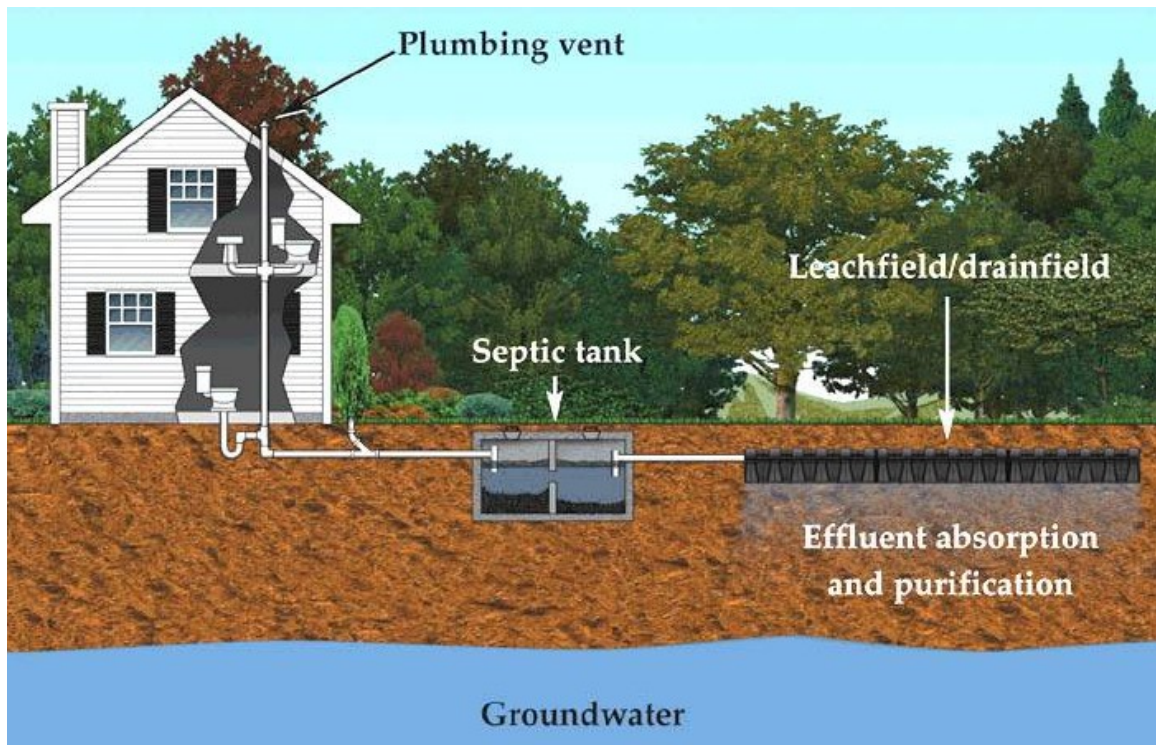


HOMEOWNER'S MANUAL

Septic Systems 101

How Your Septic System Works,
How to Care For & Maintain It,
Extend Its Useful Life,
And Save You Money!



**As a community service,
your Homeowner's Manual and Education Program
was developed and presented by the
Arizona Onsite Wastewater Recycling Association
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***AzOWRA* is extremely grateful to the
Yavapai County Board of Supervisors
and
Yavapai County Development Services
for supporting the efforts of our organization
to provide education to the property owners
of Yavapai County who use an onsite wastewater system.**

INTRODUCTION

Most of us are conscientious about the care and maintenance of our vehicles. Oil and filter changes plus other periodic inspections help protect the investment.

Similarly, our onsite wastewater system represents a significant part of the investment in our property. **THIS SYSTEM MAY BE OUR MOST OVERLOOKED AND UNDERVALUED UTILITY.**

A properly designed, installed and maintained onsite system can be expected to provide many years of service. However, lack of proper care and maintenance and/or abuse of the system can result in problems or premature failure. Repairs can be expensive...and replacement could cost as much as a new automobile.

