



Florida Onsite Sewage Nitrogen Reduction Strategies Study

Task B.7

B-HS7 Field System Monitoring Report No. 5

Progress Report

September 2014

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In association with:



AET
Applied Environmental Technology

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TASK B.7 PROGRESS REPORT

B-HS7 Field System Monitoring Report No. 5

Prepared for:

Florida Department of Health
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1.0 Background

Task B of the Florida Onsite Sewage Nitrogen Reduction Strategies Study (FOSNRS) includes performing field experiments to critically evaluate the performance of nitrogen removal technologies that were identified in FOSNRS Task A.9 and pilot tested in Task A.26. To meet this objective, full scale treatment systems are being installed at various residential sites in Florida and monitored over an extended timeframe under actual onsite conditions. The Task B Quality Assurance Project Plan (Task B.5) documents the objectives, monitoring framework, sample frequency and duration, and analytical methods to be used at the home sites. This report documents the fifth sample event of the passive nitrogen reduction system at a home site B-HS7 in Marion County, Florida.

2.0 Purpose

This monitoring report documents data collected from the fifth B-HS7 monitoring and sampling event conducted on August 20, 2014 (Experimental Day 274). This monitoring event consisted of conducting flow measurements from the household water use meter and the treatment system internal water meters, recording electricity use, monitoring of field parameters, collection of water samples from sixteen points in the treatment system, and chemical analyses of water samples by a NELAC certified laboratory.

3.0 Materials and Methods

3.1 Project Site

The B-HS7 field site is located in Marion County, FL. The nitrogen reducing onsite treatment system for the single family residence was installed in November 2013. Design and construction details were presented previously in the Task B.6 document. Figure 1 is a system schematic showing the system components and layout of the installation. A flow schematic of the system is shown in Figure 2. The B-HS7 system consists of a 300 gallon concrete pump tank, low-pressure distribution network, and an in-ground Stage 1 nitrification biofilter directly over a lined Stage 2 denitrification biofilter. The existing 900 gallon dual chamber septic tank will continue to provide primary

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treatment for the new PNRS system. The treated effluent is discharged into the soil around the perimeter of the liner. There were no changes to the physical configuration of the treatment system or system operation since the last monitoring report.

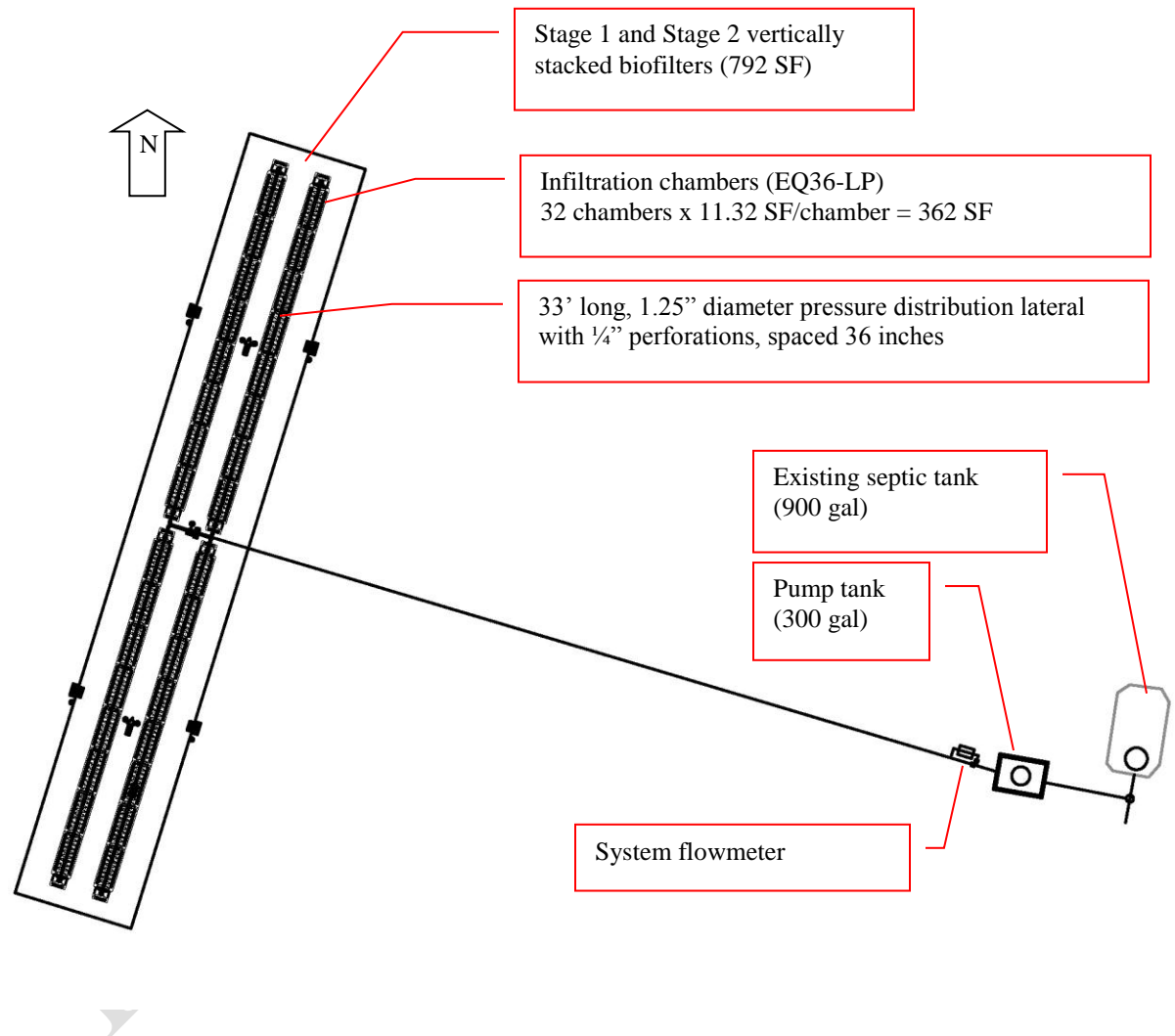


Figure 1
Plan view of B-HS7 System Layout

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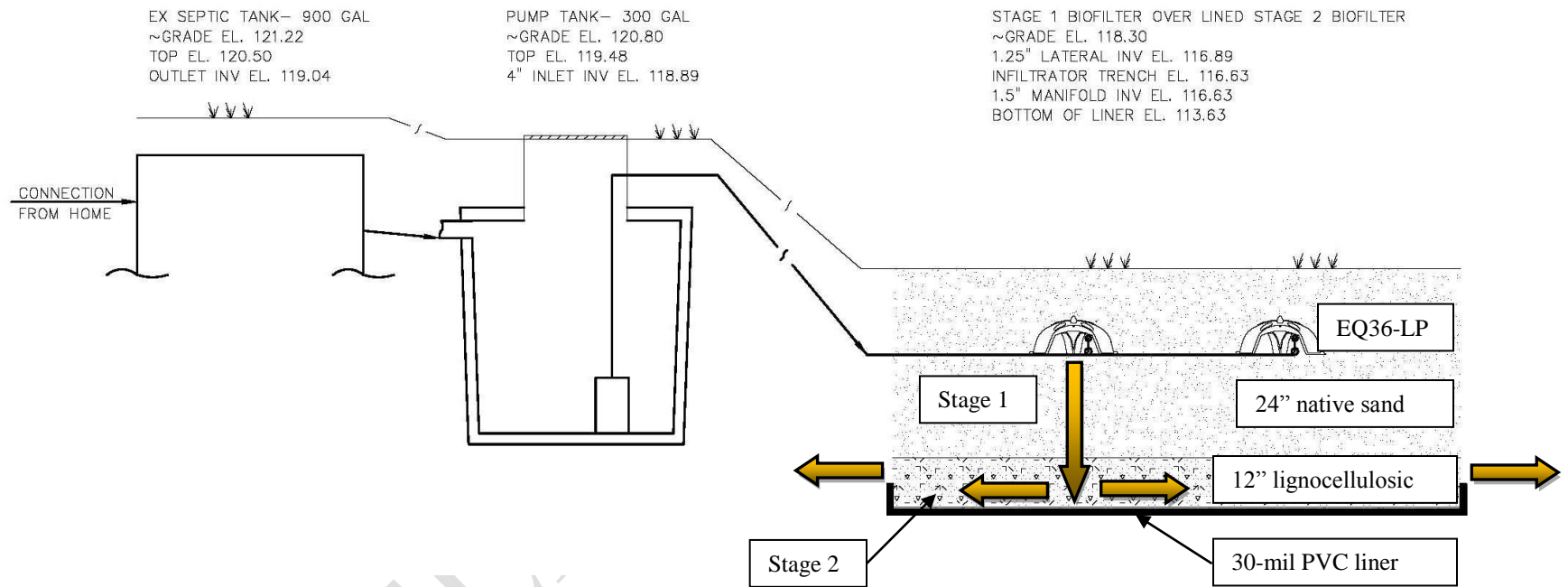


Figure 2
Flow Schematic of B-HS7 PNRS Installed in Marion County

3.3 Monitoring and Sample Locations and Identification

The monitoring points are shown in Figure 3. The monitoring points used for treatment evaluation are shown on a cross section in the southwest side of the treatment area on Figure 4.

PRELIMINARY

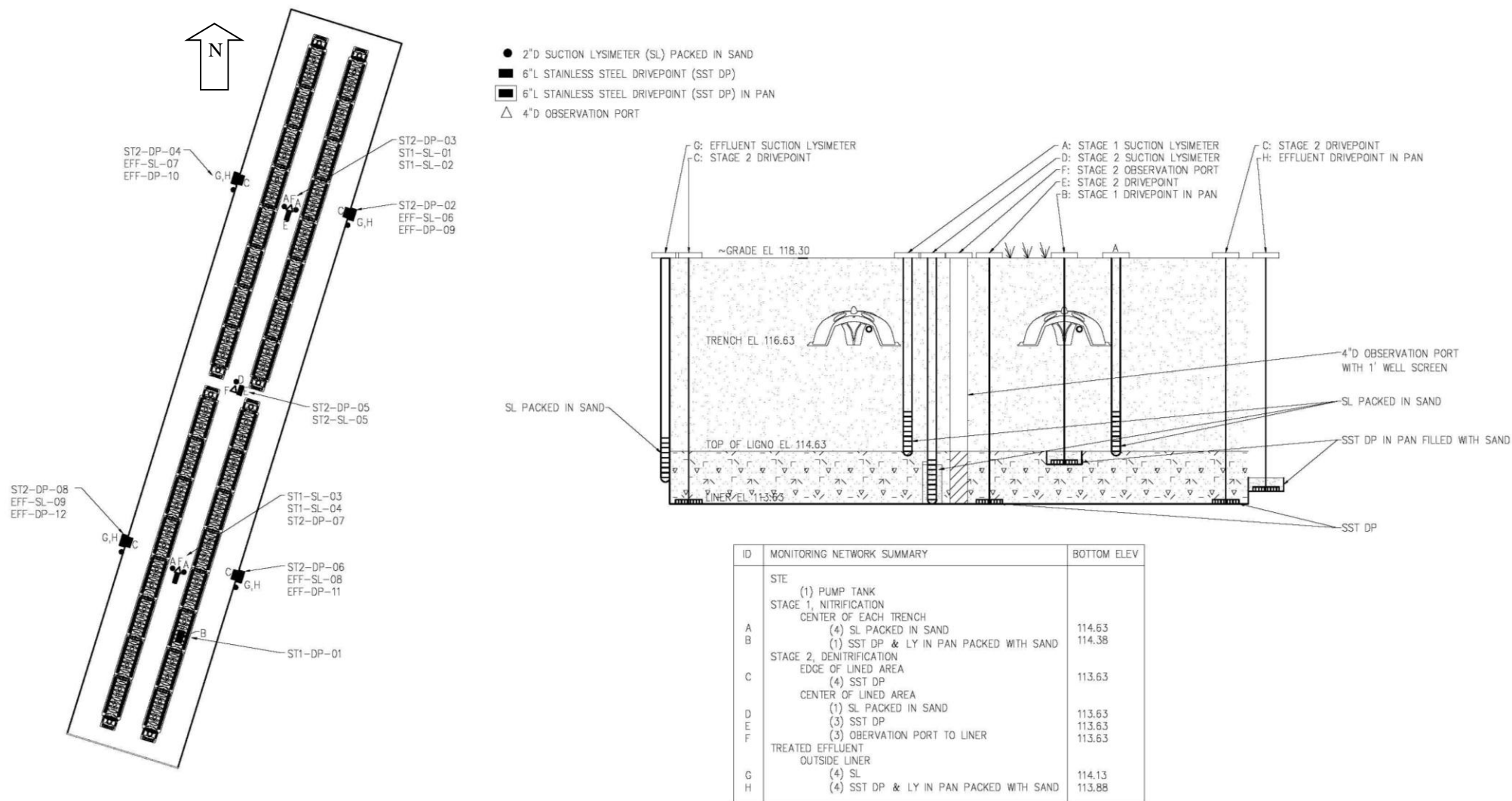


Figure 3
B-HS7 Sample and Monitoring Locations

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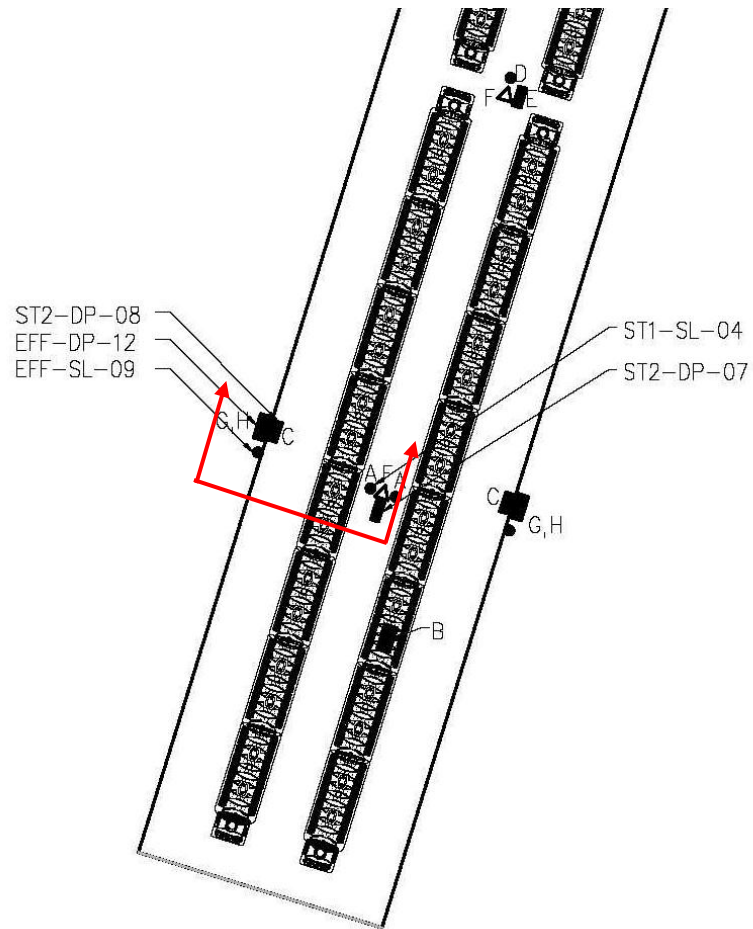


Figure 4
B-HS7 Treatment Evaluation Cross Section

Primary Effluent: Household wastewater enters the 1st chamber of the primary tank and exits the second chamber as septic tank effluent (STE) through an effluent screen. Screened effluent is directed to the pump tank which contains the pump and float switches. The first monitoring point, B-HS7-STE, is the STE sampled approximately 1.5 feet below the surface of the pump tank (Figure 5). Samples from monitoring point B-HS7-STE are the whole household wastewater after it has had some residence time in the primary tank.

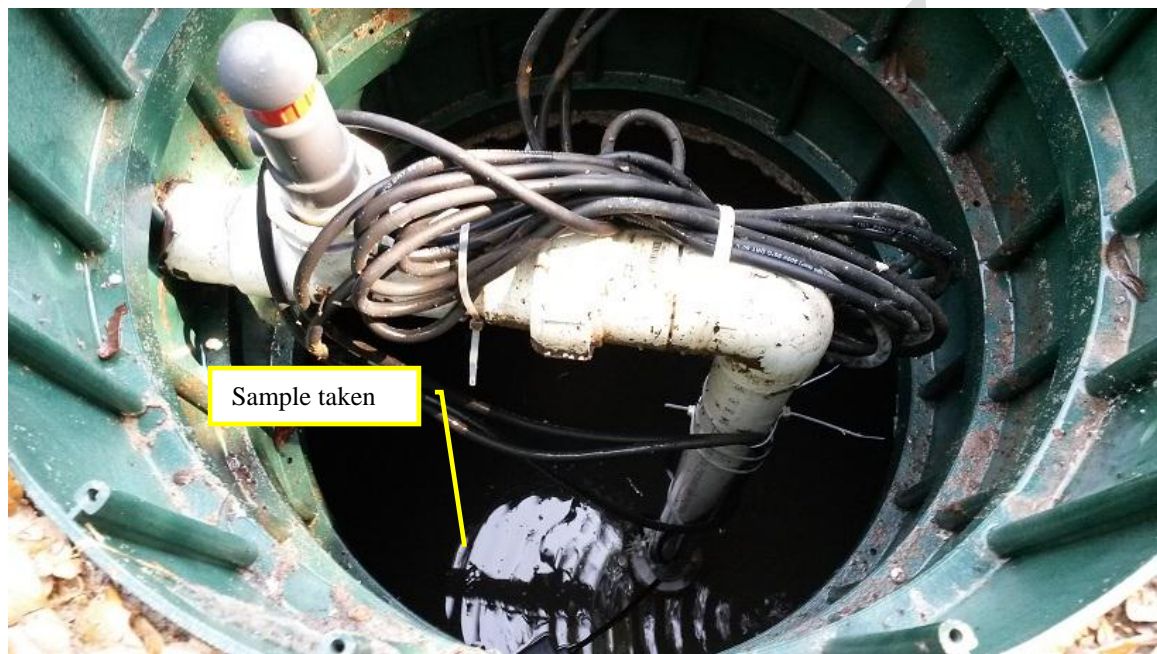


Figure 5
Pump Tank (B-HS7-STE sample)

Stage 1 Effluent: STE in the pump tank is discharged through a low-pressure distribution network installed inside Infiltrator EQ36-LP™ chambers. The low-pressure distribution network consists of a central manifold design with (4) 33-foot long, 1.25-inch diameter perforated laterals installed along the top of the 24-inch native sand media (unsaturated Stage 1 biofilter). In the Stage 1 biofilter, wastewater percolates downward through the unsaturated native sand media where nitrification occurs. Ceramic cup suction lysimeters (BHS7-ST1-SL-01, BHS7-ST1-SL-02, BHS7-ST1-SL-03, and BHS7-ST1-SL-04) were installed with the cup at the bottom of the native sand layer to represent water quality after downward passage through the sand layer (see Figure 6). In addition, one stainless steel drivepoint (BHS7-ST1-DP-01) was installed in a shallow pan at the bottom of the native sand layer (see Figure 7). However, during this sample

event the drivepoint did not produce any sample (dry). The Stage 1 monitoring point in the treatment evaluation cross section is BHS7-ST1-SL-04, which is located in the center of the south end of the lined area.



Figure 6
Stage 1 biofilter effluent sample taken from suction lysimeter (BHS7-ST1-SL samples)

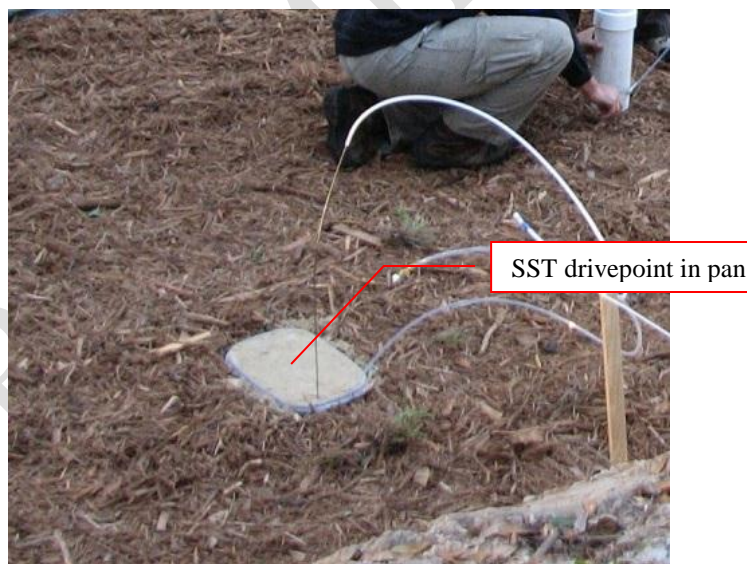


Figure 7
Stage 1 biofilter effluent sample taken from drivepoint in pan (BHS7-ST1-DP-01 sample)

Stage 2 Effluent: Directly below the 24-inch native sand Stage 1 biofilter is a 12-inch layer of lignocellulosic media as a supplemental carbon source for denitrification (Stage 2 biofilter), a blended urban waste wood from Wood Resource Recovery, Ocala, FL. The new Stage 2 biofilter treatment area was prepared with a 30 mil PVC liner installed below the lignocellulosic media. The liner was installed with a 6 inch lip around the outside perimeter. Therefore, approximately 6-inches of the lignocellulosic media is saturated, promoting oxygen depletion and denitrification of the nitrified effluent. At the bottom of the Stage 2 biofilter lignocellulosic media, directly above the liner, stainless steel drivepoint samplers were installed (see Figure 8) including: BHS7-ST2-DP-02, BHS7-ST2-DP-03, BHS7-ST2-DP-04, BHS7-ST2-DP-05, BHS7-ST2-DP-06, BHS7-ST2-DP-07, and BHS7-ST2-DP-08. The Stage 2 monitoring points in the treatment evaluation cross section are BHS7-ST2-DP-07 (which is located in the center of the south end of the lined area) and BHS7-ST2-DP-08 (which is located on the southwest edge of the lined area).



Figure 8

Stage 2 biofilter effluent sample taken from drivepoint (BHS7-ST2-DP samples)

Perimeter Monitoring Points: The treated effluent is discharged by flowing over the lip of the liner and into the soil surrounding the perimeter of the lined area. Ceramic cup suction lysimeters (BHS7-EFF-SL-06, BHS7-EFF-SL-07, BHS7-EFF-SL-08, and BHS7-EFF-SL-09) were installed around the perimeter of the liner, with the bottom of the cup approximately 6-inches below the lip of the liner within the native sand (see Figure 9) to represent treated effluent. In addition, stainless steel drivepoints (BHS7-EFF-DP-09, BHS7-EFF-DP-10, BHS7-EFF-DP-11, BHS7-EFF-DP-12) were installed in shallow pans adjacent to the lip of the liner (see Figure 10). The treated effluent monitoring points in the treatment evaluation cross section are BHS7-EFF-SL-09 and BHS7-EFF-DP-12, which are located adjacent to the southwest lined area.

Suction lysimeter installed in native sand outside lined area



Figure 9

Treated effluent sample taken from suction lysimeter (BHS7-EFF-SL samples)

SST drivepoint in pan installed adjacent to liner lip



Figure 10

Treated effluent sample taken from drivepoint in pan (BHS7-EFF-DP samples)

3.4 Operational Monitoring

Start-up of the system occurred on November 19, 2013 (Experimental Day 0). However, during the Thanksgiving holiday, the homeowners projected having between thirty and forty additional people staying at the home. Therefore, since this was so soon after start-up, on November 26, 2013, the Bull Run™ diversion valve was flipped so that all the wastewater flow was diverted to the old drainfield. The diversion valve was flipped back to the PNRS system on December 2, 2014. Shortly thereafter, the homeowners planned a holiday party with a projected eighty people in attendance. Therefore on December 6, 2013, the diversion valve was flipped again so that all the wastewater flow was diverted to the old drainfield. The diversion valve was flipped back to the PNRS system on December 9, 2013, and the PNRS system has operated continually since that date.

During the monthly site visit prior to this sample event, it was observed that the power breaker to the system had been flipped. This was likely due to a severe thunderstorm. With no power to the system, the pump had not run for several days, and the water elevation within the primary tank and pump tank was very high. Upon further inspection, the breaker that was installed within the panel was a GFI breaker. The contractor was contacted and came to the site later in the week to install a non-GFI breaker for the pump.

The fifth formal sampling event was conducted August 20, 2014 (Experimental Day 274). For this fifth formal sampling event, the water meter for the house and treatment system flow meters were read and recorded on August 20, 2014. The household water meter is located on the potable water line from the onsite well prior to entering the household plumbing. The water meter does not include the irrigation water use. Therefore, the water meter reading should be indicative of the wastewater flow to the system.

The PNRS treatment system flow meter (Figure 11) is located on the pump tank discharge line and records the cumulative flow in gallons pumped from the pump chamber to the low-pressure distribution network.

Three observation ports are installed along the centerline of the Stage 2 biofilter lined area (north, center and south). The observation ports are 4-inch diameter well screens that were installed with the bottom positioned on the liner. Therefore, the water level within the lined area is able to be monitored within the observation ports.



Figure 11
PNRS system flow meter

3.5 Energy Consumption

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

3.6 Water Quality Sample Collection and Analyses

The fifth formal sample event (Sample Event No. 5), which is the subject of this report, was conducted on August 20, 2014 (Experimental Day 274). A full suite of influent, intermediate and effluent water quality samples were collected from the system for water quality analysis. Samples were collected at each of the monitoring points described in Section 3.2. A peristaltic pump was used to collect samples and route them directly into analysis-specific containers after sufficient flushing of the tubing had occurred. Field parameters were then recorded.

In addition, field blank (B-HS7-FB) sample was taken. The field blank was collected by filling sample containers with deionized water that had been transported into the field

along with other sample containers. This sample was then analyzed for the same parameters as the monitoring samples.

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

Field parameters were measured using portable electronic probes and included temperature (Temp), dissolved oxygen (DO), oxidation-reduction potential (ORP), pH, and specific conductance. The field parameters were measured by placing the analytical probes in a container overflowing with sample water. The influent, intermediate, and effluent samples were analyzed by the laboratory for: total alkalinity, chemical oxygen demand (COD), total Kjeldahl nitrogen (TKN-N), ammonia nitrogen (NH₃-N), nitrate nitrogen (NO₃-N), nitrite nitrogen (NO₂-N), total phosphorus (TP), orthophosphate (Ortho P), total suspended solids (TSS), volatile suspended solids (VSS), total organic carbon (TOC), fecal coliform (fecal), and E.coli. All analyses were performed by independent and fully NELAC certified analytical laboratory (Southern Analytical Laboratory). Table 1 lists the analytical parameters, analytical methods, and detection limits for laboratory analyses.

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

| Analytical Parameter | Method of Analysis | Method Detection Limit (mg/L) |
|--|--------------------|-------------------------------|
| Total Alkalinity as CaCO ₃ | SM 2320B | 2 mg/L |
| Chemical Oxygen Demand (COD) | EPA 410.4 | 10 mg/L |
| Total Kjeldahl Nitrogen (TKN-N) | EPA 351.2 | 0.05 mg/L |
| Ammonia Nitrogen (NH ₃ -N) | EPA 350.1 | 0.005 mg/L |
| Nitrate Nitrogen (NO ₃ -N) | EPA 300.0 | 0.01 mg/L |
| Nitrite Nitrogen (NO ₂ -N) | EPA 300.0 | 0.01 mg/L |
| Nitrate+Nitrite Nitrogen (NOX-N) | EPA 300.0 | 0.02 mg/L |
| Total Phosphorus (TP) | SM 4500P-E | 0.01 mg/L |
| Orthophosphate as P (Ortho P) | EPA 300.0 | 0.01 mg/L |
| Carbonaceous Biological Oxygen Demand (CBOD ₅) | SM5210B | 2 mg/L |
| Total Suspended Solids (TSS) | SM 2540D | 1 mg/L |
| Volatile Suspended Solids (VSS) | SM 2540E | 1 mg/L |
| Chloride | EPA 300.0 | 0.50 mg/L |
| Fecal Coliform (fecal) | SM9222D | 2 ct/100mL |
| E.coli | SM9223B | 2 ct/100mL |

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4.0 Results and Discussion

4.1 Operational Monitoring

Table 2 provides a summary of the household water use since the household water meter installation on October 15, 2013. The treatment system flow meter readings for the B-HS7 field site are also summarized in Table 2. The operation and maintenance log which includes actions taken since start-up is provided in Appendix B.

Table 2
Summary of Flowmeters

| Date and Time Read | Household Water Meter Reading | Average Daily Household Flow between readings | PNRS Flow Meter Reading | Average Daily PNRS Flow between readings |
|---|-------------------------------|---|-----------------------------|--|
| | Cumulative Volume (gallons) | gallons/day | Cumulative Volume (gallons) | gallons/day |
| 10/15/2013 13:51 | 2.9 | XX | | |
| 10/23/2013 12:20 | 1,186.9 | 149.2 | | |
| 11/14/2013 8:50 | 3,602.5 | 110.5 | | |
| 11/15/2013 14:40 | 3,800.0 | 158.9 | | |
| 11/19/2013 14:18 | 4,997.5 | 300.5 | 652.0 | PNRS Start-up |
| 11/26/2013 10:30 | 7,901.4 | 424.4 | 2,480.0 | 267.2 |
| 12/2/2013 9:45 | 9,148.6 | 209.0 | 2,480.0 | 0.0 |
| 12/6/2013 9:00 | 10,470.4 | 333.1 | 3,134.0 | 164.8 |
| 12/10/2013 10:00 | 11,218.9 | Flow to PNRS | 3,302.0 | Flow to PNRS |
| 12/12/2013 9:00 | 11,519.1 | 153.3 | 3,635.0 | 170.0 |
| 1/3/2014 10:50 | 14,722.0 | 145.1 | 6,774.0 | 142.2 |
| 1/17/2014 10:00 | 16,940.8 | 158.9 | 8,621.0 | 132.3 |
| 1/20/2014 12:37 | 17,483.4 | 174.5 | 9,134.0 | 165.0 |
| 3/5/2014 12:00 | 26,166.5 | 197.5 | 11,575.0 | 55.5 |
| 3/13/2014 13:30 | 27,382.4 | 150.8 | 12,609.0 | 128.2 |
| 3/19/2014 11:30 | 28,122.6 | 125.1 | 13,167.5 | 94.4 |
| 3/20/2014 12:30 | 28,281.8 | 152.8 | 13,318.0 | 144.5 |
| 4/28/2014 10:05 | 34,294.9 | 154.6 | 18,259.0 | 127.0 |
| 5/8/2014 9:00 | 36,055.4 | 176.9 | 19,521.0 | 126.8 |
| 5/27/2014 11:00 | 39,320.1 | 171.1 | 22,272.0 | 144.2 |
| 6/19/2014 12:00 | 43,520.7 | 182.3 | 25,837.0 | 154.7 |
| 7/16/2014 9:45 | 47,666.8 | 154.1 | 26,991.0 | 42.9 |
| 8/20/2014 12:20 | 53,342.4 | 161.7 | 32,037.0 | 143.7 |
| Average since start-up to August 20, 2014 | | 166.4 | | 113.5 |

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As discussed in Section 3.4, there were two periods during the holidays when the wastewater was diverted to the old drainfield. Following these interruptions in flow, the household water use average was 166.4 gallons per day through June 19, 2014 with periods of higher and lower flows (Table 2). The average pumped flow to the PNRS system for the same time period was 113.5 gallons per day. The difference in flow is likely due to outdoor water use such as filling the pool, car washing, hose bibbs for hand watering the garden, etc. The irrigation system is not part of the metered flow.

An additional water input to consider for evaluation of the system treatment performance is precipitation. A weather station was installed at the site on the roof of the home on January 6, 2014. Data from this weather station is available from the homeowner. Recorded meteorological data is provided in Appendix C, Table C.1. Table 3 provides daily precipitation totals leading up to and during the sample event.

Table 3
Precipitation Data Daily Totals Measured
August 1, 2014 through August 20, 2014
Sample Event No. 5

| Date | Precipitation (inches) |
|-----------------|---------------------------|
| August 1, 2014 | 0.00 |
| August 2, 2014 | 0.06 |
| August 3, 2014 | 0.26 |
| August 4, 2014 | 0.00 |
| August 5, 2014 | 0.00 |
| August 6, 2014 | 0.00 |
| August 7, 2014 | 0.00 |
| August 8, 2014 | 0.59 |
| August 9, 2014 | 0.00 |
| August 10, 2014 | 0.35 |
| August 11, 2014 | 0.25 |
| August 12, 2014 | 0.43 |
| August 13, 2014 | 0.00 |
| August 14, 2014 | 0.61 |
| August 15, 2014 | 0.01 |
| August 16, 2014 | 0.01 |
| August 17, 2014 | 0.01 |
| August 18, 2014 | 0.00 |
| August 19, 2014 | 0.00 |
| August 20, 2014 | 0.00 |

As discussed in Section 3.4, three observation ports are installed along the centerline of the Stage 2 biofilter lined area (north, center and south). The observation port measurements are summarized in Table 4 which indicate that the monitored liner water level is continuously below the overflow elevation (114.03 ft). During this sample event, the water elevation ranged between 5.3 and 5.4 inches below the overflow elevation.

Table 4
Liner Water Level within Observation Ports

| Date Read | North Observation Port water elevation | | Center Observation Port water elevation | | South Observation Port water elevation | | Range |
|------------|--|------------------------------------|---|------------------------------------|--|------------------------------------|---------|
| | Water elevation (ft) | Depth below overflow (in) | Water elevation (ft) | Depth below overflow (in) | Water elevation (ft) | Depth below overflow (in) | |
| 11/26/2014 | 113.65 | 4.6 | 113.70 | 4.0 | 113.69 | 4.1 | 4.0-4.6 |
| 12/2/2014 | 113.60 | 5.2 | 113.63 | 4.8 | 113.59 | 5.3 | 4.8-5.3 |
| 12/6/2014 | 113.64 | 4.7 | 113.67 | 4.3 | 113.64 | 4.7 | 4.3-4.7 |
| 12/12/2014 | 113.65 | 4.5 | 113.67 | 4.4 | 113.59 | 5.3 | 4.4-5.3 |
| 1/3/2014 | 113.67 | 4.3 | 113.69 | 4.1 | 113.61 | 5.0 | 4.1-5.0 |
| 1/17/2014 | 113.67 | 4.3 | 113.73 | 3.6 | 113.65 | 4.5 | 3.6-4.5 |
| 3/20/2014 | 113.67 | 4.3 | 113.73 | 3.6 | 113.76 | 3.3 | 3.3-4.3 |
| 4/28/2014 | 113.72 | 3.8 | 113.69 | 4.1 | 113.69 | 4.0 | 3.8-4.1 |
| 5/8/2014 | 113.74 | 3.5 | 113.73 | 3.6 | 113.69 | 4.0 | 3.5-4.0 |
| 5/27/2014 | 113.67 | 4.3 | 113.73 | 3.6 | 113.69 | 4.0 | 3.6-4.3 |
| 6/18/2014 | 113.69 | 4.0 | 113.69 | 4.1 | 113.65 | 4.5 | 4.0-4.5 |
| 6/19/2014 | 113.67 | 4.3 | 113.67 | 4.4 | 113.63 | 4.8 | 4.3-4.8 |
| 7/16/2014 | 113.74 | 3.5 | 113.71 | 3.9 | 113.65 | 4.5 | 3.5-4.5 |
| 8/19/2020 | 113.59 | 5.3 | 113.58 | 5.4 | 113.59 | 5.3 | 5.3-5.4 |

Overflow elevation is 114.03 ft which is 6 inches above the liner.

4.2 Energy Consumption

Energy consumption is monitored using an electrical meter installed between the main power box for the house and the control panel to record cumulative power usage of the pump in kilowatt-hours. The recorded electrical use for the system is summarized in Table 5.

Table 5
Summary of System Electrical Use

| Date and Time Read | Electrical Meter Reading | Average Daily Electrical Use | Average Electrical Use per Gallon Treated |
|-----------------------------------|--------------------------|------------------------------|---|
| | Cumulative (kWh) | (kWh/day) | (kWh/ 1000 gal) |
| 11/19/2013 14:18 | 0.2 | 0.03 | PNRS Start-up |
| 11/26/2013 10:30 | 0.6 | 0.06 | 0.219 |
| 12/2/2013 9:45 | 0.6 | 0.00 | No flow |
| 12/6/2013 9:00 | 0.8 | 0.05 | 0.306 |
| 12/10/2013 10:00 | 0.8 | 0.00 | 0.000 |
| 12/12/2013 9:00 | 0.9 | 0.05 | 0.300 |
| 1/3/2014 10:50 | 1.7 | 0.04 | 0.255 |
| 1/17/2014 10:00 | 2.3 | 0.04 | 0.325 |
| 1/20/2014 12:37 | 2.4 | 0.03 | 0.195 |
| 3/5/2014 12:00 | 3.1 | 0.02 | 0.287 |
| 3/13/2014 13:30 | 3.5 | 0.05 | 0.387 |
| 3/19/2014 11:30 | 3.7 | 0.03 | 0.358 |
| 3/20/2014 12:30 | 3.7 | 0.00 | 0.000 |
| 4/28/2014 10:05 | 5.5 | 0.05 | 0.364 |
| 5/8/2014 9:00 | 6.0 | 0.05 | 0.396 |
| 5/27/2014 11:00 | 6.9 | 0.05 | 0.327 |
| 6/19/2014 12:00 | 8.0 | 0.05 | 0.309 |
| 7/16/2014 9:45 | 8.1 | 0.00 | 0.087 |
| 8/20/2014 12:20 | 9.6 | 0.04 | 0.297 |
| Total average start-up to 8/20/14 | | 0.03 | 0.262 |

The total average electrical use through August 20, 2014 was 0.03 kWh per day. The average electrical use per 1,000 gallons treated since start-up was 0.262 kWh per 1,000 gallons treated, and this parameter has been fairly stable since start-up.

4.3 Water Quality

Water quality results for the fifth sampling event (Sample Event No. 5) are listed in Table 6. A summary of the water quality data collected for the test system since start-up is presented in Table 7. Nitrogen results for the treatment evaluation cross section displayed in Figure 4 are graphically displayed in Figure 13. The laboratory report containing the raw analytical data is included in Appendix A. The following discussion summarizes the water quality analytical results for Sample Event No. 5. The

performance of the various system components was compared by considering the changes through treatment of nitrogen species (TKN, $\text{NH}_3\text{-N}$, and $\text{NO}_x\text{-N}$), as well as supporting water quality parameters.

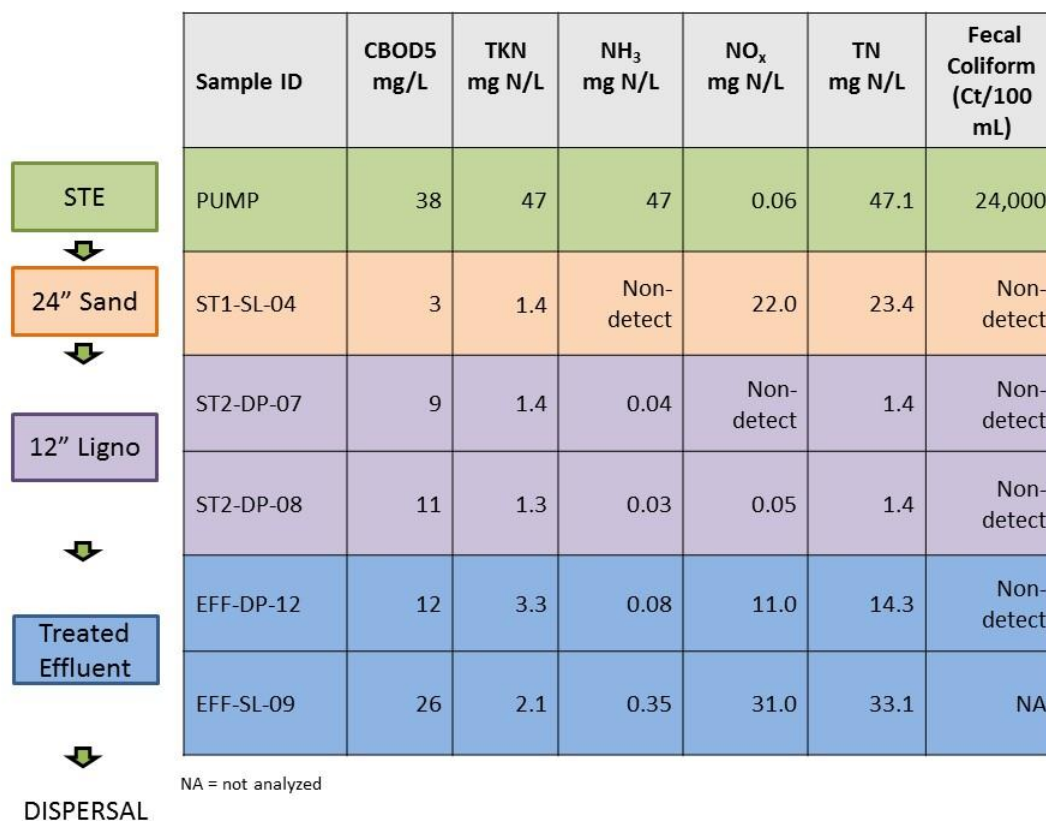


Figure 13
Graphical Representation of Nitrogen Results

Septic Tank Effluent (STE) Quality: The water quality characteristics of STE collected in Sample Event 5 were within the typical range generally expected for domestic STE. The measured STE total nitrogen (TN) concentration was 47 mg/L, which is within the range that has been typically reported for Florida single family residence STE.

Stage 1 Effluent (native sand): The sample points considered representative of Stage 1 effluent included: BHS7-ST1-SL-01, BHS7-ST1-SL-02, BHS7-ST1-SL-03, and BHS7-ST1-SL-04. Based on these samples (n=4), the mean concentration \pm the standard deviation are evaluated. Stage 1 effluent mean $\text{NH}_3\text{-N}$ level was 0.04 ± 0.05 mg/L with a mean DO level of 3.81 ± 0.56 mg/L in the Stage 1 effluent (Table 6). These results indi-

cate a substantial reduction of ammonia through the Stage 1 biofilter. The Stage 1 effluent mean $\text{NO}_x\text{-N}$ concentration was 20.6 ± 9.6 mg/L, implying significant nitrification.

Stage 2 Biofilter Effluent (lignocellulosic): The sample points considered representative of the effluent of the Stage 2 biofilter (lignocellulosic media) included: BHS7-ST2-DP-03, BHS7-ST2-DP-05, BHS7-ST2-DP-07, and BHS7-ST2-DP-08. Based on these samples ($n=4$), the mean concentration \pm the standard deviation are evaluated. The Stage 2 effluent mean $\text{NO}_x\text{-N}$ concentration was 0.04 ± 0.02 mg/L with a mean DO level at 2.9 ± 1.4 mg/L. The Stage 2 system produced a highly reducing environment and achieved nearly complete $\text{NO}_x\text{-N}$ reduction. The mean total nitrogen (TN) concentration was 1.8 ± 0.6 mg/L. The effluent mean CBOD_5 was 10 ± 1.4 mg/L.

Perimeter Monitoring Points: The sample points considered representative of system effluent included: BHS7-EFF-SL-06, BHS7-EFF-SL-07, BHS7-EFF-SL-08, BHS7-EFF-SL-09, BHS7-EFF-DP-10, BHS7-EFF-DP-11, and BHS7-EFF-DP-12. Based on these samples ($n=7$), the mean concentration \pm the standard deviation are evaluated. The treated effluent mean TN was 17.1 ± 10.6 mg/L of which mean TKN was 2.1 ± 0.7 and mean $\text{NO}_x\text{-N}$ was 14.9 ± 10.5 mg/L.

It is still unclear why $\text{NO}_x\text{-N}$ levels in the perimeter monitoring points are higher than $\text{NO}_x\text{-N}$ levels in samples collected within Stage 2 media. The observation port measurements at the time of sampling showed that the water level within the liner was between 5.3 and 5.4 inches below the periphery overflow elevation, which are the lowest levels measured throughout the study period. The water sampled at the perimeter points is therefore not likely to be water that was recently discharged off of the liner. One hypothesis is that the $\text{NO}_x\text{-N}$ plume beneath the wastewater application zone extends laterally past the width of the Stage 2 biofilter liner area. The overlying Stage 1 biofilter is a 24-inch layer of native sand media which is classified as Candler fine sand. During site reconnaissance, two soil profiles indicated that the water table was below 72 inches, which would provide a free drainage condition for the Stage 1 domain. As depicted in the Task D.7 Hydrus 2-D Simulation, Scenario 45 graphic (Figure 14), it is possible that the nitrate plume may extend approximately +100 cm (3.28 ft) from the exterior trench wall. The Stage 2 biofilter was designed to extend only 2.5 ft from the exterior trench wall, therefore a portion of the unsaturated plume could be missing the liner and causing the high $\text{NO}_x\text{-N}$ results along the perimeter.

Scenario 45

Configuration: trench, equal distribution
Soil Type: more permeable sand
Loading Rate: 2.67 cm/d (0.65 gpd/ft²)
Effluent Nitrogen: 60 mg-N/L as NH₄
Depth to Water Table: free drainage

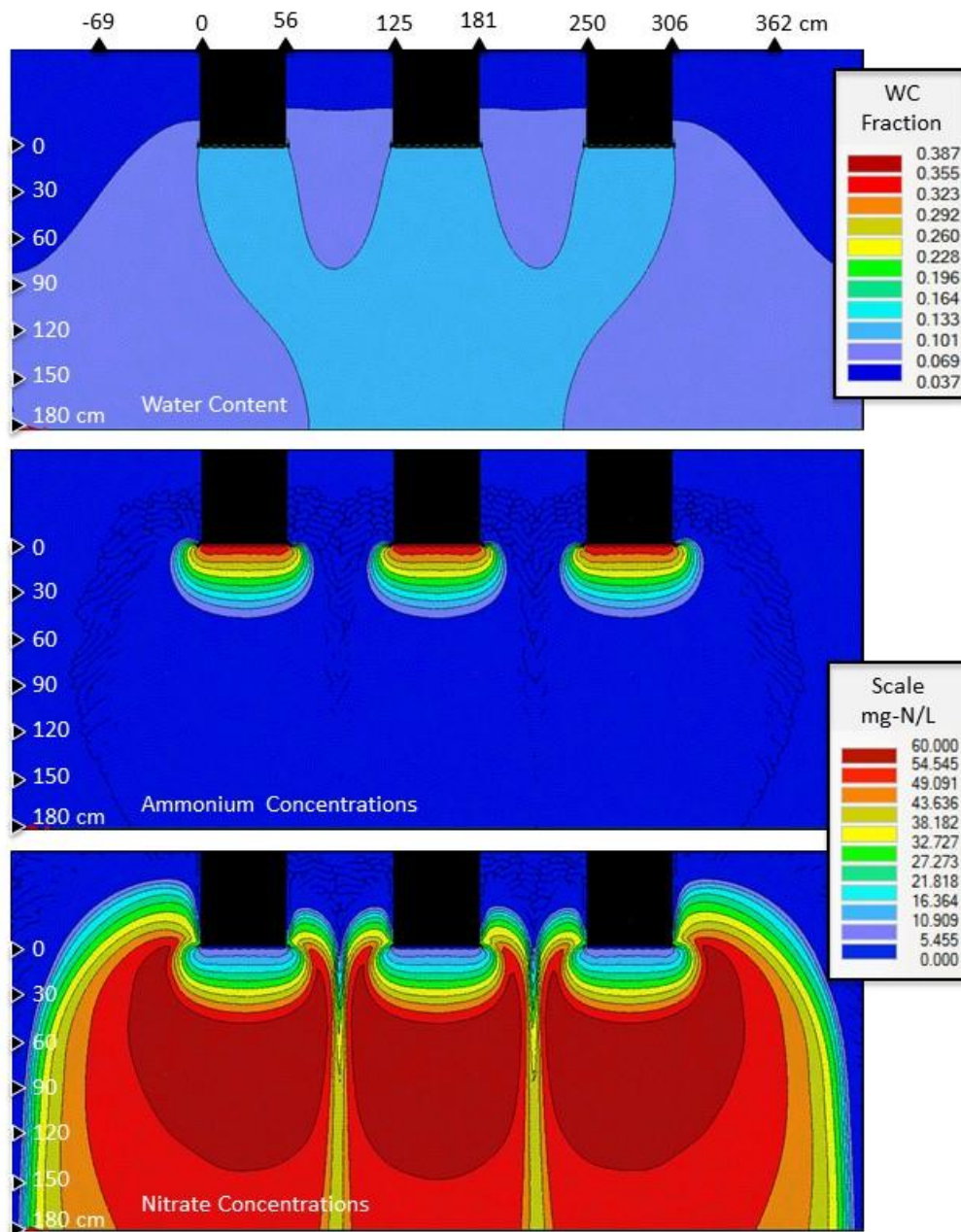


Figure 14
Graphic Representation of Task D.7 Hydrus 2-D Simulation, Scenario 45

Field Blank (FB): Described in Section 3.5, the field blank (FB) results for most of the parameters measured were at or below the method detection limit. The slightly elevated parameters were total alkalinity 4.7 mg/L, COD 12 mg/L, and TKN 0.07 mg/L.

Table 6
Water Quality Analytical Results

| Sample ID | Sample Date/Time | Temp (°C) | pH | Specific Conductance (uS/cm) | DO (mg/L) | ORP (mV) | Total Alkalinity (mg/L) | TSS (mg/L) | VSS (mg/L) | CBOD ₅ (mg/L) | COD (mg/L) | TN (mg/L N) ¹ | TKN (mg/L N) | Organic N (mg/L N) ² | NH ₃ -N (mg/L N) | NO ₃ -N (mg/L N) | NO ₂ -N (mg/L N) | NO _x (mg/L N) | TIN (mg/L N) ³ | TP (mg/L) | Ortho P (mg/L P) | Fecal (Ct/100 mL) | E-coli (Ct/100 mL) | Chloride (mg/L) |
|-----------------------|------------------|-----------|------|------------------------------|-----------|----------|-------------------------|------------|------------|--------------------------|------------|--------------------------|--------------|---------------------------------|-----------------------------|-----------------------------|-----------------------------|--------------------------|---------------------------|-----------|------------------|-------------------|--------------------|-----------------|
| BHS7-PUMP | 8/20/2014 11:30 | 27.8 | 7.06 | 1911 | 0.05 | -104.7 | 290 | 43 | 37 | 38 | 190 | 47.1 | 47 | 0.0 | 47.00 | 0.06 | 0.01 | 0.06 | 47.06 | 5.7 | 3.9 | 24000 | 8200 | 310 |
| BHS7-PUMP-DUP | 8/20/2014 11:40 | 27.8 | 7.06 | 1911 | 0.05 | -104.7 | 260 | 49 | 4 | 37 | 200 | 49.0 | 49 | 5.0 | 44.00 | 0.03 | 0.01 | 0.03 | 44.03 | 6.1 | 4 | 23000 | 8200 | 340 |
| NC-BHS7-ST1-SL-01 | 8/20/2014 10:56 | 28.9 | 5.55 | 2110 | 4.34 | 191.0 | | | | | | 24.6 | 1.6 | 1.6 | 0.03 | 23.00 | 0.01 | 23.00 | 23.03 | | | | | 490 |
| NC-BHS7-ST1-SL-02 | 8/20/2014 11:00 | 28.6 | 5.64 | 1457 | 3.04 | 154.8 | | | | | | 9.1 | 1.9 | 1.9 | 0.01 | 7.20 | 0.01 | 7.20 | 7.21 | | | | | 340 |
| SC-BHS7-ST1-SL-03 | 8/20/2014 10:45 | 29.1 | 5.09 | 1863 | 4.06 | 200.2 | | | | | | 31.6 | 1.6 | 1.5 | 0.11 | 30.00 | 0.01 | 30.00 | 30.11 | | | | | 440 |
| SC-BHS7-ST1-SL-04 | 8/20/2014 10:50 | 29.5 | 5.29 | 1838 | 3.78 | 194.9 | | | | 3 | 170 | 23.4 | 1.4 | 1.4 | 0.01 | 22.00 | 0.01 | 22.00 | 22.01 | 0.095 | 0.01 | 1 | 2 | 440 |
| NC-BHS7-ST2-DP-03 | 8/20/2014 8:48 | 27.3 | 6.44 | 1059 | 3.48 | 82 | | | | | | 1.7 | 1.7 | 1.7 | 0.03 | 0.03 | 0.01 | 0.03 | 0.06 | | | | | 200 |
| NC-BHS7-ST2-DP-03-DUP | 8/20/2014 8:54 | 27.4 | 6.19 | 1086 | 4.32 | 105.1 | | | | | | 16.0 | 16 | 15.9 | 0.06 | 0.03 | 0.01 | 0.03 | 0.09 | | | | | 200 |
| C-BHS7-ST2-DP-05 | 8/20/2014 10:06 | 28.3 | 6.16 | 1183 | 4.50 | 50.5 | | | | | | 2.7 | 2.6 | 2.6 | 0.05 | 0.05 | 0.01 | 0.05 | 0.10 | | | | | 250 |
| SC-BHS7-ST2-DP-07 | 8/20/2014 9:14 | 28.0 | 6.29 | 2025 | 2.23 | 45.2 | 180 | 11 | 1 | 9 | 95 | 1.4 | 1.4 | 1.4 | 0.04 | 0.01 | 0.01 | 0.02 | 0.06 | 1.3 | 0.82 | 1 | 2 | 470 |
| SW-BHS7-ST2-DP-08 | 8/20/2014 9:40 | 28.1 | 6.12 | 1633 | 1.34 | 60.8 | 150 | 13 | 1 | 11 | 130 | 1.4 | 1.3 | 1.3 | 0.03 | 0.05 | 0.01 | 0.05 | 0.08 | 1.3 | 0.68 | 1 | 2 | 380 |
| NE-BHS7-EFF-SL-06 | 8/20/2014 8:40 | 27.5 | 5.53 | 943 | 4.94 | 192.2 | | | | | | 4.4 | 1.4 | 1.1 | 0.35 | 3.00 | 0.01 | 3.00 | 3.35 | | | | | 170 |
| NW-BHS7-EFF-SL-07 | 8/20/2014 9:20 | 27.3 | 6.11 | 1843 | 5.51 | 126.7 | | | | | | 11.8 | 2 | 0.4 | 1.60 | 9.80 | 0.01 | 9.80 | 11.40 | | | | | 450 |
| NW-BHS7-EFF-DP-10 | 8/20/2014 8:50 | 27.3 | 5.97 | 2187 | 4.71 | 85.3 | | | | | | 7.2 | 1.5 | 1.5 | 0.02 | 5.70 | 0.01 | 5.70 | 5.72 | | | | | 570 |
| SE-BHS7-EFF-SL-08 | 8/20/2014 9:50 | 27.6 | 5.04 | 1830 | 5.10 | 196.7 | | | | | | 27.7 | 1.7 | 1.7 | 0.01 | 26.00 | 0.01 | 26.00 | 26.01 | | | | | 410 |
| SE-BHS7-EFF-SL-08-DUP | 8/20/2014 9:55 | 27.6 | 5.04 | 1830 | 5.10 | 196.7 | | | | | | 27.2 | 1.2 | 1.2 | 0.02 | 26.00 | 0.01 | 26.00 | 26.02 | | | | | 340 |
| SE-BHS7-EFF-DP-11 | 8/20/2014 9:35 | 28.0 | 6.06 | 2151 | 5.03 | 146.8 | | | | | | 21.0 | 3 | 2.3 | 0.74 | 18.00 | 0.01 | 18.00 | 18.74 | | | | | 500 |
| SW-BHS7-EFF-SL-09 | 8/20/2014 10:35 | 28.8 | 5.14 | 4550 | 5.06 | 193.2 | | | | 26 | 60 | 33.1 | 2.1 | 1.8 | 0.35 | 31.00 | 0.01 | 31.00 | 31.35 | 0.01 | 0.01 | | | 1400 |
| SW-BHS7-EFF-DP-12 | 8/20/2014 10:10 | 28.2 | 6.24 | 2173 | 4.18 | 171.9 | 160 | 3 | 1 | 12 | 100 | 14.3 | 3.3 | 3.2 | 0.08 | 11.00 | 0.01 | 11.00 | 11.08 | 1.6 | 1 | 1 | 2 | 470 |
| BHS7-FB | 8/20/2014 11:50 | 27.4 | 5.87 | 1.82 | 7.14 | 96.1 | 2 | | | 2 | 10 | 0.3 | 0.21 | 0.2 | 0.05 | 0.03 | 0.06 | 0.09 | 0.14 | 0.01 | 0.01 | 1 | 2 | 0.99 |
| BHS7-BKG | 8/20/2014 10:30 | 29.5 | 5.96 | 35.8 | 6.32 | 186.6 | | | | | | | | | | | | | | | | | | |

Notes:

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

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

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

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

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

Table 7
Summary of Water Quality Analytical Results

| Sample ID | | Temp (°C) | pH | Specific Conductance (uS/cm) | DO (mg/L) | ORP (mV) | Total Alkalinity (mg/L) | TSS (mg/L) | VSS (mg/L) | CBOD ₅ (mg/L) | COD (mg/L) | TN (mg/L N) ¹ | TKN (mg/L N) | Organic N (mg/L N) ² | NH ₃ -N (mg/L N) | NO ₃ -N (mg/L N) | NO ₂ -N (mg/L N) | NOx (mg/L N) | TIN (mg/L N) ³ | TP (mg/L) | Ortho P (mg/L P) | Fecal (Ct/100 mL) | E-coli (Ct/100 mL) | Cl (mg/L) |
|----------------|-----------|--------------|------|------------------------------------|--------------|-------------|-------------------------------|---------------|---------------|-----------------------------|---------------|-----------------------------|-----------------|------------------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------|------------------------------|--------------|---------------------|-------------------------|--------------------------|--------------|
| BHS7-PUMP | n | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| | MEAN | 23.11 | 7.23 | 2076.00 | 0.08 | -164.00 | 282.00 | 36.00 | 32.80 | 91.20 | 148.40 | 48.24 | 48.20 | 9.42 | 38.78 | 0.03 | 0.01 | 0.04 | 38.82 | 6.72 | 4.46 | 33800 | 3871 | 438.00 |
| | STD. DEV. | 3.74 | 0.27 | 223.13 | 0.10 | 69.24 | 21.68 | 5.43 | 6.83 | 33.69 | 79.64 | 2.16 | 2.17 | 18.84 | 17.95 | 0.03 | 0.00 | 0.02 | 17.96 | 1.49 | 0.62 | | | 173.41 |
| | MIN | 18.60 | 6.92 | 1909.00 | 0.01 | -240.10 | 250.00 | 28.00 | 22.00 | 38.00 | 22.00 | 46.02 | 46.00 | 0.00 | 6.90 | 0.01 | 0.01 | 0.02 | 6.92 | 5.70 | 3.90 | 20000 | 96 | 300.00 |
| | MAX | 27.82 | 7.63 | 2454.00 | 0.25 | -95.20 | 310.00 | 43.00 | 40.00 | 120.00 | 220.00 | 51.02 | 51.00 | 43.10 | 50.00 | 0.07 | 0.01 | 0.07 | 50.02 | 9.30 | 5.40 | 51000 | 10000 | 700.00 |
| BHS7-ST1-SL-01 | n | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 3 |
| | MEAN | 23.26 | 5.40 | 1638.20 | 4.90 | 169.32 | | | | | | 24.50 | 2.70 | 2.25 | 0.45 | 18.75 | 0.01 | 21.80 | 22.25 | | | | | 370.00 |
| | STD. DEV. | 5.34 | 0.00 | 438.28 | 0.50 | 34.46 | | | | | | 15.29 | 1.14 | 0.45 | 0.81 | 14.99 | 0.00 | 14.66 | 15.14 | | | | | 111.36 |
| | MIN | 15.50 | 5.23 | 1077.00 | 4.34 | 128.90 | | | | | | 2.42 | 1.60 | 1.57 | 0.03 | 0.01 | 0.01 | 0.02 | 0.06 | | | | | 270.00 |
| | MAX | 28.90 | 5.62 | 2110.00 | 5.65 | 203.40 | | | | | | 40.60 | 4.60 | 2.70 | 1.90 | 36.00 | 0.01 | 36.00 | 37.90 | | | | | 490.00 |
| BHS7-ST1-SL-02 | n | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 3 |
| | MEAN | 23.06 | 5.26 | 1326.20 | 4.44 | 166.18 | | | | | | 16.81 | 2.16 | 2.06 | 0.10 | 14.64 | 0.01 | 14.65 | 14.74 | | | | | 266.67 |
| | STD. DEV. | 5.32 | 0.00 | 190.16 | 0.99 | 29.23 | | | | | | 21.28 | 0.65 | 0.67 | 0.14 | 21.25 | 0.00 | 21.24 | 21.38 | | | | | 64.29 |
| | MIN | 15.40 | 5.04 | 1156.00 | 3.04 | 129.60 | | | | | | 1.32 | 1.30 | 1.25 | 0.01 | 0.01 | 0.01 | 0.02 | 0.05 | | | | | 220.00 |
| | MAX | 28.60 | 5.64 | 1595.00 | 5.84 | 196.70 | | | | | | 53.20 | 3.10 | 3.07 | 0.35 | 51.00 | 0.01 | 51.00 | 51.35 | | | | | 340.00 |
| BHS7-ST1-SL-03 | n | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 3 |
| | MEAN | 23.51 | 5.34 | 1749.80 | 4.67 | 175.28 | | | | | | 34.60 | 3.20 | 2.37 | 0.83 | 26.00 | 0.87 | 31.40 | 32.23 | | | | | 386.67 |
| | STD. DEV. | 5.90 | 0.00 | 345.54 | 1.01 | 35.90 | | | | | | 19.52 | 2.22 | 0.65 | 1.72 | 17.66 | 1.92 | 18.69 | 19.24 | | | | | 68.07 |
| | MIN | 15.80 | 5.05 | 1348.00 | 3.95 | 115.20 | | | | | | 2.22 | 1.60 | 1.49 | 0.02 | 0.01 | 0.01 | 0.02 | 0.10 | | | | | 310.00 |
| | MAX | 29.10 | 5.87 | 2100.00 | 6.33 | 202.60 | | | | | | 50.30 | 7.10 | 3.20 | 3.90 | 38.00 | 4.30 | 48.00 | 48.02 | | | | | 440.00 |
| BHS7-ST1-DP-01 | n | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| | MEAN | 17.85 | 5.08 | 1556.50 | 5.21 | 138.95 | | | | | | 27.56 | 5.05 | 3.31 | 1.74 | 22.51 | 0.01 | 22.51 | 24.25 | | | | | |
| | STD. DEV. | 1.48 | 0.00 | 675.29 | 0.23 | 73.19 | | | | | | 36.68 | 4.88 | 2.53 | 2.35 | 31.81 | 0.00 | 31.81 | 34.15 | | | | | |
| | MIN | 16.80 | 5.04 | 1079.00 | 5.05 | 87.20 | | | | | | 1.62 | 1.60 | 1.52 | 0.08 | 0.01 | 0.01 | 0.02 | 0.10 | | | | | |
| | MAX | 18.90 | 5.12 | 2034.00 | 5.37 | 190.70 | | | | | | 53.50 | 8.50 | 5.10 | 3.40 | 45.00 | 0.01 | 45.00 | 48.40 | | | | | |
| BHS7-ST1-SL-04 | n | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 3 | 4 | 4 |
| | MEAN | 23.30 | 5.38 | 1467.20 | 4.22 | 169.66 | 22.67 | 4.25 | 3.50 | 2.40 | 57.60 | 35.98 | 3.78 | 2.75 | 1.03 | 27.75 | 0.01 | 32.20 | 33.23 | 0.16 | 0.01 | 4 | 2 | 337.50 |
| | STD. DEV. | 6.04 | 0.26 | 522.94 | 0.86 | 38.38 | | 2.63 | 2.08 | 0.55 | 63.87 | 22.23 | 3.36 | 1.27 | 2.16 | 21.51 | 0.00 | 21.12 | 21.73 | 0.13 | 0.00 | | | 91.79 |
| | MIN | 15.30 | 5.11 | 635.00 | 3.16 | 106.90 | 17.00 | 2.00 | 1.00 | 2.00 | 15.00 | 2.62 | 1.40 | 1.39 | 0.01 | 0.01 | 0.01 | 0.02 | 0.10 | 0.04 | 0.01 | 1 | 2 | 230.00 |
| | MAX | 29.50 | 5.80 | 1933.00 | 5.28 | 194.90 | 31.00 | 8.00 | 6.00 | 3.00 | 170.00 | 52.20 | 9.70 | 4.80 | 4.90 | 48.00 | 0.01 | 50.00 | 50.03 | 0.38 | 0.01 | 10 | 2 | 440.00 |

