

**NOTICE OF ADOPTION OF AMENDMENTS TO THE AITKIN COUNTY SUBSURFACE
SEWAGE TREATMENT SYSTEM ORDINANCE**

On July 8, 2025 the Aitkin County Board of Commissioners adopted amendments to the Aitkin County Subsurface Sewage Treatment System (SSTS) Ordinance.

EFFECTIVE DATE: This ordinance shall take effect and be in force immediately after its adoption and publication.

A full text version of the amendments and ordinance are available at the Aitkin County Planning and Zoning Office located at 307 2nd St NW Room 219, Aitkin, MN 56431 during regular business hours, and is posted on the Aitkin County website at:
www.co.aitkin.mn.us/departments/env/.

Aitkin County Planning and Zoning

SUBSURFACE SEWAGE TREATMENT SYSTEM ORDINANCE

Aitkin County

May 1, 2014
Amended July 8, 2025

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AITKIN COUNTY SUBSURFACE SEWAGE TREATMENT ORDINANCE

SECTION 1 PURPOSE, INTENT AND SCOPE

1.1 Purpose

The purpose of the Subsurface Sewage Treatment System (SSTS) Ordinance is to comply with State mandates and to provide minimum standards for and regulation of Individual Sewage Treatment Systems (ISTS) and Midsized Sewage Treatment Systems (MSTS) including the proper location, design and construction; their necessary modification and reconstruction; their operation, maintenance and repair to protect surface water and groundwater from contamination by human sewage and waterborne household and commercial wastes within the applicable jurisdiction of the County; to protect the public's health and safety, and eliminate or prevent the development of public nuisances pursuant to the authority granted under Minnesota Statutes, Sections 115.55, 145A.05, 375.51, 394.21-394.37, and the County Comprehensive Plan, and the County Zoning Ordinance, Shoreland Management Ordinance and the Flood Plain Management Ordinance.

1.2 Intent

It is intended by the County that this Ordinance will promote the following:

- A.** The protection of lakes, rivers and streams, wetlands, and groundwater in Aitkin County essential to the promotion of public health, safety, welfare, socioeconomic growth and development of the County.
- B.** The regulation of proper SSTS construction, reconstruction, repair, maintenance, and location of SSTS to prevent the entry and migration of contaminants, thereby preventing the degradation of surface water and groundwater quality.
- C.** The establishment of minimum standards for SSTS placement, design, construction, reconstruction, repair, maintenance and to prevent contamination and, if contamination is discovered, the identification and control of its consequences and the abatement of its source and migration.
- D.** The appropriate utilization of privy vaults and other non-water carried sewage collection and storage facilities.
- E.** The provision of technical assistance and education, SSTS permitting, inspections, and enforcement to prevent and control water-borne diseases, lake and stream degradation, groundwater-related hazards, and public nuisance conditions.

1.3 Scope

This Ordinance regulates the siting, design, installation, alterations, operation, maintenance, monitoring, and management of all SSTS within the County's applicable jurisdiction including, but not necessarily limited to individual SSTS and cluster or community SSTS, privy vaults, and other non-water carried SSTS. All sewage generated in unsewered areas of the County shall be treated and dispersed by an approved SSTS that is sited, designed, installed, operated, and maintained in accordance with the provisions of this Ordinance or by a system that has been permitted by the MPCA.

SECTION 2 GENERAL PROVISIONS

2.1 Authority

This Ordinance is adopted pursuant to MN Statutes, Section 115.55; MN Statutes, Sections 145A.01 through 145A.08; MN Statutes, Section 375.51; or successor statutes, MN Rules 2006, Chapter 7080, and elements of 2011 Rules from Chapters 7080, 7081, 7082, and 7083; or successor Rules.

2.2 Jurisdiction

The jurisdiction of this Ordinance shall include all lands of the County except for incorporated areas that administer a (SSTS) program by Ordinance within their incorporated jurisdiction, which is at least as strict as this Ordinance.

2.3 Interpretation

In their interpretation and application, the provisions of this Ordinance shall be held to be minimum requirements and shall be liberally construed in favor of the County and shall not be deemed a limitation or repeal of any other powers granted by MN Statutes.

2.4 Severability

If any section, clause, provision, or portion of this Ordinance is adjudged unconstitutional or invalid by a court of law, the remainder of this Ordinance shall not be affected and shall remain in full force.

2.5 Liability

The County's involvement in administration of this Ordinance does not create a special duty to any person and, further liability or responsibility shall not be imposed upon the County or any of its officials, employees, or other contract agents, for damage resulting from the defective construction, operation, or abandonment of any onsite or cluster SSTS regulated under this Ordinance or by reason of any standards, requirements, or inspections authorized by this Ordinance hereunder.

2.6 Abrogation and Greater Restrictions

It is not intended by this Ordinance to repeal, abrogate, or impair any other existing County Ordinance, easements, covenants, or deed restrictions. However, where this Ordinance imposes greater restrictions, the provisions of this Ordinance shall prevail. All other Ordinances inconsistent with this Ordinance are hereby repealed to the extent of the inconsistency only.

SECTION 3 ADMINISTRATION

3.1 County Administration

- A. The Aitkin County Environmental Services Department shall administer the SSTS program and all provisions of this Ordinance.
- B. The County's duties and responsibilities include, but are not limited to, the following:
 1. Review all applications for SSTS.
 2. Issue all permits required in this Ordinance.
 3. Inspect all work regulated in this Ordinance.
 4. Investigate all complaints regarding SSTS.
 5. Issue certificates of installation, certificates of compliance or notices of noncompliance where applicable.
 6. Enact enforcement provisions of this Ordinance as necessary.

7. Refer unresolved violations of this Ordinance to the County Attorney.
8. Maintain current records for each permitted SSTS including all site evaluation documents, design documents, inspection documents, and other applicable documents.
9. The County shall employ or retain under contract qualified and appropriately licensed professionals to administer and operate the SSTS program.
10. Submit annual reports to MPCA as required.

3.11 References to Rule

References to Minnesota (MN) Rules Chapter 7080 are referencing the 2011 Rules. References to the 2006 Rules will be specifically indicated as 2006 Minnesota (MN) Rules Chapter 7080.

3.2 State of Minnesota

Where a single SSTS or group of SSTS under single ownership within one-half mile of each other, have a design flow greater than 10,000 gallons per day, the owner or owners shall make application for and obtain a State Disposal System permit from MPCA. For any SSTS that has a measured daily flow for a consecutive seven-day period, as determined according to 7081.0110, which equals or exceeds 10,000 gallons per day, a State Disposal System permit is required.

SSTS serving establishments or facilities licensed or otherwise regulated by the State shall conform to the requirements of this Ordinance.

3.3 Cities and Township

Any jurisdiction within the County that regulates SSTS must comply with the standards and requirements of this Ordinance. The standards and ordinance of the jurisdiction may be administratively and technically more restrictive than this Ordinance.

SECTION 4 DEFINITIONS

The following words and phrases shall have the meanings ascribed to them in this Section. If not specifically defined in this Section, terms used in this Ordinance shall have the same meaning as provided in the standards adopted by reference. For purposes of this Ordinance, the words “must” and “shall” are mandatory and the words “may” and “should” are permissive.