BE AWARE: A malfunctioning (or inadequate) septic system can negatively affect your property's value and could pose legal liability consequences.

Become familiar with and follow recommendations in your Homeowner's Manual...in particular, the "Do Not Flush" and "Do's and Don'ts" Sections.

THE CARE AND MAINTENANCE OF YOUR SEPTIC SYSTEM IS YOUR RESPONSIBILITY . . . IT'S ALSO THE LAW. At stake are your economic best interests, your family's health as well as protection of our groundwater and the environment.

GENERAL OVERVIEW OF A SEPTIC SYSTEM

A septic system is an onsite sewage treatment and disposal facility. It consists of three main parts: the septic tank, the drainfield and the soil under the drainfield. A septic system should effectively accept and treat liquid wastes from your home. Its ultimate purpose is to prevent contaminants from entering the groundwater and nearby wells, lakes and streams.

Installing a new conventional septic system can cost from \$4,000 - \$5,000+/- . Alternative systems may cost in the range of \$10,000 - \$20,000 . . . or more.

In Arizona, an estimated one of every five households is served by some type of onsite wastewater system. Savvy homeowners understand that system problems are cheaper and easier to prevent than they are to correct. They are also aware that a well maintained system can enhance the value of their property.

SYSTEM RECORDS: Your property record file should include copies of your system's permitting documents and plot plan. These documents will be a valuable reference to help you better understand the components and location of your system. They will also save time for the inspector or service provider of your system.

RECOMMENDATION: If you do not already have system records in your possession, contact your local Environmental or Health Agency and request copies of all available documents, usually filed by your Tax Parcel Number (APN).

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1.0 Types of Systems Defined

ONSITE WASTEWATER TREATMENT SYSTEM: This term includes conventional septic tank systems as well as alternative systems. All systems are often referred to as an "onsite system".

CONVENTIONAL SEPTIC TANK SYSTEM: The most common type of system. It consists of a septic tank where partial treatment of wastewater takes place, then releases the effluent by gravity to the drainfield for final treatment.

ALTERNATIVE (or Alternate) SYSTEM: These are advanced technology treatment systems that are required when site/soil conditions prevent the use of a conventional septic tank system. These systems typically have special maintenance requirements and a "system specific" operating manual. (There are 20 different types of alternative systems approved for use in Arizona. All of these systems incorporate the use of a septic tank.)

ALTERNATIVE SYSTEMS APPROVED FOR USE UNDER ARIZONA CODES:

- | | |
|--|------------------------------------|
| ➤ Composting Toilets | ➤ Denitrifying Systems |
| ➤ Pressure Distribution Systems | ➤ Sewage Vaults |
| ➤ Gravelless Trenches | ➤ Aerobic Systems |
| ➤ Natural Seal Evapotranspiration Beds | ➤ Nitrate-Reactive Media Filters |
| ➤ Lined Evapotranspiration Beds | ➤ Cap Systems |
| ➤ Wisconsin Mound | ➤ Constructed Wetlands |
| ➤ Engineered Pad Systems (Eljen GSF) | ➤ Sand-Lined Trenches |
| ➤ Intermittent Sand Filters | ➤ Disinfection Devices |
| ➤ Peat Filters | ➤ Surface Disposal (i.e. Bubblers) |
| ➤ Textile Filters | ➤ Subsurface Drip Irrigation |

2.0 Basic Septic System Terms

BIOMAT: A layer of organic material that forms in the upper few inches of soil under the drainfield. This biomat zone helps remove many of the germs and chemical pollutants. However, failure to pump out solids in the septic tank on a timely basis can result in a clogged biomat. When that happens, effluent is prevented from flowing out of the drainfield, creating a failed system.

DISTRIBUTION: A means of distributing effluent from septic tank to the drainfield, either single or multiple lines. This distribution can occur through a D-Box, D-valve, serial loading, or pressure distribution.

DRAINFIELD (aka Disposal Works or Leachfield): Common terms referring to that part of the system where final treatment takes place.

