Florida Department of Health
Onsite Nitrogen Reduction Strategies Study

Contract CORCL

S&GW TEST FACILITY CONSTRUCTION
TASK C.10, C.11 and C.12
PROGRESS REPORT

Date: November 30, 2011
NTP Date: September 8, 2011

Construction of the S&GW test facility was started November 8th. Below is a list of items completed to date.

I. S&GW Test Facility Construction JTD

A. Installed Monitoring Equipment

1. Test Area 1 (STE Trench System)

- (1) (2'x 3.3') SST Pan Lysimeter
  1. Location - north end of mound
  2. Depth – sloped at natural grade (west @ EL 128.38, east @ EL 128.55)
- (2) 4" Observation Ports
  1. Location – north and south end of mound
  2. Depth – bottom at natural grade @ EL 128.36
- (2) 2"D Soil Moisture Access Tubes and Casing
  1. Location – north and south end of mound
  2. Depth – top at infiltrative surface @ EL 129.36, 1 meter deep
  3. 6" casing around tubes to infiltrative surface
- (1) 1"D Standpipe Piezometers with 5' screen
  1. Location – center of mound
  2. Depth – bottom at spodic @ EL 118.14. Bentonite seal placed approximately 1' above screen.
- (4) 2"D Soil Suction Lysimeters

1. Location – (1) center, (3) south end of mound
2. Elevation relative to center of 9” cup
    a. (1) shallow: 12” below infiltrative surface (IS) @ EL 128.36
    b. (2) middle: 24” below IS @ EL 127.36. Bentonite seal placed approximately 6” above ceramic cup.
    c. (1) deep: 42” below IS @ EL 125.86. Bentonite seal placed approximately 6” above ceramic cup.

- (10) Tensiometers
    1. Location – (5) center, (5) south end of mound
    2. Depths – (2) 6” below IS, (2) 12” below IS, (2) 24” below IS, (2) 36” below IS, (2) 42” below IS. Bentonite seal placed approximately 6” above ceramic cup for 24”, 36” and 42” tensiometers.

2. Test Area 2 (Nitrified Effluent Trench System)
    - (1) (2’x 3.3’) SST Pan Lysimeter
        1. Location - north end of mound
        2. Depth – sloped at natural grade (west @ EL 127.93, east @ EL 128.11)
    - (2) 4” Observation Ports
        1. Location – north and south end of mound
        2. Depth – north - bottom at infiltrative surface @ EL 128.88, south - bottom at natural grade @ EL 127.88
    - (1) Soil Moisture Access Tubes and Casing
        1. Location – center of mound
        2. Depth – top at infiltrative surface @ EL 128.88, 1 meter deep
        3. 6” casing around tubes to infiltrative surface
    - (1) 1”D Standpipe Piezometers with 5’ screen
        1. Location – center of mound
        2. Depth – bottom at spodic @ EL 118.48. Bentonite seal placed approximately 1’ above screen.
    - (4) 2”D Soil Suction Lysimeters
        1. Location – (1) center, (3) south end of mound
        2. Elevation relative to center of 9” cup
            a. (1) shallow: 12” below infiltrative surface (IS) @ EL 127.88

b. (2) middle: 24" below IS @ EL 126.88. Bentonite seal placed approximately 6" above ceramic cup.

c. (1) deep: 42" below IS @ EL 125.38. Bentonite seal placed approximately 6" above ceramic cup.

3. Test Area 3 (STE Drip System)

- (1) (2'x 3.3') SST Pan Lysimeter
    1. Location - north end of mound
    2. Depth – sloped at natural grade (west @ EL 128.67, east EL @ 128.84)
- (2) 4" Observation Ports
    1. Location – north and south end of mound
    2. Depth – bottom at natural grade @ EL 128.71
- (2) Soil Moisture Access Tubes and Casing
    1. Location – north and south end of mound
    2. Depth – top at infiltrative surface @ EL 129.71, 1 meter deep
    3. 6" casing around tubes to infiltrative surface
- (2) 1"D Standpipe Piezometers with 5' screen
    1. Location – center and south end of mound
    2. Depth – center: bottom at spodic @ EL 118.37. Bentonite seal placed approximately 1' above screen. South: bottom at spodic @ EL 118.08. Bentonite seal placed approximately 1' above screen.
- (4) 2"D Soil Suction Lysimeters
    1. Location – (1) center, (3) south end of mound
    2. Elevation relative to center of 9" cup
        a. (1) shallow: 12" below infiltrative surface (IS) @ EL 128.71.
        b. (2) middle: 24" below IS @ EL 127.71. Bentonite seal placed approximately 6" above ceramic cup.
        c. (1) deep: 42" below IS @ EL 126.21. Bentonite seal placed approximately 6" above ceramic cup.
- (10) Tensiometers
    1. Location – (5) center, (5) south end of mound
    2. Depths – (2) 6" below IS, (2) 12" below IS, (2) 24" below IS, (2) 36" below IS, (2) 42" below IS. Bentonite seal placed approximately 6" above ceramic cup for 24", 36" and 42" tensiometers.

4. Test Area 4 (Nitrified Effluent Drip System)
    - (2'x 3.3') SST Pan Lysimeter Location - north end of mound
        1. Depth – sloped at natural grade (west @ EL 127.43, east @ EL 127.66)
    - (2) 4" Observation Ports
        1. Location – north and south end of mound
        2. Depth – bottom at natural grade @ EL 127.35
    - (1) Soil Moisture Access Tubes and Casing
        1. Location – center of mound
        2. Depth – top at infiltrative surface @ EL 128.35, 1 meter deep
        3. 6" casing around tubes to infiltrative surface
    - (1) 1"D Standpipe Piezometers with 5' screen
        1. Location – center of mound
        2. Depth – bottom at spodic @ EL 117.09. Bentonite seal placed approximately 1' above screen.
    - (4) 2"D Soil Suction Lysimeters
        1. Location – (1) center, (3) south end of mound
        2. Elevation relative to center of 9" cup
            a. (1) shallow: 12" below infiltrative surface (IS) @ EL 127.35
            b. (2) middle: 24" below IS @ EL 126.35. Bentonite seal placed approximately 6" above ceramic cup.
            c. (1) deep: 42" below IS @ EL 124.85. Bentonite seal placed approximately 6" above ceramic cup.
5. Test Area 5 (STE PNRS II System)
    - (2) 3" Observation Ports
        1. Location – north and south end of mound
        2. Depth – tee connection with collection pipe at bottom of sloped liner
    - (1) 1"D Standpipe Piezometers with 5' screen
        1. Location – south of infiltrator chambers
        2. Depth – bottom at spodic @ EL 117.79. Bentonite seal placed approximately 1' above screen.
    - (1) 2"D Soil Suction Lysimeters
        1. Location – center of mound

