

MISSOURI DEPARTMENT OF HEALTH  
Bureau of Community Sanitation

# WASTE STABILIZATION PONDS (Sewage Lagoons)

E3.12 - Rev. 4/90

AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER  
services provided on a non-discriminatory basis

# GUIDELINES FOR INDIVIDUAL WASTE STABILIZATION LAGOON FOR A RESIDENCE

A. Wastewater Stabilization Ponds. A waste stabilization pond can provide satisfactory sewage treatment in rural areas where soils are not suited for absorption systems. Single residence wastewater stabilization ponds are not generally suitable in subdivisions with lots less than three (3) acres in size.

1. The following minimum separation distances may be modified as necessary to accommodate site requirements or local codes:

- a. the pond shall be located a minimum of seventy-five feet (75') from property lines as measured from the adjoining pond shoreline. However, this distance must be increased where necessary to be sure that all effluent is disposed upon the property from which it originated;
- b. the pond shall be located a minimum of two hundred feet (200') from the nearest existing residence and a minimum of one hundred feet (100') from the residence that it serves;
- c. the pond shall be located at least one hundred feet (100') from a potable water supply or pump suction line; and
- d. the pond shall be located at least fifty feet (50') from a stream, water course, lake or impoundment.

2. Ponds may be utilized when there are no significant limitations related to groundwater from their use and the soils have been demonstrated to be impermeable such as percolation rates

slower than one hundred twenty (120) minutes per inch. There shall be a minimum separation distance between the pond bottom and creviced bedrock of three feet (3'). Percolation losses from the pond shall not exceed one-eighth inch (1/8") per day to prevent groundwater contamination or nuisance conditions. Site modifications may be accomplished to provide these soil requirements. In areas of highly permeable bedrock, restrictive layers such as fragipans shall be a minimum of twelve inches (12") thick and shall not be breached during construction.

3. Steeply sloping areas should be avoided.

4. Selection of the pond site should consider a clear sweep of the surrounding area by prevailing winds. Heavy timber should be removed for a distance of fifty feet (50') from the water's edge to enhance wind action and prevent shading.

5. The administrative authority may require that a properly sized and constructed septic tank or aeration unit precede the pond. If irrigation of the effluent is required to maintain the wastewater on the property from which it originated, a septic tank or aeration unit should precede the pond. The use of a septic tank or aeration unit should not be used as a basis for reduction of the setback distances as set forth in subparagraphs A.1.a-d.

6. The pond shall be designed on the basis of four hundred forty (440) square feet of water surface area per bedroom at the three-foot (3') operating level. Whenever the pond is preceded by a septic tank or aeration unit, the water surface area may be reduced up to a maximum of twenty percent (20%); however, the minimum water surface area at the three foot (3') level shall be nine hundred (900) square feet. This reduction in size shall not be allowed where irrigation of the pond effluent is required by the administrative authority in order to keep the wastewater on the property from which it originated.

7. A single cell is generally acceptable for single residence pond systems. If multiple cells are used for further polishing or storage of the effluent, the secondary cell should be one-half (1/2) the size of the primary cell.

8. The minimum embankment top width shall be four feet (4'). The embankment slopes shall not be steeper than three to one (3:1) on the inner and outer slopes. Inner embankment slopes shall not be flatter than four to one (4:1). Outer embankment slopes shall be sufficient to prevent the entrance of surface water into the pond. Freeboard shall be at least eighteen inches (18") and preferably twenty-four inches (24"). Additional freeboard may be provided.

9. Embankments shall be seeded with a locally hardy grass from the outside toe to one foot (1') above the water line to

minimize erosion and facilitate weed control. Alfalfa or similar long-rooted crops which might interfere with the water-holding capacity of the embankment shall not be used. Riprap may be necessary under unusual conditions to provide protection of embankments from erosion.

