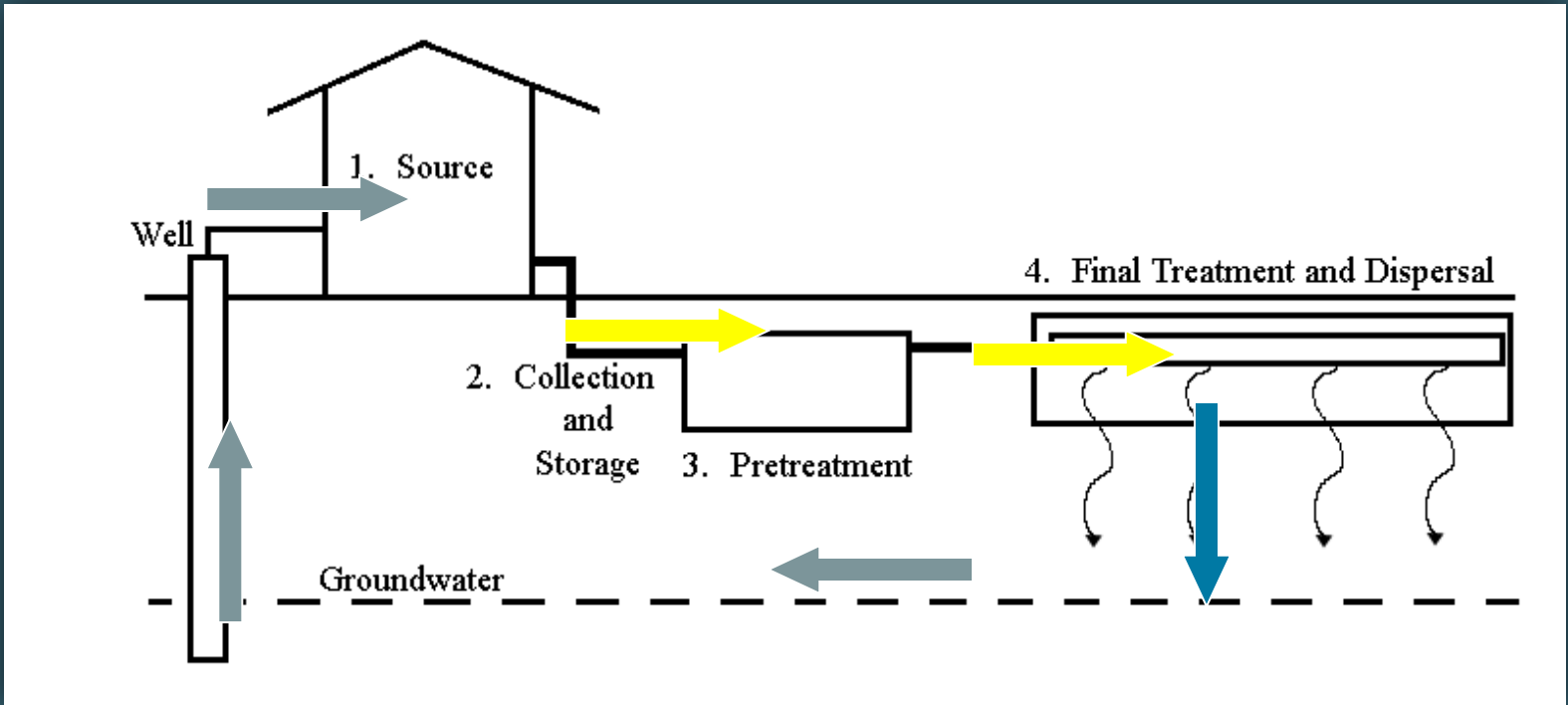
Components of an Onsite Wastewater Treatment System

1. *Wastewater source*
2. *Collection and storage*
3. *Pretreatment components*
4. *Final treatment and dispersal components*



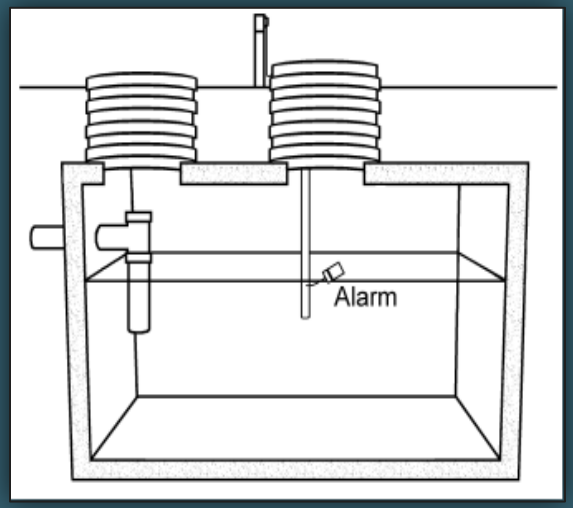
Wastewater Source

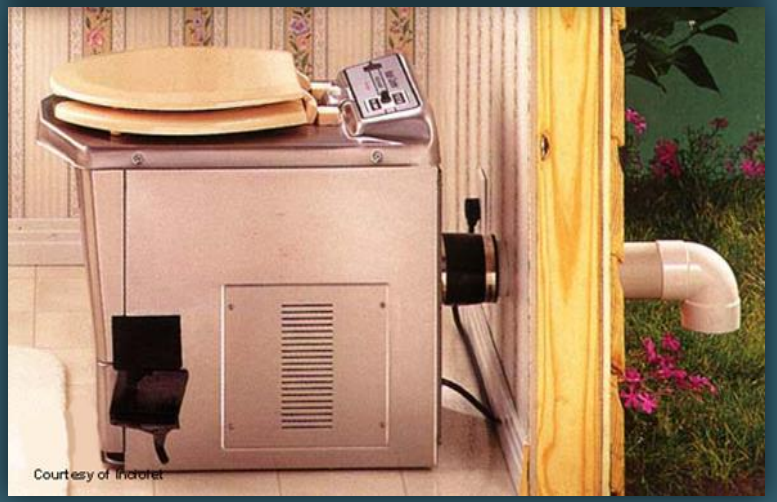
- Facility type
  - Domestic
  - Commercial
- User
  - Owner/family
  - Employees

The homeowner should be aware that anything they do in the home could end up affecting the system.

