Colchester Septic Solutions Workshop

Septic Systems 101

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Agency of Natural Resources

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VERMONT

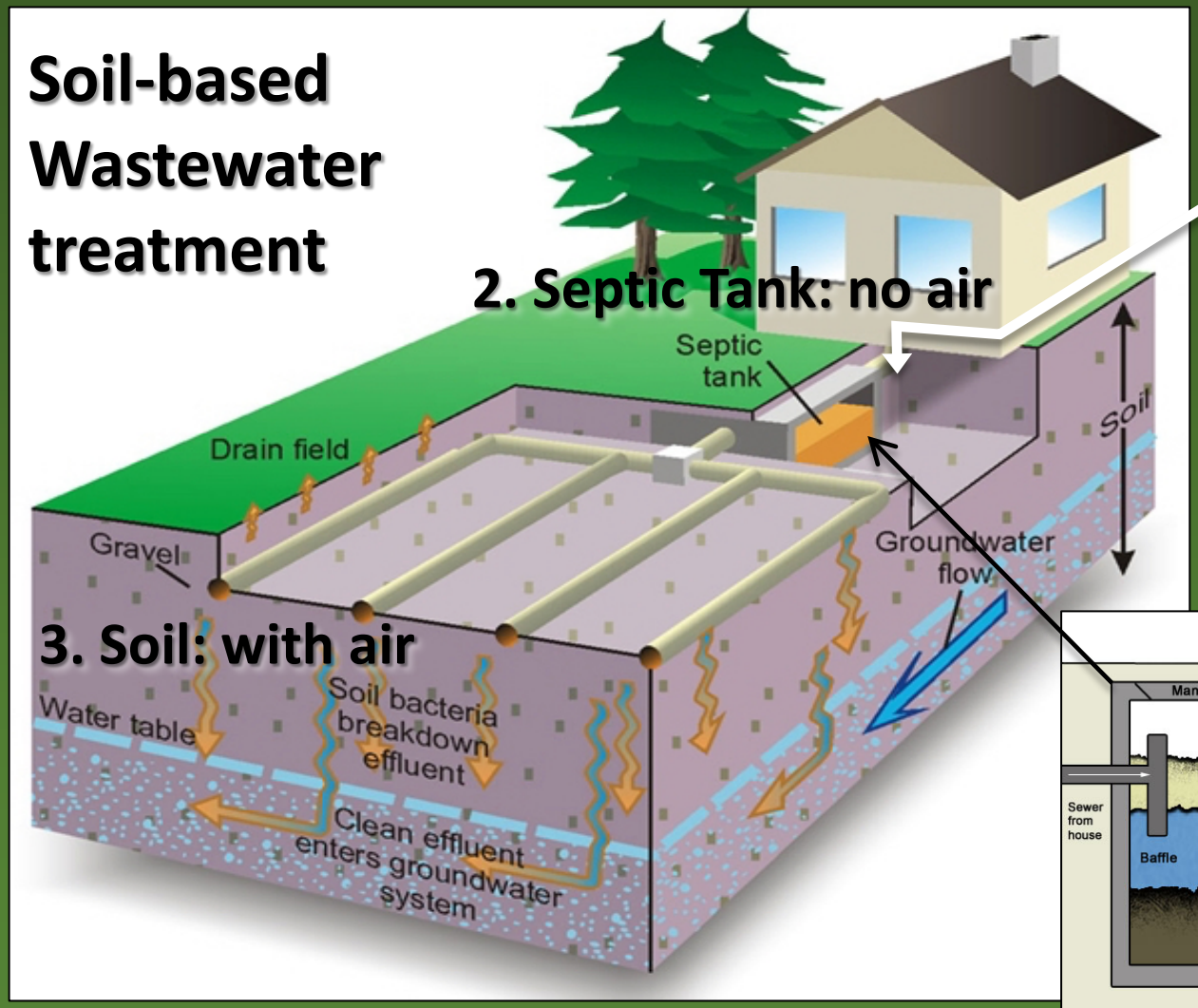
Winooski Conservation District

"Connecting people to a sustainable landscape"

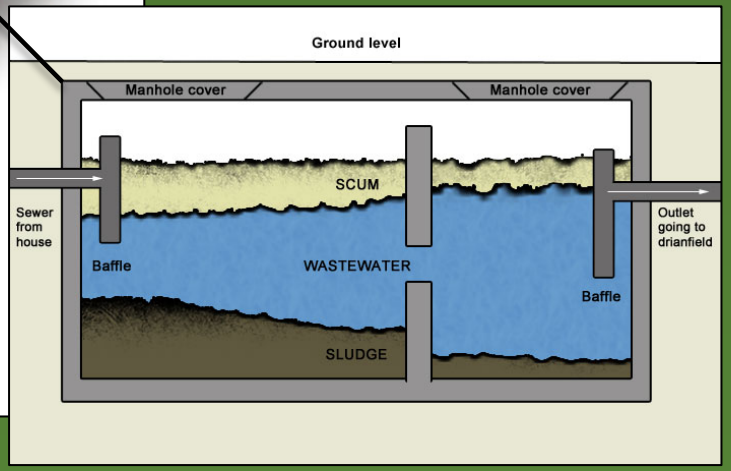
Septic Systems 101

- What are the components of a septic system?
- Why care about wastewater treatment?
- How do onsite wastewater treatment systems work?
- What are the different types of wastewater systems?
- When is a new septic system required?
- Who can design a wastewater treatment system?
- What does a wastewater system designer do?
- Pop quiz!

What are the Components of a Septic System?

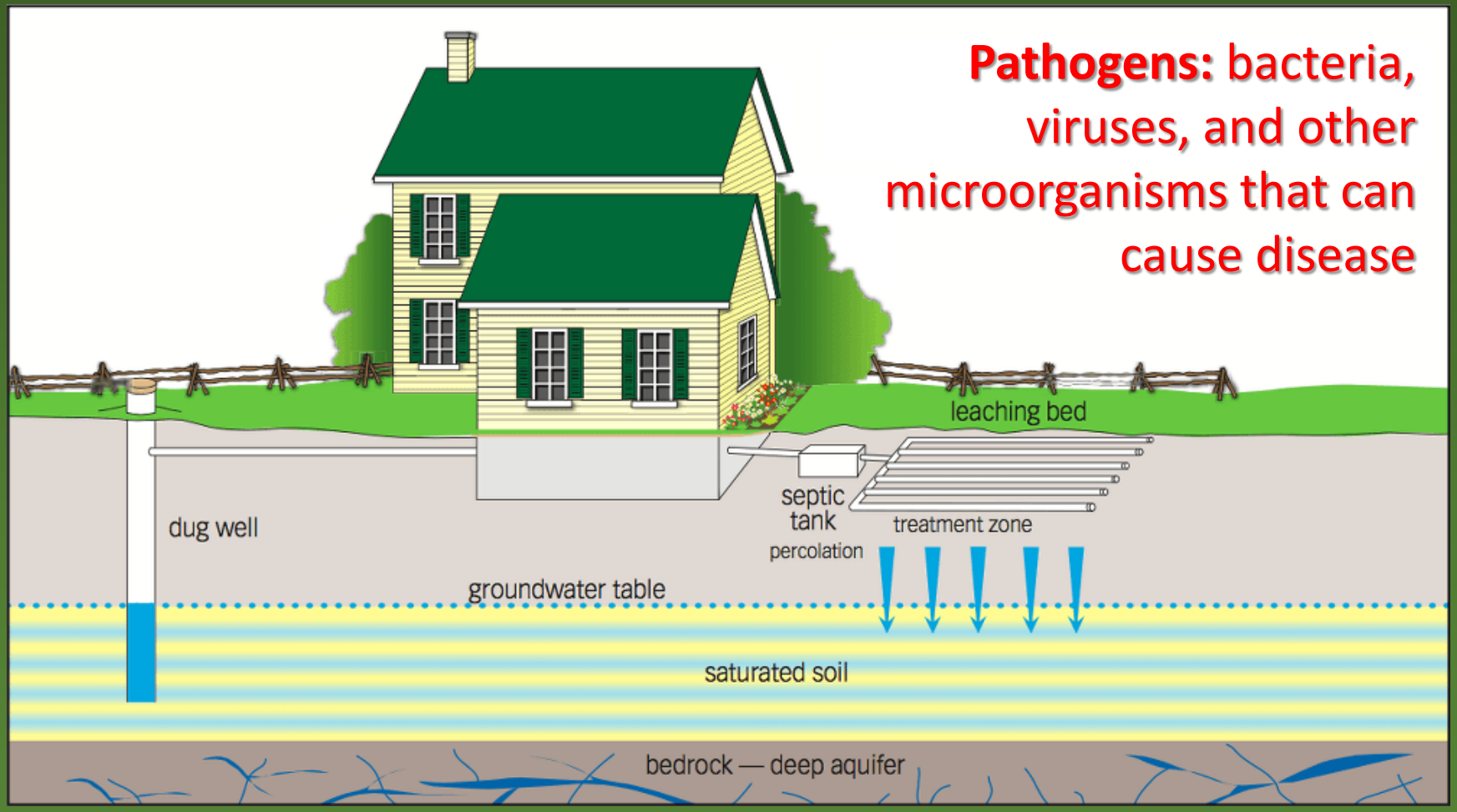


1. Digestion



Why care about wastewater treatment?