2. Depth – bottom of cup in mound sand at lignocellulosic mixture interface with mound sand

6. Test Area 6 (Nitrified Effluent PNRS II System)
   - (2) 3” Observation Ports
     1. Location – north and south end of mound
     2. Depth – tee connection with collection pipe at bottom of sloped liner
   - (1) 1”D Standpipe Piezometers with 5’ screen
     1. Location – south of infiltrator chambers
     2. Depth – bottom at spodic @ EL 118.00. Bentonite seal placed approximately 1’ above screen.
   - (1) 2”D Soil Suction Lysimeters
     1. Location – center of mound
     2. Depth – bottom of cup in mound sand at lignocellulosic mixture interface with mound sand

B. Nitrified Effluent Systems Tanks, Pumps and Accessories Installed

1. 1.25” STE feed line
2. ¾” potable water line
3. 1.25” disposal line to existing lift station
4. 500 gallon per day nitrification system
5. 300 gallon nitrified effluent lift station
   - Pump 12 nitrified effluent feed pump
   - Pump 15 little giant overflow discharge pump
6. Nitrified effluent drip system headworks (filters)
7. 1” pipe from headworks to TA2, TA4 and TA6
8. 1” ball valves for isolation of test areas after flow splitter
9. Drip emitter lines in TA2, TA4 and TA6
10. Flowmeter on return line

C. STE System Tanks, Pumps and Accessories Installed

1. 1.25” STE feed line
2. ¾” potable water line
3. 1.25” disposal line to existing lift station
4. 300 gallon STE lift station

- Pump 13 STE systems feed pump

5. STE drip system headworks (filters)
6. 1" pipe from headworks to TA1, TA3 and TA5
7. 1" ball valves for isolation of test areas after flow splitter
8. Drip emitter lines in TA1, TA3 and TA5
9. Flowmeter on return line

D. Mound Elevation (ft. above MSL)

	TA1	TA2	TA3	TA4	TA5	TA6
	STE Trench	NO3 Trench	STE Drip	NO3 Drip	STE PNRS II	NO3 PNRS II
	Elevation (ft above mean sea level (MSL))					
Cover	130.86	130.38	130.21	128.85	131.72	130.94
Top of Gravel	130.36	129.88				
Infiltrative Surface	129.36	128.88	129.71	128.35	131.22	130.44
Top of liner, tank end					129.33	128.51
Bottom of liner, tank end					128.58	127.76
Natural Grade	128.36	127.88	128.71	127.35	128.31	127.49

E. Electrical

1. Nitrification drip system control panel
   - Power receptacle for blower
   - Connected flowmeter signals to main control panel in PNRS II shed
2. STE drip system control panel
   - Connected floats and flowmeter signals to main control panel in PNRS II shed
3. Connected power for both new panels from main power feed panel.

II. Construction Status

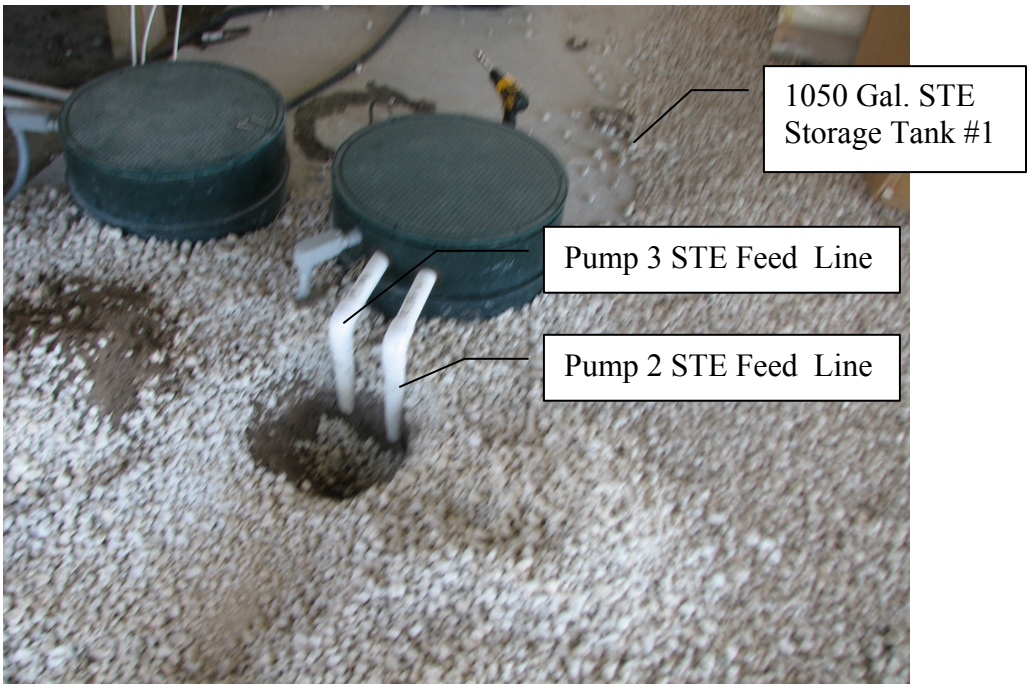
The soil and groundwater test facility construction is substantially complete. Hazen and Sawyer staff were onsite throughout construction and conducted a final site inspection of the facility on November 29, 2011 and completed a punch list of items for completion by the contractor prior to accepting construction. The nitrification tank, nitrified effluent lift station, and STE lift station tanks were filled with tap water and all pumps, valves, meters and other equipment were tested. The punch list developed is included in Section IV of this progress report. Completion of these items is underway and all items should be complete in late December.

Start up of the test facility is planned for the week of January 2nd. Final calibration of flows to the pilot systems will be completed, and the STE supply pumps (Pump #2 and Pump #3) in Tank 1 will be activated, which will then begin supplying wastewater to the system. Water quality monitoring is anticipated to begin in late February.

