



Florida Onsite Sewage Nitrogen Reduction Strategies Study

Task B.7

B-HS3 Field System Monitoring Report No. 1

Progress Report

October 2013

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Environmental Engineers & Scientists

In association with:



AET
Applied Environmental Technology

**Otis Environmental
Consultants, LLC**

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TASK B.7 PROGRESS REPORT

B-HS3 Field System Monitoring Report No. 1

Prepared for:

Florida Department of Health
Division of Disease Control and Health Protection
Bureau of Environmental Health
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1.0 Background

Task B of the Florida Onsite Sewage Nitrogen Reduction Strategies Study (FOSNRS) includes performing field experiments to critically evaluate the performance of nitrogen removal technologies that were identified in FOSNRS Task A.9 and pilot tested in PNRS II. To meet this objective, full scale treatment systems are being installed at various residential sites in Florida and monitored over an extended timeframe under actual onsite conditions. The Task B Quality Assurance Project Plan (Task B.5) documents the objectives, monitoring framework, sample frequency and duration, and analytical methods to be used at the home sites. This report documents the first sample event of a passive nitrogen reduction system at home site B-HS3 in Seminole County, Florida.

2.0 Purpose

Operation of the B-HS3 system was initiated on July 12, 2013. This monitoring report documents data collected from a preliminary monitoring event conducted on August 15, 2013 (Day 34) and the first full monitoring and sampling event conducted on September 30, 2013 (Day 80). The first full monitoring event of September 30th consisted of collecting flow measurements from the household water use meter and the treatment system flow meters, recording electricity use, monitoring of field parameters, collection of water samples from ten points in the treatment system, and sample analyses by a NELAC certified laboratory.

3.0 Materials and Methods

3.1 Project Site

The B-HS3 field site is located in Seminole County, FL. The nitrogen reducing onsite treatment system for the single family residence was installed in June 2013. Design and construction details were presented previously in the Task B.6 document. The B-HS3 system consists of a replacement septic tank (which was upgraded to a 1,500 gallon two chamber concrete primary tank); 600 gallon concrete STE dose tank; a two zone drip system; a Stage 1 lined drip zone; a 1,050 gallon concrete tank Stage 2

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saturated media biofilter; and a treated effluent dispersal drip zone. Figure 1 is a system schematic showing the system components and layout of the installation. A flow schematic of the system is shown in Figure 2.

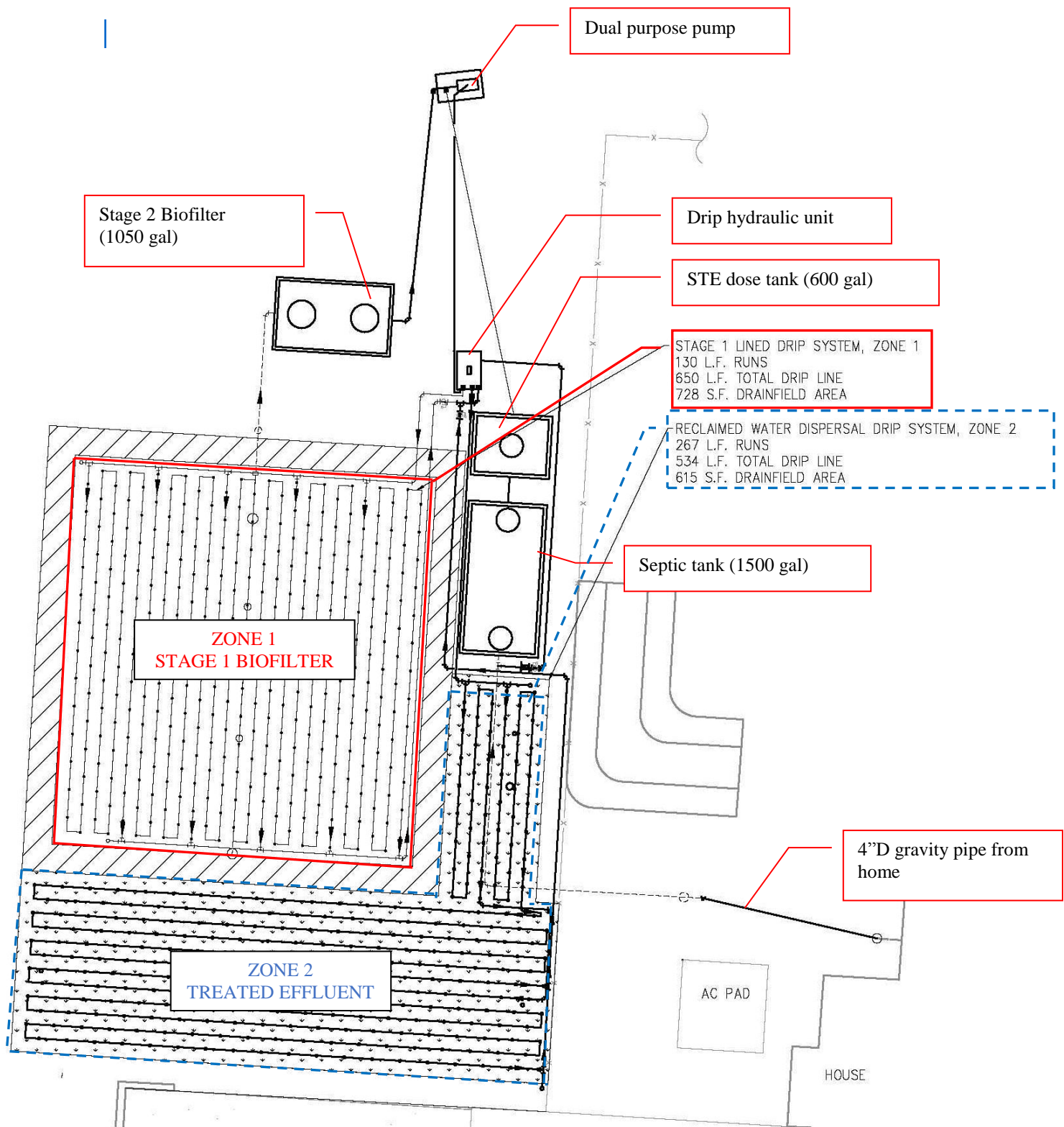


Figure 1
Plan view of B-HS3 system layout

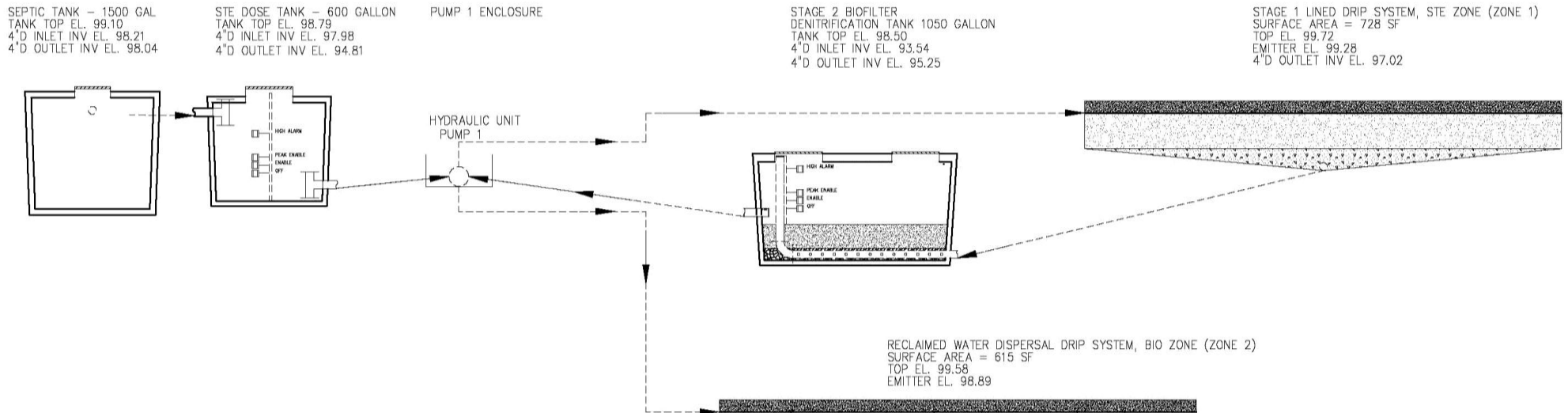


Figure 2
Flow Schematic of B-HS3 PNRS installed in Seminole County

3.2 Monitoring and Sample Locations and Identification

The ten main treatment system monitoring points for this sample event are shown in Figure 3. The B-HS3 installation also includes five downgradient groundwater monitoring points which are standpipe piezometers that were installed as part of the C-HS2 groundwater monitoring network (Figure 4). In the treatment system, household wastewater enters the 1st chamber of the primary tank and exits the second chamber as septic tank effluent through an effluent screen into the STE dose tank. The first monitoring point, B-HS3-STE, is the effluent sampled approximately 1.5 feet below the surface of the second chamber of the primary tank (Figure 5) before the effluent filter, which is referred to as primary effluent or septic tank effluent (STE). Samples from monitoring point B-HS3-STE are of whole household wastewater after it has had some residence time in the primary tank and represent the influent to the remainder of the onsite nitrogen reduction system.

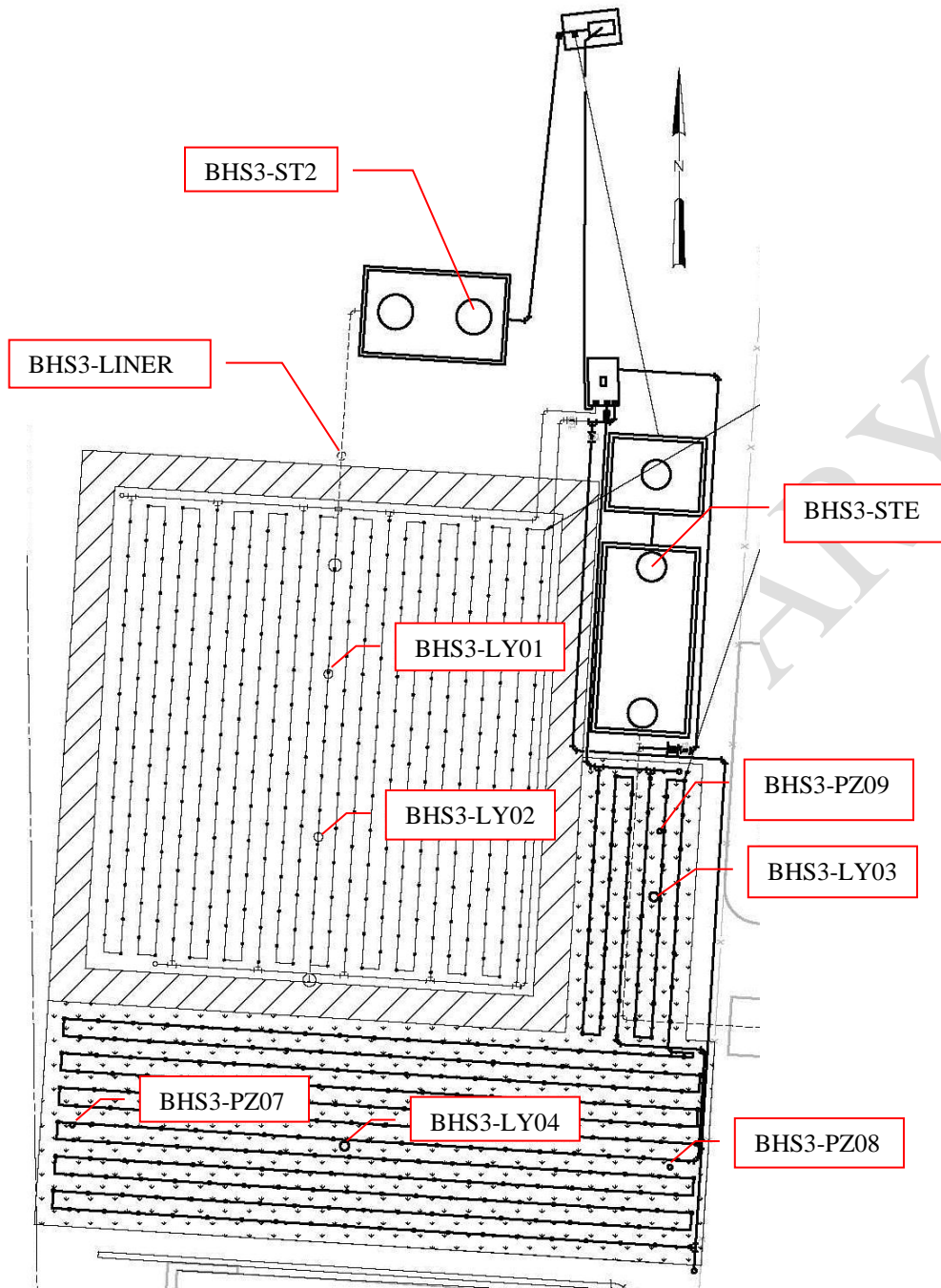


Figure 3
BHS-3 Treatment System Sampling and Monitoring Locations

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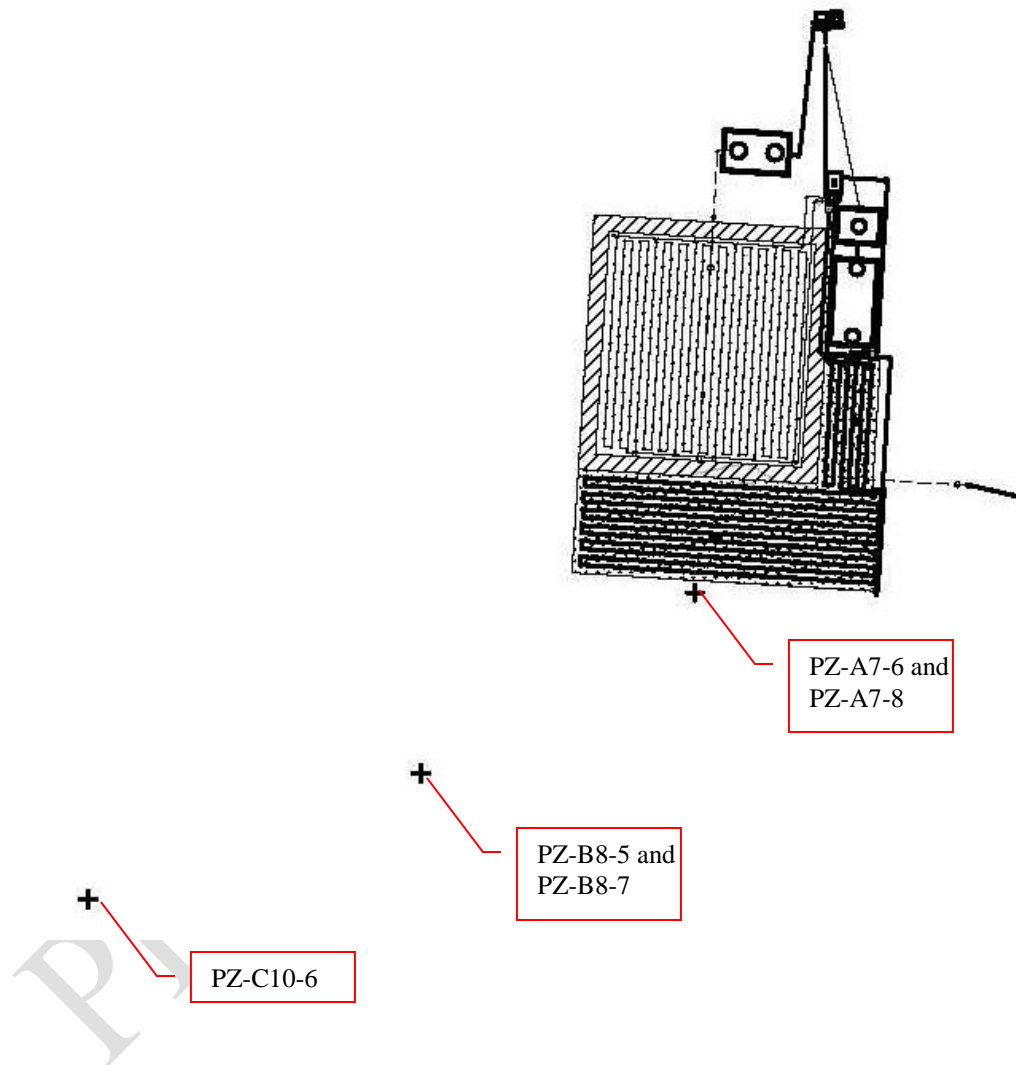


Figure 4
BHS-3 PNRS Downgradient Groundwater Sampling Locations

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Figure 5
Second chamber of Primary Tank (B-HS3-STE sample)

The STE dose tank effluent is pumped through the drip system hydraulic unit and discharged to the Stage 1 drip system emitters (Zone 1). In the Stage 1 drip area, wastewater proceeds downward through an 18-inch layer of sand and a 9-inch layer of lignocellulosic and sand media mixture placed above a 30 mil PVC liner. The second and third sampling points are two suction lysimeters (BHS3-LY01 and BHS3-LY02) located in the Stage 1 drip area with the bottom of the 9 inch ceramic cup located at the lignocellulosic mixture and sand interface to represent the nitrified effluent (Figure 6).

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Figure 6
Stage 1 Suction Lysimeter (B-HS3-LY01 and -LY02 sample)

The Stage 1 drip system area was prepared by grading a V-shape so that effluent would collect on the liner and flow to the center where a perforated pipe within a gravel underdrain conveys the nitrified (potentially denitrified as well through the lignocellulosic media mixture) effluent to the Stage 2 denitrification tank through a pipe boot within the liner. The fourth sampling point (BHS3-LINER) is a sample port of the Stage 1 lined area effluent prior to the Stage 2 biofilter.

The liner effluent is conveyed to a Stage 2 biofilter, a concrete 1,050 gallon tank, containing elemental sulfur reactive media for additional treatment (denitrification). The fifth sampling point, B-HS2-ST2, is the Stage 2 biofilter effluent which is sampled approximately 6 inches below the water surface of the Stage 2 biofilter tank (Figure 7).



Figure 7
Second chamber of Stage 2 Biofilter (B-HS3-ST2 sample)

The Stage 2 biofilter effluent is pumped through the drip system hydraulic unit and discharged to the treated effluent drip system emitters (Zone 2) to the natural soil. The sixth and seventh sampling points are two suction lysimeters (BHS3-LY03 and BHS3-LY04) located in the treated effluent drip area with the top of the 9 inch ceramic cup located 24 inches below the drip emitters to represent treatment through 24-inches of unsaturated soil (Figure 8). Also located within the treated effluent drip area, are the eighth, ninth and tenth sampling points which are standpipe piezometers (BHS3-PZ07, BHS3-

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PZ08, and BHS3-PZ09) positioned so that the top of the 5-foot screen is 24-inches below the drip emitters (Figure 9).



Figure 8
Treated Effluent Suction Lysimeter (B-HS3-LY03 and –LY04 sample)



Figure 9
Treated Effluent Area Standpipe Piezometers (B-HS3-PZ07, -PZ08 and –PZ09 sample)

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3.3 Operational Monitoring

Start-up of the system occurred on July 12, 2013 (Experimental Day 0) and the system has almost operated continually since that date. Between September 10, 2013 and September 17, 2013 the system was not operating because a replacement part for the hydraulic unit was required. Preliminary sampling for several key parameters was conducted August 15, 2013 (Experimental Day 34) to evaluate start-up performance. The first formal sampling event was conducted September 30, 2013 (Experimental Day 80). For the first formal sampling event, the water meter for the house and the treatment system flow meters were read and recorded on September 30, 2013.

The combined pump flow meter is located inside the hydraulic unit following the hydraulic unit filters prior to the split between the two zones, and records the cumulative pumped flow in gallons pumped from both the STE dose tank and Stage 2 biofilter tank. Therefore, the measurement of the combined flow meter includes both the STE flow from the household and the treated effluent flow from the Stage 2 biofilter. The Stage 2 treated effluent flow meter is located following the split on the line from the pump to the treated effluent drip system and records the cumulative flow in gallons pumped from the Stage 2 biofilter tank. The control panel includes telemetry which logs alarms, cumulative pump cycles, and cumulative field flush cycles.

3.4 Energy, Chemical and/or Additives Consumption

Energy consumption was monitored using an electrical meter installed between the main power box for the house and the control panel. The electrical meter records the cumulative power usage of the system in kilowatt-hours. The power usage of the system is primarily due to the single pump, although a small amount of power is used by the control panel itself. There are no chemicals added to the system. However, the denitrification media (lignocellulosic and sulfur) are “reactive” media which will be consumed during operation. The Stage 1 lined area was initially filled with 9 inches of lignocellulosic and sand media mixture and the Stage 2 biofilter was initially filled with 12 inches of sulfur and oyster shell media mixture, which ostensibly will last for many years without replenishment or replacement.

