

# *Rhode Island Department of Environmental Management*

To: Interested Parties

Date: August 10, 2016

Subject: **Alternative or Experimental Onsite Wastewater Treatment System (OWTS) Technologies**

Attached herewith is the official “List” of Approved Alternative/Experimental (A/E) Technologies for onsite wastewater treatment. These technologies and components have been approved pursuant to RIDEM OWTS Rules. The technologies have been reviewed and accepted by a nine member Technical Review Committee composed of representatives of local government, the University of Rhode Island, CRMC, environmental organizations, and the private sector.

Immediately following this cover is a brief summary of the A/E technology application process and a "Guidance to OWTS Designers" that provides additional information and specifies responsibility for designers who are contemplating the use of an approved A/E technology.

Should you have any question or need further information, please contact Deb Knauss of the OWTS Program Office at [deb.knauss@dem.ri.gov](mailto:deb.knauss@dem.ri.gov) or 401-222-4700 x 7612.

# *Rhode Island Department of Environmental Management*

February 2013

## **ALTERNATIVE/EXPERIMENTAL ONSITE WASTEWATER TREATMENT SYSTEMS (OWTS) TECHNOLOGY PROGRAM**

Onsite Wastewater Treatment System Rules, provide the basis for approval of Alternative/Experimental (A/E) Technologies in Rhode Island. A/E systems are designed as alternatives to conventional OWTS or parts of a conventional system. A conventional system is a traditional OWTS with a septic tank, pump chamber with pump or siphon (if needed), distribution box and a standard leachfield with gravity distribution. An Alternative/Experimental System or Technology is an OWTS that does not meet the location, design or construction requirements of a conventional system, but has been demonstrated through field testing, calculations and other engineering evaluations to provide the same degree (or better) of environmental and public health protection.

There are three different categories of A/E technologies: alternative systems, system components, and experimental systems.

**Alternative Systems** - This category has two classes of certification: Class One and Class Two.

- A **Class One** certification is issued to technologies that have been shown to have at least four (4) consecutive years of performance data per installation for no fewer than ten (10) installations, collected no less frequently than quarterly, which clearly demonstrate that all applicable standards have been met. A Class One system must also have been approved for at least four (4) consecutive years in Rhode Island with no fewer than ten installations or at least four (4) consecutive years in at least three (3) other jurisdictions, with no fewer than ten (10) installations in each jurisdiction. Class One certifications do not require renewal.
- A **Class Two** certification may be issued to technologies under the following conditions:
  - The applicant documents at least two (2) consecutive years of performance data per installation for no fewer than ten installations, with data collected no less frequently than quarterly that demonstrates that Department standards have been met, have demonstrated a theory or applied research, and the applicant demonstrates that the technology has been approved and utilized successfully for at least two (2) consecutive years in Rhode Island or at least two (2) consecutive years in another jurisdiction with no fewer than ten (10) installations in each jurisdiction, *or*

For a nitrogen reducing technology:

- The applicant provides certification that the technology meets NSF/ANSI “Standard 245- Wastewater Treatment Systems- Nitrogen Reduction” and the testing results show a preponderance of treated effluent nitrogen concentrations of nineteen (19) mg/l or less. Systems approved based on being certified to NSF/ANSI Standard 245 are subject to additional monitoring and a maximum of 50 approvals will be issued for systems requiring nitrogen removal until the terms of the additional monitoring have been successfully fulfilled; these system and their approval status are identified in the technology listing. *or*
- demonstrates approval for use in another jurisdiction in an area where the temperature conditions are similar to or colder than those in Rhode Island and with technology review criteria substantially equivalent to Class One or Class Two summarized above and detailed in OWTS Rules 37.4.1 or 37.4.2 (A)-(B). The full text of the Rules is available at: <http://www.dem.ri.gov/pubs/regs/regs/water/owts16.pdf>.

Class Two certifications require renewal every five years.

**System Components** - This category also has two classes of certification: Class One and Class Two.

- A **Class One** system component certification is issued for a component when the applicant documents that applicable manufacturer’s and material standards are met; the applicant provides at least two (2) consecutive years of performance data for no fewer than ten (10) installations that demonstrates Department standards are met, if applicable; and the applicant demonstrates that the component has been approved and utilized

successfully for at least two (2) consecutive years in Rhode Island or at least two (2) years in at least three (3) other jurisdictions for no fewer than ten (10) installations in each jurisdiction.

- A **Class Two** system component certification is issued for a component when the applicant documents that applicable manufacturer's and material standards are met; the applicant provides at least one (1) year of performance data for no fewer than ten (10) installations that demonstrates Department standards are met, if applicable; the applicant demonstrates that the component has been approved and utilized successfully for at least one (1) year in Rhode Island or at least one (1) other jurisdictions for no fewer than ten (10) installations in each jurisdiction.

**Experimental Systems** - This category is designed to allow innovative systems that have been demonstrated to work in practice or theory, to be installed on a limited basis as they are further tested and studied.

Experimental use is approved when:

1. The applicant demonstrates that the technology will work in practice and in theory;
2. Provides for three (3) to ten (10) proposed installations, a suitable area at each location for the installation of an OWTS permitted under the OWTS Rules, or a Class One A/E OWTS Technology;
3. The applicant proposing the Experimental Technology, the property owner(s) and subsequent purchaser(s) submit a signed statement to the Director agreeing to abandon the Experimental Technology and install an OWTS permitted under these Rules, or a Department approved Class One A/E OWTS Technology if the Experimental OWTS fails to perform as designed; and
4. The applicant submits documentation securing a bond or other form of financial security acceptable to the Director, to replace the entire OWTS in the event it fails to perform as designed.

### **Review and Approval Process**

For a technology or component to be approved for use in the state of Rhode Island, the Vendor of that technology must submit an application package to the Department's A/E Technology Program for review. The application package is reviewed by Department staff for completeness. Completed applications are forwarded to the Department's OWTS Technical Review Committee (TRC). The TRC is made up of members from the Department, Coastal Resource Management Council, local Universities, OWTS design and installation firms, local municipalities, and environmental organizations. The TRC reviews all A/E applications and makes recommendations to the Department based on their findings. The Department then issues the final approval or denial.

An approval is documented in the form of a Certification signed by the Chief of Groundwater and Wetlands Protection in the Office of Water Resources. The Certification lists any design, maintenance or installation requirements or restrictions placed on the technology and it also indicates the general requirements and any sampling and reporting requirements associated with the technology.

After a technology is approved is certified by the Department, the Vendor must submit a Design and Installation Manual for review. When the technology's Design and Installation Manual is approved the technology is then placed on the Department's List of Approved Innovative/Alternative Technologies. Once an A/E technology is on the list then individual applications to design, construct, alter, or install these technologies may be submitted to the Department. Please note that an A/E technology is not approved for use under the program until placed on the list. Individual OWTS applications submitted to the Department proposing a technology not yet listed as of the date of receipt of the application must be submitted through the variance process.

## GUIDANCE TO OWTS DESIGNERS

### Rhode Island Alternative/Experimental OWTS Technology Program

The purpose of this section is to provide guidance on the design, installation and use of the approved technologies under the Rhode Island A/E OWTS Technology Program. By following this guidance, designers will help promote the acceptance and beneficial use of A/E technologies in Rhode Island and expedite the approval process for individual applications.

A/E technologies generally offer improved performance over conventional technologies by using one or a combination of innovative designs, patented products, alternative materials, filtration processes, recirculation systems, pumps, or other electromechanical devices. The primary application for these technologies is at existing home sites on substandard lots having failing or otherwise inadequate OWTSs, and at other sensitive or difficult sites. A/E technologies often require special design and maintenance considerations, and some may involve significant additional design, installation or operational cost.

**Certification:** The certification letter issued by the Department for each A/E technology is the primary source of information concerning the terms and requirements guiding the use of the technology under the A/E program. The certification includes the design requirements, design exceptions, special operation and maintenance requirements, and obligations of the vendor. Copies of the certifications are available from the vendor.

**Important:** Please note that the certification represents only that the Department has accepted the technology for listing on the List of Approved A/E Technologies in accordance with its Rules. It is not an endorsement of the technology, nor is it a recognition of any claim other than that which is specifically stated in the certification letter.

**Authority to Design:** Please note that technology certifications specify the license classes which are authorized to submit to the Department design applications incorporating any of these approved A/E OWTS technologies. These classes are listed with the technology summaries provided herein as “Authority to Design”.

**Designer Responsibility to Inform Purchasers and Users:** Conventional OWTS systems are relatively well understood by the general public. Most people know about basic septic system components, their limited operation and maintenance requirements, and have a rough idea of costs. A/E technologies, on the other hand, vary considerably from these familiar standards. As a practical matter, the Department will not be able to inform the public adequately about the many different A/E technologies. Accordingly, this responsibility will fall upon the vendors of the technologies and, more particularly, upon designers who elect to use or recommend these technologies to their clients.