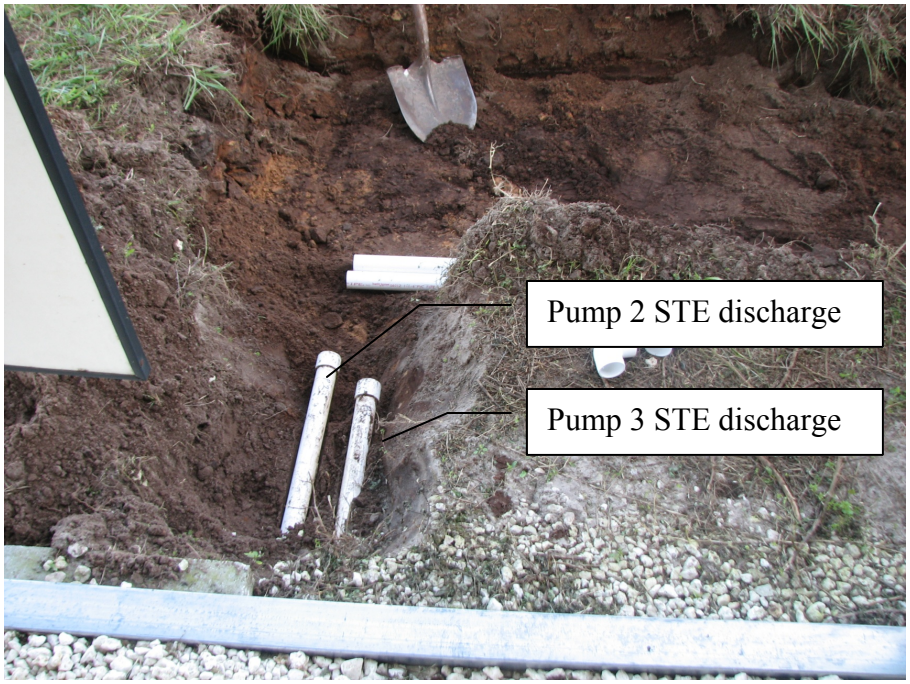
Additional experimental apparatus for evaluation of nitrogen uptake by turf is yet to be constructed. This will occur in early 2012 after a work plan is developed by GCREC staff.

III. Photos Showing Various Components of the Test Facility

Prepped mound construction area (cleared vegetation and O horizon)

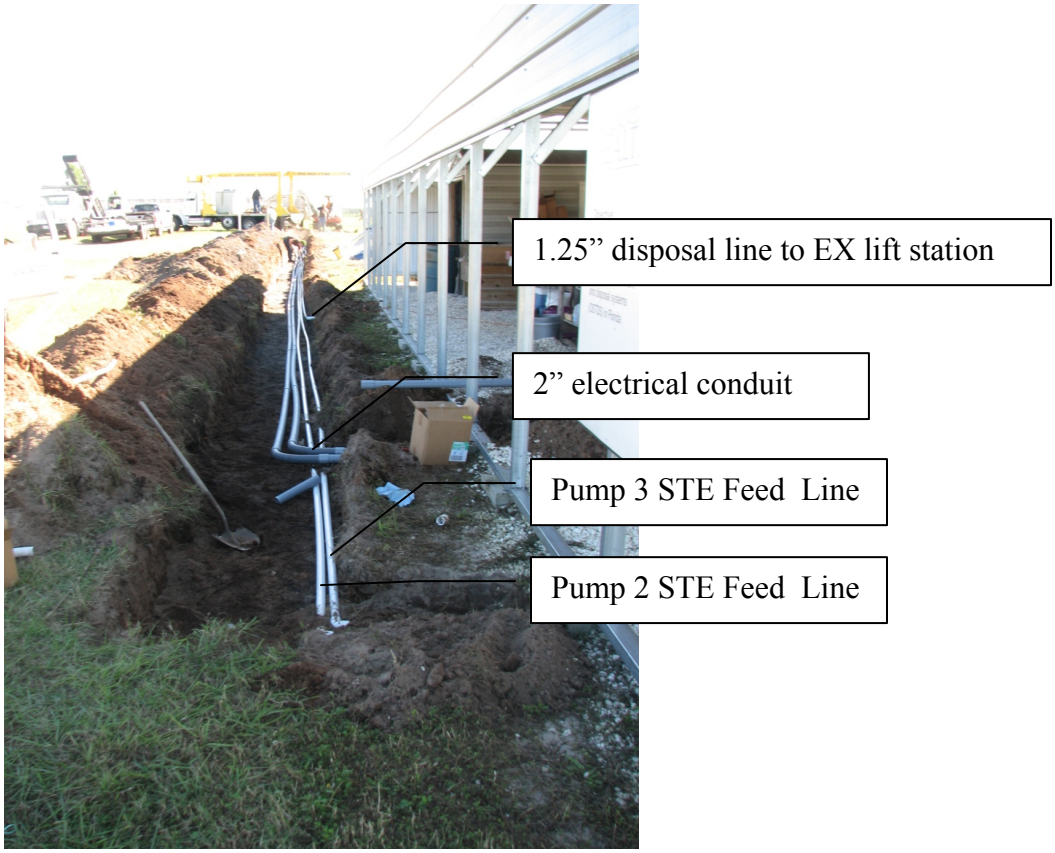


STE feed lines (pump 2 and pump 3 in tank 1)