3.5 Water Quality Sample Collection and Analyses

Preliminary start-up sampling was conducted on August 15, 2013 (Experimental Day 34) and consisted of monitoring the nitrogen transformation through the system. The first formal sample event was conducted on September 30, 2013 and include a full suite of influent, intermediate and effluent water quality samples from the system. Samples were collected at each of the fifteen monitoring points described previously in Section 3.2 and illustrated in Figure 3: ten treatment system monitoring points and five groundwater

sampling points. A peristaltic pump was used to collect samples and route them directly into analysis-specific containers after sufficient flushing of the tubing had occurred. Field parameters were then recorded.

In addition, equipment blank (EB), irrigation well water (WELL) and tap water blank (TAP) were taken. The equipment blank was collected by pumping deionized water through the cleaned pump tubing. The irrigation well and tap water samples were collected directly from the associated hose bibs after sufficient flushing and purging had occurred. These samples were then analyzed for the same parameters as the monitoring samples.

The analysis-specific containers were supplied by the analytical laboratory and contained appropriate preservatives. The analysis-specific containers were labeled, placed in coolers and transported on ice to the analytical laboratories. Each sample container was secured in packing material as appropriate to prevent damage and spills, and was recorded on chain-of-custody forms supplied by the laboratory. Chain of custody forms, provided in Appendix A, were used to document the transfer of samples from field personnel to the analytical laboratory.

Field parameters were measured using portable electronic probes and included temperature (Temp), dissolved oxygen (DO), oxidation-reduction potential (ORP), pH, and specific conductance. The field parameters were measured by placing the analytical probes in a container overflowing with sample water. The influent, intermediate, and effluent samples were analyzed by the laboratory for: total alkalinity, chemical oxygen demand (COD), total Kjeldahl nitrogen (TKN-N), ammonia nitrogen ($\text{NH}_3\text{-N}$), nitrate nitrogen ($\text{NO}_3\text{-N}$), nitrite nitrogen ($\text{NO}_2\text{-N}$), total phosphorus (TP), orthophosphate (Ortho P), total suspended solids (TSS), volatile suspended solids (VSS), total organic carbon (TOC), fecal coliform (fecal), and E. coli. The influent and sulfur media samples included sulfate, sulfide, and hydrogen sulfide (unionized). All analyses were performed by an independent and fully NELAC certified analytical laboratory (Southern Analytical Laboratory). Table 1 lists the analytical parameters, analytical methods, and detection limits for these analyses.

Table 1
Analytical Parameters, Method of Analysis, and Detection Limits

Analytical Parameter	Method of Analysis	Method Detection Limit (mg/L)
Total Alkalinity as CaCO ₃	SM 2320B	2 mg/L
Chemical Oxygen Demand (COD)	EPA 410.4	10 mg/L
Total Kjeldahl Nitrogen (TKN-N)	EPA 351.2	0.05 mg/L
Ammonia Nitrogen (NH ₃ -N)	EPA 350.1	0.005 mg/L
Nitrate Nitrogen (NO ₃ -N)	EPA 300.0	0.01 mg/L
Nitrite Nitrogen (NO ₂ -N)	EPA 300.0	0.01 mg/L
Nitrate+Nitrite Nitrogen (NOX-N)	EPA 300.0	0.02 mg/L
Total Phosphorus (TP)	SM 4500P-E	0.01 mg/L
Orthophosphate as P (Ortho P)	EPA 300.0	0.01 mg/L
Carbonaceous Biological Oxygen Demand (CBOD ₅)	SM5210B	2 mg/L
Total Solids (TS)	EPA 160.3	.01 % by wt
Total Suspended Solids (TSS)	SM 2540D	1 mg/L
Volatile Suspended Solids (VSS)	SM 2540E	1 mg/L
Total Organic Carbon (TOC)	SM5310B	0.06 mg/L
Sulfate	EPA 300.0	2.0 mg/L
Sulfide	SM 4500SF	0.10 mg/L
Hydrogen Sulfide (unionized)	SM 4550SF	0.01 mg/L
Fecal Coliform (fecal)	SM9222D	2 ct/100mL
E.coli	EPA1603	2 ct/100mL

4.0 Results and Discussion

4.1 Operational Monitoring

Table 2 provides a summary of the household water use since water meter installation on July 13, 2011. The treatment system flow meter readings for the B-HS3 field site are summarized in Table 3. The operation and maintenance log which includes actions taken since start-up is provided in Appendix B.

Table 2
Summary of Household Water Use

Date	Cumulative Volume (gallons)	Average Daily Household Flow, Q Between readings (gpd)
7/13/2011 14:45	5302677.9	Installed
7/20/2011 17:50	5304207.8	214.6
7/26/2011 15:19	5305257.9	178.1
10/27/2011 15:19	5327920.4	243.7
11/30/2011 8:00	5355610.4	821.8
3/13/2012 8:10	5378780.2	222.8
7/10/2012 16:15	5453899.3	629.5
10/18/2012 15:30	5470593.1	167.0
3/7/2013 14:00	5488517.4	128.1
6/7/2013 14:00	5504725.9	176.2
7/9/2013 12:50	5508873.0	129.8
PNRS System Start-up		
7/12/13 14:01	5509172.1	98.1
7/17/13 13:55	5509884.1	142.5
7/29/13 9:50	5510830.9	80.0
8/6/13 10:40	5511588.8	94.3
8/12/13 11:07	5512244.8	109.0
8/15/13 8:48	5513128.8	304.5
9/5/13 15:31	5514810.2	79.0
9/10/13	Septic tank pumped	
9/17/13	System running again	
9/27/13 8:00	5517331.9	116.3
9/30/13 11:00	5519187.0	96.9
Total average start-up to 9/30/13		124.5

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Table 3
Summary of System Flow

Date and Time Read	Combined Pumped Flow, Stage 1 and Treated Effluent Drip Zones, Water Meter Reading	Average Daily Combined Pumped Flow	Calculated Flow to Stage 1	Average Daily Calculated Flow to Stage 1	Treated Effluent Flow Meter Reading	Average Daily Treated Effluent Flow	Rainfall/ Precipitation/ Irrigation into Stage 1 biofilter
	Cumulative Volume (gallons)	Gallons/ day	Cumulative Volume (gallons)	Gallons/ Day	Cumulative Volume (gallons)	Gallons/ Day	Gallons/ Day
7/12/13	206.9	Start-up	148.3	Start-up	58.6	Start-up	Start-up
7/17/13	423.0	44.0	188.8	8.3	234.2	35.7	27.5
7/29/13	3,345.1	186.5	913.5	45.5	2,431.6	141.0	95.5
8/6/13	6,541.1	255.2	1,193.3	42.1	5,347.8	213.1	171.0
8/12/13	8,953.1	283.2	2,508.3	76.4	6,444.9	206.8	130.4
8/15/13	10,131.2	293.8	3,232.5	91.3	6,898.7	202.5	111.2
9/5/13	18,696.5	335.8	7,882.7	140.5	10,813.8	195.3	54.9
9/9/13	19,884.6	334.7	8,435.8	141.0	11,448.8	193.7	52.8
9/10/13	20,435.8	338.4	8,752.0	143.9	11,683.8	194.5	50.6
9/17/13	20,912.4	309.8	7,933.4	116.5	12,979.0	193.3	76.8
9/27/13	22,142.0	285.8	9,387.6	120.4	12,754.5	165.4	45.0
9/30/13	22,885.0	284.4	9,840.4	121.5	13,044.6	162.8	41.3
Total average start-up to 9/30/13		268.3		95.2		173.1	77.9

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The household flow average since the PNRS system start-up was 124.5 gallons per day with periods of higher and lower flows. The average combined pumped flow (flow to the Stage 1 drip system and treated effluent drip system) was 268.3 gallons per day, the average calculated Stage 1 drip system (STE) flow was 95.2 gallons per day and the average treated effluent drip system (Stage 2 biofilter effluent) flow was 173.1 gallons per day. The average calculated Stage 1 drip system flow is an estimate of the household wastewater flow. The higher average flow to the treated effluent drip system is likely attributed to rain water and irrigation water applied above the lined area. Therefore a calculated average rain/precipitation/irrigation flow was 77.9 gallons per day.

4.2 Energy, Chemical and/or Additives Consumption

Energy consumption is monitored using an electrical meter installed between the main power box for the house and the control panel to record cumulative power usage of the pump in kilowatt-hours. The recorded electrical use for the system is summarized in Table 4.

Table 4
Summary of System Electrical Use

Date and Time Read	Electrical Meter Reading	Average Daily Electrical Use	Average Electrical Use per Gallon Pumped
	Cumulative (kWh)	(kWh/day)	(kWh/gal)
7/12/13 14:01	0.6	Start-up	Start-up
7/17/13 11:57	1.1	0.10	0.002
7/29/13 9:52	8.9	0.49	0.003
8/6/13 9:45	19.1	0.75	0.003
8/12/13 11:07	27.9	0.88	0.003
8/15/13 8:48	32.5	0.94	0.003
9/5/13 15:31	69.6	1.25	0.004
9/9/13 9:00	82.3	1.39	0.004
9/17/13 8:00	86.1	1.28	0.004
9/17/13 10:12	86.2	1.28	0.004
9/27/13 8:00	88.8	1.15	0.004
9/30/13 8:00	90.6	1.13	0.004
Total average start-up to 9/30/13		0.97	0.003

The total average electrical use through September 30, 2013 was 0.97 kWh per day. The average electrical use per gallon pumped is 0.003 kWh per gallon, and this parameter appears fairly stable since start-up.

4.3 Water Quality

Water quality analytical results and raw analytical data for the preliminary start-up sampling conducted on August 15, 2013 (Experimental Day 34) is included in Appendix A. Water quality analytical results, for the preliminary start-up sample event are listed in Table A.1. Nitrogen and sulfate results are graphically displayed in Figure 10 for the preliminary sample event.

Water quality analytical result, for Sample Event No.1 are listed in Table 5 and graphically displayed in Figure 11. The laboratory report containing the raw analytical data is included in Appendix A. The following discussion summarizes the water quality analytical results for the Sample Event No. 1. The performance of the various system components was compared by considering the changes through treatment of nitrogen species (TKN-N, NH₃-N, and NO_x-N), as well as supporting water quality parameters.

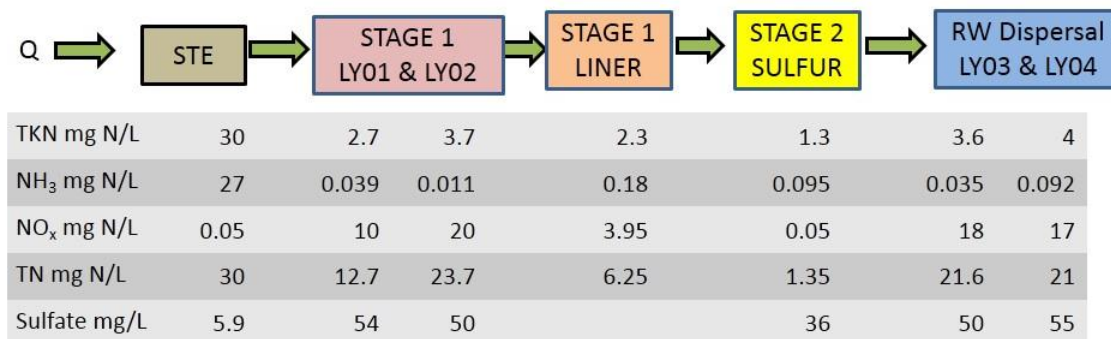


Figure 10
Graphical Representation of Nitrogen and Sulfate Results
Preliminary Sample Event August 15, 2013

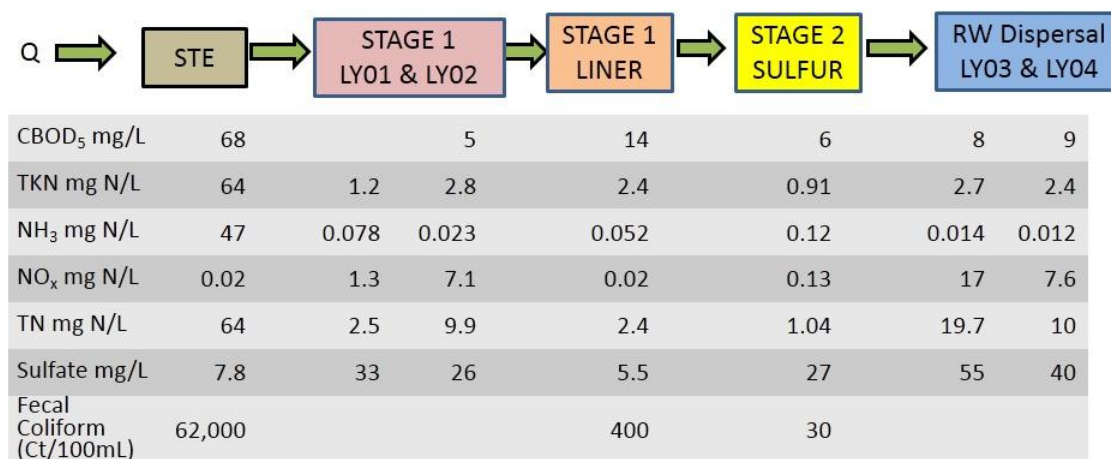


Figure 11
Graphical Representation of Nitrogen and Sulfate Results
Sample Event No. 1 September 30, 2013

Septic Tank Effluent (STE) Quality: The water quality characteristics of STE collected in Sample Event 1 were within the typical range generally expected for domestic STE. The measured STE total nitrogen (TN) concentration was 64 mg/L, which is within the range that has been typically reported for Florida single family residence STE.

Stage 1 (Nitrified Effluent) Soil Suction Lysimeters (LY01 and LY02): The soil suction lysimeters effluent $\text{NH}_3\text{-N}$ levels were 0.078 mg/L and 0.023 mg/L, respectively with a DO level at 6.52 mg/L and 2.62 mg/L the (Table 5). TSS and CBOD_5 was equal to or below 5 mg/L. The $\text{NO}_x\text{-N}$ was 1.3 mg/L and 7.1 mg/L, respectively.

Stage 1 Liner Effluent (Liner): The Stage 1 effluent $\text{NH}_3\text{-N}$ level was 0.052 mg/L with a DO level at 1.34 mg/L (Table 5). TSS and CBOD_5 was equal to or below 15 mg/L. The Stage 1 effluent $\text{NO}_x\text{-N}$ was below the method detection limit of 0.02 mg/L. These results indicate significant pre-denitrification in the Stage 1 lined area (approximately 96% reduction of STE total nitrogen). The Stage 1 biofilter showed nearly complete nitrification and denitrification with an effluent $\text{NH}_3\text{-N}$ of 0.052 mg/L, $\text{NO}_x\text{-N}$ of 0.02 mg/L and TKN of 2.4 mg/L.

Stage 2 Biofilter Effluent (ST2): Effluent $\text{NO}_x\text{-N}$ from the Stage 2 biofilter was 0.13 mg/L. The low $\text{NO}_x\text{-N}$ was accompanied by a measured 0.15 mg/L DO and -299.9 mV ORP. Final total nitrogen (TN) in the treatment system effluent was 1.04 mg/L. The Stage 2 biofilter effluent CBOD_5 concentration was 6 mg/L, TSS was 2 mg/L and sulfate was 55 mg/L.

Treated Effluent Soil Suction Lysimeters (LY03 and LY04) and Groundwater Piezometers (PZ07, PZ08 and PZ09): The treated effluent drip system monitoring devices all indicated $\text{NO}_x\text{-N}$ concentrations higher than the Stage 2 effluent concentration. The two soil suction lysimeters sample $\text{NO}_x\text{-N}$ were 19.7 mg/L and 10 mg/L, respectively. The groundwater piezometers sample $\text{NO}_x\text{-N}$ were 10 mg/L, 8.6 mg/L and 13 mg/L, respectively. The $\text{NO}_x\text{-N}$ may be attributed to leaching of fertilizer from the newly installed Zoysia sod.

Table 5
Water Quality Analytical Results

Sample ID	Sample Date/Time	Temp (°C)	pH	Specific Conductance (uS/cm)	DO (mg/L)	ORP (mV)	Total Alkalinity (mg/L)	TSS (mg/L)	VSS (mg/L)	CBOD ₅ (mg/L)	COD (mg/L)	TN (mg/L N) ¹	TKN (mg/L N)	Organic N (mg/L N) ²	NH ₃ -N (mg/L N)	NO ₃ -N (mg/L N)	NO ₂ -N (mg/L N)	NO _x (mg/L N)	TIN (mg/L N) ³	TP (mg/L)	Ortho P (mg/L P)	Chloride	Sulfate (mg/L)	Hydrogen Sulfide (mg/L)	Sulfide (mg/L)	Fecal (Ct/100 mL)	E-coli (Ct/100 mL)
BHS3-STE	9/30/2013 10:40:00 AM	26.4	7.26	1066	0.11	-317.5	390	16	15	68	400	64.02	64	17	47	0.01	0.01	0.02	47.02	7.4	4.5	41	7.8	4	12	62000	24000
BHS3-LY01	9/30/2013 8:50:00 AM	26.0	6.33	330	6.52	161.6					10	2.5	1.2	1.122	0.078	1.3	0.01	1.3	1.378	0.14	0.01	15	33				
BHS3-LY02	9/30/2013 9:00:00 AM	26.3	6.46	559	2.62	54.6	170	4	1	5	24	9.9	2.8	2.777	0.023	7.1	0.01	7.1	7.123	0.18	0.01	23	26				
BHS3-LINER	9/30/2013 10:20:00 AM	27.8	6.44	651	1.34	-199.7	290	15	8	14	10	2.42	2.4	2.348	0.052	0.01	0.01	0.02	0.072	1.2	0.01	15	5.5			400	2
BHS3-ST2	9/30/2013 10:10:00 AM	27.1	6.55	785	0.15	-299.9	310	2	2	6	45	1.04	0.91	0.79	0.12	0.13	0.01	0.13	0.25	0.39	0.01	15	27	12	16	30	2
BHS3-LY03	9/30/2013 9:25:00 AM	25.1	6.28	770	3.64	107.3	250	4	4	8	47	19.7	2.7	2.686	0.014	17	0.01	17	17.014	0.14	0.01	13	55	0.34	0.41		
BHS3-LY04	9/30/2013 9:10:00 AM	25.6	6.21	698	2.4	71.2	250	1	1	9	32	10	2.4	2.388	0.012	7.6	0.01	7.6	7.612	0.031	0.01	16	40	0.35	0.41		
BHS3-PZ07	9/30/2013 10:21:00 AM	27.5	6.18	809	1.98	26.4	290	3	3	4	10	12.3	2.3	2.22	0.08	10	0.01	10	10.08	0.14	0.01	17	35	0.35	0.41	1	2
BHS3-PZ08	9/30/2013 11:06:00 AM	26.0	6.44	606	2.12	81	190	23	10	11	10	11.1	2.5	2.481	0.019	8.6	0.01	8.6	8.619	0.41	0.36	15	35	0.32	0.41	10	2
BHS3-PZ09	9/30/2013 11:51:00 AM	27.0	5.94	525	3.39	38.3	120	11	11	2	300	15.5	2.5	2.429	0.071	13	0.01	13	13.071	1.2	0.74	18	35	0.37	0.41	1	2
PZ-A7-6	9/30/2013 9:24:00 AM	26.1	5.83	359	0.09	-51.4	110					1.54	1.4	1.15	0.25	0.14	0.01	0.14	0.39			15	21				
PZ-A7-8	9/30/2013 9:41:00 AM	26.0	5.77	496	0.38	115.3	2					13.2	2.2	2.191	0.009	11	0.01	11	11.009			17	43				
PZ-B8-5	9/30/2013 8:35:00 AM	25.4	5.89	414	0.39	155.2	93					3.4	2.2	2.158	0.042	1.2	0.01	1.2	1.242			22	41				
PZ-B8-7	9/30/2013 8:48:00 AM	25.4	5.81	332	0.26	168.5	2					2.19	1.2	1.142	0.058	0.99	0.01	0.99	1.048			28	26				
PZ-C10-6	9/30/2013 9:05:00 AM	26.3	5.91	270	0.1	-68.4	61					5.6	3	2.89	0.11	2.6	0.01	2.6	2.71			11	23				
Tap	9/30/2013 9:46:00 AM	23.1	7.29	332	7.23	167.1	110					0.23	0.09	0.081	0.009	0.14	0.01	0.14	0.149			19	16				
Well	9/30/2013 9:40:00 AM	24.8	7.15	222	0.7	81.6	100					0.15	0.05	0.041	0.009	0.1	0.01	0.1	0.109			5.5	0.91				
EB	9/30/2013 11:05:00 AM	29.4	7.19	6.12	7.21	165.4	4.6	1	1	2	10	0.07	0.05	0.041	0.009	0.01	0.01	0.02	0.029	0.01	0.01	0.05	0.2	0.08	0.2	1	2

Notes:

¹Total Nitrogen (TN) is a calculated value equal to the sum of TKN and NO_x.

²Organic Nitrogen (ON) is a calculated value equal to the difference of TKN and NH₃.

