



GRANITE STATE DESIGNERS & INSTALLERS
New Hampshire's Association of Septic System Professionals

Inspection and Troubleshooting of Septic Systems

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UNIVERSITY OF MINNESOTA
ONSITE SEWAGE TREATMENT PROGRAM



Presentation Overview

- Background info: users, occupied, maintenance
- Locating tanks
- Evaluating tanks
 - Septic
 - Pump
 - Soil treatment systems

System Users

- Number of people
 - Sellers
 - Anticipated
- Number of bedrooms
 - Customer
 - Permit
 - Listing

Document to Watch

Occupied or Vacant?

- Occupied
- Have owner sign-off on back-up related questions
- Vacant? How long has it been vacant?
 - Surfacing concerns
 - 0-1 week, may be still wet
 - 1 week, but < 1 month, vegetation may still be lush
 - > 1 month, vegetation likely NOT indicated a problem, look for surges inside the tank

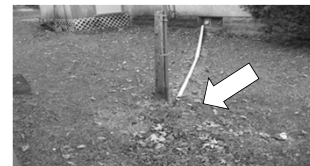
Maintenance

- When
- Frequency
- Check with the maintainer
 - Problem statements
 - *Great customer*
 - *I am there every week*



All Sewage Entering System

- Greywater
 - Laundry
- Out buildings
 - Toilets or sinks?
 - Shop
 - Garage
 - Milk house



Tank Inspection



Tough to Check



Locate Tank

- Downhill from house
- Locate roof stack
- Impression
- Different shade of grass
- Landscaping

Locating Tanks

- Probe
- Snake
- Camera
- Witching
- Records



Locating Tools - Prototek

AR-1 "Ardy"

- Nonmetallic lines
- Analog receiver locates tanks and nonmetallic lines
- Flushable Transmitters
- ~\$650



FR-1 "Ferris"

- Cast iron & nonmetallic
- Locates in cast iron and nonmetallic lines
- \$750




www.prototek.net
800.541.9123

Locating Toils - Camera

- Probe
- Small diameter access
- Manhole access

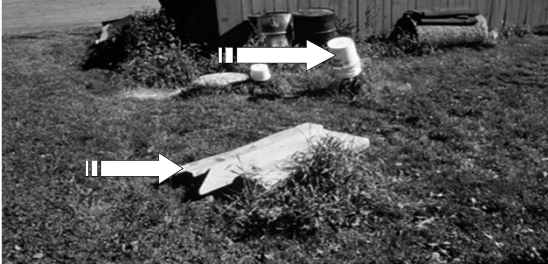


Evaluate Conditions




Conditions at the Tank

Problems: Could make system a public health threat

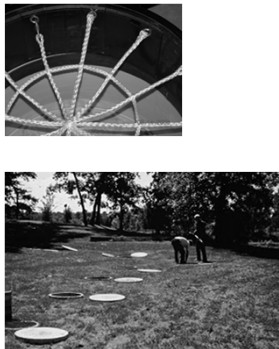


Septic Tanks



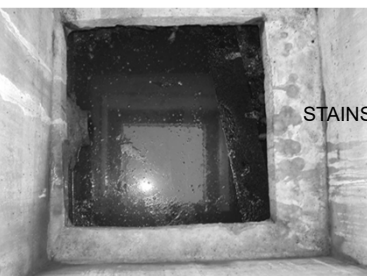
Tank Access

- Operable
- At-grade
 - Securely fastened
 - Recommend secondary constraint?
- Buried
 - Recommend risers to grade?



Evaluate Risers

- Evidence of infiltration on risers?

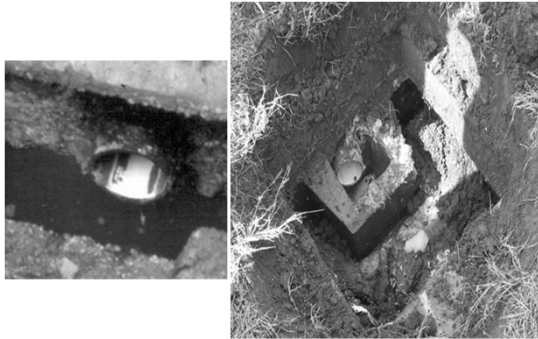


Check Inlet Baffle

Is it clear of debris?



