

Lakes Fairlee and Morey Wastewater Workshop: Onsite Systems for Homeowners

Cristin Ashmankas

Drinking Water and Groundwater Protection Division

Department of Environmental Conservation

Agency of Natural Resources

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Regional Office Program




<http://dec.vermont.gov/water/ww-systems>

<http://dec.vermont.gov/water/contacts>

Regional Office Program

- Soil-based wastewater systems and water supplies
- Wastewater flows of less than 6,500 gallons per day
- Potable water supplies (water supplies that are not public water supplies)
- Municipal water and sewer connections
- Subdivision of lands
- Testing and education services for the Licensed Designer Program and the Public
- Review and approval of Innovative and Alternative wastewater products

**VERMONT**

State of Vermont
Department of Environmental Conservation

Agency of Natural Resources
Drinking Water and Groundwater Protection Division

WASTEWATER SYSTEM AND POTABLE WATER SUPPLY PERMIT

LAWS/REGULATIONS INVOLVED
10 V.S.A. Chapter 64, Potable Water Supply and Wastewater System Permit
Wastewater System and Potable Water Supply Rules, Effective April 12, 2019

Permittee(s): **Donald Schroeder**
825 Poor Farm Road
Colchester, VT 05446

Permit Number: **WW-5-8527**

This permit affects the following property/properties in Belvidere, Vermont:

Lot	Parcel	SPAN	Acres	Book(s)/Page(s)#
Lot 3	109-075.300	048-014-10317	53.50	Book:16 Page(s):224

This application, consisting of improving Lot 3 with a 2-bedroom single-family residence and a detached 2-bedroom accessory apartment that are to be served by individual wastewater systems and a shared potable water supply from a drilled well, located at Bog Road in Belvidere, Vermont, is hereby approved under the requirements of the regulations named above subject to the following conditions. Any person aggrieved by this permit may appeal to the Environmental Court within 30 days of the date of issuance of this permit in accordance with 10 V.S.A. Chapter 220 and the Vermont Rules of Environmental Court Proceedings.

1. GENERAL

1.1 The permittee is responsible to record this permit in the Belvidere Land Records within 30 days of issuance of this permit and prior to the conveyance of any lot subject to the jurisdiction of this permit.

1.2 The permittee is responsible to record the design and installation certifications and other documents that are required to be filed under these Rules or under a permit condition in the Belvidere Land Records.

1.3 Each assign or successor in interest shall be shown a copy of the Wastewater System and Potable Water Supply Permit and the stamped plan(s) prior to the conveyance of a lot.

1.4 By acceptance of this permit, the permittee agrees to allow representatives of the State of Vermont access to the property covered by the permit, at reasonable times, for the purpose of ascertaining compliance with the Vermont environmental and health statutes and regulations, and permit conditions.


1.5 This permit does not relieve the landowner from obtaining all other approvals and permits from other State Agencies or Departments, or local officials prior to construction.

2. CONSTRUCTION

2.1 Construction shall be completed as shown on the plans and/or documents prepared by Graham Tidman, with the stamped plans listed as follows:

Title	Sheet #	Plan Date	Revision
Wastewater Disposal And Water Supply Plan	1	03/19/2021	None.
Wastewater Disposal Details and Specifications	2	03/19/2021	None.

2.2 Construction of wastewater systems or potable water supplies, or buildings or structures (as defined by the Wastewater System and Potable Water Supply Rules), or campgrounds, not depicted on the stamped plans, or identified in this permit, is not allowed without prior approval by the Drinking Water and Groundwater Protection Division.




Regional Offices – Montpelier/Essex Jct./Rutland/Springfield/St. Johnsbury

Regional Office Program

- Soil-based wastewater systems and water supplies
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This applies to almost every property in the State of Vermont and every Vermonter! This translates to issuing 2500+ permits each year.

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Regional Offices – Montpelier/Essex Jct./Rutland/Springfield/St. Johnsbury

WW Workshop

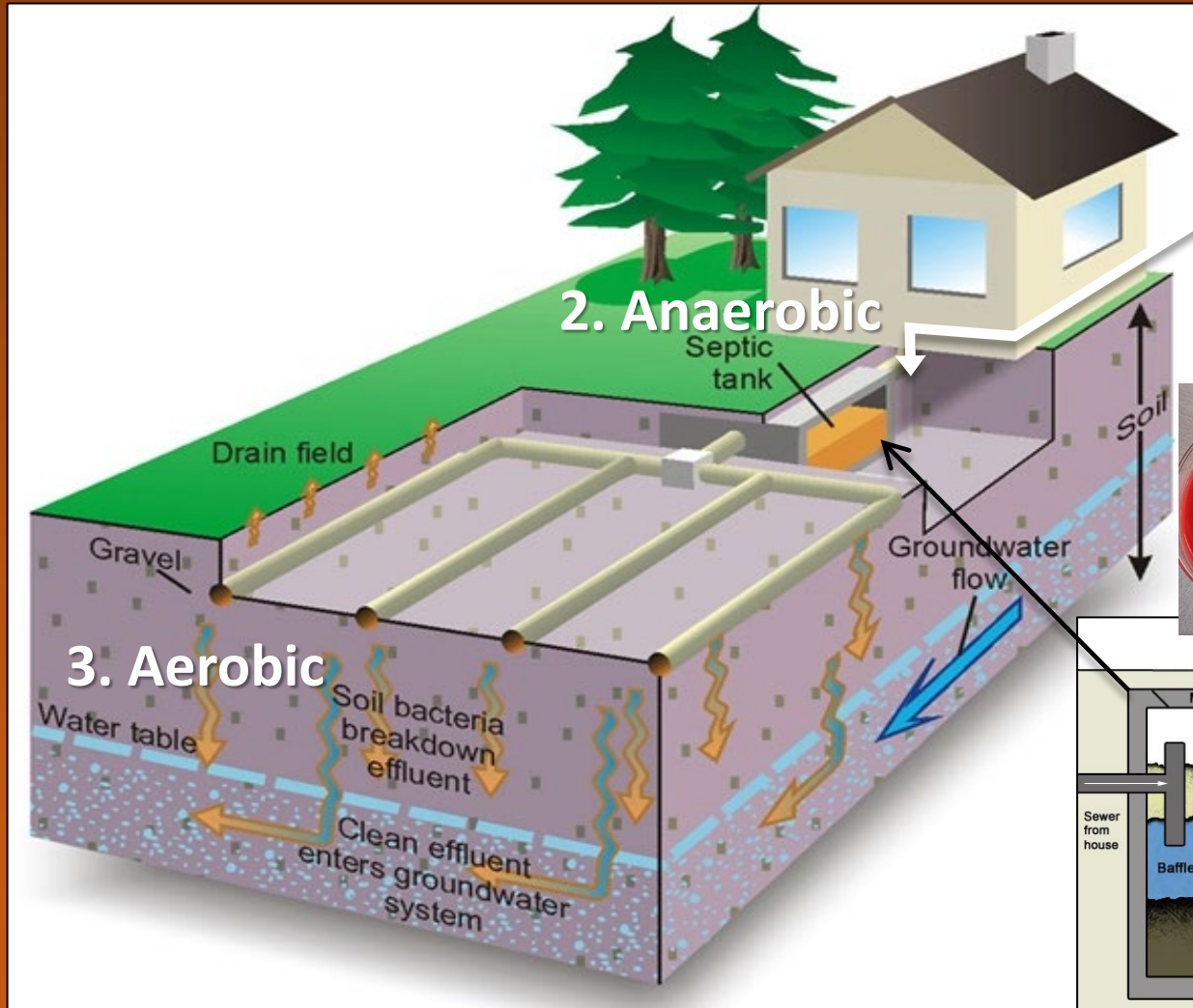
Introductions

1. Onsite Wastewater Systems 101
2. Wastewater System & Water Supply Rules
3. Preventative Maintenance

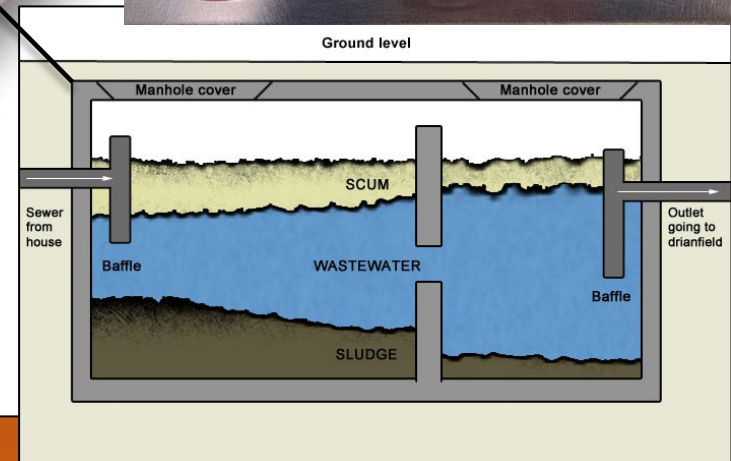
Questions and discussion



Part 1 - Wastewater 101: How do Soil-Based Wastewater Treatment Systems Work?



1. Digestion



Part 1 - Wastewater 101: How do Soil-Based Wastewater Treatment Systems Work?