³Total Inorganic Nitrogen (TIN) is a calculated value equal to the sum of NH₃ and NO_x.

Gray-shaded data points indicate values below method detection level (mdl), mdl value used for statistical analyses.

Yellow-shaded data points indicate the reported value is between the laboratory method detection limit and the laboratory practical quantitation limit, value used for statistical analysis.

Too many colonies were present. The numeric value represents the filtration volume.

Results based on colony counts outside the ideal range.

5.0 B-HS3 Sample Event No. 1: Summary and Recommendations

5.1 Summary

The results of the first sampling event indicate that the system is operating well and no adjustments are recommended at this time. The Sample Event No. 1 results indicate that:

- Septic tank effluent (STE) quality is characteristic of typical household STE quality. The total nitrogen concentration of 64 mg/L is within the range of values typically reported for Florida single family residence STE.
- The Stage 1 lined drip system was effective in converting ammonium to oxidized nitrogen; effluent contained 2.4 mg/L TKN, of which 0.052 mg/L was ammonia. In addition, the Stage 1 lined drip system was effective in producing a reducing environment and effluent NO_x-N was below the method detection limit.
- The Stage 2 biofilter effluent NO_x-N was 0.13 mg/L.
- The total nitrogen concentration in the final effluent from the total treatment system was approximately 1.04 mg/L, an approximately 98% reduction from STE.

5.2 Recommendations

No operational adjustments are recommended at this time, and continued sampling should provide additional insight to system performance.



Appendix A: Laboratory Report

PRELIMINARY

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**Table A.1
Preliminary Start-up Sampling Results**

Sample ID	Sample Date/Time	Temp (°C)	pH	Specific Conductance (uS/cm)	DO (mg/L)	ORP (mV)	TN (mg/L N) ¹	TKN (mg/L N)	Organic N (mg/L N) ²	NH ₃ -N (mg/L N)	NO ₃ -N (mg/L N)	NO ₂ -N (mg/L N)	NO _x (mg/L N)	TIN (mg/L N) ³	Sulfate (mg/L)	Hydrogen Sulfide (mg/L)	Sulfide (mg/L)
BHS3-STE	8/15/2013 11:00	29.4	7.20	868	0.05	-319.7	30.05	30.0	3	27	0.05	0.01	0.05	27.05	5.9	2.5	6.7
BHS3-LY01	8/15/2013 10:40	30.9	6.36	404	2.39	113.8	12.7	2.7	2.661	0.039	9.8	0.13	10	10.04	54		
BHS3-LY02	8/15/2013 10:35	30.2	6.49	624	1.50	106.2	23.7	3.7	3.689	0.011	20	0.01	20	20.01	50		
BHS3-LINER	8/15/2013 10:10	31.8	7.15	552	6.08	29.5	6.25	2.3	2.12	0.180	3.9	0.05	3.95	4.13			
BHS3-ST2	8/15/2013 10:45	29.7	6.53	653	0.14	-265.8	1.35	1.3	1.205	0.095	0.05	0.01	0.05	0.15	36	0.6	0.81
BHS3-LY03	8/15/2013 10:20	29.0	6.32	934	2.05	103.3	21.6	3.6	3.565	0.035	18	0.05	18	18.04	50		
BHS3-LY04	8/15/2013 10:30	29.4	6.32	807	1.41	117.0	21	4.0	3.908	0.092	17	0.01	17	17.09	55		
BHS3-PZ07	8/15/13 9:18	27.4	6.44	833	0.59	-248.7	11	4.0	3.26	0.740	7	0.01	7	7.74			
BHS3-PZ08	8/15/13 9:37	27.0	6.35	962	2.27	-21.9	21.5	2.5	2.484	0.016	19	0.01	19	19.02			
BHS3-PZ09	8/15/13 9:55	26.7	5.57	526	0.62	48.2	17.1	3.1	3.031	0.069	14	0.01	14	14.07			
BHS3-TAP	8/15/2013 11:10	28.2	7.65	327	6.72	-35.7	0.26	0.2	0.105	0.095	0.06	0.01	0.06	0.16	16		

Notes:

¹Total Nitrogen (TN) is a calculated value equal to the sum of TKN and NO_x.

²Organic Nitrogen (ON) is a calculated value equal to the difference of TKN and NH₃.

³Total Inorganic Nitrogen (TIN) is a calculated value equal to the sum of NH₃ and NO_x.

Gray-shaded data points indicate values below method detection level (mdl), mdl value used for statistical analyses.

Yellow-shaded data points indicate the reported value is between the laboratory method detection limit and the laboratory practical quantitation limit, value used for statistical analysis.

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Laboratory Report

Project Name		C-HS2 SE#5						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		B10-7						
Matrix		Groundwater						
SAL Sample Number		1306198-01						
Date/Time Collected		06/14/13 10:37						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
<u>Inorganics</u>								
Ammonia as N	mg/L	1.3	EPA 350.1	0.040	0.009		07/05/13 14:58	1
Chemical Oxygen Demand	mg/L	65	EPA 410.4	25	10	06/20/13 13:13	06/20/13 16:35	1
Chloride	mg/L	32	EPA 300.0	0.20	0.050		06/15/13 10:39	1
Nitrate (as N)	mg/L	0.08	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Nitrite (as N)	mg/L	0.17	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Total Alkalinity	mg/L	76	SM 2320B	8.0	2.0		06/25/13 16:00	1
Total Kjeldahl Nitrogen	mg/L	2.2	EPA 351.2	0.20	0.05	07/02/13 09:02	07/05/13 11:53	1
Nitrate+Nitrite (N)	mg/L	0.24	EPA 300.0	0.08	0.02		06/15/13 10:39	1
Sample Description		B8-7						
Matrix		Groundwater						
SAL Sample Number		1306198-02						
Date/Time Collected		06/14/13 10:00						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
<u>Inorganics</u>								
Ammonia as N	mg/L	0.015 I	EPA 350.1	0.040	0.009		07/05/13 15:00	1
Chemical Oxygen Demand	mg/L	49	EPA 410.4	25	10	06/20/13 13:13	06/20/13 16:35	1
Chloride	mg/L	36	EPA 300.0	0.20	0.050		06/15/13 10:39	1
Nitrate (as N)	mg/L	16	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Nitrite (as N)	mg/L	0.30	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Total Alkalinity	mg/L	65	SM 2320B	8.0	2.0		06/25/13 16:00	1
Total Kjeldahl Nitrogen	mg/L	2.0	EPA 351.2	0.20	0.05	07/02/13 09:02	07/05/13 11:54	1
Nitrate+Nitrite (N)	mg/L	16	EPA 300.0	0.08	0.02		06/15/13 10:39	1
Sample Description		B8-5						
Matrix		Groundwater						
SAL Sample Number		1306198-03						
Date/Time Collected		06/14/13 10:00						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
<u>Inorganics</u>								
Ammonia as N	mg/L	0.029 I	EPA 350.1	0.040	0.009		07/05/13 15:02	1
Chemical Oxygen Demand	mg/L	120	EPA 410.4	25	10	06/20/13 13:13	06/20/13 16:35	1
Chloride	mg/L	24	EPA 300.0	0.20	0.050		06/15/13 10:39	1

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Laboratory Report

Project Name		C-HS2 SE#5						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		B8-5						
Matrix		Groundwater						
SAL Sample Number		1306198-03						
Date/Time Collected		06/14/13 10:00						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
Nitrate (as N)	mg/L	15	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Nitrite (as N)	mg/L	0.18	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Total Alkalinity	mg/L	44	SM 2320B	8.0	2.0		06/25/13 16:00	1
Total Kjeldahl Nitrogen	mg/L	4.3	EPA 351.2	0.20	0.05	07/02/13 09:02	07/05/13 11:55	1
Nitrate+Nitrite (N)	mg/L	16	EPA 300.0	0.08	0.02		06/15/13 10:39	1
Sample Description		C8-7						
Matrix		Groundwater						
SAL Sample Number		1306198-04						
Date/Time Collected		06/14/13 09:41						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
<u>Inorganics</u>								
Ammonia as N	mg/L	0.009 U	EPA 350.1	0.040	0.009		07/05/13 15:04	1
Chemical Oxygen Demand	mg/L	77	EPA 410.4	25	10	06/20/13 13:13	06/20/13 16:35	1
Chloride	mg/L	51	EPA 300.0	2.0	0.50		06/15/13 10:39	10
Nitrate (as N)	mg/L	44	EPA 300.0	0.40	0.10		06/15/13 10:39	10
Nitrite (as N)	mg/L	0.32	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Total Alkalinity	mg/L	55	SM 2320B	8.0	2.0		06/25/13 16:00	1
Total Kjeldahl Nitrogen	mg/L	2.0	EPA 351.2	0.20	0.05	07/02/13 09:02	07/05/13 11:57	1
Nitrate+Nitrite (N)	mg/L	44	EPA 300.0	0.44	0.11		06/15/13 10:39	10
Sample Description		C10-6						
Matrix		Groundwater						
SAL Sample Number		1306198-05						
Date/Time Collected		06/14/13 09:20						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
<u>Inorganics</u>								
Ammonia as N	mg/L	0.65	EPA 350.1	0.040	0.009		07/05/13 15:06	1
Chemical Oxygen Demand	mg/L	77	EPA 410.4	25	10	06/20/13 13:13	06/20/13 16:35	1
Chloride	mg/L	14	EPA 300.0	0.20	0.050		06/15/13 10:39	1
Nitrate (as N)	mg/L	1.7	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Nitrite (as N)	mg/L	0.12	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Total Alkalinity	mg/L	65	SM 2320B	8.0	2.0		06/25/13 16:00	1
Total Kjeldahl Nitrogen	mg/L	4.0	EPA 351.2	0.20	0.05	07/02/13 09:02	07/05/13 12:04	1

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Laboratory Report

Project Name		C-HS2 SE#5						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		C10-6						
Matrix		Groundwater						
SAL Sample Number		1306198-05						
Date/Time Collected		06/14/13 09:20						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
Nitrate+Nitrite (N)	mg/L	1.8	EPA 300.0	0.08	0.02		06/15/13 10:39	1
Sample Description		PZ02						
Matrix		Groundwater						
SAL Sample Number		1306198-06						
Date/Time Collected		06/14/13 10:15						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
<u>Inorganics</u>								
Ammonia as N	mg/L	0.53	EPA 350.1	0.040	0.009		07/05/13 15:16	1
Chemical Oxygen Demand	mg/L	57	EPA 410.4	25	10	06/20/13 13:13	06/20/13 16:35	1
Chloride	mg/L	40	EPA 300.0	2.0	0.50		06/21/13 00:27	10
Nitrate (as N)	mg/L	0.10	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Total Alkalinity	mg/L	98	SM 2320B	8.0	2.0		06/28/13 16:00	1
Total Kjeldahl Nitrogen	mg/L	1.2	EPA 351.2	0.20	0.05	07/02/13 09:02	07/05/13 12:05	1
Nitrate+Nitrite (N)	mg/L	0.10	EPA 300.0	0.08	0.02		06/15/13 10:39	1
Sample Description		A11-7						
Matrix		Groundwater						
SAL Sample Number		1306198-07						
Date/Time Collected		06/14/13 10:03						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
<u>Inorganics</u>								
Ammonia as N	mg/L	0.33	EPA 350.1	0.040	0.009		07/05/13 15:18	1
Chemical Oxygen Demand	mg/L	79	EPA 410.4	25	10	06/20/13 13:13	06/20/13 16:35	1
Chloride	mg/L	59	EPA 300.0	2.0	0.50		06/21/13 00:37	10
Nitrate (as N)	mg/L	0.08	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Total Alkalinity	mg/L	33	SM 2320B	8.0	2.0		06/28/13 16:00	1
Total Kjeldahl Nitrogen	mg/L	1.5	EPA 351.2	0.20	0.05	07/02/13 09:02	07/05/13 12:06	1
Nitrate+Nitrite (N)	mg/L	0.08	EPA 300.0	0.08	0.02		06/15/13 10:39	1

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Laboratory Report

Project Name		C-HS2 SE#5						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		A10-9						
Matrix		Groundwater						
SAL Sample Number		1306198-08						
Date/Time Collected		06/14/13 09:50						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
Inorganics								
Ammonia as N	mg/L	6.2	EPA 350.1	0.40	0.095		07/05/13 16:43	10
Chemical Oxygen Demand	mg/L	77	EPA 410.4	25	10	06/20/13 13:13	06/20/13 16:35	1
Chloride	mg/L	23	EPA 300.0	0.20	0.050		06/15/13 10:39	1
Nitrate (as N)	mg/L	0.09	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Nitrite (as N)	mg/L	0.15	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Total Alkalinity	mg/L	260	SM 2320B	8.0	2.0		06/28/13 16:00	1
Total Kjeldahl Nitrogen	mg/L	8.2	EPA 351.2	0.20	0.05	07/02/13 09:02	07/05/13 13:28	9.62
Nitrate+Nitrite (N)	mg/L	0.23	EPA 300.0	0.08	0.02		06/15/13 10:39	1
Sample Description		A7-8						
Matrix		Groundwater						
SAL Sample Number		1306198-09						
Date/Time Collected		06/14/13 09:36						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
Inorganics								
Ammonia as N	mg/L	0.090	EPA 350.1	0.040	0.009		07/05/13 15:23	1
Chemical Oxygen Demand	mg/L	150	EPA 410.4	25	10	06/20/13 13:13	06/20/13 16:35	1
Chloride	mg/L	3.9	EPA 300.0	0.20	0.050		06/15/13 10:39	1
Nitrate (as N)	mg/L	2.0	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Nitrite (as N)	mg/L	0.04	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Total Alkalinity	mg/L	65	SM 2320B	8.0	2.0		06/28/13 16:00	1
Total Kjeldahl Nitrogen	mg/L	2.5	EPA 351.2	0.20	0.05	07/02/13 09:02	07/05/13 12:09	1
Nitrate+Nitrite (N)	mg/L	2.0	EPA 300.0	0.08	0.02		06/15/13 10:39	1
Sample Description		B2-6						
Matrix		Groundwater						
SAL Sample Number		1306198-10						
Date/Time Collected		06/14/13 09:24						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
Inorganics								
Ammonia as N	mg/L	0.36	EPA 350.1	0.040	0.009		07/05/13 15:25	1
Chemical Oxygen Demand	mg/L	79	EPA 410.4	25	10	06/20/13 13:13	06/20/13 16:35	1
Chloride	mg/L	46	EPA 300.0	2.0	0.50		06/21/13 00:46	10

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Laboratory Report

Project Name		C-HS2 SE#5						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		B2-6						
Matrix		Groundwater						
SAL Sample Number		1306198-10						
Date/Time Collected		06/14/13 09:24						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
Nitrate (as N)	mg/L	0.70	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		06/15/13 10:39	1
Total Alkalinity	mg/L	150	SM 2320B	8.0	2.0		06/28/13 16:00	1
Total Kjeldahl Nitrogen	mg/L	1.4	EPA 351.2	0.20	0.05	07/02/13 09:02	07/05/13 12:11	1
Nitrate+Nitrite (N)	mg/L	0.70	EPA 300.0	0.08	0.02		06/15/13 10:39	1
Sample Description		STE						
Matrix		Wastewater						
SAL Sample Number		1306198-11						
Date/Time Collected		06/14/13 10:20						
Collected by		Sean Schmidt						
Date/Time Received		06/14/13 14:50						
<u>Inorganics</u>								
Ammonia as N	mg/L	60	EPA 350.1	4.0	0.95		07/05/13 16:44	100
Chemical Oxygen Demand	mg/L	190	EPA 410.4	25	10	06/21/13 11:40	06/21/13 16:40	1
Chloride	mg/L	55	EPA 300.0	2.0	0.50		06/21/13 00:55	10
Nitrate (as N)	mg/L	0.82	EPA 300.0	0.40	0.10		06/15/13 10:39	10
Nitrite (as N)	mg/L	0.94	EPA 300.0	0.40	0.10		06/15/13 10:39	10
Total Alkalinity	mg/L	440	SM 2320B	8.0	2.0		06/28/13 16:00	1
Total Kjeldahl Nitrogen	mg/L	82	EPA 351.2	0.20	0.05	07/02/13 09:02	07/05/13 14:01	41.67
Nitrate+Nitrite (N)	mg/L	1.8	EPA 300.0	0.80	0.20		06/15/13 10:39	10

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF31435 - Ion Chromatography 300.0 Prep										
Blank (BF31435-BLK1)					Prepared & Analyzed: 06/15/13					
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Chloride	0.050 U	0.20	0.050	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
LCS (BF31435-BS1)					Prepared & Analyzed: 06/15/13					
Nitrite (as N)	1.36	0.04	0.01	mg/L	1.4		97	85-115		
Chloride	2.98	0.20	0.050	mg/L	3.0		99	85-115		
Nitrate (as N)	1.67	0.04	0.01	mg/L	1.7		98	85-115		
LCS Dup (BF31435-BSD1)					Prepared & Analyzed: 06/15/13					
Nitrite (as N)	1.45	0.04	0.01	mg/L	1.4		103	85-115	6	200
Nitrate (as N)	1.59	0.04	0.01	mg/L	1.7		94	85-115	5	200
Chloride	3.07	0.20	0.050	mg/L	3.0		102	85-115	3	200
Matrix Spike (BF31435-MS1)					Source: 1306198-09		Prepared & Analyzed: 06/15/13			
Nitrite (as N)	1.37	0.04	0.01	mg/L	1.4	0.0350	96	85-115		
Nitrate (as N)	3.76	0.04	0.01	mg/L	1.7	2.01	103	85-115		
Chloride	7.07	0.20	0.050	mg/L	3.0	3.92	105	80-120		
Matrix Spike (BF31435-MS2)					Source: 1306198-11		Prepared & Analyzed: 06/15/13			
Chloride	30.0 L	0.20	0.050	mg/L	3.0	55.4	NR	80-120		
Nitrite (as N)	1.94 J5	0.04	0.01	mg/L	1.4	0.938	72	85-115		
Nitrate (as N)	0.0890 J5	0.04	0.01	mg/L	1.7	0.818	NR	85-115		
Batch BF31824 - Ion Chromatography 300.0 Prep										
Blank (BF31824-BLK1)					Prepared & Analyzed: 06/18/13					
Chloride	0.050 U	0.20	0.050	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						

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Tampa, FL 33619

July 15, 2013
Work Order: 1306198

Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF31824 - Ion Chromatography 300.0 Prep										
LCS (BF31824-BS1)					Prepared & Analyzed: 06/18/13					
Chloride	2.83	0.20	0.050	mg/L	3.0		94	85-115		
Nitrate (as N)	1.58	0.04	0.01	mg/L	1.7		93	85-115		
LCS Dup (BF31824-BS1)					Prepared & Analyzed: 06/18/13					
Nitrate (as N)	1.58	0.04	0.01	mg/L	1.7		93	85-115	0.4	200
Chloride	2.82	0.20	0.050	mg/L	3.0		94	85-115	0.4	200
Matrix Spike (BF31824-MS1)					Source: 1305558-05		Prepared & Analyzed: 06/18/13			
Nitrate (as N)	63.2	0.40	0.10	mg/L	17	45.9	102	85-115		
Chloride	107	2.0	0.50	mg/L	30	79.6	92	80-120		
Matrix Spike (BF31824-MS2)					Source: 1305987-02		Prepared & Analyzed: 06/18/13			
Nitrate (as N)	1.62	0.04	0.01	mg/L	1.7	0.0880	90	85-115		
Chloride	30.0 L	0.20	0.050	mg/L	3.0	215	NR	80-120		
Batch BF32024 - COD prep										
Blank (BF32024-BLK1)					Prepared & Analyzed: 06/20/13					
Chemical Oxygen Demand	10 U	25	10	mg/L						
LCS (BF32024-BS1)					Prepared & Analyzed: 06/20/13					
Chemical Oxygen Demand	51	25	10	mg/L	50		102	90-110		
Matrix Spike (BF32024-MS1)					Source: 1306198-01		Prepared & Analyzed: 06/20/13			
Chemical Oxygen Demand	110	25	10	mg/L	50	65	85	85-115		
Matrix Spike Dup (BF32024-MSD1)					Source: 1306198-01		Prepared & Analyzed: 06/20/13			
Chemical Oxygen Demand	110	25	10	mg/L	50	65	89	85-115	2	32

