

**NATURAL RESOURCES CONSERVATION SERVICE**  
**CONSERVATION PRACTICE STANDARD**

**WASTE TRANSFER**

(No.)

**CODE 634**

**DEFINITION**

A system using structures, conduits or equipment to convey byproducts (wastes) from agricultural operations to points of usage.

**PURPOSE**

To transfer agricultural material associated with production, processing, and/or harvesting through a hopper or reception pit, a pump (if applicable), a conduit, and/or hauling equipment to:

- a storage/treatment facility,
- a loading area, and/or
- agricultural land for final utilization as a resource.

**CONDITIONS WHERE PRACTICE APPLIES**

The transfer component is a part of a planned waste management or comprehensive nutrient management system.

Material generated by livestock production or agricultural product processing and a conveyance system is necessary to transfer the byproducts from the source to a storage/treatment facility and/or a loading area, and/or from storage/treatment to an area for utilization. This includes hauling nutrients from one geographical area with excess nutrients to a geographical area that can utilize the nutrients in an acceptable manner.

**CRITERIA**

**General Criteria Applicable to All Purposes**

Waste transfer components shall comply with all Federal, State and local laws, rules and regulations.

**Structures.** All structures, including those that provide a work area around pumps, shall be designed to withstand the anticipated static and dynamic loading. Structures shall be designed to withstand earth and hydrostatic loading in accordance with practice standard Waste Storage Facility, Code 313. Covers, when needed, shall be designed to support the anticipated dead and live loads. All waste transfer structures shall be liquid tight for the maximum anticipated static pressure.

Reception pits or tanks shall be sized to contain a minimum of one full day's production. For reception pits receiving runoff, sufficient storage shall be provided to also contain the volume of runoff from the 25-year, 24-hour storm plus any required freeboard and emergency storage.

Openings to structures to receive material from alley scrape collection shall be a minimum of 9 square feet with one dimension no smaller than 4 feet. The opening shall be equipped with a grate designed to support the anticipated loads.

When curbs are needed in conjunction with structures, they shall be constructed of either concrete or wood. Curbs shall be of sufficient height to ensure all materials flow into the structure and shall be adequately anchored.

**Pipelines.** Design of pipelines shall be in accordance with sound engineering principles considering the waste material properties, management operations, exposure, etc. The minimum pipeline capacity from collection facilities to storage/treatment facilities shall be the maximum peak flow anticipated.

The minimum pipeline capacity from storage/treatment facilities to utilization areas shall ensure the storage/treatment facilities can be emptied within the time limits stated in the management plan for nutrient utilization.

Pipelines used for transferring material to an irrigation system shall meet the requirements of NRCS conservation practice standard, Irrigation Water Conveyance, Pipeline, Code 430.

Vents, air-and-vacuum release valves, and thrust blocks shall be considered in the design.

All pipes shall be designed to convey the required flow without plugging, based on the type of material and total solids content. To minimize settling of solids in the pipeline, design velocities shall be between 3 to 6 feet per second. Fluid velocities shall not exceed 5 feet per second if pipe is not buried or securely tied down. Plastic pipelines shall have a maximum flow velocity of 5 feet per second.

Clean-out access shall be provided for gravity pipelines at a maximum interval of 150 feet unless an alternative design is approved by the design engineer. Gravity pipelines shall not have horizontal curves or bends except minor deflections (less than 10 degrees) in the pipe joints unless special design considerations are used.

In a gravity flow pipe system, a minimum head is required, depending upon the consistency of the material: 4 feet for heavily bedded manure, 2 feet for slurry or semi-solid manure, and 1 foot for liquids and liquid manure.

Special provisions shall apply to gravity flow pipes which transfer waste with a total solids content greater than 8% (wet basis). The minimum pipe diameter shall be 24 inches. A vent shall be installed within 4 feet of the inlet. The last section of pipe which outlets into a storage pond shall be restrained with a concrete thrust block.

Gravity discharge pipes used for emptying a storage/treatment facility shall have a minimum of two gates or valves, one of which shall be manually operated.

Pipelines shall be installed with appropriate connection devices to prevent contamination of private or public water supply distribution systems and ground water.

Pipe joints, junctions, and connections shall be liquid tight for the maximum anticipated pressure including blow out and cleaning.

Pipelines shall be installed at sufficient depth below the ground surface to provide protection

from traffic crossing, farming operations, and frost. The potential for wheel ruts and soil cracking shall be considered in soil cover specifications. The minimum depth of cover shall be 30 inches, unless additional protective measures are included in the design. The minimum depth of cover for frost protection shall be 72 inches or an equivalent amount of soil and insulation.

**Other Conduits.** Concrete lined ditches shall be designed in accordance with NRCS conservation practice standard Lined Waterway or Outlet, Code 468. A minimum design velocity of 1.5 feet per second shall be used.

**Pumps.** Pumps installed for transfer shall meet the requirements of NRCS conservation practice standard Pumping Plant, Code 533. Pumps shall be sized to transfer material at the required system head and volume. Type of pump shall be based on the consistency of the material and the type of solids. Pump RPM should be kept as low as possible for manure slurries which contain abrasives such as sand. Requirements for pump installations shall be based on manufacturer's recommendations.

