

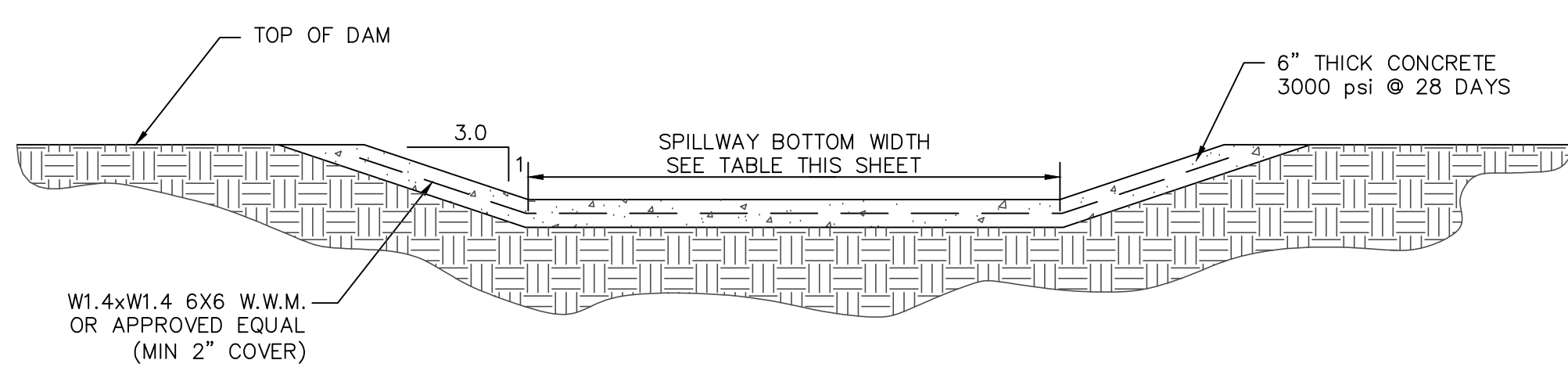
**DAM EMBANKMENT DETAIL**  
NTS

**DAM EMBANKMENT NOTES:**

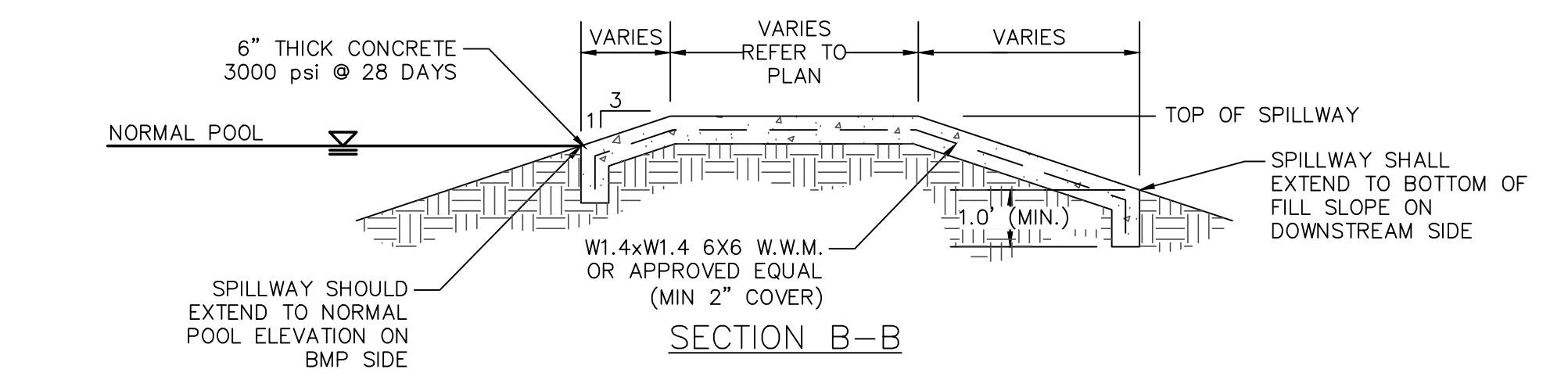
- 1) TOPSOIL BENEATH THE EMBANKMENT SHALL BE REMOVED AND STOCKPILED. THE FOUNDATION WILL BE PROOF ROLLED AND ANY SOFT OR ORGANIC MATERIALS WILL BE REMOVED.
- 2) ALL MATERIAL SHALL BE COMPACTED IN 6-8 INCH LIFTS TO 95% OF MAXIMUM STANDARD PROCTOR DRY DENSITY OR HIGHER (ASTM D-698). THE CLAY CORE ZONE WILL HAVE A MOISTURE CONTENT OF OPTIMUM TO 4 PERCENT ABOVE OPTIMUM MOISTURE CONTENT. THE SHELL ZONE FILL WILL HAVE A MOISTURE CONTENT FROM 2 PERCENT BELOW OPTIMUM MOISTURE CONTENT TO 4 PERCENT ABOVE OPTIMUM.
- 3) EMBANKMENT FILL:  
SHELL ZONE: SOILS WITH LESS THAN 30% PASSING THE NO. 200 SIEVE OR A PI OF LESS THAN 10 WHEN THE PERCENTAGE OF MATERIAL PASSING THE NO. 200 SIEVE IS GREATER THAN 30 PERCENT. SOILS WHICH ARE CLASSIFIED AS CLAYS (CH OR CL) SHOULD NOT BE USED AT THE FACE OF THE SHELL ZONES.  
CLAY CORE ZONE: CH, CL OR SC MATERIAL WITH A PI RANGING BETWEEN 15 AND 60
- 4) NO FILL SHALL CONTAIN ROCKS OR GRAVEL LARGER THAN 4 INCHES IN DIAMETER.
- 5) A PROFESSIONAL GEOTECHNICAL ENGINEER SHALL APPROVE ALL MATERIALS USED FOR THE EMBANKMENT AND SUPERVISE CONSTRUCTION.
- 6) ALL DISTURBED AREAS ABOVE PERMANENT POOL SHALL BE SEEDED USING THE FOLLOWING GRASS SEED MIX MANUFACTURED BY ERNST SEED COMPANY: Carolina FACW Meadow Mix ERNMX-182

**CLAY LINER NOTES:**

IN ORDER TO HELP SUSTAIN THE PERMANENT POOL AND TO PREVENT WATER FROM INFILTRATING TOO QUICKLY INTO THE UNDERLYING SOIL, THE CONTRACTOR SHALL INSTALL A 6" THICK CLAY LINER ON THE BOTTOM OF THE BMP AREA UP TO THE NORMAL POOL ELEVATION. THE LINER CAN BE ACCOMPLISHED BY BLENDING EXISTING SITE SOILS WITH CLAY TO ACHIEVE A LOW PERMEABILITY MIXTURE OR BY INSTALLING A GEOSYNTHETIC LINER MADE OF A BENTONAT CL. IF THE CONTRACTOR CHOOSES TO BLEND THE EXISTING SITE SOILS WITH CLAY, THE ONSITE GEOTECHNICAL ENGINEER SHALL DETERMINE THE AMOUNT OF CLAY TO ADD, THE DEGREE OF COMPACTION, AND WILL OVERSEE THE INSTALLATION OF THE CLAY LINER. THE MAXIMUM PERMEABILITY RATE FOR THE LINER SHALL BE 0.01 IN/HR IN ACCORDANCE WITH THE NCDENR BMP MANUAL. THE PROPOSED MATERIAL FOR THIS LINER SHALL BE TESTED BY THE ONSITE GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT. THE RESULTS OF THIS TESTING SHALL BE SUBMITTED TO THE DESIGN ENGINEER FOR REVIEW PRIOR TO PLACEMENT. UPON COMPLETION OF LINER INSTALLATION, A 4" MINIMUM LAYER OF TOPSOIL SHALL BE ADDED OVER THE LINER TO PROVIDE A HEALTHY MEDIA FOR VEGETATION GROWTH.



**SECTION A-A**

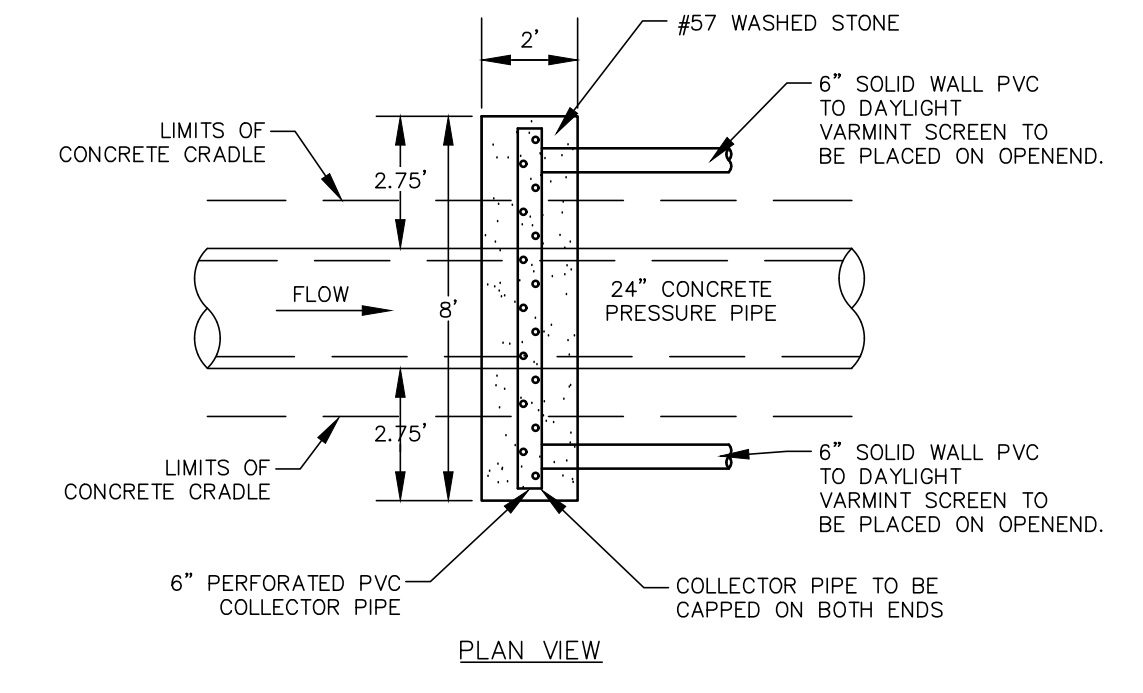


**SECTION B-B**

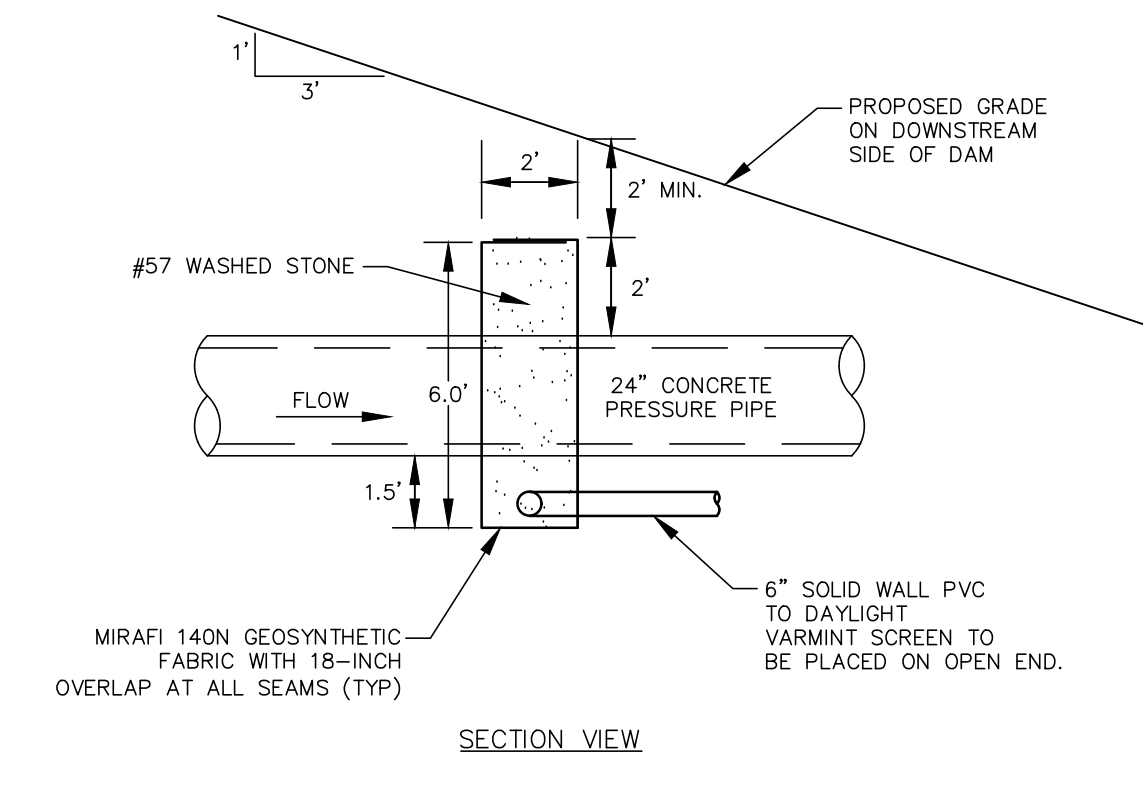
BMP #2	NORMAL POOL EL.	TOP DAM EL.	SPILLWAY BOTTOM EL.	SPILLWAY BOTTOM WIDTH
	452.50	458.00	456.00	20'

NOTE: EXPANSION/CONTRACTION JOINTS PER AMERICAN CONCRETE INSTITUTE (ACI) STANDARDS FOR SLABS ON GRADE.

**EMERGENCY SPILLWAY DETAIL**  
NTS

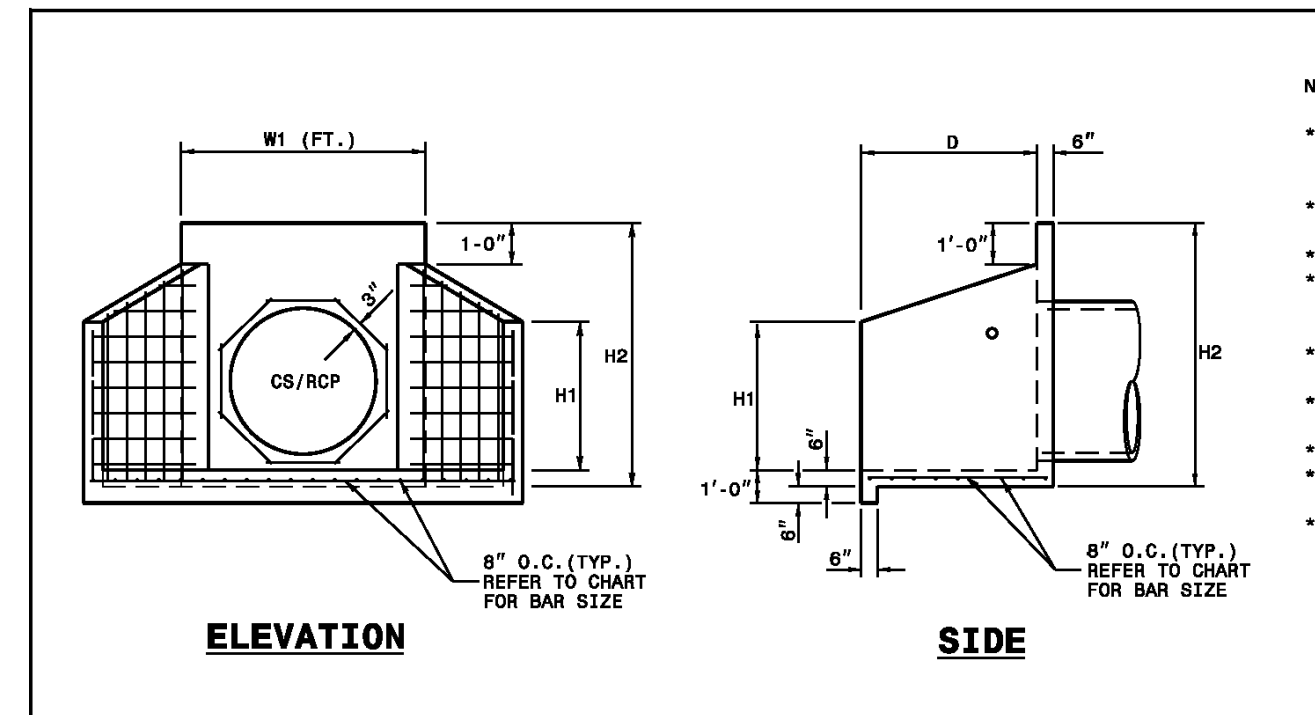


**PLAN VIEW**



**SECTION VIEW**

**FILTER DIAPHRAGM DETAIL**  
NTS



**ELEVATION**

**SIDE**

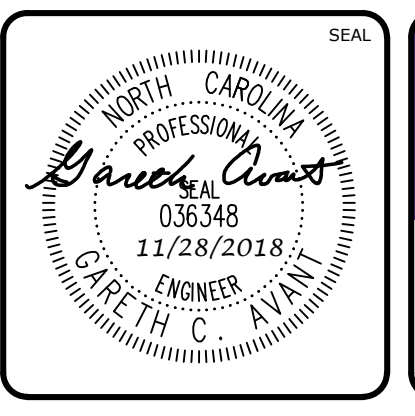
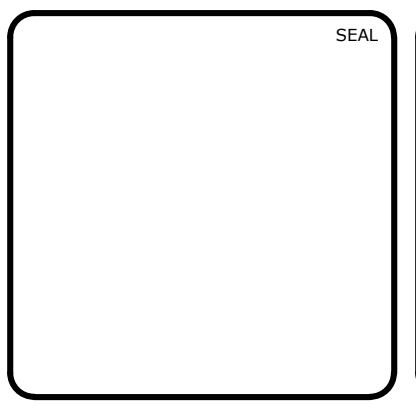
- NOTES:**
- THIS PRECAST ENDWALL MAY BE USED FOR THE FOLLOWING STANDARDS: 838-01, 838-11, 838-21, 838-27, 838-35, 838-39, 838-51, 838-67, 838-63 AND 838-69.
  - INSTALL PRECAST ENDWALLS WITH WINGS AND PAY FOR IN ACCORDANCE WITH SPECIFICATION SECTION 838.
  - USE 4000 PSI CONCRETE.
  - PROVIDE ALL REINFORCING STEEL WHICH MEETS ASTM A618 FOR GRADE 60 AND WELDED WIRE FABRIC CONFORMING TO ASTM A185 WITH 2" MIN. CLEARANCE.
  - PLACE LIFT HOLES OR PINS IN ACCORDANCE WITH OSHA STANDARD 1926.704.
  - PIPE TO BE GROUDED INTO HEADWALL AT JOB SITE BY CONTRACTOR
  - ALL ELEMENTS PRECAST TO MEET ASTM C919.
  - WELDED WIRE FABRIC MAY BE SUBSTITUTED FOR REBAR AS LONG AS THE SAME AREA OF STEEL IS PROVIDED.
  - CHAMFER ALL CORNERS 1" OR HAVE A RADIUS OF 1".
- NOTE: THE MINIMUM BAR SIZE SHALL BE #6 BARS AT 9" CTS. THE CONTRACTOR WILL HAVE THE OPTION TO INCREASE THIS BAR SIZE AS NEEDED.

