

City of Estevan

Water / Wastewater Services Division

2016

**Wastewater Treatment Plant
Annual Report on Operations**

DATE: March 13, 2017

TO: Jeff Ward, City Manager

SUBMITTED BY: Kevin Sutter, ASCT Water and Wastewater Services Division Manager

RE: 2016 Annual Wastewater Report

ITEM OR INQUIRY

As part of the permit to operate a wastewater facility it is required that the utility develop an annual report and submit this report to the Water Security Agency. The report must contain information about the quality and quantity of water treated and released. It will also state how the conditions of the permit were maintained and itemize any upset conditions as defined in the "The Environmental Management and Protection Act, 2010".

Attached is the 2016 Annual Report on the City of Estevan Wastewater Treatment System.

BACKGROUND AND DISCUSSION

The wastewater treatment plant (WWTP) was put on line January 1996. In short we take the entire wastewater collection flow and process it using a biological process called Biological Nutrient Removal / Activated Sludge Process. We then discharge the treated effluent to the holding cells and over the summer months SaskPower removes the effluent by pumping from holding cell "J". The waste sludge produced by these processes is de-watered using the new equipment installed in December 2016 and disposed of at the landfill. A provincial permit to operate that was put into place in November 25, 2015, requires us to maintain an effluent quality-leaving Cell "J".

Some highlights to the plant operation in 2016 are as follows:

- The new dewatering equipment went on line in December 2016
- We purchased new blowers for the plant and they will be installed in 2017

- Sask Power has had some problems with their pumps that move water from Cell “J” to the wetlands. They will need to start pumping in April 2017.
- We have had a failed data logger that monitors the flows. We are using a totalizer until the new data collection system is up and running.
- Even though the WWTP effluent quality spiked from time to time, the holding ponds have been able to buffer these spikes, and as can be noted, the effluent-leaving Cell “J” meets the requirements set out in the new permit to operate total bacteria counts. We do not disinfect and the plant is being operated at maximum capacity, so this in mind the plant has operated relatively well. SPC uses the effluent as cooling water for SHAND and we do not discharge this effluent into the environment.
- Water Security Agency completed an inspection; the inspection reports from WSA are attached.
- The Wastewater treatment system was designed for a maximum daily flow of 6000m³ per day and in 2016 we surpassed that flow 12 of the 365 days. The volumes treated have increased from 2015 mostly due to the heavy downpours in July. The plant operated relatively well, operating within its capacity for much of the year. The flow stabilization portion of the efficiency upgrade will extend the life of this facility, but we will need to continue to plan for an expansion once water use and disposal increase once again.

RECOMMENDATIONS

- That Council accept the Annual Report and authorize the sending it to the WSA as per the requirements of our permit to operate.

Cell J - 2016

Test	18-Apr-16	10-May-16	7-Jun-16	4-Jul-16	8-Aug-16	6-Sep-16	11-Oct-16	15-Nov-16	Permit Objectives
Suspended Solids (mg/l)	64	15	11	12	21	40	17	12	20
pH	9.3	8.2	8.4	8.6	9.3	9.3	8.9	8.8	
Chlorides (mg/l)	183.7	201	196.6	182.5	178.5	184.2	182.6	183.8	10
BOD (mg/l)	16.1	6	3.4	3.6	7.5	7.3	3.8	3.8	
Ammonia (mg/l as N)	0	2.28	4.96	2	0.19	0	0.47	0	3
Total Nitrogen (mg/l as N)	4.9	7.2	7.1	4.8	3.1	4	2.9	2.4	
TKN (mg/l as N)	4.6	5.9	6.9	4.1	3.1	4	2.7	2.2	
Total Phosphorus (mg/l)	1.8	2.56	4.05	3.67	1.12	1.26	1.06	1.11	
E Coli (Orgs/100ml)	0	0	0	20	0	20	0	0	200
Total Coliform (Orgs/100ml)	41	20	435	39900	44100	24600	285	1153	2500

**City of Estevan
WWTP
Yearly Report
2016**

	Influent	
	Maximum	Minimum
Suspended Solids (mg/l)	230158	40
Biological Oxygen Demand (mg/l)	387	4.6
Temperature (C)	22.0	10.0
pH	8.4	7.1
TKN (mg/l as N)	128.0	10.0
Total Phosphorous (mg/l as P)	31.5	4.5
Ortho Phosphorous (mg/l as P)	18.0	2.0
Ammonia (mg/l as NH3)	62.4	3.6
Chemical Oxygen Demand (mg/l)	1700.0	146.0

Average
1166.7
177.5
15.3
7.8
61.3
9.2
7.1
24.3
565.1

	Effluent	
	Maximum	Minimum
Suspended Solids (mg/l)	110.0	0.8
Biological Oxygen Demand (mg/l)	17.0	1.8
Temperature (C)	8.1	6.9
pH	8.1	6.9
TKN (mg/l as N)	61.0	0.8
Total Phosphorous (mg/l as P)	10.8	1.3
Ortho Phosphorous (mg/l as P)	7.2	0.5
Ammonia (mg/l as NH3)	4.7	0.0
Chemical Oxygen Demand (mg/l)	608.0	6.0

Average
8.6
4.2
7.5
7.5
19.3
4.7
3.5
1.0
87.5

% Removal
99%
98%
69%
49%
50%
96%
85%

Daily Flows (m3)	11753	1066
Peak Flow (l/s)	219	
Peak one hour flow (l/s)	175	
Peak four hour flow (l/s)	157	

4473

Totals	
Flow (m3)	1,637,024
Septage Received (m3)	24,846
Solids removed dry (Kg)	97821
Effluent removed from Cell J (m3)	1,471,000

City of Estevan
 WWTP
 Quarterly Report
 1st Quarter 2016

Influent	
	Maximum Minimum
Suspended Solids (mg/l)	1520 116
Biological Oxygen Demand (mg/l)	275 100
Temperature (C)	13 10
pH	8.2 7.5
TKN (mg/l as N)	128 61
Total Phosphorous (mg/l as P)	11.6 7.6
Ortho Phosphorous (mg/l as P)	8.6 3.1
Ammonia (mg/l as NH3)	62.4 6.9
Chemical Oxygen Demand (mg/l)	891 381

Average
308
211
11.8
7.77
86.8
9.2
7.3
29.3
631

Effluent	
	Maximum Minimum
	48 2
	11 2
	7.8 7.0
	7.80 7.00
	61.0 10.8
	8.6 1.7
	7.2 0.8
	2.0 0.0
	312 6

Average
9
4
7.4
7.43
26.2
4.5
3.1
0.5
35

% Removal
97%
98%
70%
51%
58%
98%
95%

Daily Flows (m3)	4556	3665
Peak Flow (l/s)	219	
Peak one hour flow (l/s)	113	
Peak four hour flow (l/s)	103	

3969

Totals	
Flow (m3)	361028
Septage Received (m3)	5893
Solids removed dry (Kg)	29530

City of Estevan
 WWTP
 Quarterly Report
 2nd Quarter 2016

Influent	
	Maximum Minimum
Suspended Solids (mg/l)	230158 113.6
Biological Oxygen Demand (mg/l)	387 4.63
Temperature (C)	19 11
pH	8.10 7.5
TKN (mg/l as N)	117.5 28
Total Phosphorous (mg/l as P)	9 6.4
Ortho Phosphorous (mg/l as P)	8.6 2.3
Ammonia (mg/l as NH3)	40 7.3
Chemical Oxygen Demand (mg/l)	1700 255

