



Florida Onsite Sewage Nitrogen Reduction Strategies Study

Task C.21

GCREC Mound Monitoring Sample Event Report No. 3

Progress Report

June 2011

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In association with



AET
Applied Environmental Technology

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ENVIRONMENTAL
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Florida Onsite Sewage Nitrogen Reduction Strategies Study

TASK C.21 PROGRESS REPORT

GCREC Mound Monitoring Sample Event Report No. 3

Prepared for:

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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 existing mound system at the Gulf Coast Research and Education Center (GCREC) is being monitored to serve as a bridge between the controlled GCREC pilot-scale testing conducted within the same type of soils and the uncontrolled monitoring at home sites in different soils throughout the state. The Task C.5 QAPP documents the objectives, monitoring framework, sample frequency and duration, and analytical methods to be used at the GCREC existing mound system site. The Task C.20 Instrumentation of GCREC Mound System and Plume Progress Reports No. 1 and 2 document the test area design, number and location of monitoring points, and preliminary sample collection and analyses.

2.0 Purpose

This sample event report documents data collected from the third GCREC mound monitoring and sampling event conducted June 27, 2011 through June 29, 2011. This monitoring event consisted of measurement of flowrates dosed to the system, 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 GCREC mound is located at the University of Florida Gulf Coast Research and Education Center (GCREC) in southeast Hillsborough County, Florida. The facility is situated on 475 acres of land that were donated by Hillsborough County government. At the GCREC, wastewater from the research offices and onsite dormitories flow to an existing OSTDS. Lab waste from Facility laboratories is not directed to the OSTDS. This

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existing OSTDS consists of a pressure dosed mound system designed for 2,850 gallons per day. Two septic tanks (2,500 and 1,250 gallons) provide primary treatment followed by a dosing tank (3,000 gallons). The mound drainfield has 4,351 ft² of infiltrative area (design hydraulic loading rate of 0.65 gpd/ft²) with each half of the drainfield receiving alternating doses. As part of this project, two flow meters were installed to monitor the actual daily flow to the drainfield.

3.2 Operational Monitoring

Wastewater flow to the mound system is measured via two (2) flow meters located on the dose lines to the mound. The two flow meters were installed in December 2009. Prior to July 16, 2010, the GCREC air conditioning systems were discharging considerable quantities of A/C condensate to the sewer. The PNRS II test facility programmable logic controller (PLC) records flow data from these meters. Appendix A summarizes the recorded wastewater flow data for the GCREC mound pumps since PNRS II test facility start-up.

In addition, a weather station is located at the GCREC facility with weather conditions recorded every minute and stored on a private website. Table 1 provides the recorded meteorological data daily averages leading up to and during the sample event. Appendix B provides summary tables of the average monthly recorded meteorological data.

Table 1
Meteorological Data Daily Averages Measured June 24, 2011 – June 29, 2011

Date	Temp Avg 60 cm (°F)	Temp Avg 10 m (°F)	Temp Soil Avg -10 cm (°F)	Dewpoint Avg 2m (°F)	Relative Humidity Avg 2m (%)	Rain Total 2m (in)	Wind Speed Avg 10m (mph)	ET (in)
June 24, 2011	79.04	78.61	82.00	73.08	84	1.05	6.22	0.17
June 25, 2011	76.52	76.24	81.15	72.09	88	0.06	5.18	0.15
June 26, 2011	77.08	76.95	80.43	71.39	84	0.00	5.30	0.13
June 27, 2011	78.11	77.83	80.83	71.64	83	0.04	4.82	0.14
June 28, 2011	76.42	76.22	80.49	71.52	87	0.23	4.70	0.12
June 29, 2011	76.79	76.36	80.53	72.01	87	0.02	5.77	0.15

3.3 Monitoring and Sampling Locations and Identification

A sampling grid for groundwater screening was developed downgradient of the soil treatment unit as depicted in Figure 1. A 25-ft by 25-ft grid was staked then locations

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surveyed (x, y, and z). Transect lines AA through R are parallel to the southern edge of the mound and increase (higher letter identification) moving southward from the mound. Transect lines 1 through 15 (from east to west) are perpendicular to the southern edge of the mound. Groundwater monitoring points were installed in May, June, and November 2010. Two types of monitoring points were installed using either hand or drilling methods: drive point samplers and standpipe piezometers. Drive point samplers consist of a stainless steel drive tip and attached 1-in. long screen with a protective “umbrella” (to prevent soil entering and clogging the screen), and flexible tubing that extends to the ground surface (Figure 2). Standpipe piezometers consist of either ¾-in., 1¼-in., or 2-in. diameter PVC with 1-ft, 4-ft, 5-ft, or 10-ft long 0.010 slot PVC screens and PVC riser extending to the ground surface (refer to the Task C QAPP and Task C.20 Progress Reports No. 1 and No. 2 for additional detail).

Each monitoring location has been assigned a unique identification indicating the type of monitoring point (DP = drive point, PZ = standpipe piezometer), grid location (self explanatory), and depth below ground surface (bottom of the drive point or well screen in feet). For example DP-AA9-14 is a drive point sampler located on the grid at AA9 at 14 ft below ground surface. A schematic of the GCREC monitoring network is shown in Figure 1. Figure 3 depicts an installed ¾-in. diameter PVC standpipe piezometer. A complete list of all installed drive points and standpipe piezometers is included in Appendix C.

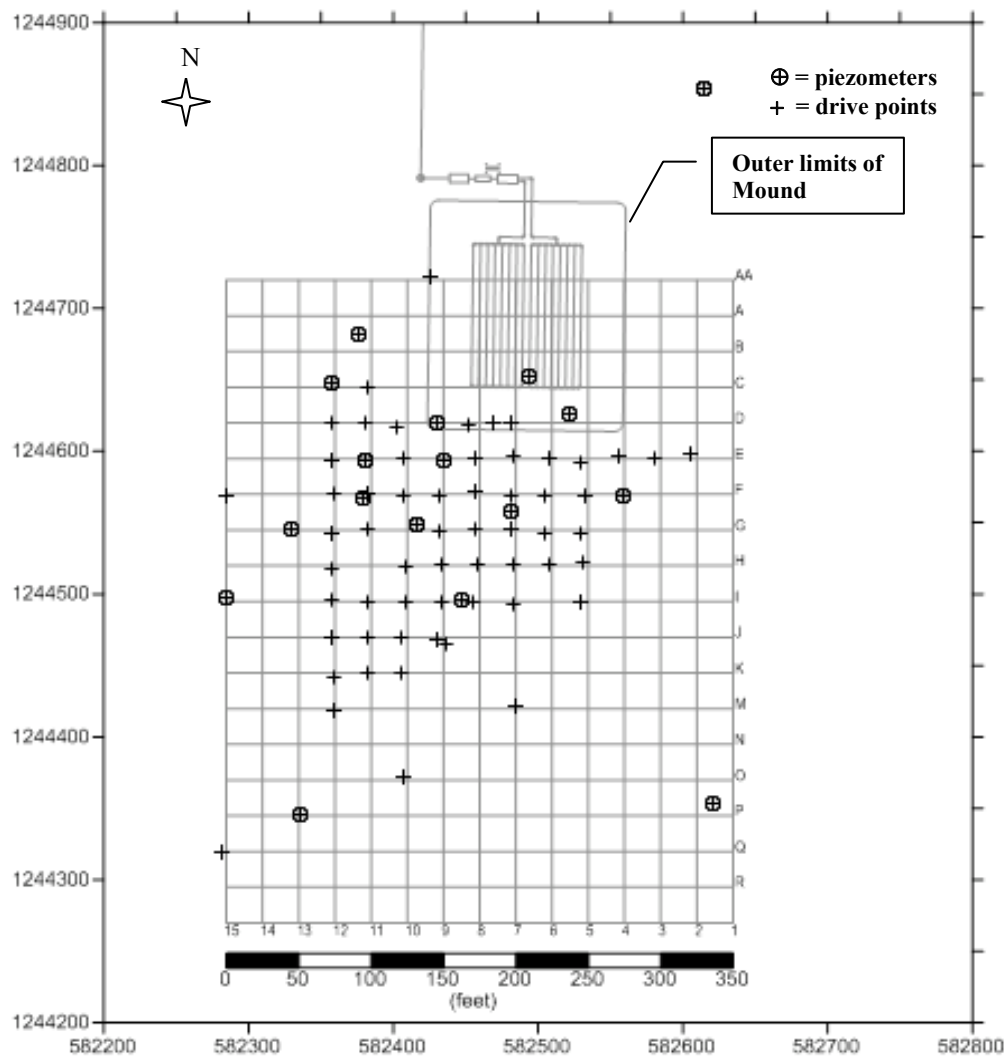


Figure 1
Schematic of GREC Monitoring Network (UTM coordinates are used)
 ⊕ denotes piezometers and + denotes drive points



Figure 2
Stainless Steel Drive Point with Mesh Screen, Umbrella and Tubing



Figure 3
Installed 3/4" Diameter PVC Standpipe Piezometer

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3.4 Soil Characteristics

During the instrumentation of the mound, soil cores were collected to the spodic layer at four locations (CD6.5, E9, F4, and west side of the mound [near A9]), and at one location (G10) a continuous soil core was collected to the confining Hawthorn clay layer. The shallow soil cores will provide information on vadose zone properties, and the deep soil core will provide a general idea of the soil properties within the aquifer. The information will be used when determining appropriate parameters to be used in model development. During the installation of monitoring points during the summer of 2010, a prominent spodic layer was discovered at approximately 4-6 feet below the ground surface. At several locations the top elevation of this layer was determined with handheld methods during this time. Attempts were also made to determine the top and the thickness of the spodic layer at the remaining monitoring well locations during the November drilling event. Whenever this proved impossible, estimations were made.

3.5 Groundwater Elevation Measurements

Groundwater level measurements are used to determine hydraulic gradients, directions of flow, rates of flow, locations of groundwater recharge and discharge, the amount of water in storage, the change in storage over time, and aquifer hydraulic characteristics. Groundwater levels were measured using a hand-cranked steel tape graduated in feet. Groundwater elevations have been monitored frequently at the site to determine the direction and gradient of flow.

3.6 Water Quality Sample Collection and Analyses

Groundwater and septic tank effluent (STE) were collected June 27, 2011 through June 29, 2011 for water quality analysis. A peristaltic pump was used to collect STE directly into the analysis-specific container supplied by the analytical laboratory. Samples were collected from the existing lift station, which supplies STE to the GCREC mound. Groundwater samples were obtained using a peristaltic pump, which was either attached directly to the drive point tubing or to dedicated standpipe piezometer tubing. Samples were collected into the analysis-specific containers after sufficient purging had occurred. 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, provided in Appendix D, supplied by the laboratory.

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In addition, equipment blank, field blank, and field sample duplicates were taken. The equipment blank was collected by pumping deionized water (provided by the laboratory) through the cleaned pump tubing. These samples were then analyzed for the same parameters as the GW samples. One field blank was collected by filling sample containers with deionized water that had been transported from the laboratory into the field along with other sample containers. The field sample duplicates were collected immediately subsequent to the regular samples.

Field parameters (pH, specific conductance, temperature (Temp), and dissolved oxygen (DO)) were measured using portable electronic probes with probe tips placed in a flow-cell device as groundwater was being pumped. All samples were analyzed by the laboratory for total alkalinity, total Kjeldahl nitrogen (TKN-N), ammonia nitrogen (NH₃-N), and nitrate/nitrite nitrogen (NO_x-N). Additionally, at some of the locations with elevated conductivity in previous preliminary sampling, total organic carbon (TOC) and dissolved organic carbon (DOC) were included. All analyses were performed by an independent and fully certified analytical laboratory (Southern Analytical Laboratory). Table 2 lists the analytical parameters, analytical methods, and detection limits for these analyses.

Table 2
Analytical Parameters, Method of Analysis, and Detection Limits

Analytical Parameter	Method of Analysis	Laboratory 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/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
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, GCREC Mound Data Summary Report No. 3 (Task C22) will be prepared describing the results from this sampling event.

4.1 Groundwater Flow, Gradient and Velocity

Groundwater level monitoring has been conducted over a larger area since additional piezometers were installed in November 2010. Although the groundwater elevations have been found to fluctuate due to periods of dry weather and/or heavy precipitation, continuous monitoring of the groundwater elevations indicates that the general flow-path does not change. Table 3 shows the actual measured water levels during this sample event.