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF32031 - Ion Chromatography 300.0 Prep										
Blank (BF32031-BLK1)					Prepared & Analyzed: 06/20/13					
Chloride	0.050 U	0.20	0.050	mg/L						
LCS (BF32031-BS1)					Prepared & Analyzed: 06/20/13					
Chloride	2.85	0.20	0.050	mg/L	3.0		95	85-115		
LCS Dup (BF32031-BSD1)					Prepared & Analyzed: 06/20/13					
Chloride	3.00	0.20	0.050	mg/L	3.0		100	85-115	5	200
Matrix Spike (BF32031-MS1)					Source: 1306371-04		Prepared & Analyzed: 06/20/13			
Chloride	30.0 L	0.20	0.050	mg/L	3.0	285	NR	80-120		
Matrix Spike (BF32031-MS2)					Source: 1306198-11		Prepared & Analyzed: 06/21/13			
Chloride	87.8	2.0	0.50	mg/L	30	55.4	108	80-120		
Nitrate (as N)	17.3	0.40	0.10	mg/L	17	0.818	97	85-115		
Nitrite (as N)	16.2	0.40	0.10	mg/L	14	0.938	109	85-115		
Batch BF32111 - COD prep										
Blank (BF32111-BLK1)					Prepared & Analyzed: 06/21/13					
Chemical Oxygen Demand	10 U	25	10	mg/L						
LCS (BF32111-BS1)					Prepared & Analyzed: 06/21/13					
Chemical Oxygen Demand	49	25	10	mg/L	50		98	90-110		
Matrix Spike (BF32111-MS1)					Source: 1306218-01		Prepared & Analyzed: 06/21/13			
Chemical Oxygen Demand	71	25	10	mg/L	50	28	86	85-115		

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July 15, 2013
Work Order: 1306198

Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF32111 - COD prep										
Matrix Spike Dup (BF32111-MSD1)		Source: 1306218-01			Prepared & Analyzed: 06/21/13					
Chemical Oxygen Demand	71	25	10	mg/L	50	28	86	85-115	0	32
Batch BF32811 - alkalinity										
Blank (BF32811-BLK1)				Prepared & Analyzed: 06/25/13						
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
LCS (BF32811-BS1)				Prepared & Analyzed: 06/25/13						
Total Alkalinity	120	8.0	2.0	mg/L	120		96	90-110		
Matrix Spike (BF32811-MS1)		Source: 1306198-02			Prepared & Analyzed: 06/25/13					
Total Alkalinity	190	8.0	2.0	mg/L	120	65	96	80-120		
Matrix Spike Dup (BF32811-MSD1)		Source: 1306198-02			Prepared & Analyzed: 06/25/13					
Total Alkalinity	190	8.0	2.0	mg/L	120	65	96	80-120	0	26
Batch BG30204 - Digestion for TKN by EPA 351.2										
Blank (BG30204-BLK1)				Prepared: 07/02/13 Analyzed: 07/05/13						
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
LCS (BG30204-BS1)				Prepared: 07/02/13 Analyzed: 07/05/13						
Total Kjeldahl Nitrogen	2.70	0.20	0.05	mg/L	2.5		107	90-110		
Matrix Spike (BG30204-MS1)		Source: 1306198-02			Prepared: 07/02/13 Analyzed: 07/05/13					
Total Kjeldahl Nitrogen	4.37	0.20	0.05	mg/L	2.5	2.04	92	90-110		

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July 15, 2013
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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG30204 - Digestion for TKN by EPA 351.2										
Matrix Spike (BG30204-MS2)		Source: 1306401-02			Prepared: 07/02/13 Analyzed: 07/05/13					
Total Kjeldahl Nitrogen	3.61	0.20	0.05	mg/L	2.5	0.820	110	90-110		
Matrix Spike Dup (BG30204-MSD1)		Source: 1306198-02			Prepared: 07/02/13 Analyzed: 07/05/13					
Total Kjeldahl Nitrogen	4.48	0.20	0.05	mg/L	2.5	2.04	96	90-110	2	20
Matrix Spike Dup (BG30204-MSD2)		Source: 1306401-02			Prepared: 07/02/13 Analyzed: 07/05/13					
Total Kjeldahl Nitrogen	3.29	0.20	0.05	mg/L	2.5	0.820	97	90-110	9	20
Batch BG30209 - alkalinity										
Blank (BG30209-BLK1)		Prepared & Analyzed: 06/28/13								
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
LCS (BG30209-BS1)		Prepared & Analyzed: 06/28/13								
Total Alkalinity	120	8.0	2.0	mg/L	120		96	90-110		
Matrix Spike (BG30209-MS1)		Source: 1306403-07			Prepared & Analyzed: 06/28/13					
Total Alkalinity	230	8.0	2.0	mg/L	120	110	96	80-120		
Matrix Spike Dup (BG30209-MSD1)		Source: 1306403-07			Prepared & Analyzed: 06/28/13					
Total Alkalinity	230	8.0	2.0	mg/L	120	110	96	80-120	0	26
Batch BG30505 - Ammonia by SEAL										
Blank (BG30505-BLK1)		Prepared & Analyzed: 07/06/13								
Ammonia as N	0.009 U	0.040	0.009	mg/L						

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG30505 - Ammonia by SEAL										
LCS (BG30505-BS1)					Prepared & Analyzed: 07/05/13					
Ammonia as N	0.47	0.040	0.009	mg/L	0.50		94	90-110		
Matrix Spike (BG30505-MS1)					Source: 1306198-04 Prepared & Analyzed: 07/05/13					
Ammonia as N	0.51	0.040	0.009	mg/L	0.50	ND	102	90-110		
Matrix Spike (BG30505-MS2)					Source: 1306401-02 Prepared & Analyzed: 07/05/13					
Ammonia as N	0.50	0.040	0.009	mg/L	0.50	0.022	97	90-110		
Matrix Spike Dup (BG30505-MSD1)					Source: 1306198-04 Prepared & Analyzed: 07/05/13					
Ammonia as N	0.51	0.040	0.009	mg/L	0.50	ND	102	90-110	0.08	10
Matrix Spike Dup (BG30505-MSD2)					Source: 1306401-02 Prepared & Analyzed: 07/05/13					
Ammonia as N	0.50	0.040	0.009	mg/L	0.50	0.022	95	90-110	1	10

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* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

L Off-scale high. Result exceeded highest calibration standard.
J5 Matrix spike of this sample was outside typical range. All other QC criteria were acceptable.

Questions regarding this report should be directed to :

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SOUTHERN ANALYTICAL LABORATORIES, INC.

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SAL Project No.

1306198

Client Name Hazan and Sawyer						Contact / Phone: Josephin Edeback-Hirst 813-630-4498						
Project Name / Location Wakulla County C-HS2 SE#5						iedeback@hazanandsawyer.com						
Samplers: (Signature) 						PARAMETER / CONTAINER DESCRIPTION						
Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water		Date	Time	Matrix	Composite	Grab	500mLP, Cool Total Alkalinity, NOx, Cl	125mLP, H ₂ SO ₄ COD, TKN, NH ₃				No. of Containers (Total per each location)
SAL Use Only	Sample No.											
Sample Description												
	01 B10-7	6/18/13	1037	GW		X	1	1				2
	02 B8-7		1000	GW		X	1	1				2
	03 B8-5		1000	GW		X	1	1				2
	04 C8-7		0941	GW		X	1	1				2
	05 C10-6		0920	GW		X	1	1				2
	06 P202		1015	GW		X	1	1				2
	07 A11-7		1003	GW		X	1	1				2
	08 A10-9		0950	GW		X	1	1				2
	09 A7-8		0936	GW		X	1	1				2
	10 B2-6		0924	GW		X	1	1				2
	11 STE		1020	WW		X	1	1				
Containers/Prepared/Relinquished: 		Date/Time: 1120 6/18/13	Received: 		Date/Time: 1450 06-14-13	Seal intact? Y N <input checked="" type="radio"/> N/A		Instructions / Remarks				
Relinquished: 		Date/Time: 1500 06-14-13	Received: 		Date/Time: 1450 06-14-13	Samples intact upon arrival? <input checked="" type="radio"/> Y N N/A						
Relinquished:		Date/Time:	Received:		Date/Time:	Received on ice? Temp 01 <input checked="" type="radio"/> Y N N/A						
Relinquished:		Date/Time:	Received:		Date/Time:	Proper preservatives indicated? <input checked="" type="radio"/> Y N N/A						
Relinquished:		Date/Time:	Received:		Date/Time:	Rec'd within holding time? <input checked="" type="radio"/> Y N N/A						
Relinquished:		Date/Time:	Received:		Date/Time:	Volatiles rec'd w/out headspace Y N <input checked="" type="radio"/> N/A						
Relinquished:		Date/Time:	Received:		Date/Time:	Proper containers used? <input checked="" type="radio"/> Y N N/A						

Hazen and Sawyer
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September 9, 2013
Work Order: 1307316

Laboratory Report

Project Name		B-HS3 Preliminary SE#1						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		STE						
Matrix		Wastewater						
SAL Sample Number		1307316-01						
Date/Time Collected		08/15/13 11:00						
Collected by		Josefin Hirst						
Date/Time Received		08/15/13 14:30						
<u>Client Provided Field Data</u>								
pH		7.20						
Temperature		29.4 °C						
Conductivity		868 umhos						
Dissolved Oxygen		0.05 mg/L						
<u>Inorganics</u>								
Hydrogen Sulfide (Unionized)	mg/L	2.5	SM 4550SF	0.04	0.01		08/20/13 10:45	1
Ammonia as N	mg/L	27	EPA 350.1	0.80	0.19		08/28/13 14:58	20
Carbonaceous BOD	mg/L	54	SM 5210B	2	2	08/16/13 11:33	08/21/13 09:51	1
Nitrate (as N)	mg/L	0.05	EPA 300.0	0.04	0.01		08/16/13 17:16	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		08/16/13 17:16	1
Sulfate	mg/L	5.9	EPA 300.0	0.60	0.20		08/16/13 17:16	1
Sulfide	mg/L	6.7	SM 4500SF	0.40	0.10		08/20/13 10:45	1
Total Kjeldahl Nitrogen	mg/L	30	EPA 351.2	0.20	0.05	08/29/13 16:08	09/06/13 11:10	20.83
Total Suspended Solids	mg/L	16	SM 2540D	1	1	08/16/13 13:00	08/19/13 13:56	1
Nitrate+Nitrite (N)	mg/L	0.05 I	EPA 300.0	0.08	0.02		08/16/13 17:16	1

Sample Description **Stage 1**
Matrix **Wastewater**
SAL Sample Number **1307316-02**
Date/Time Collected **08/15/13 10:10**
Collected by **Josefin Hirst**
Date/Time Received **08/15/13 14:30**

Client Provided Field Data								
pH		7.15						
Temperature		31.8 °C						
Conductivity		552 umhos						
Dissolved Oxygen		6.08 mg/L						
Inorganics								
Ammonia as N	mg/L	0.18 I	EPA 350.1	0.40	0.095		08/28/13 12:34	10
Nitrate (as N)	mg/L	3.9	EPA 300.0	0.04	0.01		08/16/13 17:25	1
Nitrite (as N)	mg/L	0.05	EPA 300.0	0.04	0.01		08/16/13 17:25	1
Total Kjeldahl Nitrogen	mg/L	2.3	EPA 351.2	0.20	0.05	08/29/13 16:08	09/06/13 11:12	1
Nitrate+Nitrite (N)	mg/L	3.9	EPA 300.0	0.08	0.02		08/16/13 17:25	1

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September 9, 2013
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Laboratory Report

Project Name		B-HS3 Preliminary SE#1						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution

Sample Description **Stage 2**
 Matrix **Wastewater**
 SAL Sample Number **1307316-03**
 Date/Time Collected **08/15/13 10:45**
 Collected by **Josefin Hirst**
 Date/Time Received **08/15/13 14:30**

Client Provided Field Data

pH 6.53
 Temperature 29.7 °C
 Conductivity 653 umhos
 Dissolved Oxygen 0.14 mg/L

Inorganics

Hydrogen Sulfide (Unionized)	mg/L	0.60	SM 4550SF	0.04	0.01		08/20/13 10:45	1
Ammonia as N	mg/L	0.095 U	EPA 350.1	0.40	0.095		08/28/13 12:36	10
Nitrate (as N)	mg/L	0.05	EPA 300.0	0.04	0.01		08/16/13 17:35	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		08/16/13 17:35	1
Sulfate	mg/L	36	EPA 300.0	0.60	0.20		08/16/13 17:35	1
Sulfide	mg/L	0.81	SM 4500SF	0.40	0.10		08/20/13 10:45	1
Total Kjeldahl Nitrogen	mg/L	1.3	EPA 351.2	0.20	0.05	08/29/13 16:08	09/06/13 11:13	1
Nitrate+Nitrite (N)	mg/L	0.05 I	EPA 300.0	0.08	0.02		08/16/13 17:35	1

Sample Description **TAP**
 Matrix **Drinking Water**
 SAL Sample Number **1307316-04**
 Date/Time Collected **08/15/13 11:10**
 Collected by **Josefin Hirst**
 Date/Time Received **08/15/13 14:30**

Client Provided Field Data

pH 7.65
 Temperature 28.2 °C
 Conductivity 327 umhos
 Dissolved Oxygen 6.72 mg/L

Inorganics

Ammonia as N	mg/L	0.095 U	EPA 350.1	0.40	0.095		08/28/13 12:38	10
Nitrate (as N)	mg/L	0.06	EPA 300.0	0.04	0.01		08/16/13 17:44	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		08/16/13 17:44	1
Sulfate	mg/L	16	EPA 300.0	0.60	0.20		08/16/13 17:44	1
Total Kjeldahl Nitrogen	mg/L	0.20	EPA 351.2	0.20	0.05	08/29/13 16:08	09/06/13 11:15	1
Nitrate+Nitrite (N)	mg/L	0.06 I	EPA 300.0	0.08	0.02		08/16/13 17:44	1

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September 9, 2013
Work Order: 1307316

Laboratory Report

Project Name		B-HS3 Preliminary SE#1						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LY-ST1-N LY-1						
Matrix		Wastewater						
SAL Sample Number		1307316-05						
Date/Time Collected		08/15/13 10:40						
Collected by		Josefin Hirst						
Date/Time Received		08/15/13 14:30						

Client Provided Field Data

pH	6.36
Temperature	30.9 °C
Conductivity	404 umhos
Dissolved Oxygen	2.39 mg/L

Inorganics

Ammonia as N	mg/L	0.039 I	EPA 350.1	0.040	0.009		08/28/13 12:40	1
Nitrate (as N)	mg/L	9.8	EPA 300.0	0.04	0.01		08/16/13 18:50	1
Nitrite (as N)	mg/L	0.13	EPA 300.0	0.04	0.01		08/16/13 18:50	1
Sulfate	mg/L	54	EPA 300.0	0.60	0.20		08/16/13 18:50	1
Total Kjeldahl Nitrogen	mg/L	2.7	EPA 351.2	0.20	0.05	08/29/13 16:08	09/06/13 11:17	1
Nitrate+Nitrite (N)	mg/L	10	EPA 300.0	0.08	0.02		08/16/13 18:50	1

Sample Description		LY-ST1-S LY-2						
Matrix		Wastewater						
SAL Sample Number		1307316-06						
Date/Time Collected		08/15/13 10:35						
Collected by		Josefin Hirst						
Date/Time Received		08/15/13 14:30						

Client Provided Field Data

pH	6.49
Temperature	30.2 °C
Conductivity	624 umhos
Dissolved Oxygen	1.50 mg/L

Inorganics

Ammonia as N	mg/L	0.011 I	EPA 350.1	0.040	0.009		08/28/13 12:50	1
Nitrate (as N)	mg/L	20	EPA 300.0	0.04	0.01		08/16/13 18:59	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		08/16/13 18:59	1
Sulfate	mg/L	50	EPA 300.0	0.60	0.20		08/16/13 18:59	1
Total Kjeldahl Nitrogen	mg/L	3.7	EPA 351.2	0.20	0.05	08/29/13 16:08	09/06/13 11:25	1
Nitrate+Nitrite (N)	mg/L	20	EPA 300.0	0.08	0.02		08/16/13 18:59	1

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September 9, 2013
Work Order: 1307316

Laboratory Report

Project Name		B-HS3 Preliminary SE#1						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LY-ST2-N LY-3						
Matrix		Wastewater						
SAL Sample Number		1307316-07						
Date/Time Collected		08/15/13 10:20						
Collected by		Josefin Hirst						
Date/Time Received		08/15/13 14:30						

Client Provided Field Data

pH	6.32
Temperature	29.0 °C
Conductivity	934 umhos
Dissolved Oxygen	2.05 mg/L

Inorganics

Ammonia as N	mg/L	0.035 I	EPA 350.1	0.040	0.009		08/28/13 12:52	1
Nitrate (as N)	mg/L	18	EPA 300.0	0.04	0.01		08/16/13 19:09	1
Nitrite (as N)	mg/L	0.05	EPA 300.0	0.04	0.01		08/16/13 19:09	1
Sulfate	mg/L	50	EPA 300.0	0.60	0.20		08/16/13 19:09	1
Total Kjeldahl Nitrogen	mg/L	3.6	EPA 351.2	0.20	0.05	08/29/13 16:08	09/06/13 11:27	1
Nitrate+Nitrite (N)	mg/L	18	EPA 300.0	0.08	0.02		08/16/13 19:09	1

Sample Description		LY-ST2-S LY-4						
Matrix		Wastewater						
SAL Sample Number		1307316-08						
Date/Time Collected		08/15/13 10:30						
Collected by		Josefin Hirst						
Date/Time Received		08/15/13 14:30						

Client Provided Field Data

pH	6.32
Temperature	29.4 °C
Conductivity	807 umhos
Dissolved Oxygen	1.41 mg/L

Inorganics

Ammonia as N	mg/L	0.092	EPA 350.1	0.040	0.009		08/28/13 12:54	1
Nitrate (as N)	mg/L	17	EPA 300.0	0.04	0.01		08/16/13 19:18	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		08/16/13 19:18	1
Sulfate	mg/L	55	EPA 300.0	0.60	0.20		08/16/13 19:18	1
Total Kjeldahl Nitrogen	mg/L	4.0	EPA 351.2	0.20	0.05	08/29/13 16:05	09/04/13 16:26	1
Nitrate+Nitrite (N)	mg/L	17	EPA 300.0	0.08	0.02		08/16/13 19:18	1

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Tampa, FL 33619

September 9, 2013
Work Order: 1307316

Laboratory Report

Project Name		B-HS3 Preliminary SE#1						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution

Sample Description **PZ-07**
 Matrix **Groundwater**
 SAL Sample Number **1307316-09**
 Date/Time Collected **08/15/13 09:18**
 Collected by **Josefin Hirst**
 Date/Time Received **08/15/13 14:30**

Client Provided Field Data

pH 6.44
 Temperature 27.4 °C
 Conductivity 833 umhos
 Dissolved Oxygen 0.59 mg/L

Inorganics

Ammonia as N	mg/L	0.74	EPA 350.1	0.040	0.009		08/28/13 12:56	1
Nitrate (as N)	mg/L	7.0	EPA 300.0	0.04	0.01		08/16/13 19:27	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		08/16/13 19:27	1
Total Kjeldahl Nitrogen	mg/L	4.0	EPA 351.2	0.20	0.05	08/29/13 16:05	09/04/13 16:28	1
Nitrate+Nitrite (N)	mg/L	7.0	EPA 300.0	0.08	0.02		08/16/13 19:27	1

Sample Description **PZ-08**
 Matrix **Groundwater**
 SAL Sample Number **1307316-10**
 Date/Time Collected **08/15/13 09:37**
 Collected by **Josefin Hirst**
 Date/Time Received **08/15/13 14:30**

Client Provided Field Data

pH 6.35
 Temperature 27.0 °C
 Conductivity 962 umhos
 Dissolved Oxygen 2.27 mg/L

Inorganics

Ammonia as N	mg/L	0.016 I	EPA 350.1	0.040	0.009		08/26/13 12:53	1
Nitrate (as N)	mg/L	19	EPA 300.0	0.04	0.01		08/16/13 19:37	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		08/16/13 19:37	1
Total Kjeldahl Nitrogen	mg/L	2.5	EPA 351.2	0.20	0.05	08/29/13 16:05	09/04/13 16:30	1
Nitrate+Nitrite (N)	mg/L	19	EPA 300.0	0.08	0.02		08/16/13 19:37	1

Sample Description **PZ-09**
 Matrix **Groundwater**
 SAL Sample Number **1307316-11**
 Date/Time Collected **08/15/13 09:55**
 Collected by **Josefin Hirst**
 Date/Time Received **08/15/13 14:30**

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September 9, 2013
Work Order: 1307316

Laboratory Report

Project Name		B-HS3 Preliminary SE#1						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		PZ-09						
Matrix		Groundwater						
SAL Sample Number		1307316-11						
Date/Time Collected		08/15/13 09:55						
Collected by		Josefin Hirst						
Date/Time Received		08/15/13 14:30						
<u>Client Provided Field Data</u>								
pH		5.57						
Temperature		26.7 °C						
Conductivity		526 umhos						
Dissolved Oxygen		0.62 mg/L						
<u>Inorganics</u>								
Ammonia as N	mg/L	0.069	EPA 350.1	0.040	0.009		08/26/13 12:55	1
Nitrate (as N)	mg/L	14	EPA 300.0	0.04	0.01		08/16/13 19:46	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		08/16/13 19:46	1
Total Kjeldahl Nitrogen	mg/L	3.1	EPA 351.2	0.20	0.05	08/29/13 16:05	09/04/13 16:31	1
Nitrate+Nitrite (N)	mg/L	14	EPA 300.0	0.08	0.02		08/16/13 19:46	1