Feed lines connected to trench out to drip systems

Potable water line connection



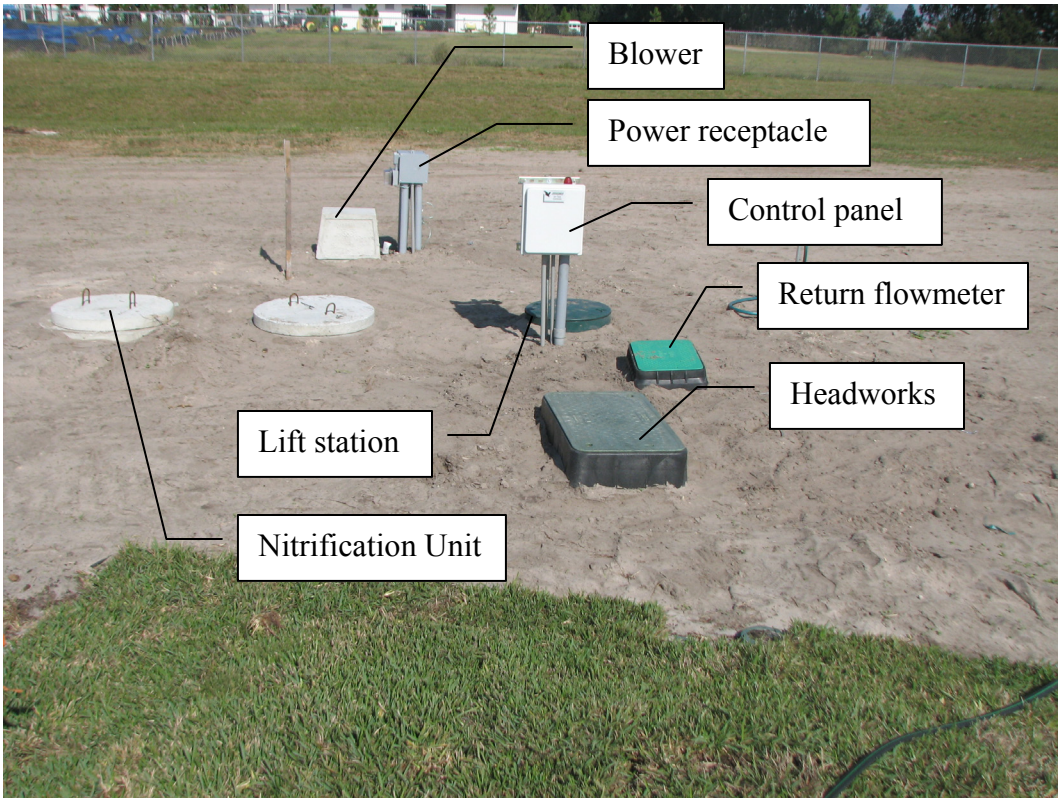
3’ trench to drip systems

3’ trench to nitrified effluent drip system

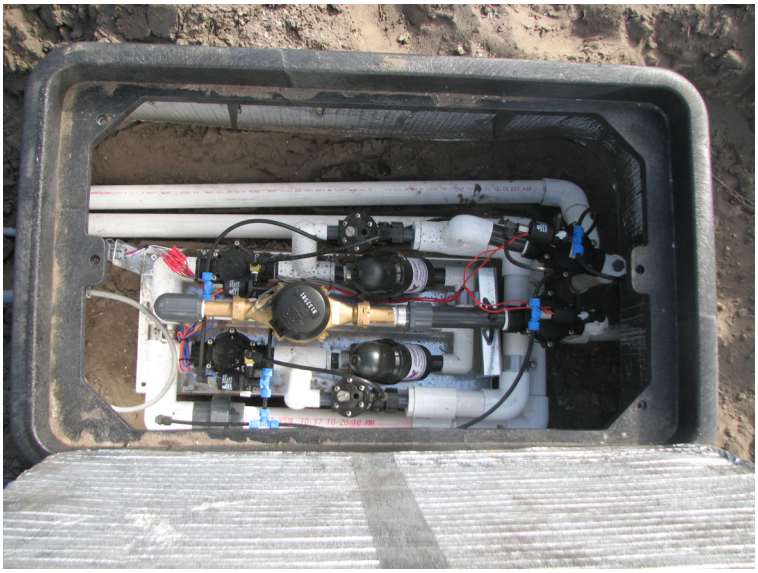
Nitrification unit and nitrified effluent lift station

