg/day of loading). Average nitrogen levels, as TKN were 19.1 mg/L (or a loading of 458 kg/day). Total phosphorus was 3.1 mg/L, which represents a loading of 74 kg/day.

Plant Performance & Effluent

Detailed analytical data of annual and monthly averages are summarized later in this report in Exhibit 1.

Over the reporting period, the annual average effluent $CBOD_5$ concentration was 2.5 mg/L (or an equivalent 97.8% reduction). The suspended solids average was 3.8 mg/L, which represents a 98% reduction. Ammonia averaged 0.20 mg/L (or a 98.6% reduction). Total phosphorus average was 0.24 mg/L, which represents a 92.3% reduction.

The operator on a minimum weekly basis measures the plants pH of both the influent and effluent streams. There was no single pH result outside the discharge limits of 6-9.5 in 2011.

There was no reported non-compliant event for the Woodstock Wastewater Plant for any discharge parameter in 2011.

Bypassing, Upset and Abnormal Conditions

There were no bypasses or spills from the Woodstock WWTP in 2011 and there were no upset conditions noted during the year.

A sanitary manhole overflow occurred on July 5th, 2011 North of Elmwood Cr. after being obstructed by a blockage. The blockage was cleared by a contractor working for the City of Woodstock.

The Health unit was in contact with Oxford County after receiving a complaint from a resident. Oxford County contacted City of Woodstock staff and were informed that the City had contacted the Spills Action Center and that the MOE were satisfied that the impacted soil would not have to be removed because it only slightly elevated the organic content in the swamp area, and due to the restricted access to the affected area. No further action was required.

Maintenance and Calibration

The operating and maintenance staff at the Woodstock WWTP conduct regular scheduled maintenance of the plant equipment. Detailed maintenance records for each piece of

equipment are kept on-site at the plant. The plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

Calibration of flow meters is conducted yearly by R&R Instrumentation; the records are kept on-site at the plant.

Biosolids

Discussion:

The Biosolids are anaerobically digested, and dewatered at the Woodstock WWTP using two Alfa Laval Centrifuges. The biosolids are then stored at the Oxford County biosolids centralized storage facility prior to land application. The testing results and land application details are summarized in a separate Biosolids report, appended.

Haulers Report

Exhibit 2 has a summary table for incoming septic haulers for volumes.

Summary and Recommendations

The Woodstock WWTP was operating within its design criteria and was within its discharge limits for 2011.

Exhibit 1

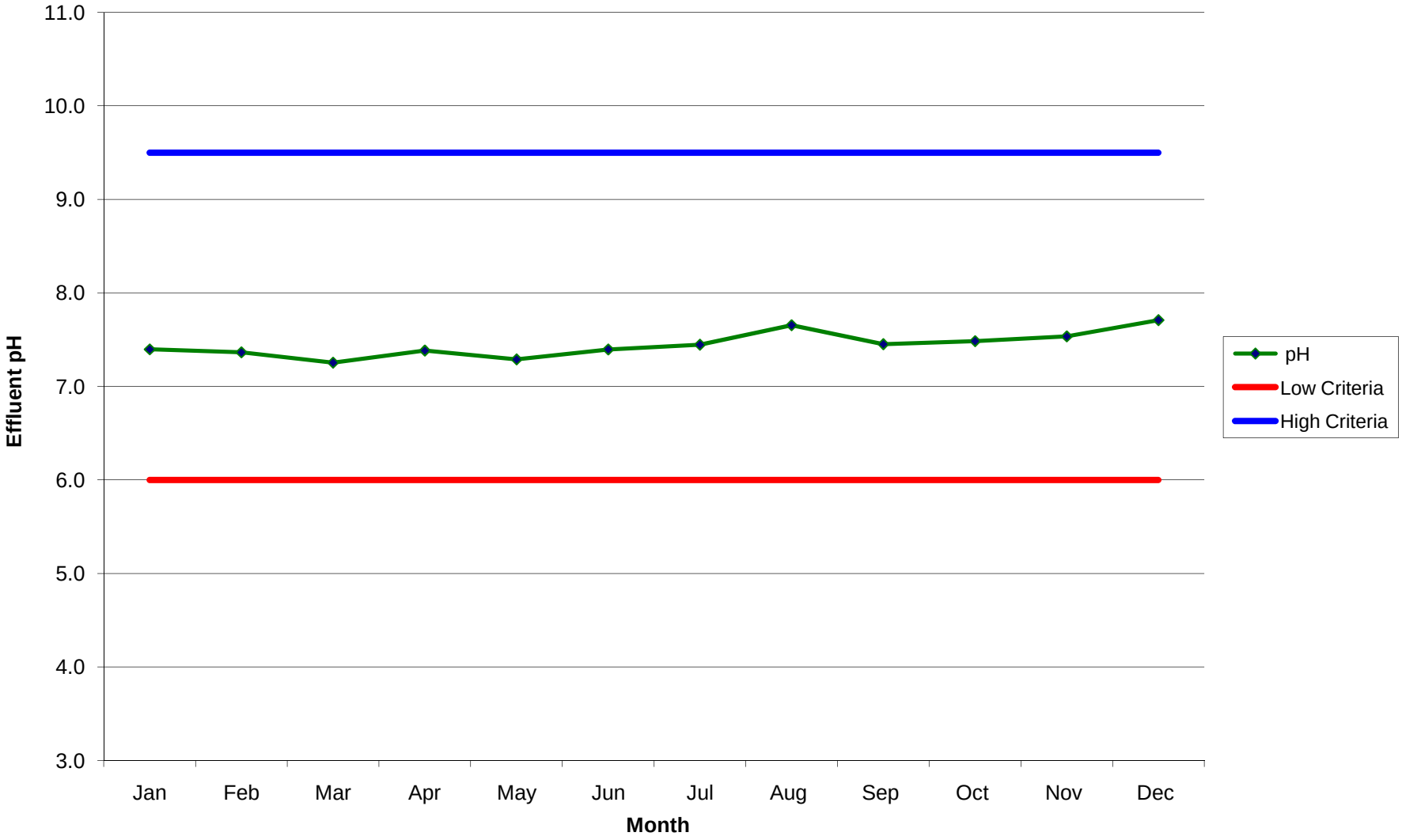
Municipality: Woodstock
PROJECT:Woodstock WWTP
Operator: Oxford County
Works Number:
120000685

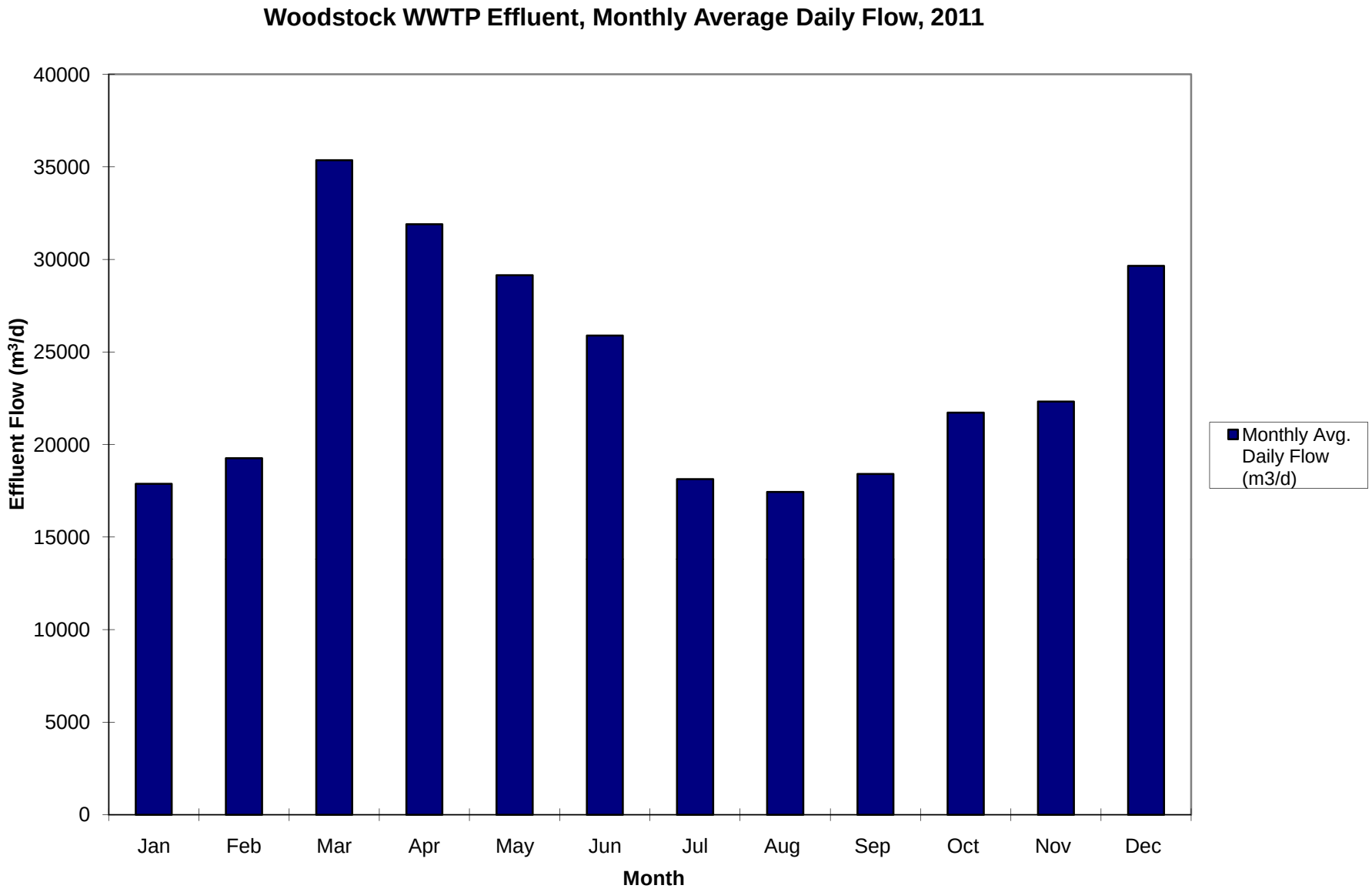
2011

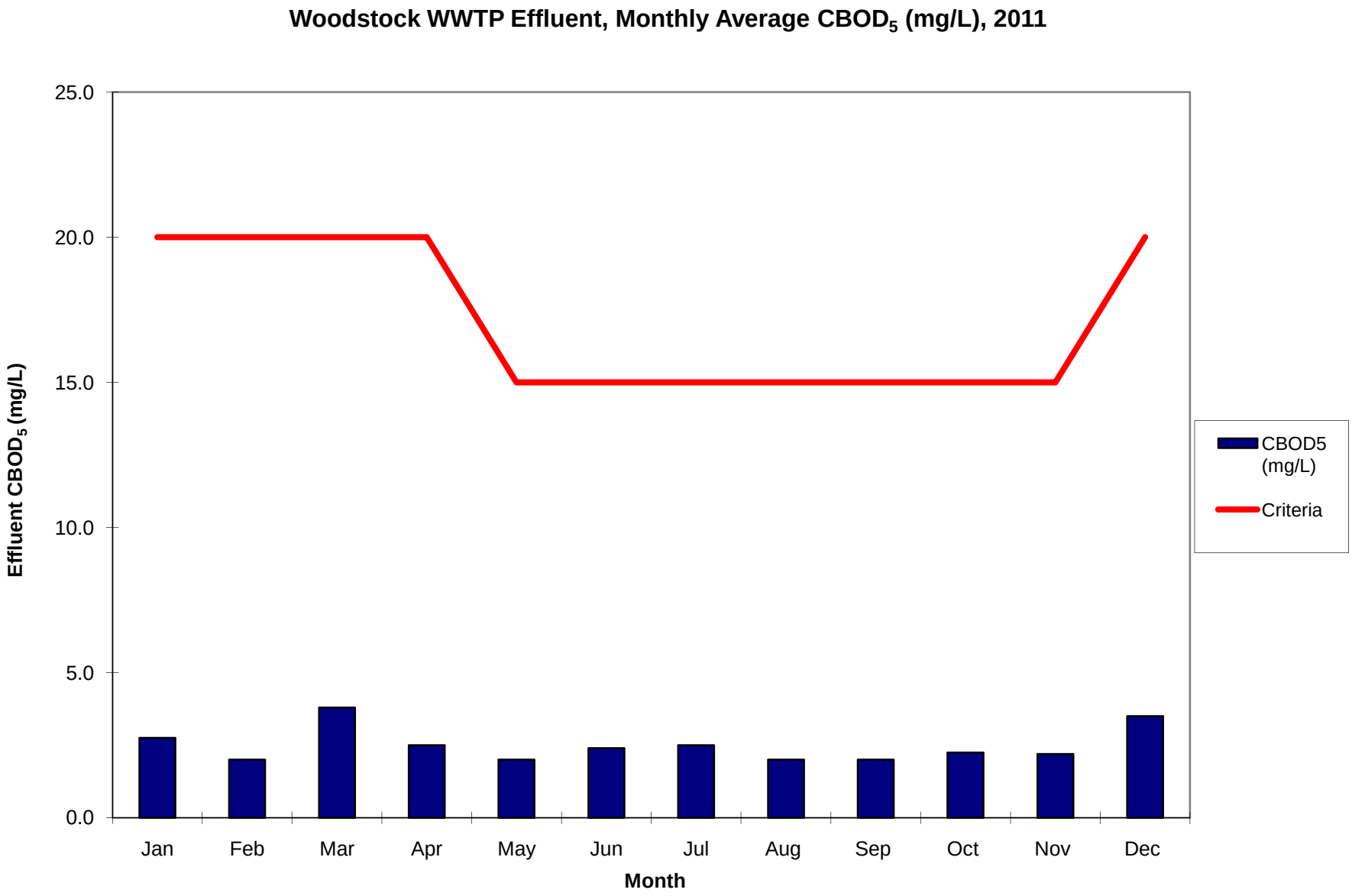
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avaerage	Min	Max	Total	Total 1000m3	
Total Flow (m^3)	554192	539152	1096040	957040	903435	776765	562054	540408	552409	673275	669548	919040				8743358	8743	Design
Monthly Avg. Daily Flow (m3/d)	17877	19255	35356	31901	29143	25892	18131	17433	18413.6	21719	22318	29646	23924	17433	35356			33000
Min. Daily Flow (m^3/d)	12945	12833	17095	20265	21084	15739	13453	11156	12739	12952	14909	20978	15512	11156	21084			72.6%
Max. Daily Flow (m3/d)	28887	36968	62258	51113	44280	49857	29770	31746	29617	32717	67056	46680	42579	28887	67056			
Influent																		
BOD_5 (mg/L)	162.5	149.5	115.4	104.5	138.8	137.8	156.3	129.4	117.3	140.5	139.4	96.3	132	96.25	163			
SS (mg/L)	267	248	145	156	148	273	230	151	231	174	231	100	196	100	273			
Total P (mg/L)	3.6	3.8	3.2	2.0	2.2	3.5	4.0	3.0	3.7	2.2	4.0	1.9	3.1	1.9	4.0			
NH3+NH4-N (mg/L)	17.1	18.0	10.2	10.5	12.9	15.0	15.3	19.0	16.8	13.7	15.7	12.3	14.7	10.2	19.0			
TKN (mg/L)	31.7	20.6	16.8	11.4	14.5	18.5	22.5	20.4	19.3	17.0	22.28	14.0	19.1	11.4	31.7			
NITRITE (mg/L)	0.07	0.22	0.41	0.45	0.36	0.21	0.06	0.17	0.07	0.20	0.11	0.28	0.22	0.06	0.45			
NITRATE (mg/L)	0.05	0.95	0.97	0.46	0.33	0.05	0.05	0.23	0.07	0.47	0.26	1.48	0.45	0.05	1.48			
pH	7.50	7.50	7.53	7.60	7.44	7.65	7.55	7.65	7.59	7.53	7.7	7.64	7.57	7.44	7.68			
Temp Celcius	11.3	10.6	9.2	10.9	13.1	15.6	17.6	18.9	18.4	16.5	15.4	13.5	14.2	9.2	18.9			
$CBOD_5$ (mg/L)	133	144	86	86	96	133	138	107	122	124	123	84	115	84	144			
Primary Effluent																		Criteria
BOD5 (mg/L)	98	103	81	81	90	69	73	56	95	65	100	69	81	56	103			
SS (mg/L)	98	162	77	122	108	98	121	91	94	74	89	115	104	74	162			
Total P (mg/L)	1.9	2.6	1.6	2.1	2.3	1.7	2.4	1.9	2.3	1.8	2.1	2.3	2.1	1.6	2.6			
NH3+NH4-N (mg/L)	15.3	21.0	13.8	10.4	14.9	15.9	20.7	20.0	19.4	16.3	17.1	12.7	16.5	10.4	21.0			
TKN (mg/L)	18.2	23.6	15.7	11.9	17.0	16.0	22.0	23.3	20.7	18.9	17.3	13.9	18.2	11.9	23.6			
NITRITE (mg/L)	0.66	0.95	0.91	0.39	0.25	0.30	0.24	0.22	0.17	0.14	0.16	0.41	0.40	0.14	0.95			
NITRATE (mg/L)	3.24	5.14	2.82	1.43	1.29	1.40	1.33	1.29	1.38	1.22	1.60	1.70	1.99	1.22	5.14			
pH	7.45	7.42	7.56	7.61	7.39	7.65	7.54	7.66	7.59	7.59	7.75	7.73	7.58	7.39	7.75			
Temp Celcius	5.5	4.8	4.2	9.0	11.8	18.2	17.5	18.2	15.3	12.8	10.6	8.8	11.4	4.2	18.2			
$CBOD_5$ (mg/L)	56	64	46	53	39	37	39	31	41	38	42	51	45	31	64			

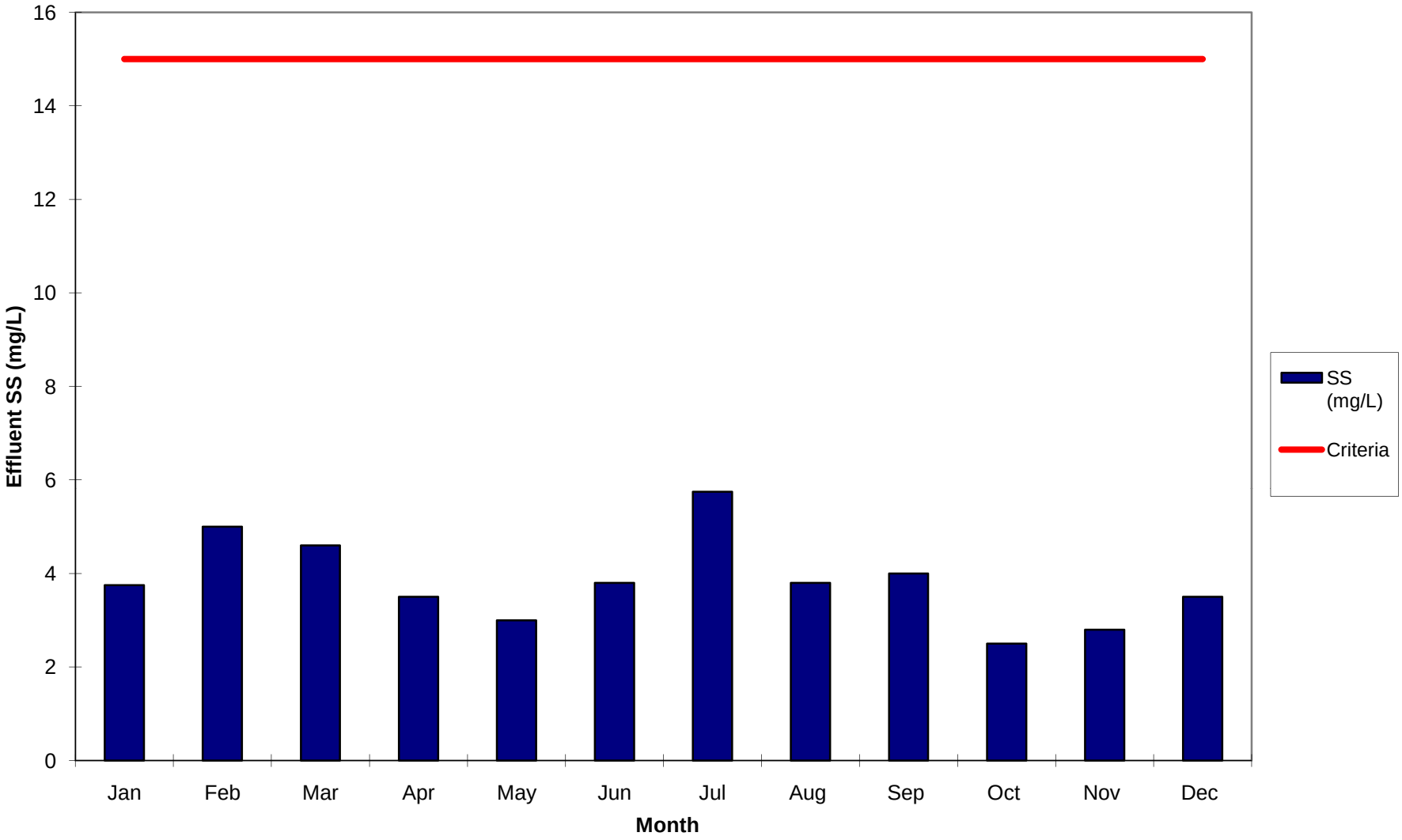
Plant Effluent																		
$CBOD_5$ (mg/L)	2.8	2.0	3.8	2.5	2.0	2.4	2.5	2.0	2.0	2.3	2.2	3.5	2.5	2.0	3.8			15/20
SS (mg/L)	3.8	5.0	4.6	3.5	3.0	3.8	5.8	3.8	4.0	2.5	2.8	3.5	3.8	2.5	5.8			15
Total P (mg/L)	0.23	0.21	0.25	0.20	0.16	0.19	0.22	0.31	0.24	0.32	0.28	0.30	0.24	0.16	0.32			0.75
Soluble P (mg/L)	0.18	0.13	0.21	0.16	0.16	0.15	0.18	0.31	0.18	0.32	0.22	0.26	0.20	0.13	0.32			
Ammonia (mg/L)	0.18	0.38	0.40	0.25	0.15	0.14	0.15	0.14	0.18	0.15	0.14	0.10	0.20	0.10	0.40			3/5
TKN (mg/L)	0.9	1.4	1.0	0.8	0.9	1.2	0.7	2.3	0.5	1.4	1.28	0.5	1.1	0.5	2.3			
NITRITE (mg/L)	0.17	0.49	0.25	0.11	0.06	0.06	0.08	0.06	0.06	0.06	0.08	0.10	0.13	0.06	0.49			
NITRATE (mg/L)	21.7	23.3	15.8	17.6	19.4	19.8	23.7	19.3	20.7	18.2	20.2	15.9	19.6	15.8	23.7			
pH	7.40	7.36	7.25	7.38	7.29	7.40	7.45	7.65	7.45	7.49	7.53	7.71	7.45	7.25	7.71			6-9.5
Temp Celcius	11.4	11.1	10.8	12.6	14.8	17.7	19.9	20.6	19.7	17.0	16.3	13.7	15.5	10.8	20.6			
DO (mg/L)	8.22	8.6	8.74	8.91	8.71	7.86	7.9	7.9	7.9	8.0	7.1	8.2	8.2	7.1	8.9			
BOD5 (mg/L)	3.3	5.5	5.2	4.3	3.5	2.8	3.5	3.0	2.3	2.3	4.2	3.5	3.6	2.3	5.5			
Disinfection Effluent																		
E. Coli (#/100 mL)					4.1	5.3	3.7	5.3	4.2	27.7			8	4	28			200
geomean																		
Influent Loadings																		
Month													Average	Min	Max			Criteria
BOD (kg/d)	2905	2879	4080	3334	4044	3568	2833	2256	2159	3051	3111	2853	3162	2159	4080			
TSS (kg/d)	4769	4780	5141	4977	4306	7063	4161	2625	4244	3784	5156	2972	4695	2625	7063			

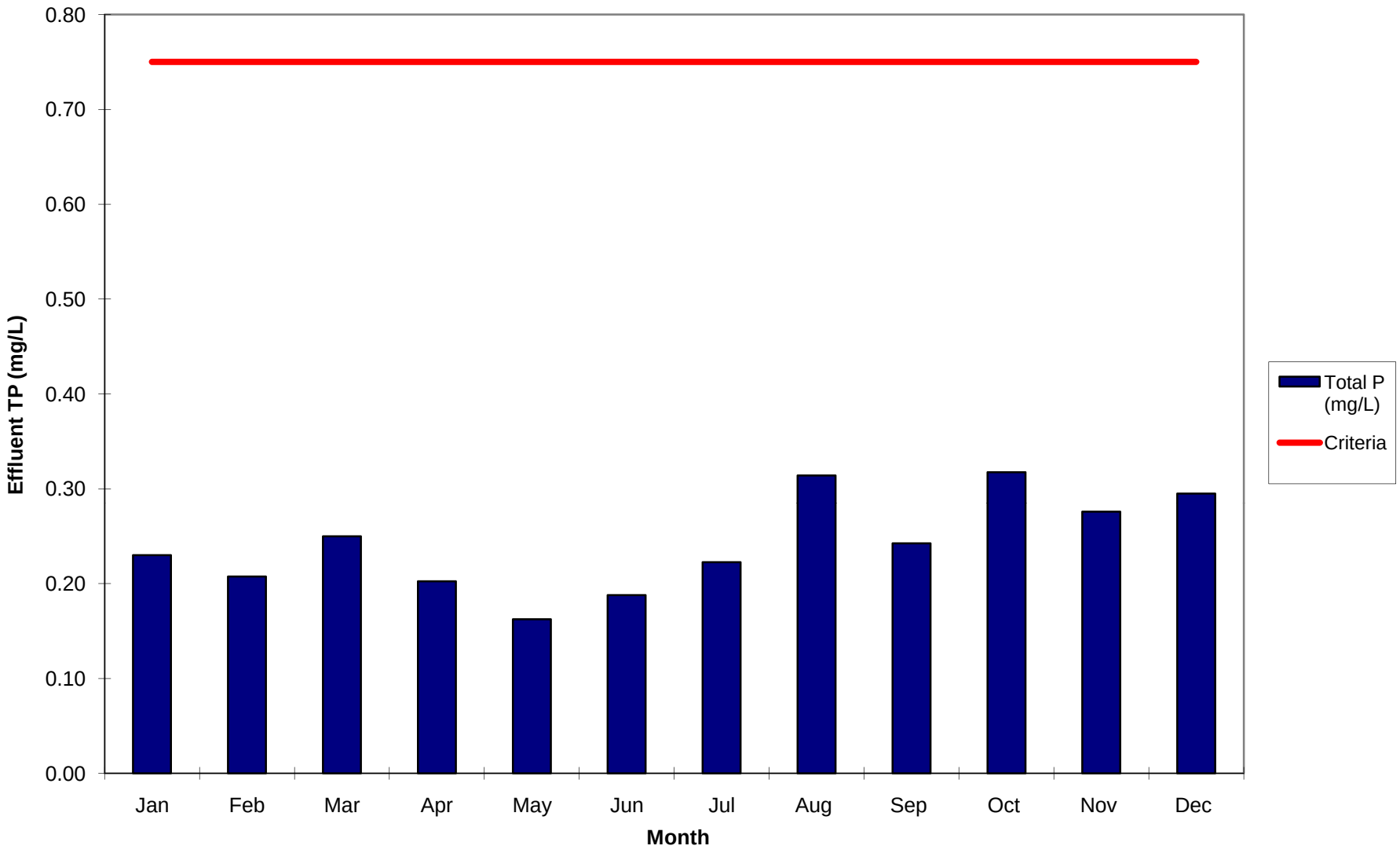
Woodstock WWTP Effluent, Monthly Average pH, 2011

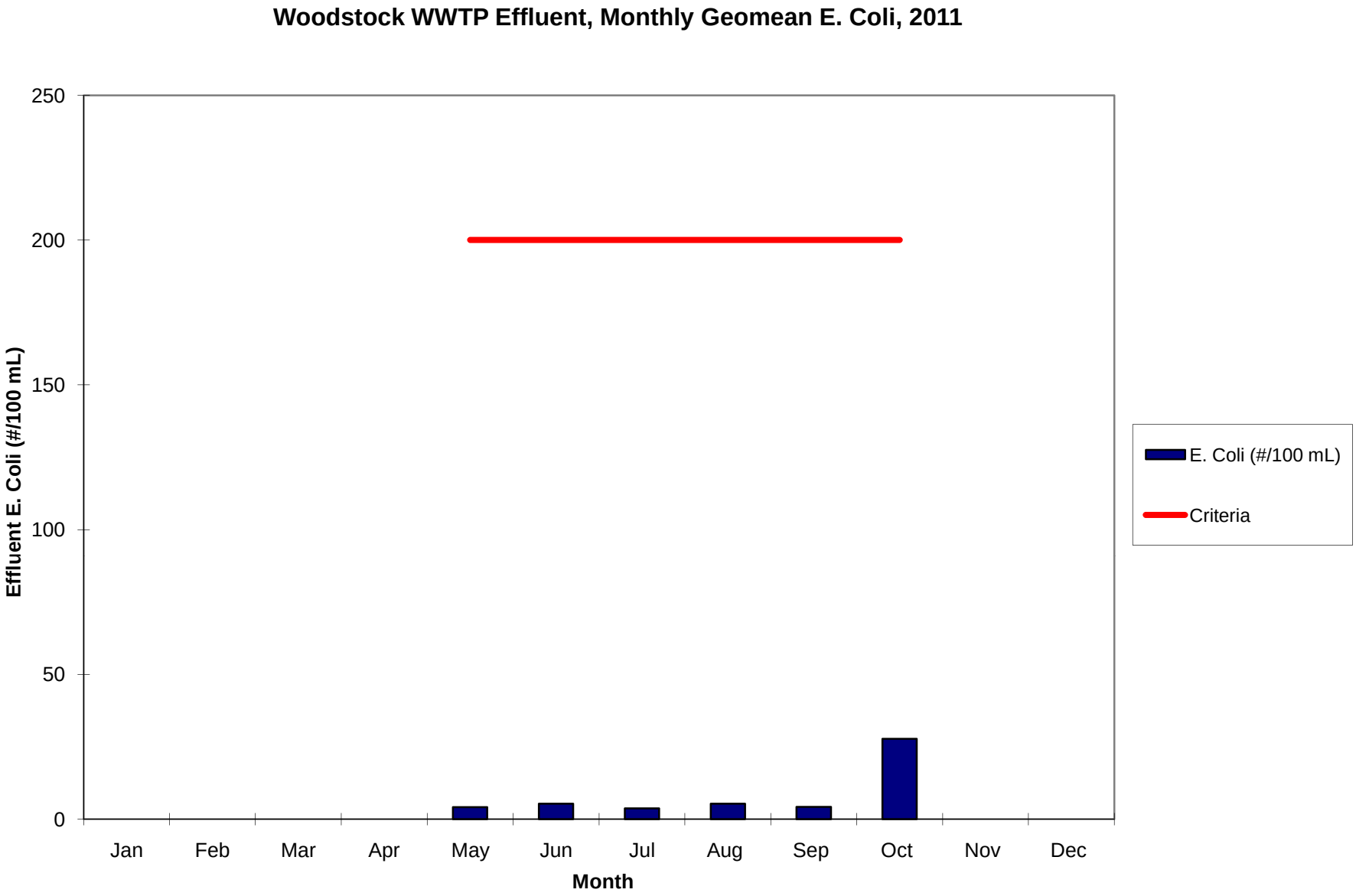



Woodstock WWTP Effluent, Monthly Average Daily Flow, 2011
Effluent Flow (m³/d)
40000
35000
30000
25000
20000
15000
10000
5000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Monthly Avg. Daily Flow (m3/d)


Woodstock WWTP Effluent, Monthly Average CBOD5 (mg/L), 2011
Effluent CBOD5 (mg/L)
25.0
20.0
15.0
10.0
5.0
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (mg/L)
Criteria


Woodstock WWTP Effluent, Monthly Average SS (mg/L), 2011
Effluent SS (mg/L)
16
14
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
SS (mg/L)
Criteria


Woodstock WWTP Effluent, Monthly Average TP (mg/L), 2011
Effluent TP (mg/L)
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Total P (mg/L)
Criteria


Woodstock WWTP Effluent, Monthly Geomean E. Coli, 2011
250
200
150
100
50
0
Effluent E. Coli (#/100 mL)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
E. Coli (#/100 mL)
Criteria

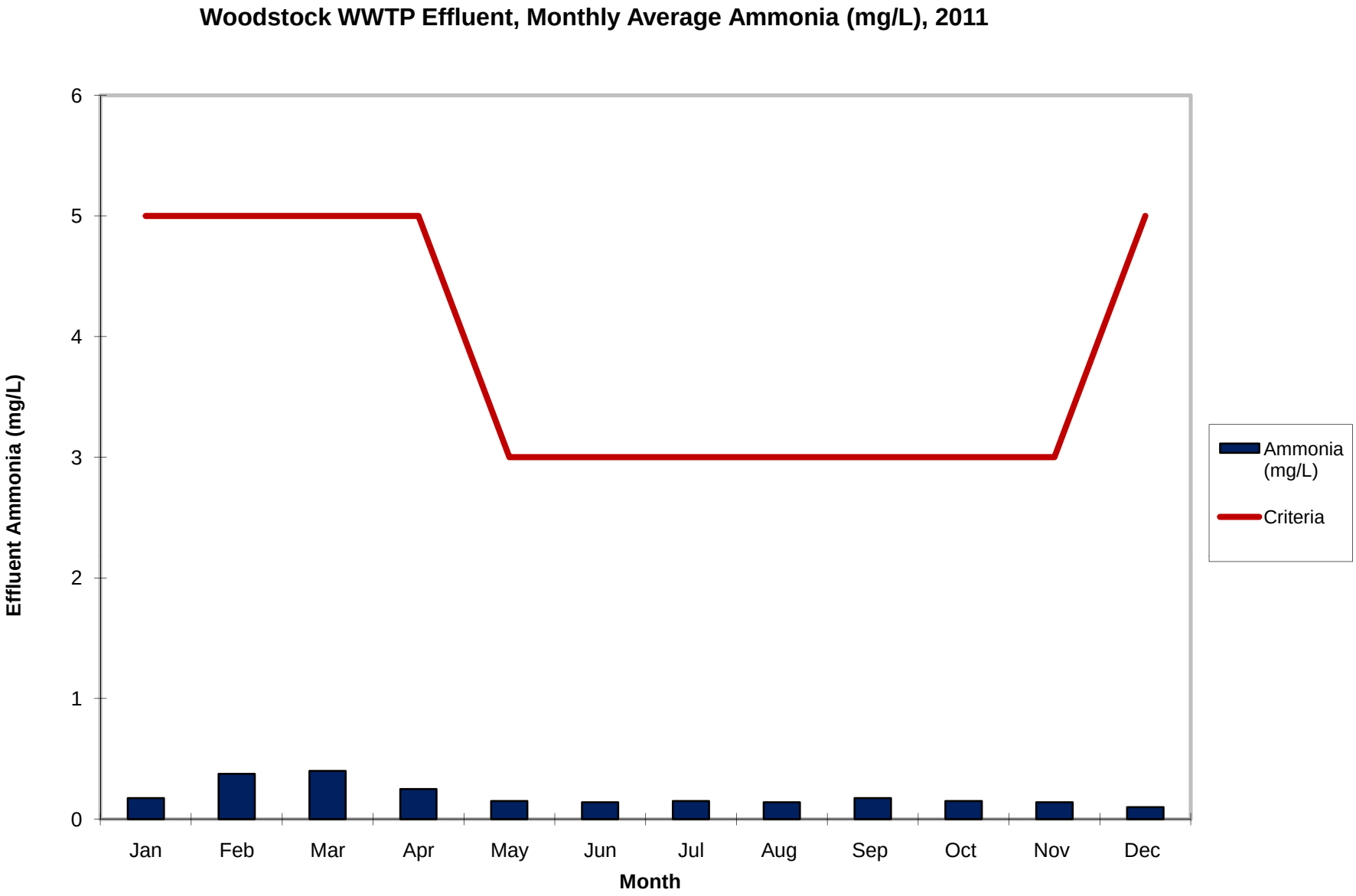

Woodstock WWTP Effluent, Monthly Average Ammonia (mg/L), 2011
Effluent Ammonia (mg/L)
6
5
4
3
2
1
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Ammonia (mg/L)
Criteria

Exhibit 2

Hauler Summary 2011

Hauler Name	Quantity								Gallons				
	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Year to Date
Gerber									10,800		2,000		12,800
Chitters		2,000	13,500	9,300	5,000	7,000	2,000	14,600	25,200	17,600	18,400	15,700	130,300
County	33,600	25,200	33,600	16,800	22,400	36,400	19,600	19,600	22,400	28,000	22,400	19,600	299,600
Denby	34,100	50,100	85,400	85,000	99,000	119,800	99,800	110,200	72,700	90,900	81,200	52,000	980,200
Thamesford			40,000	25,000									65,000
Jack Hall	14,500	5,600	30,900	41,000	71,100	70,600	72,900	54,000	48,200	86,600	96,100	52,500	644,000
Norms	12,100	11200	20,900	43,500	72,600	51,200	192,500	313,450	322,400	295,150	26,500	39,450	1,400,950
Otterville	24,900	30,600	39,500	12,600	32,400	66,300	49,400	47,600	53,100	54,600	42,300	51,600	504,900
E + J					425	200	575	650	675	175	300	300	3,300
Watts	2,400	8,600	9,900	23,400	11,900	16,500	11,700	14,300	7,600	30,500	14,900	9,000	160,700
Aff Portables	685	1,075	1,035	615	1,175	3,100	2,595	3,765	2,140	2,720	1,850	810	21,565
Nor Pac	21,600	36,000	21,600										79,200
Ingersoll	240,000	220,000	202,800	210,000	250,000	215,000	190,000	200,400	220,200	265,200	199,800	185,000	2,598,400
Total Haulage	383,885	390,375	296,335	467,215	316,000	371,100	641,070	778,565	785,415	871,445	505,750	425,960	6,900,915

Public Works
P. O. Box 1614, 21 Reeve St.,, Woodstock Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

March 15, 2012

District Manager,
Ministry of the Environment
London District Office
C/o
Mr. Ian Ness-Jack
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Report Ingersoll Wastewater Treatment Plant (WWTP) 2011
(Certificate of Approval #0342-7WCKCJ)

This year-end report is prepared as required by the Certificate of Approval #0342-7WCKCJ.

I trust this report fulfills the intent of the Certificate of Approval reporting requirements. If there are any questions, please contact me.

Yours Truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, County of Oxford

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager Wastewater Services, Oxford County
Mr. Mark Maxwell, EIT
Project Engineer, Oxford County

Overview

The Ingersoll Wastewater Treatment Plant (WWTP) is comprised of two plants: Old Plant and New Plant. Both Old and New Plants are conventional activated sludge systems. They provided effective wastewater treatment in 2011, with an average flow of 4,960 m^3/d for the New Plant, and 2,757 m^3/d for the Old Plant. The combined average flow of 7,719 m^3/d represents 75.5% of the design capacity of 10,230 m^3/d for both plants. The total combined flow for 2011 was 2,815,122 m^3.

Figure 1

Plant Description

The Ingersoll Old and New Plants began operation in 1947 and 1974, respectively. The facilities are conventional activated sludge plants consisting of primary and secondary treatment; both plants share the same ultraviolet light disinfection system and combine at a single discharge point. The facility adds Aluminum Sulphate into the reactors for total phosphorus reduction. Oxford County owns and operates the facility.

Plant Specifications

Facility - Ingersoll Wastewater Treatment Plant
Design Capacity - 10,230 m^3/d

Average Daily Flow - 7,719 m^3/d
Receiving Area - Thames River
Classification - WWT – III
Certificate(s) of Approval
MOE CofA #0342-7WCKCJ

CofA Effluent Requirements	Limits Monthly Average Concentration	Limits Monthly Average Loading	Objectives Monthly Average Concentration
CBOD	25 mg/L	256 kg/d	15 mg/L
TSS	25 mg/L	256 kg/d	15 mg/L
TP	1 mg/L	10.3 kg/d	0.75 mg/L
E.Coli	NA	NA	200 organisms/100 ml

pH between 6-9.5
Seasonal Disinfection May 1 - October 31

Sampling Procedure

Influent and effluent samples are collected bi-weekly using a composite sampler over a 24-hour period. Raw sewage samples are collected at the main lift station located on-site; the sample is drawn after the lift station pumps and prior to the primary tanks of either plant.

Effluent is sampled directly from the combined flow after it leaves the UV disinfection system prior to discharge and constitutes the effluent sample for the entire facility.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are field collected. All in-house testing is done for process control and is not included in this report.

Flows

The total flow treated in 2011 was 2,815,122 m^3. The daily average flow was 7,719 m^3/day which represents 75.5% of the design flow for Ingersoll WWTP of 10,230 m^3/day.

Raw Sewage Quality

The annual average raw sewage $CBOD_5$ concentration to the plant was 102 mg/L, which represents an average loading of 787 kg/day. The average suspended solids concentration was 153 mg/L, which represents a loading of 1,178 kg/day. Average nitrogen concentration, as TKN was 23.2 mg/L; equivalent to a loading of 179 kg/day. Total phosphorus was 2.5 mg/L, which represents a loading of 19 kg/day.

Plant Performance & Effluent

Detailed analytical data of annual and monthly averages are summarized later in this report in Exhibit 1.

Over the reporting period, the annual average effluent $CBOD_5$ concentration was 7 mg/L which represents a 93% reduction. The suspended solids annual average concentration was 10 mg/L, which represents a 93.5% reduction. The effluent Ammonia averaged 0.6 mg/L or a 96.9% reduction. Total phosphorus annual average concentration was 0.4 mg/L, which equates to an 84% reduction.

pH of both influent and effluent streams is measured by the operator approximately four times a week. There was no single pH result outside the discharge limits of 6-9.5 for 2011.

Bypassing, Upset and Abnormal Conditions

There were no bypasses or spills of raw wastewater at the Ingersoll Wastewater Treatment Plant in 2011. All results for 2011 were compliant to the CofA limits.

Maintenance and Calibration

The operating and maintenance staff from the Ingersoll WWTP conducts regular scheduled maintenance of the plant equipment. Detailed maintenance records for each piece of equipment are kept on site at the Ingersoll WWTP.

R&R Instrumentation Services provided meter calibration service on both effluent meters in 2011.

Biosolids 2011

The Ingersoll Wastewater Treatment Plant utilizes anaerobic digesters to stabilize biosolids prior to dewatering through a belt press. Normally the dewatered cake is stored at the Oxford County Biosolids Centralized Storage Facility in Salford, Ontario and land applied.

The system was offline in 2011 as the digesters were under rehabilitation by a contractor. Raw co-thickened sludge was transported to Woodstock for treatment and no Biosolids were digested or dewatered on site.

Please see Biosolids report, prepared and submitted separately, for more detailed information.

Summary and Recommendations

The Ingersoll WWTP was operating within its hydraulic design criteria in 2011.

Digester upgrades began in 2011, and include a primary digester and secondary digester roof replacement and a new primary digester mixing system. The digesters are to begin operation again in 2012.

Following this project, Oxford County will begin an upgrade of the dewatering facility in Ingersoll which should be completed before the end of 2012.