Anerobic = No Oxygen

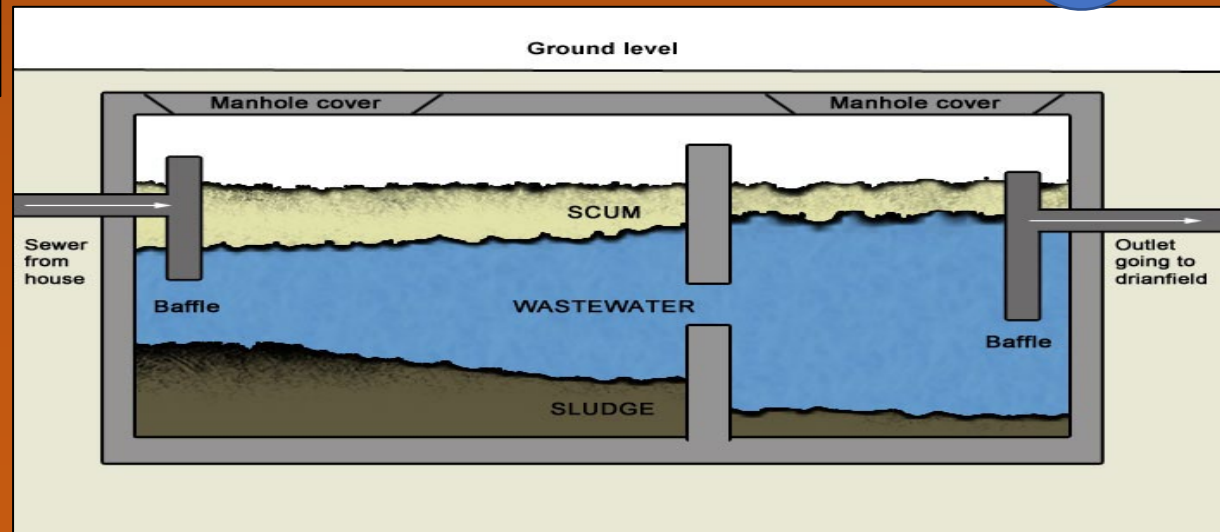
1. Digestion



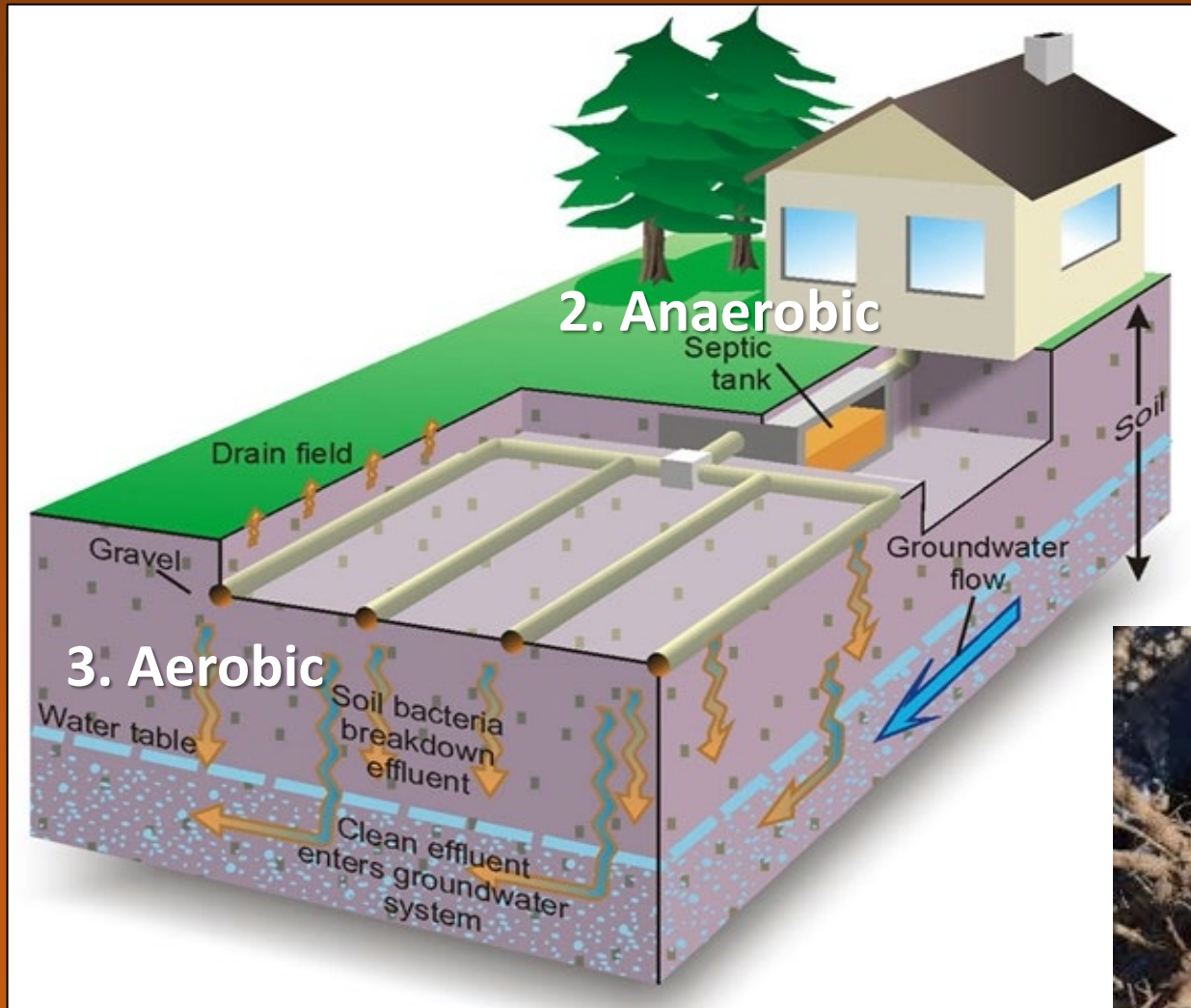
Anerobic bacteria break down biosolids into basic components and biogas. Biogas is CO₂ and Methane.



Biogas =
“stink”



Part 1 - Wastewater 101: How do Soil-Based Wastewater Treatment Systems Work?



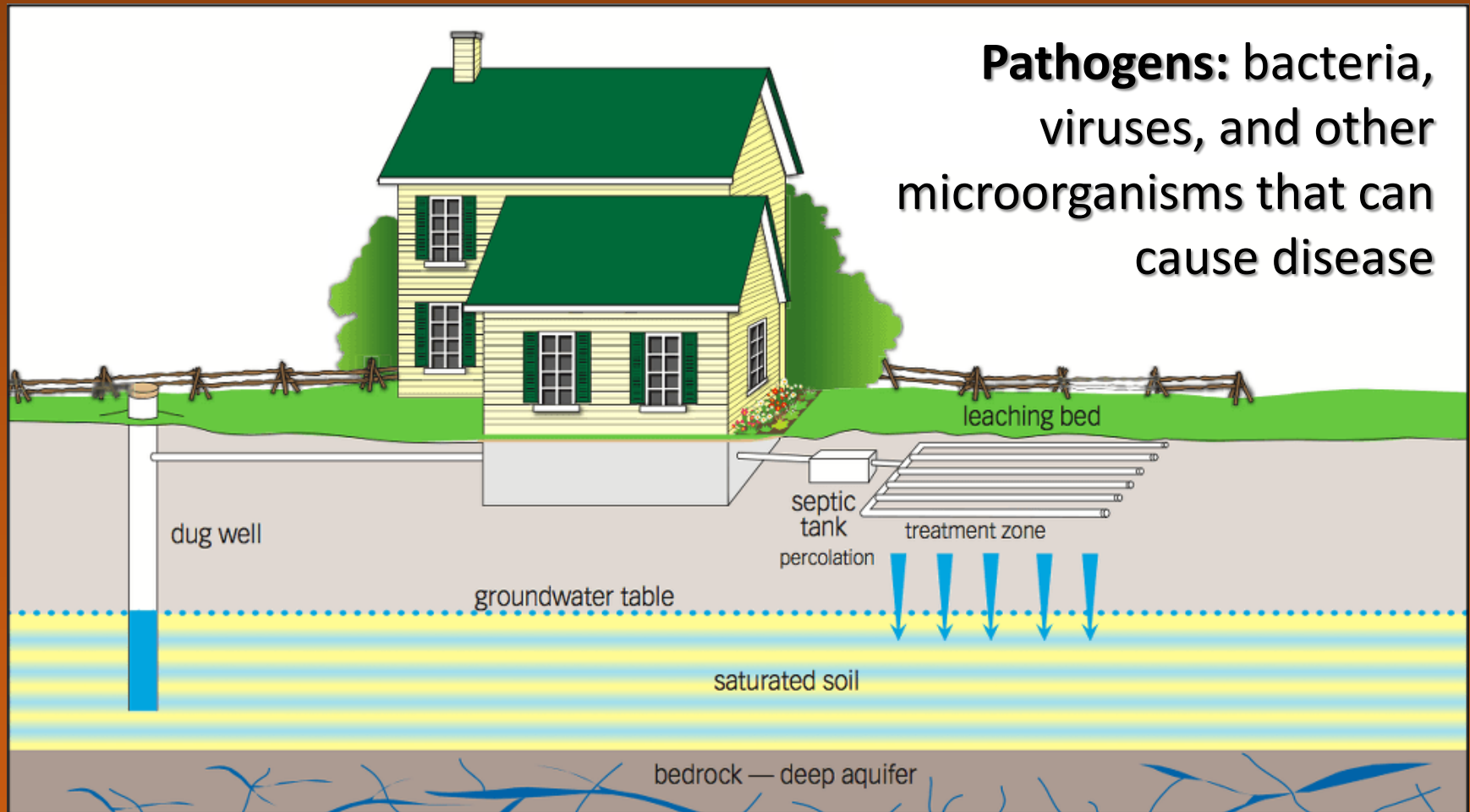
Aerobic = Oxygen

Aerobic bacteria present in soil break down Carbon and other nutrients, recycling the nutrients for plant use and leaving behind clean water.