EFFLUENT: Partially treated wastewater; flows from tank to the drainfield.

EFFLUENT FILTER: A special filter, installed in the outlet tee of septic tank, designed to protect the drainfield.

INLET Baffle/TEE: Slows incoming waste to reduce disturbance of the sludge in septic tank.

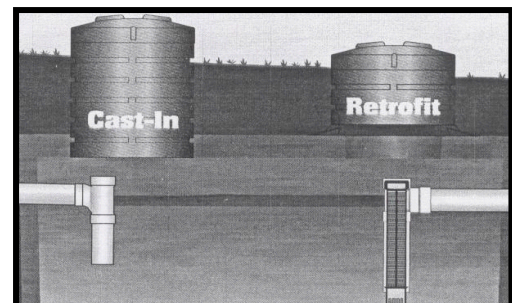
MANHOLE: Large removable cover(s) at top of septic tank for pumping access and inspection purposes.

OUTLET Baffle/TEE: Prevents solids from flowing out with the liquids. (If installed, an effluent filter enhances this important function.)

PUMP TANK / EFFLUENT PUMP: When a system's drainfield is higher in elevation than the septic tank, an effluent pump chamber and pump is required to raise the effluent to the elevation of the drainfield.

RESERVE AREA: Refers to an area on your property designated as suitable for a new drainfield system if your current drainfield should fail. A reserve area is now required by most states, including Arizona. **BE AWARE:** Many older systems may not have been designed with a specified reserve area.

RISERS: These are tube-like extensions installed on top of a septic tank to permit easier access to the manhole(s) and/or access ports. Risers are required for new systems if the tank lids are more than 6" below final grade. They can also be retrofitted to older systems . . . **recommended.** Risers save time (and \$\$) for inspections or pumping and avoid digging up your yard.



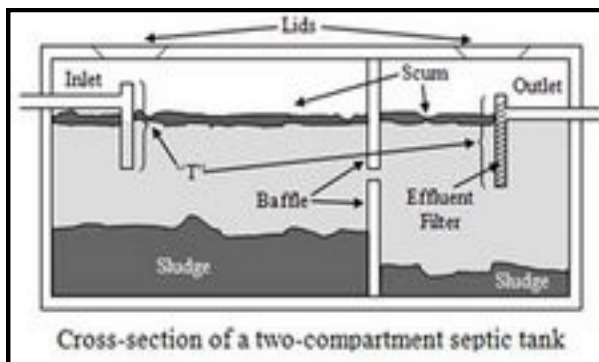
3.0 SEPTIC TANK

The septic tank provides the first step in treatment using natural processes to partially treat the wastewater. Its primary purpose is to protect the drainfield and the receiving soil from being clogged by suspended solids in the effluent.

The wastewater discharged from the home flows into the tank where heavier solids settle to the bottom to form a **sludge** layer. Lighter materials such as soaps, fats, grease, etc., float to the top forming a **scum** layer.

Micro organisms (naturally occurring bacteria in the waste stream) digest or break down the waste solids helping to reduce the volume of sludge and scum. This biological process can only reduce about 40% of the sludge and scum.

The tank must be pumped regularly to remove the accumulated solids. This will prevent them from being washed out into the drainfield where they can clog the soil and create potential system failure.

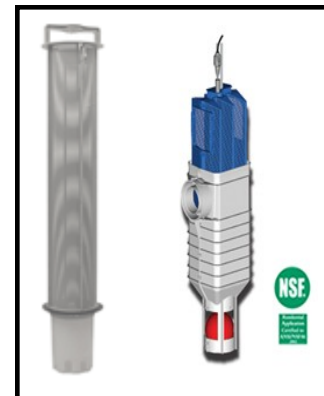


A septic tank is a large watertight container buried in the ground outside of the home. It provides the primary level of wastewater treatment. Tanks are usually constructed of concrete, fiberglass, polyethylene or plastic. Tank size (in gallons) will vary depending on the system's design requirements.

