PERMIT FACT SHEET - MUNICIPAL

Prepared by Bruce Oman – October 19, 2012

General Information		
Permittee	Kelly Lake Sanitary District	
	Permit No: WI-0060224	FID: 443004650
Design Flow	0.165 MGD 0.255 cfs	Type: Annual Average
Receiving Stream	Groundwater of Little River Watershed (GB04)	
Discharge Location	SE ¼ of NE ¼, Sec. 1, T29N-R18E Town of Maple Valley, Oconto Co. N 45° 1.167' W 88° 14.717'	

Facility Description

Treatment consists of two septic tank trains, a dosing chamber, four recirculating sand filters with discharge to four seepage cells. A groundwater monitoring system has been provided. These facilities were constructed in 1999. The collection system includes seven lift stations. Solids generated at the facility are considered septage.

Substantial Compliance

	Compliance	Comments
Limits being met	Yes	
Sampling/Testing as required	Yes	
Groundwater Standards	Yes	The facility has exceeded the Preventative Action Limits (PALs) for Nitrite/Nitrate Nitrogen and Chloride in downgradient wells. Enforcement Standards (ES) do not apply at any of the wells. The discharge plume intersects surface water (wetland) inside the DMZ.
Operator at proper grade	Yes	
Reporting as required	Yes	
Compliance Schedules met	Yes	The current permit which expires December 31, 2012 does not contain any compliance schedules.
Sludge Management Adequate	Yes	
Enforcement considerations	No.	
In substantial compliance?	Yes.	

Proposed Permit Changes & Explanations

Permit Monitoring – Influent

Sample Point 701 Location: End of forcemain in first chamber of septic tank

Parameter	Existing Sample Frequency	Existing Sample Type	Proposed Sample Frequency	Proposed Sample Type
Flow	Daily	Continuous	Daily	Continuous
BOD5	Monthly	24-hr fp composite	2/Monthly	24-hr fp composite
Suspended Solids	Monthly	24-hr fp composite	2/Monthly	24-hr fp composite
Nitrogen,Total Kjeldahl	Monthly	24-hr fp composite	2/Monthly	24-hr fp composite
Nitrogen, Ammonia	Monthly	24-hr fp composite	2/Monthly	24-hr fp composite
Nitrogen, Organic	Monthly	24-hr fp composite	2/Monthly	24-hr fp composite

Influent monitoring results have shown variability and acceptance of significant amounts of septage make it important to adequately assess loading to the treatment plant. Therefore it is recommended that sampling frequency be increased.

Permit Monitoring and Limits – Effluent

Outfall 002 Sample Location: Splitter box effluent flume. Samples collected for all parameters with the exception of pH must be 24-hr flow proportional composits. The pH samples shall be a grabs.

	Existing			Proposed	
	Limits	**Type**	**Sampling Frequency**	**Limits**	**Sampling Frequency**
Flow		Continuous	Daily		Daily
BOD_5	50 mg/l	Monthly Avg	Weekly	50 mg/L	Weekly
TSS		Monitoring	Weekly	Monitoring	Weekly
pH		Monitoring	Weekly	Monitoring	Weekly
Nitrogen, T. Kjeldahl		Monitoring	Monthly	Monitoring	Monthly
Nitrogen, Ammonia		Monitoring	Monthly	Monitoring	Monthly
Nitrogen, Organic		Calculated	Monthly	Calculated	Monthly
Nitrogen, NO2+NO3		Monitoring	Monthly	Monitoring	Monthly
Nitrogen, Total		Calculated	Monthly	Calculated	Monthly
Chloride		Monitoring	Monthly	Monitoring	Monthly
Total Dissolved Solids		Monitoring	Monthly	Monitoring	Monthly

The basis for the alternative limits (i.e. no limits) for Total Nitrogen and Chloride is that it is believed the facility will not exceed the groundwater standards at the point of standards application. At the boundaries of the Design Management Zone the treated wastewater will no longer be in the groundwater but rather will have been discharged to a wetland. It is also believed that the discharge will not exceed water quality standards for surface waters or adversely impact the wetland.

Permit Monitoring and Limits – Groundwater

The following wells are to be monitored: 803, 804 and 805(background). An NR140 Conformance Evaluation was completed in October 2012. PAL's for indicator parameters (also shown below) were calculated using 17 data sets from well 805. Administrative Code NR 140 was recently revised to include Public Health Groundwater Quality Standards for Ammonia Nitrogen and Manganese (as shown below).