ENDWALL DIMENSIONS							
PIPE DIA.	BAR SIZE	MIN./MAX. H1 (FT.)	MIN./MAX. H2 (FT.)	MIN./MAX. D (FT.)	MIN./MAX. W1	MIN./MAX. W2	
1.0	#5 @ 8"	1.25/2.00	2.00/3.75	1.25/1.75	3.00/3.75	5.50/6.00	
1.25	#5 @ 8"	1.25/2.00	3.00/3.75	1.25/2.00	3.50/3.75	6.50/6.75	
1.50	#5 @ 8"	1.25/2.00	3.00/4.25	1.50/2.50	3.50/3.75	6.50/6.75	
2.0	#5 @ 8"	1.50/2.50	4.00/4.75	1.75/2.50	4.00/4.25	7.50/8.25	
2.5	#5 @ 8"	2.50/3.50	4.00/6.00	2.00/3.00	4.50/5.50	10.00/11.50	
3.0	#5 @ 8"	3.00/3.50	5.00/6.00	2.75/3.50	5.25/5.75	11.50/11.75	
3.5	#5 @ 8"	3.25/4.50	6.00/6.75	3.25/3.50	6.00/6.75	12.00/13.25	
4.0	#5 @ 8"	3.50/4.50	6.50/7.00	3.25/3.50	6.50/6.75	13.00/13.25	
4.5	#5 @ 8"	4.00/5.00	6.50/8.50	3.25/4.00	7.00/8.25	13.50/15.75	
5.0	#5 @ 8"	4.50/5.00	7.00/8.50	3.25/4.00	7.25/8.25	13.75/15.75	
5.5	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.25/8.25	14.00/15.75	
6.0	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.75/8.25	14.75/16.75	

**PLAN**

ROADWAY STANDARD DRAWING FOR PRECAST CONCRETE ENDWALL FOR SINGLE 12" THRU 72" PIPE - 90° SKEN  
 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.  
 SHEET 1 OF 838-80

REV. NO.	DESCRIPTION	DATE
4	REVISIONS PER NCDOT COMMENTS	2018.11.28
3	REVISIONS PER NCDOT COMMENTS	2018.11.27
2	REVISIONS PER NCDOT	2018.11.16
1	REVISIONS PER COUNTY EROSION CONTROL AND STORMWATER, NCDSDQ P155	2018.10.02
0	INITIAL SUBMITTAL	2018.08.17



**MCKIM & CREED**  
ENGINEERS SURVEYORS PLANNERS

1730 VARSITY DRIVE, SUITE 500 FIRM LICENSE #: F-1222  
 RALEIGH, NORTH CAROLINA 27606 mckimcreed.com  
 T 919.233.8091 F 919.233.8031

**RYAN'S CROSSING**  
Chatham County, North Carolina

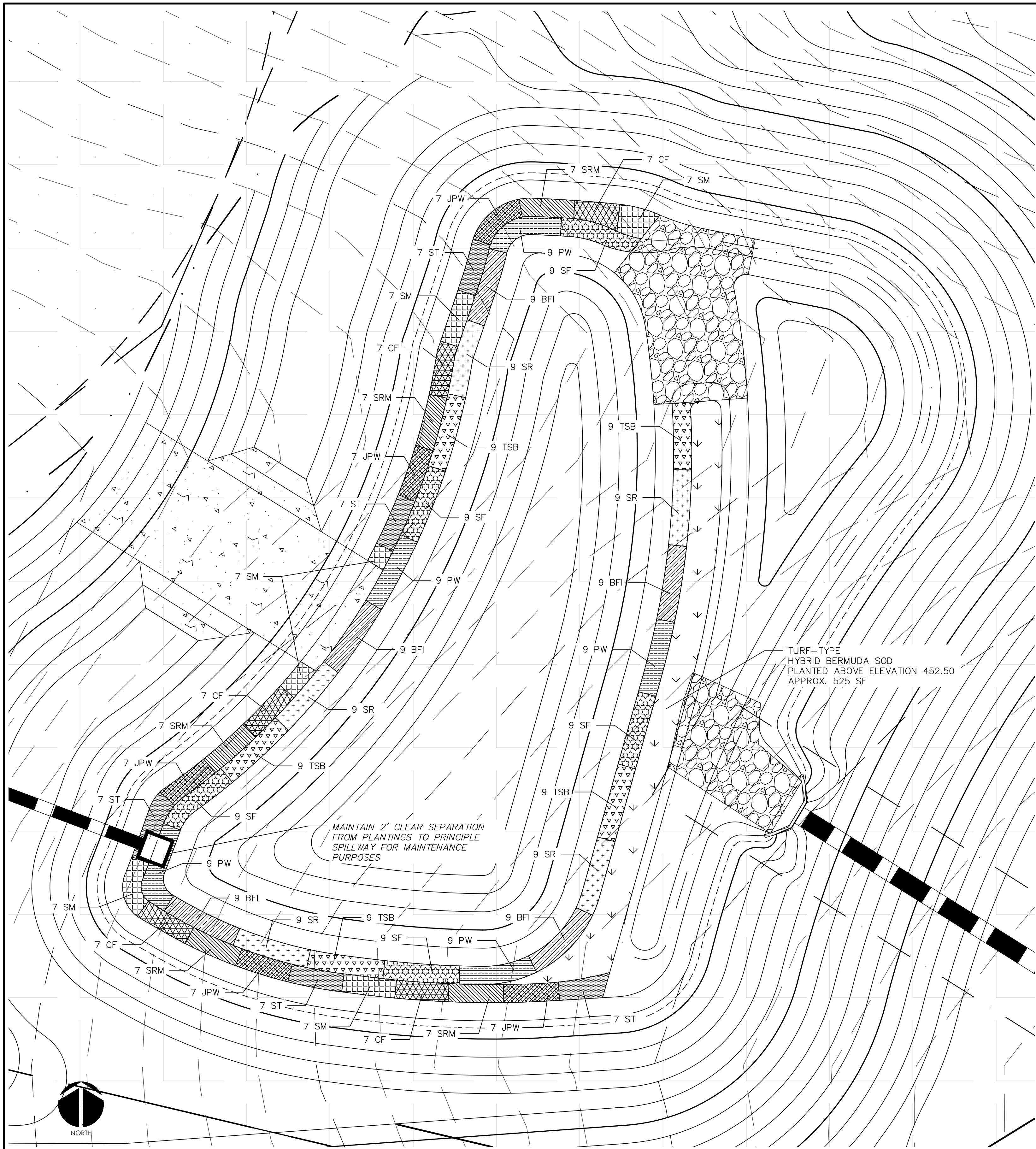
**CONSTRUCTION PLAT**  
BMP #2 PLAN & DETAILS

DATE: AUGUST 17, 2018  
 MCE PROJ. # 07291-0002  
 DRAWN: BSS  
 DESIGNED: BSS  
 CHECKED: GCA  
 PROJ. MGR: CHS

SCALE: HORIZONTAL: AS NOTED  
 VERTICAL: N/A

M&C FILE NUMBER: D4.X  
 DRAWING NUMBER: D4.5

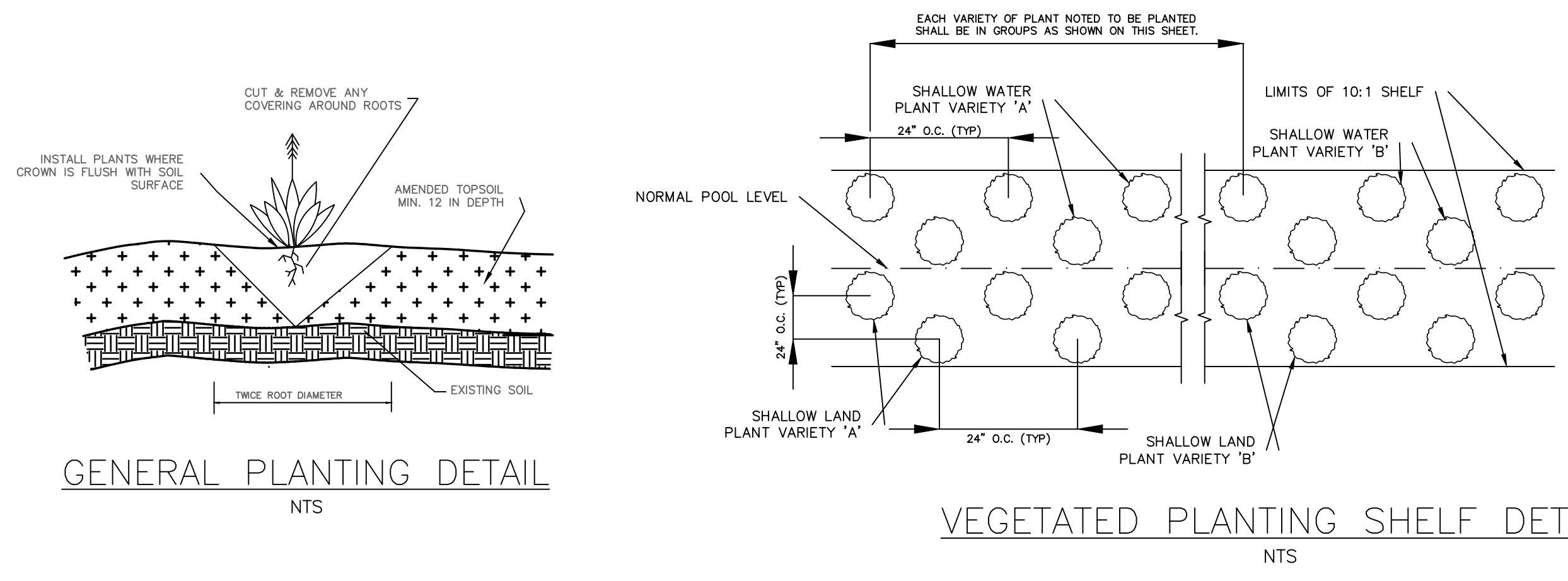
STATUS: PRELIMINARY FOR CONSTRUCTION  
 REVISION: 4



WET DETENTION POND #2 PLANTING PLAN  
SCALE = 1" = 20'

PLANTING SCHEDULE

SYM.	ABB.	COMMON NAME	BOTANICAL NAME	QUANTITY	SPACING	CONTAINER SIZE AT PLANTING
SHALLOW WATER PLANTINGS						
	SF	SWEETFLAG	<i>Acorus subcordatum</i>	45	24"-30" O.C.	1 QT.
	PW	PICKERELWEED	<i>Pontederia cordata</i>	45	24"-30" O.C.	1 QT.
	BFI	BLUE FLAG IRIS	<i>Iris virginica</i>	45	24"-30" O.C.	1 QT.
	SR	SOFT RUSH	<i>Juncus effusus var. pyfaei or solutus</i>	45	24"-30" O.C.	1 QT.
	TSB	THREE SQUARE BULRUSH	<i>Schoenoplectus americanus</i>	45	24"-30" O.C.	1 QT.
SHALLOW LAND PLANTINGS						
	SM	SWAMP MILKWEED	<i>Asclepias incarnata</i>	35	24"-30" O.C.	1 QT.
	CF	CARDINAL FLOWER	<i>Lobelia cardinalis</i>	35	24"-30" O.C.	1 QT.
	SRM	SCARLET ROSE MALLOW	<i>Hibiscus coccineus</i>	35	24"-30" O.C.	1 QT.
	JPW	DWARF JOE PYE WEED	<i>Eupatoriadelphus dubius</i>	35	24"-30" O.C.	1 QT.
	ST	SPOTTED TRUMPETWEED	<i>Eupatoriadelphus maculatus</i>	35	24"-30" O.C.	1 QT.

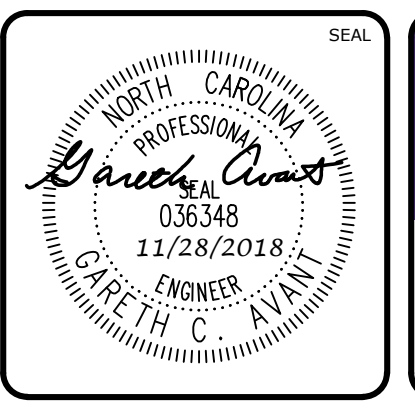
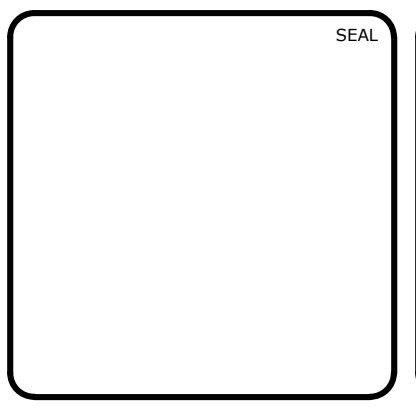


NOTES:  
1. CONTINUE PLANTING SCHEME SHOWN FOR EACH OF THE 5 PLANT VARIETIES NOTED BELOW AROUND ENTIRE LENGTH OF THE SHALLOW WATER PLANTING ZONE.  
2. CONTINUE PLANTING SCHEME SHOWN FOR EACH OF THE 5 PLANT VARIETIES NOTED BELOW AROUND ENTIRE LENGTH OF THE SHALLOW LAND PLANTING ZONE.  
3. OTHER SPECIES WITH SIMILAR GROWTH HABITS AND MAY BE APPROVED AS LISTED IN THE "STORMWATER BEST MANAGEMENT PRACTICES MANUAL" TABLE 9-1.

- GENERAL PLANTING NOTES:
1. AVOID COMPACTING TOPSOIL TO PROMOTE HEALTHY ENVIRONMENTAL CONDITIONS FOR THE PLANTS.
  2. ALL PLANTS SHOULD BE PLANTED IN THE INDICATED RANGE TO ENSURE SURVIVAL.
  3. SHALLOW WATER AND SHALLOW LAND AREAS TO BE PLANTED WITH BARE ROOT, PLUGS, OR CONTAINER LIVE PLANTINGS AS SPECIFIED.
  4. EXCAVATE A HOLE TWICE THE DIAMETER OF ROOT BALL AND EQUAL TO THE ROOT DEPTH OF THE INDIVIDUAL PLANT. PLACE PLANT IN HOLE WITH CROWN FLUSH WITH SOIL SURFACE. BACKFILL WITH TOPSOIL AND LIGHTLY PLANT.
  5. BEGIN PLANTING DURING LOCAL GROWING SEASON IN ORDER TO ENSURE THAT PLANTS HAVE ADEQUATE TIME TO ESTABLISH BEFORE WINTER MONTHS.
  6. OBTAIN PLANTS FROM: COASTAL PLAIN CONSERVATION NURSERY (252-482-5707), MELLOW MARSH FARMS (919-742-1200), CURE NURSERY (919-542-6186) OR ENGINEER APPROVED SUBSTITUTE.
  7. REFER TO EROSION CONTROL DETAIL SHEET D1.2 FOR SEEDBED PREPARATION AND SEEDING SCHEDULES FOR AREAS NOT SPECIFIED IN THIS PLAN.

- SHALLOW WATER PLANTING NOTES:
1. 70% OF PICKERELWEED SHOULD BE PLANTED WITHIN 5-6 INCHES BELOW NORMAL POOL.
  2. 70% OF SWEETFLAG AND 70% OF SOUTHERN BLUE FLAG IRIS SHOULD BE PLANTED IN THE 2-3 INCHES BELOW NORMAL POOL.
  3. 70% OF SOFT RUSH SHOULD BE PLANTED AT THE NORMAL POOL ELEVATION.
- SHALLOW LAND PLANTING NOTES:
1. PLANTS IN THIS GROUP SHOULD NOT BE PLANTED IN AREAS THAT ARE INUNDATED FOR EXTENDED PERIODS.

REV. NO.	DESCRIPTIONS	DATE
4	REVISIONS PER NCDOT COMMENTS	2018.11.28
3	REVISIONS PER NCDOT COMMENTS	2018.11.27
2	REVISIONS PER NCDOT	2018.11.16
1	REVISIONS PER COUNTY EROSION CONTROL AND STORMWATER, NCDOT PWS	2018.10.02
0	INITIAL SUBMITTAL	2018.08.17



