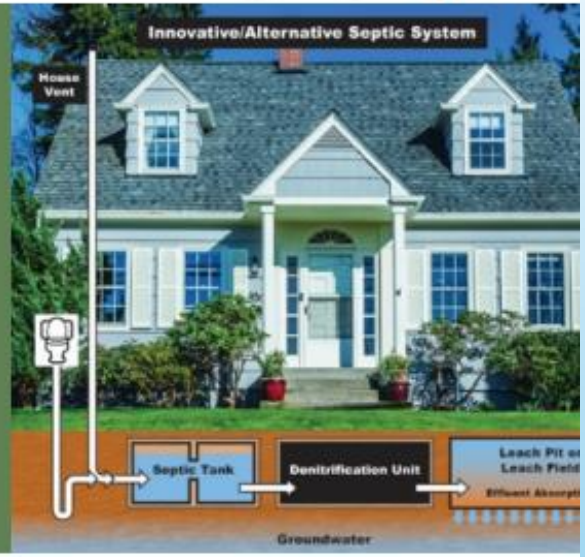
INNOVATIVE/ALTERNATIVE (I/A) SYSTEM FIELD TRAINING

Please join YOWA for an all-day training event focusing on Innovative Alternative Treatment Systems (I/A). Expand your I/A knowledge with presentations given on various onsite wastewater treatment and dispersal practices used here in New England. Topics will include an overview of the different types of treatment and dispersal, applications for use in our area, how to evaluate performance, and inspection and troubleshooting procedures. You'll also be able to see a few of these systems in action during a tour of the MASSTC facility.

June 24, 2025
8:00 AM - 4:00 PM
MASSTC, SANDWICH, MA



AGENDA - JUNE 24, 2025

8:00 – 8:30 AM	Registration - Coffee & Muffins provided
8:30 - 8:45 AM	**Welcome and Introductions** Jim Healy, YOWA President
8:45 - 9:45 AM	**Packed Bed Filters/AdvanTex** Jim Healy, Orenco Water
9:45 – 10:45 AM	**Aerobic Treatment Systems** Lauren Usilton, J&R Sales and Service
10:45 – 11:00 AM	Break
11:00 AM – 11:45 AM	**Innovative/Alternative (I/A) Drain Field Technology** Dennis Healy, Infiltrator Water Technologies
11:45 – 12:45 PM	Lunch (provided)
12:45 – 1:45 PM	**Drip Dispersal** Rob Sarmanian, Oakson
1:45 - 2:45 PM	**Operations & Maintenance** Jared Willey, Advanced Onsite Services
2:45 – 3:45 PM	**MASSTC Tour - see the technology in action**
3:45 PM	Adjourn

Yankee On-site Wastewater Association

I/A Systems Field Training

Jim Healy, President

June 24, 2025

- YOWA, a local affiliate of NOWRA
- Established in the early 2000s
- Currently have 115 members
- Volunteer Executive Board
  - 3 Regulators
  - 7 Manufacturers
  - 2 Service Providers
  - 1 Non-Profit Water/Wastewater Consultant
  - 1 Training Administrator
  - NEWEA Management

Our Mission

- Provide knowledge
- Grow the profession
- Educate membership
- Provide information

yowa
Yankee Onsite Wastewater Association

Benefits

- Representation on Policy Committees
- Legislation monitoring
- System education for homeowners
- Discounts on training
- NOWRA membership

yowa
Yankee Onsite Wastewater Association

Contact Information

YOWA

10 Tower Office Park, Suite 601

Woburn, MA 01801-2155

781-939-5710

yankeeonsite@gmail.com

yankeeonsite.org

Media Filter Technology

YOWA/MASSTC I/A Field Training
Jim Healy
President-Yankee Onsite Wastewater Association
Eastern Regional Sales Manager-Orenco Water

Media Filtration for Advanced Organic & Nutrient Treatment in Onsite Systems

Evolution of Sand Media/Manufactured Media For Use In MADEP Title 5 Systems

Overview

- Why Media Filtration
- Types of Media Filters
- Evolution of Media Utilized
- Benefits/Drawbacks of Technology
- Approved Systems in Massachusetts

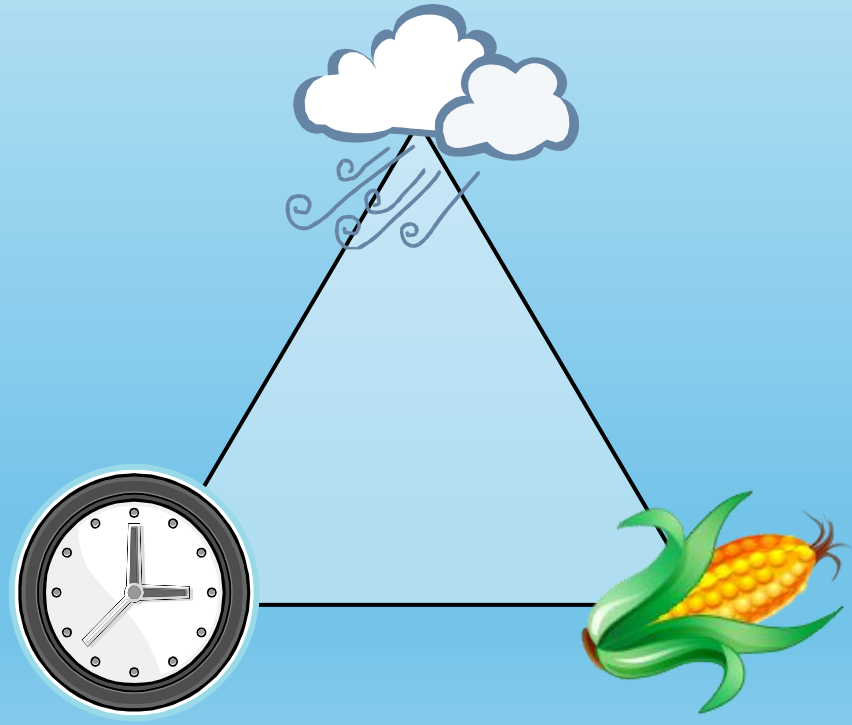
Why I/A Treatment

- Situations where conventional systems are insufficient
  - Proximity to water bodies/sources
  - Poorly draining soils
  - Small lots unable to accommodate a full-sized drain field
- Regulations
  - Sites requiring secondary treatment 30/30 BOD/TSS
  - Nitrogen reduction
    - Zone II 19 mg/l
    - BANRT 10 mg/l

Wastewater Treatment

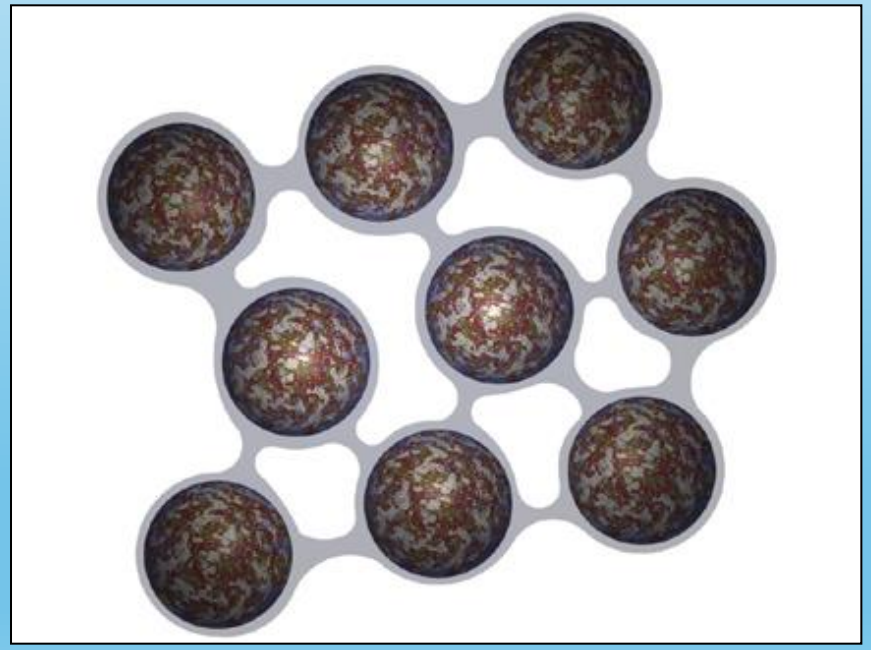
- Food
- Air
- Time

Balance these 3 in the correct proportions and in the correct forms

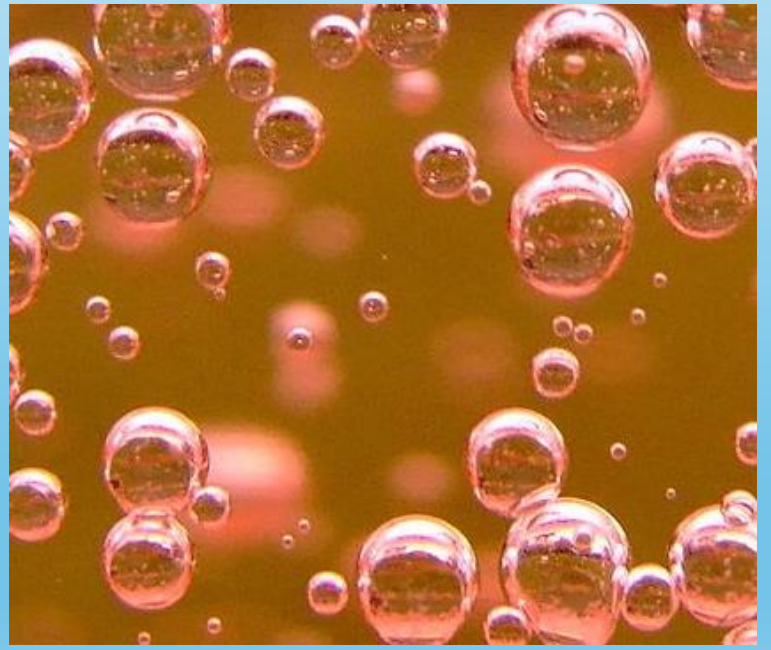


Two General Types of Treatment:
Suspended and Attached Growth

Attached growth submerged or non-submerged



Suspended growth



Oxygen Availability in Air

≈ 275 mg/L oxygen in free air, which directly interfaces with the biomass
… in contrast to 9 mg/L DO holding capacity of water for oxygen transfer

Packed-Bed vs Trickling Media Filter

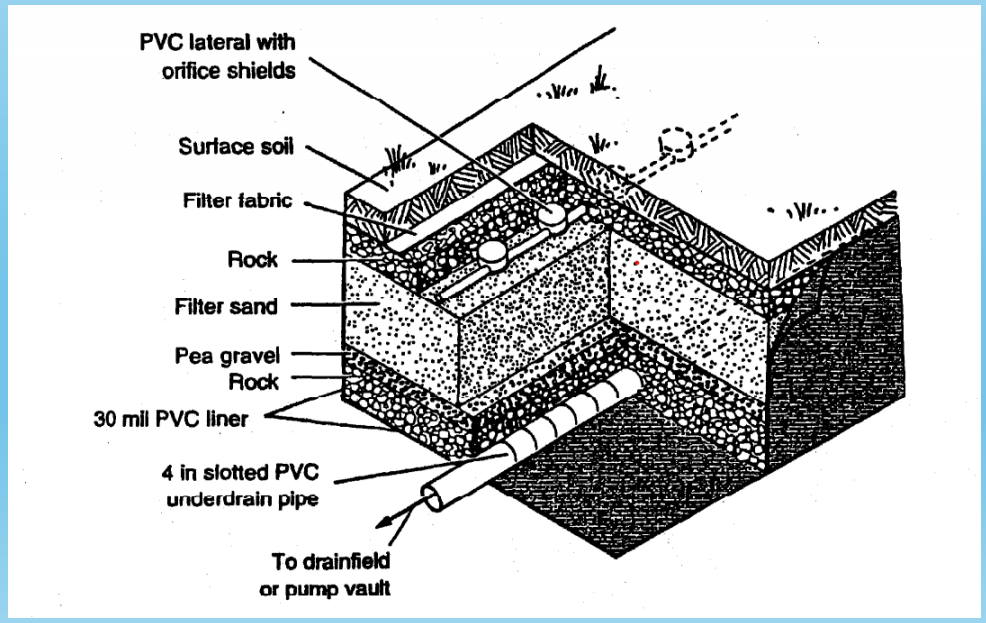
- Both are Components of an Advanced Wastewater Treatment System Providing Secondary or Tertiary Treatment
- Both Follow Primary Treatment
- Both Utilize Non-Submerged Attached Growth
- Both Take Advantage of Atmospheric Oxygen

Packed-Bed Filter Process Description

- Single and multiple pass
  - Dates to late 1800s
- Developed for small scale flows as supplementary septic system components
- Similar to trickling filters, but with lower loading rates and higher surface areas
- Media types
  - Sand/gravel
  - Peat
  - Foam
  - Textile

