



SANITATION CODE

(adopted May 11, 2015)

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CHAPTER 1 ADMINISTRATIVE PROCEDURES

Article 1 AUTHORITY AND POLICY

Section 1-1.1 **LEGAL AUTHORITY:** This code is adopted under the authority granted to the Board of County Commissioners by K.S.A. 19-3701 through 19-3709 as amended.

Section 1-1.2 **DECLARATION OF FINDING AND POLICY:** The County Commissioners find that provisions for adequate and reasonable control over the environmental conditions in unincorporated areas of the county are necessary and desirable; and that it is necessary to adopt a sanitation code to:

- a. Eliminate and prevent the development of environmental conditions that are hazardous to health and safety, and
- b. Promote the economical and orderly development of the land and water resources of the county.

For these reasons and objectives, it will be the policy of the Board of County Commissioners to amend this code from time to time with respect to any matter affecting environmental sanitation and safety.

Section 1-1.3 **PURPOSE:** The purpose and intent of this Code is:

- a. To prescribe the administrative procedures to be followed in administering this Sanitation Code or any amendments thereto;
- b. To prescribe rules and regulations for controlling practices to minimize health and safety hazards;
- c. To establish administrative procedures to facilitate fair and equitable regulation while recognizing the rights of affected persons to receive reasonably prompt processing and to appeal administrative decisions

Section 1-1.4 **COMPATIBILITY WITH OTHER LAWS:** Nothing contained in this Code shall be deemed to alter or modify the application of any other laws, codes, or regulations which are or may be applicable to the property, use, or activity. Any permit, approval, or other condition given or acknowledged, under this Code, shall be limited to the requirements of this Code and shall not relieve the holder from compliance with all other applicable laws, codes, regulations, or requirements.

Section 1-1.5 **TITLE:** This Code shall be known and referred to as the Linn County Sanitation Code.

Section 1-1.6 **APPLICABILITY:** The administrative procedures prescribed in this chapter shall be followed in administering this Code and any amendments thereto.

Section 1-1.7 **EFFECTIVE DATE:** This Code shall become effective on and after its adoption by County Resolution.

Article 2 ADMINISTRATIVE POWERS AND ENFORCEMENT

- Section 1-2.1 **RIGHT OF ENTRY:** Representatives of the Administrative Agency and/or its designees shall have the right to enter upon private property to inspect, examine, and/or to survey for any purpose, reasonably related to enforcement of this Code.
- Section 1-2.2 **OBSTRUCTION OF ADMINISTRATIVE AGENCY:** No person shall willfully and knowingly impede or obstruct representatives of the Administrative Agency in the discharge of official duties under the provisions of this Code. Any representative denied access to any premises for the purposes authorized in this Code shall have authority to seek such injunctive or other legal or equitable relief from the District Court as is necessary to ensure access and compliance with this Code.
- Section 1-2.3 **ENFORCEMENT:** Unless otherwise specifically designated by this Code, the Linn County Planning/Zoning Office shall have the primary authority and responsibility for the administration of this Code; and is herein referred to as the Administrative Agency.
- The County Attorney or County Counselor shall enforce the provisions of this Code and is hereby authorized and directed to file appropriate actions for such enforcement within sixty (60) days of receipt of a request from the Administrative Agency.
- Section 1-2.4 **PENALTIES:** Any violation of any provision or requirement of this Code or the commission of any unlawful act or conduct specified in this Code shall be deemed to be a misdemeanor under the Codes and Regulations of Linn County, Kansas, and punishable upon conviction by a fine of not less than five hundred dollars (\$500) for each offense. Each day's violation shall constitute a separate offense.
- Section 1-2.5 **VESTED INTERESTS:** Nothing contained in this Code or any regulations shall be deemed or construed to grant any vested interest or protected right to any person beyond the express limited terms of any permit or ruling issued under this Code, and the Code and regulations are expressly declared to be subject to amendment, change, or modification.
- Section 1-2.6 **DISCLAIMER OF LIABILITY:** This Code shall not be construed or interpreted as imposing upon Linn County or its officials or employees any guarantee or assurance that any system installation or portion thereof constructed or repaired under permits, licenses, or inspections required by this Code will function properly.
- Section 1-2.7 **SEPARABILITY:** No decision of a court of competent jurisdiction declaring any section, subsection, paragraph, sentence, clause, or phrase of this Code invalid, shall affect the remaining portion of this Code, which shall remain in full force and effect; and to this end, the provisions of this Code are hereby declared to be severable and shall be presumed to have been adopted knowing that the part of section declared invalid would be so declared.

Article 3 DEFINITIONS

Section 1-3.1 DEFINITIONS OF TERMS

All terms used in this Code shall be interpreted and given meaning to provide reasonable application of the purpose and intent of this Code according to their common usage. Whenever the context requires, the terms and phrases used shall be interpreted in the following manner:

- a. Words appearing in the singular shall include the plural, and those appearing in the plural shall include the singular.
- b. Words used in the present tense shall include the past tense and future tense, and words used in the future tense shall include the present and past tense.
- c. Words appearing in the masculine gender shall include the feminine and neutral genders.
- d. The word "shall" is mandatory; the word "may" is permissive.
- e. The phrase "this Code" shall refer to the Code and all authorized rules, regulations, restrictions, and requirements authorized by the Code.
- f. Unless the context requires or specifies otherwise, the following words, terms, or phrases as used in this Code shall be given meaning defined as follows:
 1. Access: Entry into or upon any real estate, structure, or including any part thereof.
 2. Administrative Agency: The agency or official designated to administer the provisions of this Code, specifically, the Linn County Planning/Zoning office.
 3. Administration Rules: Any regulation adopted by the Administering Agency, which the Agency determines to be necessary and appropriate to enable it to fulfill its duties and responsibilities under this Code.
 4. Alternative Wastewater System: A wastewater system other than a septic tank soil absorption system that is used or designed to be used to collect, treat, hold, or discharge domestic wastewater from residential, industrial, or commercial property into a soil absorption field. This includes such systems as evapo-transpiration fields and mechanical treatment systems.
 5. Applicant: Any person who submits an application or requests permission to do some act regulated by this Code.
 6. Application: The application form provided by the Administering Agency, including the filing fee and any other supporting documents required by the Agency.
 7. Authorized Representative: A person who is designated by the Administering Agency to administer the provisions of this Code or any Chapter therein.
 8. Board of Health: The County Health Department Director.
 9. Board of County Commissioners: The Board of County Commissioners of Linn County, Kansas.
 10. Domestic Sewage: Sewage which is normally characterized as, and is similar to, residential wastewater, which originates primarily from kitchen, bathroom, and laundry sources, including waste from food preparation, dishwashing, garbage grinding, toilets, baths, showers, and sinks.
 11. Dwelling: Any building or structure occupied by a human being on either a full time or part time basis.
 12. Effluent: The liquid waste discharged from a sewage disposal system.

13. **Engineer**: A licensed professional engineer registered with the State of Kansas.
14. **Establishment**: Any structure or self-contained unit therein, including single and multiple family dwellings, commercial and industrial buildings, schools, churches, and public institutions.
15. **Flood Plain**: Land this is subject to inundation as a result of flooding, having one percent (1%) chance of annual occurrence. Also known as the 100-year Flood Plain.
16. **Ground Water Table**: The upper surface of ground water in the zone of saturation of a geologic formation.
17. **Industrial and Commercial Wastes**: Any wastes produced as a by-product of any industrial or commercial process or operation, other than domestic sewage. Uses involving industrial or commercial wastewater must comply with regulations involving industrial and commercial wastes as approved and permitted by the Kansas Department of Health and Environment.
18. **Industrial and Commercial Private Sewage Disposal System**: Any approved wastewater collection and/or treatment system for industrial and commercial sewage, not domestic wastewater, and certain nonhazardous waste material when approved by the Kansas Department of Health and Environment.
19. **KDHE**: The Kansas Department of Health and Environment.
20. **Permit**: The written authorization to perform some act regulated by this Code, including, for example, authorization to construct or authorization to operate.
21. **Person**: An individual, corporation, partnership, association, state or political subdivision thereof, federal agency, state agency, municipality, commission, interstate body, or other legal entity.
22. **Point Source**: Any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating crafts, from which pollutants are or may be discharged.
23. **Pollution**: Any induced alteration of the physical, chemical, biological, and radiological integrity of water, air, soils (both surface and subsurface), or contamination of food or foodstuffs.
24. **Premises**: Any lot or tract of land and all buildings, structures, or facilities located thereon.
25. **Private Sewage Disposal System**: A wastewater collection and treatment system designed exclusively for the use of a single residential structure or commercial structure solely for domestic sewage not discharged into a stream or waterway.
26. **Sanitary Privy**: A facility with a water-tight concrete receptacle designed to receive, store, and provide for periodic removal of non-water carried wastes from the human body.
27. **Sanitary Service**: The pumping and/or removal of wastes, sludge, or human excreta from privies, septic systems, or alternative wastewater systems, and the transportation of such material to a point of final disposal.
28. **Sanitary Sewerage System**: Any system of pipes, tanks, conduits, structures, or other devices for the collection, transportation, storage, treatment, and disposal of sewage.

29. Sanitation Department: The department of the Linn County Planning/Zoning office responsible for enforcing this Code.
30. Sanitation Inspector: An official designated by the Planning/Zoning office to enforce the regulations set forth in this Code.
31. Schedule of Compliance: A schedule of remedial measures and times, including an enforceable sequence of actions or operations leading to compliance with any regulations or limitation.
32. Septic System: A septic tank soil absorption system used for the collection, treatment, and disposal of domestic wastewater.
33. Sewage: A combination of liquid wastes, which may include chemicals, house wastes, laundry wastes, human excreta, animal or vegetable matter in suspension or solution, and other solids in suspension or solution, which is discharged from a dwelling or building, or other establishment.
34. Sewer district: Any special district duly formed, authorized, and empowered to plan, construct, and operate a public sewer system in accordance with K.S.A. 19-27a01.
35. Subdivision: Any land, vacant or improved, which is divided or proposed to be divided into two (2) or more lots, parcels, sites, units, plots, or interests for the purpose of sale, lease, or financing of development, either on the installment plan or upon any and all other plans, terms and conditions, including re-subdivision. "Subdivision" includes the division or development of residential and nonresidential zones land, whether by deed, metes and bounds description, map, plat, or other recorded instrument.
36. Wastewater: Liquid or water carrying pollutants or water contaminants from industrial, municipal, agricultural, or other sources.

Article 4 PERMITS, LICENSES, AND PROCEDURES

Section 1-4.1 **PERMITS AND LICENSES REQUIRED:** No private sewage disposal system shall be installed, removed, altered, repaired, or replaced except subject to a permit or license as required by this Code.

- a. Private Sewage Disposal System – Permit Required: Every person who installs, removes, alters, repairs or replaces, or causes to be installed, removed, altered, repaired, or replaced any private sewage disposal system or part thereof shall apply for and obtain a permit to perform such work.
- b. Private Sewage Disposal System Contractor – License Required: Every person who contracts for the activity of installing, removing, altering, repairing, or replacing a private sewage disposal system shall apply for, obtain, and maintain a valid license to perform that activity.

Section 1-4.2 **APPLICATION FORMS AND PROCEDURES:** All persons required by this Code to obtain a permit or license shall make application for such permit or license to the Administrative Agency on standard forms provided for that purpose by the Administrative Agency.

- a. Content: The application shall give a description of the character of the work proposed to be done, or activity to be engaged in, the locations, ownership, occupancy, and use of the premises in connection therewith. The Administrative Agency shall require plans, specifications, or drawings and such other information as deemed necessary.

- b. Filing: an application for any permit or license required under this Code shall be filed with the Linn County Planning/Zoning Office.
- c. Verification: An application for a permit or license must be signed by the person for whose benefit the permit or license is being required or his/her authorized representatives. The Administrative Agency may require proof of such authorization.
- d. The applicant shall be responsible for compliance with the requirements as further set out in this Code.

Section 1-4.3 **ISSUANCE OF PERMIT OR LICENSE:** Within three (3) working days after receipt of an application for a permit or license required by this Code, the Administrative Agency shall begin such investigations and inspections as he/she shall deem necessary to determine whether the permit or license should be issued or denied, and shall issue or deny the permit or license within ten (10) working days.

If the permit or license is denied, the Administrative Agency shall send the applicant a written notice with the reason(s) for the rejection stated thereon.

Section 1-4.4 **PERMIT NON-TRANSFERABLE:** No permit or license shall be transferable, nor shall any fees required and paid therefore be refunded.

Section 1-4.5 **STANDARD FEES:** For the purpose of defraying all or part of the costs of administration of this Code, The Board of County Commissioners shall establish a schedule of fees for all permits, licenses, and inspections required by the Code, payable upon submission of the application for such permit or license.

Section 1-4.6 **RECEIPTS FOR FEES AND DEPOSITS:** The Administrative Agency shall issue receipts for all fees and deposits required by the Sanitation Code, and the money received shall be deposited with the Linn County Treasurer.

Section 1-4.7 **PROPERTY RESALE:** Whenever any property connected to or served by a private sewage disposal system is offered for or subject to a contract of sale, an inspection of the sewage disposal system is mandatory. The system must pass inspection prior to occupancy. Any inspection for property resale is subject to fees as established by the Board of Commissioners, as in Section 1-4.5 of this Code. This shall not constitute nor be deemed a warranty, and neither the Administrative Agency nor any other official of the County shall be liable for any future failures of the system or for other claims arising out of the inspection. Upon completion of the inspection, a report shall be issued to the property owner reporting the results. Issuance of the report shall not relieve any person of compliance with the requirements of this Code.

Article 5 NOTICES, ORDERS, AND APPEALS

- Section 1-5.1 NOTICE OF VIOLATIONS:** Whenever the Administrative Agency determines that there has been or is likely to be a violation of any provisions of this Code, he/she shall give notice of such violation. The notice:
- a. Shall be in writing,
 - b. Shall identify the Code violation and the factual basis therefore,
 - c. Shall specify necessary corrective action,
 - d. Shall specify a reasonable period of time for performance of any corrective action and/or work required by the notice, and
 - e. Shall be properly served upon the occupant and/or owner of the premises; provided that such notice shall be deemed properly served upon such owner or occupant, when a copy thereof has been sent by registered mail to the last known address of the owner or occupant as identified on the latest county tax rolls.
- Section 1-5.2 APPEAL HEARING:** Any person aggrieved by any notice or order issued by the Administrative Agency under the provisions of this Code shall be entitled to a hearing on the matter before the Linn County Board of Commissioners; provided, such person shall have filed 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 objection is made. The filing of the request for hearing shall operate as a stay of the notice or order, except as provided in Section 1-5.4 to follow. Upon receipt of such petition, the Administrative Agency shall set a time and place for such hearing and shall give the petitioner seven (7) working days written notice thereof. Upon request of the petitioner, and for good cause shown, the Commissioners may continue the hearing from its original setting.
- Section 1-5.3 REPORT OF HEARING:** Within three (3) working days after the hearing, the Hearing Officer shall prepare a written decision containing findings of fact. Said decision may reaffirm, in whole or in part, the corrective action specified in the notice provided in Section 1-5.1 or may set aside the same. The Board of Commissioners' decision shall be effective upon delivery of the same to the mailing address provided by the petitioner at the hearing. Any appeal from a finding and determination of the Commissioners shall be to the District Court.
- Section 1-5.4 EMERGENCY ORDERS:** Whenever the Administrative Agency finds that an emergency exists which requires immediate action to protect the public health, he/she may, without notice or hearing, issue an order reciting the existence of such an emergency and require that such action be taken as he/she may deem necessary to meet the emergency, including suspension of the permit. Notwithstanding any other provisions of this Code, such order shall be effective immediately and shall be enforceable in Linn County District Court.

CHAPTER 2 WASTEWATER AND DISPOSAL

Article 1 PURPOSE AND INTENT

Section 2-1.1 **PURPOSE AND INTENT OF CODE:** The provisions of this chapter are adopted for the purpose of regulating and controlling the location, construction, maintenance, and use of septic systems, holding tanks, wastewater stabilization ponds (lagoons), alternative wastewater systems, and privies, and the removal and disposal of materials from such systems in order to protect the health of the citizens and the environment of Linn County, Kansas.