Absorption Area: means the area below a mound that is designed to absorb sewage tank effluent. This area is determined by multiplying the rockbed length by the required absorption width. The absorption area shall be the minimum clean sand area under the mound.

Absorption Width- is determined by using (2006 MN Rules Chapter 7080) Part 7080.0170, Subp. 5 (B), subitems 4 and 5, or by calculating the berm widths by using the berm slope multipliers found on the Mound Design Worksheet (see Appendix A), whichever is greater.

Alternative Local Standards (ALS): ALS are individual sewage treatment system standards that are less restrictive than the State’s technical standards and criteria. ALS contain the adopted standards from the 2006 MN Rules for systems using less than 2,500 gallons of water per day.

As-Built: Drawings and documentation specifying the final in-place location, size, and type of all system components. These records identify the results of materials testing and describe conditions during construction. Information provided must be verified by a certified statement.

Authorized Representative: An employee or agent of the Environmental Services Department.

Bedroom: Any room or unfinished area within a dwelling that is designed or might reasonably be used for sleeping. An all purpose room, den, study, or office will be considered a bedroom if it has an egress window.

Composting Toilet: A Composting toilet is a self-contained unit (not connected to sewer or water) that has two principles of operation: liquid (urine) is evaporated, and solids (fecal matter) are biologically decomposed into compost.

County: Aitkin County, Minnesota.

County Board: The Aitkin County Board of Commissioners.

Department: The Aitkin County Environmental Services Department.

Failing System: At a minimum, an SSTS that discharges sewage to a seepage pit, cesspool, drywell, leaching pit, or other pit; and any SSTS with less than the required vertical separation distance as described in Chapter 7080.1500, Subp. 4(D & E). The determination of the threat to groundwater for other conditions shall be made by a Qualified Employee or State licensed inspection business.

Grey water: Sewage that does not contain toilet wastes.

Imminent Threat to Public Health or Safety (ITPH): A SSTS that creates the potential to immediately and adversely affect or threaten public health and safety as described in Chapter 7080.1500, Subp. 4(A). At a minimum a SSTS with a discharge of sewage or sewage effluent to the ground surface, drainage systems, ditches, or storm water drains or directly to surface water; SSTS that cause a reoccurring sewage backup into a dwelling or other establishment; SSTS with electrical hazards; or sewage tanks with unsecured, or weak maintenance access covers. The determination of protectiveness for other conditions must be made by a Qualified Employee or a State licensed inspection business.

Individual Subsurface Sewage Treatment System or ISTS: A subsurface sewage treatment system, or part thereof, that is designed to treat a sewage design flow of 5,000 gallons per day or less.

Large Subsurface Sewage Treatment System or LSTS: A system designed to treat more than 10,000 gallons of sewage per day. These systems are permitted by the MPCA.

Midsized Subsurface Sewage Treatment System or MSTs: A subsurface sewage treatment system, or part thereof, that is designed to treat more than 5,000 gallons per day to a maximum of 10,000 gallons per day. These systems require an operating permit.

Mottling: As applied to soils, means a zone of chemical and reduction activity, appearing as splotchy patches of red, brown or grey in the soil. In sub soils with a color value of four or more, the term mottling also includes soil having matrix colors with a chroma of two or less as described in "Keys to Soil Taxonomy": 11th Edition, 2010.

MPCA: Minnesota Pollution Control Agency.

Qualified Employee: A State or Local Unit of Government employee who designs, installs, maintains, pumps, or inspects SSTS as part of the individual's employment duties.

Running water: as it pertains to structures, means when a faucet or other device is opened and water drains out whether by pressure or gravity flow.

Sewage: Waste from toilets, bathing, laundry, or culinary activities or operations or floor drains associated with these sources, including household cleaners and other constituents in amounts normally used for domestic purposes.

Soil Dispersal System: A system where sewage effluent is dispersed into the soil for treatment by absorption and filtration and includes, but is not limited to, trenches, seepage beds, at-grade systems, mound systems and drip dispersal systems.

State: The State of Minnesota.

Subsurface Sewage Treatment System or SSTS: Subsurface Sewage Treatment System including an ISTS, MSTs or LSTS.

SWF: Shoreland, wellhead protection areas, food, beverage, lodging establishments.

Toilet Waste Treatment Device: Incinerating and composting toilets. Chemical, biological and holding toilets are not included in this definition.

Type I System (Standard): An SSTS that is designed according to Parts 7080.2200 to 7080.2240, including but not limited to: trenches, beds, mounds, at-grades, or graywater systems. Type I systems must be placed on natural and undisturbed soils.

Type II System: An SSTS that is designed according to Parts 7080.2270 to 7080.2290 including but not limited to: holding tanks, privies, and septic systems installed in the flood plain.

Type III System: An SSTS that deviates from the requirements in Parts 7080.2210 to 7080.2240. These systems, constructed according to 7080.2300 include, but are not limited to: systems built on fill or disturbed soil, systems constructed on sites with less than twelve (12) inches of natural soil above the periodically saturated soil or bedrock, and reduced size systems with timed dosing.

Type IV System: An SSTS that is designed according to Part 7080.2350. These systems utilize registered treatment or pretreatment technologies in order to meet various treatment requirements that a standard system may not accomplish.

Type V System: An SSTS that is designed according to Part 7080.2400.

Zoning/Land Use/Building Permit. “Zoning permit” means a document issued by the zoning office to use land as designated in this ordinance. In addition to specific instances provided for herein, and unless otherwise provided for herein, a permit shall be required before beginning any construction, moving, rebuilding or material alteration of a structure or septic system.

SECTION 5 GENERAL REQUIREMENTS

5.1 Retroactivity

5.11 Existing Permits

Unexpired permits which were issued prior to the effective date of this Ordinance shall remain valid under the terms and conditions of the original permit until the original expiration date.

5.12 Existing SSTS

A SSTS installed prior to the effective date of this Ordinance and meeting the minimum requirements at the time it was installed, shall be allowed to continue in use except if it is determined as a failure to protect ground water or an Imminent Threat to Public Health or Safety.

5.13 SSTS on Lots Created After January 21, 1992 and January 23, 1996

Lots created after January 21, 1992 through the subdivision/platting process must have two (2) septic system sites capable of supporting standard/Type I individual sewage treatment systems. Lots created after January 23, 1996, through metes and bounds descriptions must have two (2) septic system sites each capable of supporting standard/Type I individual sewage treatment systems. Lots that would require use of holding tanks will not be approved.

5.2 Upgrade, Repair, Replacement, and Abandonment

5.21 SSTS Capacity Expansions

Expansion of an existing SSTS must include any system upgrades that are necessary to bring the entire system into compliance with the provisions of this Ordinance at the time of the expansion. Expansions may include addition of bedrooms, water using appliances and mobile home replacement with a larger home.

5.22 Bedroom Additions

Any addition to a structure that includes bedroom(s) that require a zoning permit from the County shall require that the SSTS meet the required design flow according to MN Rule 7080.1860.

5.23 Failure to Protect Groundwater

An SSTS that is determined not to be protective of groundwater in accordance with MN Rule 7080.1500, Subp. 4(B) shall be upgraded, repaired, replaced or abandoned by the owner in accordance with the provisions of this Ordinance within twelve (12) months upon receipt of a Notice of Noncompliance.