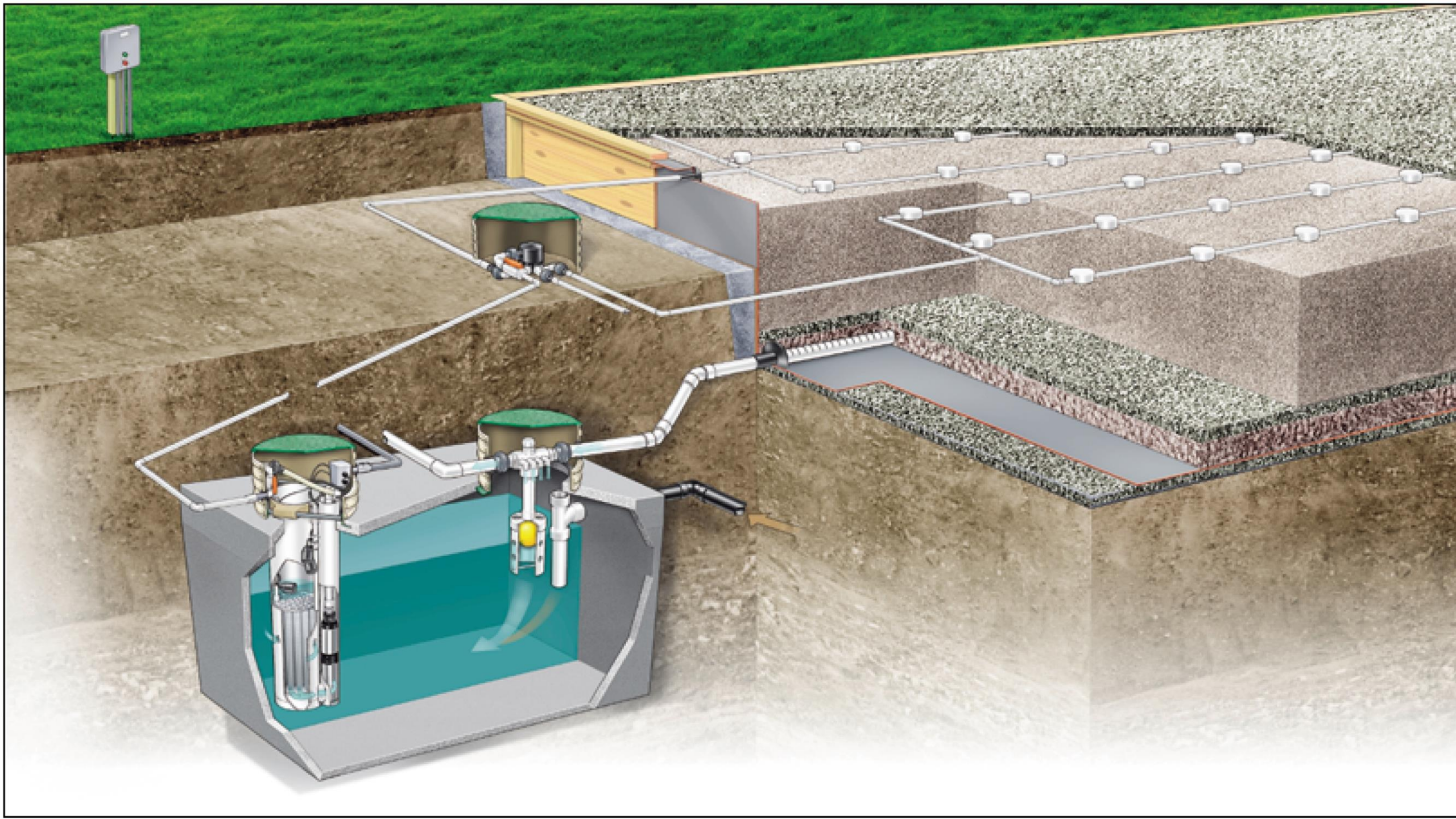
Packed Bed Filter History

- First Used in England in the 1860s and Massachusetts in the 1870s
- Usage Waned Until the 1940s In Florida
- Modern-Day PBFs Gained Traction in the1980s
- Removal Rates of ~ 90% Organics and ~50% Nutrients



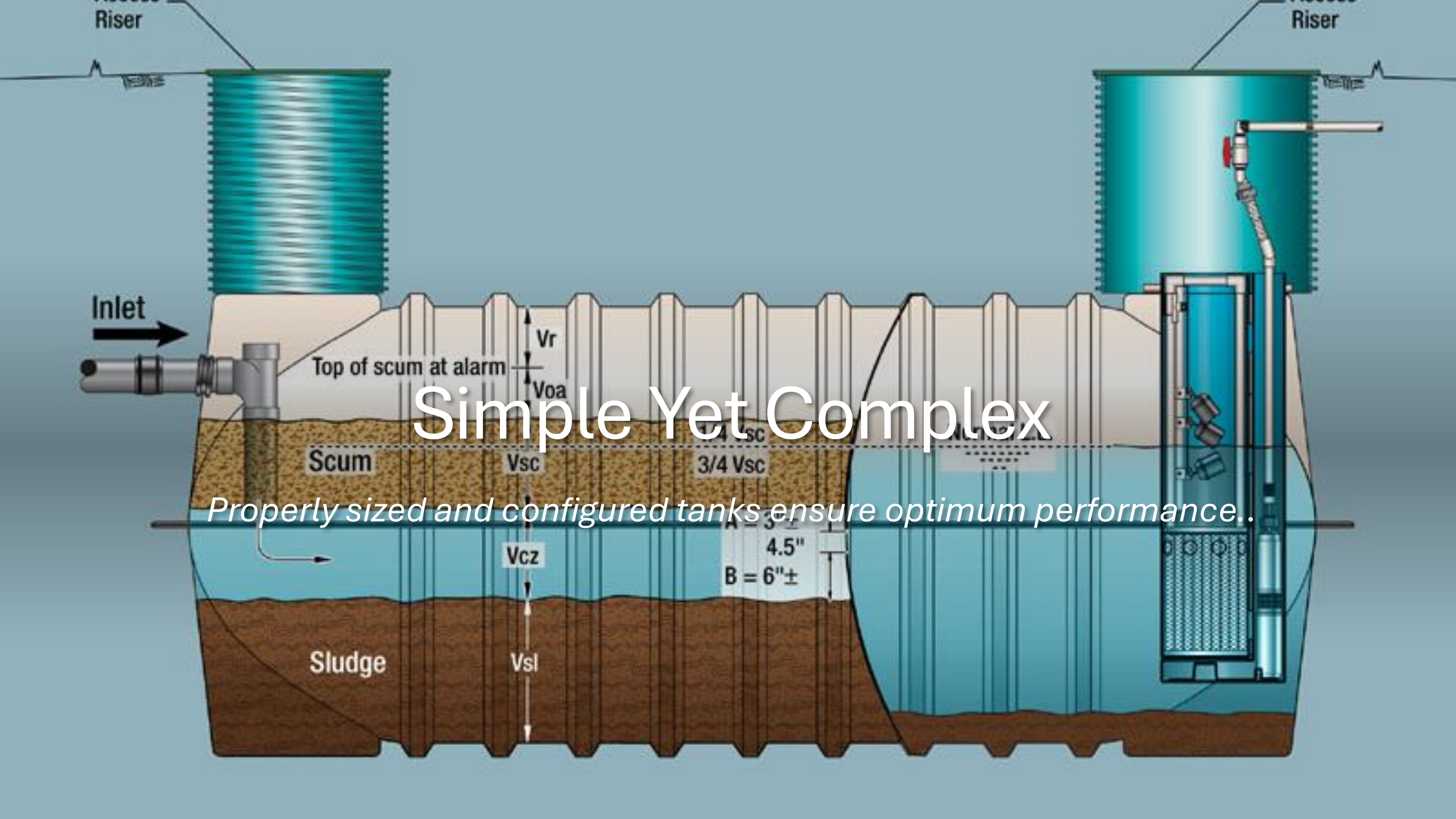
Packed Bed Filtration Technology Process

- Component of an Advanced Wastewater Treatment System Providing Secondary or Tertiary Treatment
- Follows Primary Treatment
- Non-Submerged Attached Growth
- Utilizes Atmospheric Oxygen
- PBF Consists of the Following Components
  - Container w/Liner for Holding Media
  - Underdrain for Removing Treated Fluid
  - Distribution System for Dosing and Distributing the Liquid to be Treated
  - Supporting Appurtenances



Primary Treatment

Septic tanks
Sized to hold wastewater for extended periods of time
>50% BOD_5
Up to 70% TSS
Fats/oils/grease (FOG) sequestering
Mandatory



Simple Yet Complex

Properly sized and configured tanks ensure optimum performance..

Attributes of Packed Bed Filters

- Quick start-up
- Efficient performance with highly variable wastewater strengths and flows, including occasional hydraulic and biologic overloads
- No release of untreated sewage if a malfunction occurs
- Consistent trouble-free operation; low maintenance (e.g. annual service call recommended; on-site routine service time 1 hour ±)
- Ease of maintenance (components should be easily accessible and serviceable)
- Low energy consumption
- Adequate storage during power outages (normally 24 hours or more at typical flows)
- Recoverable and expandable
- Reliability in providing the level of treated water required to final dispersal treatment processes

Pros & Cons of Packed Bed Filters

- RPBF Pros
  - Utilizes passive ventilation
  - Consistent high-quality treatment
  - Full access to components for service
  - Process Control
  - Low power costs
  - Able to handle seasonal or increasing flows
  - Excels in lower flow application
  - Comparatively easy expansion
  - BOD_5 and nitrogen reduction

- RPFB Cons
  - Tend to have larger footprints
  - Most can’t be placed in traffic rated areas.
  - Higher initial cost
  - Installation/assembly tends to be more complicated
  - Can be difficult to blend in aesthetically
  - Insect infestation

Trickling Bed FilterProcess Description

- Single and multiple pass
- Commonly used in municipal WWTPs before activated sludge aeration became popular
- Scaled down for use in small flows applications and individual residential systems
- Similar to packed bed filters, but with higher loading rates and smaller surface areas
- Media types
  - Gravel
  - Foam
  - Plastic