Average
3763
181
14.8
7.82
66.4
7.2
6.1
26.2
604

Effluent	
	Maximum Minimum
	110 0.8
	17 2
	7.8 6.9
	7.80 6.90
	50 11.7
	6.4 1.3
	5.8 0.5
	4.68 0.08
	608 15

Average
8
6
7.6
7.55
24.7
3.6
3.1
1.3
102

% Removal
100%
97%
63%
50%
50%
95%
83%

Daily Flows (m3)	8296	2381
Peak Flow (l/s)	195	
Peak one hour flow (l/s)	171	
Peak four hour flow (l/s)	157	

4621

Totals	
Flow (m3)	420147
Septage Received (m3)	6235
Solids removed dry (Kg)	30727

**City of Estevan
WWTP
Quarterly Report
3rd Quarter 2016**

	Maximum	Minimum
Suspended Solids (mg/l)	320	40
Biological Oxygen Demand (mg/l)	180	100
Temperature (C)	22	15
pH	8.30	7.5
TKN (mg/l as N)	59	10
Total Phosphorous (mg/l as P)	31.2	4.5
Ortho Phosphorous (mg/l as P)	18	2
Ammonia (mg/l as NH3)	29.4	3.6
Chemical Oxygen Demand (mg/l)	1437	323

Influent

Average
222
147
18.9
7.81
36.4
10.1
7.8
16.5
551

Maximum	Minimum
26	1.6
8	2
8.1	7.1
8.10	7.10
35	3.8
10.8	2
6.8	1.7
3.8	0.04
306	56

Effluent

Average
7
4
7.6
7.56
14.4
5.2
4.0
1.3
93

% Removal
97%
97%
60%
49%
48%
92%
83%

Daily Flows (m3)	11753	1066
Peak Flow (l/s)	193	
Peak one hour flow (l/s)	175	
Peak four hour flow (l/s)	139	

4787

Totals	
Flow (m3)	440308
Septage Received (m3)	6245
Solids removed dry (Kg)	21560

**City of Estevan
WWTP
Quarterly Report
4th Quarter 2016**

Influent	
	Maximum Minimum
Suspended Solids (mg/l)	1926 180
Biological Oxygen Demand (mg/l)	340 85
Temperature (C)	18 13
pH	8.40 7.1
TKN (mg/l as N)	98 34
Total Phosphorous (mg/l as P)	31.5 6.2
Ortho Phosphorous (mg/l as P)	13.5 2.2
Ammonia (mg/l as NH3)	42 4.5
Chemical Oxygen Demand (mg/l)	987 146

Average
374
171
15.7
7.87
55.5
10.3
7.0
25.4
475

Effluent	
	Maximum Minimum
	35.6 3.6
	6 2
	8.1 6.9
	8.10 6.90
	33 0.8
	9.75 2.2
	5.6 1.4
	1.5 0.02
	359 25

Average
10
3
7.6
7.56
11.9
5.5
3.9
0.8
121

% Removal
97%
98%
79%
47%
45%
97%
75%

Daily Flows (m3)	6373	3412
Peak Flow (l/s)	N/A	
Peak one hour flow (l/s)	N/A	
Peak four hour flow (l/s)	N/A	

4515

Totals	
Flow (m3)	415541
Septage Received (m3)	6473
Solids removed dry (Kg)	16004

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1810981-1 WASTEWATER EFFLUENT							
Sampled By: BILL BAKER on 08-AUG-16 @ 12:00							
Matrix: WATER							
Miscellaneous Parameters							
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		11-AUG-16	R3524412
Total Metals in Water by CRC ICPMS							
Aluminum (Al)-Total	0.0466	DLDS	0.0060	mg/L		15-AUG-16	R3527036
Antimony (Sb)-Total	0.00087	DLDS	0.00020	mg/L		15-AUG-16	R3527036
Arsenic (As)-Total	0.00541	DLDS	0.00020	mg/L		15-AUG-16	R3527036
Barium (Ba)-Total	0.0200	DLDS	0.00020	mg/L		15-AUG-16	R3527036
Beryllium (Be)-Total	<0.00020	DLDS	0.00020	mg/L		15-AUG-16	R3527036
Bismuth (Bi)-Total	<0.00010	DLDS	0.00010	mg/L		15-AUG-16	R3527036
Boron (B)-Total	0.842	DLDS	0.020	mg/L		15-AUG-16	R3527036
Cadmium (Cd)-Total	0.000106	DLDS	0.000010	mg/L		15-AUG-16	R3527036
Calcium (Ca)-Total	95.7	DLDS	0.10	mg/L		15-AUG-16	R3527036
Cesium (Cs)-Total	0.000033	DLDS	0.000020	mg/L		15-AUG-16	R3527036
Chromium (Cr)-Total	0.00042	DLDS	0.00020	mg/L		15-AUG-16	R3527036
Cobalt (Co)-Total	0.00081	DLDS	0.00020	mg/L		15-AUG-16	R3527036
Copper (Cu)-Total	0.0046	DLDS	0.0010	mg/L		15-AUG-16	R3527036
Iron (Fe)-Total	0.096	DLDS	0.020	mg/L		15-AUG-16	R3527036
Lead (Pb)-Total	0.00026	DLDS	0.00010	mg/L		15-AUG-16	R3527036
Lithium (Li)-Total	0.131	DLDS	0.0020	mg/L		15-AUG-16	R3527036
Magnesium (Mg)-Total	96.4	DLDS	0.020	mg/L		15-AUG-16	R3527036
Manganese (Mn)-Total	0.0502	DLDS	0.00020	mg/L		15-AUG-16	R3527036
Molybdenum (Mo)-Total	0.0164	DLDS	0.00010	mg/L		15-AUG-16	R3527036
Nickel (Ni)-Total	0.0089	DLDS	0.0010	mg/L		15-AUG-16	R3527036
Potassium (K)-Total	30.0	DLDS	0.10	mg/L		15-AUG-16	R3527036
Phosphorus (P)-Total	1.16	DLDS	0.10	mg/L		15-AUG-16	R3527036
Rubidium (Rb)-Total	0.0106	DLDS	0.00040	mg/L		15-AUG-16	R3527036
Selenium (Se)-Total	0.00148	DLDS	0.00010	mg/L		15-AUG-16	R3527036
Silicon (Si)-Total	3.74	DLDS	0.10	mg/L		15-AUG-16	R3527036
Silver (Ag)-Total	<0.000020	DLDS	0.000020	mg/L		15-AUG-16	R3527036
Sodium (Na)-Total	386	DLDS	0.10	mg/L		15-AUG-16	R3527036
Strontium (Sr)-Total	0.746	DLDS	0.00040	mg/L		15-AUG-16	R3527036
Sulfur (S)-Total	327	DLDS	1.0	mg/L		15-AUG-16	R3527036
Tellurium (Te)-Total	<0.00040	DLDS	0.00040	mg/L		15-AUG-16	R3527036
Thallium (Tl)-Total	<0.000020	DLDS	0.000020	mg/L		15-AUG-16	R3527036
Thorium (Th)-Total	<0.00020	DLDS	0.00020	mg/L		15-AUG-16	R3527036
Tin (Sn)-Total	<0.00020	DLDS	0.00020	mg/L		15-AUG-16	R3527036
Titanium (Ti)-Total	<0.0030	DLM	0.0030	mg/L		15-AUG-16	R3527036
Tungsten (W)-Total	0.00227	DLDS	0.00020	mg/L		15-AUG-16	R3527036
Uranium (U)-Total	0.00915	DLDS	0.000020	mg/L		15-AUG-16	R3527036
Vanadium (V)-Total	0.0038	DLDS	0.0010	mg/L		15-AUG-16	R3527036
Zinc (Zn)-Total	0.0168	DLDS	0.0060	mg/L		15-AUG-16	R3527036
Zirconium (Zr)-Total	<0.00060	DLDS	0.00060	mg/L		15-AUG-16	R3527036