Exhibit 1

Municipality: Ingersoll
PROJECT:INGERSOLL WWTP
Operator: County of Oxford
Works Number:
(O) 110003978 (N) 110003969

2011

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avaerage	Min	Max	Total	Total 1000m3
Total Flow m3	220077	201710	342527	252696	273721	229706	187246	218280	188242	214588	222851	263478				2815122	2815.122
Flow (m^3/d) (New)	4350	4656	7017	5412	5705	4939	3911	4560	3953	4541	4657	5849	4962	3910.5	7016.9	Design	
Flow (m^3/d) (Old)	2750	2548	4032	3178	3125	2718	2130	2481	2322	2381	2771	2650	2757	2129.6	4032.4	Criteria	
Flow (m^3/d) (Combined)	7099	7204	11049	8590	8830	7657	6040	7041	6275	6922	7428	8497	7719	6040.2	11049	10230	
Max Daily Flow	10410	10657	17674	12454	12109	10152	8334	9285	7995	8385	16189	12301	11329	7995	17674		
Min Daily Flow	3168	5050	7855	6048	6311	4906	4696	4400	4518	4244	5615	6005	5235	3168	7855		
Common Influent																	
$CBOD_5$ (mg/L)	145	132	61	77	86	65	121	76	148	118	133	65	102	61	147.5		
TSS (mg/L)	188	177	111	99	134	152	214	124	225	168	164	76	153	76	225		
Total P (mg/L)	3.4	3.6	1.8	2.3	1.8	1.5	2.5	1.8	3.8	2.4	3.3	1.3	2.5	1.345	3.76		
NH3+NH4-N (mg/L)	22.0	29.25	19.4	13.83	11.6	11.05	16.7	18.4	28.25	12.8	36.75	11.95	19.3	11.05	36.75		
TKN (mg/L)	29.2	34.15	21.27	16.0	14.6	16.3	25.2	21.03	30.55	18.4	37.0	15.2	23.2	14.6	37		
NITRITE (mg/L)	0.225	0.15	0.693	0.18	0.12	0.03	0.03	0.03	0.03	0.03	0.26	0.64	0.20	0.03	0.6933		
NITRATE (mg/L)	0.275	0.268	0.817	0.372	0.063	0.025	0.025	0.025	0.03	0.025	0.048	0.73	0.22	0.025	0.8167		
pH (mg/L)	7.40	7.60	7.64	7.27	7.58	7.43	7.43	7.43	7.31	7.56	7.21	7.59	7.45	7.205	7.6367		
Effluent Combined	Old and New Plant Combined Effluent after UV System Upgrade															Objectives	Limits
$CBOD_5$ (mg/L)	16.5	15	11.3	8	6.5	2	3.5	1.7	6	4	4	5	7	2	11	15	25
TSS (mg/L)	23.5	15	6	7	8.5	4.5	2.5	8.7	17.7	14	8.3	6.3	10	2.50	17.70	15	25
Total P (mg/L)	0.53	0.28	0.19	0.36	0.57	0.35	0.36	0.39	0.67	0.56	0.54	0.31	0.4	0.2	0.7	0.75	1
NH3+NH4-N (mg/L)	1.25	0.28	1.17	0.15	0.25	0.15	0.18	0.43	1.20	0.35	1.93	0.25	0.6	0.2	1.9		
TKN (mg/L)	3.85	1.80	1.20	1.68	0.75	1.85	0.25	1.82	2.80	1.25	3.28	1.13	1.805	0.250	3.275		
NITRITE (mg/L)	1.51	5.41	4.41	0.33	0.31	0.20	0.06	0.48	0.16	0.03	0.71	0.08	1.14	0.03	4.41		
NITRATE (mg/L)	12.30	8.77	5.83	11.63	15.20	14.05	17.80	18.17	17.20	18.45	23.80	14.28	14.790	5.830	23.800		
pH	6.98	6.94	7.07	6.86	7.68	7.07	7.19	7.49	7.35	8.05	7.05	8.00	7.3	6.9	8.0		
E.Coli Geomean					30	27	6	187	19	11			47	6.00	187	200	NA
unionized ammonia (mg/L)	0.003	0.0025	0.003	0.003	0.011	0.0025	0.003	0.013	0.015	0.0	0	0.010					

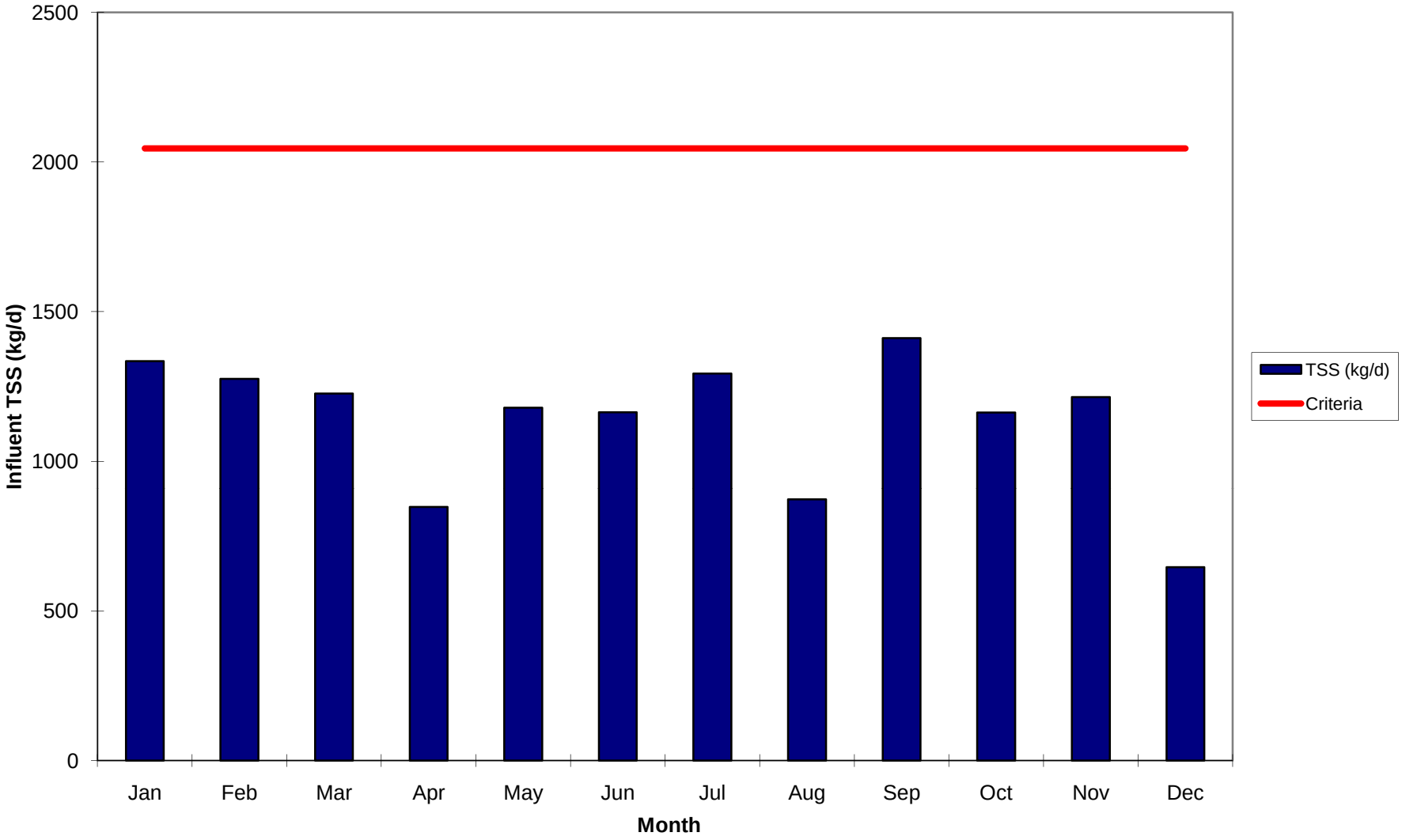
Influent Loadings

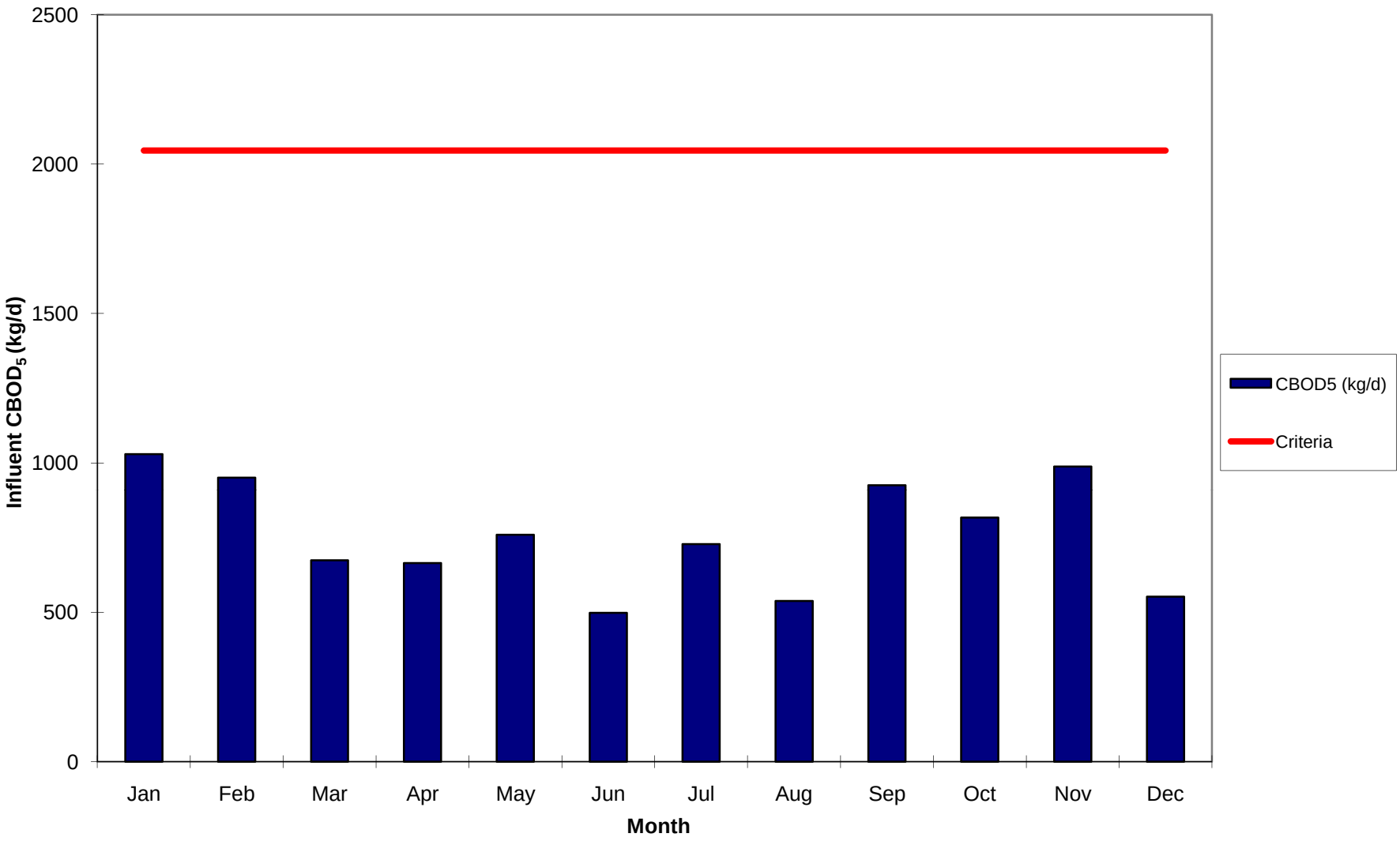
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max		Design
$CBOD_5$ (kg/d)	1029	951	674	664	759	498	728	537	926	817	988	552	789	498	988		2045
TSS (kg/d)	1335	1275	1226	848	1179	1164	1293	873	1412	1163	1215	646	1178	646	1412		2045

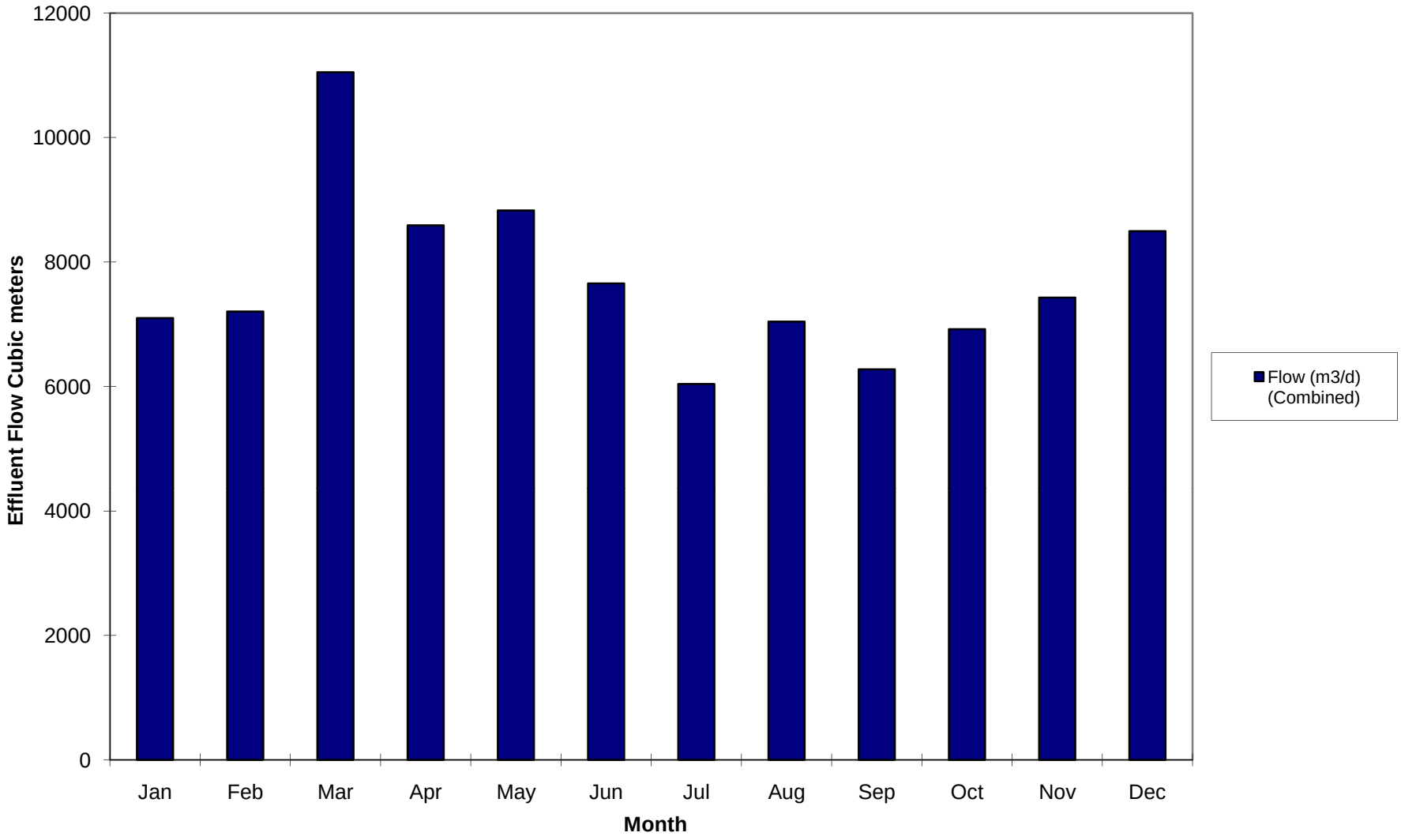
Effluent Loadings to Thames River

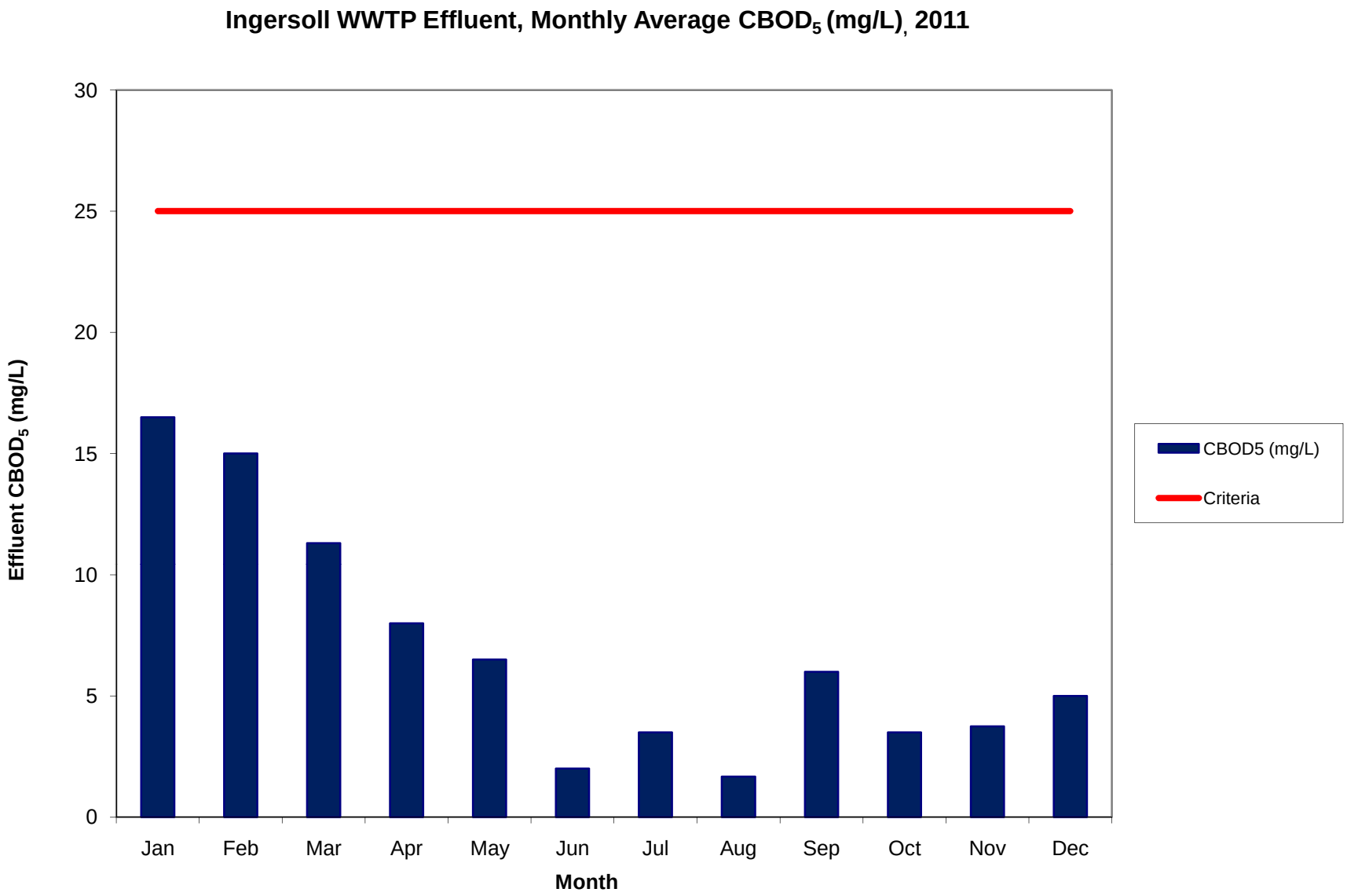
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max		Limits
$CBOD_5$ (kg/d)	72	70	79	43	37	10	14	8	24	16	17	29	35	8	79		256
TSS (kg/d)	102	70	42	38	48	22	10	40	70	61	38	37	48	10	102		256
TP (kg/d)	2	1	1	2	3	2	1	2	3	3	2	2	2	1	3		10.3

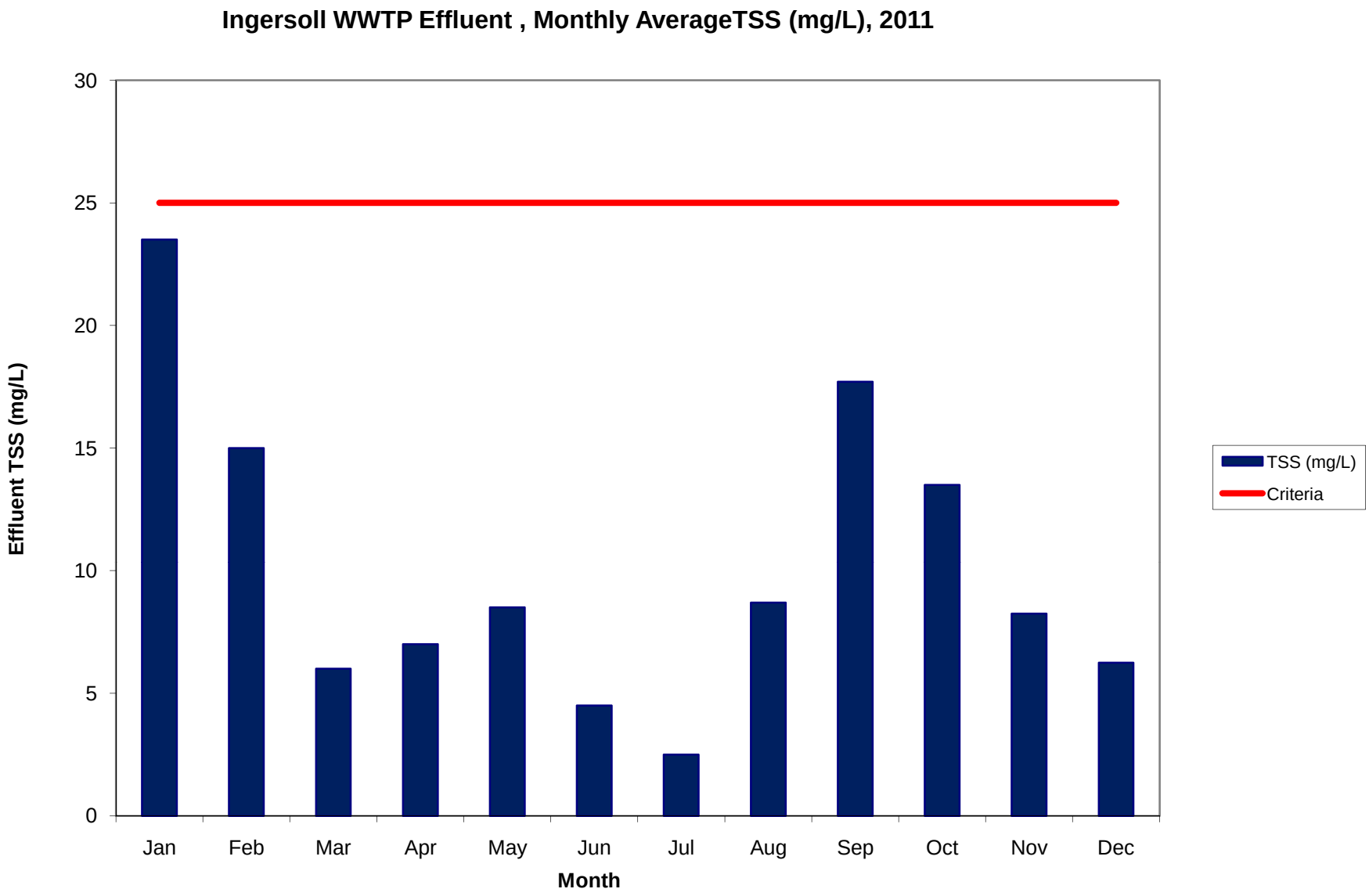
Ingersoll WWTP Influent ,TSS Loading (kg/d), 2011

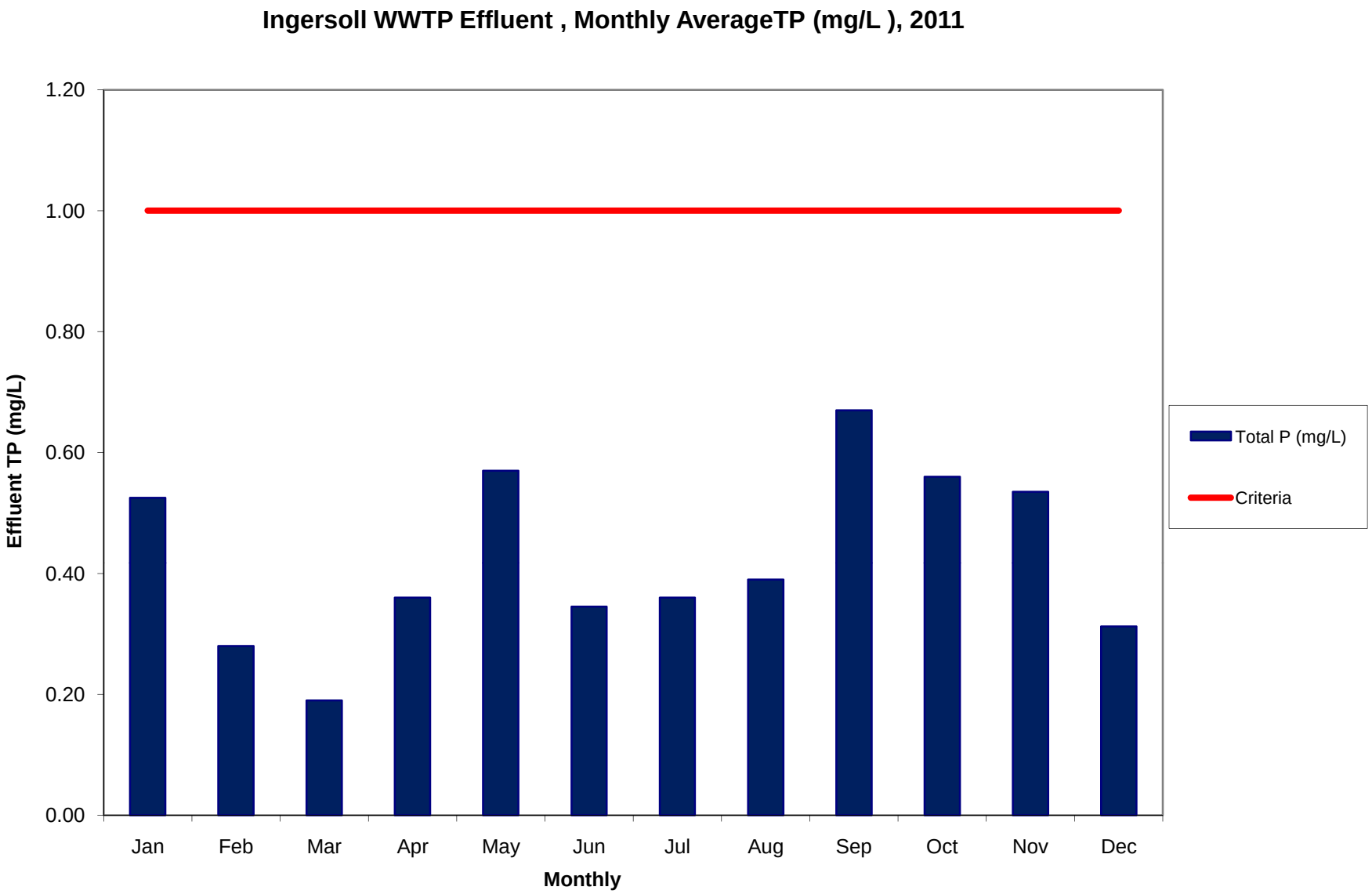



Ingersoll WWTP Influent, CBOD5 Loading (kg/d), 2011
Influent CBOD5 (kg/d)
2500
2000
1500
1000
500
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (kg/d)
Criteria

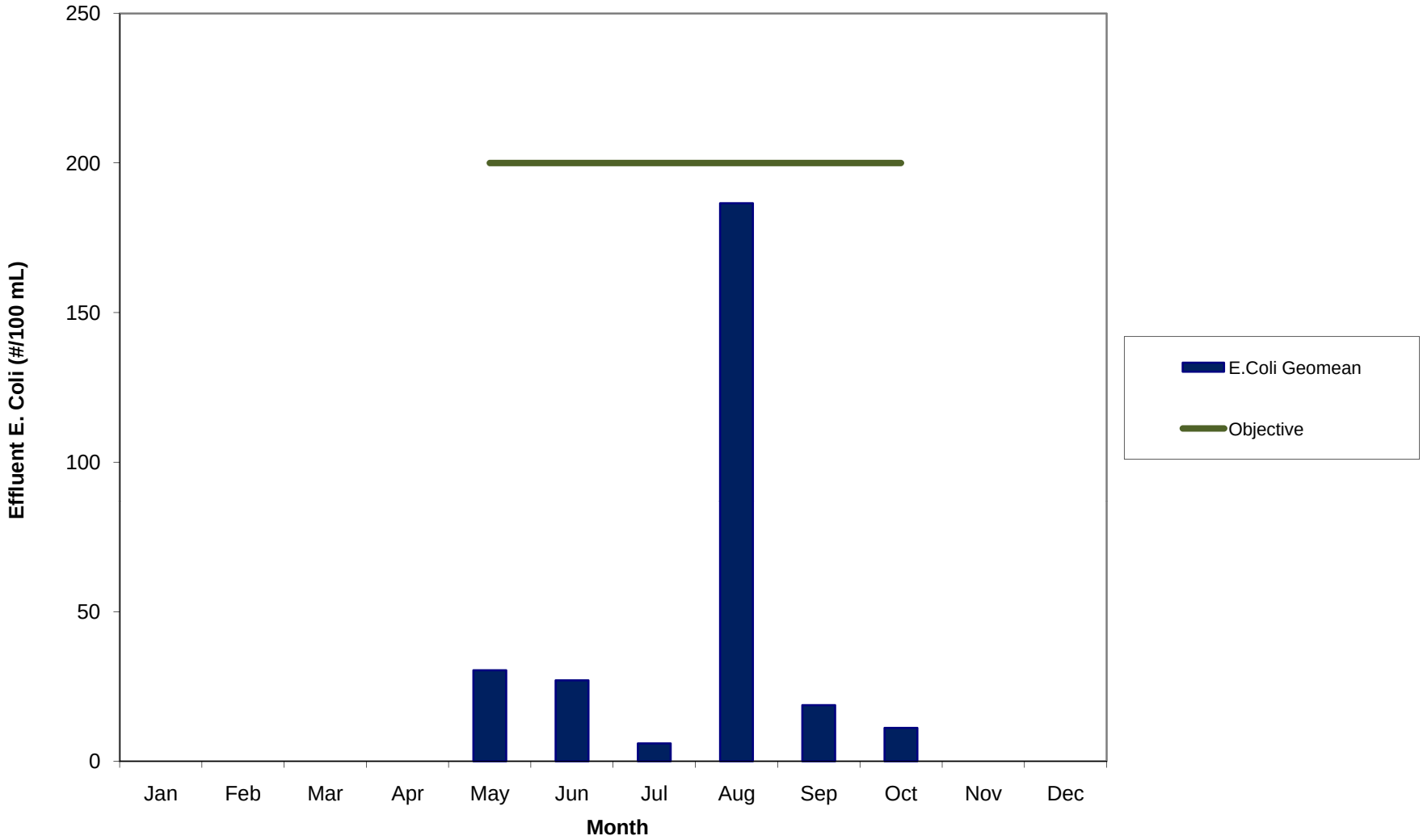

Ingersoll WWTP Effluent Flow Cubic Meters ,2011
Effluent Flow Cubic meters
12000
10000
8000
6000
4000
2000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Flow (m3/d) (Combined)

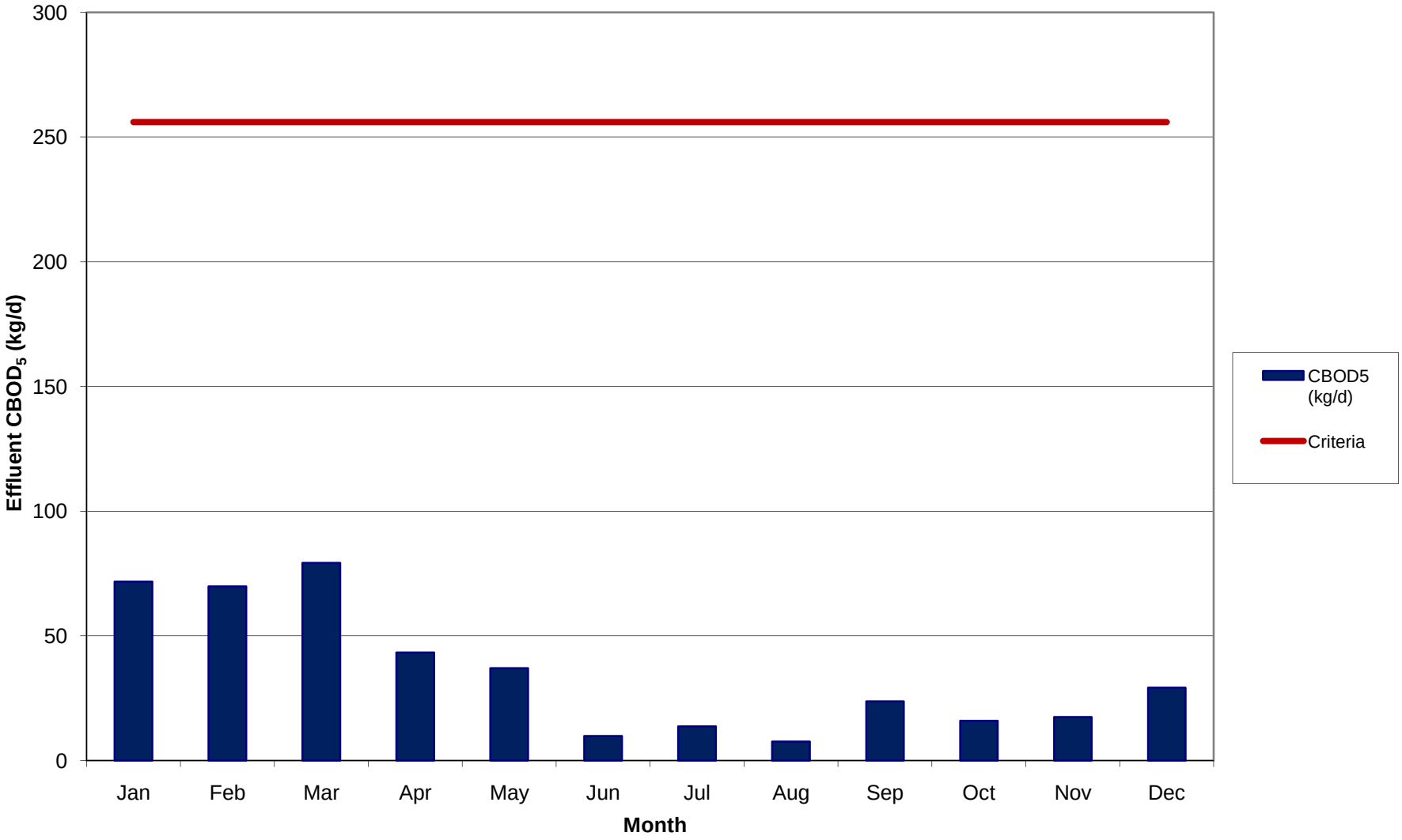

Ingersoll WWTP Effluent, Monthly Average CBOD5 (mg/L), 2011
Effluent CBOD5 (mg/L)
30
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (mg/L)
Criteria


Ingersoll WWTP Effluent , Monthly AverageTSS (mg/L), 2011
Effluent TSS (mg/L)
30
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TSS (mg/L)
Criteria

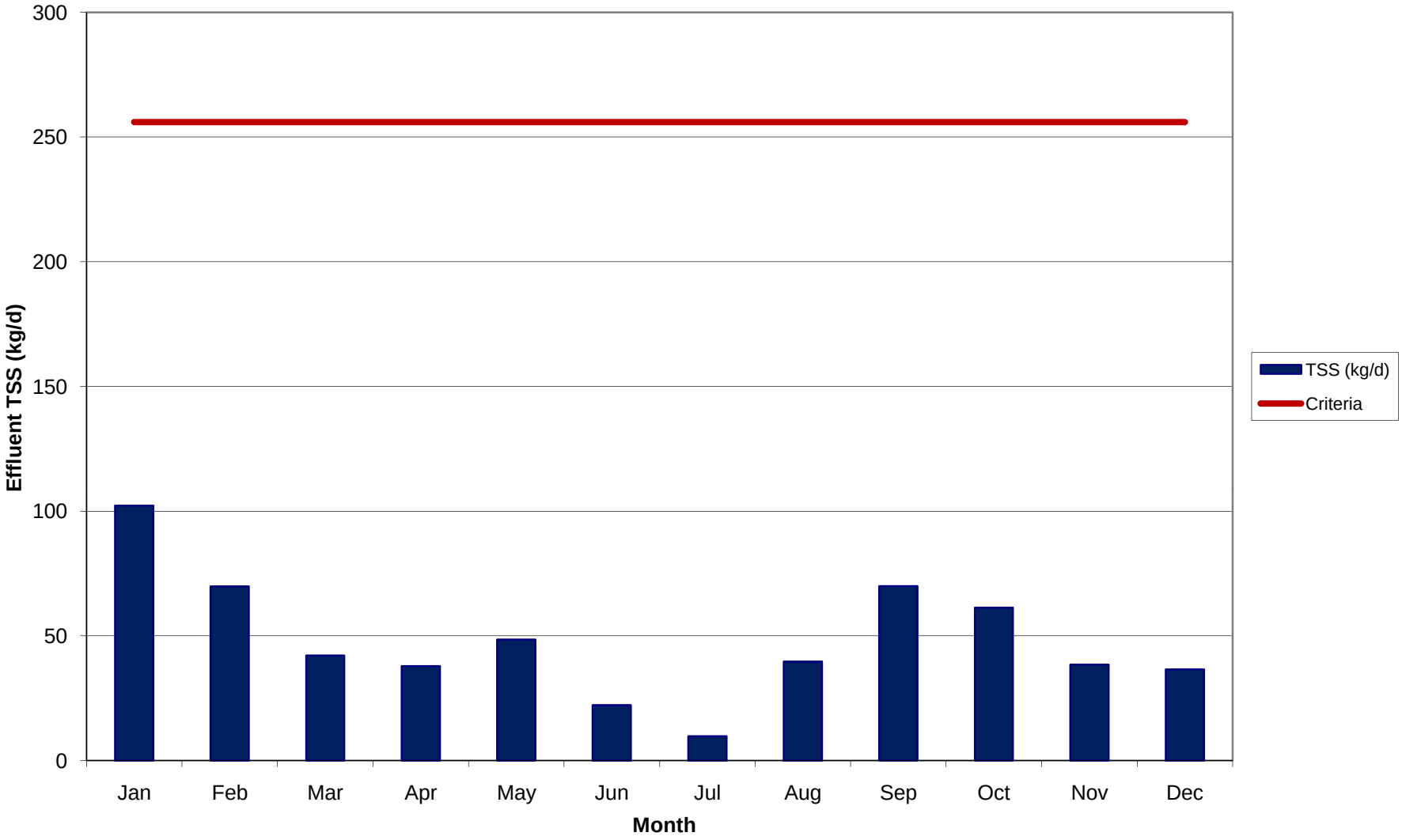

Ingersoll WWTP Effluent , Monthly AverageTP (mg/L), 2011
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Effluent TP (mg/L)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Monthly
Total P (mg/L)
Criteria

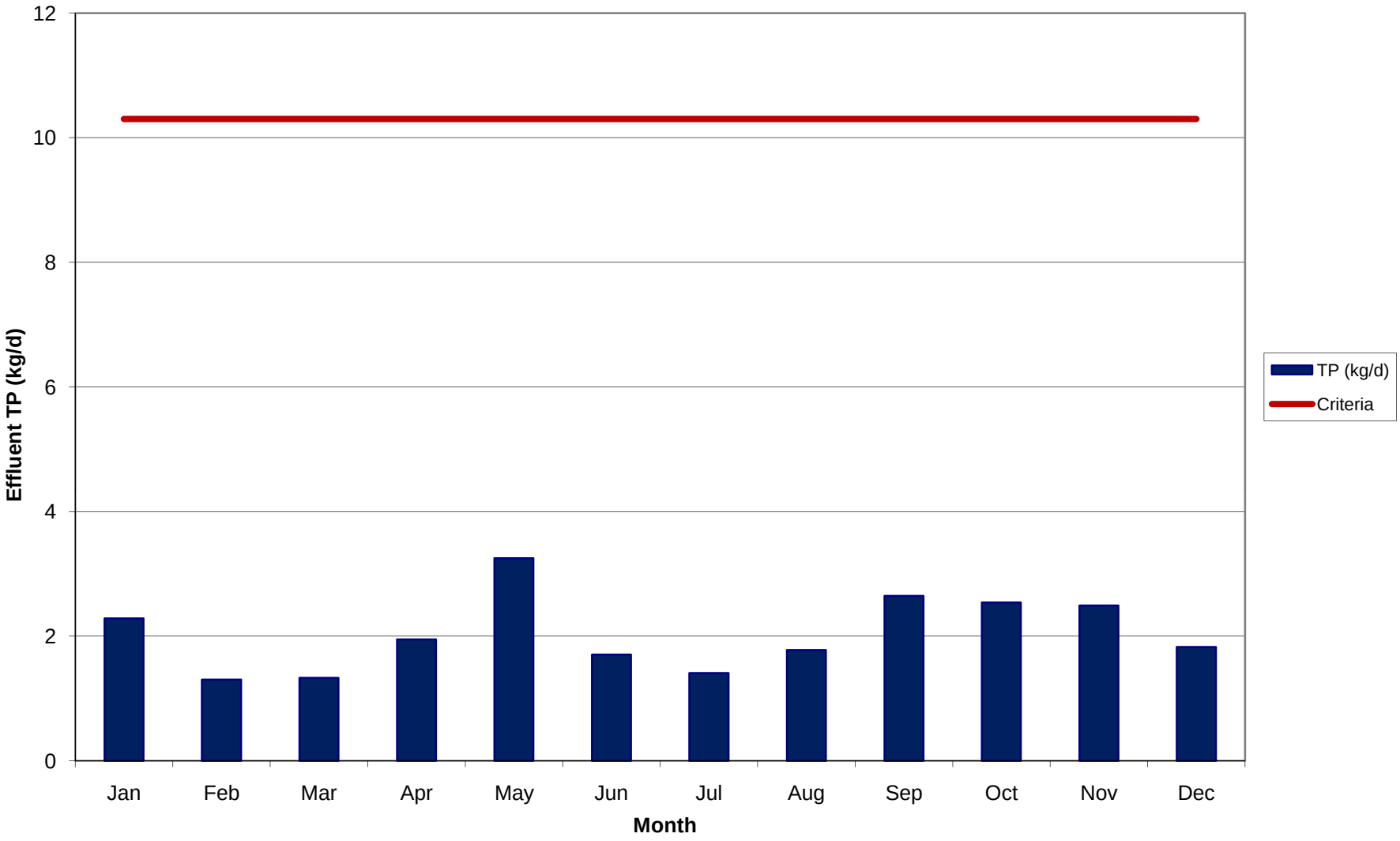
Ingersoll WWTP Effluent , Monthly Geometric Mean Density E. Coli (#/100 mL), 2011




Ingersoll WWTP Effluent, CBOD5 (kg/d) Loadings to Thames River, 2011
Effluent CBOD5 (kg/d)
300
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (kg/d)
Criteria

Ingersoll WWTP Effluent, TSS (kg/d) Loading to Thames River, 2011




Ingersoll WWTP Effluent, TP (kg/d) loading to Thames River, 2011
Effluent TP (kg/d)
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TP (kg/d)
Criteria

Public Works
P. O. Box 1614, 21 Reeve St.,, Woodstock Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

March 15, 2012

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Ian Ness-Jack
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Report Tillsonburg Wastewater Treatment Plant (WWTP) 2011
(Certificate of Approval # 9997-82RS5A)

This year-end report is prepared as required by the certificate of approval # 9997-82RS5A. I trust this report fulfills the intent of the annual reporting requirements of the Certificate of Approval.

If there are any questions, please contact me.

Yours Truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, Oxford County

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager Wastewater Services, Oxford County
Mr. Mark Maxwell, EIT,
Project Engineer, Oxford County

Overview

The Tillsonburg Wastewater Treatment Plant (WWTP) is a conventional activated sludge system that provided effective wastewater treatment in 2011, with an average flow for the plant of 6,364 m^3/day which represents 77.8% of the design capacity of 8,180 m^3/day. The total flow for 2011 was 2,323,963 m^3.

Plant Description

The facility is a conventional activated sludge plant consisting of primary and secondary treatment, with an outfall pipe to the Big Otter Creek. The facility adds aluminum sulphate into the reactors for phosphate control and ultraviolet light for disinfection seasonally.

Oxford County owns and operates the facility.

Figure 1

Plant Specifications

Facility - Tillsonburg Wastewater Treatment Plant
Design Capacity - 8,180 m3/day
Average Daily Flow - 6,364 m3/day
Receiving Area - Otter Creek
Classification - WWT – III
Certificate(s) of Approval CoA # 9997-82RS5A

CofA Effluent Requirements	Limits Monthly Average Concentration	Limits Monthly Average Loading	Objectives Monthly Average Concentration
CBOD	25 mg/L	203 kg/d	15 mg/L
SS	25 mg/L	203 kg/d	15 mg/L
TP	1 mg/L	8.1 kg/d	0.75 mg/L
E.Coli*	200 organisms/100 ml*	NA	150 organisms/100 ml*
pH	6.0-9.5		6.5-8.0
TRC			1.0

*Seasonal May 1 to Nov. 30

Sampling Procedure

Raw sewage samples are collected where the influent streams combine before entering the sewage works. A composite sampler gathers samples over a 24 hour duration on a bi-weekly basis.

The final effluent 24-hour composite sample is collected after secondary treatment and disinfection, and prior to the effluent discharge to Otter Creek on a weekly basis.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are field collected. All in-house testing is done for process control and is not included in this report.

Flows

The total flow treated in 2011 was 2,323,963 m^3. The daily average flow was 6,364 m^3/day which represents 77.8% of the design flow for Tillsonburg WWTP of 8,180 m^3/day.

Raw Sewage Quality

The annual average influent raw sewage $CBOD_5$ concentration to the plant was 172 mg/L which corresponds to an average influent loading of 1,093 kg/day. The average suspended solids concentration was 205 mg/L that corresponds to 1,302 kg/d. Average nitrogen level, as TKN was 19 mg/L which represents a loading of 119 kg/d. Total phosphorus was 3.4 mg/L, which represents a loading of 22 kg/day.

Plant Performance & Effluent

Detailed analytical data of annual and monthly averages are summarized later in this report in Exhibit 1.

Over the reporting period, the annual average effluent CBOD concentration was 2.1 mg/L this is a 98.8% reduction. The suspended solids average concentration was 6.7 mg/L, which represents a 96.7% reduction. Ammonia averaged 1.1 mg/L. Total phosphorus average was 0.42 mg/L, which results in an 87.6% reduction.

All pH is measured in the Effluent by the operator a minimum of weekly and there was no single sample outside our range of 6-9.5 for 2011.

Bypassing, Upset and Abnormal Conditions

There were no bypasses of raw sewage to Otter Creek in 2011 from the Tillsonburg Wastewater Treatment Plant or collection system. There were no upset conditions at the Tillsonburg WWTP and all discharges achieved the discharge criteria required for the effluent.

Maintenance and Calibration

The operating and maintenance staff from the Ingersoll and Tillsonburg WWTP conducts regular scheduled maintenance of the plant equipment. Detailed maintenance records for each piece of equipment are kept on site.

Calibrations are completed by R&R Instrumentation on an annual basis for all flow measurement devices.

Summary and Recommendations

A class environmental assessment has begun for the Tillsonburg WWTP, looking at needed upgrades to meet future capacity needs.

Biosolids

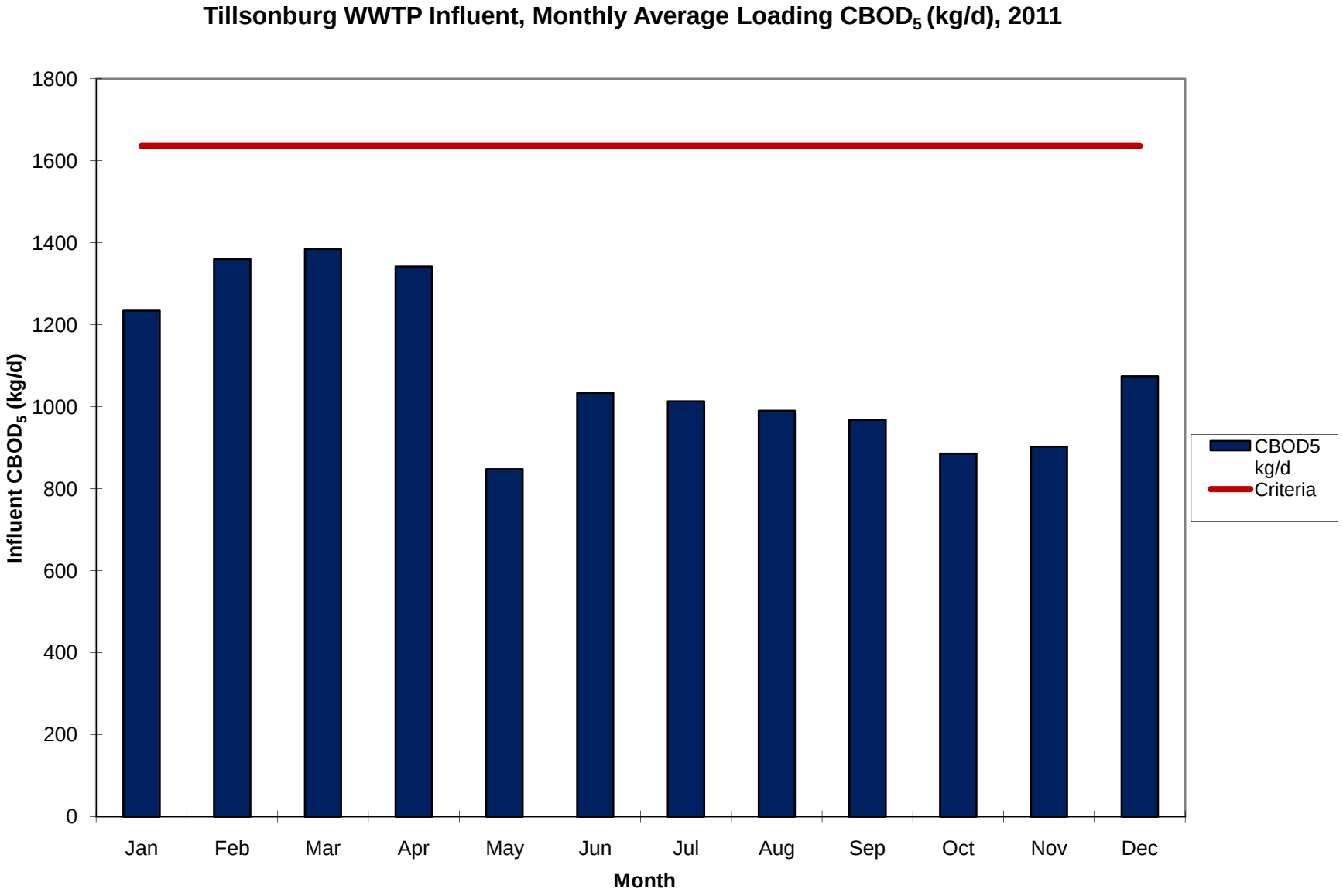
Discussion:

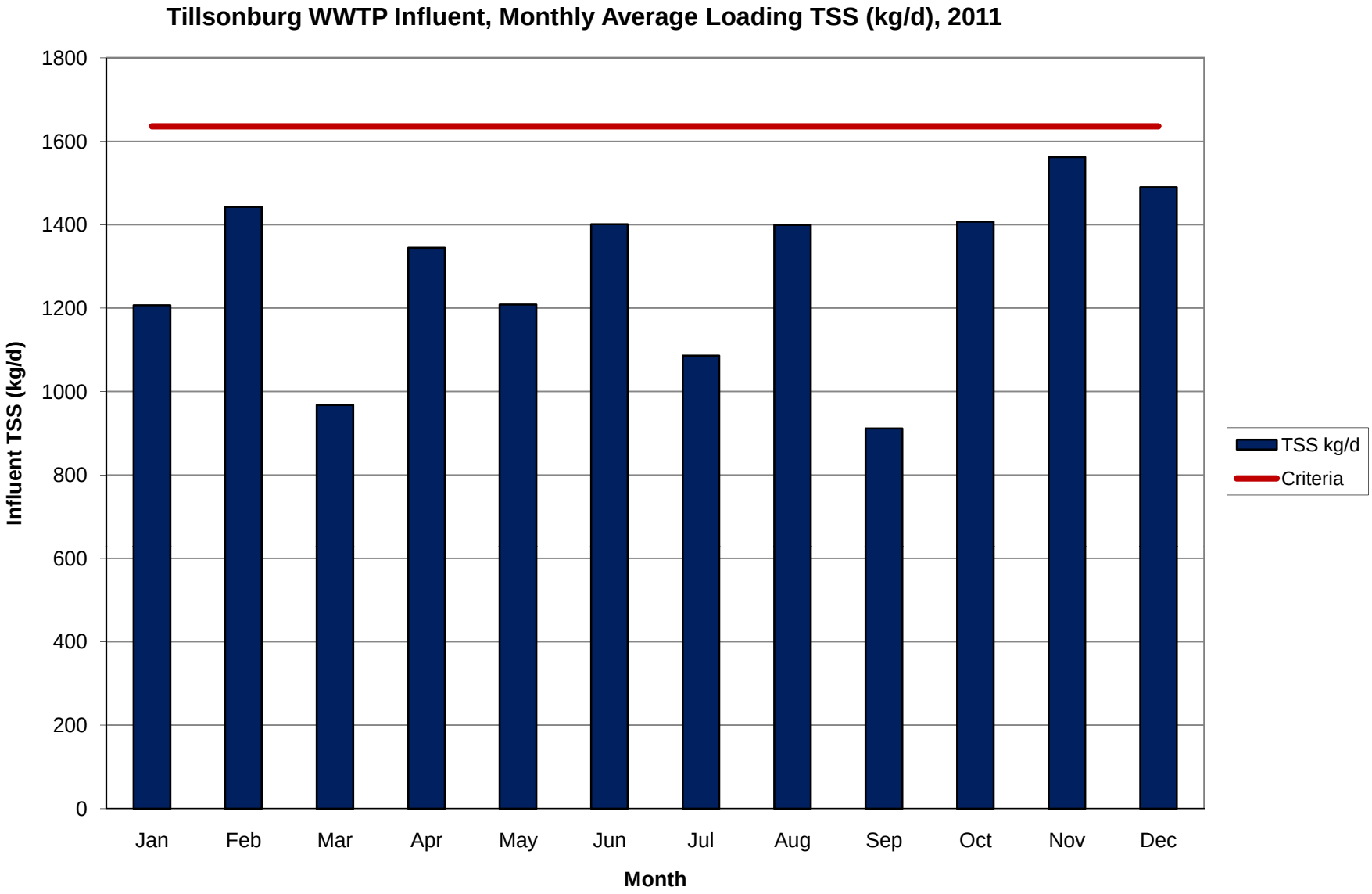
The biosolids are aerobically digested and dewatered then taken to the Oxford County's Biosolids Centralized Storage Facility after which they are land applied.