5.24 Imminent Threat to Public Health or Safety

An SSTS posing an Imminent Threat to Public Health or Safety shall be pumped within 24 hours and managed as a holding tank in accordance with MN Rule 7080.1500, Subp. 4(A) and said SSTS shall be upgraded, repaired, replaced or abandoned by the owner in accordance with the provisions of this Ordinance within ten (10) months upon receipt of a Notice of Noncompliance.

5.25 Abandonment of SSTS

Any SSTS, or any component thereof, which is no longer intended to be used, must be abandoned in accordance with MN Rule 7080.2500.

5.3 SSTS Located in Floodplain

SSTS shall not be located in a floodway and wherever possible, location within any part of a floodplain should be avoided. If no option exists to locate a SSTS outside of a floodplain, location within the flood fringe is allowed if the requirements in MN Rule 7080.2270 and all relevant local requirements are met. For existing structures within the floodway that are served by an SSTS, holding tanks will be allowed as a replacement system but the ground elevation where the tank is placed shall not be raised above its existing elevation.

5.4 Class V Injection Wells

All owners of new or replacement SSTS that are considered to be Class V injection wells, as defined in the Code of Federal Regulations, Title 40, Part 144, are required by the Federal Government to submit an UIC Class 5 Inventory Form to the Environmental Protection Agency as described in CFR40, Part 144. Further, owners are required to identify all Class V injection wells in property transfer disclosures.

5.5 SSTS Practitioner Licensing

5.51 License Required

No person shall engage in site evaluation, inspection, design, installation, construction, alteration, extension, repair, maintenance, or pumping of SSTS in Aitkin County without an appropriate and valid license issued by MPCA in accordance with MN Rules Chapter 7083 except as exempted in Rule 7083.0700.

5.52 License Exemption

A MPCA license is not required of an individual who is constructing a SSTS on land that is owned by the individual and functions solely as a dwelling for that individual pursuant to MN Rule 7083.0700. Installation of the system shall be based upon a design by a licensed designer. The system shall be inspected before it is covered and a twenty-four (24)-hour notification to the Department for inspection is required.

5.6 Prohibitions

5.61 Sewage Discharge to Ground Surface or Surface Water

It is unlawful for any person to construct, maintain, or use any SSTS system regulated under this Ordinance that results in raw or partially treated wastewater/sewage seeping to the ground surface or flowing into any surface water. Any surface discharging system must be permitted under the National Pollutant Discharge Elimination System program by the MPCA.

5.62 Sewage Discharge to a Well or Boring

It is unlawful for any person to discharge raw or treated wastewater/sewage into any well or boring as described in MN Rules Chapter 4725.2050, or any other excavation in the ground that is not in compliance with this Ordinance.

5.63 Discharge of Hazardous or Deleterious Materials

It is unlawful for any person to discharge into any treatment system, regulated under this Ordinance, any hazardous or deleterious material other than in normal household use and quantities that adversely affects the treatment or dispersal performance of the system or groundwater quality.

5.64 Occupancy or Use of a Building without a Compliant SSTS

It is unlawful for any person to maintain, occupy, or use any building intended for habitation or that contains one or more of the following – sleeping areas, bathtub, shower, toilet facilities, sink, or any other feature that would make the structure more oriented towards a dwelling unit than an accessory structure, that is not provided with a wastewater treatment system or that disposes of wastewater in a manner that does not comply with the provisions of this Ordinance.

5.65 Holding Tanks

Holding tanks are not allowed as a means of sewage treatment for new construction on lots created after January 21, 1992 within the shoreland district and January 10, 1995 outside the shoreland district.

5.66 Toilet Waste Treatment Devices

Toilet waste treatment devices are not allowed as the only method of sewage treatment for structures with running water. For structures without running water a composting toilet or an incinerating toilet would be allowed as an only method of sewage treatment. Specifications on type of toilet waste treatment device must be submitted at the time of

permit application. Photos and receipts must be submitted to the Department as evidence of compliance. Toilet waste treatment devices must meet 7080.2450, Subp. 4(A).

SECTION 6 SSTS STANDARDS

6.1 Alternative Local Standards Adopted By Reference

6.11 Alternative Local Standards for New and Existing SSTS

The County hereby adopts by reference the 2006 version of MN Rules Chapter 7080 effective April 3, 2006 as the alternative local standards for new and existing residential SSTS with flows of less than 2,500 gallons per day, and SSTS that serve Food, Beverage and Lodging Establishments with a flow of less than 2,500 gallons per day provided the effluent discharge does not exceed the standards in MN Rules 7080.2150, Subp. 3(K).

6.12 Adoption of Rule by Reference

The County hereby adopts by reference the 2011 MN Rules Chapters 7080 and 7081 for new and replacement systems using greater than 2,500 gallons per day. Specific elements that are required by the 2011 Rules for all sizes of systems are listed in Section 6.8 of this Ordinance. This adoption does not supersede the County's right or ability to adopt local standards that are in compliance with MN Statute 115.55.

6.2 Compliance Criteria for Existing SSTS

For an SSTS built before April 1, 1996, and outside of areas designated as "SWF" – Systems in shoreland areas, wellhead protection areas, or systems serving food, beverage, or lodging establishments – there must be at least two feet of vertical separation between the bottom of the dispersal system and periodically saturated soil or bedrock.

6.3 Dispute Resolution

Resolution of disputes between SSTS Certified Individuals regarding conflicting compliance inspections, determination of periodically saturated soils and other technical issues shall follow MNRule7082.0700, Subp. 5.

6.4 Holding Tanks

Holding tanks may be allowed for the following applications:

- A. For dwellings that are seasonal (used fewer than 180 days per calendar year) and water usage is not more than 150 gallons of water per day. Two Type I soil treatment areas must be identified on the Management Plan by the designer, when applicable, and preserved for future use by landowner.
- B. When it can be conclusively shown that a Type I (Classification I or II as per MN Rules Chapter 7080.1860) SSTS cannot be feasibly installed as determined by a licensed designer and approved the Department.

Holding Tanks installed after the date of the enactment of this current ordinance shall follow these conditions:

- A. The owner of a holding tank must install a water meter to continuously record indoor water usage. The Department may request water usage readings at any time.
- B. A Management Plan meeting the requirements of 7082.0600 Subp. 1 must be provided by the licensed designer.

6.5 Pumping Agreements

Pumping agreements are required for all permits issued for holding tanks, privies and outhouses.

6.6 SSTS for Recreational Vehicles (RV)/Fish Houses used as RV's

RV's, that have manufactured built in holding tanks for gray and black water, that are on a parcel of land without a principle dwelling unit for more than 60 days in a calendar year must comply with the following:

If there is running water from a well to the RV a standard/Type I or Type II (Holding Tank) SSTS must be installed. Where there is no running water from a well to the RV, at a minimum an outhouse/privy must be installed, or a toilet waste treatment device as in Section 5.66 of this Ordinance would be allowed. Holding tanks will be considered as per Section 6.4.

6.7 Differences in Standards

- 6.71** Alternative Local Standards as per Section 6.11 of this Ordinance.
- 6.72** All SSTS shall be sized on a Type I (Classification I) Dwelling as indicated in 2006 MN Rules Chapter 7080.0125 Table I. On lots created prior to January 21, 1992 within shoreland areas and January 10, 1995 outside the shoreland area, if the lot area does not permit for a Type I SSTS, a Type II or III SSTS may be allowed with conditions.
- 6.73** Mound septic systems with percolation rates greater than thirty (30) mpi shall not be located on slopes in excess of twelve (12)%.
- 6.74** The absorption width of mounds shall be calculated using dike (Berm) slope multiplier ratios of 3:1 or flatter. If the lot area or setback distances don't allow for the use of these multipliers, the Department may consider the use of steeper dike slopes.
- 6.75** A maximum of two ten-foot wide beds may be installed side by side in a single mound if the original soil percolation rate is between five (5) and sixty (60) mpi to a depth of at least twenty four (24) inches below the sand layer. The beds must be separated by at least four (4) feet of clean sand. The absorption area under the sand layer must equal or exceed that of a similar sized mound with one rockbed. It is preferred that the separation between the rockbeds is the same as a downslope dike width.
- 6.76** The entire construction of a mound must take place and continue through the entire construction process when the upper twelve (12) inches of soil has a moisture content of less than the plastic limit. If a mound gets rained on prior to covering, construction of the mound shall not continue until the upper twelve (12) inches of soil under the absorption area and around the perimeter of the sand base has a moisture content less than the plastic limit.
- 6.77** Setback distances from mound septic systems to buildings, property lines, wells, road right-of-ways, ordinary high water level, etc., will be taken from the outer limits of the absorption area.
- 6.78** All SSTS in sandy soils, shall be sized on a soil sizing factor of 1.27 sq.ft./gallon/day or .79 gal/day/sqft unless the sandy soil meets the special requirements in 2006 MN Rules Chapter 7080.0170, Subp. 2(C), Table V - Fine Sand, which would require a soil sizing factor of 1.67 sq.ft./gallon/day or .6 gal/day/sqft.

- 6.79** Each drainfield line must be connected separately to drop boxes and distribution boxes and must not be subdivided.
- 6.791** For pressure distribution systems using perforated laterals, it is recommended the square foot per perforation be 6-10 as in item #6 of Appendix B.

6.8 2011 MN Rule Elements included in this Ordinance

6.81 Sewage Tanks

Tank Strength Requirements, 7080.1910

Septic Tank Design, 7080.1920

Multiple Septic Tanks, 7080.1940

Compartmentalization of Single Tanks, 7080.1950

Septic Tank Baffles, 7080.1960

Sewage Tank Access, 7080.1970

Tank Construction, 7080.1980

Tank Storage, Transport and Use, 7080.1990

Location and Installation of Tanks, 7080.2000, excluding Floodways in D, H.

Tank sizing shall meet 2006 MN Rules Chapter 7080.0130, Subp. 3 A-D.

6.82 Registered Products

Final Treatment and Dispersal, MN Rules Chapter 7080.2150, Subp. 3, A is hereby adopted by reference.

6.83 Vertical Separation Flexibility

MN Rule 7080.1500, Subp. 4(D) is hereby adopted allowing a fifteen (15)% reduction in vertical separation distance for settling of sand or soil, normal variation of measurements and interpretations of the limiting layer for existing SSTs. This provision does not apply to Section 6.2.

6.84 Trench and Seepage Bed Design, 7080.2210, Subp. 4(D)

The minimum depth of soil cover, including topsoil borrow, over the distribution medium is twelve (12) inches.

6.85 Type IV Systems

MN Rules Chapter 7080.2350 is hereby adopted by reference.

6.86 Type V Systems

MN Rules Chapter 7080.2400 is hereby adopted by reference.

SECTION 7 VARIANCES

7.1 Variance Requests

A property owner may request a variance from the standards as specified in this Ordinance pursuant to the Aitkin County Zoning Ordinance, Section 10.

7.2 State Agency Variance Requests

Variances that pertain to the standards and requirements of the State of MN must be approved by the affected State Agency pursuant to the requirements of the State Agency. No permits will be issued by the County until all required State Agency variances have been approved.

7.3 Board of Adjustment Decisions

The Board of Adjustment shall have the authority only to consider variances to horizontal setbacks from ordinary high water levels, property lines, rights of way, structures, or buildings and other standards and criteria per 2006 MN Rules Chapter 7080.0030, Subp. 3. Variances to wells and water supply lines, MN Statutes 4720, 4725, 6105, and 6120 must be approved by the MN Department of Health.

7.4 Department Decisions

The Department may grant an exception to these standards for reduced setback distances to structures when an application is accompanied by an approval from a Registered Engineer of the State of Minnesota approving of the reduced setback distance. The report must address, among other considerations, any impacts to the structural integrity of the structure and septic/pump/holding tank, and contamination from the effluent to the interior of the structure.

The Department may grant an exception to these standards for reduced setback distances to road right-of-ways and easements when an application is accompanied by a letter from the road authority or easement holder(s) approving of the reduced setback distance.

SECTION 8 SSTS PERMITS AND PLANS

8.1 SSTS Permits Required

A SSTS Permit shall be obtained by the property owner or an agent of the property owner from the Department prior to the installation, construction, replacement, modification, alteration, or capacity expansion including the use of advanced treatment components of a SSTS. It is unlawful for any person to construct, install, modify or replace a SSTS without the appropriate permit from the Department including repair or replacement of components that will alter the original function of the system, change the treatment capacity of the system, change the location of the system, or otherwise change the original system's design, layout, or function. The issuing of any permit, variance, or conditional use under the provisions of this Ordinance shall not absolve the applicant of responsibility to obtain any other required permit.

No Zoning/Land Use/Building Permit, where an SSTS is required, shall be issued until after the SSTS permit is approved and issued.

No dwelling, commercial, business, institutional or industrial unit shall be redesigned or enlarged if such redesign or enlargement results in exceeding the design capacity of the SSTS unless a permit has been granted by the Department to redesign or enlarge the SSTS to accommodate the expected increase in sewage.

8.2 Activities Requiring a SSTS Permit

All contractors, property owners or other persons having charge of the SSTS construction, replacement (including tanks and dispersal systems), repair, or modification of components of SSTS, shall obtain a SSTS Permit from the Department prior to starting construction. Permits shall be granted upon receipt of a completed application with design and the appropriate fee.

8.3 Activities Not Requiring a SSTS Permit

A SSTS construction permit is not required for minor repairs or replacements of system components that do not alter the original function of the system, change the treatment capacity of the system, change the location of the system, or otherwise change the original system's design, layout, or function. Examples are, crushed pipe, pumps, floats, or other electrical devices of the pump, maintenance hole risers and cover, baffles and effluent filters.

8.4 SSTS Permit Applications

SSTS construction permit applications shall be made on forms provided by the Department and signed by the applicant or an authorized agent. The application shall include but is not limited to the information and documents listed in items A through D below. Completed application shall be examined and approved or denied by the Department.

- A. Name, mailing address, telephone number, (and email address if available.)
- B. Property Identification Number, property address and legal description of property location.
- C. Site evaluations shall contain all the information in 2006 MN Rules Chapter 7080.0110. A minimum of two (2) soil observations per SSTS site shall be conducted. Two (2) SSTS sites shall be identified on each property, if the land area exists.
- D. Design Reports, operating permits if applicable, and any documents described in 2006 MN Rules Chapter 7080.0110-7080.0115. Design reports shall be made on forms required or approved by the Department.

8.5 Incomplete Application

If after consideration of the application for a permit, the Department shall be satisfied that the work contemplated will not conform to or comply with the provisions of this Ordinance, the Department shall deny the application for a permit. Notice of such denial shall be served by mail or in person on the applicant or permittee. The notice shall state the reason for denial. The permit application may be revised or corrected and resubmitted to the Department at any reasonable time for reconsideration.

8.6 Property Owners Doing Own Work

No SSTS for a commercial establishment can be constructed by anyone other than a MPCA Licensed Installer.

Owners of non-commercial properties may be permitted to construct or repair SSTS on their own properties and shall be exempted from providing proof of a MPCA License but shall be required to execute a signed indemnification agreement pursuant to Subsection 8.61. Property owners doing their own work must comply with Sections 8.1 thru 8.4, as well as other applicable provisions of this Ordinance. A property owner shall have a current license issued by the MPCA for a Designer, Intermediate Designer or Advanced Designer if they wish to perform the site evaluation or design their own SSTS. Every phase of the installation must be inspected by the Department at such stages and times as the Department determines. There shall be a reinspection fee for each additional inspection required to ensure compliance with this Ordinance. If the property owner arranges for, hires, or subcontracts for services or assistance installing the SSTS, a person or entity providing such assistance or services must be fully licensed by the MPCA.

8.61 Indemnification Agreement

The permittee in Section 8.6 shall provide a signed agreement to the Department which indemnifies and saves the County, holding it harmless from all losses, damages, costs and charges that may be incurred by the County due to the failure of the permittee to conform

to and comply with the provisions of this Ordinance. A copy of a signed agreement will be provided by the Department.

8.7 SSTS Permit Expiration

The SSTS Permit is valid for a period of one (1) year from its date of issue. An extension of the permit may be granted at the discretion of the Department for up to three (3) additional months.

8.8 Transferability

A SSTS Permit is not transferable from one parcel to another.

8.9 Operating Permits

Operating Permits must be submitted on forms approved by the Department.

A. An Operating Permit shall be required for the following SSTS:

- 1.** SSTS with high strength waste effluent standards that exceed MN Rule 7080.2150, Subp. 3(K).
- 2.** Type III, (excluding Type III systems constructed on sites with less than twelve (12) inches of natural soil above the periodically saturated soil or bedrock), Type IV and Type V SSTS.
- 3.** SSTS that exceed a daily flow of 2,500 gallons per day.

B. Operating Permits shall be a signed agreement between the Department and the property owner and shall include monitoring, performance, mitigation, and reporting requirements.

C. Operating permits are not transferable as to person or place.

D. Operating Permits shall be valid for the specific term stated on the permit as determined by the Department.

E. An Operating Permit must be renewed prior to its expiration. If not renewed, the Department may require the system to be removed from service or operated as a holding tank until the permit is renewed. If not renewed within ninety (90) calendar days of the expiration date, the Department may require that the system be abandoned in accordance with Section 5.25.

F. Operating Permits do not transfer to new property owners. New owners shall apply for an Operating Permit in accordance with Section 8.9. The Department shall not terminate the current permit until ninety (90) calendar days after the date of sale unless an Imminent Threat to Public Health and Safety exists. To consider the new owner's application, the Department may require an inspection of the treatment system certified by a licensed service provider or inspector.

G. A report shall be prepared and certified by the licensed inspection business or licensed service provider. The report shall be submitted to the Department on or before the compliance reporting date stipulated in the operating permit as required. The report shall contain a description of all maintenance and servicing activities performed since the last compliance monitoring report as described in the Operating Permit.

H. The Department may suspend or revoke any Operating Permit issued under this Section for any false statements or misrepresentations of facts on which the Operating Permit was issued.

I. If suspended or revoked, the Department may require that the system be removed from service, operated as a holding tank, or abandoned.

J. At the Department's discretion, the Operating Permit may be reinstated or renewed upon the owner taking appropriate corrective actions.

8.10 Management Plans

Management Plans for all new or replacement SSTS shall be provided by the licensed designer. The plans shall include operating, monitoring and maintenance requirements for the new or replacement system. Homeowners are required every three (3) years to maintain their sewage tank per instructions in 7080.2450, Subp. 2 and 3.

For those SSTS without a Management Plan or Operating Permit according to the provisions of this Ordinance, must follow the provisions of 7080.2450, Subp. 2 and 3.

8.11 Suspension or Revocation

The Department may suspend or revoke a SSTS Permit issued under this Section for any false statements, misrepresentations of facts on which the SSTS Permit was issued, or unauthorized changes to the system design that alter the original function of the system, change the treatment capacity of the system, change the location of the system, or otherwise change the original system design, layout, or function. A notice of suspension or revocation and the reasons for the suspension or revocation shall be conveyed in writing to the permit holder. If suspended or revoked, installation or modification of a treatment system may not commence or continue until a valid SSTS Permit is obtained.

SECTION 9 COMPLIANCE INSPECTIONS

9.1 Compliance Inspection Program

A. SSTS Compliance Inspections are performed:

1. To ensure compliance with applicable requirements.
2. To ensure system compliance before issuance of a Zoning/Land Use/Building Permit, not to include land alteration permits.
3. For all new SSTS construction or replacement.
4. When a construction permit is required to repair, modify, or upgrade an existing system.
5. Prior to the Transfer of Title to Real Estate with a dwelling unit, mobile home or any other building served by or required to have a SSTS, whether by warranty deed, quit claim deed or any other method of transfer including the lease of a term of three (3) years or more.
6. To ensure compliance before issuance of a permit for the addition of a bedroom on properties served by a SSTS.
7. Any time the Department deems appropriate, such as upon receiving a complaint or other information of system failure.

B. It is the responsibility of the Department, or its agent, to perform installation inspections of new SSTS or upgrades of SSTS to assure that the requirements of this Ordinance are met.

C. All Compliance Inspections must be performed and signed by licensed inspection businesses or Qualified Employees certified as inspectors.

D. The Department shall be given access to enter a property at any reasonable time to inspect and/or monitor the SSTS system. As used in this paragraph, "property" does not include a residence or private building.

E. No person shall hinder or otherwise interfere with the Department's employees in the performance of their duties and responsibilities pursuant to this Ordinance. Refusal to allow

reasonable access to the property by the Department shall be deemed a separate and distinct offense.

- F. A signed Winter Release of Compliance Inspection form may be accepted in lieu of a Compliance Inspection for property transfers between November 1 and April 30, at the Departments discretion, provided the compliance inspection is submitted to the Department by the following June 1, a certificate of compliance is completed by the following September 30, and an escrow agreement, as per Section 9.9, is submitted to the Department. During these months, the signed winter release of compliance inspection form may only be used when frost conditions will not permit for an inspection. Failure to fulfill all of the obligations of the winter release of compliance inspection form shall be a violation of this Ordinance. A copy of the “Winter Release of Compliance Inspection Form” can be obtained from the Department.