NOTE: Newer septic tanks are designed with two compartments (as illustrated) which increase functional efficiency. Older tanks typically have one compartment.

4.0 SEPTIC TANK EFFLUENT FILTER

An effluent filter prevents excessive solids from entering a system's final treatment phase. A filter can be installed in the septic tank at the outlet or in a separate container just after the tank. Filters are now required for all new installations. A filter can also be added to an older existing system either in the tank or externally.

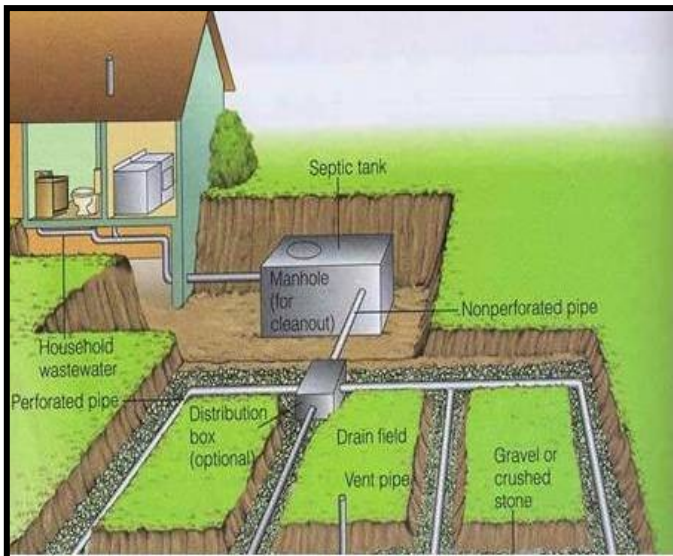


NOTE: If your septic tank has an effluent filter, it will need to be serviced at least each time the tank is pumped . . . sometimes more often.

BE AWARE: Cleaning the filter could be performed by the homeowner with some basic instructions. However, many people consider this task to be messy and unpleasant. Also, there are safety issues to consider such as toxic gases and exposure to germs in the sewage. Many homeowners rely on their septic pumper to clean the filter as part of routine system inspections.

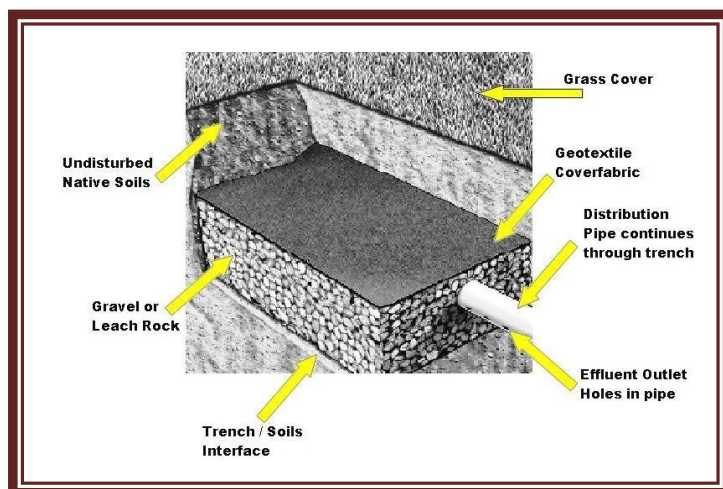
5.0 THE DRAINFIELD

A septic system's drainfield (aka "disposal works" or "leachfield") delivers the liquid sewage effluent to the soil for final treatment. The effluent flows (by gravity) out of the tank through the outlet baffle/tee (or filter, if installed), into perforated pipe in the drainfield trenches. The effluent passes through holes in the pipe, then trickles through gravel (or other media) to the soil. The soil acts as a biological filter to remove nearly all harmful substances including disease-causing bacteria, viruses and toxic organic materials. A drainfield can consist of a single trench or multiple trenches, as illustrated, depending upon design



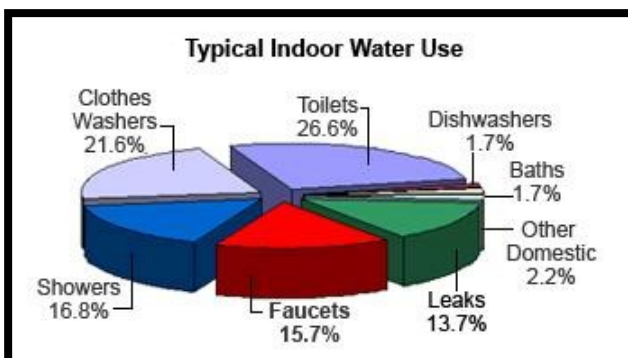
requirements.

