

Drinking Water Wells & Septics

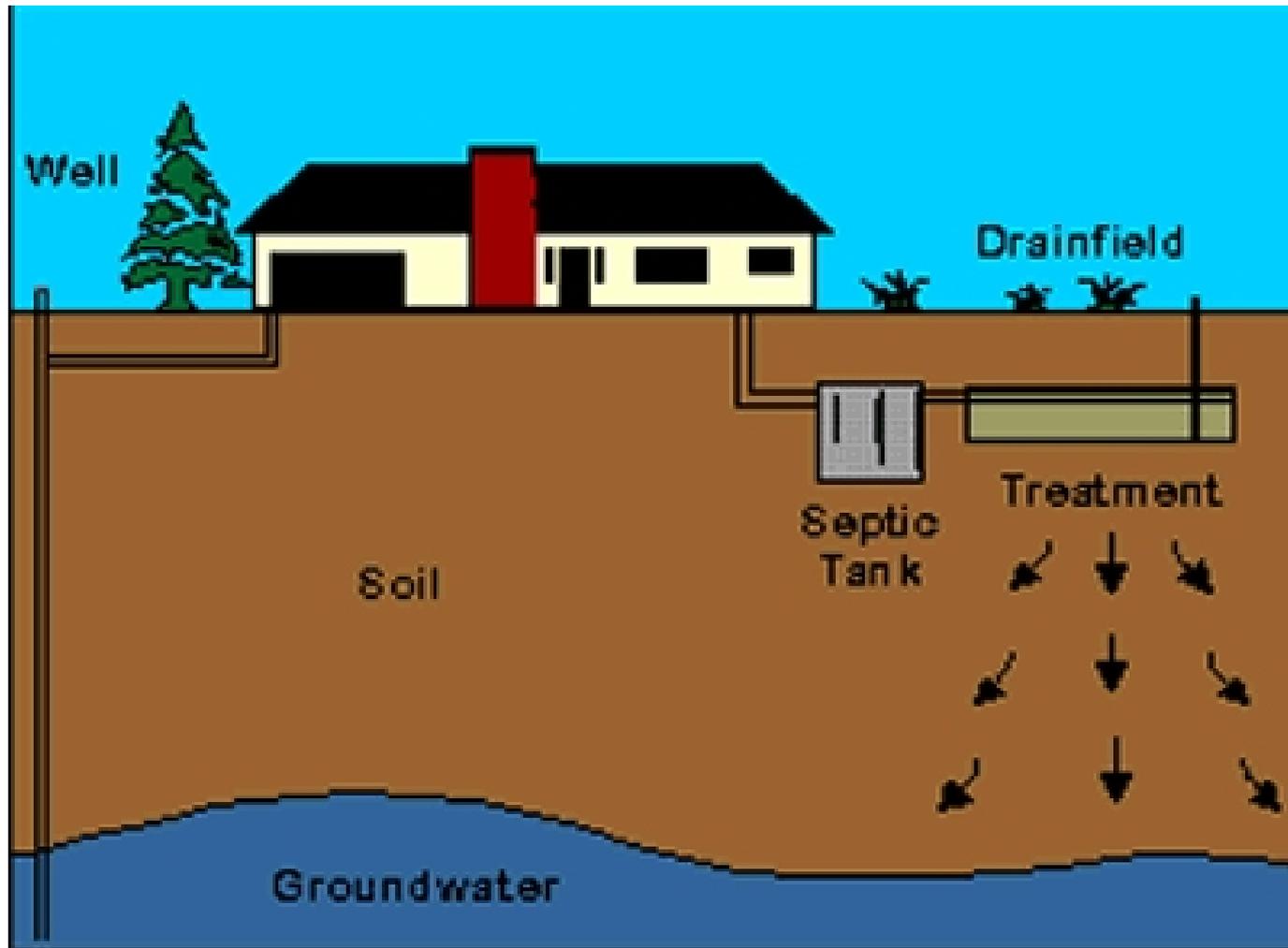
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Outline

- **Main Points**
- **History of Sewage Treatment**
- **Types of Systems**
- **Care & Maintenance**

Main Point -Septic Systems Recharge Groundwater



Main Point -Septic Systems Treat Sewage

Parameter	Raw Sewage	3' Below Drainfield
Viruses	unknown (high)	0
Fecal Coliform	1 million-100 million	0
Nitrogen	50 to 100	50-60
BOD (mg/L)	270-400	0
Phosphorous (mg/L)	10 to 40	0-1

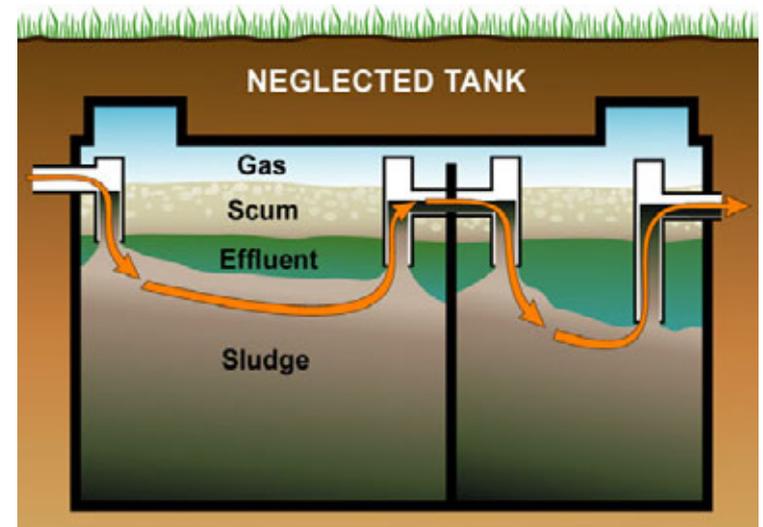
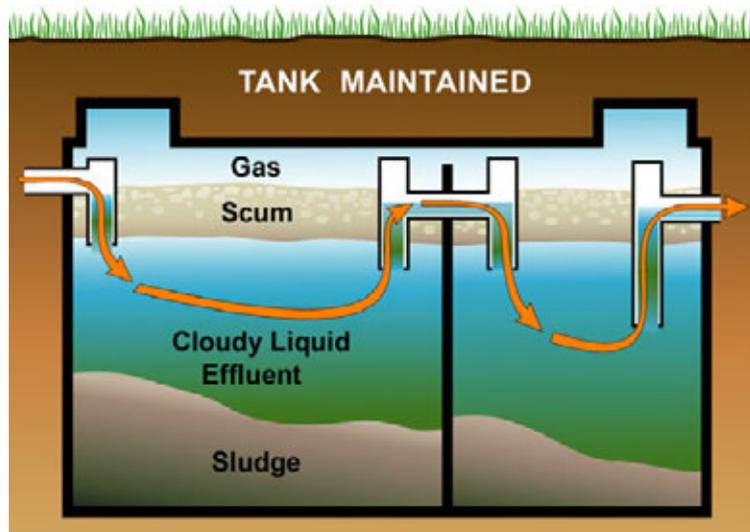
Main Point -Septic Systems Need Maintenance

To Pump...or Not To Pump

- Pumping costs about **\$150-\$275** for the average 1,000 gallon tank, every 3 years or so
- A new leachfield costs from **\$5,000** for an in-ground system to as much as **\$20,000** for an engineered field

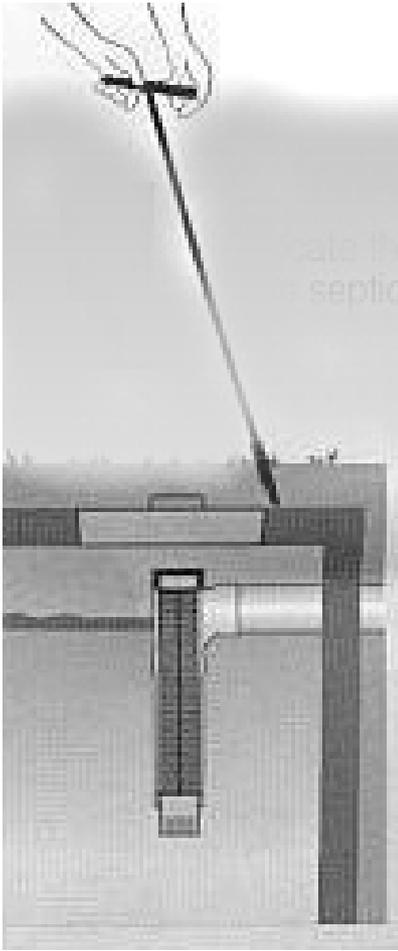
Which would you choose?

Main Point –Septic system failure is not just a soggy spot in the lawn

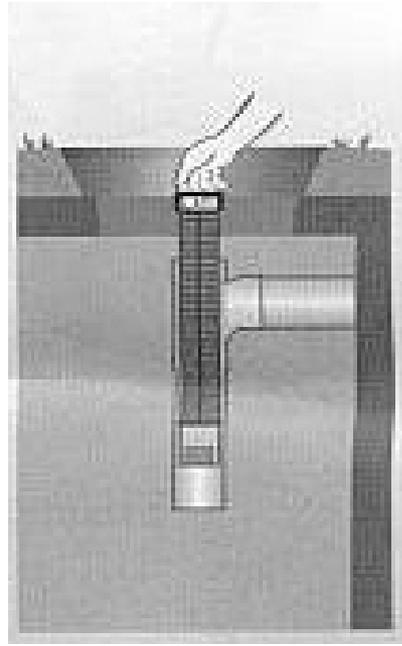


It is also a failure to properly treat wastewater!

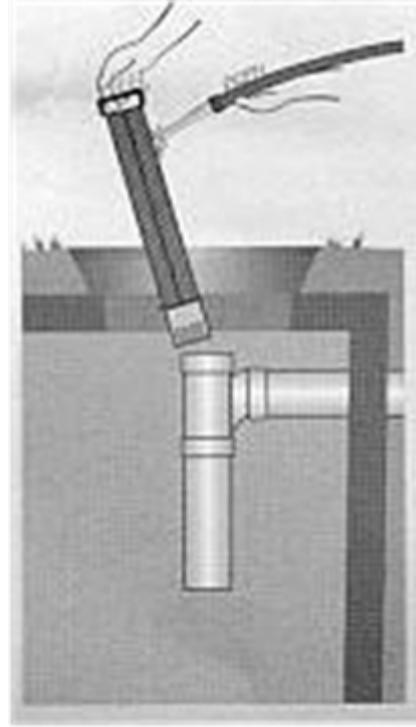
Main Point -Septic Systems Need Maintenance



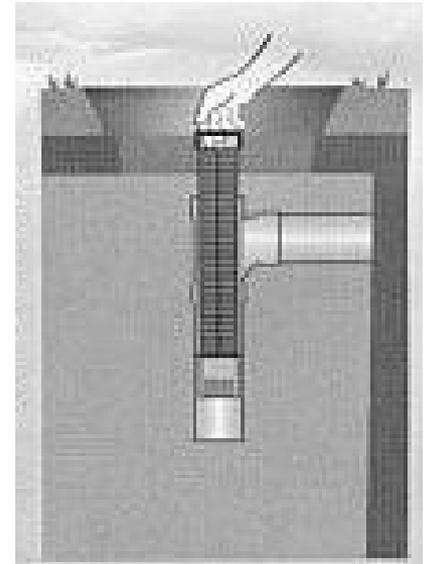
1



2



3



4



John Snow M.D.

London 1854: Snow proved that cholera was transmitted by water.

▶ when pump handle removed = cholera decreased.

Raw sewage from sick people using an overflowing outhouse was getting into the well.