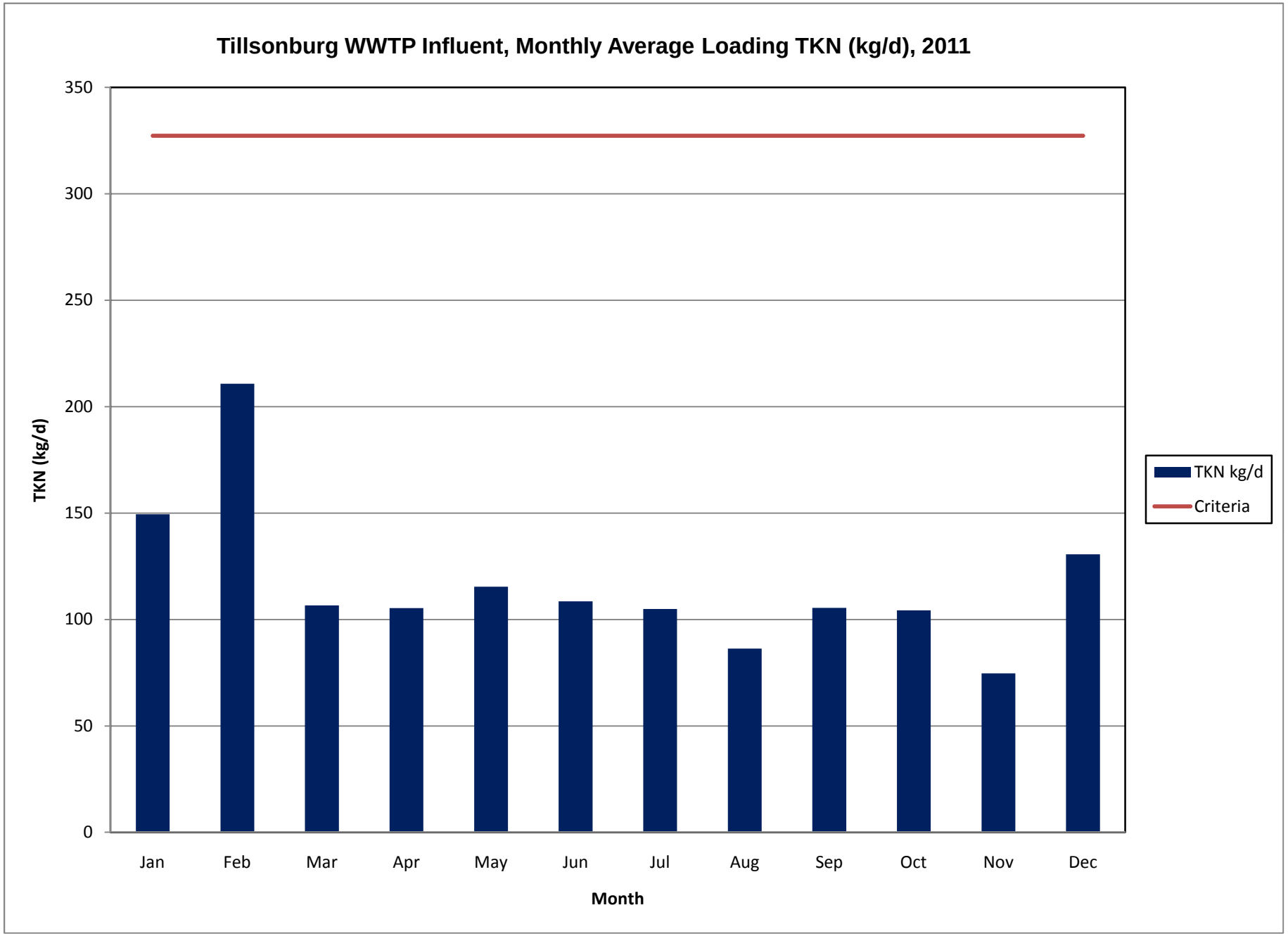
Details of the Biosolids and the land application program are contained in a separate biosolids report.

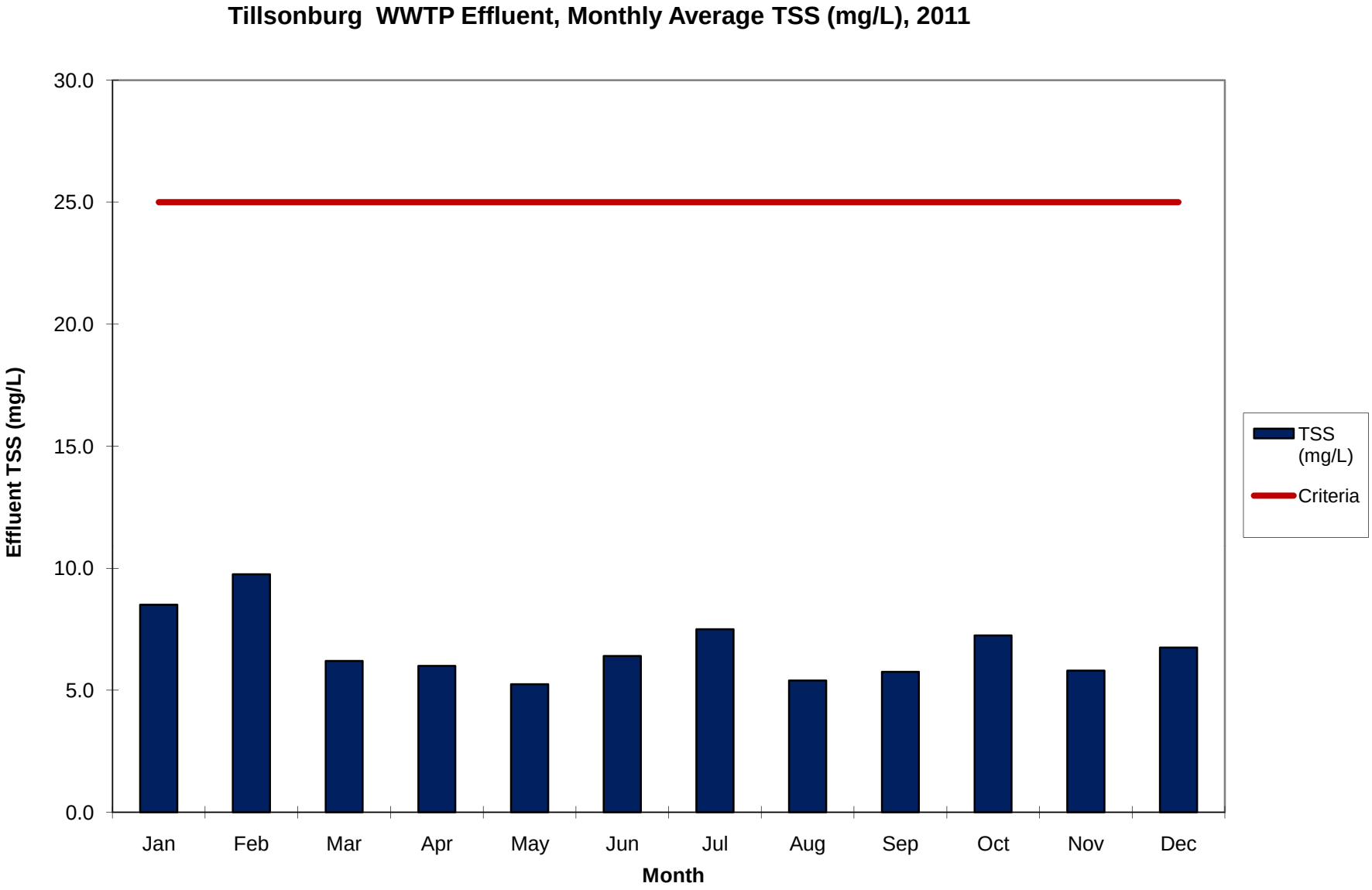
Exhibit 1

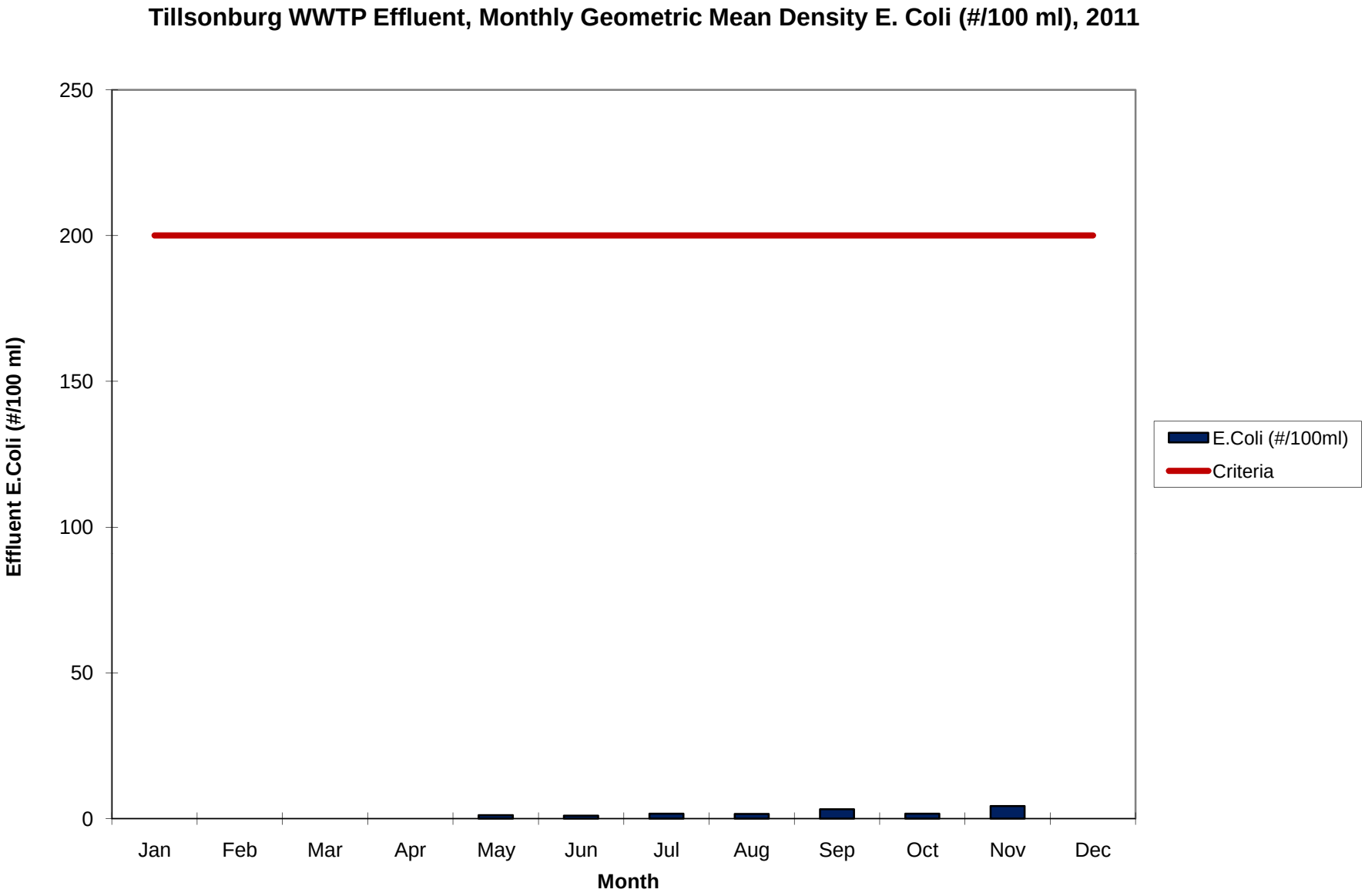
Municipality: Tillsonburg Project: Tillsonburg WWTP Operator: County of Oxford Works Number: 110000757	**2011**																
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avaerage	Min	Max	Total	Criteria
Total Flow (m^3)	187502	166206	243862	221074	211016	186798	161086	171473	168776	194753	187173	224244				2323963	
Flow (m^3/d)	6048	5936	7867	7369	6807	6227	5196	5531	5626	6282	6239	7234	6364	5196.3	7866.5		8180
Min Daily Flow (m3/d)	5114	5037	6224	6172	5863	5408	4672	4851	4667	5036	5185	5991	5352	4667	6224		
Max Daily Flow (m3/d)	11089	8782	10915	9235	8258	8020	6103	7079	8110	8653	13076	9850	9098	6103	13076		
Influent																	
BOD_5 (mg/L)																	
$CBOD_5$ (mg/L)	204	229	176	182	125	166	195	179	172	141	145	149	172	125	229		
TSS (mg/L)	200	243	123	183	178	225	209	253	162	224	250	206	205	123	253		
Total P (mg/L)	3.8	5.9	2.4	2.9	2.8	3.7	2.6	3.2	3.8	4.2	3.1	2.9	3.4	2.4	5.9		
Ammonia (mg/L)																	
TKN (mg/L)	24.7	35.5	13.55	14.3	16.95	17.43	20.20	15.60	18.75	16.6	11.97	18.05	19	12	35.5		
NITRITE (mg/L)																	
NITRATE (mg/L)																	
pH	7.71	7.74	7.52	7.78	7.65	7.54	7.45	7.35	7.44	7.76	7.74	7.54	7.60	7.35	7.775		
Temp (C)	15.75	14.40	11.60	13.00	15.85	19.13	20.75	21.95	21.80	19.15	17.13	15.20	17.1	11.6	22.0		
Effluent																	Criteria
BOD_5 (mg/L)																	
TSS (mg/L)	8.5	9.8	6.2	6.0	5.3	6.4	7.5	5.4	5.8	7.3	5.8	6.8	6.71	5.25	7.50		25
Total P (mg/L)	0.51	0.59	0.36	0.41	0.25	0.51	0.54	0.26	0.44	0.54	0.33	0.37	0.42	0.2	0.5		1
Ammonia (mg/L)	0.90	0.25	0.68	1.68	1.08	1.54	2.93	1.67	1.59	0.09	0.15	0.18	1.1	0.1	2.9		
TKN (mg/L)																	
NITRITE (mg/L)																	
NITRATE (mg/L)																	
pH	7.71	7.75	7.75	7.79	7.67	7.87	7.72	7.65	7.92	7.82	7.84	7.88	7.8	7.6	7.9		6-9.5
Temp (C)	13.8	12.5	12.3	13.1	15.1	18.1	20.1	21.6	21.4	19.5	17.3	14.83	16.6	12.3	21.6		
E.Coli (#/100ml)					1	1	2	2	3	2	4		2	1	4		200
$CBOD_5$ (mg/L)	2.0	4.0	3.4	2.0	2	2.0	2.0	2	1	2	2	2	2.1	1.0	3		25
Un-ionized Ammonia Calculated	0.0025	0.003	0.003	0.009	0.005	0.01	0.014	0.011	0.027	0.0025	0.005	0.003	0.0	0.0			
Influent Loadings **Month**	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max		Design
$CBOD_5$ kg/d	1234	1359	1385	1341	847	1034	1013	990	968	886	903	1074	6	847	1385		1636
TSS kg/d	1207	1442	968	1345	1208	1401	1086	1399	911	1407	1562	1490	1302	911	1562		1636
TKN kg/d	149	211	107	105	115	109	105	86	105	104	75	131	119	75	211		327.2

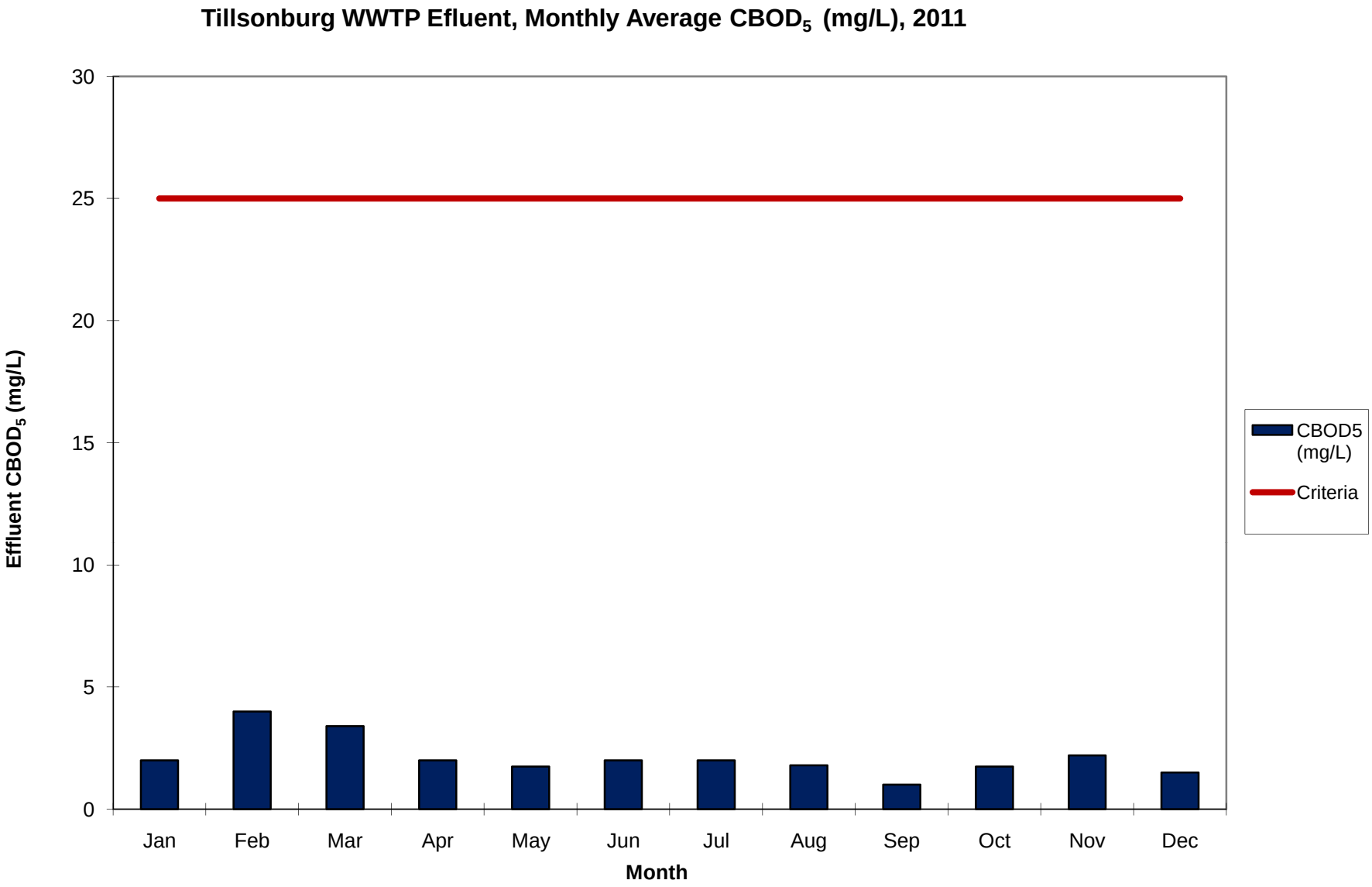

Tillsonburg WWTP Influent, Monthly Average Loading CBOD5 (kg/d), 2011
Influent CBOD5 (kg/d)
1800
1600
1400
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 kg/d
Criteria

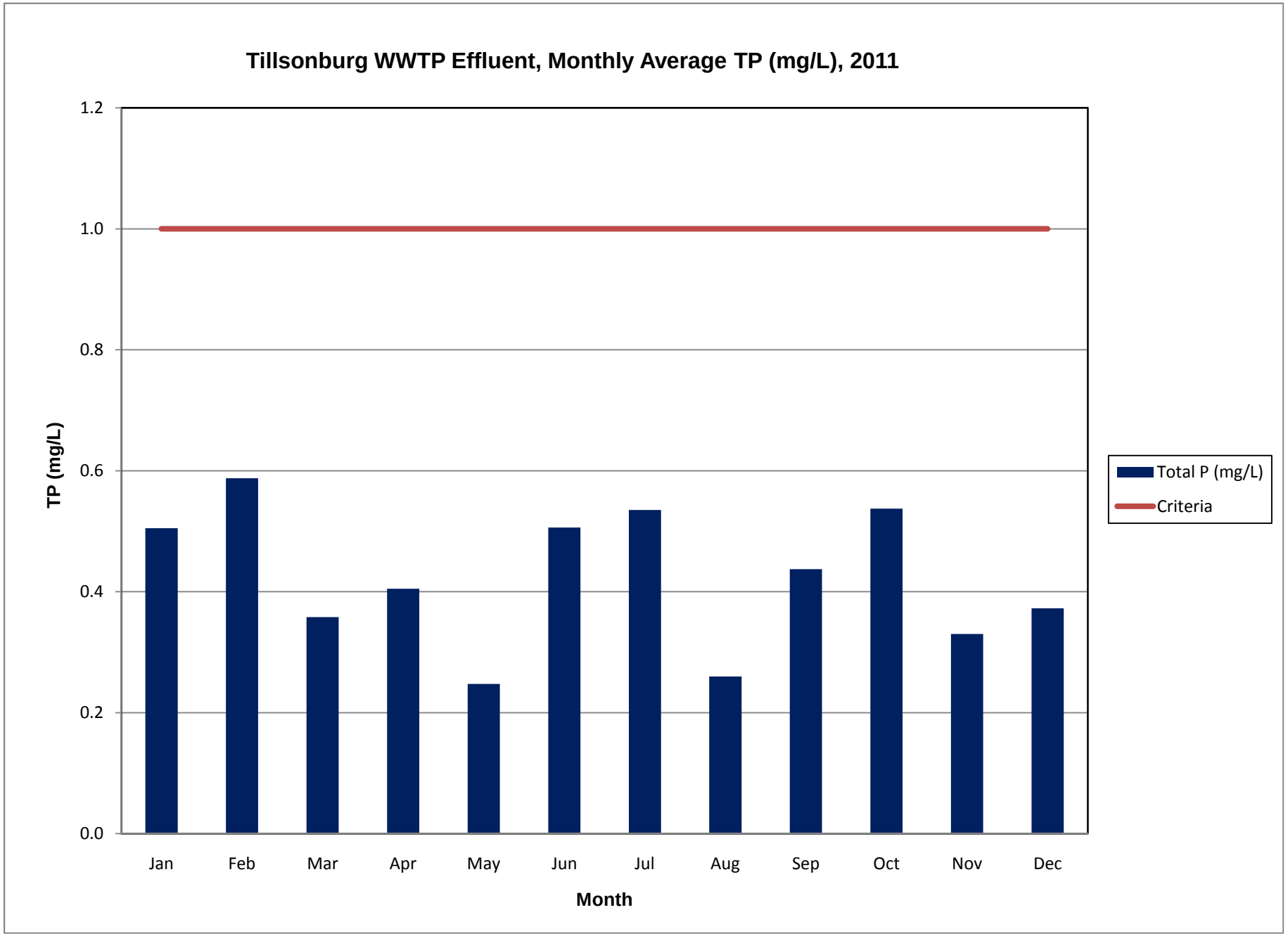

Tillsonburg WWTP Influent, Monthly Average Loading TSS (kg/d), 2011
Influent TSS (kg/d)
1800
1600
1400
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TSS kg/d
Criteria


Tillsonburg WWTP Influent, Monthly Average Loading TKN (kg/d), 2011
350
300
250
200
150
100
50
0
TKN (kg/d)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TKN kg/d
Criteria


Tillsonburg WWTP Effluent, Monthly Average TSS (mg/L), 2011
Effluent TSS (mg/L)
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TSS (mg/L)
Criteria


Tillsonburg WWTP Effluent, Monthly Geometric Mean Density E. Coli (#/100 ml), 2011
Effluent E.Coli (#/100 ml)
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
E.Coli (#/100ml)
Criteria


Tillsonburg WWTP Efluent, Monthly Average CBOD5 (mg/L), 2011
Effluent CBOD5 (mg/L)
30
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (mg/L)
Criteria


Tillsonburg WWTP Effluent, Monthly Average TP (mg/L), 2011
1.2
1.0
0.8
0.6
0.4
0.2
0.0
TP (mg/L)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Total P (mg/L)
Criteria

Public Works
P. O. Box 1614, 21 Reeve St.,, Woodstock Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

March 15, 2012

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Ian Ness-Jack
Provincial Officer
733 Exeter Rd.
London, Ont.

Dear Sir:

RE: Year-End Monitoring Report 2011 for Thamesford Wastewater Treatment Plant
(Certificate of Approval #6974-6FKKAY)

Attached is the monitoring report for 2011 for the Thamesford Wastewater Treatment Plant. This report is prepared as required by the certificate of approval #6974-6FKKAY. I trust this report fulfills the intent of the annual reporting requirements of the Certificate of Approval.

If there are any questions, please contact me.

Yours Truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, Oxford County

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager Wastewater Services, Oxford County
Mr. Mark Maxwell, EIT
Project Engineer, Oxford County

Overview

The Thamesford Wastewater Treatment Plant provided effective wastewater treatment in 2011. The average daily flow for 2011 was 1,561 m^3/d. This represents 62% of the design criteria of 2,500 m^3/d. The total annual flow was 568,540 m^3 with an average monthly flow of 47,378 m^3.

Figure 1

Plant Description

The Thamesford WWTP forms part of the Oxford County Wastewater Treatment System, which contains nine wastewater treatment facilities.

The main customer is the Maple Leaf Foods (MLF) business complex, however, the treatment plant also receives domestic wastewater via the sanitary sewer line and a dedicated lift station. The wastewater from MLF is collected from its various on-site business units and pumped to a pretreatment system comprised of an equalization silo and a Dissolved Air Flotation (DAF) unit. The MLF effluent enters the MLF lift station of the Wastewater Treatment Plant where it is pumped to the complete mix aeration basin prior to a plug flow reactor. The extended aeration system is comprised of two tanks: the complete mix basin and the plug flow reactor. After the plug flow reactor, the wastewater flows into one of two clarifiers where the settled activated sludge is either returned or wasted and the supernatant flows to either the old or the new sand filter, prior to disinfection and direct discharge to the Middle Thames River. Wasted Biosolids is processed/stabilized in two aerobic digesters, held on-site in a storage tank for eventual removal, and applied to permitted soil-conditioning sites.

The treated effluent flow for purposes of calculating loading to the river is from the Parshall flume located after the stilling well just before discharge to the re-aeration chamber and the Middle Thames River. The flow used to apportion the loading to the plant is from two meters one on each lift station. The influent meters and all meters are calibrated annually.

Effluent Criteria

Effluent Parameter	Monthly Average Concentration (milligrams per litre unless otherwise indicated)	Monthly Average Loading (kilograms per day unless otherwise indicated)
Column 1	Column 2	Column 3
BOD_5		
- non-freezing (see Note 1)	10.0	25.0
- freezing (see Note 2)	15.0	37.5
Suspended Solids		
- non-freezing	10.0	25.0
- freezing	15.0	37.5
Total Phosphorus		
- non-freezing	0.2	0.5
- freezing	0.5	1.25
Total Ammonia Nitrogen		
- non-freezing	2.0	5.0
- freezing	5.0	12.5
Dissolved Oxygen	5.0	-
Total Chlorine Residual	0.01	-
E. Coli	200 organisms/100 mL (Monthly *Geometric Mean Density*)	-
pH of the effluent maintained between 6.0 to 9.5, inclusive, at all times		

Note 1: Non-freezing refers to conditions when the water temperature of the Middle Branch of Thames River is greater than 5 °C.

Note 2: Freezing refers to conditions when the water temperature of the Middle Branch of Thames River is equal to or less than 5 °C.

Sampling Description

Influent samples were taken from sampling ports located in-line after the influent pumps. Two 24-hour composite samplers take a sample every 15 minutes for a 24-hour period concurrent with effluent sampling. A sampler is installed on the municipal and the Maple Leaf Foods influent lines. The two Influent streams are separately tested, and then the results are mathematically combined based on flow.

Effluent samples were taken using a 24-hour composite sampler set to take a sample every 15 minutes for 24 hours. Samples were drawn from a stilling well prior to the parshall flume immediately before the discharge. TRC samples are taken daily from the

stilling well prior to the parshall flume. The stilling well follows the chlorination and de-chlorination chambers. pH of the final effluent composite is measured.

Dissolved Oxygen samples are taken at the discharge well. After the parshall flume, the effluent flows through a discharge pipe and drops about 30" into a discharge well prior to flowing to the river. This serves as re-oxygenation as reflected in the DO measurements.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples, except for TRC, DO and pH which are tested in the field. These results are used here for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

Upset and Bypass Events

There was a single non-compliance for the plant which occurred in February 2011. The effluent Total Suspended Solids (TSS) monthly criteria in the freezing period is 15 mg/L and the Monthly Average for the plant was 16.5 mg/L. This was likely due to an upset MLF pretreatment system, caused by a polymer feed pump failure which was further complicated by the time it took for MLF to source a replacement, as it is a specific type of pump that was required for the chemical addition system. This event was reported to the MOE at the time of occurrence.

There were two spills from the wastewater collection system. One in June with a small leak from a forcemain which was contained, cleaned up, and reported to the spills action center at the time it occurred. The second occurred in August 2011 and involved a broken valve, where a half a cubic meter of grey water escaped which was then vacuumed up. This was reported to the MOE.

Maintenance and Calibration

The operating and maintenance staff from the Ingersoll WWTP conducts regular scheduled maintenance of the Thamesford WWTP equipment. Detailed maintenance records for each piece of equipment are kept on site at the Ingersoll Plant and are available upon request.
All flow meters were checked and calibrated by R&R instrumentation.

Discussion Of Results

Exhibit 1 is a summary Table with the average, maximum, and minimum values for all influent and effluent parameters. The table is based on all external test results.
The average annual Influent BOD_5 concentration to the plant was 561 mg/L. This corresponds to an average BOD_5 loading of 757 kg/d, which is 57% of the design value of 1,333 kg/d. The average annual Influent TSS concentration to the plant was 286 mg/L. This corresponds to an average TSS loading of 385 kg/d which is 49% of the design criteria of 779 kg/d. The annual average TKN concentration was 83.7 mg/L. This corresponds to 113 kg/d which is 74% of the design value of 199 kg/d. The annual

average TP concentration was 11.6 mg/L. This corresponds to 16 kg/d which is 70% of the design value of 23 kg/d. The annual average O&G loading is 42 mg/L. This corresponds to 57 kg/d.

The annual average BOD_5 concentration was 1.6 mg/L. This represents a 99.7% removal efficiency. The annual average TSS concentration was 6 mg/L which represents a 97.9% removal efficiency. The annual average Ammonia concentration was 0.1 mg/L. The annual average TP concentration was 0.15 mg/L which represents a 99% removal efficiency.

pH is measured in the Effluent by the operator a minimum of weekly and there was no single sample outside the criteria of 6-9.5 for 2011. All dissolved oxygen readings in the Effluent were measured at least weekly by the operator and no sample was below the required minimum of 5 mg/L.

Biosolids 2011

Discussion:

The Biosolids removal was contracted out for land application. The details of the quantity and quality of the biosolids can be found in a separate Biosolids Report.

DAF Bio-Solids Activity

January to December 2011

MLF Inc. operates its own wastewater pretreatment system which includes a Dissolved air flotation (DAF) treatment where sludge is generated. The material is transported to the Thamesford Wastewater Treatment Plant where it is combined with the WWTP stored Biosolids. There is an existing letter from the MOE indicating that this practice is acceptable.

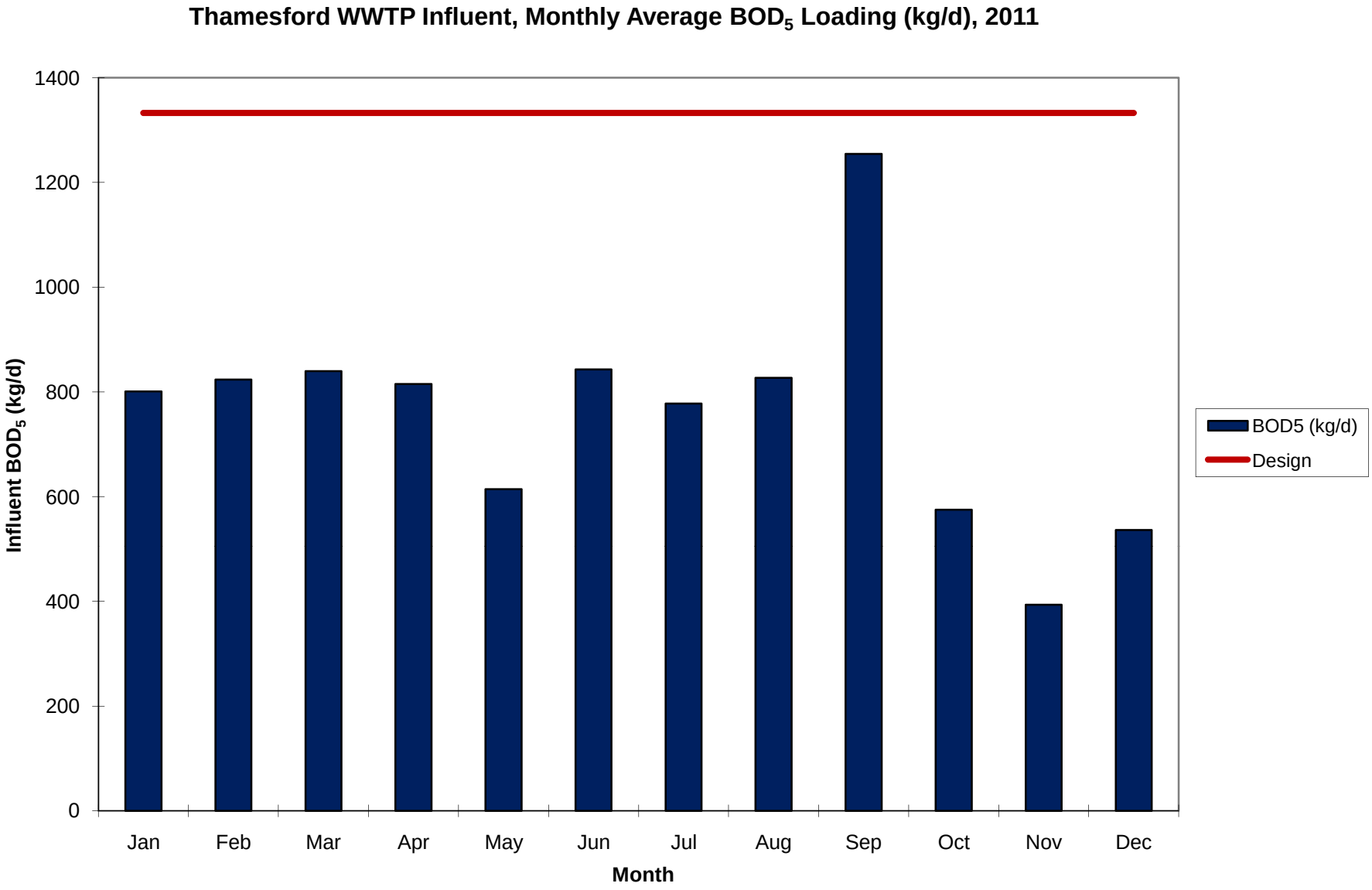
EXHIBIT 1

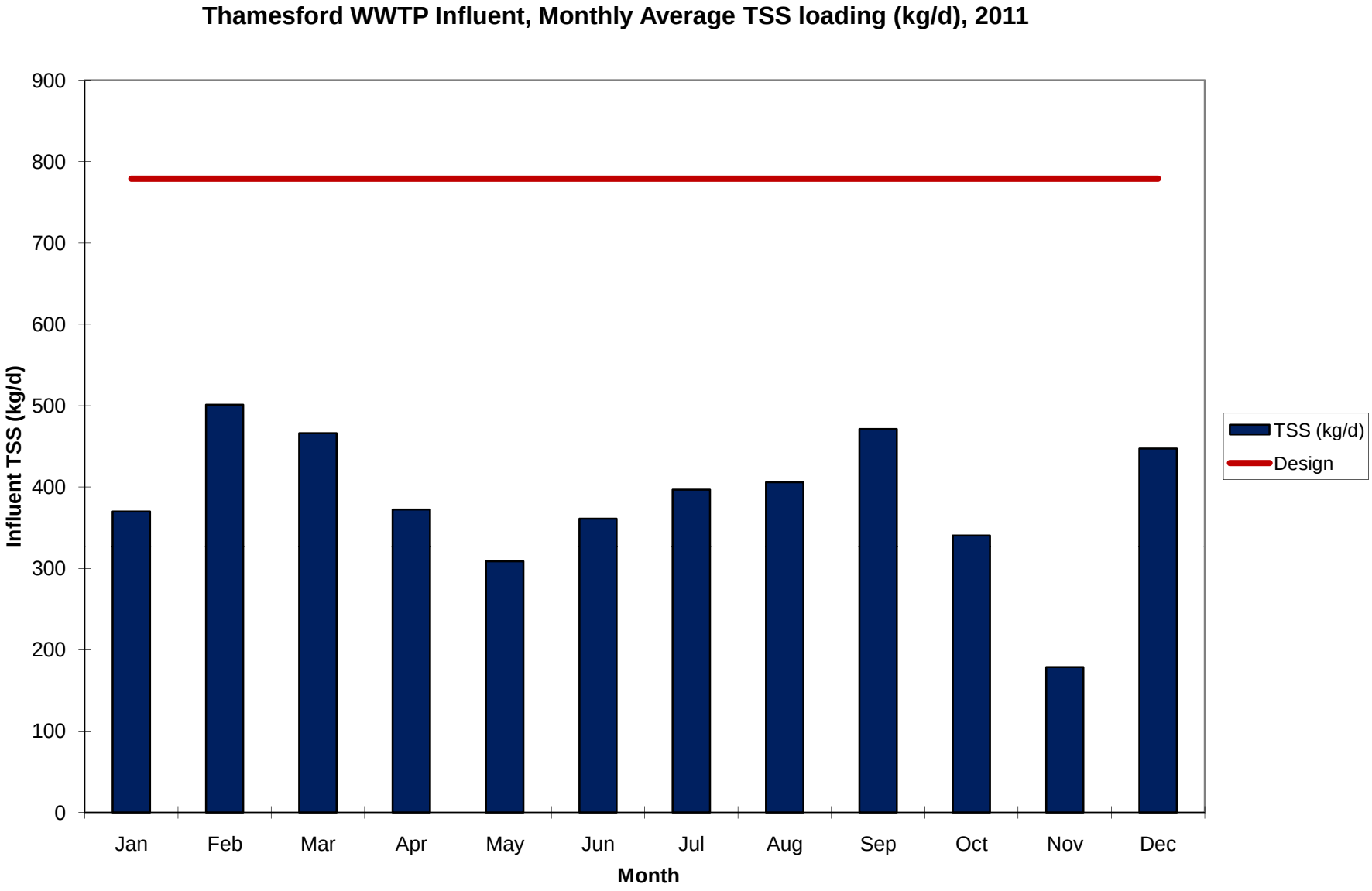
Municipality: THAMESFORD
PROJECT:THAMESFORD WWTP
Operator: County of Oxford
Works Number:
120002601

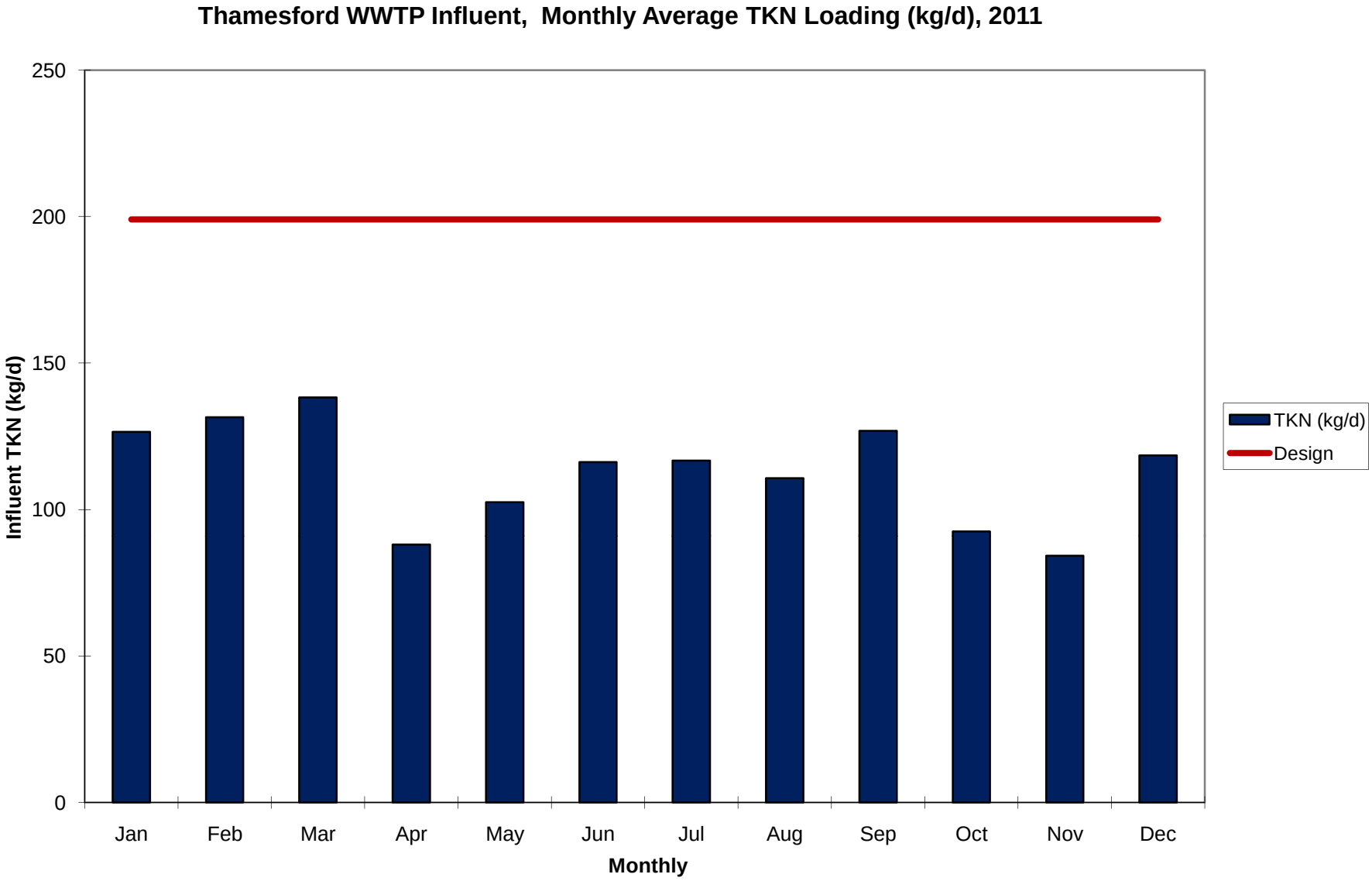
2011

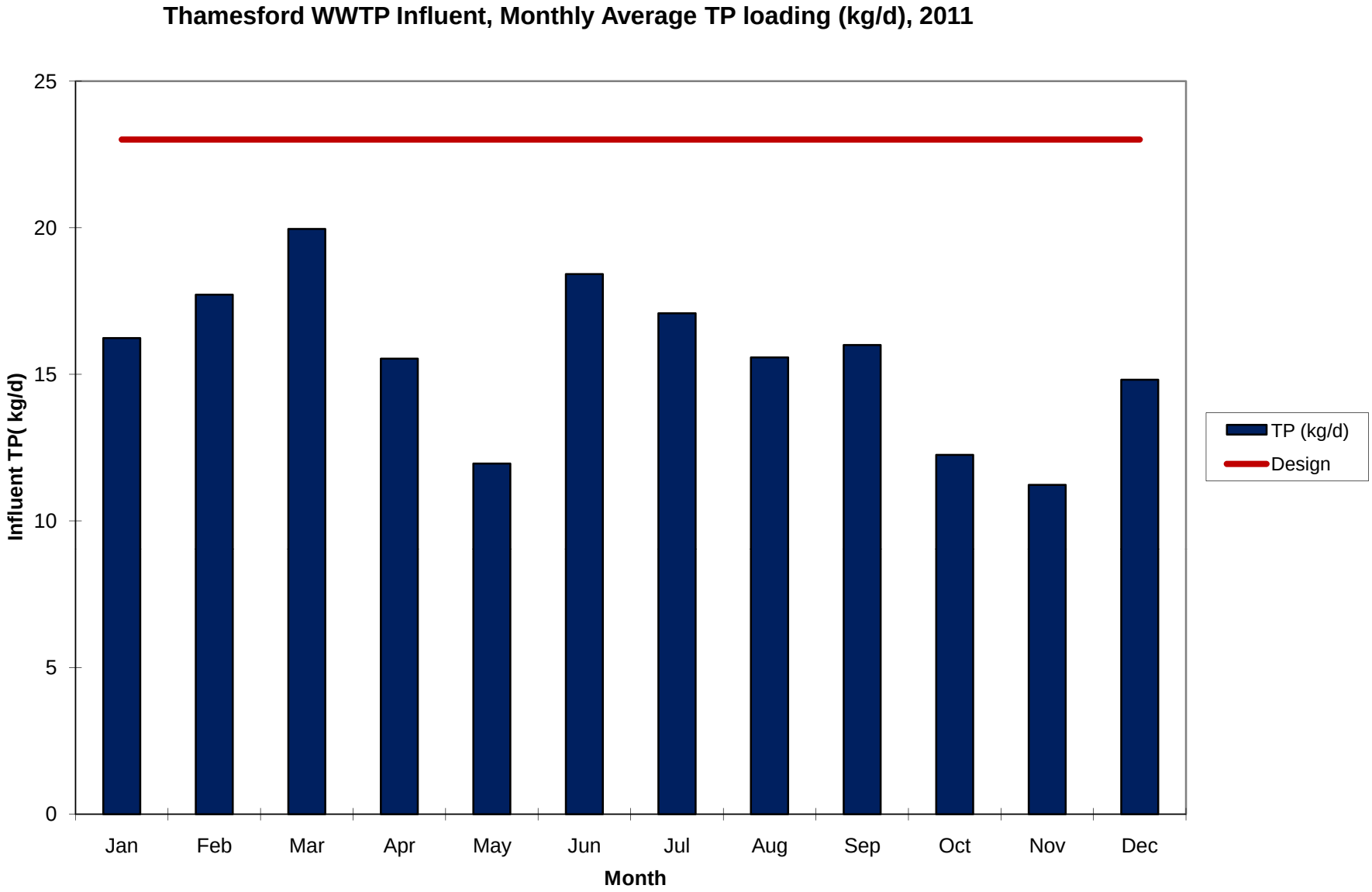
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avaerage	Min	Max	Total	Criteria
Effluent Meter																	
Total Flow (1000 m^3)	44.065	39.418	50.463	43.743	44.442	46.928	47.777	51.868	53.495	48.758	47.363	50.220	47.378	39.418	53.495	568.540	
Average Daily Flow (1000 m^3/d)	1.421	1.408	1.628	1.458	1.434	1.564	1.541	1.673	1.783	1.625	1.579	1.620	1.561	1.408	1.783		2.5
Maximum Daily Flow (1000 m^3/d)	2.019	1.931	2.192	2.142	2.010	2.016	2.224	2.348	2.267	2.197	2.228	2.372	2.162	1.931	2.372		
Daily Average Influent (m3/d)																	
CSF Flow (m3/d)	808	787	976	756	853	1015	866	1048	992	879	913	996	908	756	1048		
Municipal (m3/d)	416	447	476	484	435	468	443	452	463	431	358	421	441	358	484		
Combined Flow (m3/d)	1224	1234	1452	1240	1287	1483	1309	1501	1455	1310	1272	1418	1349	1224	1501		
Production Average Influent																	
CSF Flow (m3/d)	1098	1067	1185	1012	1081	1308	1180	1289	1241	1102	1181	1219	1164	1012	1308		
Municipal (m3/d)	414	461	475	488	436	463	444	452	457	430	350	436	442	350	488		
Combined Flow (m3/d)	1512	1528	1659	1500	1517	1771	1624	1741	1699	1532	1531	1654	1606	1500	1771		
Combined Influent																	
pH	7.48	7.14	6.40	7.55	7.30	7.13	7.33	7.31	7.28	7.56	6.59	7.18	7.19	6.40	7.56		
$BOD_{5\ (mg/L)}$	654	667	578	657	477	568	594	551	862	439	309	378	561	309	862		
TSS (mg/L)	302	406	321	300	240	243	303	270	324	260	141	316	286	141	324		
TKN (mg/L)	103	107	95	71	80	78	89	74	87	71	66	84	83.7	66.3	95.2		
TP (mg/L)	13.3	14.4	13.7	12.5	9.3	12.4	13	10.4	11	9.4	8.8	10.5	11.6	8.8	13.7		
O&G (mg/L)	55	81	42	18	45	37	31	31	35	36	17	76	42	17	76		
Effluent																	
pH	6.28	6.41	6.47	7.18	6.97	6.79	6.80	7.09	7.34	7.62	6.90	7.08	6.91	6.41	7.62		6.0-9.5
$BOD_{5\ (mg/L)}$	1.00	2.5	3.7	2.5	1.3	1	1.0	1.0	1.3	1.3	1.5	1	1.6	1.0	3.7		10/15
TSS (mg/L)	3.50	16.8	9.3	5.5	5.3	3.2	4.0	6.2	7	5.5	1.8	3.6	6.0	1.8	9.3		10/15
Ammonia (mg/L)	0.05	0.36	0.20	0.06	0.06	0.05	0.06	0.08	0.10	0.1	0.09	0.07	0.107	0.050	0.200		2/5
TP (mg/L)	0.10	0.31	0.26	0.19	0.18	0.10	0.10	0.13	0.16	0.09	0.08	0.06	0.15	0.06	0.26		0.2/0.5
TRC (mg/L)	0.005	0.005	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.008	0.005	0.01		0.01
Temp	12.1	11.7	12.4	15.0	16.7	19.9	21.3	21.9	18.4	19.8	17.5	18.6	17.1	11.7	21.9		
DO (mg/L)	6.01	5.43	5.56	5.31	5.2	6.09	6.26	6.32	6.12	6.13	7.08	6.08	5.97	5.20	7		5
E. Coli (#/100mL)	3	6	1	165	2	3	1	1	10	1	4	3	17	1	165		200
Unionized Ammonia (mg/L)													#DIV/0!	0.0000	0.0000		