	Preventative Action Limit (PAL)	Enforcement Standard (ES)	Monitoring Requirement
Depth to Groundwater			Quarterly measurement
Groundwater Elevation			Quarterly calculation
Total Kjeldahl Nitrogen			Quarterly - Grab
Nitrite/Nitrate Nitrogen	2.0 mg/L	10 mg/L	Quarterly - Grab
Ammonia Nitrogen	0.97 mg/L	9.7 mg/L	Quarterly - Grab
Manganese[1]	60 ug/L	300 ug/L	Quarterly - Grab
Organic Nitrogen	2.8 mg/L		Quarterly calculation
Chlorides	125 mg/L	250 mg/L	Quarterly - Grab
Total Dissolved Solids	520 mg/L		Quarterly - Grab
pH	6.5-8.5 s.u.		Quarterly - Grab

1 – Manganese monitoring shall only occur in the fourth year of the permit. That data will be used to determine if monitoring is necessary in the subsequent permit.

Sludge Requirements

Sludge Type	Solids generated are considered septage. They are currently collected every other year by a licensed septage hauler and land applied on a nearby agricultural field.

Other

Because the only discharge from the facility is to groundwater the Department may consider delaying issuance of the permit because of workload issues. A complete permit application was electronically submitted May 19, 2012. The application did not include any requested changes to the reissued permit. As noted above the permittee is in substantial compliance with the effluent and groundwater requirements in the current permit. An NR140 Conformance Evaluation report (copy is in SWAMP – Permit Documents) was prepared in 2012 and the Preventative Action Limits (PAL's) calculated are not significantly different than those in the current permit. The current groundwater monitoring system is adequate to assess impacts of the discharge on groundwater. The report does not recommend Alternative Concentration Limits (ACL's). The new groundwater standards for Ammonia Nitrogen are well above the concentrations found in the monitoring wells. The permittee doesn't currently monitor for Manganese but there is no indication that the facility can not meet the PAL and ES. Therefore there is no need to reissue the permit immediately to address these issues. Based on this information the Permit Drafter may delay issuance of the permit until workload allows.

Recommended Permit End Date	Five years after reissuance.

COMPLIANCE INSPECTION &

NR 140 CONFORMANCE EVALUATION REPORT

FOR THE

KELLY LAKE SD #1

WASTEWATER TREATMENT FACILITY

OCONTO COUNTY

WPDES PERMIT NO. WI-0060224

October 18, 2012

BRUCE S OMAN, PE – DNR Peshtigo

The Kelly Lake SD #1 wastewater treatment plant is located in central Oconto County in the Lower North Branch of the Oconto River watershed (GB05) in the Upper Green Bay Basin of the Departments East District. The legal description of the property is the SE 1/4 of the NE 1/4, Section 1, T29N-R18E in the Town of Maple Valley.

FACILITY DESCRIPTION

The Kelly Lake SD wastewater treatment plant treats domestic wastes generated within the district which is comprised of a mixture of permanent and seasonal homes around Kelly Lake. Beginning in 2009 the District began receiving considerable amounts of septage. The collection system includes seven lift stations. An aerial photo of the plant site is attached.

Influent wastewater is monitored using a 24-hour flow proportional composite sampler. Wastewater can flow through one or both of the septic tank trains to a dosing chamber. Wastewater is pumped from the dosing chamber to the recirculating sand filters. The under drains for the sand filters collect the filtered water and it flows by gravity to the seepage cells. A portion of the under drain water can be returned (by gravity) to the dosing chamber to be sent through the filters again. Effluent from the sand filters is monitored using a 24-hour flow proportional composite sampler.

Treated wastewater is discharged to the seepage basins using an above ground distribution pipe network. Solids from the septic tanks must be periodically removed and land applied as septage to agricultural fields. Three monitoring wells have been provided to assess the impact of the discharge on the groundwater.

The treatment plant was designed to accept 0.165 million gallons per day (MGD) and treat 250 pounds of BOD per day. In 2011 the treatment plant received an average of 0.055 MGD which included an average BOD load of 80 #/day. The flow and BOD load are considerably higher during the summer months.

In 2011 the treatment plant received 478,000 gallons of septic tank waste and 1,425,000 gallons of holding tank waste. Septage is accepted year round with the highest loading occurring in May and June (see Attachment 1). Samples collected by the influent composite sampler do not account for the septage discharge. The operator does include the septage flow in reporting but the actual total BOD load is understated by the current monitoring system.