The original outhouse



Newest Version of the privy

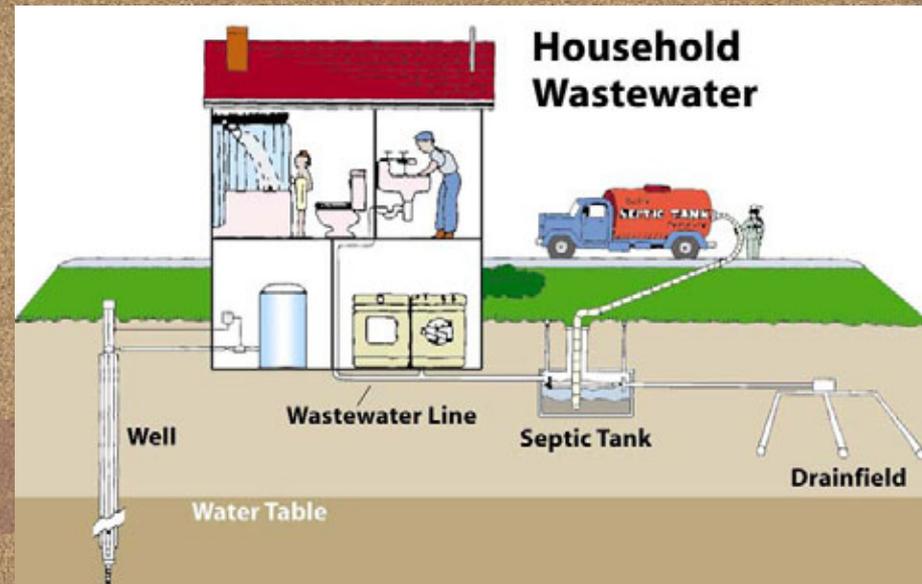


House With On-site Wastewater System



2004 11 10

What is in household wastewater



Parameter	Raw Sewage	3' Below Drainfield
Viruses	unknown (high)	0
Fecal Coliform	100 million-1 million	0
Nitrogen	50 to 100	50-60
BOD (mg/L)	270-400	0
Phosphorus (mg/L)	10 to 40	0-1

Whatever you flush

Site Conditions Affect Treatment

- **SOILS:**

Type and depth of soil control type and size of septic system

- **GROUNDWATER and BEDROCK:**

4-foot separation between the trench bottom and a limiting layer (bedrock or groundwater)

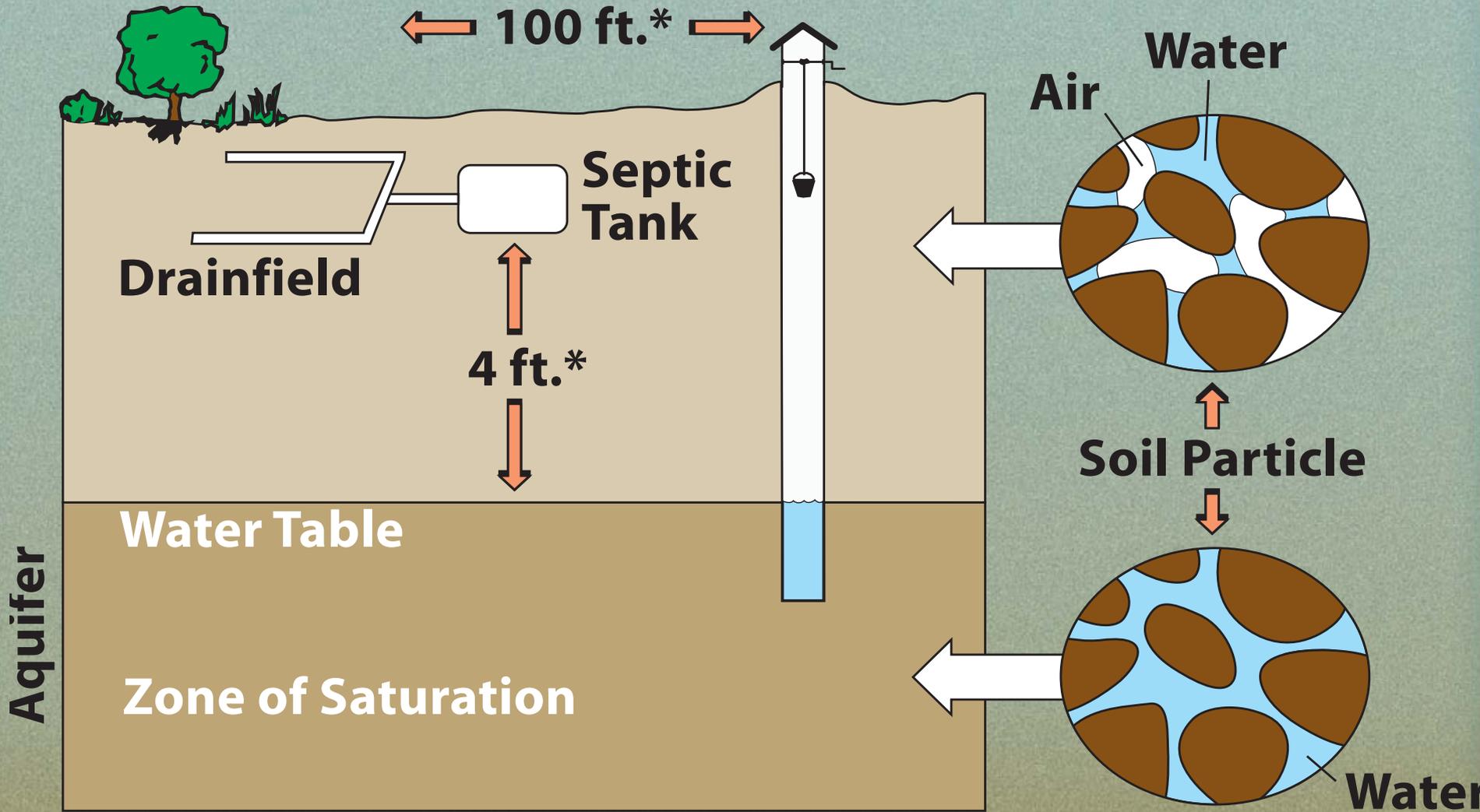
- **FLOODPLAIN:**

Must maintain a 100-foot separation from 100-year floodplain. No construction allowed in the floodway.

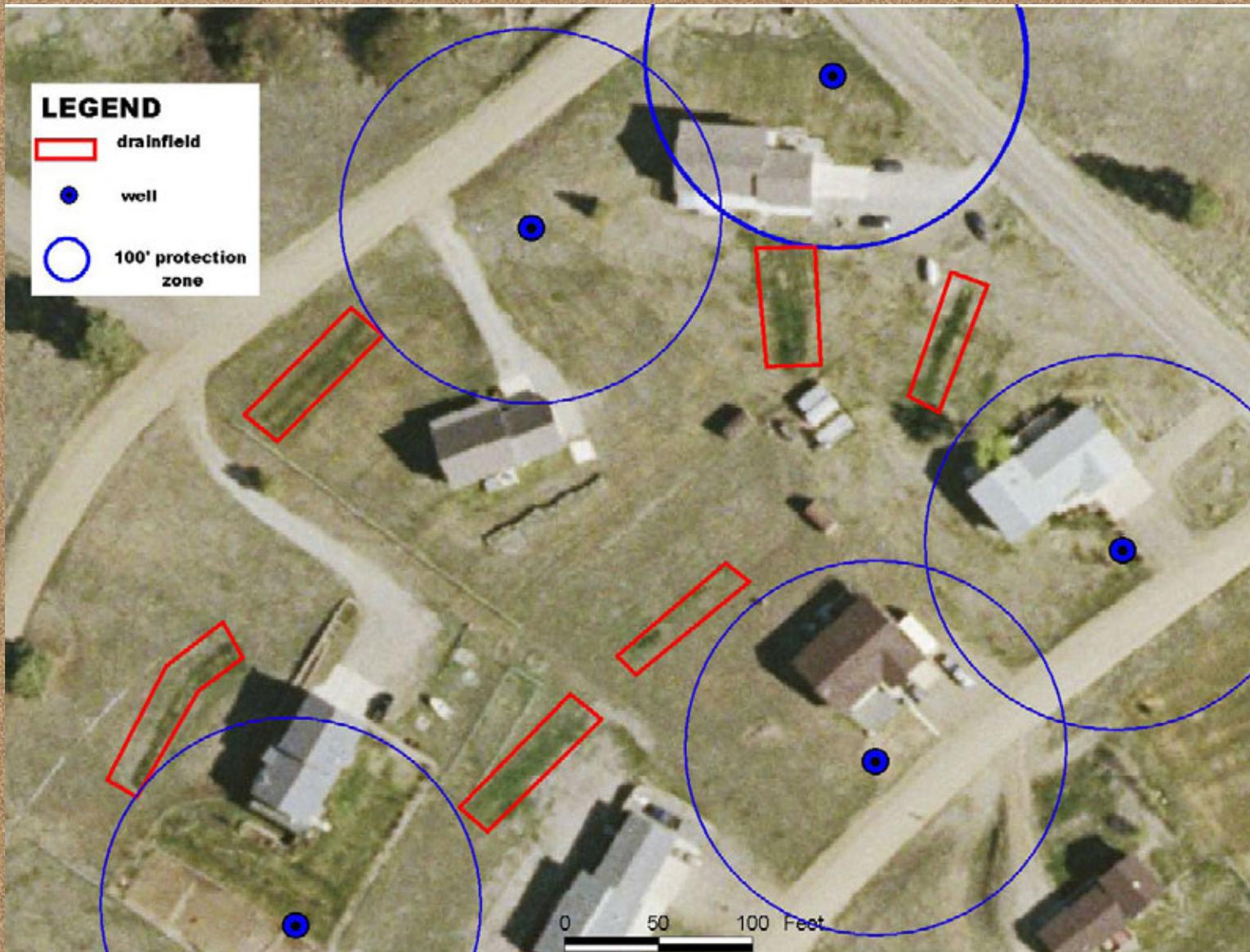
- **SLOPE:**

Gravity trenches may not exceed 15% and pressure dosed up to 25%.