A semi-open impeller shall be considered to handle manure slurry with straw, twine, hair, or sludge. Consider pumps with cutting knives and the capacity for agitation.

The total dynamic head used in pump selection should be corrected for viscosity and specific gravity of the liquid.

Provisions shall be included in the design to flush conventional irrigation pumps and metal appurtenances which are used to apply wastewater.

**Solid/liquid waste separation.** A filtration or screening device, settling tank, settling basin, or settling channel used to separate a portion of solids from the manure or liquid waste stream will be designed in accordance with NRCS conservation practice standard Solid/Liquid Waste Separation Facility, Code 632.

**Safety.** The system design shall consider the safety of humans and animals during construction and operation.

Open structures shall be provided with covers or barriers such as gates, fences, etc. Ventilation and warning signs shall be provided for transfer

systems as necessary to warn of the danger of entry and to reduce the risk of explosion, poisoning, or asphyxiation.

Pipelines from enclosed buildings shall be provided with a water-sealed trap and vent or similar devices where necessary to control gas entry into buildings.

Barriers shall be placed on push-off ramps to prevent tractors or other equipment from slipping into waste collection, storage, or treatment facilities.

**Biosecurity.** Products from diseased animals shall be handled in accordance with the recommendations of the state veterinarian.

Equipment leaving the farm shall be sanitized as appropriate to prevent the spread of disease.

#### **Additional Criteria in Support of Agricultural Land for Final Utilization**

**Waste utilization.** Nutrients shall be applied to the utilization area in amounts, uniformity, rates, and at a time consistent with the requirements of NRCS conservation practice standard Nutrient Management Code 590 or Waste Utilization, Code 633 as appropriate.

**Hauling equipment.** Equipment used for hauling material from one geographical area to another area shall be capable of hauling the material without spillage, leakage, or wind-blown losses during transport. Equipment shall have adequate capacity to insure the emptying of storage/treatment facilities within appropriate time periods as stated in the system operation and maintenance plan.

**Sprinklers.** Sprinklers or sprinkler systems shall be designed in accordance with conservation practice standard Irrigation System, Sprinkler Code 442. Sprinkler system design capacity shall be adequate to apply the required volume of waste at a rate and uniformity that shall prevent runoff and meet the nutrient needs of the plants. Nozzle size shall be appropriate for the consistency of the waste applied. Sprinkler applied, waste contaminated water, shall normally contain less than two percent solids unless provisions are made for straining or filtering before application. Consideration shall be given to nozzles and spray heads which are less susceptible to clogging by suspended solids.

Gated Pipe and other appurtenances used in conjunction with gravity application shall be designed to insure uniform application amounts.

## **CONSIDERATIONS**

### **General**

Consider economics (including design life), overall nutrient management system plans, and health and safety factors.

Consider the timing and location of agitation and transfer activities to minimize odor formation and transport and to minimize the breeding of insects within the material.

Consider covering and/or minimizing the amount or number of times the material is disturbed to reduce the likelihood of air emissions of particulate matter, volatile organic compounds, and ammonia air emissions formation and release.

### **Transfer Operations**

In locating structures, utilize existing topography to the greatest extent possible to generate head on structures and reduce pumping requirements.

Consider the operating space requirements of loading and unloading of equipment in the vicinity of the transfer components.

Consider the subsurface conditions, i.e., depth to bedrock, water table, etc., when locating and designing structures.

When applicable and compatible, consider the joint use of waste transfer pipelines with irrigation system design requirements.

The pipe pressure rating required may need adjustment based on material temperature.

Consider corrosion resistance and water tightness in the selection of pipe material and joints.

Consider the potential for salt (struvite) deposits in smaller diameter pipes.

Consider the need for appropriate check valves, anti-siphon protection and open air breaks in all pipelines.

Vehicles used to transfer waste material should be sized to reduce the danger of rollover.

Where material is to be spread on land not owned or controlled by the producer, a nutrient management plan is recommended, establishing environmentally acceptable utilization of the material.

### **PLANS AND SPECIFICATIONS**

Plans and specifications for installing waste transfer systems shall be in accordance with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

### **OPERATION AND MAINTENANCE**

An Operation and Maintenance (O&M) Plan must be prepared and reviewed with the landowner or operator responsible for the application of this practice. The O&M Plan shall provide specific instructions for proper operation and maintenance of each component of this practice and shall detail the level of repairs needed to maintain the effectiveness and useful life of the practice.

Operation and maintenance shall be in accordance with the requirements specified in the overall operation and maintenance plan required by conservation practice standard Waste Storage Facility Code 313.

The operation and maintenance plan shall describe what actions will be taken to minimize flies and other insects during the transfer of material.

Liquid or slurry material shall be adequately agitated prior to transfer for the purpose of land application both on and off the farm.

Pipelines used for transferring waste material should be flushed with clean water after use to reduce the risk of gas build up and pipeline explosion.

Provisions should be made for removing solids during management operations from conveyance conduits such as concrete lined ditches, etc.

For the hauling of material from one geographical area to another, record keeping by the producer or his/her designated representative will be required and may include such items as:

- the type, nutrient content, and amount of material transferred;
- the solids percentage of the material;
- the date of the transfer;
- the name and address of the source and destination of the material; and
- the condition of the material as left at the destination (spread, stockpiled and covered, etc.)