Collection

- Piping from facility with cleanout
  - Blackwater
  - Graywater
- Collection Options
  - Holding tanks
  - Composting toilets
  - Incinerating toilets





Pretreatment

Pre-treating waste before it reaches the soil

- Septic tanks
- Aerobic treatment units
- Media filters
- Constructed wetlands
- Disinfection

Final Treatment and Dispersal

Final treatment occurs in the soil

- Conventional trench or bed distribution
- Low pressure distribution
- Drip field
- Spray field
- Evapotranspiration beds

How do we make the OSSF work?

- Evaluate the wastewater source:
  - Hydraulic and organic loading
- Evaluate site
  - Wastewater treatment
  - Wastewater acceptance
- Choose a final treatment and dispersal component
- Choose the appropriate pretreatment system
- Operation and maintenance

Choices of Distribution for Various Soil Types

Soil conditions		Distribution systems							
		Standard drain field[A]	Low-pressure distribution	Subsurface drip distribution	Spray distribution[B]	Mound system	ET bed[C]	Soil substitution drain field	Pumped effluent drain field
Soil type[D]	Ia	No	No[B]	No[B]	Yes	Yes	Yes (lined only)	Yes	No
	Ib	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	II	Yes[H]	Yes[H]	Yes[H]	Yes	Yes[H]	Yes	Yes[H]	Yes[H]
	III	Yes[H]	Yes[H]	Yes[H]	Yes	Yes[H]	Yes	Yes[H]	Yes[H]
	IV	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Depth of good soil (type Ib, II, III) below application depth	2 or more feet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	1 foot	No	Yes	Yes	Yes	Yes[F]	Yes (lined only)	Yes[E]	Yes
	Less than 1 foot	No	No	Yes[B] (6 inches)	Yes (must support vegetation)	Yes[F]	Yes (lined only)	Yes[E]	No
Groundwater depth below application depth	2 feet or more	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	1 foot	No	No	Yes[B]	Yes	Yes[F]	Yes (lined only)	No	No
	Less than 1 foot	No	No	No	Yes	Yes[F]	Yes (lined only)	No	No
Soil surface slope	0-30%	Yes[I] < 30%	Yes	Yes	Yes[G]	≤10%	Yes	Yes	≤ 2%
	Over 30% or complex slopes	No	Yes	Yes	Yes[G]	No	No	No	No

[A] This option includes conventional gravel-filled trench, leaching chambers and gravelless pipe.

[B] This option is available with a pretreatment system giving a secondary-quality effluent and disinfection. Class I aerobic units and sand filters are designed to give secondary-quality effluent. Other treatment systems need to be professionally designed to obtain the secondary-quality effluent.

[C] ET= Evapotranspiration

[D] Soil types: Ia - sandy soil with more than 30% gravel; Ib - sand and loamy sand; II - sandy loam and loam; III - silt, silt loam, silty clay loam, clay loam, sandy clay loam and sandy clay; and IV - silty clay and clay. A site evaluator determines these conditions.

[E] The soil substitution drain field is built by removing the unsuitable soil and placing 2 feet of suitable soil around the absorption system. However, this system cannot be used in a type IV soil.

[F] The mound must be constructed to maintain 2 feet of good soil below the wastewater application level and above groundwater, 18 inches to restrictive horizon.

[G] Spray distribution of wastewater can be used on surface slopes of 0-15%. Land with steeper slopes needs to be landscaped and terraced to minimize runoff.

[H] May require gravel analysis for determning further suitability.

[I] Sites with a slope of less than 2% need a drainage plan for removing rainfall runoff.

Minimum Required Separation Distances

From	To: Sewage treatment tanks or holding tanks	Soil absorption systems and unlined ET beds	Lined evapotranspiration beds	Sewer pipe with watertight joints	Surface distribution (spray area)	Drip distribution
Public water wells	50	150	150	50	150	150
Public water supply lines	10	10	10	10	10	10
Private water well	50	100	50	20	100	100
Private water line	10	10	5	10 except at connection to structure	0	10
Private water well (pressure cemented or grouted to 100 ft. or cemented or grouted to water table if water table is less that 100 ft. deep	50	50	50	20	50	50
Streams, ponds, lakes, rivers (measured from normal pool elevation (with and water level); saltwater bodies (high tide only)	50	75, LPD (Secondary treatment and disinfection) - 50	50	20	50	25 when $R_a \leq 0.1$[B] 75 when $R_a > 0.1$ secondary treatment and disinfection) - 50
Foundations, buildings, surface improvements, property lines easements, swimming pools and other structures	5	5	5	5	No separation distances except: property lines - 10[E] swimming pools - 25	No separation distances except[C] property lines - 5
Sharp slopes, breaks	0 Special support may be required for zero separation distances	25	5	10	25	10 when $R_a \leq 0.1$[B] 25 when $R_a > 0.1$[B]
Edwards Aquifer recharge features[D]	50	150	50	50	150	100 when $R_a \leq 0.1$[B] 150 when $R_a > 0.1$[B]

[A] All distances measured in feet.

