

**JOINT**  
**PUBLIC NOTICE**

**CHARLESTON DISTRICT, CORPS OF ENGINEERS**  
**1835 Assembly Street, Room 865B-1**  
**Columbia, South Carolina 29201**

and

**THE S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL**  
**Water Quality Certification and Wetlands Section**  
**2600 Bull Street**  
**Columbia, South Carolina 29201**

REGULATORY DIVISION

Refer to: P/N SAC-2016-01856

December 29, 2017

Pursuant to Sections 401 and 404 of the Clean Water Act (33 U.S.C. 1341), an application has been submitted to the Department of the Army and the S.C. Department of Health and Environmental Control by

**Clemson University**  
**c/o Kelly Warner**  
**Land Planning Associates, Inc.**  
**110 W 1<sup>st</sup> Ave, Suite A**  
**Easley, South Carolina 29640**

for a permit to place fill material for stream restoration work in

**Hunnicut Creek**

at a location along Hunnicutt Creek between Perimeter Road and McMillan Road, Pickens County, South Carolina (Latitude: 34.6748 °N, Longitude: -82.8297 °W), Clemson.

In order to give all interested parties an opportunity to express their views

**NOTICE**

is hereby given that written statements regarding the proposed work will be received by the **Corps** until

**15 Days from the Date of this Notice,**

and **SCDHEC** will receive written statements regarding the proposed work until

**30 Days from the Date of this Notice**

from those interested in the activity and whose interests may be affected by the proposed work.

The proposed work consists of the placement of fill material in 1,024 linear feet of tributary for stream restoration activities. In detail, the work includes the placement of riffles, pools, and step pools in 1,024 linear feet to restore approximately 6,000 linear feet of Hunnicutt Creek. This project could possibly fit under a Nationwide Permit, but due to length of the restoration project and timeline for implementation, the applicant has requested a 10 year permit. According to the applicant, the project purpose is to restore severely incised and degraded Hunnicutt Creek and

North Hunnicutt Creek so they may serve as positive amenities to the local community and valuable resources to the ecosystem in which they reside.

**NOTE: This public notice and associated plans are available on the Corps' website at: <http://www.sac.usace.army.mil/Missions/Regulatory/PublicNotices> .**

The District Engineer has concluded that the discharges associated with this project, both direct and indirect, should be reviewed by the South Carolina Department of Health and Environmental Control in accordance with provisions of Section 401 of the Clean Water Act. As such, this notice constitutes a request, on behalf of the applicant, for certification that this project will comply with applicable effluent limitations and water quality standards. This activity may also require evaluation for compliance with the S. C. Construction in Navigable Waters Permit Program. State review, permitting and certification is conducted by the S. C. Department of Health and Environmental Control. The District Engineer will not process this application to a conclusion until such certifications are received. The applicant is hereby advised that supplemental information may be required by the State to facilitate the review.

This notice initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. Implementation of the proposed project would impact freshwater habitat upstream of estuarine substrates and emergent wetlands utilized by various life stages of species comprising the shrimp, and snapper-grouper management complexes. The District Engineer's initial determination is that the proposed action would not have a substantial individual or cumulative adverse impact on EFH or fisheries managed by the South Atlantic Fishery Management Council and the National Marine Fisheries Service (NMFS). The District Engineer's final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the NMFS.

Pursuant to the Section 7 of the Endangered Species Act of 1973 (as amended), the applicant has provided a protected species survey for the property associated with the activity described above. Based upon this report, the District Engineer has determined that the project is not likely to adversely affect any Federally endangered, threatened, or proposed species or result in the destruction or adverse modification of designated or proposed critical habitat. This public notice serves as a request for written concurrence from the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service on this determination.

Pursuant to Section 106 of the National Historic Preservation Act (NHPA), this public notice also constitutes a request to Indian Tribes to notify the District Engineer of any historic properties of religious and cultural significance to them that may be affected by the proposed undertaking.

In accordance with Section 106 of the NHPA, the District Engineer has consulted South Carolina ArchSite (GIS), for the presence or absence of historic properties (as defined in 36 C.F.R. 800.16)(1)(1)), and has initially determined that no historic properties are present; therefore, there will be no effect on historic properties. To ensure that other historic properties that the District Engineer is not aware of are not overlooked, this public notice also serves as a request to the State Historic Preservation Office and any other interested parties to provide any information they may have with regard to historic properties. This public notice serves as a request for concurrence within 30 days from the SHPO (and/or Tribal Historic Preservation Officer).

The District Engineer's final eligibility and effect determination will be based upon

coordination with the SHPO and/or THPO, as appropriate and required and with full consideration given to the proposed undertaking's potential direct and indirect effects on historic properties within the Corps-identified permit area.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for a public hearing shall state, with particularity, the reasons for holding a public hearing.

The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the activity on the public interest and will include application of the guidelines promulgated by the Administrator, Environmental Protection Agency (EPA), under authority of Section 404(b) of the Clean Water Act. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the project must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the project will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, flood plain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production and, in general, the needs and welfare of the people. A permit will be granted unless the District Engineer determines that it would be contrary to the public interest. In cases of conflicting property rights, the Corps cannot undertake to adjudicate rival claims.

The Corps is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this project. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the activity. **Please submit comments in writing, identifying the project of interest by public notice number, to the following address:**

**U.S. Army Corps of Engineers  
ATTN: REGULATORY DIVISION  
1835 Assembly Street, Room 865B-1  
Columbia, South Carolina 29201**

If there are any questions concerning this public notice, please contact Kristin B. Andrade, Watershed Manager, at (803) 253-3903.

## Impact Length Summary

HUNNICUTT CREEK RESTORATION (REACH 1)						
Sta. Start	Sta. End	Impact No	Flow Type	Avg. Stream Width (LF)	Impact Type	Impact Length (LF)
0+00	0+15		Perennial	8	ShoreMax Outlet Protection	No impact
0+15	0+33	3	Perennial	8	Riffle	18
0+33	0+65	2	Perennial	8	Pool	32
0+65	0+73	3	Perennial	8	Riffle	8
0+73	1+00	1	Perennial	8	Step-Pool	27.0
1+00	1+12.64	3	Perennial	8	Riffle	12.6
1+12.64	1+36.64	2	Perennial	8	Pool	24.0
1+36.64	1+50	3	Perennial	8	Riffle	13.4
1+50	1+77	1	Perennial	8	Step-Pool	27.0
1+77	2+04	1	Perennial	8	Step-Pool	27.0
2+04	2+31	1	Perennial	8	Step-Pool	27.0
2+31	2+58	1	Perennial	8	Step-Pool	27.0
2+58	2+85	1	Perennial	8	Step-Pool	27.0
2+85	3+00	3	Perennial	8	Riffle	15.0
3+00	3+24	2	Perennial	8	Pool	24.0
3+24	3+42.46	3	Perennial	8	Riffle	18.5
3+42.46	3+69.46	1	Perennial	8	Step-Pool	27.0
3+69.46	3+96.46	1	Perennial	8	Step-Pool	27.0
3+96.46	4+23.46	1	Perennial	8	Step-Pool	27.0
4+23.46	5+75	3	Perennial	8	Riffle	151.5
5+75	6+02	1	Perennial	8	Step-Pool	27.0
6+02	6+29	1	Perennial	8	Step-Pool	27.0
6+29	6+56	1	Perennial	8	Step-Pool	27.0
6+56	8+50	3	Perennial	8	Riffle	194.0
8+50	8+74	2	Perennial	8	Pool	24.0
8+74	10+39.09	3	Perennial	8	Riffle	165.1

IMPACT SUMMARY	Impact No	Impact Type	Impact Length (LF)
	1	TOTAL STEP POOL	324
	2	TOTAL POOL	104
	3	TOTAL RIFFLE	596
		TOTAL	1024