Begin by making sure you obtain from the vendor the complete details of the technology, including its design and installation details, operational and maintenance requirements, applicability to the siting or design problem you are attempting to address, and all costs. Next, give your client a complete copy of the certification for the technology issued to the vendor and ask your client to read it. The certification contains many special provisions of which users or purchasers should be apprised. The certification requires that the vendor provide any purchaser of the system with a copy of the Department’s approval prior to the sale of the system. Take time to familiarize the client with all relevant details of the technology. These details may include: appearance or aesthetic aspects, such as above ground tanks, vents or other components; manhole covers; motors; pumps; electrical panel boxes; energy requirements; periodic maintenance needs; costs including design, installation, operating and maintenance costs; noise; and odors, if any. The expected service life of the equipment and overall system should also be addressed. Finally, the advantages and disadvantages of each technology being considered should be fully explained.

#### **Design**

**Manuals:** Each A/E technology is required to have a Design, Installation and O&M Manual. The manuals are produced by the manufacturer or vendor and should be obtained directly from them. The contact name, address and telephone number of the vendor is given on the A/E technology list. The manuals are intended to supply all of the required information to enable design and installation of the A/E system. The manuals also include a copy of the Department’s certification letter. Vendors must ensure proper training to help acquaint you with their technologies and answer questions. Some vendors offer specific design and installation services. Some offer services as part of the cost of supplying the product; others may offer additional services on a fee for service basis.

Leachfield Size Reduction: Certain A/E technologies have been approved with an allowance for a reduction in leachfield size. However, for new building construction, the designer proposing a reduced leachfield area must demonstrate that sufficient land area is available to permit installation of a full size leachfield; this should be shown on the plan as an extension of the proposed leachfield area. The additional area must be clearly labeled as the “reserve area”, so that it is clear that no construction will take place in this area. The full size leachfield shall meet all OWTS regulatory requirements. Please note that in most cases the leachfield size reduction may only be applied to conventional leachfield types contained in the rules. The size reduction ordinarily does not apply to the Eljen GSF system because this system is considered an A/E technology. Sizing for Eljens should comply with the requirement in the certification.

Electrical: Electrical components and wiring must comply with applicable state and local codes. Power interrupt alarms, where required, generally must be placed on the exterior of the building. The Department will allow interior placement at commercial buildings where access to the interior is readily available during normal business hours.

Operational Requirements: All mechanical treatment systems require electrical power. One or more controllers are normally supplied. Hours of operation are sometimes adjustable and must be reviewed as part of the design process. Operational controls must be set so as to optimize treatment and ensure compliance with the operational efficiencies stipulated by the terms of the certification.

Eljen GSF: The Eljen GSF leachfield system may be used with a single trench line. Normally, two trench lines are required for the minimum trench design according to state Rules.

Effluent Filters: Several effluent filters have been approved for use. Please note that a manhole to grade is required over the outlet port above the effluent filter to facilitate maintenance of the filter.

Variiances: Designs incorporating A/E technologies must comply with all other applicable OWTS standards. Where these standards cannot be met, a variance application must be filed in order that the Department properly assesses the impacts of the variance request on the operation of the system and on the environment. The fee for the specially engineered system will not be assessed if the only engineered feature is the approved A/E technology.

Nitrogen-Reducing Treatment Systems: Technologies currently recognized as capable of significantly reducing nitrogen levels in residential wastewater are AdvanTex AX, AdvanTex AX-RT\*\*, Amphidrome, BioBarrier\*, Bioclere, FAST, Hydro Kinetic Model 600 FEU\*, Nitrex, Singulair TNT & Green TNT\*\*, SeptiTech, Singulair DN & Singulair Green DN and the RSF as specified provided in the Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - December 2013.

\*The following systems approved under Rule 37.4.2(B)(i) are subject to a maximum of 50 approvals for systems where nitrogen removal is required until the terms of the [Monitoring Protocol](#) for Nitrogen Removal Systems have been successfully fulfilled. **The approval total should be verified with RIDEM prior to specifying these systems in design plans where nitrogen is required.**

- BioBarrier
- Hydro Kinetic Model 600 FEU

\*\* The following systems approved under Rule 37.4.2(B)(i) **have reached the maximum of 50 approvals** for systems where nitrogen removal is required until the terms of the [Monitoring Protocol](#) for Nitrogen Removal Systems have been successfully fulfilled and **until further notice may not be specified in design plans where nitrogen is required.**

- AdvanTex AX-RT
- Singulair TNT & Green TNT

Non-Endorsement: The Department of Environmental Management certification under the A/E program does not represent an endorsement by the agency of any system or technology. A representation by any person, vendor or designer that the Department endorses any A/E technology is strictly prohibited.

Onsite Wastewater Treatment System Program  
Use of Dispersal Trench and Approved Alternative Leachfields  
With Approved A-E Advanced Treatment Systems

October 2, 2008

Effective immediately for all New Building Construction, Alteration and Repair Applications, RIDEM announces the following changes to applicable Alternative – Experimental Technology Certifications concerning requirements for use of pressurized shallow narrow drainfields (PSNDs) or bottomless sand filters (BSFs) with RIDEM approved nitrogen removal OWTS technologies in the Salt Pond and Narrow River Critical Resource Areas:

Dispersal trench (or conventional leachfield) and approved alternative leachfield technologies may be used in the design of any OWTS in the Salt Pond and Narrow River Critical Resource Area provided that the leachfield design complies with all setback and design requirements of the OWTS Rules. Designs employing a reduced leachfield area as may be allowed pursuant to the applicable A-E advanced treatment technology certification must show the 100% leachfield area on the plans and demonstrate compliance with all setbacks required by the OWTS Rules. Designs for Repair applications are not required to show the 100% leachfield area.

Please note that the use of dispersal trenches (conventional leachfields) in the Salt Pond and Narrow River Critical Resource Areas will not likely be allowed where a variance application to any minimum standard is required. For single family residential applications, the designer should employ a pressurized shallow narrow drain field (PSND) or bottomless sand filter (BSF). If a design using a dispersal trench or alternative leachfield cannot meet the minimum setback standards contained in the OWTS Rules, the Department will require consideration of alternate designs – including a reduction in project scale for new construction and other projects which propose an increase in wastewater flow – that would enable compliance or substantial compliance with the OWTS Rules prior to or as part of any application for variance to the minimum setback standards contained in said Rules.

Please also note that should any language above deviate from that contained in any A-E technology certification, the provisions given herein shall apply to that certification.

# List of Approved Alternative/Experimental OWTS

## LEACHFIELD SYSTEMS

**Technology Name:** [Perc-Rite® Drip Dispersal System](#)

**Vendor Information:**

Tom Ashton R.E.H.S, C.P.S.S.  
Regulatory Relations  
American Manufacturing Company, Inc.  
PO Box 97  
22011 Greenhouse Road  
Elkwood, VA 22718

Phone: 1-800-345-3132  
Fax: 540-825-7234

**Regional Contacts:**

Dan Ottenheimer  
Oakson, Inc.  
6 Sargent Street  
Gloucester, MA 01930

Email: [info@oaksoninc.com](mailto:info@oaksoninc.com)

Phone: 1-877-Oakson1  
1-978-282-1322

Fax: 978-282-1318

Website: [www.OaksonInc.com](http://www.OaksonInc.com)

**Certification:** Component Technology - Class Two Component

**Technology Type:** Alternative Leachfield Component

**Authority to Design:** CI-II & III Licensed Designers

**Description:** The Perc-Rite® Drip Dispersal System receives time-dosed effluent from a final dosing tank after either a septic tank or a RIDEM approved pre-treatment system producing a minimum effluent quality of TSS/BOD of 30/30 mg/L and FOG of 5 mg/L and following 115-micron disc filtration, disperses effluent below the soil surface through ½” nominal diameter pressurized tubing.

**Technology Name:** [ARC 18\\*, ARC 24, ARC 36 and ARC 36 HC](#)

**Vendor Information:**

Infiltrator Water Technologies, LLC  
4 Business Park Road  
P.O. Box 768  
Old Saybrook, CT 06475  
David Lentz, PE  
Regulatory Director  
(860) 577-7198  
[dlentz@infiltratorsystems.net](mailto:dlentz@infiltratorsystems.net)

Technical Services  
(800) 221-4436

**Certification:** Alternative Component - Class Two

**Technology Type:** Alternative Leach Field Component

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The Component is arc-shaped, molded high-density polyethylene, with a solid roof, louvered sidewalls and an open bottom; it is installed in a trench configuration. Sizing is based on a 1.72 multiplier of the open bottom area with a maximum of 4.0 SF/LF. No stone is used in this installation and trenches are required to be interconnected.

\*The ARC 18 chamber is also approved for use as the dome structure in a Pressurized Shallow Narrow Drainfield (PSND). Design and sizing are in accordance with specification in the RIDEM Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields (November, 2013) and the approved vendor’s design and installation manual.

