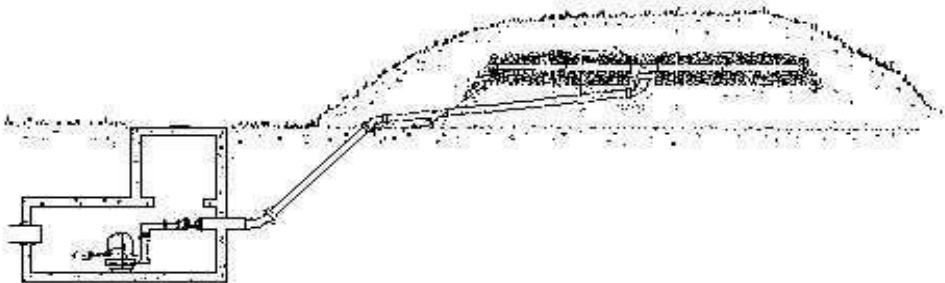


Onlot Sewage Disposal System Options

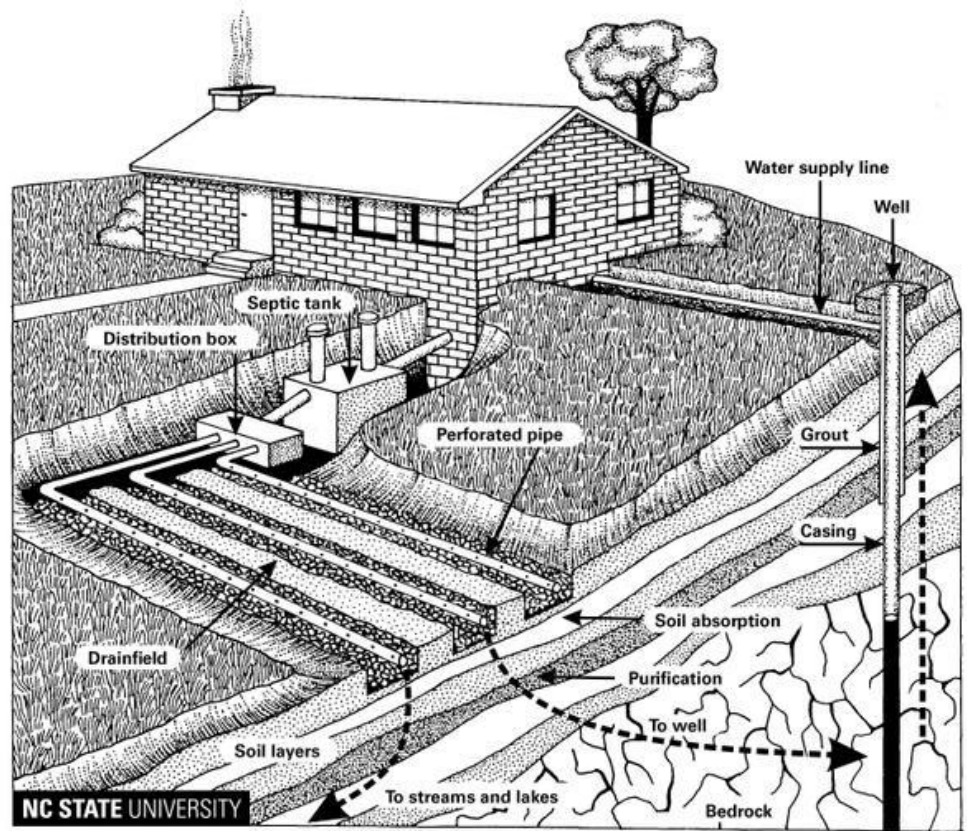
Upper Makefield Township - Act 537 Public Education
Session #2