[B] R_a refers to the application rate for wastewater to the soil. This term is presented as gallons of wastewater applied per square foot of absorption area. Soil types Ia, Ib, II, III and IV have the corresponding Ra values 0.5, 0.38, 0.25, 0.20 and 0.1, respectively.

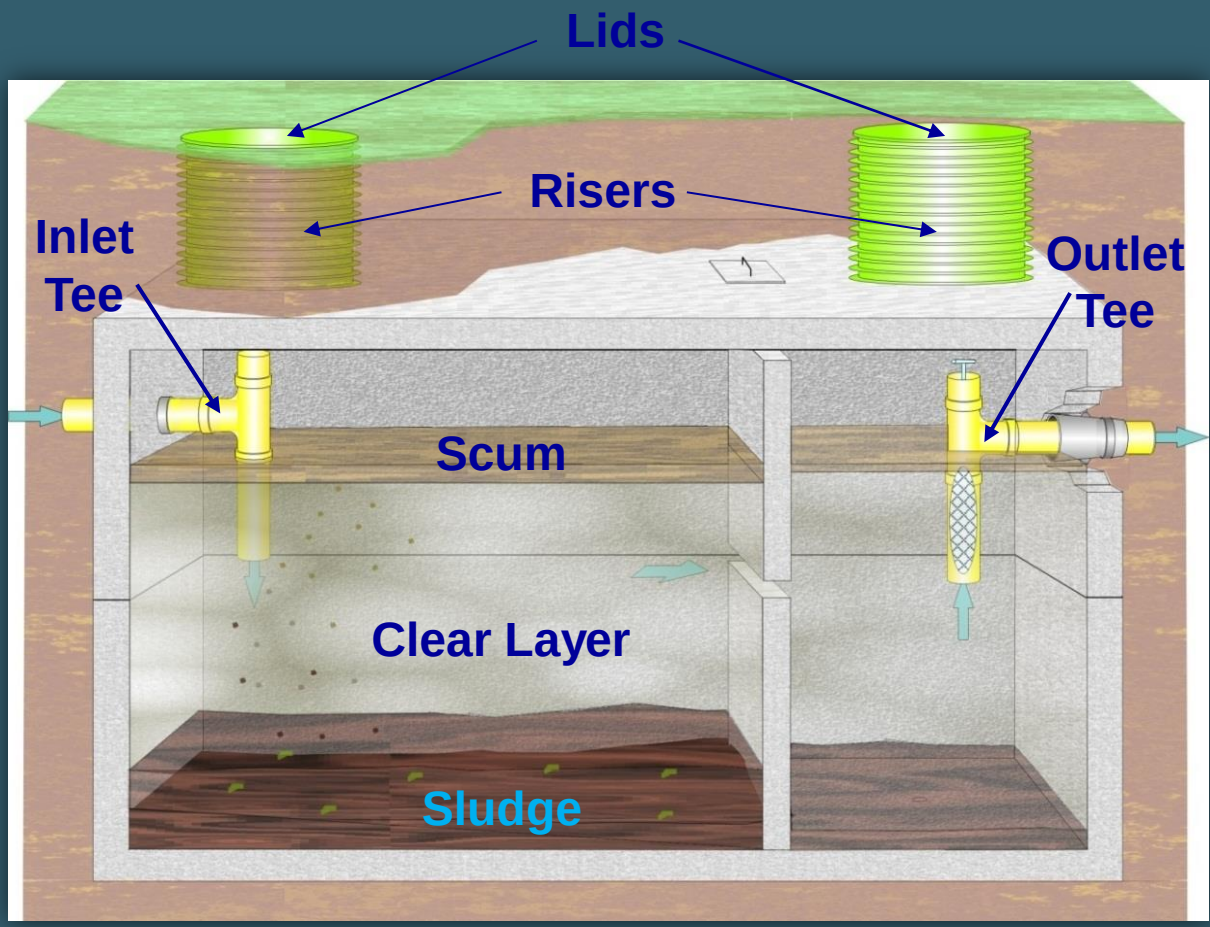
[C] Drip distribution lines may not be placed under foundations.

[D] No on-site sewage facility may be installed closer than 75 feet from the banks of the Nueces, Dry Frio, Frio or Sabinal rivers downstream from the northern Uvalde County line to the recharge zone.

[E] A separation distance of 10 feet is for spray systems controlled by a timer. A separation distance of 20 feet is required for uncontrolled spray systems, which spray effluent when the pump tank is full. This can occur at any time of the day.

What is a Septic Tank?

