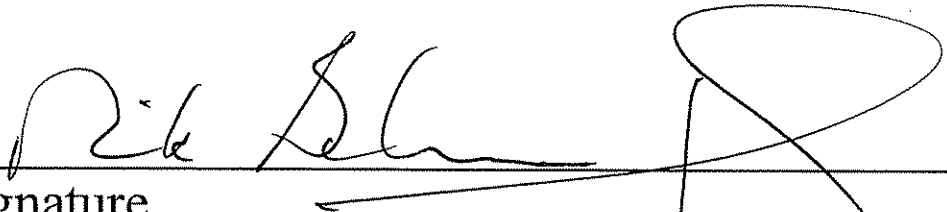


The enclosed Barton County Sanitary Code has been officially adopted by the Barton County Board of Commissioners.



Signature
Chairman, Board of County Commissioners

08-27-07
Date

Return to:

KDHE-Watershed Management Section
1000 SW Jackson, Suite 420
Topeka, KS 66612-1367

RESOLUTION 2007-12

**Revision of the Barton County Sanitary Environmental Code
and Rescinding Certain Related Resolutions**

WHEREAS, the Board of County Commissioners of Barton County, Kansas, has the authority to implement sanctions for the betterment of life in Barton County; and

WHEREAS, in order to protect the health and welfare, a sanitary code would provide for adequate and reasonable control over environmental conditions in Barton County, establish standards to eliminate and/or prevent development of environmental conditions that are hazardous to health and safety and promote economical and planned development of land and water resources.

NOW, THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Barton County, Kansas, pursuant to K.S.A. 19-3701, et. seq., that the Sanitary Environmental Code be revised for Barton County, Kansas. Such Revised Barton County Sanitary Environmental Code shall be incorporated into this Resolution as "Exhibit A"; and

BE IT FURTHER RESOLVED that copies of the Sanitary Environmental Code shall be available for inspection by the public at the Barton County Environmental Management Division; and

FURTHER, should this Resolution be in conflict with any previous resolutions of the Board of County Commissioners of Barton County, Kansas, that only the conflicting part of any previous resolutions and not the previous resolutions in total be declared void and ineffective; and

FURTHER, that Resolution 1984-24, Resolution Adopting and Incorporating a Sanitary Code for Barton County, adopted December 19, 1984; Resolution 1985-01, A Resolution Amending the Barton County Sanitary Code, adopted May 7, 1985, and Resolution 1993-19, Adoption of Sanitary Code for Barton County, Kansas, adopted September 13, 1993, be rescinded.

ADOPTED this 27th day of August, 2007.

BOARD OF COUNTY COMMISSIONERS


Rick Scheufler, Chairman

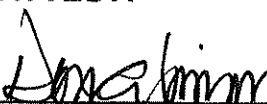

Betty Chlumsky, Commissioner


Jennifer Schartz, Commissioner


Kenny Schremmer, Commissioner



Joe Wilson, Commissioner

ATTEST:


Donna Zimmerman,
County Clerk



APPROVED AS TO FORM:


Richard A. Boeckman,
County Counselor

**ENVIRONMENTAL AND SANITARY CODE
BARTON COUNTY, KANSAS**

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**CHAPTER 1
ADMINISTRATIVE PROCEDURES**

SECTION 1-1.0 AUTHORITY AND POLICY

- 1-1.1 *Legal Authority.* This code is adopted under authority granted to Barton County Board of Commissioners by K.S.A. 19-3701.
- 1-1.2 *Declaration of Finding and Policy.* The County Commission finds that provisions for adequate and reasonable control over environmental conditions in Barton County are necessary and desirable. An environmental code establishes standards to eliminate and/or prevent development of environmental conditions that are hazardous to health and safety, and promotes economical and planned development of land and water resources of Barton County. For these reasons and objectives, it will be policy of the County Commission to adopt and maintain a sanitary code to provide current regulations of practices that affect health and safety.
- 1-1.3 *Purpose.* The purpose and intent of this chapter is to prescribe administrative procedures to be followed in administering this environmental code or any amendments thereto.
- 1-1.4 *Title.* This code shall be known and referred to as Barton County Environmental Code, Barton County Sanitary Code, or Barton County Environmental and Sanitary Code.
- 1-1.5 *Applicability.* Procedures prescribed in this chapter shall be followed in administering this code and any amendments thereto.
- 1-1.6 *Effective Date.* This code shall become effective

SECTION 1-2.0 DEFINITIONS

The following words, terms, and phrases appear in more than one chapter of this code and thus have general application and usage. Words, terms, and phrases appropriate or applicable to specific chapters within this code may be found in that particular chapter.

- 1-2.1 *Administrative Agency* means the entity authorized to implement the provisions of this code.
 - 1-2.1.1 The administrative agency for Barton County is the Barton County Environmental Management Division.
- 1-2.2 *Administrative Rules* mean those rules and regulations contained in chapter one of this environmental code which prescribe general procedures to be followed in administration of the environmental code adopted by the county.
- 1-2.3 *Authorized Representative* means any person who is designated by the administrative agency to administer this code.

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- 1-2.4 *Board of County Commissioners and Commission* means Board of County Commissioners of Barton County, Kansas.
- 1-2.5 *Board of Health* means Board of County Commissioners of Barton County, Kansas.
- 1-2.6 *Environmental Code Appeals Board* means a five-member board appointed by the Board of County Commissioners to hear appeals from decisions relating to administration of this code. The Environmental Code Appeals Board for Barton County shall be the same board members which serve on the Barton County Zoning Appeals Board.
- 1-2.7 *Person* means an individual, corporation, partnership, association, state, or political subdivision thereof, federal, state, municipality, commission, or interstate body or other legal entity recognized by law as the subject of rights and duties.
- 1-2.8 *Premise* means any lot or tract of land and all buildings, structures, or facilities located thereon.
- 1-2.9 KDHE means Kansas Department of Health and Environment.

SECTION 1-3.0

ADMINISTRATIVE POWERS AND PROCEDURES

- 1-3.1 *Right of Entry.* Representatives of the administrative agency shall have power and authority to inspect for compliance with Barton County Environmental Code.
- 1-3.2 *Permit and License.*
 - 1-3.2.1 Applications for Permit and Licenses. Every person required by this environmental code to obtain a permit or license shall make application for such permit or license to the administrative agency.
 - 1-3.2.2 Issuance of Permit or License. After receipt of an application, the administrative agency shall begin such investigation as deemed necessary to determine whether the permit or license should be issued or denied, and shall issue or deny the permit or license within 30 days of such receipt. If the permit or license is denied, the administrative agency shall send the applicant a written notice and state the reasons for rejection.
 - 1-3.2.3 Permit Nontransferable. No permit or license required by this environmental code shall be transferable, nor shall any fees required and paid therefore be refundable.
 - 1-3.2.4 Permit Revocation. All permits are subject to revocation for reasons of noncompliance or misrepresentation.

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1-3.2.5 Standard Fees. The Board of County Commissioners, based upon recommendations from the administrative agency, shall establish a schedule of fees sufficient to recover direct and indirect costs of processing all permits and licenses required by this code, and said fees shall be paid to the administrative agency. The administrative agency shall not process any application for a permit or license until the required fee has been paid.

1-3.3 *Notices, Orders, Appeals.*

1-3.3.1 Notice of Violations. When the administrative agency determines that there has been a violation of any provision of this code, notice of such violation shall be issued to the person responsible. The notice shall:

- (1) be in writing;
- (2) include a statement of why the notice is being issued;
- (3) allow a specified period of time for performance of any work required by the notice; and,
- (4) be properly served upon the owner or agent.

Such notice shall be deemed properly served when a copy thereof has been sent by certified mail to the last known address of the owner or agent.

1-3.3.2 Appeal for Hearing. Any person aggrieved by any written notice or order issued by the administrative agency under provisions of this environmental code may request, and shall be granted, a hearing on the before the Environmental Code Appeals Board. Such person shall file with the administrative agency within ten (10) working days after the date of issuance of the notice or order, a written petition requesting a hearing and setting forth the grounds upon which the request is made. Filing of a request for hearing shall operate as a stay of notice or order.

Upon receipt of such petition, the administrative agency shall:

- (1) confer with the Environmental Code Appeals Board and
- (2) set a time and place for such hearing and

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- (3) give the petitioner and the appeals board written notice thereof.

At such hearing, the petitioner shall be given an opportunity to show why such notice or order should be modified or withdrawn. The hearing shall be commenced no later than ten (10) working days after the date on which the petition was filed; provided, that upon request of the petitioner, the administrative agency may postpone the hearing for a reasonable time beyond such ten (10) day period, when in agency's judgment the petitioner has submitted justifiable reasons for such postponement. The burden of proof shall be on the petitioner by a preponderance of the evidence.

1-3.3.3

Report of Hearing. Within ten (10) working days after such a hearing, the board shall submit the findings of the hearing in writing to the administrative agency and the petitioner. Findings shall include a finding that the order be either sustained, modified, or withdrawn. The administrative agency may provide clerical assistance to the board in preparation of the board's findings.

- (a) Any person, official or governmental agency dissatisfied with any order or determination of the Environmental Code Appeals Board may bring an action in the district court of the county to determine the reasonableness of any such order or determination. Such appeal shall be filed within 30 days of the final decision of the Environmental Code Appeals Board.

1-3.3.4

Emergency Orders. Whenever the administrative agency finds that an emergency exists which requires immediate action to protect human health, safety or the environment, the agency may issue an order reciting the existence of such an emergency, and specifying action to be taken to meet the emergency.

An emergency may also be deemed as any activity that is in violation of the provisions of this code. Such an order shall be effective immediately. Any person to whom such an order is directed shall comply therewith immediately and shall have the same appeal rights as set forth above, except that there will not be a stay of the order pending the appeal.

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1-3.4 *Records.*

1-3.4.1 Permit Applications. Applications for permits or licenses required by this code shall be filed with and managed by the administrative agency.

1-3.4.2 Official Actions. A written record of all official actions taken on applications for permits and licenses required by this environmental code shall be kept on file by the administrative agency.

1-3.4.3 Proceedings of Hearings. Proceedings of all hearings, including findings and decisions of the appeals board, together with a copy of every notice and order related thereto shall be filed with the administrative agency.

1-3.5 *General Provisions.*

1-3.5.1 Enforcement Procedure. This code is being adopted pursuant to county home-rule power and K.S.A. 19-101d. Violations of this code by any person shall be punishable as a Class B Misdemeanor with penalties for each separate offense by a term of confinement in the Barton County Detention Facility not to exceed six months and/or a fine in an amount not to exceed \$1,000.

Each day the violation occurs shall be deemed a separate violation of this code.

As authorized by K.S.A. 19-101d, the county may request the court enjoin violations of this code.

The County Attorney shall enforce the provision of this code and other environmental codes adopted by the county and is hereby authorized and may file appropriate actions for such enforcement, upon request of the administrative agency. Action of injunction, mandamus, and quo warranto may be utilized for enforcement of these codes and shall be governed by provisions of Kansas Code of Civil Procedure.

1-3.5.2 Disclaimer of Liability. This code and other environmental codes adopted shall not be construed or interpreted as imposing upon the county or its officials or employees:

- (1) any liability or responsibility for damages to any property; or

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- (2) any warranty that any system, installation or portion thereof that is constructed or repaired under permits and inspections required by code will function properly.

1-3.5.2

Separability. If any clause, sentence, paragraph, section or subsection of this code shall for any reason be found by any court of competent jurisdiction to be unconstitutional and invalid, such finding shall not affect, repeal or invalidate the remainder thereof, but shall be confined to the clause, sentence, paragraph, section or subsection found unconstitutional and invalid.

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**CHAPTER 2
ON-SITE WASTEWATER MANAGEMENT**

SECTION 2-1.0 PURPOSE AND INTENT

Sewage is a potential source of disease and water pollution, and a hazard to the health, safety, and welfare of the public. It is the purpose of this chapter to provide minimum standards for location, design, construction, maintenance and use of on-site wastewater systems, and removal and disposal of materials from such facilities within the legal boundaries of Barton County.

SECTION 2-2.0 APPLICABILITY

Provisions of this chapter shall apply to all unincorporated areas located in Barton County.

SECTION 2-3.0 DEFINITIONS

2-3.1 *Alternative Onsite Wastewater Treatment System* means any system that relies on pumps, aerators, and / or other electrical and mechanical components to enhance treatment of wastewater prior to discharge to the soil absorption field or other treatment unit. Examples of alternative treatment systems include but are not limited to pumping stations which pump wastewater to a treatment unit such as septic tank, lagoon or other device, sand or other media filters, aerated tanks, mounds, rock plant filter (wetland treatment) which receive gravity or pressurized flow followed by soil absorption, including drip irrigation; or any other system determined to be alternative by the Barton County Environmental Management Division.

2-3.2 *Alternative to Soil Absorption Field* means a mound, drip irrigation system and rock plant filter system. A rock plant filter system shall be designed, constructed, installed and maintained according to KSU Bulletin MF-2340 Rock-Plant Filter Design and Construction for Home Wastewater Systems published June, 1998 by the Kansas Extension Service and KSU Bulletin MF-2337 Rock-Plant Filter Operation, Maintenance and Repair published June, 1998 by the Kansas Extension Service; are hereby adopted by reference and as amended.

2-3.3 *Beneficial Use* means conservation use of water for any of the following purposes: agricultural water supply; aquatic life; domestic water supply; groundwater recharge; industrial water supply; and recreation.

2-3.4 *Conventional Onsite Wastewater Treatment System* means wastewater flows by gravity through a standard septic tank (one or two compartment) followed by conventional soil absorption such as at-grade and shallow in ground, chambers, rock and pipe, gravel less pipe, with or without effluent filter. A properly designed non-overflowing wastewater lagoon which may include the use of a septic tank prior to the lagoon as determined by the Administrative Agency.

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- 2-3.5 *Domestic Wastewater* means wastewater originating primarily from kitchen, bathroom and laundry sources, including waste from food preparation, dishwashing, garbage grinding, toilets, baths, showers and sinks.
- 2-3.6 *Nuisance* means conditions or activities on properties both public and private, which have or threaten to have a detrimental effect on either the health of the public or the environment.
- 2-3.7 *Private Wastewater System* means any system which does not hold a Kansas Water Pollution Control permit pursuant to K.S.A. 65-165. A private wastewater system includes wastewater disposal systems which function by soil absorption, evaporation, transpiration, holding tanks, or any combination of the above.
- 2-3.8 *Sanitary Privy* means a facility with a water-tight concrete or other material acceptable to the code administrator receptacle designed to receive, store and provide for periodic removal of non-water carried wastes from the human body.
- 2-3.9 *Sanitary Service* means pumping out and \ or removal of sewage, sludge, or human excreta from privies, vaults, septic tanks, or private wastewater disposal systems; and transportation of such material to a point of final disposal.
- 2-3.10 *Seepage Pit* means a subsurface excavation, which is filled with rock or gravel and receives effluent from treatment devices.
- 2-3.11 *Sewage* means any substance that contains any of the waste products or excrement or other discharges from the bodies of human beings or animals, or chemicals or other wastes from domestic, manufacturing or other forms of industry.
- 2-3.12 *Subdivision* means any tract of land that is divided into two or more lots for the purpose of sale or building development, whether immediate or future, including the streets, alleys, or other portions thereof intended to be dedicated for public use, and any re-division of lands.
- 2-3.13 *Vault \ Holding Tank* means a water-tight concrete or other material acceptable to the code administrator receptacle for the retention of sewage either before, during or after treatment.
- 2-3.14 *Wastewater System* means any system along with attendant pipes and appurtenances designed and constructed to collect, store, treat, and dispose of domestic, industrial, or commercial waste.

SECTION 2-4.0

PROHIBITED PRACTICES

APPROVED 2-4.1

Seepage Pits.

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- 2-4.2 Use of Non-approved Private Wastewater Systems. No person shall use or cause to be used any private wastewater system or sanitary privy constructed after adoption of this environmental code until it has been inspected and determined to comply with the provisions of this code by the administrative agency or:
- (a) has been enjoined as a public health nuisance by a court of competent jurisdiction; or
 - (b) fails to comply with the provisions of this environmental code, and written notice thereof has been given by the administrative agency; or
 - (c) discharge wastes onto the surface of the ground, or waters of the State as defined in K.S.A. 65-161(a), or
 - (d) causes potential breeding grounds or habitat of rats, mice, snakes, mosquitoes or other vermin, rodents, insects or other disease vectors, produces offensive odors or any condition that is prejudicial to health and comfort.

A private wastewater system in use before adoption of this code may be required to comply with provisions of this code, with due consideration to existing lot size and conditions.

- 2-4.3 *Use of Wastewater Systems Within 400 Feet of a Public Sewer.* No private wastewater system shall be constructed within 400 feet of an existing public sewer, unless the administrative agency finds that connection to such a sewer is not feasible and that a private wastewater system, meeting the requirements of this code, can be constructed on that property.

- 2-4.4 *Location of Private Wastewater Systems Below Full \ Flood Pool.* No portion of a private wastewater system shall be located below the flood pool elevation of any reservoir or full pool elevation of any pond, lake, stream or water supply reservoir.

- 2-4.5 *Location of Private Wastewater Systems within a 100 Year Flood Plain.* A modified existing private wastewater system located within a 100 year flood plain, as established by Federal Emergency Management Agency, shall be equipped with a backflow device suitable for wastewater systems, located between the structure and septic tank. New private wastewater systems shall not be constructed within a 100-year flood plain.

- 2-4.6 *Location of a Private Wastewater System Within 50 Feet of a Non-public Water Supply Well.* No portion of a private wastewater system shall be located less than 50 feet from a non-public water supply well or a water line from a water well. No sanitary sewer line, regardless of construction, shall be located less than 10 feet from a non-public water supply well or a water line from a private water well.

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SECTION 2-5.0

REQUIREMENTS FOR PRIVATE WASTEWATER SYSTEMS

- 2-5.1 *Approval of Plans.* After adoption of this code no person shall develop any private wastewater system until plans and specifications for such system have been approved by the administrative agency. All private wastewater systems shall be designed, constructed and installed according to KDHE Bulletin 4-2 Minimum Standards for Design and Construction of Onsite Wastewater Systems published March, 1997 by KDHE and Kansas Extension Service; (Appendix 1, Bulletin No. 4-2) is hereby adopted by reference and as amended or as described in a written variance issued by the code administrator.
- 2-5.2 *Permit.* No person shall construct or modify, or permit to be constructed or modified, any private wastewater system until a permit has been issued by the administrative agency.
- 2-5.3 *Suitable Site.* No site shall be approved if:
- (a) connection to an approved public wastewater system is feasible, or
 - (b) the site violates the provisions of Section 2-4.0 of this code, or
 - (c) the site contains less than three acres of land exclusive of roads, streets, or other public rights-of-way easements;
 - (1) except current surveyed or platted lots of record, occupied or unoccupied, of less than three acres shall be allowed to construct or reconstruct wastewater systems; or
 - (d) the soil, topography, and geology does not meet the requirements set forth in Section 2-6.0.
- 2-5.4 *Construction Approval.* All private wastewater systems constructed or reconstructed after the effective date of this sanitary code must be inspected and approved by the administrative agency for compliance with the approved plans. No portion of this system shall be covered or made inaccessible to inspection prior to approval. Twenty-Four hours notice is required to ensure timely inspections. All inspections will be conducted during normal County working hours.
- 2-5.5 *Proper Maintenance and Operation.* All private wastewater systems shall be maintained in good working condition. Whenever the administrative agency finds the private wastewater system in violation of this code, the owner and/or user shall be ordered to correct the condition.

