OSTDS
It's not just septic tanks anymore

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Florida Onsite Wastewater Association (FOWA)

It’s time to discuss onsite solutions

- Septic tanks were never designed to treat nitrogen

Available technologies

- Proprietary Aerobic Treatment Technologies (ATUs)
  - This includes media filters
- Performance Based Treatment Systems (PBTS)
- Innovative Systems
- Passive Nitrogen Study Technologies

Proprietary Aerobic Treatment Technologies (ATUs)

- **Standard 40: Residential Wastewater Treatment Systems**
- **Standard 245: Wastewater treatment systems**

NSF Testing & Certification Process

- Application/engineering review - 1-3 months
- Test unit installation at test facility - 1-3 days
- Test administration - 6 months
- Test data analyzed by program office & engineering - 4-6 weeks
- Issuance of the Wastewater Technology Report

NSF Evaluation Criteria - 40

Influent Wastewater Characteristics:

- BOD_5 = 100 mg/L - 300 mg/L
- TSS = 100 mg/L - 350 mg/L
- pH = 6 – 9
- Temperature = less than 30°C

Effluent Criteria (Class 1; 30-day average):

- $CBOD_5$ = 25 mg/L
- TSS = 30 mg/L
- Color, Odor, Oily Film & Foam (MBAs) – 3 times during test
- pH = 6 – 9
- Temperature = no criteria
- DO = no criteria

NSF/ANSI Standard 245 Nitrogen Reduction

Standard 245: Any residential system with a treatment capacity of 400-1500 gpd; Nitrogen reduction.

- **Must also meet the requirements of Standard 40 effluent.**

ETV Nutrient Reduction

Only a verification process

- **Systems can be adjusted daily**

Nitrogen Testing

Testing Aspect	*NSF/ANSI 245*	*ETV Nutrient Reduction*
Duration of testing	6 months; up to 37 weeks total	1 year
System start-up	Up to 3 weeks	Up to 8 weeks
Influent requirements	Average required over course of test: CBOD5 100 – 300 mg/L TSS 100 – 350 mg/L TKN 35 – 70 mg/L Alkalinity >120 mg/L Temperature 10°C - 30°C Allows chemical addition to adjust influent – sodium bicarbonate for alkalinity; urea and methanol at a C:N ratio of not less than 5:1 for TKN.	Only suggested ranges: CBOD5 100 – 450 mg/L TSS 100 – 500 mg/L TKN 25 – 70 mg/L Phosphorus 3 – 20 mg/L Alkalinity >60 mg/L Temperature 10°C – 30°C Allows chemical addition to adjust influent – sodium bicarbonate for alkalinity.

Nitrogen Testing

Testing Aspect	*NSF/ANSI 245*	*ETV Nutrient Reduction*
Temperature impacts (temperatures below 10°C impact process bacteria)	Allows for suspension of Nitrogen sampling when temperature drops below 10°C, with extension of sampling to obtain a minimum of 55 valid sample sets	No allowance, test runs 1 year and all data is reported
Maintenance during testing	None – same as NSF/ANSI 40	Maintenance allowed, but documented and reported in final report
Stress Sequences	4 - wash day, working parent, equipment/power failure, vacation	5 - wash day, working parent, equipment/power failure, low loading, vacation

