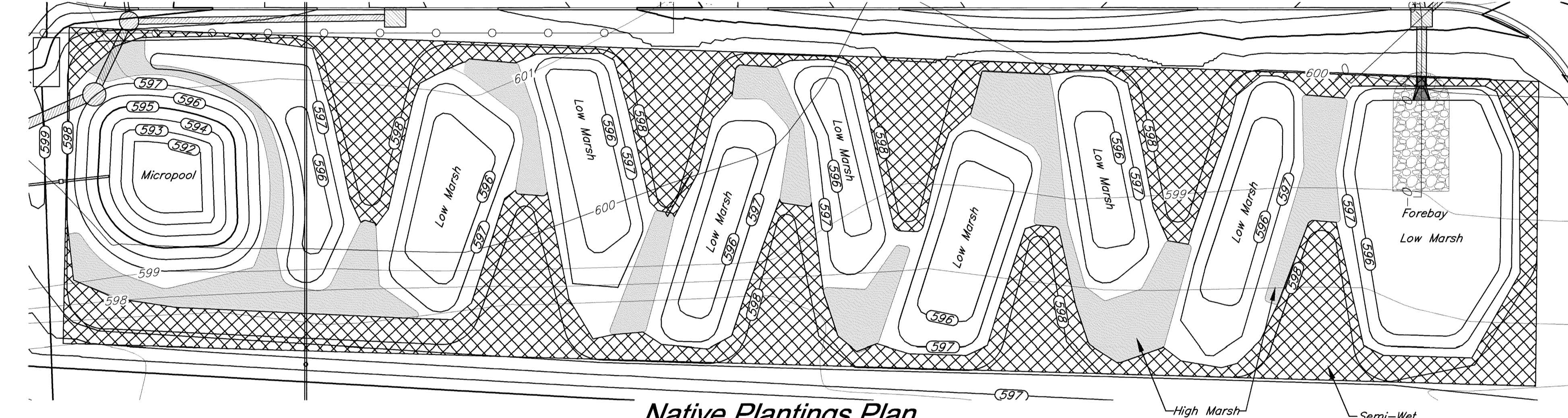


**Stormwater BMP Data:**  
Permanent Pool Elevation=597.50  
Water Quality Volume=0.51 AC-FT  
Water quality volume retained indefinitely  
AgrDrain structure to drain BMP, minimum internal weir elevation=597.50  
Weir Length=12.57'  
15 Year storm at 3.85 CFS/AC  
15 Year Q=11.73 CFS  
15 Year Water Surface Elev.=597.93'  
100 Year storm at 6.08 CFS/AC  
100 Year Q=31.98 CFS  
100 Year Water Surface Elev.=598.34