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

@3:00 P.M.										Mixed Liquor										Effluent			
Date	Flow Est. M3	Temp C	pH	BOD mg/l	VSS mg/l	SS mg/l	sludge %	D.O. Call 3	MLSS 3 mg/l	MLSS 4 mg/l	MLSS 5 mg/l	Sat Solids Call3 30 min	Sat Solids Call3 60 min	Sat Solids Call4 30 min	Sat Solids Call4 60 min	Sat Solids Call5 30 min	Sat Solids Call5 60 min	Temp C	D.O. mg/l	pH	SS Composite	BOD Composite	
1	3665																						
2	3764																						
3	4010																						
4	3998	13	7.6			548	8.9	3.5	4000	5200	5100	700	450	950	800	900	700	13.0	4.3	7.1	7.2		
5	3979	13	7.5			648		3	4100	5300	5200	700	500	950	850	900	700	13.0	3.8	7.2	8.0		
6	3827	13	7.6			220		2.8	4100	5100	5200	850	400	700	500	850	650	12.0	3.2	7.1	8.0		
7	3748	13	7.6			164		3.3	4200	5300	5100	700	500	900	800	900	800	13.0	4.0	7.1	6.4		
8	3847	12	7.7			158		4.2	4600	5100	5400	800	500	850	600	900	750	12.0	5.3	7.0	6.8	1.8	
9	3782																						
10	4067																						
11	3910	11	7.7			176		5.3	4600	5200	5000	850	750	850	800	900	750	10.0	6.0	7.3	4.4		
12	3914	13	7.6			124		3.8	4500	5700	4900	800	700	900	800	750	650	12.0	4.9	7.2	8.0		
13	3876	11	7.7			202		4.9	4600	5700	5000	850	550	900	800	750	700	12.0	4.8	7.3	6.4		
14	3845	11	7.6			506		5.1	4900	6200	5400	850	700	950	900	900	800	12.0	6.4	7.4	5.6		
15	3895	11	7.6			140		6.8	5000	5600	5000	850	700	900	800	850	700	11.0	6.8	7.5	6.4	2.8	
16	3803																						
17	3881																						
18	3902	10	7.8			160		6	4500	5600	5300	900	800	950	800	950	850	10.0	5.6	7.6	1.6		
19	3893	11	7.7			150		5.8	4900	5200	5400	900	700	900	750	850	700	10.0	6.1	7.5	6.8		
20	3904	11	7.7			194		5.2	4700	5900	5300	900	450	950	900	950	650	12.0	4.5	7.7	5.2		
21	3882	11	7.9			116		4.2	4900	6100	5800	900	650	950	900	950	800	11.0	6.8	7.8	9.2		
22	3946	11	7.8			205		3.9	4800	5900	5900	800	700	950	900	900	850	11.0	4.0	7.5	10.4	2.8	
23	3950																						
24	4037																						
25	3974	11	7.7			276		3.4	4800	6000	5600	850	700	950	900	950	850	12.0	3.7	7.2	4.0		
26	3937	11	7.8			172		5.9	4700	5800	5500	900	850	900	800	900	850	11.0	6.2	7.4	11.6		
27	4024	12	7.9			216		5.5	4700	5600	5500	850	700	900	750	900	850	12.0	4.3	7.6	11.2		
28	3885	13	7.8			196		4.8	4800	6200	5600	900	750	980	950	950	850	13.0	3.9	7.5	11.6		
29	4133	12	8			428		5.9	4900	6100	5600	900	800	950	900	950	800	12.0	5.0	7.5	12.0	4.8	
30	3995																						
31	4046																						
TOTAL	12319																						
MIN	3665	10.0	7.50	140		116			4000		4900	700	400	700	500	750	650			7.0	1.8	1.8	
MAX	4133	13.0	8.00	275		648			5000		5900	900	850	980	950	950	850			7.8	12.0	4.8	
AVE	3914	11.7	7.72	201		265			4615		5340	838	643	912	810	893	763			7.4	7.5	3.1	
Peak Flow	95.1 l/s		Peak One Hour	72 l/s							65 l/s												

BOD Removed (kg) 24046

Sludge removed = 73,000 Kg Hauled

OTHER NUTRIENTS (mg/l)