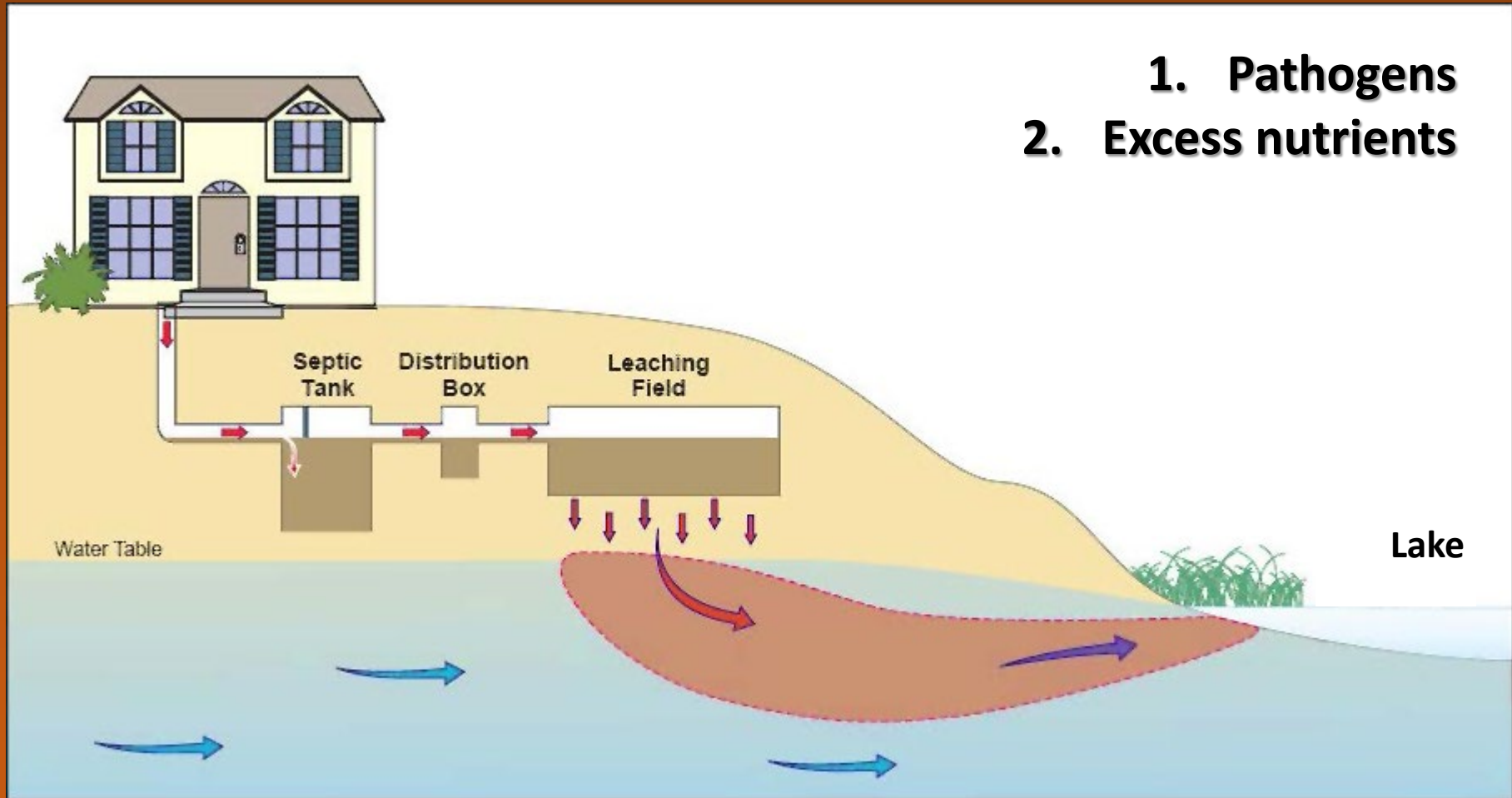
Why care about wastewater treatment?

Human Health



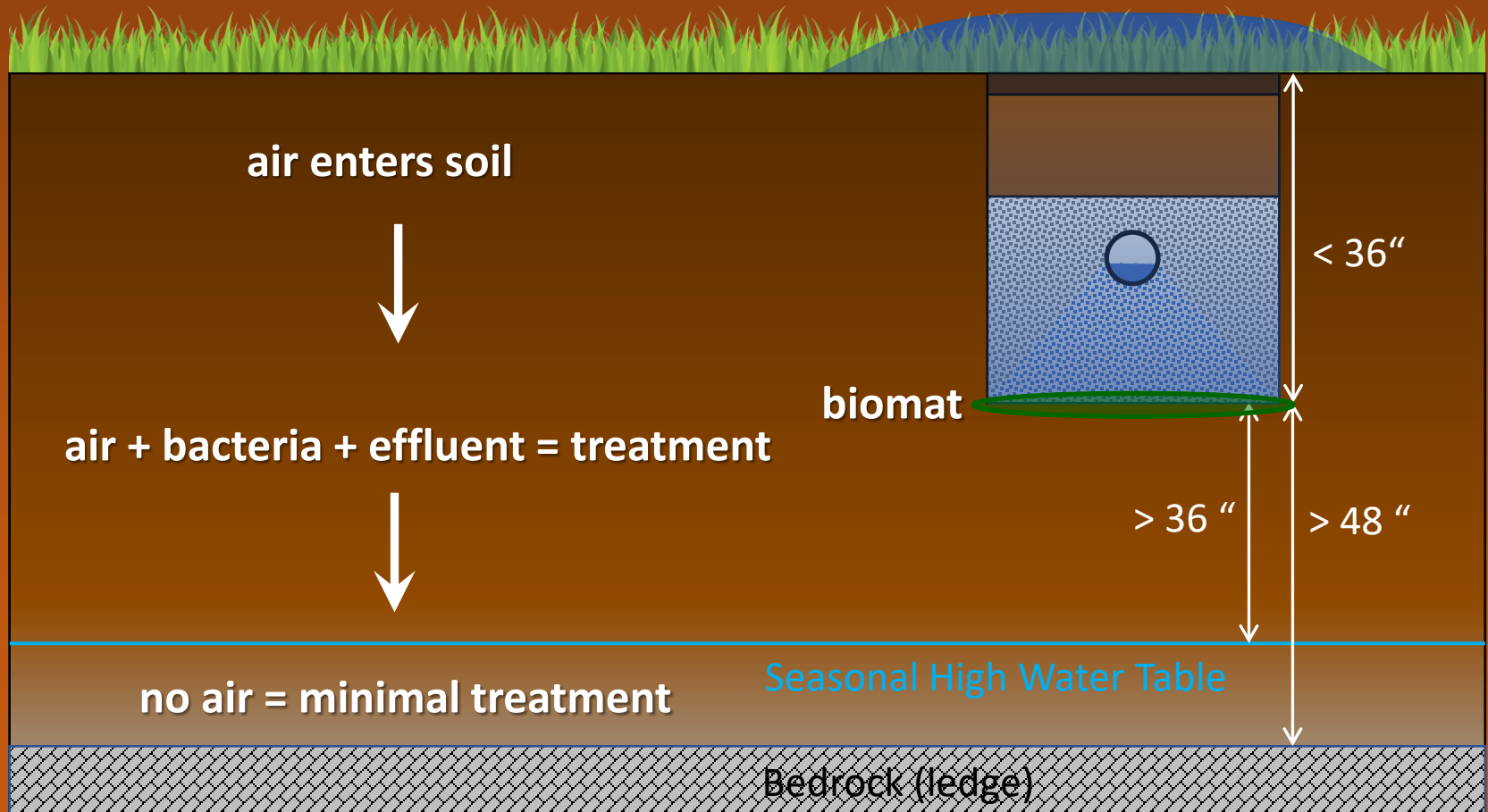
Why care about wastewater treatment?

Environment



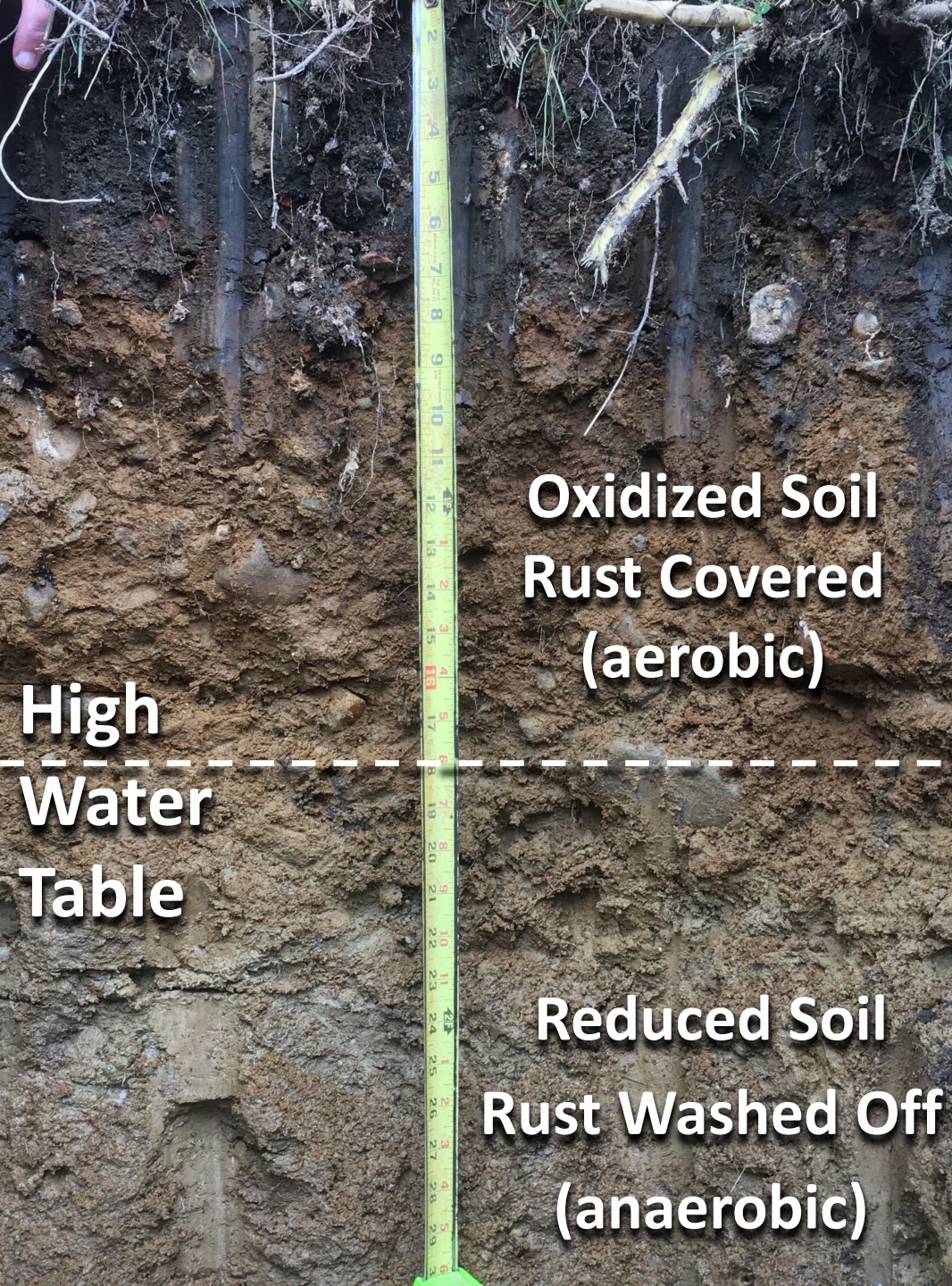
Soil-Based Treatment Systems

How they work, and how they fail.



