STAR HOME INSPECTIONS, INC.

Thursday, April 16, 2015

RE: Report
Well and Septic System Investigation
Residential Property
0000 S. 000 W
Somewhere, Indiana 47872
Project #Sample Report

Dear Mr. Jones:

Star Home Inspections Inc. has completed the Well and Septic System Investigation for the above referenced property. The attached report documents the conditions encountered at the time of the inspection and presents conclusions relative to the property. ***Please read the complete contents of this report carefully.*** *It contains important information regarding the limitations of septic system investigations, as well as information on your specific system.*
A Homeowner's Guide to Septic Systems, published by the Environmental Protection Agency (EPA) has been supplied as an attachment in the email that you have received containing this report. It can also be found at:
http://www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf

We have enjoyed working with you on this project and look forward to working with you in the future. At Star Home Inspections Inc., we place great emphasis on the value of open communication -- ***both in written and verbal form.*** Therefore, please feel free to contact me anytime if you have any questions, and I will be glad to meet with you and discuss the report, and explain anything you find unclear.

Sincerely,

James O. Akers ***RREI, CREI***
Commercial/Residential Real Estate Inspector and Infrared Specialist
Indiana Home Inspector License #HI00500158

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STAR HOME INSPECTIONS, INC.

SECTION I -- SUMMARY

Private Water Well and Septic System Investigation
Residence located at 0000 S. 000 W, Somewhere, Indiana

Star Home Inspections Inc. conducted a Private Water Well and Septic System Investigation of the residence listed above. The inspection was conducted to evaluate the function and integrity of the water well, water pump, pressure tank and controls, water quality and quantity, septic tank, distribution system, and soil properties. The investigation was conducted, using the methods described in SECTION 2 of the body of this report:

PLEASE NOTE: *Given the nature of well and septic systems, it is virtually impossible to evaluate the integrity of such systems in such a way as to be absolutely sure that these systems will be functioning in the future as they are at the time of the investigation. It is virtually impossible to determine "beyond a shadow of a doubt" if a septic system is and will continue to function properly without excavating the entire system -- more costly than the installation of a complete new system.*

In inspections of this nature, we therefore, rely on certain methods (outlined in SECTION 2) that give the most accurate and complete information practical given the nature of the systems that are being investigated.

The following *items of interest* were noted at the property:

- ***Iron Content:*** Iron is present in the water in a high enough concentration to cause staining of clothes, hair, and skin. It should be noted that filtration and water softening equipment is necessary to maintain optimum water quality.

- ***Well Production:*** Water was run for approximately 150 minutes at the rate of 4.0 gallons per minute for a total volume of 600 gallons. Flow from the well remained stable throughout the pumping test (4.0 gallons per minute), indicating that the volume of water pumped is less than or equal to the recharge rate of the well. ***The well production is considered to be acceptable for a modern home.***

- ***Well/Septic Tank Spacing:*** Based on a visual cursory inspection, using a conventional tile probe, the well appears to be approximately 70 feet from the septic tank.

- ***Septic System:*** Approximately 600 gallons of water was introduced into the septic system with no evidence of upward migration or surface pooling of waste water anywhere in the septic system. ***The septic tank and leech field appeared to be functioning in an acceptable manner on the day of the inspection.***

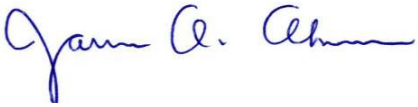
- ***Other Observations:*** The system at this home appears to be a dosing system, where a lift pump is installed in a “dosing tank” and waste liquid is pumped to the leach field. These systems appear to be the system of choice for the health department, since they buffer the influx of waste water into the leach field. As with all mechanical devices, pumps will eventually fail and need replacement. Most of these systems have a “tank alert” installed,

which is an alarm mechanism that sounds an alarm when the pump has failed. No "tank alert" could be located on this system. It is speculated that a tank alert may not have been required when the system was installed. Health Department standards are updated every few years; therefore, it is not unreasonable to assume that this system does not conform to the most current standards. Therefore, when repairs or corrections are necessary that require the application for a permit at the health department, it may be necessary to update the system to the most current health department standards.

- ***Total and Fecal Coliform:*** Laboratory analysis shows the absence of coliform bacteria in the well system. The water is considered bacteriologically safe for human consumption by state and county board of health standards. ***Therefore, no corrective measures are recommended at this time.***

Please feel free to contact me anytime if you have any questions, and I will be glad to meet with you and discuss the report, and explain anything you find unclear.

Sincerely,



James O. Akers ***RREI, CREI***
Residential and Commercial Real Estate Inspector and Environmental Consultant

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 has 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 course 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.*

SECTION 3 -- *General Guidelines for Private Water Systems*

The following guidelines are not federal, state, or local codes. Local codes vary from community to community; therefore additional restrictions or requirements may exist for specific localities.

⇒ The well should be at least 10 feet from the nearest overhang (eave) of the home. In certain cases, a variance is sometimes approved.