On-site wastewater treatment systems

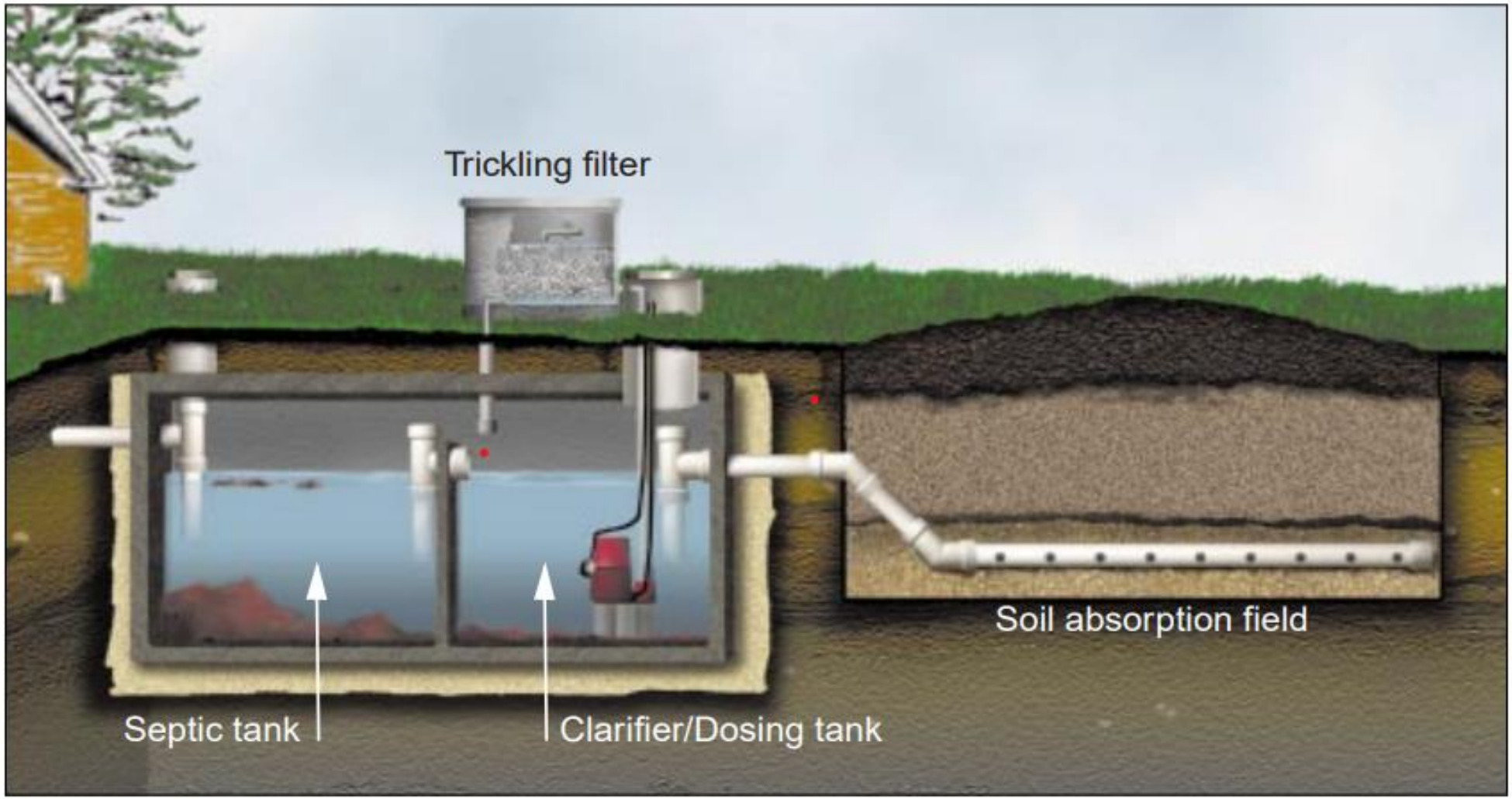
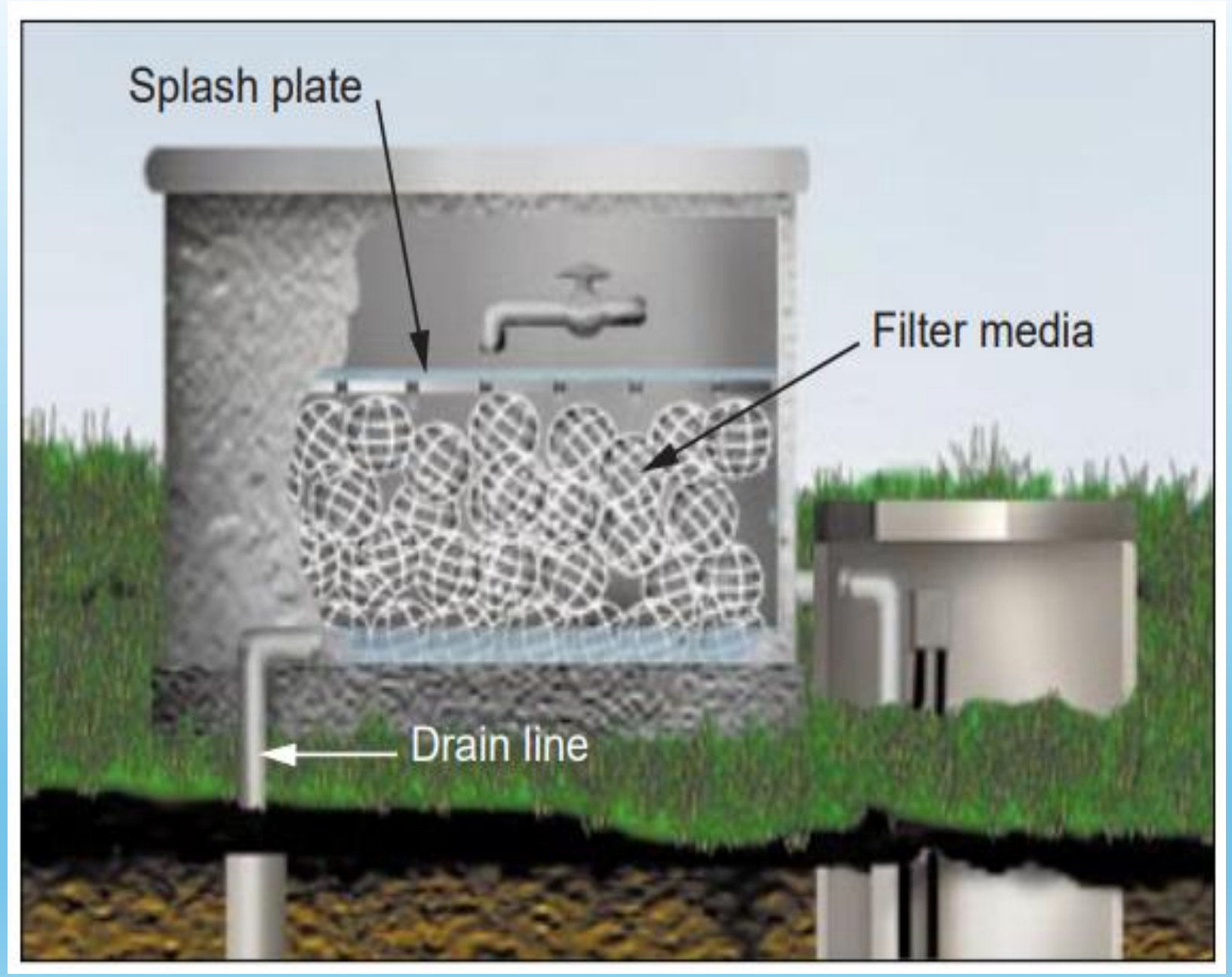


Figure 1: Trickling filters are a simple technology for treating wastewater.

Trickling filter


Splash plate
Filter media
Drain line

Attributes of Trickling Filters

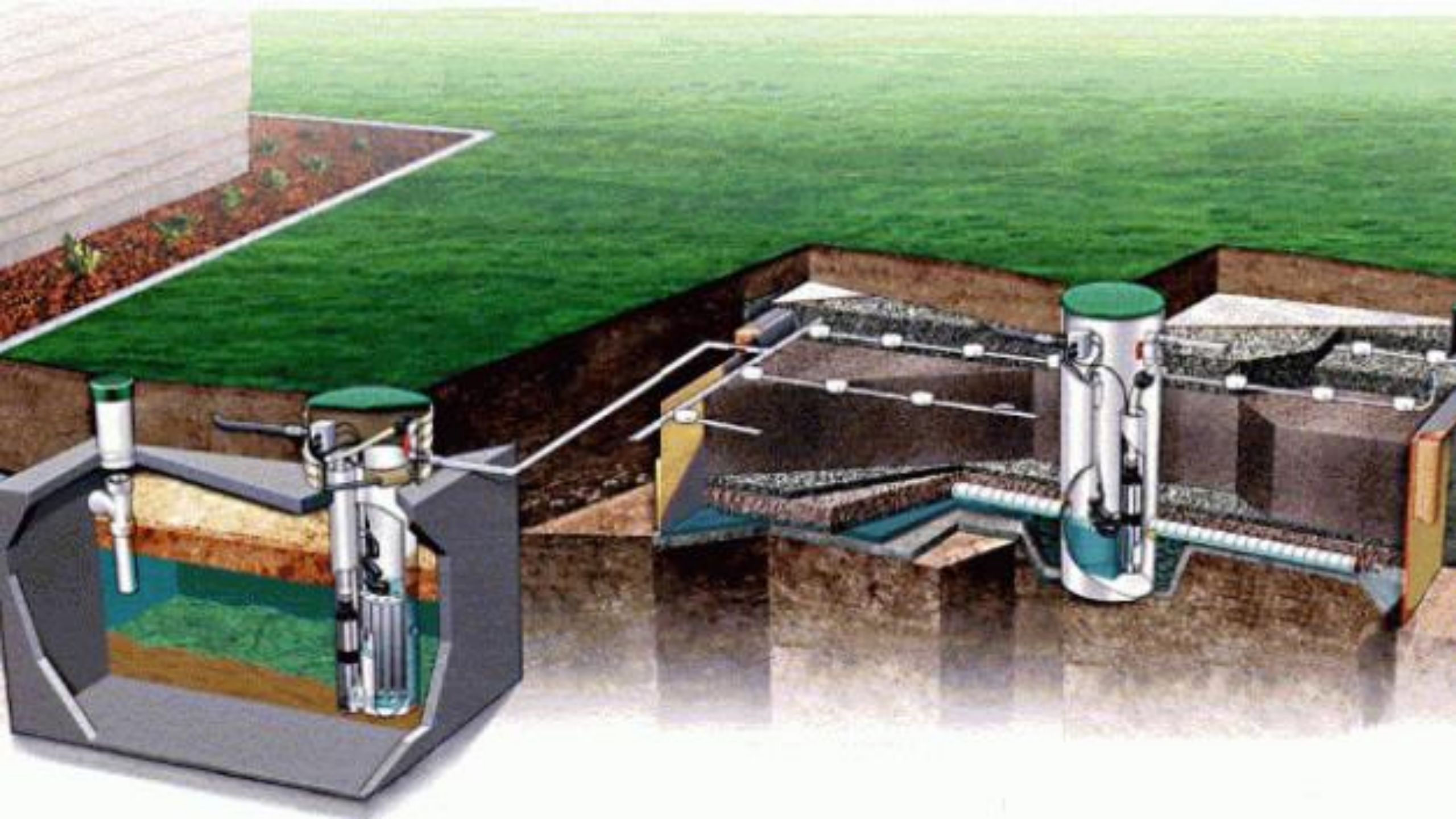
- Simple, reliable biological process
- Suitable in areas where land availability is tight
- Effective in treating high concentrations of organics depending on the medium used
- Appropriate for small and medium-sized communities
- Low energy consumption
- Rapidly reduce BOD in applied wastewater
- Efficient nitrification units
- Moderate level of skill and technical expertise needed to manage and operate the system

Disadvantages of Trickling Filters

- Additional treatment stages may be needed for more stringent permit limits
- Solids management in the treatment process is necessary and can become problematic
- Requires regular operator attention
- Incidence of clogging can be high
- Not ideal for large swings in flow
- Vector and odor problems
- Snail problems

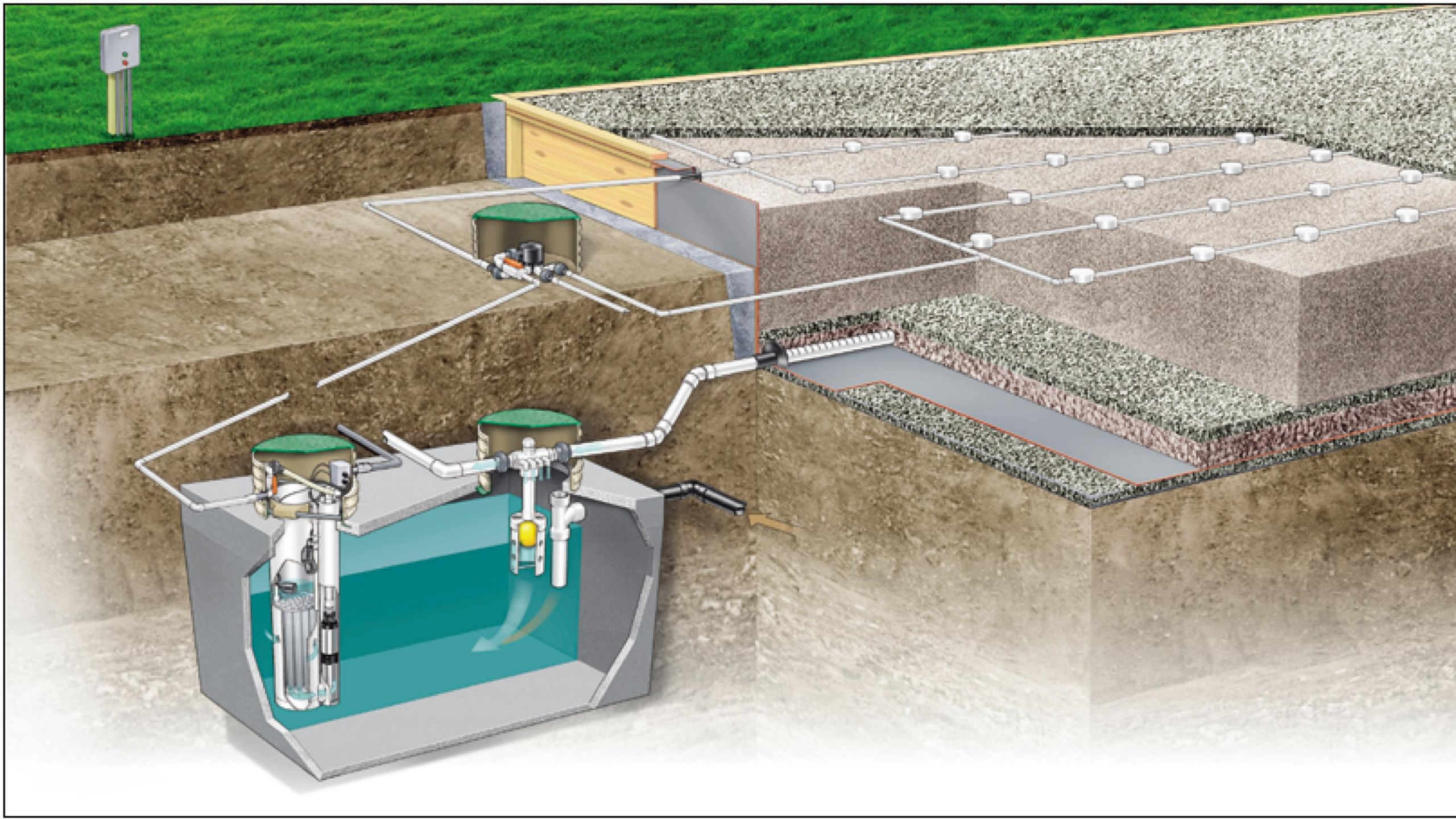
Intermittent Sand Filters

- Single Pass Using Sand as the Media
- Passively Vented Utilizing Atmospheric Oxygen
- Typical Loading Rate ~ 1GPD/SF Resulting in Significant Land Requirement
- BOD/TSS Typically 30/30, Nitrate ~30 mg/l
- Sand Gradation Critical to Performance
- Consistent Performance Difficult to Achieve Due to Construction Variability
- 12-72 Doses Over the Media Per Day. 24 Doses Is Typical.



