



## **WASTE STORAGE STRUCTURE CONSTRUCTION SPECIFICATION**

### **1. SCOPE**

The work shall consist of furnishing materials and installing all components of the waste storage structure as outlined in this specification and the drawings.

Construction work covered by this specification shall not be performed between December 1 and the following March 15 unless the site conditions and/or the construction methods to be used have been reviewed and approved by the Engineer or his/her designated Representative.

### **2. MATERIALS**

All materials used shall conform to the quality and grade noted on the drawings, set forth in Section 9, or as otherwise listed below:

PORTLAND CEMENT shall be Type I, IA, II or IIA and conform to ASTM-C150, unless otherwise set forth in Section 9. If Type I or II is used, an air-entrainment agent shall be used.

CONCRETE AGGREGATE shall meet the requirements and gradation specified in ASTM-C33. Coarse aggregate shall meet the gradation for size numbers 57 or 67.

WATER used in mixing or curing concrete shall be clean and free from injurious amounts of oil, acid, salt, organic matter or other deleterious substances.

REINFORCEMENT BARS shall be grade 40 or higher, and shall conform to ASTM- A615, A616, or A617. Welded wire fabric reinforcement shall conform to ASTM-A185 or A497. Reinforcement shall be free from loose rust, oil, grease, curing compound, paint or other deleterious coatings.

CONCRETE ADMIXTURES shall conform to ASTM-C260 for air-entrainment, and ASTM-C494, type A, D, F or G, for water- reduction and set-retardation, and type C or E for non-corrosive accelerators.

POZZOLAN shall conform to ASTM-C618, Class F, except loss of ignition shall not exceed 3.0 percent.

CURING COMPOUND shall meet the requirements of ASTM-C309, Type 2, Class A or B or as otherwise required in Section 9.

MASONRY COMPONENTS shall meet the requirements of ASTM-C90 & C270 and placed in accordance with ACI-530.

PRECAST CONCRETE units shall comply with ACI-525 and 533.

PREFORMED EXPANSION JOINT FILLER shall conform to the requirements of ASTM- D1752, Type I, II, or III, unless bituminous type is specified, in which case it shall conform to ASTM-D994 or D1751.

JOINT SEALERS shall conform to the requirements for ASTM-C920, Federal Specification SS-S-210A, or Federal Specification TT-S-227, as appropriate for the specific application. WATERSTOPS. Vinyl-chloride polymer types shall be tested in accordance with Federal Test Method Standard No. 601 and shall show no sign of web failure due to brittleness at a temperature of -35 degrees Fahrenheit. Colloidal (bentonite) waterstops shall be at least 75 percent bentonite in accordance with Federal Specification SS- S-210A. Non-colloidal waterstops shall only be used if approved by the Engineer.

METALS shall conform to the following standards:

Structural steel - ASTM-A36

Carbon steel - ASTM-A283, grade C or D; or A611, grade D; or A570, grade C or D

Aluminum alloy - ASTM-B308, B429, B221, B210, B211, or B209

Bolts - ASTM-A307; zinc coating shall conform to ASTM-A153, B633 (cond. SC3), A165 (type TS).

Screws - wrought iron or medium steel Split or tooth-ring connectors - hot-rolled, low carbon steel conforming to ASTM- A711, grade 1015

WOOD shall be graded and stamped by an agency accredited by the American Lumber Standards Committee as meeting the required species, grade, and moisture content. In the absence of such a stamp, the Contractor or material supplier shall provide written certification that the wood products meet the designated quality criteria.

MANUFACTURED TRUSSES shall be certified as having been designed and built to Truss Plate Institute standards.

PRESSURE TREATED WOOD PRODUCTS shall be Douglas Fir, Southern Yellow Pine, or as otherwise specified on the drawings or in Section 9. They shall be treated with preservatives in accordance with the American Wood Preservers Association (AWPA) Standard C16, "Wood Used on Farms, Pressure Treatment." Each piece shall bear the AWPA stamp of quality. In the absence of such a stamp, the Contractor or material supplier shall provide written certification that the pressure treated wood meets the designated quality criteria.

FASTENERS for wood structures shall be stainless steel, galvanized, or otherwise protected from corrosion due to contact with moisture, manure and associated gasses.

### **3. FOUNDATION PREPARATION AND CONDITIONS**

All trees, brush, fences, and rubbish shall be cleared within the area of the structure, including any appurtenances, and borrow areas. All material removed by clearing and excavation operations shall be disposed of as directed by the Owner or his/her Representative. Sufficient topsoil shall be stockpiled in a convenient location for spreading on disturbed areas.

All structures shall be set on undisturbed soil or non-yielding compacted material. Over excavation must be corrected as noted on the drawings or as directed by the Engineer or his/her designated Representative.

In addition to uniformity, the existing subgrade material must have sufficient strength to support the structure and its associated loads. Organic soils shall be removed. A base course (a layer of granular material placed on the subgrade prior to placement of concrete) may be used to improve the stability of the foundation. In addition, geosynthetics may be used, if approved by the Engineer, to further separate and/or stabilize the foundation.

Surface and subsurface drainage systems shall be installed and operating adequately to

remove water from the foundation to allow for proper structure placement.

Drainfill upon which concrete is to be placed shall be covered with a geosynthetic that has an AOS between 20 and 100, inclusive.

Concrete shall not be placed until the subgrade, forms and steel reinforcements have been inspected and approved by the Engineer or his/her designated Representative. Notification shall be given far enough in advance to provide time for the inspection.

Prior to placement of concrete, the forms and subgrade shall be free of chips, sawdust, debris, standing water, ice, snow, extraneous oil, mortar or other harmful substances or coatings.

Earth surfaces against which concrete is to be placed shall be firm and damp. Placement of concrete on mud, dried earth or uncompacted fill or frozen subgrade will not be permitted.

#### **4. CAST-IN-PLACE CONCRETE STRUCTURES**

##### **a. Concrete Forms**

Forms shall be of wood, plywood, steel, or other approved material and shall be mortar tight. The forms and associated falsework shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions and contours.

Form surfaces shall be smooth and essentially free of holes, dents, sags, or other irregularities. Forms shall be coated with form oil before being set into place.

Care shall be taken to prevent form oil from coming in contact with steel reinforcement.