If the drainfield is overloaded with too much wastewater in a short period of time, (e.g. running consecutive loads of laundry), it can cause sewage to ooze up to the ground surface. This condition not only creates a health hazard... it can also result in back-ups and other unpleasant events.



Profile of a Drainfield Trench

Water conservation is critical to the operation of your septic system and to reduce risk of failure. Consider the following tips:



1. Modern high efficiency toilets can dramatically cut water usage;
2. Faucet aerators and shower head restrictors can further reduce water use;
3. Use common sense water conserving practices; and
4. Closely monitor and repair leaks from fixtures.

6.0 TANK PUMPING & INSPECTIONS

What Does An Inspection Include?

- Locate septic tank & system.
- Uncover & inspect manhole covers.
- Check liquid level of tank.
- Measure scum & sludge layers.
- Check Inlet & Outlet Tees.
- Check water flow into tank.
- Water test drainfield.
- Check for leaks & roots.
- Inspect filter & mechanical components.
- Pump tank if necessary

“Out of sight, out of mind . . . as long as the toilets flush and drains drain, everything’s O.K.”. Some homeowners assume that their septic system will work forever without maintenance. They often wait until the system has problems before having the system inspected and the tank pumped . . . not a good decision.

NOTE: If you currently own an alternative system with mechanical and electrical components, an annual inspection is recommended as a minimum. Most homeowners using one of these more complex systems establish maintenance contracts with specialists to help ensure that the system continues to operate as intended.

Homeowners who install a new alternative system are now required to sign a maintenance contract with a qualified person for a minimum of one year.

As emphasized in other parts of this manual, periodic inspections and having the tank pumped, when necessary, are critical to the system’s proper operation. The table below offers further guidance:

Tank Size (GAL)	Number of People Living in House							
	1	2	3	4	5	6	7	8
750	9.1	4.2	2.6	1.8	1.3	1	0.7	0.6
1000	12.4	5.9	3.7	2.6	2	1.5	1.2	1
1250	15.6	7.5	4.8	3.4	2.6	2	1.7	1.4
1500	18.9	9.1	5.9	4.2	3.3	2.6	2.1	1.8
1750	22.1	10.7	6.9	5	3.9	3.1	2.6	2.2
2000	25.4	12.4	8	5.9	4.5	3.7	3.1	2.6
2500	31.9	15.6	10.2	7.5	5.9	4.8	4	4

Pumping Frequency in Years OSU Extension AEX-740-98

The Pumping Frequency Chart above does not account for a garbage disposal. If one is being used, tank pumping frequency will likely need to be increased.

7.0 SEPTIC TANK ADDITIVES

Many commercial septic tank additives (biological or chemical) claim to keep septic systems healthy, stimulate bacterial action, avoid system upsets . . . some infer that you won’t have to pump the tank. Many onsite industry authorities are skeptical. Additives have not been proven to improve long term system performance. Some additives are known to be harmful. **CONSENSUS:** Additives will not eliminate the need for timely pumping of the septic tank.