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September 9, 2013
Work Order: 1307316

Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BH31603 - Ion Chromatography 300.0 Prep										
Blank (BH31603-BLK1)					Prepared & Analyzed: 08/16/13					
Sulfate	0.20 U	0.60	0.20	mg/L						
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
Surrogate: Dichloroacetate	1.12			mg/L	1.0		112	90-115		
Surrogate: Dichloroacetate	1.12			mg/L	1.0		112	90-115		
Surrogate: Dichloroacetate	1.12			mg/L	1.0		112	90-115		
LCS (BH31603-BS1)					Prepared & Analyzed: 08/16/13					
Nitrite (as N)	1.43	0.04	0.01	mg/L	1.4		102	85-115		
Nitrate (as N)	1.72	0.04	0.01	mg/L	1.7		101	85-115		
Sulfate	9.05	0.60	0.20	mg/L	9.0		101	85-115		
Surrogate: Dichloroacetate	1.14			mg/L	1.0		114	90-115		
Surrogate: Dichloroacetate	1.14			mg/L	1.0		114	90-115		
Surrogate: Dichloroacetate	1.14			mg/L	1.0		114	90-115		
LCS Dup (BH31603-BSD1)					Prepared & Analyzed: 08/16/13					
Nitrate (as N)	1.72	0.04	0.01	mg/L	1.7		101	85-115	0	200
Sulfate	9.06	0.60	0.20	mg/L	9.0		101	85-115	0.1	200
Nitrite (as N)	1.43	0.04	0.01	mg/L	1.4		102	85-115	0.2	200
Surrogate: Dichloroacetate	1.13			mg/L	1.0		113	90-115		
Surrogate: Dichloroacetate	1.13			mg/L	1.0		113	90-115		
Surrogate: Dichloroacetate	1.13			mg/L	1.0		113	90-115		
Matrix Spike (BH31603-MS1)					Source: 1308471-01		Prepared & Analyzed: 08/19/13			
Sulfate	17.1	0.60	0.20	mg/L	9.0	8.52	95	85-115		
Nitrite (as N)	0.696 J5	0.04	0.01	mg/L	1.4	ND	50	85-115		
Nitrate (as N)	2.38 J5	0.04	0.01	mg/L	1.7	0.0650	136	85-115		
Surrogate: Dichloroacetate	1.00			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	1.00			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	1.00			mg/L	1.0		100	90-115		

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September 9, 2013
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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Batch BH31603 - Ion Chromatography 300.0 Prep

Matrix Spike (BH31603-MS2)		Source: 1307316-04			Prepared & Analyzed: 08/16/13					
Nitrite (as N)	1.44	0.04	0.01	mg/L	1.4	ND	103	85-115		
Sulfate	25.5	0.60	0.20	mg/L	9.0	16.5	100	85-115		
Nitrate (as N)	1.76	0.04	0.01	mg/L	1.7	0.0560	101	85-115		
Surrogate: Dichloroacetate	1.12			mg/L	1.0		112	90-115		
Surrogate: Dichloroacetate	1.12			mg/L	1.0		112	90-115		
Surrogate: Dichloroacetate	1.12			mg/L	1.0		112	90-115		

Batch BH31604 - Ion Chromatography 300.0 Prep

Blank (BH31604-BLK1)		Prepared & Analyzed: 08/16/13								
Sulfate	0.20 U	0.60	0.20	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Surrogate: Dichloroacetate	1.12			mg/L	1.0		112	90-115		
Surrogate: Dichloroacetate	1.12			mg/L	1.0		112	90-115		
Surrogate: Dichloroacetate	1.12			mg/L	1.0		112	90-115		

LCS (BH31604-BS1)		Prepared & Analyzed: 08/16/13								
Sulfate	8.88	0.60	0.20	mg/L	9.0		99	85-115		
Nitrite (as N)	1.39	0.04	0.01	mg/L	1.4		100	85-115		
Nitrate (as N)	1.66	0.04	0.01	mg/L	1.7		98	85-115		
Surrogate: Dichloroacetate	1.11			mg/L	1.0		111	90-115		
Surrogate: Dichloroacetate	1.11			mg/L	1.0		111	90-115		
Surrogate: Dichloroacetate	1.11			mg/L	1.0		111	90-115		

LCS Dup (BH31604-BSD1)		Prepared & Analyzed: 08/16/13								
Sulfate	8.86	0.60	0.20	mg/L	9.0		98	85-115	0.2	200
Nitrite (as N)	1.39	0.04	0.01	mg/L	1.4		99	85-115	0.3	200
Nitrate (as N)	1.66	0.04	0.01	mg/L	1.7		98	85-115	0.2	200
Surrogate: Dichloroacetate	1.13			mg/L	1.0		113	90-115		
Surrogate: Dichloroacetate	1.13			mg/L	1.0		113	90-115		
Surrogate: Dichloroacetate	1.13			mg/L	1.0		113	90-115		

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September 9, 2013
Work Order: 1307316

Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Batch BH31604 - Ion Chromatography 300.0 Prep

Matrix Spike (BH31604-MS1)		Source: 1308453-01			Prepared & Analyzed: 08/16/13					
Nitrate (as N)	2.00	0.04	0.01	mg/L	1.7	0.183	107	85-115		
Nitrite (as N)	1.38	0.04	0.01	mg/L	1.4	ND	98	85-115		
Sulfate	88.4	0.60	0.20	mg/L	9.0	80.3	91	85-115		
Surrogate: Dichloroacetate	1.12			mg/L	1.0		112	90-115		
Surrogate: Dichloroacetate	1.12			mg/L	1.0		112	90-115		
Surrogate: Dichloroacetate	1.12			mg/L	1.0		112	90-115		
Matrix Spike (BH31604-MS2)		Source: 1308509-01			Prepared & Analyzed: 08/16/13					
Nitrate (as N)	2.28	0.04	0.01	mg/L	1.7	0.477	106	85-115		
Nitrite (as N)	1.44	0.04	0.01	mg/L	1.4	ND	102	85-115		
Sulfate	19.6	0.60	0.20	mg/L	9.0	11.0	95	85-115		
Surrogate: Dichloroacetate	0.919			mg/L	1.0		92	90-115		
Surrogate: Dichloroacetate	0.919			mg/L	1.0		92	90-115		
Surrogate: Dichloroacetate	0.919			mg/L	1.0		92	90-115		

Batch BH31616 - BOD

Blank (BH31616-BLK1)		Prepared: 08/16/13 Analyzed: 08/21/13								
Carbonaceous BOD	2 U	2	2	mg/L						
LCS (BH31616-BS1)		Prepared: 08/16/13 Analyzed: 08/21/13								
Carbonaceous BOD	199	2	2	mg/L	200		99	85-115		
LCS Dup (BH31616-BSD1)		Prepared: 08/16/13 Analyzed: 08/21/13								
Carbonaceous BOD	210	2	2	mg/L	200		105	85-115	5	200
Duplicate (BH31616-DUP1)		Prepared: 08/16/13 Analyzed: 08/21/13								
Carbonaceous BOD	51	2	2	mg/L		54			6	25

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September 9, 2013
Work Order: 1307316

Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BH31619 - TSS prep										
Blank (BH31619-BLK1)					Prepared: 08/16/13 Analyzed: 08/19/13					
Total Suspended Solids	1 U	1	1	mg/L						
LCS (BH31619-BS1)					Prepared: 08/16/13 Analyzed: 08/19/13					
Total Suspended Solids	46.5	1	1	mg/L	50		93	85-115		
Duplicate (BH31619-DUP1)					Source: 1307315-01 Prepared: 08/16/13 Analyzed: 08/19/13					
Total Suspended Solids	54.0	1	1	mg/L		58.0			7	30
Batch BH32022 - Sulfide prep										
Blank (BH32022-BLK1)					Prepared & Analyzed: 08/20/13					
Sulfide	0.10 U	0.40	0.10	mg/L						
LCS (BH32022-BS1)					Prepared & Analyzed: 08/20/13					
Sulfide	5.08	0.40	0.10	mg/L	5.0		102	85-115		
Matrix Spike (BH32022-MS1)					Source: 1308433-01 Prepared & Analyzed: 08/20/13					
Sulfide	4.88	0.40	0.10	mg/L	5.0	0.200	94	85-115		
Matrix Spike Dup (BH32022-MSD1)					Source: 1308433-01 Prepared & Analyzed: 08/20/13					
Sulfide	4.88	0.40	0.10	mg/L	5.0	0.200	94	85-115	0	14
Batch BH32614 - Ammonia by SEAL										
Blank (BH32614-BLK1)					Prepared & Analyzed: 08/26/13					
Ammonia as N	0.009 U	0.040	0.009	mg/L						

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September 9, 2013
Work Order: 1307316

Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BH32614 - Ammonia by SEAL										
LCS (BH32614-BS1)					Prepared & Analyzed: 08/26/13					
Ammonia as N	0.47	0.040	0.009	mg/L	0.50		93	90-110		
Matrix Spike (BH32614-MS1)					Source: 1307786-08 Prepared & Analyzed: 08/26/13					
Ammonia as N	0.48	0.040	0.009	mg/L	0.50	0.017	92	90-110		
Matrix Spike (BH32614-MS2)					Source: 1308326-07 Prepared & Analyzed: 08/26/13					
Ammonia as N	0.49	0.040	0.009	mg/L	0.50	0.015	94	90-110		
Matrix Spike Dup (BH32614-MSD1)					Source: 1307786-08 Prepared & Analyzed: 08/26/13					
Ammonia as N	0.48	0.040	0.009	mg/L	0.50	0.017	92	90-110	0.2	10
Matrix Spike Dup (BH32614-MSD2)					Source: 1308326-07 Prepared & Analyzed: 08/26/13					
Ammonia as N	0.47	0.040	0.009	mg/L	0.50	0.015	91	90-110	3	10
Batch BH32618 - Ammonia by SEAL										
Blank (BH32618-BLK1)					Prepared & Analyzed: 08/28/13					
Ammonia as N	0.009 U	0.040	0.009	mg/L						
LCS (BH32618-BS1)					Prepared & Analyzed: 08/28/13					
Ammonia as N	0.49	0.040	0.009	mg/L	0.50		98	90-110		
Matrix Spike (BH32618-MS1)					Source: 1308651-07 Prepared & Analyzed: 08/28/13					
Ammonia as N	0.52	0.040	0.009	mg/L	0.50	ND	105	90-110		
Matrix Spike (BH32618-MS2)					Source: 1308703-07 Prepared & Analyzed: 08/28/13					
Ammonia as N	0.52	0.040	0.009	mg/L	0.50	ND	104	90-110		

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Batch BH32618 - Ammonia by SEAL

Matrix Spike Dup (BH32618-MSD1)		Source: 1308651-07			Prepared & Analyzed: 08/28/13					
Ammonia as N	0.53	0.040	0.009	mg/L	0.50	ND	106	90-110	1	10
Matrix Spike Dup (BH32618-MSD2)		Source: 1308703-07			Prepared & Analyzed: 08/28/13					
Ammonia as N	0.54	0.040	0.009	mg/L	0.50	ND	108	90-110	4	10

Batch BH32938 - Digestion for TKN by EPA 351.2

Blank (BH32938-BLK1)					Prepared: 08/29/13 Analyzed: 09/05/13					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
LCS (BH32938-BS1)					Prepared: 08/29/13 Analyzed: 09/04/13					
Total Kjeldahl Nitrogen	2.32	0.20	0.05	mg/L	2.5		92	90-110		
Matrix Spike (BH32938-MS1)		Source: 1308864-02			Prepared: 08/29/13 Analyzed: 09/05/13					
Total Kjeldahl Nitrogen	3.69	0.20	0.05	mg/L	2.5	0.964	108	90-110		
Matrix Spike (BH32938-MS2)		Source: 1308762-07			Prepared: 08/29/13 Analyzed: 09/04/13					
Total Kjeldahl Nitrogen	3.02	0.20	0.05	mg/L	2.5	0.420	103	90-110		
Matrix Spike Dup (BH32938-MSD1)		Source: 1308864-02			Prepared: 08/29/13 Analyzed: 09/04/13					
Total Kjeldahl Nitrogen	3.23	0.20	0.05	mg/L	2.5	0.964	90	90-110	13	20
Matrix Spike Dup (BH32938-MSD2)		Source: 1308762-07			Prepared: 08/29/13 Analyzed: 09/04/13					
Total Kjeldahl Nitrogen	3.07	0.20	0.05	mg/L	2.5	0.420	105	90-110	2	20

Batch BH32939 - Digestion for TKN by EPA 351.2

Blank (BH32939-BLK1)		Prepared: 08/29/13 Analyzed: 09/06/13								
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						

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September 9, 2013
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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BH32939 - Digestion for TKN by EPA 351.2										
LCS (BH32939-BS1)					Prepared: 08/29/13 Analyzed: 09/06/13					
Total Kjeldahl Nitrogen	2.40	0.20	0.05	mg/L	2.5		95	90-110		
Matrix Spike (BH32939-MS1)					Source: 1308848-07 Prepared: 08/29/13 Analyzed: 09/06/13					
Total Kjeldahl Nitrogen	2.98	0.20	0.05	mg/L	2.5	0.638	92	90-110		
Matrix Spike (BH32939-MS2)					Source: 1307315-05 Prepared: 08/29/13 Analyzed: 09/06/13					
Total Kjeldahl Nitrogen	2.48	0.20	0.05	mg/L	2.5	0.108	94	90-110		
Matrix Spike Dup (BH32939-MSD1)					Source: 1308848-07 Prepared: 08/29/13 Analyzed: 09/06/13					
Total Kjeldahl Nitrogen	3.08	0.20	0.05	mg/L	2.5	0.638	97	90-110	4	20
Matrix Spike Dup (BH32939-MSD2)					Source: 1307315-05 Prepared: 08/29/13 Analyzed: 09/06/13					
Total Kjeldahl Nitrogen	2.64	0.20	0.05	mg/L	2.5	0.108	100	90-110	6	20

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September 9, 2013
Work Order: 1307316

*** Qualifiers, Notes and Definitions**

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

J5 Matrix spike of this sample was outside typical range. All other QC criteria were acceptable.

Questions regarding this report should be directed to :

Kathryn Nordmark

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Kathryn@southernanalyticalabs.com



Chain of Custody.xls
Rev.Date 11/19/01

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October 15, 2013
Work Order: 1308838

Laboratory Report

Project Name		B-HS3 SE#1						
Sample Description		BHS3-STE						
Matrix		Wastewater						
SAL Sample Number		1308838-01						
Date/Time Collected		09/30/13 10:40						
Collected by		Josefin Hirst						
Date/Time Received		09/30/13 16:04						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
<u>Client Provided Field Data</u>								
pH		7.26						
Temperature		26.4 °C						
Conductivity		1066 umhos/cm						
Dissolved Oxygen		0.11 mg/L						
<u>Inorganics</u>								
Ammonia as N	mg/L	47	EPA 350.1	2.0	0.47		10/02/13 11:36	50
Carbonaceous BOD	mg/L	68	SM 5210B	2	2	09/30/13 16:35	10/05/13 13:43	1
Chemical Oxygen Demand	mg/L	400	EPA 410.4	25	10	10/08/13 12:19	10/10/13 14:41	1
Chloride	mg/L	41	EPA 300.0	2.0	0.50		10/03/13 00:59	10
Hydrogen Sulfide (Unionized)	mg/L	4.0	SM 4550SF	0.04	0.01	10/07/13 09:00	10/07/13 11:15	1
Nitrate (as N)	mg/L	0.01 u	EPA 300.0	0.04	0.01		10/01/13 16:43	1
Nitrate+Nitrite (N)	mg/L	0.02 u	EPA 300.0	0.08	0.02		10/01/13 16:43	1
Nitrite (as N)	mg/L	0.01 u	EPA 300.0	0.04	0.01		10/01/13 16:43	1
Orthophosphate as P	mg/L	4.5	EPA 300.0	0.040	0.010		10/01/13 16:43	1
Phosphorous - Total as P	mg/L	7.4	SM 4500P-E	0.20	0.050	10/01/13 11:37	10/04/13 15:38	5
Sulfate	mg/L	7.8	EPA 300.0	0.60	0.20		10/01/13 16:43	1
Sulfide	mg/L	12	SM 4500SF	0.40	0.10		10/07/13 11:15	1
Total Alkalinity	mg/L	390	SM 2320B	8.0	2.0		10/08/13 14:23	1
Total Kjeldahl Nitrogen	mg/L	64	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 11:07	20.83
Total Suspended Solids	mg/L	16	SM 2540D	1	1	10/01/13 11:29	10/04/13 08:49	1
Volatile Suspended Solids	mg/L	15	EPA 160.4	1	1	10/01/13 11:29	10/04/13 08:49	1
<u>Microbiology</u>								
E. Coli	MPN/100 mL	24,000 z	SM 9223B	2.0	2.0	09/30/13 17:25	10/01/13 11:25	1
Fecal Coliforms	CFU/100 ml	62,000	SM 9222D	1	1	09/30/13 17:16	10/01/13 15:16	1

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Laboratory Report

Project Name	B-HS3 SE#1
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Sample Description	BHS3-LY01
Matrix	Wastewater
SAL Sample Number	1308838-02
Date/Time Collected	09/30/13 08:50
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
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Client Provided Field Data

pH		6.33						
Temperature		26.0 °C						
Conductivity		330 umhos/cm						
Dissolved Oxygen		6.52 mg/L						

Inorganics

Ammonia as N	mg/L	0.078 I	EPA 350.1	0.20	0.047		10/02/13 11:14	5
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10	10/11/13 08:45	10/11/13 16:55	1
Chloride	mg/L	15	EPA 300.0	0.20	0.050		10/01/13 17:02	1
Nitrate (as N)	mg/L	1.3	EPA 300.0	0.04	0.01		10/01/13 17:02	1
Nitrate+Nitrite (N)	mg/L	1.3	EPA 300.0	0.08	0.02		10/01/13 17:02	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		10/01/13 17:02	1
Orthophosphate as P	mg/L	0.010 U	EPA 300.0	0.040	0.010		10/01/13 17:02	1
Phosphorous - Total as P	mg/L	0.14	SM 4500P-E	0.040	0.010	10/01/13 11:37	10/04/13 14:22	1
Sulfate	mg/L	33	EPA 300.0	0.60	0.20		10/01/13 17:02	1
Total Kjeldahl Nitrogen	mg/L	1.2	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 09:49	1

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Laboratory Report

Project Name		B-HS3 SE#1
Sample Description	BHS3-LY02	
Matrix	Wastewater	
SAL Sample Number	1308838-03	
Date/Time Collected	09/30/13 09:00	
Collected by	Josefin Hirst	
Date/Time Received	09/30/13 16:04	

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
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Client Provided Field Data

pH		6.46
Temperature		26.3 °C
Conductivity		559 umhos/cm
Dissolved Oxygen		2.62 mg/L

Inorganics

Ammonia as N	mg/L	0.023 I	EPA 350.1	0.040	0.009		10/02/13 10:01	1
Carbonaceous BOD	mg/L	5	SM 5210B	2	2	09/30/13 16:35	10/05/13 13:43	1
Chemical Oxygen Demand	mg/L	24 I	EPA 410.4	25	10	10/11/13 08:45	10/11/13 16:55	1
Chloride	mg/L	23	EPA 300.0	0.20	0.050		10/01/13 17:30	1
Nitrate (as N)	mg/L	7.1	EPA 300.0	0.04	0.01		10/01/13 17:30	1
Nitrate+Nitrite (N)	mg/L	7.1	EPA 300.0	0.08	0.02		10/01/13 17:30	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		10/01/13 17:30	1
Orthophosphate as P	mg/L	0.010 U	EPA 300.0	0.040	0.010		10/01/13 17:30	1
Phosphorous - Total as P	mg/L	0.18	SM 4500P-E	0.040	0.010	10/01/13 11:37	10/04/13 14:23	1
Sulfate	mg/L	26	EPA 300.0	0.60	0.20		10/01/13 17:30	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		10/08/13 17:19	1
Total Kjeldahl Nitrogen	mg/L	2.8	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 09:51	1
Total Suspended Solids	mg/L	4	SM 2540D	1	1	10/01/13 11:29	10/04/13 08:49	1
Volatile Suspended Solids	mg/L	1 U	EPA 160.4	1	1	10/01/13 11:29	10/04/13 08:49	1

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Laboratory Report

Project Name	B-HS3 SE#1
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Sample Description	BHS3-LINER
Matrix	Wastewater
SAL Sample Number	1308838-04
Date/Time Collected	09/30/13 10:20
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
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Client Provided Field Data

pH		6.44						
Temperature		27.8 °C						
Conductivity		651 umhos/cm						
Dissolved Oxygen		1.34 mg/L						