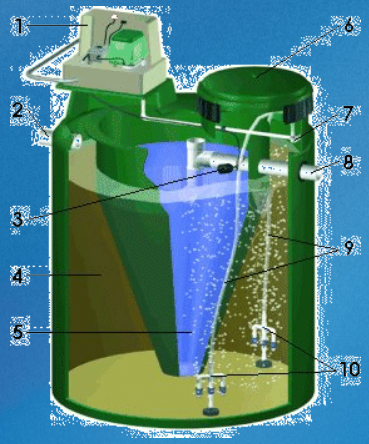
Nitrogen Testing

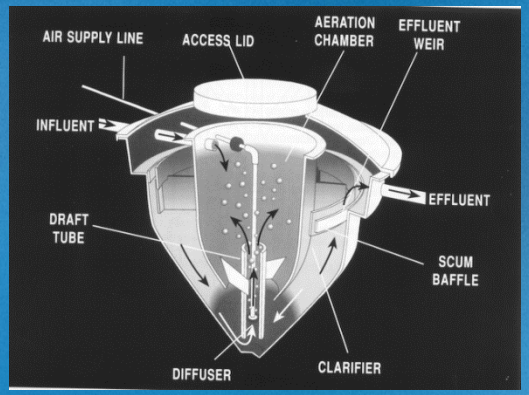
Testing Aspect	*NSF/ANSI 245*	*ETV Nutrient Reduction*
Sampling	3 times/week during design loading (weeks 1–16 and weeks 24½–26); 2 times during the week following each stress test	Minimum 1 time/month; same as NSF/ANSI 40 during stress sequence; also for 5 consecutive days at end of test
Acceptance criteria	For pass/fail, only samples collected during design loading periods (samples during stress sequence reported, but not included in the pass/fail criteria calculation). Average of all effluent samples may not exceed: CBOD5 25 mg/L TSS 30 mg/L TKN <50% of average of all influent pH 6.0 – 9.0 SU	None; all data is reported

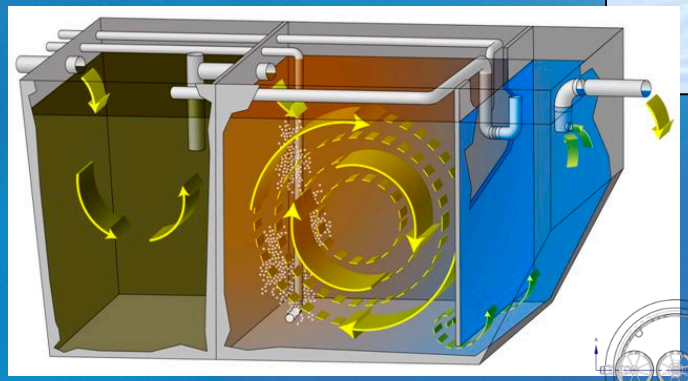
ATU/PBTS Units Approved in Florida

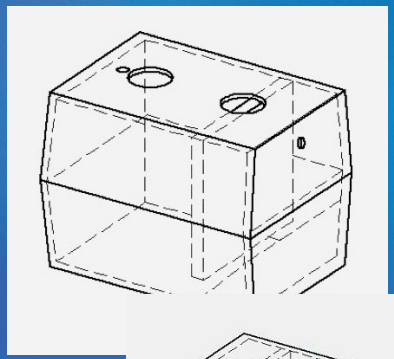
Hoot *
Nyadic
Multiflo
HydroAction
Norweco*
Clearstream
CajunAire
Delta Whitewater
Aero-Tech
AquaKlear
Mighty Mac
Bionest – fixed film
Aqua Safe
SCAT
Aqua Aire
American Wastewater
FAST – fixed film*
Jet – fixed film
Fuji Clean – fixed film