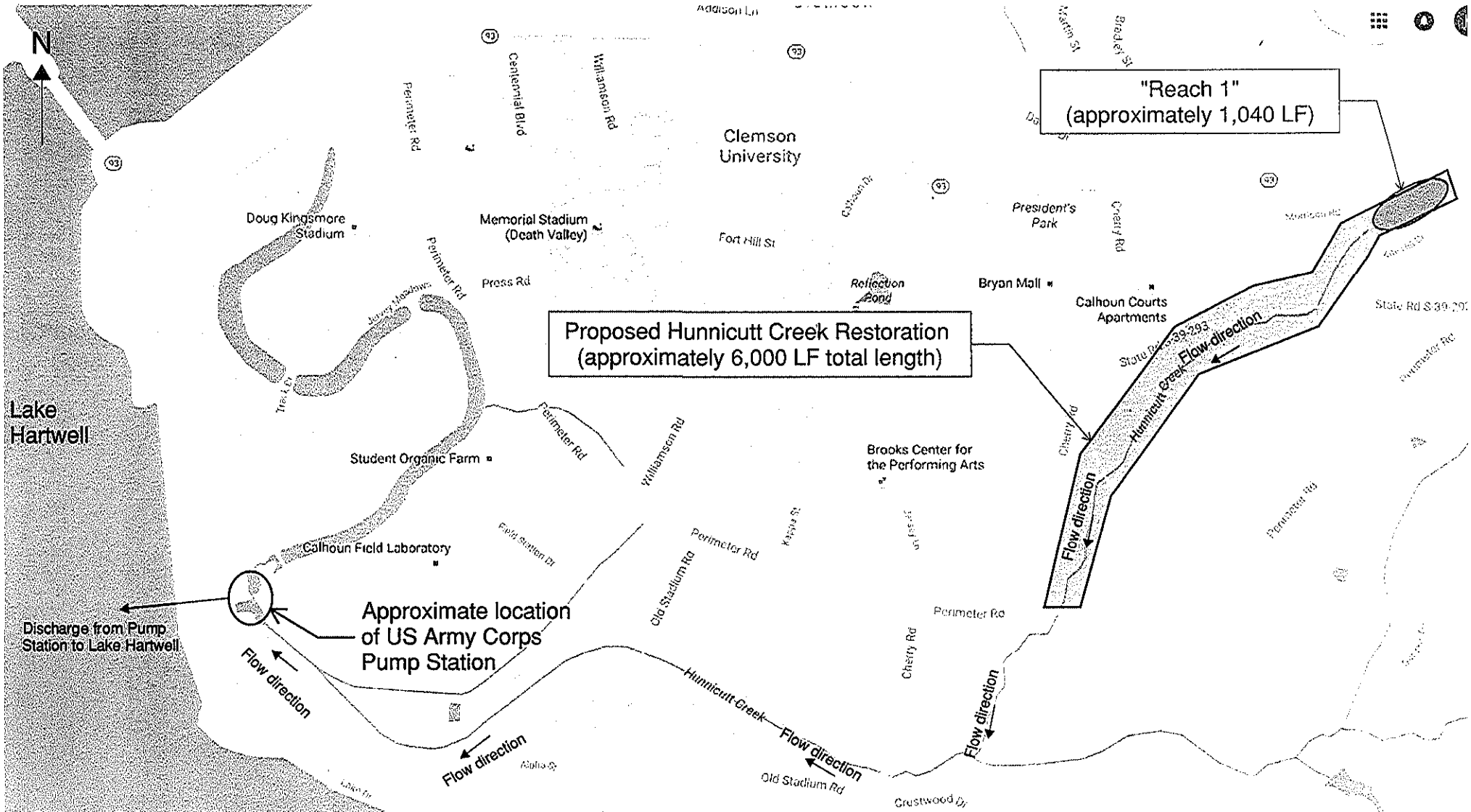
## Impact Volume/Area Summary

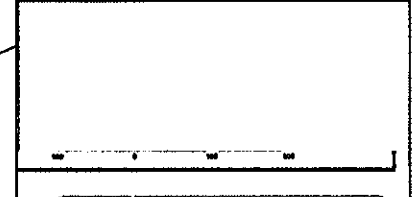
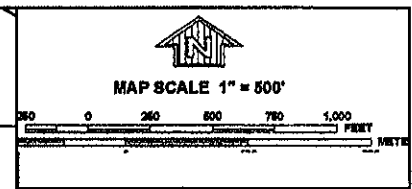
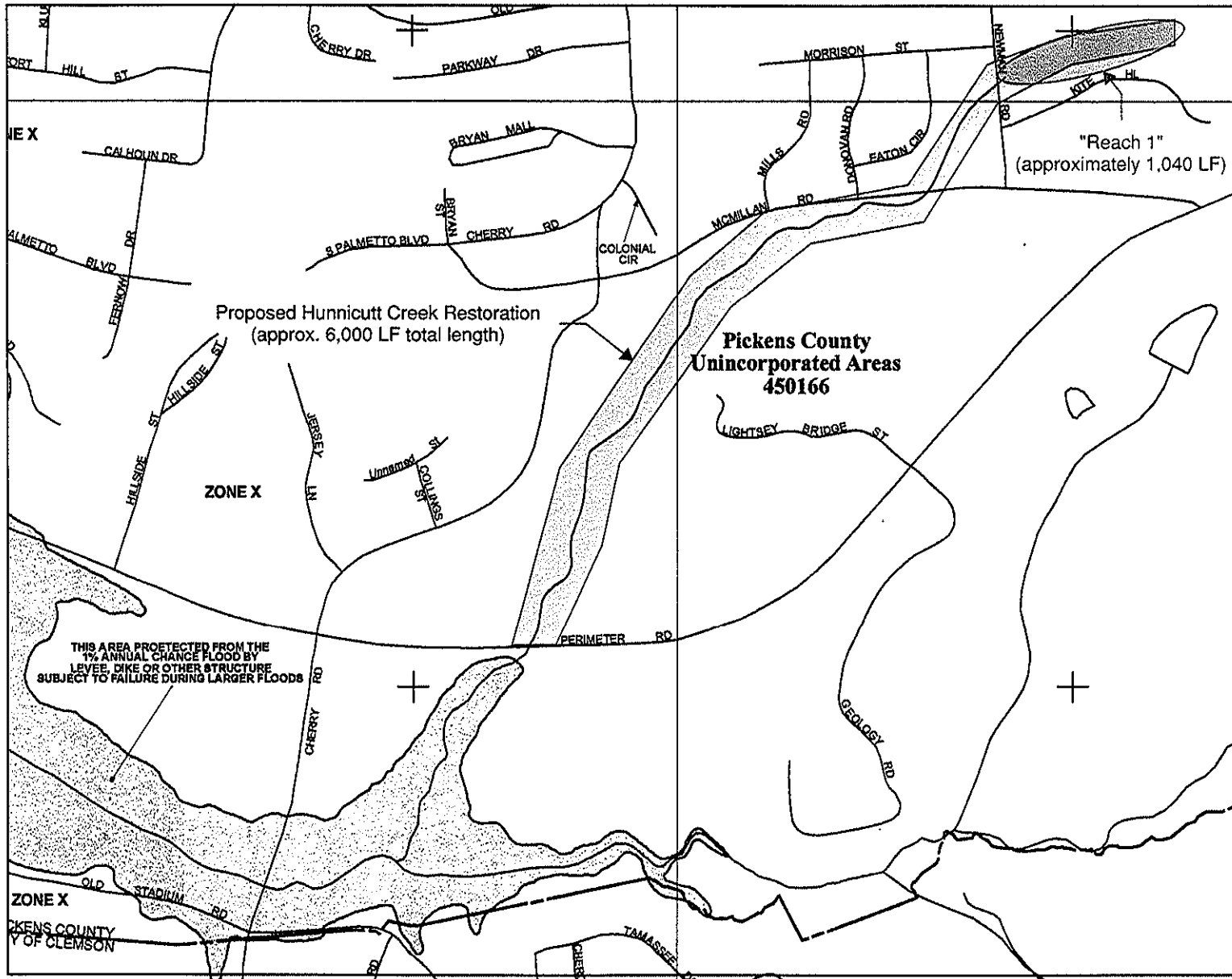
<b>Rock/Stone Fill (Below OHWM)</b>	
	Volume (CY)
Reach 1	717.09

<b>Dirt Fill (Below OHWM)</b>	
	Volume (CY)
Reach 1	728.12

<b>Total Fill (Below OHWM)</b>		
	Volume (CY)	Area (SF)
Reach 1	1445.21	7431.90

12 DIGIT FILE NO.: \_\_\_\_\_





PANEL 0387D

**FIRM**  
FLOOD INSURANCE RATE MAP  
PICKENS COUNTY,  
SOUTH CAROLINA  
AND INCORPORATED AREAS

PANEL 387 OF 430  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY

COMMUNITY	SUBSIST	PAUL	SUEZS
CLEMSON, CITY OF	40034	087	0
PICKENS COUNTY	40036	087	0

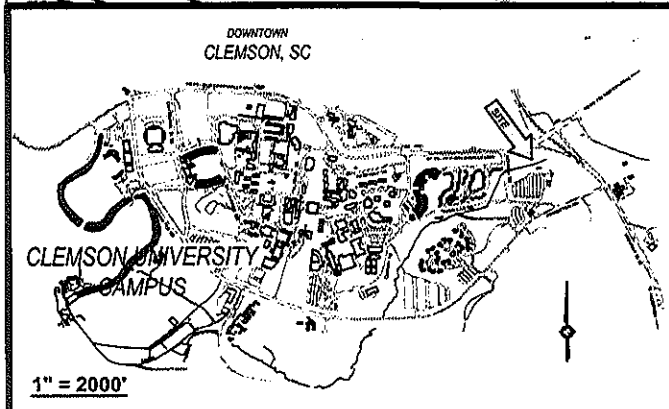
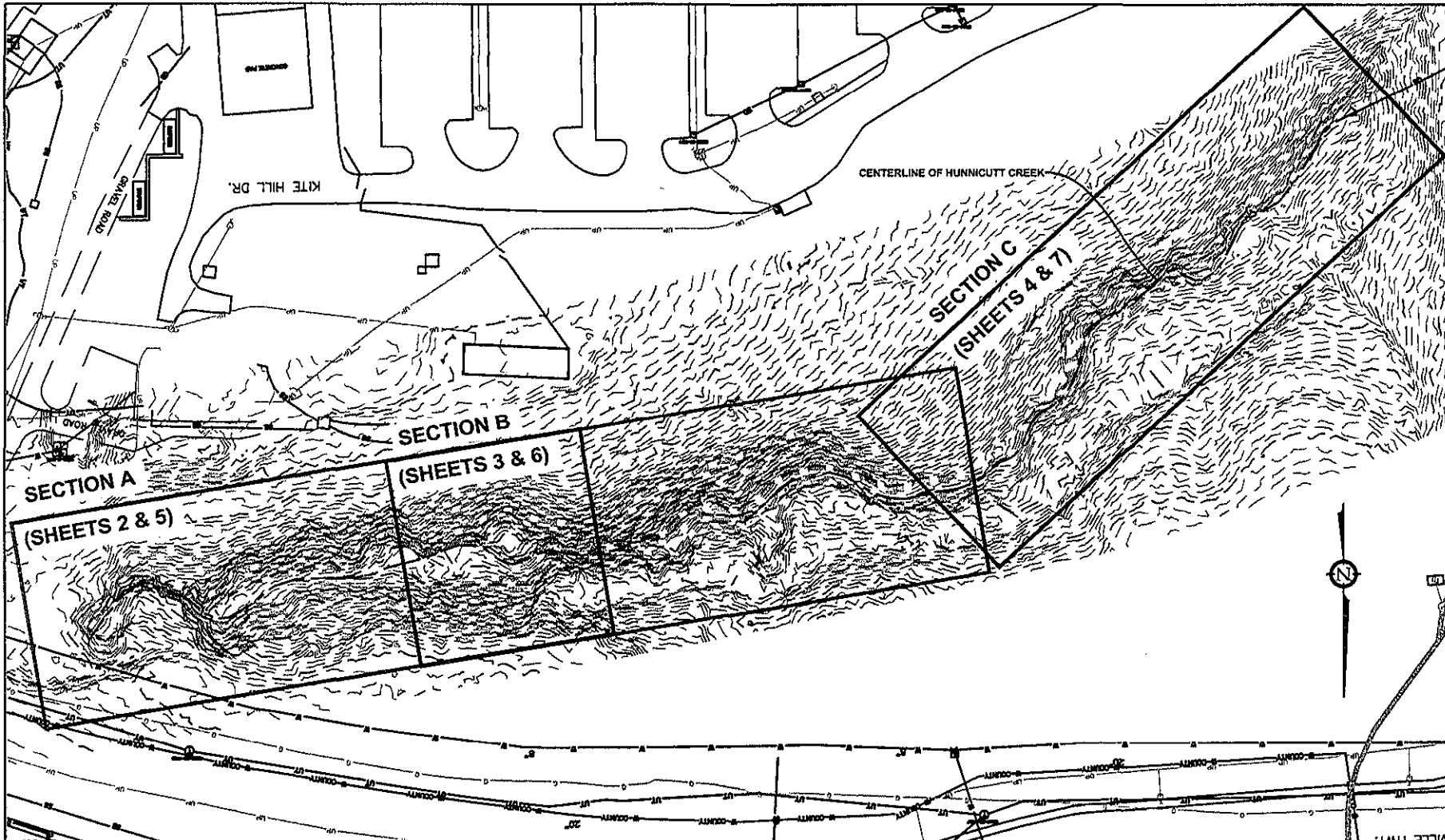
Notes to Users: The Map Number shown below should be used when making map orders. The Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER  
45077C0387D

EFFECTIVE DATE  
APRIL 16, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using FIRM On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the info block. For the latest product information about National Flood Insurance Program flood maps, check the FEMA Flood Map Store at [www.nrc.fema.gov](http://www.nrc.fema.gov).



SHEET LIST	
SHEET #	SHEET TITLE
1	OVERALL PLAN VIEW
2	PROFILE SECTION A
3	PROFILE SECTION B
4	PROFILE SECTION C
5	CROSS-SECTIONS - SECTION A
6	CROSS-SECTIONS - SECTION B
7	CROSS-SECTIONS - SECTION C
8	TYPICAL CROSS-SECTION DETAILS
9	BOULDER STEP DETAIL
10	RIFFLE DETAIL
11	GREENLOXX DETAIL
12	MATTING DETAIL
13	FILTREXX BANK STABILIZATION DETAIL
14	OUTLET PROTECTION DETAIL
15	TEMPORARY BYPASS DETAIL



LEGEND			
	EXISTING GAS LINE		EXISTING DUCTBANK
	EXISTING WATER LINE		EXISTING LIGHT POLE
	EXISTING UNDERGROUND TELEPHONE		EXISTING FIRE HYDRANT
	EXISTING UNDERGROUND ELECTRIC		CENTERLINE HUNNICUTT CREEK
	EXISTING SANITARY SEWER		EXISTING STORM DRAINAGE LINE
	EXISTING FIBER OPTIC		
	EXISTING OVERHEAD ELECTRIC		

NOTE:  
- E  
- E

SAC-2016-01856

Sheet 5 of 19

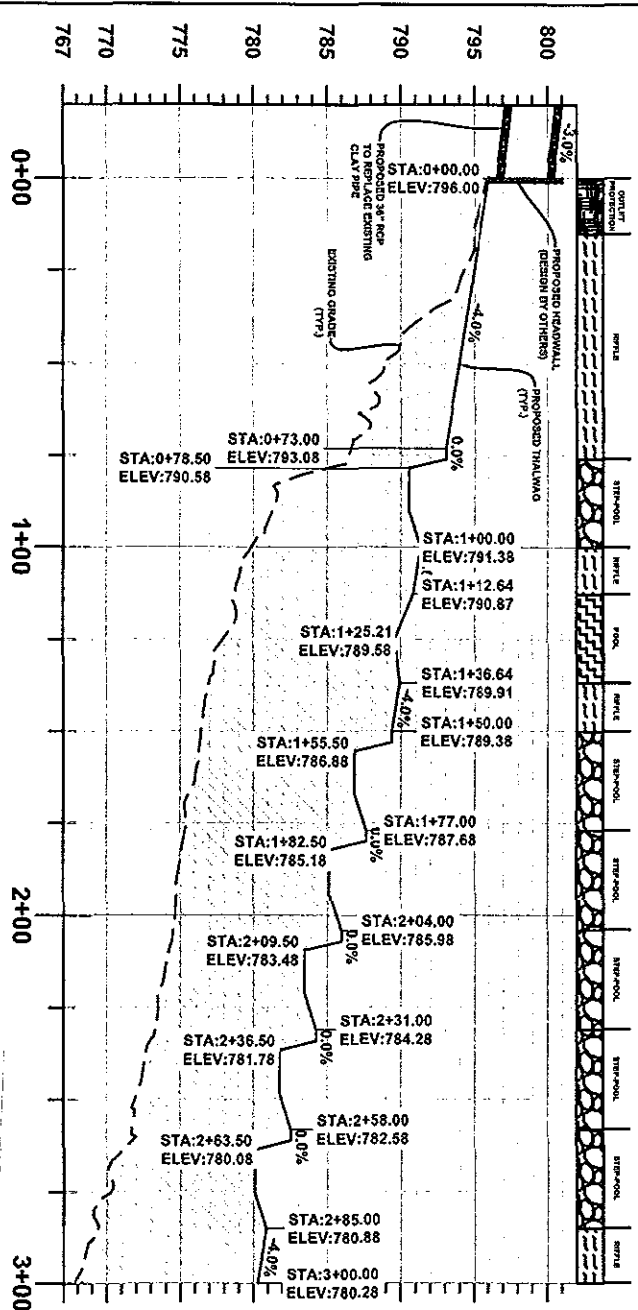
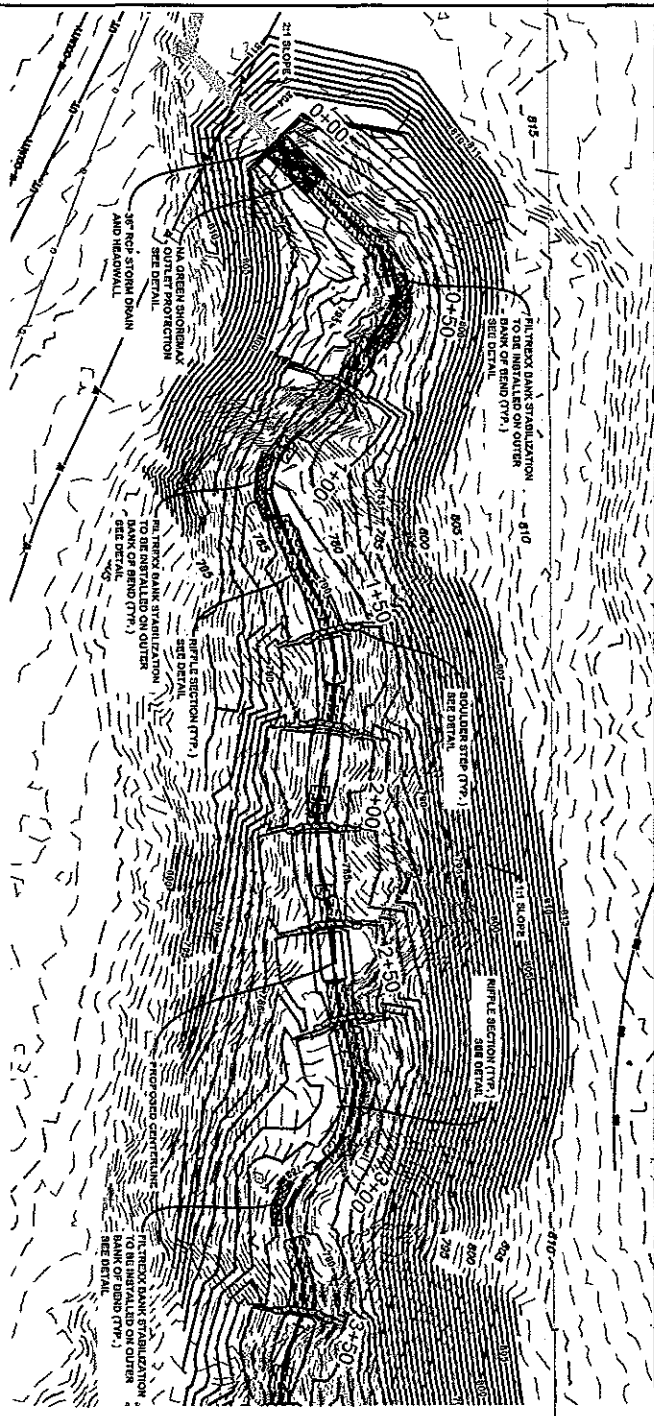