Table 3
Standpipe Piezometer Groundwater Level
Measured on June 28, 2011

Fig 2 & 3 Identification	Location	Identification	Water Table Elevation (ft) June 28, 2011
1	Bkgd, North	PZ01-BKG-9	123.24
2	PQ1.75	PZ02-P02-9	119.78
3	H11	PZ03-H11-6	120.60
4	Bkgd, North	PZ04-BKG-9	122.08
5	Bkgd, East	PZ05-BKG-9	NR
6	Bkgd, NW	PZ06-BKG-12	123.50
7	D5.5	PZ07-D05-7	121.10
8	FG7	PZ08-FG7-6	120.81
9	I8.5	PZ09-I08-5	120.53
10	CD6.5	PZ10-CD6-13	121.21
11	E9	PZ11-E09-10	120.85
12	F4	PZ13-F04-8	121.12
13	G13	PZ14-G13-7	119.99
14	A11	PZ15-A11-6	120.82
15	C12	PZ16-C12-28	120.53
16	I15	PZ17-I15-26	119.82
17	R12	PZ18-R12-26	119.82
18	G9.75	PZ19-G10-26	120.48
19	G9.75	PZ20-G10-15	120.49
20	E11	PZ21-E11-26	120.48
21	E11	PZ22-E11-15	120.47
22	D9	PZ23-D09-27	120.77
23	Bkgd, North	PZ24-BKG-26	121.81
24	AA9	PZ25-AA9-13	121.35

Notes: PZ12 abandoned; If blank – no data was collected

4.2 Water Quality Analyses

4.2.1 Field Parameters

Field parameters (temperature, pH, dissolved oxygen (DO), and specific conductivity) were measured at all the sampling locations during the June 2011 sampling event. The complete field parameter data set is included in Appendix E.

Appendix A: GCREC Mound Wastewater Flow Data

Table A.1
GCREC Mound Metered Wastewater Flow Data

Date Range	Flow Meter Totalized Pump 1 to GCREC Mound (avg. gpd)	Flow Meter Totalized Pump 2 to GCREC Mound (avg. gpd)	Total Recorded Flow (avg. gpd)
Before A/C Condensate Diversion			
12/21/10 – 7/16/10	1,650	591	2,241
After A/C Condensate Diversion			
7/19/10 – 7/5/11	994	1,235	2,229

Table A.2
Summary of Daily Wastewater Flows (PLC Recorded)

	Date Range	Average Recorded Flow (gpd)	Std. Dev.	MIN (gpd)	MAX (gpd)
Before A/C Condensate Diversion					
Pump 1 to Mound	6/14/10 – 7/16/10	5,422	1,565	3,013	9,117
Pump 2 to Mound		-	-	-	-
Sum of Both Pumps		5,422	1,565	3,013	9,117
After A/C Condensate Diversion					
Pump 1 to Mound	7/16/10 – 6/27/11	984	680	0	3,548
Pump 2 to Mound		1,249	784	0	5,022
Sum of Both Pumps		2,233	1,017	584	5,730

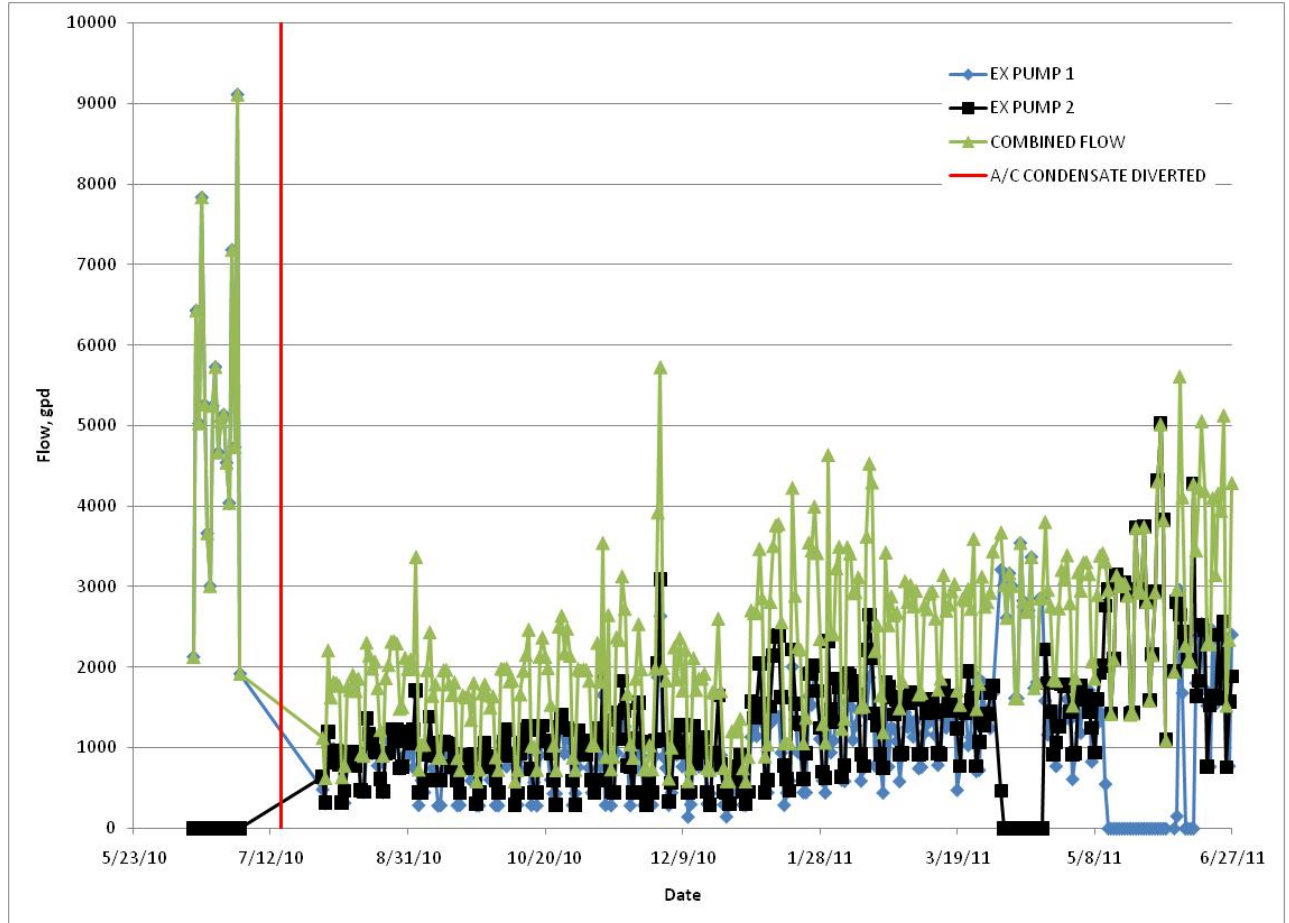


Figure A.1
PLC Recorded Daily Wastewater Flows
(6/14/10 – 6/27/11)

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Appendix B: GCREC Weather Station Data

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Table B.1
Monthly Recorded Meteorological Data

Period	60cm T avg (°F)	60cm T min (°F)	60cm T max (°F)	Tsoil avg - 10cm (°F)	Tsoil min(avg) -10cm (°F)	Tsoil max(avg) -10cm (°F)	2m DewPt avg (°F)	Relative Humidity avg 2m (%)	2m Rain total (in)	2m Rain max over 15min (in)	10m Wind avg (mph)	10m Wind max (mph)	WDir avg 10m (deg)	ET avg (in)
Jan-10	53.10	23.97	82.38	59.67	51.13	66.63	44.57	76	3.19	0.57	7.60	32.80	348	0.05
Feb-10	53.75	30.84	78.96	59.86	54.32	65.75	43.97	74	2.22	0.47	7.85	36.13	348	0.07
Mar-10	59.24	32.89	82.26	62.09	55.31	68.11	48.75	73	6.15	0.44	8.25	38.27	289	0.10
Apr-10	69.78	44.74	88.54	70.78	63.00	75.72	59.50	74	2.79	0.52	7.46	44.17	94	0.15
May-10	77.78	62.37	93.63	79.11	73.17	83.97	68.62	77	0.89	0.13	6.75	31.10	126	0.18
Jun-10	80.91	65.84	99.09	82.32	76.69	88.63	72.87	80	8.25	1.30	5.85	50.47	116	0.19
Jul-10	80.67	68.00	96.21	82.58	77.49	87.03	74.05	82	7.30	0.48	5.95	35.37	103	0.18
Aug-10	80.54	70.59	96.87	82.63	79.11	87.85	75.03	85	13.51	1.74	5.78	43.53	154	0.16
Sep-10	78.91	63.43	95.88	80.83	78.17	83.39	72.11	82	3.42	0.55	6.33	41.60	84	0.16
Oct-10	71.98	51.24	93.00	74.97	71.83	78.62	61.55	73	0.01	0.01	5.56	32.00	31	0.11
Nov-10	65.75	39.95	86.77	69.47	64.33	75.34	56.97	76	1.24	0.16	6.52	30.53	55	0.07
Dec-10	50.64	22.86	78.37	60.71	54.61	71.33	39.83	71	0.50	0.05	7.33	36.77	354	0.04
Jan-11	57.65	29.23	79.54	61.34	56.86	65.07	49.01	77	4.13	0.49	7.08	44.07	319	0.06
Feb-11	62.95	34.76	85.21	63.94	57.76	69.58	54.40	78	0.47	0.07	6.38	35.57	75	0.09
Mar-11	66.56	39.12	88.66	68.35	61.45	73.83	56.59	75	6.89	0.47	7.41	44.13	82	0.12
Apr-11	73.3	46.33	93.02	74.09	66.49	79.99	62.81	73	0.94	0.31	6.67	26.67	2877	0.17
May-11	76.07	50.68	96.04	78.67	73.58	84.22	64.22	71	1.05	0.28	6.61	44.47	2976	0.19
Jun-11	79.5	63.07	98.83	81.83	76.96	87.12	69.97	76	4.86	0.43	6.08	37.53	2880	0.18

Appendix C: GCREC Mound Sample Identification

Table C.1
GCREC Mound Sample Identification

	Grid Location	Sample Identification	Notes	Bottom Elevation (ft)
1	Lift Station	STE PumpTank	Wastewater Sample	N/A
2	Bkgd, North	PZ01-BKG-9	1 1/4" Standpipe Piezometer, 4' screen	120.33
3	Bkgd, North	PZ04-BKG-9	1 1/4" Standpipe Piezometer, 4' screen	118.66
4	Bkgd, North	PZ24-BKG-26	2" Standpipe Piezometer, 5' screen	101.41
5	Bkgd, East	PZ05-BKG-9	1 1/4" Standpipe Piezometer, 4' screen	117.39
6	Bkgd, NW	PZ06-BKG-12	1 1/4" Standpipe Piezometer, 4' screen	118.10
7	AA9	DP-AA9-14	SST Drive Point	110.68
8	AA9	DP-AA9-22	SST Drive Point	103.08
9	AA9	DP-AA9-27	SST Drive Point	98.28
10	A6.5	PZ25-A6.5-10	3/4" Standpipe Piezometer, 3.5' screen	119.62
11	A11	PZ15-A11-6	3/4" Standpipe Piezometer, 5' screen	118.84
12	CD6.5	PZ10-CD6-13	3/4" Standpipe Piezometer, 5' screen	116.03
13	C11	DP-C11-8	SST Drive Point	116.18
14	C12	PZ16-C12-28	3/4" Standpipe Piezometer, 1' screen	94.75
15	D5.5	PZ07-D05-7	1 1/4" Standpipe Piezometer, 4' screen	118.89
16	D7	DP-D07-5	SST Drive Point	120.82
17	D7	DP-D07-7	SST Drive Point	118.86
18	D7	DP-D07-9	SST Drive Point	116.79
19	D7.5	DP-D7.5-14	SST Drive Point	111.24
20	D7.5	DP-D7.5-20	SST Drive Point	105.31
21	D7.5	DP-D7.5-26	SST Drive Point	99.24
22	D8	DP-D08-9	SST Drive Point	116.31
23	D9	DP-D09-6	SST Drive Point	118.35
24	D9	DP-D09-8	SST Drive Point	116.45
25	D9	DP-D09-15	SST Drive Point, taped to PZ riser	109.45
26	D9	DP-D09-21	SST Drive Point, taped to PZ riser	103.45
27	D9	DP-D09-27	SST Drive Point, taped to PZ riser	97.45
28	D9	PZ23-D09-27	2" Standpipe Piezometer, 5' screen	97.41
29	D10	DP-D10-8	SST Drive Point	116.31

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Table C.1
GCREC Mound Sample Identification

	Grid Location	Sample Identification	Notes	Bottom Elevation (ft)
30	D11	DP-D11-11	SST Drive Point	113.29
31	D12	DP-D12-11	SST Drive Point	112.46
32	E2	DP-E02-6	SST Drive Point	119.55
33	E2	DP-E02-8	SST Drive Point	117.55
34	E3	DP-E03-10	SST Drive Point	115.26
35	E4	DP-E04-6	SST Drive Point	119.71
36	E4	DP-E04-8	SST Drive Point	117.71
37	E5	DP-E05-6	SST Drive Point	118.58
38	E6	DP-E06-6	SST Drive Point	118.86
39	E6	DP-E06-8	SST Drive Point	116.86
40	E7	DP-E07-10	SST Drive Point	114.74
41	E8	DP-E08-6	SST Drive Point	118.41
42	E8	DP-E08-8	SST Drive Point	116.41
43	E9	PZ11-E09-10	3/4" Standpipe Piezometer, 5' screen	114.56
44	E10	DP-E10-6	SST Drive Point	118.21
45	E11	DP-E11-12	SST Drive Point	111.98
46	E11	PZ21-E11-26	2" Standpipe Piezometer, 5' screen	111.98
47	E11	PZ22-E11-15	3/4" Standpipe Piezometer, 10' screen	111.98
48	E12	DP-E12-10	SST Drive Point	113.22
49	E12	DP-E12-15	SST Drive Point	107.75
50	E12	DP-E12-22	SST Drive Point	101.65
51	E12	DP-E12-28	SST Drive Point	95.80
52	F3	DP-F03-8	SST Drive Point	116.44
53	F4	PZ13-F04-8	3/4" Standpipe Piezometer, 5' screen	116.31
54	F4	DP-F04-17	SST Drive Point	108.06
55	F4	DP-F04-22	SST Drive Point	102.95
56	F4	DP-F04-32	SST Drive Point	92.85
57	F5	DP-F05-5	SST Drive Point	119.94
58	F5	DP-F05-31	SST Drive Point	93.89
59	F6	DP-F06-10	SST Drive Point	115.03
60	F7	DP-F07-6	SST Drive Point	118.25
61	FG7	PZ08-FG7-6	1 1/4" Standpipe Piezometer, 4' screen	118.25