⇒ The well should be at least 50 feet from the septic tank.

⇒ The septic tank should be at least 15 feet from the home

⇒ The distribution system (filter field or finger system) should be at least 100 feet from the well.

⇒ A sustained flow rate of water from the well to the home of 4 gallons per minute is considered the minimum standard for a modern 3-bedroom home.

⇒ A peak flow rate of 4 gallons per minute may be considered the optimal flow rate for a modern home with 2 bathrooms.

⇒ A water pressure of 20 pounds per square inch is considered the minimum water pressure a water system should maintain. Most systems maintain a flow rate of 30-50 lbs. or 40-60 lb.

⇒ A pump supply line from the well to the water pump should be a minimum of ¾ inch inside diameter.

SECTION 4 -- *Collected Field Data*

Well Information

Comments: The following information may not be complete due to incomplete or missing archived records from the Indiana Department of Natural Resources - Water Division, and the County Board of Health. Personal communication with the present land owner may be the only convenient source available for this information.

Location: Due south of the southeast corner of the home Distance from the home: 13 feet

Distance from the septic system: 70 feet Depth: N/A feet below ground level

Note: Measured depth may not correlate with original depth due to sedimentation over time. The well head will not be disturbed during this inspection; to do so would possibly contaminate the well with bacteria and would require sanitization/chlorination.

Static level: N/A feet below ground level

Static level defined: The elevation or depth below ground level at which the water level rises in the well when no pumping is taking place. Most wells in the state of Indiana are by definition "Artesian." This simply means the water contained in the water-bearing strata (called the aquifer) is under pressure, and the water level will rise to some point above the aquifer.

Apparent Diameter (inside diameter) of well casing: 5 inches

Apparent type of well casing: PVC

Apparent condition: Acceptable ☒ Poor ☐

Comments: Well casing condition is inferred from observed sediment content.

Apparent type of well seal: Pitless adapter

Apparent condition: Acceptable ☒ Poor ☐

Comments: Well seal condition is inferred from coliform test results.

Appears to be properly vented: YES ☒ NO ☐ NOT VISIBLE ☐

Pump, Tank, & Controls

Type of Pump: Submersible

Manufacturer of Pump: Located inside the well -- appears to be a Myers pump

Size of Pump: 1/2 HP

Pumping system condition: Operable ☒ Inoperable ☐

Comments:

Apparent Size (diameter) of well-to-pump supply lines: 1 inches

Apparent Type of well-to-pump supply lines: black plastic

Condition of well-to-pump supply lines: Acceptable: ☒ Needs replacement: ☐

Approximate or apparent depth of pump suction pipe: N/A

Type of Pressure Tank: Vertical With Bladder Manufacturer of Pressure Tank: Well X Trol

Capacity of Pressure Tank: 20 Gallon

Pressure Gauge Operates: YES ☒ NO ☐ Not Present ☐

Pressure Tank maintains pressure between 40 and 60 pounds/inch^2

Pressure Tank Adequately Charged With Air: YES ☒ NO ☐

Comments:

Water Quality

Total Coliform: Present ☐ Absent ☒

Fecal Coliform: Present ☐ Absent ☒

Physical Evidence of High Iron Concentration: Present ☒ Absent ☐

Physical Evidence of High Calcium Concentration: Present ☒ Absent ☐

Comments: As part of this inspection the well is tested for the presence/absence of coliform bacteria. Iron/Calcium concentrations are informal observations.

Pumping Rate Results

Time since pumping began	*Volume (Gallons per minute)*
0 minutes	4 gpm

15 minutes	4 gpm
30 minutes	4 gpm
45 minutes	4 gpm
60 minutes	4 gpm
150 minutes	4 gpm

Total time well was pumped: 150 minutes

Total volume (gallons) of water pumped 600 gallons

Septic System

Apparent Type of Septic System: Dosing or "Mound" System

Several types of septic systems are commonly observed. Some are considered acceptable by State and County Health Standards, and some are not. A discussion of these systems can be found in SECTION 2: Methodology and Discussion.

Septic Tank

Comments: Location: 15 feet north of of the northeast corner of the garage; the dosing tank is 10 feet north of the septic tank.

Apparent/Approximated Tank Capacity/Size: 1250 gallons

Inspection Port Present: YES ☒ NO ☐

Apparent Manufacturing Material of Septic Tank: concrete

Signs of Internal Obstructions: YES ☐ NO ☒

Signs of Leakage: YES ☐ NO ☒

Comments:

Septic System Distribution Field

Comments:

Estimated/Approximated Location: The D-box is located approximately 20 feet north of the dosing tank. The finger system is located in a "mound" beginning 20 feet north of the D-box, and appears to consist of 5 fingers that run due west. A perimeter tile is apparent, but no inspection ports were visible.