Nitrified effluent lift station pump and float tree

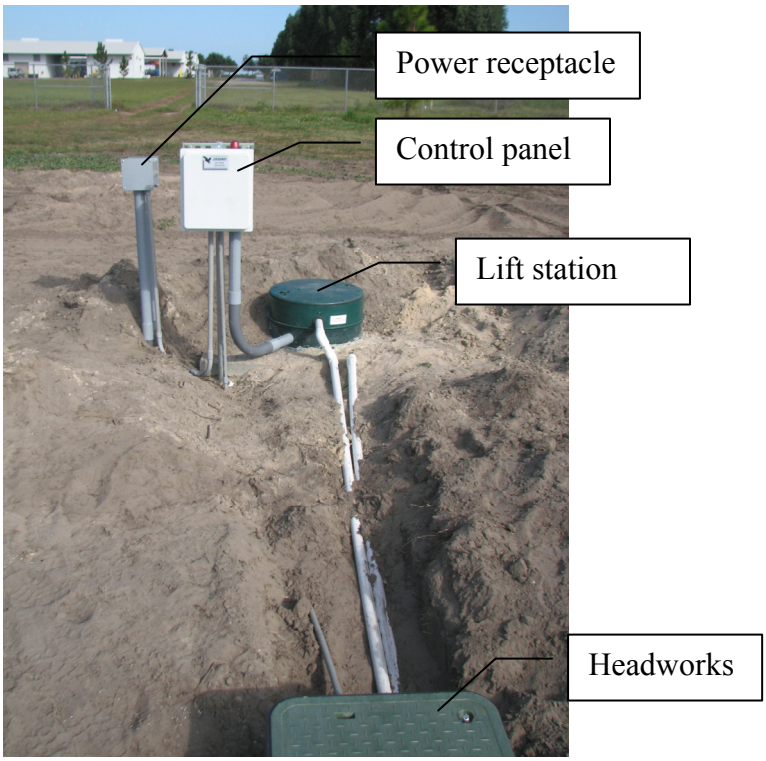
Nitrification unit blower



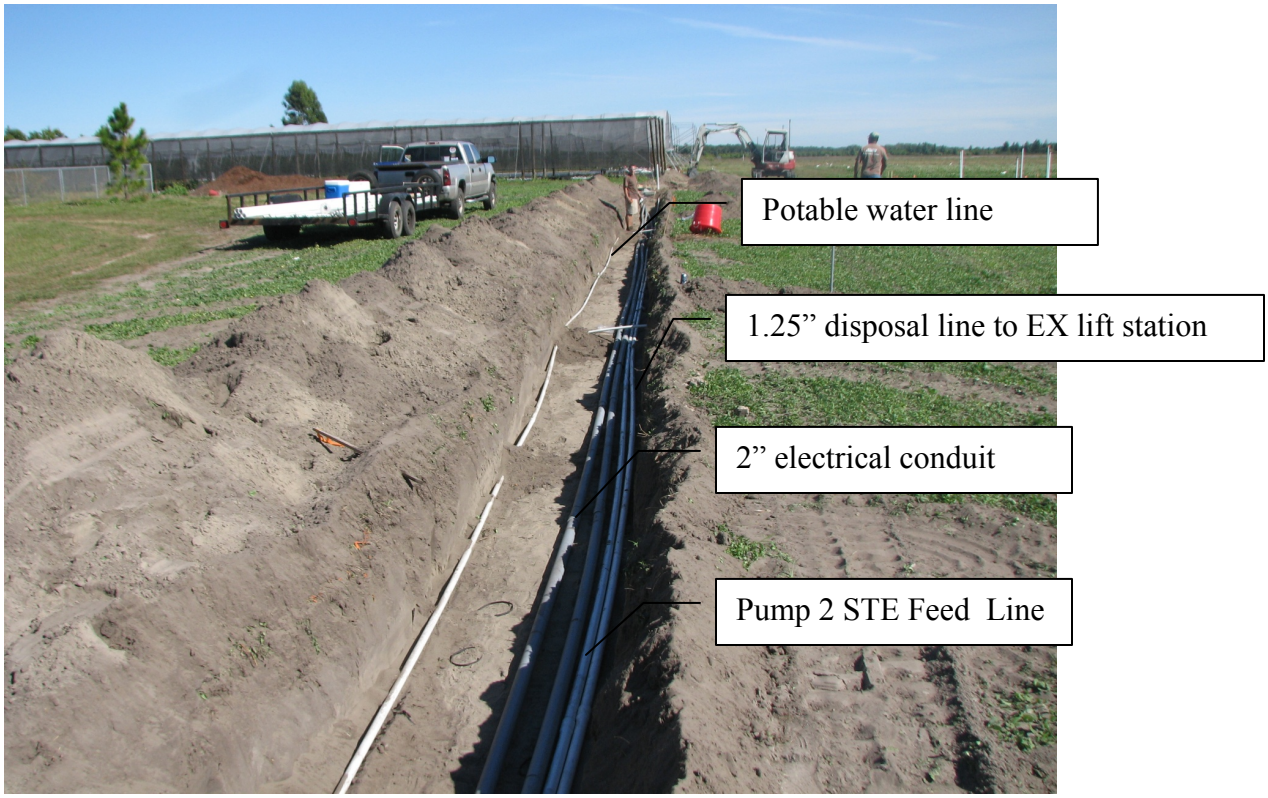
Nitrified effluent drip systems control panel



