



**Title 10—DEPARTMENT OF NATURAL RESOURCES
Division 20—Clean Water Commission
Chapter 8—Minimum Design Standards**

WORKING DOCUMENT
Strawman

**The Department presents these draft materials for
stakeholder review and discussion only.
Subject to the Red Tape Reduction review.**

The Missouri Department of Natural Resources has identified 10 CSR 20-8, Minimum Design Standards, as a potential rulemaking amendment. This workgroup has been convened for the purpose of informal and voluntary public participation and discussions regarding the development of this rule prior to initiating formal rulemaking.

Under Governor Greitens' leadership, all state agencies are working to reduce regulations and other government processes that unnecessarily burden individuals and businesses while doing little to protect or improve public health, safety, and our natural resources. The Missouri Department of Natural Resources is committed to limiting regulation to what is necessary to protect Missouri's environment, implementing statutory mandates, and maintaining state control of programs. Any further proposed changes to rules discussed on this page are being developed with these goals in mind. We welcome your comments to help ensure that our regulations provide required protections but do not add unnecessary costs.

Title 10 – DEPARTMENT OF NATURAL RESOURCES
Division 20 – Clean Water Commission
Chapter 8—[Design Guides] Minimum Design Standards

10 CSR 20-8.125 Alternative Sewer Systems.

PURPOSE: The following minimum criteria have been prepared as a standard for the design of wastewater systems. This rule is to be used with rules 10 CSR 20-8.110 through 10 CSR 20-8.500 for the planning and design of a treatment facility. It is not reasonable or practical to include all aspects of design in these standards. The design engineer may use other appropriate reference materials for these design aspects not addressed in this rule, which include but are not limited to: copies of all ASTM International and American Water Works Association (AWWA) standards pertaining to wastewater systems and appurtenances, design manuals such as Water Environment Federation's Manuals of Practice, Department prepared guides and other wastewater design manuals containing principles of accepted engineering practice. This rule specifies minimum standards for the design and construction of wastewater systems, in addition to engineering experience and judgement in accordance with standards of practice.

(1) Applicability. Wastewater systems shall be designed based on criteria contained in this rule, published standards, applicable federal and state requirements, standard textbooks, current technical literature and applicable safety standards. To the extent of any conflict between the above criteria, the requirement in this rule shall prevail.

(A) This rule shall not apply to animal waste management systems. Design guide and criteria for these facilities are found in 10 CSR 20-8.300.

(B) This rule shall not apply to agrichemical facilities. Design guide and criteria for these facilities are found in 10 CSR 20-8.500.

(2) Approval of Sewers. Rain water from roofs, streets, and other areas and groundwater from foundation drains shall be excluded from sewers in accordance with 10 CSR 20-8.120(2).

(3) Supplement to the Engineering Report. Alternative sewer systems shall not be used in lieu of conventional gravity sewers, but may be acceptable when it can be shown in the engineering report that it is not feasible to provide conventional gravity sewers. Refer to 10 CSR 20-8.110(4) for more information.

(4) General.

(A) Continuing Authority. The continuing authority shall be responsible for the operation and maintenance and modernization of an alternative sewer system collection system. Per section 249.1000, RSMo 2016, publicly owned treatment works are exempt from continuing authority responsibilities of alternative sewer individual units (i.e., grinder pump stations, septic tanks, and septic tank pumps). See 10 CSR 20-6.010(3) for acceptable continuing authorities.

(B) Flooding. Refer to 10 CSR 20-8.140(2)(B) for flood protection.

(C) Accessibility. Make pumping station structures and septic tanks readily accessible in accordance with 10 CSR 20-8.140(2)(D) for access roads.

(D) Security. Refer to 10 CSR 20-8.140(7)(A) for fencing criteria.

(E) Potable Water Sources. Refer to 10 CSR 20-8.130(2)(D) for the minimum separation distances from potable water sources.

(F) Protection of Water Supplies. Refer to 10 CSR 20-8.120(5) for the separation and crossings of water supplies.

(5) Pressure Sewers.

(A) Sewer Design.

1. Velocity. Design shall be based on the most probable number of pumping units expected to operate simultaneously or on some other acceptable method of computing the peak pumpage rate.

A. A cleansing velocity of at least two feet per second (2 ft/s) at least once and preferably several times per day shall be achieved.

B. Maximum velocity in any portion of the system shall be eight feet per second (8 ft/s) without velocity protection and thirteen feet per second (13 ft/s) with velocity protection.

2. Minimum size. The minimum diameter sewer main pipe shall not be less than one and a half inches (1.5").

3. Installation. Refer to 10 CSR 20-8.120(3)(B) for sewer installation.

4. Hydrostatic pressure test. Hydrostatic testing shall, as a minimum, conform to the test procedure described in AWWA C600-17 *Installation of Ductile-Iron Mains and Their Appurtenances*, as approved and published July 1, 2017, for ductile iron pipe and AWWA C605-13 *Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings*, as approved and published February 1, 2014, for plastic pipe. These standards are incorporated by reference in this rule, as published by American Water Works Association (AWWA), 6666 West Quincy Avenue, Denver, CO 80235-3098. This rule does not incorporate any subsequent amendments or additions

(B) Sewer Appurtenances. Appurtenances shall be compatible with the piping system and full bore with smooth interior surfaces to eliminate obstruction and keep friction loss to a minimum.