RAW SEWAGE

TREATED EFFLUENT

	TKN	PHOSPHORUS	AMMONIA as NH3	COD
Ortho	74.8	8.1	18.3	536
Total		10.1	0.7	64.0

Date	Flow Est. M3	Temp C	pH	Influent				Mixed Liquor										Effluent					
				BOD mg/l	VSS mg/l	SS mg/l	Sludge %	D.O. Cell 3	MLSS 3 mg/l	MLSS 4 mg/l	MLSS 5 mg/l	Sett.Solids Cell3 30 min	Sett.Solids Cell3 60 min	Sett.Solids Cell4 30 min	Sett.Solids Cell4 60 min	Sett.Solids Cell5 30 min	Sett.Solids Cell5 60 min	Temp C	D.O. mg/l	pH	S.S. Composite	BOD Composite	
1	4093	12	7.7	410	524	10.1	4.6	4400	5900	5400	700	530	900	900	900	850	800	12	3.8	7.3	22.8	3.0	
2	3960	13	7.9	196	166	10.1	2.8	4800	5900	4600	850	700	950	900	950	950	850	13	4	7.4	5.2	10.5	
3	4008	12	7.6	166	236	10.2	2	4500	6400	4700	800	700	950	900	950	950	850	12	4	7.3	8.0	2.0	
4	3957	13	7.6	235	356	9.9	4	4900	6300	5400	800	650	950	900	980	980	950	12	4.4	7.4	22.4	4.5	
5	3961	13	8	235	356	9.9	4.4	5200	5900	5600	900	750	900	900	850	800	11	5.6	7.5	4.8	3.0		
6	4093	12	7.9	384	466	9.9	5.3	4700	6200	5700	850	600	950	900	900	850	800	11	4.4	7.6	7.3	10.5	
7	3939	13	7.9	466	170	10.1	4.8	4900	5300	5800	700	600	850	850	700	900	750	12	3.9	7.6	6.4	4.4	
8	4073	12	7.8	748	166	10.2	5.1	4900	6300	5500	750	600	950	900	900	850	700	12	4.5	7.7	21.6	4.4	
9	3963	11	7.7	202	202	9.9	4.7	5000	6400	5700	900	600	980	900	950	950	850	12	4	7.6	4.4	3.8	
10	4027	11	7.8	202	202	9.9	5.8	5000	6400	5700	850	650	950	900	900	850	800	10	5	7.6	4.4	3.8	
11	3979	12	7.9	144	184	10.2	4.4	5100	5900	5600	750	650	900	850	850	750	750	11	4.2	7.6	9.6	4.8	
12	3986	12	7.9	155	200	9.9	5.1	5300	6600	5900	800	700	950	900	900	800	800	12	3.8	7.6	4.8	4.8	
13	3916	12	8	155	200	9.9	6.7	5600	6000	5700	900	650	900	900	900	850	750	12	6.3	7.4	2.8	3.8	
14	3842	11	7.9	362	362	9.9	5	5100	6400	5700	800	700	950	900	850	850	750	11	4.2	7.6	9.6	4.8	
15	3866	12	7.9	248	184	10.2	4.4	5100	5900	5600	750	650	900	850	850	750	750	12	3.8	7.6	4.8	4.8	
16	3910	12	7.9	144	184	10.2	5.1	5300	6600	5900	800	700	950	900	900	800	800	12	4.1	7.6	8.0	4.8	
17	3877	12	7.9	200	200	9.9	6.7	5600	6000	5700	900	650	900	900	900	850	750	12	6.3	7.4	2.8	3.8	
18	4556	12	8	155	200	9.9	5.8	5100	6400	5700	800	700	950	900	850	850	750	11	4.2	7.6	9.6	4.8	
19	3938	12	7.8	308	388	10.1	5.6	5100	5900	5600	750	650	900	850	850	750	750	12	4.7	7.4	11.6	5.6	
20	3942	12	7.6	202	254	10.2	5.6	5100	6300	5600	800	700	950	900	900	800	800	13	4.7	7.4	10.8	5.6	
21	4227	12	7.9	308	388	10.1	5.6	5400	5900	5900	800	700	900	900	900	900	700	12	5.5	7.5	2.0	4.5	
22	4135	12	7.8	254	314	9.9	5.7	5200	6300	6000	800	650	900	800	800	700	700	11	5.1	7.5	2.0	4.5	
23	4025	12	7.8	254	314	9.9	5.4	5500	5900	5400	850	700	900	900	800	800	700	12	6	7.4	22.0	4.5	
24	4111	12	7.9	232	232	9.9	5.4	5100	5400	5300	800	700	950	900	800	800	650	12	7.5	7.5	23.6	4.5	
25	4308	12	7.7	9.9	9.9	9.9	5.100	5400	5300	5300	800	700	950	900	800	800	650	12	7.5	7.5	23.6	4.5	
26	4214	12	7.7	9.9	9.9	9.9	5.100	5400	5300	5300	800	700	950	900	800	800	650	12	7.5	7.5	23.6	4.5	
27	4135	12	7.7	9.9	9.9	9.9	5.100	5400	5300	5300	800	700	950	900	800	800	650	12	7.5	7.5	23.6	4.5	
28	4556	12	7.7	9.9	9.9	9.9	5.100	5400	5300	5300	800	700	950	900	800	800	650	12	7.5	7.5	23.6	4.5	
29	4556	12	7.7	9.9	9.9	9.9	5.100	5400	5300	5300	800	700	950	900	800	800	650	12	7.5	7.5	23.6	4.5	
30	4556	12	7.7	9.9	9.9	9.9	5.100	5400	5300	5300	800	700	950	900	800	800	650	12	7.5	7.5	23.6	4.5	
31	4556	12	7.7	9.9	9.9	9.9	5.100	5400	5300	5300	800	700	950	900	800	800	650	12	7.5	7.5	23.6	4.5	
TOTAL	117465																						
MIN	3842	11.0	7.60	155	166	10.1	4.400	4600	700	530	850	700	900	900	800	800	550		7.3	2.0	3.0		
MAX	4556	13.0	8.00	255	748	10.2	5600	6000	900	750	980	900	900	900	980	980	950		7.7	23.6	10.5		
AVE	4051	12.1	7.82	225	296	10.1	5040	5340	810	657	927	840	897	870	870	780			7.5	10.4	5.5		

BOD Removed (kg) 25799 Sludge removed = 99,750 Kg Hauled

OTHER NUTRIENTS (mg/l)		RAW SEWAGE		TREATED EFFLUENT	
TKN	80.9	20.7			
PHOSPHORUS		6.1	2.8		
		8.7	5.3		
AMMONIA as NH3	38.0	0.2			
COD	656.0	103.8			

@3:00 P.M.										Influent										Mixed Liquor										Effluent					
Date	Flow Est. M3	Temp C	pH	BOD mg/l	VSS mg/l	SS mg/l	sludge %	D.O. Cell 3	MLSS 3 mg/l	MLSS 4 mg/l	MLSS 5 mg/l	Sat Solids Cell3 30 min	Sat Solids Cell3 60 min	Sat Solids Cell4 30 min	Sat Solids Cell4 60 min	Sat Solids Cell5 30 min	Sat Solids Cell5 60 min	Temp C	D.O. mg/l	pH	S.S Composite	BOD Composite													
1	4012	12	7.7			572			4800	5800	5100	600	500	750	700	600	600	11		7.3	8.0														
2	4056	12	7.8			360			4500	5200	5100	600	450	700	450	900	500	12		7.5	5.2														
3	3973	12	7.8		246	266	10		4600	5400	5100	550	400	650	500	700	600	12		7.3	7.6														
4	3999	12	7.7			448			4900	5200	5300	400	400	600	500	700	600	11		7.4	5.6	4.5													
5	3971																																		
6	4058																																		
7	4027	13	7.7			288	10.8	6.8	5100	5800	5400	800	600	900	850	950	750	13		7.2	3.6														
8	3977	12	7.9		270	318		5.5	5400	5500	5500	650	400	750	400	750	450	12		7.6	0.8														
9	3962	12	7.9			230	10.4	6.9	4800	5900	5400	650	550	900	800	800	700	11		7.5	1.6														
10	3977	12	7.9			458		5.4	4600	5800	5500	600	490	900	800	750	600	13		7.3	19.2														
11	3916	12	7.8			488	9.4	5.8	4800	6000	4800	600	500	750	650	650	450	13		7.4	48.0	4.5													
12	3884																																		
13	3858																																		
14	3957	13	7.7			1520		4	5200	4500	5600	750	550	750	550	850	650	14		7.3	6.0														
15	3822	12	7.7			160		3.8	4500	5300	5300	650	500	800	700	750	650	12		7.3	2.4														
16	3895	12	7.7			142	9.7	4.6	4800	5900	5500	850	550	950	850	950	800	12		7.5	10.0														
17	3834	11	7.8		116	188		5.9	4500	5600	5100	600	400	800	650	750	600	12		7.6	14.8														
18	3915	11	7.78			504	9.3	5.6	4200	5100	4800	400	350	600	450	550	400	12		7.6	22.4	3.8													
19	3744																																		
20	3846																																		
21	3958	12	7.7		122	184	17.8	7.3	4100	5500	2100	500	300	900	800	250	100	12		7.4	11.6														
22	3855	10	7.6			218		6.7	3700	5400	1900	350	200	900	700	150	100	10		7.4	5.2														
23	3878	12	7.7			242		8.3	3600	5600	1800	400	250	950	800	150	100	12		7.3	8.4														
24	3890	12	8.2		265	278		8.3	3500	4700	2300	400	200	900	500	200	100	12		7.5	7.2	2.2													
25	3846																																		
26	3889																																		
27	3926																																		
28	4179	11	7.8		182	248		4.2	4000	4400	3800	450	350	700	400	400	200	12		7.3	6.0														
29	4109	11	7.8			366		4	3900	4300	3900	400	300	650	400	400	300	12		7.3	9.6														
30	3997	11	7.9			222		3.8	3900	4100	3900	400	300	600	400	400	300	12		7.4	5.2														
31	4034	12	7.7			246		3.6	3800	4600	4900	350	300	800	700	700	500	12		7.5	8.4														
TOTAL	122243																																		
MIN	3744	10.0	7.60		100	142			3500		1800	350	200	600	400	150	100			7.2	0.8	2.2													
MAX	4179	13.0	8.20		285	1520			5400		5600	850	600	950	850	950	800			7.6	48.0	4.5													
AVE	3843	11.8	7.79		206	362			4418		4459	543	402	782	616	605	457			7.4	9.9	3.8													
Peak Flow	219 l/s		Peak One Hour		113 l/s				Peak Four Hour		103 l/s																								