**Technology Name:** [Bottomless Sand Filter](#)

**Vendor Information:** Generic

**Certification:** Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - November 2013

**Technology Type:** Alternative Leachfield

**Authority to Design:** CI-II & III Licensed Designers

**Description:** An equal or superior leachfield for pretreated effluent which is applied under pressure to a 2' bed of specified sand media. The effluent is pumped to and distributed by SCH 40 PVC or equivalent surrounded by a minimum of 6" of pea stone. Wastewater trickles down in unsaturated thin-film flow through sand media in a time dosed mode. After treatment the effluent is disposed directly under the sand filter. The technology is targeted for single family sized systems where soil and site conditions exist that make the use of conventional or shallow narrow drain fields impractical or not economical.

**Technology Name:** [Cultec Contactor Chambers Models 75, 100, 125 & Field Drain Panels \(C-1, C-2, C-3 & C-4\)](#)

**Vendor Information:** Cultec, Inc.  
878 Federal Road  
Brookfield, CT 06804  
(800) 4-CULTEC

**Certification:** Component Technology - Class One Component

**Technology Type:** Alternative Leachfield Component

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The System consists of high-density polyethylene arch-shaped chambers that have holes along the sidewall of the lower portion of the units. Three models of Contactor Chambers (models 175, 100 and 125) and four Field Drain Panel configurations (C-1, C-2, C-3, C-4) have been approved. The system is installed with 1 ft. of stone beneath the chambers and additional stone filling the sidewall space between the trench wall and the chamber. Trench width and depth varies with the model of the system, see the RIDEM issued Cultec Certification for more details. These chambers shall be sized based on DEM's approval and designed in accordance with DEM Rules for shallow concrete chambers (flow diffusers) Rule 34.2.

**Technology Name:** [Eljen Geotextile Sand Filter \(GSF\)](#)

**Vendor Information:** Eljen Corporation  
James Donlin, or Brian Parker  
125 McKee Street  
East Hartford, CT 06108  
(800) 444-1359

**Certification:** Alternative System or Technology - Class One

**Technology Type:** Alternative Leachfield

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The Eljen GSF is designed to replace the gravel/stone media of a conventional trench leachfield. GSF modules are constructed of a cusped plastic core that is completely enveloped by a geotextile fabric that is folded accordion style over and under the plastic core. Each GSF module unit is 3 feet wide, 4 feet long, and 7 inches high, and is designed to be installed in a trench with a minimum of 6 inches of concrete sand bedding beneath and along the sidewalls of the units. The GSF has been assigned the following sizing criteria: one linear foot of GSF is equivalent to 7 square feet of required leachfield area.

**Technology Name:** **Geoflow Drip System**

Geoflow WASTEFLOW™ Classic WF16-4-24 and WF16-2-24  
Geoflow WASTEFLOW™ PC WFPC16-4-24 and WFPC16-2-24

**Vendor Information:**

Karen Ferguson  
Geoflow, Inc.  
506 Tamal Plaza  
Corte Madera, CA 94925

Phone: 800-828-3388

Fax: 415-927-0120

E-mail: [krf@geoflow.com](mailto:krf@geoflow.com)

Web: [www.geoflow.com/](http://www.geoflow.com/)

**Regional Contacts:**

J&R Sales & Service, Inc.  
James Dunlap  
44 Commercial Street  
Raynham, MA 02767

Phone: 508-823-9566

Fax: 508-880-7232

E-mail: [jim@jrengprod.com](mailto:jim@jrengprod.com)

**Certification:** Component Technology - Class Two Component Approval

**Technology Type:** Alternative Leachfield Component

**Authority to Design:** CI-II & III Licensed Designers

**Description:** The Geoflow subsurface drip dispersal system time doses effluent below the soil surface through ½” nominal diameter pressurized tubing. Following treatment by a RIDEM approved A/E treatment system producing a minimum effluent quality of TSS/BOD of 30/30 mg/L and FOG of 5 mg/L, the wastewater is discharged to a final dosing tank for timed-dosing to the Component.

**Technology Name:** **GeoMat 1200 and GeoMat 3900**

**Vendor Information:** **Geomatrix Systems, LLC**

114 Mill Rock Road East  
Old Saybrook, CT 06475

**Contacts:**

David Potts

Phone: 860-510-0730

Fax: 860-510-0735

Web: <http://www.geomatrixsystems.com/>

**Certification:** Component - Class Two

**Technology Type:** Alternative Leachfield

**Authority to Design:** CI-II and III Licensed Designers

**Description:** GeoMat is a leaching system comprised of a one-inch thick core of fused, entangled plastic filaments; it is installed on natural soil or a sand interlayer where specified in applicable design guidance. GeoMat 1200 is sleeved in geotextile fabric and a low-pressure distribution line (1-inch Schedule 40 PVC), with down-facing orifices set in clear plastic orifice shields, is inserted into the fabric sleeve, on top of the mat material and then covered by soil to a depth between 6 and 12 inches. GeoMat 3900 is dosed by two low-pressure distribution lines (1-inch Schedule 40 PVC), with down-facing orifices set in clear plastic orifice shields. The GeoMat 3900 and its two dosing pipes are covered by geotextile fabric prior to backfilling. Cleanout/distal pressure monitoring ports are installed on the terminal end of each of the distribution lines for both GeoMat 1200 and 3900. The Component is used in conjunction with a time-dosed pump apparatus and must be preceded by a RIDEM approved treatment technology producing an effluent quality of at least 30 mg/l for each TSS and BOD.

**Technology Name:** [Infiltrator Chambers](#)  
Double-Wide Standard Infiltrator Chambers  
Double-Wide High Capacity Infiltrator Chambers

**Vendor Information:** Infiltrator Water Technologies, LLC  
Judd Efinger  
4 Business Park Road  
P.O. Box 768  
Old Saybrook, CT 06475  
(800) 221-4436

**Certification:** Component Technology - Class One

**Technology Type:** Alternative Leachfield Component

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The Infiltrator Chambers are arch-shaped high density polyethylene chambers with a nominal width of 2.83 ft. and a length of 6.25 ft. with a ¼ inch high horizontal slots along the sidewall on the lower half of the units. The Standard Chamber is 12 inches high and the High Capacity Chamber is 16 inches high. The system is installed in a 6 ft. wide trench with 1 ft. of stone beneath the chambers and additional stone filling the sidewall space between the trench wall and the chamber. These chambers shall be sized based on DEM's approval and designed in accordance with DEM Rules for shallow concrete chambers (flow diffusers) Rule 34.2.

**Technology Name:** [Infiltrators \(Stoneless Trench Configuration\)](#)

Quick 4 Standard Chamber  
Quick4 Equalizer 24 Low Profile Chamber

**Vendor Information** Infiltrator Water Technologies, LLC  
4 Business Park Road  
P.O. Box 768  
Old Saybrook, CT 06475  
(800) 221-4436

**Certification** Component Technology – Class One

**Technology Type** Alternative leachfield component

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The component is an arch shaped Polyolefin injection molded chamber with louvered side slots installed in a trench configuration. The Quick 4 Standard Chamber is sizing is based on a 1.72 multiplier of the open bottom area with a maximum of 4.0 SF/LF. No stone is used in this Installation and trenches are required to be interconnected. The Quick4 Equalizer 24 Low Profile Chamber is approved exclusively for use as the dome structure in a Pressurized Shallow Narrow Drainfield (PSND). Design and sizing are in accordance with specification in the RIDEM Sand Filter Guidance Document and the approved vendor's design and installation manual.

**Technology Name:** [Pressurized Shallow-Narrow Drainfield](#)

**Vendor Information:** Generic

**Certification:** Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - November 2013

**Technology Type:** Alternative Leachfield

**Authority to Design:** CI-II & III Licensed Designers

**Description:** Pre-treated effluent of at least 30 mg/L for each TSS and BOD is applied under pressure through distribution laterals of 1 to 1 ¼ inch Schedule 40, pressure rated PVC pipe, installed 8-12 inches below existing, and finish grades. The distribution pipe is covered with a dome-like structure made of 12 inch diameter PVC pipe (or approved equivalent) cut lengthwise; this dome and the pressure-distribution pipe are supported by one (1) inch diameter Schedule 40 PVC support pipes, which also act as a spreader device for the dome, and provide a greater bearing surface for the dome. Schedule 40 PVC or equivalent sweep elbows (turnups) at the distal end of each drainfield lateral facilitate maintenance and inspection.

## SYSTEM COMPONENTS

### A. EFFLUENT FILTERS, SCREENED PUMP VAULTS & STEP SYSTEMS

**Technology Name:** [GAG SIM/TECH Filter](#)

**Vendor Information:** Gary Koteskey, President  
SIM/TECH Filter  
06598 Horton Bay North Rd  
Boyne City, MI 49712  
616-582-7327

**Certification:** Component - Class One

**Technology Type:** Pump effluent filter for use with pressure distribution system

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The SIM/TECH filter is 3 inches in diameter, 18 inches in length, made of schedule 40PVC (or ABS) and stainless steel containing 1/16 inch holes with a total open area of 69.52 sq. in. (41%). It is placed on the discharge side of a pump and lessens clogging of small diameter holes of pressure distribution piping.