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Table C.1
GCREC Mound Sample Identification

	Grid Location	Sample Identification	Notes	Bottom Elevation (ft)
62	F8	DP-F08-14	SST Drive Point	110.43
63	F8	DP-F08-20	SST Drive Point	103.96
64	F8	DP-F08-28	SST Drive Point	96.18
65	F9	DP-F09-5	SST Drive Point	118.98
66	F10	DP-F10-11	SST Drive Point	112.93
67	F11	DP-F11-11	SST Drive Point	112.68
68	F11	DP-F11-15	SST Drive Point	108.88
69	F11	DP-F11-18	SST Drive Point	105.73
70	F11	DP-F11-21	SST Drive Point	102.93
71	F11	DP-F11-24	SST Drive Point	99.88
72	F11	DP-F11-27	SST Drive Point	96.73
73	F12	DP-F12-10	SST Drive Point	112.77
74	F15	DP-F15-14	SST Drive Point	108.81
75	F15	DP-F15-20	SST Drive Point	102.84
76	F15	DP-F15-26	SST Drive Point	97.00
77	G5	DP-G05-6	SST Drive Point	118.51
78	G6	DP-G06-7	SST Drive Point	116.95
79	G7	DP-G07-13	SST Drive Point	111.63
80	G7	DP-G07-15	SST Drive Point	109.56
81	G7	DP-G07-17	SST Drive Point	106.76
82	G7	DP-G07-21	SST Drive Point	103.31
83	G7	DP-G07-24	SST Drive Point	100.51
84	G7	DP-G07-27	SST Drive Point	97.61
85	G8	DP-G08-5	SST Drive Point	119.54
86	G9	DP-G09-11	SST Drive Point	112.99
87	G9.75	PZ19-G10-26	2" Standpipe Piezometer, 5' screen	97.55
88	G9.75	PZ20-G10-15	3/4" Standpipe Piezometer, 10' screen	108.50
89	G11	DP-G11-8	SST Drive Point	115.27
90	G12	DP-G12-9	SST Drive Point	114.44
91	G12	DP-G12-15	SST Drive Point	108.37
92	G12	DP-G12-18	SST Drive Point	105.27
93	G12	DP-G12-21	SST Drive Point	102.32

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Table C.1
GCREC Mound Sample Identification

	Grid Location	Sample Identification	Notes	Bottom Elevation (ft)
94	G12	DP-G12-24	SST Drive Point	99.72
95	G12	DP-G12-27	SST Drive Point	96.37
96	G13	PZ14-G13-7	1 1/4" Standpipe Piezometer, 4' screen	115.11
97	H5	DP-H05-7	SST Drive Point	117.13
98	H6	DP-H06-7	SST Drive Point	117.33
99	H7	DP-H07-8	SST Drive Point	116.32
100	H8	DP-H08-10	SST Drive Point	113.84
101	H9	DP-H09-12	SST Drive Point	111.74
102	H10	DP-H10-11	SST Drive Point	112.68
103	H11	PZ03-H11-6	1 1/4" Standpipe Piezometer, 4' screen	121.47
104	H12	DP-H12-5	SST Drive Point	118.01
105	I6	DP-I06-14	SST Drive Point	110.24
106	I6	DP-I06-20	SST Drive Point	103.99
107	I6	DP-I06-26	SST Drive Point	97.94
108	I7	DP-I07-8	SST Drive Point	115.67
109	I8	DP-I08-5	SST Drive Point	118.56
110	I8.5	PZ09-I08-5	1 1/4" Standpipe Piezometer, 4' screen	118.93
111	I9	DP-I09-11	SST Drive Point	112.96
112	I10	DP-I10-6	SST Drive Point	117.72
113	I11	DP-I11-10	SST Drive Point	113.50
114	I12	DP-I12-6	SST Drive Point	117.54
115	I15	PZ17-I15-26	3/4" Standpipe Piezometer, 1' screen	97.09
116	J8	DP-J08-6	SST Drive Point	118.02
117	J9	DP-J09-12	SST Drive Point	112.05
118	J9	DP-J09-14	SST Drive Point	109.61
119	J9	DP-J09-20	SST Drive Point	103.36
120	J9	DP-J09-26	SST Drive Point	97.11
121	J10	DP-J10-6	SST Drive Point	117.32
122	J11	DP-J11-12	SST Drive Point	111.99
123	J12	DP-J12-13	SST Drive Point	110.44
124	J12	DP-J12-15	SST Drive Point	108.26
125	J12	DP-J12-20	SST Drive Point	102.61

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Table C.1
GCREC Mound Sample Identification

	Grid Location	Sample Identification	Notes	Bottom Elevation (ft)
126	J12	DP-J12-27	SST Drive Point	96.36
127	K10	DP-K10-7	SST Drive Point	116.41
128	K11	DP-K11-13	SST Drive Point	110.43
129	K12	DP-K12-5	SST Drive Point	117.68
130	M7	DP-M07-15	SST Drive Point	108.98
131	M7	DP-M07-21	SST Drive Point	102.65
132	M7	DP-M07-27	SST Drive Point	96.95
133	M12	DP-M12-10	SST Drive Point	112.79
134	N12	DP-N12-14	SST Drive Point	108.40
135	N12	DP-N12-18	SST Drive Point	104.75
136	N12	DP-N12-21	SST Drive Point	101.73
137	N12	DP-N12-24	SST Drive Point	98.75
138	N12	DP-N12-27	SST Drive Point	95.63
139	O10	DP-O10-12	SST Drive Point	110.71
140	O10	DP-O10-18	SST Drive Point	104.56
141	O10	DP-O10-24	SST Drive Point	98.56
142	PQ1.75	PZ02-P02-9	1 1/4" Standpipe Piezometer, 4' screen	115.24
143	Q15	DP-Q15-15	SST Drive Point	108.20
144	Q15	DP-Q15-21	SST Drive Point	102.29
145	Q15	DP-Q15-26	SST Drive Point	96.40
146	R12	PZ18-R12-26	3/4" Standpipe Piezometer, 1' screen	96.56

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Appendix D: Chain of Custody Forms

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Client Name		Hazen and Sawyer		Contact / Phone:																						
Project Name / Location		GCRC Mound Groundwater Analyses																								
Samplers: (Signature)																										
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	1LP, Cool	Chloride	1LP, Cool	Total Alkalinity, F, NO ₃	OP, SO ₄	250mL P, H ₂ SO ₄	TKN, NO ₃ , NH ₃ , COD	250mL Ag, Cool	DOC	40mL Ag, HCl	TOC	250mL P, HNO ₃	B, Cd, K, Fe, Mg, Na	Field Temperature	Field pH	Field Conductivity	Field DO		
	25	DP-F08-20	06/28/11	0940	GW		X	1													74.7	5.3	347.0	0.45		
	26	DP-F08-28	06/28/11	0945	GW		X	1													74.3	5.4	323.7	0.26		
	27	DP-F10-11	06/28/11	0950	GW		X	1													75.3	4.9	492.2	0.38		
	28	DP-F11-11	06/28/11	0955	GW		X	1													76.0	4.8	447.0	0.31		
	29	DP-F11-15	06/28/11	1000	GW		X	1													74.6	4.7	486.5	0.15		
	30	DP-F11-18	06/28/11	1005	GW		X	1													74.5	5.0	389.3	0.33		
	31	DP-F11-21	06/28/11	1010	GW		X	1													74.4	4.9	310.1	0.37		
	32	DP-F11-24	06/28/11	1020	GW		X	1													74.4	4.8	310.4	0.23		
	33	DP-F11-27	06/28/11	1025	GW		X	1													74.3	4.9	331.3	0.18		
	34	DP-F12-10	06/28/11	1030	GW		X	1													75.3	4.3	500	0.16		
	35	DP-F15-14	06/29/11	1250	GW		X	1													74.2	4.5	486.9	0.28		
	36	DP-F15-20	06/29/11	1255	GW		X	1													74.4	4.6	359.2	0.24		
Containers Prepared/Relinquished			Date/Time: 6/23/11	1450	Received:																					
Relinquished:			Date/Time: 6/23/11	1550	Received:																					
Relinquished:			Date/Time: 6/28/11	730	Received:																					
Relinquished:			Date/Time: 6/30/11		Received:																					
Relinquished:			Date/Time:		Received:																					
Relinquished:			Date/Time:		Received:																					

Seal intact? ☒ Y ☒ N
 Samples intact upon arrival? ☒ Y ☒ N
 Received on ice? Temp _____
 Proper preservatives indicated? ☒ Y ☒ N
 Rec'd within holding time? ☒ Y ☒ N
 Volatiles rec'd w/out headspace? ☒ Y ☒ N
 Proper containers used? ☒ Y ☒ N

Instructions / Remarks:
1105413

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLD SMAR, FL 34677 813-855-1844 Fax 813-855-2218

SAL Project No. 1105413

Client Name		Hazen and Sawyer		Contact / Phone:																			
Project Name / Location		GOREC Mound Groundwater Analyses																					
Samplers: (Signature)																							
Matrix Codes: DW-Drinking Water WW-Wastewater SW-Surface Water 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	1LP, Cool	Total Alkalinity, F, NO ₃	OP, SO ₄	250mL P, H ₂ SO ₄	TKN, NO _x , NH ₃ , COD	250mL Ag, Cool	DOC	40mL Ag, HCl	250mL P, HNO ₃	B, Cd, K, Fe, Mg, Na	Field Temperature	Field pH	Field Conductivity	Field DO		
13	DP-E04-8	06/28/11	0910	GW		X	1											26.0	4.7	135.1	1.59		
14	DP-E07-10	06/28/11	0905	GW		X	1											25.5	4.5	245.2	0.24		
15	DP-E08-8	06/28/11	0900	GW		X	1											25.8	4.5	358.3	0.28		
16	DP-E11-12	06/28/11	0850	GW		X	1											24.9	5.0	488.6	0.28		
17	DP-E12-10	06/28/11	0830	GW		X	1											25.1	4.9	502	0.29		
18	DP-E12-15	06/28/11	0825	GW		X	1											24.7	5.2	462.4	0.31		
19	DP-E12-22	06/28/11	0836	GW		X			1	1			1	1	2	1		24.2	4.6	328.2	0.35		
20	DP-E12-22-D	06/28/11	0835	GW		X			1	1			1	1	2	1		24.2	4.2	328.2	0.35		
21	DP-E12-28	06/28/11	0840	GW		X	1											24.2	4.8	328.2	0.34		
22	DP-F04-17	06/28/11	0925	GW		X	1											25.1	6.1	573.8	0.33		
23	DP-F04-32	06/28/11	0930	GW		X	1											24.6	6.1	335.3	0.26		
24	DP-F05-5	06/28/11	0935	GW		X	1											Dry	Dry	Dry	Dry		
Containers Prepared/Relinquished:	Date/Time: 6/23/11	Received:	Date/Time: 6/24/11																			Instructions / Remarks:	
Relinquished:	6/23/11	Received:	Date/Time: 6/24/11																			1105413	
Relinquished:	6/28/11	Received:	Date/Time: 6/28/11																			Add Bromide to	
Relinquished:	6/28/11	Received:	Date/Time: 7:30																			DP-F04-17	
Relinquished:	6/30/11	Received:	Date/Time: 6/30/11																			DP-F04-32	
Relinquished:		Received:	Date/Time:																				
Relinquished:		Received:	Date/Time:																				

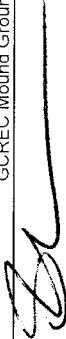
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Chain of Custody

SOUTHERN ANALYTICAL LABORATORIES, INC.
 110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-655-1844 fax 813-655-2218