Designing Wastewater Systems



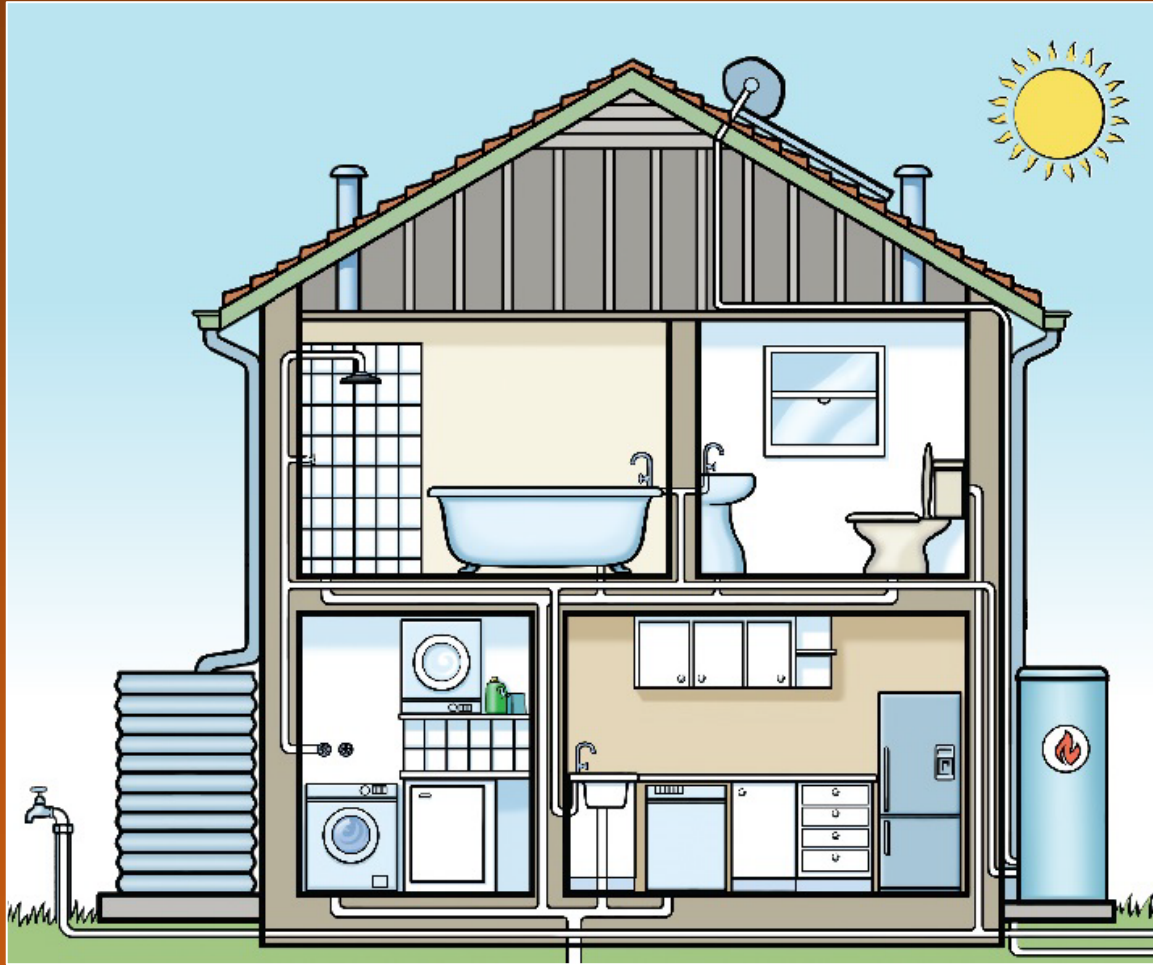


Where do the wastewater treating microbes live?

***Look for the rust covered (red-brown) soil! (Is there Fe everywhere?)**

***Grey soil indicates the rust has been dissolved & washed off below the seasonal high water table (SHWT).**

How much wastewater per house?



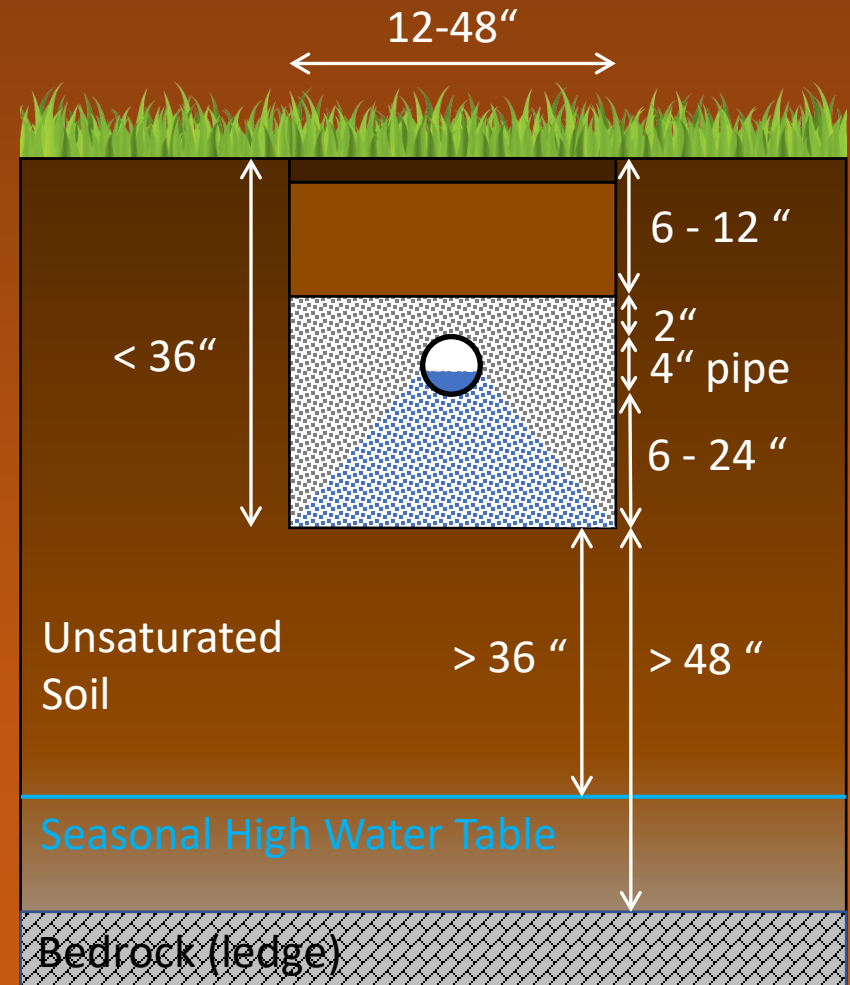
Design Flow

- 70 gallons per person per day
- Based on number of bedrooms (min. 2-bedrooms)
- 2 people in first three bedrooms
- 1 person in further bedrooms

Five Bedroom House: $(3\text{br}(2\text{ppl} \times 70\text{gpd}) + (2\text{br}(1\text{psn} \times 70\text{gpd})) = 560\text{ gpd}$

