Florida Department of Health
Bureau of Onsite Sewage Programs
Research Review and Advisory Committee Meeting

DATE AND TIME: **July 1, 2009 at 10 am**

PLACE: Gulf Coast Research and Education Center
14625 County Road 672
Wimauma, FL 33598
813-634-0000

To attend via Conference Call: 1-888-808-6959
Conference Code: 1454070#

This meeting is open to the public

AGENDA: FINAL 6/29/2009 Elke Ursin

1. Introductions and Housekeeping
2. Review Minutes of Meeting May 27, 2009 and May 28, 2009
3. Discussion on the Florida Nitrogen Reduction Strategies Study
4. Lunch
5. Brief Updates on Ongoing and Future Projects
6. Other Business
7. Public Comment
8. Closing Comments, Next Meeting, and Adjournment

OPTIONAL tour of Gulf Coast Research and Education Center to be held after the meeting.

Research Review and Advisory Committee for the Bureau of Onsite Sewage Programs

Minutes of the Meeting held at the Gulf Coast Research and Education Center, Wimauma, FL
July 1, 2009
Approved by RRAC September 10, 2009

In attendance:

- **Committee Membership and Alternates**:
  - In person: Sam Averett (alternate, Septic Tank Industry); David Carter (chairman, member, Home Building Industry); Anthony Gaudio (member, Septic Tank Industry); Mike McInarnay (alternate, Septic Tank Industry); Jim Peters (alternate, Professional Engineer), Eanix Poole (alternate, Consumer); Patti Sanzone (member, Environmental Interest Group); John Schert (member, State University System)
  - Via teleconference: Bill Melton (member, Consumer); Vincent Seibold (alternate, Local Government); and Pam Tucker (member, Real Estate Profession)
- **Not represented**: DOH-Environmental Health and Restaurant Industry
- **Visitors**:
  - In person: Damann Anderson (Hazen and Sawyer); Blaine Carter (Carter Engineering); Ivy Cormier (Hillsborough County DOH); Mike Dreyer (Hillsborough County DOH); Josefin Edeback (Hazen and Sawyer); Don Orr (ADS/Sludge Hammer); Craig Stanley (University of Florida IFAS); Gurpal Toor (University of Florida IFAS)
  - Via teleconference: Quentin (Bob) Beitel (Markham Woods Association); John Byrd (Orange County Government Mayor & Board of County Commissioners); Chris Ferraro (Florida Department of Environmental Protection); Jack Hannahs (Markham Woods Association); Pio Lombardo (Lombardo Associates); Debra Roberts (Florida Department of Health)
- **Department of Health (DOH), Bureau of Onsite Sewage Programs**:
  - Paul Booher; Eberhard Roeder; and Elke Ursin

1. **Introductions:** Eight out of ten groups were present, representing a quorum. Chairman Carter called the meeting to order at 10:07 a.m. Introductions were made and some housekeeping issues were discussed.

2. **Review of Previous Meeting Minutes**:

   Motion by Eanix Poole and seconded by Jim Peters to approve the minutes as submitted. All were in favor with none opposed and the motion passed unanimously.

3. **Updates on projects**

   a. **Florida Onsite Sewage Nitrogen Reduction Strategies Study** – The 2009 budget language was discussed. The language authorizes the department to spend $540,000 of the funds appropriated in the 2008-2009 budget and directs the department to continue the study and submit an interim report by February 1, 2010 and a final report by May 1, 2010. While there is every possibility of additional funding to continue the study, the department and the provider should prioritize the tasks that should get done this year that will provide the most information and benefits. At this point Damann Anderson with Hazen and Sawyer presented on their proposed revision to the scope

and schedule. He mentioned that there are many reports that are coming out soon that will be distributed out to the RRAC. At the last meeting it was decided to utilize the Gulf Coast Research and Education Center to use as the test facility. The new budget language does not appropriate any additional funds, so the proposed reorganized scope and schedule makes the best use of the time and money that is available for this project. He went over the proposed Year 1 scope and schedule revisions, the PNRS II design, next steps for this project, and a tour of the facility if the weather permits. Pio Lombardo asked why the test facility design was expedited over the testing at the home sites, and that it appeared that the selection of the technologies has been made prior to the ranking. Damann Anderson stated that there are two components to their approach: initial development of the technologies and actual testing at home sites. The Invitation to Negotiate advertised with the Department of Health was open to allow for any type of proposal and the Passive Nitrogen Removal Systems Phase II (PNRS II) project was the highest ranked RRAC priority. Much of the groundwater transport and modeling work will be developed at the test facility so that the model can be calibrated and tested at a controlled setting and then moved out to testing at home sites. There was a discussion on the University of Central Florida (UCF) work currently going on looking at passive nitrogen removal technologies. Damann Anderson stated that their work is complimentary to this study, that there are no intentions of duplicating their work with this study, and as the results come in from UCF they will be looked at along with the results coming from this study. Anthony Gaudio had several objections to the proposed revised scope. He wanted to see more of a focus on testing existing systems. He outlined several objectives that he would like to see achieved with this study, and would like some of the resources devoted to investigating some of these issues. One objective was to look at nitrogen fate and transport, and he sees that some of that will be done at the test facility. Also, he would like to see a comparison of nitrogen reduction to drip irrigation as well as a comparison of advanced treatment vs. standard systems, and Damann Anderson stated that that will partly be done in the PNRS II and will also be partly done in the Task C groundwater testing. Another objective is to test a variety of vegetation over the drip and Damann Anderson stated that there are too many variables with this and they are not planning on doing this now but could possibly look at this in the future. Finally, Anthony Gaudio stated that another concern he has is the amount of sodium and sulfate released from the PNRS II media.

> **Jim Peters made a motion, seconded by Patti Sanzone, to amend the contract to reflect the scope and schedule as discussed and presented by the consultants. All except for one were in favor with Anthony Gaudio casting the dissenting vote, and the motion passed.**

The draft Quality Assurance Project Plan (QAPP) was submitted for the Passive Nitrogen Removal Study Phase II and the QAPP was discussed in detail during the meeting. The objectives are to perform a follow-up to PNRS I, develop detailed performance data for passive biofiltration, and produce scalable design data from the pilot scale biofilters. Dr. Daniel Smith accepted an award from the American Academy of Environmental Engineers for Excellence in Environmental Engineering in Applied Research and Practice. The basic approach for Phase II of this study is to establish a test site at the Gulf Coast Education and Research Center, use in-vessel and in-situ pilot systems, operate on septic tank effluent for 12-months, and test various

nitrification and denitrification biofilters. Pam Tucker asked whether the effluent from the dormitory will be comparable to home sites and Damann Anderson stated that the number of people affects the flow but does not necessarily affect the nitrogen levels in the wastewater. A sample of the effluent was taken prior to finalizing the selection of the facility and it appears to be representative. The individual testing units will be scaled down to an appropriate size so that the amount of effluent is proportionate to be comparable with a standard system. Phase I of this study was at a lab scale, and this next pilot stage is a necessary step prior to going to full scale, to help define the design criteria. Anthony Gaudio asked whether the recycling will be done around the stage 1 or the stage 2 effluent, and Damann Anderson stated that it will be the stage 1 effluent moved back into the top of stage 1. Specifically they will look at the difference between no recycling and a 3:1 recycle rate (one goes to stage 2 and three get recycled). Anthony Gaudio stated that by adding the recycling it could add an additional pump which would no longer make this a passive system per the definition. Damann Anderson stated that this has not been designed yet, but it could still meet the definition of passive. The test facility set-up itself may not be technically passive because they are trying to test several different scenarios at once, but the final design could very well end up passive. The two-stage biofiltration pilot units will have a horizontal configuration with 10 unsaturated (stage 1) biofilters and 9 denitrification biofilters (stage 2). The stage 1 variables are the media (expanded clay, clinoptilolite, and polystyrene), whether it's single pass or recycled, and the depth of the media (either 15-inches or 30-inches). The stage 2 variables are the media (either lignocellulosic, sulfur, or glycerol). Eberhard Roeder stated that there may be issues with compliance with the additive rule for the sulfur and glycerol. The University of Central Florida (UCF) test facility had to route all their wastewater back to sewer because there was no data on how what they were testing related to the additive rules. Next Damann Anderson went of the in-ground engineered media portion of this study. This could be a system that could be added to an existing septic tank by simply adding this type of drainfield. Full strength septic tank effluent or nitrified effluent could be added to a drainfield constructed with either drip irrigation or a capillary seepage mat. The capillary seepage mat is used in the agricultural industry for improving the efficiency of irrigation, and consists of a porous mat that would lie under the drip lines to hold the water for a longer period of time and spread it out so that plants can better use it. Another addition to this system would be a mix of expanded clay/lignocellulosic/sulfur just above the topsoil in a mound, which could go anoxic. Anthony Gaudio mentioned that this mix will be compressed and used up over time and Damann Anderson stated that they will monitor this as long as there is funding but that having the expanded clay there will keep the structure so that it does not compress. Anthony Gaudio also mentioned that with mounded systems the confining layer is generally removed to allow the effluent to drain downward rather than pooling over the confining layer and blowing out of the sides of the mound, and that this design has several confining layers which could be an issue. Damann Anderson stated that this is experimental and that the loading rate will be fairly low. Eberhard Roeder suggested making a column for stage one including the proposed mix that will be used in this in-ground test and Damann Anderson indicated that that could be looked at. Eberhard Roeder also asked whether this in-ground test could be done with low-pressure dosing as well. Eberhard Roeder also stated that there might be an issue with having a confining layer so close to the water table and this is coming more from a permitting standpoint as the current rule does not allow coarse sand within 48-inches

of the groundwater table. Sam Averett asked how deep the drip will be below grade, and Damann Anderson stated he would like to see it as shallow as possible by just laying the sod over the drip line. Damann Anderson listed the different application of technologies for the passive two stage biofiltration, the in-situ biofiltration, and passive denitrification and which could be used for new or replacement systems, retrofitting of existing conventional systems, and additions to existing aerobic treatment systems.

The next steps for this project are to complete the contract amendment, complete subconsultant contract amendments, and to continue work on the test facility design and remaining tasks. Anthony Gaudio asked whether the agreement with the Gulf Coast Research and Education Center (GCREC) will be between Hazen and Sawyer or with DOH and Elke Ursin stated that the memorandum of understanding should be between DOH and GCREC with Hazen and Sawyer as an authorized agent but that GCREC will be a subcontractor under Hazen and Sawyer for the purposes of this project. Anthony Gaudio wants to make sure the contract/agreement is clear as to who has possession of the equipment after this study is done so that it can be used in future projects. Comments on the QAPP draft are due on Monday July 13th and should be sent to Elke Ursin for her to compile and send to the provider.

b. **Town of Suwannee Study** – The Quality Assurance Project Plan (QAPP) was approved by all parties on May 18, 2009. Weekly sampling continues until mid-July. A decision was made to provide source tracking for three sites (two sites with high Enterococci and one background site) for four sampling events and to remove phosphorus sampling from all sites. The source tracking will allow for a determination to be made on whether the source of the Enterococci is from a human or non-human source.