8.0 DO NOT FLUSH ...

The First Line of Defense to Protect your Septic System



DO NOT FLUSH

Coffee Grounds
Dental Floss
Disposable Diapers
Baby Wipes / Facial Tissues
Sanitary Napkins / Tampons
Condoms
Cigarette Butts
Fats, Grease or Oil

Chemicals such a
Paints
Varnishes
Thinners / Solvents
Anti-Freeze
Photographic Solutions
Pesticides / Herbicides

Prescription Drugs &
Over-the-Counter
Medicines*



***BE AWARE:** Flushing certain unused medicines down the toilet can cause the natural bacteria in the septic tank to become “sick” or even die. This can disrupt the primary treatment process causing waste to not break down as it should. This can negatively affect the system’s performance. REMINDER: Other than normal toilet waste, flush only toilet paper.

WHAT TO DO WITH UNUSED MEDICINES?

The Prescott Police Department will properly dispose of these medications. The Department’s goal is to help keep these meds out of the hands of children as well as avoid potential groundwater pollution. They recommend you clean out your medicine cabinet and deliver the old items to the Police Station at 222 S. Marina on weekdays, between 9:30 am and 4:30 pm. Confidentiality is assured.

Federal guidelines and options for proper drug disposal are also available at:

www.WhiteHouseDrugPolicy.gov

OTHER CAUTIONS: Recent studies indicate that some household cleaning products may not be compatible with the bacteria in the septic tank. These items include caustic drain cleaners, laundry detergents with high levels of bleach, anti-bacterial soaps and bathroom products such as toilet cleaners and scum-removing shower sprays.

RECOMMENDATION: Read labels and use such products sparingly. Consider “green” cleaning products such as baking soda, white vinegar and lemon juice.

9.0 SEPTIC SYSTEM DO's & DON'Ts

- ◆ **DO** maintain a file of permits and other system documents including Operation & Maintenance information. Keep records of all inspections, pumping & repairs.
- ◆ **DO** have your system inspected & the tank pumped every 3-5 years, depending on its size, use & number of residents. An alternative system with mechanical or electrical components should be inspected at least annually.
- ◆ **DO** call a licensed professional, when needed, if you experience problems or observe indication of system failures.
- ◆ **DO** learn and mark the location of your septic tank, drainfield & other system components. Draw a sketch of the system.
- ◆ **DO** divert other sources of water away from the area of the system; e.g. surface water, downspouts, French drains & sump pump.
- ◆ **DO** conserve water to avoid overloading the system. Repair any leaky faucets or toilets. Use modern water saver fixtures.
- ◆ **DO** limit the use of a garbage disposal ... or don't use one. More frequent pumping is necessary by using a disposal. Compost and use the trash can.
- ◆ **DO** be skeptical about using septic tank additives. They have not been proven to eliminate or reduce regular septic tank pumping.
- ◆ **DO** be cautious about allowing water softener backwash to enter your septic tank.
- ◆ **DON'T** use your toilet as a trash can for non-biodegradable material. Other than normal toilet waste, flush only plain toilet paper. **OBSERVE THE OTHER "DO NOT FLUSH" CAUTIONS.**
- ◆ **DON'T** use excessive amounts of anti-bacterial soaps, commercial bathroom cleaners or laundry detergents with high levels of bleach. Consider using "green" cleaning products such as baking soda, white vinegar, ammonia, lemon juice or cream of tartar.
- ◆ **DON'T** run successive loads of laundry. Overloading your septic tank in a short period of time does not allow it to function properly.
- ◆ **DON'T** drain a hot tub into your septic tank. Instead, drain cooled hot tub water onto areas away from the septic tank & drainfield.
- ◆ **DON'T** construct any buildings, home additions or any hard surfaced area over the septic tank, drainfield or the reserve area.
- ◆ **DON'T** plant trees/vegetation (except grass) over or near the tank or drainfield. Roots can cause clogging & back-ups.
- ◆ **DON'T** allow anyone to drive over or park on any part of the septic tank or drainfield. Compacted soil inhibits proper treatment.
- ◆ **DON'T** ignore: UNSECURED COVERS on risers or tank covers above ground level (small children could fall in); POOLING WATER/ SOGGY SOIL in area of septic tank or drainfield; TOILETS OR SINK BACK-UPS when you flush or do laundry; GREEN GRASS/WEEDS growing over the drainfield.