**MCKIM & CREED**  
ENGINEERS SURVEYORS PLANNERS

1730 VARSITY DRIVE, SUITE 500  
RALEIGH, NORTH CAROLINA 27606  
T 919.233.8091 F 919.233.8031

FIRM LICENSE #: F-1222  
mckimcreed.com

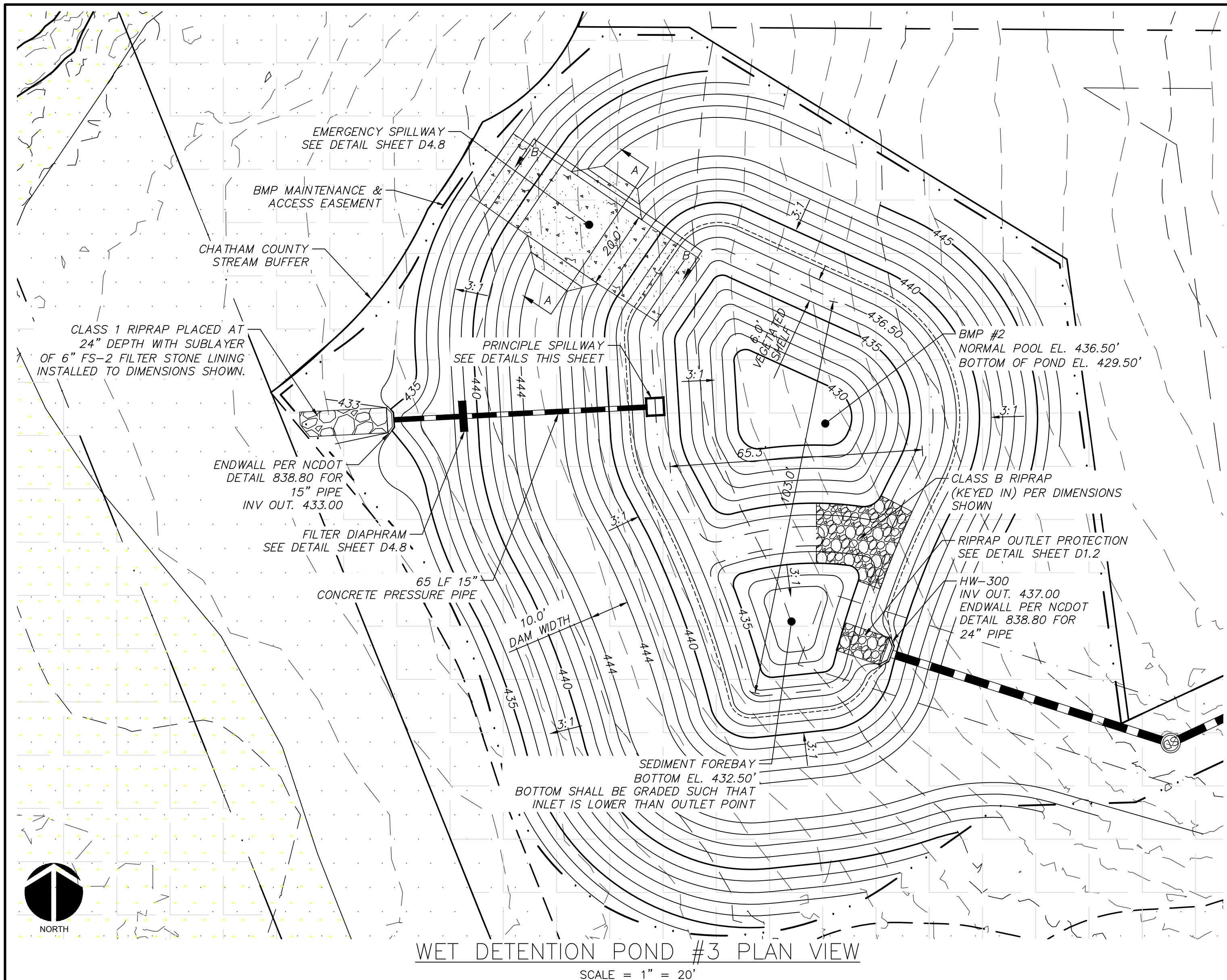
**RYAN'S CROSSING**

Chatham County, North Carolina

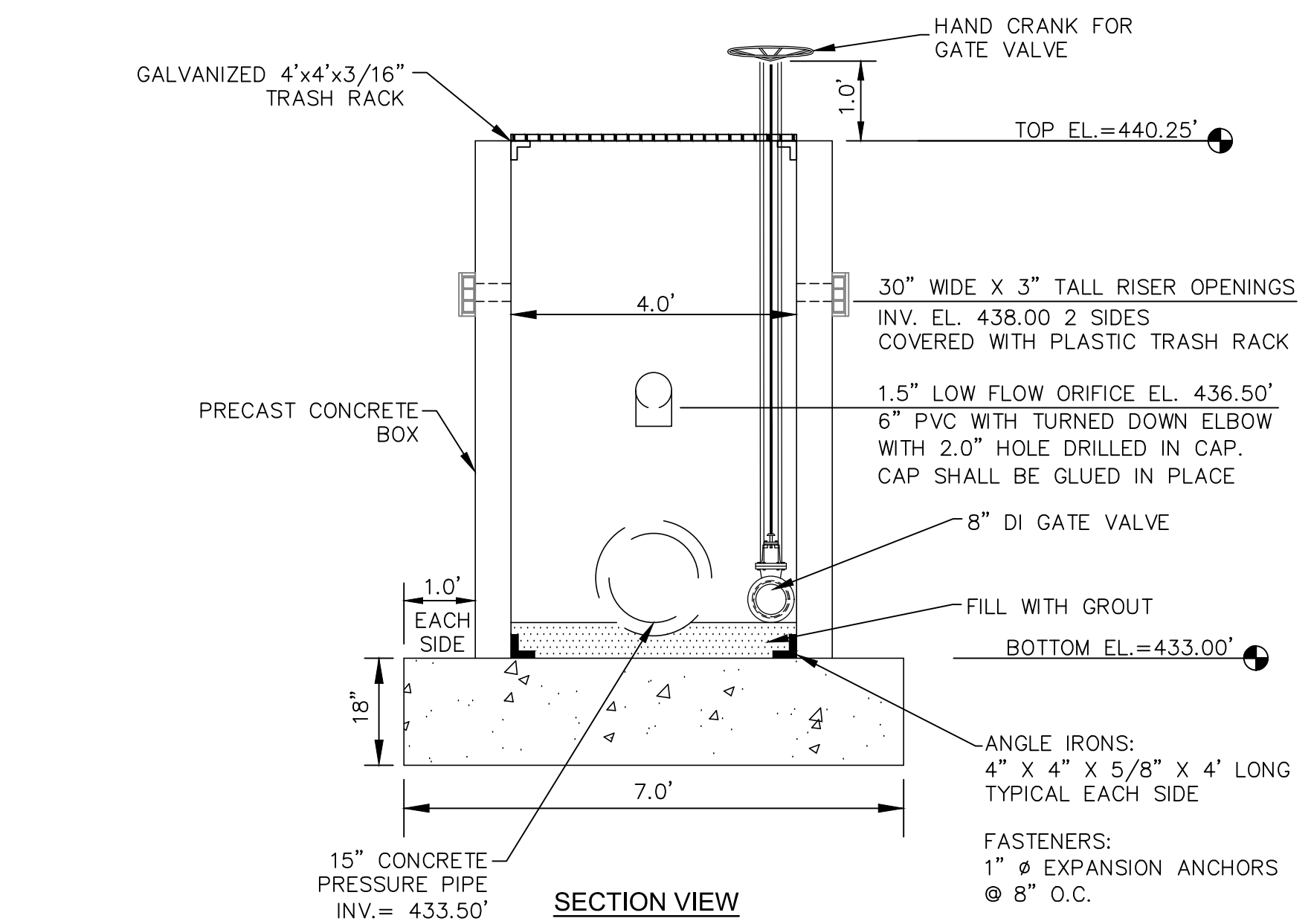
**CONSTRUCTION PLAT**

BMP #2 PLAN & DETAILS

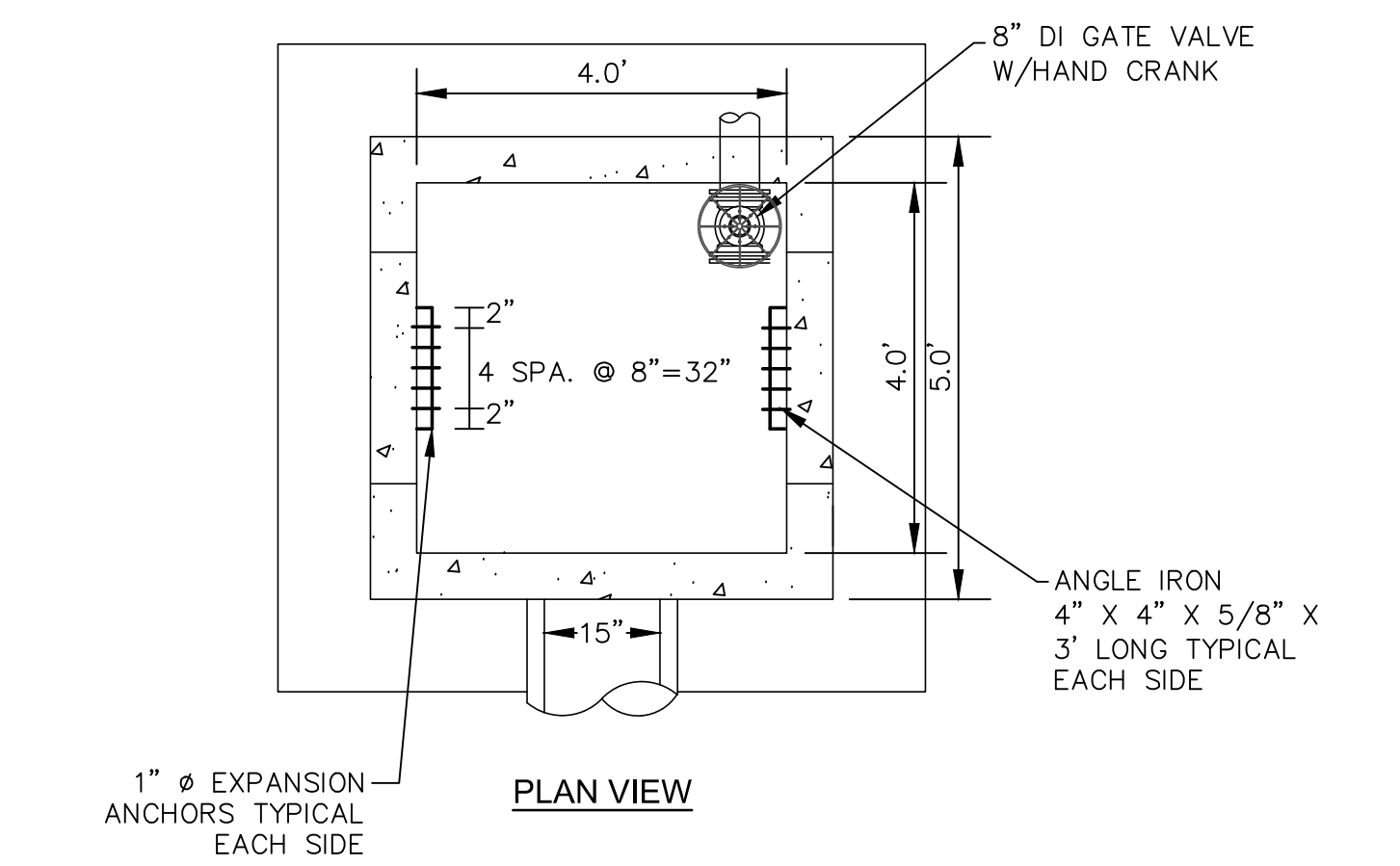
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DRAWN: BSS	VERTICAL: N/A	REVISION: 4
DESIGNED: BSS	STATUS: PRELIMINARY FOR CONSTRUCTION	
CHECKED: GCA		
PROJ. MGR.: CHS		



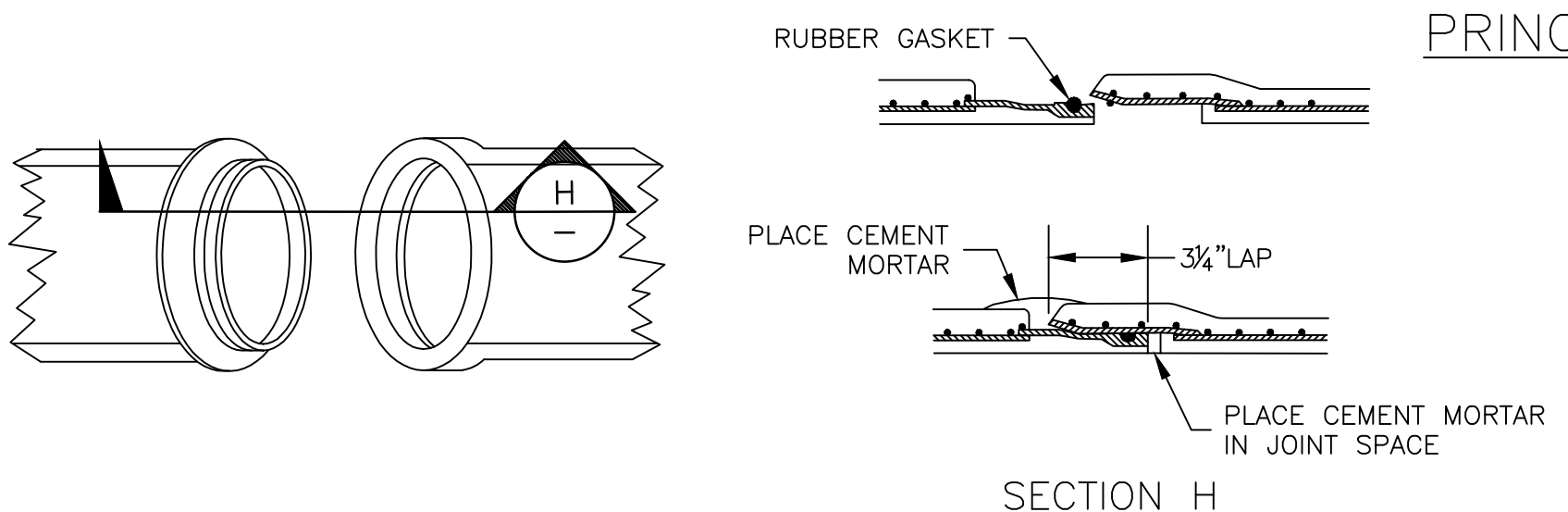
WET DETENTION POND #3 PLAN VIEW  
SCALE = 1" = 20'



SECTION VIEW

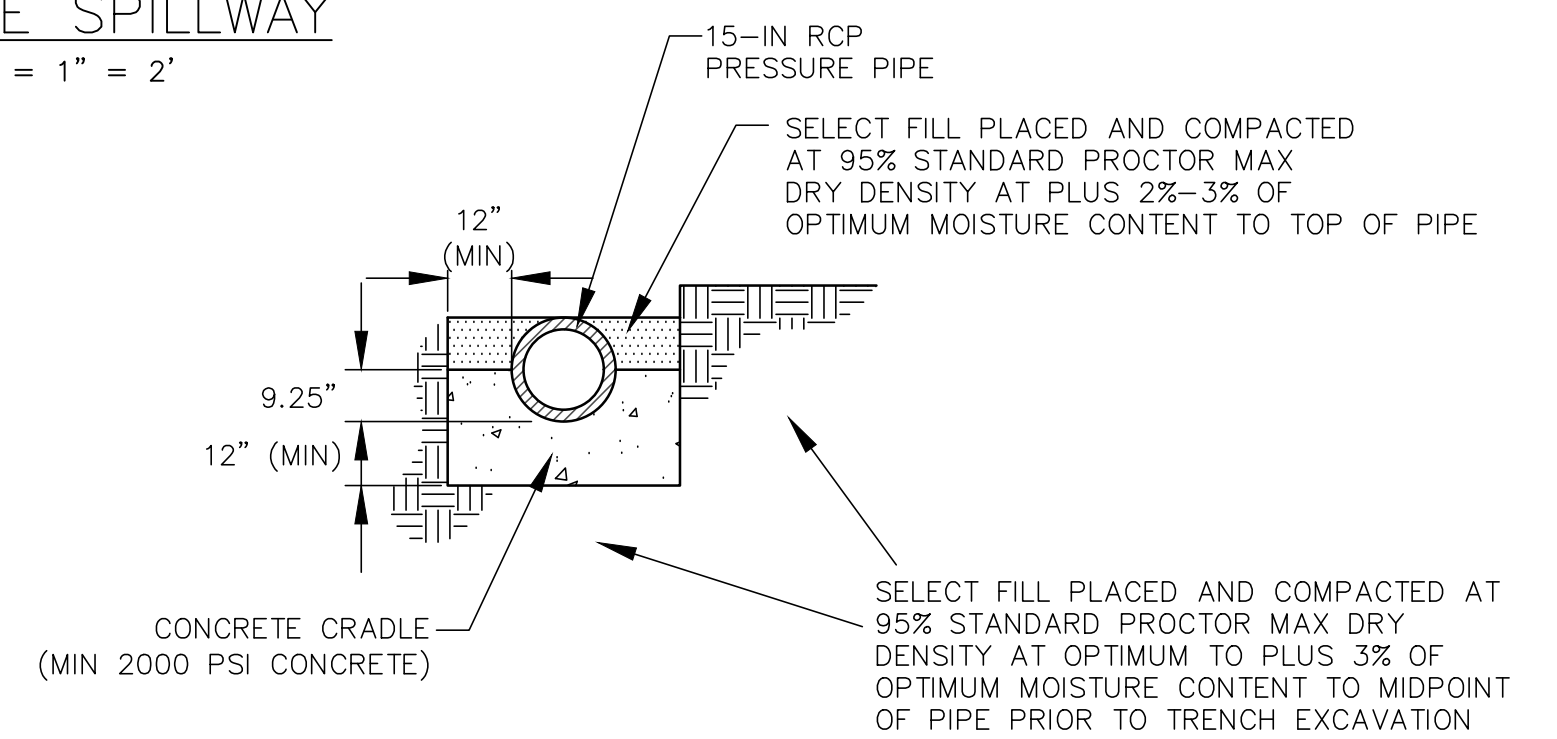


PLAN VIEW

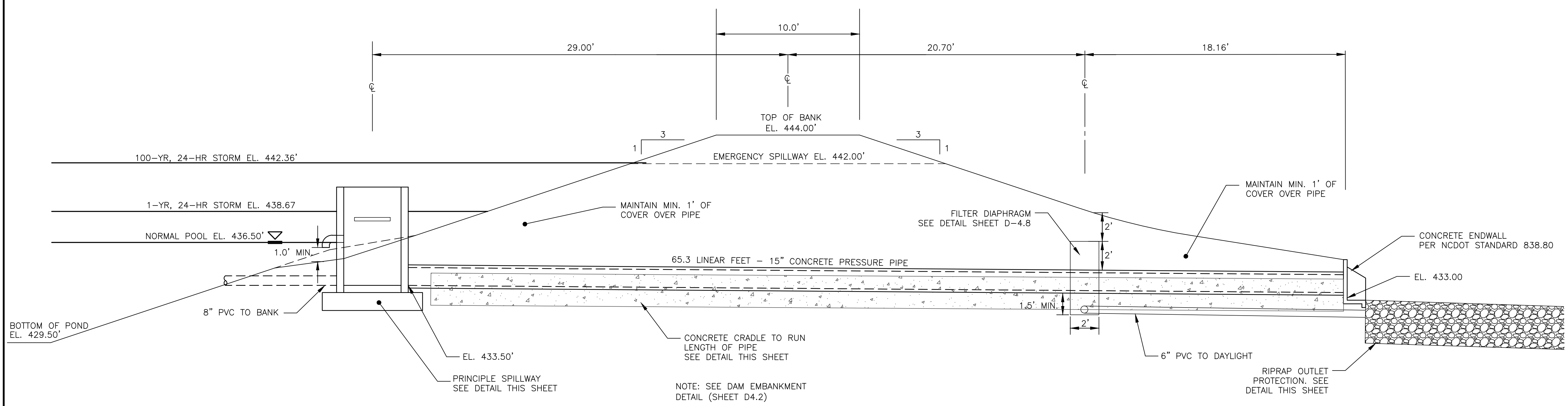


CONCRETE PRESSURE PIPE JOINT DETAIL  
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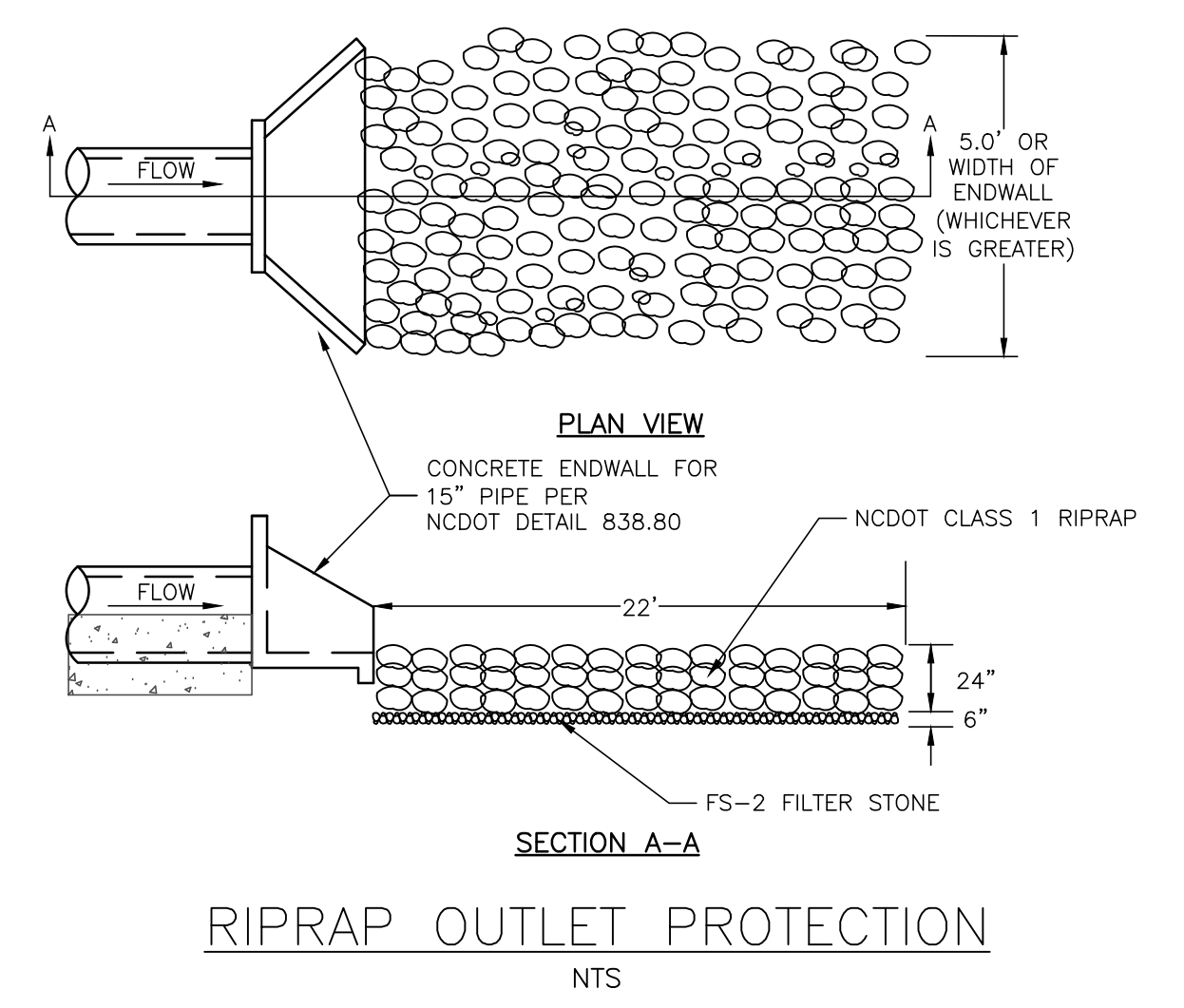
PRINCIPLE SPILLWAY  
SCALE = 1" = 2'



CONCRETE CRADLE DETAIL  
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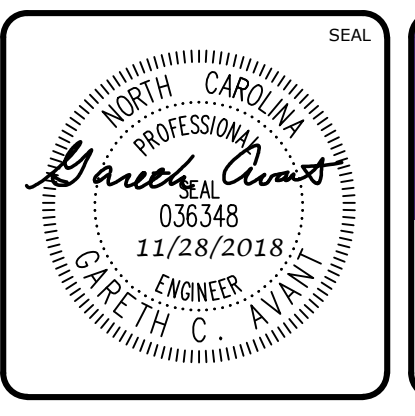
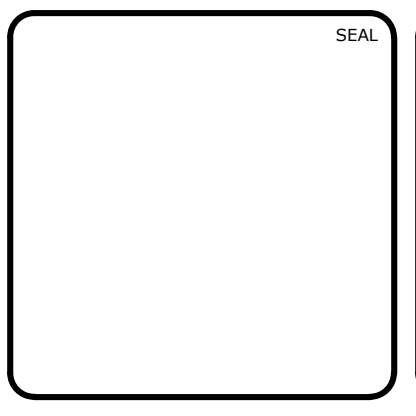


SECTION AT PRINCIPLE SPILLWAY  
SCALE = NTS



RIPRAP OUTLET PROTECTION  
NTS

REV. NO.	DESCRIPTION	DATE
4	REVISIONS PER NCDOT COMMENTS	2018.11.28
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1	REVISIONS PER COUNTY EROSION CONTROL AND STORMWATER, NCDOT PWS	2018.10.02
0	INITIAL SUBMITTAL	2018.08.17



**MCKIM & CREED**  
ENGINEERS SURVEYORS PLANNERS

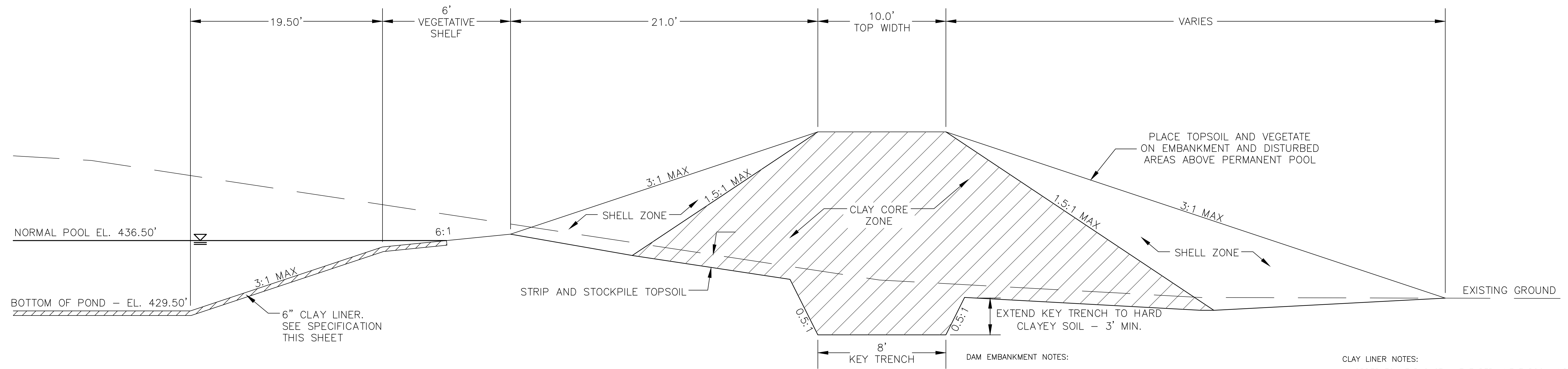
1730 VARSITY DRIVE, SUITE 500  
RALEIGH, NORTH CAROLINA 27606  
T 919.233.8091 F 919.233.8031