FACILITY OPERATION & MAINTENANCE

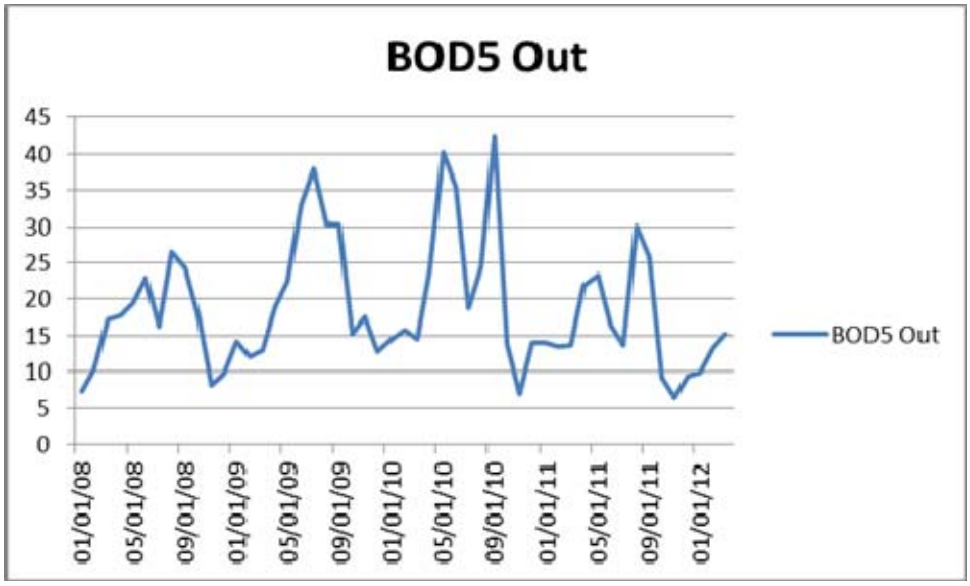
Because of the significant amount of septage received both septic tank trains are currently being used. The sand filters can be set to operate at different recycle rates. The sand filters are now being operated in a once through mode. Currently two of the sand filters are in use. The operator rotates use of the filters being careful to “season” a new filter during the warmer months.

The operator also rotates use of the seepage cells. A dosing log is maintained. The operator uses a winter operation mode to protect the distribution system. Because of rapid permeability of the cells the operator has discontinued tilling the surfaces of the cells. He maintains the cells by preventing deep rooted vegetation from becoming established. The Operation & Maintenance manual includes discussion of operation of the land application system but there is no separate management plan.

The operator maintains equipment as required but doesn’t have an organized system of documentation and filing.

SEPTIC TANK AND SAND FILTER PERFORMANCE

The only effluent limitation contained in the WPDES permit is for monthly average Total BOD_5 (50 mg/L) at outfall 002. There were no exceedances reported of this limitation during the current permit term. There is a seasonal fluctuation with the highest values being observed in the summer. The graph below may indicate the impact of summer acceptance of septage; however it wasn't accepted until 2009.



There are other monitoring requirements at outfall 002 to assess the potential for groundwater standard exceedances. Attachment 2 is a summary of that data.

There were no significant trends observed when viewing the data, however since about mid 2010 there has been a moderate increase in Total Nitrogen and NO_2/NO_3 Nitrogen and slight decrease in effluent Ammonia Nitrogen. Attachment 3 is a graph of these trends. This roughly coincides with the significant amount of septage received beginning in 2009. The lower ammonia results may be due to increased denitrification in the sand filters, which would in turn increase the NO_2/NO_3 concentration. The increase in Total Nitrogen may indicate an impact from the septage. If NO_2/NO_3 concentrations continue to increase the Sanitary District may have to look at alternatives to reduce it to prevent excessive amounts in the groundwater and nearby wetland.

Following is an analysis of the Sanitary District's conformance with Wisconsin Administrative Code NR 140 (Groundwater Quality). This is a review of the impacts of the groundwater discharge from the facility.

SITE CHARACTERISTICS

The seepage cells are located in a rural area used for forestry and recreation. The topography of the area is nearly level with groundwater near the surface. Wetlands nearly surround the site. Glacial lake plains, consisting principally of fine sand overly the bedrock at the site. The bedrock underlying the site is composed of Upper Cambrian sandstone.

The seepage cells were constructed in Shawano series soils. This series consists of deep, excessively drained, rapidly permeable soils on outwash plains and glacial lake plains. These soils formed in deposits of fine sand. The upper 60” of soil has a permeability of 6.0-20 inches/hour. The seepage cells and dikes were constructed using native soils.

According to the monitoring well logs, the depth to bedrock is greater than 20 feet and the depth to groundwater is approximately 10 feet below the bottom of the seepage cells. Groundwater beneath the site flows to the west and north of the seepage cells where it eventually intersects a wetland adjacent to the site. The wetland drains to a tributary to Kelly Brook about 500 feet from the edge of the seepage cells.

The nearest potable wells to the seepage cells are private wells serving residences on the west shore of Kelly Lake approximately 0.5 miles east (upgradient).

Based on information regarding the Shawano series, it would be expected that the hydraulic conductivity is high. When the seepage cells are dosed they do not flood.

GROUNDWATER MONITORING

As stated previously, three groundwater-monitoring wells were installed around the seepage cells in 1999. STS Consultants installed the wells. Borings were advanced using a hollow stem auger. Upon completion of each boring, a 2" inside diameter PVC observation well was installed. Ten-foot PVC screens were provided. Waupaca 40/60 was used a filter pack material.

Monitoring Well #3 (803) is 18.0 feet deep with about 8.5 feet of standing water. The well is located approximately 20 feet from the southern edge of seepage cell 4.

Monitoring Well #4 (804) is 18.0 feet deep with about 7.3 feet of standing water. The well is located approximately 20 feet from the northern edge of seepage cell 3.