1. Isolation valves shall be—

A. Resilient seated gate valve or ball valve with a position indicator;

B. Constructed from corrosion resistant materials; and

C. Enclosed in a watertight and lockable valve box.

2. Isolation valves shall be installed—

A. On the upstream side of major pipe intersections;

B. On both sides of stream, bridge, and railroad crossings, and unstable soil; and

C. On the terminal end of the system to facilitate future extensions.

3. Proper support (e.g., crushed stone, concrete pads, or a well compacted trench bottom) shall be provided for valves so the weight of the valve not carried by the pipe.

(C) Service Line Connection. Refer to 10 CSR 20-8.120(4)(C)1. The minimum diameter service line pipe shall not be less than one and one quarter inches (1.25").

(D) Grinder Pump Stations.

1. Number of pumps.

A. Simplex grinder pump station shall—

(I) Not serve multiple EDUs if owned, operated, and maintained by individual homeowners; and

(III) Not serve commercial facilities.

B. Multiple unit grinder pump stations **must** be owned, operated, and maintained by an approved continuing authority. See **subsection (4)(A) of this rule** for more continuing authority information.

2. Grinder pump vaults **shall** be watertight.
3. Access. A minimum access diameter of twenty-four inches (24") **shall** be provided for all grinder pump vaults.
4. Storage volume. A grinder pump vault **must** have a storage volume of at least seventy (70) gallons.
5. Valves. The following valves **must** be provided in the grinder pump vaults:
 - A. A shutoff valve accessible from the ground surface;
 - B. A check valve to prevent backflow; and
 - C. An anti-siphon valve, where siphoning could occur.
6. Grinder pump construction. Refer to **10 CSR 20-8.130(5)** for design of pumps and motors.
7. Controls. Refer to **10 CSR 20-8.130(3)(D)** for water level control design.
8. Electrical equipment. Refer to **10 CSR 20-8.130(3)(C)2.** for electrical equipment.
9. Alarm systems. Alarm systems with a backup power source **shall** be provided for all grinder pump stations.
10. Emergency operations. When the continuing authority operates and maintains the grinder pump stations, provisions **must** be made for periods of mechanical or power failure.

(6) Septic Tank Effluent Pumped (STEP) Sewers.

(A) Sewer Design. Refer to **subsection (5)(A) of this rule.**

(B) Sewer Appurtenances. Refer to **subsection (5)(B) of this rule.**

(C) Service Line Connection. Refer to **subsection (5)(C) of this rule.**

(D) Septic Tank Design. In addition to the requirements of **10 CSR 20-8.180(3)**, septic tank design **shall** meet the following:

1. A single septic tank serving no more than one (1) EDU; and
2. A capacity of at least one thousand (1,000) gallons. Provide twenty percent (20%) of the septic tank volume for freeboard and ventilation.

(E) Existing Septic Tanks. When existing on-site septic tanks are proposed for reuse in an alternative sewer system, they **must** be inspected and verified watertight prior to acceptance. Refer to **subsection (6)(D) of this rule** for the minimum design of acceptable existing septic tanks proposed for reuse.

(F) Pump Vault Design.

1. Number of pumps. Duplex pumps **shall** be provided where the design flow from the EDUs, or other, is one thousand five hundred (1,500) gallons per day or greater.
2. Access. Refer to **paragraph (5)(D)3. of this rule.**
3. Pump removal. Refer to **10 CSR 20-8.130(5)(A).**
4. Valves. Refer to **paragraph (5)(D)5. of this rule.**
5. Controls. Refer to **10 CSR 20-8.130(3)(D)** for water level control design.
6. Electrical equipment. Refer to **10 CSR 20-8.130(3)(C)2.** for electrical equipment.

7. Alarm systems. Refer to paragraph (5)(D)9. of this rule.
8. Emergency operations. Provisions must be made for periods of mechanical or power failure.

(7) Septic Tank Effluent Gravity (STEG) Sewers.

(A) Sewer Design.

1. Velocity. The maximum velocity in any portion of the system shall be thirteen feet per second (13 ft/s) with velocity protection.
2. Minimum size. The minimum diameter sewer main pipe shall not be less than four inches (4").
3. Installation. Refer to 10 CSR 20-8.120(3)(B) for sewer installation
4. Leakage tests. Refer to 10 CSR 20-8.120(3)(D)2. for leakage testing.

(B) Sewer Appurtenances. Refer to subsection (5)(B) of this rule. When manholes are utilized at major junctions of sewer mains, refer to 10 CSR 20-8.120(4).

(C) Service Line Connection. Refer to paragraphs (5)(C) of this rule.

1. The diameter of service line pipe shall not be less than four inches (4").

(D) Septic Tank Design. Refer to subsections (6)(D) through (6)(E) of this rule.

(8) Combination of Sewers. A pressure sewer system discharging to a downstream STEP and STEG sewer system shall not be permitted, as effluent sewers are not designed to carry settleable solids and grease.