Article 2 APPLICABILITY

Section 2-2.1 **APPLICABILITY:** Pursuant to K.S.A. 19-3706, the provisions of this chapter shall apply to all premises containing less than 640 acres under one ownership and located in the unincorporated land located in Linn County, Kansas.

Article 3 PROHIBITED PRACTICES

Section 2-3.1 **USE OF NON-APPROVED WASTEWATER SYSTEMS:** No person shall sell, use, lease, or rent for use any alternative wastewater system, septic system, holding tank, wastewater stabilization pond (lagoon), or privy:

- a. Until it has been inspected and approved by the Sanitation Inspector and a permit for use issued;
- b. That has been temporarily or permanently enjoined as a public health nuisance by a court of competent jurisdiction;
- c. That fails to comply with the provisions of this Sanitation Code, and written notice thereof has been given by the Sanitation Inspector to the owner or responsible person;
- d. That discharges treated wastes onto the surface of the ground into watercourses, lakes, ponds, or any impoundment; or
- e. That causes fly breeding, produces offensive odors or any other condition that is prejudicial to health and comfort.

Section 2-3.2 **USE OF PRIVATE SEWAGE DISPOSAL SYSTEM WITHIN 400 FEET OF PUBLIC WASTEWATER SYSTEMS (SEWER):** No alternative wastewater system, septic system, holding tank, wastewater stabilization pond (lagoon), or privy shall be constructed within 400 feet of an existing public sewer, unless the Sanitation Inspector finds that connection to such sewer is not feasible and that a wastewater system, meeting the requirements of this Code, can be constructed on the property.

- Section 2-3.3 **LOCATION OF PRIVATE SEWAGE DISPOSAL SYSTEM BELOW FULL FLOOD POOL:** No portion of an alternative wastewater system, septic system, holding tank, wastewater stabilization pond (lagoon), or privy shall be located below the full flood elevation of any federal reservoir or full pool elevations of any pond, lake, or water supply reservoir.
- Section 2-3.4 **LOCATION OF PRIVATE SEWAGE DISPOSAL SYSTEM WITHIN 100 FEET OF WELL:** No portion of an alternative wastewater system, septic system, holding tank, wastewater stabilization pond (lagoon), or privy shall be located less than 100 feet from a private water well or a pump suction line from a private water well, unless the wastewater line be of watertight construction. No wastewater line, regardless of construction, shall be located less than 10 feet from a private water well or a suction line from a private water well.
- Section 2-3.5 **CONNECTION TO NON-APPROVED PUBLIC WASTEWATER SYSTEM:** No premises shall be permitted to connect to any public wastewater system that does not hold a valid permit from KDHE as required in Section 2-4.2.
- Section 2-3.6 **APPROVAL OF PLATS:** No township or county planning commission or zoning board, authorized to review plats of subdivisions of land, shall recommend for approval any plat containing one or more lots or building sites having less than three (3) acres of land each, unless a public wastewater system is provided to serve all properties within the subdivision or a surety bond in an amount stipulated by the Board of County Commissioners is filed with the County Treasurer to guarantee the installation of such public system.

Article 4 REQUIREMENTS FOR PUBLIC WASTEWATER SYSTEMS

- Section 2-4.1 **APPROVAL OF PLANS AND SPECIFICATIONS:** Plans and specifications for all public wastewater systems shall be submitted to and approved by the KDHE prior to starting any construction of such systems. Copies of such approved systems shall be filed with the Sanitation Department.
- Section 2-4.2 **PERMIT:** The owner of every public wastewater system shall obtain a permit for operation of the system from KDHE and no public wastewater system shall be operated or put in operation until the owner has obtained the required permit.
- Section 2-4.3 **RESPONSIBILITY OF OPERATION:** Responsibility for operation of all public wastewater systems must be vested in:
- a. A sewer district, improved district, or similar public agency authorized to operate public wastewater systems, or
 - b. A private corporation incorporated under Kansas laws and legally bound and authorized by a charter and bylaws to operate and maintain the public wastewater system until such time as the responsibility is transferred to a duly constituted public agency.

Article 5 REQUIREMENTS FOR ALTERNATIVE WASTEWATER SYSTEMS

- Section 2-5.1 **APPROVAL OF PLANS:** No person shall construct or permit to be constructed any alternative wastewater system until the plans and specifications for such system have been submitted to and approved by the Sanitation Inspector, who may require the system to be designed by a professional engineer and who may ask for review of the proposal by KDHE.
Additional monitoring and reporting requirements of alternative systems may be required by the Sanitation Inspector. (Single family lagoons are to be approved by the County Sanitation Inspector.)
- Section 2-5.2 **PERMIT:** No person shall use or permit to be used any alternative wastewater system until he/she has applied for and obtained a permit to use such system from the Administrative Agency.
- Section 2-5.3 **PROPER MAINTENANCE AND OPERATION:** All alternative wastewater systems shall be maintained in good working condition and shall not discharge onto the surface of the ground or drain into any stream or roadside ditch, produce offensive odors, or become a breeding place for flies, mosquitoes, or rats. Whenever the Sanitation Inspector shall find any alternative wastewater system malfunctioning and causing any of the above prohibited conditions, he/she shall order the owner and/or user to correct the condition within thirty (30) calendar days.

Article 6 REQUIREMENTS FOR SEPTIC SYSTEMS AND LATERAL FIELD INSTALLATION

- Section 2-6.1 **REQUIREMENTS:** No permit shall be issued in accordance with Section 2-3.1 until a suitable site has been approved by the Sanitation Inspector. No one shall occupy a residence until the Sanitation Inspector has approved the installed septic tank system. Before a permit shall be issued, the site must meet the following requirements:
- a. There must be a minimum of three (3) acres of ground, no more than one-half acre of which may be roads, streets, lakes, or waterways;
 - b. The natural slope of the land shall be such as to accommodate installation of a wastewater system as approved by the County Sanitation Inspector;
 - c. The septic tank shall have at least a 1000-gallon capacity or more (residential use) and be constructed of concrete. It shall be provided with a 20-inch manhole and a 4-inch stand pipe for use in transferring sewage out of the septic tank into the transport truck and also as a locator for the septic tank. Inlet and outlet baffles shall be required on all tanks to optimize settling and reduce the flow of solids to the lateral field. Inspection holes shall be required over the inlet and outlet for inspection of the baffles. There shall be six (6) inches of gravel bedding placed beneath the tank. The septic tank shall be set at least ten (10) feet from any house or structure, at least 100 feet from any public water supply, at least fifty (50) feet from any private water well, and at least twenty-five (25) feet from private water lines;
 - d. If a sequential lateral system is not used, another approved method of distributing the sewage flow must be provided. If a sequential lateral system is used, the overhead distribution line must be connected at the center of each lateral line, and at an elevation so the bottom of the overhead line is two (2) inches above the crushed rock in the lateral trench;

- e. Each lateral shall not exceed 100 feet in length from where it is fed. All pipe shall be four (4) inches in diameter. Most lots are not level; installation of laterals shall be along contour lines so that level trenches of uniform depth can be constructed. A trench bottom slope of less than four (4) inches per 100 feet will be acceptable. Filter fabric shall be used to cover lateral rock and a 16-inch depth of washed or clean lateral rock shall be required. The earth cover over the lateral rock shall be of uniform depth. Only 8-inch minimum to 18-inch maximum shall be acceptable for lateral cover. All lateral trenches shall be 24-inch minimum to 36-inch maximum width. Depth of trenches shall be a 24-inch minimum to a 36-inch maximum;
- f. The laterals shall be eight (8) feet or more apart; ten (10) feet from the house, septic tank, other buildings, property lines, driveways, private service lines, buried utility lines, foundation drains, and drop-offs, etc.; twenty-five (25) feet from basements, cellars, public water supply lines, house service lines, etc.; fifty (50) feet from cisterns, ponds, and creek banks; and 100 feet from the water wells. All sewage lateral pipe shall meet ASTM standards.
- g. All sewage must go into the septic tank, unless a variance is granted for a KDHE approved grey water system.
- h. The following criteria shall be used to determine the amount of lateral required:
 - 1) SINGLE FAMILY RESIDENCE: The minimum area for tracts of land provided with a septic tank absorption type system is three (3) acres. The septic tank size shall be based upon the number of bedrooms within the dwelling. The lateral field size shall be calculated based on the maximum wastewater loading rate for different soil types.
 - A. Two to three bedrooms: shall be 1,000 gallon size septic tank.
 - B. Four to five bedrooms: shall be 1,500 gallon size septic tank.

The size of the lateral field of perforated pipe shall be a minimum of 800 square feet. All lateral pipe in this lateral field shall be either capped or enjoined, and there shall be no open ended lateral pipe. A minimum of 100 linear or 200 square feet of lateral shall be required for each 1,000 gallons of water used per month.

- 2) COMMERCIAL SEPTIC SYSTEM: (1200-gallon concrete tank or more) Commercial septic systems shall be designed on loading and anticipated water usage and sewage produced. A minimum of 100 linear or 200 square feet of lateral shall be required for each 1,000 gallons of water used per month. A minimum of 1,200 square feet of lateral will be required. The size of commercial lateral field shall be determined by the County Sanitation Inspector.

All commercial food establishments must have a grease trap installed and approved by the County Sanitation Inspector.

- Section 2-6.2 **APPROVED PLANS:** A septic system shall not be constructed, reconstructed, or modified after the effective date of this Code without the plans for the same first having been submitted to and approved by the Sanitation Inspector. The plans shall include a drawing indicating the following: (See Appendix for example drawing.)
- a. Name, address, and phone number of the applicant/owner;
 - b. Location of building site, including legal description of property;
 - c. Size of house or building in square feet, number of bedrooms (for residential), locations of water-using appliances, and anticipated water usage;
 - d. Location of buildings, driveways, and other features near the proposed lateral field;
 - e. Location and type of water supply, and location of water service lines;
 - f. Layout of entire disposal system, tank, distribution box (if used), laterals and interconnecting lines;
 - g. A cross-section of lateral trench, with dimensions.
- Section 2-6.3 **APPROVAL OF CONSTRUCTION:** All septic systems constructed, reconstructed, or modified after the effective date of this Code must be inspected and approved by the Sanitation Inspector for compliance with the approved plans, and no portion of the system shall be covered or made inaccessible to inspection prior to approval.
- Section 2-6.4 **PRIOR NOTICES:** Every sanitation inspection shall be required to have a 24-hour notice prior to inspection.
- Section 2-6.5 **PROPER MAINTENANCE AND OPERATION:** All septic systems shall be maintained in good working condition and shall not discharge onto the surface of the ground or drain into any stream or roadside ditch, produce offensive odors, or become a breeding place for flies, mosquitoes, or rats. Whenever the Sanitation Inspector shall find any septic system malfunctioning and causing any of the above prohibited conditions, he/she shall order the owner and/or user to correct the condition within thirty (30) days.

Article 7 WASTEWATER STABILIZATION PONDS (LAGOONS)

- Section 2-7.1 **LAGOONS:** The use of individual waste stabilization ponds, usually referred to as "lagoons", will be considered only if the installation of a septic tank lateral field disposal system is not approved by the County Sanitation Inspector. The site, design, and construction shall be approved by the County Sanitation Inspector. Permits are required from the Linn County Administrative Agency.
- Section 2-7.2 **APPROVAL OF CONSTRUCTION:** KDHE recommended design standards on wastewater stabilization ponds shall be accepted by Linn County Sanitation. Construction design for "lagoons" will be supplied by the Administrative Agency upon approval of this type of system.
- Section 2-7.3 **PROPER MAINTENANCE:** Maintenance of a "lagoon" system is necessary for its proper operation. A list of maintenance requirements shall be supplied by the Sanitation Department for this system.

Article 8 WATERLESS TOILETS (SANITARY PRIVIES)

Section 2-8.1 The use of sanitary privies and other types of dry or chemical toilets will be allowed only as a temporary measure subject to the approval of the Linn County Sanitation Inspector. All other waterless toilets shall be prohibited.

Article 9 SEWAGE HOLDING TANKS

Section 2-9.1 SCOPE: For purposes of this Article, the term "holding tank" refers to a watertight receptacle to retain sewage on-site prior to removal from the site by a licensed Sanitary Disposal Contractor.

Section 2-9.2 AUTHORIZED USAGE: A holding tank may be used for the on-site retention of sewage for commercial or industrial uses, for RV parks, mobile home parks, or campgrounds where it has been determined that no other private sewage disposal system will work or is available.

Any holding tank which serves more than one (1) commercial or industrial use or more than one (1) RV, mobile home, cabin, or camp site shall be considered a public sewage disposal system and shall not be permitted under this Code.

Section 2-9.3 PERMIT REQUIRED: It shall be unlawful for any person, firm, or corporation to construct, perform any structurally significant alteration, convert, or use any holding tank without first obtaining a permit from the Administrative Agency. Said permit application must include evidence of a service contract with a licensed Sanitary Disposal Contractor prior to approval of a permit.

No permit shall be issued to any person, property, or establishment that does not comply with the specifications prescribed in this Article and all applicable terms, conditions, and requirements of this Code.

Permits for holding tanks are not transferable.

Section 2-9.4 GENERAL REQUIREMENTS: The system shall be designed to consist of a holding unit and required connection(s). The design of the system shall ensure that waste discharged into the system:

- a. Does not contaminate any groundwater or drinking water,
- b. Does not contaminate the waters of any stream,
- c. Is not a danger by being exposed or accessible to animals or children,
- d. Does not give rise to a nuisance due to odor or unsightly appearance

Section 2-9.5 SPECIFICATIONS: Any holding tank system authorized under this Article shall be designed, constructed, and operated to comply with specifications deemed necessary and advisable by the Administrative Agency, including the minimum requirements specified in this Section.

- a. Capacity: Tanks serving commercial or industrial establishments shall have a minimum five (5) day holding capacity, but not less than 2,500 gallons. Tanks serving non-commercial or industrial uses shall have a minimum seven (7) day capacity, but not less than 1,500 gallons.
- b. Site Location: Tanks shall be located at least ten (10) feet from any part of a building. Holding tanks shall be located with access to an all-weather road or drive to provide access for pumping equipment.
- c. Warning Device: A high water warning device shall be installed so that it activates one (1) foot below the inlet pipe. This device shall be either an audible or an illuminated alarm.
- d. Access Opening: Each tank shall have an access manhole with a minimum twenty (20) inch diameter opening.

Section 2-9.6 OTHERS: Cesspools and seepage pits shall be prohibited for new or permanent installations. However, portable holding tanks serving camping, recreational vehicles, and boats are acceptable as long as there is access to a dumping station. Portable toilets equipped with holding or storage tanks, chemical or otherwise, shall be prohibited except on a temporary basis as determined acceptable by the Linn County Administrative Agency.

Article 10 SANITARY SERVICES

Section 2-10.1 LICENSE REQUIRED: No person shall remove, haul, or transport, or offer to remove, haul, or transport, any domestic wastes, industrial or commercial wastes, or human excreta from any alternative wastewater system, septic system, or privy without a valid license from the Administrative Agency. A valid sanitary service license issued to a sole proprietor, a partnership, or a corporation shall be valid to all its agents and employees.

Section 2-10.2 MINIMUM STANDARDS FOR SANITARY SERVICE VEHICLES: All sanitary service vehicles used for rendering of sanitary service shall be of water-tight construction, maintained in good working condition, and provided with hoses, couplings, valves, pumps, and other necessary equipment to ensure that all material removed from the systems will be transported to a point of disposal approved by the Sanitation Inspector without spillage of the waste onto the road or street. All hoses and valves shall be capped or plugged. All equipment shall be in good workable condition, and the operator shall demonstrate that the equipment is in good operating condition and will perform its function without leakage or spillage.

Section 2-10.3 APPLICATION AND INSPECTION FEE: Every person wishing to obtain a sanitary service license shall make application for a license on forms provided by the Administrative Agency for this purpose and shall pay the inspection fees for sanitary service vehicles prescribed in Section 2-10.4 before filing the application with the Sanitation Department. A receipt showing such payment shall be attached to the application form. If the license is denied, no portion of the inspection fee will be refunded. A copy of a written contract between the applicant and a public wastewater system shall be attached to the application.