9.2 New Construction or Replacement

- A. New installation inspections must be performed on new or replacement SSTS to determine compliance with this Ordinance and MN Rules Chapters 7080 or 7081. SSTS found to be noncompliant with other applicable requirements must be repaired or replaced according to the Department’s requirements.
- B. All SSTS, in whole or in part, shall be inspected by the Department. No system shall be covered, in whole or in part, prior to inspection by the Department unless prior approval has been given by the Department. Failure to obtain approval from the Department shall cause the system to be exposed for inspection. The amount of SSTS exposed for inspection shall be determined by the Department at the time of inspection. The permittee shall notify the Department prior to the completion and covering of the SSTS. The installation and construction of the SSTS shall be in accordance with the permit requirements and application design. Proposals to alter the permitted design shall be reviewed and the proposed change accepted by the Department prior to construction. Inspections shall be conducted up to two (2) times for a drainfield trench system (prior to final cover and after final cover) and up to three (3) times for a mound or at-grade system (scarification, prior to final cover and after final cover) or at other such times as to assure that the system has been constructed per submitted and approved design.
- C. It is the responsibility of the SSTS owner or the owner’s agent to notify the Department twenty-four (24) hours prior to the installation inspection.
- D. If the installer provides proper notice and the Department does not provide an inspection within two (2) hours after an inspection time was set, the installer may complete the construction per the following:

The installer shall submit photographs of the entire uncovered system and complete an as-built form with a certified statement that the installation of the SSTS met the design and permit conditions and it is free from defects. The as-built form and photographs must be submitted to the Department within five (5) working days of the installation. The as-built form will be supplied by the Department.

- E. A Certificate of Installation for new SSTS construction or replacement shall be issued by the Department within thirty (30) days of inspection if the Department has reasonable assurance that the system was built in accordance with the applicable requirements as specified in the construction permit.
- F. The Certificate of Installation must include a certified statement by the Licensed Inspector or Qualified Employee who conducted the inspection that the SSTS is or is not in compliance with the Ordinance requirements. If the SSTS is determined not to be in compliance with the

applicable requirements, a notice of noncompliance must be issued to the owner which includes a statement specifying those Ordinance provisions with which the SSTS does not comply.

- G.** No SSTS shall be placed into operation until a valid Certificate of Installation has been issued.
- H.** Certificates of Installation for new construction or replacement shall remain valid for five (5) years from the date of issuance unless the Department finds evidence of noncompliance.

9.3 Existing Systems

- A.** Compliance inspections shall be required when any of the following conditions occur:
 - 1.** When a construction permit is required to repair, modify, or upgrade an existing system.
 - 2.** Anytime there is an expansion of use of the building being served by an existing SSTS which may impact the performance of the system.
 - 3.** Anytime there is a change in use of the property being served by an existing SSTS which may impact the performance of the system.
 - 4.** When applying for a zoning permit, minor subdivision, plat, land use map amendment, conditional use permit or variance and the original Certificate of Installation is more than five (5) years old or the Certificate of Compliance is more than three (3) years old.
 - 5.** Prior to the Transfer of Title to Real Estate with a dwelling unit, mobile home or any other building served by or required to have an SSTS, whether by warranty deed, quit claim deed or any other method of transfer including the lease of a term of three (3) years or more.
 - 6.** At anytime as required by this Ordinance or the Department deems appropriate such as upon receipt of a complaint or other notice of a system malfunction.
- B.** Compliance Inspections of existing SSTS shall be reported on the inspection report forms provided by MPCA.
- C.** Soil borings for Compliance Inspections of existing systems must be done off the ends of trenches, beds and mounds, and outside the area of influence of the absorption area. If topography or other conditions don't allow for a representative soil sample in these areas the inspector shall use their best judgment in locating a representative soil sample.
- D.** The Certificate of Compliance must include a certified statement by a Qualified Employee or licensed inspection business, indicating whether the SSTS is in compliance with the requirements of this Ordinance. If the SSTS is determined not to be in compliance with the applicable requirements, a notice of noncompliance must include a statement specifying those ordinance provisions with which the SSTS does not comply. A construction permit application must be submitted to the Department if the required corrective action is not a minor repair under Section 8.3.
- E.** The Certificate of Compliance or notice of noncompliance must be submitted by the inspector to the Department no later than fifteen (15) calendar days after the date the inspection was performed.
- F.** Certificates of Compliance for existing SSTS shall remain valid for three (3) years from the date of issuance unless the Department finds evidence of noncompliance.

9.4 Failing SSTS

- A. A SSTS that is found to be failing shall be upgraded, replaced or repaired in compliance with this Ordinance, as applicable within one (1) year.
- B. A SSTS that is found to be an Imminent Threat to Public Health or Safety (ITPHS) shall abate the Imminent Threat to Public Health or Safety within ten (10) days and the SSTS shall be upgraded, replaced or repaired within ten (10) months. If the ITPHS is a surface discharge of sewage or sewage tank effluent the SSTS must be pumped often enough to prevent a surface discharge from reoccurring.
- C. Any SSTS, irrespective of the date of original installation, which is found to be in violation of this Ordinance, shall be relocated, reconstructed or reinstalled so as to be in compliance with this Ordinance.

9.5 Transfer of Property

- A. A Certificate of Compliance shall be provided by the seller or transferor to the buyer or transferee before the Transfer of Title to Real Estate with a dwelling unit, mobile home or any other building served by or required to have a SSTS, or, before the Transfer of Title by Deed, contract or lease of a term of three (3) years or more.
- B. If the seller fails to provide a Certificate of Compliance, the seller shall provide the buyer with a site evaluation report, approved septic system design and approved Zoning Permit from the Department for the installation of a SSTS, or an Escrow Agreement, as per Section 9.9, is submitted to the Department.
- C. The Certificate of Compliance shall be completed by an Inspector licensed by the State of Minnesota and shall indicate that said SSTS is in compliance with MN Rule Chapter 7080 and this Ordinance.
- D. In the event that one of the exemptions listed in Section 9.6 of this Ordinance applies, the Sworn Affidavit must be completed and accompany the deed for recording. A copy of the Sworn Affidavit can be obtained from the Department.
- E. The Certificate of Compliance, Winter Release Form, Sworn Affidavit and/or Escrow Agreement shall be filed with the Department.
- F. A Certificate of Compliance, Winter Release Form, Sworn Affidavit, and/or Escrow Agreement shall accompany the deed for recording. The County Recorder shall note on a copy of each deed when the required forms are not submitted. Nothing in this Section precludes the County Recorder from recording a deed.

9.6 Exempt Transactions The Certificate of Compliance need not be completed if the sale or transfer involves the following circumstances:

- A. The tract of land is without buildings or contains no dwellings or other buildings with plumbing fixtures.
- B. No Certificate of Real Estate Value need be filed with the County Auditor, as per Minnesota Statutes, Chapter 272.115.
- C. The sale or transfer completes a contract for deed entered into prior to June 30, 1998. This subsection applies only to the original vendor and vendee on such a contract.
- D. Any dwellings or other buildings with running water are connected to a municipal wastewater treatment system.
- E. Documents dated prior to June 30, 1998.

9.7 Transactions Occurring Between November 1 and April 30

A signed Winter Release of Compliance Inspection Form may be accepted in lieu of a Compliance Inspection for property transfers between November 1 and April 30, at the Department's sole discretion, provided the Compliance Inspection is submitted to the Department by the following June 1, a Certificate of Compliance is completed by the following September 30, and an Escrow Agreement as per Section 9.9 is submitted to the Department. During these months, the signed Winter Release of Compliance Inspection Form may only be used when frost conditions will not permit for an inspection. Failure to fulfill all of the obligations of the Winter Release of Compliance Inspection Form shall be a violation of this Ordinance. A copy of the Winter Release of Compliance Inspection Form can be obtained from the Department. The forms and documents listed above must be brought to the Department for approval.

9.8 Disclaimer

Neither the issuance of permits, Certificates of Compliance, nor Notices of Noncompliance as requested or issued shall be construed to represent a guarantee or warranty of the system's operation or effectiveness. Such certificates signify that the system in question is or has been designed and installed in compliance or non-compliance with the provisions of these standards and regulations.

9.9 Escrow

If the seller fails to provide a Certificate of Compliance, or if a compliance inspection indicates a Notice of Noncompliance or if the seller is unable to complete a compliance inspection due to frozen soil conditions, the seller shall provide the buyer sufficient security in the form of an Escrow Agreement to assure the installation of the complying SSTS. The buyer may, by mutual written agreement with the seller, assume the responsibilities to fund the escrow.

The security shall be placed in an escrow with a licensed real estate closer, licensed attorney at law, or federal or state-chartered financial institution. The amount escrowed shall be equal to 125% of a written estimate to install a complying SSTS provided by a Licensed Installation business or Licensed Installer.

The Escrow Agreement shall list Aitkin County as having the "release authority" of the escrow monies which shall not be released until a Certificate of Compliance is issued by the Department or its agent.

After a complying SSTS has been installed and a Certificate of Compliance issued, the Department shall provide the escrow agent a copy of the Certificate of Compliance which shall cause the escrow to be released. A copy of the Escrow Agreement and written estimate must be submitted to the Department.

SECTION 10 ENFORCEMENT

10.1 Violations

10.11 Cause to Issue a Notice of Violation

Any person, firm, agent, or corporation who violates any of the provisions of this Ordinance, or who fails, neglects, or refuses to comply with the provisions of this Ordinance, including violations of conditions and safeguards, or who knowingly makes any material false statement or knowing omission in any document required to be submitted under the provisions hereof, shall be guilty of a misdemeanor and upon conviction thereof, shall be punishable as defined by MN Statutes.

10.12 Notice of Violation

The Department shall serve, in person or by mail, a notice of violation to any person determined to be violating provisions of this Ordinance. The notice of violation shall contain:

- A.** A statement documenting the findings of fact determined through observations, inspections, reinspections or investigations.
- B.** A list of specific violation(s) of this Ordinance.
- C.** Specific requirements for correction or removal of the specified violation(s).
- D.** A mandatory time schedule for correction, removal and compliance with this Ordinance.
- E.** Specific enforcement actions that will be taken if corrective action is not completed.

10.13 Cease and Desist Orders

Cease and Desist Orders may be issued when the Department has probable cause that an activity regulated by this or any other County Ordinance is being or has been conducted without a permit or in violation of a permit. When work has been stopped by a Cease and Desist Order, the work shall not resume until the reason for the work stoppage has been completely satisfied, administrative fees paid, and the Cease and Desist Order lifted.

10.14 Administrative Fees

Any application for a permit that is made after the work has commenced and which requires a permit or is done in violation of a permit may be charged an “after-the-fact” administrative fee of five (5) times the original permit fee.

10.15 Reimbursements for Restoration

The Department may require correction and/or restoration of the property to its original state should the application for a permit be denied or if the action permitted does not include all or part of the work commenced prior to approval of said permit. The Department may recover the cost incurred in removal or abatement in a civil action; or at the discretion of the County Board, the cost of an enforcement action under this Ordinance may be assessed and charged against the real property on which the public health nuisance was located. The County Auditor may extend the cost as assessed and charged on the tax roll against said real property.

10.2 Prosecution

- A.** In the event of a violation or a threatened violation of this Ordinance, Aitkin County, in addition to other remedies, may institute appropriate actions or proceedings to prevent, restrain, or abate such violations or threatened violations. The Department may and is empowered to issue Citations and/or Cease and Desist Orders to halt the progress of any on-going violation. When the work has been stopped by the Department for any valid reason whatsoever, it shall not again be resumed until the reason for the work stoppage has been completely satisfied and the Cease and Desist Order lifted.
- B.** Any person with standing, may institute mandamus proceedings in the District Court to compel specific performance by the proper official or officials of any duty required by this Ordinance.

- C. Any person, firm or corporation who violates, disobeys, omits, neglects or refuses to comply with, or who resists the enforcement of any other provisions of this Ordinance shall be guilty of a misdemeanor, punishable by \$1,000.00 and/or ninety (90) days imprisonment or both. Each day that a violation is permitted to exist shall constitute a separate offense. The County Attorney shall have the authority to prosecute any and all violations of this Ordinance.
- D. After two or more attempts to achieve compliance, the Department may charge for the enforcement of violations of this Ordinance to recover actual costs for staff time, mileage and supplies. This cost shall be above and beyond any other fee imposed by this Ordinance.

SECTION 11 FEES

From time to time, the County Board shall establish fees for activities undertaken by the Department pursuant to this Ordinance. Fees shall be due and payable at a time and in a manner to be determined by the Department.

SECTION 12 ADOPTION

The Aitkin County Subsurface Sewage Treatment System Ordinance is hereby adopted by Aitkin County Board of Commissioners on the 8th day of July, 2025.

J. Mark Wedel
Chairperson, Aitkin County Board of Commissioners

ATTEST:

John Welle
County Engineer

Approved as to Form:

James Ratz
Aitkin County Attorney

EFFECTIVE DATE: July 8, 2025

MINIMUM MOUND SIZE

1. Subtract rock layer width from absorption width to obtain minimum downslope berm toe

_____ ft - _____ ft = _____ feet

2. Determine depth of clean sand fill at upslope edge of rock layer:

Separation 3' - _____ ft = _____ feet

3. Add depth of clean sand for separation (2) at upslope edge, depth of rock layer (1 ft) to depth of cover (1 ft) to find the mound height at upslope edge of rock layer:

_____ ft + 1 ft + 1 ft = _____ feet

4. Enter table with landslope and upslope berm ratio.

Select berm multiplier _____.

5. Multiply berm multiplier by upslope mound height to find upslope berm width:

_____ x _____ = _____ feet

6. Multiply rock layer width (K) by landslope to determine drop in elevation:

_____ x _____ % \div 100 = _____ feet

7. Add depth of clean sand for slope difference (6) at downslope edge to the mound height at the upslope edge of rock layer (3) to find the downslope height:

_____ ft + _____ ft = _____ feet

8. Enter table with landslope and downslope berm ratio.

Select berm multiplier of _____.

9. Multiply berm multiplier by downslope mound height to get downslope berm width:

_____ x _____ = _____ feet

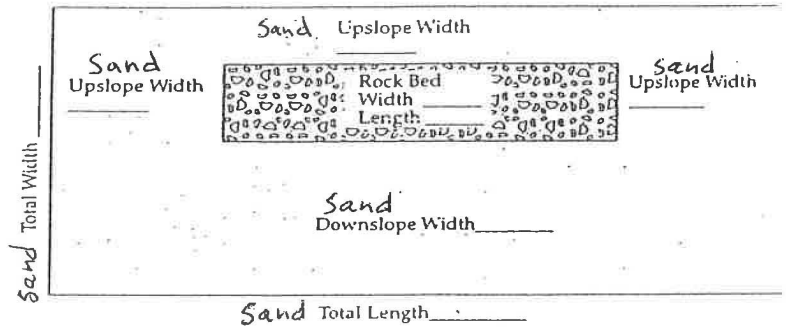
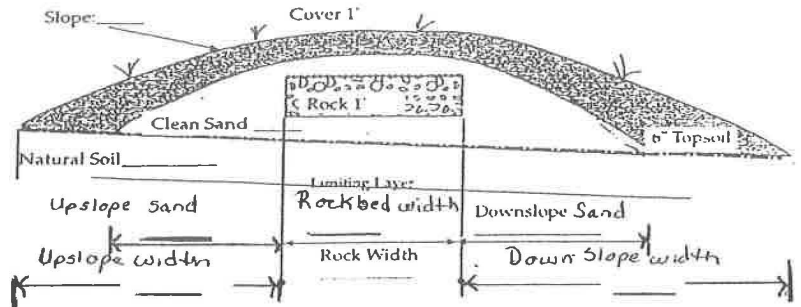
10. Compare the values of Step (1) _____ and Step(9) _____. Select the greater of the two values as the downslope berm width: _____ feet

11. Total mound width is the sum of upslope berm (5): width plus rock layer width (K) plus downslope berm width (9):

_____ ft + _____ ft + _____ ft = _____ feet

12. Total mound length is the sum of upslope berm width (5) plus rock layer length (L) plus upslope berm width (5):

_____ ft + _____ ft + _____ ft = _____ feet



BERM SLOPE MULTIPLIERS

Land Slope, in %	DOWNSLOPE berm multipliers for various berm slope ratios					UPSLOPE berm multipliers for various berm slope ratios				
	3:1	4:1	5:1	6:1	7:1	3:1	4:1	5:1	6:1	7:1
0	3.0	4.0	5.0	6.0	7.0	3.0	4.0	5.0	6.0	7.0
1	3.09	4.17	5.26	6.38	7.53	2.91	3.85	4.76	5.66	6.54
2	3.19	4.35	5.56	6.82	8.14	2.83	3.70	4.54	5.36	6.14
3	3.30	4.54	5.88	7.32	8.86	2.75	3.57	4.35	5.08	5.79
4	3.41	4.76	6.25	7.89	9.72	2.68	3.45	4.17	4.84	5.46
5	3.53	5.00	6.67	8.57	10.77	2.61	3.33	4.00	4.62	5.19
6	3.66	5.26	7.14	9.38	12.07	2.54	3.23	3.85	4.41	4.93
7	3.80	5.56	7.69	10.34	13.73	2.48	3.12	3.70	4.23	4.70
8	3.95	5.88	8.33	11.54	15.91	2.42	3.03	3.57	4.05	4.49
9	4.11	6.25	9.09	13.04	18.92	2.36	2.94	3.45	3.90	4.30
10	4.29	6.67	10.00	15.00	23.33	2.31	2.86	3.33	3.75	4.12
11	4.48	7.14	11.11	17.65	30.43	2.26	2.78	3.23	3.61	3.95
12	4.69	7.69	12.50	21.43	43.75	2.21	2.70	3.12	3.49	3.80

Note: The product of the multiplier and the height results in the horizontal distance to where the berm meets the original land slope. Example: Height at upper edge of rock layer is 3.0 feet, rock layer is 10 feet wide, land slope is 6% and berm slope ratio is 4:1. Upslope berm width is $3.23 \times 3.0 = 9.7$ ft; height at lower edge of rock layer is $3.0 + 10 \times 0.6 = 3.6$ ft and downslope berm width is $5.26 \times 3.6 = 18.9$ ft.

Final Cover Dimension

X

PRESSURE DISTRIBUTION SYSTEM

1. Select number of perforated laterals _____
2. Select perforation spacing = _____ feet.
3. Since perforations should not be placed closer than 1 ft. to the edge of the rock layer (see diagram), subtract 2 ft. from the rock layer length. System area: _____ x _____ = _____

$$\frac{\text{Rock layer length}}{\text{Rock layer length}} - 2 \text{ ft.} = \text{_____ feet.}$$

4. Determine the number of spaces between perforations. Divide the length above by perforation spacing and round down to nearest whole number.

$$\text{Length perf. spacing} = \frac{\text{_____ ft.}}{(3)} \div \frac{\text{_____ ft.}}{(2)} = \text{_____ spaces}$$

5. Number of perforations is equal to one plus the number of perforation spaces .

$$\text{_____ spaces} + 1 = \text{_____ perforations/lateral}$$

6. Multiply perforations per lateral by number of laterals to get total number of perforations.

$$\frac{\text{_____ laterals}}{\text{laterals}} \times \frac{\text{_____ perfs/lateral}}{\text{perfs/lateral}} = \text{_____ perforations.}$$

Calculate the square footage per perforation (6-10 sqft/perf)

$$\frac{\text{_____ area}}{\text{area}} \div \frac{\text{_____ perforations}}{\text{perforations}} = \text{_____ sqft/perf}$$

7. Determine required flow rate by multiplying number of perforations by flow per perforation

$$\frac{\text{_____ perfs}}{\text{perfs}} \times \frac{\text{_____ gpm/perf}}{\text{gpm/perf}} = \text{_____ gpm}$$

8. If laterals are connected to header pipe as shown on upper example, to select minimum required lateral diameter; enter table with perforation spacing and number of perforations per lateral. Select minimum diameter for perforated lateral = _____ inches.

9. If perforated lateral system is attached to manifold pipe near the center, lower diagram, perforated lateral length and number of perforations per lateral will be approximately one half of that in step 8. Using these values, select minimum diameter for perforated lateral = _____ inches.



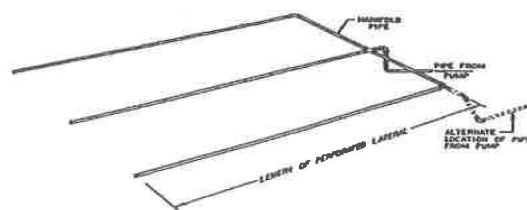
Perf Sizing 7/32" - 1/4"
Perf Spacing 1.5' - 5'

Perforation Discharges in GPM				
Head (feet)	Perforation diameter (inches)			
	1/8*	3/16	7/32	1/4
1.0a	0.18	0.42	0.56	0.74
2.0b	0.26	0.59	0.80	1.04
5.0	0.41	0.94	1.26	1.65

a Use 1.0 foot for single homes.
b Use 2.0 feet for anything else.
* Potential for plugging

Maximum number of quarter inch perforations per lateral to guarantee < 10% discharge variation			
Perforation Spacing (feet)	1 1/4	1 1/2	2
2.5	14	18	28
3.0	13	17	26
3.3	12	16	25
4.0	11	15	23
5.0	10	14	22

MANIFOLD LOCATED AT END OF PRESSURE DISTRIBUTION SYSTEM



LAYOUT OF PERFORATED PIPE LATERALS FOR PRESSURE DISTRIBUTION IN MOUND