Drip system headworks

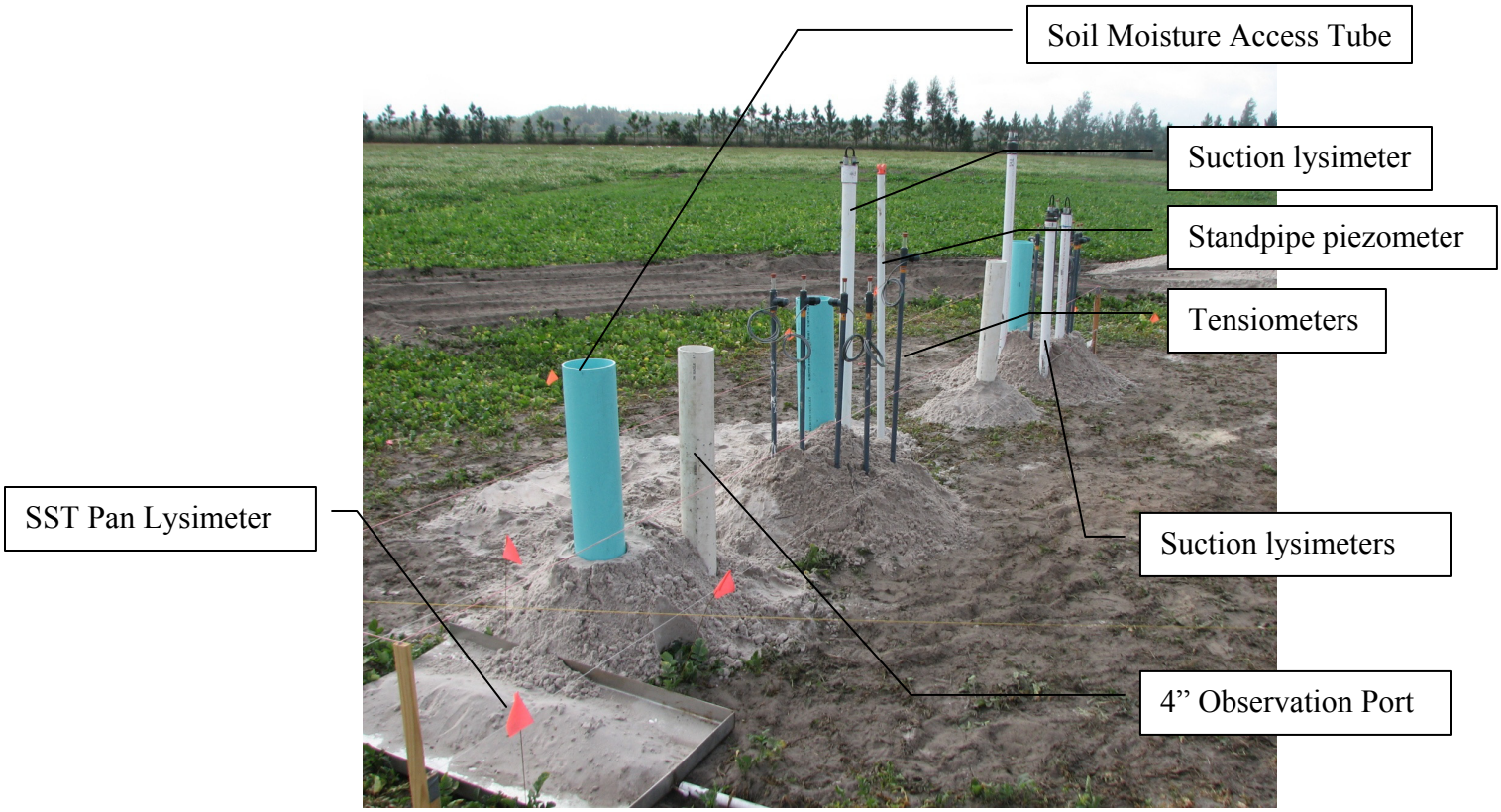


STE drip system control panel



3’ trench to STE drip system

STE lift station



Test Area 1 (STE trench system) monitoring equipment

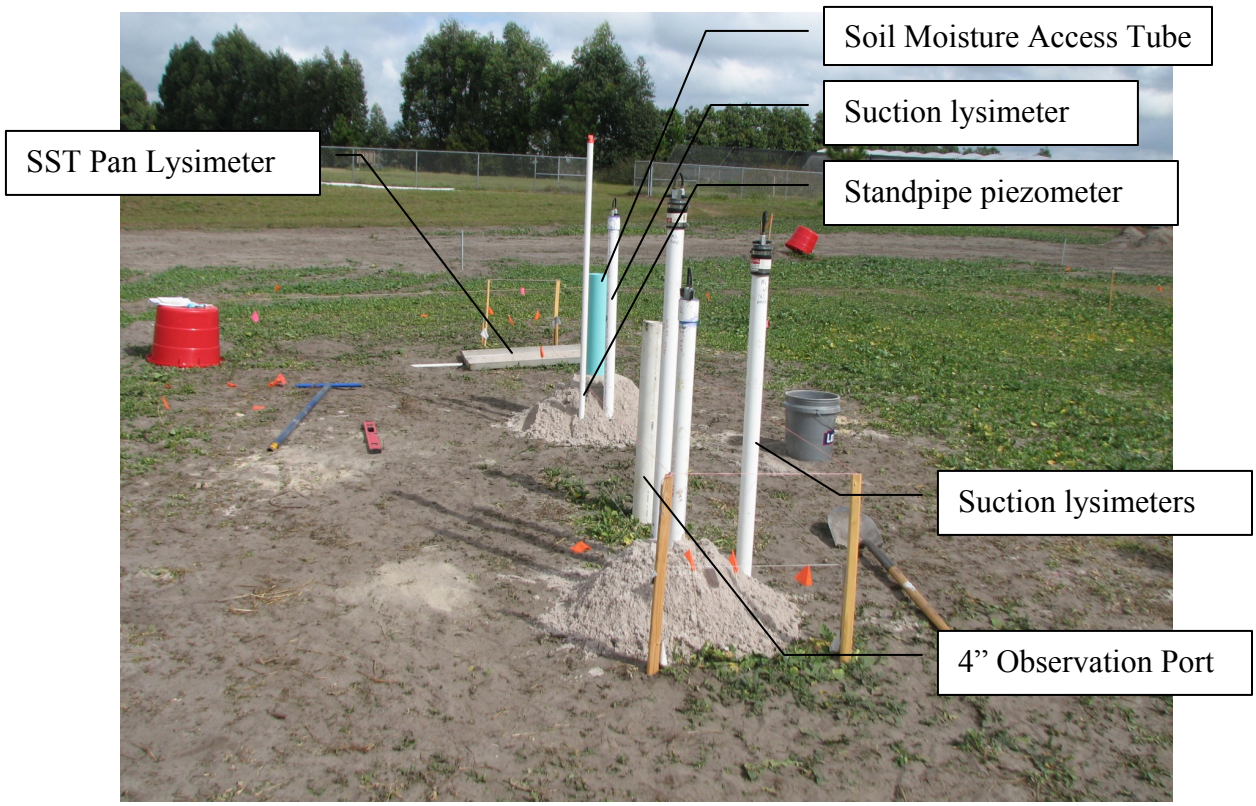
Test Area 1 (STE trench system) infiltrative surface