BOD Removed (kg) 24754 Sludge removed = 122,550 Kg Hauled

OTHER NUTRIENTS (mg/l)

RAW SEWAGE

TREATED EFFLUENT

	TKN	PHOSPHORUS	AMMONIA as NH3	COD
Ortho	104.8	7.8	31.6	726.0
Total		8.9	0.6	
				40.0

@3:00 P.M.		Influent										Mixed Liquor										Effluent			
Date	Flow Est. M3	Temp C	pH	BOD mg/l	VSS mg/l	SS mg/l	sludge %	D.O. Cell 3	MLSS 3 mg/l	MLSS 4 mg/l	MLSS 5 mg/l	Sat.Solids Cell3 30 min	Sat.Solids Cell3 60 min	Sat.Solids Cell4 30 min	Sat.Solids Cell4 60 min	Sat.Solids Cell5 30 min	Sat.Solids Cell5 60 min	Temp C	D.O. mg/l	pH	S.S Composite	BOD Composite			
1	4013	12	7.8	205		342	10.6	6.6	4000	4400	4000	400	250	600	300	500	250	12	6.7	7.5	7.2	4.0			
2	3920																								
3	4026																								
4	3975	12	7.7		198	246		4.7	4000	4800	4400	400	300	800	650	700	500	12	4.5	7.3	2.6				
5	4066	12	7.8			1396		5.2	3900	5000	4400	400	300	850	750	600	450	12	7	7.5	35.2				
6	3960	12	7.8			170		5.8	3900	5000	4200	400	300	800	650	650	450	12	6.4	7.7	23.6				
7	3921	12	7.8			174		6.7	3900	4000	4200	400	300	650	400	550	350	12	8.5	6.9	8.8				
8	3995	12	7.8			422		6.4	4100	5100	4500	400	300	850	650	500	400	12	5.2	7.2	1.2	17.0			
9	3884																								
10	3900																								
11	3962	12	7.5		950	1152		5	4000	4700	4800	400	350	750	550	850	600	12	5.5	7.5	5.2				
12	3916	12	7.6			113.6		5.6	4300	5000	4600	400	300	800	500	700	450	12	5.5	7.6	5.6				
13	3955	13	7.9			188		5.6	3900	4700	4900	400	300	750	600	850	600	14	5.5	7.6	9.6				
14	3922	13	7.8			342		5.4	3900	4900	4700	450	350	800	600	850	600	14	5	7.5	10.8				
15	5569	11	7.8	165		232		6.5	3900	5400	5400	300	250	700	550	600	450	11	4	7.7	5.2	2.2			
16	4075																								
17	4128																								
18	4190	13	7.8			414		5.1	4200	5500	4900	450	300	850	700	800	600	13	5.8	7.6	5.6				
19	4146	13	7.7		316	436		4.2	4400	5900	5300	650	550	950	850	800	650	14	3.4	7.5	7.2				
20	4125	13	7.6			202		4.4	4200	5400	5000	450	300	800	600	550	400	14	6	7.6	6.8				
21	4136	13	7.7			675		4	4200	5800	5200	400	300	850	700	650	500	14	3.3	7.5	1.2				
22	4158	13	7.9	220		192	10.6	4.1	4500	5500	4800	650	450	900	750	700	600	13	3.5	7.7	0.8	4.0			
23	4077																								
24	4173																								
25	4120	13	7.8			646		4.6	4300	5400	4900	400	300	800	700	800	700	14	3.9	7.6	2.0				
26	4112	13	7.7			280		2.8	4400	5700	5300	750	450	950	850	900	750	13	3.8	7.6	1.9				
27	4043	13	7.7			156		3.1	4300	5500	5500	650	500	950	900	900	850	13	4.12	7.6	4.0				
28	4100	13	7.9			290	9	4.1	4300	5600	5500	700	450	900	850	900	850	13	4.3	7.5	1.6				
29	4159	17	8	195		314		6	4500	5700	5400	800	500	900	750	950	700	13	4.6	7.6	0.8	3.0			
30	4113																								
31	4113																								
TOTAL	122839																								
MIN	3884	11.0	7.50	165		114			3900	4000	4000	300	250	600	300	500	250			6.9	0.8	2.2			
MAX	5569	17.0	8.00	387		1396			4500	5500	5500	800	550	950	900	950	850			7.7	35.2	17.0			
AVE	4095	12.7	7.77	234		399			4148	4852	488	488	352	819	650	729	557			7.5	7.0	6.0			
Peak Flow	131 l/s		Peak One Hour	121 l/s					Peak Four Hour	112 l/s															

BOD Removed (kg) 28051

Sludge removed = 35350 Kg Hauled

OTHER NUTRIENTS (mg/l)