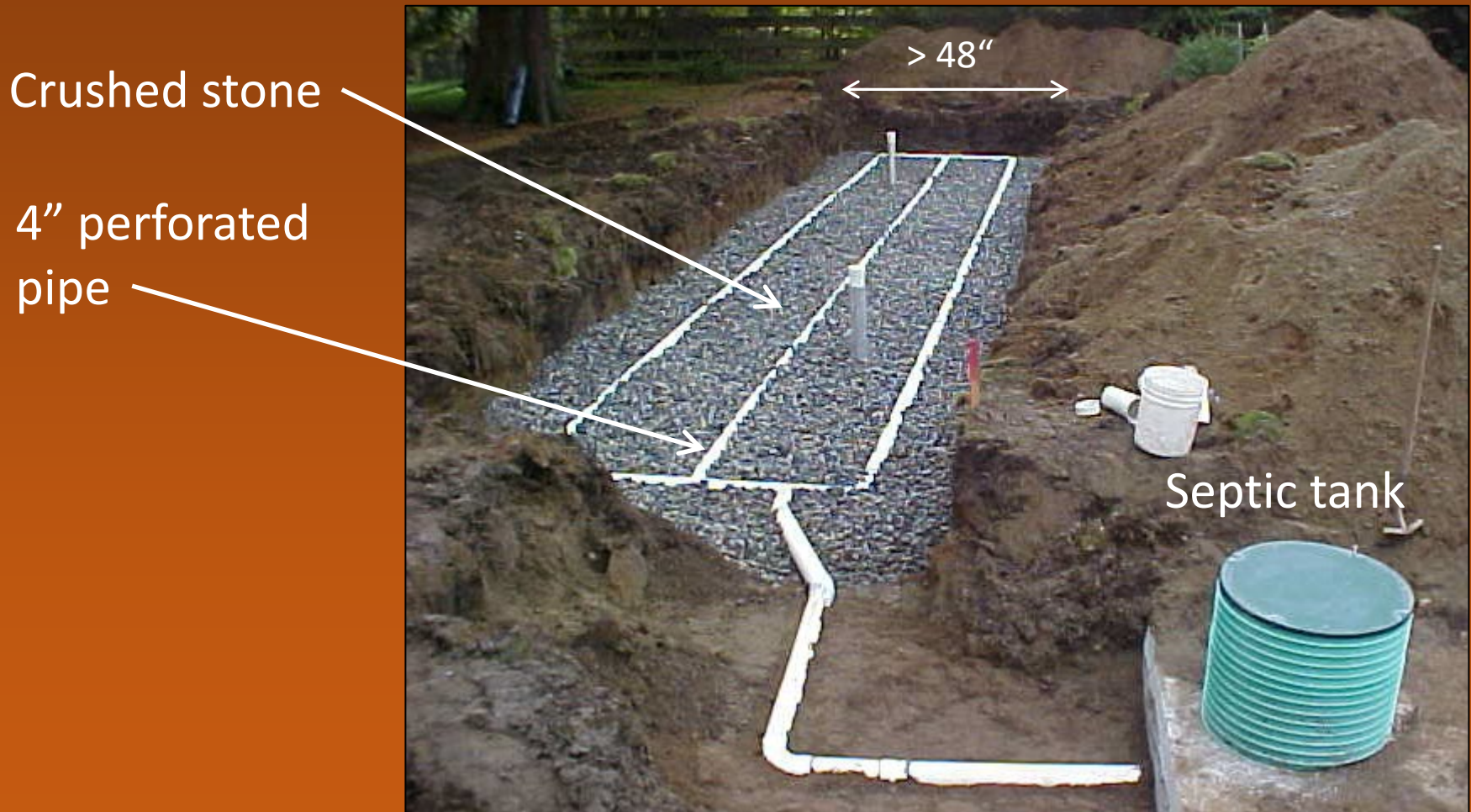
Soil-Based Treatment System Layouts

1. Trenches – narrow, single pipe



Soil-Based Treatment System Layouts

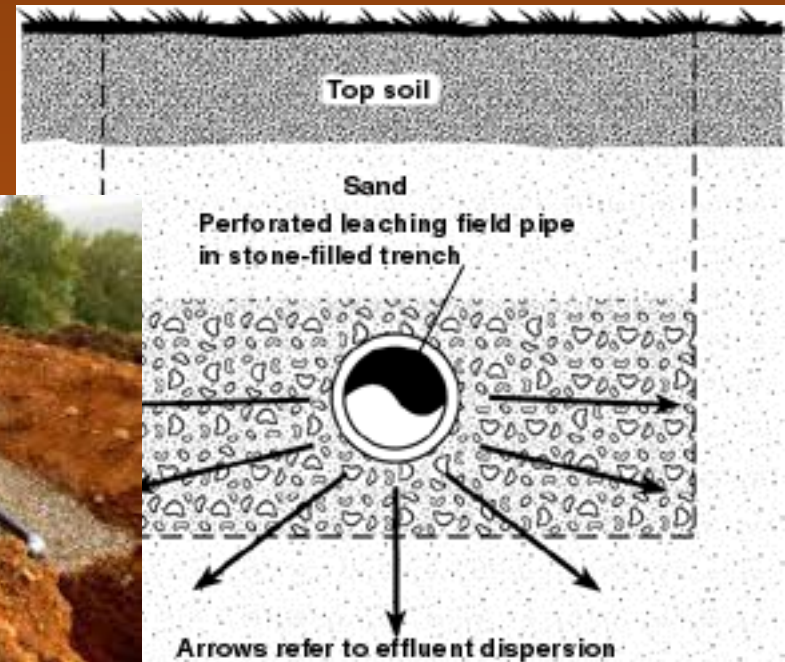
2. Beds – wide, multiple pipes



Soil-Based Treatment System Profiles

1. Inground System

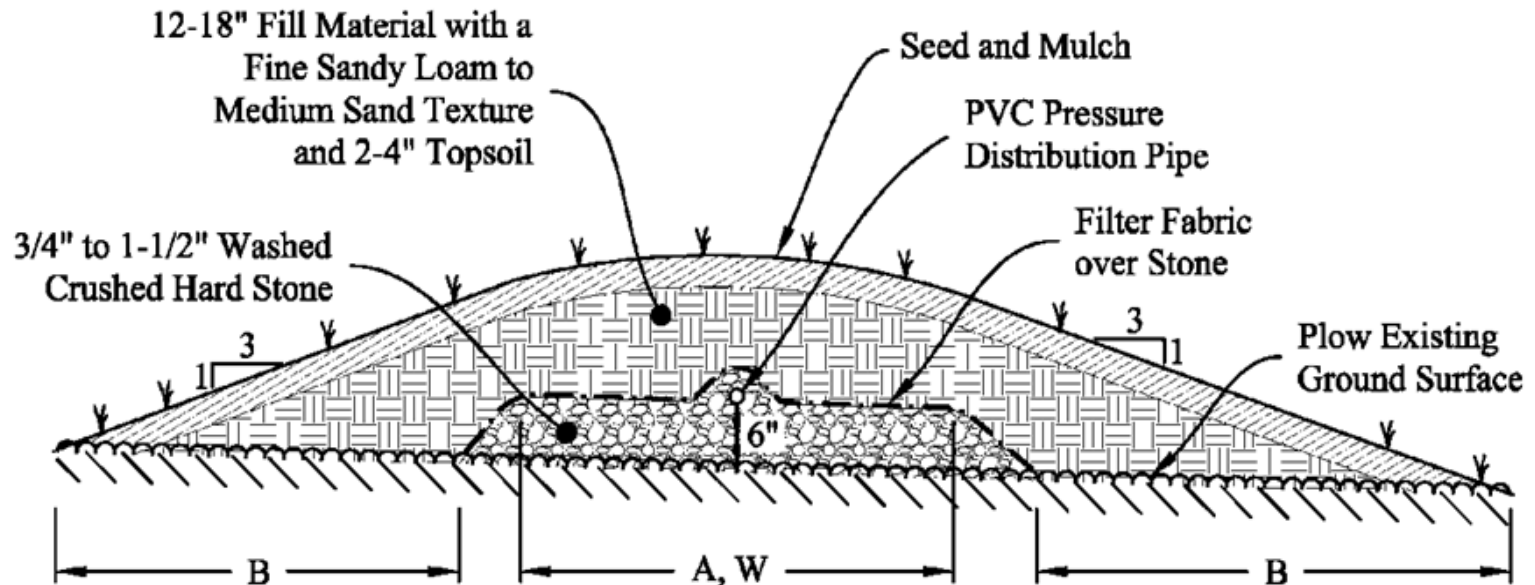
–ideal for low
SHWT and deep
ledge



Soil-Based Treatment System Profiles

2. At-Grade System

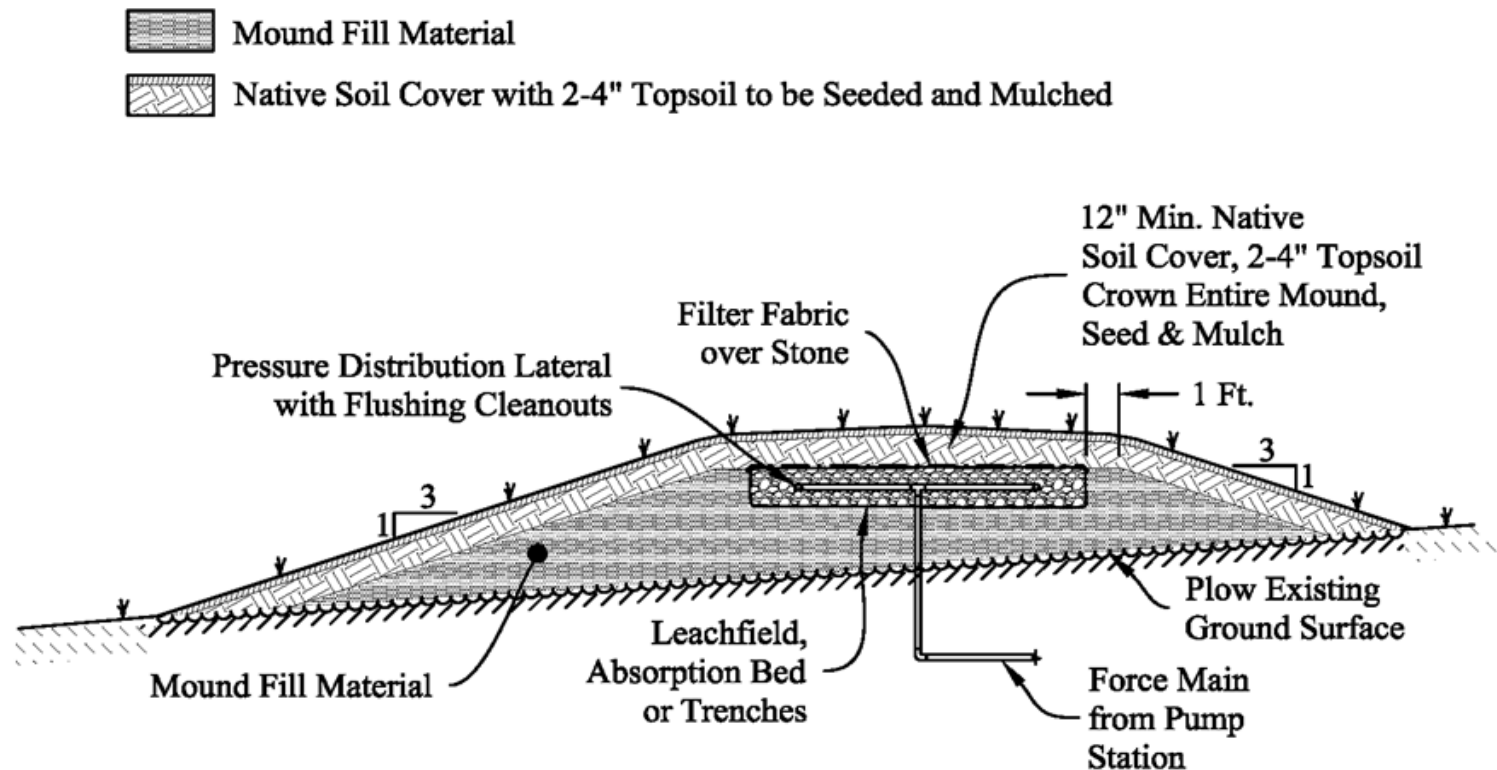
- Ideal for moderate SHWT and/or moderately shallow ledge



