FLORIDA DEPARTMENT OF HEALTH

Florida Onsite Sewage Nitrogen Reduction Strategies Study

Task C.24

C-HS3 Monitoring Sample Event Report No. 1

Progress Report

September 2012

4423-001

HAZEN AND SAWYER
Environmental Engineers & Scientists

In association with

SCHOOL OF MINES 1874 COLORADO

AET
Applied Environmental Technology

OTIS ENVIRONMENTAL CONSULTANTS, LLC

Florida Onsite Sewage Nitrogen Reduction Strategies Study

TASK C.24
PROGRESS REPORT

C-HS3 Monitoring
Sample Event Report No. 1

Prepared for:

Florida Department of Health
Division of Environmental Health
Bureau of Onsite Sewage Programs
4042 Bald Cypress Way Bin #A-08
Tallahassee, FL 32399-1713

FDOH Contract CORCL

September 2012

Prepared by:

HAZEN AND SAWYER
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In Association With:

SCHOOL OF MINES
1874
COLORADO

C-HS3 Monitoring
Sample Event Report No. 1

1.0 Background

Task C of the Florida Onsite Sewage Nitrogen Reduction Strategies Study includes monitoring at field sites in Florida to evaluate nitrogen reduction in soil and groundwater, to assess groundwater impacts from various onsite wastewater systems, and to provide data for parameter estimation, verification, and validation of models developed in Task D. The Task C.5 QAPP documents the objectives, monitoring framework, sample frequency and duration, and analytical methods to be used at the field sites. The Task C.23 instrumentation report for the C-HS3 OSTDS system and plume monitoring documents the test area design, number and location of monitoring points, and preliminary field parameters from monitoring points for this Polk County, Florida field site, and also includes preliminary sample collection and analyses.

2.0 Purpose

This sample event report documents data collected from the first C-HS3 monitoring and sampling event which was conducted August 28 through August 30, 2012. This monitoring event consisted of groundwater elevation measured within the standpipe piezometers, measurement of field parameters, and collection of groundwater samples and their analyses by a NELAC certified laboratory.

3.0 Materials and Methods

3.1 Project Site

The C-HS3 field site is located in Polk County, FL adjacent to Big Gum lake in a rural area surrounded by commercial orange groves. The onsite sewage treatment and disposal system (OSTDS) for the residence consists of a 750 gallon concrete septic tank located adjacent to the soil treatment unit, which is a gravity fed standard bed drainfield, 10 ft by 20 ft in area.

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3.2 Monitoring and Sample Locations and Identification

A sampling grid for groundwater screening was developed downgradient of the soil treatment unit as depicted in Figure 1. A 6-foot by 5-foot grid spacing was staked. Transect lines A through U run east-west, roughly perpendicular to the groundwater flow direction and increase (higher letter identification) moving northward from the drainfield. Transect lines 0 through 7 run north-south, roughly parallel to the groundwater flow direction and increase moving from the east to west. Based on initial screening data, 22 monitoring locations were chosen within the grid for standpipe piezometer installation. Groundwater monitoring points were installed in June 2012. One type of monitoring point was installed using either hand or drilling methods: standpipe piezometers. Standpipe piezometers consist of either ¾-inch or 1-inch diameter PVC with a 1-foot or 5-foot screen (0.010-inch slots) and riser extending to the ground surface (refer to the Task C QAPP and Task C.23 C-HS3 Instrumentation Report for additional detail).

Each monitoring location was assigned a unique identification indicating grid location (self explanatory), and depth below ground surface (bottom of the drive point or well screen in feet). For example A03-15 is a standpipe piezometer sampler located on the grid at A03 at 15 feet below ground surface. A schematic of the C-HS3 monitoring network is shown in Figure 1. A complete list of all installed standpipe piezometers and sample identification is included in Appendix A. A total of 67 specific monitoring locations were sampled during this first C-HS3 sampling event.

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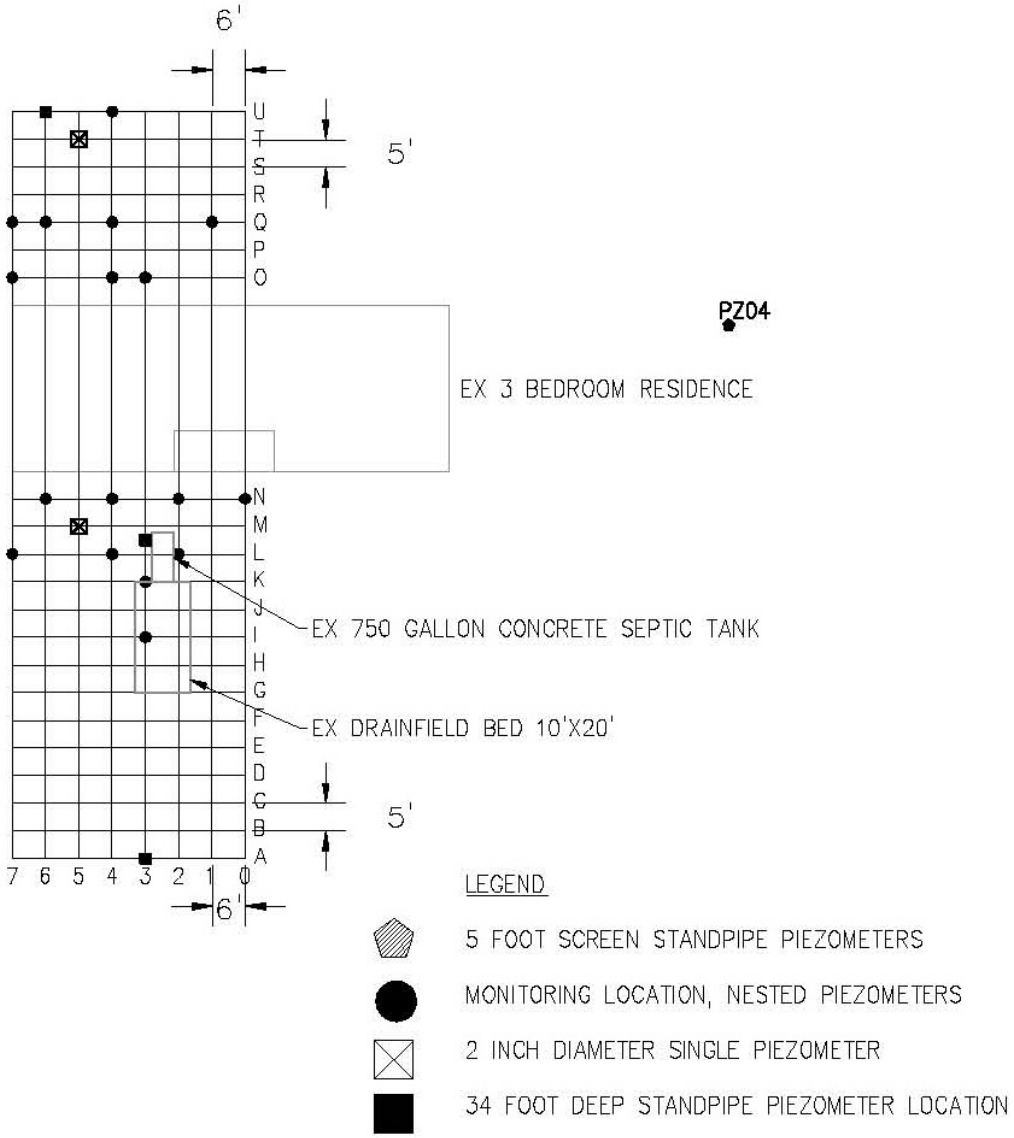

Figure 1
C-HS3 Monitoring Network

3.3 Operational Monitoring

A water meter for the house site has not yet been installed. A weather station (Ben Hill Griffin Elementary School in Frostproof, FL) is located approximately 17 miles from the

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site. Data from this weather station is available at the following website: http://fawn.ifas.ufl.edu/.