Monitoring Well #5 (805-background) is 14.0 feet deep with about 9.4 feet of standing water. The well is located approximately 600 feet east of the seepage cells on the access road to the treatment plant.

Groundwater monitoring is conducted quarterly. The system operator collects samples using a 12 volt pump. The appropriate volume is purged from the well prior to sample collection. The wells recharge sufficiently to allow collection of the proper sample volume. Groundwater elevations are determined using an electronic sensor attached to a graduated staff gage. Field pH is determined using a portable meter. Samples are shipped to a commercial laboratory (currently Davy Laboratories) for analysis.

GROUNDWATER DATA

To protect public health NR 140 establishes Preventive Action Limits (PALs) and Enforcement Standards for many substances. Recent revisions included Public Health Groundwater Quality Standards for Ammonia Nitrogen and Manganese (as shown below). The standards for NO2 & NO3 (as N) and Chloride remained the same. The following table includes those parameters pertinent to the Kelly Lake groundwater discharge.

Parameter	Groundwater Standard	PAL	Enf. Std.
Ammonia (as N)	Health - NR140 Table 1	0.97 mg/l	9.7 mg/l
Manganese	Health - NR140 Table 1	60 ug/l	300 ug/l
NO_2 & NO_3 (as N)	Health - NR140 Table 1	2 mg/l	10 mg/l
Chloride	Welfare - NR140 Table 2	125 mg/l	250 mg/l

There is no available groundwater data for Manganese to determine if these standards are appropriate for Kelly Lake. The reissued WPDES permit should require monitoring to make that determination.

NR 140 requires that Preventative Action Limits for indicator parameters be calculated. Indicator parameters are used to assess impacts on background water quality. PALs for indicator parameters are based on the average background concentration plus three times the standard deviation or Table 3 of NR140 except pH which is taken from NR140.20. The following PAL's for indicator parameters have been calculated (see Attachment 4) using data from well MW-5 (805):

Parameter	PAL based on	Existing PAL	Proposed PAL
pH	NR140.20(2)a	6.5-8.5 su	6.5-8.5 su
Ammonia Nitrogen	NR140.20(2)c Mean + Table 3	2.2 mg/L	N/A
Organic Nitrogen	NR140.20(2)c Mean + Table 3	2.1 mg/L	2.8 mg/L
Dissolved Solids	NR140.20(2)c Mean + Table 3	490 mg/L	520 mg/L

The tables in Attachment 5 summarize the groundwater monitoring data collected over the last five years. Wells 803 and 804 are located inside the Design Management Zone (DMZ) and within the property boundary. The DMZ is established in the code as a three dimensional boundary surrounding the seepage area. In this case it would extend horizontally 250 feet from the edge of the seepage cells and vertically down through all saturated geological formations.

Groundwater elevations at Well 805 are not significantly different than the other wells however results from groundwater monitoring indicate that it is a background well and data from it should be used to calculate PALs.

NO_2/NO_3-Nitrogen results for Wells 803 and 804 during the current permit term were slightly higher than the results from the previous permit term. NO_2/NO_3-Nitrogen results for Wells 803 and 804 reflect the concentration found in the sand filter effluent. No NO_2/NO_3-Nitrogen removal can be expected from the seepage cells.

Results for Chloride and Total Dissolved Solids (TDS) for Wells 803 and 804 have also consistently exceeded the PALs established in the current permit. There has also been an increasing trend for these parameters (About 12% in well 803 and 25% in well 804) when comparing the concentrations with the last permit term.

Enforcement Standards apply at any point outside the property boundary, or any point within the property boundary beyond the 250-foot DMZ. PAL's apply at any point groundwater is monitored. In this case only PAL's apply.

Since the PALs for Chloride, TDS and NO2/NO3-Nitrogen have been exceeded inside the DMZ, the Department must evaluate the location of the monitoring point of PAL exceedance, the specific characteristics of the site, the nature of the substance involved and the likelihood of substance migration. The characteristics of Chloride, TDS and NO2/NO3-Nitrogen indicate the only reduction in concentration for groundwater at this location would come from dilution. It is also expected that these substances would migrate in the direction of groundwater flow.

Following are 10 areas the Department must look at in determining what action the discharger should take:

1. Background water quality- A review of the data shows that the discharge is obviously impacting the concentration of Chloride, TDS and NO2/NO3-Nitrogen. Therefore the PALs are not being exceeded due to background conditions.

2. Reliability of sampling data- The data for Chloride, TDS and NO2/NO3-Nitrogen appears to be reliable.

3. Public health, welfare, and environmental effects of substance- Consumption of groundwater contaminated with NO2/NO3-Nitrogen may cause health problems, however there are no known uses of the affected groundwater.

4. Probability that a PAL or an enforcement standard may be attained or exceeded outside the DMZ- It is likely that the discharge intersects surface water within the 250 foot DMZ.