Indication of Problems



Checking from the Surface

Mirror & flashlight
Camera



Current Operating Condition

- Below the outlet elevation
- Leaking
- Pumped recently



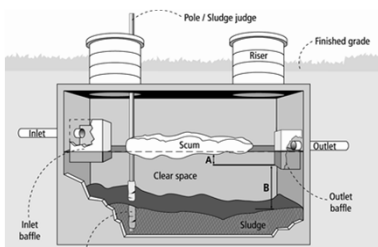
Current Operating Distance

- Above the outlet elevation
- Effluent screen plugged
- Soil treatment plugged
- Pump broke



Does the Tank Need Maintenance?

- Full when total solids reach 25- 30% of tank capacity
- If necessary note on inspection



Checking the Sludge Levels

- Should be three distinct layers if functioning properly
- Heavy accumulation means excess inputs
- One uniform layer ~ excess chemical inputs?

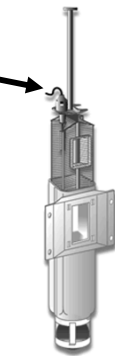


Effluent Screen Cleaning



- Screen is washed off directly into the septic tank
- This is being done at the inlet end of the tank to protect against cleanings going directly out the outlet
- Some units have protection against outflow or an extra screen that that operates during cleaning.

Alarm on Screen Present and working?



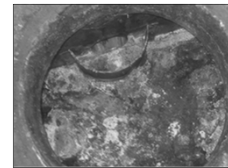
Problematic Effluent Screens

- The need for frequent cleaning is an indication of:
 - Hydraulic overloading
 - Organic overloading
 - Toxic loading



Factors That Influence Anaerobic Digestion

- Microbe health
- Detention time:
 - High velocity into tank
 - Highly variable flow patterns
 - High or low
 - Lack of tank maintenance
 - Process wastewaters from water treatment devices



Dissolved Oxygen (DO)

- Check in center or end of septic tank
- Value should be < 1 mg/L
- If > 1 mg/L
 - Check source water DO
 - Leaks into system
 - Home
 - Ground or surface water

How to Test DO

- Kit
- Probe



Operation Test

- Flush all toilets once and run all fixtures to determine that they flow into treatment tank
- Introduce water into the system at the rate of 3-4 gpm (this is the flow of one spigot fully opened) for 20-30 minutes
- Observe level of water in Tank

Water meter



Pump Through the Manhole

- Tanks shall ONLY be pumped from/through the manhole/access port of each tank or tank compartment

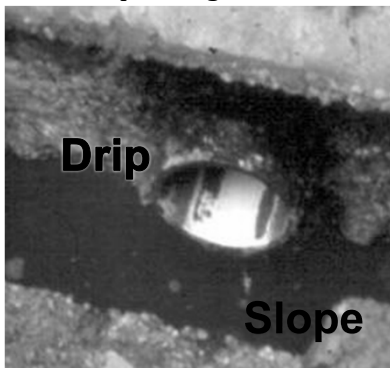


Observe

- Lid
- Walls
- Listen for running water
 - Inlet
 - Outlet
 - Sides

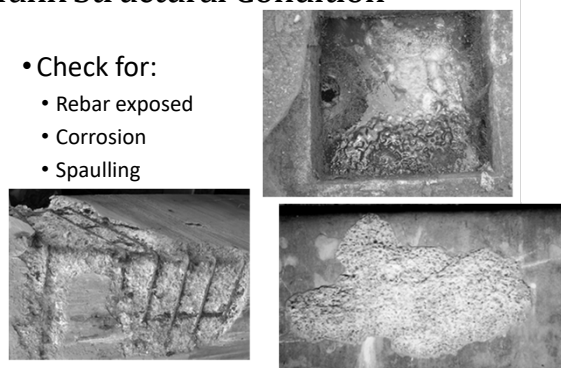


Current operating condition



Tank Structural Condition

- Check for:
 - Rebar exposed
 - Corrosion
 - Spalling



Problems - Roots



Cracks, Deterioration, Damage?