3.4 Groundwater Elevation Measurements

Groundwater level measurements are used to determine hydraulic gradients and directions of flow. Groundwater levels were measured using a flat tape water level meter graduated in feet (measurement accuracy is 0.01 feet). The groundwater level within all the sampled standpipe piezometers was measured for this sampling event.

3.5 Water Quality Sample Collection and Analyses

Groundwater and septic tank effluent (STE) were collected August 28 through August 30, 2012 for water quality analysis. A sample was collected from the septic tank to represent the effluent delivered to the drainfield. A peristaltic pump was used to collect STE directly into the analysis-specific containers. Groundwater samples were obtained using a peristaltic pump, which was attached directly to dedicated standpipe piezometer tubing. Samples were collected after sufficient purging (the sample was clear and pH and conductivity readings had stabilized) had occurred. Field parameters were then recorded.

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 laboratory. 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 B, were used to document the transfer of samples from field personnel to the analytical laboratory.

In addition, field sample duplicates were collected immediately subsequent to the regular samples. The field duplicate samples taken include:

- C-HS3-STE
- C-HS3-PZ-A03-15
- C-HS3-PZ-N04-17
- C-HS3-PZ-O03-17
- C-HS3-PZ-Q06-15
- C-HS3-PZ-U06-12

Field parameters (pH, specific conductance, temperature (Temp), and dissolved oxygen (DO)) were measured using portable electronic probes with probe tips placed in an overflowing plastic beaker as groundwater was being pumped. All samples were

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analyzed by the laboratory for: total alkalinity, total Kjeldahl nitrogen (TKN-N), ammonia nitrogen (NH_3-N), nitrate/nitrite nitrogen (NO_X-N), and chloride (CL). At some of the locations, chemical oxygen demand (COD), total phosphorus (TP), anions, cations, total organic carbon (TOC) and dissolved organic carbon (DOC) were included. Additionally, for the STE sample, carbonaceous biological oxygen demand ($CBOD_5$), total solids (TS), total suspended solids (TSS), and fecal coliform (fecal) were included. All analyses were performed by an independent and fully certified analytical laboratory (Southern Analytical Laboratory). Table 1 lists the analytical parameters, analytical methods, and detection limits for these analyses.

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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
Carbonaceous BOD ($CBOD_5$)	SM 5210B	2 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/Nitrite Nitrogen (NO_X-N)	EPA 300.0	0.02 mg/L
Total Phosphorus	SM 4500P-E	0.01 mg/L
Dissolved Organic Carbon (DOC)	SM 5310B	0.5 mg/L
Total Organic Carbon (TOC)	SM 5310B	0.5 mg/L
Total Solids (TS)	EPA 160.3	0.01% by wt
Total Suspended Solids (TSS)	SM 2540D	1 mg/L
Fecal Coliform (fecal)	SM9222D	1 ct/100mL
Anions		
Fluoride	EPA 300.0	0.01 mg/L
Chloride	EPA 300.0	0.05 mg/L
Nitrate-N	EPA 300.0	0.01 mg/L
Nitrite-N	EPA 300.0	0.01 mg/L
Orthophosphate-P	EPA 300.0	0.01 mg/L
Sulfate	EPA 300.0	0.20 mg/L
Cations		
Boron	EPA 200.7	0.05 mg/L
Calcium	EPA 200.7	0.01 mg/L
Iron	EPA 200.7	0.02 mg/L
Magnesium	EPA 200.7	0.01 mg/L
Manganese	EPA 200.7	0.001 mg/L
Potassium	EPA 200.7	0.01 mg/L
Sodium	EPA 200.7	0.01 mg/L

4.0 Results

Once analytical results are obtained from the laboratory, the C-HS3 Data Summary Report No. 1 (Task C.25) will be prepared describing the results from this sampling event.

4.1 Site Conditions

Daily recorded meteorological data is provided in Appendix C. Table 3 provides the daily averages leading up to and during the sample event.

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Table 3
Meteorological Data Daily Averages Measured August 28 through August 30, 2012

Date	Temp Avg 60 cm (°F)	Temp Avg 2m (°F)	Temp Avg 10 m (°F)	Temp Soil Avg -10 cm (°F)	Dewpoint Avg 2m (°F)	Relative Humidity Avg 2m (%)	Rain Total 2m (in)	2m Rain max over 15min (in)	10m Wind avg (mph)
24-Aug-12	80.80	80.94	79.69	84.69	73.66	80	0	0	7.32
25-Aug-12	78.75	79.06	77.72	84.21	71.15	78	0	0	9.17
26-Aug-12	77.36	78.12	77.19	83.33	75.80	93	1.09	0.19	12.35
27-Aug-12	77.60	78.37	77.36	79.68	76.21	93	3.19	0.39	14.59
28-Aug-12	79.83	80.08	78.92	81.80	76.82	90	0.24	0.07	9.85
29-Aug-12	80.03	80.16	79.10	82.99	76.03	88	0.15	0.11	6.47
30-Aug-12	82.18	82.02	81.07	83.67	75.08	81	0.02	0.02	4.24

4.2 Groundwater Levels

Water levels were measured at all standpipe piezometers sampled August 28 through August 30, 2012 for this sampling event as summarized in Table 4. Figure 3 illustrates the surficial groundwater contours as measured within the standpipe piezometers.

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Table 4
Standpipe Piezometer Groundwater Levels
(August 28 through August 30, 2012)