5. Performance of the facility- The treatment facility is performing as designed. It may be possible to further reduce nitrogen through operational changes and source reduction, however this is not the case for Chloride and Total Dissolved Solids.

6. Location of the monitoring point- Well numbers 803 and 804 are located such that they intersect groundwater flow from beneath the seepage cells.

7. Other known or suspected sources of the substance in the area - It is possible the previous treatment system has impacted the groundwater. There are no other sources in the area.

8. Hydrogeologic conditions- Groundwater from beneath and around the seepage cells intersects the surface water adjacent to the facility.

9. Extent of groundwater contamination - Groundwater impacts would cover the small area previous to where the water table intersects with surface water. As stated earlier, no groundwater uses exist downgradient of the site.

10. Alternate responses- Operational changes or source reduction may be able to prevent exceedances of the PAL for NO2/NO3-Nitrogen.

DISCUSSION

During the current permit term there has been an increase in Chloride, Total Dissolved Solids and NO2/NO3-Nitrogen concentrations in Monitoring Wells 803 and 804. The Sanitary District should track this trend as well as review its monitoring procedures to assure accurate data is being collected.

The NO_2/NO_3-N concentration could be reduced through operational changes. However, it is unlikely that improved nitrogen removal could be sustained throughout the year because of winter temperatures. It may also be possible to reduce the NO2/NO3-Nitrogen concentration by restricting the acceptance of septage or by more frequent solids removal from the septic tanks. The current WPDES permit does not include a 10 mg/L Total Nitrogen limit because the groundwater from beneath the seepage cells surfaces within the Design Management Zone.

The Sanitary District needs to better document its land application management plan and equipment maintenance activities.

CONCLUSIONS

1. The treatment system is being operated as designed.

2. Acceptance of significant amounts of septage may be affecting plant performance.

3. The monitoring wells appear to have been properly installed.

4. There is enough data to calculate Preventative Action Limits for the indicator parameters.

5. There is very low potential for groundwater impacts on public or private wells.

RECOMMENDATIONS

A. The Sanitary District shall prepare a Land Application Management Plan for operation of the seepage cell system in accordance with section 5.3.6 of its WPDES permit.

B. The Sanitary District should initiate a documented equipment maintenance program for all major pieces of equipment.

C. The Sanitary District should review its sampling and groundwater elevation measurement procedures to assure accurate data is being collected.

D. The Sanitary District should look at ways to optimize wastewater treatment in the recirculating sand filter.

E. The Sanitary District should evaluate ways of estimating the organic load from septage.

F. The Sanitary District should maintain a log of process actions taken.

G. The Department should incorporate the PAL's calculated in this report into the District's reissued WPDES permit.

H. The Department should not include a 10 mg/L Total Nitrogen limit in the reissued WPDES permit because impacted groundwater surfaces within the DMZ.

I. The Department should include quarterly Manganese monitoring during the fourth year of the reissued permit to assess the need to require more frequent monitoring in the subsequent permit.