FIRM LICENSE #: F-1222  
mckimcreed.com

**RYAN'S CROSSING**  
Chatham County, North Carolina

**CONSTRUCTION PLAT**  
BMP #3 PLAN & DETAILS

DATE: AUGUST 17, 2018	SCALE: HORIZONTAL: AS NOTED	M&C FILE NUMBER: D4.7
M&C PROJ. #: 07291-0002	DESIGNED: BSS	DRAWING NUMBER: D4.7
DRAWN: BSS	CHECKED: GCA	VERTICAL: N/A
DESIGNED: BSS	PROJ. MGR.: CHS	
STATUS: PRELIMINARY FOR CONSTRUCTION	REVISION: 4	



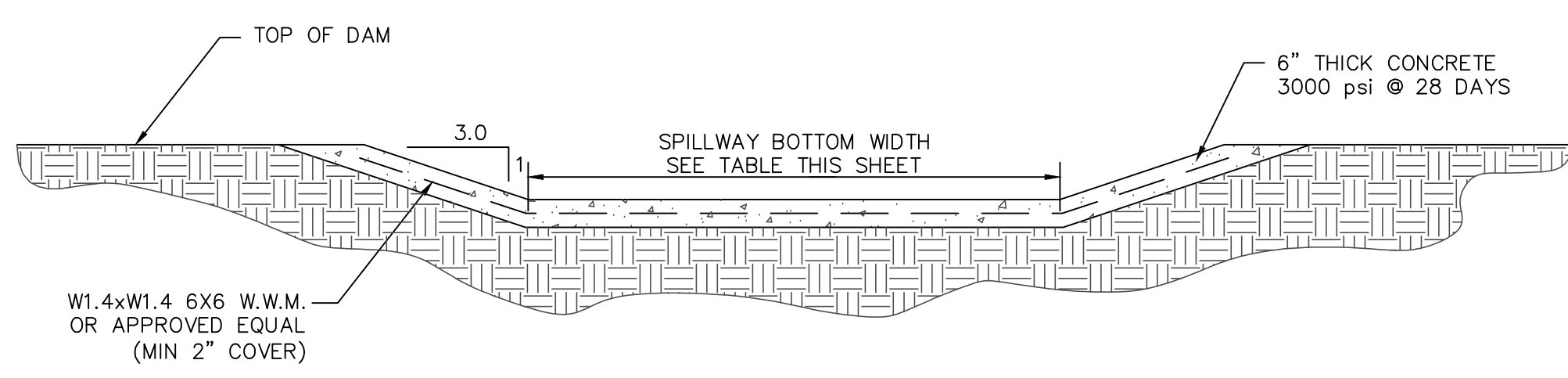
DAM EMBANKMENT DETAIL  
NTS

DAM EMBANKMENT NOTES:

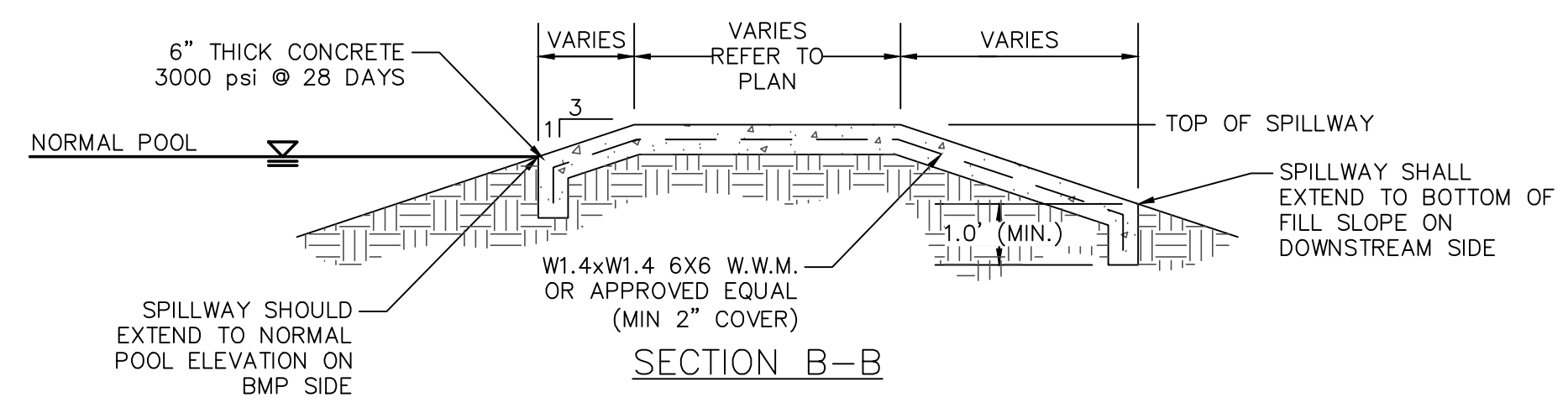
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SECTION A-A

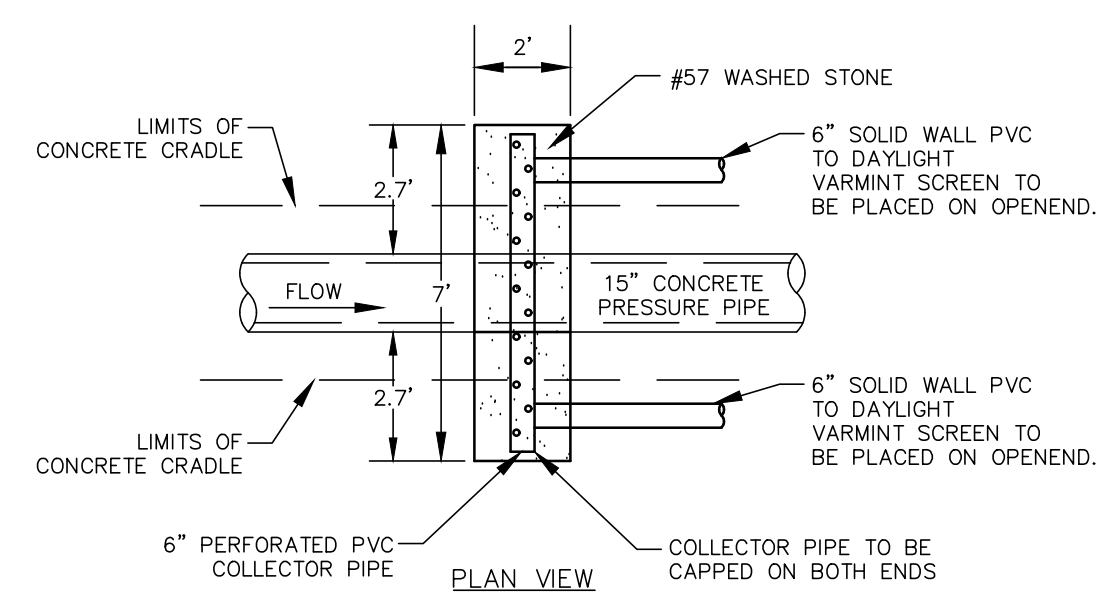


SECTION B-B

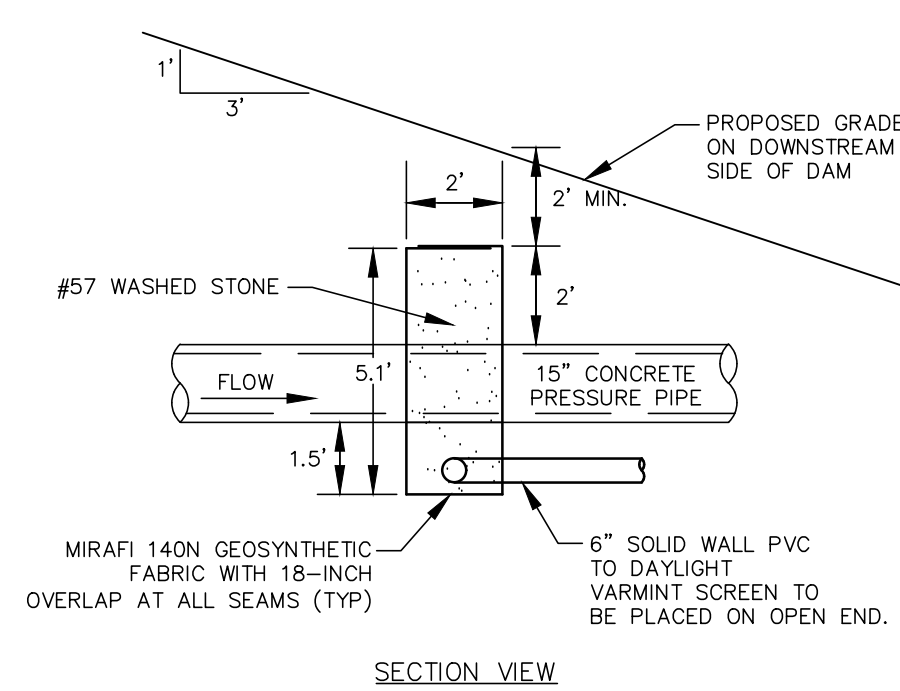
BMP #3	NORMAL POOL EL.	TOP DAM EL.	SPILLWAY BOTTOM EL.	SPILLWAY BOTTOM WIDTH
	436.50	444.00	442.00	20'

NOTE: EXPANSION/CONTRACTION JOINTS PER AMERICAN CONCRETE INSTITUTE (ACI) STANDARDS FOR SLABS ON GRADE.

EMERGENCY SPILLWAY DETAIL  
NTS

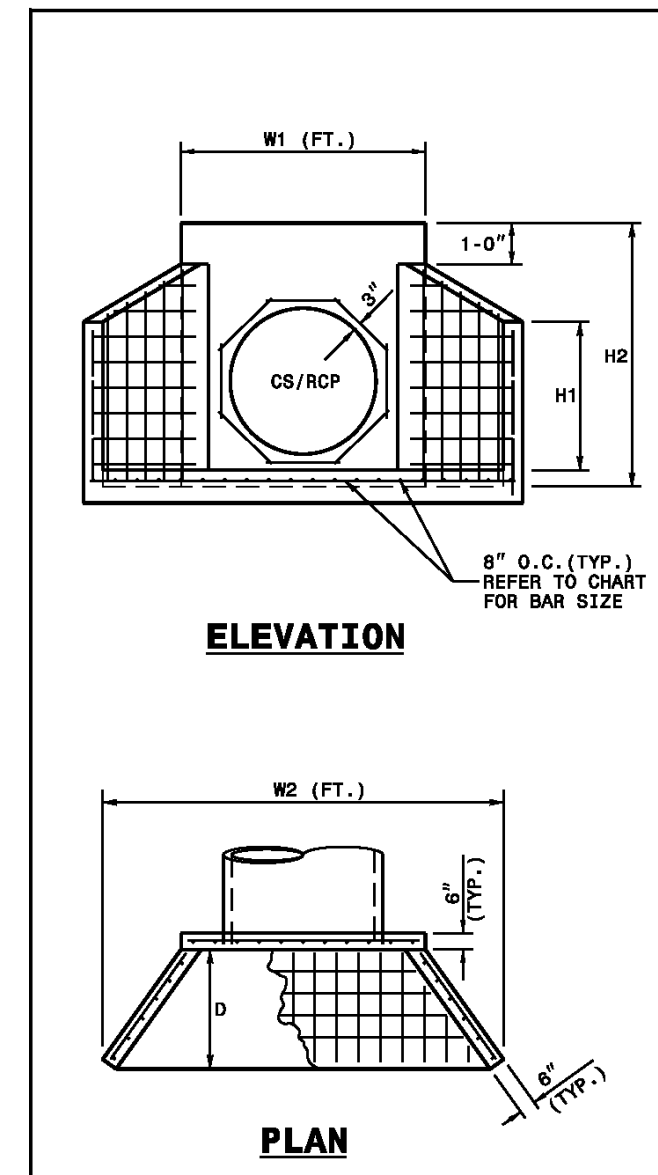


PLAN VIEW



SECTION VIEW

FILTER DIAPHRAGM DETAIL  
NTS



ELEVATION

SIDE

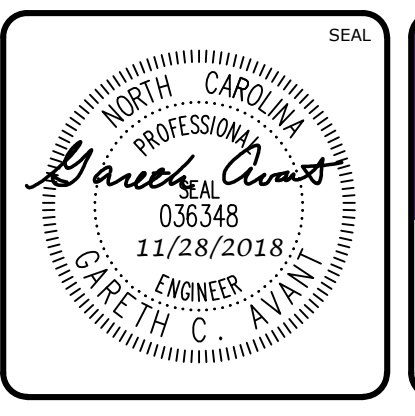
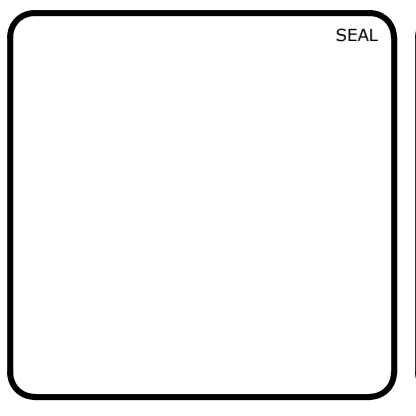
PLAN

ENDWALL DIMENSIONS							
PIPE DIA.	BAR SIZE	MIN./MAX. H1 (FT.)	MIN./MAX. H2 (FT.)	MIN./MAX. D (FT.)	MIN./MAX. W1	MIN./MAX. W2	
1.0	#5 @ 8"	1.25/2.00	2.00/3.75	1.25/1.75	3.00/3.75	5.50/6.00	
1.25	#5 @ 8"	1.25/2.00	3.00/3.75	1.25/2.00	3.50/3.75	6.50/6.75	
1.50	#5 @ 8"	1.25/2.00	3.00/4.25	1.50/2.50	3.50/3.75	6.50/6.75	
2.0	#5 @ 8"	1.50/2.50	4.00/4.75	1.75/2.50	4.00/4.25	7.50/8.25	
2.5	#5 @ 8"	2.50/3.50	4.00/6.00	2.00/3.00	4.50/5.00	10.00/11.50	
3.0	#5 @ 8"	3.00/3.50	5.00/6.00	2.75/3.50	5.25/5.75	11.50/11.75	
3.5	#5 @ 8"	3.25/4.50	6.00/6.75	3.25/3.50	6.00/6.75	12.00/13.25	
4.0	#5 @ 8"	3.50/4.50	6.50/7.00	3.25/3.50	6.50/6.75	13.00/13.25	
4.5	#5 @ 8"	4.00/5.00	6.50/8.50	3.25/4.00	7.00/8.25	13.50/15.75	
5.0	#5 @ 8"	4.50/5.00	7.00/8.50	3.25/4.00	7.25/8.25	13.75/15.75	
5.5	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.25/8.25	14.00/15.75	
6.0	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.75/8.25	14.75/16.75	

- NOTES:
- THIS PRECAST ENDWALL MAY BE USED FOR THE FOLLOWING STANDARDS: 838-01, 838-11, 838-21, 838-27, 838-35, 838-39, 838-51, 838-67, 838-63 AND 838-69.
  - INSTALL PRECAST ENDWALLS WITH WINGS AND PAY FOR IN ACCORDANCE WITH SPECIFICATION SECTION 816.
  - USE 4000 PSI CONCRETE.
  - PROVIDE ALL REINFORCING STEEL WHICH MEETS ASTM A618 FOR GRADE 60 AND WELDED WIRE FABRIC CONFORMING TO ASTM A185 WITH 2" MIN. CLEARANCE.
  - PLACE LIFT HOLES OR PINS IN ACCORDANCE WITH OSHA STANDARD 1926.704.
  - PIPE TO BE GROUDED INTO HEADWALL AT JOB SITE BY CONTRACTOR
  - ALL ELEMENTS PRECAST TO MEET ASTM C919.
  - WELDED WIRE FABRIC MAY BE SUBSTITUTED FOR REBAR AS LONG AS THE SAME AREA OF STEEL IS PROVIDED.
  - CHAMFER ALL CORNERS 1" OR HAVE A RADIUS OF 1".
- NOTE: THE MINIMUM BAR SIZE SHALL BE #6 BARS AT 9" CTS. THE CONTRACTOR WILL HAVE THE OPTION TO INCREASE THIS BAR SIZE AS NEEDED.

ROADWAY STANDARD DRAWING FOR  
 PRECAST CONCRETE ENDWALL  
 FOR SINGLE 12" THRU 72" PIPE - 90° SKEW  
 STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.  
 SHEET 1 OF 8  
**838-80**

REV. NO.	DESCRIPTION	DATE
4	REVISIONS PER NCDOT COMMENTS	2018.11.28
3	REVISIONS PER NCDOT COMMENTS	2018.11.27
2	REVISIONS PER NCDOT	2018.11.16
1	REVISIONS PER COUNTY EROSION CONTROL AND STORMWATER, NCDOT PWS	2018.10.02
0	INITIAL SUBMITTAL	2018.08.17



**MCKIM & CREED**  
ENGINEERS SURVEYORS PLANNERS

1730 VARSITY DRIVE, SUITE 500  
RALEIGH, NORTH CAROLINA 27606  
T 919.233.8091 F 919.233.8031

FIRM LICENSE #: F-1222  
mckimcreed.com

**RYAN'S CROSSING**  
Chatham County, North Carolina

**CONSTRUCTION PLAT**  
BMP #3 PLAN & DETAILS

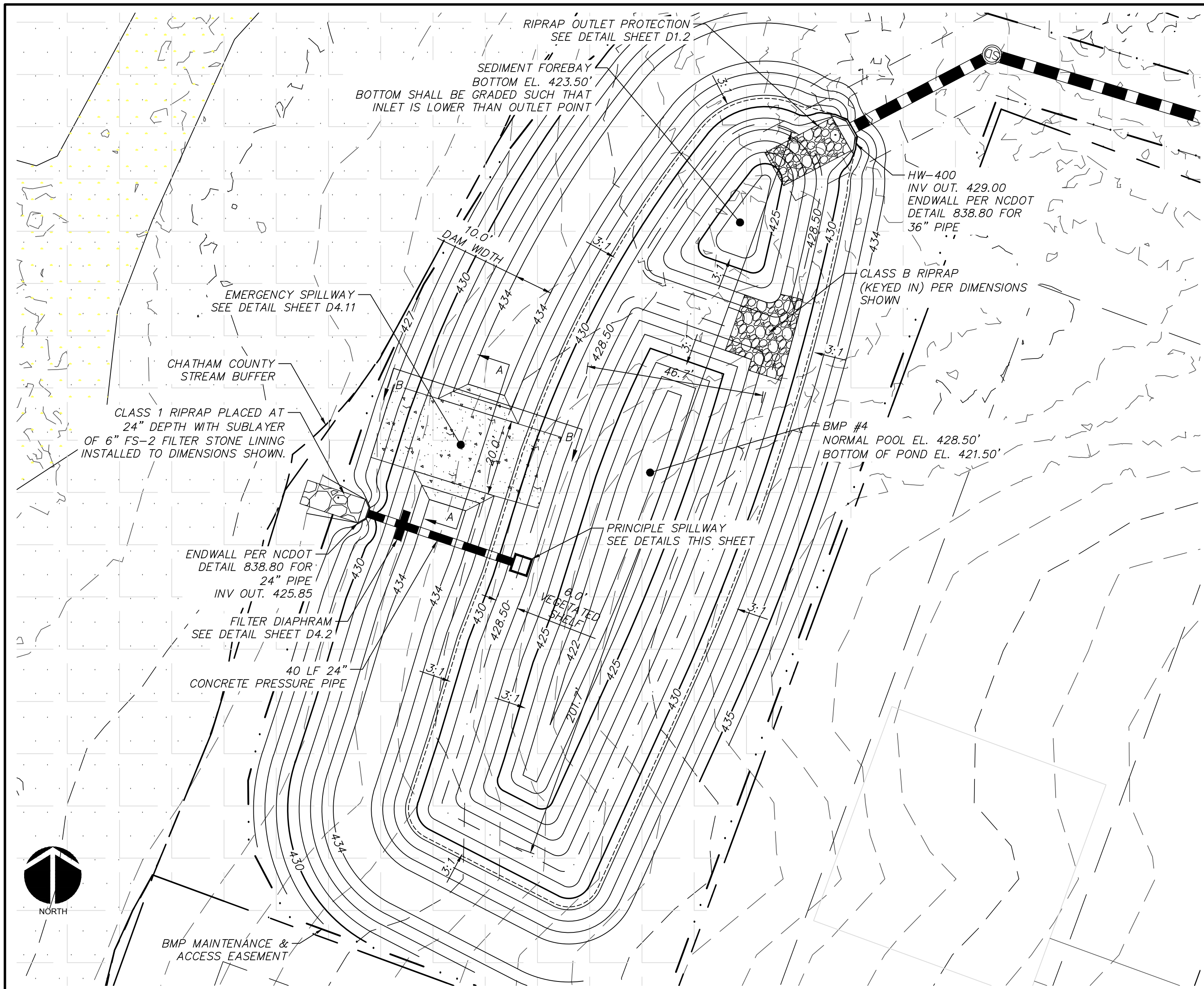
DATE: AUGUST 17, 2018  
MCE PROJ. # 07291-0002  
DRAWN: BSS  
DESIGNED: BSS  
CHECKED: GCA  
PROJ. MGR: CHS