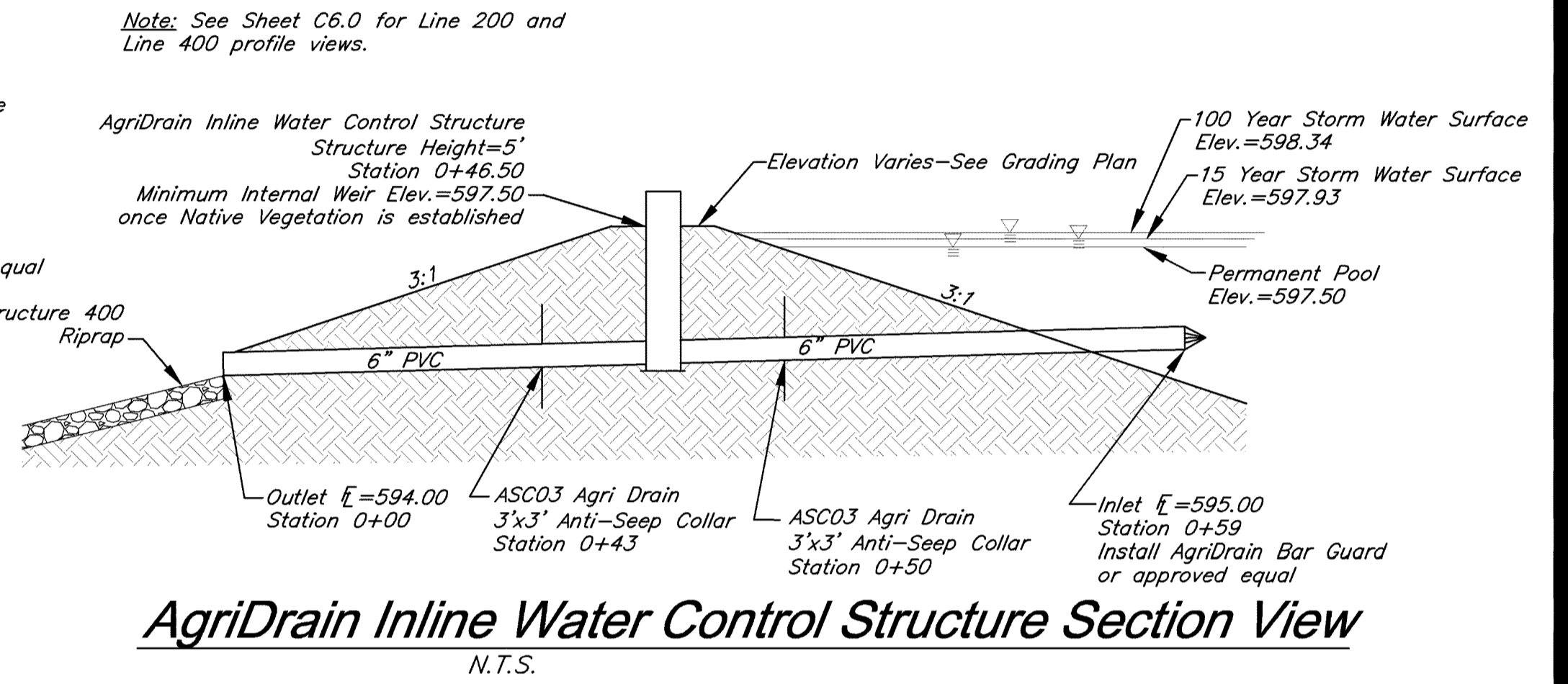
**Water Quality Volume Calculation:**  
WQV=(P/RVA)/12  
P = 1.14"  
A = 15.00 AC  
% Impervious=(5.08/15)x100 33.87%  
Rv=0.05+(0.009x33.87)  
Rv=0.3548  
WQV=(1.14x0.3548x15)/12  
WQV=0.51 AC-FT=22,025 CF

**Peak Water Surface Elevation Calculations:**  
Drainage Area=5.25 AC  
Weir Length=12.57'  
15 Year storm at 3.85 CFS/AC  
15 Year Q=11.73 CFS  
15 Year Water Surface Elev.=597.93'  
100 Year storm at 6.08 CFS/AC  
100 Year Q=31.98 CFS  
100 Year Water Surface Elev.=598.34



**Construction Notes:**  
1. 6" PVC=594.00  
N=1079134.8251 E=752159.3984  
Install 46 LF 6" PVC NE @ 1.7% to 2  
2. Install AgrDrain In-line Water Control Structure  
Structure Height=5'  
Internal Weir Minimum Elev.=597.50  
N=1079139.8290 E=752205.6064  
Install 12 LF 6" PVC NE @ 1.7% to 3  
3. 6" PVC=595.00  
Install 6" AgrDrain Bar Guard or approved equal  
N=1079141.1628 E=752217.9233

**Planting Legend**  
Zone 2 Plantings (2,904 SF)  
Shallow Water Bench-High Marsh  
Zone 3 Plantings (10,002 SF)  
Fringe-Semi Wet



**Native Planting Plan**  
O'FALLON JUSTICE CENTER  
STORMWATER BMP  
INSTALLATION, ESTABLISHMENT AND MAINTENANCE PLAN  
Scale: 1"=20'

**1.0 INSTALLATION AND ESTABLISHMENT (YEAR 1)**

**A.SCOPE:** The scope is to install and establish native vegetation the BMP area designated on the Plans. The disturbed areas outside of the BMP area will be stabilized per the seeding and sodding Plans. The Contractor shall be responsible for the installation of all native vegetation and performing the Year 1 native establishment activities.

**B.PERSONNEL:** All work shall be performed by experienced personnel regularly engaged in native BMP installation and establishment activities.