Soil-Based Treatment System Profiles

3. Mound System

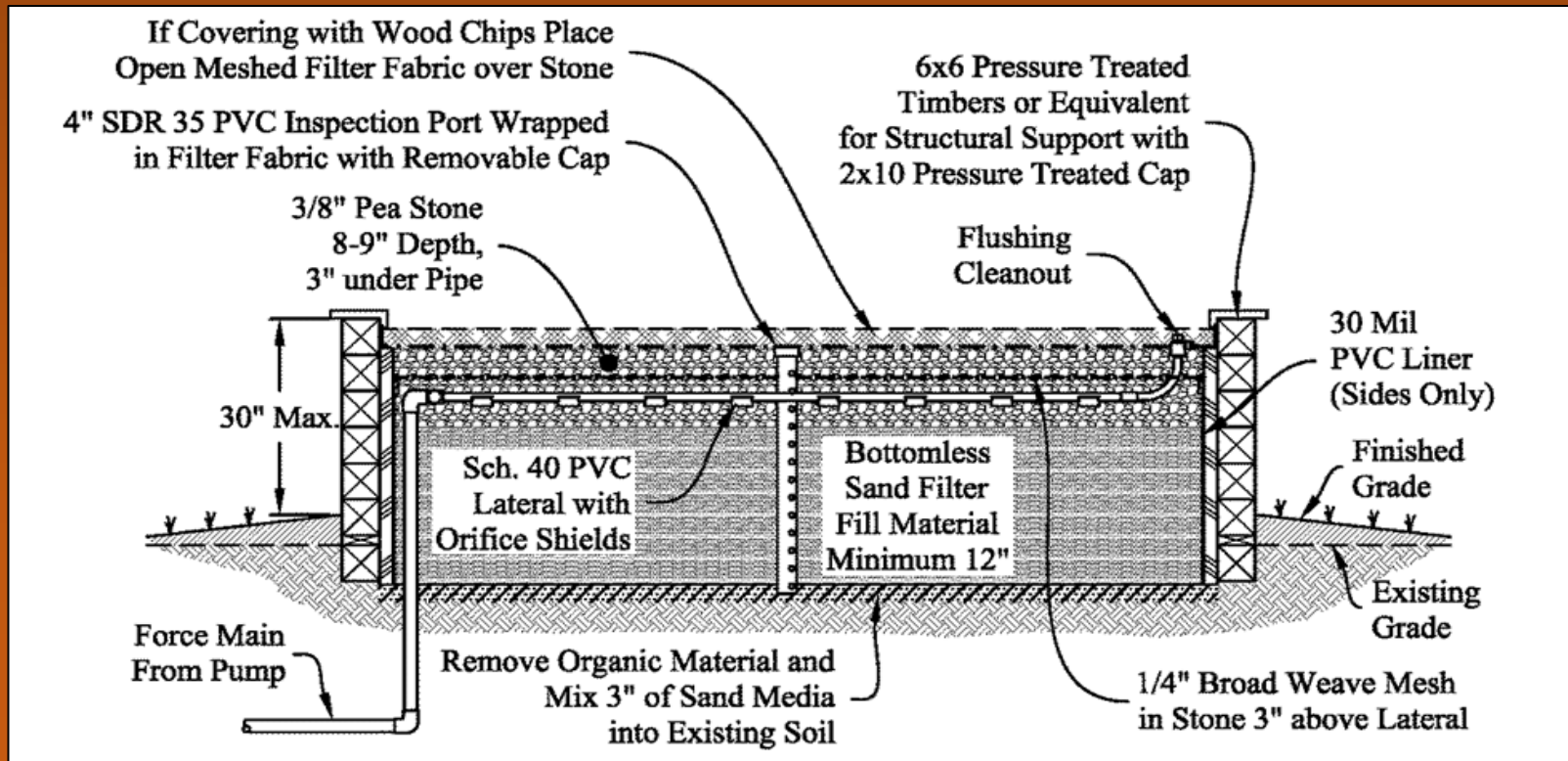
–ideal for high
SHWT and/or
shallow ledge



Soil-Based Treatment System Profiles

4. Bottomless Sand Filter

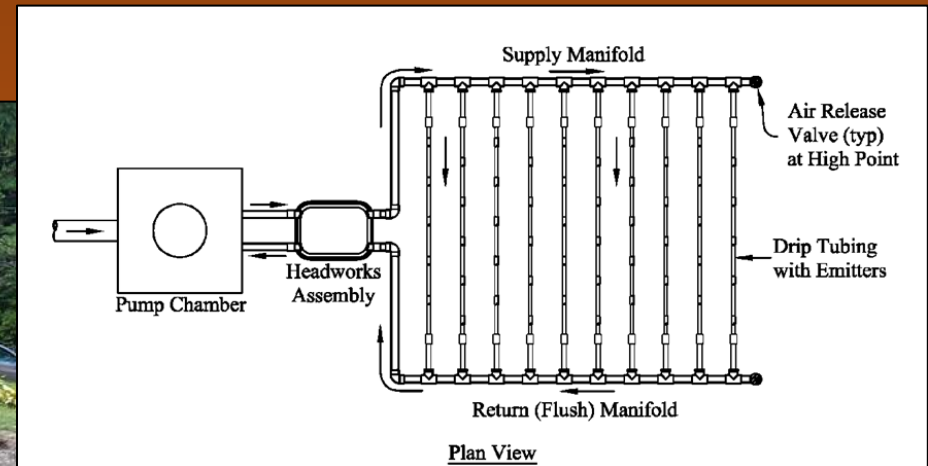
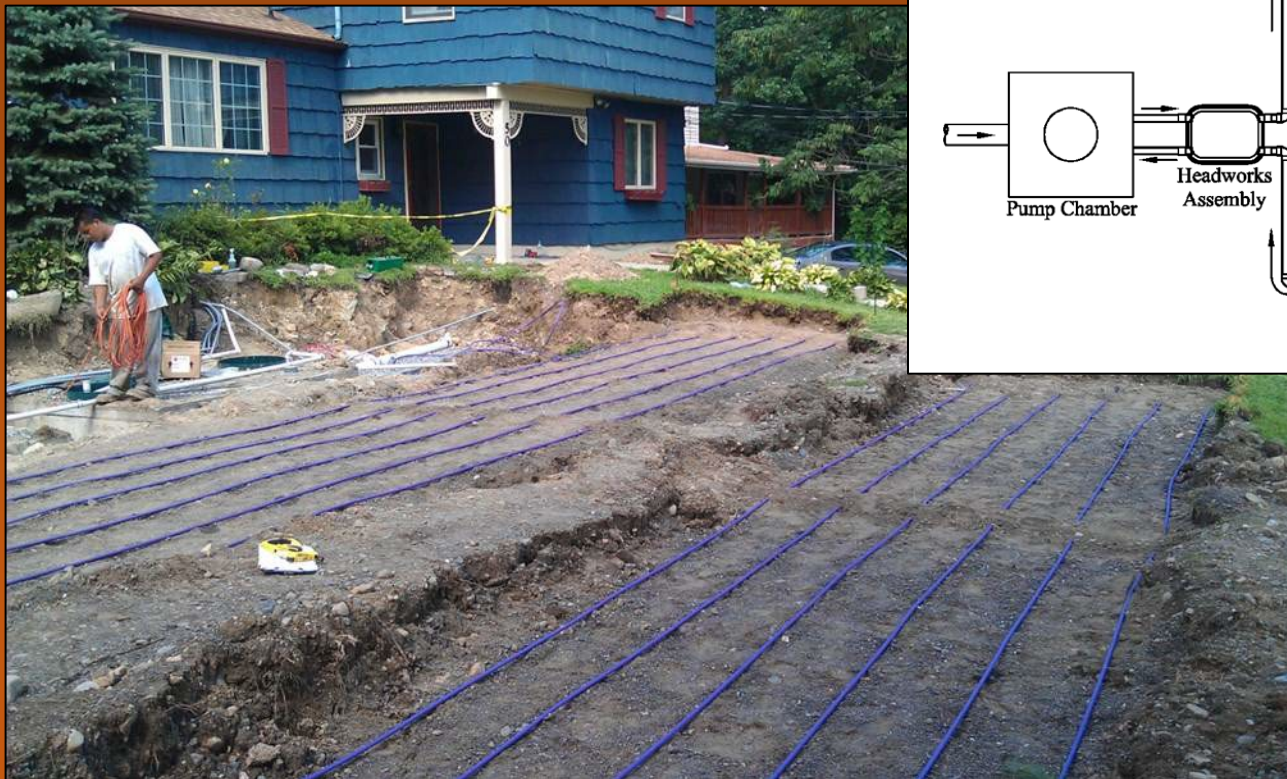
-ideal for high SHWT,
shallow ledge, and little
space