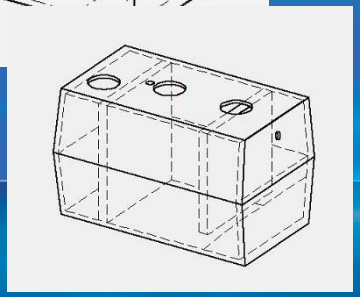
Suspended ATUs

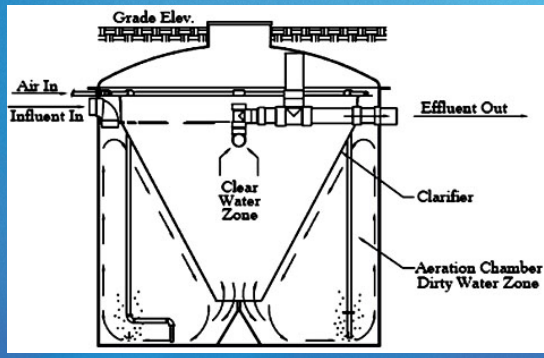


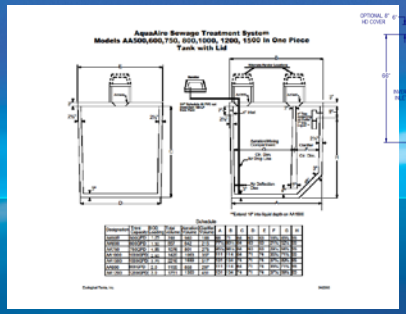


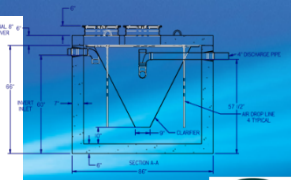


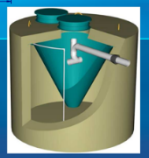




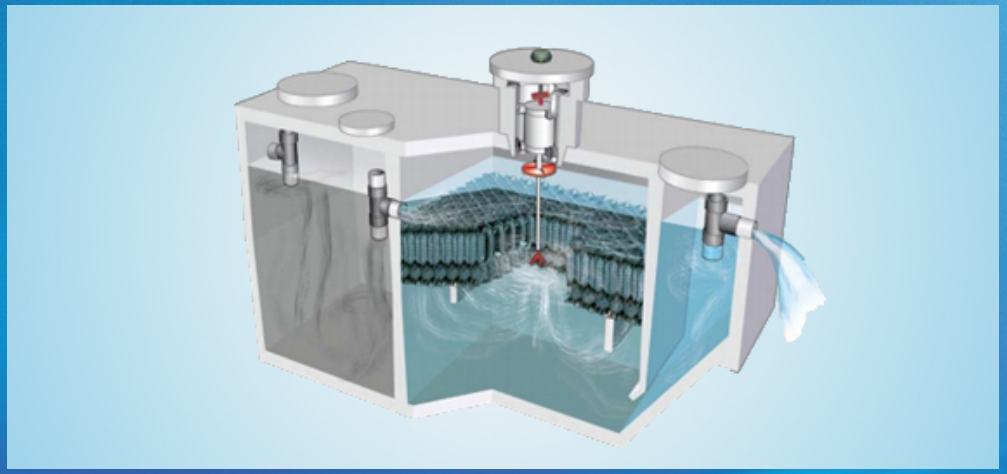








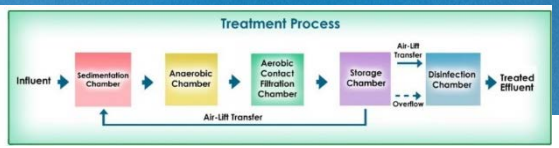
Fixed Film/Submerged Media ATUs



Treatment Process Overview

Fuji Clean's "contact filtration" treatment consists of a controlled, circuitous flow train through anaerobic and aerobic chambers and in direct contact with assorted proprietary fixed film medias on which biological digestion of organic matter occurs. Media is also designed and positioned to provide mechanical filtration of process wastewater.

The system includes two air lift pumps (see diagram below) The Recirculating Airlift Pump returns process water and sludge from the aerobic zone to the sedimentation chamber, recirculating 2-4 times inflow per day for CE models and 4-6 times inflow for CEN (enhanced denitrification) models. The Effluent Airlift Pump is designed to help equalize flow and discharge treated effluent.



Two Air Lift Pumps. One Recirculating Air Lift pump sending process water and solids back to Chamber 1, and one Effluent Air Lift Pump for measured discharge of treated effluent. (See airlift pump info below).

Sludge Transfer (Recirculating air lift pumpback) See airlift pump info below.

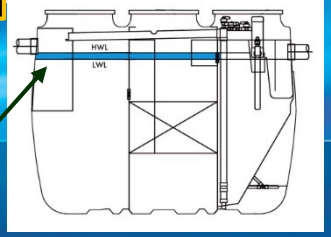
Chamber 1. Sedimentation Chamber (separates solids and greases)

Chamber 2. Anaerobic Contact Filtration Chamber (spherical-skeleton filter media) organic matter decomposition by micro-organisms, suspended solids captured and nitrates are denitrified

Chamber 3. Aerobic Contact Filtration Chamber (both board and cylindrical hollow mesh media) oxygen rich zone for aerobic microbe digestion activity, solids filtration and nitrification of ammoniac nitrogens to nitrates

Airlift Pumps. This generic illustration shows the mechanics of the "airlift pumps" used in this system, which are not mechanical pumps. They are simple pipe conduits through which pressurized air (from blower) is introduced at the bottom and by fluid pressure, water is carried up the pipe by ascending bubbles.