SAL Project No

1105413

Client Name		Hazen and Sawyer		Contact / Phone:																		
Project Name / Location		GCRC Mound Groundwater Analyses																				
Samplers: (Signature)																						
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	1LP, Cool	Chloride	1LP, Cool	Total Alkalinity, F, NO ₃	OP, SO ₄	250mL P, H ₂ SO ₄	TKN, Nox, NH ₃ , COD	250mL Ag, Cool	DOC	40mL V, HCl	250mL P, HNO ₃	B, Cd, K, Fe, Mg, Na	Field Temperature	Field pH	Field Conductivity	Field DO
37	DP-F15-26	06/29/11	1300	GW	X	X	1												24.2	4.3	320.3	0.24
38	DP-G07-13	06/28/11	1210	GW	X	X	1												24.9	5.4	255.0	3.13
39	DP-G07-15	06/28/11	1215	GW	X	X	1												25.6	5.0	295.5	0.83
40	DP-G07-17	06/28/11	1220	GW	X	X	1												24.5	5.0	337.3	0.77
41	DP-G07-21	06/28/11	1235	GW	X	X	1												24.8	5.1	333.4	1.32
42	DP-G07-24	06/28/11	1245	GW	X	X	1												24.6	4.9	285.5	0.63
43	DP-G07-27	06/28/11	1250	GW	X	X	1												25.0	5.0	325.4	1.75
44	DP-G07-29 Trip Blank 6/29 1105413-44A 1330	06/29/11	1200	GW	X	X	1												Day	Day	Day	Day
45	DP-G09-11	06/28/11	1150	GW	X	X	1												22.9	5.4	279.1	2.87
46	DP-G11-8	06/28/11	1145	GW	X	X	1												27.6	4.6	312.0	1.05
47	DP-G12-9	06/28/11	1045	GW	X	X	1												26.5	4.22	358.9	0.24
48	DP-G12-15	06/29/11	1055	GW	X	X	1												25.2	4.7	472.7	0.20
Containers Prepared/Relinquished:		Date/Time: 06/23/11 1450	Received: 06/23/11 1450	Date/Time: 06/24/11 1000								Seal intact?	Y N N/A	Instructions / Remarks:								
Relinquished:		Date/Time: 06/23/11 1550	Received: 06/23/11 1550	Date/Time: 06/24/11 1000								Samples intact upon arrival?	Y N N/A	1105413								
Relinquished:		Date/Time: 06/26/11 730	Received: 06/26/11 730	Date/Time: 06/24/11 1000								Received on ice? Temp	Y N N/A	DP-600-5 Bottle used for trip blank.								
Relinquished:		Date/Time: 06/30/11	Received: 06/30/11	Date/Time: 06/24/11 1000								Proper preservatives indicated?	Y N N/A	Per Josephine								
Relinquished:		Date/Time:	Received:	Date/Time: 06/24/11 1000								Rec'd within holding time?	Y N N/A	6/24/11 1330								
Relinquished:		Date/Time:	Received:	Date/Time: 06/24/11 1000								Volatiles rec'd w/out headspace?	Y N N/A									
Relinquished:		Date/Time:	Received:	Date/Time: 06/24/11 1000								Proper containers used?	Y N N/A									

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 Rev Date 11/15/01

Chain of Custody

Client Name		Hazen and Sawyer		Contact / Phone:															
Project Name / Location		GCRC Mound Groundwater Analyses																	
Samplers: (Signature)																			
Matrix Codes: DW-Drinking Water WW-Wastewater SW-Surface Water 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 Chloride	1LP, Cool OP, SO ₄	250mL P, H ₂ SO ₄ TKN, NO _x , NH ₃ , COD	250mL Ag, Cool DOC	40mL V, HCl TOC	250mL P, HNO ₃ B, Cd, K, Fe, Mg, Na	Field Temperature	Field pH	Field Conductivity	Field DO			
49	DP-G12-18	06/29/11	1100	GW		X	1						24.6	4.8	443.2	0.24			
50	DP-G12-21	06/29/11	1110	GW		X		1	1	1	2	1	24.4	4.9	361.3	0.10			
51	DP-G12-24	06/29/11	1115	GW		X		1	1	1	2	1	24.3	4.8	345.8	0.12			
52	DP-G12-27	06/28/11	1130	GW		X	1	1	1	1	2	1	24.8	4.8	334.3	0.20			
53	DP-H06-7	06/28/11	1305	GW		X	1						25.8	5.0	274.7	0.76			
54	DP-H09-12	06/28/11	1315	GW		X	1						28.5	5.16	228.5	5.08			
55	DP-H10-11	06/29/11	1325	GW		X		1	1	1	2	1	24.4	4.7	217.5	0.27			
56	DP-I06-14	06/29/11	1430	GW		X		1	1	1	2	1	24.1	4.9	361.4	0.33			
57	DP-I06-20	06/29/11	1435	GW		X	1						24.2	5.0	312.4	0.25			
58	DP-I06-26	06/29/11	1440	GW		X	1						26.6	4.7	138.0	0.43			
59	DP-I12-6	06/29/11	1425	GW		X	1						27.3	5.9	182.8	3.12			
60	DP-J08-6	06/29/11	1450	GW		X	1												
Containers Prepared/Relinquished:		Date/Time: 6/23/11	Received: 6/24/11	Seal intact? Y N N/A				Samples intact upon arrival? Y N N/A				Received on ice? Temp				Instructions / Remarks: 1105413			
Relinquished:		Date/Time: 6/28/11	Received: 6/28/11	Proper preservatives indicated? Y N N/A				Rec'd w/ thin holding time? Y N N/A				Volatiles rec'd w/ out headspace? Y N N/A				Proper containers used? Y N N/A			
Relinquished:		Date/Time: 6/30/11	Received: 6/30/11																
Relinquished:		Date/Time:	Received:																
Relinquished:		Date/Time:	Received:																

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No. 1105413

Client Name		Hazen and Sawyer		Contact / Phone:																						
Project Name / Location																										
Samplers: (Signature)		GOREC Mound Groundwater Analyses																								
Matrix Codes: DW-Drinking Water WW-Wastewater SW-Surface Water 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	1LP, Cool	250mL P, H ₂ SO ₄	250mL P, H ₂ SO ₄	TKN, NO ₃ , NH ₃ , COD	250mL Ag, Cool	DOC	40mL Ag, HCl	250mL P, HNO ₃	B, Cd, K, Fe, Mg, Na	Field Temperature	Field pH	Field Conductivity	Field DO						
61	DP-J09-12	6/29/11	1000	GW	X	X	1										25.7	4.8	189.1	0.27						
62	DP-J09-14	6/29/11	1005	GW	X	X	1										24.8	4.5	249.3	0.26						
63	DP-J09-20	6/29/11	1010	GW	X	X	1										24.1	4.7	308.2	0.20						
64	DP-J09-26	6/29/11	1015	GW	X	X	1										24.0	4.5	306.4	0.21						
65	DP-J12-13	6/29/11	1020	GW	X	X	1										24.9	4.6	244.2	0.27						
66	DP-J12-15	6/29/11	1025	GW	X	X	1										24.7	4.6	287.0	0.24						
67	DP-J12-20	6/29/11	1030	GW	X	X	1										24.5	4.9	355.8	0.41						
68	DP-J12-27	6/29/11	1035	GW	X	X	1										24.4	4.7	310.1	0.19						
69	DP-K10-7	6/29/11	1045	GW	X	X	1										27.4	5.1	175.6	1.30						
70	DP-K12-5	6/29/11	1040	GW	X	X	1										27.5	4.7	80.3	0.71						
71	DP-M07-21	6/29/11	1050	GW	X	X	1										24.5	4.9	366.1	0.27						
72	DP-M07-27	6/29/11	1055	GW	X	X	1										24.3	5.0	302.9	0.18						
Containers Prepared/Relinquished:		Date/Time: 6/28/11 1450	Received: 6/29/11 1000	Date/Time: 6/24/11		Seal intact?		Samples intact upon arrival?		Received on ice? Temp.		Proper preservatives indicated?		Rec'd within holding time?		Violates rec'd w/out headspace?		Proper containers used?		Instructions / Remarks:						
Relinquished		Date/Time: 6/28/11 1550	Received: 6/29/11 1005	Date/Time: 6/24/11		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		1105413						
Relinquished		Date/Time: 6/28/11 730	Received: 6/29/11 1010	Date/Time: 6/24/11		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A								
Relinquished		Date/Time: 6/30/11	Received: 6/29/11 1055	Date/Time: 6/24/11		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A								
Relinquished		Date/Time:	Received:	Date/Time:		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A								

Chain of Custody

Chain of Custody As
Rev Date 11/19/01

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No. 1105413

Client Name		Hazen and Sawyer		Contact / Phone:															
Project Name / Location		GCRC Mound Groundwater Analyses																	
Samplers: (Signature)																			
Matrix Codes: DW-Drinking Water WW-Wastewater SW-Surface Water 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 Chloride	1LP, Cool OP, SO ₄	250mL P, H ₂ SO ₄ TKN, NO _x , NH ₃ , COD	250mL Ag, Cool DOC	40mL Ag, HCl TOC	250mL P, HNO ₃ B, Cd, K, Fe, Mg, Na	Field Temperature	Field pH	Field Conductivity	Field DO			
73	DP-N12-10	6/24/11	1100	GW		X	1						27.0	5.1	176.8	0.84			
74	DP-N12-14	6/27/11	1110	GW		X	1						25.4	4.4	177.2	0.18			
75	DP-N12-18	6/29/11	1115	GW		X	1						25.2	4.7	246.4	0.32			
76	DP-N12-21	6/29/11	1120	GW		X		1				1	24.4	4.8	304.2	0.20			
77	DP-N12-24	6/29/11	1130	GW		X	1						24.7	4.6	354.2	0.13			
78	DP-N12-27	6/29/11	1135	GW		X		1				1	24.6	4.7	364.4	0.10			
79	DP-N12-27-D	6/29/11	1140	GW		X		1				1	24.6	4.7	364.9	0.10			
80	DP-O10-18	6/29/11	1210	GW		X	1						25.1	4.4	335.4	0.64			
81	DP-O10-24	6/29/11	1215	GW		X	1						24.7	4.7	366.1	0.31			
82	DP-Q15-21	6/29/11	1235	GW		X	1						25.2	4.8	357.8	0.32			
83	DP-Q15-26	6/29/11	1240	GW		X	1						25.3	4.8	384.9	0.35			
84	PZ03-H11-6	6/27/11	1205	GW		X		1				1	28.1	4.5	164.4	3.01			
Containers Prepared/Relinquished:		Date/Time: 6/23/11 1450	Received: 6/24/11 1000		Date/Time: 6/24/11	Seal intact?		Samples intact upon arrival?		Received on ice? Temp		Proper preservatives indicated?		Rec'd within holding time?		Volatiles rec'd w/out headspace?		Proper containers used?	
Relinquished:		Date/Time: 6/23/11 1845	Received:		Date/Time:														
Relinquished:		Date/Time: 6/28/11 730	Received:		Date/Time:														
Relinquished:		Date/Time: 6/30/11	Received:		Date/Time:														
Relinquished:		Date/Time:	Received:		Date/Time:														
Relinquished:		Date/Time:	Received:		Date/Time:														

Chain of Custody.xls
Rev Date 11/15/01

Chain of Custody

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

SAL Project No.

1105413

Client Name		Hazen and Sawyer		Contact / Phone:																				
Project Name / Location		GCREC Mound Groundwater Analyses																						
Samplers: (Signature)																								
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	1LP, Cool	Chloride	1LP, Cool	Total Alkalinity, F, NO ₃	250mL P, H ₂ SO ₄	TKN, Nox, NH ₃ , COD	250mL Ag, Cool	DOC	40mL aV, HCl	250mL P, HNO ₃	B, Cd, K, Fe, Mg, Na	Field Temperature	Field pH	Field Conductivity	Field DO			
85	PZ04-BKG-9	06/27/11	0840	GW	X	X	1											25.9	5.6	1002	4.75			
86	PZ07-D05-7	06/27/11	1140	GW	X	X	1											27.3	4.77	787.5	7.50			
87	PZ11-E09-10	06/27/11	1100	GW	X	X			1	1								22.0	5.3	483.9	1.77			
88	PZ11-E09-10-D	06/27/11	1105	GW	X	X			1	1								22.0	5.3	483.9	1.77			
89	PZ15-A11-6	06/27/11	1040	GW	X	X	1											20.0	5.26	125.1	2.13			
90	PZ16-C12-28	06/27/11	1032	GW	X	X	1											25.1	5.5	305.9	0.47			
91	PZ17-I15-26	06/27/11	1239	GW	X	X	1											25.4	4.9	307.3	1.60			
92	PZ18-R12-26	06/27/11	1302	GW	X	X	1											26.6	5.1	251.9	0.89			
93	PZ19-G10-26	06/27/11	0931	GW	X	X	1											23.9	5.0	294.4	0.65			
94	PZ20-G10-15	06/27/11	0905	GW	X	X	1											25.7	5.3	300.3	2.61			
95	PZ21-E11-26	06/27/11	0956	GW	X	X	1											24.8	4.9	267.6	0.87			
96	PZ24-BKG-26	06/27/11	0829	GW	X	X	1											24.4	4.9	295.6	0.73			
Containers Prepared/Relinquished		Date/Time	Received	Date/Time	Date/Time		Date/Time		1000		Seal intact?		Samples intact upon arrival?		Received on ice? Temp		Proper preservatives indicated?		Rec'd w/ thin holding time?		Volatiles rec'd w/ out headspace?		Proper containers used?	
Relinquished		06/28/11 1430	06/28/11 1430	06/28/11 1430	06/24/11		06/24/11				Y N N/A		Y Y N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A	
Relinquished		06/28/11 1530	06/28/11 1530	06/28/11 1530	06/24/11		06/24/11				Y N N/A		Y Y N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A	
Relinquished		06/28/11 1730	06/28/11 1730	06/28/11 1730	06/24/11		06/24/11				Y N N/A		Y Y N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A	
Relinquished		06/30/11	06/30/11	06/30/11	06/24/11		06/24/11				Y N N/A		Y Y N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A	
Relinquished					06/24/11		06/24/11				Y N N/A		Y Y N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A		Y N N/A	

Instructions / Remarks:

1105413

Chain of Custody

SAL Project No. 1105413

SAL Project No.