**Technology Name:** Orenco Systems, Inc. Effluent Screens, Screened Pump Vaults and Biotube Pump Vaults

**Filters:** F, FE, FT, and FTI Series

**Screened Vaults:** OSI200, SV1500

**Biotube Pump Vaults:** [PVU Series \(replaces SVT Series\)](#)

[PVU57-1819, PVU57-2419, PVU68-1819, PVU68-2425](#)

**Vendor Information:**

Orenco Systems Inc.  
Eric Ball, VP Product Development  
Terry Bounds, Executive VP  
814 Airway Avenue  
Sutherlin, OR 97479-9012  
(514) 459-4449  
[www.orenco.com](http://www.orenco.com)

**Regional Contacts:**

Atlantic Solutions  
Robert Johnson  
2417 East Main Road  
Portsmouth, RI 02871  
(401) 293-0176

Green Wastewater Solutions  
Richard Pezza  
80 Kilvert Street  
Warwick, RI 02886  
(401) 737-7600

**Certifications:** Component - Class One

**Technology Type:** Effluent Screen and Pump Vault Filter

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** Effluent screens are constructed of reinforced cylinders of 1/8-in. mesh polyethylene with a fiberglass base; they are used in effluent dosing tanks to minimize the solids leaving the tank. Screened pump vaults are designed for use with conventional low-head style effluent and sewage pumps; they are installed at the outlet end of a single or double compartment septic tank. The screened vault minimizes entry of solids to the pump. Biotube pump vaults are installed at the outlet end of a single or double compartment septic tank or separate dosing tanks in effluent pumping systems. Pump vaults house a Biotube effluent filter that minimizes solids carryover to following components in the system. Pump vaults are 12 in. in diameter, and accommodate one pump (simplex) or two pumps (duplex).

**Technology Name:** [Polylok PL-122, PL-525 & PL-625 Effluent Filters](#)

**Vendor Information:** Polylok, Incorporated  
3 Fairfield Blvd.  
Wallingford, CT 06492  
<http://www.polylok.com>  
Patrick Mulhall  
Vice President, Sales and Marketing  
877-765-9565

**Certification:** Component - Class One

**Technology Type:** Effluent Filter

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The Polylok PL-122, PL-525 and PL-625 are wastewater effluent filters designed for installation at the outlet of a septic tank to minimize solids from passing to the leachfield.

- **PL-122** has 122 linear feet of 1/16<sup>th</sup>-inch slots and is suitable for residential flows up to 1,500 gallons per day; it is modular, providing increased filtration area by snapping two or more filters together.
- **PL-525** has 525 linear feet of 1/16<sup>th</sup>-inch slots and is rated for residential or commercial flows up to 10,000 gallons per day.
- **PL-625** has 625 linear feet of 1/32<sup>nd</sup>-inch slots; it is rated for residential or commercial flows up to 10,000 gallons per day and is suitable for use in grease tanks.

All three filters are alarm accessible and are equipped with a gas deflector and buoyant shut-off ball that prevents flow of unfiltered effluent from the tank when the filter is removed for maintenance.

**Technology Name:** [Zabel A-1800, A-100, A-300 Residential and Commercial Wastewater Filters](#)

**Vendor Information:** Zabel Environmental Technology  
10409 Watterson Trail  
Jefferson, KY 40299  
(800) 221-5742

**Certification:** Component - Class One

**Technology Type:** Effluent Filter

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The Zabel filters are PVC wastewater effluent filters designed to be installed at the outlet of a septic tank to prevent solids from passing to the drain field.

**Technology Name:** [Zoeller Effluent Filter WW1 \(Part Number 170-0078\)](#)

**Vendor Information:** Zoeller Pump Co.  
3469 Cane Run Road  
Louisville, KY 40211  
(800) 928-7867

**Certification:** Component - Class One

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The component is designed for use at single family homes with maximum flow less than 1,500 gallons per day. Installed at the outlet of a septic tank, it provides 132 linear feet of 1/16-inch filtration to prevent solids discharging to the leachfield.

**Technology Name:** [Zoeller Effluent Filter WW4 \(Part Number 5000-0007\)](#)

**Vendor Information:** Zoeller Pump Co.  
3469 Cane Run Road  
Louisville, KY 40211  
(800) 928-7867

**Certification:** Component - Class One

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The component is designed residential or commercial use maximum flow less than 4,000 gallons per day. Installed at the outlet of a septic tank, it provides 528 linear feet of 1/16-inch filtration to prevent solids discharging to the leachfield.

**Technology Name:** [Zoeller Centrifugal STEP System](#)

**Vendor Information:** Zoeller Pump Co.  
3469 Cane Run Road  
Louisville, KY 40211  
(800) 928 7867

**Certification:** Component Technology Class One

**Authority to Design:** CI-II & III Licensed Designers

**Description:** A centrifugal effluent pump, float system, and effluent filter pack (528 linear feet 1/16th-inch filtration) are contained within a polyethylene vault (simplex configuration only). The Component may be installed in a septic tank as an alternative to a separate pump tank or in a distinct pump tank following a septic tank; it can be equipped with a control panel for use in either demand-dosed or timed-dose systems. The vault diameter is 15-3/8 inches and is available in various heights, with a variety of pump and control panel options accommodating flows up to 50 gpm.

**Technology Name:** [Zoeller Turbine STEP System](#)

**Vendor Information:** Zoeller Pump Co.  
3469 Cane Run Road  
Louisville, KY 40211  
(800) 928 7867

**Certification:** Component - Class One

**Authority to Design:** CI-II & III Licensed Designers

**Description:** The Component is designed for high head applications; a turbine effluent pump (simplex, or duplex), float system, and effluent filter cartridge (924 linear feet of 1/16<sup>th</sup>-inch filtration) are contained within a polyethylene vault. It may be installed in a septic tank as an alternative to a separate pump tank or in a distinct pump tank following a septic tank, and can be equipped with a control panel for use in either demand-dose or timed-dose systems. The vault diameter is 17-1/8 inches and is available in various heights, with a variety of pump and control panel options, accommodating discharge rates from 11 gpm to 85 gpm, with Vendor (manufacturer) consultation required for discharge rates over 27 gpm.

## SYSTEM COMPONENTS

### B. DISTRIBUTION COMPONENTS

**Technology Name:** [Polylok PL- Dipper Box](#)

**Vendor Information:** Polylok, Inc./Zabel Environmental  
3 Fairfield Boulevard  
Wallingford, CT 06492  
877-765-9565

**Certification:** Component - Class One

**Technology Type:** Distribution Box

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The Polylok Dipper Box is a leachfield dosing mechanism designed on the pivot and balance principal. The Component is comprised of a specially designed concrete distribution box with dipper tray assembly. The dipper storage tray receives effluent from the septic tank; a volume of 1.5 gallons causes the tray to tip, discharging its contents within the distribution box to equally distribute effluent to each line of the leaching component.

**Technology Name:** [Roth Monster D-Box, STAR-24DB11  
Installation Manual](#)

**Vendor Information:** Roth Global Plastics, Inc.  
P.O. Box 245  
Syracuse, NY 13211  
Office Telephone (315) 475-0100  
Office Fax: (315) 475-0200  
[www.roth-usa.com](http://www.roth-usa.com)

**Certification:** Component - Class One

**Technology Type:** Distribution Box

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The Roth Monster D-Box is a leachfield distribution box manufactured of blow molded HDPE, with a Tuf-tite TB4 Tee Baffle. It is designed to evenly split effluent flow among up to 11 outlet lines. The Roth Monster D Box ships with a threaded STAR- 24L gasketed lid that threads directly into the top of the D Box and is compatible with Roth's STAR 24 Riser system. RIDEM requires that the Monster D Box be installed with access at finish grade.

**Technology Name:** [Zoeller Tru-Flow D-Box](#)

**Vendor Information:** Zoeller Pump Co.  
P.O. Box 16347  
Louisville, KY 40256-0347

**Certification:** Component – Class One

**Technology Type:** Distribution Box

**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The unit is comprised of a diverter basin and a diverter assembly to evenly split flow to five outlet lines by adjusting a bubble level and adjustment screw in the event of uneven settling.

## ALTERNATIVE SYSTEMS

### A. ADVANCED TREATMENT SYSTEMS for BOD & TSS (and FOG) REMOVAL

Technology Name: [AdvanTex AX20 \(Mode 1 Configuration\)](#)

Also approved for nitrogen removal in Mode 3, see Nitrogen Reduction Treatment Systems.

Technology Name: [AdvanTex AX100 \(Mode 1 Configuration\)](#)

Also approved for nitrogen removal in Mode 3, see Nitrogen Reduction Treatment Systems.

Technology Name: [AdvanTex® AX-RT Series: AX20-RT, AX25-RT \(Mode 1 Configuration\)](#)  
[Other smaller or larger-scale AX-RT units if developed](#)

Also approved for nitrogen removal in Mode 3, see Nitrogen Reduction Treatment Systems.

**IMPORTANT:** This system was approved under Rule 37.4.2(B)(i) and **the maximum of 50 approvals for systems where nitrogen removal is required have been issued** until the terms of the [Monitoring Protocol](#) for Nitrogen Removal Systems have been successfully fulfilled. **Until further notice this system may not be specified in design plans where nitrogen removal is required.**

Technology Name: [Amphidrome®](#)

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

Technology Name: [Bioclere](#)

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

Technology Name: [BioBarrier](#)

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

**IMPORTANT:** This system was approved under Rule 37.4.2(B)(i) and is subject to a maximum of 50 approvals for systems **where nitrogen removal is required** until the terms of the [Monitoring Protocol](#) for Nitrogen Removal Systems have been successfully fulfilled. **Approval total should be verified with RIDEM prior to specifying this system in design plans where nitrogen removal is required.**

Technology Name: [FAST \(Single Home and Modular\)](#)

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

Technology Name: [Hydro-Kinetic Model 600 FEU](#)

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

**IMPORTANT:** This system was approved under Rule 37.4.2(B)(i) and is subject to a maximum of 50 approvals for systems **where nitrogen removal is required** until the terms of the [Monitoring Protocol](#) for Nitrogen Removal Systems have been successfully fulfilled. **Approval total should be verified with RIDEM prior to specifying this system in design plans where nitrogen removal is required.**

**Technology Name:** [The NIBBLER® Wastewater Treatment Process](#)  
[Models: NIBBLER® SBP \(square pod\) and NIBBLER® CBP \(cylindrical pod\)](#)

**Vendor Information:**

Aqua Test, Inc.  
P.O. Box 1116  
Black Diamond, WA 98010  
28620 Maple Valley Rd SE  
Maple Valley, WA 98038

Tel: 1-800-221-3159

Fax: 425-413-9431

Website: [www.aquatestinc.com](http://www.aquatestinc.com)

Matt Lee, President

Email: [aquatestinc@yahoo.com](mailto:aquatestinc@yahoo.com)

Tel: 1-800-221-3159

Fax: 425-413-9431

**Distributor:**

Atlantic Solutions, LTD

Bob Johnson

2417 East Main Road

Portsmouth, RI 02871

Tel: 401-293-0176

Website: [www.atlanticsolutionsltd.com/](http://www.atlanticsolutionsltd.com/)

Email: [bjohnson@septicssystems.net](mailto:bjohnson@septicssystems.net)

**Certification:** Alternative System or Technology - Class Two

**Technology Type:** Advanced Treatment System for BOD, TSS and FOG Removal

**Authority to Design:** CI-II & III Licensed Designers

**Description:** The NIBBLER® Wastewater Treatment Process incorporates aerobic fixed film treatment and is designed based on organic load per NIBBLER® pod for removal of BOD, TSS and FOG, to reduce high strength commercial or residential wastewater to levels comparable to that of residential strength septic tank effluent.

The NIBBLER® **SBP** is comprised of a septic tank, grease tank (or comingle tank where a single plumbing stub is available) and a surge tank, which time doses the NIBBLER® based on average daily flow. The NIBBLER® SBP tank is followed by a clarifier tank, a pump tank, and then a leachfield or an advanced treatment system. Multiple NIBBLER® SBP tanks may be installed in parallel following a splitter basin.

The NIBBLER® **CBP** (cylindrical pod) is designed for installation with associated aeration system in existing septic tanks.

At the design organic loading rate of 0.81 pounds per day BOD per Nibbler pod, the RIDEM recognizes the System as capable of achieving the following guaranteed treatment objectives:

- At operating capacity: BOD5 <150 mg/L, TSS <125 mg/L and FOG <20 mg/L and,
- At peak design flow BOD5 <200 mg/L, TSS <150 mg/L and FOG <25 mg/L.

**Technology Name:** [Singulair 960 \[concrete\] \(500, 750, 1000 1250 & 1500 gpd\)](#)  
[Singulair Green® 960-500 \[HDPE\] \(maximum design flow 600 gpd\)](#)

**Vendor Information:**

Norweco, Inc.  
220 Republic Street  
Norwalk, OH 44857

Tel: 419-668-4471  
Web: [www.norweco.com](http://www.norweco.com)

Scott Hetrick, Vice President of Sales  
Email: [shetrick@norweco.com](mailto:shetrick@norweco.com)  
Tel: 419-669-4471  
Fax: 419-663-5440

**Local Contacts (Distributors / Dealers):**

Siegmund Environmental Services  
102 West Main Street  
Norton, MA 02766

Matthew Dalton  
Tel: 401-785-0130  
Fax: 508-222-2499  
Email: [matt@seswastewater.com](mailto:matt@seswastewater.com)

Sterling Environmental Technologies  
319A West Beach Road  
Charlestown, RI 02813  
Tel: 401-322-7669

Robert Frost  
Tel: 401-523-4812  
Fax: 401-315-0750  
Email: [bob@sterling-et.com](mailto:bob@sterling-et.com)

**Certification:** Alternative System or Technology - Class Two  
**Technology Type:** Advanced Treatment System for TSS & BOD Removal  
**Authority to Design:** CI-II & III Licensed Designers

**Description:** The Singulair wastewater treatment system is a self-contained three-chambered treatment system utilizing primary treatment (settling), mechanical aeration, clarification, and flow equalization to achieve treatment. Wastewater from the building enters the primary settling chamber through an inlet tee, then enters an aeration chamber. In the aeration chamber, an aspirator at the bottom of a shaft disperses air radially as fine bubbles provide oxygen for the biomass and vertically mix chamber contents. The wastewater in the aeration chamber passes through to the clarification chamber for final settling of solids. Treated wastewater passes through an effluent filter as it exits the system and is then gravity fed to the leachfield. The RIDEM recognizes the System as capable of achieving effluent concentrations of 30 mg/L for both TSS and BOD. Based on these reductions, the RIDEM has allowed for a 40% reduction in leachfield size.

**Technology Name:** [Norweco Singulair TNT \[concrete\] 750, 1000, 1250 and 1500](#)  
[Norweco Singulair Green TNT \[HDPE\] 500](#)

Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.

**IMPORTANT:** This system was approved under Rule 37.4.2(B)(i) and **the maximum of 50 approvals for systems where nitrogen removal is required have been issued** until the terms of the [Monitoring Protocol](#) for Nitrogen Removal Systems have been successfully fulfilled. **Until further notice this system may not be specified in design plans where nitrogen removal is required.**

**Technology Name:** [Puraflo® Peat Biofilter](#)

**Vendor Information:** Greg O'Donnell  
Bord na Mona Environmental Products US, Inc.  
P.O. Box 77457  
Greensboro, NC 27417  
800-PURAFLO

**Certification:** Alternative System or Technology - Class Two

**Technology Type:** Advanced Treatment System for TSS & BOD Removal

**Authority to Design:** CI-II & III Licensed Designers

**Description:** The Puraflo is a modular pre-engineered biofiltration system that utilizes natural peat fiber as a biofilm media. Among the processes occurring are filtration, absorption, adsorption, ion exchange, and microbial assimilation. Primarily used in single pass mode. The system is capable of significantly reducing biological oxygen demand (BOD<sub>5</sub>), and total suspended solids (TSS). Ammonia and pathogens reductions may also be achieved. The technology is targeted for use in critical resource areas and may be used with shallow pressurized drainfields.

**Technology Name:** [SeptiTech M series](#)

**Also approved for nitrogen removal, see Nitrogen Reduction Treatment Systems.**

**Vendor Information:** Bio-Microbics of Maine, Inc.  
16002 West 110th Street  
Lenexa, KS 66219

**Contacts:** Tracey Rioux  
69 Holland Street  
Lewiston, Maine 04240  
Tel: (207) 333-6940  
Fax: (207) 333-6944

**Technology Type:** Advanced Treatment System for TSS & BOD Removal

**Authority to Design:** CI-II and III Licensed Designers

**Description:** SeptiTech is an aerobic biological trickling filter, hereafter referred as the "System". The System is a two-tank design with a primary anoxic tank (a septic tank) followed by the aerobic trickling filter tank (the SeptiTech processor tank). Raw wastewater enters and passes through the primary anoxic tank to a reservoir beneath treatment media in the aerobic processor tank. The wastewater is aerated and sprayed onto the media; a programmable logic controller (PLC) controls the timing and sequence of the recirculation of wastewater in the lower collection reservoir. Treated wastewater is time dosed to a leachfield. A 50% reduction of leachfield area is allowed for RIDEM approved Class One leachfield components and conventional leachfields.

**Technology Name:** [Single Pass Sand Filter](#)

**Vendor Information:** Generic

**Certification:** Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - November 2013

**Technology Type:** Advanced Treatment System

**Authority to Design:** CI-II and III Licensed Designers

**Description:** Wastewater, having received primary treatment in a septic tank or equivalent unit, is pressure dosed to a bed of specified sand media. Wastewater applications to the filter surface are controlled by both a programmable timer and float switch. Wastewater is dispersed over the sand filter surface in a PVC pipe distribution network surrounded in pea stone. Wastewater trickles down in unsaturated thin film-flow through the sand media, where biological treatment occurs. The treated wastewater (sand filter effluent) is collected in an underdrain at the bottom of the filter and discharged by pressure to a shallow - narrow drainfield, where additional treatment occurs. The system is capable of significantly reducing biological oxygen demand (BOD<sub>5</sub>), and total suspended solids (TSS). Ammonia and pathogens reductions may also be achieved. The technology is targeted for use in critical resource areas and is intended to be used with shallow pressurized drainfields.

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## **B. NITROGEN REMOVAL SYSTEMS**

**Technology Name:** [AdvanTex AX20 \(Mode 3 Configuration\)](#)  
**(Also approved for TSS & BOD removal in Mode 1)**

**Vendor Information:**

Orenco Systems Inc.  
814 Airway Avenue  
Sutherlin, OR 97479-9012  
(514) 459-4449  
[www.orenco.com](http://www.orenco.com)

**Regional Contacts:**

Atlantic Solutions  
Robert Johnson  
2417 East Main Road  
Portsmouth, RI 02871  
(401) 293-0176

Eric Ball, VP Product Development  
Terry Bounds, Executive VP  
Jason Churchill, Government Relations Representative

Green Wastewater Solutions  
Richard Pezza  
80 Kilvert Street  
Warwick, RI 02886  
(401) 737-7600

**Certification:** Alternative System or Technology - Class One

**Technology Type:** Nitrogen Removal: TN ≤ 19 mg/L

**Authority to Design:** CI-II & III Licensed Designers

**Description:** A prepackaged packed bed filter that significantly reduces BOD and TSS inside a waterproof container installed after a two compartment tank prior to discharge to a leachfield which may be reduced in size by 50%. When configured in Mode 3, this system is acknowledged as an approved nitrogen reducing system.

**Technology Name:** [AdvanTex AX100 \(Mode 3 Configuration\)](#)  
(Also approved for TSS & BOD removal in Mode 1)

**Vendor Information:**  
Orenco Systems Inc.  
814 Airway Avenue  
Sutherlin, OR 97479-9012  
(514) 459-4449  
[www.orenco.com](http://www.orenco.com)

**Regional Contacts:**  
Atlantic Solutions  
Robert Johnson  
2417 East Main Road  
Portsmouth, RI 02871  
(401) 293-0176

Eric Ball, VP Product Development  
Terry Bounds, Executive VP  
Jason Churchill, Government Relations Representative

Green Wastewater Solutions  
Richard Pezza  
80 Kilvert Street  
Warwick, RI 02886  
(401) 737-7600

**Certification:** Alternative System or Technology - Class Two

**Technology Type:** Nitrogen Removal: TN  $\leq$  19 mg/L

**Authority to Design:** CI-II & III Licensed Designers

**Description:** A prepackaged packed bed filter that significantly reduces BOD and TSS inside a waterproof container installed after a two compartment tank prior to discharge to a leachfield which may be reduced in size by 50%. When configured in Mode 3, this system is acknowledged as an approved nitrogen reducing system.

**Technology Name:** [AdvanTex® AX-RT Series: AX20-RT, AX25-RT](#)  
[Other smaller or larger-scale AX-RT units if developed](#)  
(Also approved for TSS & BOD removal in Mode 1)

**IMPORTANT:** This system was approved under Rule 37.4.2(B)(i) and the maximum of 50 approvals for systems where nitrogen removal is required have been issued until the terms of the [Monitoring Protocol](#) for Nitrogen Removal Systems have been successfully fulfilled. **Until further notice this system may not be specified in design plans where nitrogen removal is required.**

**Vendor Information:**  
Orenco Systems Incorporated  
814 Airway Avenue  
Sutherlin, Oregon 97479

Website: [www.orenco.com](http://www.orenco.com)

Eric Ball, VP Product Development  
Terry Bounds, Executive VP  
Jason Churchill, Government Relations Representative  
Phone: 419-668-4471  
Fax: 419-663-5440

**Distributors:**  
Atlantic Solutions, LTD  
Bob Johnson  
2417 East Main Road  
Portsmouth, RI 02871  
Tel: (401) 293-0176  
Website: [www.atlanticsolutionsltd.com/](http://www.atlanticsolutionsltd.com/)

Green Wastewater Solutions  
Richard Pezza  
80 Kilvert Street  
Warwick, RI 02886  
Tel: (401) 737-7600  
Website: [www.greenwastewatersolutions.com/](http://www.greenwastewatersolutions.com/)

**Certification:** Alternative System or Technology - Class Two

**Technology Type:** Advanced Treatment System for TSS and BOD removal and for Nitrogen Removal when configured in Mode 3: TN  $\leq$  19 mg/L

**Authority to Design:** CI-II & III Licensed Designers

**Description:** The AdvanTex® AX-RT Series (the AX20-RT, AX25-RT and other smaller or larger-scale versions of the technology that might be developed), hereafter referred to as the System, is a recirculating textile filter treatment system. It is contained within a single fiberglass tank installed with the access panel at grade. It is preceded by a two-compartment septic tank and discharges to a leachfield. The RIDEM recognizes the System as capable of achieving effluent concentrations of less than or equal to 19 mg/L total nitrogen (TN) when configured in Mode 3 and 20 mg/L or less for TSS and BOD; based on TSS & BOD reductions, the RIDEM has allowed for a 50% reduction in leachfield size as applicable by leachfield type.

**Technology Name:** [Amphidrome®](#)

**Vendor Information:** F. R. Mahoney & Associates, Inc. **Contact:**  
273 Weymouth Street Keith Dobey  
Rockland, MA 02370 Tel: (781) 982-9300, Ext. 37  
Fax: (781) 982-1056

**Certification:** Alternative System or Technology – Class Two

**Technology Type:** Nitrogen Removal: TN ≤ 19 mg/L

**Authority to Design:** CI-II & III Licensed Designers

**Description:** The Amphidrome® system uses a submerged attached growth bioreactor process operating in a batch mode.

The Amphidrome® system utilizes two tanks and one submerged attached growth bioreactor, called the Amphidrome® reactor. The first tank, the anoxic/equalization tank, is where the raw wastewater enters the system. The tank has an equalization section, a settling zone, and a sludge storage section. It serves as a primary clarifier before the Amphidrome® reactor.

This Amphidrome® reactor consists of the following four items: underdrain, support gravel, filter media, and backwash trough. The underdrain, constructed of stainless steel, is located at the bottom of the reactor. It provides support for the media and even distribution of air and water into the reactor. The underdrain has a manifold and laterals to distribute the air evenly over the entire filter bottom. The design allows for both the air and water to be delivered simultaneously--or separately--via individual pathways to the bottom of the reactor. As the air flows up through the media, the bubbles are sheared by the sand, producing finer bubbles as they rise through the filter. On top of the underdrain is 18” (five layers) of four different sizes of gravel. Above the gravel is a deep bed of coarse, round silica sand media. The media functions as filter, significantly reducing suspended solids and provides the surface area for which an attached growth biomass can be maintained. The Department allows a 50% reduction in conventional and approved AE “component technology” leachfield size with this System.

**Technology Name:** BioBarrier

**IMPORTANT:** This system was approved under Rule 37.4.2(B)(i) and is subject to a maximum of 50 approvals for systems where nitrogen removal is required until the terms of the [Monitoring Protocol](#) for Nitrogen Removal Systems have been successfully fulfilled. **Approval total should be verified with RIDEM prior to specifying this system in design plans where nitrogen is required.**

**Vendor Information:**

Bio-Microbics, Inc.  
16002 West 110th Street  
Lenexa, KS 66219

Tel: 913-422-0707  
Tel (toll-free): 800-753-3278  
Fax: 913-422-0808  
Web: [www.biomicrobics.com/](http://www.biomicrobics.com/)

Jim Bell, Executive Vice President  
Email: [jbelle@biomicrobics.com](mailto:jbelle@biomicrobics.com)

**Regional Contact:**

J&R Sales and Service, Inc.  
5344 Commercial Street  
Raynham, MA 02767

Tel: 508-823-9566  
Fax: 508-880-7232  
Web: [www.JRSALESINC.COM](http://www.JRSALESINC.COM)

Lauren D. Usilton, President  
Email: [laurenu@jrsalesinc.com](mailto:laurenu@jrsalesinc.com)

**Certification:** Alternative System or Technology - Class Two

**Technology Type:** Nitrogen Removal TN  $\leq$  10 mg/L

**Authority to Design:** CI-II & III Licensed Designers

**Description:** The System incorporates a Membrane Bioreactor (MBR) and uses three-compartment tankage either as a single three-compartment tank, or a single-compartment pre-treatment tank followed by a two-compartment tank; the BioBarrier MBR is located in the last of the three compartments in both configurations. The first compartment or tank provides primary treatment and is equipped with an outlet screening device (SaniTEE®). The second and third compartments must be in the same tank. Denitrification occurs in the second compartment of the System under anoxic conditions; a mixing pump installed in this compartment recycles some of the nitrified water through a baffle wall between the second and the third compartments (the aeration/membrane zone). The third compartment contains the Membrane Bioreactor, through which water passes for additional treatment prior to discharge to a leachfield by a float-activated discharge pump. The system is capable of significantly reducing biological oxygen demand (BOD<sub>5</sub>), total suspended solids (TSS), and total nitrogen in the effluent. Based on these reductions, the Department has allowed for a 45% reduction in leachfield size.

**Technology Name:** Bioclere

**Vendor Information:** Aquapoint.3, LLC  
Mark Lubbers  
39 Tarkiln Place  
New Bedford, MA 02745  
(508) 985-9050 Extension 105  
[mlubbers@aquapoint.com](mailto:mlubbers@aquapoint.com)

**Certification:** Alternative System or Technology - Class Two

**Technology Type:** Nitrogen Removal: TN  $\leq$  19 mg/L

**Authority to Design:** CI-II & III Licensed Designers

**Description:** The Bioclere system is essentially a modified trickling filter positioned over a clarifier. Effluent from the septic tank enters Bioclere and is pumped up to the top of the insulated unit where it is evenly distributed over the surface of the filter media. Biochemical oxidation takes place as the water trickles through the filter and over the biological film that grows on the surface of the filter media. Oxygen is supplied to the system through a small axial fan located in the top of the housing. The system is capable of significantly reducing biological oxygen demand (BOD<sub>5</sub>) and total suspended solids (TSS) in the effluent. Based on these reductions, the Department has allowed for a 45% reduction in leachfield size.

**Technology Name:** [FAST \(Single Home and Modular\)](#)

**Vendor Information:**

Bio-Microbics, Inc.  
16002 West 110th Street  
Lenexa, KS 66219

Tel: 913-422-0707  
Tel (toll-free): 800-753-3278  
Fax: 913-422-0808  
Web: [www.biomicrobics.com/](http://www.biomicrobics.com/)

Jim Bell, Executive Vice President  
Email: [jbelle@biomicrobics.com](mailto:jbelle@biomicrobics.com)

**Regional Contact:**

J&R Sales and Service, Inc.  
5344 Commercial Street  
Raynham, MA 02767

Tel: 508-823-9566  
Fax: 508-880-7232  
Web: [www.JRSALESINC.COM](http://www.JRSALESINC.COM)  
Lauren D. Usilton, President  
Email: [laurenu@jrsalesinc.com](mailto:laurenu@jrsalesinc.com)

**Certification:** Alternative System or Technology - Class Two

**Technology Type:** Nitrogen-Removal:  $TN \leq 19$  mg/L

**Authority to Design:** CI-II & III Licensed Designers

**Description:** The FAST (Fixed Activated Sludge Treatment) system is an aerobic wastewater treatment system that utilizes an aerobic fixed film process that is a combination of the conventional trickling filter and activated sludge processes. The FAST system is designed to be installed within a two-compartment tank where the first compartment provides a primary settling zone for incoming sewage and the second houses the actual FAST system. The system contains submerged media that provide surfaces for microbial growth. Aeration and circulation are provided by a blower that pumps air into a draft tube that extends down the center of the tank. The system is capable of significantly reducing biological oxygen demand (BOD<sub>5</sub>), total suspended solids (TSS), and total nitrogen in the effluent. Based on these reductions, the Department has allowed for a 45% reduction in leachfield size.

**Technology Name:** Hydro-Kinetic Model 600 FEU

**IMPORTANT:** This system was approved under Rule 37.4.2(B)(i) and is subject to a maximum of 50 approvals for systems where nitrogen removal is required until the terms of the [Monitoring Protocol](#) for Nitrogen Removal Systems have been successfully fulfilled. **Approval total should be verified with RIDEM prior to specifying this system in design plans where nitrogen is required.**

**Vendor Information:**

Norweco, Inc.  
220 Republic Street  
Norwalk, OH 44857

Tel: 419-668-4471

Web: [www.norweco.com](http://www.norweco.com)

Scott Hetrick, Vice President of Sales

Email: [shetrick@norweco.com](mailto:shetrick@norweco.com)

Tel: 419-669-4471

Fax: 419-663-5440

**Technology Name & Model Numbers:**

Hydro-Kinetic Model 600 FEU  
(Maximum design flow 600 GPD)

**Certification**

Class Two

**Technology Type:**

Nitrogen Removal: TN ≤ 10 mg/L

**Design Authority**

Class II & III Designers

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**Local Contacts (Distributors/Dealers)**

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Siegmund Environmental Services  
102 West Main Street  
Norton, MA 02766

Matthew Dalton  
Tel: 401-785-0130  
Fax: 508-222-2499

Email: [matt@seswastewater.com](mailto:matt@seswastewater.com)

Sterling Environmental Technologies  
319A West Beach Road  
Charlestown, RI 02813

Tel: 401-322-7669

Robert Frost  
Tel: 401-523-4812  
Fax: 401-315-0750

Email: [bob@sterling-et.com](mailto:bob@sterling-et.com)

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**Description:** The System uses extended aeration, attached growth, nitrification and denitrification processes to treat wastewater. It consists of four treatment chambers (pretreatment, anoxic, aeration and clarification) followed by a Hydro-Kinetic FEU filter containing filter media facilitating additional reduction of BOD and TSS by attached growth, prior to discharge to a leachfield. The clarification chamber incorporates a flow equalization unit. Aeration is controlled by a factory-programmed timer and wastewater is recirculated from the clarifier back to the anoxic chamber at factory set intervals. The system is available with both concrete and HDPE tankage and with the pre-treatment tank either integral to the other three chambers in a four-chambered tank, or as a distinct tank. Designs incorporating this System and a conventional leachfield shall be allowed a 40% reduction in the required leachfield size.

**Technology Name:** [Nitrex™](#)

**Vendor Information:** Lombardo Associates, Inc.  
188 Church Street  
Newton, MA 02458

**Contact:**  
Pio Lombardo, PE  
Tel: (617) 964-2924  
Fax: (617) 332-5477  
E-mail:  
[pio@LombardoAssociates.com](mailto:pio@LombardoAssociates.com)

**Certification:** Alternative System or Technology – Class Two

**Technology Type:** Nitrogen Removal: TN ≤10 mg/L

**Authority to Design:** CI-II & III Licensed Designers

**Description:** The Nitrex™ Filter performs a treatment step as part of a multi-component onsite wastewater treatment system. The Nitrex™ Filter is preceded by a nitrifying advanced pretreatment system designed to convert organic nitrogen and/or ammonium to nitrate, prior to the Nitrex™ Filter performing the denitrification step. Any advanced treatment system used in conjunction with a Nitrex™ Filter must also be a Department approved A/E Technology and must be approved by the Vendor for use with the Nitrex™ Filter. The term “Nitrex™ Filter” shall mean the media-filled tank and associated components and controls produced by the Vendor to cause denitrification. The term Nitrex™ Filter System shall mean the Nitrex™ Filter and the advanced pretreatment system.

The Nitrex™ Filter provides a carbon source in the form of wood media for heterotrophic bacteria operating in an anaerobic environment to reduce the nitrate to nitrogen gas. Nitrified effluent is piped into the bottom of the Nitrex™ Filter and moves vertically through the media under a slight pressure head caused by gravity or pressure; the denitrified effluent is then discharged to a drainfield.

The pretreatment system used in advance of the Nitrex™ Filter must be designed, installed, operated and maintained in accordance with the terms of the certification issued by the Department for use of that system.

Please note that this certification was revised February 23, 2012 and that the Nitrex™ Filter System may not be used with a BSF or PSND until further notice. See certification document (Nitrex) for further information.