Test Area 1 (STE trench system) gravel installation

Test Area 1 (STE trench system) drip lines covered with filter paper

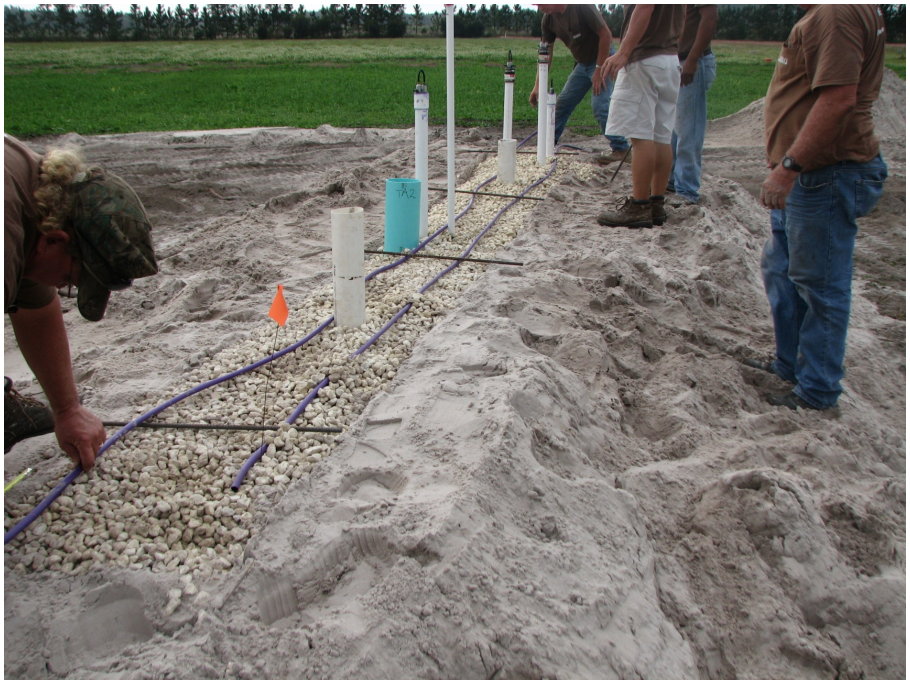
Test Area 1 (STE trench system) covered

Test Area 1 (STE trench system) sod



Test Area 2 (Nitrified effluent trench system) monitoring equipment

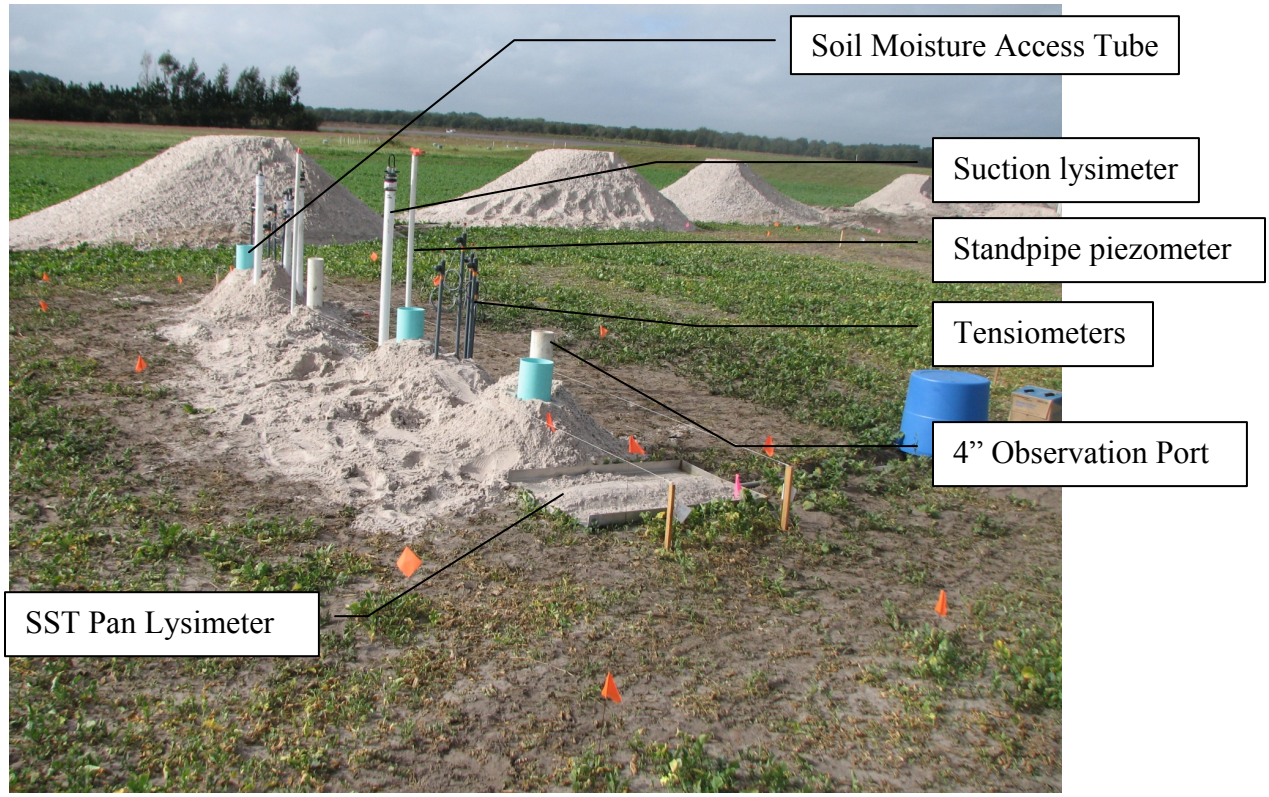
Test Area 2 (Nitrified effluent trench system) top of sand (infiltrative surface)



Test Area 2 (Nitrified effluent trench system) top of gravel and drip lines

Test Area 2 (Nitrified effluent trench system) covered

Test Area 2 (Nitrified effluent trench system) sod

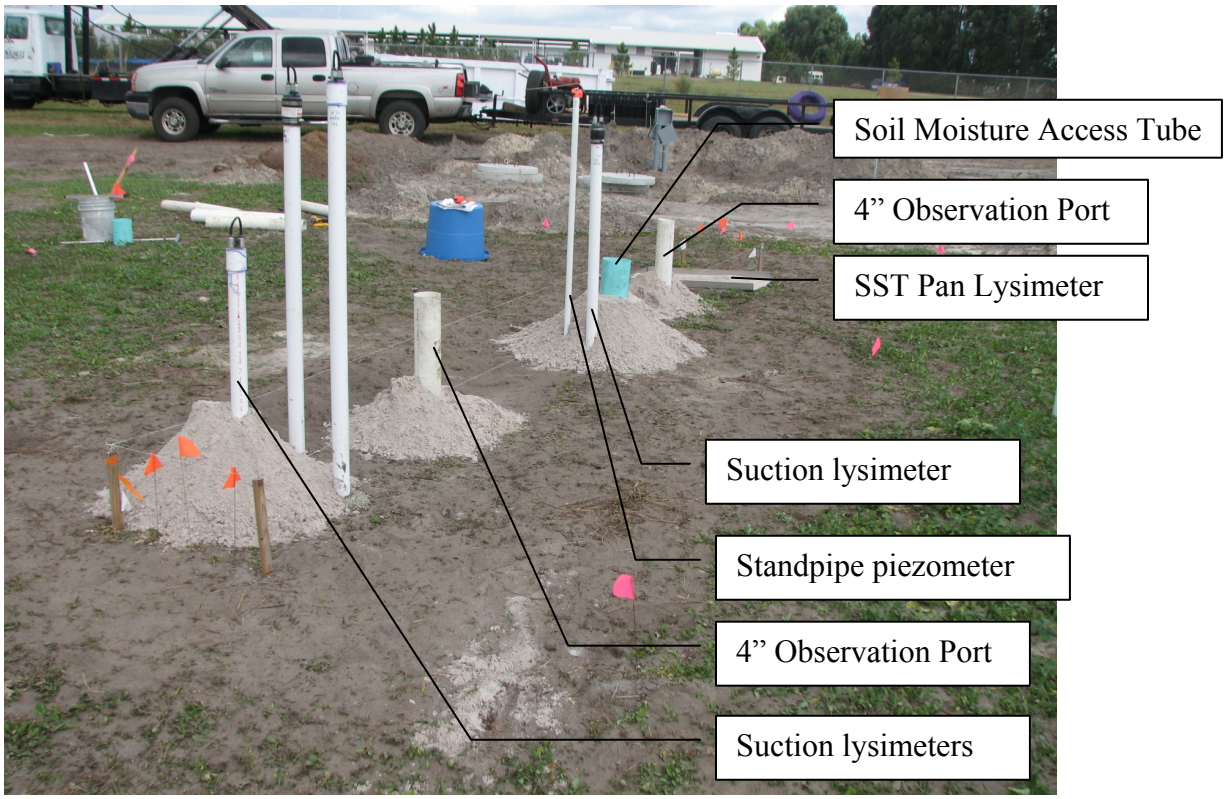


Test Area 3 (STE drip system) monitoring equipment

Test Area 3 (STE drip system) drip line [infiltrative surface]