Inorganics

Ammonia as N	mg/L	0.052	EPA 350.1	0.040	0.009		10/02/13 10:03	1
Carbonaceous BOD	mg/L	14	SM 5210B	2	2	09/30/13 16:35	10/05/13 13:43	1
Chemical Oxygen Demand	mg/L	10 u	EPA 410.4	25	10	10/14/13 08:32	10/14/13 13:00	1
Chloride	mg/L	15	EPA 300.0	0.20	0.050		10/01/13 17:40	1
Nitrate (as N)	mg/L	0.01 u	EPA 300.0	0.04	0.01		10/01/13 17:40	1
Nitrate+Nitrite (N)	mg/L	0.02 u	EPA 300.0	0.08	0.02		10/01/13 17:40	1
Nitrite (as N)	mg/L	0.01 u	EPA 300.0	0.04	0.01		10/01/13 17:40	1
Orthophosphate as P	mg/L	0.010 u	EPA 300.0	0.040	0.010		10/01/13 17:40	1
Phosphorous - Total as P	mg/L	1.2	SM 4500P-E	0.040	0.010	10/01/13 11:37	10/04/13 14:24	1
Sulfate	mg/L	5.5	EPA 300.0	0.60	0.20		10/01/13 17:40	1
Total Alkalinity	mg/L	290	SM 2320B	8.0	2.0		10/10/13 15:25	1
Total Kjeldahl Nitrogen	mg/L	2.4	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 09:53	1
Total Suspended Solids	mg/L	15	SM 2540D	1	1	10/01/13 11:29	10/04/13 08:49	1
Volatile Suspended Solids	mg/L	8	EPA 160.4	1	1	10/01/13 11:29	10/04/13 08:49	1

Microbiology

E. Coli	MPN/100 mL	2.0 u	SM 9223B	2.0	2.0	09/30/13 17:25	10/01/13 11:25	1
Fecal Coliforms	CFU/100 ml	400	SM 9222D	1	1	09/30/13 17:16	10/01/13 15:16	1

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Laboratory Report

Project Name	B-HS3 SE#1
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Sample Description	BHS3-ST2
Matrix	Wastewater
SAL Sample Number	1308838-05
Date/Time Collected	09/30/13 10:10
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
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Client Provided Field Data

pH		6.55						
Temperature		27.7 °C						
Conductivity		785 umhos/cm						
Dissolved Oxygen		0.15 mg/L						

Inorganics

Ammonia as N	mg/L	0.12	EPA 350.1	0.040	0.009		10/02/13 10:05	1
Carbonaceous BOD	mg/L	6	SM 5210B	2	2	09/30/13 16:35	10/05/13 13:43	1
Chemical Oxygen Demand	mg/L	45	EPA 410.4	25	10	10/14/13 08:32	10/14/13 13:00	1
Chloride	mg/L	15	EPA 300.0	0.20	0.050		10/01/13 17:49	1
Hydrogen Sulfide (Unionized)	mg/L	12	SM 4550SF	0.04	0.01	10/07/13 09:00	10/07/13 11:15	1
Nitrate (as N)	mg/L	0.13	EPA 300.0	0.04	0.01		10/01/13 17:49	1
Nitrate+Nitrite (N)	mg/L	0.13	EPA 300.0	0.08	0.02		10/01/13 17:49	1
Nitrite (as N)	mg/L	0.01 u	EPA 300.0	0.04	0.01		10/01/13 17:49	1
Orthophosphate as P	mg/L	0.010 u	EPA 300.0	0.040	0.010		10/01/13 17:49	1
Phosphorous - Total as P	mg/L	0.39	SM 4500P-E	0.040	0.010	10/01/13 11:37	10/04/13 14:25	1
Sulfate	mg/L	27	EPA 300.0	0.60	0.20		10/01/13 17:49	1
Sulfide	mg/L	16	SM 4500SF	0.40	0.10		10/07/13 11:15	1
Total Alkalinity	mg/L	310	SM 2320B	8.0	2.0		10/10/13 15:34	1
Total Kjeldahl Nitrogen	mg/L	0.91	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 09:54	1
Total Suspended Solids	mg/L	2	SM 2540D	1	1	10/01/13 11:29	10/04/13 08:49	1
Volatile Suspended Solids	mg/L	2	EPA 160.4	1	1	10/01/13 11:29	10/04/13 08:49	1

Microbiology

E. Coli	MPN/100 mL	2.0 u	SM 9223B	2.0	2.0	09/30/13 17:25	10/01/13 11:25	1
Fecal Coliforms	CFU/100 ml	30	SM 9222D	1	1	09/30/13 17:16	10/01/13 15:16	1

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Laboratory Report

Project Name	B-HS3 SE#1
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Sample Description	BHS3-LY03
Matrix	Wastewater
SAL Sample Number	1308838-06
Date/Time Collected	09/30/13 09:25
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
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Client Provided Field Data

pH		6.28						
Temperature		25.1 °C						
Conductivity		770 umhos/cm						
Dissolved Oxygen		3.64 mg/L						

Inorganics

Ammonia as N	mg/L	0.014 I	EPA 350.1	0.040	0.009		10/02/13 10:07	1
Carbonaceous BOD	mg/L	8	SM 5210B	2	2	09/30/13 16:35	10/05/13 13:43	1
Chemical Oxygen Demand	mg/L	47	EPA 410.4	25	10	10/14/13 08:32	10/14/13 13:00	1
Chloride	mg/L	13	EPA 300.0	0.20	0.050		10/01/13 17:58	1
Hydrogen Sulfide (Unionized)	mg/L	0.34	SM 4550SF	0.04	0.01	10/07/13 09:00	10/07/13 11:15	1
Nitrate (as N)	mg/L	17	EPA 300.0	0.04	0.01		10/01/13 17:58	1
Nitrate+Nitrite (N)	mg/L	17	EPA 300.0	0.08	0.02		10/01/13 17:58	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		10/01/13 17:58	1
Orthophosphate as P	mg/L	0.010 U	EPA 300.0	0.040	0.010		10/01/13 17:58	1
Phosphorous - Total as P	mg/L	0.14	SM 4500P-E	0.040	0.010	10/01/13 11:37	10/04/13 14:26	1
Sulfate	mg/L	55	EPA 300.0	0.60	0.20		10/01/13 17:58	1
Sulfide	mg/L	0.41	SM 4500SF	0.40	0.10		10/07/13 11:15	1
Total Alkalinity	mg/L	250	SM 2320B	8.0	2.0		10/10/13 15:42	1
Total Kjeldahl Nitrogen	mg/L	2.7	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 09:56	1
Total Suspended Solids	mg/L	4	SM 2540D	1	1	10/01/13 11:29	10/04/13 08:49	1
Volatile Suspended Solids	mg/L	4	EPA 160.4	1	1	10/01/13 11:29	10/04/13 08:49	1

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Laboratory Report

Project Name	B-HS3 SE#1
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Sample Description	BHS3-LY04
Matrix	Wastewater
SAL Sample Number	1308838-07
Date/Time Collected	09/30/13 09:10
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
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Client Provided Field Data

pH		6.21						
Temperature		25.6 °C						
Conductivity		698 umhos/cm						
Dissolved Oxygen		2.40 mg/L						

Inorganics

Ammonia as N	mg/L	0.012 I	EPA 350.1	0.040	0.009		10/02/13 10:09	1
Carbonaceous BOD	mg/L	9	SM 5210B	2	2	09/30/13 16:35	10/05/13 13:43	1
Chemical Oxygen Demand	mg/L	32	EPA 410.4	25	10	10/14/13 08:32	10/14/13 13:00	1
Chloride	mg/L	16	EPA 300.0	0.20	0.050		10/01/13 18:08	1
Hydrogen Sulfide (Unionized)	mg/L	0.35	SM 4550SF	0.04	0.01	10/07/13 09:00	10/07/13 11:15	1
Nitrate (as N)	mg/L	7.6	EPA 300.0	0.04	0.01		10/01/13 18:08	1
Nitrate+Nitrite (N)	mg/L	7.6	EPA 300.0	0.08	0.02		10/01/13 18:08	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		10/01/13 18:08	1
Orthophosphate as P	mg/L	0.010 U	EPA 300.0	0.040	0.010		10/01/13 18:08	1
Phosphorous - Total as P	mg/L	0.031 I	SM 4500P-E	0.040	0.010	10/01/13 11:37	10/04/13 14:27	1
Sulfate	mg/L	40	EPA 300.0	0.60	0.20		10/01/13 18:08	1
Sulfide	mg/L	0.41	SM 4500SF	0.40	0.10		10/07/13 11:15	1
Total Alkalinity	mg/L	250	SM 2320B	8.0	2.0		10/10/13 15:50	1
Total Kjeldahl Nitrogen	mg/L	2.4	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 09:58	1
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	10/01/13 11:29	10/04/13 08:49	1
Volatile Suspended Solids	mg/L	1 U	EPA 160.4	1	1	10/01/13 11:29	10/04/13 08:49	1

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Laboratory Report

Project Name	B-HS3 SE#1
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Sample Description	BHS3-PZ-07
Matrix	Wastewater
SAL Sample Number	1308838-08
Date/Time Collected	09/30/13 10:21
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
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Client Provided Field Data

pH		6.18						
Temperature		27.5 °C						
Conductivity		809 umhos/cm						
Dissolved Oxygen		1.98 mg/L						

Inorganics

Ammonia as N	mg/L	0.080	EPA 350.1	0.040	0.009		10/02/13 10:11	1
Carbonaceous BOD	mg/L	4	SM 5210B	2	2	09/30/13 16:35	10/05/13 13:43	1
Chemical Oxygen Demand	mg/L	10 u	EPA 410.4	25	10	10/14/13 08:32	10/14/13 13:00	1
Chloride	mg/L	17	EPA 300.0	0.20	0.050		10/01/13 18:17	1
Hydrogen Sulfide (Unionized)	mg/L	0.35	SM 4550SF	0.04	0.01	10/07/13 09:00	10/07/13 11:15	1
Nitrate (as N)	mg/L	10	EPA 300.0	0.04	0.01		10/01/13 18:17	1
Nitrate+Nitrite (N)	mg/L	10	EPA 300.0	0.08	0.02		10/01/13 18:17	1
Nitrite (as N)	mg/L	0.01 u	EPA 300.0	0.04	0.01		10/01/13 18:17	1
Orthophosphate as P	mg/L	0.010 u	EPA 300.0	0.040	0.010		10/01/13 18:17	1
Phosphorous - Total as P	mg/L	0.14	SM 4500P-E	0.040	0.010	10/01/13 11:37	10/04/13 14:29	1
Sulfate	mg/L	35	EPA 300.0	0.60	0.20		10/01/13 18:17	1
Sulfide	mg/L	0.41	SM 4500SF	0.40	0.10		10/07/13 11:15	1
Total Alkalinity	mg/L	290	SM 2320B	8.0	2.0		10/10/13 15:59	1
Total Kjeldahl Nitrogen	mg/L	2.3	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 09:59	1
Total Suspended Solids	mg/L	3	SM 2540D	1	1	10/01/13 11:29	10/04/13 08:49	1
Volatile Suspended Solids	mg/L	3	EPA 160.4	1	1	10/01/13 11:29	10/04/13 08:49	1

Microbiology

E. Coli	MPN/100 mL	2.0 u	SM 9223B	2.0	2.0	09/30/13 17:25	10/01/13 11:25	1
Fecal Coliforms	CFU/100 ml	1 u	SM 9222D	1	1	09/30/13 17:16	10/01/13 15:16	1

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Laboratory Report

Project Name		B-HS3 SE#1						
Sample Description		BHS3-PZ-08						
Matrix		Wastewater						
SAL Sample Number		1308838-09						
Date/Time Collected		09/30/13 11:06						
Collected by		Josefin Hirst						
Date/Time Received		09/30/13 16:04						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
<u>Client Provided Field Data</u>								
pH		6.44						
Temperature		26.0 °C						
Conductivity		606 umhos/cm						
Dissolved Oxygen		2.12 mg/L						
<u>Inorganics</u>								
Ammonia as N	mg/L	0.019 I	EPA 350.1	0.040	0.009		10/02/13 10:13	1
Carbonaceous BOD	mg/L	11	SM 5210B	2	2	09/30/13 16:35	10/05/13 13:43	1
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10	10/14/13 08:32	10/14/13 13:00	1
Chloride	mg/L	15	EPA 300.0	0.20	0.050		10/01/13 18:27	1
Hydrogen Sulfide (Unionized)	mg/L	0.32	SM 4550SF	0.04	0.01	10/07/13 09:00	10/07/13 11:15	1
Nitrate (as N)	mg/L	8.6	EPA 300.0	0.04	0.01		10/01/13 18:27	1
Nitrate+Nitrite (N)	mg/L	8.6	EPA 300.0	0.08	0.02		10/01/13 18:27	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		10/01/13 18:27	1
Orthophosphate as P	mg/L	0.36	EPA 300.0	0.040	0.010		10/01/13 18:27	1
Phosphorous - Total as P	mg/L	0.41	SM 4500P-E	0.040	0.010	10/01/13 11:35	10/04/13 10:27	1
Sulfate	mg/L	35	EPA 300.0	0.60	0.20		10/01/13 18:27	1
Sulfide	mg/L	0.41	SM 4500SF	0.40	0.10		10/07/13 11:15	1
Total Alkalinity	mg/L	190	SM 2320B	8.0	2.0		10/10/13 16:06	1
Total Kjeldahl Nitrogen	mg/L	2.5	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 10:01	1
Total Suspended Solids	mg/L	23	SM 2540D	1	1	10/01/13 11:29	10/04/13 08:49	1
Volatile Suspended Solids	mg/L	10	EPA 160.4	1	1	10/01/13 11:29	10/04/13 08:49	1
<u>Microbiology</u>								
E. Coli	MPN/100 mL	2.0 U	SM 9223B	2.0	2.0	09/30/13 17:25	10/01/13 11:25	1
Fecal Coliforms	CFU/100 ml	10	SM 9222D	1	1	09/30/13 17:16	10/01/13 15:16	1

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Laboratory Report

Project Name		B-HS3 SE#1						
Sample Description		BHS3-PZ09						
Matrix		Wastewater						
SAL Sample Number		1308838-10						
Date/Time Collected		09/30/13 11:51						
Collected by		Josefin Hirst						
Date/Time Received		09/30/13 16:04						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
<u>Client Provided Field Data</u>								
pH		5.94						
Temperature		27.0 °C						
Conductivity		525 umhos/cm						
Dissolved Oxygen		3.39 mg/L						
<u>Inorganics</u>								
Ammonia as N	mg/L	0.071	EPA 350.1	0.040	0.009		10/02/13 10:15	1
Carbonaceous BOD	mg/L	2	SM 5210B	2	2	09/30/13 16:35	10/05/13 13:43	1
Chemical Oxygen Demand	mg/L	300	EPA 410.4	25	10	10/14/13 08:32	10/14/13 13:00	1
Chloride	mg/L	18	EPA 300.0	0.20	0.050		10/01/13 18:36	1
Hydrogen Sulfide (Unionized)	mg/L	0.37	SM 4550SF	0.04	0.01	10/07/13 09:00	10/07/13 11:15	1
Nitrate (as N)	mg/L	13	EPA 300.0	0.04	0.01		10/01/13 18:36	1
Nitrate+Nitrite (N)	mg/L	13	EPA 300.0	0.08	0.02		10/01/13 18:36	1
Nitrite (as N)	mg/L	0.01 u	EPA 300.0	0.04	0.01		10/01/13 18:36	1
Orthophosphate as P	mg/L	0.74	EPA 300.0	0.040	0.010		10/01/13 18:36	1
Phosphorous - Total as P	mg/L	1.2	SM 4500P-E	0.040	0.010	10/01/13 11:35	10/04/13 10:28	1
Sulfate	mg/L	35	EPA 300.0	0.60	0.20		10/01/13 18:36	1
Sulfide	mg/L	0.41	SM 4500SF	0.40	0.10		10/07/13 11:15	1
Total Alkalinity	mg/L	120	SM 2320B	8.0	2.0		10/10/13 16:12	1
Total Kjeldahl Nitrogen	mg/L	2.5	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 10:03	1
Total Suspended Solids	mg/L	11	SM 2540D	1	1	10/01/13 11:29	10/04/13 08:49	1
Volatile Suspended Solids	mg/L	11	EPA 160.4	1	1	10/01/13 11:29	10/04/13 08:49	1
<u>Microbiology</u>								
E. Coli	MPN/100 mL	2.0 u	SM 9223B	2.0	2.0	09/30/13 17:25	10/01/13 11:25	1
Fecal Coliforms	CFU/100 ml	1 u	SM 9222D	1	1	09/30/13 17:16	10/01/13 15:16	1

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Laboratory Report

Project Name	B-HS3 SE#1
Sample Description	C-10-6
Matrix	Wastewater
SAL Sample Number	1308838-11
Date/Time Collected	09/30/13 09:05
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
<u>Client Provided Field Data</u>								
pH		5.91						
Temperature		26.3 °C						
Conductivity		270 umhos/cm						
Dissolved Oxygen		0.10 mg/L						
<u>Inorganics</u>								
Ammonia as N	mg/L	0.11	EPA 350.1	0.040	0.009		10/02/13 10:25	1
Chloride	mg/L	11	EPA 300.0	0.20	0.050		10/01/13 18:45	1
Nitrate (as N)	mg/L	2.6	EPA 300.0	0.04	0.01		10/01/13 18:45	1
Nitrate+Nitrite (N)	mg/L	2.6	EPA 300.0	0.08	0.02		10/01/13 18:45	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		10/01/13 18:45	1
Sulfate	mg/L	23	EPA 300.0	0.60	0.20		10/01/13 18:45	1
Total Alkalinity	mg/L	61	SM 2320B	8.0	2.0		10/10/13 16:24	1
Total Kjeldahl Nitrogen	mg/L	3.0	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 10:11	1

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Laboratory Report

Project Name	B-HS3 SE#1
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Sample Description	B8-5
Matrix	Wastewater
SAL Sample Number	1308838-12
Date/Time Collected	09/30/13 08:35
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
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Client Provided Field Data

pH		5.89						
Temperature		25.4 °C						
Conductivity		414 umhos/cm						
Dissolved Oxygen		0.39 mg/L						

Inorganics

Ammonia as N	mg/L	0.042	EPA 350.1	0.040	0.009		10/02/13 10:27	1
Chloride	mg/L	22	EPA 300.0	0.20	0.050		10/01/13 18:55	1
Nitrate (as N)	mg/L	1.2	EPA 300.0	0.04	0.01		10/01/13 18:55	1
Nitrate+Nitrite (N)	mg/L	1.2	EPA 300.0	0.08	0.02		10/01/13 18:55	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		10/01/13 18:55	1
Sulfate	mg/L	41	EPA 300.0	0.60	0.20		10/01/13 18:55	1
Total Alkalinity	mg/L	93	SM 2320B	8.0	2.0		10/10/13 16:30	1
Total Kjeldahl Nitrogen	mg/L	2.2	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 10:13	1

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Laboratory Report

Project Name	B-HS3 SE#1
Sample Description	B8-7
Matrix	Wastewater
SAL Sample Number	1308838-13
Date/Time Collected	09/30/13 08:48
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
<u>Client Provided Field Data</u>								
pH		5.81						
Temperature		25.4 °C						
Conductivity		332 umhos/cm						
Dissolved Oxygen		0.26 mg/L						
<u>Inorganics</u>								
Ammonia as N	mg/L	0.058	EPA 350.1	0.040	0.009		10/02/13 10:29	1
Chloride	mg/L	28	EPA 300.0	0.20	0.050		10/01/13 20:00	1
Nitrate (as N)	mg/L	0.99	EPA 300.0	0.04	0.01		10/01/13 20:00	1
Nitrate+Nitrite (N)	mg/L	0.99	EPA 300.0	0.08	0.02		10/01/13 20:00	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		10/01/13 20:00	1
Sulfate	mg/L	26	EPA 300.0	0.60	0.20		10/01/13 20:00	1
Total Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		10/08/13 17:19	1
Total Kjeldahl Nitrogen	mg/L	1.2	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 10:14	1

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Laboratory Report

Project Name	B-HS3 SE#1
Sample Description	A7-8
Matrix	Wastewater
SAL Sample Number	1308838-14
Date/Time Collected	09/30/13 09:41
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
<u>Client Provided Field Data</u>								
pH		5.77						
Temperature		26.0 °C						
Conductivity		496 umhos/cm						
Dissolved Oxygen		0.38 mg/L						
<u>Inorganics</u>								
Ammonia as N	mg/L	0.009 U	EPA 350.1	0.040	0.009		10/02/13 12:38	1
Chloride	mg/L	17	EPA 300.0	0.20	0.050		10/01/13 20:10	1
Nitrate (as N)	mg/L	11	EPA 300.0	0.04	0.01		10/01/13 20:10	1
Nitrate+Nitrite (N)	mg/L	11	EPA 300.0	0.08	0.02		10/01/13 20:10	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		10/01/13 20:10	1
Sulfate	mg/L	43	EPA 300.0	0.60	0.20		10/01/13 20:10	1
Total Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		10/08/13 17:19	1
Total Kjeldahl Nitrogen	mg/L	2.2	EPA 351.2	0.20	0.05	10/03/13 11:28	10/11/13 10:16	1