**C.EQUIPMENT:** Planting operations shall be accomplished with equipment suitable for preparing the topsoil and installation of the fertilizer, plantings and erosion controls. Equipment necessary for the proper preparation of the ground surface and for handling and placing all required materials shall be of a size appropriate for the areas to be worked, on hand, and in good condition.

**D.GROWING SEASON:** Per the Natural Resources Conservation Service (NRCS) WETS Station: St. Charles (M07397), the growing season for this specification occurs between April 7 and October 22 (70% probability of 32°F or higher).

**E.SUBMITTALS:**

- General. All information required by the Engineer and/or Owner shall be submitted prior to commencing the native installation activities. Work done prior to Engineer and/or Owner review of the submittals will be considered unacceptable and shall be removed at the sole cost of the Contractor.
- Labels. All labels for the plantings, temporary seed, fertilizer, herbicide, mycorrhizal inoculant, erosion control blankets, and imported topsoil, if required, shall be submitted to the Engineer and/or Owner for acceptance prior to installation.
  - a.Planting certificates shall include the following information: 1) date and location plant harvest; 2) scientific and common name identification; 3) planting format and size; 4) supplier name and address; 5) and state of supplier registration.
- Monthly Inspection Report. During the Year 1 establishment period, the Contractor shall submit monthly inspection reports to the Engineer and/or Owner. At a minimum, the inspection reports shall include the following information: date of inspection, person conducting inspection, BMP area inspected and a detailed description of activities performed (e.g. watering, weeding, repairs, etc.).

**F.TIMING:** The Contractor shall maintain temporary erosion control practices during non-planting periods. BMP construction shall not commence until contributing drainage areas and areas adjacent have been stabilized. Once started, the BMP installation work shall continue in an expeditious manner until complete. When conditions delay BMP installation, erosion control measures shall be implemented to prevent soil erosion by stormwater runoff or excessive wind. Note: native planting shall occur no less than 14 days after any herbicide application.

**4.Rock Outlet Protection.** The Contractor shall install the rock outlet protection within the BMP forebay as shown on Plans.

**5.Fertilizer.** Prior to planting, an all-natural fertilizer consisting of a 3-7-2 (Nitrogen, Phosphate, Potassium) with mycorrhizae and humates shall be installed within the designated BMP planting areas using push or hand broadcast spreaders. Use of other equipment methods to install fertilizer shall be approved by the Engineer and/or Owner. The fertilizer shall be uniform in composition, free flowing and suitable for application with the approved equipment. The fertilizer shall be delivered to the site in convenient containers, each fully labeled, conforming to the applicable state fertilizer laws, bearing the name, trade mark, or trade name, and a warranty of the producer. The fertilizer shall be distributed uniformly and incorporated into the topsoil to a depth of at least 2-inches by disking, harrowing, or hand raking methods at rate of 50 pounds per 1,000 square feet.

**6.Temporary Seeding.** After fertilizer placement, broadcast temporary grass seed consisting of Common Oats (*Avena sativa*) over the entire BMP area at a rate of 1 pound per 1,000 square feet to control erosion and reduce unwanted weed growth.

**7.Erosion Control Blanket.** After fertilizer and temporary seed installation, the Contractor shall install a short-term (12-month longevously) biodegradable straw erosion control blanket (ECB) or Engineer-approved equivalent over the entire BMP area. Secure the ECB with 6-inch wire staples as shown on the Plans. The purpose of the ECB is to protect the topsoil surface and plantings during periods of inundation and to reduce invasive weed growth within the BMP area.

**H.NATIVE PLANTING:** All native plant material shall be healthy, vigorous, and free from any signs of insect, disease, mechanical injury, or signs of environmental or other stress. Plant roots shall be firm and moist with light-colored root tips. Plantings shall be true to the name and type, nursery grown, and originate from a 100-mile radius of the project site if at all possible. In all cases, scientific names shall take precedence over common names.

The Contractor shall deliver the plantings to the site in good condition with species tags or labels. Plant materials shall be protected from the drying action of the sun and wind after being dug, while being transported, and while waiting planting. Keep plant roots moist throughout the planting process.

1. Plantings. As shown on the Plans, the BMP area is designated for plantings in two (2) separate hydrologic planting zones - Zone 2 (Shallow Water Bench) and Zone 3 (Fringe). Plantings shall consist of 2x2x5-inch deep soil plugs (DOP) to be installed on 24-inch centers with triangular spacing on staggered rows. The Contractor shall alternate each plant species within the planting rows. The BMP area shall consist of the native plant species provided in Table 1.

