



# GRAHAM COUNTY

## DEPARTMENT OF HEALTH AND HUMAN SERVICES

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### PERMIT REQUIREMENTS FOR THE INSTALLATION OF SEPTIC SYSTEMS

**1. AVAILABILITY OF SEWER** - Conventional septic systems may be installed in areas that are not served by a sewer system, or when connection to a sewer system would be impractical. If site conditions allow however, a home or business must connect to a sewer system if an ordinance of an incorporated community requires it, connection costs are less than \$6,000, and the installation cost of constructing a line from the wastewater source to the service connection is not more than \$3,000 (AAC R18-9-A309).

**2. LOT SIZE** - Conventional septic systems may be installed on lots that are of sufficient size to accommodate the original wastewater system, plus a reserve for a 100% expansion of the system (in case a replacement system is eventually needed). Lots with both a well and a septic system must be at least one acre in size. Although there is no specifically stated size for a lot that has a public water supply and a septic system, typically it will require a lot that is at least 20,000 square feet in order to accommodate the system and the reserve area.

**3. SITE EVALUATION** - Although conventional septic systems may be installed by the homeowner if certain criteria are met, the site evaluation must be done by an Arizona-registered professional engineer, geologist, sanitarian, an appropriately licensed septic or plumbing contractor (K-41 or L-41) who has completed training recognized by ADEQ, or an individual otherwise qualified by ADEQ under applicable regulations. It is important that the property owner provide the evaluator with details of what is intended to be built on the property, including: the lot size, the building size, number of bedrooms, number of bathrooms and the number and types of plumbing fixtures that are proposed. The possibility of a future remodel or expansion that would add bedrooms or plumbing fixtures should also be considered at this point.

Site suitability is a term used to describe an overall evaluation of a building site to determine whether a conventional septic system can be expected to function properly. While the soil in some locations may be relatively uniform, there are other locations where soil types can vary considerably within the space of just a few feet. Therefore, the site suitability process is used to determine if a conventional septic system may be installed and how the system should be designed and constructed. Site suitability should include the following:

**A. Soil Absorption Rate Testing** – Evaluation of the soil absorption rates through either percolation testing or the ASTM Method are used to determine how fast the soil will absorb water after it has become saturated with water, and establishes the basis for sizing the system. Most soils will initially absorb water, but after becoming saturated, some soils will seal up and refuse to absorb more water or will take water

too quickly, which can impact the groundwater locally and in some instances far distances away, which is why the tests are performed. Soil absorption rates that fall within the range of those specified in the attached table are suitable for conventional septic systems. Percolation Rates of less than 1 MPI (Minutes Per Inch), as well as rates over 120 MPI are considered unsuitable for conventional systems and will therefore have to consider the installation of an alternative system. ASTM SAR Values slower than .20 or faster than 1.20 will require percolation testing to see if the values exceed the maximum allowable under code. In various situations, both ASTM and percolation testing should be done – or may be required – to fully evaluate the soil.

**B. Subsurface Investigation** – The evaluator shall determine whether any subsurface limiting conditions exist in the primary and reserve areas within a minimum of 12 feet of the surface, e.g., soils with an absorption rate faster than 1 MPI, shallow groundwater, large rocks, bedrock – including sandstone, excessive amounts of rock (bear in mind that all sand or rock particles 2 mm or larger are considered rock rather than soil), or other impervious conditions. This is typically done with soil borings that are dug with either a backhoe or an auger in three locations: two in the area where the septic is to be located and one in the reserve area. Site evaluators should keep in mind that if a site appears to be problematic, our office should be contacted to discuss the potential problems. We may choose to be onsite for soil borings or percolation testing, and we can require this at any time up to permitting and prior to final approval if we feel this is necessary.

Currently, most site investigators use the ASTM method of soil testing, which is very similar to the NRCS (former Soil Conservation Service) method. If percolation tests are done, or are required to be done in addition to the ASTM method, the tests must be observed and the locations and depths should be representative of the soil layers. Specific pre-soaking and testing procedures must be followed for the tests to be accepted. To ensure that the percolation tests are accepted by the department we must witness them. Please contact our office to coordinate the availability of such testing. Keep in mind that these tests must still be done by a qualified site investigator.

**Decomposed Granite-** In various areas of the county, decomposed granite (DG) can be observed at different sites and depths. DG is a bedrock that is in the process of weathering into soil and will be seen in different stages of decomposition. Generally, the further you go below the surface the less decomposed it will be; this means the material will generally get chunkier until it is cracked bedrock, which will not be acceptable for a conventional septic system. As with all bedrock, if the material cannot be excavated with a hand tool or shovel it is considered bedrock. The issue with DG is that since it is not completely soil it will not necessarily perform the same as a soil. If DG is observed, a percolation test will be required in addition to the ASTM method to ensure proper sizing of the septic system.