Recirculating Sand Filters

- Multiple Passes Over the Media achieving 10/10 BOD/TSS ~30 mg/l nitrate
- Passively Vented Using Atmospheric Oxygen
- More Aggressive Loading Rates ~5 GPD/SF
- Design Based on the More Stringent of Hydraulic vs Organic Requirements
- Better Utilization of Land Making It a More Effective Choice for Commercial/Municipal Applications
- Needs Additional Components to achieve aggressive permit limits
- 72-100 Doses Per Day to Achieve 5:1 Recirc Ratios



General Use

Company	Technology	Design Flow	Technology Description
Generic	Composting Toilets Composting toilets are approved for use under Title 5. See 310 CMR 15.289.	Compliant with Title 5	Composting Toilet
Generic	Recirculating Sand Filter Approval Other Documents: 1	Compliant with Title 5	Nitrogen Reduction for 550 gallons per day per acre: TN = 25mg/L Secondary treatment: BOD5 = 30mg/L, TSS = 30 mg/L

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

CERTIFICATION FOR GENERAL USE

Pursuant to Title 5, 310 CMR 15.000

GENERIC – Recirculating Sand Filter (secondary or nitrogen reducing)

Trade name of technology and model: **Recirculating Sand Filter** designed in accordance with Department guidance (hereinafter the "System"). An inspection checklist and design guidance are part of this approval.

Date of Issuance: September 9, 2008

Authority for Issuance:

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

JANE SWIFT
Governor

BOB DURAND
Secretary

LAUREN A. LISS Commissioner

TITLE 5 RECIRCULATING SAND FILTERS DESIGN GUIDANCE

Effective Date: June 24, 2002 (updated April 2006) Policy # : BRP/BWP/WPeP/G02-3

Program Applicability: BRP/DWM/Watershed Permitting/ Title 5 Program

Supersedes: Recirculating Sand Filters (RSF) Design Guide
Regulation Reference: 310 CMR 15.202

Approved By: ____ [signed] _____
Cynthia Giles, Assistant Commissioner, Bureau of Resource Protection

4. Size the sand filter based on the appropriate loading rate, either hydraulic, 3 to 5 GPD/SF or organic limit, 0.005 lbs BOD_5/SF. When the organic loading rate is the criteria that control the sizing of the filter a hydraulic loading rate of less than 3 GPD/SF may be required.

DESIGN EXAMPLE

Hydraulic Loading Rate

- 440 GPD
- 300 mg/l BOD Primary Treated Effluent
- 440GPD/4GPD/SF=110 SF RSF

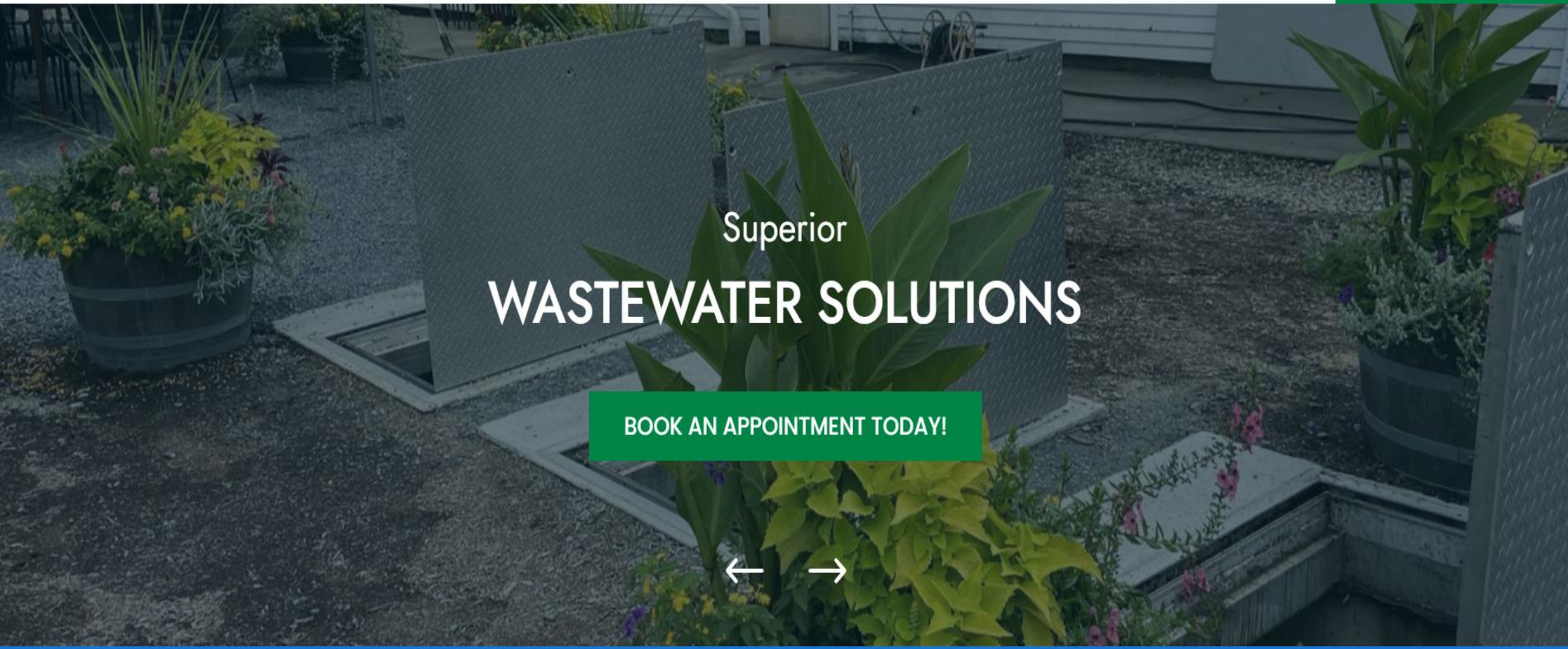
Organic Loading Rate

- 440 GPD
- 300 mg/l BOD Primary Treated Effluent
- (300X440X8.34)/1MM=1.1lb BOD
- 1.1lb BOD/.005 lbs BOD/SF=220 SF

Use the greater of the HLR vs OLR
RSF=220 SF Effective HLR=2GPD/SF

Best Available Nitrogen Reducing Technologies

General Use Technologies					
Company	**Technology**	**Facility Type**	**Flow (gpd)**	**TN Approval Limit**	**Performance Data**
SeptiTech, Inc. 69 Holland Street Lewiston, ME 04240	STAAR by SeptiTech/Bio-Microbics of Maine, Inc. Approval	Residential	<2,000	19 mg/L	Graph 1
Orenco Systems, Inc. 814 Airway Avenue Sutherlin, OR 97479	Advantex Treatment System (AX20 models) Approval	Residential	<2,000	19 mg/L	Graph 2


Superior
WASTEWATER SOLUTIONS
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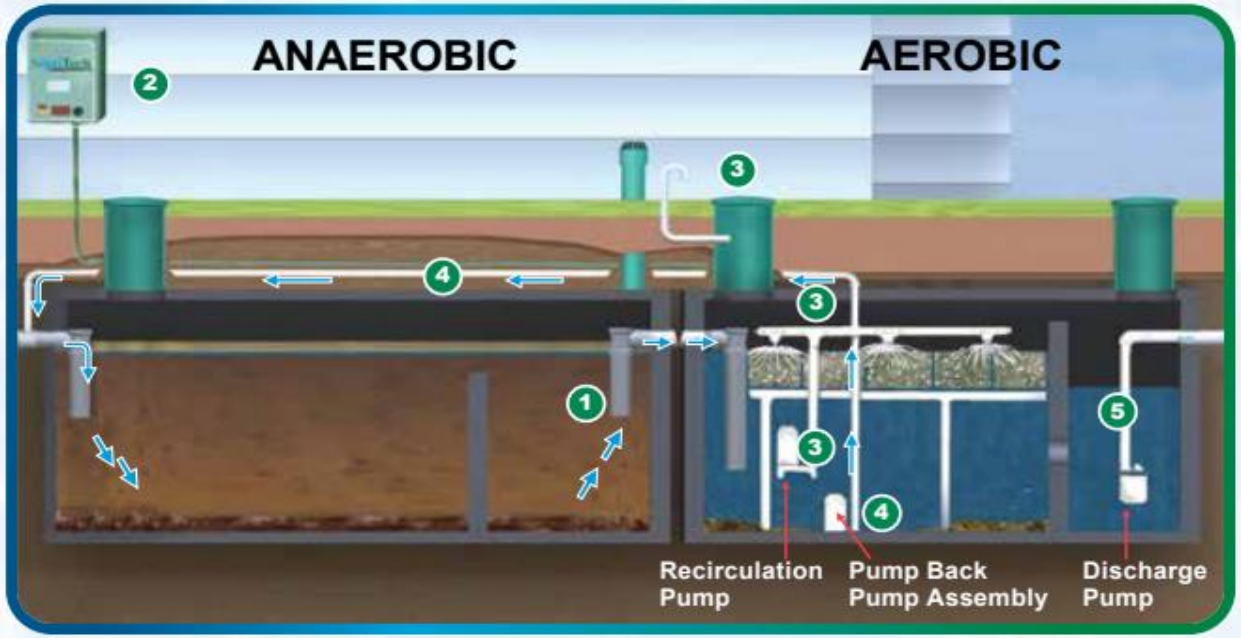
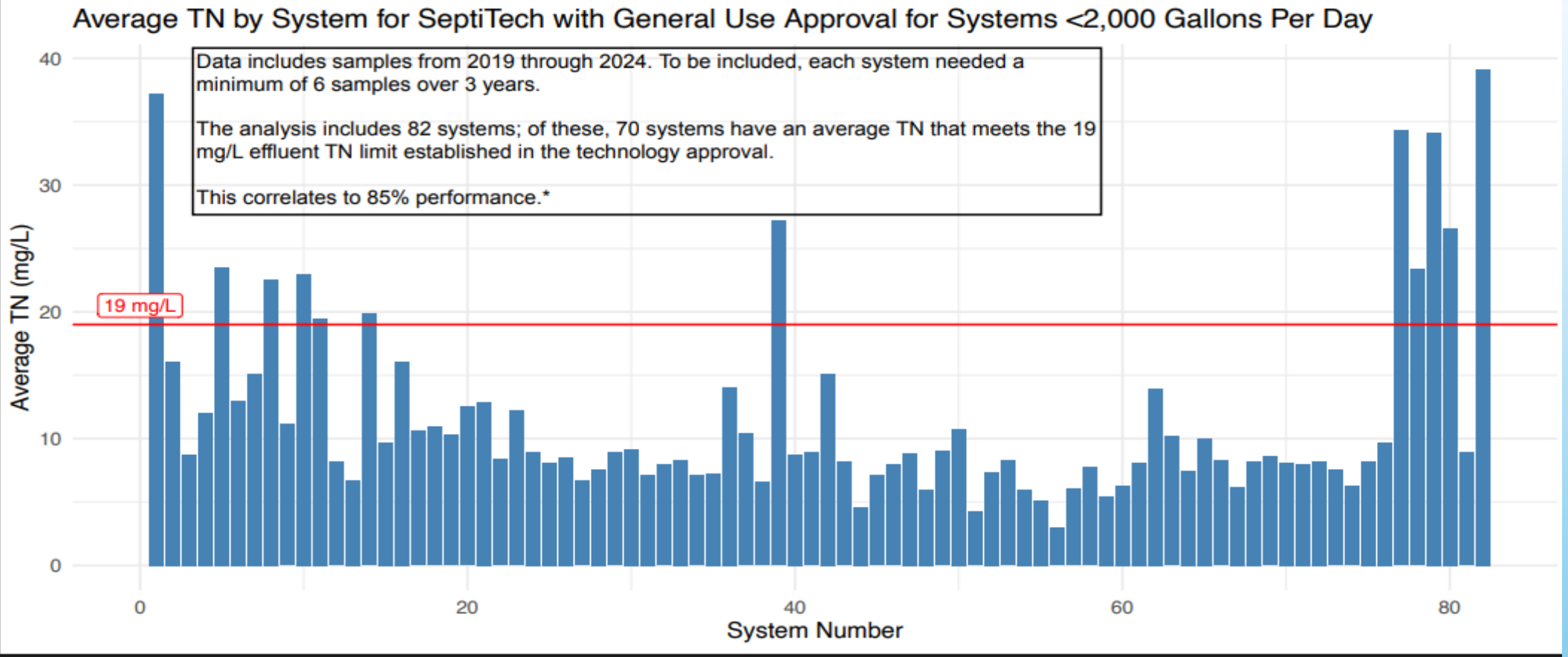
HOW IT WORKS!

1. After settling in the **Anaerobic zone**, the influent wastewater flows into the bottom of the trickling filter mixing with the treated wastewater.
2. The **control panel** senses “surge flow” and “low flow” activity automatically adjusting the discharge rate as needed. It even senses a “no flow” situation to “slow down” or put the system into “sleep” mode.
3. With the **recirculation pump**, the combination of wastewater and air that is passively drawn in through venturis trickles down through the filter media. **For the commercial system:** 2 stages and 2 types of media used with multiple returns for an optimum treatment process.