Site conditions also determine septic system type



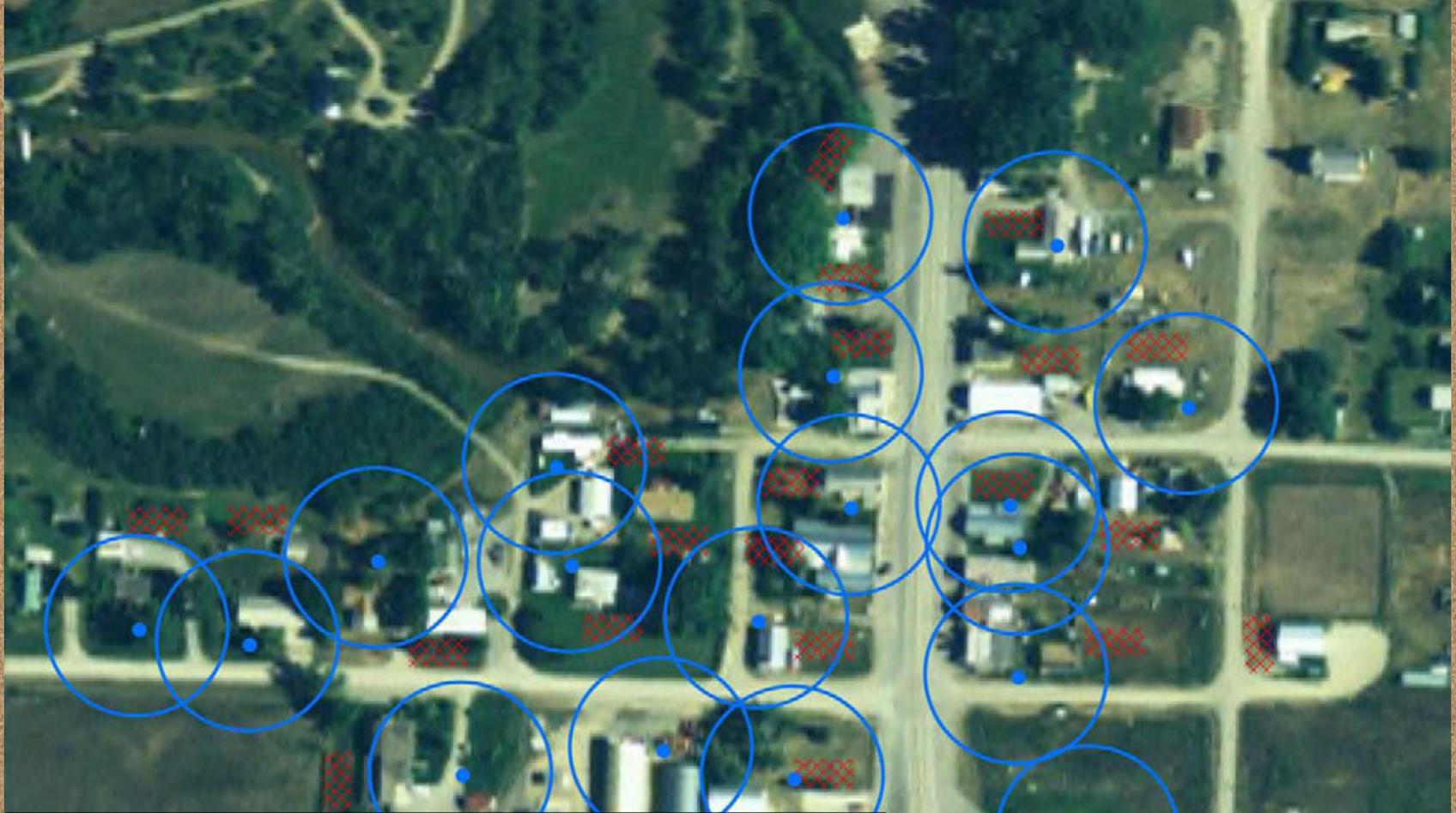
Septic System/Well Separation



Septic System/Well Separation



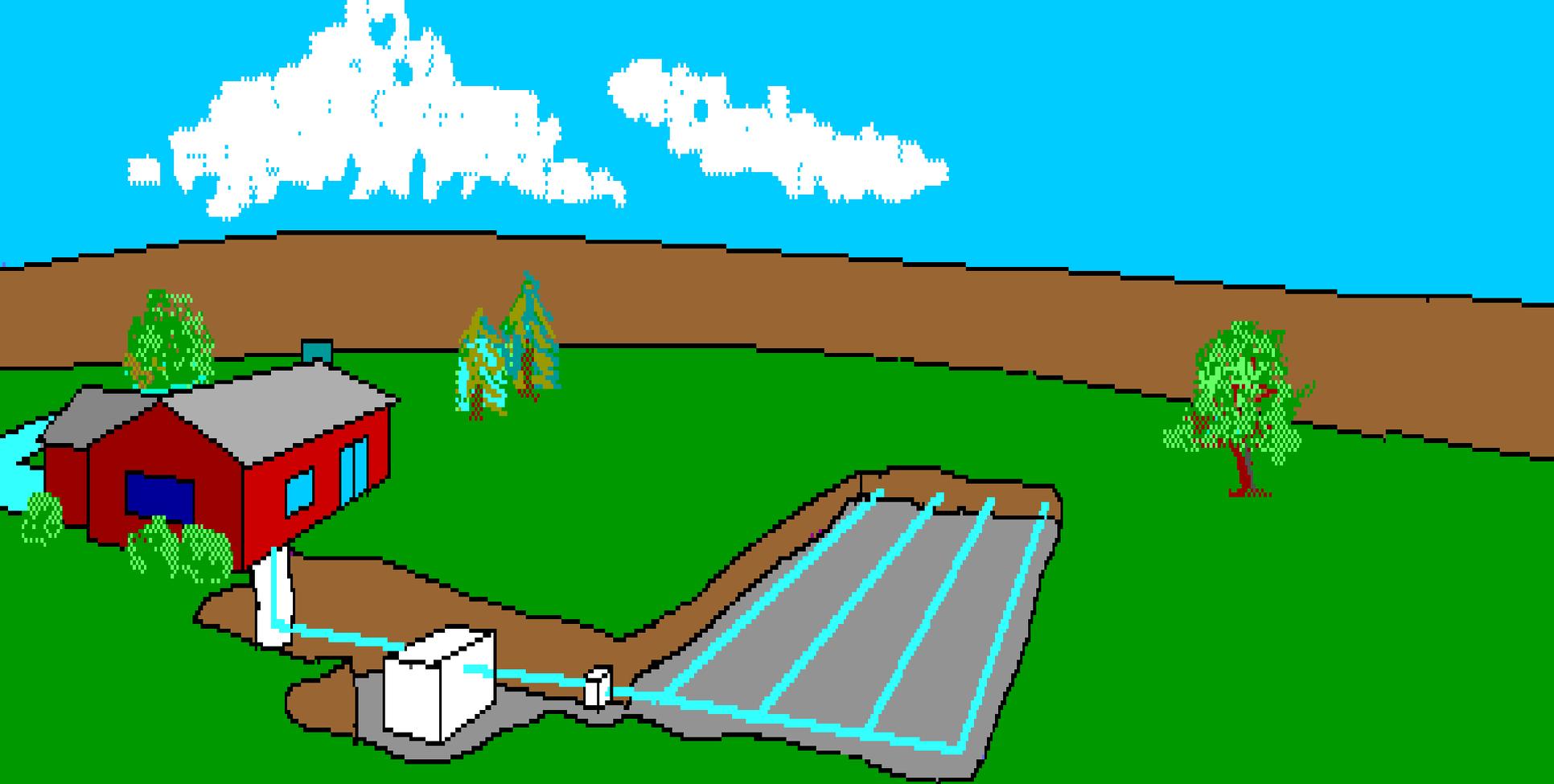
Septic System/Well Separation



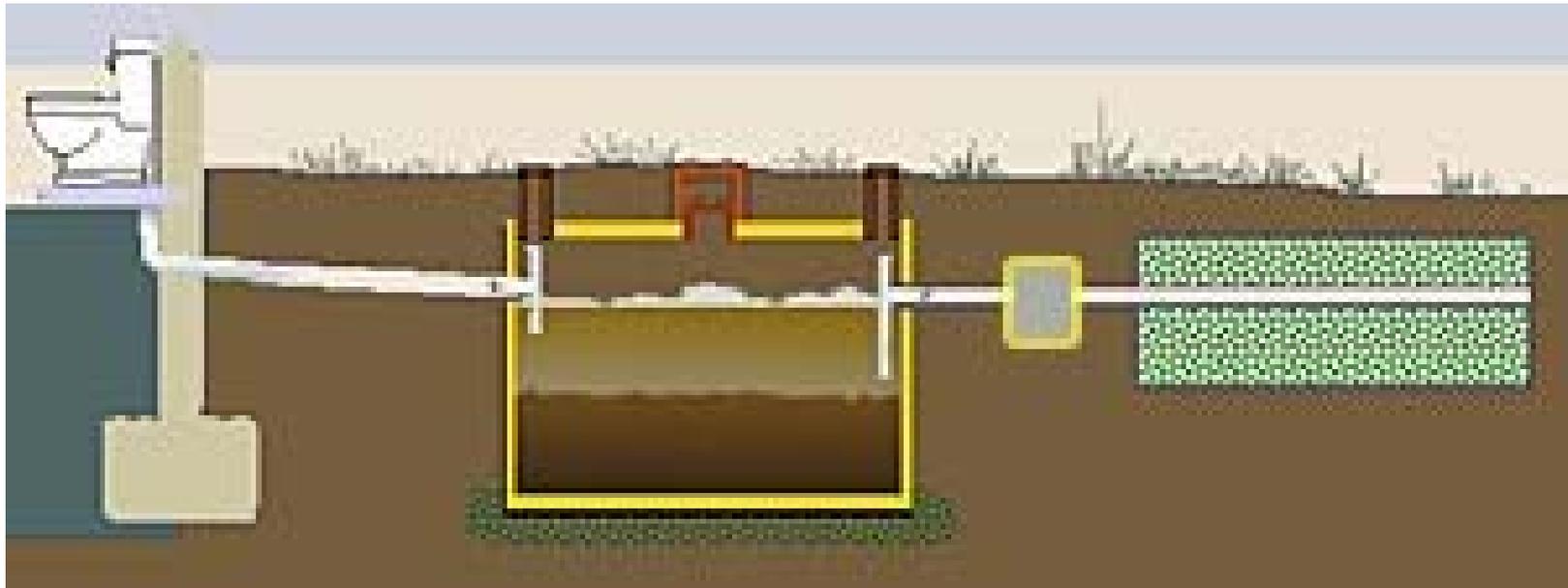
Wells and septic systems may be too close in some of our older communities.

