

SECTION 2 – Methodology and Discussion

The inspection consists of the following:

- (1) A visual qualitative and quantitative inspection of the well system and all components up to and including the pressure tank.
- (2) A visual inspection of the area in which the septic tank and waste water distribution system is installed.
- (3) If possible, a stress test to determine adequate volume production of the well.
- (4) If possible, a stress test to determine the efficiency in which the septic system processes wastes and to determine the waste water distribution system's ability to adequately disperse waste liquids into the soil and substrata without contamination to the well and without upward migration and subsequent surface runoff.
- (5) To determine the overall quality of the well water in terms of presence and concentration of pathogenic bacteria and excess mineral (calcium, magnesium, iron) concentrations.

Well Configuration: Due to potential bacterial contamination, the well seal or cap on the well **will not be removed** to determine diameter, depth or static level. The integrity of the well seal and the ability of the well casing to seal out surface water contamination will be inferred from total and fecal coliform laboratory analysis. The well will be evaluated for volume production as described below. If the well is located underground (buried), the well will not be located by probing with a tile probe. Tile probes can and will damage the plastic water lines exiting the top of the well. For many years now, the entity that regulates well heads in this state (Indiana Department of Natural Resources, Water Division), has required that any well head that is buried below grade, if exposed for any reason, must be extended to a point 12 inches above grade and a pitless adapter must be installed. The client should be aware that if this is not the case, it will eventually be necessary.

Pump Configuration: The type of pump, pressure switch, pressure tank, pressure gauge, and pipes are inspected for function, proper size, installation, and operability.

Volume Test and Sample Collection: If possible, two (2) or more indoor faucets will be opened to obtain at least a four (4) g.p.m. (gallons per minute) flow rate from the well. Since the rate (gallons per minute) that a water pump is capable of pumping is determined by the water level in the well, drawdown will be inferred from the pumping rate over time. Rate of pumped water will be measured at intervals (15-30 minutes) to determine whether the well produces enough water to meet the needs of a modern home. A water sample collected for laboratory submission to determine the presence and concentration of Total Coliform and Fecal Coliform.

Well Production and Septic System Stress: Faucets will be allowed to run. A volume or rate of flow is measured to achieve a minimum of four (4) gallons per minute flow rate through the system. Most County Health Departments, estimate that a septic system should be capable of processing 150 gallons of waste water/bedroom/day. If the home has a whirlpool bath that exceeds 80 gallons in capacity, it is considered to a “bedroom.” For example, a home with 3 bedrooms and a large whirlpool bath should be able to process 150 gallons X 4 = 600 gallons/day. Time required to run an amount of water into the septic system to achieve a single day loading is calculated. Please note: Different quantities of water will be used depending on the size of the home.

Well and Septic System Location Requirements: If possible (without damaging equipment) Measurements are taken to determine proper placement of the well and septic system.

Septic System Delineation: If outdoor weather conditions permit, a probe is used to locate the boundaries of the septic tank, dimensions are noted, and tank size is calculated from the collected data. Location of the distribution system may be identified through personal communication with the present landowner/property manager, and then an attempt is made to verify the information using a probe. If personal communication is not available, an approximation is made based on visible observations at the site. If practical, the health department is contacted and an attempt is made to retrieve any records they may have pertaining to the system. Please note: Several factors may make health department records inaccurate. If the system was installed before record keeping was in place, there may be no records on file. The system may have been repaired or altered without the proper permits from the health department. ***In these cases, it should be assumed that the system does not confirm to health department standards, and in the event of a problem, a new system may be required.***

Septic Tank Inspection: If the septic tank has an inspection port that is not buried, it is inspected from this port. It is inspected for type of material in which the septic tank is constructed, and for the presence of obstructions in the tank that could limit or inhibit flow through the tank. We are not a septic tank pumping service. Since the inside of the tank is only visible on the day tank is pumped, we advise you to have a service pump the tank, determine the amount of undigested solids present in the tank, and inspect the exit baffle to make sure it is operable and in place.

Soil Properties of the Distribution Field: A number of areas will be probed around and through the distribution field to determine if upward migration of fluids have occurred during the pumping test. Any saturated soil conditions or dark organic deposits are noted.

Several types of septic systems are commonly observed. Some are considered acceptable by State and County Health Standards, and some are not. A few types are explained below.