SCALE: HORIZONTAL: AS NOTED  
VERTICAL: N/A

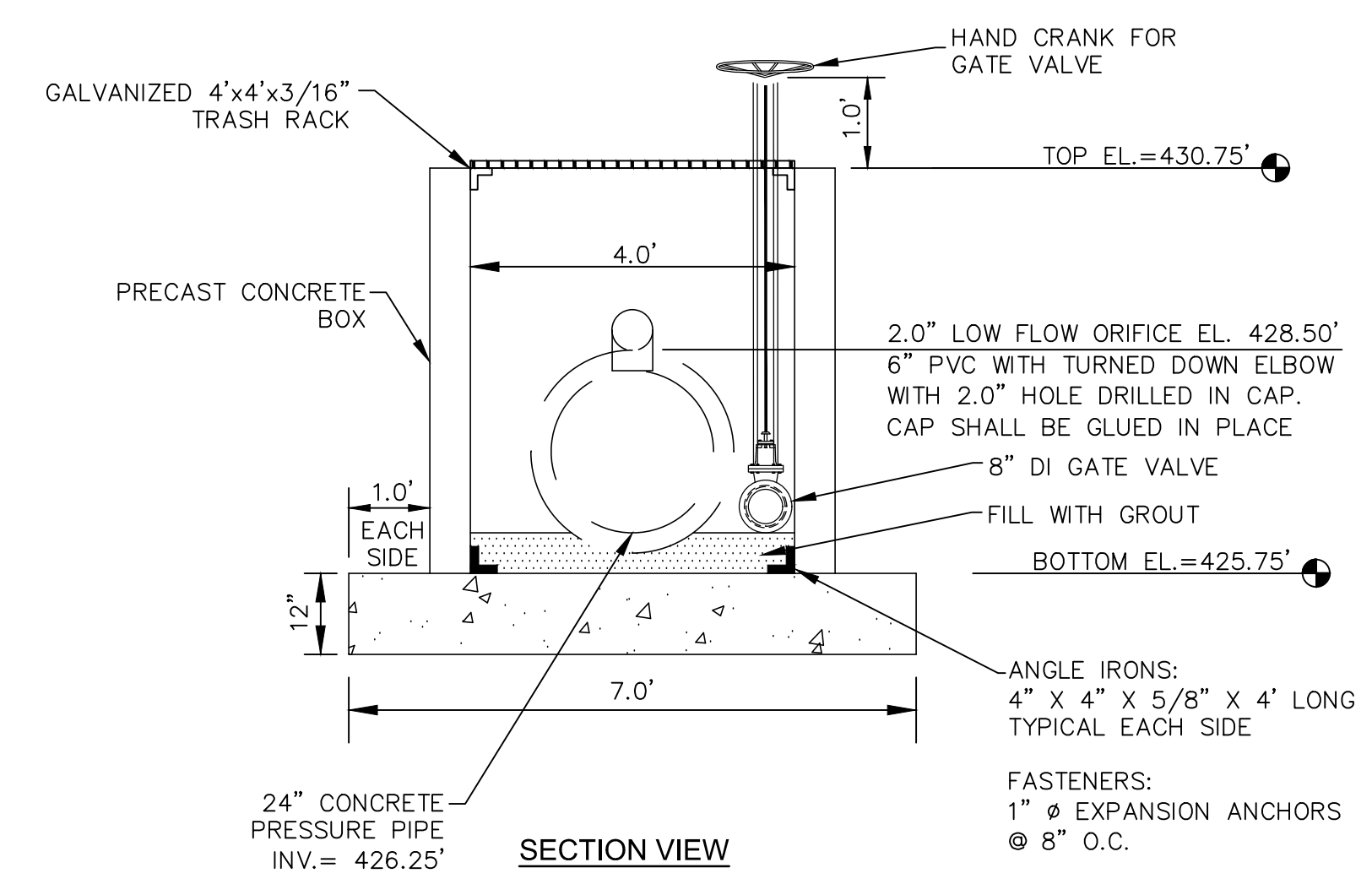
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STATUS: PRELIMINARY FOR CONSTRUCTION  
REVISION: 4

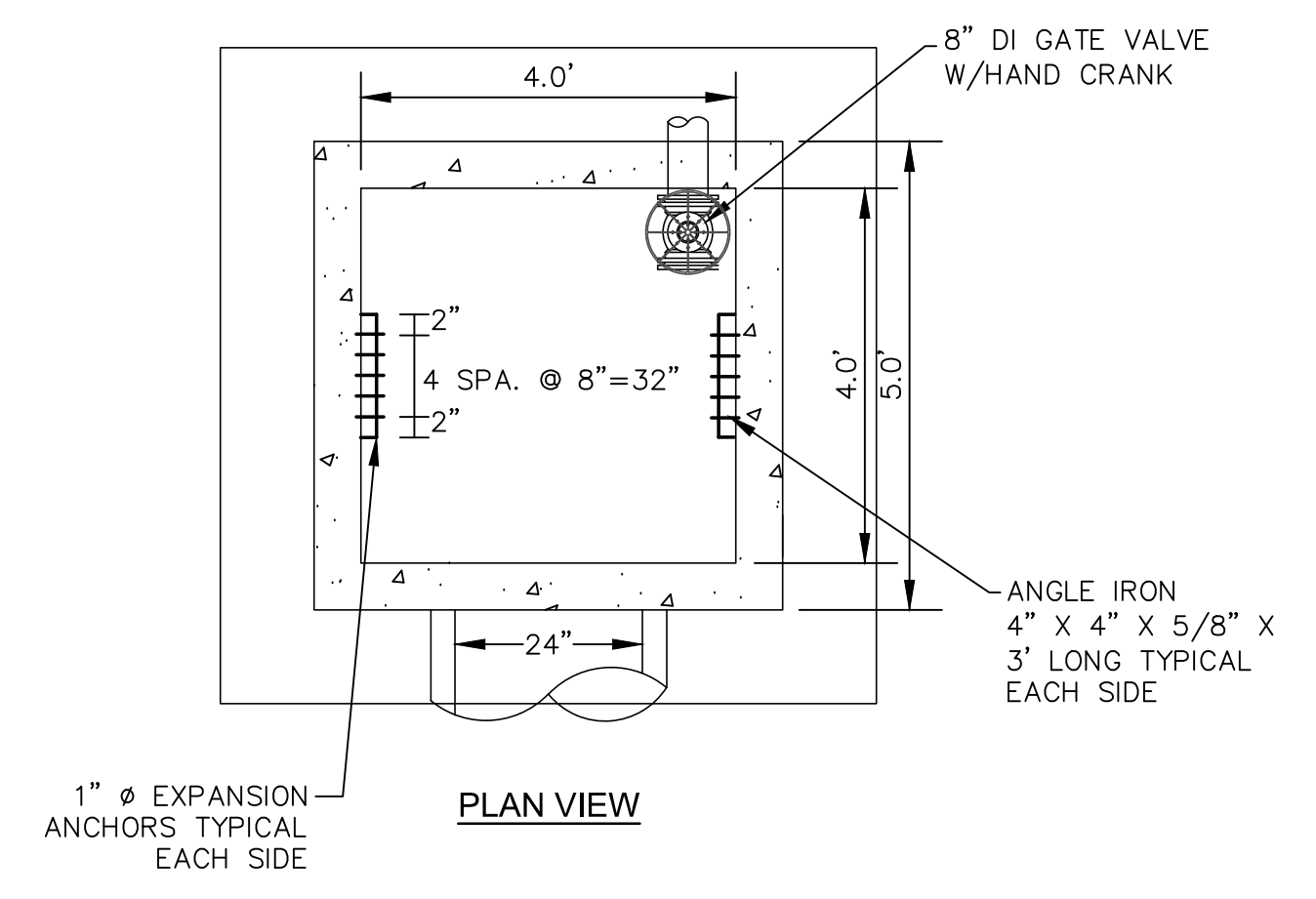




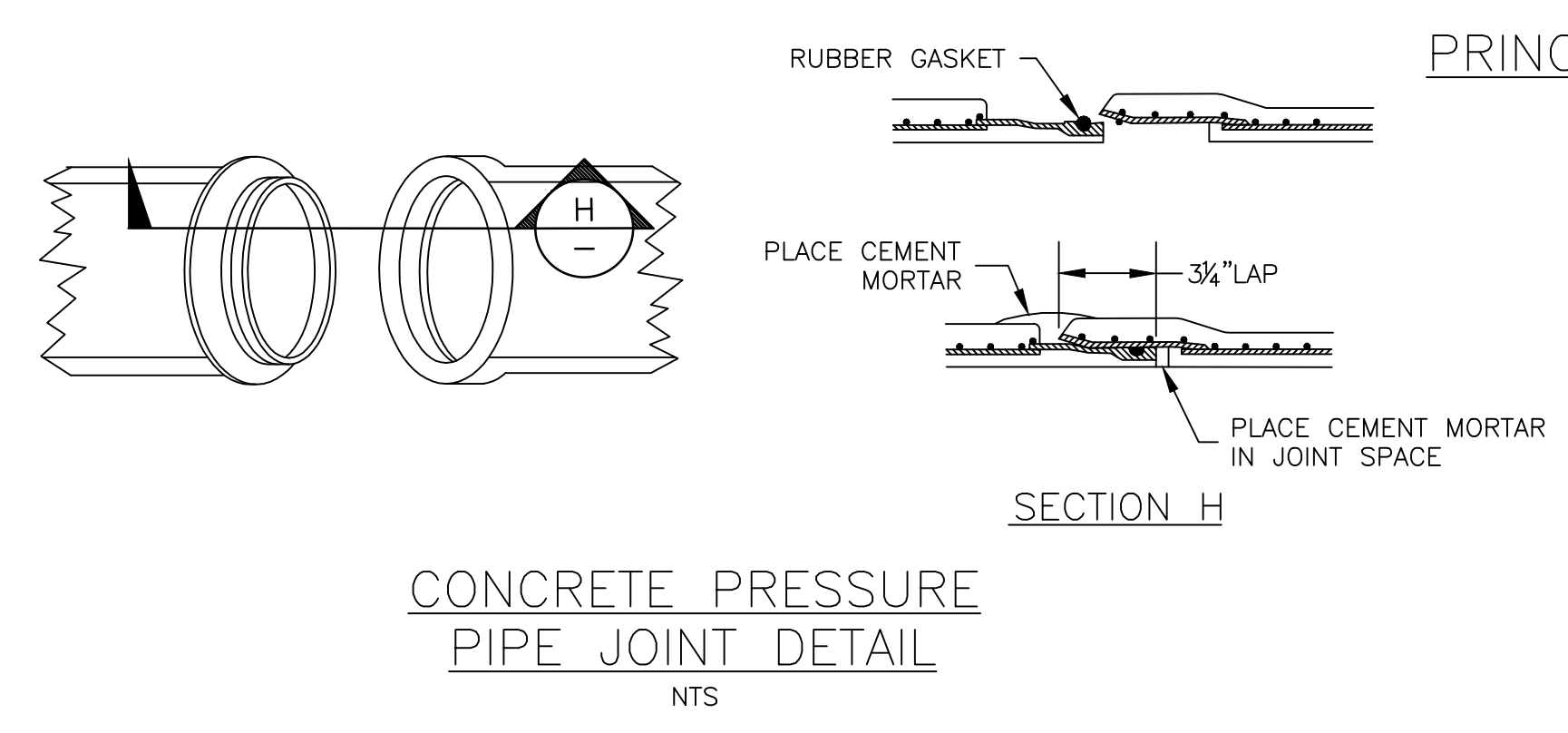
WET DETENTION POND #4 PLAN VIEW  
SCALE = 1" = 20'



SECTION VIEW

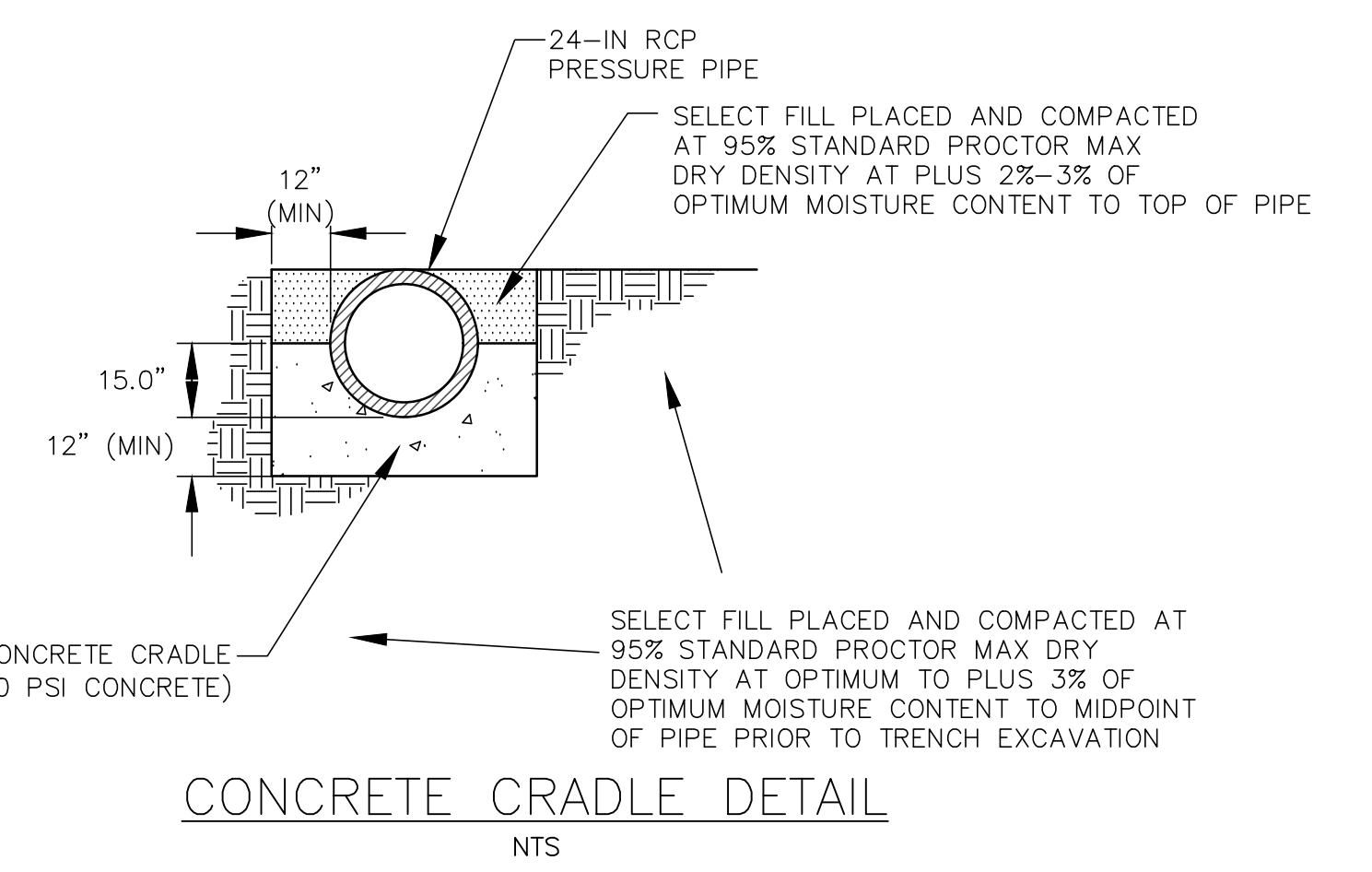


PLAN VIEW

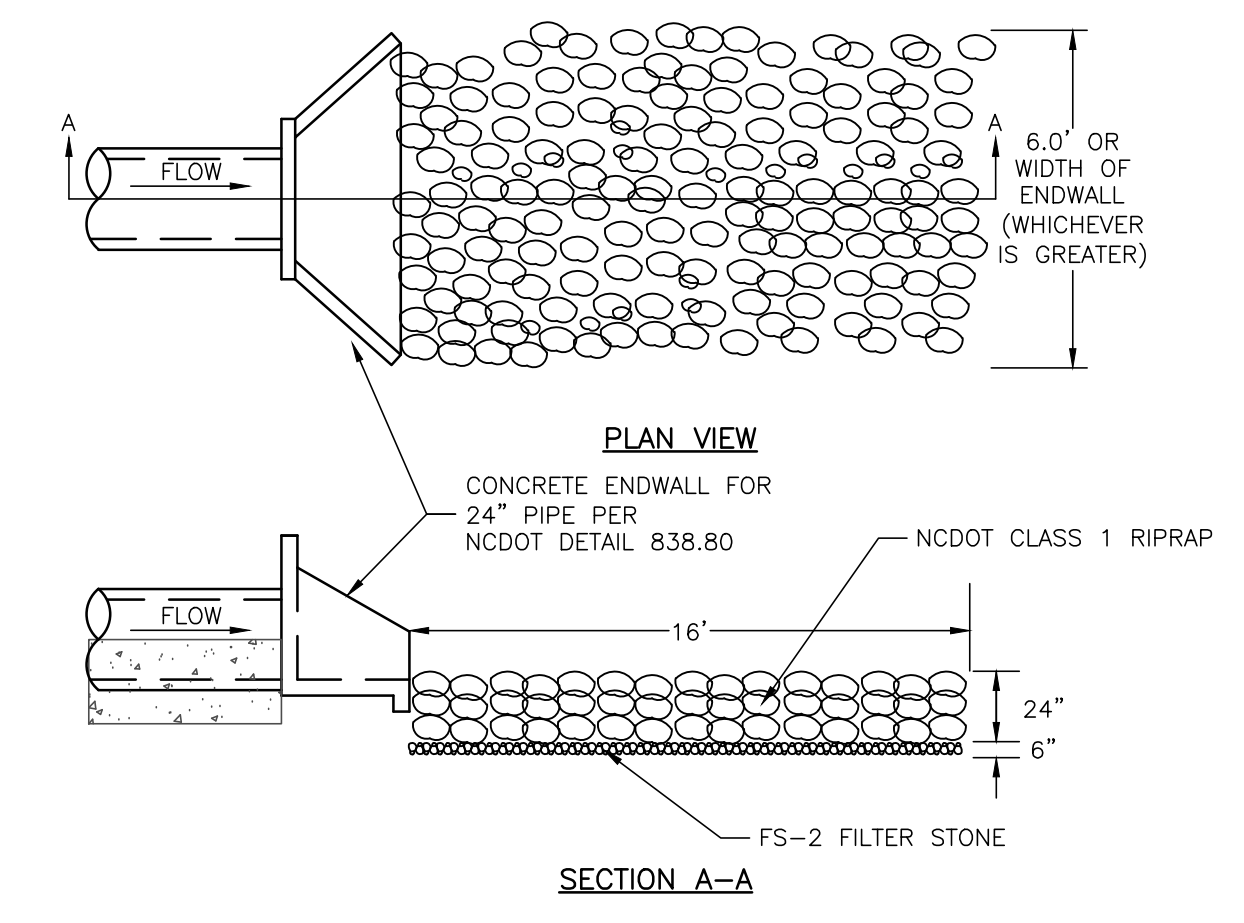


CONCRETE PRESSURE PIPE JOINT DETAIL  
NTS

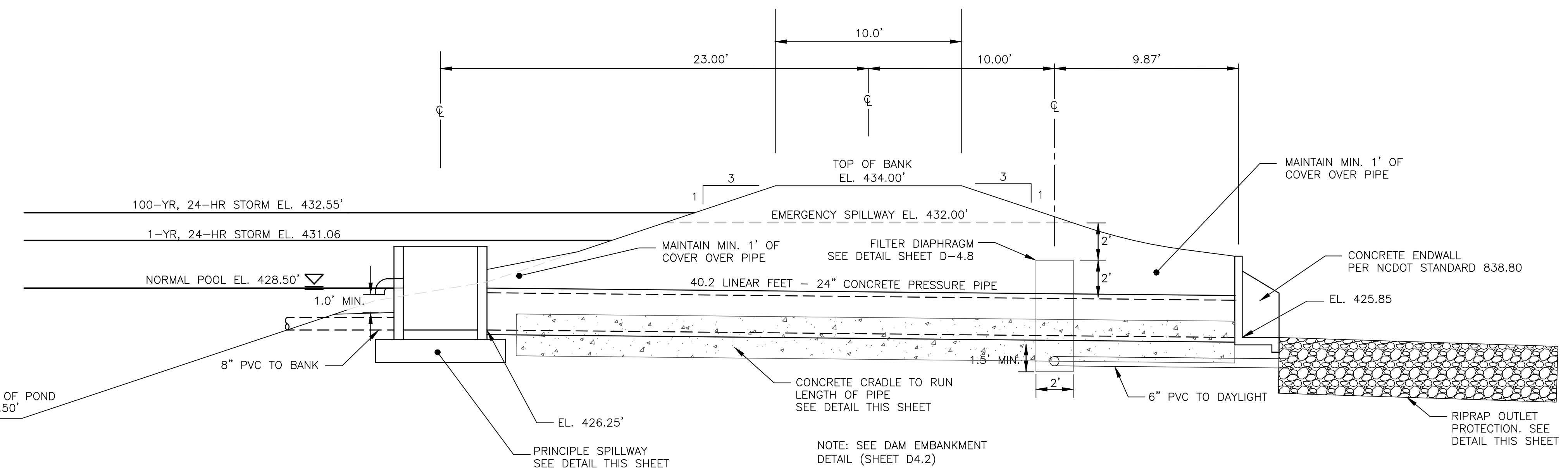
PRINCIPLE SPILLWAY  
SCALE = 1" = 2'



