

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
RHODE ISLAND**

WASTEWATER TREATMENT STRIP

(Ac.)

CODE 635

DEFINITION

A treatment component of an approved comprehensive nutrient management plan (CNMP) consisting of a strip or area of herbaceous vegetation.

PURPOSE

To improve water quality by reducing loading of nutrients, organics, pathogens, and other contaminants associated with animal manure and other wastes, and wastewater by treating agricultural wastewater and runoff from livestock holding areas with a system designed using “**the slow rate process**”.

CONDITIONS WHERE PRACTICE APPLIES

Below livestock concentration areas and agricultural wastewater discharges where a reduction of sediments and total suspended solids in runoff or applied wastewater is needed as a component of a waste management system. The maximum contributing uncontrolled drainage area for concentrated livestock areas shall be 0.5 acres. The maximum number of animal units for agricultural wastewater shall be 97 (69 dairy cows). The maximum capacity for food processing water shall be 1000 gal/day.

This practice applies:

- Where a treatment strip is a component of an approved CNMP
- Where a treatment strip can be constructed, operated and maintained without polluting air or water resources
- To the treatment of contaminated runoff

from such areas as feedlots, barnyards, and other livestock holding areas

- To the treatment of dilute wastewater such as milk house effluent.

CONDITIONS WHERE PRACTICE DOES NOT APPLY

- As a single component practice. Wastewater treatment strips, as a single component practice will not satisfy Rhode Island water quality standards for direct discharge to waters of the state. More stringent pollution abatement measures will be necessary where bacteria, dissolved organic materials and/or dissolved nutrients, can impair receiving water quality.
- This practice does not apply to the management of human waste, silage juices, or other high strength wastes.
- This practice does not apply below "Picket Dam" and other slow release waste storage facilities.

CRITERIA

General Criteria

Laws and Regulations. All Federal, state, and local laws, rules, and regulations, including local inland wetland agency regulations, governing the construction and use of this practice as well as setbacks from wells, surface water and property boundaries shall be followed. Planned work shall comply with all federal, state, and local laws and permit conditions and requirements. **The landowner shall obtain all necessary**

permits prior to construction or any land clearing activities.

Safety. Safety and personal protection features and practices shall be incorporated into the facility and its operation as appropriate to minimize the occurrence of equipment hazards and biological agents during the treatment process. ***Warning signs, fences, ladders, ropes, bars, rails, and other devices shall be provided, as appropriate, to ensure the safety of humans and livestock.***

Separation Distances. Separation distances from residences and buildings, property lines, surface water bodies including wetlands, private wells or springs, and/or public wells shall be determined on a case by case basis in consultation with appropriate state or local regulatory agencies.

Use the following separation distances for preliminary planning purposes only.

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| Residences and businesses – Owner-Operator | 250 feet |
| Residences and businesses - Other | 500 feet |
| Property lines | 250 feet |
| Public Roads | 250 feet |
| Drinking Water Supply Lines | 150 feet |
| Surface water bodies | 250 feet |
| Private well or spring | 150 feet |
| Public water supply well | 500 feet |
| Above seasonal high water table | 24 in. |
| Depth to bedrock | 48 in.* |
| * May reduce with DEM concurrence. | |

Location. Locate this practice considering prevailing winds and landscape elements such as building arrangement, landforms, and vegetation to minimize odors and protect the visual resources.

This practice shall be located so as to meet all local, state and federal setback requirements including those stated in environmental protection, planning and zoning, wetlands, health department, milk inspection, and stream channel encroachment regulations. Treatment strips shall be located outside of floodplains.

Inflow to wastewater treatment strips shall be pretreated as appropriate.

Discharge to and through treatment strips shall be as sheet flow. Some means, such as a ditch, curb, or gated pipe, shall be provided to disperse concentrated flow and ensure sheet flow across the width (dimension perpendicular to flow length) of the treatment strip. Land grading and structural components necessary to maintain sheet flow throughout the length (dimension parallel to the flow) of the treatment strip shall be provided as necessary.

Permanent herbaceous vegetation consisting of a mixture of grasses, legumes and/or other forbs adapted to the soil and climate shall be established in the treatment strip. Vegetation shall be able to withstand anticipated wetting and/or submerged conditions.

Clean water shall be diverted from the treatment strip to the fullest extent possible.