John Schert made a motion, seconded by Anthony Gaudio, to authorize staff to spend approximately $1,600 and commended staff for taking this initiative. All were in favor and the motion passed.

At the last meeting the RRAC agreed to utilize research funds to renew this contract and have sampling done during December/January of 2009-2010. Staff is working on getting the contract renewed.

c. **Manatee Springs, Performance of Onsite Systems Phase II Karst Study** – The modifications to the systems have been completed and final approved by the County Health Department. A background sampling event has been completed. An intensive 4-day performance sampling event has been completed. A draft final report has been submitted for review by the RRAC, DOH, and other interested parties. The project is to be completed in July. Elke Ursin proposed the option of adding an additional sampling event during a non-flood time in approximately six-eight weeks.

John Schert made a motion, seconded by Patti Sanzone, to authorize staff to extend this project to add one additional sampling event. All were in favor and the motion passed.

d. **Monroe County Performance Based Treatment System Performance Assessment** – Quality control of existing data is ongoing. The phase III sampling has been completed and lab results should be submitted soon. The department is

discussing the option of paying a portion of the salary for the employee who did the sampling to train the new employee that has been hired to do the statewide sampling.

e. **319 Project on Performance and Management of Advanced Onsite Systems** – For the database task, data has been gathered from the state database, any county specific databases, and from Carmody. The data fields and database structure have been discussed and sketched. The Florida State University Survey Research Laboratory was selected to perform the user-group perceptions survey task, and they are currently in the process of developing the surveys with the homeowner and regulator surveys nearing completion. Once the surveys are final they will be sent to the committee. Debra Roberts has been hired to assist with this project, and her background was discussed. One of the next steps for this project is to develop a Quality Assurance Project Plan for the sampling based on the Keys Sampling Plan.

f. **Inventory Study** – The final report has been submitted and the contract has now ended. The RRAC voted at the May 27th meeting to continue this project. Initial internal discussions have begun on how to do this and were presented to the RRAC. One option would be to work with the Department's Environmental Health Database (EHD) people to see if hiring a programmer to integrate the inventory database into the EHD. Another idea is to automate a process to update the Inventory with Department of Revenue information as that is updated every year. Bill Melton mentioned that there are definite holes in the data pointing out that some cities that are on sewer are listed as septic on the maps. Elke Ursin responded by saying that if the utility provider did not respond to the request for information from EarthSteps, then that information was not available for them to create accurate maps. This is another one of the proposed next steps: to resend requests out to the DEP regulated Wastewater Treatment Plants for current information. David Carter stated there needs to be strongly worded legislative language to make these Wastewater Treatment Plants respond to these information requests. Eanix Poole asked of what value this inventory is, and Elke Ursin stated that it very valuable and is a good first step to a management program. Anthony Gaudio stated that there is more value on a county level rather than an aggregate basis. Another option for a next step for this project is to see if County Health Departments might be interested in receiving a grant to update their specific county information in whatever method they propose. Different options will be scoped out and presented to the RRAC at a future meeting.

4. **Other Business** – David Carter recommended staff to contact Dr. Wanielista with the University of Central Florida to let him know that DOH and RRAC are interested in what they are doing.
5. **Public Comment** - The public was allowed to comment throughout the meeting.
6. **Next Meeting** – The next meeting will be scheduled for the beginning of September. The meeting location has not been determined, but the option of having a live meeting via teleconference and/or via the computer was discussed and staff will research this further. The focus of the next meeting will be to hear a presentation on the Town of Suwannee Study, discuss progress on the Nitrogen Reduction Strategies Study, as well as discuss current and proposed research projects.

The meeting adjourned at 4:25 p.m.

Department of Health
Bureau of Onsite Sewage Programs
Research Review and Advisory Committee

Wednesday July 1, 2009

10 am – 3 pm

Agenda:

1. Introductions and Housekeeping
2. Review Minutes of Meetings on May 27 & 28, 2009
3. Discussion on the Florida Nitrogen Reduction Strategies Study
4. Brief Updates on Ongoing and Future Projects
5. Other Business
6. Public Comment
7. Closing Comments, Next Meeting, and Adjournment

Introductions & Housekeeping

- Travel forms
- Roll call
- Identification of audience

Review Minutes of Meeting May 27 & 28, 2009

- See draft minutes

Florida Onsite Sewage Nitrogen Reduction Strategies Study

Purpose: Develop passive strategies for nitrogen reduction that complement use of conventional onsite sewage treatment and disposal systems, and further develop cost-effective nitrogen reduction strategies

Progress:

- Draft QAPP submitted for Passive Nitrogen Removal Study Phase II

2009 Budget Language

"From the funds in Specific Appropriation 471, **$540,000** from the Grants and Donations Trust Fund is provided to the department to **continue and complete the study** authorized in Specific Appropriation 1682 of chapter 2008-152, Laws of Florida. The report shall include **recommendations on passive strategies for nitrogen reduction that complement use of conventional onsite wastewater treatment systems**. The department shall submit an **interim study and report on February 1, 2010**, and a **final study and report on May 1, 2010**, to the Governor, the President of the Senate, and the Speaker of the House of Representatives prior to proceeding with any nitrogen reduction activities."