Conventional Gravity System: These systems are common, and many are still in use today. They consist of a septic tank with an exit baffle, where solids are digested into liquid (this is referred to as “primary digestion”). From there, liquid flows to a box called a “D-box” (distribution box). In this box are discharge pipes – one for each “finger” of the leach field. “Fingers” are branches or individual tiles that are perforated and installed in a gravel layer. Here is where waste water is further digested (called “secondary digestion”). The leach fields of older systems of this type were sometimes backfilled with sand rather than coarse gravel or stone; this can make the leach field difficult to “feel” with a tile probe, and sometimes the actual leach field cannot be delineated. Newer systems have a perimeter drain around the leach field to prevent seasonal saturation of soils from causing a problem.

Dosing or Mound System: These newer systems were originally implemented to keep the leach field above the water table to prevent groundwater contamination, when site limitations were present (seasonal high water table, poor drainage, high clay soils, etc.). They have become much more common in recent years, since it has been shown that the design provides a buffer for times

of heavy use, “dosing” the leach field at periodic intervals. They have all the components of a conventional gravity system with the addition of a “dosing” tank installed after the septic tank. A pump is installed in the dosing tank that pumps the waste water to the leach field that is located at a higher elevation than the tank. This is why a pump is needed. These types of systems should have a working “high water alert alarm” installed as part of the system. This tells the homeowner when the pump has failed and maintenance is required. As with all mechanical devices, the pump has a finite lifespan and will eventually require replacement.

Sand Bed with Overflow: These older systems consisted of a septic tank and a small sand filter bed. The overflow from the end of the sand bed usually drained to a field tile. Sometimes a chlorination system was installed. These types of systems are considered obsolete by the health department, since they drain to field tiles. When repairs are necessary that require a permit from the health department, complete replacement with a modern acceptable system is required.

Aeration System: These systems were installed in 50’s through the 60’s. They operated on the same principle as a public wastewater treatment plant. The septic tank had an aerator installed in it that introduces oxygen into the wastewater. All other systems use anaerobic (without oxygen) bacteria to decompose the waste, which is a slower process. These systems use aerobic (with oxygen) bacteria, making the decomposition process much quicker. They were also equipped with a chlorination system to kill any residual bacteria before it entered the surface drainage systems. Unfortunately, the problem with these systems is this – homeowners let the aerator fail and/or ignoring maintenance on the chlorination system, allowing the system revert to anaerobic, and they begin discharging E.coli to the surface water drainage system. This is why they are no longer acceptable by state and county health departments.

Black Water/Gray Water Field Tile Systems: These systems are obsolete and are no longer acceptable. With these systems, the toilet and sometimes the kitchen sink was routed through a small septic tank, commonly 500 gallons or less, and waste liquid was discharged to a field tile. This was called the “black water.” All other wastewater inside the home was discharged through another pipe that bypassed the septic tank, and was discharged directly to the field tile. This was called the “gray water.” Field tiles are very difficult to locate, and may acres of cross fields before they outcrop and discharge to surface water drainage systems. These systems are very difficult to discover, which is why so many are still in use today. They are no longer acceptable, since they are an environmental hazard, and when discovered by the health department, they virtually always need to be replaced.

A Word on Open Tile Systems: *Open tile systems are systems that direct wastewater from the septic tank to a field tile, which then leads to a surface water stream or other type of surface drainage system. These systems are illegal according to county and state boards of health. However, many older homes in rural settings still have such a system. Additionally, since these tiles sometimes outcrop a considerable distance from the septic tank, it is virtually impossible to identify their presence. Also, sometimes the tile is backfilled with gravel to leave one with the impression that a leach field exists, when in fact it does not. To make matters even more difficult, sometimes a leach field is installed, fails to function in a few years, and the homeowner solves the problem by tying an open tile into the end of the leach field. ***For these reasons: (1) Star Home Inspections Inc. cannot guarantee that wastewater does not drain to an open tile.****

(2) Cannot be held responsible in the unlikely event that the true nature of the system is not verified.

Septic Systems are Regulated by the County Health Department: Before the late 1980's, septic systems were regulated quite inconsistently from county to county. In the late 1980's the Indiana State Health Department established "minimum" guidelines to provide guidance to the counties. Some counties follow these "minimum" guidelines, while a few have regulations that greatly exceed the minimum. For this reason, Star Home Inspections cannot "quote health code." To complicate things even more, Health Department Criteria has a tendency to be updated every few years. With the exception of open tiles discussed above, a system usually does not have any oversight from the Health Department until a problem with the system develops. If repairs or corrections that require a permit from the health department develop, it may be necessary to update or replace the system according to the most current standard. **Therefore, the scope of this inspection is limited to only the functionality of the system on the day of the inspection.** **THIS INSPECTION CANNOT BE A CODE COMPLIANCE INSPECTION.** Since the County Health Department is the government regulatory agency that oversees and enforces septic system regulations, they will always have the final word.