Section 2-10.4 **LICENSE AND INSPECTION FEES:** For the purpose of defraying all or part of the cost of administration of a sanitation code, fees shall be assessed for each inspection, permit, or license required pursuant to this Code, including the following:

- a. Licenses: Contractors doing any type of sanitation work in Linn County shall have a valid license. This license shall be renewed each year. Every contractor shall furnish evidence of either a cash bond or surety bond in an amount established by the County Commissioners to insure consumers against poor and careless workmanship.
- b. Inspections: A fee will be assessed for each inspection visit. Every sanitation vehicle must be inspected each year. The owner will pay an inspection fee according to the fee schedule established by the County Commissioners.

Article 11 UNLICENSED CONTRACTING PROHIBITED

Section 2-11.1 **PROHIBITED:** Any person responsible for hiring a contractor, for any type of sanitation work, shall not contract with any contractor that does not have a valid license with the Linn County Sanitation Department.

Article 12 WAIVER OF REQUIREMENTS

Section 2-12.1 **EXCEPTIONS:** Requests for exception to any of the foregoing rules and regulations set forth in this Code shall be submitted to the Sanitation Inspector in writing and shall contain all information relevant to the request, including why such exception(s) should be considered. The Sanitation Inspector may grant an exception when he/she determines that such waiver does not and will not impair the potability of the ground water or otherwise endanger the health and safety of the individuals involved and/or the general public. The Sanitation Inspector may, when necessary, obtain the written consent of KDHE prior to granting an exception. Appeal procedure found in Section 1-5.2 shall apply to this Section.

CHAPTER 3 WATER SUPPLIES

Article 1 PURPOSE AND INTENT

Section 3-1.1 **PURPOSE:** The provisions of this Chapter are for the purpose of regulating and controlling the development, maintenance, and use of private or nonpublic water supplies in the unincorporated areas of Linn County, Kansas, in order that public health will be protected and the contamination and pollution of the water resources of the County will be prevented.

Section 3-1.2 **APPLICABILITY:** This Chapter shall apply to all unincorporated land located in Linn County of less than 640 acres.

Article 2 COMPLIANCE REQUIRED

Section 3-2.1 After the effective date of this Code, no person shall construct on any property subject to the provisions of this Code, any nonpublic, or private water supply that does not comply with the requirements of this Code.

Article 3 DEFINITIONS

Section 3-3.1 In addition to the definitions provided in Chapter 1 of this Code, the words, terms, and phrases listed below, for purpose of this Chapter, are defined as follows:

- a. **DOMESTIC PURPOSE:** 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, for the irrigation of lands not exceeding a total of two acres in area for the growing of gardens, orchards, and lawns.
- b. **PUBLIC WATER SUPPLY WELL:** means a well that provides groundwater to the public for human consumption, if such system has at least ten (10) service connections or serves an average of at least twenty-five (25) individuals daily, at least sixty (60) days out of the year.
- c. **NONPUBLIC WATER SUPPLY:** A water supply that is used for domestic purposes serving two (2) to nine (9) residential units (rental or under separate ownership) on a piped system and serving less than twenty-five (25) persons a year.
- d. **PRIVATE WATER SUPPLY:** A water supply used for domestic purposes which serves, or will serve, not more than one (1) dwelling on a piped system.
- e. **WATER DISTRICT:** Any special district authorized and empowered by state statutes to plan, construct, and/or operate a public water supply system.
- f. **ABANDONED WATER WELL:** A well:
 1. Which has been permanently discontinued from use,
 2. From which the 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 possesses potential health and safety hazards.

- g. **TEST HOLE OR "HOLE"**: means any excavation constructed for the purposes of determining the geologic and hydrologic characteristics of underground formations.
- h. **TREATMENT**: shall be defined as the stimulation of production of groundwater from a water well, through 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 or water quality characteristics.
- i. **RECONSTRUCTED WATER WELL**: 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.
- j. **ACTIVE WELL**: A water well which is an operating well used to withdraw water, or monitor or observe groundwater conditions.
- k. **INACTIVE STATUS**: A water well which is not presently operating but is maintained in such a way it can be put back into operation with a minimum of effort.
- l. **GROUNDWATER**: That part of the subsurface water which is in the zone of saturation.
- m. **WATER WELL**: Any excavation that is drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed, when the intended use of such excavation is for the location, diversion, artificial recharge, or acquisition of groundwater.
- n. **CONSTRUCTION OF WATER WELL**: All acts necessary to obtain groundwater by any method for any use including, without limitation, the location of and excavation for the well.

Article 4 REQUIREMENTS FOR PUBLIC WATER SUPPLIES

- Section 3-4.1 **STATE PERMIT**: No person shall operate a public water supply without obtaining a permit from KDHE. A copy of the permit shall be filed with the County Sanitation Inspector.
- Section 3-4.2 **STATE APPROVED PLANS**: No person shall construct any public water supply on any property subject to the provisions of this Code until the plans and specifications have been submitted to and approved by KDHE. A copy of the approved plans and specifications shall be filed with the County Sanitation Inspector.

Article 5 REQUIREMENTS FOR NONPUBLIC WATER SUPPLIES

- Section 3-5.1 No person shall operate or maintain a nonpublic water supply system that has been:
 - a. Constructed or reconstructed after the effective date of this Code, until it has been inspected and a permit issued by the Sanitation Inspector.
 - b. Temporarily or permanently enjoined as a public health nuisance by a court of competent jurisdiction.
 - c. Found by the Sanitation Inspector not to comply with the provisions of this Code and a written notice thereof has been given to the owner or his/her agent.

Section 3-5.2 **USE OF A NONPUBLIC WATER SUPPLY:** In addition to the requirements of Article 6 of this Chapter, the following analyses shall be conducted by a KDHE Certified Laboratory and the results reviewed by the Administrative Agency prior to the issuance of a permit, to assure water quality for the public:

- a. An initial and at least annual Bacterial Analysis;
- b. A partial Chemical Analysis shall be done initially and every three (3) years thereafter;
- c. Other tests such as a screen for pesticides, volatile organic chemicals, and heavy metals shall be required when, at the discretion of the Sanitation Inspector, it is necessary to protect the public's health;

The water samples shall be collected by the Sanitation Inspector and sent to a KDHE certified laboratory for analysis. All costs incurred shall be paid for by the well owner.

The owner will be charged a fee for the investigation and cost of analysis. This fee is the responsibility of the owner of the water supply or his representative and is to be paid to the Linn County Sanitation Department.

Article 6 REQUIREMENT FOR PRIVATE WATER SUPPLY

Section 3-6.1 **PERMIT:** No person shall drill, develop, or construct any private water supply well on any premises subject to the regulations of this Code until he/she has obtained a permit from the Administrative Agency.

Section 3-6.2 **APPROVED PLANS:** No permit to construct or develop a private water supply on premises subject to the regulations of this Code shall be issued until the plan showing the location and construction of the supply has been approved by the Sanitation Inspector.

Section 3-6.3 **USE LIMITATION:** No use of surface water (lakes, ponds, or streams) as a source of water for private water supply shall be permitted:

- a. Where a satisfactory ground water source is available;
- b. Where adequate treatment is not provided (in no case shall surface water be used without filtration and chlorination);
- c. Where the pond or lake receives any drainage or discharge from septic tanks or sewage treatment plants.

Article 7 MINIMUM STANDARDS FOR ALL GROUNDWATER SUPPLIES

- Section 3-7.1 **LOCATION:** The horizontal distance between the well and the potential sources of pollution or contamination, such as septic tanks, lateral fields, pit privy, seepage pits, fuel or fertilizer storage, pesticide storage, feed lots, or barnyards shall be 100 feet or more.

- Section 3-7.2 **CONSTRUCTION:** All wells that are to serve as a source of private or nonpublic water shall be constructed in accordance with all Kansas State Administrative Regulations.

- Section 3-7.3 **PLUGGING OF ABANDONED WELLS AND TEST HOLES:** All water wells abandoned by the well owner 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.

- Section 3-7.4 **POLLUTION SOURCES:** Well locations shall be approved by the Sanitation Inspector with respect to distances from pollution sources and compliance with wastewater and disposal regulations.

- Section 3-7.5 **WATER WELL DISINFECTION FOR WELLS USED FOR HUMAN CONSUMPTION:** Disinfection standards set forth in K.A.R. 28-30-10 are hereby adopted by Linn County and shall apply to all water wells used for public consumption or food processing.

- Section 3-7.6 **WAIVER OF REQUIREMENTS:** Requests for exception to any of the foregoing rules and regulations set forth in Chapter 3 shall be submitted to the Sanitation Inspector in writing and shall contain all information relevant to the request, including why such exception(s) should be considered. The Sanitation Inspector may grant an exception 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; provided, however, no such exception shall be granted without the prior written consent of KDHE.

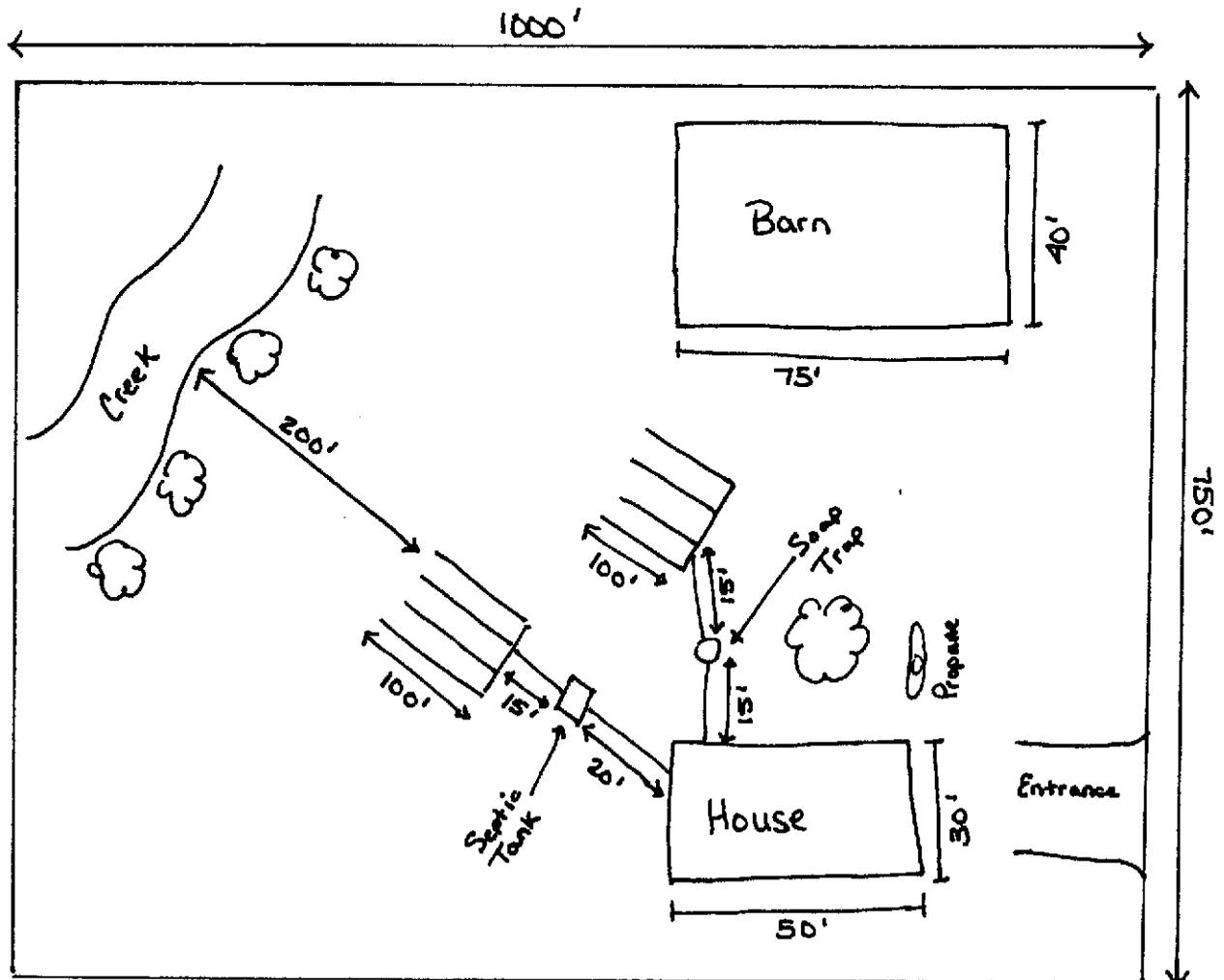
APPENDIX

**SAMPLE OF AN ACCEPTABLE DRAWING/SKETCH
TO ACCOMPANY PERMIT APPLICATION**

John & Jane Doe
12345 W 3000 Rd
Anytown, KS 66000
(913) 555-1212

House = 1500 ft²
2 Bedroom, 3 occupants

Legal Description:
SW 1/4 of NE 1/4
Section 99 Township 33 Range 88



BEFORE THE BOARD OF COUNTY COMMISSIONERS
of
LINN COUNTY, KANSAS

RESOLUTION NO. 2015-11

A RESOLUTION ADOPTING THE SANITATION CODE OF LINN COUNTY, KANSAS, PROVIDING FOR RULES AND REGULATIONS FOR SANITATION PRACTICES TO MINIMIZE HEALTH AND SAFETY HAZARDS IN THE UNINCORPORATED AREAS OF LINN COUNTY, KANSAS

WHEREAS, the Board of County Commissioners finds that provisions for adequate and reasonable control over the environmental conditions in the unincorporated areas of the County are necessary and desirable in the interest of public health and safety and the orderly development of land and water resources;

Now therefore, be it resolved by the Board of County Commissioners of Linn County, Kansas:

1. The new Sanitation Code of Linn County, Kansas, is hereby adopted under the authority granted to the Board of County Commissioners pursuant to K.S.A. 19-3701 through 19-3709 as amended.
2. This Code was prepared in book form by the Board of Commissioners of Linn County, Kansas, following a public hearing as required by state law, and it is hereby declared to be approved and incorporated by reference as if fully set out herein.
3. Not less than three (3) copies of the Sanitation Code of Linn County, Kansas, marked, "Official Copy as Incorporated by Resolution Number 2015-11" and to which there shall be attached a published copy of this Resolution, shall be filed with the County Clerk to be open for inspection and available to the public at all reasonable hours.
4. Pursuant to K.S.A. 19-3707, violation of any provision of the Sanitation Code of Linn County, Kansas, shall be deemed a misdemeanor, and any person, firm association, partnership, or corporation convicted thereof shall be punished by a fine not to exceed \$200.00 and that each days violation shall constitute a separate offense. The Governing Body shall further have the authority to maintain suite or actions in any court of competent jurisdiction for the purpose of enforcing any provisions of these regulations and to abate nuisances maintained in violation thereof; and, in addition to other remedies, institute injunction, mandamus, or other appropriate action or proceeding to prevent unlawful construction, erection, reconstruction, alteration, conversion, maintenance, or use, or the correct or abate such violation, or to prevent the occupancy of any building, structure, or land.
5. Any provision of this Resolution which shall be declared invalid shall not affect the validity and authority of any other sections.

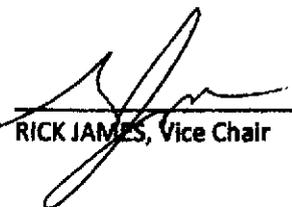
6. Previous resolutions and any parts of resolutions in conflict with this Resolution are hereby repealed.
7. This Resolution shall be in full force and effect from and after its publication once in the official county newspaper.

This Resolution is passed and approved by the Board of County Commissioners of Linn County, Kansas, this 11th day of May, 2015.