2008 Budget Language

$1 million from the Water Protection and Sustainability Program Trust Fund shall be transferred to the Department of Health to **further develop cost-effective nitrogen reduction strategies**. The Department of Health shall contract, by request for proposal, for Phase I of an anticipated 3-year project to **develop passive strategies for nitrogen reduction that complement use of conventional onsite wastewater treatment systems**. The project shall be controlled by the Department of Health's research review and advisory committee and shall include the following components:

1) comprehensive review of existing or ongoing studies on passive technologies;

2) field-testing of nitrogen reducing technologies at actual home sites for comparison of conventional, passive technologies and performance-based treatment systems to determine nitrogen reduction performance;

3) documentation of all capital, energy and life-cycle costs of various technologies for nitrogen reduction;

4) evaluation of nitrogen reduction provided by soils and the shallow groundwater below and down gradient of various systems; and

5) development of a simple model for predicting nitrogen fate and transport from onsite wastewater systems.

A progress report shall be presented to the Executive Office of the Governor, the President of the Senate and the Speaker of the House of Representatives on February 1, 2009, including recommendations for funding additional phases of the study.

Florida Onsite Sewage Nitrogen Reduction Strategies Study

- While there is every possibility of additional funding to continue the study, we should prioritize the tasks we want to get done this year that will provide the most information and benefits

Hazen and Sawyer Presentation of:

Options for Prioritization of Tasks

and

Discussion on Passive Nitrogen Removal Study Phase II

Ongoing projects

Statewide Inventory of Onsite Sewage Treatment and Disposal Systems in Florida Study

Purpose: To provide a comprehensive inventory of the 2.5 million systems in the state

Progress:

- Final report has been submitted
- Contract has now ended
- RRAC voted the continuation of this project as a priority at the May 27th meeting
- Initial internal discussions have begun on process forward

Town of Suwannee Study

Purpose: Test the difference in water quality after central sewer has been installed in an area previously served by onsite sewage systems

Progress:

- Quality Assurance Project Plan (QAPP) approved by DEP on May 18th
- Weekly sampling continues until mid-July
- Decision to provide source tracking for three sites (two sites with high *Enterococci* and one background) for 4 sampling events and remove Phosphorus sampling from all sites

Manatee Springs, Performance of Onsite Systems Phase II Karst Study

Purpose: Test the difference in water quality after nutrient reducing systems are installed in a Karst area

Progress:

- Modifications of systems have been completed and final approved by the County Health Department
- Background sampling event completed
- Performance sampling event completed
- Draft final report submitted
- Project to be completed in July
- Discuss option to add an additional sampling event during non-flood conditions

Monroe County PBTS Assessment: Next Phase of Sampling in the Keys

Purpose: Evaluate effectiveness of Performance Based Treatment Systems in the Keys

Progress:

- Quality control of existing data ongoing
- Phase III sampling completed, waiting for lab results
- Discussing option of paying for employee who did sampling to train new employee hired to do statewide sampling

319 Project on Performance and Management of Advanced Onsite Systems

Purpose: Assess water quality protection by advanced onsite sewage treatment and disposal systems throughout the State of Florida

Progress:

- Database of advanced systems:
  - Data has been gathered from the state database, any county specific databases, and from Carmody
  - Data fields and database structure have been discussed and sketched
- Survey of user groups perceptions task:
  - Provider is Florida State University Survey Research Laboratory
  - Development of surveys is ongoing with draft homeowner and regulator surveys nearing completion
- Debra Roberts has been hired to assist with this project. Debra is a graduate of Florida A&M University with a major in Biology and minor in Chemistry, and she has worked in several diverse arenas such as Quality Assurance Supervisor, Chemist, and QA environmental laboratory technician
- Next steps: Development of Quality Assurance Project Plan for sampling (based off of Keys Sampling Plan)

Upcoming projects

Other Business

Public Comment

Next Meeting

Upcoming meeting topics:
Suwannee Draft Report

Proposed dates for next meeting:

- Week of August 31st?
- Other suggestions?

Closing Comments and Adjournment

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FLORIDA DEPARTMENT OF HEALTH

FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES (FOSNRS) STUDY

RRAC Meeting Presentation
July 1, 2009

SCHOOL OF MINES 1874 COLORADO

AET
Applied Environmental Technology

OTIS ENVIRONMENTAL CONSULTANTS

1

Agenda

- Proposed Year 1 Scope and Schedule Revisions
- PNRS II
- Next Steps
- Tour of the GCREC Facility

Scope – Task A

Task	Current Year 1	Proposed Year 1
A.1 Draft Lit Review	1	1
A.2 Final Lit Review	1	1
A.3 Draft Classification of Tech	1	1
A.4 Draft Tech Ranking Criteria	1	1
A.5 Draft Priority List for Testing	1	1
A.6 Tech Classification, Ranking & Prioritization Workshop	1	1
A.7 Final Classification of Tech	1	1
A.8 Final Tech Ranking Criteria	1	1
A.9 Final Priority List for Testing	1	1
A.10 Draft Innovative Systems Application	2	
A.12 Identification of Test Facility Sites	2	1.8
A.13 Draft QAPP PNRS II	1	1
A.14 Recommendation for Process Forward	1	1
A.15 Final QAPP PNRS II	1	1
A.16 PNRS Specification Reports	2	2
A.17 Test Facility Design 50%	1	1
A.18 Test Facility Design 100%	1	1
A.19 Test Facility Design Final	1	
A.20 Test Facility Accept Bid	1	
A.25 Sample Event Reports		3
A.26 Data Summary Report		3

Scope – Task B

Task	Current Year 1	Proposed Year 1
B.1 Identification of Home Site	10	
B.2 Vendor Agreement Report	8	
B.3 Draft QAPP for Field Testing	1	
B.4 Recommendation for Process Forward	1	
B.5 Final QAPP for Field Testing	1	
B.11 LCAA Template Report	1	