CONCRETE CRADLE DETAIL  
NTS

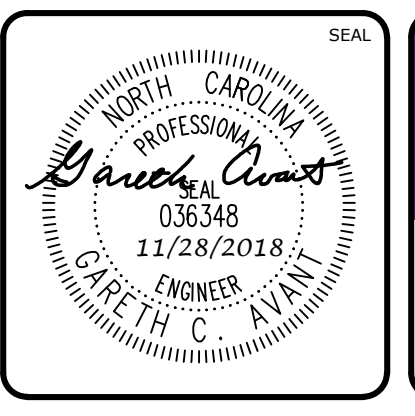
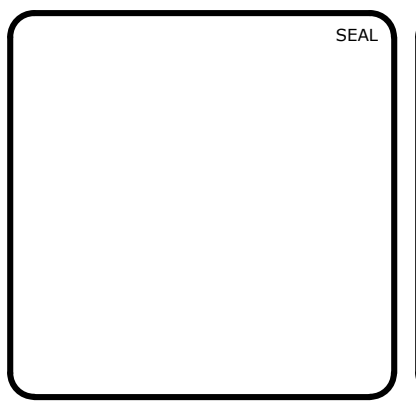


RIPRAP OUTLET PROTECTION  
NTS



SECTION AT PRINCIPLE SPILLWAY  
SCALE = NTS

REV. NO.	DESCRIPTION	DATE
4	REVISIONS PER NCDOT COMMENTS	2018.11.28
3	REVISIONS PER NCDOT COMMENTS	2018.11.27
2	REVISIONS PER NCDOT	2018.11.16
1	REVISIONS PER COUNTY EROSION CONTROL AND STORMWATER, NCDOT PWS	2018.10.02
0	INITIAL SUBMITTAL	2018.08.17



**MCKIM & CREED**  
ENGINEERS SURVEYORS PLANNERS

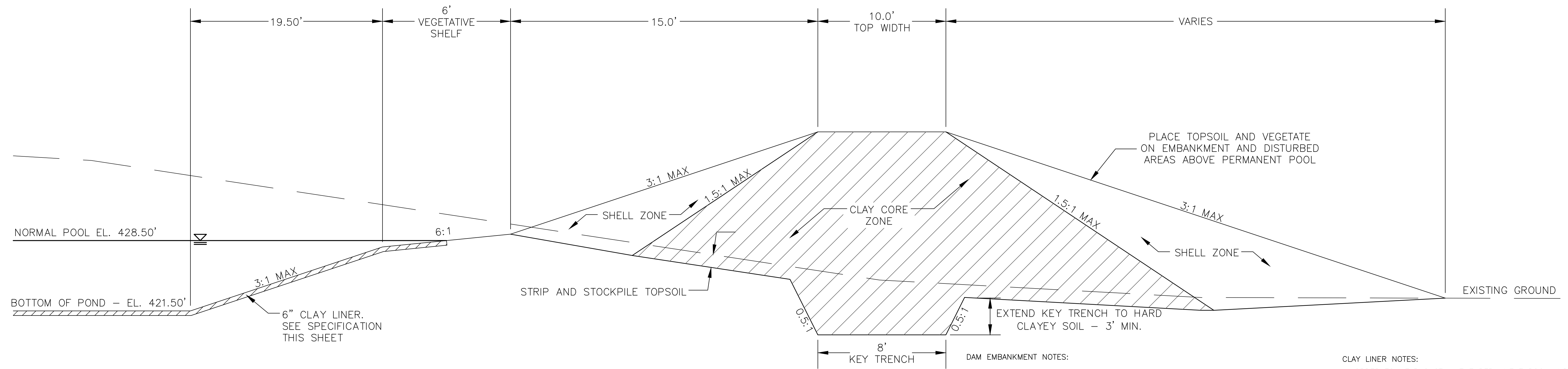
1730 VARSITY DRIVE, SUITE 500  
RALEIGH, NORTH CAROLINA 27606  
T 919.233.8091 F 919.233.8031

FIRM LICENSE #: F-1222  
mckimcreed.com

**RYAN'S CROSSING**  
Chatham County, North Carolina

**CONSTRUCTION PLAT**  
BMP #4 PLAN & DETAILS

DATE: AUGUST 17, 2018	SCALE: D4.10
MCE PROJ. # 07291-0002	HORIZONTAL: AS NOTED
DRAWN: BSS	VERTICAL: D4.10
DESIGNED: BSS	REVISION: 4
CHECKED: GCA	STATUS: PRELIMINARY FOR CONSTRUCTION
PROJ. MGR.: CHS	



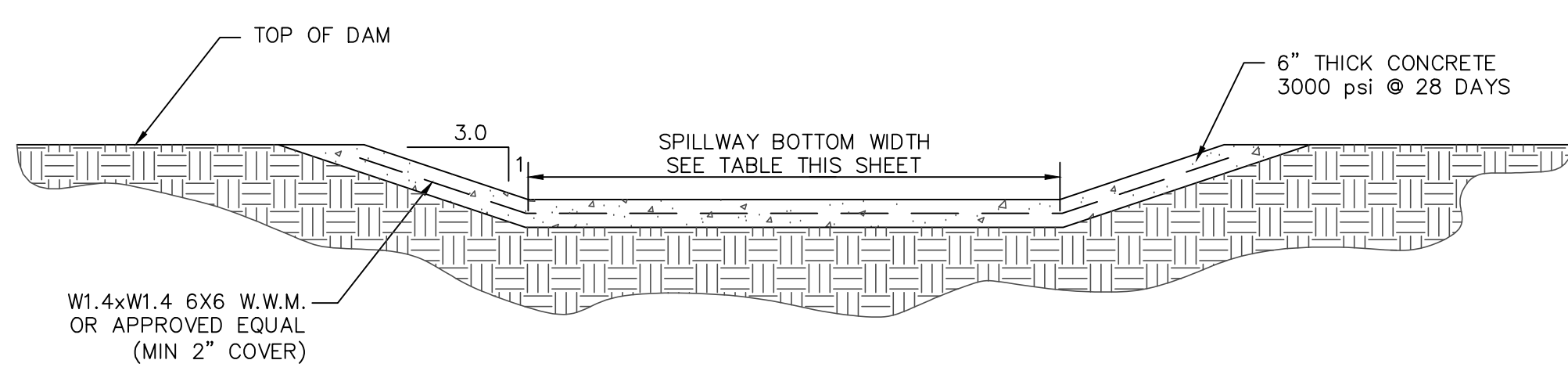
DAM EMBANKMENT DETAIL  
NTS

DAM EMBANKMENT NOTES:

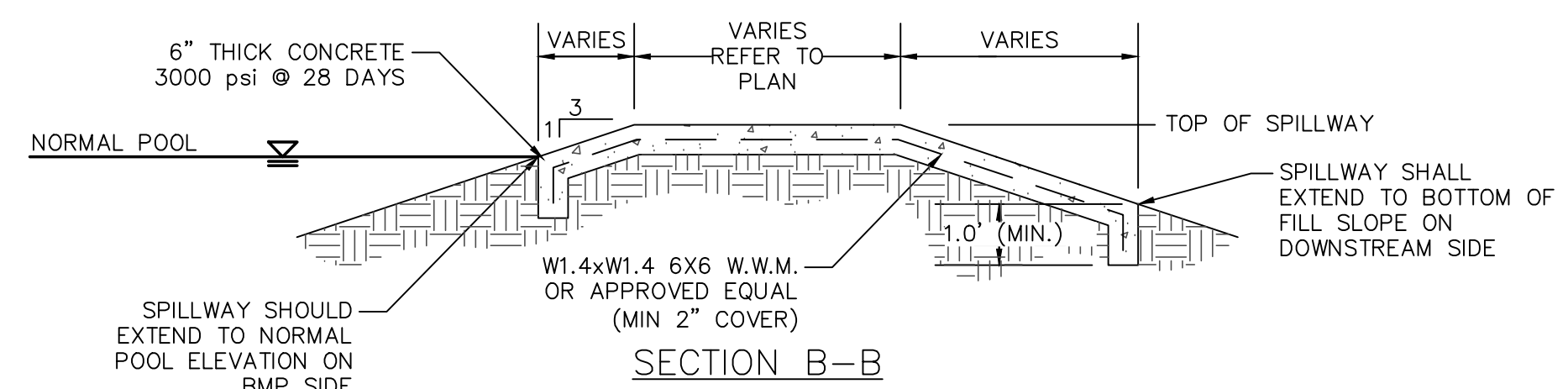
- 1) TOPSOIL BENEATH THE EMBANKMENT SHALL BE REMOVED AND STOCKPILED. THE FOUNDATION WILL BE PROOF ROLLED AND ANY SOFT OR ORGANIC MATERIALS WILL BE REMOVED.
- 2) ALL MATERIAL SHALL BE COMPACTED IN 6-8 INCH LIFTS TO 95% OF MAXIMUM STANDARD PROCTOR DRY DENSITY OR HIGHER (ASTM D-698). THE CLAY CORE ZONE WILL HAVE A MOISTURE CONTENT OF OPTIMUM TO 4 PERCENT ABOVE OPTIMUM MOISTURE CONTENT. THE SHELL ZONE FILL WILL HAVE A MOISTURE CONTENT FROM 2 PERCENT BELOW OPTIMUM MOISTURE CONTENT TO 4 PERCENT ABOVE OPTIMUM.
- 3) EMBANKMENT FILL:  
SHELL ZONE: SOILS WITH LESS THAN 30% PASSING THE NO. 200 SIEVE OR A PI OF LESS THAN 10 WHEN THE PERCENTAGE OF MATERIAL PASSING THE NO. 200 SIEVE IS GREATER THAN 30 PERCENT. SOILS WHICH ARE CLASSIFIED AS CLAYS (CH OR CL) SHOULD NOT BE USED AT THE FACE OF THE SHELL ZONES.  
CLAY CORE ZONE: CH, CL OR SC MATERIAL WITH A PI RANGING BETWEEN 15 AND 60
- 4) NO FILL SHALL CONTAIN ROCKS OR GRAVEL LARGER THAN 4 INCHES IN DIAMETER.
- 5) A PROFESSIONAL GEOTECHNICAL ENGINEER SHALL APPROVE ALL MATERIALS USED FOR THE EMBANKMENT AND SUPERVISE CONSTRUCTION.
- 6) ALL DISTURBED AREAS ABOVE PERMANENT POOL SHALL BE SEEDED USING THE FOLLOWING GRASS SEED MIX MANUFACTURED BY ERNST SEED COMPANY: Carolina FACW Meadow Mix ERNMX-182

CLAY LINER NOTES:

IN ORDER TO HELP SUSTAIN THE PERMANENT POOL AND TO PREVENT WATER FROM INFILTRATING TOO QUICKLY INTO THE UNDERLYING SOIL, THE CONTRACTOR SHALL INSTALL A 6" THICK CLAY LINER ON THE BOTTOM OF THE BMP AREA UP TO THE NORMAL POOL ELEVATION. THE LINER CAN BE ACCOMPLISHED BY BLENDING EXISTING SITE SOILS WITH CLAY TO ACHIEVE A LOW PERMEABILITY MIXTURE OR BY INSTALLING A GEOSYNTHETIC LINER MADE OF A BENTONITE CL. IF THE CONTRACTOR CHOOSES TO BLEND THE EXISTING SITE SOILS WITH CLAY, THE ONSITE GEOTECHNICAL ENGINEER SHALL DETERMINE THE AMOUNT OF CLAY TO ADD, THE DEGREE OF COMPACTION, AND WILL OVERSEE THE INSTALLATION OF THE CLAY LINER. THE MAXIMUM PERMEABILITY RATE FOR THE LINER SHALL BE 0.01 IN/HR IN ACCORDANCE WITH THE NCDENR BMP MANUAL. THE PROPOSED MATERIAL FOR THIS LINER SHALL BE TESTED BY THE ONSITE GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT. THE RESULTS OF THIS TESTING SHALL BE SUBMITTED TO THE DESIGN ENGINEER FOR REVIEW PRIOR TO PLACEMENT. UPON COMPLETION OF LINER INSTALLATION, A 4" MINIMUM LAYER OF TOPSOIL SHALL BE ADDED OVER THE LINER TO PROVIDE A HEALTHY MEDIA FOR VEGETATION GROWTH.



SECTION A-A

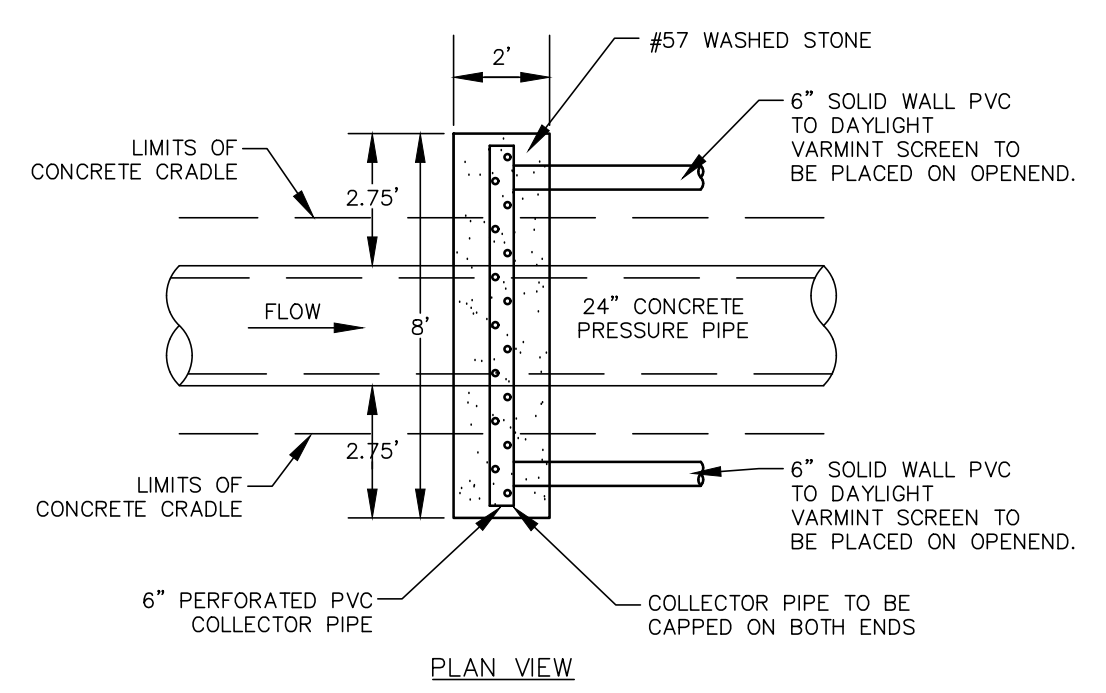


SECTION B-B

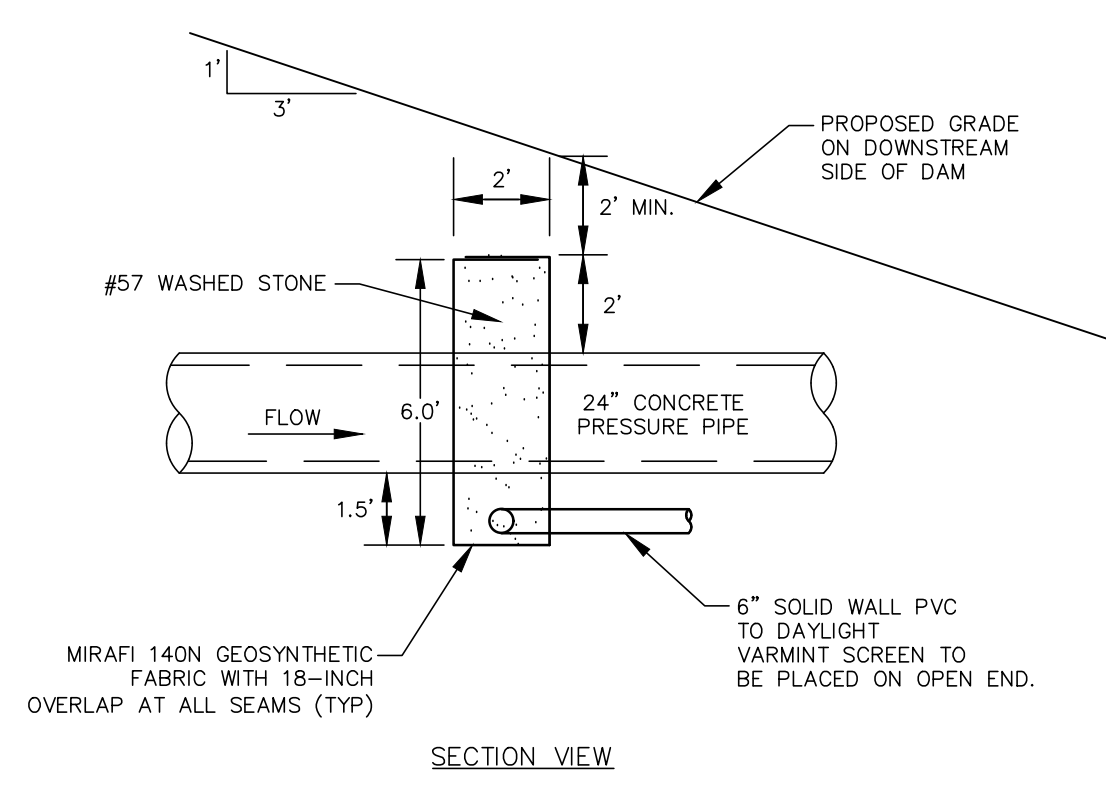
BMP #4	NORMAL POOL EL.	TOP DAM EL.	SPILLWAY BOTTOM EL.	SPILLWAY BOTTOM WIDTH
428.50	434.00	432.00	20'	

NOTE: EXPANSION/CONTRACTION JOINTS PER AMERICAN CONCRETE INSTITUTE (ACI) STANDARDS FOR SLABS ON GRADE.

EMERGENCY SPILLWAY DETAIL  
NTS

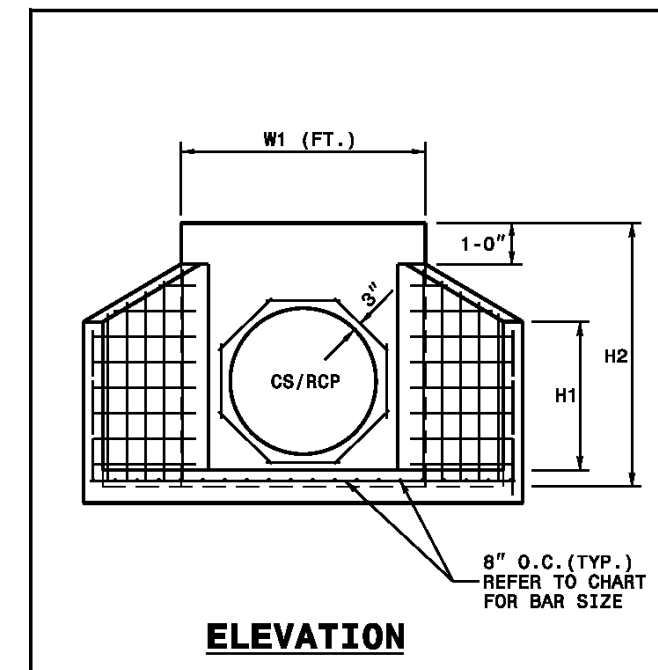


PLAN VIEW

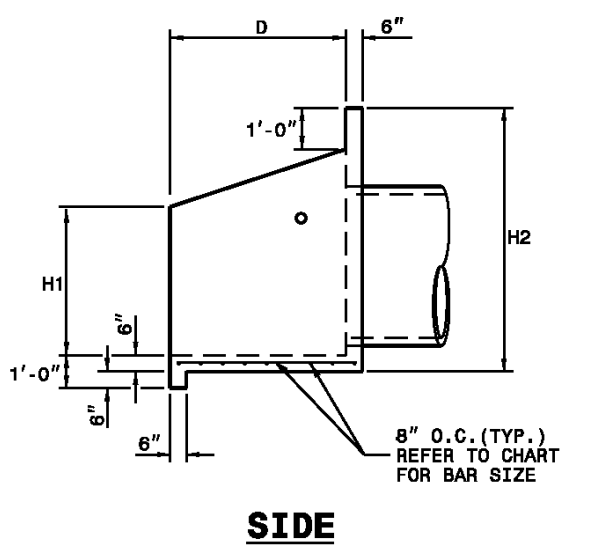


SECTION VIEW

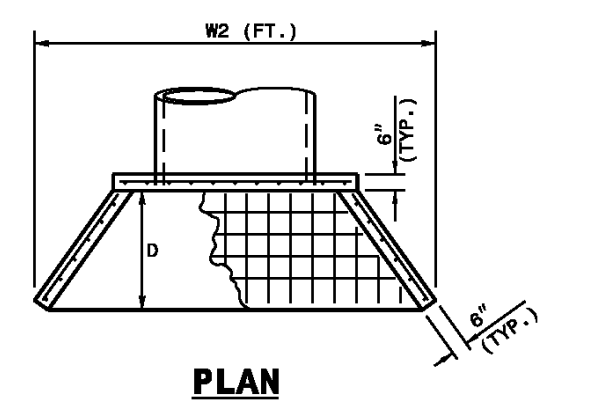
FILTER DIAPHRAGM DETAIL  
NTS



ELEVATION



SIDE



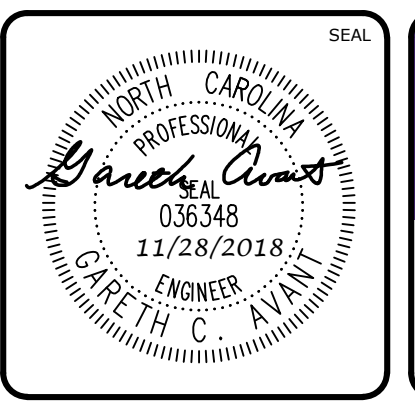
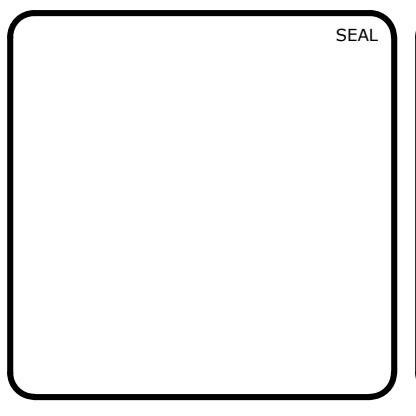
PLAN