4. **Pump back pump assembly** transfers the wastewater to the settling zone to remove sludge from the **Aerobic zone**. All sludge management is in the **Anaerobic zone**, which also performs denitrification.
5. After treatment, a **discharge pump** will send small, frequent time doses to the leachfield to ensure optimal soil absorption.



***Notes**

MassDEP reviews performance data for nitrogen reducing technologies approved for use in Massachusetts on a yearly basis to maintain the Best Available Nitrogen Reducing Technology (BANRT) list in accordance with 310 CMR 15.215(2)(g).

In 2024, the BANRT analysis for the SeptiTech system with General Use approval included 56 systems with 45 systems that had an average TN that met the 19 mg/L effluent TN standard established in the technology approval. This correlated to 80% performance.

In 2025, the BANRT analysis for the SeptiTech system with General Use approval includes 82 systems with 70 systems that have an average TN meeting the 19 mg/L effluent TN standard established in the technology approval. This correlates to 85% performance.

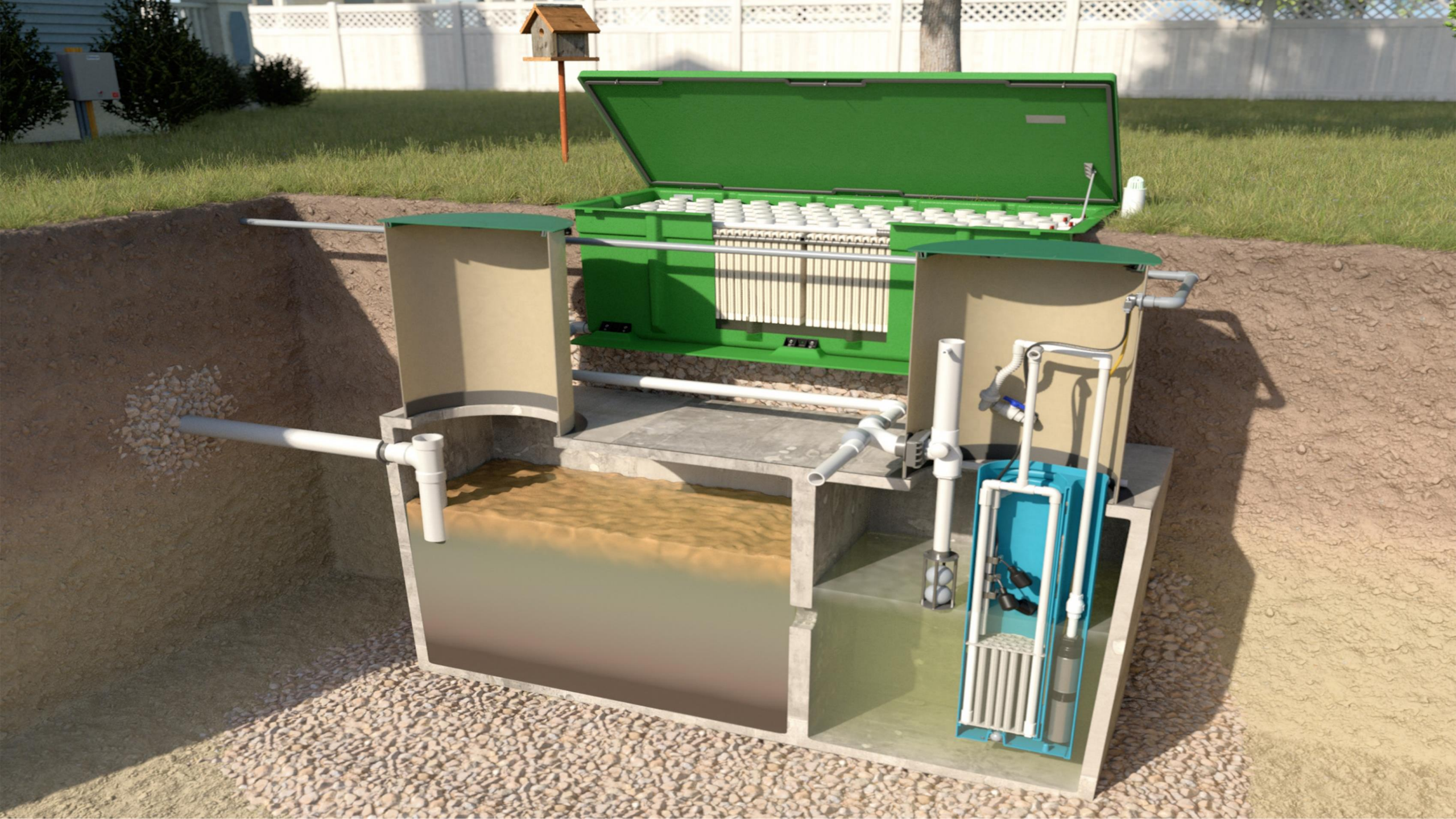
System Sizing

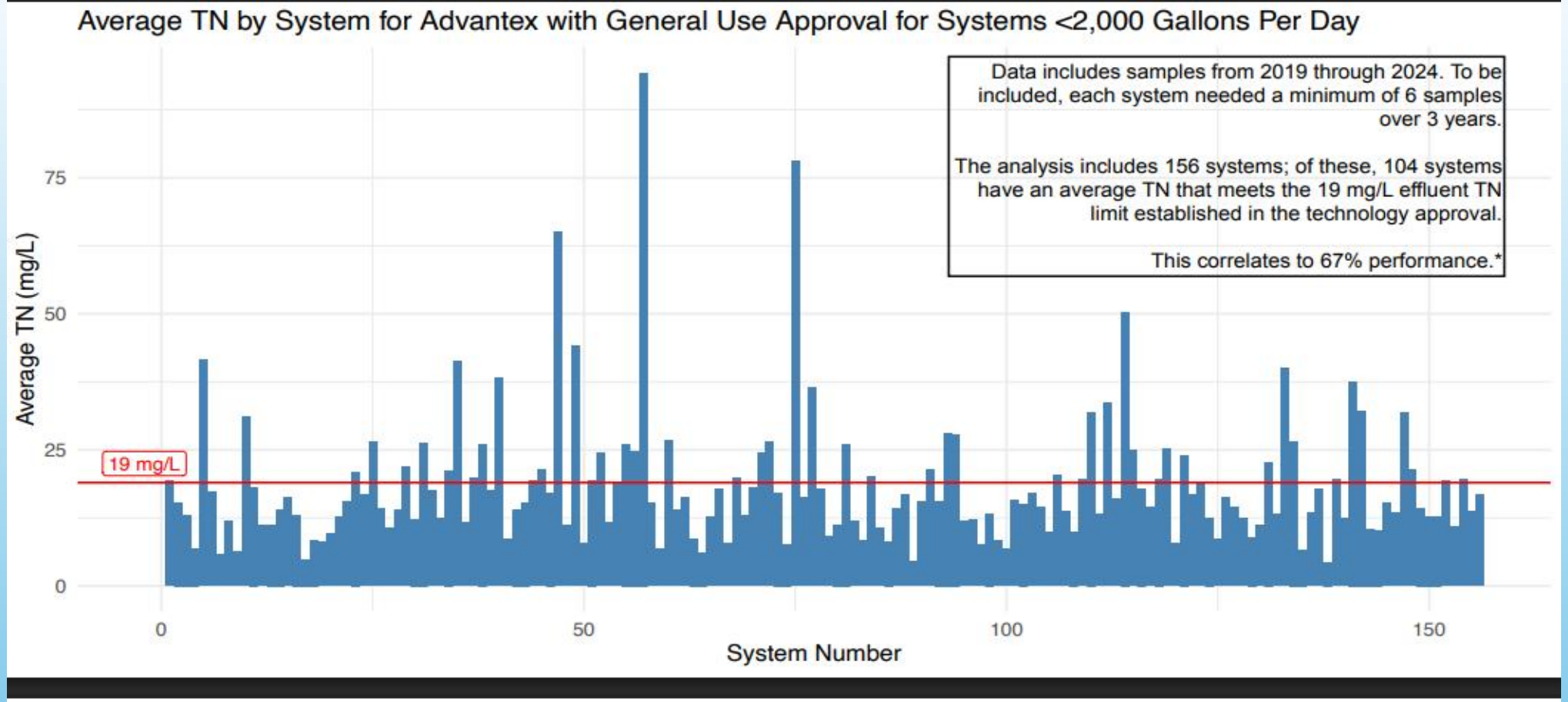
SeptiTech® STAAR® Residential Models	Hydraulic Capacity	People Served
SeptiTech® STAAR® 0.5 Residential System	500 gpd (1893 lpd)	1 – 5 people
SeptiTech® STAAR® 0.75 Residential System	750 gpd (2839 lpd)	1 – 8 people
SeptiTech® STAAR® 1.0 Residential System	1000 gpd (3785 lpd)	1 – 11 people
SeptiTech® STAAR® 1.2 Residential System	1200 gpd (4542 lpd)	1 – 18 people
SeptiTech® STAAR® 1.5 Residential System	1500 gpd (5678 lpd)	6 – 21 people
SeptiTech® STAAR® 3.0 Residential System	3000 gpd (11 m3/D)	10 – 42 people
SeptiTech® STAAR® 4.5 Residential System	4500 gpd (17 m3/D)	18 – 63 people
SeptiTech® STAAR® 6.0 Residential System	6000 gpd (23 m3/D)	27 – 82 people

Orenco SYSTEMS

New Products | International

Exciting Orenco Announcement: Learn More





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In 2024, the BANRT analysis for the Advantex system with General Use approval included 97 systems with 62 systems that had an average TN that met the 19 mg/L effluent TN standard established in the technology approval. This correlated to 64% performance.

In 2025, the BANRT analysis for the Advantex system with General Use approval includes 156 systems with 104 systems that have an average TN meeting the 19 mg/L effluent TN standard established in the technology approval. This correlates to 67% performance.

Modes of Operation

- AdvanTex® Treatment Systems available in two different modes
  - Mode 1: BOD_5 and TSS the primary concern
  - Mode 3: Nitrogen reduction maximized
    - Two additional discharge modes; A for gravity discharge, B for pressure discharge
    - Mode 1A-Organics treatment gravity discharge
    - Mode 1B-Organics treatment pressure discharge
    - Mode 3A-Nutrients treatment gravity discharge
    - Mode 3B-Nutrients treatment pressure discharge
- Important to note all AdvanTex systems are pressure time-dosed. Effluent cannot move through the system without power.
- Mode determined by local and state regulations

Required Tankage and AX20 Units

The following tables summarize the required tankage and required number of AX20 units based on occupancy and maximum design flow. Table 1 is for systems using a single processing tank. Table 2 is for systems using separate processing and recirculation (recirc) tanks. Requirements assume residential peak weekly average flows (Q_{pwa}) are typically two times normal average daily flows (Q_a), or $Q_{pwa} = 2Q_A$. It's also assumed that peak weekly average flows meet typical regulations governing flow-to-bedroom ratios.

Table 1. Required Tankage and Number of AX20 Units: Systems Using Single Processing Tank

Number of Bedrooms*	Maximum Occupants†	Minimum Processing Tank Size, gal (L)‡	AX20 Units**
4 or fewer	8	1500 (5678)	1
5	10	2000 (7571)	1
6	12	3000 (11,356)	2

** Use bedrooms as default sizing criteria. (Jurisdictions vary greatly on calculations of gal or L per bedroom.) Contact Orenco for homes with more than six bedrooms.*

† Systems for homes with occupancies greater than eight require a design with multiple units based on a minimum of 2.5ft² (0.2m²) of surface loading area per capita.

‡ Processing tank includes primary (septic) and secondary (recirculation) compartments.

*** The nominal application rate is 30gpd/ft² (1222L/m²/day).*

Required Tankage and AX20 Units, cont.

Table 2. Required Tankage and Number of AX20 Units: Systems Using Separate Processing and Recirc Tanks

Number of Bedrooms*	Maximum Occupants†	Minimum Processing Tank Size, gal (L)‡	Minimum Recirc Tank Size, gal (L)‡	AX20 Units**
4 or fewer	8	1500 (5678)	1000 (3785)	1
5	10	2000 (7571)	1000 (3785)	1
6	12	3000 (11,356)	1000 (3785)	2

** Use bedrooms as default sizing criteria. (Jurisdictions vary greatly on calculations of gal or L per bedroom.) Contact Orenco for homes with more than six bedrooms.*

† Systems for homes with occupancies greater than eight require a design with multiple units based on a minimum of 2.5ft² (0.2m²) of surface loading area per capita.

‡ The 1000gal (3785L) minimum is due to float settings/reserve requirements.