Table 7 (continued)
Summary of Water Quality Analytical Results

| Sample ID | | Temp (°C) | pH | Specific Conductance (uS/cm) | DO (mg/L) | ORP (mV) | Total Alkalinity (mg/L) | TSS (mg/L) | VSS (mg/L) | CBOD ₅ (mg/L) | COD (mg/L) | TN (mg/L N) ¹ | TKN (mg/L N) | Organic N (mg/L N) ² | NH ₃ -N (mg/L N) | NO ₃ -N (mg/L N) | NO ₂ -N (mg/L N) | NOx (mg/L N) | TIN (mg/L N) ³ | TP (mg/L) | Ortho P (mg/L P) | Fecal (Ct/100 mL) | E-coli (Ct/100 mL) | Cl (mg/L) |
|----------------|-----------|--------------|------|------------------------------------|--------------|-------------|-------------------------------|---------------|---------------|-----------------------------|---------------|-----------------------------|-----------------|------------------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------|------------------------------|--------------|---------------------|-------------------------|--------------------------|--------------|
| BHS7-ST2-DP-02 | n | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| | MEAN | 19.25 | 6.00 | 1732.50 | 0.12 | 24.70 | | | | | | 10.74 | 10.40 | 9.73 | 0.68 | 0.34 | 0.06 | 0.34 | 1.02 | | | | | |
| | STD. DEV. | 0.35 | 0.00 | 369.82 | 0.01 | 142.69 | | | | | | 8.00 | 7.92 | 8.27 | 0.35 | 0.08 | 0.06 | 0.08 | 0.26 | | | | | |
| | MIN | 19.00 | 5.99 | 1471.00 | 0.11 | -76.20 | | | | | | 5.08 | 4.80 | 3.88 | 0.43 | 0.28 | 0.01 | 0.28 | 0.83 | | | | | |
| | MAX | 19.50 | 6.01 | 1994.00 | 0.12 | 125.60 | | | | | | 16.40 | 16.00 | 15.57 | 0.92 | 0.40 | 0.10 | 0.40 | 1.20 | | | | | |
| BHS7-ST2-DP-03 | n | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 3 |
| | MEAN | 23.08 | 6.08 | 1662.60 | 1.08 | 23.80 | | | | | | 3.43 | 3.28 | 3.18 | 0.10 | 0.15 | 0.01 | 0.15 | 0.26 | | | | | 313.33 |
| | STD. DEV. | 3.21 | 0.22 | 384.99 | 1.39 | 89.34 | | | | | | 1.55 | 1.63 | 1.59 | 0.05 | 0.17 | 0.00 | 0.16 | 0.18 | | | | | 102.63 |
| | MIN | 19.50 | 5.88 | 1059.00 | 0.13 | -109.60 | | | | | | 1.73 | 1.70 | 1.62 | 0.03 | 0.01 | 0.01 | 0.02 | 0.06 | | | | | 200.00 |
| | MAX | 27.28 | 6.44 | 2068.00 | 3.48 | 125.40 | | | | | | 5.52 | 5.50 | 5.36 | 0.15 | 0.39 | 0.01 | 0.39 | 0.47 | | | | | 400.00 |
| BHS7-ST2-DP-04 | n | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| | MEAN | 19.80 | 6.02 | 1828.50 | 0.08 | -5.45 | | | | | | 3.77 | 3.75 | 3.66 | 0.09 | 0.01 | 0.01 | 0.02 | 0.11 | | | | | |
| | STD. DEV. | 0.71 | 0.00 | 375.47 | 0.00 | 208.38 | | | | | | 1.34 | 1.34 | 1.35 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | | | | | |
| | MIN | 19.30 | 5.94 | 1563.00 | 0.08 | -152.80 | | | | | | 2.82 | 2.80 | 2.71 | 0.08 | 0.01 | 0.01 | 0.02 | 0.10 | | | | | |
| | MAX | 20.30 | 6.10 | 2094.00 | 0.08 | 141.90 | | | | | | 4.72 | 4.70 | 4.62 | 0.09 | 0.01 | 0.01 | 0.02 | 0.11 | | | | | |
| BHS7-ST2-DP-05 | n | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 3 |
| | MEAN | 23.68 | 6.13 | 1701.80 | 1.22 | -7.78 | | | | | | 2.82 | 2.78 | 2.70 | 0.08 | 0.04 | 0.01 | 0.04 | 0.13 | | | | | 323.33 |
| | STD. DEV. | 3.69 | 0.00 | 366.24 | 1.90 | 104.82 | | | | | | 0.55 | 0.55 | 0.56 | 0.03 | 0.03 | 0.00 | 0.02 | 0.02 | | | | | 70.24 |
| | MIN | 19.30 | 6.05 | 1183.00 | 0.08 | -147.60 | | | | | | 2.22 | 2.20 | 2.09 | 0.05 | 0.01 | 0.01 | 0.02 | 0.10 | | | | | 250.00 |
| | MAX | 28.31 | 6.20 | 2133.00 | 4.50 | 119.40 | | | | | | 3.52 | 3.50 | 3.40 | 0.11 | 0.07 | 0.01 | 0.07 | 0.16 | | | | | 390.00 |
| BHS7-ST2-SL-05 | n | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| | MEAN | 19.25 | 6.02 | 1585.50 | 2.30 | 97.20 | | | | | | 8.80 | 3.45 | 3.36 | 0.09 | 5.35 | 0.01 | 5.35 | 5.44 | | | | | |
| | STD. DEV. | 4.60 | 0.00 | 651.25 | 1.56 | 59.40 | | | | | | 2.26 | 1.63 | 1.66 | 0.03 | 0.64 | 0.00 | 0.64 | 0.61 | | | | | |
| | MIN | 16.00 | 5.94 | 1125.00 | 1.20 | 55.20 | | | | | | 7.20 | 2.30 | 2.19 | 0.07 | 4.90 | 0.01 | 4.90 | 5.01 | | | | | |
| | MAX | 22.50 | 6.10 | 2046.00 | 3.40 | 139.20 | | | | | | 10.40 | 4.60 | 4.53 | 0.11 | 5.80 | 0.01 | 5.80 | 5.87 | | | | | |
| BHS7-ST2-DP-06 | n | 4 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0 | 2 |
| | MEAN | 22.47 | 6.18 | 7052.75 | 0.34 | 0.27 | | | | | | 5.30 | 5.25 | 5.10 | 0.15 | 0.04 | 0.01 | 0.05 | 0.20 | | | | | 400.00 |
| | STD. DEV. | 2.98 | 0.00 | 10499.67 | 0.46 | 81.66 | | | | | | 1.86 | 1.87 | 1.87 | 0.04 | 0.07 | 0.00 | 0.06 | 0.10 | | | | | 14.14 |
| | MIN | 19.90 | 5.95 | 1554.00 | 0.06 | -120.40 | | | | | | 3.52 | 3.50 | 3.36 | 0.11 | 0.01 | 0.01 | 0.02 | 0.13 | | | | | 390.00 |
| | MAX | 25.99 | 6.63 | 22800.00 | 1.02 | 60.10 | | | | | | 7.92 | 7.90 | 7.76 | 0.20 | 0.14 | 0.01 | 0.14 | 0.34 | | | | | 410.00 |
| BHS7-ST2-DP-07 | n | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 |
| | MEAN | 24.44 | 6.26 | 6199.80 | 0.76 | -4.88 | 208.00 | 14.20 | 9.60 | 25.00 | 213.00 | 3.76 | 3.74 | 3.63 | 0.11 | 0.01 | 0.01 | 0.02 | 0.13 | 16.20 | 9.82 | 15 | 3 | 435.00 |
| | STD. DEV. | 4.28 | 0.00 | 9672.81 | 0.88 | 73.79 | 21.68 | 7.46 | 5.81 | 22.16 | 154.01 | 2.13 | 2.13 | 2.10 | 0.04 | 0.00 | 0.00 | 0.00 | 0.04 | 24.83 | 14.50 | | | 70.00 |
| | MIN | 19.90 | 6.14 | 1636.00 | 0.10 | -117.30 | 180.00 | 8.00 | 1.00 | 9.00 | 50.00 | 1.42 | 1.40 | 1.36 | 0.04 | 0.01 | 0.01 | 0.02 | 0.06 | 1.30 | 0.82 | 1 | 2 | 330.00 |
| | MAX | 29.36 | 6.38 | 23500.00 | 2.23 | 69.50 | 240.00 | 27.00 | 17.00 | 64.00 | 380.00 | 7.22 | 7.20 | 7.07 | 0.15 | 0.01 | 0.01 | 0.02 | 0.17 | 60.00 | 35.00 | 1200 | 10 | 470.00 |
| BHS7-ST2-DP-08 | n | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 |
| | MEAN | 23.67 | 6.13 | 1735.00 | 0.58 | -18.20 | 194.00 | 11.40 | 7.20 | 33.60 | 362.00 | 2.85 | 2.80 | 2.72 | 0.08 | 0.05 | 0.01 | 0.05 | 0.14 | 11.64 | 6.69 | 1 | 2 | 375.00 |
| | STD. DEV. | 4.28 | 0.03 | 211.81 | 0.51 | 98.01 | 26.08 | 3.44 | 4.27 | 27.22 | 421.98 | 1.27 | 1.27 | 1.25 | 0.04 | 0.06 | 0.00 | 0.06 | 0.07 | 15.26 | 8.65 | | | 69.52 |
| | MIN | 18.40 | 6.09 | 1556.00 | 0.08 | -161.00 | 150.00 | 8.00 | 1.00 | 11.00 | 110.00 | 1.35 | 1.30 | 1.27 | 0.03 | 0.01 | 0.01 | 0.02 | 0.08 | 1.30 | 0.68 | 1 | 2 | 290.00 |
| | MAX | 28.07 | 6.17 | 2070.00 | 1.34 | 63.80 | 220.00 | 16.00 | 13.00 | 78.00 | 1100.00 | 4.72 | 4.70 | 4.61 | 0.13 | 0.15 | 0.01 | 0.15 | 0.26 | 37.00 | 20.00 | 1 | 2 | 460.00 |

Table 7 (continued)
Summary of Water Quality Analytical Results

| Sample ID | | Temp (°C) | pH | Specific Conductance (uS/cm) | DO (mg/L) | ORP (mV) | Total Alkalinity (mg/L) | TSS (mg/L) | VSS (mg/L) | CBOD ₅ (mg/L) | COD (mg/L) | TN (mg/L N) ¹ | TKN (mg/L N) | Organic N (mg/L N) ² | NH ₃ -N (mg/L N) | NO ₃ -N (mg/L N) | NO ₂ -N (mg/L N) | NOx (mg/L N) | TIN (mg/L N) ³ | TP (mg/L) | Ortho P (mg/L P) | Fecal (Ct/100 mL) | E-coli (Ct/100 mL) | Cl (mg/L) |
|----------------|-----------|--------------|------|------------------------------------|--------------|-------------|-------------------------------|---------------|---------------|-----------------------------|---------------|-----------------------------|-----------------|------------------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------|------------------------------|--------------|---------------------|-------------------------|--------------------------|--------------|
| BHS7-EFF-SL-06 | n | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 3 |
| | MEAN | 22.08 | 5.69 | 799.40 | 5.47 | 172.42 | | | | | | 20.66 | 2.06 | 1.92 | 0.14 | 14.50 | 0.01 | 18.60 | 18.74 | | | | | 117.00 |
| | STD. DEV. | 5.87 | 0.00 | 265.95 | 0.34 | 37.88 | | | | | | 11.55 | 1.04 | 1.10 | 0.13 | 7.77 | 0.00 | 11.37 | 11.27 | | | | | 46.12 |
| | MIN | 12.40 | 5.53 | 469.00 | 4.94 | 124.10 | | | | | | 4.40 | 1.40 | 1.05 | 0.04 | 3.00 | 0.01 | 3.00 | 3.35 | | | | | 86.00 |
| | MAX | 27.50 | 5.94 | 1073.00 | 5.74 | 215.80 | | | | | | 36.60 | 3.90 | 3.84 | 0.35 | 20.00 | 0.01 | 35.00 | 35.05 | | | | | 170.00 |
| BHS7-EFF-DP-09 | n | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| | MEAN | 17.70 | 6.06 | 431.00 | 6.36 | 131.50 | | | | | | 7.20 | 2.50 | 1.59 | 0.91 | 4.70 | 0.01 | 4.70 | 5.61 | | | | | |
| | STD. DEV. | | | | | | | | | | | | | | | | | | | | | | | |
| | MIN | 17.70 | 6.06 | 431.00 | 6.36 | 131.50 | | | | | | 7.20 | 2.50 | 1.59 | 0.91 | 4.70 | 0.01 | 4.70 | 5.61 | | | | | |
| | MAX | 17.70 | 6.06 | 431.00 | 6.36 | 131.50 | | | | | | 7.20 | 2.50 | 1.59 | 0.91 | 4.70 | 0.01 | 4.70 | 5.61 | | | | | |
| BHS7-EFF-SL-07 | n | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 3 |
| | MEAN | 22.52 | 5.26 | 1079.20 | 6.09 | 165.74 | | | | | | 28.08 | 1.66 | 1.28 | 0.38 | 23.78 | 0.01 | 26.42 | 26.80 | | | | | 316.67 |
| | STD. DEV. | 4.50 | 0.56 | 559.63 | 0.48 | 30.55 | | | | | | 15.94 | 0.43 | 0.66 | 0.69 | 17.02 | 0.00 | 15.88 | 15.43 | | | | | 117.19 |
| | MIN | 15.50 | 4.61 | 367.00 | 5.51 | 126.70 | | | | | | 9.50 | 1.20 | 0.40 | 0.01 | 8.30 | 0.01 | 8.30 | 8.51 | | | | | 230.00 |
| | MAX | 27.30 | 6.11 | 1843.00 | 6.75 | 198.50 | | | | | | 40.60 | 2.20 | 2.15 | 1.60 | 39.00 | 0.01 | 39.00 | 39.01 | | | | | 450.00 |
| BHS7-EFF-DP-10 | n | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 3 |
| | MEAN | 21.68 | 5.94 | 1578.60 | 5.58 | 141.24 | | | | | | 24.42 | 2.28 | 2.21 | 0.07 | 22.14 | 0.01 | 22.14 | 22.21 | | | | | 376.67 |
| | STD. DEV. | 5.54 | 0.16 | 421.15 | 1.26 | 35.15 | | | | | | 14.81 | 0.54 | 0.51 | 0.04 | 14.57 | 0.00 | 14.57 | 14.57 | | | | | 177.86 |
| | MIN | 13.30 | 5.74 | 1147.00 | 4.40 | 85.30 | | | | | | 7.20 | 1.50 | 1.48 | 0.02 | 5.70 | 0.01 | 5.70 | 5.72 | | | | | 220.00 |
| | MAX | 27.30 | 6.18 | 2187.00 | 7.18 | 182.80 | | | | | | 41.20 | 3.00 | 2.88 | 0.12 | 39.00 | 0.01 | 39.00 | 39.06 | | | | | 570.00 |
| BHS7-EFF-SL-08 | n | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 3 |
| | MEAN | 22.50 | 5.29 | 1561.20 | 5.58 | 169.04 | | | | | | 36.02 | 2.42 | 2.20 | 0.22 | 31.00 | 0.01 | 33.60 | 33.82 | | | | | 350.00 |
| | STD. DEV. | 4.90 | 0.55 | 222.04 | 0.86 | 37.84 | | | | | | 10.56 | 0.95 | 0.61 | 0.37 | 9.35 | 0.00 | 9.96 | 10.14 | | | | | 65.57 |
| | MIN | 15.80 | 4.88 | 1331.00 | 4.49 | 114.20 | | | | | | 22.80 | 1.70 | 1.69 | 0.01 | 21.00 | 0.01 | 21.00 | 21.08 | | | | | 280.00 |
| | MAX | 27.60 | 6.25 | 1830.00 | 6.56 | 211.20 | | | | | | 46.00 | 4.00 | 3.12 | 0.88 | 42.00 | 0.01 | 44.00 | 44.03 | | | | | 410.00 |
| BHS7-EFF-SL-09 | n | 5 | 5 | 5 | 5 | 5 | 2 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 0 | 1 | 4 |
| | MEAN | 23.42 | 5.56 | 1391.00 | 5.33 | 128.62 | 12.00 | 1.00 | 1.50 | 8.25 | 33.00 | 34.03 | 2.03 | 1.76 | 0.21 | 27.25 | 0.01 | 32.60 | 32.81 | 0.11 | 0.06 | | 2.00 | 399.75 |
| | STD. DEV. | 5.68 | 0.44 | 1778.92 | 0.57 | 71.00 | 1.41 | 0.00 | 1.00 | 11.84 | 20.61 | 21.81 | 0.31 | 0.48 | 0.18 | 12.12 | 0.00 | 15.92 | 15.81 | 0.13 | 0.10 | | | 667.23 |
| | MIN | 16.40 | 5.09 | 269.00 | 4.58 | 53.80 | 11.00 | 1.00 | 1.00 | 2.00 | 10.00 | 12.70 | 1.70 | 1.29 | 0.01 | 11.00 | 0.01 | 11.00 | 11.41 | 0.01 | 0.01 | | 2.00 | 34.00 |
| | MAX | 29.10 | 6.14 | 4550.00 | 6.10 | 195.60 | 13.00 | 1.00 | 3.00 | 26.00 | 60.00 | 56.30 | 2.30 | 2.24 | 0.41 | 40.00 | 0.01 | 54.00 | 54.06 | 0.29 | 0.24 | | 2.00 | 1400.00 |
| BHS7-EFF-DP-12 | n | 5 | 5 | 5 | 5 | 5 | 3 | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 3 | 3 | 2 | 2 | 3 |
| | MEAN | 23.18 | 6.11 | 1730.60 | 4.24 | 92.76 | 140.00 | 10.33 | 6.33 | 9.33 | 84.33 | 10.20 | 3.26 | 3.14 | 0.12 | 6.94 | 0.01 | 6.94 | 7.06 | 2.13 | 0.74 | 1.00 | 2.00 | 386.67 |
| | STD. DEV. | 4.70 | 0.17 | 318.98 | 0.50 | 86.14 | 20.00 | 6.35 | 5.03 | 4.62 | 24.58 | 4.06 | 0.81 | 0.81 | 0.02 | 4.13 | 0.00 | 4.13 | 4.12 | 0.50 | 0.28 | | | 73.71 |
| | MIN | 17.20 | 5.90 | 1309.00 | 3.66 | -36.30 | 120.00 | 3.00 | 1.00 | 4.00 | 56.00 | 4.00 | 2.50 | 2.35 | 0.08 | 1.20 | 0.01 | 1.20 | 1.33 | 1.60 | 0.44 | 1.00 | 2.00 | 330.00 |
| | MAX | 28.20 | 6.25 | 2173.00 | 5.01 | 171.90 | 160.00 | 14.00 | 11.00 | 12.00 | 100.00 | 14.30 | 4.60 | 4.47 | 0.15 | 11.00 | 0.01 | 11.00 | 11.08 | 2.60 | 1.00 | 1.00 | 2.00 | 470.00 |

Table 7 (continued)
Summary of Water Quality Analytical Results

| Sample ID | | Temp (°C) | pH | Specific Conductance (uS/cm) | DO (mg/L) | ORP (mV) | Total Alkalinity (mg/L) | TSS (mg/L) | VSS (mg/L) | CBOD ₅ (mg/L) | COD (mg/L) | TN (mg/L N) ¹ | TKN (mg/L N) | Organic N (mg/L N) ² | NH ₃ -N (mg/L N) | NO ₃ -N (mg/L N) | NO ₂ -N (mg/L N) | NO _x (mg/L N) | TIN (mg/L N) ³ | TP (mg/L) | Ortho P (mg/L P) | Fecal (Ct/100 mL) | E-coli (Ct/100 mL) | Cl (mg/L) |
|-------------|-----------|--------------|------|------------------------------------|--------------|-------------|-------------------------------|---------------|---------------|-----------------------------|---------------|-----------------------------|-----------------|------------------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------------------|------------------------------|--------------|---------------------|-------------------------|--------------------------|--------------|
| BHS7-BKG-LY | n | 3 | 3 | 3 | 3 | 3 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 2 |
| | MEAN | 27.07 | 5.71 | 78.87 | 5.92 | 182.07 | 11.00 | 1.00 | 8.50 | 16.00 | 30.50 | 3.25 | 0.89 | 0.82 | 0.08 | 2.36 | 0.01 | 2.36 | 2.44 | 0.05 | 0.01 | 1.00 | 2.00 | 3.90 |
| | STD. DEV. | 2.74 | | 37.47 | 0.35 | 24.52 | | 0.00 | 10.61 | | 26.16 | 3.18 | 0.16 | 0.14 | 0.02 | 3.03 | 0.00 | 3.03 | 3.04 | 0.01 | 0.00 | | | 0.99 |
| | MIN | 24.10 | 5.43 | 35.80 | 5.67 | 155.60 | 11.00 | 1.00 | 1.00 | 16.00 | 12.00 | 1.00 | 0.78 | 0.72 | 0.06 | 0.22 | 0.01 | 0.22 | 0.28 | 0.04 | 0.01 | 1.00 | 2.00 | 3.20 |
| | MAX | 29.50 | 5.96 | 104.00 | 6.32 | 204.00 | 11.00 | 1.00 | 16.00 | 16.00 | 49.00 | 5.50 | 1.00 | 0.91 | 0.09 | 4.50 | 0.01 | 4.50 | 4.59 | 0.05 | 0.01 | 1.00 | 2.00 | 4.60 |
| BHS7-TAP | n | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| | MEAN | 21.40 | 7.21 | 176.60 | 6.49 | 99.75 | 82.50 | 2.00 | 2.00 | 2.00 | 10.00 | 0.24 | 0.05 | 0.04 | 0.01 | 0.11 | 0.08 | 0.19 | 0.20 | 0.15 | 0.12 | 1.00 | 2.00 | 4.00 |
| | STD. DEV. | 1.84 | 0.10 | 3.82 | 0.93 | 77.00 | 6.36 | 1.41 | 1.41 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.03 | 0.01 | 0.04 | 0.04 | 0.04 | 0.04 | | | |
| | MIN | 20.10 | 7.14 | 173.90 | 5.83 | 45.30 | 78.00 | 1.00 | 1.00 | 2.00 | 10.00 | 0.21 | 0.05 | 0.04 | 0.01 | 0.09 | 0.07 | 0.16 | 0.17 | 0.12 | 0.10 | 1.00 | 2.00 | 4.00 |
| | MAX | 22.70 | 7.28 | 179.30 | 7.15 | 154.20 | 87.00 | 3.00 | 3.00 | 2.00 | 10.00 | 0.27 | 0.05 | 0.04 | 0.01 | 0.13 | 0.09 | 0.22 | 0.23 | 0.17 | 0.15 | 1.00 | 2.00 | 4.00 |
| BHS7-EB | n | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 |
| | MEAN | 24.95 | 6.39 | 1.91 | 7.40 | 95.80 | 2.08 | 1.00 | 1.00 | 2.00 | 10.00 | 0.11 | 0.09 | 0.08 | 0.02 | 0.01 | 0.01 | 0.02 | 0.03 | 0.02 | 0.01 | 1.00 | 2.00 | 0.05 |
| | STD. DEV. | 7.13 | 1.24 | 0.49 | 1.71 | 61.89 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.09 | 0.07 | 0.02 | 0.00 | 0.00 | 0.01 | 0.02 | 0.01 | 0.00 | | | 0.00 |
| | MIN | 15.90 | 4.62 | 1.20 | 5.16 | 43.10 | 2.00 | 1.00 | 1.00 | 2.00 | 10.00 | 0.06 | 0.05 | 0.04 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 | 1.00 | 2.00 | 0.05 |
| | MAX | 30.90 | 7.39 | 2.26 | 9.29 | 181.20 | 2.30 | 1.00 | 1.00 | 2.00 | 10.00 | 0.24 | 0.22 | 0.18 | 0.04 | 0.01 | 0.01 | 0.02 | 0.06 | 0.03 | 0.01 | 1.00 | 2.00 | 0.05 |

Notes:

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

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

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

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

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

5.0 B-HS7 Sample Event No. 5: Summary and Recommendations

5.1 Summary

The Sample Event No. 5 results indicate that:

- Septic tank effluent (STE) quality is characteristic of typical household STE quality. The total nitrogen concentration of 47 mg/L is within the range of values typically reported for Florida single family residence STE.
- The Stage 1 biofilter converted the majority of ammonium to oxidized nitrogen; mean effluent values contained 1.6 ± 0.2 mg/L TKN, of which 0.04 ± 0.05 mg/L was ammonia.
- The Stage 2 biofilter produced a reducing environment and mean effluent $\text{NO}_x\text{-N}$ within the biofilter media was 0.04 ± 0.02 mg N/L.
- The total nitrogen concentration in the perimeter monitoring points surrounding the treatment system was 17.1 ± 10.6 mg/L of which mean TKN was 2.1 ± 0.7 and mean $\text{NO}_x\text{-N}$ was 14.9 ± 10.5 mg/L. It is still unclear why the perimeter monitoring points show higher $\text{NO}_x\text{-N}$ levels than in samples taken from within the Stage 2 media. Since the observation port measurements indicated that the liner water level was between 5.3 and 5.4 inches below the overflow elevation at the time of sampling, the water sampled at the perimeter points is not likely to be water that was recently discharged off the liner. One hypothesis is that the unsaturated zone $\text{NO}_x\text{-N}$ plume extends past the width of the Stage 2 biofilter liner area. This hypothesis will be further evaluated as more data is collected and analyzed at the site.

5.2 Recommendations

The perimeter monitoring point samples continue to show high total nitrogen mostly comprised of $\text{NO}_x\text{-N}$. It is possible that water sampled at the perimeter monitoring points may not be representative of water that has passed through the Stage 2 media. One possible method to track the wastewater plume without compromising nitrogen analyses is to introduce rhodamine dye or other tracer into the system.

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Appendix A: Laboratory Report

PRELIMINARY

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

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

September 10, 2014
Work Order: 1408512

Laboratory Report

| Project Name | | B-HS7 SE#5 | | | | | | |
|----------------------------|------------|----------------|-------------|-------|-------|----------------|----------------|----------|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Dilution |
| Sample Description | | BHS7-PUMP | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-01 | | | | | | |
| Date/Time Collected | | 08/20/14 11:30 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 47 | EPA 350.1 | 3.6 | 0.85 | | 08/27/14 12:36 | 90 |
| Carbonaceous BOD | mg/L | 38 | SM 5210B | 2 | 2 | 08/21/14 09:19 | 08/26/14 11:37 | 1 |
| Chemical Oxygen Demand | mg/L | 190 | EPA 410.4 | 25 | 10 | 08/26/14 09:23 | 08/26/14 12:43 | 1 |
| Chloride | mg/L | 310 | SM 4500Cl-E | 5.7 | 1.1 | | 09/03/14 20:04 | 1.14 |
| Nitrate (as N) | mg/L | 0.06 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 14:35 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 14:35 | 1 |
| Orthophosphate as P | mg/L | 3.9 | EPA 300.0 | 0.040 | 0.010 | | 08/21/14 14:35 | 1 |
| Phosphorous - Total as P | mg/L | 5.7 | SM 4500P-E | 0.040 | 0.010 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Total Alkalinity | mg/L | 290 | SM 2320B | 8.0 | 2.0 | 08/26/14 11:22 | 08/29/14 10:48 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 47 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Total Suspended Solids | mg/L | 43 | SM 2540D | 1 | 1 | 08/25/14 08:32 | 08/26/14 16:29 | 1 |
| Volatile Suspended Solids | mg/L | 37 | EPA 160.4 | 1 | 1 | 08/26/14 08:23 | 08/27/14 16:22 | 1 |
| Nitrate+Nitrite (N) | mg/L | 0.06 I | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 14:35 | 1 |
| <u>Microbiology</u> | | | | | | | | |
| E. Coli | MPN/100 mL | 8,200 | SM 9223B | 2.0 | 2.0 | 08/20/14 17:19 | 08/21/14 11:30 | 1 |
| Fecal Coliforms | CFU/100 ml | 24,000 | SM 9222D | 1 | 1 | 08/20/14 17:09 | 08/21/14 15:36 | 1 |
| Sample Description | | BHS7-PUMP-DUP | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-02 | | | | | | |
| Date/Time Collected | | 08/20/14 11:40 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 44 | EPA 350.1 | 0.040 | 0.009 | 08/25/14 16:49 | 08/25/14 18:28 | 1 |
| Carbonaceous BOD | mg/L | 37 | SM 5210B | 2 | 2 | 08/21/14 09:19 | 08/26/14 11:37 | 1 |
| Chemical Oxygen Demand | mg/L | 200 | EPA 410.4 | 25 | 10 | 08/26/14 09:23 | 08/26/14 12:43 | 1 |
| Chloride | mg/L | 340 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:02 | 1.14 |
| Nitrate (as N) | mg/L | 0.03 I | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 21:53 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 21:53 | 1 |
| Orthophosphate as P | mg/L | 4.0 | EPA 300.0 | 0.040 | 0.010 | | 08/21/14 21:53 | 1 |
| Phosphorous - Total as P | mg/L | 6.1 | SM 4500P-E | 0.040 | 0.010 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Total Alkalinity | mg/L | 260 | SM 2320B | 8.0 | 2.0 | 08/26/14 11:22 | 08/29/14 11:01 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 49 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Total Suspended Solids | mg/L | 49 | SM 2540D | 1 | 1 | 08/25/14 08:32 | 08/26/14 16:29 | 1 |
| Volatile Suspended Solids | mg/L | 4 | EPA 160.4 | 1 | 1 | 08/26/14 08:23 | 08/27/14 16:22 | 1 |

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

September 10, 2014
Work Order: 1408512

Laboratory Report

| Project Name | | B-HS7 SE#5 | | | | | | |
|-------------------------|------------|-------------------|-------------|-------|-------|----------------|----------------|----------|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Dilution |
| Sample Description | | BHS7-PUMP-DUP | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-02 | | | | | | |
| Date/Time Collected | | 08/20/14 11:40 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| Nitrate+Nitrite (N) | mg/L | 0.03 I | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 21:53 | 1 |
| Microbiology | | | | | | | | |
| E. Coli | MPN/100 mL | 8,200 | SM 9223B | 2.0 | 2.0 | 08/20/14 17:19 | 08/21/14 11:30 | 1 |
| Fecal Coliforms | CFU/100 ml | 23,000 | SM 9222D | 1 | 1 | 08/20/14 17:09 | 08/21/14 15:36 | 1 |
| Sample Description | | NC-BHS7-ST1-SL-01 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-03 | | | | | | |
| Date/Time Collected | | 08/20/14 10:56 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| Inorganics | | | | | | | | |
| Ammonia as N | mg/L | 0.030 I | EPA 350.1 | 0.040 | 0.009 | | 08/27/14 11:06 | 1 |
| Chloride | mg/L | 490 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:03 | 1.14 |
| Nitrate (as N) | mg/L | 23 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 14:16 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 14:16 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 1.6 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Nitrate+Nitrite (N) | mg/L | 23 | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 14:16 | 1 |
| Sample Description | | NC-BHS7-ST1-SL-02 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-04 | | | | | | |
| Date/Time Collected | | 08/20/14 11:00 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| Inorganics | | | | | | | | |
| Ammonia as N | mg/L | 0.009 U | EPA 350.1 | 0.040 | 0.009 | 08/25/14 16:49 | 08/25/14 18:28 | 1 |
| Chloride | mg/L | 340 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:03 | 1.14 |
| Nitrate (as N) | mg/L | 7.2 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 14:26 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 14:26 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 1.9 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Nitrate+Nitrite (N) | mg/L | 7.2 | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 14:26 | 1 |

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September 10, 2014
Work Order: 1408512

Laboratory Report

| Project Name | | B-HS7 SE#5 | | | | | | |
|--------------|-------|------------|--------|-----|-----|----------|----------|----------|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Dilution |

Sample Description **SC-BHS7-ST1-SL-03**
 Matrix **Wastewater**
 SAL Sample Number **1408512-05**
 Date/Time Collected **08/20/14 10:45**
 Collected by **Josefin Hirst**
 Date/Time Received **08/20/14 16:05**

Inorganics

| | | | | | | | | |
|-------------------------|------|--------|-------------|-------|-------|----------------|----------------|------|
| Ammonia as N | mg/L | 0.11 | EPA 350.1 | 0.040 | 0.009 | 08/26/14 12:04 | 08/26/14 13:34 | 1 |
| Chloride | mg/L | 440 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:04 | 1.14 |
| Nitrate (as N) | mg/L | 30 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 13:58 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 13:58 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 1.6 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Nitrate+Nitrite (N) | mg/L | 30 | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 13:58 | 1 |

Sample Description **SC-BHS7-ST1-SL-04**
 Matrix **Wastewater**
 SAL Sample Number **1408512-07**
 Date/Time Collected **08/20/14 10:50**
 Collected by **Josefin Hirst**
 Date/Time Received **08/20/14 16:05**

Inorganics

| | | | | | | | | |
|--------------------------|------|---------|-------------|-------|-------|----------------|----------------|------|
| Ammonia as N | mg/L | 0.009 U | EPA 350.1 | 0.040 | 0.009 | 08/25/14 16:49 | 08/25/14 18:28 | 1 |
| Carbonaceous BOD | mg/L | 3 | SM 5210B | 2 | 2 | 08/21/14 09:19 | 08/26/14 11:37 | 1 |
| Chemical Oxygen Demand | mg/L | 170 | EPA 410.4 | 25 | 10 | 08/26/14 09:23 | 08/26/14 12:43 | 1 |
| Chloride | mg/L | 440 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 16:31 | 1.14 |
| Nitrate (as N) | mg/L | 22 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 14:07 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 14:07 | 1 |
| Orthophosphate as P | mg/L | 0.010 U | EPA 300.0 | 0.040 | 0.010 | | 08/21/14 14:07 | 1 |
| Phosphorous - Total as P | mg/L | 0.095 | SM 4500P-E | 0.040 | 0.010 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 1.4 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Nitrate+Nitrite (N) | mg/L | 22 | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 14:07 | 1 |

Microbiology

| | | | | | | | | |
|-----------------|------------|-------|----------|-----|-----|----------------|----------------|---|
| E. Coli | MPN/100 mL | 2.0 U | SM 9223B | 2.0 | 2.0 | 08/20/14 17:19 | 08/21/14 11:30 | 1 |
| Fecal Coliforms | CFU/100 ml | 1 U | SM 9222D | 1 | 1 | 08/20/14 17:09 | 08/21/14 15:36 | 1 |

Sample Description **NC-BHS7-ST2-DP-03**
 Matrix **Wastewater**
 SAL Sample Number **1408512-08**
 Date/Time Collected **08/20/14 08:48**
 Collected by **Josefin Hirst**
 Date/Time Received **08/20/14 16:05**

Inorganics

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September 10, 2014
 Work Order: 1408512

Laboratory Report

| Project Name | | B-HS7 SE#5 | | | | | | |
|-------------------------|-------|-----------------------|-------------|-------|-------|----------------|----------------|----------|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Dilution |
| Sample Description | | NC-BHS7-ST2-DP-03 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-08 | | | | | | |
| Date/Time Collected | | 08/20/14 08:48 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| Ammonia as N | mg/L | 0.027 I | EPA 350.1 | 0.040 | 0.009 | 08/25/14 16:49 | 08/25/14 18:28 | 1 |
| Chloride | mg/L | 200 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:06 | 1.14 |
| Nitrate (as N) | mg/L | 0.03 I | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 11:37 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 11:37 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 1.7 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Nitrate+Nitrite (N) | mg/L | 0.03 I | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 11:37 | 1 |
| Sample Description | | NC-BHS7-ST2-DP-03-DUP | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-09 | | | | | | |
| Date/Time Collected | | 08/20/14 08:54 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 0.056 | EPA 350.1 | 0.040 | 0.009 | 08/26/14 12:04 | 08/26/14 13:34 | 1 |
| Chloride | mg/L | 200 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:07 | 1.14 |
| Nitrate (as N) | mg/L | 0.03 I | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 11:56 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 11:56 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 16 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Nitrate+Nitrite (N) | mg/L | 0.03 I | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 11:56 | 1 |
| Sample Description | | C-BHS7-ST2-DP-05 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-10 | | | | | | |
| Date/Time Collected | | 08/20/14 10:06 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 0.050 | EPA 350.1 | 0.040 | 0.009 | 08/25/14 16:49 | 08/25/14 18:28 | 1 |
| Chloride | mg/L | 250 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:07 | 1.14 |
| Nitrate (as N) | mg/L | 0.05 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 13:29 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 13:29 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 2.6 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Nitrate+Nitrite (N) | mg/L | 0.05 I | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 13:29 | 1 |

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September 10, 2014
Work Order: 1408512

Laboratory Report

| Project Name | | B-HS7 SE#5 | | | | | | |
|----------------------------|------------|-----------------------|-------------|-------|-------|----------------|----------------|----------|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Dilution |
| Sample Description | | SE-BHS7-EFF-SL-08-DUP | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-12 | | | | | | |
| Date/Time Collected | | 08/20/14 09:55 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 0.020 I | EPA 350.1 | 0.040 | 0.009 | 08/26/14 12:04 | 08/26/14 13:34 | 1 |
| Chloride | mg/L | 340 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:08 | 1.14 |
| Nitrate (as N) | mg/L | 26 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 13:20 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 13:20 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 1.2 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Nitrate+Nitrite (N) | mg/L | 26 | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 13:20 | 1 |
| Sample Description | | SC-BHS7-ST2-DP-07 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-13 | | | | | | |
| Date/Time Collected | | 08/20/14 09:14 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 0.043 | EPA 350.1 | 0.040 | 0.009 | 08/26/14 12:04 | 08/26/14 13:34 | 1 |
| Carbonaceous BOD | mg/L | 9 | SM 5210B | 2 | 2 | 08/21/14 09:19 | 08/26/14 11:37 | 1 |
| Chemical Oxygen Demand | mg/L | 95 | EPA 410.4 | 25 | 10 | 08/26/14 09:23 | 08/26/14 12:43 | 1 |
| Chloride | mg/L | 470 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:09 | 1.14 |
| Nitrate (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 12:05 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 12:05 | 1 |
| Orthophosphate as P | mg/L | 0.82 | EPA 300.0 | 0.040 | 0.010 | | 08/21/14 12:05 | 1 |
| Phosphorous - Total as P | mg/L | 1.3 | SM 4500P-E | 0.040 | 0.010 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Total Alkalinity | mg/L | 180 | SM 2320B | 8.0 | 2.0 | 08/26/14 11:22 | 08/29/14 11:08 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 1.4 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 10:58 | 08/26/14 15:03 | 1 |
| Total Suspended Solids | mg/L | 11 | SM 2540D | 1 | 1 | 08/25/14 08:32 | 08/26/14 16:29 | 1 |
| Volatile Suspended Solids | mg/L | 1 U | EPA 160.4 | 1 | 1 | 08/26/14 08:23 | 08/27/14 16:22 | 1 |
| Nitrate+Nitrite (N) | mg/L | 0.02 U | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 12:05 | 1 |
| <u>Microbiology</u> | | | | | | | | |
| E. Coli | MPN/100 mL | 2.0 U,Q | SM 9223B | 2.0 | 2.0 | 08/20/14 17:19 | 08/21/14 11:30 | 1 |
| Fecal Coliforms | CFU/100 ml | 1 U | SM 9222D | 1 | 1 | 08/20/14 17:09 | 08/21/14 15:36 | 1 |

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September 10, 2014
Work Order: 1408512

Laboratory Report

| Project Name | | B-HS7 SE#5 | | | | | | |
|----------------------------|------------|-------------------|-------------|-------|-------|----------------|----------------|----------|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Dilution |
| Sample Description | | SW-BHS7-ST2-DP-08 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-14 | | | | | | |
| Date/Time Collected | | 08/20/14 09:40 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 0.026 I | EPA 350.1 | 0.040 | 0.009 | 08/25/14 16:49 | 08/25/14 18:28 | 1 |
| Carbonaceous BOD | mg/L | 11 | SM 5210B | 2 | 2 | 08/21/14 09:19 | 08/26/14 11:37 | 1 |
| Chemical Oxygen Demand | mg/L | 130 | EPA 410.4 | 25 | 10 | 08/26/14 09:23 | 08/26/14 12:43 | 1 |
| Chloride | mg/L | 380 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:10 | 1.14 |
| Nitrate (as N) | mg/L | 0.05 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 12:33 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 12:33 | 1 |
| Orthophosphate as P | mg/L | 0.68 | EPA 300.0 | 0.040 | 0.010 | | 08/21/14 12:33 | 1 |
| Phosphorous - Total as P | mg/L | 1.3 | SM 4500P-E | 0.040 | 0.010 | 08/26/14 15:07 | 08/27/14 15:35 | 1 |
| Total Alkalinity | mg/L | 150 | SM 2320B | 8.0 | 2.0 | 08/26/14 11:22 | 08/29/14 11:14 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 1.3 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 15:07 | 08/27/14 15:35 | 1 |
| Total Suspended Solids | mg/L | 13 | SM 2540D | 1 | 1 | 08/25/14 08:32 | 08/26/14 16:29 | 1 |
| Volatile Suspended Solids | mg/L | 1 U | EPA 160.4 | 1 | 1 | 08/26/14 08:23 | 08/27/14 16:22 | 1 |
| Nitrate+Nitrite (N) | mg/L | 0.05 I | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 12:33 | 1 |
| <u>Microbiology</u> | | | | | | | | |
| E. Coli | MPN/100 mL | 2.0 U | SM 9223B | 2.0 | 2.0 | 08/20/14 17:19 | 08/21/14 11:30 | 1 |
| Fecal Coliforms | CFU/100 ml | 1 U | SM 9222D | 1 | 1 | 08/20/14 17:09 | 08/21/14 15:36 | 1 |

Sample Description **NE-BHS7-EFF-SL-06**
 Matrix **Wastewater**
 SAL Sample Number **1408512-18**
 Date/Time Collected **08/20/14 08:40**
 Collected by **Josefin Hirst**
 Date/Time Received **08/20/14 16:05**

| | | | | | | | | |
|--------------------------|------|--------|-------------|-------|-------|----------------|----------------|------|
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 0.35 | EPA 350.1 | 0.040 | 0.009 | 08/26/14 12:04 | 08/26/14 13:34 | 1 |
| Chloride | mg/L | 170 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:10 | 1.14 |
| Nitrate (as N) | mg/L | 3.0 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 11:27 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 11:27 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 1.4 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 15:07 | 08/27/14 15:35 | 1 |
| Nitrate+Nitrite (N) | mg/L | 3.0 | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 11:27 | 1 |

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September 10, 2014
Work Order: 1408512

Laboratory Report

| Project Name | | B-HS7 SE#5 | | | | | | |
|--------------------------|-------|-------------------|-------------|-------|-------|----------------|----------------|----------|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Dilution |
| Sample Description | | NW-BHS7-EFF-SL-07 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-20 | | | | | | |
| Date/Time Collected | | 08/20/14 09:20 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 1.6 | EPA 350.1 | 0.040 | 0.009 | 08/26/14 12:04 | 08/26/14 13:34 | 1 |
| Chloride | mg/L | 450 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:11 | 1.14 |
| Nitrate (as N) | mg/L | 9.8 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 12:14 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 12:14 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 2.0 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 15:07 | 08/27/14 15:35 | 1 |
| Nitrate+Nitrite (N) | mg/L | 9.8 | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 12:14 | 1 |
| Sample Description | | NW-BHS7-EFF-DP-10 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-21 | | | | | | |
| Date/Time Collected | | 08/20/14 08:50 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 0.020 I | EPA 350.1 | 0.040 | 0.009 | 08/26/14 12:04 | 08/26/14 13:34 | 1 |
| Chloride | mg/L | 570 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:12 | 1.14 |
| Nitrate (as N) | mg/L | 5.7 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 11:46 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 11:46 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 1.5 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 15:07 | 08/27/14 15:35 | 1 |
| Nitrate+Nitrite (N) | mg/L | 5.7 | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 11:46 | 1 |
| Sample Description | | SE-BHS7-EFF-SL-08 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-22 | | | | | | |
| Date/Time Collected | | 08/20/14 09:50 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 0.009 U | EPA 350.1 | 0.040 | 0.009 | 08/25/14 16:49 | 08/25/14 18:28 | 1 |
| Chloride | mg/L | 410 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:13 | 1.14 |
| Nitrate (as N) | mg/L | 26 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 12:43 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 12:43 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 1.7 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 15:07 | 08/27/14 15:35 | 1 |
| Nitrate+Nitrite (N) | mg/L | 26 | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 12:43 | 1 |

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September 10, 2014
Work Order: 1408512

Laboratory Report

| Project Name | | B-HS7 SE#5 | | | | | | |
|--------------------------|-------|-------------------|-------------|-------|-------|----------------|----------------|----------|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Dilution |
| Sample Description | | SE-BHS7-EFF-DP-11 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-23 | | | | | | |
| Date/Time Collected | | 08/20/14 09:35 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 0.74 | EPA 350.1 | 0.040 | 0.009 | 08/25/14 16:49 | 08/25/14 18:28 | 1 |
| Chloride | mg/L | 500 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:13 | 1.14 |
| Nitrate (as N) | mg/L | 18 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 12:24 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 12:24 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 3.0 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 15:07 | 08/27/14 15:35 | 1 |
| Nitrate+Nitrite (N) | mg/L | 18 | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 12:24 | 1 |
| Sample Description | | SW-BHS7-EFF-SL-09 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-24 | | | | | | |
| Date/Time Collected | | 08/20/14 10:35 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 0.35 | EPA 350.1 | 0.040 | 0.009 | 08/26/14 12:04 | 08/26/14 13:34 | 1 |
| Carbonaceous BOD | mg/L | 26 | SM 5210B | 2 | 2 | 08/21/14 09:19 | 08/26/14 11:37 | 1 |
| Chemical Oxygen Demand | mg/L | 60 | EPA 410.4 | 25 | 10 | 08/26/14 09:23 | 08/26/14 12:43 | 1 |
| Chloride | mg/L | 1,400 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:14 | 1.14 |
| Nitrate (as N) | mg/L | 31 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 13:48 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 13:48 | 1 |
| Orthophosphate as P | mg/L | 0.010 U | EPA 300.0 | 0.040 | 0.010 | | 08/21/14 13:48 | 1 |
| Phosphorous - Total as P | mg/L | 0.010 U | SM 4500P-E | 0.040 | 0.010 | 08/26/14 15:07 | 08/27/14 15:35 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 2.1 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 15:07 | 08/27/14 15:35 | 1 |
| Nitrate+Nitrite (N) | mg/L | 31 | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 13:48 | 1 |
| Sample Description | | SW-BHS7-EFF-DP-12 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-25 | | | | | | |
| Date/Time Collected | | 08/20/14 10:10 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| <u>Inorganics</u> | | | | | | | | |
| Ammonia as N | mg/L | 0.084 | EPA 350.1 | 0.040 | 0.009 | 08/26/14 12:04 | 08/26/14 13:34 | 1 |
| Carbonaceous BOD | mg/L | 12 | SM 5210B | 2 | 2 | 08/21/14 09:19 | 08/26/14 11:37 | 1 |
| Chemical Oxygen Demand | mg/L | 100 | EPA 410.4 | 25 | 10 | 09/02/14 14:15 | 09/03/14 09:11 | 1 |