ENDWALL DIMENSIONS							
PIPE DIA.	BAR SIZE	MIN./MAX. H1 (FT.)	MIN./MAX. H2 (FT.)	MIN./MAX. D (FT.)	MIN./MAX. W1	MIN./MAX. W2	
1.0	#5 @ 8"	1.25/2.00	2.00/3.75	1.25/1.75	3.00/3.75	5.50/6.00	
1.25	#5 @ 8"	1.25/2.00	3.00/3.75	1.25/2.00	3.50/3.75	6.50/6.75	
1.50	#5 @ 8"	1.25/2.00	3.00/4.25	1.50/2.50	3.50/3.75	6.50/6.75	
2.0	#5 @ 8"	1.50/2.50	4.00/4.75	1.75/2.50	4.00/4.25	7.50/8.25	
2.5	#5 @ 8"	2.50/3.50	4.00/6.00	2.00/3.00	4.50/5.00	10.00/11.50	
3.0	#5 @ 8"	3.00/3.50	5.00/6.00	2.75/3.50	5.25/5.75	11.50/11.75	
3.5	#5 @ 8"	3.25/4.50	6.00/6.75	3.25/3.50	6.00/6.75	12.00/13.25	
4.0	#5 @ 8"	3.50/4.50	6.50/7.00	3.25/3.50	6.50/6.75	13.00/13.25	
4.5	#5 @ 8"	4.00/5.00	6.50/8.50	3.25/4.00	7.00/8.25	13.50/15.75	
5.0	#5 @ 8"	4.50/5.00	7.00/8.50	3.25/4.00	7.25/8.25	13.75/15.75	
5.5	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.25/8.25	14.00/15.75	
6.0	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.75/8.25	14.75/16.75	

- NOTES:
- THIS PRECAST ENDWALL MAY BE USED FOR THE FOLLOWING STANDARDS: 838-01, 838-11, 838-21, 838-27, 838-35, 838-39, 838-51, 838-57, 838-63 AND 838-69.
  - INSTALL PRECAST ENDWALLS WITH WINGS AND PAY FOR IN ACCORDANCE WITH SPECIFICATION SECTION 816.
  - USE 4000 PSI CONCRETE.
  - PROVIDE ALL REINFORCING STEEL WHICH MEETS ASTM A618 FOR GRADE 60 AND WELDED WIRE FABRIC CONFORMING TO ASTM A185 WITH 2" MIN. CLEARANCE.
  - PLACE LIFT HOLES OR PINS IN ACCORDANCE WITH OSHA STANDARD 1926.704.
  - PIPE TO BE GROUDED INTO HEADWALL AT JOB SITE BY CONTRACTOR
  - ALL ELEMENTS PRECAST TO MEET ASTM C919.
  - WELDED WIRE FABRIC MAY BE SUBSTITUTED FOR REBAR AS LONG AS THE SAME AREA OF STEEL IS PROVIDED.
  - CHAMFER ALL CORNERS 1" OR HAVE A RADIUS OF 1".
- NOTE: THE MINIMUM BAR SIZE SHALL BE #6 BARS AT 9" CTS. THE CONTRACTOR WILL HAVE THE OPTION TO INCREASE THIS BAR SIZE AS NEEDED.

ROADWAY STANDARD DRAWING FOR  
 PRECAST CONCRETE ENDWALL  
 FOR SINGLE 12" THRU 72" PIPE - 90° SKEN  
 STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.  
 SHEET 1 OF 8  
**838-80**

REV. NO.	DATE	DESCRIPTION
4	2018.11.28	REVISIONS PER NCDOT COMMENTS
3	2018.11.27	REVISIONS PER NCDOT COMMENTS
2	2018.11.16	REVISIONS PER NCDOT
1	2018.10.02	REVISIONS PER COUNTY EROSION CONTROL AND STORMWATER, NCDSDQ P155
0	2018.08.17	INITIAL SUBMITTAL



**MCKIM & CREED**  
ENGINEERS SURVEYORS PLANNERS

1730 VARSITY DRIVE, SUITE 500 FIRM LICENSE #: F-1222  
 RALEIGH, NORTH CAROLINA 27606 mckimcreed.com  
 T 919.233.8091 F 919.233.8031

**RYAN'S CROSSING**  
Chatham County, North Carolina

**CONSTRUCTION PLAT**  
BMP #4 PLAN & DETAILS

DATE: AUGUST 17, 2018  
 MCE PROJ. # 07291-0002  
 DRAWN: BSS  
 DESIGNED: BSS  
 CHECKED: GCA  
 PROJ. MGR.: CHS

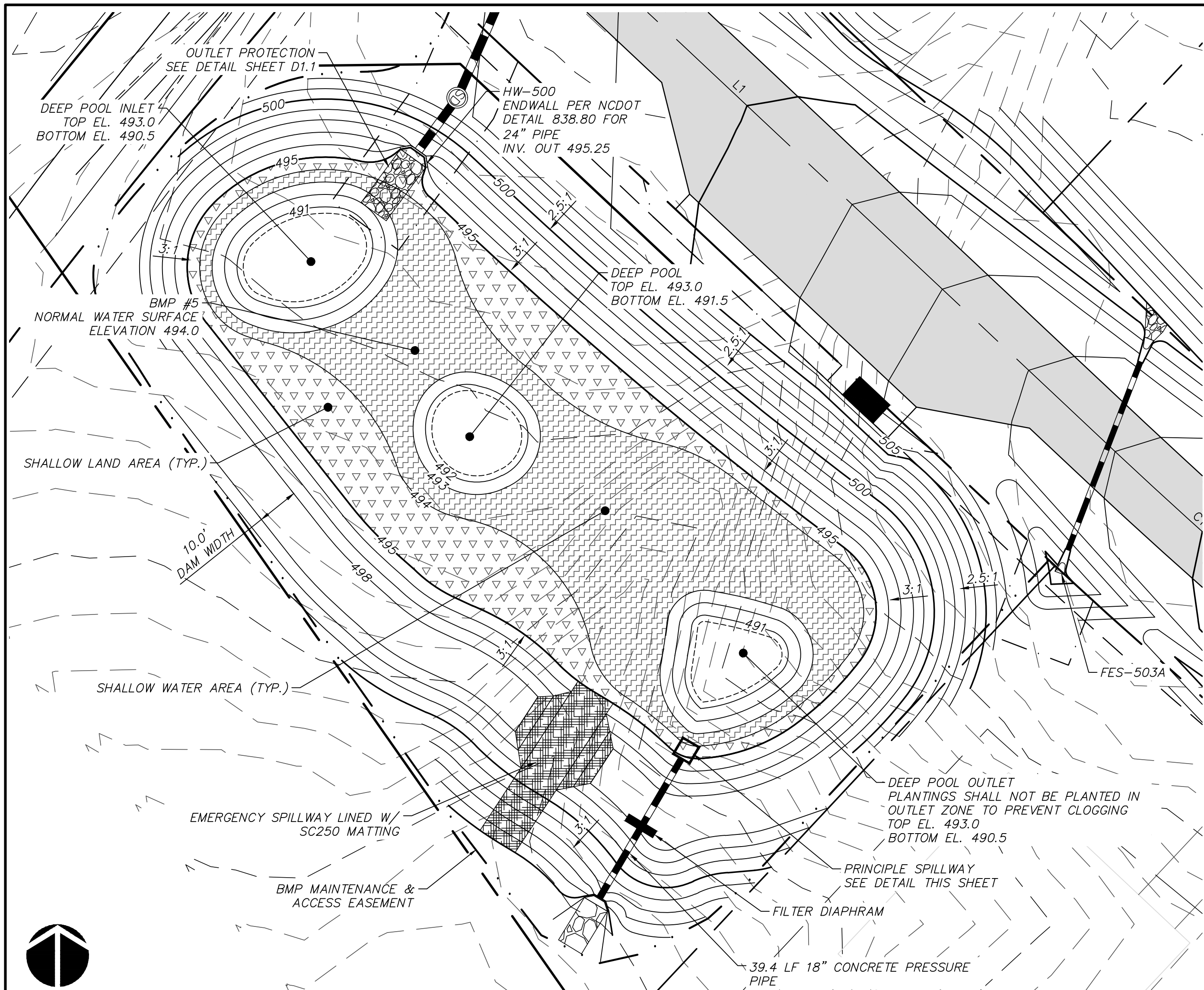
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 VERTICAL: N/A

M&C FILE NUMBER: D4.10  
 DRAWING NUMBER: D4.11

STATUS: PRELIMINARY FOR CONSTRUCTION  
 REVISION: 4







STORMWATER WETLAND PLANTING SCHEDULE

DEEP POOL ZONE: ALLOWABLE PLANT SPECIES

COMMON NAME	BOTANICAL NAME	DEPTH RANGE (INCHES BELOW NORMAL POOL)	SPACING (O.C., FT)	QUANTITY	PERCENTAGE	SIZE
SPATTERDOCK	NUPHAR POLYSPALUM	6-18	5	10	33%	2 IN PLUG (MIN)
FRAGRANT WHITE LILY	NYMPHAEA LUTEA	6-18	5	10	33%	2 IN PLUG (MIN)
AMERICAN LOTUS	NELUMBO LUTEA	6-18	5	10	33%	2 IN PLUG (MIN)

SHALLOW WATER ZONE: ALLOWABLE PLANT SPECIES

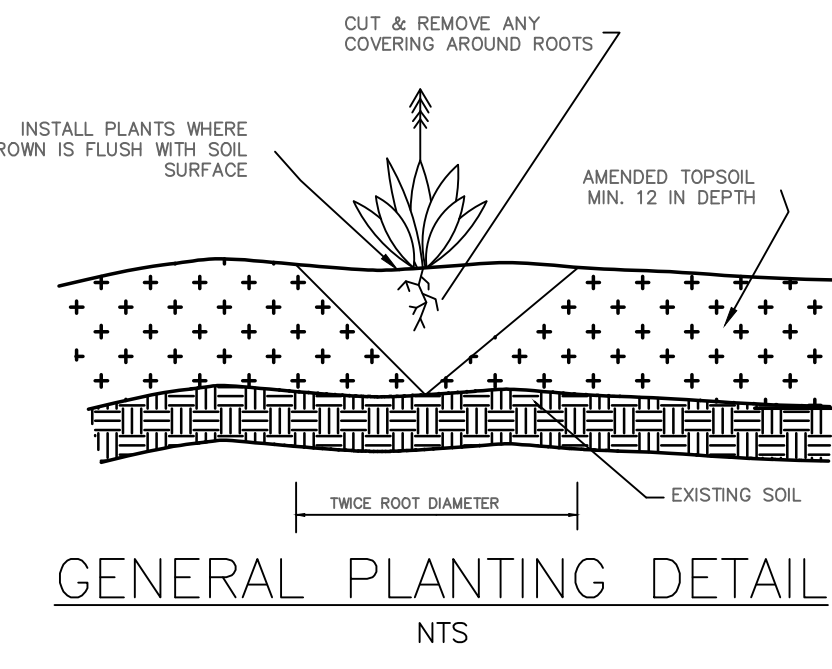
COMMON NAME	BOTANICAL NAME	DEPTH RANGE (INCHES BELOW NORMAL POOL)	SPACING (O.C., FT)	QUANTITY	PERCENTAGE	SIZE
ARROW ARUM	PELTANDRA VIRGINICA	0-6	2.0	129	10%	PINT
PICKERELWEED	PONTEDERIA CORDATA	0-6	2.0	129	10%	2 IN PLUG (MIN)
DUCK POTATO	SAGITTARIA LATIFOLIA	0-6	2.0	129	10%	BARE ROOT
SOFTSTEM BULRUSH	SCHOENOPLECTUS TABERNEMONTANI	0-6	2.0	129	10%	2 IN PLUG (MIN)
SWEETFLAG	ACORUS CALAMUS	0-6	2.0	129	10%	BARE ROOT
THREE WAY SEDGE	DULICHUM ARUNDINACEUM	0-6	2.0	129	10%	BARE ROOT
SPIKERUSH	ELEOCHARIS OBTUSA	0-6	2.0	129	10%	2 IN PLUG (MIN)
SOUTHERN BLUE FLAG IRIS	IRIS VIRGINICA	0-6	2.0	129	10%	2 IN PLUG (MIN)
LIZARD'S TAIL	SAURURUS CERNUUS	0-6	2.0	129	10%	3 IN PLUG (MIN)
SOFT RUSH	JUNCUS EFFUSUS	0-6	2.0	129	10%	2 IN PLUG (MIN)

SHALLOW LAND ZONE: ALLOWABLE PLANT SPECIES

COMMON NAME	BOTANICAL NAME	DEPTH RANGE (INCHES ABOVE NORMAL POOL)	SPACING (O.C., FT)	QUANTITY	PERCENTAGE	SIZE
SWAMP MILKWEED	ASCLEPIAS INCARNATA	0-12	2.0	79	9.0%	2 IN PLUG (MIN)
FRINGED SEDGE	CAREX CRINITA	0-12	2.0	79	9.0%	2 IN PLUG (MIN)
GREAT BLADDER SEDGE	CAREX INTUMESCENS	0-12	2.0	79	9.0%	2 IN PLUG (MIN)
HOP SEDGE	CAREX LUPULINA	0-12	2.0	79	9.0%	2 IN PLUG (MIN)
SHALLOW SEDGE	CAREX LURIDA	0-12	2.0	79	9.0%	2 IN PLUG (MIN)
SCARLET ROSE MALLOW	HIBISCUS COCCINEUS	0-12	2.0	79	9.0%	2 IN PLUG (MIN)
ROSE MALLOW	HIBISCUS MOSCHEutos	0-12	2.0	79	9.0%	2 IN PLUG (MIN)
SPIDER LILY	HYMENOCALLIS EULAE	0-12	2.0	79	9.0%	2 IN PLUG (MIN)
SWAMP LILY	CRINUM ERUBESCENS	0-12	2.0	79	9.0%	2 IN PLUG (MIN)
CARDINAL FLOWER	LOBELIA CARDINALIS	0-12	2.0	79	9.0%	2 IN PLUG (MIN)
SWAMP SUNFLOWER	HELIANTHUS ANGIUSTIFOLIUS	0-12	2.0	79	9.0%	2 IN PLUG (MIN)

STORMWATER WETLAND PLANTING LEGEND:

- DEEP POOL (6" BELOW - 30" BELOW)
- SHALLOW WATER (NORMAL POOL - 6" BELOW)
- SHALLOW LAND (NORMAL POOL - 12" ABOVE)



STORMWATER WETLAND PLANTING NOTES

- GENERAL PLANTING NOTES**
1. AVOID COMPACTING TOPSOIL TO PROMOTE HEALTHY ENVIRONMENTAL CONDITIONS FOR THE PLANTS.
  2. PLANTS OF THE SAME SPECIES SHOULD BE PLANTED IN CLUSTERS, THESE CLUSTERS SHOULD CONTAIN MIN. 4-6 PLANTS OF THAT SPECIES.
  3. ALL PLANTS SHOULD BE PLANTED IN THE INDICATED RANGE TO ENSURE SURVIVAL.
  4. AVOID PLANTING INDIVIDUAL SPECIES IN LARGE GROUPS BY SPACING CLUSTERS A MIN. OF 5' APART.
  5. SHALLOW WATER AND SHALLOW LAND AREAS TO BE PLANTED WITH BARE ROOT, PLUGS, OR CONTAINER LIVE PLANTINGS AS SPECIFIED.
  6. EXCAVATE A HOLE TWICE THE DIAMETER OF ROOT BALL AND EQUAL TO THE ROOT DEPTH OF THE INDIVIDUAL PLANT. PLACE PLANT IN HOLE WITH CROWN FLUSH WITH SOIL SURFACE. BACKFILL WITH TOPSOIL AND LIGHTLY PLANT.
  7. BEGIN PLANTING DURING LOCAL GROWING SEASON IN ORDER TO ENSURE THAT PLANTS HAVE ADEQUATE TIME TO ESTABLISH BEFORE WINTER MONTHS.
  8. OBTAIN PLANTS FROM: COASTAL PLAIN CONSERVATION NURSERY (252-482-5707), MELLOW MARSH FARMS (919-742-1200), CURE NURSERY (919-542-6186) OR ENGINEER APPROVED SUBSTITUTE.

**SHALLOW WATER PLANTING NOTES:**

1. 70% OF SOFT STEM BULRUSH SHOULD BE PLANTED WITHIN 3-4 INCHES BELOW NORMAL POOL.
2. 70% OF PICKERELWEED AND 70% OF ARROW ARUM SHOULD BE PLANTED WITHIN 5-6 INCHES BELOW NORMAL POOL.
3. SEDGES SHOULD BE PLANTED WITHIN 0-2 INCHES BELOW NORMAL POOL.
4. 70% OF SWEETFLAG, 70% OF LIZARDS TAIL, AND 70% OF SOUTHERN BLUE FLAG IRIS SHOULD BE PLANTED IN THE 2-3 INCHES BELOW NORMAL POOL.
5. 70% OF SOFT RUSH SHOULD BE PLANTED AT THE NORMAL POOL ELEVATION.

**SHALLOW LAND PLANTING NOTES:**

1. PLANTS IN THIS GROUP SHOULD NOT BE PLANTED IN AREAS THAT ARE INUNDATED FOR EXTENDED PERIODS.
2. 70% OF CARDINAL FLOWER AND 70% OF BLUE LOBELIA SHOULD BE PLANTED WITHIN 0-1 INCH OF THE NORMAL POOL ELEVATION.

**DEEP POOL PLANTING NOTES:**

1. ENSURE ALL PLANTS ARE PLACED IN WATER NO DEEPER THAN 24 INCHES BELOW NORMAL POOL.

**GRADING PLAN NOTES:**

1. WETLAND MUST BE STABILIZED WITHIN 14 DAYS OF CONSTRUCTION
2. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR LOCATING AND PROTECTION OF EXISTING ABOVE AND BELOW GROUND UTILITIES AND STRUCTURES. ANY AND ALL MAINS OR INDIVIDUAL SERVICES LINES PRESENTLY IN SERVICE WHICH ARE DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED IMMEDIATELY AT NO ADDITIONAL EXPENSE TO THE UTILITY OWNER.
3. CONTRACTOR SHALL KEEP ALL PARKING AREAS AND STREETS ADJACENT TO THE CONSTRUCTION SITE CLEAN AND OPEN AT ALL TIMES DURING CONSTRUCTION.
4. ALL SHALLOW WATER AND SHALLOW LAND AREAS WITHIN THE WETLAND CELL SHALL BE TOP DRESSED WITH A MINIMUM OF 12 IN OF TOPSOIL.
5. ALL ITEMS WHICH ARE SHOWN FOR REMOVAL SHALL BE REMOVED FROM THE CONSTRUCTION SITE AND LEGALLY DISPOSED OF OFF SITE.
6. CONTRACTOR SHALL AT ALL TIMES MAINTAIN ADEQUATE SAFETY MEASURES, ACTIVITIES, AND BARRICADES FOR THE PROTECTION OF ALL PERSONS ON OR ABOUT THE LOCATION OF THE SITE.
7. GRADE TO ELEVATIONS AND DIMENSIONS SHOWN ON DRAWINGS. ELEVATIONAL GRADING TOLERANCE IS ±0.1 FT.
8. NO GRADING IS TO OCCUR IN THE DEEP POOL AREAS BEYOND THE SPECIFIED GRADING LIMITS.