**Technology Name:** [Singulair DN \[concrete\] \(500, 750, 1000, 1250 & 1500 gpd\)](#)  
[Singulair DN Green® 500 \[HDPE\]\(maximum design flow 600 gpd\)](#)

**Vendor Information:**

Norweco, Inc.  
220 Republic Street  
Norwalk, OH 44857  
Tel: 419-668-4471  
Web: [www.norweco.com](http://www.norweco.com)  
Scott Hetrick, Vice President of Sales  
Email: [shetrick@norweco.com](mailto:shetrick@norweco.com)  
Tel: 419-669-4471  
Fax: 419-663-5440

**Technology Name & Model Numbers:**

*Concrete:*  
Singulair DN 500, 750, 1000, 1250 & 1500 gpd  
*HDPE:*  
Singulair DN Green® 500 (maximum design flow 600 gpd)

**Certification**

Class Two

**Technology Type:**

Nitrogen Removal: TN ≤ 19 mg/L

**Design Authority**

Class II & III Designers

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**Local Contacts (Distributors/Dealers)**

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Siegmund Environmental Services  
102 West Main Street  
Norton, MA 02766

Matthew Dalton  
Tel: 401-785-0130  
Fax: 508-222-2499

Email: [matt@seswastewater.com](mailto:matt@seswastewater.com)

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**Description:** The Singulair wastewater treatment system is a self-contained three-chambered treatment system utilizing primary treatment (settling), mechanical aeration, clarification, and flow equalization to achieve treatment. Wastewater from the building enters the primary settling chamber through an inlet tee, then enters an aeration chamber. In the aeration chamber, an aspirator at the bottom of a shaft disperses air radially as fine bubbles provide oxygen for the biomass and vertically mix chamber contents. The wastewater in the aeration chamber passes through to the clarification chamber for final settling of solids. A portion of the clarified wastewater is recirculated back to either the inlet pipe (building sewer) or into the primary chamber for denitrification. Treated wastewater passes through an effluent filter as it exits the system and is then gravity fed to the leachfield. The RIDEM recognizes the System as capable of achieving effluent concentrations of 30 mg/L for both TSS and BOD and less than or equal to 19 mg/L TN. Based on these reductions, the RIDEM has allowed for a 40% reduction in leachfield size.

\*Where site conditions and design flow accommodate, Norweco Singulair Green® 600 may be used in place of the concrete Singulair tank.

**Technology Name:** [Singulair TNT \[concrete\] 600, 750, 1000, 1250 and 1500](#)  
[Singulair Green TNT \[HDPE\] 500](#)

**IMPORTANT:** This system was approved under Rule 37.4.2(B)(i) and **the maximum of 50 approvals for systems where nitrogen removal is required have been issued** until the terms of the [Monitoring Protocol](#) for Nitrogen Removal Systems have been successfully fulfilled. **Until further notice this system may not be specified in design plans where nitrogen removal is required.**

**Vendor Information:**

Norweco, Inc.  
220 Republic Street  
Norwalk, OH 44857  
Tel: 419-668-4471  
Web: [www.norweco.com](http://www.norweco.com)

Scott Hetrick, Vice President of Sales  
Email: [shetrick@norweco.com](mailto:shetrick@norweco.com)  
Tel: 419-669-4471  
Fax: 419-663-5440

**Technology Name & Model Numbers:**

*Concrete:* Singulair TNT 600, 750, 1000, 1250, 1500  
*HDPE:* Singulair Green TNT 500  
(Maximum design flow 600 GPD)

**Certification**

Class Two

**Technology Type:**

Nitrogen Removal: TN ≤ 19 mg/L

**Design Authority**

Class II & III Designers

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**Local Contacts (Distributors/Dealers)**

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**Description:** The Singulair TNT and Singulair Green TNT Wastewater Treatment System

The System consists of a three-chambered tank. The first chamber provides pretreatment, the second is an aeration chamber with an infused air system: air is introduced to the aeration chamber by an aeration system, which spins a hollow aspirator shaft, drawing air into the hollow shaft through four intake ports located beneath the aerator handle; the aerator vent through which the air is drawn is integral to the access cover above the aerator. The aeration system is controlled by a factory programmed, non-adjustable timer to run a 60 minute aeration cycle followed by a 60 minute anoxic cycle, during which the aerator is not running. Settling takes place in the clarification chamber (the third chamber) following aeration and currents generated by the spinning aerator draw sludge from the clarification chamber back to the aeration chamber. The Bio-Kinetic filter within the clarification chamber filters wastewater prior to discharge to a leachfield. The system is capable of significantly reducing biological oxygen demand (BOD<sub>5</sub>) and total suspended solids (TSS) in the effluent. Based on these reductions, the Department has allowed for a 40% reduction in leachfield size.

**Technology Name:** [Recirculating Sand Filter](#)

**Vendor Information:** Generic

**Certification:** Guidelines for the Design, Use, and Maintenance of Pressurized Drainfields - November 2013

**Technology Type:** Nitrogen Reducing Treatment System

**Authority to Design:** CI-II and III Licensed Designers

**Description:** Wastewater, having received primary treatment in a septic tank or equivalent unit, flows by gravity to a recirculation (mixing) tank. In doses controlled by both a programmable timer and float switch, the mixed fresh wastewater and partially treated filter effluent is applied to a bed of coarse sand (fine gravel) media. This mixed wastewater is dispersed over the filter surface in a PVC distribution network surrounded in pea stone. Wastewater trickles down through the sand media, where biological treatment occurs. The treated effluent is collected in an underdrain at the bottom of the filter and discharged back to the recirculation tank. There most of it mixes with incoming wastewater, a small amount gets discharged to the drainfield, and the cycle begins again. Typically, a buoyant-ball check valve is used to control discharge and recirculation. Treated wastewater is discharged to a drainfield for additional treatment. The system is capable of significantly reducing biological oxygen demand (BOD<sub>5</sub>), total suspended solids (TSS), and total nitrogen in the effluent. The technology is targeted for use in critical resource areas and is intended to be used with shallow pressurized drainfields.

**Technology Name:** [SeptiTech](#)

[Models M400D, M550D, M750D, M1200D, M1500D, M2500D and M3000D](#)

**Vendor Information:** Bio-Microbics of Maine, Inc.  
16002 West 110th Street  
Lenexa, KS 66219

**Contacts:** Tracey Rioux  
69 Holland Street  
Lewiston, Maine 04240  
Tel: (207) 333-6940  
Fax: (207) 333-6944

**Certification:** Alternative System or Technology - Class Two

**Technology Type:** Nitrogen Removal: TN ≤ 19 mg/L

**Authority to Design:** CI-II and III Licensed Designers

**Description:** SeptiTech is an aerobic biological trickling filter, hereafter referred as the “System”. The System is a two-tank design with a primary anoxic tank (a septic tank) followed by the aerobic trickling filter tank (the SeptiTech processor tank). Raw wastewater enters and passes through the primary anoxic tank to a reservoir beneath treatment media in the aerobic processor tank. The wastewater is aerated and sprayed onto the media; a programmable logic controller (PLC) controls the timing and sequence of the recirculation of wastewater in the lower collection reservoir. A portion of the wastewater is pumped back to the septic tank; this process is self-adjusting based on demand and is controlled by the PLC. Treated wastewater is time dosed to a leachfield. A 50% reduction of leachfield area is allowed for RIDEM approved Class One leachfield components and conventional leachfields.

## D. LEACHFIELD RENOVATION

**Technology Name:** [White Knight™ Microbial Inoculator/Generator Models WK-40 and WK-78](#)

**Vendor Information:** Robert Silva, President  
Knight Treatment Systems, Inc.  
281 County Route 51A  
Oswego, NY 13126  
Tel: 800-560-2454  
Fax: 315-343-6114  
[www.knighttreatmentsystems.com](http://www.knighttreatmentsystems.com)

**Certification:** Alternative System or Technology – Class Two  
**Technology Type:** Microbial Inoculator/Generator Leachfield Renovation  
**Authority to Design:** CI-I, II & III Licensed Designers

**Description:** The White Knight™ Microbial Inoculator/Generator (White Knight™) is contained within a HDPE cylinder, designed to be installed into a septic tank, continuously inoculating the tank with non-pathogenic IOS-500™ bacterial cultures. An air pump provides fine bubble aeration and circulation within the System bringing the bacteria into contact with fixed film substrate and the suspended organic compounds in the septic tank. The IOS-500™ bacteria released by the System digest organic wastes in the septic tank and in the leachfield.

White Knight™ is approved for renovation of Onsite Wastewater Treatment Systems (OWTS) that are organically clogged resulting in hydraulic failure, as follows.

1. a) In the Salt Pond and Narrow River Critical Resource Areas White Knight™ may be used only if the leachfield was properly sized in accordance with the Regulations in effect at the time the permit was approved, as evidenced by the approved permit. If the leachfield did not meet the requirements of the Regulations in effect at the time the permit was approved, or if there is no permit available for the subject system, the site is not eligible for use of White Knight™.  
b) In all other areas of the State an approved permit, or system analysis performed by a Class II or III OWTS designer documenting that the system is suitable for use, is required.
2. Statewide, in addition to the two sets of requirements cited above, candidate site eligibility is determined based on system size, type and condition. The site evaluation must confirm that the system failure is due to organic clogging in the leachfield.

White Knight™ may also be installed in a properly functioning OWTS as well as a new OWTS, by application for new construction.