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Scope – Task C

Task	Current Year 1	Proposed Year 1
C.1 Draft Literature Review on N Reduction in Soil	1	1
C.2 Final Literature Review on N Reduction in Soil	1	1
C.3 Draft QAPP Evaluation of N Reduction by Soils & Shallow GW	1	1
C.4 Recommendation for Process Forward	1	1
C.5 Final QAPP Evaluation of N Reduction by Soils & Shallow GW	1	1
C.6 Home Site Selection	8	
C.7 Instrumentation of Home Sites	4	1 (GCREC)
C.11 Test Facility Design 50%	1	1
C.12 Test Facility Design 100%	1	1
C.13 Test Facility Design Final		1
C.14 Test Facility Accept Bid		1
C.15 Test Facility Shop Drawing Review		4
C.16 Test Facility Construction		1
C.17 Test Facility Construction Substantial Completion		1
C.18 Test Facility Accept Construction		1
C.19 Monitoring Report		3

Scope – Tasks D & E

Task	Current Year 1	Proposed Year 1
D.1 Draft Lit Review on N Fate & Transport Model	1	1
D.2 Final Lit Review on N Fate & Transport Model	1	1
D.3 Selection of Existing Data Set for Calibration	1	1
D.4 Draft QAPP N Fate & Transport Models	1	1
D.5 Recommendation for Process Forward	1	1
D.6 Final QAPP N Fate & Transport Models	1	1
D.7 Simple Soil Model Development	1	
D.8 Non-Steady State Aquifer Model, Simple Soil Model	1	
D.9 Aquifer Model with Averaged Output, Simple Soil Model	1	
E.1 Project Kick-Off Meeting	1	1
E.2 PM – Project Progress Reports	6	5
E.3 RRAC Meetings	1	1
E.4 PAC Meetings	1	1

Schedule – Task A

Task	June 2009	Jul 2009	Aug 2009	Sept 2009	Oct 2009	Nov 2009	Dec 2009	Jan 2010	Feb 2010	March 2010	April 2010	May 2010	June 2010
A.1 Draft Lit Review	1												
A.2 Final Lit Review	1												
A.3 Draft Classification of Tech	1												
A.4 Draft Tech Ranking Criteria	1												
A.5 Draft Priority List for Testing	1												
A.6 Tech Classification, Ranking & Prioritization Workshop	1												
A.7 Final Classification of Tech		1											
A.8 Final Tech Ranking Criteria			1										
A.9 Final Priority List for Testing				1									
A.12 Iden. of Test Facility Sites	1.8												
A.13 Draft QAPP PNRS II	1												
A.14 Rec. for Process Forward		1											
A.15 Final QAPP PNRS II			1										
A.16 PNRS Specification Reports				1	1								
A.17 Test Facility Design 50%		1											
A.18 Test Facility Design 100%			1										
A.25 Sample Event Reports								1		1		1	
A.26 Data Summary Report									1		1		1

Schedule – Task C

Task	June 2009	Jul 2009	Aug 2009	Sept 2009	Oct 2009	Nov 2009	Dec 2009	Jan 2010	Feb 2010	March 2010	April 2010	May 2010	June 2010
C.1 Draft Literature Review	1												
C.2 Final Literature Review		1											
C.3 Draft QAPP			1										
C.4 Rec. for Process Forward			1										
C.5 Final QAPP				1									
C.7 Instrumentation of Home Sites					1								
C.11 Test Facility Design 50%	1												
C.12 Test Facility Design 100%			1										
C.13 Test Facility Design Final				1									
C.14 Test Facility Accept Bid					1								
C.15 Test Fac Shop Dwg Review						4							
C.16 Test Facility Construction						1							
C.17 Test Facility Construction Substantial Completion							1						
C.18 Test Facility Accept Construction							1						
C.19 Monitoring Report								1		1		1	

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Schedule – Tasks D & E

Task	June 2009	Jul 2009	Aug 2009	Sept 2009	Oct 2009	Nov 2009	Dec 2009	Jan 2010	Feb 2010	March 2010	April 2010	May 2010	June 2010
D.1 Draft Lit Review on N Fate & Transport Model	1												
D.2 Final Lit Review on N Fate & Transport Model			1										
D.3 Selection of Existing Data Set for Calibration	1												
D.4 Draft QAPP N Fate & Transport Models					1								
D.5 Recommendation for Process Forward								1					
D.6 Final QAPP N Fate & Transport Models											1		
E.1 Project Kick-Off Meeting	1												
E.2 PM – Project Progress Reports	5			0.5				0.5					
E.3 RRAC Meetings		1											
E.4 PAC Meetings						1							

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FLORIDA DEPARTMENT OF HEALTH

PNRS II Workplan Overview

AET
Applied Environmental Technology

Passive Nitrogen Removal Study II

Objectives

- Follow up to PNRS I
- Develop detailed performance data for passive biofiltration
- Produce scalable design data from pilot scale biofilters

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PNRS I – AWARD WINNING!