Human Health



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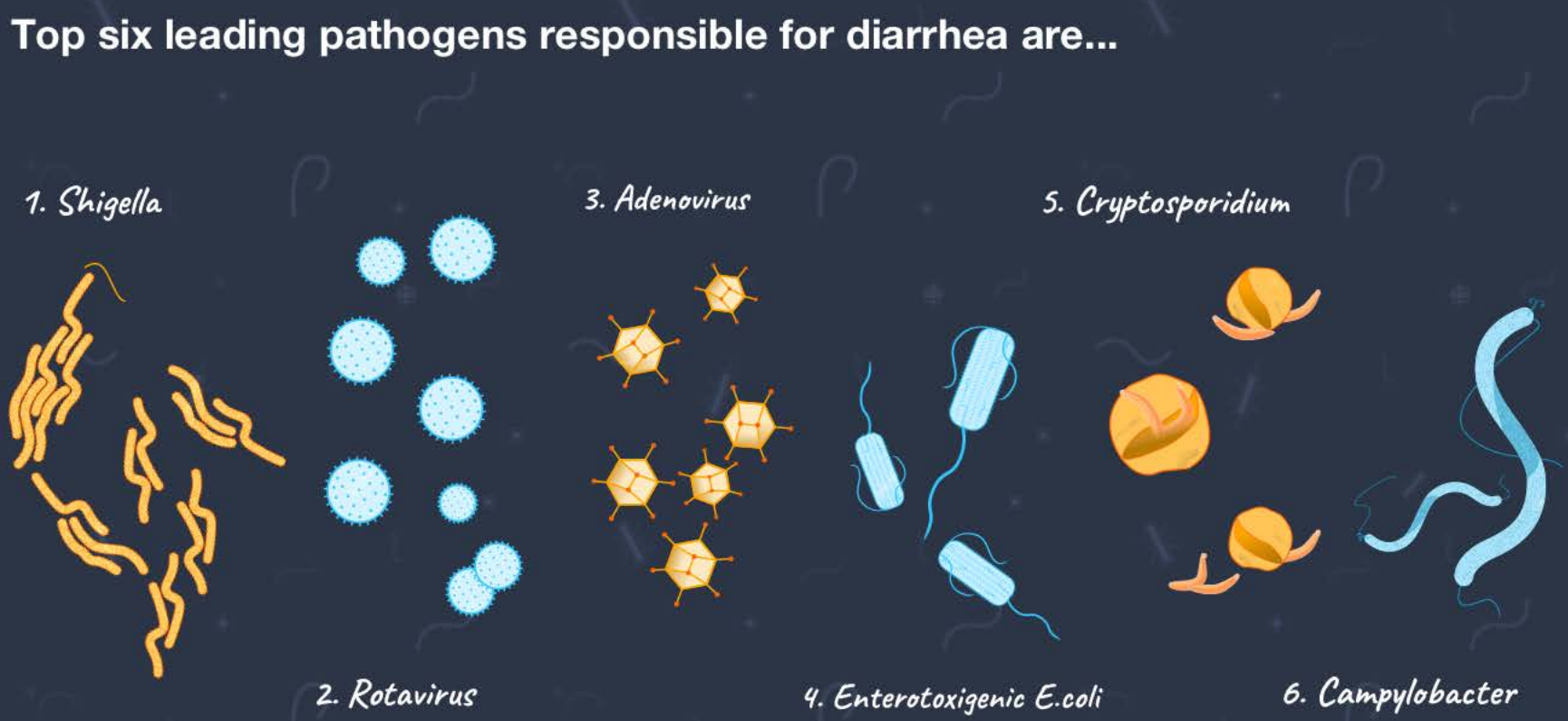
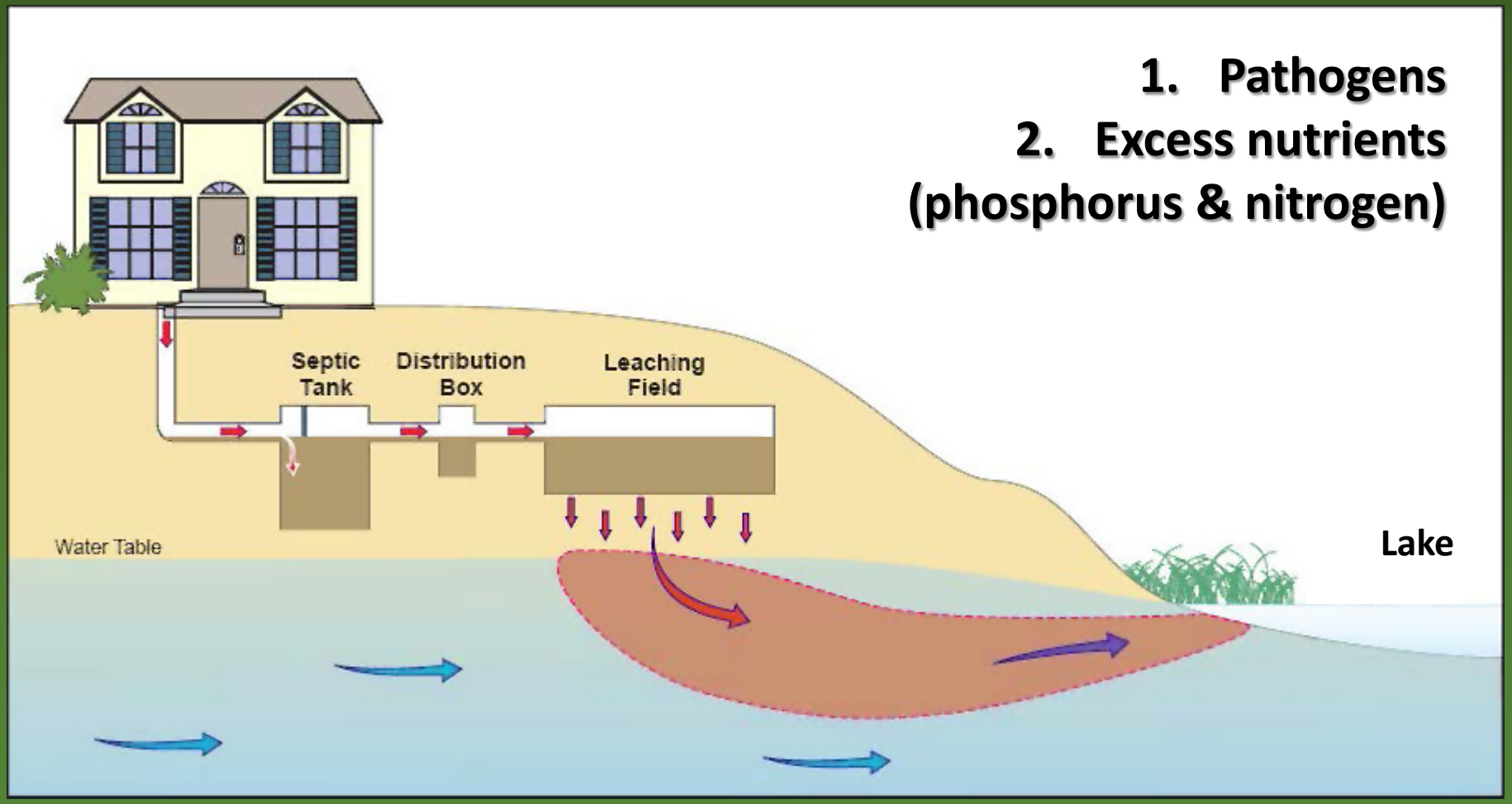
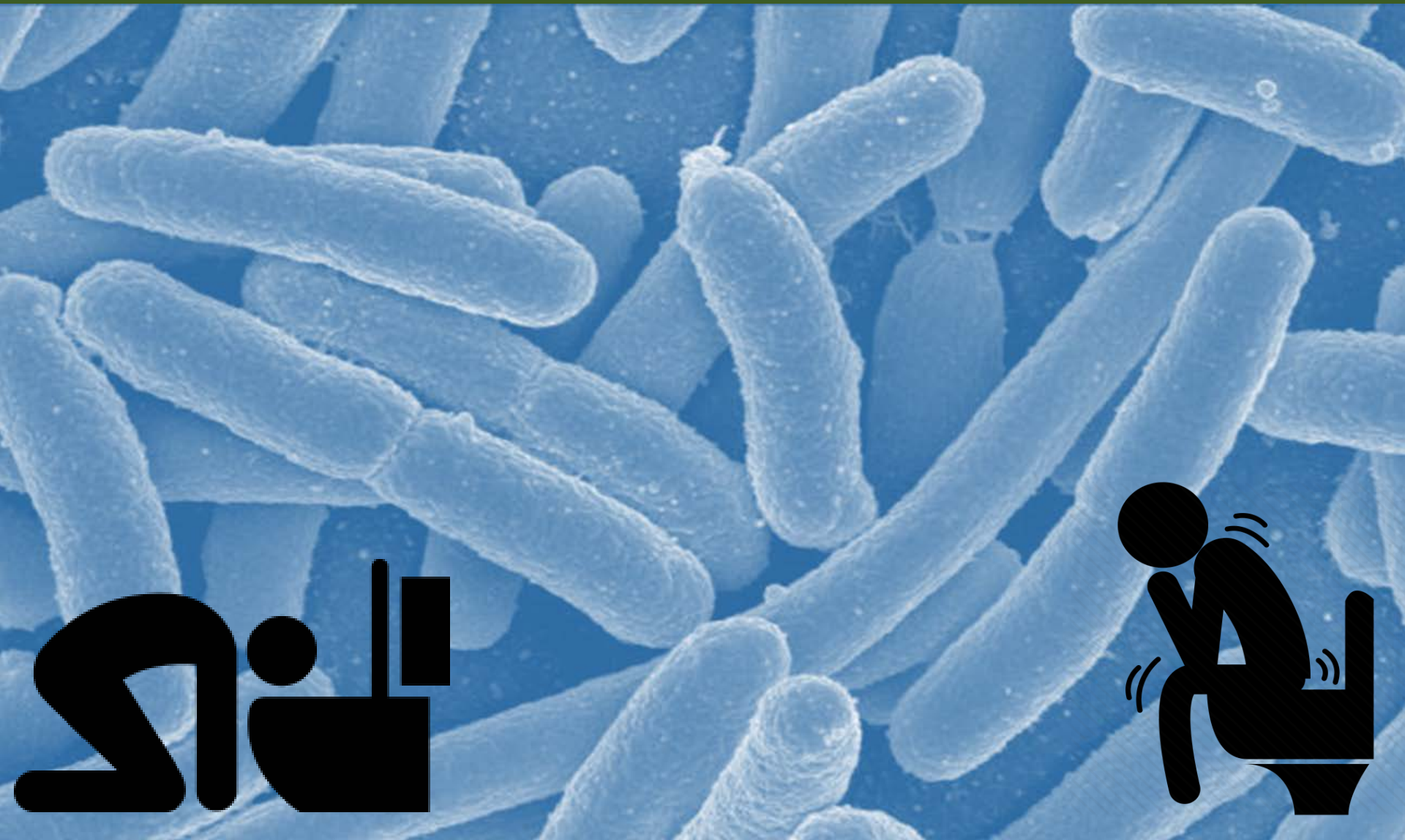