- Water tight containers
  - Concrete
  - Plastic / Fiberglass
  - NOT Metal
- Detention time
  - Typically 2-3 days
  - Calm conditions
- Gravity separation
  - Heavy sinks
  - Lighter floats
- Anaerobic digestion



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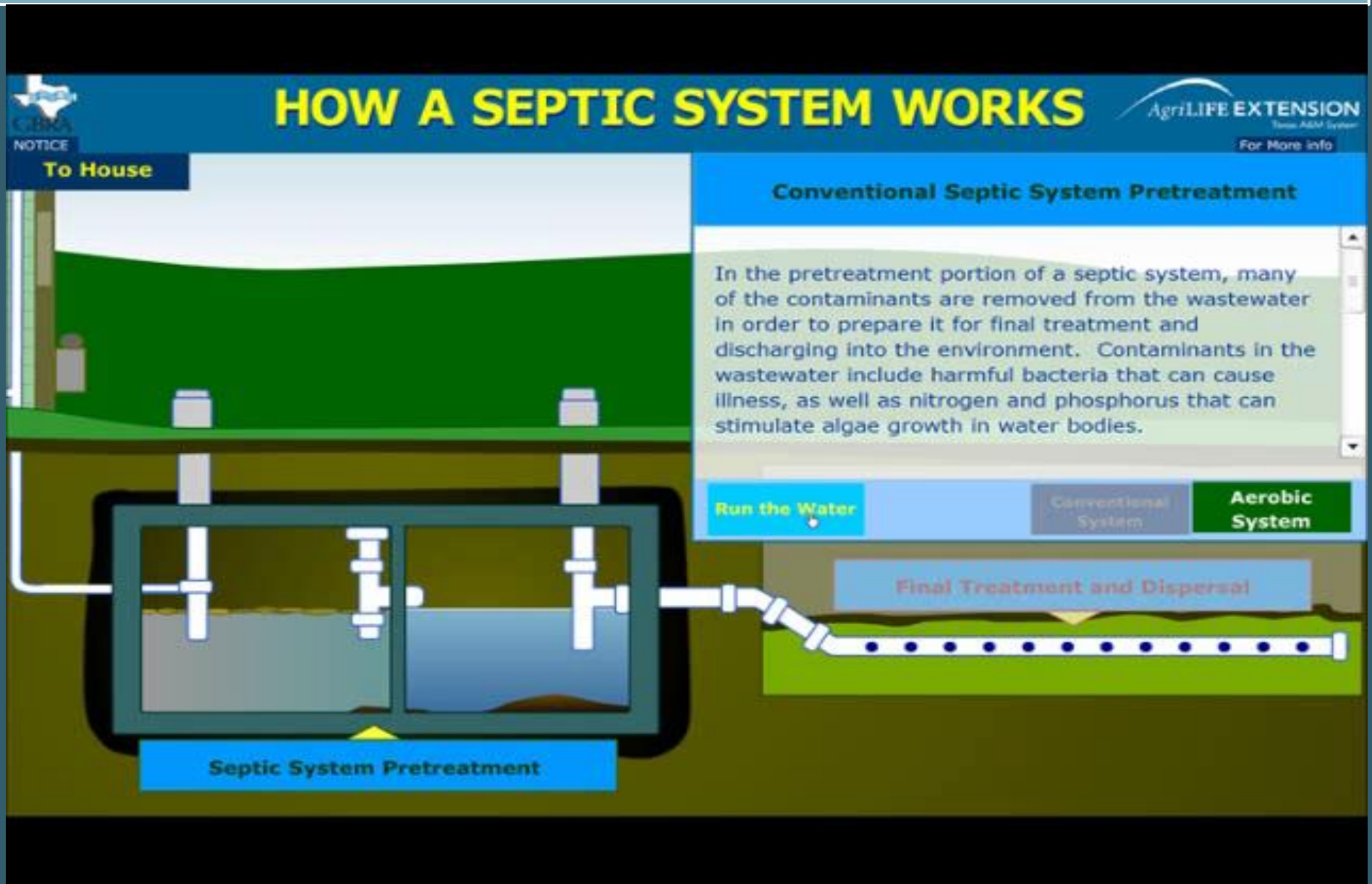