Tom Zarko, PE - CKS Engineers, Inc.
June 8, 2017



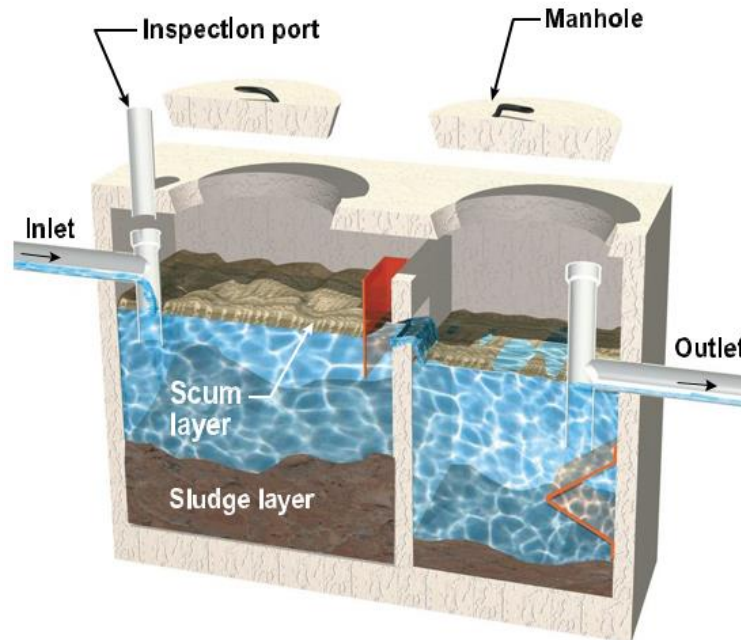
How Does a Conventional Sewage System Work?

- ▶ Building Sewer
- ▶ Treatment Tank
 - ▶ Anaerobic (septic tank) or Aerobic
- ▶ Distribution Box or Dosing Tank & Pump
- ▶ Absorption Area

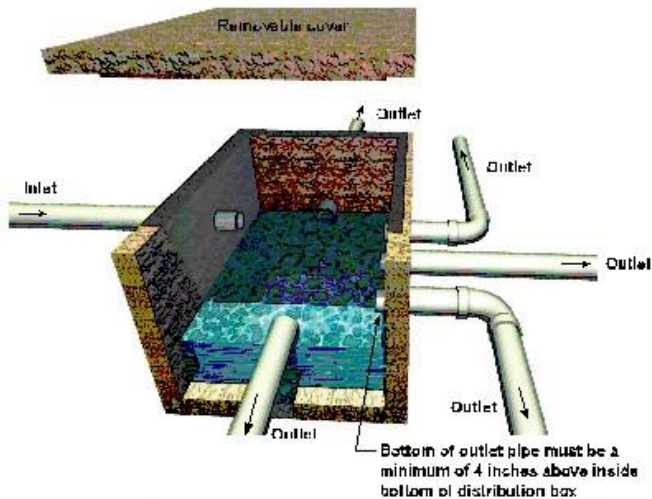


Septic Tank - First Stage of Treatment

- ▶ Septic Tank - First stage of treatment
 - ▶ Collects wastewater
 - ▶ Separates:
 - ▶ Floatable solids (Scum)
 - ▶ Settleable solids (Sludge)
 - ▶ Liquid effluent