Why care about wastewater treatment?

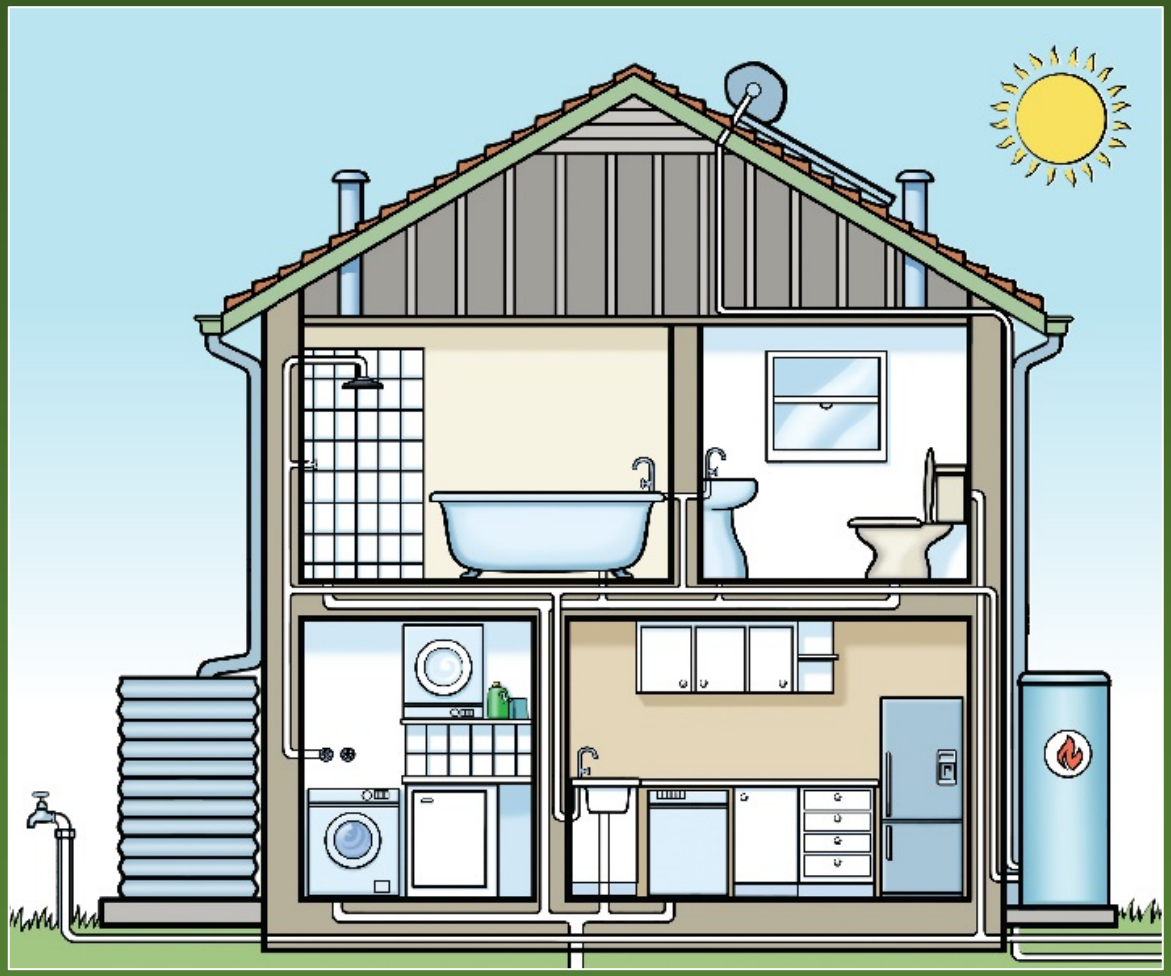
Environment



Vermont Wastewater Rules Address Pathogens



How much wastewater per house?

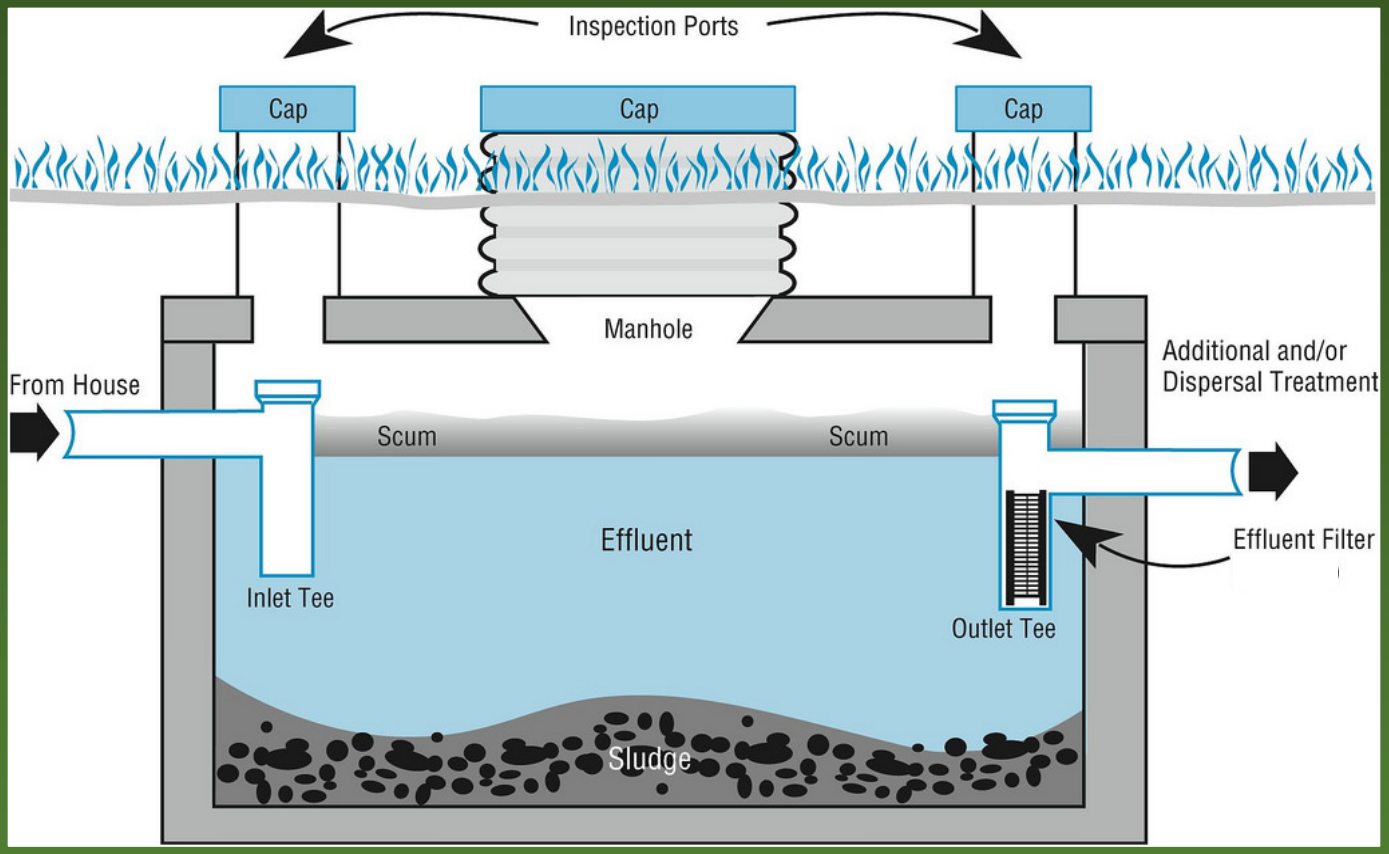


Design Flow

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

Five Bedroom House: (3 × 2 x 70) + (2 × 1 × 70) = 560 gpd

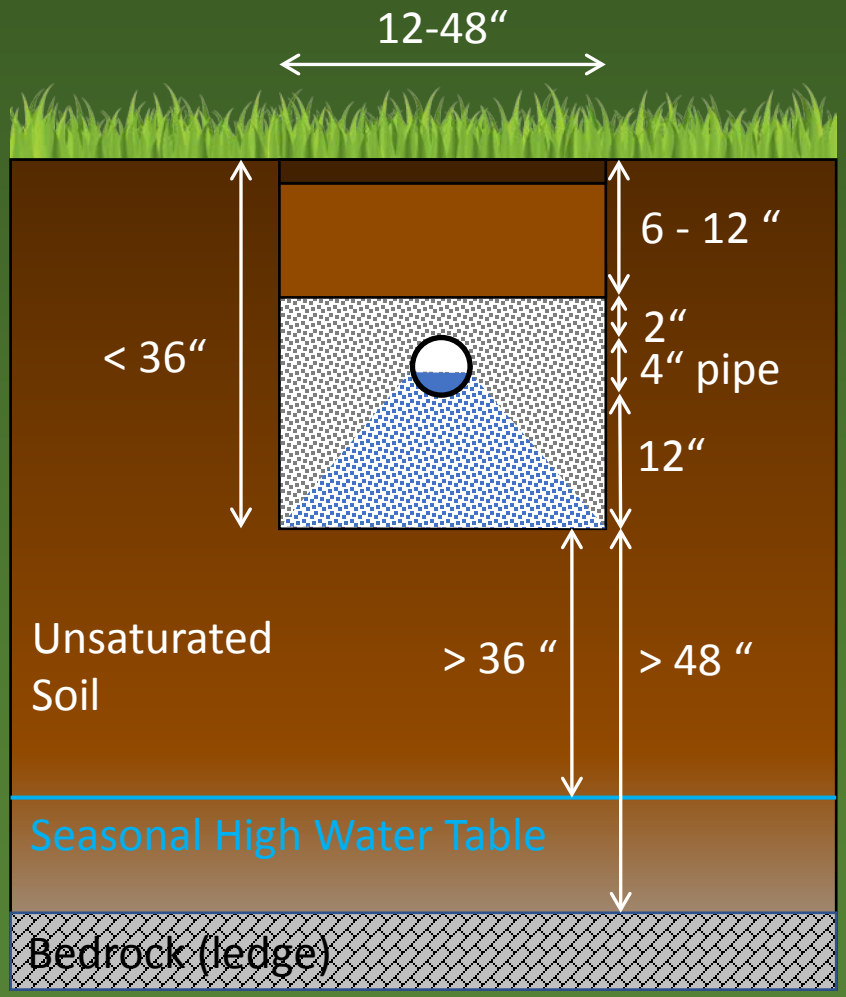
Septic Tank: separates liquid from solid



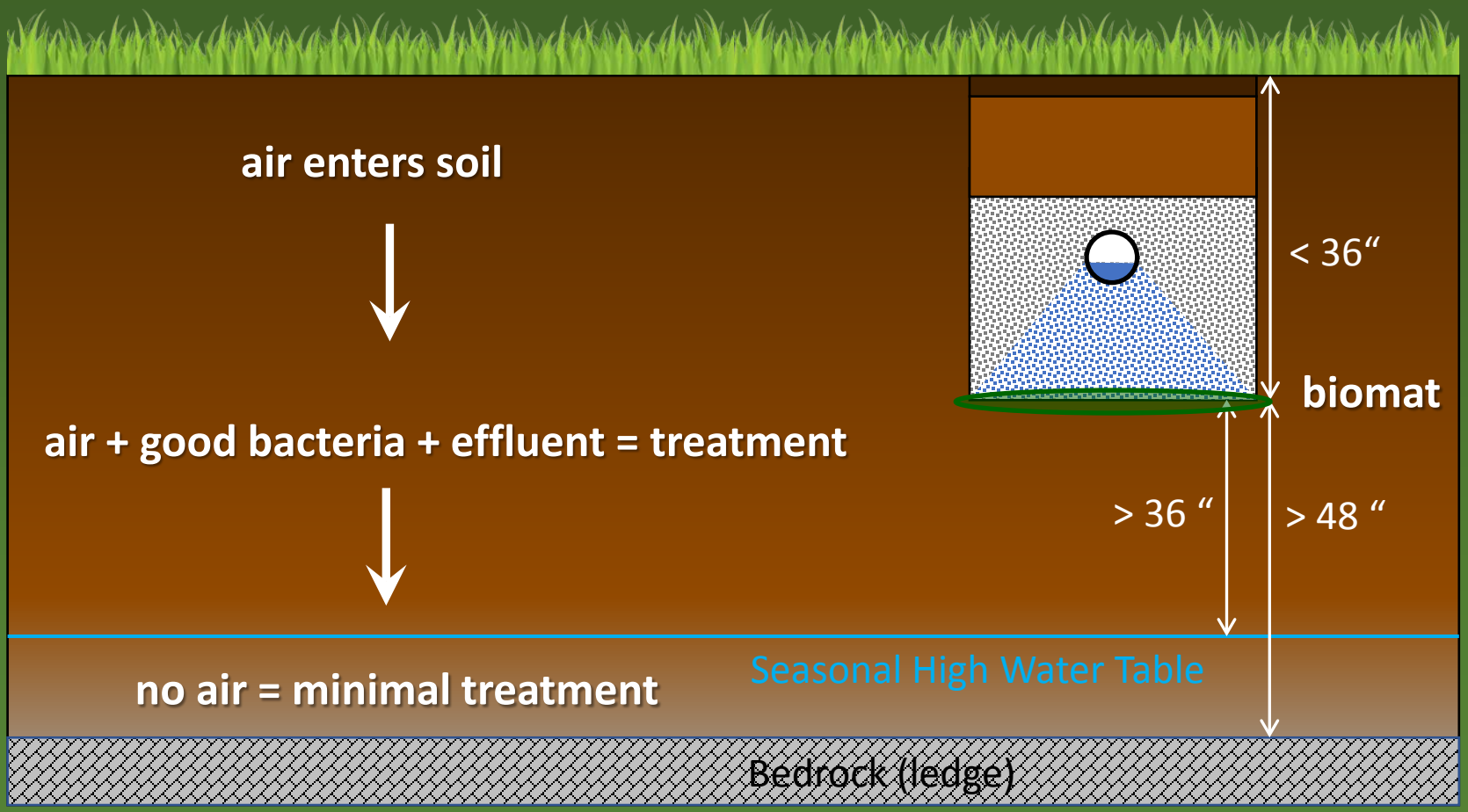
- Wastewater must reside in tank at least two days
- Floating solids form the scum layer
- Sinking solids form the sludge layer
- Wastewater goes to the leachfield

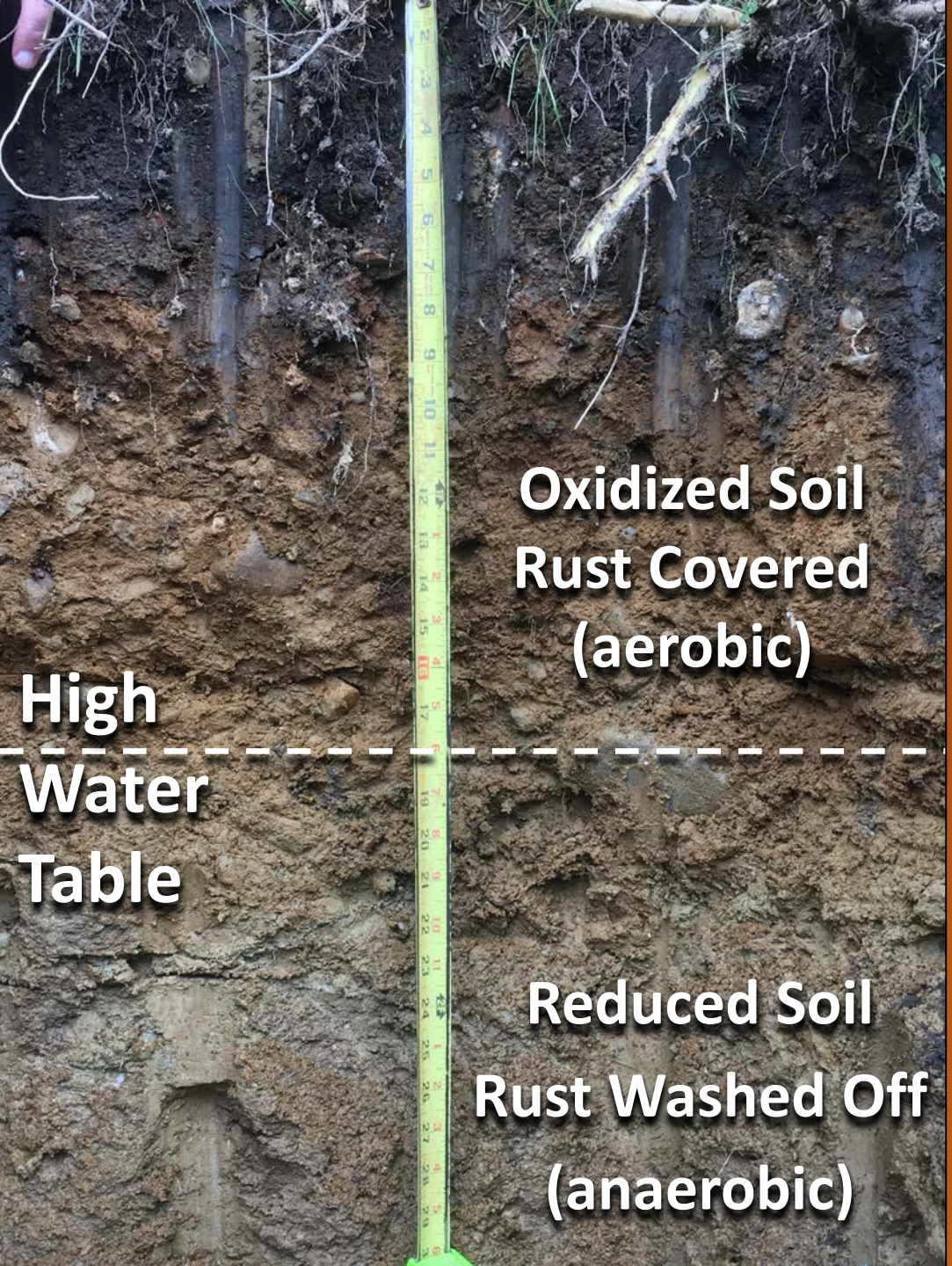
Leachfield: treats the wastewater

Trenches



Leachfield: treats the wastewater

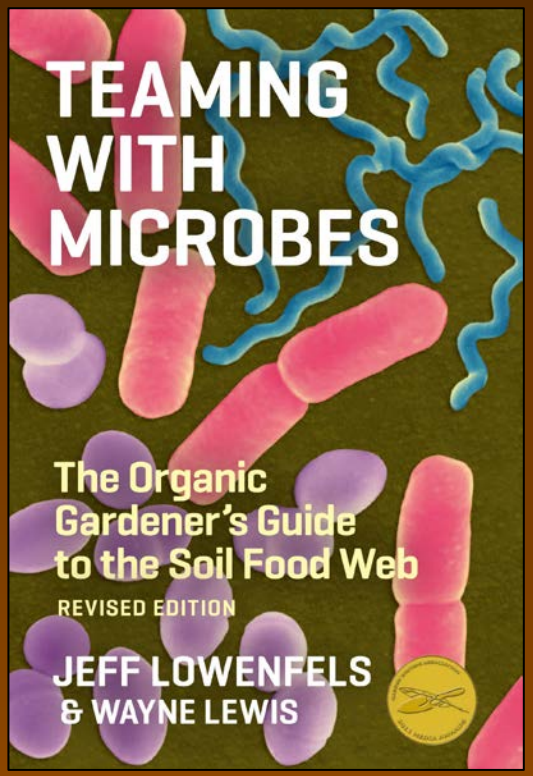


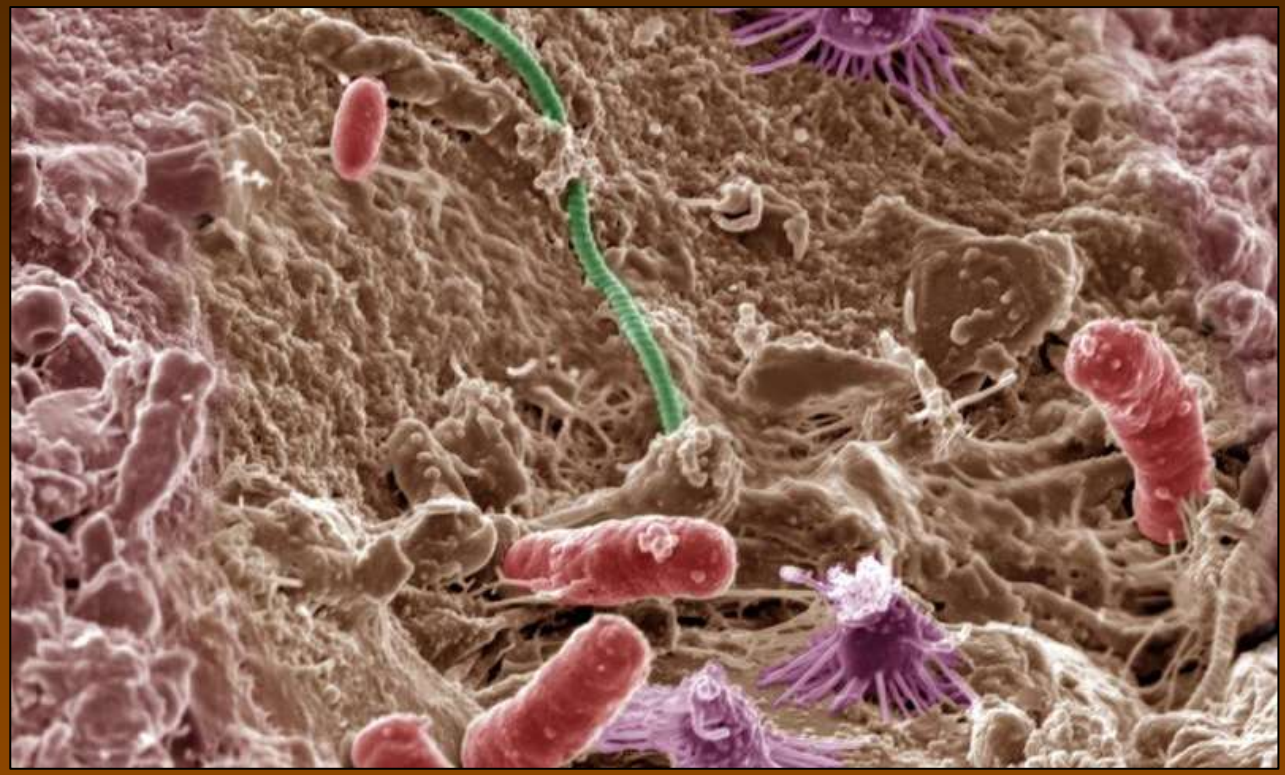


Where do the wastewater treating bugs live?

Look for the rust covered (red-brown) soil!

Grey soil indicates the rust has been dissolved & washed off below the Spring water table.





You and your wastewater system designer are microbe farmers!

Leachfield: treats the wastewater

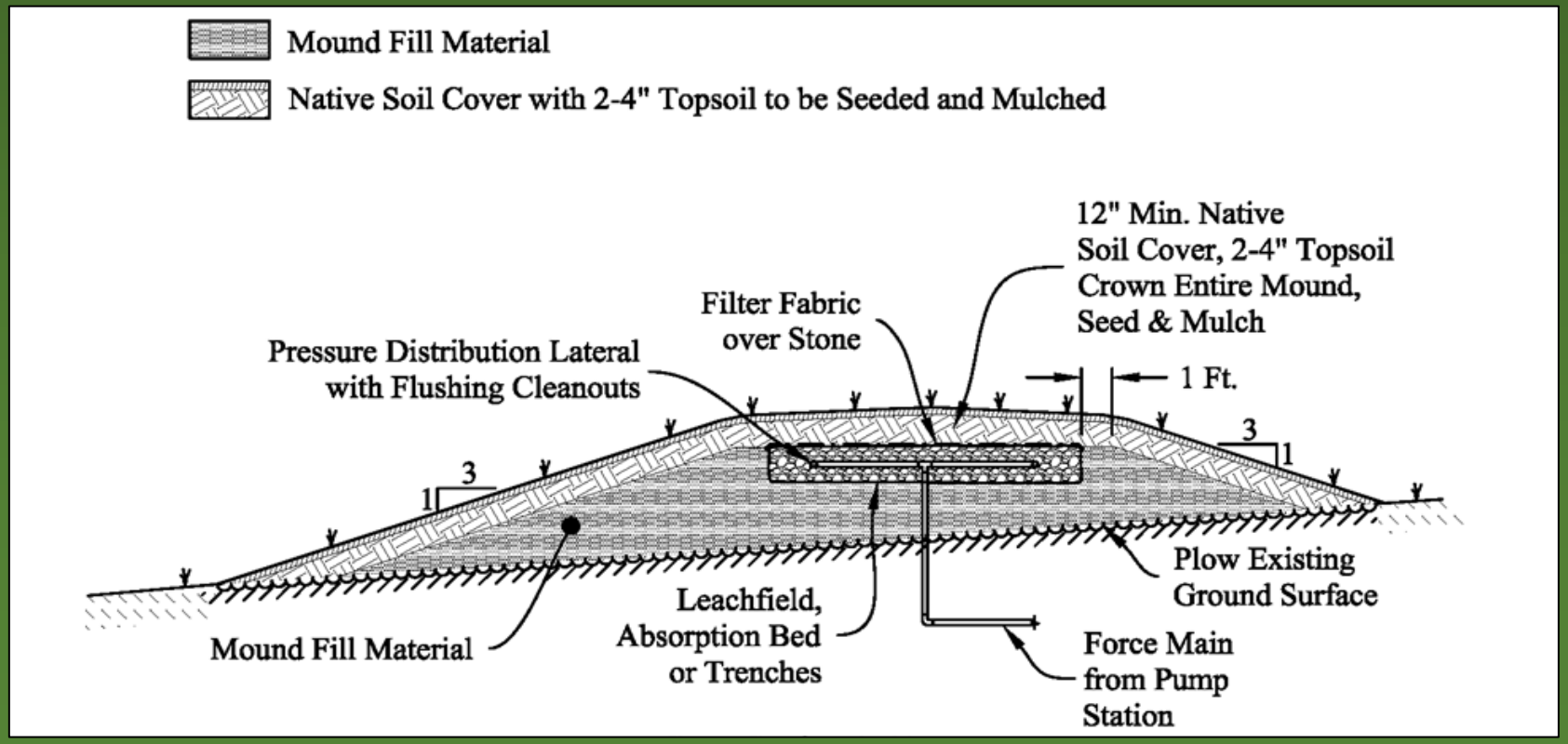
Beds

What if you don't have 3 feet to the water table?