Identification	Water Table El[1] (ft)	Identification	Water Table El[1] (ft)
PZ01	95.75	PZ-06N-15	95.31
PZ02	94.64	PZ-06N-17	95.09[2]
PZ03	95.24	PZ-06N-21	95.31
PZ04	95.25	PZ-03O-15	95.15
PZ05	94.58	PZ-03O-17	95.34[2]
PZ-03A-15	95.52	PZ-03O-21	95.10
PZ-03A-17	95.52	PZ-04O-15	95.12
PZ-03A-21	95.51	PZ-04O-17	93.94[2]
PZ-03A-34	95.53	PZ-04O-21	94.03
PZ-03I-15	95.40	PZ-07O-15	95.03
PZ-03I-17	95.41	PZ-07O-17	95.10
PZ-03I-21	95.40	PZ-07O-20	95.08
PZ-03K-15	95.45	PZ-01Q-13	95.06
PZ-03K-17	95.39	PZ-01Q-15	95.05
PZ-03K-21	95.43	PZ-01Q-19	95.09
PZ-02L-15	95.60[2]	PZ-04Q-13	95.08
PZ-02L-17	95.28[2]	PZ-04Q-15	94.99
PZ-02L-21	95.37[2]	PZ-04Q-19	95.01
PZ-04L-15	95.36	PZ-06Q-13	95.08
PZ-04L-17	95.16[2]	PZ-06Q-15	95.06
PZ-04L-21	95.38	PZ-06Q-19	95.11
PZ-07L-15	95.35	PZ-07Q-13	95.11
PZ-07L-17	95.31	PZ-07Q-15	95.13
PZ-07L-21	95.34	PZ-07Q-19	95.14
PZ-00N-15	95.37	PZ-04U-12	95.01
PZ-00N-17	95.39	PZ-04U-14	95.02
PZ-00N-21	95.32	PZ-04U-18	94.97
PZ-04N-15	95.33	PZ-06U-12	94.94[2]
PZ-04N-17	95.33	PZ-06U-14	94.78
PZ-04N-21	95.34	PZ-06U-34	94.75

[1]Elevation above mean sea level based on NGVD 1929
[2]Most likely erroneous instrument reading

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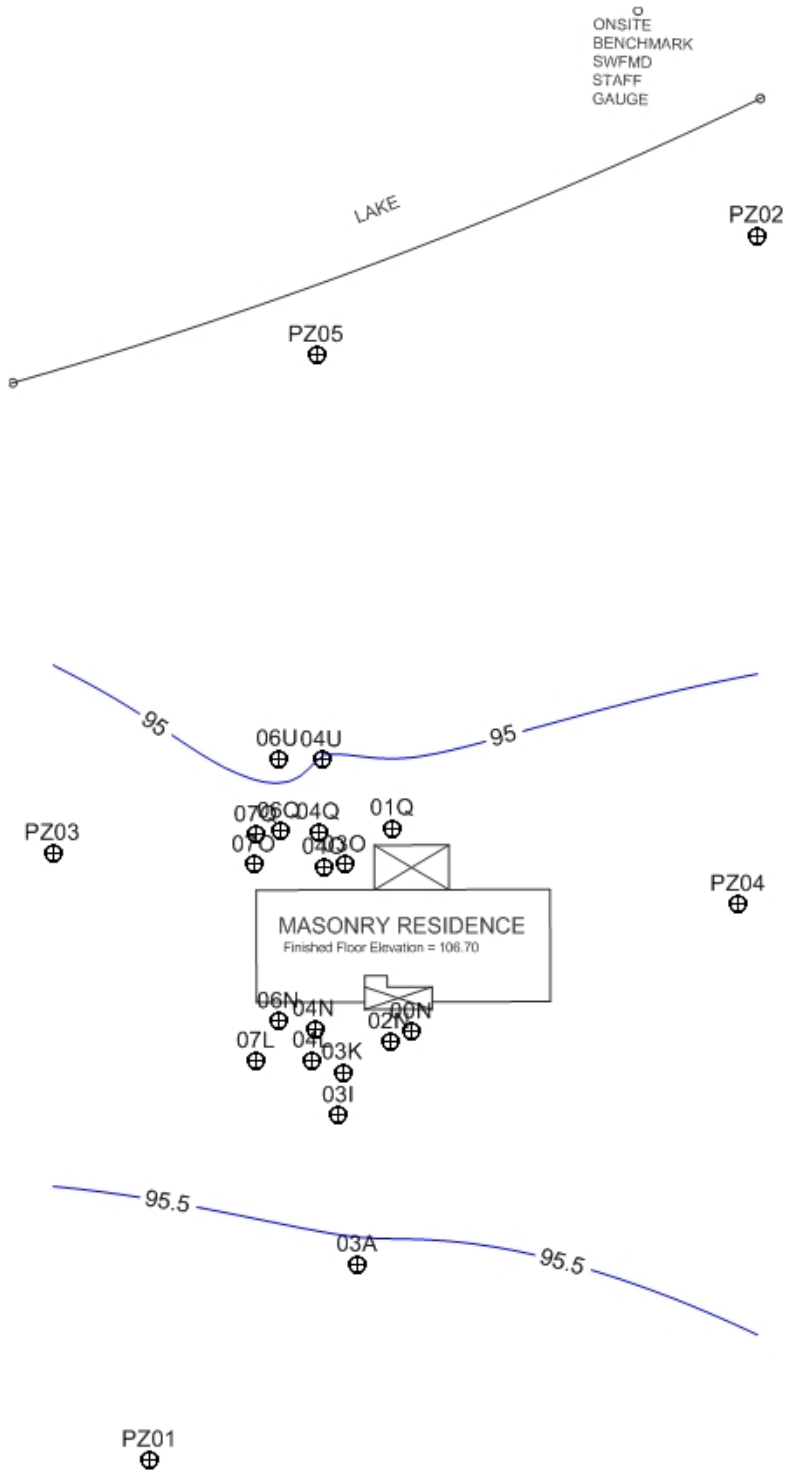

Figure 3
Surficial Groundwater Contours August 28, 2012

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4.3 Water Quality

Field parameters were measured prior to sample collection and are listed in Appendix D. Once analytical results are obtained from the laboratory, C-HS3 Data Summary Report No. 1 (Task C25) will be prepared describing the results from this sampling event.

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Appendix A: C-HS3 Sample Identification

Table 3

Site C-HS3 Sample Identification

	Identification	Type of Monitoring Point	Top Elevation[1] (feet)	Bottom Elevation[1] (feet)
1	C-HS3-STE	Wastewater	N/A	N/A
2	PZ01	1" Standpipe Piezometer, 5' screen	108.53	92.73
3	PZ02	1" Standpipe Piezometer, 5' screen	98.08	91.80
4	PZ03	1" Standpipe Piezometer, 5' screen	102.84	92.04
5	PZ04	1" Standpipe Piezometer, 5' screen	104.35	92.45
6	PZ05	1" Standpipe Piezometer, 5' screen	98.68	91.08
7	PZ-03A-15	1" Standpipe Piezometer, 5' screen	106.84	91.84
8	PZ-03A-17	3/4" Standpipe Piezometer, 1' screen	106.75	89.75
9	PZ-03A-21	3/4" Standpipe Piezometer, 1' screen	106.84	85.84
10	PZ-03A-34	2" Standpipe Piezometer, 5' screen	107.12	73.12
11	PZ-03I-15	1" Standpipe Piezometer, 5' screen	106.46	91.46
12	PZ-03I-17	3/4" Standpipe Piezometer, 1' screen	106.35	89.35
13	PZ-03I-21	3/4" Standpipe Piezometer, 1' screen	106.44	85.44
14	PZ-03K-15	1" Standpipe Piezometer, 5' screen	106.12	91.12
15	PZ-03K-17	3/4" Standpipe Piezometer, 1' screen	106.11	89.11
16	PZ-03K-21	3/4" Standpipe Piezometer, 1' screen	106.13	85.13
17	PZ-02L-15	1" Standpipe Piezometer, 5' screen	106.02	91.02
18	PZ-02L-17	3/4" Standpipe Piezometer, 1' screen	105.90	88.90
19	PZ-02L-21	3/4" Standpipe Piezometer, 1' screen	105.95	84.95
20	PZ-04L-15	1" Standpipe Piezometer, 5' screen	105.86	90.86
21	PZ-04L-17	3/4" Standpipe Piezometer, 1' screen	105.84	88.84
22	PZ-04L-21	3/4" Standpipe Piezometer, 1' screen	105.78	84.78
23	PZ-07L-15	1" Standpipe Piezometer, 5' screen	105.97	90.97
24	PZ-07L-17	3/4" Standpipe Piezometer, 1' screen	105.93	88.93
25	PZ-07L-21	3/4" Standpipe Piezometer, 1' screen	105.98	84.98
26	PZ-03ML-15	1" Standpipe Piezometer, 5' screen	106.00	91.00
27	PZ-03ML-17	3/4" Standpipe Piezometer, 1' screen	106.03	89.03
28	PZ-03ML-21	3/4" Standpipe Piezometer, 1' screen	105.93	84.93
29	PZ-05M-25	2" Standpipe Piezometer, 5' screen	106.01	81.01
30	PZ-00N-15	1" Standpipe Piezometer, 5' screen	105.78	90.78
31	PZ-00N-17	3/4" Standpipe Piezometer, 1' screen	105.74	88.74