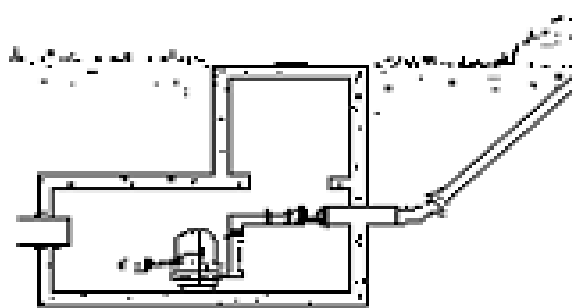


Effluent Distribution - Second Stage of Treatment



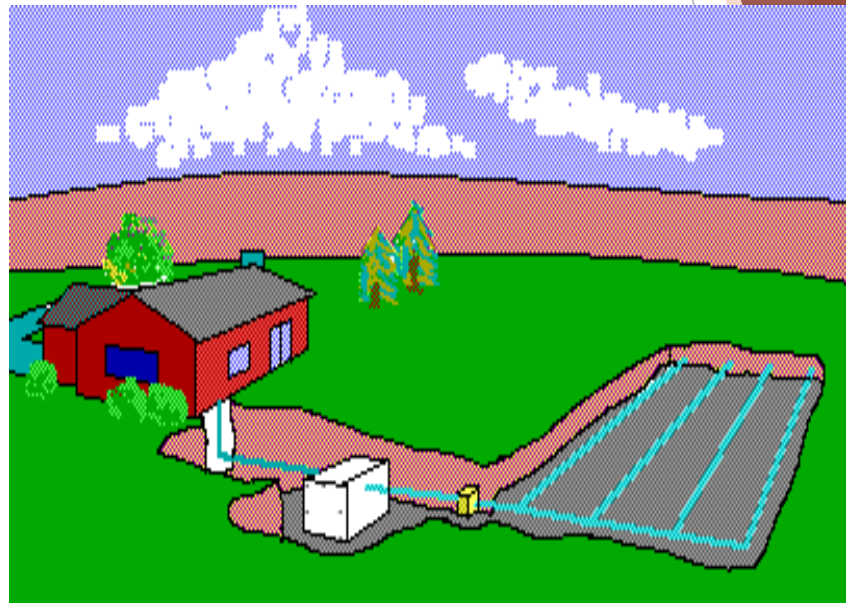
Gravity Distribution Box

Dosing Tank and Pump



Drain field - Third Stage of Treatment

- ▶ Perforated pipes in gravel bedding
- ▶ Effluent flows out of pipes through gravel and into the soil
 - ▶ Filters bacteria
 - ▶ Absorbs viruses
 - ▶ Retains certain chemicals (phosphorous & nitrogen)
 - ▶ Recharges groundwater