REMINDER: Suggest you review this care & maintenance information with family members as well as with guests and/or renters, as applicable.

10.0 POTENTIAL SYSTEM PROBLEMS

Homeowners need to be aware of symptoms that may indicate their septic system is not operating normally. Prompt response to early warning signs is critical to help prevent more serious problems and unnecessary expense.

EARLY WARNING SIGNS OF A MALFUNCTIONING SYSTEM:

- * Slow draining (or “gurgling”) toilets or household drains
- * Sewage backing up into house
- * Sewage odors, inside or outside
- * Sewage over or near the leach field
- * Lush, green growth over the leach field
- * Damp, soggy or wet soil over or near the disposal area

A COMMON EARLY WARNING SIGN . . . if your toilets or other fixtures suddenly begin to drain slowly. This could be the result of overloading the system with wastewater. Owners should evaluate recent household events that may be affecting their system, such as:

- ✓ Have we had extra guests/children visiting our home?
- ✓ Did we run several loads of laundry in a short time?
- ✓ Are we using a garbage disposal?
- ✓ Do we have any water leaks from toilets or other fixtures?
- ✓ Is the filter (if installed) overdue for servicing?
- ✓ Has it been more than 3-5 years since the system was serviced?

Occasional slow draining symptoms caused by a minor fixture blockage may be relieved by using a plunger or snake. Other suggestions are to monitor and/or change your water usage habits, operational practices and check for fixture leaks.

However, this is not a time to relax!

Persistent slow draining symptoms (or other early warning signs noted above) should trigger an immediate investigation! Identifying and correcting certain system deficiencies are usually difficult for most homeowners to handle. **YOUR NEXT STEP SHOULD BE TO CALL YOUR SEPTIC SYSTEM SPECIALIST.**

An early inspection by a professional will likely reveal more significant (but usually correctable) issues, such as:

- * A clogged filter (if installed);
- * Blockage between the tank and drainfield;
- * Faulty or deteriorated Tees/Baffles;
- * Obstructed inlet or outlet pipes in tank;
- * Blockage between the house and septic tank;
- * Tree roots;
- * Excessive accumulation of sludge and scum;
- * Cracked tank, allowing seepage of groundwater into the tank;
- * Plugged or improperly installed vent pipes.

WORST CASE SCENARIO: A clogged/failed drainfield is most likely to occur with an older or undersized system not designed for modern day living. NOTE: In extreme situations, your drain field may be diagnosed as “failed”...or an entire new system is suggested. In this case, it would be advisable to get a second opinion from other septic system contractors or designers.

WHAT TO DO? Consult with the staff at your County Environmental or Health Agency and an experienced septic system installer or designer to discuss your options.

11.0 WHO TO CALL FOR PUMPING & INSPECTIONS

For inspections, pumping and servicing of your septic or alternative system, it is recommended that you contact one of the “Certified Inspectors” listed on the website (in bold print) shown near the end of Section 12.0 under the University of Arizona Cooperative Extension Service.

A Certified Inspector is a person who has completed an ADEQ approved training course, meets other qualifications and attends required refresher courses.

NOTE: A person who plans to sell (or otherwise transfer) a property served by an onsite system is required, by law, to engage a Certified Inspector to perform a pre-transfer inspection of the septic system. When this type of inspection is applicable, a prudent homeowner should verify the current certification status of any inspector they plan to use. The services of a competent real estate professional can be invaluable to represent the interests of a seller ... and help avoid potential transaction “booby traps.”