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Laboratory Report

Project Name **B-HS3 SE#1**

Sample Description	Tap
Matrix	Drinking Water
SAL Sample Number	1308838-15
Date/Time Collected	09/30/13 09:46
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
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Client Provided Field Data

pH	7.29
Temperature	23.1 °C
Conductivity	332 umhos/cm
Dissolved Oxygen	7.23 mg/L

Inorganics

Ammonia as N	mg/L	0.009 U	EPA 350.1	0.040	0.009	10/02/13 12:40	1
Chloride	mg/L	19	EPA 300.0	0.20	0.050	10/01/13 20:19	1
Nitrate (as N)	mg/L	0.14	EPA 300.0	0.04	0.01	10/01/13 20:19	1
Nitrate+Nitrite (N)	mg/L	0.14	EPA 300.0	0.08	0.02	10/01/13 20:19	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01	10/01/13 20:19	1
Sulfate	mg/L	16	EPA 300.0	0.60	0.20	10/01/13 20:19	1
Total Alkalinity	mg/L	110	SM 2320B	8.0	2.0	10/10/13 13:51	1
Total Kjeldahl Nitrogen	mg/L	0.09 I	EPA 351.2	0.20	0.05	10/03/13 11:28 10/11/13 10:18	1

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Laboratory Report

Project Name	B-HS3 SE#1
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Sample Description	Well
Matrix	Groundwater
SAL Sample Number	1308838-16
Date/Time Collected	09/30/13 09:40
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
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Client Provided Field Data

pH		7.15						
Temperature		24.8 °C						
Conductivity		222 umhos/cm						
Dissolved Oxygen		0.70 mg/L						

Inorganics

Ammonia as N	mg/L	0.009 U	EPA 350.1	0.040	0.009		10/02/13 12:42	1
Chloride	mg/L	5.5	EPA 300.0	0.20	0.050		10/01/13 20:29	1
Nitrate (as N)	mg/L	0.10	EPA 300.0	0.04	0.01		10/01/13 20:29	1
Nitrate+Nitrite (N)	mg/L	0.10	EPA 300.0	0.08	0.02		10/01/13 20:29	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		10/01/13 20:29	1
Sulfate	mg/L	0.91	EPA 300.0	0.60	0.20		10/01/13 20:29	1
Total Alkalinity	mg/L	100	SM 2320B	8.0	2.0		10/10/13 14:11	1
Total Kjeldahl Nitrogen	mg/L	0.05 U	EPA 351.2	0.20	0.05	10/03/13 11:30	10/11/13 13:34	1

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Laboratory Report

Project Name	B-HS3 SE#1
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Sample Description	EB
Matrix	Reagent Water
SAL Sample Number	1308838-17
Date/Time Collected	09/30/13 11:05
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
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Client Provided Field Data

pH		7.19						
Temperature		29.4 °C						
Conductivity		6.12 umhos/cm						
Dissolved Oxygen		7.21 mg/L						

Inorganics

Ammonia as N	mg/L	0.009 u	EPA 350.1	0.040	0.009		10/02/13 12:44	1
Carbonaceous BOD	mg/L	2 u	SM 5210B	2	2	09/30/13 16:35	10/05/13 13:43	1
Chemical Oxygen Demand	mg/L	10 u	EPA 410.4	25	10	10/14/13 08:32	10/14/13 13:00	1
Chloride	mg/L	0.050 u	EPA 300.0	0.20	0.050		10/01/13 20:38	1
Hydrogen Sulfide (Unionized)	mg/L	0.08	SM 4550SF	0.04	0.01	10/07/13 09:00	10/07/13 11:15	1
Nitrate (as N)	mg/L	0.01 u	EPA 300.0	0.04	0.01		10/01/13 20:38	1
Nitrate+Nitrite (N)	mg/L	0.02 u	EPA 300.0	0.08	0.02		10/01/13 20:38	1
Nitrite (as N)	mg/L	0.01 u	EPA 300.0	0.04	0.01		10/01/13 20:38	1
Orthophosphate as P	mg/L	0.010 u	EPA 300.0	0.040	0.010		10/01/13 20:38	1
Phosphorous - Total as P	mg/L	0.010 u	SM 4500P-E	0.040	0.010	10/01/13 11:35	10/04/13 10:29	1
Sulfate	mg/L	0.20 u	EPA 300.0	0.60	0.20		10/01/13 20:38	1
Sulfide	mg/L	0.20 l	SM 4500SF	0.40	0.10		10/07/13 11:15	1
Total Alkalinity	mg/L	4.6 l	SM 2320B	8.0	2.0		10/10/13 14:14	1
Total Kjeldahl Nitrogen	mg/L	0.05 u	EPA 351.2	0.20	0.05	10/03/13 11:30	10/11/13 13:35	1
Total Suspended Solids	mg/L	1 u	SM 2540D	1	1	10/01/13 11:29	10/04/13 08:49	1
Volatile Suspended Solids	mg/L	1 u	EPA 160.4	1	1	10/01/13 11:29	10/04/13 08:49	1

Microbiology

E. Coli	MPN/100 mL	2.0 u	SM 9223B	2.0	2.0	09/30/13 17:25	10/01/13 11:25	1
Fecal Coliforms	CFU/100 ml	1 u	SM 9222D	1	1	09/30/13 17:16	10/01/13 15:16	1

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Laboratory Report

Project Name	B-HS3 SE#1
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Sample Description	A7-6
Matrix	Wastewater
SAL Sample Number	1308838-18
Date/Time Collected	09/30/13 09:24
Collected by	Josefin Hirst
Date/Time Received	09/30/13 16:04

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
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Client Provided Field Data

pH		5.83						
Temperature		26.1 °C						
Conductivity		359 umhos/cm						
Dissolved Oxygen		0.09 mg/L						

Inorganics

Ammonia as N	mg/L	0.25	EPA 350.1	0.040	0.009		10/02/13 12:46	1
Chloride	mg/L	15	EPA 300.0	0.20	0.050		10/01/13 20:47	1
Nitrate (as N)	mg/L	0.14	EPA 300.0	0.04	0.01		10/01/13 20:47	1
Nitrate+Nitrite (N)	mg/L	0.14	EPA 300.0	0.08	0.02		10/01/13 20:47	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		10/01/13 20:47	1
Sulfate	mg/L	21	EPA 300.0	0.60	0.20		10/01/13 20:47	1
Total Alkalinity	mg/L	110	SM 2320B	8.0	2.0		10/10/13 14:20	1
Total Kjeldahl Nitrogen	mg/L	1.4	EPA 351.2	0.20	0.05	10/03/13 11:30	10/11/13 11:42	1

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BI33016 - BOD										
Blank (BI33016-BLK1)					Prepared: 09/30/13 Analyzed: 10/05/13					
Carbonaceous BOD	2 U	2	2	mg/L						
Blank (BI33016-BLK2)					Prepared: 09/30/13 Analyzed: 10/05/13					
Carbonaceous BOD	2 U	2	2	mg/L						
LCS (BI33016-BS1)					Prepared: 09/30/13 Analyzed: 10/05/13					
Carbonaceous BOD	208	2	2	mg/L	200		104	85-115		
LCS (BI33016-BS2)					Prepared: 09/30/13 Analyzed: 10/05/13					
Carbonaceous BOD	210	2	2	mg/L	200		105	85-115		
LCS Dup (BI33016-BSD1)					Prepared: 09/30/13 Analyzed: 10/05/13					
Carbonaceous BOD	205	2	2	mg/L	200		103	85-115	2	200
LCS Dup (BI33016-BSD2)					Prepared: 09/30/13 Analyzed: 10/05/13					
Carbonaceous BOD	207	2	2	mg/L	200		103	85-115	2	200
Duplicate (BI33016-DUP1)					Source: 1310335-03 Prepared: 09/30/13 Analyzed: 10/05/13					
Carbonaceous BOD	110	2	2	mg/L		110			1	25
Duplicate (BI33016-DUP2)					Source: 1308839-01 Prepared: 09/30/13 Analyzed: 10/05/13					
Carbonaceous BOD	95	2	2	mg/L		92			3	25
Batch BJ30107 - Ion Chromatography 300.0 Prep										
Blank (BJ30107-BLK1)					Prepared & Analyzed: 10/01/13					
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Chloride	0.050 U	0.20	0.050	mg/L						
Sulfate	0.20 U	0.60	0.20	mg/L						
Orthophosphate as P	0.010 U	0.040	0.010	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
Surrogate: Dichloroacetate		Result: 0.956		mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate		Result: 0.956		mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate		Result: 0.956		mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate		Result: 0.956		mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate		Result: 0.956		mg/L	1.0		96	90-115		

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BJ30107 - Ion Chromatography 300.0 Prep										
LCS (BJ30107-BS1)					Prepared & Analyzed: 10/01/13					
Nitrate (as N)	1.71	0.04	0.01	mg/L	1.7		101	85-115		
Nitrite (as N)	1.43	0.04	0.01	mg/L	1.4		102	85-115		
Sulfate	9.01	0.60	0.20	mg/L	9.0		100	85-115		
Chloride	2.99	0.20	0.050	mg/L	3.0		100	85-115		
Orthophosphate as P	0.853	0.040	0.010	mg/L	0.90		95	85-115		
Surrogate: Dichloroacetate	Result: 0.947			mg/L	1.0		95	90-115		
Surrogate: Dichloroacetate	Result: 0.947			mg/L	1.0		95	90-115		
Surrogate: Dichloroacetate	Result: 0.947			mg/L	1.0		95	90-115		
Surrogate: Dichloroacetate	Result: 0.947			mg/L	1.0		95	90-115		
Surrogate: Dichloroacetate	Result: 0.947			mg/L	1.0		95	90-115		
LCS Dup (BJ30107-BSD1)					Prepared & Analyzed: 10/01/13					
Nitrate (as N)	1.72	0.04	0.01	mg/L	1.7		101	85-115	0.5	200
Sulfate	9.06	0.60	0.20	mg/L	9.0		101	85-115	0.6	200
Orthophosphate as P	0.861	0.040	0.010	mg/L	0.90		96	85-115	0.9	200
Nitrite (as N)	1.44	0.04	0.01	mg/L	1.4		103	85-115	0.5	200
Chloride	3.00	0.20	0.050	mg/L	3.0		100	85-115	0.5	200
Surrogate: Dichloroacetate	Result: 0.959			mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate	Result: 0.959			mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate	Result: 0.959			mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate	Result: 0.959			mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate	Result: 0.959			mg/L	1.0		96	90-115		
Matrix Spike (BJ30107-MS1)					Source: 1308838-01		Prepared & Analyzed: 10/01/13			
Nitrate (as N)	1.72	0.04	0.01	mg/L	1.7	ND	101	85-115		
Sulfate	17.1	0.60	0.20	mg/L	9.0	7.81	103	85-115		
Orthophosphate as P	5.42	0.040	0.010	mg/L	0.90	4.52	100	85-115		
Chloride	30.0 L	0.20	0.050	mg/L	3.0	40.7	NR	80-120		
Nitrite (as N)	1.53	0.04	0.01	mg/L	1.4	ND	109	85-115		
Surrogate: Dichloroacetate	Result: 1.00			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	Result: 1.00			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	Result: 1.00			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	Result: 1.00			mg/L	1.0		100	90-115		
Surrogate: Dichloroacetate	Result: 1.00			mg/L	1.0		100	90-115		

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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Batch BJ30107 - Ion Chromatography 300.0 Prep**Matrix Spike (BJ30107-MS2)**

Source: 1308838-12

Prepared & Analyzed: 10/01/13

Chloride	25.1	0.20	0.050	mg/L	3.0	22.3	92	80-120		
Sulfate	49.6	0.60	0.20	mg/L	9.0	41.2	94	85-115		
Nitrite (as N)	1.39	0.04	0.01	mg/L	1.4	ND	99	85-115		
Orthophosphate as P	1.42	0.040	0.010	mg/L	0.90	0.537	99	85-115		
Nitrate (as N)	2.88	0.04	0.01	mg/L	1.7	1.22	98	85-115		
Surrogate: Dichloroacetate	Result: 0.966			mg/L	1.0		97	90-115		
Surrogate: Dichloroacetate	Result: 0.966			mg/L	1.0		97	90-115		
Surrogate: Dichloroacetate	Result: 0.966			mg/L	1.0		97	90-115		
Surrogate: Dichloroacetate	Result: 0.966			mg/L	1.0		97	90-115		
Surrogate: Dichloroacetate	Result: 0.966			mg/L	1.0		97	90-115		

Batch BJ30108 - Ion Chromatography 300.0 Prep**Blank (BJ30108-BLK1)**

Prepared & Analyzed: 10/01/13

Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
Sulfate	0.20 U	0.60	0.20	mg/L						
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Orthophosphate as P	0.010 U	0.040	0.010	mg/L						
Chloride	0.050 U	0.20	0.050	mg/L						
Surrogate: Dichloroacetate	Result: 0.917			mg/L	1.0		92	90-115		
Surrogate: Dichloroacetate	Result: 0.917			mg/L	1.0		92	90-115		
Surrogate: Dichloroacetate	Result: 0.917			mg/L	1.0		92	90-115		
Surrogate: Dichloroacetate	Result: 0.917			mg/L	1.0		92	90-115		
Surrogate: Dichloroacetate	Result: 0.917			mg/L	1.0		92	90-115		

LCS (BJ30108-BS1)

Prepared & Analyzed: 10/01/13

Nitrite (as N)	1.43	0.04	0.01	mg/L	1.4		102	85-115		
Chloride	3.00	0.20	0.050	mg/L	3.0		100	85-115		
Orthophosphate as P	0.845	0.040	0.010	mg/L	0.90		94	85-115		
Nitrate (as N)	1.71	0.04	0.01	mg/L	1.7		101	85-115		
Sulfate	9.05	0.60	0.20	mg/L	9.0		101	85-115		
Surrogate: Dichloroacetate	Result: 0.966			mg/L	1.0		97	90-115		
Surrogate: Dichloroacetate	Result: 0.966			mg/L	1.0		97	90-115		
Surrogate: Dichloroacetate	Result: 0.966			mg/L	1.0		97	90-115		
Surrogate: Dichloroacetate	Result: 0.966			mg/L	1.0		97	90-115		
Surrogate: Dichloroacetate	Result: 0.966			mg/L	1.0		97	90-115		

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BJ30108 - Ion Chromatography 300.0 Prep										
LCS Dup (BJ30108-BSD1)					Prepared & Analyzed: 10/01/13					
Chloride	3.01	0.20	0.050	mg/L	3.0		100	85-115	0.5	200
Nitrite (as N)	1.44	0.04	0.01	mg/L	1.4		103	85-115	0.7	200
Sulfate	9.07	0.60	0.20	mg/L	9.0		101	85-115	0.2	200
Orthophosphate as P	0.856	0.040	0.010	mg/L	0.90		95	85-115	1	200
Nitrate (as N)	1.72	0.04	0.01	mg/L	1.7		101	85-115	0.2	200
Surrogate: Dichloroacetate	Result: 0.949			mg/L	1.0		95	90-115		
Surrogate: Dichloroacetate	Result: 0.949			mg/L	1.0		95	90-115		
Surrogate: Dichloroacetate	Result: 0.949			mg/L	1.0		95	90-115		
Surrogate: Dichloroacetate	Result: 0.949			mg/L	1.0		95	90-115		
Surrogate: Dichloroacetate	Result: 0.949			mg/L	1.0		95	90-115		
Matrix Spike (BJ30108-MS1)					Source: 1308839-04		Prepared & Analyzed: 10/01/13			
Sulfate	44.1	0.60	0.20	mg/L	9.0	35.4	97	85-115		
Nitrate (as N)	1.68	0.04	0.01	mg/L	1.7	ND	99	85-115		
Orthophosphate as P	1.20	0.040	0.010	mg/L	0.90	0.322	98	85-115		
Chloride	30.0 L	0.20	0.050	mg/L	3.0	78.1	NR	80-120		
Nitrite (as N)	1.53	0.04	0.01	mg/L	1.4	ND	109	85-115		
Surrogate: Dichloroacetate	Result: 0.936			mg/L	1.0		94	90-115		
Surrogate: Dichloroacetate	Result: 0.936			mg/L	1.0		94	90-115		
Surrogate: Dichloroacetate	Result: 0.936			mg/L	1.0		94	90-115		
Surrogate: Dichloroacetate	Result: 0.936			mg/L	1.0		94	90-115		
Surrogate: Dichloroacetate	Result: 0.936			mg/L	1.0		94	90-115		
Matrix Spike (BJ30108-MS2)					Source: 1309410-04		Prepared & Analyzed: 10/01/13			
Chloride	250	2.0	0.50	mg/L	30	219	104	80-120		
Nitrate (as N)	16.9	0.40	0.10	mg/L	17	0.205	98	85-115		
Nitrite (as N)	14.7	0.40	0.10	mg/L	14		105	85-115		
Orthophosphate as P	8.28	0.40	0.10	mg/L	9.0		92	85-115		
Sulfate	172	6.0	2.0	mg/L	90	81.6	100	85-115		
Surrogate: Dichloroacetate	Result: 0.958			mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate	Result: 0.958			mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate	Result: 0.958			mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate	Result: 0.958			mg/L	1.0		96	90-115		
Surrogate: Dichloroacetate	Result: 0.958			mg/L	1.0		96	90-115		

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BJ30110 - Ammonia by SEAL										
Blank (BJ30110-BLK1)					Prepared & Analyzed: 10/02/13					
Ammonia as N	0.009 U	0.040	0.009	mg/L						
LCS (BJ30110-BS1)					Prepared & Analyzed: 10/02/13					
Ammonia as N	0.53	0.040	0.009	mg/L	0.50		106	90-110		
Matrix Spike (BJ30110-MS1)					Source: 1308838-07 Prepared & Analyzed: 10/02/13					
Ammonia as N	0.50	0.040	0.009	mg/L	0.50	0.012	98	90-110		
Matrix Spike (BJ30110-MS2)					Source: 1310370-07 Prepared & Analyzed: 10/02/13					
Ammonia as N	0.49	0.040	0.009	mg/L	0.50	ND	98	90-110		
Matrix Spike Dup (BJ30110-MSD1)					Source: 1308838-07 Prepared & Analyzed: 10/02/13					
Ammonia as N	0.51	0.040	0.009	mg/L	0.50	0.012	99	90-110	0.8	10
Matrix Spike Dup (BJ30110-MSD2)					Source: 1310370-07 Prepared & Analyzed: 10/02/13					
Ammonia as N	0.47	0.040	0.009	mg/L	0.50	ND	93	90-110	5	10
Batch BJ30111 - Ammonia by SEAL										
Blank (BJ30111-BLK1)					Prepared & Analyzed: 10/02/13					
Ammonia as N	0.009 U	0.040	0.009	mg/L						
LCS (BJ30111-BS1)					Prepared & Analyzed: 10/02/13					
Ammonia as N	0.55	0.040	0.009	mg/L	0.50		110	90-110		
Matrix Spike (BJ30111-MS1)					Source: 1308838-16 Prepared & Analyzed: 10/02/13					
Ammonia as N	0.54	0.040	0.009	mg/L	0.50	ND	109	90-110		

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BJ30111 - Ammonia by SEAL										
Matrix Spike (BJ30111-MS2)		Source: 1310458-01			Prepared & Analyzed: 10/02/13					
Ammonia as N	0.51	0.040	0.009	mg/L	0.50	ND	101	90-110		
Matrix Spike Dup (BJ30111-MSD1)		Source: 1308838-16			Prepared & Analyzed: 10/02/13					
Ammonia as N	0.50	0.040	0.009	mg/L	0.50	ND	99	90-110	9	10
Matrix Spike Dup (BJ30111-MSD2)		Source: 1310458-01			Prepared & Analyzed: 10/02/13					
Ammonia as N	0.50	0.040	0.009	mg/L	0.50	ND	100	90-110	1	10
Batch BJ30121 - VSS Prep										
Blank (BJ30121-BLK1)		Prepared: 10/01/13 Analyzed: 10/04/13								
Total Suspended Solids	1 U	1	1	mg/L						
Volatile Suspended Solids	1 U	1		mg/L						
LCS (BJ30121-BS1)		Prepared: 10/01/13 Analyzed: 10/04/13								
Total Suspended Solids	50.0	1	1	mg/L	50		100	85-115		
Duplicate (BJ30121-DUP1)		Source: 1308838-01			Prepared: 10/01/13 Analyzed: 10/04/13					
Total Suspended Solids	17.0	1	1	mg/L		16.0			6	30
Volatile Suspended Solids	16.0	1		mg/L		15.0			6	20
Batch BJ30123 - Digestion for TP by EPA 365.2/SM4500PE										
Blank (BJ30123-BLK1)		Prepared: 10/01/13 Analyzed: 10/04/13								
Phosphorous - Total as P	0.010 U	0.040	0.010	mg/L						