Septic System Components

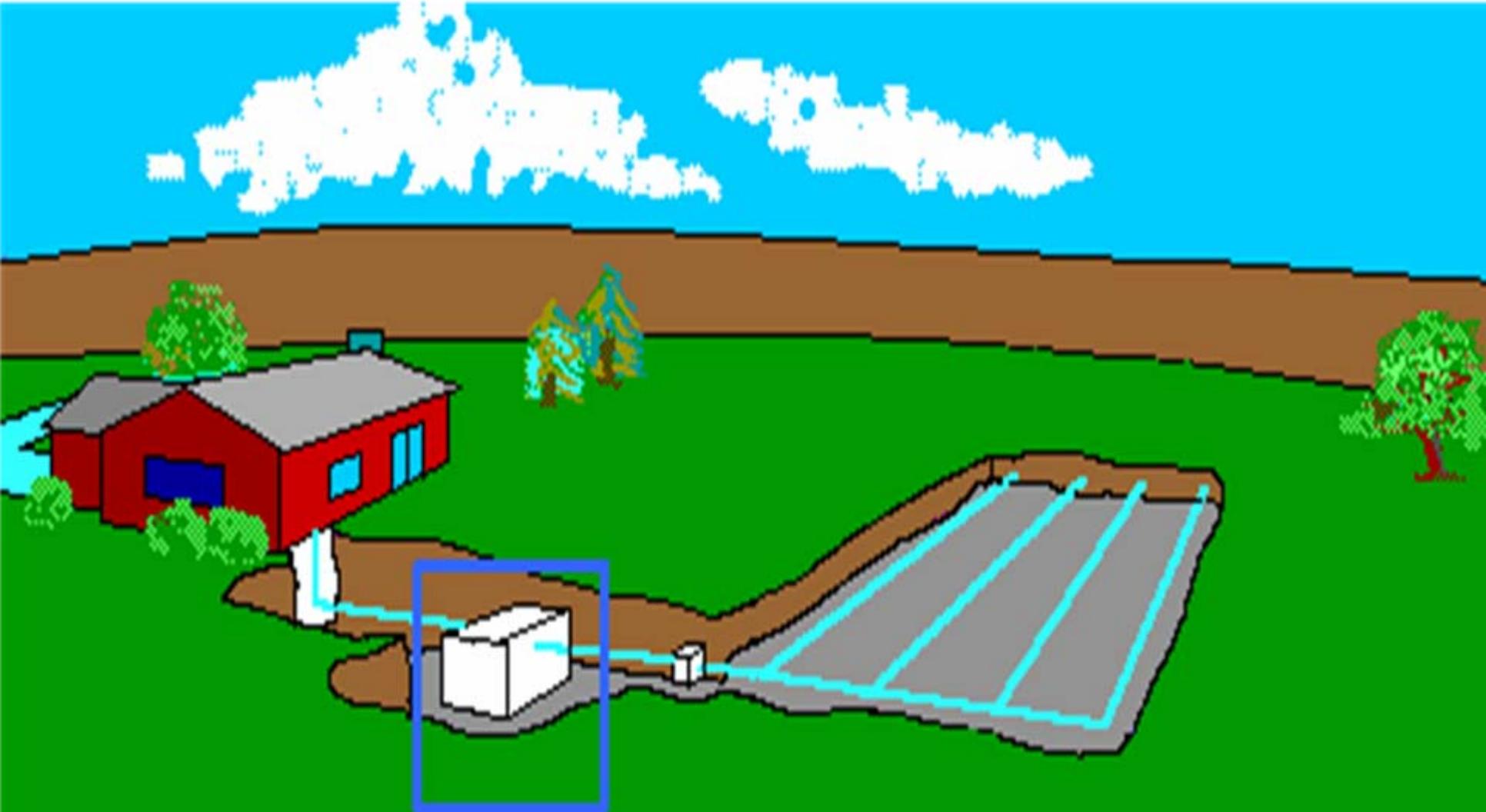




A typical septic system consists of three main components



Cross section of a typical septic system

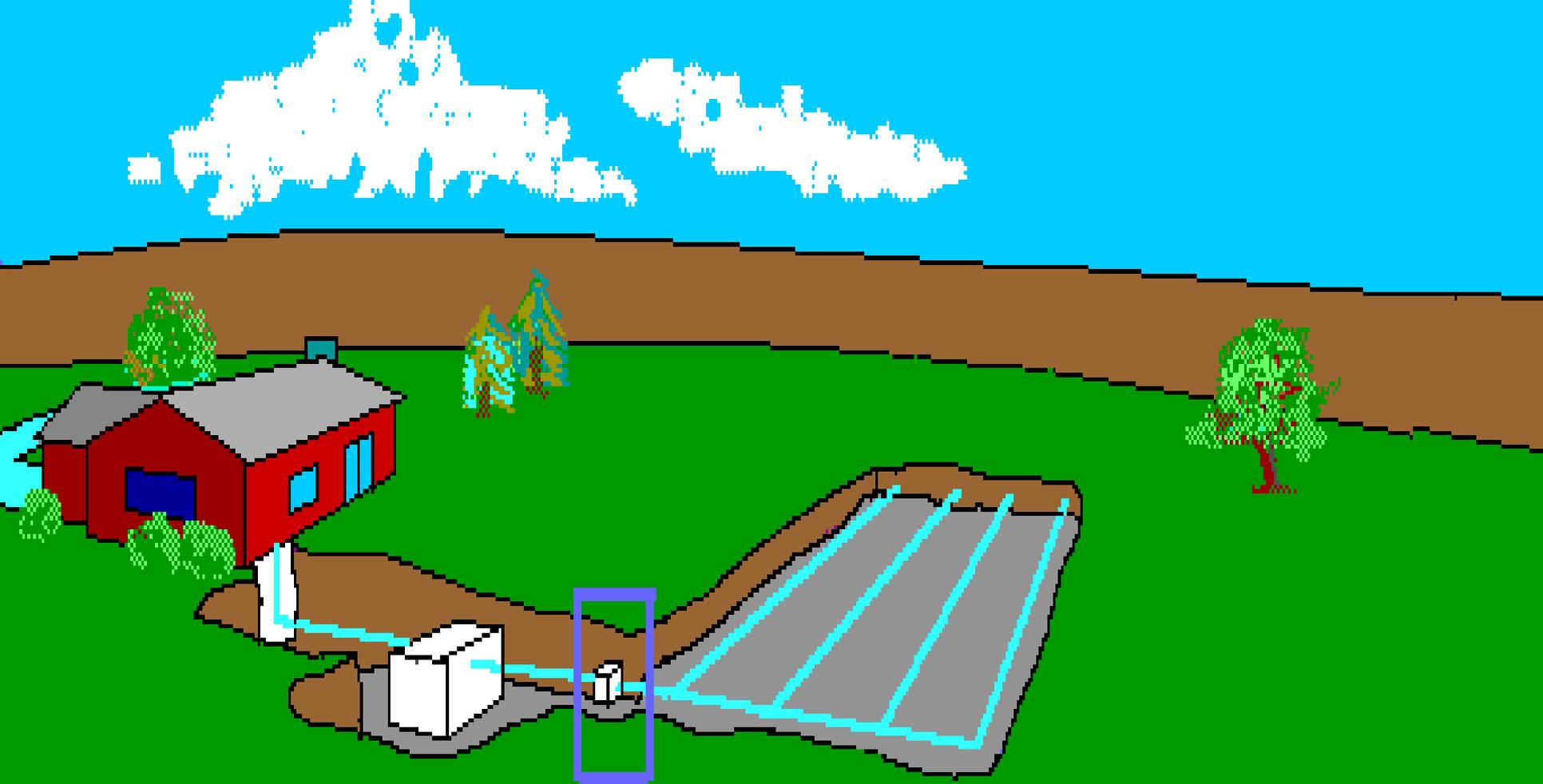


Septic Tank





Effluent Filter

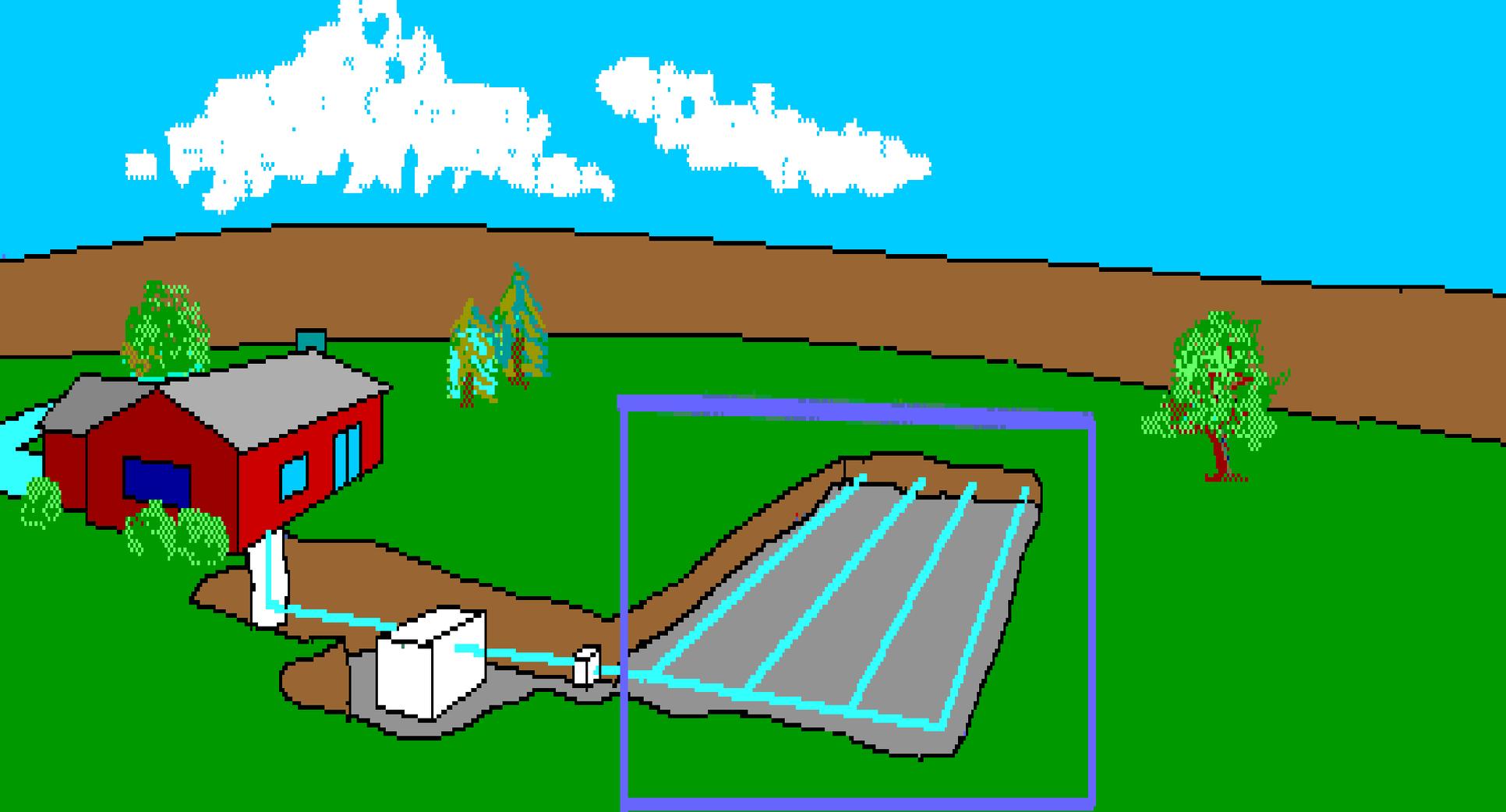


Distribution Box

Looking down into a distribution box.