Soil-Based Treatment System Profiles

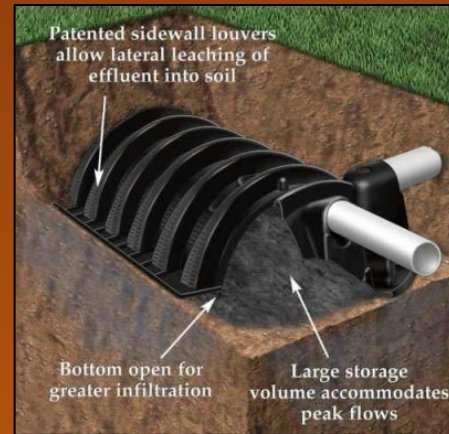
5. Drip System –near surface, small diameter

-ideal for sites where stone, space, ledge, and or flow is a challenge



Soil-Based Innovative and Alternative (I/A) Dispersal Systems

large diameter aeration/infiltration chambers replacing traditional stone and pipe, may require regular inspections by licensed professional



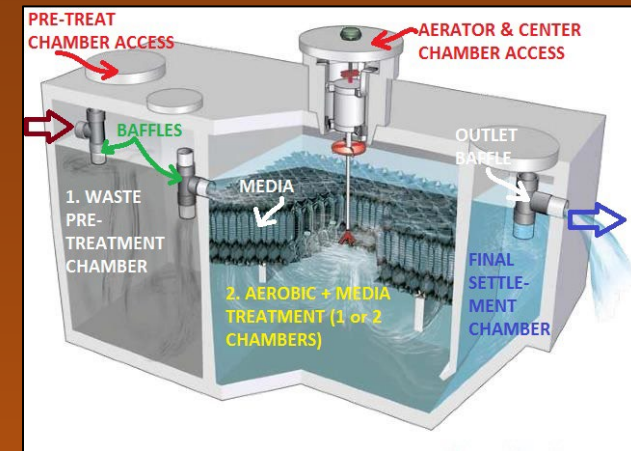
Innovative/Alternative Treatment Systems

1. Aerobic Treatment Units

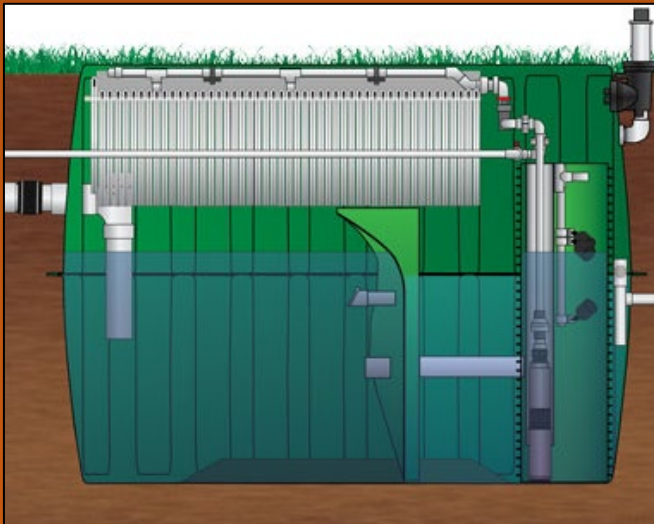


2. Media Filters

a) Bubbles up through synthetic media



b) Trickle down through synthetic media



c) Trickle down through organic media



Innovative/Alternative Dispersal and Treatment Systems

Where can I learn more about an Innovative and Alternative Technology and their Vermont requirements?

From VT DEC Drinking Water and Groundwater Protection I/A page!
OR the property's WW Permit

Part 2: The Wastewater System and Potable Water Supply Rules

1. Scope and Purpose
2. Municipal Delegation
3. Designer Licensing
4. Permits (site-specific) for Wastewater & Water Supply
5. Approval (technology-specific) for Innovative/Alternative Systems



Scope of the Rules

- Regulate **soil-based** disposal systems with design flow less than **6,500 gallons per day** and municipal connections to water & sewerage
- **Construction, modification, or replacement** of building, structure, campground, and associated **wastewater systems** and **potable water supplies**

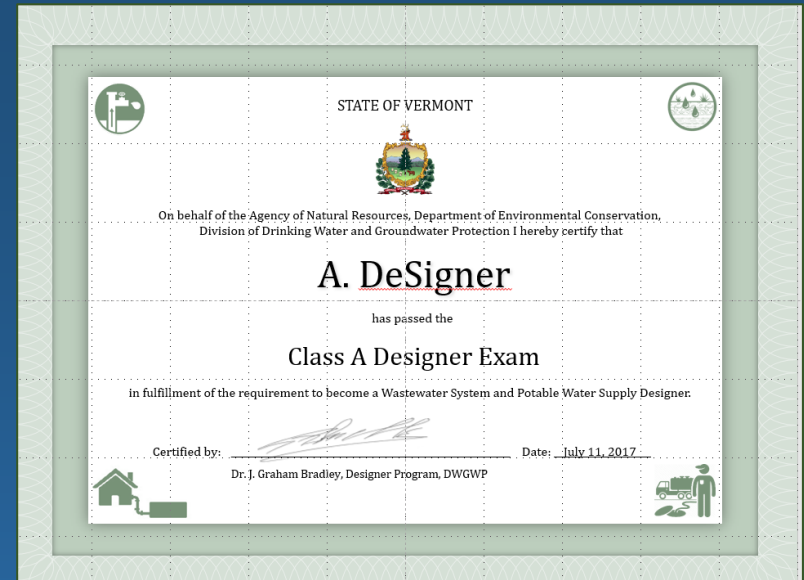
Purpose of the Rules

1. Protect **human health & the environment**
2. Regulate **design, construction, modification, operation, & maintenance** of wastewater systems
3. Increase **accountability** of **designers & installers**
4. Ensure **owners** know **responsibilities** & have **knowledge** of system's design, operation & maintenance
5. Establish **performance criteria**:
 - I. wastewater not exposed to air or backed-up in building
 - II. no direct discharge to surface waters (streams, lakes etc.)
 - III. does not contaminate potable water supply
6. Encourage **innovation & flexibility** of design



Designer Licensing

- **Class 1 (Professional Engineers)** – authorized to do all aspects of design, applications, certifications, and review for delegated municipalities.
- **Class A** – authorized to design inground and at-grade systems
- **Class B** – authorized to design inground, at-grade, mound, bottomless sand filters, with or without the inclusion of I/A Technology
- **Class BW**- same authorization as Class B, but may design a water supply system that serves more than one structure



Finding a Designer

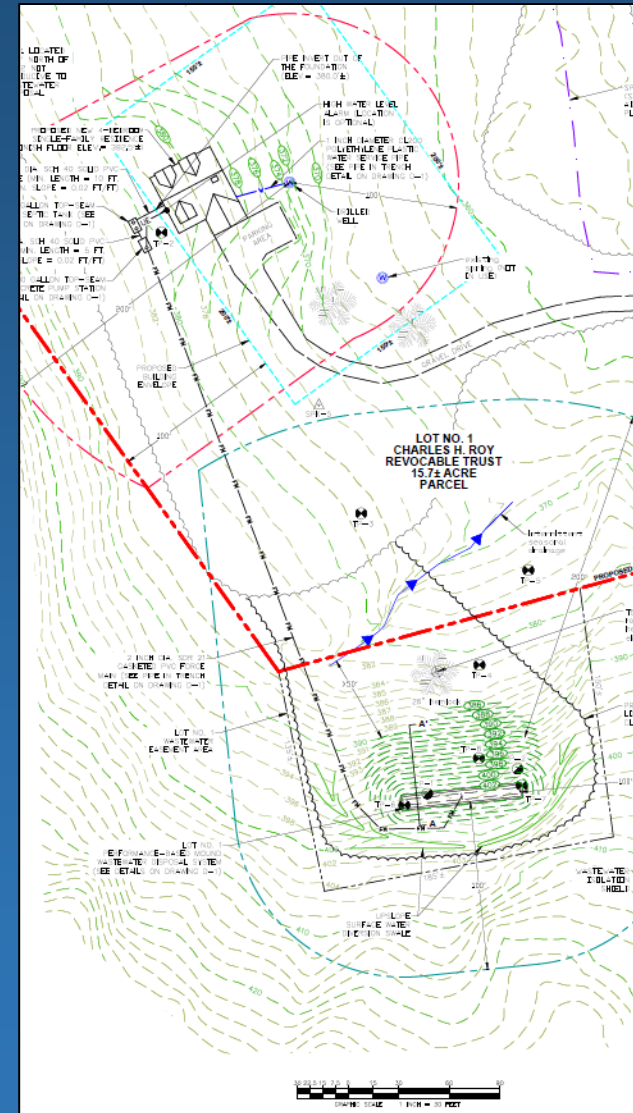
- **Office of Professional Regulation (OPR)** – Administer applications, renewals, complaints, and disciplinary action.
- Official lists can be found here:
<https://www.sec.state.vt.us/professional-regulation.aspx>
- **DWGPD (ANR)** – Set exams and provide or endorse continuing education and training. Cannot recommend designers.
- Unofficial lists with contact information can be found here:

<http://dec.vermont.gov/water/licensed-designers>



Permit Application Requirements

1. **Design Flow** — gallons per day
2. **Soil Descriptions** — Where is water table? What is soil absorption capacity? Where is ledge?
3. **Wastewater System Design** — Loading rates (gallons per square foot per day), system type, system size calculations, and component details
4. **Plans and Detailed Drawings** —
 - a) contours; b) water features; c) flood plain;
 - d) engineered features; e) existing/approved wells & wastewater systems; f) easements or rights of way; g) test pit & well locations; h) construction details; i) isolation distances & presumptive zones.