*** The nominal application rate is 30gpd/ft² (1222L/m²/day).*

Company	Technology	Facility Type	Flow (gpd)	TN Approval Limit	Performance Data
Maine 04011					
Lombardo Associates, Inc. 188 Church Street Newton, MA 02458	Nitrex Filter Approval	Residential and commercial systems	<2,000	10 mg/L	Graph 5
KleanTu LLC 300 Old Pond Road, Ste# 206 Bridgeville, PA 15017	NitROE Waste-Water Treatment System Approval	Residential and commercial systems	<2,000	11 mg/L	Graph 6
Bio-Microbics of Maine, Inc. 69 Holland Street Lewiston, ME 04240	STAAR by SeptiTech/Bio-Microbics of Maine, Inc. Approval	Commercial systems	<2,000	19 mg/L	Graph 7

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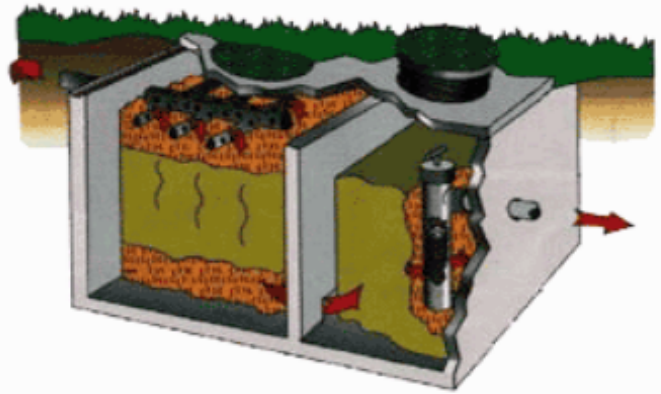
PROJECT DESCRIPTIONS

- Nitrex™ Nitrogen Removal Systems
  - Cluster Applications
  - Single Family Residential Applications
  - Multi-Family & Institutional Applications
  - Test Center & Independent Evaluations
- PhosRID™ Phosphorus Removal Systems
- Groundwater & Stormwater Treatment
- No Discharge & Water Reuse Systems
- Municipal & Private Wastewater Applications
- Sustainable Water

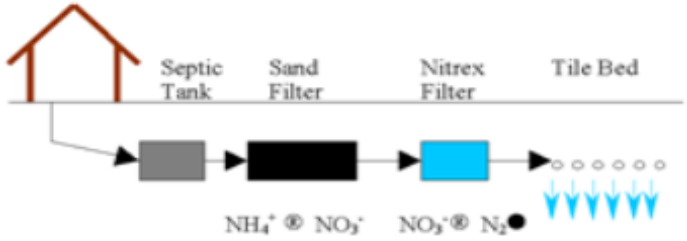
NITREX™
NITROGEN REMOVAL WASTEWATER TREATMENT SYSTEM

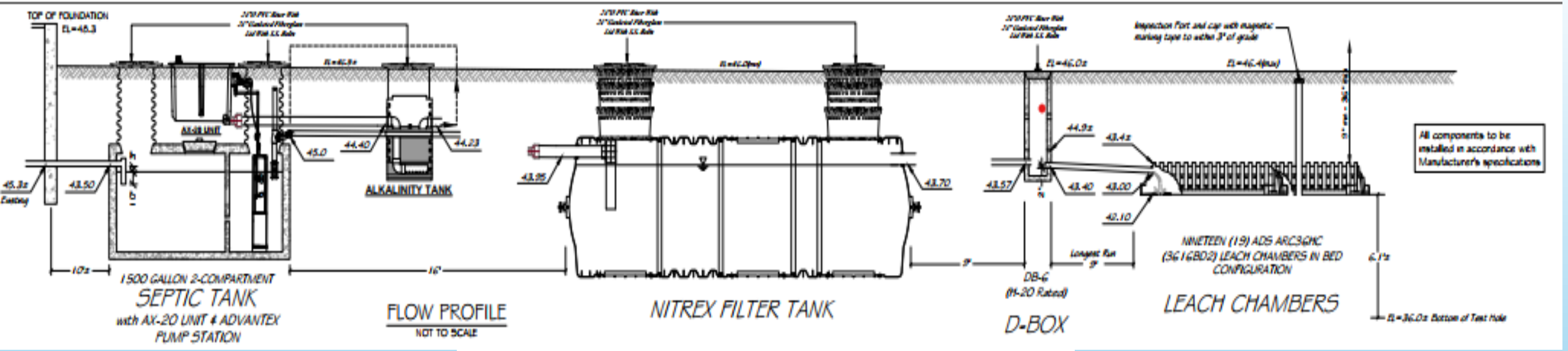
Contact: Pio Lombardo, P.E.
Lombardo Associates, Inc.
Environmental Engineers/Consultants
188 Church Street
Newton, MA 02458
Tel: 617-964-2924
Fax: 617-332-5477
Email: Pio@LombardoAssociates.com

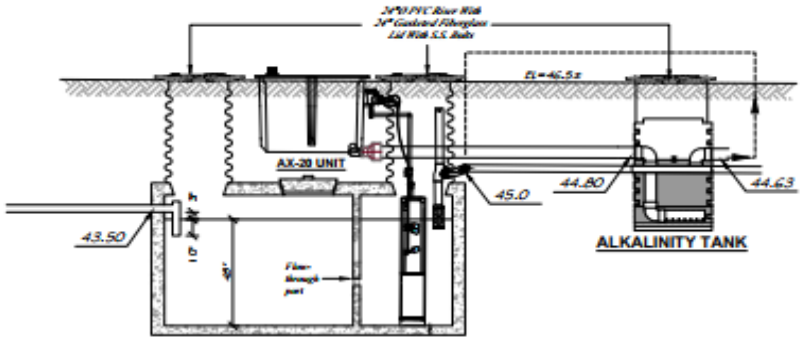


Technology Description: Based on ten years of research, a proprietary patented nitrate-reactive media has been discovered that converts nitrate to inert nitrogen gas (denitrification). The NITREX™ reactive media is contained in a prefabricated tank or, for larger installations, in an engineered excavation. Nitrate contaminated wastewater is gravitationally fed through the treatment module. For septic tank applications, an oxidative pre-treatment step is required to convert ammonium (NH_4^+) to nitrate (NO_3^-) before the NITREX™ filter can perform the reductive denitrification step. Pre-treatment can be achieved with any of the existing oxidative technologies commonly used in wastewater treatment. The nitrate-free effluent from the NITREX™ filter is simply discharged to a conventional tile bed or receiving water body. Compared to other technologies, the NITREX™ filter is passive and essentially maintenance free. It provides almost 100% nitrate removal in a low cost easy to install process.

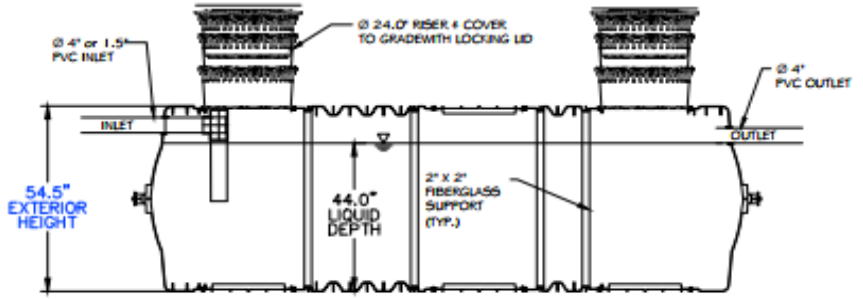
Application: The NITREX™ filter can be used to remove nitrogen in water or wastewater such as treatment plants wastewater, septic tank effluent, agricultural runoff, and landfill leachate. For large flows, the NITREX™ reactive media may be placed in a lined excavation, and the wastewater allowed to gravitationally percolate through the reactive media.



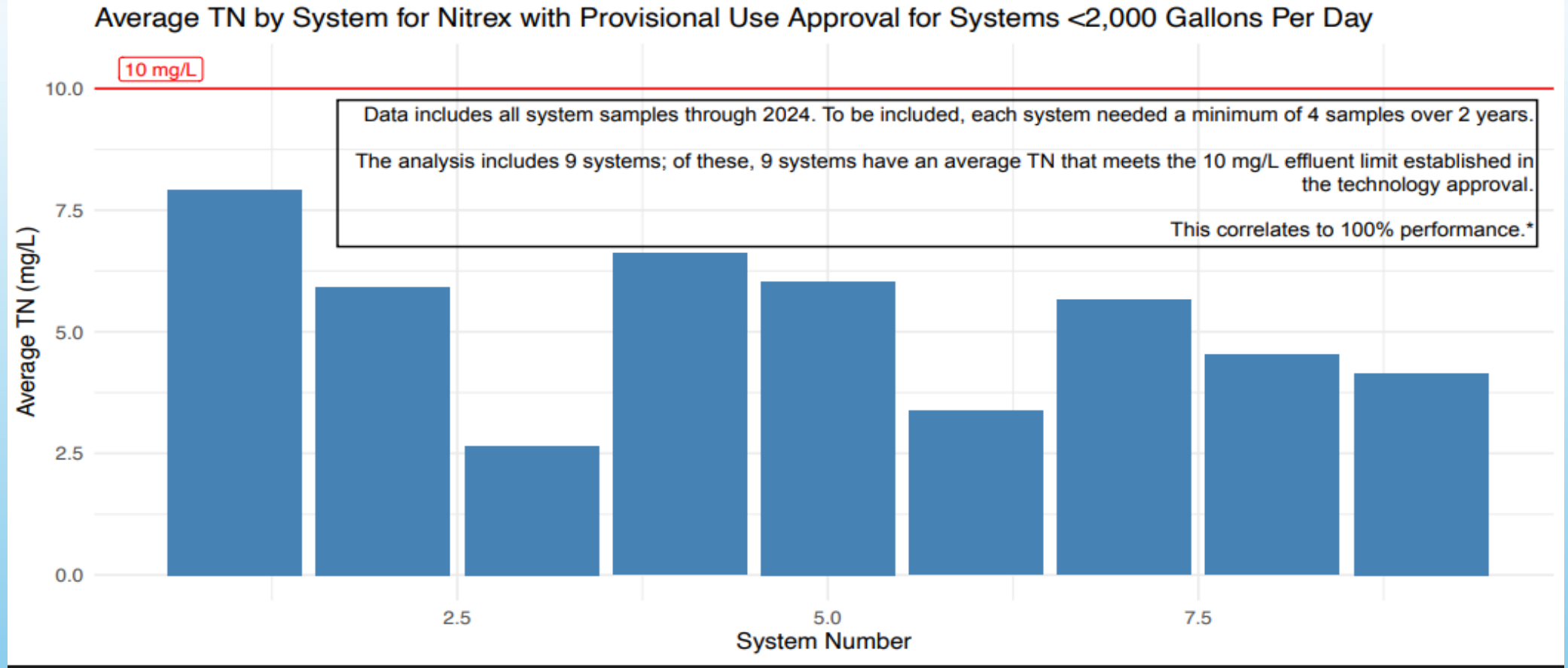




1500 GALLON SEPTIC TANK WITH ADVANTEX AX-20 UNIT
NOT TO SCALE



NITREX FILTER TANK
NOT TO SCALE



***Notes**

MassDEP reviews performance data for nitrogen reducing technologies approved for use in Massachusetts on a yearly basis to maintain the Best Available Nitrogen Reducing Technology (BANRT) list in accordance with 310 CMR 15.215(2)(g).

In 2024, the BANRT analysis for the Nitrex Filter with Provisional Use approval for systems with flows less than 2,000 gallons per day included 8 systems with 8 systems that had an average TN meeting the 10 mg/L effluent TN standard established in the technology approval. This correlated to 100% performance.

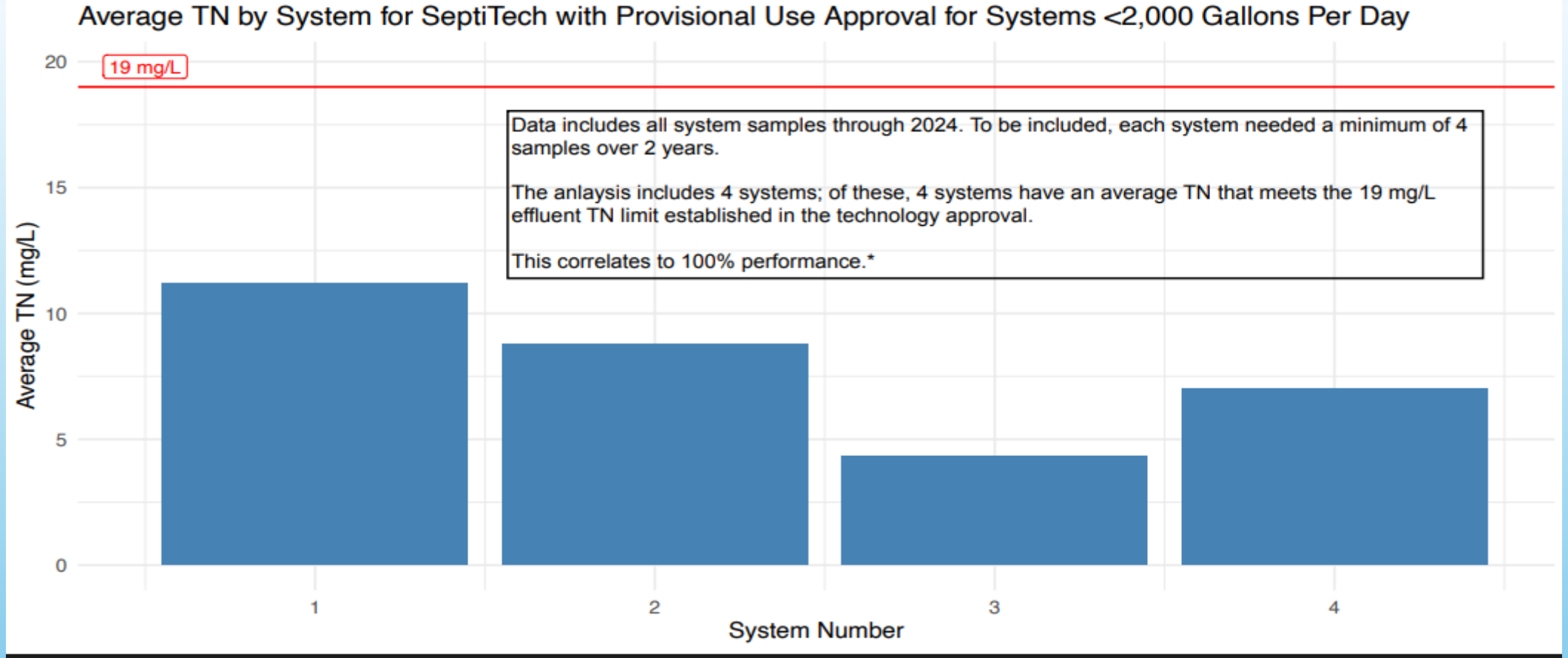
In 2025, the BANRT analysis for the Nitrex Filter with Provisional Use approval for systems with flows less than 2,000 gallons per day includes 9 systems with 9 systems that have an average TN meeting the 10 mg/L effluent TN standard established in the technology approval. This correlates to 100% performance.