10. The influent line shall be of sound, durable material of water-tight construction. The line shall have a minimum diameter of four inches (4") and be laid on a firm foundation at a minimum grade of one-fourth inch (1/4") per foot. The influent line shall discharge as far as practical from the possible outlet side of the pond. A cleanout or manhole should be provided in the influent line near the pond embankment. From this point the line should be laid to the inner toe of the embankment and then on the bottom of the pond to the terminus point. A concrete splash pad three feet (3') square should be placed under the terminus of the pipe. The elevation of the cleanout or manhole bottom should be a minimum of six inches (6") above the high water level in the pond.

11. The shape of the pond should be such that there are no narrow or elongated portions. Round, square or rectangular cells are considered most desirable. Rectangular cells shall have a length not exceeding three (3) times the width. No islands, peninsulas or covers shall be permitted. Embankments should be rounded at corners to minimize accumulation of floating materials.

12. The floor of the pond shall be stripped of vegetation and levels to the proper elevation. Organic material removed from the pond area shall not be used in embankment construction. The wetted area of the pond must be sealed to prevent excessive exfiltration. Seals consisting of soils must be adequately compacted by the construction equipment or a sheeps-foot type roller may be used.

13. Embankments shall be constructed of impervious materials and compacted sufficiently to form a stable structure with very little settlement.

14. Any effluent should be withdrawn from six inches (6") below the water surface. This can be accomplished by placing a tee on the inlet end of the pipe or by placing the outlet pipe eight to ten inches (8-10") lower on the inlet end than the outlet end of the pipe.

*ADD*  
*(4') four foot*  
15. The pond area shall be enclosed with a ~~five-foot (5')~~ fence to preclude livestock and discourage trespassing. The fence shall be so located to permit mowing of the embankment top and slopes. A gate of sufficient width to accommodate mowing equipment shall be provided. Appropriate warning signs shall be provided to designate the nature of the facility.

16. Effluent from a pond must be disposed of on the property from which it originated. This may be accomplished by locating the outlet as far as practical from the property line and out of any

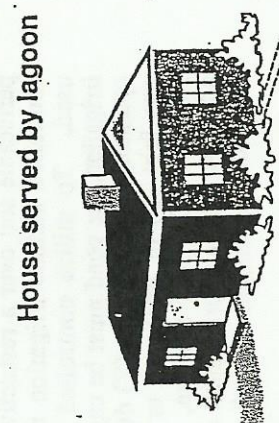
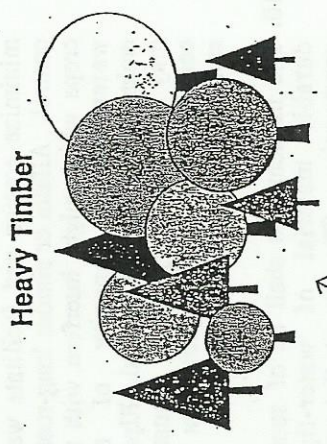
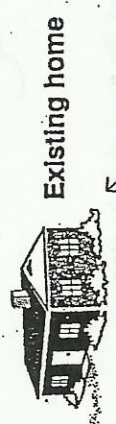
natural drainage ditches or swales. The minimum distance from the outlet to a property line shall be one hundred feet (100'). Another method is to construct a terraced swale with a minimum length of one hundred fifty feet (150'). If these methods are unsuccessful, or whenever there is less than twelve inches (12") of permeable soil over a restrictive layer, controlled surface irrigation must be used. To utilize controlled surface irrigation, the pond must be capable of operating up to five feet (5') deep with one foot (1') of freeboard or have a second cell for storage. The administrative authority shall approve the method of effluent disposal.

17. It may be necessary to introduce water into the pond to facilitate start-up of the biological processes, however, there shall be no permanent connection of any roof drain, footing drain or any source of rainwater to the wastewater stabilization pond.

18. Odor problems caused by spring turnover of water, temporary overloading, ice cover, atmospheric conditions or anaerobic conditions may be controlled by broadcasting sodium or ammonium nitrate over the surface of the pond. In general the amount of sodium or ammonium nitrate should not exceed two pounds (2 lbs.) per day until the odor dissipates.

