567—69.11(455B) At-grade systems.

69.11(1) *General requirements.*

a. At-grade systems shall be permitted only after a thorough site evaluation has been made and landscaping, dwelling placement, effect on surface drainage, and general topography have been considered.

b. At-grade systems shall not be utilized on sites subject to flooding with a ten-year or greater frequency.

c. At-grade systems shall not be utilized on soils where the high groundwater level, impermeable bedrock or soil strata having a percolation rate exceeding 60 minutes per inch occur within 36 inches of natural grade.

d. At-grade systems shall be constructed only upon undisturbed naturally occurring soils or where a soil analysis has determined the site is suitable.

e. At-grade systems shall be located in accordance with the distances specified in Table I as measured from the outer edge of the gravel in the system.

f. No buildings, driveways or other surface or subsurface obstructions shall be permitted within 25 feet on the down-gradient side of the at-grade system when the at-grade system is constructed on a slope greater than 5 percent. No future construction shall be permitted in this effluent disposal area as long as the at-grade system is in use.

g. Specifications given in these rules for at-grade systems are minimal and may not be sufficient for all applications. Technical specifications are changing with experience and research. Other design information beyond the scope of these rules may be necessary to properly design an at-grade system.

69.11(2) *Construction details.*

a. There shall be a minimum of 3 feet of undisturbed naturally occurring soils between the bottom of the gravel in the at-grade system and the highest elevation of the limiting conditions defined in paragraph 69.11(1)*"c."*

b. An at-grade system may be installed up to 12 inches deep.

c. Gravel shall meet the requirements specified in paragraph 69.9(4)*"a."* EPS aggregate or chambers are acceptable alternatives to gravel.

d. At-grade systems shall utilize an absorption bed distribution piping design. The bed shall be installed with the long dimension parallel to the land contour. Systems on steep slopes with slowly permeable soils should be narrow to reduce the possibility of toe seepage.

e. No soils under or within 15 feet of any at-grade system may be disturbed. On sloping sites, no soils shall be disturbed within 10 feet uphill of the system and within 15 feet downhill of the system plus an additional 5 feet for every 5 percent slope downhill.

f. Construction equipment which would cause undesirable compaction of the soil shall be kept off the base area. Construction or plowing shall not be initiated when the soil moisture content is high. If a sample of soil from approximately 9 inches below the surface can be easily rolled into a ⅛-inch diameter wire 1½ inches long, the soil moisture content is too high for construction purposes.

g. Aboveground vegetation shall be closely cut and removed from the ground surface throughout the area to be utilized for the placement of the fill material.

h. The area shall be plowed to a minimum depth of 7 to 9 inches, parallel to the land contour, with the plow throwing the soil up slope to provide a proper interface between the fill and the natural soil. Chisel teeth on a backhoe bucket shall be at least as long as the depth of plowing. Tree stumps should be cut flush with the surface of the ground, and roots should not be pulled. All work shall be done from the uphill side of the at-grade system.

i. The gravel bed absorption area of the at-grade system is to be calculated based on the results of the percolation rate test or soil analysis as indicated in Table IIIa or IIIb and the flow rate.

j. One foot of loamy cover material shall be installed over the rock bed. Cover shall extend at least 5 feet from the ends of the rock bed and be sloped to divert surface water. Side slopes shall not be steeper than 4:1. The upper 6 inches of the loamy soil cover must be topsoil borrow. Topsoil borrow must be of a quality that provides a good vegetative cover on the at-grade system.

k. Distribution system.

(1) The distribution pipe shall be rigid plastic pipe, Schedule 40 or 80 with a 1-inch nominal diameter or equivalent design that ensures proper distribution.

(2) The distribution pipe shall be provided with a single row of ¼-inch perforations in a straight line 30 inches on center along the length of the pipe or an equivalent design that ensures uniform distribution. All joints and connections shall be solvent-cemented.

(3) The distribution pipe shall be placed in the clean, washed gravel (or crushed limestone as described in paragraph 69.9(4)*"a"*), with holes downward. The gravel shall be a minimum of 10 inches in depth below the pipe and 2 inches in depth above the pipe.

(4) Distribution pipe shall be installed in the center of the gravel bed on slopes less than 1 percent and on the upslope edge at the gravel bed absorption width on slopes 1 percent or greater.

(5) No perforations shall be permitted within 3 inches of the outer ends of any distribution pipe.

(6) The outer ends of all pressure distribution lines shall be turned up, with a long 90-degree elbow or two 45-degree elbows to allow for cleaning. The outer ends will have a screw-on cap and cover. The cover shall be accessible from the ground surface without excavation.

(7) The central pressure manifold should consist of 1½- or 2-inch solid plastic pipe using a tee for connecting the distribution lines or an equivalent design that ensures uniform distribution.

(8) The top of the gravel shall be covered with synthetic drainage fabric. Unbacked, rolled, 3½-inch-thick fiberglass insulation, untreated building paper, or other suitable material may be used with approval of the administrative authority. Plastic or treated building paper shall not be used.

(9) After installation of the distribution system, the distribution system shall be pressure-tested before it is covered with gravel. The entire at-grade system is to be covered with topsoil native to the site or of similar characteristics to support vegetation found in the area. The entire at-grade system shall be crowned by providing 12 inches of topsoil on the side slopes, with a minimum of 18 inches of topsoil over the center of the at-grade system. The entire at-grade system shall be seeded, sodded or otherwise provided with a grass cover to ensure stability of the installation.

(10) The area surrounding the at-grade system shall be graded to provide for diversion of surface runoff water.

69.11(3) *Dosing.*

a. Pump dosing shall be required for at-grade systems.

b. The dosing volume shall be three to ten times the distribution piping network volume, but not more than 25 percent of the design flow shall be applied to the soil in one dose.

c. The dosing pump shall be capable of maintaining a squirt height of 3 feet above the pipe at the outer ends of the distribution lines. All lines shall have an equal squirt height above the pipe to maintain equal distribution.

[**ARC 7569B**, IAB 2/11/09, effective 3/18/09; **ARC 0208C**, IAB 7/11/12, effective 8/15/12]