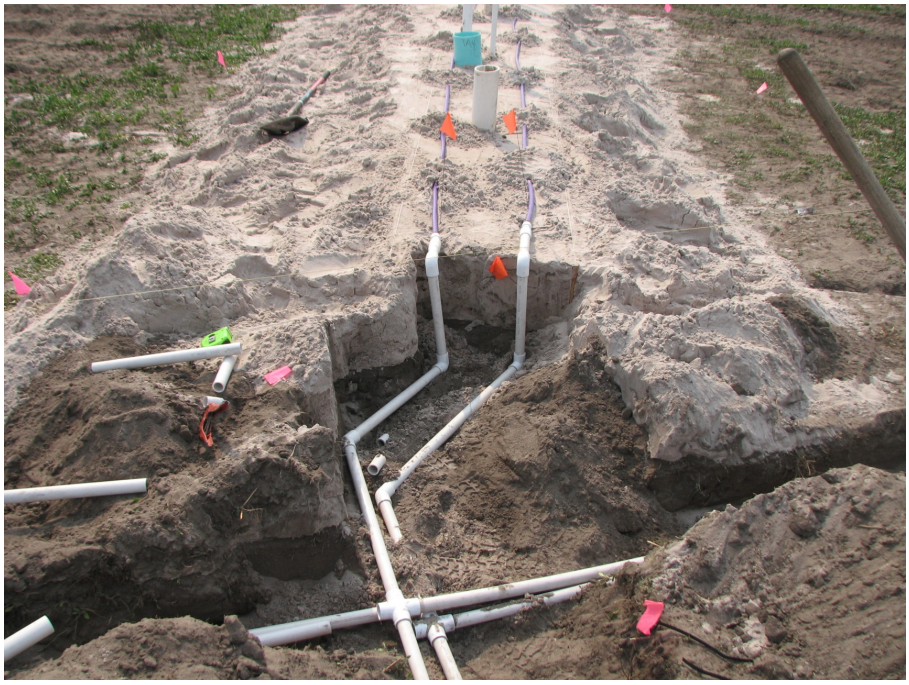
Test Area 3 (STE drip system) covered

Test Area 3 (STE drip system) sod



Test Area 4 (Nitrified effluent drip system) monitoring equipment

Test Area 4 (Nitrified effluent drip system) drip tubing installed



Test Area 4 (Nitrified effluent drip system) drip influent pipe

Test Area 4 (Nitrified effluent drip system) cover

Test Area 4 (Nitrified effluent drip system) sod

Test Area 5 (STE PNRS II system) infiltrator

Test Area 5 (STE PNRS II system) liner v-area

Test Area 5 (STE PNRS II system) liner with effluent collection pipe on bottom and observation ports

Test Area 5 (STE PNRS II system) mound sand and lignocellulosic mixture

Test Area 5 (STE PNRS II system) denitrification tank and piping

Test Area 5 (STE PNRS II system) influent pipe

Test Area 5 (STE PNRS II system) sulfur and oyster shell mixture

Test Area 5 (STE PNRS II system) covered

Test Area 5 (STE PNRS II system) sod

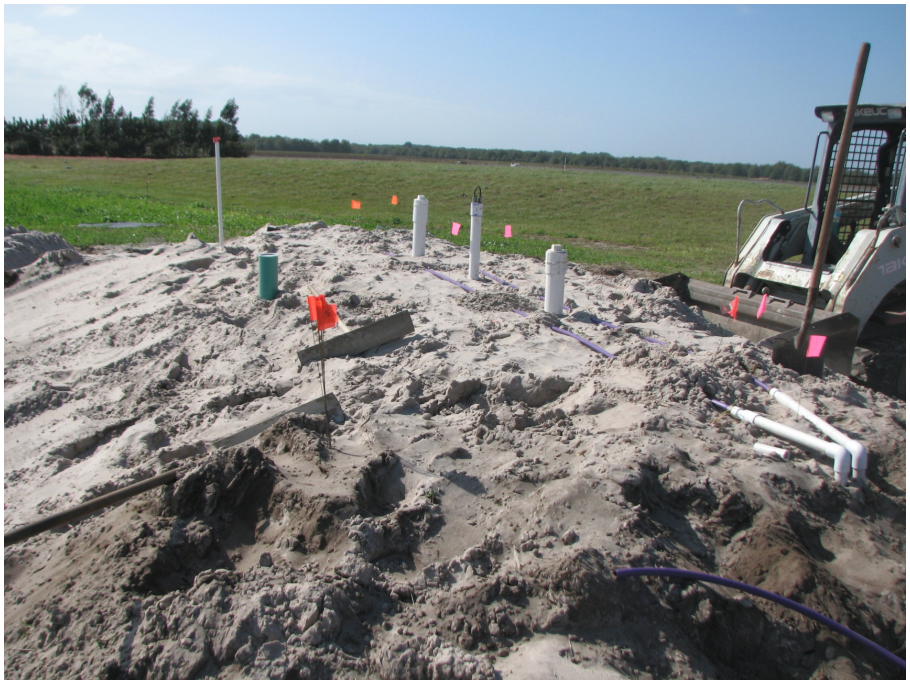
Test Area 6 (Nitrified effluent PNRS II system) infiltrator area

Test Area 6 (Nitrified effluent PNRS II system) infiltrator cover and observation port

Test Area 6 (Nitrified effluent PNRS II system) liner v-area

Test Area 6 (Nitrified effluent PNRS II system) liner installed

Test Area 6 (Nitrified effluent PNRS II system) mound sand and lignocellulosic mixture



Test Area 6 (Nitrified effluent PNRS II system) drip tubing

Test Area 6 (Nitrified effluent PNRS II system) denitrification tank

Test Area 6 (Nitrified effluent PNRS II system) covered

Test Area 6 (Nitrified effluent PNRS II system) sod

IV. Punch List

PNRS II TEST FACILITY CONSTRUCTION CONTRACTOR PUNCH LIST

Location	Item	Description	Complete
Nitrified effluent systems	1.	Connect flowmeter signal wires to main control panel located in PNRS II shed	11/29/11
STE systems	2.	Connect flowmeter signal wires to main control panel located in PNRS II shed	11/29/11
STE systems	3.	Connect float signal wires back to main control panel located in PNRS II shed for Pump 2 operation	11/29/11
TA3 (STE drip)	4.	Install 1” tee with ball valve to influent line to allow for future tracer test dosing	11/18/11
TA5 (STE PNRS II)	5.	Install sample port on denitrification tank discharge line	Samples will be taken from tank
TA5 (Nitrified effluent PNRS II)	6.	Install sample port on denitrification tank discharge line	Samples will be taken from tank
STE systems	7.	Install globe valve for throttling on return line	To be completed when globe valve received
Nitrified effluent systems	8.	Install globe valve for throttling on return line	To be completed when globe valve received
Main Control Panel	9.	Programming changes to software to include STE and nitrified effluent system flowmeter logs	To be completed
Feed & Return lines for both systems	10.	Install air-release valves	To be completed
TA1 (STE trench) and TA2 (NO3 trench)	11.	Move observation ports so that bottom is at infiltrative surface rather than natural grade	To be completed