**C. Surface Investigation** – The evaluator shall determine an area not only best suited in terms of subsurface characteristics, but in terms of surface characteristics as well. Areas with greater than 15 percent slope are not recommended for installation of conventional systems in general. Areas subject to sheet flooding,

runoff, or in or near floodplains will all have potential surface limiting conditions. An outcropping of rock or sandstone at the surface of the ground, or disturbed or fill material deposits, are considered surface limiting conditions. The evaluator must consider the terrain and the potential for future problems and must combine this with the potential location of the home. The evaluator is responsible for locating flood plains and floodways, which can be done by contacting the Graham County Engineering Department. The evaluator must also verify the slope as discussed earlier. Guessing the slope of a site is not acceptable; a level or transit are required tools of a site evaluator and a septic installer.

**D. Separation from Groundwater** - The minimum vertical separation from the bottom of the disposal trench to the high seasonal groundwater level should be great enough to filter out microbiological contaminants. Groundwater depths may be determined by soil borings, well charts indicating typical groundwater depths in Graham County, or a well driller’s log for an adjacent well. Seasonal variation and years of drought may affect the current groundwater level; therefore, historical evidence and evidence of soil saturation will be considered also. The following criteria must be met:

<b>Soil Percolation Rate (Minutes Per Inch)</b>	<b>SAR (Soil Acceptance Rate)</b>	<b>Minimum Vertical Separation From Groundwater</b>
1 to less than 10 MPI	.63 – 1.20	10 feet
10 MPI or longer	.20 – .63	5 feet

**E. Setback Requirements** - Septic systems location must take into account minimum setback requirements from a variety of property structures, e.g., wells, houses, property lines, etc. The minimum setback requirements are listed on page two of the Construction Plan (see attachment). The diagram of the proposed system should include the location of the septic system, the placement and size of all buildings (existing and planned), driveways, walls, ditches or canals, ponds, property lines, and other relevant features, including sloping terrain and structures on adjacent properties that affect the placement of the septic system due to setback requirements (see attached plot plan sample).

**F. Reserve Area** - When designing the system, a reserve area must be identified in the event that it becomes necessary to install a replacement system. This reserve area must be identified on the plot plan, and no permanent structures or pavement may be built upon the reserve area. One of the three minimum soil test pits required to be excavated by the site evaluator must be dug in the reserve area to ensure that the soil material is consistent with the soil in the primary area.

#### 4. OBTAINING A SEPTIC PERMIT

Upon completion of the Site Evaluation, the homeowner will then determine if a licensed contractor will be used to complete the installation of the system or if they intend to self-install the system. Property owners may choose to self-install septic systems on land that they intend to occupy. Rental properties and properties intended for re-sale within one year of completion must have septic systems installed by licensed contractors. Property owners intending to self-install a septic system may complete the entire installation themselves, or they may hire appropriately licensed contractors to do some of the work. Every aspect of the project – tank installation, trench excavation, and laying the sewage pipe – is a regulated activity under the Registrar of Contractors. Therefore, if the work is not done by the property owner, it must be performed by a licensed contractor.

As with any construction project, it is advisable to determine your complete costs, e.g., septic tank, distribution boxes, pipe, rock, equipment rentals, as well as your personal time and ability to complete the project. In most cases, your complete costs will not save enough money to justify a self-installation, as opposed to having a licensed contractor complete the project. Property owners should also be advised that trench excavation can be a dangerous activity, especially around buildings and at depths in excess of five feet, and that they should seek to protect themselves from injury and liability.

If choosing a contractor, it is then the contractor's responsibility to obtain the permit, otherwise the homeowner must submit the following information to secure a permit:

**A. Site Investigation Report** – as described in Section 3.

**B. Notice of Intent to Discharge** – (see attached form), providing all of the information that is requested, a scale drawing of the system including the location of all relevant features and property lines (see attached sample plot plan), and a list of materials used.

The Department will review the Notice of Intent to Discharge (septic application) as soon as possible. **We attempt to complete the review within ten business days**, which includes application and site review. Occasionally, due to unforeseen issues on our part or with complications related to the application or the site, the review may take longer than ten days. Please understand the State of Arizona allows 73 days in total to for septic applications to be evaluated for completeness and to be reviewed, if needed.

**Applicants or contractors should not contact the Department sooner than ten business days after submitting the Notice of Intent to Discharge to inquire about the status of their application.** The applicant will be contacted as soon as a permit is issued or if there are any questions about the application

Septic permits may not be issued if either the Planning and Zoning Department or the Engineering Department have not issued a permit or otherwise given approval to the project. Construction on any part of the septic system or tank installation shall not begin until a permit has been issued by the department and the permit has been paid for and picked up.

## 5. SEPTIC TANK DESIGN AND SIZE

Only commercial septic tanks, with an engineered design approved by ADEQ, may be used. An effluent filter must be installed in the septic tank to prevent the passage of solids from the outlet. A permanent surface marker must be installed to identify the access opening, for the purpose of maintaining the system; installing a clean-out immediately prior to the tank would also fulfill this requirement. Access openings and/or risers must be constructed to allow accessibility within six inches of the finished grade. Minimum septic tank capacities for single-family dwellings shall be:

Number of Bedrooms	Fixture Count	Minimum Tank Capacity
1-3	Less than 21	1,000 gallons
4	21-28	1,250 gallons
5	29-35	1,500 gallons
6	36-42	2,000 gallons

**A. Water Tightness** – The tank must be tested for watertightness after installation and repaired or replaced if necessary. To conduct the test:

- 1) Fill the tank with clean water to the level of the outlet pipe and leave it for 24 hours;
- 2) After 24 hours, refill the tank to the original water level, if necessary;
- 3) Record the water level and the time and recheck after one hour has passed;
- 4) The tank passes the test if the water level does not drop during the one-hour period; however, any visible leak is considered a failure.