12/4/17  
OVERALL PLAN VIEW  
SHEET 1 OF 15

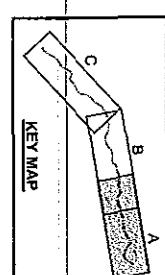
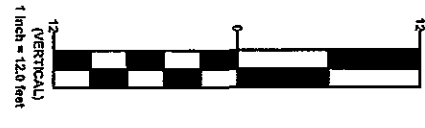
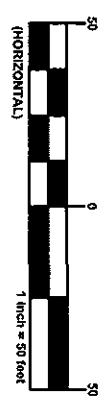
CLEMSON UNIVERSITY  
HUNNICUTT CREEK RESTORATION  
12 DIGIT FILE NO.:







Sta. Start	Sta. End	Cross-Sectional Design
0+00	0+15	Outlet Protection
0+15	0+76	Riffle
0+76	1+00	Step-Pool
1+00	1+12.64	Riffle
1+12.64	1+36.64	Pool
1+36.64	1+50	Riffle
1+50	1+77	Step-Pool
1+77	2+04	Step-Pool
2+04	2+31	Step-Pool
2+31	2+58	Step-Pool
2+58	2+85	Step-Pool
2+85	3+00	Riffle



SAC-2016-01856

Sheet 6 of 19

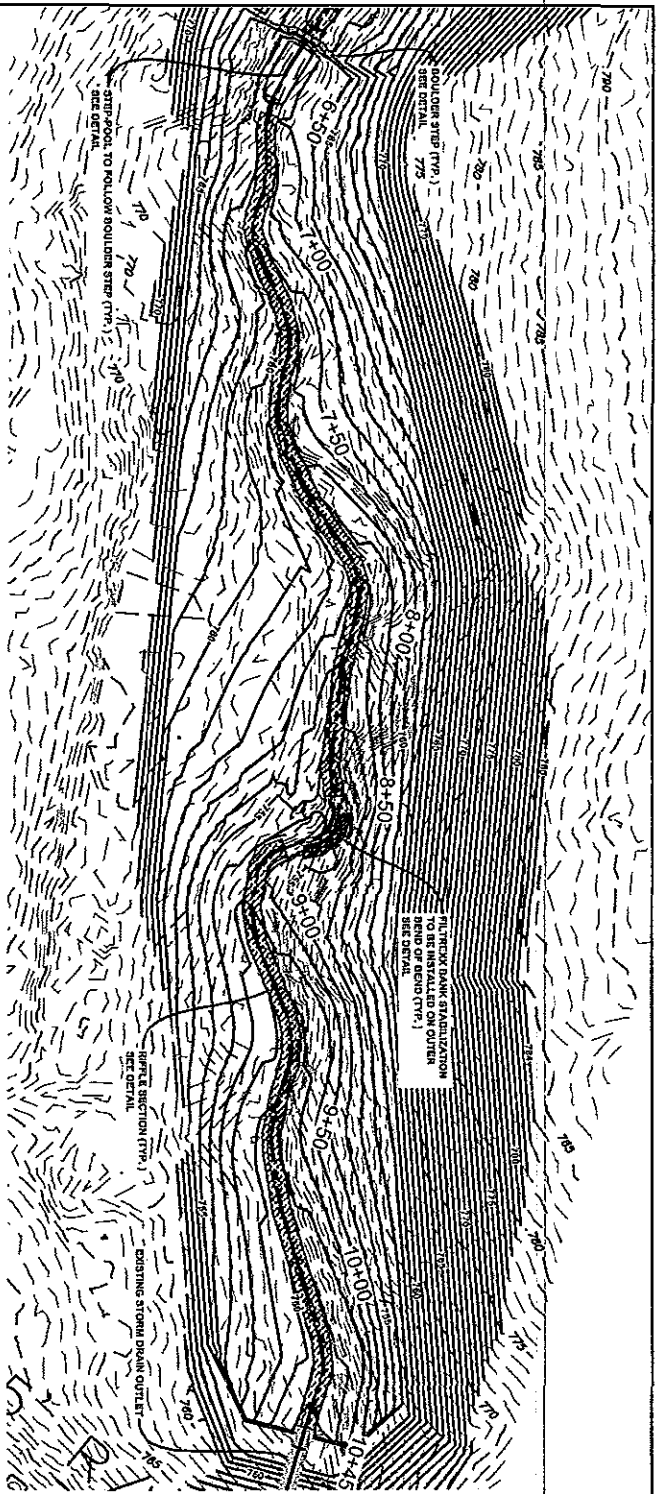


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 HUNNICUTT CREEK RESTORATION  
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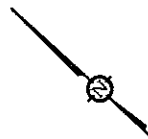
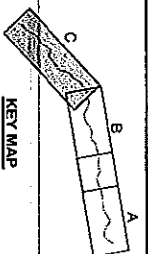
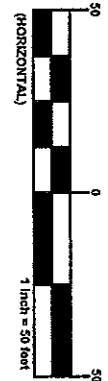
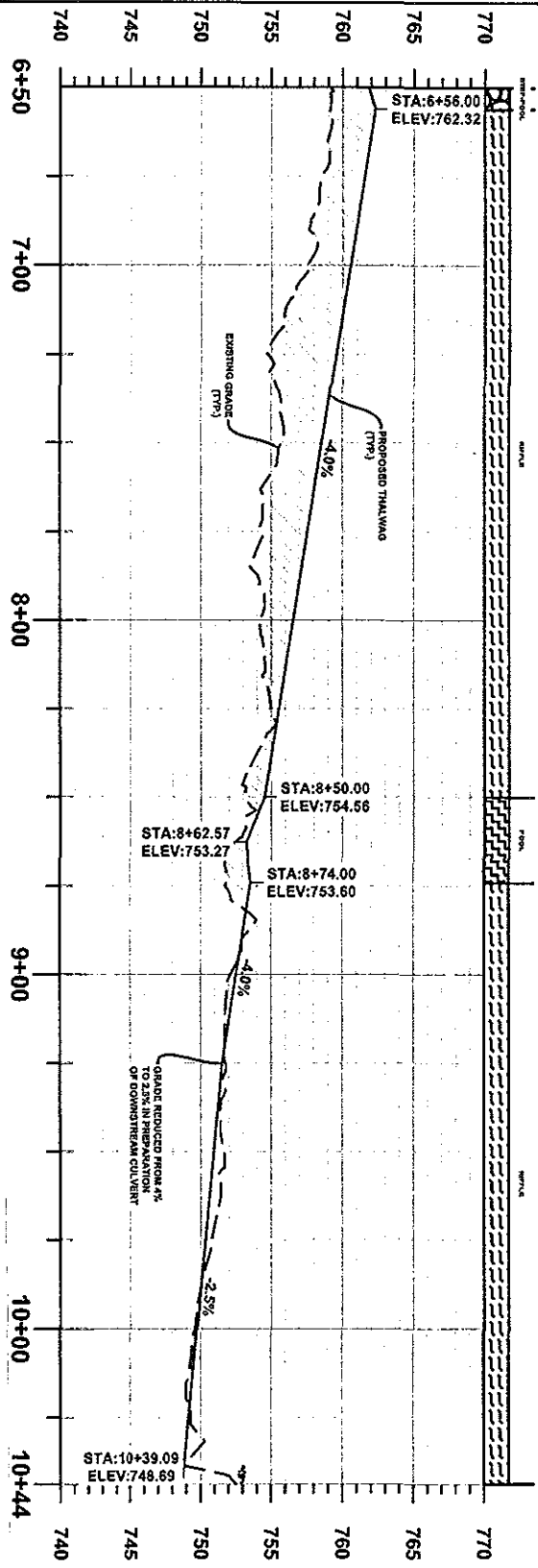
12/4/17  
 PROFILE SECTION A  
 SHEET 2 OF 15







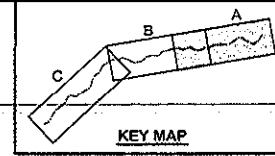
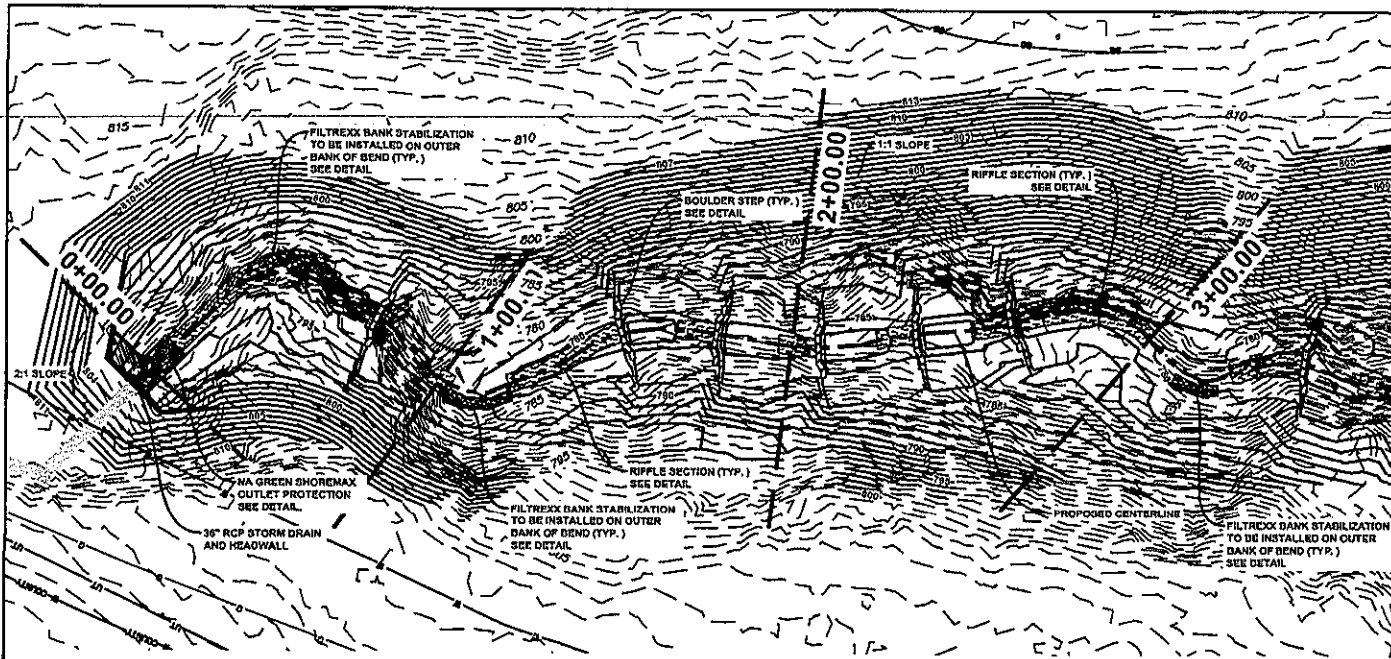
Sta. Start	Sta. End	Cross-Sectional Design
6+29	6+56	Step-Pool
6+56	8+50	Riffle
8+50	8+74	Pool
8+74	10+39.09	Riffle