Leach field boundaries exceed property boundaries? YES ☐ NO ☒ Unknown ☐

Field Observations of Leech Field

Number of random probing's: 10 Depth of probing: 10-18 inches

Visual Signs of upward migration of septic fluids: YES ☐ NO ☒

Signs of Surface Runoff: YES ☐ NO ☒

Soil Chroma and Hue Indicative of Seasonal Saturation: YES ☐ NO ☒

Soil Chroma and Hue Indicative of Full-time Saturation: YES ☐ NO ☒

Comments:

Professional Qualifications

Real Estate Inspection/Construction/Restoration Background

⇒ Full-time professional home/real estate inspector since 1997
⇒ Well over 8,000 (approximated) Performed Professional Real Estate Inspections
⇒ Attended American Home Inspector's Training Institute
⇒ Licensed Pest Inspector in State of Indiana for 10 years
⇒ 10 years as a Restoration Specialist in historic Parke County, Indiana (home of the Covered Bridge Festival) Experience includes but is not limited to:
- ✯ Foundation Repair/Restoration and Floor Leveling
- ✯ Lead-based Paint Abatement
- ✯ Woodwork Restoration/Refinishing
- ✯ Drywall and Plaster Repair
- ✯ Roof, Gutter, and Downspout Work including Clay, Slate, and Metal Repairs/Maintenance
- ✯ Bathroom and Kitchen Remodeling and Restoration
- ✯ Paint Restoration (Painting tinted and styled to the era in which the structure was built)
- ✯ Interior Decoration Consultant for Historic Buildings

⇒ 4 years as a Water Well Driller
- ✯ Cable Tool Operator
- ✯ Installed water Systems for rural residents
- ✯ Installed jet and submersible pumps, pitless adapters, pressure tanks, and all controls including electrical components

⇒ 2 years as a Power Plant Mechanic, Cayuga Power Generating Station

Certifications/License

- ✯ State of Indiana Home Inspector License #HI00500158
- ✯ Certified member of INTERNACHI (International Association of Certified Home Inspectors) since 2006
- ✯ Certified Infrared through INTERNACHI since 2009
- ✯ Certified Completion of Asbestos Training Program
- ✯ Certified completion of EPA's Model Lead Inspector Training Program

Environmental Background

⇒ A.S. Degree in Environmental Sciences, Vincennes University

⇒ B.S. Degree in Land Management (Minor in Geology) from the Department of Natural Resources and Environmental Management, Ball State University

Undergraduate research includes:

- ***Reconnaissance of Acid Rain Related Water, Rock, Soil, and Sediment Chemistry in the Adirondack Region***
- ***Soil/Flora Nutrient Cycling in Ball State University Wetlands***
- ***Land Suitability Analysis of the Jefferson Proving Grounds***
- ***Statistical Epidemiological Analysis of Indoor Air Quality in Latrobe Valley, Australia***

Other Awards and Activities:

- Established a computer lab facility in the Department of Natural Resources and Environmental Management and served as Computer Laboratory Supervisor
- Received the Award for Outstanding Service to the Department

M.S. Degree in Natural Resources and Environmental Management, Ball State University (IC)

Research Activities:

- ***A Mathematical Comparison of Horizontal versus Vertical Oriented Soil Vapor Extraction Wells for the Remediation of Hydrocarbon Contaminated Strata***
- ***A Survey of Indoor Air Quality, Building Related Health Symptoms, and Building Characteristics in Indiana Schools***

Other Activities:

Teaching:

- Water Resources
- Soil Fertility
- Natural Resources and Man

As Contract Faculty:

- Environmental Engineering

As a Guest Lecturer:

- Computer Applications in Environmental Management
- Integrated Resources Planning and Management

Teaching Activities Included Topics such as:

- Lead Based Paint Certification
- Asbestos Certification

- ✯ Drinking Water Quality Analysis
- ✯ Groundwater Modeling
- ✯ Wastewater Management
- ✯ Indoor Air Quality
- ✯ Energy Conservation in Building Design
- ✯ Soil Resources
- ✯ Soil Particle Size Analysis
- ✯ Soil Bulk Density Determination
- ✯ Soil Classification and Physical Properties
- ✯ Air Resources
- ✯ Water Resources
- ✯ Indigenous Freshwater Flora and Fauna
- ✯ Solid and Hazardous Waste Management
- ✯ Remediation Techniques for Contaminated Soils and Waters
- ✯ Using Geographic Information Systems and Remote Sensing Techniques for Land Suitability Assessment and Environmental Modeling

Remediation Project Manager:

Performed all field work, data collection, computer aided drafting, environmental modeling, and report writing for submission to Indiana Dept. of Environmental Management for:

- ✯ Phase I Environmental Assessments
- ✯ Phase II Environmental Assessments
- ✯ Underground Storage Tank Closures
- ✯ Initial Site Characterizations
- ✯ Indoor Air Quality Assessments/Sick Building Syndrome Assessments

Supervised:

- ✯ Emergency response efforts for petroleum spills
- ✯ Worker safety management during hazardous waste clean up