Septitech Commercial

System Sizing

SeptiTech® STAAR® Commercial Models	Hydraulic Capacity	Organic Capacity
SeptiTech® STAAR® 1.2 Commercial Systems	1200 gpd (4.5 m3/D)	Consult with Factory to discuss wastewater characteristics and project requirements
SeptiTech® STAAR® 1.5 Commercial Systems	1500 gpd (6 m3/D)	
SeptiTech® STAAR® 3.0 Commercial Systems	3000 gpd (11 m3/D)	
SeptiTech® STAAR® 4.5 Commercial Systems	4500 gpd (17 m3/D)	
SeptiTech® STAAR® 6.0 Commercial Systems	6000 gpd (23 m3/D)	
SeptiTech® STAAR® 9.0 Commercial Systems	9000 gpd (34 m3/D)	
SeptiTech® STAAR® 12.0 Commercial Systems	12000 gpd (45 m3/D)	
SeptiTech® STAAR® 18.0 Commercial Systems	18000 gpd (68 m3/D)	
SeptiTech® STAAR® 27.0 Commercial Systems	27000 gpd (102 m3/D)*	

Larger Systems Available. Consult Factory to design a system to meet your flow and regulatory requirements



***Notes**

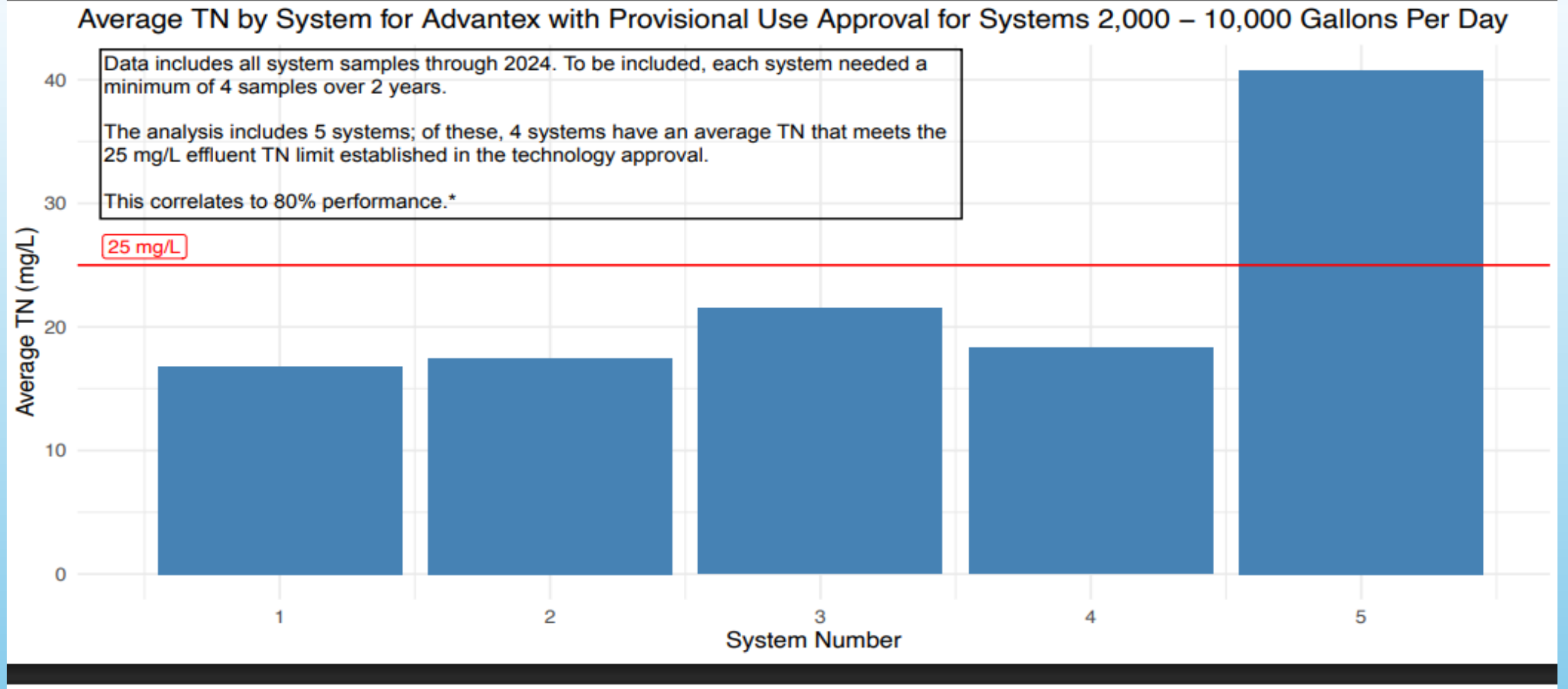
MassDEP reviews performance data for nitrogen reducing technologies approved for use in Massachusetts on a yearly basis to maintain the Best Available Nitrogen Reducing Technology (BANRT) list in accordance with 310 CMR 15.215(2)(g).

In 2024, the SeptiTech system with Provisional Use approval for systems with flows less than 2,000 gallons per day did not have enough data for BANRT analysis.

In 2025, the BANRT analysis for the SeptiTech system with Provisional Use approval for systems with flows less than 2,000 gallons per day includes 4 systems with 4 systems that have an average TN meeting the 25 mg/L effluent TN standard established in the technology approval. This correlates to 100% performance.

Provisional Use Technologies 2,000 – 10,000 Gallons Per Day					
Company	**Technology**	**Facility Type**	**Flow (gpd)**	**TN Approval Limit**	**Performance Data**
Orenco Systems, Inc. 814 Airway Avenue Sutherlin, OR 97479	Advantex Treatment System Approval	Residential and commercial systems	2,000 – 10,000	25 mg/L	Graph 8
Aquapoint.3 LLC 39 Tarkiln Place New Bedford, MA 02745	Bioclere Approval	Residential and commercial systems	2,000 – 10,000	25 mg/L	Graph 9
Lombardo Associates, Inc. 188 Church Street Newton, MA 02458	Nitrex Filter Approval	Residential and commercial systems	2,000 – 10,000	25 mg/L	Graph 10
Bio-Microbics of Maine, Inc. 69 Holland Street Lewiston, ME 04240	STAAR by SeptiTech/Bio-Microbics of Maine, Inc. Approval	Residential and commercial systems	2,000 – 10,000	25 mg/L	Graph 11

AdvanTex® Treatment System Family



***Notes**

MassDEP reviews performance data for nitrogen reducing technologies approved for use in Massachusetts on a yearly basis to maintain the Best Available Nitrogen Reducing Technology (BANRT) list in accordance with 310 CMR 15.215(2)(g).

In 2024, the Advantex system with Provisional Use approval was not included in the BANRT analysis because the previous technology approval expired on 12/6/2021. As of 5/29/2025, MassDEP is renewing the Advantex approval for Provisional Use in Massachusetts.

In 2025, the BANRT analysis for the Advantex system with Provisional Use approval includes 5 systems with 4 systems that have an average TN meeting the 25 mg/L effluent TN standard established in the technology approval. This correlates to 80% performance.