[illegible]Chain of Custody.xls
Rev. Date 11/19/01

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

GROUNDWATER SAMPLING LOG

Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
Date Sampled:	06/27/11	SAL Project #	1105413	Phone:	813-630-4498
Well Number:	PZ15-A11-6	Sample ID	89	Project Name:	GCREC Mound Groundwater Analyses
				GPS LAT	
				GPS LONG	

PURGING DATA

WELL DIAMETER (Inches)	1.25	WELL CAPACITY (gal/ft)	0.06	Screen Interval (Feet)	UNK	To	UNK	Static Depth to Water (Feet)	6.35	PURGE PUMP CODE	PP	GP	IBP
TOTAL WELL DEPTH (Feet)	7.50	REFERENCE ELEVATION (NGVD)		GROUND WATER ELEVATION (REFERENCE-STATIC)				TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)			
Purge Technique: q Submerged Screen (1,1/4,1/4 Well) q Submerged Screen (1EQ Volume, 3, 3 Minutes) q Partially Submerged Screen (1 Well, 3,3 minutes)													
WELL VOLUME = (TOTAL DEPTH - STATIC DEPTH) x WELL CAPACITY =													
ONE WELL VOLUME	0.069	1/4 WELL VOLUME	0.017	3 WELL VOLUMES				5 WELL VOLUMES					
EQUIPMENT VOLUME = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME													
PUMP VOLUME		TUBING LENGTH		FLOW CELL VOLUME				EQUIPMENT VOLUME					
INITIAL TUBING LENGTH IN WELL (FEET)		FINAL TUBING LENGTH IN WELL (FEET)		PURGE TIME START	1006	PURGE TIME END		TOTAL PURGED					
INST. ID					SAL-SAM-63-4	SAL-SAM-65-4	SAL-SAM-63-4	SAL-SAM-55-5	SAL-SAM-0-2				
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) ($\Delta < 0.2$)	TEMP (oC) ($\Delta < 0.2$)	SP COND (uS/cm) ($\Delta < 5\%$)	DO (mg/L) (% SAT < 20)	TURBIDITY (NTUs) (< 20 NTU)	COLOR (Describe)	ODOR (Describe)		
1009	0.30	0.30	0.10	dry	5.76	77.4	1951	3.13		cloudy	none		
1012	0.30	0.60											
1015	0.30	0.90											
Well Capacity (gallons/foot): 0.75"=0.02, 1.25"=0.06, 2"=0.16, 3"=0.37, 4"=0.65, 5"=1.02, 6"=1.47, 12"=5.88													
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016													

SAMPLING DATA

SAMPLED BY / COMPANY (PRINT)				SAMPLER(S) SIGNATURES:			
TUBING MATERIAL CODE (CIRCLE ONE)				SAMPLE TUBING LENGTH IN WELL (FEET)			
PP PE NP (TL) TT				SAMPLE PUMP FLOW RATE (mL/min)			
SAMPLING INITIATED	1016	SAMPLING ENDED	1016	FIELD CLEANED	Y (N)	CLEANING STEPS	
FIELD FILTERED?	Y (N)	FILTER SIZE (um)		DUPLICATE	Y (N)	VOC COLLECTED BY REVERSE FLOW?	Y N (N/A)
PRESERVATION CHECKED IN FIELD?	Y (N) N/A	LIST PRESERVATIVES ADDED					
WEATHER CONDITIONS							
COMMENTS							
Well went dry let recover enough to grab sample. + took readings per Josefin. would not							
PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump							
TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon							
Reviewed By:				Date:			

Revision Date 09/25/09

recover in sufficient amount of time to get all readings.

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

GROUNDWATER SAMPLING LOG

Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
				Phone:	813-630-4498
Date Sampled:	062711	SAL Project #	1105413	Project Name	GCREC Mound Groundwater Analyses
Well Number	PZ24-BKG-26-D	Sample ID	96	GPS LAT	
				GPS LONG	

PURGING DATA

WELL DIAMETER (Inches)	2.0	WELL CAPACITY (gal/ft)	0.16	Screen Interval (Feet)	UNK	To	UNK	Static Depth to Water (Feet)	10.82	PURGE PUMP CODE	PP IBP
TOTAL WELL DEPTH (Feet)	30.3	REFERENCE ELEVATION (NGVD)		GROUND WATER ELEVATION (REFERENCE-STATIC)				TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Technique: q Submerged Screen (1,1/4,1/4 Well) q Submerged Screen (1EQ Volume, 3, 3 Minutes) q Partially Submerged Screen (1 Well, 3,3 minutes)											
WELL VOLUME = (TOTAL DEPTH - STATIC DEPTH) x WELL CAPACITY =											
ONE WELL VOLUME	3.17	1/4 WELL VOLUME	0.79	3 WELL VOLUMES				5 WELL VOLUMES			
EQUIPMENT VOLUME = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME											
PUMP VOLUME		TUBING LENGTH		FLOW CELL VOLUME				EQUIPMENT VOLUME			
INITIAL TUBING LENGTH IN WELL (FEET)		FINAL TUBING LENGTH IN WELL (FEET)		PURGE TIME START	0815	PURGE TIME END	0828	TOTAL PURGED	6.5		
INST. ID					SAL-SAM-63-4	SAL-SAM-65-4	SAL-SAM-63-4	SAL-SAM-55-3	SAL-SAM-02		
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) ($\Delta < 0.2$)	TEMP (oC) ($\Delta < 0.2$)	SP COND (uS/cm) ($\Delta < 5\%$)	DO (mg/L) (% SAT < 20)	TURBIDITY (NTUs) (< 20 NTU)	COLOR (Describe)	ODOR (Describe)
0822	3.5	3.5	0.50	12.2	4.9	24.4	295.4	0.91	146	clear	none
0825	1.5	5.0	1	1	4.9	24.4	296.0	0.84	144	1	1
0828	1.5	6.5	1	1	4.9	24.4	295.6	0.73	141	1	1
Well Capacity (gallons/foot): 0.75"=0.02, 1.25"=0.06, 2"=0.16, 3"=0.37, 4"=0.65, 5"=1.02, 6"=1.47, 12"=5.88											
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016											

SAMPLING DATA

SAMPLED BY / COMPANY (PRINT)	SAL				SAMPLER(S) SIGNATURES:	[Signature]	
TUBING MATERIAL CODE (CIRCLE ONE)	PP PE NP <u>TL</u> TT	SAMPLE TUBING LENGTH IN WELL (FEET)			SAMPLE PUMP FLOW RATE (mL/min)		
SAMPLING INITIATED	0829	SAMPLING ENDED	0829	FIELD CLEANED	Y <u>N</u>	CLEANING STEPS	
FIELD FILTERED?	Y <u>N</u>	FILTER SIZE (um)		DUPLICATE	Y <u>N</u>	VOC COLLECTED BY REVERSE FLOW?	Y N <u>N/A</u>
PRESERVATION CHECKED IN FIELD?	<u>Y</u> N N/A	LIST PRESERVATIVES ADDED					
WEATHER CONDITIONS	clear						
COMMENTS							
PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump							
TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon							
Reviewed By:					Date:		

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

GROUNDWATER SAMPLING LOG

Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
Date Sampled:	062711	SAL Project #	1105413	Phone:	813-630-4498
Well Number:	PZ20-G10-15	Sample ID	94	Project Name:	GCREC Mound Groundwater Analyses
				GPS LAT	
				GPS LONG	

PURGING DATA

WELL DIAMETER (Inches)	0.75	WELL CAPACITY (gal/ft)	0.02	Screen Interval (Feet)	UNK	To	UNK	Static Depth to Water (Feet)	8.08	PURGE PUMP CODE	PP IBP
TOTAL WELL DEPTH (Feet)	13.04	REFERENCE ELEVATION (NGVD)		GROUND WATER ELEVATION (REFERENCE-STATIC)				TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Technique: q Submerged Screen (1,1/4,1/4 Well) q Submerged Screen (1EQ Volume, 3, 3 Minutes) q Partially Submerged Screen (1 Well, 3,3 minutes)											
WELL VOLUME = (TOTAL DEPTH - STATIC DEPTH) x WELL CAPACITY =											
ONE WELL VOLUME	0.21	1/4 WELL VOLUME	0.054	3 WELL VOLUMES				5 WELL VOLUMES			
EQUIPMENT VOLUME = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME											
PUMP VOLUME		TUBING LENGTH		FLOW CELL VOLUME				EQUIPMENT VOLUME			
INITIAL TUBING LENGTH IN WELL (FEET)		FINAL TUBING LENGTH IN WELL (FEET)		PURGE TIME START	0255	PURGE TIME END	0904	TOTAL PURGED	0.90		
INST. ID					SAL-SAM-63-04	SAL-SAM-65-04	SAL-SAM-63-4	SAL-SAM-55-2	SAL-SAM-02		
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (oC) (Δ <0.2)	SP COND (μS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
0858	0.30	0.30	0.10	13.62	5.4	25.8	299.4	7.54	230	BROWN	NOAL
0901	0.30	0.60	1	1	5.4	25.7	299.9	7.60	225	1	1
0904	0.30	0.90	1	1	5.3	25.7	300.3	7.61	230	1	1
Well Capacity (gallons/foot): 0.75"=0.02, 1.25"=0.06, 2"=0.16, 3"=0.37, 4"=0.65, 5"=1.02, 6"=1.47, 12"=5.88											
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016											

SAMPLING DATA

SAMPLED BY / COMPANY (PRINT)	SAL				SAMPLER(S) SIGNATURES:						
TUBING MATERIAL CODE (CIRCLE ONE)	PP	PE	NP	TL	TT	SAMPLE TUBING LENGTH IN WELL (FEET)		SAMPLE PUMP FLOW RATE (mL/min)			
SAMPLING INITIATED	0905	SAMPLING ENDED	0905	FIELD CLEANED	Y N	CLEANING STEPS					
FIELD FILTERED?	Y N	FILTER SIZE (μm)		DUPLICATE	Y N	VOC COLLECTED BY REVERSE FLOW?	Y N	SEMI-VOLS COLLECTED THROUGH TRAP?	Y N	N/A	
PRESERVATION CHECKED IN FIELD?	Y N	N/A	LIST PRESERVATIVES ADDED								
WEATHER CONDITIONS	clear										
COMMENTS											
PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump											
TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon											
Reviewed By:						Date:					

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

GROUNDWATER SAMPLING LOG

Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
				Phone:	813-630-4498
Date Sampled:	062711	SAL Project #	1105413	Project Name	GCREC Mound Groundwater Analyses
Well Number	PZ04-BKG-9	Sample ID	85	GPS LAT	
				GPS LONG	

PURGING DATA

WELL DIAMETER (Inches)	1.25	WELL CAPACITY (gal/ft)	0.06	Screen Interval (Feet)	UNK	To	UNK	Static Depth to Water (Feet)	7.90	PURGE PUMP CODE	PP GP IBP
TOTAL WELL DEPTH (Feet)	9.1	REFERENCE ELEVATION (NGVD)		GROUND WATER ELEVATION (REFERENCE-STATIC)				TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Technique: q Submerged Screen (1,1/4,1/4 Well) q Submerged Screen (1EQ Volume, 3, 3 Minutes) q Partially Submerged Screen (1 Well, 3,3 minutes)											
WELL VOLUME = (TOTAL DEPTH - STATIC DEPTH) x WELL CAPACITY =											
ONE WELL VOLUME	0.072	1/4 WELL VOLUME	0.018	3 WELL VOLUMES				5 WELL VOLUMES			
EQUIPMENT VOLUME = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME											
PUMP VOLUME		TUBING LENGTH		FLOW CELL VOLUME				EQUIPMENT VOLUME			
INITIAL TUBING LENGTH IN WELL (FEET)		FINAL TUBING LENGTH IN WELL (FEET)		PURGE TIME START	0830	PURGE TIME END	0839	TOTAL PURGED	0.90		
INST. ID					SAL-SAM-63-4	SAL-SAM-65-4	SAL-SAM-63-4	SAL-SAM-55-3	SAL-SAM-0-2		
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) ($\Delta < 0.2$)	TEMP (oC) ($\Delta < 0.2$)	SP COND (uS/cm) ($\Delta < 5\%$)	DO (mg/L) (% SAT < 20)	TURBIDITY (NTUs) (< 20 NTU)	COLOR (Describe)	ODOR (Describe)
0833	0.30	0.30	0.10	8.75	5.6	100.1	25.9	4.60	163	Green	None
0836	0.30	0.60	1	1	5.6	99.6	25.9	4.31	161	1	1
0839	0.30	0.90	1	1	5.6	100.2	25.9	4.25	161	1	1
Well Capacity (gallons/foot): 0.75"=0.02, 1.25"=0.06, 2"=0.16, 3"=0.37, 4"=0.65, 5"=1.02, 6"=1.47, 12"=5.88											
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016											