## 6. LEACH FIELD DESIGN AND SIZE

**A. Sizing the System** - Once the soil absorption rate has been determined, refer to the attached table to determine the required size of the leach field. The leach field should ideally be sized for a minimum of three bedrooms, unless a structure smaller than a house is being built; however, each additional bedroom increases the size requirements. (ADEQ requires that a system be designed for two bedrooms minimum.)

For the purpose of determining design flow for a septic system, a **bedroom** is any room that has:

- 1) A floor space of at least 70 square feet in area, excluding closets;
- 2) A ceiling height of at least 7 feet;
- 3) Electrical service and ventilation;
- 4) A closet or an area where a closet could be constructed;

- 5) One window capable of being opened and used for emergency egress; and
- 6) A method of entry and exit to the room that allows the room to be considered distinct from other rooms in the dwelling and to afford a level of privacy customarily expected for such a room.

For the purpose of calculating the required size of the leach field for a standard rock and pipe trench, the bottom of the trench and the sidewalls (downward from the bottom of the disposal pipe) are measured. The depth of both sidewalls and the width of the trench are added together up to a maximum of 11 feet of disposal area per linear foot. For example, a five-foot deep sidewall (x2) with a 1-foot wide trench will equal 11 feet of disposal area; a four-foot deep sidewall (x2) plus a two-foot trench will equal 10 feet of disposal area. (Trenches may be deeper, but no additional disposal area will be credited.)

#### **B. Installing the Leach Field (disposal trench):**

- 1) Either single or multiple trenches may be installed (see the attachment for Trench Details), however multiple trenches must be spaced from each other at least five feet, or twice the effective trench depth, whichever is greater. Multiple trenches must be of equal length and each trench, single or multiple, shall not exceed 100 feet in length.
- 2) Disposal trenches must be level at the bottom and one to three feet wide, in order to calculate the highest level of soil absorption area per linear foot. The sidewalls of the trenches should be roughed up (with a rake, etc.) to prevent smearing, a condition which prevents maximum absorption
- 3) The rock fill used for leach fields shall be clean, washed, and of uniform size, from 3/4 to 2 1/2 inches in diameter. Rock may not always be exactly this size but needs to fall in this range. Rock can be averaged by adding 3 sides and dividing by 3 to find the average size of the rock. Most companies that sell rock know the size needed if you ask for leach rock or septic rock. The rock fill shall extend from the bottom of the trench to two inches above the distribution pipe.
- 4) The distribution pipe must be installed on a level plane. All pipe used in the system shall be standard perforated leach field pipe (3- or 4-inch diameter, preferably SDR .035), available at most hardware stores. SDR .035 or equivalent is required if the trench pipe will be more than 24 inches below the surface.
- 5) There shall be a minimum of five feet of non-perforated distribution pipe between the septic tank and the beginning of the disposal trench. There must be a minimum of five feet between the tank and the leach field, in any direction, as well. Diversion valves or distribution boxes must also be installed with dual trenches. The end of the distribution pipe at the end of the leach field shall be capped. The septic tank as well as all connections between the tank, distribution boxes and distribution pipe shall be watertight.

- 6) The final cover over the distribution pipe shall consist of two inches of leach field rock and a protective layer of geotextile fabric, such as landscape fabric. A minimum of nine inches of native soil shall be back-filled over the filter material. Soil placed over the trenches shall be slightly mounded to control settlement and erosion in the drainfield area.
- 7) An inspection pipe shall be installed at the end of each disposal trench, to serve as a means of locating the leach field, observe depth to ponding, and to measure system performance. The inspection pipe shall be placed vertically down to the bottom of the disposal trench. The pipe should be open at the bottom and capped at the surface, with perforations in the part of the pipe that extends into the rock and non-perforated above the rock line. (Additional inspection pipes may be installed along the trench.)

## 7. FINAL INSPECTION

The Health Department must perform the final inspection(s) of the septic system upon completion of construction. The first inspection takes place when the septic tank has been installed and is visible, and the trenches have been excavated. Another inspection takes place after installation of the disposal pipe. Some systems will need only one inspection – after the rock and pipe has been laid – but this will depend on the system. Chamber systems must have the bare trench inspected prior to installation of chambers.

In most cases, final inspections can be scheduled one business day prior to completion. However, it is strongly recommended that more than one day notice be given, to ensure that staff is available. **Requests for inspections will not be granted if the septic permit has not been paid for and picked up, as construction must not commence on any part of the system without first obtaining the permit.** Final inspection must occur before backfilling over the system. Upon successful completion of the final inspection, a final septic system record will be created and issued to the owner.