

Ohio EPA Policy	Design Criteria; Land Application of Domestic Wastewater	
DSW-0400.014 Removed	Statutory reference: Rule reference:	Ohio EPA, Division of Surface Water Revision 0, August 1, 1988 Removed, April 30, 2003
THIS POLICY DOES NOT HAVE THE FORCE OF LAW Pursuant to Section 3745.30 of the Revised Code, this policy was reviewed and removed.		

This policy does not meet the definition of policy contained in Section 3745.30 of the Ohio Revised Code. Ohio EPA is removing this document from the Division of Surface Water Policy Manual and is considering addressing this topic in a future rulemaking.

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ISSUED: 8-1-88
STATUS: FINAL
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Design Criteria; Land Application of Domestic Wastewater

PURPOSE: To establish minimum guidelines for the design and operation of land application systems for treatment and disposal of domestic wastewater in Ohio.

BACKGROUND: Treatment of wastewater by land application involves the use of plants, the soil surface, and the soil matrix to remove many of the pollutants contained in the wastewater. The pollutants can be removed by: plant uptake; organic decomposition in the vegetation-soil complex; and by absorptive, physical, chemical reactions with earth materials. Only wastewater with pollutants that are compatible with land application will be permitted for land application. The three main processes are: slow rate (irrigation); rapid infiltration; and overland flow. The other processes are wetlands and subsurface, but these are not widely used. The benefits of land application can include the recovery and beneficial use of wastewater treatment to levels comparable to advanced technologies; reclamation and reuse of water resources; recharge of ground water; and reclamation of marginal land.

Land application of wastewater is not practiced by many communities in Ohio. Septic tank/absorption field systems are common and are the simplest land disposal systems. Several industries in the state use land application as a means of treatment and disposal of wastewater. Water resources and precipitation are generally abundant so there is not much incentive to use wastewater as a source of irrigation water. Storage requirements, land costs and land use tend to discourage land application especially for large communities. Public acceptance may also pose problems as the public becomes more concerned about projects, health and well being. Because of the potential benefits of land application, the Ohio EPA recognizes this technology as an alternative wastewater treatment technology.

POLICY: Land application of wastewater will only be approved by the Ohio EPA if the entity can show the following: that it can be done without contaminating the ground water causing it to be unusable for potable water supply; that the soil will not be contaminated such that it cannot be used for any useful purpose such as for agriculture; that the surface waters will not be contaminated in violation of applicable water quality standards; that the pollutants removed from the wastewater will not enter the food chain and be a potential problem; that a nuisance or public health problem will not occur; and that the entity will properly monitor the operation to demonstrate the above.

During the preliminary planning stage, the entity must contact the appropriate district office of discuss the proposal. This is necessary so that the proposed sites can be evaluated by the Divisions of Surface Water and Drinking and Ground Water. The Ohio EPA will notify the entity if the sites are acceptable for consideration as land application or storage lagoon sites.

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An application for permit to install must be submitted, and in some cases, a NPDES permit application will also have to be submitted. The PTI application must be accompanied by the following:

1. A design report as specified in the latest edition of the "Recommended Standards for Sewage Works" in Great Lakes-Upper Mississippi River Board of State Sanitary Engineers.
2. A detailed characterization of the wastewater that will be applied to the land. In some cases a very thorough laboratory analysis of the wastewater will have to be performed especially if it is suspected that there may be "toxic" pollutants present or pollutants not compatible with land application.
3. Wastewater flows must be carefully determined. Infiltration and inflow must be accounted for. If flows are not accurately determined, storage volume may be inadequate and/or application rates may have to be higher than originally designed for.
4. A report and findings of a detailed hydro-geologic study. Design calculations that use data from the worst year for precipitation/ evapotranspiration during the past ten years.
5. Detailed engineering drawings and specifications. Details of the site; storage areas; pretreatment systems; distribution systems, application equipment; and monitoring systems; etc., must be shown in detail.
6. A detailed operations and site management manual. This manual must explain in detail how the system will be operated, maintained and monitored. The PTI will be issued with a condition that the land application be operated, maintained and monitored in accordance with the operations manual approved by the Ohio EPA.
7. The system will have to be operated under the supervision of a certified operator of a class determined by the Ohio EPA.

Design Considerations for Slow Rate (Irrigation) Systems

A. Site Requirements

1) Buffer Zone

A 500 foot isolation must be maintained from the edge of the site to the nearest residence.