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Table 3
Site C-HS3 Sample Identification

	Identification	Type of Monitoring Point	Top Elevation[1] (feet)	Bottom Elevation[1] (feet)
32	PZ-00N-21	3/4" Standpipe Piezometer, 1' screen	105.72	84.72
33	PZ-02N-15	1" Standpipe Piezometer, 5' screen	105.90	90.90
34	PZ-02N-17	3/4" Standpipe Piezometer, 1' screen	105.87	88.87
35	PZ-02N-21	3/4" Standpipe Piezometer, 1' screen	105.86	84.86
36	PZ-04N-15	1" Standpipe Piezometer, 5' screen	105.60	90.60
37	PZ-04N-17	3/4" Standpipe Piezometer, 1' screen	105.61	88.61
38	PZ-04N-21	3/4" Standpipe Piezometer, 1' screen	105.64	84.64
39	PZ-06N-15	1" Standpipe Piezometer, 5' screen	105.73	90.73
40	PZ-06N-17	3/4" Standpipe Piezometer, 1' screen	105.70	88.70
41	PZ-06N-21	3/4" Standpipe Piezometer, 1' screen	105.80	84.80
42	PZ-03O-15	1" Standpipe Piezometer, 5' screen	104.59	89.59
43	PZ-03O-17	3/4" Standpipe Piezometer, 1' screen	104.54	87.54
44	PZ-03O-21	3/4" Standpipe Piezometer, 1' screen	104.58	83.58
45	PZ-04O-15	1" Standpipe Piezometer, 5' screen	104.10	89.10
46	PZ-04O-17	3/4" Standpipe Piezometer, 1' screen	104.09	87.09
47	PZ-04O-21	3/4" Standpipe Piezometer, 1' screen	104.11	83.11
48	PZ-07O-15	1" Standpipe Piezometer, 5' screen	103.83	88.83
49	PZ-07O-17	3/4" Standpipe Piezometer, 1' screen	103.75	86.75
50	PZ-07O-20	3/4" Standpipe Piezometer, 1' screen	103.91	83.91
51	PZ-01Q-13	1" Standpipe Piezometer, 5' screen	104.19	91.19
52	PZ-01Q-15	3/4" Standpipe Piezometer, 1' screen	104.18	89.18
53	PZ-01Q-19	3/4" Standpipe Piezometer, 1' screen	104.24	85.24
54	PZ-04Q-13	1" Standpipe Piezometer, 5' screen	103.58	90.58
55	PZ-04Q-15	3/4" Standpipe Piezometer, 1' screen	103.54	88.54
56	PZ-04Q-19	3/4" Standpipe Piezometer, 1' screen	103.60	84.60
57	PZ-06Q-13	1" Standpipe Piezometer, 5' screen	103.66	90.66
58	PZ-06Q-15	3/4" Standpipe Piezometer, 1' screen	103.66	88.66
59	PZ-06Q-19	3/4" Standpipe Piezometer, 1' screen	103.71	84.71
60	PZ-07Q-13	1" Standpipe Piezometer, 5' screen	103.56	90.56
61	PZ-07Q-15	3/4" Standpipe Piezometer, 1' screen	103.64	88.64
62	PZ-07Q-19	3/4" Standpipe Piezometer, 1' screen	103.62	84.62
63	PZ-05T-25	2" Standpipe Piezometer, 5' screen	102.73	77.73
64	PZ-04U-12	1" Standpipe Piezometer, 5' screen	102.61	90.61
65	PZ-04U-14	3/4" Standpipe Piezometer, 1' screen	102.64	88.64

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Table 3
Site C-HS3 Sample Identification

	Identification	Type of Monitoring Point	Top Elevation[1] (feet)	Bottom Elevation[1] (feet)
66	PZ-04U-18	3/4" Standpipe Piezometer, 1' screen	102.61	84.61
67	PZ-06U-12	1" Standpipe Piezometer, 5' screen	102.07	90.07
68	PZ-06U-14	3/4" Standpipe Piezometer, 1' screen	101.96	87.96
69	PZ-06U-34	3/4" Standpipe Piezometer, 1' screen	101.94	67.94

[1]Elevation above mean sea level based on NGVD 1929

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Appendix B: Chain of Custody Forms

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SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813 855 1844 fax 813-855-2218

SAL Project No. 1209578

Client Name: Hazen and Sawyer	Contact / Phone:
Project Name / Location: C-HS3 SE#1	
Samplers: (Signature)	

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

SAL USE ONLY	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, TSS, TS, CBOD, NOx, Cl	250mL P, H_2SO_4 TKN, NH_3, TP	125mL P, $Na_2S_2O_3$ FC-MF							DO	pH	Conductivity	Temperature	No. of Containers (Total per each location)
01	STE	083012	1340	GW		X	1	1	2							1.55	7.2	693	30.4	
02	STE Dup		1345	GW		X	1	1	2							1.55	7.2	693	30.4	

	Date/Time	Received	Date/Time
Containers Prepared/ Relinquished: Bowling	8/27/12 835		082712 0835
Relinquished:	083012 1550	Received:	08-30-12 1550
Relinquished:		Received:	
Relinquished:		Received:	
Relinquished:		Received:	

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 within holding time?	Y N N/A
Volatiles rec'd w/out headspace?	Y N N/A
Proper containers used?	Y N N/A

1209578

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

SAL Project No. 1209581

Client Name: Hazen and Sawyer

Contact / Phone:

Project Name / Location: C-HS3 SE#1

Samplers: (Signature)