Additional Criteria For Treating Wastewater With The Slow Rate Process

Designs shall be based on the latest edition of the Environmental Protection Agency Technology Transfer Process Design Manual for Land Treatment of Municipal Wastewater or other technically acceptable reference.

The slow rate process refers to a specific remediation technique involving the application of wastewater to a vegetated surface for treatment as it flows down through the plant-soil matrix.

The design hydraulic loading shall be based on the more restrictive of two limiting conditions – the capacity of the soil profile to transmit water (soil permeability) or in the nitrogen concentration in the water percolating below the root zone. The percolate nitrate-nitrogen concentration leaving the root zone shall not exceed 8 mg/L.

In addition, nutrient loading shall not exceed the vegetation's agronomic critical need for phosphorus expressed as pounds of P₂O₅ per acre. Typically for grass vegetation managed as hay the agronomic critical need is 60 pounds of P₂O₅ per acre. The system shall be managed so that Soil test phosphorus levels are optimum or below optimum.

Storage shall be provided when the amount of available wastewater exceeds the design

hydraulic loading rate or for strip non-operating periods.

Wastewater shall be applied to the treatment strip utilizing a method that will result in an even application of the entire strip and a rate that does not exceed the infiltration rate of the soil. Dosing the treatment strip is the acceptable method of accomplishing this. Wastewater shall not be applied more often than every 3 days.

CONSIDERATIONS

- More than one treatment strip should be considered to allow for resting, harvesting vegetation, maintenance, and to minimize the potential for overloading.
- Consider pre-treating influent with solid/liquid separation to reduce organic loading, odor generation, and maintenance requirements
- Consider suspension of application to treatment strips when weather conditions are not favorable for aerobic activity or when soil temperatures are lower than 39^o F. When soil temperatures are between 39^o F and 50^o F reductions of application rate and increased application period while maintaining the hydraulic loading rate constant should also be considered.

PLANS AND SPECIFICATIONS

Plans and specifications shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. Plans and specifications shall include construction plans, drawings, job sheets or other similar documents. These documents shall as a minimum, specify the requirements for installing the practice and include the kind, quantity and quality of materials to be used.

To the extent practical, specifications shall conform to NRCS National Engineering Handbook Parts 642 and 643 (Section 20).

Specifications will include:

- Length, width, and slope of the treatment strips to accomplish the planned purpose (length refers to flow length down the slope of the treatment strip)

- Herbaceous species and seed selection, and seeding rates to accomplish the planned purpose
- Planting dates, care, and handling of the seed to ensure that planted materials have an acceptable rate of survival
- Statement that only viable, certified weed free, high quality, and regionally adapted seed will be used
- Site preparation sufficient to establish and grow selected species

AS BUILT DRAWINGS

As built drawings shall be prepared showing all pertinent element and elevations as actually installed, and a copy shall be provided to the owner / operator upon construction completion.

OPERATION AND MAINTENANCE

An Operation and Maintenance (O&M) plan shall be prepared for, reviewed, and signed by the landowner or operator. The plan shall specify that the treated areas and associated practices are inspected annually and after significant storm events to identify repair and maintenance needs. An operation and maintenance plan shall be developed that is consistent with the purposes of the practice, its intended life, safety requirements, and the criteria for its design. The plan shall include the following as appropriate:

- Test the soil every three years to determine soil test phosphorus levels.
- Maintain records of wastewater applications, dates and results of soil tests, dates and amounts of vegetation harvested and dates and extent of any maintenance performed.
- Harvest treatment strip vegetation as appropriate to encourage dense growth, maintain an upright growth habit, and remove nutrients and other contaminants that are contained in the plant tissue.
- Control undesired weed species, especially state-listed noxious weeds.
- Inspect and repair treatment strips after storm events to fill in gullies, remove flow

disrupting sediment accumulation, re-seed disturbed areas, and take other measures to prevent concentrated flow.

- Apply lime and any supplemental micro- or trace nutrients as recommended by a soil test.
- Maintain or restore the treatment strip as necessary by periodically grading when deposition jeopardizes its function, and then reestablishing to herbaceous vegetation.
- Routinely de-thatch and/or aerate treatment strips used for treating runoff from livestock holding areas in order to promote infiltration.
- Conduct maintenance activities only when the treatment strip is dry and moisture content in the surface soil layer will not allow compaction.
- Prevent grazing in treatment strips.