SAMPLING DATA

SAMPLED BY / COMPANY (PRINT)	SAL				SAMPLER(S) SIGNATURES:					
TUBING MATERIAL CODE (CIRCLE ONE)	PP PE NP TL TT	SAMPLE TUBING LENGTH IN WELL (FEET)				SAMPLE PUMP FLOW RATE (mL/min)				
SAMPLING INITIATED	0840	SAMPLING ENDED	0840	FIELD CLEANED	Y N	CLEANING STEPS				
FIELD FILTERED?	Y N	FILTER SIZE (um)		DUPLICATE	Y N	VOC COLLECTED BY REVERSE FLOW?	Y N N/A	SEMI-VOLS COLLECTED THROUGH TRAP?	Y N N/A	
PRESERVATION CHECKED IN FIELD?	Y N N/A	LIST PRESERVATIVES ADDED								
WEATHER CONDITIONS	Clear									
COMMENTS										
PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump										
TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon										
Reviewed By:						Date:				

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

GROUNDWATER SAMPLING LOG

Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
				Phone:	813-630-4498
Date Sampled:	062711	SAL Project #	1105413	Project Name	GCREC Mound Groundwater Analyses
Well Number	PZ19-G10-26	Sample ID	93	GPS LAT	
				GPS LONG	

PURGING DATA

WELL DIAMETER (Inches)	7.0	WELL CAPACITY (gal/ft)	0.1632	Screen Interval (Feet)	UNK	To	UNK	Static Depth to Water (Feet)	7.95	PURGE PUMP CODE	PP GP IBP
TOTAL WELL DEPTH (Feet)	30.0	REFERENCE ELEVATION (NGVD)		GROUND WATER ELEVATION (REFERENCE-STATIC)				TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Technique: q Submerged Screen (1,1/4,1/4 Well) q Submerged Screen (1EQ Volume, 3, 3 Minutes) q Partially Submerged Screen (1 Well, 3,3 minutes)											
WELL VOLUME = (TOTAL DEPTH - STATIC DEPTH) x WELL CAPACITY =											
ONE WELL VOLUME	3.59	1/4 WELL VOLUME	0.89	3 WELL VOLUMES				5 WELL VOLUMES			
EQUIPMENT VOLUME = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME											
PUMP VOLUME		TUBING LENGTH		FLOW CELL VOLUME				EQUIPMENT VOLUME			
INITIAL TUBING LENGTH IN WELL (FEET)		FINAL TUBING LENGTH IN WELL (FEET)		PURGE TIME START	0907	PURGE TIME END	0931	TOTAL PURGED	5.75		
INST. ID					SAL-SAM-63-4	SAL-SAM-65-4	SAL-SAM-63-4	SAL-SAM-55-5	SAL-SAM-02		
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) ($\Delta < 0.2$)	TEMP (oC) ($\Delta < 0.2$)	SP COND (uS/cm) ($\Delta < 5\%$)	DO (mg/L) (% SAT < 20)	TURBIDITY (NTUs) (< 20 NTU)	COLOR (Describe)	ODOR (Describe)
0922	3.75	3.75	0.25	10.63	5.0	24.1	239.7	0.71	42.2	cloudy	none
0926	1.0	4.75	1	10.63	5.0	24.0	293.5	0.70	40.1	1	1
0930	1.0	5.75	1	10.63	5.0	23.9	294.4	0.65	38.3	1	1
Well Capacity (gallons/foot): 0.75"=0.02, 1.25"=0.06, 2"=0.16, 3"=0.37, 4"=0.65, 5"=1.02, 6"=1.47, 12"=5.88											
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016											

SAMPLING DATA

SAMPLED BY / COMPANY (PRINT)	SAL			SAMPLER(S) SIGNATURES:			
TUBING MATERIAL CODE (CIRCLE ONE)	PP PE NP <u>TL</u> TT	SAMPLE TUBING LENGTH IN WELL (FEET)		SAMPLE PUMP FLOW RATE (mL/min)			
SAMPLING INITIATED	0931	SAMPLING ENDED	0931	FIELD CLEANED	Y <u>(N)</u>	CLEANING STEPS	
FIELD FILTERED?	Y <u>(N)</u>	FILTER SIZE (um)		DUPLICATE	Y <u>(N)</u>	VOC COLLECTED BY REVERSE FLOW?	Y N <u>(N/A)</u>
PRESERVATION CHECKED IN FIELD?	Y N <u>(N/A)</u>	LIST PRESERVATIVES ADDED					
WEATHER CONDITIONS	clear						
COMMENTS							
PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump							
TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon							
Reviewed By:				Date:			

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

GROUNDWATER SAMPLING LOG

Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
				Phone:	813-630-4498
Date Sampled:	062711	SAL Project #	1105413	Project Name	GCREC Mound Groundwater Analyses
Well Number	PZ21-E11-26	Sample ID	95	GPS LAT	
				GPS LONG	

PURGING DATA

WELL DIAMETER (Inches)	2.0	WELL CAPACITY (gal/ft)	0.1632	Screen Interval (Feet)	UNK	To	UNK	Static Depth to Water (Feet)	7.95	PURGE PUMP CODE	PP GP IBP
TOTAL WELL DEPTH (Feet)	215	REFERENCE ELEVATION (NGVD)		GROUND WATER ELEVATION (REFERENCE-STATIC)				TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Technique: q Submerged Screen (1,1/4,1/4 Well) q Submerged Screen (1EQ Volume, 3, 3 Minutes) q Partially Submerged Screen (1 Well, 3,3 minutes)											
WELL VOLUME = (TOTAL DEPTH - STATIC DEPTH) x WELL CAPACITY =											
ONE WELL VOLUME	2.71	1/4 WELL VOLUME	0.55	3 WELL VOLUMES				5 WELL VOLUMES			
EQUIPMENT VOLUME = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME											
PUMP VOLUME		TUBING LENGTH		FLOW CELL VOLUME				EQUIPMENT VOLUME			
INITIAL TUBING LENGTH IN WELL (FEET)		FINAL TUBING LENGTH IN WELL (FEET)		PURGE TIME START	0940	PURGE TIME END		TOTAL PURGED			
INST. ID					SAL-SAM-63-4	SAL-SAM-65-4	SAL-SAM-63-4	SAL-SAM-55-3	SAL-SAM-02		
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) ($\Delta < 0.2$)	TEMP (°C) ($\Delta < 0.2$)	SP COND (uS/cm) ($\Delta < 5\%$)	DO (mg/L) (% SAT < 20)	TURBIDITY (NTUs) (< 20 NTU)	COLOR (Describe)	ODOR (Describe)
0949	2.25	2.25	0.75	6.21	5.0	24.8	284.5	1.16	23.8	clear	none
0952	0.75	3.00	1	1	4.9	24.6	284.6	0.99	25.6	1	1
0955	0.75	3.75	1	1	4.9	24.6	287.6	0.87	28.3	1	1
Well Capacity (gallons/foot): 0.75"=0.02, 1.25"=0.06, 2"=0.16, 3"=0.37, 4"=0.65, 5"=1.02, 6"=1.47, 12"=5.88											
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016											

SAMPLING DATA

SAMPLED BY / COMPANY (PRINT)	SAL	SAMPLER(S) SIGNATURES:			
TUBING MATERIAL CODE (CIRCLE ONE)	PP PE NP <u>TL</u> TT	SAMPLE TUBING LENGTH IN WELL (FEET)		SAMPLE PUMP FLOW RATE (mL/min)	
SAMPLING INITIATED	0956	SAMPLING ENDED	0956	FIELD CLEANED	Y <u>N</u>
FIELD FILTERED?	Y <u>N</u>	FILTER SIZE (um)		DUPLICATE	Y <u>N</u>
PRESERVATION CHECKED IN FIELD?	Y <u>N</u> N/A	LIST PRESERVATIVES ADDED		CLEANING STEPS	
				VOC COLLECTED BY REVERSE FLOW?	Y <u>N</u> <u>N/A</u>
				SEMI-VOLS COLLECTED THROUGH TRAP?	Y <u>N</u> <u>N/A</u>
WEATHER CONDITIONS	clear				
COMMENTS					
PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump					
TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon					
Reviewed By:		Date:			

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

GROUNDWATER SAMPLING LOG

Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
				Phone:	813-630-4498
Date Sampled:	06/21/11	SAL Project #:	1105413	Project Name:	GCREC Mound Groundwater Analyses
Well Number:	PZ16-C12-28	Sample ID:	90	GPS LAT:	
				GPS LONG:	

PURGING DATA

WELL DIAMETER (Inches)	0.75	WELL CAPACITY (gal/ft)	0.07	Screen Interval (Feet)	UNK	To	UNK	Static Depth to Water (Feet)	393	PURGE PUMP CODE	PP GP IBP
TOTAL WELL DEPTH (Feet)	79.0	REFERENCE ELEVATION (NGVD)		GROUND WATER ELEVATION (REFERENCE-STATIC)				TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Technique: q Submerged Screen (1,1/4,1/4 Well) q Submerged Screen (1EQ Volume, 3, 3 Minutes) q Partially Submerged Screen (1 Well, 3,3 minutes)											
WELL VOLUME = (TOTAL DEPTH - STATIC DEPTH) x WELL CAPACITY =											
ONE WELL VOLUME	0.50	1/4 WELL VOLUME	0.12	3 WELL VOLUMES				5 WELL VOLUMES			
EQUIPMENT VOLUME = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME											
PUMP VOLUME		TUBING LENGTH		FLOW CELL VOLUME				EQUIPMENT VOLUME			
INITIAL TUBING LENGTH IN WELL (FEET)		FINAL TUBING LENGTH IN WELL (FEET)		PURGE TIME START	1020	PURGE TIME END		TOTAL PURGED			
INST. ID					SAL-SAM-63-4	SAL-SAM-65-4	SAL-SAM-63-11	SAL-SAM-55-3	SAL-SAM-06		
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) ($\Delta < 0.2$)	TEMP (oC) ($\Delta < 0.2$)	SP COND (uS/cm) ($\Delta < 5\%$)	DO (mg/L) (% SAT < 20)	TURBIDITY (NTUs) (< 20 NTU)	COLOR (Describe)	ODOR (Describe)
1025	0.50	0.50	0.10	N/A	5.6	25.0	295.2	0.79	64.6	cloudy	none
1028	0.30	0.80	0.10	1	5.5	25.1	301.6	0.62	63.1	1	
1031	0.30	1.10	0.10	1	5.5	25.1	305.9	0.47	60.8	1	
Well Capacity (gallons/foot): 0.75"=0.02, 1.25"=0.06, 2"=0.16, 3"=0.37, 4"=0.65, 5"=1.02, 6"=1.47, 12"=5.88											
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016											

SAMPLING DATA

SAMPLED BY / COMPANY (PRINT)	CAL				SAMPLER(S) SIGNATURES:					
TUBING MATERIAL CODE (CIRCLE ONE)	PP PE NP (TL) TT	SAMPLE TUBING LENGTH IN WELL (FEET)				SAMPLE PUMP FLOW RATE (mL/min)				
SAMPLING INITIATED	1032	SAMPLING ENDED	1032	FIELD CLEANED	Y (N)	CLEANING STEPS				
FIELD FILTERED?	Y (N)	FILTER SIZE (um)		DUPLICATE	Y (N)	VOC COLLECTED BY REVERSE FLOW?	Y N (N/A)	SEMI-VOLS COLLECTED THROUGH TRAP?	Y N (N/A)	
PRESERVATION CHECKED IN FIELD?	(Y) N N/A	LIST PRESERVATIVES ADDED								
WEATHER CONDITIONS	clear									
COMMENTS										
PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump										
TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon										
Reviewed By:						Date:				

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

GROUNDWATER SAMPLING LOG

Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
				Phone:	813-630-4498
Date Sampled:	062711	SAL Project #	1105413	Project Name	GCREC Mound Groundwater Analyses
Well Number	PZ07-D05-7	Sample ID	86	GPS LAT	
				GPS LONG	

PURGING DATA

WELL DIAMETER (Inches)	1.25	WELL CAPACITY (gal/ft)	0.06	Screen Interval (Feet)	UNK	To	UNK	Static Depth to Water (Feet)	7.44	PURGE PUMP CODE	(PP) GP IBP
TOTAL WELL DEPTH (Feet)	9.02	REFERENCE ELEVATION (NGVD)		GROUND WATER ELEVATION (REFERENCE-STATIC)				TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Technique: q Submerged Screen (1,1/4,1/4 Well) q Submerged Screen (1EQ Volume, 3, 3 Minutes) q Partially Submerged Screen (1 Well, 3,3 minutes)											
WELL VOLUME = (TOTAL DEPTH - STATIC DEPTH) x WELL CAPACITY =											
ONE WELL VOLUME	0.09	1/4 WELL VOLUME	0.02	3 WELL VOLUMES				5 WELL VOLUMES			
EQUIPMENT VOLUME = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME											
PUMP VOLUME		TUBING LENGTH		FLOW CELL VOLUME				EQUIPMENT VOLUME			
INITIAL TUBING LENGTH IN WELL (FEET)		FINAL TUBING LENGTH IN WELL (FEET)		PURGE TIME START	1130	PURGE TIME END	1139	TOTAL PURGED	0.90		
INST. ID					SAL-SAM-63-4	SAL-SAM-65-4	SAL-SAM-63-4	SAL-SAM-55-3	SAL-SAM-0-2		
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ < 0.2)	TEMP (oC) (Δ < 0.2)	SP COND (uS/cm) (Δ < 5%)	DO (mg/L) (% SAT < 20)	TURBIDITY (NTUs) (< 20 NTU)	COLOR (Describe)	ODOR (Describe)
1133	0.30	0.30	0.16	8.73	4.7	27.2	287.8	3.29	15.33	clear	none
1136	0.30	0.60	1	8.73	4.7	27.3	288.0	2.71	10.46	1	1
1139	0.30	0.90	1	8.73	4.7	27.3	287.5	2.50	9.18	1	1
Well Capacity (gallons/foot): 0.75"=0.02, 1.25"=0.06, 2"=0.16, 3"=0.37, 4"=0.65, 5"=1.02, 6"=1.47, 12"=5.88											
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016											