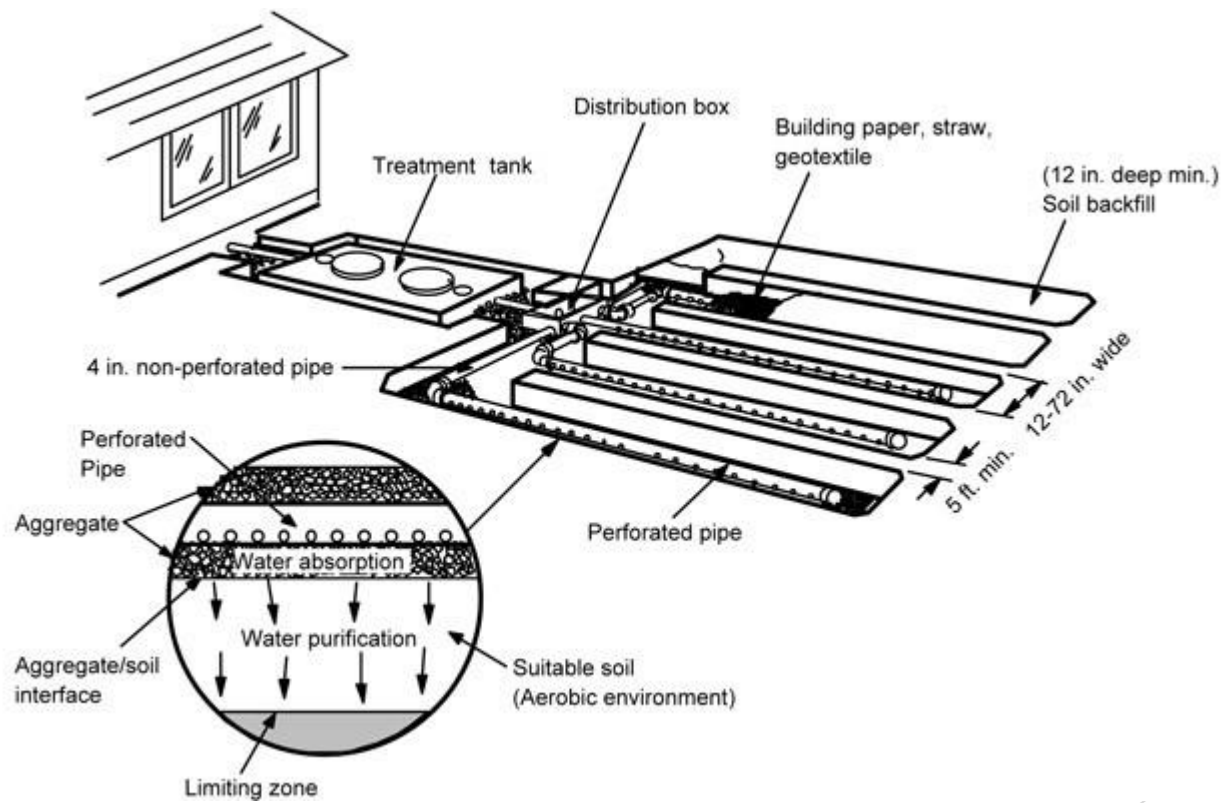


Approved Conventional Onlot System Types

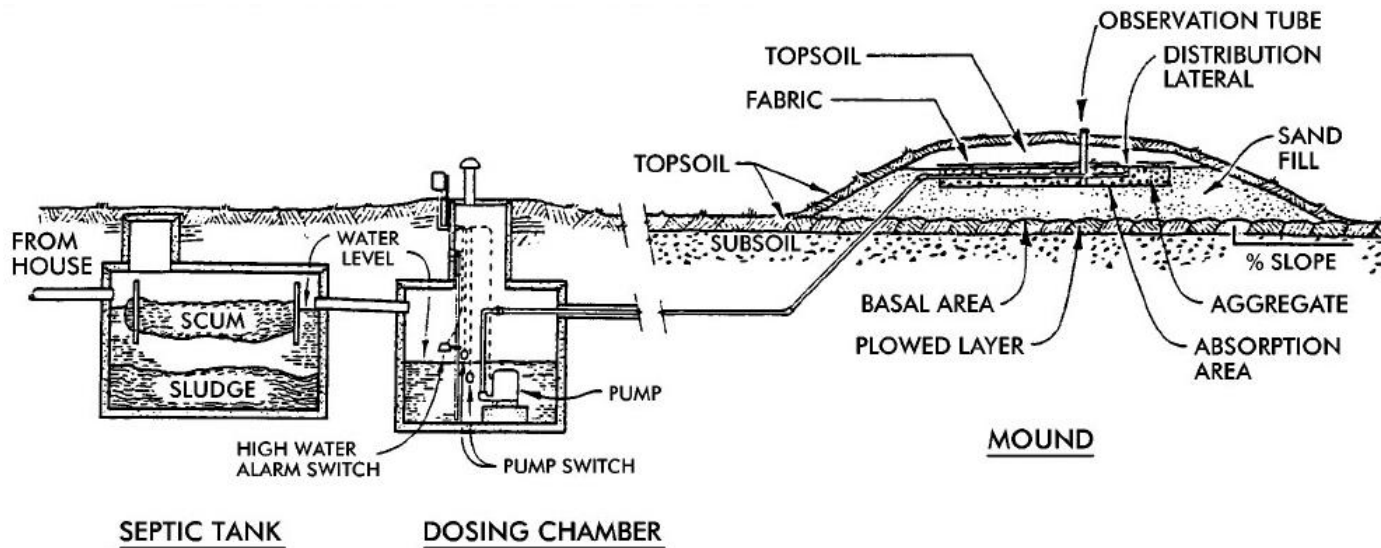
- ▶ Three types:
 - ▶ Conventional In-Ground Trench or Bed System
 - ▶ Conventional Elevated Sand Mound System
 - ▶ Individual Residential Spray Irrigation System