BOARD OF COMMISSIONERS
LINN COUNTY, KANSAS



MIKE PAGE, Chair

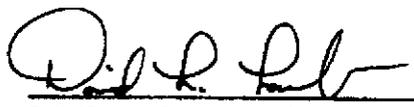


RICK JAMES, Vice Chair



VICKI LEONARD, Member





DAVID LAMB, County Clerk

Chapter IX

WASTEWATER POND (LAGOON)

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EDITORIAL COMMENTS

This chapter needs to be revised to in order to be good guidance for sizing and constructing small domestic lagoons. Shortcomings that need to be addressed include:

1. Procedure for sizing lagoons based on average flow rather than peak flow as used for underground wastewater systems. When flow is based on 75 gallons per person per day (gpcd), lagoons are often been oversized. Homes rarely have two people per bedroom for extended times. Flow per person decreases the more people there are in a home, thus with more than 6 people the flow is typically under 50 gpcd.
2. Discuss essential factors to achieve lagoons that maintain water levels of 3 to 5 feet depth including: wastewater flow, construction, compaction, and management.
3. Discuss design and construction practices that give substantially less seepage loss than 1/4 inch per day (maximum specified by KDHE). Preferably seepage should be no more than 1/8 inch per day. The protocol addresses repairing a leaky lagoon but a comparable discussion about constructing a lagoon so it does not leak too much is needed.
4. Expand guidelines for maintenance needs including suggested times for specific tasks.
5. Recommended controls of troublesome weeds including duck weed and other floating weeds and also cattails and other rooted weeds.
6. How to care for and manage the lagoon to minimize sludge accumulation and thus extend the time until sludge removal will be needed. Develop a protocol for evaluating sludge accumulation and guidance for removal of accumulated sludge.
7. Expand discussion about using a septic tank ahead of the lagoon; add advantages and limitations.
8. Incorporate the KDHE guidance materials regarding *Intermediate Lagoon Sizes* so this chapter seamlessly covers all lagoons up to average flows of 2500 gpd.
9. Things to be aware of and to look for that would indicate that the source includes other than domestic type flows.
10. Protocols and data forms should be formatted similar to those in other chapters.

INTRODUCTION

A septic tank followed by an in-ground soil absorption system is the preferred onsite wastewater treatment system when site and soil conditions are suitable. However, when the soil is too impermeable for an in-ground system and there is adequate area, a lagoon may be an option. Soils with high clay, poor drainage, seasonal perched water table, or platy, very weak, or massive structure are typically poorly suited to soil absorption but often well suited to lagoons.

Proliferation of single-family wastewater lagoons within subdivisions of many homes should be avoided when other options are available. Multiple lots in close proximity with soil poorly suited to traditional in-ground systems may be suitable to other wastewater treatment options. A cluster system consisting of collection, pretreatment, and soil dispersal on a dedicated site should be considered as discussed in *Assessing Wastewater Options for Small Communities* (1999).

This chapter of the Environmental Health Handbook has been prepared to provide guidelines for the design, construction, operation, maintenance, and repair of small (less than 2500 gallons per day) nondischarging wastewater lagoons. Guidelines in this chapter are intended primarily for private wastewater facilities for individual homes. However, guidance for wastewater treatment lagoons may be adapted to serve schools, institutions, and businesses such as motels, restaurants, camps, and mobile-home parks that have domestic type wastewater.

Any system receiving industrial wastewater including shop floor drains, must to be referred to the Kansas Department of Health and Environment. Guidance provided here must be considered to be in development, thus, the user needs to search out the most current guidance.

KDHE AND LOCAL JURISDICTION RESPONSIBILITIES

The Kansas Department of Health and Environment has defined their responsibility for permitting wastewater lagoon systems which:

- 11) Discharge to the surface.
- 12) Receive more than 2500 gallons per day.
- 13) Receive any amount of industrial wastewater discharge.
- 14) Serve wastewater systems owned by local government or other public entity.

Authority to regulate wastewater lagoons is granted to local government under K.S.A. 19-3701 et seq.; K.S.A. 19-101a; K.S.A. 12-3302 or 3303; and K.A.R. 24-5-6. Local governments may regulate wastewater treatment lagoons if all conditions specified in paragraphs 1 through 3 shown below are satisfied.

1. Local governments, which have a KDHE approved sanitary code, have authority and may regulate small wastewater lagoons which receive domestic wastewater. Domestic sewage consists of wastewater originating primarily from kitchen, bathroom and laundry sources, including waste from food preparation, dishwashing, garbage-grinding, toilets, baths, showers, laundry, and sinks.
2. Local governments may regulate wastewater lagoons to which less than 2500 gallons per day (gpd) of domestic type sewage is discharged. Wastewater lagoons receiving more than 2500 gpd of sewage (daily average) generally must obtain a permit from the Kansas Department of Health and Environment.
3. All discharging lagoons require a permit from KDHE. Local governments may regulate only nondischarging lagoons.

If the local authority chooses to exercise the option to permit and regulate the lagoon, local authority will approve plans, conduct inspections during construction, conduct periodic inspections of the property, and take enforcement action when necessary to maintain compliance with local government requirements for wastewater lagoons regulated by that local authority. The Bureau of Water will provide technical materials and other information as available to help support local government. The KDHE District Offices will provide assistance and advice, including onsite training in inspection techniques or backup inspections, as requested by the local entity. If the local unit of government objects to the proposed project, it should state the objections in writing to both the owner and KDHE to assure intergovernmental coordination.

The local authority should also inform the customer that if a city or regional wastewater collection system becomes available, within 400 to 1500 feet of the location, the local authority and/or KDHE may require connection to the central collection system and proper abandonment of the local wastewater treatment system.

If the local authority desires assistance from the Kansas Department of Health and Environment, the local authority should initially contact the appropriate District Office (District Environmental Administrator, District LEPP or District water program staff) or the Topeka LEPP program staff person.

If the local unit of government does not object to the proposed project but does not choose to exercise the option to permit and regulate the lagoon, they must refer the owner to the appropriate KDHE District Office and notify the district office. KDHE will inform the owner that the local authority has chosen not to accept local regulatory authority for the wastewater system (or for this particular lagoon, whichever is the case), and therefore, the customer is subject to state regulation. The District Environmental Administrator (DEA) or designated District staff will take appropriate action. State law requires:

- a. Wastewater treatment facility plans and specifications prepared by a Kansas licensed engineer.
- b. Payment of an annual wastewater permit fee. The first year's annual fee is due with the plans and specifications.
- c. Operation of wastewater treatment facility by a trained and KDHE certified operator. This requires application for and passing of a certification examination, periodic continuing education, and payment of a bi-annual fee to maintain the operator certificate.

If a state permit is issued, the appropriate KDHE, District Office water program personnel shall:

- a. Conduct the appropriate site inspection and provide a written report for both the Topeka and the District office files.
- b. Provide review of plans and specifications and technical assistance for the owner as needed.
- c. Develop the draft permit and submit the draft permit to KDHE/BOW/TSS.
- d. Provide other assistance as needed to issue and support the permit, including inspection of the lagoon during and immediately after construction and follow-up inspections as needed to assure compliance with the permit and Kansas law.

The Bureau of Water shall:

- a. Provide a standard format for permits to be developed by the District offices.
- b. Give public notice of the draft permit application.
- c. Assist the District Office with resolution of public notice comments.
- d. Provide notice to the Permittee of the requirement to apply for annual permit renewal.
- e. Collect the annual wastewater permit fee and issue the permits.

CONSIDERATIONS FOR LAGOON SITING

Due to space requirements and access for maintenance and repair, many factors must be considered in deciding on a lagoon for sewage treatment. These factors include:

- 1) Adequate space - the foot print area required by a lagoon may be 10,000 square feet or more, for an individual home and potentially larger for a business. In addition to the initial lagoon location, planning for a replacement must also be considered.
- 2) Separation and setback - distances from property lines, wells, surface water and drainage, easements, buildings, and flood plain are determined by local code and state minimum standards. See Table IV-7 in Chapter IV for minimum required and recommended setback.
- 3) Separation of tall vegetation - the site should have adequate separation distances from trees and other vegetation which could impair functioning, especially shading, air flow restriction, and leaf drop.
- 4) Ease of maintenance - routine care of berms, fences, and vegetation is required on a regular schedule.
- 5) Site conditions - slope of land and restrictive soil conditions within 5 feet of the ground surface. A high water table or a saturated zone near ground surface may prohibit a lagoon.
- 6) Adequate area - a minimum lot size of 3 to 5 acres is typically needed to accommodate a private well and lagoon with all of the required setback and/or appropriate separation distances.

SITE EVALUATION

See Chapter IV of this handbook for additional discussion about site and soil evaluation. Conducting a proper site evaluation for a lagoon includes the following specific steps:

- 1) Determine the appropriate local agency responsible for facility permitting. In most cases this would be the sanitarian in the local health department or planning and zoning office.
- 2) Conduct a preliminary site evaluation to select the most suitable location. See Protocol, Site Evaluation for Onsite Wastewater Systems in Chapter IV. Note all conditions which could adversely affect location and construction, such as private or public water wells or pipelines, sandy or rocky soil, utilities, easements, property lines, topography, and geology. Utilize all available site-specific information, such as site history, soil profiles, and county soil survey book available from the local USDA, NRCS office.
- 3) Evaluate the potential effects of unexpected overflow or release and resultant contamination to surrounding property and environment.
- 4) Based on soil profile evaluation obtain the estimated design loading rate (DLR) using Table IV-4 in Chapter IV. Soil textures and structures with no suitable DLR are frequently acceptable for a wastewater lagoon with adequate compaction. Fine textured soils with a DLR of 0.2 gallons per day, especially in eastern Kansas, may be suitable for lagoons.

- 5) Compare the results with the permeability of the soil on the site in the SCS/NRCS county soil survey to see if there is general agreement. Large discrepancies in results should be reconciled by further testing done by someone experienced with soil texture, structure, and permeability.

A lagoon location that is down slope and down wind from the source is preferred so sewage will flow by gravity at the correct slope. The site should be downwind of the residence or facility to minimize possible nuisance conditions and such as odor, in Kansas usually to the east or northeast. Only rarely do objectionable odors occur from a properly operated and maintained lagoon. However, odors may be noticed for a brief period in the spring or fall when a stratified lagoon turns over or when there are several consecutive overcast days.

Separation distances from surface water, wells, property lines, and public water lines must be in compliance with local codes and/or KDHE Bulletin 4-2 or Chapter IV, Table IV-7 in this handbook. The site for a lagoon should be 100 feet or more from the house and property boundaries, 50 feet from any surface water, 30 feet from potable water lines, outside areas subject to flooding or the 100 year flood plain, and away from utility easements.

A detailed site plan showing all physical features, surface and buried, and contour elevations will be a great help to locate and design a wastewater lagoon. The bottom of the lagoon should be at least 4 feet above highest groundwater level or other limiting condition.

To assure adequate drainage and to avoid the risk of a backup in the residence or facility, the top of a lagoon berm should be below the lowest drain or clean out.

Sometimes the lagoon must be located upgrade from the house which necessitates a pump tank and pump. Pumps are subject to failure, require maintenance, and will increase costs. When pumping is required, it is advisable to add a septic tank and use an effluent pump. To assure good hydraulic operation have the system designed by an experienced person. Adherence to hydraulic principals including pump selection and backflow prevention from the lagoon are essential.

When the site evaluation indicates a lagoon is the most appropriate and acceptable option, sizing, design, specifications, and construction plans are the next step.

SIZING THE LAGOON

The primary objectives of sizing the lagoon is to provide adequate depth, wastewater treatment and prevent overflow. Optimum lagoon water depth is 5 feet measured from the bottom of the lagoon to the water surface. Satisfactory operation occurs with water depths of 3 to 5 feet. Water level may drop as low as 2½ feet for short periods without adversely affecting the lagoon's operation. However, sunlight may penetrate a shallower depth and plant growth across the lagoon bottom with depths less than 2½ feet will impair a lagoon's operation. Additional water should be added to maintain at least 3 feet of depth at all times.

Estimating wastewater retention in a lagoon is achieved by identifying the amount of wastewater flow minus the net water loss. Water loss occurs through evaporation and seepage.

Evaporation plus seepage can range up to 14 feet annual loss in southwestern Kansas to 10 feet or less in eastern Kansas. Seepage varies with the soil and compaction from very low to the maximum allowable of 0.25 inches per day (few inches to 7.6 feet per year). Precipitation and evaporation data is collected **only** at certain sites across the state and has been extrapolated to include areas where data were not available.

Wastewater flow for sizing a lagoon is based on average flow rather than peak flow that is used for sizing an inground wastewater system. Lagoons easily handle temporary high flows with a rise in water level which results in an increase in losses. Conversely, inground systems must be able to handle these peak flows to avoid a malfunction or failure.

Actual water records, when available, are a preferable source of determining expected average flow. Factors to consider when estimating wastewater flow to size lagoon:

- 1) Wastewater design flows are based on average number of persons expected to reside in the house. This is certainly less than full occupancy of 2 persons per number of bedrooms. Use a wastewater flow rate of typically 40 to 50 gallons per person per day. Use 2 to 5 person average occupancy for a 3 bedroom house with corresponding flows of 125 to 250 gpd.
- 2) Assess lifestyle factors for a deviation above or below the average wastewater flow. For example, a couple living in a 4-bedroom home might better utilize a lagoon dug deeper to a smaller base, requiring less water to maintain adequate depth. If needed later, a second cell could be added that would achieve maximum capacity sizing. An overflow pipe between the two cells that maintained 5 feet of water in the first cell before overflowing into the second cell could be used. Ideally water in the first cell should rise to 5 feet deep and be drawn down to no less than 3 feet deep.
- 3) Additional water may need to be added especially during dry periods. Ways to do this are from roof guttering and downspouts or sump pump that includes or diverts drainage, or the household water supply, especially from a private well.
- 4) Avoid discharging large doses of chemicals to a lagoon to protect its chemical balance. Large doses of disinfectants as from well shock chlorination and possibly swimming pools or hot tubs and some other chemicals can upset the lagoon's biological balance.

Table IX-1 lists guidelines for three household sizes and three locations in Kansas. Experience and advice from agencies and contractors will help determine the most suitable size. Table IX-1 shows the side length for square lagoons and diameter for round lagoons. Other shapes may be used but length should not exceed twice the width.

The findings of site investigation and pertinent preliminary information should be reviewed with both parties. An original and at least two sets of construction plans and specifications should be prepared. The contractor and home owner should receive the copies and the original should be retained in the office permit files.

Applicants need to be informed that single-family wastewater lagoons are to be constructed, operated, and maintained according to county or city/county requirements. Failure to do so can

result in a declaration of a public health nuisance by the local board of health (KSA 65-159) and prosecution by the county attorney (KSA 65-160).

Additionally, applicants should be informed that if a central collection system becomes available, within 1500 feet of the property, the connection to the central collection system may be required, as defined by county code. If connection occurs, proper abandonment of the wastewater lagoon must occur.

Table IX-1. Recommended sizes for square and round wastewater lagoons.

	Square - side length ft ^a	Round diameter ft ^a	Surface area square feet ^a	Volume 1000s gal ^a	Minimum flow per month ^b
Western					
<i>Small</i>	35	40	1,225	18	4
<i>Medium</i>	40	45	1600	26	5.5
<i>Large</i>	45	51	2025	32	7
East Central					
<i>Small</i>	40	45	1600	26	4
<i>Medium</i>	45	51	2025	32	5
<i>Large</i>	50	56	2500	43	6
Eastern					
<i>Small</i>	45	51	2025	32	3
<i>Medium</i>	50	56	2500	43	4
<i>Large</i>	55	62	3025	56	5

These sizings are based on an assumed 1/4 in/day seepage loss

Small = 3 or less people; Medium = 3-5 people; Large = 6 or more;

^a *contents at 5 ft depth;*

^b *minimum flow (1000 gallons/month) to maintain a 3 ft depth*

LAGOON DESIGN DATA

All city and county code requirements shall be met prior to construction. Construction of a wastewater lagoon may be considered if the soil properties at the bottom of the lagoon are satisfactory as indicated by slow percolation rates, minimal porosity and fine soil texture. Soil profiles can be used to determine texture, giving percentages of sand, silt, and clay. A soil profile evaluation is recommended because permeability rates obtained from a perc test varies in

accuracy depending on soil moisture content at the time of testing. In the absence of a soil profile evaluation a permeability rate of less than an inch per hour indicated by a perc test may be a good indicator for a suitable lagoon site.

Separation Distance Requirements: These measurements are from the inside of the berm at the 5 feet operational water level as measured vertically from the bottom of the lagoon.