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September 10, 2014
Work Order: 1408512

Laboratory Report

| Project Name | | B-HS7 SE#5 | | | | | | |
|---------------------------|------------|-------------------|-------------|-------|-------|----------------|----------------|----------|
| Parameters | Units | Results * | Method | PQL | MDL | Prepared | Analyzed | Dilution |
| Sample Description | | SW-BHS7-EFF-DP-12 | | | | | | |
| Matrix | | Wastewater | | | | | | |
| SAL Sample Number | | 1408512-25 | | | | | | |
| Date/Time Collected | | 08/20/14 10:10 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| Chloride | mg/L | 470 | SM 4500Cl-E | 5.7 | 1.1 | | 08/28/14 14:14 | 1.14 |
| Nitrate (as N) | mg/L | 11 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 13:39 | 1 |
| Nitrite (as N) | mg/L | 0.01 U | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 13:39 | 1 |
| Orthophosphate as P | mg/L | 1.0 | EPA 300.0 | 0.040 | 0.010 | | 08/21/14 13:39 | 1 |
| Phosphorous - Total as P | mg/L | 1.6 | SM 4500P-E | 0.040 | 0.010 | 08/26/14 15:07 | 08/27/14 15:35 | 1 |
| Total Alkalinity | mg/L | 160 | SM 2320B | 8.0 | 2.0 | 08/26/14 11:22 | 08/29/14 11:20 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 3.3 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 15:07 | 08/27/14 15:35 | 1 |
| Total Suspended Solids | mg/L | 3 | SM 2540D | 1 | 1 | 08/25/14 08:32 | 08/26/14 16:29 | 1 |
| Volatile Suspended Solids | mg/L | 1 U | EPA 160.4 | 1 | 1 | 08/26/14 08:23 | 08/27/14 16:22 | 1 |
| Nitrate+Nitrite (N) | mg/L | 11 | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 13:39 | 1 |
| Microbiology | | | | | | | | |
| E. Coli | MPN/100 mL | 2.0 U | SM 9223B | 2.0 | 2.0 | 08/20/14 17:19 | 08/21/14 11:30 | 1 |
| Fecal Coliforms | CFU/100 ml | 1 U | SM 9222D | 1 | 1 | 08/20/14 17:09 | 08/21/14 15:36 | 1 |
| Sample Description | | BHS7-FB | | | | | | |
| Matrix | | Reagent Water | | | | | | |
| SAL Sample Number | | 1408512-26 | | | | | | |
| Date/Time Collected | | 08/20/14 11:50 | | | | | | |
| Collected by | | Josefin Hirst | | | | | | |
| Date/Time Received | | 08/20/14 16:05 | | | | | | |
| Inorganics | | | | | | | | |
| Ammonia as N | mg/L | 0.045 | EPA 350.1 | 0.040 | 0.009 | 08/26/14 12:04 | 08/26/14 13:34 | 1 |
| Carbonaceous BOD | mg/L | 2 U | SM 5210B | 2 | 2 | 08/21/14 09:19 | 08/26/14 11:37 | 1 |
| Chemical Oxygen Demand | mg/L | 10 U | EPA 410.4 | 25 | 10 | 09/02/14 14:15 | 09/03/14 09:11 | 1 |
| Chloride | mg/L | 0.99 | EPA 300.0 | 0.20 | 0.050 | | 08/21/14 22:03 | 1 |
| Nitrate (as N) | mg/L | 0.03 I | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 22:03 | 1 |
| Nitrite (as N) | mg/L | 0.06 | EPA 300.0 | 0.04 | 0.01 | | 08/21/14 22:03 | 1 |
| Orthophosphate as P | mg/L | 0.010 U | EPA 300.0 | 0.040 | 0.010 | | 08/21/14 22:03 | 1 |
| Phosphorous - Total as P | mg/L | 0.010 U | SM 4500P-E | 0.040 | 0.010 | 08/26/14 15:07 | 08/27/14 15:35 | 1 |
| Total Alkalinity | mg/L | 2.0 U | SM 2320B | 8.0 | 2.0 | 08/26/14 11:22 | 08/29/14 11:23 | 1 |
| Total Kjeldahl Nitrogen | mg/L | 0.21 | EPA 351.2 | 0.20 | 0.05 | 08/26/14 15:07 | 08/27/14 15:35 | 1 |
| Nitrate+Nitrite (N) | mg/L | 0.09 | EPA 300.0 | 0.08 | 0.02 | | 08/21/14 22:03 | 1 |
| Microbiology | | | | | | | | |
| E. Coli | MPN/100 mL | 2.0 U | SM 9223B | 2.0 | 2.0 | 08/20/14 17:19 | 08/21/14 11:30 | 1 |
| Fecal Coliforms | CFU/100 ml | 1 U | SM 9222D | 1 | 1 | 08/20/14 17:09 | 08/21/14 15:36 | 1 |

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Tampa, FL 33619

September 10, 2014
Work Order: 1408512

Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|----------------|-----|-----|-------|--|---------------|------|-------------|-----|-----------|
| Batch BH42032 - Chloride by Seal | | | | | | | | | | |
| Blank (BH42032-BLK1) | | | | | Prepared & Analyzed: 09/03/14 20:01 | | | | | |
| Chloride | 1.0 U | 5.0 | 1.0 | mg/L | | | | | | |
| LCS (BH42032-BS1) | | | | | Prepared & Analyzed: 09/03/14 20:02 | | | | | |
| Chloride | 39 | 5.0 | 1.0 | mg/L | 40 | | 98 | 90-110 | | |
| Matrix Spike (BH42032-MS1) | | | | | Source: 1408634-03 Prepared & Analyzed: 09/03/14 20:03 | | | | | |
| Chloride | very = 48%. J5 | 5.7 | 1.1 | mg/L | 40 | 170 | 62 | 80-120 | | |
| Matrix Spike (BH42032-MS2) | | | | | Source: 1409092-02 Prepared & Analyzed: 09/03/14 20:11 | | | | | |
| Chloride | very = 83% | 5.7 | 1.1 | mg/L | 40 | 310 | 52 | 80-120 | | |
| Matrix Spike Dup (BH42032-MSD1) | | | | | Source: 1408634-03 Prepared & Analyzed: 09/03/14 20:03 | | | | | |
| Chloride | very = 45%. J5 | 5.7 | 1.1 | mg/L | 40 | 170 | 36 | 80-120 | 6 | 20 |
| Matrix Spike Dup (BH42032-MSD2) | | | | | Source: 1409092-02 Prepared & Analyzed: 09/03/14 20:12 | | | | | |
| Chloride | blue = 81%. | 5.7 | 1.1 | mg/L | 40 | 310 | 39 | 80-120 | 2 | 20 |

Batch BH42101 - Ion Chromatography 300.0 Prep

| | | | | | | | | | | |
|-----------------------------|---------|-------|-------|------|-------------------------------------|--|----|--------|--|--|
| Blank (BH42101-BLK1) | | | | | Prepared & Analyzed: 08/21/14 10:59 | | | | | |
| Nitrite (as N) | 0.01 U | 0.04 | 0.01 | mg/L | | | | | | |
| Orthophosphate as P | 0.010 U | 0.040 | 0.010 | mg/L | | | | | | |
| Nitrate (as N) | 0.01 U | 0.04 | 0.01 | mg/L | | | | | | |
| Surrogate: Dichloroacetate | 0.956 | | | mg/L | 1.0 | | 96 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.956 | | | mg/L | 1.0 | | 96 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.956 | | | mg/L | 1.0 | | 96 | 78-120 | | |

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September 10, 2014
Work Order: 1408512

Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|--|--------------|-------|-------|-------|-------------------------------------|---------------|-------------------------------------|-------------|-----|-----------|
| Batch BH42101 - Ion Chromatography 300.0 Prep | | | | | | | | | | |
| LCS (BH42101-BS1) | | | | | Prepared & Analyzed: 08/21/14 11:09 | | | | | |
| Nitrate (as N) | 1.62 | 0.04 | 0.01 | mg/L | 1.7 | | 95 | 85-115 | | |
| Nitrite (as N) | 1.32 | 0.04 | 0.01 | mg/L | 1.4 | | 94 | 85-115 | | |
| Orthophosphate as P | 0.873 | 0.040 | 0.010 | mg/L | 0.90 | | 97 | 85-115 | | |
| Surrogate: Dichloroacetate | 0.917 | | | mg/L | 1.0 | | 92 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.917 | | | mg/L | 1.0 | | 92 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.917 | | | mg/L | 1.0 | | 92 | 78-120 | | |
| LCS Dup (BH42101-BSD1) | | | | | Prepared & Analyzed: 08/21/14 11:18 | | | | | |
| Nitrate (as N) | 1.56 | 0.04 | 0.01 | mg/L | 1.7 | | 92 | 85-115 | 4 | 200 |
| Nitrite (as N) | 1.33 | 0.04 | 0.01 | mg/L | 1.4 | | 95 | 85-115 | 1 | 200 |
| Orthophosphate as P | 0.860 | 0.040 | 0.010 | mg/L | 0.90 | | 96 | 85-115 | 2 | 200 |
| Surrogate: Dichloroacetate | 0.978 | | | mg/L | 1.0 | | 98 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.978 | | | mg/L | 1.0 | | 98 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.978 | | | mg/L | 1.0 | | 98 | 78-120 | | |
| Matrix Spike (BH42101-MS1) | | | | | Source: 1408512-22 | | Prepared & Analyzed: 08/21/14 12:52 | | | |
| Orthophosphate as P | 0.571 J2 | 0.040 | 0.010 | mg/L | 0.90 | ND | 63 | 85-115 | | |
| Nitrite (as N) | 0.01 U,J2,J6 | 0.04 | 0.01 | mg/L | 1.4 | ND | | 85-115 | | |
| Nitrate (as N) | 28.9 L2 | 0.04 | 0.01 | mg/L | 1.7 | 26.2 | 160 | 85-115 | | |
| Surrogate: Dichloroacetate | 1.12 | | | mg/L | 1.0 | | 112 | 78-120 | | |
| Surrogate: Dichloroacetate | 1.12 | | | mg/L | 1.0 | | 112 | 78-120 | | |
| Surrogate: Dichloroacetate | 1.12 | | | mg/L | 1.0 | | 112 | 78-120 | | |
| Matrix Spike (BH42101-MS2) | | | | | Source: 1408512-01 | | Prepared & Analyzed: 08/21/14 14:44 | | | |
| Orthophosphate as P | 4.65 | 0.040 | 0.010 | mg/L | 0.90 | 3.88 | 86 | 85-115 | | |
| Nitrite (as N) | 5.50 J6 | 0.04 | 0.01 | mg/L | 1.4 | ND | 393 | 85-115 | | |
| Nitrate (as N) | 1.51 | 0.04 | 0.01 | mg/L | 1.7 | 0.0560 | 86 | 85-115 | | |
| Surrogate: Dichloroacetate | 1.04 | | | mg/L | 1.0 | | 104 | 78-120 | | |
| Surrogate: Dichloroacetate | 1.04 | | | mg/L | 1.0 | | 104 | 78-120 | | |
| Surrogate: Dichloroacetate | 1.04 | | | mg/L | 1.0 | | 104 | 78-120 | | |

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September 10, 2014
Work Order: 1408512

Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|--|---------|-------|-------|-------|---|---------------|------|-------------|-----|-----------|
| Batch BH42112 - BOD | | | | | | | | | | |
| Blank (BH42112-BLK1) | | | | | Prepared: 08/21/14 Analyzed: 08/26/14 11:37 | | | | | |
| Carbonaceous BOD | 2 U | 2 | 2 | mg/L | | | | | | |
| LCS (BH42112-BS1) | | | | | Prepared: 08/21/14 Analyzed: 08/26/14 11:37 | | | | | |
| Carbonaceous BOD | 196 | 2 | 2 | mg/L | 200 | | 98 | 85-115 | | |
| LCS Dup (BH42112-BSD1) | | | | | Prepared: 08/21/14 Analyzed: 08/26/14 11:37 | | | | | |
| Carbonaceous BOD | 213 | 2 | 2 | mg/L | 200 | | 106 | 85-115 | 8 | 200 |
| Duplicate (BH42112-DUP1) | | | | | Prepared: 08/21/14 Analyzed: 08/26/14 11:37 | | | | | |
| Carbonaceous BOD | 140 | 2 | 2 | mg/L | | 130 | | | 4 | 25 |
| Batch BH42127 - Ammonia by SEAL | | | | | | | | | | |
| Blank (BH42127-BLK1) | | | | | Prepared & Analyzed: 08/25/14 18:28 | | | | | |
| Ammonia as N | 0.009 U | 0.040 | 0.009 | mg/L | | | | | | |
| LCS (BH42127-BS1) | | | | | Prepared & Analyzed: 08/25/14 18:28 | | | | | |
| Ammonia as N | 0.54 | 0.040 | 0.009 | mg/L | 0.50 | | 109 | 90-110 | | |
| Matrix Spike (BH42127-MS1) | | | | | Prepared & Analyzed: 08/25/14 18:28 | | | | | |
| Ammonia as N | 0.48 | 0.040 | 0.009 | mg/L | 0.50 | ND | 95 | 90-110 | | |
| Matrix Spike (BH42127-MS2) | | | | | Prepared & Analyzed: 08/25/14 18:28 | | | | | |
| Ammonia as N | 0.48 | 0.040 | 0.009 | mg/L | 0.50 | ND | 96 | 90-110 | | |
| Matrix Spike Dup (BH42127-MSD1) | | | | | Prepared & Analyzed: 08/25/14 18:28 | | | | | |
| Ammonia as N | 0.50 | 0.040 | 0.009 | mg/L | 0.50 | ND | 100 | 90-110 | 5 | 10 |

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September 10, 2014
Work Order: 1408512

Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---------|--------|-----|-----|-------|-------------|---------------|------|-------------|-----|-----------|
|---------|--------|-----|-----|-------|-------------|---------------|------|-------------|-----|-----------|

Batch BH42127 - Ammonia by SEAL

| | | | | | | | | | | |
|--|------|---------------------------|-------|------|-------------------------------------|----|----|--------|---|----|
| Matrix Spike Dup (BH42127-MSD2) | | Source: 1407976-06 | | | Prepared & Analyzed: 08/25/14 18:28 | | | | | |
| Ammonia as N | 0.45 | 0.040 | 0.009 | mg/L | 0.50 | ND | 91 | 90-110 | 5 | 10 |

Batch BH42140 - Ammonia by SEAL

| | | | | | | | | | | |
|---------------------------------|---------|--------------------|-------|------|-------------------------------------|-------|--------|--------|----|----|
| Blank (BH42140-BLK1) | | | | | Prepared & Analyzed: 08/26/14 13:34 | | | | | |
| Ammonia as N | 0.012 I | 0.040 | 0.009 | mg/L | | | | | | |
| LCS (BH42140-BS1) | | | | | Prepared & Analyzed: 08/26/14 13:34 | | | | | |
| Ammonia as N | 0.48 | 0.040 | 0.009 | mg/L | 0.50 | 96 | 90-110 | | | |
| Matrix Spike (BH42140-MS1) | | Source: 1408512-09 | | | Prepared & Analyzed: 08/26/14 13:34 | | | | | |
| Ammonia as N | 0.51 J5 | 0.040 | 0.009 | mg/L | 0.50 | 0.056 | 91 | 90-110 | | |
| Matrix Spike (BH42140-MS2) | | Source: 1408698-07 | | | Prepared & Analyzed: 08/26/14 13:34 | | | | | |
| Ammonia as N | 0.36 J5 | 0.040 | 0.009 | mg/L | 0.50 | 0.020 | 68 | 90-110 | | |
| Matrix Spike Dup (BH42140-MSD1) | | Source: 1408512-09 | | | Prepared & Analyzed: 08/26/14 13:34 | | | | | |
| Ammonia as N | 0.50 J5 | 0.040 | 0.009 | mg/L | 0.50 | 0.056 | 88 | 90-110 | 3 | 10 |
| Matrix Spike Dup (BH42140-MSD2) | | Source: 1408698-07 | | | Prepared & Analyzed: 08/26/14 13:34 | | | | | |
| Ammonia as N | 0.59 J5 | 0.040 | 0.009 | mg/L | 0.50 | 0.020 | 114 | 90-110 | 49 | 10 |

Batch BH42151 - Ion Chromatography 300.0 Prep

| | | | | | | | | | | |
|-----------------------------|---------|-------------------------------------|-------|------|-----|--|----|--------|--|--|
| Blank (BH42151-BLK1) | | Prepared & Analyzed: 08/21/14 18:28 | | | | | | | | |
| Nitrite (as N) | 0.01 U | 0.04 | 0.01 | mg/L | | | | | | |
| Orthophosphate as P | 0.010 U | 0.040 | 0.010 | mg/L | | | | | | |
| Chloride | 0.050 U | 0.20 | 0.050 | mg/L | | | | | | |
| Nitrate (as N) | 0.01 U | 0.04 | 0.01 | mg/L | | | | | | |
| Surrogate: Dichloroacetate | 0.880 | | | mg/L | 1.0 | | 88 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.880 | | | mg/L | 1.0 | | 88 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.880 | | | mg/L | 1.0 | | 88 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.880 | | | mg/L | 1.0 | | 88 | 78-120 | | |

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September 10, 2014
Work Order: 1408512

Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|--|------------|-------|-------|-------|-------------------------------------|---------------|-------------------------------------|-------------|-----|-----------|
| Batch BH42151 - Ion Chromatography 300.0 Prep | | | | | | | | | | |
| LCS (BH42151-BS1) | | | | | Prepared & Analyzed: 08/21/14 18:46 | | | | | |
| Orthophosphate as P | 0.926 | 0.040 | 0.010 | mg/L | 0.90 | | 103 | 85-115 | | |
| Nitrate (as N) | 1.59 | 0.04 | 0.01 | mg/L | 1.7 | | 94 | 85-115 | | |
| Nitrite (as N) | 1.32 | 0.04 | 0.01 | mg/L | 1.4 | | 94 | 85-115 | | |
| Chloride | 2.82 | 0.20 | 0.050 | mg/L | 3.0 | | 94 | 85-115 | | |
| Surrogate: Dichloroacetate | 0.962 | | | mg/L | 1.0 | | 96 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.962 | | | mg/L | 1.0 | | 96 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.962 | | | mg/L | 1.0 | | 96 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.962 | | | mg/L | 1.0 | | 96 | 78-120 | | |
| LCS Dup (BH42151-BS1) | | | | | Prepared & Analyzed: 08/21/14 18:55 | | | | | |
| Nitrate (as N) | 1.60 | 0.04 | 0.01 | mg/L | 1.7 | | 94 | 85-115 | 0.6 | 200 |
| Nitrite (as N) | 1.32 | 0.04 | 0.01 | mg/L | 1.4 | | 94 | 85-115 | 0.6 | 200 |
| Chloride | 2.87 | 0.20 | 0.050 | mg/L | 3.0 | | 96 | 85-115 | 2 | 200 |
| Orthophosphate as P | 0.905 | 0.040 | 0.010 | mg/L | 0.90 | | 101 | 85-115 | 2 | 200 |
| Surrogate: Dichloroacetate | 0.966 | | | mg/L | 1.0 | | 97 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.966 | | | mg/L | 1.0 | | 97 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.966 | | | mg/L | 1.0 | | 97 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.966 | | | mg/L | 1.0 | | 97 | 78-120 | | |
| Matrix Spike (BH42151-MS1) | | | | | Source: 1408074-03 | | Prepared & Analyzed: 08/21/14 20:38 | | | |
| Nitrate (as N) | 4.12 | 0.04 | 0.01 | mg/L | 1.7 | 2.49 | 96 | 85-115 | | |
| Nitrite (as N) | 2.01 J2,J6 | 0.04 | 0.01 | mg/L | 1.4 | ND | 143 | 85-115 | | |
| Orthophosphate as P | 0.624 J2 | 0.040 | 0.010 | mg/L | 0.90 | 0.0260 | 66 | 85-115 | | |
| Chloride | 45.8 L2 | 0.20 | 0.050 | mg/L | 3.0 | 44.8 | 36 | 80-120 | | |
| Surrogate: Dichloroacetate | 0.854 | | | mg/L | 1.0 | | 85 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.854 | | | mg/L | 1.0 | | 85 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.854 | | | mg/L | 1.0 | | 85 | 78-120 | | |
| Surrogate: Dichloroacetate | 0.854 | | | mg/L | 1.0 | | 85 | 78-120 | | |

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Tampa, FL 33619

September 10, 2014
Work Order: 1408512

Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---------|--------|-----|-----|-------|-------------|---------------|------|-------------|-----|-----------|
|---------|--------|-----|-----|-------|-------------|---------------|------|-------------|-----|-----------|

Batch BH42151 - Ion Chromatography 300.0 Prep

| Matrix Spike (BH42151-MS2) | | Source: 1409010-01 | | | Prepared & Analyzed: 08/22/14 09:04 | | | | | |
|----------------------------|-------|--------------------|-------|------|-------------------------------------|-------|-----|--------|--|--|
| Nitrite (as N) | 1.32 | 0.04 | 0.01 | mg/L | 1.4 | ND | 95 | 85-115 | | |
| Orthophosphate as P | 0.974 | 0.040 | 0.010 | mg/L | 0.90 | ND | 108 | 85-115 | | |
| Chloride | 6.15 | 0.20 | 0.050 | mg/L | 3.0 | 3.48 | 89 | 80-120 | | |
| Nitrate (as N) | 1.73 | 0.04 | 0.01 | mg/L | 1.7 | 0.275 | 86 | 85-115 | | |
| Surrogate: Dichloroacetate | 1.09 | | | mg/L | 1.0 | | 109 | 78-120 | | |
| Surrogate: Dichloroacetate | 1.09 | | | mg/L | 1.0 | | 109 | 78-120 | | |
| Surrogate: Dichloroacetate | 1.09 | | | mg/L | 1.0 | | 109 | 78-120 | | |
| Surrogate: Dichloroacetate | 1.09 | | | mg/L | 1.0 | | 109 | 78-120 | | |