**TOPSOIL SPECIFICATION:**

1. TOPSOIL TO BE ADDED TO TOP OF WETLAND SHELF IS TO MEET CRITERIA SPECIFIED BELOW.
2. TOPSOIL SHALL BE WELL MIXED, FREE OF TRASH AND DEBRIS, UNCOMPACTED, AND VOID OF LARGE STONES (>2 INCHES) AND WOODY MATERIAL (>3 INCHES).
3. TOPSOIL SHALL MEET THE FOLLOWING SPECIFICATIONS:  
SOIL TYPE: CLAY < 60%, SAND < 80%, SILT < 80%  
ORGANIC CONTENT: 5-8%  
P-I: 20<50  
PH: 6.0-7.0
4. IN THE EVENT THAT SELECTED TOPSOIL DOES NOT MEET SPECIFICATION LISTED ABOVE, SOIL CAN BE AMENDED BY ADDITION OF APPROPRIATE MATERIALS (MASON SAND OR MATURE STABLE COMPOST, OR LIME).
5. UPON PLACEMENT OF TOPSOIL, AREA SHOULD BE LIGHTLY COMPACTED TO ENSURE STABILIZATION OF MATERIAL.
6. EXCESSIVE TRAFFICKING OF EQUIPMENT OVER WETLAND PLANTING AREAS SHOULD BE AVOIDED.
7. MINIMUM DEPTH OF TOPSOIL SHOULD BE 12 INCHES.

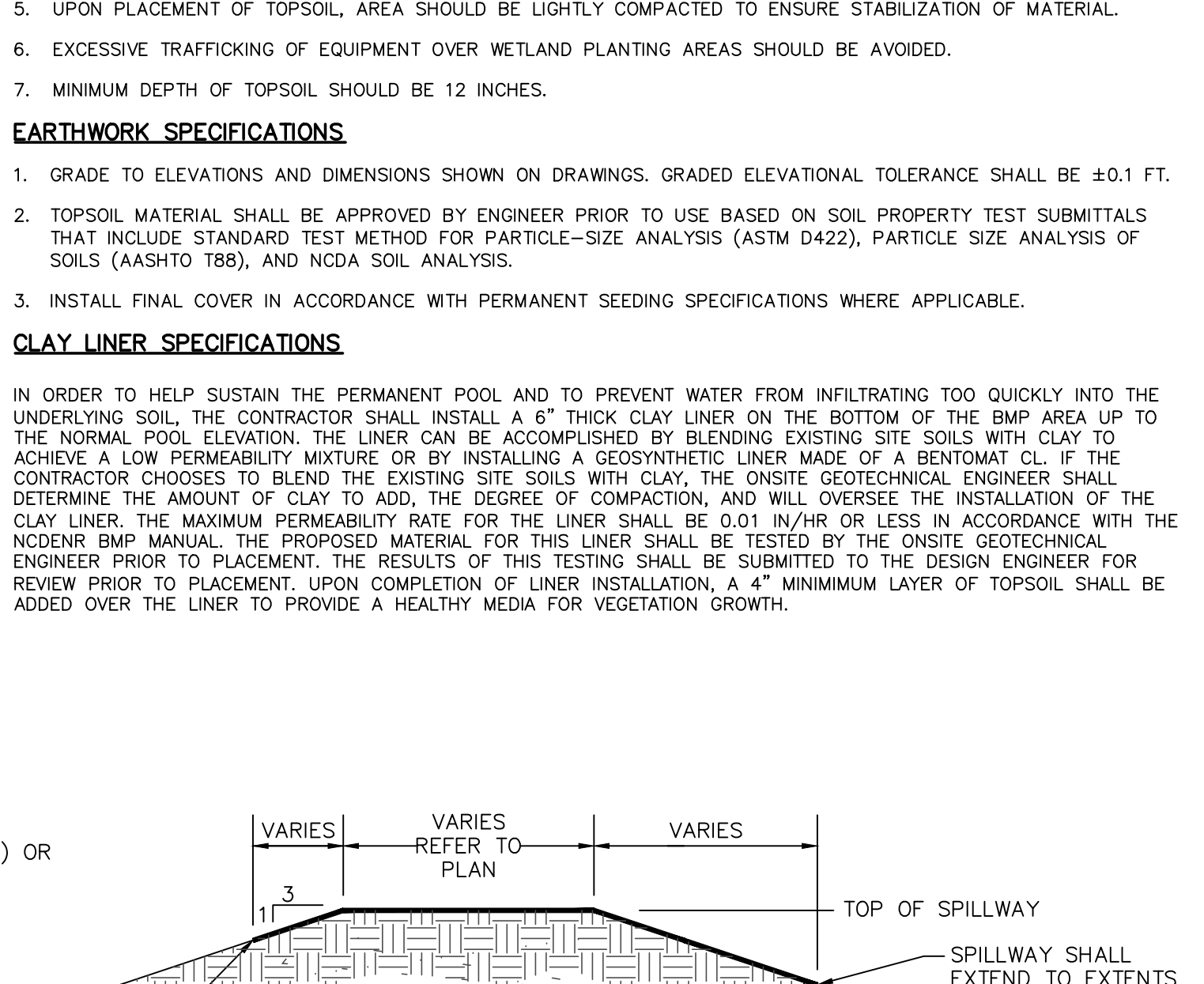
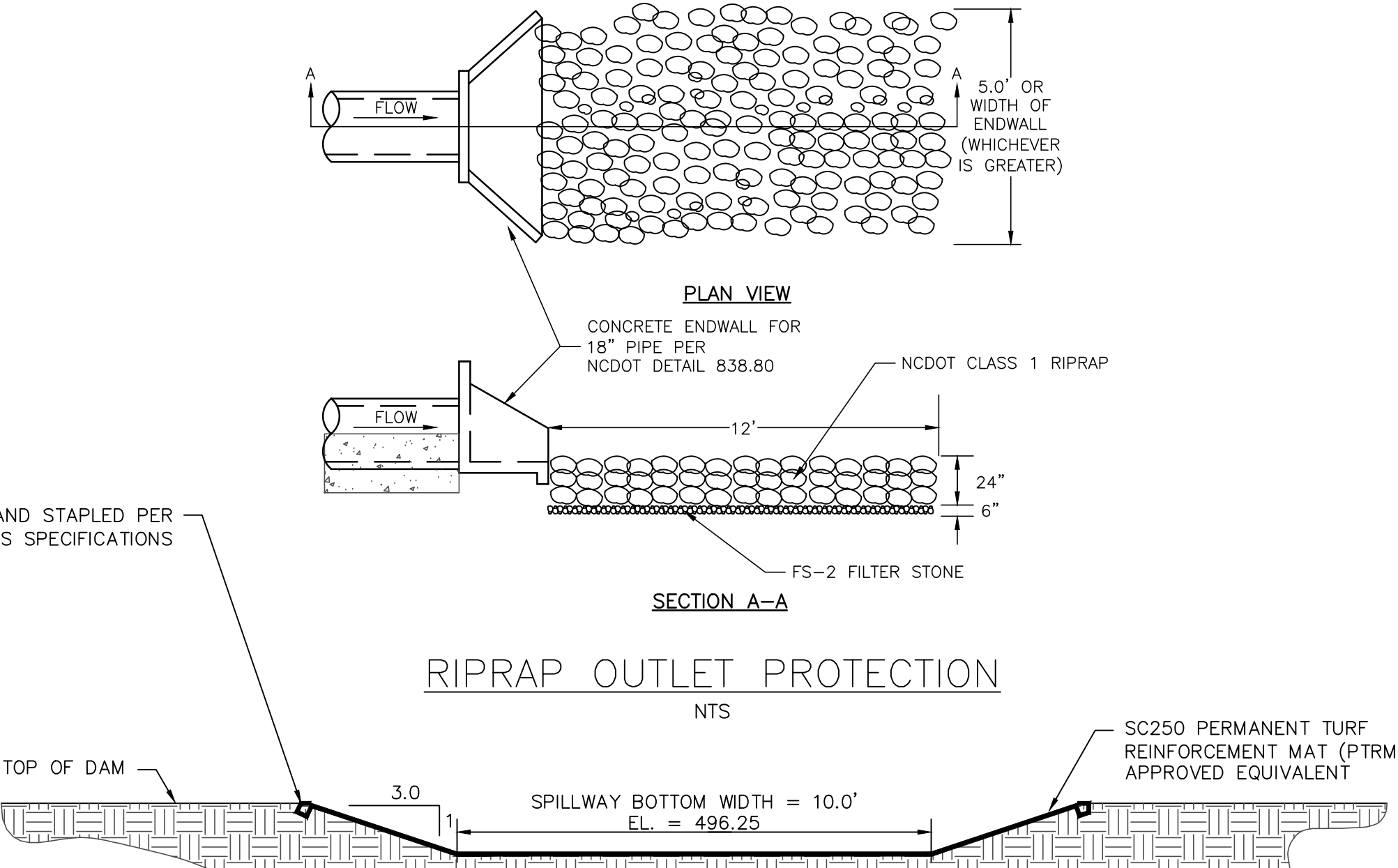
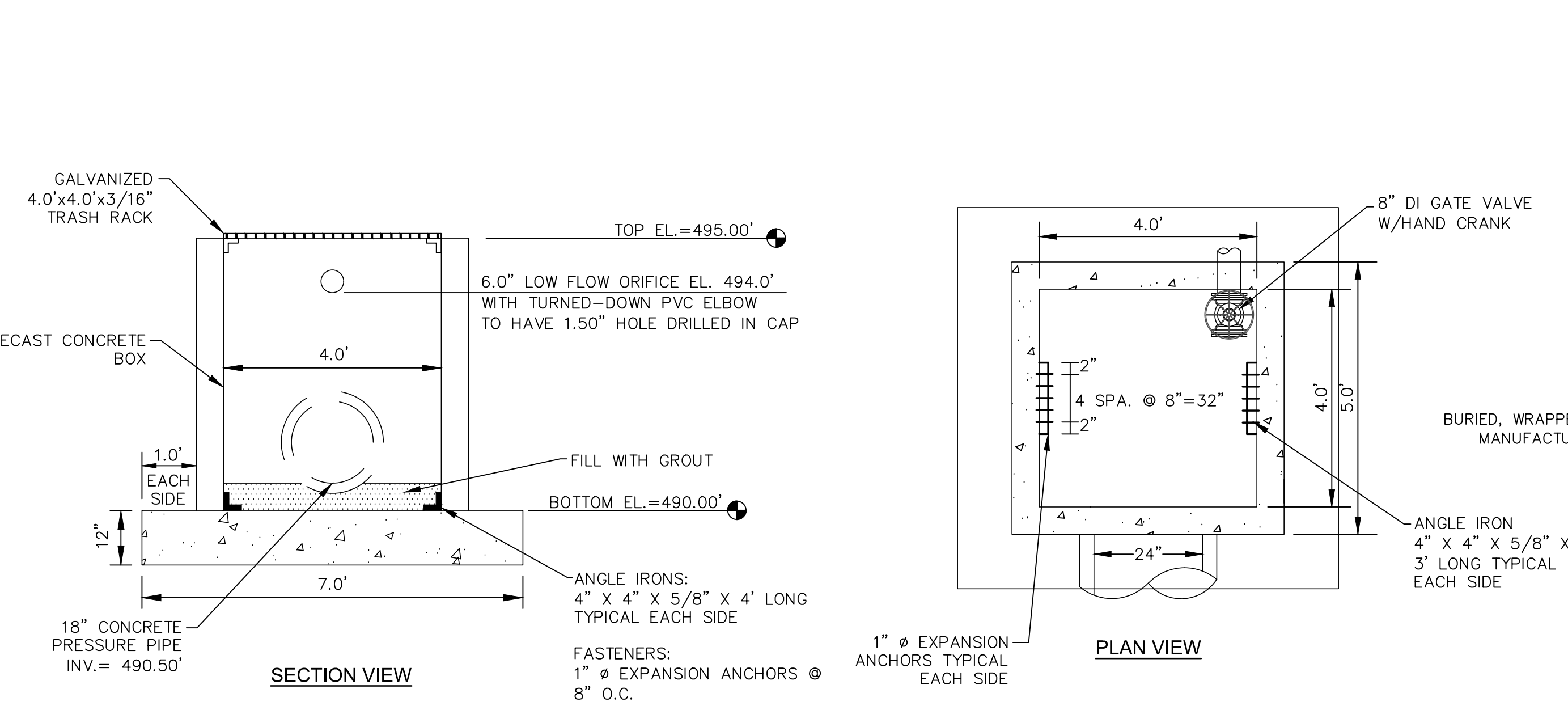
**EARTHWORK SPECIFICATIONS**

1. GRADE TO ELEVATIONS AND DIMENSIONS SHOWN ON DRAWINGS. GRADED ELEVATIONAL TOLERANCE SHALL BE ±0.1 FT.
2. TOPSOIL MATERIAL SHALL BE APPROVED BY ENGINEER PRIOR TO USE BASED ON SOIL PROPERTY TEST SUBMITTALS THAT INCLUDE STANDARD TEST METHOD FOR PARTICLE-SIZE ANALYSIS (ASTM D422), PARTICLE SIZE ANALYSIS OF SOILS (AASHTO T88), AND NCDA SOIL ANALYSIS.
3. INSTALL FINAL COVER IN ACCORDANCE WITH PERMANENT SEEDING SPECIFICATIONS WHERE APPLICABLE.

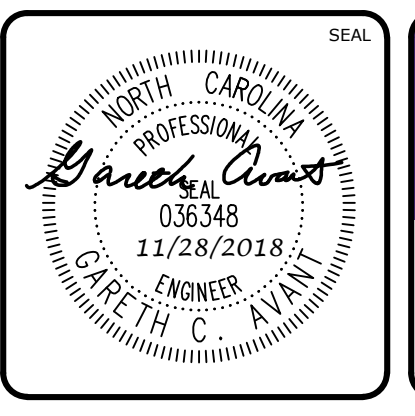
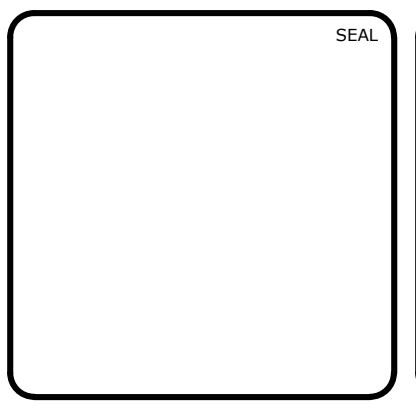
**CLAY LINER SPECIFICATIONS**

IN ORDER TO HELP SUSTAIN THE PERMANENT POOL AND TO PREVENT WATER FROM INFILTRATING TOO QUICKLY INTO THE UNDERLYING SOIL, THE CONTRACTOR SHALL INSTALL A 6" THICK CLAY LINER ON THE BOTTOM OF THE BMP AREA UP TO THE NORMAL POOL ELEVATION. THE LINER CAN BE ACCOMPLISHED BY BLENDING EXISTING SITE SOILS WITH CLAY TO ACHIEVE A LOW PERMEABILITY MIXTURE OR BY INSTALLING A GEOSYNTHETIC LINER MADE OF A BENTONITE CL. IF THE CONTRACTOR CHOOSES TO BLEND THE EXISTING SITE SOILS WITH CLAY, THE ONSITE GEOTECHNICAL ENGINEER SHALL DETERMINE THE AMOUNT OF CLAY TO ADD, THE DEGREE OF COMPACTION, AND WILL OVERSEE THE INSTALLATION OF THE CLAY LINER. THE MAXIMUM PERMEABILITY RATE FOR THE LINER SHALL BE 0.01 IN/HR OR LESS IN ACCORDANCE WITH THE NCDNR BMP MANUAL. THE PROPOSED MATERIAL FOR THIS LINER SHALL BE TESTED BY THE ONSITE GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT. THE RESULTS OF THIS TESTING SHALL BE SUBMITTED TO THE DESIGN ENGINEER FOR REVIEW PRIOR TO PLACEMENT. UPON COMPLETION OF LINER INSTALLATION, A 4" MINIMUM LAYER OF TOPSOIL SHALL BE ADDED OVER THE LINER TO PROVIDE A HEALTHY MEDIA FOR VEGETATION GROWTH.

STORMWATER WETLAND #5 PLAN VIEW  
SCALE = 1" = 20'



REV. NO.	DESCRIPTIONS	DATE
4	REVISIONS PER NCDOT COMMENTS	2018.11.28
3	REVISIONS PER NCDOT COMMENTS	2018.11.27
2	REVISIONS PER NCDOT	2018.11.16
1	REVISIONS PER COUNTY EROSION CONTROL AND STORMWATER, NCDCE PWS	2018.10.02
0	INITIAL SUBMITTAL	2018.08.17



**MCKIM & CREED**  
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FIRM LICENSE #: F-1222  
mckimcreed.com

**RYAN'S CROSSING**  
Chatham County, North Carolina

**CONSTRUCTION PLAT**  
BMP #5 PLAN & DETAILS

DATE: AUGUST 17, 2018  
MCE PROJ. #: 07291-0002  
DRAWN: BSS  
DESIGNED: BSS  
CHECKED: GCA  
PROJ. MGR.: CHS

SCALE: HORIZONTAL: AS NOTED  
VERTICAL: N/A

M&C FILE NUMBER: D4.13  
DRAWING NUMBER: D4.13

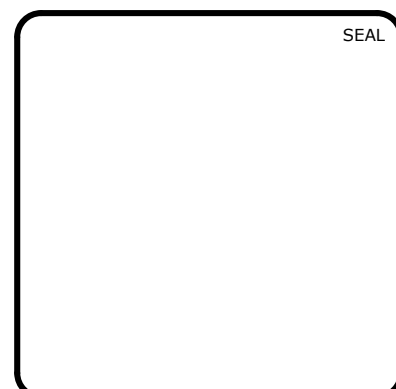
STATUS: PRELIMINARY FOR CONSTRUCTION  
REVISION: 4

STORM DRAINAGE SUMMARY TABLE							
UPSTREAM STRUCTURE	DOWNSTREAM STRUCTURE	UPSTREAM INVERT	DOWNSTREAM INVERT	PIPE DIAMETER	PIPE MATERIAL	LENGTH (ft)	SLOPE
BOX CULVERT	BOX CULVERT	433.90	433.30	BOX CULVERT	BOX CULVERT	69.1	0.87%
2GI-102	SDMH-101	457.00	454.50	24"	* RCP CLASS IV	72.5	3.45%
2GI-201	HW-200	457.00	453.00	36"	RCP	71.8	5.57%
2GI-303	SDMH-302	445.80	444.90	24"	RCP	83.4	1.08%
2GI-402	SDMH-401	434.50	432.00	36"	RCP	132.1	1.89%
FES-02	FES-01	498.75	498.20	24"	RCP	49.3	1.12%
FES-11	FES-10	448.75	444.00	30"	RCP	75.6	6.28%
FES-21	HW-20	456.00	452.00	24"	* RCP CLASS IV	62.2	6.43%
FES-103	2GI-102	459.75	457.10	24"	* RCP CLASS IV	46.1	5.74%
FES-202	2GI-201	463.75	461.95	30"	RCP	48.7	3.70%
FES-203	2GI-201	467.50	462.50	18"	* RCP CLASS IV	100.9	4.95%
FES-304	2GI-303	448.70	445.90	18"	RCP	45.4	6.17%
FES-403	2GI-402	437.25	435.30	30"	RCP	64.8	3.01%
FES-502	SDMH-501	498.75	498.00	24"	* RCP CLASS IV	71.7	1.05%
FES-503A	FES-503B	504.75	504.40	15"	RCP	48.4	0.72%
SDMH-101	HW-100	452.00	450.00	24"	RCP	33.9	5.90%
SDMH-301	HW-300	438.00	437.00	24"	RCP	75.7	1.32%
SDMH-302	SDMH-301	444.80	441.00	24"	RCP	219.7	1.73%
SDMH-401	HW-400	429.50	429.00	36"	RCP	41.5	1.20%
SDMH-501	HW-500	496.00	495.25	24"	RCP	15.8	4.74%

\*ALL PIPE RUNS ARE TO BE RCP CLASS III UNLESS OTHERWISE NOTED ABOVE

STORM DRAINAGE STRUCTURE SUMMARY	
STRUCTURE	RIM ELEVATION
2GI-102	463.31
2GI-201	468.27
2GI-303	451.20
2GI-402	439.59
FES-01	500.53
FES-02	501.08
FES-10	446.88
FES-11	451.62
FES-21	458.33
FES-103	462.79
FES-202	466.62
FES-203	469.29
FES-304	450.49
FES-403	440.12
FES-502	501.18
FES-503A	506.27
FES-503B	505.92
HW-20	454.71
HW-100	453.25
HW-200	457.33
HW-300	439.71
HW-400	433.33
HW-500	497.95
SDMH-101	459.48
SDMH-301	446.04
SDMH-302	451.59
SDMH-401	437.86
SDMH-501	503.37

REV. NO.	DESCRIPTIONS	DATE
4	REVISIONS PER NCDOT COMMENTS	2018.11.28
3	REVISIONS PER NCDOT COMMENTS	2018.11.27
2	REVISIONS PER NCDOT	2018.11.16
1	REVISIONS PER COUNTY EROSION CONTROL AND STORMWATER, NCDSD PHSS	2018.10.02
0	INITIAL SUBMITTAL	2018.08.17



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**RYAN'S CROSSING**  
Chatham County, North Carolina

**CONSTRUCTION PLAT**

STORM DRAINAGE TABLES

DATE: AUGUST 17, 2018	SCALE	MAC FILE NUMBER
MCE PROJ. # 07291-0002	HORIZONTAL: N/A	D4.4
DRAWN BSS	VERTICAL: N/A	D4.14
DESIGNED BSS		
CHECKED GCA		
PROJ. MGR. CHS		

STATUS: PRELIMINARY FOR CONSTRUCTION	REVISION: 4
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