- 1) A minimum of 50 feet (200 ft recommended) from property boundaries. Some times adjacent property owners are willing to agree to a legal easement in which a wastewater lagoon may be constructed closer than 50 feet. An adjacent property owner needs to be made aware that construction of a well requires a 100 foot distance from a wastewater lagoon. If a legal easement is obtained, a wastewater lagoon may be constructed closer than 50 feet from adjacent property. Legal easements must be filed with the register of deeds to protect the interests of all present or future parties.
- 2) Public roadways (total right-of-way), may be considered part of the separation distance; however, no part of a wastewater lagoon may be placed on a public access or utility easement.
- 3) Potable water supply or suction line must be 100 feet from the lagoon's operational water level.
- 4) Pressurized water-supply lines, public or private, must be separated by at least 25 feet separation from the lagoon operational water level. Lagoon berm may under NO circumstances infringe on easement for a water supply. At the time of this writing, DIG SAFE does not check for Rural Water District lines; always contact rural water districts in the area before beginning construction.

PRETREATMENT OPTIONS FOR LAGOONS

In most cases a lagoon will work fine with no pretreatment of normal household wastewater before it enters the lagoon. The ideal sewer grade is 1/8 to 1/4 inch of drop per foot of sewer pipe or 1 to 2 percent grade of the sewer line. Slopes substantially greater or flatter than this can lead to problems of solids separation from the wastewater. A septic tank can be added ahead of the lagoon to remove solids and reduce the problems resulting from a substantially flatter or greater grade on the line leading to the lagoon. A septic tank has the advantages of: removing solids (this expands the range of suitable sewer grade slope), reduces organic load (aids lagoon function), minimize the chances of odor as long as discharge line is under water surface, and reduces rate of solids accumulation.

A lagoon can serve as a soil dispersal unit for a site with very limiting soil conditions. The design for the lagoon can be modified depending on the use and purpose it serves. The size of the lagoon can be minimized and compaction could be reduced or eliminated if wastewater entering the lagoon is more highly treated such as from an enhanced treatment component. However, enhanced pretreated effluent is still sewage and because of bacteria and safety the lagoon should still be fenced.

GUIDELINES FOR DESIGNING AND CONSTRUCTING LAGOONS

- 1) **Rock or porous strata.** Excavation that penetrates or terminates in rock or porous strata should be over excavated a minimum depth of 2 feet on both the side slopes and bottom. The entire excavation area must be filled with non-permeable earthen material to limit seepage from the lagoon to a maximum value of 1/4 inch per day (0.01 inch per hour). Use high clay subsoil that is free of rocks or fill soil that is mixed with bentonite clay and applied at the manufacturer's recommended rate and then compacted may also be used.
- 2) **Compact to avoid excessive water loss.** Compaction is essential to achieve consistency in low water loss from lagoons. A sheepsfoot roller compacted lining of at least 3 – 8 inch lifts to make a lining of at least 1½ feet thick is strongly recommended.
- 3) **Prevent surface water entry.** Divert surface runoff to prevent sediment entry and lagoon overflow/overflow. Construct the berm above the surrounding soil level or make an interception terrace (trench and ridge) to carry runoff away from the upslope side to accomplish this.
- 4) **Prevent berm erosion with vegetation.** Following final grading establish a perennial or temporary annual groundcover on the berm, as soon as feasible, and mulching until vegetation is established helps prevent erosion.
- 5) **Assure adequate air flow and avoid shading.** Sunlight and air circulation over the lagoon are essential for good lagoon operation. Trees need to be located at least 30 feet outside the embankment and shrubs should be at least 15 feet outside the embankment. Because sunlight is essential for algae to produce oxygen, a lagoons east, south, and west sides should not be shaded. It is recommended that no plants grow taller than a 22 degree angle (approximately 2½ horizontal to 1 vertical ratio) from the top outer edge of the berm.
- 6) **Fence for human and animal safety.** These lagoons contain raw sewage that can easily spread disease. If unfenced, these lagoons create both a hazard and liability, especially with drowning the second leading cause of accidental death in children. State and county codes require that all wastewater lagoons be fenced. Fencing needs to be located 3 feet outside the berm toe. A 4-foot wide rigid-frame, hinged gate can allow easy access to mowing equipment. Gating must provide the same degree of resistance to entry as fencing, and requires a padlock. Fencing diagrams are located in Figures IX-1, IX-2, IX-3, IX-4, and IX-5.

Specification for lagoon fence

- a. Height: 4 feet minimum. If fence will also be accessible to livestock, a double strand of barbed wire placed above the fence top or an electrical fence placed outside the inner fence may also be installed.
- b. Size: 12.5 gauge wire.
- c. Open space: 8 square inches or smaller. Example 2" x 4"
- d. Warning signs. A sign stating WASTEWATER TREATMENT Lagoon or RAW SEWAGE, KEEP OUT, shall be posted on the gate or fence adjacent to the gate.

CONSTRUCTION

- 1) **Soil condition.** Soil that is moist enough to compact into a firm ball is most suitable. Muddy soil is not only difficult to work, but also forms clods that can be difficult to smooth out. Soil that is too dry for compaction into a firm ball can have moisture added.

Top soil needs to be removed and stockpiled for later use on the berm. Once the lagoon construction is completed, the top soil may then be placed on the berm surface to support groundcover growth. **Berm compaction needs to be done in layers**, preferably by sheepsfoot roller, rather than by machine traffic or other provision. This practice is critical if the soil is borderline acceptable for a wastewater lagoon. Fill layers shall be no more than 6 inches thick.

- 2) **Lagoon Depth.** Lagoons are normally excavated to a depth no greater than 8 feet below the surface of the surrounding ground. Greater depth may contribute to problems of inadequate sunlight and/or air transfer. Surfaces of the berm and lagoon bottom, shall have uniform slope. They need to be free of rocks, debris, ruts, and ridges. When rock is encountered in excavation, the hole must be over excavated by at least 2 feet to remove rock, then filled and compacted with at least 2 feet of clay material.
- 3) **Berms.** Wastewater lagoons shall be completely enclosed by berms which shall be 3 feet higher than the surface of the surrounding ground. Both the interior and exterior slope shall be at no less than 3 feet of lateral movement for each foot of vertical drop; 3.5 ft is better when space allows.
- 4) **Linings.** Where soil percolation rates exceed 1 inch fall per hour, the bottom and interior sides of the wastewater lagoon need to be lined with a compacted clay of sufficient thickness to reduce the soil absorption rate to 1/4 inch per day or less. See compacted lining guidelines at the end of this chapter. Refer to manufacturer's recommended rate when using bentonite clay, asphalt cement, or membrane application.
- 5) **Sewage Inflow.** Pipe carrying wastewater from the house to the lagoon must be at least 4 inches in diameter. Schedule 40 thermoplastic sewer pipe with solvent welded joints is recommended. Slope can vary between 1/8 and 3/8 inch per foot. A 1/4 inch slope per foot or 2 foot slope per 100 feet, is recommended to avoid solids accumulation in the line. Pipe entry needs to be located below the water surface and extend nearly to the lagoon center, ideally located at 18 to 20 inches off the bottom. Beneath the pipe ending, a concrete pad of 2 feet x 2 feet x 4 inch thickness, placed at the lagoon center bottom, can protect the lagoon lining from effluent damage. Supporting the end pipe can be done by anchoring it above concrete blocks with posts and/or steel support.
- 6) **Monitoring lagoon-water depth.** A post with markings, located near the center is recommended for ease in observation of water depth.
- 7) **At least two cleanouts need to be installed.** One located near the outside of the house and the second one near the lagoon where the ground surface is approximately 6 inches higher

than the berm, are favorable locations. Additional cleanouts are recommended with any change in pipe direction or distance of greater than 100 feet. A Tee or Y design may be used. However, a Y shaped design allows easier access, and double cleanouts allow for easier cleaning in both directions.

- 8) **Top Soil Replacement to Berm.** Application of topsoil is for the purpose of supporting groundcover growth. Reapplying topsoil by spreading in a loose manner is desirable, or if packed too firmly it can be tilled, prior to planting groundcover. Perennial groundcover, for preventing erosion, needs to be seeded as promptly as possible following construction. Natural Resources Conservation Service or Extension may provide recommendations for groundcover most suitable to one's specific location. Protective covering of straw or hay mulch may be beneficial in holding the soil and seeding during the process of establishing groundcover growth.
- 9) **Fencing Installation.** Fencing must be completed as soon as possible for public safety. Posts need to be placed 2½ to 3 feet deep and backfilled with tightly compacted soil. Placing cemented posts at a 2½ foot depth is an alternative option. Wire needs to be stretched tightly using a come along (wire stretcher), tractor, or other method.

INSPECTION

Sample inspection report forms are provided at the end of this chapter. These may serve as a guideline in addressing important points of an inspection.

OPERATION AND MAINTENANCE

- 1) **Groundcover establishment and maintenance.** All of the area bounded by the toe of the berms and within the fence shall have an ample stand of low-growing perennial groundcover. Once the groundcover is established, it needs to be regularly maintained during the growing season at a height of 6 inches or less. Under no circumstances shall trees or tall weeds be allowed to develop on the berm area. Near the lagoon edge, it is preferable to cut the vegetation shorter than 6 inches to prevent any drooping into the water. Ideally, grass clippings should be removed from the lagoon area. At a minimum, they must be directed away from the lagoon.
- 2) **Remove any trees and additional vegetation.** All trees, weeds, cattails, duckweed, and other undesirable vegetation need to be removed promptly with the first signs of their development in the water or along the berm. Removing weeds by hand before they become embedded and contribute to the lagoon's organic load is advisable. Excess vegetation can create additional problems, including a reduction of air flow, decreased evaporation, lagoon filling, shading, and less sunlight activity over the lagoon. Mosquito production is often directly proportional to the amount of such vegetation. Destruction of the lagoon's seal by root penetration can also occur. See protocol - Sealing a Leaking Lagoon at the end of this chapter.
- 3) **Herbicide use is best avoided.** Improper use can cause temporary system failure. If use becomes necessary, consult with the local county Extension office or environmental health

officer for the most recent product advice. Follow the manufacturer's label, and avoid spillage or drift that might cause chemical holes or kill groundcover on the berm.

- 4) **Maintain desirable water depth - as close as feasible to 5 foot.** A short-term depth of 2.5 feet during drought conditions is acceptable. Adequate treatment can become a problem if the depth becomes less than 2.5 feet. Therefore, a design of directing roof drains and/or sump pump wastewater to the lagoon as a temporary condition is desirable and must have a plan for rerouting the same wastewater elsewhere during prolonged periods of wet weather. Two feet of freeboard (berm height above the water surface) for water storage needs to be maintained to provide for times of exceptional storms. For emergency situations in which wastewater is encroaching on the freeboard and may overflow the lagoon, follow procedures in protocol Emergency Dewatering.
- 5) **Berm damage.** A certain amount of erosion will occur after first-time construction. Any damage incurred by reasons of weather, animal entry, or other means shall be repaired by shaping the area to the original plan and reestablishing perennial groundcover. Among the most common causes of damage are settling, erosion, and rodent burrowing.
- 6) **Evaluation of wastewater lagoon condition.** Proper operation of a wastewater lagoon can be evaluated by color, odor, and water testing. Generally, routine testing is beyond the ability of the owner or user. Thus, one must rely on appearance and odor for operation information. Table IX-2 gives a color interpretation guide. Lagoon color is directly related to pH and dissolved oxygen (DO).

Table IX-2. Visual Indicators of a Lagoon's Condition

COLOR	CONDITION	SYMPTOM OR CAUSE
Dark sparkling green	good	high pH and DO
Dull green to yellow	not as good	-pH and CO ₂ are dropping -blue-green type algae are becoming predominant
Gray to black	very bad	lagoon is septic with anaerobic conditions prevailing
Tan to brown	OK if . . . Not good if . . .	due to predominance of a type of brown algae (not found in Kansas) not good, if due to silt or bank erosion

Source: Stabilizing Lagoons - Operations Manual. Aug 1977, EPA Office of Water Program Operations, O-15

- 7) **Maintenance of essential lagoon features.** The fence, gate, vegetation height, and inlet pipe shall also be maintained in the condition called for in the original plans and specifications. Any diversions provided to keep surface runoff away shall be maintained in satisfactory condition and at sufficient height to protect the lagoon.
- 8) **Odors.** Properly operating lagoons rarely emit an odor. Odors may indicate that the lagoon is not functioning properly. Odors may be due to the following: a) sludge may be filling the lagoon; b) lagoon may be improperly sized; or c) overloaded. Odor that persists longer than two days, indicates an operational problem and the cause must be determined.

SLUDGE REMOVAL

Wastewater lagoons will begin to fill with silt, sludge, and organic debris after a period of extended use. Lack of maintenance will increase the rate of fill. Leaves, uncut grass, grass clippings, water fowl, animal burrowing, and livestock damage will accelerate the rate of filling occurring in the lagoon. Original lagoon volume must be maintained so that overflow does not occur.

Evidence of filling includes 1) Overflow; 2) Presence of cattails or other aquatic vegetation toward the center of the lagoon; 3) Overloaded condition indicated by heavy algae growth, dark lagoon water, decreased wave action, slow flowing toilets, and foul air odor; 4) Water level on the berm is near overflow condition during periods of normal rainfall.

Any of the above conditions, by themselves, may be attributed to inadequate lagoon sizing or unusually heavy or light wastewater flow. Dewatering may be necessary to determine the cause. Consulting the local environmental health officer for assistance in determining whether to clean and reconstruct, abandon, or initiate other corrective action, may be beneficial.

Procedure to clean and reconstruct the lagoon:

- 1) Regulating Authority shall be contacted for permit requirements or improvement requirements.
- 2) Lagoon dewatering must be accomplished with the greatest degree of environmental safety possible. Refer to protocol Emergency Dewatering Procedure.
- 3) Sludge may then be removed, utilizing a backhoe, bulldozer, or front-end loader in accordance with guidelines established by the local regulatory agency. The sludge can then be taken to a publicly owned wastewater treatment facility such as a landfill permitted and willing to accept sludge, or it can be tilled into farm land. If the sludge material is applied to farmland, it needs to be tilled into the soil as soon as possible (within 24 hours). (Refer to EPA 503 Regulations).
- 4) Clay or bentonite layers, or lining originally installed to control seepage losses need to be checked and restored. See protocol Sealing a Leaking Lagoon.

- 5) Inlet pipes and cleanouts need to be checked for proper functioning and repairs made if needed.
- 6) Berm restoration. Berm must be reshaped, packed and smoothed. Reseeding and restoring the fence to an approved condition, needs to be done.
- 7) Water level should be restored to a 2 ½ foot depth before the lagoon is returned to service.

LAGOON ABANDONMENT

Reasons for abandonment of a wastewater lagoon may include:

- 1) Public sewer available within a feasible property distance.
- 2) Lagoon will not retain wastewater.
- 3) Sludge level is at a depth that impairs proper functioning of the lagoon.
- 4) Local environmental health officer determines the system can not be made to function properly, cannot adequately protect health of property owner, health of the public, or the quality of state waters.

Abandoning a wastewater lagoon would normally entail: dewatering, sludge removal by a licensed septage hauler, and returning the land area to the contour it held prior to lagoon construction. Kansas Department of Health and Environment issues addendums as new laws and procedures are developed. Wastewater lagoons are subject to these additions. Current guideline procedures for abandoning a wastewater lagoon are:

- 1) Dewater according to the dewatering procedure.
- 2) Push berms in to fill lagoon. A slight elevation above the center is desirable to eliminate the possibility of an area holding water, once settling occurs.
- 3) Cover the area with topsoil and reseed with suitable groundcover.

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REFERENCES AND OTHER READING MATERIALS

The following publications are available from K-State Research and Extension, Distribution Center - 24 Umberger Hall, Manhattan, KS 66506 or local Extension office.

Aquatic Plants and Their Control, C-667, KSU Agricultural Experiment Station and Cooperative Extension Service, August 2005.

Reducing Pond Water Losses, R-15, December 1977, available from Ext Bio and Ag Engr, 147 Seaton Hall, Kansas State University, Manhattan, KS 66506.

Site and Soil Evaluation for Onsite Wastewater Systems, MF-2645, KSU Agricultural Experiment Station and Cooperative Extension Service, March 2004.