RAW SEWAGE

TREATED EFFLUENT

TKN	66.2	19.1
PHOSPHORUS	6.3	3.1
Ortho	6.8	4.0
AMMONIA as NH3	31.1	0.7
COD	793.4	183.8

Date	Flow Est. M3	Temp C	pH	Influent					Mixed Liquor					Effluent																	
				BOD mg/l	VSS mg/l	SS mg/l	sludge %	D.O. Cell 3	MLSS 3 mg/l	MLSS 4 mg/l	MLSS 5 mg/l	Sett Solids Cell 3 30 min	Sett Solids Cell 3 60 min	Sett Solids Cell 4 30 min	Sett Solids Cell 4 60 min	Sett Solids Cell 5 30 min	Sett Solids Cell 5 60 min	Temp C	D.O. mg/l	pH	S.S Composite mg/l	BOD Composite									
1	6183	15	7.9			230158		4.3	3700	5600	5500	400	200	600	500	550	450	15	5.6	7.7	8.4										
2	5766	15	7.9			158		5	3600	5500	6200	350	200	700	550	950	600	16	4	7.5	6.4										
3	5435	15	7.9			346		3.7	3900	5500	6200	400	350	800	550	900	650	16	3.8	7.6	3.6	7.5									
4	4927																														
5	4986																														
6	5043	17	8			190		3.6	4800	5600	5800	400	300	650	500	750	650	17	4	7.6	1.2										
7	5019	17	7.9			230																									
8	5029	17	8			208																									
9	5236	16	8.1			170																									
10	3376	16	8.1			192																									
11	2381																														
12	5938																														
13	6738	17	7.9			538		4.4	3400	3500	3600	150	150	200	150	200	150	17	5.5	7.5	110.0										
14	6701	16	7.8			112		3.6	3500	3700	3800	150	150	200	180	200	180	18	3.3	7.6	8.0										
15	6047	17	7.8			168		3.8	3700	4400	3800	200	150	250	200	200	150	17	4.4	7.5	4.4										
16	5826	17	7.9			130		5.2	3200	3400	3700	150	100	150	100	150	100	17	4.7	7.7	6.8										
17	5374	16	7.7			278		5	2900	3100	2800	150	100	150	100	150	100	18	5	7.7	3.6										
18	4936																														
19	6145																														
20	5207	17	7.9			46		7	2200	2000	2100	100	80	80	70	80	70	16	7.5	7.7	2.4										
21	4443	18	7.7			22		6.3	2300	2000	2200	80	80	80	60	80	70	18	6.8	7.5	1.2										
22	7573	17	7.9			244		6.6	2200	2400	2300	80	70	90	80	80	70	17	6.5	7.7	16.8										
23	5953	19	8			9.5		6.8	2300	2400	2200	80	70	80	70	80	70	18	6.7	7.7	20.8										
24	5671	17	7.9			48		7.3	2300	2200	2100	80	70	80	70	80	70	19	7.1	7.8	10.0										
25	8022																														
26	6882																														
27	5630	17	7.8			336		5.8	2500	2500	2400	80	70	80	70	80	70	17	5.9	7.7	0.4										
28	5259	18	7.9			142		5.9	2600	2500	2600	90	90	90	90	90	90	18	6	7.8	1.2										
29	5140	18	7.9			282		5.9	2900	2500	2300	100	90	80	70	70	60	19	6	7.7	2.4										
30	5010	18	7.8			192		6.3	2700	2500	2500	110	90	110	90	90	80	18	6	7.5	11.6										
31	165874																														
TOTAL	2381	15.0	7.70			22			2200	2100	2100	80	70	80	60	70	60			7.5	0.4										
MIN	8022	19.0	8.10			230158			4800	6200	6200	400	350	800	550	950	650			7.8	110.0										
MAX	5529	16.8	7.90			10652			3023	3450	3450	175	134	248	194	266	204			7.6	12.2										
AVE	195																														
Peak Flow																															

BOD Removed (kg) 23616 Sludge removed = 42,120 Kg Hauled

OTHER NUTRIENTS (mg/l)

RAW SEWAGE TREATED EFFLUENT

TKN	58.1	26.7
PHOSPHORUS	6.6	3.3
AMMONIA as NH3	7.5	3.5
COD	20.9	2.7
	534.2	64.8

@3:00 P.M.		Influent										Mixed Liquor										Effluent			
Date	Flow Est. M3	Temp C	pH	BOD mg/l	VSS mg/l	SS mg/l	Sludge %	D.O. Cell 3	MLSS 3 mg/l	MLSS 4 mg/l	MLSS 5 mg/l	Sett.Solids Cell3 30 min	Sett.Solids Cell3 60 min	Sett.Solids Cell4 30 min	Sett.Solids Cell4 60 min	Sett.Solids Cell5 30 min	Sett.Solids Cell5 60 min	Temp C	D.O. mg/l	pH	S.S Composite mg/l	BOD Composite mg/l			
1	4626																								
2	4506																								
3	4514																								
4	4677	18	7.7			148		4	2600	2600	2500	100	100	100	100	100	100	18	7.78	7.6	3.2				
5	4545	17	7.9			106		7.4	2700	2100	2500	100	100	100	100	90	90	19	6.9	7.6	7.6				
6	4498	18	7.8		98	128	11	6.8	2700	2100	2400	100	100	100	100	90	90	19	7.1	7.7	6.8				
7	4260	17	7.8			96		6.4	2700	2500	2400	100	100	100	100	90	90	18	7.3	7.6	1.2				
8	4284	18	7.7		160	160	10.4	6	2700	2500	2400	100	100	100	100	100	90	19	4.5	7.5	11.6	3.5			
9	4203																								
10	5754																								
11	11753																								
12	7347	19	7.5					6.1	2700	3000	2600	90	80	110	100	80	70	18	6.4	7.4					
13	6113	18	7.6		102	158		5.8	2800	2900	2700	100	90	100	100	100	80	18	6	7.5	9.2				
14	4823	16	7.6			40		7.7	2600	2500	2400	100	70	100	80	100	80	18	7.6	7.6	12.0				
15	4613	18	7.7		170	98		7	2600	2400	2500	100	80	90	100	90	90	18	7.5	7.6	12.8	2.2			
16	4088																								
17	4471																								
18	4216	19	7.5					7.4	2600	2200	2200	100	90	70	60	70	60	19	8.2	7.5					
19	4213	19	7.6		106	138	20.5	7.1	2800	2600	2500	100	80	100	80	100	80	19	7.6	7.5	4.0				
20	5088	19	7.9			164		4.7	2300	2600	2500	90	80	100	80	100	80	19	3.9	7.6	3.6				
21	6045	19	7.6			190		4.2	2300	2500	2300	90	80	90	80	90	80	19	4.7	7.5	2.8				
22	5410	18	7.8		110	96	13.6	4	2300	2500	2400	90	80	80	100	90	90	19	5	7.6	6.4	3.5			
23	5229																								
24	4699																								
25	5221	18	7.8		268	364		3.8	2500	2400	2500	100	90	100	100	100	90	19	3.6	7.6	1.2				
26	5247	18	7.9			150	11	3.6	2400	2400	2400	100	90	100	90	100	90	19	3.8	7.6	2.8				
27	4823	18	7.9			162		4	2500	2300	2400	100	90	100	100	100	80	19	3.6	7.6	2.4				
28	5600	18	7.9			172		5.6	2200	2500	2000	100	90	100	80	90	80	19	4.4	7.8	12.0				
29	4370	18	7.8			144		4.6	2500	2000	2400	100	100	100	100	100	100	19	3.9	7.6	7.6	5.8			
30	4950																								
31	4265																								
TOTAL	158453																								
MIN	4088	16.0	7.50	110		40		2200			2000	90	70	70	60	70	60			7.4	1.2	2.2			
MAX	11753	19.0	7.90	175		364		2800			2700	100	100	110	100	100	100			7.8	12.8	5.8			
AVE	5111	18.1	7.74	154		148		2533			2421	98	89	97	89	95	85			7.6	6.3	3.8			
Peak Flow	183 l/s		Peak One Hour	150 l/s				Peak Four Hour			103 l/s														