Dr. Daniel Smith accepts E3 Award from AAEE President Dr. Deborah Reinhart of UCF

American Academy of Environmental Engineers:

Excellence in Environmental Engineering (E3) Award in Applied Research and Practice

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Passive Nitrogen Removal Study II

Significant Features

- Couple first stage recycle (mixed biomass) to denitrification (separate stage biomass)
- Unsaturated filter: 2 layer stratification design with 2 media depths
- Evaluate lignocellulosic and sulfur based denitrification biofilters
- Reactive media in in-ground systems

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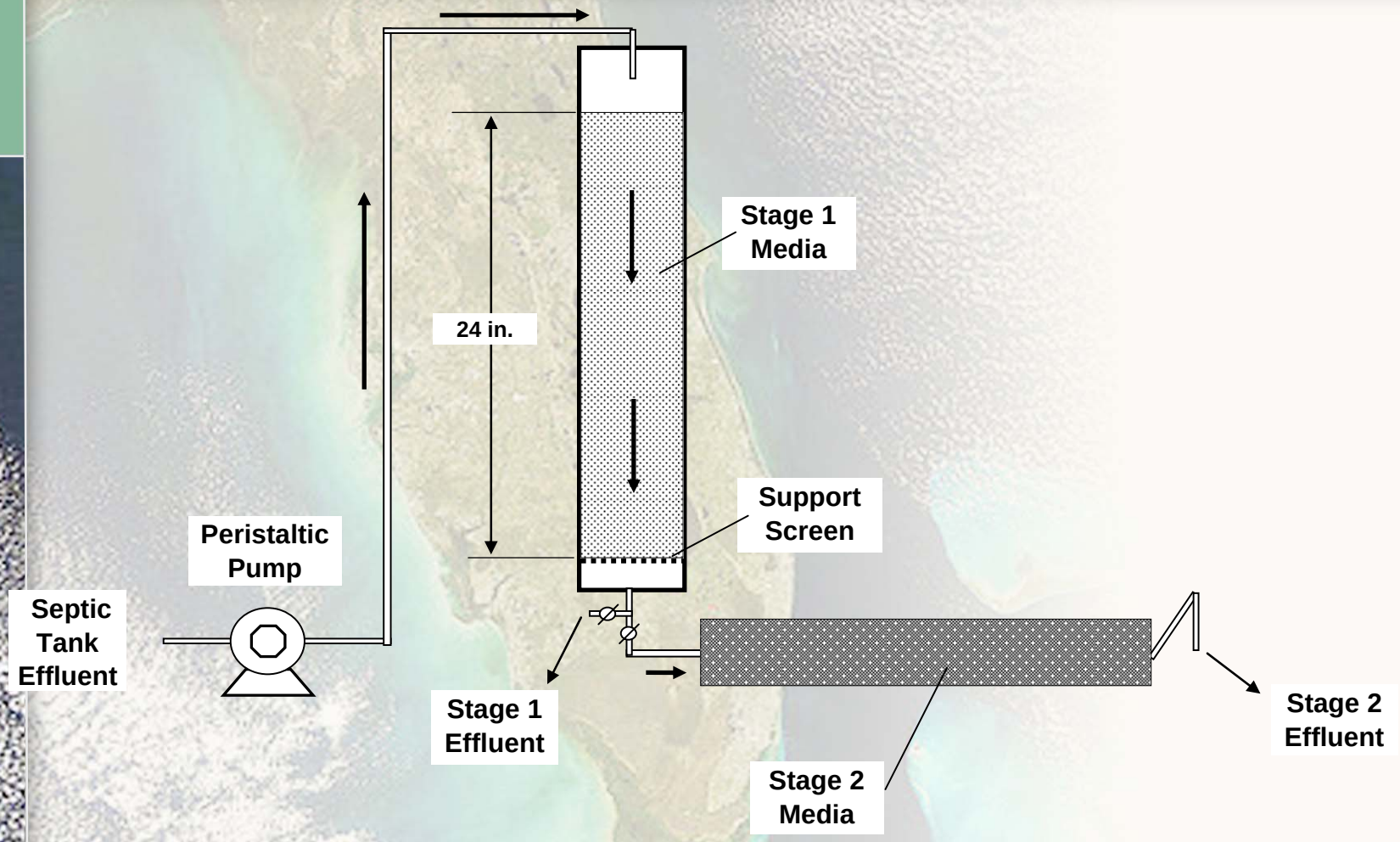
Passive Nitrogen Removal Study II

Approach

- Establish test site at Gulf Coast Education and Research Center (IFAS)
- In-vessel and in-situ pilot systems
- Operate on septic tank effluent for 12 months
- Nitrification and denitrification biofilters