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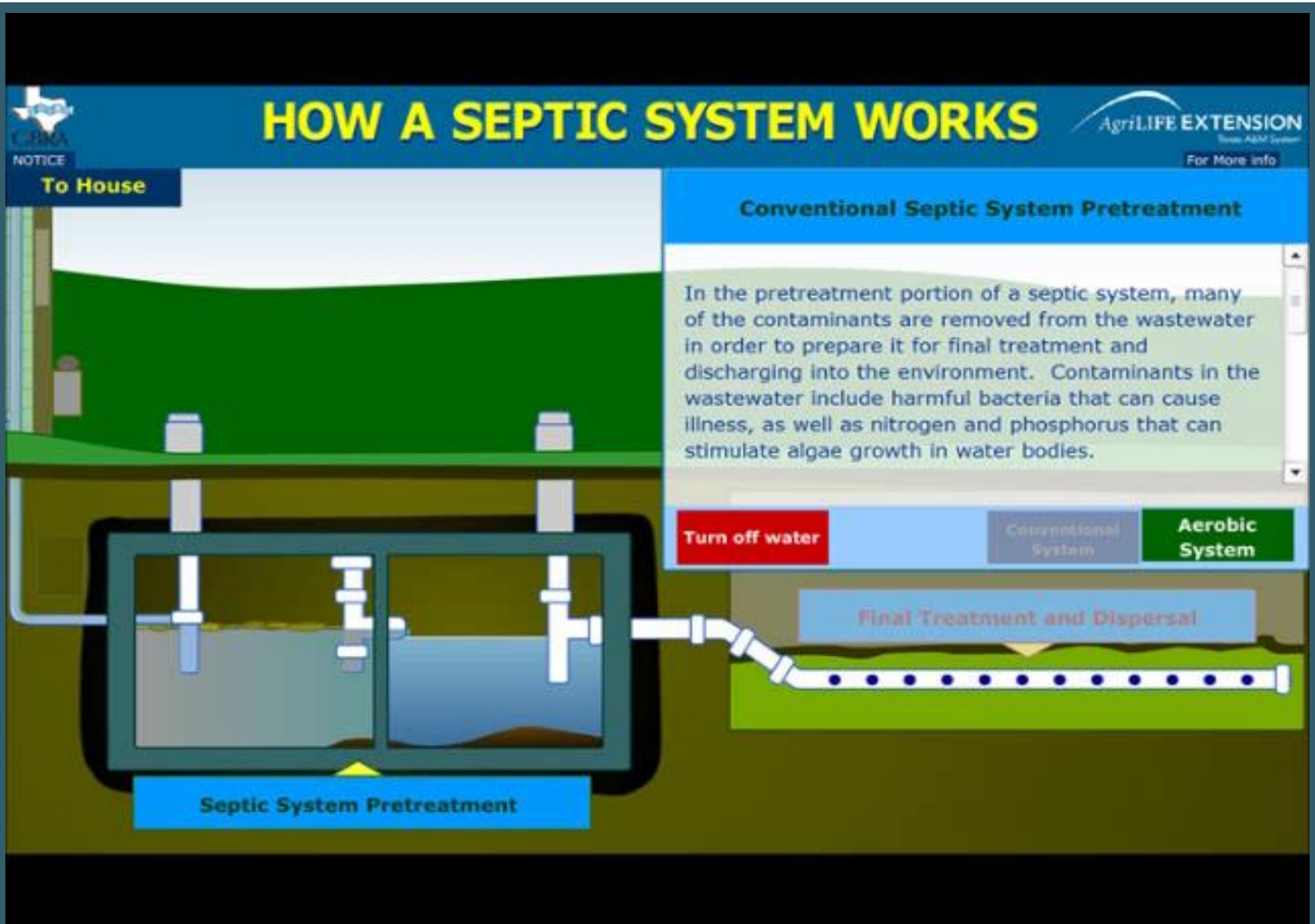