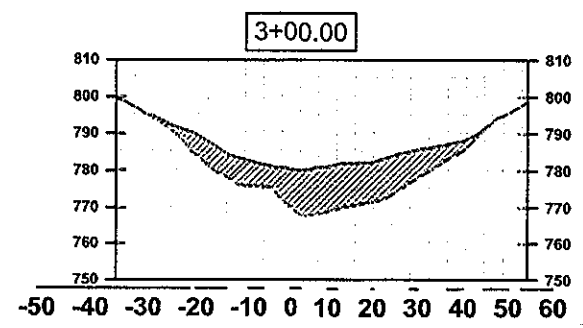
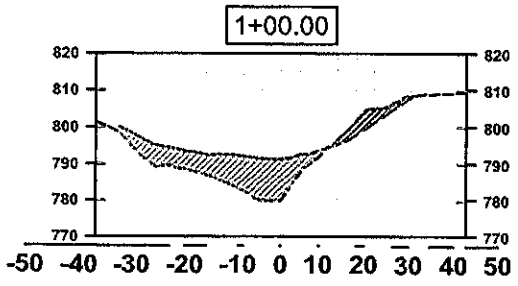
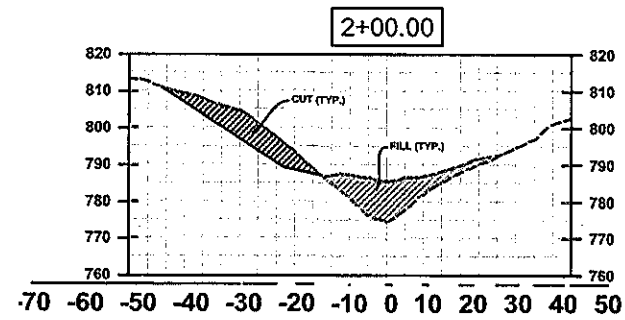
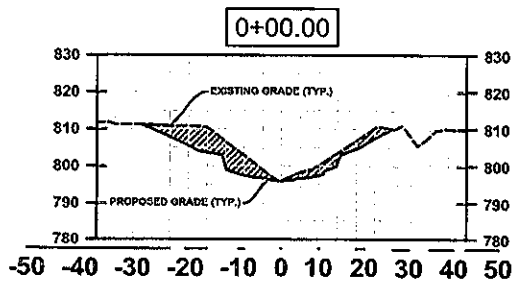
CLEMSON UNIVERSITY  
 HUNNICUTT CREEK RESTORATION  
 12 DIGIT FILE NO.:

12/4/17  
 PROFILE - SECTION C  
 SHEET 4 OF 15



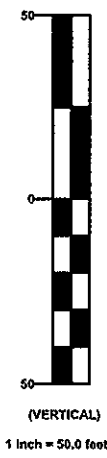


12/4/17  
 CROSS-SECTIONS - SECTION A  
 SHEET 5 OF 15



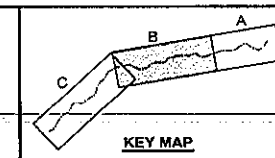
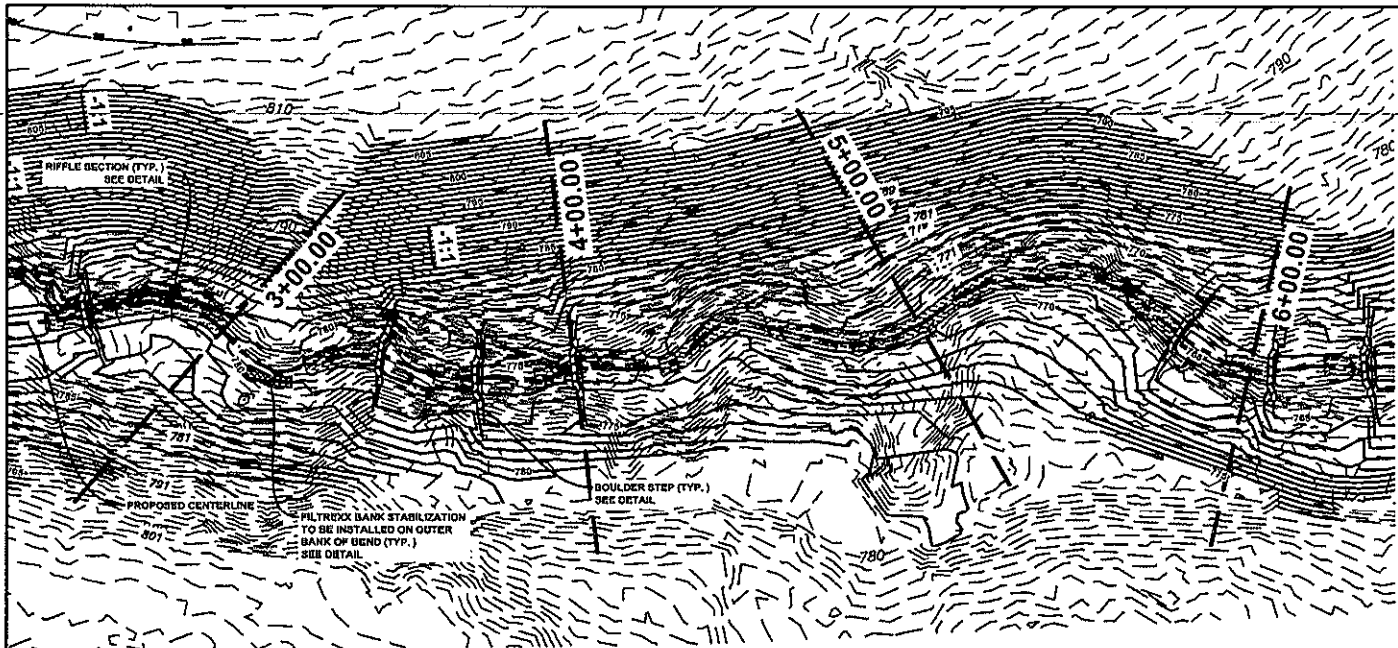
NOTES:

1. ALL PROPOSED GRADES GREATER THAN 2:1 SHALL BE STABILIZED WITH GREENLOXX NON-MSE REINFORCED LIVING WALL (OR APPROVED EQUAL) - SEE SHEET 11 FOR DETAIL.
2. PROPOSED GRADES LESS THAN 2:1 MAY BE STABILIZED WITH EC MATTING AS SPECIFIED ON SHEET 12.
3. TEMPORARY STREAM BYPASS PUMP WITH FLOW CAPACITY ACCORDING TO SIZING METHODOLOGY NOTED IN DETAIL SHALL BE IN PLACE PRIOR TO CONSTRUCTION ACTIVITY AND REMAIN IN PLACE UNTIL CONSTRUCTION ACTIVITY IS COMPLETE AND ALL OTHER STABILIZATION MEASURES HAVE BEEN INSTALLED. SEE SHEET 15 FOR DETAIL.
4. NO HEAVY MACHINERY SHALL BE OPERATED BELOW THE ORDINARY HIGH WATER MARK.
5. IF FILL MATERIAL REQUIRES DOUBLE HANDLING, MATERIAL WILL BE PLACED IN A DESIGNATED UPLAND AREA ON CLEMSON UNIVERSITY'S CAMPUS. NO MATERIAL WILL BE PLACED IN WATERS OF THE U.S. OUTSIDE OF THE PERMITTED CHANNEL DESIGN.



CLEMSON UNIVERSITY  
 HUNNICUTT CREEK RESTORATION  
 12 DIGIT FILE NO.:





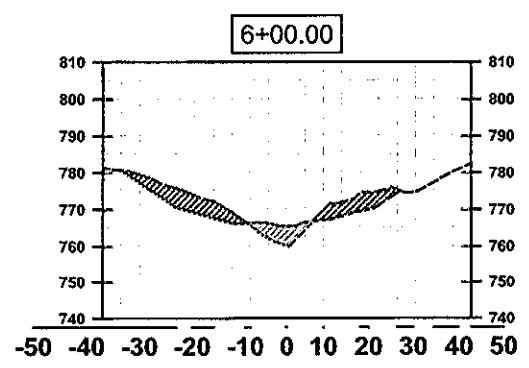
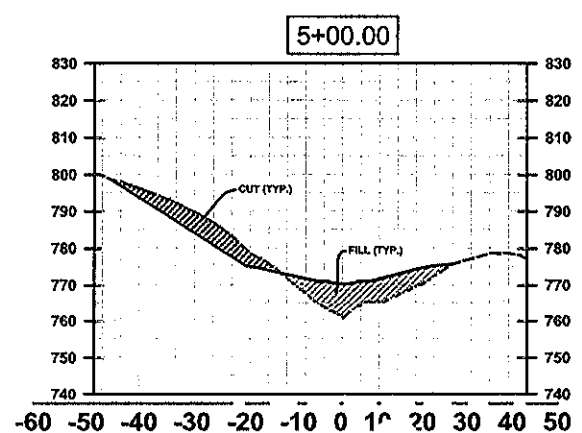
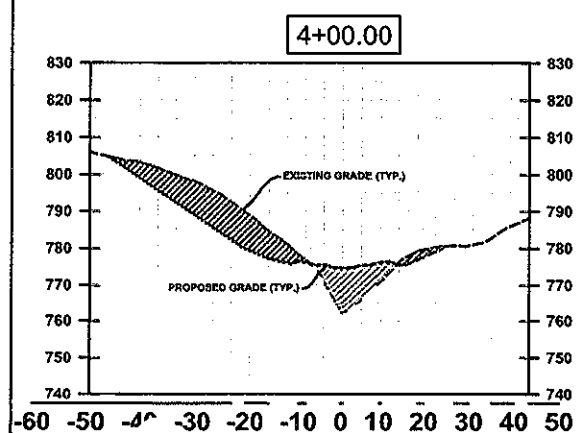
(VERTICAL)  
1 inch = 50.0 feet



(HORIZONTAL)  
1 inch = 50 feet

NOTES:

1. ALL PROPOSED GRADES GREATER THAN 2:1 SHALL BE STABILIZED WITH GREENLOXX NON-MSE REINFORCED LIVING WALL (OR APPROVED EQUAL) - SEE SHEET 11 FOR DETAIL.
2. PROPOSED GRADES LESS THAN 2:1 MAY BE STABILIZED WITH EC MATTING AS SPECIFIED ON SHEET 12.
3. TEMPORARY STREAM BYPASS PUMP WITH FLOW CAPACITY ACCORDING TO SIZING METHODOLOGY NOTED IN DETAIL SHALL BE IN PLACE PRIOR TO CONSTRUCTION ACTIVITY AND REMAIN IN PLACE UNTIL CONSTRUCTION ACTIVITY IS COMPLETE AND ALL OTHER STABILIZATION MEASURES HAVE BEEN INSTALLED. SEE SHEET 15 FOR DETAIL.
4. NO HEAVY MACHINERY SHALL BE OPERATED BELOW THE ORDINARY HIGH WATER MARK.
5. IF FILL/CUT MATERIAL REQUIRES DOUBLE HANDLING, MATERIAL WILL BE PLACED IN A DESIGNATED UPLAND AREA ON CLEMSON UNIVERSITY'S CAMPUS. NO MATERIAL WILL BE PLACED IN WATERS OF THE U.S. OUTSIDE OF THE PERMITTED CHANNEL DESIGN.