Leachfield in a Mound

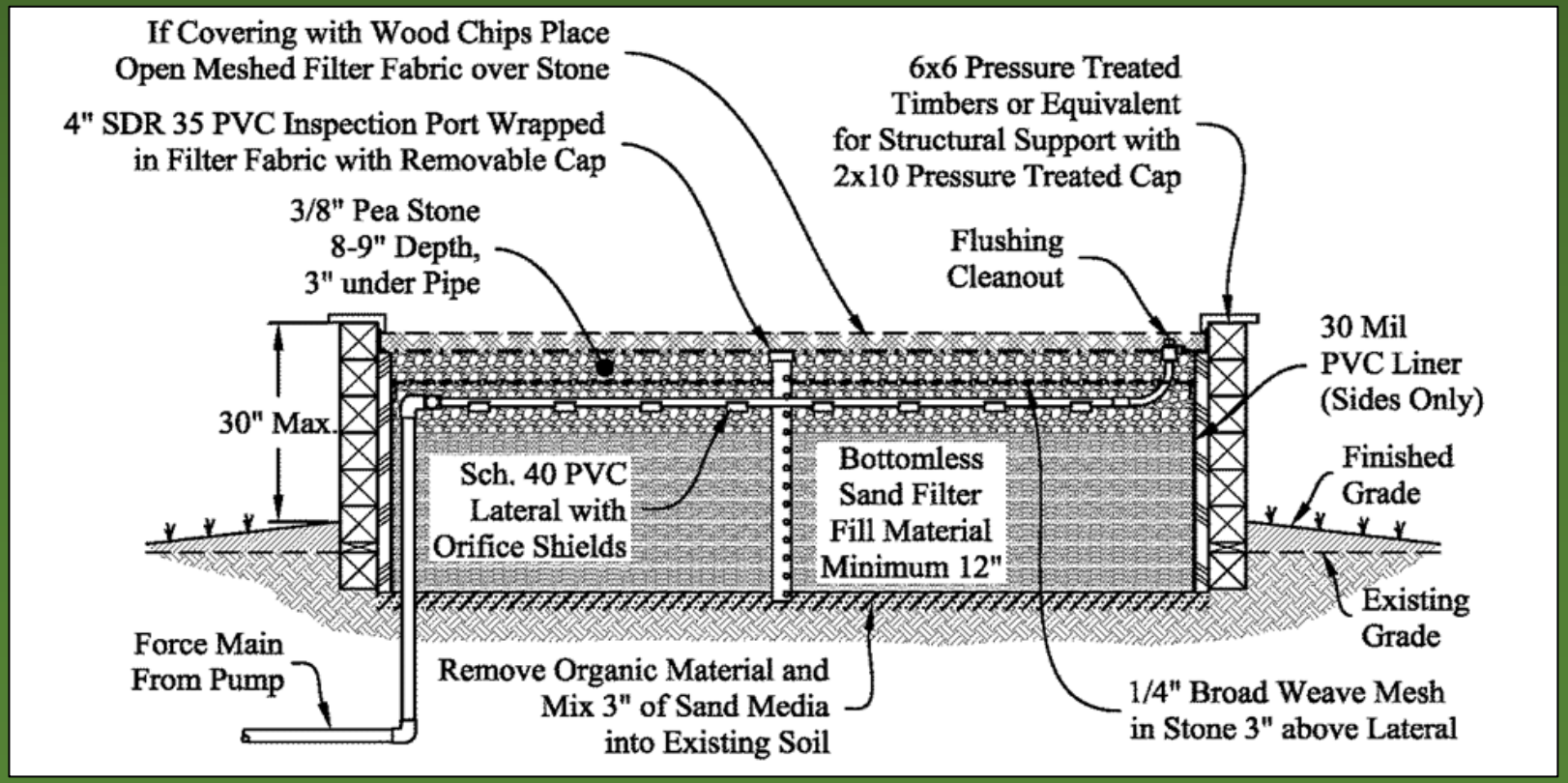
high water table

or thin soil



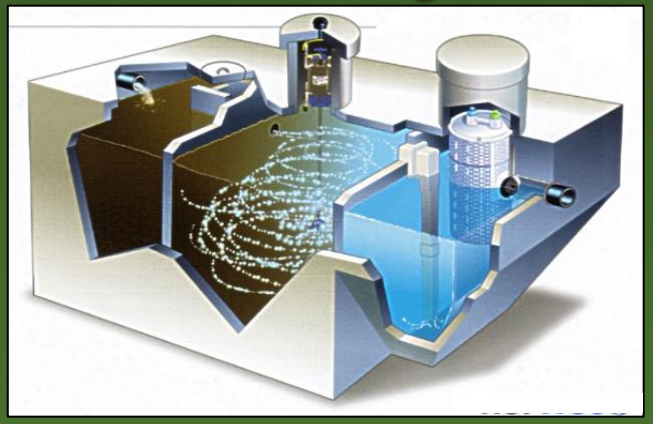
Leachfield in a Bottomless Sand Filter

shallow water table, thin soil, & little space

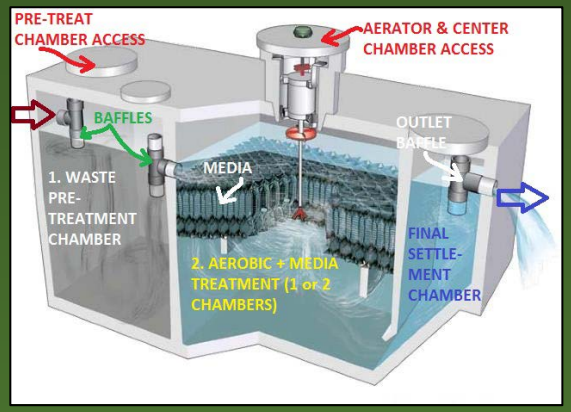


If you don't have enough soil: pretreatment

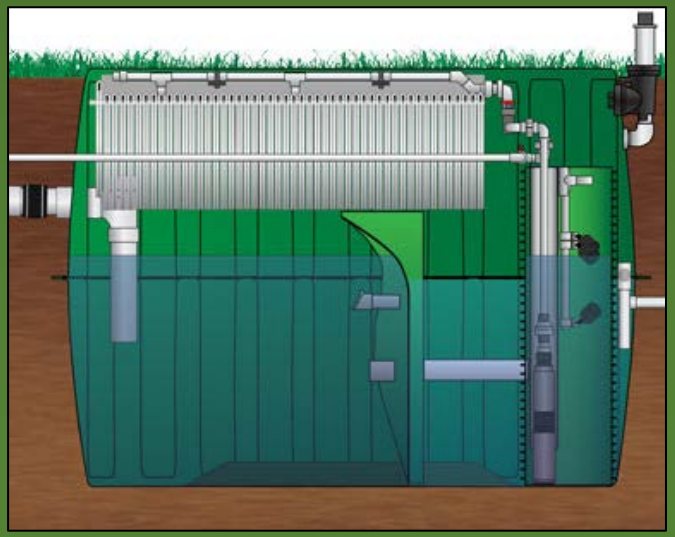
Bubble air through effluent with free-floating microbes



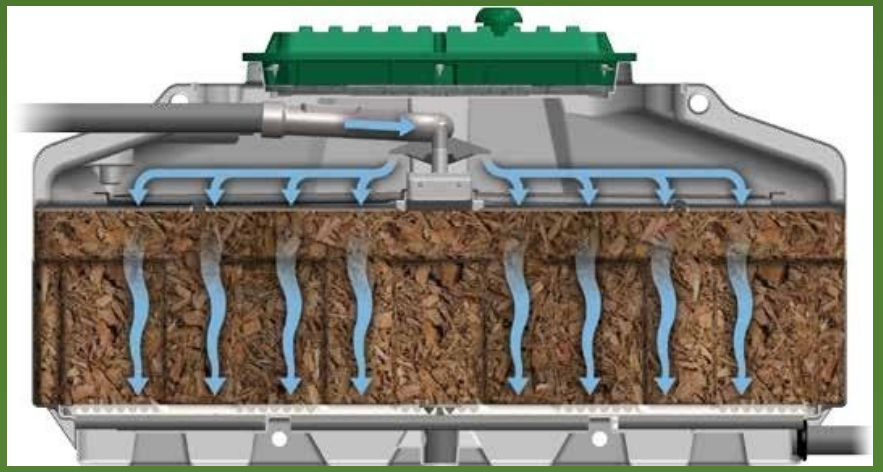
Bubble air through effluent & synthetic material microbes can live on



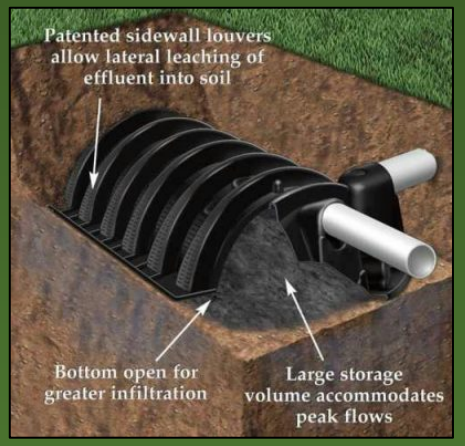
Trickle effluent through synthetic material microbes can live on



Trickle effluent through organic material microbes can live on

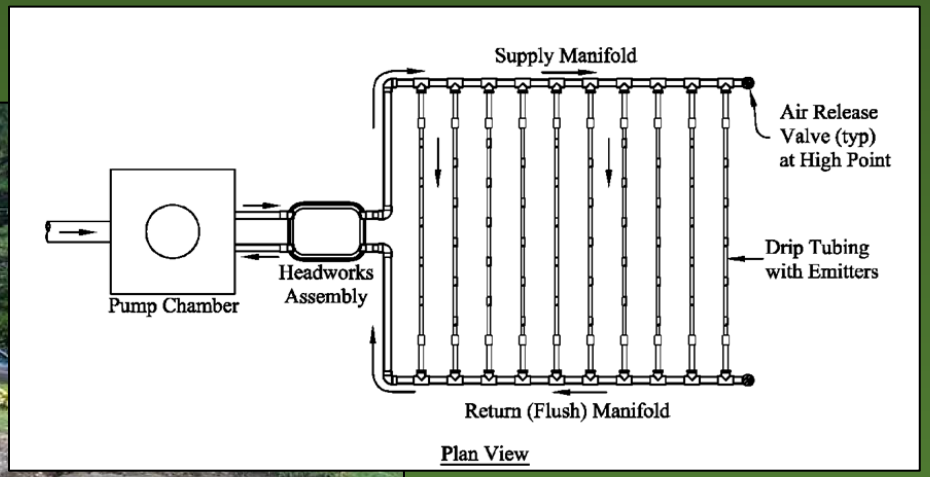


If you don't have enough area: gravelless disperse and treat systems

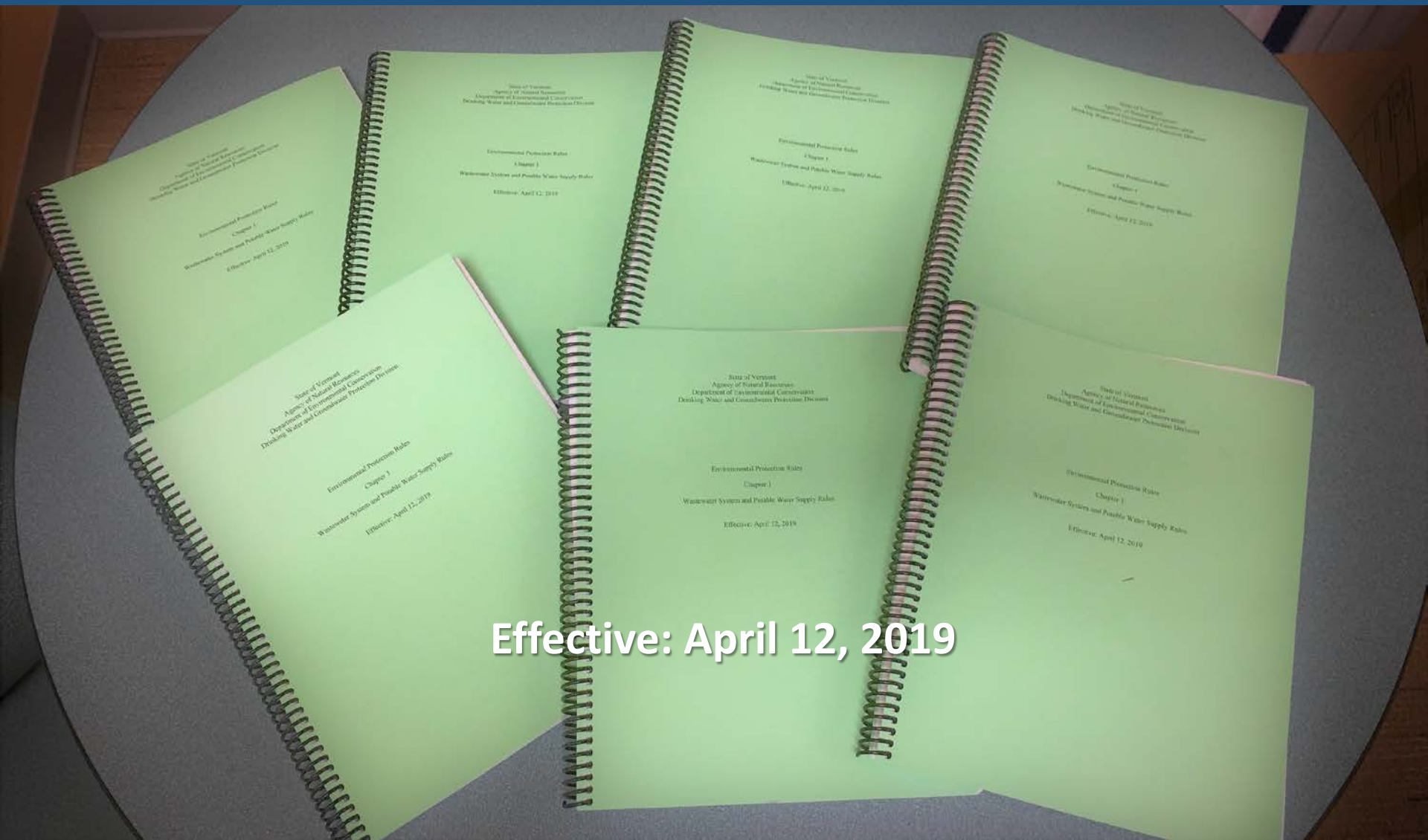


If you don't have enough soil and/or have an awkward space:

pressure-dosed drip system



Wastewater System and Potable Water Supply Rules 2019

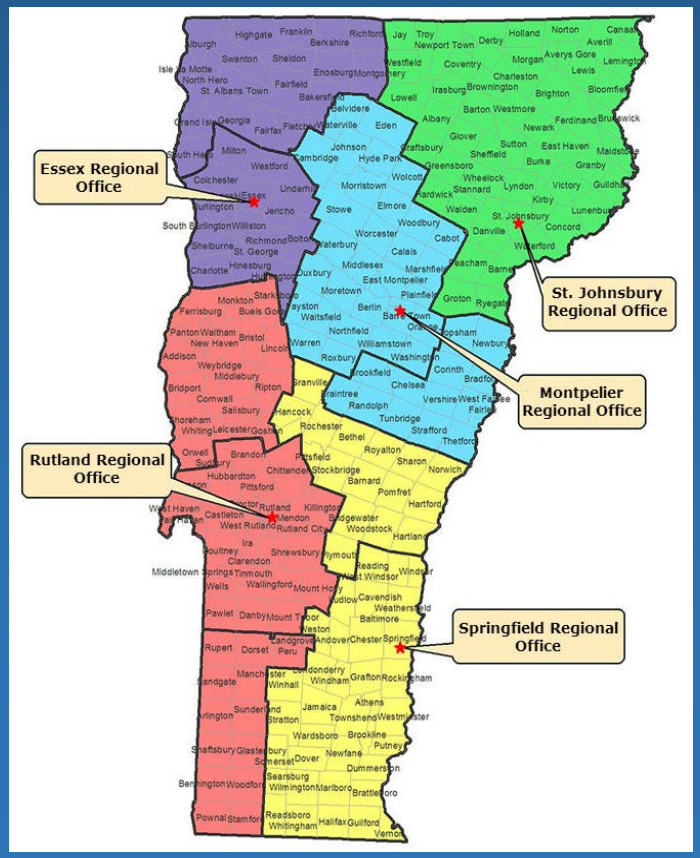


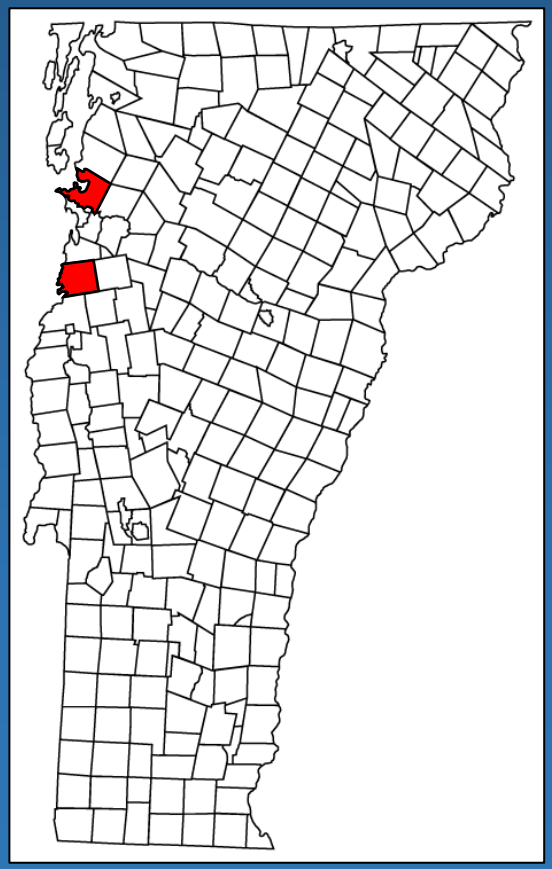
Purpose and Scope of the Rules

- Protect **Human Health** and the **Environment**
- **Soil-based** wastewater 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**

Municipal Delegation

- From 2007 all Vermont land under the State's "Wastewater System and Potable Water Supply Rules"
- Municipalities may elect to receive delegation to issue permits
- Municipalities that have delegation are Colchester and Charlotte.





When is it time to get a new septic system?

- When you want to increase the design flow (by adding a bedroom or changing use)
- When the existing system has failed

When is a Permit Required?

(or not required)

- Subdividing a lot
- Creating or increasing design flow
  - New residence
  - Adding bedrooms
  - Adding an in-law apartment
  - Converting from seasonal to year-round
- Constructing a new wastewater system

No permit required if in existence before 2007 (clean slate)

Converting Seasonal to Year-Round

1. No additional bedrooms

- Need to permit because leachfield must function all seasons
- May use variances
- Cannot use holding tank

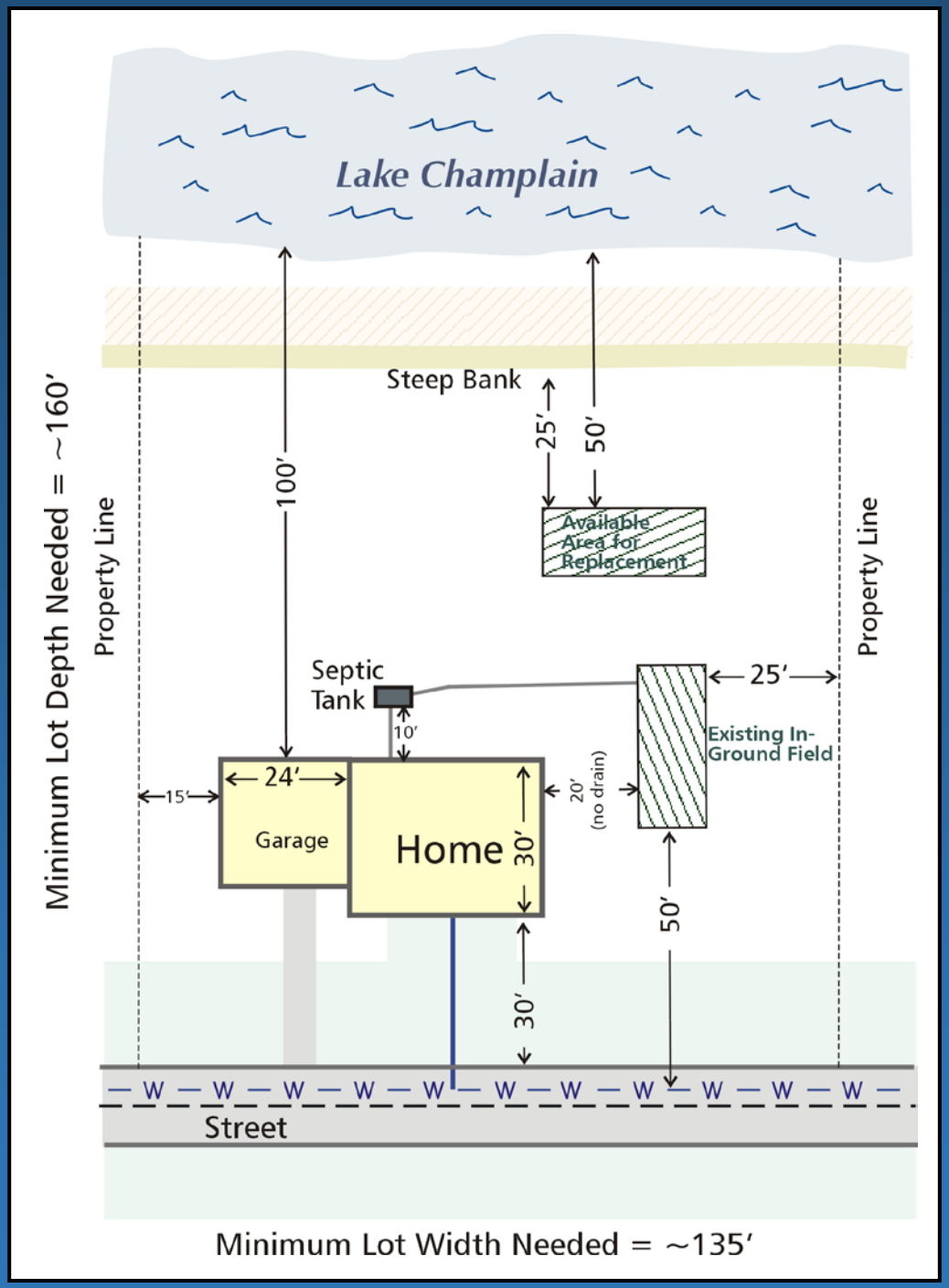
2. With additional bedrooms

- May not use variances: need to comply with technical standards
- May not use holding tank

How do you know when a wastewater system has failed?

When wastewater is:

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



Lot Size Challenges

- Minimum lot size to install replacement leachfield for 3-bedroom home with favorable soil is

  About 160 ft x 135 ft

  (0.5 acre)

- **Waivers** for some isolation distances may be considered
- **Variances** for some aspects of design may be considered
  - Depth to Water Table
  - Leachfield Size
  - Leachfield Length

Who can design a new septic system in Vermont?


STATE OF VERMONT

On behalf of the Agency of Natural Resources, Department of Environmental Conservation, Division of Drinking Water and Groundwater Protection I hereby certify that

A. DeSigner

has passed the

Class A Designer Exam

in fulfillment of the requirement to become a Wastewater System and Potable Water Supply Designer.

Certified by: _____ Date: July 11, 2017

Dr. J. Graham Bradley, Designer Program, DWGWP

Licensed Designers:

- **Class 1** (Professional Engineers) authorized for all aspects of design
- **Class A –** authorized to design trench & bed systems
- **Class B –** authorized to do most aspects of design, except store & dose, high strength wastewater, and some innovative or alternative systems
- **Class BW –** same as Class B, but can design potable water supplies for multiple residences

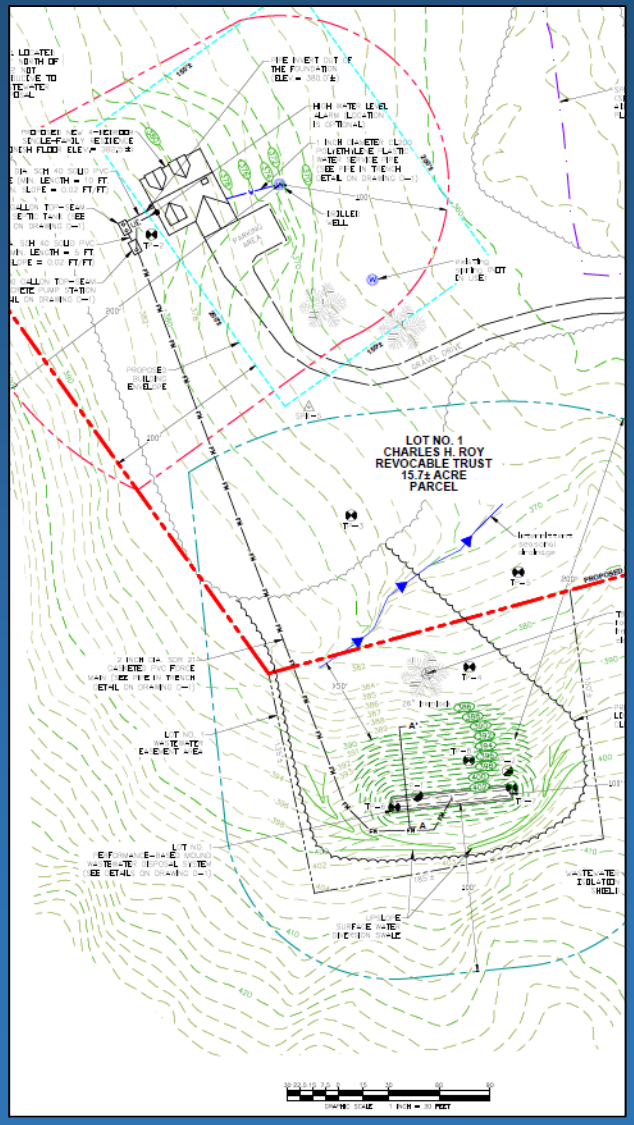
https://dec.vermont.gov/water/licensed-designers

Permit Application Requirements

1. **Design Flow** – Wastewater per day?
2. **Soil Descriptions** – Where is water table? What is soil absorption capacity?
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, percolation test, & monitoring well locations; h) construction details; i) isolation distances & presumptive zones.



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