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BJ30123 - Digestion for TP by EPA 365.2/SM4500PE										
LCS (BJ30123-BS1)					Prepared: 10/01/13 Analyzed: 10/04/13					
Phosphorous - Total as P	0.859	0.040	0.010	mg/L	0.80		107	90-110		
Matrix Spike (BJ30123-MS1)					Source: 1308838-17 Prepared: 10/01/13 Analyzed: 10/04/13					
Phosphorous - Total as P	0.946	0.040	0.010	mg/L	1.0	ND	95	90-110		
Matrix Spike (BJ30123-MS2)					Source: 1310368-02 Prepared: 10/01/13 Analyzed: 10/04/13					
Phosphorous - Total as P	0.998	0.040	0.010	mg/L	1.0	0.0598	94	90-110		
Matrix Spike Dup (BJ30123-MSD1)					Source: 1308838-17 Prepared: 10/01/13 Analyzed: 10/04/13					
Phosphorous - Total as P	1.00	0.040	0.010	mg/L	1.0	ND	100	90-110	5	25
Matrix Spike Dup (BJ30123-MSD2)					Source: 1310368-02 Prepared: 10/01/13 Analyzed: 10/04/13					
Phosphorous - Total as P	1.11	0.040	0.010	mg/L	1.0	0.0598	105	90-110	10	25
Batch BJ30124 - Digestion for TP by EPA 365.2/SM4500PE										
Blank (BJ30124-BLK1)					Prepared: 10/01/13 Analyzed: 10/04/13					
Phosphorous - Total as P	0.010 U	0.040	0.010	mg/L						
LCS (BJ30124-BS1)					Prepared: 10/01/13 Analyzed: 10/04/13					
Phosphorous - Total as P	0.878	0.040	0.010	mg/L	0.80		110	90-110		
Matrix Spike (BJ30124-MS1)					Source: 1310374-01 Prepared: 10/01/13 Analyzed: 10/04/13					
Phosphorous - Total as P	0.803	0.040	0.010	mg/L	1.0	ND	80	90-110		
Matrix Spike (BJ30124-MS2)					Source: 1310374-04 Prepared: 10/01/13 Analyzed: 10/04/13					
Phosphorous - Total as P	1.08	0.040	0.010	mg/L	1.0	ND	108	90-110		

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BJ30124 - Digestion for TP by EPA 365.2/SM4500PE										
Matrix Spike Dup (BJ30124-MSD1)		Source: 1310374-01			Prepared: 10/01/13 Analyzed: 10/04/13					
Phosphorous - Total as P	0.960	0.040	0.010	mg/L	1.0	ND	96	90-110	18	25
Matrix Spike Dup (BJ30124-MSD2)		Source: 1310374-04			Prepared: 10/01/13 Analyzed: 10/04/13					
Phosphorous - Total as P	1.02	0.040	0.010	mg/L	1.0	ND	102	90-110	6	25
Batch BJ30226 - Ion Chromatography 300.0 Prep										
Blank (BJ30226-BLK1)		Prepared & Analyzed: 10/02/13								
Chloride	0.050 U	0.20	0.050	mg/L						
Surrogate: Dichloroacetate		Result: 1.01		mg/L	1.0		101	90-115		
LCS (BJ30226-BS1)		Prepared & Analyzed: 10/02/13								
Chloride	3.02	0.20	0.050	mg/L	3.0		101	85-115		
Surrogate: Dichloroacetate		Result: 0.997		mg/L	1.0		100	90-115		
LCS Dup (BJ30226-BSD1)		Prepared & Analyzed: 10/02/13								
Chloride	3.02	0.20	0.050	mg/L	3.0		101	85-115	0.3	200
Surrogate: Dichloroacetate		Result: 0.965		mg/L	1.0		96	90-115		
Matrix Spike (BJ30226-MS1)		Source: 1310503-06			Prepared & Analyzed: 10/02/13					
Chloride	30.0 L	0.20	0.050	mg/L	3.0	156	NR	80-120		
Surrogate: Dichloroacetate		Result: 1.04		mg/L	1.0		104	90-115		
Matrix Spike (BJ30226-MS2)		Source: 1310463-01			Prepared & Analyzed: 10/03/13					
Chloride	30.0 L	0.20	0.050	mg/L	3.0	1390	NR	80-120		
Surrogate: Dichloroacetate		Result: 0.943		mg/L	1.0		94	90-115		

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BJ30312 - Digestion for TKN by EPA 351.2										
Blank (BJ30312-BLK1)					Prepared: 10/03/13 Analyzed: 10/11/13					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
LCS (BJ30312-BS1)					Prepared: 10/03/13 Analyzed: 10/11/13					
Total Kjeldahl Nitrogen	2.40	0.20	0.05	mg/L	2.5		95	90-110		
Matrix Spike (BJ30312-MS1)					Source: 1308838-08 Prepared: 10/03/13 Analyzed: 10/11/13					
Total Kjeldahl Nitrogen	4.81	0.20	0.05	mg/L	2.5	2.29	99	90-110		
Matrix Spike (BJ30312-MS2)					Source: 1308838-15 Prepared: 10/03/13 Analyzed: 10/11/13					
Total Kjeldahl Nitrogen	2.64	0.20	0.05	mg/L	2.5	0.0882	101	90-110		
Matrix Spike Dup (BJ30312-MSD1)					Source: 1308838-08 Prepared: 10/03/13 Analyzed: 10/11/13					
Total Kjeldahl Nitrogen	4.89	0.20	0.05	mg/L	2.5	2.29	102	90-110	2	20
Matrix Spike Dup (BJ30312-MSD2)					Source: 1308838-15 Prepared: 10/03/13 Analyzed: 10/11/13					
Total Kjeldahl Nitrogen	2.55	0.20	0.05	mg/L	2.5	0.0882	97	90-110	3	20
Batch BJ30313 - Digestion for TKN by EPA 351.2										
Blank (BJ30313-BLK1)					Prepared: 10/03/13 Analyzed: 10/11/13					
Total Kjeldahl Nitrogen	0.05 U	0.20	0.05	mg/L						
LCS (BJ30313-BS1)					Prepared: 10/03/13 Analyzed: 10/11/13					
Total Kjeldahl Nitrogen	2.49	0.20	0.05	mg/L	2.5		98	90-110		
Matrix Spike (BJ30313-MS1)					Source: 1308838-17 Prepared: 10/03/13 Analyzed: 10/11/13					
Total Kjeldahl Nitrogen	2.38	0.20	0.05	mg/L	2.5	ND	94	90-110		

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BJ30313 - Digestion for TKN by EPA 351.2										
Matrix Spike (BJ30313-MS2)		Source: 1310676-02			Prepared: 10/03/13 Analyzed: 10/11/13					
Total Kjeldahl Nitrogen	3.47	0.20	0.05	mg/L	2.5	0.808	105	90-110		
Matrix Spike Dup (BJ30313-MSD1)		Source: 1308838-17			Prepared: 10/03/13 Analyzed: 10/11/13					
Total Kjeldahl Nitrogen	2.56	0.20	0.05	mg/L	2.5	ND	101	90-110	7	20
Matrix Spike Dup (BJ30313-MSD2)		Source: 1310676-02			Prepared: 10/03/13 Analyzed: 10/11/13					
Total Kjeldahl Nitrogen	3.45	0.20	0.05	mg/L	2.5	0.808	104	90-110	0.5	20
Batch BJ30727 - Sulfide prep										
Blank (BJ30727-BLK1)		Prepared & Analyzed: 10/07/13								
Sulfide	0.10 U	0.40	0.10	mg/L						
LCS (BJ30727-BS1)		Prepared & Analyzed: 10/07/13								
Sulfide	4.88	0.40	0.10	mg/L	5.0		98	85-115		
Matrix Spike (BJ30727-MS1)		Source: 1308838-17			Prepared & Analyzed: 10/07/13					
Sulfide	4.88	0.40	0.10	mg/L	5.0	0.200	94	85-115		
Matrix Spike Dup (BJ30727-MSD1)		Source: 1308838-17			Prepared & Analyzed: 10/07/13					
Sulfide	4.88	0.40	0.10	mg/L	5.0	0.200	94	85-115	0	14
Batch BJ30807 - alkalinity										
Blank (BJ30807-BLK1)		Prepared & Analyzed: 10/08/13								
Total Alkalinity	2.0 U	8.0	2.0	mg/L						

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BJ30807 - alkalinity										
Blank (BJ30807-BLK2)					Prepared & Analyzed: 10/10/13					
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
LCS (BJ30807-BS1)					Prepared & Analyzed: 10/08/13					
Total Alkalinity	120	8.0	2.0	mg/L	120		96	90-110		
LCS (BJ30807-BS2)					Prepared & Analyzed: 10/10/13					
Total Alkalinity	120	8.0	2.0	mg/L	120		96	90-110		
Matrix Spike (BJ30807-MS1)					Source: 1310638-01		Prepared & Analyzed: 10/08/13			
Total Alkalinity	520 L2	8.0	2.0	mg/L	120	430	76	80-120		
Matrix Spike (BJ30807-MS2)					Source: 1308838-15		Prepared & Analyzed: 10/10/13			
Total Alkalinity	230	8.0	2.0	mg/L	120	110	91	80-120		
Matrix Spike (BJ30807-MS3)					Source: 1308838-12		Prepared & Analyzed: 10/10/13			
Total Alkalinity	200	8.0	2.0	mg/L	120	93	88	80-120		
Matrix Spike Dup (BJ30807-MSD1)					Source: 1310638-01		Prepared & Analyzed: 10/08/13			
Total Alkalinity	520 L2	8.0	2.0	mg/L	120	430	73	80-120	0.6	26
Matrix Spike Dup (BJ30807-MSD2)					Source: 1308838-15		Prepared & Analyzed: 10/10/13			
Total Alkalinity	230	8.0	2.0	mg/L	120	110	90	80-120	0.5	26
Matrix Spike Dup (BJ30807-MSD3)					Source: 1308838-12		Prepared & Analyzed: 10/10/13			
Total Alkalinity	200	8.0	2.0	mg/L	120	93	88	80-120	0.2	26
Batch BJ30821 - COD prep										
Blank (BJ30821-BLK1)					Prepared: 10/08/13 Analyzed: 10/10/13					
Chemical Oxygen Demand	10 U	25	10	mg/L						

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Tampa, FL 33619

October 15, 2013
Work Order: 1308838

Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BJ30821 - COD prep										
LCS (BJ30821-BS1)					Prepared: 10/08/13 Analyzed: 10/10/13					
Chemical Oxygen Demand	52	25	10	mg/L	50		104	90-110		
Matrix Spike (BJ30821-MS1)					Source: 1310480-01 Prepared: 10/08/13 Analyzed: 10/10/13					
Chemical Oxygen Demand	91	25	10	mg/L	50	45	92	85-115		
Matrix Spike Dup (BJ30821-MSD1)					Source: 1310480-01 Prepared: 10/08/13 Analyzed: 10/10/13					
Chemical Oxygen Demand	100	25	10	mg/L	50	45	110	85-115	9	32
Batch BJ31115 - COD prep										
Blank (BJ31115-BLK1)					Prepared & Analyzed: 10/11/13					
Chemical Oxygen Demand	10 U	25	10	mg/L						
LCS (BJ31115-BS1)					Prepared & Analyzed: 10/11/13					
Chemical Oxygen Demand	52	25	10	mg/L	50		104	90-110		
Matrix Spike (BJ31115-MS1)					Source: 1308840-02 Prepared & Analyzed: 10/11/13					
Chemical Oxygen Demand	54	25	10	mg/L	50	ND	108	85-115		
Matrix Spike Dup (BJ31115-MSD1)					Source: 1308840-02 Prepared & Analyzed: 10/11/13					
Chemical Oxygen Demand	50	25	10	mg/L	50	ND	100	85-115	8	32
Batch BJ31406 - COD prep										
Blank (BJ31406-BLK1)					Prepared & Analyzed: 10/14/13					
Chemical Oxygen Demand	10 U	25	10	mg/L						

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BJ31406 - COD prep										
LCS (BJ31406-BS1)					Prepared & Analyzed: 10/14/13					
Chemical Oxygen Demand	45	25	10	mg/L	50		90	90-110		
Matrix Spike (BJ31406-MS1)					Source: 1308838-04 Prepared & Analyzed: 10/14/13					
Chemical Oxygen Demand	54	25	10	mg/L	50	ND	108	85-115		
Matrix Spike Dup (BJ31406-MSD1)					Source: 1308838-04 Prepared & Analyzed: 10/14/13					
Chemical Oxygen Demand	50	25	10	mg/L	50	ND	100	85-115	8	32

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Microbiology - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BJ30105 - FC-MF										
Blank (BJ30105-BLK1)					Prepared: 09/30/13 Analyzed: 10/01/13					
Fecal Coliforms	1 U	1	1	CFU/100 ml						
Duplicate (BJ30105-DUP1)					Source: 1310372-01 Prepared: 09/30/13 Analyzed: 10/01/13					
Fecal Coliforms	1 U	1	1	CFU/100 ml		ND				200
Duplicate (BJ30105-DUP2)					Source: 1310373-01 Prepared: 09/30/13 Analyzed: 10/01/13					
Fecal Coliforms	1 U	1	1	CFU/100 ml		ND				200

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* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

- Z Too many colonies were present for accurate counting.
- L2 Analyte level in sample invalidated Matrix Spike.
- L Off-scale high. Result exceeded highest calibration standard.

Questions regarding this report should be directed to :

Kathryn Nordmark
Telephone (813) 855-1844 FAX (813) 855-2218
Kathryn@southernanalyticalabs.com



Client Name Hazen and Sawyer														Contact / Phone:									
Project Name / Location B-HS3 SE#1																							
Samplers: (Signature) <i>[Signature]</i>														PARAMETER / CONTAINER DESCRIPTION									
Matrix Codes: DW-Drinking Water WW-Wastewater SW-Surface Water SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water																							
SAL Use Only Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	125mLP, Na ₂ S ₂ O ₃ FC	125mLP, Na ₂ S ₂ O ₃ FC-QT	500mLP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx, Cl, OP, SO ₄	125mLP, H ₂ SO ₄ COD, TKN, NH ₃ , TP	500mLP, NaOH, Zn Acetate H ₂ S	500mLP, Cool Total Alkalinity, TSS, VSS, CBOD, Cl, NOx, OP	500mLP, Cool Total Alkalinity, NOx, Cl	125mLP, H ₂ SO ₄ TKN, NH ₃	add sulfate (SO ₄)			pH	Temperature	Conductivity	DO		
01	BHS3-STE	9/30/13	12:40	WW		X	2	2	1	1	1					✓		7.26	26.4	1066	0.11		
02	BHS3-LY01		8:50	WW		X				1		1				✓		6.33	26.0	330	6.52		
03	BHS3-LY02		9:00	WW		X				1		1				✓		6.46	26.3	551	2.42		
04	BHS3-LINER		10:20	WW		X	2	2		1		1				✓		6.44	27.8	651	1.34		
05	BHS3-ST2		10:10	WW		X	2	2	1	1	1					✓		6.55	27.7	785	0.15		
06	BHS3-LY03		9:25	WW		X			1	1	1					✓		6.28	25.1	770	3.64		
07	BHS3-LY04		9:10	WW		X			1	1	1					✓		6.21	25.6	698	2.40		
08	BHS3-PZ07		10:21	WW		X	2	2	1	1	1					✓		6.18	27.5	809	1.98		
09	BHS3-PZ08		11:06	WW		X	2	2	1	1	1					✓		6.44	26.0	606	2.12		
10	BHS3-PZ09		11:51	WW		X	2	2	1	1	1					✓		5.94	27.0	525	3.39		
11	DE C-10-6		09:05	WW		X							1	1		✓		5.91	26.3	270	0.10		
12	B8-5		08:35	WW		X							1	1		✓		5.89	25.4	414	0.39		
Containers Prepared Relinquished: <i>[Signature]</i>		Date/Time: 10:00AM 8/28	Received: <i>[Signature]</i>		Date/Time: 12:00pm 8/29		Seal intact? Y N N/A		Samples intact upon arrival? Y N N/A		Received on ice? Temp _____ Y N N/A		Proper preservatives indicated? Y N N/A		Rec'd w/in holding time? Y N N/A		Volatiles rec'd w/out headspace? Y N N/A		Proper containers used? Y N N/A		Instructions / Remarks: 1308838		
Relinquished: <i>[Signature]</i>		Date/Time: 9/30/13	Received: <i>[Signature]</i>		Date/Time: 9/30/13 1604																		
Relinquished:		Date/Time:	Received:		Date/Time:																		
Relinquished:		Date/Time:	Received:		Date/Time:																		
Relinquished:		Date/Time:	Received:		Date/Time:																		

Client Name						Contact / Phone:																		
Project Name / Location																								
B-HS3 SE#1																								
Samplers: (Signature)						PARAMETER / CONTAINER DESCRIPTION																		
Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water						Date	Time	Matrix	Composite	Grab	125mLP, Na ₂ S ₂ O ₃ FC	125mLP, Na ₂ S ₂ O ₃ FC-QT	500mLP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx, Cl, OP, SO ₄	125mLP, H ₂ SO ₄ COD, TKN, NH ₃ , TP	500mLP, NaOH, Zn Acetate H ₂ S	500mLP, Cool Total Alkalinity, TSS, VSS, CBOD, Cl, NOx, OP	500mLP, Cool Total Alkalinity, NOx, Cl	125mLP, H ₂ SO ₄ TKN, NH ₃	add sulfate (50u)	pH	Temperature	Conductivity	DO	
SAL Use Only Sample No.	Sample Description																							
	13	B8-7	9/30/13	08:48	WW	X										1	1	✓			5.81	25.4	332	0.26
	14	A7-8		09:41	WW	X										1	1	✓			5.77	26.0	496	0.38
	15	Tap		9:46	DW	X										1	1	✓			7.29	23.1	332	7.23
	16	Well		9:40	GW	X										1	1	✓			7.15	24.8	222	0.70
	17	EB	↓	10:05	R	X	2	2	1	1	1							✓			7.19	29.4	6.12	7.21
	18	A7-6'	9/30/13	09:24												1	1	✓			5.83	26.1	359	0.09
Containers Prepared/ Relinquished: J Lynn						Date/Time: 10:40AM 8/28	Received: [Signature] Date/Time:						Seal intact? Y N NA						Instructions / Remarks:					
Relinquished: [Signature]						Date/Time:	Received: K Schmuck Date/Time: 9/30/13 1604						Samples intact upon arrival? Y N NA											
Relinquished: [Signature]						Date/Time:	Received:						Received on ice? Temp _____ Y N NA											
Relinquished:						Date/Time:	Received:						Proper preservatives indicated? Y N NA											
Relinquished:						Date/Time:	Received:						Rec'd w/in holding time? Y N NA											
Relinquished:						Date/Time:	Received:						Volatiles rec'd w/out headspace? Y N NA						1308838					
Relinquished:						Date/Time:	Received:						Proper containers used? Y N NA											

Appendix B: Operation & Maintenance Log

Table B.1
Operation and Maintenance Log

Date	Description
7/25/2011	C-HS2 Groundwater Sample Event 1
11/30/2011	C-HS2 Groundwater Sample Event 2
3/13/2012	C-HS2 Groundwater Sample Event 3
7/10/2012	C-HS2 Groundwater Sample Event 4
6/14/2013	PNRS Pre-construction sample event
6/17/2013	PNRS construction. Old septic tank removed, new septic tank installed
	Stage 2 biofilter installed
6/18/2013	PNRS construction - backfill to set tanks, anchor trench for liner area
6/19/2013	PNRS construction - liner installed by Comanco
	Ligno and sand 50/50 filled to toe of lined area, fill dirt to grade
6/24/2013	New piezometers PZ-07, PZ-08, and PZ-09 installed and developed
	4 Lysimeters installed
6/26/2013	Both drip systems covered
7/9/2013	Electrician installed panel for system
7/11/2013	Electrician set up panel for hydraulic unit
	Dose times and volumes set
7/12/2013	System start-up
	Installed priming tee on pump. Installed reclaimed water flowmeter
7/17/2013	System check
7/22/2013	Repaired leaks in feed and return lines
	Installed new fittings for air release valves
7/29/2013	System check
7/31/2013	Sod installation
8/15/2013	Preliminary SE#1
9/5/2013	Checked system
9/8/2013	Homeowner reported alarm went off at 9 pm
9/9/2013	System check - high water level in STE dose tank
	Both filters severely clogged - not able to dose
9/10/2013	System check, still high alarm - high water level in STE dose tank

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Date	Description
9/10/2013	Not able to fix system - need replacement part for hydraulic unit
	Septic tank was pumped at 4 pm
9/11/2013	Homeowner reported no alarms
9/13/2013	System check
9/17/2013	Installed replacement solenoid coil on backwash filter valve #2
	System operational again, septic tank very low volume
9/27/2013	SE#1 prep
	Applied vacuum to lysimeters
	Cleaned STE outlet filter screen
9/30/2013	Sample Event No. 1
10/11/2013	System check
	Uploaded new program
10/17/2013	System check
	Bio valve ahead of pump had sand under the diaphragm in valve
11/8/2013	System check