##### **b. Concrete Mix**

Concrete for structures shall have a 28-day compressive strength of at least 4000 psi, unless otherwise specified on the drawings or in Section 9. The Contractor shall be responsible for the design of the mix and certification of the necessary compressive strength. Current certification of the design mix by Penn DOT may be accepted in lieu of additional testing.

The slump shall be 3 to 6 inches (without superplasticizers, if any); the air content by volume shall be five to seven percent of the volume of the concrete. Admixtures such as superplasticizers, water-reducers and set-retarders may be used provided they are approved by the Engineer prior to concrete placement and are used in accordance with the manufacturer's recommendations. Superplasticizers (ASTM C494, Type F or G) may be added to concrete that has a 2 to 4-inch slump before the addition, and that is not warmer than 95° F. The slump shall not exceed 7½ inches with the addition of superplasticizer.

##### **c. Mixing and Handling Concrete**

In general, concrete shall be transported, placed, and consolidated in accordance with ACI-304, of which some specific interpretations are set forth below.

The supplier shall provide a batch ticket to the Owner or Technician with each load of concrete delivered to the site. The batch ticket shall state the class of concrete, any admixtures used, time out, and the amount of water that can be added at the site and still be within the design mix limits.

Concrete shall be uniform and thoroughly mixed when delivered to the job site. The Contractor

shall test slump and air entrainment as necessary to insure that the concrete meets the requirements of this specification. Variations in slump of more than one inch within a batch will be considered evidence of inadequate mixing and shall be corrected or rejected. No water in excess of the amount called for by the job design mix shall be added to the concrete.

For concrete mixed at the site, the mixing time after all cement, aggregates and water are in the mixer drum shall be at least 1-1/2 minutes.

Concrete shall be conveyed from the mixer to the forms as rapidly as practical by methods that will prevent segregation of the aggregates or loss of mortar. Concrete shall be placed in the forms within 1-1/2 hours after the introduction of cement to the aggregate unless an approved set-retarding admixture is used in the mix. In hot weather or under conditions contributing to quick stiffening of the concrete, or when temperatures of the concrete is 85°F or above, the time between the introduction of the cement to the aggregates and completion of truck discharge shall not exceed 45 minutes.

Concrete shall not be dropped more than 5 feet vertically unless special equipment is used to prevent segregation.

Superplasticized concrete shall not be dropped more than 12 feet unless special equipment is used to prevent segregation.

Slab concrete shall be placed at the design thickness in one layer. Formed walls shall be placed in layers not more than 24-inches high, unless superplasticizer is used, in which case the maximum layer shall be 5 feet. Each layer shall be consolidated to insure a good bond with the preceding layer.

Immediately after placement, concrete shall be consolidated by spading and vibrating, or by spading and hand tamping. It shall be worked into corners and angles of the forms and around all reinforcement and embedded items in a manner that prevents segregation or in the formation of "honeycomb." Excessive vibration that results in segregation of materials will not be allowed. Vibration must not be used to make concrete flow in forms, slabs, or conveying equipment.

If the surface of a layer in place will develop its initial set, i.e., will not flow and merge with the succeeding layer when vibrated, a construction joint shall be made.

Construction joints shall be made by cleaning the hardened concrete surface to exposed aggregate by sandblasting, air/water jetting, or hand scrubbing with wire brush, and keeping the concrete surface moist for at least one hour prior to placement of new concrete.

Concrete surfaces do not require extensive finishing work; however, the surface shall be smooth and even with concrete paste worked to the surface to fill all voids. The concrete surface must be watertight. Careful screeding (striking-off) and/or wood float finishing shall be required, unless otherwise shown on the drawings. Exposed edges shall be chamfered, either with form molding or molding tools.

The addition of dry cement or water to the surface of screeded concrete to expedite finishing is not allowed.

#### **d. Reinforcing Steel Placement**

Reinforcement shall be accurately placed and secured in position in a manner that will prevent its displacement during the placement of concrete. In forms, this shall be accomplished by tying temperature and shrinkage steel or special tie bars (not stress steel) to the form "snap ties" or

by other methods of tying. In slabs, steel or wire shall be supported by precast concrete bricks (not clay bricks), or metal or plastic chairs. Concrete bricks supporting steel and wire must be full and not broken (unless bricks are manufactured with creases or indentations meant to be broken). Except for dowel rods, placing steel reinforcement into concrete already in place shall not be permitted.

The following tolerances will be allowed in the placement of reinforcing bars shown on the drawings:

- (1) Maximum reduction in cover:  
from formed and exposed surfaces –  $\frac{1}{4}$  inch from earth surfaces -  $\frac{1}{2}$  inch
- (2) Maximum variation from indicated spacing:  
 $\frac{1}{12}$ th of indicated spacing

Splices of reinforcing bars shall be made only at the locations shown on the drawings, unless otherwise approved by the Engineer. Unless otherwise required, welded wire fabric shall be spliced by overlapping sections at least one full mesh dimension plus two inches. All reinforcement splices shall be in accordance with ACI 318.

Reinforcing steel shall not be welded, unless approved by the Designer. The ends of all reinforcing steel shall be covered with at least 1-1/2 inches of concrete.

#### e. Curing

Concrete shall be prevented from drying for at least seven days after it is placed. Exposed surfaces shall be kept continuously moist during this period by covering with moistened canvas, burlap, straw, sand or other approved material unless they are sprayed with a curing compound. Wooden forms left in place during the curing period shall be kept wet.

Concrete, except at construction joints, may be coated with a curing compound in lieu of continuous application of moisture. The compound shall be sprayed on moist concrete surfaces as soon as free water has disappeared but shall not be applied to any surface until patching, repairs and finishing of that surface are completed.

Concrete shall be wet cured or remain in forms until immediately before patching, repairs, or finishing is performed. Curing compound shall not be allowed on any rebars.

Curing compound shall be applied in a uniform layer over all surfaces requiring protection at a rate of not less than one gallon per 150 square feet of surface.

Surfaces subjected to heavy rainfall or running water within three hours after the curing compound has been applied, or otherwise damaged, shall be resprayed.

Any construction activity which disturbs the curing material shall be avoided during the curing period. If the curing material is subsequently disturbed, it shall be reapplied immediately.

Steel tying or form construction adjacent to new concrete shall not be started until the concrete has cured at least 24 hours.

Vehicles, overlying structures, or other heavy loads shall not be placed on new concrete slabs for at least three days, unless the concrete strength can be shown to be adequate to support such loads.