ATTACHMENT 1

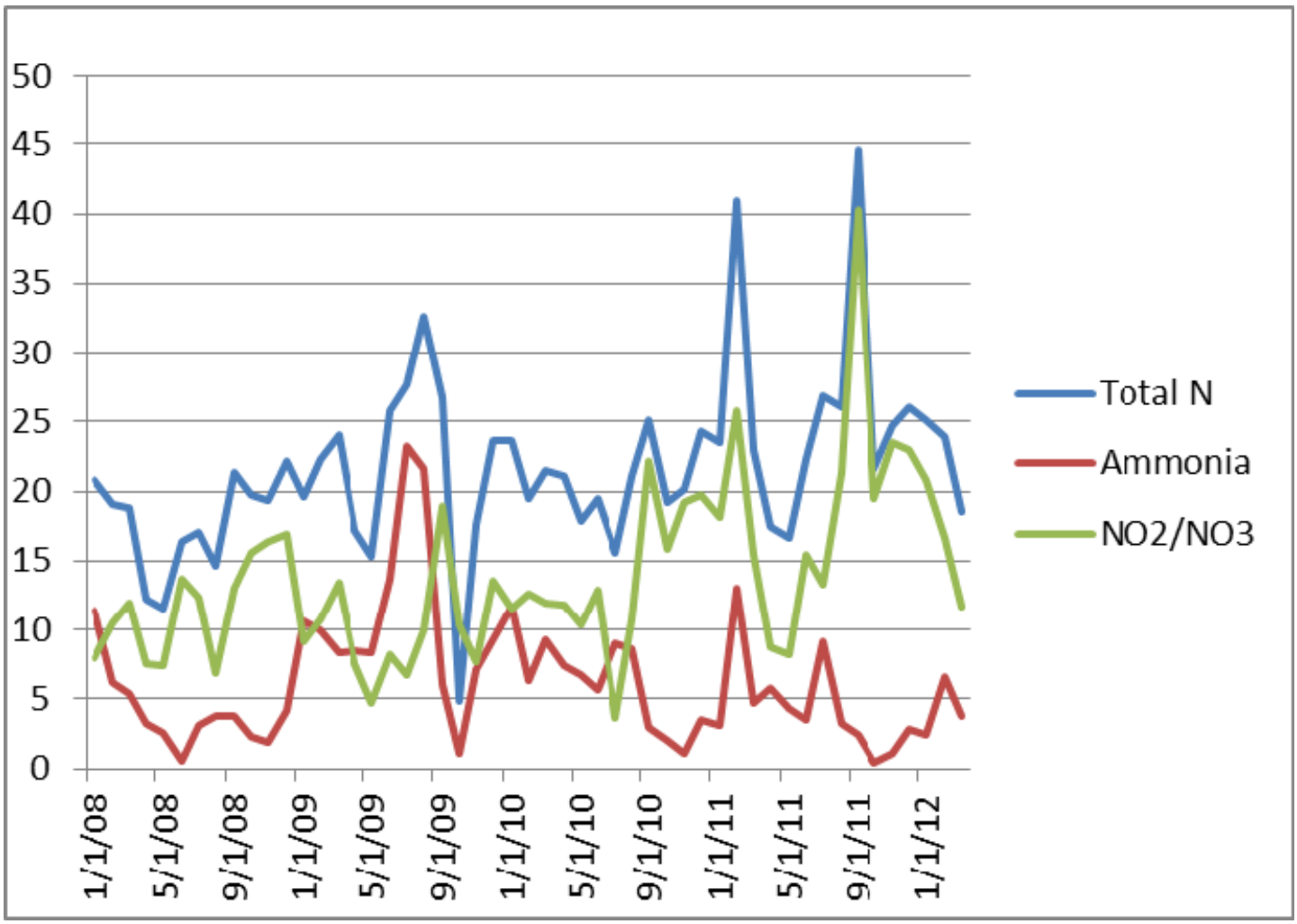
Septage Accepted			Septic Tank	Holding Tank
			Gallons	Gallons
Kelly Lake	2006		0	0
Kelly Lake	2007		0	0
Kelly Lake	2008		59,450	102,650
Kelly Lake	2009		671,800	854,600
Kelly Lake	2010		352,900	820,033
Kelly Lake	2011		477,900	1,425,795

Kelly Lake Septage Acceptance 2011					
		Holding Tank	Septic Tank		Total
January		109,350	11,000		120,350
February		107,000	7,950		114,950
March		92,350	8,550		100,900
April		124,450	37,450		161,900
May		175,310	73,100		248,410
June		167,110	103,050		270,160
July		124,100	26,200		150,300
August		95,900	56,300		152,200
September		125,850	40,300		166,150
October		102,825	55,100		157,925
November		89,900	42,650		132,550
December		111,650	16,250		127,900
		1,425,795	477,900		1,903,695