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2-5.6 *Variance.* The administrative agency shall have authority to grant exceptions when reliable information is provided which justifies the exception and effectively achieves the purpose and intent of this code.

2-5.7 *Wastewater Lagoons and Septic Tank and Lateral Field Requirements.* The following sections are intended to provide guidance for construction of private wastewater systems. The provisions of section (a) and (b)(1) through (14) are intended to provide general guidance. More specific requirements are contained in section (c).

(a) references approved by State of Kansas, such as Bulletin No. 4-2, Minimum Standards For Design And Construction Of Onsite Wastewater Systems, March, 1997, KDHE, Division of Environment; (Appendix 1, Bulletin No. 4-2) or as amended.

(b) (1) Site Requirements – Lateral Fields. Locations for the lateral fields must meet the following conditions:

(a) Four feet or more of soil depth above solid rock formation.

(b) Ground water elevation six feet or more below the ground surface.

(c) Private wastewater systems which are dependent upon soil absorption for disposal of wastewater shall meet minimum percolation standards.

(d) Provisions in the above sections shall not prohibit soil modification to enhance percolation or other advanced systems that employ similar technology.

(2) Alternative Wastewater Systems. An alternative wastewater system may be allowed by the administrative agency if soil percolation tests of the original soil indicate a soil porosity at saturation of one inch absorption or greater within a time period of sixty minutes (1 hour).

(a) The owner shall be responsible for the operation and maintenance of an alternative treatment system.

(3) Minimum Absorption Area Required. Lateral fields are required to have a minimum of 700 square feet of lateral absorption area, except as otherwise provided herein.

(4) Minimum Septic Tank Capacity:

1 bedroom dwelling – 1000 gallon tank

2 bedroom dwelling – 1000 gallon tank

3 bedroom dwelling – 1000 gallon tank

4 bedroom dwelling – 1250 gallon tank

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- (5) Construction Requirements for Septic Tanks. Septic tanks shall be watertight and of durable construction. The material used to construct the tanks, the size of the tank as well as the type of baffles shall meet all requirements set forth in Bulletin No. 4-2, Minimum Standards For Design And Construction Of Onsite Wastewater Systems, March 1997, KDHE, Division of Environment; (Appendix 1, Bulletin No. 4-2) or as amended. The ability to support a conventional septic tank servicing vehicle is required as specified in Section 2-5.7 (b)(8) of this code.
- (6) Separation Requirements From Other Properties. Septic tanks and lateral fields must have a minimum horizontal separation of 25 feet from other properties.
- (7) Separation Requirements From Public Water Supply Systems. Public Water Supply Separation Requirements of Kansas Department of Health and Environment shall be used as requirements for separation of private sewerage facilities from public or community water supply systems.
- (8) Septic Tank Access – All septic tanks shall be required to have a manhole access for sanitary service pumping and inspection.
- (9) Sewer Pipe Material, Perforated and Solid:
 - (a) Rigid PVC or corrugated polyethylene plastic pipe meeting American Society for Testing and Materials (ASTM) standard ASTM D2729-93 and ASTM F405-93 or latest edition respectively meet minimum standards for use as solid or perforated gravity distribution lines.
 - (b) All materials used in the plumbing, wastewater line, and lateral fields shall meet standards specified by ASTM.
 - (c) Schedule 40 PVC or stronger rated pipe is required under driveways, easements, or other areas where vehicle traffic is likely. Schedule 40 PVC or stronger rated pipe is also required between the main structure and the septic tank and at least the first ten feet out of the septic tank.
 - (d) Flexible sewer pipe is not allowed unless prior approval is granted by the administrative agency.

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- (10) Sewer Pipe Sizes:
 - (a) Four (4) inch diameter minimum.
 - (b) No longer than twenty (20) feet joints.
 - (11) Clean-outs. A minimum of one sewer clean-out from the dwelling to the septic tank shall be provided. One clean-out access shall be provided every 100 feet.
 - (12) Trenches:
 - (a) Minimum width of eighteen (18) inches.
 - (b) Maximum width of three (3) feet.
 - (c) Maximum depth of three (3) feet, unless approved by the administrative agency.
 - (d) Separation between trenches a minimum of six (6) feet, unless approved by the administrative agency.
 - (13) Gravel – Crushed rock, egg rock or crushed brick one (1) to three (3) inches in size or greater shall be used. It shall be clean and free of debris. Limestone or sandstone will not be used.
 - (14) Lateral Lines – Lateral lines shall be run level as much as possible, with pipe sloped no greater than one-eighth (1/8) inch per foot. When necessary on sloping ground, lateral lines shall be stepped.
- (C) Barton County Environmental Management Division Wastewater Requirements 2007; which is attached here to as (Appendix 2, Wastewater System Requirements, 2007) is incorporated by reference as though fully set forth in this section. (Appendix 2, Wastewater System Requirements, 2007), or any superseding document which provides more specific direction for certain private wastewater system applications. This document may be revised from time to time by the Environmental Management Division. Such revisions shall not require adoption of an amending resolution by the County Commissioners.

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SECTION 2-6.0

MINIMUM STANDARDS FOR SOIL TOPOGRAPHY AND GEOLOGY

No private wastewater system which is dependent upon soil absorption for the disposal of wastewater, shall be constructed on any lot of any size unless minimum standards specifying limits for percolation rates, soil profiles, and depth to high groundwater level or confining geologic depth to high groundwater level or confining geologic layer are met. Refer to Bulletin No. 4-2, Minimum Standards For Design And Construction Of Onsite Wastewater Systems, March, 1997, KDHE, Division of Environment; (Appendix 1, Bulletin No. 4-2) or as amended.

SECTION 2-7.0

REQUIREMENTS FOR SANITARY PRIVIES

- 2-7.1 *Approval of Plans.* No sanitary privy shall be constructed on any site when the use of a water flush and \ or more effective sanitary service can be provided on or to the site. No person shall construct or modify any sanitary privy until the plans and specifications for the proposed construction and \ or modification have been approved by the administrative agency.
- 2-7.2 *Approval of Construction.* No person shall use, or make available for use, any newly constructed or modified sanitary privy until the construction has been permitted, inspected and approved by the administrative agency for compliance with approved plan.
- 2-7.3 *Proper Maintenance.* No person shall use, or offer for use, any sanitary privy that is not maintained in a clean and sanitary condition.
- 2-7.4 *Location.* No sanitary privy shall be installed less than 100 feet from an existing well, and greater distances are highly recommended.
- 2-7.5 *Pumping Schedule.* Persons responsible for operating a sanitary privy must have an ongoing pumping maintenance contract with a Licensed Sanitary Service Provider and must provide documentation of the pumping schedule to the Administrative Agency upon request.

SECTION 2-8.0

SANITARY SERVICES

- 2-8.1 *License Required.* No person shall remove or transport any wastes from any wastewater system or privy, unless that person holds a valid license from the administrative agency or its assigns. To receive a license:
 - (a) Persons wishing to remove or transport any wastes from any wastewater system or privy in Barton County must complete an application for a Septage Hauler License, provide a copy of every driver's current driver's license and schedule an appointment for a truck inspection by the Administrative Agency.
 - (b) No person shall dispose of septage at any site not approved by administrative agency. A publicly owned wastewater treatment plant is the preferred septage disposal method.

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- (c) Any Licensed Septage Hauler found violating any provisions of this code will be subject to revocation of his or her license.

2-8.2 *Contracting with Non-licensed Persons Prohibited.* No person responsible for operating a private wastewater system or sanitary privy shall contract with any person for sanitary service unless that second person holds a valid license.

2-8.3 *Minimum Standards for Sanitary Service Equipment.* All equipment used for rendering of sanitary service shall be of watertight construction and maintained in good working condition. This ensures that all materials removed from private wastewater disposal systems or privies will be transported to an approved point of disposal without spillage of the waste.

SECTION 2-9.0 REQUIREMENTS FOR SUBDIVISION DEVELOPMENT

After adoption of this code no person shall develop any subdivision until the plans and specifications for wastewater management for such subdivision have been approved by the administrative agency.

SECTION 2-10.0 REQUIREMENTS FOR WASTEWATER SYSTEM CONTRACTORS

No person shall install or offer to install a private wastewater system on any property other than his own unless that person holds a valid license from the administrative agency. To receive a license:

- (1) Contractors wishing to work in Barton County must pass an examination. Multiple employees of a contractor may be licensed. Only the primary owner or manager of the business is required to pass the test. However, if only the primary owner or manager of the business is the only individual who obtains a license, then he or she must be present and on the job-site during the installation of the wastewater system.
- (2) The examination will test the Contractor's knowledge of the Barton County Environmental Code, KDHE Bulletin No. 4-2 (Appendix 1, Bulletin No. 4-2), and the current Barton County Environmental Management Division Wastewater Requirements, a document which outlines specific private wastewater requirement for Barton County; (Appendix 2, Wastewater Requirements).
- (3) Licenses are valid from January 1st through December 31st of each year and must be renewed annually after January 1st of each year.
- (4) The test is a "take-home test" with a minimum passing score requirement of 85 percent. All contractors passing the test will be placed on a list that is sorted alphabetically.
- (5) In the event that the Contractor receives less than an 85 percent score the Contractors will be provided the opportunity to re-test at the Barton County Environmental Management Division office in the Courthouse upon reasonable notice. The re-test will not be open book.

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- (6) Any Licensed Contractor found installing a private wastewater system on any property in Barton County and not following all provisions of this code will be subject to revocation of his or her license.

2-10.1 *Contracting with Non-licensed Persons Prohibited.* No person responsible for operating a private wastewater system or sanitary privy on his or her own property shall contract with any person to perform upgrades or installation of a wastewater system unless that second person holds a valid license.

2-10.2 *Self Installation.* Persons responsible for operating a private wastewater system or sanitary privy on their own property may perform self-installation or upgrades of a wastewater system on their own property so long as the work is supervised by the landowner. The self-installation or upgrade is subject to all provisions of this code.

SECTION 2-11.0

PROPERTY TRANSFER INSPECTIONS

Provisions of this code do not address requirements for property transfer inspections in Barton County. The Administrative Agency does offer the service to persons with a private water supply, septic tank, sanitary privy or subsurface absorption field or cistern subject to the regulations of this code. A Policy has been adopted for conducting these inspections which is based on an inspection of existing facilities and a comparison to new construction standards. That policy is set forth as (Appendix 3, Lender Evaluation Policy, July 7, 2003), or any superseding document; which is incorporated by reference as though fully set forth in this section. There is a fee established for this service. This policy document may be revised from time to time by the Environmental Management Division. Such revisions shall not require adoption of an amending resolution by the County Commissioners.

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**CHAPTER 3
WATER SUPPLIES**

SECTION 3-1.0 PURPOSE AND INTENT

Provisions of this chapter are for the purpose of regulating and controlling the development, maintenance, use and abandonment of all water supplies other than Public Water Supplies and irrigated areas larger than two acres in Barton County, Kansas, in order that public health will be protected and contamination and pollution of water resources of the county will be prevented.

SECTION 3-2.0 APPLICABILITY

Provisions of this chapter shall apply to all unincorporated areas located in Barton County, Kansas.

SECTION 3-3.0 DEFINITIONS

- 3-3.1 *Domestic Water Supply* means the use of water by any persons or family unit or household for household purposes, or for the watering of livestock, poultry, farm and domestic animals used in operating a farm, or for the irrigation of lands not exceeding a total of two acres in area for the growing of gardens, orchards and lawns.
- 3-3.2 *Non-Public Water Supply* means all water supplies not meeting the definition of Public Water Supply. A non-public water supply includes a water supply with fewer than nine service connections serving a user population of fewer than twenty-five individuals.
- 3-3.3 *Private Water Supply* means a water supply that is not defined as a semi-public or public water supply.
- 3-3.4 *Public Water Supply* means a system that has at least ten service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year (K.S.A. 65-162a). Public water supplies are not subject to the water supply requirements of this code.

SECTION 3-4.0 REQUIREMENTS FOR NON-PUBLIC WATER SUPPLIES

- 3-4.1 *Permit.* No person shall develop, use, sell, or lease any non-public water supply until a permit has been obtained from the administrative agency.
- 3-4.2 *Approved plans.* No permit to develop a non-public water supply subject to regulations of this code shall be issued until the application and plans have been approved by the administrative agency. References approved by State Department, such as K.A.R. 28-30 (Appendix 4, Article 30) or any superseding document, shall be used as a guide by the administrative agency in reviewing and approving plans for non-public water supply systems.
- 3-4.3 *Non-public Water Supplies Which Serve Two to Nine Service Connections.* All non-public water supplies which serve two to nine service connections shall:

- (1) Mechanically disinfect water delivered to the connections; and

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- (2) Test for nitrate-nitrogen and bacteriological quality at least every three months.
- (3) Maintain logs to verify chlorine residuals, nitrates and bacteriological quality for a period of three years.

SECTION 3-5.0 MINIMUM STANDARDS FOR GROUNDWATER SUPPLIES

3-5.1 *Location.* All wells used as sources of water for water supplies shall be separated from the specified sources of pollution by distances equal to or greater than those shown in Table I. Such distances may be increased by the administrative agency to provide additional protection from sources of contamination.

TABLE I
Minimum Separation Distance Between Non-public Water Supply Wells and Sources of Pollution

Source of Pollution	Minimum Separation*	Recommended Separation
Subsurface absorption field for septic tank effluent	50 feet	≥ 100 feet
Pit privy	50 feet	≥ 100 feet
Septic tank	50 feet	≥ 100 feet
Barnyards, stables, manure piles, animal pens, etc.	50 feet	≥ 100 feet
Sewer lines, not constructed of cast iron or other equally tight construction	50 feet	≥ 100 feet
Other sources of pollution	50 feet	≥ 100 feet
Sewer lines constructed of cast iron or other equally tight construction	10 feet	≥ 100 feet
Streams, lakes and ponds	25 feet	≥ 50 feet
Property lines	25 feet	≥ 50 feet
*As required by K.A.R. 28-10-101 and \ or K.A.R. 28-30-8		

3-5.2 *Construction and Enforcement.* Well construction, abandoned well plugging or reconstruction and enforcement of this section of the environmental code shall be regulated in accordance with K.A.R. 28-30-1 through 28-30-10 et seq. as amended.

3-5.3 *Backflow Devices.* Water wells to be used for underground sprinkler systems shall be equipped with an approved backflow prevention device. Such device shall be installed according to manufacturer listed distances and standards.

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3-5.4

Cross-Connection. No connection or arrangement shall be made between a potable water supply system and any equipment or device, through which it may be possible for used, unclean, polluted, and contaminated water or other substances, to enter into any part of such potable water system under any condition.

SECTION 3-6.0

REQUIREMENTS FOR SUBDIVISION DEVELOPMENT

After adoption of this code no person shall develop any subdivision until the plans and specifications for water supply provision and/or protection have been approved by the administrative agency.

SECTION 3-7.0

PROPERTY TRANSFER INSPECTIONS

Provisions of this code do not address requirements for property transfer inspections in Barton County. The Administrative Agency does offer the service to persons with a private water supply, septic tank, sanitary privy or subsurface absorption field or cistern subject to the regulations of this code. A policy has been adopted for conducting these inspections which is based on an inspection of existing facilities and a comparison to new construction standards. That policy is set forth as (Appendix 3, Lender Evaluation Policy, July 7, 2003), or any superseding document; which is incorporated by reference as though fully set forth in this section. There is a fee established for this service. This policy document may be revised from time to time by the Environmental Management Division. Such revisions shall not require adoption of an amending resolution by the County Commissioners.

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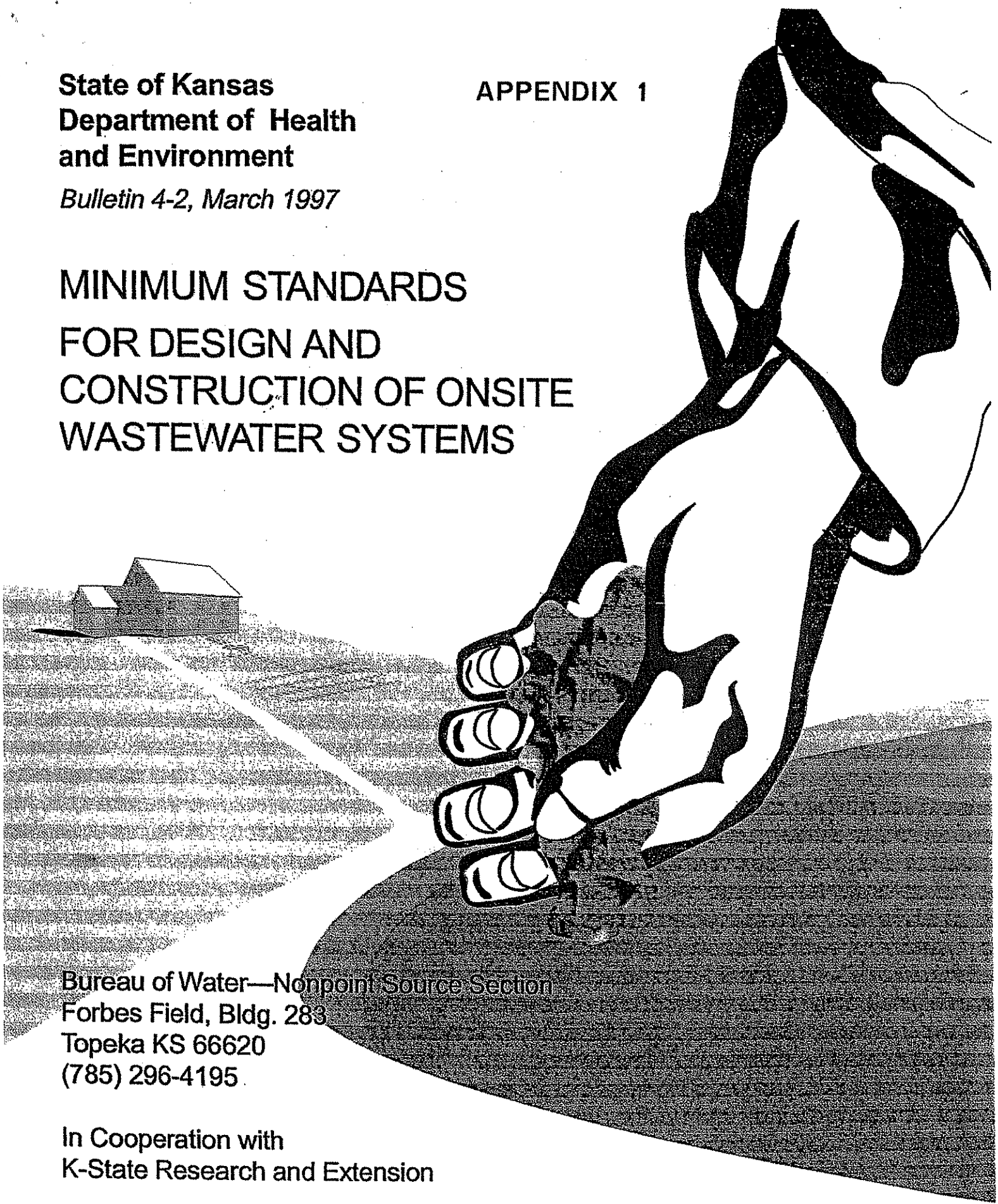
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**State of Kansas
Department of Health
and Environment**

Bulletin 4-2, March 1997

APPENDIX 1

**MINIMUM STANDARDS
FOR DESIGN AND
CONSTRUCTION OF ONSITE
WASTEWATER SYSTEMS**



**Bureau of Water—Nonpoint Source Section
Forbes Field, Bldg. 283
Topeka KS 66620
(785) 296-4195**

**In Cooperation with
K-State Research and Extension**

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Introduction

Kansas Administrative Regulations (K.A.R. 28-5-6 to 9) authorize the Kansas Department of Health and Environment (KDHE) to establish minimum standards for septic tank-lateral fields. KDHE bulletin 4-2: *Minimum Standards for Design and Construction of Onsite Wastewater Systems* fulfills that purpose. The minimum standards presented in this document are intended to ensure domestic wastewater is managed so that:

- Quality of surface and groundwater is protected for drinking water, recreation, aquatic life support, irrigation, and industrial uses.
- A breeding place or habitat will not be created for insects, rodents, and other vectors that may later contact food, people, pets, or drinking water.
- Wastewater will not be exposed on the ground surface where it can be contacted by children and/or pets, creating a significant health hazard.
- State and federal laws and local regulations governing water pollution or wastewater disposal will be met.
- Nuisance conditions or obnoxious odors and unsightliness will be avoided.