Built-in flow equalization. During treatment, water level fluctuates between high and low water levels



FujiClean USA LLC
Toward Clean Water...

NSF
Certified to
NSF/ANSI Standards 40 & 245

NSF/ANSI Data Summary

Fuji Clean USA Model CE5
NSF/ANSI 40 Data
450-gpd, straight septic, no septic tank.

BOD/CBOD (mg/l)		TSS (mg/l)		Nutrients					
				Total Nitrogen (1 sample/week)			Total Phosphorus (1 sample/week)		
Influent (Avg)	Effluent (Avg)	Influent (Avg)	Effluent (Avg)	Influent (Avg)	Effluent (Avg)	% Removal	Influent (Avg)	Effluent (Avg)	% Removal
152	**11**	259	**13**	24	**10**	62%	9	**7**	22%

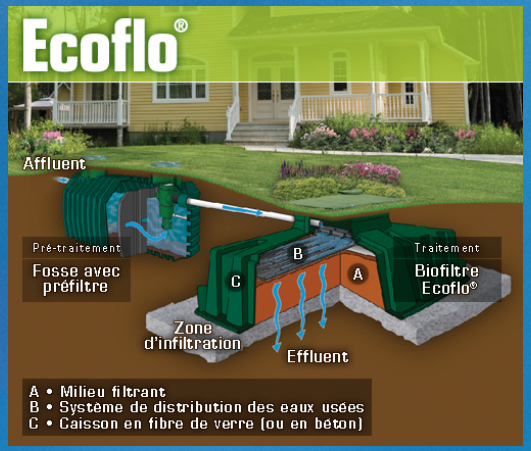
Fuji Clean USA Model CEN5
NSF/ANSI 40/245 Data
450-gpd, straight septic, no septic tank.

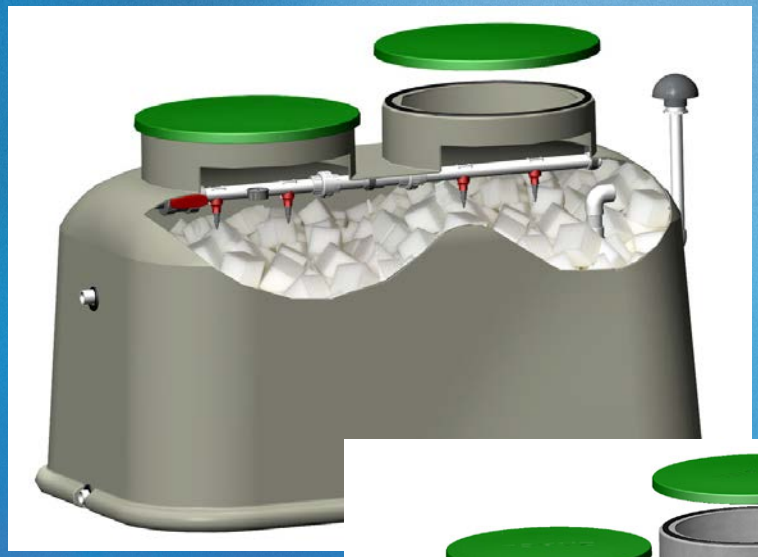
BOD/CBOD (mg/l)		TSS (mg/l)		Total Nitrogen		Fecal Coliform (w/ UV) Total Colonies /100 mL
Influent (Avg)	Effluent (Avg)	Influent (Avg)	Effluent (Avg)	Influent (Avg)	Effluent (Avg)	Effluent (Geomean)
190	**5**	305	**6**	40	**10**	**70**