#### f. Form Removal and Concrete Repair

Forms for walls and columns shall not be removed for at least 24 hours after placing the concrete. When forms are removed in less than seven days, the exposed concrete shall be sprayed with a curing compound or be kept wet continuously for the remainder of the curing

period. Forms which support beams or covers shall not be removed for at least seven days, or 14 days if they are to support forms or shoring.

Forms shall be removed in such a way as to prevent damage to the concrete. Forms shall be removed before walls are backfilled. Columns shall be at least seven days old before any structural loads are applied.

Where minor areas of the concrete surface are "honeycombed," damaged or otherwise defective, the area shall be cleaned, wetted and then filled with a dry-pack mortar. Dry-pack mortar shall consist of one-part Portland cement and three parts sand with just enough water to produce a workable paste.

**g. Concreting in Cold Weather** Concreting in cold weather shall be performed in accordance with ACI-306R-16. In addition, the contractor shall provide a written plan at least 24 hours in advance of placing concrete in cold weather and shall have the necessary equipment and materials on the job site before the placement begins.

**h. Concreting in Hot Weather**

Concreting in hot weather shall be performed in accordance with ACI 305, of which some specific interpretations are set forth below.

The supplier shall apply effective means to maintain the temperature of concrete below 90 degrees Fahrenheit during mixing and conveying. Exposed surfaces shall be continuously moistened by means of fog spray or otherwise protected from drying during the time between placement and finishing and during curing. Concrete with a temperature above 90 degrees Fahrenheit shall not be placed.

**i. Backfilling New Concrete Walls**

Backfilling and compaction of fill adjacent to new concrete walls shall not begin in less than 14 days after placement of the concrete, except that walls that can be backfilled on both sides simultaneously may be done so within seven days.

Heavy equipment shall not be allowed within three feet of a new concrete wall. Provide compaction near the wall by means of hand tamping or small, manually-directed equipment.

## **5. WOOD STRUCTURES**

All framing shall be true and exact. Timber and lumber shall be accurately cut and assembled to a close fit and shall have even bearing over the entire contact surfaces.

Nails and spikes shall be driven with just sufficient force to set the heads flush with the wood surface. Deep hammer marks in the wood shall be considered evidence of poor workmanship and may be sufficient cause for rejection of the work.

Holes for lag screws shall be bored with a bit not larger than the body of the screw at the base of the thread. Holes for bolts shall be bored with a bit no more than 1/16" larger than the bolt diameter to achieve a snug fit without forcibly driving the bolt.

Washers shall be used in contact with all bolt heads and nuts that would otherwise be in contact with wood.

All joints shall be fastened with the number, type, and size of fasteners specified, at the locations or spacing specified.

If field cuts of pressure-treated wood expose untreated interior wood, the untreated surfaces shall be covered with two coats of a liquid preservative, as approved by the Engineer.

Roof trusses shall be handled, installed and braced according to the Truss Plate Institute's BCSI-B1-06, "Handling, Installing and Bracing MPC Wood Trusses."

Wood structures shall be backfilled within the limits shown on the drawings by placing material in uniform lifts not to exceed nine inches. Compaction within three feet of walls shall be accomplished by means of hand tamping or small manually-directed equipment.

## **6. STRUCTURES INSTALLED ACCORDING TO STANDARD DETAIL DRAWINGS PREPARED BY OTHERS**

Commercially available structures shall be installed as shown on the drawings provided to and concurred in by NRCS. All materials furnished and installed shall conform to the quality and grade noted on the drawings. A site-specific set of construction drawings shall be at the site during construction.

Modification of the structure outside limits shown on the drawings shall not be made without prior review and approval by the Engineer with appropriate approval authority. The Supplier or Contractor who submitted the original standard detail drawings shall be responsible for making any changes. Sufficient design documentation to allow an adequate review of the proposed modification shall accompany any request for a change.

Within thirty (30) days of the completion of construction of the structure, the Contractor or Supplier shall furnish written certification to the Engineer that all aspects of the installation are in conformance with the requirements of the drawings and specifications.

## **7. BURIED TANKS**

### **a. Tank Condition**

Tanks, whether steel or fiberglass/plastic, shall have sufficient strength to withstand design loads, be watertight, and be protected from corrosion. New tanks shall have a manufacturer's certification to this effect.

Used tanks must be inspected for pitting, corrosion, and cracks that could impair the strength or water tightness. Tanks which originally stored leaded fuels may have tetraethyl lead deposits and scale on the inside. This material should be detached from the tank's interior, pumped out, and disposed of in a manner which will not pollute ground or surface waters. Also, if welding, handling, etc. is done, safety precautions should be taken to avoid ingesting or inhaling the lead or its fumes. (These tanks may have gasoline fumes or vapors in them and may explode from a spark, welding arc or torch.)

A tank that has been bent or dented will not be accepted unless adequate repairs have been made to restore the strength, water tightness, and corrosion protection.

When inlet or outlet pipes or other type of openings are to be cut into one of these tanks, the reduced strength must be considered when the tank is put into use. The Steel Tank Institute's sti-P<sub>3</sub> certification procedure shall be used to evaluate the structural integrity and assure the corrosion protection of steel tanks which have been repaired or modified.

### **b. Installation**

Underground tanks shall be handled and installed according to the manufacturer's

recommended procedures.

At a minimum, all tanks shall be set on a firm earth foundation or a full-length concrete slab covered with six inches of clean sand. The tank shall be surrounded by clean sand or well-tamped earth, free from stones and other debris. The use of saddles or "chock blocks" of any sort interferes with the proper distribution of the backfill loads and shall not be permitted.

The excavation shall be dewatered during installation and backfill operations. The backfill shall be well compacted, particularly under the tank, to provide adequate support.

Tanks shall be covered with a minimum of two feet of earth, or with not less than one foot of earth on which is placed a reinforced concrete slab not less than four inches thick.

Tank installations, which will be subjected to traffic, shall have adequate strength to withstand the anticipated overload. Tanks shall be protected against damage from vehicles passing over them by at least three feet of earth cover or by 18 inches of well-tamped earth plus either eight inches of asphaltic paving or six inches of reinforced concrete. The paving or concrete shall be placed to extend at least one foot horizontally in all directions beyond the outline of the tank.

Tanks shall not be filled or even partially filled during their installation and backfilling.

Unless high ground water levels are not expected, the site shall have a drain system to prevent ground water from flooding around the tank. Where a tank may become buoyant due to a rise in the level of the water table or due to location in an area subjected to flooding, applicable precautions shall be taken to anchor the tank in place or dewater the site.

Openings on all underground tanks must be properly located and maintained in place during backfilling.

## **8. PIPES**

Excavation for pipes shall be made to the grades and lines shown on the drawings or as indicated by construction stakes. Care should be taken not to excavate below the depths specified. Excavation below grade shall be corrected by placing firmly compacted layers of moist earth to provide a good foundation. If rock or boulders are exposed in the bottom of the excavation, they shall be removed to a minimum depth of eight inches below the invert grade of the pipe and any appurtenances and replaced with firmly compacted earth to the specified grade.

Pipes shall be backfilled with horizontal lifts of moist earth not to exceed four inches in thickness, or with other material as specified in Section 9 or in the drawings.

Each lift shall be compacted by hand tampers or other compaction equipment, however at no time shall driven equipment tires or tracks be within two feet of pipes or appurtenances.

All connections between pipes and structure walls and floors shall be water tight and capable of withstanding the expected operating pressures.

## **9. ADDITIONAL CONDITIONS WHICH APPLY TO THIS PROJECT ARE:**





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## Natural Resources Conservation Service Practice Specification Pumping Plant (Code 533)

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### 1. SCOPE

The work shall consist of furnishing materials and installing all components of the pumping facility, as outlined in this specification and the drawings.

### 2. MATERIALS

All materials used shall conform to the size, type, etc. noted on the plans, set forth in Section 6, or as otherwise listed below:

#### 1. PUMP:

The pump shall meet the required capacity, pressure, and head requirements, as specified in Section 6 or on the drawings. Pumps shall be compatible and resistant to the type of water or manure being conveyed.

The contractor shall be responsible for assessing the consistency, nature, quality and quantity of the substance to be pumped, and provide the appropriate equipment. The contractor shall provide in writing, or by performance tables provided by the manufacturer, the pumps performance characteristics (discharge, head, and pressure) and the relationship to or requirements of the following:

- a. Operating power requirements
- b. Estimated service life
- c. Maintenance requirements
- d. Efficiency

#### 2. PIPE:

Suction and Discharge pipe shall be chosen so that the type and class of pipe exceeds the systems pressure requirement. The operating pressure shall be specified in Section 6 or on the drawings, or as determined by the pump manufacturer. If the pipe is an integral part of another related planned practice or distribution system, the pipe type and class shall meet or exceed the requirements of the pipe installed in that planned system.

Fittings shall be rated equal to the pipe being specified.

The pipe and fittings, where applicable, shall be marked by the manufacturer as described in the applicable ASTM specification.

Used pipe or seconds shall not be used. Pipe shall be approved by the engineer prior to installation.

#### 3. CONTROLS:

All check valves and directional control valves, gauges, quick disconnects, and automatic controls shall be durable and constructed with a rust resistant, non-corrosive, material able to withstand the type of water, or manure being pumped.

#### 4. SUCTION AND DISCHARGE BAYS:

Suction and discharge bays shall be designed to conform to the hydraulic characteristics of the pump. They shall be to the dimension and capacity as specified in Section 6 or on the drawings.

Precast concrete units shall be in conformance with PennDOT specifications for such units and/or comply with ACI-525 and 533. All concrete units shall have a 28-day compressive strength of 4000psi., or greater, and all reinforcement bars shall be of grade 60 steel or higher, unless otherwise specified in Section 6 or on the drawings.

*Portland cement* shall be Type I, IA, II, or IIA and conform to ASTM-C150, unless otherwise set forth in Section 6. If Type I or II is used, an air-entrainment agent shall be used.

*Concrete Aggregate* shall meet the requirements and gradation specified in ASTM-C33. Coarse aggregate shall meet the gradation for size numbers 57 or 67.

*Reinforcement* bars shall conform to ASTM-A615, A616, or A617. Welded wire fabric reinforcement shall conform to ASTM-A185 or A497. Reinforcement shall be free from loose rust, oil, grease, curing compound, paint or other deleterious coatings.

All rock structures shall be of rock that is durable and resistant to weathering. The rock shall be of the type specified in Section 6 and shall be obtained from a source listed in the most current edition of PennDOT Bulletin #14. The gradation of the rock shall comply with the requirements set forth by the National Crushed Stone Association.

#### 5. HOUSING AND ACCESSORIES:

Trash racks, housings, and other devices shall be installed as shown on the drawings provided to and concurred in by NRCS. All materials furnished and installed shall conform to the quality and grade noted on the drawings. A site-specific set of construction drawings shall be at the site during construction.

Wood shall be graded and stamped by an agency accredited by the American Lumber Standards Committee as meeting the required species, grade, and moisture content. All exposed or buried lumber shall be pressure treated. Pressure treated wood products shall be Douglas Fir, Southern Yellow Pine, or as otherwise specified in Section 6 or on the drawings. They shall be treated with preservatives in accordance with the American Wood Preservers Association (AWPA) Standard C16 for "wood used on Farms, Pressure Treatment". Non-CCA preservative pressure treated lumber shall be used where aquatic life is a concern.

Roofing material shall be corrugated 29 gage galvanized steel. Equivalent or better material maybe approved by the Engineer.

Sheet piling shall be of steel or vinyl type. The piling must be of the thickness and grade specified in Section 6, and as recommended by the manufacturer for the intended use. Suitable methods of installing and anchoring the piling shall be as listed in Section 6, and as recommended by the manufacturer.

### 3. SITE PREPARATION

All trees, brush, fences, and other debris shall be cleared so as not to interfere with construction or proper functioning of the Pumping Plant system. All material removed by the clearing and grubbing operation shall be disposed of as directed by the Owner or his/her Representative.

#### **4. SAFETY**

All positive responses from the Pennsylvania One Call System should be shown on the drawings and the Pennsylvania One Call serial number and date noted on the plans. It is the Contractor's or Landowner's responsibility to contact the affected utility for marking at the time of construction.

The Contractor must comply with OSHA requirements Part 1926, subpart P, for protection of workers entering trenches.

#### **5. INSTALLATION**

Pipelines shall be placed so that they are protected against hazards imposed by traffic, farm operation, freezing temperatures, or soil cracking. Other means of protection must be provided if the depth required for protection is impractical because of shallow soils over rock or for other reasons.

Trenches for pipeline shall be free of rocks and other sharp-edged materials. The pipe shall be carefully placed to prevent damage.