Bulletin 4-2 is not intended to provide an in-depth discussion of the rationale for these standards. For more information, see the *Environmental Health Handbook* and resources identified therein as well as other references in Appendix B (page 16). Most county health departments have a copy of this handbook, or copies are available at cost from Kansas State University, Extension Biological and Agricultural Engineering (see Appendix B).

Local governments have the authority to adopt minimum requirements (codes) for onsite wastewater management systems, to approve individual plans, to issue permits for construction, to issue permits for operation, and to grant variances. County sanitary (environmental) codes specify local design and permitting requirements. Compliance with these requirements helps prevent illness caused by environmental contamination and protects surface and groundwater.

Some local requirements, such as those in wellhead protection or sensitive groundwater areas, may be more stringent than those established in Bulletin 4-2. Often, these stricter requirements provide greater protection of public health and the environment, especially where water resources are vulnerable to contamination.

Sanitary codes are adopted and administered by local government usually through county health departments. The local administering authority should always be contacted before any time or money is invested in system design, plans, installation, or repairs.

If there is no local code, landowners are required to comply with Kansas Administrative Regulations (K.A.R.) 28-5-6 to 9 and minimum standards in this bulletin. If no assistance is available from the health department or other local authority, contact your county Extension Office or KDHE, Bureau of Water, phone (785) 296-4195, or the nearest KDHE District Office (see inside back cover).

K.A.R. 28-5-6 stipulates that all domestic wastewater shall be discharged to an approved sewage collection system or an approved lagoon, septic system, or alternative system. Domestic wastewater means all waterborne wastes produced at family dwellings in connection with ordinary living including kitchen, toilet, laundry, shower, and bath tub wastewater. It also includes similar type wastewater, produced at businesses, churches, industrial, and commercial facilities or establishments.

Wastewater from a home shall be discharged to a properly designed and maintained septic tank-soil absorption field or wastewater pond, an approved alternative treatment and disposal system, or a permitted sewage treatment plant. Seepage pits, cesspools, and dry wells (rat holes) are not permitted. This bulletin provides information on conventional soil absorption fields, wastewater ponds, and alternatives that may be considered when conventional absorption fields or ponds are not suitable.

Bulletin 4-2 covers five basic elements of proper septic tank-lateral field system design:

1. wastewater flow,
2. soil and site evaluation,
3. septic tank standards, for design, construction and installation,
4. lateral field design and construction, and
5. system maintenance.

This bulletin also addresses basic principles for wastewater ponds.

This bulletin is intended to provide information on treatment of domestic wastewater. Domestic wastewater excludes surface runoff from roof, paved areas, or other surfaces; subsurface drainage from springs, foundation drains, and sump pump; or cooling water. Industrial or commercial wastewater (from shops, manufacturing, car washes, etc.) is not permitted to be discharged to an onsite soil absorption system, so it shall not be mixed with domestic wastewater.

By following the standards established in Bulletin 4-2 and your county's sanitary code, you actively contribute to protecting the environment and quality of life for your family, your neighbors, your community, and other Kansans. Your contribution is appreciated!

Wastewater Flows

One major concern in the design of household wastewater systems is the quantity of wastewater generated daily. The system must have enough capacity to accommodate and treat this total flow. Normal contributions to this flow will come from bathroom, kitchen, and laundry facilities. Kansas regulations require that all domestic wastewater be treated and disposed through the onsite system. Surface runoff from roofs and paved areas, subsurface drainage from footing drains and sump pumps and cooling water are not domestic wastewater and must be excluded from soil absorption systems. Such water may be used to help maintain the operating water level in wastewater ponds.

Design flow is estimated by multiplying the number of household bedrooms by 150 gallons per day (gpd). This is based on 75 gallons per person per day for two people in each bedroom¹. This accounts for the number of people that can occupy the home for extended periods rather than how many actually live there when the system is installed. Houses frequently experience a change in ownership or occupancy over the life of the wastewater system. When calculating wastewater flow, note that a water softener may increase water use by as much as 10 gallons per capita per day or possibly more where water is very hard.

Site and Soil Evaluation

Although the septic tank is important for removing solids from the wastewater, more of the wastewater treatment is provided by the soil. Microorganisms living in the soil profile feed on organic matter in the wastewater, treating and purifying the water as they grow. Four feet of aerated soil below the bottom of the absorption field is necessary to ensure adequate treatment of the wastewater before it reaches the water table or flows laterally due to a restrictive condition.

In sandy soil, it is recommended that as much vertical separation as possible be provided. An understanding of the soil is necessary to assess the ability of the site to provide good wastewater treatment. Soil must absorb the septic tank effluent, treat the wastewater, and transmit treated wastewater away from the soil absorption areas.

The site evaluation begins by reviewing available information such as a published soil survey and then evaluating the soil on site. County soil survey reports are usually available from the local Natural Resource Conservation Service (NRCS, formerly Soil Conservation Service). Contact your local NRCS office, county conservation district or Extension office for a copy of the report.

The soil survey provides general information and serves as a guide to the soil conditions. Sites characterized by slow permeability, restrictive subsoil layer, shallow soil over rock, high groundwater, poor drainage, or steep slopes, as identified in the soil survey, have moderate to

TABLE 1—Soil Limitation Ratings Used by NRCS For Wastewater Absorption Fields

Property	LIMITS			Restriction or Feature
	Slight	Moderate	Severe	
USDA Texture	—	—	Ice	Permafrost (not found in Kansas)
Flooding	None, Protected	Rare	Common	Flood water inundates site
Depth to Bedrock (in.)	> ² 72	40-72	< ³ 40	Bedrock or weathered bedrock restricts water movement or reduces treatment capacity
Depth to Cemented Pan (in.)	> 72	40-72	< 40	Reduces water and air movement
Depth to High Water Table, (ft. below surface)	> 6	4-6	< 4	Saturated soil, poor aeration, anaerobic soil, restricted movement
Permeability, (in./hr.)				
24-60 in. layers	2.0-6.0	0.6-2.0	< 0.6	Slow perc rate, poor drainage
less than 24 in. layers	—	—	> 6.0	Poor filter
Slope, (percent)	0-8	8-15	> 15	Difficult to construct and hold in place
Large stones greater than 3 in., (percent by wt.)	< 25	25-50	> 50	Restricted water and air movement results in reduced treatment capacity

¹The 150 gallons per bedroom, or 75 gallons of wastewater produced daily by each person, assumes at least some water using appliances such as clothes washer, dishwasher, water softener, etc.

²> means greater than

³< means less than

severe restrictions for conventional septic tank-soil absorption systems and other options may be preferred or required.

A site and soil evaluation should be completed in order to locate the area to be used for the absorption field, to verify the soil characteristics, and to size the system. Areas with slopes steeper than about 20 percent will cause considerable difficulty during construction and are not recommended for lateral field installations. Rock outcroppings warn of shallow soils and may suggest the probable direction of groundwater flow. The range of values for each of several properties that cause the soil to be placed in slight, moderate, and severe limitation rating for soil absorption systems is shown on Table 1.

The wastewater system area should be chosen prior to any construction on a site and should be an integral part of the homesite design and development. A soil profile analysis is highly recommended to ensure suitability of the area and to establish the loading rate so that adequate space is available for the absorption field and its replacement.

To perform a soil profile analysis, an excavator is usually used to open a pit, which exposes the soil profile. The soil evaluation, performed by a trained and qualified person⁴, includes examining the soil profile, determining the soil texture, structure, color, consistency, measuring soil depth, and looking for evidence of a high or perched water table or other restrictions. The soil profile should be analyzed to a depth of at least 4 feet below the bottom of the absorption area or at least 6 feet below the surface.

Because OSHA regulations require shoring for trenches deeper than 5 feet for some soils, it is recommended that the pit be constructed so a person is not required to go deeper. Soil below 5 feet can be examined from cuttings, observation from a distance, and by shovel or auger without entering a deeper pit.

At least three pits should be dug surrounding the area to establish the range of soil characteristics that are present on the site, and to determine the best location for the absorption field. Sanitarians, usually through local health or environmental departments, or environmental health specialists, are available to assist in the site and soil

TABLE 2—Design Septic Tank Effluent Loading Rates for Various Soil Textures and Structures

Group	Soil Characteristics	Wastewater Loading		
		(in/day)	(cm/day)	(gpd/ft ²)
I.	Gravelly coarse sand and coarser.	Not Recommended for conventional soil absorption system ⁵		
II.	Coarse sands (not cemented).	1.8	4.6	1.1
III.	Medium sand with single grain structure and loose to friable consistence (not cemented).	1.5	3.7	0.9
IV.	Other sands and loamy sands with single grain or weak structure (not extremely firm or cemented consistence). Sandy loams, loams and silt loams with moderate or strong structure (except platy and loose to friable consistence).	1	2.5	0.6
V.	Sandy loams, silt loams and loams with weak structure (not of extremely firm or cemented consistence). Sandy clay loams, clay loams and silty clay loams with moderate to strong structure (not of platy, of firm, or of cemented consistence).	0.7	1.7	0.4
VI.	Sandy clay loams, clay loams and silty clay loams with weak structure (not massive, not of firm, or of cemented consistence.) Some sandy clays, clays and silty clays with moderate and strong structure (not platy, not of firm, or of cemented consistence).	0.4	1	0.25
VII.	Other soils of high clay content with weak or massive structure, extremely firm or cemented consistence or platy, clay pan, fragipan, and caliche soils.	Not Recommended for conventional soil absorption system ⁶		

NOTE: The above descriptions are estimates and assume that the soil does not have large amounts of swelling clays. Soils with platy structure, massive, compacted or high density should be used with extreme caution or avoided.

⁴A trained and qualified person would include a soil scientist, such as one working for NRCS, environmental health specialist, sanitarian, or other person who has received appropriate soil training and through experience is competent.

⁵Soil is too coarse for conventional soil absorption designs, use pressure distribution dosing or other alternative system to prevent too rapid infiltration.

⁶Soils with these conditions may be acceptable for wastewater stabilization ponds or possibly other alternative systems. (See Table 6).

evaluations. A few consultants, either engineers or design/installation contractors, also provide this service.

Table 2 gives the recommended loading rates based on soil texture, structure, and consistence information. These loading rates are based on research that has shown that soil characteristics provide a strong basis for wastewater system design loading rate. Results show system design should be based on the most limiting soil texture found in the first 4 feet of soil below the bottom of the proposed absorption lateral.

Once the wastewater flow (number of bedrooms) and loading rate for the soil are known, the absorption field area needed for the lateral system can be calculated. It is highly recommended that the absorption field and an equal area reserved for future use be marked and fenced so they will not be disturbed during construction. Required setback distances to property lines, wells, surface water, and buildings must be checked and included in the site plan.

Where evaporation substantially exceeds precipitation, as in central and western Kansas, a reduction in soil absorption area may be used when the soil is well suited to wastewater absorption. A well suited soil has medium to coarse texture, perc rates less than 45 minutes per inch and

TABLE 3—Recommended Absorption Reductions

	Western Kansas	Central Kansas	Eastern Kansas
Actual absorption area (in percent)	65	80	100
Recommended reduction (in percent)	35	20	0

wastewater loading rates of 0.5 gallons per square foot per day or more. For marginal, high clay, soil that has low loading rates, no reduction should be used regardless of location in Kansas. Recommended allowable soil absorption system reductions and percent of total absorption area for central and western Kansas is shown on Table 3.

Since about 1970 considerable research about onsite wastewater systems has occurred. New information, including design procedures, operating characteristics, and many new products, has been and continues to be developed to help improve onsite wastewater systems.

The soil profile evaluation provides a comprehensive assessment of soil characteristics and is the preferred

TABLE 4—Soil Absorption Field Loading Rate and Area Recommendation for Septic Tank Effluent Based on Perc

Perc Rate (minutes/inch)	Recommended Absorption Area (ft ² /bedroom)	Loading Rate (gpd/ft ²)
Less than 5 minutes	Not recommended for conventional soil absorption system ⁵	
5-10 minutes	165	0.91
11-15 minutes	190	0.79
16-30 minutes	250	0.6
31-45 minutes	300	0.5
46-60 minutes	330	0.45
Greater than 60 minutes	Not recommended for conventional soil absorption system ⁶	

TABLE 5—Minimum Required and Minimum Recommended Separation Distances for Onsite Wastewater Systems

Separation Distances	Minimum Distance (ft.)	
	Required	Recommended ⁷
Septic Tank to foundation of house or other buildings	10	10
Soil Absorption System to dwelling foundation	20	50
Any part of a wastewater system to:		
public potable water line	25 ⁸	25
private potable water line	10	25
property line	10	50
public water supply well or suction line	100 ⁹	200
private water supply well or suction line	50 ⁹	100
surface water course	50	100
Wastewater Lagoons to:		
property line	50 ¹⁰	200
dwelling foundation	50 ¹⁰	200

⁵Soil is too coarse for conventional soil absorption designs, use pressure distribution dosing or other alternative system to prevent too rapid infiltration.

⁶Soils with these conditions may be acceptable for wastewater stabilization ponds or possibly other alternative systems. (See Table 6).

⁷These recommended separation distances help assure a minimum of problems, but are no assurance that problems will not result.

⁸The minimum distance specified by KDHE guidelines for public water supplies

⁹The minimum distance required by KAR 28-30-8(a).

¹⁰When lot dimension, topography, or soil condition make maintaining the required 50 feet separation distance impossible, a written variance from the affected property owners shall be obtained and filed with deeds.

method for determining the suitability of the soil to accept and treat wastewater and establish the design loading.

Some local sanitary codes require the perc test and other codes require both a perc test and a soil profile evaluation. "Perc" is short for percolation and has become the preferred term for this test to evaluate soil suitability to accept wastewater. Percolation means water movement through a soil. Since the driving force is gravity, most of the movement will be downward. The perc test really measures an infiltration rate for water into a wet but unsaturated soil at the depth of expected system placement. The procedure for doing a perc test is described in Appendix A (page 14). Once the perc rate is known, refer to Table 4 to determine the loading rate and absorption field area, or use another method specified by the local sanitary code.

Separation of the soil absorption field from buildings, structures, and boundaries is essential to maintain system

performance, to permit repairs, to maintain required separation from wells, and to reduce undesirable effects of underground wastewater flow and dispersion. The structures and boundaries to consider include easements, buildings, property lines, utilities, wells, and components of the wastewater disposal system. Minimum required and recommended separation distances for private wastewater systems are given in Table 5.

Many soils, especially in eastern Kansas, have properties that restrict their suitability for soil absorption fields. When limiting properties occur in the soil profile, a variation of conventional laterals, wastewater ponds or alternative treatment systems may be used to compensate for the limiting condition. Variations and alternatives that may be considered are summarized in Table 6. When possible, sites with these restrictive conditions should be avoided due to higher cost, larger land area, and greater maintenance requirements for the alternative systems.

TABLE 6—General Alternative Option Guide for Moderate or Severe Limiting Soil Conditions

<p>I. Shallow Permanent, Perched or Seasonal Groundwater</p> <ul style="list-style-type: none"> • Subsurface drainage system at least 50 feet from the soil absorption area to lower the water table—suitable for moderate or more permeable soil conditions. This alternative creates drainage that must be discharged away from the area • Variation of conventional lateral trench <ul style="list-style-type: none"> - Shallow in-ground trench—suitable for groundwater at 4¾ feet or deeper - At-grade lateral system—suitable for groundwater at 4 feet or deeper • Enhanced wastewater treatment¹¹ by rock-plant filter¹², sand filter¹³, or aerated tank¹⁴ or other equivalent system¹⁵ followed by shallow soil absorption or wastewater pond • Wisconsin (engineered) mound—suitable for groundwater or other restriction at 1 foot or deeper • Rock-plant filter¹²—suitable for ground water at 1 foot or deeper followed by soil absorption
<p>II. Shallow Bedrock</p> <ul style="list-style-type: none"> • Wastewater pond—suitable for sites with bedrock at any depth when overexcavated and at least 1½ feet of compacted clay lining is installed • Variation of conventional lateral trench <ul style="list-style-type: none"> - Shallow in-ground trench system—suitable for bedrock at 4¾ feet or deeper - At-grade lateral system—suitable for bedrock at 4 feet or deeper • Enhanced wastewater treatment¹¹ options (see I above) followed by shallow soil absorption • Wisconsin (engineered) mound—suitable for bedrock at 1 foot or deeper
<p>III. Rapid Perc Rate (< 5 mpi) or very permeable soil (> 20 in/hr)</p> <ul style="list-style-type: none"> • Pressurized distribution dosing system to uniformly distribute wastewater throughout the absorption field • One foot lining using loam soil to bottom and sides of the trench to limit water absorption rate
<p>IV. Slow Perc Rate (60 to 120 mpi) or "slow" soil permeability (0.2-0.6 in/hr)</p> <ul style="list-style-type: none"> • Dual shallow lateral systems in permeable surface soils (each with 60% to 80% of conventional lateral area) with a diversion valve and alternating use of systems • Wastewater pond provided sufficient site area is available to meet all setback requirements • Wisconsin (engineered) mound—suitable for nearly level sites with more permeable surface soil • Enhanced wastewater treatment¹¹ options (see I above) followed by shallow soil absorption into permeable surface soil
<p>V. Very Slow Perc Rate Soil (> 120 mpi), "very slow" soil permeability (< 0.2 in/hr)</p> <ul style="list-style-type: none"> • Wastewater pond—suitable for sites with enough site area to meet all setback requirements • Wisconsin (engineered) mound—suitable for level sites with permeable surface soil • Enhanced wastewater treatment¹¹ options (see I above) followed by shallow soil absorption into permeable surface soil

¹¹Enhanced treatment is higher quality than septic tank effluent and may be equivalent to secondary treatment in wastewater treatment terminology, or in some cases even higher quality, comparable to advanced wastewater treatment

¹²Rock-plant filter provides a higher level of treatment than septic tanks. Due to higher quality effluent, the soil absorption field size may be smaller than for a conventional absorption field system.

¹³Sand filters provide a very high level of treatment. Due to this high quality effluent, the soil absorption field may be smaller than that required for a conventional absorption field.