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

SAL Use Only Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, NOx, Cl, F, OP, SO_4	250mL P, H_2SO_4 COD, TKN, NH_3, TP	40mLaV, HCl TOC	250mLaG, Cool DOC	250mL P, HNO_3 B, Ca, Fe, Mg, Mn, K, Na						DO	pH	Conductivity	Temperature	No. of Containers (Total per each location)
01	PZ-O3A-15	08/28/12	09:15	GW		X	1	1	2	1	1						7.4	6.0	54	28.0	6
02	PZ-O3A-15 Dup	08/28/12	09:45	GW		X	1	1	2	1	1						7.4	6.0	54	28.0	6
03	PZ-O3A-17	08/28/12	10:30	GW		X	1	1									6.5	5.8	79.6	28.2	2
04	PZ-O3A-21	08/28/12	11:05	GW		X	1	1									2.0	5.6	267	28.4	2
05	PZ-O3A-34	08/28/12	1506	GW		X	1	1									1.70	4.2	292.8	27.0	

Containers Prepared/ Relinquished:	Date/Time: 8-27-12 1200	Received:	Date/Time: 1200 08/27/12
Relinquished:	Date/Time: 1555 08/28/12	Received:	Date/Time: 1555 08-28-12
Relinquished:	Date/Time: 1655 08-28-12	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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 within holding time?	Y N N/A
Volatiles rec'd w/out headspace?	Y N N/A
Proper containers used?	Y N N/A

1209581

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

Chain of Custody

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

SAL Project No. 1209582

Client Name: Hazen and Sawyer

Contact / Phone:

Project Name / Location: C-HS3 SE#1

Samplers: (Signature)

Matrix Codes:
DW-Drinking Water WW-Wastewater
SW-SurfaceWater SL-Sludge SO-Soil
GW-Groundwater SA-Saline Water O-Other
R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

SAL Use Only Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, NOx, Cl, F, OP, SO_4	250mL P, H_2SO_4 COD, TKN, NH_3, TP	250mL P, H_2SO_4 TKN, NH_3							DO	pH	Conductivity	Temperature	No. of Containers (Total per each location)
01	PZ-03I-15	8/28/12	11:50	GW		X	1	1								6.4	5.7	81	28.4	2
02	PZ-03I-17	8/28/12	1305	GW		X	1		1							6.7	6.0	56.5	29.8	2
03	PZ-03I-21	8/28/12	1335	GW		X	1		1							4.3	4.7	1785	29.4	2

Containers Prepared/ Relinquished: Bayling	Date/Time: 1885 8/27/12	Received:	Date/Time: 0935 082712
Relinquished:	Date/Time: 1555 08/28/12	Received:	Date/Time: 1255 08-28-12
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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 within holding time? Y N N/A
Volatiles rec'd w/out headspace? Y N N/A
Proper containers used? Y N N/A

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SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2219

SAL Project No. 1209583

Client Name: Hazen and Sawyer

Contact / Phone:

Project Name / Location: C-HS3 SE#1

Samplers: (Signature)

Matrix Codes:
DW-Drinking Water WW-Wastewater
SW-SurfaceWater SL-Sludge SO-Soil
GW-Groundwater SA-Saline Water O-Other
R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, NOx, Cl	250mL P, H_2SO_4 COD, TKN, NH_3, TP	250mL P, H_2SO_4 TKN, NH_3							DO	pH	Conductivity	Temperature	No. of Containers (Total per each location)
01	PZ-O3K-15	082912	1401	GW		X	1	1								5.08	6.3	332.6	28.0	
02	PZ-O3K-17		1420	GW		X	1		1							4.57	6.3	53.0	27.4	
03	PZ-O3K-21		1441	GW		X	1		1							2.82	5.8	173.7	27.5	

Containers Prepared/ Relinquished: Bowling	Date/Time: 835 8/27/12	Received:	Date/Time: 0835 082712
Relinquished:	Date/Time: 1730 082912.	Received:	Date/Time: ~~08~~ 1730 08-29-12
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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 within holding time?	Y N N/A
Volatiles rec'd w/out headspace?	Y N N/A
Proper containers used?	Y N N/A

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1209592

SAL Project No. ~~1209598~~

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

Client Name: Hazen and Sawyer

Contact / Phone:

Project Name / Location: C-HS3 SE#1

Samplers: (Signature)

Matrix Codes:
DW-Drinking Water WW-Wastewater
SW-SurfaceWater SL-Sludge SO-Soil
GW-Groundwater SA-Saline Water O-Other
R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, NOx, Cl	250mL P, H_2SO_4 COD, TKN, NH_3, TP	250mL P, H_2SO_4 TKN, NH_3							DO	pH	Conductivity	Temperature	No. of Containers (Total per each location)
01	PZ-O2L-15	082912	0808	GW		X	1	1								4.47	6.2	175.8	27.2	
02	PZ-O2L-17		0829	GW		X	1		1							4.86	6.3	58.5	26.7	
03	PZ-O2L-21		0843	GW		X	1		1							2.48	5.3	191.8	26.5	
04	PZ-O4L-15	082912	~~0805~~ 0803	GW		X	1	1								5.13	6.2	161.0	27.3	
05	PZ-O4L-17		0923	GW		X	1		1							3.96	6.3	58.8	26.8	
06	PZ-O4L-21		0942	GW		X	1		1							2.48	5.3	191.8	26.5	
07	PZ-O7L-15	082812	1248	GW		X	1	1								5.82	6.1	93.0	27.6	
08	PZ-O7L-17		1308	GW		X	1		1							4.78	6.2	60.5	27.0	
09	PZ-O7L-21		1329	GW		X	1		1							2.81	5.1	127.8	26.7	

Containers Prepared/ Relinquished:	Date/Time: 8/27/12 835	Received:	Date/Time: 082712 0835
Relinquished:	Date/Time: 082912 1730	Received:	Date/Time: 08.29-12 1730
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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 within holding time?	Y N N/A
Volatiles rec'd w/out headspace?	Y N N/A
Proper containers used?	Y N N/A

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SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

SAL Project No. 1209598

Client Name: Hazen and Sawyer

Contact / Phone:

Project Name / Location: C-HS3 SE#1

Samplers: (Signature)

Matrix Codes:
DW-Drinking Water WW-Wastewater
SW-SurfaceWater SL-Sludge SO-Soil
GW-Groundwater SA-Saline Water O-Other
R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, NOx, Cl	250mL P, H_2SO_4 COD, TKN, NH_3, TP	250mL P, H_2SO_4 TKN, NH_3	1LP, Cool Alkalinity, NOx, Cl, F, OP, SO_4	40mLaV, HCl TOC	250mLaG, Cool DOC	250mL P, HNO_3 B, Ca, Fe, Mg, Mn, K, Na				DO	pH	Conductivity	Temperature	No. of Containers (Total per each location)
01	PZ-OON-15	082912	1305	GW		X	1	1									5.97	6.2	88.2	27.5	
02	PZ-OON-17		1323	GW		X	1		1								4.55	6.2	56.6	27.1	
03	PZ-OON-21		1343	GW		X	1		1								2.88	4.6	154.5	26.8	
04	PZ-O2N-15		1206	GW		X	1	1									6.25	6.4	119.2	27.6	
05	PZ-O2N-17		1224	GW		X	1		1								4.57	6.1	44.3	27.2	
06	PZ-O2N-21		1245	GW		X	1		1								2.25	4.6	209.6	26.6	
07	PZ-O4N-15		1106	GW		X		1		1	2	1	1				5.02	6.2	188.4	27.5	
08	PZ-O4N-17		1127	GW		X	1		1								3.40	6.3	65.3	27.0	
09	PZ-O4N-17 Dup		1152	GW		X	1		1								3.40	6.3	65.3	27.0	
10	PZ-O4N-21		1148	GW		X	1		1								2.95	5.7	197.1	26.7	
11	PZ-O6N-15		1011	GW		X	1	1									4.65	6.0	78.6	27.1	
12	PZ-O6N-17		1032	GW			1		1								3.65	6.2	72.5	26.7	

Containers Prepared/ Relinquished: Bowling	Date/Time: 1145 8/27/12	Received:	Date/Time: 1145 082712
Relinquished:	Date/Time: 1730 082912	Received: HH	Date/Time: 1730 08-29-12
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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 within holding time?	(Y) N N/A
Volatiles rec'd w/out headspace?	Y N (N/A)
Proper containers used?	(Y) N N/A

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SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1044 fax 813-855-2218

SAL Project No. 1209598

Client Name: Hazen and Sawyer	Contact / Phone:
Project Name / Location: C-HS3 SE#1	
Samplers: (Signature)	

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, NOx, Cl	250mL P, H_2SO_4 TKN, NH_3									DO	pH	Conductivity	Temperature	No. of Containers (Total per each location)
13	PZ-06N-21	08/29/12	1052	GW		X	1	1									2.92	5.3	92.8	26.7	

Containers Prepared/ Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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 within holding time?	Y N N/A
Volatiles rec'd w/out headspace?	Y N N/A
Proper containers used?	Y N N/A

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SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

SAL Project No. 1209601

Client Name: Hazen and Sawyer

Contact / Phone:

Project Name / Location: C-HS3 SE#1

Samplers: (Signature)

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

SAL Lab Only Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, Cl, NOx	250mL P, H_2SO_4 COD, TKN, NH_3, TP	250mL P, H_2SO_4 TKN, NH_3	1LP, Cool Alkalinity, Nox, Cl, F, OP, SO4	40mLaV, HCl TOC	250mLaG, Cool DOC	250mL P, HNO3 B, Ca, Fe, Mg, Mn, K, Na				DO	pH	Conductivity	Temperature	No. of Containers (Total per each location)
01	PZ-03O-15	082812	0858	GW		X	1	1									2.38	6.5	152.1	26.1	
02	PZ-03O-17		0920	GW		X	1		1								2.28	6.3	59.8	25.8	
03	PZ-03O-17 Dup		0925	GW		X	1		1								2.28	6.3	59.8	25.8	
04	PZ-03O-21		0942	GW		X	1		1								2.18	4.5	180.9	25.7	
05	PZ-04O-15		1004	GW		X		1		1	2	1	1				2.30	6.0	149.4	26.1	
06	PZ-04O-17		1028	GW		X	1		1								2.40	6.3	100.1	25.8	
07	PZ-04O-21		1048	GW		X	1		1								3.28	4.9	150.1	26.0	
08	PZ-07O-15		1113	GW		X	1	1									4.58	6.0	95.0	22.0	
09	PZ-07O-17		1134	GW		X	1		1								2.45	6.4	84.3	27.1	
10	PZ-07O-20		1147	GW		X	1		1								3.18	5.3	128.8	26.2	

Relinquished:	Date/Time:	Received:	Date/Time:
Containers Prepared/ Relinquished: J Chambers	8-27-12 11:53		1153 082712
Relinquished:	1555 082812		1555 08-28-12
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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 within holding time?	Y N N/A
Volatiles rec'd w/out headspace?	Y N N/A
Proper containers used?	Y N N/A

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SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

SAL Project No. 1209615

Client Name: Hazen and Sawyer

Contact / Phone:

Project Name / Location: C-HS3 SE#1

Samplers: (Signature)

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

SAL Lab Use Only	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, NOx, Cl	250mL P, H_2SO_4 COD, TKN, NH_3, TP	250mL P, H_2SO_4 TKN, NH_3	1LP, Cool Alkalinity, NOx, Cl, F, OP, SO_4	40mLaV, HCl TOC	250mLaG, Cool DOC	250mL P, HNO_3 B, Ca, Fe, Mg, Mn, K, Na				DO	pH	Conductivity	Temperature	No. of Containers (Total per each location)
01	PZ-01Q-13	083012	0804	GW		X	1	1									5.42	6.8	81.2	26.1	
02	PZ-01Q-15		0824	GW		X	1	1									8.25	6.1	43.2	25.8	
03	PZ-01Q-19		0844	GW		X	1		1								3.16	5.1	56.3	25.6	
04	PZ-04Q-13		0912	GW		X	1	1									5.55	6.0	184.5	26.5	
05	PZ-04Q-15		0931	GW		X	1	1									7.93	6.4	94.2	26.1	
06	PZ-04Q-19		0950	GW		X	1		1								3.48	6.2	75.8	25.8	
07	PZ-06Q-13		1010	GW		X		1		1	2	1	1				4.69	6.4	82.8	26.7	
08	PZ-06Q-15		1022	GW		X	1	1									2.85	6.3	411.2	26.3	
09	PZ-06Q-15 Dup		1027	GW		X	1	1									2.85	6.3	411.2	26.3	
10	PZ-06Q-19		1045	GW		X	1	1									0.53	6.6	109.8	26.1	
11	PZ-07Q-13		1058	GW		X	1	1									5.26	6.6	130.0	27.1	
12	PZ-07Q-15		1118	GW			1		1								2.76	6.4	118.3	26.6	

Relinquished:	Date/Time:	Received:	Date/Time:
Containers Prepared/ Relinquished: Bowling	1215 8/27/12		1215 082712
	1550 083012		1550 08-30-12

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 within holding time? Y N N/A

Volatiles rec'd w/out headspace? Y N N/A

Proper containers used? Y N N/A

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SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

SAL Project No. 1209615

Client Name: Hazen and Sawyer

Contact / Phone:

Project Name / Location: C-HS3 SE#1

Samplers: (Signature)

Matrix Codes:
DW-Drinking Water WW-Wastewater
SW-SurfaceWater SL-Sludge SO-Soil
GW-Groundwater SA-Saline Water O-Other
R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, NOx, Cl	250mL P, H_2SO_4 TKN, NH_3									DO	pH	Conductivity	Temperature	No. of Containers (Total per each location)
13	PZ-07Q-19	083012	1137	GW		X	1	1									2.54	6.3	100.8	26.5	

Containers Prepared/ Relinquished: Bowling	Date/Time: 1215 8/27/12	Received:	Date/Time: 1215 082712
Relinquished:	Date/Time: 1550 083012	Received:	Date/Time: 1550 08-30-12
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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 within holding time?	Y N N/A
Volatiles rec'd w/out headspace?	Y N N/A
Proper containers used?	Y N N/A

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Chain of Custody

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

SAL Project No. 1209644

Client Name: Hazen and Sawyer

Contact / Phone:

Project Name / Location: C-HS3 SE#1

Samplers: (Signature)

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

SAL Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alaklinity, NOx, Cl	250mL P, H_2SO_4 COD, TKN, NH_3, TP	250mL P, H_2SO_4 TKN, NH_3	1LP, Cool Alkalinity, NOx, Cl, F, OP, SO_4	40mLaV, HCl TOC	250mLaG, Cool DOC	250mL P, HNO_3 B, Ca, Fe, Mg, Mn, K, Na				DO	pH	Conductivity	Temperature	No. of Containers (Total per each location)
01	PZ-04U-12	083012	1207	GW		X	1	1									4.15	6.4	92.6	27.7	
02	PZ-04U-14		1226	GW		X	1		1								4.61	6.5	62.3	26.9	
03	PZ-04U-18		1247	GW		X	1		1								3.47	5.6	90.4	26.3	
04	PZ-06U-12		1304	GW		X		1		1	2	1	1				4.57	6.4	124.2	27.4	
05	PZ-06U-12 Dup		1309	GW		X		1		1	2	1	1				4.57	6.4	124.2	27.4	
06	PZ-06U-14		1328	GW		X	1		1								2.08	5.9	395.9	5.9	
07	PZ-06U-34		1348	GW		X	1		1								0.86	5.9	230.2	26.0	

Containers Prepared/ Relinquished:	Date/Time:	Received:	Date/Time:
J. Chambers	8-27-12 11:53		1153 082712
Relinquished:	Date/Time: 1550 083012	Received:	Date/Time: 1550 08-30-12
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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 within holding time? Y N N/A

Volatiles rec'd w/out headspace? Y N N/A

Proper containers used? Y N N/A

1209644

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SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

SAL Project No. 1209645

Client Name: Hazen and Sawyer

Contact / Phone:

Project Name / Location: C-HS3 SE#1

Samplers: (Signature)

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

SAL Use Only	Sample Description	Date	Time	Matrix	Composite	Grab	1LP, Cool Alkalinity, NOx, Cl	250mL P, H_2SO_4 COD, TKN, NH_3, TP								DO	pH	Conductivity	Temperature	No. of Containers (Total per each location)
01	PZ-01BKG	083012	1310	GW		X	1	1								4.91	6.0	38.1	27.3	
02	PZ-02BKG		1230	GW		X	1	1								3.17	5.34	44.0	28.1	
03	PZ-03BKG		1328	GW		X	1	1								5.24	5.5	58.1	28.5	
04	PZ-04BKG		1254	GW		X	1	1								2.20	5.0	54.1	26.2	
05	PZ-05BKG		1213	GW		X	1	1								0.34	5.4	35.5	28.8	

Containers Prepared/ Relinquished: Bowling	Date/Time: 835 8/24/12	Received:	Date/Time: 0835 082712
Relinquished:	Date/Time: 1550 083012	Received:	Date/Time: 1550 08-30-12
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

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 within holding time?	Y N N/A
Volatiles rec'd w/out headspace?	Y N N/A
Proper containers used?	Y N N/A

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Appendix C: Weather Station Data

o:\44237-001\Wpdocs\Report\Draft

Table C.1
Monthly Recorded Meteorological Data
Frostproof, FL

Period	60cm T avg (F)	60cm T min (F)	60cm T max (F)	2m T avg (F)	2m T min (F)	2m T max (F)	10m T avg (F)	10m T min (F)	10m T max (F)	Tsoil avg - 10cm (F)	Tsoil min (avg) - 10cm (F)	Tsoil max (avg) - 10cm (F)	2m DewPt avg (F)	Rel Hum avg 2m (%)	2m Rain tot (in)	2m Rain max over 15min (in)	10m Wind avg (mph)	10m Wind min (mph)	10m Wind max (mph)	WDir avg 10m (deg)
1-Aug-12	81.32	71.76	95.56	81.36	73.04	93.13	80.26	72.97	89.69	87.58	85.33	89.76	74.40	81	0.01	0.01	5.92	0.37	20.7	240
2-Aug-12	83.94	70.79	97.83	83.56	73.13	95.00	82.36	73.89	91.63	87.59	84.72	90.81	73.38	74	0	0	5.07	0.2	15.33	235
3-Aug-12	80.44	70.61	97.66	79.98	72.18	93.69	79.18	72.86	90.72	87.75	85.05	91.11	72.30	80	0.04	0.02	5.18	0	24.97	177
4-Aug-12	82.13	71.71	97.59	81.86	72.64	94.53	80.47	72.93	91.06	86.86	84.52	89.67	74.16	80	0.01	0.01	5.82	0.27	36.5	41
5-Aug-12	81.77	74.59	94.14	81.66	75.87	90.82	80.30	75.20	88.03	86.97	85.03	88.86	75.16	82	0.04	0.04	6.61	0	48.53	143
6-Aug-12	81.91	73.51	94.39	81.30	74.32	91.74	79.84	73.63	88.83	87.10	84.72	89.91	74.77	82	0.04	0.02	7.14	0.17	26.33	137
7-Aug-12	82.00	71.69	97.81	81.53	72.46	94.44	80.18	72.09	91.38	87.01	84.38	90.03	73.86	80	0.08	0.05	5.62	0.4	20.77	121
8-Aug-12	84.40	73.35	99.32	83.81	74.26	95.77	82.60	74.10	93.09	87.61	85.01	90.64	73.92	75	0	0	4.88	0	22.47	183
9-Aug-12	83.16	71.44	98.89	82.05	72.41	94.71	81.13	73.63	92.28	87.70	84.88	92.14	73.34	78	0.98	0.38	4.59	0.2	23.5	112
10-Aug-12	79.54	71.87	96.40	79.27	72.57	92.48	78.77	73.20	90.37	85.26	83.03	88.61	73.88	85	1.91	0.99	4.42	0	32.97	194
11-Aug-12	80.03	73.40	91.45	79.92	74.35	88.54	78.77	73.87	86.04	84.28	82.47	86.56	74.82	85	0	0	5.02	0.13	13.2	195
12-Aug-12	77.00	71.37	92.77	77.15	72.50	89.46	76.50	72.91	87.04	84.17	83.17	85.32	74.62	92	0.52	0.23	4.20	0	21.83	203
13-Aug-12	80.98	72.18	94.17	80.83	73.29	90.90	80.05	73.71	88.47	84.51	82.24	87.21	75.15	85	0.06	0.05	3.96	0	11.8	194
14-Aug-12	80.55	72.05	96.44	80.07	73.29	93.15	79.40	73.94	91.02	85.26	83.17	88.05	74.26	84	0.03	0.01	4.05	0	29	198
15-Aug-12	82.54	71.31	95.77	82.07	72.37	93.09	81.01	72.25	90.90	85.61	83.14	88.43	74.42	80	0	0	4.00	0	19.43	173
16-Aug-12	81.49	71.89	94.19	81.26	73.09	91.51	80.64	74.08	89.46	85.97	84.00	88.34	74.61	81	0	0	4.03	0.2	26.4	225
17-Aug-12	80.72	73.29	95.45	80.68	74.57	93.40	79.77	74.07	90.05	85.78	84.09	87.22	75.00	84	0.15	0.1	4.66	0.07	17.83	203
18-Aug-12	78.99	73.90	89.28	79.17	74.93	88.07	78.11	74.32	85.24	84.96	83.84	85.86	74.73	87	0	0	5.61	0	30.7	225
19-Aug-12	82.42	74.19	93.76	82.66	75.49	92.79	81.49	75.13	90.27	85.33	83.17	88.11	75.29	80	0.02	0.02	6.73	0.97	19.43	215
20-Aug-12	83.63	74.28	95.83	83.68	75.42	94.08	82.23	74.80	91.47	86.60	83.93	90.03	74.75	76	0	0	7.38	0.57	23.33	212
21-Aug-12	79.23	70.02	94.62	79.44	70.56	93.31	78.24	69.84	90.34	86.39	84.42	89.24	72.73	82	0.44	0.16	7.51	0.07	23.9	178
22-Aug-12	75.98	71.08	92.46	75.99	71.58	90.30	75.00	70.97	87.60	84.30	83.17	86.23	72.48	90	0.21	0.11	6.00	0	28.6	206
23-Aug-12	81.09	69.22	95.40	80.53	70.77	92.10	79.77	71.47	90.27	84.09	81.93	86.70	72.00	78	0.03	0.03	3.64	0.07	19.97	117
24-Aug-12	80.80	73.09	93.16	80.94	74.03	91.53	79.69	73.62	88.38	84.69	82.96	86.65	73.66	80	0	0	7.32	2	17.6	49
25-Aug-12	78.75	69.73	88.48	79.06	71.01	87.69	77.72	70.70	84.87	84.21	82.76	85.51	71.15	78	0	0	9.17	1.97	23.4	53
26-Aug-12	77.36	74.37	83.91	78.12	75.18	84.06	77.19	74.46	82.27	83.33	81.64	84.22	75.80	93	1.09	0.19	12.35	3.2	29.73	50
27-Aug-12	77.60	73.56	81.81	78.37	74.43	81.84	77.36	73.67	80.51	79.68	78.15	81.54	76.21	93	3.19	0.39	14.59	4.27	31.1	122
28-Aug-12	79.83	74.19	90.25	80.08	74.95	89.10	78.92	74.26	86.90	81.80	80.35	83.97	76.82	90	0.24	0.07	9.85	2.6	26.83	159
29-Aug-12	80.03	73.29	92.39	80.16	74.41	90.93	79.10	73.94	88.57	82.99	81.19	85.21	76.03	88	0.15	0.11	6.47	0.13	38.63	149
30-Aug-12	82.18	72.16	93.13	82.02	73.51	91.27	81.07	74.16	88.86	83.67	81.57	86.00	75.08	81	0.02	0.02	4.24	0.07	13.63	138
31-Aug-12	82.11	73.99	92.62	82.27	75.07	91.09	81.11	74.88	88.74	84.08	82.49	85.75	75.27	81	0	0	5.34	0.73	17.27	70