Before backfilling, the pipeline shall be pressure tested. To pressure test the pipe, fill the pipe with water and test at the design working head and pressure. All leaks must be repaired, and the test must be repeated before backfilling.

All backfilling shall be completed before the line is placed in service. The initial backfill shall be of selected material that is free of rocks or sharp-edged materials that can damage the pipe.

Deformation or displacement of the pipe must not occur during backfilling.

All seeding shall be in accordance with the Critical Area Planting Standard and Specifications (PA342).

#### **6. ADDITIONAL CONDITIONS WHICH APPLY TO THIS PROJECT ARE:**

## **Natural Resources Conservation Service Practice Specification Access Road (Code 560)**

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### **1. SCOPE**

The work shall consist of construction of the Access Road at the location, and to the dimensions and grades, shown on the drawings and as staked in the field.

### **2. SITE PREPARATION**

All trees, stumps, roots, brush, weeds, and other objectionable material shall be removed from the work area and disposed of as directed.

All unsuitable material shall be removed from the roadbed area prior to placing fill or surfacing materials.

The roadbed shall be graded to the required elevations. All areas which require filling will be scarified prior to placement of fill. All fill shall be compacted according to the specified method with the appropriate equipment or to the specified density.

### **3. SURFACING**

Aggregate for the subbase shall be clean and free from deleterious substances.

GEOTEXTILE shall meet the requirements as outlined in NRCS Design Note 24 and NRCS Material Specification 592 or as otherwise stated in Section 6.

Gradation shall be such that a stable base will be formed. Placement of the surface course shall be in accordance with sound highway construction practices.

### **4. SEEDING**

All disturbed areas shall be revegetated as designated on the drawings.

### **5. EROSION CONTROL**

Construction operations shall be carried out in such a manner that erosion and air and water pollution will be minimized. State and local laws concerning pollution abatement must be followed.

### **6. ADDITIONAL CONDITIONS WHICH APPLY TO THIS PROJECT ARE:**

## **Practice Specification Stream Crossing (Code 578)**

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### **1. SCOPE**

The work shall consist of furnishing materials and installing all components of the stream crossing, as outlined in this specification and the drawings.

### **2. MATERIALS**

Unless otherwise set forth in Section 7, the following materials are to be used:

a. ROCK shall be durable and obtained from sources listed in PennDOT Bulletin 14 or as otherwise approved by the designer. Size and gradation, where required, shall be as specified in Section 7 or as shown on the drawings. The nominal size of a rock is that dimension (middle) which passes through a square opening with the same size dimension; i.e. it is not the greatest dimension. The rock shall be free from soil and trash. Rocks shall be angular or subangular in shape. However, the least dimension of any individual rock shall be not less than one-third the greatest dimension.

b. GEOSYNTHETICS shall meet the requirements set forth in Section 7 and/or on the drawings. In addition, geotextiles shall meet the requirements of PennDOT Specifications, Section 735, for the appropriate class defined in Section 212. Certification from the manufacturer shall be provided by the Contractor that the geosynthetics meets these requirements.

c. BIOTEXTILES, BIOMATS and other manufactured, natural materials shall conform to the requirements in Section 7, and be installed according to the manufacturer's recommendations for flowing water applications.

d. AGGREGATE for bedding, drainfill, and concrete shall be durable and obtained from sources listed in PennDOT Bulletin 14. The gradation shall be as set forth in Section 7 or on the drawings.

e. PORTLAND CEMENT shall be Type I, with air-entrainment agent, or Type IA, unless otherwise required in Section 7. All cement shall conform to ASTM-C150.

f. MASONRY shall meet the requirements of ASTM-C90 & C270.

g. PRECAST concrete units shall meet the requirements of ACI-525 & 533, unless otherwise specified in Section 7.

h. LUMBER shall be the dimensions and species specified in Section 7 or shown on the drawings. Pressure treated products shall conform to the requirements of the AWPA Standard C16, except that only non-CCA preservatives, suitable for use in aquatic habitats, can be used.

i. PLANT MATERIALS, including seed, shall be true to the type, name and size required on the drawings or in Section 7. Plants and seeds shall be viable and free from disease, injurious insects, mechanical injury, decay, or other defect that will decrease survivability. All bare rootstock shall have a root:stem ratio of at least 1:1 by volume. Bulbs and tubers shall be firm and rhizomes resilient. Balled and burlapped, multi-stem stock shall be pruned to one-half height prior to planting. Transport and storage of all stock shall be done in a manner that prevents windburn and drying. All local, state, and Federal regulations regarding plant shipments shall be complied with.

### **3. SITE ACCESS AND CLEARING**

Only those areas, shown on the drawings, to be protected or actually required for access shall be cleared. Tree and brush removal shall be done in such a manner to prevent damage to other trees and property, and to minimize erosion. Unless otherwise specified in Section 7, all cleared materials, including trash, shall be burned or removed from the site. Burning shall comply with all state and local applicable regulations.

### **4. GRADING**

Soil surfaces shall be graded to the lines or sections shown on the drawings and/or staked in the field. Surfaces which have been over-excavated shall be brought to the planned grade by replacement with

soils similar to, and at a density equal to, that of the adjacent soils. Unless otherwise set forth in Section 7, fill that is required to be imported to the site shall be similar to, and placed at a density equal to, that of the adjacent soils, except that areas to be vegetated shall receive topsoil approved by the Engineer. Excess soil material shall be disposed of as set forth in Section 7 or shown on the drawings.

Provide for water diversion and erosion control as set forth in plans and permits.

## **5. STRUCTURAL INSTALLATION**

Structures shall be installed as set forth in Section 7, as shown on the drawings, and in such a manner as to minimize erosion and sedimentation.

Rock shall be placed by equipment on the surface and to the depths specified, and in such a manner as to avoid displacement or damage to the underlying materials or adjacent structures. Graded rock shall be delivered and placed in such a manner that will ensure that the in-place material is homogeneous with no one size dominating an area. Some hand placing may be necessary to provide a neat and uniform surface on grade.

Commercially manufactured structures, including but not limited to culverts, gabions, precast slabs, etc., shall be installed as required by the manufacturer for flowing water applications.

## **6. VEGETATION**

Vegetation shall be established at the locations shown on the drawings and/or staked in the field, and as set forth herein, in Section 7, and/or as shown on the drawings. Unless otherwise set forth in Section 7, all woody vegetation shall be planted between October 1 and April 15.

Unless otherwise approved by the Engineer, the application of seed, soil supplements, and mulch shall be done by mechanical methods that ensure uniform coverage.

## **7. ADDITIONAL CONDITIONS WHICH APPLY TO THIS PROJECT ARE:**

# CONSTRUCTION SPECIFICATION

## 606. SUBSURFACE DRAIN

### 1. SCOPE

The work shall consist of furnishing materials and installing all components of the subsurface drain as outlined in the specification and the drawings.

### 2. MATERIALS

- a. DRAINFILL AGGREGATE shall meet the requirements of Penn DOT, Publication 408, Section 703, fine and coarse aggregate. The size and gradation shall be as specified in the additional conditions of this specification or on the drawings.
- b. PIPE shall meet the requirements of Table 1, and as set forth in Section 9 and/or on the drawings. All pipes shall be clearly marked with the appropriate specification designation. If plastic pipe is stored on site for a length of time, it should be protected from sunlight. At the time of installation, it should be kept as cool as possible to minimize elongation of the pipe during installation.
- c. GEOTEXTILE shall meet the requirements as outlined in PennDOT Publication 408, Section 735, Class 1, Subsurface Drainage.

**Table 1 – Drain pipe requirements**

<u>Type</u>	<u>Specification</u>
Clay drain tile, solid & perforated	ASTM-C-4
Clay pipe, perforated, standard and extra strength	ASTM-C-700
Clay pipe testing	ASTM-C-301
Concrete drain tile	ASTM-C-412
Concrete pipe for irrigation or drainage	ASTM-C-118
Concrete pipe or tile, determining physical properties of	ASTM-C-497
Concrete sewer, storm drain and culvert pipe	ASTM-C-14
Reinforced concrete culvert, storm drain and sewer pipe	ASTM-C-76
Perforated concrete pipe	ASTM-C-444
Portland cement	ASTM-C-150
Pipe, bituminized fiber & fitting	Federal Specification SS-P-1540
Styrene rubber (SR) plastic drain pipe & fitting	ASTM-D-2852
Polyvinyl chloride (PVC) sewer pipe & fitting	ASTM-D-2729
Polyvinyl chloride (PVC) pipe	ASTM-D-3034 type PSM
Corrugated polyethylene tubing & fitting ( 3-6 inch)	ASTM-F-405
Corrugated polyethylene tubing & fitting ( 8-24 inch)	ASTM-F-667
Pipe, corrugated (steel, polymer coated)	ASTM-A-762
Pipe, corrugated (steel, zinc coated)	ASTM-A-760

### 3. SITE PREPERATION

All trees, brush, fences and rubbish shall be cleared within the area that the subsurface drain will be installed. All material removed by the clearing and grubbing operation shall be disposed of as directed by the Owner or his/her Representative.

### 4. INSPECTION AND MATERIAL HANDLING

Material for subsurface drains shall be carefully inspected before the drains are installed. If applicable, clay and concrete tile shall be checked for damage from freezing and thawing before it is installed. Bituminized fiber and plastic pipe and tubing shall be protected from hazard causing deformation or warping. Plastic pipe and tubing with physical imperfections shall not be installed. Any damaged section shall be removed and replaced. All material shall be satisfactory for its intended use and shall meet applicable specifications and requirements.

### 5. SAFETY

All positive "design" responses from the Pennsylvania One Call System are noted on the plans. It is the Contractor's or Landowner's responsibility to notify One Call of pending construction and to contact the affected utility for marking at the time of construction.

The Contractor must comply with OSHA requirements Part 1926, subpart P, for protection of workers entering trench.

### 6. INSTALLATION

Flexible conduits, such as plastic pipe or tubing and bituminized fiber pipe, shall be installed, according to the requirements in ASTM-F-449, "Standard Recommended Practice for Subsurface Installation of Corrugated Thermoplastic Tubing for Agricultural Drainage or Water Table Control."

All subsurface drains shall be laid to line and grade and covered with approved blinding, envelope or filter material to a depth of not less than three inches over the top of the pipe. If an impervious sheet is used over the drain, at least three inches of blinding material must cover the sheet. No reversals in grade of the conduit shall be permitted.

If the conduit is to be laid in a rock trench or if rock is exposed at the bottom of the trench, the rock shall be removed below grade so that the trench can be backfilled, compacted and bedded. When completed, the tile conduit shall be not less than two inches from the rock.

Joints between drain tiles shall not exceed 1/8 inch except in sandy soils where the closest possible fit must be obtained and in organic soil where some of the more fibrous soil types make it desirable to slightly increase the space between tiles.

Earth backfill material shall be placed in the trench in a manner to ensure that the conduit does not become displaced and so that the filter and bedding material, after backfilling, meet the requirements of the plans and specifications.

If a filter is needed, no part of the conduit containing openings shall be left exposed. If a sand-gravel filter material is used, it shall be a gradation that is compatible with the base material in the trench. The trench shall be over excavated three inches and backfilled to grade with filter material. After the conduit is placed on the filter material, additional filter material shall be placed over the conduit to fill the trench to a depth of three inches over the conduit.

### 7. FITTINGS AND CONNECTIONS

All fitting and connections for pipe shall be made with manufacturer-supplied components made for the intended purpose.

### 8. CONDUIT PERFORATIONS

If perforations are specified, the water inlet area shall be at least 1inch/foot of the pipe length. The perforations shall be either circular or slots equally spaced around the circumference of the pipe in not less than three rows. Circular perforations shall not exceed 3/16 inch in diameter and slots shall not be more than 1/8 inch wide and 1 ¼ inch long for 3, 4 and 5 inch diameter pipe, or 1 ½ inch for 6 and 8 inch diameter pipe, or 1 ¾ inch for 10 and 12 inch diameter pipe. All slots and circular perforations shall be cleanly cut.





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## Natural Resources Conservation Service Practice Specification Waste Transfer Pipeline (Code 634)

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### 1. Scope

The work consists of furnishing and installing all materials, assemblies, labor, and equipment for constructing the structures for transfer of animal waste, including all appurtenances, according to the construction drawings, these specification, and all applicable manufacturer's recommendations and specifications.

### 2. Utilities

Landowners or operators, sponsoring organizations, and/or contractors will be liable for damage to utilities and damage resulting from disruption of service caused by construction activities.

It is the responsibility of the contractor to determine if there are buried or overhead utilities in the vicinity of the proposed work. The contractor is required to call PA ONE CALL for utilities to be located prior to commencing construction. They must follow proper procedures to ensure the utilities are not jeopardized and equipment operators and others will not be injured during construction operations. They will conduct all work and operations in accordance with the proper safety codes for the types of construction being performed with due regard to the safety of all persons and property.

NRCS makes no representation on the existence or nonexistence of any utilities. Absence of utilities on the drawings is not assurance that no utilities are present at the site.

### 3. Quality Control

Quality control of all materials and construction procedures is the responsibility of the landowner and contractor. NRCS will make periodic quality assurance review(s) of the work for the benefit of the agency which will include the final construction check.

### 4. Construction Operations

Carry out construction operations in a manner and sequence that erosion and air and water pollution are minimized and held within legal limits.

The completed job must present a workmanlike appearance and must conform to the line, grades, and elevations shown on the drawings or as staked in the field. Carry out all operations in a safe and skillful manner. Observe safety and health regulations and use appropriate safety measures.

Save documentation of materials used (rock delivery tickets, geotextile tags, seed tags, photographs of pipe labeling, etc.) and provide to NRCS.

## 5. Materials

### PIPE

Pipe, fittings, and appurtenances must be new, commercially available, uniform, and with the size, type and pressure class as shown on the construction drawings and specifications. It must be free from visible cracks, holes, and other defects. Used pipe or “seconds” are not acceptable. The pipe and fittings must be marked by the manufacturer as described in the applicable ASTM specification as shown in table 1. Pipe and fittings must be approved by the engineer or the engineer’s representative prior to installation.

**Table 1. Pipe Specifications**

Installation Type	Material	Specification
Gravity Flow Pipelines	Polyvinyl Chloride (PVC) Pipe <sup>1</sup>	ASTM F679
		ASTM F794
		ASTM F949
		ASTM D3034
	Polyethylene (PE) Pipe	ASTM F2306
		ASTM F667
		ASTM F894
	High Density Polyethylene (HDPE) Pipe	ASTM D3350
	Acrylonitrile-Butadiene Styrene (ABS)	ASTM D2680
	Polypropylene (PP) Pipe	ASTM F3219
AASHTO M294		
Concrete Culvert Pipe	ASTM C76	
	ASTM C655	
Ductile Iron Pipe	ASTM A746	
Pressure Flow Pipelines <sup>3</sup>	Polyvinyl Chloride (PVC) Pipe <sup>1</sup>	ASTM D1785
		ASTM D2241
	Polyethylene (PE) Pipe	ASTM D2239
		ASTM F714
		ASTM D3035
	Acrylonitrile-Butadiene Styrene (ABS) Pipe	ASTM D2235
		ASTM F2806
	Steel Pipe <sup>2</sup>	ASTM A53
		ASTM A134
		ASTM A135
		ASTM A139
	Ductile Iron Pipe	ASTM A377
AWWA C150/C151		
<sup>1</sup> PVC pipe material must be Type 1 (1120/1220) for pressure pipelines.		
<sup>2</sup> Metal pipes must be coated with asphalt or plastic to retard corrosion, depending upon the type of metal.		
<sup>3</sup> Pressure pipes can also be used for gravity flow.		

Fittings and connections must meet or exceed the same strength requirements as those of the pipe and must be made of material recommended for use with the pipe. Fittings must be new, free of defects, and comply with the appropriate ASTM specification listed in table 2. Solvent for solvent cement joints must conform to ASTM Specification D2564 for PVC pipe and fittings, and to ASTM Specification D2235 for ABS pipe and fittings.

Rubber gasket joints must conform to ASTM Specification D3139.

Accessories – All valves and appurtenances must be of adequate capacity and suitable quality to withstand the design pressures. They must be installed in accordance with the manufacturer’s recommendations.

**Table 2. ASTM Standard Specifications for Fittings**

<b>ASTM Standard Specification for Fittings</b>	
Socket-type PVC, Schedule 40	ASTM D2466
Socket-type PVC, Schedule 80	ASTM D2467
Polyethylene (PE) Plastic Insert Fittings	ASTM D2609
Socket-type Polyethylene (PE), SDR 11.0	ASTM D2683
Flexible Elastomeric Seals	ASTM D3139
Polyethylene (PE) Butt Heat Fusion Fittings	ASTM D326

Pumps and motors must be as specified in Section 11 or on the construction drawings. Pumps must be specifically rated for handling agricultural waste.

GEOTEXTILE shall meet the requirements as outlined in NRCS Design Note 24 and NRCS Material Specification 592 or as otherwise stated in Section 6.

**6. Site Preparation for Pipe**

The work area as shown on the construction drawings, or as staked in the field, must be cleared of all trees, logs, stumps, roots, brush, boulders, and trash. Roots having a diameter greater than 1 inch and rocks larger than 6 inches must be removed to a depth of at least 2 feet below the trench subgrade. Topsoil and sod will be removed and stockpiled for use on disturbed areas following trench backfill.

**7. Pipe Installation**

Pipe Depth and Protection – Pipe must be buried below the frost line. Pipelines must also be protected from hazards imposed by traffic crossing, farming operations, or soil cracking. Unless otherwise specified, the minimum burial depth of pipe will be 24 inches for normal field traffic. Deeper burial may be required for protection from freezing or other hazards. When crossing under roadways, additional protection, such as placing the pipe inside a steel pipe or conduit, may be necessary to prevent the pipe from collapsing. Other means of protection must be provided if the depth required for protection is impractical because of shallow soils over rock or for other reasons. Abrupt changes in grade must be avoided to prevent damage to pipe.

Trench Excavation – The excavation for the pipe will be constructed to the lines, grades, depth, and cross sections as shown on the drawings or as staked in the field. Minimize trench width to the extent possible for pipe placement and uniform initial backfill under the lower half of the pipe. Excavate trenches to ensure stable sides under working conditions. Use trench safety practices that conform to local, State, and Federal safety regulations. Backfill trenches as soon as practicable, but no later than by the end of the working day. Trenches for plastic pipelines must be free of rocks and other sharp-edge materials. Bedding material must be free of rocks.

Pipe Placement – The pipe must be firmly and uniformly bedded throughout its full length to the depth and in the manner specified on the drawings. Provide a firm, stable, and uniform bedding for the pipe barrel and any protruding features of its joint. Install foundation and bedding as shown on the drawings. Provide a minimum of 6 inches of bedding unless a deeper layer is specified. The minimum bedding depth will be 6 inches when the pipe will be installed near bedrock. Pipe must be placed on undisturbed or nonyielding compacted material. For pipe with bell joints, bell holes will be excavated in the bedding material, as needed, to allow for unobstructed assembly of the joint and to permit the body of the pipe to be in contact with the bedding material throughout its length. Do not lay or embed pipe in standing or running water. At all times prevent runoff and surface water from entering the trench.

Just before placement, each pipe section must be inspected to ensure that all foreign material is removed from inside the pipe. The pipe ends and the couplings must be free of foreign material when assembled. At the completion of a work shift, all open ends of the pipeline must be temporarily closed off using a suitable cover or plug.

Pipe must be installed to the line and grade shown on the drawings or as staked in the field. Unless otherwise specified, the pipe must be installed so that there are no reversals of grade between joints and must be installed in accordance with the manufacturer's recommendations. Abrupt changes in grade must be avoided to prevent rupture of the pipe. The pipe must be uniformly and continuously supported over its entire length on firm stable material. Blocking or mounding will not be used to bring the pipe to final grade. The pipe must not be dropped or dumped on the bedding or into the pipe trench. The ground surface near the pipe trench must be free of loose rocks and stones greater than 1 inch in diameter.

Standard manufactured pieces will be used for angles required to make direction changes. Directional pipe deflection will be allowed in plastic pipe per the manufacturer's allowable bend radius. Bell and spigot pipe should be laid with the bell pointed upstream. The pipe ends and couplings must be free of foreign material when assembled.

Appurtenances – Air vents, cleanouts, warning signs, pumps, motors, pressure relief valves, shutoff valves, and other appurtenances and accessories, as specified, will be installed where shown on the construction drawings and in accordance with the manufacturers' recommendations.

Thrust Blocks and Anchors – When specified, install concrete thrust blocks and anchors as shown on the drawings or as staked in the field.

The thrust block cavity must be hand-excavated into undisturbed soil or previously placed compacted backfill. Form the cavity with soil or wood to hold the freshly placed concrete without displacement until an initial set has occurred. Construct so the space between the pipe and trench wall is filled to the height of the outside diameter of the pipe or as specified in the construction drawings.

Testing – Testing shall be as specified in the site-specific design. When pressure testing pipelines use water to determine pressure strength, leakage, and proper functioning. The tests may be performed before backfilling or any time after the pipeline is ready for service. Unless otherwise specified, tests for pressure strength and leaks will be accomplished with water by inspecting the pipeline and appurtenances while the maximum working pressure is maintained and all joints and connections are uncovered, or by observing normal operation of the pipeline after it is put into service. Partial backfills needed to hold the pipe in place during testing will be placed as specified in “Initial Backfill” below. Any leaks must be repaired, and the system retested.

The pipeline must be tested to ensure that it functions properly at design capacity. At or below design capacity, there must be no objectionable flow conditions. Objectionable flow conditions include water hammer, continuing unsteady delivery of waste, damage to the pipeline, pipe blockage, or detrimental discharge from control valves.

Initial Backfill – Hand or mechanical backfill methods may be used.

The initial backfill material will be soil or sand that is free from rocks or stones larger than 1 inch in diameter. At the time of placement, the moisture content of the material will be such that the required degree of compaction can be obtained with the backfill method to be used. The initial backfill material will be placed so that the pipe will not be displaced, excessively deformed, or damaged.

If backfilling is done by hand or mechanical means, the initial fill will be compacted firmly around and above the pipe as required to provide adequate lateral support to the pipe.

Final Backfill – Final backfill will consist of placing the remaining material required to complete the backfill from the top of the initial backfill to the ground surface, including mounding at the top of the trench. Final backfill material within 2 feet of the top of the pipe will be free of debris or rocks larger than 3 inches nominal diameter. Coarse backfill material will be the specified sand, gravel, crushed rock, or drain fill shown on the drawings. Final backfill will be placed in uniform, compacted layers. Final backfill compaction and layer thickness requirements will be as shown on the drawings.

Vehicles or construction equipment will not be allowed to cross the pipe until the minimum earth cover and required density has been obtained.

## **8. Concrete**

Concrete shall meet 313.

Pipe connectors shall be used for precast manholes and hoppers, including flexible boot and compression connectors. Both need to meet ASTM C-923. Do not use corrugated pipe with

these connectors unless an approved adaptor is used to make a water tight connection. Provide a water-tight connections for pipes penetrating a concrete wall for liquid storages such as using hydrophilic waterstop. Minimum concrete cover over bentonite shall be as per manufacturer.

## **9. Site Preparation**

The work area as shown on the construction drawings, or as staked in the field, must be cleared of all trees, logs, stumps, roots, brush, boulders, and trash. Roots having a diameter greater than 1 inch and rocks larger than 6 inches must be removed to a depth of at least 2 feet below the foundation subgrade. Topsoil and suitable backfill material will be removed and stockpiled.

## **10. Foundation Preparation for Structures**

Excavate the foundation to the lines, grades, and elevations shown on the construction drawings, allowing for bedding material, if any. Excavated vertical or sloped surfaces too steep to be stable must be properly supported to protect workers.

If shown on the construction drawings, use bedding material to level the foundation excavation to the finished grade. Use moist (not saturated) bedding material to facilitate screeding, leveling, and finishing operations.

Place bedding material as specified on the construction drawings, uniformly over the entire area.

## **11. Structure Outlet and Drain Pipe**

Install the pipe according to the manufacturer's instructions and as specified on the construction drawings.

Use drain fill material as specified and install as shown on the construction drawings. Place geotextile at all soil-drainfill interfaces. The geotextile material must be as specified on the construction drawings.

## **12. Structure Safety Barriers**

Provide open structures with secure covers or barriers, such as gates or fences, as shown on the construction drawings. Place barriers on push-off ramps to prevent tractors or other equipment from slipping into waste collection, storage, or treatment facilities. Install the barrier according to the manufacturer's instructions and as specified on the construction drawings.

## **13. Vegetation**

After adding topsoil, as needed, establish a protective cover of vegetation on all earth surfaces in the construction area that have been altered or disturbed by the construction operation. Seedbed preparation, seeding, fertilizing, and mulching must comply with the construction drawings and NRCS Construction Specifications 342, "Critical Area Planting" and 484, "Mulching."