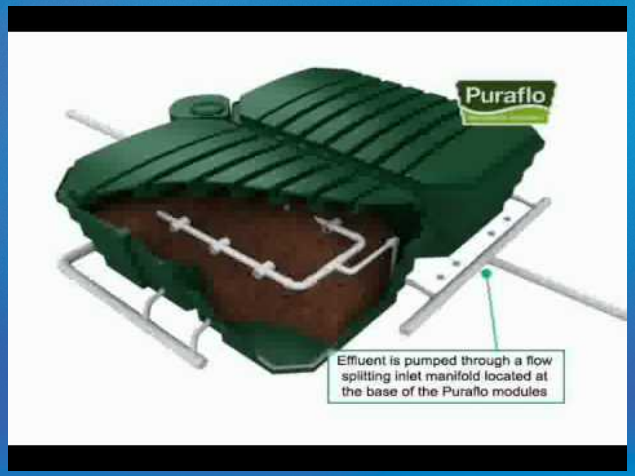
Media Units Approved in Florida

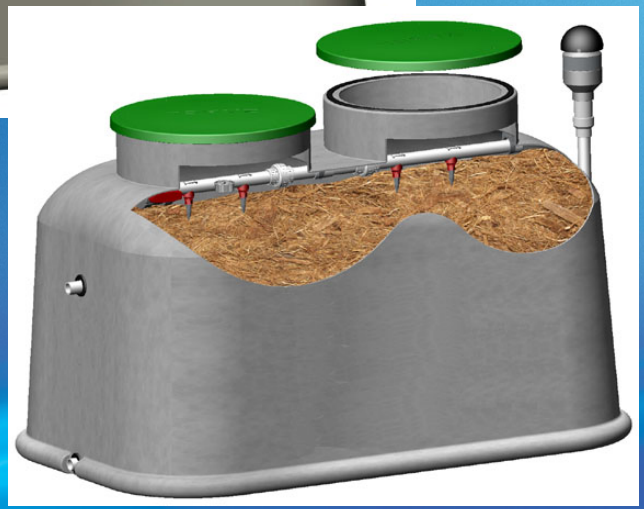
- Unsaturated - natural
  - Quanics – coconut coir*
  - Ecoflo
  - Ecopure*
  - Puraflo
- Unsaturated - artificial
  - Advantex*
  - Earthtek
  - Quanics – foam*

Unsaturated Media Filters

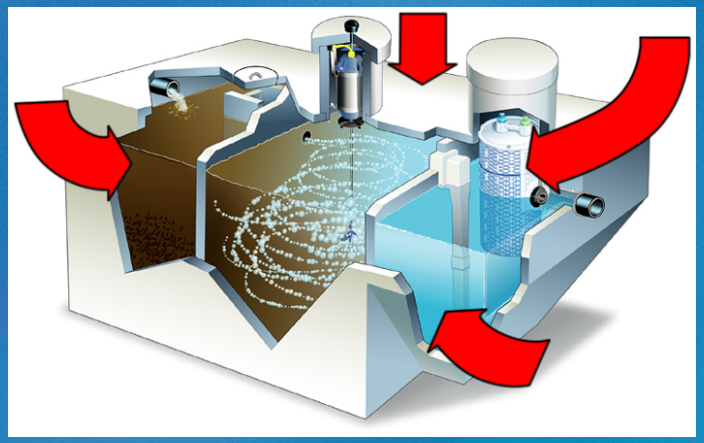


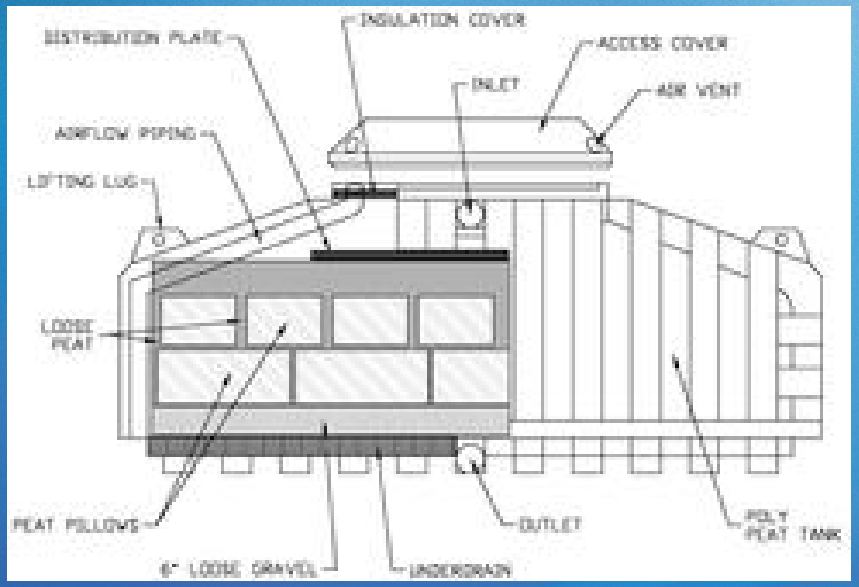






Currently Approved PBTS





Bio-Microbics, Inc.