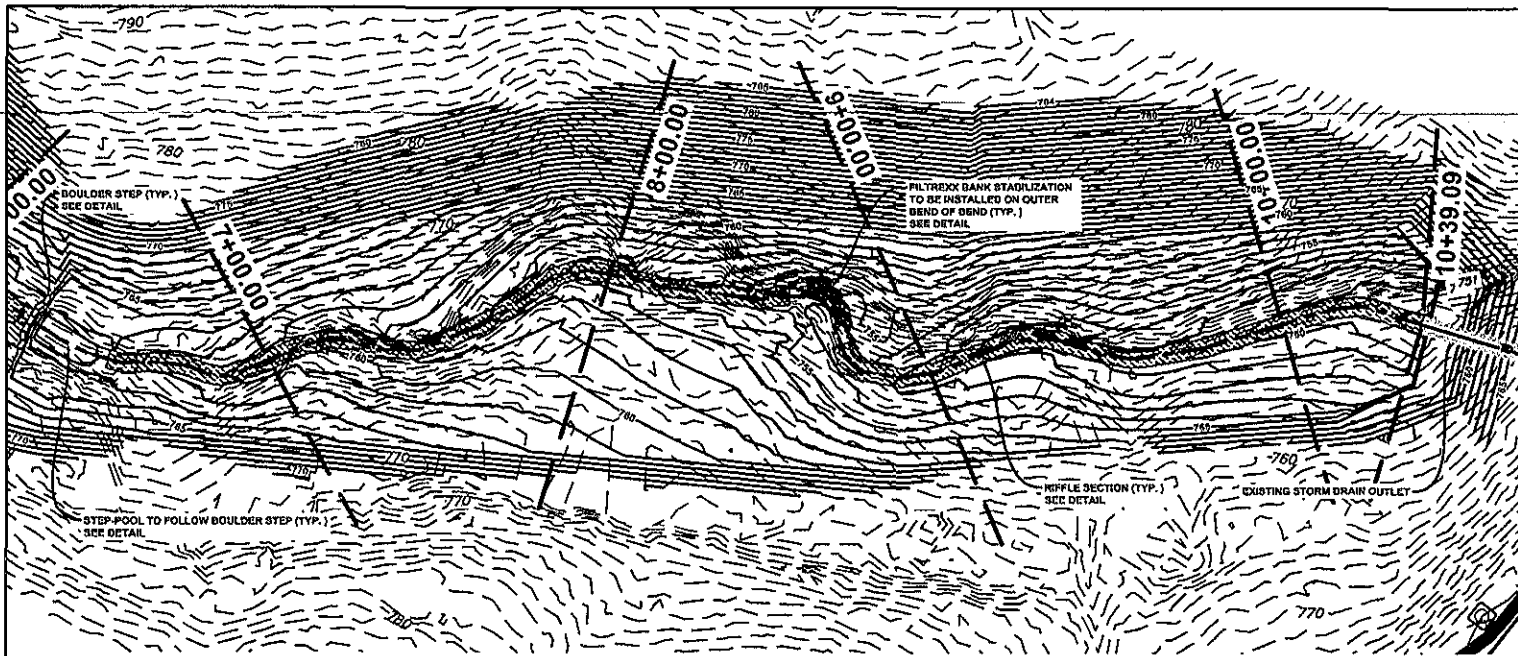
LAND  
PLANNING  
ASSOCIATES, INC.  
ENGINEERS & SURVEYORS



12/4/17  
CROSS-SECTIONS - SECTION B  
SHEET 6 OF 15

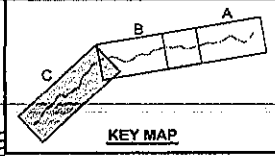
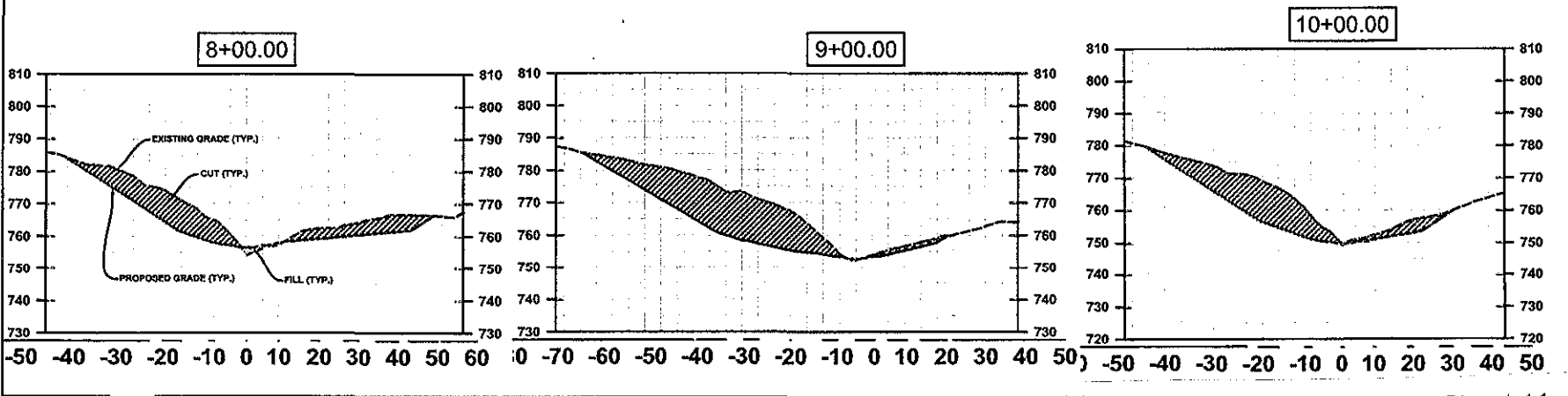
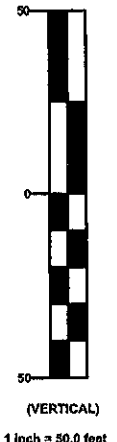
CLEMSON UNIVERSITY  
HUNNICUTT CREEK RESTORATION  
12 DIGIT FILE NO.:





NOTES:

1. ALL PROPOSED GRADES GREATER THAN 2:1 SHALL BE STABILIZED WITH GREENLOXX NON-MSE REINFORCED LIVING WALL (OR APPROVED EQUAL) - SEE SHEET 11 FOR DETAIL.
2. PROPOSED GRADES LESS THAN 2:1 MAY BE STABILIZED WITH EC MATTING AS SPECIFIED ON SHEET 12.
3. TEMPORARY STREAM BYPASS PUMP WITH FLOW CAPACITY ACCORDING TO SIZING METHODOLOGY NOTED IN DETAIL SHALL BE IN PLACE PRIOR TO CONSTRUCTION ACTIVITY AND REMAIN IN PLACE UNTIL CONSTRUCTION ACTIVITY IS COMPLETE AND ALL OTHER STABILIZATION MEASURES HAVE BEEN INSTALLED. SEE SHEET 15 FOR DETAIL.
4. NO HEAVY MACHINERY SHALL BE OPERATED BELOW THE ORDINARY HIGH WATER MARK.
5. IF FILL/CUT MATERIAL REQUIRES DOUBLE HANDLING, MATERIAL WILL BE PLACED IN A DESIGNATED UPLAND AREA ON CLEMSON UNIVERSITY'S CAMPUS. NO MATERIAL WILL BE PLACED IN WATERS OF THE U.S. OUTSIDE OF THE PERMITTED CHANNEL DESIGN.



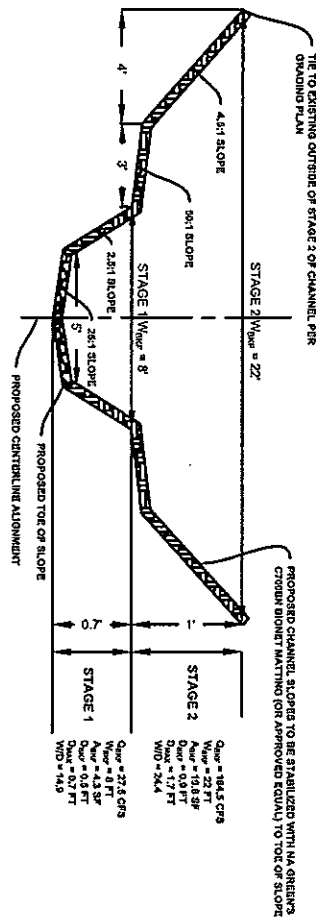
LAND  
PLANNING  
ASSOCIATES, INC.  
ENGINEERING SURVEYS

12/4/17  
CROSS-SECTIONS - SECTION C  
SHEET 7 OF 15

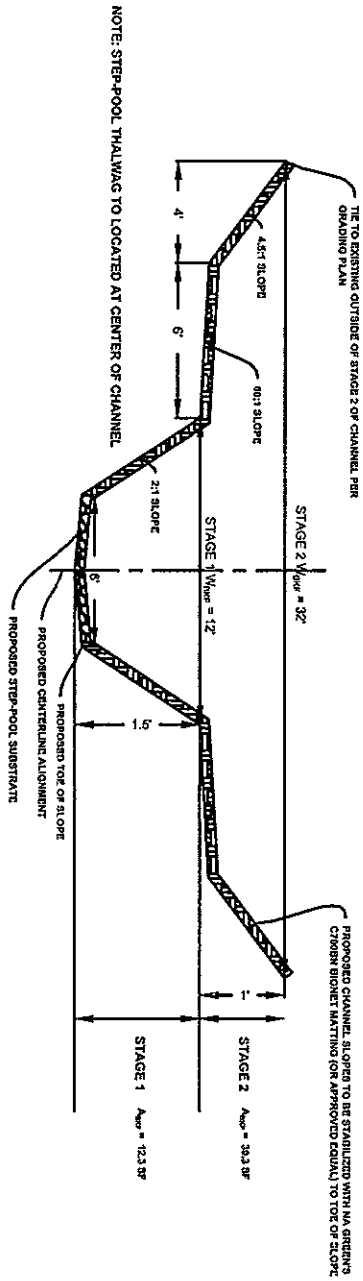
CLEMSON UNIVERSITY  
HUNNICUTT CREEK RESTORATION  
12 DIGIT FILE NO.:



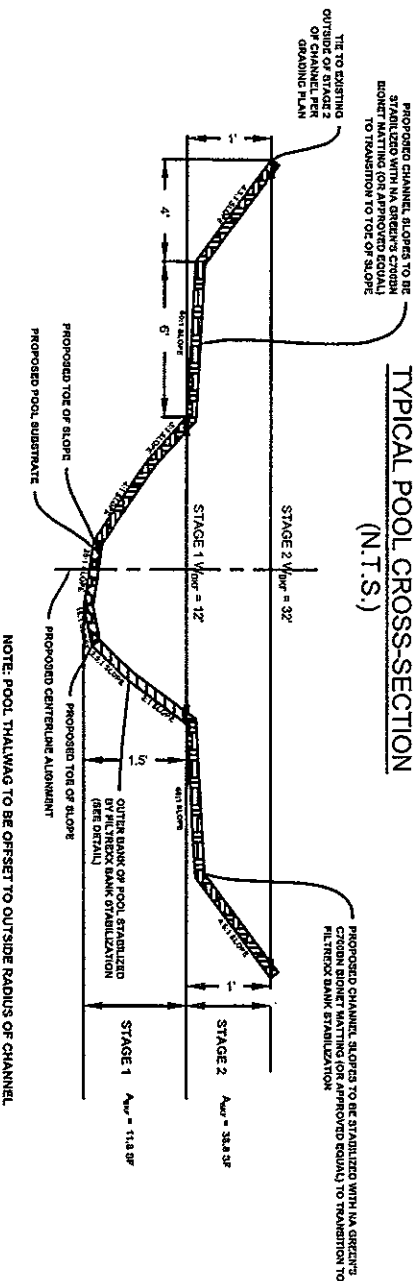
### TYPICAL RIFLE CROSS-SECTION (N.T.S.)



### TYPICAL STEP-POOL CROSS-SECTION (N.T.S.)



### TYPICAL POOL CROSS-SECTION (N.T.S.)

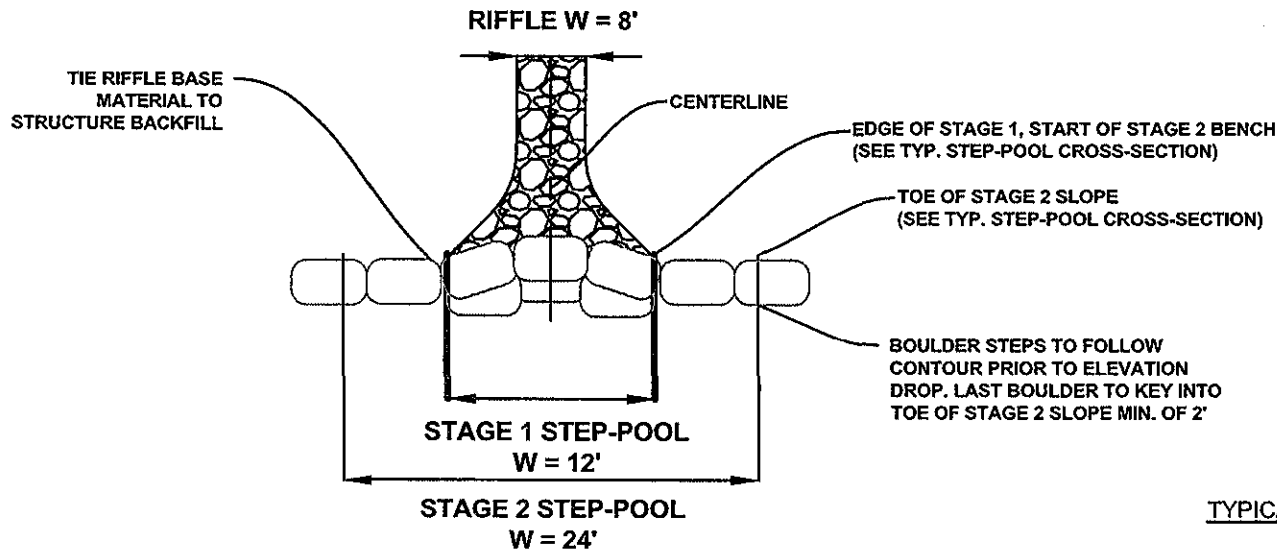


CLEMSON UNIVERSITY  
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TYPICAL CROSS-SECTION DETAILS  
SHEET 8 OF 15



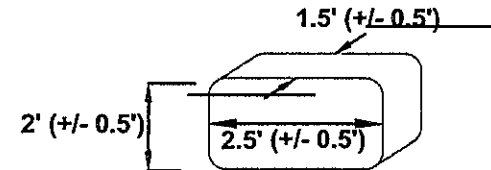
**TYPICAL BOULDER STEP  
PLAN VIEW  
(N.T.S.)**



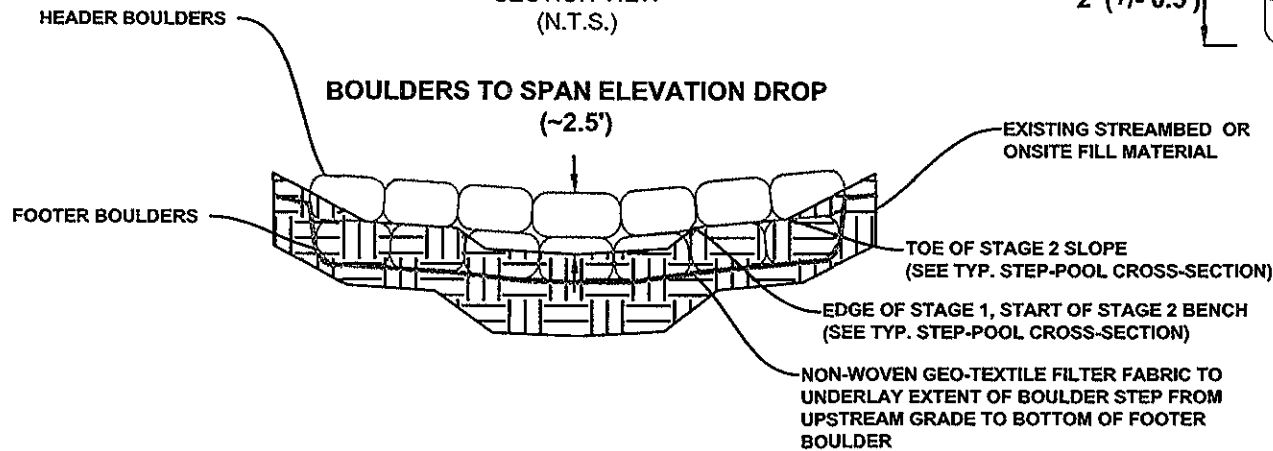
**TYPICAL BOULDER STEP: NOTES**

1. NON-WOVEN GEO-TEXTILE FILTER FABRIC SHALL BEGIN BENEATH BASE OF FOOTER BOULDER AND FOLLOW THE UPSTREAM SIDE OF BOULDER STEP TO FINISHED GRADE ELEVATION OF UPSTREAM SIDE. FABRIC SHALL RUN THE ENTIRE LENGTH OF STRUCTURE.
2. BOULDERS SHALL BE FIT TOGETHER AS TIGHTLY AS POSSIBLE. ANY GAPS SHALL BE PLUGGED WITH ON-SITE STONE MATERIAL OR CLASS A STONE TO REDUCE RISK OF UNDERCUTTING.
3. DROP FROM TOP OF STEP TO BASE OF STEP-POOL SHALL BE 2.5' AS INDICATED BY THE PROPOSED PROFILE (SEE SHEETS 2-4).
4. DIMENSIONS OF BOULDERS SHALL BE 2.5'X2'X1.5' (+/- 0.5') AS SEEN BELOW.
5. BOULDERS ON OUTERMOST EDGE OF STRUCTURE SHALL TIE INTO TOE OF STAGE 2 SLOPE A MIN. OF 2'.

**TYPICAL BOULDER DIMENSIONS  
(N.T.S.)**



**TYPICAL BOULDER STEP  
SECTION VIEW  
(N.T.S.)**



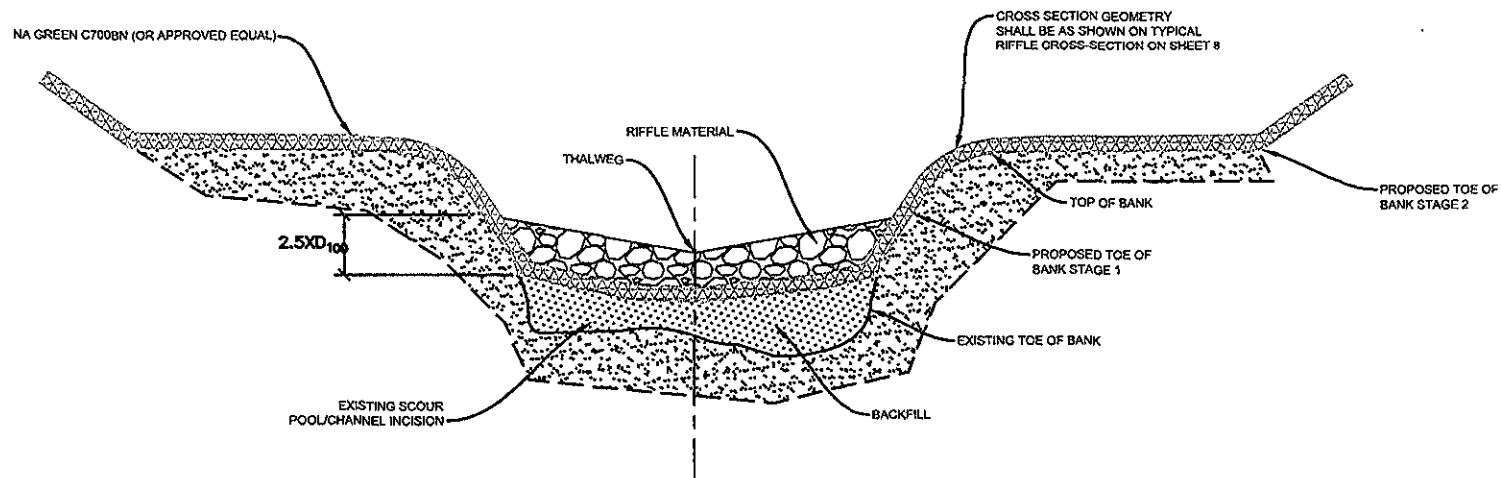
12/4/17  
BOULDER STEP DETAIL  
SHEET 9 OF 15

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12 DIGIT FILE NO.:





**TYPICAL RIFFLE  
CROSS-SECTION VIEW  
(N.T.S.)**



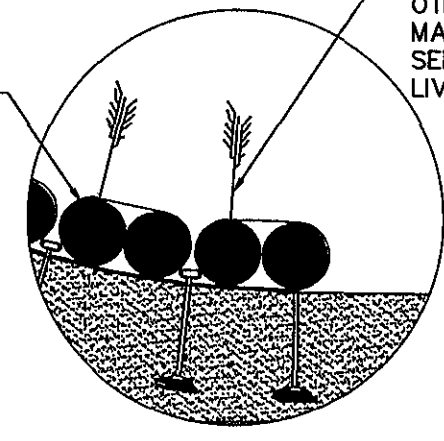
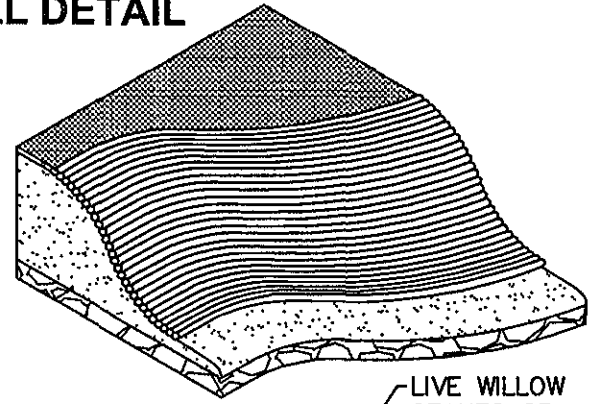
**TYPICAL RIFFLE NOTES:**

1. CONSTRUCTED RIFFLES SHALL BE INSTALLED WITH GEOMETRY PER TYPICAL RIFFLE CROSS-SECTION ON SHEET 8.
2. NA GREEN C700BN MATTING (OR APPROVED EQUAL) TO BE INSTALLED OVER FINISHED GRADES FOR ENTIRE CROSS-SECTION OF RIFFLE PRIOR TO PLACEMENT OF RIFFLE MATERIAL. MATTING SHALL TRANSITION TO GREENLOXX NON-MSE REINFORCED LIVING WALL WHERE SLOPES TYING TO EXISTING GRADE EXCEED 2:1.
3. BACKFILL MATERIAL, TO RAISE THE CHANNEL BED DUE TO SCOUR/INCISION, SHALL BE PLACED SUCH THAT THE ADDITION OF THE SPECIFIED THICKNESS OF RIFFLE MATERIAL SHALL ACHIEVE THE DESIGNATED GRADES.
4. RIFFLE MATERIAL SHALL BE IN THE RANGE OF 4.7-16.5" DIAMETER. RIFFLE MATERIAL MAY BE EXCAVATED, STOCKPILED, AND RE-USED FROM ABANDONED CHANNEL SECTIONS.
5. THE PLACEMENT OF BACKFILL AND/OR RIFFLE MATERIAL SHALL BE DONE IN A MANNER TO CREATE A SMOOTH PROFILE, WITH NO ABRUPT "JUMP"(TRANSITION) BETWEEN THE UPSTREAM POOL AND THE RIFFLE, AND LIKEWISE NO ABRUPT "DROP"(TRANSITION) BETWEEN THE RIFFLE AND THE START OF THE DOWNSTREAM STEP-POOL OR POOL.
6. ALSO A THALWEG SHALL BE FASHIONED WITHIN THE RIFFLE WIDTH SO THAT THE FINISHED CROSS SECTION OF THE RIFFLE MATERIAL MATCHES THE GEOMETRY OF THE RIFFLE TYPICAL SECTION (SEE SHEET 8).
7. THE END OF RIFFLE CONTROL POINT MAY TIE IN TO A DRAINAGE STRUCTURE OR OTHER IN-STREAM STRUCTURE (E.G. -J-HOOK VANE, CROSS VANE, ETC.).

**INSTALLATION NOTES**

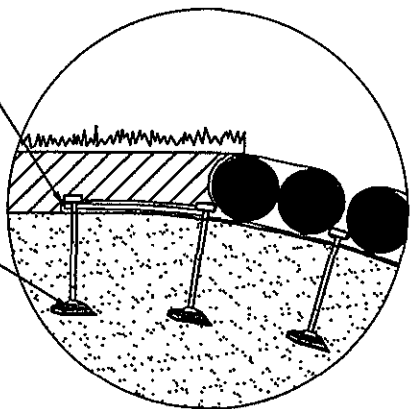
1. GREENLOXX NON-MSE REINFORCED LIVING WALL TO BE APPLIED WHERE PROPOSED GRADES EXCEED 2:1 SLOPES.
2. GREENLOXX NON-MSE REINFORCED LIVING WALL SHALL MEET STABILIZATION SPECIFICATIONS AND USE FILTREXX GROWINGMEDIA(TM).
3. CONTRACTOR IS REQUIRED TO BE A FILTREXX CERTIFIED INSTALLER AS DETERMINED BY FILTREXX INTERNATIONAL, LLC (440-926-2807; WWW.FILTREXX.COM). CERTIFICATION SHALL BE CONSIDERED CURRENT IF APPROPRIATE IDENTIFICATION IS SHOWN DURING TIME OF BID OR AT TIME OF APPLICATION. LOOK FOR THE FILTREXX CERTIFIED INSTALLER SEAL.
4. LAND SURFACE SHALL BE CLEARED OF DEBRIS, INCLUDING ROCKS, ROOTS, LARGE CLOUDS, AND STICKS THAT WOULD PREVENT GOOD GROUND CONTACT OR DAMAGE THE GROSOXX PRIOR TO INSTALLATION.
5. ON-SITE FABRICATION OF BANK STABILIZATION WILL ENSURE A CONTINUOUS LENGTH SOCK SYSTEM. UPON COMPLETING ONE SECTION OF SOCK FILLING (APPROX. 100-200 FT, THE NEXT SECTION SHALL BE 'SLEEVED' OVER THE COMPLETED SECTION BY A MINIMUM OF 1 FT. A STAKE SHALL BE PLACED IN THE OVERLAP SECTION, SECURING THE TWO SECTIONS.
6. DUCKBILL TR 65 ANCHORS (3' MINIMUM DEPTH) SHALL BE INSTALLED BETWEEN EVERY OTHER SET FILTREXX GROSOXX, SPACED 4' ON CENTER' ALONG THE SLOPE AND WHEREEVER GEOGRID IS OVERLAPPED.
7. GREENLOXX NON-MSE REINFORCED LIVING WALL SHALL BE SEEDED AT THE TIME OF APPLICATION; SEEDED BANK STABILIZATION SHOULD NOT BE INSTALLED PRIOR TO SEASONS WHERE GROWING VEGETATION IS DIFFICULT.
8. SEED SHALL BE THOROUGHLY MIXED WITH THE GROWINGMEDIA PRIOR TO CONSTRUCTION OR INJECTED INTO GROWINGMEDIA AT THE TIME OF APPLICATION.

**GREENLOXX NON-MSE REINFORCED LIVING WALL DETAIL**



**DETAIL B**

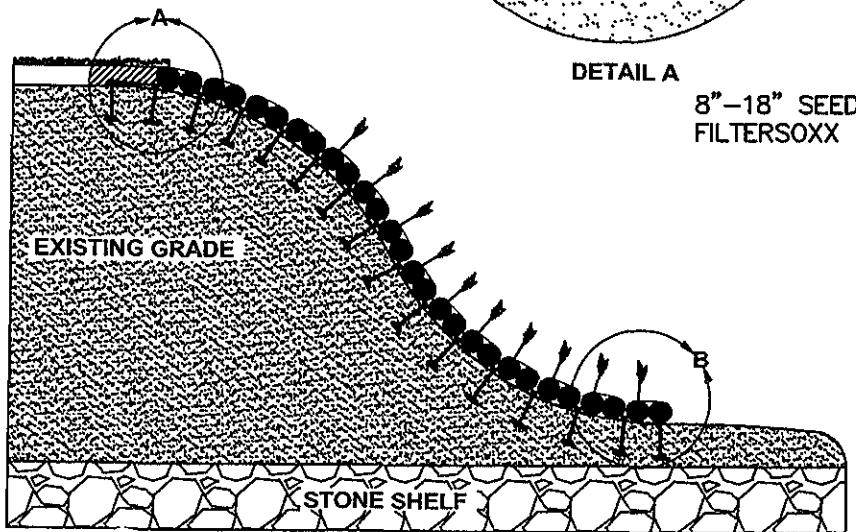
\*NO GRID STRANDS ARE ALLOWED TO BE CUT IN ORDER TO INSERT PLANTS IN ANY



**DETAIL A**

FLW 20 GEOGRID OR OTHER DESIGN STRENGTH (FLW 35 OR FLW 55)

GRIPPLE SOIL ANCHOR 3' MIN DEPTH OR OTHER ANCHOR STRENGTH AS PER ENGINEER

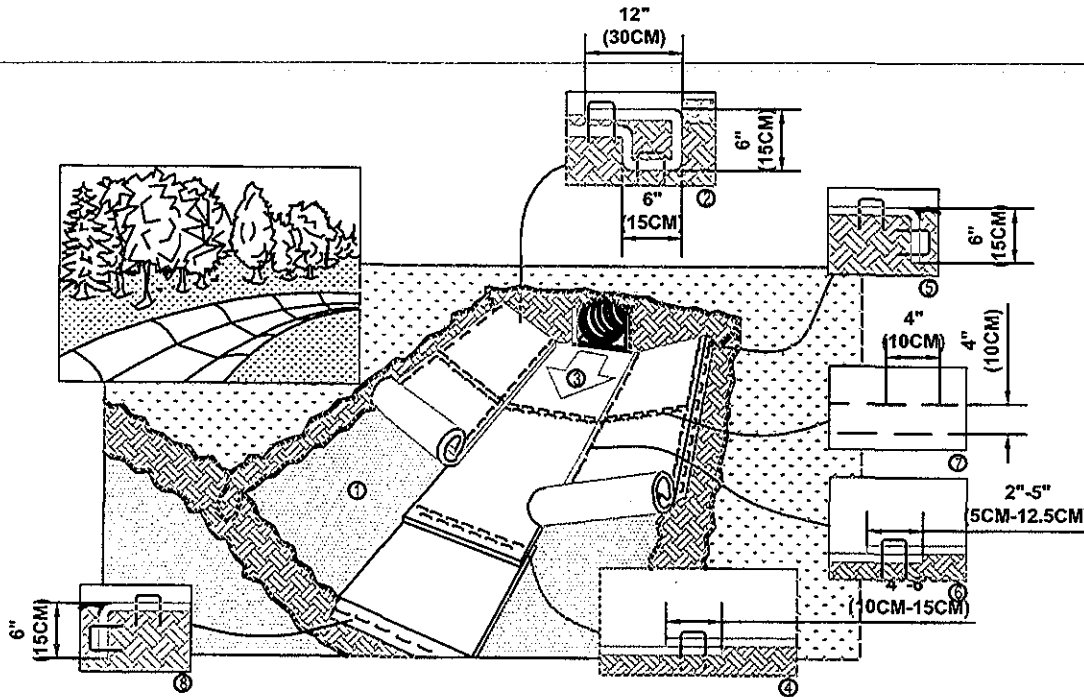


LIVE WILLOW STAKES OR OTHER PLANT MATERIAL FROM SEED OR FROM LIVE PLUGS

8"-18" SEEDED FILTREXX FILTERSOXX

**CHANNEL INSTALLATION SPECIFICATIONS**

1. NA GREEN MATTING C700BN (OR APPROVED EQUAL) TO BE INSTALLED OVER ALL PROPOSED GRADES LESS THAN OR EQUAL TO 2:1 SLOPES. ALL SLOPES GREATER THAN 2:1 SHALL BE STABILIZED WITH GREENLOXX SYSTEM (SEE GREENLOXX DETAIL ON SHEET 11).
2. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED, DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH THE PAPER SIDE DOWN.
3. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE BLANKET IN A 6" (15CM) DEEP X 6" (15CM) WIDE TRENCH WITH APPROXIMATELY 12" (30CM) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30CM) PORTION OF BLANKET OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30CM) APART ACROSS THE WIDTH OF THE BLANKET.
4. ROLL CENTER BLANKET IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
5. PLACE CONSECUTIVE BLANKETS END OVER END (SHINGLE STYLE) WITH A 4"-6" (10CM-15CM) OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" (10CM) APART AND 4" (10") ON CENTER TO SECURE BLANKETS.
6. FULL LENGTH EDGE OF BLANKETS AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30CM) APART IN A 6" (15CM) DEEP X 6" (15CM) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
7. ADJACENT BLANKETS MUST BE OVERLAPPED APPROXIMATELY 2"-5" (5CM-12.5CM) (DEPENDING ON BLANKET TYPE) AND STAPLED TO ENSURE PROPER SEAM ALIGNMENT. PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE BLANKET BEING OVERLAPPED.
8. IN HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30' TO 40' (9M-12M) INTERVALS. USE A DOUBLE ROW OF STAPLES STAGGERED 4" (10CM) APART AND 4" (10CM) ON CENTER OVER ENTIRE WIDTH OF CHANNEL.
9. THE TERMINAL END OF THE BLANKETS MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30CM) APART IN A 6" (15CM) DEEP X 6" (15CM) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.



**CRITICAL POINTS**

- A. OVERLAPS AND SEAMS
- B. PROJECTED WATER LINE
- C. CHANNEL BOTTOM/SIDE SLOPE VERTICES

\* HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE.

\*\* IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY ANCHOR THE BLANKETS.



**TURF REINFORCEMENT MATERIAL (TRM)**

CHANNEL INSTALLATION

(N.T.S.)

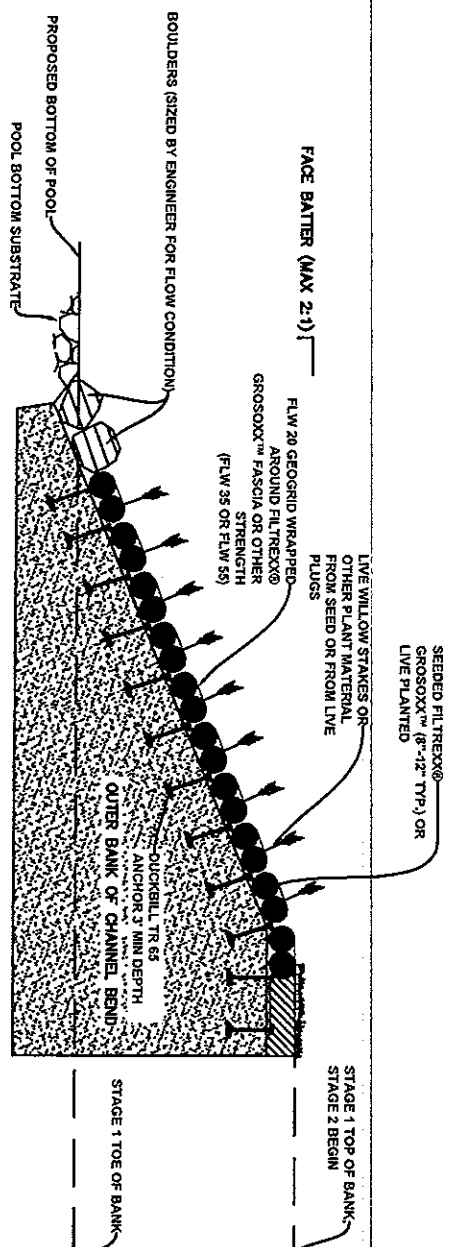
LAND  
PLANNING  
ASSOCIATES, INC.  
ENGINEERS & SURVEYORS



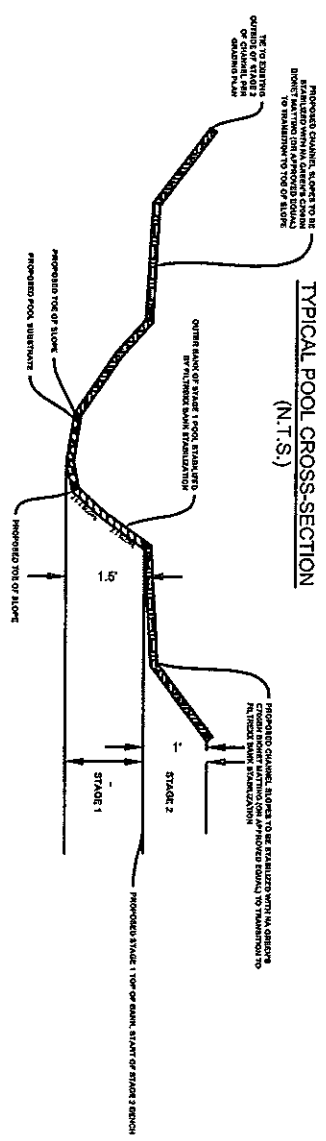
12/4/17  
MATTING DETAIL  
SHEET 12 OF 15

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12 DIGIT FILE NO.:





TYPICAL POOL CROSS-SECTION (N.T.S.)



- INSPECTION AND MAINTENANCE**
1. ROUTING INSPECTION SHOULD BE CONDUCTED WITHIN 24 HOURS OF A RUNOFF EVENT FOR THE FIRST YEAR AFTER INSTALLATION.
  2. SEED BANK STABILIZATION SHALL BE MAINTAINED UNTIL THE COUNTERSINKS ARE FULLY ESTABLISHED.
  3. SEEDED BANK STABILIZATION MAY NEED TO BE REGRATED IN HOT AND DRY WEATHER SEASONS.
  4. WHENEVER BANK STABILIZATION FAILS BECOMES DIS-COORED, THE CONTRACTOR WILL REGRAD PRODUCT IS IN GOOD CONDITION, AND THE CONTRACTOR WILL REGRAD PRODUCT IS IN GOOD CONDITION.
  5. REPAIR AND REPLACE THE BANK STABILIZATION.
  6. WHERE VEGETATION DOES NOT ESTABLISH THE CONTRACTOR WILL REGRAD, REPLANT OR PROVIDE AN APPROVED ALTERNATIVE.

- INSTALLATION NOTES**
1. FILTREXX BANK STABILIZATION TO BE APPLIED TO OUTER BANK OF BRIMS AS SPECIFIED ON PLANS.
  2. FILTREXX BANK STABILIZATION SHALL MEET STABILIZATION SPECIFICATIONS AND USE FILTREXX GROWING MEDIA.
  3. FILTREXX GROWING MEDIA SHALL BE A FULLY COMPOSED MATERIAL AS DETERMINED BY FILTREXX INTERNATIONAL, LLC (466-536-5072 WWW.FILTREXX.COM). CERTIFICATION SHALL BE OBTAINED CURRENT IF APPROPRIATE IDENTIFICATION IS SHOWN DURING TIME OF BID OR AT TIME OF APPLICATION (LIST FOUND AT WWW.FILTREXX.COM).
  4. BANK STABILIZATION SHALL BE PLACED AT LOCATIONS INDICATED ON PLANS AS SHOWN.
  5. BANK STABILIZATION SHALL BE PLACED IN ANCHORS THAT CONTACTS THE ENTIRE BANK OR SHOULDER FROM EROSION AND DESTABILIZATION.
  6. BANK STABILIZATION MUST BE INSTALLED AND STABILIZED BEFORE CONCENTRATED FLOW IS ALLOWED TO CONTACT BANK OR SLOPE AREA.
  7. BANK STABILIZATION SHALL BE PLACED IN ANCHORS THAT CONTACTS THE ENTIRE BANK OR SHOULDER FROM EROSION AND DESTABILIZATION.
  8. LAND SURFACE SHALL BE CLEARED OF DEBRIS, INCLUDING ROCKS, ROOTS, LARGE LOGS, AND STICKS PRIOR TO BANK STABILIZATION INSTALLATION.
  9. WATERWAY BANK OR SHOULDER SHALL BE MADE SMOOTH PRIOR TO INSTALLATION OF FILTREXX BANK STABILIZATION.
  10. IF TOE-CUTTING IS AN ISSUE AT WATERWAY BED AND SLOPE INTERFACE, EXCAVATION SHOULD BE PERFORMED AT INTERFACE BELOW CREEK BED LEVEL TO ALLOW PLACEMENT OF BANK STABILIZATION SOX.
  11. BANK STABILIZATION SHALL BE A MINIMUM OF 1' BELOW SCOUR LINE FOR STREAMS WITH FLOW DEPTH OF 1' OR MORE.
  12. GEORGRID FABRIC SHALL BE ANCHORED TO THE BANK TO PROVIDE ADDITIONAL BANK STABILITY AND ANCHORING SURFACE FOR THE BANK STABILIZATION SYSTEM.
  13. ON-SITE FABRICATION OF BANK STABILIZATION WILL BEGRAD A CONTINGENT LENGTH OF 10' TO 15' TO ALLOW FOR TOLERANCES AND TO PROVIDE A MINIMUM OF 1' FT. A STAKE SHALL BE PLACED IN THE OVERLAP SECTION, SECURING THE TWO SECTIONS.
  14. BANK STABILIZATION SHALL BE PLACED PARALLEL TO WATER FLOW AND PERPENDICULAR TO THE BANK TO PROVIDE ADDITIONAL STABILITY TO PREVENT WATER SEEPAGE BETWEEN ADJACENT SECTIONS.
  15. FOR ANCHORING AND TERRACE APPLICATIONS, LARGER DIAMETER BANK STABILIZATION SOX WILL BE PLACED ON THE BOTTOM OF THE INSTALLATION AND SMALL DIAMETER BANK STABILIZATION SOX PLACED ON THE TOP AS THE CONSTRUCTION MOVES.
  16. STABILIZATION APPLICATIONS BELOW THE WATERLINE WILL USE PVA GRAYWIL AND SHALL ROCK IN THE BANK STABILIZATION SOX AT THE BASE OF THE BANK.
  17. STABILIZATION APPLICATIONS ABOVE THE WATERLINE SHALL BE PLACED IN THE WATERLINE AND SHALL BE PLACED ABOVE THE WATERLINE.
  18. DUGRIBBLE TR 65 ANCHORS OF MINIMUM DEPTH SHALL BE INSTALLED BETWEEN EVERY OTHER SET FILTREXX GROSOLX SPACERS 4' ON CENTER ALONG THE SLOPE AND BANK STABILIZATION SHALL BE SEED AT THE TIME OF APPLICATION. SEEDED BANK STABILIZATION SHOULD NOT BE INSTALLED PRIOR TO SEASON WHERE GROWING VEGETATION IS DIFFICULT.
  19. SEED SHALL BE TERRACEDLY MIXED WITH THE GROWING MEDIA PRIOR TO CONSTRUCTION ON INSTALLED INTO GROWING MEDIA AT THE TIME OF APPLICATION.

FIL TREXX EDGESAVER STREAM 3 BANK STABILIZATION SYSTEM - REINFORCED WITH RIPRAP TOE



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12/4/17  
FILTREXX BANK STABILIZATION DETAIL  
SHEET 13 OF 15





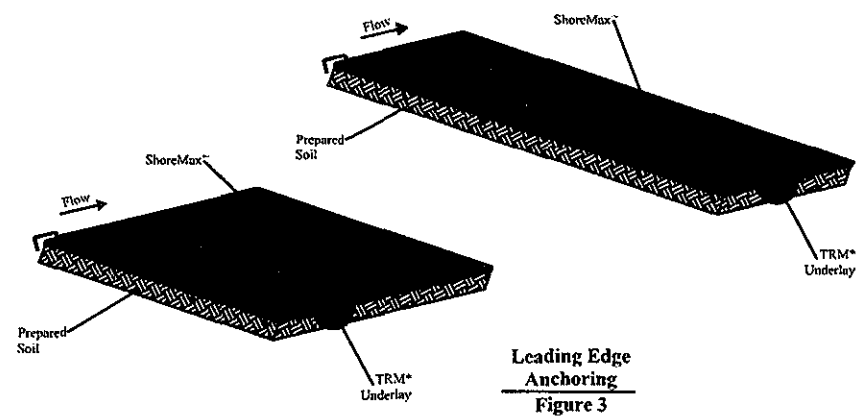
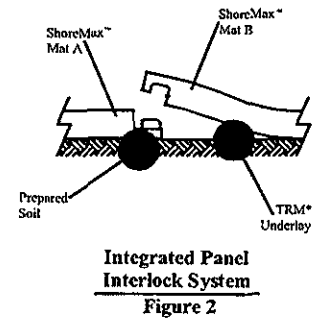
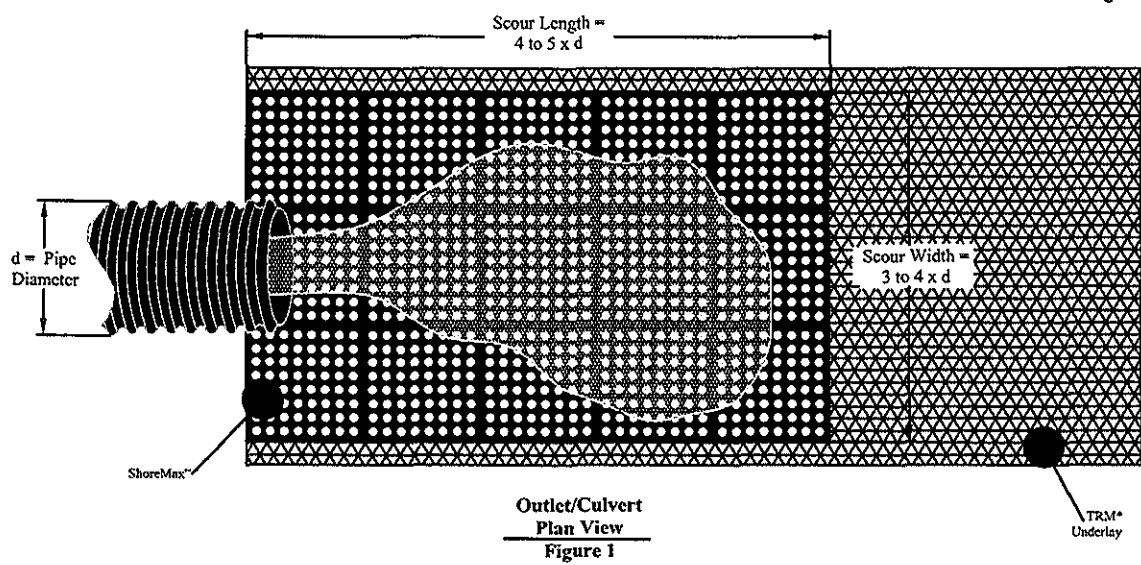
Drawing Not To Scale

# ShoreMax™

## OUTLET/CULVERT PROTECTION DETAIL

\* ShoreMax mats can be installed over a variety of underlayments including: sod, turf reinforcement mats (TRMs), geotextiles, and in some cases erosion control blankets (ECBs).

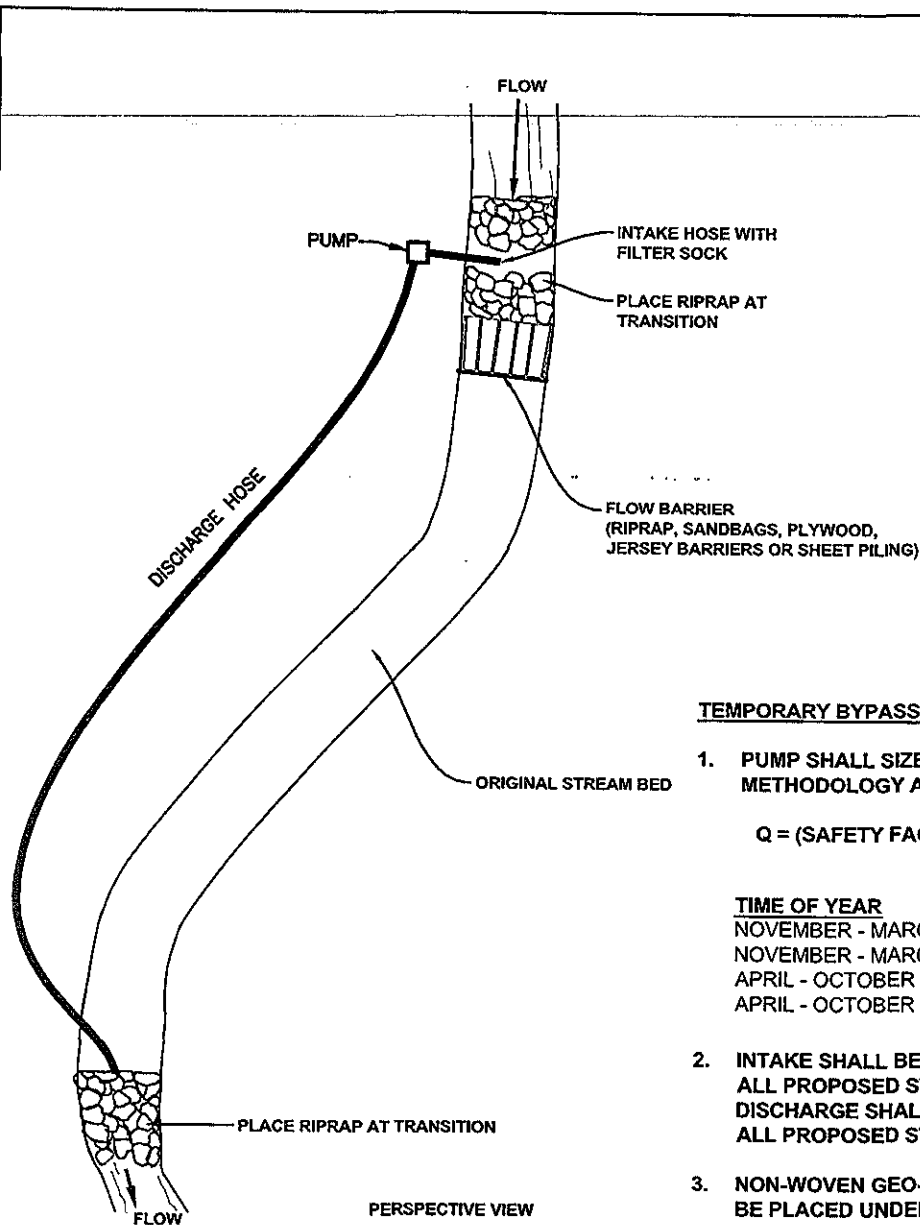
1. Prepare soil before installing erosion control products, including any necessary application of lime, fertilizer, and seed.
2. Install turf reinforcement mat (TRM) over prepared soils according to manufacturer's recommendations.
3. Place ShoreMax mat over the installed TRM (figure 1). When using multiple panels, connect the panels using the Integrated Panel Interlock System (figure 2). ShoreMax mat can be laid in either direction.
4. For culvert and outfall applications, ShoreMax mat scour protection should extend a minimum width of 3-4 times the pipe diameter and a minimum length of 4-5 times the pipe diameter (figure 1). With steeper channel gradients, the length of scour protection may need to be extended.
5. Place staples/anchors in the appropriate pattern. Perimeter staples can be shared between two adjacent panels. In soft or highly erodible soils, percussion earth anchors may be required. View ShoreMax Anchoring Guide, for additional details.
6. Place 1 staple/pin per linear foot along the leading edge of the ShoreMax system, resulting in one staple/pin on each corner and gridline (figure 3).



5401 St. Wendel - Cynthiana Rd. PH: 800-772-2040  
Poseyville, IN 47633 www.nagreen.com

**Disclaimer:**  
The information presented herein is general design information only. For specific applications, consult an independent professional for further design guidance.

Drawn on: 5-4-17



**TEMPORARY BYPASS DETAIL NOTES:**

1. PUMP SHALL BE SIZED TO BYPASS DESIGN FLOW AS SPECIFIED BY SIZING METHODOLOGY AS FOLLOWS:

$$Q = (\text{SAFETY FACTOR}) \times (\text{DIVERSION SIZING COEFF.}) \times (\text{DRAINAGE AREA})$$

<u>TIME OF YEAR</u>	<u>PROJECT DURATION</u>	<u>SAFETY FACTOR</u>	<u>SIZING COEFF.</u>
NOVEMBER - MARCH	LESS THAN 2 WEEKS	1.0	0.2
NOVEMBER - MARCH	2 WEEKS TO 1 MONTH	1.5	0.2
APRIL - OCTOBER	LESS THAN 2 WEEKS	1.0	0.5
APRIL - OCTOBER	2 WEEKS TO 1 MONTH	1.5	0.5

2. INTAKE SHALL BE INSTALLED UPSTREAM OF ALL PROPOSED STRUCTURES/GRADES, AND DISCHARGE SHALL BE DOWN GRADIENT OF ALL PROPOSED STRUCTURES/GRADES.
3. NON-WOVEN GEO-TEXTILE FILTER FABRIC TO BE PLACED UNDER RIP RAP AT INTAKE AND DISCHARGE LOCATIONS.

**TEMPORARY STREAM BYPASS PIPING DETAIL**  
(N.T.S)



12/4/17  
TEMPORARY BYPASS DETAIL  
SHEET 15 OF 15

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