BOD Removed (kg) 23768 Sludge removed = 61,300 Kg Hauled

OTHER NUTRIENTS (mg/l) RAW SEWAGE TREATED EFFLUENT

TKN	54.3	24.1
PHOSPHORUS	5.5	3.3
AMMONIA as NH3	6.1	3.9
COD	14.1	1.6
	809.0	77.3

Date	Flow Est. M3	Temp C	pH	Influent					Mixed Liquor										Effluent							
				BOD mg/l	VSS mg/l	SS mg/l	sludge %	D.O. Cell 3 mg/l	MLSS 3 mg/l	MLSS 4 mg/l	MLSS 5 mg/l	Set.Solids Cell3 30 min	Set.Solids Cell3 60 min	Set.Solids Cell4 30 min	Set.Solids Cell4 60 min	Set.Solids Cell5 30 min	Set.Solids Cell5 60 min	Temp C	D.O. mg/l	pH	S.S Composite	BOD Composite				
1	5189	18	7.96					7.61	2700	2400	2300	130	110	100	90	100	110	100	100	90	18	7.74	7.9	7.7	14.4	2.2
2	5208	19	8.11					5.3	2800	2100	2500	130	110	90	80	120	110	110	110	19	2.59	7.8	7.7	2.0	6.0	
3	4889	19	8.06					6.87	2700	2600	2300	130	110	120	110	100	100	100	90	19	6.5	7.9	7.9	6.0	6.0	
4	4716	18	7.98					7.19	2500	2300	2200	110	100	100	90	100	100	100	90	19	7.14	7.9	7.9	20.0	6.0	
5	4653	18	7.98																							
6	4613	18	7.98																							
7	4021	20	7.8																							
8	4027	19	7.9																							
9	4712	19	8.1																							
10	4158	19	8																							
11	3599	19	8																							
12	4729	19	7.9																							
13	3942	20	7.9																							
14	3799	20	7.9																							
15	2116	20	8.1																							
16	7892	22	8																							
17	4997	22	8																							
18	3733	21	7.9																							
19	6601	21	7.9																							
20	5534	21	7.8																							
21	1066	21	7.8																							
22	4998	20	8.1																							
23	5111	20	7.8																							
24	3837	20	7.8																							
25	3900	20	7.5																							
26	4288	20	7.5																							
27	3886	20	7.8																							
28	3900	20	7.8																							
29	3288	20	7.8																							
30	4526	21	7.8																							
31	3427	21	7.5																							
TOTAL	134855																									
MIN	1066	18.0	7.50																							
MAX	7892	22.0	8.11																							
AVE	4350	19.8	7.90																							
Peak Flow	193 U/s																									
Sludge removed =																										
BOD Removed (kg)	20066																									
Sludge removed =																										
81,700 Kg Hauled																										

OTHER NUTRIENTS (mg/l)		RAW SEWAGE		TREATED EFFLUENT	
TKN	28.9	28.9	12.4		
PHOSPHORUS	8.2	8.2	3.7		
AMMONIA as NH3	10.1	10.1	6.0		
COD	489.3	19.7	1.2		
			129.5		

Date	Flow Est. M3	Temp C	pH	Influent				Mixed Liquor										Effluent			
				BOD mg/l	VSS mg/l	SS mg/l	Sludge %	D.O. Cell 3	M.L.S.S 3 mg/l	M.L.S.S 4 mg/l	M.L.S.S 5 mg/l	Sol:Solids Cell3 30 min	Sol:Solids Cell3 60 min	Sol:Solids Cell4 30 min	Sol:Solids Cell4 60 min	Sol:Solids Cell5 30 min	Sol:Solids Cell5 60 min	Temp C	D.O. mg/l	pH	S.S Composite
1	4900	21	7.7	156	2700	142	2.5	2800	2900	2800	140	120	130	110	130	120	21	3.5	7.3	1.6	1.6
2	4900	21	7.8	115	2700	142	3	2700	2900	2700	130	110	130	110	120	110	21	3	7.5	2.8	4.5
3	4900																				
4	4900																				
5	4900																				
6	4900	20	7.5	214	278	146	3.2	3700	4000	3600	180	150	200	160	190	160	20	3.6	7.1	3.6	3.0
7	4900	20	7.6	436	278	122	3	4000	5200	3100	180	160	350	250	170	130	19	3.5	7.2	8.0	8.0
8	4900	20	7.6	122	2800	146	4.2	4600	2800	3600	250	200	150	120	160	140	20	5	7.2	4.0	4.0
9	4900	20	7.6	146	2500	146	3.4	3900	2500	5600	220	170	140	100	600	370	20	4.6	7.5	6.8	6.8
10	4900																				
11	4900	20	8.1	114	102	86	2	3200	5300	4600	200	150	400	350	300	250	19	3.6	7.7	3.2	3.2
12	4900	17	8.1	348		36	2.8	4300	4800	4600	260	200	300	250	300	250	18	4.6	7.6	11.6	11.6
13	4900	19	8	330		36	3.1	3100	5800	5000	200	150	500	400	450	320	19	5	7.6	13.2	13.2
14	4900	19	7.9	36		86	2.1	3100	5900	5500	200	150	700	400	600	450	19	3.8	7.8	17.2	17.2
15	4900	19	8.3	86		86	0.75	3700	5800	4400	210	160	670	350	250	200	18	5.4	7.9	26.0	26.0
16	4900																				
17	4900	19	7.7	374		238	2.6	3700	3600	5400	250	200	650	450	250	150	19	3.7	7.6	9.6	9.6
18	4900	19	7.8	238		86	2.2	3500	5600	4700	200	180	500	400	400	350	19	3	7.7	9.2	9.2
19	4900	18	8.1	86		318	2.1	3100	6200	5300	200	150	650	500	450	350	19	3.1	8.1	16.0	16.0
20	4900	18	7.8	318		284	2.6	4500	6200	5200	250	200	600	500	400	300	18	3.2	7.7	6.0	6.0
21	4900	15	7.6	284		15	2.7	3700	7200	5100	250	200	850	700	450	400	17	2.9	7.3	20.0	20.0
22	4900																				
23	4900	17	7.7	15		264	3.4	2700	6700	4300	200	150	700	600	300	200	18	4.4	7.2	8.8	8.8
24	4900	17	7.6	264		122	3.6	3200	6500	4200	250	150	750	650	300	250	17	3.8	7.1	10.8	10.8
25	4900	18	7.6	122		172	5.3	3800	5500	3500	300	200	650	600	300	200	18	3.8	7.1	10.8	10.8
26	4900	19	7.6	172		168	4.8	3400	6500	3800	250	200	700	600	350	250	19	3.5	7.1	4.8	4.8
27	4900	18	7.7	168			4	3800	6000	3800	350	200	700	600	400	200	19	3.3	7.1	12.0	12.0
28	4900																				
29	4900																				
30	4900																				
31	4900																				
TOTAL	147000																				
MIN	4900	15.0	7.50	100		15		2700		2700	130	110	130	100	120	110			7.1	1.6	3.0
MAX	4900	21.0	8.30	180		436		4600		5600	350	200	850	700	600	450			8.1	26.0	8.0
AVE	4900	18.8	7.78	136		199		3548		4324	222	169	496	390	322	240			7.4	9.8	5.4
Peak Flow	127 Us		Peak One Hour	104 Us				Peak Four Hour		89 Us											

BOD Removed (kg) 19204 Sludge removed = 72,600 Kg Hauled

OTHER NUTRIENTS (mg/l)