Batch BH42504 - TSS prep

| Blank (BH42504-BLK1) | | Prepared: 08/25/14 Analyzed: 08/26/14 16:29 | | | | | | | | |
|--------------------------|------|---|---|------|---|------|----|--------|---|----|
| Total Suspended Solids | 1 U | 1 | 1 | mg/L | | | | | | |
| Blank (BH42504-BLK2) | | Prepared: 08/25/14 Analyzed: 08/26/14 16:29 | | | | | | | | |
| Total Suspended Solids | 1 U | 1 | 1 | mg/L | | | | | | |
| LCS (BH42504-BS1) | | Prepared: 08/25/14 Analyzed: 08/26/14 16:29 | | | | | | | | |
| Total Suspended Solids | 46.0 | 1 | 1 | mg/L | 50 | | 92 | 85-115 | | |
| LCS (BH42504-BS2) | | Prepared: 08/25/14 Analyzed: 08/26/14 16:29 | | | | | | | | |
| Total Suspended Solids | 49.5 | 1 | 1 | mg/L | 50 | | 99 | 85-115 | | |
| Duplicate (BH42504-DUP1) | | Source: 1408843-01 | | | Prepared: 08/25/14 Analyzed: 08/26/14 16:29 | | | | | |
| Total Suspended Solids | 165 | 1 | 1 | mg/L | | 171 | | | 4 | 30 |
| Duplicate (BH42504-DUP2) | | Source: 1408895-01 | | | Prepared: 08/25/14 Analyzed: 08/26/14 16:29 | | | | | |
| Total Suspended Solids | 90.0 | 1 | 1 | mg/L | | 94.0 | | | 4 | 30 |

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Tampa, FL 33619

September 10, 2014
Work Order: 1408512

Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|--|--------|-----|-----|-------|--|---------------|------|-------------|-----|-----------|
| Batch BH42605 - VSS Prep | | | | | | | | | | |
| Blank (BH42605-BLK1) | | | | | Prepared: 08/26/14 Analyzed: 08/27/14 16:22 | | | | | |
| Volatile Suspended Solids | 1 U | 1 | | mg/L | | | | | | |
| Duplicate (BH42605-DUP1) | | | | | Source: 1408512-01 Prepared: 08/26/14 Analyzed: 08/27/14 16:22 | | | | | |
| Volatile Suspended Solids | 37.5 | 1 | | mg/L | | 37.0 | | | 1 | 20 |
| Batch BH42610 - alkalinity | | | | | | | | | | |
| Blank (BH42610-BLK1) | | | | | Prepared & Analyzed: 09/04/14 11:22 | | | | | |
| Total Alkalinity | 2.0 U | 8.0 | 2.0 | mg/L | | | | | | |
| Blank (BH42610-BLK2) | | | | | Prepared & Analyzed: 08/26/14 12:42 | | | | | |
| Total Alkalinity | 2.0 U | 8.0 | 2.0 | mg/L | | | | | | |
| LCS (BH42610-BS1) | | | | | Prepared & Analyzed: 08/26/14 12:57 | | | | | |
| Total Alkalinity | 120 | 8.0 | 2.0 | mg/L | 120 | | 98 | 90-110 | | |
| LCS (BH42610-BS2) | | | | | Prepared & Analyzed: 08/26/14 13:03 | | | | | |
| Total Alkalinity | 120 | 8.0 | 2.0 | mg/L | 120 | | 97 | 90-110 | | |
| Matrix Spike (BH42610-MS1) | | | | | Source: 1407939-01 Prepared & Analyzed: 08/26/14 13:24 | | | | | |
| Total Alkalinity | 520 | 8.0 | 2.0 | mg/L | 120 | 410 | 83 | 80-120 | | |
| Matrix Spike (BH42610-MS2) | | | | | Source: 1407976-01 Prepared: 08/26/14 Analyzed: 09/04/14 11:22 | | | | | |
| Total Alkalinity | 560 | 8.0 | 2.0 | mg/L | 120 | 440 | 97 | 80-120 | | |
| Matrix Spike Dup (BH42610-MSD1) | | | | | Source: 1407939-01 Prepared & Analyzed: 08/26/14 13:34 | | | | | |
| Total Alkalinity | 510 | 8.0 | 2.0 | mg/L | 120 | 410 | 82 | 80-120 | 0.2 | 26 |

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September 10, 2014
Work Order: 1408512

Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|--|----------|--------------------|-------|-------|---|---------------|------|-------------|-----|-----------|
| Batch BH42610 - alkalinity | | | | | | | | | | |
| Matrix Spike Dup (BH42610-MSD2) | | Source: 1407976-01 | | | Prepared: 08/26/14 Analyzed: 09/04/14 11:22 | | | | | |
| Total Alkalinity | 560 | 8.0 | 2.0 | mg/L | 120 | 440 | 95 | 80-120 | 0.4 | 26 |
| Batch BH42612 - COD prep | | | | | | | | | | |
| Blank (BH42612-BLK1) | | | | | Prepared & Analyzed: 08/26/14 12:43 | | | | | |
| Chemical Oxygen Demand | 10 U | 25 | 10 | mg/L | Prepared & Analyzed: 08/26/14 12:43 | | | | | |
| LCS (BH42612-BS1) | | | | | | | | | | |
| Chemical Oxygen Demand | 52 | 25 | 10 | mg/L | 50 | | 104 | 90-110 | | |
| Matrix Spike (BH42612-MS1) | | Source: 1408271-01 | | | Prepared & Analyzed: 08/26/14 12:43 | | | | | |
| Chemical Oxygen Demand | 890 | 25 | 10 | mg/L | 500 | 450 | 88 | 85-115 | | |
| Matrix Spike Dup (BH42612-MSD1) | | Source: 1408271-01 | | | Prepared & Analyzed: 08/26/14 12:43 | | | | | |
| Chemical Oxygen Demand | 910 | 25 | 10 | mg/L | 500 | 450 | 92 | 85-115 | 2 | 32 |
| Batch BH42620 - Digestion for TP and TKN | | | | | | | | | | |
| Blank (BH42620-BLK1) | | | | | Prepared & Analyzed: 08/26/14 15:03 | | | | | |
| Total Kjeldahl Nitrogen | 0.05 U | 0.20 | 0.05 | mg/L | Prepared & Analyzed: 08/26/14 15:03 | | | | | |
| Phosphorous - Total as P | 0.0150 I | 0.040 | 0.010 | mg/L | | | | | | |
| LCS (BH42620-BS1) | | | | | | | | | | |
| Total Kjeldahl Nitrogen | 0.952 | 0.20 | 0.05 | mg/L | 1.0 | | 95 | 90-110 | | |
| Phosphorous - Total as P | 1.04 | 0.040 | 0.010 | mg/L | 1.0 | | 104 | 90-110 | | |

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Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---------|---|-------|-------|---|---------------|------|-------------|-------|-----------|
| Batch BH42620 - Digestion for TP and TKN | | | | | | | | | | |
| Matrix Spike (BH42620-MS1) | | Source: 1408512-01 | | | Prepared & Analyzed: 08/26/14 15:03 | | | | | |
| Phosphorous - Total as P | 6.75 | 0.040 | 0.010 | mg/L | 1.0 | 5.66 | 108 | 90-110 | | |
| Total Kjeldahl Nitrogen | 47.7 | 0.20 | 0.05 | mg/L | 1.0 | 46.6 | 109 | 90-110 | | |
| Matrix Spike (BH42620-MS2) | | Source: 1408512-13 | | | Prepared & Analyzed: 08/26/14 15:03 | | | | | |
| Total Kjeldahl Nitrogen | 2.76 J5 | 0.20 | 0.05 | mg/L | 1.0 | 1.45 | 131 | 90-110 | | |
| Phosphorous - Total as P | 2.40 | 0.040 | 0.010 | mg/L | 1.0 | 1.34 | 106 | 90-110 | | |
| Matrix Spike Dup (BH42620-MSD1) | | Source: 1408512-01 | | | Prepared & Analyzed: 08/26/14 15:03 | | | | | |
| Phosphorous - Total as P | 6.76 | 0.040 | 0.010 | mg/L | 1.0 | 5.66 | 110 | 90-110 | 0.2 | 25 |
| Total Kjeldahl Nitrogen | 47.7 | 0.20 | 0.05 | mg/L | 1.0 | 46.6 | 109 | 90-110 | 0.002 | 20 |
| Matrix Spike Dup (BH42620-MSD2) | | Source: 1408512-13 | | | Prepared & Analyzed: 08/26/14 15:03 | | | | | |
| Phosphorous - Total as P | 2.43 | 0.040 | 0.010 | mg/L | 1.0 | 1.34 | 109 | 90-110 | 1 | 25 |
| Total Kjeldahl Nitrogen | 2.53 | 0.20 | 0.05 | mg/L | 1.0 | 1.45 | 108 | 90-110 | 9 | 20 |
| Batch BH42634 - Digestion for TP and TKN | | | | | | | | | | |
| Blank (BH42634-BLK1) | | Prepared: 08/26/14 Analyzed: 08/27/14 15:35 | | | | | | | | |
| Total Kjeldahl Nitrogen | 0.05 U | 0.20 | 0.05 | mg/L | | | | | | |
| Phosphorous - Total as P | 0.010 U | 0.040 | 0.010 | mg/L | | | | | | |
| LCS (BH42634-BS1) | | Prepared: 08/26/14 Analyzed: 08/27/14 15:35 | | | | | | | | |
| Phosphorous - Total as P | 1.09 | 0.040 | 0.010 | mg/L | 1.0 | | 109 | 90-110 | | |
| Total Kjeldahl Nitrogen | 0.987 | 0.20 | 0.05 | mg/L | 1.0 | | 99 | 90-110 | | |
| Matrix Spike (BH42634-MS1) | | Source: 1408512-26 | | | Prepared: 08/26/14 Analyzed: 08/27/14 15:35 | | | | | |
| Phosphorous - Total as P | 1.10 | 0.040 | 0.010 | mg/L | 1.0 | ND | 110 | 90-110 | | |
| Total Kjeldahl Nitrogen | 1.16 | 0.20 | 0.05 | mg/L | 1.0 | 0.206 | 95 | 90-110 | | |

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September 10, 2014
Work Order: 1408512

Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|---------|-------------------------------------|-------|-------|---|---------------|------|-------------|-----|-----------|
| Batch BH42634 - Digestion for TP and TKN | | | | | | | | | | |
| Matrix Spike (BH42634-MS2) | | Source: 1408931-07 | | | Prepared: 08/26/14 Analyzed: 08/27/14 15:35 | | | | | |
| Phosphorous - Total as P | 1.06 | 0.040 | 0.010 | mg/L | 1.0 | 0.0201 | 104 | 90-110 | | |
| Total Kjeldahl Nitrogen | 1.64 | 0.20 | 0.05 | mg/L | 1.0 | 0.543 | 110 | 90-110 | | |
| Matrix Spike Dup (BH42634-MSD1) | | Source: 1408512-26 | | | Prepared: 08/26/14 Analyzed: 08/27/14 15:35 | | | | | |
| Total Kjeldahl Nitrogen | 1.14 | 0.20 | 0.05 | mg/L | 1.0 | 0.206 | 94 | 90-110 | 2 | 20 |
| Phosphorous - Total as P | 1.09 | 0.040 | 0.010 | mg/L | 1.0 | ND | 109 | 90-110 | 0.9 | 25 |
| Matrix Spike Dup (BH42634-MSD2) | | Source: 1408931-07 | | | Prepared: 08/26/14 Analyzed: 08/27/14 15:35 | | | | | |
| Phosphorous - Total as P | 1.09 | 0.040 | 0.010 | mg/L | 1.0 | 0.0201 | 107 | 90-110 | 3 | 25 |
| Total Kjeldahl Nitrogen | 1.58 | 0.20 | 0.05 | mg/L | 1.0 | 0.543 | 104 | 90-110 | 4 | 20 |
| Batch BH42639 - Ammonia by SEAL | | | | | | | | | | |
| Blank (BH42639-BLK1) | | Prepared & Analyzed: 08/27/14 10:56 | | | | | | | | |
| Ammonia as N | 0.009 U | 0.040 | 0.009 | mg/L | | | | | | |
| LCS (BH42639-BS1) | | Prepared & Analyzed: 08/27/14 10:58 | | | | | | | | |
| Ammonia as N | 0.52 | 0.040 | 0.009 | mg/L | 0.50 | | 105 | 90-110 | | |
| Matrix Spike (BH42639-MS1) | | Source: 1408931-07 | | | Prepared & Analyzed: 08/27/14 11:00 | | | | | |
| Ammonia as N | 0.25 J5 | 0.040 | 0.009 | mg/L | 0.50 | ND | 50 | 90-110 | | |
| Matrix Spike (BH42639-MS2) | | Source: 1407939-16 | | | Prepared & Analyzed: 08/27/14 11:24 | | | | | |
| Ammonia as N | 0.39 J5 | 0.040 | 0.009 | mg/L | 0.50 | 0.047 | 68 | 90-110 | | |
| Matrix Spike Dup (BH42639-MSD1) | | Source: 1408931-07 | | | Prepared & Analyzed: 08/27/14 11:01 | | | | | |
| Ammonia as N | 0.40 J5 | 0.040 | 0.009 | mg/L | 0.50 | ND | 81 | 90-110 | 47 | 10 |

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September 10, 2014
Work Order: 1408512

Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|----------|---------------------------|-------|-------|-------------------------------------|---------------|------|-------------|-----|-----------|
| Batch BH42639 - Ammonia by SEAL | | | | | | | | | | |
| Matrix Spike Dup (BH42639-MSD2) | | Source: 1407939-16 | | | Prepared & Analyzed: 08/27/14 11:25 | | | | | |
| Ammonia as N | 0.34 J5 | 0.040 | 0.009 | mg/L | 0.50 | 0.047 | 58 | 90-110 | 14 | 10 |
| Batch BH42813 - Chloride by Seal | | | | | | | | | | |
| Blank (BH42813-BLK1) | | | | | Prepared & Analyzed: 08/28/14 13:58 | | | | | |
| Chloride | 1.0 U | 5.0 | 1.0 | mg/L | | | | | | |
| LCS (BH42813-BS1) | | | | | Prepared & Analyzed: 08/28/14 13:58 | | | | | |
| Chloride | 41 | 5.0 | 1.0 | mg/L | 40 | | 104 | 90-110 | | |
| Matrix Spike (BH42813-MS1) | | Source: 1408512-02 | | | Prepared & Analyzed: 08/28/14 13:59 | | | | | |
| Chloride | 320 I,L2 | 440 | 88 | mg/L | 40 | 340 | NR | 80-120 | | |
| Matrix Spike (BH42813-MS2) | | Source: 1408512-13 | | | Prepared & Analyzed: 08/28/14 14:08 | | | | | |
| Chloride | 480 L2 | 440 | 88 | mg/L | 4.0 | 470 | 185 | 80-120 | | |
| Matrix Spike Dup (BH42813-MSD1) | | Source: 1408512-02 | | | Prepared & Analyzed: 08/28/14 14:00 | | | | | |
| Chloride | 340 I,L2 | 440 | 88 | mg/L | 40 | 340 | 1 | 80-120 | 8 | 20 |
| Matrix Spike Dup (BH42813-MSD2) | | Source: 1408512-13 | | | Prepared & Analyzed: 08/28/14 14:09 | | | | | |
| Chloride | 410 I,L2 | 440 | 88 | mg/L | 4.0 | 470 | NR | 80-120 | 15 | 20 |
| Batch BH42818 - Chloride by Seal | | | | | | | | | | |
| Blank (BH42818-BLK1) | | | | | Prepared & Analyzed: 08/28/14 16:15 | | | | | |
| Chloride | 1.0 U | 5.0 | 1.0 | mg/L | | | | | | |

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September 10, 2014
Work Order: 1408512

Inorganics - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---|----------|-----|-----|-------|---|---------------|------|-------------|-----|-----------|
| Batch BH42818 - Chloride by Seal | | | | | | | | | | |
| LCS (BH42818-BS1) | | | | | Prepared & Analyzed: 08/28/14 16:15 | | | | | |
| Chloride | 41 | 5.0 | 1.0 | mg/L | 40 | | 104 | 90-110 | | |
| Matrix Spike (BH42818-MS1) | | | | | Source: 1408634-02 Prepared & Analyzed: 08/28/14 16:16 | | | | | |
| Chloride | 210 L2 | 5.7 | 1.1 | mg/L | 40 | 190 | 40 | 80-120 | | |
| Matrix Spike (BH42818-MS2) | | | | | Source: 1408697-02 Prepared & Analyzed: 08/28/14 16:25 | | | | | |
| Chloride | 3,200 L2 | 5.7 | 1.1 | mg/L | 4.0 | 3400 | NR | 80-120 | | |
| Matrix Spike Dup (BH42818-MSD1) | | | | | Source: 1408634-02 Prepared & Analyzed: 08/28/14 16:17 | | | | | |
| Chloride | 200 L2 | 5.7 | 1.1 | mg/L | 40 | 190 | 21 | 80-120 | 4 | 20 |
| Matrix Spike Dup (BH42818-MSD2) | | | | | Source: 1408697-02 Prepared & Analyzed: 08/28/14 16:26 | | | | | |
| Chloride | 2,600 L2 | 5.7 | 1.1 | mg/L | 4.0 | 3400 | NR | 80-120 | 21 | 20 |
| Batch BI40231 - COD prep | | | | | | | | | | |
| Blank (BI40231-BLK1) | | | | | Prepared: 09/02/14 Analyzed: 09/03/14 09:11 | | | | | |
| Chemical Oxygen Demand | 10 U | 25 | 10 | mg/L | | | | | | |
| LCS (BI40231-BS1) | | | | | Prepared: 09/02/14 Analyzed: 09/03/14 09:11 | | | | | |
| Chemical Oxygen Demand | 49 | 25 | 10 | mg/L | 50 | | 98 | 90-110 | | |
| Matrix Spike (BI40231-MS1) | | | | | Source: 1408512-26 Prepared: 09/02/14 Analyzed: 09/03/14 09:11 | | | | | |
| Chemical Oxygen Demand | 43 | 25 | 10 | mg/L | 50 | ND | 86 | 85-115 | | |
| Matrix Spike Dup (BI40231-MSD1) | | | | | Source: 1408512-26 Prepared: 09/02/14 Analyzed: 09/03/14 09:11 | | | | | |
| Chemical Oxygen Demand | 47 | 25 | 10 | mg/L | 50 | ND | 94 | 85-115 | 9 | 32 |

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September 10, 2014
Work Order: 1408512

Microbiology - Quality Control

| Analyte | Result | PQL | MDL | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit |
|---------------------------------|--------|-----|-----|------------|---|---------------|------|-------------|-----|-----------|
| Batch BH42106 - FC-MF | | | | | | | | | | |
| Blank (BH42106-BLK1) | | | | | Prepared: 08/20/14 Analyzed: 08/21/14 15:36 | | | | | |
| Fecal Coliforms | 1 U | 1 | 1 | CFU/100 ml | | | | | | |
| Duplicate (BH42106-DUP1) | | | | | Source: 1408512-26 Prepared: 08/20/14 Analyzed: 08/21/14 15:36 | | | | | |
| Fecal Coliforms | 1 U | 1 | 1 | CFU/100 ml | | ND | | | | 200 |
| Duplicate (BH42106-DUP2) | | | | | Source: 1408075-01 Prepared: 08/20/14 Analyzed: 08/21/14 15:36 | | | | | |
| Fecal Coliforms | 1 U | 1 | 1 | CFU/100 ml | | ND | | | | 200 |

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* Qualifiers, Notes and Definitions

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

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

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

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

- Q Sample held beyond the accepted holding time.
- L2 Analyte level in sample invalidated Matrix Spike.
- J6 The sample matrix interfered with the ability to make any accurate determination.
- J5 Matrix spike of this sample was outside typical range. All other QC criteria were acceptable.
- J2 Quality control value for accuracy was outside control limits.