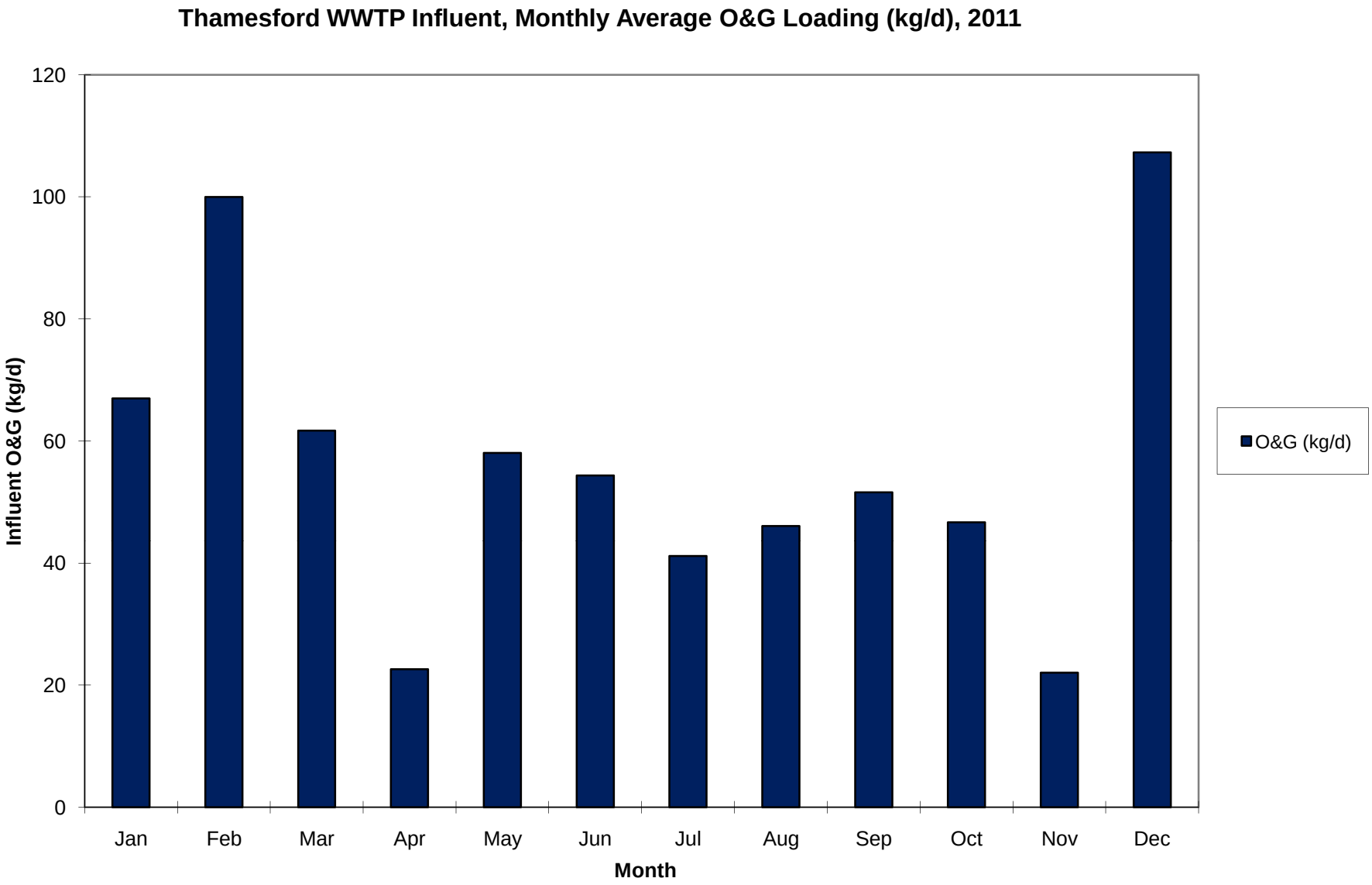
Influent Loadings based on Combined Average Daily Influent Flows and Results																	Design
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max		Criteria
BOD_5 (kg/d)	801	823	839	815	614	843	778	827	1255	575	393	536	757	393	1255		1333
TSS (kg/d)	370	501	466	372	309	361	397	406	471	341	179	447	385	179	501		779
TKN (kg/d)	127	132	138	88	102	116	117	111	127	93	84	118	113	84	138		199
TP (kg/d)	16	18	20	16	12	18	17	16	16	12	11	15	16	11	20		23
O&G (kg/d)	67	100	62	23	58	54	41	46	52	47	22	107	57	22	107		250

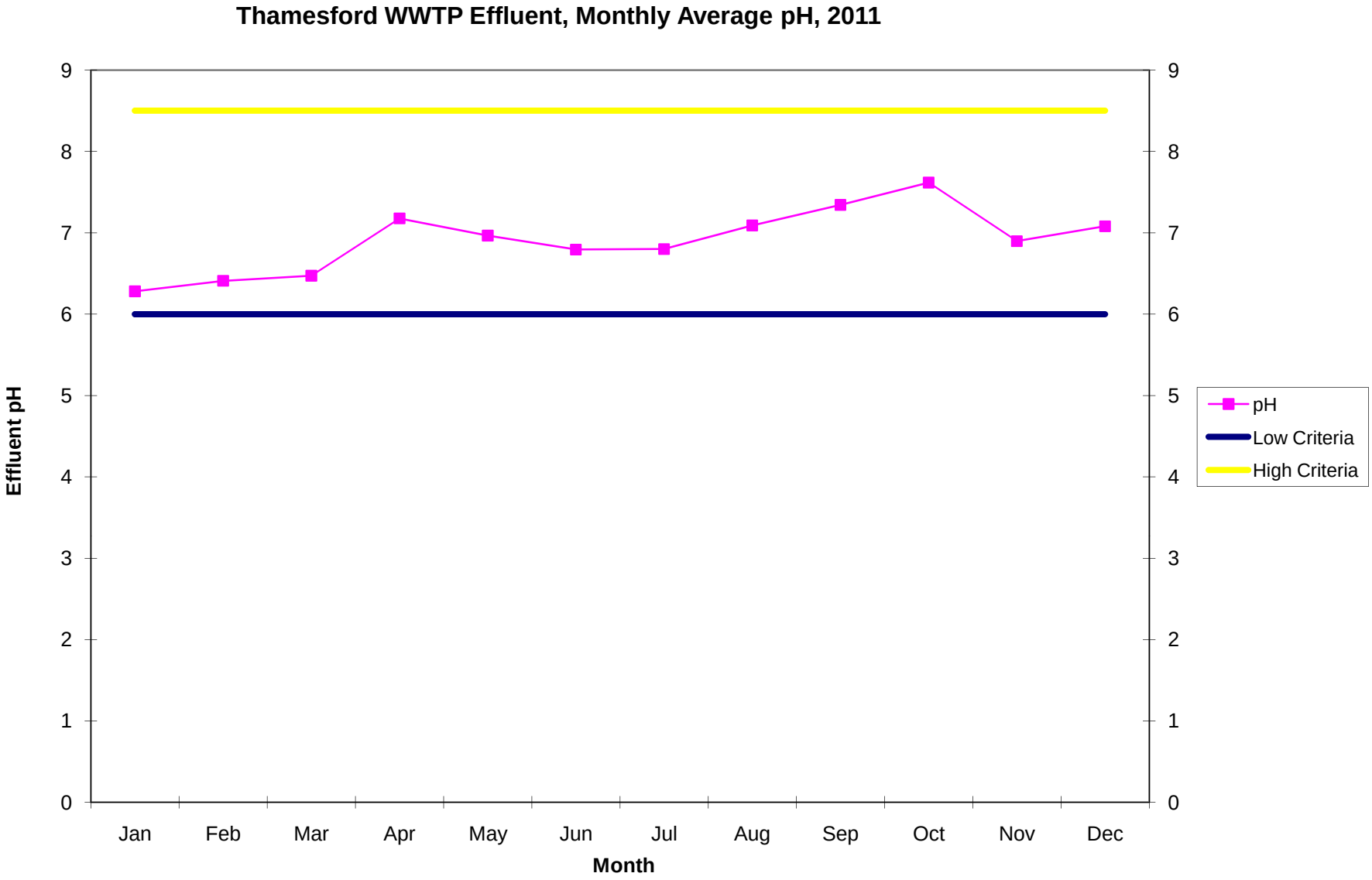

Thamesford WWTP Influent, Monthly Average BOD5 Loading (kg/d), 2011
Influent BOD5 (kg/d)
1400
1200
1000
800
600
400
200
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
BOD5 (kg/d)
Design

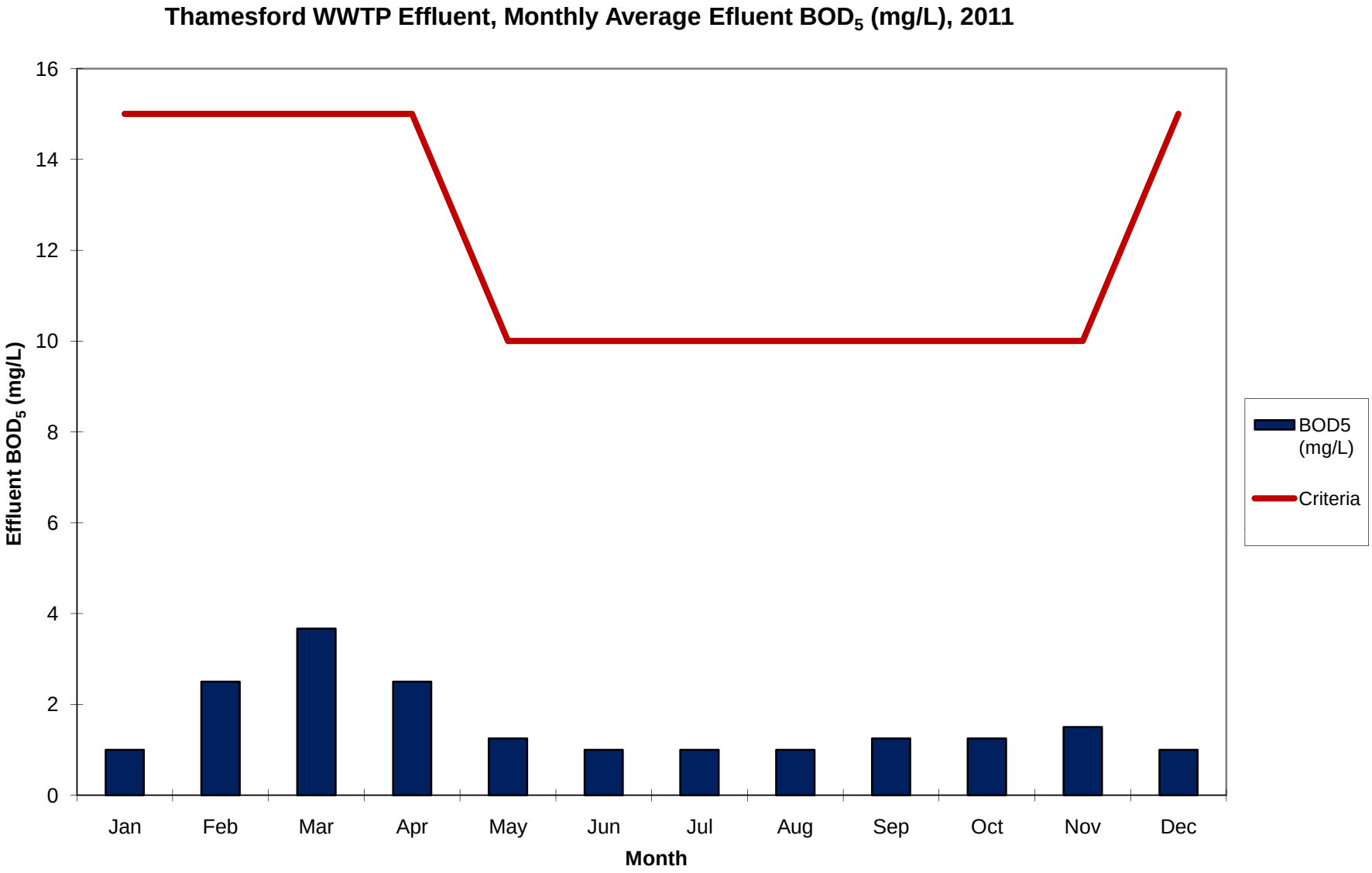

Thamesford WWTP Influent, Monthly Average TSS loading (kg/d), 2011
900
800
700
600
500
400
300
200
100
0
Influent TSS (kg/d)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TSS (kg/d)
Design

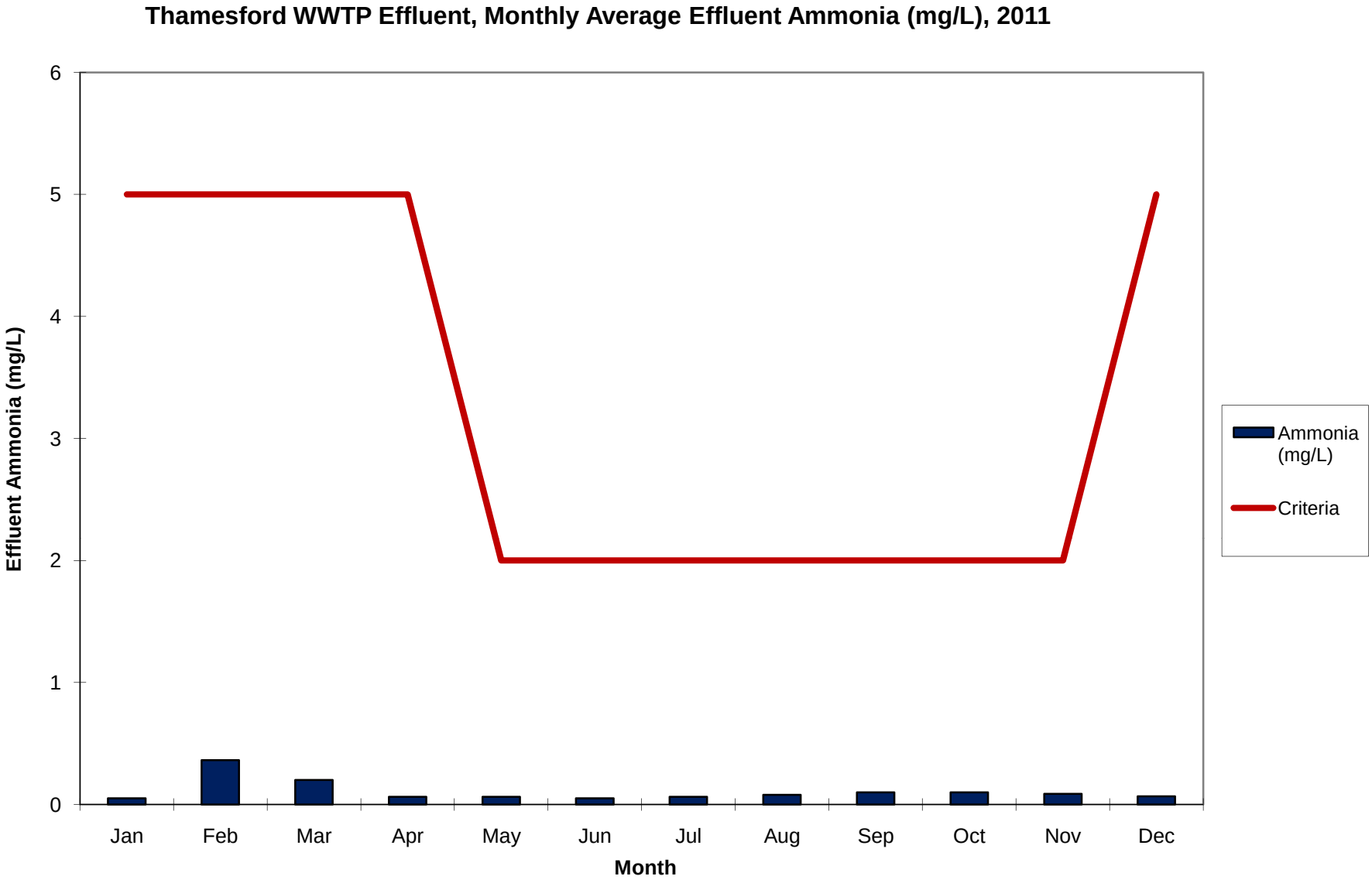

Thamesford WWTP Influent, Monthly Average TKN Loading (kg/d), 2011
Influent TKN (kg/d)
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Monthly
TKN (kg/d)
Design


Thamesford WWTP Influent, Monthly Average TP loading (kg/d), 2011
Influent TP(kg/d)
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TP (kg/d)
Design

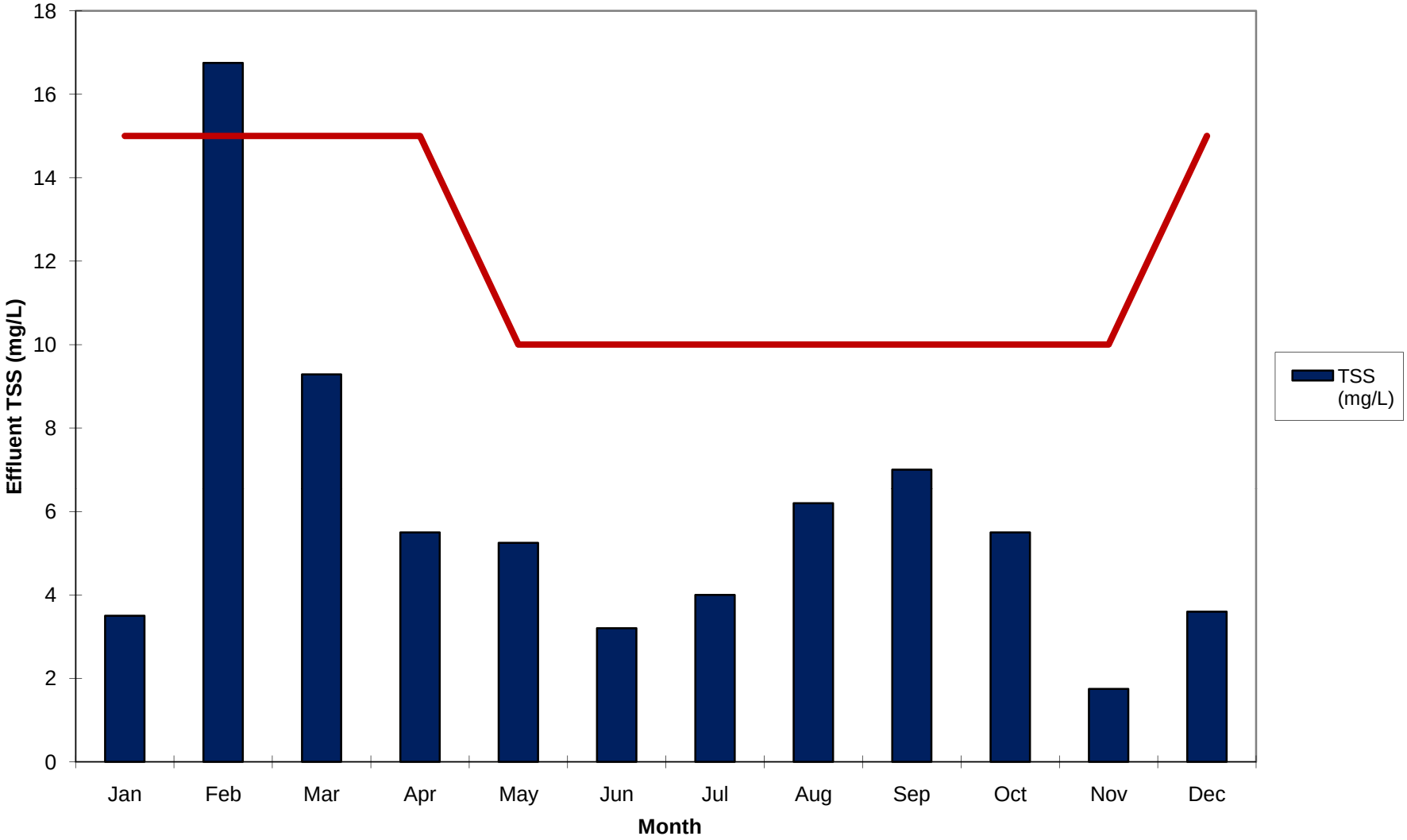

Thamesford WWTP Influent, Monthly Average O&G Loading (kg/d), 2011
120
100
80
60
40
20
0
Influent O&G (kg/d)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
O&G (kg/d)

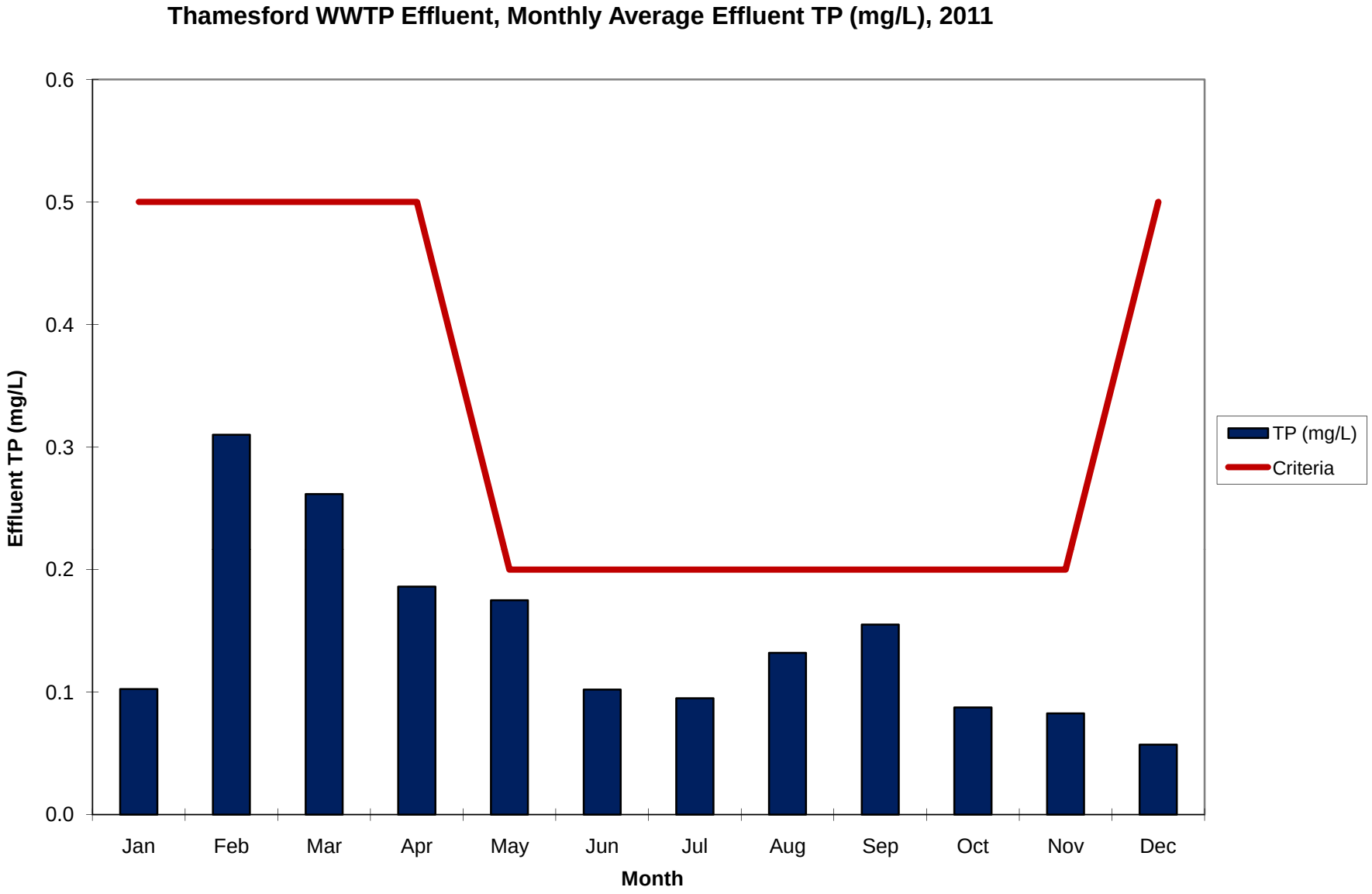

Thamesford WWTP Effluent, Monthly Average pH, 2011
Effluent pH
Month
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0
1
2
3
4
5
6
7
8
9
pH
Low Criteria
High Criteria

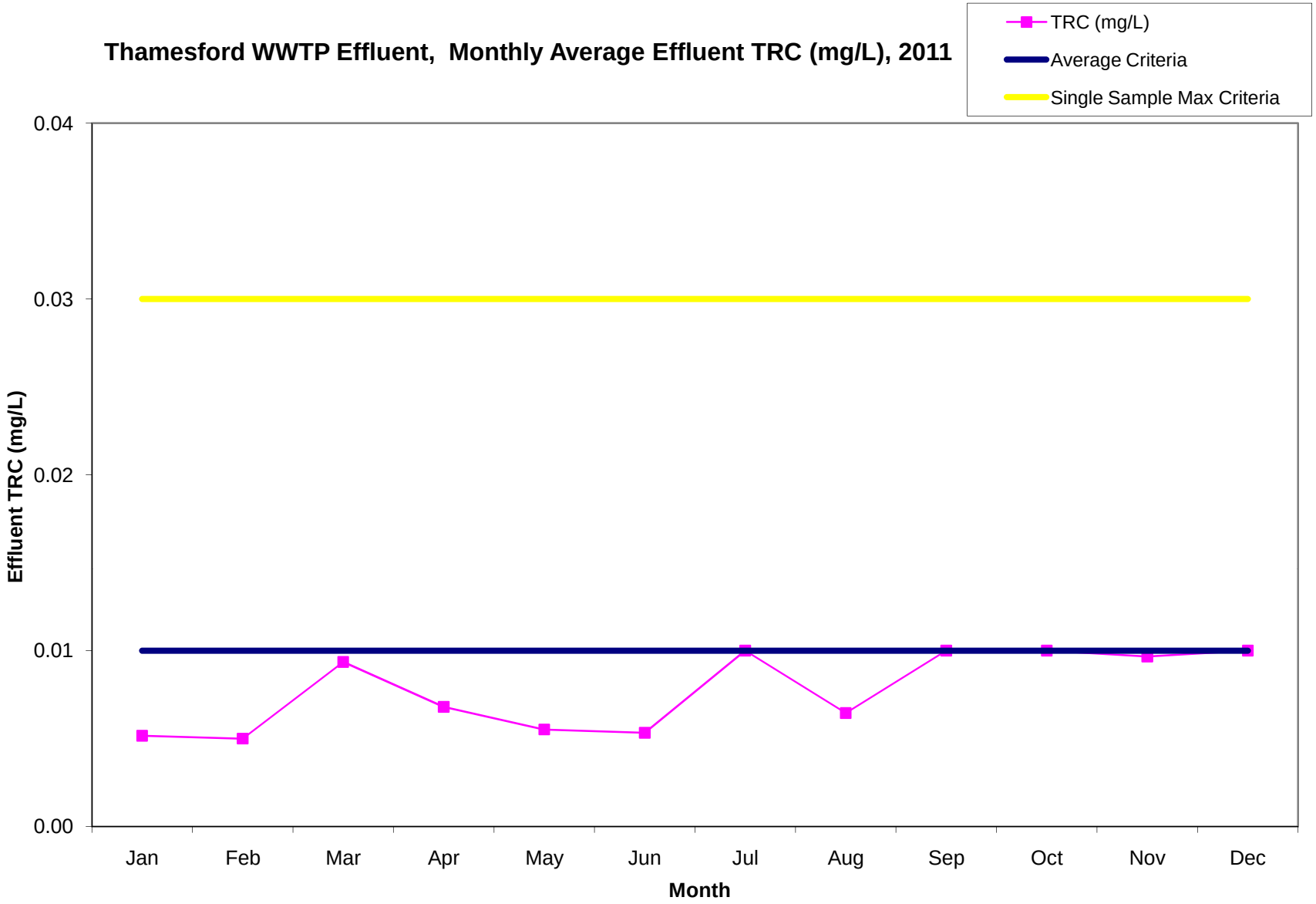

Thamesford WWTP Effluent, Monthly Average Efluent BOD5 (mg/L), 2011
Effluent BOD5 (mg/L)
16
14
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
BOD5 (mg/L)
Criteria

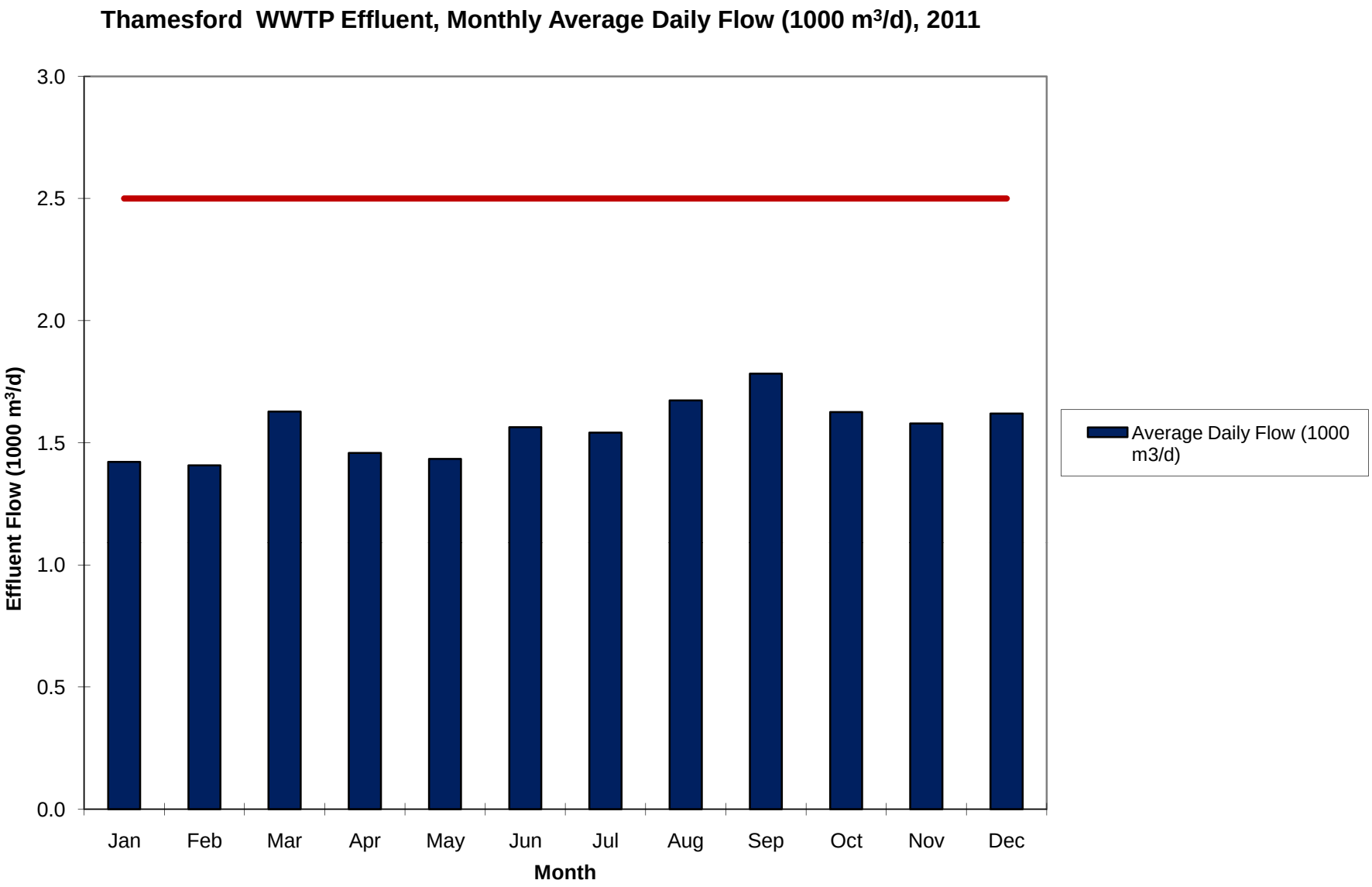

Thamesford WWTP Effluent, Monthly Average Effluent Ammonia (mg/L), 2011
Effluent Ammonia (mg/L)
6
5
4
3
2
1
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Ammonia (mg/L)
Criteria

Thamesford WWTP Effluent, Monthly Average Effluent TSS (mg/L), 2011




Thamesford WWTP Effluent, Monthly Average Effluent TP (mg/L), 2011
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Effluent TP (mg/L)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TP (mg/L)
Criteria


Thamesford WWTP Effluent, Monthly Average Effluent TRC (mg/L), 2011
TRC (mg/L)
Average Criteria
Single Sample Max Criteria
0.04
0.03
0.02
0.01
0.00
Effluent TRC (mg/L)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Thamesford WWTP Effluent, Monthly Average Daily Flow (1000 m3/d), 2011
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Effluent Flow (1000 m3/d)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Average Daily Flow (1000 m3/d)

Public Works
P. O. Box 1614, 21 Reeve St.,, Woodstock Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

March 15, 2012

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Ian Ness-Jack
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Report Tavistock Lagoon 2011
(Certificate of Approval #8316-6JSJJF)

This year-end report is prepared as required by the certificate of approval #8316-6JSJJF.

I trust this report fulfills the intent of the Certificate of Approval reporting requirements. If there are any questions, please contact me.

Yours Truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, County of Oxford

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager Wastewater Services, Oxford County
Mr. Mark Maxwell, EIT
Project Engineer, Oxford County

Overview

The Tavistock Lagoon System provided effective wastewater treatment in 2011 and all effluent concentration limits as specified by the certificate of approval were met with the exception of one non-compliance reported during the discharge period provided by the letter of permission from the MOE, described in more detail below under bypassing and abnormal conditions.

A new certificate of approval CofA # 7789-8AKJL5 took effect following the substantial completion of the plant upgrades in 2012. Interim discharge limits govern for a period of nine months after substantial completion. The annual average daily flow in 2011 was 1,681 m^3/d, which represents 81% of the rated capacity of 2,070 m^3/d included in CofA #8316-6JSJJF.

Plant Description

The Tavistock Wastewater Treatment Plant (WWTP) began operation in its present configuration in 1988. The facility consists of three facultative lagoons equipped with Mat Aerators in all three cells, as well as six 15 hp aspirating surface aerators in Cell 1 to provide the necessary dissolved oxygen for the lagoons. Any two of the three existing rotary positive displacement blowers provide air into Cell #1 and Cell #2.

There is also the provision for continuous aluminum sulphate addition for phosphorus removal. The wastewater is dosed with aluminum sulphate as it enters Cell #1 and as the flow enters Cell #2. Effluent from Cell #1 overflows to Cell #2 then into Cell #3 where it is stored until discharge from November 1 to April 30. Once again this year a one-time approval by the MOE was issued allowing for an early release covering the period from August 1st to November 1st. This was necessary due to the inability to hold the wastewater until a November release.

Construction began in the fall of 2010 for the new lagoon and filter system with substantial completion occurring early in 2012. The Oxford County operates the facility, utilizing the staff located at the Woodstock WWTP.

Figure 1

Plant Specifications

Certificate of Approval #8316-6JSJJF

Facilities - Three Facultative Lagoons
Design Capacity - 2,070 m^3/day
Peak Capacity - 7,556 m^3/day
Average Daily Flow - 1,681 m^3/day
Receiving Stream - Thames River via Hohner Drain
Plant Classification - WWT – I
Certificate(s) of Approval 8316-6jSJJF
Effluent requirements:
CBOD 25.0 mg/L
Suspended Solids 25.0 mg/L
Total Phosphorous 1.0 mg/L
Dissolved Oxygen >4.0

Free Ammonia

(Jan. & Feb.)	8.6 mg/L	(Mar.)	4.5 mg/L
(Apr.)	2.0 mg/L	(Nov.)	2.3 mg/L
(Dec.)	6.8 mg/L		

During the period of May 1 to October 31, no effluent is to be discharged to the receiving stream. A letter from the Manager of the London District Office of the MOE was received dated July 4th 2011, allowing effluent discharge from August 1st to November 1st, 2011 but limiting volumes and with additional limits on discharge criteria. This was subsequently amended in a letter from MOE dated September 14th, 2011 to increase the allowable discharge flows from the lagoons and to accommodate flow from the site due

to rainwater accumulation. Copies of the letters received from MOE which include the limits required for the early discharge period are included as Exhibit 2.

Sampling Procedures

Raw Sewage is sampled a minimum of once monthly and tested for $CBOD_5$, suspended solids, TKN, total phosphorous, pH and temperature.
Automatic composite samplers are used to collect raw sewage samples from Chamber #3 as the flow enters Cell #1. Automated composite samples are also taken at the same time from a major cheese processor in Tavistock. The cheese company can discharge significant loadings to the Tavistock Lagoon system and is under a surcharge agreement with Oxford County.

Grab samples of final effluent is taken weekly during effluent discharge and tested for $CBOD_5$, suspended solids, total phosphorous, pH, temperature, dissolved oxygen, nitrate nitrogen, nitrite nitrogen and ammonia nitrogen. Un-ionized ammonia, BOD_5 and E.Coli were also included under the amendment. SGS Lakefield Research Ltd. performs all sample analyses with the exception of pH, temperature, and dissolved oxygen which are measured in the field. A detailed summary of monthly raw sewage and final effluent analysis is provided in this report in Exhibit 1.

Flows

The annual average daily flow was 1,681 m^3/d this represents 81% of the rated capacity of 2,070 m^3/d included in CofA #8316-6JSJJF.

Plant treated effluent volume of 613,920 m^3 was released in 2011.

Raw Sewage Quality

The annual average raw sewage $CBOD_5$ concentration to the plant was 356 mg/L. This corresponds to an average $CBOD_5$ loading of 598 kg/day. The average suspended solids loading was 269 mg/L (or 452 kg/day). The annual raw sewage nitrogen levels as TKN were 31 mg/L (or a loading of 52 kg/day). Phosphorous levels averaged 9 mg/L, which correspond to 15 kg/day.

Plant Performance & Effluent Quality

Detailed analytical data of annual and monthly averages are summarized later in the report under Exhibit 1.

The annual $CBOD_5$ effluent concentration was 4 mg/L with a removal efficiency of 98.9%. The annual suspended solids effluent concentration was 8 mg/L with a removal efficiency of 97%. The annual average TKN effluent concentration was 3 mg/L with a removal efficiency of 90%. The annual average total phosphorous effluent concentration was 0.07 mg/L, which represents a removal efficiency of 99%.

For compliance purposes, annual average concentrations are based only on data from the effluent discharge period, while raw sewage flows for the entire year are used to assess loading and hydraulic capacity.

All pH is measured in the effluent by the operator a minimum of weekly during discharge and there was no single sample with pH outside of the CofA range of 6-9.5 in 2011.

Bypassing and Abnormal Conditions

The Tavistock Lagoon System was operating within its discharge criteria for 2011 for its normal discharge period, however; there was one non-compliance reported during the discharge period provided by letter or permission from the MOE dated July 4th 2011. This involved an ammonia discharge concentration of 2.6 mg/L for the month of October which exceeded the limit of 2 mg/L. The lagoon discharge was closed and the contents retained, aerated and tested to ensure compliance before any further discharge. This was reported to the MOE at the time of the event.

There were three spill events in the collection system in 2011. One involved an overflow that was reported to the Spills Action Center for the Hope Street lift station on September 12, 2011. Upon further review, the chart recorded data was discovered to be erroneous due to a faulty level indicator (Milltronic's transponder) rather than being caused by an actual overflow. The other two events took place on July 11th and August 17th and were due to small spills from forcemain construction activities. They were contained, cleaned up, and reported to the MOE Spills Action Center.

There were no spills or bypasses of the wastewater lagoons in 2011.

Maintenance and Calibration Activities

The operating and maintenance staff from the Woodstock WWTP conducts regular scheduled maintenance of the plant equipment. Detailed maintenance records for each piece of equipment are kept on-site at the Woodstock Plant. The plant utilizes a database system known as City Works to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

R & R Instrumentation calibrated all flow measuring equipment.

Summary and Recommendations

The Tavistock WWTP performed within its discharge criteria in 2011 with the one exception noted above.

Construction began in the fall of 2010 for the Tavistock Lagoon upgrade. As of February 6th, 2012 it is substantially complete.

Miscellaneous

As part of a collection system upgrade in Tavistock, a new sewage lift station was constructed adjacent to the lagoon site that will provide relief to the existing pump stations by directing wastewater to this new location.

EXHIBIT 1

Tavistock Influent Data 2011

Month		JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL	AVE.	Criteria	Special Permit #8316-6JSJJF Aug 1-Nov 1
Total Influent	(1000 m^3)	45.211	42.081	70.864	56.073	44.57	50.212	39.094	43.136	44.612	57.771	51.308	68.985	**613.92**	**51.160**		
Average Influent	(1000 m^3/d)	1.458	1.503	2.286	1.869	1.438	1.674	1.261	1.391	1.487	1.864	1.71	2.225		**1.681**	**2.070**	
Max Raw	(1000 m^3/d)	2.917	3.284	4.051	3.336	2.651	3.092	1.647	1.798	2.293	3.25	5.842	3.686		**3.154**		
Min Raw	(1000 m^3/d)	0.993	0.990	1.462	0.168	0.585	0.59	0.865	1.04	1.111	1.21	1.18	1.136		**0.944**		
Cheese Total	(1000 m^3)	15.126	13.789	23.329	18.978	13.024	14.106	12.199	12.3	13.596	12.802	11.15	15.83	**176.23**	**14.69**		
Cheese Average	(1000 m^3/d)	0.488	0.445	0.753	0.612	0.420	0.470	0.394	0.397	0.439	0.413	0.372	0.511		**0.48**		
Cheese Max	(1000 m^3/d)	0.833	0.832	1.177	1.169	0.747	0.778	0.727	0.71	0.772	0.672	0.55	0.73		**0.81**		
Cheese Min	(1000 m^3/d)	0.2	0	0.189	0	0.166	0.184	0.131	0.18	0	0.198	0.125	0.12		**0.12**		
Effluent Total	(1000 m^3)	117.31	92.7	21.710					42.117	159.11	127.61		182.806	**743.404**	**106.20**		46.5-108
Effluent Average	(1000 m^3/d)	3.784	3.312	2.412					1.914	5.30	4.116		7.03		**3.98**		Amend 150
Effluent Max	(1000 m^3/d)	5.009	6.509	3.673					3.431	8.37	8.872		10.45		**6.62**		
Effluent Min	(1000 m^3/d)	0.139	1.136	0.518					0.107	1.98	0.163		0.63		**0.67**		

Tavistock Cheese Influent

BOD_5	(mg/L)	1164	1143	1072	979	921.00	1229.2	814	676.75	684	670.75	1375	778.5		**959**	
SS	(mg/L)	308	283	332	324	297.75	516.4	323	216	234.5	310.25	527.5	224.25		**325**	
AMMONIA	(mg/L)	12.025	11.775	12.62	10.73	10.18	21.5	26.85	13.1	15.525	18.30	14.425	12.25		**15**	
TKN	(mg/L)	76	67.1	65.54	46.73	56.33	59.92	60.7	60.5	56.15	52.25	69.625	58.325		**61**	
NITRITE	(mg/L)	3.9	0.51	1.78	6.33	4.425	0.492	0.345	0.20	7.73	1.24	4.7425	4.5825		**3**	
NITRATE	(mg/L)	25.8	38.925	32.08	5.57	6.4	0.05	0.05	0.05	3.8125	0.19	9.415	18.7375		**12**	
TOTAL P.	(mg/L)	32	29.2	30.56	29.50	29.15	40.2	25.075	20.775	28.975	28.38	38.825	26.625		**30**	
pH	Cheese	7.49	7.65	8.27	7.19	7.12	6.68	7.06	6.84	6.76	7.11	6.67	7.08		**7.16**	

Tavistock Lagoon Influent

$CBOD_5$	(mg/L)	299	327	282	471	290	325	698	554	271	245	331	181		**356.01**	
BOD_5	(mg/L)	277.5	290.5	262.3	400.5	263.5	390	850	777	344	257.5	297.5	150.5		**380.07**	
SS	(mg/L)	234	240	222	344	218	244	425	288	320	271	298	126		**268.8**	
AMMONIA	(mg/L)	23.9	24.2	17.6	8.8	26.6	22.5	24.2	18.6	33.4	21.0	18.2	16.8		**21**	
TKN	(mg/L)	36.50	35.90	23.47	22.90	35.10	30.15	32.20	33.20	37.80	28.75	27.30	27.30		**30.9**	
NITRITE	(mg/L)	1.09	0.06	0.06	0.08	0.06	0.06	2.42	0.08	0.06	6.21	7.28	0.06		**1**	
NITRATE	(mg/L)	3.7	0.13	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.49	7.13	0.05		**1**	
TOTAL P.	(mg/L)	7.8	8.8	7.6	15.6	5.53	8.9	11.5	9.6	4.0	8.5	9.9	4.8		**9**	
pH	Influent	6.91	7.12	6.90	7.30	7.57	7.10	6.87	7.31	7.67	7.62	7.23	7.84		**7.28**	
Temperature (celcius)		8.8	9.8	9.1	12.5	16.3	20.8	22.14	22.8	19.1	16.4	15.5	12.3		**15.5**	

Tavistock Lagoon Effluent

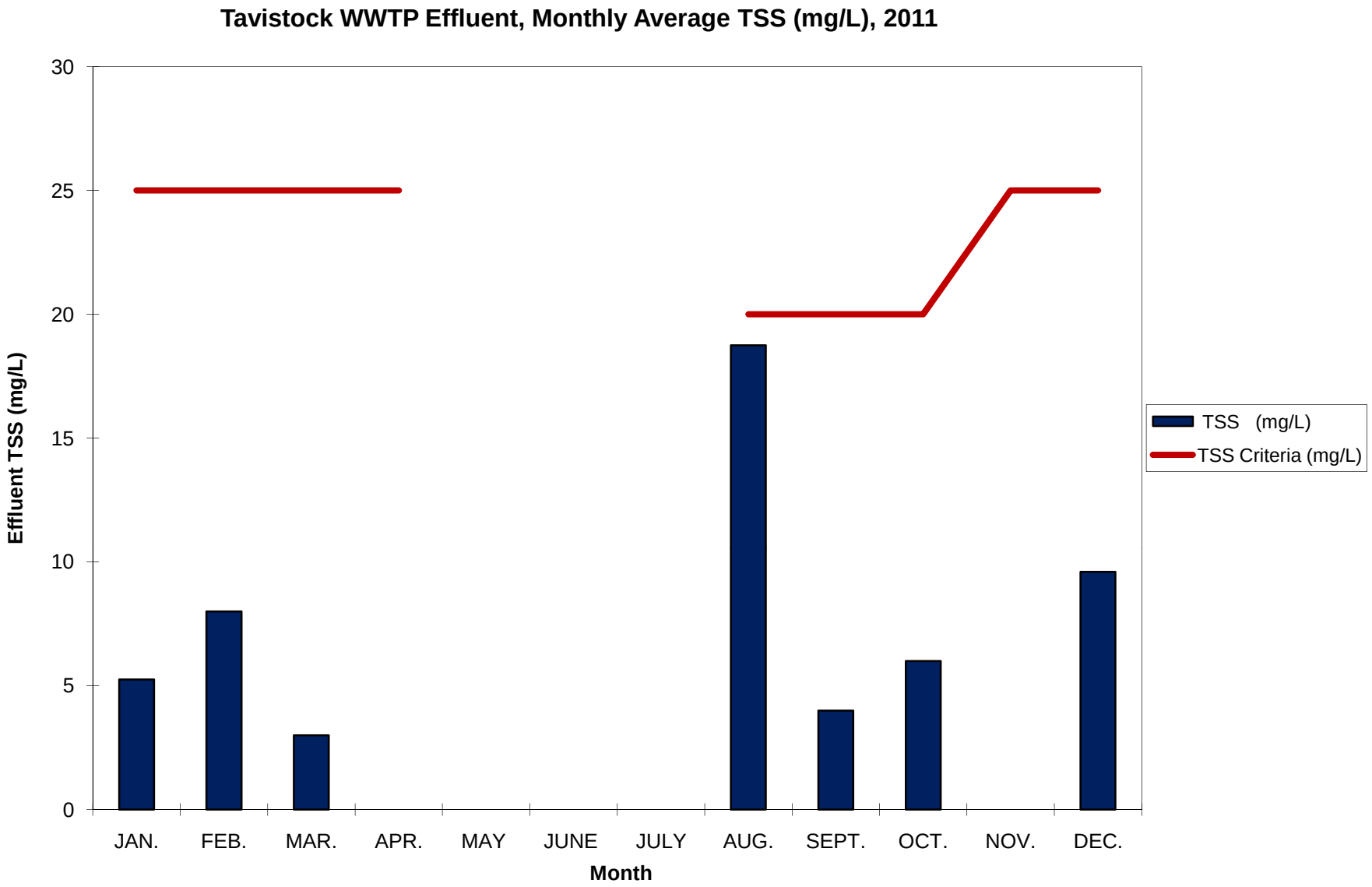
														TOTAL	AVE.	Criteria	Permit Aug 1-Nov 1
$CBOD_5$	(mg/L)	2.5	3.8	7.00					5.5	2.0	3.8		3.4		**3.99**	**25**	
BOD_5	(mg/L)	2.0	3.5	7.00					6.5	2.25	2.75		3.2		**3.89**		10
TSS	(mg/L)	5.3	8.0	3					18.8	4.0	6.0		9.6		**8**	**25**	20
AMMONIA	(mg/L)	1.13	3.05	3.6					1.03	1.7	2.60		2.38		**2.21**	**2.0-8.6**	2
TKN	(mg/L)	2.4	3.88	4.9					1.95	2.33	2.95		3.48		**3.13**		
NITRITE	(mg/L)	0.08	0.07	0.06					0.06	0.11	0.08		0.09		**0.1**		
NITRATE	(mg/L)	0.6	0.99	1.1					0.08	0.17	0.27		0.8		**0.6**		
TOTAL P.	(mg/L)	0.06	0.05	0.06					0.05	0.13	0.09		0.07		**0.07**	**1.00**	0.5
pH		7.77	7.60	7.88					7.95	7.82	7.95		8.10		**7.87**	**6.0-9.5**	
E. Coli	(#/100 mL)	9.1	19.2	4.00					195.2	15.3	9.7		7.3		**37**		200
Temp.	Celcius	1.90	2.5	3.2					19.7	17.4	12.3		6.3		**9.03**		
D.O.	(mg/L)	7.6	10.4	14.1					8.0	7.7	7.8		7.7		**9.1**	**(4.0)**	
Un-ion'd Ammonia	(mg/L)								0.04	0.04	0.04				**0.041**		0.1

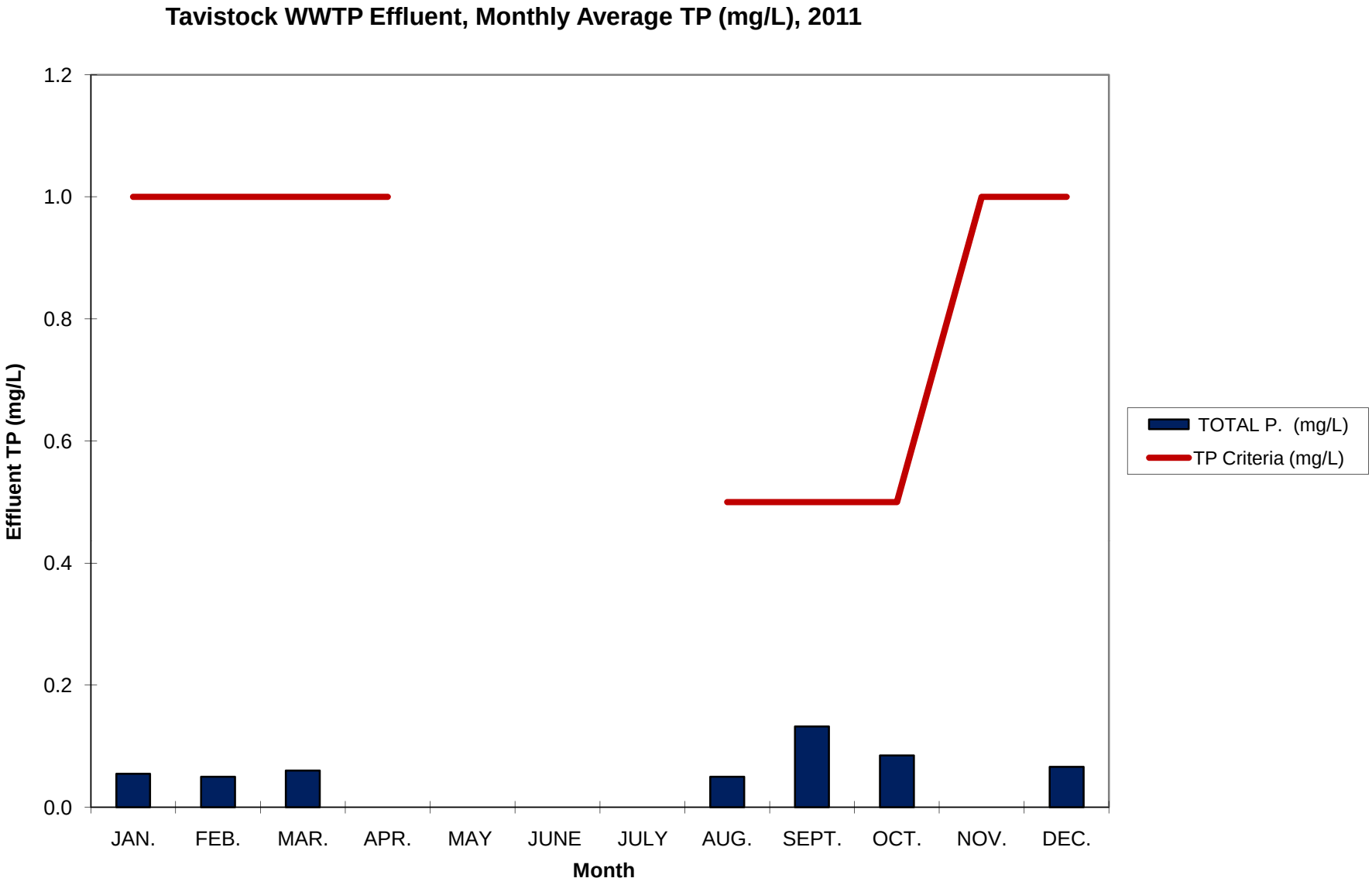
Criteria per Month

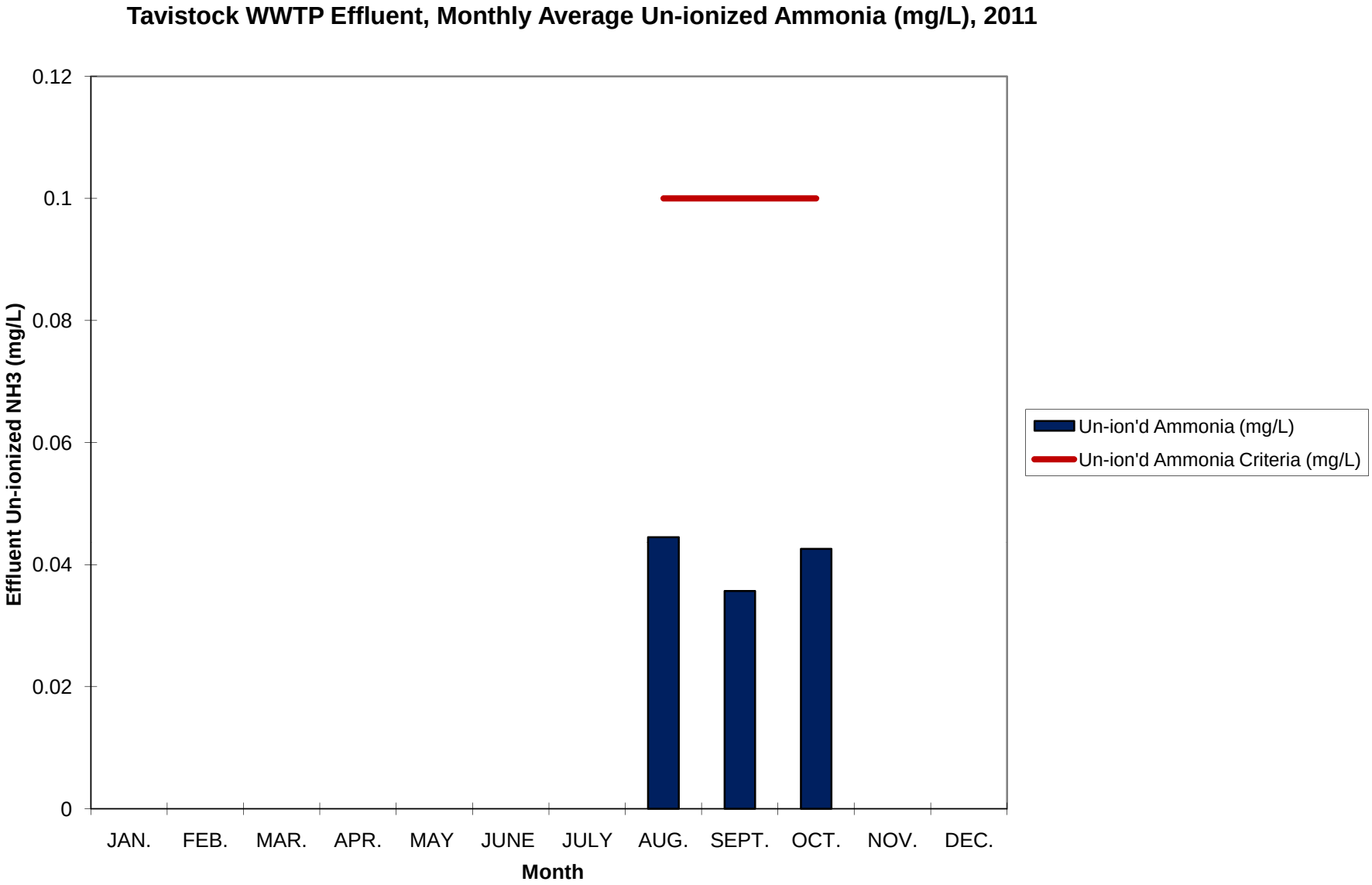
		JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
$CBOD_5$ Criteria	(mg/L)	25	25	25	25							25	25
TSS Criteria	(mg/L)	25	25	25	25				20	20	20	25	25
TP Criteria	(mg/L)	1	1	1	1				0.5	0.5	0.5	1	1
NH3-N Criteria	(mg/L)	8.6	8.6	4.5	2				2	2	2	2.3	6.8
DO	(mg/L)	4	4	4	4							4	4
Influent Flow Design	(1000m3/d)	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07
Un-ion'd Ammonia Criteria	(mg/L)								0.1	0.1	0.1		
E.Coli Criteria	(#/100 mL)								200	200	200		
Effluent Flow	(1000m3/d)								46.5	75	108		
BOD_5 Criteria	(mg/L)								10	10	10		

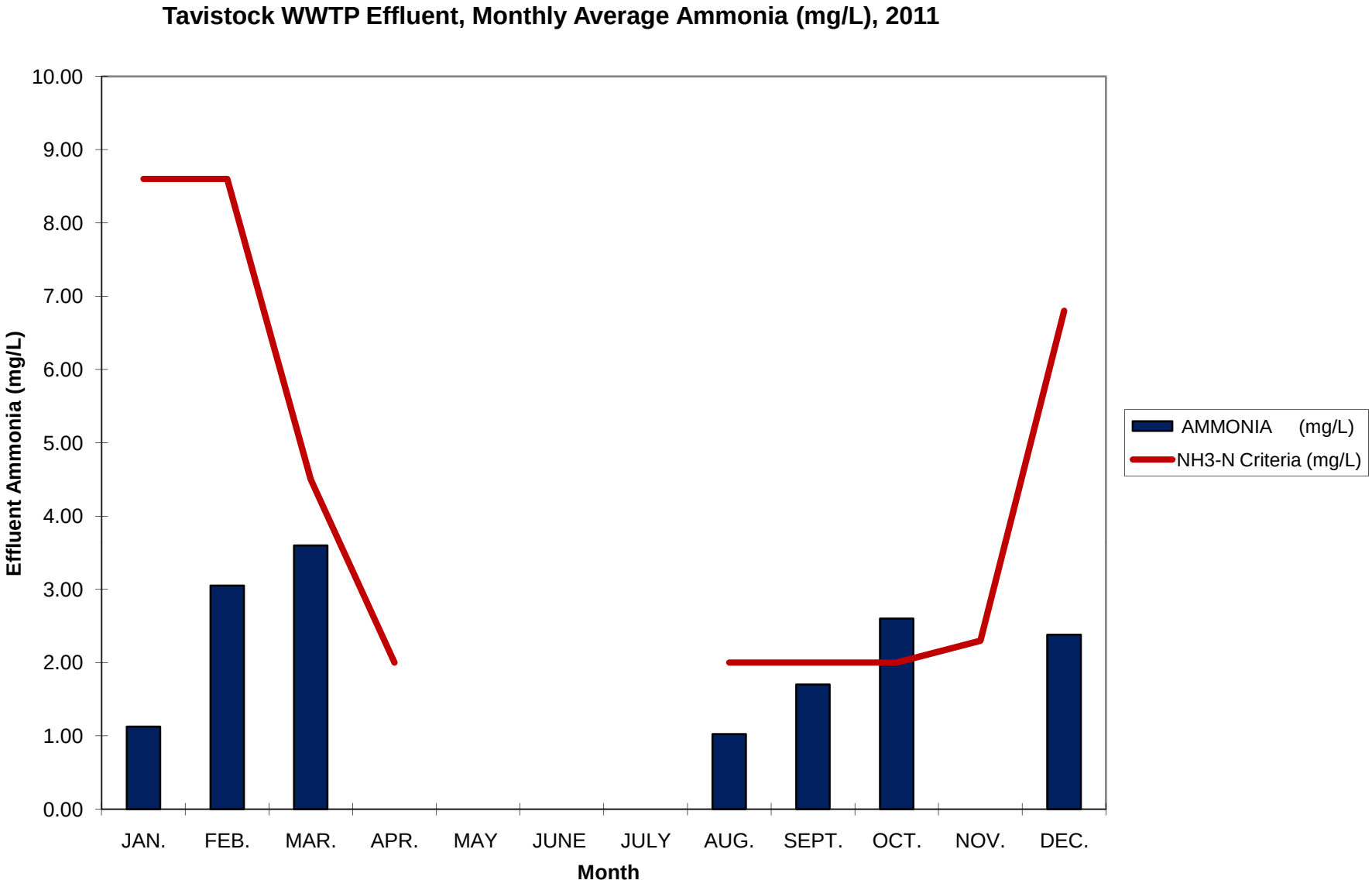
Tavistock Influent Loading kg/d 2011

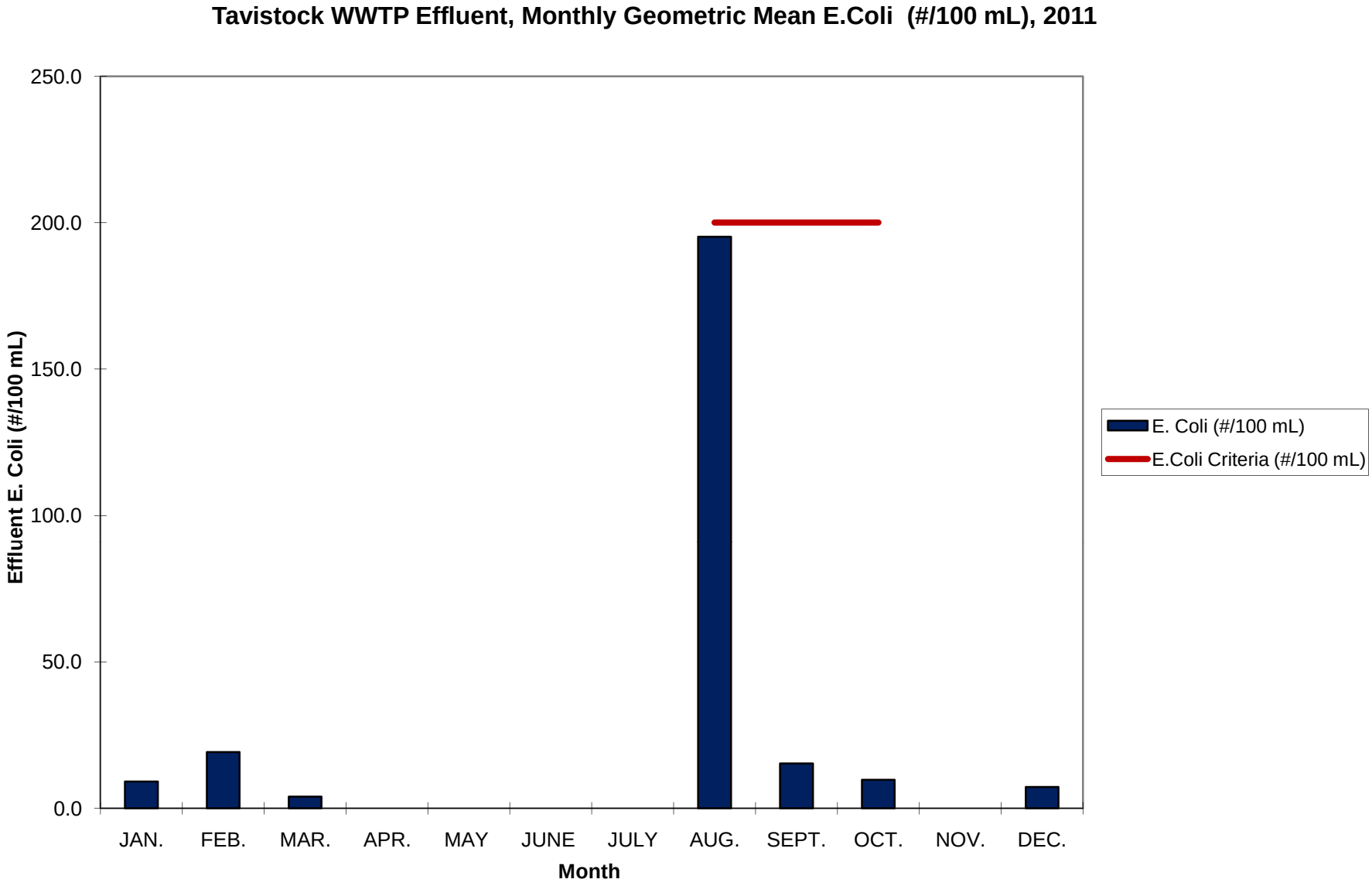
		JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.		AVE.
BOD_5 Loading	(kg/d)	405	437	600	749	379	653	1072	1081	512	480	509	335		**639**
TSS Loading	(kg/d)	341	361	507	642	313	408	536	401	475	504	509	279		**452**
Cheese BOD Loading	(kg/d)	568	508	807	599	387	183	320	269	300	277	511	398		**427**
Cheese TS Loading	(kg/d)	150	126	250	199	125	115	127	86	103	128	196	115		**143**
Cheese TKN Loading	(kg/d)	37	30	49	29	24	14	24	24	25	22	26	30		**28**
Cheese TP Loading	(kg/d)	16	13	23	18	12	4	10	8	13	12	14	14		**13**

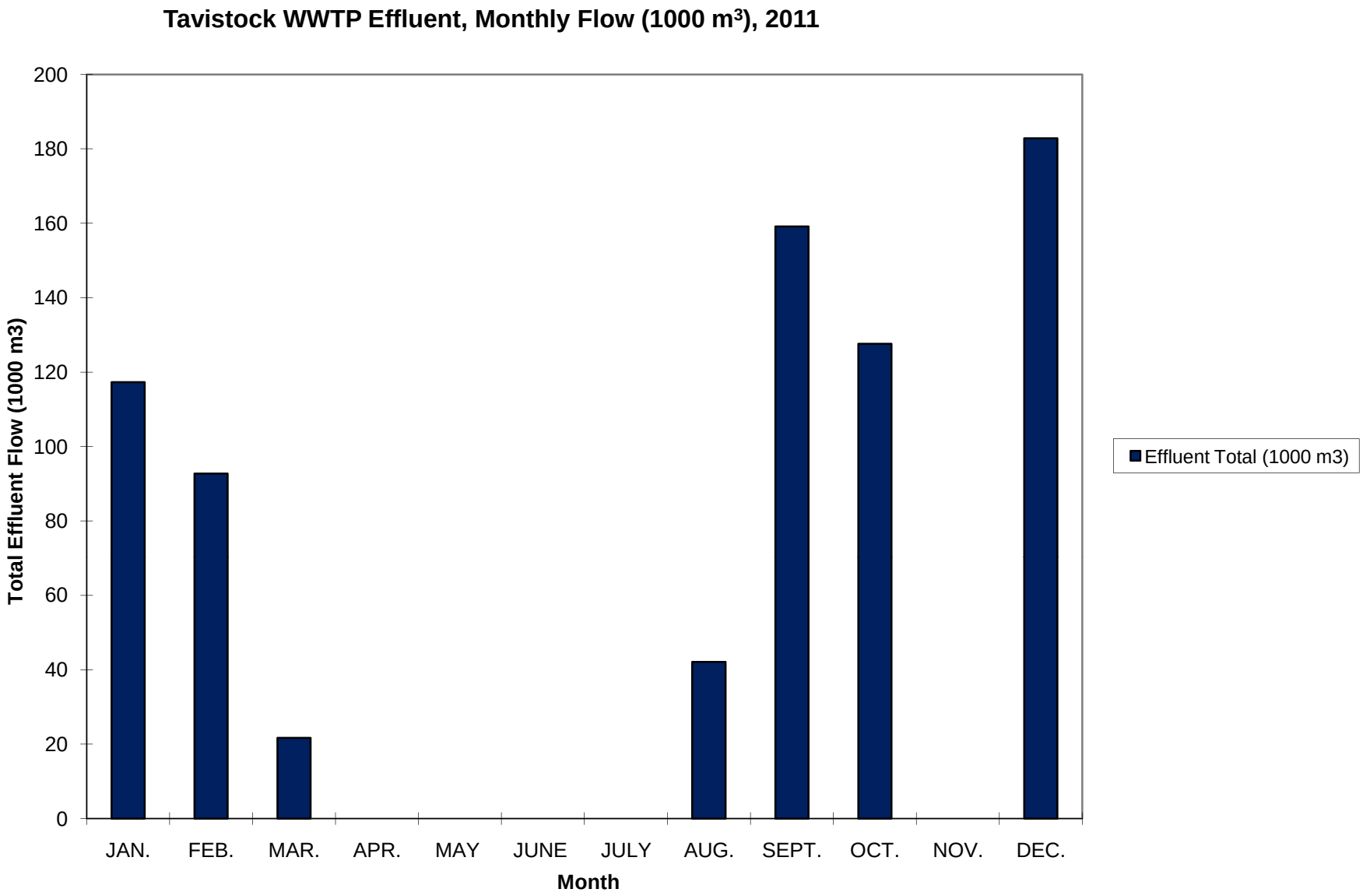

Tavistock WWTP Effluent, Monthly Average TSS (mg/L), 2011
Effluent TSS (mg/L)
30
25
20
15
10
5
0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
TSS (mg/L)
TSS Criteria (mg/L)

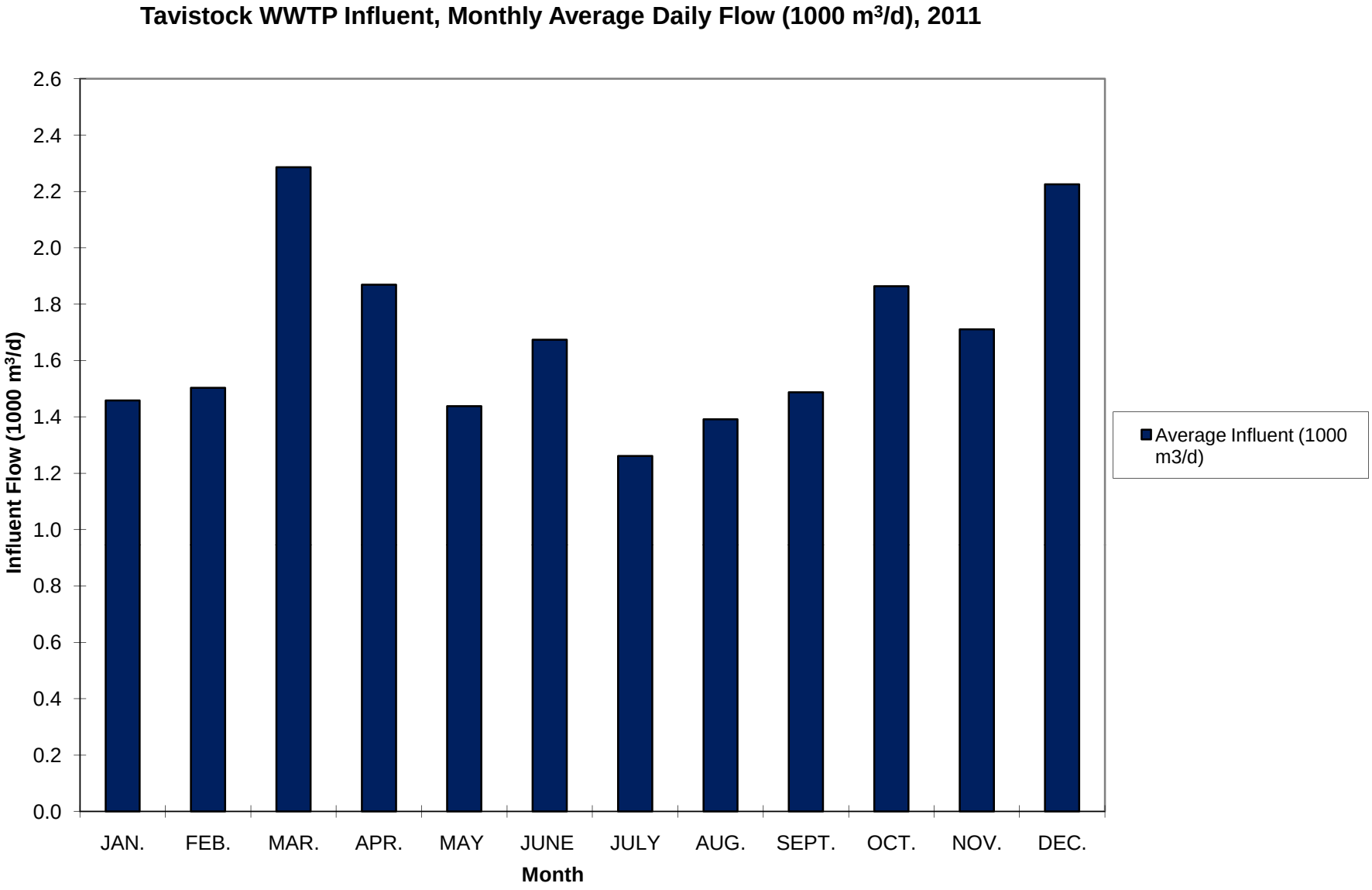

Tavistock WWTP Effluent, Monthly Average TP (mg/L), 2011
Effluent TP (mg/L)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
TOTAL P. (mg/L)
TP Criteria (mg/L)

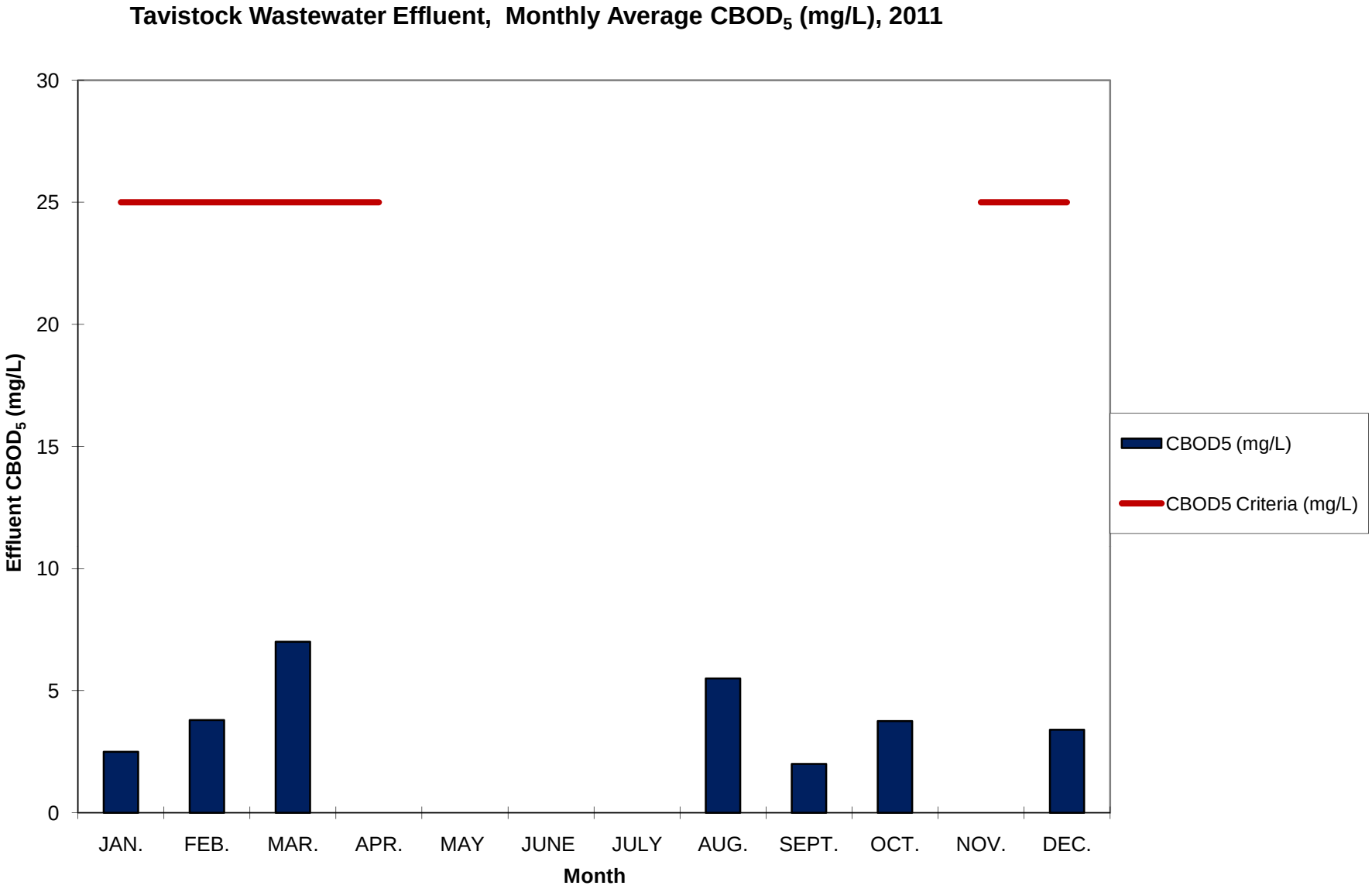

Tavistock WWTP Effluent, Monthly Average Un-ionized Ammonia (mg/L), 2011
0.12
0.1
0.08
0.06
0.04
0.02
0
Effluent Un-ionized NH3 (mg/L)
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
Un-ion'd Ammonia (mg/L)
Un-ion'd Ammonia Criteria (mg/L)

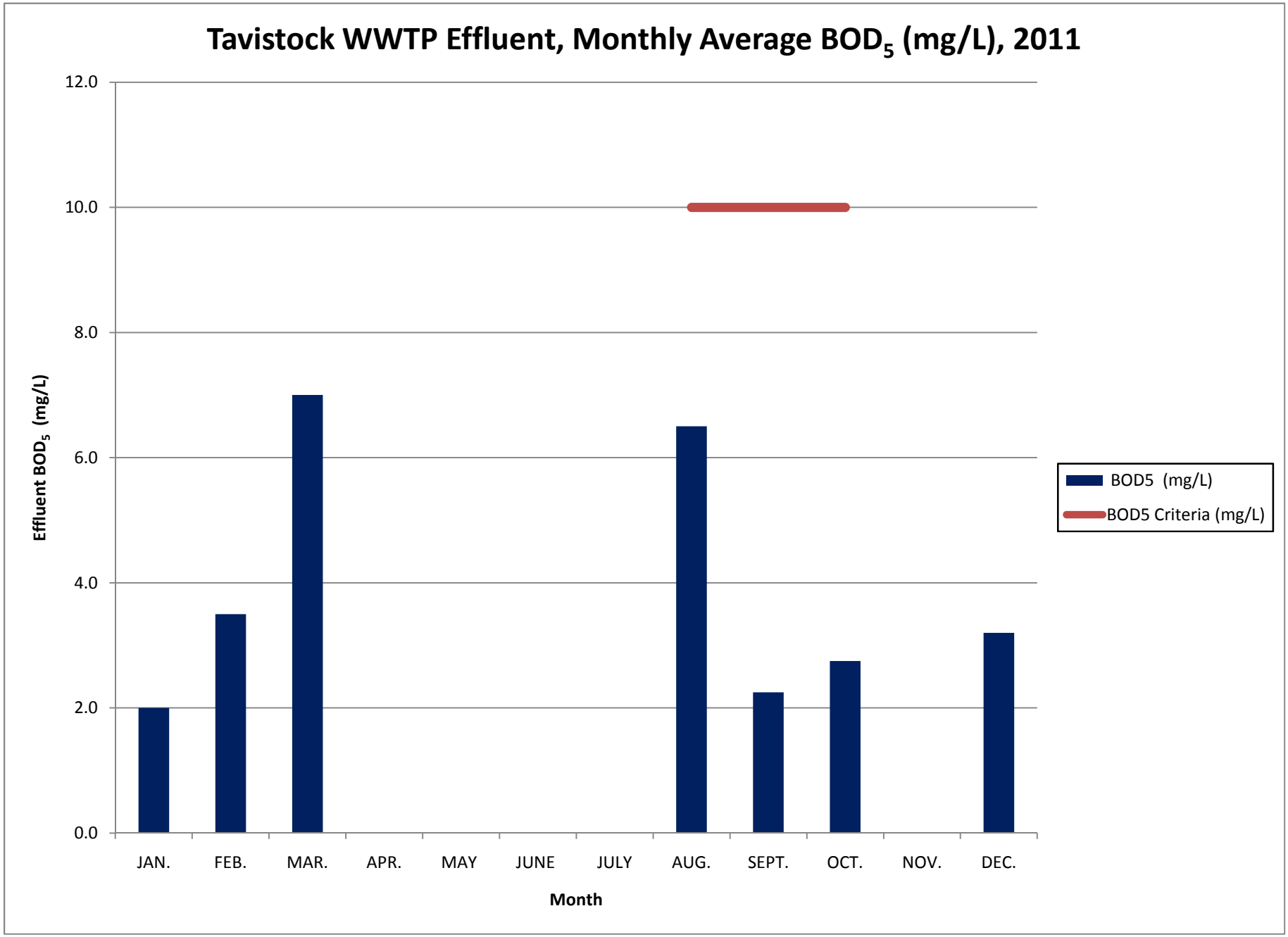

Tavistock WWTP Effluent, Monthly Average Ammonia (mg/L), 2011
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Effluent Ammonia (mg/L)
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
AMMONIA (mg/L)
NH3-N Criteria (mg/L)


Tavistock WWTP Effluent, Monthly Geometric Mean E.Coli (#/100 mL), 2011
250.0
200.0
150.0
100.0
50.0
0.0
Effluent E. Coli (#/100 mL)
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
E. Coli (#/100 mL)
E.Coli Criteria (#/100 mL)


Tavistock WWTP Effluent, Monthly Flow (1000 m3), 2011
Total Effluent Flow (1000 m3)
200
180
160
140
120
100
80
60
40
20
0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
Effluent Total (1000 m3)


Tavistock WWTP Influent, Monthly Average Daily Flow (1000 m3/d), 2011
Influent Flow (1000 m3/d)
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
Average Influent (1000 m3/d)


Tavistock Wastewater Effluent, Monthly Average CBOD5 (mg/L), 2011
30
25
20
15
10
5
0
Effluent CBOD5 (mg/L)
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
CBOD5 (mg/L)
CBOD5 Criteria (mg/L)


Tavistock WWTP Effluent, Monthly Average BOD5 (mg/L), 2011
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Effluent BOD5 (mg/L)
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month
BOD5 (mg/L)
BOD5 Criteria (mg/L)

Cheese Plant pH vs Lagoon Influent pH 2011

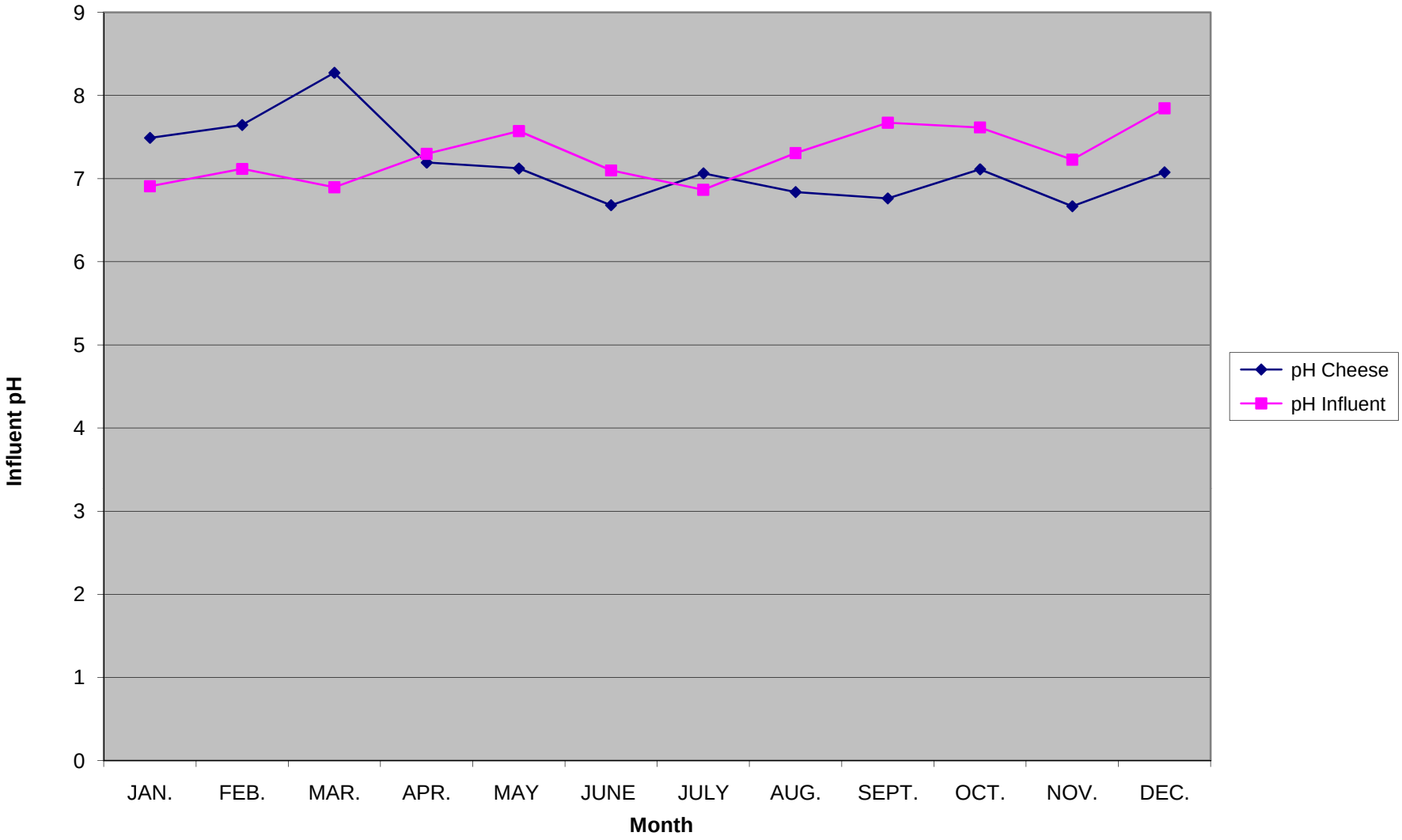


EXHIBIT 2

Ministry of the Environment
733 Exeter Road
London ON N6E 1L3
Tel': 519 873-5000
Fax: 519 873-5020

Ministère de l'Environnement
733, rue Exeter
London ON N6E 1L3
Tél.: 519 873-5000
Téléc.: 519 873-5020

Ontario

FILE COPY

July 4, 2011

County of Oxford
P.O. Box 397, 21 Market Square
Woodstock ON N4S 7Y3

Attn: Mr. Shahab Shafai
Manager of Wastewater Services

RE: Certificate of Approval No. 8316-6JSJJF

Dear Mr. Shafai:

Thank you for your letter dated May 27, 2011 requesting approval for the early discharge of treated wastewater from the Tavistock Sewage Lagoons to deal with a storage capacity issue.

Based upon your letter the Tavistock Class EA Project and the Environmental Study Report has been completed. It is recognized that there is an ongoing storage issue that persists with the existing Tavistock Sewage Lagoons.

Based upon your correspondence, I concur with your proposal for an early discharge of treated wastewater and will accept a discharge starting date of August 1, 2011 and ending November 1, 2011.

Effluent Sampling Program and Discharge Criteria

During this one-time discharge period, the County of Oxford shall undertake an effluent sampling program during discharge events which consists of weekly grab sampling. The non-compliance criteria based on monthly averages of the weekly samples are as follows:

BOD_5	10 mg/L
Total Suspended Solids	20 mg/L
Total Phosphorus	0.5 mg/L
Total Ammonia	2 mg/L
Un-ionized ammonia	0.1 mg/L
E. coli	200 cfu/100 ml

The effluent pH and temperature shall be measured weekly to calculate the un-ionized ammonia in the effluent. The volume of the discharge shall also be measured.

The proposed monthly discharge volumes are acceptable and therefore you are limited to the following volumes:

August	46.5 x 1000 m^3
September	75.0 x 1000 m^3
October	108.0 x 1000 m^3

If a discharge criterion or monthly volume limited is exceeded, the discharge shall cease until such time the limit can be achieved.

The limits of BOD_5 Total Phosphorus and Total Suspended Solids are achievable based on a review of summary data reports and the fact that lagoon effluent quality tends to be highest in the summer. Though E. coli is not limited in the Certificate of Approval, lagoons typically can comply. The specified limits are reasonably stringent which is appropriate since the Horner Drain could have little, if any, flow during the summer.

Reporting

During the one-time discharge period, the county shall submit weekly reports to the District Manager providing results of the effluent sampling program for all compliance criteria, pH, temperature and discharge volume. The first report shall be submitted within nine (9) days of the commencement of discharge. The reports may indicate that analyses of some of the criterion have not been received yet and will be reported in later reports, provided that no criterion shall be reported more than 14 days after completion of sampling for the report.

The county shall submit a final report to the ministry by November 15, 2011, summarizing the results of the effluent sampling program. The report shall also include plans to prevent further discharges from occurring outside the lagoon's discharge window.

Term

The conditions of this direction expire on October 31, 2011, except for the final reporting requirements which shall be submitted no later than November 15, 2011. After October 31, 2011, all further discharges will be controlled by Certificate of Approval Number 3-0425-87-006.

If you have any questions, please feel free to contact Ian Ness-Jack at 519-873-5026.

Yours truly,

Kanina Blanchard
District Manager
London District Office

c. M. Dhalla, MOE – Environmental Assessment and Approvals Branch
Scott Abernethy, MOE – SWR, Tech Support Unit

Ministry of the Environment

733 Exeter Road
London ON N6E 1L3
Tel': 519 873-5000
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Ministère de l'Environnement

733, rue Exeter
London ON N6E 1L3
Tél.: 519 873-5000
Téléc.: 519 873-5020

Ontario

September 14, 2011

County of Oxford
P.O. Box 397, 21 Market Square
Woodstock ON N4S 7Y3

Attn: Mr. Shahab Shafai
Manager of Wastewater Services

RE: Certificate of Approval No. 8316-6JSJJF

Dear Mr. Shafai:

Following an inspection of Tavistock Sewage Lagoons on Friday September 9, 2011 it was apparent that an increase in the monthly discharge flow was necessary to address the rainfall events that have occurred this summer.

On Monday September 12, 2011 a follow-up was carried out by both Ian Ness-Jack and Scott Abernathy of our Tech Support Section to determine how we could best address this issue along with the accumulation of rain water within the construction area of the new lagoon.

We are amending our letter dated July 15, 2011 to increase discharge volumes to 150 x 1000m^3 for the month of September and October respectively.

The new lagoon cell under construction needs to be dewatered for construction to proceed. The County and MOE have agreed that the pumped out turbid water shall be discharged diffusely into the area identified as established vegetation located on the east side of Hohner Creek on the lagoon property just upstream of the golf course property at or near William Street. The purpose of a diffused discharge into vegetation is to filter out elevated solids content of the pumped water to protect Hohner Creek. Creek water samples for TSS testing shall be collected upstream and downstream daily on days when de-watering occurs.

The two effluent streams described above shall be maintained as separate discharges to the creek. If possible cell dewatering and high-volume discharges from the lagoon should be done on different days to avoid over-loading the capacity of the creek. Downstream visual inspections shall be done during discharge events to ensure that the creek's capacity is not exceeded. For example, bank over-topping and erosion are signs of an over-capacity discharge rate to the creek. Discharge rates shall be scaled back if downstream impacts are evident. Visual monitoring of the diffuse discharge is also required to ensure that the turbid water is effectively being spread out and filtered and is not "short circulating" directly to the creek.

Reporting

During the one-time discharge period, the county shall submit weekly reports to the District Manager providing results of the effluent sampling program for all compliance criteria, pH, temperature and discharge volume. The first report shall be submitted within nine (9) days of the commencement of discharge. The reports may indicate that analyses of some of the criterion have not been received yet and will be reported in later reports, provided that no criterion shall be reported more than 14 days after completion of sampling for the report.

The county shall submit a final report to the ministry by November 15, 2011, summarizing the results of the effluent sampling program. The report shall also include plans to prevent further discharges from occurring outside the lagoon's discharge window.

Term

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If you have any questions, please feel free to contact Ian Ness-Jack at 519-873-5026.

Yours truly,

Kanina Blanchard
District Manager
London District Office

c. M. Dhalla, MOE – Environmental Assessment and Approvals Branch
Scott Abernethy, MOE – SWR, Tech Support Unit

Public Works
P. O. Box 1614, 21 Reeve St.,, Woodstock Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

March 15, 2012

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Ian Ness-Jack
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Monitoring Report 2011 for Norwich Wastewater Treatment Plant
(Certificate of Approval #1680-6F6QR5)

Attached is the monitoring report for 2011 for the Norwich Wastewater Treatment Plant. This report is prepared as required by the certificate of approval #1680-6F6QR5. I trust this report fulfills the intent of the Certificate of Approval annual reporting requirements.

If there are any questions, please contact me.

Yours Truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, County of Oxford

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager Wastewater Services, Oxford County
Mr. Mark Maxwell, EIT
Project Engineer, Oxford County

Overview of Norwich Wastewater Treatment Plant

The Norwich Wastewater Treatment Plant (WWTP) provided effective wastewater treatment in 2011. The average daily flow for 2011 was 1,199 m^3/d. This represents 78.4% of the design criteria of 1,530 m^3/d.

Figure 1

Plant Description

The Norwich WWTP is a lagoon treatment system serving the community of Norwich, Ontario. The wastewater is pumped from one of two pump stations to a splitter box; then to either of two lagoons as determined by the operator. The lagoons are operated in series with the filtering of the effluent through the sand filter beds performed for a period each day as required. The lagoons may discharge year-round; however, the freezing period prevents discharge through the filter beds (normally December to April).

Plant Specifications

Facilities - Lagoons
Design Capacity - 1530 m^3/day
Average Daily Flow - 1199 m^3/day
Receiving Stream - Otter Creek
Plant Classification - WWT – I
Works Number - 110001480
MOE CofA # 1680-6F6QR5

Effluent Limits:

Effluent Parameters	Concentration in Effluent	
Escherichia Coli	200 organisms / 100 mL (monthly geometric mean density)	
Effluent Parameters	Monthly Concentration	Loading[3]
BOD_5	10mg/L	23.7kg/d
Suspended Solids	10mg/L	23.7kg/d
Total Phosphorus Non-freezing period:	0.5mg/L	1.2kg/d
Freezing period	1.0mg/L	2.4kg/d
(Ammonia + Ammonium) Nitrogen[2] Non-freezing period:	3.0mg/L (5.0mg/L)[1]	11.8kg/d
Freezing period	5.0mg/L (8.0 mg/L)[1]	18.9kg/d
Total Chlorine Residual (when chlorine is in use)	0.002mg/L(0.01mg/L)[1]	0.005kg/d
Dissolved Oxygen	> 4.0 mg/L	

Notes: (1) Values in brackets indicate daily concentration limits.

(2) In addition to the (Ammonia + Ammonium) Nitrogen concentrations noted above, the un-ionized ammonia concentration in the effluent shall not exceed 0.1 mg/L for monthly average values and 0.2 mg/L for any individual sample.

(3) The loading are based on an average daily flow of 2,366 m^3/d over a 236-day discharge period.

The Owner shall maintain the pH of the effluent from the sewage treatment plant within the range of 6.0 to 9.5, inclusive, at all times.

Sampling Description

Influent samples were taken from the Lagoon Influent splitter box using a 24-hour composite sampler set to take a sample every 15 minutes for 24 hours. The sampling frequency is once per week and samples are tested for Biochemical Oxygen Demand (BOD_5), and Suspended Solids (SS) monthly, and Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN) weekly.

Effluent samples are taken using a 24-hour composite sampler set to take a sample every 15 minutes for the duration of the discharge period. BOD_5 and SS are sampled at least monthly. TP, ammonia, TKN, pH, and temperature samples are taken three times per week; E.coli and dissolved oxygen are tested at least weekly.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples except for pH, temperature and dissolved oxygen which are tested in the field during collection. These results are used here for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

Discussion of Results

Calculated in Table A that follows are the average, maximum and minimum values for all influent and effluent parameters. The calculation is based on all external test results and both flow meters.

The average flow was 1,199 m^3/d representing 78.4% of the design criteria of 1,530 m^3/d. The average annual influent BOD_5 concentration to the plant was 178 mg/L. This corresponds to an average BOD_5 loading of 213 kg/d. The average annual Influent SS concentration to the plant was 206 mg/L which corresponds to an average SS loading of 247 kg/d. The annual average TKN concentration was 38 mg/L which corresponds to 46 kg/d. The annual average TP concentration was 4.1 mg/L which corresponds to 4.9 kg/d.

The annual average effluent BOD_5 concentration was 3.5 mg/L. This represents a 98% removal efficiency. The annual average SS concentration was 3.7 mg/L. This represents 98% removal efficiency. The annual average Ammonia concentration was 1 mg/L. The annual average TP concentration was 0.25 mg/L which represents a 93.9 % removal efficiency.

All pH is measured in the effluent by the operator a minimum of three times per week during discharge. There were no samples outside the pH range of 6-9.5 for 2011. All dissolved oxygen readings in the effluent were measured at least weekly by the operator during discharge and no sample was below the required minimum of 4 mg/L.

The average, maximum, and minimum influent and effluent results were calculated and are shown in Table A of Exhibit 1.

Upset Conditions 2011

There were no results outside of the compliance limits for 2011. The Lagoon did not bypass or spill during the reporting period.

Maintenance Activities

Maintenance was completed as needed on the Wastewater Treatment Plant and was initiated by the operator during routine inspection of the system. The system is owned and operated by the Oxford County and is supervised as one of nine plants. The maintenance is completed by the southern area staff. Detailed records on each piece of equipment are kept at the Ingersoll WWTP.

R&R Instrumentation Services did meter calibration on the lagoon effluent meter.

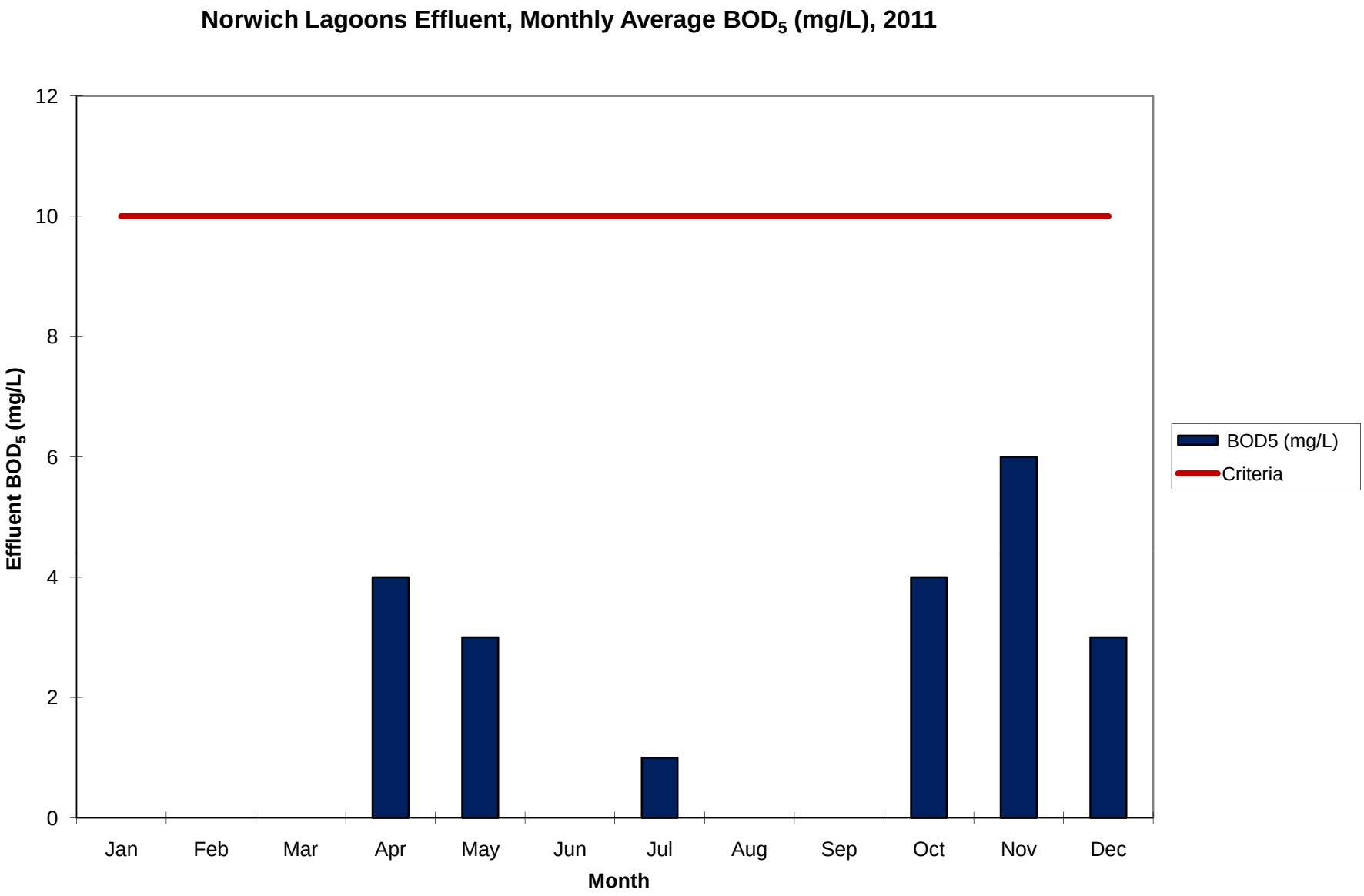
Other Activities 2011

There is a Class Environmental Assessment study underway for the Norwich WWTP to determine the preferred alternative to upgrade the plant to meet the wastewater treatment needs of the community.

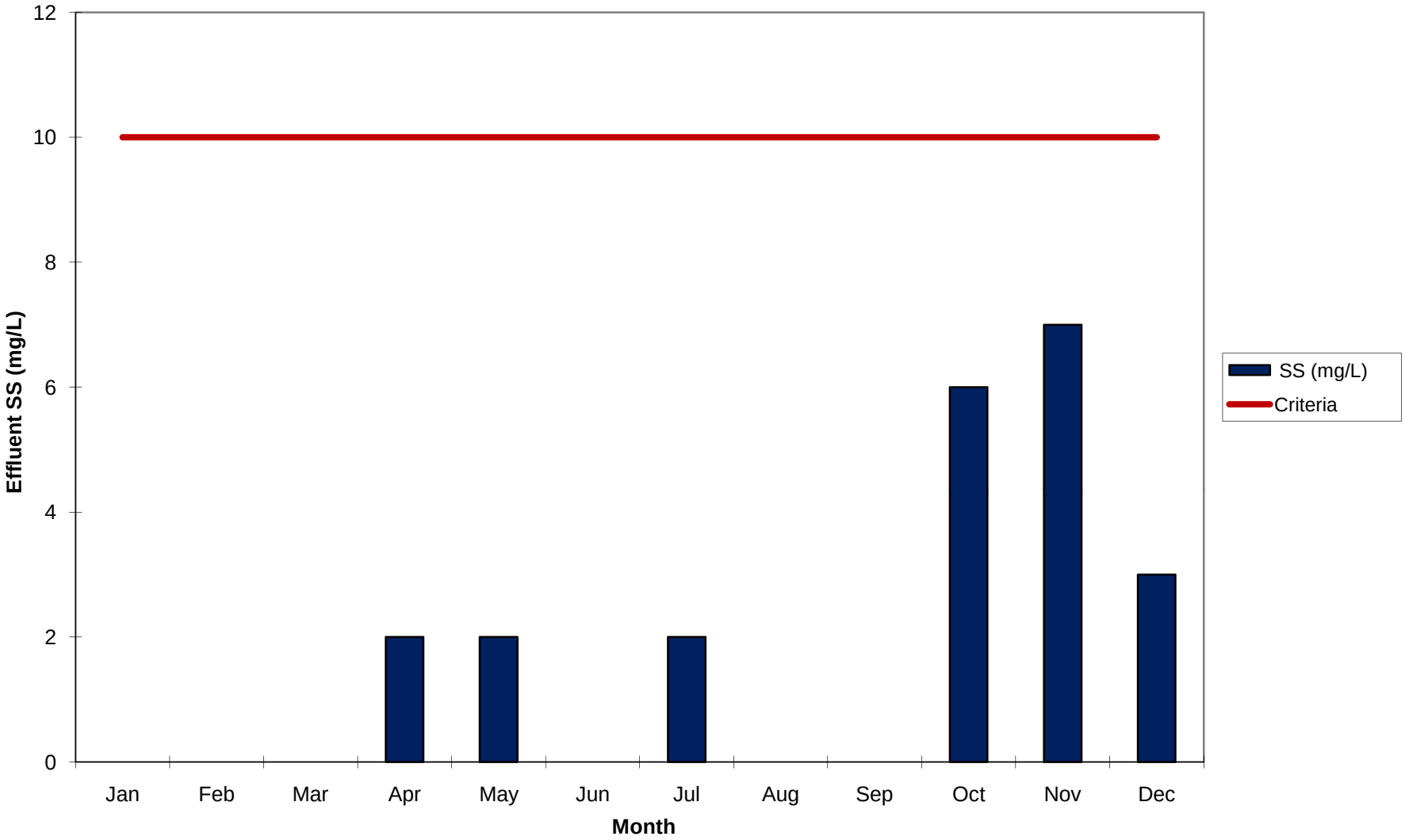
EXHIBIT 1

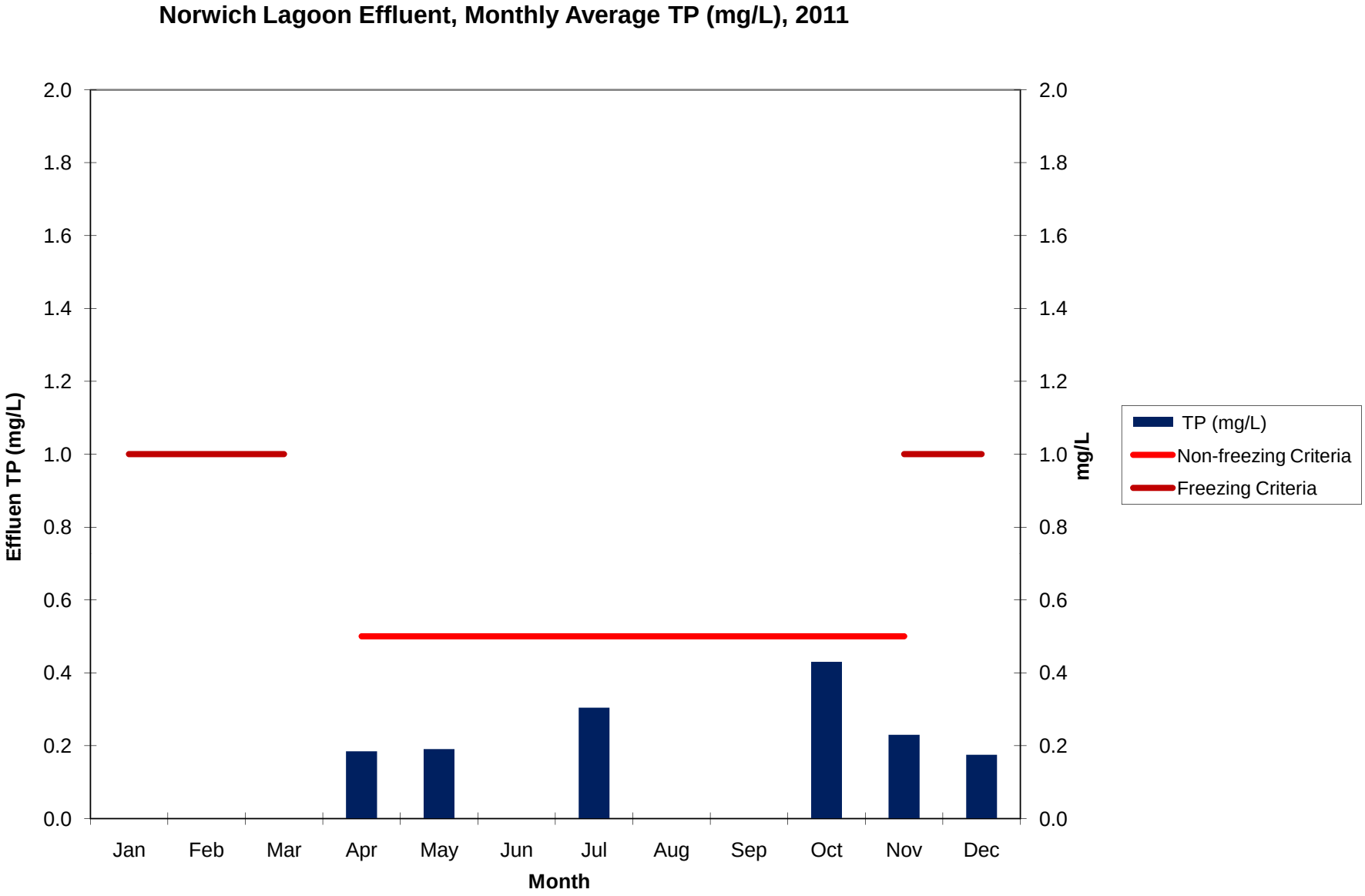
TABLE A	NORWICH LAGOONS			WORKS # 110001480			YEAR 2011										
LAGOON INFLUENT FLOW	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		ANNUAL	DESIGN CRITERIA	CofA Criteria	% Capacity
TOTAL (1000 m3)	27.850	26.690	70.117	54.454	46.548	31.840	21.027	20.561	21.872	30.841	34.055	49.945	TOTAL	435.800			
AVERAGE DAILY FLOW (1000 m3/d)	0.898	0.989	2.262	1.815	1.552	1.061	0.678	0.663	0.729	0.995	1.135	1.611	AVERAGE DAILY FLOW	1.199		1.53	78.4%
MAX. DAILY FLOW (1000 m3/d)	1.682	2.943	6.197	3.853	3.766	1.971	0.902	1.024	1.158	1.760	5.774	3.153	MAX. DAILY FLOW	6.197			
MIN. DAILY FLOW (1000 m3/d)	0.6	0.5	1.1	1.0	0.6	0.6	0.4	0.5	0.5	0.406	0.532	0.941	MIN. DAILY FLOW	0.406			
LAGOON INFLUENT RESULTS														ANNUAL AVERAGE		ANNUAL MAXIMUM	ANNUAL MINIMUM
BOD (mg/L)	116	282	116	111	141	140	158	156	302	286	188	142		178		302	111
SS (mg/L)	72	154	128	114	144	163	258	244	336	240	244	376		206		376	72
AMMONIA (mg/L)																	
TKN (mg/L)	46.25	38.23	24.14	29.10	29.40	41.02	40.20	37.64	55.03	49.85	34.90	33.45		38		55.0	24.1
NITRITE (mg/L)																	
NITRATE (mg/L)																	
TOTAL P. (mg/L)	4.73	4.04	2.63	3.00	3.26	4.72	4.16	4.31	6.35	5.77	3.32	3.50		4.1		6.3	2.6
pH	7.42	6.91	7.12	7.38	7.33	7.40	7.41	7.13	7.62	7.97	7.79	7.32		7.40		7.97	6.91

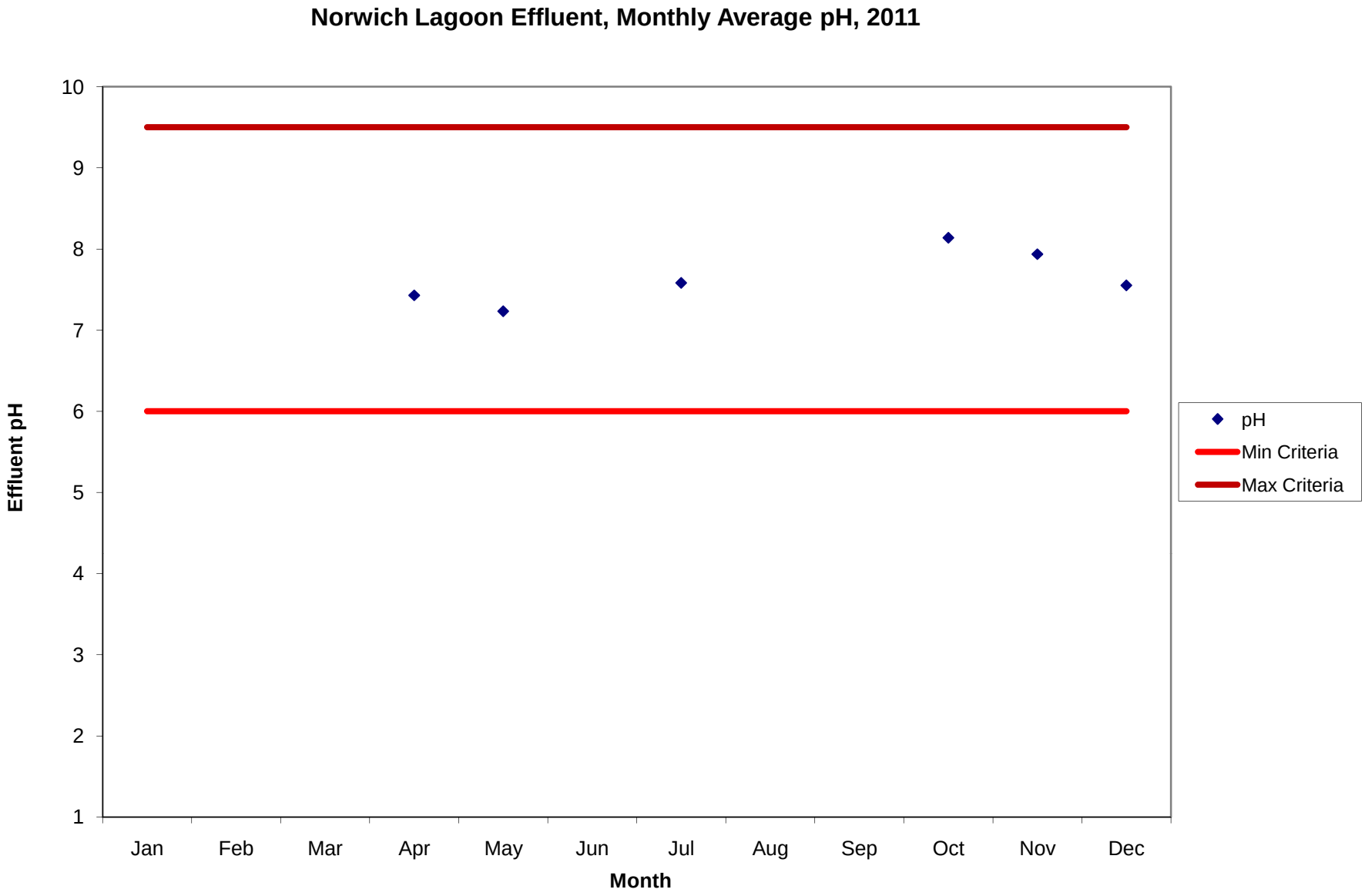
LAGOON EFFLUENT FLOW													TOTAL ANNUAL FLOW	Monthly AVERAGE	DESIGN CRITERIA	CofA Criteria	CofA 236 day
TOTAL (1000 m3)				55.0	72.8		27.7			8.906	51.430	26.914	242.744	40.457			
AVERAGE DAILY FLOW (1000 m3/d)				2.201	2.427		1.627			1.781	2.143	3.845		2.337			
MAX. DAILY FLOW (1000 m3/d)				3.031	4.609		3.030			2.277	3.294	4.864		3.518			
MIN. DAILY FLOW (1000 m3/d)				1.3	0.6		0.1			0.323	0.719	0.655		0.636			
LAGOON EFFLUENT RESULTS														Monthly AVERAGE	DISCHARGE CRITERIA	ANNUAL MAXIMUM	ANNUAL MINIMUM
$BOD_{5\ (mg/L)}$				4.0	3		1.0			4	6	3		3.5	10	6	1.0
SS (mg/L)				2.0	2		2.0			6	7	3		3.7	10	7.0	2
AMMONIA (mg/L)				4.14	1.37		0.06			0.13	0.11	0.19		1.0	3.0 non freezing	4.1	0.06
TKN (mg/L)															& 5.0 freezing		
NITRITE (mg/L)																	
NITRATE (mg/L)																	
TP (mg/L)				0.19	0.19		0.30			0.43	0.23	0.18		0.25	0.5 non freezing	0.43	0.18
															& 1.0 freezing		
pH				7.43	7.23		7.58			8.14	7.94	7.55		7.65	6.00-9.00	8.14	7.23
E. Coli (#/100ml)				36	94		31			1	2	1		28	200	94	1
Temp. Celcius				8	14		24			7	7	4		10.9		23.9	4.5
D.O. (mg/L)				10.3	5.7		4.6			12.4	11.5	12.4		9.5	(4.0)	12.4	4.6

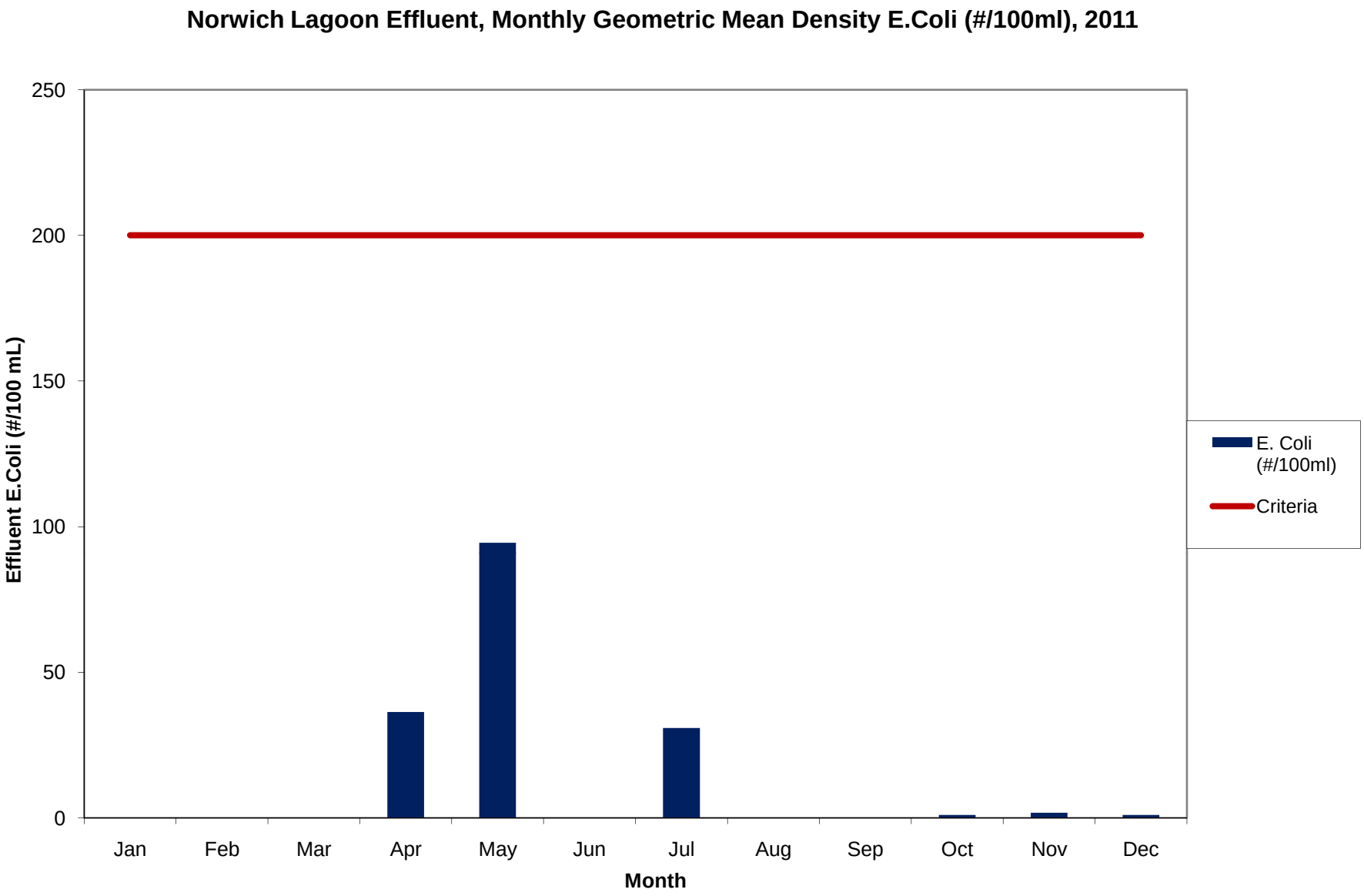

Norwich Lagoons Effluent, Monthly Average BOD5 (mg/L), 2011
Effluent BOD5 (mg/L)
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
BOD5 (mg/L)
Criteria

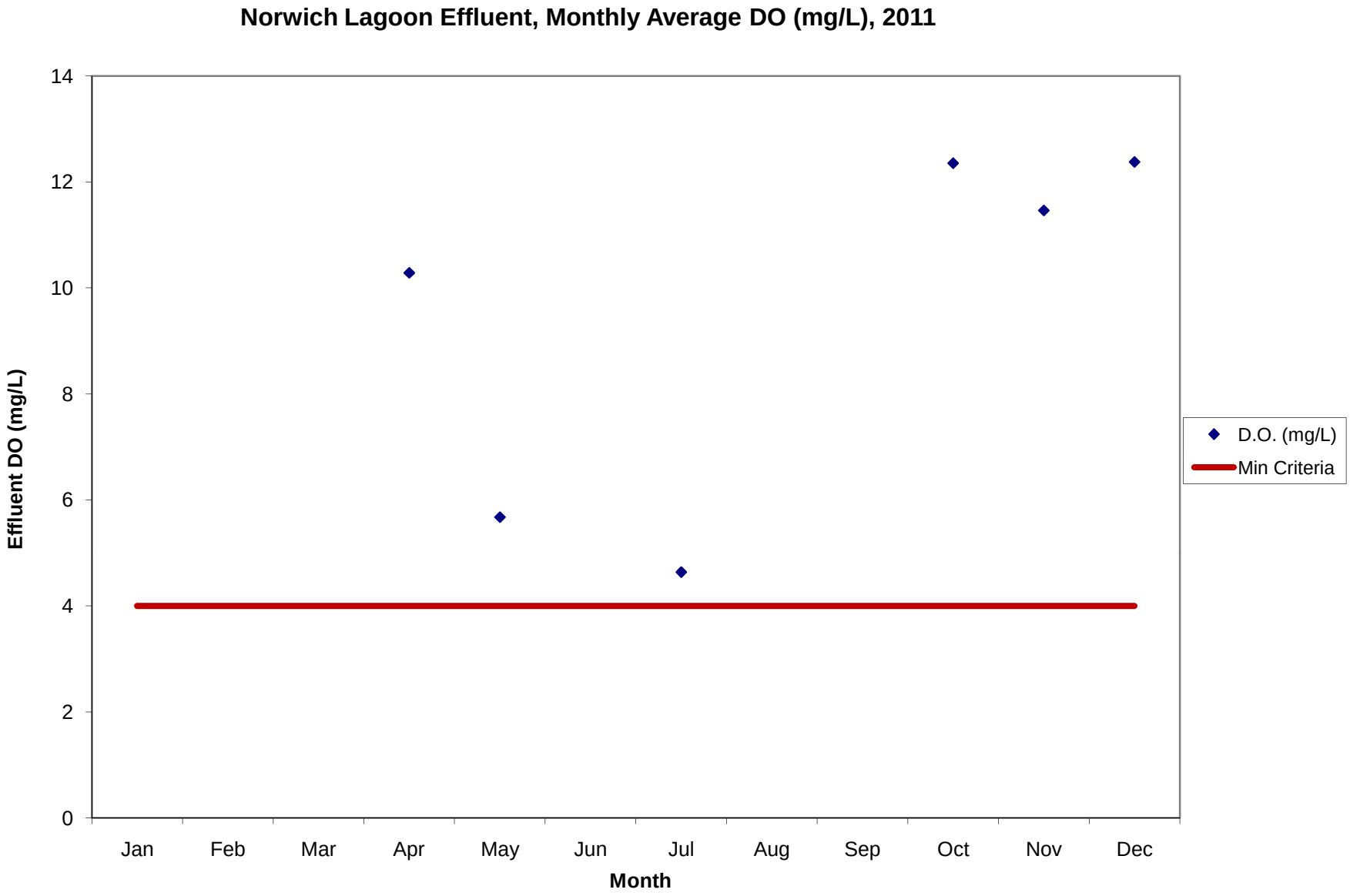
Norwich Lagoons Effluent, Monthly Average SS (mg/L), 2011



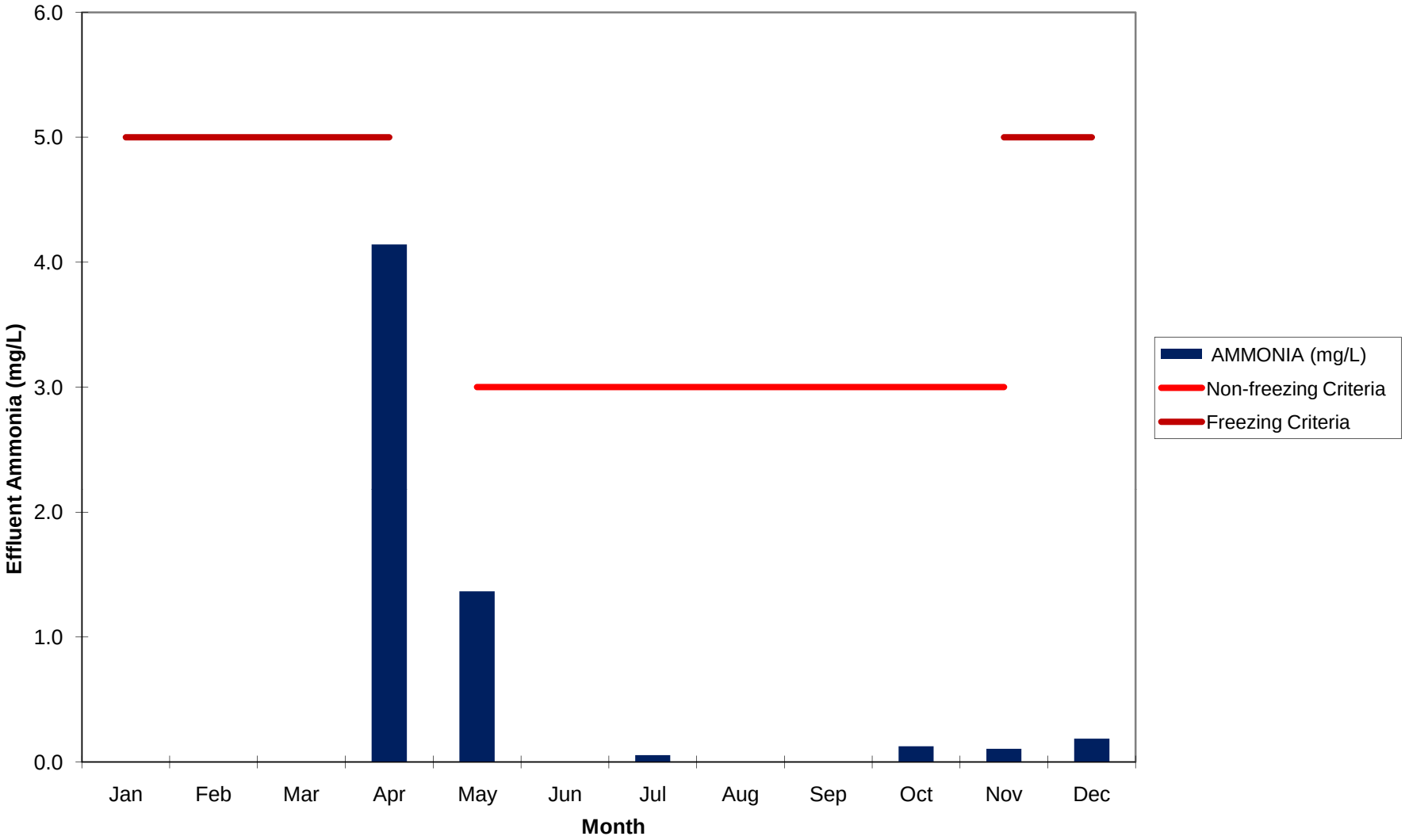

Norwich Lagoon Effluent, Monthly Average TP (mg/L), 2011
Effluen TP (mg/L)
mg/L
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TP (mg/L)
Non-freezing Criteria
Freezing Criteria

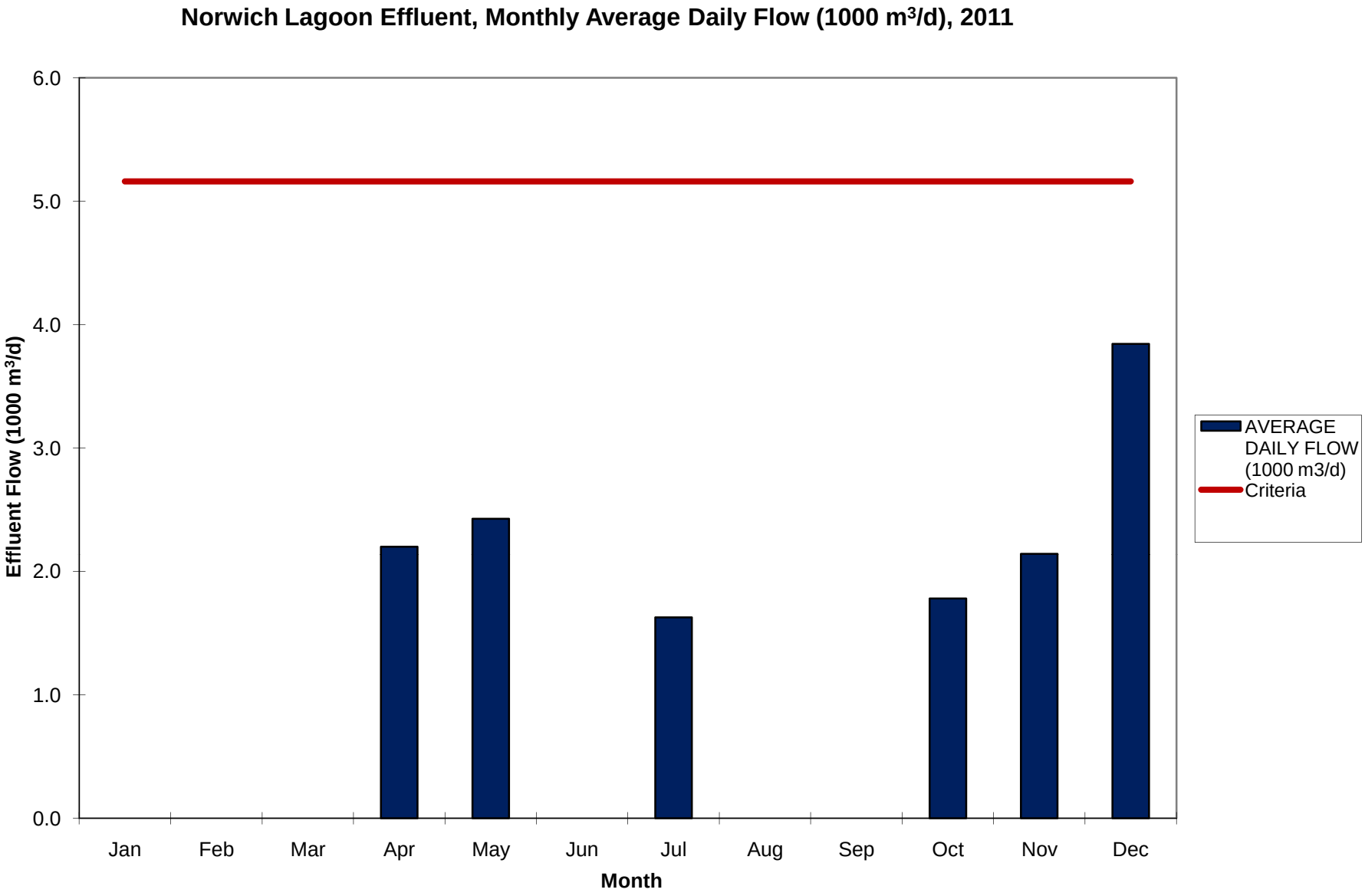

Norwich Lagoon Effluent, Monthly Average pH, 2011
Effluent pH
10
9
8
7
6
5
4
3
2
1
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
pH
Min Criteria
Max Criteria

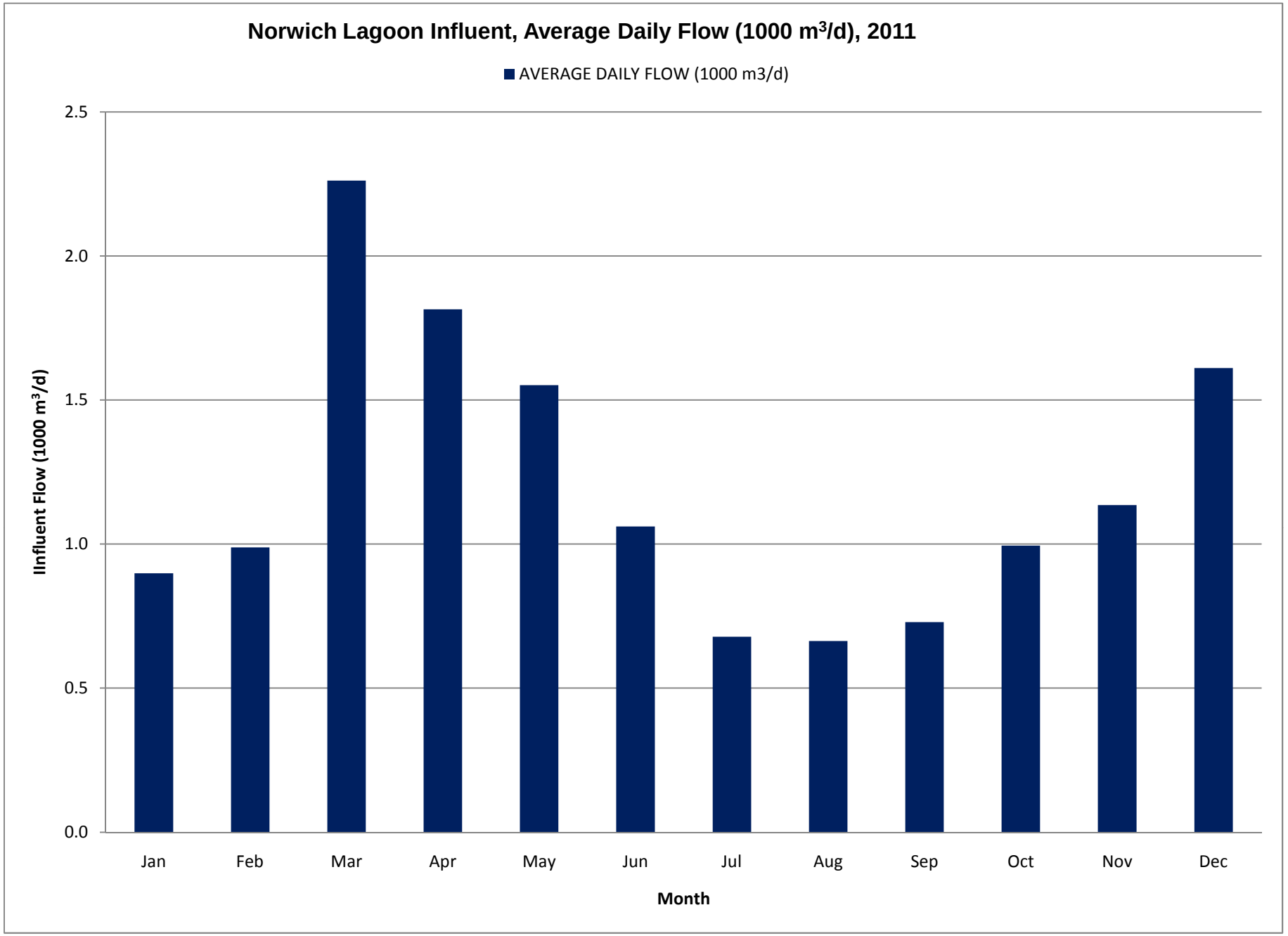

Norwich Lagoon Effluent, Monthly Geometric Mean Density E.Coli (#/100ml), 2011
250
200
150
100
50
0
Effluent E.Coli (#/100 mL)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
E. Coli (#/100ml)
Criteria


Norwich Lagoon Effluent, Monthly Average DO (mg/L), 2011
Effluent DO (mg/L)
14
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
D.O. (mg/L)
Min Criteria

Norwich Lagoon Effluent, Monthly Average Ammonia (mg/L), 2011




Norwich Lagoon Effluent, Monthly Average Daily Flow (1000 m3/d), 2011
Effluent Flow (1000 m3/d)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
AVERAGE DAILY FLOW (1000 m3/d)
Criteria


Norwich Lagoon Influent, Average Daily Flow (1000 m3/d), 2011
AVERAGE DAILY FLOW (1000 m3/d)
2.5
2.0
1.5
1.0
0.5
0.0
Influent Flow (1000 m3/d)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

Public Works
P. O. Box 1614, 21 Reeve St.,, Woodstock Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

March 15, 2012

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Ian Ness-Jack
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Report for Plattsville Lagoons 2011
(CofA # 3133-7QWH4N)

This year-end report is prepared as required under CofA # 3133-7QWH4N.

I trust this report fulfills the intent of the Certificate of Approval annual reporting requirements. If there are any questions, please contact me.

Yours Truly,

Don Ford BA, CMM II, C. Tech.
Wastewater Supervisor, County of Oxford

C.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager Wastewater Services, Oxford County
Mr. Mark Maxwell, EIT
Project Engineer, Oxford County

Overview

The Plattsville Lagoon System provided effective wastewater treatment in 2011 and all effluent concentration limits as specified by MOE CofA # 3133-7QWH4N were met on an annual basis. The annual average daily flow rate was 506 m^3/d; this represents 63% of the WWTP rated capacity of 800 m^3/d.

Figure 1

Plant Description

Wastewater is collected and treated at the Plattsville Wastewater Treatment Plant (WWTP), which includes two aerated lagoon cells and two conventional wastewater stabilization ponds. Phosphorus removal is accomplished through batch dosing of Aluminum Sulphate. It then enters a filter system designed for ammonia removal prior to discharge to the Nith River.

Oxford County operates the facility, utilizing the staff located at the Woodstock WWTP.

Plant Specifications

Facilities - Lagoons
Design Capacity - 800 m^3/day
Average Daily Flow - 506 m^3/day
Receiving Stream - Nith River
Plant Classification - WWT – I
Works Number - 110003022
MOE CofA # 3133 7QWH4N
Effluent Limits:

Monthly Average $CBOD_5$	10 mg/L
Monthly Average Suspended Solids	10 mg/L
Monthly Average Total Phosphorous	0.5 mg/L
Monthly Average Ammonia when Nith > 12 degrees Celsius	2 mg/L
Monthly Average Ammonia when Nith < 12 degrees Celsius	5 mg/L

E.Coli geometric mean 200 colonies per 100 ml

Effluent is discharged according to a discharge table (Table 3) within the Certificate of Approval.

Sampling Procedures

Sampling is done on a monthly basis of the raw influent wastewater and analyzed for BOD_5, TSS, TKN, TP and pH. Effluent discharge samples are gathered bi-weekly or monthly and at an interval to meet the percentage of draw down of the lagoon cell as stipulated in the CofA during discharge periods and analyzed for $CBOD_5$, TSS, Total Ammonia Nitrogen, TP, E. Coli, temperature and pH.

Groundwater monitoring requires an annual sample be collected and tested for Total Organic Carbon, Total Phosphorus, Total Kjeldahl Nitrogen, Nitrite and Nitrate. Two samples were collected at two locations referred to as shallow well and deep well. The results are included in an attached Table under Exhibit 2.

Flows

The total flow treated in 2011 was 184,790 m^3. The average daily flow of 506 m^3/day was 63% of the design capacity of 800 m^3/day.

Plant effluent can be discharged in accordance with Table 3 - Monthly Discharge Regime contained in the Certificate of Approval (CofA). The total annual discharge for 2011 was 205,522 m^3/d.

Raw Sewage Quality

The annual average raw sewage BOD_5 concentration to the plant was 163 mg/L. This corresponds to an average BOD_5 loading of 82 kg/day. The average suspended solids loading was 196 mg/L equivalent to 99 kg/day loading. The annual raw sewage nitrogen levels (as TKN) were 40 mg/L. Phosphorous levels averaged 4.7 mg/L, which correspond to 2.4 kg/day.

Plant Performance & Effluent Quality

Detailed analytical data of annual and monthly averages are summarized later in the report under Exhibit 1.

Over the reporting period, the annual average effluent $CBOD_5$ concentration was 2.1 mg/L with a removal efficiency of 98.7%. The annual suspended solids concentration was 2.9 mg/L with a removal efficiency of 98.5%. The annual average ammonia nitrogen concentration was 0.33 mg/L with a removal efficiency of 99%. The annual total phosphorous level was 0.05 mg/L, which represents a removal efficiency of 98.9%.

For compliance purposes, annual average concentrations are based only on data from the effluent discharge period, while raw sewage flows for the entire year are used to assess loading and hydraulic capacity.

Bypassing and Abnormal Conditions

There was no bypass to the Nith River of the treatment system at the Plattsville Lagoons in 2011.

There were, however, three force main breaks during the year. Two occurred in May and one in June 2011. These were reported immediately to the MOE, repaired, and the areas involved were cleaned up.

Maintenance Activities

Regularly scheduled maintenance of the plant equipment including surface aerators is conducted by the operating and maintenance staff of the Woodstock WWTP. Detailed maintenance records are kept on file at the Woodstock WWTP.

Summary and Recommendations

The newly constructed wastewater treatment works performed well during 2011.

EXHIBIT 1

Municipality: Plattsville
PROJECT:Plattsville Lagoons
Operator: County of Oxford
Works Number:
110003022

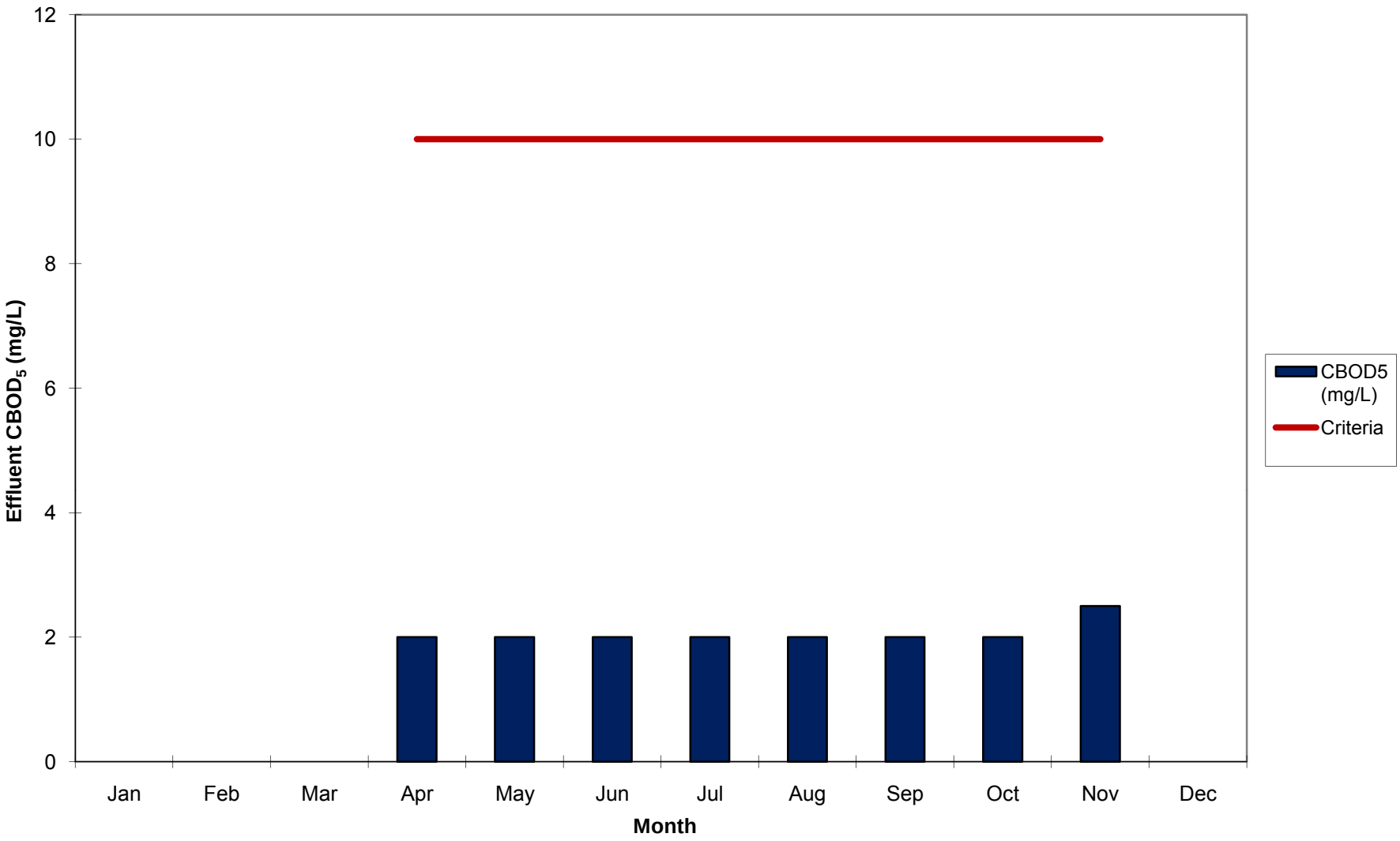
2011

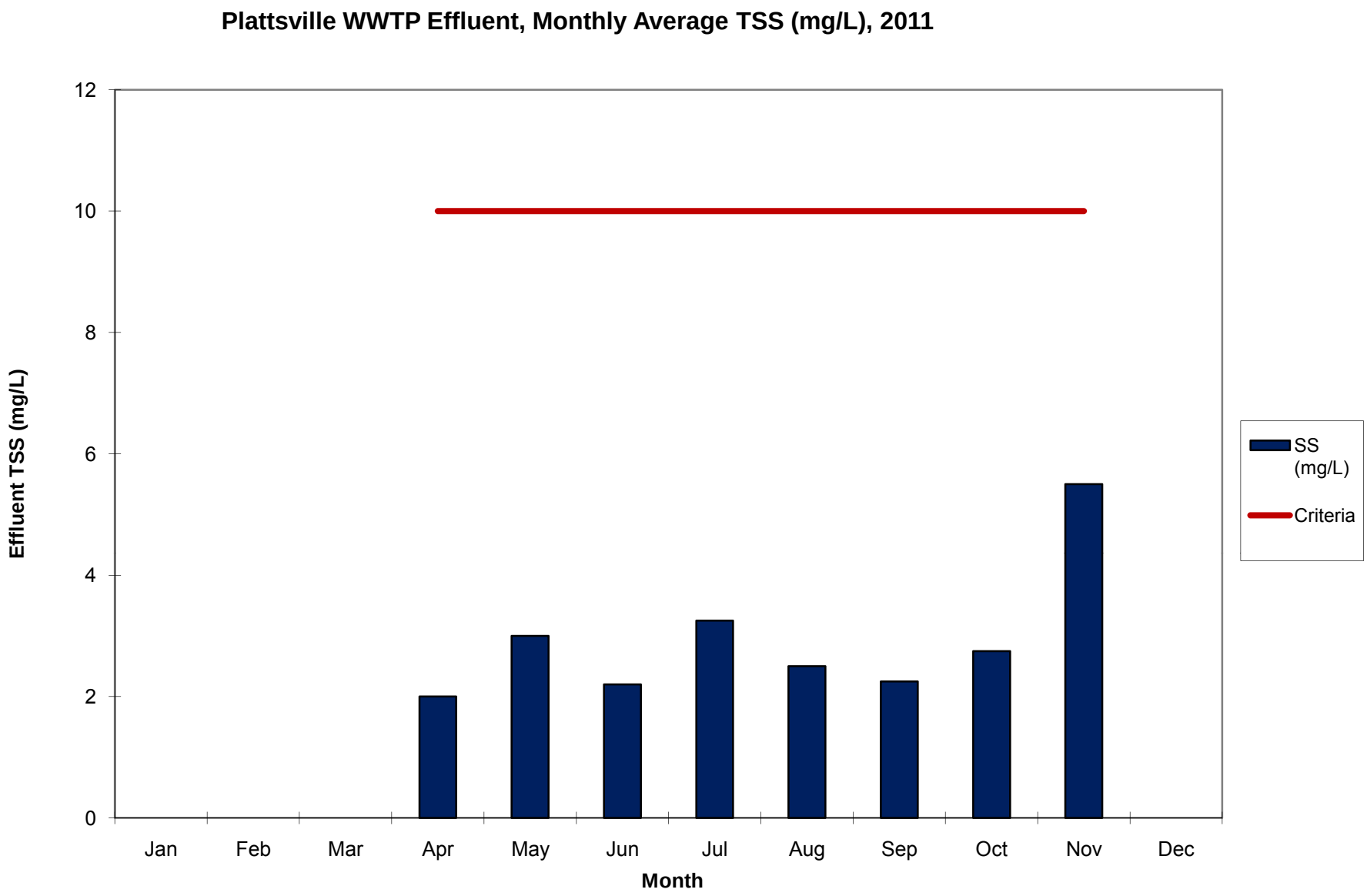
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average	Min	Max	Total	
Influent																	
Total Flow (1000m^3)	14.579	12.956	19.494	17.449	17.62	14.455	13.38	13.378	13.98	14.966	14.999	17.534				184.790	Criteria
Flow (1000m^3/d)	0.470	0.463	0.629	0.5816	0.568	0.48183	0.4316	0.4315	0.466	0.4828	0.500	0.566	0.506	0.432	0.629		0.8
Max Flow (1000m^3/d)	0.6	0.586	0.844	0.698	0.701	0.565	0.665	0.495	0.552	0.593	0.76	0.725	0.649	0.495	0.844		2.98
Min Flow (1000m3/d)	0.347	0.2	0.442	0.467	0.432	0.39	0.322	0.302	0.399	0.412	0.364	0.421	0.375	0.200	0.467		
Influent																	
BOD_5 (mg/L)	57	182	146	79	109	116	142	145	224	173	452	126	163	57	452		
SS (mg/L)	68	550	178	96	182	161	206	190	210	205	163	142	196	68	550		
AMMONIA (mg/L)	17.1	44.0	33.7	22.7	35.7	40.2	27.4	36.1	30.8	47.0	38.0	29.9	33.6	17.1	47.0		
TKN (mg/L)	19.0	49.1	34.2	25.9	38.2	43.6	37.2	54.0	48.3	44.25	51.1	34.5	39.9	19.0	54.0		
NITRITE (mg/L)	0.07	0.06	0.06	0.11	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.06	0.11		
NITRATE (mg/L)	1.16	0.05	0.11	1.45	0.050	0.05	1.27	0.05	0.05	0.05	0.05	0.05	0.37	0.05	1.45		
TP (mg/L)	1.9	6.8	4.8	3.0	4.94	4.3	5.6	4.9	6.4	5.1	6.3	2.3	4.7	1.9	6.8		
Temp	8.5	7.5	8.0	6.0	13.300	17.1	19.5	21.7	19.6	16.5	15.4	11.8	13.73	6.00	21.75		
pH	7.85	8.03	7.52	7.96	8.01	8.01	8.11	8.43	8.07	7.89	8.29	8.25	8.03	7.52	8.43		
Effluent																	
Total Flow (1000m3)				51.241	39.253	33.687	8.3	2.068	18.265	28.814	23.913					205.522	
Flow (1000m3/d)				2.562	1.266	1.123	0.267	0.067	0.609	0.929	1.407		1.029	0.067	2.562		
Criteria (1000m3/d)	0.0	0.0	0.0	2.920	2.170	1.447	0.727	0.727	0.727	0.964	1.472	0.0					

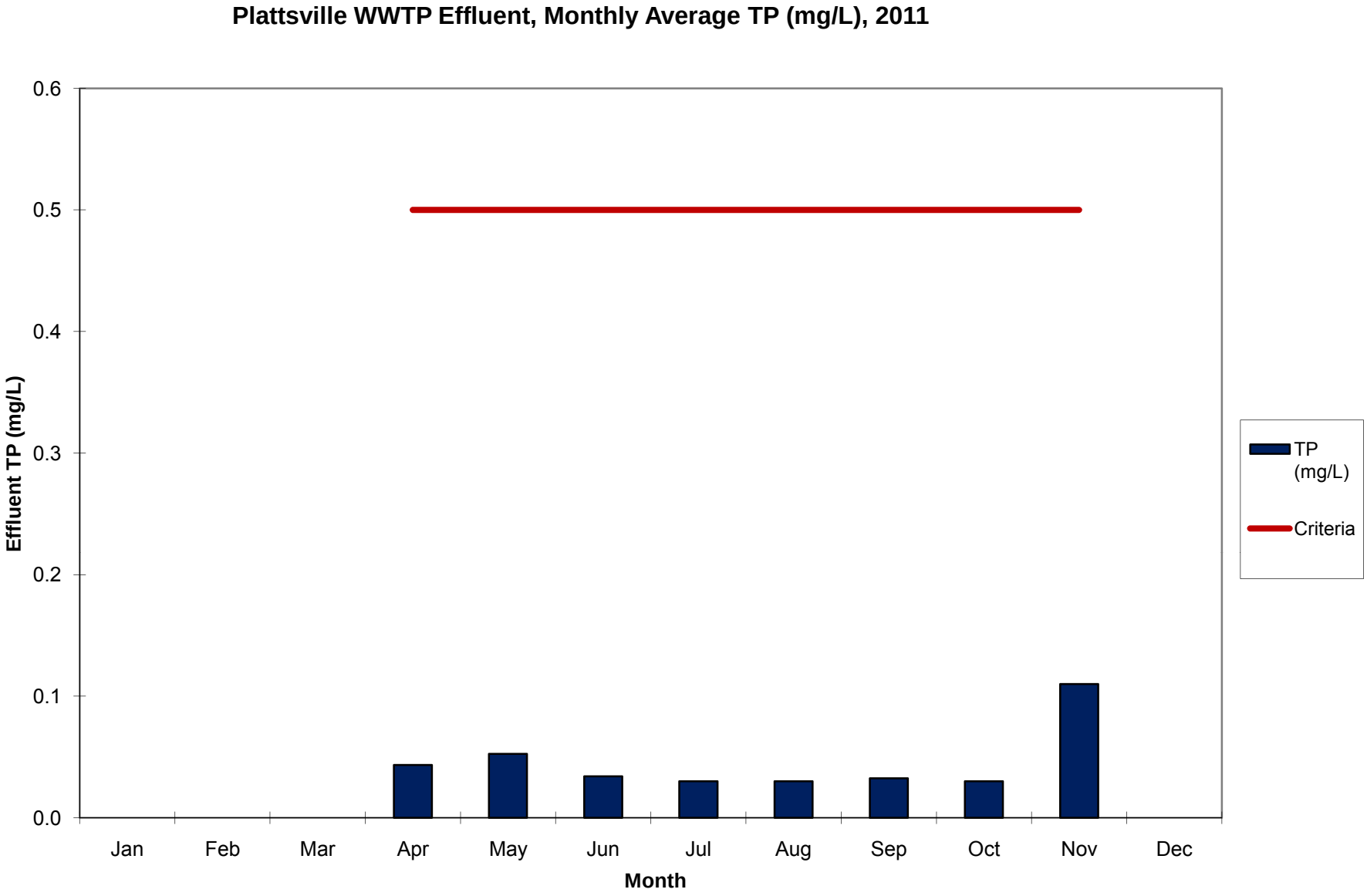
Plant Effluent													Annual Average	Min.	Max.	Compliance Criteria	
$CBOD_5$ (mg/L)				2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.5		2.1	2.0	2.5	Average*	≤ 10
SS (mg/L)				2	3.00	2.2	3.3	2.50	2.3	2.8	5.50		2.9	2.0	5.5	Average**	≤ 10
Ammonia (mg/L)				1.80	0.13	0.10	0.10	0.10	0.18	0.10	0.18		0.33	0.10	1.80	Average[1]	2 / 5
TKN (mg/L)				2.13	0.6	0.5	0.7	0.6	0.8	0.5	0.50		0.78	0.50	2.13		
NITRITE (mg/L)				0.07	0.06	0.1	0.1	0.1	0.06	0.06	0.1		0.06	0.06	0.07		
NITRATE (mg/L)				3.42	3.1	2.8	2.3	3.9	1.5	0.3	0.4		2.22	0.33	3.88		
TP (mg/L)				0.04	0.05	0.03	0.03	0.03	0.03	0.03	0.11		0.05	0.03	0.11	Average***	≤ 0.5
pH				7.90	7.80	7.60	7.86	8.04	7.76	7.92	7.94		7.85	7.60	8.04		
E. Coli (#/100ml)				2	2.0	2	2.0	3.5	56	10	2		4	2	56	Geomean	200
Temp. Celcius				9.0	13.4	19.7	23.2	22.8	18.4	12.3	10.7		16.2	9.00	23.2		
D.O. (mg/L)				10.47	10	8.50	8.28	8	8.9	10.356	11		9.5	8.28	11.3		

Influent Loadings **Month**	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average	Min	Max		Criteria
BOD5 kg/d	26.807	84.214	92	45.949	61.954	55.893	61.289	62.575	104.384	83.279	225.985	71.267	82	46	226		
TSS kg/d	31.980	254.493	112	55.84	103.446	77.575	88.912	81.99	97.860	98.727	81.495	80.317	99	56	112		
Effluent Loadings																	
CBOD5 kg/d				5	3	2	1	0	1	2	4		2	0	5		
TSS kg/d				5	4	2	1	0	1	3	8		3	0	8		
TP kg/d				0.111	0.066	0.038	0.008	0.002	0.020	0.028	0.155		0.054	0.002	0.155		
Total Ammonia kg/d				4.612	0.158	0.112	0.027	0.007	0.107	0.093	0.246		0.670	0.007	4.612		
Criteria																	
CBOD5 Criteria kg/d	0	0	0	29	22	14	7	7	7	10	15	0					
TSS Criteria kg/d	0	0	0	29	22	14	7	7	7	10	15	0					
TP Criteria kg/d	0	0	0	1.46	1.09	0.72	0.36	0.36	0.36	0.48	0.74	0					
Total Ammonia Criteria kg/d	0	0	0	15	4	3	1	1	1	2	3	0					

* MOE Criteria: CBOD5 Monthly Average not to exceed 10 mg/L
** MOE Criteria: TSS Monthly Average not to exceed 10 mg/L
[1] MOE Criteria: Ammonia Monthly Average changes when stream is > 12 or < 12 degrees celcius respectively
*** MOE Criteria: TP Monthly Average not to exceed 0.50 mg/L


Plattsville WWTP Effluent, Monthly Average CBOD5 (mg/L), 2011
Effluent CBOD5 (mg/L)
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (mg/L)
Criteria


Plattsville WWTP Effluent, Monthly Average TSS (mg/L), 2011
Effluent TSS (mg/L)
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
SS (mg/L)
Criteria


Plattsville WWTP Effluent, Monthly Average TP (mg/L), 2011
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Effluent TP (mg/L)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
TP (mg/L)
Criteria

Plattsville WWTP Effluent, Monthly Average Ammonia Discharge (mg/L), 2011

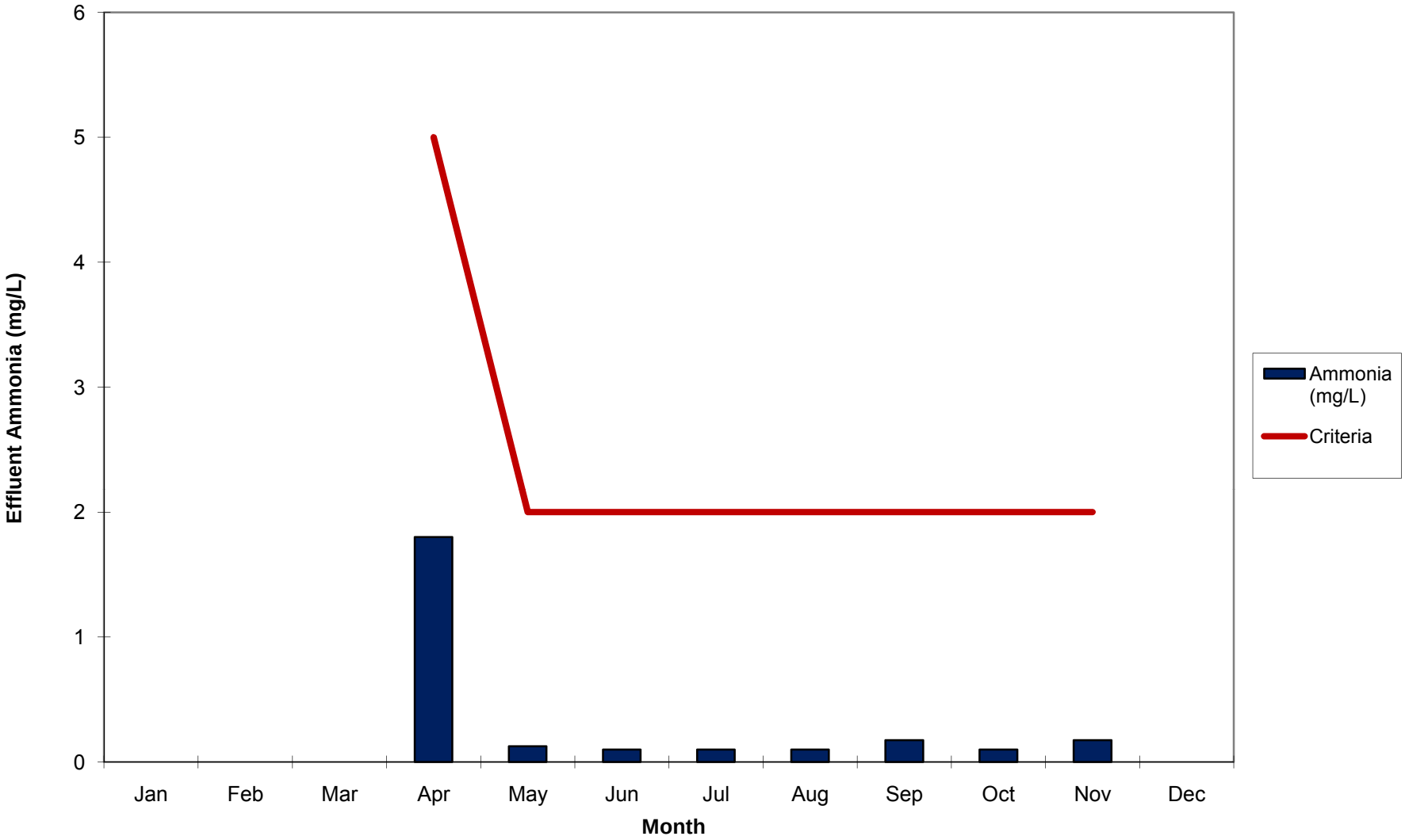


EXHIBIT 2

Plattsville Wastewater Treatment Facility
Monitoring Well Chemistry (Lab Analyses)*

Parameter	15-Mar-11 Shallow	29-Mar-11 Shallow	2011 Average Shallow
TOC (mg/L)	2.2	1	1.6
Total P (mg/L)	0.03	0.03	0.03
TKN (mg/L N)	0.5	0.5	0.5
Ammonia/ium (mg/L)	0.1	0.1	0.1
Nitrite (mg/L)	0.06	0.06	0.06
Nitrate (mg/L)	0.26	0.24	0.25
Nitrate + Nitrite (mg/L N)	0.26	0.24	0.25
Chloride (mg/L)	4.4	4	4.2
	Deep	**Deep**	**Deep**
TOC (mg/L)	1.6	1.1	1.35
Total P (mg/L)	0.03	0.2	0.115
TKN (mg/L N)	0.5	0.5	0.5
Ammonia/ium (mg/L)	0.1	0.1	0.1
Nitrite (mg/L)	0.06	0.06	0.06
Nitrate (mg/L)	0.05	0.06	0.055
Nitrate + Nitrite (mg/L N)	0.06	0.06	0.06
Chloride (mg/L)	17	17	17

*Results less than MDL are listed as MDL

Public Works
P. O. Box 1614, 21 Reeve St.,, Woodstock Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

March 15, 2012

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Ian Ness-Jack
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Report Drumbo SBR 2011
(Certificate of Approval #3-2191-90-916)

This year-end report is prepared as required by the Certificate of Approval #3-2191-90-916.

I trust this report fulfills the intent of the Certificate of Approval reporting requirements. If there are any questions, please contact me.

Yours Truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, County of Oxford

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager Wastewater Services, Oxford County
Mr. Mark Maxwell, EIT,
Project Engineer, Oxford County

Overview

The Drumbo Wastewater Treatment Plant (WWTP) is a Sequencing Batch Reactor (SBR) that provided effective wastewater treatment in 2011 with an average flow for the plant of 282 m^3/d which represents 104% of the design capacity of 272 m^3/d. The total flow in 2011 was 103,004 m^3.

Plant Description

The Drumbo WWTP began operation in its present configuration in 1992. The facility is an SBR plant consisting of two alternating reactors, pressure filters and ultra-violet radiation for disinfection, with an outfall pipe to the Cowan Drain. The facility adds aluminum sulphate into the reactors for phosphorus control.
Oxford County operates the facility, utilizing the staff located at the Woodstock WWTP.

Plant Specifications

Facility - Sequencing Batch Reactor
Design Capacity - 272 m^3 / day
Peak Capacity - 774 m^3 / day
Average Daily Flow - 282 m^3 / day
Receiving Area - Cowan Drain
Classification - WWT – II
Certificate(s) of Approval 3-2191-90-916
8-1158-92-006

Effluent Criteria:	Ave. Monthly Concentration	Average Loading
BOD_5 (Period A)	10 mg/L	2.8 kg/day
BOD_5 (Period B)	15 mg/L	4.0 kg/day
Suspended Solids (Period A)	10 mg/L	2.8 kg/day
Suspended Solids (Period B)	15 mg/L	4.0 kg/day
Total Phosphorus (Period A)	0.5 mg/L	0.14 kg/day
Total Phosphorus (Period B)	1.0 mg/L	0.27 kg/day
Total Ammonia (Period A)	3.0 mg/L	0.8 kg/day
Total Ammonia (Period B)	5.0 mg/L	1.36 kg/day
Total Chlorine Residual	0.01 mg/L	

Note:

Period A refers to the time that the receiving stream temperature exceeds 5^{o} C.

Period B refers to the time that the receiving stream temperature is less than or equal to 5^{o} C.

The geometric mean density of E.Coli in the effluent shall not exceed 200 per 100 ml for any calendar month.

The average monthly concentration of dissolved oxygen in the effluent shall not be less than 5.0 mg/L.

Sampling Procedure

Influent samples are taken using a 24-hour composite sampler on a bi-weekly basis from the transfer tank; this tank receives flow from the trash tank, which holds most of the daily flow.

Effluent samples are taken bi-weekly using a 24-hour composite sampler installed so as to sample during periods of flow from either of two reactors. Samples are taken on site and tested for pH, chlorine residual, dissolved oxygen, and temperature.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, D.O., chlorine residual, and temperature.

Flows

The total flow treated in 2011 was 103,004 m^3. The daily average flow was 282 m^3/day which represents 104 % of the design flow for Drumbo of 272 m^3 /day.

Raw Sewage Quality

The annual average raw sewage BOD_5 concentration to the plant was 162 mg/L; equivalent to a loading of 46 kg/day. The average suspended solids concentration was 279 mg/L; equivalent to 79 kg/day of loading. Average nitrogen levels, as TKN, were 37 mg/L; equivalent to a loading of 10 kg/day. Total phosphorus was 10 mg/L, which represents a loading of 3 kg/day.

Plant Performance & Effluent

Detailed analytical data of annual and monthly averages are summarized later in this report in Exhibit 1.

Over the reporting period, the annual average effluent BOD_5 concentration was 4.3 mg/L or an equivalent reduction of 97.3%. The suspended solids average was 4.9 mg/L, which represents a 98.2 % reduction. Ammonia averaged 0.7 mg/L (a 97.2 % reduction); total effluent phosphorus average concentration was 0.14 mg/L; a 98.6 % reduction.

Bypassing, Upset and Abnormal Conditions

There were no spills from the Drumbo SBR in 2011.

There was a spill from the Drumbo collection system on April 28th due to a power failure at the main lift station that resulted in a volume of 20.4 m^3 overflowing to the storm retention pond, in South Drumbo. The incident was reported to the MOE spills action center at the time of the event.

There was also a spill by a contractor in a new subdivision on July 12th, 2011 that knocked the cap off the north forcemain an estimated 2-3 m^3 was spilt. The spill was contained and cleaned up and the pipe repaired.

Maintenance

The operating and maintenance staff from the Woodstock WWTP conducts regular scheduled maintenance of the plant equipment. Detailed maintenance records for each piece of equipment are kept at the Woodstock Plant.

Summary and Recommendations

The Drumbo Wastewater Treatment Plant was operating within its design and discharge criteria for 2011, with the exception of the annual average flow exceeding the design capacity. A class EA is being initiated in 2012 to address the capacity issues at the Drumbo WWTP.

BIOSOLIDS REPORT 2011

Discussion:

The biosolids are a combination of waste activated sludge and primary sludge which is drawn from the Trash tank which is the first tank the raw wastewater enters before siphoning into the transfer tank that loads the reactors. The tank is designed to allow the settling and collection of solids for removal by truck.

The removal is accomplished by the Oxford County sewage truck with a useful volume of approximately 13 m^3 (2,800 Igal) as permitted under an MOE Waste Management System certificate number A800939 or is accomplished by a contracted certified waste hauler as needed.

The biosolids are then transported to the Woodstock WWTP for final disposal.

The total volume of Biosolids from the Drumbo WWTP in 2011 was 1,361 m^3. Below are the monthly volumes of Biosolids transported to the Woodstock WWTP in 2011.

SUMMARY OF ALL BISOLIDS REMOVAL

DATE	BIOSOLIDS QUANTITY(m^3)
January	153
February	114
March	153
April	76
May	102
June	165
July	89
August	89
September	102
October	127
November	102
December	89
2011 Total	1361

Exhibit 1

DRUMBO RAW INFLUENT 2011

Month		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Ave.	Criteria
Volume	(m3)	7177	7124	11549	10417	10102	7703	6730	7045	7413	8607	8313	10824	**103,004**	**8584**	
Monthly Average Daily Flow	(m3/d)	232	254	373	347	326	257	217	227	247	278	277	349		**282**	**272**
Min	(m3/d)	206	186	295	271	288	222	180	206	206	246	222	301		**236**	
Max	(m3/d)	278	328	656	443	368	302	237	247	283	339	572	488		**378**	**774**
BOD_5	(mg/L)	139	112	74	89	78	87	89	125	126	108	81	840		**162**	
CBOD	(mg/L)	103.5	99	62	77	61	58	48	100	96	84	65	652		**125**	
TSS	(mg/L)	66	83	63	62	62	61	63	76	86	78	124	2520		**279**	
Total Phosphorus	(mg/L)	3.6	3.6	2.5	2.4	2.8	3.2	3.2	3.8	4.4	3.5	3.1	80.6		**10**	
ALKALINITY	(mg/L)	405	400.0	371.3	361.5	374.0	360.0	381.0	386.7	376.5	378.5	375.0	381.5		**379**	
TKN	(mg/L)	35.10	35.45	22.63	21.60	26.40	26.60	26.85	35.90	31.80	31.30	22.45	126.40		**37**	
AMMONIA	(mg/L)	29.5	33.5	20.40	16.3	22.25	23.55	26.90	31.23	31.80	28.05	20.60	19.00		**25**	
NITRATE	(mg/L)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05		**0**	
NITRITE	(mg/L)	0.06	0.06	0.06	0.38	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07		**0**	
pH		7.43	7.45	7.45	7.63	7.68	7.91	7.58	7.63	7.38	7.38	7.70	7.67		**8**	
Temp		4.0	5.5	8.9	10.0	13.5	18.5	19.5	20.3	15.5	12.0	10.5	10.5		**12**	

DRUMBO FINAL EFFLUENT 2011

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		**Ave**	**Criteria A**	**Criteria B**
BOD_5	(mg/L)	3.5	7.5	9.3	6	2	2.5	2.5	4.3	2.0	3.0	4	5.5		**4.3**	**10**	**15**
CBOD	(mg/L)	2.0	2.0	2	2	2	2	2	2.3	2.0	2.0	2.5	3.0		**2.2**		
TSS	(mg/L)	8.0	4.0	3.7	3.5	4.0	4	8.0	5.0	3.0	5.0	6.5	4.0		**4.9**	**10**	**15**
Total P	(mg/L)	0.11	0.13	0.06	0.14	0.12	0.10	0.18	0.20	0.21	0.14	0.190	0.07		**0.14**	**0.5**	**1**
ALKALINITY	(mg/L)	186	159	203	203	191	94	193	205	202	200	197	217		**187**		
TKN	(mg/L)	2.60	1.60	3.23	2.90	0.50	1.45	1.90	0.80	2.00	1.15	1.70	1.10		**1.74**		
AMMONIA	(mg/L)	0.70	1.00	2.77	0.85	0.20	0.25	0.15	0.63	0.20	0.40	0.40	0.70		**0.688**	**3**	**5**
NITRATE	(mg/L)	18.45	24.15	12.9	14.9	16.3	14.1	12.7	12.7	15.3	14.0	17.6	10.6		**15.3**		
NITRITE	(mg/L)	1.38	0.45	0.47	0.35	0.10	0.18	0.29	0.42	0.11	0.10	0.26	1.0		**0.42**		
PH	(mg/L)	7.46	7.43	7.94	7.66	7.73	7.99	7.65	8.20	7.64	7.61	7.83	7.75		**7.74**		
Dissolved Phosphorus	(mg/L)	0.05	0.05	0.07	0.11	0.04	0.10	0.10	0.10	0.14	0.08	0.13	0.06		**0.09**		
Dissolved Oxygen	(mg/L)	11.0	9.5	10.1	9.8	9.6	8.2	7.1	7.7	7.5	7.9	9.2	9.0		**8.9**	**Min= 5**	**Min= 5**
E.Coli	#/100 mL	2	2	2	2	2	4	2	18	2	6	2	2		**3.8**	**200**	**200**

Compliance criteria are based on Periods A and B, where Period A refers to the time that the receiving stream exceeds 5 degrees C. and Period B refers to the time that the receiving stream is less than or equal to 5 degrees C, as measured by operating staff.

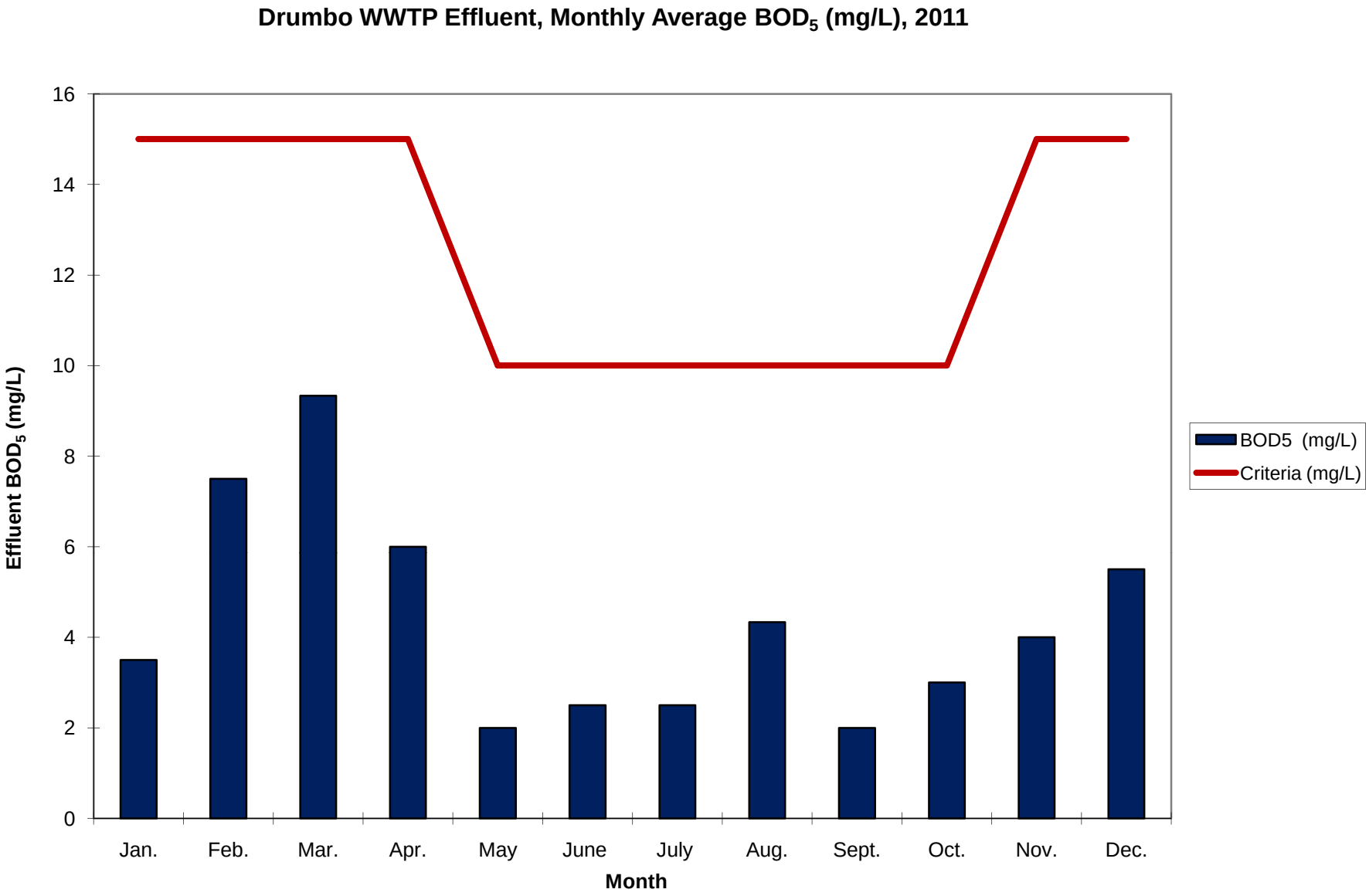
Drumbo SBR Effluent Discharge Loading kg/d 2011

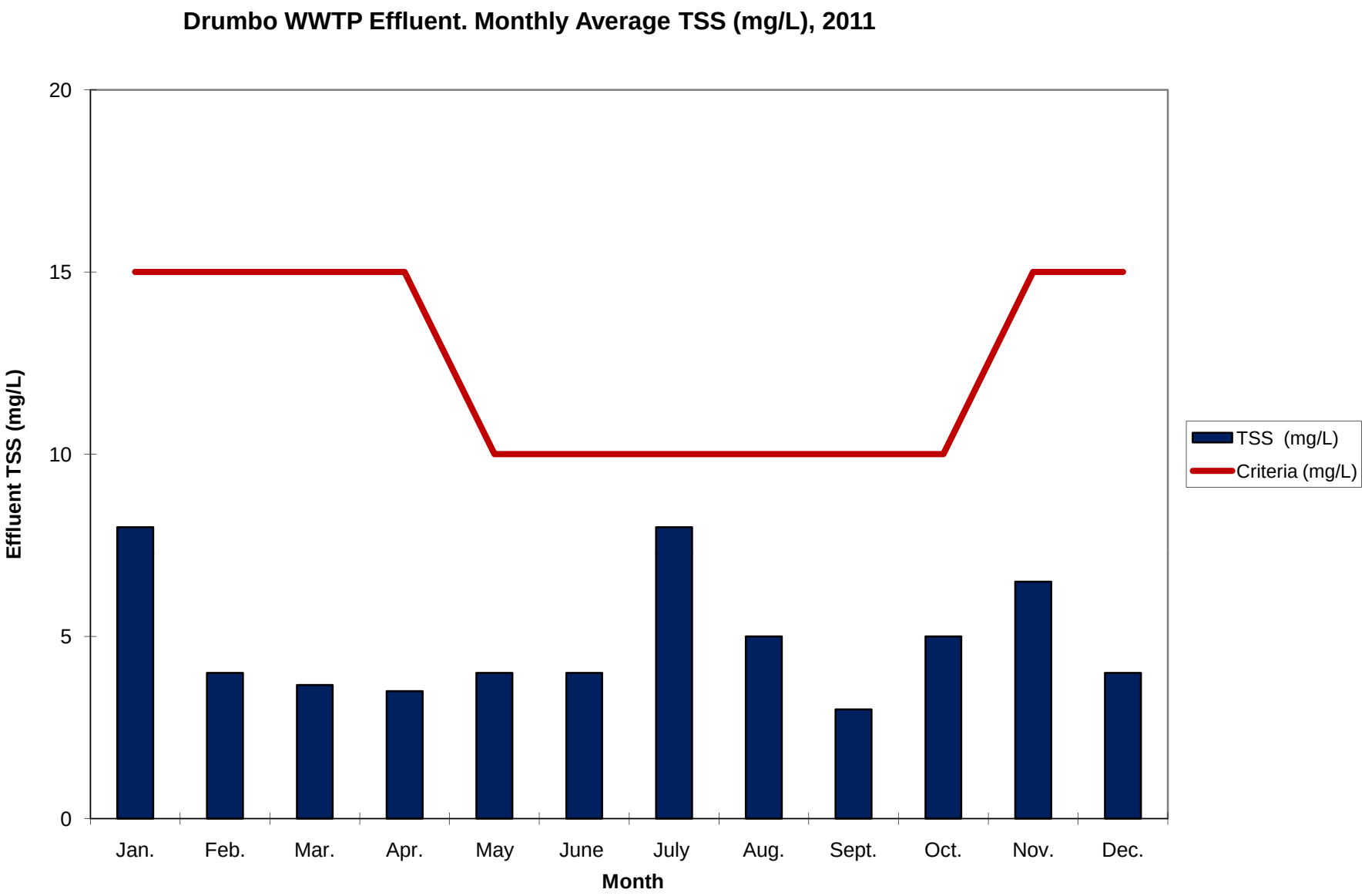
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		**Ave.**	**Criteria A**	**Criteria B**
BOD_5	(kg/d)	0.8	1.9	3.5	2.1	0.7	0.6	0.5	1.0	0.5	0.8	1.1	1.9		**1.3**	**2.8**	**4.0**
TSS	(kg/d)	1.9	1.0	1.4	1.2	1.3	1.0	1.7	1.1	0.7	1.4	1.8	1.4		**1.3**	**2.8**	**4.0**
TP	(kg/d)	0.02	0.03	0.02	0.05	0.04	0.03	0.04	0.05	0.05	0.04	0.05	0.02		**0.04**	**0.1**	**0.3**
NH4	(kg/d)	0.16	0.25	1.03	0.30	0.07	0.06	0.03	0.14	0.05	0.11	0.11	0.24		**0.21**	**0.80**	**1.36**

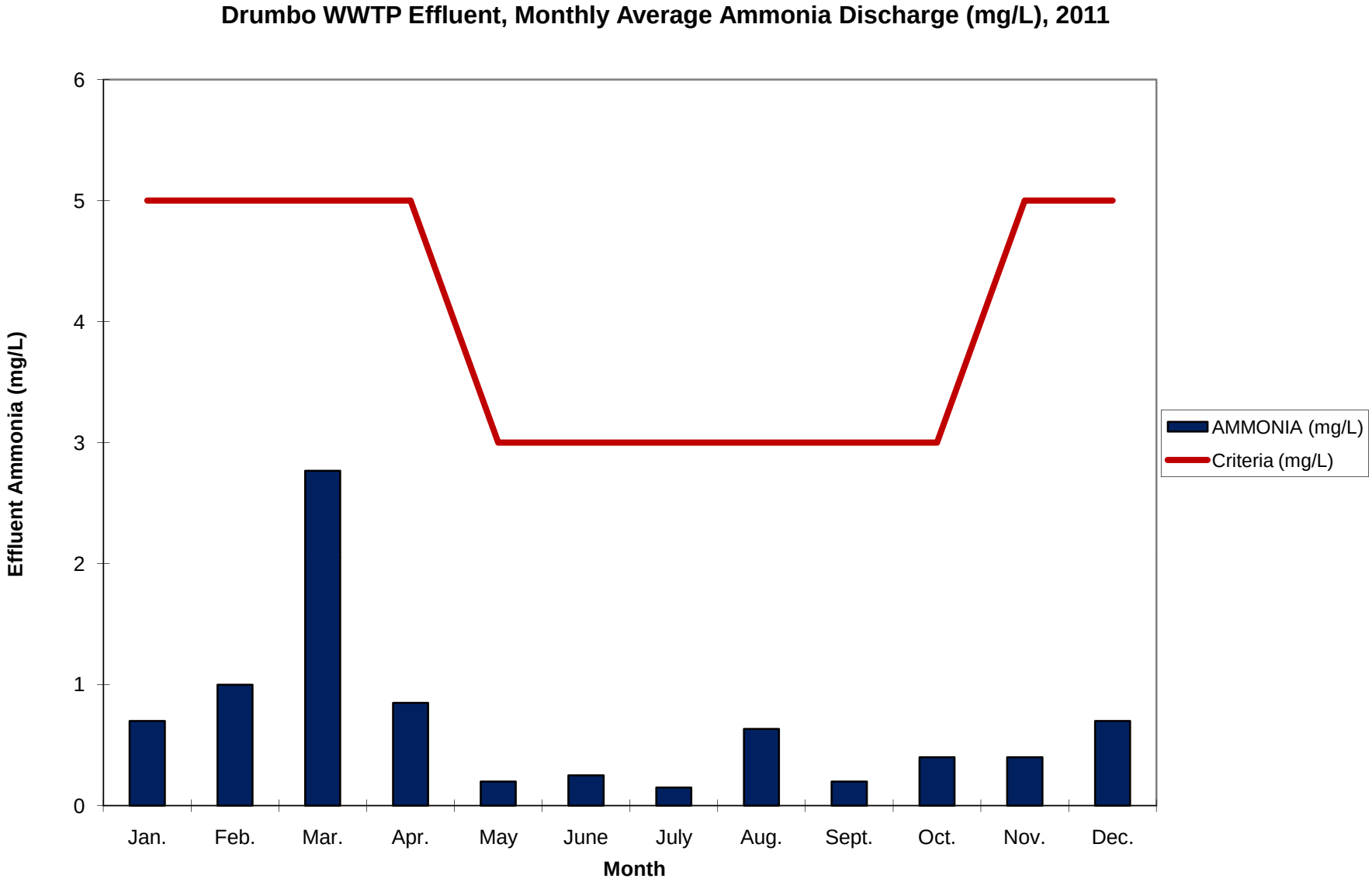
Drumbo SBR Influent Loading kg/d 2011

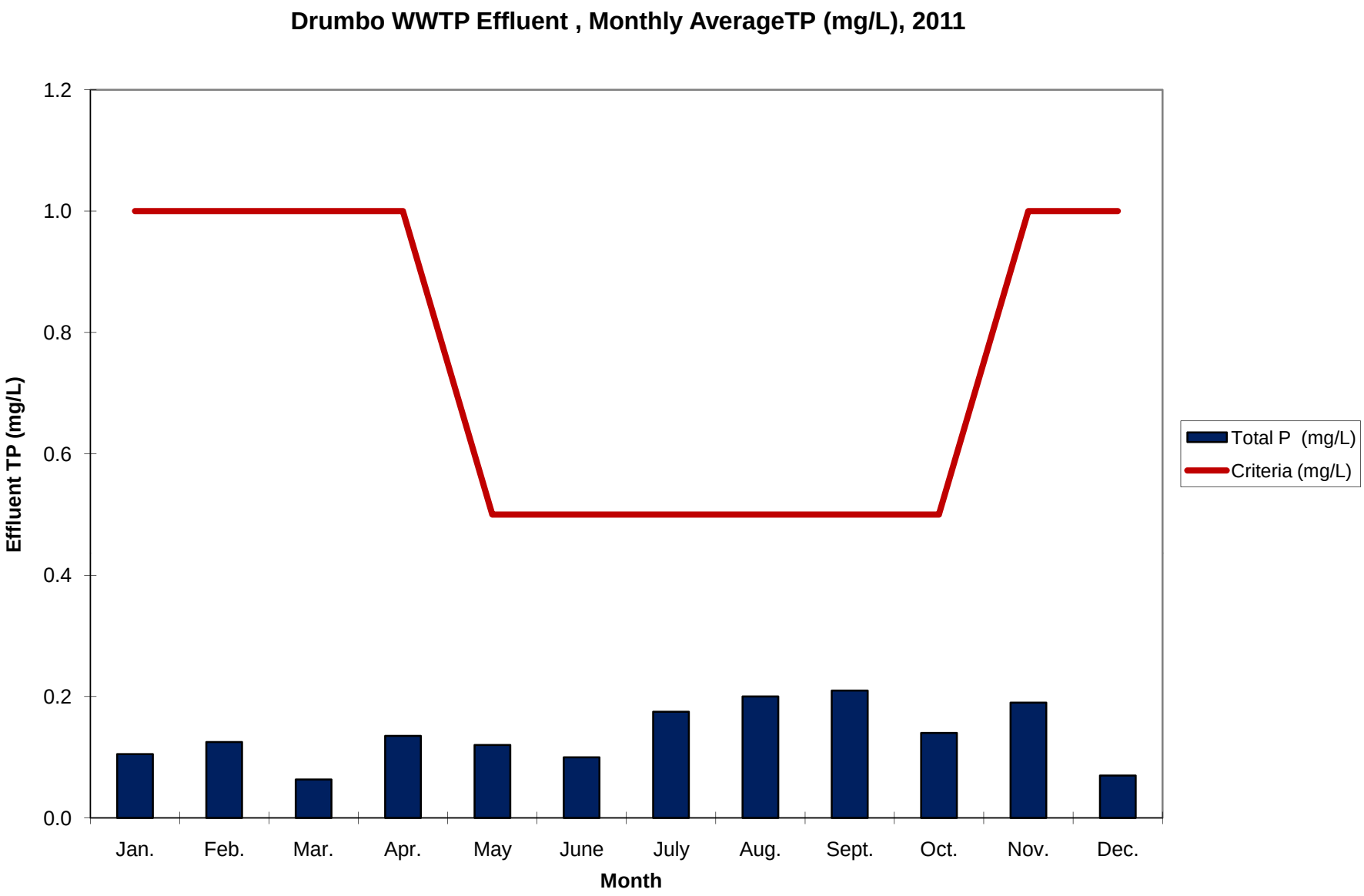
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		**Ave.**		
BOD	(kg/d)	32	28	28	31	25	22	19	28	31	30	22	293		46		
TSS	(kg/d)	15	21	24	21	20	16	14	17	21	22	34	880		79		
TP	(kg/d)	1	1	1	1	1	1	1	1	1	1	1	28		3		
TKN	(kg/d)	8	9	8	8	9	7	6	8	8	9	6	44		10		

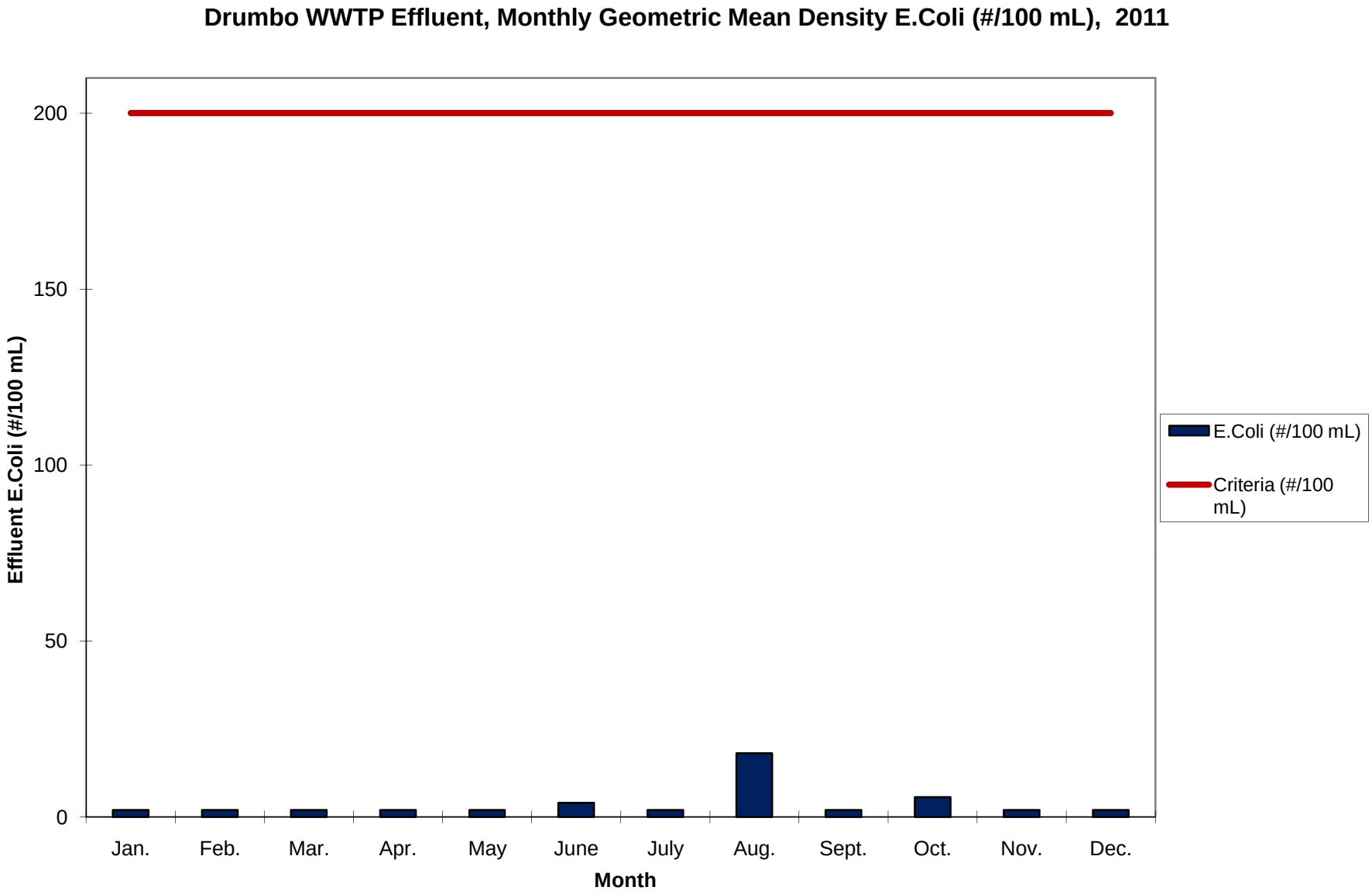
Compliance criteria are based on Periods A and B, where Period A refers to the time that the receiving stream exceeds 5 degrees C. and Period B refers to the time that the receiving stream is less than or equal to 5 degrees C, as measured by operating staff

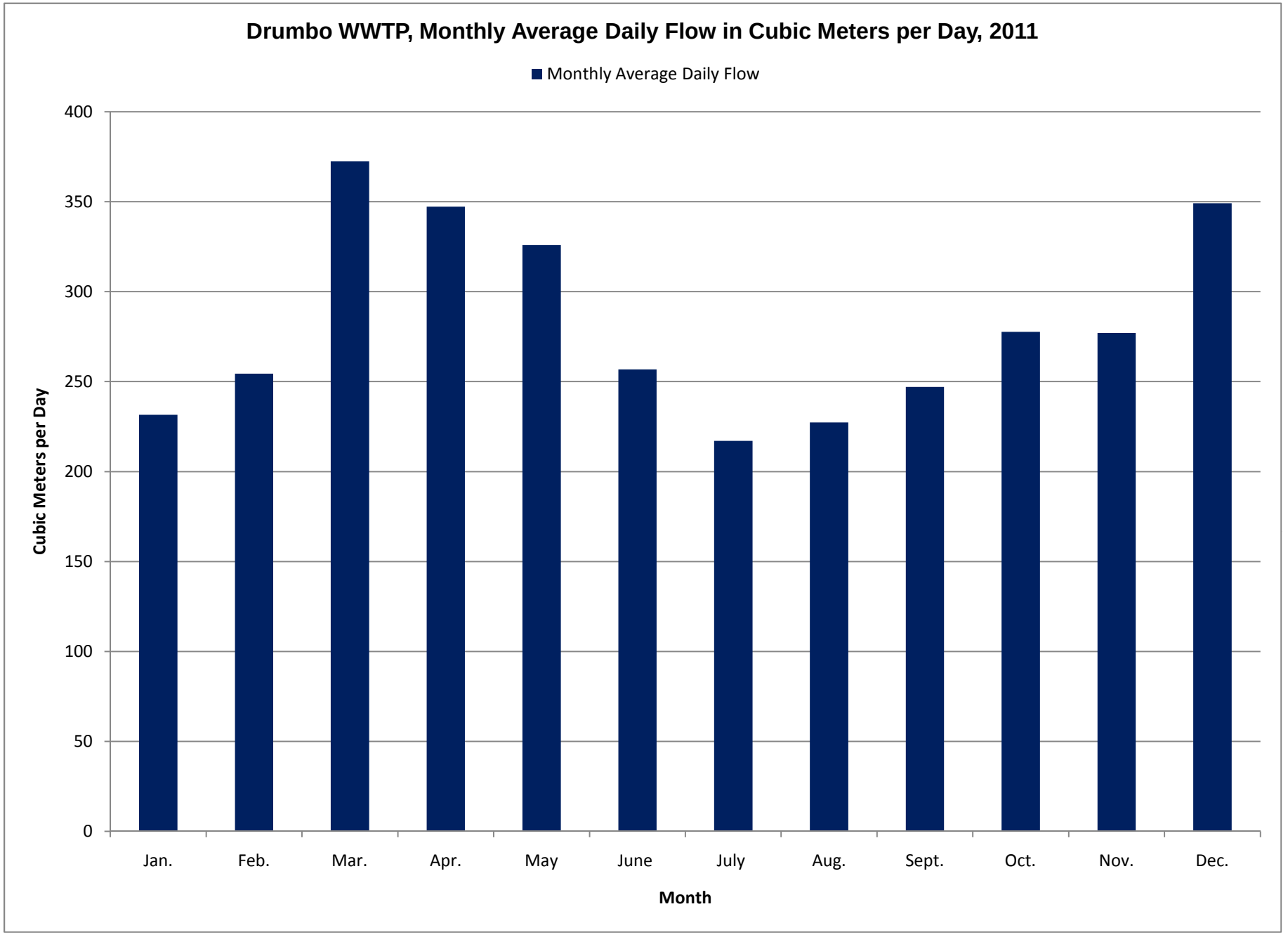

Drumbo WWTP Effluent, Monthly Average BOD5 (mg/L), 2011
Effluent BOD5 (mg/L)
16
14
12
10
8
6
4
2
0
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month
BOD5 (mg/L)
Criteria (mg/L)


Drumbo WWTP Effluent. Monthly Average TSS (mg/L), 2011
Effluent TSS (mg/L)
20
15
10
5
0
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month
TSS (mg/L)
Criteria (mg/L)


Drumbo WWTP Effluent, Monthly Average Ammonia Discharge (mg/L), 2011
Effluent Ammonia (mg/L)
6
5
4
3
2
1
0
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month
AMMONIA (mg/L)
Criteria (mg/L)


Drumbo WWTP Effluent , Monthly AverageTP (mg/L), 2011
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Effluent TP (mg/L)
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month
Total P (mg/L)
Criteria (mg/L)


Drumbo WWTP Effluent, Monthly Geometric Mean Density E.Coli (#/100 mL), 2011
Effluent E.Coli (#/100 mL)
200
150
100
50
0
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month
E.Coli (#/100 mL)
Criteria (#/100 mL)


Drumbo WWTP, Monthly Average Daily Flow in Cubic Meters per Day, 2011
Monthly Average Daily Flow
400
350
300
250
200
150
100
50
0
Cubic Meters per Day
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month

Public Works
P. O. Box 1614, 21 Reeve St.,, Woodstock Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

March 15, 2012

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Ian Ness-Jack
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Monitoring Report 2011 for Mount Elgin Wastewater Treatment Plant
(Certificate of Approval # 0611-6Q3JQL)

Attached is the monitoring report for 2011 for the Mount Elgin Wastewater Treatment Plant. This report is prepared as required by the certificate of approval # 0611-6Q3JQL. I trust this report fulfills the intent of the annual reporting requirements of the Certificate of Approval.

If there are any questions, please contact me.

Yours Truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, Oxford County

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager Wastewater Services, Oxford County
Mr. Mark Maxwell, EIT
Project Engineer, Oxford County

Overview

The Mount Elgin wastewater provided effective wastewater treatment in 2011. The average daily flow for 2011 was 18 m^3/d. This represents 19% of the design criteria of 95.25 m^3/d.

Plant Description

The Septic Tank Effluent Gravity (STEG) system is one component of the overall sewage treatment system. In STEG collection systems, the wastewater is collected from individual homes in septic tanks where it is pretreated to remove solids and grease before it drains by gravity to the small diameter collection mains. The small diameter collection mains direct the primary treated effluent to a pump station located near the main road at the entrance of the sewage treatment plant.

The primary treated effluent is the raw influent to the sewage treatment system where it is pumped to recirculation tanks. The influent is then pumped to the recirculating sand filter and then collected and pumped to a splitter valve that allows 80% of the flow to recirculate and 20% to enter the dosing tank. The dosing tank is where the effluent sample is collected and is the tank that pumps to the shallow buried trench drain field that provides the subsurface discharge.

SAMPLING DESCRIPTION

Grab samples were taken from the influent lift station, the minimum sampling frequency is quarterly and samples are tested for Carbonaceous Biochemical Oxygen Demand (CBOD), Suspended Solids (SS), Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN).

Effluent grab samples are taken and analyzed for CBOD, SS, TP, ammonia, TKN, nitrite, nitrate, pH, and E.Coli at least quarterly. Groundwater testing is done for nitrites, nitrates, and pH on a quarterly basis.

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples except pH, which is tested in the field during collection. These results are used in this report for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

DISCUSSION OF RESULTS

Calculated in Table A that follows are the average, maximum, and minimum values for all influent, and effluent parameters. External test results and flow information are used in the calculation.

The average annual Influent CBOD concentration to the plant for 2011 was 80 mg/L, with an average flow of 18 m^3/d; this corresponds to an average CBOD loading of 1.4 kg/d. The average annual Influent SS concentration to the plant was 36.8 mg/L. This

corresponds to an average SS loading of 0.7 kg/d. The annual average TKN concentration was 60.6 mg/L. This corresponds to 1.1 kg/d. The annual average TP concentration was 7.5 mg/L. This corresponds to 0.14 kg/d.

The annual average Effluent CBOD concentration was 1.0 mg/L. This represents a 98.8% removal efficiency. The annual average SS concentration was 2.3 mg/L. This represents a 93.8% removal efficiency. The annual average Ammonia concentration was 2.6 mg/L. The annual average TP concentration was 4.8 mg/L. This represents a 36% removal efficiency.

The average, maximum, and minimum influent and effluent results were calculated and are given in Table A in Exhibit 1.

Upset Conditions

There were no upset conditions, spills, or bypasses of the treatment or collection system in 2011.

Maintenance and Calibration

Maintenance was completed as needed on the wastewater system and was initiated by the operator during routine inspection of the system. The system is owned, operated, and maintained by Oxford County and is supervised as one of the nine wastewater treatment plants. The maintenance is completed by the southern area staff. Detailed records on each piece of equipment are kept at the Ingersoll WWTP.

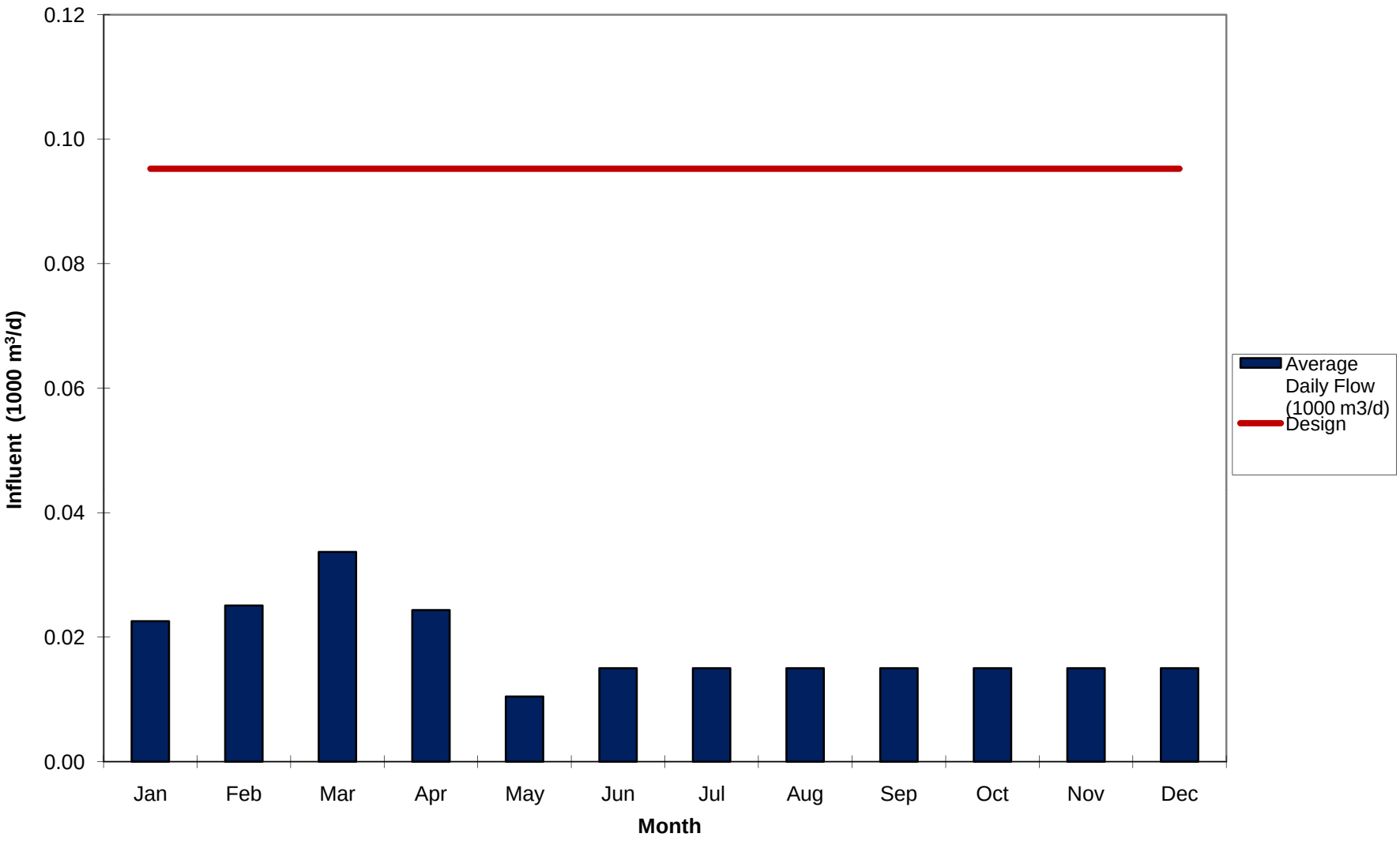
R&R Instrumentation Services did meter calibration on the influent meter; however estimating flow is permitted under the certificate of approval and was necessary as groundwater infiltration to the meter compartment continue to disable the equipment for long periods of time in 2011.

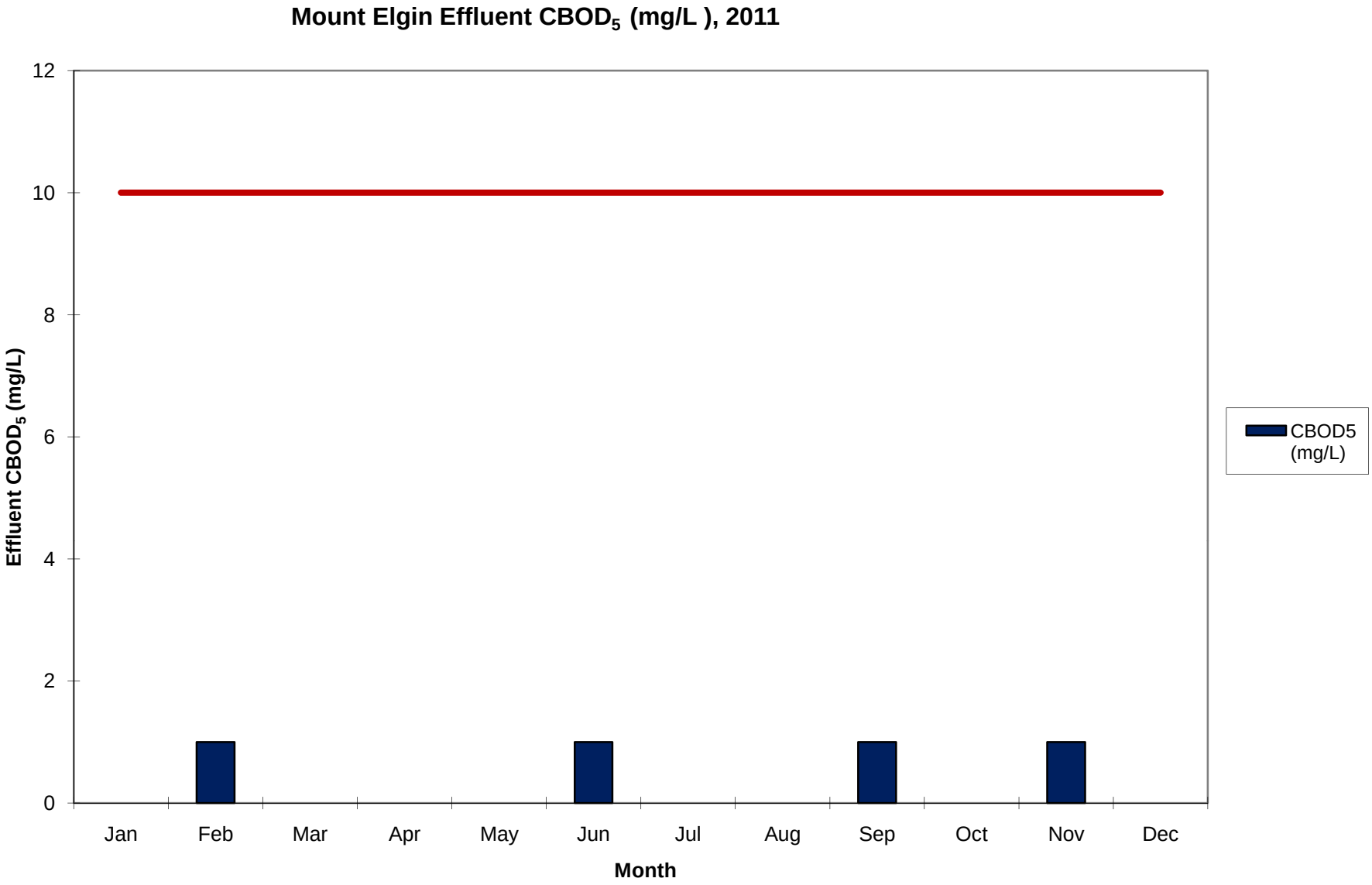
Other Activities

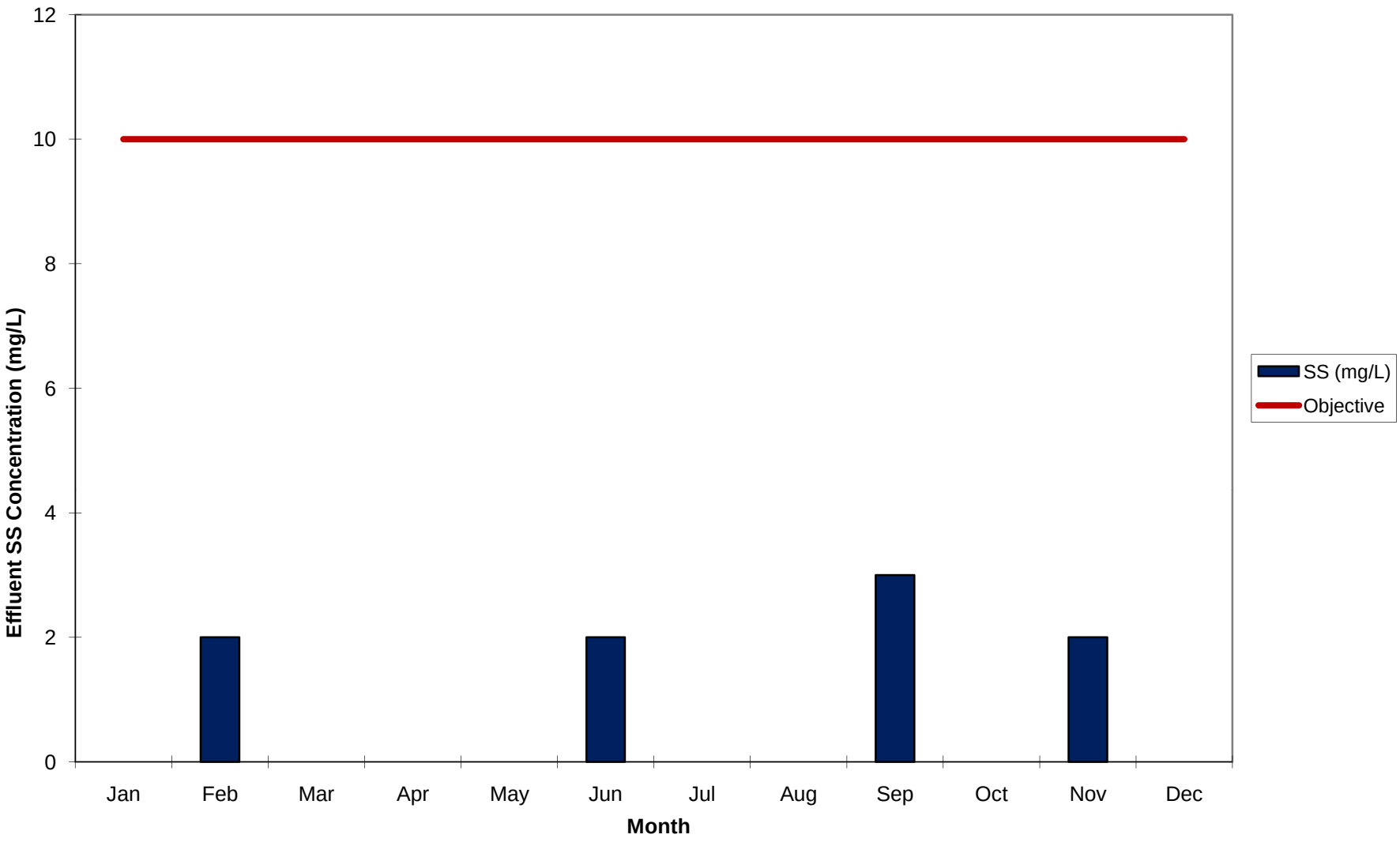
There were no alterations or changes in operation for 2011.

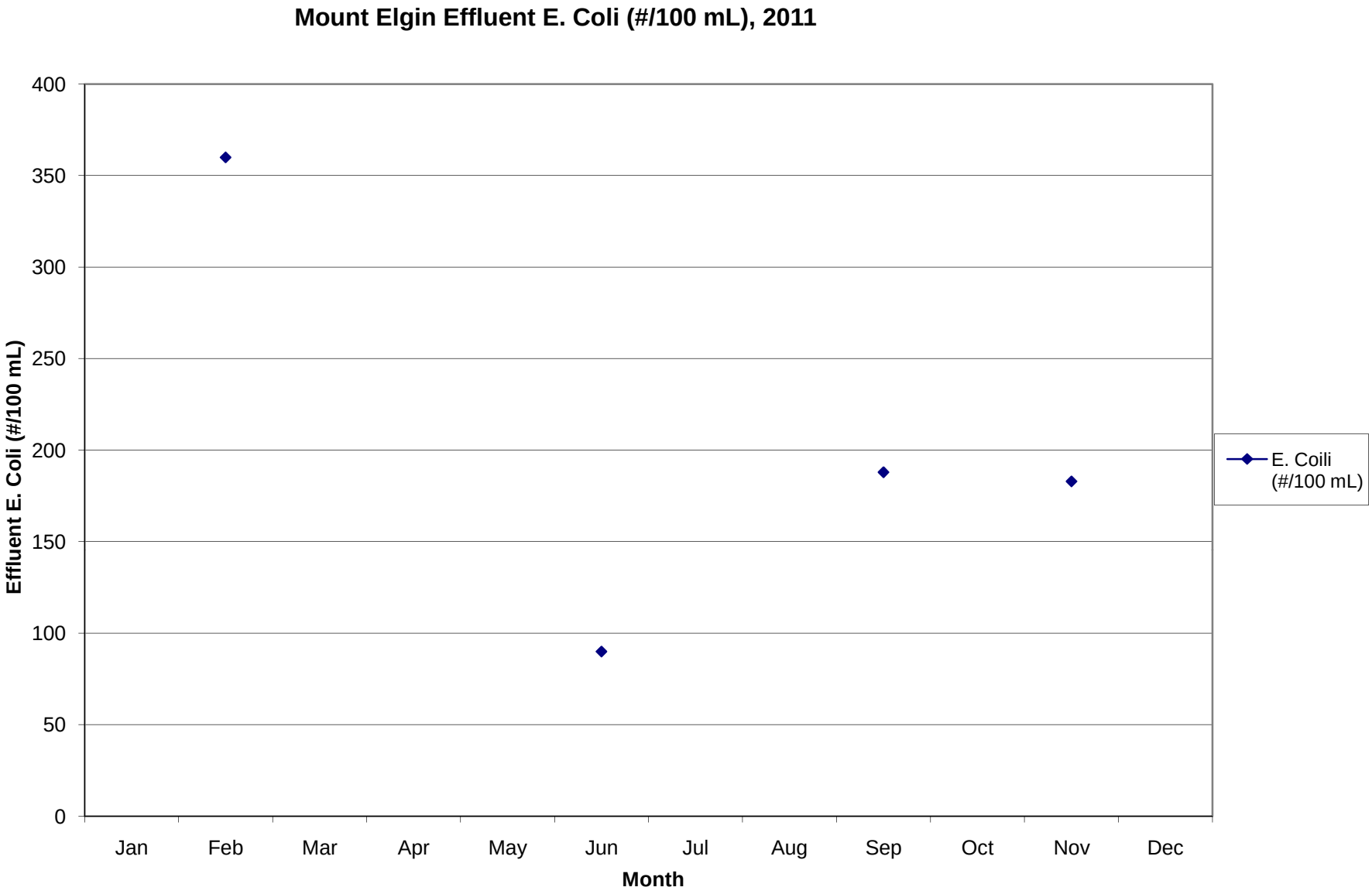
EXHIBIT 1

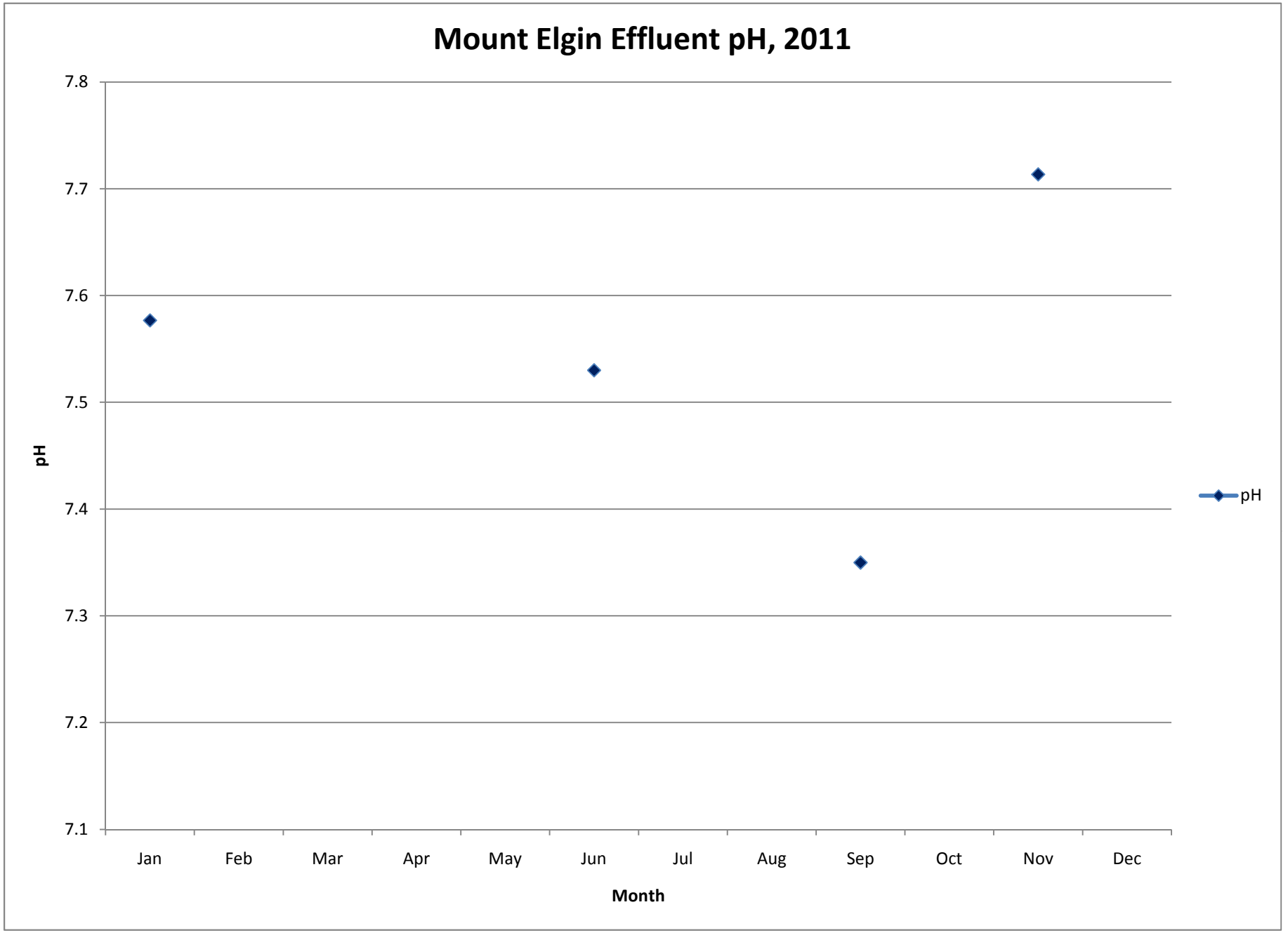
TABLE A	Mt Elgin Wastewater Draft			WORKS # 120002870			YEAR 2011										
INFLUENT FLOW	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		AVERAGE	DESIGN CRITERIA	DESIGN CRITERIA	
															Phase 1	All Phases	
TOTAL (1000m^3)	0.700	0.702	1.044	0.731	0.325	0.450	0.465	0.465	0.450	0.465	0.450	0.465	TOTAL	6.712			
Average Daily Flow (1000 m^3/d)	0.023	0.025	0.034	0.024	0.010	0.015	0.015	0.015	0.015	0.015	0.015	0.015	AVERAGE DAILY FLOW	0.018	0.09525	0.381	
MAX. DAILY FLOW (1000 m^3/d)	0.025	0.032	0.041	0.025	0.013	0.015	0.015	0.015	0.015	0.015	0.015	0.015	MAX. DAILY FLOW	0.041			
																Results	Results
INFLUENT RESULTS														AVERAGE		MAXIMUM	MINIMUM
CBOD5 mg/L		86				61			60		111			79.5		111	60
SS (mg/L)		29				32			21		65			36.8		65	21
TKN (mg/L)		53.4				55.4			57.5		75.9			60.6		75.9	53.4
TOTAL P. (mg/L)		5.9				5.80			7.8		10.50			7.5		10.5	5.8
pH	7.33	7.15						7.16	7.04		6.87			7.1		7.325	6.87
GROUNDWATER														AVERAGE			
pH	7.58					7.53			7.350		7.71			7.543			
Nitrates (mg/L)	0.15					0.09			0.440		0.64			0.331			
Nitrites (mg/L)	0.030					0.03			0.030		0.03			0.030			
																Results	Results
EFFLUENT RESULTS														AVERAGE		MAXIMUM	MINIMUM
$CBOD_5$ (mg/L)		1				1.0			1.0		1			1.0		1	1.0
SS (mg/L)		2.0				2.0			3.0		2			2.3		3	2.0
Ammonia (mg/L)		0.2				9.40			0.9		0.05			2.6		9.4	0.1
TKN (mg/L)		2				8.7			2.1		0.03			3.2		8.7	0.0
TP (mg/L)		5.7				5.8			7.7		0.1			4.8		7.66	0.1
pH	6.99	6.51				7.02		6.91	6.80		6.60			6.8		7.02	6.5
E. Coili (#/100 mL)		360				90			188		183			183	Geomean	360	90.0
Nitrates (mg/L)		35.1				13.8			21.6		33.4			26.0		35.1	13.8
Nitrites (mg/L)		0.03				0.2			0.1		0.0			0.1		0.2	0.0


Mount Elgin Influent, Average Daily Flow (1000 m3/d), 2011
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Influent (1000 m3/d)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Average Daily Flow (1000 m3/d)
Design


Mount Elgin Effluent CBOD5 (mg/L), 2011
12
10
8
6
4
2
0
Effluent CBOD5 (mg/L)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
CBOD5 (mg/L)


Mount Elgin Effluent, SS Concentration (mg/L), 2011
Effluent SS Concentration (mg/L)
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
SS (mg/L)
Objective


Mount Elgin Effluent E. Coli (#/100 mL), 2011
Effluent E. Coli (#/100 mL)
400
350
300
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
E. Coili (#/100 mL)


Mount Elgin Effluent pH, 2011
7.8
7.7
7.6
7.5
7.4
7.3
7.2
7.1
pH
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
pH

Public Works
P. O. Box 1614, 21 Reeve St.,, Woodstock Ontario N4S 7Y3
Phone: 519-539-9800 Fax: 519-421-4711
Website: www.oxfordcounty.ca

March 15, 2012

District Manager
Ministry of the Environment
London District Office
C/o
Mr. Ian Ness-Jack
Provincial Officer
733 Exeter Rd.
London, Ont.
N6E 1L3

Dear Sir:

RE: Year-End Report Storm Water Management Facility for the Bisolids Centralized Storage Facility (BCSF) and BCSF Inspection
(Certificate of Approval # 8633-76AHSG)

This year-end report is prepared as required by the certificate of approval # 8633-76AHSG. I trust this report fulfills the intent of the Certificate of Approval reporting requirements.

If there are any questions, please contact me.

Yours Truly,

Don Ford, BA, CMM II, C. Tech.
Wastewater Supervisor, County of Oxford

c.c. Mr. Shahab Shafai, M.Sc., P.Eng.
Manager Wastewater Services, Oxford County
Mr. Mark Maxwell, EIT,
Project Engineer, Oxford County

Overview

The storm water management facility services a total drainage area of 4.85 ha consisting of leaf and yard waste composting pad and a biosolids centralized storage facility (BCSF) located east of the Oxford County Landfill site, it was designed to attenuate storm water runoff from storm events.

Project Description and Specifications

The facility consists of approximately a 132 m long 300 mm diameter solid pipe running from the compost pad to the forebay; an approximately 50 m long 200 mm diameter storm sewer collecting from areas located east and north of the BCSF to the forebay; and approximately 300 m long perimeter ditches collecting storm water runoff from the BCSF building and from the south and west side of the structure discharging through a 300 mm diameter CSP culvert to the forebay. It also includes one 18 m long 1 m deep forebay, complete with rip rap, two inlet structures and one concrete weir outlet structure discharging to a wet detention pond. The wet detention storm water pond with top dimensions of 78 m long by 38 m wide provides a permanent storage capacity of 1,564 m^3 with a depth of 0.9 m. The pond is equipped with an outlet structure consisting of one 1,200 mm diameter precast concrete manhole, one 75 mm diameter orifice plate and approximately 13 m long outlet sewer discharging to Hooper Drain.

Sampling Procedure

Samples are collected semi-annually during spring and fall after a significant rainfall event and analyzed for the following:

Alkalinity
Total Ammonia Nitrogen
Chloride
Iron
Nitrate Nitrogen
Nitrite Nitrogen
TKN
Total Phosphorus
Total Suspended Solids
Sulphate
CBOD
COD
Phenol

Field parameter

pH
Temperature
Conductivity
Dissolved Oxygen

Storm Water Facility Performance & Effluent

The facility is inspected regularly and a log book of the inspections is maintained at the BCSF. The results of the sampling program are included in Exhibit 1 in a summary Table.

Spills, Upset and Abnormal Conditions

There were no spills or abnormal discharge events in 2011.

BCSF Maintenance

The Biosolids Centralized Storage Facility was cleaned and an in-house inspection took place on December 1, 2011.

A contractor was used to pump out the sump pits and landfill staff swept the building prior to inspection.

The following is a list of items found during inspection and the actions taken.

Inspection Item	Action Taken
• There are cracks in the concrete floor at the aisle end of the concrete divider wall of Bins 1, 3, 4, 5, 6, 7, 8, 9, 10, 11&12.	No action required at this time, minor cracks.
• There is a sump pit cover missing in bin 11.	Cover will be located, or new one fabricated.
• In the centre aisle east of bin 5 there is a piece of concrete reinforcing steel exposed.	Will address exposed steel to avoid any injury.
• In bin 12 on the south side near the west end there are two places in the floor that are broken.	No action required at this time.
• There are minor cracks in the exterior walls on all sides of the building, some have minor staining, but none of them have opened up.	There is no action required.

Summary and Recommendations

The storm water facility provided effective attenuation of storm water in 2011 with no adverse or abnormal conditions occurring.

The BCSF provided storage for the Oxford County biosolids land application program and was in excellent overall condition. No complaints were received about the operation of either facility in 2011.

Exhibit 1

BCSF Storm Water Pond 2011

Analysis	Units	Jan.	Feb.	March	April Field	April	May	June	July	Aug.	Sept.	Oct.	Oct. Field	Nov	Dec.	Average	Max	MIN
Temperature	C				4.1	9.0						12.0	10.6			8.9	12.0	4.1
pH	pH units				6.9	9.0						8.0	7.7			7.9	9.0	6.9
Alkalinity(as CaCO3	mg/L					235						208				222	235	208
Conductivity	uS/cm				847								563			705	847	563
COD	mg/L					25						63				44	63	25
NH3+NH4	as N mg/L					0.2						0.7				0.45	0.7	0.2
TKN	as N mg/L					1.80						4				2.70	3.6	1.80
Tot Susp.Solids	mg/L					49						33				41	49	33
Sulphate	mg/L					30						24				27.00	30	24
Nitrite (as nitrogen)	mg/L					<0.06						0				<0.06	0	0
Nitrate(as nitrogen)	mg/L					4.89						3				4	5	3
Nitrate + Nitrite (as nitrogen)	mg/L					4.89						3				4	5	3
CBOD	mg/L					<4						5				5	5	5
Chloride	mg/L					110						67				89	110	67
4AAP-Phenolics	mg/L							<0.002				<0.002				0	0	0
Fe iron	mg/L					1.12						2.06				1.59	2.06	1.12
Phosphorous	mg/L					0.139						0.05				0.093	0.139	0.047
Disolved Oxygen	mg/L				12.8								4.5			8.6	12.8	4.5

*If less than MDL, detection limit is used