Scientific Name	Common Name	Plant Size	Planting Zone
<i>Carex stricta</i>	Tussock Sedge	2'x2'x5" DOP	2
<i>Juncus effusus</i>	Common Rush	2'x2'x5" DOP	2
<i>Carex vulpinoidea</i>	Fox Sedge	2'x2'x5" DOP	3
<i>Juncus torreyi</i>	Torrey's Rush	2'x2'x5" DOP	3

Notes:  
1. Any species substitutions shall be approved by the Engineer and/or Owner.  
2. DOP= Deep soil plug.  
3. See Plans for planting zone locations.  
4. Plantings shall be installed on 24" centers with triangular spacing on staggered rows.  
5. Alternate each plant species within the planting rows.  
6. Engineer estimated planting quantity per species: 339 plants per 1,000 sq. ft.

**2. Inoculant.** Remove the planting from the container and apply 1/16 cup (15 ml) of granular-based inoculant directly to the roots of the planting. The mycorrhizal inoculant shall have the minimum active ingredient of endomycorrhizal (AM) fungi (*Glomus intraradices*) at 6,800 spores per pound.

**3. Planting Installation.** At each planting location, cut a small opening in the ECB so that each planting is placed in an appropriate sized, hand excavated or augered hole. Place the planting in the hole in an upright and straight position. Backfill with topsoil, tamp as necessary to minimize settling and secure the planting with a 6-inch ECB wire staple.

**I.CLEANUP AND REMOVAL:** Upon completion of the planting activities, the Contractor shall cleanup and remove any remaining materials, tools, equipment, empty containers, trash, and debris.

**J.WATER:** During the Year 1 establishment period to increase plant survivability, during the first growing season (April 7 to October 22), the BMP area shall receive a minimum of 1 inch of water weekly from rainfall and/or supplemental watering. All watering equipment required for the work shall be furnished by the Contractor. Water from adjacent fire hydrants or public water lines shall be metered.

**K.REPAIR:** The BMP area shall be kept free from traffic until accepted. If any time before acceptance by the Engineer and/or Owner, any portion of the BMP area becomes gullied or otherwise damaged, or the plantings have been damaged or destroyed by the Contractor's operations, then the Contractor shall immediately repair to re-establish the affected area to the specified condition prior to the acceptance of the work.

**L.WEED CONTROL:** During the first growing season (April 7 to October 22), the Contractor shall inspect the BMP area monthly for unwanted volunteer woody and weed species. The Contractor shall take care to identify undesirable vegetation and limit damage to native vegetation during weed control activities.

To control unwanted woody and weed competition, the Contractor shall carefully string trim, as necessary, the unplanted spaces between the installed native plantings. String trim undesirable vegetation 6-inches above the ground surface and up to 3 times during the first growing season so that undesirable vegetation does not exceed 12-inches above the ground surface. Trimmed bio-mass shall not excessively accumulate in such a manner to be harmful to the existing native plants.

If an herbicide is necessary to control excessive weeds, the Contractor shall preferentially use a rope wick applicator. The application of herbicides using sprayers is discouraged due to the adverse effects of overspray and windblown distribution of herbicide onto native plants. Herbicides with trade names such as Pursuit® and Plateau® are labeled for limited use in native establishment areas. Refer to product labels for specific application information.

**M.FERTILIZER:** Use of fertilizers after plant installation is not recommended within the BMP area since Nitrogen-containing fertilizers promote unwanted weed growth.

**N.LITTER AND DEBRIS:** During the Year 1 establishment period, the Contractor shall inspect the BMP area monthly and remove any litter and debris.

**O.EROSION:** During the Year 1 establishment period, the Contractor shall inspect the BMP area monthly for soil erosion and repair any eroded areas immediately.

**P.NATIVE REPLACEMENT:** During the Year 1 establishment period, the Contractor shall replace dead plantings as necessary to meet the final acceptance and guarantee requirements provided in Section 1.0.G. Replacement plantings shall be the same species specified in Table 1 of Section 1.0.H.