FOR MORE INFORMATION, CONTACT:  
Missouri Department of Health  
Bureau of Community Sanitation  
P.O. Box 570  
Jefferson City, MO 65102-0570  
314/751-6095

**NOT to scale**



Cleanouts  
no more than  
'100' apart

WATER  
SUPPLY

Septic tank recommended and  
if used may be able to reduce  
the size of the lagoon by 20%.  
(See section on sewage tanks and #6  
on waste stabilization ponds)

Warning sign  
designating the nature  
of the facility

Stream, Water Course, Lake or Impoundment

PROPERTY LINE

The discharge line  
may be placed  
on the uphill  
side to achieve  
the 100'

200'

50'

100'

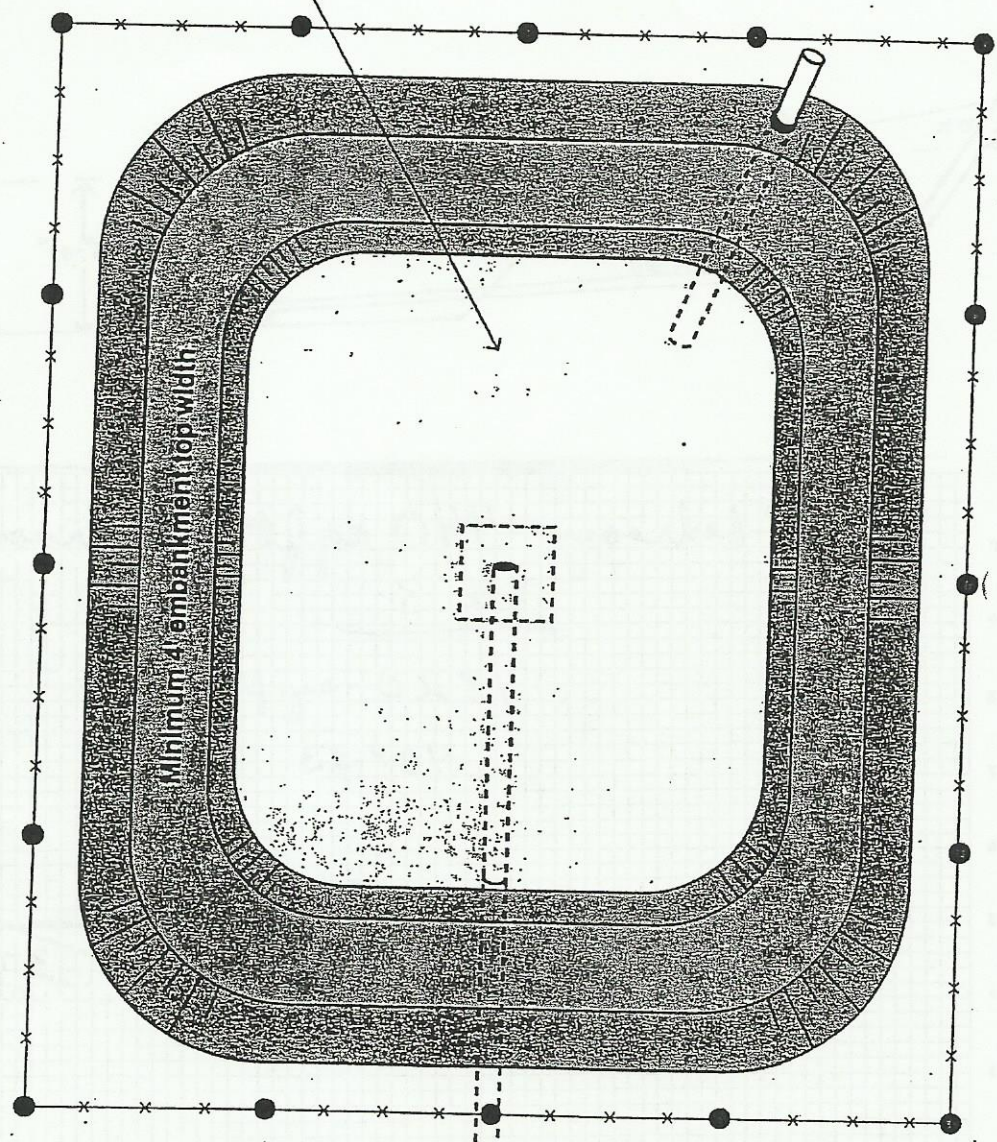
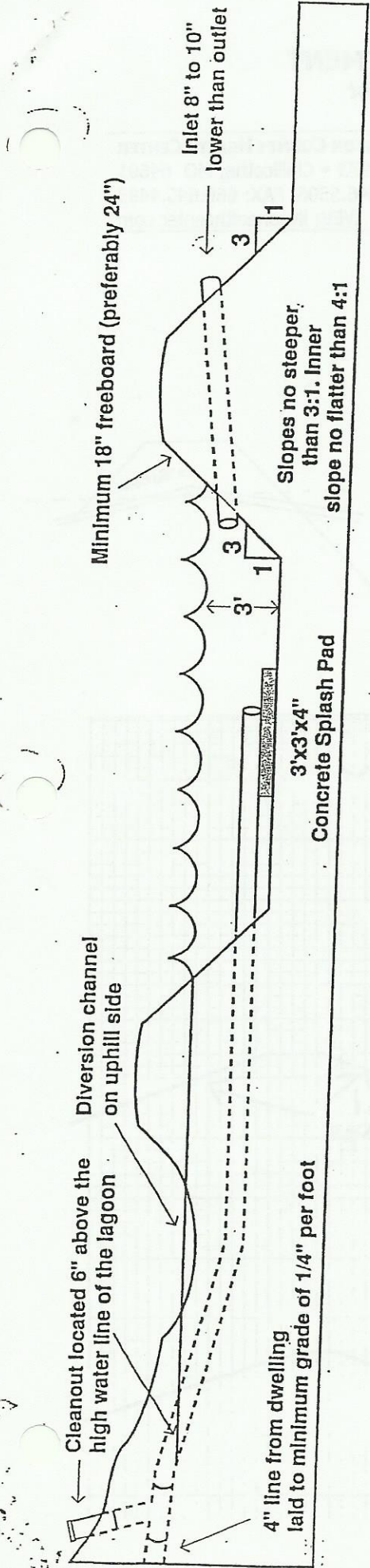
50'