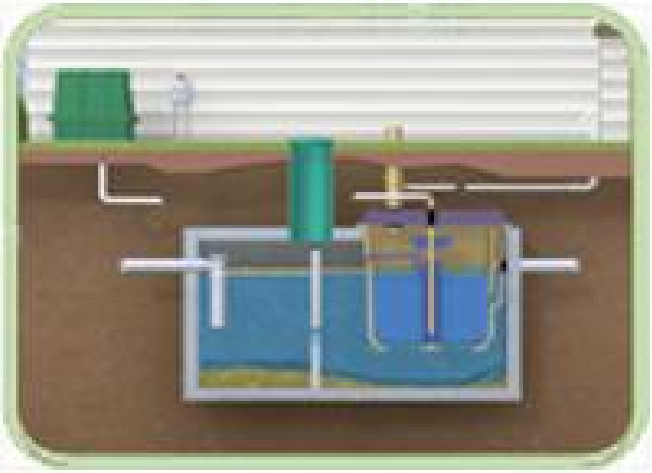
NSF/ANSI 245

Wastewater Treatment Systems - Nitrogen Reduction

- BioBarrier® MBR 0.5-N 500
- BioBarrier® MBR 1.0-N 1000
- BioBarrier® MBR 1.5-N 1500
- MicroFast 0.5[1] 500
- MicroFast 0.625 625
- MicroFast 0.75[2] 750
- MicroFast 0.9[3] 900
- MicroFast 1.5[4] 1500

