

**Pima County Department of Environmental Quality
Alternative Wastewater On-Site Residential Treatment System Checklist
for Engineers, Designers, and Site Evaluators**

per Arizona Administrative Code Title 18, Chapter 9

R18-9-E308. 4.08 General Permit: Wisconsin Mound, Less Than 3000 Gallons Per Day Design Flow

General Permit

- _____ Wastewater treated to a level equal to or better than that specified in R18-9-E302 (B).
- _____ Wisconsin mound is characterized by:
 - An above-grade bed system that blends with the land surface into which is dispensed pressure dosed wastewater from a septic tank or other upstream treatment device,
 - Dispersal of wastewater under unsaturated flow conditions through the engineered media system contained in the mound, and
 - Wastewater treated by passage through the mound before percolation into the native soil below the mound.
- _____ A Wisconsin mound may be used if:
 - The native soil has excessively high or low permeability,
 - There is little native soil overlying fractured or excessively permeable rock, or
 - A reduction in minimum vertical separation is desired.

Performance

- _____ Design a Wisconsin mound so that treated wastewater released to the native soil meets the following criteria:
 - Category A.
 - TSS of 20 milligrams per liter, 30-day arithmetic mean;
 - BOD₅ of 20 milligrams per liter, 30-day arithmetic mean;
 - Total nitrogen (as nitrogen) of 53 milligrams per liter, 5-month arithmetic mean; and
 - Total coliform level of 1000 (Log₁₀ 3.0) colony forming units per 100 milliliters, 95th percentile; or
 - Category B.
 - TSS of 30 milligrams per liter, 30-day arithmetic mean;
 - BOD₅ of 30 milligrams per liter, 30-day arithmetic mean;
 - Total nitrogen (as nitrogen) of 53 milligrams per liter, 5-month arithmetic mean; and
 - Total coliform level of 300,000 (Log₁₀ 5.5) colony forming units per 100 milliliters, 95th percentile.

Notice of Intent to Discharge

- _____ Meets the requirements specified in R18-9-A301(B) and R18-9-A309(B)
- _____ Submit specifications for the internal wastewater distribution system media proposed for use;
- _____ Two scaled or dimensioned cross sections of the mound (one of the shortest basal area footprint dimension and one of the lengthwise dimension); and
- _____ Design calculations following the “Wisconsin Mound Soil Absorption System: Siting, Design, and Construction Manual,” published by the University of Wisconsin – Madison, January 1990 Edition (the Wisconsin Mound Manual).

Design requirements

- _____ Meet the applicable requirements in R18-9-A312
- _____ Pressure dosed wastewater is delivered into the Wisconsin mound through a pressurized line and secondary distribution lines into an engineered aggregate infiltration bed, or equivalent system, in conformance with R18-9-E304 and the Wisconsin Mound Manual. Ensure that the aggregate is washed;
- _____ Wastewater is applied to the inlet surface of the mound media at not more than 1.0 gallon per day per square foot of mound bed inlet surface if the mound bed media conforms with the “Standard Specification for Concrete Aggregates, C33-03 (2003),” except if cinder sand is used that is the appropriate grade with not more than 5 percent passing a #200 screen.
 - For cinder sand, ensure that the rate is not more than 0.8 gallons per day per square foot of mound bed inlet surface; and
 - Wash the media used for the mound bed;
- _____ The aggregate infiltration bed and mound bed is capped by coarser textured soil, such as sand, sandy loam, or silt loam.
 - Do not use silty clay, clay loam, or clays;
- _____ The cap material is covered by topsoil, following the procedure in the Wisconsin Mound Manual, and the topsoil is capable of supporting vegetation, is not clay, and is graded to drain;
- _____ The top and bottom surfaces of the aggregate infiltration bed are level and do not exceed 10 feet in width and that:
 - The minimum depth of the aggregate infiltration bed is 9 inches, or
 - Synthetic filter fabric permeable to water and air and capable of supporting the cap and topsoil load is placed on the top surface of the aggregate infiltration bed;
- _____ The minimum depth of mound bed media is:
 - Performance Category A, 24 inches; or
 - Performance Category B, 12 inches;
- _____ The maximum allowable side slope of the mound bed, cap material, and topsoil is not more than one vertical to three horizontal;
- _____ Ports for inspection and monitoring are provided to verify performance, including verification of unsaturated flow within the aggregate infiltration bed.
 - Install a vertical PVC pipe and cap with a minimum diameter of 4 inches as an inspection port at the end of the disposal line, and
 - Install the pipe with a physical restraint to maintain pipe position;
- _____ The main pressurized line and secondary distribution lines for the aggregate infiltration bed are equipped at appropriate locations with cleanouts to grade;
- _____ The following requirements and the setbacks specified in R18-9-A312(C) are observed:
 - Increase setbacks for the following downslope features at least 30 feet from the toe of the mound system:
 - Property line,
 - Driveway,
 - Building,
 - Ditch or interceptor drain, or
 - Any other feature that impedes water movement away from the mound; and
 - Ensure that no upslope natural feature or improvement channels surface water or groundwater to the mound area;
- _____ The portion of the basal area of native soil below the mound conforms to the Wisconsin Mound Manual.
 - Calculate the absorption of wastewater into the native soil for only the effective basal area;
 - Apply the soil absorption rate specified in R18-9-A312 (D).