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Appendix D: Field Parameter Analyses

Table D.1
Field Parameter Results
(August 28 through August 30, 2012)

Sample Identification	Temperature (°C)	pH	Specific Conductance (µS)	Dissolved Oxygen (mg/L)
STE	30.4	7.2	693	1.6
STE-Dup	30.4	7.2	693	1.6
PZ01	27.3	6.0	38	4.9
PZ02	28.1	5.3	45	3.2
PZ03	28.5	5.5	58	5.2
PZ04	26.2	5.0	54	2.2
PZ05	28.8	5.4	36	0.4
PZ-03A-15	28.0	6.0	54	7.4
PZ-03A-15 Dup	28.0	6.0	54	7.4
PZ-03A-17	28.2	5.8	80	6.5
PZ-03A-21	28.4	5.6	267	2.0
PZ-03A-34	27.0	4.2	293	0.7
PZ-03I-15	28.4	5.7	81	6.4
PZ-03I-17	29.8	6.0	56	6.7
PZ-03I-21	29.4	4.7	180	4.3
PZ-03K-15	28.0	6.3	333	5.1
PZ-03K-17	27.4	6.3	53	4.6
PZ-03K-21	27.5	5.8	174	2.8
PZ-02L-15	27.2	6.2	176	4.5
PZ-02L-17	26.7	6.3	58	4.9
PZ-02L-21	26.5	5.3	182	2.5
PZ-04L-15	27.3	6.2	161	5.1
PZ-04L-17	26.8	6.3	59	4.0
PZ-04L-21	26.5	5.3	192	2.5
PZ-07L-15	27.6	6.1	93	5.8
PZ-07L-17	27.0	6.2	60	4.8

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Sample Identification	Temperature (°C)	pH	Specific Conductance (µS)	Dissolved Oxygen (mg/L)
PZ-07L-21	26.7	5.1	128	2.8
PZ-00N-15	27.5	6.2	88	6.0
PZ-00N-17	27.1	6.2	57	4.6
PZ-00N-21	26.8	4.6	154	2.9
PZ-02N-15	27.6	6.4	110	6.2
PZ-02N-17	27.2	6.1	44	4.6
PZ-02N-21	26.6	4.6	210	2.2
PZ-04N-15	27.5	6.2	188	5.0
PZ-04N-17	27.0	6.3	65	3.4
PZ-04N-17 Dup	27.0	6.3	65	3.4
PZ-04N-21	26.7	5.7	197	3.0
PZ-06N-15	27.1	6.0	79	4.6
PZ-06N-17	26.7	6.2	72	3.6
PZ-06N-21	26.7	5.3	93	2.9
PZ-03O-15	26.1	6.5	152	2.4
PZ-03O-17	25.8	6.3	60	2.3
PZ-03O-17 Dup	25.8	6.3	60	2.3
PZ-03O-21	25.7	4.5	181	2.2
PZ-04O-15	26.1	6.0	149	2.3
PZ-04O-17	25.8	6.3	100	2.4
PZ-04O-21	26.0	4.9	150	3.3
PZ-07O-15	27.0	6.0	93	4.6
PZ-07O-17	27.1	6.4	84	2.4
PZ-07O-20	26.2	5.3	129	3.2
PZ-01Q-13	26.1	6.8	81	5.4
PZ-01Q-15	25.8	6.1	43	4.2
PZ-01Q-19	25.6	5.1	56	3.2
PZ-04Q-13	26.5	6.0	184	5.8
PZ-04Q-15	26.1	6.4	94	2.9
PZ-04Q-19	25.8	6.2	76	3.5
PZ-06Q-13	26.7	6.4	83	4.7
PZ-06Q-15	26.3	6.3	411	2.8
PZ-06Q-15 Dup	26.3	6.3	411	2.8

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Sample Identification	Temperature (°C)	pH	Specific Conductance (µS)	Dissolved Oxygen (mg/L)
PZ-06Q-19	26.1	6.6	110	0.5
PZ-07Q-13	27.1	6.6	130	5.3
PZ-07Q-15	26.6	6.4	118	2.8
PZ-07Q-19	26.5	6.3	101	2.5
PZ-04U-12	27.7	6.4	79	4.2
PZ-04U-14	26.9	6.5	63	4.6
PZ-04U-18	26.3	5.6	90	3.5
PZ-06U-12	27.4	6.4	124	4.6
PZ-06U-12 Dup	27.4	6.4	124	4.6
PZ-06U-14	26.9	5.9	394	2.1
PZ-06U-34	26.0	5.9	230	0.9

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