Absorption Field



Gravelless Chambers

**Standard, gravel filled
drainfield trench**



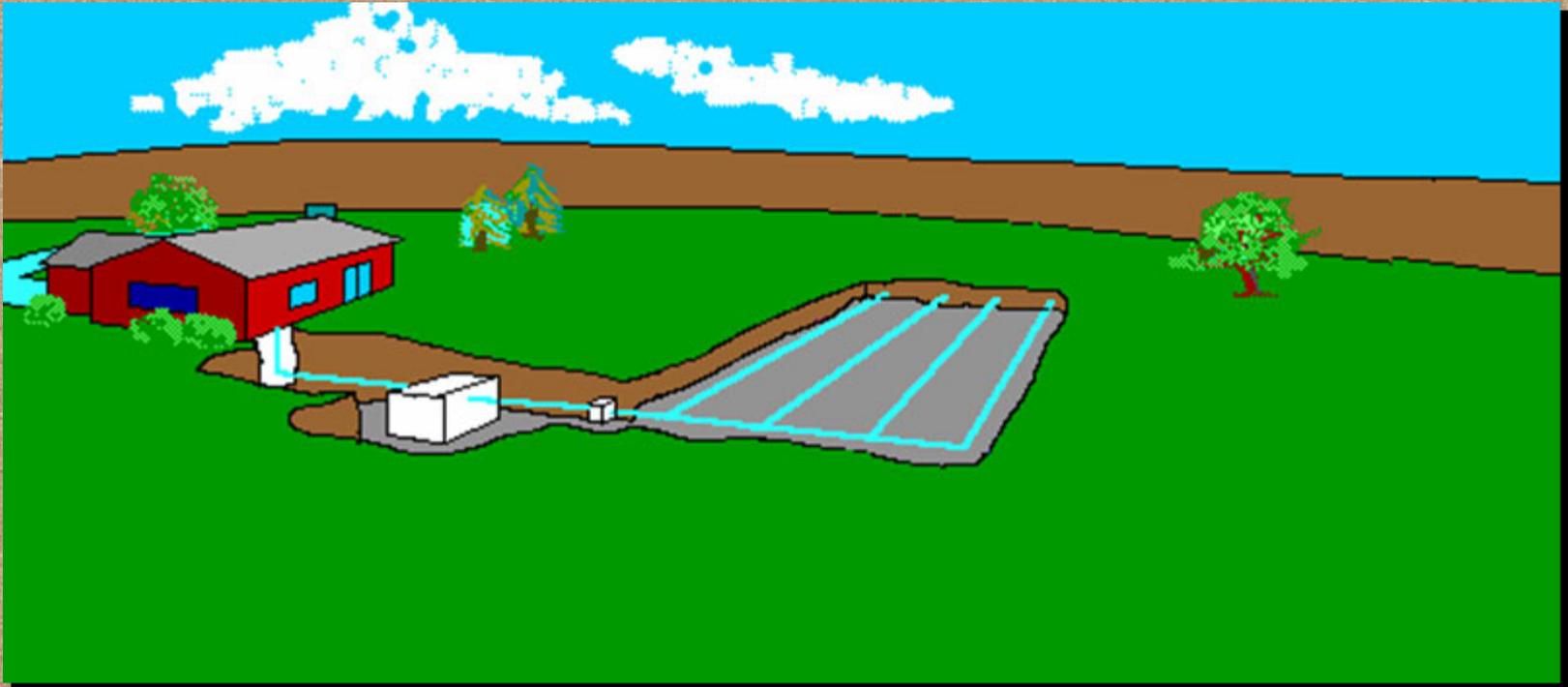
Types of Septic Systems



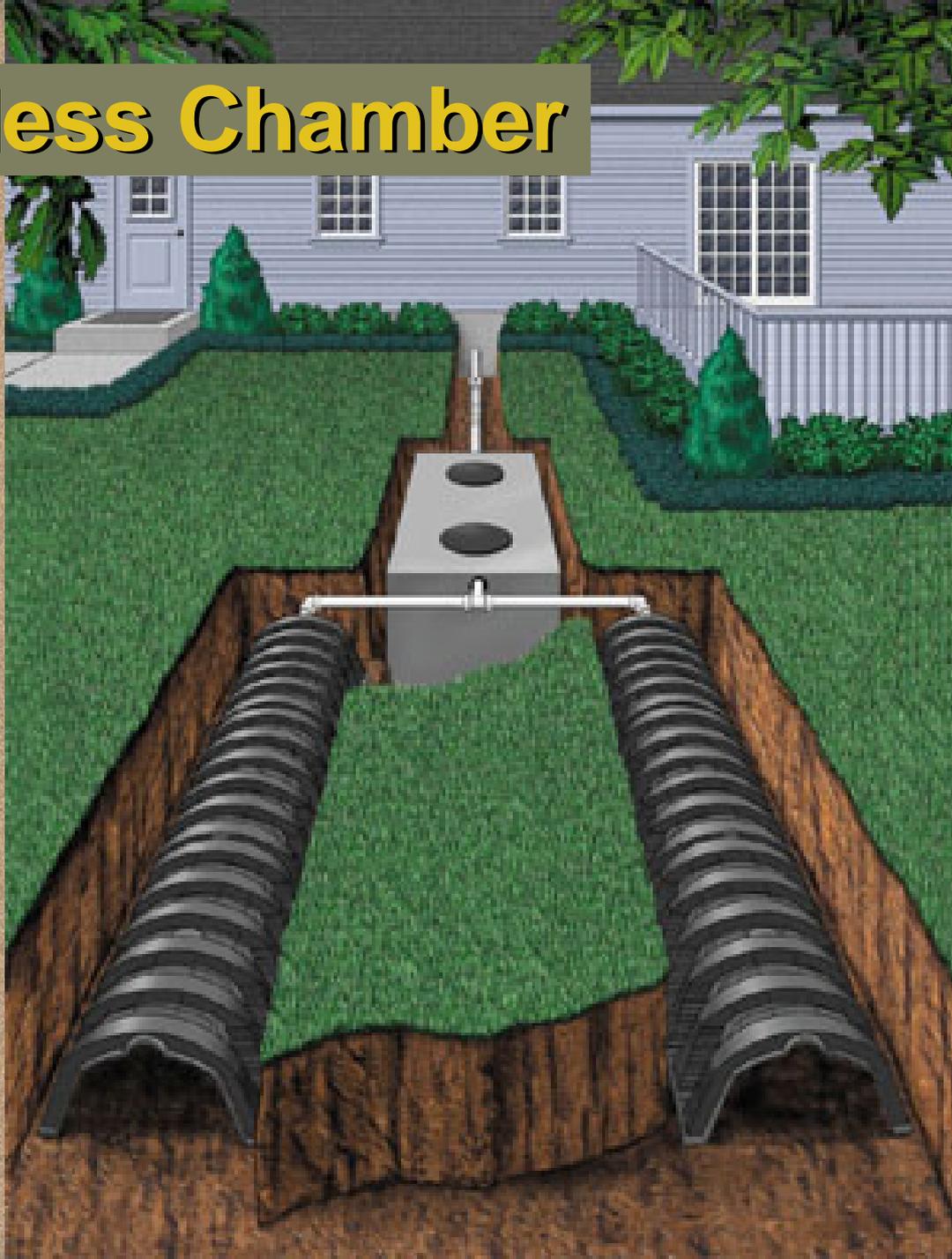
- **Gravity – gravel or chambers**
- **Pressure-dosed**
- **Mound**
- **Sand filter or other filter media systems**



Gravity System



Gravelless Chamber





Gravelless Chambers

Pressure-dosed Drainfield

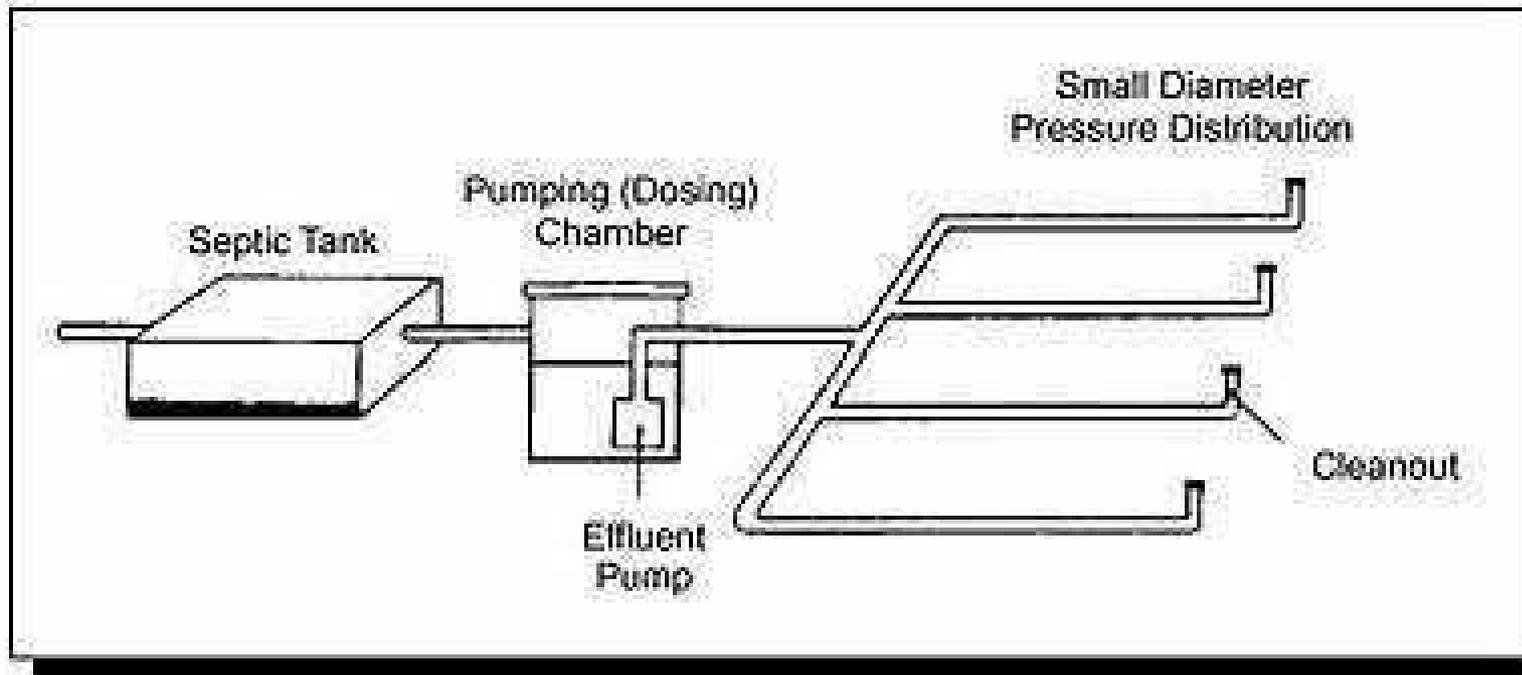


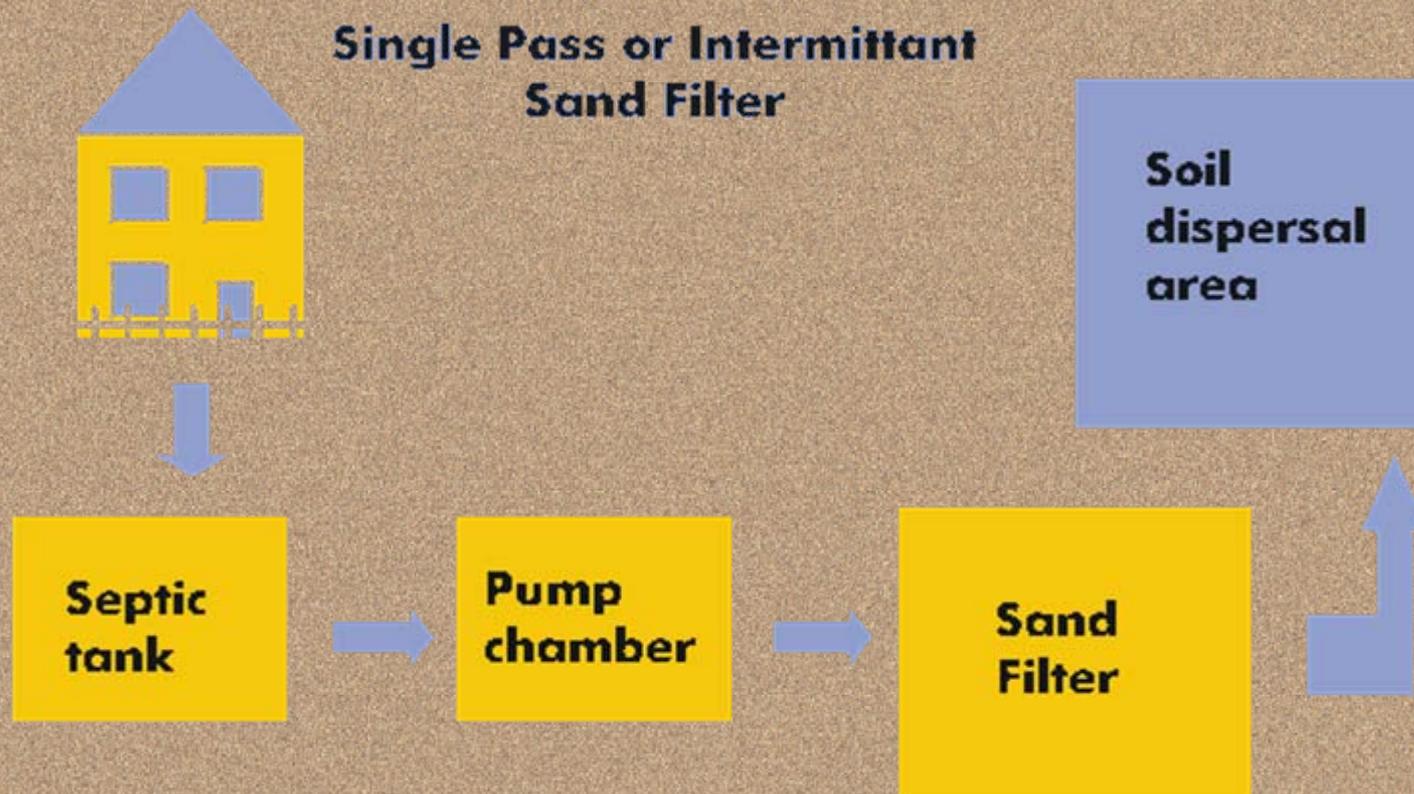
Figure 1: Low-Pressure Pipe System

Source: U.S. Environmental Protection Agency (1992)