Wastewater Flow and Characteristics, Chapter 4, Section 2 of Environmental Health Handbook, 3rd Edition, KSU Agricultural Experiment Station and Cooperative Extension Service, October 2004.

Wastewater Pond Design and Construction, MF-1044, KSU Agricultural Experiment Station and Cooperative Extension Service, August 1998 (to be revised).

Wastewater Pond Operation, Maintenance and Repair, MF-2290, KSU Agricultural Experiment Station and Cooperative Extension Service, April 2005.

The following publications are available from other state Cooperative Extension in as indicated.

Individual Home Sewage Treatment Systems: Lagoons, AE 892, North Dakota State University, www.ag.ndsu.edu/pubs/ageng/structu/ae892-3.htm, February 1997.

Residential On-site Wastewater Treatment: Lagoon Design and Construction, G01-1441-A, NebGuide, U of Nebraska, Cooperative Extension, August 2004.

Residential Sewage Lagoon Systems: A Homeowner's Guide to Installation and Maintenance, WQ 402, U of Missouri, Extension, Columbia, MO, March 1997.

Reducing Pond Seepage, G1555, November 1997, MU Guide, available from Outreach and Extension, University of Missouri - Columbia, Agriculture Building, Columbia, MO, 65211, January 1998.

The following publications are available from the respective state environment agency as shown.

Assessing Wastewater Options for Small Communities in Kansas, Kansas Department of Health & Environment, K-State Research & Extension, Midwest Assistance Program, and Crawford County Health Department, on KDHE web site at http://www.kdheks.gov/nps/ww_options_manual/index.html, November 1999.

Lagoon Sewage Disposal Systems: It's Your On-site System, Operation and Maintenance Guide for Homeowners, Oklahoma Department of Environmental Quality, July 2003. www.deq.state.ok.us/ECLSnew/Fact%20Sheets%20ECLS/july03/Lagoon.pdf

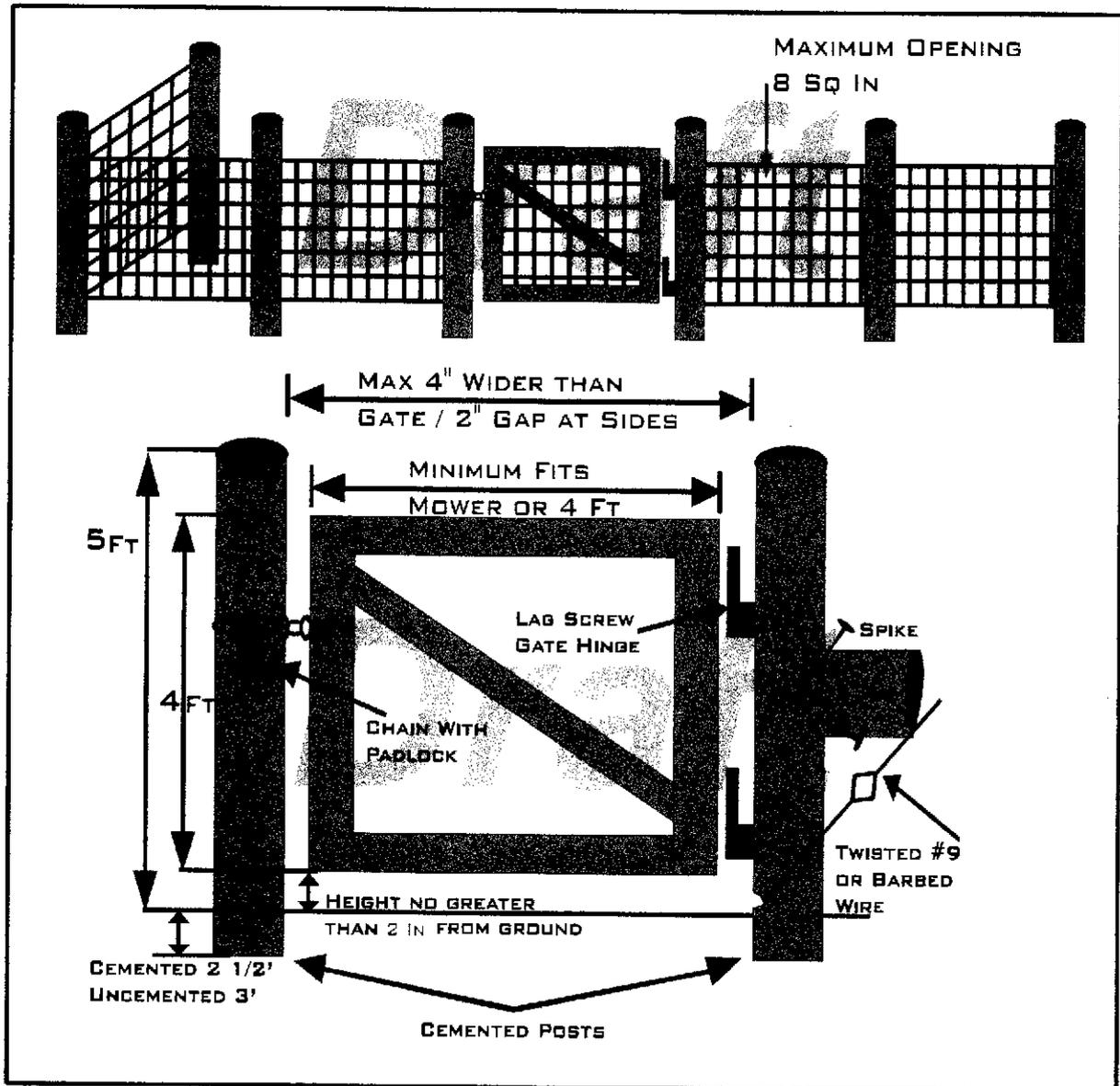


Figure IX-1. Gate and Fencing

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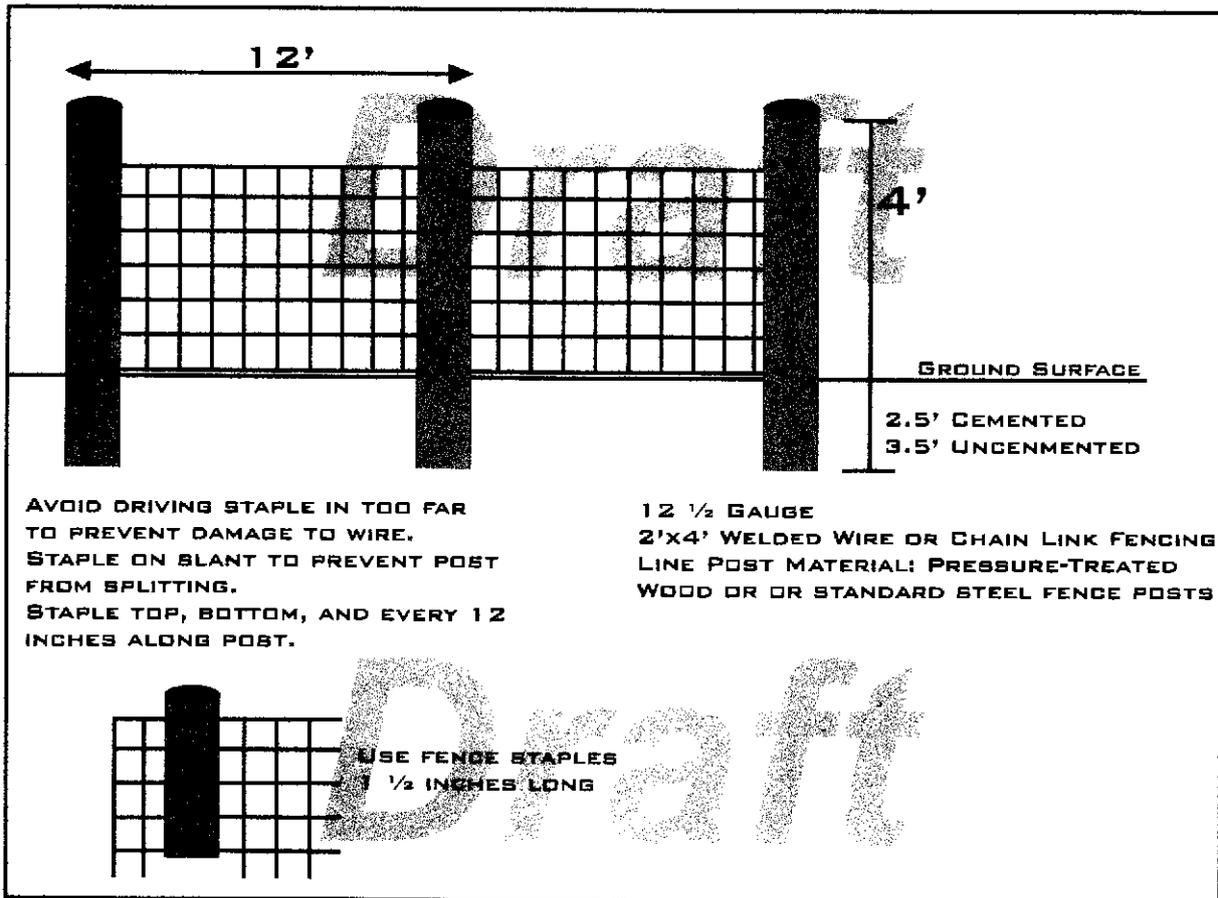


Figure IX-2. Fencing: The Standard Fence

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STANDARD BRACING FOR CORNERS "H"-STYLE