Conventional In-ground Trench or Bed System



Conventional Elevated Sand Mound System



Conventional Elevated Sand Mound System

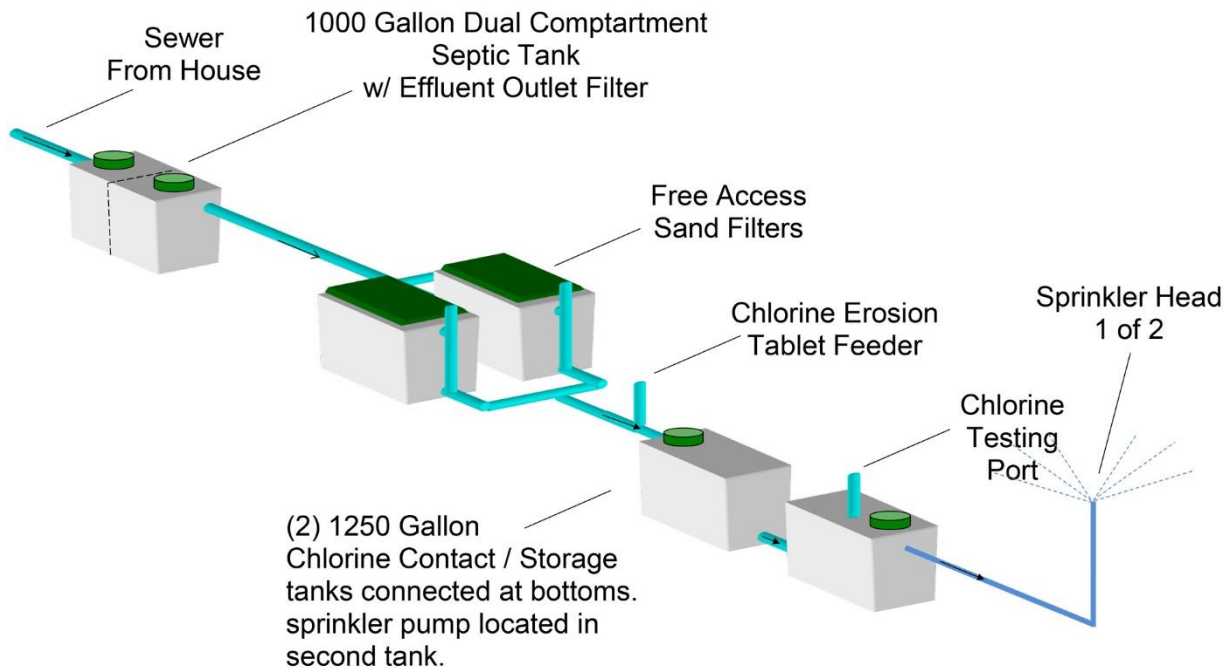


ESM Under Construction



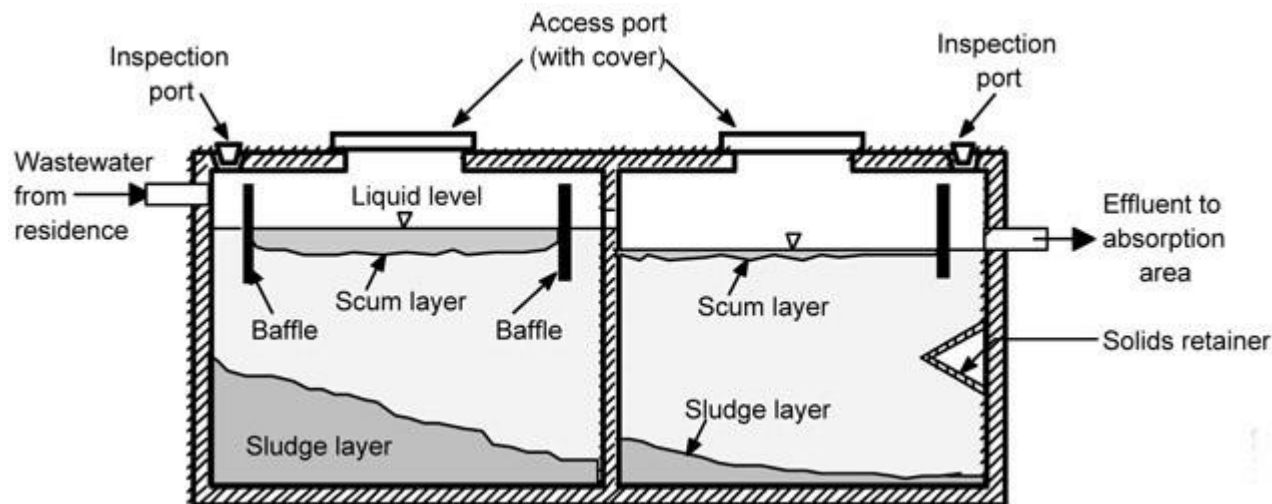