¹⁴Aerobic tanks have poor operating records so an operating/maintenance agreement with a reliable supplier is strongly recommended to ensure system performance.

¹⁵Promising technology is underdevelopment that may meet enhanced treatment requirements.

Septic Tank

The septic tank separates the settleable and floatable solids, contains an anaerobic environment where bacteria partially decompose the solids, and provides storage for the accumulated sludge and scum. The septic tank is sized so that wastewater flow through the tank takes at least 24 hours even with sludge and scum accumulation. This detention time permits the settling of solids heavier than water and allows scum, grease and other materials lighter than water to float to the surface before the water is discharged to the absorption field.

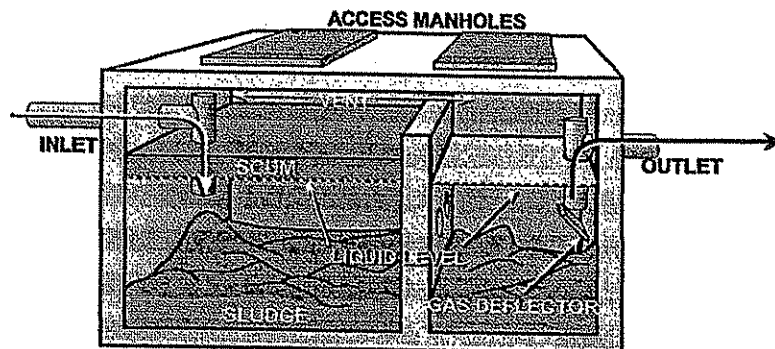
Septic tanks are designed to handle all the daily flow a household will normally produce and must have sufficient capacity for the minimum recommended volume of at least two times the daily wastewater flow. Larger capacity tanks usually mean less carryover of solids, resulting in prolonged life of the soil absorption field. Larger tanks require less frequent cleaning and allow for future expansion of the home or times when guests visit. They also have a good cost-benefit return. Table 7 gives minimum and recommended capacities for sizing septic tanks.

Less solids exiting the septic tank helps extend the life of the soil absorption field because less clogging of the soil pores will occur. Septic tank effluent filters are effective in reducing solids and providing an added measure of protection for the soil absorption field so their use is highly recommended.

TABLE 7—Minimum and Recommended Septic Tank Capacities Based on the Number of Household Bedrooms.¹⁶

Number of Bedrooms	Septic Tank Capacity (gallons) ¹⁷	
	150 gpd/bedroom	
	Minimum	Recommended
1-3	1,000 ¹⁸	1,350
4	1,200	1,800
5	1,500	2,250

Figure 1—Compartmentalized Septic Tank



Two compartment tanks or two tanks in series also may help. If a multiple compartment tank is used, the first compartment shall be sized to contain from one-half to two-thirds of the total tank capacity. The total tank capacity is important and should be sized to retain at least two-to-three times the total daily wastewater flow as shown in Table 7. Figure 1 shows a design concept for a two compartment septic tank.

Tanks shall never be closer than 50 feet from any water supply and greater distances are preferred if possible. However, a 100-foot separation is required if the water source serves a public water supply. The septic tank shall not be located closer than 10 feet from any building, in swampy areas, or in areas located within the 100 year flood plain. Table 5 gives minimum required and recommended separation distances for onsite wastewater systems.

There shall be no permanent structure (patio, building, driveway, etc.) over the tank, lateral or other part of an onsite wastewater system. Consideration should also include easy access of trucks and equipment for pumping, maintenance, and repair. To avoid damage to the system, heavy equipment should not have to cross any portion of the wastewater system when servicing the septic tank.

A sketch of the wastewater disposal system as constructed, showing measurements should be made and delivered to the homeowner for future reference, and filed with the permit at the county health department. Figure 3 shows an example septic system reference sketch.

Septic tanks and soil absorption systems are an expensive and long-term investment. Material selection, design, and construction should be done with long life in mind. When located in suitable soil, well designed, properly constructed, and adequately maintained, they should last several decades.

All abandoned or unused septic tanks, cesspools, seepage pits or other holes that have received wastewater shall be emptied and plugged following procedures described in K-State Research and Extension bulletin MF-2246.

¹⁶For each additional bedroom, add 300 gallons to the minimum value and 450 gallons to the recommended value.
¹⁷Volume held by the tank below the liquid level (invert of the outlet pipe).
¹⁸Minimum tank size is 1,000 gallons.

Septic Tank Design/Construction Specifications¹⁹

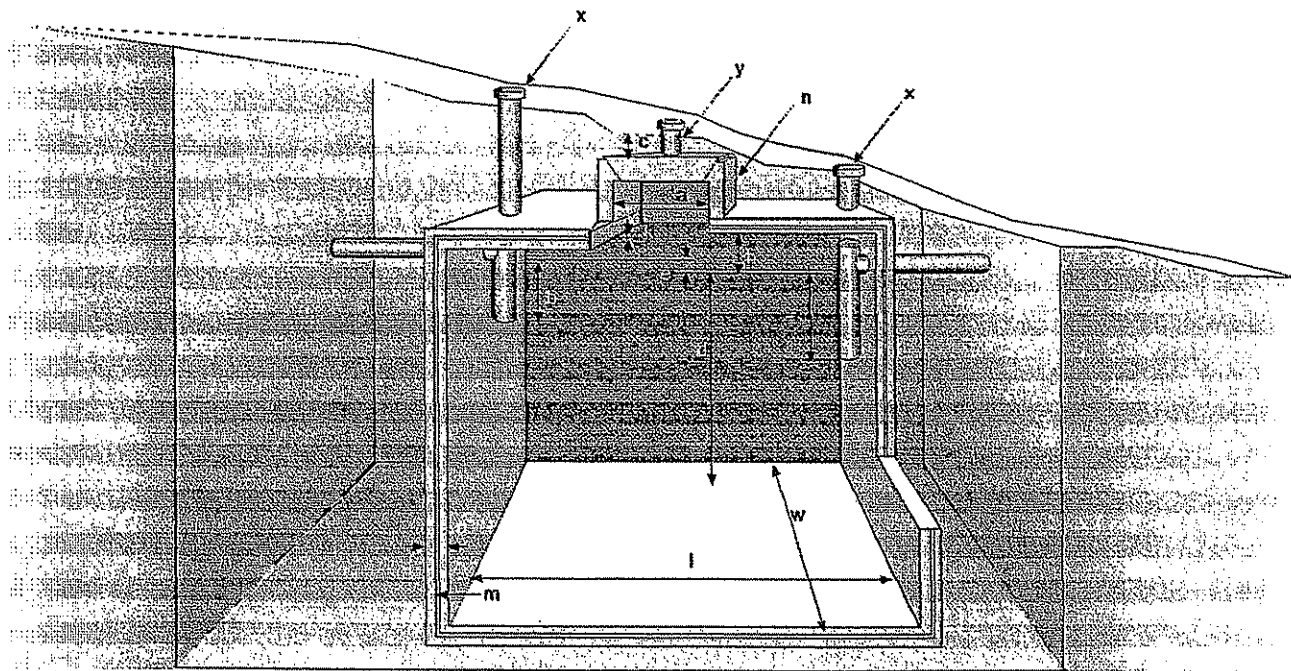
General Requirements

Figure 2 shows the dimensions included in this section for a typical precast concrete septic tank. The following factors are required of all septic tanks regardless of the construction material:

- A. The septic tank including all extensions to the surface shall be watertight to prevent leakage into or out of the tank. It shall be structurally sound and made of materials resistant to corrosion from soil and acids produced from septic tank gasses. Because of corrosion, steel tanks are not acceptable.
- B. The tank liquid depth (distance from outlet invert to bottom of tank) shall be at least 3 feet but shall not exceed 6½ feet. The effective inside length of tanks shall not be less than 1.5 nor greater than four times the effective inside width.

- C. The minimum septic tank capacity is two times the daily wastewater flow using 150 gallons per bedroom or 1,000 gallons, whichever is larger. See Table 7 for minimum tank sizes. Tanks sized at three times daily flow are recommended and shall be required when garbage disposals are used.
- D. The top of all tanks shall be designed and constructed to support a minimum uniform load of 400 pounds per square foot plus 2,500 pound axle load. When buried more than 2 feet deep, the tank, especially the top, shall support an additional 100 pounds per square foot for each foot of soil or portion thereof in excess of 2 feet.
- E. If the tank is placed in an area subject to any vehicular traffic it shall be certified to meet H-20 highway loading by a Kansas licensed structural engineer.
- F. Space above the liquid line is required for that portion of the scum that floats above the liquid. For vertical sidewall tanks, the distance between the top of the tank and the outlet invert should be at least 15 percent of the liquid depth with a minimum

Figure 2—Design Details for a Precast Concrete Septic Tank



Name	Measurement	Min.	Max.	Name	Measurement	Min.	Max
a. access manhole	smallest dimension	20"	—	h. open space	outlet invert to top	7"	0.15 × d
b. inlet baffle	penetration	8"	0.2 × d	k. space	gap	1"	—
c. cover ²⁰	surface to manhole	surface	12"	l. tank length	inside of walls	6'	4 × w
d. liquid depth	outlet to tank bottom	3'	6½'	m. reinforcement	per engineering design		as needed
e. difference	inlet to outlet inverts	3"	4"	n. extension riser length ²⁰	to ≤ 1' from surface grade		
f. outlet baffle	outlet to bottom	0.35 × d.	—	w. tankwidth	inside of walls	4'	
g. thickness	wall	2½"	—	x. inspection riser	inside diameter	6"	
				y. location riser	inside diameter	1½"	

¹⁹Where locally available products cannot presently meet these requirements, manufacturers will have until July 1, 2002 to comply.
²⁰If tank is deeper than 12" add extension riser as shown so top of riser is no more than 12" from surface

of 7 inches. In horizontal, cylindrical tanks, an area equal to approximately 12½ percent of the total volume should be provided above the liquid level. This condition is met if the space above the liquid level (distance from outlet invert to top of tank) is 15 percent of the tank diameter .

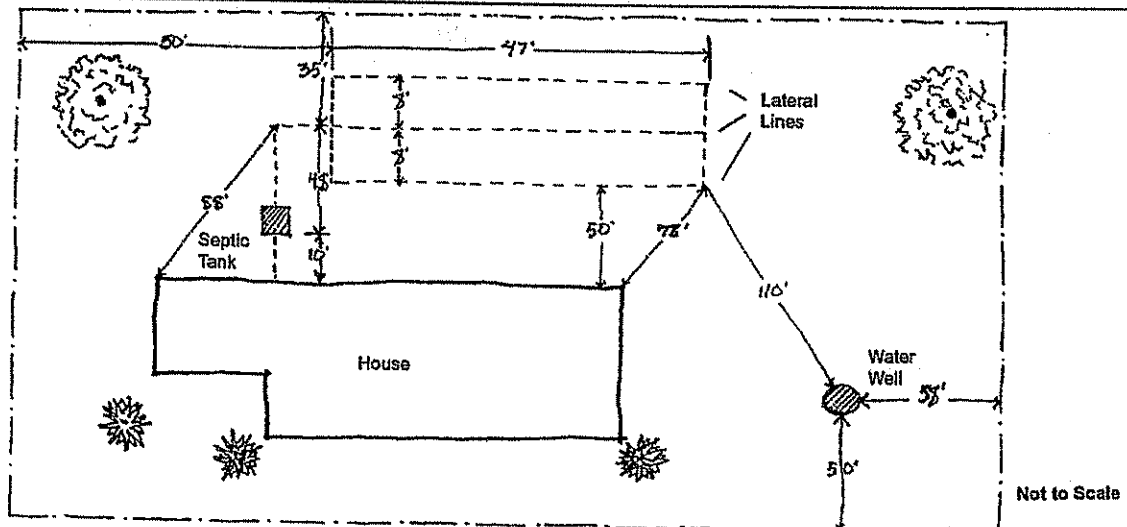
- G. Sewage lines carrying solids from the source to the tank should have sufficient slope to maintain velocities that keep solids moving. For household size lines, a slope of between 1 percent (1/8 inch per foot) and 2 percent (1/4 inch per foot) is usually best. The last 15 feet of sewer line preceding the tank shall not slope more than 2 percent (1/4 inch per foot).
- H. The inlet and outlet baffle or tee and compartment baffle should extend above the liquid level to one inch below the top of the tank. This space at the top of the tank is essential to allow gas to escape from the tank through the house stack vent.
- I. The invert of the inlet pipe shall be located at least 3 inches above the invert of the outlet when the tank is level. This space allows for temporary rise in liquid level during discharges to the tank, and prevents liquid from standing in the sewer line between the house and the septic tank, which may cause stoppage or backup.
- J. The septic tank or pumping tank inlet shall be a sanitary tee, elbow or long sweep elbow with low head inlet or baffle to direct incoming sewage downward and prevent flow from disturbing the floating scum layer. It should extend at least 8 inches below the liquid level, but should not penetrate deeper than 20 percent of the liquid depth.
- K. The outlet tee or baffle prevents scum from being carried out with effluent, but limits the depth of sludge that can be accommodated. The outlet device

should generally extend below the liquid surface a distance equal to 35 percent of the liquid depth. For horizontal, cylindrical tanks, this distance should be reduced to 30 percent of liquid depth.

Example: Horizontal cylindrical tank 60 inches in diameter, liquid depth = 52 inches, outlet tee penetrates $52 \times .30 = 15.6$ inches below liquid level.

- L. Inlet and outlet openings shall be designed and constructed to be water tight for at least a 20-year life of the system.
- M. The dividing baffle in two compartment tanks shall extend from the bottom of the tank to at least 6 inches above the liquid line. The opening in the dividing baffle may be any shape and shall be at least 2 inches minimum dimension with a total area of at least 12 square inches. The baffle opening is to be centered 35 percent of liquid depth (30 percent for cylindrical tanks) below the liquid level.
- N. Septic tanks shall have an access manhole with 20 inches minimum dimension for each compartment. If the manhole does not extend to surface grade, a small diameter (at least 1½ inch diameter) pipe shall extend to surface from the cover to mark the location of the manhole. This pipe shall not penetrate the lid of the tank. Inspection risers at least 6 inch diameter shall extend to surface grade centered over the inlet and outlet tees. All below grade attachments to the tank, connections, riser, extensions and lid shall be water tight. When any opening larger than 8 inches extends to the surface, that opening shall be child and tamper resistant. Ways to accomplish this include lids weighing at least 65 pounds, locks, or anchors that are not removable without special tools .
- O. The sewer line from the house to the tank, all fittings and pipe in the tank, all extensions to the

Figure 3—Septic System Reference Sketch



surface from the top of the tank and the first 10 feet exiting the tank shall be schedule 40 pipe or heavier.

- P. Septic tanks shall be designed for at least a 20-year life. They shall be designed and constructed to withstand extremes in loads resulting from adverse conditions without excessive deflection, deforming, creep, cracking or breaking. Change in shape shall be limited to 5 percent. Loads shall be based on 62.4 pounds per cubic foot for water and water saturated soil. Top loads for design shall be in uniform 400 pounds per square foot plus 2,500 pound axle point load. Design shall be based on a 2 foot placement depth to top of the tank. If the tank will be placed deeper than 2 feet or subject to vehicular traffic over the tank, a design by Kansas licensed structural engineer shall be done for the specific conditions.

Special Considerations for Concrete Tanks

The anaerobic environment of a septic tank produces gases that combine with moisture to produce acids. Concrete above the liquid level is subject to corrosion and deterioration from these acids. This corrosion is best resisted by high quality concrete mix. Concrete septic tanks shall meet the following requirements in addition to those above:

- A. The concrete design mix shall be for a compressive strength of at least 4,000 pounds per square inch at 28 day cure. The water-cement ratio shall not exceed 0.45.
- B. Baffles or other interior concrete units shall not be used for precast or poured in place concrete septic tanks unless they are cast or built into the tank wall at the time the tank is constructed.
- C. Air entrainment additives shall be added to 5 percent volume. Other chemical admixtures are encouraged to reduce water content, improve cement placement in forms and wet handling of incompletely cured concrete.
- D. Concrete tanks and lids shall receive proper care during the hydration (hardening) period by: 1) monitoring and controlling temperature of the concrete and gradients (i.e. maintain 50 to 90 degrees Fahrenheit for conventional cure and up to 140 degrees Fahrenheit under low pressure steam cure.) 2) monitoring and controlling humidity to prevent adverse moisture loss from fresh concrete (i.e. prevent or replenish loss of essential moisture during the early relatively rapid stage of hydration.)
- E. Reinforcing steel shall be placed as designed by a Kansas licensed structural engineer to ensure floor, wall, and top do not crack from moisture, frost, soil load, water loads, axle loads, or other stresses. Loads as specified above shall be used for the design condition. Reinforcing steel shall be covered by a minimum of 1 inch of concrete and shall be placed within $\pm \frac{1}{4}$ inch.

- F. Pouring the floor and walls of the septic tank at the same time (monolithic pour) is the preferred construction procedure. Very large tanks are often cast in 2 pieces and assembled in the field. All tanks shall meet the same structural strength standard as specified earlier. Two piece tanks shall have permanently sealed structurally sound joints and shall be water tested after assembly. A Kansas Licensed structural engineer shall determine if the tank meets the strength specification.

- G. In areas of high sulfate water (greater than 250 mg/L) more acid producing gases are likely and additional corrosion resistance is appropriate. Recommended measures include ASTM C150 Type II cement (moderate sulfate resisting), ASTM C150 Type V cement (highly sulfate resisting), or coating interior concrete surfaces above the water line. Coatings that provide additional protection of the concrete include asphalt, coal tar, or epoxy. The product used should be acid resistant and provide a moisture barrier coating for the concrete. The product must not bleed into the water and thus risk groundwater contamination.

- H. Manufacturers are strongly urged to follow guidelines and meet standards of American Concrete Institute, National Precast Concrete Association, and American Society for Testing and Materials. Manufacturers should identify and advertise their products that meet applicable standards.

Special Considerations for Fiberglass, Fiberglass Reinforced Polyester, and Polyethylene Tanks

- A. All tanks shall be sold and delivered by the manufacturer completely assembled.
- B. Tanks shall be structurally sound and support external forces as specified above when empty and internal forces when full. Tanks shall not deform or creep resulting in deflection more than 5 percent in shape as a result of loads imposed.
- C. Tanks and all below grade fittings and connections shall be water tight.

Septic Tank Placement Specifications

- A. During the process of placing the septic tank, avoid causing compaction in the absorption field by not entering the absorption field area.
- B. Where natural soil is not suitable tanks shall be placed on a bed of at least 4 inches of sand, pea gravel, or crushed granular noncorrosive material for proper leveling and bearing. Material shall be no larger than 2 inches in diameter and bed depth shall be at least four times the largest material diameter.