Passive Two Stage Biofiltration PNRS I



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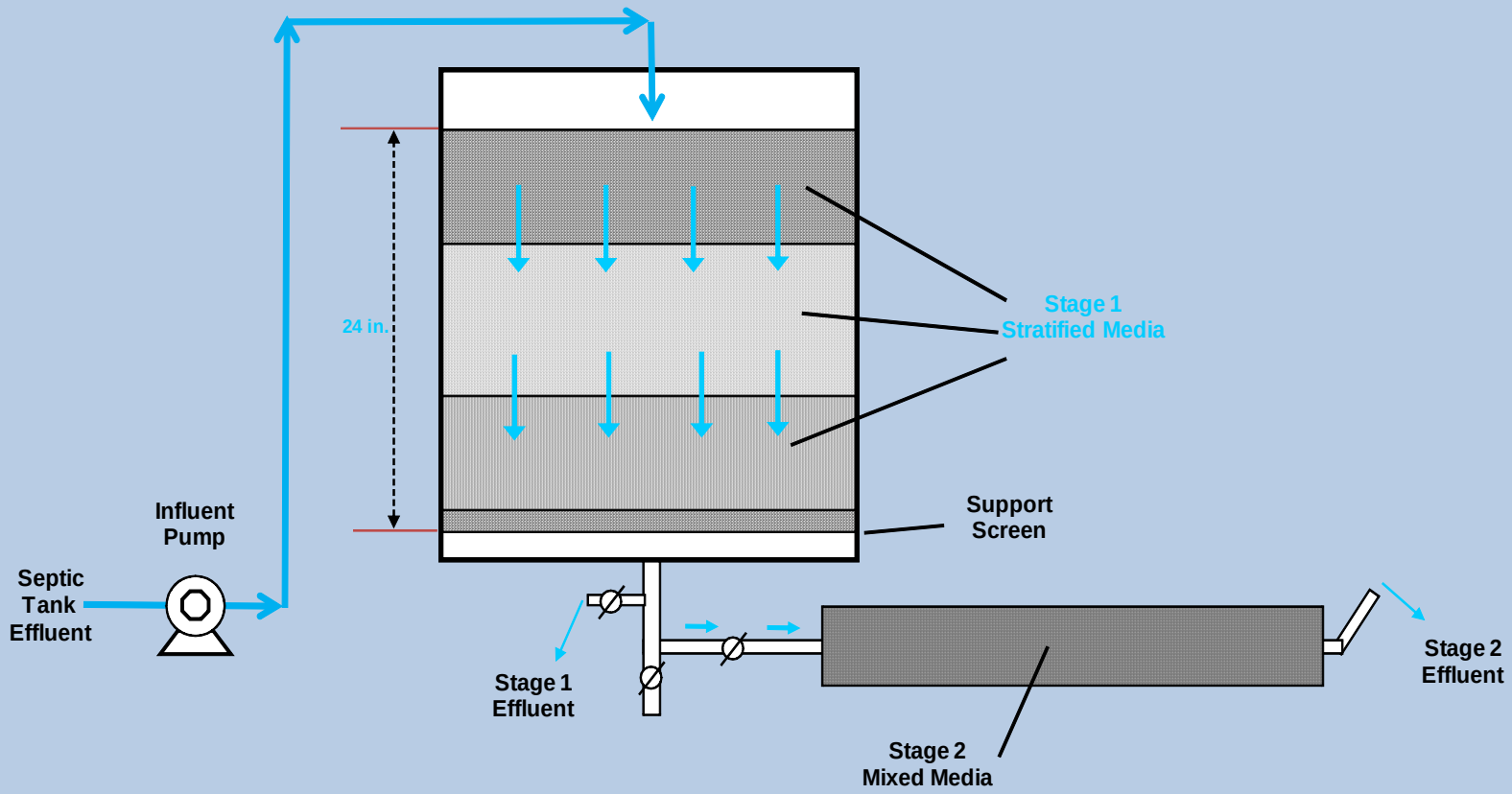
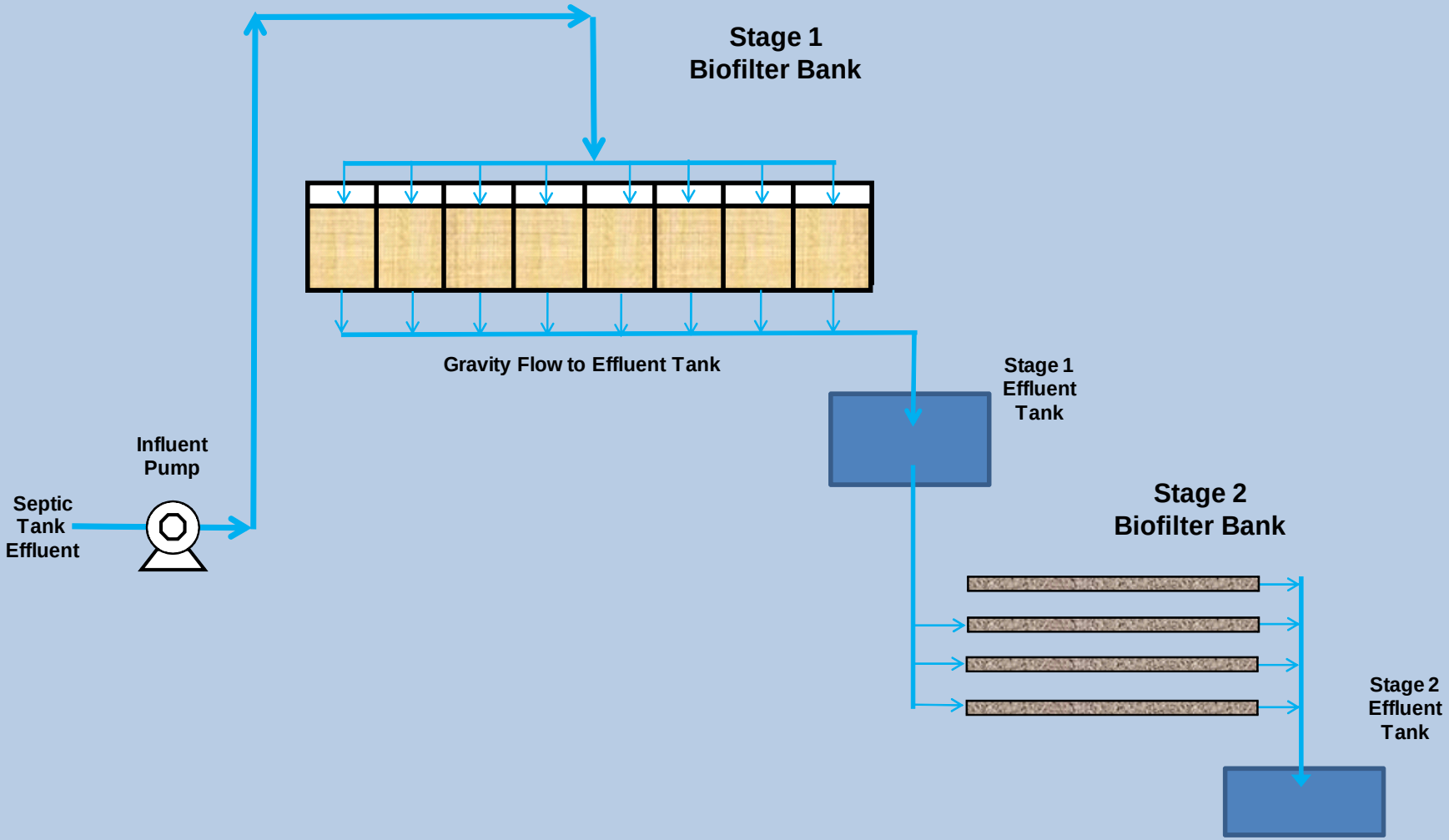
Passive Nitrogen Removal Study II