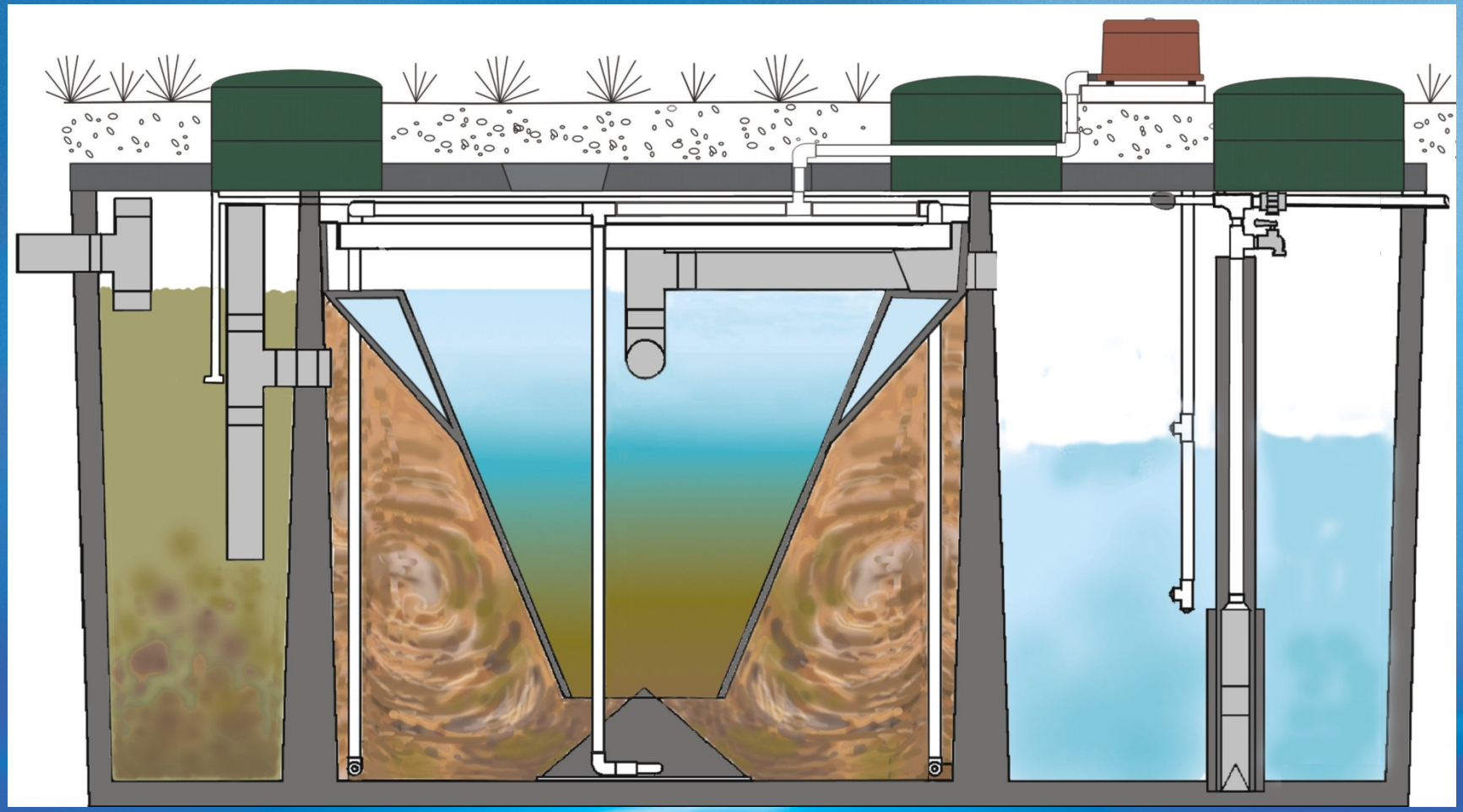
BioBarrier® Membrane Bioreactor

- NSF/ANSI Standard 40, Class 1 Certified (BioBarrier® 0.5, 1.0, & 1.5)
- NSF/ANSI Standard 245 (Nitrogen Reduction) Certified (BioBarrier® 0.5, 1.0, & 1.5)
- NSF/ANSI Standard 350, Class R (Water Reuse) Certified (BioBarrier® 0.5, 1.0, & 1.5 – FIRST system to achieve this Standard!)