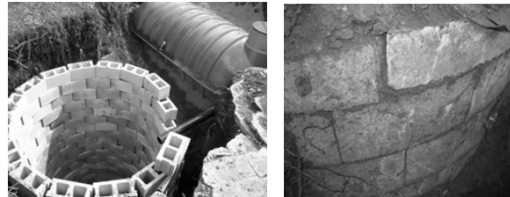
Structural Issues?



Leak at Mid-Seam



Problem "Tanks" Seepage Pit, Leaching Pit, Drywell

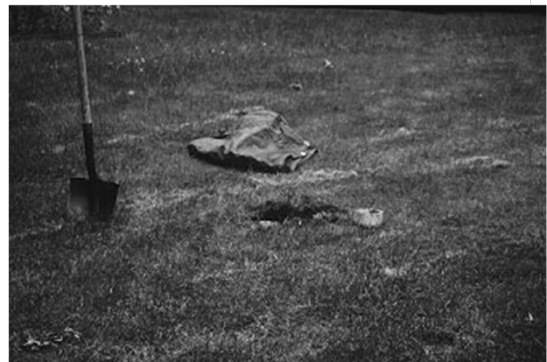


Surface Water


- Down spots
- Storm water
- Elevation
- Slopes/settling
- Note issues on inspection



Close the Tank




Pump Tank Inspection



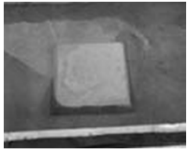

Pump

- Pump under access
- Reachable from surface
- Removable
- Note if not



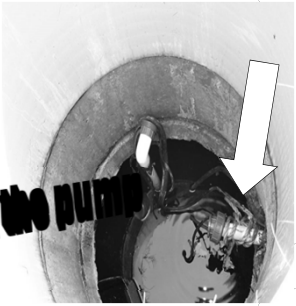
Pump Should Be

- Elevated off bottom
- Storage
- Covered with effluent
- Protection

Pump Removal?

- Pull chain or rope present
- Make sure it is secure when leaving the site
- Loose ropes sink pumps




Snake Removal?



Discharge Assembly

Quick disconnect present?

Fernco is not a quick disconnect!



Does the Pump Work?

- On/ Off
- Alarm

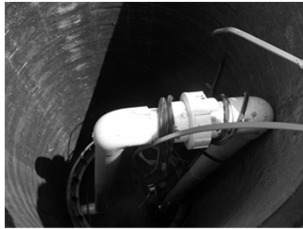


How to Check?

- Lift the float
- Fill the tank to operate
- Run a dose
 - Check gpm {flow rate}
 - Gallons per inch x inches ÷ time = gpm

Drain Back?

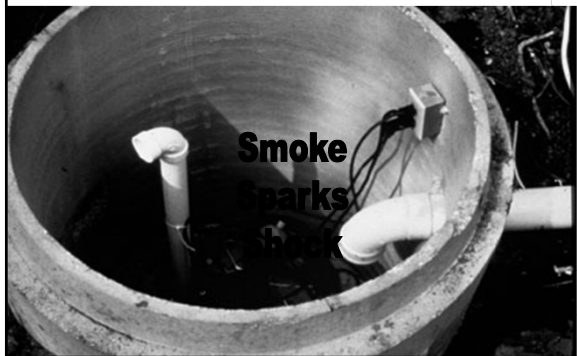
- Weep hole
- Check valve
- Freezing



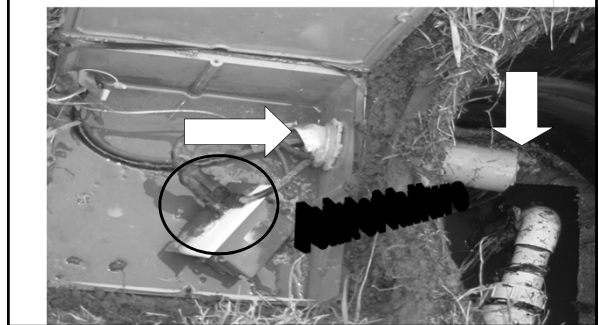
Alarm?