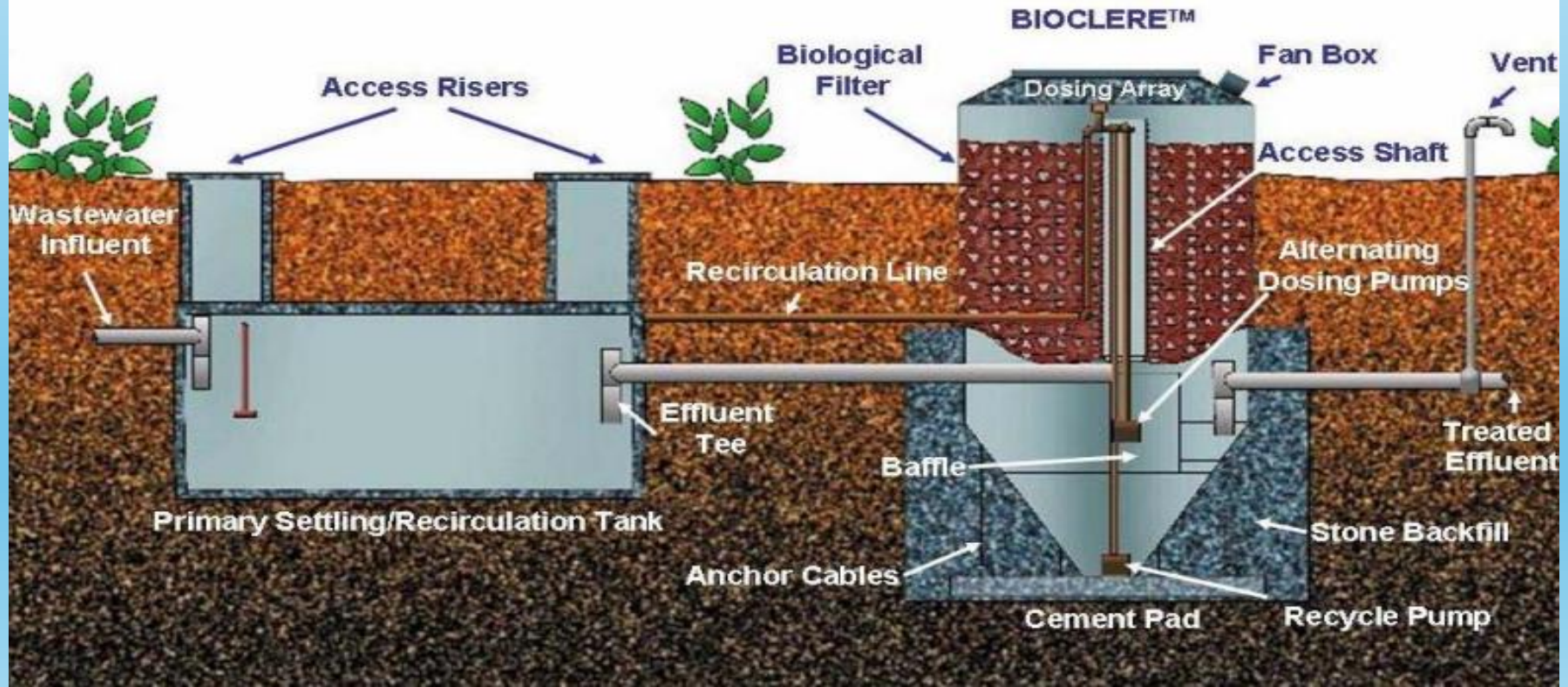
"Count on it" Compliance

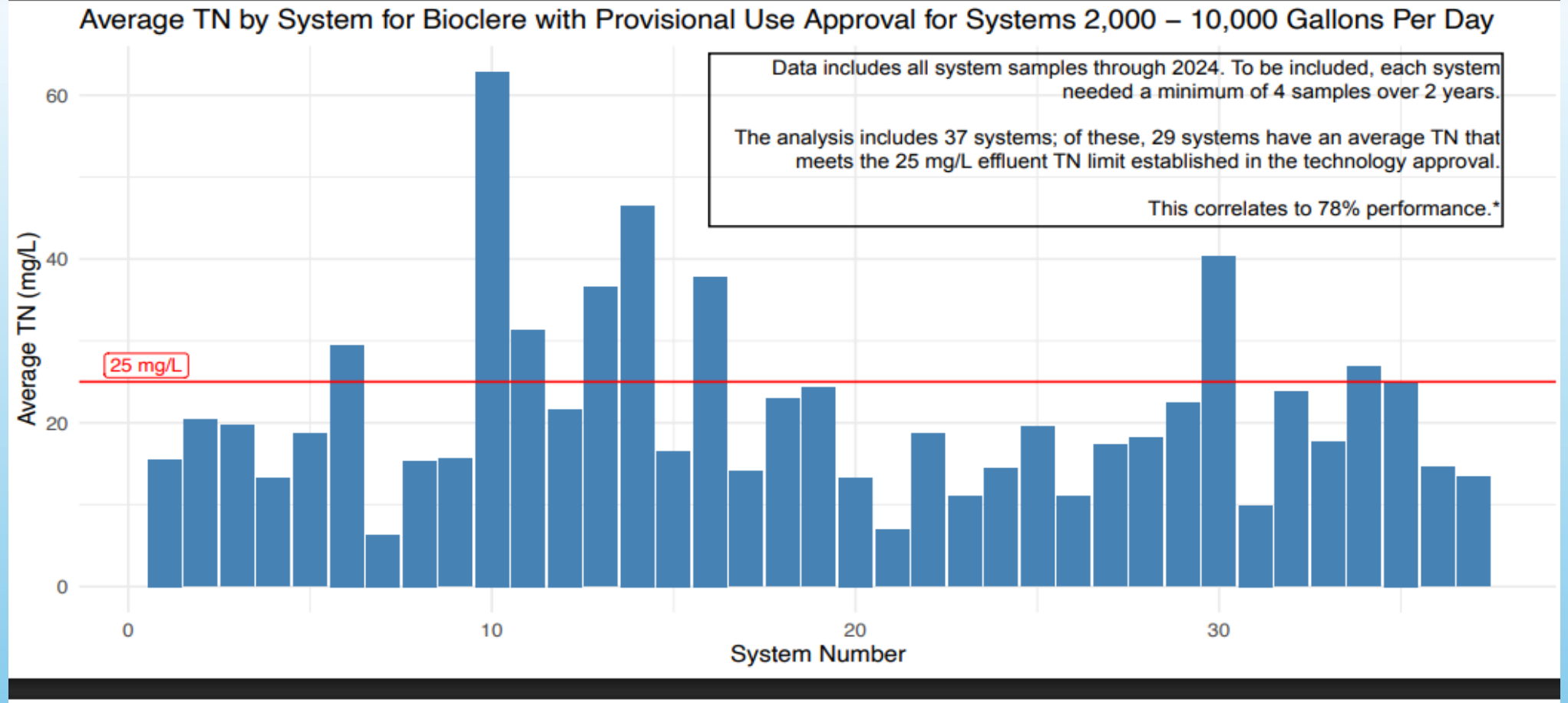
"The Bioclere™ is straightforward to operate and very effective at meeting its effluent limits on an ongoing basis."

Terry Parker, Operator - Piperton, TN

Learn More About Bioclere™

Standard Single Bioclere™ Installation:



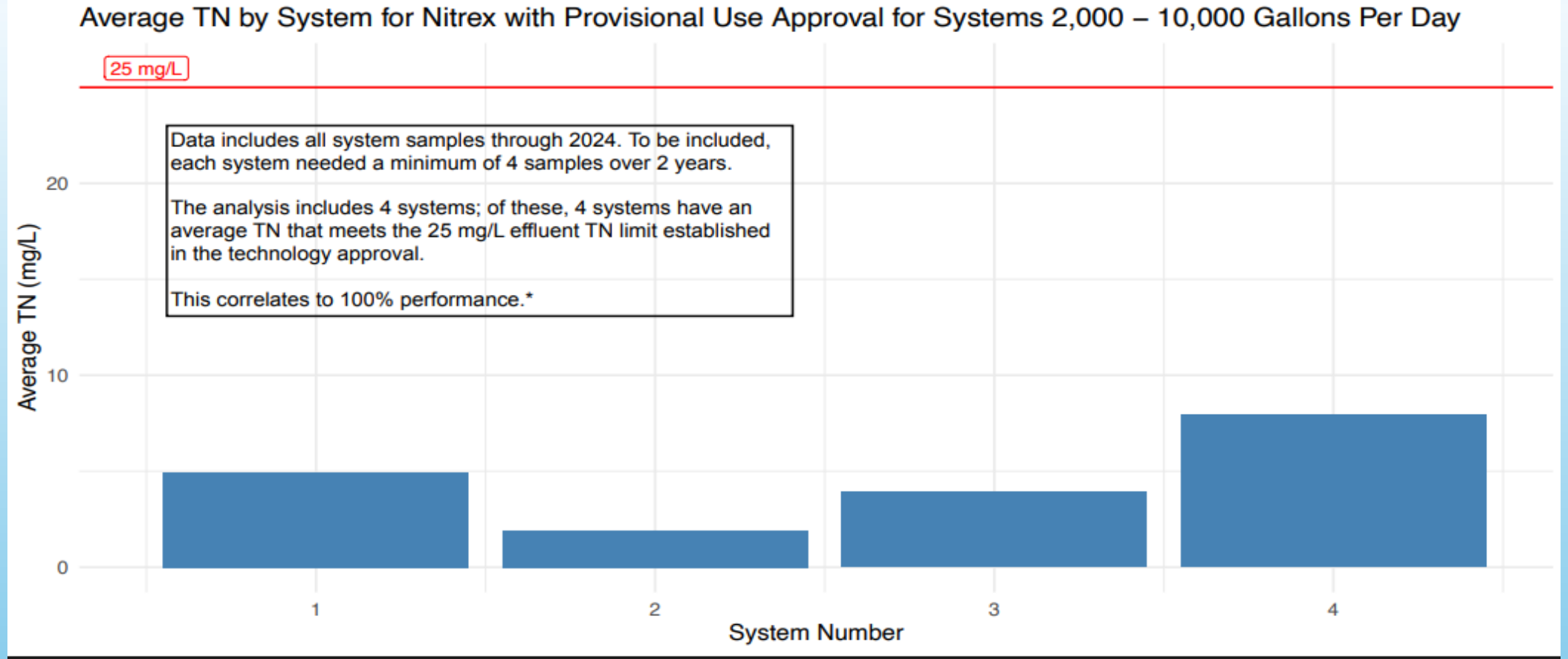


***Notes**

MassDEP reviews performance data for nitrogen reducing technologies approved for use in Massachusetts on a yearly basis to maintain the Best Available Nitrogen Reducing Technology (BANRT) list in accordance with 310 CMR 15.215(2)(g).

In 2024, the BANRT analysis for the Bioclere system with Provisional Use approval included 32 systems with 25 systems that had an average TN meeting the 25 mg/L effluent TN standard established in the technology approval. This correlated to 78% performance.

In 2025, the BANRT analysis for the Bioclere system with Provisional Use approval includes 37 systems with 29 systems that have an average TN meeting the 25 mg/L effluent TN standard established in the technology approval. This correlates to 78% performance.

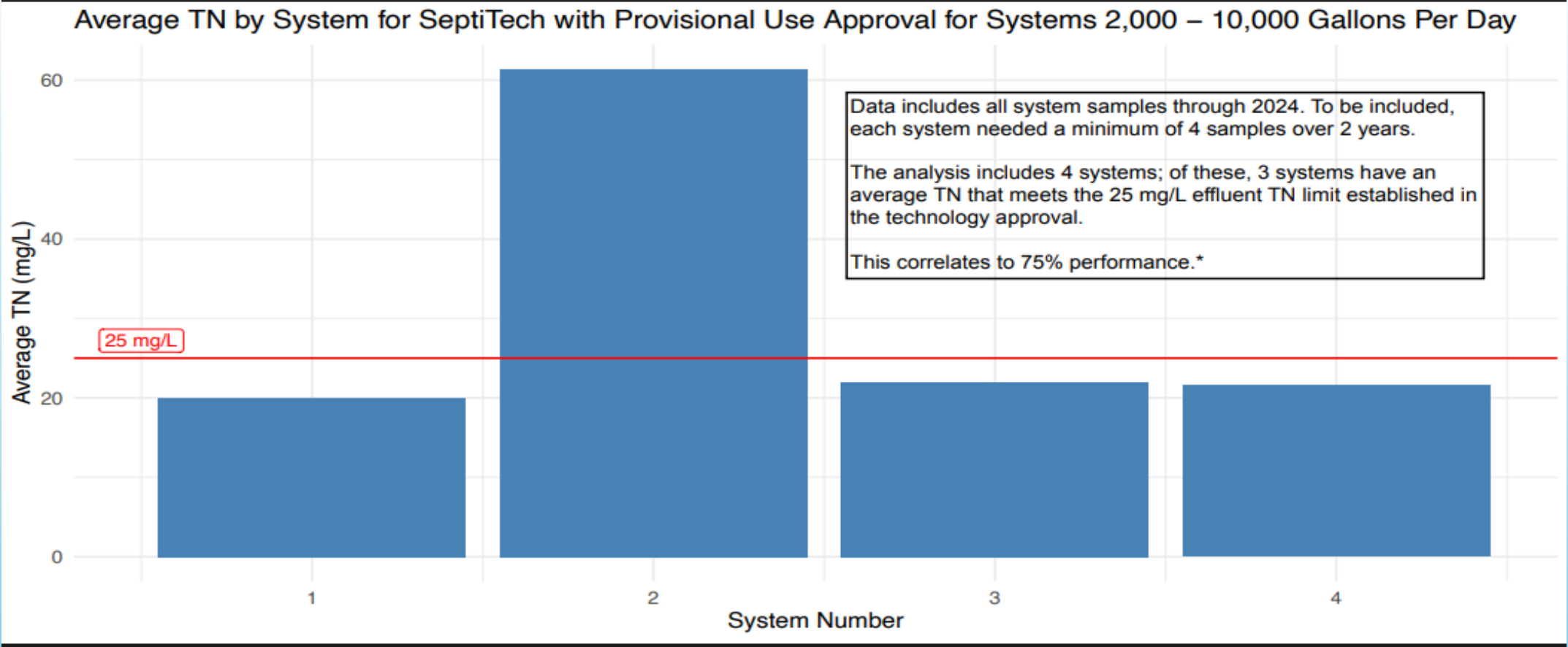


***Notes**

MassDEP reviews performance data for nitrogen reducing technologies approved for use in Massachusetts on a yearly basis to maintain the Best Available Nitrogen Reducing Technology (BANRT) list in accordance with 310 CMR 15.215(2)(g).

In 2024, the BANRT analysis for the Nitrex Filter with Provisional Use approval for systems with flows from 2,000 - 10,000 gallons per day included 4 systems with 4 systems that had an average TN meeting the 25 mg/L effluent TN standard established in the technology approval. This correlated to 100% performance.

In 2025, the BANRT analysis for the Nitrex Filter with Provisional Use approval for systems with flows from 2,000 - 10,000 gallons per day includes 4 systems with 4 systems that have an average TN meeting the 25 mg/L effluent TN standard established in the technology approval. This correlates to 100% performance.



***Notes**

MassDEP reviews performance data for nitrogen reducing technologies approved for use in Massachusetts on a yearly basis to maintain the Best Available Nitrogen Reducing Technology (BANRT) list in accordance with 310 CMR 15.215(2)(g).

In 2024, the BANRT analysis for the SeptiTech system with Provisional Use approval for systems with flows from 2,000 - 10,000 gallons per day included 4 systems with 3 systems that had an average TN meeting the 25 mg/L effluent TN standard established in the technology approval. This correlated to 75% performance.

In 2025, the BANRT analysis for the SeptiTech system with Provisional Use approval for systems with flows from 2,000 - 10,000 gallons per day includes 4 systems with 3 systems that have an average TN meeting the 25 mg/L effluent TN standard established in the technology approval. This correlates to 75% performance.

General Use - Secondary Treatment Units			
Company	**Technology**	**Design Flow**	**Technology Description**
Orenco Systems, Inc. 814 Airway Avenue Sutherlin, OR 97479	Advantex Treatment System by Orenco Systems, Inc. Approval Other Documents: 1 | 2 | 3	Systems <10,000 GPD	Secondary Treatment BOD5 = 30mg/L TSS=30 mg/L
F.R. Mahony & Associates, Inc. 273 Weymouth Street Rockland, MA 02370	Amphidrome Treatment System by F.R. Mahony & Associates, Inc. Approval Other Documents: 1	Systems 2,000 GPD to 10,000 GPD	Secondary Treatment BOD5 = 30mg/L TSS=30 mg/L
Aquapoint.3 LLC 39 Tarkiln Place New Bedford, MA 02745	Bioclere Units by Aquapoint.3 LLC Approval Other Documents: 1	Systems <10,000 GPD	Secondary Treatment Unit: for BOD5 and TSS Removal. Trickling Filter
Waterloo Biofilter System, Inc. 143 Dennis Street Rockwood, NT, N0B 2K0	Biofilter by Waterloo Biofilter Systems, Inc. Approval Other Documents: 1	Systems 2,000 GPD to <10,000 GPD	Secondary Treatment BOD5 = 30mg/L TSS=30 mg/L

Onsite Wastewater Treatment

Over 30 years of experience designing and manufacturing advanced septic systems

START A PROJECT »

FIND AN INSTALLER »

Basket Biofilters

Baskets are constructed of a rigid steel mesh that is coated for corrosion protection. Baskets are filled with the patented Waterloo Biofilter filter medium, shipped to site, and placed in a concrete or fiberglass tank.

Questions?

YOWA/MASSTC I/A Field Training

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(339) 222-6025