SAMPLING DATA

SAMPLED BY / COMPANY (PRINT)	EAL	SAMPLER(S) SIGNATURES:	
TUBING MATERIAL CODE (CIRCLE ONE)	PP PE NP (TL) TT	SAMPLE TUBING LENGTH IN WELL (FEET)	SAMPLE PUMP FLOW RATE (mL/min)
SAMPLING INITIATED	1140	SAMPLING ENDED	1140
FIELD FILTERED?	Y (N)	FILTER SIZE (μm)	
		DUPLICATE	Y (N)
PRESERVATION CHECKED IN FIELD?	(Y) N N/A	LIST PRESERVATIVES ADDED	
WEATHER CONDITIONS	clear		
COMMENTS			
PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump			
TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon			
Reviewed By:		Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

GROUNDWATER SAMPLING LOG

Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
				Phone:	813-630-4498
Date Sampled:	062711	SAL Project #	1105413	Project Name	GCREC Mound Groundwater Analyses
Well Number	PZ03-H11-6	Sample ID	84	GPS LAT	
				GPS LONG	

PURGING DATA

WELL DIAMETER (Inches)	1.75	WELL CAPACITY (gal/ft)	0.06	Screen Interval (Feet)	UNK	To	UNK	Static Depth to Water (Feet)	7.34	PURGE PUMP CODE	PP GP IBP
TOTAL WELL DEPTH (Feet)	9.05	REFERENCE ELEVATION (NGVD)		GROUND WATER ELEVATION (REFERENCE-STATIC)				TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Technique: q Submerged Screen (1,1/4,1/4 Well) q Submerged Screen (1EQ Volume, 3, 3 Minutes) q Partially Submerged Screen (1 Well, 3,3 minutes)											
WELL VOLUME = (TOTAL DEPTH - STATIC DEPTH) x WELL CAPACITY =											
ONE WELL VOLUME	0.10	1/4 WELL VOLUME	0.02	3 WELL VOLUMES				5 WELL VOLUMES			
EQUIPMENT VOLUME = PUMP VOLUME + (TUBING CAPACITY X TUBING LEGNTH) + FLOW CELL VOLUME											
PUMP VOLUME		TUBING LEGNTH		FLOW CELL VOLUME				EQUIPMEN T VOLUME			
INITIAL TUBING LEGNTH IN WELL (FEET)		FINAL TUBING LEGNTH IN WELL (FEET)		PURGE TIME START	1253	PURGE TIME END	1207	TOTAL PURGED	0.90		
INST. ID				SAL-SAM-63-4	SAL-SAM-65-4	SAL-SAM-63-4	SAL-SAM-55-3	SAL-SAM-02			
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (oC) (Δ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
1256	0.30	0.30	0.10	8.85	4.5	28.1	168.3	3.01	6.34	clear	A 62-11
1159	0.30	0.60	1	8.85	4.5	28.3	166.7	3.03	3.89	1	1
1202	0.30	0.90	1	8.85	4.5	28.4	164.9	3.01	2.61	1	1
Well Capacity (gallons/foot): 0.75"=0.02, 1.25"=0.06, 2"=0.16, 3"=0.37, 4"=0.65, 5"=1.02, 6"=1.47, 12"=5.88											
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016											

SAMPLING DATA

SAMPLED BY / COMPANY (PRINT)	SAL	SAMPLER(S) SIGNATURES:	
TUBING MATERIAL CODE (CIRCLE ONE)	PP PE NP <u>TL</u> TT	SAMPLE TUBING LEGNTH IN WELL (FEET)	SAMPLE PUMP FLOW RATE (mL/min)
SAMPLING INITIATED	1203	SAMPLING ENDED	1203
FIELD FILTERED?	Y <u>N</u>	FILTER SIZE (μm)	
PRESERVATION CHECKED IN FIELD?	Y <u>N</u> N/A	LIST PRESERVATIVES ADDED	
WEATHER CONDITIONS	clear		
COMMENTS			
PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump			
TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon			
Reviewed By:		Date:	

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

GROUNDWATER SAMPLING LOG

Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
				Phone:	813-630-4498
Date Sampled:	062711	SAL Project #	1105413	Project Name	GCREC Mound Groundwater Analyses
Well Number	PZ17-115-26	Sample ID	91	GPS LAT	
				GPS LONG	

PURGING DATA

WELL DIAMETER (Inches)	0.15	WELL CAPACITY (gal/ft)	0.02	Screen Interval (Feet)	UNK	To	UNK	Static Depth to Water (Feet)	8.42	PURGE PUMP CODE	PP IBP
TOTAL WELL DEPTH (Feet)	30.05	REFERENCE ELEVATION (NGVD)		GROUND WATER ELEVATION (REFERENCE-STATIC)				TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Technique: q Submerged Screen (1,1/4,1/4 Well) q Submerged Screen (1EQ Volume, 3, 3 Minutes) q Partially Submerged Screen (1 Well, 3,3 minutes)											
WELL VOLUME = (TOTAL DEPTH - STATIC DEPTH) x WELL CAPACITY =											
ONE WELL VOLUME	0.43	1/4 WELL VOLUME	0.10	3 WELL VOLUMES			5 WELL VOLUMES				
EQUIPMENT VOLUME = PUMP VOLUME + (TUBING CAPACITY X TUBING LENGTH) + FLOW CELL VOLUME											
PUMP VOLUME		TUBING LENGTH		FLOW CELL VOLUME			EQUIPMENT VOLUME				
INITIAL TUBING LENGTH IN WELL (FEET)				FINAL TUBING LENGTH IN WELL (FEET)				PURGE TIME START	1227	PURGE TIME END	
INST. ID					SAL-SAM-63-4	SAL-SAM-65-4	SAL-SAM-63-4	SAL-SAM-55-3	SAL-SAM-02		
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) ($\Delta < 0.2$)	TEMP (oC) ($\Delta < 0.2$)	SP COND (uS/cm) ($\Delta < 5\%$)	DO (mg/L) (% SAT < 20)	TURBIDITY (NTUs) (< 20 NTU)	COLOR (Describe)	ODOR (Describe)
1232	0.30	0.50	0.10	N/A	4.9	25.5	307.2	1.8	68.9	cloudy	none
1235	0.30	0.80	1	1	4.9	25.4	307.3	1.80	67.3	1	1
1238	0.30	1.10	1	1	4.9	25.4	307.3	1.60	65.5	1	1
Well Capacity (gallons/foot): 0.75"=0.02, 1.25"=0.06, 2"=0.16, 3"=0.37, 4"=0.65, 5"=1.02, 6"=1.47, 12"=5.88											
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016											

SAMPLING DATA

SAMPLED BY / COMPANY (PRINT)				SAMPLER(S) SIGNATURES:			
TUBING MATERIAL CODE (CIRCLE ONE)				SAMPLE PUMP FLOW RATE (mL/min)			
TUBING MATERIAL CODE		PP PE NP TL TT		SAMPLE TUBING LENGTH IN WELL (FEET)			
SAMPLING INITIATED	1239	SAMPLING ENDED	1239	FIELD CLEANED	Y N	CLEANING STEPS	
FIELD FILTERED?	Y N	FILTER SIZE (um)		DUPLICATE	Y N	VOC COLLECTED BY REVERSE FLOW?	Y N N/A
PRESERVATION CHECKED IN FIELD?		Y N N/A		LIST PRESERVATIVES ADDED			
WEATHER CONDITIONS							
COMMENTS							
PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump							
TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon							
Reviewed By:				Date:			

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

GROUNDWATER SAMPLING LOG

Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
				Phone:	813-630-4498
Date Sampled:	062711	SAL Project #	1105413	Project Name	GCREC Mound Groundwater Analyses
Well Number	PZ18-R12-26	Sample ID	92	GPS LAT	
				GPS LONG	

PURGING DATA

WELL DIAMETER (Inches)	0.75	WELL CAPACITY (gal/ft)	0.02	Screen Interval (Feet)	UNK	To	UNK	Static Depth to Water (Feet)	2.56	PURGE PUMP CODE	PP GP IBP
TOTAL WELL DEPTH (Feet)	2.55	REFERENCE ELEVATION (NGVD)		GROUND WATER ELEVATION (REFERENCE-STATIC)				TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Technique: q Submerged Screen (1,1/4,1/4 Well) q Submerged Screen (1EQ Volume, 3, 3 Minutes) q Partially Submerged Screen (1 Well, 3,3 minutes)											
WELL VOLUME = (TOTAL DEPTH - STATIC DEPTH) x WELL CAPACITY =											
ONE WELL VOLUME	0.45	1/4 WELL VOLUME	0.11	3 WELL VOLUMES				5 WELL VOLUMES			
EQUIPMENT VOLUME = PUMP VOLUME + (TUBING CAPACITY X TUBING LEGNTH) + FLOW CELL VOLUME											
PUMP VOLUME		TUBING LEGNTH		FLOW CELL VOLUME				EQUIPMENT VOLUME			
INITIAL TUBING LEGNTH IN WELL (FEET)		FINAL TUBING LEGNTH IN WELL (FEET)		PURGE TIME START	1250	PURGE TIME END	1301	TOTAL PURGED	1.10		
INST. ID					SAL-SAM-63-4	SAL-SAM-65-4	SAL-SAM-63-4	SAL-SAM-55-3	SAL-SAM-2		
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) ($\Delta < 0.2$)	TEMP (oC) ($\Delta < 0.2$)	SP COND (uS/cm) ($\Delta < 5\%$)	DO (mg/L) (% SAT < 20)	TURBIDITY (NTUs) (< 20 NTU)	COLOR (Describe)	ODOR (Describe)
1255	0.50	0.50	0.10	N/A	5.1	26.8	252.1	0.71	635.0	Brown	None
1258	0.30	0.80			5.1	26.6	251.8	0.79	397.0		
1301	0.30	1.10			5.1	26.6	251.9	0.59	260.0		
Well Capacity (gallons/foot): 0.75"=0.02, 1.25"=0.06, 2"=0.16, 3"=0.37, 4"=0.65, 5"=1.02, 6"=1.47, 12"=5.88											
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016											

SAMPLING DATA

SAMPLED BY / COMPANY (PRINT)	SAL			SAMPLER(S) SIGNATURES:			
TUBING MATERIAL CODE (CIRCLE ONE)	PP PE NP <u>TL</u> TT	SAMPLE TUBING LEGNTH IN WELL (FEET)			SAMPLE PUMP FLOW RATE (mL/min)		
SAMPLING INITIATED	1302	SAMPLING ENDED	1302	FIELD CLEANED	Y <u>N</u>	CLEANING STEPS	
FIELD FILTERED?	Y <u>N</u>	FILTER SIZE (um)		DUPLICATE	Y <u>N</u>	VOC COLLECTED BY REVERSE FLOW?	Y N <u>N/A</u>
PRESERVATION CHECKED IN FIELD?	Y N <u>N/A</u>	LIST PRESERVATIVES ADDED				SEMI-VOLS COLLECTED THROUGH TRAP?	Y N <u>N/A</u>
WEATHER CONDITIONS	clear						
COMMENTS							
PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump							
TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon							
Reviewed By:				Date:			

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

GROUNDWATER SAMPLING LOG

Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
				Phone:	813-630-4498
Date Sampled:	062711	SAL Project #	1105413	Project Name	GCREC Mound Groundwater Analyses
Well Number:	PZ23-D09-27 <i>EQ Black</i>	Sample ID	97	GPS LAT	
				GPS LONG	