- C. Access manholes should be at surface grade, but shall not be more than 12 inches below surface grade. Where top of the tank must be more than 12 inches below surface grade, a water tight extension collar shall be added as required to raise the cover. Inspection openings placed over inlet and outlet tees or baffles shall be at least 6 inches in diameter and extend to the surface to permit easy tank inspection, cleaning of effluent filter, checking condition of tee or baffle and sludge accumulation.
- D. Septic tanks should not be placed into the water table (including perched or seasonal water table) because of the tendency of the tank to float, especially when empty, as when pumped for maintenance. In any area subject to high water table or seasonally high water table, plastic and fiberglass tanks shall not be used unless precautions are taken to drain groundwater.
- E. Septic tanks shall be water tight. An adequate test for water tightness is to fill the tank with water and let it stand for 8 hours to allow concrete to absorb water and plastic tanks to adjust. Then the tank is topped off and an initial measurement made with a hook gauge with vernier scale. After an hour, another measurement is made. Any loss is cause to reject the tank. Observations

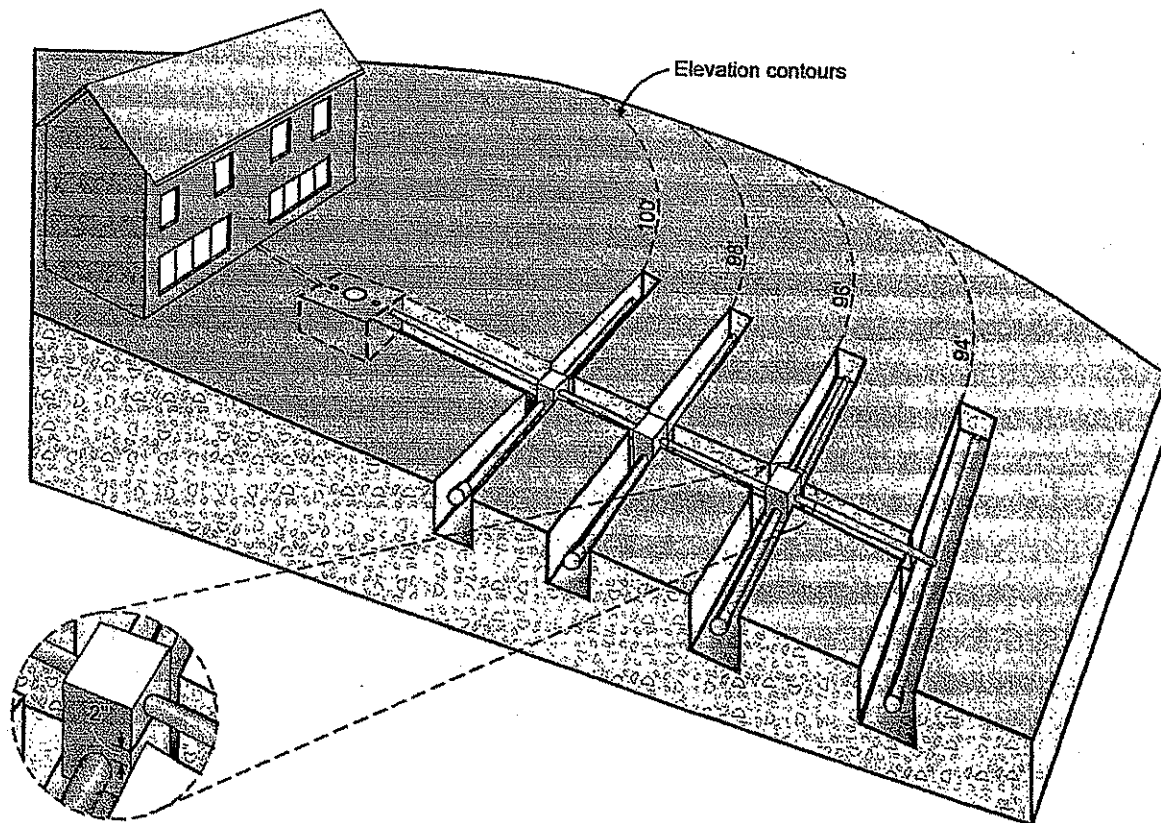
of the outside of the tank can also give clues about leakage losses. Any trickle, ooze, or exterior wet spot is reason to reject the tank. Precast one piece tanks are best tested at the plant before delivery. Two piece tanks that are assembled on-site must be tested following placement but before back filling.

- F. The hole that the tank is placed into shall provide ample space around the tank for access to do compaction. Backfill shall be in uniform, compacted layers not exceeding 2 feet thick and surrounding the tank. Because of potential soil collapse, it is unsafe and may be illegal for a person to enter a trench deeper than 5 feet without adequate shoring. Compaction should be done from the surface without entering trenches deeper than 5 feet.

Absorption Field Size

Absorption field area is dependent on two factors: wastewater flow and soil loading rate. The wastewater design flow is based on the number of bedrooms allowing 150 gpd per bedroom (75 gpd per person) as discussed previously. The wastewater flow assumes the house is fully occupied with two persons per bedroom.

Figure 4. Typical Step Down or Serial Distribution System



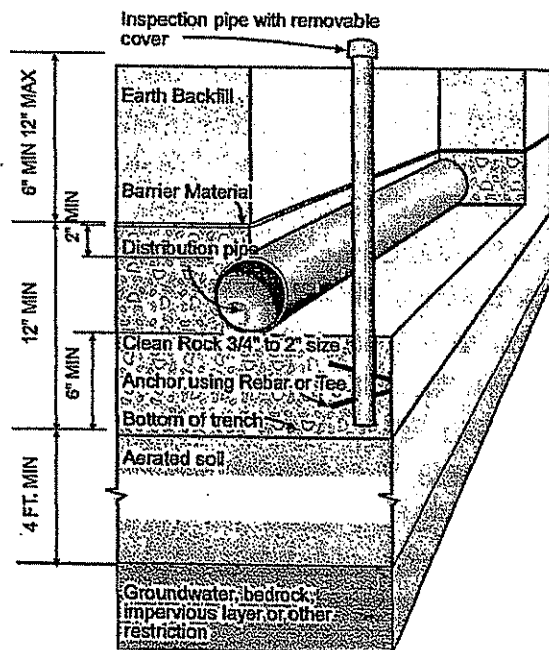
The site and soil evaluation previously discussed in that section is essential for good design. The loading rate is determined from the soil profile using Table 2 or from the perc rate using Table 4 or by using another method as specified in the local code. The soil absorption area is obtained by dividing the wastewater flow in gallons per day (gpd) by the loading rate (gpd per square foot (ft²)).

The maximum gravity lateral run shall not exceed 100 feet and preferably should be less than 60 feet. If a lateral is supplied from the center, the total length shall not exceed 200 feet (100 feet to each side) and a maximum of 120 feet is preferred. Lateral systems on level sites with all laterals on the same elevation shall be connected at each end with a level manifold or connector pipes as shown in Figure 3 so there are no dead ends.

Table 8—Trench Separation Distances

Trench Width (inches)	Recommended Minimum Distance Between Trench Centerline (feet)
18-24	8.0
24-30	8.5
30-36	9.0

Figure 5—Standard Lateral Trench Design



Loading rate example

The following example illustrates how to choose and use the loading rate for design:

- four-bedroom home
- Harney soil: Light silty clay loam with medium subangular blocky structure at 17 to 40 inches
- greater than 6 feet to restrictions of rock or perched water table
- perc rate 40 minutes per inch
- trench width 3 feet
- undisturbed soil width between trenches is 6 feet

Wastewater flow

Size of house (number of bedrooms) × flow rate (gpd) per bedroom = total daily wastewater production

$$4 \text{ bedrooms} \times 150 \text{ gpd/bedroom} = 600 \text{ gpd}$$

Loading rate

From soil evaluation Table 2 = 0.4 gpd/ft² and from perc test using Table 4 = 0.5 gpd/ft²

Use the smaller of these or 0.4 gpd/ft² for design.

Absorption Area

Wastewater flow ÷ loading rate = absorption area

$$\frac{600 \text{ gpd}}{0.4 \text{ gpd/ft}^2} = \frac{600 \text{ ft}^2}{0.4} = 1,500 \text{ ft}^2$$

Trench Length

Absorption area ÷ trench width = length of trench

$$\frac{1,500 \text{ ft}^2}{3 \text{ feet}} = 500 \text{ lineal feet of trench length}$$

Field Area

Only the bottom area of the trench is considered in determining absorption area. The absorption trench width should be 18 to 36 inches, preferably 24 inches. For 3 feet wide trenches as in this example, the total lateral length needed is 500 feet. If trenches are 2 feet wide, the total lateral trench length is 750 feet.

Assuming that a 3 feet wide trench will be used and 100 feet is the length of each trench, 5 trenches, 100 feet long will be needed for 1,500 ft² total trench bottom. To calculate the total area necessary for the field, include the minimum 6 feet of undisturbed soil between trenches. For this example the total width is (5 × 3 ft) + (4 × 6 ft) = 15 ft + 24 ft = 39 feet. The total field area is 39 × 100 or 3,900 ft². An area equal to this same size should be reserved for future expansion and/or replacement.

For sites that slope more than about 1 percent, a level lateral system installed without shaping the surface often requires more than a half foot difference in soil cover from one side of the area to the other. On slopes greater than 1½ percent there is enough slope to use a step down (or serial) distribution. This results in the top lateral

being filled before effluent builds up and flows to the next lateral down slope. Step down or serial distribution as shown in Figure 4 is recommended for all sites that slope 1½ percent or more and/or result in more than 6 inches difference in cover for a level lateral system.

Adjacent absorption field trenches should be separated by at least 6 feet of undisturbed soil. Table 8 shows the minimum spacing for trench widths ranging from 18 to 36 inches. Individual trenches should be constructed on contour with the surface grade and with a level trench bottom to keep the trench cover a uniform thickness.

A minimum of 6 inches of rock or gravel shall be placed in the trench under the distribution pipe, followed by enough gravel to cover the pipe by 2 inches. The soil cover over the trench should not be less than 6 inches to provide adequate water holding capacity for grass nor more than 12 inches to maximize water and nutrient use by vegetation. Generally, the total trench depth should be as shallow as possible, but not less than 18 inches. Perforated distribution pipe shall be used and, where pressure dosing is not required, 4-inch diameter pipe is adequate. See standard lateral trench design and dimensions shown in Figure 5. Where pressure dosing is required, the pipe size should be just large enough to avoid excessive pressure loss (no more than 10 percent) in the distribution lines.

Variations from the standard lateral design described above allow the designer additional flexibility in some restrictive soil situations and are discussed in the site and soil evaluation section and included in Table 6. Many soils in eastern Kansas have a friable, moderately permeable surface soil layer of up to 15 to 18 inches in thickness. Many subsoils have high clay contents and a very restricted permeability. Laterals placed into the tight, very slowly permeable subsoil frequently do not perform satisfactorily.

Shallow in-ground laterals dug 6 to 12 inches into the surface soil layer and covered with imported topsoil may be a viable option to achieve a workable soil absorption system for some soil conditions. Shallow in-ground systems may overcome marginal conditions such as groundwater or rock over 4½ feet but less than 6 feet required for conventional laterals.

The shallow, rock-filled trench shall be covered with a synthetic geotextile barrier material (at least 3 ounce nylon or 5 ounce polypropylene nonwoven filter fabric) before the lateral and interval between laterals is covered with top soil brought to the site.

In soils with still more restrictive or shallow soil conditions (4 to 4½ feet to restrictions) an at-grade lateral system may be an option. The at-grade lateral involves preparing the soil surface on a level contour in strips much as the first step in constructing a Wisconsin

mound. The rock, normally placed in a trench, is placed on the surface. Pressure dosing distribution is used to ensure even water distribution and help prevent horizontal flow at the natural soil surface resulting from temporary ponding in the lateral. The rock lateral shall be covered with barrier material before the lateral and interval space is covered with top soil brought to the site.

Loading rates and other design criteria are basically the same for shallow in-ground and at-grade systems as for conventional lateral trenches. The at-grade lateral requires tilling the soil strip under the lateral on a level contour. A pressure dosing system shall be included as a part of the at-grade design. Distribution lateral line pressure should not exceed 5 feet of head. Orifices in the pipe shall be sized and spaced to evenly distribute flow throughout the lateral system. If the area is too large to pressurize the entire system, a multizone design and sequencing valve shall be used to dose zones in sequence.

The use of an effluent filter on the septic tank outlet is strongly encouraged to prevent solids from plugging the absorption field. This will prolong the life of the absorption field and improve performance of the system. It also helps reduce the strength of wastewater effluent.

Absorption Field Material Specifications

Rigid PVC or corrugated polyethylene plastic pipe meeting American Society for Testing and Materials (ASTM) standard ASTM D2729-93 and ASTM F405-93 or latest edition respectively meet minimum standards for use as solid or perforated gravity distribution lines. All materials used in the plumbing, wastewater line, and lateral fields shall meet standards specified by ASTM. In gravity lateral pipes, perforations are circular, ½-inch diameter and are placed at 4 and 8 o'clock positions on the pipe circumference. In no circumstance is slotted pipe acceptable as the narrow slot openings plug easily.

Washed gravel or crushed stone is commonly used as the porous media for the trench. The media gradation shall be ¾ inches to 2 inches in diameter, with the smaller sizes preferred to reduce masking of the infiltration surface. Uniform size is preferred because more void space is created. Rock having a hardness of three or more on the Moh's Scale of Hardness is required. Rock that can scratch a penny without crumbling or flaking generally meets this criterion. Larger diameter and smaller diameter material, or soft aggregate such as calcite limestone are not acceptable and shall not be used.

Fines should be eliminated as much as possible. Fines shall not exceed 5 percent by volume, so unwashed material is generally unacceptable. A simple test is to wash a volume of material into a clear container of the same diameter and measure fines (5 inches of gravel should produce no more than ¼" of fines).

When suitable rock or gravel is not locally available, is expensive, or access to the site is restricted, gravelless chambers are good choices for laterals. They have the advantage of more liquid storage capacity, reducing the effect of high flows or loadings on weekends or holidays. Chamber systems are lightweight making installation easier at sites with restricted heavy equipment access. Chambers also may be recovered for reuse in the future. Before using chambers, consult the local authority to identify requirements.

Chunks of recycled tires are a suitable substitute for rock. Ninety percent of the pieces should be 1/2 to 4 inches in size with no fines. Wire strands shall not extend more than 1/2 inch from the pieces.

The porous media shall be covered with a filter fabric (at least 3 ounce nylon or 5 ounce polypropylene) before backfilling to prevent soil from sifting through the media. Traditional untreated building paper or 3-inch layer of straw are inferior second choices or are not recommended. Filter fabric is required when tire pieces are used as the porous media. Materials relatively impervious to air and moisture are not permitted.

Field Construction Specifications

Protection of the absorption field area begins before any activity on the site. The site and soil evaluation identifies the best lateral field area and reserve area. Heavy equipment, such as loaded trucks, should be kept away from the absorption field by marking the site. The weight of such equipment can permanently alter soil characteristics due to compaction. Excessive equipment or foot traffic can compact even relatively dry soils.

Construction of septic tank-lateral field systems when the soil is too wet causes compaction and smearing of the soil structure, greatly reducing the water absorption and treatment efficiency of the system. A good test for this is to work the soil into a ball and roll between the hands. If it can be rolled out into a soil wire 1/4 inch in diameter or smaller without falling apart, it is too wet and construction should not proceed.

Before beginning construction, contours should be determined and level lateral locations should be marked by flags or stakes on the contour. Trenches shall not be excavated deeper than the design depth or wider than the design width. Following excavation, the trench sides and bottom shall be raked to remove any smearing and graded to assure a bottom with no more than 1 inch difference in elevation along the entire lateral length or the complete field for a level system. The lateral pipe and rock cover shall not vary more than 1 inch in elevation along the lateral length using a surveyor level or laser.

The trench bottom should then be immediately covered with at least 6 inches of rock or the chamber. Distribution pipes are carefully placed on the rock,

and leveled with perforations at 4 o'clock and 8 o'clock positions. Rock is placed around and over the pipe to a cover depth of at least 2 inches.

After rock and pipe have been placed in the trench the filter fabric or other barrier shall be placed to protect from soil movement into the rock. Finally, earth backfill shall be carefully placed to fill the trench cavity. The backfill shall be mounded above the trench about 20 percent of the soil fill height to allow for settling. If a variation in the trench depth is used, topsoil also must be placed between laterals as well as over the lateral to level the site.

Maintaining Onsite Wastewater Systems

The homeowner's responsibility for onsite wastewater treatment and disposal does not end when the backfill is placed over the trench lines and wastewater introduced. Maintenance of the system is a critical factor to ensure long life and continued effectiveness of the system. Minimum annual maintenance criteria include:

- check the sludge and scum in the tank to determine pumping requirements; tanks need to be pumped regularly depending on wastewater flow and tank size, (often 3 to 5 years),
- check the baffles or tees to ensure they are intact, secure, and in good condition,
- check the septic tank and soil absorption area monthly for indications of leaks or failure,
- check observation ports in each lateral to ensure effluent is reaching all parts of the system,
- check effluent filter and clean as needed.

Refer to K-State Research and Extension bulletins listed at the end of this document for additional information. A file containing records of repairs, pumping, site plan of the system, annual checklist, and other pertinent information should be maintained for easy reference and for information when ownership changes.

Wastewater Stabilization Ponds

Wastewater ponds, sometimes called lagoons, are a viable sewage treatment method and should be considered for individual household wastewater where soil conditions have severe limitations for conventional lateral absorption field systems. Single family wastewater ponds should not be considered if septic tank-lateral field systems are feasible as determined by local requirements or recommendations contained in this bulletin. Wastewater ponds are especially applicable on sites with very restrictive permeability, high clay subsoil, (i.e. slow perc rates) or shallow bedrock where adequate area is available.

A wastewater pond is a small pond with a maximum 5-foot operational water depth, which receives domestic wastewater. Size, as in a soil absorption field, is deter-

mined by the number of occupants and thus the wastewater flow, the soil, and evaporation.

Wastewater enters the pond by a pipe outlet near the bottom close to the center of the lagoon. All private wastewater ponds must be nondischarging and must be fenced. Wastewater ponds require a sizable area, including water surface, embankment, and separation distances. Maintenance is required to remove vegetation at the water's edge, to mow vegetation on embankments, and to remove trees that will shade the pond. Odors from a properly designed, installed, and maintained pond are infrequent and minimal.

Individuals considering wastewater ponds for sewage treatment should first check with county or other local authorities to determine requirements. Proceed with any private sewerage facility only when public sewers are not available and all applicable local requirements are met. Refer to K-State Research and Extension bulletins on wastewater ponds for more information and guidance.

Alternative Systems Guidelines

Kansas Administrative Regulations (K.A.R. 28-5-9) authorize county health departments, or other authorized local agency, in counties that have local codes, to grant a variance for alternative onsite wastewater treatment and disposal systems. Most county codes contain a variance clause that authorizes the local administrative agency to grant requests for variances provided that certain conditions are met. The request for variance is filed with the county administrative agency. The local agency can consult with KDHE for technical assistance in evaluating the system, but has the authority to issue the variance locally if there is a local code.

No private onsite wastewater system shall have a surface discharge.

When there is no local code KDHE is authorized by regulation to grant a variance. Onsite wastewater treatment options that might be considered for variance include enhanced wastewater treatment options such as aerated tank, sand or media filter, rock-plant filter, or other equivalent system. Design, construction, operation, and maintenance criteria or guidelines are planned but are not yet available for use in Kansas.

Some county codes require that design and specifications for alternative systems be completed by a licensed professional engineer. Engineers should be adequately trained or have experience under adequate supervision, before designing alternative systems. Results show that design by an inexperienced engineer can not produce a more reliable or long life alternative than conventional systems. Some alternative systems involve complex design and specific construction criteria that can result in dramatic failure when violated.