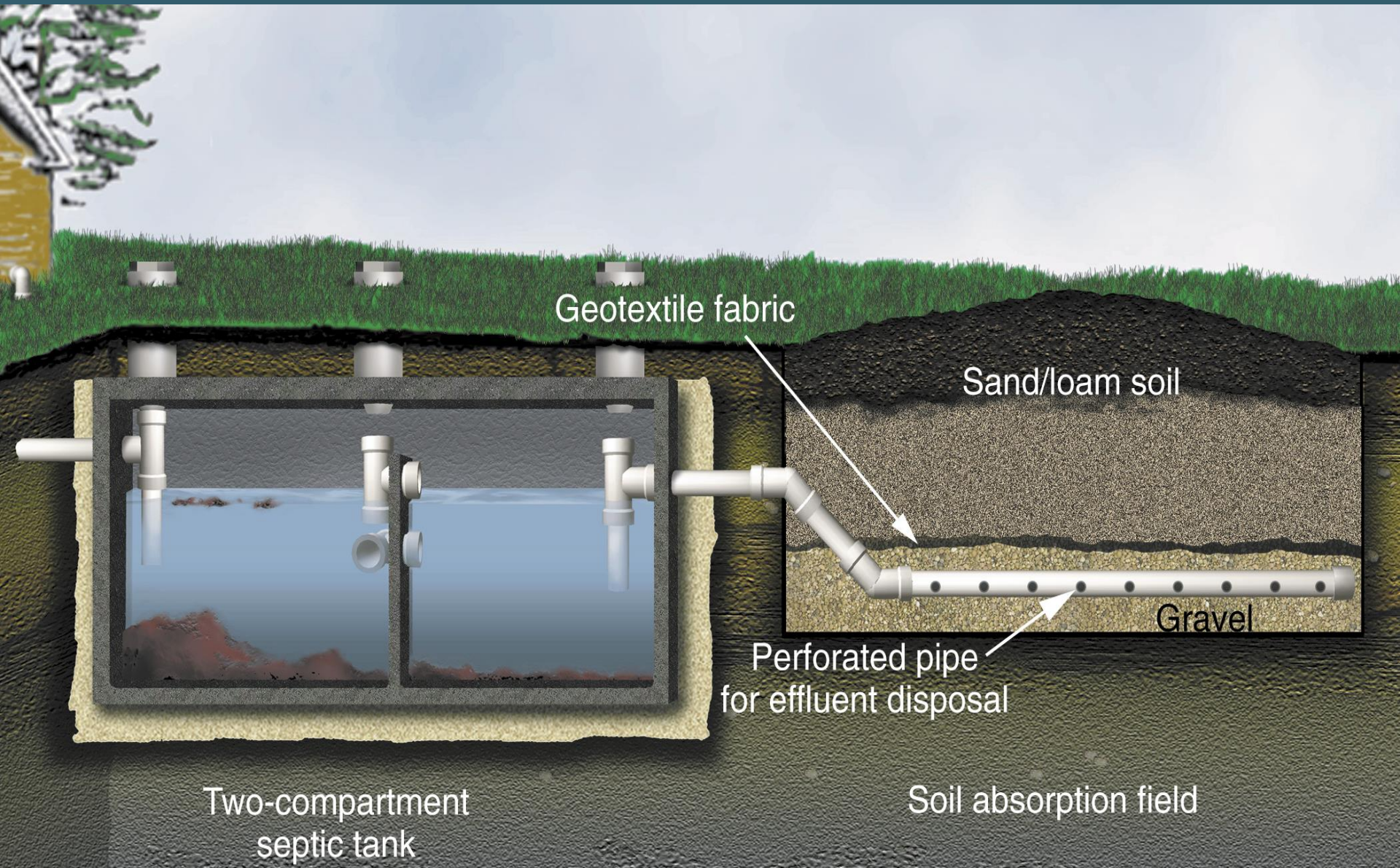
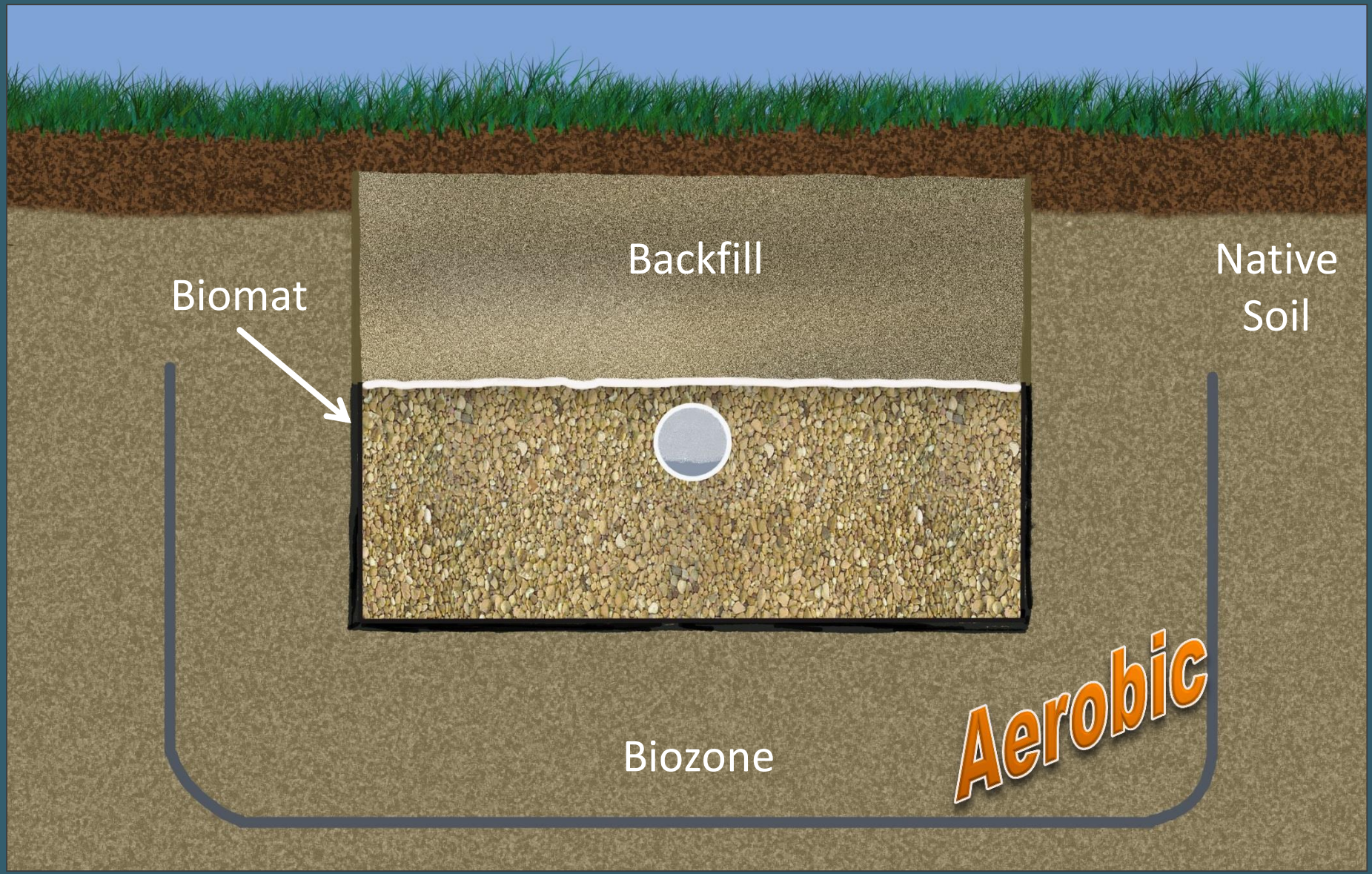