12.0 GOVERNMENTAL AGENCIES AND WASTEWATER GROUPS

Onsite wastewater systems are influenced by many governmental agencies and wastewater groups. These include:

U.S. ENVIRONMENTAL PROTECTION AGENCY (US EPA) – The Federal agency involved in a wide range of environmental issues including onsite wastewater treatment systems. Below is an excerpt from EPA’s statement relating to onsite systems:

“Public health and environmental protection officials now acknowledge that onsite systems are not just temporary installations that will be replaced eventually by centralized sewage treatment services, but permanent approaches to treating wastewater for release and reuse in the environment.”

www.epa.gov

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY (ADEQ): The state agency that governs the regulations for onsite systems. These regulations are part of Arizona’s Administrative Code (A.A.C.) and are implemented by county agencies.

www.azdeq.gov

LOCAL COUNTY DEVELOPMENT SERVICES OR ENVIRONMENTAL/HEALTH AGENCIES: Local agency that administers the permitting and inspection process for onsite systems and other regulatory provisions adopted by ADEQ.

(www.co.yavapai.az.us)

ARIZONA ONSITE WASTEWATER RECYCLING ASSOCIATION (AzOWRA): AzOWRA’s primary mission is to provide educational and training programs for all onsite industry stakeholders, including homeowners.

www.azonsite.org

UNIVERSITY OF ARIZONA COOPERATIVE EXTENSION SERVICE: Coordinates the training programs to qualify Certified Inspectors for ADEQ’s pre-transfer inspection requirements. Names of these inspectors can be obtained at:

<http://www.nawt.org>.

Other published information regarding water conservation, gray water, and other water issues in Arizona are accessible on the U of A website at:

www.arizona.edu

Homeowner's Septic System Service And Maintenance Record

Record keeping is an important part of the operation and maintenance of your onsite system. Complete, as much as possible, the information asked for below. Much of this information can assist persons you call on to inspect, pump or service your system.

Property Information:			
Property Address: _____		Assessor Parcel #: _____	
Subdivision: _____		Lot / Block _____	
Household Information:	Number of Bedrooms When Built: _____	Number of Bedrooms After Addition: _____	
	Number of Toilets When Built: _____	Number of Toilets After Addition: _____	
<input type="checkbox"/> Hot Tub/Garden Tub/ Multi-head Shower System	<input type="checkbox"/> Reverse Osmosis Water Filter	<input type="checkbox"/> Private Water Supply	
<input type="checkbox"/> Garbage Disposal	<input type="checkbox"/> Water softener	<input type="checkbox"/> Public Water Supply	
<input type="checkbox"/> Other _____			
CATEGORY OF SYSTEM:			Date Installed: _____
<input type="checkbox"/> Conventional Onsite System			Permit # _____
<input type="checkbox"/> Alternative System			Type or Brand _____
<input type="checkbox"/> Other Mechanical / Electrical Components _____			
SEPTIC TANK	Number of Tanks: _____	<input type="checkbox"/> Concrete	Manufacturer _____
<input type="checkbox"/> Rectangular	<input type="checkbox"/> One Compartment	<input type="checkbox"/> Fiberglass	
<input type="checkbox"/> Round/Oval	<input type="checkbox"/> Multi-Compartment	<input type="checkbox"/> Plastic	Capacity (Gallons) _____
PUMP TANK	Capacity (Gallons) _____	Pump Horsepower _____	Manufacturer _____
Location of Power Switch _____			
System Features:			
<input type="checkbox"/> Septic Tank Effluent Filter		<input type="checkbox"/> Siphon / Pump	
<input type="checkbox"/> Distribution Box / Flow Divider		<input type="checkbox"/> High Water Alarm	
<input type="checkbox"/> Diversion Valve		<input type="checkbox"/> Other _____	
DRAINFIELD OR DISPOSAL METHOD			Length of Field (sq. foot / Linear foot) _____
<input type="checkbox"/> Pipe & Gravel (Conventional)			Number of Trenches: _____
<input type="checkbox"/> Chambers			<input type="checkbox"/> Bed - Bed Dimensions: _____
<input type="checkbox"/> Drip Irrigation			<input type="checkbox"/> Other _____

IMPORTANT CONTACTS FOR ASSISTANCE

Install Contractor	Phone: _____
Septic Tank Pumper	Phone: _____
Maintenance Contractor	Phone: _____
County Environmental Agency	Phone: _____

SERVICE AND MAINTENANCE RECORD ON FOLLOWING PAGE