ATTACHMENT 2										
	Effluent	Effluent	Influent	Effluent	Effluent	Effluent	Influent	Effluent	Well 803	Well 804
Date	Chloride	NO2/NO3	TKN	TKN	Total N	TDS	Ammonia	Ammonia	NO2/NO3	NO2/NO3
01/31/08	301	7.92	36.3	12.9	20.82		28.1	11.4		
02/29/08	307	10.5	38.9	8.59	19.09		33.1	6.18		
03/31/08	289	12	52.4	6.78	18.78		24.7	5.41	12.6	3.91
04/30/08	204	7.48	25.6	4.81	12.29	745	19.8	3.29		
05/31/08	281	7.4	34.3	4.2	11.6	183	25.2	2.64		
06/30/08	270	13.7	42.9	2.71	16.41	836	27.4	0.51	8.99	9.85
07/31/08	274	12.4	54.1	4.62	17.02	852	42	3.15		
08/31/08	292	6.84	64.4	7.86	14.7	892	44.4	3.84		
09/30/08	333	13	49.6	8.32	21.32	943	35.5	3.72	10.1	10.7
10/31/08	333	15.6	48.8	4.16	19.76	989	35.1	2.3		
11/30/08	329	16.4	49.1	2.92	19.32	958	33.3	1.86		
12/31/08	394	17	51.4	5.17	22.17	1070	29.4	4.21	11.7	12.1
01/31/09	347	9.2	30.8	10.4	19.6	938	31.3	10.6		
02/28/09	293	10.7	47.5	11.6	22.3	852	26.2	10		
03/31/09	310	13.4	40.1	10.6	24	897	30	8.41	9.29	11.3
04/30/09	285	7.53	37.9	9.61	17.14	916	18.4	8.43		
05/31/09	270	4.66	36.2	10.7	15.36	903	27.1	8.33		
06/30/09	358	8.23	46.8	17.6	25.83		32.9	13.7	7.32	13.9
07/31/09	268	6.7	58.6	21	27.7	914	42.9	23.3		
08/31/09	303	10	58.6	22.6	32.6	996	47.2	21.6		
09/30/09	316	18.9	56.7	7.86	26.76	1040	37.4	6	14.6	18.6
10/31/09	306	10.3	44.2	6.05	4.89	925	27.2	1.16		
11/30/09	294	7.63	44.1	10	17.63	840	30.7	7.15		
12/31/09	332	13.6	54.7	10	23.6	960	33.5	9.28	13.9	11.4
01/31/10	314	11.5	50.8	12.1	23.6	931	35.7	11.7		
02/28/10	328	12.7	35.2	6.83	19.53	945	27.1	6.4		
03/31/10	425	12	35.8	9.43	21.43	917	24	9.32	13	12.1
04/30/10	290	11.8	32.8	9.23	21.03	865	17.5	7.43		
05/31/10	315	10.4	38.3	7.51	17.91	968	22.8	6.76		
06/30/10	304	12.9	41.7	6.53	19.43	971	27	5.67	16	20.5
07/31/10	208	3.65	44.6	12	15.65	814	31.9	9.07		
08/31/10	256	10.7	46.2	10.4	21.1	888	36.4	8.61		
09/30/10	293	22.2	37.9	2.97	25.17	951	23.4	2.92	10.2	0.96
10/31/10	320	15.8	36.8	3.44	19.24	914	22.6	2.07		
11/30/10	306	19.2	32.4	1.16	20.19	908	18.2	1.16		
12/31/10	274	19.7	33	4.64	24.34	867	18.2	3.57	13.6	1.17
01/31/11	315	18.2	43.9	5.35	23.55	913	28.7	3.17		
02/28/11	348	25.8	29.7	15.1	40.9	947	23.1	13.1		
03/31/11	309	15.5	26.9	7.42	22.92	840	15.9	4.72	15.3	12.4
04/30/11	203	8.74	17.1	8.7	17.44	755	11.8	5.8		
05/31/11	209	8.22	32.3	8.42	16.64	811	17.4	4.3		
06/30/11	291	15.4	43.2	6.93	22.33	917	28.3	3.54	6.94	11.2
07/31/11	270	13.3	45.4	13.6	26.9	928	27.5	9.09		
08/31/11	265	21.4	48.2	4.71	26.11	888	33.3	3.23		
09/30/11	292	40.3	28.2	4.22	44.52	1060	24.3	2.46	5.05	17
10/31/11	320	19.5	41.1	2.11	21.61	982	29.6	0.41		
11/30/11	264	23.5	24.6	1.19	24.69	881	16.6	1.05		
12/31/11	225	23	30.3	3.04	26.04	857	15.6	2.85	8.83	7.23

ATTACHMENT 3

Effluent (Outfall 002) Nitrogen Data



ATTACHMENT 4 - PAL Calculations

Date	Chloride mg/L	TDS mg/L	ORG-N mg/L	NH3-N mg/L	NO2/NO3 mg/L	pH S.U.	Elevation feet
03/22/08	2.4	269	0.46	0.02	0.12		825.55
06/29/08	3.1	273	0.7	0.02	0.24	7.26	826.92
09/27/08	1.9	284	1.23	0.02	0.29	7.48	825.07
12/27/08	2	257	0.85	0.02	0.4	7.56	824.86
03/15/09	2.9	265	0.47	0.02	0.21	7.39	825.24
06/21/09	62.4	445	0.56	0.02	0.16	7.37	826.85
09/27/09	0.3	260	1.51	0.035	0.56	7.61	824.69
12/06/09	6.6	265	0.56	0.035	0.24	7.64	825.68
03/21/10	13	320	0.63	0.17	0.17	7.61	826.82
06/14/10	10.8	314	0.7	0.035	0.79	7.45	826.51
09/26/10	11.8	413	0.65	0.035	0.16	7.41	826.93
12/05/10	18.4	391	0.99	0.035	0.36	7.38	827.23
03/20/11	12.8	367	1.25	0.035	0.27	7.44	827.47
06/26/11	5.7	372	0.23	0.28	0.035	7.13	828.58
09/29/11	2	271	0.8	0.07	0.37	7.64	826.46
12/13/11	14.5	361	0.75	0.07	0.74	7.4	826.94
03/18/12	3.9	309	0.6	0.07	0.13	7.39	828.08
MEAN	10	320	0.76	0.06	0.31	7.5	826.46
STD DEV	15	60	0.32	0.07	0.21		
3*STD DEV		181	0.97				
BACK+3STD		501	1.73				
BACK+TBL3		520	2.76				
PAL	125	520	2.8	0.97	2	6.5 TO 8.5	
ENF STD	250			9.7	10		

Alternative Concentration Limit - DNR must grant an exemption - See below.

BACK+2STD	39			0.19	0.73		
BACK+1STD +PAL	150			1.10	2.52		
ACL	150			1.1	2.6		

Outliers

Values less than limit of detection were set at one half the limit of detection.