100'

75'

100'

50'



440 square feet of water per bedroom at 3 foot operating level but never less than 900 square feet. See item #6.

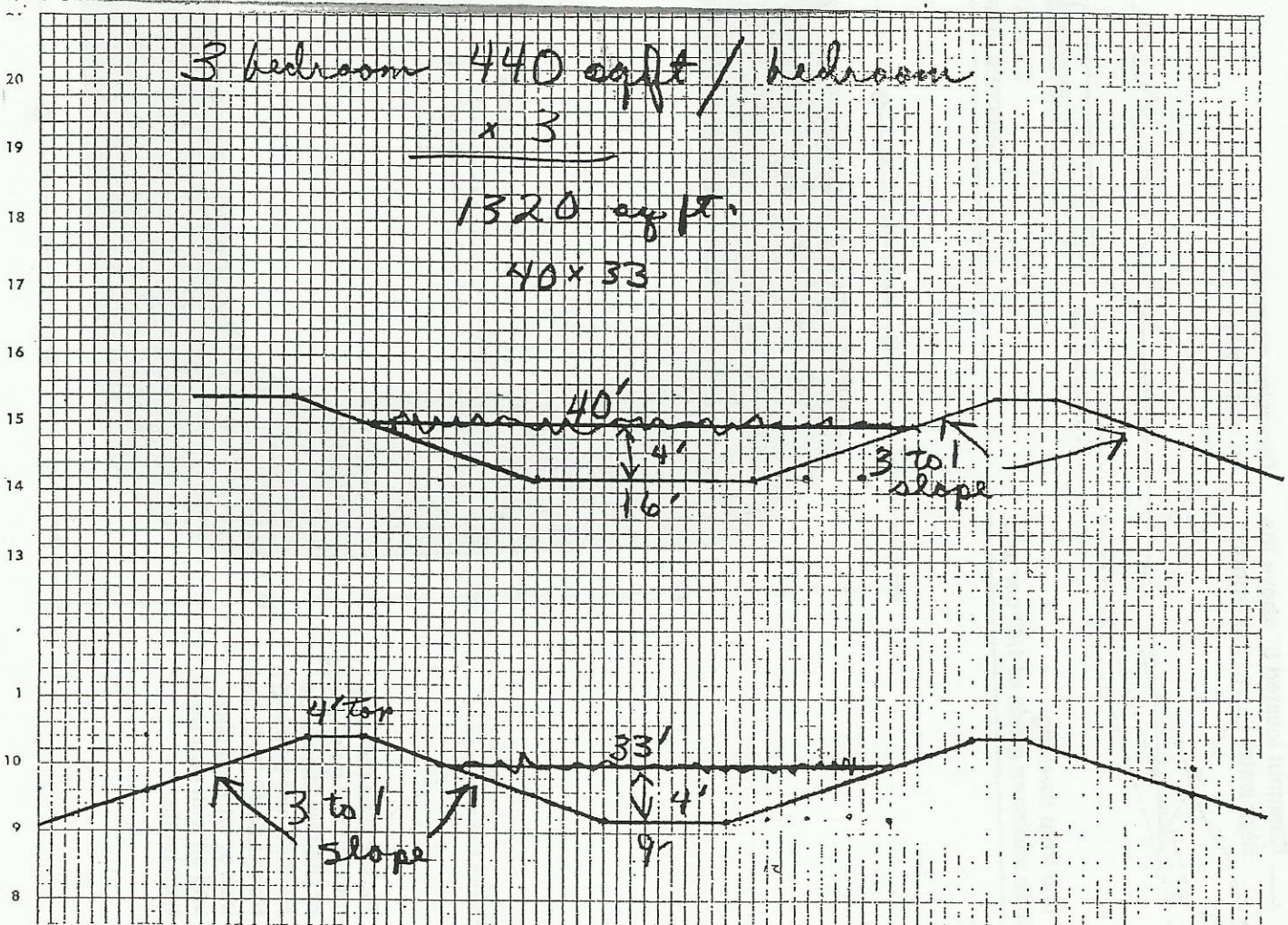
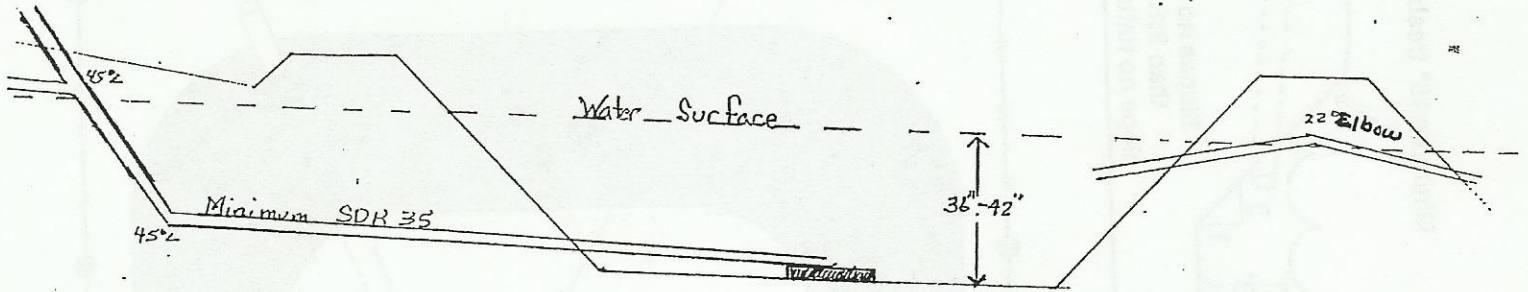
Plastic pipe meeting minimum requirements of (ASTM) Standards F789-85 and D3034-81, Schedule 40 PVC, cast iron or vitrified clay and all with approved type joints.

# ENVIRONMENTAL PUBLIC HEALTH DEPARTMENT

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All services provided on a non-discriminatory basis