Pressure-dosed System



Single Pass or Intermittent Sand Filter

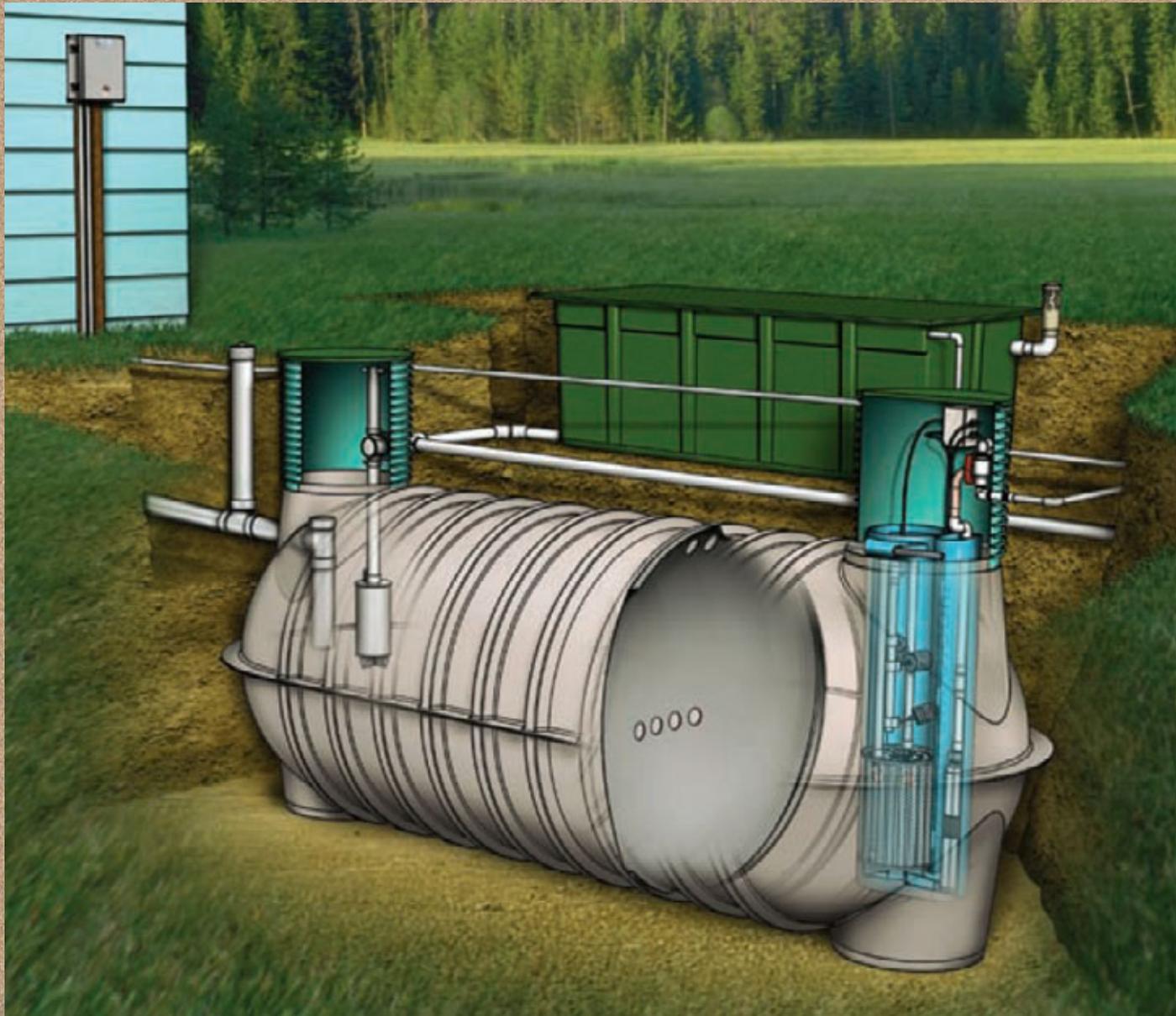


The pump chamber may be part of the septic tank

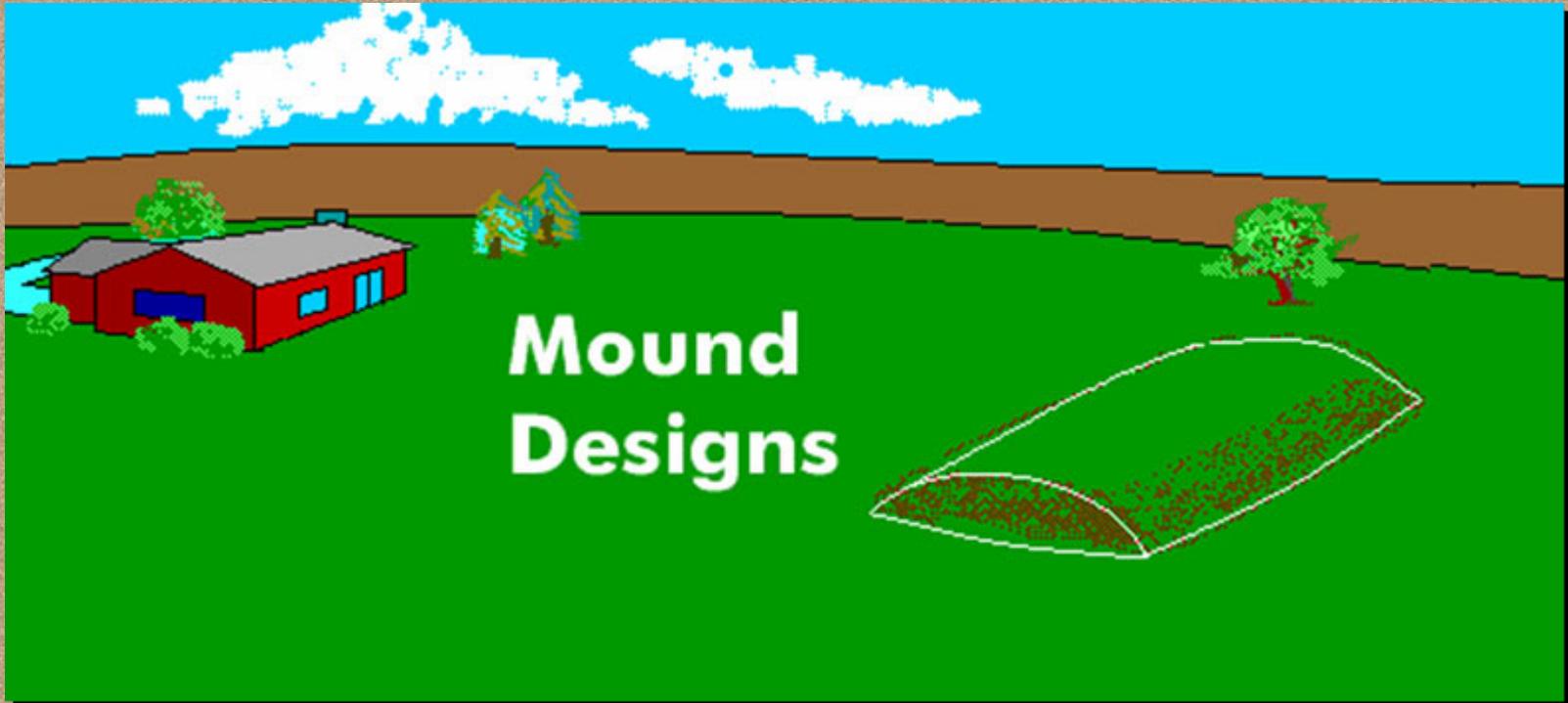
Sand Filter



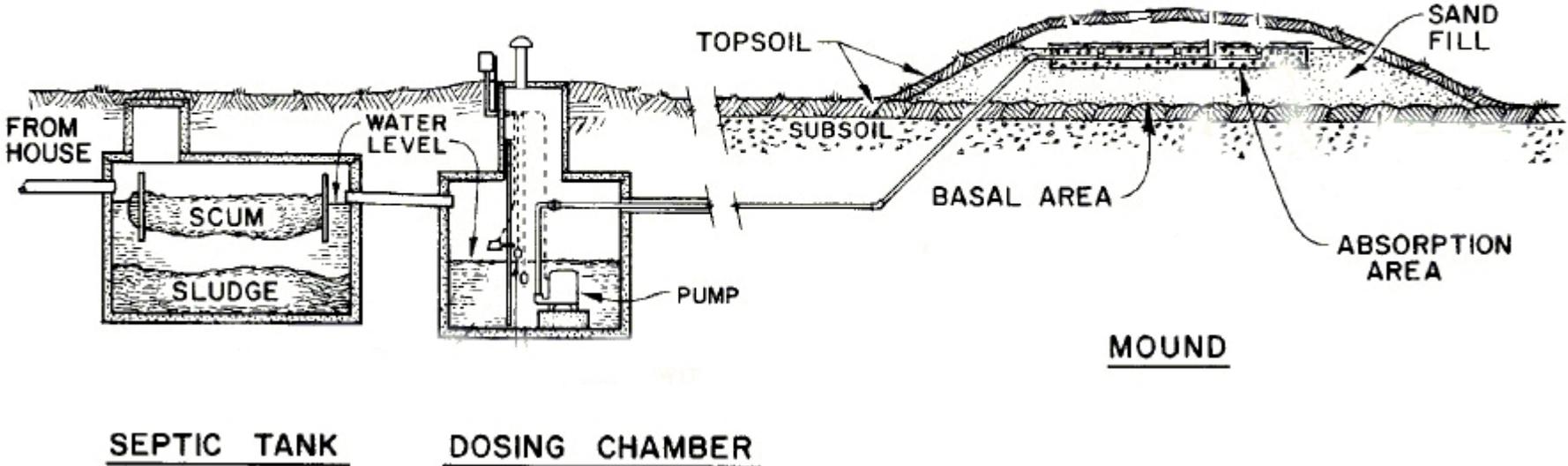
AdvanTex (recirc filter)