Questions regarding this report should be directed to :

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



| | | | | | | | | | | | | | | | | | | | | |
|---|------------------------------|---------|-------|--------|-----------|------|---|--|--|--|-------------------------|--|--|--|--|----------|-------------------|---------------------------------|----------|--|
| Client Name Hazen and Sawyer | | | | | | | | | | Josefin Hirst | | | | | | | | | | |
| Project Name / Location BHS7 SE#5 | | | | | | | | | | | | | | | | | | | | |
| Samplers: (Signature) <i>Josefin Hirst</i> | | | | | | | | | | PARAMETER / CONTAINER DESCRIPTION | | | | | | | | | | |
| Matrix Codes: DW-Drinking Water WW-Wastewater SW-Surface Water SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water | | | | | | | | | | | | | | | | | | | | |
| SAL Use Only Sample No. | Sample Description | Date | Time | Matrix | Composite | Grab | 125mLP, Na ₂ S ₂ O ₃ FC-MF, FC-QT | 500mLP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx, Cl, OP | 125mLP, H ₂ SO ₄ COD, TKN, NH ₃ , TP | 125mLP, H ₂ SO ₄ TKN, NH ₃ | 500mLP, Cool NOx, Cl | | | | | Field pH | Field Temperature | Field Conductivity <i>µS/cm</i> | Field DO | No. of Containers (Total per each location) |
| 01 | BHS7-PUMP | 8/20/14 | 11:30 | WW | | X | 4 | 2 | 1 | | | | | | | 7.06 | 27.82 | 1911 | 0.05 | |
| 02 | BHS7-PUMP-DUP | | 11:40 | WW | | X | 4 | 2 | 1 | | | | | | | 7.06 | 27.82 | 1911 | 0.05 | |
| 03 | NC-BHS7-ST1-SL-01 | | 10:56 | WW | | X | | | | 1 | 1 | | | | | 5.55 | 28.9 | 2110 | 4.34 | |
| 04 | NC-BHS7-ST1-SL-02 | | 11:00 | WW | | X | | | | 1 | 1 | | | | | 4.64 | 28.6 | 1457 | 3.04 | |
| 05 | SC-BHS7-ST1-SL-03 | | 10:45 | WW | | X | | | | 1 | 1 | | | | | 5.09 | 21.1 | 1863 | 4.06 | |
| 06 | SP-BHS7-ST1-DP-01 <i>KEY</i> | | | WW | | X | | | | 1 | 1 | | | | | | | | | |
| 07 | SC-BHS7-ST1-SL-04 | | 10:50 | WW | | X | 4 | 2 | 1 | | | | | | | 5.29 | 29.5 | 1838 | 3.78 | |
| 08 | NC-BHS7-ST2-DP-03 | | 8:48 | WW | | X | | | | 1 | 1 | | | | | 6.44 | 27.3 | 1059 | 3.48 | |
| 09 | NC-BHS7-ST2-DP-03-DUP | | 8:54 | WW | | X | | | | 1 | 1 | | | | | 6.19 | 27.4 | 1086 | 4.32 | |
| 10 | C-BHS7-ST2-DP-05 | | 10:06 | WW | | X | | | | 1 | 1 | | | | | 6.16 | 28.31 | 1183 | 4.50 | |
| 11 | SE-BHS7-ST2-DP-06 <i>KEY</i> | | | WW | | X | | | | 1 | 1 | | | | | | | | | |
| 12 | SE-BHS7-ST2-DP-06-DUP | | 9:55 | WW | | X | | | | 1 | 1 | | | | | 5.04 | 27.6 | 1820 | 5.10 | |

| | | | | | |
|--|------------------------------|--------------------------------|------------------------------|--|-------------------------|
| Containers Prepared/ Relinquished: <i>MAN</i> | Date/Time: 1000 08/13/14 | Received: <i>Josefin Hirst</i> | Date/Time: 13:00 08/14/14 | Seal intact? <input checked="" type="checkbox"/> N N/A | Instructions / Remarks: |
| Relinquished: <i>Josefin Hirst</i> | Date/Time: 14:55 08/20/14 | Received: <i>Brant White</i> | Date/Time: 14:55 08/20/14 | Samples intact upon arrival? <input checked="" type="checkbox"/> N N/A | |
| Relinquished: <i>Brant White</i> | Date/Time: 16:05 8-20-14 | Received: <i>RL</i> | Date/Time: 16:05 8-20-14 | Received on ice? Temp: <input checked="" type="checkbox"/> N N/A | |
| Relinquished: | Date/Time: | Received: | Date/Time: | Proper preservatives indicated? <input checked="" type="checkbox"/> N N/A | |
| Relinquished: | Date/Time: | Received: | Date/Time: | Rec'd within holding time? <input checked="" type="checkbox"/> N N/A | |
| Relinquished: | Date/Time: | Received: | Date/Time: | Volatiles rec'd w/out headspace? <input checked="" type="checkbox"/> N N/A | |
| Relinquished: | Date/Time: | Received: | Date/Time: | Proper containers used? <input checked="" type="checkbox"/> N N/A | |

| | | | | | | | | | | | | | | | | | | | | | |
|--|---------------|------------------------------|--------------------------------|-------|-----------------------------|-----------|--|---|--|--|--|-------------------------|--|--|--|--|-------------------------|-------------------|--------------------------------|----------|--|
| Client Name Hazen and Sawyer | | | | | | | | | | Josefin Hirst | | | | | | | | | | | |
| Project Name / Location BHS7 SE#5 | | | | | | | | | | | | | | | | | | | | | |
| Samplers: (Signature) <i>Josefin Hirst</i> | | | | | | | | | | PARAMETER / CONTAINER DESCRIPTION | | | | | | | | | | | |
| <p>Matrix Codes: DW-Drinking Water WW-Wastewater SW-Surface Water SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water</p> | | | | | | | | | | | | | | | | | | | | | |
| SAL Use Only | Sample No. | Sample Description | Date | Time | Matrix | Composite | Grab | 125mLP, Na ₂ S ₂ O ₃ FC-MF, FC-QT | 500mLP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx, Cl, OP | 125mLP, H ₂ SO ₄ COD, TKN, NH ₃ , TP | 125mLP, H ₂ SO ₄ TKN, NH ₃ | 500mLP, Cool NOx, Cl | | | | | Field pH | Field Temperature | Field Conductivity, $\mu S/cm$ | Field DO | No. of Containers (Total per each location) |
| | 13 | SC-BHS7-ST2-DP-07 | 8/20/14 | 9:14 | WW | | X | 4 | 2 | 1 | | | | | | | 5.99 | 28.07 | 2025 | 3.90 | |
| | 14 | SW-BHS7-ST2-DP-08 | | 9:40 | WW | | X | 4 | 2 | 1 | | | | | | | 6.12 | 28.07 | 1633 | 1.34 | |
| | 15 | N-BHS7-ST2-OB-01 | | | WW | | X | | | | 1 | 1 | | | | | | | | | |
| | 16 | C-BHS7-ST2-OB-02 | | | WW | | X | | | | 1 | 1 | | | | | | | | | |
| | 17 | S-BHS7-ST2-OB-03 | | | WW | | X | 4 | 2 | 1 | | | | | | | | | | | |
| | 18 | NE-BHS7-EFF-SL-06 | | 8:40 | WW | | X | | | | 1 | 1 | | | | | 5.53 | 27.5 | 943 | 4.94 | |
| | 19 | NE-BHS7-EFF-DP-09 <i>DRY</i> | | | WW | | X | | | | 1 | 1 | | | | | | | | | |
| | 20 | NW-BHS7-EFF-SL-07 | | 9:20 | WW | | X | | | | 1 | 1 | | | | | 6.11 | 27.3 | 1843 | 5.51 | |
| | 21 | NW-BHS7-EFF-DP-10 | | 8:50 | WW | | X | | | | 1 | 1 | | | | | 5.97 | 27.3 | 2187 | 4.71 | |
| | 22 | SE-BHS7-EFF-SL-08 | | 9:50 | WW | | X | | | | 1 | 1 | | | | | 5.04 | 27.6 | 1830 | 5.10 | |
| | 23 | SE-BHS7-EFF-DP-11 | | 9:35 | WW | | X | | | | 1 | 1 | | | | | 6.06 | 28.0 | 2151 | 5.03 | |
| | 24 | SW-BHS7-EFF-SL-09 | | 10:35 | WW | | X | 4 | 2 | 1 | | | | | | | 5.14 | 28.8 | 4558 | 5.06 | |
| Containers Prepared/Relinquished: | | Date/Time: 1000 08/31/14 | Received: <i>Josefin Hirst</i> | | Date/Time: 1300 08/14/14 | | Seal intact? <input checked="" type="radio"/> N <input type="radio"/> NA | | | | | | | | | | Instructions / Remarks: | | | | |
| Relinquished: <i>Josefin Hirst</i> | | Date/Time: 1455 08/20/14 | Received: <i>Brown White</i> | | Date/Time: 1455 08/20/14 | | Samples intact upon arrival? <input checked="" type="radio"/> N <input type="radio"/> NA | | | | | | | | | | | | | | |
| Relinquished: <i>Brown White</i> | | Date/Time: 1605 8/20/14 | Received: <i>RF</i> | | Date/Time: 8:20 1603 | | Received on ice? Temp. _____ <input checked="" type="radio"/> N <input type="radio"/> NA | | | | | | | | | | | | | | |
| Relinquished: | | Date/Time: | Received: | | Date/Time: | | Proper preservatives indicated? <input checked="" type="radio"/> N <input type="radio"/> NA | | | | | | | | | | | | | | |
| Relinquished: | | Date/Time: | Received: | | Date/Time: | | Rec'd within holding time? <input checked="" type="radio"/> N <input type="radio"/> NA | | | | | | | | | | | | | | |
| Relinquished: | | Date/Time: | Received: | | Date/Time: | | Volatiles rec'd w/out headspace? <input type="radio"/> Y <input checked="" type="radio"/> NA | | | | | | | | | | | | | | |
| Relinquished: | | Date/Time: | Received: | | Date/Time: | | Proper containers used? <input checked="" type="radio"/> N <input type="radio"/> NA | | | | | | | | | | | | | | |

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



Appendix B: Operation & Maintenance Log

Table B.1
Operation and Maintenance Log

| Date | Description |
|------------|---|
| 11/13/2013 | Construction - Pump tank, liner and lignocellulosic media installed |
| 11/14/2013 | Construction - Pump, feed line, laterals, infiltrator chambers installed, wet pressure test |
| 11/15/2013 | Construction - final grading, hay and seed applied |
| 11/18/2013 | Construction - electrician finished electrical work |
| 11/19/2013 | System Start-up |
| | Bull run valve (BRV) switched from old drainfield to PNRS system |
| 11/26/2013 | Site visit. System ok |
| | Flipped BRV to old drainfield for Thanksgiving holiday ~ 30-40 people staying at the house |
| 12/2/2013 | Site visit. System ok |
| | Flipped BRV back to PNRS system |
| 12/6/2013 | Site visit. System ok |
| | Flipped BRV to old drainfield for holiday party ~ 80 people attending |
| 12/9/2013 | Homeowner flipped BRV back to PNRS system |
| 12/10/2013 | Site visit. System ok |
| | Preparation for preliminary sample event |
| 12/12/2013 | Preliminary sample event No. 1 |
| 1/3/2014 | Site visit. System ok |
| 1/17/2014 | Preparation for Sample Event No. 1 |
| 1/20/2014 | Sample Event No. 1 |
| 3/5/2014 | Site visit. System ok |
| 3/13/2014 | Site visit. System ok |
| 3/19/2014 | Preparation for Sample Event No. 2 |
| 3/20/2014 | Sample Event No. 2 |
| 4/28/2014 | Site visit. System ok |
| 5/7/2014 | Preparation for Sample Event No. 3 |
| 5/8/2014 | Sample Event No. 3 |
| 5/27/2014 | Site visit. System ok |
| 6/18/2014 | Preparation for Sample Event No. 4 |
| 6/19/2014 | Sample Event No. 4 |

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| Date | Description |
|-----------|---|
| 7/16/2014 | Site visit. |
| | Primary tank and pump tank high water level. |
| | System was still on GFI breaker which had tripped. |
| | Pump came on and lowered the levels. |
| | Cleaned primary tank effluent screen. |
| 8/19/2014 | Preparation for Sample Event No. 5 |
| 8/20/2014 | Sample Event No. 5 |
| | Checked primary tank effluent screen- ok no maintenance required. |



Appendix C: Weather Station Data

Table C.1
Weather Station Data

| MONTHLY CLIMATOLOGICAL SUMMARY for JULY 2014 | | | | | | | | | | | | |
|--|------------------|------------------|------------------|--------|-----------------|--------|---------------------|---------------------|--------------------------------|--------------------------------|--------|----------|
| DAY | RAIN (inches) | MEAN TEMP (F) | HIGH TEMP (F) | TIME | LOW TEMP (F) | TIME | HEAT DEG DAYS | COOL DEG DAYS | AVG. WIND SPEED (mph) | HIGH WIND SPEED (mph) | TIME | WIND DIR |
| 1 | 0.00 | 82.2 | 94.4 | 3:30p | 73.5 | 3:00a | 0 | 17.2 | 1.7 | 17.0 | 6:00p | NNW |
| 2 | 0.22 | 79.6 | 90 | 12:30p | 73.2 | 4:30a | 0 | 14.6 | 0.7 | 14.0 | 2:30p | NNW |
| 3 | 0.58 | 78.7 | 96.5 | 1:30p | 71.9 | 10:30p | 0 | 13.7 | 0.9 | 12.0 | 5:00p | SW |
| 4 | 0.00 | 79.7 | 94.6 | 1:30p | 71.0 | 6:00a | 0 | 14.7 | 0.6 | 09.0 | 2:00p | SW |
| 5 | 0.22 | 79 | 97.7 | 3:00p | 71.0 | 10:30p | 0 | 14.0 | 0.6 | 17.0 | 4:30p | SSW |
| 6 | 1.64 | 76.3 | 93.6 | 1:00p | 69.3 | 7:00a | 0 | 11.3 | 0.3 | 09.0 | 4:00p | SW |
| 7 | 0.01 | 79 | 92.6 | 2:30p | 70.0 | 6:00a | 0 | 14.0 | 0.4 | 09.0 | 3:00p | SSW |
| 8 | 0.20 | 80 | 95 | 1:30p | 71.9 | 12:00m | 0 | 15.0 | 0.3 | 11.0 | 8:30p | SW |
| 9 | 0.46 | 78.5 | 90.3 | 11:30a | 70.9 | 4:00a | 0 | 13.5 | 0.1 | 06.0 | 11:30a | SSE |
| 10 | 0.03 | 79.6 | 92.7 | 1:00p | 72.0 | 12:00m | 0 | 14.6 | 0.5 | 14.0 | 2:30p | SW |
| 11 | 0.19 | 79 | 96.6 | 3:30p | 69.7 | 7:00a | 0 | 14.0 | 0.4 | 09.0 | 7:30p | SSW |
| 12 | 0.01 | 79.4 | 96.4 | 3:00p | 71.6 | 5:30a | 0 | 14.4 | 0.7 | 19.0 | 4:00p | E |
| 13 | 0.00 | 80.3 | 95 | 1:30p | 73.1 | 5:30a | 0 | 15.3 | 0.4 | 08.0 | 5:00p | SW |
| 14 | 0.10 | 79.1 | 99.4 | 3:30p | 71.3 | 10:30p | 0 | 14.1 | 0.4 | 11.0 | 4:30p | SW |
| 15 | 0.39 | 78.2 | 93 | 4:00p | 71.5 | 12:30a | 0 | 13.2 | 0.8 | 13.0 | 1:30p | SW |
| 16 | 0.27 | 76.2 | 82.5 | 6:30p | 72.4 | 6:30a | 0 | 11.2 | 0.9 | 11.0 | 2:30p | SSW |
| 17 | 0.38 | 81 | 94.8 | 1:30p | 73.4 | 7:00a | 0 | 16.0 | 0.5 | 10.0 | 3:00p | SW |
| 18 | 0.00 | 82.6 | 97.3 | 6:00p | 70.6 | 6:30a | 0 | 17.6 | 0.4 | 08.0 | 7:30p | SW |
| 19 | 0.00 | 83.8 | 98.2 | 3:30p | 72.9 | 7:00a | 0 | 18.8 | 0.4 | 07.0 | 1:30p | SW |
| 20 | 0.49 | 82.2 | 97 | 2:30p | 73.9 | 12:00m | 0 | 17.2 | 0.6 | 14.0 | 4:30p | SW |
| 21 | 0.54 | 81.4 | 97.5 | 3:00p | 72.3 | 2:30a | 0 | 16.4 | 0.6 | 14.0 | 9:00p | SW |
| 22 | 0.01 | 81.6 | 98.5 | 4:00p | 70.8 | 6:00a | 0 | 16.6 | 0.4 | 08.0 | 8:00p | ENE |
| 23 | 0.00 | 82.7 | 99.6 | 3:30p | 72.3 | 7:00a | 0 | 17.7 | 0.3 | 08.0 | 5:30p | SW |
| 24 | 0.00 | 84.1 | 97.3 | 2:30p | 73.7 | 5:30a | 0 | 19.1 | 0.5 | 08.0 | 6:00p | SW |
| 25 | 0.49 | 80.2 | 96.9 | 1:00p | 73.5 | 10:00p | 0 | 15.2 | 0.3 | 10.0 | 5:00p | SW |
| 26 | 0.28 | 82.2 | 95.9 | 3:00p | 73.4 | 1:00a | 0 | 17.2 | 0.5 | 09.0 | 10:00a | SW |
| 27 | 0.97 | 82.9 | 94 | 2:30p | 75.0 | 7:00a | 0 | 17.9 | 0.7 | 17.0 | 3:00p | SW |
| 28 | 0.05 | 84.5 | 93.5 | 4:30p | 78.2 | 6:00a | 0 | 19.5 | 1.5 | 11.0 | 2:00p | SW |
| 29 | 0.06 | 84.5 | 95.4 | 4:30p | 78.3 | 12:00m | 0 | 19.5 | 1.0 | 17.0 | 6:00p | SW |
| 30 | 0.00 | 81.6 | 95.6 | 2:30p | 68.6 | 7:30a | 0 | 16.6 | 0.5 | 11.0 | 1:30p | SW |
| 31 | 0.00 | 82.7 | 99.3 | 5:00p | 72.4 | 4:30a | 0 | 17.7 | 0.5 | 08.0 | 6:00p | SW |
| | 7.59 | | | | | | | | | | | |

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Table C.1
Weather Station Data (continued)

| MONTHLY CLIMATOLOGICAL SUMMARY for AUGUST 2014 | | | | | | | | | | | | |
|--|------------------|------------------|------------------|--------|-----------------|--------|---------------------|---------------------|--------------------------------|--------------------------------|--------|----------|
| DAY | RAIN (inches) | MEAN TEMP (F) | HIGH TEMP (F) | TIME | LOW TEMP (F) | TIME | HEAT DEG DAYS | COOL DEG DAYS | AVG. WIND SPEED (mph) | HIGH WIND SPEED (mph) | TIME | WIND DIR |
| 1 | 0.00 | 82.1 | 96.7 | 5:00p | 69.7 | 7:30a | 0 | 17.1 | 0.3 | 08.0 | 1:00p | SW |
| 2 | 0.06 | 81.7 | 97.7 | 2:30p | 73.4 | 7:00a | 0 | 16.7 | 0.4 | 16.0 | 6:30p | SW |
| 3 | 0.26 | 81.5 | 94.5 | 3:30p | 75.2 | 6:30a | 0 | 16.5 | 0.7 | 13.0 | 2:00p | NNW |
| 4 | 0.00 | 80.5 | 94.9 | 3:30p | 75.0 | 2:30a | 0 | 15.5 | 0.6 | 17.0 | 5:30p | NW |
| 5 | 0.00 | 82 | 96.6 | 5:00p | 72.8 | 7:00a | 0 | 17.0 | 0.4 | 11.0 | 11:00a | SW |
| 6 | 0.00 | 82.3 | 100.3 | 3:30p | 72.6 | 1:30a | 0 | 17.3 | 0.3 | 08.0 | 4:30p | SW |
| 7 | 0.00 | 81.9 | 97.1 | 3:00p | 73.1 | 6:30a | 0 | 16.9 | 0.5 | 15.0 | 7:30p | SW |
| 8 | 0.59 | 80.4 | 95.7 | 1:00p | 72.3 | 6:00a | 0 | 15.4 | 0.3 | 09.0 | 2:30p | SSW |
| 9 | 0.00 | 83.7 | 96.8 | 1:30p | 73.0 | 4:30a | 0 | 18.7 | 0.7 | 10.0 | 2:30p | SW |
| 10 | 0.35 | 81.1 | 95.2 | 12:30p | 74.8 | 2:30a | 0 | 16.1 | 0.5 | 12.0 | 12:30p | SW |
| 11 | 0.25 | 78.4 | 90.9 | 12:00p | 74.6 | 6:00a | 0 | 13.4 | 1.0 | 13.0 | 1:30p | SW |
| 12 | 0.43 | 76.4 | 80.4 | 7:00p | 74.4 | 9:00a | 0 | 11.4 | 0.7 | 12.0 | 4:00p | SW |
| 13 | 0.00 | 83.6 | 94.8 | 2:00p | 74.0 | 4:30a | 0 | 18.6 | 1.0 | 12.0 | 3:00p | SW |
| 14 | 0.61 | 80 | 93.1 | 2:30p | 73.2 | 10:30p | 0 | 15.0 | 0.5 | 12.0 | 5:00p | SW |
| 15 | 0.01 | 76.5 | 83.4 | 10:30a | 73.2 | 5:00a | 0 | 11.5 | 0.5 | 10.0 | 4:30p | SW |
| 16 | 0.01 | 79.6 | 90.8 | 12:00p | 71.1 | 4:00a | 0 | 14.6 | 0.6 | 08.0 | 12:30p | SW |
| 17 | 0.01 | 83.7 | 96 | 4:30p | 75.4 | 6:30a | 0 | 18.7 | 0.5 | 08.0 | 3:00p | SW |
| 18 | 0.00 | 83.7 | 95.8 | 1:30p | 73.7 | 6:30a | 0 | 18.7 | 0.8 | 13.0 | 3:00p | SW |
| 19 | 0.00 | 84.7 | 98 | 2:30p | 75.2 | 5:00a | 0 | 19.7 | 0.7 | 09.0 | 3:00p | SW |
| 20 | 0.00 | 84.8 | 99.2 | 3:00p | 73.5 | 7:30a | 0 | 19.8 | 0.5 | 08.0 | 5:00p | SW |
| 21 | 0.00 | 84.3 | 99.9 | 3:00p | 75.4 | 4:30a | 0 | 19.3 | 0.4 | 08.0 | 2:30p | SW |
| 22 | 0.00 | 81.2 | 99.7 | 3:00p | 72.2 | 7:00a | 0 | 16.2 | 0.5 | 14.0 | 4:00p | ESE |
| 23 | 0.00 | 83.2 | 100.7 | 2:30p | 71.2 | 5:00a | 0 | 18.2 | 0.7 | 15.0 | 6:30p | SW |
| 24 | 0.38 | 81.4 | 99.8 | 2:00p | 73.7 | 5:30a | 0 | 16.4 | 0.8 | 20.0 | 3:30p | SW |
| 25 | 0.02 | 79.9 | 88.7 | 1:30p | 74.9 | 12:00m | 0 | 14.9 | 3.2 | 20.0 | 8:00p | NNW |
| 26 | 0.00 | 80.6 | 91.1 | 2:00p | 72.8 | 7:30a | 0 | 15.6 | 2.6 | 18.0 | 2:30p | NNW |
| 27 | 0.00 | 80.8 | 93 | 3:00p | 70.9 | 12:00m | 0 | 15.8 | 1.4 | 13.0 | 6:00p | NNW |
| 28 | 0.00 | 80.3 | 95.1 | 3:30p | 66.8 | 7:00a | 0 | 15.3 | 0.8 | 10.0 | 7:30p | NW |
| 29 | 0.31 | 78.9 | 96 | 1:30p | 73.2 | 11:00p | 0 | 13.9 | 0.5 | 12.0 | 3:00p | SSW |
| 30 | 0.06 | 82.2 | 99.5 | 4:00p | 72.6 | 7:30a | 0 | 17.2 | 0.3 | 09.0 | 7:00p | ENE |
| 31 | 0.00 | 81.4 | 99.1 | 4:00p | 73.5 | 6:00a | 0 | 16.4 | 0.5 | 12.0 | 4:00p | SW |
| | 3.35 | | | | | | | | | | | |

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