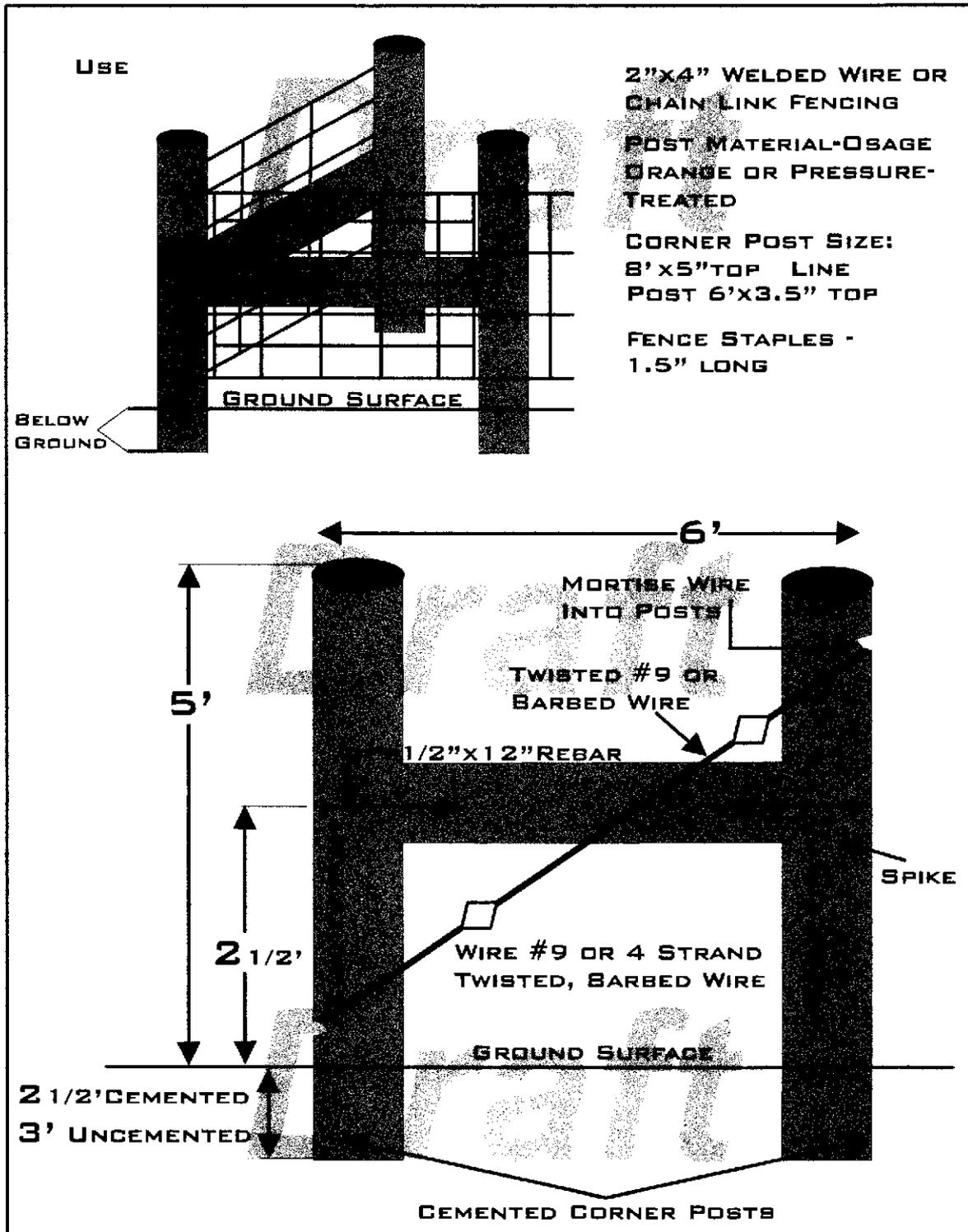


Figure IX-3. Fencing: "H" Style Corner Brace

STANDARD BRACING FOR CORNERS "N"-STYLE

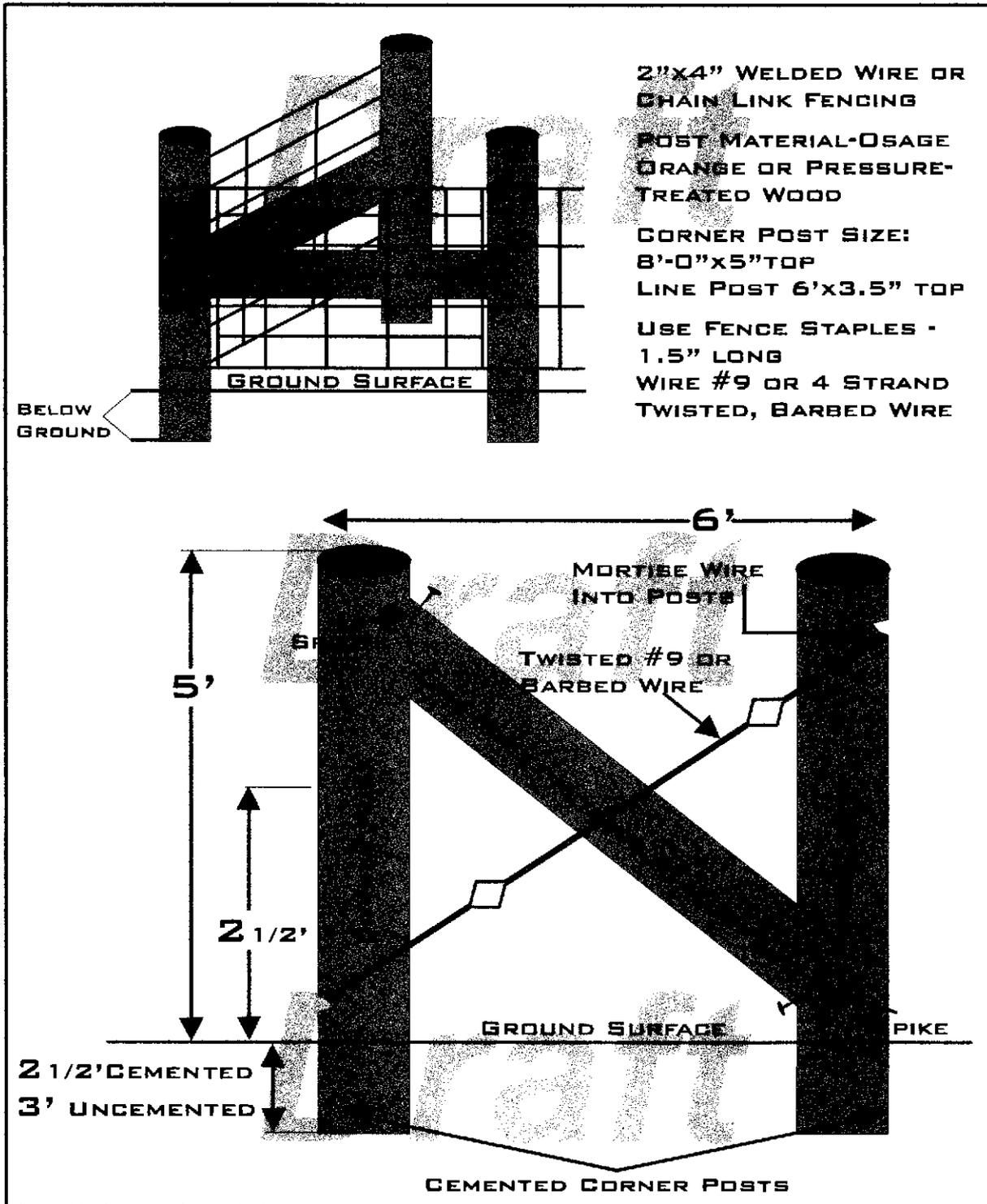


Figure IX-4. Fencing: "N" Style Corner Brace

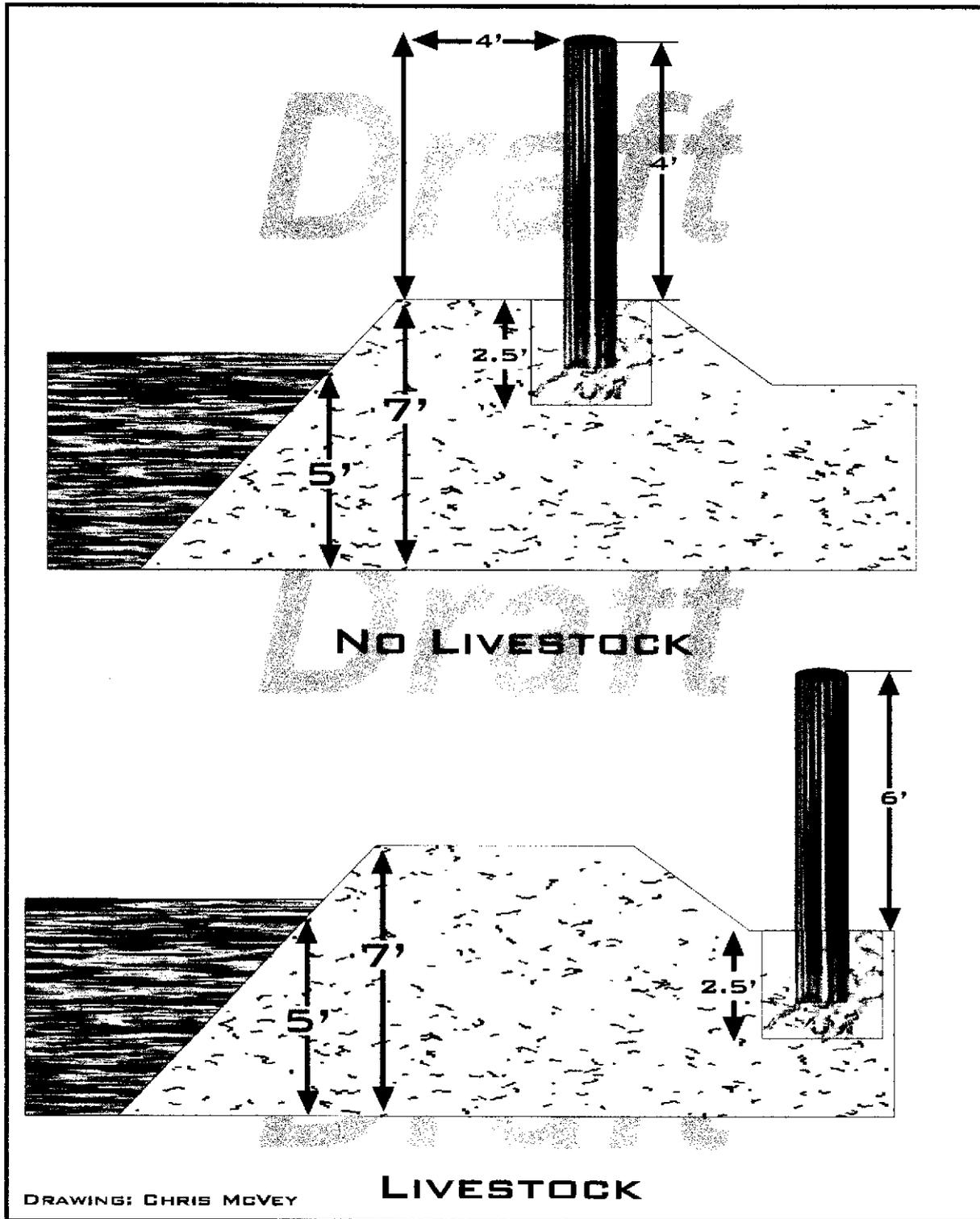


Figure IX-5. Fencing: Placement

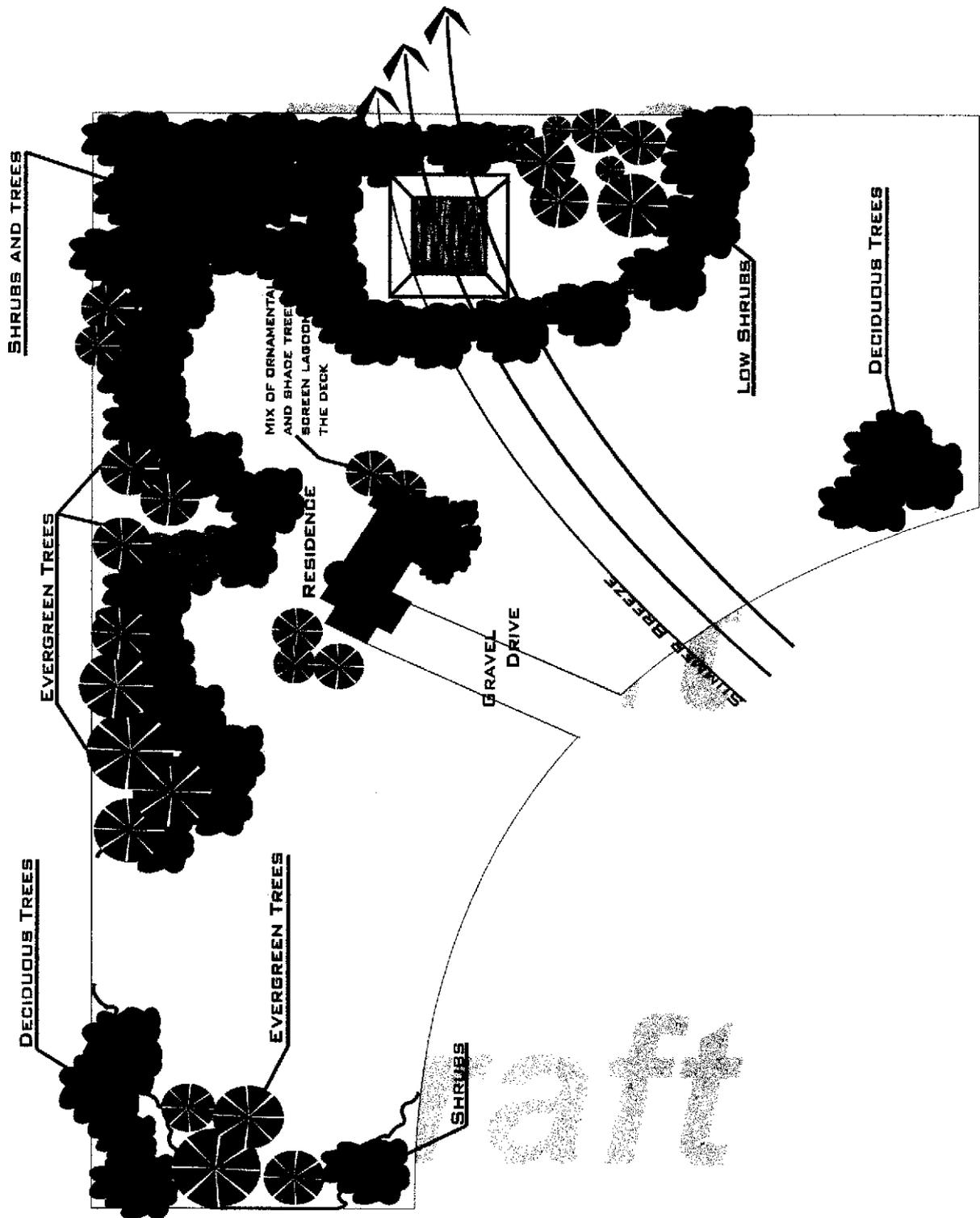


Figure IX-6. Lagoon Siting and Design

**PROTOCOL
EVALUATING AND SITING A LAGOON**

GOAL: Determine if a lagoon system is well suited to the site conditions and determine the best location on the property for a lagoon. It should protect public health, assure safe wastewater treatment, and prevent contamination to the state's water supplies.

POLICY: Site and soil evaluation for a new wastewater lagoon may be completed upon a request of the landowner, realtor, contractor, lending agency, or other interested party and payment of necessary fees. Listed below are evaluation points for discussion during the inspection. All individuals who have legal interest in the outcome of the evaluation need to be provided with a report summarizing the assessment. Whenever a site is unsuitable, a letter documenting the reasons and offering alternative solutions, if possible, is recommended. Letters and documents need to be maintained on file for future reference.

PROCEDURE

- 1) Follow the code and local regulatory agency policies and procedures regarding the application and site evaluation.
- 2) Evaluation may include an initial inspection visit to the property to meet with the owner and any other interested parties.
- 3) Inspect property and proposed lagoon site for conditions affecting location. Such conditions include, but are not limited to: wells, soil conditions, property lines, easements, depth to groundwater, and slope. The County Soil Survey can be utilized to determine probable soil type and general suitability for a wastewater lagoon. Note: Conducting a soil profile evaluation is the best method of assuring suitable soil conditions.
- 4) Mark the proposed lagoon location with flags and take photos of the proposed lagoon site from each side and looking away from the site in each direction.
- 5) If site conditions have been evaluated as favorable for a wastewater lagoon, an application requesting a wastewater lagoon installation permit needs to be completed by the landowner.
- 6) Lagoon sizing can be done according to round, square, or rectangular designs. (Refer to Table IX-1.)
- 7) Instructions and diagrams for construction need to be provided in writing for agency files and a copy given to the landowner.
- 8) A permit to construct a wastewater lagoon shall be provided to the landowner. It is recommended that the landowner be given a time limit in which construction is to be completed. The landowner needs to be instructed that delays which prevent completion by the agreed upon time will require the landowner to contact the inspector for an extension. If an extension is not requested, the property owner may be required to reapply. It is the landowner's responsibility to contact the inspector for construction inspections.
- 9) Once the inspector has been notified that construction is complete, a final inspection needs to be made to assure compliance with county codes. Lagoon construction is not complete until the fence has been built. If construction is acceptable, a permit to operate shall be issued at that time.
- 10) Permit to operate shall state that the regulating agency has the right to inspect the lagoon at any time it deems necessary to determine county-code compliance.

PROTOCOL

INSPECTION OF EXISTING WASTEWATER LAGOON

GOAL: Determine system integrity in order to provide for safe public water and to prevent contamination of any water supply within the state.

POLICY: Evaluation of an existing private wastewater lagoon may be completed on the request of a lending agency, real estate agency, land owner, or complainant. A written letter summarizing evaluation should be sent to all parties who have interest in the outcome of the evaluation. Possible parties may include, but are not be limited to: buyers, sellers, realtors, lending institutions, zoning boards, and contractors. When a system does not comply with county requirements it is the responsibility of the inspector to determine the needed corrections. Proof of system correction and adequate operation must be established prior to approval of the system.

EVALUATION

1. Acquire any previous records such as files of permit, inspections, and contractor bills. Name and address of current property owner.
2. Information that may be appropriate for evaluation purposes:
 - A. Identification of any additional features used in conjunction with the wastewater lagoon such as and the location of these additional features such as: septic tank, holding tank, or devices altering the gravity flow of wastewater.
 - B. Proof of where water lines are located (public or private).
 - C. Receipts for septage pumping and/or herbicide purchase.
 - D. Name and address for anyone not living in the household and served by the same system. (i.e. two homes sharing the same lagoon.)
 - E. Location of any wells or cisterns used for potable and nonpotable purposes.
 - F. Easements for right-of-way which include the lagoon area.
 - G. Number of persons presently and potentially served by system and an average estimated wastewater flow.
 - H. Map showing location of sewage pipes, wells, potable water pipes, and improvements.
 - I. Name of buyer with address and phone number.
 - J. Real Estate and/or Lending Agency's address and phone number, if applicable.
 - K. Contractor name, address, and phone number or contact information for person constructing the system.
 - L. System maintenance person's name, address, and phone number, if applicable.
3. Examine water and sewage pipes where they exit the house and from the basement, if possible. Determine that all household wastewater is discharged into the lagoon.
4. Check clean outs for proper flow of wastewater and location. They need to be located at every

change of direction and within 100 feet of each other along a straight line. They should also be covered to prevent entry of water, such as rainfall. It is desirable to have a combination cap and vent to allow dissipation of gases that may back up with a clogged pipe.

5. Measure the slope of the wastewater pipe from the house to the lagoon (12.5 inches to 36 inches per 100 feet.) Determine if there is a possibility of backflow from the lagoon or clean out during times of high lagoon water. A contractor's or an engineer's level may be needed to give an accurate evaluation of potential backflow occurrence.
6. Fencing. Check adequacy of height, spacing, strength, and safety measures such as a lock and posted signs to prevent unauthorized entry of humans or animals.
7. Berm evaluation. Observe area for rocks, clods, ruts, groundcover, erosion, trees, tall weeds, accessibility to farm machinery, ability to divert surface runoff away from lagoon, and presence of animals. Note any shading by adjacent vegetation.
8. Lagoon evaluation. Check that a post with measurement markings at every inch is located near the lagoon center. Check that water depth is maintained between 2.5 feet and 5 feet. An absence of aquatic vegetation is an indication that water depth stays above 2.5 feet. There should be no foul odor. The color should be sparkling dark green, which indicates the pH is correct and there is adequate dissolved.
9. Surface area. Measure the width of the lagoon at the operational level (five feet water depth) and determine the current surface area. The surface area of the system should reasonably correspond to the surface area indicated on the recommended model size.
10. Evaluate the outlet pipe. The pipe should enter the lagoon beneath the water level and extend to a point located near the lagoon center. The pipe end should be set at a height of approx. 1.5 feet off the bottom of the lagoon. A concrete pad should be placed under the pipe end to prevent lining damage from force of wastewater discharge. Check that the end of the pipe is stabilized, such as being supported by concrete blocks and secured by chain or other means to prevent movement and possible breakage.
11. Evaluate corrections and replacement considerations. Know how many years the lagoon has been in operation. Know if the lagoon has ever risen higher than the 2 feet of freeboard. Know if the lagoon ever overflowed. Know if the water level ever dropped below 2.5 feet. If there are indications of sludge build up, or undersizing of lagoon for amount of household wastewater discharge, consider what options exist to build a second cell or provide other system replacement. This needs to be documented on a map of the site. If the household has a relatively low amount of wastewater discharge for the lagoon sizing, consider if it is feasible to add water from roof drains, sump pumps, or other sources.
12. Complete change of ownership papers on permit records if appropriate. Provide owners with a copy of the permit.

**PROTOCOL
EMERGENCY DEWATERING PROCEDURE**

One method for preventing overflow in an emergency situation is to remove some of the lagoon water by irrigation. This water must be distributed so that all water is absorbed into the ground without runoff. Perforated hoses, sprinklers, and sprayers can be useful but may clog if solids are present. Irrigation is not an option when the ground is saturated or frozen. At these times, the acceptable alternative is to have the excess sewage hauled by a licensed septage hauler. Stringent water conservation practices should be used during such times.

The area to be irrigated shall not be within 50 feet of property line not under the control of the facility owner or within 100 feet of a water well. The preferred irrigation area is relatively level tilled cropland or grassland. The irrigation area should not be used for children's play area, garden area, or an accessible to lactating dairy animals. Care should be taken to minimize taking up fresh or untreated sewage and sewage solids with the irrigation water. The water intake should be about 8 to 12 inches below the water's surface.