Permit Requirements for Landowners

1. Project shall be completed as shown in Permit Application plans
2. **Permit runs with land. Enforceable against Landowner & Successors**
3. Landowner shall record Permit in local town records with 30 days
4. No permit is valid for completed project **until Installation Certificate** is received by DWGWP from the Licensed Designer
5. Permit is only valid for conditions described in the Application
6. **Purchaser shall be shown the Permit & I/A Approval if applicable**
7. Landowner agrees to allow State representative to access property to ascertain compliance with Statutes, Rules, and Permit
8. Wastewater System shall be operated to prevent surface discharge and Water Supply shall be operated to prevent its contamination

I/A Approval Requirements for Landowners

1. Comply with Permit requirements
2. **Get installation inspection & certification by Licensed Designer**
3. **Have maintenance and inspections performed by authorized Service Provider**
4. **Service Providers submit inspection reports (initial, annual, biannual as required) to DWGPD**
5. Operate and maintain as per manual and report problems to the Service Provider to record problems & repairs in inspection report
6. Landowner will have 'cloud on title' if technology fails or landowner does not meet requirements of the I/A System Approval.

<http://dec.vermont.gov/water/programs/ww-systems/innovative-alternative>

Quiz! What are the challenges installing a wastewater system on a lakeshore lot?



Quiz! What are the challenges installing a wastewater system on a lakeshore lot?



1. Small lots, high density, short-term high-occupancy, trees and roots

2. Shallow water table, thin soil (may be low permeability)

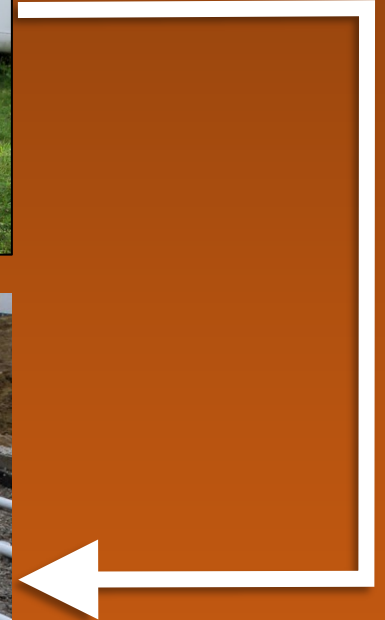
3. Close to lake – short groundwater travel time to 'receptor'

A potential solution on lakeshore lots

1. Media filter:
aerobic
pretreatment

plus

2. Bottomless
sand filter:
further aerobic
treatment and
dispersal



Part 3: Preventative Maintenance

Some of the questions we will address:

1. When has a wastewater system failed and what to do?
 - On-Site Loan Program
2. What to do with my Private Well?



When has a wastewater system failed?

A wastewater system is failed when:

1. Exposed on ground surface
2. Discharged to surface water
3. Backed up in building

* May qualify as a minor repair



Signs of a Failed Wastewater System

- Wastewater backing up into your toilets, tubs, or sinks.
- Slow-draining fixtures, especially following a weather event.
- The smell of sewage, particularly when accompanied by soggy ground or water discharging over the ground or in a nearby ditch, even if the discharge is not constant.
- A flashing light or beeping alarm in the house or yard indicating a pump is not working or the level in a tank is too high.



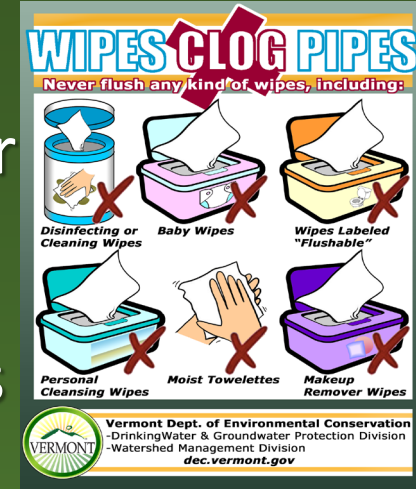
A wastewater system has not failed if...

- It can be remedied by minor repair or replacement of physical component (replace pipe)
- Effects lasted for a brief period, system has recovered, and cause of failure was an unusual and non-recurring event (Hurricane-caused flooding)



How to prevent a wastewater system from failing...

- Conserve water, particularly during a major weather event
- Repair or replace leaking plumbing fixtures
- Maintain proper landscaping around your system
- Pump your septic tank regularly
- Limit what goes into your System
- Do not drive or build on any part of your system
- Inspect your system routinely, including cleaning of effluent filter



What to do if a wastewater system has failed?

- **Contact a VT Licensed Designer** to act on property owner's behalf
- **Designer** will assess site and submit permit application
 - It is a Permit violation if replacement system not installed
 - Immediate temporary remediation is required
 - Timescale to replace depends on circumstances
- **In the meantime?**
 - **Fence off area and keep people and animals away**
 - **Don't redirect water anywhere else**
 - **Place hay bales around the area**
 - **Have your tank pumped**

On-Site Loan Program and ARPA

- **Terms:**

- \$3,000 min. No max. 15 to 20 yrs.
3% interest & \$550 fees. Secured by
lien on the property

- **Eligibility:**

- Replacement or repair required for
DWGWPD determined failed
wastewater system or potable
water supply
- One single family residence on own
lot. Year-round residence
- Household income less than 200%
State median
- Denied financing by at least one
financing entity

- **How to Apply:**

- Obtain a Permit
- Obtain two construction bids
- Complete pre-qualification & credit
union application form

- ARPA funding may be available for
single family homes used as primary
residences and when homeowners
meet income requirements. The
funding may allow for up to \$20,000
towards the replacement of failed or
inadequate water supplies or
wastewater systems. New funding
applications are currently looking at
opening up in September.

<http://dec.vermont.gov/facilities-engineering/water-financing/on-site-loan>

Routine Maintenance

How to Inspect a Soil-Based Wastewater System?

Do determine how quickly sludge and scum accumulate in the tank with semi-regular inspections. The tank should be full of wastewater.

Do have the sludge and scum pumped out of the septic tank when needed.

Don't turn off pumps or other electrical components, they are important and necessary components of the system and should be tested to determine if functioning correctly.

Do hire a licensed designer or engineer to inspect the system. They will research the size and location of the system components, expected flows, and the vitality of the leach field by inspecting it for a proper aerobic environment.

Don't purposefully stress a system to see if it is failed.

Do clean the effluent filter annually.

Don't dye test the system, the water flows from a dye test can overstress a system that was functioning and potentially cause it to fail.

Do install risers over the tank to provide easier access for the measuring and pumping of solids and the cleaning of the effluent filter.



Potable Water Supply – Private Wells

- Permit not required to replace a water supply for a single-family residence
 - Includes installing well to disconnect from municipal or shared supply
 - Exemption forms must be placed in land records to qualify
- Landowners to provide prospective purchasers with educational material on benefits of water testing



http://www.healthvermont.gov/sites/default/files/documents/pdf/ENV_DW_testing_wells_factsheet.pdf

- Water from private wells shall be tested prior to new use. If out of compliance, test prior to conveyance. We highly recommend testing annual to ensure water quality.

Home

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What Is a Septic System?

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What's New

Environmental Assistance

PROGRAM EDUCATION, OUTREACH AND RESOURCES

This is a simplified overview of how a septic system works.

Water runs out of your house from one main drainage pipe into a septic tank.

The septic tank is a buried, water-tight container usually made of concrete, fiberglass or polyethylene. Its job is to hold the wastewater long enough to allow solids to settle down to the bottom (forming sludge), while the oil and grease floats to the top (as scum). Compartments and a T-shaped outlet prevent the sludge and scum from leaving the tank and traveling into the drainfield area.



The liquid wastewater then exits the tank into the drainfield. If the drainfield is overloaded with too much liquid, it will flood, causing sewage to flow to the ground surface or create backups in toilets and sinks.

Finally, the wastewater percolates into the soil, naturally removing harmful bacteria, viruses and nutrients.

The Regional Office Program issues [water/wastewater permits](#) (WW Permits) for soil based wastewater systems with flows of less than 6500 gallons per day, for potable water supplies (water supplies that are not public water supplies), and for municipal water and sewer connections. Permitting staff are located in five Regional Offices. Staff also administers the licensed designer program and reviews innovative and alternative systems for potential use in VT.

The [regional offices map](#) provides office, program and contact information for each region.

[Licensed Designer Program information.](#)

WHAT'S NEW?

Be Septic Smart!

Over half the households in Vermont depend on septic systems or other types of onsite systems to treat their wastewater. Failure to maintain a septic system can lead to backups and overflows, which can result in costly repairs.

Even if you do not own an on-site septic system you are likely to use one at a friend's house or camp, a business or a park facility. During Septic Smart Week, EPA provides septic system use and maintenance tips, including:

- **Keep it clean!** Maintain your septic system to protect the cleanliness of your water well.
- **Don't Strain Your Drain:** Use water efficiently and stagger use of water-based appliances. This can improve septic system operation and reduce risk of failure.
- **Think at the sink!** What goes down the drain has a big impact on your septic system.
- **Don't overload the commode!** A toilet is not a trash can. Disposable diapers and wipes, feminine hygiene products, cigarette butts and cat litter can damage septic systems.
- **Protect it and inspect it!** Regular septic maintenance can save homeowners thousands of dollars.



Where do I find answers to questions?

Digging deep into the DEC web site

<http://dec.vermont.gov/water/programs/ww-systems/program-education>

Where do I find answers to my questions?

1. The Designer may be able to answer questions
<http://dec.vermont.gov/water/licensed-designers>
2. For WW Permit questions contact Regional Engineer:
<http://dec.vermont.gov/environmental-assistance/permits>
3. For compliance questions contact a compliance team member:
Cristin Ashmankas – Cristin.Ashmankas@vermont.gov (802) 522-3257
Megan Kane – Megan.Kane@vermont.gov (802) 461-5255
4. If still unsure or unhappy, contact Program Manager:
Bruce Douglas – Bruce.Douglas@vermont.gov (802) 636-7545



Engineered wastewater systems and the protection of potable water supplies is considered the single greatest human achievement, saving more human lives than all of medical science.

Questions?