Mound



Mound



Mound



Mound



Care and Maintenance of Septic Systems

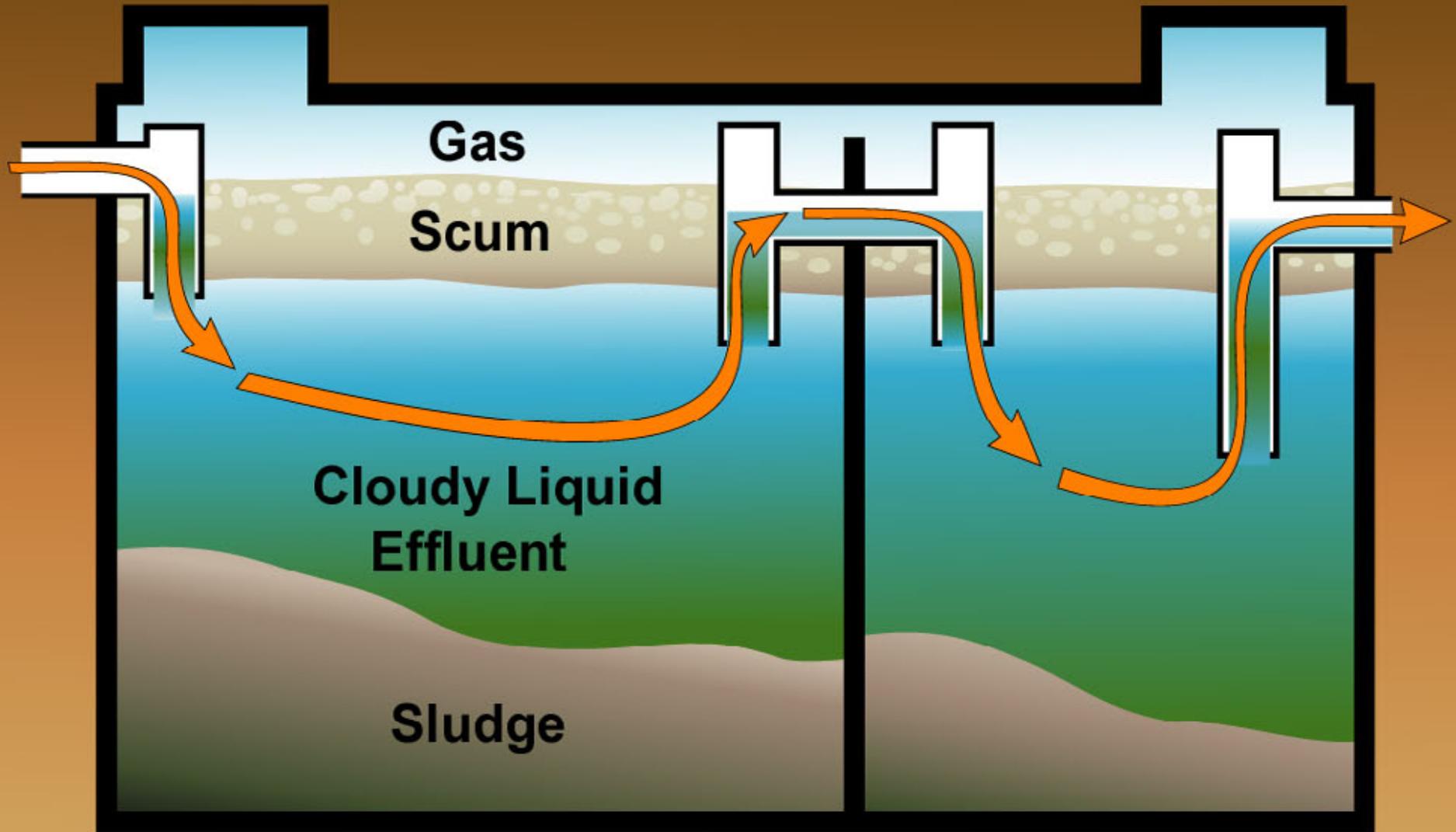




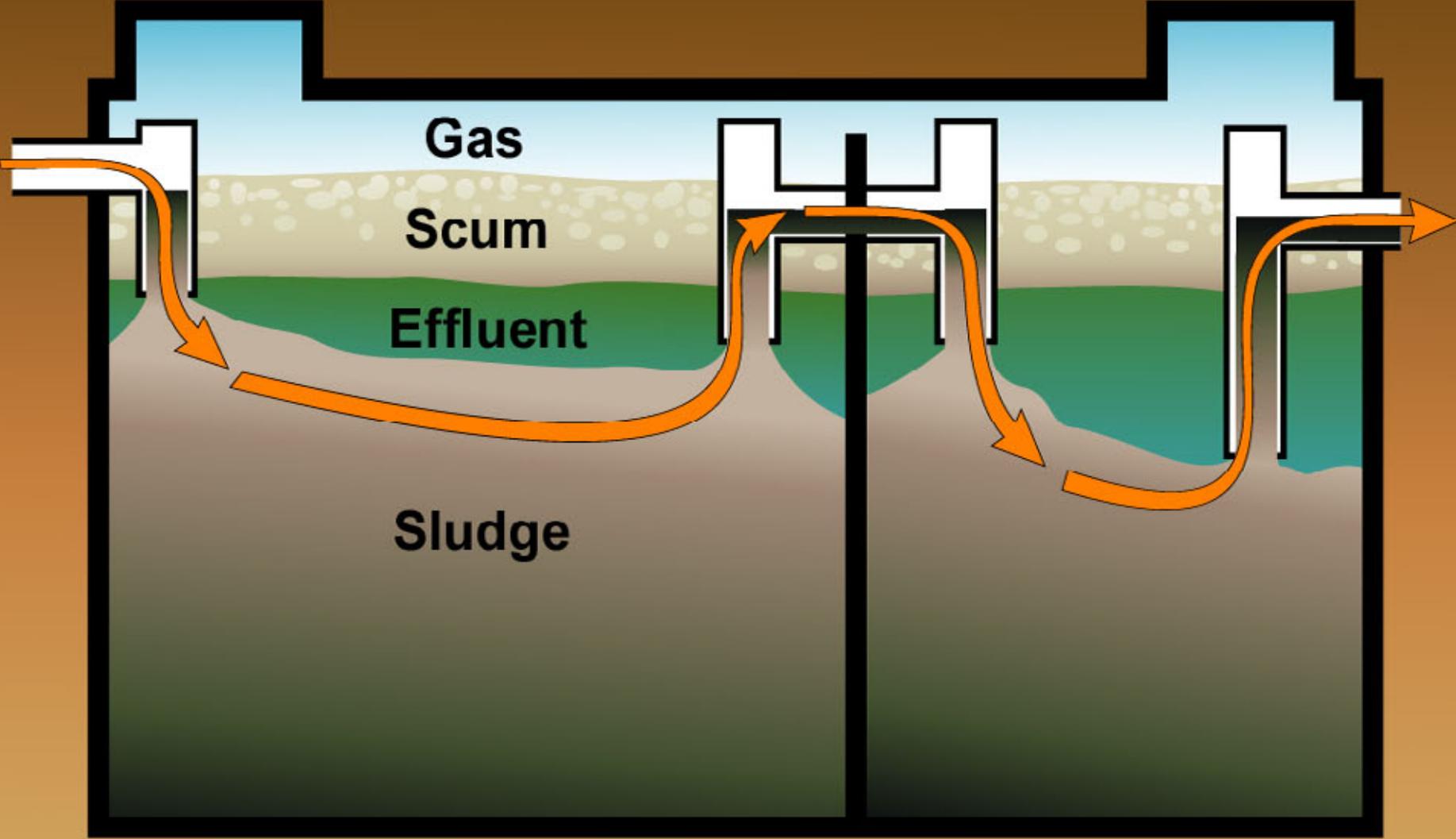
Do You Know???

- Where your tank is?
- How big it is?
- When it was last pumped?
- Where your drainfield is?

TANK MAINTAINED



NEGLECTED TANK

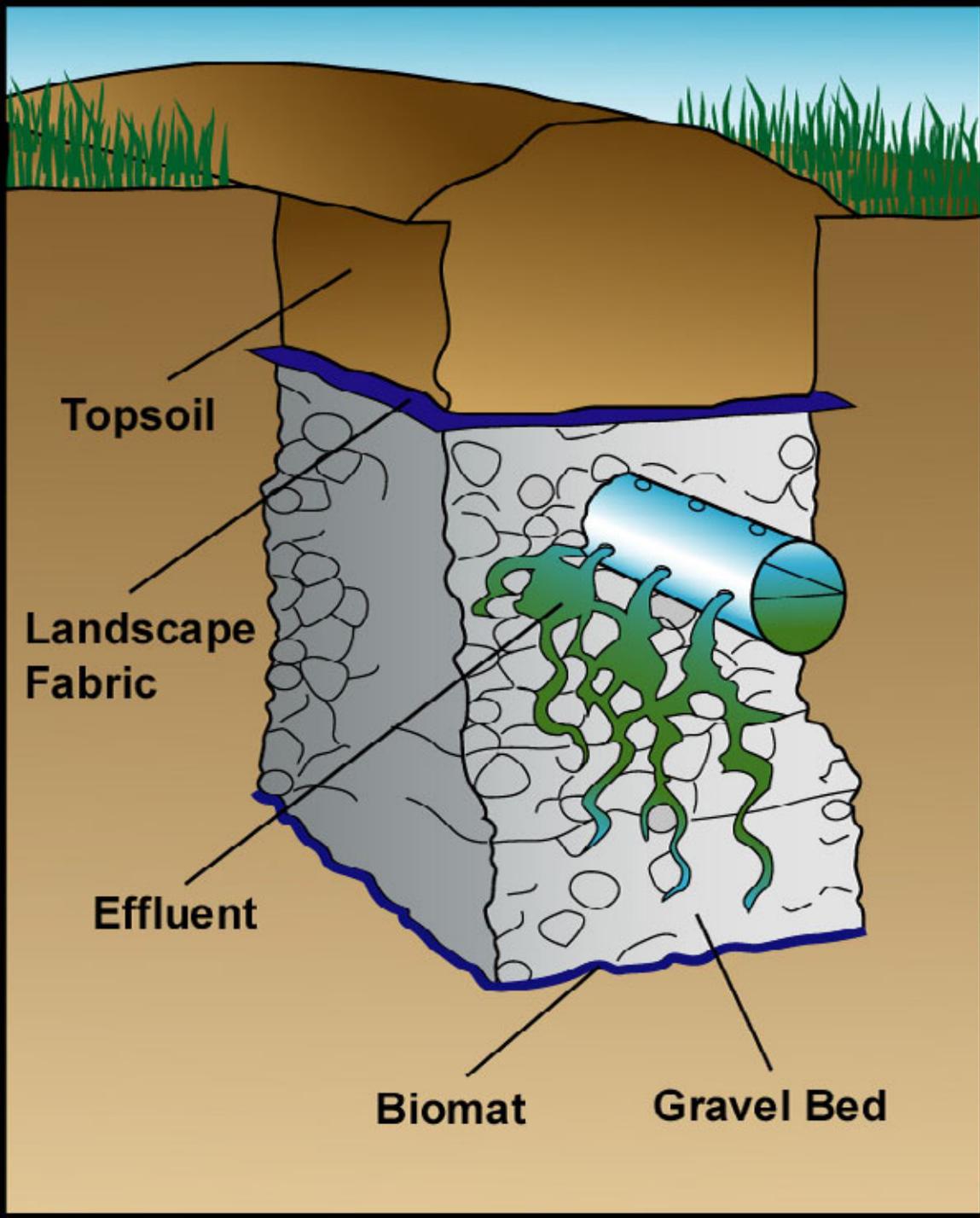


Gas

Scum

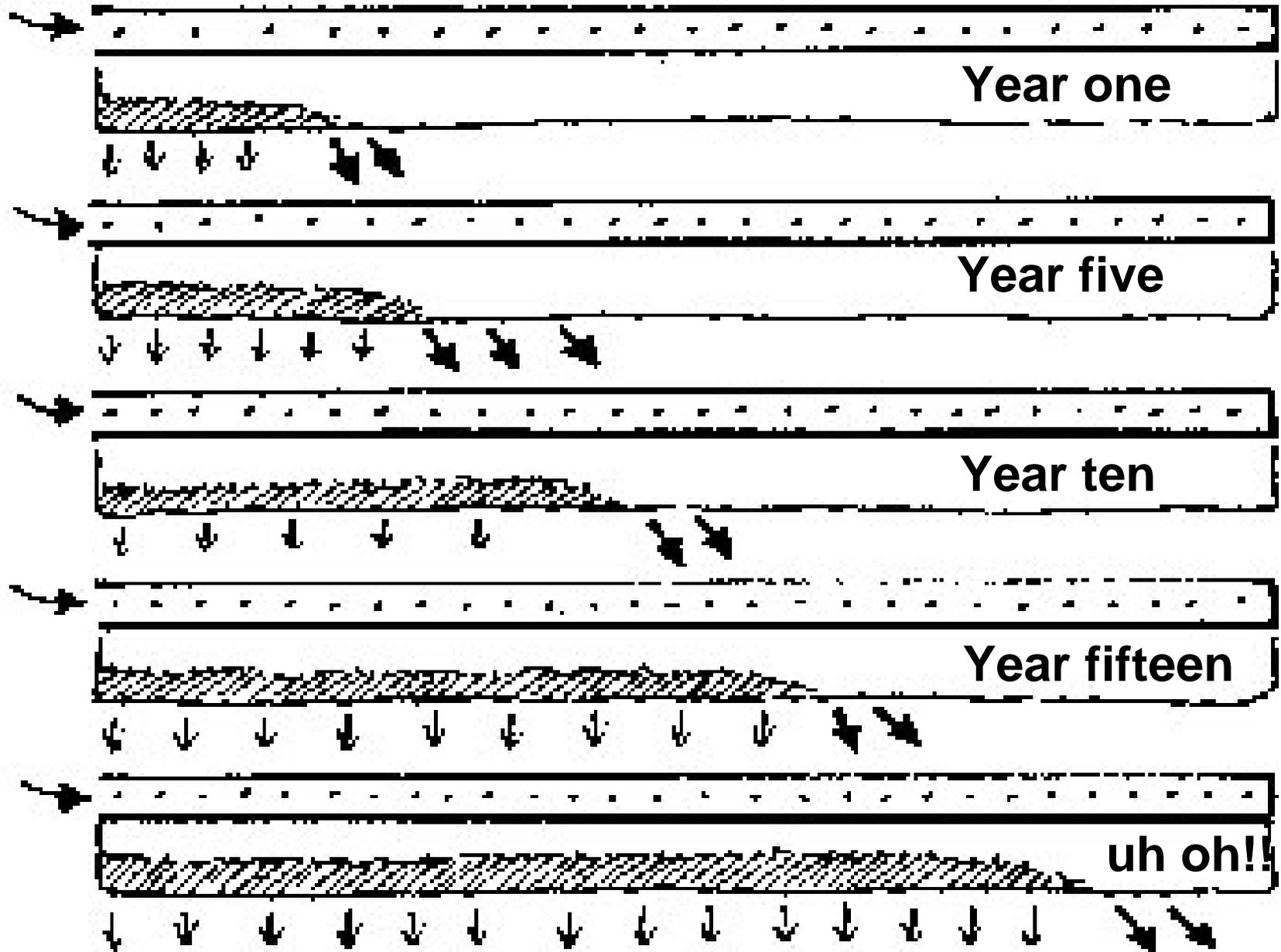
Effluent

Sludge



**Where
does the
liquid
effluent
go?**

Progressive Development of a Biomat



Good example of septic tank and distribution box access.