**Q.ACCEPTANCE AND GUARANTEE:**

- Provisional Acceptance. The work shall be considered 90% complete after all of the native plantings and erosion controls have been installed and the Contractor has completed the required cleanup and removal, watering, and any repairs as described above.
- Final Acceptance. The work shall be considered 100% complete after the Contractor has met or exceeded the guarantee requirements below.
- Guarantee. The Contractor shall guarantee a planting survival rate of no less than 80% within each of the planting zones after the first growing season. No area greater than 15 square feet shall be devoid of live native plantings. The BMP area shall not contain excessive unwanted woody and weed species, litter, debris, and/or erosion.

**END OF SECTION 1.0**

**2.0 ESTABLISHMENT (YEAR 2)**

**A.SCOPE:** After the Contractor has completed the Year 1 establishment activities and received Final Acceptance, the Owner will be responsible for performing the Year 2 establishment activities.

**B.WATER:** During the Year 2 growing season (April 7 to October 22), the Owner should continue to diligently maintain and control water levels to ensure that the BMP area receives sufficient natural and/or supplemental water to promote healthy and long-term establishment of the native plantings. Note: the native species within the BMP are less drought resistant than upland prairie species; therefore, supplemental water may be necessary to ensure long-term plant survivability.

**C.WEED CONTROL:** During the Year 2 growing season (April 7 to October 22), the Owner should continue to inspect the BMP area for any unwanted volunteer woody and weed species.

To control unwanted woody and weed competition, the Owner should carefully string trim, as necessary, the unplanted spaces between the installed native plantings. String trim undesirable vegetation 6-inches above the ground surface during the growing season so that undesirable vegetation does not exceed 12-inches above the ground surface. Trimmed bio-mass should not excessively accumulate in such a manner to be harmful to the existing native plants.

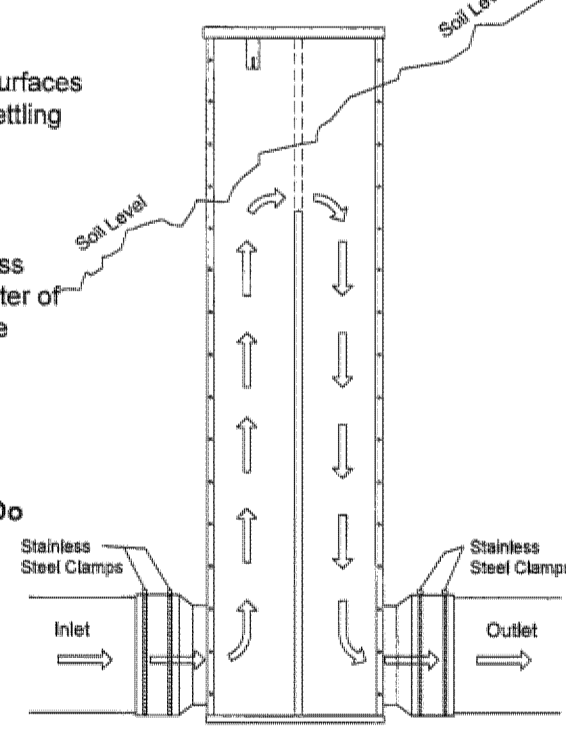
If an herbicide is necessary to control excessive weeds, the Owner should preferentially use a rope wick applicator. The application of herbicides using sprayers is discouraged due to the adverse effects of overspray and windblown distribution of herbicide onto native plants. Herbicides with trade names such as Pursuit® and Plateau® are labeled for limited use in native establishment areas. Refer to product labels for specific application information.

**G.FERTILIZER:** Use of fertilizers is not recommended within the BMP area since Nitrogen-containing fertilizers promote unwanted weed growth. However, if the native vegetation appears to be inadequate after Year 2 establishment, consider soil testing to determine if fertility is lacking.

**L.LITTER AND DEBRIS:** During the Year 2 establishment period, the Owner shall continue to inspect the BMP area and remove any litter and debris.

**Inline Water Control Structure Installation Instructions**

- EXCAVATION AND GRADING**  
The structure base, the inlet pipe, and the outlet pipe must be set on firm, flat surfaces of compacted soil or fill sand to provide a solid, stable base. This will prevent settling and reduce stress or misalignment of pipe connections.
- PIPE CONNECTION**  
Remove black tape from both inlet and outlet flex couplers exposing the stainless steel clamps. The flex couplers must be placed directly over the outside diameter of the pipes; then secured by tightening the stainless steel clamps as shown in the illustration.
- BACK FILL AND COMPACTION**  
Level the structure vertically before placing backfill. Backfill around the control structure by hand in 6" lifts. Hand tamp only - do not mechanically compact. Do not use a backhoe or blade to place backfill directly against the water control structure.



**Excessive compaction may cause structural damage or failure.**

- Either the inlet or inline structure may be used for primary or secondary outlet with larger pipe or emergency spillway as primary.
- Inline structure removes sub-surface water.
- On the inline installation, the inlet end of the pipe should be held off the bottom of the impoundment to allow for siltation and be protected with an inlet guard. The outlet end should be protected with a rodent guard.
- In a controlled drainage or sub-surface irrigation application, the structure nearest the outlet should be protected with a minimum of 20' of non-perforated pipe on the down stream end. Anti seep collars are recommended.

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Adair, Iowa 50602  
Phone: 800-232-4742  
Fax: 800-282-3353  
Web site: www.agridrain.com  
E-mail: info@agridrain.com

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**F.EROSION:** During the Year 2 establishment period, the Owner should continue to inspect the BMP area for soil erosion and repair any eroded areas immediately.

**G.NATIVE REPLACEMENT:** During the Year 2 establishment period, the Owner should continue to inspect the BMP area for lack of native coverage and replace dead plantings as necessary to maintain a dense stand of native vegetation and reduce unwanted weed growth. Replacement plantings should be the same species specified in Table 1 of Section 1.0.H.

**END OF SECTION 2.0**

**3.0 MAINTENANCE (YEAR 3+)**

**A.SCOPE:** The Owner will be responsible for performing the maintenance activities during Year 3 and beyond.

**B.WATER:** The Owner should continue to diligently maintain and control water levels to ensure that the BMP area receives sufficient natural and/or supplemental water to promote healthy and long-term establishment of the native plantings.

**C.WEED CONTROL:** The Owner should continue to periodically inspect the BMP area for unwanted volunteer woody and weed competition. If excessive weeds are becoming established, the weed control methods provided in Section 2.C. should be performed.

**D.FERTILIZER:** Use of fertilizers is not recommended within the BMP area since Nitrogen-containing fertilizers promote unwanted weed growth. However, if the native stand appears inadequate consider soil testing to determine if fertility is lacking.

**E.LITTER AND DEBRIS:** The Owner should continue to periodically inspect the BMP area and remove any litter and debris.

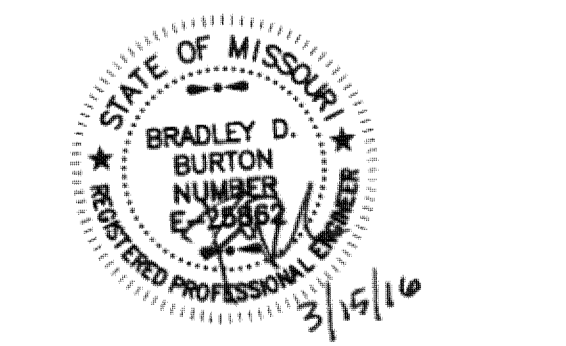
**F.EROSION:** The Owner should continue to periodically inspect the BMP area for soil erosion and repair any eroded areas immediately.

**H.NATIVE REPLACEMENT:** The Owner should continue to periodically inspect the BMP area for lack of native coverage and replace dead plantings as necessary to maintain a dense stand of native vegetation and reduce unwanted weed growth. Replacement plantings should be the same species specified in Table 1 of Section 1.0.H.

**G.STRING TRIMMING:** After the growing season, the Owner may remove dead vegetation annually in the spring and before the start of the growing season by string trimming just above new vegetation height or about 8 inches. Trimmed bio-mass should not excessively accumulate in such a manner to be harmful to the existing native plants.

**END OF SECTION 3.0**

REV	DATE	DESCRIPTION



PROJECT NUMBER  
13326.00

DATE  
03/15/16

CONSTRUCTION DOCUMENTS

DESIGNED: HTR/JWM/JRH  
DRAWN: HTR/JWM/JRH  
REVIEWED: HTR/BBB

SHEET NUMBER

**Stormwater Treatment Feature Details**

SHEET NUMBER  
**C11.0**