Functioning ESM

Individual Residential Spray Irrigation System



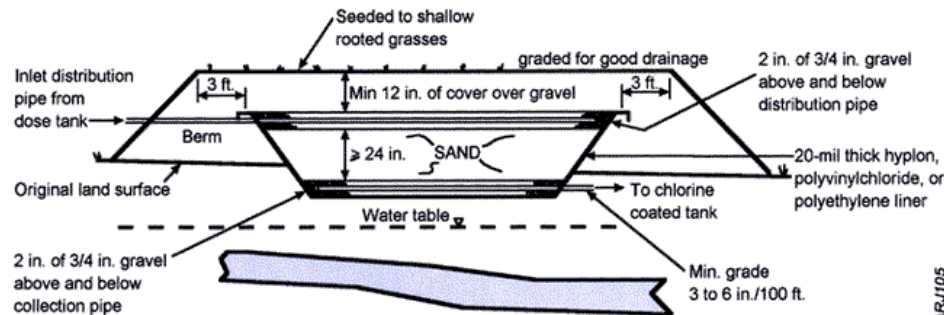
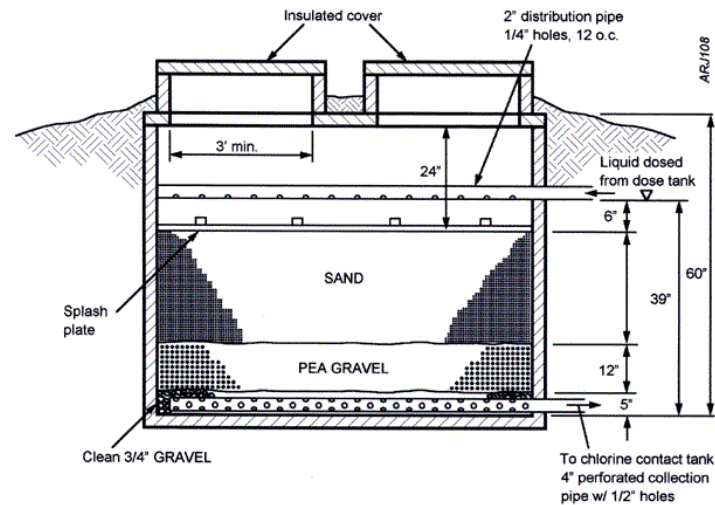
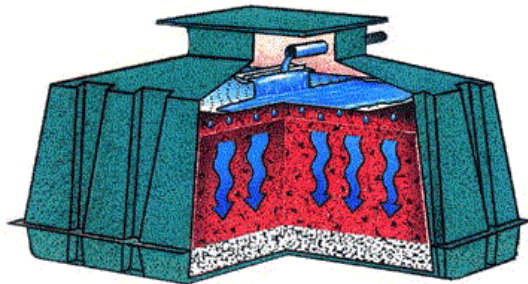
Individual Residential Spray Irrigation System