JAN 18 2007

Looking into a septic tank at the effluent filter. Pull out the filter (red) for cleaning.



JAN 18 2007



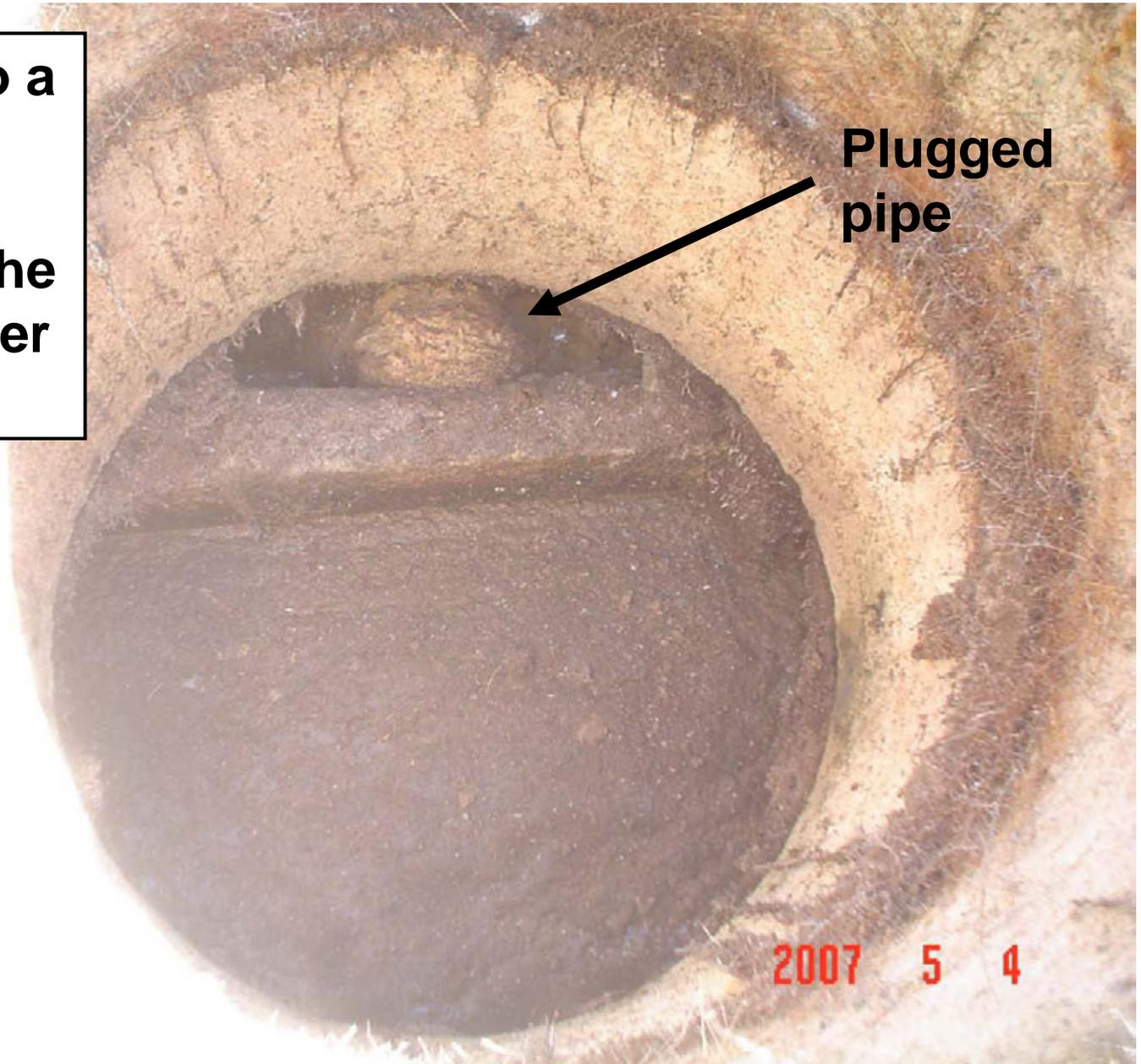
A fairly clean filter!

Top Ten Causes of Septic Failure

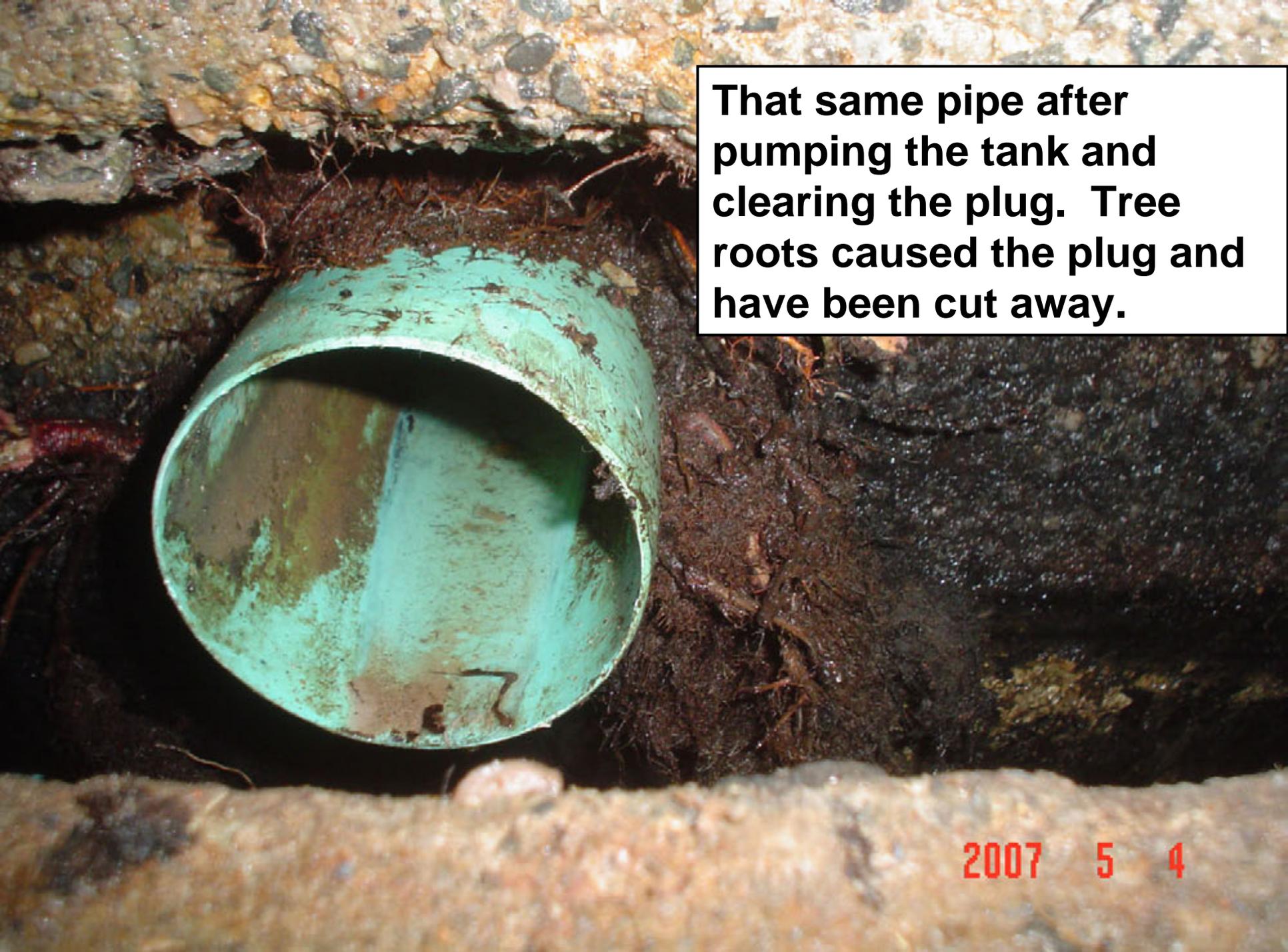
- **#10 Driving over your drainfield**
- **#9 Tree roots**
- **#8 Flushing foreign objects down the drain**
- **#7 Kitchen grease**
- **#6 Failure to install according to local codes**

**Looking into a
septic tank
that is
plugged at the
influent sewer
pipe**

**Plugged
pipe**



2007 5 4

A photograph showing a green pipe in a trench. The pipe is surrounded by dark soil and numerous tree roots. The pipe appears to be in good condition after being cleared of a previous plug. The trench is lined with concrete or stone blocks.

**That same pipe after
pumping the tank and
clearing the plug. Tree
roots caused the plug and
have been cut away.**

2007 5 4



**Inside view of a recently pumped
septic tank.**

2007 5 4

Causes of Septic Failure (cont.)

- **#5 Not maintaining system**
- **#4 Salts and chemicals from water softeners and washing machines**
- **#3 Extensive use of garbage disposals**
- **#2 Poor drainage or poor siting**
- **#1 Overloading, both hydraulic and organic**

What Can I Plant Over My Leachfield?

OK TO PLANT

(shallow-rooted)

- Grasses
- Perennial & annual flowers
- Many groundcovers



AVOID!

(deep-rooted)

- Alfalfa
- Willows
- Poplars
- Cottonwoods
- Birches
- Elms
- Other invasive-rooted trees



Septic System Failures-homeowner repair solution to plugged pipe



Surfacing Effluent



Surfacing Sewage



Surfacing Effluent



Surfacing Effluent



Failed Septic Tank



Maintaining Your Septic System



- **Keep your bacteria healthy and happy**
- **PUMP YOUR TANK!!**

Suggested Pumping Interval (years)

Number of people in your household

Tank Size (gallons)	1	2	3	4	5	6
1000	12	6	4	3	2	2
1250	16	8	5	3	3	2
1500	19	9	6	4	3	3

To Pump...or Not To Pump

- Pumping costs about **\$150-\$250** for the average 1,000 gallon tank, every 3 years or so
- A new leachfield costs from **\$5,000** for an in-ground system to as much as **\$20,000** for an engineered field

Which would you choose?

What About Additives?

- Enough bacteria are present in the tank from normal bodily wastes
- Additives cost \$\$\$
- Typically, the people who recommend additives are those who sell them
- Chemical additives may end up in groundwater
- There is no substitute for maintenance!



**Leaking Fixtures Cause Overuse of
Your Drainfield**

For More Information,

You local health department.