The site must be located at least 300 feet from the nearest well used for a water source.

The site must be located at least one-half mile from any populated area containing more than five residences.

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2) Ground Water

The average water table must be at least five feet from the surface.

The seasonal high water table level must be at least three feet from the surface.

An underdrainage system may change the above requirements.

3) Topography

Slopes shall not exceed 5 percent unless runoff collection is provided or loadings are reduced.

At least 5 feet of soil shall be above the bedrock and at least 20 inches of soil shall be above the hardpan as confirmed by soil borings.

B. Pretreatment

As a minimum, the wastewater should be pretreated to remove any floating or oily materials, settleable solids, or materials which could interfere with the application equipment.

Pretreatment may be necessary to reduce the potential for nuisance due to odors from storage areas or odors from application. Aeration of the stored wastewater may have to be provided.

Disinfection will be provided if levels of fecal coliform in the wastewater to be sprayed exceeds 1000 per 100 ml prior to application.

C. Storage

Storage volume is needed to get through periods of rainfall, snowfall, saturated soil conditions, cold temperatures equipment failure, etc. A minimum of 90 days storage will usually be necessary.

Storage lagoons must be constructed per GLUMRB standards for wastewater treatment lagoons.

Storage lagoons must be located at least 500 feet from any residences and at least 1000 feet from any drinking well.

D. Loading Criteria

The hydraulic loading rate (irrigation and precipitation) is dependent on soil characteristics, degree of moisture in the soil, crops, and climatic conditions. In general the daily application rate should not exceed 1/2 inch per day and the weekly application rate should be less than 1.5 inches per week. Sites receiving wastewater should be allowed to rest two days before being sprayed on again.

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Application rates shall not exceed 1/2 inch per hour.

There shall be no application if precipitation exceeded 0.5 inches the preceding day or the day of application or if there is over 1 inch of snow on the ground.

Biological activity is a significant mechanism in the soil for breakdown of the pollutants in the wastewater. Biological activity decreases with soil temperature and is almost absent at freezing temperatures. Therefore, no land application should occur when soil temperatures are less than 32 degrees Fahrenheit.

Nitrogen loading shall be balanced with the needs of the crop to prevent nitrate nitrogen from entering the groundwater. Since the crop is removing the nitrogen, the crop should be harvested. If the crop is not to be harvested, the nitrogen loading shall be reduced.

The metal loadings shall be the same as for that allowed for sludge application.

The organic loadings shall be less than 1400 lb/ac/week of volatile solids or 930 lb/ac/week of total BOD₅.

The total dissolved solids in the applied wastewater shall not exceed 1000 mg/l.

F. Monitoring/Reporting

The entity will be required to monitor the operation and report the information to the appropriate district office of the Ohio EPA. The reporting and monitoring requirements can be made a condition of the PTI and/or the PTI can require that the entity monitor a report in accordance to the entity's monitoring/reporting plan approved by the Ohio EPA. The entity will usually be required to submit monthly monitoring reports to the Ohio EPA. The monthly report format will be approved by the Ohio EPA. The reporting format should be proposed by the entity as part of the monitoring/reporting plan that has to be submitted with the application for permit to install.

The entity will be required to determine baseline ground water quality by sampling existing wells in the area. The entity shall establish monitoring wells to determine the quality of the ground water at the site and the ground water migrating from the site during the life of the site.

The entity will be required to monitor and report the following.

- operation information
- location of areas sprayed during the day and acreage used each day

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- volume of wastewater sprayed each day and the application rates
- hours sprayed each day
- status of the storage acres (volume stored/volume available)
- daily volume of wastewater discharged to storage
- daily precipitation, snow cover
- soil moisture content
- air and soil temperature
- crop information (type, date of harvest, ultimate use of the crop)

Sampling Information

A. Wastewater (after storage)

-TKN, nitrate, nitrite, BOD₅, COD, pH, TDS, TSS, fecal coliform (after disinfection only), chloride, phosphorus,

-Other pollutants may have to be monitored before and after storage depending on the characteristics of the wastewater. These pollutants can include calcium, sodium, arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc, aluminum, boron, fluoride, silver, magnesium.

Ground water monitoring wells

-Ground Water level, chlorides, TDS, nitrates, nitrites, ammonia, nitrogen, organic nitrogen, sulfates, alkalinity, hardness, pH.

Design Considerations for Rapid Infiltration Systems

(Reserved)

Design Consideration for Overland Flow Systems

(Reserved)