- May increase allowable loading rate to the mound bed inlet surface up to 1.6 times if the wastewater dispersed to the mound is pretreated to reduce the sum of TSS and BOD₅ to 60 mg/l or less.
- May increase the soil absorption rate to not more than 0.20 gallons per day per square foot of basal area if the following slowly permeable soils underlie the mound:
 - Sandy clay loam, clay loam, silty clay loam, or finer with weak platy structure; or
 - Sandy clay loam, clay loam, silty clay loam, or silt loam with massive structure;

_____ The slope of the native soil at the basal area does not exceed 25 percent, and a slope stability analysis is performed whenever the basal area or site slope within 50 horizontal feet from the mound system footprint exceeds 15 percent.

Installation

_____ Prepare native soil for construction of a Wisconsin mound system.

- Mow vegetation and cut down trees in the vicinity of the basal area site to within 2 inches of the surface;
- Leave in place boulders and tree stumps and other herbaceous material that would excessively alter the soil structure if removed after mowing and cutting;
- Plow native soil serving as the basal area footprint along the contours to 7- to 8- inch depth;
- Not substitute rototilling for plowing; and
- Begin mound construction immediately after plowing;

_____ Place each layer of the bed system to prevent differential settling and promote uniform density; and

_____ Use the Wisconsin Mound Manual to guide any other detail of installation.

_____ May vary installation procedures and criteria depending on mound design but shall use installation procedures and criteria that are at least equivalent to those in the Wisconsin Mound Manual.

Operation and maintenance requirements

_____ Meet the applicable requirements specified in R18-9-A313 (B), and

_____ If an existing mound system shows evidence of overload or hydraulic failure, conduct the following sequence of evaluations:

- Verify the actual loading and performance of the pretreatment system.
- Verify the watertightness of the pretreatment and dosing tanks;
- Determine the dosing rates and dosing intervals to the aggregate infiltration bed and compare it with the original design to evaluate the presence or absence of saturated conditions in the aggregate infiltration bed;
- If the above steps do not indicate an anomalous condition, evaluate the site and recalculation of the disposal capability to determine if mound lengthening is feasible;
- Determine if site modifications are possible including changing surface drainage patterns at upgrade locations and lowering the groundwater level by installing interceptor drains to reduce native soil saturation at shallow levels; and
- Determine if the basal area can be increased, consistent with R18-9-A309 (A)(9)(b)(iv);

_____ Prepare servicing and waste disposal procedures and task schedules necessary for clearing the main pressurized wastewater line and secondary distribution lines, septic tank effluent filter, pump intake, and controls.

Prepared by:

Date: