

**NATURAL RESOURCES CONSERVATION SERVICE
ILLINOIS CONSTRUCTION SPECIFICATION**

CONSTRUCTED WETLAND

Scope

The work shall consist of constructing a constructed wetland, and excavating, filling and shaping as required by the construction plans.

Utilities

The landowner and/or contractor shall be responsible for locating all buried utilities in the project area, including drainage tile and other structural measures. The landowner will obtain all necessary permissions from regulatory agencies, or document that no permits are required.

General

Construction operations shall be carried out in a manner and sequence that erosion and air and water pollution are minimized and held within legal limits.

The completed job shall present a workmanlike appearance and shall conform to the line, grades, and elevations shown on the drawings or as staked in the field.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used. Contractor shall be assured that all state laws concerning buried utilities have been met.

Documentation of materials used (rock or concrete delivery tickets, geotextile tags, seed tags, photographs of pipe labeling, etc) shall be saved and provided to NRCS.

All trees, stumps, roots, brush, weeds, and other objectionable materials shall be removed from work area as designated on the plans.

Designated locations for excavation and earthfill shall be stripped of all vegetation and topsoil containing substantial amounts of organic matter. Topsoil will be stockpiled for use to topsoil areas disturbed by the construction, embankment slopes, and other

required topsoil areas (if the percentage of organic materials is not too great).

Excavation

To the extent they are suitable and approved by the inspector, excavated materials are to be used as fill materials.

Excess spoil material shall be placed, spread, leveled, or shaped as shown on the construction plans or as staked in the field. Spoil material shall not be spread on existing wetland areas. The completed job shall be finished to a degree so the surface can be traveled with farm-type equipment unless otherwise specified in the construction plans.

All excavations shall conform to the lines, grades, elevations, bottom width, and side slopes shown on the construction plans or as staked in the field.

The location, extent, and depth of the borrow area shall be as shown on the construction plans or as staked in the field. Borrow shall not be taken within 10 feet of the embankment unless shown on the plans.

Borrow pits will be excavated and dressed in a manner to eliminate steep or unstable side slopes or other hazardous conditions. Side slopes of borrow pits shall be no steeper than 3:1 or as specified on the construction plans. Surfaces of the borrow pits outside of the wetland area shall be graded and shaped to prevent the ponding of water.

Existing Subsurface Drains

Subsurface drains shall be removed as shown on the plans. All envelope, filter material or other flow-enhancing material shall be removed. The trench shall be filled in 12 inch lifts of similar soils and compacted to achieve a density equal to the adjacent natural soils.

The ends of the abandoned and disconnected drains shall be blocked with manufactured caps or plugs, plugged with concrete, or

otherwise sealed and made inoperable in such a manner that the waterholding integrity of the wetland is not impaired.

Existing drains found during construction shall be brought to the attention of the NRCS inspector.

Water Control Structure and Pipe

The materials and manufacture of the water control structure, pipe, anti-seep collars, coupling bands, coatings, and other appurtenances shall be as shown on the construction plans and shall conform to the NRCS material specifications in the approved design.

The pipe shall be laid to the line and grade and elevations shown on the drawings and shall be firmly and uniformly bedded throughout its entire length. The pipe shall be installed according to the manufacturer's instructions.

Anti-seep collars shall be of materials compatible with that of the pipe and shall be installed so that they are watertight.

The pipe shall be laid with the outside laps of circumferential joints pointing upstream and with longitudinal laps on the sides at approximately the vertical mid-height of the pipe. Field welding of corrugated galvanized steel pipe will not be permitted. The pipe sections shall be joined with coupling bands or other approved methods, as shown on the construction drawings.

Special care shall be taken during backfill operations not to disturb the grade and alignment. The pipe shall be tied down or loaded sufficiently during backfilling around the sides to prevent its being lifted from the bedding.

Backfill material shall have sufficient moisture so that optimum compaction can be obtained. Backfill around the pipe shall be placed in layers not more than 4 inches thick before compaction.

Each layer of backfill shall be compacted with power tampers, hand tampers, or plate vibrators to the same density requirements as specified for the adjacent embankment. Backfill over and around the pipe shall be brought up uniformly on all sides. The passage of earth moving equipment will not be allowed over the pipe until backfill has been

placed above the top of the pipe surface to a depth of two (2) feet.

Hand tamping only shall be used to compact the earthfill under the bottom half of circular pipes. Equipment weighing 400 pounds or more per foot of width shall not be operated within 2 feet of any structure or pipe.

Selected impervious backfill material shall be placed around the conduit, anti-seep collars and other appurtenances in layers not more than four (4) inches thick before compaction; and each layer shall be thoroughly compacted by hand tamping, manually directed power tampers, or plate vibrators to the density of the surrounding material. The height of fill shall be increased at approximately the same rate on all sides of the structure. Heavy equipment shall not be operated within 2 feet of any structure.

Animal Guards

All inlet and outlet pipes shall have animal guards, as shown on the construction plans. Guards on outlet pipe should be hinged to allow passage of debris.

Earthfill

The foundation area where the embankment is to be built shall be scarified to a minimum depth of 4 inches before the fill material is placed, so that the first layer of fill material can be bonded to the foundation.

Fill material shall be free of detrimental amounts of sod, roots, frozen soil, stones more than 6 inches in diameter, and other objectionable material that might endanger the performance of the embankment. The moisture content of the fill material shall be sufficient to permit satisfactory compaction. Moisture content can generally be considered satisfactory if fill material can be molded into a ball with the hands without readily separating, squeezing out free water, and will easily ribbon out between the thumb and finger. Material that is too wet shall be dried and material that is too dry shall have water added and mixed until the requirements are met.

The placing and spreading of fill shall be started at the lowest point of the foundation and the fill brought up in horizontal layers not to exceed 9 inches in thickness prior to compaction. Each lift shall be compacted by routing hauling equipment over the fill in such a

manner that the entire surface will be traversed by not less than one wheel track.

The completed work shall conform to the lines, grades, and elevations shown on the construction plans or as staked in the field.

Auxiliary Spillway Lining

Where specified on the construction plans, auxiliary spillways are to be lined with protective materials such as Turf Reinforcement Mat (TRM) or geotextile-lined rock. TRM is to be installed according to the construction plans and manufacturer's specifications.

Geotextile

If geotextile is specified on the construction plans, geotextile shall be nonwoven, needle-punched, and meet the minimum criteria specified in the plan.

Place geotextile fabric on the base/subgrade as shown on the drawings, over and outside of the entire area of base/subgrade. The fabric shall be loosely laid (not stretched). No cuts or punctures in the fabric will be permitted. Fabric edges should extend at least 12 inches past the edges of the rock when laid. Use a minimum lap of 18 inches if the filter fabric is installed in more than one piece, with upstream or upslope geotextile overlapping the downslope geotextile.

Geotextile fabric shall not be left exposed for more than 48 hours.

Rock Riprap

If rock is specified on the construction plans, rock shall be dense; sound; and free from cracks, seams, or other defects conducive to accelerated weathering. The rock fragments shall be angular to sub-round in shape with the least dimensions not less than 1/3 the greatest dimension of the fragment. Riprap will meet the IDOT gradation and quality designation shown on the plans.

The rock shall be placed to the depths specified on the drawings. The riprap shall be constructed to the full course thickness in one operation and in such a manner as to avoid serious displacement of the underlying materials. The rock in place shall be reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another and with the smaller rocks filling the voids. Some hand placing may be required to

provide a neat and uniform surface. Rock riprap shall be placed in a manner to prevent damage to geotextile.

Liner

If required in the construction plans, a liner shall be installed in the constructed wetland as designated in the construction plans. Separate specifications for the liner will be provided.

Planting Medium

Topsoil stockpiled on the site shall be used to fill the bottom of the wetland cells, unless otherwise specified in the construction plans. The topsoil shall not be placed in the wetland until the liner has been inspected and approved by the engineer. Topsoil shall be placed to the depth specified in the construction plans. Equipment operation shall be controlled to minimize compaction of the topsoil, and to prevent damage to the liner. Care shall be taken to finish the top of the soil to the grades shown on the drawings.

Vegetation - Embankments

A protective cover of vegetation shall be established on constructed embankments and other non-wetland areas as specified in the design plans. Refer to Construction Specification (342), Critical Area Seeding, for detailed seeding requirements. Vegetation should be established as soon after construction as possible.

Vegetation - Wetland

Transplanting Method

Wetland plants need a full growing season to become established before winter. Planting should be done from early spring to mid-June. If the wetland has been constructed after the wetland vegetation planting season, keep the water control structure open until after the wetland plants have been planted.

To prepare for planting, flood the site with a few inches of water to settle the soil. After the site is dry enough planting may begin. Refer to plan map for locations of each type of plant.

Plant Species:

Establishment of the above species by transplanting rhizomes, stolons and plants is the fastest and most reliable method.

Transplants should be healthy pieces of rhizomes, stolons or plants that have live shoots or buds. The source should be from commercial nurseries, grown for a specific project or collected from a maintenance operation such as a ditch cleanout. Natural wetlands are not to be used as a donor site of plant material. If wild sources of plant material are used, the donor site must be inspected to ensure that unwanted exotic species do not exist at the site.

Depending on the type and size of stock, modified tree planters can be used or hand planted with a dibble bar. Plant stock at a minimum of 4 foot by 4 foot spacing. Rhizomes and stolons should be placed in the ground with 1 inch of cover. Plants should be set with the entire root in the ground, with part of the shoot out of the ground.

As soon as the wetland is planted, flood the new planting with a few inches of water. The wetland should remain saturated to ponded up to 1 inch in depth for the first growing season. The following spring, as the plants grow in height, raise the water level, always leaving a minimum of 4 to 6 inches of plant tops out of the water. After the permanent pool water depth has been reached, the constructed wetland is ready for normal operation.

Seeding Method

Apply seed in the fall after the first killing frost and before March 1.

To prepare for the seedbed, flood the site with a few inches of water to settle the soil. After the site is dry enough seeding may begin. Refer to plan map for locations of each type of seed.

Broadcast the specified amount of seed over the seedbed and roll to ensure good seed to soil contact but keep the seed on or near the surface.

Seed Species:

Rate (lb/acre):

_____	_____
_____	_____
_____	_____

As soon as the wetland is seeded, reset the control valve to keep the wetland area saturated to ponded up to 1 inch in depth for the first growing season. The following spring, as the plants grow in height, raise the water level, always leaving a minimum of 4 to 6 inches of plant tops out of the water. After the permanent pool water depth has been reached, the constructed wetland is ready for normal operation.

Natural Regeneration Method

Stockpile the top 6 inches of soil from the construction area. Construct the wetland according to the plans, bringing the pool area to an elevation 6 inches below the desired final grade. Remove surface irregularities and lightly scarify to loosen the surface. Spread the stockpiled topsoil over the wetland pool area and compact by routing hauling equipment over the fill in such a manner that the entire surface will be traversed by not less than one wheel track.

Reset the control valve to keep the wetland area saturated to ponded up to 1 inch in depth for the first growing season. The following spring, as the plants grow in height, raise the water level, always leaving a minimum of 4 to 6 inches of plant tops out of the water. After the permanent pool water depth has been reached, the constructed wetland is ready for normal operation.