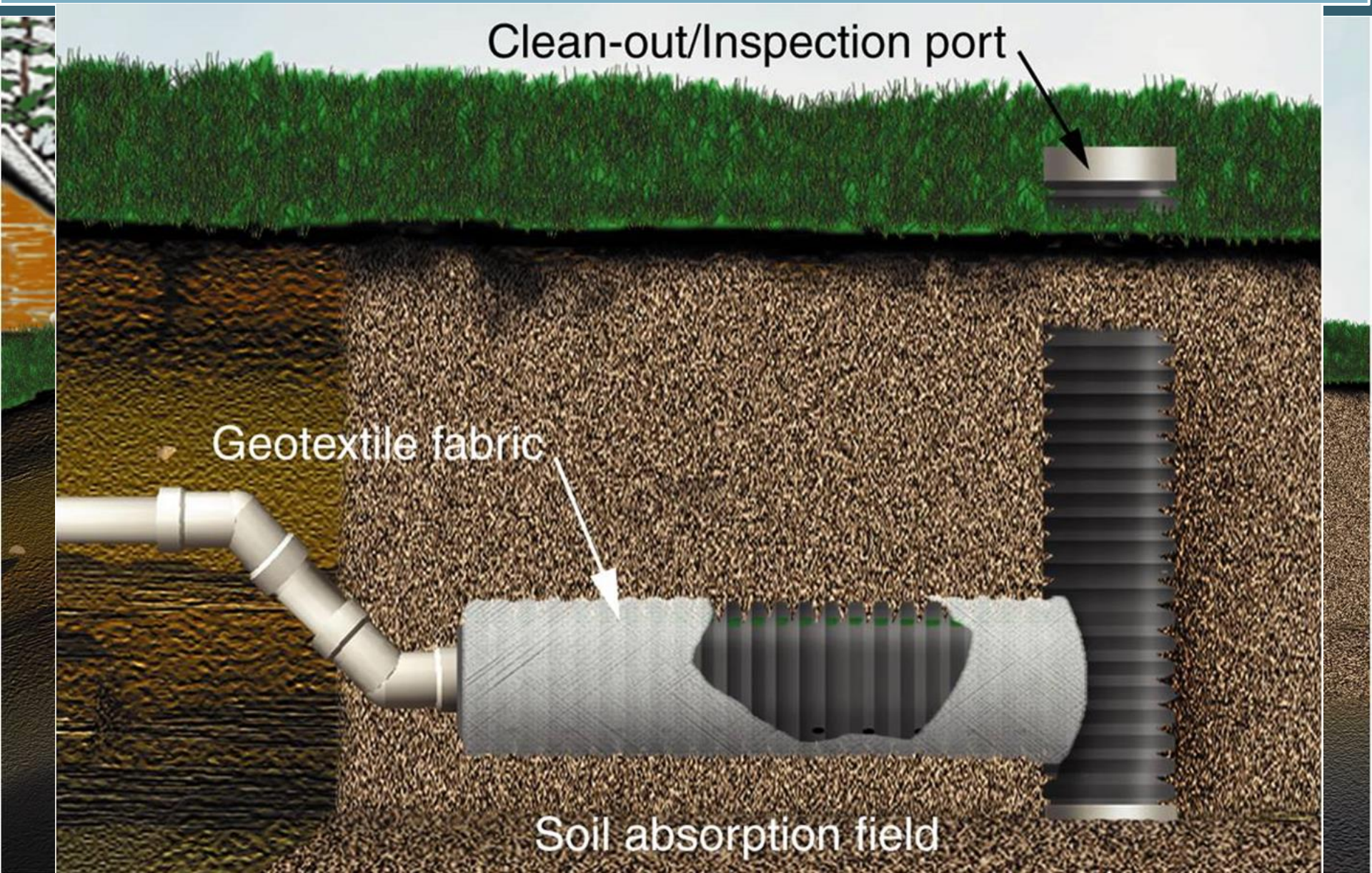
Conventional Septic Tank System



Soil Treatment Area

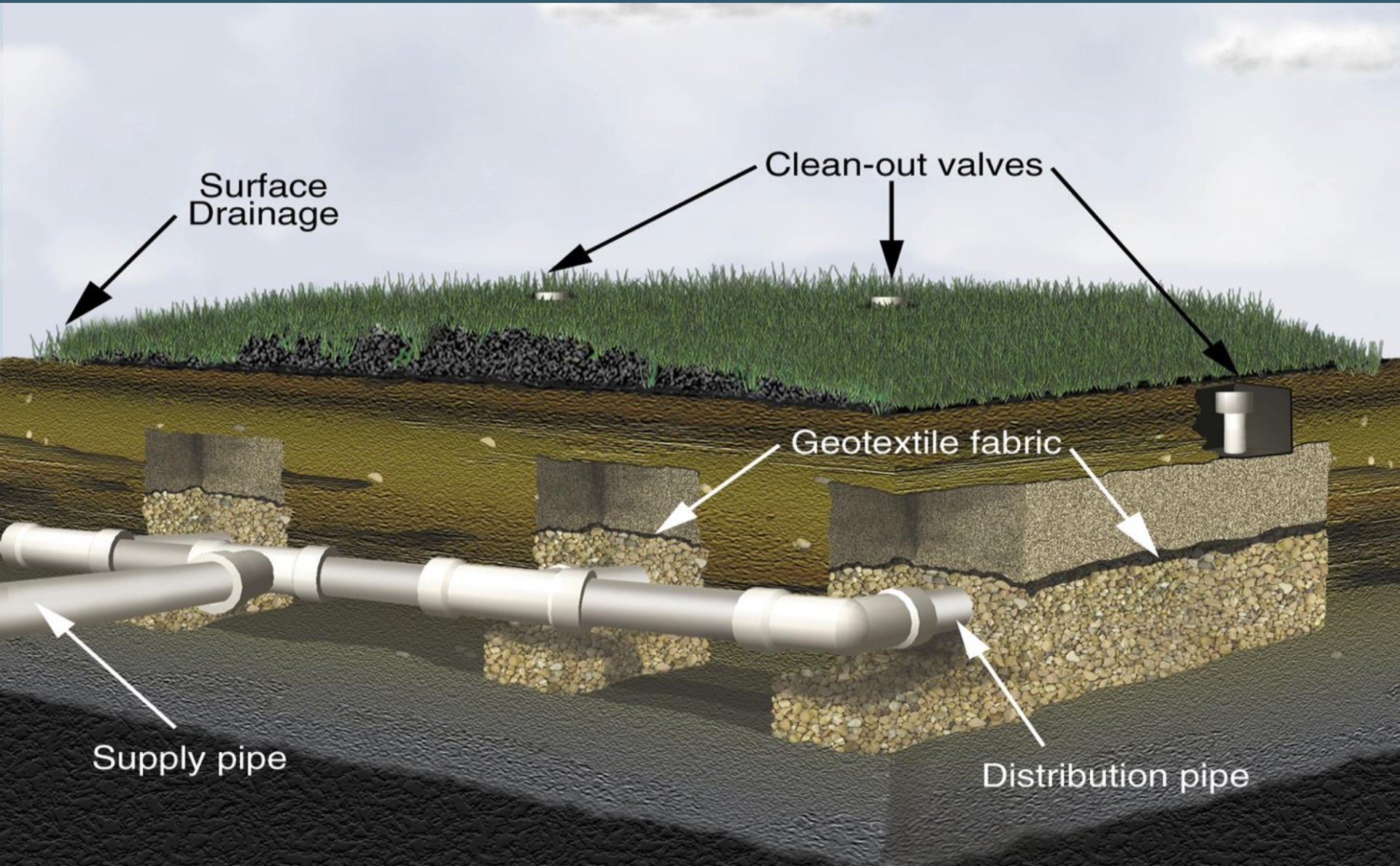


Gravel-less Pipe Distribution

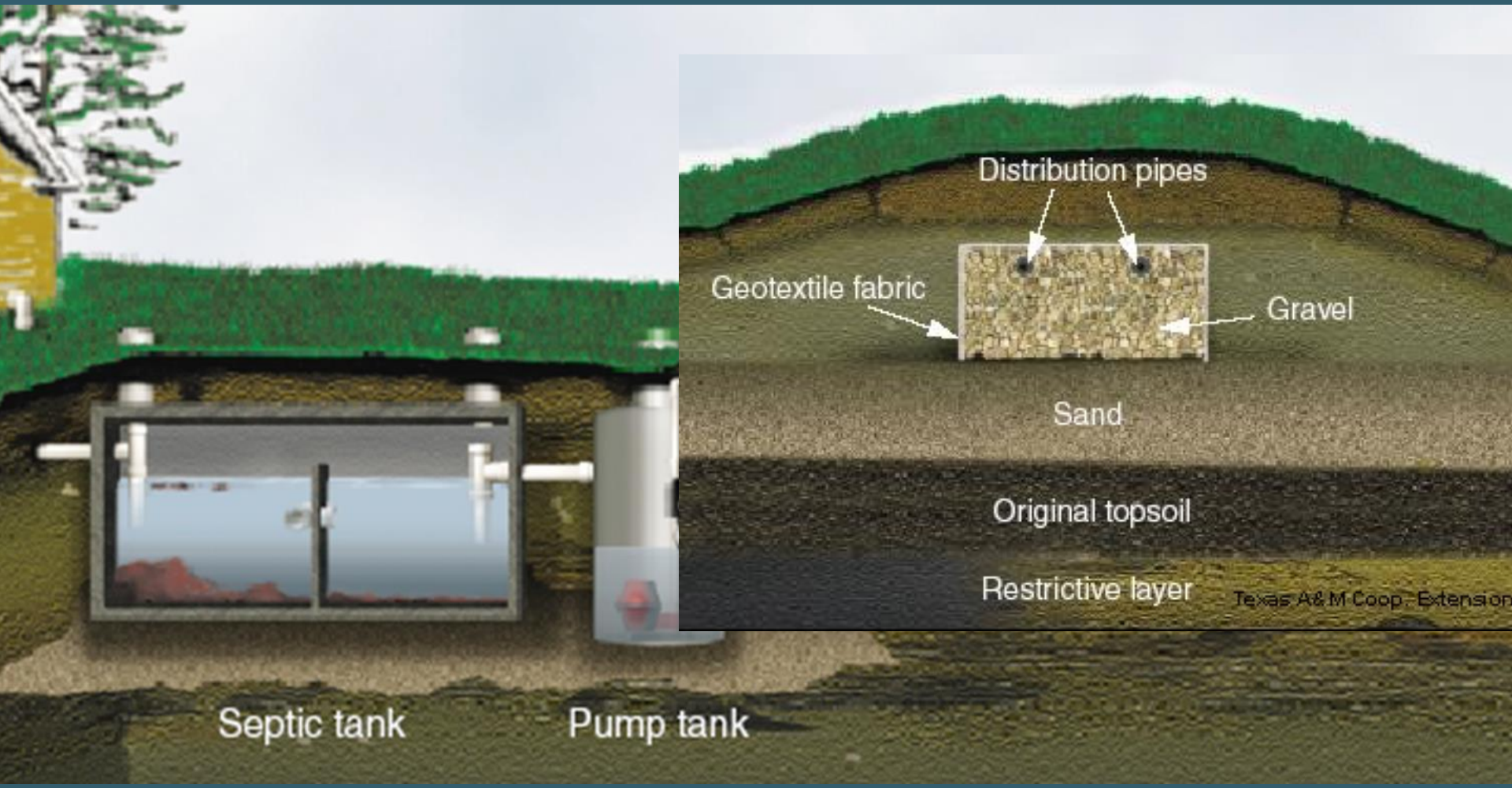


Leaching Chambers

Low-Pressure Distribution



Mound Distribution Field



Role of Vegetative Cover in Treatment System

- A healthy cover crop is essential for the system to function properly.
- Plants will:
  - Take up water and nutrients
  - Stabilize the soil and prevent erosion
  - Support beneficial soil organisms
- Do NOT park vehicles on drainfield
- Do NOT construct decks, driveways or buildings over drainfield
- NO woody vegetation over drainfield