Dewatering is not to be considered a normal operating procedure; it is an emergency procedure to be used on rare occasions. If the threat of overflow persists, other measures must be taken such as enlargement of the existing lagoon or construction of an additional cell. The lagoon owner must get permission from the appropriate regulatory authority before dewatering.

Draft

PROTOCOL

SEALING A LEAKING LAGOON

Excess seepage in farm lagoons can be both undesired and detrimental. It can often lower the water in the lagoon to unusable levels. Seepage can commonly be attributed to areas of permeable soils in the reservoir (or dam), or attributed to leakage through rock ledges in the reservoir area. Several methods can be used to reduce the seepage. The method of choosing is largely dependant upon what is causing the seepage. A thorough investigation of the leaky lagoon should be made before any method of sealing is selected. Once the cause of seepage is reasonably determined, the best and most practical method for sealing can be chosen.

Sealing with earth blankets

Sites with too little clay to prevent excessive seepage or sites with exposed rock ledges in the reservoir area, can be sealed by an earth blanket compacted over the leaky area. The best blanket material should have a good mix of particle sizes - from small gravel or coarse sand to fine sand, silt, and clay in the desired proportions. The clay particles should make up about 20 % of the weight. The area to be sealed should be prepared by draining the lagoon and permitting the area to dry. The area should then be worked with a disc, tiller, or similar equipment and the blanket material uniformly spread over the area in 6 to 8 inch layers. Each layer should be thoroughly compacted by a roller before the next layer is placed. Generally, two or three layers is adequate. For this method to be practical, a suitable borrow area should be close enough to permit hauling the blanket material at a reasonable cost.

Sealing with flexible membrane lining

This method, though generally expensive, is perhaps the most effective because it eliminates virtually all seepage when properly installed. Flexible membranes made of plastic, rubber, or similar materials are placed as impermeable liners in the bottom of the lagoon. All membranes should be constructed of high-quality materials and should be certified by the manufacturer to be suitable for use as liners. The area to be lined should be drained and allowed to dry until the surface is firm and can support the people and equipment that must travel over it during installation of the lining. All rocks, stumps, hard clods, and other materials that could damage the liner should be removed from the surface before the liner is laid.

Sealing with bentonite

It is important to remember that bentonite is a high swell clay material and is suitable for use on soils having a high proportion of coarse-grained materials and insufficient clay. Bentonite absorbs several times its own weight of water and when completely saturated can swell 8-20 times its original volume. When mixed with the coarse material and thoroughly compacted, the saturated bentonite then swells to fill the voids and pores, sealing the lagoon. Because upon drying bentonite returns to its original volume, it is not usually suitable for lagoons with a wide fluctuation in the water level. Rates of application vary from 1-3 pounds per square foot, depending on the site material. The area to be treated must be drained and dried prior to applying the bentonite. (Dumping bentonite in the water in an undrained lagoon does not work and can have detrimental effects on the water quality.) Bentonite can be purchased in bag or bulk as a powder or in pellet form. Farm supply stores, Coops, or well drillers often supply bentonite.

Sealing with soil dispersant

Excessive seepage can occur in a lagoon even in clay soils because the clay particles are arranged to form an open, porous, or honeycomb structure. Applying small amounts of certain chemicals to these porous materials can disperse them and reduce soil permeability. These chemicals are referred to as dispersing agents. Sodium chloride (common salt), sodium tripolyphosphate (STPP), and tetrasodium pyrophosphate (TSPP), are all effective dispersing agents. Commercial phosphatic fertilizer should *not* be used. Rates of application range from 0.05-0.33 pounds per square foot depending on the type of soil and the type of dispersant used. Prior to application, the area should be drained and dried. The dispersing agent should be applied at a uniform rate and thoroughly mixed into each 6-inch layer treated with a disc or tiller. Each treated layer should then be thoroughly compacted. Farm and feed supply stores and Coops often supply the proper type of salt or dispersing agent. Before any investment is made in sealing a lagoon, an evaluation of the problem area by a trained soil scientist, engineer, or technician is beneficial. Contact the local Natural Resources Conservation Service for assistance on sealing leaking lagoons.

Draft

PROTOCOL
COMPACTED LINING FOR SMALL WASTEWATER LAGOON

Purpose: Guidelines for lagoon construction where soils do not have extremely slow drainage and were it is shallow to bedrock (bottom of lagoon is less have a foot above or into rock).

Suitable Soil: Determine that subsoil is at least 30 percent clay either by determining soil texture or testing the soil to determine percent clay.

Construction Procedure:

- 1) Remove topsoil and stockpile it near the site for use later.
- 1) Test to determine if soil is at or slightly above the plastic limit by rolling out a small clump of soil into a wire shape 1/8 inch diameter or smaller without breaking apart. If it breaks it is either not wet enough or does not contain enough clay. Add water and test again. If repeated attempts are not successful there may not be enough clay and the choice of a lagoon for this site should be reconsidered. It takes a lot of water and time to wet the soil.
- 2) Remove the subsoil 12 to 18 inches below the bottom and sides of the lagoon and stockpile for reuse. When the bottom is shaped, measure the bottom area and, using a level, determine elevations near the inner corners and center. Measure horizontal distances from permanent reference points to the corners to verify thickness of the constructed lining. need to add a figure to illustrate this
- 3) Compact the bottom and side layer using at least 4 passes
 - a. A sheepsfoot or other full coverage roller is preferred.
 - b. If sheepsfoot roller is not available, use a heavily weighted wheel tractor making passes so there is complete coverage of the surface to equal one pass with a full coverage roller. Given the small percent of tire to machine width, to get full coverage of the surface may require a total of 16 to 20 passes for each width of the tractor.
- 5) Add a layer of loose subsoil (clay) material and compact. If material that was removed is not adequate then like subsoil material must be imported to the site.
 - a. Sheepsfoot roller, add 9 inches of loose material and compact to 5 to 6 inch thickness.
 - b. If tractor is used for compaction, add 6 in. of lose material and compact to 3.5 to 4 in.
- 6) Repeat step (5) until a 1.5 foot thick compacted layer is constructed.
- 7) After the compacted liner is complete, finish final grade of the compacted bottom and sides of the lagoon to maintain the proper side slope.
- 8) Place the topsoil over the outside, top and the top third of the inside of the berm.
- 9) Using field tests verify that compaction has been achieved.
 - a. Compaction makes the soil firm and it should be very difficult to insert a hand probe more than a few inches. This gives a good indication of compaction. Recommend an electronic soil compaction meter (Field Scout or equivalent) to test compaction.
 - b. To evaluate compaction of the entire liner thickness use a 4 pound hammer to drive an 18 to 24 inch long number 3 rebar 1½ to 2 feet into the lagoon lining. Count the number of blows to drive it for each 6 inch interval. The number of blows should increase with depth. The bar will be quite difficult to remove, so if removal is important plan how to do this before you go to the field. If a shorter bar is used and left flush or slightly below the surface, removal is not essential.

**INSPECTION REPORT FORM
DATA FOR A SMALL LAGOON (SHORT FORM)**

Name of Owner _____

Address of Owner _____

Person(s) Contacted At Site _____ Phone No. _____

Section _____, Township _____, Range _____, County _____

Number of Occupants Served _____ Number of Bedrooms _____

Approximate Vertical Distance-water level to top of embankment _____

Number of bedrooms _____ X 100 gpd = _____ total gpd = Alternative estimated flow

Review: Mark lagoon deficiencies, provide any necessary details on back.

1. Lagoon used by more than one household
2. Lagoon construction incomplete or substandard
3. Lagoon not sized according to plans and specifications
4. Lagoon area not fenced and/or gated according to plans & specifications
5. Lagoon within 100 feet of well
6. Lagoon too close to property line
7. Evidence of irrigation use routinely for effluent disposal or evidence of lagoon discharging
8. Surface drainage into lagoon
9. Eroded, damaged, sloped steeper than 3 ½ to 1, or in need of modification
10. Lagoon berm not mowed; trees growing and/or vegetation height more than 6 inches
11. Inadequate or NO stand of groundcover on berms
12. Cattails or other vegetation growth in lagoon
13. Tree growth too near to lagoon allowing leaf debris in lagoon, and/or blocking sunlight and airflow action on lagoon
14. Other (include anaerobic conditions)

Name: _____

Date: _____ Title: _____

**INSPECTION REPORT FORM
DATA FOR A SMALL LAGOON (LONG FORM)**

Name of Owner _____

Address of Owner _____ Phone No. _____

Person(s) Contacted At Site _____

Legal Description _____ S _____ T _____ R _____, County _____

Number of Occupants Served _____ x 50 gpd = _____ total gpd = Estimated Flow

Approximate Vertical Distance - Water Level to Top of Embankment _____

Horizontal Distance to nearest property line _____

Distance to property owner's nearest well _____

Distance to neighboring property owner's nearest well _____

Review: Mark lagoon deficiencies, provide any necessary details on back.

CONSTRUCTION:

_____ Lagoon construction incomplete or substandard.

SIZING:

_____ Lagoon used by more than one household

_____ Lagoon not sized according to plans and specifications (MODEL _____).

_____ Lagoon does not meet size requirement for number of people or estimated wastewater flow

LOCATION:

_____ There is not a potential site for a second system

_____ Lagoon is located on easement (type) _____.

Easement Holder _____

_____ Lagoon located too near well(s) or weeds and trees

PLUMBING:

_____ Household is served by two or more disposal systems

_____ Greywater is not discharged into lagoon

_____ Sewer pipe slope is not within acceptable limits

_____ Berm is above the point where sewage exits house

_____ Outlet pipe does not terminate in approximate lagoon center

- Water from roof/patio/foundation drains enters lagoon
 Overflow pipe present
 Clean outs not properly installed/maintained

FENCING:

- Fencing/gate requirements have not been met

VEGETATION:

- Berme vegetation is over 6 inches high
 Floating vegetation present
 Cattails present

BERM:

- Berm does not have stand of short-rooted perennial groundcover
 Lagoon berm eroded/damaged/berm slopes not within acceptable limits
 Animals/farm machinery has access to lagoon berm
 Surface drainage can enter lagoon

OPERATION:

- Water depth not between 2 ½ feet and 5 feet
 Seepage present
 Lagoon overflowing
 Lagoon too shallow to prevent overflow
 Lagoon water used routinely for irrigation
 Lagoon overloaded
 Wave action sluggish or absent
 Evidence of siphoning or pumping

REGISTRATION:

- Application form incomplete
 Provide map of sewage/potable water pipes
 Lagoon is not registered with health department
 Change of ownership forms have not been received
 Required fees have not been paid

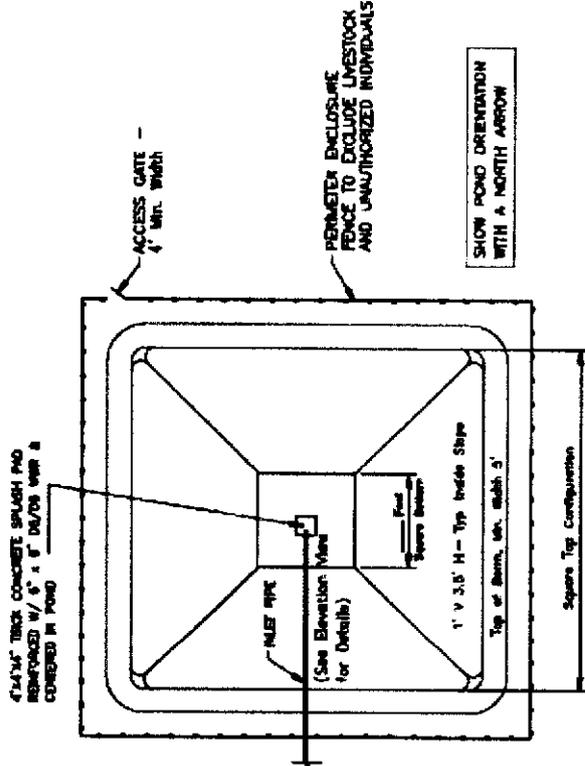
OTHER: _____

Inspector: _____ Date: _____

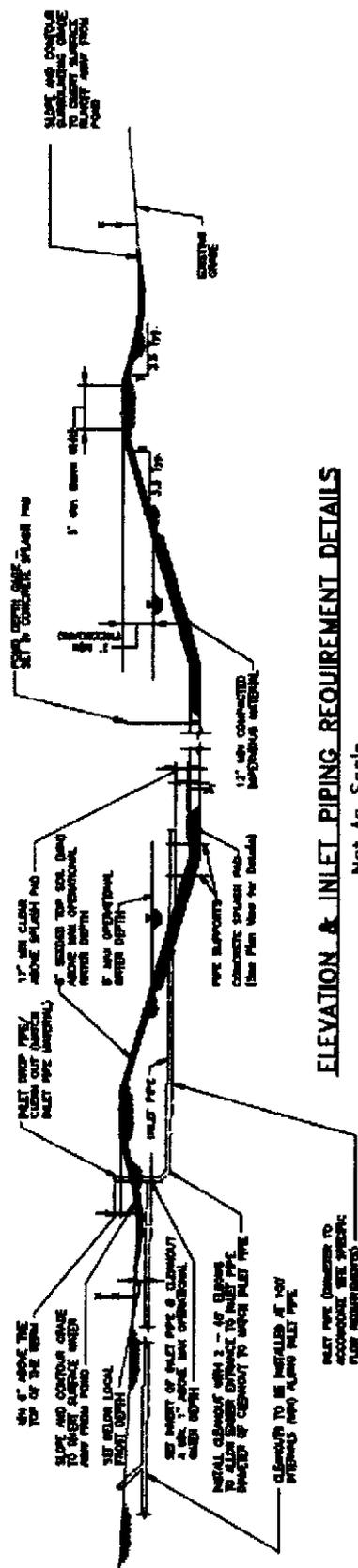
APPLICANT:	COUNTY:
ADDRESS:	DATE:
LEGAL DESCRIPTION: 1/4, Section 1, S., N., E/W	USGS Quad:

GENERAL NOTES

- 1) THE WASTE STABILIZATION POND BOTTOM SHALL BE CONSTRUCTED AT AN ELEVATION AT LEAST 10 FEET ABOVE THE GROUND WATER TABLE
- 2) ALL SLOPES SHALL BE 3 1/2 FEET HORIZONTAL TO ONE FOOT VERTICAL
- 3) SURFACE DRAINAGE SHALL BE DIVERTED AROUND THE POND
- 4) DISTURBED AREAS ABOVE THE MINIMUM OPERATIONAL LEVEL AND OUTSIDE THE BERM, SHALL BE SEEDED WITH A SHORT ROOTED, ROOTED, DENISLEY GROWING, GRASS SUCH AS BLUE FESCUE BROME OR BERMAUDA
- 5) THE INLET PIPE SHALL BE RIGID, FREEZE RESISTANT, STEEL OR PLASTIC PVC, ABS, OR HDPE PLASTIC SHALL BE SCHEDULE 80 OR 160 CLASS MINIMUM
- 6) THE MINIMUM WIDTH OF THE TOP OF THE BERM/DIKE SHALL BE 5 FEET.
- 7) THE MINIMUM FREEBOARD SHALL BE 2 FEET.
- 8) A MINIMUM DISTANCE OF 100 FEET SHALL BE PROVIDED BETWEEN THE POND AND ADJACENT PROPERTIES.
- 9) THE DEPTH GAGE SHALL BE CLEARLY MARKED IN 1 FOOT INCREMENTS STARTING FROM THE BOTTOM OF THE POND
- 10) ALL HORIZONTAL PIPING SHALL SLOPE 1/8TH TO 1/4 INCH PER FOOT TOWARD POND



PLAN VIEW
Not to Scale



ELEVATION & INLET PIPING REQUIREMENT DETAILS
Not to Scale

KDHG-BER Livestock Waste Management Program	Date Drawn: November 15, 2007
For: WASTE STABILIZATION POND APPLICATION SUBMITTAL	Drawn By: PCF, KDHG-SMS
Description: DAIRY PARLOR WASTEWATER POND DESIGN FORM	Revised Date:
	Desig. File: wastelagoon.dwg

THIS PLAN ONLY VALID FOR NOTED LOCATION

Figure IX-7. Blank Lagoon Plan Sheet and Construction Drawing