Appendix A

Conducting a Perc Test

Water movement through soil in response to gravity is called percolation. For wastewater soil absorption field evaluation, the absorption of water from a post-type hole is a method for the evaluation for soil suitability and loading rate design. The absorption of water from this hole involves water movement in 3 dimensions and forces other than gravity. The term "perc" test is applied to this evaluation. The purposes of this test include:

- Obtaining the rate at which wet, unsaturated soil will absorb water,
- Helping assess suitability of soil on a specific site to absorb septic tank effluent,
- Helping select from among alternative onsite sewage systems and establish a design loading rate.

To ensure the best evaluation, all available soil information should be utilized. This would include assessment of restrictive conditions such as high water table, perched water table, shallow depth of soil, and restrictive layers such as clay pan; soil profile evaluation from the site, including history of high water tables; and description of soil profiles from county soil surveys.

Brief Description

A minimum of four to six holes are placed throughout the proposed site of the absorption field and at the depth of the proposed laterals and soaked with water until the clay is swelled, usually for at least 24 hours. The perc rate is measured in each hole and reported as the number of minutes it takes for an inch of water to be absorbed in the hole. The optimum time to conduct a perc test is in the spring when the soil is normally wet. An accurate perc test during a dry period when the soil is cracked may not be possible.

Materials Needed to Conduct the Perc Test

1. Site plan including proposed absorption field and location of tests. Dimensions help ensure the test holes are properly located in and around the field.
2. One batter board—1 inch by 2 inch board of 18 inches long for each perc test hole.
 - A. Number each board so that each test hole will be distinguishable.
 - B. Mark a center line on the side of each batter board. This will provide a consistent reference point for the measuring device.
3. Durable measuring device (1 to 2 feet long) and a way to reproducibly locate the water surface, such as a pointed hook or float on a stiff wire or rod.
4. An adequate supply of water to soak the hole and conduct the test. Water usually has to be transported to the site. Two hundred to 300 gallons is usually adequate.

Procedure

1. **Identify Proposed Site of Absorption Field**—The site preferably should be located downslope from the septic tank. If effluent will not flow by gravity, an effluent pump may be used to move effluent to a suitable absorption field. For new homesites, the proposed area reserved for future use should also be checked for suitability.
2. **Number and Location of Tests**—Locate a minimum of four to six holes uniformly over the proposed absorption field site. If the site is sloping, it is especially important to have test holes at all elevations to be used so that any differences in soil will be evaluated.
3. **Type of Test Hole**—Dig or bore each hole to the depth of the proposed trench (usually 18 to 24 inches) and with a consistent diameter (8 inches is recommended). All test holes shall be the same size to help ensure consistency in results.
4. **Prepare the Test Hole**—Scratch the sides and bottom of the hole to eliminate any smeared or compacted soil surfaces and remove loose material from the hole. Place 2 inches of washed gravel in the bottom of the hole. The gravel can be contained in a mesh bag for easy removal and reuse at other sites. This gravel protects the bottom of the hole from erosion, scouring, and sediment as water is introduced.
5. **Wet Hole to Allow for Soil Swelling**—Saturation means that the voids between the soil particles are filled with water. This happens fairly quickly for soil immediately surrounding the portion submerged in water. Swelling is caused by intrusion of water into the clay particles and can take many hours and possibly days when the soil is quite dry.
 - A. Carefully add 12 to 14 inches of water. Using a hose will prevent soil washing down from the sides of the hole.
 - B. Maintain the water level for at least 24 hours to allow for swelling to occur. In most cases it will be necessary to add water periodically from a reservoir. A float supplied by a hose from a reservoir simplifies the procedure.
 - C. If the soil appears to be sandy or initially very dry, plan to check the condition of the hole wetting after 12 hours or overnight. If there is no water left in the hole and the reservoir is dry, refill the reservoir and holes. After the full 24 hours have passed since soaking was initiated, begin measuring as described in #6.
6. **Perc Measurement**
 - A. Remove the apparatus used to add water to the hole.
 - B. Place the batter board across the top of each hole and secure with weights, spikes or attach

to stakes. Be sure that the centerline mark is centered over the hole and each board is numbered.

- C. Align the measuring rule with mark on the board and use the hook gauge or the float and rod to read the level when it just touches the water surface. Record the measurement and time. Fill the hole to about 6 inches over the rock and make the initial measurement.
- D. Measure at 30-minute intervals (does not have to be exact) recording both level and time. If the water level in the hole drops too rapidly, it will be necessary to reduce the time interval for measurement. The time interval should be short enough that the water level should not drop more than 25 percent of the wetted hole depth.
Note: If the water drops more than 1 to 2 inches in 30 minutes, it will be necessary to add water to the hole after each reading until it is the same depth as recorded initially. Be sure to record the measurement of the refilled perc hole.
7. **Calculate Perc Rate.** Divide time interval by drop in water level to find the perc rate in minutes per inch (mpi).

Examples:

If the drop is $\frac{5}{8}$ inches in 25 minutes:

$$\frac{25}{\frac{5}{8}} = 25 \times \frac{8}{5} = 40 \text{ mpi}$$

If the drop is $1\frac{1}{2}$ inches in 12 minutes:

$$\frac{12}{1\frac{1}{2}} = \frac{12}{\frac{3}{2}} = \frac{12 \times 2}{3} = 8 \text{ mpi}$$

- A. Continue measurements until each of three consecutive calculated rates varies by no more than 10 percent from the average of the three rates. Use the average of three rates as the value for that hole

Example:

Rates of 26.0, 28.0, and 30.5 mpi average 28.2 mpi

- B. Measure and calculate the rate for each hole in the application field. Average the rates for all holes as the value to use for loading rate and bottom area sizing.
8. **Compare with Permeability in the NRCS Soil Survey.** The field measured perc (mpi) should be no smaller than about one third the inverse of the permeability rate shown in the table of physical and chemical properties of soils in the soil survey report. If it is, suspect a problem with the perc test, soil mapping or other cause. A well aggregated, undisturbed soil may have a good perc rate.

Appendix B

Sources of Additional Information

Kansas State University, Agricultural Experiment Station and Cooperative Extension Service Bulletins²¹ (except as noted)

Wastewater Systems and Related Information

Design of Submerged Flow Wetlands, Special Report 457, Missouri Small Flows Education and Research Center, Agricultural Experiment Station, University of Missouri, Columbia, MO 65211

Environmental Health Handbook, First Edition, Aug 1992, Kansas Association of Sanitarians, KDHE, and K-State Research and Extension cooperating, available from K-State, Extension Biological and Agricultural Engineering, Cost: \$20.00²²

Get to Know Your Septic System, MF-2179

How to Run a Percolation Test, FO-0583-C, (Revised 1993), Minnesota Extension Service, University of Minnesota, St. Paul, MN 55108

Onsite Domestic Sewage Disposal Handbook, MWPS-24, Midwest Plan Service, Iowa State University, available from K-State, Extension Biological and Agricultural Engineering, Cost: \$6.00²²

Plugging Cisterns, Cesspools, Septic Tanks, and Other Holes, MF-2246

Rock-Plant Filter Design and Installation, expected 1997

Rock-Plant Filter Operation, Maintenance and Repair, expected 1997

Septic Tank Maintenance, MF-947

Septic Tank-Soil Absorption System, MF-944

Soil Evaluation for Home Septic Systems, MF-945

Wastewater Pond Design and Construction, MF-1044

Wastewater Pond Operation, Maintenance, and Repair, MF-2290

Why Do Septic Systems Fail? MF-946

Your Wastewater System Owner/Operator Manual, S-90 For sale bulletin, cost 35¢

Other Helpful Bulletins

Kinds and Types of Levels, LR-17²²

Land Judging and Homesite Evaluation, S-34

Operating, Checking and Caring for Levels, LR-101²²

Safe Domestic Wells, MF-970

Soil Water Measurements: An Aid to Irrigation Water Management, L-795

Using a Level, AF-19²²

Standards Related to Onsite Wastewater System Materials and Procedures

ACI²³212.3R Chemical Admixtures for Concrete

ACI 350R Environmental Engineering Concrete Structures

ASTM²⁴C150-95 Standard Specification for Portland Cement, Vol. 04.01

ASTM C267-82 Standard Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacing, Vol 04.05

ASTM C452-95 Standard Test Method for Potential Expansion of Portland Cement-Cement Mortars Exposed to Sulfate, Vol. 04.01

ASTM C890-91 Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures, Vol. 04.05

ASTM C1227-94 Standard Specification for Precast Concrete Septic Tanks, Vol. 04.05

ASTM D1600-94 Standard Terminology for Abbreviated Terms Relating to Plastics, Vol. 08.04

ASTM D2321-89 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications, Vol. 08.04

ASTM D2729-93 Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings, Vol. 08.04

ASTM F481-94 Standard Practice for Installation of Thermoplastic Pipe and Corrugated Tubing in Septic Tank Leach Fields, Vol. 08.04

ASTM F405-93 Standard Specification for Corrugated Polyethylene (PE) Tubing and Fittings, Vol. 08.04

ASTM F412-94a Standard Terminology Relating to Plastic Piping Systems, Vol. 08.04

ASTM F449-93 Standard Practice for Subsurface Installation of Corrugated Thermoplastic Tubing for Agricultural Drainage or Water Table Control, Vol. 08.04

ASTM D3385-94 Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer, Vol. 04.08

ASTM F789-89 Standard Specification for Type PS-46 Poly(Vinyl Chloride) (PVC) Plastic Gravity Flow Sewer Pipe and fittings, Vol. 08.04

ASTM F810-93 Standard Specification for Smoothwall Polyethylene (PE) Pipe for Use in Drainage and Waste Disposal Absorption Fields, Vol. 08.04

ASTM F949-93a Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings, Vol. 08.04

NPCA²⁵ Durable, Watertight Precast Concrete, TECH notes, April 1996

NPCA Septic Tank Manufacturing: A Best Practices Manual, Anticipated by Summer 1998

NPCA Underground Watertight Systems (video)

²¹Production Services/Distribution, Kansas State University, 28 Umberger Hall, Manhattan, KS 66506-3402, Phone: (785) 532-1150

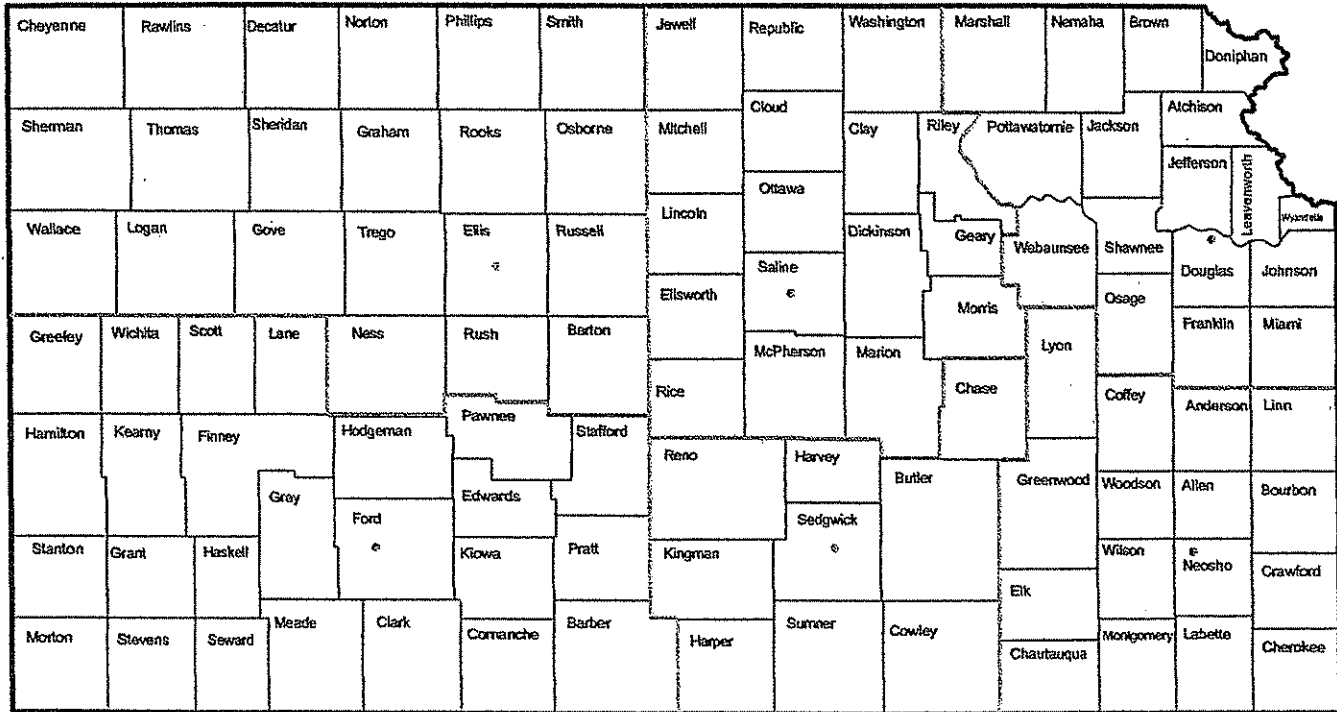
²²Available through Extension Biological and Agricultural Engineering, Kansas State University, 237 Seaton Hall, Manhattan, KS 66506-2917, Phone: (785) 532-5813

²³American Concrete Institute, P.O. Box 9094 Farmington Hills, Michigan 48333, Phone: (810) 848-3808

²⁴American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 Phone (610) 832-9500

²⁵National Precast Concrete Association, 10333 North Meridian Street, Suite 272, Indianapolis, Indiana 46290 Phone (317) 571-9500

KDHE District Boundries and District Offices



KDHE, Division of Environment, Nonpoint Source Section
 Forbes Field, Bldg. 283
 Topeka, Kansas 66620
 (785) 296-4195

KDHE District Offices

Kansas Dept Health & Environment
 Northwest District Office
 2301 E. 13th Street
 Hays, KS 67601-2651
 (785) 625-5663

Kansas Dept Health & Environment
 North Central District Office
 2501 Market Place, Suite D
 Salina, KS 67401
 (785) 827-9639

Kansas Dept Health & Environment
 Northeast District Office
 800 W. 24th Street
 Lawrence, KS 66046-4417
 (785) 842-4600

Kansas Dept Health & Environment
 Southwest District Office
 302 W. McArtor Road
 Dodge City, KS 67801-6098
 (316) 225-0596

Kansas Dept Health & Environment
 South Central District Office
 130 S. Market, 6th Floor
 Wichita, KS 67202-3802
 (316) 337-6020

Kansas Dept Health & Environment
 Southeast District Office
 1500 W. 7th Street
 Chanute, KS 66720-9701
 (316) 431-2390

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November 1997

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November 1997

MS11-97—7M

WASTEWATER SYSTEM REQUIREMENTS 2007

Distribution Box

- A distribution box is required on every wastewater system installed in Barton County.
- The distribution box can be no less than a seven-hole distribution box. The design must mimic the Tuff-Tite brand, and/or be a Tuff-Tite.
- Stackable risers must be installed on the distribution box if needed to bring the top of the box to grade.
- Speed levelers must be installed in every distribution box.
- Using a speed leveler ensures that all the lateral lines will receive the same amount of effluent. Without the speed levelers, the whole theory of a distribution box is destroyed. Additionally, the risers make the distribution box accessible to the Homeowner; so that they can make sure each lateral line is getting the same amount of effluent. This is why the top of the box needs to be at grade.

Poly Tanks & Fiberglass Tanks

- There are many different Septic Tank Manufacturers that have been approved for installation in Kansas. I am attaching a copy of the most updated list from KDHE - (10/21/05). You will note, that Fiberglass Tanks have regained approval for use in Kansas.
- All of these tanks have special setting and backfilling requirements. In many cases, the requirement comes from the Manufacturer.
- The Barton County Environmental Manager must be present when any poly and/or fiberglass tank is being set and backfilled in Barton County.

Lagoons

- Generally most of the lagoons are going to be M-40 lagoons.
- All lagoons must have five feet of operational water depth, and at least two feet of freeboard.
- All lagoons must be built with a dozer and/or an excavator. A backhoe will also be necessary to complete the installation of the sewer pipe, and to establish the proper compaction and installation of the liner. As with all wastewater systems a Licensed Wastewater Installer must be running the dozer, excavator or the backhoe.
- If grade is a problem a lift may be needed and/or a second cell must be built. Every lagoon is different.
- A lagoon requires a 100 ft separation from water wells and a 50 ft separation from property lines
- A minimum liner (bentonite) of 1600 pounds is required on all lagoons; in some cases additional bentonite is necessary if the soil conditions warrant it. Please note that Barton County Environmental Management staff must be on site during the entire process of installing the liner. Additionally, if the wind is blowing... then the liner will not be installed. Yes, this can make it difficult to complete the lagoon due to our typically windy conditions, but the bentonite is a powder and it would be lost to the wind.
- A soil analysis must be conducted on every prospective lagoon site prior to the issuance of a permit. This is so that the amount of bentonite, and/or special construction requirements can be established. The soil analysis pit needs to be dug by a Licensed Wastewater Installer.
- All lagoons must be wheel compacted during the installation of the liner. A tracked machine (such as a dozer) will not be permitted. Only after the liner is satisfactorily installed can the line then be installed to the center of the lagoon. Again, during this phase of the installation the Barton County Environmental Management Division staff must be present, and additional bentonite will be necessary to "patch" the cut in the side of the lagoon.
- From the house to the center of the lagoon must be four inch schedule 40 pipe or heavier.
- The line going to the center of the lagoon will be suspended above the bottom of the lagoon and so therefore must be physically secured in place to keep the line from "floating". See the Barton County Environmental management Division for various options on how to complete this phase.
- A concrete slab at least 2 feet x 2 feet x 4 inches thick must be installed at the center of the lagoon where the end of the line discharges. The line should be above the concrete slab at least 20 inches, however, through trial and error The Barton County Environmental Management Division recommends that the maximum separation distance not exceed 18 inches. The most successful separation distance has been 12 inches. It is necessary to submerge the pipe with water in order to insure that the line does not freeze.
- At least two cleanouts should be used, one just outside the house and a second near the pond where the ground surface is 6 inches above the embankment for access to unplug the line. A cleanout at each change in

direction and every 100 feet is also required. Cleanouts may be a Tee or "Y" the same size as the sewer line, but cleaning is easier if access in each direction is possible.

- A fence is required around the lagoon. This fence is to be installed immediately following construction of the lagoon. See the Barton County Environmental Management Division for fencing requirements.
- A lagoon packet is available at the Barton County Environmental Management Division office.
- If you have not gone through the process of building a lagoon in Barton County and dealing with the Barton County Environmental Management Division, it is highly advisable that you contact our office to discuss the specific minutia details involved before you lock yourself into a bid. The requirements are much different than a standard tank and lateral field installation, and many times the Barton County Environmental Management Staff are on site during the entire process of construction.

Notice

- The Barton County Environmental Management Division office must be notified 24 hours prior to the completion of any septic system for an inspection. Failure to provide 24 hour notice may result in the wastewater system being left open until an inspection can be made. Inspections are conducted on a "first-come-first-serve" basis. Advance notice is the only way to guarantee an inspection when it is convenient for you.

Lifts

- The lift housing and lid need to be plastic or fiberglass. The housing and lid can not be metal or any material that is corrosive.
- Any pipes going into or out of the lift need to be silicone where the pipes and the lift housing join together.