PZ23

PURGING DATA

WELL DIAMETER (Inches)	0.75	WELL CAPACITY (gal/ft)	0.02	Screen Interval (Feet)	UNK	To	UNK	Static Depth to Water (Feet)	12.71	PURGE PUMP CODE	(PP) GP IBP
TOTAL WELL DEPTH (Feet)	13.60	REFERENCE ELEVATION (NGVD)		GROUND WATER ELEVATION (REFERENCE-STATIC)				TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Technique: q Submerged Screen (1,1/4,1/4 Well) q Submerged Screen (1EQ Volume, 3, 3 Minutes) q Partially Submerged Screen (1 Well, 3,3 minutes)											
WELL VOLUME = (TOTAL DEPTH - STATIC DEPTH) x WELL CAPACITY =											
ONE WELL VOLUME	0.0173	1/4 WELL VOLUME	0.0045	3 WELL VOLUMES				5 WELL VOLUMES			
EQUIPMENT VOLUME = PUMP VOLUME + (TUBING CAPACITY X TUBING LEGNTH) + FLOW CELL VOLUME											
PUMP VOLUME		TUBING LEGNTH		FLOW CELL VOLUME				EQUIPMEN T VOLUME			
INITIAL TUBING LEGNTH IN WELL (FEET)		FINAL TUBING LEGNTH IN WELL (FEET)		PURGE TIME START	1320	PURGE TIME END		TOTAL PURGED			
INST. ID					SAL-SAM-63-4	SAL-SAM-65-4	SAL-SAM-63-	SAL-SAM-55-	SAL-SAM-0		
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ < 0.2)	TEMP (oC) (Δ < 0.2)	SP COND (uS/cm) (Δ < 5%)	DO (mg/L) (% SAT < 20)	TURBIDITY (NTUs) (< 20 NTU)	COLOR (Describe)	ODOR (Describe)
1323	0.30	0.30	0.10								
1326	0.30	0.60	1								
1329	0.30	0.90	1								
Well Capacity (gallons/foot): 0.75"=0.02, 1.25"=0.06, 2"=0.16, 3"=0.37, 4"=0.65, 5"=1.02, 6"=1.47, 12"=5.88											
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016											

SAMPLING DATA

SAMPLED BY / COMPANY (PRINT)	SAL				SAMPLER(S) SIGNATURES:					
TUBING MATERIAL CODE (CIRCLE ONE)	PP PE NP TL TT	SAMPLE TUBING LEGNTH IN WELL (FEET)				SAMPLE PUMP FLOW RATE (mL/min)				
SAMPLING INITIATED	N/A	SAMPLING ENDED	N/A	FIELD CLEANED	Y N	CLEANING STEPS				
FIELD FILTERED?	Y N	FILTER SIZE (μm)		DUPLICATE	Y N	VOC COLLECTED BY REVERSE FLOW?	Y N N/A	SEMI-VOLS COLLECTED THROUGH TRAP?	Y N N/A	
PRESERVATION CHECKED IN FIELD?	Y N N/A	LIST PRESERVATIVES ADDED								
WEATHER CONDITIONS	☀									
COMMENTS	Dry would not recover									
PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump										
TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon										
Reviewed By:						Date:				

SOUTHERN ANALYTICAL LABORATORIES, INC.

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

GROUNDWATER SAMPLING LOG

Client Name:	Hazen and Sawyer	Location:		Contact:	Josefin Edeback-Hurst, PE
				Phone:	813-630-4498
Date Sampled:	062711	SAL Project #	1105413	Project Name	GCREC Mound Groundwater Analyses
Well Number	PZ11-E09-10	Sample ID	87	GPS LAT	
				GPS LONG	

PURGING DATA

WELL DIAMETER (Inches)	0.75	WELL CAPACITY (gal/ft)	0.02	Screen Interval (Feet)	UNK	To	UNK	Static Depth to Water (Feet)	4.35	PURGE PUMP CODE	(PP) GP IBP
TOTAL WELL DEPTH (Feet)	9.9	REFERENCE ELEVATION (NGVD)		GROUND WATER ELEVATION (REFERENCE-STATIC)				TUBING DIAMETER (Inches)		TUBING CAPACITY (gal/ft)	
Purge Technique: q Submerged Screen (1,1/4,1/4 Well) q Submerged Screen (1EQ Volume, 3, 3 Minutes) q Partially Submerged Screen (1 Well, 3,3 minutes)											
WELL VOLUME = (TOTAL DEPTH - STATIC DEPTH) x WELL CAPACITY =											
ONE WELL VOLUME	0.111	1/4 WELL VOLUME	0.02	3 WELL VOLUMES				5 WELL VOLUMES			
EQUIPMENT VOLUME = PUMP VOLUME + (TUBING CAPACITY X TUBING LEGNTH) + FLOW CELL VOLUME											
PUMP VOLUME		TUBING LEGNTH		FLOW CELL VOLUME				EQUIPMEN T VOLUME			
INITIAL TUBING LEGNTH IN WELL (FEET)		FINAL TUBING LEGNTH IN WELL (FEET)		PURGE TIME START	1050	PURGE TIME END	1059	TOTAL PURGED	0.90		
INST. ID					SAL-SAM-63-4	SAL-SAM-65-4	SAL-SAM-63-4	SAL-SAM-55-3	SAL-SAM-02		
TIME	VOLUME PURGED (Gallons)	TOTAL VOLUME PURGED (Gallons)	PURGE RATE (gpm)	Depth to Water (Feet)	pH (SU) (Δ <0.2)	TEMP (oC) (Δ <0.2)	SP COND (uS/cm) (Δ <5%)	DO (mg/L) (% SAT <20)	TURBIDITY (NTUs) (<20 NTU)	COLOR (Describe)	ODOR (Describe)
1053	0.30	0.30	0.10	N/A	5.3	27.6	451.6	1.92	9.36	clear	new
1056	0.30	0.60	1	1	5.3	27.6	452.7	1.81	9.61	1	1
1059	0.30	0.90	1	1	5.3	27.6	453.9	1.77	8.77	1	1
Well Capacity (gallons/foot): 0.75"=0.02, 1.25"=0.06, 2"=0.16, 3"=0.37, 4"=0.65, 5"=1.02, 6"=1.47, 12"=5.88											
TUBING INSIDE DIA. CAPACITY (Gal./Ft.): 1/8" = 0.0006; 3/16" = 0.0014; 1/4" = 0.0026; 5/16" = 0.004; 3/8" = 0.006; 1/2" = 0.010; 5/8" = 0.016											

SAMPLING DATA

SAMPLED BY / COMPANY (PRINT)	SAL	SAMPLER(S) SIGNATURES:	
TUBING MATERIAL CODE (CIRCLE ONE)	PP PE NP <u>TL</u> TT	SAMPLE TUBING LEGNTH IN WELL (FEET)	SAMPLE PUMP FLOW RATE (mL/min)
SAMPLING INITIATED	1100	SAMPLING ENDED	1100
FIELD FILTERED?	Y <u>(N)</u>	FILTER SIZE (μm)	
		FIELD CLEANED	Y <u>(N)</u>
		DUPLICATE	Y <u>(N)</u>
PRESERVATION CHECKED IN FIELD?	Y <u>(N)</u> N/A	LIST PRESERVATIVES ADDED	
WEATHER CONDITIONS	clear		
COMMENTS			
PUMP CODES: PP=Peristaltic Pump, GP= Submersible Grundfos Pump, IBP= In-place Bladder Pump			
TUBING MATERIAL CODES: PP= Polypropylene, PE= Polyethylene, NP= Non-inert Plastic, TL= Teflon Lined, TT= Teflon			
Reviewed By:		Date:	

Appendix E: Field Parameter Analyses

Table E.1
Field Parameter Results
(June 27 – June 29, 2011)

	Sample Identification	Temperature (°C)	pH	Specific Conductance (µS)	Dissolved Oxygen (mg/L)
1	STE-EX Pump Tank	31.0	6.6	875	0.1
2	PZ03-H11-6	28.4	4.5	165	3.0
3	PZ04-BKG-9	25.9	5.6	100	4.3
4	PZ07-D05-7	27.3	4.7	288	2.5
5	PZ11-E09-10	27.6	5.3	454	1.8
6	PZ11-E09-10-D	27.6	5.3	454	1.8
7	PZ15-A11-6	29.2	5.3	195	3.1
8	PZ16-C12-28	25.1	5.5	306	0.5
9	PZ17-I15-26	25.4	4.9	307	1.6
10	PZ18-R12-26	26.6	5.1	252	0.6
11	PZ19-G10-26	23.9	5.0	294	0.7
12	PZ20-G10-15	25.7	5.3	300	2.6
13	PZ21-E11-26	24.8	4.9	288	0.9
14	PZ24-BKG-26	24.4	4.9	296	0.7
15	DP-AA9-14	24.5	4.6	752	1.3
16	DP-AA9-22	24.7	5.2	279	0.3
17	DP-AA9-27	24.7	5.1	295	0.7
18	DP-C11-8	27.8	5.8	385	3.1
19	DP-D07-5	Dry	Dry	Dry	Dry
20	DP-D07-9	24.4	4.0	539	1.9
21	DP-D08-9	27.4	5.3	411	1.8
22	DP-D09-8	27.0	4.4	670	1.1
23	DP-D09-15	26.2	5.1	461	0.9
24	DP-D11-11	26.3	5.2	464	1.1
25	DP-D12-11	26.2	4.9	487	0.3

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	Sample Identification	Temperature (°C)	pH	Specific Conductance (µS)	Dissolved Oxygen (mg/L)
26	DP-D7.5-14	24.4	4.5	483	0.4
27	DP-E04-8	26.0	4.7	185	1.6
28	DP-E07-10	25.5	4.5	245	0.2
29	DP-E08-8	25.8	4.5	348	0.3
30	DP-E11-12	24.9	5.0	489	0.3
31	DP-E12-10	25.1	4.9	502	0.3
32	DP-E12-15	24.7	5.2	462	0.4
33	DP-E12-22	24.2	4.8	328	0.4
34	DP-E12-22-D	24.2	4.8	328	0.4
35	DP-E12-28	24.2	4.8	320	0.3
36	DP-F04-17	25.1	6.1	374	0.3
37	DP-F04-32	24.6	6.1	335	0.3
38	DP-F05-5	Dry	Dry	Dry	Dry
39	DP-F08-20	24.2	5.3	347	0.5
40	DP-F08-28	24.3	5.4	324	0.3
41	DP-F10-11	25.3	4.9	492	0.4
42	DP-F11-11	26.0	4.8	447	0.3
43	DP-F11-15	24.6	4.7	487	0.2
44	DP-F11-18	24.5	5.0	354	0.3
45	DP-F11-21	24.4	4.9	310	0.4
46	DP-F11-24	24.4	4.8	610	0.2
47	DP-F11-27	24.3	4.9	331	0.2
48	DP-F12-10	25.3	4.3	500	0.2
49	DP-F15-14	24.2	4.5	487	0.3
50	DP-F15-20	24.4	4.6	359	0.3
51	DP-F15-26	24.2	4.3	320	0.2
52	DP-G07-13	29.9	5.4	255	3.1
53	DP-G07-15	25.6	5.0	296	0.8
54	DP-G07-17	24.5	5.0	337	0.8
55	DP-G07-21	24.8	5.1	333	1.3
56	DP-G07-24	24.6	4.9	286	0.6
57	DP-G07-27	25.0	5.0	325	1.8
58	DP-G08-5	Dry	Dry	Dry	Dry

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	Sample Identification	Temperature (°C)	pH	Specific Conductance (µS)	Dissolved Oxygen (mg/L)
59	DP-G09-11	27.9	5.4	279	2.9
60	DP-G11-8	27.6	4.6	312	1.1
61	DP-G12-9	26.5	4.2	359	0.2
62	DP-G12-15	25.2	4.7	478	0.2
63	DP-G12-18	24.6	4.8	443	0.2
64	DP-G12-21	24.4	4.9	361	0.1
65	DP-G12-24	24.3	4.8	346	0.1
66	DP-G12-27	24.8	4.8	334	0.2
67	DP-H06-7	30.2	5.9	164	4.7
68	DP-H09-12	25.8	5.0	274	0.8
69	DP-H10-11	28.5	5.6	229	5.1
70	DP-I06-14	24.4	4.7	218	0.3
71	DP-I06-20	24.1	4.9	368	0.3
72	DP-I06-26	24.2	5.0	312	0.3
73	DP-I12-6	26.6	4.7	138	0.4
74	DP-J08-6	27.3	5.9	183	3.1
75	DP-J09-12	25.7	4.8	189	0.4
76	DP-J09-14	24.8	4.5	249	0.3
77	DP-J09-20	24.1	4.7	368	0.2
78	DP-J09-26	24.0	4.5	306	0.2
79	DP-J12-13	24.9	4.6	249	0.3
80	DP-J12-15	24.7	4.6	287	0.3
81	DP-J12-20	24.5	4.9	356	0.4
82	DP-J12-27	24.4	4.7	310	0.2
83	DP-K10-7	27.4	5.1	176	1.3
84	DP-K12-5	27.5	4.7	80	0.7
85	DP-M07-21	24.5	4.9	366	0.3
86	DP-M07-27	24.3	5.0	303	0.2
87	DP-M12-10	27.0	5.1	177	0.8
88	DP-N12-14	25.4	4.4	177	0.2
89	DP-N12-18	25.2	4.7	247	0.3
90	DP-N12-21	24.9	4.8	309	0.2
91	DP-N12-24	24.7	4.6	354	0.1

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	Sample Identification	Temperature (°C)	pH	Specific Conductance (µS)	Dissolved Oxygen (mg/L)
92	DP-N12-27	24.6	4.7	365	0.1
93	DP-N12-27-D	24.6	4.7	365	0.1
94	DP-O10-18	25.1	4.9	335	0.7
95	DP-O10-24	24.7	4.7	366	0.3
96	DP-Q15-21	25.2	4.8	358	0.3
97	DP-Q15-26	25.3	4.8	385	0.4
98	Equipment Rinsate	28.8	6.8	10	4.9