HOOT SYSTEMS, LLC.
www.hootsystems.com
Install A Hoot Don't Pollute

Hoot BNR



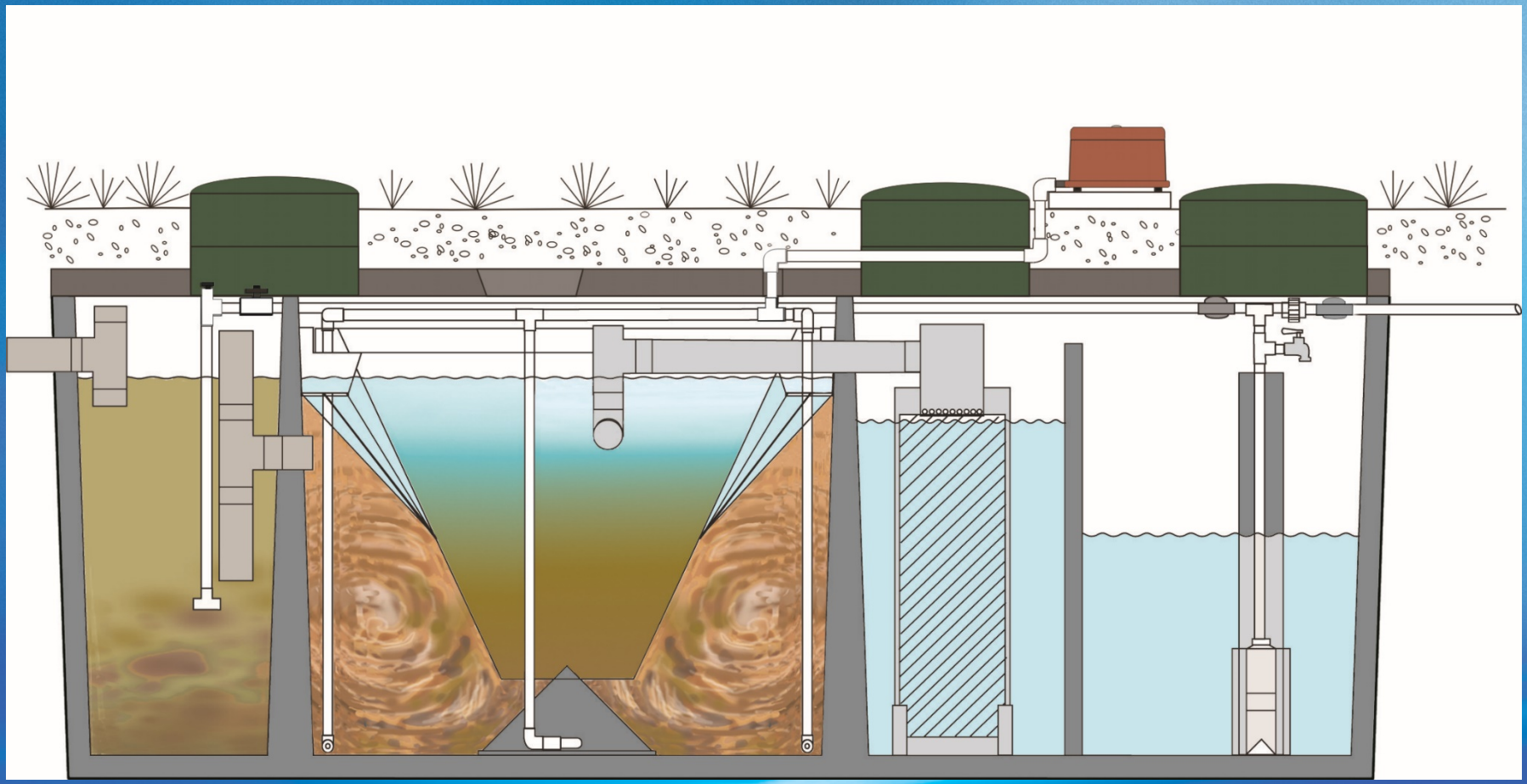
Hoot Systems, working today to protect tomorrow's environment.

History of the BNR

- BNR - Biological/Basic Nitrogen Reduction
- Tested in 1999, Introduced in 2001
- Thousands of installations in Florida
- Standard 40 Since 2001,
- Similar Model (Hoot-NR) is Std. 245
- Adds Total Nitrogen Reduction <60%
- Field Verification by Maryland Department of the Environment (MDE) of 62%.

HOOT SYSTEMS, LLC.
www.hootsystems.com
Install A Hoot Don't Pollute

Hoot ANR - RTS



Hoot Systems, working today to protect tomorrow's environment.

History of the Hoot ANR

- ANR – Advanced Nitrogen Reduction
- Research Began in 2001, Certified in 2007
- NSF Standard 40 & 245 Certified
- For BOD_5, TSS, TN & Fecal Reduction
- The only system in certification conditions to get below 10 mg/l, FDWS

Hoot Systems H-450ANR – Electrical Monitoring

NSF has completed a review of the Hoot Model H-450ANR treatment system for the average electrical consumption. The Hoot ANR system was monitored for electrical consumption during an extended period beyond the Standard 40/245 performance evaluation. There were no modifications made to the tested system during the 2nd six months of performance evaluation. During the 163 days of operation, the system used a total of 343 kW of electricity, averaging a daily electrical consumption of 2.1 kW per day.

Dispersal Options

- Low Pressure Piping (LPP)
- Drip Irrigation

Gives us the opportunity to build “treatment trains” for water reuse with additional uptake of nitrogen

Benefits of OSTDS

- Individualized
  - Single family
  - Decentralized
- Groundwater recharge
- Limited Collection/Transport Piping
  - Less opportunity for contamination
  - $$$ savings

Where do we go from here?

- Determine acceptable TN loading rate for area
- Determine “best fit” technology
  - Use – fulltime, seasonal, rental
  - Footprint
  - “Cradle to Grave” cost

Questions/Comments

- I would like to suggest manufacturers be invited to present specifics of technologies at upcoming meeting(s).
- Or a fieldtrip to the FOWA Training Center to gain “hands-on” experience of various technologies.