Laterals

- The maximum depth of the lateral line trench is 36 inches from ground grade to the bottom of the trench.
- Minimum distance from center line to center line is 7 feet. Ten feet is recommended for normal installation.
- Splash protection is required. Splash protection can be rock, cement, fiber paper (this is also known as geotextile or weed barrier material), plastic, fiberglass, or shingles. The protection must be 3 ft wide and 3 ft long in the first chamber of each line.
- The pipe leading into the front cover of the first chamber must be silicone.
- A riser must be installed at the end of each lateral line.
- The minimum separation distance from houses or building for a lateral field is 20 ft. A variance can be issued to be closer to a building, as long as the homeowner realizes what the consequences could be and they are willing to sign off on the variance.
- The pipe leading into the front cover of the chamber must pass all the way through, so please modify the covers if you receive the wrong kind from your supplier.
- Remember that Barton County's minimum absorption field is 700 square feet. Soil conditions and the number of bedrooms dictate if the square footage is larger than the county minimum size.

Septic Tanks

- A septic tank must be state approved by the KDHE. (see attached listed dated 10/21/05)
- The inlet and outlet pipes where they enter and exiting the tank need to be silicone.
- From the house to the tank, risers on the tank, and 10 ft. out of the tank need to be four inch schedule 40 PVC pipe or heavier.
- The minimum separation distance between the septic tank and a house or building is 10 ft.
- The minimum separation distance between the septic tank and the lateral field is 10 ft.
- The minimum separation distance between the septic tank and any domestic water well is 50 ft.
- Remember that an abandoned septic tank must be pumped out, the top of the tank crushed or chewed up with the backhoe, and then chlorinated before backfilling.

Chamber Beds

- A Chamber Bed is usually installed when the homeowner does not have enough room for a lateral field. Due to this the Barton County Environmental Management Division office wants to get as many sections of chambers in the ground as possible. This will be the homeowners one and only shot at a septic system.
- When the Chamber Bed is being constructed, the ground under the entire header system and the first three feet into the chambers from the header will be covered with 2 inches of rock (rock that meets the Barton County Environmental Management Division specifications).
- Each chamber is required to have three rebar stakes. (This is to hold the form of the chamber).
- Six inches of rock is required to be placed between the chamber rows. This will cover past the chamber louvers.

- Inspection ports are required at the end of every other row.
- In most cases a distribution box will not be required with a chamber bed; however, contact the Barton County Environmental Manager on each site as each lay-out may be different.
- When installing the header system, there must be an independent line installed for each chamber row.

Variances, Consent, Easement

- A variance can be issued to get close to a building with the lateral field. ONLY if it is not possible to stay 20 feet away, and if the Owner is willing to acknowledge the risks involved.
 - Consent is needed in order to be within 25 ft of the property line. The consent has to be given by the property owner that it is affecting, and it must be notarized.
 - An easement needs to be obtained to put any part of a septic system on another person's property. This should be legally binding.
-

In Barton County no part of the septic system can be within 50 ft of any domestic well.

The septic system can not be constructed in any right-of-ways, easements, or set backs.

By placing a filter in a septic tank it can add 250 gallons to the septic tank size. Minimum septic tank size is 1000 gallons.

Please be advised that the Barton County Environmental Management Division reserves the right to change or update this list of requirements as necessary due to ever changing technology as well as changes that come about to State and County Regulations. If you have questions....ASK. We look forward to working with all of you.



Judy Goreham, Environmental Manager jgoreham@bartoncounty.org email

MEMORANDUM**Dated July 7, 2003**

TO: Real Estate Community
Lending Institutions

FROM: Barton County Environmental Management Division

RE: Policy Changes for Lender Evaluations Effective July 7, 2003

Please accept this memorandum as a policy change for all Lender Evaluations conducted by the Barton County Environmental Management Division after July 1, 2003.

Per this policy change, a formal request form must be completed on all Lender Evaluations. Please use the updated form as will be provided by the Environmental Management Division.

For all properties without permits on file for septic systems, and/or for all properties where the septic systems are more than ten years old, the tank must be pumped out and an inspection conducted. This inspection must be done from start to finish of the pump-out. We recommend that you have an order put in with a licensed wastewater hauler, asking that they contact the Environmental Management Division to schedule the inspection. This inspection is being done to verify the size, type and condition of the tank, as well as to verify that the lateral field and/or brick pit does not "back-pressure" to the septic tank. If any portion of this inspection does not "pass", upgrades will be required before the report will be approved.

For all properties with permits on file for septic systems, and if less than ten years old, the tank will need to be pumped out by a licensed wastewater hauler and a receipt provided to Barton County showing the size, type and condition of the tank. This needs to be done unless documentation is provided showing that the tank was pumped within the last three years. An actual receipt from the wastewater hauler will be necessary. Note, a copy of a check is not a receipt. For these properties, County staff does not need to be present for the pump-out.

Additional requirements will include a visual inspection of all basements and/or crawl spaces to verify the location that the plumbing exits the home. There will also be visual inspections of all cleanouts and risers wherever they are present.

For all properties that have been vacated for "any" amount of time, then in addition to the above requirements, a cautionary statement will be included with the report stating that due to the fact that the property has been vacant, it is advised that caution be shown toward the septic system.

For any property that has "distressed" vegetation in the area of the septic system, a cautionary statement will be included with regard to the septic system. This is not to be confused with actual surfacing sewage. The presence

of “distressed” vegetation is a sign that the septic system is problematic. Surfacing sewage is evidence of a “failed” septic system.

Barton County licensed wastewater haulers are aware of the requirements for having tanks pumped out. They are aware that County staff must be present before they begin a pump-out. They are also aware that the County recommends contact with the haulers to order a pump-out and that they will need to schedule the inspection with this office. The haulers know that receipts of all future pump-outs will be required.

You must communicate to the wastewater hauler if the tank needs an inspection or not. Please call this office at 793-1894, or toll free at 1-877-419-7171, on any property and we will conduct a file search for past permits and tell you immediately if an inspection of the tank is necessary.

The County does recommended that inspections be completed as soon as possible. It will place the seller in a better position if he/she is aware of how their property will rate and what may be involved in the sale.

The current fee schedule, as adopted by the Barton County Commission on July 7, 2003, is:

SERVICE	FEE
Septic System Permit Fee	\$75.00
Water Well Permit Fee	\$45.00
<i>Lender Evaluation Fees</i>	
Full Inspection – Water Well Evaluation, Septic Evaluation, H2O Test through Certified Lab	\$75.00
Full Inspection – Water Well Evaluation, Septic Evaluation, H2O Test through In-House Lab	\$50.00
Partial Inspection – Water Well Evaluation or Septic Evaluation only	\$50.00
Re-visit Inspection	\$25.00
<i>Water Testing Fees</i>	
Chloride (Cl)	\$10.00
Chlorine (Cl ₂)	Free
Coliform Bacteria ¹ (Biological)	\$15.00 ¹
Fecal Coliform ² (Biological)	\$15.00 ²
Nitrate Nitrogen (NO ₃ -N)	\$10.00
Daycare Inspection Fee	\$10.00 plus the cost of a Water Test

Please note, Central Kansas Local Environmental Planning Group records, as relate to properties located in Barton County, will be available through the Environmental Management Division.

Should you have any questions reference County policies or operating procedures, contact Judy Goreham, Environmental Manager, at the Barton County Environmental Management Division, Barton County Courthouse, 1400 Main – Room 108, Great Bend, Kansas, 67530. The office phone number is (620) 793-1894 or toll free – 1-877-419-7171. You may also email questions or comments to jgoreham@bartoncounty.org.

APPENDIX 4

K.A.R. 28-30-2

KANSAS ADMINISTRATIVE REGULATIONS
AGENCY 28. DEPARTMENT OF HEALTH AND ENVIRONMENT
ARTICLE 30.--WATER WELL CONTRACTOR'S LICENSE; WATER WELL
CONSTRUCTION AND ABANDONMENT

Current with rules/regulations filed before January 1, 2001

28-30-2 Definitions.

- (a) "License" means a document issued by the Kansas department of health and environment to qualified persons making application therefore, authorizing such persons to engage in the business of water well contracting.
- (b) "Department" means the Kansas department of health and environment.
- (c) "Abandoned water well" means a water well determined by the department to be a well:
- (1) whose use has been permanently discontinued;
 - (2) in which pumping equipment has been permanently removed;
 - (3) which is either in such a state of disrepair that it cannot be used to supply water, or has the potential for transmitting surface contaminants into the aquifer, or both;
 - (4) which poses potential health and safety hazards; or
 - (5) which is in such a condition that it cannot be placed in active or inactive status.
- (d) "Water well contractor" or "contractor" means any individual, firm, partnership, association, or corporation who constructs, reconstructs, or treats a water well. The term shall not include:
- (1) an individual constructing, reconstructing or treating a water well located on land owned by the individual, when the well is used by the individual for farming, ranching, or agricultural purposes or for domestic purposes at the individual's place of abode; or
 - (2) an individual who performs labor or services for a licensed water well contractor at the contractor's direction and under the contractor's supervision.
- (e) "Aquifer" means an underground formation that contains and is capable of transmitting groundwater.
- (f) "Confined aquifer" is an aquifer overlain and underlain by impermeable layers. Groundwater in a confined aquifer is under pressure greater than atmospheric pressure and will rise in a well above the point at which it is first encountered.

(g) "Unconfined aquifer" is an aquifer containing groundwater at atmospheric pressure. The upper surface of the groundwater in an unconfined aquifer is the water table.

(h) "Domestic uses" means the use of water by any person or family unit or household for household purposes, or for the watering of livestock, poultry, farm and domestic animals used in operating a farm, or for the irrigation of lands not exceeding a total of two acres in area for the growing of gardens, orchards and lawns.

(i) "Public water-supply well" means a well that:

(1) provides groundwater to the public for human consumption; and

(2) has at least 10 service connections or serves an average of at least 25 individuals daily at least 60 days out of the year.

(j) "Groundwater" means the part of the subsurface water which is in the zone of saturation.

(k) "Grout" means cement grout, neat cement grout, bentonite clay grout or other material approved by the department used to create a permanent impervious watertight bond between the casing and the undisturbed formation surrounding the casing or between two or more strings of casing.

(1) "Neat cement grout" means a mixture consisting of one 94 pound bag of portland cement to five to six gallons of clean water.

(2) "Cement grout" means a mixture consisting of one 94 pound bag of portland cement to an equal volume of sand having a diameter no larger than 0.080 inches (2 millimeters) to five to six gallons of clean water.

(3) "Bentonite clay grout" means a mixture consisting of water and commercial grouting or plugging sodium bentonite clay containing high solids such as that manufactured under the trade name of "volclay grout," or an equivalent as approved by the department.

(A) The mixture shall be as per the manufacturer's recommendations to achieve a weight of not less than 9.4 pounds per gallon of mix. Weighting agents may be added as per the manufacturer's recommendations.

(B) Sodium bentonite pellets, tablets or granular sodium bentonite may also be used if they meet the specifications listed in paragraph (k)(3) of this regulation.

(C) Sodium bentonite products that contain low solids, are designed for drilling purposes, or that contain organic polymers shall not be used.

(l) "Pitless well adapter or unit" means an assembly of parts installed below the frost line which will permit pumped groundwater to pass through the wall of the casing or extension thereof and prevent entrance of contaminants.

(m) "Test hole" or "hole" means any excavation constructed for the purpose of determining the geologic, hydrologic and water quality characteristics of underground formations.

(n) "Static water level" means the highest point below or above ground level which the groundwater in the well reaches naturally.

(o) "Annular space" means the space between the well casing and the well bore or the space between two or more strings of well casing.

(p) "Sanitary well seal" is a manufactured seal installed at the top of the well casing which, when installed, creates an airtight and watertight seal to prevent contaminated or polluted water from gaining access to the groundwater supply.

(q) "Treatment" means the stimulation of production of groundwater from a water well, through the use of hydrochloric acid, muriatic acid, sulfamic acid, calcium or sodium hypochlorite, polyphosphates or other chemicals and mechanical means, for the purpose of reducing or removing iron and manganese hydroxide and oxide deposits, calcium and magnesium carbonate deposits and slime deposits associated with iron or manganese bacterial growths which inhibit the movement of groundwater into the well.

(r) "Reconstructed water well" means an existing well that has been deepened or has had the casing replaced, repaired, added to or modified in any way for the purpose of obtaining groundwater.

(s) "Pump pit" means a watertight structure which:

(1) is constructed at least two feet away from the water well and below ground level to prevent freezing of pumped groundwater; and

(2) houses the pump or pressure tank, distribution lines, electrical controls, or other appurtenances.

(t) "Grout tremie pipe" or "grout pipe" means a steel or galvanized steel pipe or similar pipe having equivalent structural soundness that is used to pump grout to a point of selected emplacement during the grouting of a well casing or plugging of an abandoned well or test hole.

(u) "Uncased test hole" means any test hole in which casing has been removed or in which casing has not been installed.

(v) "Drilling rig registration license number" means a number assigned by the department which is affixed to each drilling rig operated by or for a licensed water well contractor.

(w) "Active well" means a water well which is an operating well used to withdraw water, or to monitor or observe groundwater conditions.

(x) "Inactive status" means a water well which is not presently operating but is maintained in such a way that it can be put back in operation with a minimum of effort.

(y) "Heat pump hole" means a hole drilled to install piping for an earth coupled water source heat pump system, also known as a vertical closed loop system.

(Authorized by K.S.A. 1992 Supp. 82a-1205 and implementing > K.S.A. 82a-1202, K.S.A. 1992 Supp. 82a-1205, 82a-1213; effective, E-74-34, July 2, 1974; modified, L. 1975, ch. 481, May 1, 1975; amended May 1, 1980; amended May 1, 1987; amended Nov. 22, 1993.)

K.A.R. 28-30-3

KANSAS ADMINISTRATIVE REGULATIONS
AGENCY 28. DEPARTMENT OF HEALTH AND ENVIRONMENT
ARTICLE 30.--WATER WELL CONTRACTOR'S LICENSE; WATERWELL
CONSTRUCTION AND ABANDONMENT

Current with rules/regulations filed before January 1, 2001

28-30-3 Licensing.

(a) Eligibility. To be eligible for a water well contractor's license an applicant shall:

- (1) pass an examination conducted by the department; or
- (2) meet the conditions contained in subsection (c).

(b) Application and fees.

(1) Each application shall be accompanied by an application fee of \$10.00.

(2) Before issuance of a water well contractor's license, each contractor shall pay a license fee of

\$100.00 plus \$25.00 for each drill rig operated by or for the contractor. These fees shall accompany the application and shall be by bank draft, check or money order payable to the Kansas department of health and environment--water well licensure.

(c) Reciprocity.

(1) Upon receipt of an application and payment of the required fees from a nonresident, the secretary may issue a license, providing the nonresident holds a valid license from another state and meets the minimum requirements for licensing as prescribed in > K.S.A. 82a-1207, and any amendments thereto.

(2) If the nonresident applicant is incorporated, evidence shall be submitted to the department of health and environment showing that the applicant meets the registration requirements of the Kansas secretary of state.

(3) Nonresident fees for a license shall be equal to the fee charged a Kansas contractor by the applicant's state of residence but shall not be less than \$100.00. The application fee and drill rig license fee shall be the same as the Kansas resident fees.

(d) License renewal.

(1) Each licensee shall make application for renewal of license and rig registrations before July 1 of each year by filing the proper renewal forms provided by the department and fulfilling the following requirements:

(A) payment of the annual license fee and a rig registration fee for each drill rig to be operated in the state;

(B) filing of all well records for each water well constructed, reconstructed or plugged by the licensee in accordance with K.S.A. 28-30-4 during the previous licensure period;

(C) filing a report, on a form provided by the department, of all approved continuing education units earned by the licensee during the previous licensure period;

(D) satisfying the continuing education requirements set forth in subsection (g); and

(E) providing any remaining outstanding information or records requested that existed prior to the issuance of revocation of a license.

(2) Failure to comply with paragraphs (A), (B),

(C), (D) and (E) above shall be grounds to revoke the existing license and terminate the license renewal process.

(e) Water well construction fee. A fee of \$5.00 shall be paid to the Kansas department of health and environment, either by bank draft, check or money order, for each water well constructed by a licensed water well contractor. The construction fee shall be paid when the contractor requests the water well record form WWC-5 from the department, or shall accompany the water well records submitted on form WWC-5 as required under > K.A.R. 28-30-4. No fee shall be required for reconstructed or plugged water wells.

(f) License number. Each drill rig operated by or for a licensed water well contractor shall have prominently displayed thereon the drill rig license number, as assigned by the department, in letters at least two inches in height. Decals, paint, or other permanent marking materials shall be used.

(g) Continuing education requirements. Licensed water well contractors shall earn at least eight units of approved continuing education per year beginning with the first full year of licensure or the renewal period. One unit of continuing education shall equal 50 minutes of approved instruction except for trade shows and exhibitions which shall be counted as one unit per approved trade show and exhibition attended.

(Authorized by K.S.A. 1992 Supp. 82a-1205; implementing > K.S.A. 82a-1202, K.S.A. 1992 Supp. 82a-1205, 82a-1206, 82a-1207, 82a-1209; effective, E-74-34, July 2, 1974; effective May 1, 1975; amended May 1, 1980; amended May 1, 1983; amended May 1, 1987; amended Nov. 22, 1993.)

K.A.R. 28-30-4

KANSAS ADMINISTRATIVE REGULATIONS
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ARTICLE 30.--WATER WELL CONTRACTOR'S LICENSE; WATERWELL
CONSTRUCTION AND ABANDONMENT

Current with rules/regulations filed before January 1, 2001

28-30-4 General operating require-ments.

(a) Water well record.

Within 30 days after construction or reconstruction of a water well, the water well contractor shall submit a report of such work, to the Kansas department of health and environment and to the landowner, on the water well record form, form WWC-5, provided by the department. The contractor shall report to the department and to the landowner on the water well record or attachments made thereto any polluted or other noncompliant conditions which the contractor was able to correct and any conditions which the contractor was unable to correct. The contractor shall report to the department and the landowner the plugging of any abandoned water well. The report shall include the location, landowner's name, method, type of plug material, its placement and amount used to plug the abandoned water well. A landowner who constructs, reconstructs, or plugs a water well, which will be or was, used by the landowner for farming, ranching or agricultural purposes or is located at the landowner's place of abode, shall submit a water well record, on form WWC-5, of such work to the department within 30 days after the construction, reconstruction or plugging of the water well. No fee shall be required from the landowner for the record.

(b) Artificial recharge and return. The construction of artificial recharge wells and freshwater return wells shall comply with all applicable rules and regulations of the department.

(c) Well tests. When a pumping test is run on a well, results of the test shall be reported on the water well record, form WWC-5, or a copy of the contractor's record of the pumping test shall be attached to the water well record.

(d) Water samples. Within 30 days after receipt of the water well record, form WWC-5, the department may request the contractor, or landowner who constructs or reconstructs his or her own water well, to submit a sample of water from the well for chemical analysis. Insofar as is possible, the department will define in advance areas from which well water samples are required. (Authorized by > K.S.A. 82a-1205 and implementing > K.S.A. 82a-1202, > 82a-1205, > 82a-1212, > 82a-1213; effective, E-74-34, July 2, 1974; modified, L. 1975, ch. 481, May 1, 1975; amended May 1, 1980; amended May 1, 1987.)

K.A.R. 28-30-5

KANSAS ADMINISTRATIVE REGULATIONS
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ARTICLE 30.--WATER WELL CONTRACTOR'S LICENSE; WATER WELL
CONSTRUCTION AND ABANDONMENT

Current with rules/regulations filed before January 1, 2001

28-30-5 Construction regulations for public water supply and reservoir sanitation zone wells.