- ▶ Primary treatment - Provided by either septic tank or aerobic unit



Individual Residential Spray Irrigation System

- Secondary Treatment - Provided by either sand filter or peat filter

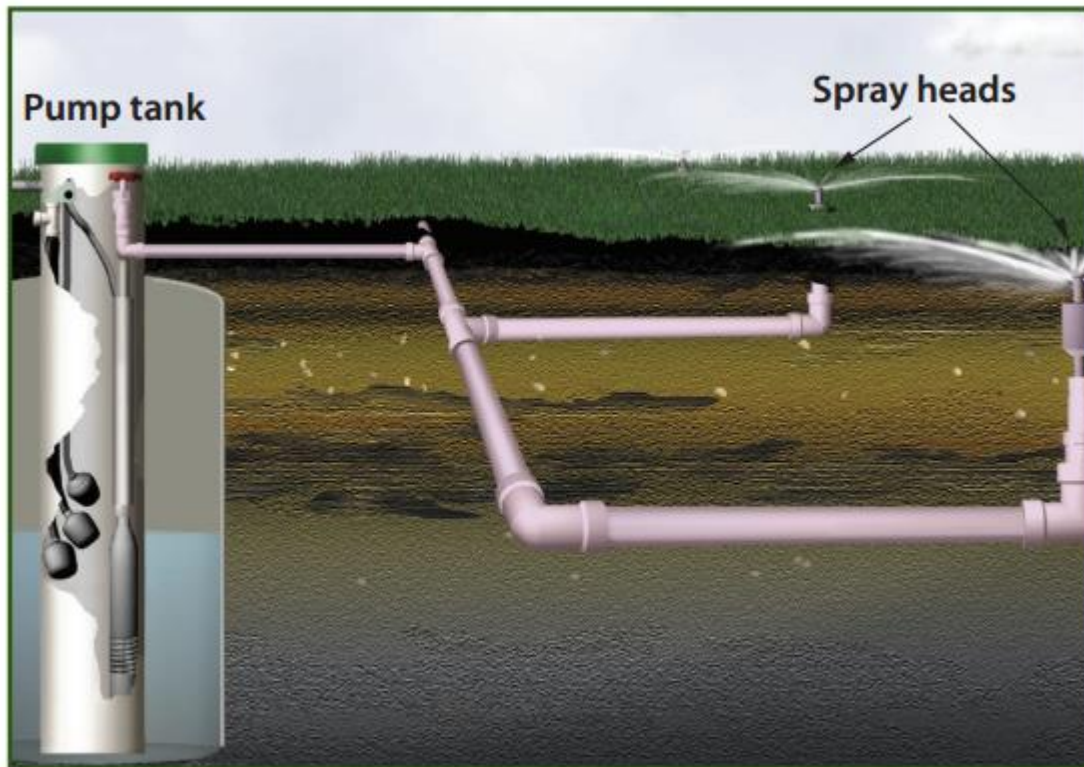


Note: Buried sand filter must be placed above bedrock and the seasonal high water table unless a concrete lining is used.

Note: Berm cover may be fill.

Individual Residential Spray Irrigation System

- ▶ Effluent is disinfected and stored in a tank until it can be discharged through sprinkler system



Permitted Alternative On-Lot Sewage Disposal Systems

- ▶ Alternative Individually Designed Composting Toilets
- ▶ Flow Equalization
- ▶ Alternative Peat-based System Options
- ▶ Free Access Gravity Sand Filter
- ▶ CO-OP RFS III System option
- ▶ Leaching Chambers
- ▶ Alternative Aggregates
- ▶ Greywater Systems
- ▶ At-Grade Bed Systems
- ▶ Modified Subsurface Sand Filter for Fast Percolation, Shallow Bedrock Sites with No Water Table Present
- ▶ Shallow Placement Pressure Dosed System
- ▶ Drip Irrigation Systems
- ▶ Steep Slope Elevated Sand Mound Beds
- ▶ A/B Soil System
- ▶ Non-Infiltration, Evapotranspiration Bed contained within a Greenhouse
- ▶ AdvanTex AX-Series Treatment System
- ▶ Air Injection Absorption Area Renovation
- ▶ Drip Distribution PERC-RITE Primary Effluent
- ▶ Drip Distribution PERC-RITE Micro-Mound
- ▶ Floating Outlet (Flout) Siphon
- ▶ Geotextile Sand Filters
- ▶ Leaching Chambers

Questions?