- Separate circuits?
 - Shut off circuit in basement for alarm
 - Pump still operational?
- Only lift it up if you can silence @ panel
- Be careful as lifting to not damage

Electrical?



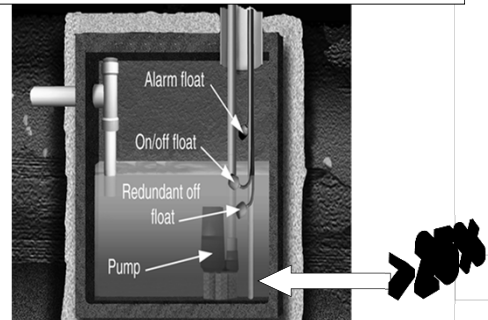
Electrical Components Sealed and Watertight?



Electrical Conduit Sealed?



Tank Pumping Recommended?



Myths and Additives

- Tanks typically do not require additives
 - No need to “start” a tank with a dead chicken
 - Adding yeast, while harmless, is not needed
 - Commercial additives are normally not needed
- Beware of any additive that suggests it will reduce pumping frequency
 - Normal function means some accumulation
 - Nonbiodegradables – e.g. synthetic fabric lint
 - Solids may be washed out to next downstream treatment component
 - Independent research shows no benefit



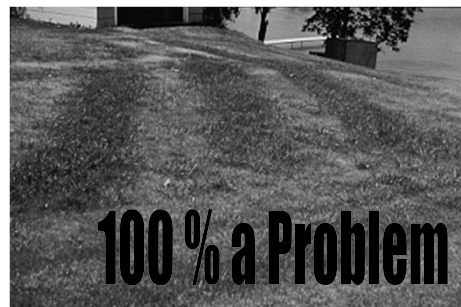
Soil Treatment Systems

Probe the Soil Treatment Area

- Determine its location
- Check for excessive moisture
- Odor
- Effluent



Ponding Water?



Surfacing Effluent or Bed Full?

- This level of ponding is *NOT* acceptable
- Indicates a mound failure
- Is a direct public and environmental health threat
- Needs prompt corrective actions



Lush Vegetation?

- Green grass – isn't lush
- Cattails?
- Change?



Dye Test

- Can expose obvious leaks
- Procedure
 - Dye is flushed down a toilet
 - The amount of dye determined by the size of the septic tank
 - Larger septic tank will require that more dye
 - In most cases, several ounces of concentrated dye solution is adequate for a test
 - Water is run into the system with a faucet to flush the dye into the septic tank, and then into the soil
 - Volume of water introduced to the system is determined by the size of the tank
 - The objective is to flood the absorption area with water containing the dye solution
 - No dye should be present at the surface



Dye Test Outcome

- Only identifies problems
- Not a passing test



Correct System Installed?

- Does the system have separation to the limiting condition
 - Redox features/mottles
 - Bedrock
 - Hardpans
- Is the system the right size for building and soil conditions
 - Gallons per day
 - Loading rate

Soil Observations for Existing Systems

- Same Contour
- Same Soil
- 5-7' off the system
- Soil that has not been disturbed
- Need to do a boring outside the zone of influence of the soil treatment system



Excessive Ponding in Distribution Media

- Construction materials
 - Rock
 - Topsoil cover
 - Too fine limits air diffusion
 - Organic-rich too much infiltration
 - Sand
- Vertical separation to limiting condition
- Hydraulic overload
- Organic overload
- Uneven distribution



Biomat Influences

- System: Food
 - Hydraulic loading
 - Organic loading
- Site: Oxygen
 - Soil type
 - Texture
 - Structure
 - Separation
 - Depth
 - Geometry [Width]



The Biomat

Questions ??????

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