All activities involving public water supply wells and wells located in reservoir sanitation zones shall conform to existing statutes, and rules and regulations, of the Kansas department of health and environment, including K.A.R. 28-10-100, > 28-10-101, and > 28-15-16.

(Authorized by > K.S.A. 82a-1205; implementing > K.S.A. 82a-1202, > 82a-1205; effective, E-74-34, July 2, 1974; effective May 1, 1975; amended May 1, 1980; amended May 1, 1983; amended May 1, 1987.)

K.A.R. 28-30-6

KANSAS ADMINISTRATIVE REGULATIONS
AGENCY 28. DEPARTMENT OF HEALTH AND ENVIRONMENT
ARTICLE 30.--WATER WELLCONTRACTOR'S LICENSE; WATERWELL
CONSTRUCTION AND ABANDONMENT

Current with rules/regulations filed before January 1, 2001

28-30-6 Construction regulations for all wells not included under section 28-30-5.

(a) Each water well shall be so located as to minimize the potential for contamination of the delivered or obtained groundwater and to protect groundwater aquifers from pollution and contamination.

(b) Grouting.

(1) Constructed or reconstructed wells shall be sealed by grouting the annular space between the casing and the well bore from ground level to a minimum of 20 feet or to a minimum of five feet into the first clay or shale layer if one is present, whichever is greater. If a pitless well adapter or unit is being installed, the grouting shall start below the point at which the pitless well adapter or unit attaches to the well casing and shall continue a minimum of 20 feet below this point, or to a minimum of five feet into the first clay or shale layer, whichever is greater.

(2) To facilitate grouting, the grouted interval of the well bore shall be drilled to a minimum diameter at least three inches greater than the maximum outside diameter of the well casing. If a pitless well adapter or unit is being installed on the well's casing, the well bore shall be a minimum diameter of at least three inches greater than the outside maximum diameter of the well casing through the grouted interval below the point where the pitless well adapter or unit attaches to the well casing.

(c) If groundwater is encountered at a depth less than the minimum grouting requirement, the grouting requirement may be modified to meet local conditions if approved by the department.

(d) Waters from two or more separate aquifers shall be separated from each other in the bore hole by sealing the bore hole between the aquifers with grout.

(e) The well casing shall terminate not less than one foot above the finished ground surface. No casing shall be cut off below the ground surface except to install a pitless well adapter unit, which shall extend at least 12 inches above the ground surface. No opening shall be made through the well casing except for the installation of a pitless well adapter designed and fabricated to prevent soil, subsurface and surface water from entering the well.

(f) Well vents shall be used and shall terminate not less than one foot above the ground surface and shall be screened with brass, bronze, copper screen or other screen materials

approved by the department which are 16-mesh or greater and turned down in a full 180 degree return bend so as to prevent the entrance of contaminating materials.

(g) Prior to completion of a constructed or reconstructed well, the well shall be cleaned of mud, drill cuttings and other foreign matter so as to make it suitable for pump installations.

(h) Casing. All wells shall have durable watertight casing from at least one foot above the finished ground surface to the top of the producing zone of the aquifer. The watertight casing shall extend not less than 20 feet below the ground level. Exceptions to either of the above requirements may be granted by the department if warranted by local conditions. The casing shall be clean and serviceable and of a type to guarantee reasonable life so as to insure adequate protection to the aquifer or aquifers supplying the groundwaters. Used, reclaimed, rejected, or contaminated pipe shall not be used for casing any well. All water well casing shall be approved by the department.

(i) All wells, when unattached during construction, reconstruction, treatment or repair, or during use as cased test holes, observation or monitoring wells, shall have the top of the well casing securely capped in a watertight manner to prevent contaminating or polluting materials from gaining access to the groundwater aquifer.

(j) During construction, reconstruction, treatment or repair and prior to its first use, all wells producing water for human consumption or food processing shall be disinfected according to > K.A.R. 28-30-10.

(k) The top of the well casing shall be sealed by installing a sanitary well seal.

(l) All groundwater producing zones that are known or suspected to contain natural or manmade pollutants shall be adequately cased and grouted off during construction of the well to prevent the movement of polluted groundwater to either overlying or underlying fresh groundwater zones.

(m) Toxic materials shall not be used in the construction, reconstruction, treatment or plugging of a water well unless those materials are thoroughly flushed from the well prior to use.

(n) Any pump pit shall be constructed at least two feet away from the water well. The pipe from the pump or pressure tank in the pump pit to the water well shall be sealed in a watertight manner where it passes through the wall of the pump pit.

(o) Water wells shall not be constructed in pits, basements, garages or crawl spaces. Existing water wells which are reconstructed, abandoned and plugged in basements shall conform to these rules and regulations except that the finished grade of the basement floor shall be considered ground level.

(p) All drilling waters used during the construction or reconstruction of any water well shall be initially disinfected by mixing with the water enough sodium hypochlorite to produce at least 100 milligrams per liter, mg/l, of available chlorine.

(q) Natural organic or nutrient producing material shall not be used during the construction, reconstruction, or treatment of a well unless it is thoroughly flushed from the well and the groundwater aquifer or aquifers before the well is completed. Natural organic or nutrient producing material shall not be added to a grout mix used to grout the well's annular space.

(r) Pump mounting.

(1) All pumps installed directly over the well casing shall be so installed that an airtight and watertight seal is made between the top of the well casing and the gear or pump head, pump foundation or pump stand.

(2) When the pump is not mounted directly over the well casing and the pump column pipe or pump suction pipe emerges from the top of the well casing, a sanitary well seal shall be installed between the pump column pipe or pump suction pipe and the well casing. An airtight and watertight seal shall be provided for the cable conduit when submersible pumps are used.

(s) Construction of sand point or well point water wells. Sand point or well point water wells shall be constructed by drilling or boring a pilot hole to a minimum depth of three feet below ground surface. The pilot hole shall be a minimum of three inches greater in diameter than the drive pipe or blank casing if the casing method is used. Sand point wells shall only be completed by using the casing method or the drive pipe method as described in paragraphs (1) and (2) below or other methods as described in paragraph (3) below. Sand point wells constructed prior to the effective date of this regulation shall not be required to meet these requirements. All sand point wells that are replaced, constructed, reconstructed or plugged after the effective date of this regulation shall meet these regulations.

(1) Casing method. Approved, durable, watertight well casing shall be set from a minimum of three feet below the ground surface to at least one foot above the ground surface. The casing shall be sealed between the casing and the pilot hole with approved grouting material from the bottom of the casing to ground surface. The drive pipe shall be considered the pump drop pipe. For underground discharge completions, a "T" joint shall be used. The drive pipe shall be capped with a solid cap at the "T" joint when the casing method is used. An approved sanitary well seal and a well vent shall be installed on the top of the well casing in accordance with K.A.R. 28-30-6 (f) and (k).

(2) Drive pipe method. Sand point wells may be installed without a casing for above ground discharge completions only. In such completions, the drive pipe shall terminate at least one foot above finished ground level. The annular space between the drive pipe and the pilot hole shall be sealed with approved grouting material from the bottom of the pilot hole to ground surface. The top of the drive pipe shall be sealed airtight and watertight with a solid cap of the same material as the drive pipe. A well vent shall not be required for the drive pipe method.

(3) Other methods. Other methods may be specifically approved by the department on a case-by-case basis by using the appeal procedure included in > K.A.R. 28-30-9.

(4) Abandonment of sand point wells. Upon abandonment of a sand point well, the contractor or landowner shall either pull the drive pipe or leave it in place. If the drive pipe is left in place, the sand point well shall be plugged from the bottom of the well to three feet below the ground surface with approved grouting material. The drive pipe well shall be cut off three feet below the ground surface and the remaining three foot deep hole shall be backfilled with surface soil. If the drive pipe is completely pulled, the remaining hole shall be plugged with approved grouting material from the bottom of the remaining hole to three feet below the ground surface. The hole shall be backfilled with surface soil from 3 feet to ground surface.

(Authorized by K.S.A. 1991 Supp. 82a-1205; implementing K.S.A. 82a1202, K.S.A. 1991 Supp. 82a-1205; effective, E74-34, July 2, 1974; modified, L. 1975, ch. 481, May 1, 1975; amended May 1, 1980; amended May 1, 1983; amended May 1, 1987; amended June 21, 1993.)

K.A.R. 28-30-7

KANSAS ADMINISTRATIVE REGULATIONS
AGENCY 28. DEPARTMENT OF HEALTH AND ENVIRONMENT
ARTICLE 30.--WATER WELL CONTRACTOR'S LICENSE; WATERWELL
CONSTRUCTION AND ABANDONMENT

Current with rules/regulations filed before January 1, 2001

28-30-7 Plugging of abandoned wells, cased and uncased test holes.

(a) All water wells abandoned by the landowner on or after July 1, 1979, and all water wells that were abandoned prior to July 1, 1979 which pose a threat to groundwater supplies, shall be plugged or caused to be plugged by the landowner. In all cases, the landowner shall perform the following as minimum requirements for plugging abandoned wells.

(1) The casing shall be cut off three feet below ground surface and removed.

(2) All wells shall be plugged from bottom to top using volumes of material equaling at least the inside volume of the well.

(3) Plugging top of well:

(A) For cased wells a grout plug shall be placed from six to three feet below ground surface.

(B) For dug wells, the lining material shall be removed to at least five feet below ground surface, and then sealed at five feet with a minimum of six inches of concrete or other materials approved by the department. Compacted surface silts and clays shall be placed over the concrete seal to ground surface.

(4) Any groundwater displaced upward inside the well casing during the plugging operation shall be removed before additional plugging materials are added.

(5) >From three feet below ground level to ground level, the plugged well shall be covered over with compacted surface silts or clays.

(6) Compacted clays or grout shall be used to plug all wells from the static water level to six feet below surface.

(7) All sand and gravel used in plugging abandoned domestic or public water supply wells shall be chlorinated prior to placement into a well.

(b) Abandoned wells formerly producing groundwater from an unconfined aquifer shall be plugged in accordance with the foregoing and in addition shall have washed sand, and gravel or other material approved by the department placed from the bottom of the well to the static water level.

(c) Abandoned wells, formerly producing groundwater from confined and unconfined aquifers or in confined aquifers only, shall be plugged according to K.A.R. 28-30-7(a) and by using one of the following additional procedures:

(1) The entire well column shall be filled with grout, or other material approved by the department, by use of a grout tremie pipe.

(2) A 10 foot grout plug shall be placed opposite the impervious formation or confining layer above each confined aquifer or aquifers by use of a grout tremie pipe; and

(A) The space between plugs shall be filled with clays, silts, sand and gravel or grout and shall be placed inside the well so as to prevent bridging.

(B) A grout plug at least 20 feet in length shall be placed with a grout pipe so at least 10 feet of the plug extends below the base of the well casing and at least 10 feet of the plug extends upward inside the bottom of the well casing.

(C) A grout plug at least 10 feet in length shall be placed from at least 13 feet below ground level to the top of the cut off casing.

(3) Wells that have an open bore hole below the well casing, and where the casing was not grouted into the well bore when the well was constructed, shall be plugged by (1) or (2) above except that the top 20 feet of well casing shall be removed or perforated with a casing ripper or similar device prior to plugging. If the well is plugged according to part (2) of this subsection, the screened or perforated intervals below the well casing shall be grouted the entire length by use of a grout tremie pipe.

(d) Plugging of abandoned holes. If the hole penetrates an aquifer containing water with more than 1,000 milligrams per liter, mg/l, total dissolved solids or is in an area determined by the department to be contaminated, the entire hole shall be plugged with an approved grouting material from the bottom of the hole, up to within three feet of the ground surface using a grout tremie pipe or similar method. From three feet below ground surface to ground surface the plugged hole shall be covered over with compacted surface silts or clays; otherwise, the hole shall be plugged in accordance with the following paragraphs.

(1) Plugging of abandoned cased test holes. The casing shall be removed if possible and the abandoned test hole shall be plugged with an approved grouting material from the bottom of the hole, up to within three feet of the ground surface, using a grout tremie pipe or similar method. From three feet below ground surface to ground surface the plugged hole shall be covered over with compacted surface silts or clays. If the casing cannot be removed, in addition to plugging the hole with an approved grouting material the annular space shall also be grouted as described in K.A.R. 28-30-6 or as approved by the department.

(2) Abandoned uncased test holes, exploratory holes or any bore holes except seismic or oil field related exploratory and service holes regulated by the Kansas corporation commission under > K.A.R. 82-3-115 through > 82-3-117. A test hole or bore hole drilled, bored, cored or augered shall be considered an abandoned hole immediately after the completion of all testing, sampling or other operations for which the hole was originally intended. The agency or contractor in charge of the exploratory or other operations for which the hole was originally

intended is responsible for plugging the abandoned hole using the following applicable method, within three calendar days after the termination of testing or other operations.

(A) The entire hole shall be plugged with an approved grouting material from bottom of the hole, up to within three feet of the ground surface, using a grout tremie pipe or similar method.

(B) >From three feet below ground surface to ground surface the plugged hole shall be covered over with compacted surface silts or clays.

(C) For bore holes of 25 feet or less, drill cuttings from the original hole may be used to plug the hole in lieu of grouting material, provided that an aquifer is not penetrated or the bore hole is not drilled in an area determined by the department to be a contaminated area.

(3) Plugging of heat pump holes drilled for closed loop heat pump systems. The entire hole shall be plugged with an approved grouting material from bottom of the hole, to the bottom of the horizontal trench, using a grout tremie pipe or similar method approved by the department.

(e) Abandoned oil field water supply wells. A water well drilled at an oil or gas drilling site to supply water for drilling activities shall be considered an abandoned well immediately after the termination of the oil or gas drilling operations. The company in charge of the drilling of the oil or gas well shall be responsible for plugging the abandoned water well, in accordance with K.A.R. 28-30-7(a), (b), and (c), within 30 calendar days after the termination of oil or gas drilling operations. Responsibility for the water well may be conveyed back to the landowner in lieu of abandoning and plugging the well but the well must conform to the requirements for active or inactive status. The transfer must be made through a legal document, approved by the department, advising the landowner of the landowner's responsibilities and obligations to properly maintain the well, including the proper plugging of the well when it is abandoned and no longer needed for water production activities. If a transfer is to be made, the oil or gas drilling company shall provide the department with a copy of the transfer document within 30 calendar days after the termination of oil or gas drilling operations. Within 30 calendar days of the effective date of the transfer of the well the landowner shall notify the department of the intended use and whether the well is in active status or inactive status in accordance with K.A.R. 28-30-7(f).

(f) Inactive status. Landowners may obtain the department's written approval to maintain wells in an inactive status rather than being plugged if the landowner can present evidence to the department as to the condition of the well and as to the landowner's intentions to use the well in the future. As evidence of intentions, the owner shall be responsible for properly maintaining the well in such a way that:

(1) The well and the annular space between the hole and the casing shall have no defects that will permit the entrance of surface water or vertical movement of subsurface water into the well;

(2) the well is clearly marked and is not a safety hazard;

(3) the top of the well is securely capped in a watertight manner and is adequately maintained in such a manner as to prevent easy entry by other than the landowner;

(4) the area surrounding the well shall be protected from any potential sources of contamination within a 50 foot radius;

(5) if the pump, motor or both, have been removed for repair, replacement, etc., the well shall be maintained to prevent injury to people and to prevent the entrance of any contaminant or other foreign material;

(6) the well shall not be used for disposal or injection of trash, garbage, sewage, wastewater or storm runoff; and

(7) the well shall be easily accessible to routine maintenance and periodic inspection. The landowner shall notify the department of any change in the status of the well. All inactive wells found not to be in accordance with the criteria listed in lines one through seven above shall be considered to be abandoned and shall be plugged by the landowner in accordance with K.A.R. 28-30-7(a) through (c).

(Authorized by > K.S.A. 82a-1205; implementing > K.S.A. 82a-1202, > 82a-1205, > 82a-1212, > 82a-1213; effective, E-74-34, July 2, 1974; modified, L. 1975, ch. 481, May 1, 1975; amended May 1, 1980; amended May 1, 1983; amended May 1, 1987.)

K.A.R. 28-30-8

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28-30-8 Pollution sources.

Well locations shall be approved by municipal and county governments with respect to distances from pollution sources and compliance with local regulations. The following minimum standard shall be observed.

(a) The horizontal distances between the well and the potential source of pollution or contamination such as sewer lines, pressure sewer lines, septic tanks, lateral fields, pit privy, seepage pits, fuel or fertilizer storage, pesticide storage, feed lots or barn yards shall be 50 feet or more as determined by the department.

(b) Proper drainage in the vicinity of the well shall be provided so as to prevent the accumulation and ponding of surface water within 50 feet of the well. The well shall not be located in a ravine or any other drainage area where surface water may flow into the well.

(c) When sewer lines are constructed of cast iron, plastic or other equally tight materials, the separation distance shall be 10 feet or more as determined by the department.

(d) All wells shall be 25 feet or more from the nearest property line, allowing public right-ofways to be counted; however, a well used only for irrigation or cooling purposes may be located closer than 25 feet to an adjoining property where:

(1) such adjoining property is served by a sanitary sewer and does not contain a septic tank system, disposal well or other source of contamination or pollution; and

(2) the property to be provided with the proposed well is served by both a sanitary sewer and a public water supply.

(Authorized by and implementing > K.S.A. 82a-1202, > 82a-1205; effective, E74-34, July 2, 1974; modified, L. 1975, ch. 481, May 1, 1975; amended May 1, 1980; amended May 1, 1987.)

K.A.R. 28-30-9

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28-30-9 Appeals.

(a) Requests for exception to any of the foregoing rules and regulations shall be submitted to the department in writing and shall contain all information relevant to the request.

(1) Those requests shall specifically set forth why such exception should be considered.

(2) The department may grant exceptions when geologic or hydrologic conditions warrant an exception and when such an exception is in keeping with the purposes of the Kansas groundwater exploration and protection act.

(b) Appeals from the decision of the department shall be made to the secretary, who after due consideration may affirm, reverse or modify the decision of the department.

(Authorized by > K.S.A. 82a-1205; implementing > K.S.A. 82a-1202, 82a1205; effective, E-74-34, July 2, 1974; effective May 1, 1975; amended May 1, 1980; amended May 1, 1983; amended May 1, 1987.)

K.A.R. 28-30-10

KANSAS ADMINISTRATIVE REGULATIONS
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28-30-10 Water well disinfection for wells constructed or reconstructed for human consumption or food processing.

(a) Gravel for gravel-packed wells shall be disinfected by immersing the gravel in a chlorine solution containing not less than 200 milligrams per liter, mg/l, of available chlorine before it is placed in the wells annular space.

(b) Constructed or reconstructed wells shall be disinfected by adding sufficient hypochlorite solution to them to produce a concentration of not less than 100 mg/l of available chlorine when mixed with the water in the well.

(c) The pump, casing, screen and pump column shall be washed down with a 200 mg/l available chlorine solution.

(d) All persons constructing, reconstructing or treating a water well and removing the pump or pump column, replacing a pump, or otherwise performing an activity which has potential for contaminating or polluting the groundwater supply shall be responsible for adequate disinfection of the well, well system and appurtenances thereto.

(Authorized by and implementing K.S.A. 82a1202, > 82a-1205; effective, E-74-34, July 2, 1974; modified, L. 1975, ch. 481, May 1, 1975; amended May 1, 1980; amended May 1, 1987.)