Pilot Two Stage Biofiltration



Passive Nitrogen Removal Study II



Stage 1 Media (nitrification)

Zeo-Pure clinoptilolite

Expanded polystyrene

Expanded clay

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Stage 2 Media (denitrification)

Lignocellulosics

Elemental sulfur

Expanded clay

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Passive Nitrogen Removal Study II

Two-Stage Biofiltration Pilot Units

- Horizontal configuration
- 10 unsaturated (Stage 1) biofilters

  expanded clay (4), clinoptilolite (4), polys (2)

  single pass (5), recycle (5)

  15 in. depth (4), 30 in. depth (6)
- 9 denitrification biofilters

  lignocellulosic (5), sulfur (3), glycerol (1)

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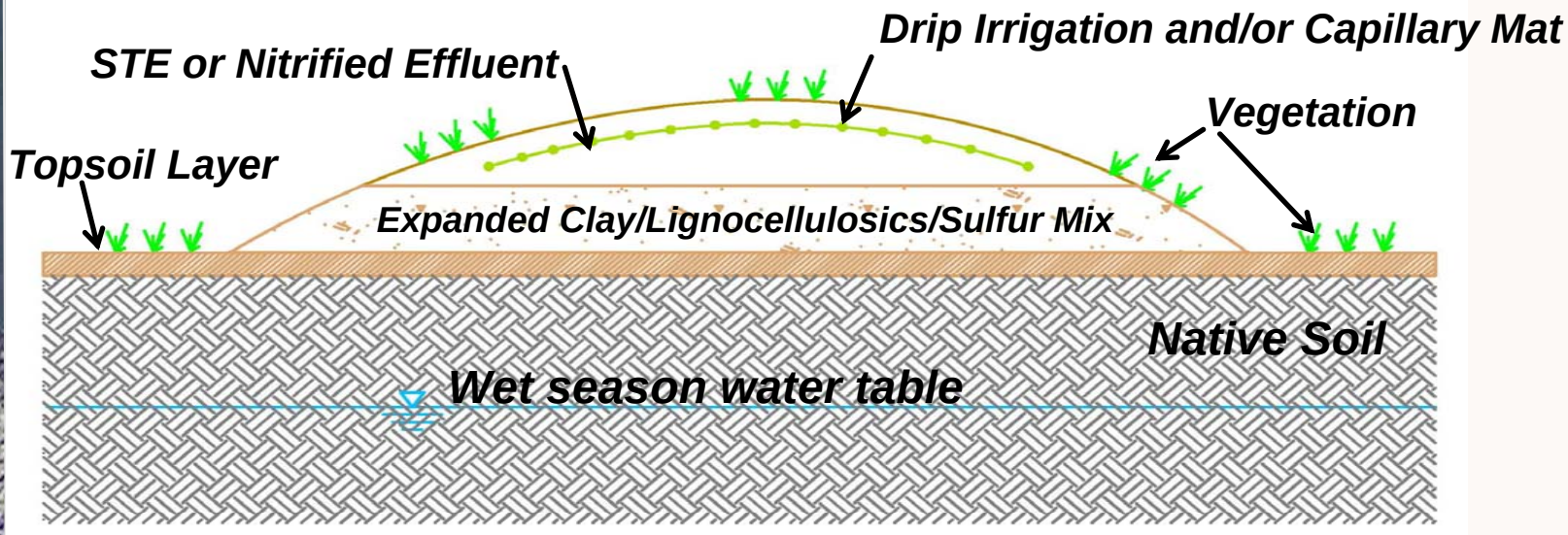
Passive Nitrogen Removal Study II

In-Ground Engineered Media



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Passive Nitrogen Removal Study II

In-Ground Engineered Media

- 12 - 24 in. unsaturated mixed media above natural soil horizon
- Media: expanded clay/lignocellulosic/sulfur
- Plan area loading rate: ~0.50 gal/ft^2-day
- Dosing: 24 dose/day

  STE : subsurface drip tubing

  Nitrified effluent: SD w capillary seepage matt

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Passive Nitrogen Removal Study II

Application of Technologies

	Passive Two Stage Biofiltration	In-Situ Biofiltration	Passive Denitrifcation
New or replacement systems	X	X	
Retrofit to existing conventional system	X	X	
Addition to existing aerobic treatment system		X	X

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FOSNRS Study – Next Steps

- Complete contract amendment for Year 1 with FDoH
- Complete subconsultant contract amendments
- Continue on test facility design and remaining year 1 tasks