ATTACHMENT 5

Monitoring Well - 803

Date	Chloride mg/L	TDS mg/L	ORG-N mg/L	NH3-N mg/L	NO2/NO3 mg/L	pH S.U.	Elevation feet
03/22/08	240	762	0.18	< 0.04	12.6	7.43	825.77
06/29/08	81.9	501	0.51	< 0.04	8.99	7	826.11
09/27/08	194	672	0.8	< 0.04	10.1	7.04	825.38
12/27/08	196	756	0.42	< 0.04	11.7	7.3	825.58
03/15/09	193	712	0.57	< 0.04	9.29	7.22	827.27
06/21/09	220	761	0.56	< 0.04	7.32	7.16	828.26
09/27/09	334	1020	0.81	4.53	14.6	7.24	826.17
12/06/09	298	949	< 0.13	2.09	13.9	7.25	827.15
03/21/10	237	857	< 1.04	< 1.05	13	8.14	828.59
06/14/10	232	808	< 0.13	1	16	7.04	827.39
09/26/10	136	575	0.27	0.07	10.2	7.28	827.32
12/05/10	172	690	0.55	0.11	13.6	7.32	828.46
03/20/11	265	856	1.11	< 0.07	15.3	7.53	826.19
06/26/11	70.1	495	0.26	0.16	6.94	7.11	827.82
09/29/11	71.9	458	0.53	0.17	5.05	7.33	825.83
12/13/11	110	587	0.55	< 0.14	8.83	7.22	826.46
03/18/12	214	805	0.19	0.23	18.1	7.14	827.98
MEAN	192	721	0.5	1.0	11.5	7.3	826.93

Monitoring Well – 804

Date	Chloride mg/L	TDS mg/L	ORG-N mg/L	NH3-N mg/L	NO2/NO3 mg/L	pH S.U.	Elevation feet
03/22/08	219	716	0.23	< 0.04	3.91	7.51	825.47
06/29/08	267	794	0.37	< 0.04	9.85	7.16	825.96
09/27/08	279	885	0.71	< 0.04	10.7	7.31	825.62
12/27/08	282	889	0.28	< 0.04	12.1	7.4	825.36
03/15/09	305	917	0.42	< 0.04	11.3	7.34	825.53
06/21/09	258	869	0.14	< 0.04	13.9	7.36	826.02
09/27/09	326	1000	< 0.13	1.79	18.6	7.21	826.22
12/06/09	287	917	0.34	0.92	11.4	7.38	825.44
03/21/10	291	977	0.24	0.65	12.1	7.45	826.13
06/14/10	280	960	< 0.13	0.82	20.5	7.2	827.3
09/26/10	275	856	1.08	0.78	0.96	7.33	825.82
12/05/10	255	784	1	0.94	1.17	7.44	825.85
03/20/11	216	750	0.64	1.87	12.4	7.59	826.2
06/26/11	242	818	0.54	1.45	11.2	7.12	828.51
09/29/11	252	875	0.52	3.14	17	7.32	825.91
12/13/11	218	849	0.73	0.51	7.23	7.6	825.63
03/18/12	280	879	0.44	0.3	15.4	7.35	826.28
MEAN	267	867	0.51	1.20	11.2	7.40	826.07

ATTACHMENT 5 - Continued

Monitoring Well - 805

Date	Chloride mg/L	TDS mg/L	ORG-N mg/L	NH3-N mg/L	NO2/NO3 mg/L	pH S.U.	Elevation feet
03/22/08	2.4	269	0.46	< 0.04	0.12		825.55
06/29/08	3.1	273	0.7	< 0.04	0.24	7.26	826.92
09/27/08	1.9	284	1.23	< 0.04	0.29	7.48	825.07
12/27/08	2	257	0.85	< 0.04	0.4	7.56	824.86
03/15/09	2.9	265	0.47	< 0.04	0.21	7.39	825.24
06/21/09	62.4	445	0.56	< 0.04	0.16	7.37	826.85
09/27/09	< 0.6	260	1.51	< 0.07	0.56	7.61	824.69
12/06/09	6.6	265	0.56	< 0.07	0.24	7.64	825.68
03/21/10	13	320	0.63	0.17	0.17	7.61	826.82
06/14/10	10.8	314	0.7	< 0.07	0.79	7.45	826.51
09/26/10	11.8	413	0.65	< 0.07	0.16	7.41	826.93
12/05/10	18.4	391	0.99	< 0.07	0.36	7.38	827.23
03/20/11	12.8	367	1.25	< 0.07	0.27	7.44	827.47
06/26/11	5.7	372	0.23	0.28	< 0.07	7.13	828.58
09/29/11	2	271	0.8	< 0.14	0.37	7.64	826.46
12/13/11	14.5	361	0.75	< 0.14	0.74	7.4	826.94
03/18/12	3.9	309	0.6	< 0.14	0.13	7.39	828.08
MEAN	11	320	0.76	0.23	0.33	7.5	826.46