RAW SEWAGE

TREATED EFFLUENT

	TKN	PHOSPHORUS	AMMONIA as NH3	COD
RAW SEWAGE	28.0	Ortho 9.6 Total 14.2	15.7	375.0
TREATED EFFLUENT	6.7	5.1 5.7	1.3	72.8

Date	Flow Est. M3	Temp C	pH	Influent					Mixed Liquor						Effluent							
				BOD mg/l	VSS mg/l	SS mg/l	sludge %	D.O. Cell 3	MLSS 3 mg/l	MLSS 4 mg/l	MLSS 5 mg/l	Sett.Solids Cell3 30 min	Sett.Solids Cell3 60 min	Sett.Solids Cell4 30 min	Sett.Solids Cell4 60 min	Sett.Solids Cell5 30 min	Sett.Solids Cell5 60 min	Temp C	D.O. mg/l	pH	S.S Composite mg/l	BOD Composite mg/l
1	4400	17	7.4	158	246	158	204	2.4	5400	7900	7100	600	500	900	800	850	750	16	3.1	6.9	2.4	2.3
2	4400	17	7.4	158	246	158	204	2.6	5300	7800	7000	650	500	850	800	800	700	18	3.7	6.9	12.4	3.0
3	4400	17	7.4	125	204	204	204	4.6	6400	7800	6900	800	600	900	800	900	700	19	6.2	7.3	8.8	
4	4400	18	7.6																			
5	4400	17	7.9	668	972	972	294	3.2	5900	8000	7400	650	500	900	800	850	750	17	4	7.4	6.8	
6	4400	17	7.6					2.4	5700	8000	7600	550	400	850	750	850	700	17	4.8	7.2	10.4	
7	4400	17	7.6					1.2	5600	8100	7400	500	500	900	800	950	800	17	3.5	7.3	4.0	
8	4400	18	7.8	160	170	170	170	1.8	5700	8200	7500	800	550	900	800	950	850	17	3.4	7.5	15.6	3.2
9	4400	17	7.8																			
10	4400	17	7.8																			
11	4400	17	7.8																			
12	4400	17	7.8																			
13	4400	17	7.8																			
14	4400	17	7.8	214	310	310	144	1	5700	8300	7700	800	600	950	900	950	850	17	3	7.7	6.0	
15	4400	17	7.9					3.6	5900	900	850	900	850	950	850	950	900	17	5.8	7.9	17.6	
16	4400	17	7.9					4	5700	7600	7600	750	650	950	850	950	900	17	4.9	7.7	21.6	
17	4400	17	7.8					3.8	5600	6800	8200	700	400	800	600	950	900	17	4.6	7.6	10.8	
18	4400	16	8.2	340	290	290	184	5.8	5600	7300	6800	800	550	900	650	950	750	16	4.2	8.0	35.6	2.3
19	4400																					
20	4400	15	7.9	254	320	320	590	5.9	5200	6900	6500	800	700	800	700	900	850	15	3.9	7.5	7.5	
21	4400	15	8					3.8	5000	6600	6500	740	900	900	770	910	800	15	4	7.6	7.6	
22	4400	16	8.1					7.3	5600	5600	6100	820	550	830	680	840	680	16	7.7	7.8	7.8	
23	4400	16	8.1					7.2	5500	5500	5500	750	500	740	490	770	500	16	7.7	7.8	7.8	
24	4400	16	8.2					7.1	5400	5500	5500	830	620	840	580	780	530	16	7.4	7.8	7.8	
25	4400																					
26	4400																					
27	4400																					
28	4400																					
29	4400																					
30	4400																					
31	4400																					
TOTAL	132000																					
MIN	4400	15.0	7.40	125	144	144	972		5000		5500	550	400	740	490	770	500			6.9	2.4	2.3
MAX	4400	18.0	8.20	340	302	302	10894		6400		70000	900	850	950	900	950	900			8.0	35.6	3.2
AVE	4400	16.6	7.84	208					5600		10894	746	559	869	736	884	751			7.5	12.7	2.8

BOD Removed (kg) 27126 Sludge removed = 16510 Kg Hauled

OTHER NUTRIENTS (mg/l)

RAW SEWAGE	TREATED EFFLUENT	
TKN	58.3	126
PHOSPHORUS	7.3	4.3
Ortho	9.4	6.0
Total		
AMMONIA as NH3	24.2	0.9
COD	440.8	95.3

Date	Flow Est. M3	Temp C	pH	Influent						Mixed Liquor						Effluent						
				BOD mg/l	VSS mg/l	SS mg/l	sludge %	D.O. Cell 3	MLSS 3 mg/l	MLSS 4 mg/l	MLSS 5 mg/l	30 min	60 min	30 min	60 min	30 min	60 min	Temp C	D.O mg/l	pH	S.S Composite	BOD Composite
1	4500	15	8.3	170	168	264		4.3	4900	6000	5300	450	350	900	650	800	550	15	3.8	7.7	14.8	2.2
2	4500	15	8.2	170	168	220		3.1	4700	5400	5400	650	500	850	700	850	750	15	5.9	7.8	20.8	2.2
3	4500																					
4	4500																					
5	4500	14	8.1	156	198			4.2	4200	5200	5100	500	400	900	800	900	800	14	5.7	7.9	25.2	5.8
6	4500	14	8.3					7.4	4500	5000	4300	610	430	870	700	730	520	13	6.8	8.1	6.8	2.2
7	4500	13	8.3					5.4	3350	4400	3000	500	300	950	600	500	250	14	6.1	7.9	15.2	2.2
8	4500	13	8.4					5.9	3700	3500	3300	400	30	450	350	450	350	13	6.4	7.9	8.8	2.2
9	4500	13	8.3	115				6	2400	2500	2900	350	250	400	300	400	300	13	6.2	7.9	8.4	5.8
10	4500																					
11	4500																					
12	4500	13	7.9	150	236			4.4	3100	3200	3200	300	200	300	200	350	250	13	4.7	7.8	19.6	2.2
13	4500	13	8.1					7.3	3300	3400	3200	270	210	310	250	280	210	13	7.9	7.9	3.6	2.2
14	4500	13	7.1					2.9	3200	3000	3300	300	200	300	200	300	200	12	3.9	7.9	14.8	2.2
15	3823	13	8.2	150	364			3.8	2700	2900	2800	300	200	350	250	300	200	12	4.4	7.7	5.2	2.2
16	5794	13	8.1					4	2600	2900	2900	250	200	300	250	300	250	13	4	7.8	10.0	2.5
17	3412																					
18	4647																					
19	5002	13	8.2					3.4	2600	2800	2800	300	200	350	250	350	250	13	4	7.9	10.4	2.2
20	4673	13	8.1					3	2600	2800	2800	300	200	350	200	350	200	13	3.8	7.6	10.0	2.2
21	6373	13	8.2	562	1038			3.2	2500	3000	2900	250	150	300	200	350	250	13	4.1	7.7	13.6	2.2
22	4117	13	7.8	170	362			4.6	2400	2900	2600	300	200	350	200	300	200	13	4.3	7.4	4.8	2.2
23	4171	13	7.9						2600	2600	2600	300	200	350	200	300	200	13	5.5	7.3	5.2	3.0
24	4495																					
25	4519																					
26	4183																					
27	4510	13	8.1	195	222			3.8	2500	2900	2800	250	100	350	250	300	200	12	4	7.4	8.8	4.2
28	5304																					
29	3827																					
30	5162	13	8					3.6	2900	2900	2900	300	200	300	200	300	200	13	4.1	7.4	13.2	4.2
31	3928																					
TOTAL	140941																					
MIN	3412	13.0	7.10	115	180				2400		2600	250	30	300	200	260	200			7.3	3.6	2.2
MAX	6373	15.0	8.40	195	1926				4900		5400	650	500	950	800	900	800			8.1	25.2	5.8
AVE	4546	13.3	8.08	160	455				3197		3389	359	238	486	358	444	325			7.7	11.5	3.5

BOD Removed (kg) 22052 Sludge removed = 116,630 Kg Hauled

OTHER NUTRIENTS (mg/l)

RAW SEWAGE

TREATED EFFLUENT

	TKN	PHOSPHORUS	AMMONIA as NH3	COD
RAW SEWAGE	55.7	6.0	22.8	683.8
TREATED EFFLUENT	12.7	3.6	0.8	218.4
		8.0		
		Ortho		
		Total		